



SAR TEST REPORT

HCT CO., LTD



EUT Type:	Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN and NFC(Felica)	
FCC ID:	ZNFL02E	
Model:	L-02E	
Date of Issue:	Oct.12, 2012	
Test report No.:	HCTA1210FS03	
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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.	
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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 (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). 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).

where:

SAR	=	$\sigma E^2 / \rho$
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	Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN and NFC(Felica)			
FCC ID:	ZNFL02E			
Model:	L-02E			
Trade Name	LG Electronics, MobileComm U.S.A., Inc.			
Application Type	Certification			
Mode(s) of Operation	GSM850/GSM1900/WCDMA850/802.11a/b/g/n			
Tx Frequency	824.20 - 848.80 MHz (GSM850) /1 850.20 – 1 909.80 MHz (GSM1900) 826.4-846.6 MHz (WCDMA850)/ 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	869.20 - 893.80 MHz (GSM850)/ 1 930.20 – 1 989.80 MHz (GSM1900) 871.4 - 891.6 MHz (WCDMA850)/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
	GSM850	0.318	0.575	0.598
	GSM1900	0.155	0.335	0.335
	WCDMA850	0.426	0.587	0.677
	802.11b	0.193	0.048	0.049
	802.11a	0.125	0.197	-
Simultaneous SAR per KDB 690783 D01		0.527	0.784	0.723
Date(s) of Tests	Oct. 8, 2012 ~ Oct. 11, 2012			
Antenna Type	Integral Antenna			
GPRS	Multislot Class: 12, 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.

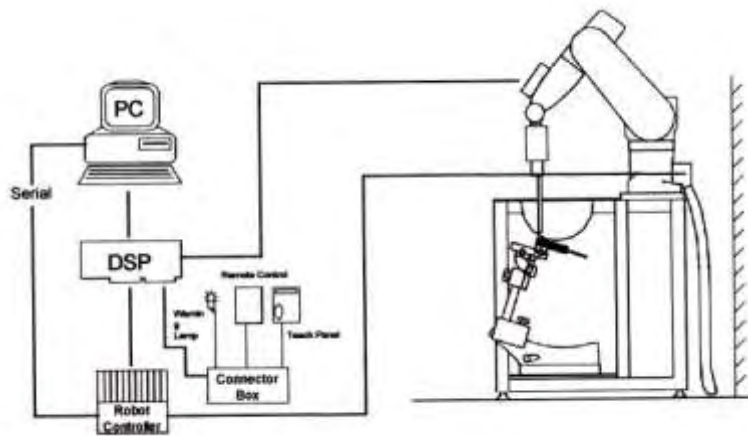


Figure 3.1 HCT SAR Lab. Test Measurement Set-up

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 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 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 2nd 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/cm³ for brain tissue)

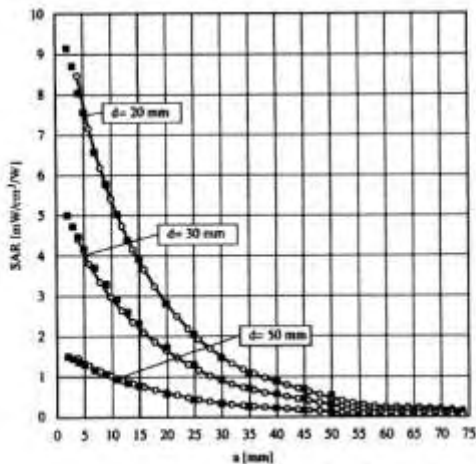


Figure 3.4 E-Field and Temperature measurements at 900 MHz

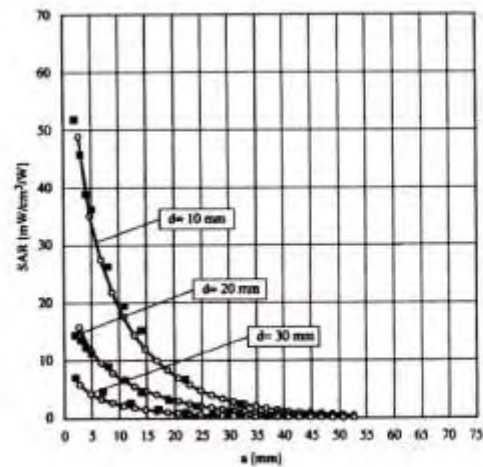


Figure 3.5 E-Field and temperature measurements at 1.8 GHz

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/cm³

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

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

with P_{pwr} = equivalent power density of a plane wave in W/cm²
 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	810 mm x 1 000 mm x 500 mm (H x L x W)

Triple Modular Phantom consists of three identical modules which can be installed and removed separately without emptying the liquid. It includes three reference points for phantom installation. Covers prevent evaporation of the liquid. Phantom material is resistant to DGBE based tissue simulating liquids. The MFP V5.1 will be delivered including wooden support only (**non**-standard SPEAG support).

Applicable for system performance check from 700 MHz to 6 GHz (MFP V5.1C) or 800 MHz - 6 GHz (MFP V5.1A) as well as dosimetric evaluations for body-worn operation.

Figure 3.6 MFP V5.1 Triple Modular Phantom

Shell Thickness	2.0 mm ± 0.2 mm
Filling Volume	approx. 9.2 L
Dimensions	830 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 repeatably 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 bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissue simulating liquids are according to the data by C. Gabriel and G. Hartsgrove.

Ingredients (% by weight)	Frequency (MHz)										
	750		835		915		1 900		2 450		5200-5800
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body	Body
Water	41.2	51.7	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2	78.66
Salt (NaCl)	1.4	1.0	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04	0.0
Sugar	57	47.2	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0	0.0
HEC	0.2	0.0	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0	0.0
Bactericide	0.2	0.1	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0	0.0
Triton X-100	0.00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0	10.67
DGBE	0.00	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7	0.0
Diethylene glycol hexyl ether											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	912	Nov. 17, 2011	Annual	Nov. 17, 2012
SPEAG	E-Field Probe EX3DV4	3863	July 13, 2012	Annual	July 13, 2013
SPEAG	E-Field Probe ET3DV6	1630	Nov. 18, 2011	Annual	Nov. 18, 2012
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	Aug. 20, 2012	Annual	Aug. 20, 2013
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 778D	16072	Nov. 04, 2011	Annual	Nov. 04, 2012
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/body 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/body-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.
5. For 5GHz testing finer resolution zoom scans were performed as specified by FCC SAR Measurement Requirements for 3 -6 GHz, KDB pub 865664. The 5GHz zoom scan requires a minimum volume of 24mm x 24mm x 20mm and 7 x 7 x 11 points.

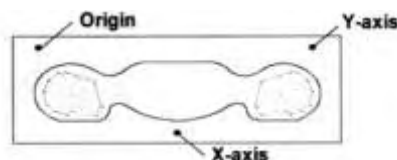


Figure 4.1 SAR Measurement Point in Area Scan

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

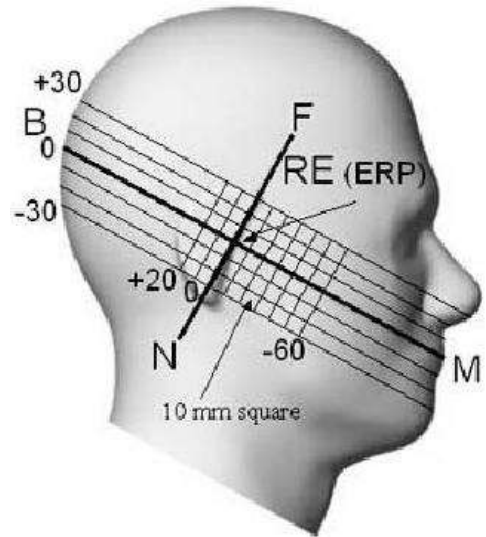


Figure 5.1 Side view of the phantom

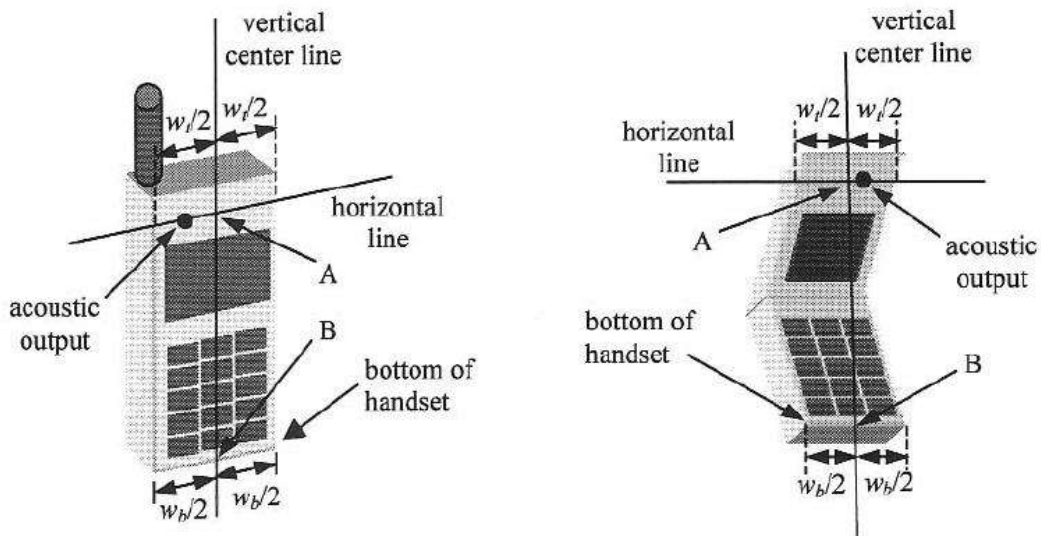


Figure 5.2 Handset vertical and horizontal reference lines

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 Permittivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permittivity(meas.)	5.02	N	1	0.6	3.01	9
Combine 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 Permittivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permittivity(meas.)	5.02	N	1	0.6	3.01	9
Combine 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	Oct.08, 2012	Head	21.2	ϵ_r	41.5	40.4	- 2.65	± 5
				σ	0.90	0.918	+ 2.00	± 5
Body		ϵ_r		55.2	54.3	- 1.63	± 5	
		σ		0.97	1.01	+ 4.12	± 5	
1 900	Oct.09, 2012	Head	21.1	ϵ_r	40.0	40.9	+ 2.25	± 5
				σ	1.40	1.37	- 2.14	± 5
Body		ϵ_r		53.3	52.3	- 1.88	± 5	
		σ		1.52	1.55	+ 1.97	± 5	
2 450	Oct.11, 2012	Head	21.1	ϵ_r	39.2	39	- 0.51	± 5
				σ	1.80	1.79	- 0.56	± 5
Body		ϵ_r		52.7	53.8	+ 2.09	± 5	
		σ		1.95	1.99	+ 2.05	± 5	
5 500	Oct.10, 2012	Head	21.2	ϵ_r	35.6	35.7	+ 0.28	± 5
				σ	4.96	4.83	- 2.62	± 5
Body		ϵ_r		48.6	46.5	- 4.32	± 5	
		σ		5.65	5.58	- 1.24	± 5	
5 800		Head		ϵ_r	35.3	34.9	- 1.13	± 5
				σ	5.27	5.24	- 0.57	± 5
5 800		Body		ϵ_r	48.2	46.2	- 4.15	± 5
				σ	6.00	6.17	+ 2.83	± 5

The Tissue dielectronic parameters were verified 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 $\pm 10\%$ of the specifications at 835 MHz / 1 900 MHz / 2 450 MHz / 5 GHz 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	Oct.08, 2012	1630	Head	21.4	21.2	9.43	0.961	9.61	+ 1.91	± 10
835			Body			9.50	0.965	9.65	+ 1.58	± 10
1 900	Oct.09, 2012		Head	21.3	21.1	39.0	3.96	39.6	+ 1.54	± 10
1 900			Body			39.9	4.0	40	+ 0.25	± 10
2 450	Oct.11, 2012		Head	21.3	21.1	52.7	5.27	52.7	0.00	± 10
2 450			Body			51.2	5.16	51.6	+ 0.78	± 10
5 500	Oct.10, 2012	3863	Head	21.4	21.2	82.2	8.11	81.1	- 1.34	± 10
5 500			Body			78.5	7.96	79.6	+ 1.40	± 10
5 800			Head			77.6	7.66	76.6	- 1.29	± 10
5 800			Body			74.6	7.57	75.7	+ 1.47	± 10

8.3 System Validation Procedure

SAR measurement was prior to assessment, the system is verified to the $\pm 10\%$ 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 than 5 % occurred, the tests were repeated.

9.1 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 Class33 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)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)
GSM 850	128	32.97	32.97	31.06	30.02	28.40
	190	32.95	32.95	31.07	29.98	28.56
	251	32.95	32.95	31.06	30.10	28.64
GSM 1900	512	30.17	30.15	28.18	26.59	25.04
	661	30.17	30.16	28.12	26.64	25.05
	810	29.96	29.96	27.90	26.51	24.93

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)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)
GSM 850	128	23.85	23.91	24.44	24.64	25.01
	190	23.95	24.02	24.54	24.67	25.19
	251	23.9	23.93	24.47	24.57	24.69
GSM 1900	512	20.85	20.95	22.53	22.05	22.04
	661	20.87	20.96	22.38	22.06	22.1
	810	20.92	20.93	22.41	22.04	21.97

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 $\leq 75\%$ 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	$\beta_{hs}^{(2)}$	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 $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
 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 $\beta_c = 11/15$ and $\beta_d = 15/15$.

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	$\beta_{hs}^{(1)}$	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	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
 Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCCH, 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 $\beta_c = 10/15$ and $\beta_d = 15/15$.
 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 $\beta_c = 14/15$ and $\beta_d = 15/15$.
 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	Mode	3GPP 34.121	Cellular Band [dBm]						MPR Target
		Subtest	4132	Power reduction (dB)	4183	Power reduction (dB)	4233	Power reduction (dB)	
Version									
99	WCDMA	12.2 kbps RMC	23.94		23.88		23.85		-
99	WCDMA	12.2 kbps AMR	23.9		23.83		23.81		
5	HSDPA	Subtest 1	22.91		22.86		22.85		0
5		Subtest 2	22.89	0.02	22.83	0.03	22.84	0.01	0
5		Subtest 3	22.4	0.51	22.42	0.44	22.34	0.51	0.5
5		Subtest 4	22.4	0.51	22.38	0.48	22.36	0.49	0.5
6	HSUPA	Subtest 1	22.16		22.13		22.22		0
6		Subtest 2	21.84	0.32	21.84	0.29	21.75	0.47	2
6		Subtest 3	21.39	0.77	21.44	0.69	21.33	0.89	1
6		Subtest 4	21.9	0.26	21.95	0.18	21.91	0.31	2
6		Subtest 5	22.17	-0.01	22.31	-0.18	22.2	0.02	0

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

802.11 a/b/g and 4.9 GHz operating modes are tested independently according to the service requirements in each frequency band. 802.11 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"		
				§15.247 802.11b	802.11g	UNII
802.11 b/g	2.412	1		√	∇	
	2.437	6	6	√	∇	
	2.462	11		√	∇	
802.11a	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				=
	5.580	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		√		√
	5.785	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	15.40	15.37	15.42	15.22
	6	15.75	15.79	15.78	15.32
	11	15.81	15.80	15.76	15.55

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	9.25	9.17	9.05	8.89	8.65	8.35	8.07	7.40
	6	10.06	9.95	9.82	9.63	9.35	9.09	8.79	8.70
	11	10.31	10.20	10.10	9.92	9.66	9.29	9.00	8.94

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	9.25	9.15	8.87	8.48	8.18	7.84	7.60	7.28
	6	8.41	7.94	8.14	7.92	7.62	7.33	7.26	7.11
	11	8.02	8.22	8.00	7.81	7.54	6.73	7.03	6.87

Average IEEE 802.11n Conducted output power

WLAN 5GHz Conducted Powers(Without Power Reduction)

802.11 a

Mode	Freq [MHz]	Channel	conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36	10.49	10.22	10.09	9.93	9.43	9.24	9.09	8.80
802.11a	5200	40	10.22	10.23	9.49	9.65	9.41	9.18	9.04	8.84
802.11a	5220	44	10.08	10.03	9.49	9.66	9.47	8.94	8.58	8.43
802.11a	5240	48	10.21	10.19	10.09	9.88	9.64	9.29	9.13	8.99
802.11a	5260	52	10.29	10.28	10.29	9.99	10.09	9.49	8.90	8.96
802.11a	5280	56	10.26	10.15	9.71	9.89	9.67	9.40	8.71	8.58
802.11a	5300	60	10.17	9.98	9.61	9.41	9.37	8.80	8.25	8.14
802.11a	5320	64	9.99	9.51	9.48	9.31	9.02	9.16	8.68	8.24
802.11a	5500	100	10.70	10.43	10.41	10.27	10.11	9.83	9.33	9.13
802.11a	5520	104	10.40	9.93	10.22	9.71	9.53	9.28	8.83	8.65
802.11a	5540	108	10.46	10.38	10.25	10.13	9.96	9.72	9.41	9.35
802.11a	5560	112	10.25	10.09	9.98	9.85	9.67	9.39	9.15	9.05
802.11a	5580	116	10.78	10.48	10.50	10.34	10.23	9.95	9.73	9.68
802.11a	5660	132	10.63	10.57	10.50	10.30	10.03	9.54	9.13	8.98
802.11a	5680	136	10.42	10.34	10.29	10.13	9.97	9.70	9.39	9.32
802.11a	5700	140	10.90	10.89	10.87	10.65	10.40	9.95	9.70	9.60
802.11a	5745	149	11.04	10.95	10.91	10.32	10.19	9.79	9.47	9.34
802.11a	5765	153	10.61	10.79	10.36	10.27	10.25	9.56	9.29	9.22
802.11a	5785	157	10.61	10.50	10.32	10.25	10.14	9.86	9.58	9.43
802.11a	5805	161	11.05	10.88	10.81	10.75	10.30	9.85	9.93	9.40
802.11a	5825	165	10.71	10.61	10.48	10.24	10.40	9.62	9.30	9.15

802.11 n

Mode	Freq [MHz]	Channel	conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11n	5180	36	10.49	10.22	10.09	9.93	9.43	9.24	9.09	8.80
802.11n	5200	40	10.22	10.23	9.49	9.65	9.41	9.18	9.04	8.84
802.11n	5220	44	10.29	10.25	10.03	9.91	9.88	9.20	9.16	8.89
802.11n	5240	48	10.21	10.19	10.09	9.88	9.64	9.29	9.13	8.99
802.11n	5260	52	10.48	10.37	10.26	10.09	9.74	9.48	9.35	9.06
802.11n	5280	56	10.28	10.02	9.85	9.63	9.36	9.12	8.95	8.86
802.11n	5300	60	9.84	9.82	9.56	9.35	9.02	8.83	8.79	8.67
802.11n	5320	64	9.92	9.63	9.47	9.26	8.86	8.52	8.40	8.35
802.11n	5500	100	10.65	10.59	10.35	10.10	9.85	9.47	9.51	9.42
802.11n	5520	104	10.60	10.48	10.25	10.09	9.89	9.24	9.12	9.35
802.11n	5540	108	10.53	10.30	10.15	9.90	9.67	9.42	9.31	9.22
802.11n	5560	112	10.77	10.21	10.02	9.79	9.51	9.23	9.14	9.05
802.11n	5580	116	10.83	10.90	10.75	10.60	10.16	9.88	9.82	9.74
802.11n	5660	132	10.78	10.93	10.44	10.11	9.69	9.39	9.29	9.14
802.11n	5680	136	10.82	10.65	10.49	10.31	9.99	9.75	9.60	9.43
802.11n	5700	140	11.05	11.08	10.88	10.60	10.21	9.86	9.69	9.67
802.11n	5745	149	11.05	10.83	10.71	10.29	9.99	9.61	9.43	9.37
802.11n	5765	153	11.03	10.48	10.24	10.37	9.75	9.50	9.43	9.32
802.11n	5785	157	10.80	10.69	10.52	10.41	10.08	9.87	9.78	9.54
802.11n	5805	161	11.16	10.95	10.68	10.52	10.10	9.73	9.62	9.51
802.11n	5825	165	10.89	10.67	10.47	10.09	9.69	9.44	9.35	9.26

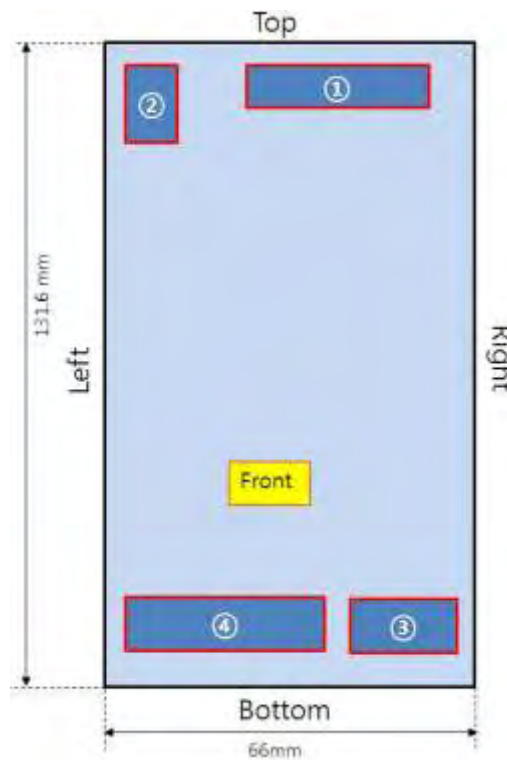
Note;
SAR testing was performed according to the FCC KDB 248227.

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
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



[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	<u>Routine evaluation required</u>	SAR not required: <u>Unlicensed only</u>
Unlicensed Transmitters	<p>When there is no simultaneous transmission –</p> <ul style="list-style-type: none"> o output ≤ 60/f: SAR not required o output > 60/f: stand-alone SAR required <p>When there is simultaneous transmission –</p> <p><u>Stand-alone SAR not required when</u></p> <ul style="list-style-type: none"> 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 <p><u>Otherwise stand-alone SAR is required</u></p> <p>When stand-alone SAR is required</p> <ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> o when stand-alone 1-g SAR is not required and antenna is ≥ 5 cm from other antennas <p><u>Licensed & Unlicensed</u></p> <ul style="list-style-type: none"> 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 <p>SAR required:</p> <p><u>Licensed & Unlicensed</u></p> <p>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</p> <p>Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply</p>
Jaw, Mouth and Nose	<p><u>Flat phantom SAR required</u></p> <ul style="list-style-type: none"> 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: ZNFL02E

BT Max. RF output power: (7.93 mW)

11.2 SAR Summation Scenario

Simultaneous Transmission Summation for Held to Ear

Simultaneous TX	configuration	GSM850 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	GSM850 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Left Cheek	0.318	0.072	0.390	Head SAR	Left Cheek	0.318	0.101	0.419
	Left Tilt	0.171	0.055	0.226		Left Tilt	0.171	0.109	0.280
	Right Cheek	0.226	0.193	0.419		Right Cheek	0.226	0.125	0.351
	Right Tilt	0.156	0.109	0.265		Right Tilt	0.156	0.119	0.275
Simultaneous TX	configuration	GSM1900 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	GSM1900 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Left Cheek	0.155	0.072	0.227	Head SAR	Left Cheek	0.155	0.101	0.256
	Left Tilt	0.068	0.055	0.123		Left Tilt	0.068	0.109	0.177
	Right Cheek	0.082	0.193	0.275		Right Cheek	0.082	0.125	0.207
	Right Tilt	0.044	0.109	0.153		Right Tilt	0.044	0.119	0.163
Simultaneous TX	configuration	WCDMA850 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	WCDMA850 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Left Cheek	0.426	0.072	0.498	Head SAR	Left Cheek	0.426	0.101	0.527
	Left Tilt	0.235	0.055	0.290		Left Tilt	0.235	0.109	0.344
	Right Cheek	0.324	0.193	0.517		Right Cheek	0.324	0.125	0.449
	Right Tilt	0.224	0.109	0.333		Right Tilt	0.224	0.119	0.343

Simultaneous Transmission Summation for Body-Worn (1cm)

Simultaneous TX	configuration	GPRS850 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	GPRS850 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.575	0.048	0.623	Body SAR	Back	0.575	0.197	0.772
	Front	0.418	0.049	0.467		Front	0.418	0.027	0.445
Simultaneous TX	configuration	GPRS1900 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	GPRS1900 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.335	0.048	0.383	Body SAR	Back	0.335	0.197	0.532
	Front	0.225	0.049	0.274		Front	0.225	0.027	0.252
Simultaneous TX	configuration	WCDMA850 SAR(W/kg)	2.4 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	WCDMA850 SAR(W/kg)	5 GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.587	0.048	0.635	Body SAR	Back	0.587	0.197	0.784
	Front	0.458	0.049	0.507		Front	0.458	0.027	0.485

Simultaneous Transmission Summation for Hotspot (1cm)

Simultaneous TX	configuration	GPRS850 SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	Σ SAR (W/kg)	Simultaneous TX	configuration	GPRS1900 SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.575	0.048	0.623	Body SAR	Back	0.335	0.048	0.383
	Front	0.418	0.049	0.467		Front	0.225	0.049	0.274
	Left	0.598	0.046	0.644		Left	0.246	0.046	0.292
	Right	0.476	-	0.476		Right	0.056	-	0.056
	Bottom	0.185	-	0.185		Bottom	0.057	-	0.057
	Top	-	0.03	0.030		Top	-	0.03	0.030
Simultaneous TX	configuration	WCDMA850 SAR(W/kg)	2.4GHz WIFI SAR (W/kg)	Σ SAR (W/kg)					
Body SAR	Back	0.587	0.048	0.635					
	Front	0.458	0.049	0.507					
	Left	0.677	0.046	0.723					
	Right	0.492	-	0.492					
	Bottom	0.181	-	0.181					
	Top	-	0.03	0.030					

Note;

- **Body-Worn 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.
- The EUT front body-worn configuration is provided to cover any potential accessory that will position the EUT in this manner.

11.3 Simultaneous Transmission Conclusion

The above numerical summed SAR was below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. No volumetric SAR summation is required per FCC KDB Publication 648474.

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

The conducted output power level of the 5GHz WLAN(5180~5240, 5260~5350) & BT transmitter is less than $2 \cdot P_{ref}$, the WLAN/BT antenna is more than 5 cm from the other antenna, therefore, a stand-alone 5GHz WLAN(5180~5240, 5260~5350) & BT SAR evaluation are not required.

12. SAR TEST DATA SUMMARY

12.1 Measurement Results (GSM850 Head SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
836.6	190 (Mid)	GSM850	32.95	-0.042	Standard	Left Ear	0.318
			32.95	0.089	Standard	Left Tilt 15°	0.171
			32.95	-0.038	Standard	Right Ear	0.226
			32.95	0.009	Standard	Right Tilt 15°	0.156
ANSI/ IEEE C95.1 - 1992- Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg (mW/g) <small>Averaged over 1 gram</small>	

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	Conducted Power (dBm)	Power Drift (dB)	Battery	Phantom Position	SAR(mW/g)
MHz	Channel						
1 880.0	661 (Mid)	GSM1900	30.17	-0.059	Standard	Left Ear	0.155
			30.17	-0.044	Standard	Left Tilt 15°	0.068
			30.17	-0.085	Standard	Right Ear	0.082
			30.17	-0.159	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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type Standard Extended Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode Manual Test cord Base Station Simulator
- 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	23.88	-0.093	Standard	Left Ear	0.426
836.6	4183 (Mid)	WCDMA850	23.88	-0.021	Standard	Left Tilt 15°	0.235
836.6	4183 (Mid)	WCDMA850	23.88	-0.081	Standard	Right Ear	0.324
836.6	4183 (Mid)	WCDMA850	23.88	-0.063	Standard	Right Tilt 15°	0.224
ANSI/ IEEE C95.1 - 2005– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Head 1.6 W/kg (mW/g) <small>Averaged over 1 gram</small>	

NOTES:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type Standard Extended Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode Manual Test cord Base Station Simulator
- 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).
- WCDMA Mode was tested under RMC 12.2 kbps and HSPA Inactive.

12.4 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	15.81	0.111	Standard	Left Ear	1 Mbps	0.072
			15.81	0.041	Standard	Left Tilt 15°	1 Mbps	0.055
			15.81	-0.042	Standard	Right Ear	1 Mbps	0.193
			15.81	0.106	Standard	Right Tilt 15	1 Mbps	0.109
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.

12.5 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							
5700	140	802.11a	10.90	-0.046	Standard	Left Ear	6Mbps	0.101
5700	140	802.11a	10.90	0.063	Standard	Left Tilt 15°	6Mbps	0.109
5700	140	802.11a	10.90	-0.065	Standard	Right Ear	6Mbps	0.125
5700	140	802.11a	10.90	0.032	Standard	Right Tilt 15	6Mbps	0.119
5805	161	802.11a	11.05	-0.08	Standard	Left Ear	6Mbps	0.042
5805	161	802.11a	11.05	-0.04	Standard	Left Tilt 15°	6Mbps	0.038
5805	161	802.11a	11.05	-0.027	Standard	Right Ear	6Mbps	0.00213
5805	161	802.11a	11.05	-0.09	Standard	Right Tilt 15	6Mbps	0.054
ANSI/ IEEE C95.1 - 1992– Safety Limit						Head		
Spatial Peak						1.6 W/kg (mW/g)		
Uncontrolled Exposure/ General Population						<small>Averaged over 1 gram</small>		

NOTES:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type Standard Extended Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode Manual Test cord Base Station Simulator
- 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.
- When Hotspot is enabled, 5 GHz Bands are disabled
- 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.

12.6 Measurement Results (GSM850 Hotspot SAR)

Frequency		Modulation	Conducted Power (dBm)	Power Drift (dB)	Configuration	Separation Distance	SAR(mW/g)
MHz	Channel						
836.6	190 (Mid)	GPRS 3Tx	29.98	0.114	Rear	1.0 cm	0.575
836.6	190 (Mid)	GPRS 3Tx	29.98	-0.011	Front	1.0 cm	0.418
836.6	190 (Mid)	GPRS 3Tx	29.98	-0.007	Left	1.0 cm	0.598
836.6	190 (Mid)	GPRS 3Tx	29.98	-0.093	Right	1.0 cm	0.476
836.6	190 (Mid)	GPRS 3Tx	29.98	-0.093	Bottom	1.0 cm	0.185
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type Standard Extended Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode Manual Test cord Base Station Simulator
- Test Configuration With Holster Without Holster
- 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).
- For body SAR testing, the EUT was set in GPRS multi-slot class12 with 3uplink slots for GSM850 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.

12.7 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 3Tx	26.64	-0.012	Rear	1.0 cm	0.335
1 880.0	661 (Mid)	GPRS 3Tx	26.64	-0.007	Front	1.0 cm	0.225
1 880.0	661 (Mid)	GPRS 3Tx	26.64	0.067	Left	1.0 cm	0.246
1 880.0	661 (Mid)	GPRS 3Tx	26.64	-0.066	Right	1.0 cm	0.056
1 880.0	661 (Mid)	GPRS 3Tx	26.64	0.01	Bottom	1.0 cm	0.057
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:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type Standard Extended Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode Manual Test cord Base Station Simulator
- Test Configuration With Holster Without Holster
- 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).
- For body SAR testing, the EUT was set in GPRS multi-slot class12 with 4uplink 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.

12.8 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	23.88	-0.07	Rear	1.0 cm	0.587
836.6	4183 (Mid)	WCDMA850	23.88	-0.03	Front	1.0 cm	0.458
836.6	4183 (Mid)	WCDMA850	23.88	0.056	Left	1.0 cm	0.677
836.6	4183 (Mid)	WCDMA850	23.88	0.048	Right	1.0 cm	0.492
836.6	4183 (Mid)	WCDMA850	23.88	-0.094	Bottom	1.0 cm	0.181
ANSI/ IEEE C95.1 - 2005– Safety Limit						Body	
Spatial Peak						1.6 W/kg (mW/g)	
Uncontrolled Exposure/ General Population						<small>Averaged over 1 gram</small>	

- 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.

12.9 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	15.81	-0.092	Rear	1.0 cm	1 Mbps	0.048
2 462	11 (High)	802.11b	15.81	0.086	Front	1.0 cm	1 Mbps	0.049
2 462	11 (High)	802.11b	15.81	0.015	Left	1.0 cm	1 Mbps	0.046
2 462	11 (High)	802.11b	15.81	-0.043	Top	1.0 cm	1 Mbps	0.03
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg (mW/g) <small>Averaged over 1 gram</small>		

NOTES:

- 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].
- All modes of operation were investigated and the worst-case are reported.
- Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Battery Type Standard Extended Slim
Batteries are fully charged for all readings.
- Test Signal Call Mode Manual Test code Base Station Simulator
- 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.
- 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.

12.10 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							
5700	140	802.11a	10.90	-0.09	Rear	1.0 cm	6Mbps	0.197
5700	140	802.11a	10.90	0.07	Front	1.0 cm	6Mbps	0.027
5805	161	802.11a	11.05	-0.01	Rear	1.0 cm	6Mbps	0.077
5805	161	802.11a	11.05	0.004	Front	1.0 cm	6Mbps	0.000885
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.

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: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Left touch 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

GSM850 Left touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

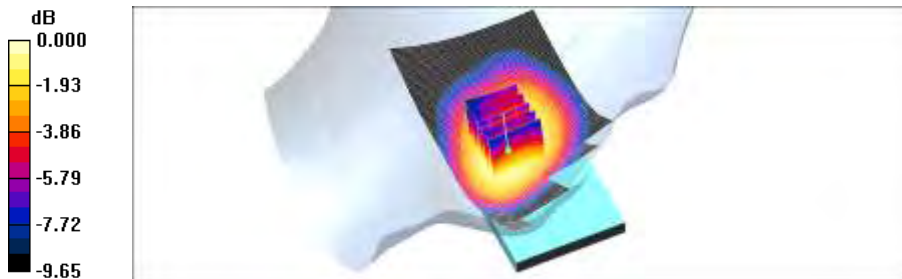
Reference Value = 6.42 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 0.387 W/kg

SAR(1 g) = 0.318 mW/g; SAR(10 g) = 0.245 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.337 mW/g



0 dB = 0.337mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Left tilt 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.173 mW/g

GSM850 Left tilt 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

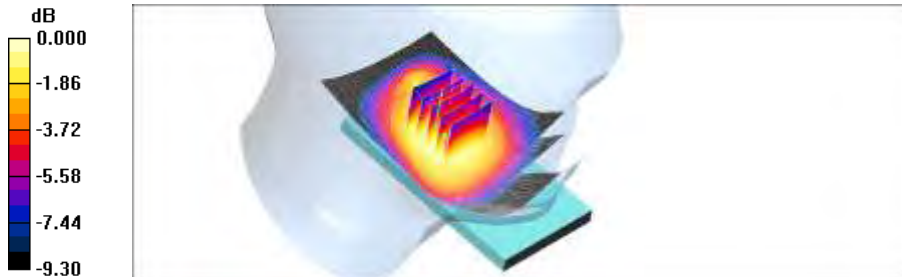
Reference Value = 8.24 V/m; Power Drift = 0.089 dB

Peak SAR (extrapolated) = 0.203 W/kg

SAR(1 g) = 0.171 mW/g; SAR(10 g) = 0.132 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.179 mW/g



0 dB = 0.179mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Right touch 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.238 mW/g

GSM850 Right touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

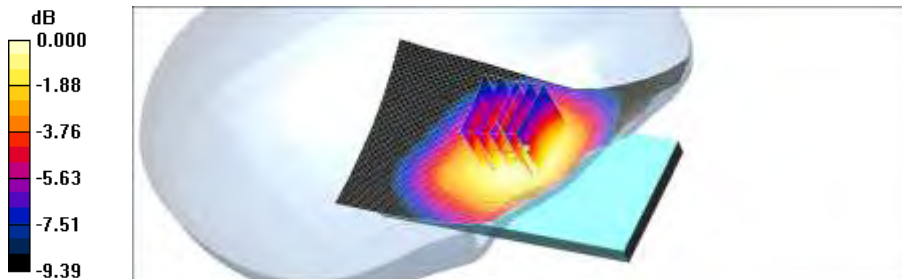
Reference Value = 4.96 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.268 W/kg

SAR(1 g) = 0.226 mW/g; SAR(10 g) = 0.175 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.240 mW/g



0 dB = 0.240mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Right tilt 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.158 mW/g

GSM850 Right tilt 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

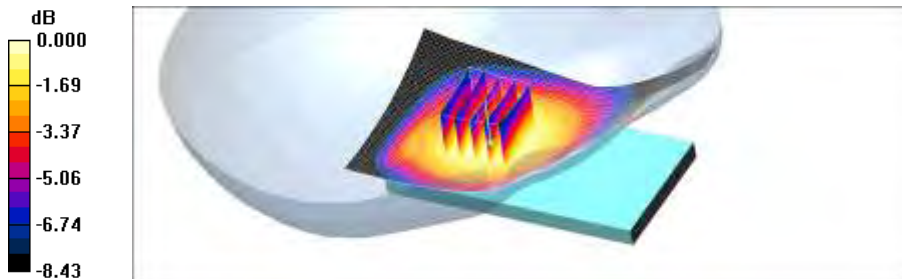
Reference Value = 8.54 V/m; Power Drift = 0.009 dB

Peak SAR (extrapolated) = 0.183 W/kg

SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.120 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.164 mW/g



0 dB = 0.164mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012

DUT: L-02E; Type: bar; Serial: #1

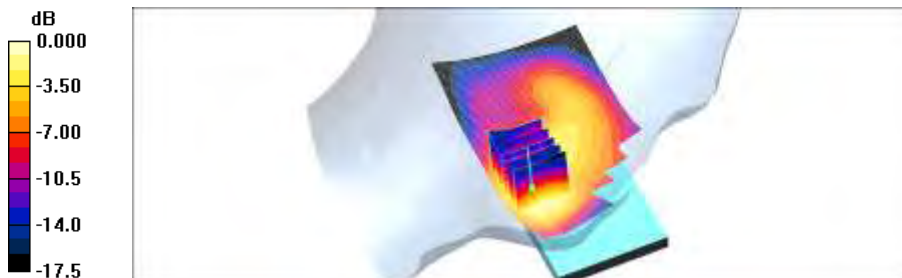
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 835/900 Phantom ; Type: SAM

GSM1900 Left touch 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.167 mW/g

GSM1900 Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.42 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.090 mW/g
Maximum value of SAR (measured) = 0.166 mW/g



0 dB = 0.166mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012

DUT: L-02E; Type: bar; Serial: #1

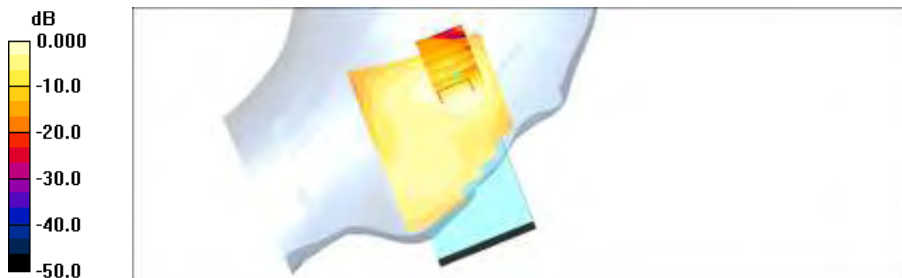
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 835/900 Phantom ; Type: SAM

GSM1900 Left tilt 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.082 mW/g

GSM1900 Left tilt 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.70 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 0.109 W/kg
SAR(1 g) = 0.068 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.073 mW/g



0 dB = 0.073mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012

DUT: L-02E; Type: bar; Serial: #1

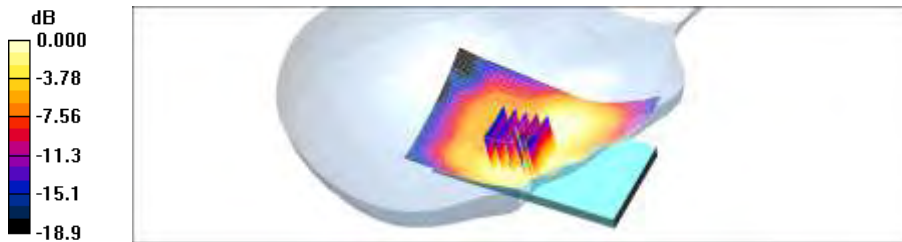
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 835/900 Phantom ; Type: SAM

GSM1900 Right touch 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.088 mW/g

GSM1900 Right touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.47 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 0.134 W/kg
SAR(1 g) = 0.082 mW/g; SAR(10 g) = 0.049 mW/g
Maximum value of SAR (measured) = 0.086 mW/g



0 dB = 0.086mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012

DUT: L-02E; Type: bar; Serial: #1

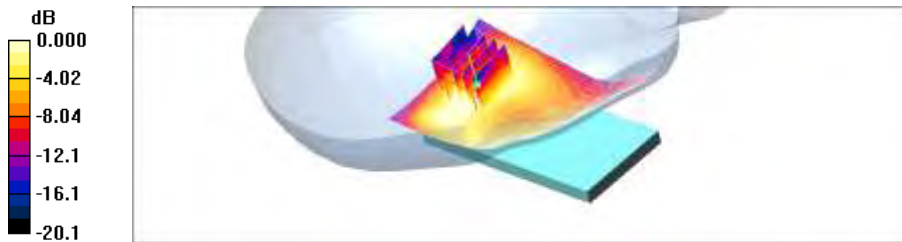
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 835/900 Phantom ; Type: SAM

GSM1900 Right tilt 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.050 mW/g

GSM1900 Right tilt 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.46 V/m; Power Drift = -0.159 dB
Peak SAR (extrapolated) = 0.067 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



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.452 mW/g

WCDMA850 Left touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

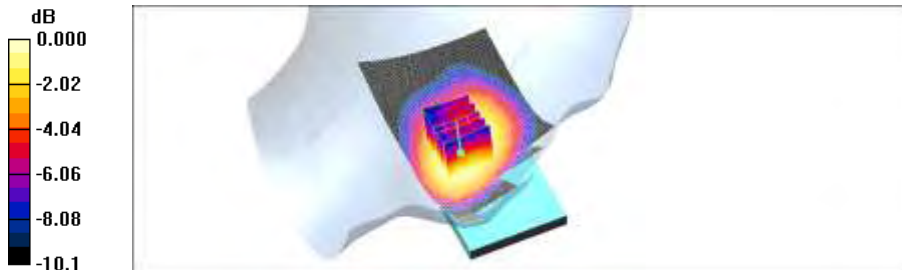
Reference Value = 6.85 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.532 W/kg

SAR(1 g) = 0.426 mW/g; SAR(10 g) = 0.322 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.447 mW/g



0 dB = 0.447mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 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) = 0.243 mW/g

WCDMA850 Left tilt 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

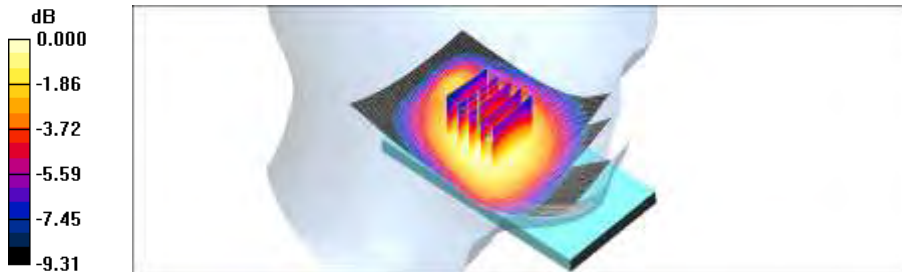
Reference Value = 10.3 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 0.283 W/kg

SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.181 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.249 mW/g



0 dB = 0.249mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 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) = 0.341 mW/g

WCDMA850 Right touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

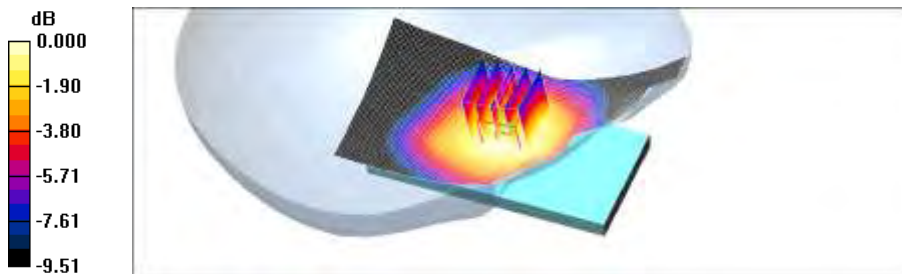
Reference Value = 5.90 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 0.378 W/kg

SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.250 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.343 mW/g



0 dB = 0.343mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 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) = 0.228 mW/g

WCDMA850 Right tilt 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

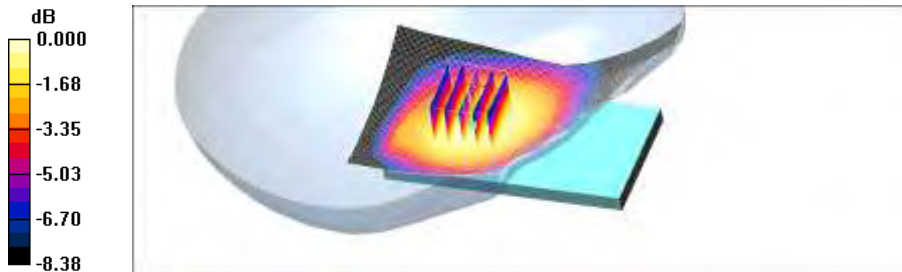
Reference Value = 10.6 V/m; Power Drift = -0.063 dB

Peak SAR (extrapolated) = 0.264 W/kg

SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.172 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.237 mW/g



0 dB = 0.237mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.8$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 1800/1900 Phantom; Type: SAM

802.11b Left touch 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.079 mW/g

802.11b Left touch 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

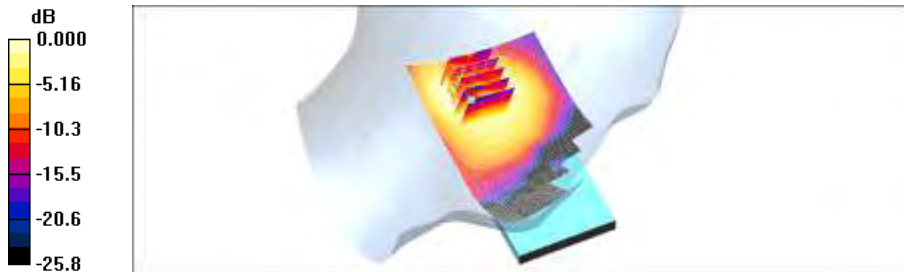
Reference Value = 4.94 V/m; Power Drift = 0.111 dB

Peak SAR (extrapolated) = 0.143 W/kg

SAR(1 g) = 0.072 mW/g; SAR(10 g) = 0.036 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.079 mW/g



0 dB = 0.079mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.8$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 1800/1900 Phantom; Type: SAM

802.11b Left tilt 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.064 mW/g

802.11b Left tilt 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

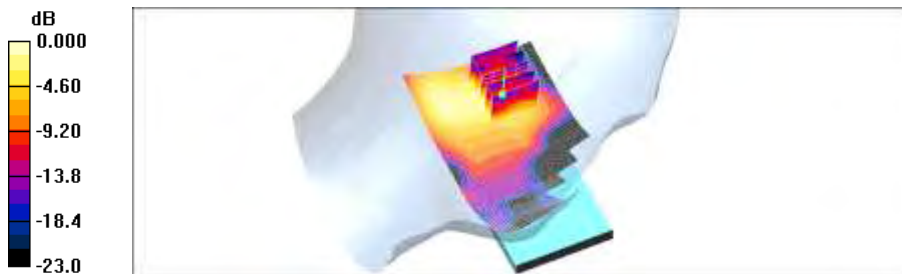
Reference Value = 4.60 V/m; Power Drift = 0.041 dB

Peak SAR (extrapolated) = 0.102 W/kg

SAR(1 g) = 0.055 mW/g; SAR(10 g) = 0.027 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.063 mW/g



0 dB = 0.063mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.8$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 1800/1900 Phantom; Type: SAM

802.11b Right touch 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.197 mW/g

802.11b Right touch 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

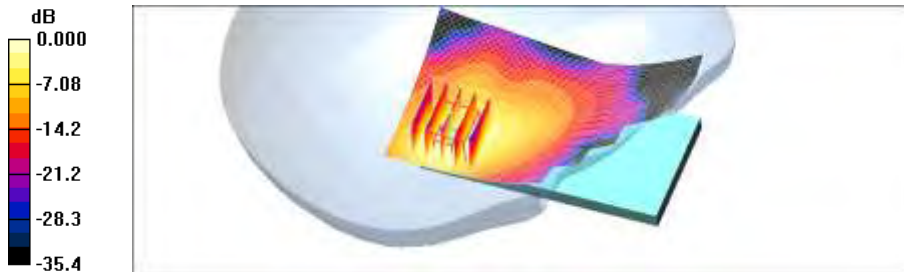
Reference Value = 3.50 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 0.464 W/kg

SAR(1 g) = 0.193 mW/g; SAR(10 g) = 0.086 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.215 mW/g



0 dB = 0.215mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.8$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 1800/1900 Phantom; Type: SAM

802.11b Right tilt 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.103 mW/g

802.11b Right tilt 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

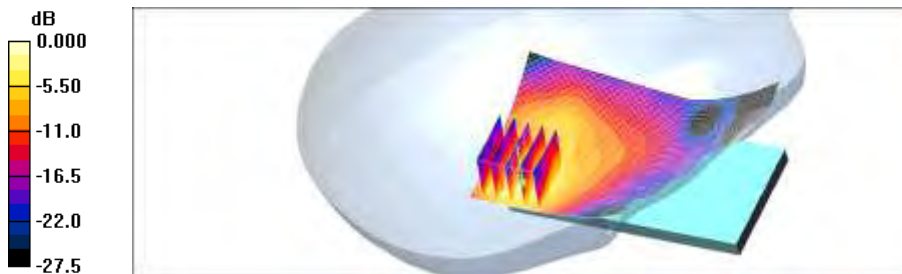
Reference Value = 4.15 V/m; Power Drift = 0.106 dB

Peak SAR (extrapolated) = 0.344 W/kg

SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.049 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: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

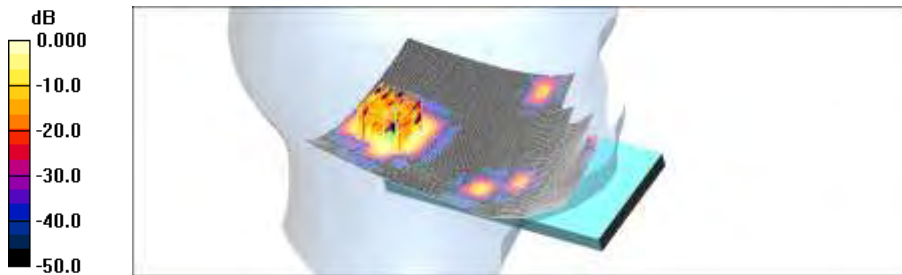
Communication System: WIFI 5GHz; Frequency: 5700 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.08$ mho/m; $\epsilon_r = 35.3$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.56, 4.56, 4.56); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: 800/900 Phantom; Type: SAM

802.11a Left touch 140ch 6Mbps/Area Scan (101x161x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.162 mW/g

802.11a Left touch 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.27 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.326 W/kg
SAR(1 g) = 0.101 mW/g; SAR(10 g) = 0.034 mW/g
Maximum value of SAR (measured) = 0.126 mW/g



0 dB = 0.126mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

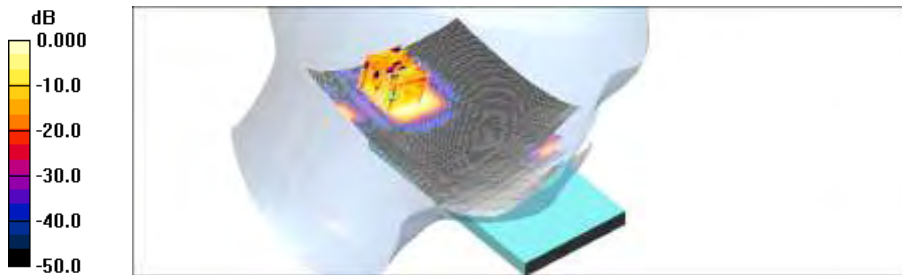
Communication System: WIFI 5GHz; Frequency: 5700 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.08$ mho/m; $\epsilon_r = 35.3$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.56, 4.56, 4.56); Calibrated: 2012-07-13
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: 800/900 Phantom; Type: SAM

802.11a Left tilt 140ch 6Mbps/Area Scan (101x161x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.293 mW/g

802.11a Left tilt 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.14 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.548 W/kg
SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.038 mW/g
Maximum value of SAR (measured) = 0.133 mW/g



0 dB = 0.133mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

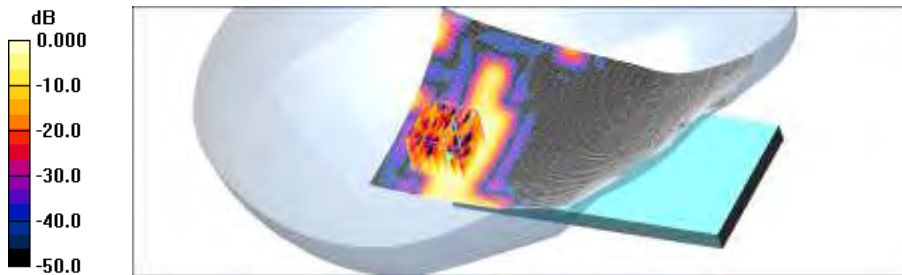
Communication System: WIFI 5GHz; Frequency: 5700 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.08$ mho/m; $\epsilon_r = 35.3$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.56, 4.56, 4.56); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: 800/900 Phantom; Type: SAM

Right touch 802.11a 140ch 6Mbps/Area Scan (91x161x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.333 mW/g

Right touch 802.11a 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.42 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.542 W/kg
SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.034 mW/g
Maximum value of SAR (measured) = 0.274 mW/g



0 dB = 0.274mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

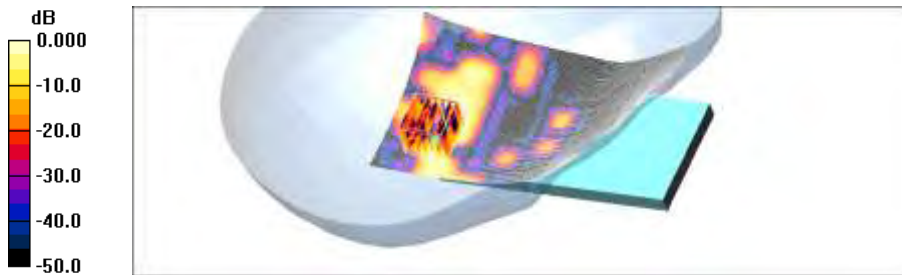
Communication System: WIFI 5GHz; Frequency: 5700 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.08$ mho/m; $\epsilon_r = 35.3$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.56, 4.56, 4.56); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: 800/900 Phantom; Type: SAM

Right tilt 802.11a 140ch 6Mbps/Area Scan (91x161x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.327 mW/g

Right tilt 802.11a 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.24 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 0.457 W/kg
SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.253 mW/g



0 dB = 0.253mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 5.24$ mho/m; $\epsilon_r = 34.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; 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: 800/900 Phantom; Type: SAM

Left touch 802.11a 161ch 6Mbps/Area Scan (101x161x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.077 mW/g

Left touch 802.11a 161ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

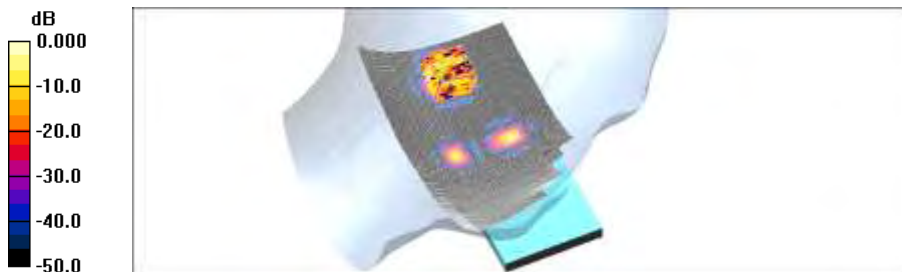
Reference Value = 2.51 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.427 W/kg

SAR(1 g) = 0.042 mW/g; SAR(10 g) = 0.015 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.084 mW/g



0 dB = 0.084mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 5.24$ mho/m; $\epsilon_r = 34.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 80; 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: 800/900 Phantom; Type: SAM

Left tilt 802.11a 161ch 6Mbps/Area Scan (101x161x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.057 mW/g

Left tilt 802.11a 161ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

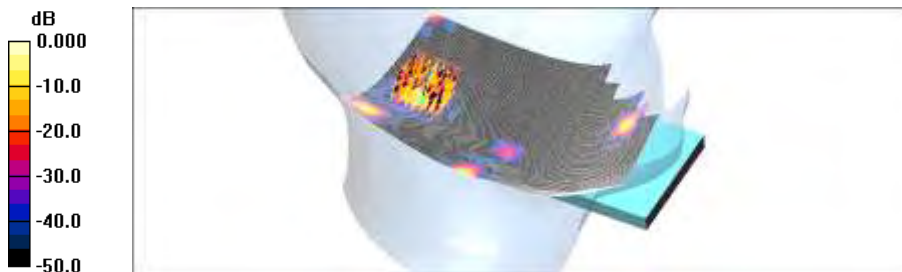
Reference Value = 2.66 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.318 W/kg

SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.013 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.088 mW/g



0 dB = 0.088mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 5.24$ mho/m; $\epsilon_r = 34.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; 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: 800/900 Phantom; Type: SAM

Right touch 802.11a 161ch 6Mbps/Area Scan (101x161x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.035 mW/g

Right touch 802.11a 161ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

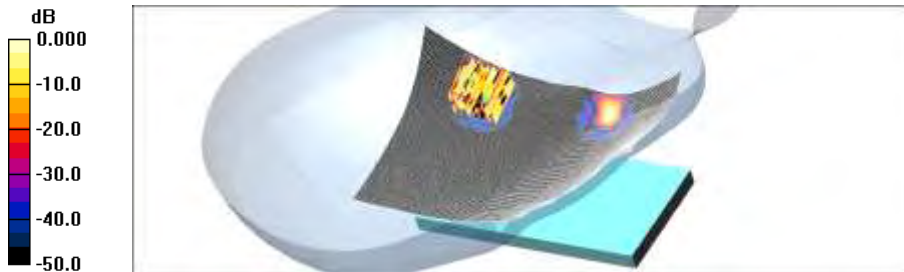
Reference Value = 1.95 V/m; Power Drift = -0.027 dB

Peak SAR (extrapolated) = 0.157 W/kg

SAR(1 g) = 0.00213 mW/g; SAR(10 g) = 0.000291 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.032 mW/g



0 dB = 0.032mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 5.24$ mho/m; $\epsilon_r = 34.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; 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: 800/900 Phantom; Type: SAM

Right tilt 802.11a 161ch 6Mbps/Area Scan (101x161x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.039 mW/g

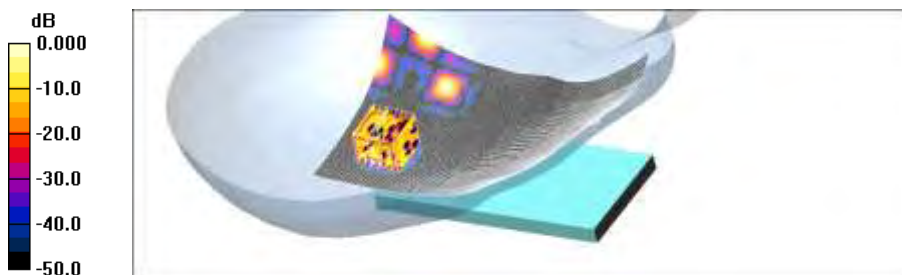
Right tilt 802.11a 161ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 1.70 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 0.505 W/kg

SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.016 mW/g

Maximum value of SAR (measured) = 0.046 mW/g



0 dB = 0.046mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.77
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Rear 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.652 mW/g

GSM850 Rear 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.8 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.575 mW/g; SAR(10 g) = 0.352 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.611 mW/g

GSM850 Rear 190/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.8 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 0.632 W/kg

SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.390 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.540 mW/g

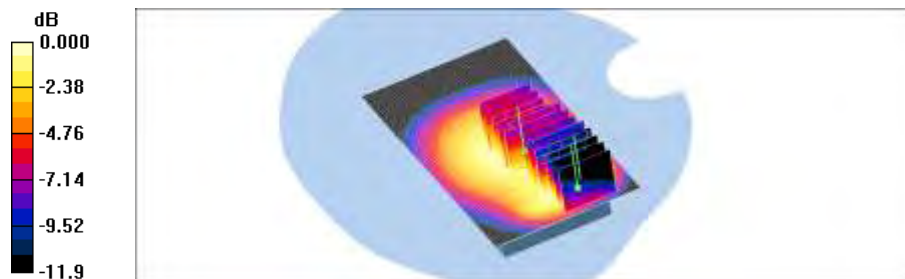
GSM850 Rear 190/Zoom Scan (5x5x7)/Cube 2: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.8 V/m; Power Drift = 0.114 dB

Peak SAR (extrapolated) = 0.787 W/kg

SAR(1 g) = 0.513 mW/g; SAR(10 g) = 0.358 mW/g

Maximum value of SAR (measured) = 0.590 mW/g



0 dB = 0.590mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.77
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Front 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.425 mW/g

GSM850 Front 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

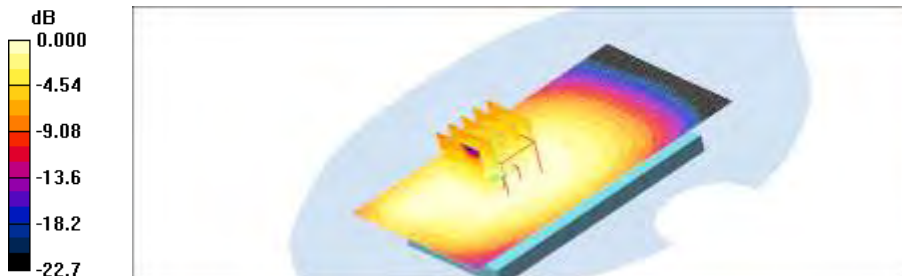
Reference Value = 17.6 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 0.819 W/kg

SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.319 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.428 mW/g



0 dB = 0.428mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.77
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Hotspot Body Left side 190/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.649 mW/g

GSM850 Hotspot Body Left side 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

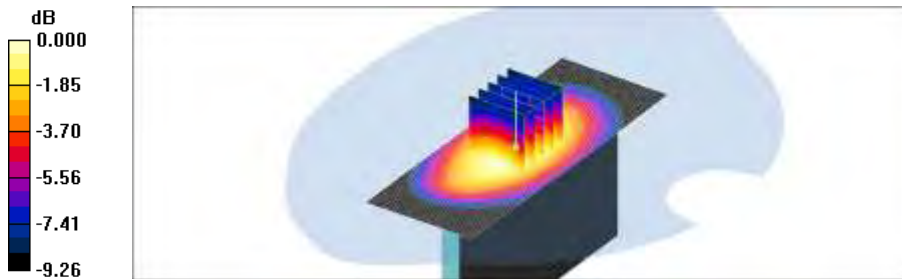
Reference Value = 24.3 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 0.778 W/kg

SAR(1 g) = 0.598 mW/g; SAR(10 g) = 0.421 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.639 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.77
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Hotspot Body Right side 190/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.508 mW/g

GSM850 Hotspot Body Right side 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

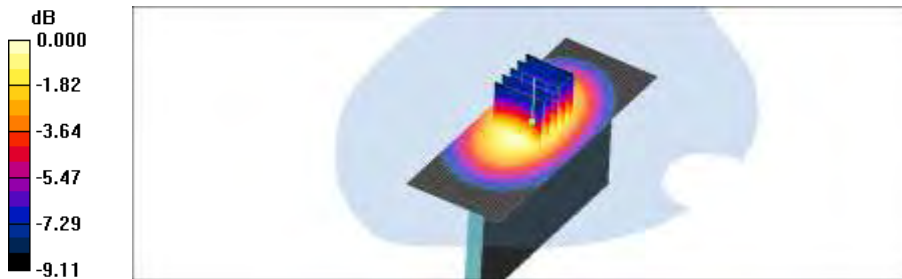
Reference Value = 22.1 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.628 W/kg

SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.336 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.505 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Hotspot Body Bottom 190/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.200 mW/g

GSM850 Hotspot Body Bottom 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

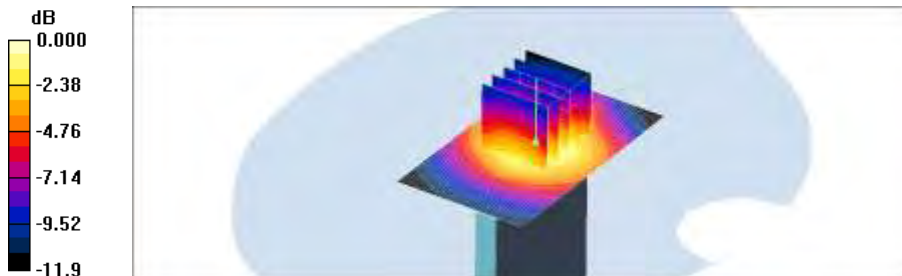
Reference Value = 14.5 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.264 W/kg

SAR(1 g) = 0.185 mW/g; SAR(10 g) = 0.120 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.200 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

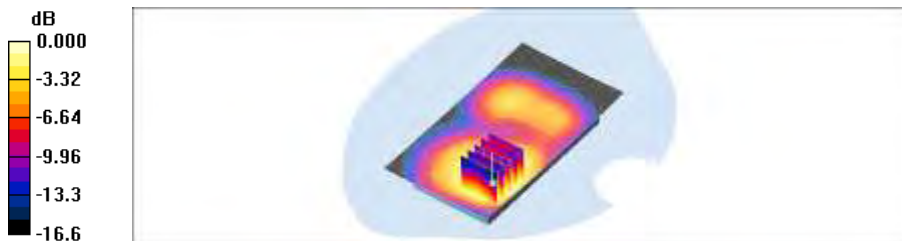
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.77
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Rear 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.476 mW/g

GSM1900 Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.48 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.500 W/kg
SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.212 mW/g
Maximum value of SAR (measured) = 0.363 mW/g



0 dB = 0.363mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

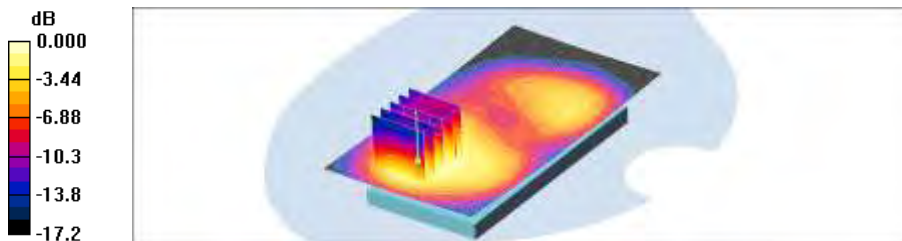
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.77
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Front 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.244 mW/g

GSM1900 Front 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.90 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.353 W/kg
SAR(1 g) = 0.225 mW/g; SAR(10 g) = 0.143 mW/g
Maximum value of SAR (measured) = 0.242 mW/g



0 dB = 0.242mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

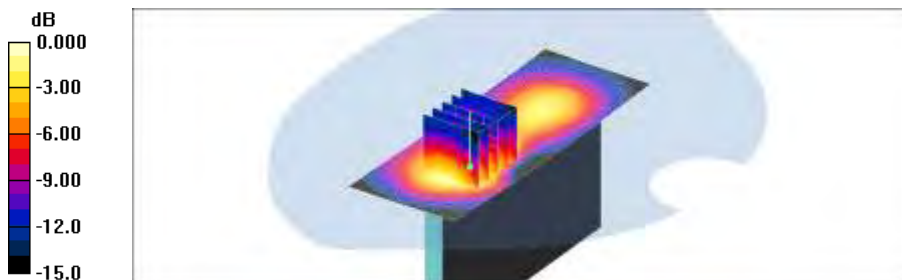
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.77
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Hotspot Body Left side 661/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.289 mW/g

GSM1900 Hotspot Body Left side 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.067 dB
Peak SAR (extrapolated) = 0.395 W/kg
SAR(1 g) = 0.246 mW/g; SAR(10 g) = 0.145 mW/g
Maximum value of SAR (measured) = 0.268 mW/g



0 dB = 0.268mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.77
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Hotspot Body Right side 661/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.061 mW/g

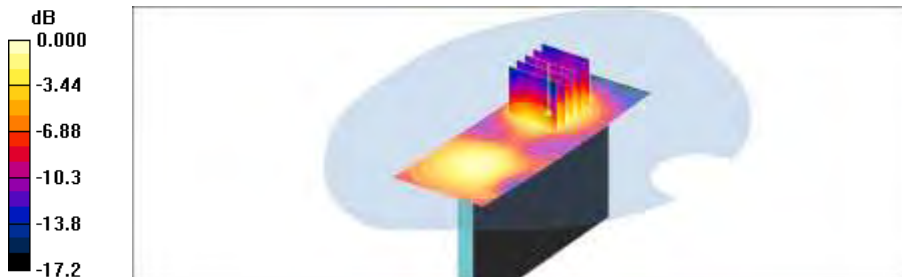
GSM1900 Hotspot Body Right side 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.79 V/m; Power Drift = -0.066 dB

Peak SAR (extrapolated) = 0.089 W/kg

SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.034 mW/g

Maximum value of SAR (measured) = 0.062 mW/g



0 dB = 0.062mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

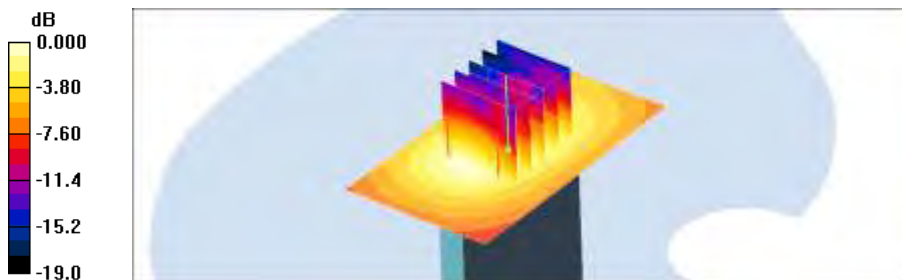
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:2.77
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Hotspot Body Bottom 661/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.060 mW/g

GSM1900 Hotspot Body Bottom 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.51 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.090 W/kg
SAR(1 g) = 0.057 mW/g; SAR(10 g) = 0.034 mW/g
aximum value of SAR (measured) = 0.062 mW/g



0 dB = 0.062mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.702 mW/g

WCDMA850 Rear 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.4 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.587 mW/g; SAR(10 g) = 0.374 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.620 mW/g

WCDMA850 Rear 4183/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

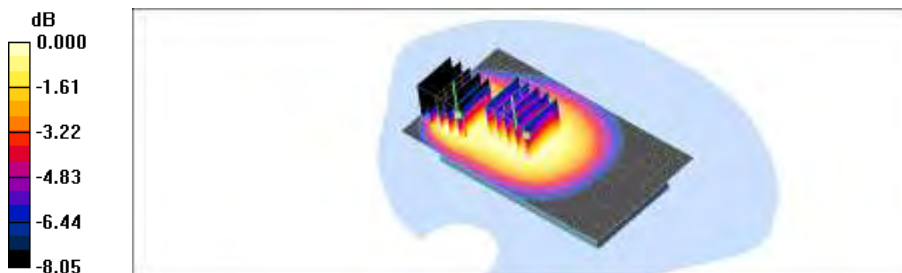
Reference Value = 22.4 V/m; Power Drift = -0.07dB

Peak SAR (extrapolated) = 0.712 W/kg

SAR(1 g) = 0.581 mW/g; SAR(10 g) = 0.443 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.605 mW/g



0 dB = 0.605mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

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

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.493 mW/g

WCDMA850 Front 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

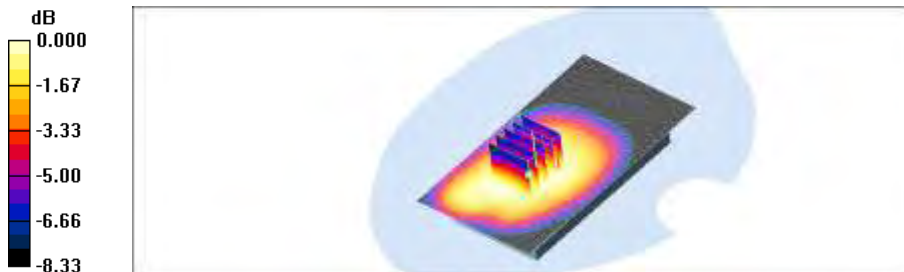
Reference Value = 19.2 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.539 W/kg

SAR(1 g) = 0.458 mW/g; SAR(10 g) = 0.356 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.480 mW/g



0 dB = 0.480mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Hotspot Body Left side 4183/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.720 mW/g

WCDMA850 Hotspot Body Left side 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

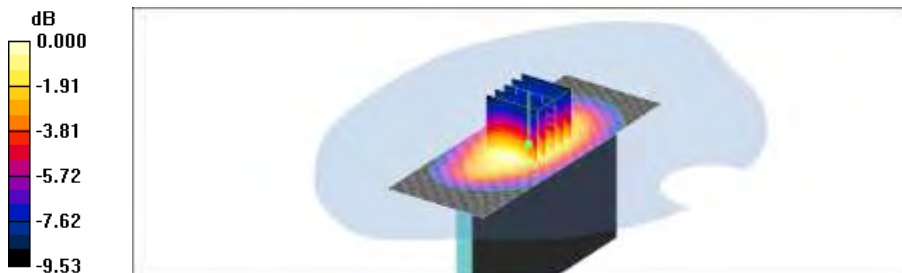
Reference Value = 26.2 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 0.915 W/kg

SAR(1 g) = 0.677 mW/g; SAR(10 g) = 0.469 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.728 mW/g



0 dB = 0.728mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Hotspot Body Right side 4183/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.514 mW/g

WCDMA850 Hotspot Body Right side 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

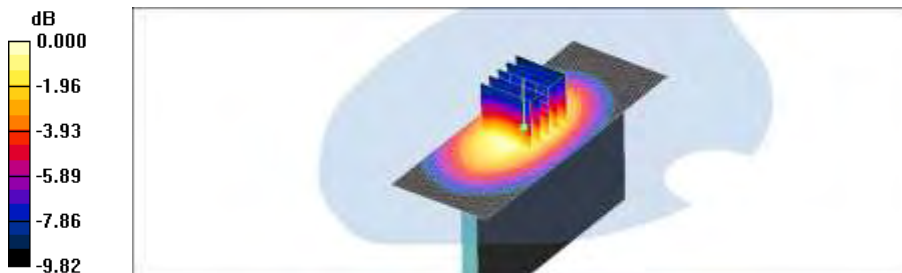
Reference Value = 20.7 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 0.674 W/kg

SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.336 mW/g

Info: [Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.539 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Hotspot Body Bottom 4183/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.195 mW/g

WCDMA850 Hotspot Body Bottom 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

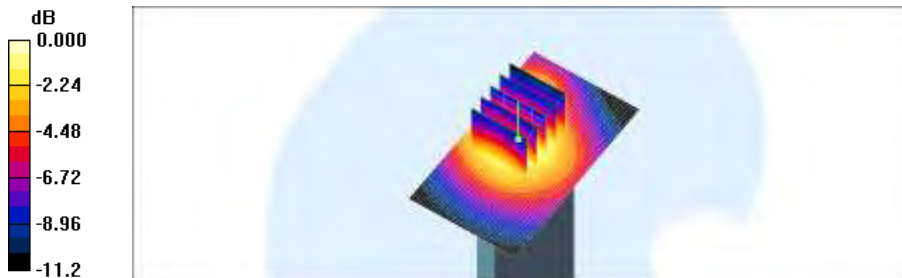
Reference Value = 13.2 V/m; Power Drift = -0.094 dB

Peak SAR (extrapolated) = 0.253 W/kg

SAR(1 g) = 0.181 mW/g; SAR(10 g) = 0.120 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.198 mW/g



0 dB = 0.198mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11b body rear 11ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.049 mW/g

802.11b body rear 11ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

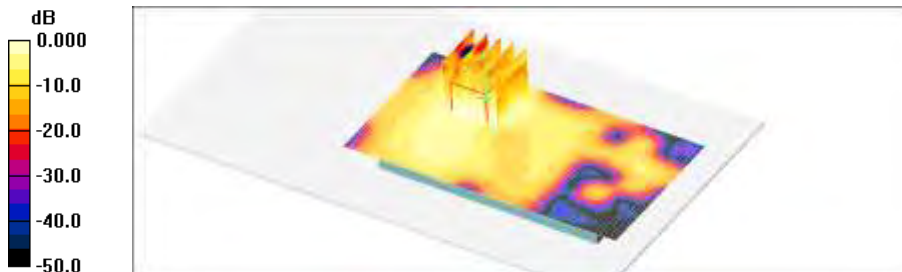
Reference Value = 3.69 V/m; Power Drift = -0.092 dB

Peak SAR (extrapolated) = 0.142 W/kg

SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.020 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.055 mW/g



0 dB = 0.055mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11b body front 11ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.057 mW/g

802.11b body front 11ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

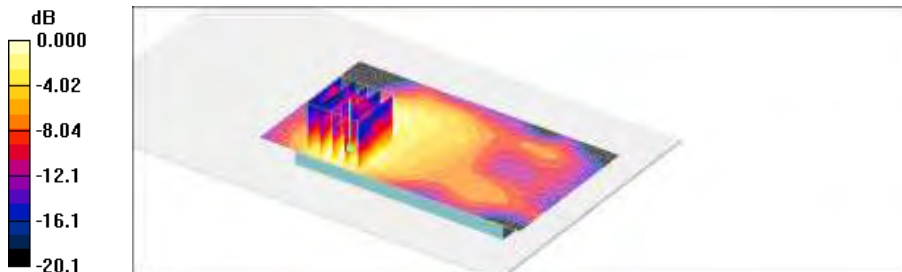
Reference Value = 4.05 V/m; Power Drift = 0.086 dB

Peak SAR (extrapolated) = 0.082 W/kg

SAR(1 g) = 0.049 mW/g; SAR(10 g) = 0.024 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.057 mW/g



0 dB = 0.057mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11b body left 11ch/Area Scan (31x11x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.053 mW/g

802.11b body left 11ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

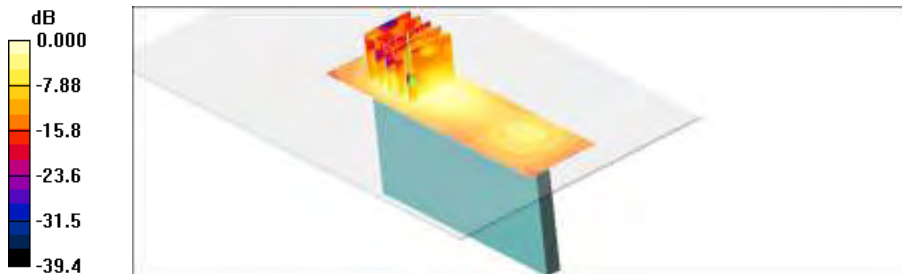
Reference Value = 4.93 V/m; Power Drift = 0.015 dB

Peak SAR (extrapolated) = 0.099 W/kg

SAR(1 g) = 0.046 mW/g; SAR(10 g) = 0.022 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.052 mW/g



0 dB = 0.052mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11b body top 11ch/Area Scan (61x31x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.033 mW/g

802.11b body top 11ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

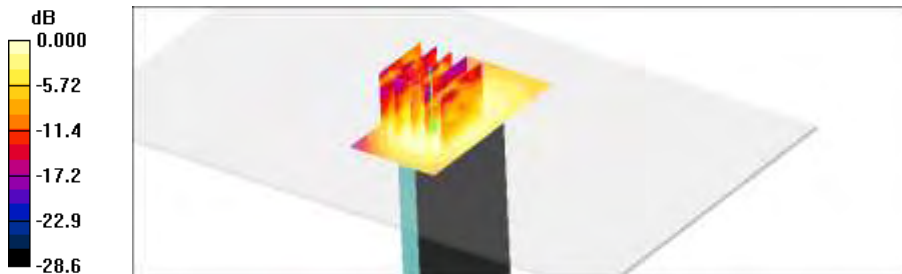
Reference Value = 3.74 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.087 W/kg

SAR(1 g) = 0.030 mW/g; SAR(10 g) = 0.016 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.032 mW/g



0 dB = 0.032mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

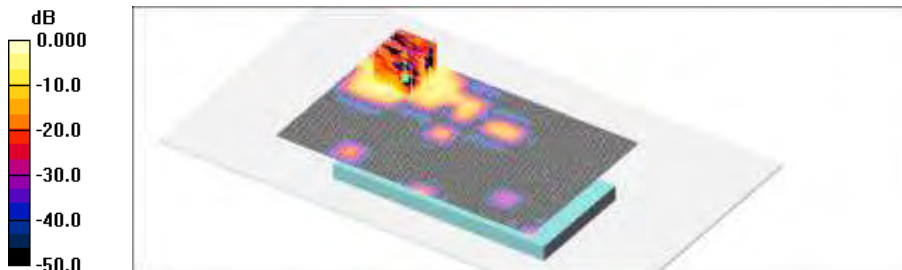
Communication System: WIFI 5GHz; Frequency: 5700 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.96$ mho/m; $\epsilon_r = 46.3$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.66, 3.66, 3.66); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

WIFI 5GHz Body Rear 140ch 6Mbps/Area Scan (161x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.401 mW/g

WIFI 5GHz Body Rear 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.16 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.055 mW/g
aximum value of SAR (measured) = 0.426 mW/g



0 dB = 0.426mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

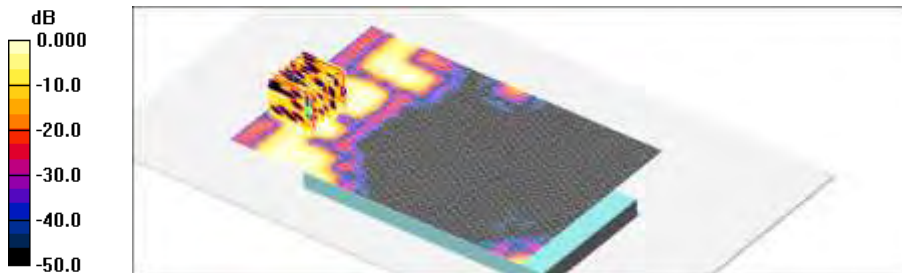
Communication System: WIFI 5GHz; Frequency: 5700 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.96$ mho/m; $\epsilon_r = 46.3$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.66, 3.66, 3.66); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

WIFI 5GHz Body Front 140ch 6Mbps/Area Scan (161x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.053 mW/g

WIFI 5GHz Body Front 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.325 V/m; Power Drift = 0.070 dB
Peak SAR (extrapolated) = 0.308 W/kg
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.00838 mW/g
aximum value of SAR (measured) = 0.048 mW/g



0 dB = 0.048mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 6.19$ mho/m; $\epsilon_r = 46.2$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; 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: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

WIFI 5GHz Body Rear 161ch 6Mbps/Area Scan (161x101x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.238 mW/g

WIFI 5GHz Body Rear 161ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

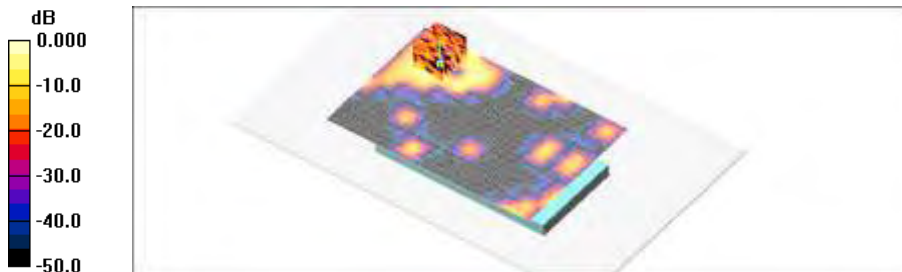
Reference Value = 0.904 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.500 W/kg

SAR(1 g) = 0.077 mW/g; SAR(10 g) = 0.021 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.185 mW/g



0 dB = 0.185mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WIFI 5GHz; Frequency: 5805 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 5805$ MHz; $\sigma = 6.19$ mho/m; $\epsilon_r = 46.2$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; 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: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

WIFI 5GHz Body Front 161ch 6Mbps/Area Scan (161x101x1): Measurement grid: dx=10mm, dy=10mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.021 mW/g

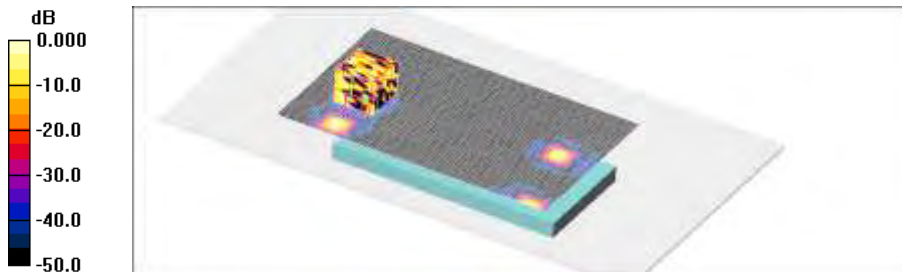
WIFI 5GHz Body Front 161ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 0.000 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 0.033 W/kg

SAR(1 g) = 0.000885 mW/g; SAR(10 g) = 0.000112 mW/g

Maximum value of SAR (measured) = 0.022 mW/g



0 dB = 0.022mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.919$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Left touch 190/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

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

GSM850 Left touch 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

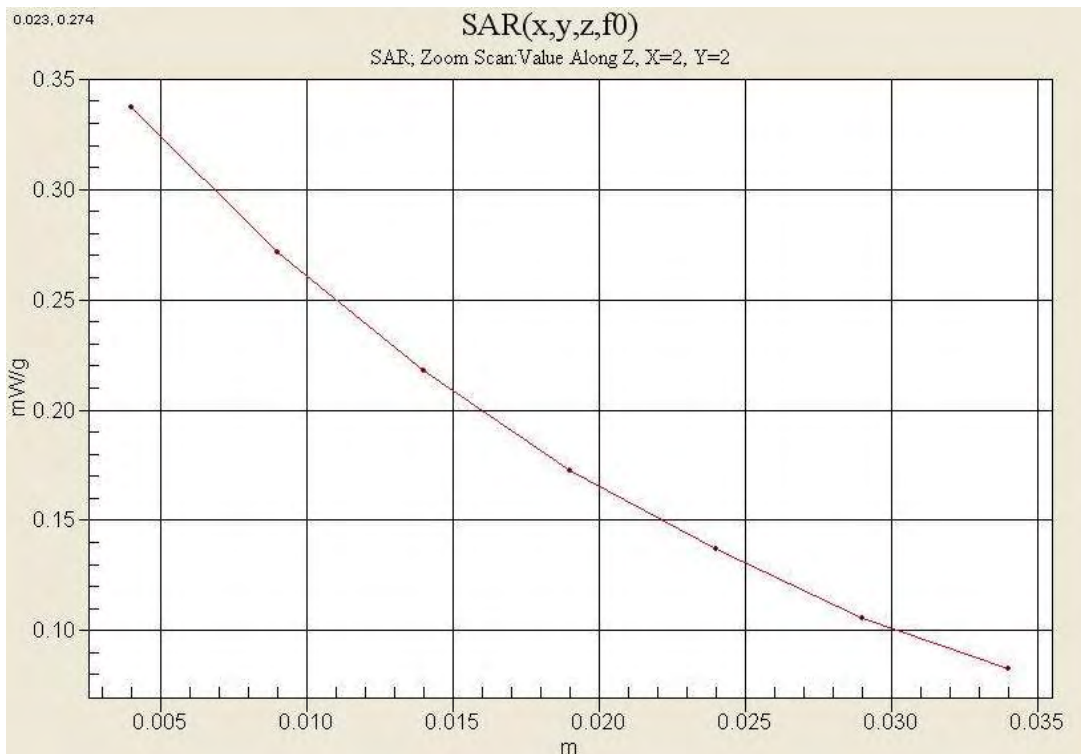
Reference Value = 6.42 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 0.387 W/kg

SAR(1 g) = 0.318 mW/g; SAR(10 g) = 0.245 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.337 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:2.77
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

GSM850 Hotspot Body Left side 190/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.649 mW/g

GSM850 Hotspot Body Left side 190/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

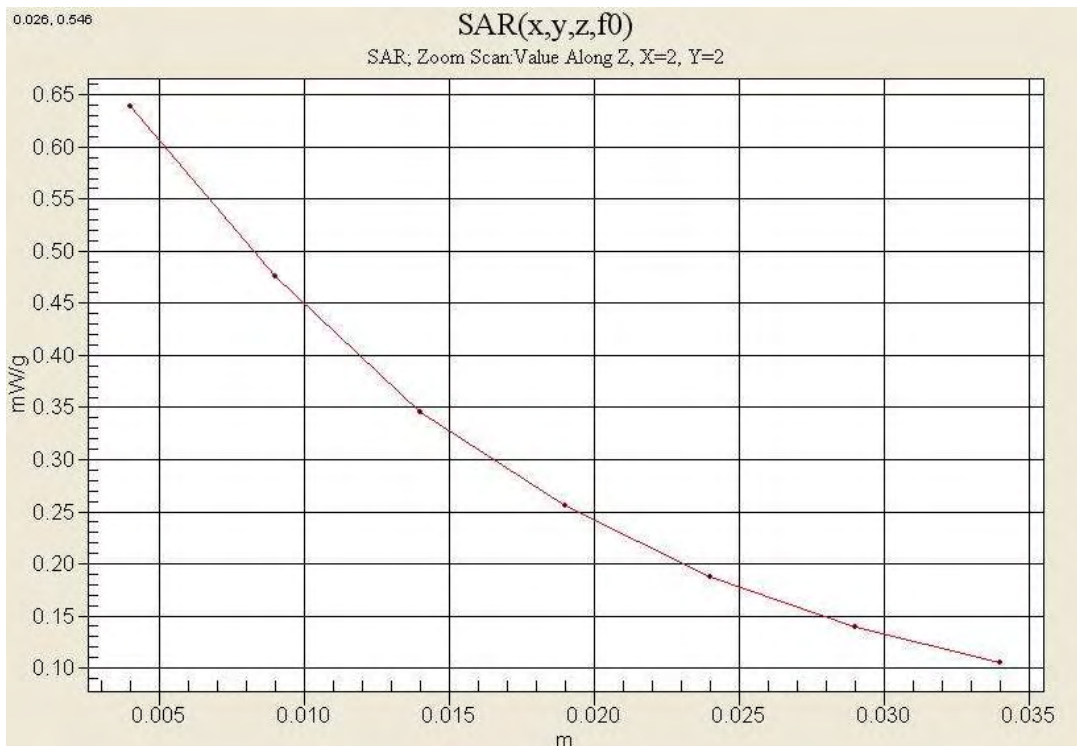
Reference Value = 24.3 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 0.778 W/kg

SAR(1 g) = 0.598 mW/g; SAR(10 g) = 0.421 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.639 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012

DUT: L-02E; Type: bar; Serial: #1

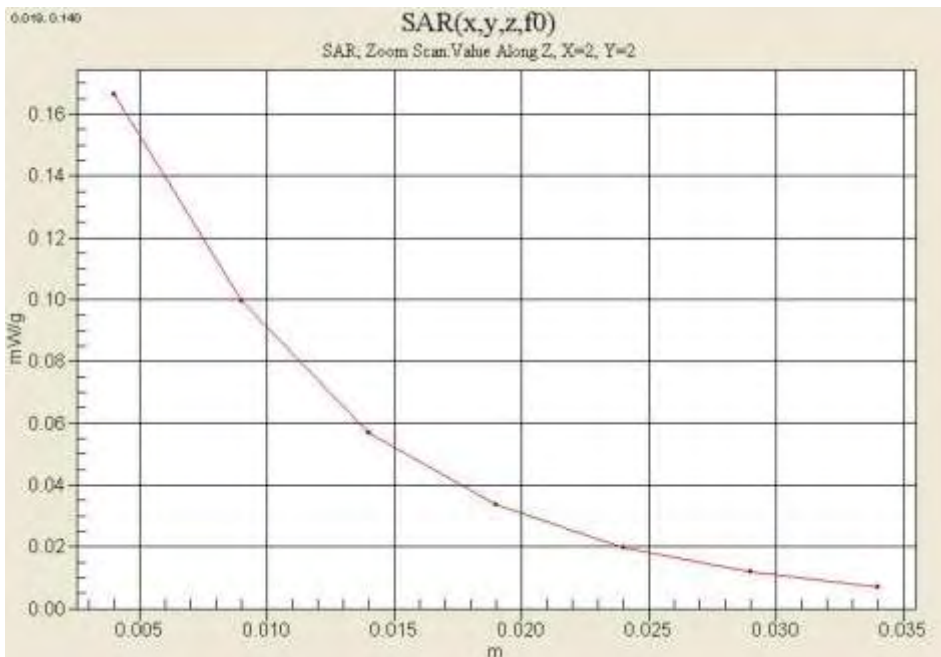
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.35$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 835/900 Phantom ; Type: SAM

GSM1900 Left touch 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.167 mW/g

GSM1900 Left touch 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.42 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.090 mW/g
Maximum value of SAR (measured) = 0.166 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.09, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

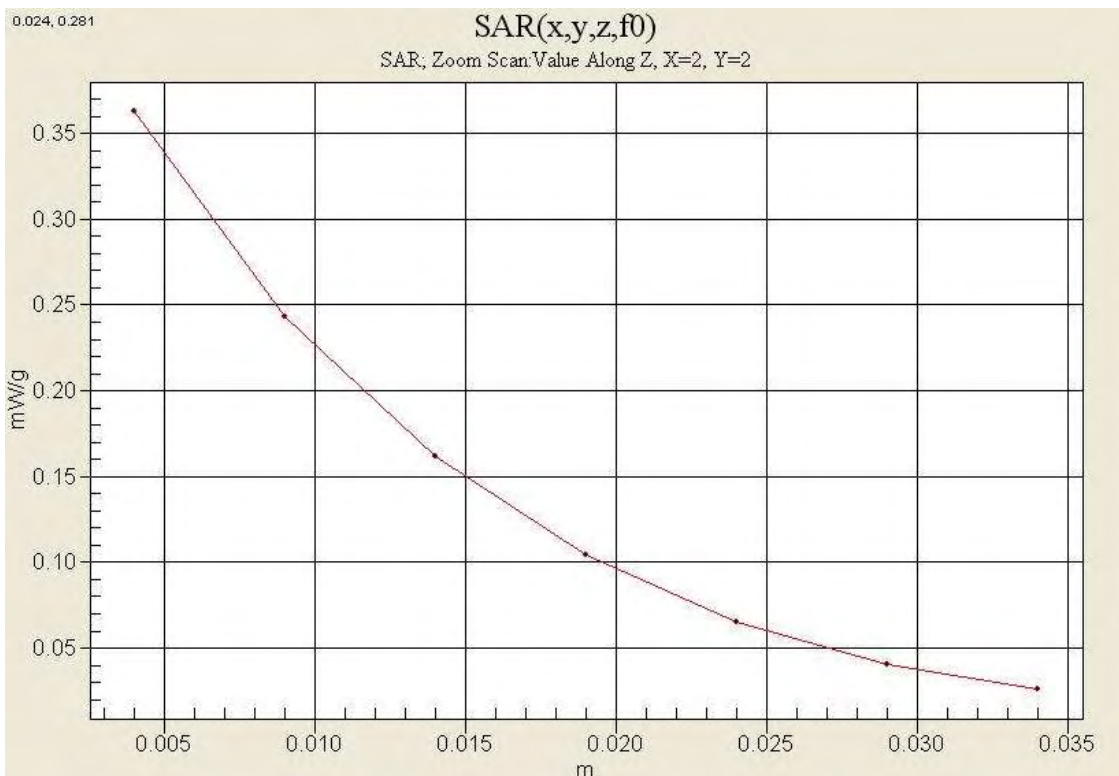
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:2.77
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.53$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

GSM1900 Rear 661/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.476 mW/g

GSM1900 Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.48 V/m; Power Drift = -0.012 dB
Peak SAR (extrapolated) = 0.500 W/kg
SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.212 mW/g
Maximum value of SAR (measured) = 0.363 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN and NFC(Felica)
 Liquid Temperature: 21.2 °C
 Ambient Temperature: 21.4 °C
 Test Date: Oct.08, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.919 \text{ mho/m}$; $\epsilon_r = 40.4$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Left Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

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

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.452 mW/g

WCDMA850 Left touch 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

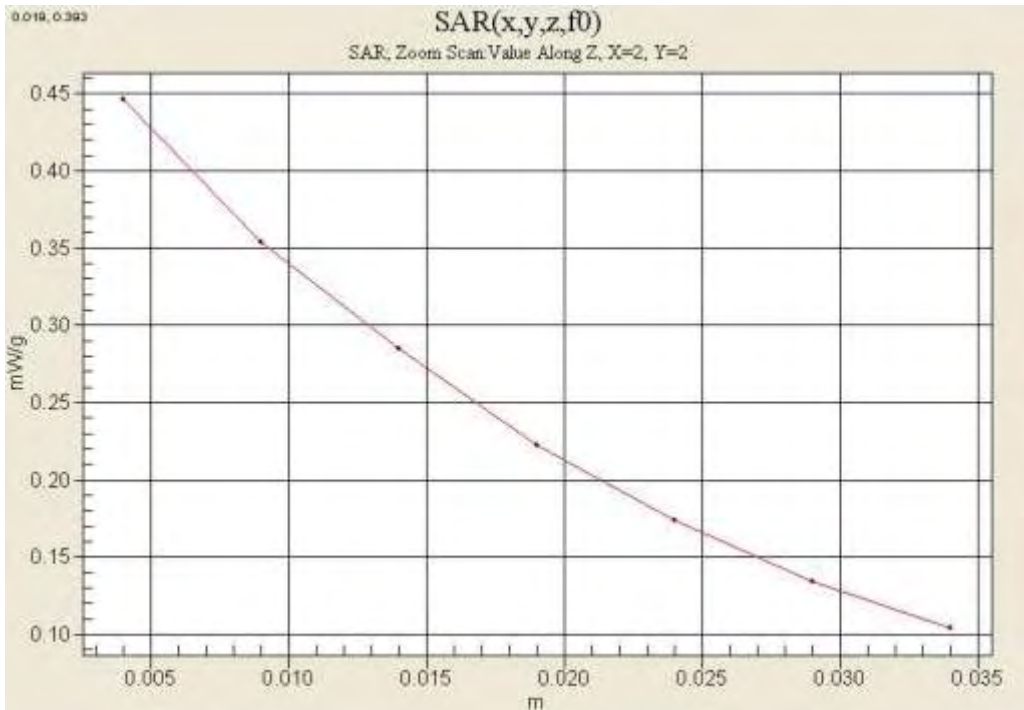
Reference Value = 6.85 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.532 W/kg

SAR(1 g) = 0.426 mW/g; SAR(10 g) = 0.322 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.447 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.08, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: WCDMA850; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

WCDMA850 Hotspot Body Left side 4183/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.720 mW/g

WCDMA850 Hotspot Body Left side 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

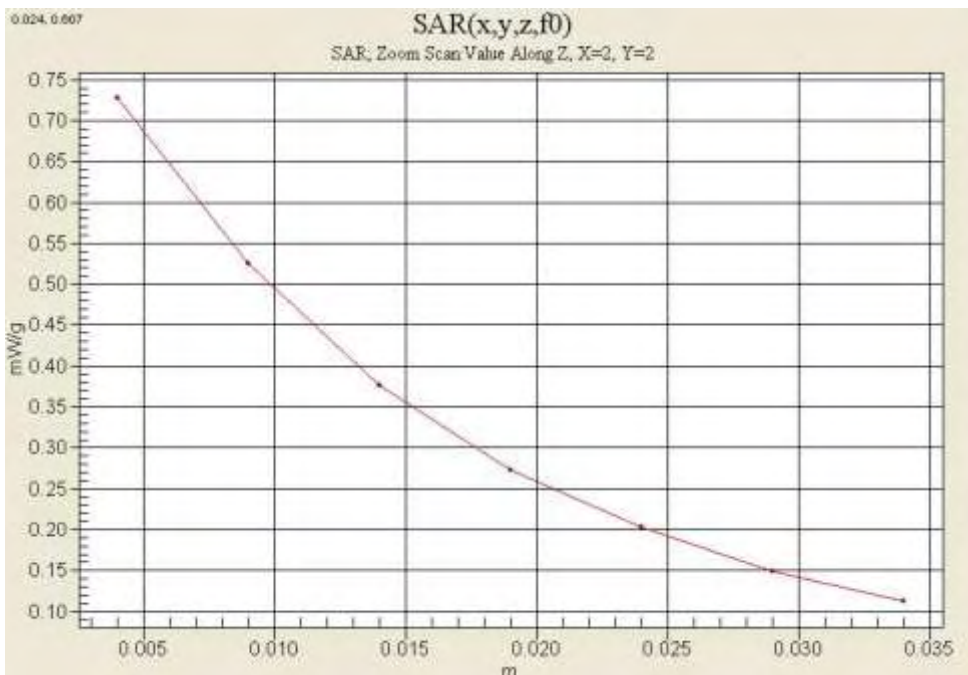
Reference Value = 26.2 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 0.915 W/kg

SAR(1 g) = 0.677 mW/g; SAR(10 g) = 0.469 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.728 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: Oct.11, 2012

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.8$ mho/m; $\epsilon_r = 38.9$; $\rho = 1000$ kg/m³
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: 1800/1900 Phantom; Type: SAM

802.11b Right touch 11/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.197 mW/g

802.11b Right touch 11/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

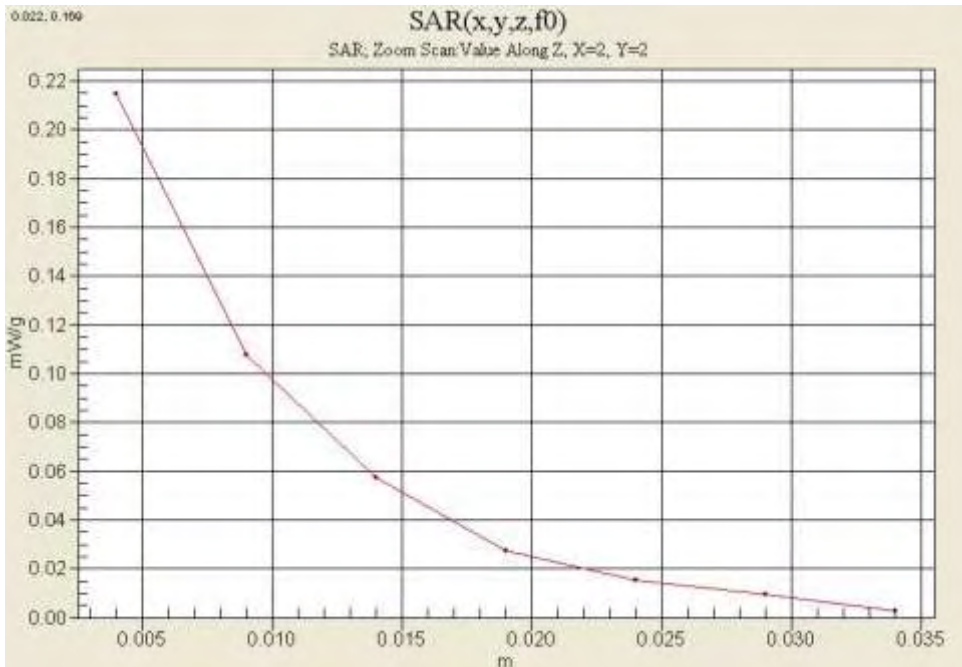
Reference Value = 3.50 V/m; Power Drift = -0.042 dB

Peak SAR (extrapolated) = 0.464 W/kg

SAR(1 g) = 0.193 mW/g; SAR(10 g) = 0.086 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (measured) = 0.215 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth, WLAN and NFC(Felica)
 Liquid Temperature: 21.1 °C
 Ambient Temperature: 21.3 °C
 Test Date: Oct.11, 2012
 Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.97$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³
 Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA

802.11b body front 11ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm

[Info: Interpolated medium parameters used for SAR evaluation.](#)

Maximum value of SAR (interpolated) = 0.057 mW/g

802.11b body front 11ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.05 V/m; Power Drift = 0.086 dB

Peak SAR (extrapolated) = 0.082 W/kg

SAR(1 g) = 0.049 mW/g; SAR(10 g) = 0.024 mW/g

[Info: Interpolated medium parameters used for SAR evaluation.](#)

aximum value of SAR (measured) = 0.057 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012

DUT: L-02E; Type: bar; Serial: #1

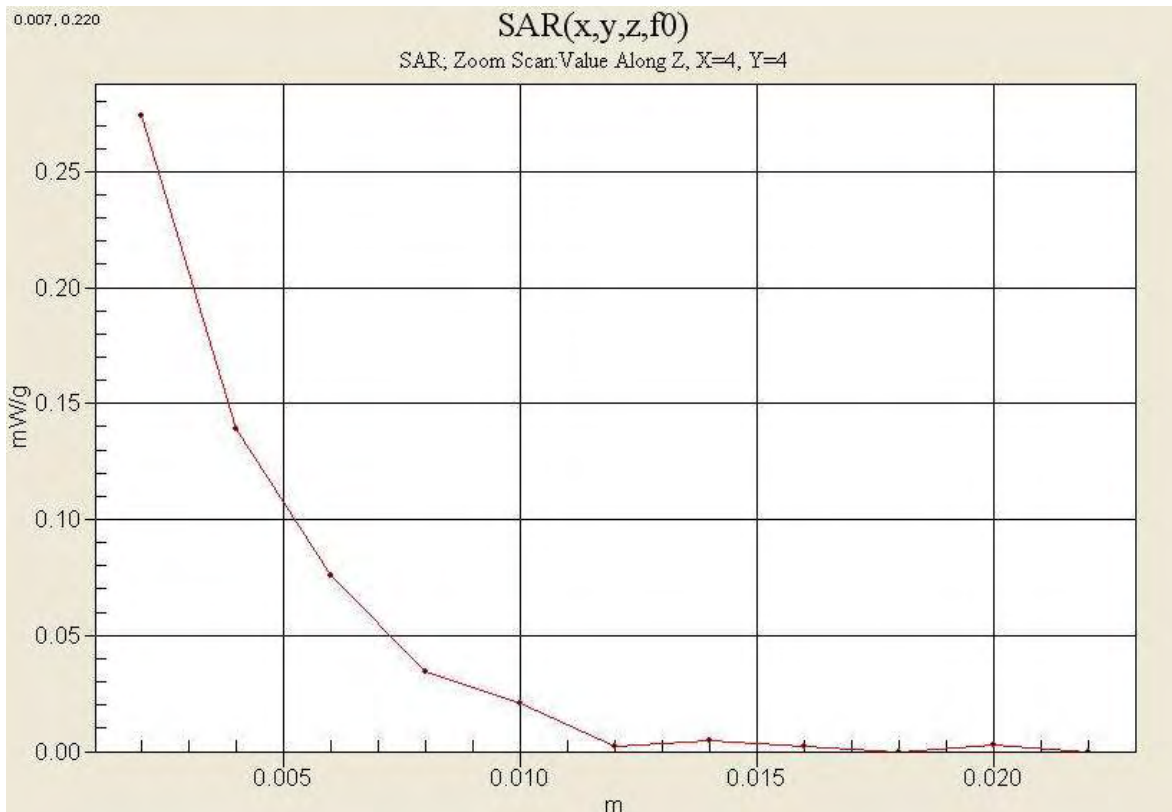
Communication System: WIFI 5GHz; Frequency: 5700 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 5700 \text{ MHz}$; $\sigma = 5.08 \text{ mho/m}$; $\epsilon_r = 35.3$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(4.56, 4.56, 4.56); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: 800/900 Phantom; Type: SAM

Right touch 802.11a 140ch 6Mbps/Area Scan (91x161x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.333 mW/g

Right touch 802.11a 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 3.42 V/m; Power Drift = -0.065 dB
Peak SAR (extrapolated) = 0.542 W/kg
SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.034 mW/g
Maximum value of SAR (measured) = 0.274 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS and Cellular WCDMA/HSDPA/HSUPA Phone with Bluetooth,
WLAN and NFC(Felica)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: Oct.10, 2012
Separation Distance: 1.0 cm

DUT: L-02E; Type: bar; Serial: #1

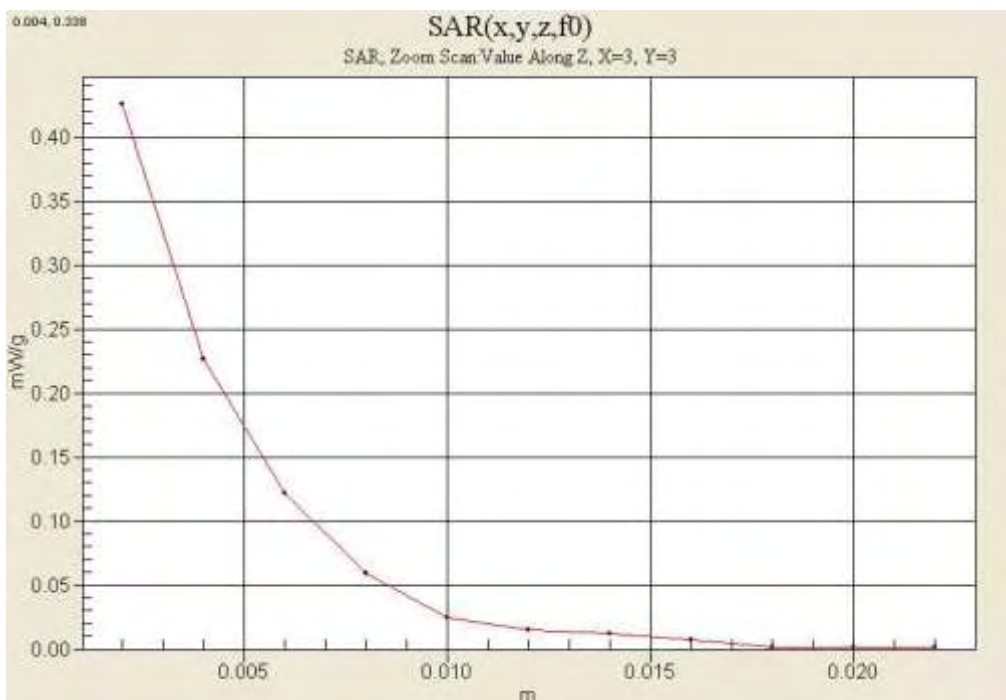
Communication System: WIFI 5GHz; Frequency: 5700 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5700$ MHz; $\sigma = 5.96$ mho/m; $\epsilon_r = 46.3$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(3.66, 3.66, 3.66); Calibrated: 2012-07-13
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn479; Calibrated: 2012-08-28
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

WIFI 5GHz Body Rear 140ch 6Mbps/Area Scan (161x101x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.401 mW/g

WIFI 5GHz Body Rear 140ch 6Mbps/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.16 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.055 mW/g
Maximum value of SAR (measured) = 0.426 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: 21.2 °C
Test Date: Oct.08, 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; $\sigma = 0.918$ mho/m; $\epsilon_r = 40.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.05 mW/g

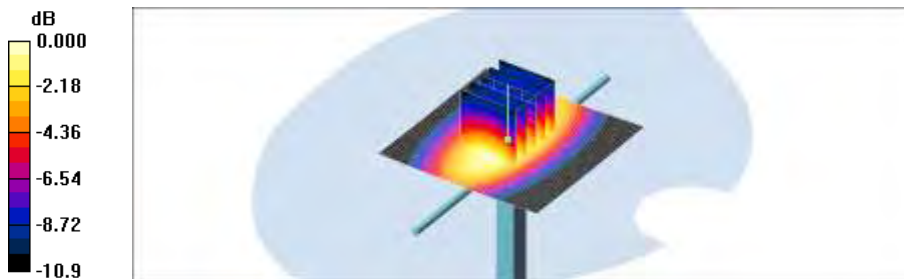
Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 34.9 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.961 mW/g; SAR(10 g) = 0.622 mW/g

Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

■ Validation Data (835 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Oct.08, 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; $\sigma = 1.01$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(6.27, 6.27, 6.27); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 835MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.05 mW/g

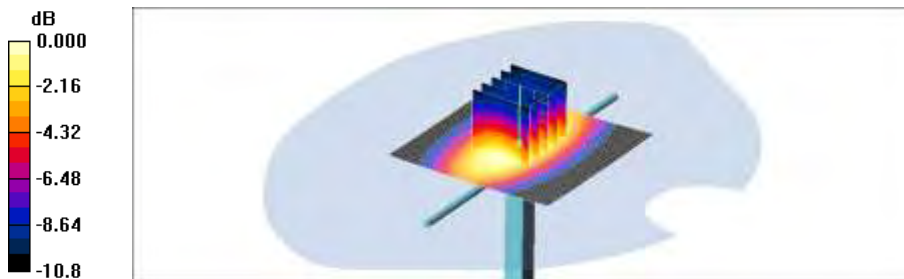
Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 33.7 V/m; Power Drift = -0.067 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.965 mW/g; SAR(10 g) = 0.625 mW/g

Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

■ Validation Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 °C
Test Date: Oct.09, 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; $\sigma = 1.37$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

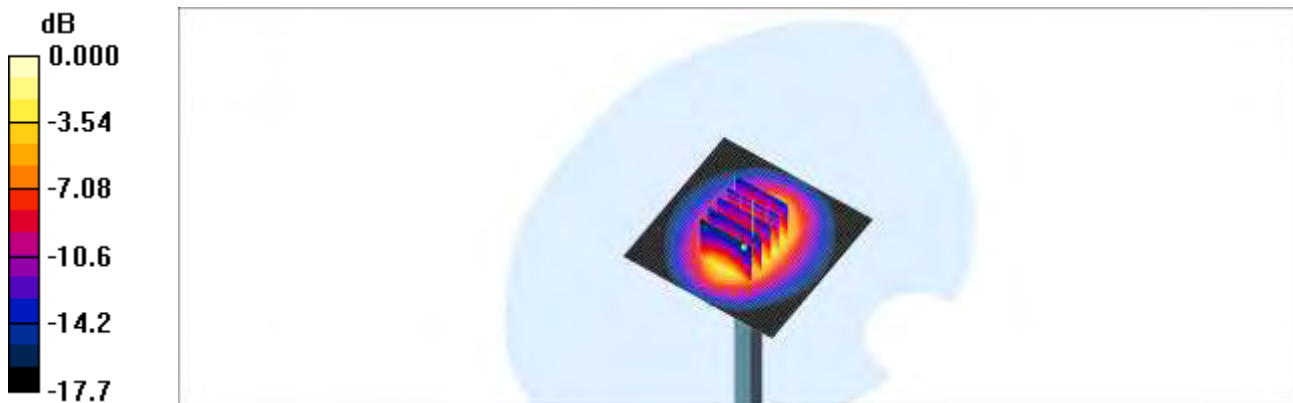
DASY4 Configuration:

- Probe: ET3DV6 - SN1630; ConvF(5.17, 5.17, 5.17); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 835/900 MHz; Type: SAM

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.44 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.3 V/m; Power Drift = -0.027 dB
Peak SAR (extrapolated) = 6.76 W/kg
SAR(1 g) = 3.96 mW/g; SAR(10 g) = 2.21 mW/g

Maximum value of SAR (measured) = 4.37 mW/g



0 dB = 4.37mW/g

■ Validation Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 °C
Test Date: Oct.09, 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; $\sigma = 1.55$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.75, 4.75, 4.75); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

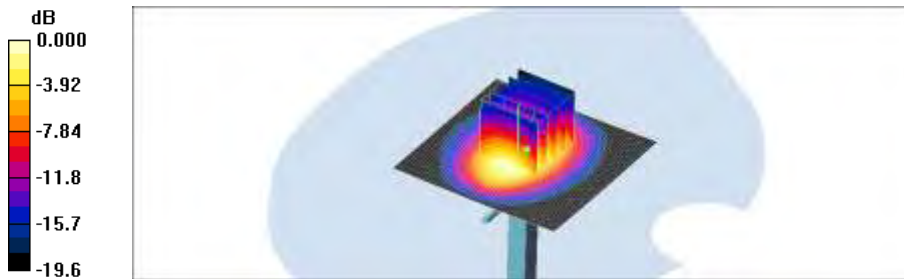
Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.87 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.6 V/m; Power Drift = -0.049 dB

Peak SAR (extrapolated) = 6.86 W/kg

SAR(1 g) = 4 mW/g; SAR(10 g) = 2.09 mW/g

Maximum value of SAR (measured) = 4.46 mW/g



0 dB = 4.46mW/g

■ Validation Data (2 450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 °C
Test Date: Oct.11, 2012

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

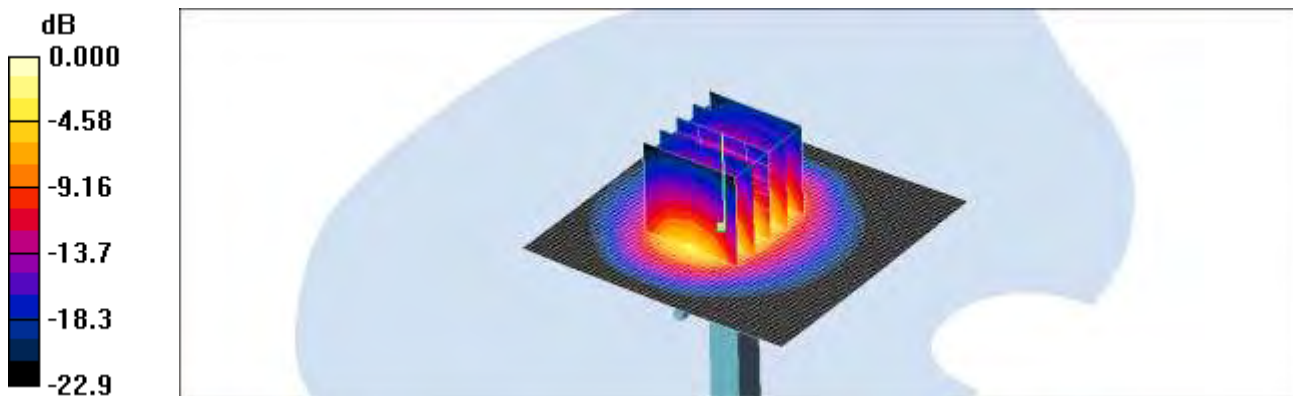
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.79$ mho/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.57, 4.57, 4.57); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.34 mW/g

Validation 2450MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 60.0 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 12.3 W/kg
SAR(1 g) = 5.27 mW/g; SAR(10 g) = 2.4 mW/g
Maximum value of SAR (measured) = 5.80 mW/g



0 dB = 5.80mW/g

■ Validation Data (2 450 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.1 °C
Test Date: Oct.11, 2012

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

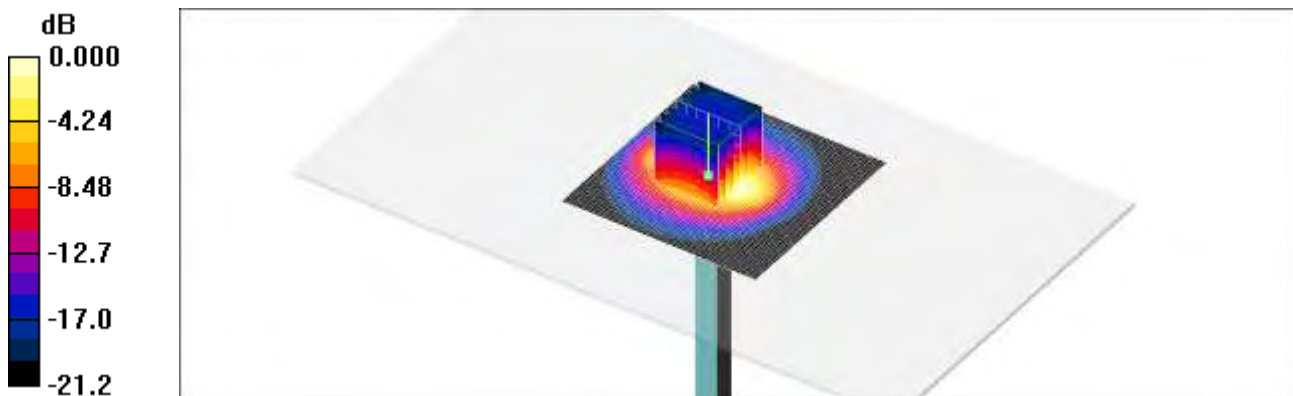
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

DASY4 Configuration:

- Probe: ET3DV6 – SN1630; ConvF(4.3, 4.3, 4.3); Calibrated: 2011-11-18
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn912; Calibrated: 2011-11-17
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Validation 2450MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 6.26 mW/g

Validation 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.2 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 12.1 W/kg
SAR(1 g) = 5.16 mW/g; SAR(10 g) = 2.46 mW/g
Maximum value of SAR (measured) = 5.61 mW/g



0 dB = 5.61mW/g

■ Validation Data (5GHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Oct.10, 2012

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1002

Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5500$ MHz; $\sigma = 4.83$ mho/m; $\epsilon_r = 35.7$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; 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

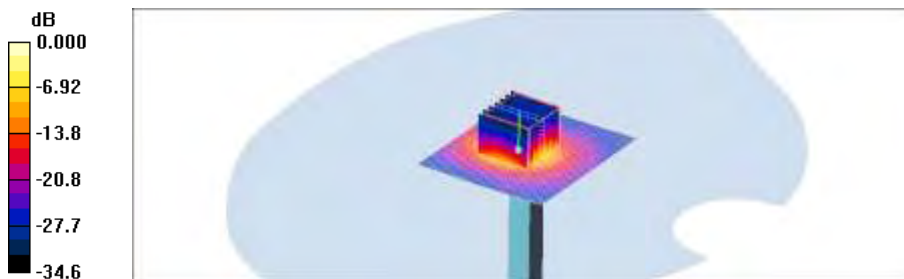
Validation 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 38.8 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 36.8 W/kg

SAR(1 g) = 8.11 mW/g; SAR(10 g) = 2.23 mW/g

Maximum value of SAR (measured) = 17.1 mW/g



0 dB = 17.1mW/g

■ Validation Data (5GHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Oct.10, 2012

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 - SN:1002

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5800$ MHz; $\sigma = 5.24$ mho/m; $\epsilon_r = 34.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; 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) = 8.44 mW/g

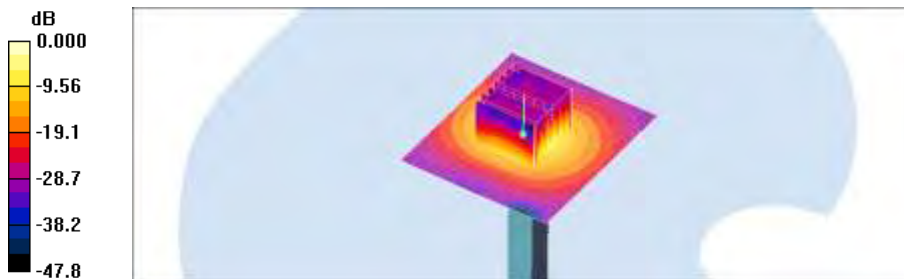
Validation 5800MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 38.0 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 35.7 W/kg

SAR(1 g) = 7.66 mW/g; SAR(10 g) = 2.14 mW/g

Maximum value of SAR (measured) = 15.4 mW/g



0 dB = 15.4mW/g

■ Validation Data (5GHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Oct.10, 2012

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 – SN:1002

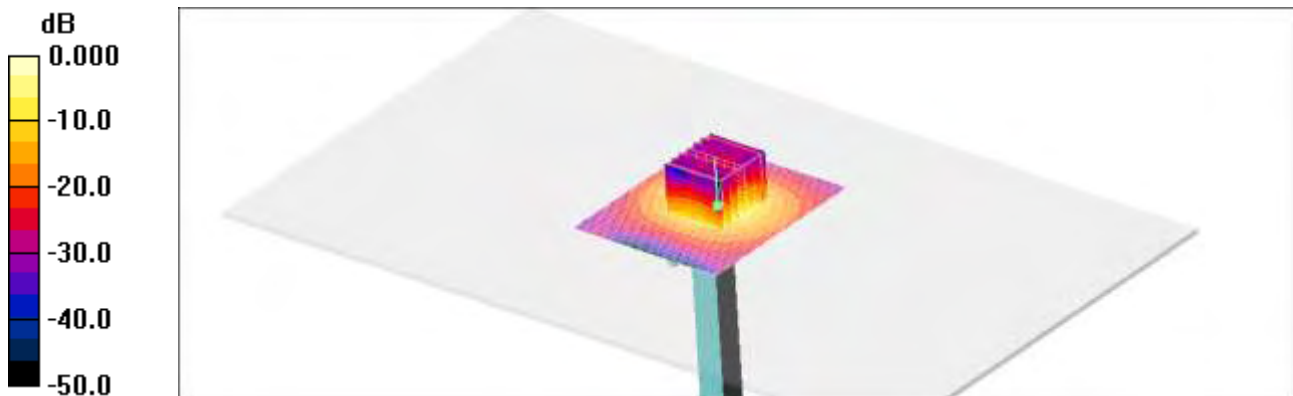
Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5500$ MHz; $\sigma = 5.58$ mho/m; $\epsilon_r = 46.5$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 184

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: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Validation 5500MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.82 mW/g

Validation 5500MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 38.0 V/m; Power Drift = 0.019 dB
Peak SAR (extrapolated) = 34.0 W/kg
SAR(1 g) = 7.96 mW/g; SAR(10 g) = 2.26 mW/g
Maximum value of SAR (measured) = 16.6 mW/g



0 dB = 16.6mW/g

■ Validation Data (5GHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: Oct.10, 2012

DUT: Dipole 5GHz; Type: D5000V2; Serial: D5000V2 – SN:1002

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5800$ MHz; $\sigma = 6.17$ mho/m; $\epsilon_r = 46.2$; $\rho = 1000$ kg/m³
Phantom section: Center Section ; Measurement SW: DASY4, V4.7 Build 80; 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: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA

Validation 5800MHz/Area Scan (61x71x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 8.39 mW/g

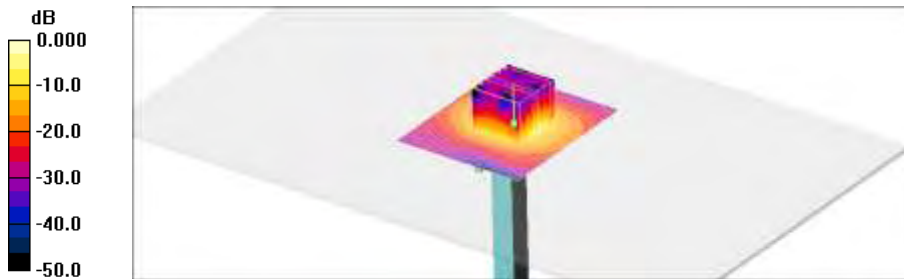
Validation 5800MHz/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 35.4 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 33.4 W/kg

SAR(1 g) = 7.57 mW/g; SAR(10 g) = 2.13 mW/g

Maximum value of SAR (measured) = 16.1 mW/g



■ Dielectric Parameter (835 MHz Head)

Title L-02E
 SubTitle 835MHz
 Test Date Oct.08, 2012

Frequency	e'	e''
800000000.0000	40.7201	19.9074
805000000.0000	40.6481	19.8547
810000000.0000	40.6105	19.8474
815000000.0000	40.5484	19.8254
820000000.0000	40.5325	19.8128
825000000.0000	40.4658	19.7873
830000000.0000	40.4400	19.7724
835000000.0000	40.4113	19.7636
840000000.0000	40.3606	19.7296
845000000.0000	40.3204	19.6931
850000000.0000	40.2573	19.6840
855000000.0000	40.2065	19.6410
860000000.0000	40.1331	19.6252
865000000.0000	40.0813	19.5731
870000000.0000	40.0610	19.5586
875000000.0000	40.0085	19.5179
880000000.0000	39.9022	19.4979
885000000.0000	39.8409	19.4908
890000000.0000	39.7891	19.4612
895000000.0000	39.7355	19.4227
900000000.0000	39.6598	19.3910

■ Dielectric Parameter (835 MHz Body)

Title L-02E
SubTitle 835MHz
Test Date Oct.08, 2012

Frequency	e'	e''
800000000.0000	54.4181	21.6903
805000000.0000	54.4270	21.6702
810000000.0000	54.4023	21.6336
815000000.0000	54.3813	21.6523
820000000.0000	54.3820	21.6348
825000000.0000	54.3890	21.6483
830000000.0000	54.3418	21.6479
835000000.0000	54.3222	21.6595
840000000.0000	54.2619	21.6473
845000000.0000	54.2135	21.6639
850000000.0000	54.1458	21.6548
855000000.0000	54.0638	21.6623
860000000.0000	53.9737	21.6297
865000000.0000	53.9191	21.5734
870000000.0000	53.8308	21.5253
875000000.0000	53.7486	21.5183
880000000.0000	53.6907	21.4599
885000000.0000	53.7090	21.4045
890000000.0000	53.6618	21.3429
895000000.0000	53.6363	21.2682
900000000.0000	53.5949	21.2317

■ Dielectric Parameter (1 900 MHz Head)

Title L-02E
SubTitle 1 900MHz
Test Date Oct.09, 2012

Frequency	e'	e''
1800000000.0000	41.2281	12.6550
1810000000.0000	41.1920	12.6769
1820000000.0000	41.1528	12.6938
1830000000.0000	41.0998	12.7303
1840000000.0000	41.0511	12.7635
1850000000.0000	41.0269	12.7904
1860000000.0000	40.9879	12.8297
1870000000.0000	40.9644	12.8713
1880000000.0000	40.9249	12.8892
1890000000.0000	40.8923	12.9181
1900000000.0000	40.8607	12.9407
1910000000.0000	40.8247	12.9799
1920000000.0000	40.7909	12.9944
1930000000.0000	40.7416	13.0370
1940000000.0000	40.7229	13.0545
1950000000.0000	40.6718	13.1004
1960000000.0000	40.6551	13.1169
1970000000.0000	40.5944	13.1339
1980000000.0000	40.5608	13.1752
1990000000.0000	40.5189	13.1854
2000000000.0000	40.4708	13.2290

■ Dielectric Parameter (1 900 MHz Body)

Title L-02E
SubTitle 1 900MHz
Test Date Oct.09, 2012

Frequency	e'	e''
1850000000.0000	52.4125	14.5770
1855000000.0000	52.3966	14.5924
1860000000.0000	52.3773	14.6049
1865000000.0000	52.3610	14.6135
1870000000.0000	52.3350	14.6205
1875000000.0000	52.3422	14.6279
1880000000.0000	52.3144	14.6382
1885000000.0000	52.3160	14.6463
1890000000.0000	52.2941	14.6489
1895000000.0000	52.2818	14.6657
1900000000.0000	52.2588	14.6585
1905000000.0000	52.2546	14.6882
1910000000.0000	52.2328	14.6919
1915000000.0000	52.2233	14.7061
1920000000.0000	52.1985	14.7151
1925000000.0000	52.1903	14.7320
1930000000.0000	52.1749	14.7357
1935000000.0000	52.1575	14.7429
1940000000.0000	52.1604	14.7686
1945000000.0000	52.1274	14.7755
1950000000.0000	52.1334	14.7808

■ Dielectric Parameter (2 450 MHz Head)

Title L-02E
SubTitle 2 450MHz
Test Date Sep.20, 2012

Frequency	e'	e''
2400000000.0000	39.2809	13.0257
2405000000.0000	39.2617	13.0331
2410000000.0000	39.2424	13.0435
2415000000.0000	39.2203	13.0535
2420000000.0000	39.2055	13.0490
2425000000.0000	39.1778	13.0584
2430000000.0000	39.1409	13.0700
2435000000.0000	39.0983	13.0811
2440000000.0000	39.0825	13.0973
2445000000.0000	39.0376	13.1050
2450000000.0000	38.9994	13.1073
2455000000.0000	38.9708	13.1402
2460000000.0000	38.9489	13.1675
2465000000.0000	38.9158	13.1879
2470000000.0000	38.9120	13.2164
2475000000.0000	38.9003	13.2353
2480000000.0000	38.9056	13.2672
2485000000.0000	38.8828	13.2984
2490000000.0000	38.8977	13.3248
2495000000.0000	38.9074	13.3225
2500000000.0000	38.9005	13.3455

■ Dielectric Parameter (2 450 MHz Body)

Title L-02E
SubTitle 2 450MHz
Test Date Sep.20, 2012

Frequency	e'	e''
2400000000.0000	51.7566	15.5926
2405000000.0000	51.9156	15.6692
2410000000.0000	52.1304	15.6759
2415000000.0000	52.3840	15.6272
2420000000.0000	52.6721	15.5302
2425000000.0000	52.9454	15.4031
2430000000.0000	53.2225	15.2285
2435000000.0000	53.4583	15.0398
2440000000.0000	53.6277	14.8833
2445000000.0000	53.7350	14.7155
2450000000.0000	53.7834	14.5661
2455000000.0000	53.7673	14.4515
2460000000.0000	53.6678	14.3874
2465000000.0000	53.5367	14.3474
2470000000.0000	53.3521	14.3595
2475000000.0000	53.1497	14.3890
2480000000.0000	52.9057	14.4628
2485000000.0000	52.6708	14.5596
2490000000.0000	52.4328	14.6701
2495000000.0000	52.2228	14.7728
2500000000.0000	52.0548	14.8898

■ Dielectric Parameter (5GHz Head)

Title L-02E
SubTitle 5GHz
Test Date Sep.20, 2012

Frequency	e'	e''
5000000000.0000	36.6322	15.0607
5050000000.0000	36.6298	15.4436
5100000000.0000	36.6108	15.1934
5150000000.0000	36.2836	15.5702
5200000000.0000	36.4676	15.5473
5250000000.0000	36.1416	15.4805
5300000000.0000	36.1443	15.7819
5350000000.0000	36.1424	15.5276
5400000000.0000	35.8637	15.7846
5450000000.0000	35.9780	15.7580
5500000000.0000	35.6859	15.7823
5550000000.0000	35.6230	15.9548
5600000000.0000	35.5670	15.8775
5650000000.0000	35.3274	16.0440
5700000000.0000	35.2766	16.0237
5750000000.0000	35.0264	16.1403
5800000000.0000	34.8957	16.2298
5850000000.0000	34.7524	16.2940
5900000000.0000	34.5622	16.4875
5950000000.0000	34.5291	16.4947
6000000000.0000	34.2943	16.6217

■ Dielectric Parameter (5GHz Body)

Title L-02E
 SubTitle 5GHz
 Test Date Sep.20, 2012

Frequency	e'	e''
5000000000.0000	48.0273	17.8130
5050000000.0000	48.1269	17.6969
5100000000.0000	47.8189	17.7866
5150000000.0000	47.8511	17.8781
5200000000.0000	47.4814	17.9871
5250000000.0000	47.6402	17.9247
5300000000.0000	47.0058	18.0551
5350000000.0000	47.5381	18.1462
5400000000.0000	46.6957	18.0466
5450000000.0000	47.2050	18.5900
5500000000.0000	46.5404	18.2290
5550000000.0000	46.7529	18.9374
5600000000.0000	46.5003	18.5231
5650000000.0000	46.3948	19.1534
5700000000.0000	46.2950	18.8085
5750000000.0000	46.0469	19.4217
5800000000.0000	46.1987	19.1282
5850000000.0000	45.7555	19.5453
5900000000.0000	46.1435	19.4853
5950000000.0000	45.4686	19.5798
6000000000.0000	46.0002	19.7982

Attachment 3. – Probe Calibration Data

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



SCS
Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
Servizio svizzero di taratura
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**

Client **HCT (Dymstec)**

Certificate No: **ET3-1630_Nov11**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1630**

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: **November 18, 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 E4419B	GBA1293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41486067	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01368)	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 ES30V2	SN: 3013	29-Dec-10 (No. ES3-3013, Dec10)	Dec-11
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-09 (in house check Apr-11)	in house check: Apr-13
Network Analyzer HP 8753E	US37300585	18-Oct-01 (in house check Oct-11)	in house check: Oct-12

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

Issued: November 18, 2011

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

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 issue simulating liquid
 NORM_{x,y,z} sensitivity in free space
 ConvF sensitivity in TSL / NORM_{x,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 β β rotation around an axis that is in the plane normal to probe axis (at measurement center),
 i.e., $\beta = 0$ 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:

- NORM_{x,y,z}: Assessed for E-field polarization $\beta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependant 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.

ET3DV6 - SN:1630

November 18, 2011

Probe ET3DV6

SN:1630

Manufactured: October 12, 2001
Calibrated: November 18, 2011

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

ET3DV6- SN:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$) ^A	1.71	1.62	1.60	$\pm 10.1\%$
DCP (mV) ^B	100.3	99.5	101.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^C (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	98.2	$\pm 2.7\%$
			Y	0.00	0.00	1.00	101.9	
			Z	0.00	0.00	1.00	98.0	

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 Norm X, Y, Z do not affect the E²-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.

ET3DV6- SN:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630

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)
300	45.3	0.87	8.13	8.13	8.13	0.31	1.60	± 13.4 %
450	43.5	0.87	7.40	7.40	7.40	0.22	2.27	± 13.4 %
750	41.9	0.89	6.61	6.61	6.61	0.82	1.68	± 12.0 %
835	41.5	0.90	6.27	6.27	6.27	0.72	1.84	± 12.0 %
900	41.5	0.97	6.16	6.16	6.16	0.68	1.92	± 12.0 %
1450	40.5	1.20	5.57	5.57	5.57	0.54	2.48	± 12.0 %
1750	40.1	1.37	5.43	5.43	5.43	0.60	2.26	± 12.0 %
1900	40.0	1.40	5.17	5.17	5.17	0.63	2.15	± 12.0 %
1950	40.0	1.40	5.05	5.05	5.05	0.63	2.13	± 12.0 %
2450	39.2	1.80	4.57	4.57	4.57	0.81	1.74	± 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:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^f	Conductivity (S/m) ^g	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
300	58.2	0.92	7.96	7.96	7.96	0.29	2.29	± 13.4 %
450	56.7	0.94	7.74	7.74	7.74	0.16	2.25	± 13.4 %
750	55.5	0.96	6.36	6.36	6.36	0.75	1.84	± 12.0 %
835	55.2	0.97	6.27	6.27	6.27	0.72	1.88	± 12.0 %
1450	54.0	1.30	5.46	5.46	5.46	0.70	1.97	± 12.0 %
1750	53.4	1.49	4.95	4.95	4.95	0.59	2.72	± 12.0 %
1900	53.3	1.52	4.75	4.75	4.75	0.60	2.56	± 12.0 %
2450	52.7	1.95	4.30	4.30	4.30	1.00	1.29	± 12.0 %

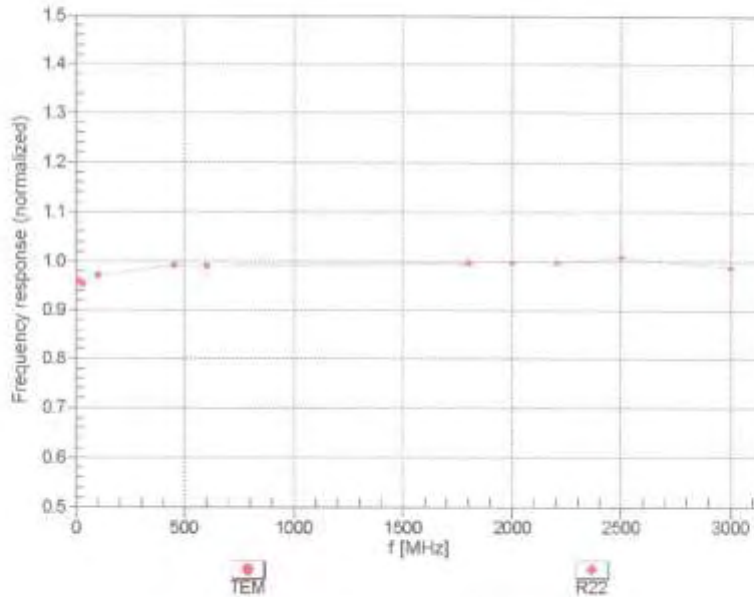
^c Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^g 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:1630

November 18, 2011

Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

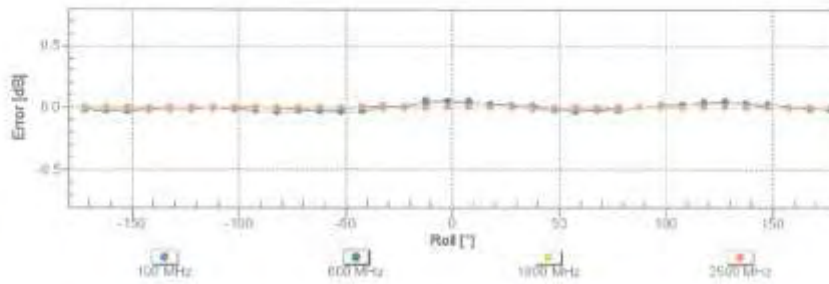
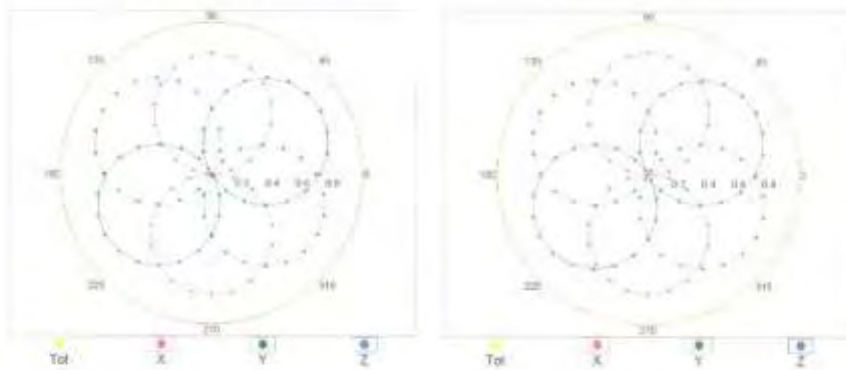
ET3DV6- SN:1630

November 16, 2011

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz,TEM

f=1800 MHz,R22

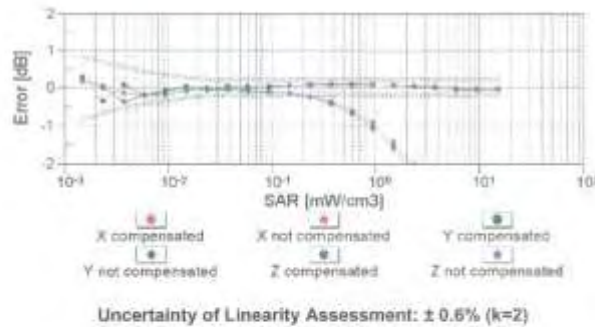
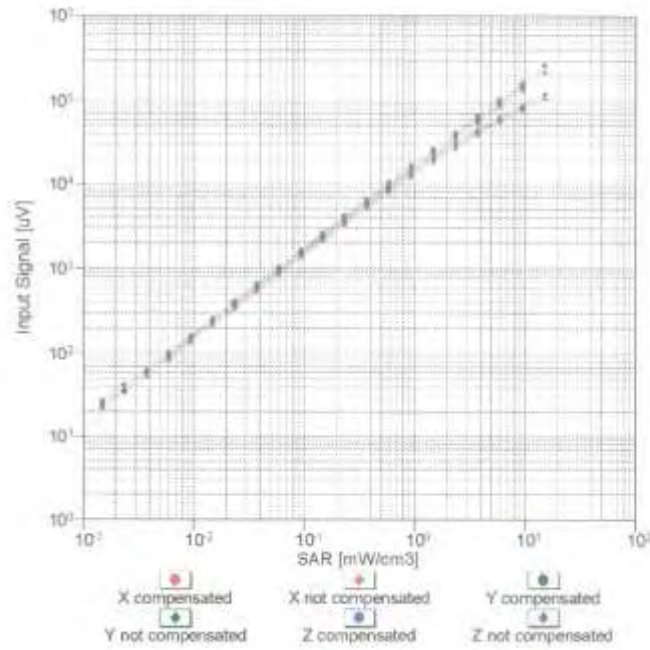


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ET3DV6- SN:1630

November 18, 2011

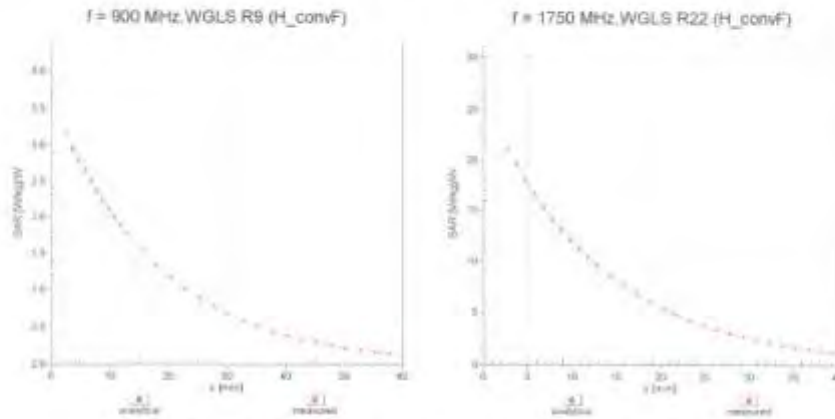
Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)



ET3DV6-SN:1630

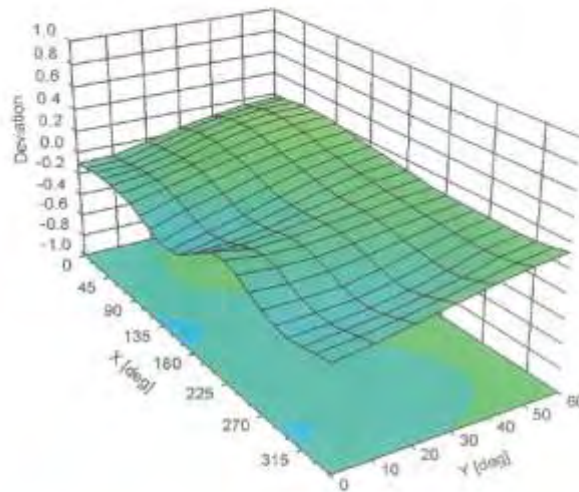
November 18, 2011

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ , θ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)

ET3DV6-SN:1630

November 18, 2011

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1630**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

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info@speag.com, <http://www.speag.com>

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1630

Place of Assessment:

Zurich

Date of Assessment:

November 21, 2011

Probe Calibration Date:

November 18, 2011

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the recalibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 450, 900 MHz or at 1750 MHz.

Assessed by:



ET3DV6-SN:1630

Page 1 of 2

November 21, 2011

Schmid & Partner Engineering AG

s p e a g

Zoughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

Dosimetric E-Field Probe ET3DV6 - SN:1630

Conversion factor (\pm standard deviation)

150 \pm 50 MHz *ConvF* 8.03 \pm 10%

$\epsilon_r = 52.3 \pm 5\%$
 $\sigma = 0.76 \pm 5\%$ mho/m
(head tissue)

150 \pm 50 MHz *ConvF* 8.29 \pm 10%

$\epsilon_r = 61.9 \pm 5\%$
 $\sigma = 0.88 \pm 5\%$ mho/m
(body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also DASY Manual.

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SCS Schweizerischer Kalibrierdienst
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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 (MSTE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	0841293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: 55054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: 55086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: 55129 (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 8548C	US3642UD1700	4-Aug-09 (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 Kastnat	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 14, 2012

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

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ 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:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,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.

EX3DV4 – SN:3863

July 13, 2012

Probe EX3DV4

SN:3863

Manufactured: February 2, 2012

Calibrated: July 13, 2012

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

EX3DV4- SN:3863

July 13, 2012

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^{\text{a}}$)	0.36	0.36	0.45	$\pm 10.1 \%$
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 ^c (k=2)
0	CW	0.00	X	0.00	0.00	1.00	138.3	$\pm 2.2 \%$
			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 E²-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.

EX3DV4- SN:3863

July 13, 2012

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

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^c	Relative Permittivity ^d	Conductivity (S/m) ^e	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.

^d 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

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 %

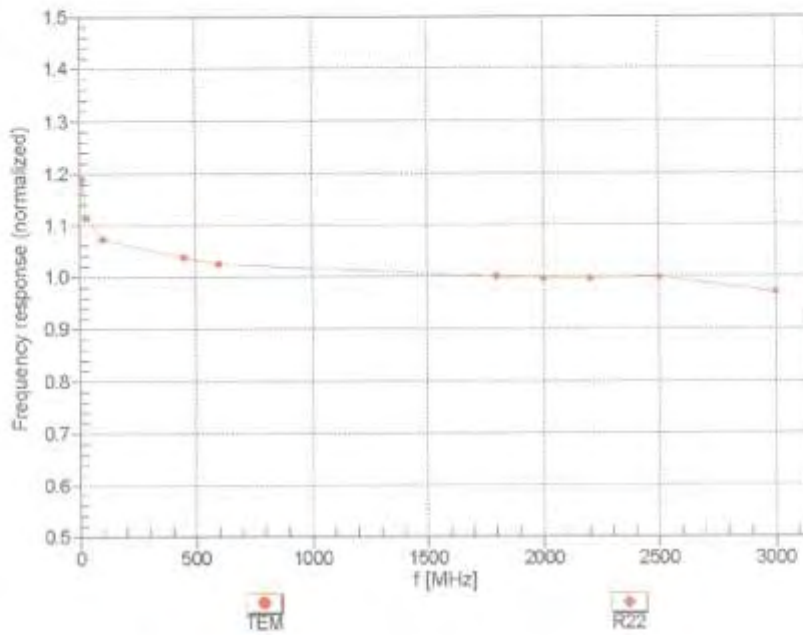
^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^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: $\pm 6.3\%$ (k=2)

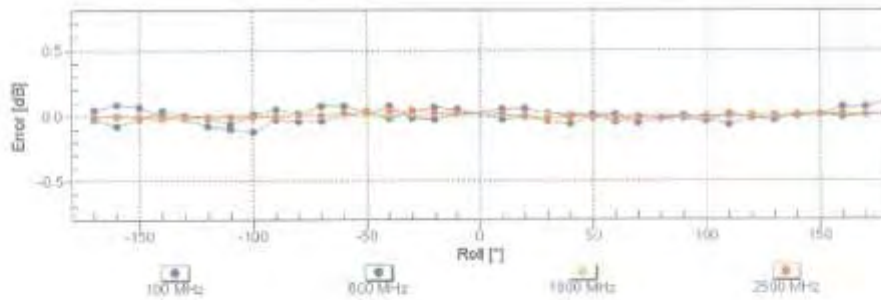
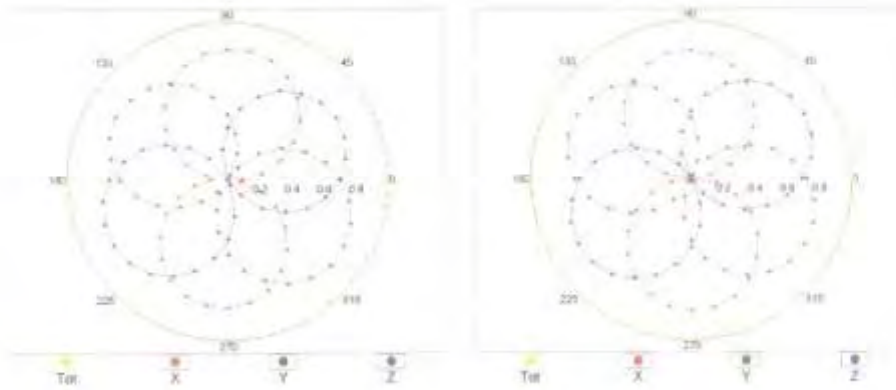
EX3DV4- SN:3863

July 13, 2012

Receiving Pattern (ϕ), $\theta = 0^\circ$

f=600 MHz,TEM

f=1800 MHz,R22

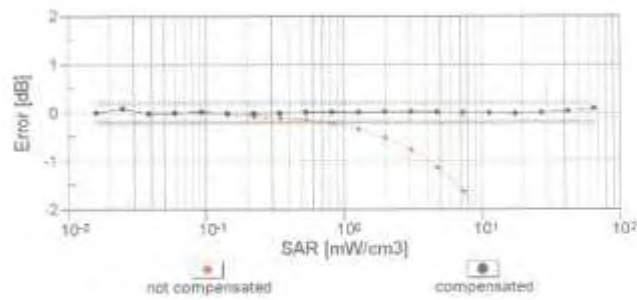
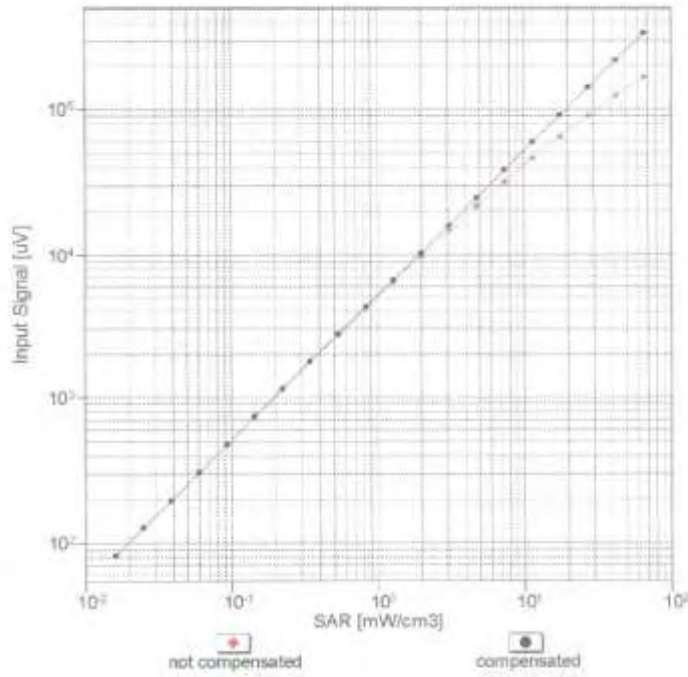


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

EX3DV4- SN:3863

July 13, 2012

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

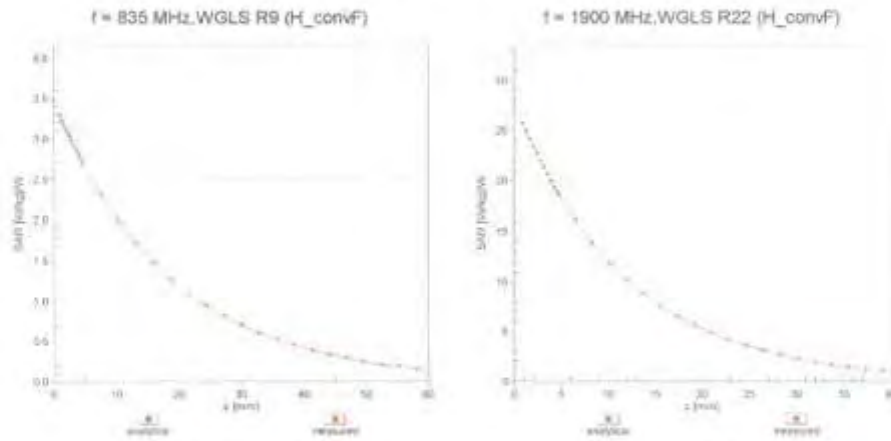


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

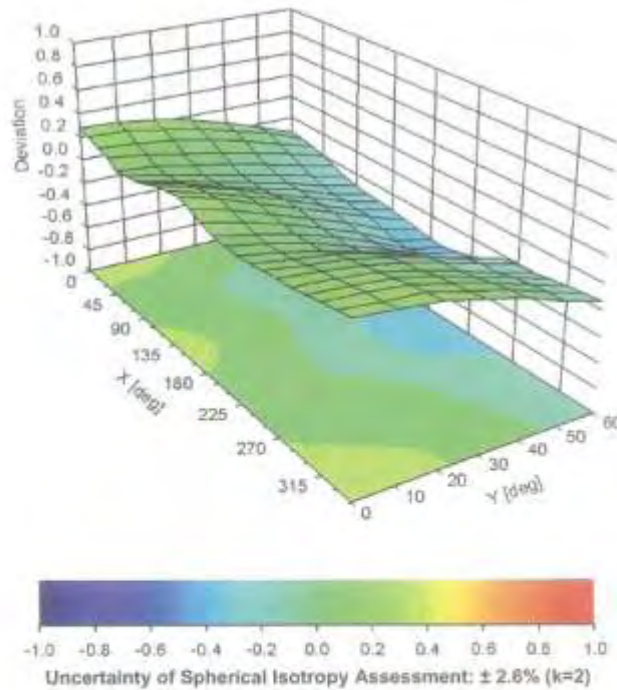
EX3DV4- SN:3883

July 13, 2012

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ , θ), $f = 900$ MHz



EX3DV4- SN:3863

July 13, 2012

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

Attachment 4. – Dipole Calibration Data

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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	G837480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP B481A	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 B481A	MY41082317	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
Calibrated by:	Name Israel El-Naouq	Function Laboratory Technician	Signature
Approved by:	Katja Pokovic	Technical Manager	
			issued: May 16, 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:

- 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
- 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
- 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:

- 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 \pm 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 \pm 0.2) °C	40.6 \pm 6 %	0.89 mho/m \pm 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	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.43 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (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 \pm 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 \pm 0.2) °C	54.3 \pm 6 %	1.00 mho/m \pm 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	2.44 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.50 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (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 \pm 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.1 Ω - 5.8 j Ω
Return Loss	- 24.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.0 Ω - 8.1 j Ω
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; $\sigma = 0.89$ mho/m; $\epsilon_r = 40.6$; $\rho = 1000$ kg/m³

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:

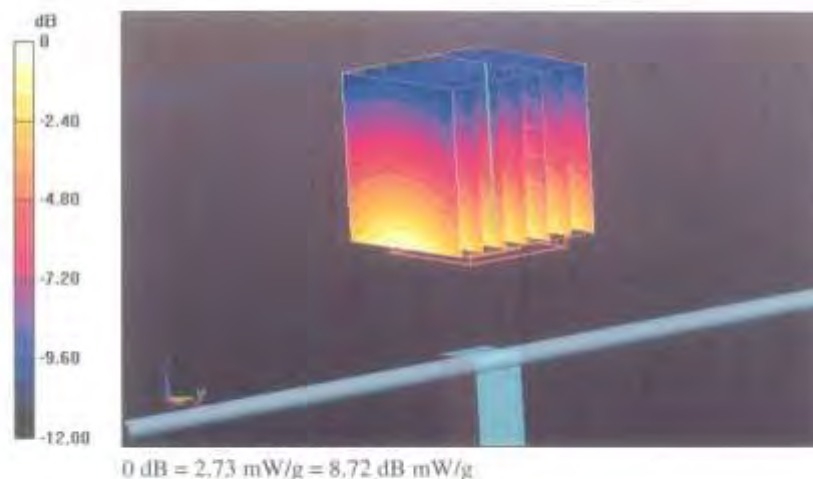
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.129 V/m; Power Drift = 0.00 dB

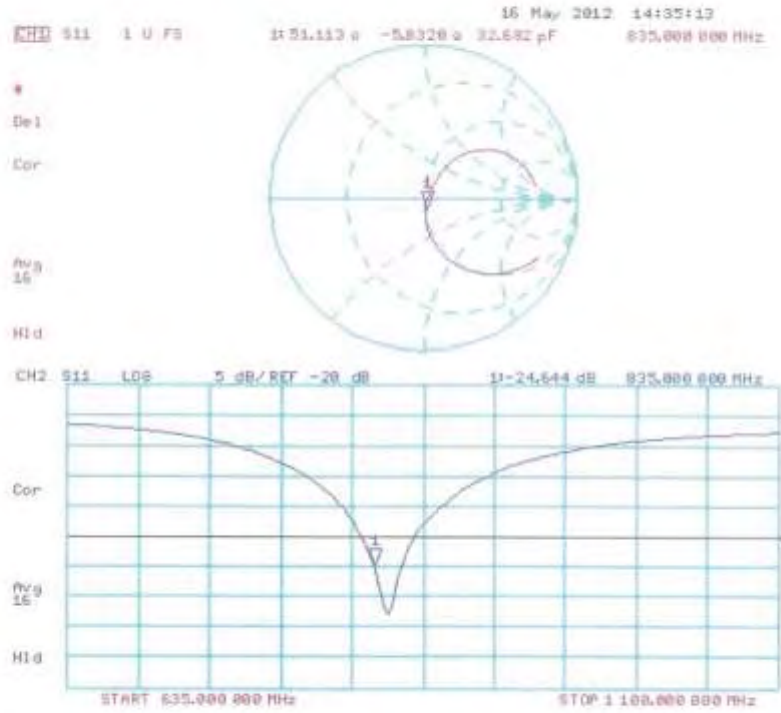
Peak SAR (extrapolated) = 3.474 mW/g

SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.73 mW/g



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; $\sigma = 1$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³

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:

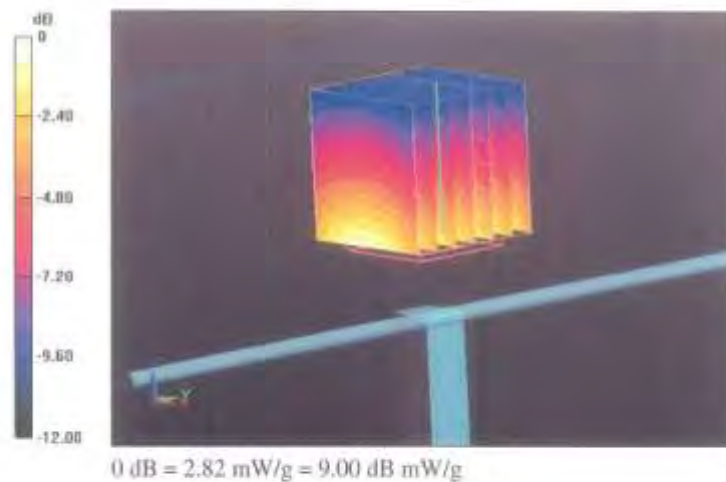
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.054 V/m; Power Drift = 0.03 dB

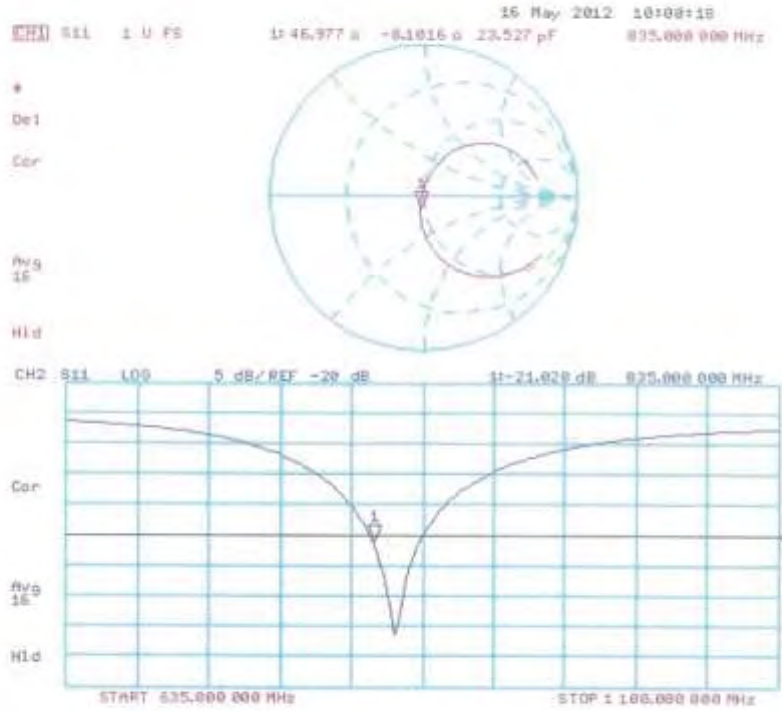
Peak SAR (extrapolated) = 3.533 mW/g

SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.82 mW/g



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 realizes 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 / 08327	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 RSS SMT-08	100005	04-Aug-09 (in house check Oct-11)	in house check: Oct-13
Network Analyzer HP 8753E	US37390585 54206	18-Oct-01 (in house check Oct-11)	in house check: Oct-12

Calibrated by:	Name Dimitar Iliev	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature

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:

- 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
- 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
- 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:

- 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 cm ³ (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	39.9 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (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 cm ³ (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 cm ³ (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; $\sigma = 1.38$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

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:

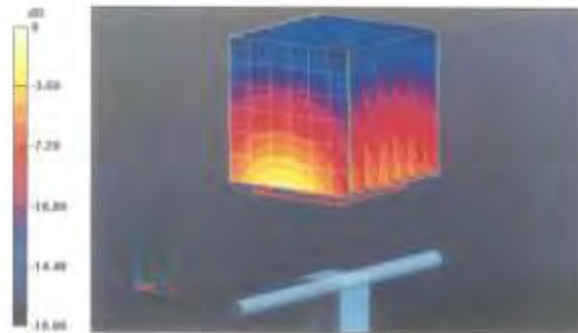
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.864 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 17.209 mW/g

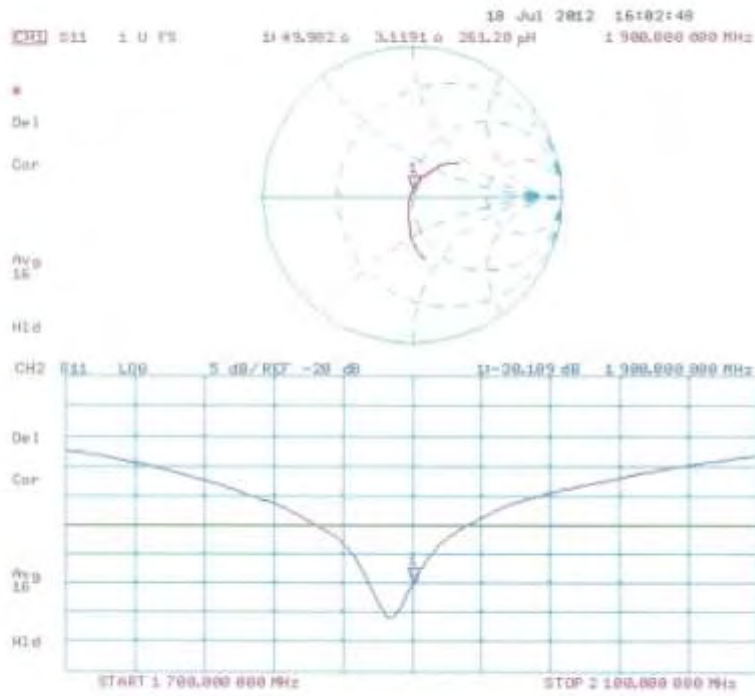
SAR(1 g) = 9.68 mW/g; SAR(10 g) = 5.11 mW/g

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; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³

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:

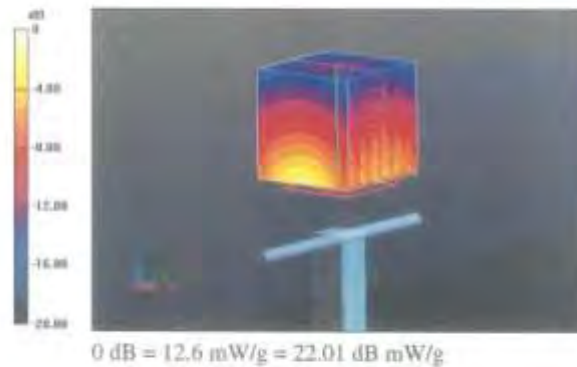
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.470 V/m; Power Drift = -0.00 dB

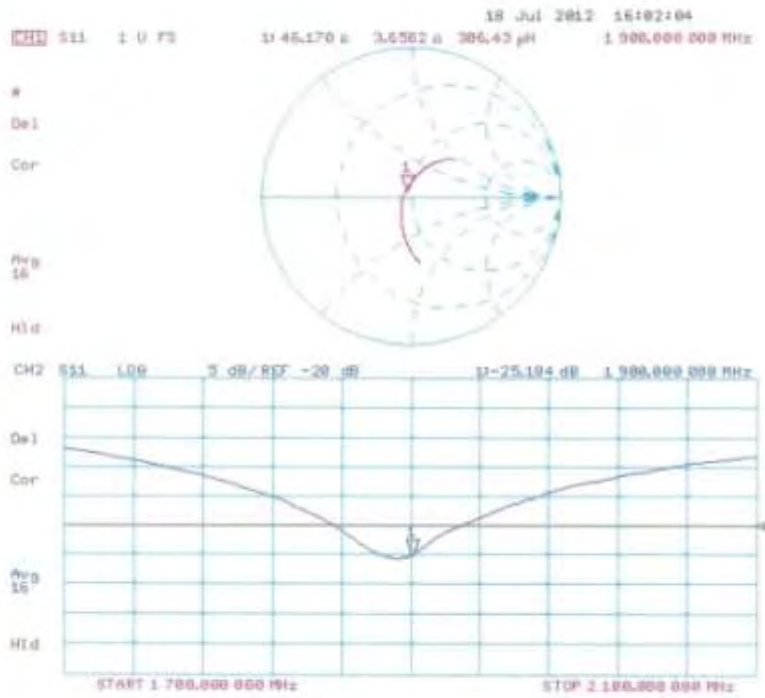
Peak SAR (extrapolated) = 17.332 mW/g

SAR(1 g) = 10 mW/g; SAR(10 g) = 5.3 mW/g

Maximum value of SAR (measured) = 12.6 mW/g



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	US37290585 54206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by: Name: Israa El-Naouq, Function: Laboratory Technician

Approved by: Katja Pokowic, Technical Manager

Signature: *Israa El-Naouq*

Katja Pokowic

Issued: August 23, 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:

- 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
- 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
- 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:

- 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; $\sigma = 1.81$ mho/m; $\epsilon_r = 39.2$; $\rho = 1000$ kg/m³

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:

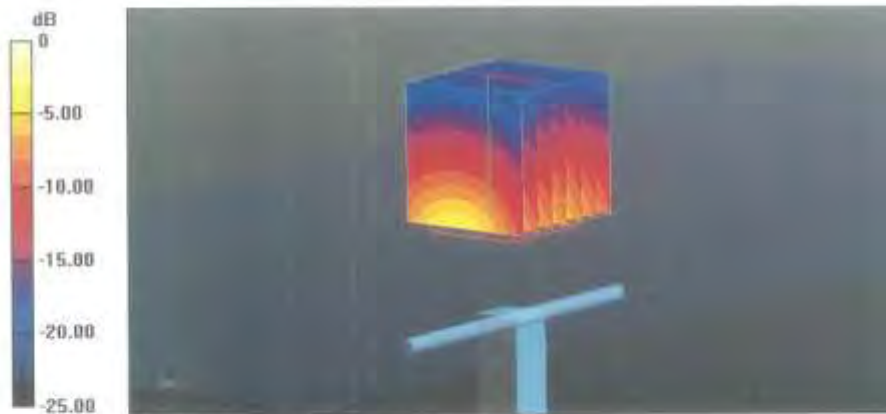
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.554 V/m; Power Drift = 0.01 dB

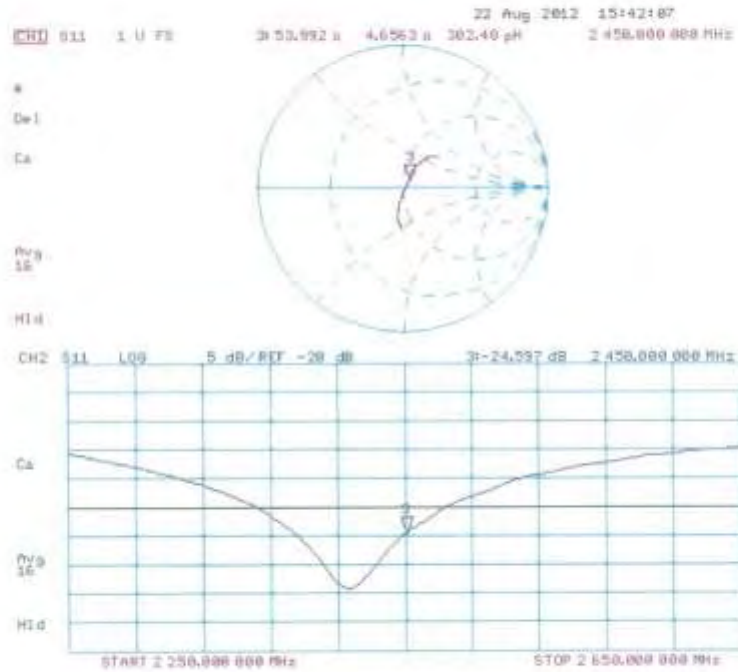
Peak SAR (extrapolated) = 26,584 mW/g

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.18 mW/g

Maximum value of SAR (measured) = 16.5 W/kg



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; $\sigma = 1.99$ mho/m; $\epsilon_r = 51.3$; $\rho = 1000$ kg/m³

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:

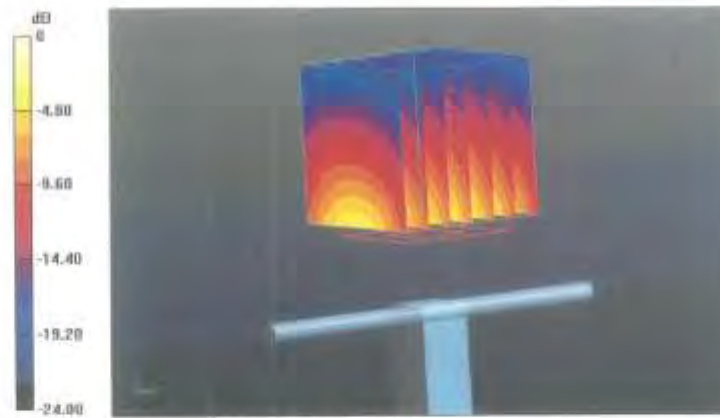
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.699 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 26.489 mW/g

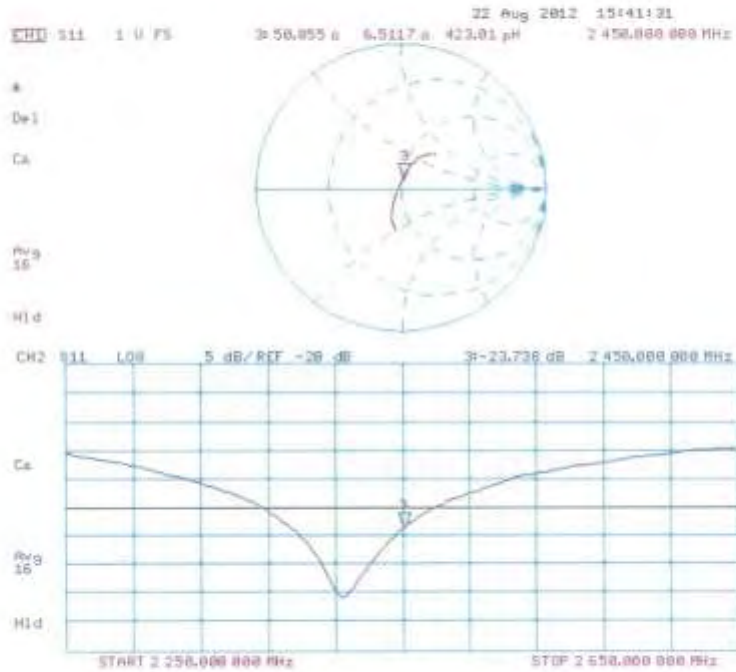
SAR(1 g) = 13 mW/g; SAR(10 g) = 6.1 mW/g

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



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



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Accreditation No.: SCS 108

Client HCT (Dymstec)

Certificate No: D5GHzV2-1107_Aug12

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:	August 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 (MATE 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	US37282783	05-Oct-11 (No. 217-01491)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01520)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe EX3DV4	SN: 3503	30-Dec-11 (No. EX3-3503_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
Calibrated by:	Name Israa El-Nasouq	Function Laboratory Technician	Signature
Approved by:	Name Katja Pokovic	Function Technical Manager	Signature
			Issued: August 21, 2012
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

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:

- IEC 62209-2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures"; Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", March 2010
- 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:

- 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 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	35.2 ± 6 %	4.49 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.93 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	78.9 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.6 mW / g ± 19.5 % (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	34.8 ± 6 %	4.77 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	---	---

SAR result with Head TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.27 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	82.2 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.35 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	23.3 mW / g ± 19.5 % (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	34.4 ± 6 %	5.08 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	7.81 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	77.5 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.22 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	22.0 mW / g ± 19.5 % (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	47.1 ± 6 %	5.42 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.64 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	75.8 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.15 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.3 mW / g ± 19.5 % (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	46.6 ± 6 %	5.79 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5500 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.91 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	78.5 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.21 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.9 mW / g ± 19.5 % (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	46.1 ± 6 %	6.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.52 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	74.6 mW / g ± 19.9 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.09 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.7 mW / g ± 19.5 % (k=2)

Appendix

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	48.8 Ω - 9.8 $j\Omega$
Return Loss	- 20.0 dB

Antenna Parameters with Head TSL at 5500 MHz

Impedance, transformed to feed point	50.8 Ω - 5.0 $j\Omega$
Return Loss	- 26.0 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	54.3 Ω - 6.0 $j\Omega$
Return Loss	- 23.0 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.0 Ω - 9.1 $j\Omega$
Return Loss	- 20.7 dB

Antenna Parameters with Body TSL at 5500 MHz

Impedance, transformed to feed point	51.7 Ω - 4.2 $j\Omega$
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	55.9 Ω - 5.2 $j\Omega$
Return Loss	- 22.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 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 11, 2011

DASY5 Validation Report for Head TSL

Date: 20.08.2012

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; $\sigma = 4.49$ mho/m; $\epsilon_r = 35.2$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5500$ MHz; $\sigma = 4.77$ mho/m; $\epsilon_r = 34.8$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 5.08$ mho/m; $\epsilon_r = 34.4$; $\rho = 1000$ kg/m³
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); Calibrated: 30.12.2011, ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2011, ConvF(4.81, 4.81, 4.81); Calibrated: 30.12.2011;
- Sensor-Surface: 1.4mm (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=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 = 64.687 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 29.009 mW/g

SAR(1 g) = 7.93 mW/g; SAR(10 g) = 2.28 mW/g

Maximum value of SAR (measured) = 18.3 W/kg

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 = 64.108 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 32.253 mW/g

SAR(1 g) = 8.27 mW/g; SAR(10 g) = 2.35 mW/g

Maximum value of SAR (measured) = 19.5 W/kg

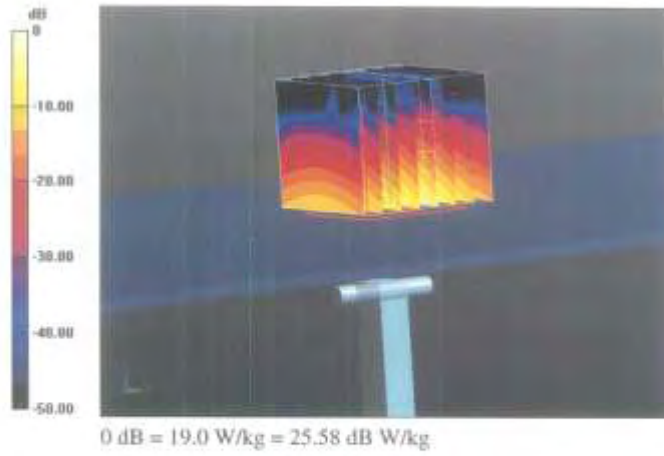
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan,**dist=1.4mm (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 60.743 V/m; Power Drift = 0.08 dB

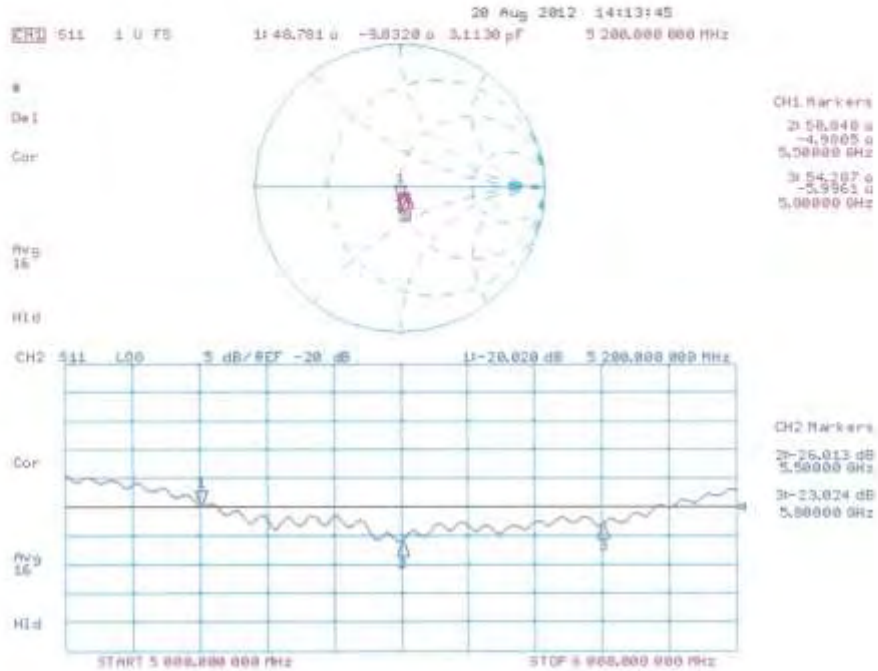
Peak SAR (extrapolated) = 32.139 mW/g

SAR(1 g) = 7.81 mW/g; SAR(10 g) = 2.22 mW/g

Maximum value of SAR (measured) = 19.0 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.08.2012

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; $\sigma = 5.42$ mho/m; $\epsilon_r = 47.1$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5500$ MHz; $\sigma = 5.79$ mho/m; $\epsilon_r = 46.6$; $\rho = 1000$ kg/m³, Medium parameters used: $f = 5800$ MHz; $\sigma = 6.2$ mho/m; $\epsilon_r = 46.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

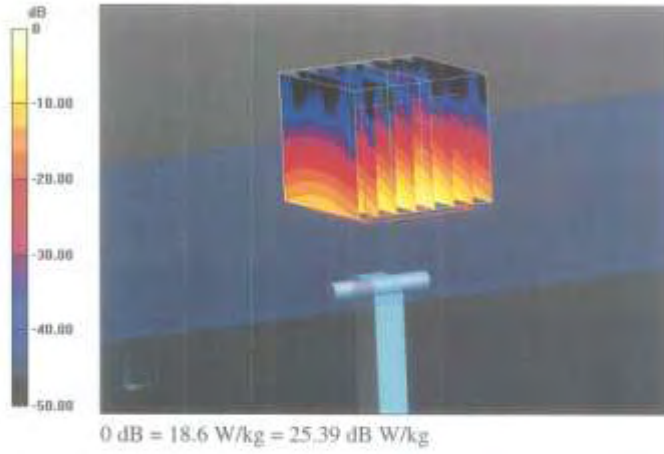
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(4.91, 4.91, 4.91); Calibrated: 30.12.2011, ConvF(4.43, 4.43, 4.43); Calibrated: 30.12.2011, ConvF(4.38, 4.38, 4.38); Calibrated: 30.12.2011;
- Sensor-Surface: 1.4mm (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=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 = 58.635 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 29.565 mW/g
SAR(1 g) = 7.64 mW/g; SAR(10 g) = 2.15 mW/g
Maximum value of SAR (measured) = 17.9 W/kg

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 = 58.287 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 33.410 mW/g
SAR(1 g) = 7.91 mW/g; SAR(10 g) = 2.21 mW/g
Maximum value of SAR (measured) = 19.2 W/kg

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 = 55.000 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 34.148 mW/g
SAR(1 g) = 7.52 mW/g; SAR(10 g) = 2.09 mW/g
Maximum value of SAR (measured) = 18.6 W/kg



Impedance Measurement Plot for Body TSL

