



SAR TEST REPORT

HCT CO., LTD

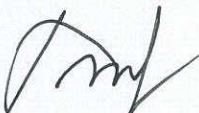

EUT Type:	Fixed WLL Telephone GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)		
FCC ID:	PH7PG530		
Model:	PG530	Trade Name	AXESSTEL
Date of Issue:	Nov.02, 2007		
Test report No.:	HCT-SAR07-1101		
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Testing has been carried out in accordance with:	47CFR §2.1093 FCC OET Bulletin 65(Edition 97-01), Supplement C (Edition 01-01) ANSI/ IEEE C95.1 – 2005 IEEE 1528-2003		
Test result:	The tested device complies with the requirements in respect of all parameters subject to the test. The test results and statements relate only to the items tested. The test report shall not be reproduced except in full, without written approval of the laboratory.		
Signature	<div style="display: flex; justify-content: space-around; align-items: flex-end;"> <div style="text-align: center;">  <hr style="width: 100%; border: 0.5px solid black;"/> <p>Report prepared by : Sun-Hee Kim Test Engineer of SAR Part</p> </div> <div style="text-align: center;">  <hr style="width: 100%; border: 0.5px solid black;"/> <p>Approved by : Nam-Wook Kang Manager of SAR Part</p> </div> </div>		

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1. INTRODUCTION

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

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

SAR Definition

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

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

Figure 2. SAR Mathematical Equation

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

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

where:

- σ = conductivity of the tissue-simulant material (S/m)
- ρ = mass density of the tissue-simulant material (kg/m³)
- 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	Fixed WLL Telephone GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
FCC ID	PH7PG530
Model(s)	PG530
Trade Name	AXESSTEL
Serial Number(s)	#1
Application Type	Certification
Modulation(s)	GSM850/GSM1900
Tx Frequency	824.20 - 848.80 MHz (GSM850) 1 850.20 – 1 909.80 MHz (GSM1900)
Rx Frequency	869.20 - 893.80 MHz (GSM850) 1 930.20 – 1 989.80 MHz (GSM1900)
FCC Classification	Licensed Non-Broadcast station Transmitter (TNB)
Production Unit or Identical Prototype	Prototype
Max SAR	1.05 W/kg GSM850 Body SAR 0.413 W/kg GSM1900 Body SAR
Date(s) of Tests	Nov. 1, 2007
Antenna Type	Removable

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 Fig.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 3.0GHz 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.

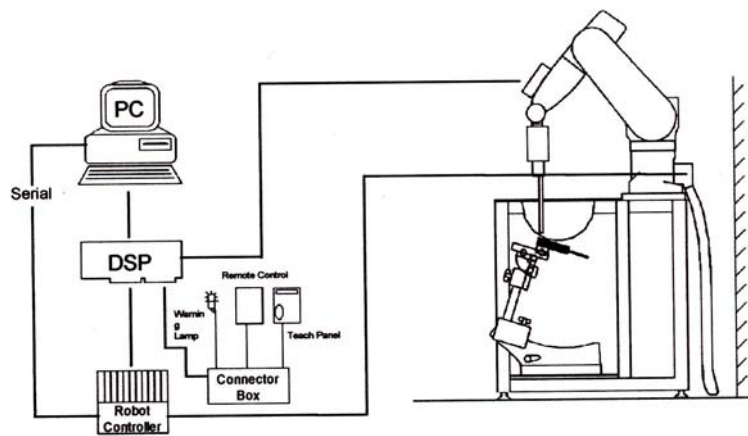


Figure 3.1 HCT SAR Lab. Test Measurement Set-up

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 DASY E-FIELD PROBE SYSTEM

3.2.1 ET3DV6 Probe Specification

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



Figure 3.2 Photograph of the probe and the Phantom



Figure 3.3 ET3DV6 E-field Probe

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

3.3 PROBE CALIBRATION PROCESS

3.3.1 E-Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with an accuracy better than $\pm 10\%$. The spherical isotropy was evaluated with the proper procedure and found to be better than ± 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 below 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)

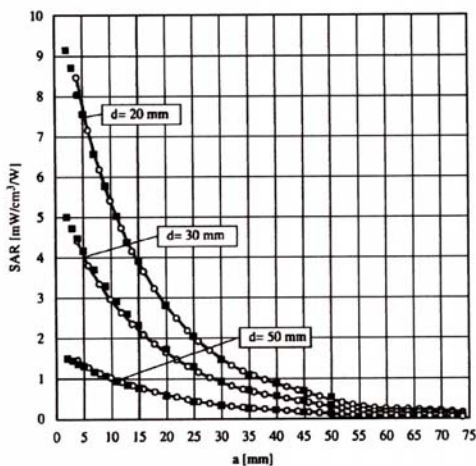


Figure 3.4 E-Field and Temperature measurements at 900 MHz

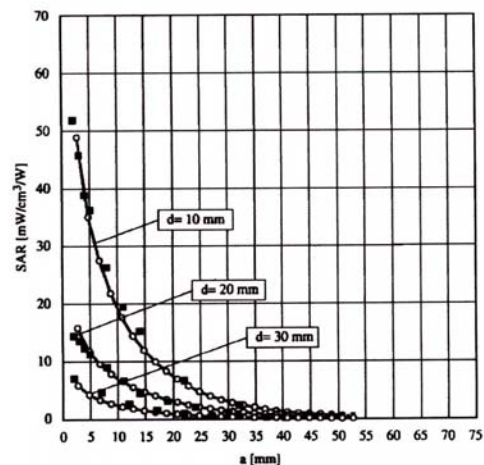


Figure 3.5 E-Field and temperature measurements at 1.8 GHz

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.

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

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

3.4 SAM Phantom

The SAM Phantom is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90 % of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

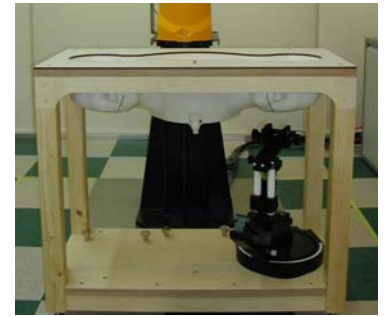


Figure 3.6 SAM Phantom

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

3.5 Device Holder for Transmitters

In combination with the SAM Phantom V 4.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and 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 produce an infinite number of configurations. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.



Fig. 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)									
	450		835		915		1 900		2 450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

Table 3.1 Composition of the Tissue Equivalent Matter

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	DAE4V1	447	Mar.06, 2007	Annual	Mar.06, 2008
SPEAG	DAE3V1	466	Jan.25, 2007	Annual	Jan.25, 2008
SPEAG	E-Field Probe ET3DV6	1609	Aug.30, 2007	Annual	Aug.30, 2008
SPEAG	E-Field Probe ET3DV6	1607	Feb.21, 2007	Annual	Feb.21, 2008
SPEAG	Validation Dipole D450V2	1007	Mar.15, 2007	Annual	Mar.15, 2008
SPEAG	Validation Dipole D835V2	481	May 24, 2007	Annual	May 24, 2008
SPEAG	Validation Dipole D900V2	121	Feb.19, 2007	Annual	Feb.19, 2008
SPEAG	Validation Dipole D1800V2	2d066	May 23, 2007	Annual	May 23, 2008
SPEAG	Validation Dipole D1900V2	5d032	Feb.20, 2007	Annual	Feb.20, 2008
SPEAG	Validation Dipole D2450V2	743	Jan.17, 2007	Annual	Jan.17, 2008
Agilent	Power Meter(F) E4419B	MY40330223	Nov.08, 2006	Annual	Nov.08, 2007
Agilent	Power Sensor(G) 8481	MY41090870	Nov.21, 2006	Annual	Nov.21, 2007
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
HP	Dual Directional Coupler 778D	16072	Nov.09, 2006	Annual	Nov.09, 2007
R&S	Base Station CMU200	838207/050	Nov.14, 2006	Annual	Nov.14, 2007
Tescom	Bluetooth TC-3000	3000A490112	Jan.22, 2007	Annual	Jan.22, 2008
Agilent	Base Station E5515C	GB44400269	Feb.11, 2007	Annual	Feb.11, 2008
HP	Signal Generator E4438C	MY45092381	Feb.07, 2007	Annual	Feb.07, 2008
HP	Network Analyzer 8753ES	JP39240221	Apr.11, 2007	Annual	Apr.11, 2008
EM POWER	Power Amp BBS3Q7ELU	1013-D/C-0127	Apr.17, 2007	Annual	Apr.17, 2008
SPEAG	DAE3V1	446	Nov.15, 2006	Annual	Nov.15, 2007

NOTE:

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

4. SAR MEASUREMENT PROCEDURE

The evaluation was performed with the following procedure:

1. The SAR value at a fixed location above the ear point was measured and was used as a reference value for assessing the power drop.
2. The SAR distribution at the exposed side of the head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20 mm x 20 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.
3. Around this point, a volume of 32 mm x 32 mm x 34 mm was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:
 - a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
 - b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x,y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR value, at the same location as procedure #1, was re-measured. If the value changed by more than 5 %, the evaluation is repeated.

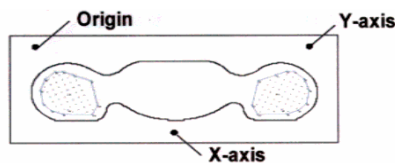


Fig. 4.1 SAR Measurement Point in Area Scan

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.

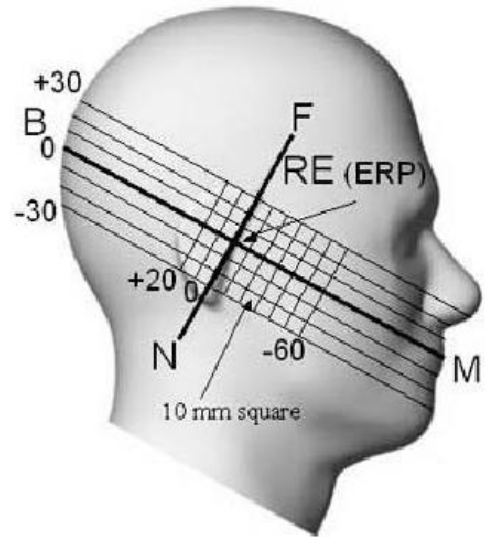


Figure 5.1 Side view of the phantom

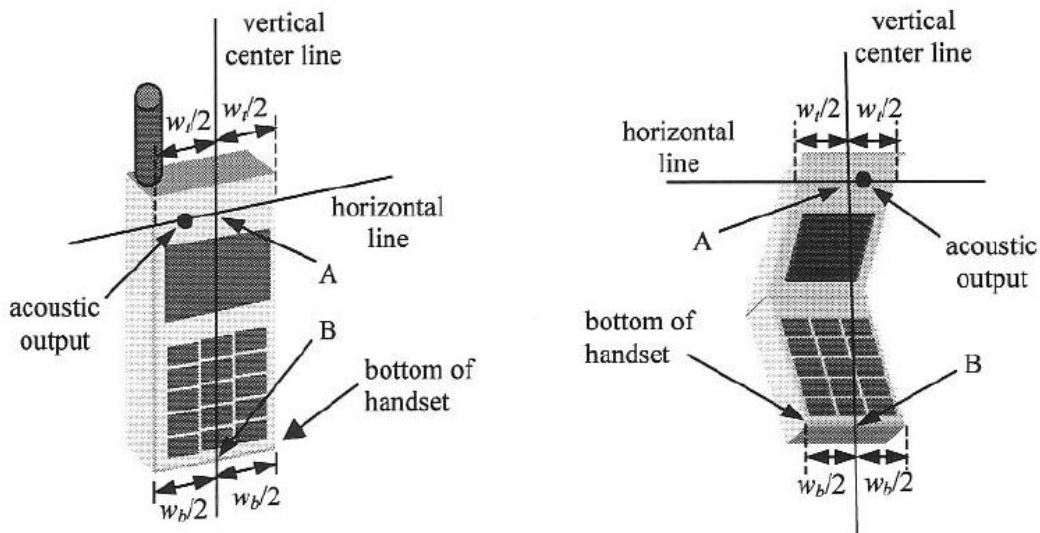


Figure 5.2 Handset vertical and horizontal reference lines

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 2.0 cm from the EUT back surface to the liquid interface is configured for the generic test.

"See the Test SET-UP Photo"

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

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

6. MEASUREMENT UNCERTAINTY

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

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

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

Error Description	Uncertainty value [%]	Probability Distribution	Divisor	ci	ci ²	Standard Uncertainty [%]	Stand Uncert ²	(Stand Uncert ²) X (ci ²)	V _i & V _e #
1. Measurement System									
Probe Calibration	5.5	Normal	1.00	1	1	5.50	30.25	30.25	∞
Axial Isotropy	4.7	Rectangular	1.73	0.7	0.49	2.71	7.36	3.61	∞
Hemispherical Isotropy	9.6	Rectangular	1.73	0.7	0.49	5.54	30.72	15.05	∞
Linearity	4.7	Rectangular	1.73	1	1	2.71	7.36	7.36	∞
System Detection limits	1.0	Rectangular	1.73	1	1	0.58	0.33	0.33	∞
Boundary effect	1.0	Rectangular	1.73	1	1	0.58	0.33	0.33	∞
Response time	0.8	Rectangular	1.73	1	1	0.46	0.21	0.21	∞
RF Ambient conditions	3.0	Rectangular	1.73	1	1	1.73	3.00	3.00	∞
Readout Electronics	0.3	Normal	1.00	1	1	0.30	0.09	0.09	∞
Integration time	2.6	Rectangular	1.73	1	1	1.50	2.25	2.25	∞
Probe positioner	0.4	Rectangular	1.73	1	1	0.23	0.05	0.05	∞
Probe positioning	2.9	Rectangular	1.73	1	1	1.67	2.80	2.80	∞
Maximum SAR evaluation	1.0	Rectangular	1.73	1	1	0.58	0.33	0.33	∞
Sub Total								65.69	
2. Test Sample Related									
Device Positioning	1.8	Normal	1.00	1	1	1.77	3.13	3.13	9
Device Holder	3.6	Normal	1.00	1	1	3.60	12.96	12.96	∞
Power Drift	5.0	Rectangular	1.73	1	1	2.89	8.33	8.33	∞
Sub Total								24.43	
3. Phantom and Setup									
Phantom Uncertainty	4.0	Rectangular	1.73	1	1	2.31	5.33	5.33	∞
Liquid conductivity (target)	5.0	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08	∞
Liquid conductivity (measurement error)	2.5	Normal	1.00	0.5	0.25	2.50	6.25	1.56	∞
Liquid permittivity (target)	5.0	Rectangular	1.73	0.5	0.25	2.89	8.33	2.08	∞
Liquid permittivity (measurement error)	2.5	Normal	1.00	0.5	0.25	2.50	6.25	1.56	∞
Sub Total								12.63	
Combined standard uncertainty [%]						10.14		102.74	-
Expanded uncertainty [k = 2, confidence 95 %]						± 20.3 %			

Table 6.1 Breakdown of Errors

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

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

Table 7.1 Safety Limits for Partial Body Exposure

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 gram 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 grams 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	Nov.01, 2007	Head	22.0	ϵr	41.5	40.8	- 1.69	± 5
				σ	0.90	0.892	- 0.89	± 5
835	Nov.01, 2007	Body	22.0	ϵr	55.2	54.8	- 0.72	± 5
				σ	0.97	0.98	+ 1.03	± 5
1 900	Nov.01, 2007	Head	22.0	ϵr	40.0	39.5	- 1.25	± 5
				σ	1.40	1.41	+ 0.71	± 5
1 900	Nov.01, 2007	Body	22.0	ϵr	53.3	52.0	- 2.44	± 5
				σ	1.52	1.56	+ 2.63	± 5

8.2 System Validation

Prior to assessment, the system is verified to the $\pm 10\%$ of the specifications at 835 MHz/1 900 MHz by using the system validation kit. (Graphic Plots Attached)

(Input Power: 1 W)

Freq. [MHz]	Date	Liquid	Liquid Temp [°C]	SAR Average	Target Value (SPEAG) (mW/g)	Measured Value (mW/g)	Deviation [%]	Limit [%]
835 MHz	Nov.01, 2007	Head	22.0	1 g	9.21	9.63	+ 4.56	$\pm 10\%$
1 900 MHz	Nov.01, 2007	Head	22.0	1 g	37.2	38.20	+ 2.69	$\pm 10\%$

9. SAR TEST DATA SUMMARY

9.1 Measurement Results (GSM850 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Battery	Separation Distance (cm)	Ant. Position	SAR(mW/g)
MHz	Channel.		Begin	End				
824.2	128 (Low)	GPRS	32.83	32.65	Standard	2.0 cm	90 degree upright	1.04
836.6	190 (Mid)	GPRS	32.75	32.80	Standard		90 degree upright	0.791
848.8	251 (High)	GPRS	32.67	32.65	Standard		90 degree upright	0.603
824.2	128 (Low)	GPRS	32.83	32.72	Standard		90 degree upright	1.05
836.6	190 (Mid)	GPRS	32.75	32.68	Standard		90 degree upright	0.797
848.8	251 (High)	GPRS	32.67	32.65	Standard		90 degree upright	0.597
824.2	128 (Low)	GSM850	32.83	32.74	Standard		90 degree upright	*0.57
ANSI/ IEEE C95.1 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram	

NOTES:

- 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 ± 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 SAR value measurement in this band repeated with *GSM850 Mode.

9.2 Measurement Results (GSM1900 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Battery	Separation Distance (cm)	Ant. Position	SAR(mW/g)
MHz	Channel.		Begin	End				
1 850.2	512 (Low)	GPRS	30.19	30.19	Standard	2.0 cm	90 degree upright	0.407
1 880.0	661 (Mid)	GPRS	29.77	29.71	Standard		90 degree upright	0.326
1 909.8	810 (High)	GPRS	29.69	29.76	Standard		90 degree upright	0.249
1 850.2	512 (Low)	GPRS	30.19	30.08	Standard		90 degree upright	0.413
1 880.0	661 (Mid)	GPRS	29.77	29.62	Standard		90 degree upright	0.324
1 909.8	810 (High)	GPRS	29.69	29.74	Standard		90 degree upright	0.247
1 850.2	512 (Low)	GSM1900	30.19	30.17	Standard		90 degree upright	*0.227
ANSI/ IEEE C95.1 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram	

NOTES:

- 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 ± 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 SAR value measurement in this band repeated with *GSM1900 Mode.

10. CONCLUSION

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

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

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Attachment 1. – SAR Test Plots

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 825$ MHz; $\sigma = 0.966$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

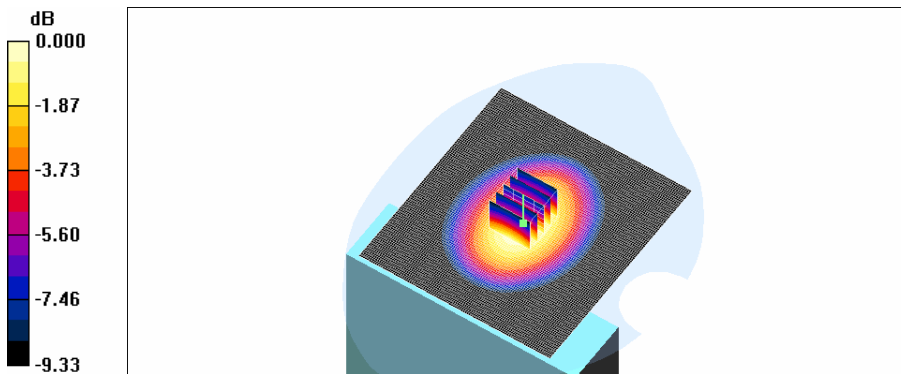
Body GSM850 128/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.14 mW/g

Body GSM850 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.6 V/m; Power Drift = -0.176 dB

Peak SAR (extrapolated) = 1.38 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.739 mW/g

Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.981$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 190/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.856 mW/g

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

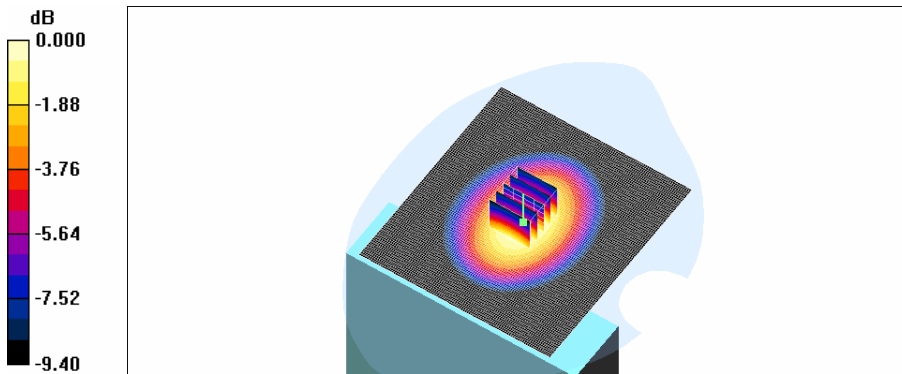
Reference Value = 30.0 V/m; Power Drift = 0.046 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.791 mW/g; SAR(10 g) = 0.558 mW/g

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

Maximum value of SAR (measured) = 0.837 mW/g



0 dB = 0.837mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.7$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 251/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.634 mW/g

Body GSM850 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

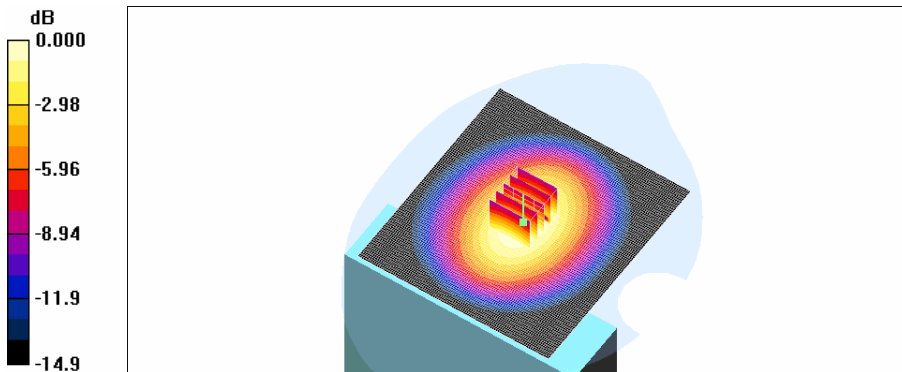
Reference Value = 25.8 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.412 mW/g

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

Maximum value of SAR (measured) = 0.630 mW/g



0 dB = 0.630mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

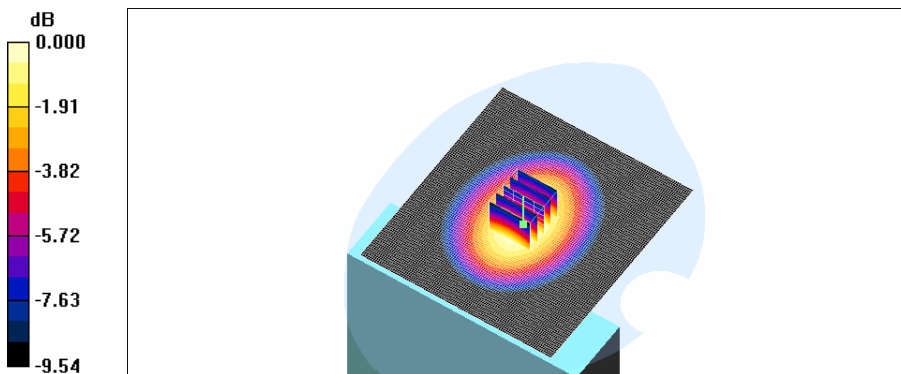
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 825$ MHz; $\sigma = 0.966$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 128/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.15 mW/g

Body GSM850 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.1 V/m; Power Drift = -0.108 dB
Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.745 mW/g
Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 850; Frequency: 836.6 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 0.981$ mho/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 190/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.850 mW/g

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

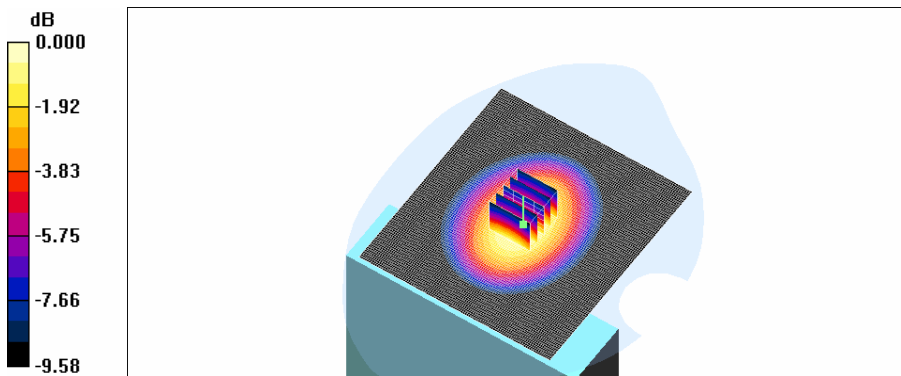
Reference Value = 29.8 V/m; Power Drift = -0.068 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.797 mW/g; SAR(10 g) = 0.559 mW/g

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

Maximum value of SAR (measured) = 0.861 mW/g



0 dB = 0.861mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 850; Frequency: 848.8 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 848.8$ MHz; $\sigma = 0.995$ mho/m; $\epsilon_r = 54.7$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 251/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.650 mW/g

Body GSM850 251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

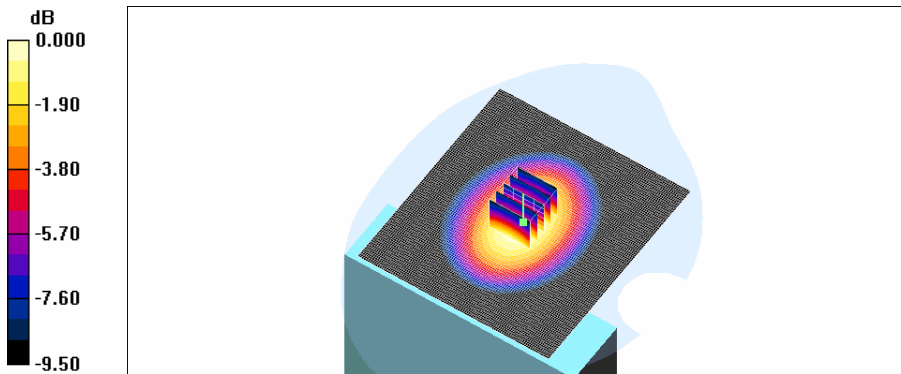
Reference Value = 25.6 V/m; Power Drift = -0.019 dB

Peak SAR (extrapolated) = 0.801 W/kg

SAR(1 g) = 0.597 mW/g; SAR(10 g) = 0.419 mW/g

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

Maximum value of SAR (measured) = 0.640 mW/g



0 dB = 0.640mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option GSM

DUT: PG530

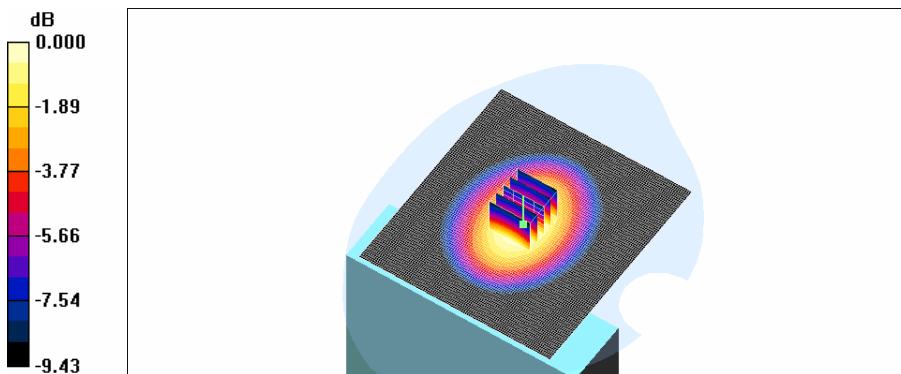
Communication System: GSM 850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium parameters used: $f = 825$ MHz; $\sigma = 0.966$ mho/m; $\epsilon_r = 55$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 128/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.625 mW/g

Body GSM850 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.8 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 0.747 W/kg
SAR(1 g) = 0.570 mW/g; SAR(10 g) = 0.404 mW/g
Maximum value of SAR (measured) = 0.607 mW/g



0 dB = 0.607mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 512/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.441 mW/g

Body GSM1900 512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

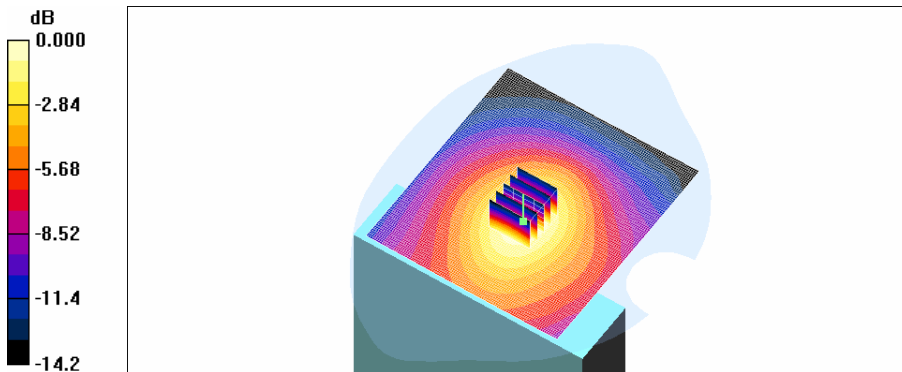
Reference Value = 17.7 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.605 W/kg

SAR(1 g) = 0.407 mW/g; SAR(10 g) = 0.256 mW/g

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

Maximum value of SAR (measured) = 0.443 mW/g



0 dB = 0.443mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

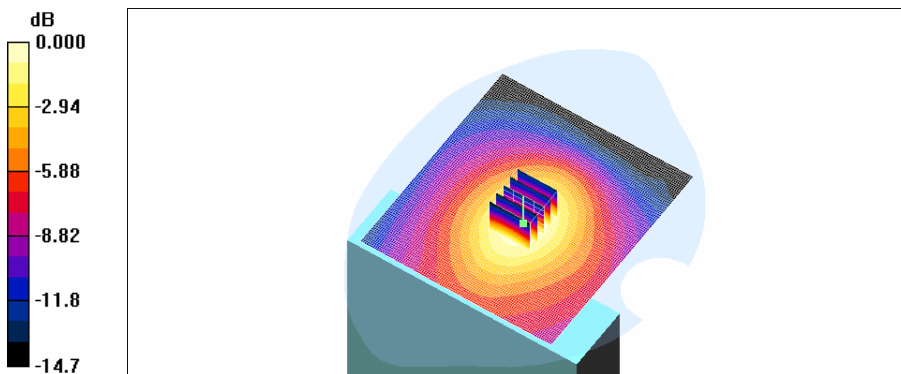
Communication System: GSM 1900; Frequency: 1880 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 661/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.350 mW/g

Body GSM1900 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.1 V/m; Power Drift = -0.061 dB
Peak SAR (extrapolated) = 0.487 W/kg
SAR(1 g) = 0.326 mW/g; SAR(10 g) = 0.203 mW/g
Maximum value of SAR (measured) = 0.352 mW/g



0 dB = 0.352mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

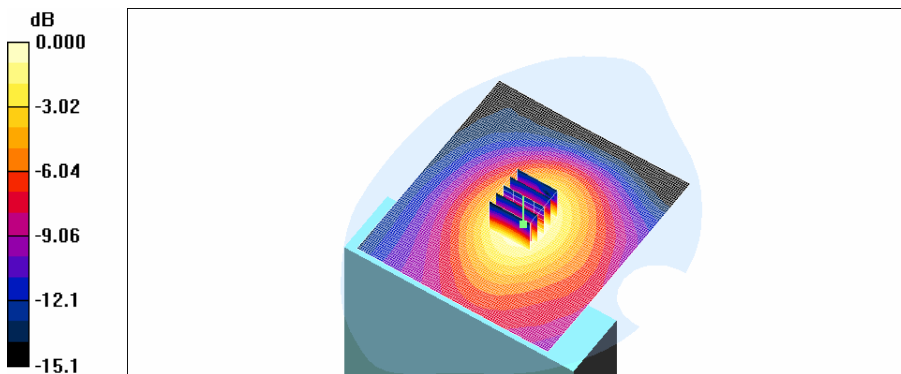
Communication System: GSM 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1910$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 810/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.273 mW/g

Body GSM1900 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.0 V/m; Power Drift = 0.068 dB
Peak SAR (extrapolated) = 0.377 W/kg
SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.155 mW/g
Maximum value of SAR (measured) = 0.268 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:4.15
Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 0mm (Fix Surface) Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 512/Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

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

Maximum value of SAR (measured) = 0.455 mW/g

Body GSM1900 512/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Body GSM1900 512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

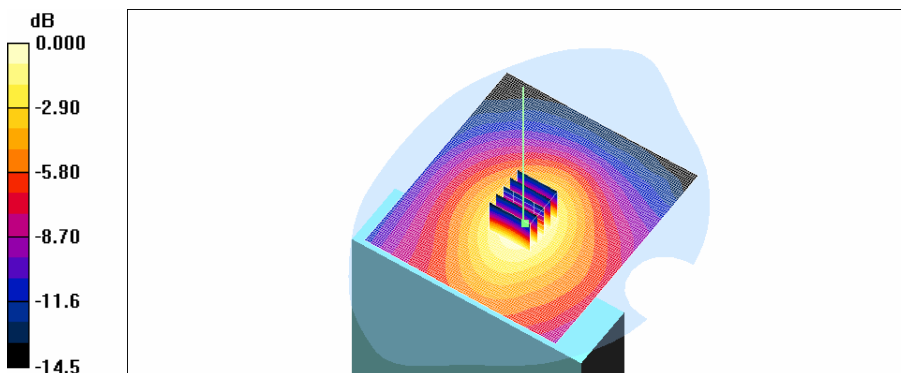
Reference Value = 17.9 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.619 W/kg

SAR(1 g) = 0.413 mW/g; SAR(10 g) = 0.257 mW/g

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

Maximum value of SAR (measured) = 0.448 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

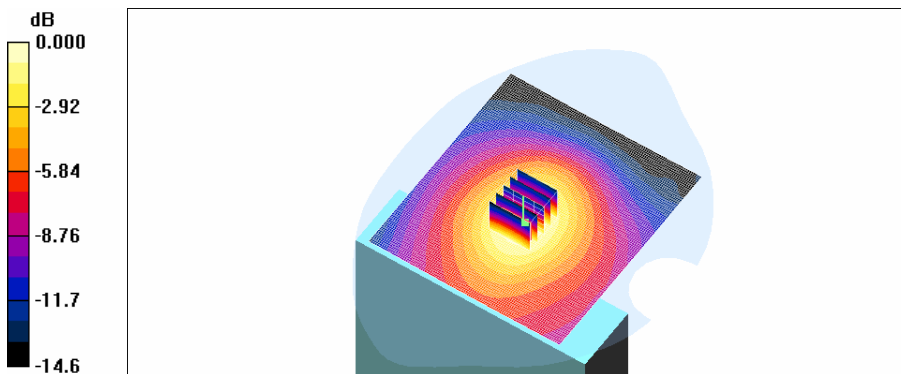
Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.54$ mho/m; $\epsilon_r = 52.1$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 661/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.349 mW/g

Body GSM1900 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.7 V/m; Power Drift = -0.146 dB
Peak SAR (extrapolated) = 0.487 W/kg
SAR(1 g) = 0.324 mW/g; SAR(10 g) = 0.202 mW/g
Maximum value of SAR (measured) = 0.351 mW/g



0 dB = 0.351mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option: GPRS

DUT: PG530

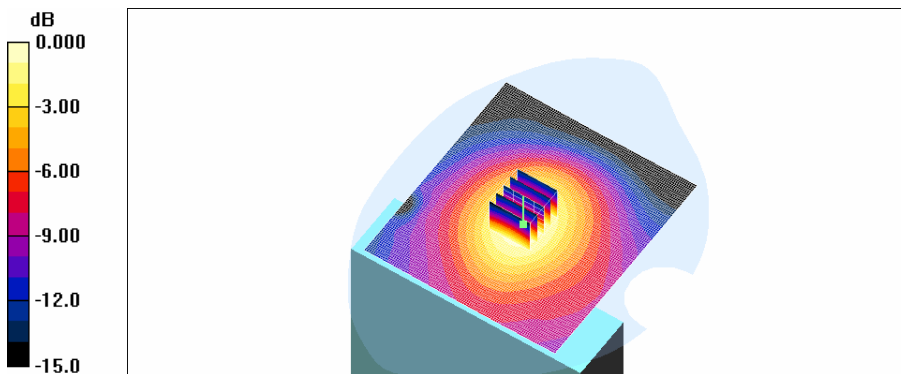
Communication System: GSM 1900; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15
Medium parameters used: $f = 1910$ MHz; $\sigma = 1.57$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 810/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.268 mW/g

Body GSM1900 810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.6 V/m; Power Drift = 0.050 dB
Peak SAR (extrapolated) = 0.371 W/kg
SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.154 mW/g
Maximum value of SAR (measured) = 0.267 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Fixed WLL Telephone
GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Nov.01, 2007
Option GSM

DUT: PG530

Communication System: GSM 1900; Frequency: 1850.2 MHz; Duty Cycle: 1:8.3
Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 512/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.247 mW/g

Body GSM1900 512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

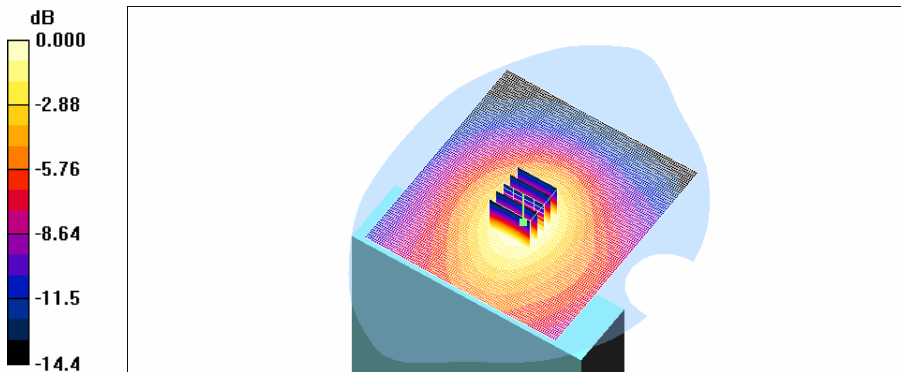
Reference Value = 13.1 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.336 W/kg

SAR(1 g) = 0.227 mW/g; SAR(10 g) = 0.142 mW/g

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

Maximum value of SAR (measured) = 0.244 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Fixed WLL Telephone
 GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Nov.01, 2007
 Option: GPRS

DUT: PG530

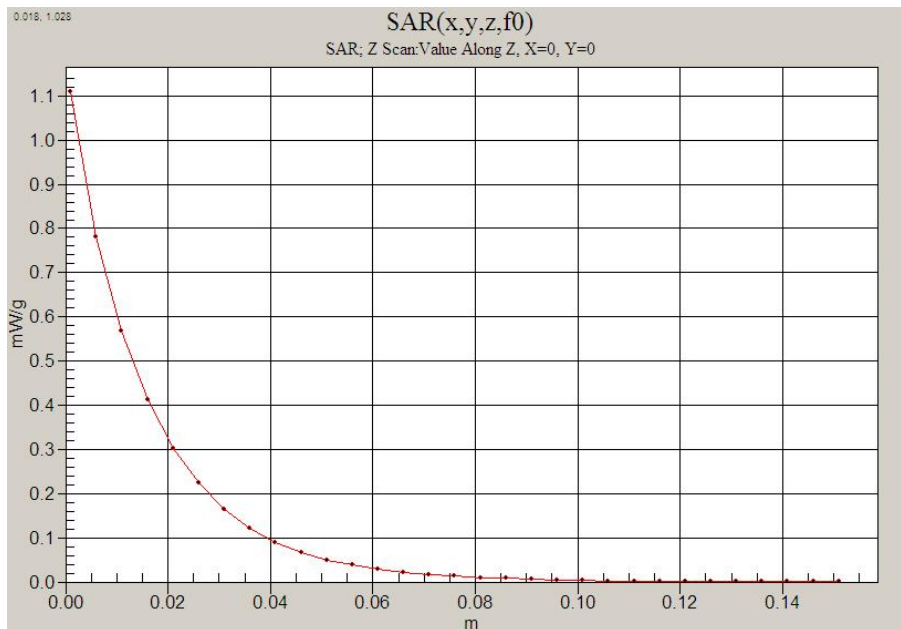
Communication System: GSM 850; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
 Medium parameters used: $f = 825 \text{ MHz}$; $\sigma = 0.966 \text{ mho/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.49, 6.49, 6.49); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Body GSM850 128/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm
 Maximum value of SAR (interpolated) = 1.15 mW/g

Body GSM850 128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
 Reference Value = 35.1 V/m; Power Drift = -0.108 dB
 Peak SAR (extrapolated) = 1.40 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.745 mW/g
 Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Fixed WLL Telephone
 GPRS Class 10 and GPRS mode class B(GPRS and GSM, but not simultaneously)
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Nov.01, 2007
 Option: GPRS

DUT: PG530

Communication System: GSM 1900; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
 Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$; $\sigma = 1.51 \text{ mho/m}$; $\epsilon_r = 52.2$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2007-08-30
- Sensor-Surface: 0mm (Fix Surface)Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Body GSM1900 512/Z Scan (1x1x31): Measurement grid: dx=20mm, dy=20mm, dz=5mm

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

Maximum value of SAR (measured) = 0.455 mW/g

Body GSM1900 512/Area Scan (101x111x1): Measurement grid: dx=15mm, dy=15mm

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

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

Body GSM1900 512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

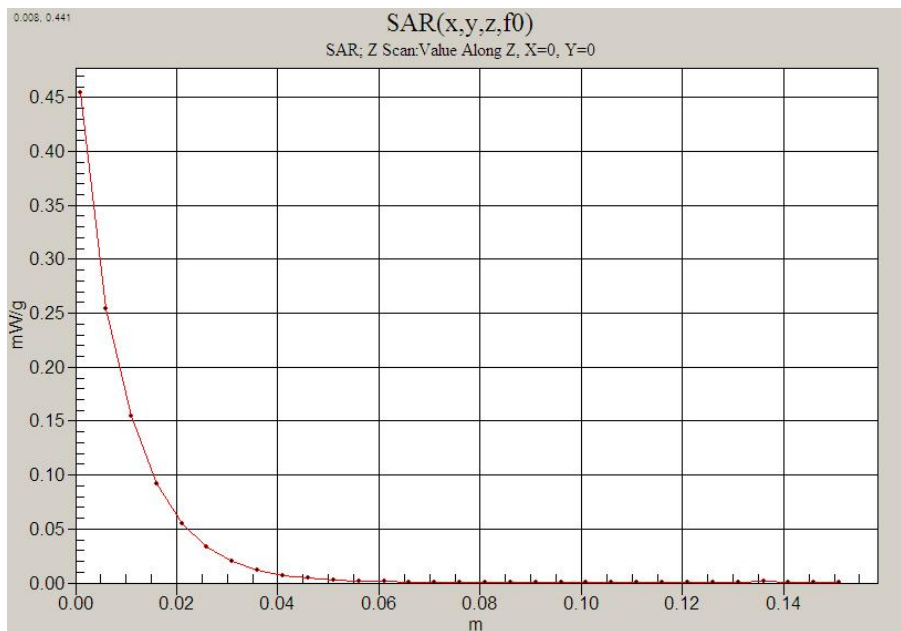
Reference Value = 17.9 V/m; Power Drift = -0.115 dB

Peak SAR (extrapolated) = 0.619 W/kg

SAR(1 g) = 0.413 mW/g; SAR(10 g) = 0.257 mW/g

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

Maximum value of SAR (measured) = 0.448 mW/g



0 dB = 0.244mW/g

Attachment 2. – Dipole Validation Plots

■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 1W (30dBm)
Liquid Temp: 22.0
Test Date: Nov.01, 2007

DUT: Dipole 835 Serial: D835V2 – SN:481

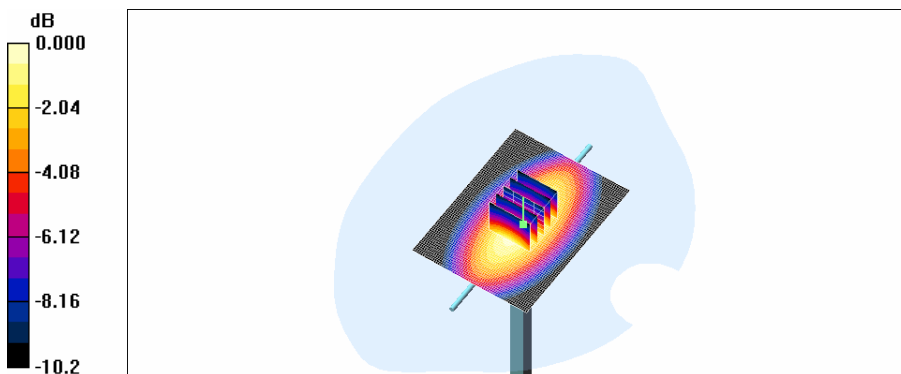
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.892 \text{ mho/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1609; ConvF(6.81, 6.81, 6.81); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 835/900 MHz; Type: SAM

Validatoin 835 MHz/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 10.3 mW/g

Validatoin 835 MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 110.6 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 14.0 W/kg
SAR(1 g) = 9.63 mW/g; SAR(10 g) = 6.36 mW/g
Maximum value of SAR (measured) = 10.4 mW/g



■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 1W (30dBm)
Liquid Temp: 22.0
Test Date: Nov.01, 2007

DUT: Dipole 1900 MHz; Serial: D1900V2 - SN:5d032

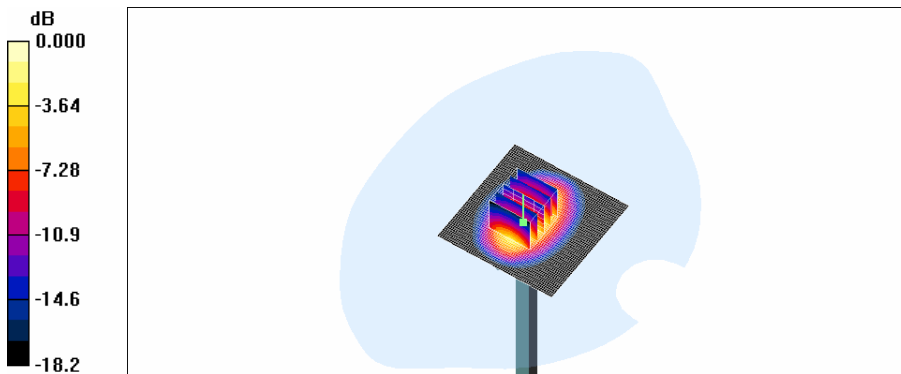
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.6 Build 23; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(5.36, 5.36, 5.36); Calibrated: 2007-08-30
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2007-01-25
- Phantom: SAM 1800/1900 MHz; Type: SAM

Validation 1900MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 46.0 mW/g

Validation 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 185.2 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 65.1 W/kg
SAR(1 g) = 38.2 mW/g; SAR(10 g) = 20.3 mW/g
Maximum value of SAR (measured) = 42.1 mW/g



0 dB = 42.1mW/g

■ Dielectric Parameter (835 MHz Head)

Title PG530
SubTitle GSM850(Head)
Test Date Nov.01, 2007

Frequency	e'	e''
800000000	40.7581	19.2234
805000000	40.7728	19.3024
810000000	40.8166	19.2653
815000000	40.8239	19.2324
820000000	40.8471	19.2380
825000000	40.8148	19.2530
830000000	40.8333	19.2381
835000000	40.7987	19.2010
840000000	40.7255	19.2115
845000000	40.7256	19.1446
850000000	40.5949	19.1457
855000000	40.5172	19.0912
860000000	40.3620	19.0491
865000000	40.2664	19.0319
870000000	40.1413	19.0134
875000000	39.9858	18.9891
880000000	39.8548	18.9385
885000000	39.7608	18.9433
890000000	39.6183	18.8777
895000000	39.5479	18.8521
900000000	39.4499	18.8643

■ Dielectric Parameter (835 MHz Body)

Title PG530
SubTitle GSM850(Body)
Test Date Nov.01, 2007

Frequency	e'	e''
800000000	55.2758	21.1795
805000000	55.2015	21.1657
810000000	55.1699	21.1254
815000000	55.0772	21.0851
820000000	55.0387	21.0818
825000000	54.9866	21.0388
830000000	54.9261	21.0605
835000000	54.8427	21.0907
840000000	54.7691	21.0841
845000000	54.7408	21.0773
850000000	54.7342	21.0678
855000000	54.6681	21.0427
860000000	54.5964	21.0850
865000000	54.6020	21.0436
870000000	54.5689	21.0119
875000000	54.5313	21.0356
880000000	54.4659	20.9847
885000000	54.4653	20.9886
890000000	54.4536	20.9491
895000000	54.3707	20.9011
900000000	54.3532	20.8435

■ Dielectric Parameter (1900 MHz Head)

Title PG530
SubTitle GSM1900(Head)
Test Date Nov.01, 2007

Frequency	e'	e''
1800000000	40.0334	13.0529
1810000000	39.8962	13.0594
1820000000	39.8057	13.1046
1830000000	39.6766	13.1530
1840000000	39.5421	13.1992
1850000000	39.4991	13.2643
1860000000	39.4621	13.2837
1870000000	39.4997	13.3012
1880000000	39.5007	13.3206
1890000000	39.5266	13.3683
1900000000	39.5292	13.3592
1910000000	39.4526	13.3594
1920000000	39.3473	13.3637
1930000000	39.2421	13.4070
1940000000	39.0832	13.4150
1950000000	38.9687	13.4481
1960000000	38.8948	13.5051
1970000000	38.8194	13.5488
1980000000	38.8132	13.6204
1990000000	38.8551	13.6658
2000000000	38.8997	13.6828

■ Dielectric Parameter (1900 MHz Body)

Title PG530
SubTitle GSM1900(Body)
Test Date Nov.01, 2007

Frequency	e'	e''
1850000000	52.1930	14.6622
1855000000	52.1844	14.6630
1860000000	52.1922	14.6820
1865000000	52.1698	14.6950
1870000000	52.1310	14.7296
1875000000	52.1031	14.7188
1880000000	52.1245	14.7510
1885000000	52.0967	14.7799
1890000000	52.0752	14.7709
1895000000	52.0663	14.7795
1900000000	52.0326	14.7961
1905000000	52.0489	14.8038
1910000000	52.0146	14.8068
1915000000	51.9909	14.8290
1920000000	52.0178	14.8667
1925000000	51.9546	14.8602
1930000000	51.9584	14.8793
1935000000	51.9599	14.8718
1940000000	51.9373	14.9043
1945000000	51.9624	14.9217
1950000000	51.9067	14.9562

Attachment 3. – Probe Calibration Data

**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 Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client: **H-CT (Dymstec)**

Certificate No: **ET3-1609_Aug07**

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1609																																																		
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-12.v5 Calibration procedure for dosimetric E-field probes																																																		
Calibration date:	August 30, 2007																																																		
Condition of the calibrated item	In Tolerance																																																		
<p>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.</p> <p>All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.</p> <p>Calibration Equipment used (M&TE critical for calibration)</p> <table border="1"> <thead> <tr> <th>Primary Standards</th> <th>ID #</th> <th>Cal Date (Calibrated by, Certificate No.)</th> <th>Scheduled Calibration</th> </tr> </thead> <tbody> <tr> <td>Power meter E4419B</td> <td>GB41293874</td> <td>29-Mar-07 (METAS, No. 217-00670)</td> <td>Mar-08</td> </tr> <tr> <td>Power sensor E4412A</td> <td>MY41495277</td> <td>29-Mar-07 (METAS, No. 217-00670)</td> <td>Mar-08</td> </tr> <tr> <td>Power sensor E4412A</td> <td>MY41498087</td> <td>29-Mar-07 (METAS, No. 217-00670)</td> <td>Mar-08</td> </tr> <tr> <td>Reference 3 dB Attenuator</td> <td>SN: S5054 (3c)</td> <td>8-Aug-07 (METAS, No. 217-00719)</td> <td>Aug-08</td> </tr> <tr> <td>Reference 20 dB Attenuator</td> <td>SN: S5086 (20b)</td> <td>29-Mar-07 (METAS, No. 217-00671)</td> <td>Mar-08</td> </tr> <tr> <td>Reference 30 dB Attenuator</td> <td>SN: S5129 (30b)</td> <td>8-Aug-07 (METAS, No. 217-00720)</td> <td>Aug-08</td> </tr> <tr> <td>Reference Probe ES3DV2</td> <td>SN: 3013</td> <td>4-Jan-07 (SPEAG, No. ES3-3013_Jan07)</td> <td>Jan-08</td> </tr> <tr> <td>DAE4</td> <td>SN: 654</td> <td>20-Apr-07 (SPEAG, No. DAE4-654_Apr07)</td> <td>Apr-08</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Secondary Standards</th> <th>ID #</th> <th>Check Date (in house)</th> <th>Scheduled Check</th> </tr> </thead> <tbody> <tr> <td>RF generator HP 8648C</td> <td>US3642U01700</td> <td>4-Aug-99 (SPEAG, in house check Nov-05)</td> <td>In house check: Nov-07</td> </tr> <tr> <td>Network Analyzer HP 8753E</td> <td>US37390585</td> <td>18-Oct-01 (SPEAG, in house check Oct-06)</td> <td>In house check: Oct-07</td> </tr> </tbody> </table>				Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration	Power meter E4419B	GB41293874	29-Mar-07 (METAS, No. 217-00670)	Mar-08	Power sensor E4412A	MY41495277	29-Mar-07 (METAS, No. 217-00670)	Mar-08	Power sensor E4412A	MY41498087	29-Mar-07 (METAS, No. 217-00670)	Mar-08	Reference 3 dB Attenuator	SN: S5054 (3c)	8-Aug-07 (METAS, No. 217-00719)	Aug-08	Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-07 (METAS, No. 217-00671)	Mar-08	Reference 30 dB Attenuator	SN: S5129 (30b)	8-Aug-07 (METAS, No. 217-00720)	Aug-08	Reference Probe ES3DV2	SN: 3013	4-Jan-07 (SPEAG, No. ES3-3013_Jan07)	Jan-08	DAE4	SN: 654	20-Apr-07 (SPEAG, No. DAE4-654_Apr07)	Apr-08	Secondary Standards	ID #	Check Date (in house)	Scheduled Check	RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07	Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-06)	In house check: Oct-07
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**Calibration Laboratory of
Schmid & Partner
Engineering AG**
Zeughausstrasse 43, 8904 Zurich, Switzerland



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Accredited by the Swiss Federal Office of Metrology and Accreditation
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
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., $\vartheta = 0$ 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 $\vartheta = 0$ ($f \leq 900$ 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 effect 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 (no uncertainty required). DCP does not depend on frequency nor media.
- **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.

ET3DV6 SN:1609

August 30, 2007

Probe ET3DV6

SN:1609

Manufactured:	July 21, 2001
Last calibrated:	March 23, 2006
Recalibrated:	August 30, 2007

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1609

August 30, 2007

DASY - Parameters of Probe: ET3DV6 SN:1609

Sensitivity in Free Space ^A			Diode Compression ^B	
NormX	1.94 ± 10.1%	μV/(V/m) ²	DCP X	95 mV
NormY	1.78 ± 10.1%	μV/(V/m) ²	DCP Y	95 mV
NormZ	1.79 ± 10.1%	μV/(V/m) ²	DCP Z	97 mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL	900 MHz	Typical SAR gradient: 5 % per mm		
	Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
	SAR _{be} [%]	Without Correction Algorithm	5.3	2.1
	SAR _{be} [%]	With Correction Algorithm	0.2	0.2
TSL	1810 MHz	Typical SAR gradient: 10 % per mm		
	Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
	SAR _{be} [%]	Without Correction Algorithm	13.6	9.0
	SAR _{be} [%]	With Correction Algorithm	0.2	0.0

Sensor Offset

Probe Tip to Sensor Center **2.7 mm**

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 Page 8).

^B Numerical linearization parameter: uncertainty not required.