



SAR TEST REPORT

HCT CO., LTD

EUT Type:	Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)		
FCC ID:	Q78-A605		
Model:	A605	Trade Name	ZTE CORPORATION
Date of Issue:	May.10, 2010		
Test report No.:	HCTA1005FS01		
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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.		
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1. INTRODUCTION

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

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

SAR Definition

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

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

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	Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
FCC ID	Q78-A605
Model(s)	A605
Trade Name	ZTE CORPORATION
Serial Number(s)	#1
Application Type	Certification
Modulation(s)	CDMA835/AWS1800/PCS1900
Tx Frequency	824.70 – 848.31 MHz (CDMA) 1 711.25 – 1 753.75 MHz (AWS CDMA) 1 851.25 – 1 908.75 MHz (PCS CDMA)
Rx Frequency	869.70 – 893.31 MHz (CDMA) 2 111.25 – 2 153.75 MHz (AWS CDMA) 1 931.25 – 1 988.75 MHz (PCS CDMA)
FCC Classification	PCS Licensed Transmitter (PCB)
Production Unit or Identical Prototype	Prototype
Max. SAR	0.443 W/kg CDMA835 Body SAR 1.05 W/kg AWS1700 Body SAR 1.14 W/kg PCS1900 Head SAR
Date(s) of Tests	May. 7, 2010 ~ May. 8, 2010
Antenna Type	Intenna

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.

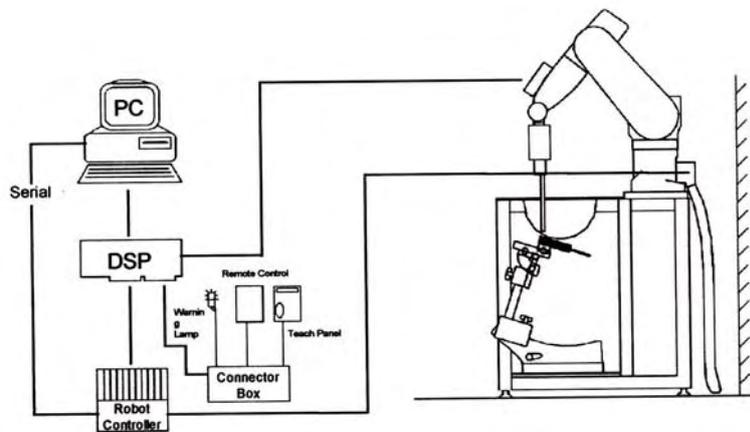


Figure 3.1 HCT SAR Lab. Test Measurement Set-up

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 DASY E-FIELD PROBE SYSTEM

3.2.1 ES3DV6 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

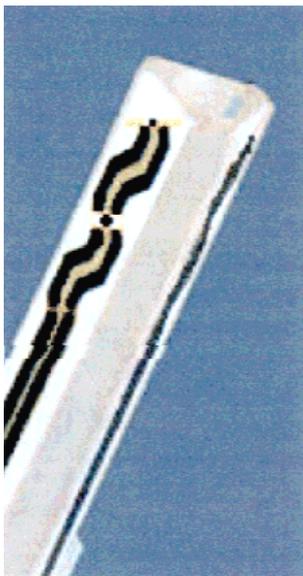


Figure 3.3 ET3DV6 E-field Probe

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 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)

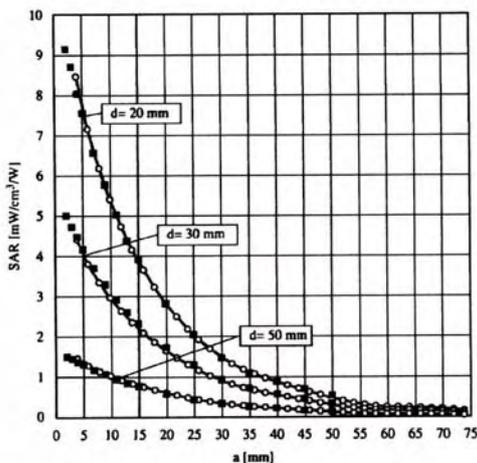


Figure 3.4 E-Field and Temperature measurements at 900 MHz

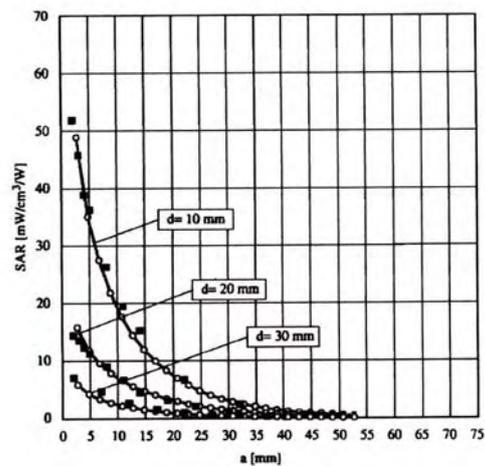


Figure 3.5 E-Field and temperature measurements at 1.8 GHz

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.

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

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.

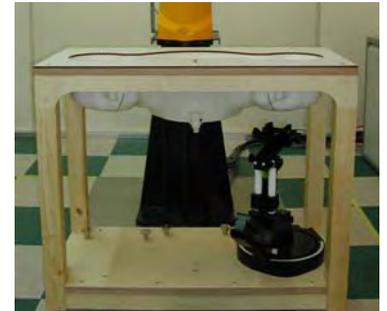


Figure 3.6 SAM Phantom

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.



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)									
	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	DAE3	446	May 22, 2009	Annual	May 22, 2010
SPEAG	DAE3	466	July 21, 2009	Annual	July 21, 2010
SPEAG	DAE4	869	Sep. 18, 2009	Annual	Sep. 18, 2010
SPEAG	E-Field Probe ET3DV6	1631	Jun. 24, 2009	Annual	Jun. 24, 2010
SPEAG	E-Field Probe ET3DV6	1798	Feb. 23, 2010	Annual	Feb. 23, 2011
SPEAG	Validation Dipole D450V2	1007	July 15, 2008	Biennial	July 15, 2010
SPEAG	Validation Dipole D835V2	441	May 25, 2009	Annual	May 25, 2010
SPEAG	Validation Dipole D1800V2	2d007	May 20, 2008	Biennial	May 20, 2010
SPEAG	Validation Dipole D1900V2	5d032	July 20, 2009	Annual	July 20, 2010
SPEAG	Validation Dipole D2450V2	743	Aug. 27, 2008	Biennial	Aug. 27, 2010
SPEAG	Validation Dipole D2600V2	1024	Aug. 12, 2009	Annual	Aug. 12, 2010
Agilent	Power Meter(F) E4419B	MY41291386	Nov. 05, 2009	Annual	Nov. 05, 2010
Agilent	Power Sensor(G) 8481	MY41090870	Nov. 05, 2009	Annual	Nov. 05, 2010
HP	Dielectric Probe Kit 85070C	00721521	N/A	N/A	N/A
HP	Dual Directional Coupler	16072	Nov. 05, 2009	Annual	Nov. 05, 2010
R&S	Base Station CMU200	110740	July 26, 2009	Annual	July 26, 2010
Agilent	Base Station E5515C	GB44400269	Feb. 10, 2010	Annual	Feb. 10, 2011
HP	Signal Generator E4438C	MY42082646	Dec. 24, 2009	Annual	Dec. 24, 2010
HP	Network Analyzer 8753C	3310J01394	Dec. 04, 2009	Annual	Dec. 04, 2010
Tescom	TC-3000/ Bluetooth	3000A490112	Jan. 11, 2009	Annual	Jan. 11, 2011

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 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-axis. This polynomial was then used to evaluate the points between the surface and the probe tip.
 - b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR value, at the same location as procedure #1, was re-measured. If the value changed by more than 5 %, the evaluation is repeated.

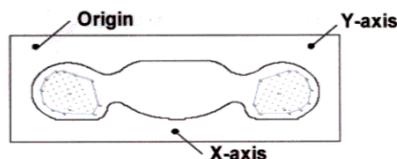


Figure 4.1 SAR Measurement Point in Area Scan

5. DESCRIPTION OF TEST POSITION

5.1 HEAD POSITION

The device was placed in a normal operating position with the Point A on the device, as illustrated in following drawing, aligned with the location of the RE(ERP) on the phantom. With the ear-piece pressed against the head, the vertical center line of the body of the handset was aligned with an imaginary plane consisting of the RE, LE and M. While maintaining these alignments, the body of the handset was gradually moved towards the cheek until any point on the mouth-piece or keypad contacted the cheek. This is a cheek/touch position. For ear/tilt position, while maintain the device aligned with the BM and FN lines, the device was pivot against ERP back for 15° or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

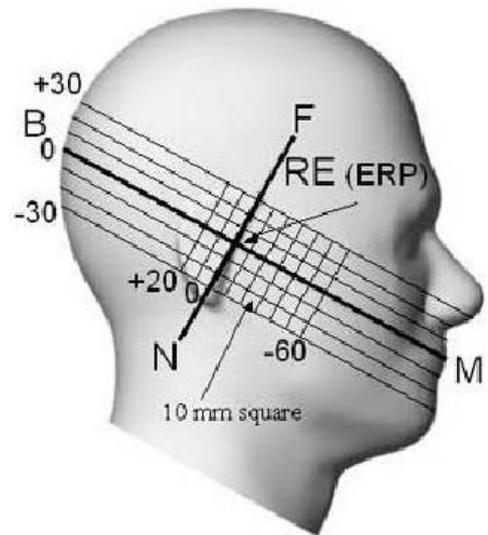


Figure 5.1 Side view of the phantom

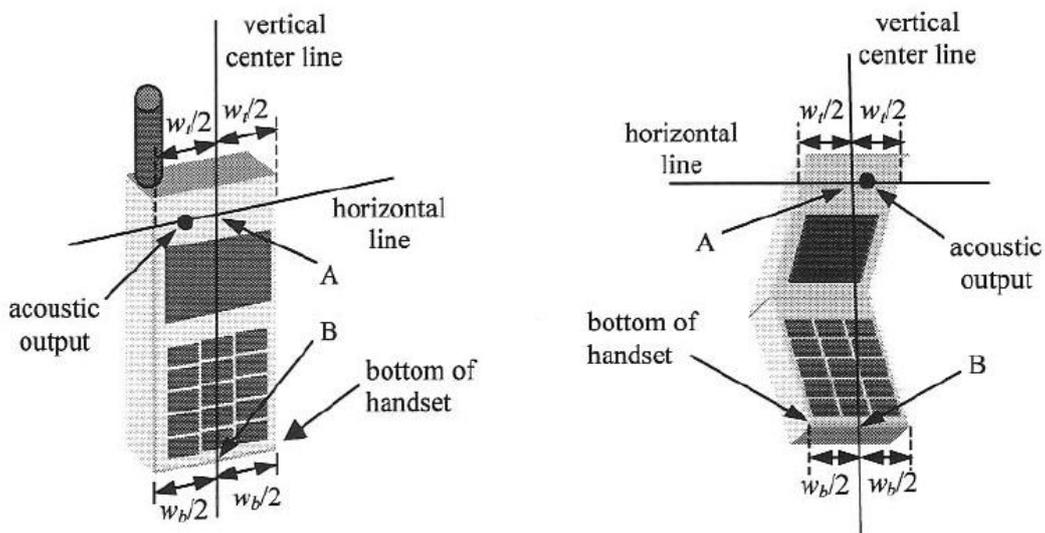


Figure 5.2 Handset vertical and horizontal reference lines

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 5 mm 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.

5.3 Test Configurations

According to KDB 447498, the device that can be connected to a host through a cable must be tested with the device positioned in all applicable orientations against the flat phantom. And a separation distance ≤ 0.5 cm is required for USB-dongle transmitters.

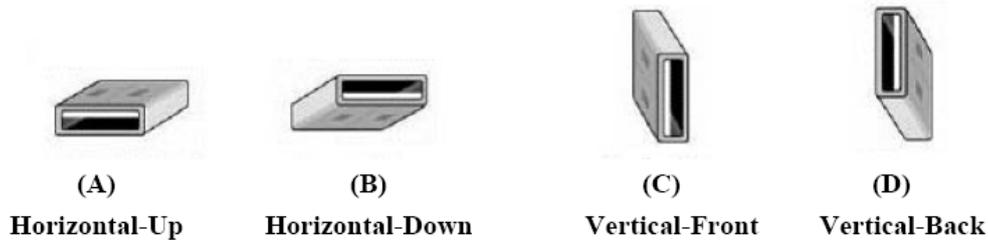


Figure 5.3 USB Connector Orientations Implemented on Laptop Computers

Therefore, the EUT was tested in following orientations;

1) Configuration 1: Front side of the EUT was tested with the direct-connection to the host device with Horizontal-Up (A), and separation distance between EUT and Phantom is 5 mm.

2) Configuration 2: Back side of the EUT was connected to the host device with Horizontal-Down (B) using a USB cable, and separation distance between EUT and Phantom is 5 mm.

3) Configuration 3: Right side of the EUT was connected to the host device with Vertical-Front (C) using a USB cable, and separation distance between EUT and Phantom is 5 mm.

4) Configuration 4: Left side of the EUT was tested with the direct-connection to the host device with Vertical-Back (D), and separation distance between EUT and Phantom is 5 mm.

5) Configuration 5: Top side of the EUT was tested with the direct-connection to the host device, and separation distance between EUT and Phantom is 5 mm.

Note;

This USB cable was used to operate this unit in the highest RF performance capability for SAR testing.

6. MEASUREMENT UNCERTAINTY

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

According to ANSI/IEEE C95.3, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of 1 dB to ± 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.

Uncertainty Budget

Frequency (MHz)	Error Description	Tol (= %)	Prob. dist.	Div.	τ	Standard Uncertainty (= %)	v_{eff}	Combined Uncertainty (= %)	k	Expanded STD Uncertainty (= %)
1. Measurement System										
	Probe Calibration	5.50	N	1	1	5.50	∞			
	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 Noise	3.00	R	1.73	1	1.73	∞			
	RF Ambient Reflection	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	1.80	N	1.00	1	1.80	9			
	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 Permittivity(target)	5.00	R	1.73	0.60	1.73	∞			
835 (Head)	Liquid Conductivity(meas.)	0.22	N	1	0.64	0.14	∞	10.42	2	20.84
835 (Head)	Liquid Permittivity(meas.)	3.13	N	1	0.60	1.88	∞			
835 (Body)	Liquid Conductivity(meas.)	0.00	N	1	0.64	0.00	∞	10.30	2	20.60
835 (Body)	Liquid Permittivity(meas.)	1.72	N	1	0.60	1.03	∞			
1800 (Head)	Liquid Conductivity(meas.)	0.00	N	1	0.64	0.00	∞	10.36	2	20.72
1800 (Head)	Liquid Permittivity(meas.)	2.50	N	1	0.60	1.50	∞			
1800 (Body)	Liquid Conductivity(meas.)	0.66	N	1	0.64	0.42	∞	10.26	2	20.53
1800 (Body)	Liquid Permittivity(meas.)	0.58	N	1	0.60	0.35	∞			
1900 (Head)	Liquid Conductivity(meas.)	1.43	N	1	0.64	0.92	∞	10.32	2	20.65
1900 (Head)	Liquid Permittivity(meas.)	1.25	N	1	0.60	0.75	∞			
1900 (Body)	Liquid Conductivity(meas.)	1.97	N	1	0.64	1.26	∞	10.33	2	20.66
1900 (Body)	Liquid Permittivity(meas.)	0.47	N	1	0.60	0.28	∞			

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 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	May.07, 2010	Head	21.1	ϵr	41.5	42.8	+ 3.13	± 5
				σ	0.90	0.898	- 0.22	± 5
835	May.07, 2010	Body	21.1	ϵr	55.2	54.25	- 1.72	± 5
				σ	0.97	0.97	0.00	± 5
1 800	May.07, 2010	Head	21.1	ϵr	40.0	41	+ 2.50	± 5
				σ	1.40	1.40	0.00	± 5
1 800	May.07, 2010	Body	21.1	ϵr	53.3	53.61	+ 0.58	± 5
				σ	1.52	1.51	- 0.66	± 5
1 900	May.08, 2010	Head	21.2	ϵr	40.0	39.5	- 1.25	± 5
				σ	1.40	1.42	+ 1.43	± 5
1 900	May.08, 2010	Body	21.2	ϵr	53.3	53.55	+ 0.47	± 5
				σ	1.52	1.49	- 1.97	± 5

8.2 System Validation

Prior to assessment, the system is verified to the $\pm 10\%$ of the specifications at 835 MHz / 1 800 MHz / 1 900 MHz by using the system validation kit. (Graphic Plots Attached)

*Input Power: 100 mW

Freq. [MHz]	Date	Liquid	Liquid Temp. [°C]	SAR Average	Target Value (SPEAG) (mW/g)	* Measured Value (mW/g)	Deviation [%]	Limit [%]
835	May.07, 2010	Head	21.1	1 g	9.56	0.975	+ 1.99	± 10
1800	May.07, 2010	Head	21.1	1 g	38.9	4.01	+ 3.08	± 10
1 900	May.08, 2010	Head	21.2	1 g	38.9	4.04	+ 3.86	± 10

9. 3G MEASUREMENT PROCEDURES

9.1 Procedures Used To Establish Test Signal

The device 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 evaluating 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.

9.2 SAR Measurement Conditions for 1x Ev-Do Devices

These procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices",

9.2.1 1xEv-Do Data Devices

The following procedures apply to Access Terminals (AT) operating under CDMA 2000 High Rate packer Data, Rev.0 and Rev.A, 1x Ev-Do protocols.

SAR for body exposure conditions are typically required devices with Ev-Do Capabilities, including handsets and data modems.

operating in various electronic devices. When VOIP is available for Ev-Do devices to operate in configurations next to the ear, head exposure conditions are applicable.

The default test configuration is to measure SAR with an established radio link between the AT and a communication test set according to 3GPP2 Test Application Protocols(TAP), FTAT/RTAP for Rev.0 and FETAP/RETAP for Rev.A. The code channel power levels, RF channel output power (ALL Bits Up) and other operating parameters should be actively monitored and controlled by the communications test set during the SAR measurement. The use of FTM should be avoided.

Maximum output power is verified according to procedures defined in 3 GPP2 C.S0033 and TIA-866, and SAR must be measured according to these maximum output conditions.

9.2.2 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to procedures in section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rev.0 and section 4.3.4 of 3GPP2 C.S0033-A for Rev.A For Rev.A, maximum outpour for both Subtype 0/1 and subtype 2 Physical Layer configurations should be measured.

The device operating configurations under TAP/ETAP should be documented in the test report; including power control, code channel and RF channel output power levels. The measurement results should be tabulated in the SAR report with any measurement difficulties and equipment limitations clearly identified.

9.2.3 SAR Measurements

SAR is measured using FTAP/RTAP and FETAP/RETAP respectively for Rev.0 and Rev.A device. The AT is Tested with a Reverse Data Channel rate of 153.6kbps in Subtype 0/1 and Subtype 2 Physical Layer configurations should be measured. The device operating configurations under TAP/ETAP should be documented in the test report; including power Control, code channel and RF channel output power levels, The measurement results should be tabulated in the SAR report with any measurement difficulties and equipment limitations clearly identified. output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. otherwise, SAR is measured on the maximum output channel for Rev.A using the exposure configuration that results in the highest SAR for that RF channels in Rev.0. Head SAR is required for Ev-Do devices that support operations next to the ear; for example, with VOIP, using Subtype 2 Physical Layer configurations according to the required handset test configurations.

9.2.4 1x RTT Support

For Ev-Do device that also support 1xRTT voice and/or data operations ,SAR is not required for 1xRTT when the maximum average output of each channel is less than 1/4dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev.0

Band	Channel	SO2	SO2	SO55	SO55	TDSO	1xEvD	1xEvD	1xEvDO	1xEvDO
		RC1/1 (dBm)	RC3/3 (dBm)	RC1/1 (dBm)	RC3/3 (dBm)	RC3/3 (dBm)	Rev.O (FTAP)	Rev.O (RTAP)	Rev.A (FETAP)	Rev.A (RETAP)
CDMA	1013	23.82	23.92	23.79	23.85	23.77	23.89	23.93	23.85	23.88
	384	24.07	24.04	23.97	23.96	23.99	23.89	24.05	24.08	24.15
	777	23.81	23.82	23.72	23.73	23.72	23.71	23.77	23.78	23.75
PCS	25	23.78	23.78	23.74	23.68	23.72	23.68	23.82	23.98	23.95
	600	24.00	23.97	23.86	23.83	23.81	23.84	23.90	23.98	24.00
	1175	24.14	24.08	24.12	24.05	24.01	24.07	24.18	24.08	23.96
AWS	25	24.29	24.28	24.21	24.09	24.08	24.13	24.20	24.22	24.25
	450	23.95	24.05	23.84	23.8	23.88	23.88	23.92	23.93	24.00
	875	23.88	23.85	23.67	23.75	23.83	23.79	23.85	23.92	23.95

10. SAR TEST DATA SUMMARY

10.1 Measurement Results (CDMA835 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Separation Distance	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
836.52	384 (Mid)	EVDO	24.05	23.99	Horizontal up	5 mm	Intenna	0.398
836.52	384 (Mid)	EVDO	24.05	24.04	Horizontal down	5 mm	Intenna	0.443
836.52	384 (Mid)	EVDO	24.05	23.99	Vertical front	5 mm	Intenna	0.352
836.52	384 (Mid)	EVDO	24.05	24.05	Vertical back	5 mm	Intenna	0.309
836.52	384 (Mid)	EVDO	24.05	23.95	Top	5 mm	Intenna	0.342
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 cm ± 0.2 cm.
- Tissue parameters and temperatures are listed on the SAR plot.
- Power Supply Power supplied through host device (TOSHIBA)
- Test Signal Call Mode Manual Test cord Base Station Simulator
- All side of the phone were tested and the worst-case side is reported.
- Test Configuration With Holster Without Holster
- The EUT was fixed by using a Styrofoam to avoid perturbation due to the device holder clamps.
- EVDO Body SAR was tested under EVDO Rev.0 RTAP.
- 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).

10.2 Measurement Results (ASW1800 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Separation Distance	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 711.25	25 (Low)	EVDO	24.2	24.19	Horizontal up	5 mm	Intenna	1.03
1 732.5	450 (Mid)	EVDO	23.92	23.90	Horizontal up	5 mm	Intenna	1.03
1 753.75	875 (High)	EVDO	23.85	23.78	Horizontal up	5 mm	Intenna	0.962
1 711.25	25 (Low)	EVDO	24.2	24.17	Horizontal down	5 mm	Intenna	0.981
1 732.5	450 (Mid)	EVDO	23.92	23.92	Horizontal down	5 mm	Intenna	1.05
1 753.75	875 (High)	EVDO	23.85	23.68	Horizontal down	5 mm	Intenna	0.972
1 732.5	450 (Mid)	EVDO	23.92	23.94	Vertical front	5 mm	Intenna	0.245
1 711.25	25 (Low)	EVDO	24.2	24.14	Vertical back	5 mm	Intenna	1.03
1 732.5	450 (Mid)	EVDO	23.92	23.99	Vertical back	5 mm	Intenna	1.02
1 753.75	875 (High)	EVDO	23.85	23.81	Vertical back	5 mm	Intenna	0.805
1 732.5	450 (Mid)	EVDO	23.92	23.88	Top	5 mm	Intenna	0.210
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>		

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 Power Supply Power supplied through host device (TOSHIBA)
 - 6 Test Signal Call Mode Manual Test cord Base Station Simulator
 - 7 All side of the phone were tested and the worst-case side is reported.
 - 9 Test Configuration With Holster Without Holster
- The EUT was fixed by using a Styrofoam to avoid perturbation due to the device holder clamps.
- 10 EVDO Body SAR was tested under EVDO Rev.0 RTAP.
 - 11 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).

10.3 Measurement Results (PCS 1900 Body SAR)

Frequency		Modulation	Conducted Power (dBm)		Configuration	Separation Distance	Antenna Type	SAR(mW/g)
MHz	Channel		Begin	End				
1 851.25	25 (Low)	EVDO	23.82	23.69	Horizontal up	5 mm	Intenna	1.02
1 880.00	600 (Mid)	EVDO	23.90	23.88	Horizontal up	5 mm	Intenna	1.13
1 908.75	1175 (High)	EVDO	24.18	24.12	Horizontal up	5 mm	Intenna	1.14
1 851.25	25 (Low)	EVDO	23.82	23.95	Horizontal down	5 mm	Intenna	0.923
1 880.00	600 (Mid)	EVDO	23.90	23.86	Horizontal down	5 mm	Intenna	1.01
1 908.75	1175 (High)	EVDO	24.18	24.16	Horizontal down	5 mm	Intenna	0.872
1 880.00	600 (Mid)	EVDO	23.90	23.93	Vertical front	5 mm	Intenna	0.449
1 880.00	600 (Mid)	EVDO	23.90	24.03	Vertical back	5 mm	Intenna	0.728
1 880.00	600 (Mid)	EVDO	23.90	23.79	Top	5 mm	Intenna	0.176
ANSI/ IEEE C95.1 2005 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population						Body 1.6 W/kg (mW/g) Averaged over 1 gram		

NOTES:

- 1 The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supplement C [July 2001].
 - 2 All modes of operation were investigated and the worst-case are reported.
 - 3 Measured Depth of Simulating Tissue is 15.0 cm ± 0.2 cm.
 - 4 Tissue parameters and temperatures are listed on the SAR plot.
 - 5 Power Supply Power supplied through host device (TOSHIBA)
 - 6 Test Signal Call Mode Manual Test cord Base Station Simulator
 - 7 All side of the phone were tested and the worst-case side is reported.
 - 9 Test Configuration With Holster Without Holster
- The EUT was fixed by using a Styrofoam to avoid perturbation due to the device holder clamps.
- 10 EVDO Body SAR was tested under EVDO Rev.0 RTAP.
 - 11 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).

11. CONCLUSION

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

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

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Attachment 1. – SAR Test Plots

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.973$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

CDMA Body 384/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.459 mW/g

CDMA Body 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

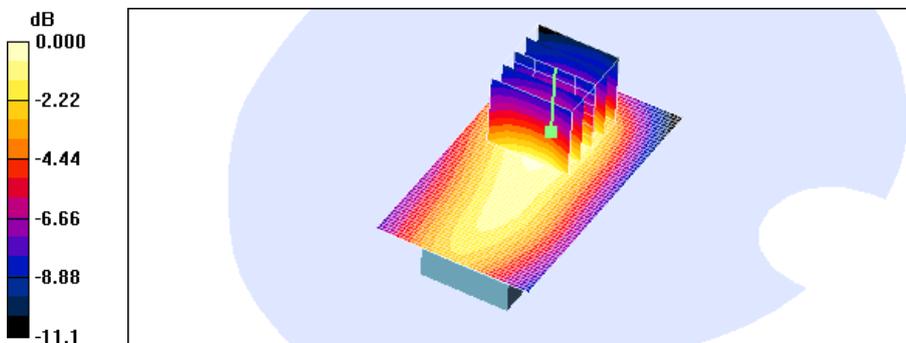
Reference Value = 21.4 V/m; Power Drift = -0.0614 dB

Peak SAR (extrapolated) = 0.571 W/kg

SAR(1 g) = 0.398 mW/g; SAR(10 g) = 0.263 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: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.973$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

CDMA Body 384/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.518 mW/g

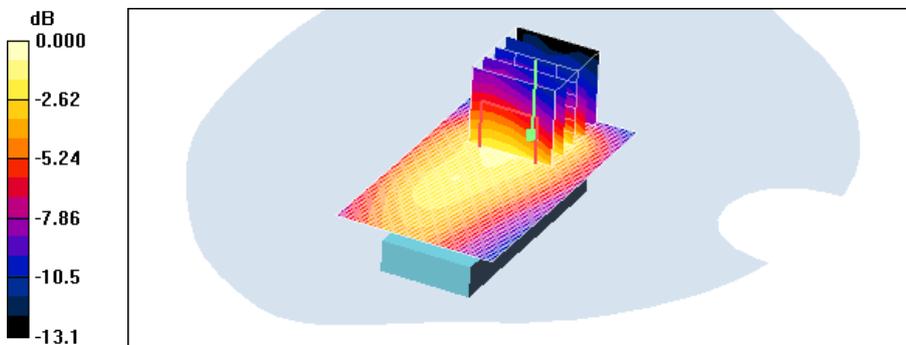
CDMA Body 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.0 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.860 W/kg

SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.258 mW/g

Maximum value of SAR (measured) = 0.499 mW/g



0 dB = 0.499mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.973$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

CDMA 384/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.362 mW/g

CDMA 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

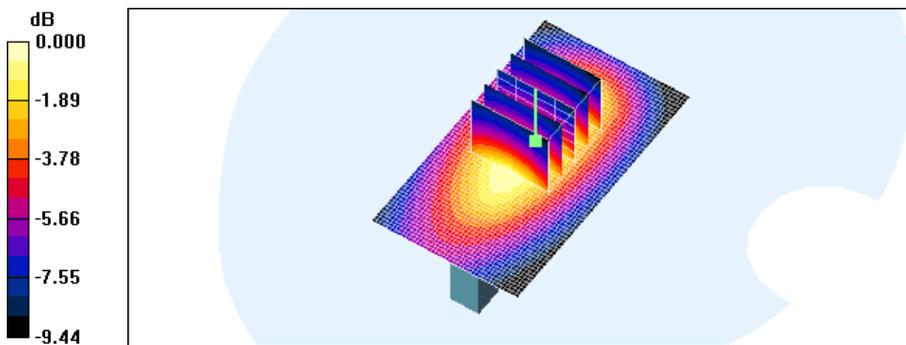
Reference Value = 18.6 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 0.521 W/kg

SAR(1 g) = 0.352 mW/g; SAR(10 g) = 0.233 mW/g

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

Maximum value of SAR (measured) = 0.386 mW/g



0 dB = 0.386mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.973$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

CDMA 384/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.327 mW/g

CDMA 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

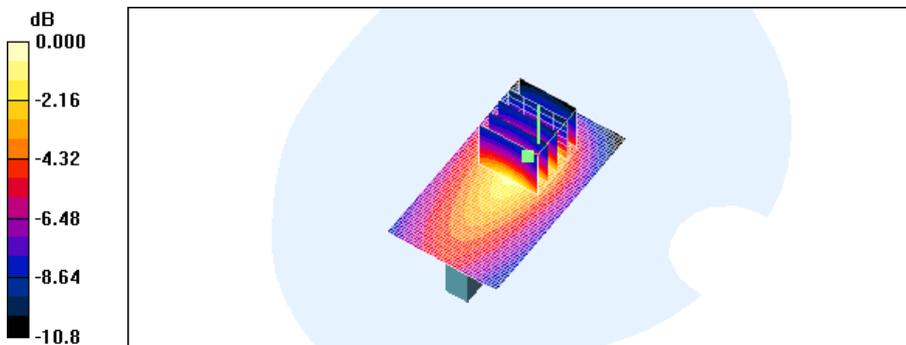
Reference Value = 18.8 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.572 W/kg

SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.183 mW/g

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

Maximum value of SAR (measured) = 0.333 mW/g



0 dB = 0.333mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.973$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

CDMA 835 384ch/Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.331 mW/g

CDMA 835 384ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

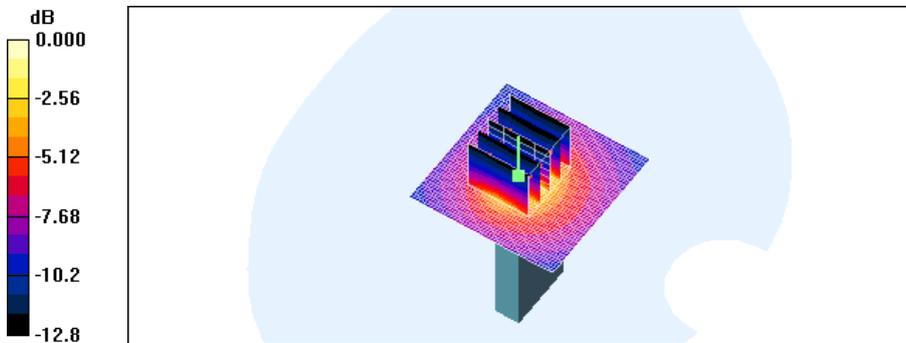
Reference Value = 19.2 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.342 mW/g; SAR(10 g) = 0.151 mW/g

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

Maximum value of SAR (measured) = 0.365 mW/g



0 dB = 0.365mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1711.25 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1711.25$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 25ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.15 mW/g

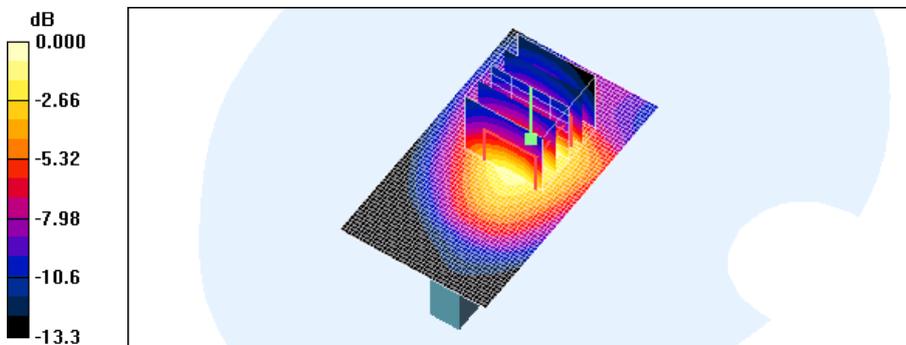
AWS Body 25ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.9 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.619 mW/g

Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.14mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 450/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.14 mW/g

AWS Body 450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

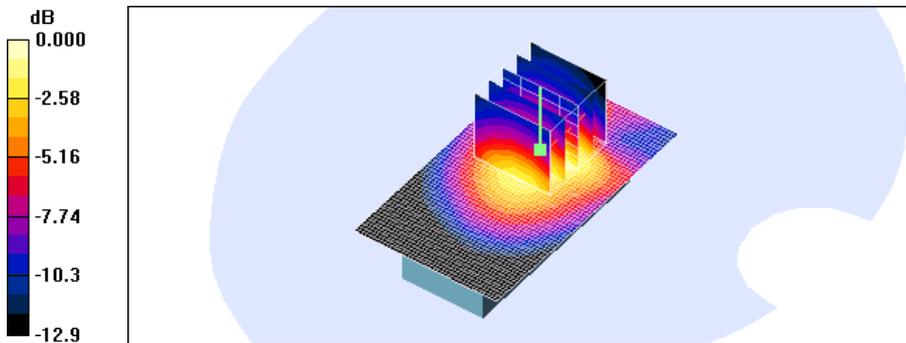
Reference Value = 24.8 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.625 mW/g

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

Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1753.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1753.75$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 875/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

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

AWS Body 875/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

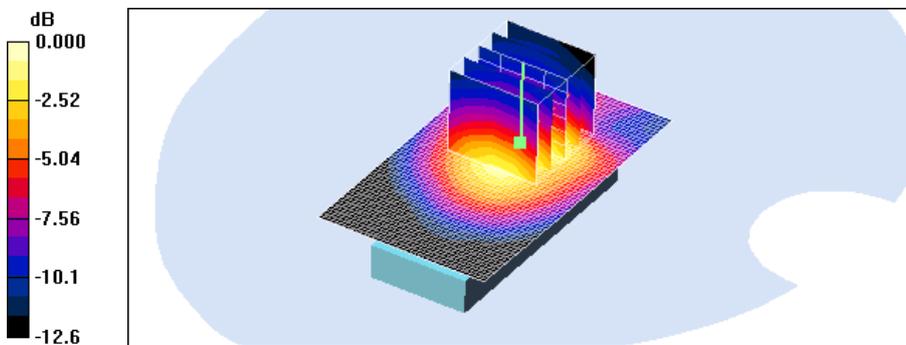
Reference Value = 24.2 V/m; Power Drift = -0.071 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.962 mW/g; SAR(10 g) = 0.593 mW/g

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

Maximum value of SAR (measured) = 1.06 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1711.25 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1711.25$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 25/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.18 mW/g

AWS Body 25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

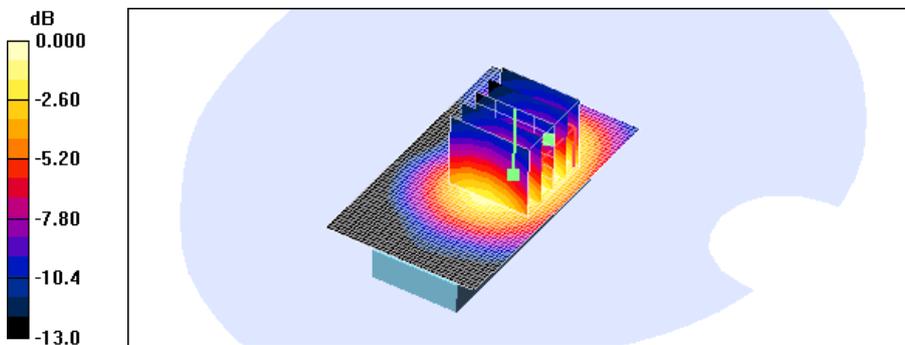
Reference Value = 28.0 V/m; Power Drift = -0.033 dB

Peak SAR (extrapolated) = 1.37 W/kg

SAR(1 g) = 0.981 mW/g; SAR(10 g) = 0.595 mW/g

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

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



0 dB = 1.05mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 450/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.22 mW/g

AWS Body 450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

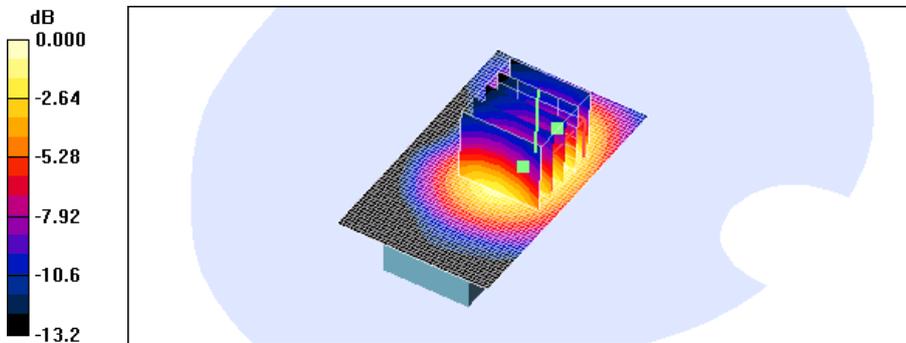
Reference Value = 28.2 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.636 mW/g

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

Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1753.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1753.75$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 875/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.19 mW/g

AWS Body 875/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

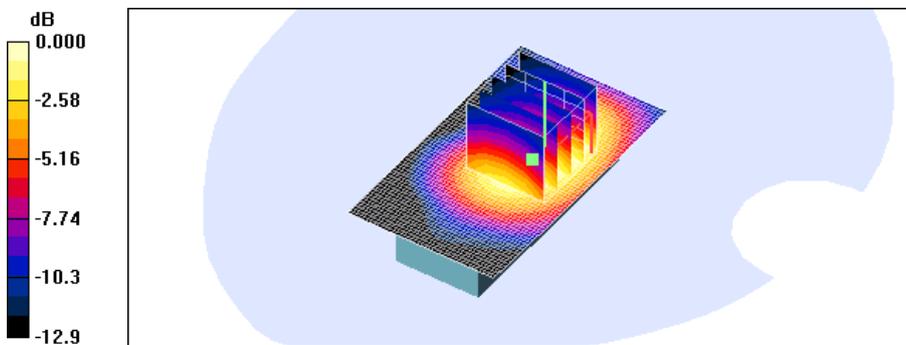
Reference Value = 27.0 V/m; Power Drift = -0.169 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.972 mW/g; SAR(10 g) = 0.593 mW/g

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

Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 450ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.273 mW/g

AWS Body 450ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

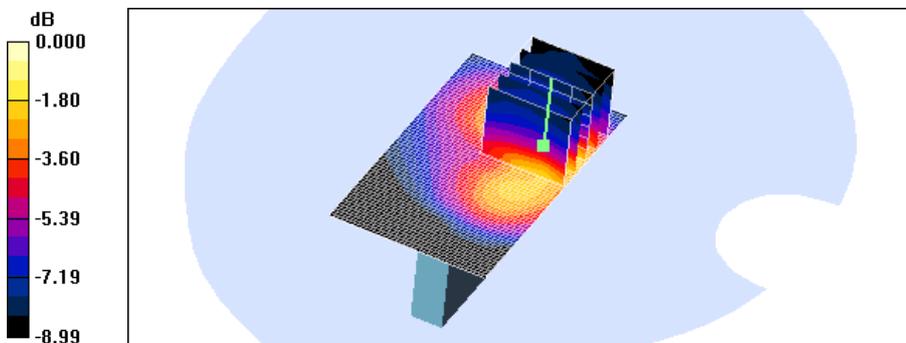
Reference Value = 14.2 V/m; Power Drift = 0.004 dB

Peak SAR (extrapolated) = 0.356 W/kg

SAR(1 g) = 0.245 mW/g; SAR(10 g) = 0.147 mW/g

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

Maximum value of SAR (measured) = 0.279 mW/g



0 dB = 0.279mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1711.25 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1711.25$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 25ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.17 mW/g

AWS Body 25ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

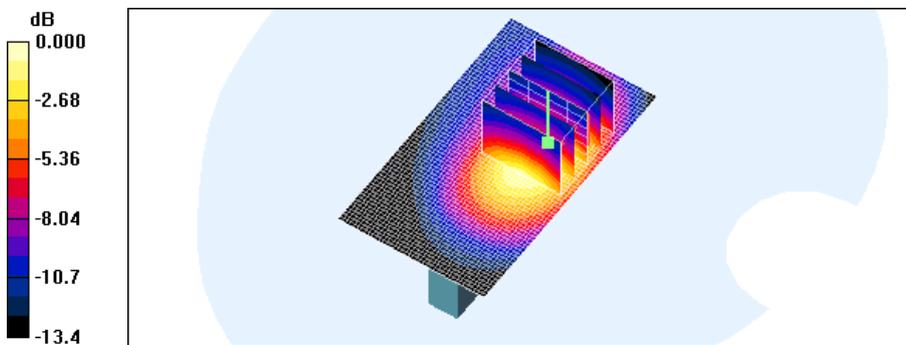
Reference Value = 28.2 V/m; Power Drift = -0.064 dB

Peak SAR (extrapolated) = 1.42 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.601 mW/g

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

Maximum value of SAR (measured) = 1.18 mW/g



0 dB = 1.18mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 450ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.14 mW/g

AWS Body 450ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

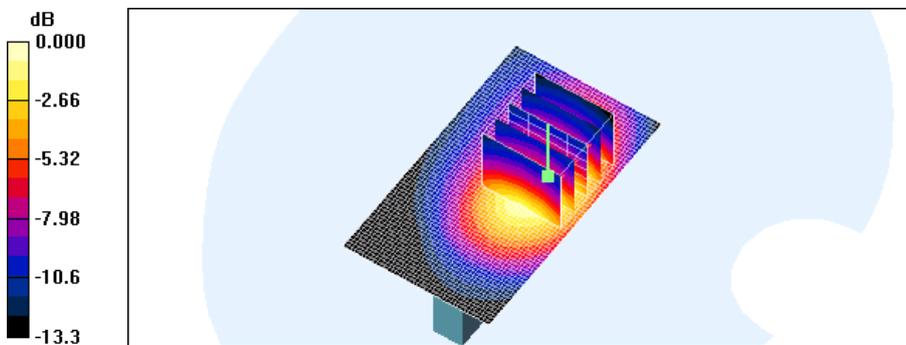
Reference Value = 25.3 V/m; Power Drift = 0.073 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.603 mW/g

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

Maximum value of SAR (measured) = 1.14 mW/g



0 dB = 1.14mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1753.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1753.75$ MHz; $\sigma = 1.47$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 875ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.902 mW/g

AWS Body 875ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

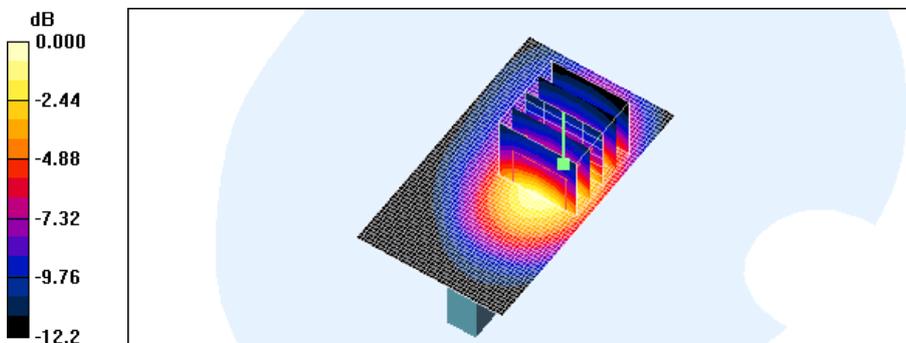
Reference Value = 22.6 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.805 mW/g; SAR(10 g) = 0.474 mW/g

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

Maximum value of SAR (measured) = 0.908 mW/g



0 dB = 0.908mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 450/Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.246 mW/g

AWS Body 450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

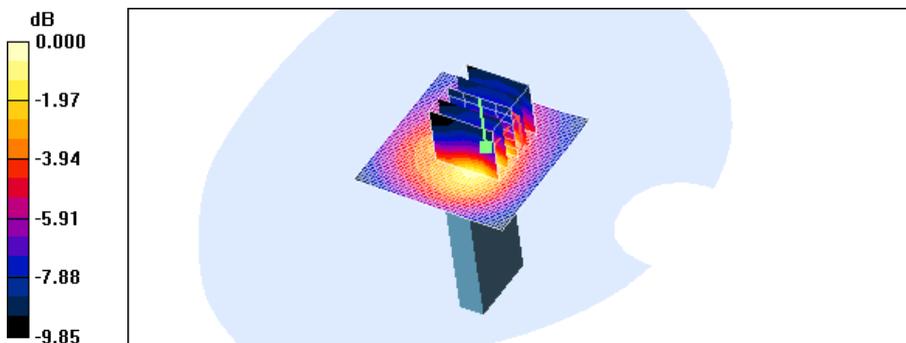
Reference Value = 12.3 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 0.272 W/kg

SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.128 mW/g

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

Maximum value of SAR (measured) = 0.232 mW/g



0 dB = 0.232mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: PCS 1900; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1851.25$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 25/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.12 mW/g

PCS Body 25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

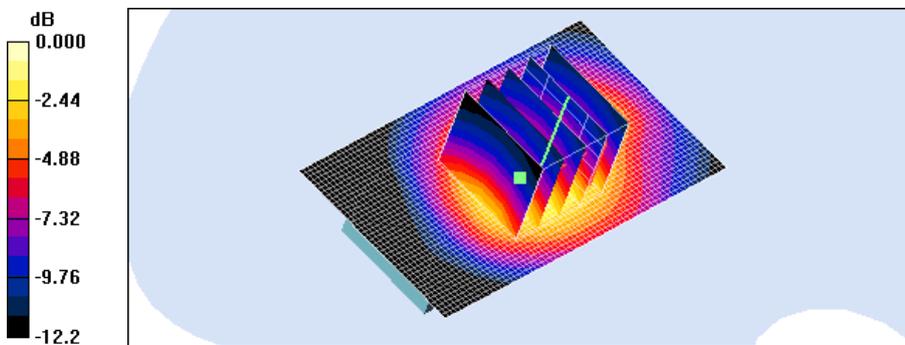
Reference Value = 23.5 V/m; Power Drift = -0.134 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.631 mW/g

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

Maximum value of SAR (measured) = 1.12 mW/g



0 dB = 1.12mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

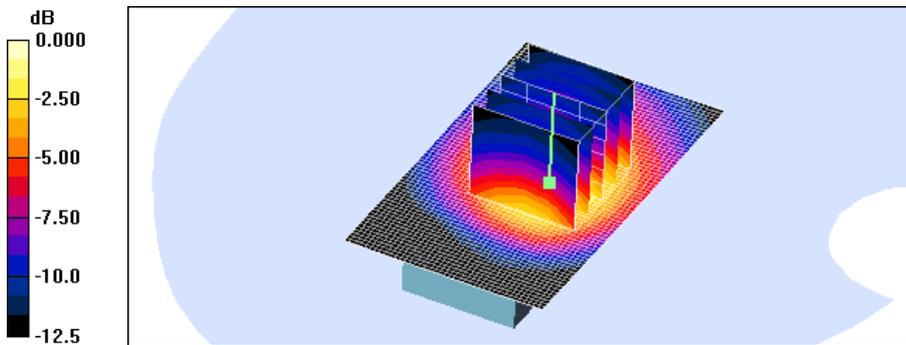
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 600/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 mW/g

PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.695 mW/g
Maximum value of SAR (measured) = 1.26 mW/g



0 dB = 1.26mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: PCS 1900; Frequency: 1908.75 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1908.75$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 1175/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.30 mW/g

PCS Body 1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

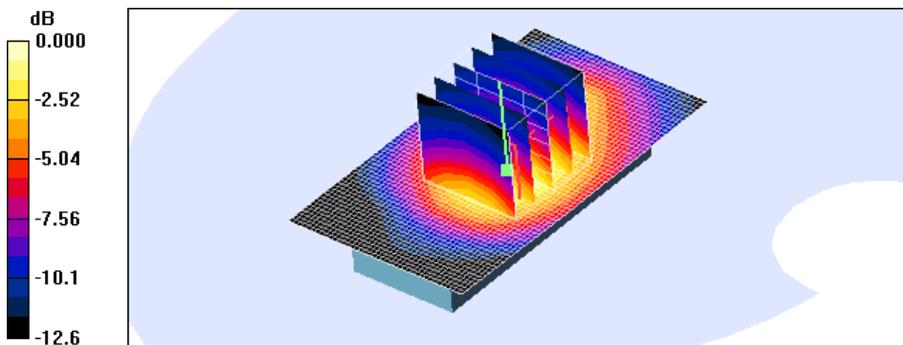
Reference Value = 23.1 V/m; Power Drift = -0.055 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.695 mW/g

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

Maximum value of SAR (measured) = 1.26 mW/g



0 dB = 1.26mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: PCS 1900; Frequency: 1851.25 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1851.25$ MHz; $\sigma = 1.45$ mho/m; $\epsilon_r = 53.9$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 25/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.12 mW/g

PCS Body 25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

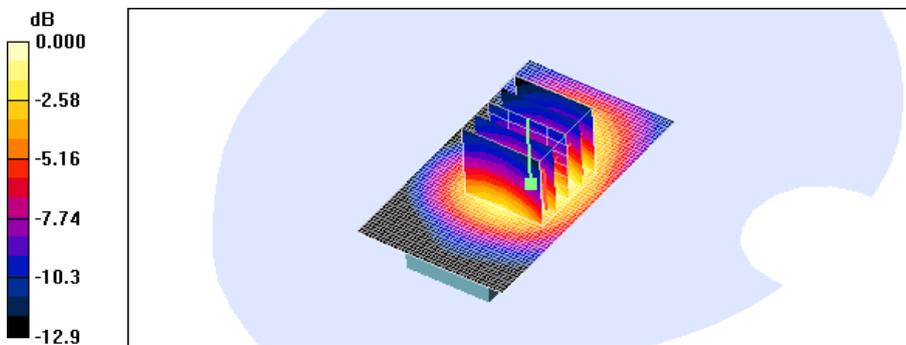
Reference Value = 24.4 V/m; Power Drift = 0.134 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.923 mW/g; SAR(10 g) = 0.580 mW/g

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

Maximum value of SAR (measured) = 0.994 mW/g



0 dB = 0.994mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

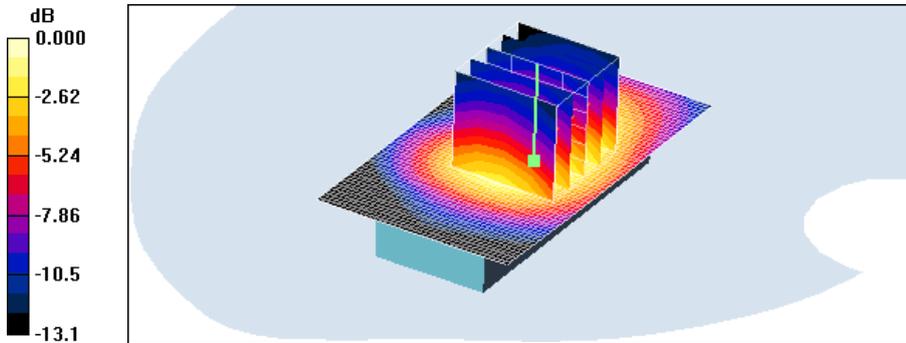
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 600/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.25 mW/g

PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.6 V/m; Power Drift = -0.036 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.633 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: PCS 1900; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1908.75$ MHz; $\sigma = 1.51$ mho/m; $\epsilon_r = 53.5$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 1175/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.04 mW/g

PCS Body 1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

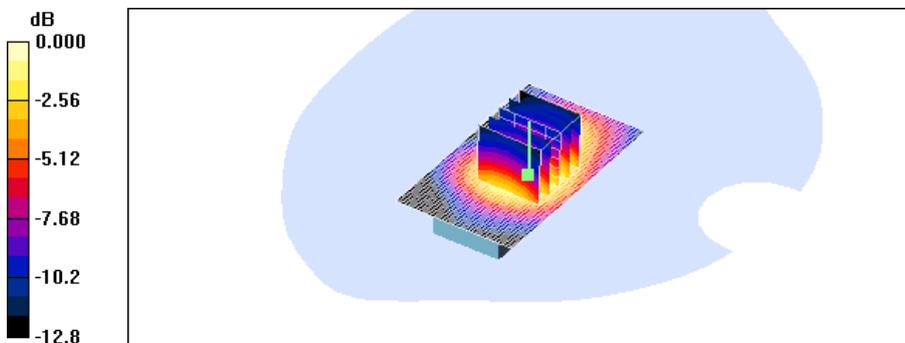
Reference Value = 23.6 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 1.10 W/kg

SAR(1 g) = 0.872 mW/g; SAR(10 g) = 0.548 mW/g

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

Maximum value of SAR (measured) = 0.955 mW/g



0 dB = 0.955mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

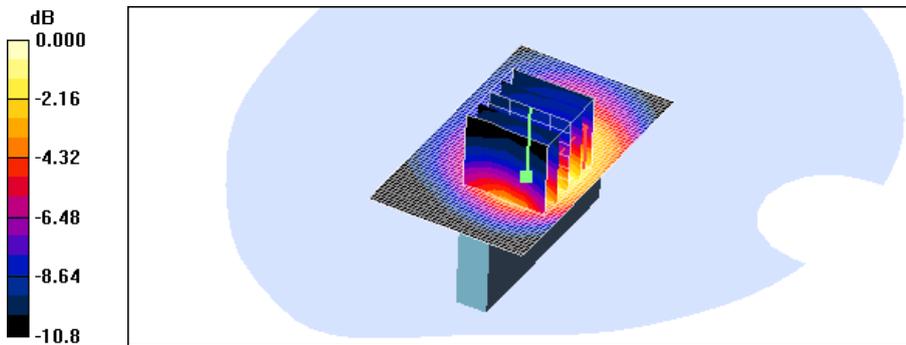
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 600ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.522 mW/g

PCS Body 600ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.6 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 0.604 W/kg
SAR(1 g) = 0.449 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.490 mW/g



0 dB = 0.490mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

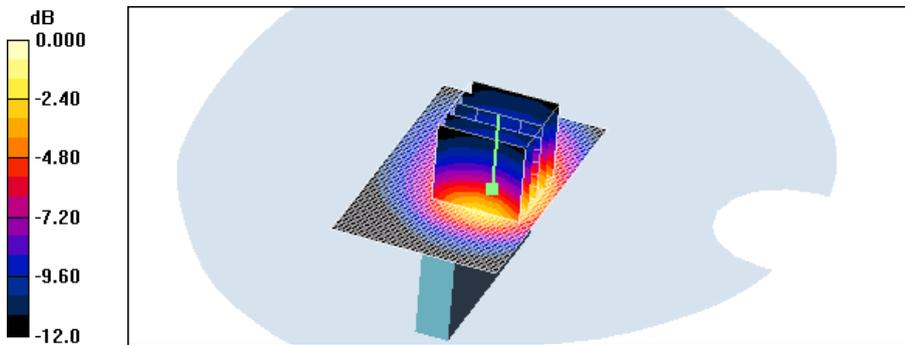
Communication System: PCS 1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 600ch/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.824 mW/g

PCS Body 600ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.5 V/m; Power Drift = 0.131 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.728 mW/g; SAR(10 g) = 0.430 mW/g
Maximum value of SAR (measured) = 0.804 mW/g



0 dB = 0.804mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.2 °C
Ambient Temperature: 21.4 °C
Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

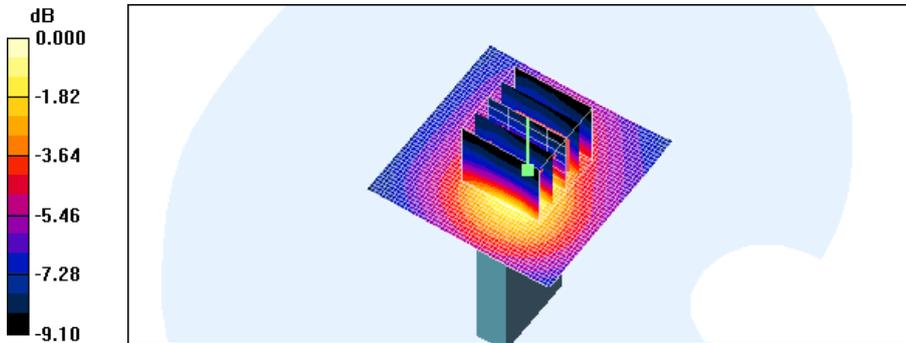
Communication System: PCS 1900; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.48$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 600/Area Scan (51x51x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.200 mW/g

PCS Body 600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.5 V/m; Power Drift = -0.109 dB
Peak SAR (extrapolated) = 0.248 W/kg
SAR(1 g) = 0.176 mW/g; SAR(10 g) = 0.106 mW/g
Maximum value of SAR (measured) = 0.196 mW/g



0 dB = 0.196mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: CDMA 835MHz FCC; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.52$ MHz; $\sigma = 0.973$ mho/m; $\epsilon_r = 54.2$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

CDMA Body 384/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 0.518 mW/g

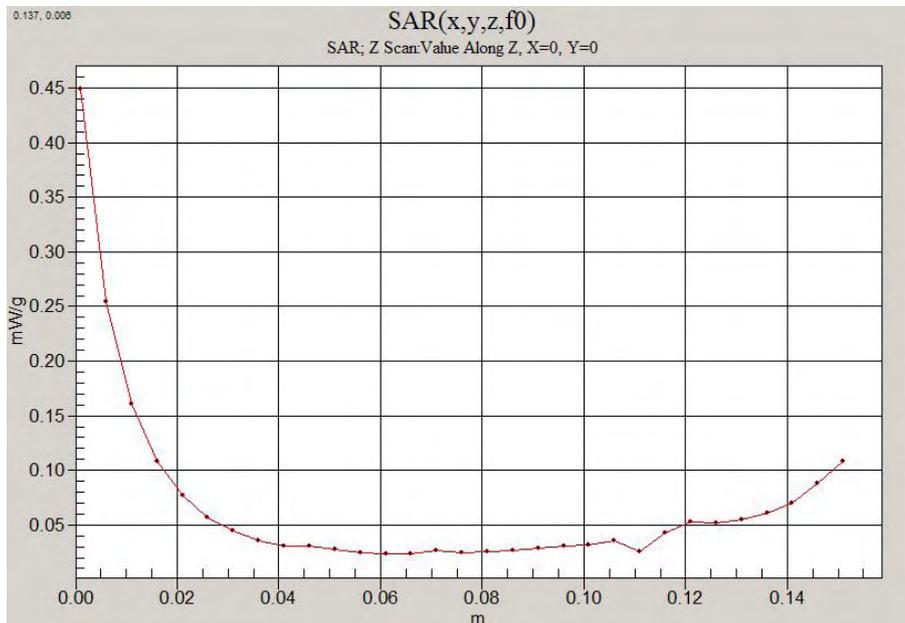
CDMA Body 384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.0 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.860 W/kg

SAR(1 g) = 0.443 mW/g; SAR(10 g) = 0.258 mW/g

Maximum value of SAR (measured) = 0.499 mW/g



Test Laboratory: HCT CO., LTD
EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
Liquid Temperature: 21.1 °C
Ambient Temperature: 21.3 °C
Test Date: May.07, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: AWS 1700 MHz FCC; Frequency: 1732.5 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.44$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: 1800/1900 Phantom; Type: SAM

AWS Body 450/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.22 mW/g

AWS Body 450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

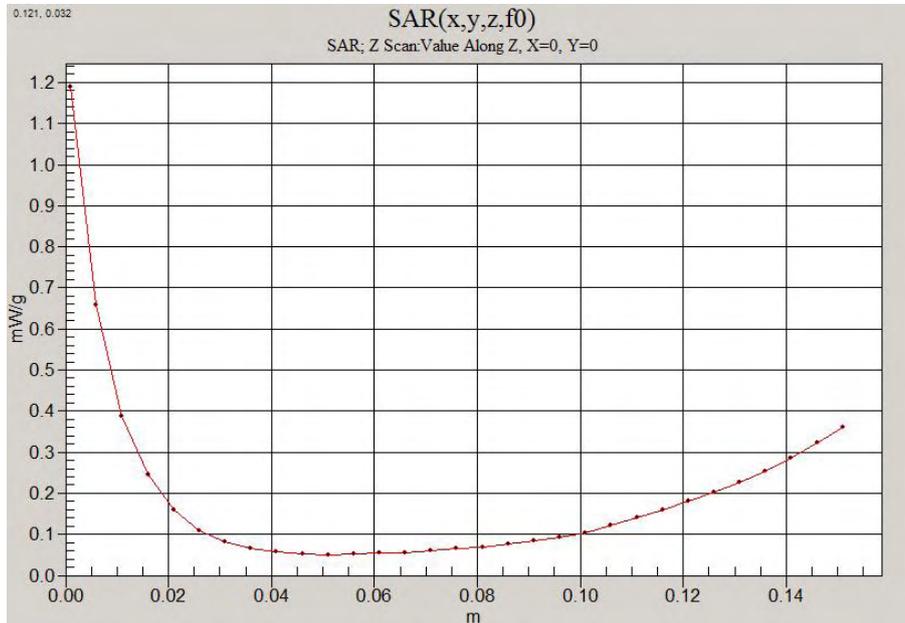
Reference Value = 28.2 V/m; Power Drift = -0.001 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.636 mW/g

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

Maximum value of SAR (measured) = 1.12 mW/g



Test Laboratory: HCT CO., LTD
 EUT Type: Tir-Band CDMA/EVDO Modem(CDMA/PCS/AWS CDMA)
 Liquid Temperature: 21.2 °C
 Ambient Temperature: 21.4 °C
 Test Date: May.08, 2010

DUT: A605; Type: Bar; Serial: #1

Communication System: PCS 1900; Frequency: 1908.75 MHz;Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 1908.75 \text{ MHz}$; $\sigma = 1.51 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

PCS Body 1175/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

Maximum value of SAR (interpolated) = 1.30 mW/g

PCS Body 1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

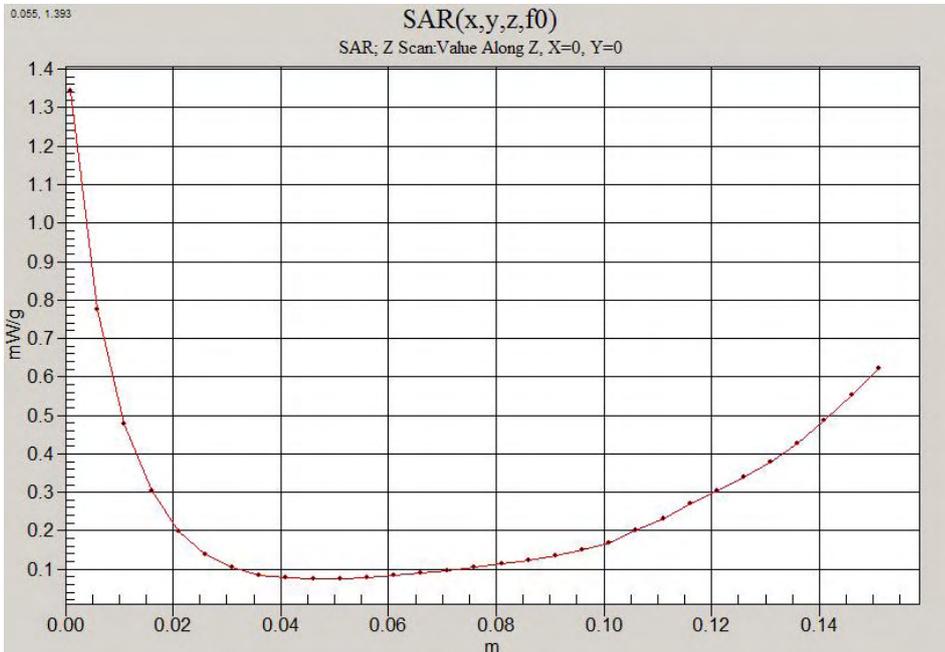
Reference Value = 23.1 V/m; Power Drift = -0.055 dB

Peak SAR (extrapolated) = 1.49 W/kg

SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.695 mW/g

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

Maximum value of SAR (measured) = 1.26 mW/g



Attachment 2. – Dipole Validation Plots

■ Validation Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20dBm)
Liquid Temp: 21.1 °C
Test Date: May.07, 2010

UT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 – SN:441

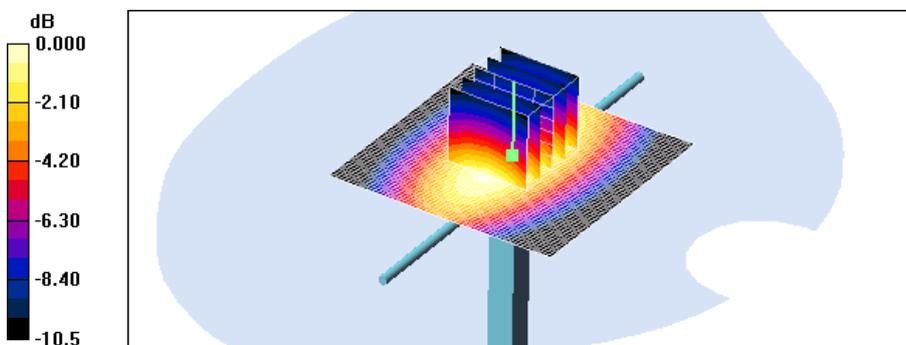
Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835$ MHz; $\sigma = 0.898$ mho/m; $\epsilon_r = 42.8$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

Validation 835MHz/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

Validation 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.8 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.975 mW/g; SAR(10 g) = 0.641 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

D

■ Validation Data (1800 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20dBm)
Liquid Temp: 21.1 °C
Test Date: May.07, 2010

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 – SN:2d007

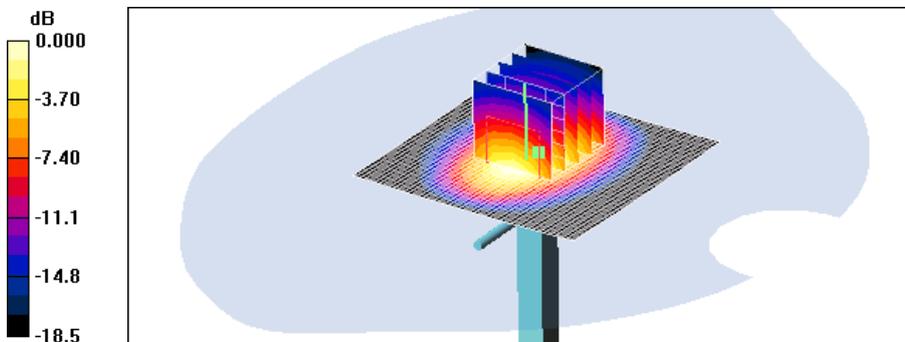
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.4 \text{ mho/m}$; $\epsilon_r = 41$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

- Probe: ET3DV6 – SN1631; ConvF(5.3, 5.3, 5.3); Calibrated: 2009-06-24
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2009-07-21
- Phantom: SAM 1800/1900 MHz; Type: SAM

Dipole 1800MHz Validation/Area Scan (61x61x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 4.86 mW/g

Dipole 1800MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 60.3 V/m; Power Drift = -0.075 dB
Peak SAR (extrapolated) = 6.56 W/kg
SAR(1 g) = 4.01 mW/g; SAR(10 g) = 2.14 mW/g
Maximum value of SAR (measured) = 4.48 mW/g



0 dB = 4.48mW/g

■ Validation Data (1900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.2 °C
Test Date: May.08, 2010

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

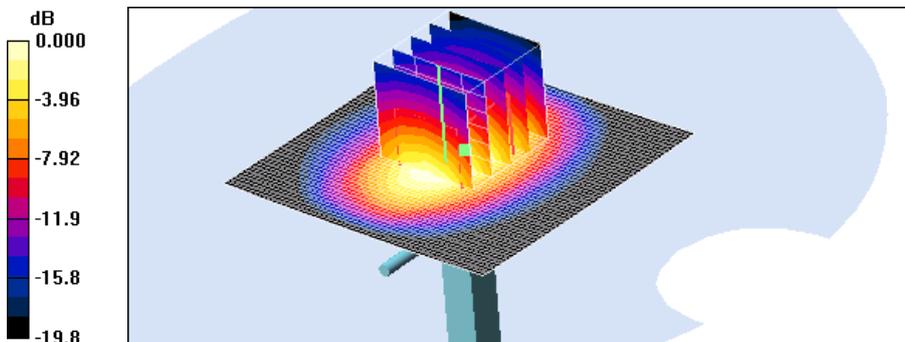
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.42$ mho/m; $\epsilon_r = 39.5$; $\rho = 1000$ kg/m³
Phantom section: Flat Section ; Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 176

DASY4 Configuration:

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

Dipole 1900MHz Validation/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.78 mW/g

Dipole 1900MHz Validation/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.8 V/m; Power Drift = 0.018 dB
Peak SAR (extrapolated) = 6.71 W/kg
SAR(1 g) = 4.04 mW/g; SAR(10 g) = 2.11 mW/g
Maximum value of SAR (measured) = 4.53 mW/g



0 dB = 4.53mW/g

■ Dielectric Parameter (835 MHz Head)

Title A605
SubTitle CDMA835(Head)
Test Date May.07, 2010

Frequency	e'	e''
800000000	43.0172	19.4457
805000000	43.0317	19.4792
810000000	42.9416	19.4658
815000000	42.9112	19.4683
820000000	42.8780	19.4769
825000000	42.8231	19.4063
830000000	42.8237	19.4161
835000000	42.7771	19.3336
840000000	42.6990	19.3400
845000000	42.6839	19.3073
850000000	42.6224	19.3456
855000000	42.5623	19.3315
860000000	42.4881	19.3012
865000000	42.3767	19.2979
870000000	42.3057	19.2881
875000000	42.2330	19.2690
880000000	42.1524	19.2880
885000000	42.0911	19.2662
890000000	42.0008	19.2283
895000000	41.9145	19.2498
900000000	41.9208	19.2284

■ Dielectric Parameter (835 MHz Body)

Title A605
SubTitle CDMA835(Body)
Test Date May.07, 2010

Frequency	e'	e''
800000000	54.7207	21.1170
805000000	54.6814	21.0945
810000000	54.6317	21.0141
815000000	54.5225	20.9744
820000000	54.4348	20.9381
825000000	54.3552	20.9746
830000000	54.2758	20.9310
835000000	54.2493	20.9091
840000000	54.1961	20.9017
845000000	54.1323	20.9048
850000000	54.0890	20.9104
855000000	54.0624	20.9116
860000000	54.0599	20.9306
865000000	54.1062	20.8921
870000000	54.0755	20.9348
875000000	54.1101	20.9195
880000000	54.0811	20.8741
885000000	54.0517	20.9115
890000000	54.0765	20.8967
895000000	54.0564	20.8770
900000000	53.9890	20.8628

-

■ Dielectric Parameter (1800 MHz Head)

Title A605
SubTitle AWS1800(Head)
Test Date May.07, 2010

Frequency	e'	e''
1700000000	41.4683	13.7685
1710000000	41.4351	13.7630
1720000000	41.3950	13.7967
1730000000	41.3372	13.7937
1740000000	41.2674	13.7636
1750000000	41.2420	13.7889
1760000000	41.1698	13.8177
1770000000	41.1626	13.8631
1780000000	41.1131	13.8783
1790000000	41.0733	13.8970
1800000000	41.0468	13.9695
1810000000	41.0117	13.9667
1820000000	40.9772	14.0071
1830000000	40.9549	14.0643
1840000000	40.8782	14.0823
1850000000	40.8264	14.0939
1860000000	40.7689	14.0850
1870000000	40.6775	14.1260
1880000000	40.6411	14.1225
1890000000	40.5792	14.1482
1700000000	41.4683	13.7685

■ Dielectric Parameter (1800 MHz Body)

Title A605
SubTitle AWS1800(Body)
Test Date May.07, 2010

Frequency	e'	e''
1700000000	53.8964	14.8164
1710000000	53.8680	14.8764
1720000000	53.8587	14.9207
1730000000	53.8218	14.9468
1740000000	53.8116	15.0067
1750000000	53.7527	15.0368
1760000000	53.7753	15.0243
1770000000	53.7044	15.0617
1780000000	53.6863	15.0801
1790000000	53.6537	15.0966
1800000000	53.6114	15.1254
1810000000	53.5616	15.1388
1820000000	53.5378	15.1966
1830000000	53.5242	15.2382
1840000000	53.4946	15.2718
1850000000	53.4839	15.3407
1860000000	53.4822	15.3718
1870000000	53.4467	15.4041
1880000000	53.3922	15.4133
1890000000	53.3782	15.4525
1900000000	53.3563	15.4770

■ Dielectric Parameter (1900 MHz Head)

Title A605
SubTitle PCS1900(Head)
Test Date May.08, 2010

Frequency	e'	e''
1800000000.0000	40.0145	13.1314
1810000000.0000	39.9645	13.1509
1820000000.0000	39.9007	13.1459
1830000000.0000	39.8629	13.1130
1840000000.0000	39.7861	13.1321
1850000000.0000	39.7136	13.1608
1860000000.0000	39.6302	13.1458
1870000000.0000	39.5716	13.1875
1880000000.0000	39.5171	13.2804
1890000000.0000	39.5080	13.3296
1900000000.0000	39.5025	13.4149
1910000000.0000	39.4759	13.4511
1920000000.0000	39.4647	13.4862
1930000000.0000	39.4083	13.5091
1940000000.0000	39.3519	13.5028
1950000000.0000	39.2905	13.4648
1960000000.0000	39.2343	13.4739
1970000000.0000	39.1616	13.4563
1980000000.0000	39.1073	13.4737
1990000000.0000	39.0632	13.5051
2000000000.0000	39.0269	13.5897

■ Dielectric Parameter (1900 MHz Body)

Title A605
SubTitle PCS1900(Body)
Test Date May.08, 2010

Frequency	e'	e''
1850000000.0000	53.8751	14.0474
1855000000.0000	53.8893	14.0330
1860000000.0000	53.8885	14.0329
1865000000.0000	53.8432	14.0466
1870000000.0000	53.8330	14.0530
1875000000.0000	53.7791	14.0766
1880000000.0000	53.7907	14.1045
1885000000.0000	53.6824	14.0836
1890000000.0000	53.6458	14.1197
1895000000.0000	53.5851	14.1020
1900000000.0000	53.5456	14.1354
1905000000.0000	53.4945	14.1582
1910000000.0000	53.4502	14.1877
1915000000.0000	53.4120	14.2126
1920000000.0000	53.3968	14.2732
1925000000.0000	53.3899	14.2878
1930000000.0000	53.3515	14.2978
1935000000.0000	53.3780	14.3406
1940000000.0000	53.3985	14.3764
1945000000.0000	53.4032	14.4123
1950000000.0000	53.4222	14.4088

Attachment 3. – Probe Calibration Data

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Accreditation No.: **SCS 108**

Client **H-CT (Dymstec)**

Certificate No: **ET3-1631_Jun09**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1631**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3
Calibration procedure for dosimetric E-field probes**

Calibration date: **June 24, 2009**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	2-Jan-09 (No. ES3-3013_Jan09)	Jan-10
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: June 24, 2009

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

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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
 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:1631

June 24, 2009

Probe ET3DV6

SN:1631

Manufactured:	October 12, 2001
Last calibrated:	October 29, 2001
Modified:	June 17, 2009
Recalibrated:	June 24, 2009

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

ET3DV6 SN:1631

June 24, 2009

DASY - Parameters of Probe: ET3DV6 SN:1631

Sensitivity in Free Space^A

Diode Compression^B

NormX	1.86 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP X	93 mV
NormY	1.83 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92 mV
NormZ	1.75 ± 10.1%	$\mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	92 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	11.8	7.6
SAR _{be} [%]	With Correction Algorithm	0.9	0.6

TSL 1750 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	15.7	10.6
SAR _{be} [%]	With Correction Algorithm	0.8	0.7

Sensor Offset

Probe Tip to Sensor Center	2.7 mm
Optical Surface Detection	not supported

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).

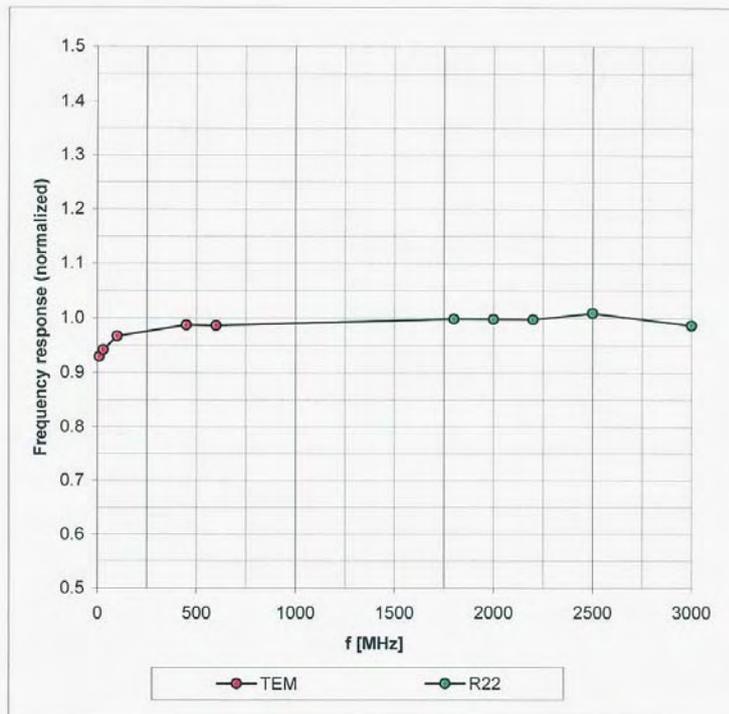
^B Numerical linearization parameter: uncertainty not required.

ET3DV6 SN:1631

June 24, 2009

Frequency Response of E-Field

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

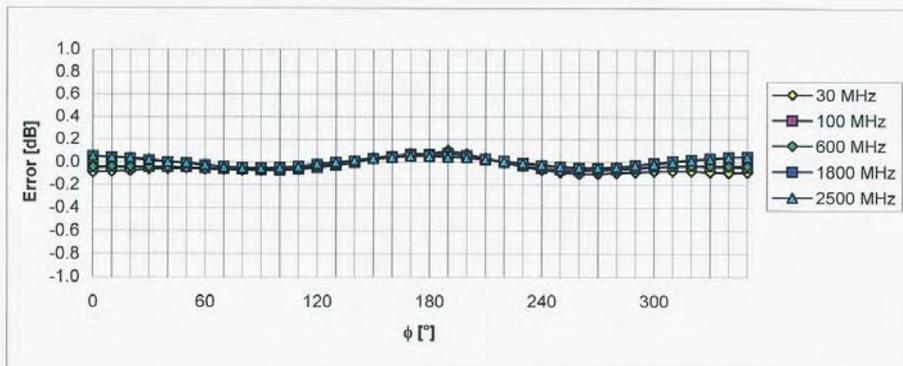
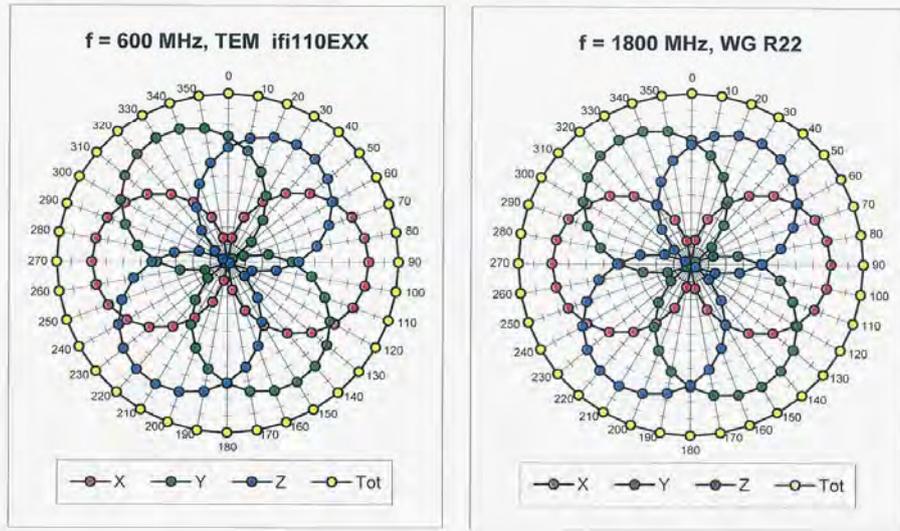


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

ET3DV6 SN:1631

June 24, 2009

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

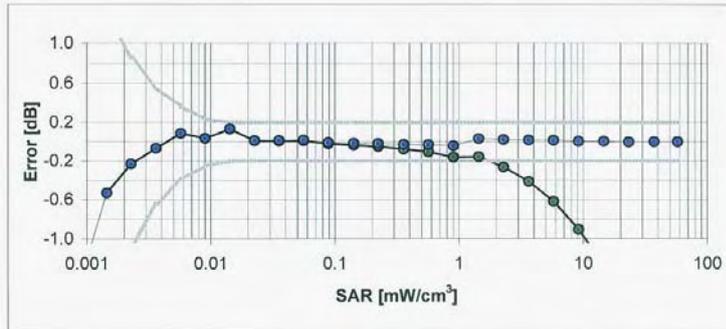
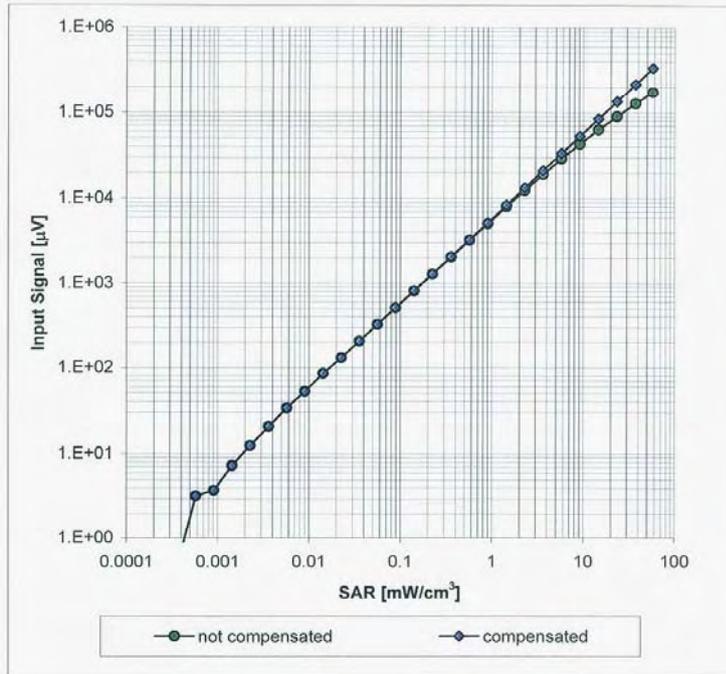


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

ET3DV6 SN:1631

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Dynamic Range $f(SAR_{head})$ (Waveguide R22, $f = 1800$ MHz)

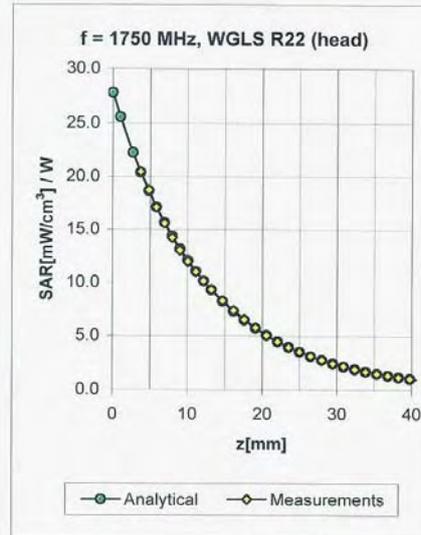
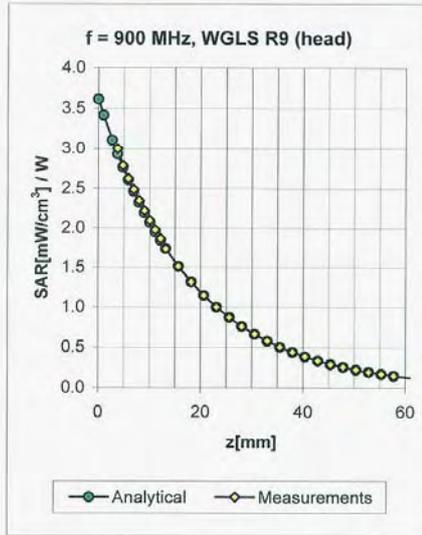


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

ET3DV6 SN:1631

June 24, 2009

Conversion Factor Assessment



f [MHz]	Validity [MHz] ^C	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.30	1.98	6.83 ± 13.3% (k=2)
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.34	2.67	5.83 ± 11.0% (k=2)
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.25	3.45	5.67 ± 11.0% (k=2)
1750	± 50 / ± 100	Head	40.1 ± 5%	1.37 ± 5%	0.67	2.50	5.30 ± 11.0% (k=2)
1900	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.71	2.45	5.07 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.69	2.46	4.90 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.90	4.52 ± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.23	2.04	7.31 ± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.51	2.18	5.91 ± 11.0% (k=2)
1750	± 50 / ± 100	Body	53.4 ± 5%	1.49 ± 5%	0.63	3.28	4.67 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.82	2.63	4.48 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.92	2.40	4.60 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	1.80	4.21 ± 11.0% (k=2)

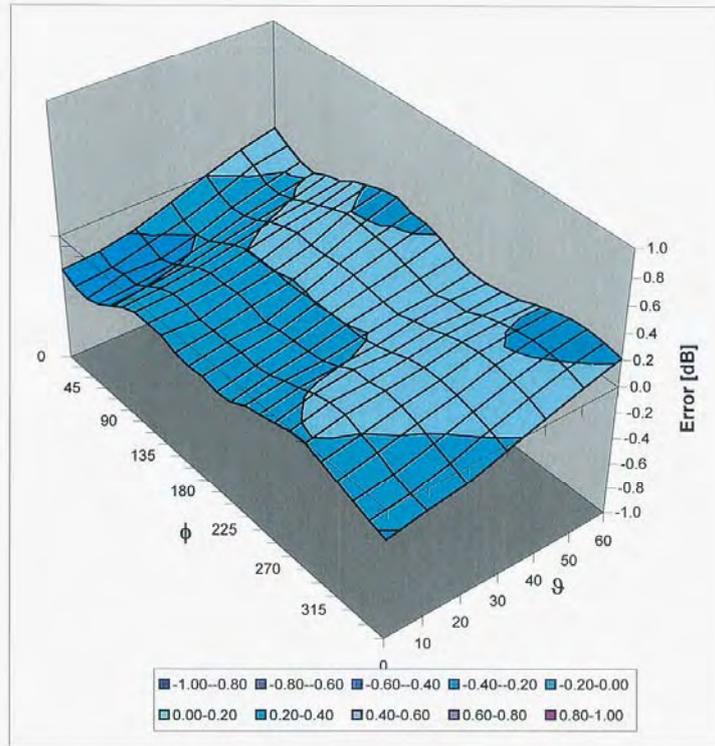
^C The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ET3DV6 SN:1631

June 24, 2009

Deviation from Isotropy in HSL

Error (ϕ , θ), $f = 900$ MHz



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

Attachment 4. – Dipole Calibration Data

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Accreditation No.: **SCS 108**

Client **HTC (Dymstec)**

Certificate No: **D835V2-441_May09**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 441
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	May 25, 2009
Condition of the calibrated item	In Tolerance

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

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

Issued: May 25, 2009

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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.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.6 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 mW / g
SAR normalized	normalized to 1W	9.52 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	9.56 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	6.26 mW / g ± 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	50.3 Ω - 7.4 j Ω
Return Loss	- 22.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.393 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 09, 2001

DASY5 Validation Report for Head TSL

Date/Time: 25.05.2009 09:55:22

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW-835; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL 900 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.89$ mho/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

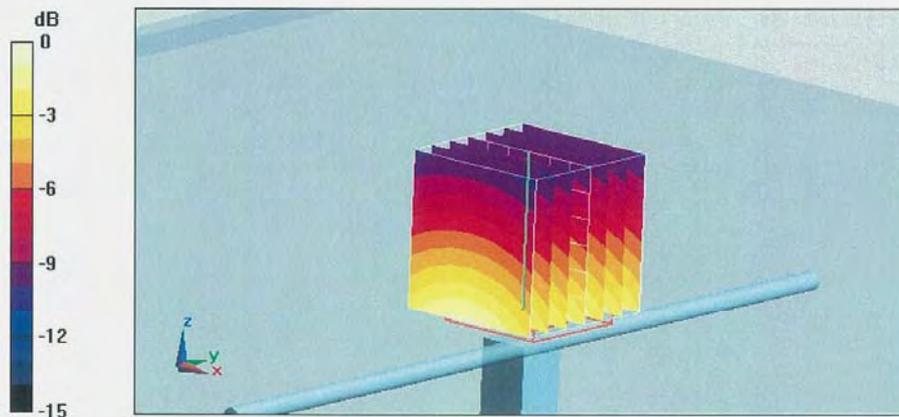
Pin=250mW; dip=15mm/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.1 V/m; Power Drift = 0.0073 dB

Peak SAR (extrapolated) = 3.53 W/kg

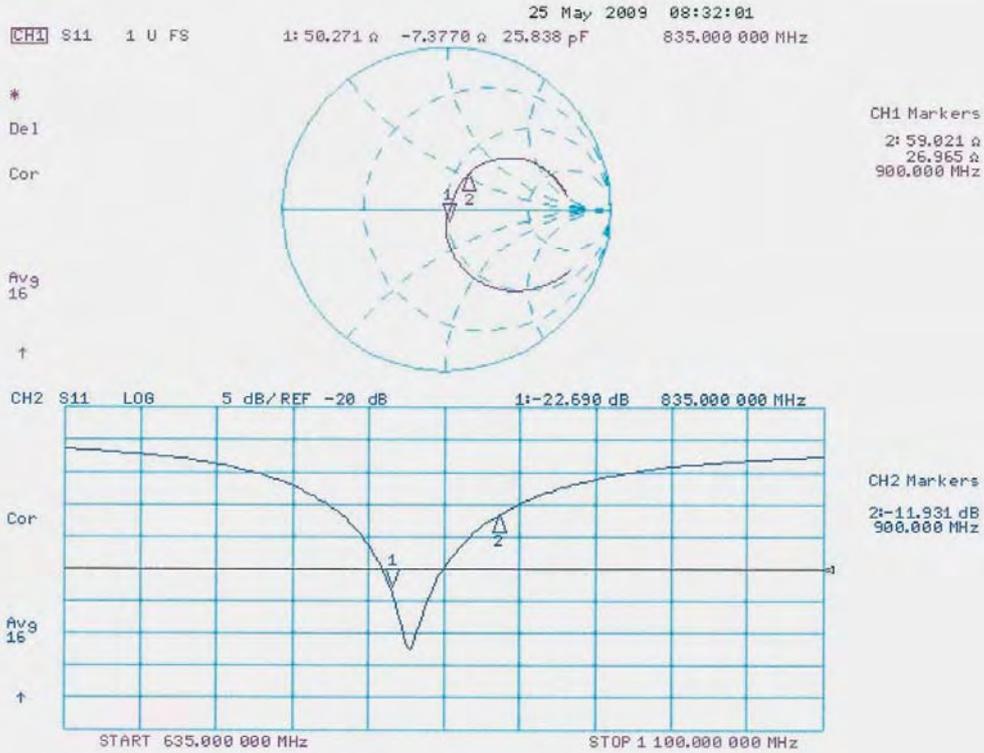
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.56 mW/g

Maximum value of SAR (measured) = 2.77 mW/g



0 dB = 2.77mW/g

Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **D1800V2-2d007-May08**

CALIBRATION CERTIFICATE

Object **D1800V2 - SN: 2d007**

Calibration procedure(s) **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **May 20, 2008**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (No. 217-00718)	Aug-08
Type-N mismatch combination	SN: 5047.2 / 06327	08-Aug-07 (No. 217-00721)	Aug-08
Reference Probe ES3DV2	SN: 3025	28-Apr-08 (No. ES3-3025_Apr08)	Apr-09
DAE4	SN: 601	14-Mar-08 (No. DAE4-601_Mar08)	Mar-09
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-08
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Mike Meili	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 22, 2008

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Accreditation No.: **SCS 108**

Glossary:

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4,7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz \pm 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 \pm 0.2) °C	39.6 \pm 6 %	1.41 mho/m \pm 6 %
Head TSL temperature during test	(21.5 \pm 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ² (1 g) of Head TSL	condition	
SAR measured	250 mW input power	9.82 mW /g
SAR normalized	normalized to 1W	39.3 mW /g
SAR for nominal Head TSL parameters ¹	normalized to 1W	38.9 mW / g \pm 17.0 % (k=2)

SAR averaged over 10 cm ² (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.11 mW /g
SAR normalized	normalized to 1W	20.4 mW /g
SAR for nominal Head TSL parameters ¹	normalized to 1W	20.3 mW / g \pm 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	46.9 $j\Omega$ - 6.4 $j\Omega$
Return Loss	- 22.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.454 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 23, 2001

DASY4 Validation Report for Head TSL

Date/Time: 20.05.2008 12:24:18

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: SN:2d007

Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: HSL U10 BB;

Medium parameters used: $f = 1800$ MHz; $\sigma = 1.41$ mho/m; $\epsilon_r = 39.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.96, 4.96, 4.96); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

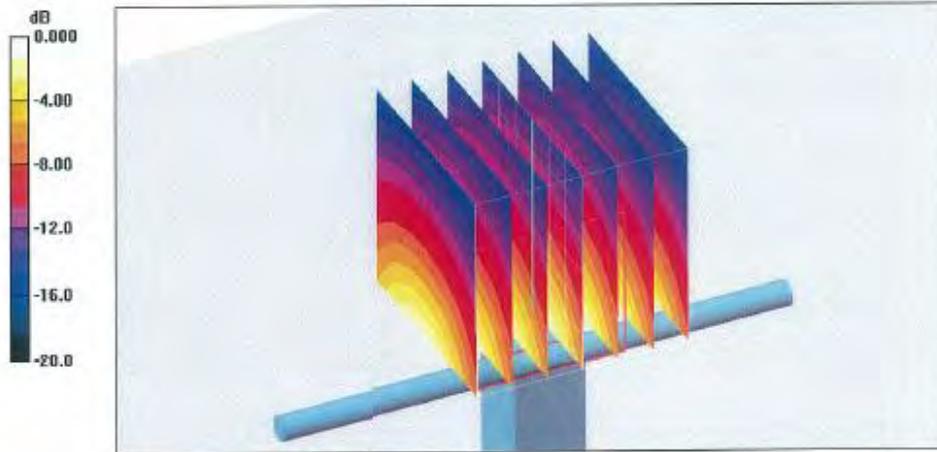
Pin = 250 mW; dip = 10 mm, scan at 3.4mm/Zoom Scan (dist=3.4mm, probe 0deg)**(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.1 V/m; Power Drift = 0.053 dB

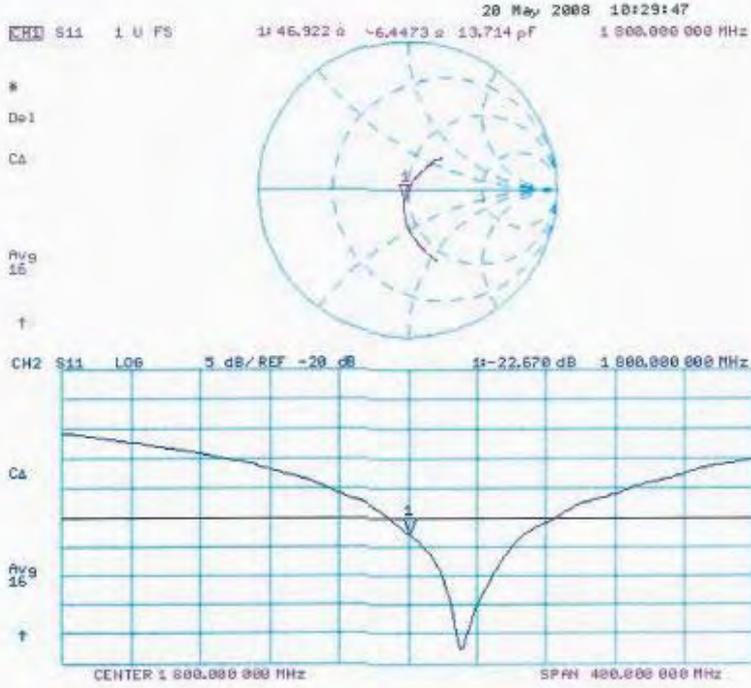
Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 9.82 mW/g; SAR(10 g) = 5.11 mW/g

Maximum value of SAR (measured) = 11.7 mW/g



Impedance Measurement Plot for Head TSL



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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **D1900V2-5d032_Jul09**

CALIBRATION CERTIFICATE

Object: **D1900V2 - SN: 5d032**

Calibration procedure(s): **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **July 20, 2009**

Condition of the calibrated item: **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	08-Oct-08 (No. 217-00898)	Oct-09
Power sensor HP 8481A	US37292783	08-Oct-08 (No. 217-00898)	Oct-09
Reference 20 dB Attenuator	SN: 5086 (20g)	31-Mar-09 (No. 217-01025)	Mar-10
Type-N mismatch combination	SN: 5047.2 / 06327	31-Mar-09 (No. 217-01029)	Mar-10
Reference Probe ES3DV2	SN: 3025	30-Apr-09 (No. ES3-3025_Apr09)	Apr-10
DAE4	SN: 601	07-Mar-09 (No. DAE4-601_Mar09)	Mar-10
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-07)	In house check: Oct-09
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-08)	In house check: Oct-09

Calibrated by: **Claudio Leubler** (Laboratory Technician) [Signature]

Approved by: **Katja Pokovic** (Technical Manager) [Signature]

Issued: July 22, 2009

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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
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- 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.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
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	40.9 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	40.5 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.36 mW / g
SAR normalized	normalized to 1W	21.4 mW / g
SAR for nominal Head TSL parameters ¹	normalized to 1W	21.4 mW / g ± 16.5 % (k=2)

¹ Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	51.2 Ω + 4.4 j Ω
Return Loss	- 27.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.197 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 17, 2003

DASY5 Validation Report for Head TSL

Date/Time: 20.07.2009 14:41:47

Test Laboratory: SPEAG, Zurich, Switzerland

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

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL U11 BB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.43$ mho/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(4.88, 4.88, 4.88); Calibrated: 30.04.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

Pin = 250 mW; dip = 10 mm, scan at 3.0 mm/Zoom Scan (dist=3.0 mm, probe 0deg)**(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.5 V/m; Power Drift = 0.063 dB

Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.36 mW/g

Maximum value of SAR (measured) = 12.8 mW/g



0 dB = 12.8mW/g

Impedance Measurement Plot for Head TSL

