TESTING
CNAS L4963

SAR TEST REPORT

No. 2011SAR059

FCC ID: Q78-ZTEMF660

Applicant: ZTE CORPORATION

Product: HSPA+ USB Stick

Model: MF660

Issued Date: 2011-08-26

Test Laboratory:

Shanghai Tejet Communications Technology Co., Ltd Testing Center.

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Note:

The following test results relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of the test laboratory.

General Information

Product Name	HSPA+ USB Stick		Model Name	MF660
Applicant	ZTE CORPORATION			
Manufacturer	ZTE CORPORATION			
Reference Standard	**ANSI/IEEE C95.1-2005** SAFETY LEVELS WITH RESPECT TO HUMAN EXPOSURE TO RADIO FREQUENCY ELECTROMAGNETIC FIELDS. 3 KHZ TO 300 GHZ			
	IEEE Std 1528™-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques			
	OET Bulletin 65-(Edition 97-01) Supplement C（edition01-01） Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields---Additional Supplement C (Edition 01-01)Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions			
	ANSI/IEEE C95.3-2002 RECOMMENDED PRACTICE FOR MEASUREMENTS AND COMPUTATIONS OF RADIO FREQUENCY ELECTROMAGNETIC FIELDS WITH RESPECT TO HUMAN EXPOSURE TOSUCH FIELDS. 100 KHZ-300 GHZ			
Test Results	Pass			

Prepared by _____ Date __2011. 8. 26__
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GM of Tejet
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(Stamp)

CONTENTS:

1. Test Laboratory

1.1 Testing Location:

Company: Shanghai Tejet Communications Technology Co., Ltd Testing Center.
Address: Room 6205-6208, Building 6, No.399 Cailun Rd. Zhangjiang Hi-Tech Park,
            Shanghai, China
Post Code :   210203
Tel: +86-21-61650880
Fax: +86-21-61650881
Website: www.tejet.cn

1.2 Laboratory Environment

Temperature   20° C～ 25 ° C
Relative humidity   20%～70%
Ground system resistance < 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards.
Reflection of surrounding objects is minimized and in compliance with requirement of standards

1.3 Testing date

The test is performed on Aug 17th 2011.

2. Client Information

2.1 Applicant information

Company Name: ZTE Corporation
Address: ZTE Plaza ,Keji Road South ,Hi-Tech Industrial Park ,Nanshan
                   District, Shenzhen, Guangdong,518057,P.R.China
Post Code :   518057
Country: China
Tel: 021-68897541
Fax: 021-50801070

2.2 Manufacturer Information

Company Name: ZTE Corporation
Address: ZTE Plaza ,Keji Road South ,Hi-Tech Industrial Park ,Nanshan
                   District, Shenzhen, Guangdong,518057,P.R.China
Post Code :   518057
Country: China
Tel: 021-68897541
Fax: 021-50801070

3.Equipment Under Test (EUT) and Accessory Equipment (AE)

3.1 Information of EUT

Device type	Portable device	
Product name	HSPA+ USB Stick	
Exposure category	Uncontrolled environment / general population	
Device operation configuration:		
Operating mode(s):	GSM850	
	GSM1900	
Test modulation	(GSM)GMSK	
GPRS Class	10	
EDGE Class	12	
DTM Support	N/A	
Rated output power	GSM 850:33dBm	
	GSM1900: 30dBm	
Antenna type:	Internal antenna	
Operating frequency range(s):	Band	Tx(MHz)
	GSM850	824.2～848.8
	GSM1900	1850.2～1909.8
Power class	GSM850: 4,test with power level 5	
	GSM1900: 1,test with power level 0	
HW Version	dk6A	
SW Version	EN_ZTE_MF660V1.0.0B04	

Note: Equipment under test (EUT) is HSPA+ USB Stick with internal antenna. SAR is tested for GSM850 , GSM1900.

3.2 Information Of AE

The following host laptop, levono T410i,are used during the tests to test the 4orientations(2 horizontals and 2 verticals) of the EUT, and the used USB slots are marked in the pictures.

Laptop

Horizontal slot

Laptop (horizontal slot)

Laptop (vertical slot)

USB cable (shorter than 12 inches)

4. Reference Documents

4.1 Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference   Title

IEEE Std 1528™-2003 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques

EN 62209-1-2006   Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures – Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)

YD/T 1643-2007   Technical Specification and Testing Methods for compatibility between wireless communication devices and hearing aids

YD/T 1644.1-2007 Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures Part1:procedure to determine the specific absorption rate (sar)for hand-held devices used in close proximity to the ear (frequency range of 300MHz~3GHz)

EN 50360-2001   Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300 MHz – 3 GHz)

IEC 62209-2-2010   Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices -Human models, Instrumentation, and Procedures -Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)

OET Bulletin 65-(Edition 97-01) Supplement C（edition01-01）   Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields---Additional Supplement C (Edition 01-01)Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions

47 CFR Ch. I-   Hearing aid-compatible mobile handsets.

ANSI/IEEE C95.1-2005 SAFETY LEVELS WITH RESPECT TO HUMAN EXPOSURE TO RADIO FREQUENCY ELECTROMAGNETIC FIELDS. 3 KHZ TO 300 GHZ

ANSI/IEEE C95.3-2002   RECOMMENDED PRACTICE FOR MEASUREMENTS AND COMPUTATIONS OF RADIO FREQUENCY ELECTROMAGNETIC FIELDS WITH RESPECT TO HUMAN EXPOSURE TOSUCH FIELDS. 100 KHZ-300 GHZ

ANSI C63.19-2007 Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids -Test Plan for Hearing Aid Compatibility-2006 Revision 1.0-Test Plan for Hearing Aid Compatibility

RSS-102-2005   Spectrum Management and Telecommunications Radio Standards Specification Radio Frequency Exposure Compliance of Radio communication Apparatus (All Frequency Bands)

5．Operational Conditions During Test

5.1 General description of test procedures

A communication link is set up with a system simulator by air link， and a call is established. The absolute radio frequency channel number(ARFCN) is allocated to 128,190 and 251respectively in the case of GSM 850 ，to 512,661 and 810 respectively in the case of GSM 1900.The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with CMU200, and the EUT is set to maximum output power by CMU200. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB .

5.2 GSM Test Configuration

SAR test for GSM 850 and GSM 1900, a communication link is set up with a system simulator by air link. Using CMU200 the power level is set to "5" in SAR of GSM850， set to "0" in SAR of GSM1900. The tests in the band of GSM850 and GSM 1900 are performed in the mode of speech transfer function and GPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink.DTM is not supported, so the testing of GPRS with head is not required.

6. SAR Measurements system configuration

6.1 SAR Measurement set-up

The DASY5 system for performing compliance tests consists of the following items:

·A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach
  pendant and software. An arm extension for accommodating the data acquisition
  electronics   (DAE).
·An isotropic _field probe optimized and calibrated for the targeted measurement.
·A data acquisition electronics (DAE) which performs the signal amplification, signal
  multiplexing, AD-conversion, offset measurements, mechanical surface detection,
  collision detection, etc. The unit is battery powered with standard or rechargeable
  batteries. The signal is optically transmitted to the EOC.
·The Electro-optical converter (EOC) performs the conversion from optical to electrical
  signals for the digital communication to the DAE. To use optical surface detection, a
  special version of the EOC is required. The EOC signal is transmitted to the
  measurement server.
·The function of the measurement server is to perform the time critical tasks such as
  signal filtering, control of the robot operation and fast movement interrupts.
·The Light Beam used is for probe alignment. This improves the (absolute) accuracy of
  the probe positioning.
·A computer running WinXP and the DASY5 software.
·Remote control and teach pendant as well as additional circuitry for robot safety such as
  warning lamps, etc.
·The generic twin phantom enabling the testing of left-hand and right-hand usage.
·The device holder for handheld mobile phones.
·Tissue simulating liquid mixed according to the given recipes.
· System validation dipoles allowing to validate the proper functioning of the system.
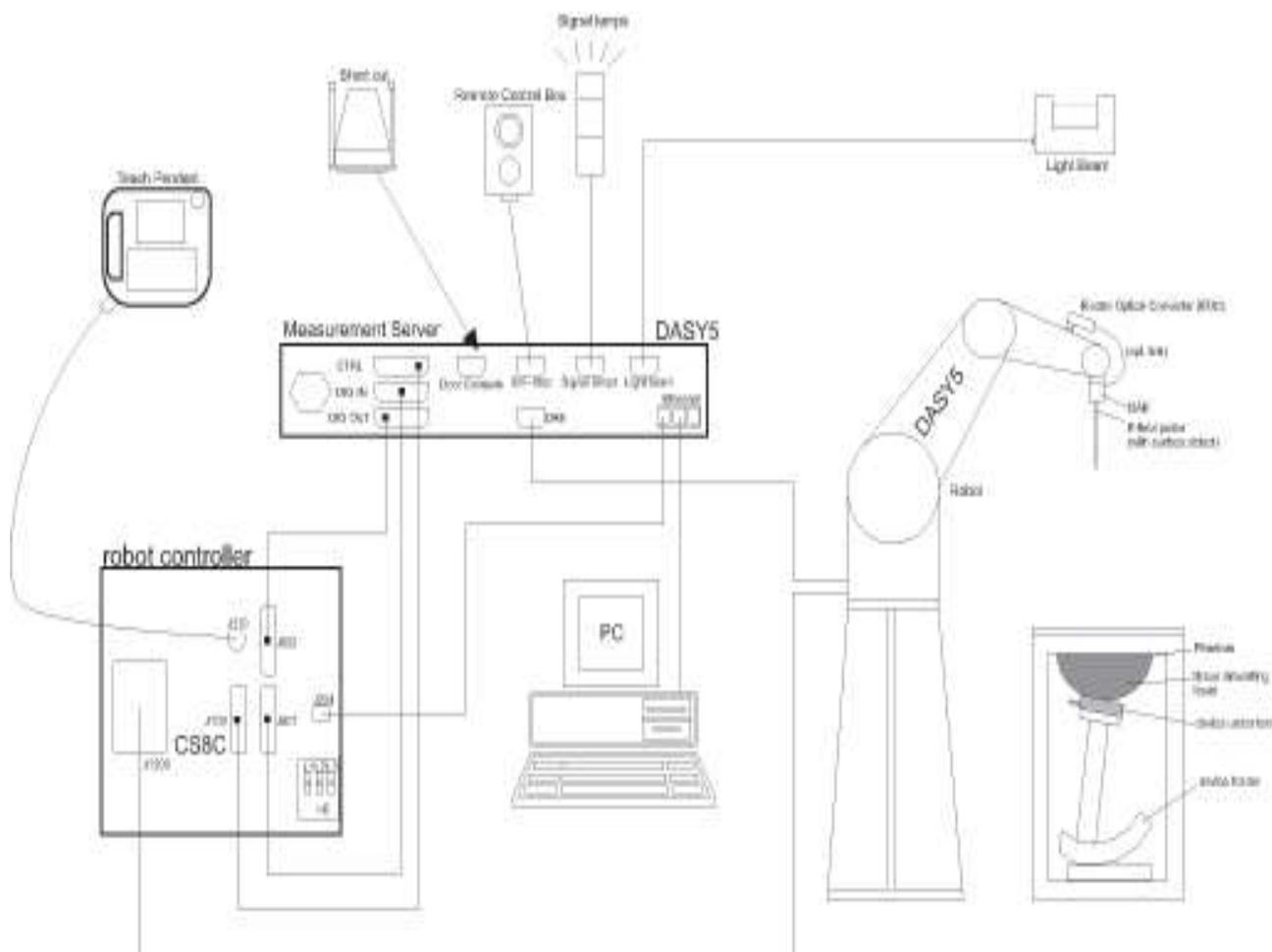
Figure 1. SAR Lab Test Measurement Set-up

6.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

6.2.1. Ex3DV3 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 850 and HSL 1750
	Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz
	Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material

(rotation normal to probe axis)

Dynamic Range   10 µW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 µW/g)

Dimensions   Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Application   High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields).   Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

Figure 2.ES3DV3 E-field Probe

Figure 3. ES3DV3 E-field probe

6.2.2. E-field Probe Calibration

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

Or

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

6.3. Other Test Equipment

6.3.1. Device Holder for Transmitters

The DASY5 device holder is designed to cope with the die rent positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the inference of the clamp on the test results could thus be lowered.

Figure 4.Device Holder

6.3.2. Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden Figure. 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.

Shell Thickness   2±0.1 mm
Filling Volume   Approx. 20 liters
Dimensions   810 x l000 x 500 mm (H x L x W)
Aailable   Special

Figure 5.Generic Twin Phantom

6.4. Scanning procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

 • The "reference" and "drift" measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %.

 • The "surface check" measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles.The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

・ Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot.Before starting the area scan a grid spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

・ Zoom Scan

Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

・ Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

• maximum search
• extrapolation
• boundary correction
• peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 5x5x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

・ A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

6.5. Data Storage and Evaluation

6.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

6.5.2. Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored   in the configuration modules of the software:

Probe parameters: - Sensitivity Norm_i, a_{i0}, a_{i1}, a_{i2}
                                     - Conversion factor ConvF_i
                                     - Diode compression point Dcp_i
Device parameters: - Frequency   f
                                     - Crest factor   cf
Media parameters: - Conductivity
                                     - Density

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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 as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

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: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

With V_i = compensated signal of channel i   (i = x, y, z)

    $Norm_i$ = sensor sensitivity of channel i   (i = x, y, z)

    [mV/(V/m)^2] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

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

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot}^2 \cdot) / (\cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m

    = conductivity in [mho/m] or [Siemens/m]

= equivalent tissue density in g/cm$_3$

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the
density of the simulation liquid. The power flow density is calculated assuming the excitation field to
be a free space field.

$$P_{pwe} = E_{tot}{}^2 / 3770 \qquad \text{or } P_{pwe} = H_{tot}{}^2 \cdot 37.7$$

with P_{pwe} = equivalent power density of a plane wave in mW/cm^2

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

H_{tot} = total magnetic field strength in A/m

6.6. System check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the 9.1 and 9.2.
System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).
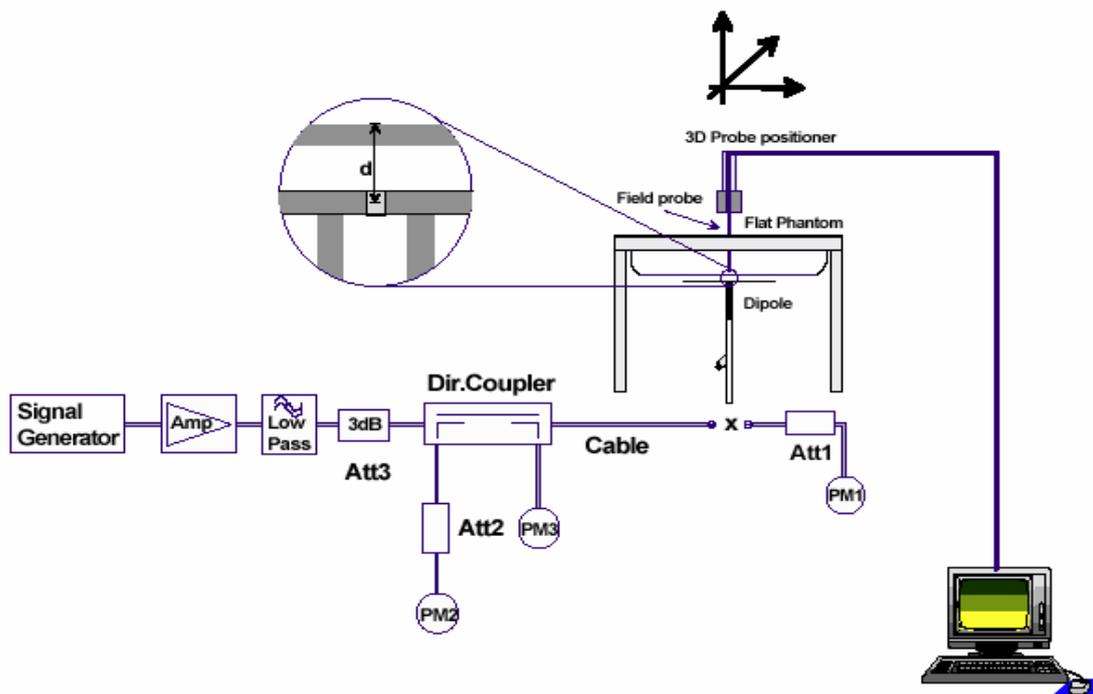System check is performed regularly on all frequency bands where tests are performed with the DASY 5 system.

Figure 6. **System Check Set-up**

6.7. Equivalent Tissues

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose.The liquid has previously been proven to be suited for worst-case. The Table 1 and Table 2 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

MIXTURE%	FREQUENCY(body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=55.2 σ=0.97

MIXTURE%	FREQUENCY(body)1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1950MHz ε=53.3 σ=1.52

7. Characteristics of the Test

7.1. Applicable Limit Regulations

ANSI/IEEE C95.1-2005 SAFETY LEVELS WITH RESPECT TO HUMAN EXPOSURE TO RADIO FREQUENCY ELECTROMAGNETIC FIELDS. 3 KHZ TO 300 GHZ

7.2. Applicable Measurement Standards

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8. Conducted Output Power Measurement

8.1. Summary

The DUT is tested using an CMU200 communications tester as controller unit to set test channels
and maximum output power to the DUT, as well as for measuring the conducted power. Conducted output power was measured using an integrated RF connector and attached RF cable.
This result contains conducted output power for the EUT.

8.2. Conducted Power Results

GSM850	Conducted power		
	Channel 128	Channel 190	Channel 251
Results（dBm）	32.1	32.2	32.2
GSM1900	Conducted power		
	Channel 512	Channel 661	Channel 810
Results（dBm）	29.1	28.9	28.8

GSM850+GPRS	CONDUCTED POWER						
	Ch 128	Ch 190	Ch251	(dB)	Ch 128	Ch190	Ch251
1 TX-slot result	32.0	32.1	32.1	-9.03	22.97	23.07	23.07
2 TX-slot result	29.1	29.2	29.2	-6.02	23.08	23.18	23.18
3 TX-slot result	27.0	27.1	27.1	-4.26	22.74	22.84	22.84
4 TX-slot result	26.2	26.3	26.3	-3.01	**23.19**	**23.29**	**23.29**
GSM1900+GPRS	CONDUCTED POWER						
	Ch 512	Ch 661	Ch 810	(dB)	Ch 512	Ch 661	Ch 810
1 TX-slot result	28.9	28.8	28.7	-9.03	19.87	19.77	19.67
2 TX-slot result	25.8	25.6	25.6	-6.02	19.78	19.58	19.58
3 TX-slot result	24.4	24.3	24.2	-4.26	20.14	20.04	19.94
4 TX-slot result	23.2	23.1	23.1	-3.01	**20.19**	**20.09**	**20.09**

GSM850+EDGE	CONDUCTED POWER						
	Ch 128	Ch 190	Ch251	(dB)	Ch 128	Ch190	Ch251
1 TX-slot result	28.86	28.77	28.68	-9.03	19.83	19.74	19.65
2 TX-slot result	25.76	25.57	25.58	-6.02	19.74	19.55	19.56
3 TX-slot result	24.16	24.17	24.08	-4.26	19.9	19.91	19.82
4 TX-slot result	23.06	23.02	23.01	-3.01	**20.05**	**20.01**	**20.0**
GSM1900+EDGE	CONDUCTED POWER						
	Ch 512	Ch 661	Ch 810	(dB)	Ch 512	Ch 661	Ch 810
1 TX-slot result	26.86	26.77	26.68	-9.03	17.83	17.74	17.65
2 TX-slot result	23.76	23.57	23.58	-6.02	17.74	17.55	17.56
3 TX-slot result	22.16	22.17	22.08	-4.26	17.9	17.91	17.82
4 TX-slot result	21.06	21.02	21.01	-3.01	**18.05**	**18.01**	**18.00**

Note:

To average the power, the division factor is as follows:

1 TX-slot =1 transmit time slot of 8 time slots

=>conducted power divided by (8/1) =>-9.03dB

2 TX-slot =2 transmit time slot of 8 time slots

=>conducted power divided by (8/2) =>-6.02dB

3 TX-slot =3 transmit time slot of 8 time slots

=>conducted power divided by (8/3) =>-4.26dB

4 TX-slot =4 transmit time slot of 8 time slots

=>conducted power divided by (8/4) =>-3.01dB

9 Test Results

9.1. Dielectric Performance

Dielectric Performance of Head Tissue Simulating Liquid

Frequency	Description	Dielectric Parameters εr	σ(s/m)	temp ℃
835MHz (body)	Target value 5% window	55.2 52.44-57.96	0.97 0.92-1.02	/
	Measurement value 2011-08-17	54.1	0.967	21.6
1900MHz (body)	Target value 5% window	53.3 50.63-55.96	1.52 1.44 — 1.60	/
	Measurement value 2011-08-17	52.3	1.5	21.6

9.2. System Check Results

System Check for Head tissue simulation liquid

Frequency	Description	SAR(W/kg)		Dielectric Parameters εr	σ(s/m)	Temp ℃
835MHz(body)	Recommended result ±10% window	1.59 1.43-1.75	2.45 2.20-2.70	55.2	0.97	/
	Measurement value 2011-08-17	1.7	2.58	54.1	0.967	21.4
1900MHz(body)	Recommended result ±10% window	5.14 4.63-5.65	9.75 8.78-10.72	53.3	1.52	/
	Measurement value 2011-08-17	5.18	9.95	52.3	1.5	21.4

Note: 1. the graph results see ANNEX D.

2 .Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.

9.3. Test Results

9.3.1. Summary of Measurement Results (GSM850)

SAR Values (GSM850)

Test Case		Measurement Result(W/kg)		Power Drift(dB)	Note
Different Test Position	Channel	10 g Average	1 g Average		
Test position of body（Distance 5mm）					
Horizontal up	middle	0.336	**0.511**	-0.053	Max
Horizontal down	middle	0.238	0.389	0.00331	
Vertical front	middle	0.114	0.187	-0.134	
Vertical back	middle	0.137	0.199	0.154	
Horizontal up	low	0.208	0.339	-0.040	
	high	0.256	0.421	-0.016	
Horizontal up with GPRS (4UP)	middle	0.283	0.442	-0.176	
Horizontal up with EDGE（4up）	middle	0.229	0.383	-0.128	

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1.0W/kg), testing at the high and low channels is optional.

9.3.2. Summary of Measurement Results (GSM1900)

SAR Values (GSM1900)

Test Case		Measurement Result(W/kg)		Power Drift(dB)	Note
Different Test Position	Channel	10 g	1 g		
		Average	Average		
Test position of body（Distance 5mm）					
Horizontal up	middle	0.121	0.206	0.145	
Horizontal down	middle	0.164	0.330	0.014	
Vertical front	middle	0.069	0.124	-0.025	
Vertical back	middle	0.088	0.163	0.048	
Horizontal down	low	0.171	**0.335**	0.089	Max
	high	0.117	0.229	0.167	
Horizontal down with GPRS (4UP)	low	0.163	0.320	-0.052	
Horizontal down with EDGE（4up）	low	0.162	0.317	0.177	

Note: 1.The value with blue color is the maximum SAR Value of test case of head and body in each test band.

2. Upper and lower frequencies were measured at the worst position.

3. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at least 3.0 dB lower than the SAR limit (< 1.0W/kg), testing at the high and low channels is optional.

9.4. Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR_{10g} **of GSM 850** is **0.511**W/kg , and maximum localized SAR_{10g} **of GSM 1900** is **0.335** W/kg ， they are below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.
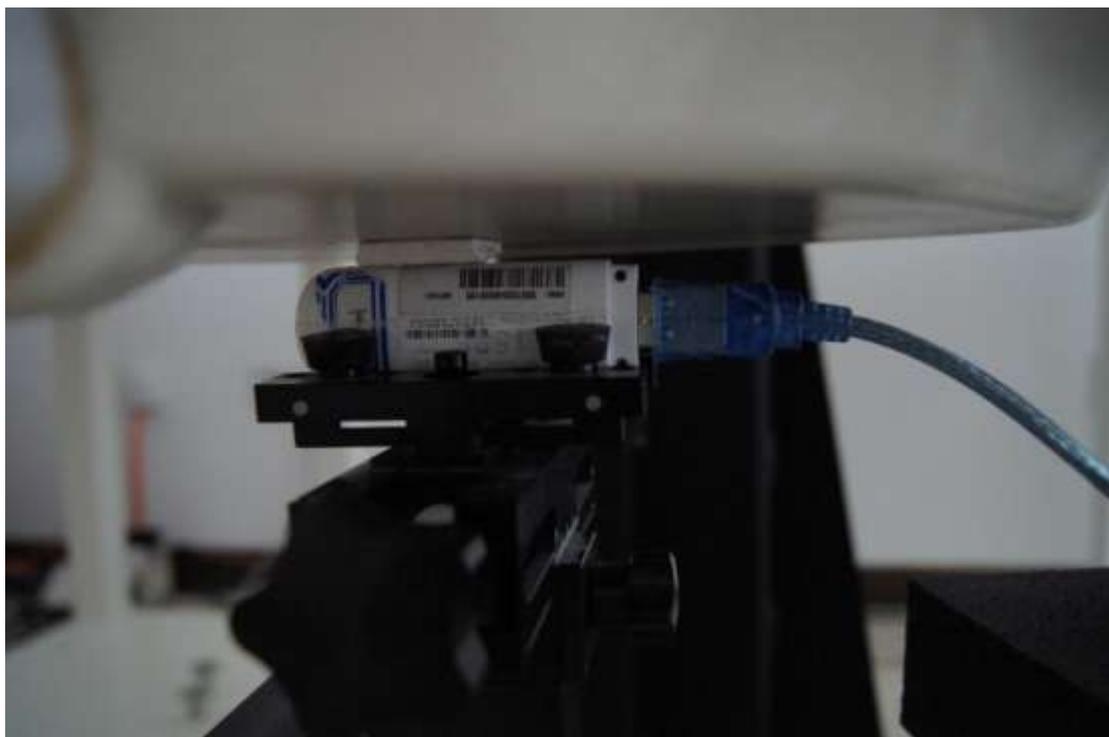
General Judgment： PASS

ANNEX A: EUT Photograph

EUT

Test position 1 (distance between EUT and phantom is 5mm) horizontal-up

Test position 2 (EUT is connected to laptop via a USB cable which is shorter than 12 inches and distance between EUT and phantom is 5mm) horizontal-down

Test position 3 (distance between EUT and phantom is 5mm) vertical-front

Test position 4 (EUT is connected to laptop via a USB cable which is shorter than 12 inches and distance between EUT and phantom is 5mm) vertical-back

ANNEX B: Measurement Uncertainty

No.	source	type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard uncertainty u_i (%	Degree of freedom V_{eff} or v_i
1	-System repetivity	A	0.3	N	1	1	0.3	9
				Measurement system				
2	－probe calibration	B	7	N	2	1	3.5	∞
3	－axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	0.5	4.3	∞
4	－ Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$			
5	－probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
6	－System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
7	－boundary effect	B	11.0	R	$\sqrt{3}$	1	6.4	∞
8	－response time	B	0	R	$\sqrt{3}$	1	0	∞
9	－noise	B	0	N	$\sqrt{3}$	1	0	∞
10	－integration time	B	5.0	R	$\sqrt{3}$	1	2.9	∞
11	－readout Electronics	B	0.4	R	$\sqrt{3}$	1	0.2	∞
12	－-phantom	B	2.9	R	$\sqrt{3}$	1	1.7	∞
13	－Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
14	－Device Holder Uncertainty	A	4.9	R	1	1	4.9	5
				物理参数				
15	-liquid density	B	0	R	$\sqrt{3}$	1	0	∞
16	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.5	2.9	∞
17	-liquid conductivity (measurement uncertainty)	A	0.23	N	1	1	0.23	9

No.	Description	Type	Value	Dist	Divisor	c_i	u_i	dof
18	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.5	2.9	∞
19	-liquid permittivity (measurement uncertainty)	A	0.46	N	1	1	0.46	9
20	－Probe Positioner Mechanical Tolerance	B	5.0	R	$\sqrt{3}$	1	2.9	∞
21	－Environment	B	3.0	R	$\sqrt{3}$	1	1.7	∞
22	－Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$					11.2	83.4
Expanded uncertainty (confidence interval of95 %)		$u_e = 2u_c$	N		K=2		22.4	

ANNEX C: Main Test Instruments

No.	Name	Type	Calibration Date	Valid Period
01	Network analyzer	Agilent E5071E	Dec 23th, 2010	One year
02	Dielectric Probe Kit	Agilent 85070E	No Calibration Requested	
03	Power meter	Agilent E4418B	Sep 19th, 2010	One year
04	Power sensor	Agilent E9200B	Aug 4th, 2011	One year
05	Signal Generator	Agilent N5182A	Nov 30th, 2010	One year
06	Amplifier	ZHL-42W	No Calibration Requested	
07	BTS	CMU200	Oct 1st, 2010	One year
08	E-field Probe	ES3DV3	June 13th, 2011	One year
09	DAE	DAE4	June 13th, 2011	One year
10	Validation Kit 835MHz	D835V2	June 14th, 2011	One year
11	Validation Kit 1950MHz	D1950V3	June 14th, 2011	One year

ANNEX D: Test Layout

Picture 1: Specific Absorption Rate Test Layout
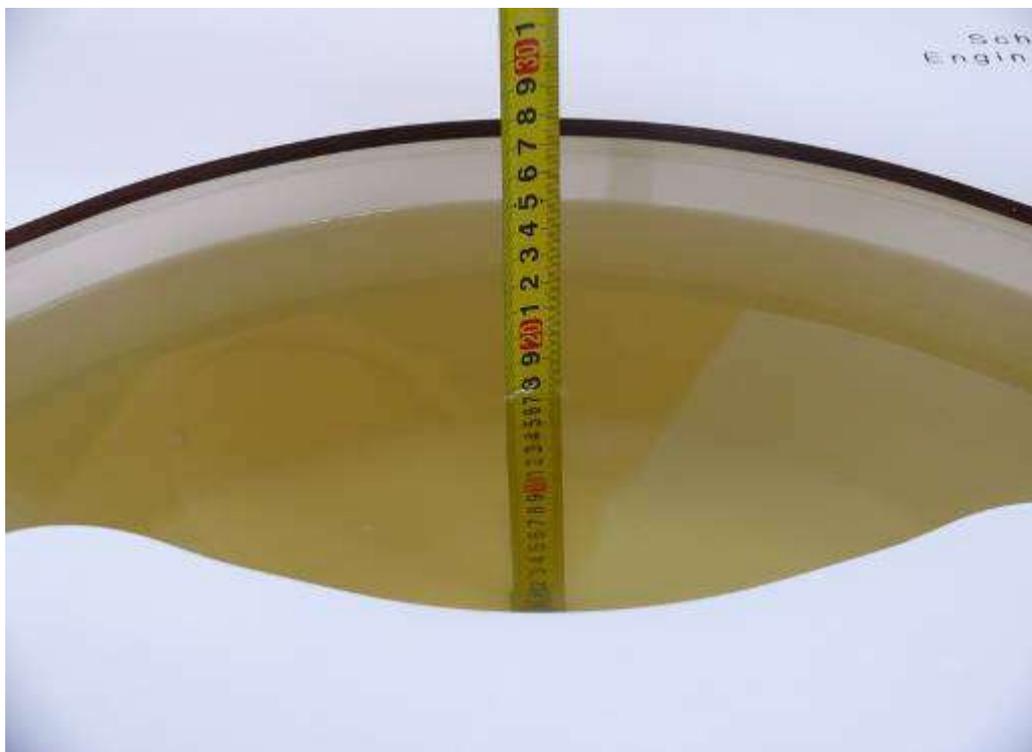
Picture 2: Liquid depth in the flat Phantom (850MHz)   (17.5cm deep)
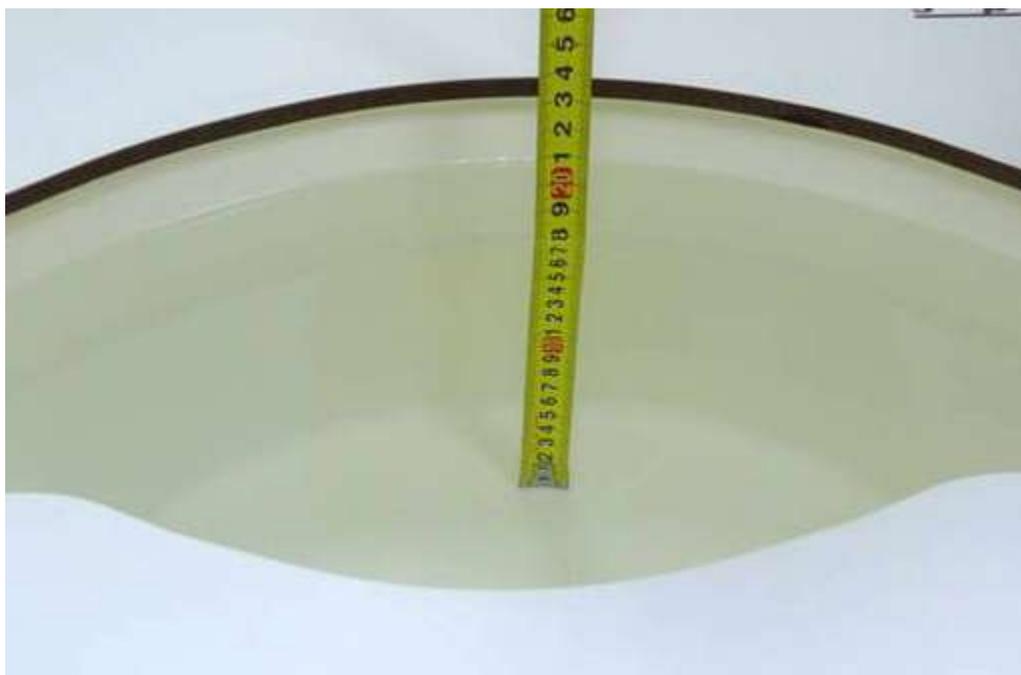
Picture3: Liquid depth in the flat Phantom (1900 MHz)   (16cm deep)

ANNEX E: System Check Results

system check 835Mhz body Date/Time: 8/17/2011 7:55:04 AM
Communication System: CW; Communication System Band: D835 (835.0 MHz);
Frequency: 835 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 835 MHz; σ = 0.948 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.11, 6.11, 6.11); Calibrated: 6/13/2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration 2/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe) Body/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.02 mW/g

**Configuration 2/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe) Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.4 V/m; Power Drift = 0.00538 dB
Peak SAR (extrapolated) = 3.86 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.7 mW/g
Maximum value of SAR (measured) = 3.04 mW/g
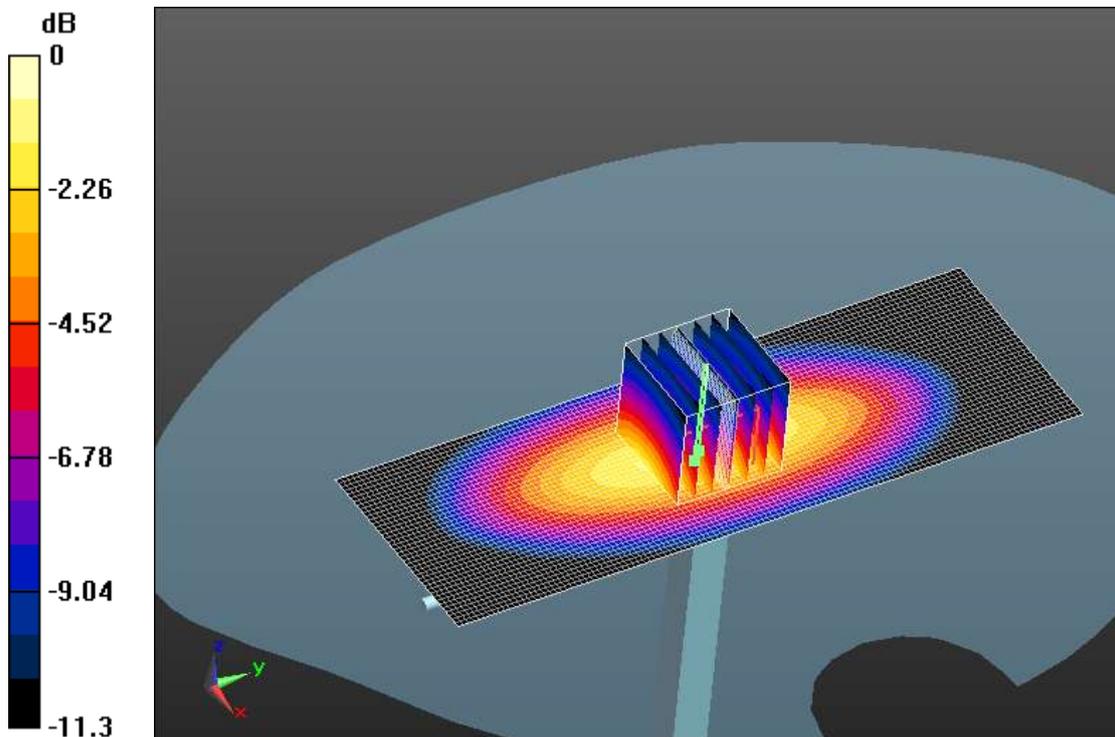
0 dB = 3.86mW/g

System Check 1900MHz Body Date/Time: 8/17/2011 7:28:23 AM

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB

Medium parameters used: f = 1900 MHz; σ = 1.49 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

1900body/ d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 12.7 mW/g

1900body/ d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 68.7 V/m; Power Drift = 0.080 dB

Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 9.95 mW/g; SAR(10 g) = 5.18 mW/g

Maximum value of SAR (measured) = 12.7 mW/g
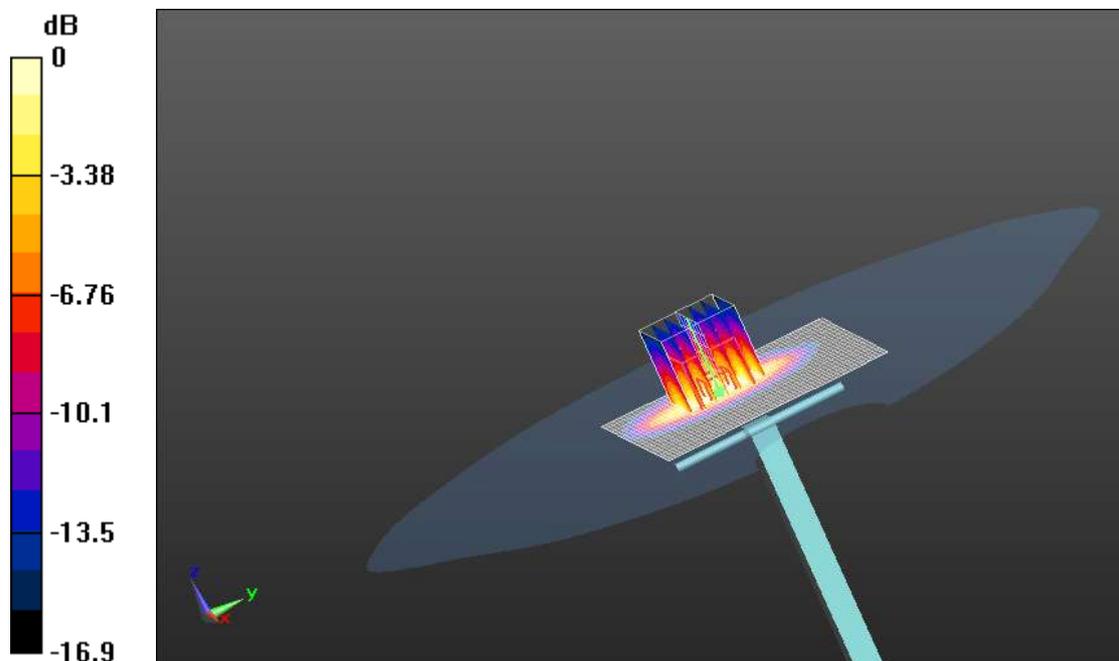
0 dB = 12.7mW/g

ANNEX F: Graph Result

GSM850 Horizontal up - Mid Date/Time: 8/17/2011 2:13:53 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 837 MHz; σ = 0.951 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal up - Mid/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR   = 0.457 mW/g

Configuration/Horizontal up - Mid/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.761 W/kg
SAR(1 g) = 0.511 mW/g; SAR(10 g) = 0.336 mW/g
Maximum value of SAR (measured) = 0.549 mW/g
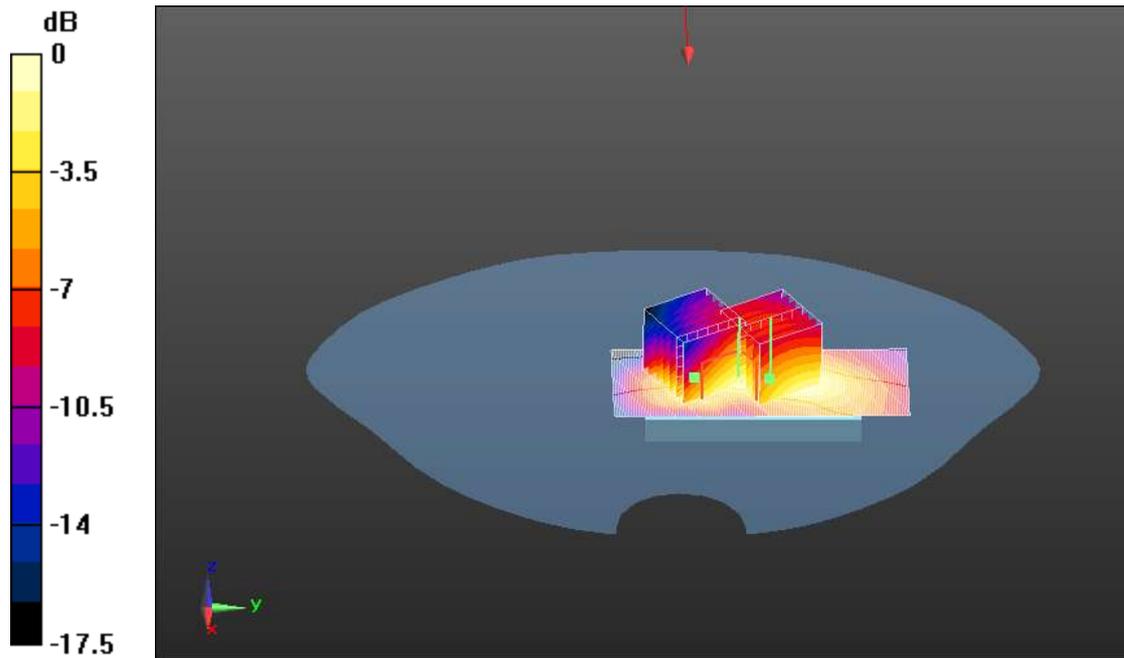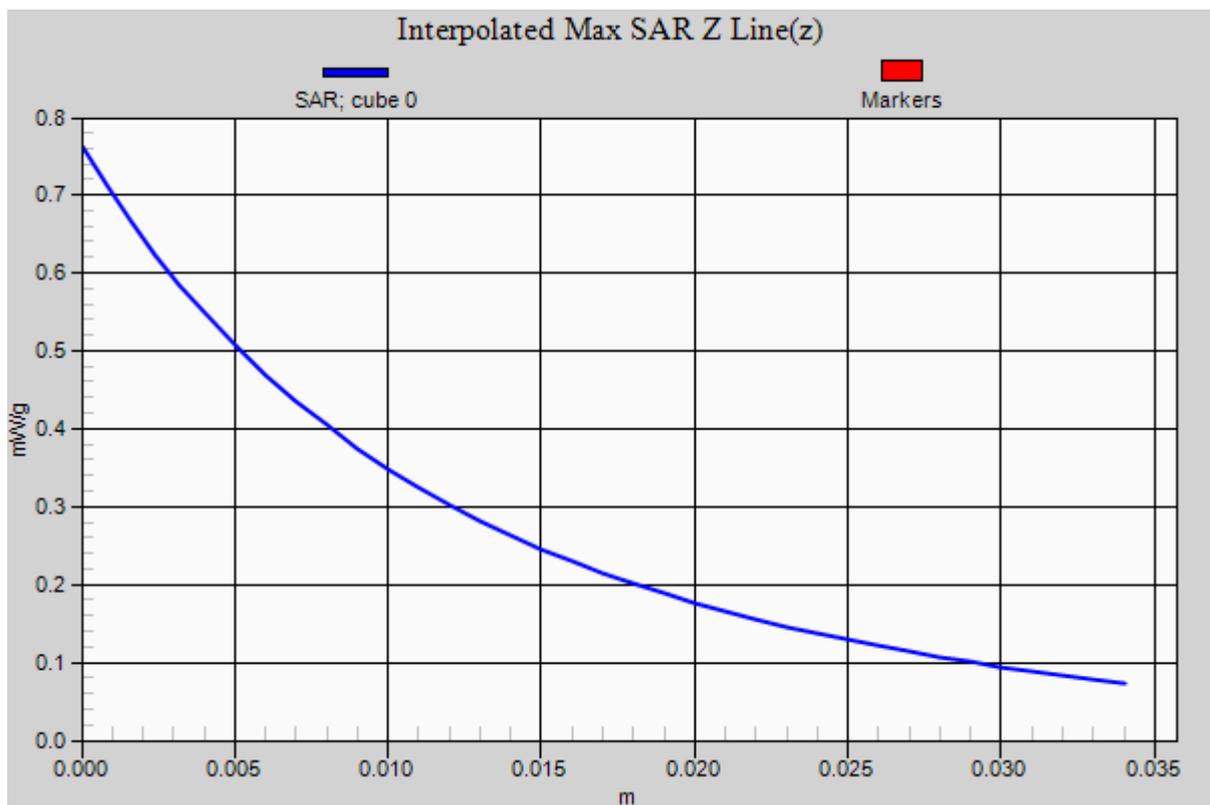**Configuration/Horizontal up - Mid/Zoom Scan (7x7x7)/Cube 1:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.8 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.691 W/kg
SAR(1 g) = 0.469 mW/g; SAR(10 g) = 0.284 mW/g
Maximum value of SAR (measured) = 0.521 mW/g

0 dB = 0.521mW/g

GSM850 Horizontal down - Mid Date/Time: 8/17/2011 4:00:05 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 837 MHz; σ = 0.951 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal down - Mid/Area Scan (51x121x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR   = 0.426 mW/g

Configuration/Horizontal down - Mid/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = 0.00331 dB
Peak SAR (extrapolated) = 0.597 W/kg
SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.238 mW/g
Maximum value of SAR (measured) = 0.428 mW/g
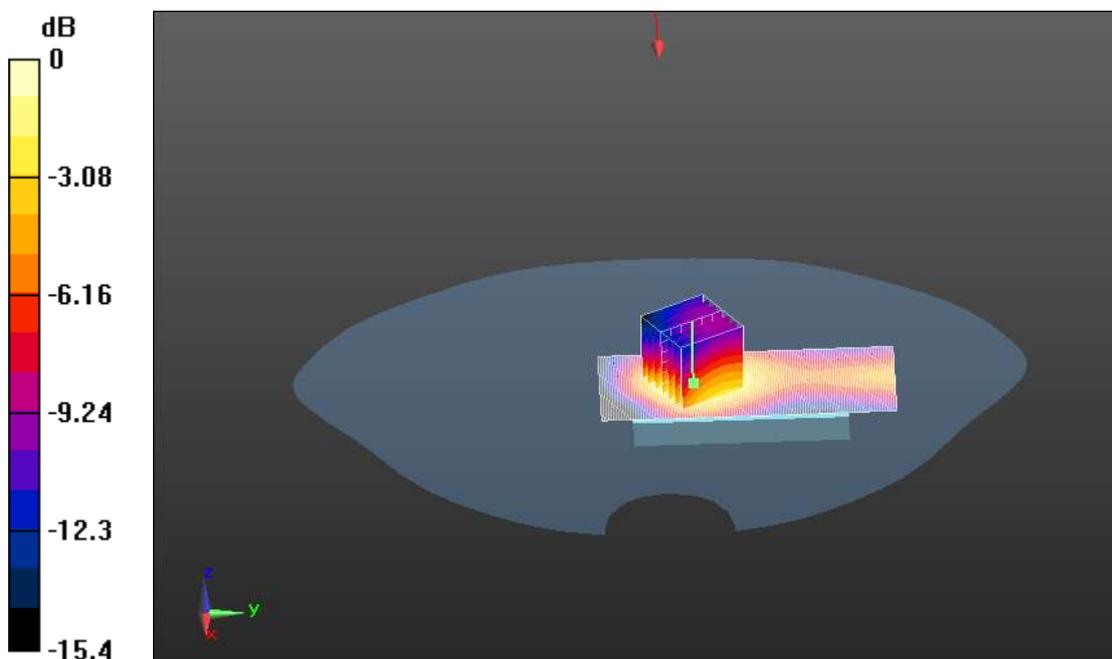
0 dB = 0.428mW/g

GSM850 Vertical front - Mid Date/Time: 8/17/2011 3:32:06 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 837 MHz; $\sigma = 0.951$ mho/m; $\varepsilon_r = 54.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration 2/Vertical front - Mid/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR = 0.206 mW/g

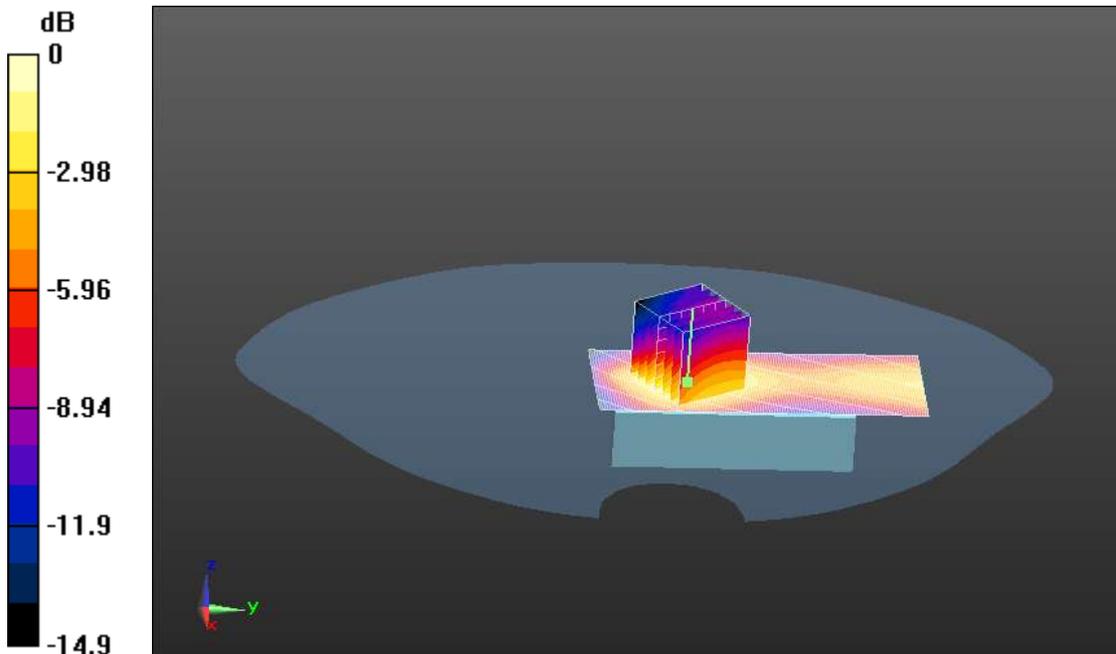**Configuration 2/Vertical front - Mid/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12 V/m; Power Drift = -0.134 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.114 mW/g
Maximum value of SAR (measured) = 0.208 mW/g

0 dB = 0.208mW/g

GSM850 Vertical back- Mid Date/Time: 8/17/2011 2:59:40 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 837 MHz; σ = 0.951 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration 2/Vertical back- Mid/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR   = 0.215 mW/g

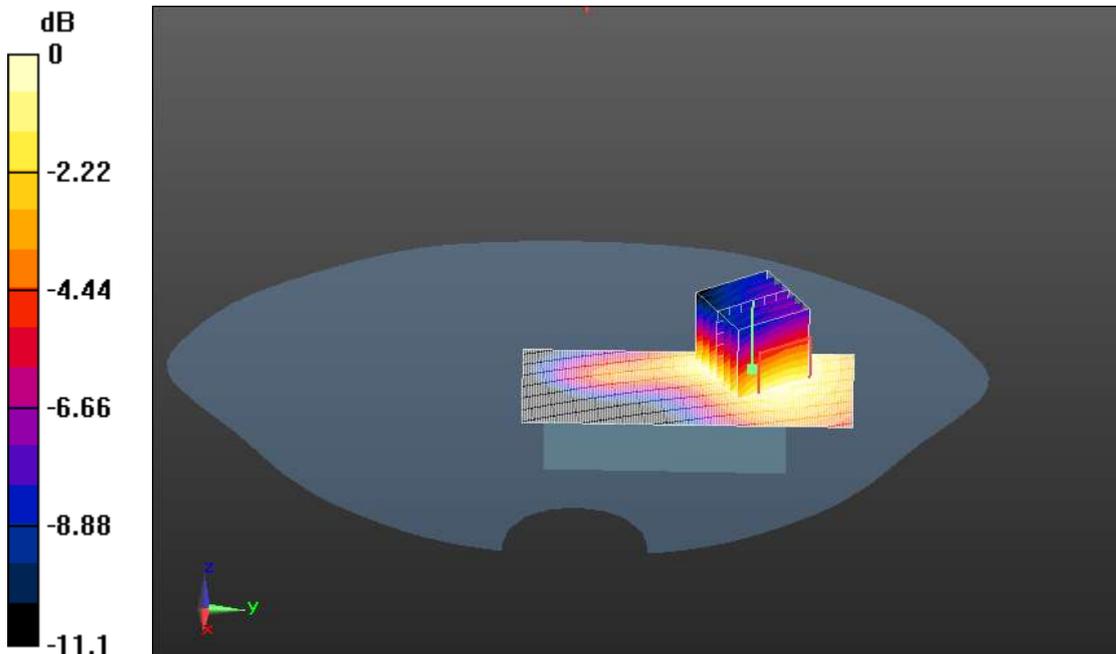**Configuration 2/Vertical back- Mid/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.61 V/m; Power Drift = 0.154 dB
Peak SAR (extrapolated) = 0.337 W/kg
SAR(1 g) = 0.199 mW/g; SAR(10 g) = 0.137 mW/g
Maximum value of SAR (measured) = 0.212 mW/g

0 dB = 0.212mW/g

GSM850 Horizontal up - low Date/Time: 8/17/2011 4:31:35 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used : f = 824.2 MHz; σ = 0.933 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal up - low/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR = 0.374 mW/g

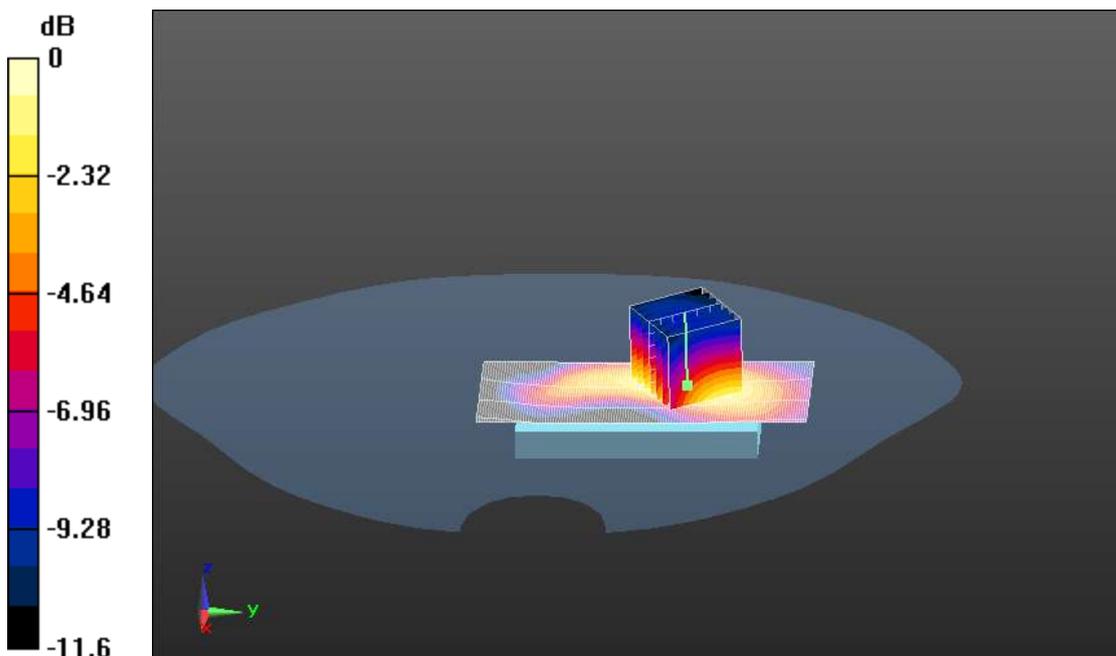**Configuration/Horizontal up - low/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.552 W/kg
SAR(1 g) = 0.339 mW/g; SAR(10 g) = 0.208 mW/g
Maximum value of SAR (measured) = 0.375 mW/g

0 dB = 0.375mW/g

GSM850 Horizontal up - high Date/Time: 8/17/2011 4:59:15 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 848.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 849 MHz; σ = 0.967 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal up - high/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR   = 0.486 mW/g

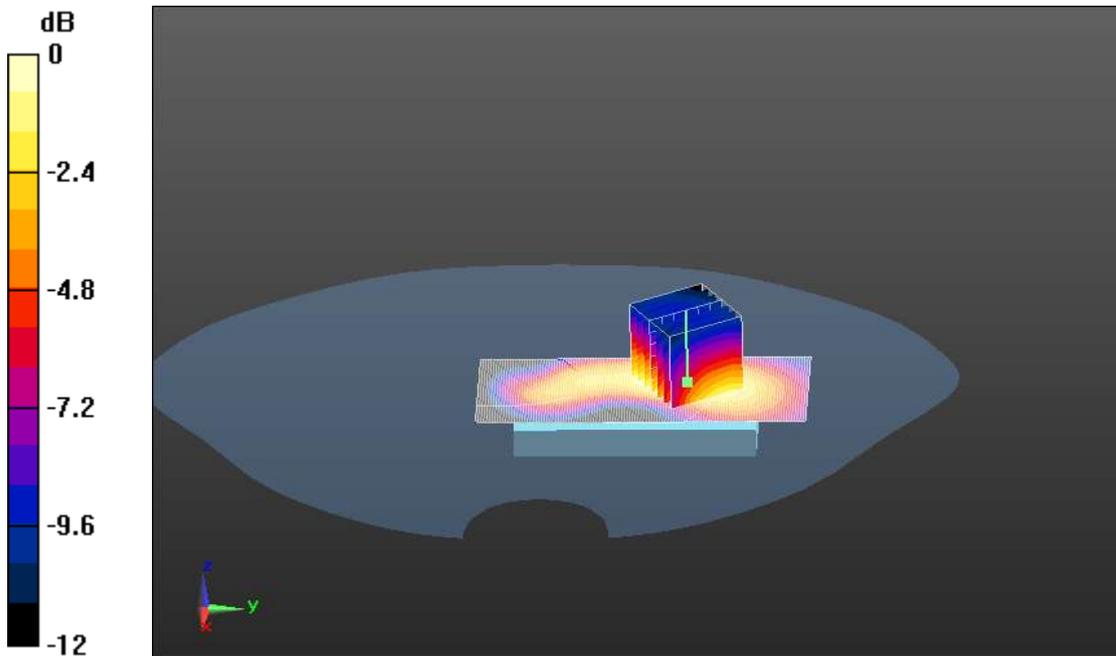**Configuration/Horizontal up - high/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.1 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 0.694 W/kg
SAR(1 g) = 0.421 mW/g; SAR(10 g) = 0.256 mW/g
Maximum value of SAR (measured) = 0.457 mW/g

0 dB = 0.457mW/g

GSM850 Horizontal up with GPRS - Mid Date/Time: 8/17/2011 5:33:01 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 837 MHz; σ = 0.951 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal up with GPRS - Mid/Area Scan (51x121x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR   = 0.524 mW/g

Configuration/Horizontal up with GPRS - Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.176 dB
Peak SAR (extrapolated) = 0.680 W/kg
SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.283 mW/g
Maximum value of SAR (measured) = 0.478 mW/g

Configuration/Horizontal up with GPRS - Mid/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.176 dB
Peak SAR (extrapolated) = 0.695 W/kg
SAR(1 g) = 0.428 mW/g; SAR(10 g) = 0.273 mW/g
Maximum value of SAR (measured) = 0.484 mW/g
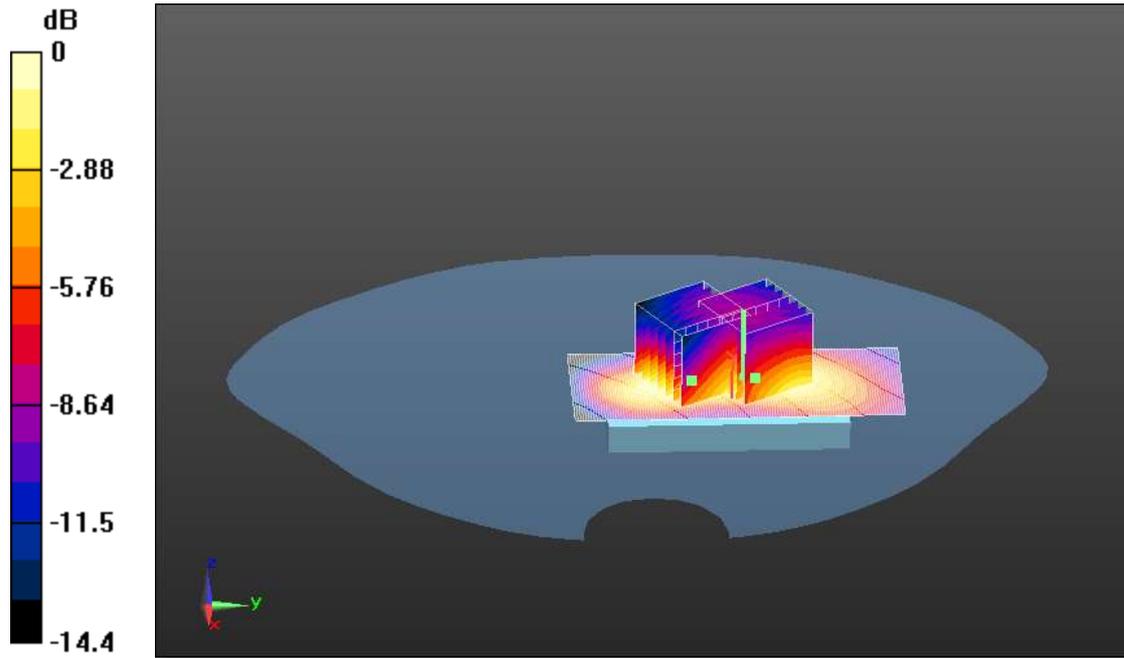
0 dB = 0.484mW/g

GSM850 Horizontal up with EDGE - Mid Date/Time: 8/17/2011 6:05:58 PM

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 836.6 MHz; Communication System PAR: 9.191 dB
Medium parameters used: $f = 837$ MHz; $\sigma = 0.951$ mho/m; $\varepsilon_r = 54.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(6.08, 6.08, 6.08); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM1; Type: SAM; Serial: TP1576
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal up with EDGE - Mid/Area Scan (51x121x1):
Measurement grid: dx=10mm, dy=10mm
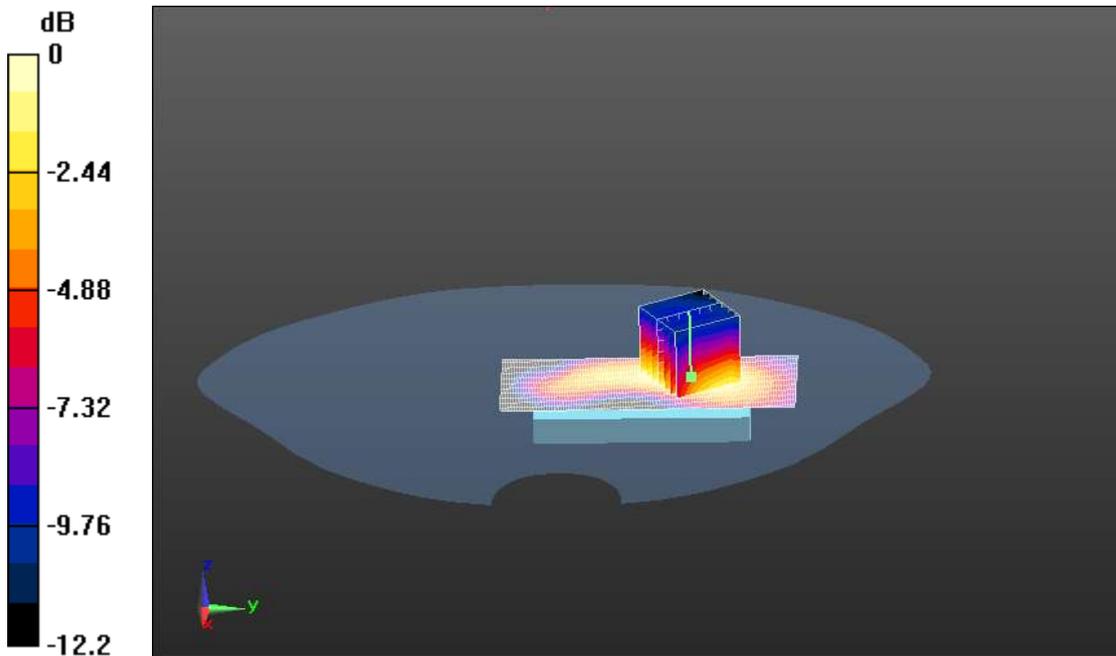Maximum value of SAR   = 0.443 mW/g

Configuration/Horizontal up with EDGE - Mid/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = -0.128 dB
Peak SAR (extrapolated) = 0.645 W/kg
SAR(1 g) = 0.383 mW/g; SAR(10 g) = 0.229 mW/g
Maximum value of SAR (measured) = 0.418 mW/g

0 dB = 0.418mW/g

GSM1900 Horizontal up - Mid Date/Time: 8/17/2011 10:35:37 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz; Communication System PAR: 9.191 dB

Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal up - Mid/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR   = 0.229 mW/g

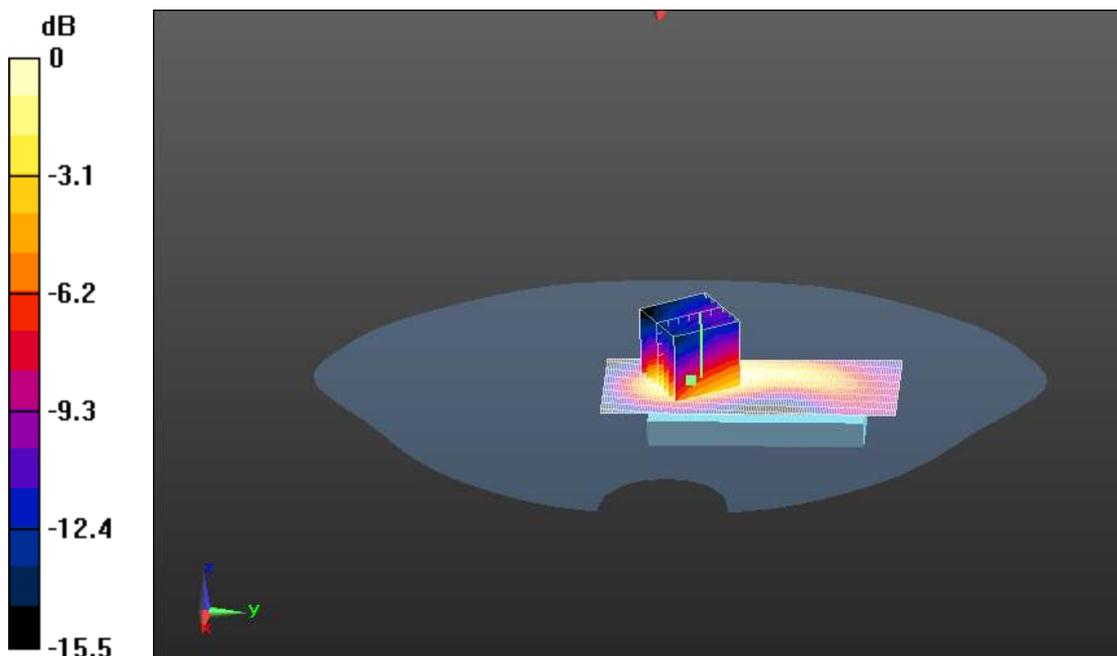**Configuration/Horizontal up - Mid/Zoom Scan (7x7x7)/Cube 0:**

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

Reference Value = 12.6 V/m; Power Drift = 0.145 dB

Peak SAR (extrapolated) = 0.326 W/kg

SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.121 mW/g

Maximum value of SAR (measured) = 0.227 mW/g

0 dB = 0.227mW/g

GSM1900 Horizontal down - Mid Date/Time: 8/17/2011 8:34:54 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz; Communication System PAR: 9.191 dB

Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal down - Mid/Area Scan (51x121x1):

Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR = 0.386 mW/g

Configuration/Horizontal down - Mid/Zoom Scan (7x7x7)/Cube 0:
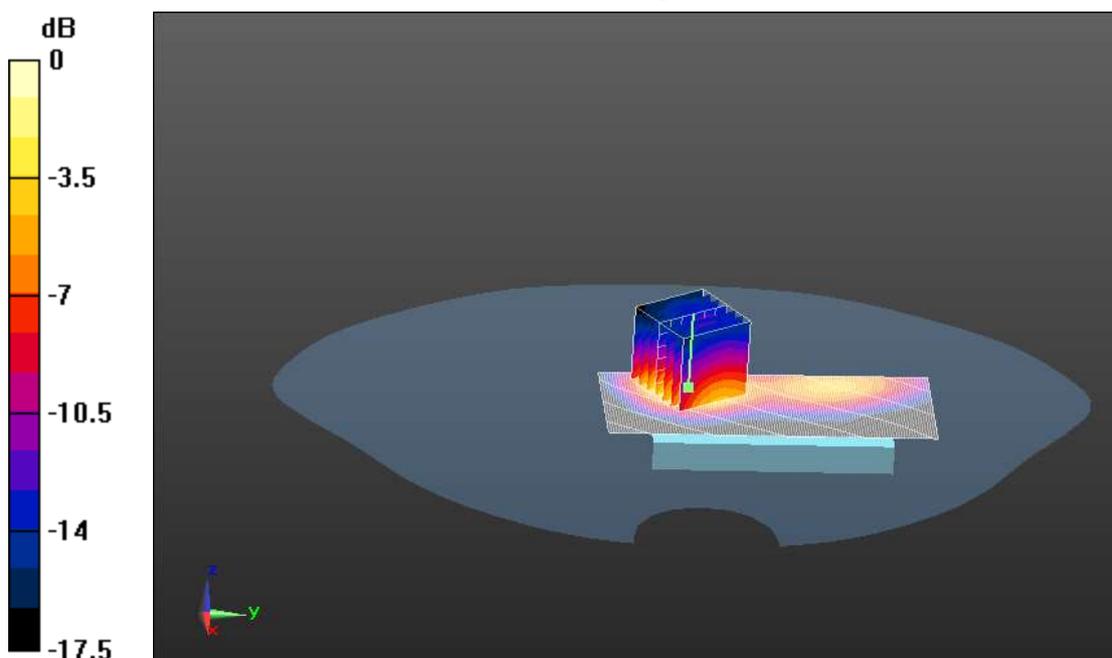
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.7 V/m; Power Drift = 0.014 dB

Peak SAR (extrapolated) = 0.604 W/kg

SAR(1 g) = 0.330 mW/g; SAR(10 g) = 0.164 mW/g

Maximum value of SAR (measured) = 0.380 mW/g

0 dB = 0.380mW/g

GSM1900 Vertical front - Mid Date/Time: 8/17/2011 9:31:03 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz; Communication System PAR: 9.191 dB

Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration 2/Vertical front - Mid/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR   = 0.141 mW/g

Configuration 2/Vertical front - Mid/Zoom Scan (7x7x7)/Cube 0:

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

Reference Value = 8.41 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.200 W/kg

SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.069 mW/g

Maximum value of SAR (measured) = 0.140 mW/g

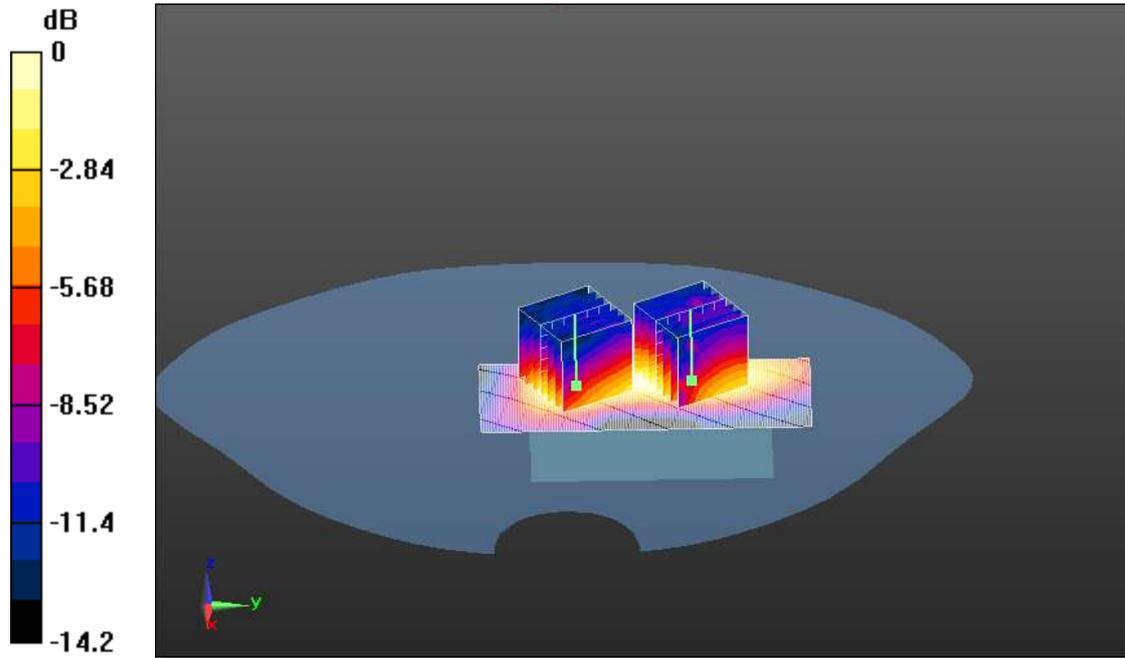**Configuration 2/Vertical front - Mid/Zoom Scan (7x7x7)/Cube 1:**

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

Reference Value = 8.41 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.177 W/kg

SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.066 mW/g

Maximum value of SAR (measured) = 0.125 mW/g

0 dB = 0.125mW/g

GSM1900 Vertical back- Mid Date/Time: 8/17/2011 10:08:17 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1880 MHz; Communication System PAR: 9.191 dB

Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration 2/Vertical back- Mid/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR   = 0.188 mW/g

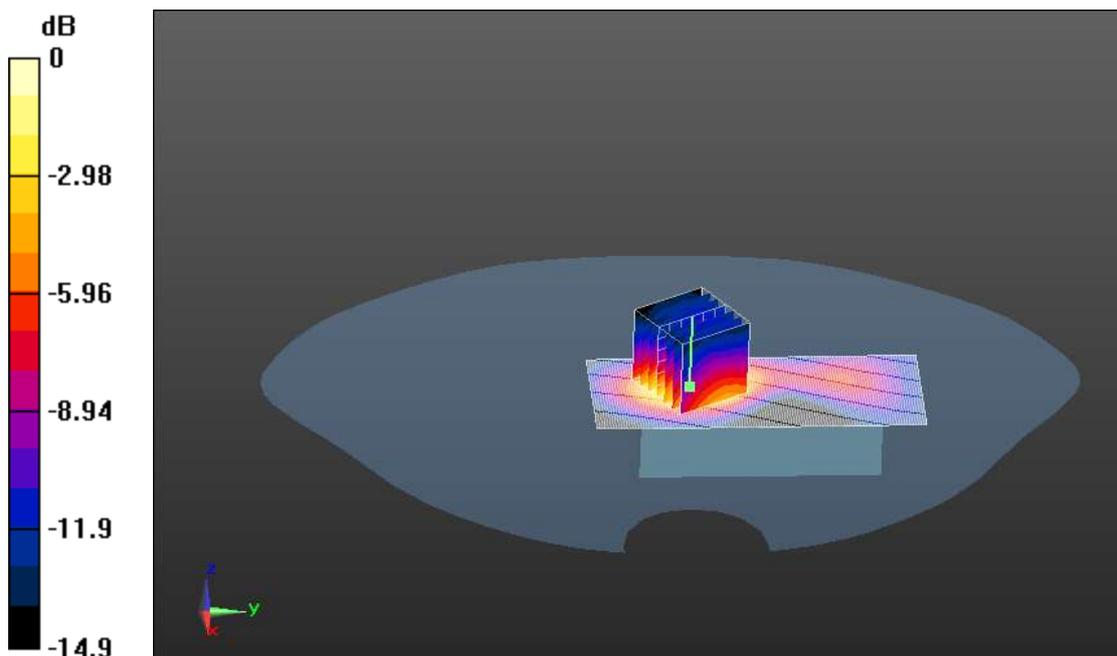**Configuration 2/Vertical back- Mid/Zoom Scan (7x7x7)/Cube 0:**

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

Reference Value = 10.3 V/m; Power Drift = 0.048 dB

Peak SAR (extrapolated) = 0.277 W/kg

SAR(1 g) = 0.163 mW/g; SAR(10 g) = 0.088 mW/g

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

0 dB = 0.185mW/g

GSM1900 Horizontal down - low Date/Time: 8/17/2011 11:02:35 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used : f = 1850.2 MHz; σ = 1.45 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal down - low/Area Scan (51x121x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR = 0.396 mW/g

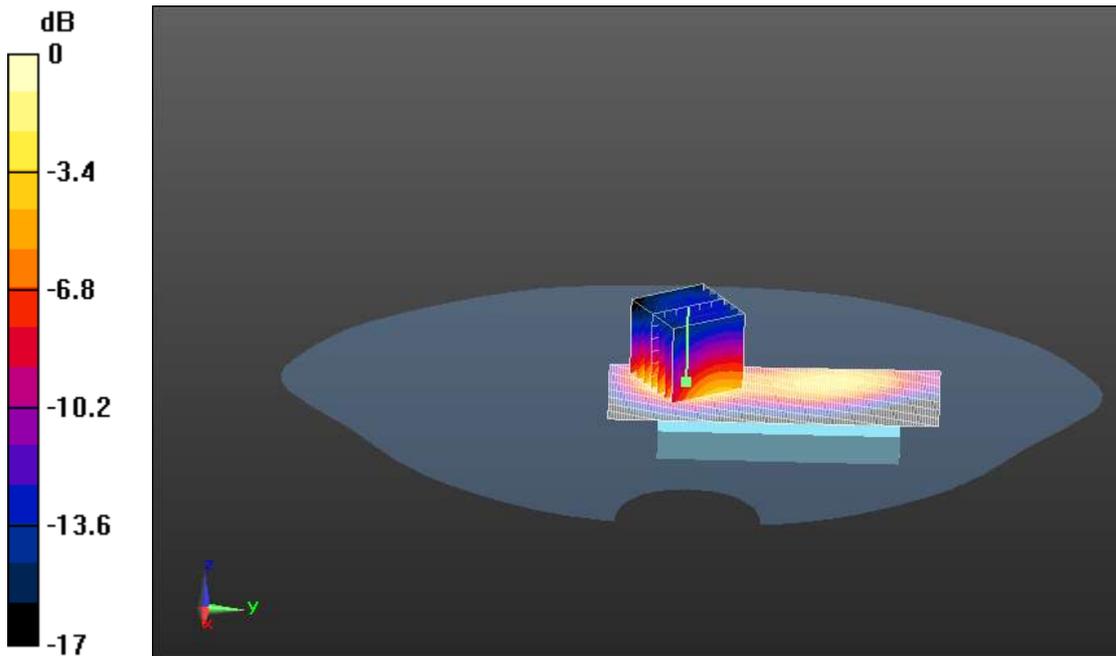**Configuration/Horizontal down - low/Zoom Scan (7x7x7)/Cube 0:**

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

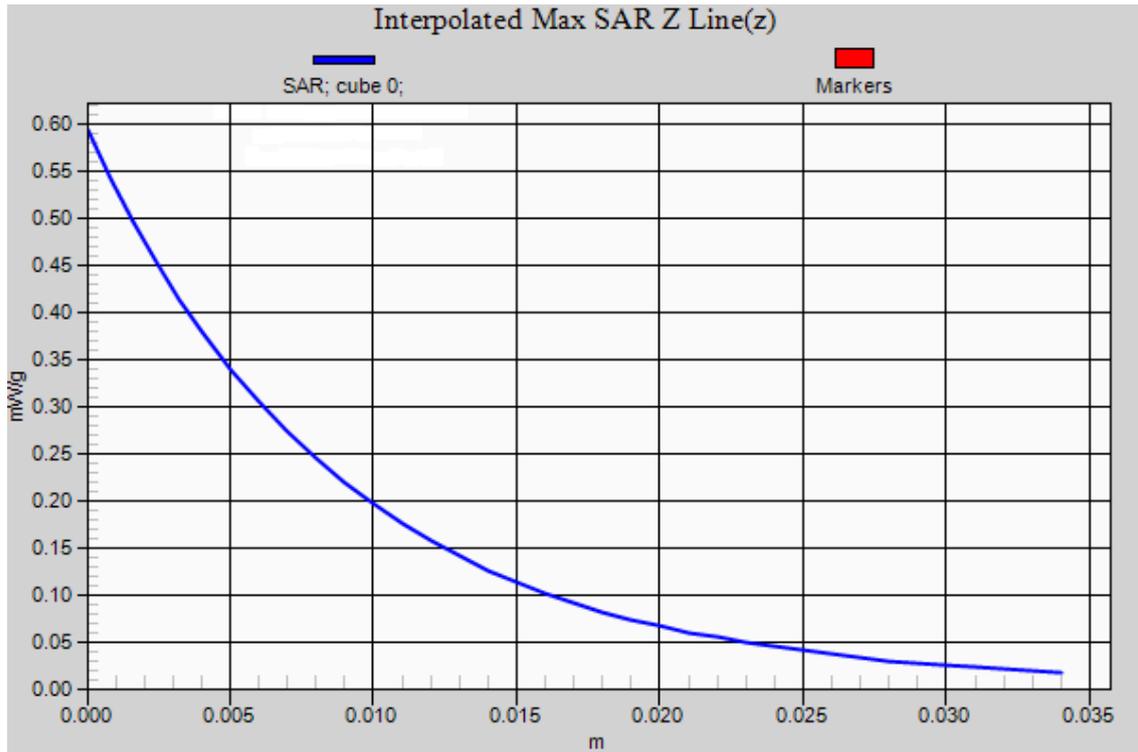Reference Value = 12.3 V/m; Power Drift = 0.089 dB

Peak SAR (extrapolated) = 0.593 W/kg

SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.171 mW/g

Maximum value of SAR (measured) = 0.383 mW/g

0 dB = 0.383mW/g

Interpolated Max SAR Z Line(z)

GSM1900 Horizontal down - high Date/Time: 8/17/2011 11:26:10 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1909.8 MHz; Communication System PAR: 9.191 dB

Medium parameters used: f = 1910 MHz; σ = 1.5 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal down - high/Area Scan (51x121x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR = 0.269 mW/g

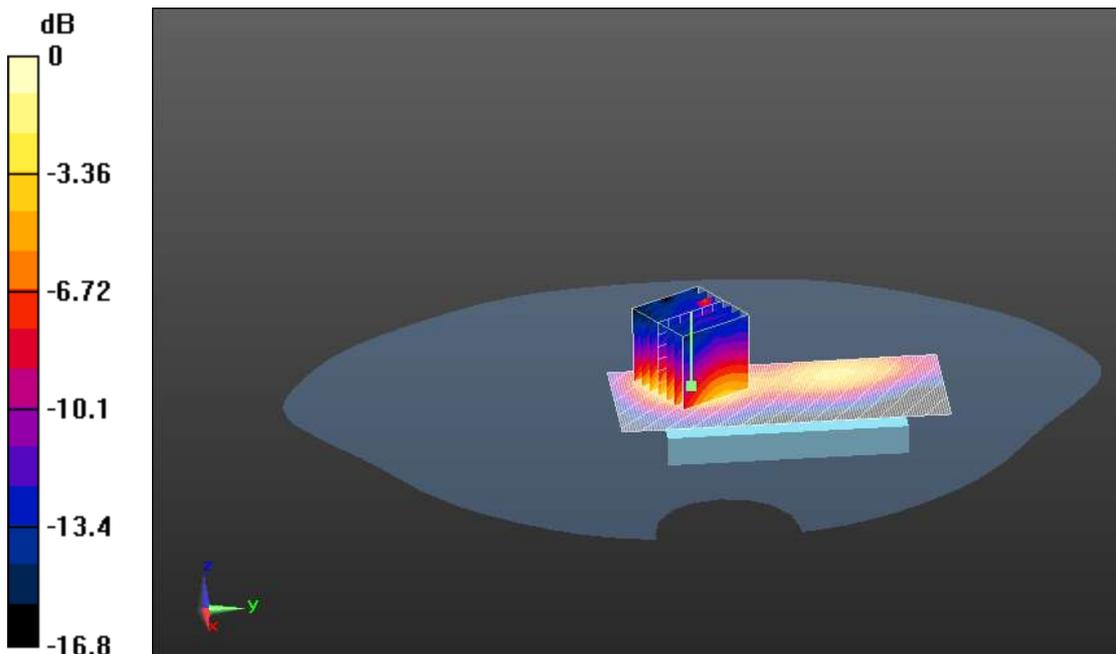**Configuration/Horizontal down - high/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.167 dB
Peak SAR (extrapolated) = 0.409 W/kg
SAR(1 g) = 0.229 mW/g; SAR(10 g) = 0.117 mW/g
Maximum value of SAR (measured) = 0.263 mW/g

0 dB = 0.263mW/g

GSM1900 Horizontal down with GPRS - low Date/Time: 8/17/2011 11:51:28 AM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used : f = 1850.2 MHz; σ = 1.45 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal down with GPRS - low/Area Scan (51x121x1):

Measurement grid: dx=10mm, dy=10mm
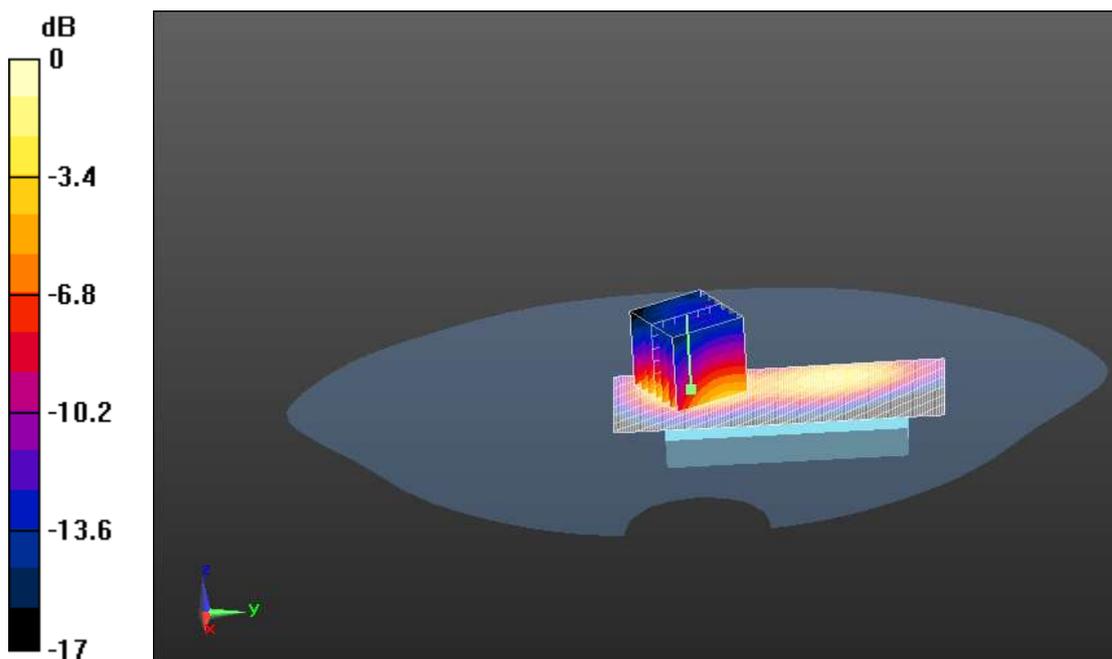
Maximum value of SAR = 0.375 mW/g

Configuration/Horizontal down with GPRS - low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 0.567 W/kg

SAR(1 g) = 0.320 mW/g; SAR(10 g) = 0.163 mW/g

Maximum value of SAR (measured) = 0.364 mW/g

0 dB = 0.364mW/g

GSM1900 Horizontal down with EDGE - low Date/Time: 8/17/2011 12:22:14 PM

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB

Medium parameters used : f = 1850.2 MHz; σ = 1.45 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3241; ConvF(4.51, 4.51, 4.51); Calibrated: 6/13/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1226; Calibrated: 6/13/2011
- Phantom: SAM2; Type: SAM; Serial: TP-1575
- Measurement SW: DASY52, V52.2 Build 0; Postprocessing SW: SEMCAD X, V14.2 Build 2Version 14.2.2 (1685) (Deployment Build)

Configuration/Horizontal down with EDGE - low/Area Scan (51x121x1):

Measurement grid: dx=10mm, dy=10mm
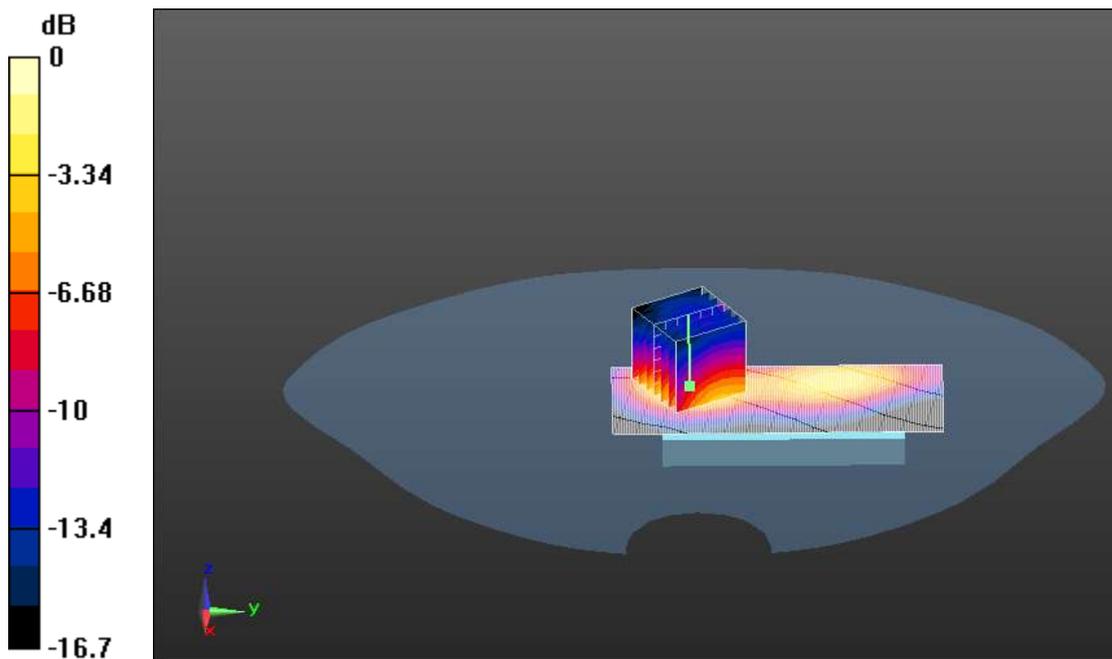
Maximum value of SAR   = 0.374 mW/g

Configuration/Horizontal down with EDGE - low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.1 V/m; Power Drift = 0.177 dB

Peak SAR (extrapolated) = 0.567 W/kg

SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.162 mW/g

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

0 dB = 0.365mW/g

ANNEX G: Probe Calibration Certificate

工业和信息化部通信计量中心
Telecommunication Metrology Center of MIIT

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
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E-mail: Info@emcite.com   Http://www.emcite.com

CNAS L0442

Client   **Tejet**   Certificate No: ES3-3241_Jun11

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN: 3241
Calibration Procedure(s)	TMC-XZ-01-028 Calibration procedure for dosimetric E-field probes
Calibration date:	June 13, 2011
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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	SN.	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	102083	11-Sep-10 (TMC, No.JZ10-443)	Sep-11
Power sensor NRV-Z5	100542	11-Sep-10 (TMC, No. JZ10-443)	Sep-11
Reference Probe EX3DV4	SN 3631	13-Dec-10 (TMC, No.JZ10-657)	Dec-11
DAE4	SN 771	21-Nov-10 (TMC, No.JZ10-653)	Nov-11
RF generator E4438C	MY49070393	13-Nov-10 (TMC, No.JZ10-394)	Nov-11
Network Analyzer 8753E	US38433212	04-Aug-10 (TMC, No.JZ10-056)	Aug-11

	Name	Function	Signature
Calibrated by:	Lin Hao	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Xiao Li	Deputy Director of the laboratory	

Issued: June 13, 2011

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

Certificate No: ES3-3241_Jun11   Page 1 of 11

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,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., θ =0 is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) For hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization θ =0 (f≤900MHz in TEM-cell;   f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z* frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep (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≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha,depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- 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.

Certificate No: ES3-3241_Jun11   Page 2 of 11

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Probe ES3DV3

SN: 3241

Manufactured:	May 5, 2009
Last Calibrated:	June 16, 2010
Recalibrated:	June 13, 2011

Calibrated for DASY System

Certificate No: ES3-3241_Jun11   Page 3 of 11

DASY – Parameters of Probe: ES3DV3 SN:3241

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μ V/(V/m)^2)^A	1.24	1.36	1.37	±10.1%
DCP (mV)^B	98.2	94.4	92	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	±1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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

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

Certificate No: ES3-3241_Jun11   Page 4 of 11

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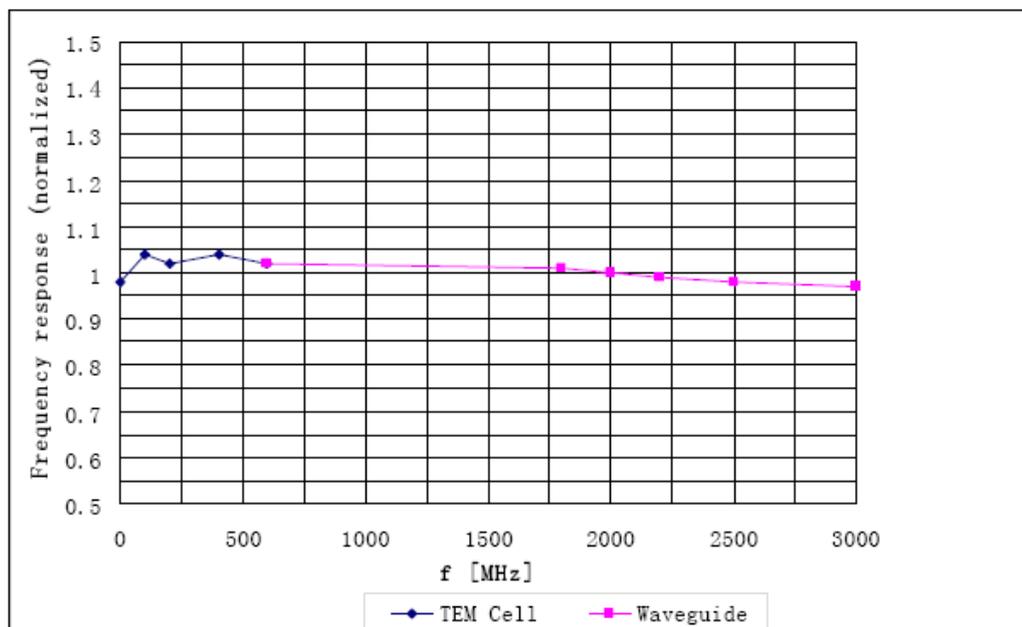## DASY – Parameters of Probe: ES3DV3 SN:3241

Calibration Parameter Determined in Body Tissue Simulating Media

f[MHz]	Validity[MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Uncertainty
835	±50 / ±100	55.2±5%	0.97±5%	6.08	6.08	6.08	0.83	1.15	±11.0% (k=2)
900	±50 / ±100	55.0±5%	1.05±5%	6.02	6.02	6.02	0.84	1.14	±11.0% (k=2)
1750	±50 / ±100	53.4±5%	1.49±5%	4.77	4.77	4.77	0.33	2.12	±11.0% (k=2)
1810	±50 / ±100	53.3±5%	1.52±5%	4.66	4.66	4.66	0.36	2.04	±11.0% (k=2)
1900	±50 / ±100	53.3±5%	1.52±5%	4.51	4.51	4.51	0.33	2.39	±11.0% (k=2)
2000	±50 / ±100	53.3±5%	1.52±5%	4.59	4.59	4.59	0.35	2.25	±11.0% (k=2)
2450	±50 / ±100	52.7±5%	1.95±5%	4.19	4.19	4.19	0.79	1.21	±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.

Certificate No: ES3-3241_Jun11   Page 6 of 11

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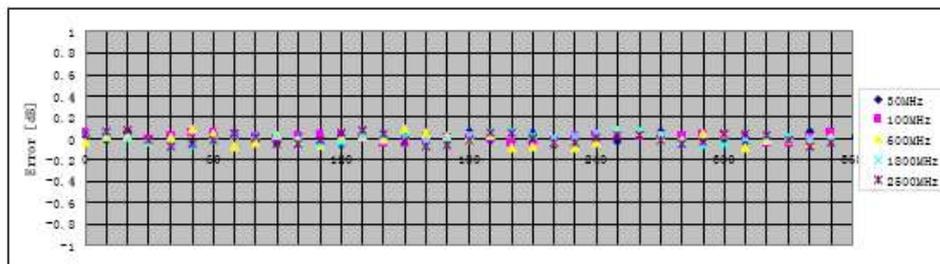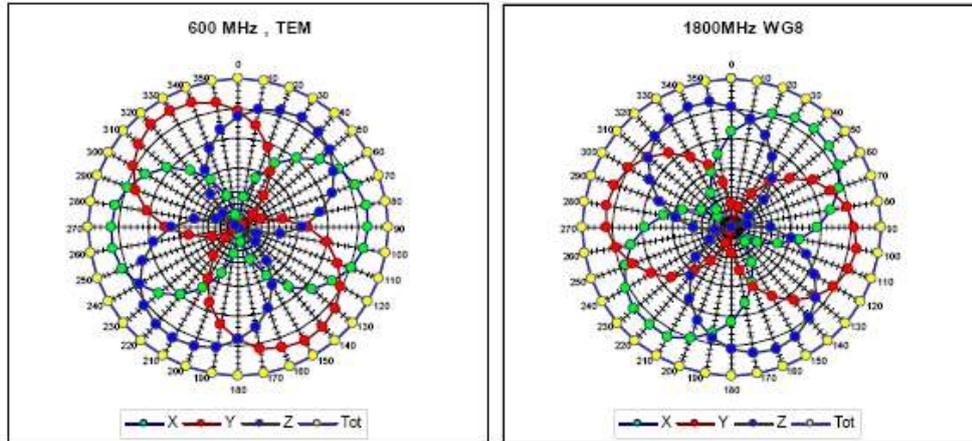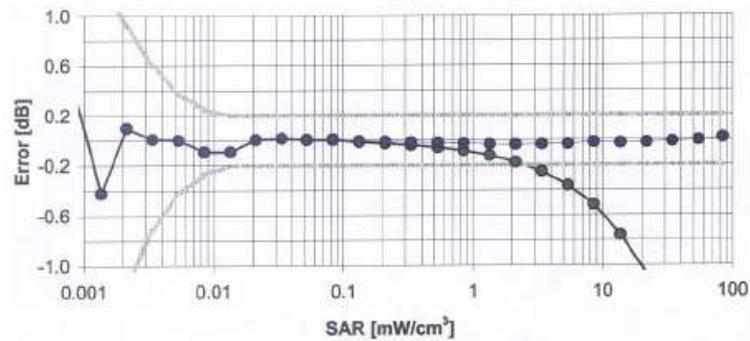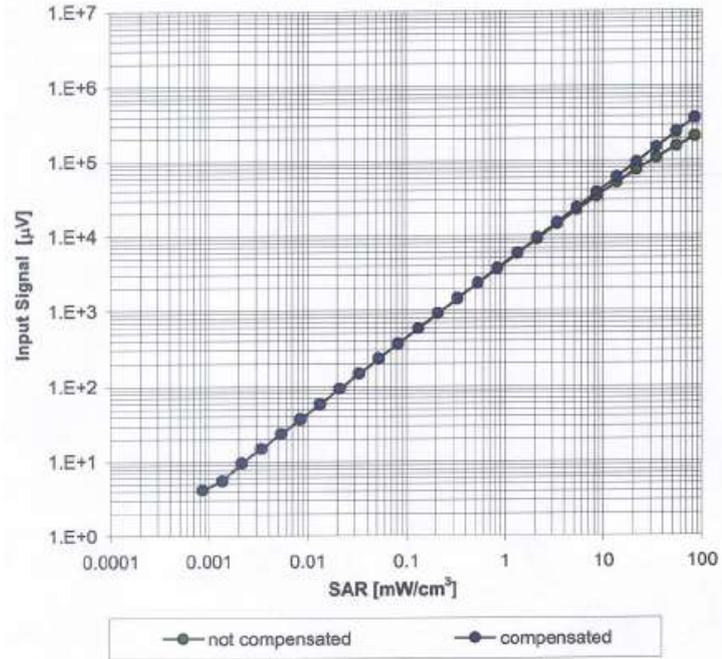E-mail: Info@emcite.com   Http://www.emcite.com

Frequency Response of E-Field
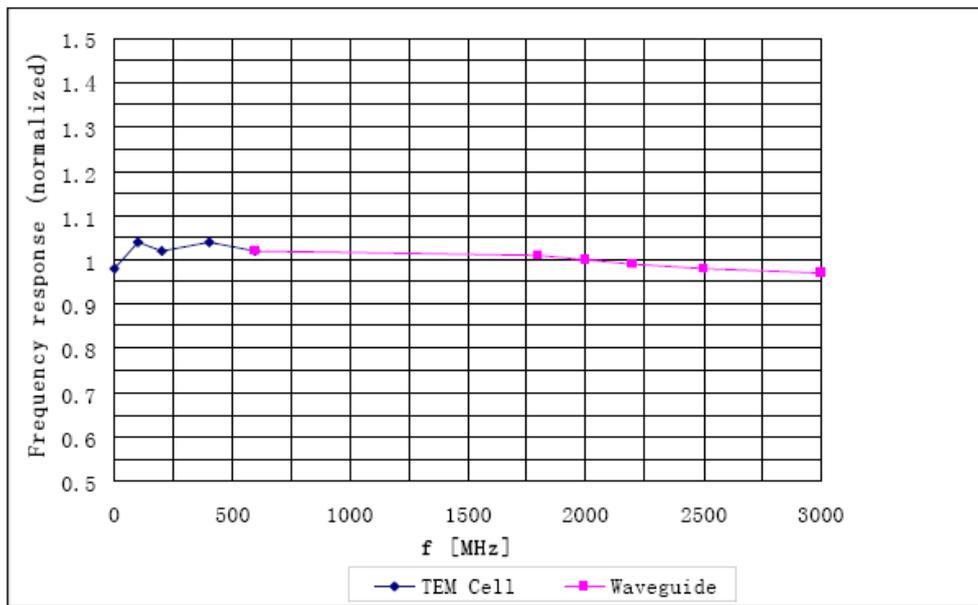
Uncertainty of Frequency Response of E-field: ±5.0% (k=2)

Certificate No: ES3-3241_Jun11   Page 7 of 11

Frequency Response of E-Field

Uncertainty of Frequency Response of E-field: ±5.0% (k=2)

Certificate No: ES3-3241_Jun11   Page 7 of 11

Receiving Pattern (Φ), θ =0°

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

Dynamic Range f(SAR$_{head}$)
(Waveguide: R22, f = 1900 MHz)

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

Certificate No: ES3-3241_Jun11   Page 9 of 11

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079   Fax: +86-10-62304793
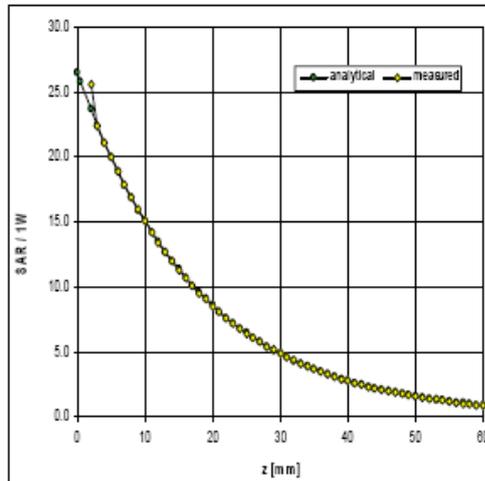E-mail: Info@emcite.com   Http://www.emcite.com

Conversion Factor Assessment
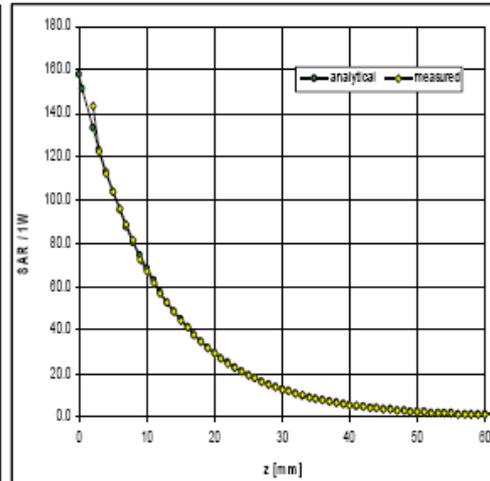
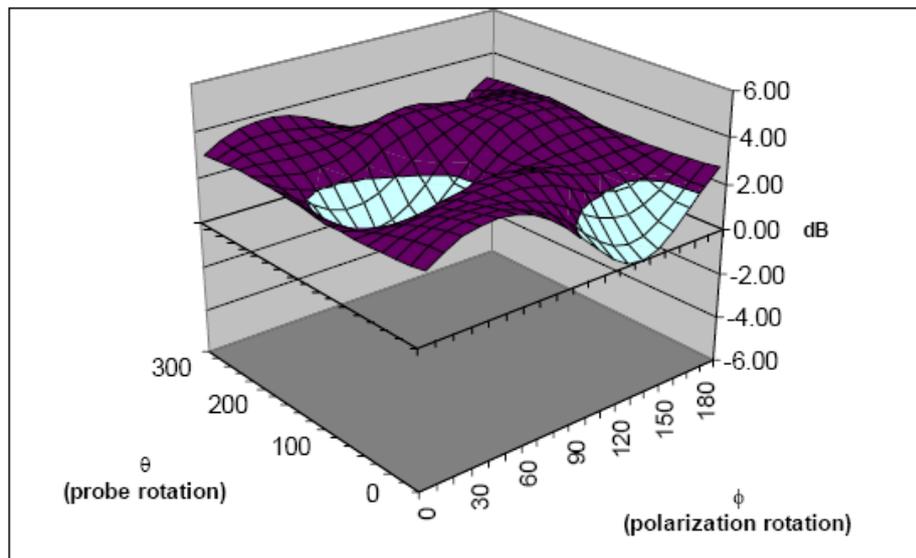Head 900 MHz (R9)   Head 1900 MHz (R22)

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

Uncertainty of Spherical Isotropy Assessment: ±2.5% (k=2)

Certificate No: ES3-3241_Jun11   Page 10 of 11

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4.0 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

ANNEX H:DAE4 Calibration Certificate

工业和信息化部通信计量中心
Telecommunication Metrology Center of MIIT

TMC iloc-MRA **CNAS**

CNAS L0442

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079　　Fax: +86-10-62304793
E-mail: Info@emcite.com　　Http://www.emcite.com

Client	Tejet		Certificate No: DAE4-1226_Jun11

CALIBRATION CERTIFICATE

Object	DAE4 - SN: 1226
Calibration Procedure(s)	TMC-XZ-01-029 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	June 13, 2011
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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Multimeter 3458A	MY45041463	12-Nov-10 (TMC, No: DLsc2010-1115)	Nov-11
DC POWER SUPPLY 66321D	MY43001657	12-Nov-10 (TMC, No: JZ10-290)	Nov-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box	/	18-Jun-10 (TMC, in house check)	In house check Jun-11

	Name	Function	Signature
Calibrated by:	Lin Hao	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Xiao Li	Deputy Director of the laboratory	

Issued: June 13, 2011

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

Certificate No: DAE4-1226_Jun11　　　　Page 1 of 5

Glossary:

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters:

- DC Voltage Measurement: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- Connector angle: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters contain technical information as a result from the performance test and require no uncertainty.
- DC Voltage Measurement Linearity: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
- Common mode sensitivity: Influence of a positive or negative common mode voltage on the differential measurement.
- Channel separation: Influence of a voltage on the neighbor channels not subject to an input voltage.
- AD Converter Values with inputs shorted: Values on the internal AD converter corresponding to zero input voltage.
- Input Offset Measurement: Output voltage and statistical results over a large number of zero voltage measurements.

Certificate No: DAE4-1226_Jun11   Page 2 of 5

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB =   6.1 μV ,   full range =   -100...+300 mV
Low Range: 1LSB =   61nV ,   full range =   -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	405.837 ± 0.1% (k=2)	405.272 ± 0.1% (k=2)	405.326 ± 0.1% (k=2)
Low Range	3.99601 ± 0.7% (k=2)	4.01768 ± 0.7% (k=2)	4.02083 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	112.5 ° ± 1 °

Certificate No: DAE4-1226_Jun11   Page 3 of 5

Appendix
1. DC Voltage Linearity

High Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	200000	200000	0.00
Channel X	+ Input	20000	20003.91	0.03
Channel X	- Input	20000	-20002.26	0.01
Channel Y	+ Input	200000	200000	0.00
Channel Y	+ Input	20000	20004.30	0.02
Channel Y	- Input	20000	-20001.84	0.01
Channel Z	+ Input	200000	200000.6	0.00
Channel Z	+ Input	20000	20002.05	0.01
Channel Z	- Input	20000	-20003.32	0.02

Low Range		Input (μV)	Reading (μV)	Error (%)
Channel X	+ Input	2000	1999.9	0.00
Channel X	+ Input	200	199.61	-0.19
Channel X	- Input	200	-200.68	0.36
Channel Y	+ Input	2000	1999.9	0.00
Channel Y	+ Input	200	199.40	-0.29
Channel Y	- Input	200	-200.46	0.23
Channel Z	+ Input	2000	2000	0.00
Channel Z	+ Input	200	199.33	-0.34
Channel Z	- Input	200	-201.29	0.66

2. Common mode sensitivity
DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	3.40	3.47
	- 200	-2.47	-3.10
Channel Y	200	0.15	-0.51
	- 200	-0.60	-1.12
Channel Z	200	-9.89	-10.17
	- 200	7.71	8.15

Certificate No: DAE4-1226_Jun11   Page 4 of 5

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.59	-0.31
Channel Y	200	0.57	-	2.47
Channel Z	200	-1.89	0.23	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	16128	16441
Channel Y	15957	16202
Channel Z	15979	16032

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation(μV)
Channel X	0.57	-1.05	2.02	0.41
Channel Y	-1.02	-1.96	-0.02	0.39
Channel Z	1.15	-0.07	1.94	0.34

6. Input Offset Current

Nominal Input Circuitry offset current on all channels: <25fA

7. Input Resistance

	Zeroing (MOhm)	Measuring (MOhm)
Channel X	0.2000	200.0
Channel Y	0.2000	200.0
Channel Z	0.2000	200.0

Certificate No: DAE4-1226_Jun11   Page 5 of 5

ANNEX I: D835V2 Calibration Certificate

工业和信息化部通信计量中心
Telecommunication Metrology Center of MIIT

TMC

CNAS L0442

Client **Tejet**

Certificate No: **D835V2-4d100_Jun11**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d100
Calibration Procedure(s)	TMC-XZ-01-027 Calibration procedure for dipole validation kits
Calibration date:	June 14, 2011
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)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRVD	101253	03-Sep-10 (TMC, No.JZ10-248)	Sep-11
Power sensor NRV-Z5	100333	03-Sep-10 (TMC, No. JZ10-248)	Sep-11
Reference Probe ES3DV3	SN 3149	25-Sep-10(SPEAG, No.ES3-3149_Sep10)	Sep-11
DAE4	SN 771	21-Nov-10(SPEAG, No.DAE4-771_Nov10)	Nov-11
RF generator E4438C	MY45092879	17-Jun-10(TMC, No.JZ10-302)	Jun-11
Network Analyzer 8753E	US38433212	28-Aug-10(TMC, No.JZ10-056)	Aug-11

	Name	Function	Signature
Calibrated by:	Lin Hao	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Xiao Li	Deputy Director of the laboratory	

Issued: July 5, 2011

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

Certificate No: D835V2-4d100_Jun11   Page 1 of 9

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,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 300MHz to 3GHz)", 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) DASY 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.

Certificate No: D835V2-4d100_Jun11   Page 2 of 9

Measurement Conditions

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

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	2mm Oval Phantom ELI4	
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	41.4 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.7 ± 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	2.37 mW / g
SAR normalized	normalized to 1W	9.48 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	9.53 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.53 mW / g
SAR normalized	normalized to 1W	6.12 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	6.14 mW /g ± 16.5 % (k=2)

---

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

Certificate No: D835V2-4d100_Jun11   Page 3 of 9

Body TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6%	1.00mho/m ± 6 %
Body TSL temperature during test	(21.9 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.45 mW / g
SAR normalized	normalized to 1W	9.80 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**9.47 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	Condition	
SAR measured	250 mW input power	1.59 mW / g
SAR normalized	normalized to 1W	6.36 mW / g
SAR for nominal Body TSL parameters [2]	normalized to 1W	**6.21 mW /g ± 16.5 % (k=2)**

---

[2] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Certificate No: D835V2-4d100_Jun11   Page 4 of 9

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8Ω + 0.22 jΩ
Return Loss	- 32.8dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.9Ω + 3.6 jΩ
Return Loss	- 24.9dB

General Antenna Parameters and Design

Electrical Delay (one direction)	2.983 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 9, 2010

DASY5 Validation Report for Head TSL

Date/Time: 2011-6-14 8:57:36

Test Laboratory: TMC, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 4d100

Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Medium: Head 835MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: ES3DV3 - SN3149; ConvF(6.56, 6.56, 6.56); Calibrated: 25.09.10
- Electronics: DAE4 Sn771; Calibration: 21.11.10
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.0 Build 119.9; Postprocessing SW: SEMCAD, V13.2 Build 87
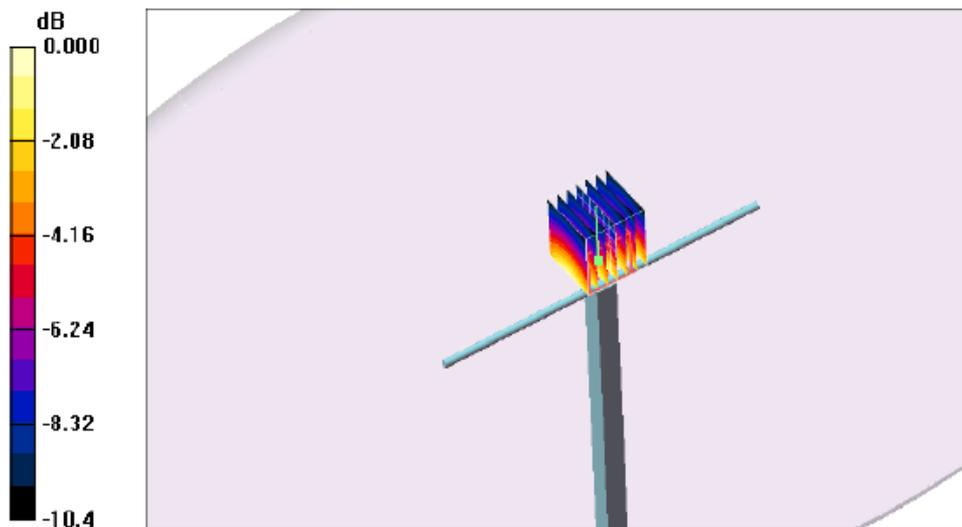
Pin=250mW; d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.1 V/m; Power Drift = 0.096 dB
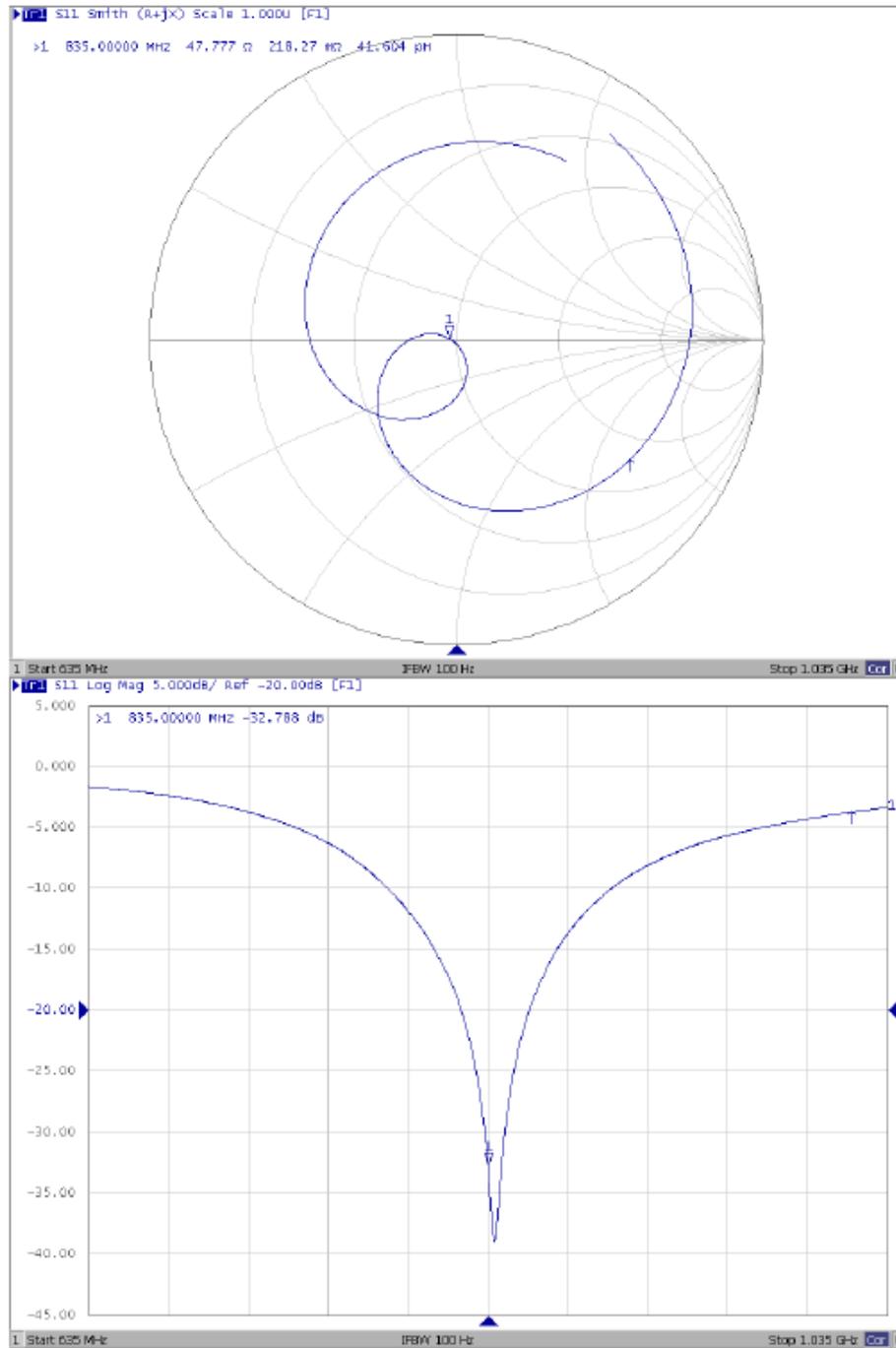Peak SAR (extrapolated) = 3.45 W/kg
SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.54 mW/g

0 dB = 2.54mW/g

Certificate No: D835V2-4d100_Jun11   Page 6 of 9

Impedance Measurement Plot for Head TSL

DASY5 Validation Report for Body TSL

Date/Time: 2011-6-14 9:52:23

Test Laboratory: TMC, Beijing, China

DUT: Dipole 835 MHz; Type: D835V2; Serial: SN: 4d100

Communication System: CW Frequency: 835 MHz Duty Cycle: 1:1
Medium: Body 835MHz
Medium parameters used: f = 835 MHz; σ = 1.00 mho/m; ε_r = 53.8; ρ = 1000 kg/m³
Phantom section: Flat Section

DASY5 Configuration:
- Probe: ES3DV3 - SN3149; ConvF(6.22, 6.22, 6.22); Calibrated: 25.09.10
- Electronics: DAE4 Sn771; Calibration: 21.11.10
- Phantom: 2mm Oval Phantom ELI4; Type: QDOVA001BB
- Measurement SW: DASY5, V5.0 Build 119.9; Postprocessing SW: SEMCAD, V13.2 Build 87

Pin=250mW; d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 41.3 V/m; Power Drift = -0.084 dB
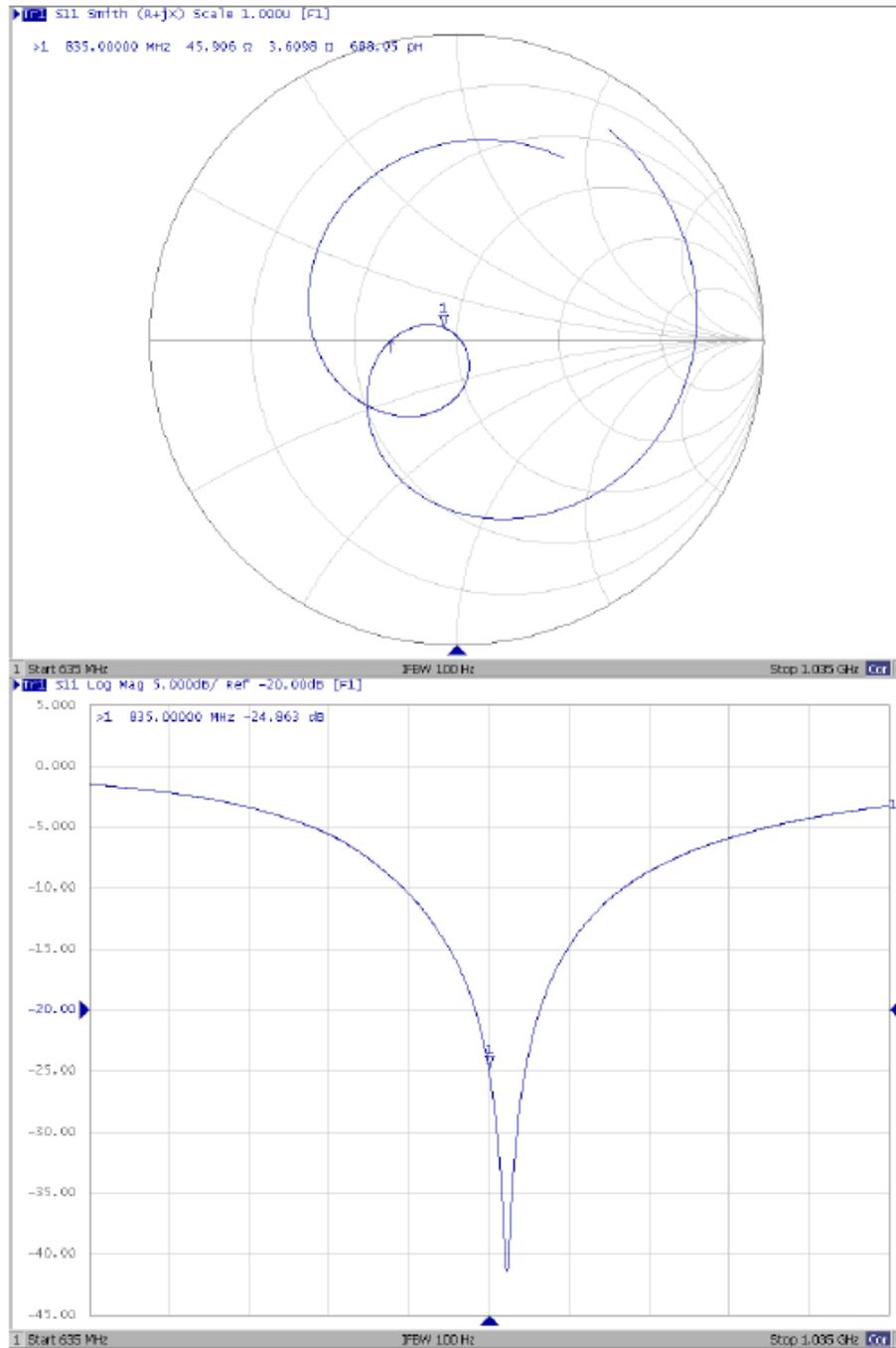Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 2.45 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.66 mW/g

0 dB = 2.66mW/g

Certificate No: D835V2-4d100_Jun11   Page 8 of 9

Impedance Measurement Plot for Body TSL

ANNEX J: D1950V2 Calibration Certificate

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

ilac-MRA

SWISS CALIBRATION

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client   **Tejet (Auden)**

Certificate No: **D1950V3-1139_Jun11**

CALIBRATION CERTIFICATE

Object	D1950V3 - SN1139
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	June 17, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	8-Jun-11 (No. DAE4-601_Jun11)	Jun-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: June 17, 2011

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

Certificate No: D1950V3-1139_Jun11   Page 1 of 8

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

ilac-MRA

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: **SCS 108**

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

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.

Certificate No: D1950V3-1139_Jun11   Page 2 of 8

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1950 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	41.0 mW /g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.27 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.3 mW /g ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.1 ± 6 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.75 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	39.4 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.14 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	20.7 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.6 Ω - 3.0 jΩ
Return Loss	- 30.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω - 3.0 jΩ
Return Loss	- 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.195 ns

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

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
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	June 04, 2009

DASY5 Validation Report for Head TSL

Date: 17.06.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1950 MHz; Type: D1950V3; Serial: D1950V3 - SN1139

Communication System: CW; Frequency: 1950 MHz
Medium: HSL BB1.9
Medium parameters used: f = 1950 MHz; σ = 1.34 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.86, 4.86, 4.86); Calibrated: 29.04.2011

- Sensor-Surface: 3mm (Mechanical Surface Detection)

- Electronics: DAE4 Sn601; Calibrated: 08.06.2011

- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001

- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
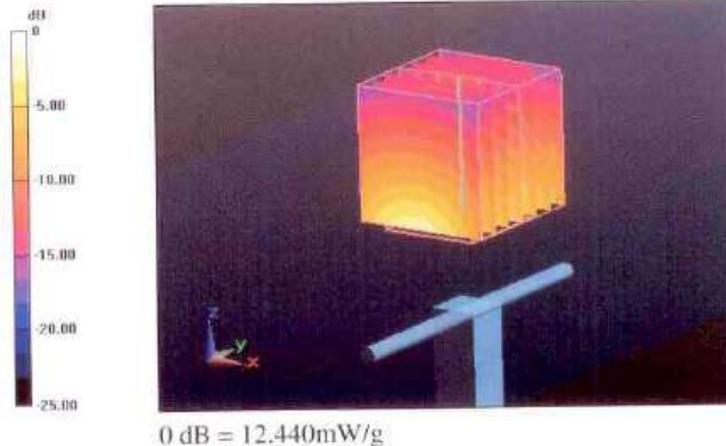Measurement grid: dx=5mm, dy=5mm, dz=5mm
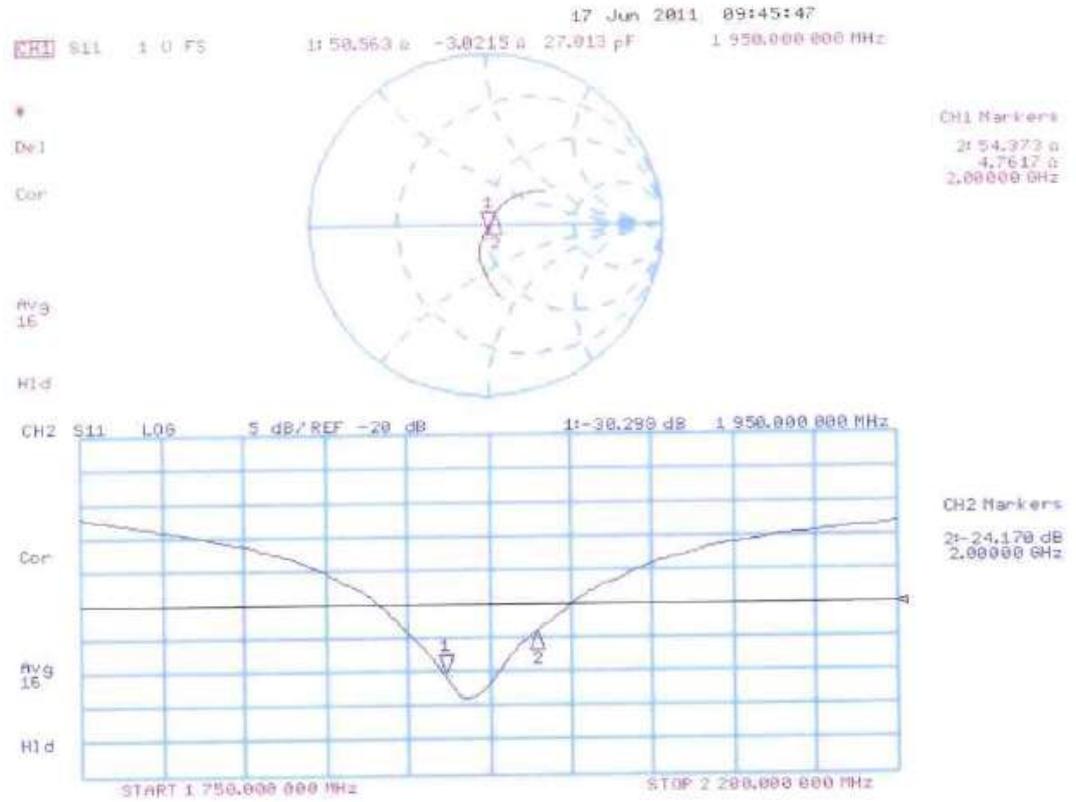Reference Value = 99.975 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 17.741 W/kg
SAR(1 g) = 10 mW/g; SAR(10 g) = 5.27 mW/g
Maximum value of SAR (measured) = 12.442 mW/g

0 dB = 12.440mW/g

Impedance Measurement Plot for Head TSL

DASY5 Validation Report for Body TSL

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1950 MHz; Type: D1950V3; Serial: D1950V3 - SN1139

Communication System: CW; Frequency: 1950 MHz
Medium: MSL BB1.9
Medium parameters used: f = 1950 MHz; σ = 1.49 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.73, 4.73, 4.73); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 08.06.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
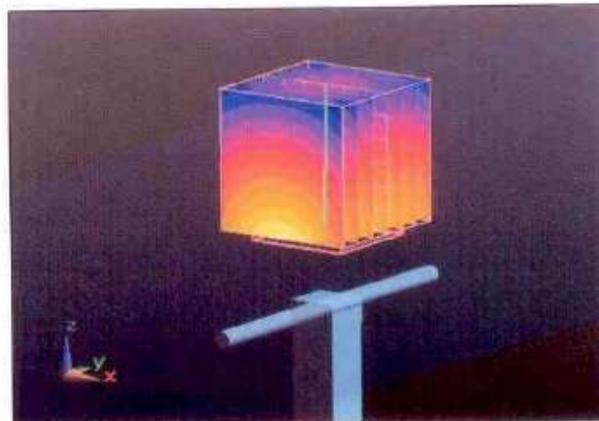
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.484 V/m; Power Drift = 0.01 dB
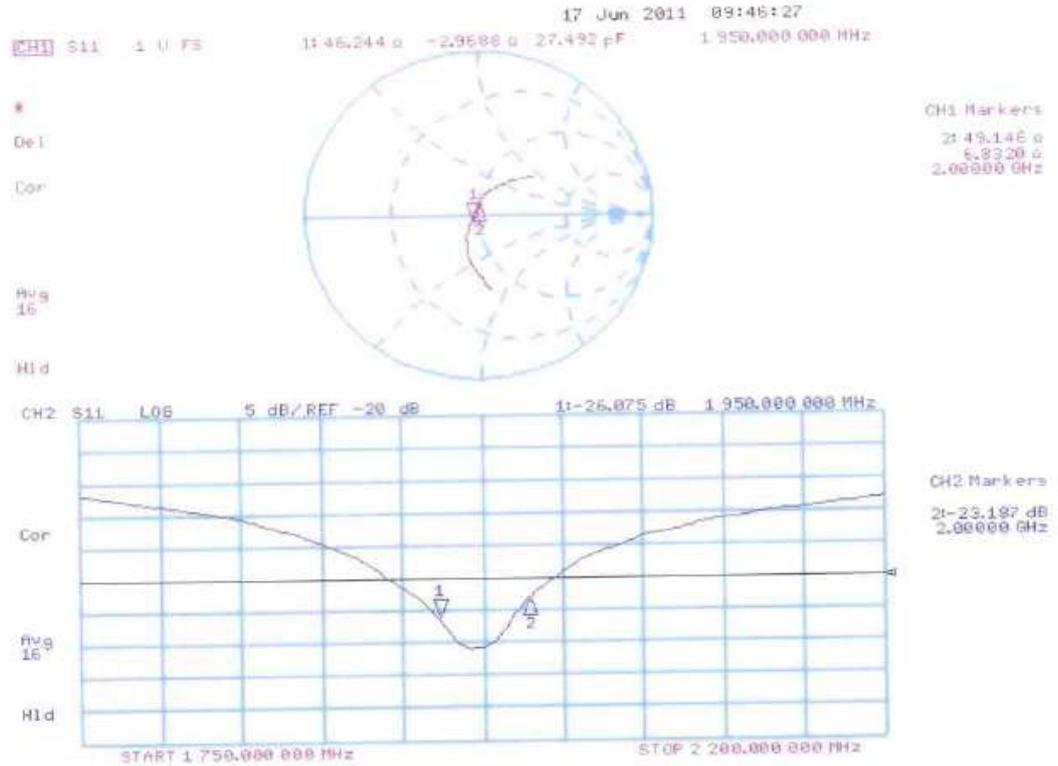Peak SAR (extrapolated) = 17.095 W/kg
SAR(1 g) = 9.75 mW/g; SAR(10 g) = 5.14 mW/g
Maximum value of SAR (measured) = 12.262 mW/g

0 dB = 12.260mW/g

Impedance Measurement Plot for Body TSL

---END OF REPORT---