TESTING
No. L2264

SAR TEST REPORT

Product Name	CDMA EVDO BC0/BC1 mobile phone
Model Name	Yaris-5 NA
Marketing Name	A564R
FCC ID	RAD476
Applicant	TCT Mobile Limited
Manufacturer	TCT Mobile Limited
Date of issue	January 6, 2015

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Reference Standard(s)	**FCC 47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **ANSI C95.1, 1992:** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991) **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. **KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03:** SAR Measurement Requirements for 100 MHz to 6 GHz **KDB 447498 D01 Mobile Portable RF Exposure v05r02:** Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies **KDB 648474 D04 Handset SAR v01r02:** SAR Evaluation Considerations for Wireless Handsets. **KDB 941225 D01 SAR test for 3G devices v03:** SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA **KDB 248227 D01 SAR meas for 802 11 a b g v01r02:** SAR Measurement Procedures for 802.11a/b/g Transmitters.
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards for the tested bands only. General Judgment: **Pass**
Comment	The test result only responds to the measured sample.

Approved by Kai Xu
Kai Xu
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SAR Manager

Performed by Jian Qi
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TABLE OF CONTENT

1. General Information

1.1. Notes of the Test Report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

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If the electronic report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing Laboratory

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1.4. Manufacturer Information

Company: TCT Mobile Limited

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Shenzhen, Guangdong
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518057

1.5. Information of EUT

General Information

Device Type:	Portable Device	
Exposure Category:	Uncontrolled Environment / General Population	
State of Sample:	Prototype Unit	
Product MEID:	A100004301E4DF	
Hardware Version:	PIO	
Software Version:	4FEF YYF0	
Antenna Type:	Internal Antenna	
Device Operating Configurations :		
Test Mode(s):	CDMA BC0; CDMA BC1; 802.11b/g/n HT20; Bluetooth/ Bluetooth 4.0;	
Test Modulation:	CDMA(QPSK); (WiFi)CCK; (Bluetooth) GFSK	
Operating Frequency Range(s):	Mode	Tx (MHz)
	CDMA BC0	824.7 ~ 848.31
	CDMA BC1	1851.25 ~ 1908.75
	WiFi	2412 ~2462
	Bluetooth	2402 ~2480
Power Class:	CDMA BC0: 3	
	CDMA BC1: 2	
Power Level	CDMA BC0/BC1: all up bits	

Auxiliary Equipment Details

Name	Model	S/N	Manufacturer
Battery	TLi020F2	B2000013C2Y01FVV	SCUD

A564C is a variant model of 7040T. Bluetooth SAR values duplicated from 7040T for A564C, the report number of 7040T is RXA1405-0127SAR. The A564C for CDMA BC0/ CDMA BC1/WiFi is tested in this report. The detailed product change description please refers to Product Change Description.

A564R is a variant model of A564C. A564R adds WiFi hotspot feature, the report number of A564C is RXA1405-0129SAR. The detailed product change description please refers to Product Change Description.

1.6. The Maximum Reported SAR_{1g}

Head SAR Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR_{1g} 1.6 W/kg	
			Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
CDMA BC0	Right, Cheek	384/836.52	0.320	0.410
CDMA BC1	Left, Cheek	25/1851.25	0.509	0.680
WiFi(802.11b)	Right, Cheek	6/2437	0.688	0.730
Bluetooth	Left, Tilt	39/2441	0.0084	0.0084

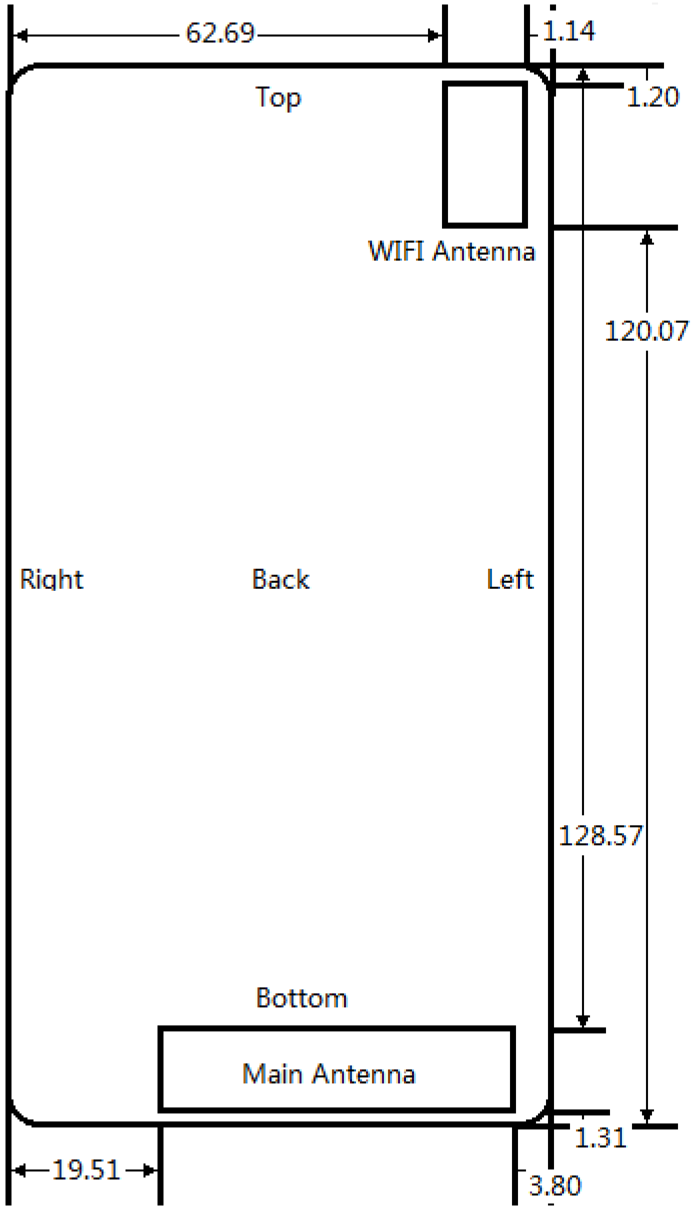
Body Worn Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR_{1g} 1.6 W/kg	
			Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
CDMA BC0	Back Side	384/836.52	0.497	0.655
CDMA BC1	Back Side	600/1880	0.590	0.753
WiFi(802.11b)	Back Side	6/2437	0.104	0.123

Hotspot SAR Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR_{1g} 1.6 W/kg	
			Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
CDMA BC0	Back Side	384/836.52	0.386	0.399
CDMA BC1	Bottom Edge	1175/1908.75	1.050	1.387
WiFi(802.11b)	Back Side	11/2462	0.880	1.326

1.7. EUT Antenna Locations



1.8. Test Date

The test performed from November 21, 2014 to December 24, 2014.

2. SAR Measurements System Configuration

2.1. SAR Measurement Set-up

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

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (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.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and 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.

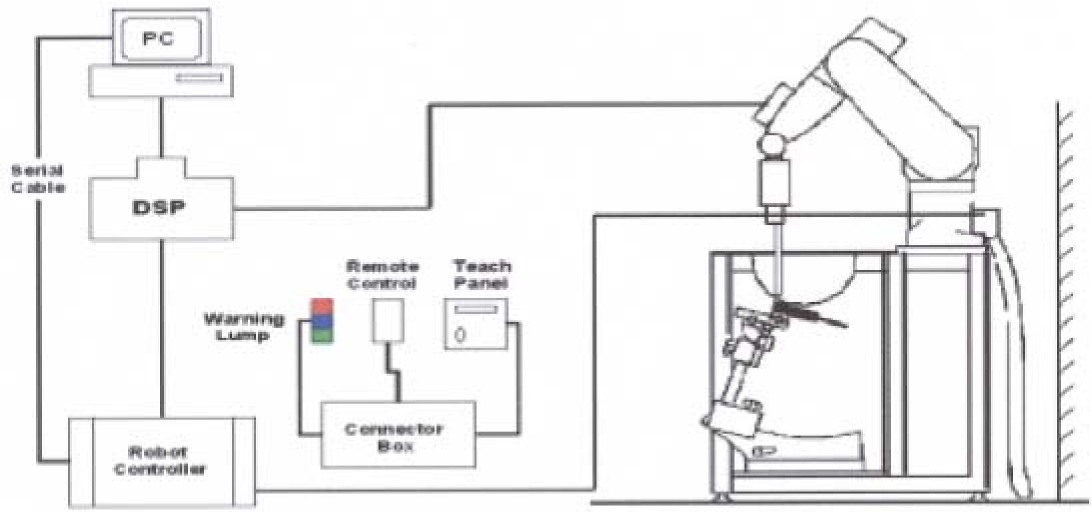


Figure 1 SAR Lab Test Measurement Set-up

2.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

2.2.1. EX3DV4 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 ISO/IEC 17025 calibration service available

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.EX3DV4 E-field Probe

Figure 3. EX3DV4 E-field probe

2.2.2. 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).

2.3. Other Test Equipment

2.3.1. Device Holder for Transmitters

The DASY 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

2.3.2. 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 1000 x 500 mm (H x L x W) Aailable Special

Figure 5 Generic Twin Phantom

2.4. 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 is set according to FCC KDB Publication 865664. During 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
  After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.
- 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.

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

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm) $\Delta z_{zoom}(n)$	Minimum Zoom Scan Volume (mm) (x,y,z)
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≥ 22

2.5. Data Storage and Evaluation

2.5.1. 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 ".DAE4". 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.

2.5.2. 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	Normi, 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:

$$V_i = U_i + U_i^2 \cdot c\,f / d\,c\,p_i$$

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.

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

with ***SAR*** = local specific absorption rate in mW/g

$\boldsymbol{E_{tot}}$ = 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.

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

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

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

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

3. Laboratory Environment

Table 2: The Requirements of the Ambient Conditions

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 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.	

4. Tissue-equivalent Liquid

4.1. Tissue-equivalent Liquid Ingredients

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 3 and table 4 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 3: Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	41.45
Sugar	56
Salt	1.45
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=41.5 σ=0.9

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz ε=40.0 σ=1.40

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	62.7
Glycol	36.8
Salt	0.5
Dielectric Parameters Target Value	f=2450MHz ε=39.20 σ=1.80

Table 4: Composition of the Body Tissue Equivalent Matter

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=1900MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY(Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.70 σ=1.95

4.2. Tissue-equivalent Liquid Properties

Table 5: Dielectric Performance of Tissue Simulating Liquid

Frequency	Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
			ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r(%)	Dev σ(%)
835MHz (head)	2014-5-29	21.5	41.3	0.93	41.5	0.90	-0.48%	3.33%
1900MHz (head)	2014-6-11	21.5	39.6	1.43	40.0	1.40	-1.00%	2.14%
2450MHz (head)	2014-6-9	21.5	39.1	1.80	39.2	1.80	-0.26%	0.00%
2450MHz (head)	2014-6-12	21.5	39.0	1.83	39.2	1.80	-0.51%	1.67%
835MHz (body)	2014-6-11	21.5	55.8	0.99	55.2	0.97	1.09%	2.06%
835MHz (body)	2014-12-24	21.5	55.9	0.96	55.2	0.97	1.27%	-1.03%
1900MHz (body)	2014-6-11	21.5	53.0	1.52	53.3	1.52	-0.56%	0.00%
1900MHz (body)	2014-11-21	21.5	53.1	1.53	53.3	1.52	-0.38%	0.66%
2450MHz (body)	2014-5-31	21.5	52.1	1.99	52.7	1.95	-1.14%	2.05%
2450MHz (body)	2014-11-28	21.5	52.2	1.98	52.7	1.95	-0.95%	1.54%

5. System Check

5.1. Description of 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 table 6 and table 7.

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 DASY5 system.

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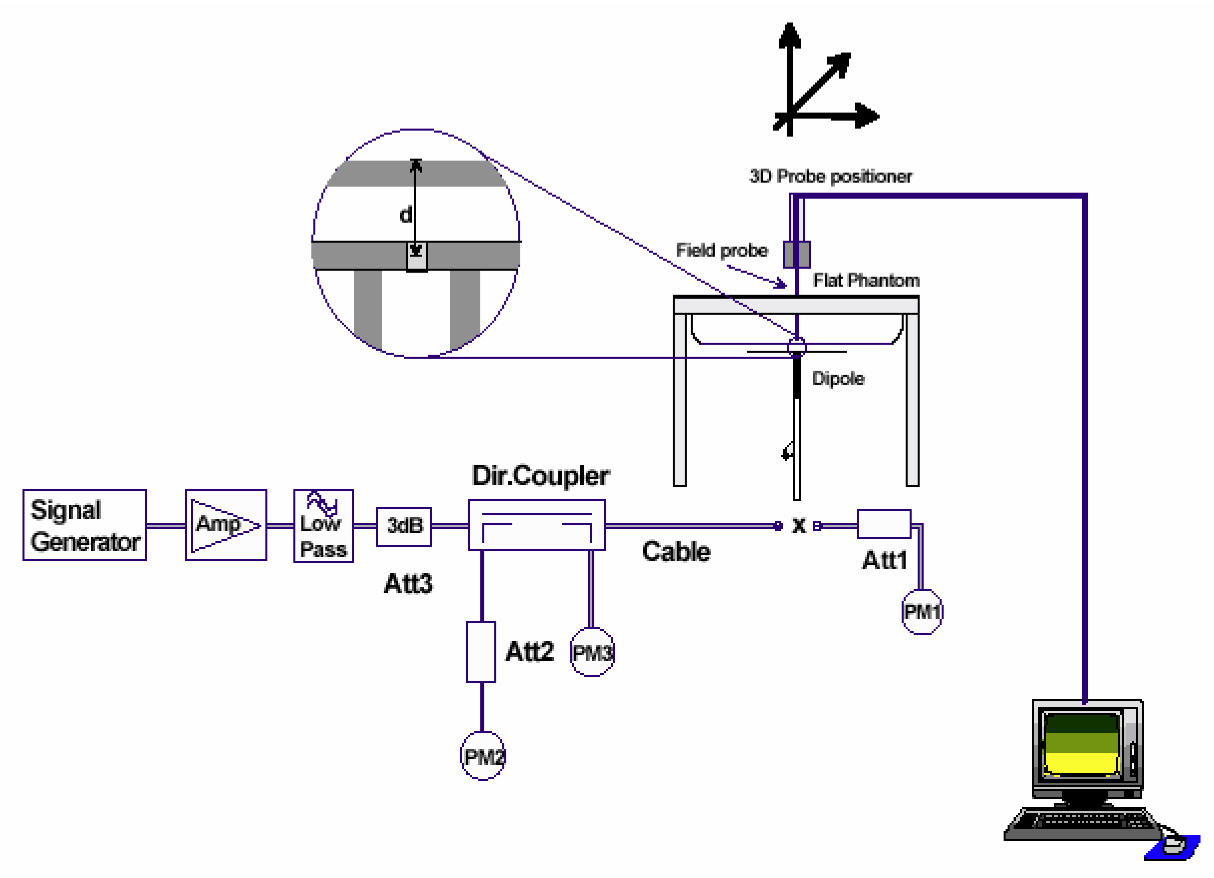


Figure 6 System Check Set-up

Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 3 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB 865664 D01:

Dipole D835V2 SN: 4d020				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/26/2011	-27.7	/	52.9	/
8/25/2012	-29.1	5.0%	55.0	2.1Ω
8/24/2013	-26.6	4.1%	55.3	2.4Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/26/2011	-25.1	/	48.7	/
8/25/2012	-24.3	3.2%	50.6	1.9Ω
8/24/2013	-24.7	1.6%	51.1	2.4Ω

Dipole D1900V2 SN: 5d060				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/31/2011	-22.3	/	52.6	/
8/30/2012	-21.7	2.7%	51.4	1.2Ω
8/29/2013	-21.4	4.2%	50.5	2.1Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/31/2011	-21.3	/	47.3	/
8/30/2012	-20.9	1.9%	45.9	1.4Ω
8/29/2013	-20.4	4.4%	44.8	2.5Ω

Dipole D2450V2 SN: 786				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/29/2011	-25.5	/	55.0	/
8/28/2012	-26.8	5.1%	56.5	1.5Ω
8/27/2013	-26.4	3.5%	56.9	1.9Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/29/2011	-29.0	/	50.4	/
8/28/2012	-29.9	3.1%	52.1	1.7Ω
8/27/2013	-28.2	2.8%	52.7	2.3Ω

5.2. System Check Results

Table 6: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
835MHz	2014-5-29	41.3	0.93	2.44	9.76	9.34	4.50%
1900MHz	2014-6-11	39.6	1.43	9.48	37.92	40.30	-5.91%
2450MHz	2014-6-9	39.1	1.80	13.70	54.80	53.80	1.86%
2450MHz	2014-6-12	39.0	1.83	13.72	54.88	53.80	2.01%

Note：1. The graph results see ANNEX B.
2. Target Values used derive from the calibration certificate

Table 7: System Check in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
835MHz	2014-6-11	55.8	0.99	2.41	9.64	9.46	1.90%
835MHz	2014-12-24	55.9	0.97	2.42	9.68	9.54	1.47%
1900MHz	2014-6-11	53.0	1.52	9.93	39.72	41.70	-4.75%
1900MHz	2014-11-21	53.1	1.53	9.98	39.92	40.00	-0.20%
2450MHz	2014-5-31	52.1	1.99	12.50	50.00	51.70	-3.29%
2450MHz	2014-11-28	52.2	1.98	12.70	50.80	52.40	-3.05%

Note：1. The graph results see ANNEX B.
2. Target Values used derive from the calibration certificate

6. Operational Conditions during Test

6.1. General Description of Test Procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The EUT is commanded to operate at maximum transmitting power.

Connection to the EUT is established via air interface with CMW 500, and the EUT is set to maximum output power by CMW 500. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. 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.

6.2. Test Positions

6.2.1. Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 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".

6.2.2. Body Worn Configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.3. Measurement Variability

Per FCC KDB Publication 865664 D01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ⩾ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ⩾ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ⩾ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

6.4. Test Configuration

6.4.1. CDMA Test Configuration

6.4.1.1. 3G SAR Test Reduction Procedure

In the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.3 This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

6.4.2. Information for the Measurement of CDMA 1x Devices

6.4.2.1 Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Results for at least steps 3, 4 and 10 of the power measurement procedures are required in the SAR report. Steps 3 and 4 are measured using Loopback Service Option SO55 with power control bits in “All Up” condition. TDSO/SO32 may be used instead of SO55 for step 4. Step 10 is measured using TDSO/SO32 with power control bits in the “Bits Hold” condition (i.e. alternative Up/Down Bits). All power measurements defined in C.S0011/TIA-98-E that are inapplicable to the handset or cannot be measured due to technical or equipment limitations must be clearly identified in the test report.

Test Parameter setup for maximum RF output power according to section 4.4.5 of 3GPP2

Parameter	Units	Value
I or	dBm/1.23MHz	-104
PilotE c /I or	dB	-7
TrafficE c /I or	dB	-7.4

6.4.2.2 Head SAR

SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55. The 3G SAR test reduction procedure is applied to RC1 with RC3 as the primary mode; otherwise, SAR is required for the channel with maximum measured output in RC1 using the head exposure configuration that results in the highest *reported* SAR in RC3.

6.4.2.3 Body-Worn Accessory SAR

Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCHn), with FCH only as the primary mode. Otherwise, SAR is required for multiple code channel configuration (FCH + SCHn), with FCH at full rate and SCH0 enabled at 9600 bps, using the highest reported SAR configuration for FCH only. When multiple code channels are enabled, the transmitter output can shift by more than 0.5 dB and may lead to higher SAR drifts and SCH dropouts.
The 3G SAR test reduction procedure is applied to body-worn accessory SAR in RC1 with RC3 as the primary mode. Otherwise, SAR is required for RC1, with SO55 and full rate, using the highest reported SAR configuration for body-worn accessory exposure in RC3.

Test communication setup meet as followings:

Communication standard between mobile station and base station simulator	3GPP2 C.S0011-B
Radio configuration	RC3（Supporting CDMA 1X）
Spreading Rate	SR1
Data Rate	9600bps
Service Options	SO55 （loop back mode）
Service Options	SO32 （test data service mode）
Multiplex Options	The mobile station does not support this service.

6.4.2.4 Handsets with built-in Ev-Do

For handsets with Ev-Do capabilities, the 3G SAR test reduction procedure is applied to Ev-Do Rev. 0 with 1x RTT RC3 as the primary mode to determine body-worn accessory test requirements. Otherwise, body-worn accessory SAR is required for Rev. 0, at 153.6 kbps, using the highest reported SAR configuration for body-worn accessory exposure in RC3.
The 3G SAR test reduction procedure is applied separately to Rev. A and Rev. B, with Rev. 0 as the primary mode to determine body-worn accessory SAR test requirements. When SAR is not required for Rev. 0, the 3G SAR test reduction is applied with 1x RTT RC3 as the primary mode. Otherwise, SAR is Target of 16 slots defined for Subtype 2 and 3 Physical Layer configurations, using the highest reported SAR configuration for body-worn accessory exposure in Rev. 0 or RC3, as appropriate.

A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with ACK Channel transmitting in all slots is configured in the downlink for Rev. 0, Rev. A and Rev. B.

6.4.3. WiFi Test Configuration

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. The Tx power is set to 19.5 for 802.11 b mode, set to 18 for 802.11 g mode, set to 16 for 802.11 n mode by software. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WiFi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g/n modes are tested on the maximum average output channel;

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

6.4.6. BT Test Configuration

For BT SAR testing, BT engineering testing software installed on the EUT can provide continuous transmitting RF signal with maximum output power. And the CBT contrl the EUT operating at 2441 MHz with hoping off, and data rate set for 3DH5. This RF signal utilized in SAR measurement has Almost 100% duty cycle and its crest factor is 1.

7. Test Results

7.1. Conducted Power Results

Table 8: Conducted Power Measurement Results (A564C)

Band	Channel/ Frequency(MHz)	Loopback		Data	
		SO55		TDSO SO32 RC3	
		RC3	RC1	FCH	+FCH-SCH
CDMA BC0	777/848.31	23.90	23.90	23.85	23.88
	384/836.52	23.92	23.92	23.80	23.89
	1013/824.7	23.92	23.94	23.90	23.91
CDMA BC1	1175/1908.75	23.70	23.70	23.71	23.65
	600/1880	23.90	23.94	23.94	23.94
	25/1851.25	23.74	23.74	23.78	23.73

Band	Channel/ Frequency(MHz)	EVDO.0	EVDO.A
		RTAP	RETAP
CDMA BC0	777/848.31	23.83	23.80
	384/836.52	23.86	23.74
	1013/824.7	23.89	23.87
CDMA BC1	1175/1908.75	23.62	23.65
	600/1880	23.86	23.90
	25/1851.25	23.71	23.72

BT	Conducted Power (dBm)		
	Channel/Frequency(MHz)		
	Ch 0/2402 MHz	Ch 39/2441 MHz	Ch 78/2480 MHz
GFSK	10.66	11.08	9.88
π/4DQPSK	8.37	8.73	7.54
8DPSK	8.47	8.77	7.59
BT 4.0	Ch 0/2402 MHz	Ch 19/2440 MHz	Ch 39/2480 MHz
GFSK	2.81	2.95	1.68

Mode	Channel/ Frequency(MHz)	Data rate (Mbps)	AV Power (dBm)
802.11b	1/2412	1	17.60
		2	17.55
		5.5	17.96
		11	17.70
	6/2437	1	18.27
		2	18.25
		5.5	18.74
		11	18.44
	11/2462	1	17.03
		2	16.95
		5.5	17.48
		11	17.12
802.11g	1/2412	6	15.95
		9	15.90
		12	15.90
		18	15.80
		24	15.70
		36	15.64
		48	18.54
		54	15.53
	6/2437	6	15.28
		9	15.26
		12	15.25
		18	15.20
		24	15.12
		36	15.07
		48	14.96
		54	14.93
	11/2462	6	14.20
		9	14.15
		12	14.12
		18	14.08

		24	14.00
		36	13.95
		48	13.84
		54	13.83
802.11n HT20	1/2412	MCS0	12.64
		MCS1	12.60
		MCS2	12.54
		MCS3	12.45
		MCS4	12.38
		MCS5	12.30
		MCS6	12.26
		MCS7	12.23
	6/2437	MCS0	13.45
		MCS1	13.41
		MCS2	13.45
		MCS3	13.28
		MCS4	13.22
		MCS5	13.13
		MCS6	13.10
		MCS7	13.06
	11/2462	MCS0	14.22
		MCS1	14.19
		MCS2	14.14
		MCS3	14.10
		MCS4	14.01
		MCS5	13.96
		MCS6	13.93
		MCS7	13.90

Table 9: Conducted Power Measurement Results (A564R)

Band	Channel/ Frequency(MHz)	Loopback		Data	
		SO55		TDSO SO32 RC3	
		RC3	RC1	FCH	+FCH-SCH
CDMA BC0 (Hotspot Close)	777/848.31	23.99	23.99	23.94	23.97
	384/836.52	24.01	24.01	23.89	23.98
	1013/824.7	24.01	24.03	23.99	24
CDMA BC0 (Hotspot Open)	777/848.31	20.88	20.9	20.89	20.91
	384/836.52	20.87	20.86	20.85	20.86
	1013/824.7	20.59	20.58	20.55	20.57
CDMA BC1 (Hotspot Close)	1175/1908.75	23.79	23.79	23.8	23.74
	600/1880	23.99	24.03	24.03	24.03
	25/1851.25	23.83	23.83	23.87	23.82
CDMA BC1 (Hotspot Open)	1175/1908.75	22.84	22.84	22.85	22.79
	600/1880	23.19	23.23	23.23	23.23
	25/1851.25	23.21	23.21	23.25	23.2

Band	Channel/ Frequency(MHz)	EVDO.0	EVDO.A
		RTAP	RETAP
CDMA BC0 (Hotspot Close)	777/848.31	23.92	23.89
	384/836.52	23.95	23.83
	1013/824.7	23.98	23.96
CDMA BC0 (Hotspot Open)	777/848.31	20.8	20.7
	384/836.52	20.9	20.69
	1013/824.7	20.94	20.75
CDMA BC1 (Hotspot Close)	1175/1908.75	23.71	23.74
	600/1880	23.95	23.99
	25/1851.25	23.8	23.81
CDMA BC1 (Hotspot Open)	1175/1908.75	22.84	22.87
	600/1880	23.08	23.12
	25/1851.25	22.93	22.94

BT	Conducted Power (dBm)		
	Channel/Frequency(MHz)		
	Ch 0/2402 MHz	Ch 39/2441 MHz	Ch 78/2480 MHz
GFSK	10.66	11.08	9.88
π/4DQPSK	8.37	8.73	7.54
8DPSK	8.47	8.77	7.59
BT 4.0	Ch 0/2402 MHz	Ch 19/2440 MHz	Ch 39/2480 MHz
GFSK	2.81	2.95	1.68

Mode	Channel/ Frequency(MHz)	Data rate (Mbps)	AV Power (dBm)
802.11b	1/2412	1	17.62
		2	17.61
		5.5	17.6
		11	17.59
	6/2437	1	18.2
		2	18.18
		5.5	18.17
		11	18.15
	11/2462	1	17.22
		2	17.17
		5.5	17.13
		11	17.14
802.11g	1/2412	6	15.92
		9	15.87
		12	15.87
		18	15.77
		24	15.67
		36	15.61
		48	18.51
		54	15.5
	6/2437	6	15.25

		9	15.23
		12	15.22
		18	15.17
		24	15.09
		36	15.04
		48	14.93
		54	14.9
	11/2462	6	14.17
		9	14.12
		12	14.09
		18	14.05
		24	13.97
		36	13.92
		48	13.81
		54	13.8
802.11n HT20	1/2412	MCS0	12.59
		MCS1	12.55
		MCS2	12.49
		MCS3	12.4
		MCS4	12.33
		MCS5	12.25
		MCS6	12.21
		MCS7	12.19
	6/2437	MCS0	13.4
		MCS1	13.36
		MCS2	13.4
		MCS3	13.23
		MCS4	13.17
		MCS5	13.08
		MCS6	13.05
		MCS7	13.03
	11/2462	MCS0	14.19
		MCS1	14.16
		MCS2	14.11

		MCS3	14.07
		MCS4	13.98
		MCS5	13.93
		MCS6	13.9
		MCS7	13.87

7.2. Standalone SAR Test Exclusion Considerations

Per FCC KDB 447498 D01, the SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{\textbf{(max. power of channel, including tune-up tolerance, mW)}}{\textbf{(min. test separation distance, mm)}} * \sqrt{\textbf{Frequency (GHz)}} \leqslant \textbf{3.0}$$

Band	Configuration	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (mm)	Calculation Result	SAR Exclusion Thresholds	Standalone SAR
Bluetooth	Head	2480	11.1	5	4.1	3.0	Yes
	Body	2480	11.1	15	1.4	3.0	No
WiFi 2.4GHz	Head	2480	19	5	25	3.0	Yes
	Body	2480	19	15	8.3	3.0	Yes

7.3. SAR Test Results

7.3.1. CDMA BC0

Table 10: SAR Values [CDMA BC0 (CDMA)] (A564C)

Test Position	Channel/ Frequency (MHz)	Service Option	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left Cheek	777/848.31	RC3/SO55	1:1	25	23.9	0.036	0.280	1.29	0.361	/
	384/836.52	RC3/SO55	1:1	25	23.92	-0.028	0.311	1.28	0.399	/
	1013/824.7	RC3/SO55	1:1	25	23.92	0.047	0.253	1.28	0.324	/
Left/Tilt	777/848.31	RC3/SO55	1:1	25	23.9	0.120	0.184	1.29	0.237	/
	384/836.52	RC3/SO55	1:1	25	23.92	0.110	0.172	1.28	0.221	/
	1013/824.7	RC3/SO55	1:1	25	23.92	-0.150	0.164	1.28	0.210	/
Right Cheek	777/848.31	RC3/SO55	1:1	25	23.9	0.060	0.307	1.29	0.395	/
	384/836.52	RC3/SO55	1:1	25	23.92	0.036	0.320	1.28	0.410	Figure 14
	1013/824.7	RC3/SO55	1:1	25	23.92	0.032	0.258	1.28	0.331	/
Right/Tilt	777/848.31	RC3/SO55	1:1	25	23.9	0.110	0.179	1.29	0.231	/
	384/836.52	RC3/SO55	1:1	25	23.92	0.180	0.166	1.28	0.213	/
	1013/824.7	RC3/SO55	1:1	25	23.92	-0.010	0.159	1.28	0.204	/
Test Position of Body (Distance 15mm)										
Back Side	384/836.52	TDSO3/SO32	1:1	25	23.8	-0.080	0.497	1.32	0.655	Figure 15
Font Side	384/836.52	TDSO3/SO32	1:1	25	23.8	0.034	0.358	1.32	0.472	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 11: SAR Values [CDMA BC0 (CDMA)] (A564R)

Test Position	Channel/ Frequency (MHz)	Service Option	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Body (Distance 10mm)										
Back Side	384/836.52	TDSO3/SO32	1:1	21	20.86	-0.010	0.386	1.03	0.399	Figure 24
Font Side	384/836.52	TDSO3/SO32	1:1	21	20.86	0.001	0.239	1.03	0.247	/
Left Edge	384/836.52	TDSO3/SO32	1:1	21	20.86	0.026	0.064	1.03	0.066	/
Right Edge	384/836.52	TDSO3/SO32	1:1	21	20.86	0.060	0.210	1.03	0.217	/
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	384/836.52	TDSO3/SO32	1:1	21	20.86	-0.04	0.079	1.03	0.081	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

1g Hotspot SAR scaled to the maximum output power

Test Position	Channel/ Frequency (MHz)	Service Option	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Body (Distance 10mm)										
Back Side	384/836.52	TDSO3/SO32	1:1	25	20.86	0.010	0.386	2.59	1.001	NA
Front Side	384/836.52	TDSO3/SO32	1:1	25	20.86	0.001	0.239	2.59	0.620	NA
Left Edge	384/836.52	TDSO3/SO32	1:1	25	20.86	0.026	0.064	2.59	0.165	NA
Right Edge	384/836.52	TDSO3/SO32	1:1	25	20.86	0.060	0.210	2.59	0.545	NA
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	384/836.52	TDSO3/SO32	1:1	25	20.86	-0.040	0.079	2.59	0.204	NA

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g *reported* SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

7.3.2. CDMA BC1

Table 12: SAR Values [CDMA BC1 (CDMA)] (A564C)

Test Position	Channel/ Frequency (MHz)	Service Option	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR$_{1g}$ 1.6 W/kg			
						Drift (dB)	Measured SAR$_{1g}$ (W/kg)	Scaling Factor	Reported SAR$_{1g}$ (W/kg)	Graph Results
Test Position of Head										
Left Cheek	1175/1908.75	RC3/SO55	1:1	25	23.7	0.190	0.418	1.35	0.564	/
	600/1880	RC3/SO55	1:1	25	23.9	0.150	0.426	1.29	0.549	/
	25/1851.25	RC3/SO55	1:1	25	23.74	-0.178	0.509	1.34	0.680	Figure 16
Left/Tilt	1175/1908.75	RC3/SO55	1:1	25	23.7	0.080	0.155	1.35	0.209	
	600/1880	RC3/SO55	1:1	25	23.9	-0.051	0.157	1.29	0.202	/
	25/1851.25	RC3/SO55	1:1	25	23.74	-0.010	0.191	1.34	0.255	/
Right Cheek	1175/1908.75	RC3/SO55	1:1	25	23.7	0.036	0.347	1.35	0.468	
	600/1880	RC3/SO55	1:1	25	23.9	0.120	0.335	1.29	0.432	/
	25/1851.25	RC3/SO55	1:1	25	23.74	0.040	0.329	1.34	0.440	/
Right/Tilt	1175/1908.75	RC3/SO55	1:1	25	23.7	0.060	0.145	1.35	0.196	/
	600/1880	RC3/SO55	1:1	25	23.9	0.090	0.159	1.29	0.205	/
	25/1851.25	RC3/SO55	1:1	25	23.74	0.100	0.187	1.34	0.250	/
Test Position of Body (Distance 15mm)										
Back Side	600/1880	TDSO3/SO32	1:1	25	23.94	-0.025	0.590	1.28	0.753	Figure 17
Font Side	600/1880	TDSO3/SO32	1:1	25	23.94	-0.050	0.483	1.28	0.617	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 13: SAR Values [CDMA BC1 (CDMA)] (A564R)

Test Position	Channel/ Frequency (MHz)	Service Option	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR$_{1g}$ 1.6 W/kg			
						Drift (dB)	Measured SAR$_{1g}$ (W/kg)	Scaling Factor	Reported SAR$_{1g}$ (W/kg)	Graph Results
Test Position of Body (Distance 10mm)										
Back Side	1175/1908.75	TDSO3/SO32	1:1	24	22.79	-0.100	0.661	1.32	0.873	/
	600/1880	TDSO3/SO32	1:1	24	23.23	-0.190	0.690	1.19	0.824	/
	25/1851.25	TDSO3/SO32	1:1	24	23.2	-0.170	0.545	1.20	0.655	/
Font Side	600/1880	TDSO3/SO32	1:1	24	23.23	-0.023	0.659	1.19	0.787	/
Left Edge	600/1880	TDSO3/SO32	1:1	24	23.23	0.120	0.252	1.19	0.301	/
Right Edge	600/1880	TDSO3/SO32	1:1	24	23.23	-0.160	0.157	1.19	0.187	/
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	1175/1908.75	TDSO3/SO32	1:1	24	22.79	-0.170	1.050	1.32	1.387	Figure 25
	600/1880	TDSO3/SO32	1:1	24	23.23	-0.190	0.787	1.19	0.940	/
	25/1851.25	TDSO3/SO32	1:1	24	23.2	-0.021	0.764	1.20	0.919	/
Worst Case Position of SAR (1st Repeated SAR, Distance 10mm)										
Bottom Edge	1175/1908.75	TDSO3/SO32	1:1	24	22.79	0.160	1.000	1.32	1.321	/

Note: 1.The value with blue color is the maximum SAR Value of each test band.
2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 14: SAR Measurement Variability Results [CDMA BC1 (CDMA)] (A564R)

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Bottom Edge	1175/1908.75	1.050	1.000	1.05	N/A	N/A

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 15: 3G SAR Test Reduction Procedure[CDMA BC1 (EVDO)]

Test Position	Channel/ Frequency (MHz)	The highest reported SAR of primary mode	The maximum Allowed Power of secondary mode (dBm)	The maximum Allowed Power of primary mode (dBm)	Scaling Factor	The adjusted SAR
Bottom Edge	1175/1908.75	1.387	24.5	24.5	1	1.387
When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode						

7.3.3. WiFi

Table 16: SAR Values(802.11b/g/n) (A564C)

Test Position	Channel/ Frequency (MHz)	Service	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left Cheek	6/2437	DSSS	1:1	19	18.27	0.080	0.225	1.18	0.266	/
Left/Tilt	6/2437	DSSS	1:1	19	18.27	0.020	0.241	1.18	0.285	/
Right Cheek	6/2437	DSSS	1:1	19	18.27	0.130	0.523	1.18	0.619	/
Right/Tilt	6/2437	DSSS	1:1	19	18.27	0.080	0.475	1.18	0.562	/
Worst Case Position of Head With 5.5Mbps										
Right Cheek	6/2437	DSSS	1:1	19	18.74	0.160	0.688	1.06	0.730	Figure18
Test position of Body (Distance 15mm)										
Back Side	6/2437	DSSS	1:1	19	18.27	0.070	0.104	1.18	0.123	Figure19
Front Side	6/2437	DSSS	1:1	19	18.27	-0.130	0.070	1.18	0.082	/
Worst Case Position of Body With 5.5 Mbps (Distance 15mm)										
Back Side	6/2437	DSSS	1:1	19	18.74	0.134	0.085	1.06	0.090	/

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).

3. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than measured on the corresponding 802.11b channels.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

Table 17: SAR Values(802.11b/g/n) (A564R)

Test Position	Channel/ Frequency (MHz)	Service	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test position of Body (Distance 10mm)										
Back Side	11/2462	DSSS	1:1	19	17.22	-0.010	0.880	1.51	1.326	Figure 26
	6/2437	DSSS	1:1	19	18.2	-0.021	0.780	1.20	0.938	/
	1/2412	DSSS	1:1	19	17.62	0.080	0.516	1.37	0.709	/
Front Side	6/2437	DSSS	1:1	19	18.2	0.030	0.491	1.20	0.590	/
Left Edge	6/2437	DSSS	1:1	19	18.2	-0.140	0.386	1.20	0.464	/
Right Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Top Edge	6/2437	DSSS	1:1	19	18.2	-0.030	0.543	1.20	0.653	/
Bottom Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Worst Case Position of SAR (1^{st} Repeated SAR, Distance 10mm)										
Back Side	11/2462	DSSS	1:1	19	17.22	-0.060	0.858	1.51	1.293	/

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is optional for such test configuration(s).

3. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than measured on the corresponding 802.11b channels.

4. Per FCC KDB Publication 648474 D04, SAR was evaluated without a headset connected to the device. Since the reported SAR was ≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.

7.3.4. Bluetooth

Table 18: SAR Values(Bluetooth) (7040T)

Test Position	Channel/ Frequency (MHz)	Service	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Head										
Left Cheek	39/2441	DSSS	1:1	11.1	11.08	0.020	0.00800	1.00	0.0080	/
Left/Tilt	39/2441	DSSS	1:1	11.1	11.08	-0.117	0.00840	1.00	0.0084	Figure20
Right Cheek	39/2441	DSSS	1:1	11.1	11.08	-0.048	0.00014	1.00	0.0001	/
Right/Tilt	39/2441	DSSS	1:1	11.1	11.08	0.043	0.00037	1.00	0.0004	/

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. Per KDB 447498 D01, standalone SAR is required for head SAR, but it is not required for body worn SAR.

7.4. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	Simultaneous Transmissions	Voice Over Digital Transport (Data)
CDMA	BC0	Voice	Yes BT or WiFi	NA
	BC1	Voice		
	BC0	Data		
	BC1	Data		
WiFi	2480	Data	Yes CDMA,	Yes
Bluetooth (BT)	2400	Data	Yes CDMA,	NA

When standalone SAR is not required to be measured per FCC KDB 447498 D01, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} * \frac{\sqrt{f\text{ (GHz)}}}{7.5}$$

Band	Configuration	Frequency (MHz)	Maximum Power (dBm)	Separation Distance (mm)	Estimated SAR （W/kg)
Bluetooth	Body	2480	11.1	15	0.180

Per FCC KDB 447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

$$\text{Ratio} = \frac{(SAR_1 + SAR_2)^{1.5}}{\text{(Peak SAR Location Separation, mm)}} < 0.04$$

About CDMA & BT antenna

SAR_{1g}(W/kg) / Test Position	CDMA BC0	CDMA BC1	BT	MAX. Σ SAR_{1g}	Peak location separation ratio
Left, Touch	0.399	**0.680**	**0.0080**	0.6880	NA
Left, Tilt	0.237	**0.255**	**0.0084**	0.2634	NA
Right, Touch	0.410	**0.468**	**0.0001**	0.4681	NA
Right, Tilt	0.231	**0.250**	**0.0004**	0.2504	NA
Back Side(15mm)	0.655	**0.753**	**0.180**	0.933	NA
Front Side(15mm)	0.472	**0.617**	**0.180**	0.797	NA

Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.
2. MAX. ΣSAR_{1g} = Reported $SAR_{Max.BT}$+ Reported $SAR_{Max.CDMA}$

About CDMA & WiFi antenna

SAR_{1g}(W/kg) / Test Position	CDMA BC0	CDMA BC1	WiFi	MAX. Σ SAR_{1g}	Peak location separation ratio
Left, Touch	0.399	**0.680**	**0.266**	0.946	NA
Left, Tilt	0.237	**0.255**	**0.285**	0.540	NA
Right, Touch	0.410	**0.468**	**0.730**	1.198	NA
Right, Tilt	0.231	**0.250**	**0.562**	0.812	NA
Back Side(15mm)	0.655	**0.753**	**0.123**	0.876	NA
Front Side(15mm)	0.472	**0.617**	**0.082**	0.699	NA
Back Side(10mm)	0.399	**0.873**	**1.326**	2.199	Yes
Front Side(10mm)	0.247	**0.787**	**0.590**	1.377	NA
Left Edge(10mm)	0.066	**0.301**	**0.464**	0.765	NA
Right Edge(10mm)	**0.217**	0.187	NA	0.217	NA
Top Edge(10mm)	NA	NA	**0.653**	0.653	NA
Bottom Edge(10mm)	0.081	**1.387**	NA	1.387	NA

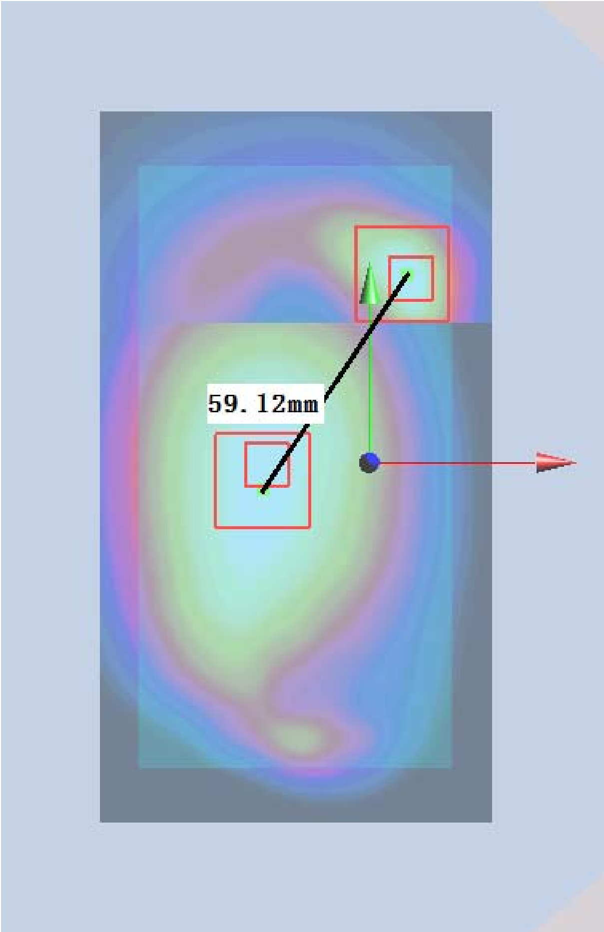
Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.
2. MAX. ΣSAR_{1g} = Reported $SAR_{Max.WiFi}$+ Reported $SAR_{Max.CDMA}$

Simultaneous Transmission for test position of back side

SAR_{1g}(W/kg) / Test Position	CDMA BC0	CDMA BC1	WiFi	MAX. ΣSAR_{1g}	Peak location separation ratio
Back side	0.399	/	1.326	1.725	Yes
	/	0.873	1.326	2.199	Yes

- **Pair Simultaneous Transmission for CDMA BC0 and WiFi**

The position SAR $_{\text{CDMA BC0}}$ is (x_1= -15.5, y_1= -9, z_1= -207),
The position $SAR_{Max.WiFi}$ is (x_2= 8.5, y_2=45, z_2= -205.2)
so the distance between the $SAR_{Max.\ CDMA\ BC0}$ and $SAR_{Max.\ WiFi}$ is 59.12mm.



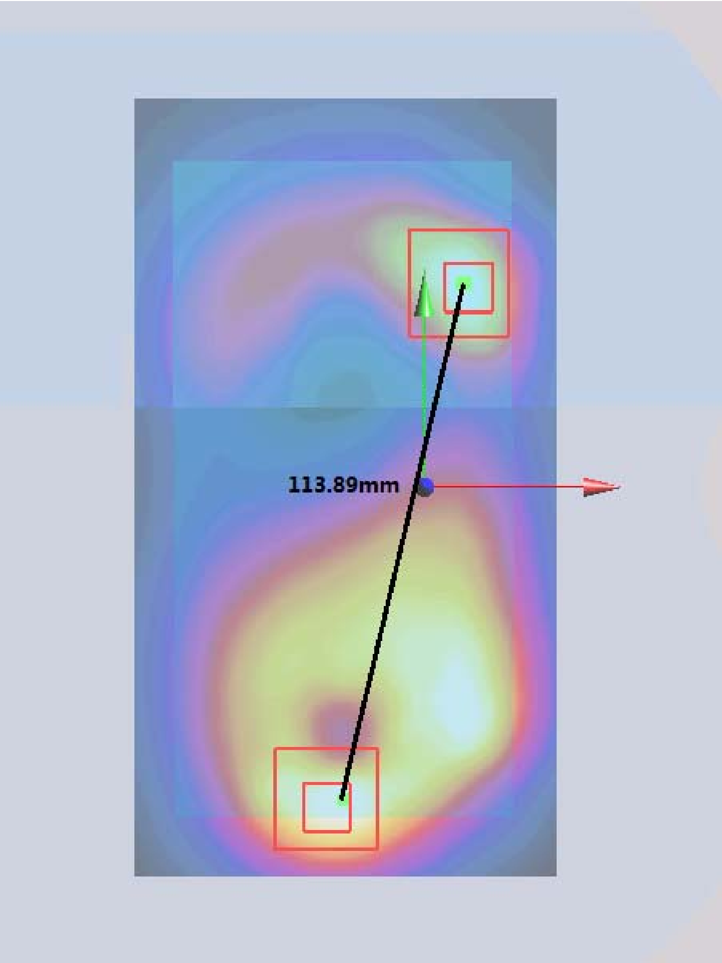
Ratio =$(0.399+1.326)^{1.5}/59.12=0.038<0.04$, so the Simultaneous transimition SAR with volum scan are not required for WiFi and CDMA BC0 antenna.

- **Pair Simultaneous Transmission for CDMA BC1 and WiFi**

The position SAR $_{\textbf{CDMA BC1}}$ is (x_1= -17, y_1= -66, z_1= -205),

The position $SAR_{Max.WiFi}$ is (x_2= 8.5, y_2=45, z_2= -205.2)

so the distance between the $SAR_{Max.\ \textbf{CDMA BC1}}$ and $SAR_{Max.\ WiFi}$ is 113.89mm.



Ratio =$(0.873+1.326)^{1.5}$/113.89=0.03<0.04, so the Simultaneous transimition SAR with volum scan are not required for WiFi and CDMA BC1 antenna.

BT and WiFi antenna cannot transmit simultaneously.

8. 700MHz to 3GHz Measurement Uncertainty

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard ncertainty $u_i^{'}$ (%)	Degree of freedom V_{eff} or v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	-probe calibration	B	6.0	N	1	1	6.0	∞
3	-axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	- Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
5	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
6	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	-readout Electronics	B	1.0	N	1	1	1.0	∞
9	-response time	B	0.8	R	$\sqrt{3}$	1	0.5	∞
10	-integration time	B	4.3	R	$\sqrt{3}$	1	2.5	∞
11	-RF Ambient noise	B	3.0	R	$\sqrt{3}$	1	1.7	∞
12	-RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.7	∞
13	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
14	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
15	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
16	-Test Sample Positioning	A	2.9	N	1	1	2.9	71
17	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
18	- Power drift	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								

19	-phantom Uncertainty	B	4.0	R	$\sqrt{3}$	1	2.3	∞
20	Algorithm for correcting SAR for deviations in permittivity and conductivity	B	1.9	N	1	0.84	0.9	∞
21	-Liquid conductivity (measurement uncertainty)	B	2.5	N	1	0.71	1.8	9
22	-Liquid permittivity (measurement uncertainty)	B	2.5	N	1	0.26	0.7	9
23	-Liquid conductivity -temperature uncertainty	B	1.7	R	$\sqrt{3}$	0.71	0.7	∞
24	-Liquid permittivity -temperature uncertainty	B	0.3	R	$\sqrt{3}$	0.26	0.05	∞
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{24} c_i^2 u_i^2}$					11.34	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		22.68	

9. Main Test Instruments

Table 19: List of Main Instruments

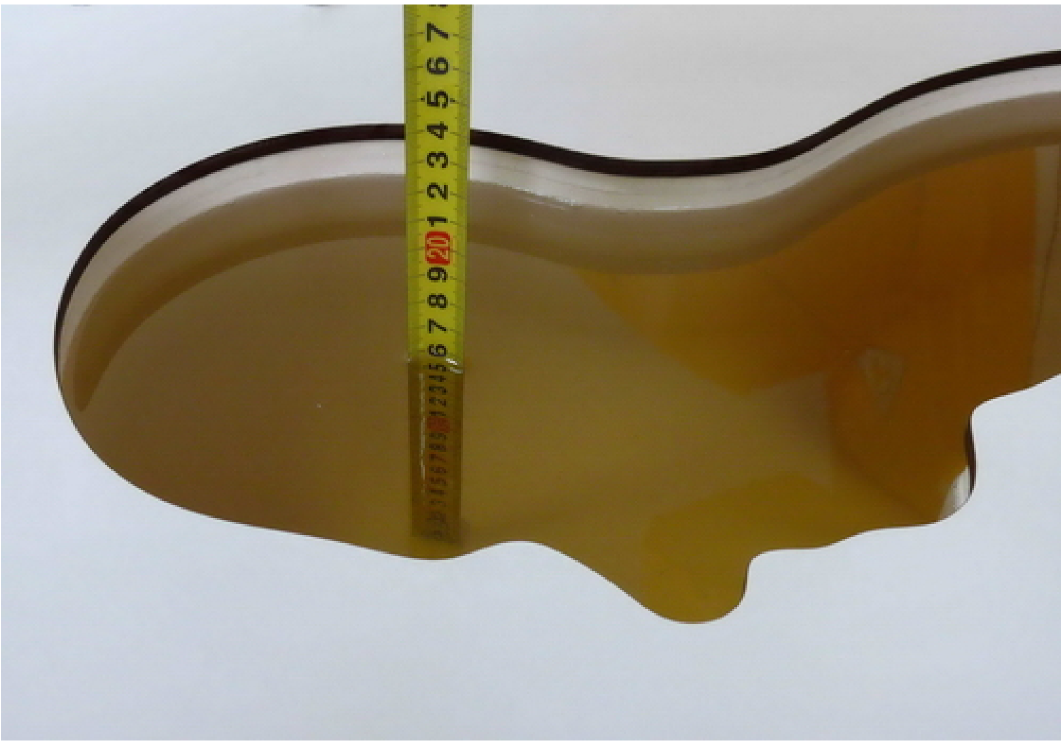
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 10, 2013	One year
02	Network analyzer	Agilent 8753E	US37390326	September 9, 2014	One year
03	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
04	Power meter	Agilent E4417A	GB41291714	March 9, 2014	One year
05	Power sensor	Agilent N8481H	MY50350004	September 23, 2013	One year
06	Power sensor	Agilent N8481H	MY50350004	September 22, 2014	One year
07	Power sensor	E9327A	US40441622	January 1, 2014	One year
08	Signal Generator	HP 8341B	2730A00804	September 9,2013	One year
09	Signal Generator	HP 8341B	2730A00804	September 8,2014	One year
10	Dual directional coupler	778D-012	50519	March 24, 2014	One year
11	Dual directional coupler	777D	50146	March 24, 2014	One year
12	Amplifier	IXA-020	0401	No Calibration Requested	
13	BTS	E5515C	MY48360988	November 30, 2013	One year
14	BTS	E5515C	MY48360988	November 29, 2014	One year
15	BT Base Station Simulator	CBT	100271	June 29, 2013	One year
16	E-field Probe	EX3DV4	3677	November 28, 2013	One year
17	E-field Probe	EX3DV4	3977	February 17, 2014	One year
18	DAE	DAE4	1317	January 16, 2014	One year
19	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Three years
20	Validation Kit 835MHz	D835V2	4d020	August 28, 2014	Three years
21	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Three years
22	Validation Kit 1900MHz	D1900V2	5d060	September 1, 2014	Three years
23	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Three years
24	Validation Kit 2450MHz	D2450V2	786	September 1, 2014	Three years
25	Temperature Probe	JM222	AA1009129	March 13, 2014	One year
26	Hygrothermograph	WS-1	64591	September 26, 2013	One year
27	Hygrothermograph	WS-1	64591	September 25, 2014	One year

*****END OF REPORT *****

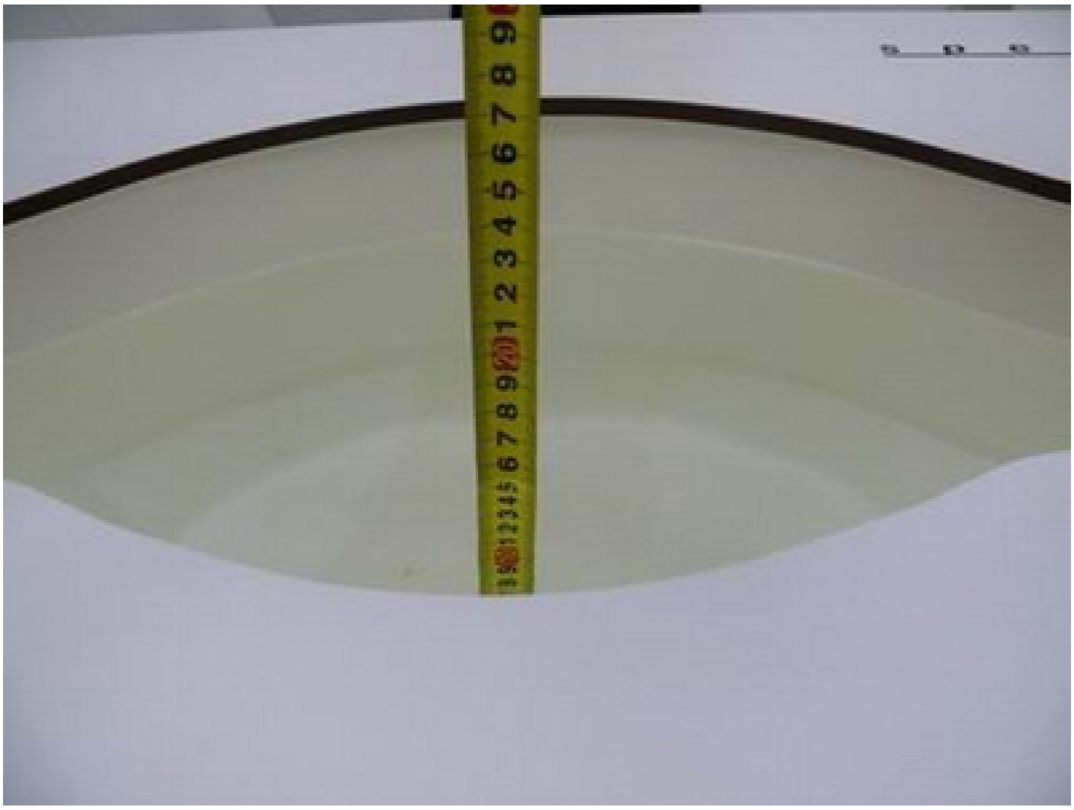
ANNEX A: Test Layout

Picture 1: Specific Absorption Rate Test Layout

Picture 2: Liquid depth in the flat Phantom (835MHz, 15.4cm depth)

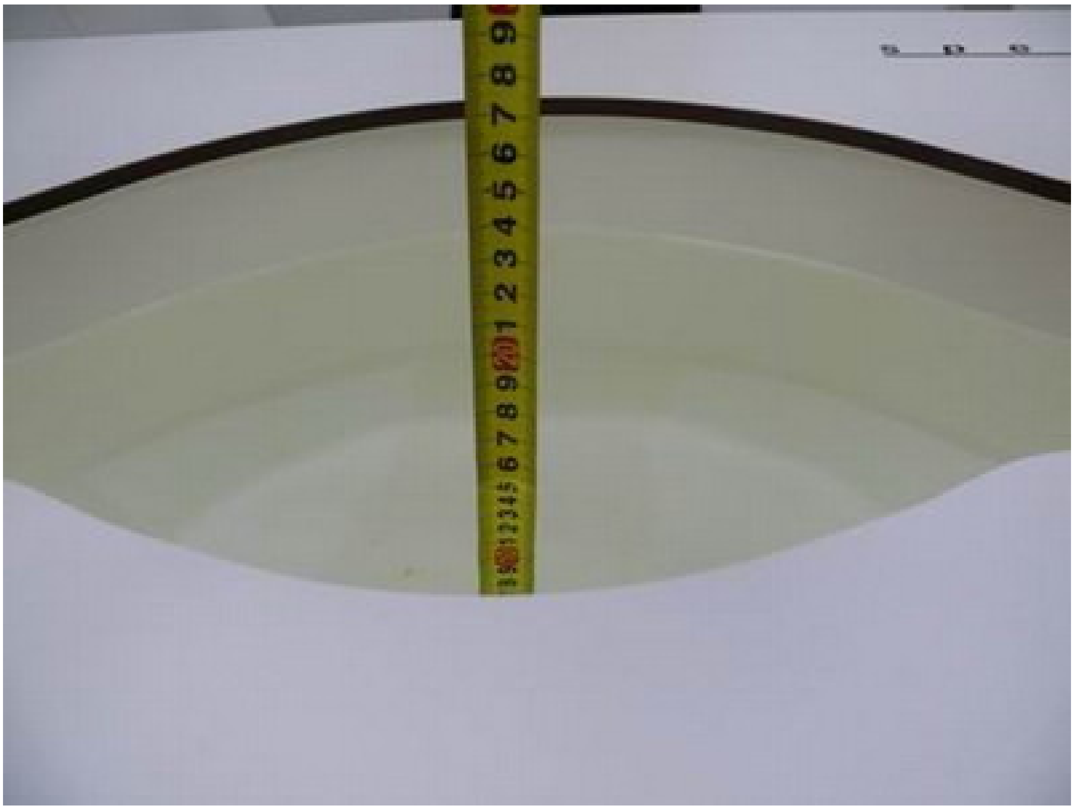


Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



Picture 4: Liquid depth in the flat Phantom (1900 MHz, 15.2cm depth)

Picture 5: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



Picture 6: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)

Picture 7: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)

ANNEX B: System Check Results (A564C)

System Performance Check at 835 MHz Head TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 5/29/2014

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

Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.64 mW/g

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

Reference Value = 54.4 V/m; Power Drift = -0.076 dB

Peak SAR (extrapolated) = 3.67 W/kg

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

Maximum value of SAR (measured) = 2.64 mW/g

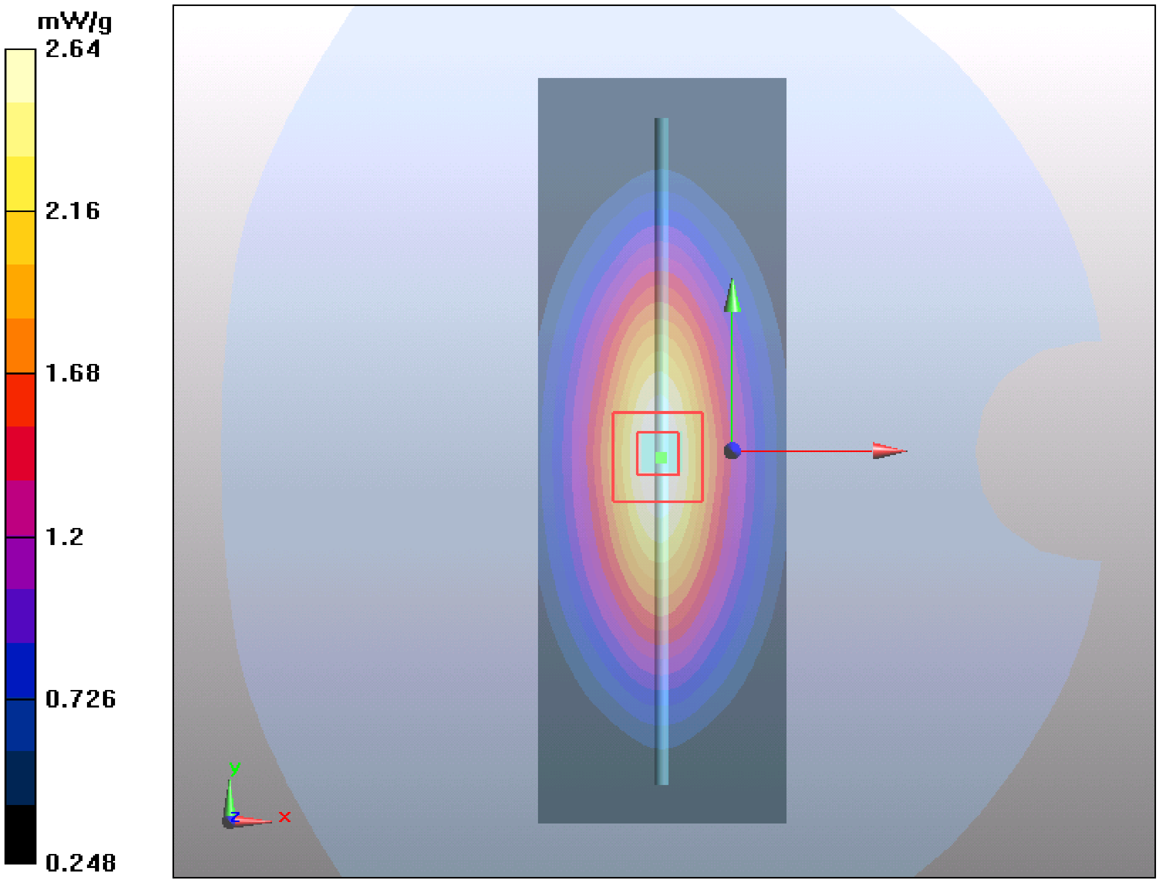


Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 6/11/2014

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

Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.58 mW/g

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

Reference Value = 51.9 V/m; Power Drift = -0.058 dB

Peak SAR (extrapolated) = 3.5 W/kg

SAR(1 g) = 2.41 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.6 mW/g

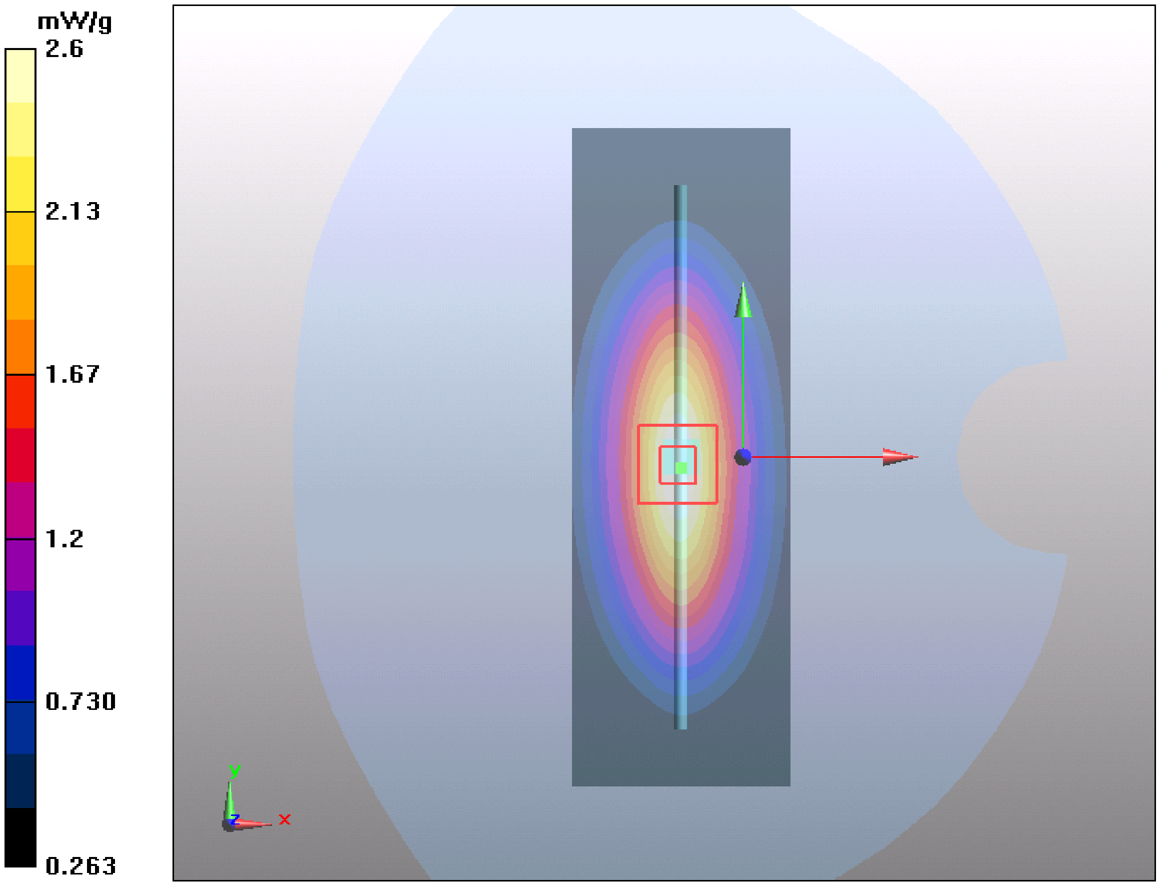


Figure 8 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz Head TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date: 6/11/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 11.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.5 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.48 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.7 mW/g

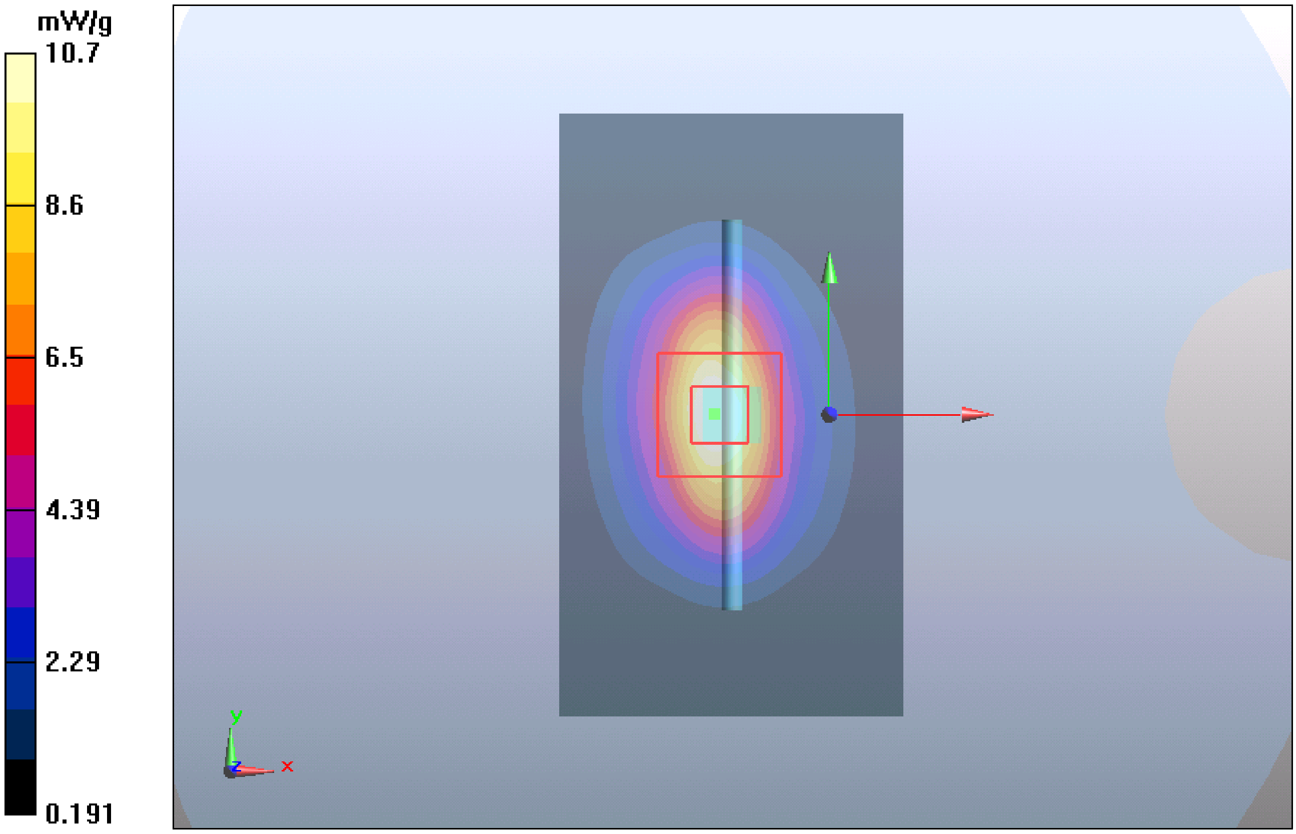


Figure 9 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date: 6/11/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 53.0; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.3 V/m; Power Drift = 0.068 dB

Peak SAR (extrapolated) = 17.8 W/kg

SAR(1 g) = 9.93 mW/g; SAR(10 g) = 5.25 mW/g

Maximum value of SAR (measured) = 11.3 mW/g

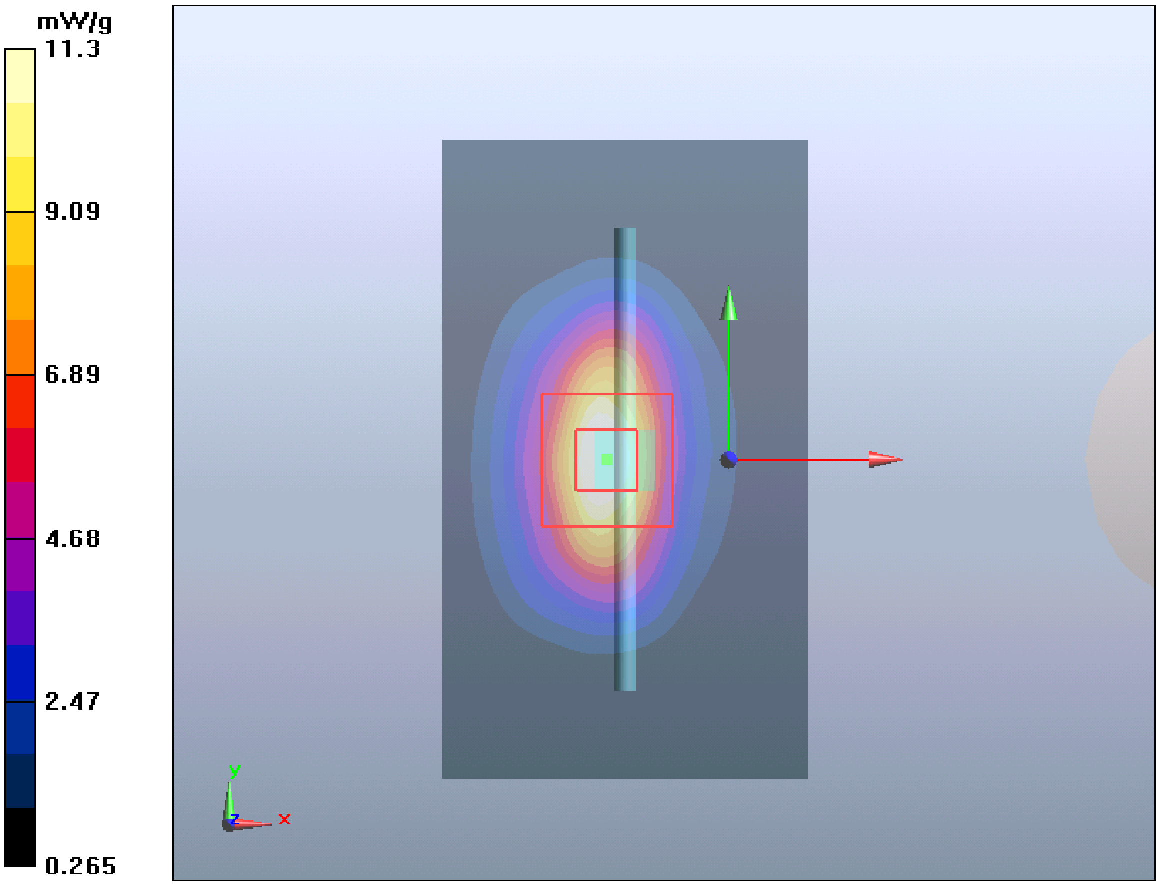


Figure 10 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date: 6/12/2014

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.83 mho/m; ε_r = 39.0; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 18.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.8 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.72 mW/g; SAR(10 g) = 6.31 mW/g

Maximum value of SAR (measured) = 15.95 mW/g

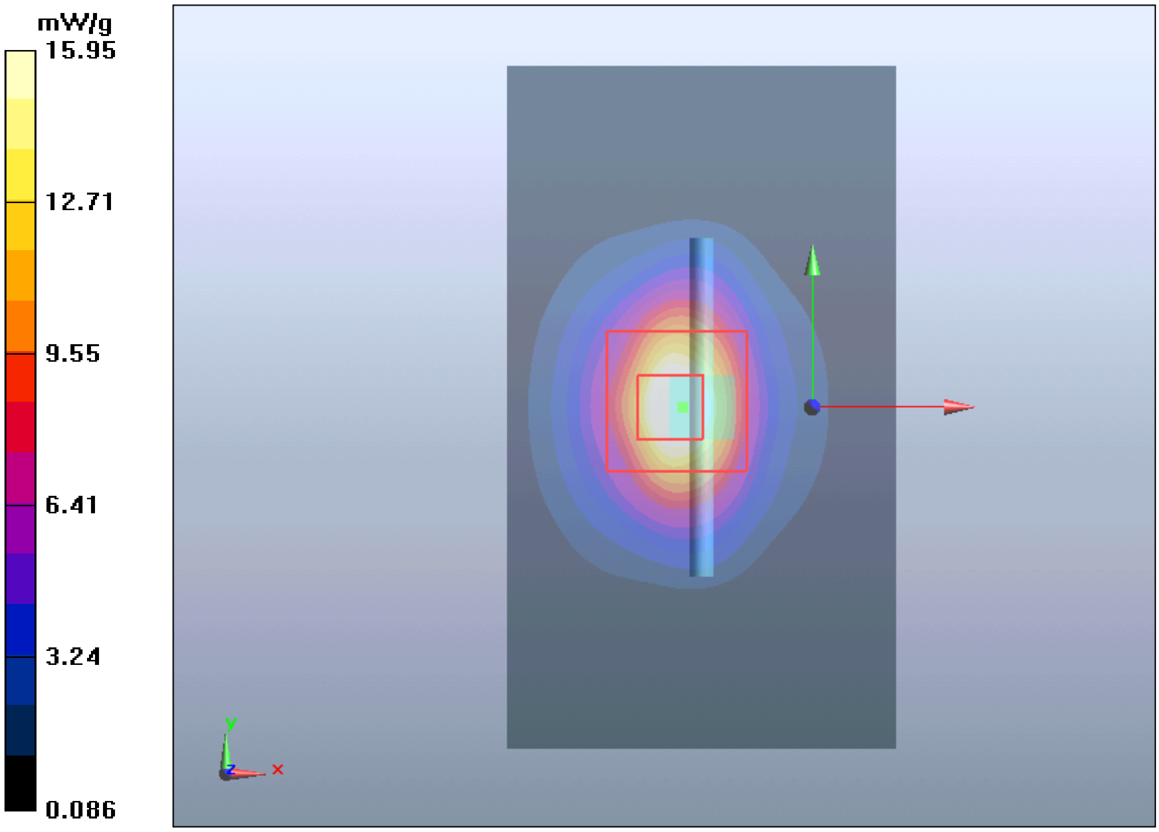


Figure 11 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date: 5/31/2014

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.99 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 16 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.2 V/m; Power Drift = 0.003 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.5 mW/g; SAR(10 g) = 6.20 mW/g

Maximum value of SAR (measured) = 14.4 mW/g

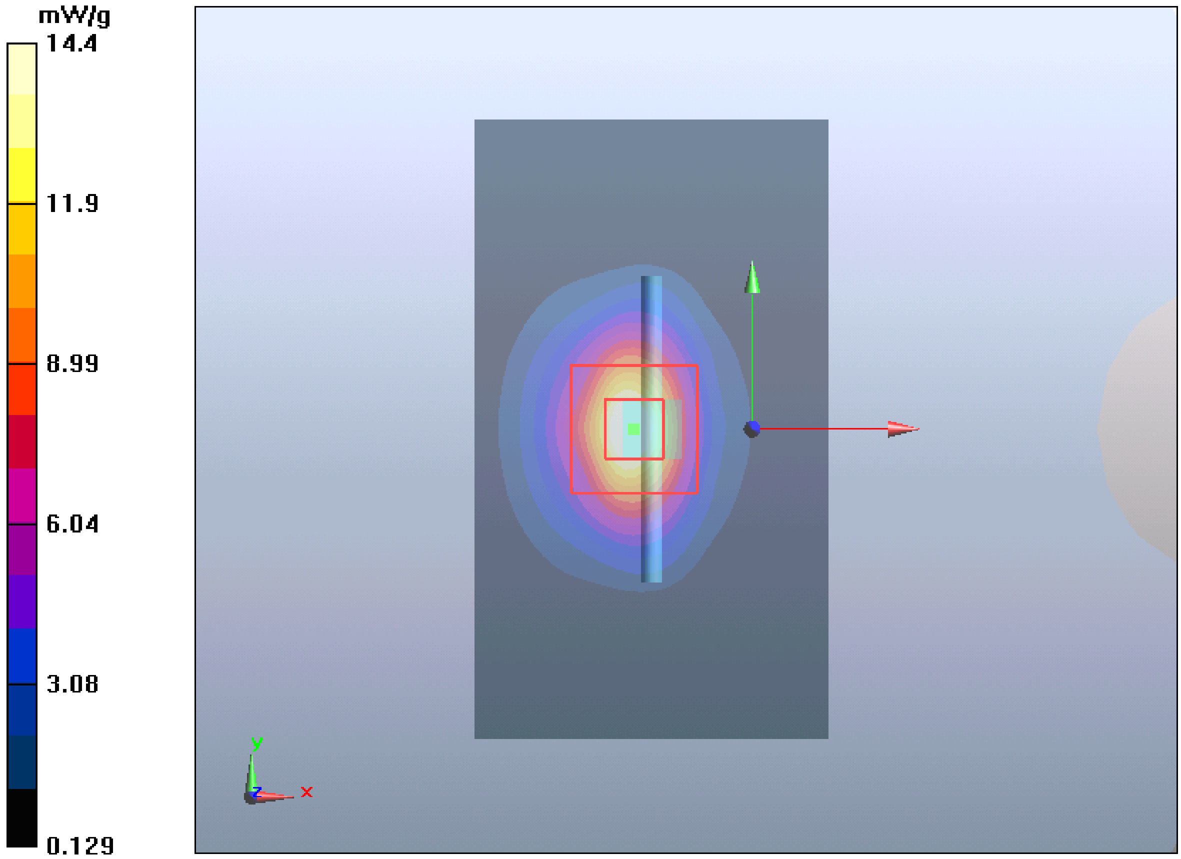


Figure 12 System Performance Check 2450MHz 250mW

ANNEX C: System Check Results (7040T)

System Performance Check at 2450 MHz Head TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date: 6/9/2014

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.80 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 18.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.8 V/m; Power Drift = 0.075 dB
Peak SAR (extrapolated) = 30 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g
Maximum value of SAR (measured) = 15.9 mW/g

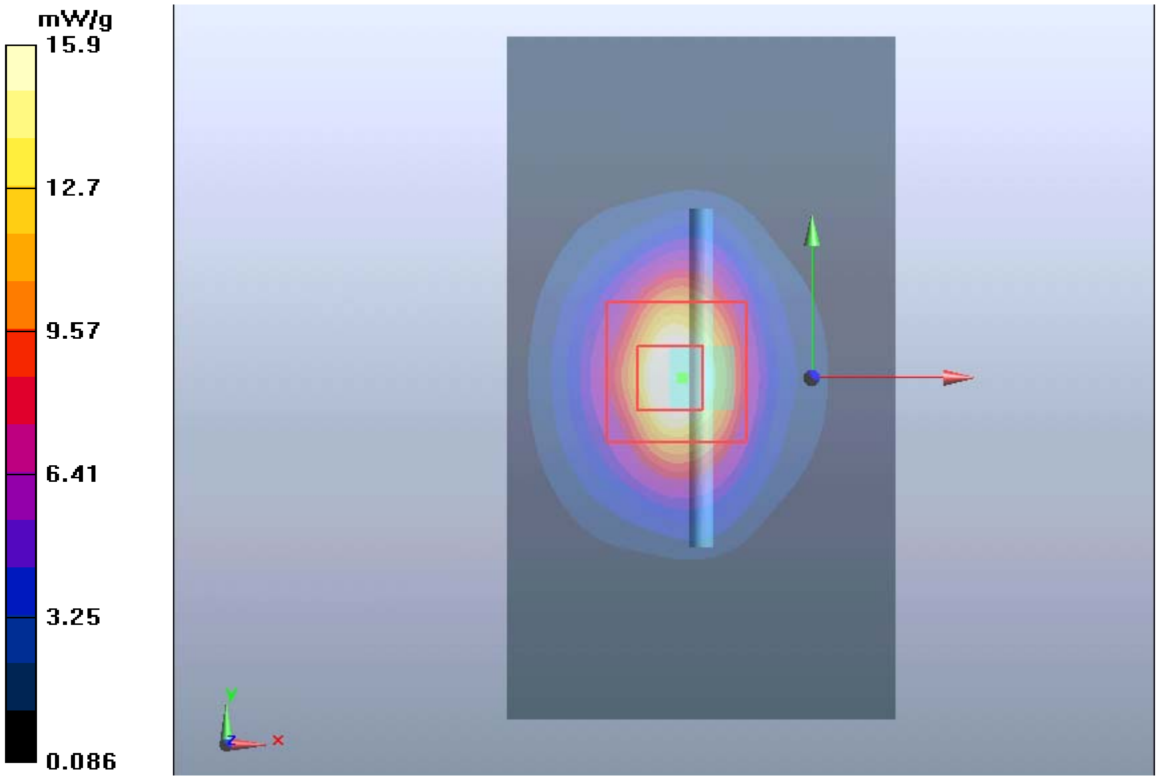


Figure 13 System Performance Check 2450MHz 250mW

ANNEX D: System Check Results (A564R)

System Performance Check at 835 MHz Body TSL

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date: 12/24/2014

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

Medium parameters used: f = 835 MHz; σ = 0.96 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3977; ConvF(9.74, 9.74, 9.74); Calibrated: 2/17/2014;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 2.49 mW/g

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

Reference Value = 51.4 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 3.5 W/kg

SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.58 mW/g

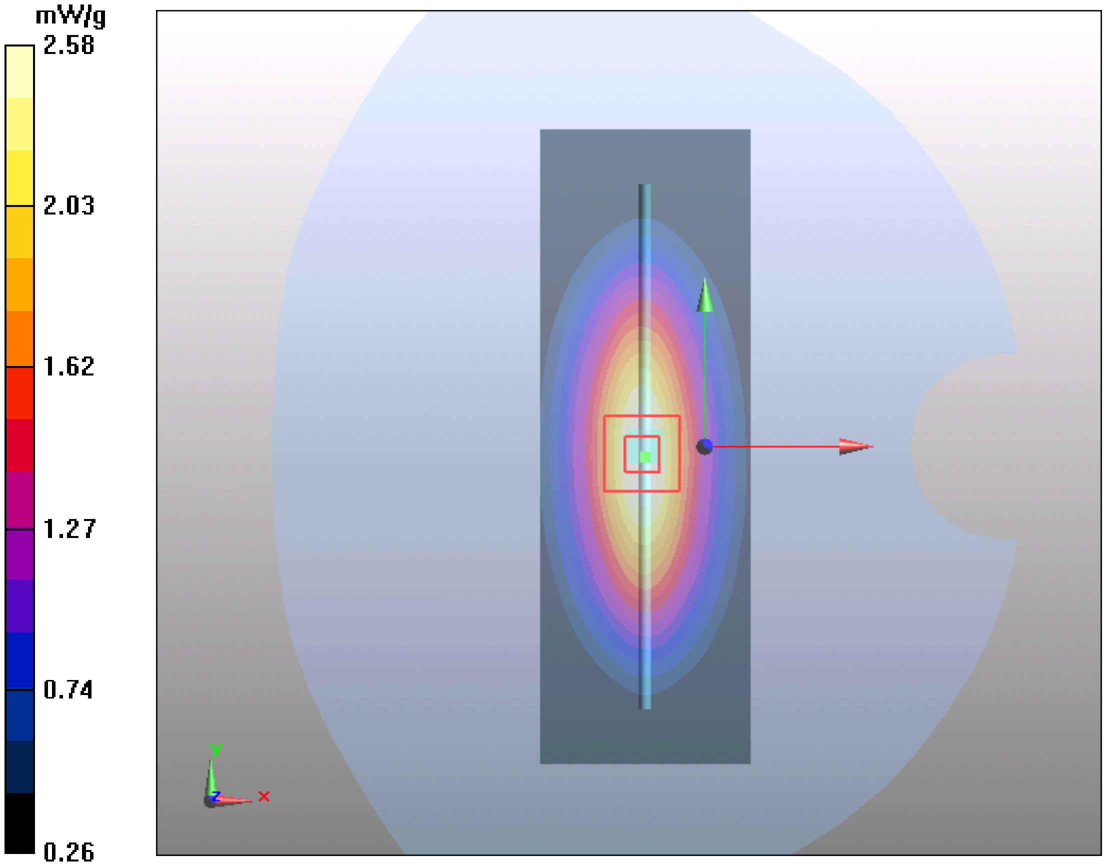


Figure 21 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date: 11/21/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3977; ConvF(7.37, 7.37, 7.37); Calibrated: 2/17/2014;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 12.4 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 82.5 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 17.5 W/kg

SAR(1 g) = 9.98 mW/g; SAR(10 g) = 5.27 mW/g

Maximum value of SAR (measured) = 11.52 mW/g

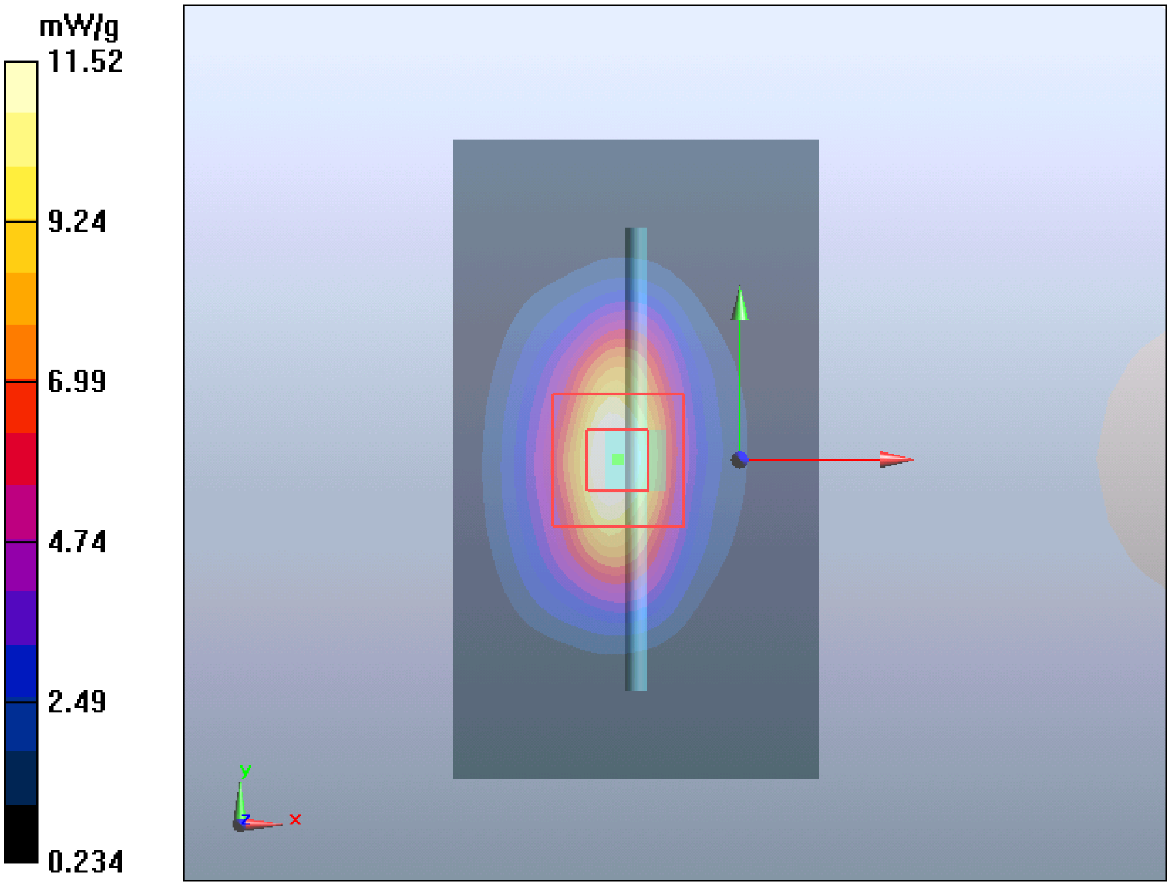


Figure 22 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date: 11/28/2014

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.98 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3977; ConvF(6.97, 6.97, 6.97); Calibrated: 2/17/2014;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 16.3 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.4 V/m; Power Drift = 0.035 dB

Peak SAR (extrapolated) = 25.7 W/kg

SAR(1 g) = 12.7 mW/g; SAR(10 g) = 6.26 mW/g

Maximum value of SAR (measured) = 15 mW/g

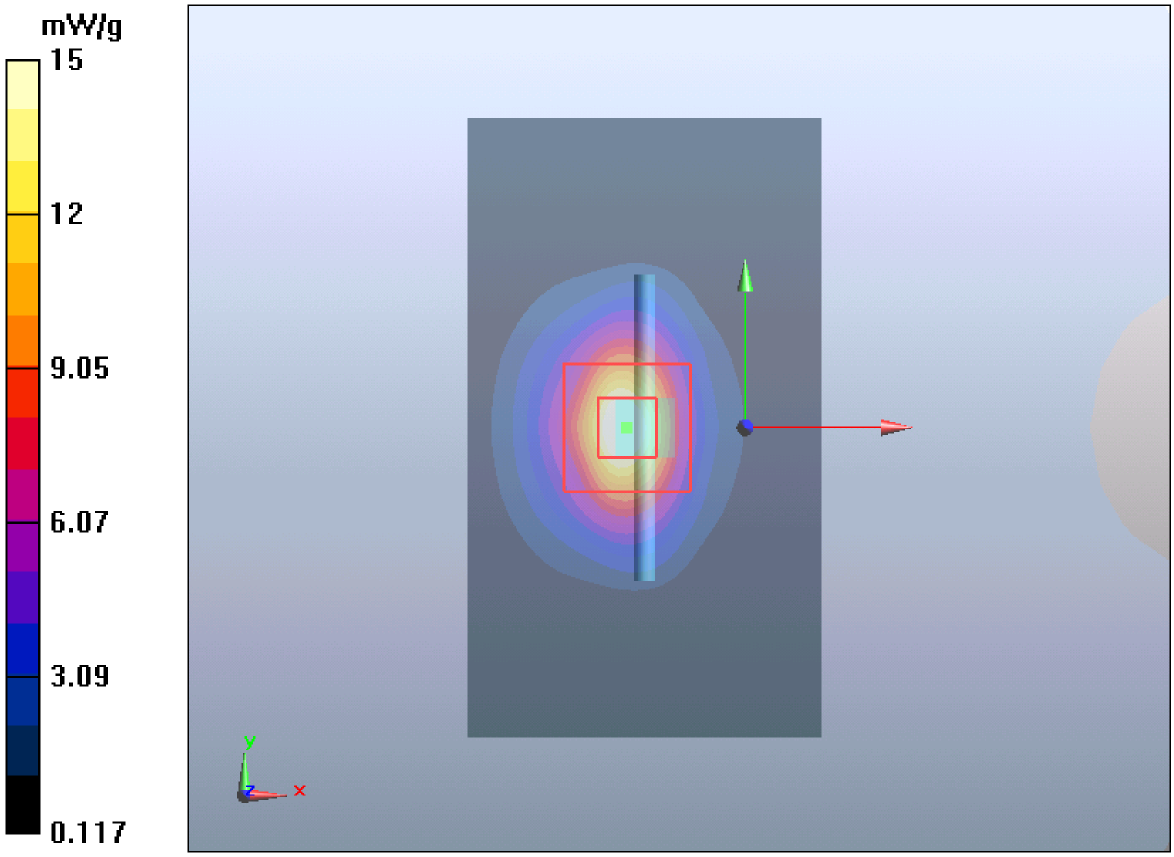


Figure 23 System Performance Check 2450MHz 250mW

ANNEX E: Highest Graph Results (A564C)

CDMA BC0 Right Cheek Middle

Date: 5/29/2014

Communication System: UID 0, CDMA (0); Frequency: 836.52 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.932 S/m; ε_r = 41.357; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.41, 9.41, 9.41); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Cheek Middle/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.333 W/kg

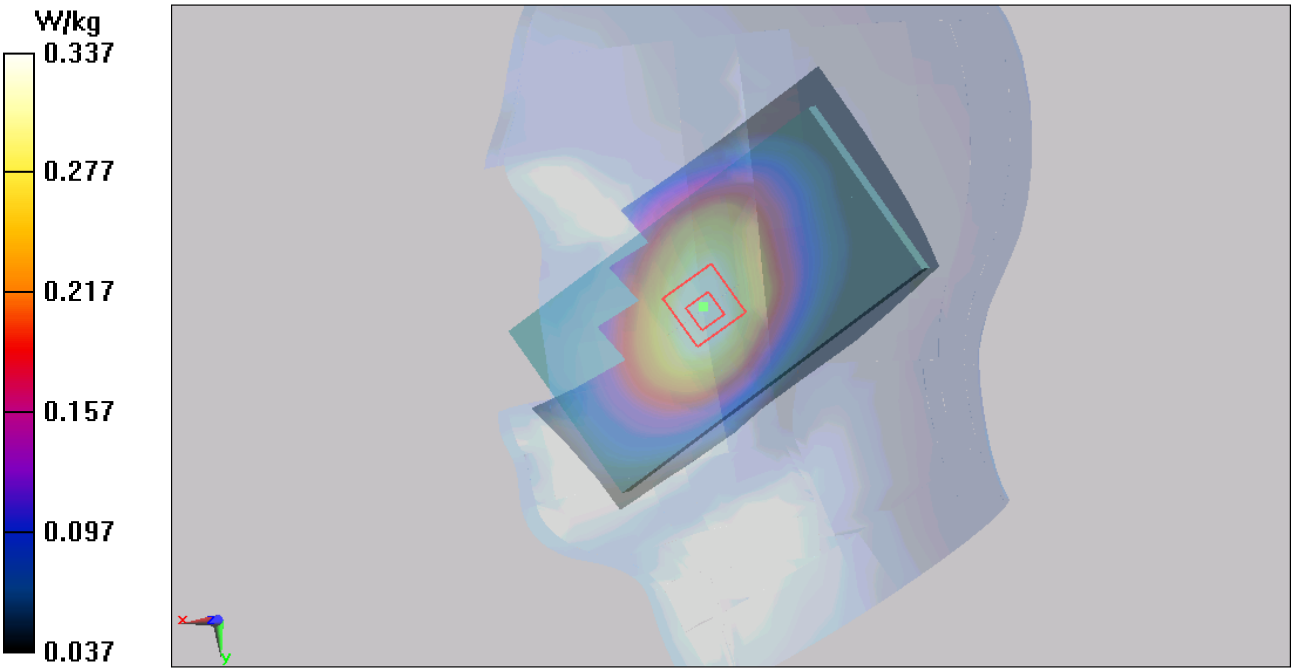
Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.866 V/m; Power Drift = 0.036 dB

Peak SAR (extrapolated) = 0.390 W/kg

SAR(1 g) = 0.320 W/kg; SAR(10 g) = 0.247 W/kg

Maximum value of SAR (measured) = 0.337 W/kg



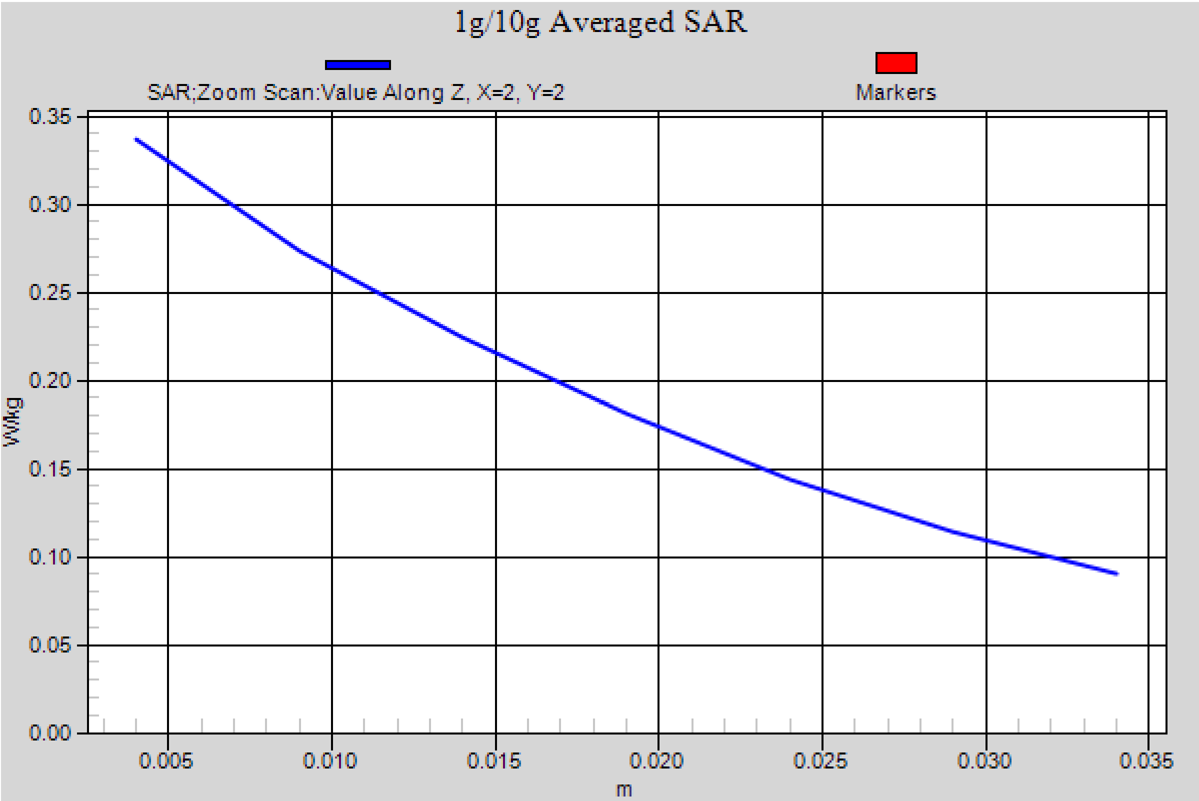


Figure 14 CDMA BC0 Right Hand Touch Cheek Channel 384

CDMA BC0 Back Side Middle

Date: 6/11/2014

Communication System: UID 0, CDMA (0); Frequency: 836.52 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side Middle/Area Scan (61x91x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.526 W/kg

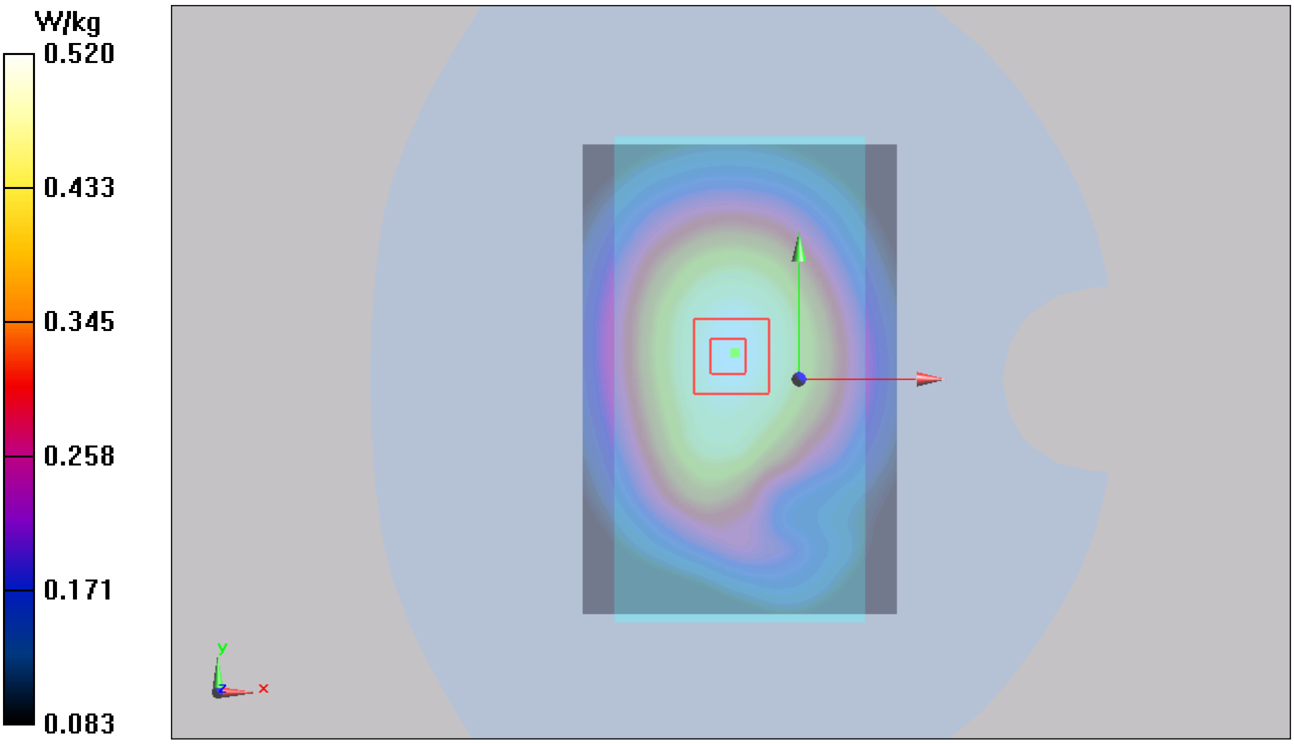
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.008 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.619 W/kg

SAR(1 g) = 0.497 W/kg; SAR(10 g) = 0.380 W/kg

Maximum value of SAR (measured) = 0.520 W/kg



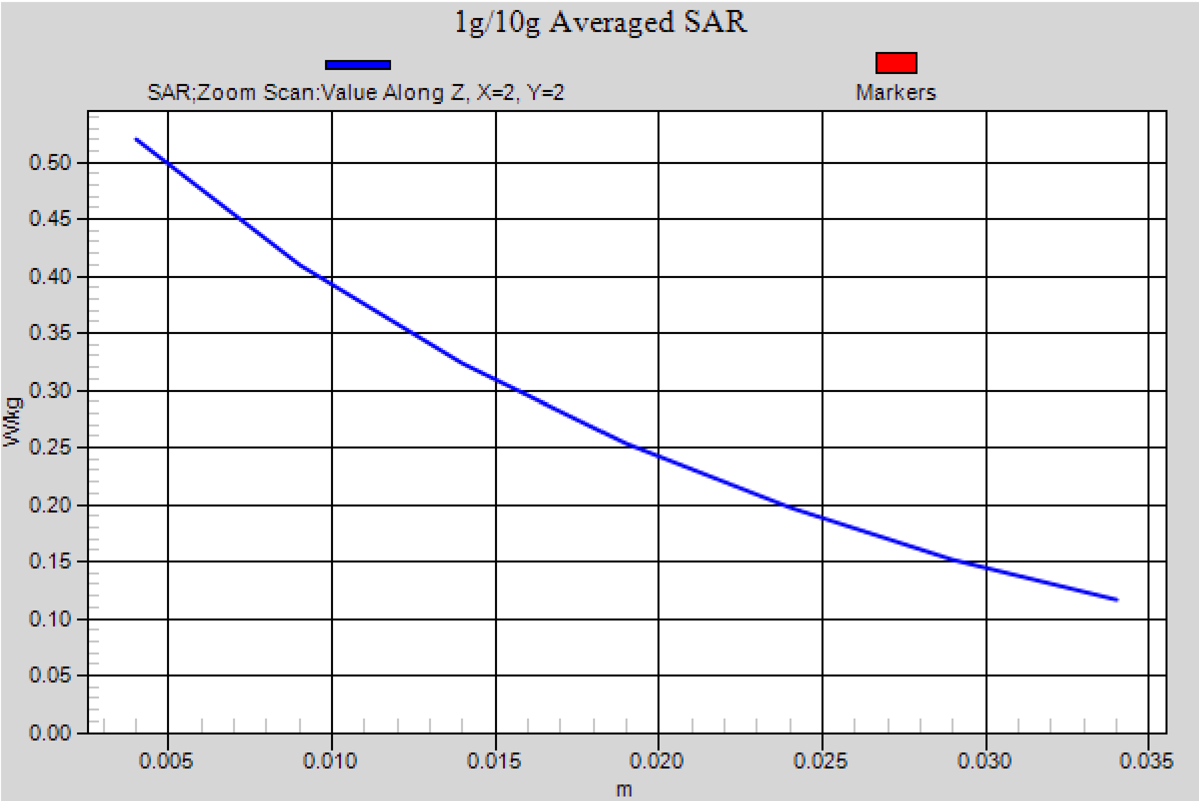


Figure 15 Body, CDMA BC0 Back Side Channel 384

CDMA BC1 Left Cheek Low

Date: 6/11/2014

Communication System: UID 0, CDMA (0); Frequency: 1851.25 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1851.25 MHz; σ = 1.387 S/m; ε_r = 39.807; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Low/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.582 W/kg

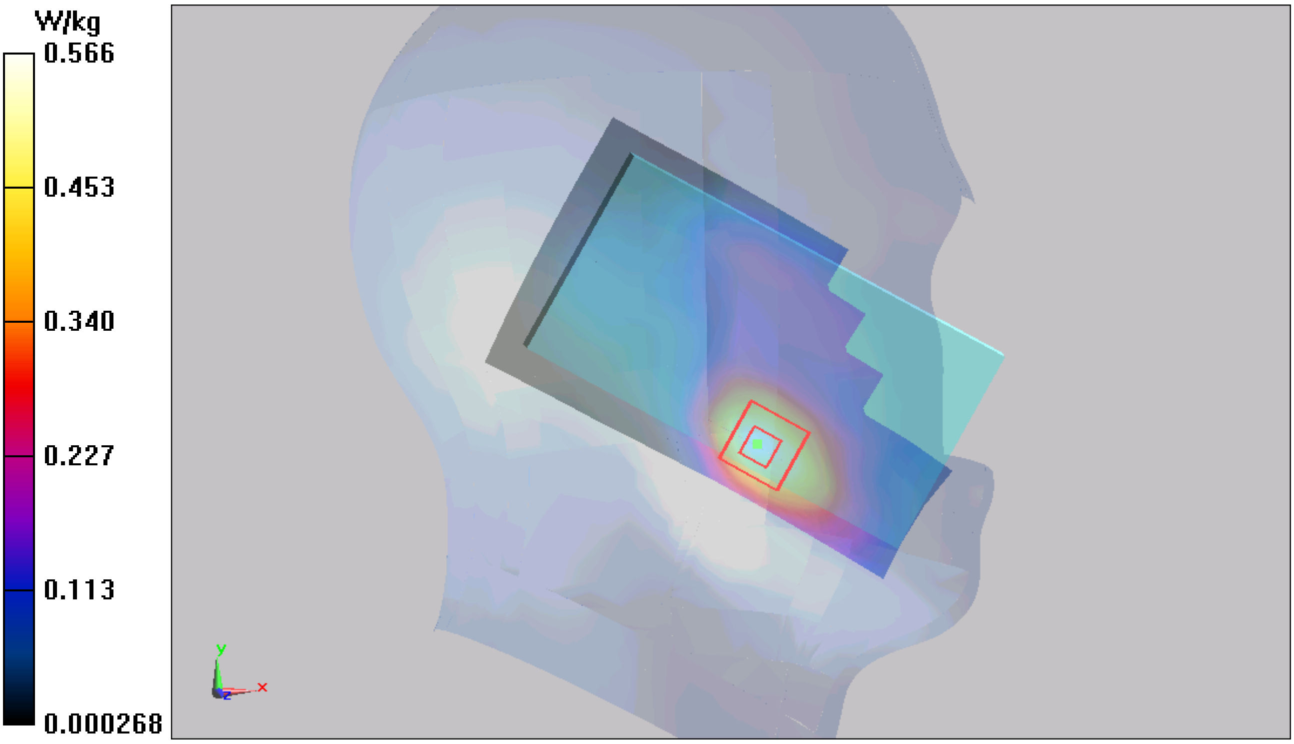
Left Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.136 V/m; Power Drift = -0.178 dB

Peak SAR (extrapolated) = 0.764 W/kg

SAR(1 g) = 0.509 W/kg; SAR(10 g) = 0.314 W/kg

Maximum value of SAR (measured) = 0.566 W/kg



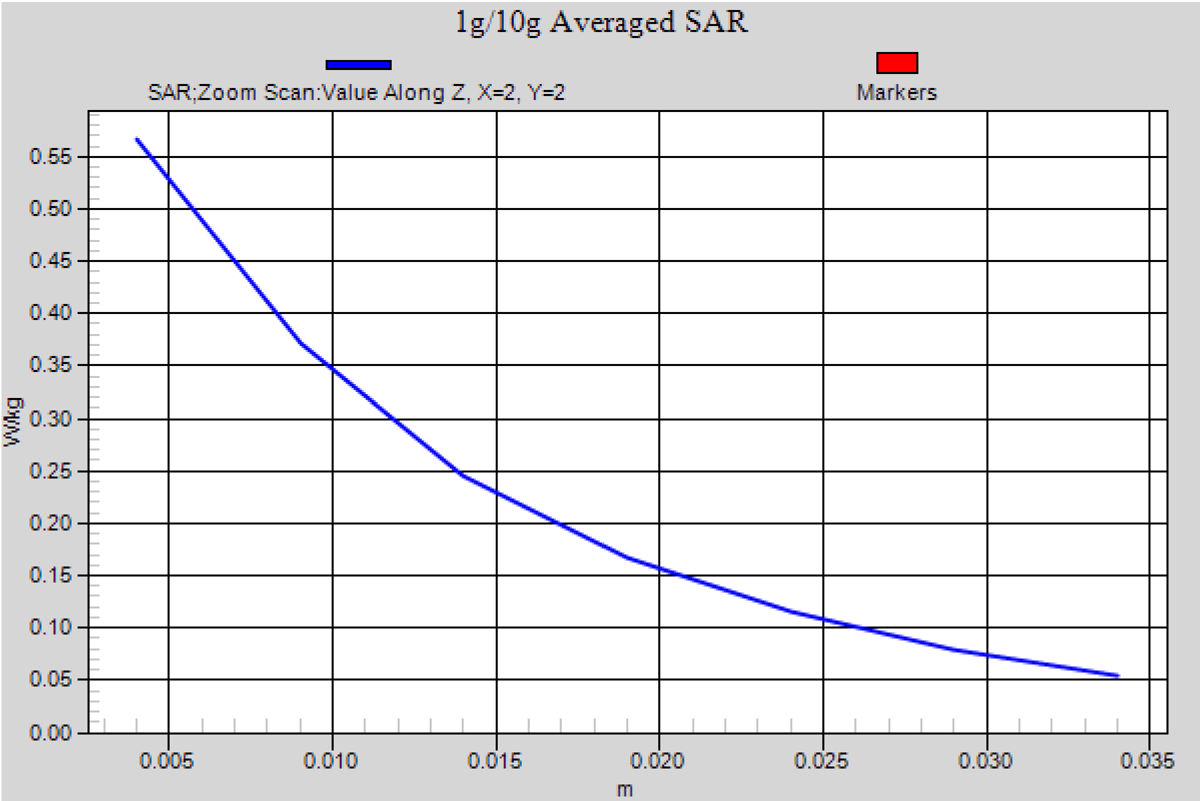


Figure 16 CDMA BC1 Left Hand Touch Cheek Channel 25

CDMA BC1 Back Side Middle

Date: 6/11/2014

Communication System: UID 0, CDMA (0); Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1880 MHz; σ = 1.504 S/m; ε_r = 53.137; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side Middle/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.633 W/kg

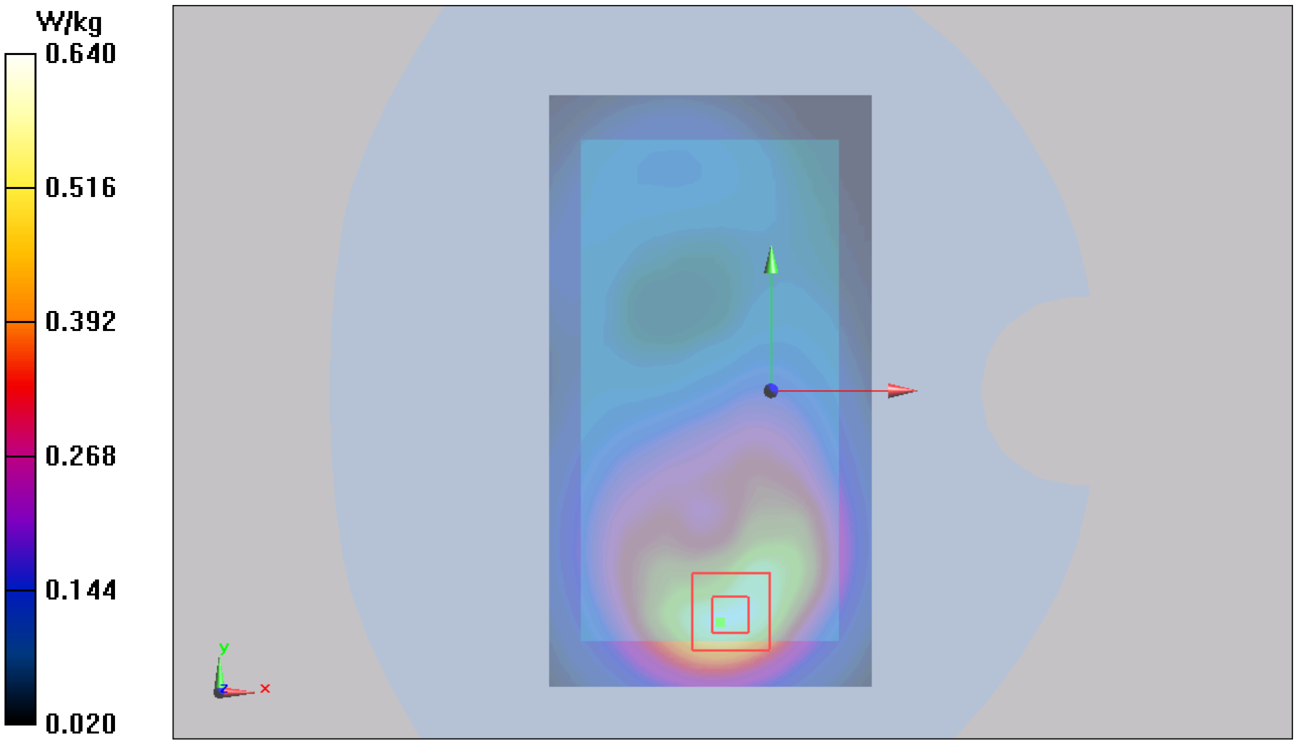
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.104 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 0.927 W/kg

SAR(1 g) = 0.590 W/kg; SAR(10 g) = 0.356 W/kg

Maximum value of SAR (measured) = 0.640 W/kg



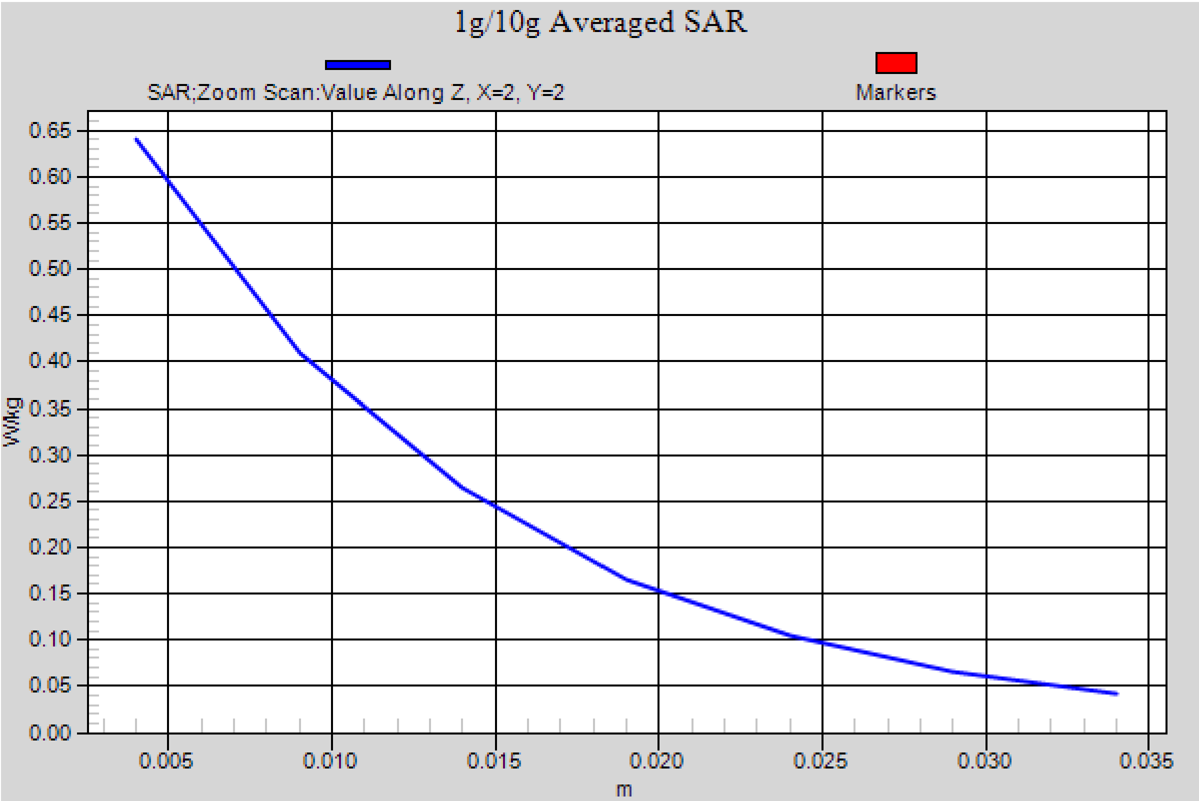


Figure 17 Body, CDMA BC1 Back Side Channel 25

802.11b Right Cheek Middle (5.5Mbps)

Date: 6/12/2014

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2437 MHz; σ = 1.787 S/m; ε_r = 39.199; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right Cheek Middle/Area Scan (81x61x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.788 W/kg

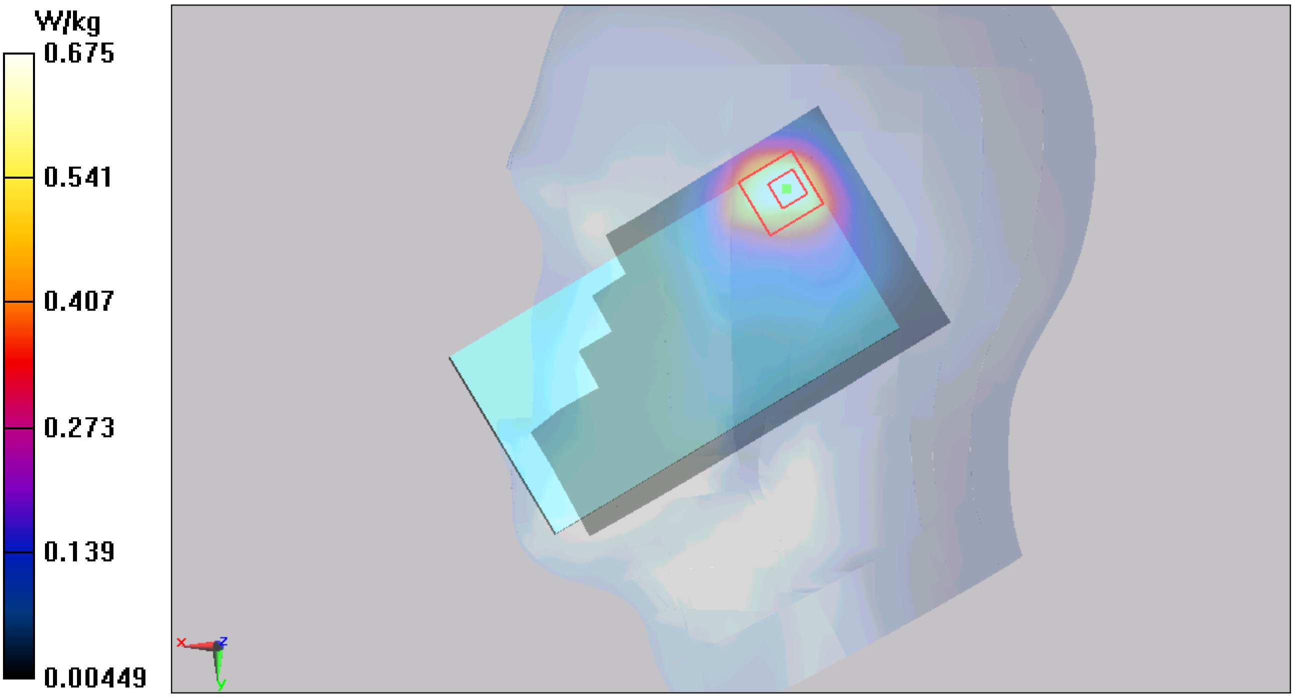
Right Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.887 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.42 W/kg

SAR(1 g) = 0.688 W/kg; SAR(10 g) = 0.342 W/kg

Maximum value of SAR (measured) = 0.675 W/kg



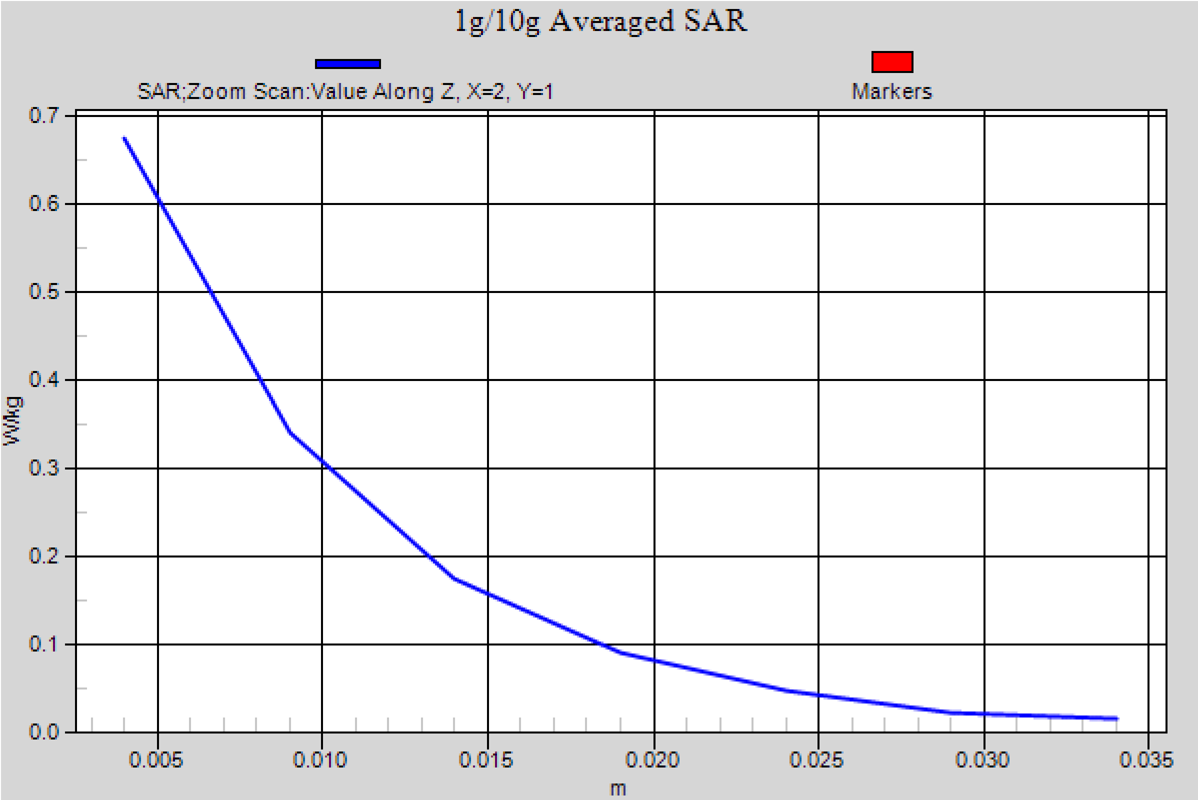


Figure 18 Right Hand Touch Cheek 802.11b Channel 6

802.11b Back Side Middle

Date: 5/31/2014

Communication System: UID 0, 802.11b (0); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2437 MHz; σ = 1.977 S/m; ε_r = 52.177; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); Calibrated: 11/28/2013;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side Middle/Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.122 W/kg

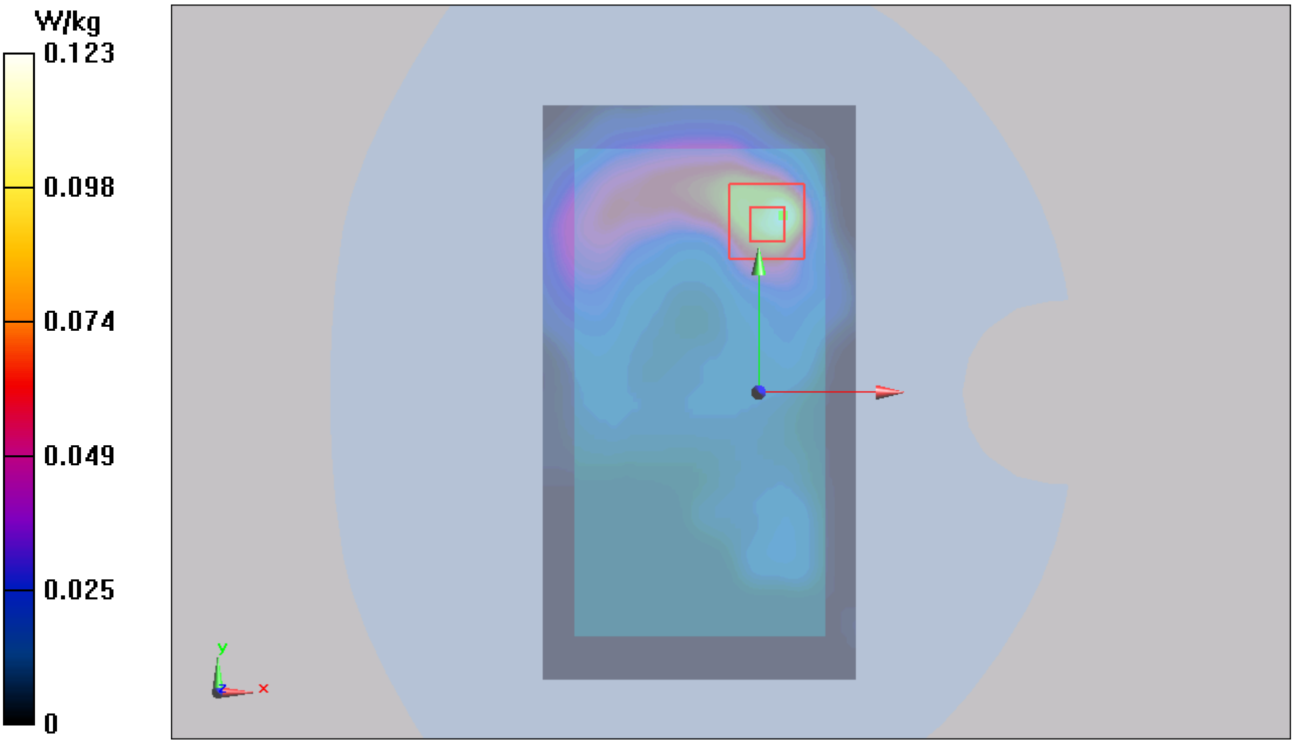
Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.111 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 0.230 W/kg

SAR(1 g) = 0.104 W/kg; SAR(10 g) = 0.047 W/kg

Maximum value of SAR (measured) = 0.123 W/kg



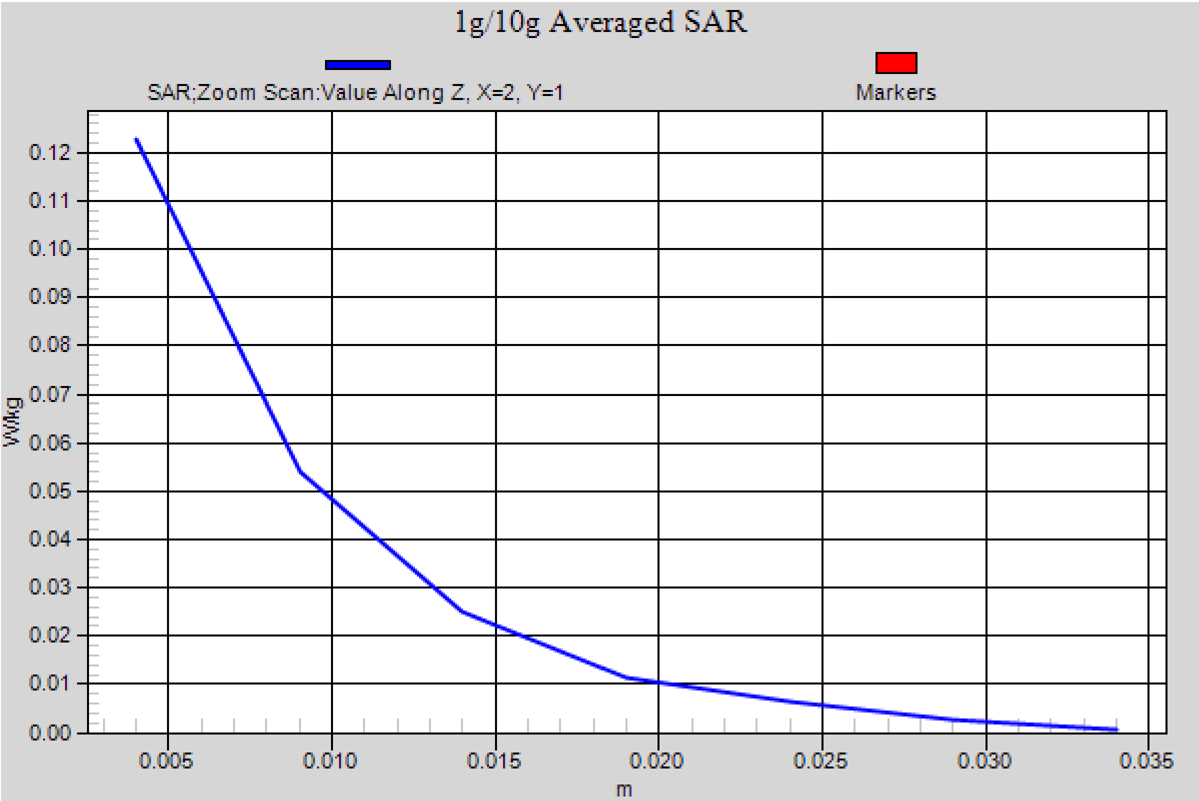


Figure 19 Body, Back Side, 802.11b Channel 6

ANNEX F: Highest Graph Results (7040T)

Bluetooth Left Tilt Middle

Date: 6/9/2014

Communication System: UID 0, BT (0); Frequency: 2441 MHz;Duty Cycle: 1:1.21955

Medium parameters used: f = 2441 MHz; σ = 1.792 S/m; ε_r = 39.169; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;

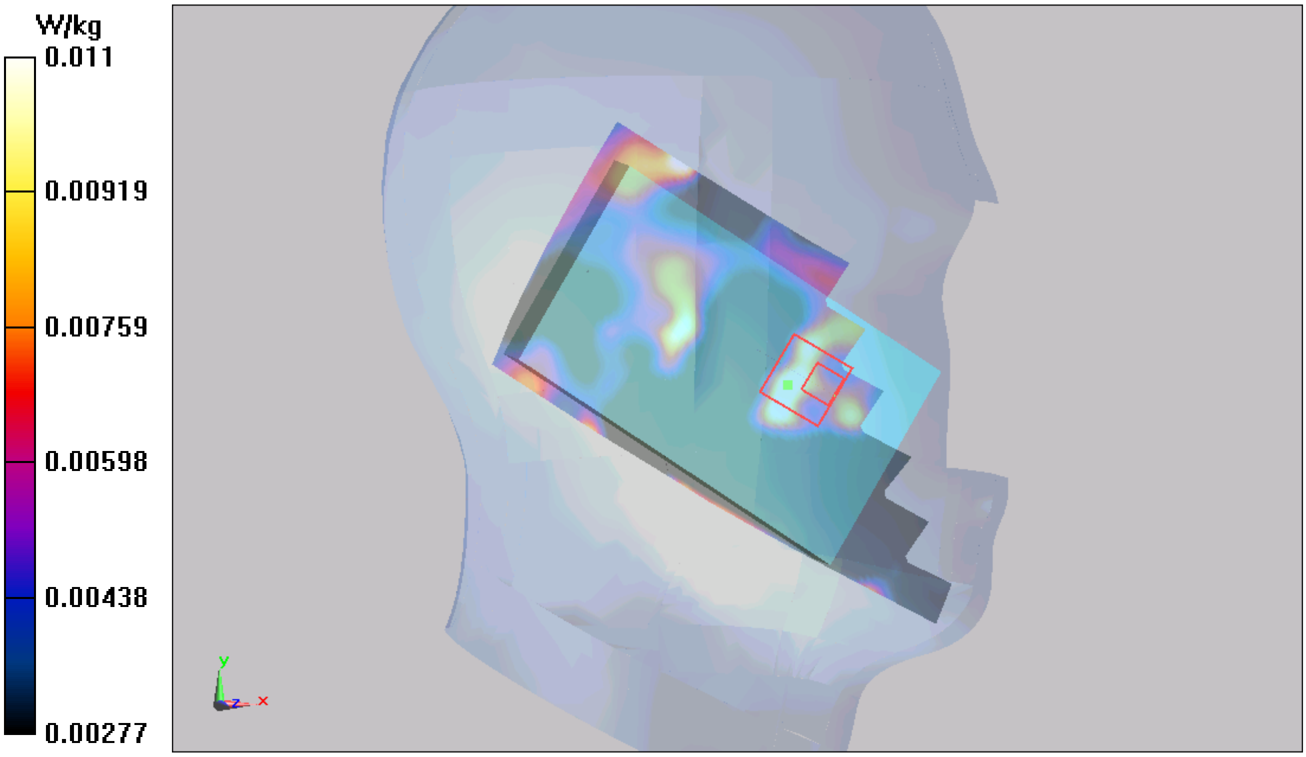
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Tilt Middle/Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.0139 W/kg

Left Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.346 V/m; Power Drift = -0.117 dB
Peak SAR (extrapolated) = 0.0150 W/kg
SAR(1 g) = 0.0084 W/kg; SAR(10 g) = 0.00587 W/kg
Maximum value of SAR (measured) = 0.0108 W/kg



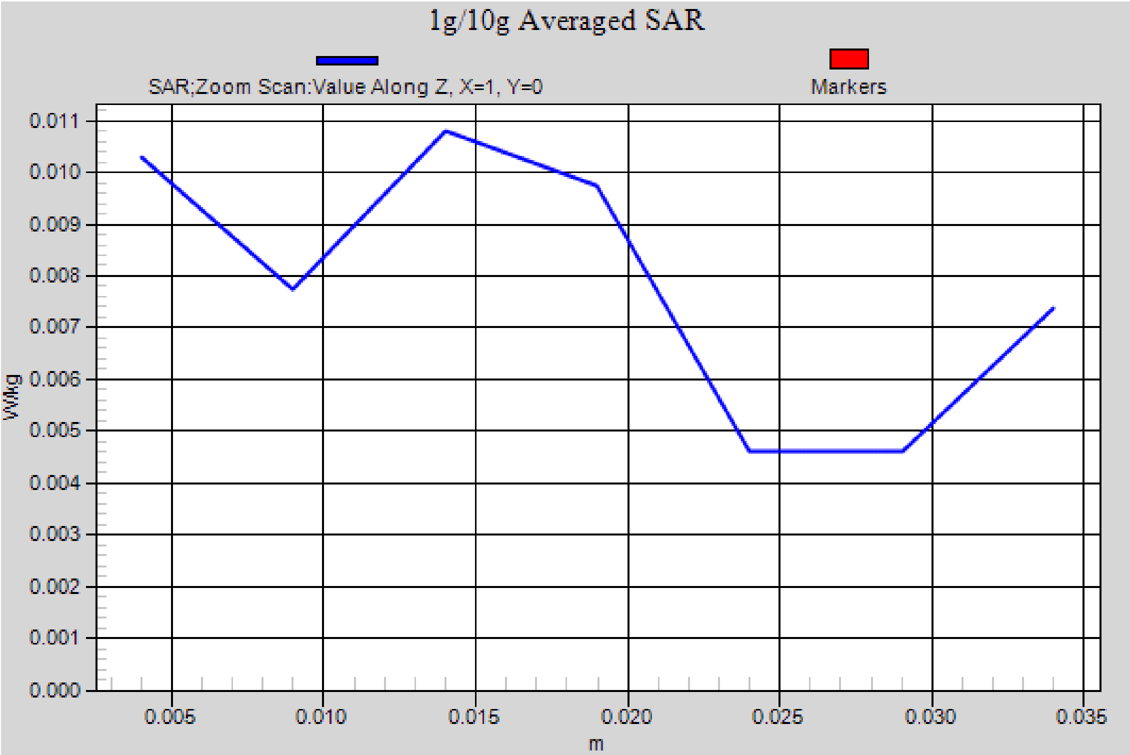


Figure 20 Left Hand Tilt 15° Bluetooth Channel 39

ANNEX G: Highest Graph Results (A564R)

CDMA BC0 Back Side Middle

Date: 12/24/2014

Communication System: UID 0, CDMA (0); Frequency: 836.52 MHz;Duty Cycle: 1:1

Medium parameters used: f = 837 MHz; σ = 0.992 S/m; ε_r = 55.882; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3977; ConvF(9.74, 9.74, 9.74); Calibrated: 2/17/2014;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side Middle /Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.403 W/kg

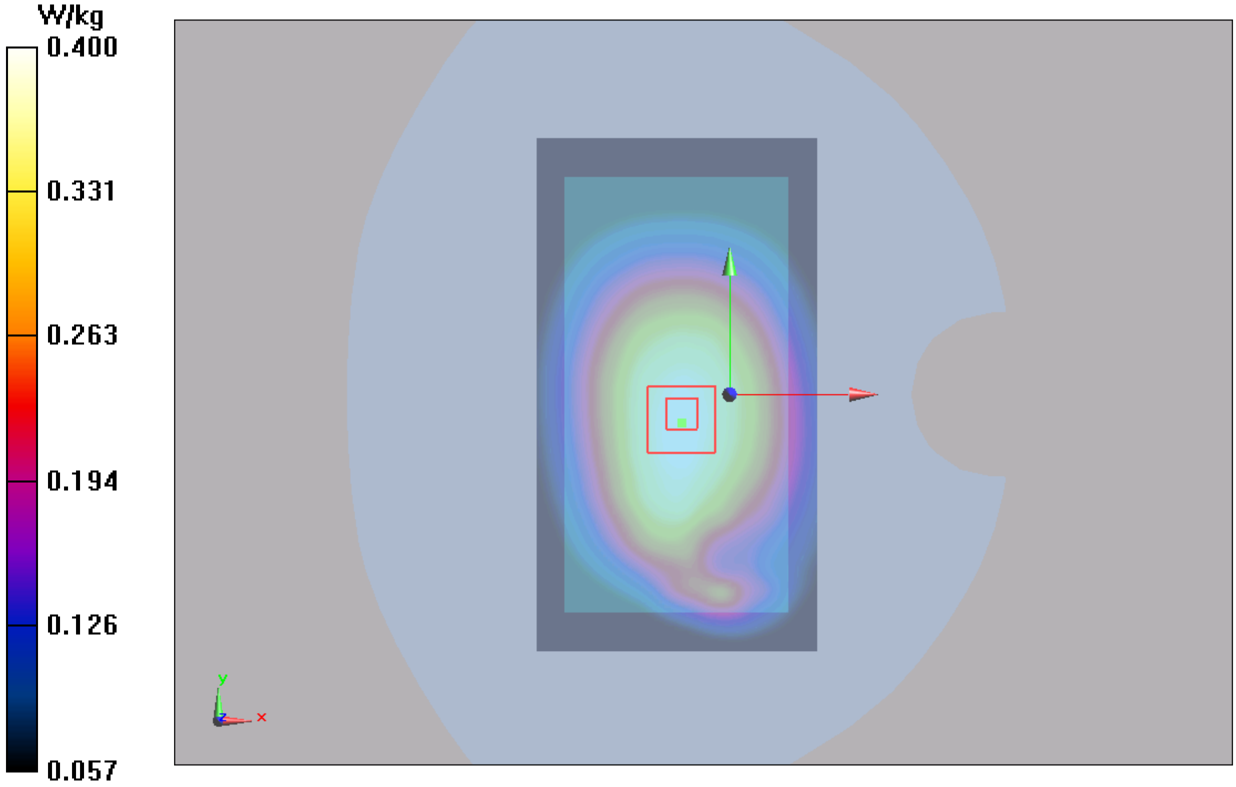
Back Side Middle /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.310 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.480 W/kg

SAR(1 g) = 0.386 W/kg; SAR(10 g) = 0.296 W/kg

Maximum value of SAR (measured) = 0.400 W/kg



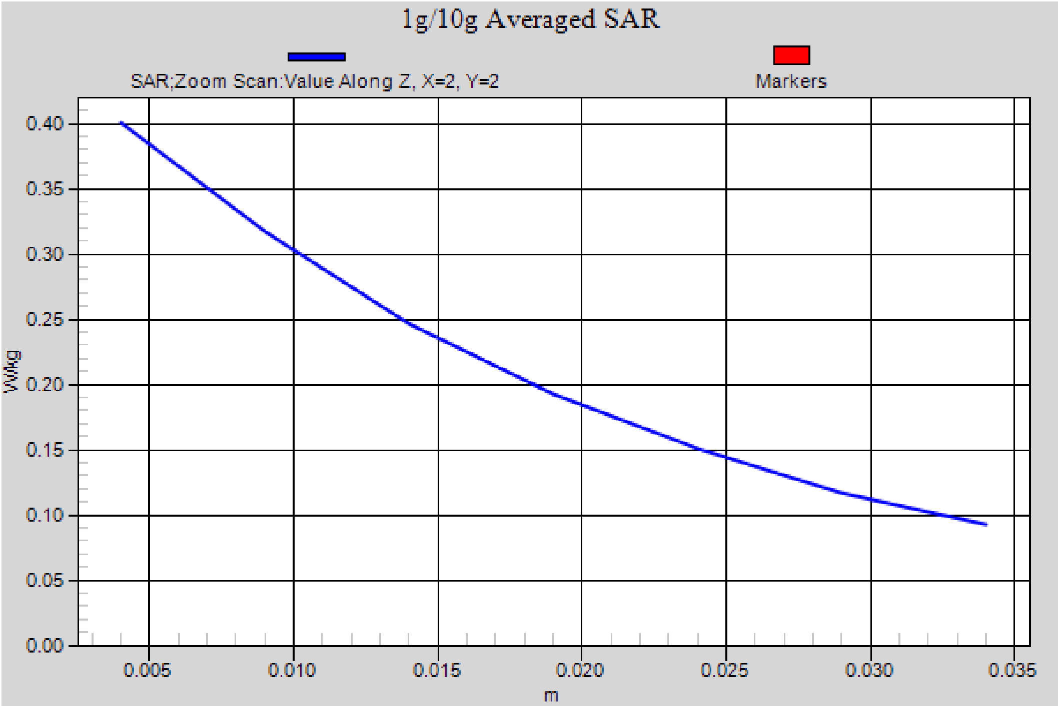


Figure 24 Body, CDMA BC0 Back Side Channel 384

CDMA BC1 Bottom Edge High

Date: 11/21/2014

Communication System: UID 0, CDMA (0); Frequency: 1908.75 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1909 MHz; σ = 1.533 S/m; ε_r = 53.049; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3977; ConvF(7.37, 7.37, 7.37); Calibrated: 2/17/2014;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Bottom Edge High /Area Scan (51x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.16 W/kg

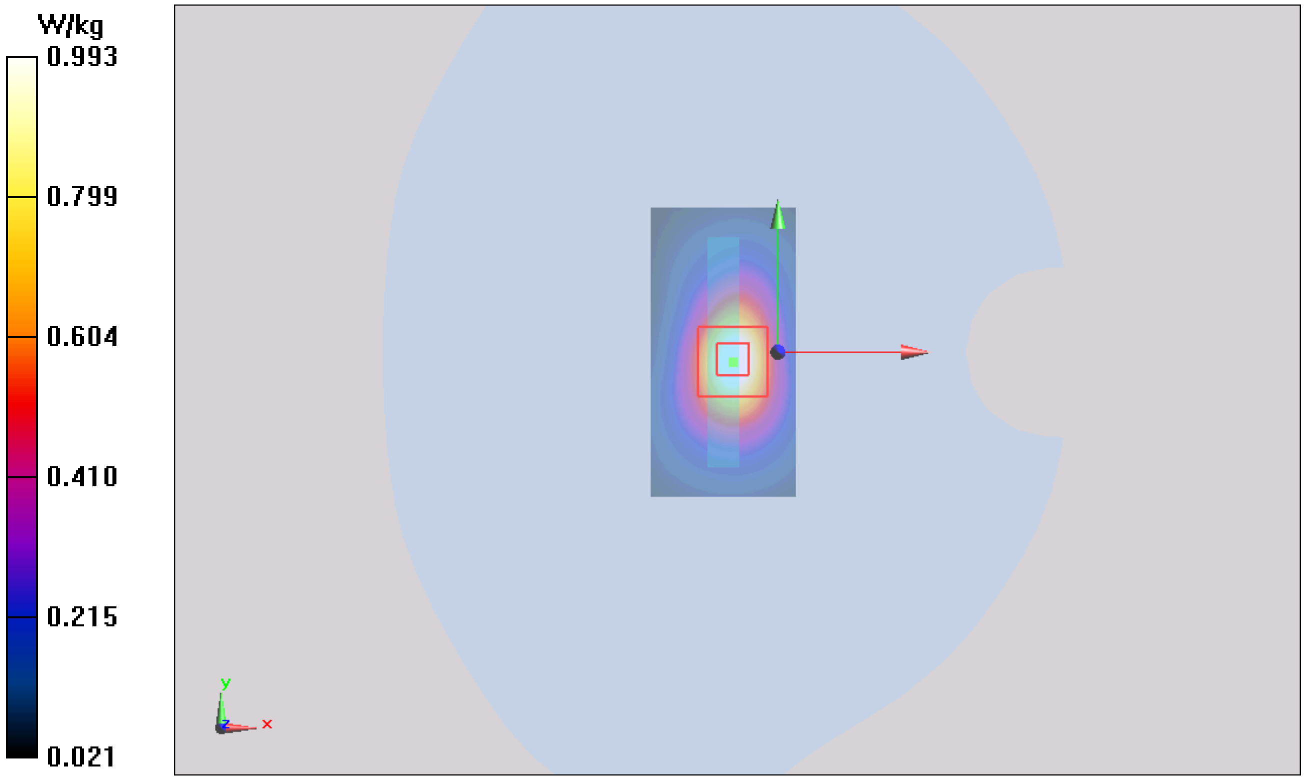
Bottom Edge High /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 28.030 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.72 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.546 W/kg

Maximum value of SAR (measured) = 0.993 W/kg



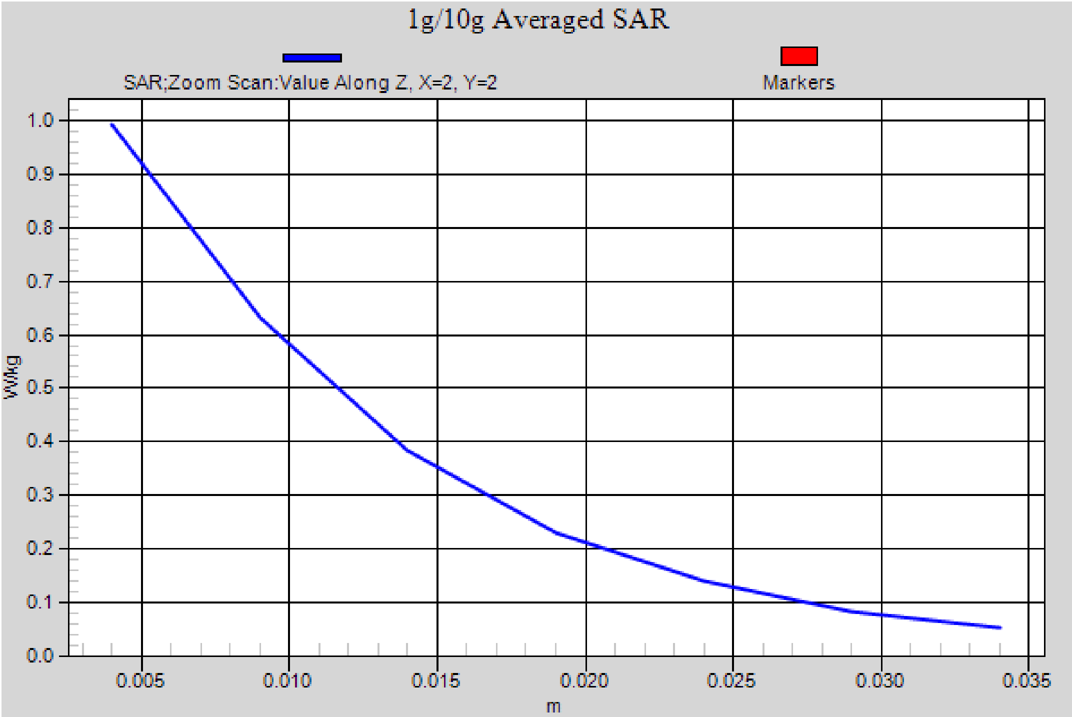


Figure 25 Body, CDMA BC1 Bottom Edge Channel 1175

802.11b Back Side High

Date/Time: 11/28/2014

Communication System: UID 0, 802.11b (0); Frequency: 2462 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2462 MHz; σ = 2.009 S/m; ε_r = 52.109; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3977; ConvF(6.97, 6.97, 6.97); Calibrated: 2/17/2014;

Electronics: DAE4 Sn1317; Calibrated: 1/16/2014

Phantom: SAM 2; Type: SAM;

Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side High/Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm

Maximum value of SAR (interpolated) = 0.970 W/kg

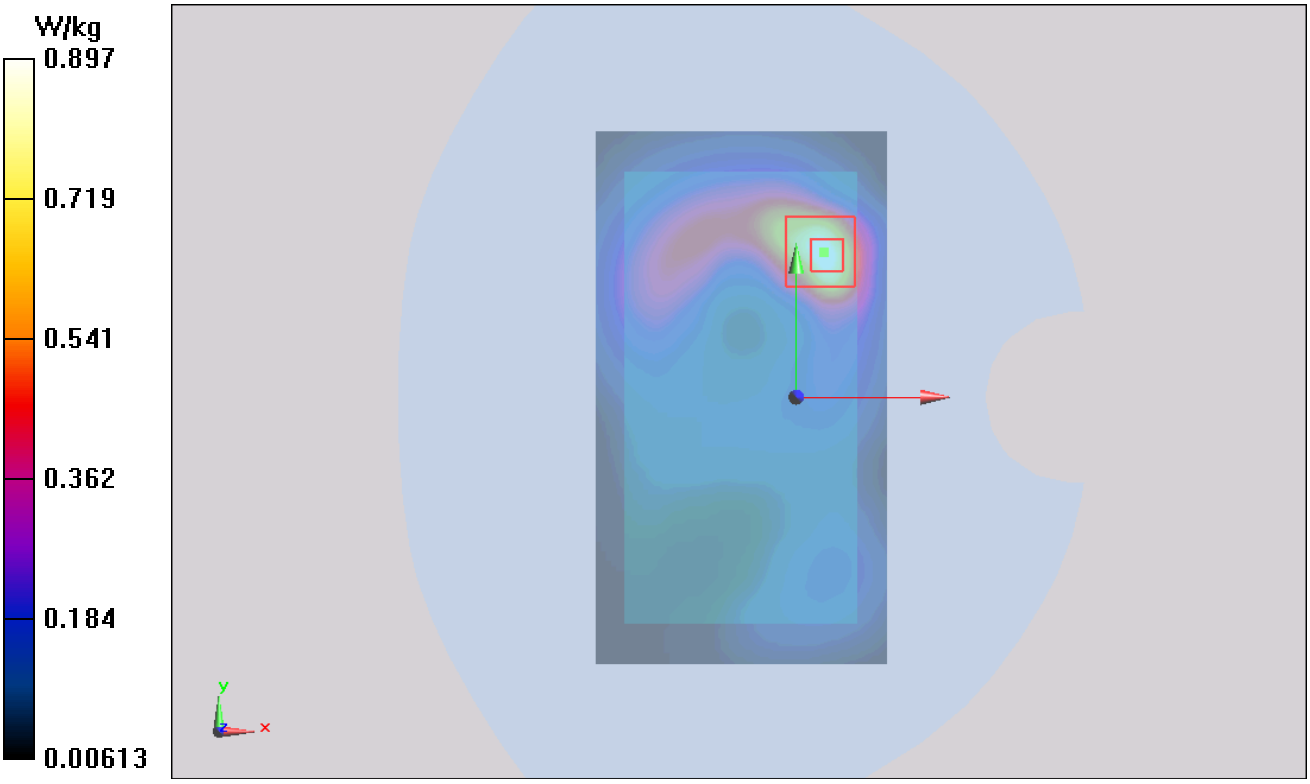
Back Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.681 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.98 W/kg

SAR(1 g) = 0.880 W/kg; SAR(10 g) = 0.406 W/kg

Maximum value of SAR (measured) = 0.897 W/kg



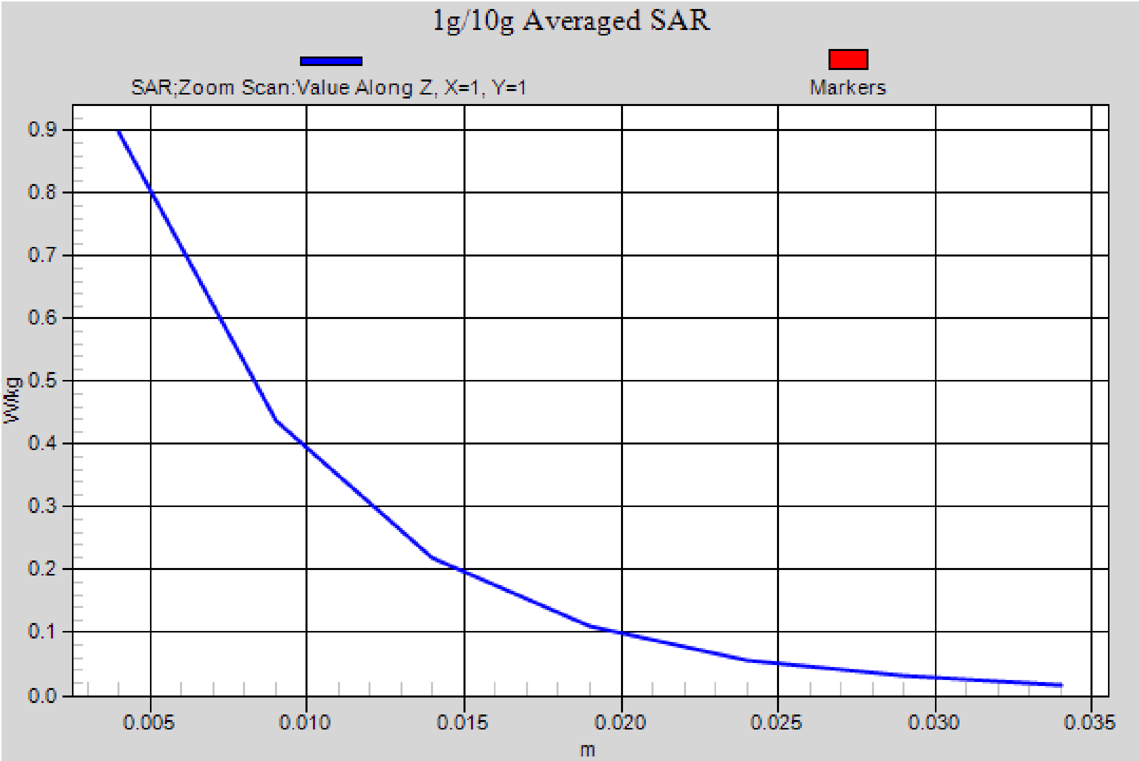


Figure 26 Body, Back Side, 802.11b Channel 11

ANNEX H: Probe Calibration Certificate(SN:3677)

TMC In Collaboration with speag CALIBRATION LABORATORY

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

ilac-MRA CNAS 校准 CNAS L0442

Client TA-ShangHai Certificate No: J13-2-2971

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3677

Calibration Procedure(s): TMC-OS-E-02-195
Calibration Procedures for Dosimetric E-field Probes

Calibration date: November 28, 2013

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 NRP2	101919	01-Jul-13 (TMC, No.JW13-044)	Jun-14
Power sensor NRP-Z91	101547	01-Jul-13 (TMC, No.JW13-044)	Jun-14
Power sensor NRP-Z91	101548	01-Jul-13 (TMC, No.JW13-044)	Jun-14
Reference10dBAttenuator	BT0520	12-Dec-12(TMC,No.JZ12-867)	Dec-14
Reference20dBAttenuator	BT0267	12-Dec-12(TMC,No.JZ12-866)	Dec-14
Reference Probe EX3DV4	SN 3846	03-Sep-13(SPEAG,No.EX3-3846_Sep13)	Sep-14
DAE4	SN 777	22-Feb-13 (SPEAG, DAE4-777_Feb13)	Feb -14
Secondary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
SignalGeneratorMG3700A	6201052605	01-Jul-13 (TMC, No.JW13-045)	Jun-14
Network Analyzer E5071C	MY46110673	15-Feb-13 (TMC, No.JZ13-781)	Feb-14

	Name	Function	Signature
Calibrated by:	Yu Zongying	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: November 29, 2013

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Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A,B,C,D	modulation dependent linearization parameters
Polarization Φ	Φ rotation around probe axis
Polarization θ	θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i 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.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤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.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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Probe EX3DV4

SN: 3677

Calibrated: November 28, 2013

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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DASY – Parameters of Probe: EX3DV4 - SN: 3677

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm(μV/(V/m)^2)[A]	0.38	0.44	0.38	±10.8%
DCP(mV)[B]	99.8	100.9	101.9	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	93.3	±2.6%
		Y	0.0	0.0	1.0		101.7	
		Z	0.0	0.0	1.0		92.1	

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

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

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DASY – Parameters of Probe: EX3DV4 - SN: 3677

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz][C]	Relative Permittivity[F]	Conductivity (S/m)[F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.94	9.94	9.94	0.16	1.13	±12%
850	41.5	0.92	9.41	9.41	9.41	0.11	1.47	±12%
1750	40.1	1.37	8.22	8.22	8.22	0.14	2.11	±12%
1900	40.0	1.40	8.15	8.15	8.15	0.14	2.34	±12%
2100	39.8	1.49	7.87	7.87	7.87	0.13	3.21	±12%
2450	39.2	1.80	7.64	7.64	7.64	0.39	0.95	±12%
5200	36.0	4.66	5.73	5.73	5.73	0.95	0.62	±13%
5300	35.9	4.76	5.68	5.68	5.68	0.87	0.67	±13%
5500	35.6	4.96	5.62	5.62	5.62	0.97	0.62	±13%
5600	35.5	5.07	5.29	5.29	5.29	0.89	0.63	±13%
5800	35.3	5.27	5.29	5.29	5.29	1.02	0.61	±13%

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

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DASY – Parameters of Probe: EX3DV4 - SN: 3677

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz][C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.72	9.72	9.72	0.11	1.97	±12%
850	55.2	0.99	9.51	9.51	9.51	0.15	1.55	±12%
1750	53.4	1.49	7.77	7.77	7.77	0.14	3.23	±12%
1900	53.3	1.52	7.63	7.63	7.63	0.15	2.81	±12%
2100	53.2	1.62	7.97	7.97	7.97	0.16	4.09	±12%
2450	52.7	1.95	7.61	7.61	7.61	0.45	0.92	±12%
5200	49.0	5.30	4.72	4.72	4.72	0.66	1.10	±13%
5300	48.9	5.42	4.67	4.67	4.67	0.64	1.19	±13%
5500	48.6	5.65	4.34	4.34	4.34	0.73	0.80	±13%
5600	48.5	5.77	4.29	4.29	4.29	0.74	0.81	±13%
5800	48.2	6.00	4.46	4.46	4.46	0.78	0.80	±13%

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

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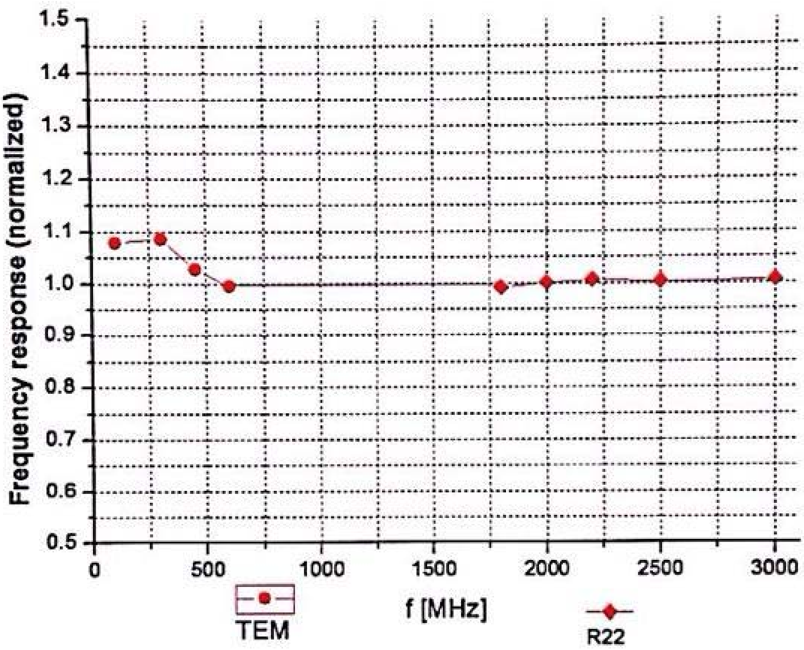
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ±7.5% (k=2)

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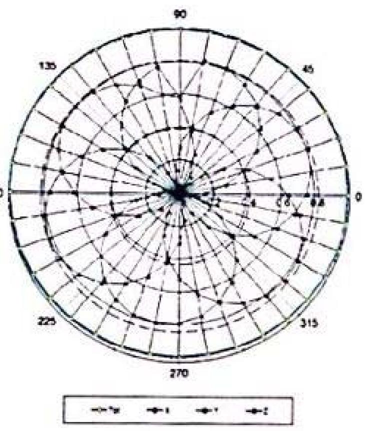
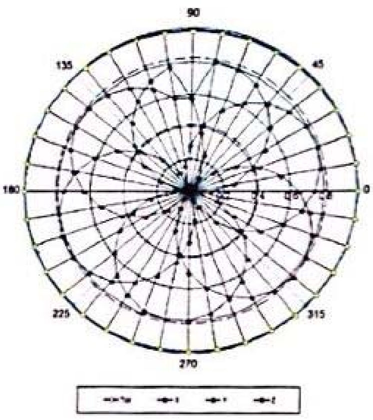
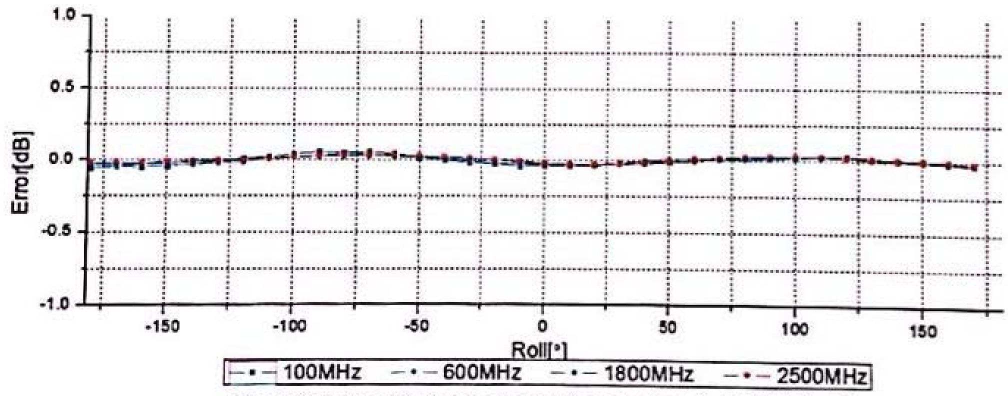
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





Uncertainty of Axial Isotropy Assessment: ±0.9% (k=2)

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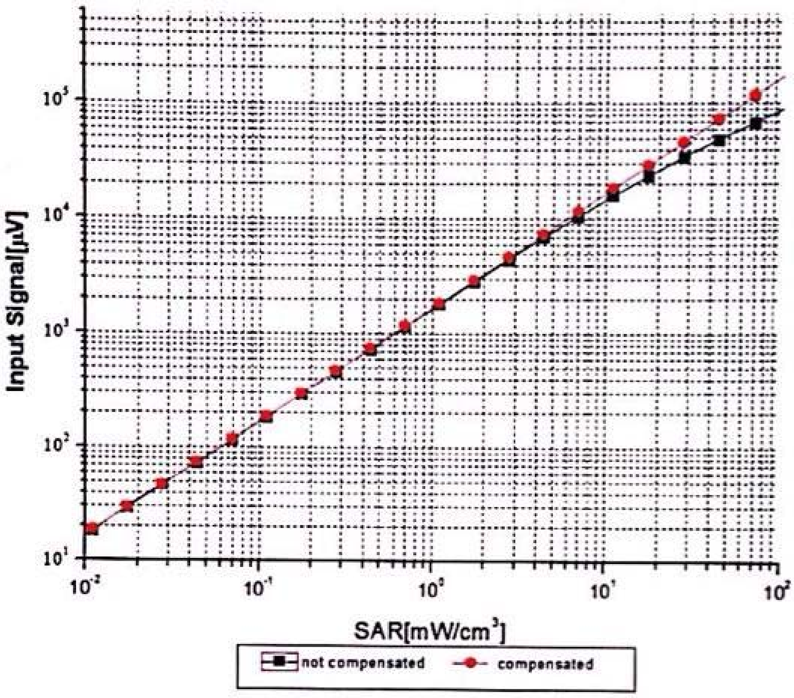
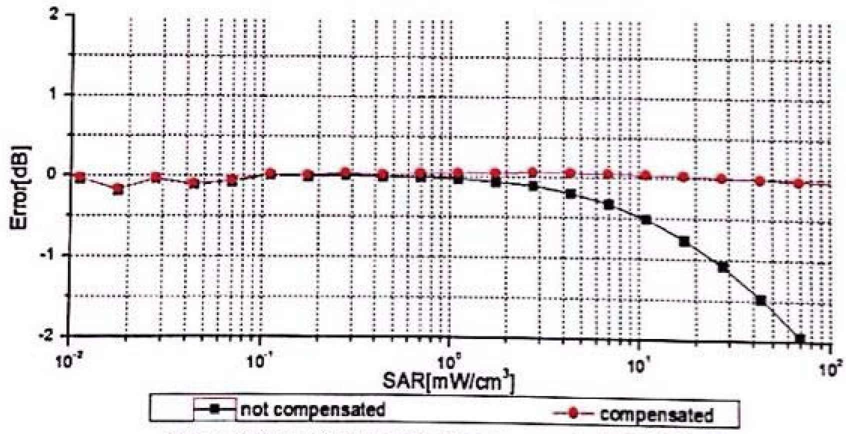
E-mail: Info@emcite.com Http://www.emcite.com

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





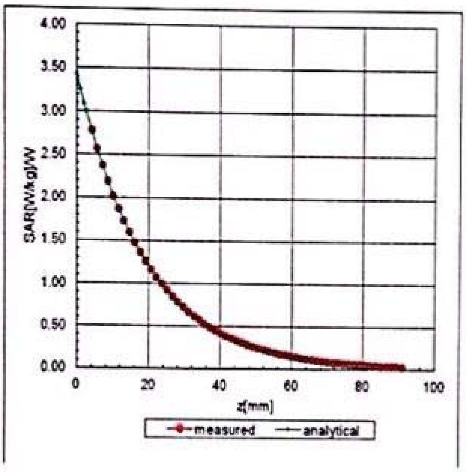
Uncertainty of Linearity Assessment: ±0.9% (k=2)

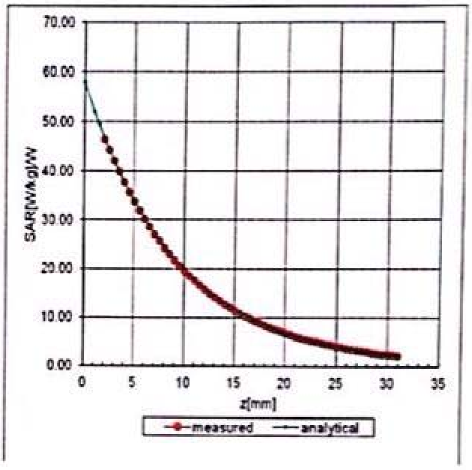
In Collaboration with
speag
CALIBRATION LABORATORY

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

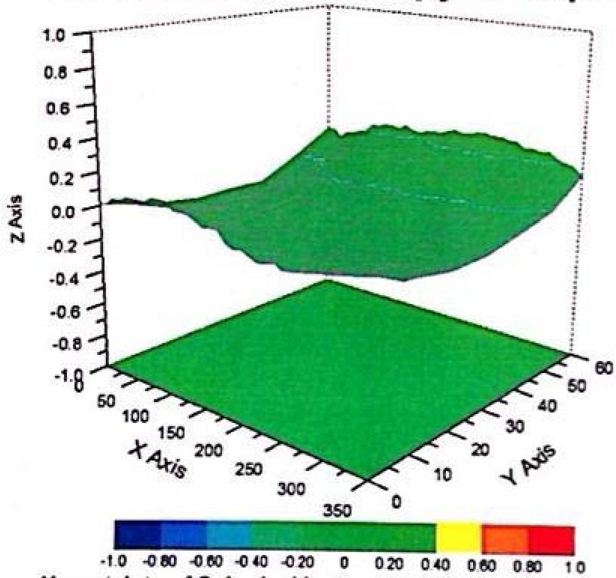
Conversion Factor Assessment

f=850 MHz, WGLS R9(H_convF) f=2450 MHz, WGLS R26(H_convF)





Deviation from Isotropy in Liquid



Uncertainty of Spherical Isotropy Assessment: ±2.8% (K=2)

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
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DASY - Parameters of Probe: EX3DV4 - SN: 3677

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	117
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disable
Probe Overall Length	337mm
Probe Body Diameter	10mm
Tip Length	9mm
Tip Diameter	2.5mm
Probe Tip to Sensor X Calibration Point	1mm
Probe Tip to Sensor Y Calibration Point	1mm
Probe Tip to Sensor Z Calibration Point	1mm
Recommended Measurement Distance from Surface	2mm

ANNEX I: Probe Calibration Certificate(SN:3977)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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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: **ATL (Auden)**

Certificate No: **EX3-3977_Feb14**

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3977

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: February 17, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	04-Apr-13 (No. 217-01733)	Apr-14
Power sensor E4412A	MY41498087	04-Apr-13 (No. 217-01733)	Apr-14
Reference 3 dB Attenuator	SN: S5054 (3c)	04-Apr-13 (No. 217-01737)	Apr-14
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-13 (No. 217-01735)	Apr-14
Reference 30 dB Attenuator	SN: S5129 (30b)	04-Apr-13 (No. 217-01738)	Apr-14
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: February 19, 2014

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

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

S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3977

Manufactured: November 5, 2013
Calibrated: February 17, 2014

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3977

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.54	0.57	0.54	± 10.1 %
DCP (mV)[B]	99.5	100.0	99.7	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	133.3	±3.3 %
		Y	0.0	0.0	1.0		134.9	
		Z	0.0	0.0	1.0		146.5	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3977

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
450	43.5	0.87	11.72	11.72	11.72	0.18	1.10	± 13.3 %
750	41.9	0.89	9.98	9.98	9.98	0.36	0.88	± 12.0 %
835	41.5	0.90	9.62	9.62	9.62	0.61	0.69	± 12.0 %
900	41.5	0.97	9.48	9.48	9.48	0.77	0.63	± 12.0 %
1750	40.1	1.37	8.14	8.14	8.14	0.78	0.60	± 12.0 %
1900	40.0	1.40	7.97	7.97	7.97	0.48	0.75	± 12.0 %
2000	40.0	1.40	7.93	7.93	7.93	0.69	0.63	± 12.0 %
2300	39.5	1.67	7.59	7.59	7.59	0.37	0.83	± 12.0 %
2450	39.2	1.80	7.24	7.24	7.24	0.27	1.10	± 12.0 %
2600	39.0	1.96	7.07	7.07	7.07	0.41	0.84	± 12.0 %
5200	36.0	4.66	5.09	5.09	5.09	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.82	4.82	4.82	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.76	4.76	4.76	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.55	4.55	4.55	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.52	4.52	4.52	0.40	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3977

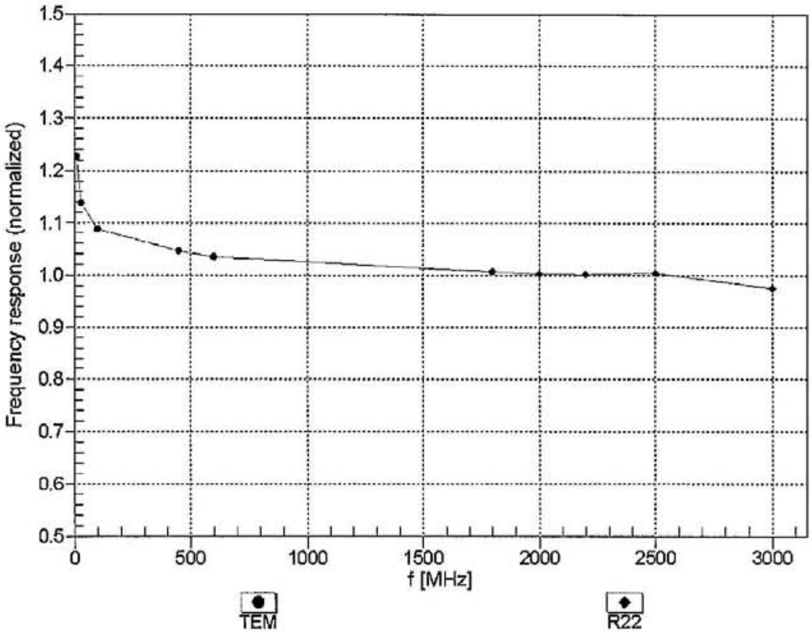
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
450	56.7	0.94	12.47	12.47	12.47	0.11	1.10	± 13.3 %
750	55.5	0.96	9.78	9.78	9.78	0.45	0.86	± 12.0 %
835	55.2	0.97	9.74	9.74	9.74	0.48	0.83	± 12.0 %
900	55.0	1.05	9.46	9.46	9.46	0.41	0.89	± 12.0 %
1750	53.4	1.49	7.69	7.69	7.69	0.41	0.88	± 12.0 %
1900	53.3	1.52	7.37	7.37	7.37	0.34	0.89	± 12.0 %
2000	53.3	1.52	7.41	7.41	7.41	0.24	1.14	± 12.0 %
2300	52.9	1.81	7.12	7.12	7.12	0.66	0.64	± 12.0 %
2450	52.7	1.95	6.97	6.97	6.97	0.80	0.50	± 12.0 %
2600	52.5	2.16	6.68	6.68	6.68	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.50	4.50	4.50	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.28	4.28	4.28	0.45	1.90	± 13.1 %
5500	48.6	5.65	4.02	4.02	4.02	0.45	1.90	± 13.1 %
5600	48.5	5.77	3.87	3.87	3.87	0.45	1.90	± 13.1 %
5800	48.2	6.00	4.12	4.12	4.12	0.50	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field

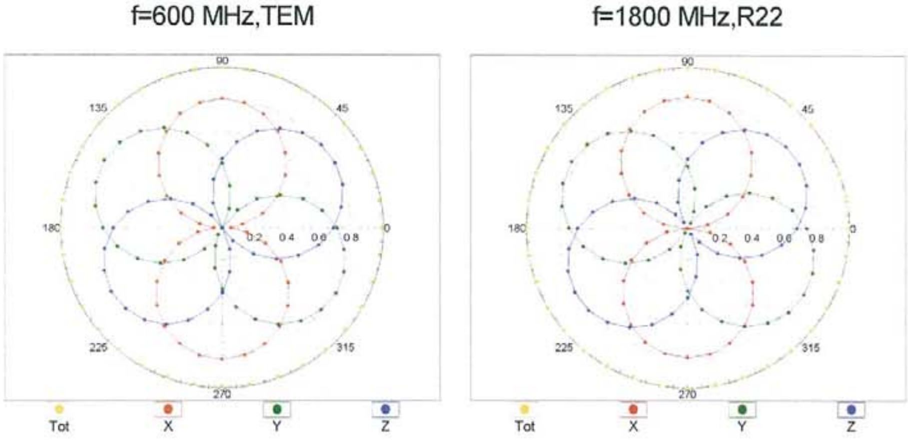
(TEM-Cell:ifi110 EXX, Waveguide: R22)

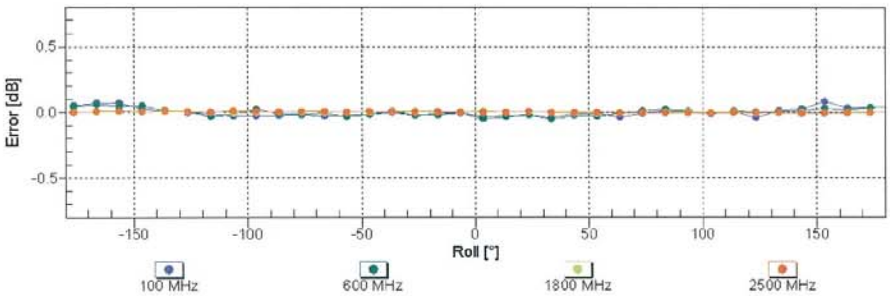


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

EX3DV4– SN:3977 February 17, 2014

Receiving Pattern (ϕ), ϑ = 0°

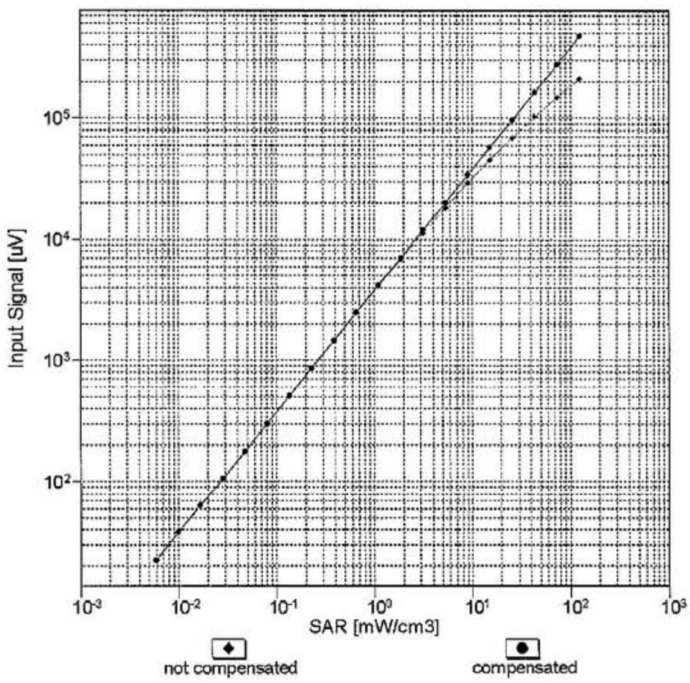


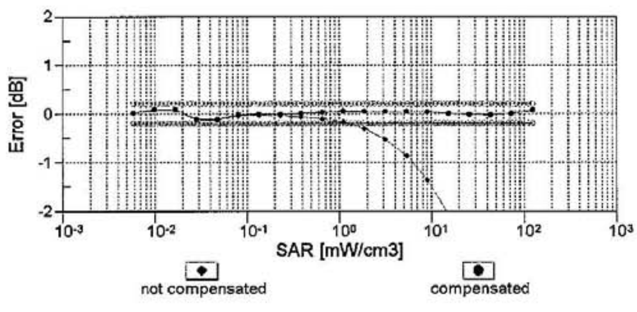


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:3977 February 17, 2014

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

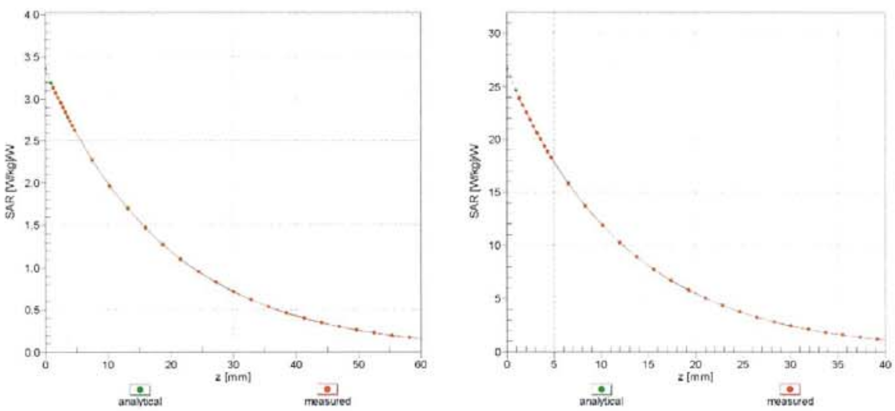




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

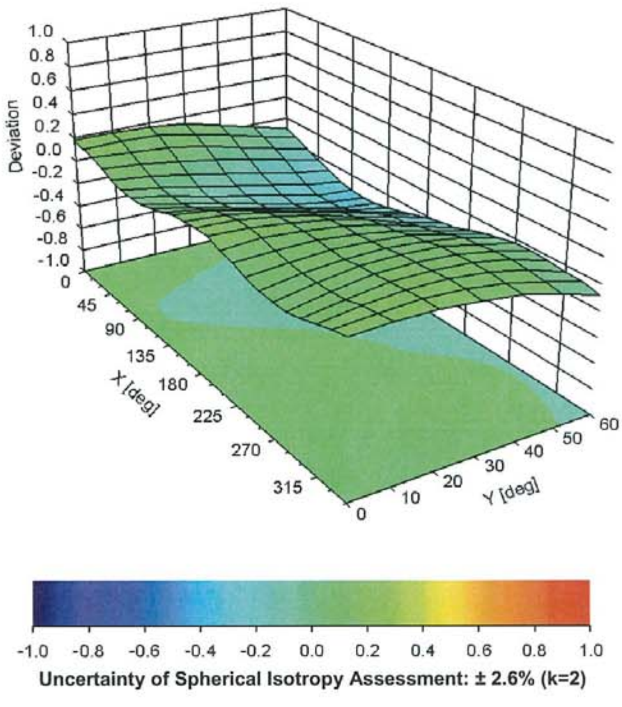
EX3DV4– SN:3977 February 17, 2014

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



DASY/EASY - Parameters of Probe: EX3DV4 - SN:3977

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	23.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

ANNEX J: D835V2 Dipole Calibration Certificate(August 26, 2011)

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

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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 **TA-Shanghai (Auden)**

Certificate No: **D835V2-4d020_Aug11**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d020
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 26, 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	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-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: August 26, 2011

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

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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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	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	41.1 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.34 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.46 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.26 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 3.1 jΩ
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω - 5.4 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 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	April 22, 2004

DASY5 Validation Report for Head TSL

Date: 25.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

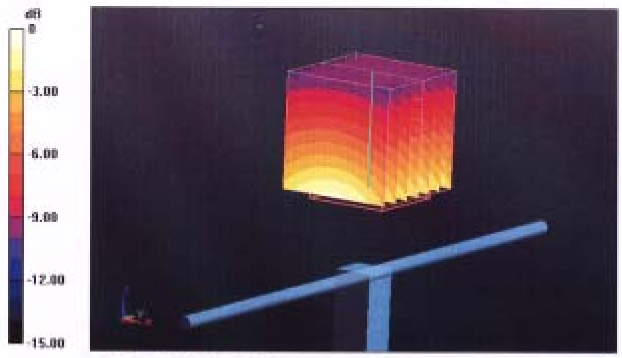
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.930 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.421 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



0 dB = 2.710mW/g

Impedance Measurement Plot for Head TSL