TESTING
No. L2264

SAR TEST REPORT

Product Name	HSUPA/HSDPA/UMTS dual-band / GSM quadbands/LTE penta bands mobile phone
Model Name	Vodafone 985N
FCC ID	RAD487
Client	TCT Mobile Limited
Manufacturer	TCT Mobile Limited
Date of issue	May 20, 2014

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 D03 Test Reduction GSM_GPRS_EDGE v01:**Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE **KDB 941225 D06 Hotspot Mode SAR v01r01:** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities **KDB 941225 D05 SAR for LTE Devices v02r03** SAR Test Considerations for LTE Handsets and Data Modems **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 Weizhong Yang	**Revised by** Minbao Ling	**Performed by** Yi Zhang
Weizhong Yang Director	Minbao Ling SAR Manager	Yi Zhang SAR Engineer

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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.

TA Technology (Shanghai) Co., Ltd. is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test. The sample under test was selected by the Client. This report only refers to the item that has undergone 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

Address: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai
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201203

1.5. Information of EUT

General Information

Device Type:	Portable Device	
Exposure Category:	Uncontrolled Environment / General Population	
State of Sample:	Prototype Unit	
Product IMEI:	352093060001616	
Hardware Version:	PIO	
Software Version:	vGMA-5-EU	
Antenna Type:	Internal Antenna	
Device Operating Configurations :		
Test Mode(s):	GSM 850/GSM 1900; LTE FDD Band 7; 802.11b/g/n HT20/HT40; Bluetooth/ Bluetooth 4.0;	
Test Modulation:	(GSM)GMSK, (LTE) QPSK, 16QAM, (WiFi) CCK	
Device Class:	B	
LTE UE Category:	3	
GPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4
	Max Number of Timeslots in Downlink	4
	Max Total Timeslot	5
EGPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4
	Max Number of Timeslots in Downlink	4
	Max Total Timeslot	5
Operating Frequency Range(s):	Mode	Tx (MHz)
	GSM 850	824.2 ~ 848.8
	GSM 1900	1850.2 ~ 1909.8
	LTE FDD 7	2502.5 ~ 2567.5
	Bluetooth	2402 ~2480
	Bluetooth 4.0	2402 ~2480
	WIFI	2412 ~2472
Power Class:	GSM 850: 4	
	GSM 1900: 1	
	LTE FDD 7: 3	
Power Level	GSM 850: level 5	
	GSM 1900: level 0	
	LTE FDD 7: max power	
Operating Channel/ Frequency(MHz): (Low - Middle - High)	128/824.4 – 190/836.6 – 251/848.8	(GSM 850)
	512/1850.2 – 661/1880 – 810/1909.8	(GSM 1900)
	20850/2510 – 21100/2535 – 21350/2560	(LTE FDD 7)
	1/2412 – 6/2437 – 11/2462 – 12/2467 – 13/2472	(802.11b/g/n HT20)
	3/2422 – 6/2437 – 9/2452 – 10/2457- 11/2462	(802.11n HT40)
	0/2402 – 39/2441 – 78/2480	(Bluetooth)
	0/2402 – 19/2440 – 39/2480	(Bluetooth 4.0)

Auxiliary Equipment Details

AE1: Battery 1

Model:	CAC3000002C2
Manufacturer:	SCUD
S/N:	/

AE2: Battery 2

Model:	CCB0009A16C1
Manufacturer:	Juwei
S/N:	/

1.6. EUT Antenna Locations

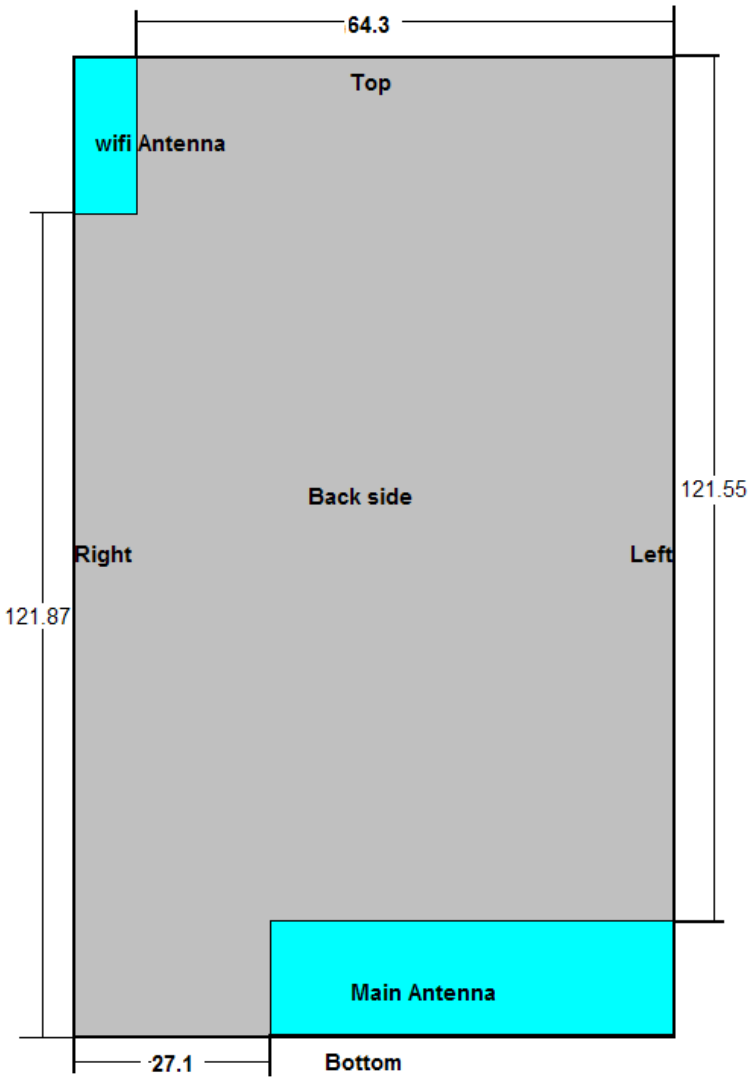

Table 1: Mobile Hotspot Sides for SAR Testing

Mode	Back Side	Front Side	Left Edge	Right Edge	Top Edge	Bottom Edge
GSM 850	Yes	Yes	Yes	No	No	Yes
GSM 1900	Yes	Yes	Yes	No	No	Yes
LTE Band 7	Yes	Yes	Yes	No	No	Yes
2.4GHz WIFI	Yes	Yes	No	Yes	Yes	No
Note: When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.						

1.7. 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)
GSM 850	Right/Cheek	251/848.8	0.311	0.348
GSM 1900	Left/Cheek	661/1880	0.198	0.218
LTE FDD 7	Left/Cheek	21100/2535	0.268	0.280
WiFi(802.11b)	Left/Cheek	6/2437	0.464	0.468

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)
GSM 850	Back Side	251/848.8	1.150	1.261
GSM 1900	Front Side	661/1880	0.475	0.524
LTE FDD 7	Back Side	21350/2560	1.270	1.393
WiFi(802.11b)	Back Side	6/2437	0.062	0.063

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)
GSM 850	Back Side	251/848.8	1.150	1.261
GSM 1900	Bottom Edge	661/1880	0.716	0.789
LTE FDD 7	Back Side	21350/2560	1.270	1.393
WiFi(802.11b)	Back Side	6/2437	0.062	0.063

1.8. Test Date

The test performed from May 3, 2014 to May 8, 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.

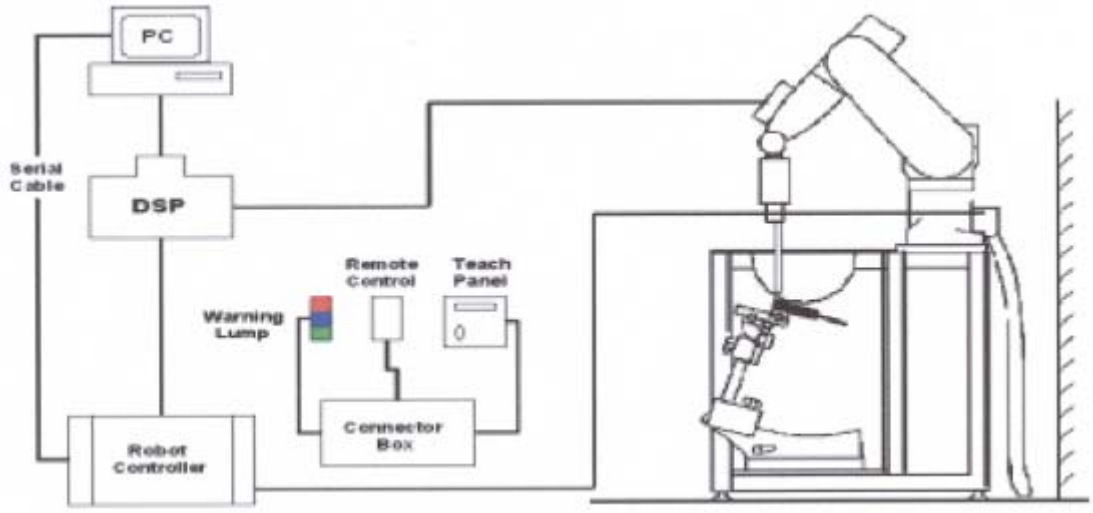

Figure 1 SAR Lab Test Measurement Set-up

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 2: 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

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

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

ρ = 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

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

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

3. Laboratory Environment

Table 3: 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 4 and table 5 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 4: 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=39.2 σ=1.80

MIXTURE%	FREQUENCY(Brain) 2600MHz
Water	55.242
Glycol	44.452
Salt	0.306
Dielectric Parameters Target Value	f=2600MHz ε=39.0 σ=1.96

Table 5: 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=52.7 σ=1.95

MIXTURE%	FREQUENCY (Body) 2600MHz
Water	72.6
Glycol monobutyl	27.3
Salt	0.1
Dielectric Parameters Target Value	f=2600MHz ε=52.5 σ=2.16

4.2. Tissue-equivalent Liquid Properties

Table 6: 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)	2014-5-3	21.5	41.4	0.93	41.5	0.90	-0.24%	3.33%
1900MHz (head)	2014-5-6	21.5	39.6	1.43	40.0	1.40	-1.00%	2.14%
2450MHz (head)	2014-5-7	21.5	39.1	1.80	39.2	1.80	-0.26%	0.00%
2600MHz (head)	2014-5-7	21.5	38.6	1.98	39.0	1.96	-1.03%	1.02%
835MHz (body)	2014-5-6	21.5	55.9	0.98	55.2	0.97	1.27%	1.03%
1900MHz (body)	2014-5-7	21.5	53.1	1.52	53.3	1.52	-0.38%	0.00%
2450MHz (body)	2014-5-8	21.5	52.1	1.99	52.7	1.95	-1.14%	2.05%
2600MHz (body)	2014-5-5	21.5	52.3	2.20	52.5	2.16	-0.38%	1.85%

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 7 and table 8.

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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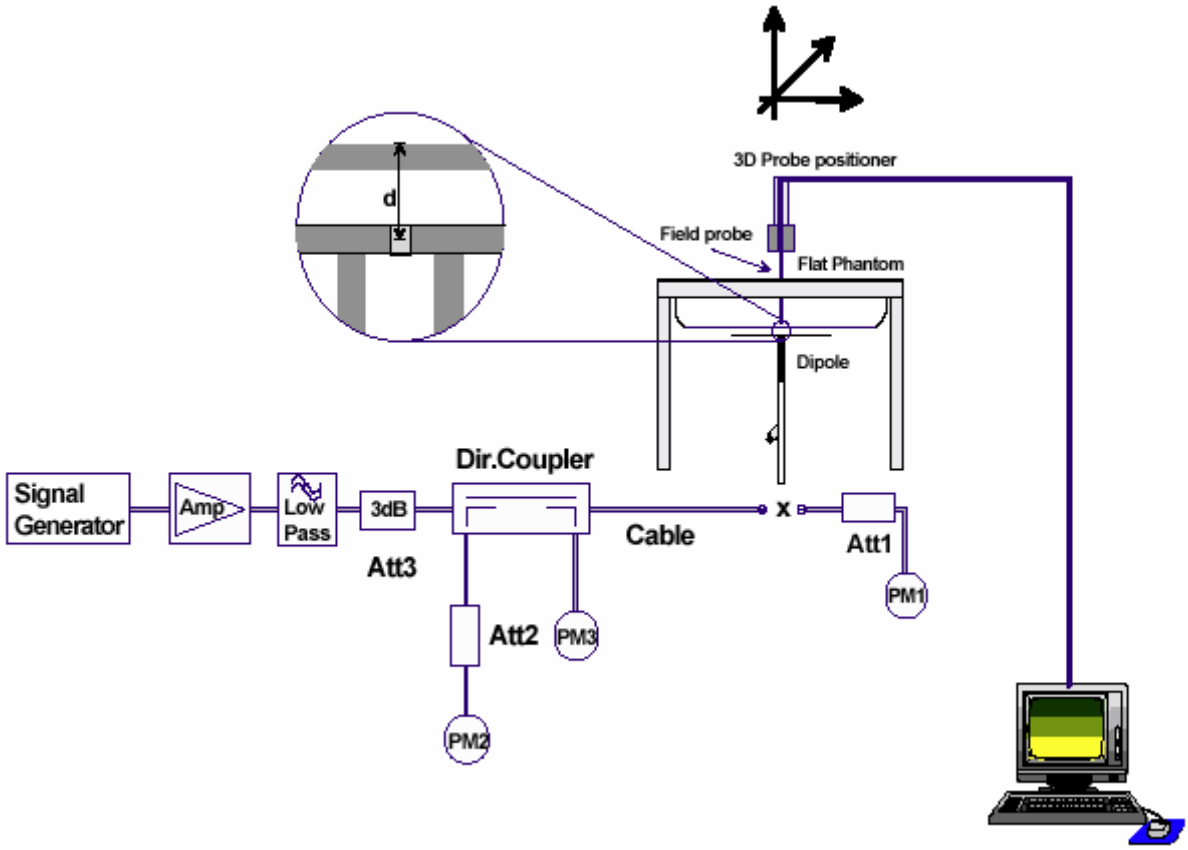


Figure 6 System Check Set-up

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

Dipole D2600V2 SN: 1012				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
5/2/2012	-25	/	48	/
5/1/2013	-23.5	6%	46.6	1.4Ω
4/29/2014	-24.1	3.6%	47.3	0.7Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
5/2/2012	-23.6	/	45	/
5/1/2013	-24.5	3.8%	43.2	1.8Ω
4/29/2014	-22.9	3.0%	43.6	1.4Ω

5.2. System Check Results

Table 7: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(℃)	(W/kg)			
835MHz	2014-5-3	41.4	0.93	21.5	2.44	9.76	9.34	4.50%
1900MHz	2014-5-6	39.6	1.43	21.5	9.48	37.92	40.30	-5.91%
2450MHz	2014-5-7	39.1	1.80	21.5	13.70	54.80	53.80	1.86%
2600MHz	2014-5-7	38.6	1.98	21.5	13.90	55.60	57.00	-2.46%

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

Table 8: System Check in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(℃)	(W/kg)			
835MHz	2014-5-6	55.9	0.98	21.5	2.41	9.64	9.46	1.90%
1900MHz	2014-5-7	53.1	1.52	21.5	9.93	39.72	41.70	-4.75%
2450MHz	2014-5-8	52.1	1.99	21.5	12.50	50.00	51.70	-3.29%
2600MHz	2014-5-5	52.3	2.20	21.5	13.50	54.00	54.30	-0.55%

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. GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using CMW 500 the power level is set to “5” for GSM 850, set to “0” for GSM 1900. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5. Since the EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

Output power of reductions:

Table 9: The allowed power reduction in the multi-slot configuration

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power,(dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

6.4.2. LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

A)Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

B)MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

C)A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

4) Higher order modulations
For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

E) Other channel bandwidth standalone SAR test requirements
For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the *reported* SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

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 18 for 802.11 b 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.

7. Test Results

7.1. Conducted Power Results

Table 10: Conducted Power Measurement Results

GSM 850		Burst Conducted Power(dBm)			/	Average power(dBm)		
		Channel 128	Channel 190	Channel 251		Channel 128	Channel 190	Channel 251
GSM		31.49	31.59	31.51	-9.03dB	22.46	22.56	22.48
GPRS (GMSK)	1Txslot	31.38	31.54	31.39	-9.03dB	22.35	22.51	22.36
	2Txslots	30.89	31.06	30.98	-6.02dB	24.87	25.04	24.96
	3Txslots	29.49	29.65	29.65	-4.26dB	25.23	25.39	25.39
	4Txslots	28.49	28.63	28.60	-3.01dB	**25.48**	**25.62**	**25.59**
EGPRS (GMSK)	1Txslot	31.55	31.67	31.54	-9.03dB	22.52	22.64	22.51
	2Txslots	31.07	31.17	31.10	-6.02dB	25.05	25.15	25.08
	3Txslots	29.64	29.77	29.77	-4.26dB	25.38	25.51	25.51
	4Txslots	28.62	28.74	28.73	-3.01dB	**25.61**	**25.73**	**25.72**
EGPRS (8PSK)	1Txslot	26.79	27.01	26.90	-9.03dB	17.76	17.98	17.87
	2Txslots	25.81	25.96	25.92	-6.02dB	19.79	19.94	19.90
	3Txslots	23.78	24.02	24.00	-4.26dB	19.52	19.76	19.74
	4Txslots	22.91	23.05	23.03	-3.01dB	19.90	20.04	20.02
GSM 1900		**Burst Conducted Power(dBm)**			/	**Average power(dBm)**		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM		28.69	28.68	28.62	-9.03dB	19.66	19.65	19.59
GPRS (GMSK)	1Txslot	28.68	28.67	28.58	-9.03dB	19.65	19.64	19.55
	2Txslots	28.07	28.02	27.95	-6.02dB	22.05	22.00	21.93
	3Txslots	26.50	26.40	26.35	-4.26dB	22.24	22.14	22.09
	4Txslots	25.48	25.37	25.38	-3.01dB	**22.47**	**22.36**	**22.37**
EGPRS (GMSK)	1Txslot	28.75	28.78	28.73	-9.03dB	19.72	19.75	19.70
	2Txslots	28.15	28.15	28.12	-6.02dB	22.13	22.13	22.10
	3Txslots	26.58	26.55	16.53	-4.26dB	22.32	22.29	12.27
	4Txslots	25.61	25.38	25.49	-3.01dB	**22.60**	**22.51**	**22.48**
EGPRS (8PSK)	1Txslot	25.67	26.10	25.90	-9.03dB	16.64	17.07	16.87
	2Txslots	24.75	25.22	25.02	-6.02dB	18.73	19.20	19.00
	3Txslots	22.64	23.26	22.96	-4.26dB	18.38	19.00	18.70
	4Txslots	21.56	22.12	21.67	-3.01dB	18.55	19.11	18.66

Note:

1) Division Factors

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

1Txslot = 1 transmit time slot out of 8 time slots

=> conducted power divided by (8/1) => -9.03 dB
2Txslots = 2 transmit time slots out of 8 time slots
=> conducted power divided by (8/2) => -6.02 dB
3Txslots = 3 transmit time slots out of 8 time slots
=> conducted power divided by (8/3) => -4.26 dB
4Txslots = 4 transmit time slots out of 8 time slots
=> conducted power divided by (8/4) => -3.01 dB

2) Average power numbers
The maximum power numbers are marks in bold.

LTE FDD Band VII				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel 20775	Channel 21100	Channel 21425
5MHz	QPSK	1	0	21.23	21.50	21.21
		1	13	21.32	21.45	21.11
		1	24	21.26	21.46	21.13
		12	0	20.38	20.54	20.27
		12	6	20.47	20.70	20.27
		12	13	20.23	20.56	20.15
		25	0	20.33	20.58	20.23
	16QAM	1	0	20.44	20.89	20.30
		1	13	20.40	20.57	20.31
		1	24	20.30	20.61	20.47
		12	0	19.42	19.82	19.69
		12	6	19.56	19.68	19.74
		12	13	19.31	19.45	19.54
		25	0	19.41	19.82	19.67
Bandwidth	Modulation	RB size	RB offset	Channel 20800	Channel 21100	Channel 21400
10MHz	QPSK	1	0	21.30	21.49	21.16
		1	25	21.28	21.37	21.15
		1	49	21.30	21.44	21.19
		25	0	20.42	20.52	20.23
		25	13	20.48	20.58	20.28
		25	25	20.27	20.54	20.11
		50	0	20.37	20.56	20.19

	16QAM	1	0	20.48	20.87	20.26
		1	25	20.40	20.51	20.30
		1	49	20.34	20.59	20.43
		25	0	19.46	19.80	19.65
		25	13	19.61	19.62	19.64
		25	25	19.35	19.43	19.50
		50	0	19.38	19.85	19.63
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20825	21100	21375
15MHz	QPSK	1	0	21.25	21.44	21.13
		1	38	21.24	21.34	21.15
		1	74	21.21	21.23	21.13
		36	0	20.33	20.49	20.13
		36	18	20.46	20.48	20.22
		36	39	20.28	20.51	20.04
		75	0	20.35	20.53	20.13
	16QAM	1	0	20.46	20.82	20.20
		1	38	20.33	20.48	20.24
		1	74	20.32	20.56	20.34
		36	0	19.44	19.57	19.59
		36	18	19.52	19.59	19.50
		36	39	19.33	19.40	19.44
		75	0	19.16	19.54	19.54
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20850	21100	21350
20MHz	QPSK	1	0	21.38	21.41	21.20
		1	50	21.30	21.31	21.19
		1	99	21.21	21.21	21.14
		50	0	20.39	20.46	20.08
		50	25	20.45	20.40	20.17
		50	50	20.34	20.48	19.99
		100	0	20.46	20.50	20.05
	16QAM	1	0	20.52	20.56	20.15
		1	50	20.39	20.45	20.19

		1	99	20.31	20.38	20.24
		50	0	19.50	19.47	19.54
		50	25	19.49	19.56	19.45
		50	50	19.39	19.37	19.34
		100	0	19.27	19.42	19.49

The average output power of BT antenna is as following:

Channel	**Ch 0 2402 MHz**	**Ch 39 2441 MHz**	**Ch 78 2480 MHz**
GFSK(dBm)	3.07	4.07	1.41
π/4DQPSK(dBm)	1.11	1.84	-0.96
8DPSK(dBm)	1.11	1.85	-0.96
BT 4.0 Channel	**Ch 0 2402 MHz**	**Ch 19 2440 MHz**	**Ch 39 2480 MHz**
Test results(dBm)	-4.29	-3.81	-7.15

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
802.11b	1	1	14.30
		2	14.28
		5.5	14.22
		11	13.92
	6	1	14.46
		2	14.38
		5.5	14.42
		11	14.01
	11	1	13.43
		2	13.52
		5.5	13.10
		11	12.77
	12	1	7.76
		2	6.64
		5.5	7.05
		11	6.56
	13	1	6.87
		2	6.64
		5.5	7.15
		11	6.46
	1	6	11.00
		9	10.82
		12	10.58
		18	10.23
		24	9.77

802.11g		36	9.20
		48	8.72
		54	8.56
	6	6	12.28
		9	12.01
		12	11.87
		18	11.57
		24	11.15
		36	10.61
		48	10.02
		54	9.85
	11	6	11.18
		9	11.24
		12	11.03
		18	10.52
		24	10.02
		36	9.37
		48	9.02
		54	8.81
	12	6	7.73
		9	7.41
		12	7.31
		18	7.01
		24	6.96
		36	6.79
		48	6.78
		54	6.74
	13	6	7.23
		9	7.22
		12	7.21
		18	7.01
		24	6.86
		36	6.78
		48	6.68
		54	6.64
	1	MCS0	10.92
		MCS1	10.50
		MCS2	10.28
		MCS3	9.65
		MCS4	9.14

802.11n HT20		MCS5	8.71
		MCS6	8.55
		MCS7	8.38
	6	MCS0	12.24
		MCS1	11.85
		MCS2	11.52
		MCS3	10.91
		MCS4	10.51
		MCS5	9.98
		MCS6	9.81
		MCS7	9.68
	11	MCS0	11.11
		MCS1	10.62
		MCS2	10.31
		MCS3	10.02
		MCS4	9.51
		MCS5	9.07
		MCS6	8.82
		MCS7	8.43
	12	MCS0	7.76
		MCS1	7.41
		MCS2	7.44
		MCS3	7.31
		MCS4	6.98
		MCS5	6.88
		MCS6	6.57
		MCS7	7.16
	13	MCS0	7.11
		MCS1	7.04
		MCS2	7.01
		MCS3	6.86
		MCS4	6.78
		MCS5	6.37
		MCS6	6.19
		MCS7	7.76
	3	MCS0	8.96
		MCS1	8.12
		MCS2	7.56
		MCS3	7.16
		MCS4	6.52

802.11n HT40		MCS5	6.05
		MCS6	5.83
		MCS7	5.77
	6	MCS0	11.02
		MCS1	10.15
		MCS2	9.18
		MCS3	9.03
		MCS4	8.34
		MCS5	8.03
		MCS6	7.81
		MCS7	7.48
	9	MCS0	9.92
		MCS1	9.12
		MCS2	8.85
		MCS3	8.08
		MCS4	7.44
		MCS5	7.13
		MCS6	7.08
		MCS7	6.85
	10	MCS0	7.86
		MCS1	7.52
		MCS2	7.43
		MCS3	7.13
		MCS4	7.09
		MCS5	7.02
		MCS6	7.59
		MCS7	7.42
	11	MCS0	7.76
		MCS1	7.42
		MCS2	7.23
		MCS3	7.11
		MCS4	7.05
		MCS5	7.00
		MCS6	7.55
		MCS7	7.44

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:

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

Based on the above equation, Bluetooth SAR was not required;
Head Evaluation = $[10^{(4.8/10)}/5] * (2.480^{1/2}) = 0.95 < 3.0$
Body Evaluation = $[10^{(4.8/10)}/10] * (2.480^{1/2}) = 0.48 < 3.0$

Based on the above equation, WIFI SAR was required;
Head Evaluation = $[10^{(14.5/10)}/5]* (2.462^{1/2)} = 8.84 > 3.0$
Body Evaluation = $[10^{(14.5/10)}/10]* (2.462^{1/2)} = 4.42 > 3.0$

7.3. SAR Test Results

7.3.1. GSM 850 (GSM/GPRS/EGPRS)

Table 11: SAR Values [GSM 850 (GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	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	251/848.8	GSM	1:8.3	32	31.51	-0.010	0.297	1.12	0.332	/
	190/836.6	GSM	1:8.3	32	31.59	-0.088	0.275	1.10	0.302	/
	128/824.4	GSM	1:8.3	32	31.49	0.032	0.231	1.12	0.260	/
Left/Tilt	251/848.8	GSM	1:8.3	32	31.51	0.080	0.185	1.12	0.207	/
	190/836.6	GSM	1:8.3	32	31.59	0.050	0.179	1.10	0.197	/
	128/824.4	GSM	1:8.3	32	31.49	0.080	0.146	1.12	0.164	/
Right/Cheek	251/848.8	GSM	1:8.3	32	31.51	0.037	0.311	1.12	0.348	Figure15
	190/836.6	GSM	1:8.3	32	31.59	0.042	0.298	1.10	0.328	/
	128/824.4	GSM	1:8.3	32	31.49	0.025	0.242	1.12	0.272	/
Right/Tilt	251/848.8	GSM	1:8.3	32	31.51	0.080	0.191	1.12	0.214	/
	190/836.6	GSM	1:8.3	32	31.59	0.090	0.186	1.10	0.204	/
	128/824.4	GSM	1:8.3	32	31.49	0.110	0.149	1.12	0.168	/
Test position of Body (Distance 10mm)										
Back Side	251/848.8	4Txslots	1:2.07	29	28.6	0.030	1.150	1.10	1.261	Figure16
	190/836.6	4Txslots	1:2.07	29	28.63	-0.080	1.020	1.09	1.111	/
	128/824.4	4Txslots	1:2.07	29	28.49	0.020	0.856	1.12	0.963	/
Front Side	190/836.6	4Txslots	1:2.07	29	28.63	-0.090	0.729	1.09	0.794	/
Left Edge	190/836.6	4Txslots	1:2.07	29	28.63	-0.120	0.491	1.09	0.535	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	190/836.6	4Txslots	1:2.07	29	28.63	-0.028	0.185	1.09	0.201	/
Worst Case Position of Body with EGPRS (Distance 10mm)										
Back Side	251/848.8	4Txslots	1:2.07	29	28.73	-0.010	1.120	1.10	1.192	/
Worst Case Position of Body with Earphone (Distance 10mm)										
Back Side	251/848.8	GSM	1:8.3	32	31.51	-0.02	0.474	1.12	0.531	/
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										
Back Side	251/848.8	4Txslots	1:2.07	29	28.6	-0.100	1.080	1.10	1.184	/

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

2. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

Table 12: SAR Measurement Variability Results [GSM 850(GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	251/848.8	1.150	1.080	1.06	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

7.3.2. GSM 1900 (GSM/GPRS/EGPRS)

Table 13: SAR Values [GSM 1900(GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	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	810/1909.8	GSM	1:8.3	29.1	28.62	0.150	0.182	1.12	0.203	/
	661/1880	GSM	1:8.3	29.1	28.68	0.020	0.198	1.10	0.218	Figure17
	512/1850.2	GSM	1:8.3	29.1	28.69	0.140	0.198	1.10	0.218	/
Left/Tilt	810/1909.8	GSM	1:8.3	29.1	28.62	0.130	0.102	1.12	0.114	/
	661/1880	GSM	1:8.3	29.1	28.68	0.020	0.099	1.10	0.109	/
	512/1850.2	GSM	1:8.3	29.1	28.69	0.050	0.114	1.10	0.125	/
Right/Cheek	810/1909.8	GSM	1:8.3	29.1	28.62	0.120	0.157	1.12	0.175	/
	661/1880	GSM	1:8.3	29.1	28.68	0.050	0.161	1.10	0.177	/
	512/1850.2	GSM	1:8.3	29.1	28.69	0.080	0.175	1.10	0.192	/
Right/Tilt	810/1909.8	GSM	1:8.3	29.1	28.62	0.024	0.087	1.12	0.098	/
	661/1880	GSM	1:8.3	29.1	28.68	0.040	0.097	1.10	0.107	/
	512/1850.2	GSM	1:8.3	29.1	28.69	0.130	0.110	1.10	0.121	/
Test position of Body (Distance 10mm)										
Back Side	661/1880	4Txslots	1:2.07	26.3	25.37	-0.038	0.455	1.10	0.502	/
Front Side	661/1880	4Txslots	1:2.07	26.3	25.37	0.011	0.475	1.10	0.524	/
Left Edge	661/1880	4Txslots	1:2.07	26.3	25.37	0.023	0.248	1.10	0.274	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	661/1880	4Txslots	1:2.07	26.3	25.37	0.024	0.706	1.10	0.779	/
Worst Case Position of Body with EGPRS (Distance 10mm)										
Bottom Edge	661/1880	4Txslots	1:2.07	26.3	25.38	0.150	0.716	1.10	0.789	Figure18

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

2. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

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.

7.3.3. LTE Band 7

Table 14: SAR Values (LTE Band 7/20MHz)

Test Position	Channel/ Frequency (MHz)	Mode	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 with 1RB, 20M, QPSK										
Left/Cheek	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.083	0.268	1.04	0.280	Figure19
Left/Tilt	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.044	0.090	1.04	0.094	/
Right/Cheek	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.029	0.171	1.04	0.179	/
Right/Tilt	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.042	0.163	1.04	0.170	/
Test Position of Head with 50%, 20M, QPSK										
Left/Cheek	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	0.195	0.204	1.03	0.210	/
Left/Tilt	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	-0.138	0.052	1.03	0.053	/
Right/Cheek	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	0.044	0.131	1.03	0.135	/
Right/Tilt	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	0.073	0.126	1.03	0.130	/
Test position of Body with 1RB, 20M, QPSK (Distance 10mm)										
Back Side	21350/2560	1RB 0 Offset	1:1	21.6	21.20	0.110	1.270	1.10	1.393	Figure20
	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.150	1.320	1.04	1.379	/
	20850/2510	1RB 0 Offset	1:1	21.6	21.38	0.110	1.210	1.05	1.273	/
Front Side	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.190	0.546	1.04	0.570	/
Left Edge	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.050	0.179	1.04	0.187	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	21350/2560	1RB 0 Offset	1:1	21.6	21.20	-0.028	1.020	1.10	1.118	/
	21100/2535	1RB 0 Offset	1:1	21.6	21.41	-0.036	1.080	1.04	1.128	/
	20850/2510	1RB 0 Offset	1:1	21.6	21.38	-0.025	1.010	1.05	1.062	/
Test position of Body with 50%RB, 20M, QPSK (Distance 10mm)										
Back Side	21350/2560	50%RB 25 Offset	1:1	20.6	20.17	0.190	0.996	1.10	1.100	/
	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	0.100	1.050	1.03	1.079	/
	20850/2510	50%RB 25 Offset	1:1	20.6	20.45	0.031	0.995	1.04	1.030	/
Front Side	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	0.150	0.461	1.03	0.474	/
Left Edge	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	0.140	0.139	1.03	0.143	/
Right Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	21350/2560	50%RB 25 Offset	1:1	20.6	20.17	0.130	0.839	1.10	0.926	/
	21100/2535	50%RB 50 Offset	1:1	20.6	20.48	-0.033	0.836	1.03	0.859	/
	20850/2510	50%RB 25 Offset	1:1	20.6	20.45	0.025	0.870	1.04	0.901	/
Test position of Body with 100%RB, 20M, QPSK (Distance 10mm)										
Back Side	21100/2535	100%RB 0 Offset	1:1	20.6	20.50	0.03	1.020	1.02	1.044	/
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										
Back Side	21100/2535	1RB 0 Offset	1:1	21.6	21.41	0.03	1.280	1.04	1.337	/

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

Table 15: SAR Measurement Variability Results (LTE Band 7/20MHz)

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	21100/2535	1.320	1.280	1.03	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

7.3.4. WIFI (802.11b/g/n)

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

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	14.5	14.46	0.045	0.464	1.01	0.468	Figure21
Left/Tilt	6/2437	DSSS	1:1	14.5	14.46	0.060	0.233	1.01	0.235	/
Right/Cheek	6/2437	DSSS	1:1	14.5	14.46	-0.060	0.162	1.01	0.163	/
Right/Tilt	6/2437	DSSS	1:1	14.5	14.46	0.140	0.142	1.01	0.143	/
Test position of Body (Distance 10mm)										
Back Side	6/2437	DSSS	1:1	14.5	14.46	-0.052	0.062	1.01	0.063	Figure22
Front Side	6/2437	DSSS	1:1	14.5	14.46	-0.030	0.031	1.01	0.031	/
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Right Edge	6/2437	DSSS	1:1	14.5	14.46	0.034	0.023	1.01	0.024	/
Top Edge	6/2437	DSSS	1:1	14.5	14.46	0.180	0.051	1.01	0.052	/
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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. 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.

7.4. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	SimultaneousTransmissions	Voice Over Digital Transport (Data)
GSM	850	Voice	Yes BT or WIFI	NA
	1900	Voice		
	850	Data	Yes BT or WIFI	
	1900	Data		
LTE	2600	Data	Yes BT or WIFI	
WIFI	2450	Data	Yes GSM/WCDMA/LTE, GPRS,EGPRS,	Yes
Bluetooth (BT)	2450	Data	Yes GSM/WCDMA/LTE, GPRS,EGPRS,	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.

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

So，Head Estimated $SAR_{Max.BT}$ = $[10^{(4.8/10)}/5]$ * $(2.480^{1/2}/7.5)$= 0.13 W/kg
Body Estimated $SAR_{Max.BT}$ = $[10^{(4.8/10)}/10]$ * $(2.480^{1/2}/7.5)$= 0.06 W/kg

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.

$$\text{Ratio} = \frac{(SAR_1 + SAR_2)^{1.5}}{\text{(peak location separation, mm)}} < 0.04$$

About BT and GSM/LTE antenna

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	LTE 7	BT	MAX. ΣSAR_{1g}	Peak location separation ratio
Left, Touch	**0.332**	0.218	0.280	**0.13**	0.462	NA
Left, Tilt	**0.207**	0.125	0.094	**0.13**	0.337	NA
Right, Touch	**0.348**	0.192	0.179	**0.13**	0.478	NA
Right, Tilt	**0.214**	0.121	0.170	**0.13**	0.344	NA
Back Side	1.261	0.502	**1.393**	**0.06**	1.453	NA
Front Side	**0.794**	0.524	0.570	**0.06**	0.854	NA
Left Edge	**0.535**	0.274	0.187	**0.06**	0.595	NA
Right Edge	NA	NA	NA	**0.06**	NA	NA
Top Edge	NA	NA	NA	**0.06**	NA	NA
Bottom Edge	0.201	0.789	**1.128**	**0.06**	1.188	NA
Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value. 2. MAX. ΣSAR_{1g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}						

MAX. ΣSAR_{1g} = 1.453 W/kg <1.6 W/kg, so the Simultaneous transimition SAR with volum scan are not required for BT and GSM/LTE antenna.

About WIFI and GSM/LTE antenna

SAR_{1g}(W/kg) Test Position	GSM 850	GSM 1900	LTE 7	WIFI	MAX. ΣSAR_{1g}	Peak location separation ratio
Left, Touch	**0.332**	0.218	0.280	**0.468**	0.800	NA
Left, Tilt	**0.207**	0.125	0.094	**0.235**	0.442	NA
Right, Touch	**0.348**	0.192	0.179	**0.163**	0.511	NA
Right, Tilt	**0.214**	0.121	0.170	**0.143**	0.357	NA
Back Side	1.261	0.502	**1.393**	**0.063**	1.456	NA
Front Side	**0.794**	0.524	0.570	**0.031**	0.825	NA
Left Edge	**0.535**	0.274	0.187	NA	NA	NA
Right Edge	NA	NA	NA	**0.024**	NA	NA
Top Edge	NA	NA	NA	**0.052**	NA	NA
Bottom Edge	0.201	0.789	**1.128**	NA	NA	NA

Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.
2. MAX. ΣSAR_{1g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. ΣSAR_{1g} = 1.456 W/kg <1.6 W/kg, so the Simultaneous transimition SAR with volum scan are not required for WIFI and GSM/LTE antenna.

WIFI & BT Mode

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 17: List of Main Instruments

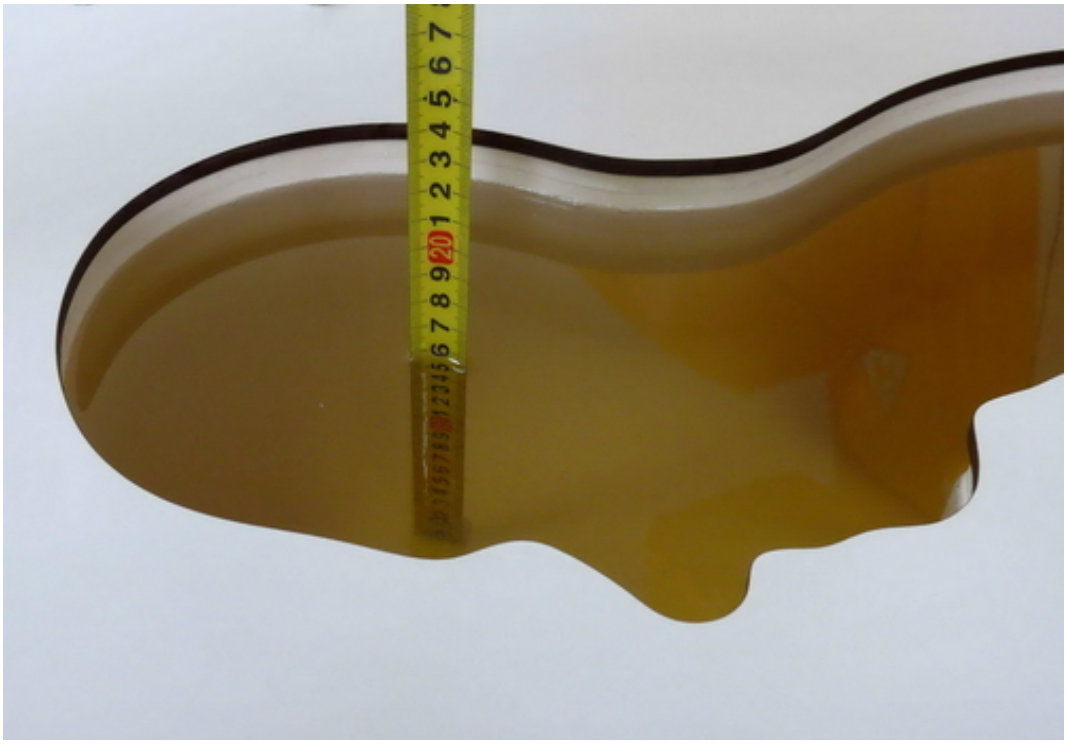
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 10, 2013	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 9, 2014	One year
04	Power sensor	Agilent N8481H	MY50350004	September 23, 2013	One year
05	Power sensor	E9327A	US40441622	January 1, 2014	One year
06	Signal Generator	HP 8341B	2730A00804	September 9,2013	One year
07	Dual directional coupler	778D-012	50519	March 24, 2014	One year
08	Dual directional coupler	777D	50146	March 24, 2014	One year
09	Amplifier	IXA-020	0401	No Calibration Requested	
10	Wideband radio communication tester	CMW 500	113645	August 29, 2013	One year
11	E-field Probe	EX3DV4	3677	November 28, 2013	One year
12	E-field Probe	EX3DV4	3816	June 4, 2013	One year
13	DAE	DAE4	1317	January 16, 2014	One year
14	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Three years
15	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Three years
16	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Three years
17	Validation Kit 2600MHz	D2600V2	1012	May 02, 2012	Three years
18	Temperature Probe	JM222	AA1009129	March 13, 2014	One year
19	Hygrothermograph	WS-1	64591	September 26, 2013	One year

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

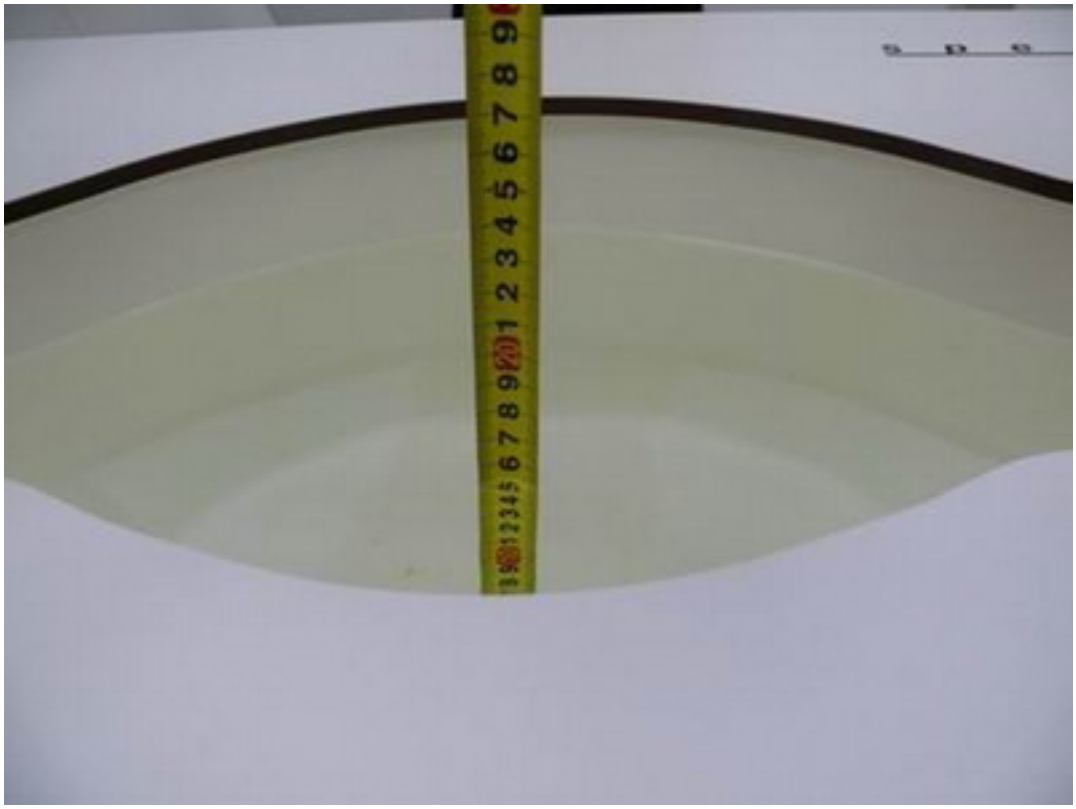
ANNEX A: Test Layout

Picture 1: Specific Absorption Rate Test Layout

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

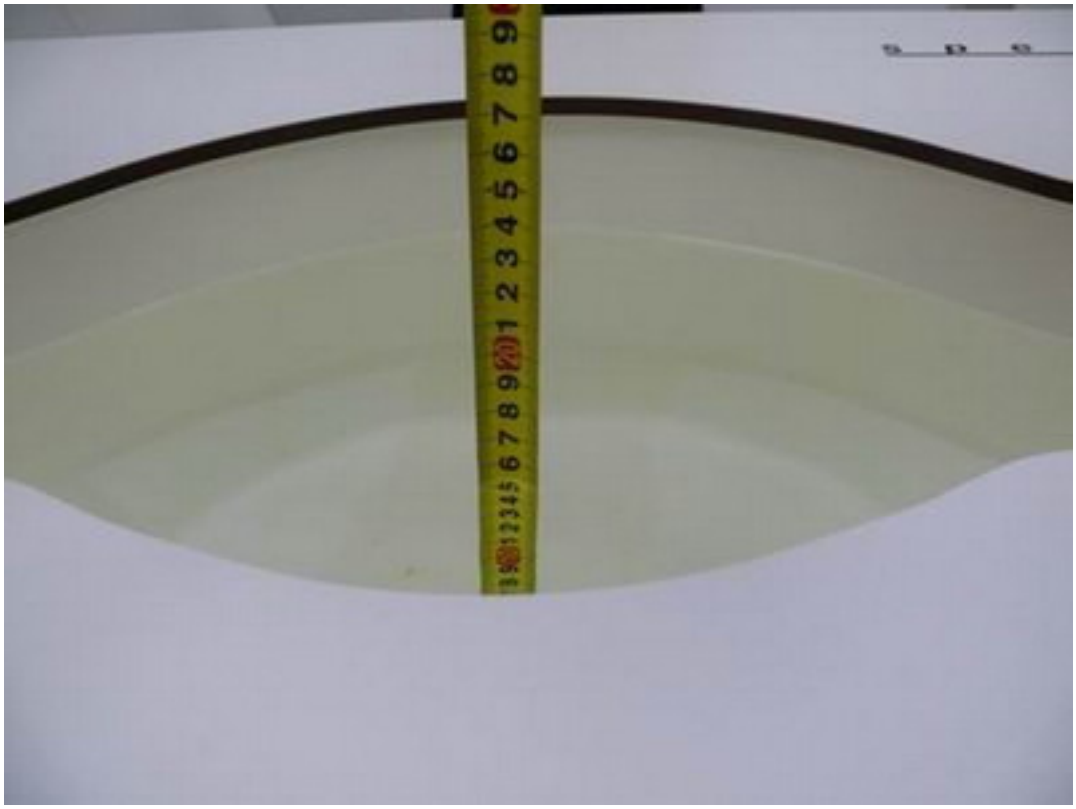


Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



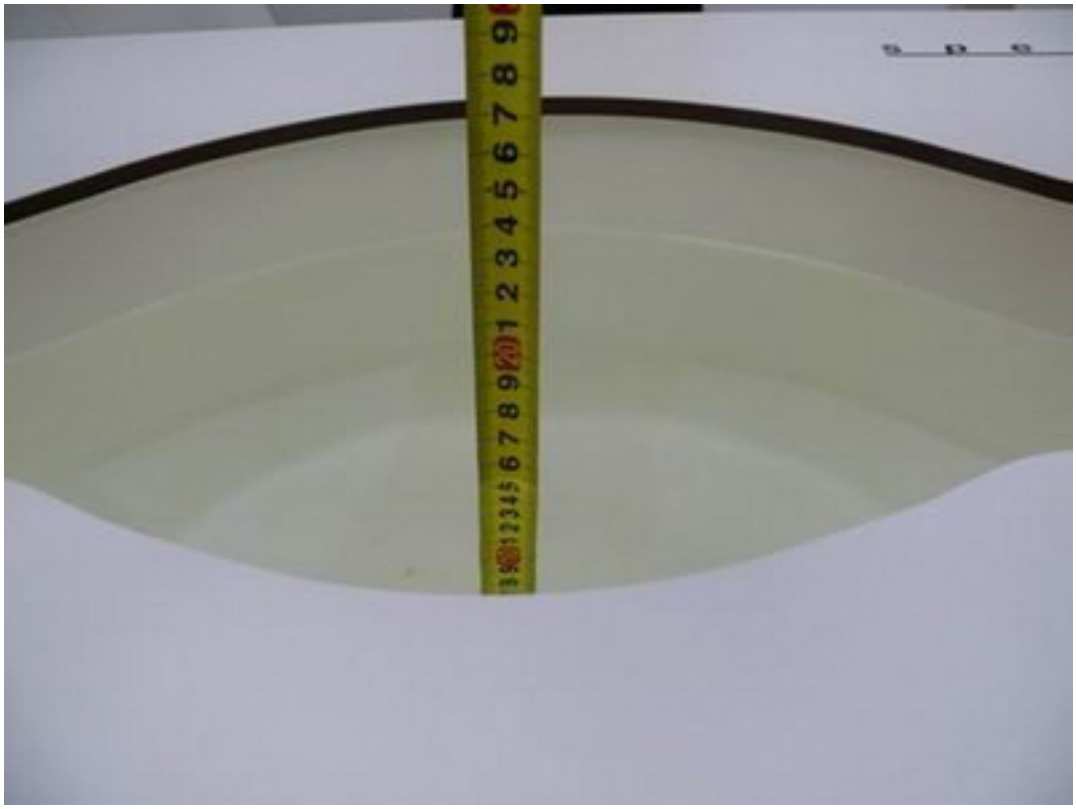
Picture 4: Liquid depth in the flat Phantom (1900 MHz, 15.2cm depth)

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)



Picture 8: Liquid depth in the flat Phantom (2600 MHz, 15.3cm depth)

Picture 9: Liquid depth in the head Phantom (2600 MHz, 15.4cm depth)

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

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

Date: 5/3/2014

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

Medium parameters used: f = 835 MHz; σ = 0.93 mho/m; ε_r = 41.4; 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=15mm, dy=15mm

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

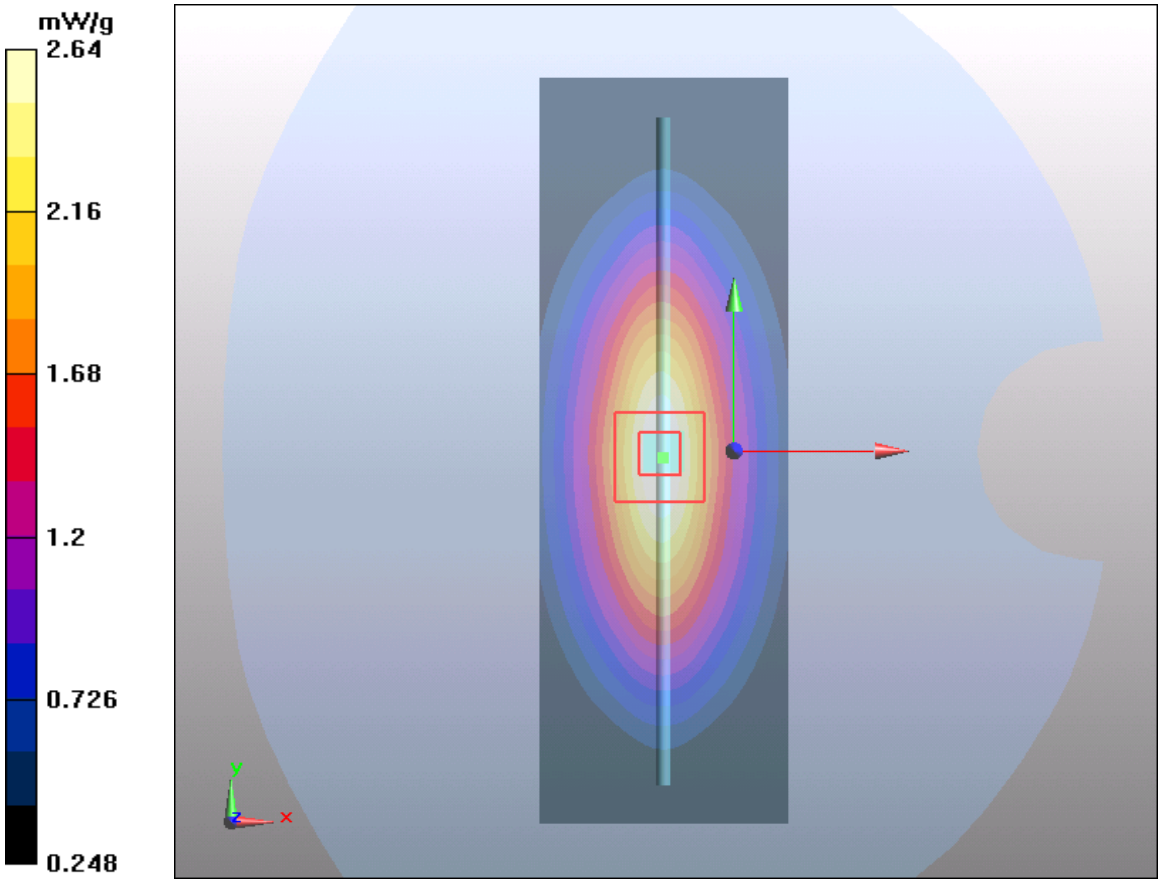


Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

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

Date: 5/6/2014

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

Medium parameters used: f = 835 MHz; σ = 0.98 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 – 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=15mm, dy=15mm

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

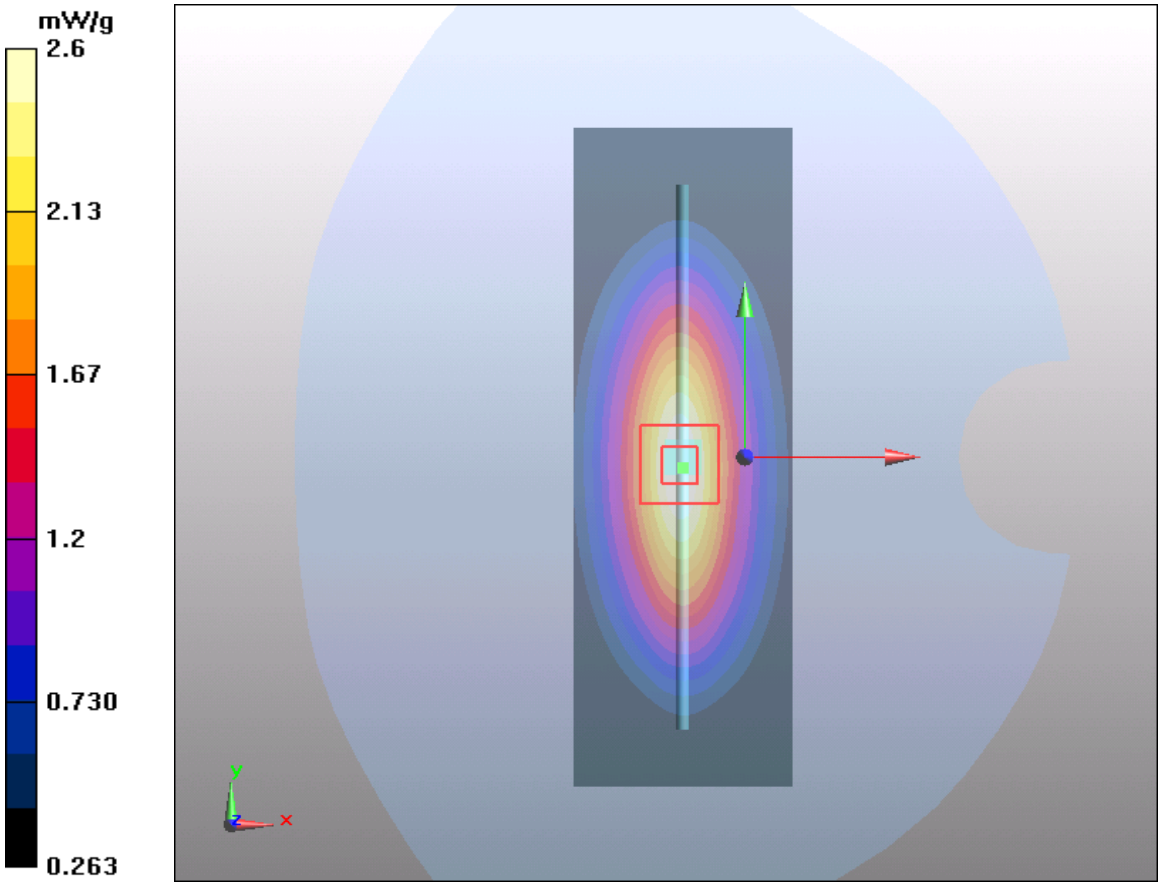


Figure 8 System Performance Check 835MHz 250Mw

System Performance Check at 1900 MHz Head TSL

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

Date: 5/6/2014

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=15mm, dy=15mm

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

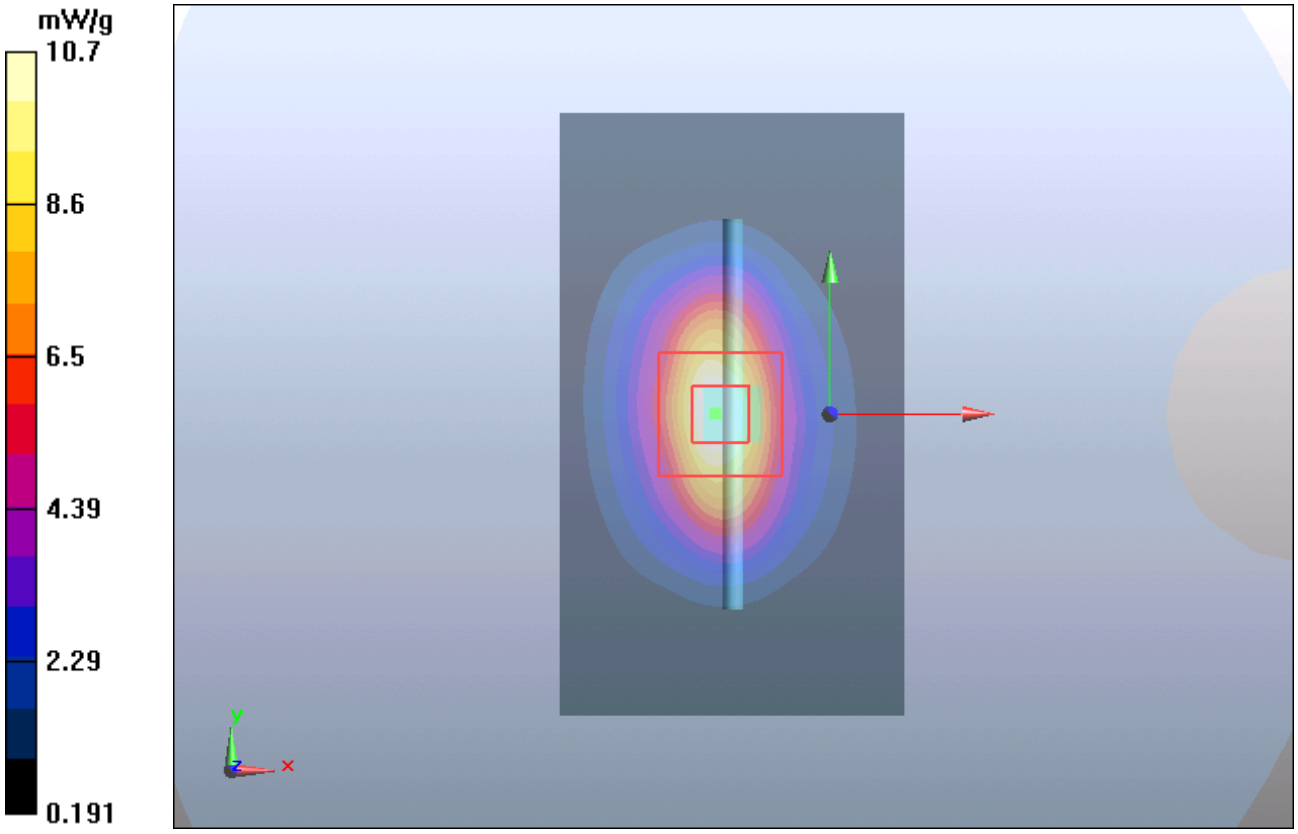


Figure 9 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

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

Date: 5/7/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 53.1; 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(7.63, 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=15mm, dy=15mm

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

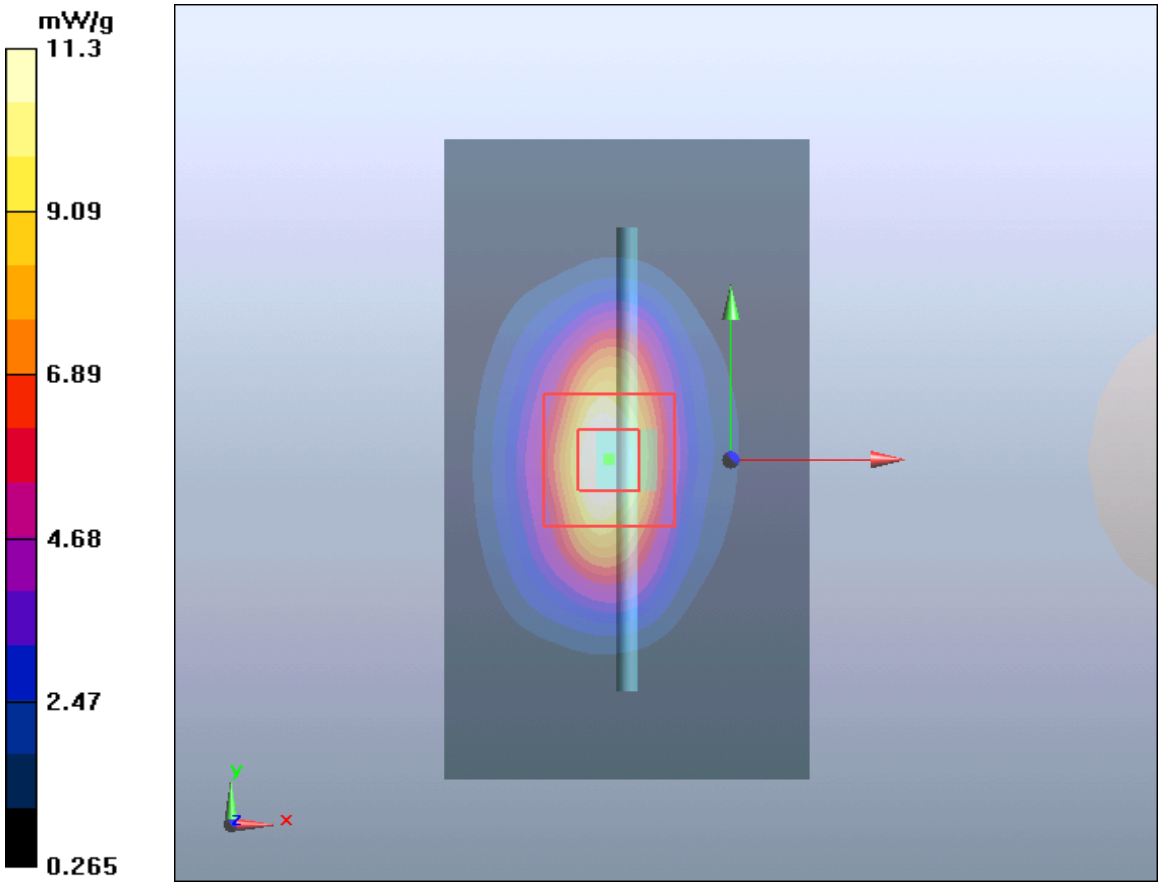


Figure 10 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

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

Date: 5/7/2014

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=10mm, dy=10mm

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

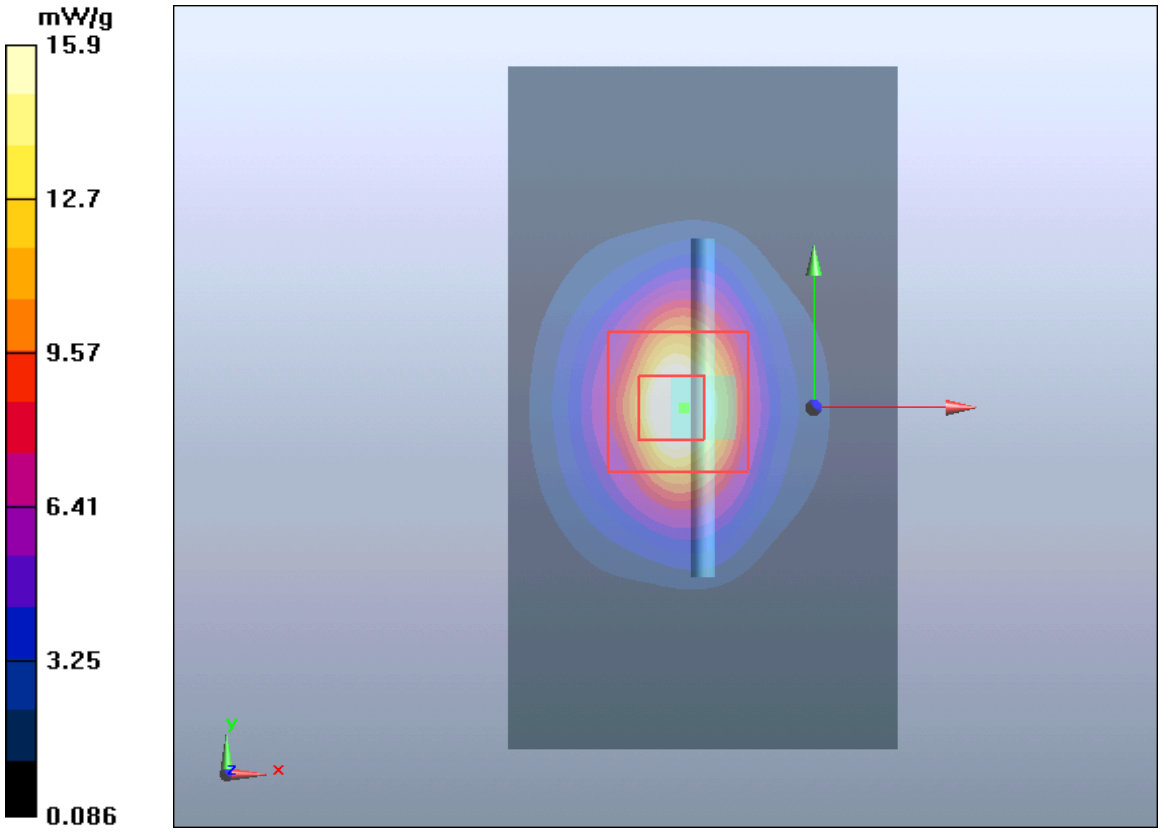


Figure 11 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

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

Date: 5/8/2014

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=10mm, dy=10mm

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

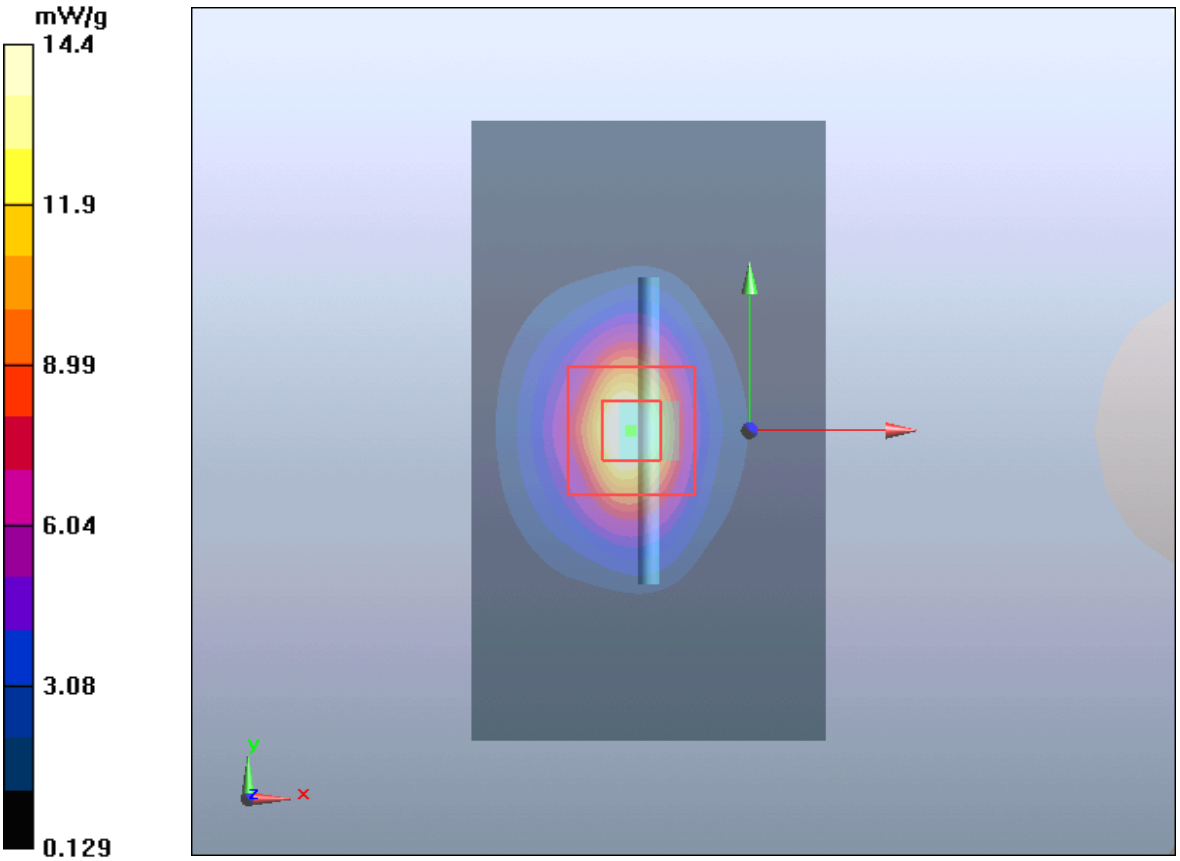


Figure 12 System Performance Check 2450MHz 250mW

System Performance Check at 2600 MHz Head TSL

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1012

Date: 5/7/2014

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz; σ = 1.98 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.26, 7.26, 7.26); Calibrated: 6/4/2013

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)

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

Maximum value of SAR (interpolated) = 17.439 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm

Reference Value = 87.998 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 31.858 W/kg

SAR(1 g) = 13.9 mW/g; SAR(10 g) = 6.07 mW/g

Maximum value of SAR (measured) = 15.617 mW/g

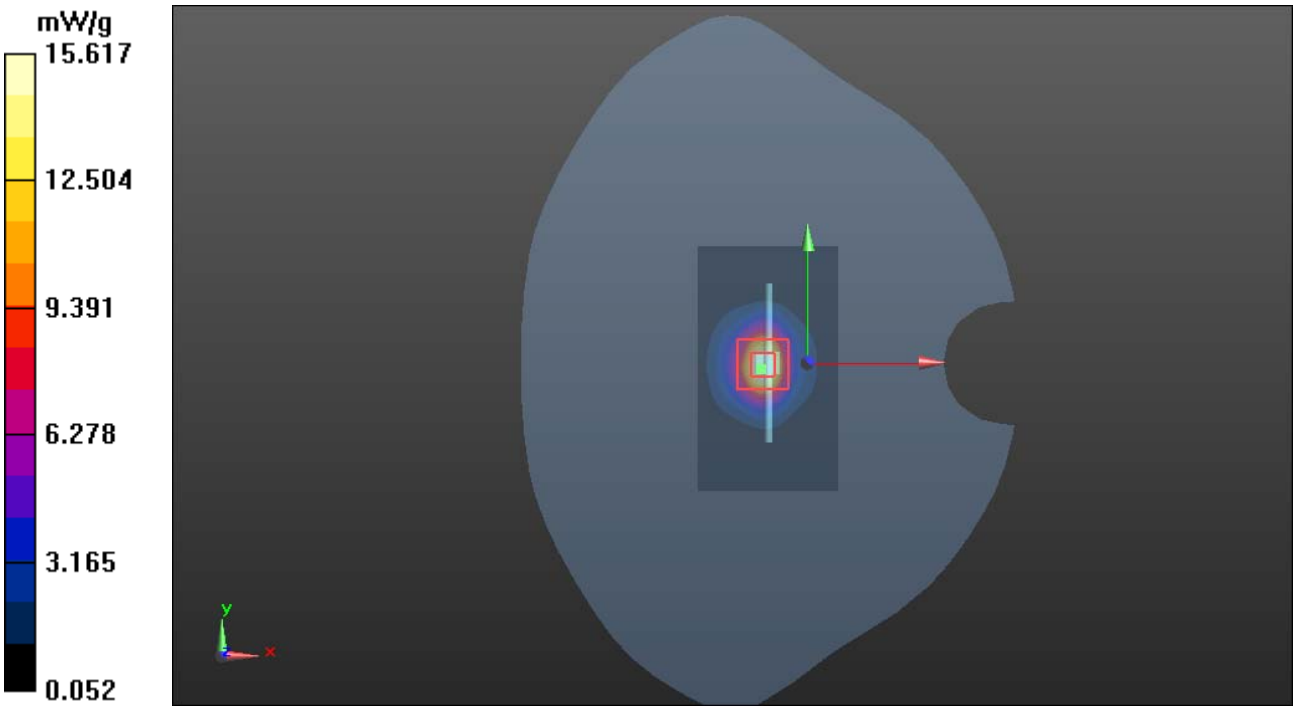


Figure 13 System Performance Check 2600MHz 250mW

System Performance Check at 2600 MHz Body TSL

DUT: Dipole 1900 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1012

Date: 5/5/2014

Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2600 MHz; σ = 2.20 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: EX3DV4 - SN3816; ConvF(7.82, 7.82, 7.82); Calibrated: 6/4/2013

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=12mm, dy=12mm

Maximum value of SAR (interpolated) = 17.7 mW/g

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

Reference Value = 74 V/m; Power Drift = -0.0027 dB

Peak SAR (extrapolated) = 28.5 W/kg

SAR(1 g) = 13.5 mW/g; SAR(10 g) = 5.99 mW/g

Maximum value of SAR (measured) = 15.7 mW/g

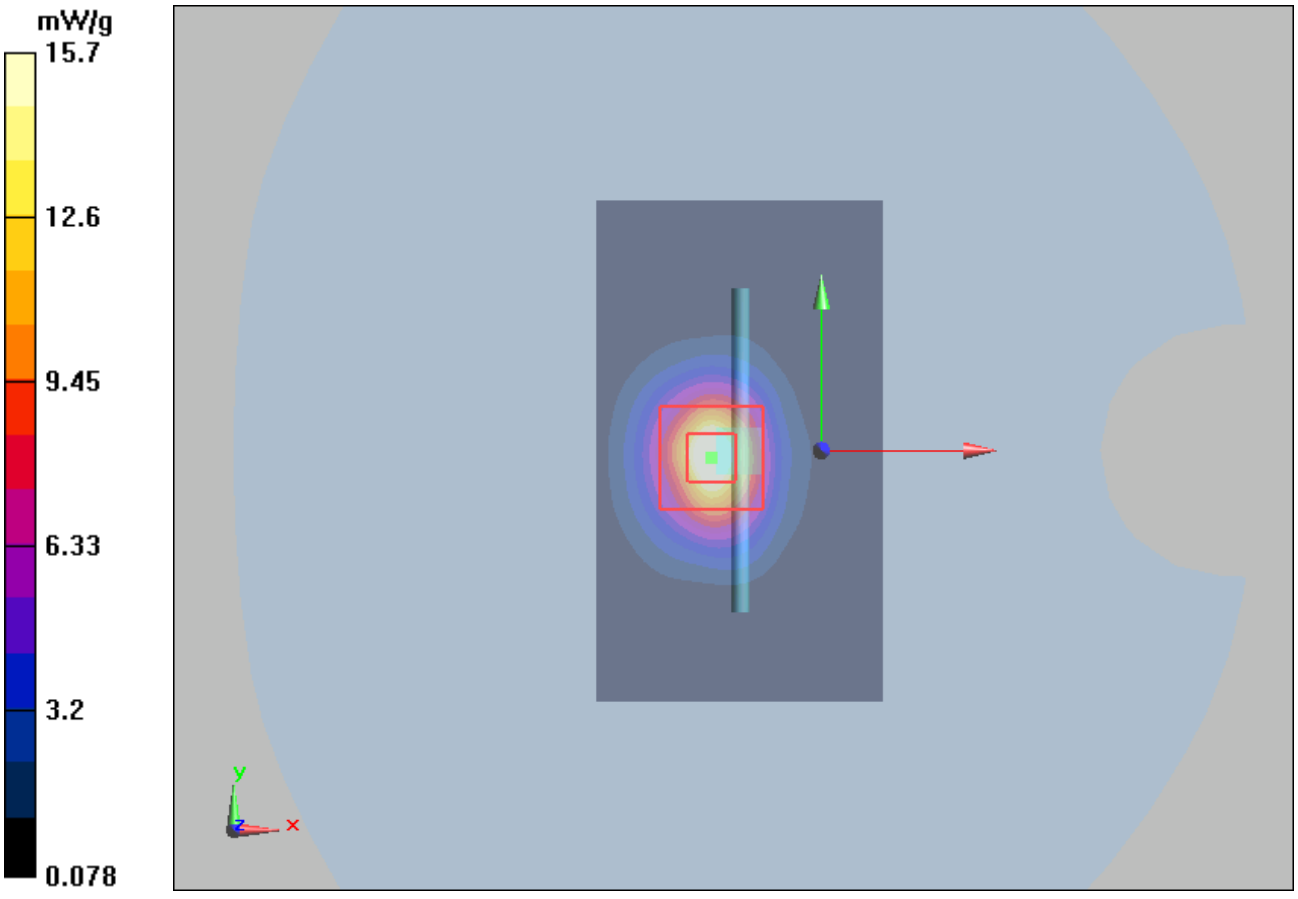


Figure 14 System Performance Check 1900MHz 250mW

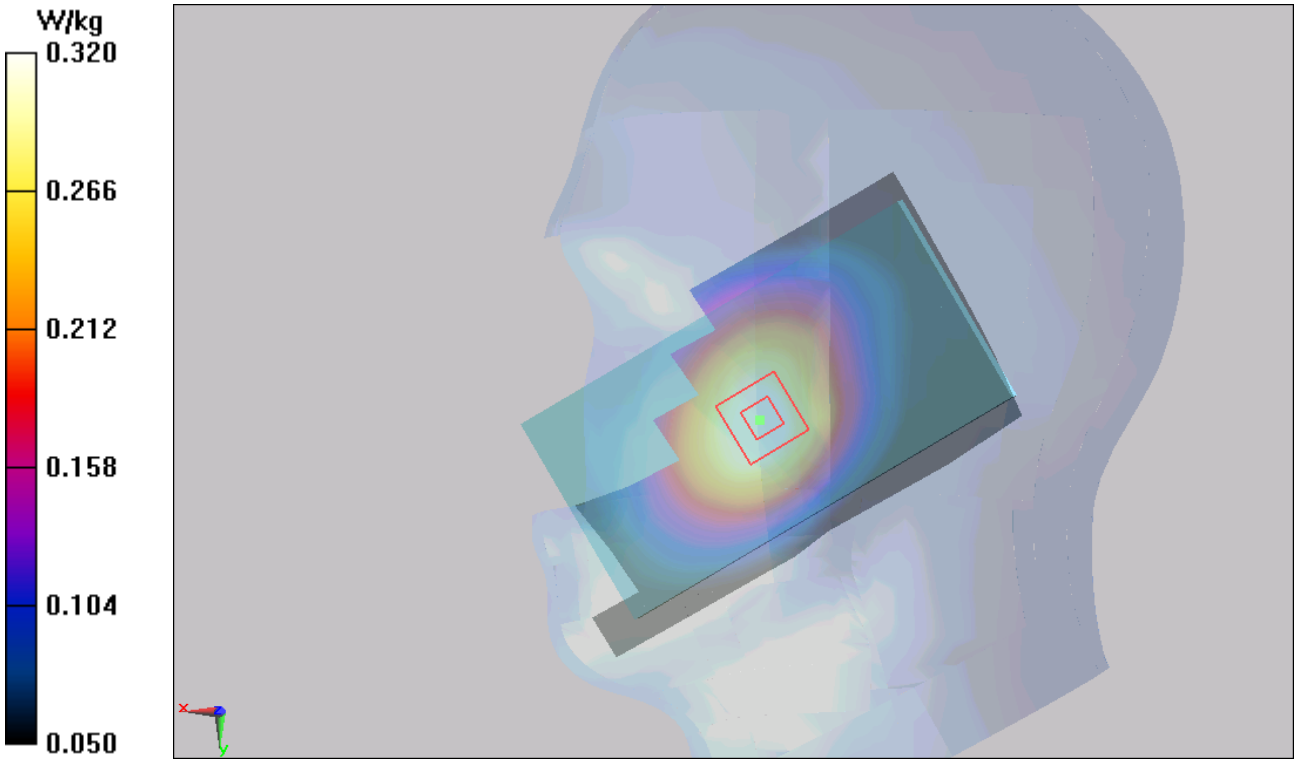
ANNEX C: Graph Results

GSM 850 Right Cheek High

Date: 5/3/2014
Communication System: UID 0, GSM (0); Frequency: 848.8 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 849 MHz; σ = 0.943 S/m; ε_r = 41.271; 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 High/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.325 W/kg

Right Cheek High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.315 V/m; Power Drift = 0.037 dB
Peak SAR (extrapolated) = 0.376 W/kg
SAR(1 g) = 0.311 W/kg; SAR(10 g) = 0.241 W/kg
Maximum value of SAR (measured) = 0.320 W/kg



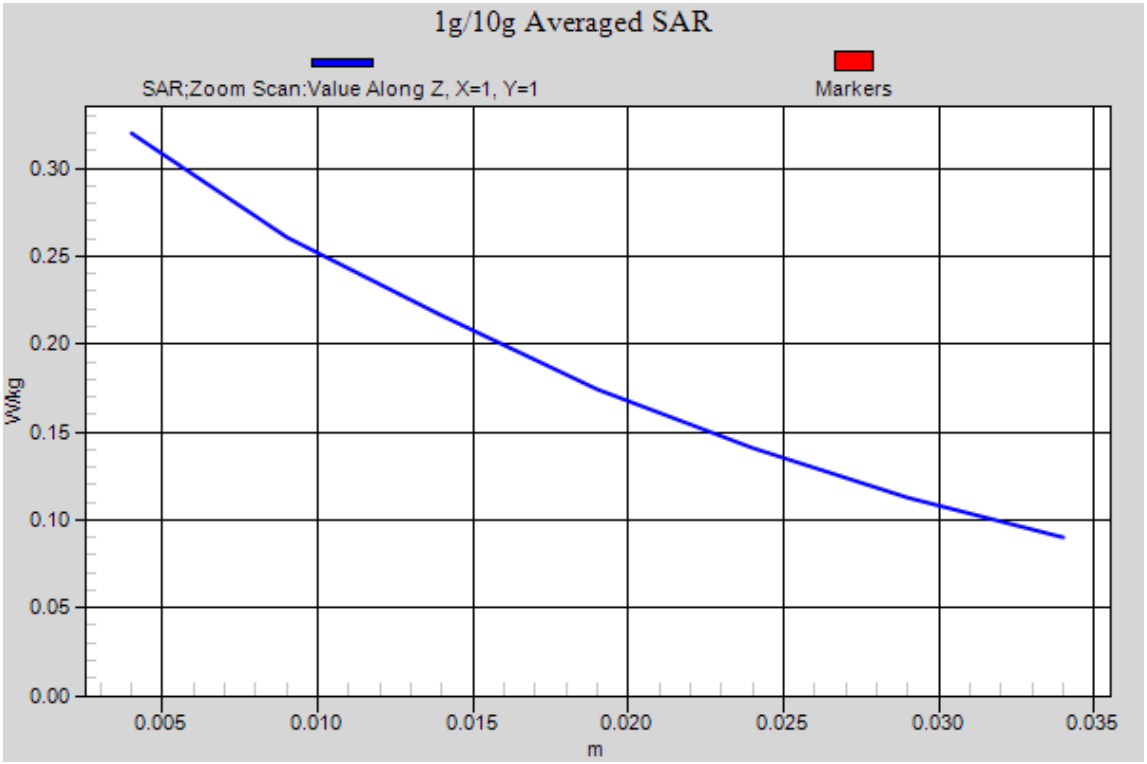


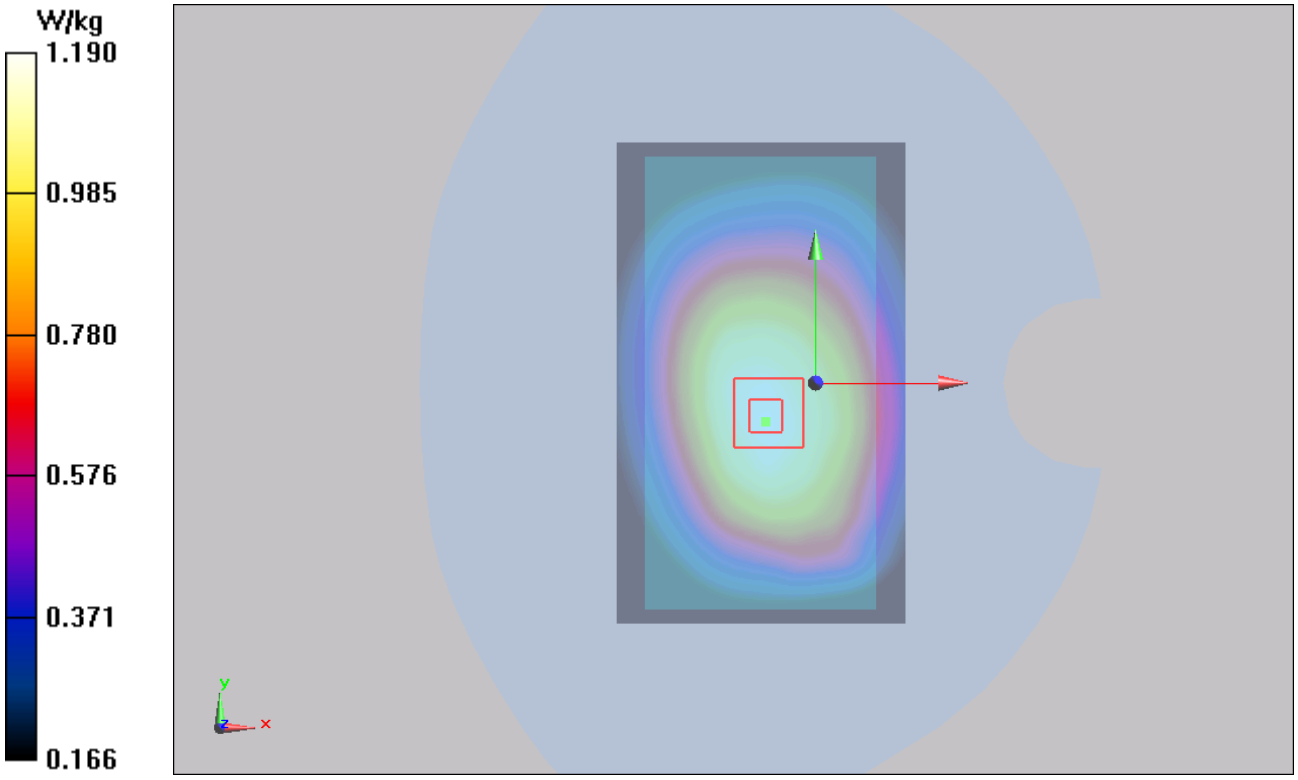
Figure 15 Right Hand Touch Cheek GSM 850 Channel 251

GSM 850 GPRS (4Txslots) Back Side High

Date: 5/6/2014
Communication System: UID 0, GPRS 4TX (0); Frequency: 848.8 MHz;Duty Cycle: 1:2.07491
Medium parameters used: f = 849 MHz; σ = 1.006 S/m; ε_r = 55.736; 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 High/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.19 W/kg

Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.164 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.880 W/kg
Maximum value of SAR (measured) = 1.19 W/kg



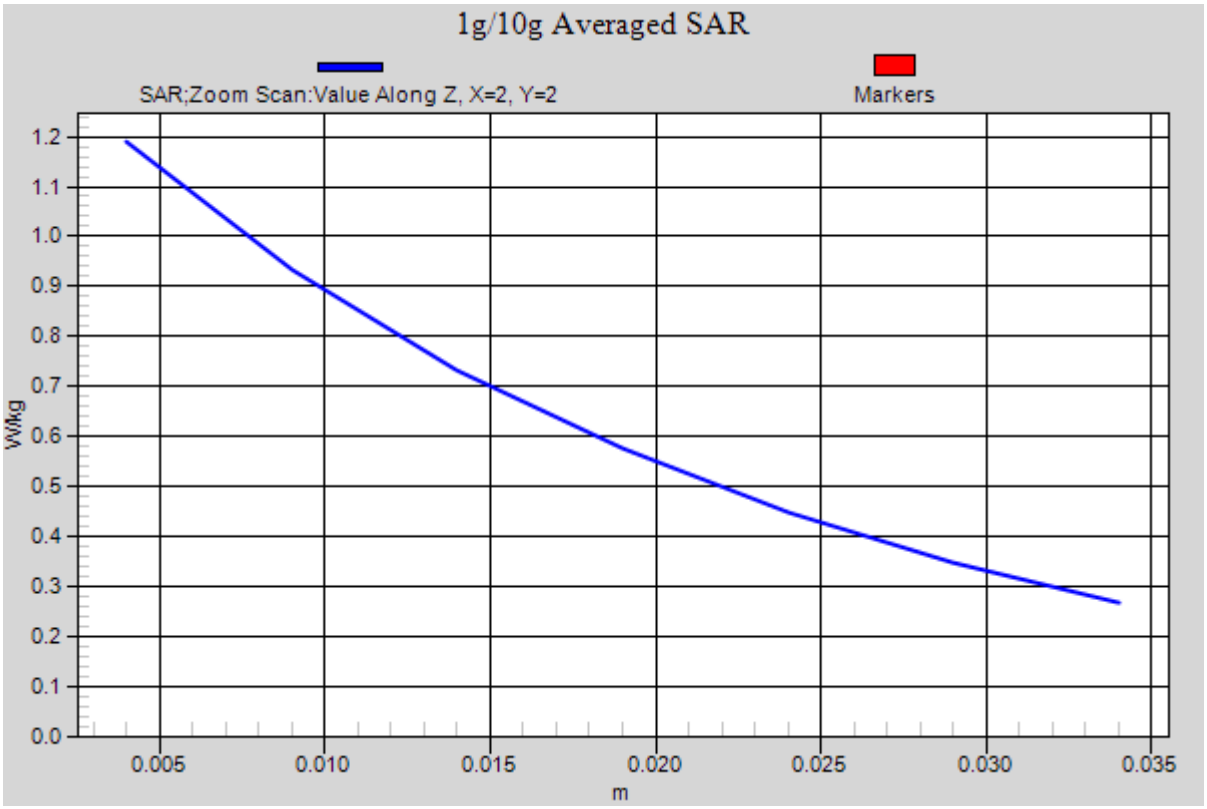


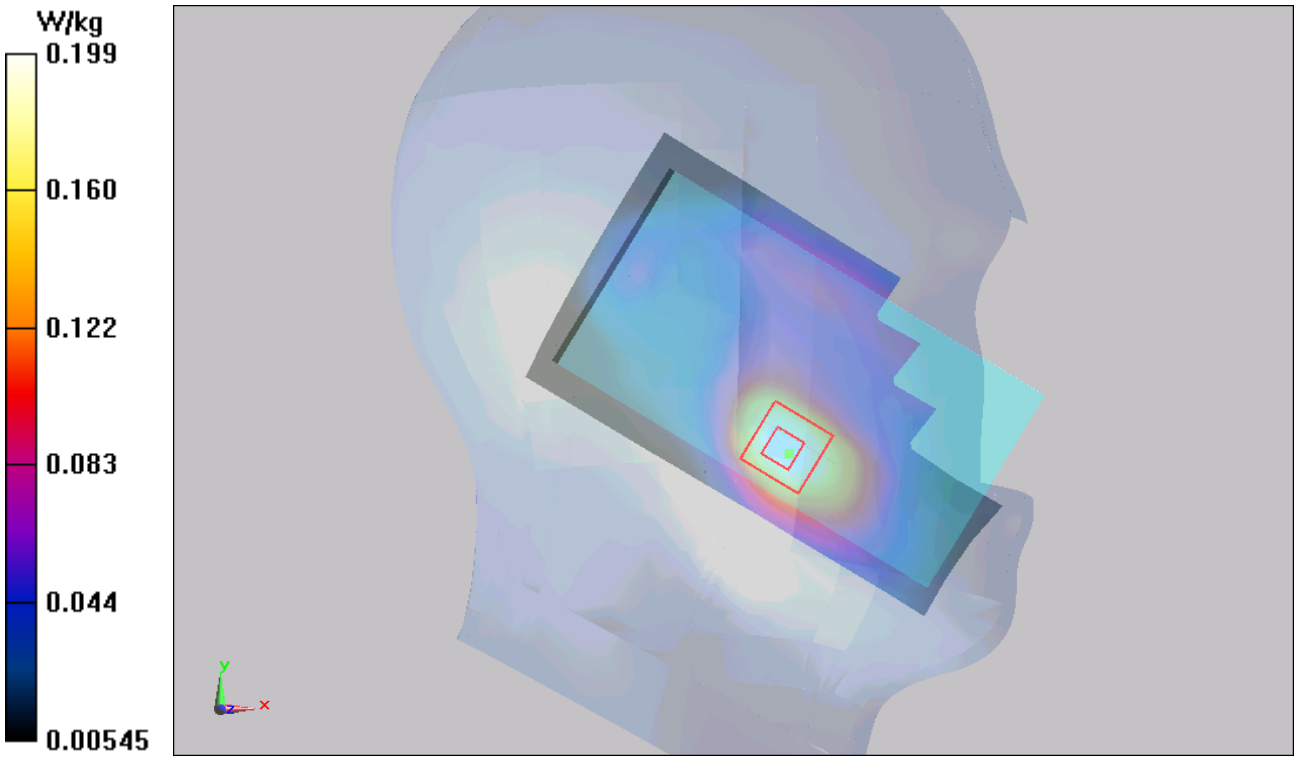
Figure 16 Body, Back Side, GSM 850 GPRS (4Txslots) Channel 251

GSM 1900 Left Cheek Middle

Date: 5/6/2014
Communication System: UID 0, GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; 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 Middle/Area Scan (61x111x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.213 W/kg

Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.207 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 0.306 W/kg
SAR(1 g) = 0.198 W/kg; SAR(10 g) = 0.122 W/kg
Maximum value of SAR (measured) = 0.199 W/kg



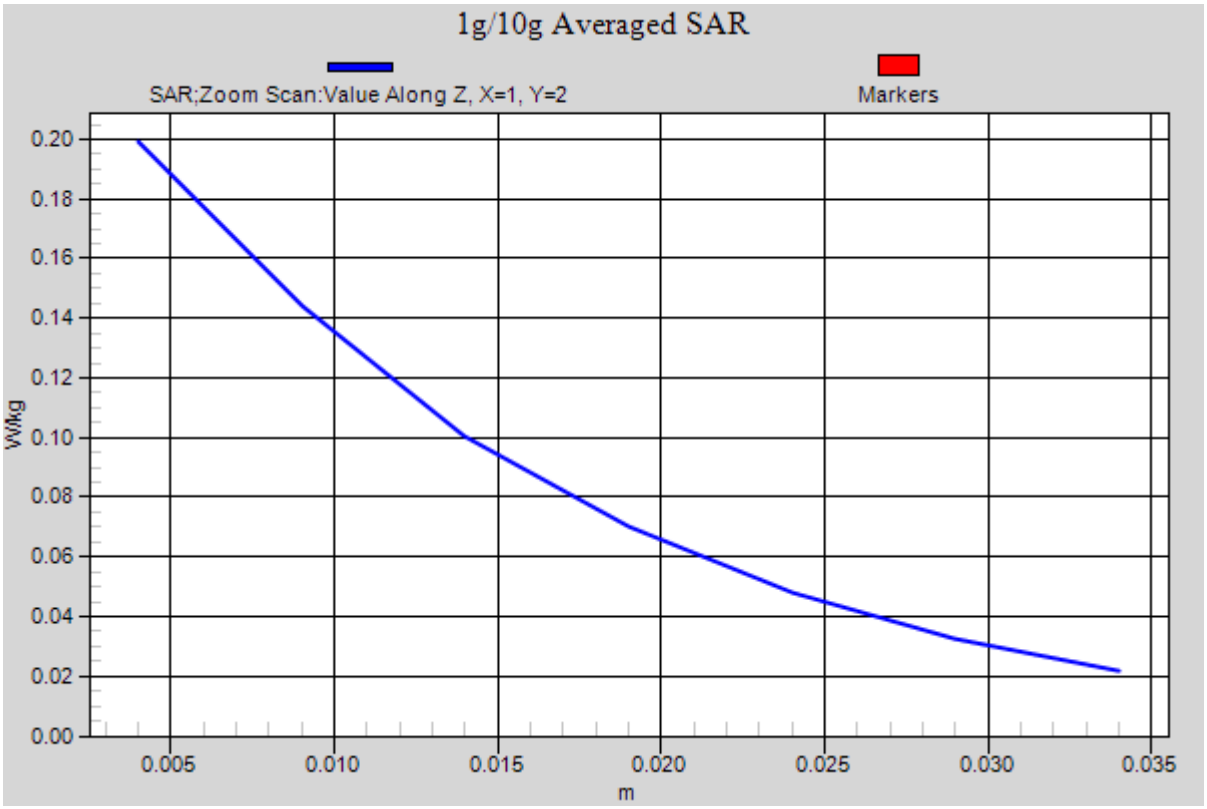


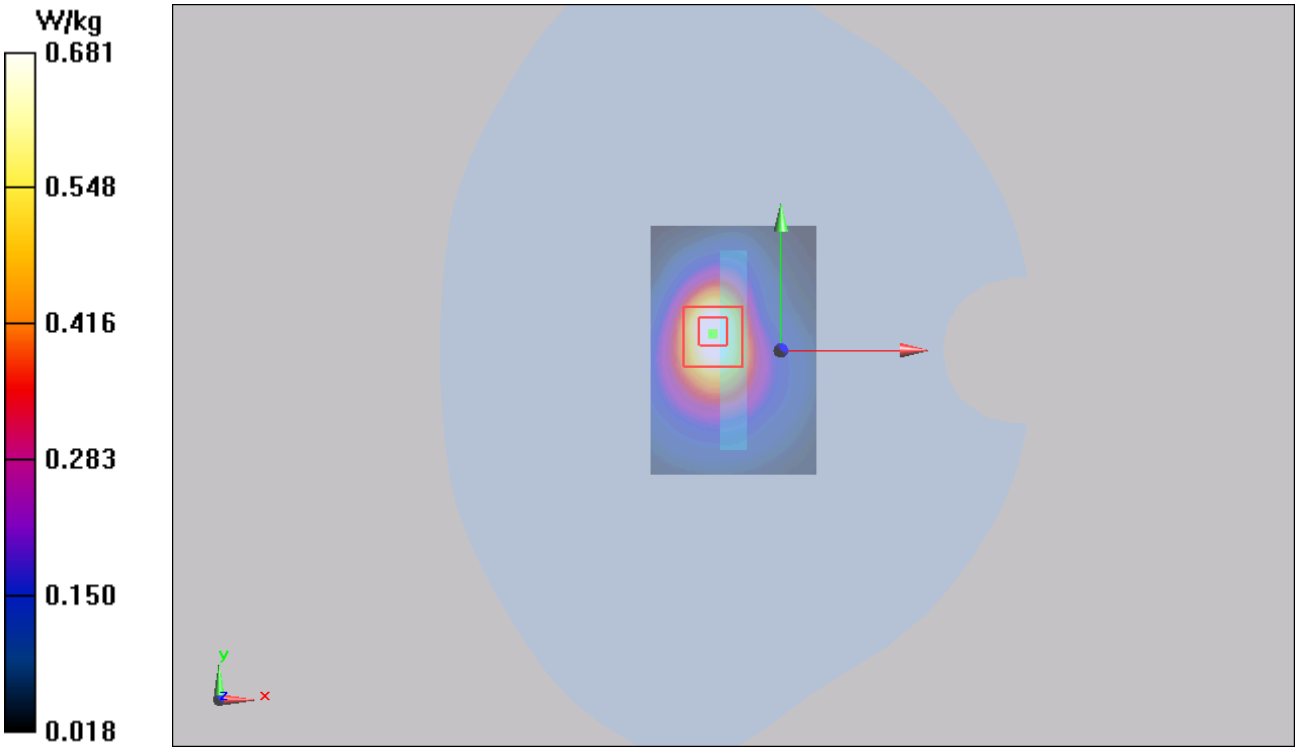
Figure 17 Left Hand Touch Cheek GSM 1900 Channel 661

GSM 1900 GPRS (4Txslots) Bottom Edge Middle

Date: 5/7/2014
Communication System: UID 0, GPRS 4TX (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491
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)

Bottom Edge Middle/Area Scan (61x91x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.799 W/kg

Bottom Edge Middle /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.856 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.716 W/kg; SAR(10 g) = 0.395 W/kg
Maximum value of SAR (measured) = 0.681 W/kg



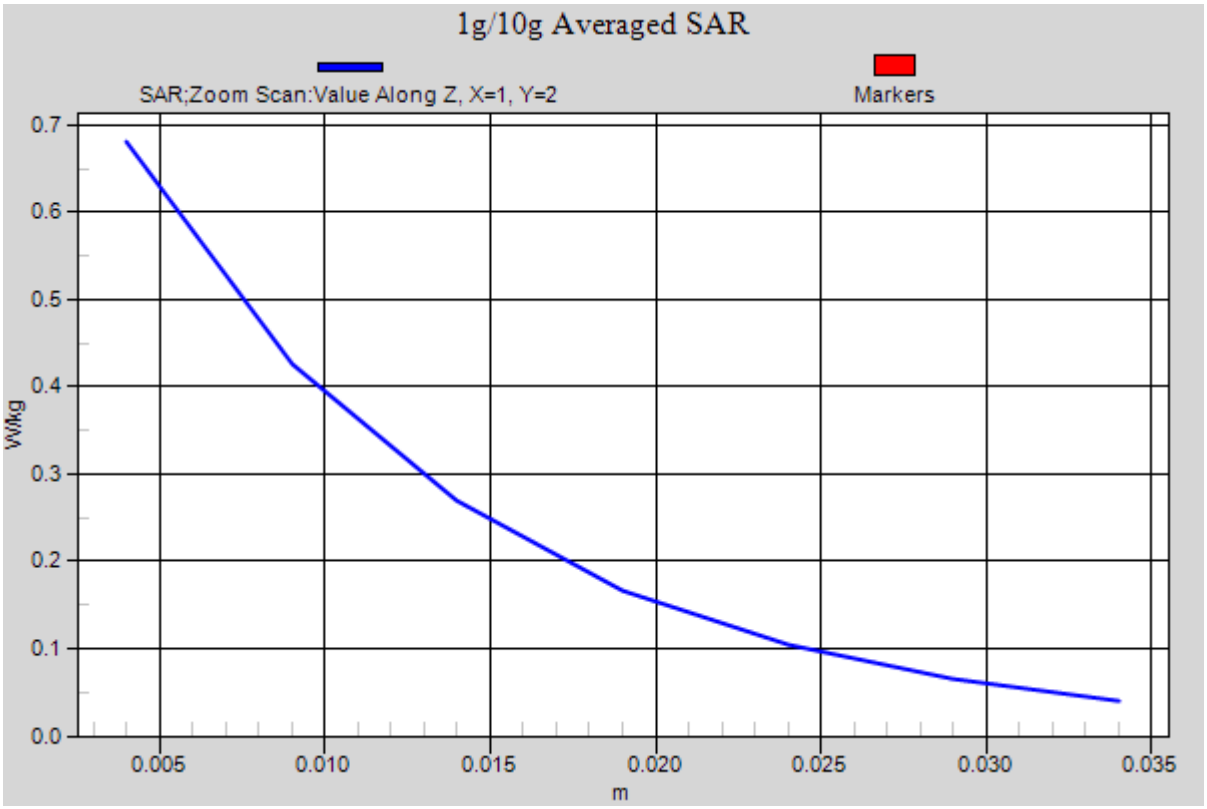


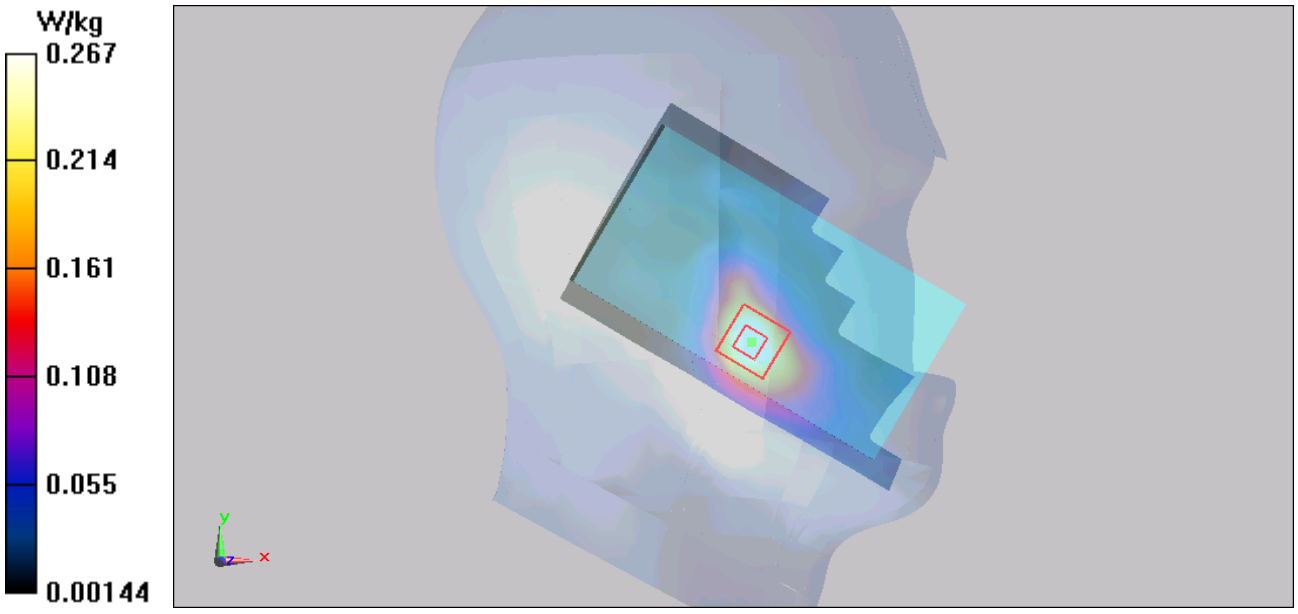
Figure 18 Body, Bottom Edge, GSM 1900 GPRS (4Txslots) Channel 810

LTE Band 7 1RB Left Cheek Middle

Date: 5/7/2014
Communication System: UID 0, LTE (0); Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2535 MHz; σ = 1.915 S/m; ε_r = 38.869; 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 - SN3816; ConvF(7.26, 7.26, 7.26); Calibrated: 6/4/2013;
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 Middle/Area Scan (61x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.312 W/kg

Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=8mm, dy=5mm, dz=5mm
Reference Value = 2.906 V/m; Power Drift = 0.083 dB
Peak SAR (extrapolated) = 0.481 W/kg
SAR(1 g) = 0.268 W/kg; SAR(10 g) = 0.145 W/kg
Maximum value of SAR (measured) = 0.267 W/kg



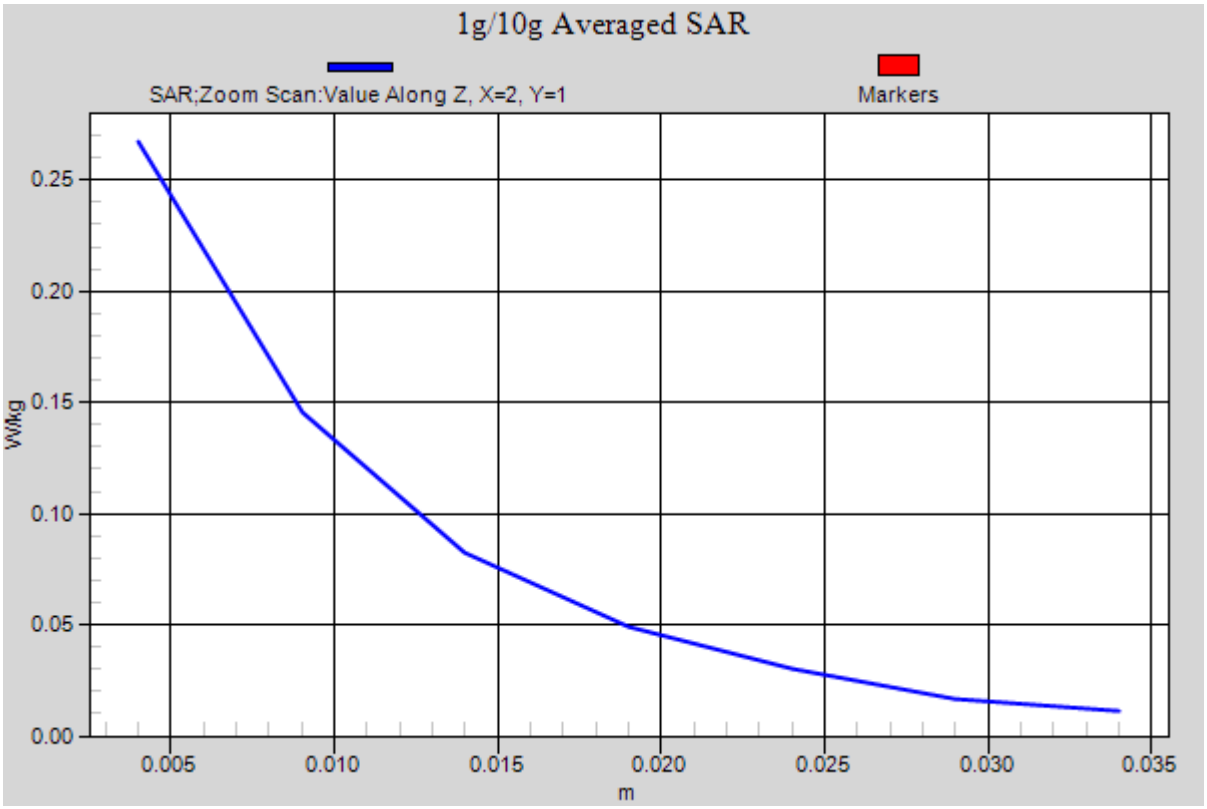


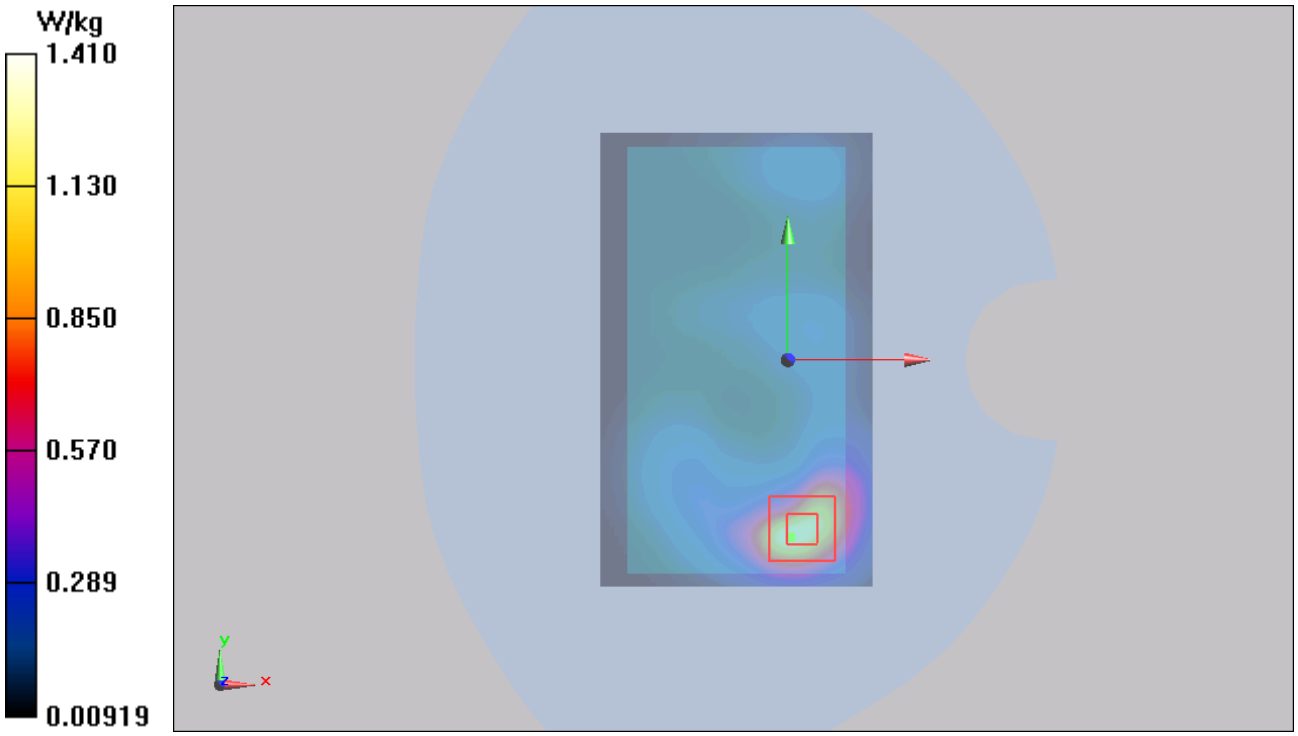
Figure 19 Left Hand Touch Cheek LTE Band 7 1RB Channel 21100

LTE Band 7 1RB Back Side High

Date: 5/5/2014
Communication System: UID 0, LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2560 MHz; σ = 2.151 S/m; ε_r = 52.442; 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 - SN3816; ConvF(7.82, 7.82, 7.82); Calibrated: 6/4/2013;
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 High/Area Scan (61x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.32 W/kg

Back Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.372 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 2.42 W/kg
SAR(1 g) = 1.27 W/kg; SAR(10 g) = 0.610 W/kg
Maximum value of SAR (measured) = 1.41 W/kg



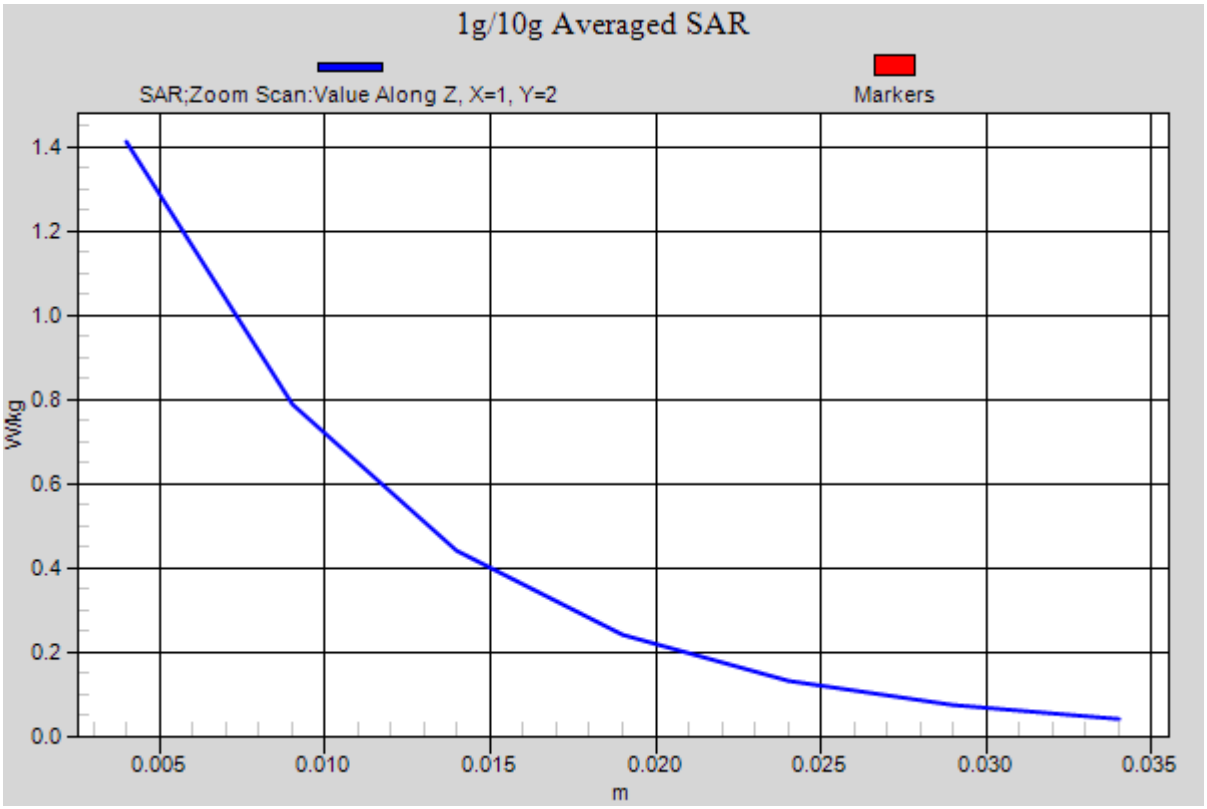


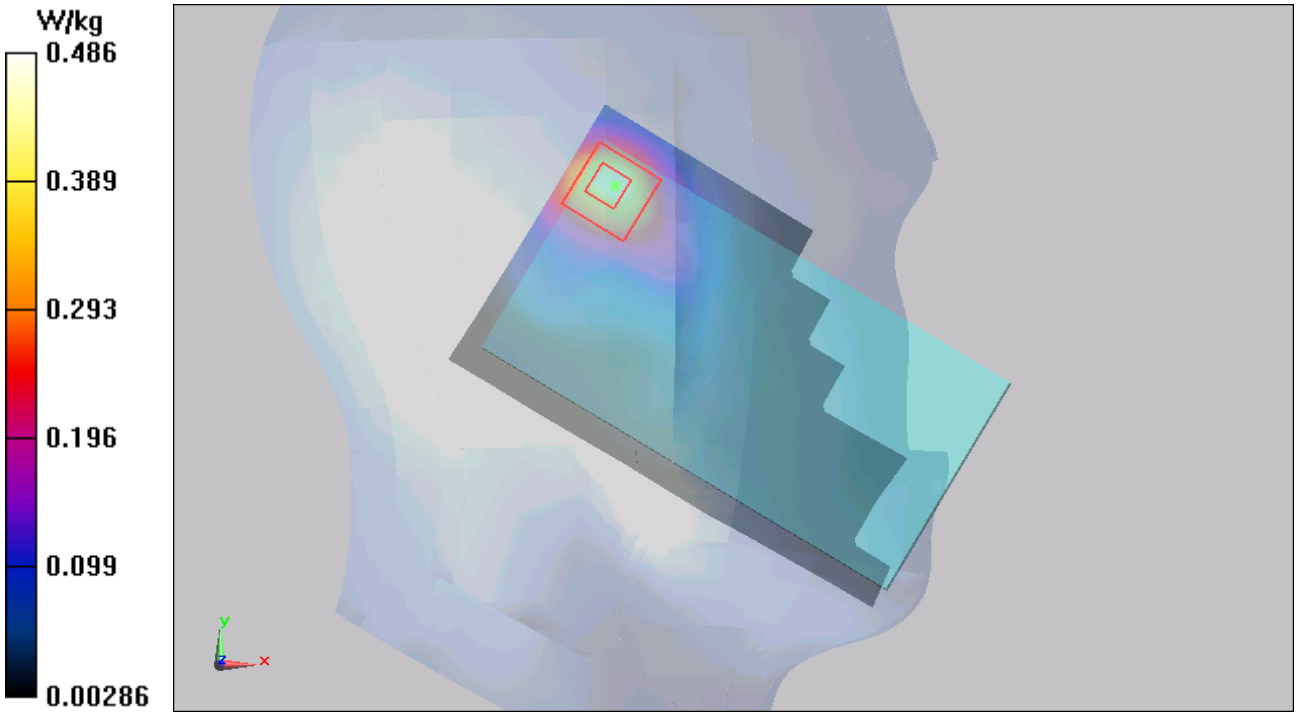
Figure 20 Body, Back Side, LTE Band 7 1RB Channel 21350

802.11b Left Cheek Middle

Date: 5/7/2014
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: Left 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 Cheek Middle/Area Scan (61x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.453 W/kg

Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.058 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 0.486 W/kg



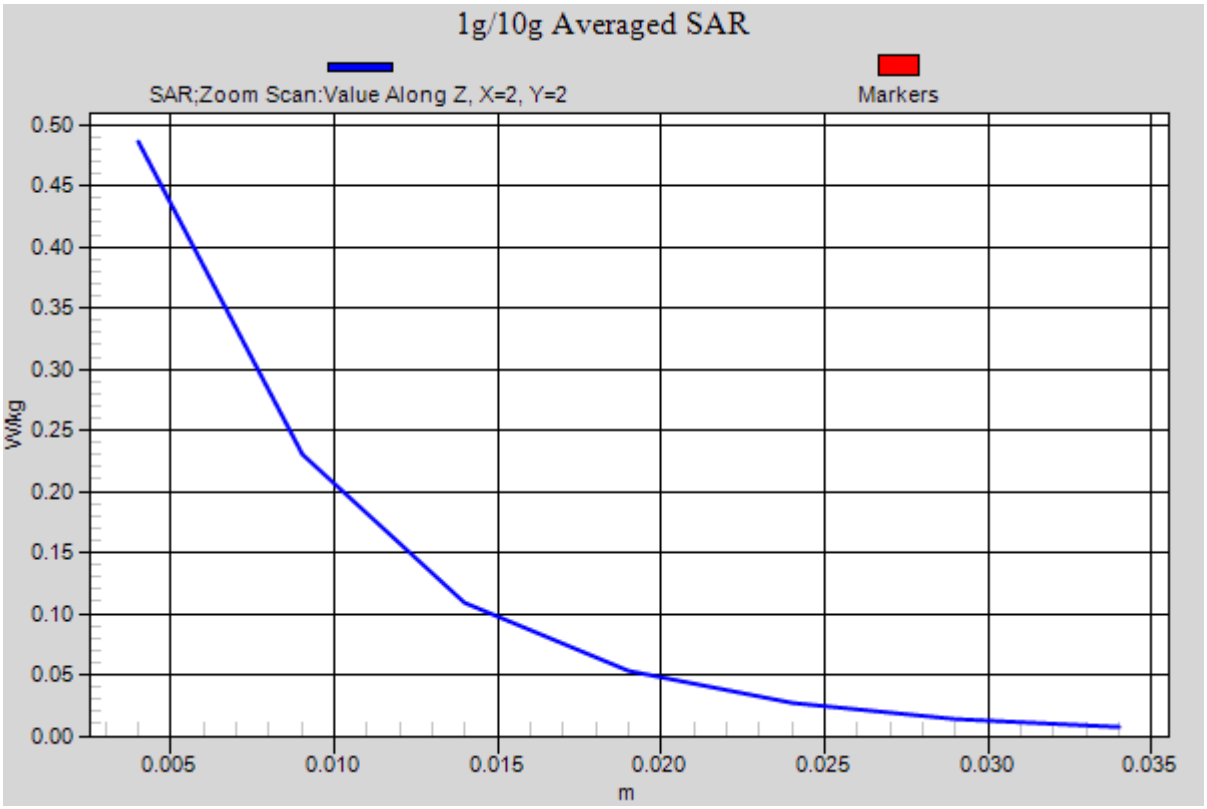


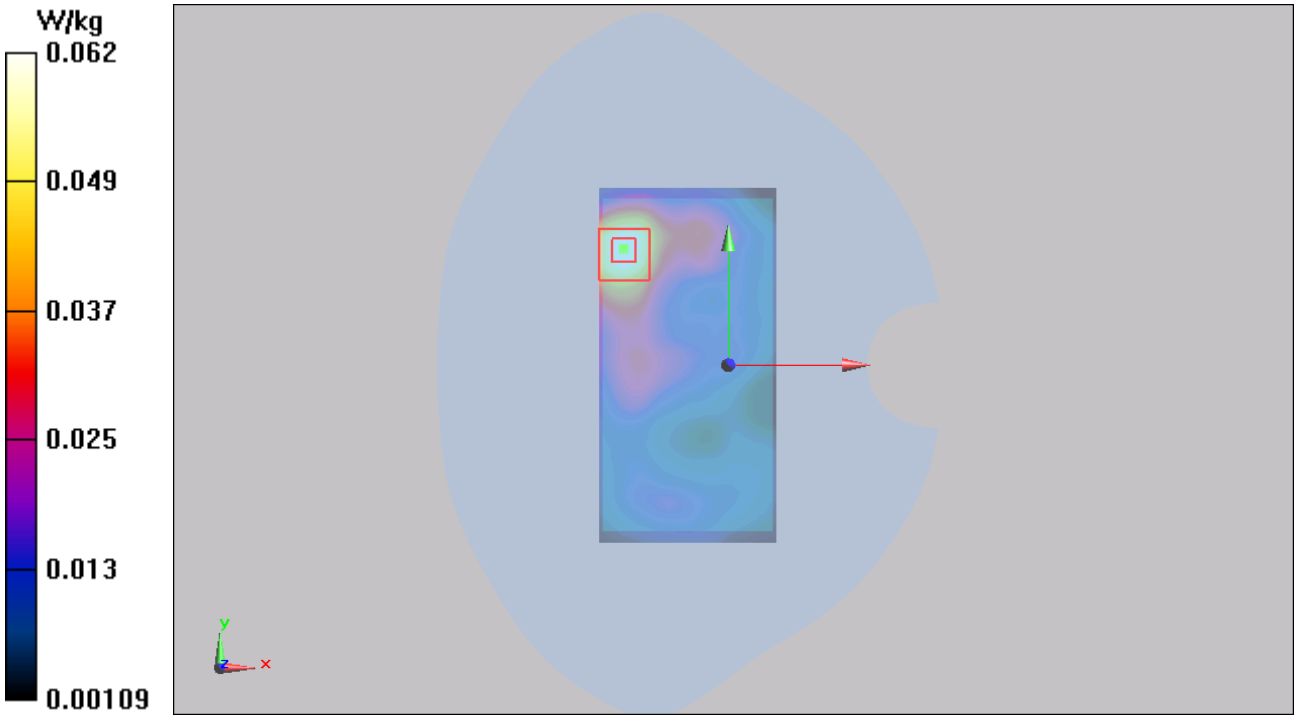
Figure 21 Left Hand Touch Cheek 802.11b Channel 6

802.11b Back Side Middle

Date: 5/8/2014
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 (51x101x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.0656 W/kg

Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.245 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 0.123 W/kg
SAR(1 g) = 0.062 W/kg; SAR(10 g) = 0.032 W/kg
Maximum value of SAR (measured) = 0.0615 W/kg



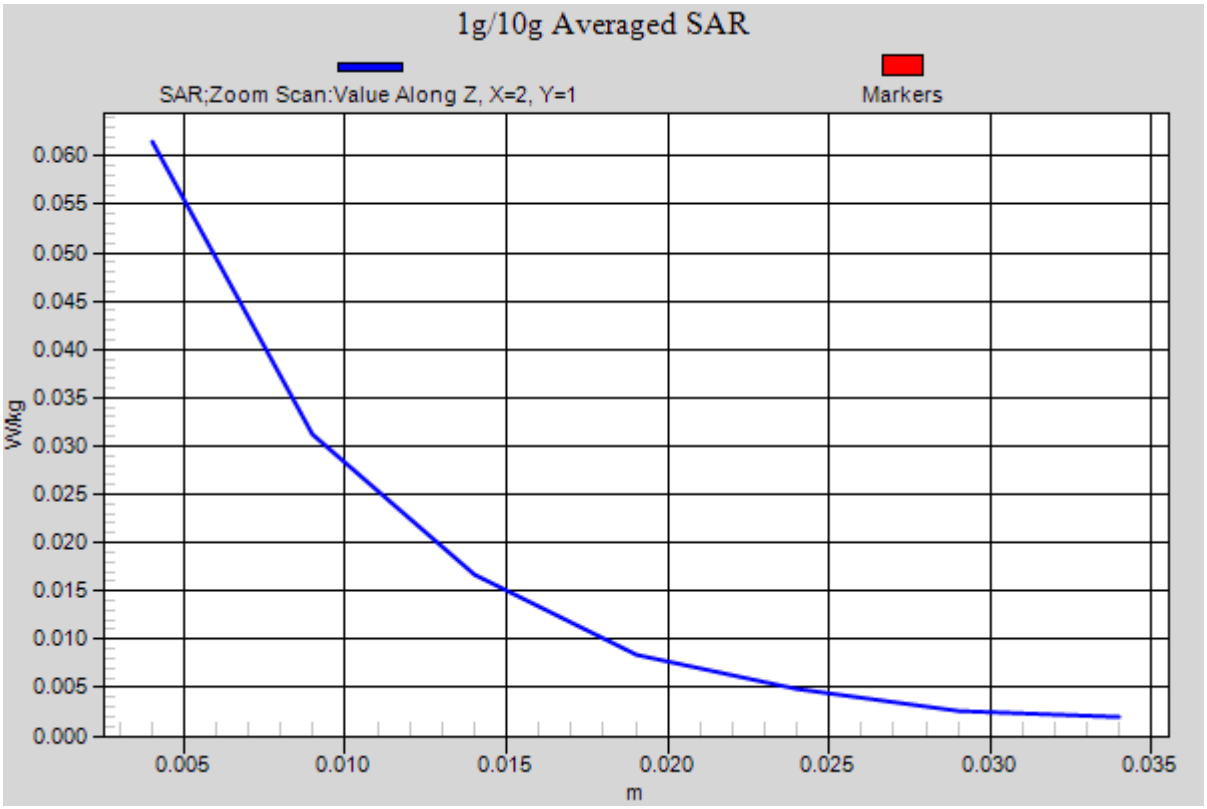


Figure 22 Body, Back Side, 802.11b Channel 6

ANNEX D: Probe Calibration Certificate(SN:3677)

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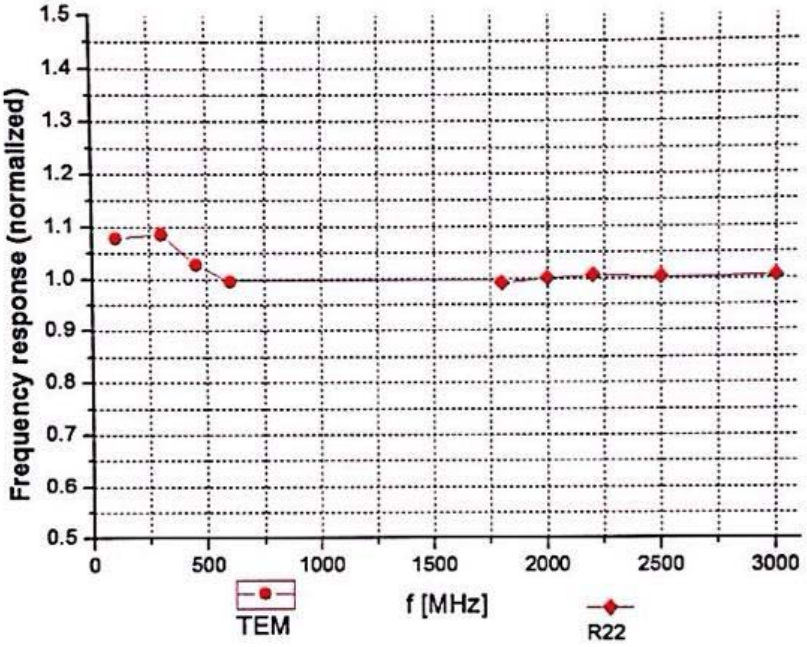
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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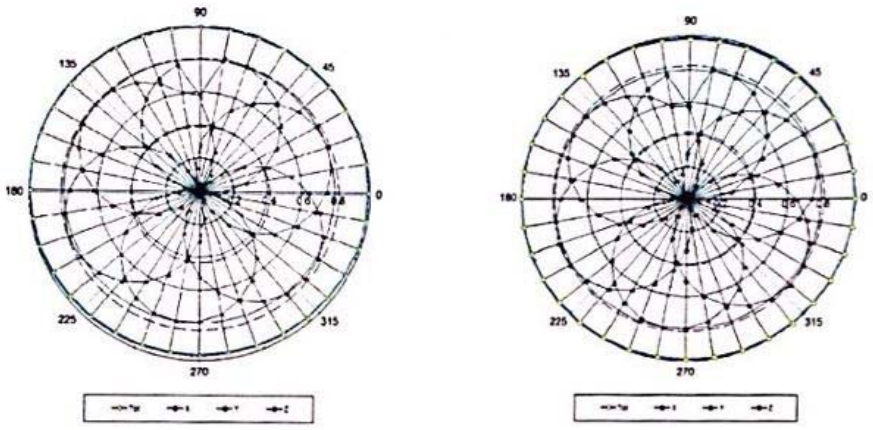
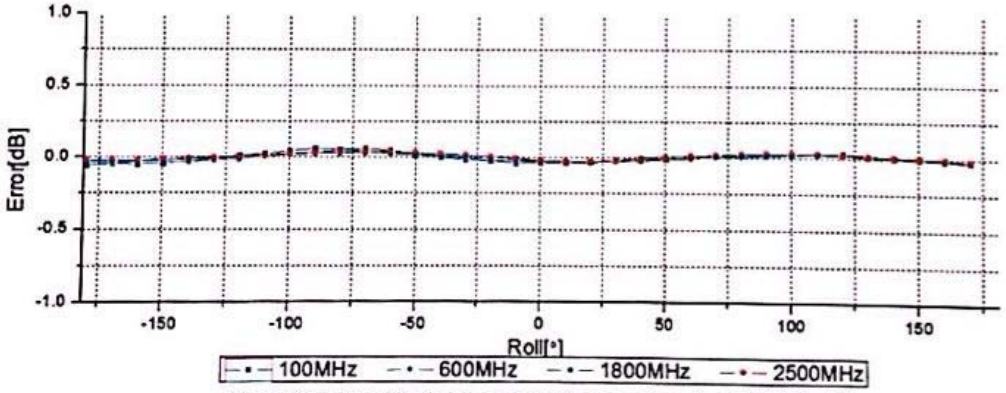
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM **f=1800 MHz, R22**





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

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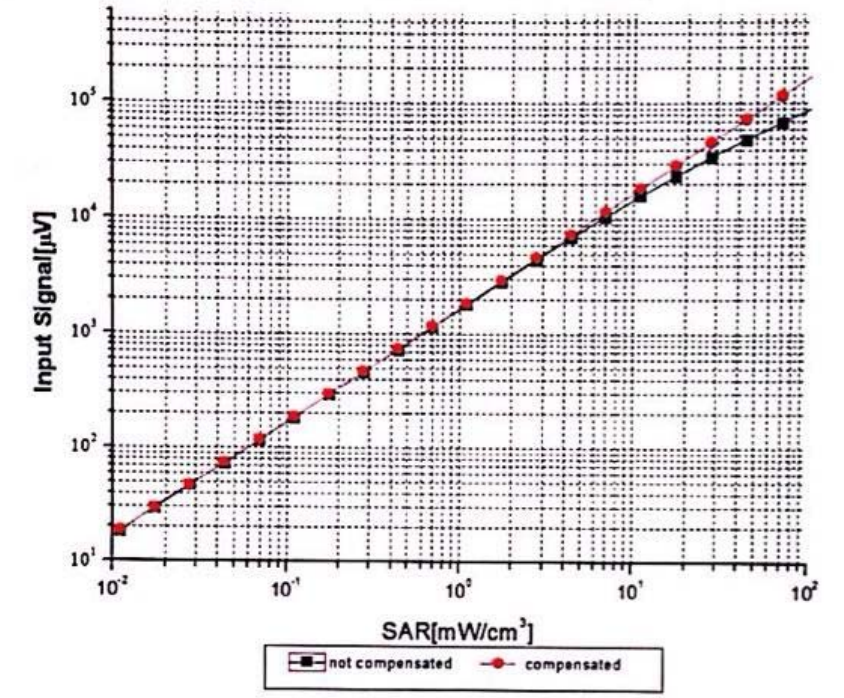
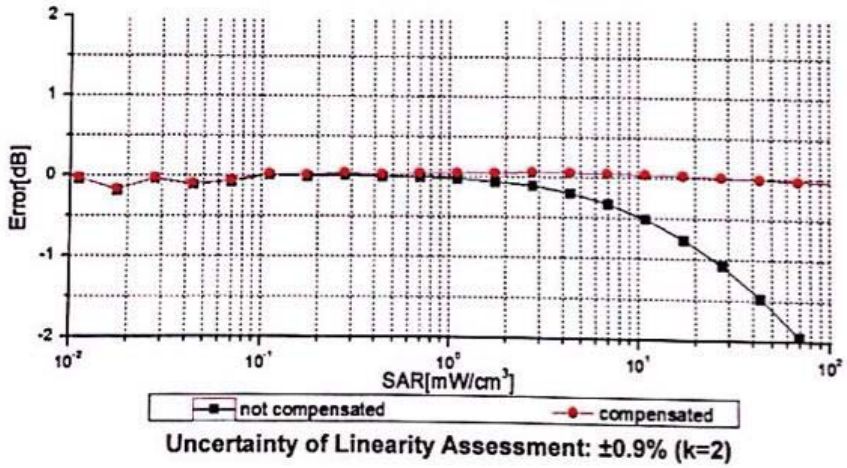
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

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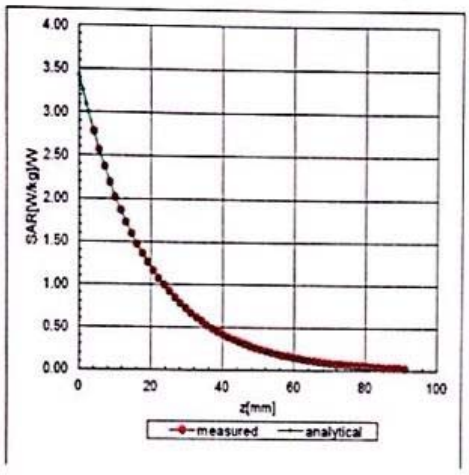
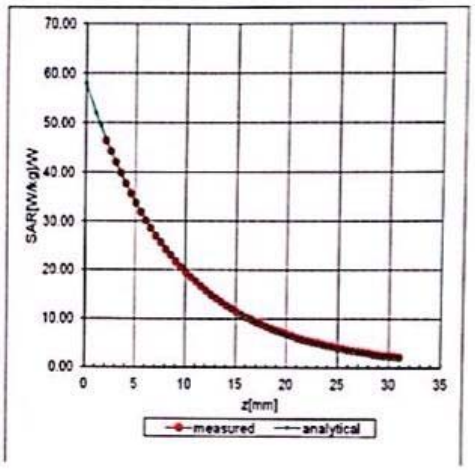
Conversion Factor Assessment

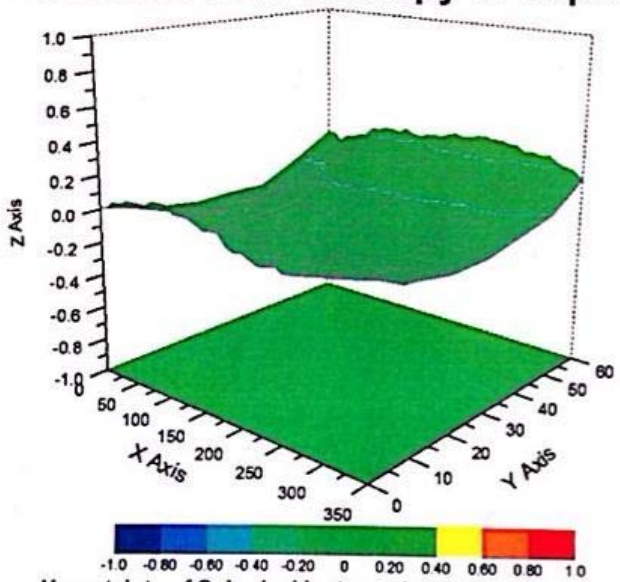
f=850 MHz, WGLS R9(H_convF)



f=2450 MHz, WGLS R26(H_convF)



Deviation from Isotropy in Liquid



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

In Collaboration with
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

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 E: Probe Calibration Certificate (SN:3816)

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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 TA-SH (Auden) **Certificate No:** EX3-3816_Jun13

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3816

Calibration procedure(s) QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: June 4, 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)°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	28-Dec-12 (No. ES3-3013_Dec12)	Dec-13
DAE4	SN: 660	31-Jan-13 (No. DAE4-660_Jan13)	Jan-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-15
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-12)	In house check: Oct-13

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

Issued: June 4, 2013

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

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *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.

Probe EX3DV4

SN:3816

Manufactured: September 2, 2011
Calibrated: June 4, 2013

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3816

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.47	0.56	0.62	± 10.1 %
DCP (mV)[B]	94.9	93.9	98.9	

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	158.2	±2.5 %
		Y	0.0	0.0	1.0		132.0	
		Z	0.0	0.0	1.0		137.0	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see 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:3816

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	9.69	9.69	9.69	0.36	0.88	± 12.0 %
2600	39.0	1.96	7.26	7.26	7.26	0.44	0.83	± 12.0 %
3500	37.9	2.91	7.14	7.14	7.14	1.00	0.52	± 13.1 %
3700	37.7	3.12	6.79	6.79	6.79	0.98	0.57	± 13.1 %
5200	36.0	4.66	5.06	5.06	5.06	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.85	4.85	4.85	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.70	4.70	4.70	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.37	4.37	4.37	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.36	4.36	4.36	0.45	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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3816

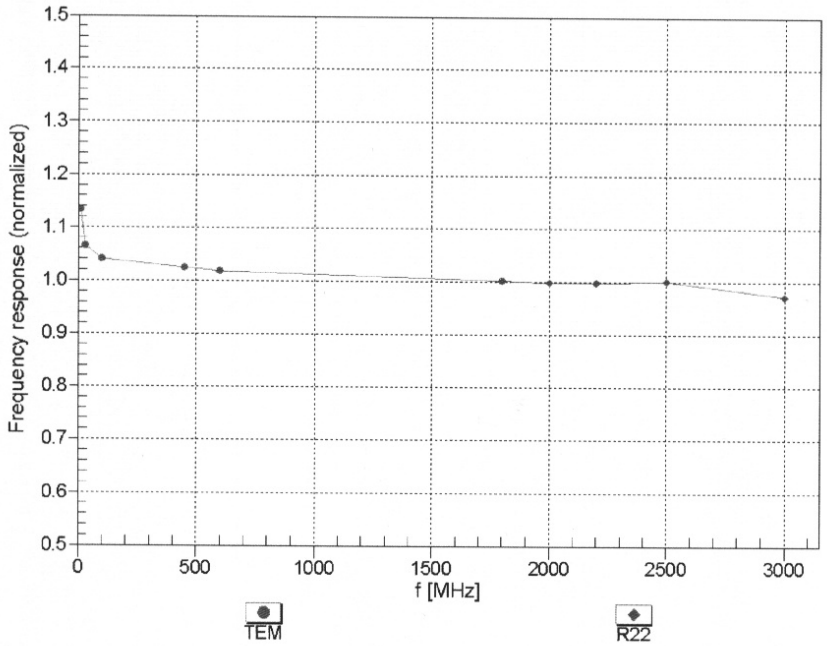
Calibration Parameter Determined in Body Tissue Simulating Media

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	9.67	9.67	9.67	0.80	0.50	± 12.0 %
2600	52.5	2.16	7.82	7.82	7.82	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.54	4.54	4.54	0.40	1.90	± 13.1 %
5300	48.9	5.42	4.27	4.27	4.27	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	3.88	3.88	3.88	0.45	1.90	± 13.1 %
5800	48.2	6.00	4.03	4.03	4.03	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.

EX3DV4– SN:3816 June 4, 2013

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

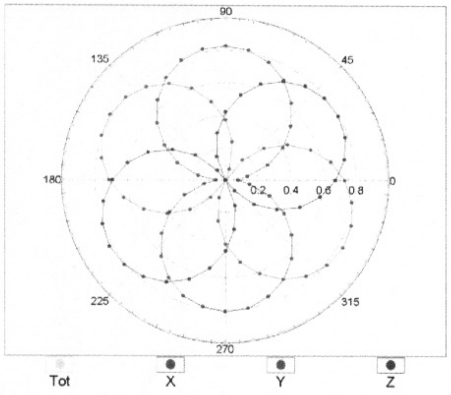


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

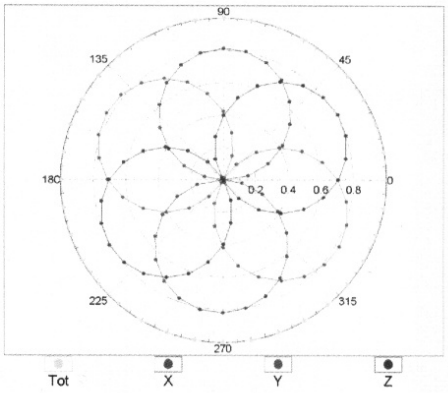
EX3DV4– SN:3816 June 4, 2013

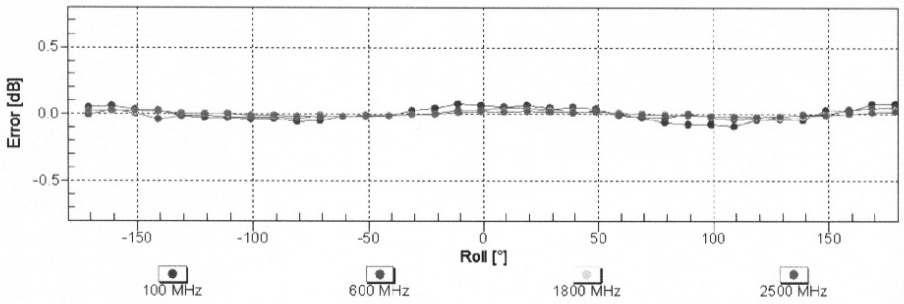
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22





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