TESTING
No. L2264

SAR TEST REPORT

Product Name	HSDPA/HSUPA/HSPA+/UMTS Quad bands / GSM Quad bands/LTE 5 bands mobile phone
Model Name	Rio-4G LATAM
Marketing Name	5050A
FCC ID	RAD488
Applicant	TCT Mobile Limited
Manufacturer	TCT Mobile Limited
Date of issue	May 19, 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 D01 SAR test for 3G devices v02:** SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA **KDB 941225 D02 HSPA and 1x Advanced v02r02** SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced **KDB 941225 D03 Test Reduction GSM_GPRS_EDGE v01:**Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE **KDB 941225 D05 SAR for LTE Devices v02r03** SAR Test Considerations for LTE Handsets and Data Modems **KDB 941225 D06 Hotspot Mode SAR v01r01:** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities **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

TABLE OF CONTENT

1. General Information

1.1. Notes of the Test Report

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

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

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.

This report alone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities. This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of **TA Technology (Shanghai) Co., Ltd.** and the Accreditation Bodies, if it applies.

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

1.2. Testing Laboratory

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Yang Weizhong
Telephone:	+86-021-50791141/2/3
Fax:	+86-021-50791141/2/3-8000
Website:	http://www.ta-shanghai.com
E-mail:	yangweizhong@ta-shanghai.com

1.3. Applicant Information

Company: TCT Mobile Limited

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

1.4. Manufacturer Information

Company: TCT Mobile Limited

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

1.5. Information of EUT

General Information

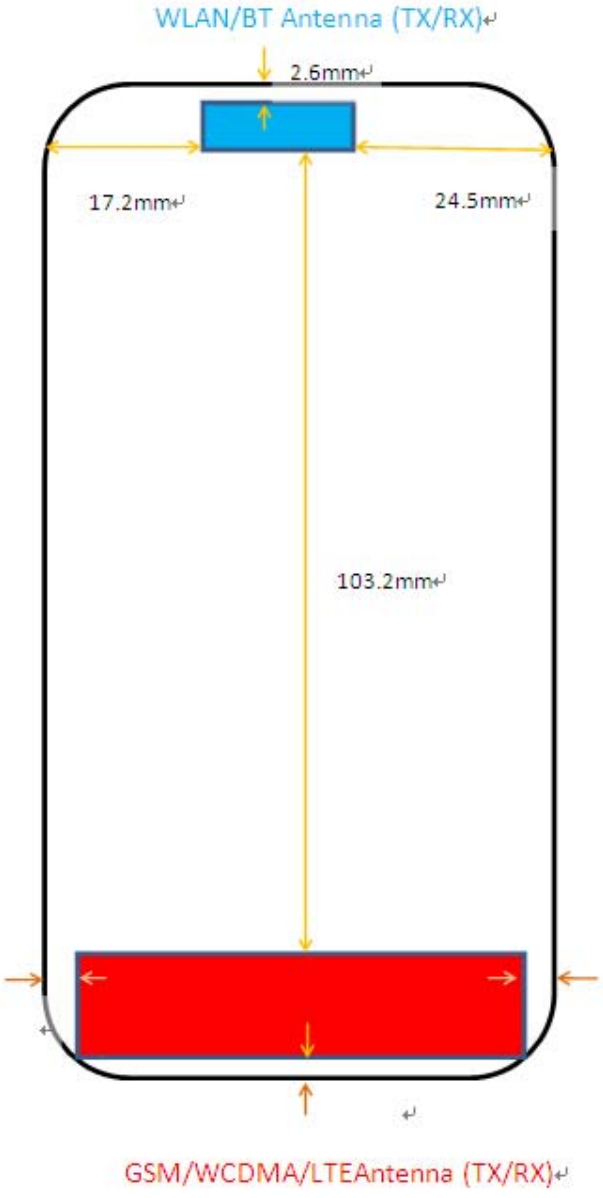
Device Type:	Portable Device	
Exposure Category:	Uncontrolled Environment / General Population	
State of Sample:	Prototype Unit	
Product IMEI:	014035000002089	
Hardware Version:	PIO	
Software Version:	9G1B	
Antenna Type:	Internal Antenna	
Device Operating Configurations :		
Test Mode(s):	GSM 850/GSM 1900; UMTS Band II/UMTS Band V; LTE FDD Band 2/4/7/17; 802.11b/g/n HT20; Bluetooth; Bluetooth 4.0;	
Test Modulation:	(GSM)GMSK,8-PSK; (UMTS)QPSK, (LTE) QPSK, 16QAM;(WIFI)CCK	
Device Class:	B	
HSUPA UE Category:	6	
HSPA+ UE Downlink Category:	14	
DC-HSDPA UE Category:	24	
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
	UMTS Band II	1852.4 ~ 1907.6
	UMTS Band V	826.4 ~ 846.6
	LTE FDD 2	1850.7 ~ 1909.3
	LTE FDD 4	1710.7 ~ 1754.3
	LTE FDD 7	2502.5 ~ 2567.5
	LTE FDD 17	706.5 ~ 713.5

	Bluetooth/ Bluetooth 4.0	2402 ~2480
	WIFI	2412 ~2462
Power Class:	GSM 850: 4	
	GSM 1900: 1	
	UMTS Band II/V: 3	
	LTE FDD 2/4/7/17: 3	
Power Level	GSM 850: level 5	
	GSM 1900: level 0	
	UMTS Band II/V: all up bits	
	LTE FDD 2/4/7/17: 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) 9262/1852.4 – 9400/1880 – 9538/1907.6 (UMTS Band II) 4132/826.4 – 4183/836.6 – 4233/846.6 (UMTS Band V) 18700/1860 – 18900/1880 – 19100/1900 (LTE FDD 2) 20050/1720 – 20175/1732.5 – 20300/1745 (LTE FDD 4) 20850/2510 – 21100/2535 – 21350/2560 (LTE FDD 7) 23780/709 – 23790/710 – 23800/711 (LTE FDD 17) 1/2412 – 6/2437 – 11/2462 (802.11b/g/n HT20)	

Auxiliary Equipment Details

Name	Model	Manufacturer	S/N
Battery 1	TLi020A1	BYD	B2000016C11001RB
Battery 2	TLp020A2	SCUD	C2000003C3Y008WQ
Earphone 1	CCB3000A12C2	Juwei	/
Earphone 2	CCB3000A12C1	Shunda	/

1.6. EUT Antenna Locations



BACK View

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	Yes	No	Yes
GSM 1900	Yes	Yes	Yes	Yes	No	Yes
UMTS Band II	Yes	Yes	Yes	Yes	No	Yes
UMTS Band V	Yes	Yes	Yes	Yes	No	Yes
LTE Band 2	Yes	Yes	Yes	Yes	No	Yes
LTE Band 4	Yes	Yes	Yes	Yes	No	Yes
LTE Band 7	Yes	Yes	Yes	Yes	No	Yes
LTE Band 17	Yes	Yes	Yes	Yes	No	Yes
2.4GHz WLAN	Yes	Yes	Yes	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	Left Cheek	251/848.8	0.476	0.557
GSM 1900	Left Cheek	512/1850.2	0.343	0.415
UMTS Band II	Left Cheek	9262/1852.4	0.513	0.684
UMTS Band V	Left Cheek	4132/826.4	0.411	0.575
LTE Band 2	Left Cheek	18700/1860	0.714	0.762
LTE Band 4	Left Cheek	20050/1720	0.636	0.678
LTE Band 7	Right Cheek	21350/2560	0.999	1.204
LTE Band 17	Left Cheek	23800/711	0.222	0.304
WiFi(802.11b)	Left Cheek	6/2437	0.528	0.799

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)
GPRS 850	Back Side	251/848.8	0.882	1.006
GPRS 1900	Back Side	661/1880	0.542	0.710
UMTS Band II	Back Side	9262/1852.4	0.763	1.017
UMTS Band V	Back Side	4183/836.6	0.473	0.662
LTE Band 2	Back Side	19100/1900	1.180	1.330
LTE Band 4	Back Side	20175/1732.5	1.060	1.214
LTE Band 7	Back Side	20850/2510	0.795	0.951
LTE Band 17	Back Side	23800/711	0.314	0.430
WiFi(802.11b)	Back Side	11/2462	0.331	0.509

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)
GPRS 850	Back Side	251/848.8	0.882	1.006
GPRS 1900	Bottom Edge	512/1850.2	0.933	1.156
UMTS Band II	Bottom Edge	9262/1852.4	1.040	1.387
UMTS Band V	Back Side	4182/836.6	0.473	0.662
LTE Band 2	Bottom Edge	18900/1880	1.300	1.442
LTE FDD 4	Bottom Edge	20300/1745	1.330	1.442
LTE Band 7	Bottom Edge	20850/2510	0.878	1.051
LTE FDD 17	Back Side	23800/711	0.314	0.430
WiFi(802.11b)	Back Side	11/2462	0.331	0.509

1.8. Test Date

The test performed from May 5, 2014 to May 11, 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.

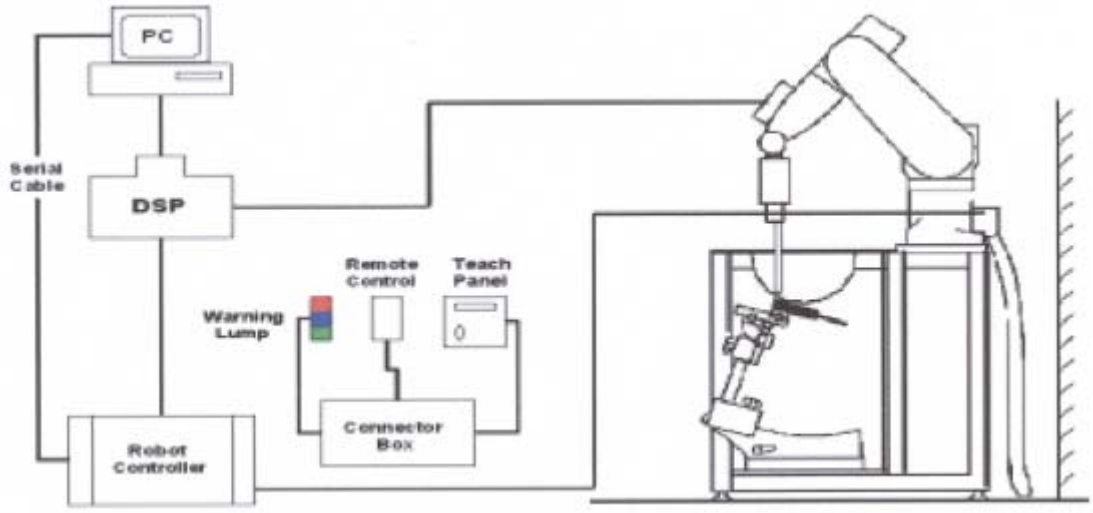


Figure 1 SAR Lab Test Measurement Set-up

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) 750MHz
Water	41.448
Sugar	56
Salt	1.452
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=750MHz ε=41.9 σ=0.89

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) 1750MHz
Water	55.24
Glycol	44.45
Salt	0.31
Dielectric Parameters Target Value	f=1750MHz ε=40.1 σ=1.37

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

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

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) 750MHz
Water	52.49
Sugar	45
Salt	1.41
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=750MHz ε=55.5 σ=0.96

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) 1750MHz
Water	69.91
Glycol	29.97
Salt	0.12
Dielectric Parameters Target Value	f=1750MHz ε=53.4 σ=1.49

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

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

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(%)
750MHz (head)	2014-5-6	21.5	41.9	0.90	41.9	0.89	0.00	1.12
835MHz (head)	2014-5-7	21.5	41.8	0.90	41.5	0.90	0.72	0.00
1750MHz (head)	2014-5-10	21.5	40.9	1.34	40.1	1.37	2.00	-2.19
1900MHz (head)	2014-5-9	21.5	39.7	1.34	40.0	1.40	-0.75	-4.29
2450MHz (head)	2014-5-5	21.5	39.1	1.80	39.2	1.80	-0.26	0.00
2600MHz (head)	2014-5-8	21.5	38.5	1.98	39.0	1.96	-1.28	1.02
750MHz (body)	2014-5-6	21.5	54.3	0.97	55.5	0.96	-2.16	1.04
835MHz (body)	2014-5-7	21.5	54.5	0.97	55.2	0.97	-1.27	0.00
1750MHz (body)	2014-5-10	21.5	52.1	1.47	53.4	1.49	-2.43	-1.34
1900MHz (body)	2014-5-11	21.5	52.9	1.53	53.3	1.52	-0.75	0.66
2450MHz (body)	2014-5-5	21.5	52.1	1.99	52.7	1.95	-1.14	2.05
2600MHz (body)	2014-5-8	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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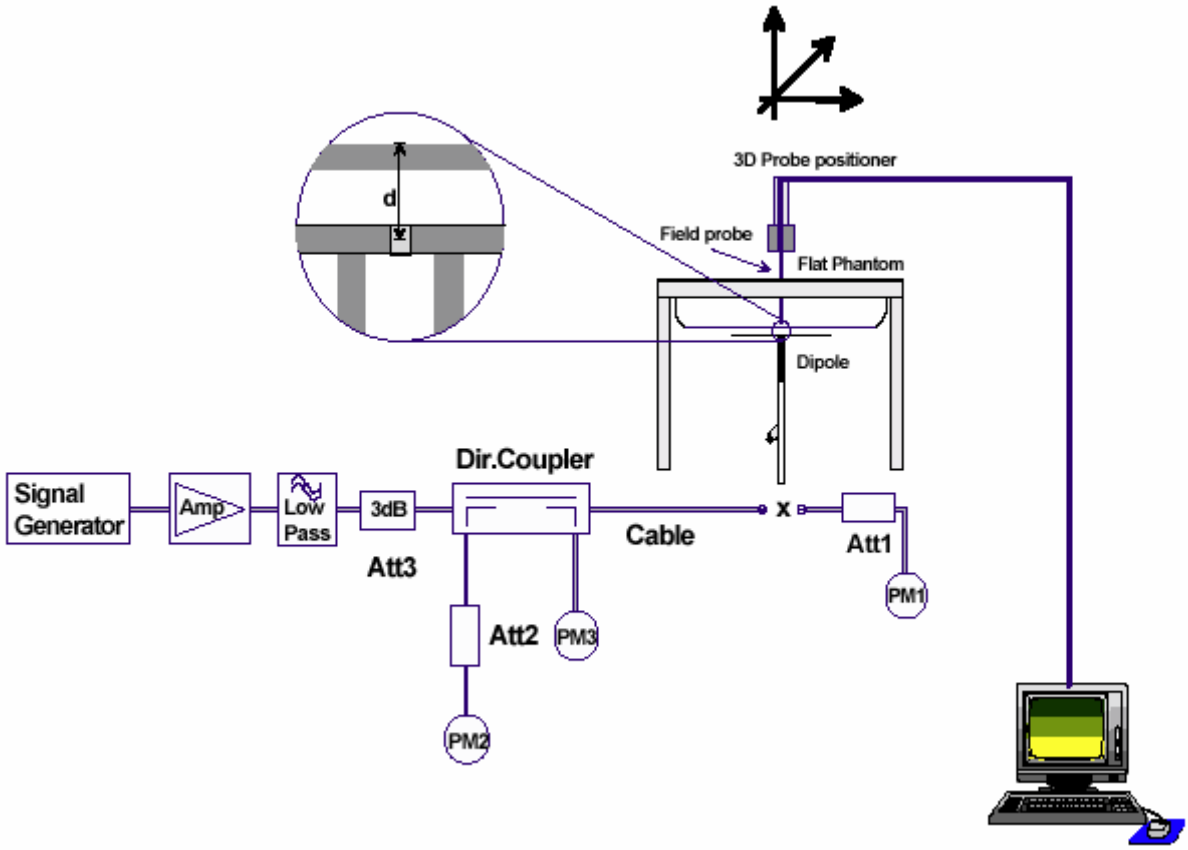


Figure 6 System Check Set-up

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 D750V3 SN: 1045				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
9/29/2011	-26.8	/	54.2	/
9/28/2012	-27.9	4.1%	53.8	0.4Ω
9/27/2013	-26.1	2.6%	55.7	1.5Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
9/29/2011	-27.5	/	49.5	/
9/28/2012	-26.9	2.2%	48.2	1.3Ω
9/27/2013	-25.4	7.6%	47.6	1.9Ω

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		250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
750MHz	2014-5-6	41.9	0.90	2.13	8.52	8.36	1.91%
835MHz	2014-5-7	41.8	0.90	2.44	9.76	9.34	4.50%
1750MHz	2014-5-10	40.9	1.34	8.75	35.0	37.20	-5.91%
1900MHz	2014-5-9	39.7	1.34	9.48	37.92	40.30	-5.91%
2450MHz	2014-5-5	39.1	1.80	13.70	54.80	53.80	1.86%
2600MHz	2014-5-8	38.5	1.98	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		250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
750MHz	2014-5-6	54.3	0.97	2.22	8.88	8.80	0.91%
835MHz	2014-5-7	54.5	0.97	2.41	9.64	9.46	1.90%
1750MHz	2014-5-10	52.1	1.47	9.24	36.96	38.80	-4.74%
1900MHz	2014-5-11	52.9	1.53	9.93	39.72	41.70	-4.75%
2450MHz	2014-5-5	52.1	1.99	12.50	50.00	51.70	-3.29%
2600MHz	2014-5-8	52.3	2.20	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

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. UMTS Test Configuration

6.4.2.1. Output power Verification

Maximum output power is verified on the High, Middle and Low channel according to the procedures described in section 5.2 of 3GPP TS 34. 121, using the appropriate RMC or AMR with TPC(transmit power control) set to all up bits for WCDMA/HSDPA or applying the required inner loop power control procedures to the maximum output power while HSUPA is active. Results for all applicable physical channel configuration (DPCCH, $DPDCH_n$ and spreading codes, HSDPA, HSPA) should be tabulated in the SAR report. All configuration that are not supported by the DUT or can not be measured due to technical or equipment limitations should be clearly identified

6.4.2.2. Head SAR Measurements

SAR for head exposure configurations in voice mode is measured using a 12.2kbps RMC with TPC bits configured to all up bits. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2kbps AMR is less than 1/4 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2kbps AMR with a 3.4 kbps SRB(Signaling radio bearer) using the exposure configuration that results in the highest SAR in 12.2kbps RMC for that RF channel.

6.4.2.3. Body SAR Measurements

SAR for body exposure configurations in voice and data modes is measured using 12.2kbps RMC with TPC bits configured to all up bits. SAR for other spreading codes and multiple $DPDCH_n$, when supported by the DUT, are not required when the maximum average output of each RF channel, for each spreading code and $DPDCH_n$ configuration, are less than 1/4 dB higher than those measured in 12.2kbps RMC. Otherwise, SAR is measured on the maximum output channel with an applicable RMC configuration for the corresponding spreading code or $DPDCH_n$ using the exposure configuration that results in the highest SAR with 12.2 kbps RMC. When more than 2 $DPDCH_n$ are supported by the DUT, it may be necessary to configure additional $DPDCH_n$ for a DUT using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

6.4.3. HSDPA Test Configuration

SAR for body exposure configurations is measured according to the ‘Body SAR Measurements’ procedures of that section. In addition,body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to the UE category of a test device.The number of HSDSCH/ HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding

sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) should be set according to values indicated in the Table below. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 10: Subtests for UMTS Release 5 HSDPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: $\triangle_{ACK}$, $\triangle_{NACK}$ and $\triangle_{CQI}$= 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c$=30/15 ⇔ β_{hs}=30/15*β_c

Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, $\triangle_{ACK}$ and $\triangle_{NACK}$= 8 (A_{hs}=30/15) with β_{hs}=30/15*β_c,and $\triangle_{CQI}$= 7 (A_{hs}=24/15) with β_{hs}=24/15*β_c.

Note3: CM=1 forβ_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4:For subtest 2 the $\beta_c\beta_d$ ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to β_c=11/15 and β_d=15/15.

Table 11: Settings of required H-Set 1 QPSK in HSDPA mode

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	534
Inter-TTI Distance	TTI's	3
Number of HARQ Processes	Processes	2
Information Bit Payload (N_{INF})	Bits	3202
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	4800
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	9600
Coding Rate	/	0.67
Number of Physical Channel Codes	Codes	5
Modulation	/	QPSK

6.4.4. DC-HSDPA Test Configuration

body SAR is also measured for DC-HSDPA when the maximum average output of each RF channel with DC-HSDPA active is at least 1/4 dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for DC-HSDPA is measured using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

Configure DC-HSDPA parameters for base station

a) Set up the HSDPA RB Test Mode Parameters

RB Test HS-DSCH Configuration Type = User Defined
RB Test User Defined HS-DSCH MAC entity = MAC-ehs (Note 1)
RB Test User Defined HARQ Processes = 6 (Note 2)
RB Test User Defined UE IR Buffer Allocation = Implicit
RB Test User Defined DC-HSDPA State = On
RB Test Mode DC-HSDPA DPCH Loopback State = On

b) Set up the Serving Cell Parameters

RB Test User Defined 64QAM State =On
RB Test User Defined Active HS-PDSCHs =15
RB Test User Def Transport Block Size Index =62
RB Test User Defined Modulation Type =64QAM
RB Test User Defined Inter-TTI Interval =1

c) Set up the Secondary Serving Cell Parameters

RB Test User Def Secondary Cell 64QAM State =On
RBTM User Def Sec Cell Active HS-PDSCHs = 15
RBTM User Def Sec Cell TB Size Index = 62
RBTM User Def Sec Cell Modulation Type =64QAM
RBTM User Def Sec Cell Inter-TTI Interval = 1

d) Set the HSDPA Conn DL Channel Levels

HSDPA Cell 1 Connected CPICH Level = -8
HSDPA Cell 1 Connected P-CCPCH/SCH Level = -20
HSDPA Cell 1 Connected PICH Level = off
HSDPA Cell 1 Connected DPCH Level = -30
HSDPA Cell 1 Connected HS-PDSCH Level (Sum) = -1 dBm
HSDPA Cell 1 Connected HS-SCCH 1 to 4 Level = -20,-20,off,off
Secondary Cell HSDPA Conn CPICH Level = -8
Secondary Cell HSDPA Conn PCCPCH/SCH Level = -20
Secondary Cell HSDPA Conn PICH Level = off
Secondary Cell HSDPA Conn HS-PDSCHs Lvl (Sum) = -1 dBm
Secondary Cell HSDPA Conn HS-SCCH 1 to 4 Level = -20,-20,off,off

Table 12: HS-DSCH UE category

Table 5.1a: FDD HS-DSCH physical layer categories

HS-DSCH category	Maximum number of HS-DSCH codes received	Minimum inter-TTI interval	Maximum number of bits of an HS-DSCH transport block received within an HS-DSCH TTI NOTE 1	Total number of soft channel bits	Supported modulations without MIMO operation or dual cell operation	Supported modulations with MIMO operation and without dual cell operation	Supported modulations with dual cell operation
Category 1	5	3	7298	19200	QPSK, 16QAM	Not applicable (MIMO not supported)	Not applicable (dual cell operation not supported)
Category 2	5	3	7298	28800			
Category 3	5	2	7298	28800			
Category 4	5	2	7298	38400			
Category 5	5	1	7298	57600			
Category 6	5	1	7298	67200			
Category 7	10	1	14411	115200			
Category 8	10	1	14411	134400			
Category 9	15	1	20251	172800			
Category 10	15	1	27952	172800			
Category 11	5	2	3630	14400	QPSK		
Category 12	5	1	3630	28800			
Category 13	15	1	35280	259200	QPSK, 16QAM, 64QAM		
Category 14	15	1	42192	259200			
Category 15	15	1	23370	345600	QPSK, 16QAM		
Category 16	15	1	27952	345600			
Category 17 NOTE 2	15	1	35280	259200	QPSK, 16QAM, 64QAM	–	
			23370	345600	–	QPSK, 16QAM	
Category 18 NOTE 3	15	1	42192	259200	QPSK, 16QAM, 64QAM	–	
			27952	345600	–	QPSK, 16QAM	
Category 19	15	1	35280	518400	QPSK, 16QAM, 64QAM		
Category 20	15	1	42192	518400			
Category 21	15	1	23370	345600	-	-	QPSK, 16QAM
Category 22	15	1	27952	345600			
Category 23	15	1	35280	518400			QPSK, 16QAM, 64QAM
Category 24	15	1	42192	518400			

6.4.5. HSUPA Test Configuration

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.[40]

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E- DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the ‘WCDMA Handset’ and ‘Release 5 HSDPA Data Devices’ sections of 3 G device.

Table 13：Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, ΔNACK and Δ_{CQI} = 8 $\Leftrightarrow$ $A_{hs} = \beta_{hs}/\beta_c$ = 30/15 $\Leftrightarrow$ β_{hs}= 30/15 *β_c.

Note 2: CM = 1 for βc/βd =12/15, β_{hs}/β_c =24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-

DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the βc/βd ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the

signaled gain factors for the reference TFC (TF1, TF1) to βc = 10/15 and βd = 15/15.

Note 4: For subtest 5 the βc/βd ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the

signaled gain factors for the reference TFC (TF1, TF1) to βc = 14/15 and βd = 15/15.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Figure 5.1g.

Note 6: βed can not be set directly; it is set by Absolute Grant Value.

Table 14: HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI (ms)	Minimum Spreading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	11484	5.76
	4	4	10		20000	2.00
7 (No DPDCH)	4	8	2	2 SF2 & 2 SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.
UE Categories 1 to 6 supports QPSK only. UE Category 7 supports QPSK and 16QAM. (TS25.306-7.3.0)

6.4.6. HSPA+ Test Configuration

When the maximum average output power of each RF channel with (uplink) HSPA+ active is ≤ ¼ dB higher than that measured without HSPA+ using 12.2 kbps RMC, or the maximum *reported* SAR for 12.2 kbps RMC without HSPA+ is ≤ 75% of the SAR limit, SAR evaluation for HSPA+ is not required.
Table Sub-test1 setup for release 7 HSPA+ with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

6.4.7. 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.

6.4.8. 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 15: 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		32.7	32.76	32.82	-9.03dB	23.67	23.73	23.79
GPRS (GMSK)	1Txslot	32.47	32.63	32.74	-9.03dB	23.44	23.6	23.71
	2Txslots	31.33	31.52	31.63	-6.02dB	**25.31**	**25.5**	**25.61**
	3Txslots	29.09	29.52	29.35	-4.26dB	24.83	25.26	25.09
	4Txslots	28.28	28.25	28.4	-3.01dB	25.27	25.24	25.39
EGPRS (GMSK)	1Txslot	32.48	32.74	32.72	-9.03dB	23.45	23.71	23.69
	2Txslots	31.38	31.67	31.62	-6.02dB	**25.36**	**25.65**	**25.6**
	3Txslots	29.14	29.38	29.3	-4.26dB	24.88	25.12	25.04
	4Txslots	28.3	28.52	28.45	-3.01dB	25.29	25.51	25.44
EGPRS (8PSK)	1Txslot	26.06	26.99	27.11	-9.03dB	17.03	17.96	18.08
	2Txslots	25.37	25.35	25.59	-6.02dB	19.35	19.33	19.57
	3Txslots	23.24	23.18	23.2	-4.26dB	18.98	18.92	18.94
	4Txslots	22.1	21.99	22.18	-3.01dB	19.09	18.98	19.17
GSM 1900		**Burst Conducted Power(dBm)**			/	**Average power(dBm)**		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM		29.67	29.18	29.65	-9.03dB	20.64	20.15	20.62
GPRS (GMSK)	1Txslot	29.61	29.33	29.5	-9.03dB	20.58	20.3	20.47
	2Txslots	28.6	28.17	28.54	-6.02dB	22.58	22.15	22.52
	3Txslots	26.76	26.47	26.87	-4.26dB	22.5	22.21	22.61
	4Txslots	25.67	25.33	25.7	-3.01dB	**22.66**	**22.32**	**22.69**
EGPRS (GMSK)	1Txslot	29.51	29.1	29.48	-9.03dB	20.48	20.07	20.45
	2Txslots	28.63	28.16	28.51	-6.02dB	22.61	22.14	22.49
	3Txslots	26.91	26.31	26.78	-4.26dB	22.65	22.05	22.52
	4Txslots	25.76	25.19	25.64	-3.01dB	**22.75**	**22.18**	**22.63**
EGPRS (8PSK)	1Txslot	26.09	25.61	26	-9.03dB	17.06	16.58	16.97
	2Txslots	24.43	23.92	24.17	-6.02dB	18.41	17.9	18.15
	3Txslots	23.18	22.68	23.02	-4.26dB	18.92	18.42	18.76
	4Txslots	21.01	20.56	20.91	-3.01dB	18	17.55	17.9

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.

UMTS Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
RMC	12.2kbps RMC	22.45	22.13	22.41
	64kbps RMC	22.46	22.14	22.31
	144kbps RMC	22.34	22.16	22.33
	384kbps RMC	22.35	22.11	22.29
HSDPA	Sub - Test 1	22.43	22.15	22.39
	Sub - Test 2	22.44	22.12	22.33
	Sub - Test 3	22.35	22.18	22.37
	Sub - Test 4	22.36	22.09	22.32
HSUPA	Sub - Test 1	21	20.68	20.96
	Sub - Test 2	19.74	19.42	19.7
	Sub - Test 3	20.22	19.9	20.18
	Sub - Test 4	21.1	20.72	21.05
	Sub - Test 5	19.78	19.5	19.74
DC-HSDPA	Sub - Test 1	22.32	22.04	22.35
	Sub - Test 2	22.27	22.08	22.31
	Sub - Test 3	22.31	22.09	22.32
	Sub - Test 4	22.37	22.12	22.30
UMTS Band V		Conducted Power (dBm)		
		Channel 4132	Channel 4183	Channel 4233
RMC	12.2kbps RMC	22.54	22.54	22.23
	64kbps RMC	22.63	22.5	22.23
	144kbps RMC	22.6	22.53	22.2
	384kbps RMC	22.52	22.51	22.19
HSDPA	Sub - Test 1	22.56	22.55	22.26
	Sub - Test 2	22.61	22.45	22.19
	Sub - Test 3	22.58	22.54	22.23
	Sub - Test 4	22.51	22.49	22.2
HSUPA	Sub - Test 1	21.1	21.1	20.79
	Sub - Test 2	19.85	19.85	19.54
	Sub - Test 3	20.31	20.31	20
	Sub - Test 4	21.13	21.15	20.75
	Sub - Test 5	19.87	19.91	19.62
DC-HSDPA	Sub - Test 1	22.42	22.42	22.21
	Sub - Test 2	22.53	22.48	22.13
	Sub - Test 3	22.48	22.42	22.36
	Sub - Test 4	22.39	22.38	22.27

LTE Band 2				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18607	18900	19193
1.4MHz	QPSK	1	0	23.63	23.55	23.67
		1	3	23.69	23.31	23.62
		1	6	23.57	23.46	23.47
		3	0	23.65	23.39	23.53
		3	2	23.73	23.31	23.64
		3	3	23.56	23.46	23.31
		7	0	22.72	22.59	22.89
	16QAM	1	0	22.74	22.62	22.74
		1	3	22.63	22.64	22.78
		1	6	22.68	22.56	22.87
		3	0	22.57	22.57	22.73
		3	2	22.61	22.49	22.84
		3	3	22.68	22.54	22.73
		7	0	21.86	21.93	21.88
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18615	18900	19185
3MHz	QPSK	1	0	23.53	23.55	23.63
		1	7	23.44	23.38	23.41
		1	14	23.31	23.26	23.38
		8	0	22.56	22.54	22.68
		8	4	22.60	22.51	22.79
		8	7	22.69	22.61	22.81
		15	0	22.78	22.59	22.95
	16QAM	1	0	22.74	22.63	22.71
		1	7	22.69	22.58	22.74
		1	14	22.64	22.56	22.86
		8	0	22.07	21.69	21.91
		8	4	22.06	21.87	21.87
		8	7	21.86	21.82	21.72
		15	0	21.86	21.93	21.88
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18625	18900	19175
5MHz	QPSK	1	0	23.74	23.53	23.63
		1	13	23.58	23.46	23.50
		1	24	23.57	23.31	23.46
		12	0	22.78	22.62	22.70
		12	6	22.71	22.67	22.77

		12	13	22.83	22.39	22.73
		25	0	22.87	22.64	22.87
	16QAM	1	0	22.88	22.73	22.73
		1	13	22.94	22.61	22.73
		1	24	22.75	22.64	22.81
		12	0	22.21	21.77	21.87
		12	6	21.95	21.95	21.82
		12	13	21.96	21.90	21.71
		25	0	22.06	22.08	21.81
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18650	18900	19150
10MHz	QPSK	1	0	23.78	23.61	23.53
		1	25	23.82	23.55	23.53
		1	49	23.62	23.47	23.62
		25	0	23.00	22.78	22.80
		25	13	22.83	22.81	22.73
		25	25	22.81	22.80	22.75
		50	0	22.99	22.82	22.92
	16QAM	1	0	22.83	22.24	22.70
		1	25	22.85	22.17	22.71
		1	49	23.01	22.10	22.73
		25	0	21.99	21.23	21.84
		25	13	21.81	21.21	21.89
		25	25	21.95	21.27	21.88
		50	0	21.97	21.30	21.92
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18675	18900	19125
15MHz	QPSK	1	0	23.73	23.68	23.56
		1	38	23.78	23.55	23.51
		1	74	23.65	23.51	23.58
		36	0	22.96	22.80	22.78
		36	18	22.79	22.85	22.71
		36	39	22.81	22.84	22.71
		75	0	22.95	22.86	22.90
	16QAM	1	0	22.85	22.24	22.68
		1	38	22.81	22.21	22.76
		1	74	22.99	22.14	22.71
		36	0	21.95	21.32	21.82
		36	18	21.77	21.25	21.82
		36	39	21.86	21.24	21.86

		75	0	21.93	21.34	21.96
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				18700	18900	19100
20MHz	QPSK	1	0	23.72	23.55	23.48
		1	50	23.71	23.49	23.48
		1	99	23.68	23.51	23.45
		50	0	22.96	22.74	22.75
		50	25	22.82	22.73	22.68
		50	50	22.89	22.73	22.73
		100	0	22.98	22.85	22.87
	16QAM	1	0	22.88	22.18	22.65
		1	50	22.84	22.15	22.73
		1	99	22.98	22.04	22.68
		50	0	21.98	21.26	21.86
		50	25	21.92	21.18	21.79
		50	50	21.89	21.18	21.83
		100	0	21.98	21.28	21.91

LTE Band 4				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				19957	20175	20393
1.4MHz	QPSK	1	0	23.73	23.51	23.77
		1	3	23.79	23.27	23.72
		1	6	23.67	23.42	23.57
		3	0	23.75	23.35	23.63
		3	2	23.83	23.27	23.74
		3	3	23.66	23.42	23.41
		7	0	22.82	22.55	22.99
	16QAM	1	0	22.84	22.58	22.84
		1	3	22.73	22.60	22.88
		1	6	22.78	22.52	22.97
		3	0	22.67	22.53	22.83
		3	2	22.71	22.45	22.94
		3	3	22.78	22.50	22.83
		7	0	21.96	21.89	21.98
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				19965	20175	20385
3MHz	QPSK	1	0	23.63	23.51	23.73
		1	7	23.54	23.34	23.51
		1	14	23.41	23.22	23.48

		8	0	22.66	22.50	22.78
		8	4	22.70	22.47	22.89
		8	7	22.79	22.57	22.91
		15	0	22.88	22.55	23.05
	16QAM	1	0	22.84	22.59	22.81
		1	7	22.79	22.54	22.84
		1	14	22.74	22.52	22.96
		8	0	22.17	21.65	22.01
		8	4	22.16	21.83	21.97
		8	7	21.96	21.78	21.82
		15	0	21.96	21.89	21.98
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				19975	20175	20375
5MHz	QPSK	1	0	23.84	23.49	23.73
		1	13	23.68	23.42	23.60
		1	24	23.67	23.27	23.56
		12	0	22.88	22.58	22.80
		12	6	22.81	22.63	22.87
		12	13	22.93	22.35	22.83
		25	0	22.97	22.60	22.97
	16QAM	1	0	22.98	22.69	22.83
		1	13	23.04	22.57	22.83
		1	24	22.85	22.60	22.91
		12	0	22.31	21.73	21.97
		12	6	22.05	21.91	21.92
		12	13	22.06	21.86	21.81
		25	0	22.16	22.04	21.91
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20000	20175	20350
10MHz	QPSK	1	0	23.88	23.57	23.63
		1	25	23.92	23.51	23.63
		1	49	23.72	23.43	23.72
		25	0	23.10	22.74	22.90
		25	13	22.93	22.77	22.83
		25	25	22.91	22.76	22.85
		50	0	23.09	22.78	23.02
	16QAM	1	0	22.93	22.20	22.80
		1	25	22.95	22.13	22.81
		1	49	23.11	22.06	22.83
		25	0	22.09	21.19	21.94

		25	13	21.91	21.17	21.99
		25	25	22.05	21.23	21.98
		50	0	22.07	21.26	22.02
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20025	20175	20325
15MHz	QPSK	1	0	23.83	23.64	23.66
		1	38	23.88	23.51	23.61
		1	74	23.75	23.47	23.68
		36	0	23.06	22.76	22.88
		36	18	22.89	22.81	22.81
		36	39	22.91	22.80	22.81
		75	0	23.05	22.82	23.00
	16QAM	1	0	22.95	22.20	22.78
		1	38	22.91	22.17	22.86
		1	74	23.09	22.10	22.81
		36	0	22.05	21.28	21.92
		36	18	21.87	21.21	21.92
		36	39	21.96	21.20	21.96
		75	0	22.03	21.30	22.06
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20050	20175	20300
20MHz	QPSK	1	0	23.82	23.51	23.65
		1	50	23.81	23.45	23.58
		1	99	23.78	23.47	23.61
		50	0	23.06	22.74	22.85
		50	25	22.92	22.69	22.78
		50	50	22.99	22.70	22.83
		100	0	23.08	22.81	22.97
	16QAM	1	0	22.98	22.14	22.75
		1	50	22.94	22.11	22.83
		1	99	23.08	22.00	22.78
		50	0	22.08	21.22	21.96
		50	25	22.02	21.14	21.89
		50	50	21.99	21.14	21.93
		100	0	22.08	21.24	22.01

LTE Band 7				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20775	21100	21425
5MHz	QPSK	1	0	23.12	23.29	23.20
		1	13	23.21	23.24	23.10
		1	24	23.15	23.25	23.12
		12	0	22.27	22.33	22.26
		12	6	22.36	22.49	22.26
		12	13	22.12	22.35	22.14
		25	0	22.22	22.37	22.22
	16QAM	1	0	22.33	22.68	22.29
		1	13	22.29	22.36	22.30
		1	24	22.19	22.40	22.46
		12	0	21.31	21.61	21.68
		12	6	21.45	21.47	21.73
		12	13	21.20	21.24	21.53
		25	0	21.30	21.61	21.66
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20800	21100	21400
10MHz	QPSK	1	0	23.16	23.27	23.16
		1	25	23.17	23.16	23.14
		1	49	23.19	23.23	23.18
		25	0	22.31	22.31	22.22
		25	13	22.37	22.37	22.27
		25	25	22.16	22.33	22.10
		50	0	22.26	22.35	22.18
	16QAM	1	0	22.37	22.66	22.25
		1	25	22.29	22.30	22.29
		1	49	22.23	22.38	22.42
		25	0	21.35	21.59	21.64
		25	13	21.50	21.41	21.63
		25	25	21.24	21.22	21.49
		50	0	21.27	21.64	21.62
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20825	21100	21375
15MHz	QPSK	1	0	23.14	23.24	23.10
		1	38	23.13	23.13	23.14
		1	74	23.10	23.02	23.12
		36	0	22.22	22.28	22.12
		36	18	22.35	22.27	22.21

		36	39	22.17	22.30	22.03
		75	0	22.24	22.32	22.12
	16QAM	1	0	22.35	22.61	22.19
		1	38	22.22	22.27	22.23
		1	74	22.21	22.35	22.33
		36	0	21.33	21.36	21.58
		36	18	21.41	21.38	21.49
		36	39	21.22	21.19	21.43
		75	0	21.05	21.33	21.53
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				20850	21100	21350
20MHz	QPSK	1	0	23.22	23.17	23.19
		1	50	23.19	23.10	23.19
		1	99	23.10	23.00	23.13
		50	0	22.28	22.25	22.07
		50	25	22.39	22.19	22.16
		50	50	22.23	22.27	21.98
		100	0	22.35	22.29	22.04
	16QAM	1	0	22.41	22.35	22.14
		1	50	22.28	22.24	22.18
		1	99	22.20	22.17	22.23
		50	0	21.39	21.26	21.53
		50	25	21.38	21.35	21.44
		50	50	21.28	21.16	21.33
		100	0	21.16	21.21	21.48

LTE Band 17				Conducted Power(dBm)		
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23755	23790	23825
5MHz	QPSK	1	0	21.92	22.02	22.19
		1	13	21.84	22.10	21.91
		1	24	21.76	22.05	22.02
		12	0	20.96	21.25	21.19
		12	6	21.01	21.13	21.24
		12	13	20.91	21.26	21.18
		25	0	21.13	21.18	21.37
	16QAM	1	0	20.86	21.04	21.27
		1	13	20.78	21.12	20.99
		1	24	20.70	21.07	21.17
		12	0	19.92	20.29	20.27
		12	6	19.95	20.15	20.32
		12	13	19.85	20.28	20.29
		25	0	20.02	20.17	20.45
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel
				23780	23790	23800
10MHz	QPSK	1	0	22.04	22.08	22.13
		1	25	21.97	22.12	22.03
		1	49	21.88	22.03	22.08
		25	0	21.02	21.33	21.32
		25	13	20.98	21.19	21.43
		25	25	20.99	21.33	21.09
		50	0	21.02	21.28	21.32
	16QAM	1	0	21.17	21.15	21.15
		1	25	21.09	21.24	21.07
		1	49	21.00	21.10	21.12
		25	0	20.17	20.42	20.31
		25	13	20.10	20.26	20.47
		25	25	20.11	20.40	20.19
		50	0	20.19	20.43	20.36

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)	4.71	2.79	4.03
π/4DQPSK(dBm)	4.91	2.98	4.24
8DPSK(dBm)	5.31	3.42	4.67
BT 4.0 Channel	**Ch 0 2402 MHz**	**Ch 19 2440 MHz**	**Ch 39 2480 MHz**
Test results(dBm)	0.82	-0.40	-0.21

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)	AV Power (dBm)
802.11b	1	1	14.65
		2	14.68
		5.5	14.68
		11	14.66
	6	1	15.20
		2	15.24
		5.5	15.22
		11	15.20
	11	1	15.13
		2	15.19
		5.5	15.20
		11	15.18
802.11g	1	6	11.89
		9	11.90
		12	11.87
		18	11.87
		24	11.86
		36	11.88
		48	11.89
		54	11.88
	6	6	12.47
		9	12.49
		12	12.45
		18	12.47
		24	12.48
		36	12.46
		48	12.48

		54	12.45
	11	6	12.38
		9	12.36
		12	12.39
		18	12.37
		24	12.38
		36	12.36
		48	12.39
		54	12.37
802.11n HT20	1	MCS0	10.44
		MCS1	10.43
		MCS2	10.41
		MCS3	10.39
		MCS4	10.42
		MCS5	10.40
		MCS6	10.42
		MCS7	10.40
	6	MCS0	11.09
		MCS1	11.07
		MCS2	11.10
		MCS3	11.09
		MCS4	11.08
		MCS5	11.09
		MCS6	11.07
		MCS7	11.08
	11	MCS0	10.91
		MCS1	10.89
		MCS2	10.92
		MCS3	10.90
		MCS4	10.88
		MCS5	10.92
		MCS6	10.91
		MCS7	10.93

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:

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

Based on the above equation, Bluetooth SAR was not required;
Head Evaluation = $[10^{(6.5/10)}/5] * (2.480^{1/2}) = 1.41 < 3.0$
Body Evaluation = $[10^{(6.5/10)}/10] * (2.480^{1/2}) = 0.70 < 3.0$

Based on the above equation, WIFI SAR was required;
Head Evaluation = $[10^{(17/10)}/5]* (2.462^{1/2}) = 15.73 > 3.0$
Body Evaluation = $[10^{(17/10)}/10]* (2.462^{1/2}) = 7.86 > 3.0$

7.3. SAR Test Results

7.3.1. GSM 850 (GSM/GPRS/EGPRS)

Table 16: 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 with Battery 1										
Left/Cheek	251/848.8	GSM	1:8.3	33.5	32.82	0.021	0.468	1.17	0.547	/
	190/836.6	GSM	1:8.3	33.5	32.76	-0.150	0.445	1.19	0.528	/
	128/824.2	GSM	1:8.3	33.5	32.70	0.030	0.391	1.20	0.470	/
Left/Tilt	251/848.8	GSM	1:8.3	33.5	32.82	0.021	0.278	1.17	0.325	/
	190/836.6	GSM	1:8.3	33.5	32.76	0.050	0.265	1.19	0.314	/
	128/824.2	GSM	1:8.3	33.5	32.70	0.060	0.232	1.20	0.279	/
Right/Cheek	251/848.8	GSM	1:8.3	33.5	32.82	0.029	0.346	1.17	0.405	/
	190/836.6	GSM	1:8.3	33.5	32.76	-0.150	0.376	1.19	0.446	/
	128/824.2	GSM	1:8.3	33.5	32.70	0.180	0.28	1.20	0.337	/
Right/Tilt	251/848.8	GSM	1:8.3	33.5	32.82	0.110	0.252	1.17	0.295	/
	190/836.6	GSM	1:8.3	33.5	32.76	0.020	0.228	1.19	0.270	/
	128/824.2	GSM	1:8.3	33.5	32.70	0.090	0.189	1.20	0.227	/
Worst Case Position of Head with Battery 2										
Left/Cheek	251/848.8	GSM	1:8.3	33.5	32.82	-0.17	0.476	1.17	0.557	Figure19
Test position of Body with Battery 1 (Distance 10mm)										
Back Side	251/848.8	2 Txslots	1:4.15	32.2	31.63	-0.020	0.862	1.14	0.983	/
	190/836.6	2 Txslots	1:4.15	32.2	31.52	-0.059	0.708	1.17	0.828	/
	128/824.2	2 Txslots	1:4.15	32.2	31.33	-0.060	0.573	1.22	0.700	/
Front Side	190/836.6	2 Txslots	1:4.15	32.2	31.52	-0.040	0.44	1.17	0.515	/
Left Edge	190/836.6	2 Txslots	1:4.15	32.2	31.52	-0.030	0.52	1.17	0.608	/
Right Edge	190/836.6	2 Txslots	1:4.15	32.2	31.52	0.030	0.472	1.17	0.552	/
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	2 Txslots	1:4.15	32.2	31.52	0.050	0.12	1.17	0.140	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Back Side	251/848.8	2 Txslots	1:4.15	32.2	31.63	0.040	0.882	1.14	1.006	Figure20
Worst Case Position of Body with EGPRS (Distance 10mm)										
Back Side	251/848.8	2 Txslots	1:4.15	32.4	31.62	0.060	0.832	1.20	0.996	/
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										

Back Side	251/848.8	2 Txslots	1:4.15	32.2	31.63	-0.030	0.855	1.14	0.975	/

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.

Table 17: 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	0.882	0.855	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

7.3.2. GSM 1900 (GSM/GPRS/EGPRS)

Table 18: 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 with Battery 1										
Left/Cheek	810/1909.8	GSM	1:8.3	30.5	29.65	0.024	0.262	1.22	0.319	/
	661/1880	GSM	1:8.3	30.5	29.18	0.161	0.266	1.36	0.360	/
	512/1850.2	GSM	1:8.3	30.5	29.67	0.022	0.338	1.21	0.409	/
Left/Tilt	810/1909.8	GSM	1:8.3	30.5	29.65	0.027	0.055	1.22	0.066	/
	661/1880	GSM	1:8.3	30.5	29.18	0.010	0.059	1.36	0.080	/
	512/1850.2	GSM	1:8.3	30.5	29.67	0.080	0.078	1.21	0.094	/
Right/Cheek	810/1909.8	GSM	1:8.3	30.5	29.65	0.100	0.240	1.22	0.292	/
	661/1880	GSM	1:8.3	30.5	29.18	0.041	0.238	1.36	0.323	/
	512/1850.2	GSM	1:8.3	30.5	29.67	0.160	0.278	1.21	0.337	/
Right/Tilt	810/1909.8	GSM	1:8.3	30.5	29.65	0.020	0.120	1.22	0.146	/
	661/1880	GSM	1:8.3	30.5	29.18	0.028	0.112	1.36	0.152	/
	512/1850.2	GSM	1:8.3	30.5	29.67	0.160	0.130	1.21	0.157	/
Worst Case Position of Head with Battery 2										
Left/Cheek	512/1850.2	GSM	1:8.3	30.5	29.67	-0.037	0.343	1.21	0.415	Figure21
Test position of Body with Battery 1 (Distance 10mm)										
Back Side	661/1880	4 Txslots	1:2.1	26.5	25.33	0.090	0.542	1.31	0.710	/
Front Side	661/1880	4 Txslots	1:2.1	26.5	25.33	0.150	0.438	1.31	0.573	/
Left Edge	661/1880	4 Txslots	1:2.1	26.5	25.33	0.140	0.099	1.31	0.130	/
Right Edge	661/1880	4 Txslots	1:2.1	26.5	25.33	0.160	0.191	1.31	0.250	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	810/1909.8	4 Txslots	1:2.1	26.5	25.70	-0.050	0.734	1.20	0.882	/
	661/1880	4 Txslots	1:2.1	26.5	25.33	-0.022	0.743	1.31	0.973	
	512/1850.2	4 Txslots	1:2.1	26.6	25.67	0.021	0.933	1.24	1.156	Figure22
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Bottom Edge	512/1850.2	4 Txslots	1:2.1	26.6	25.67	0.190	0.929	1.24	1.151	/
Worst Case Position of Body with EGPRS (Distance 10mm)										
Bottom Edge	512/1850.2	4 Txslots	1:2.1	26.7	25.76	0.115	0.927	1.24	1.151	/
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										
Bottom Edge	512/1850.2	4 Txslots	1:2.1	26.6	25.67	0.120	0.919	1.24	1.138	/

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.

Table 19: SAR Measurement Variability Results [GSM 1900(GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Bottom Edge	512/1850.2	0.933	0.919	1.02	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

7.3.3. UMTS Band II (WCDMA/HSDPA/HSUPA)

Table 20: SAR Values [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Channel Type	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 Battery 1										
Left/Cheek	9538/1907.6	RMC 12.2k	1:1	23.5	22.41	0.105	0.478	1.29	0.614	/
	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.051	0.468	1.37	0.642	/
	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.065	0.497	1.33	0.663	/
Left/Tilt	9538/1907.6	RMC 12.2k	1:1	23.5	22.41	0.062	0.102	1.29	0.131	/
	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.040	0.123	1.37	0.169	/
	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.047	0.123	1.33	0.164	/
Right/Cheek	9538/1907.6	RMC 12.2k	1:1	23.5	22.41	0.074	0.381	1.29	0.490	/
	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.034	0.358	1.37	0.491	/
	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.059	0.396	1.33	0.528	/
Right/Tilt	9538/1907.6	RMC 12.2k	1:1	23.5	22.41	0.037	0.217	1.29	0.279	/
	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.033	0.218	1.37	0.299	/
	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.039	0.222	1.33	0.296	/
Worst Case Position of Head with Battery 2										
Left/Cheek	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	-0.170	0.513	1.33	0.684	Figure23
Test position of Body with Battery 1 (Distance 10mm)										
Back Side	9538/1907.6	RMC 12.2k	1:1	23.5	22.41	-0.070	0.662	1.29	0.851	/
	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.160	0.719	1.37	0.986	/
	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	-0.060	0.763	1.33	1.017	/
Front Side	9400/1880	RMC 12.2k	1:1	23.5	22.13	-0.060	0.573	1.37	0.786	/
Left Edge	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.030	0.123	1.37	0.169	/
Right Edge	9400/1880	RMC 12.2k	1:1	23.5	22.13	0.050	0.243	1.37	0.333	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	9538/1907.6	RMC 12.2k	1:1	23.5	22.41	-0.050	0.785	1.29	1.009	/
	9400/1880	RMC 12.2k	1:1	23.5	22.13	-0.080	0.819	1.37	1.123	/
	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.010	0.955	1.33	1.274	/
Worst Case Position of Body with Earphone1 (Distance 10mm)										
Back Side	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.040	0.849	1.33	1.132	Figure24
Worst Case Position of Body with Earphone1 (Distance 10mm)										
Back Side	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	-0.180	0.838	1.33	1.117	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										

Bottom Edge	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	0.120	1.040	1.33	1.387	Figure25
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										
Bottom Edge	9262/1852.4	RMC 12.2k	1:1	23.7	22.45	-0.080	0.960	1.33	1.280	/

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

2. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level and the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.

Table 21: SAR Measurement Variability Results [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Bottom Edge	9262/1852.4	1.040	0.960	1.08	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. UMTS Band V (WCDMA/HSDPA/HSUPA)

Table 22: SAR Values [UMTS Band V (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Channel Type	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 Battery 1										
Left/Cheek	4233/846.6	RMC 12.2k	1:1	23.9	22.23	0.069	0.385	1.47	0.566	/
	4183/836.6	RMC 12.2k	1:1	24	22.54	0.079	0.393	1.40	0.550	/
	4132/826.4	RMC 12.2k	1:1	24	22.54	0.062	0.409	1.40	0.572	/
Left/Tilt	4233/846.6	RMC 12.2k	1:1	23.9	22.23	-0.038	0.241	1.47	0.354	/
	4183/836.6	RMC 12.2k	1:1	24	22.54	0.050	0.241	1.40	0.337	/
	4132/826.4	RMC 12.2k	1:1	24	22.54	0.024	0.244	1.40	0.341	/
Right/Cheek	4233/846.6	RMC 12.2k	1:1	23.9	22.23	0.046	0.286	1.47	0.420	/
	4183/836.6	RMC 12.2k	1:1	24	22.54	0.047	0.294	1.40	0.411	/
	4132/826.4	RMC 12.2k	1:1	24	22.54	0.026	0.31	1.40	0.434	/
Right/Tilt	4233/846.6	RMC 12.2k	1:1	23.9	22.23	0.130	0.21	1.47	0.308	/
	4183/836.6	RMC 12.2k	1:1	24	22.54	0.080	0.209	1.40	0.293	/
	4132/826.4	RMC 12.2k	1:1	24	22.54	0.140	0.212	1.40	0.297	/
Worst Case Position of Head with Battery 2										
Left/Cheek	4132/826.4	RMC 12.2k	1:1	24	22.54	0.062	0.411	1.40	0.575	Figure26
Test position of Body with Battery 1 (Distance 10mm)										
Back Side	4183/836.6	RMC 12.2k	1:1	24	22.54	0.050	0.467	1.40	0.654	/
Front Side	4183/836.6	RMC 12.2k	1:1	24	22.54	-0.010	0.303	1.40	0.424	/
Left Edge	4183/836.6	RMC 12.2k	1:1	24	22.54	0.190	0.212	1.40	0.297	/
Right Edge	4183/836.6	RMC 12.2k	1:1	24	22.54	-0.030	0.257	1.40	0.360	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	4183/836.6	RMC 12.2k	1:1	24	22.54	0.020	0.105	1.40	0.147	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Back Side	4183/836.6	RMC 12.2k	1:1	24	22.54	0.120	0.473	1.40	0.662	Figure27

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

2. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was not required since the average output power of the HSPA (HSDPA/HSUPA) subtests was not more than 0.25 dB higher than the RMC level and the maximum SAR for 12.2kbps RMC was less than 75% SAR limit.
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.

7.3.5. LTE Band 2

Table 23: SAR Values (LTE Band 2/20MHz)

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 (Battery 1)										
Left/Cheek	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	-0.02	0.710	1.07	0.757	/
Left/Tilt	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	0.18	0.216	1.07	0.230	/
Right/Cheek	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	0.15	0.663	1.07	0.707	/
Right/Tilt	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	0.11	0.304	1.07	0.324	/
Test Position of Head with 50% RB (Battery 1)										
Left/Cheek	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	0.031	0.559	1.01	0.564	/
Left/Tilt	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	0.14	0.175	1.01	0.177	/
Right/Cheek	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	0.024	0.520	1.01	0.525	/
Right/Tilt	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	0.025	0.236	1.01	0.238	/
Worst Case Position of Head with Battery 2										
Left/Cheek	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	0.034	0.714	1.07	0.762	Figure28
Test position of Body with 1RB (Battery 1,Distance 10mm)										
Back Side	19100/1900	QPSK 1RB 0 Offset	1:1	24	23.48	-0.15	1.180	1.13	1.330	Figure29
	18900/1880	QPSK 1RB 0 Offset	1:1	24	23.55	-0.03	1.180	1.11	1.309	/
	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	-0.03	1.220	1.07	1.301	/
Front Side	19100/1900	QPSK 1RB 0 Offset	1:1	24	23.48	0.07	0.922	1.13	1.039	/
	18900/1880	QPSK 1RB 0 Offset	1:1	24	23.55	0.05	0.975	1.11	1.081	
	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	0.02	0.973	1.07	1.038	
Left Edge	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.55	0.09	0.229	1.11	0.254	/
Right Edge	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.55	-0.14	0.336	1.11	0.373	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	19100/1900	QPSK 1RB 0 Offset	1:1	24	23.48	-0.16	1.130	1.13	1.274	/
	18900/1880	QPSK 1RB 0 Offset	1:1	24	23.55	0.14	1.280	1.11	1.420	/
	18700/1860	QPSK 1RB 0 Offset	1:1	24	23.72	-0.01	1.260	1.07	1.344	/
Test position of Body with 50%RB (Battery 1,Distance 10mm)										
Back Side	19100/1900	QPSK 50%RB 0 Offset	1:1	23	22.75	-0.01	0.930	1.06	0.985	/
	18900/1880	QPSK 50%RB 0 Offset	1:1	23	22.74	-0.03	0.941	1.06	0.999	/
	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	-0.03	0.965	1.01	0.974	/
Front Side	19100/1900	QPSK 50%RB 0 Offset	1:1	23	22.75	0.03	0.725	1.06	0.768	/
	18900/1880	QPSK 50%RB 0 Offset	1:1	23	22.74	0.11	0.736	1.06	0.781	/
	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	-0.01	0.751	1.01	0.758	/

Left Edge	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	-0.18	0.180	1.01	0.182	/
Right Edge	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	-0.04	0.342	1.01	0.345	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	19100/1900	QPSK 50%RB 0 Offset	1:1	23	22.75	0.2	0.942	1.06	0.998	/
	18900/1880	QPSK 50%RB 0 Offset	1:1	23	22.74	0.13	0.956	1.06	1.015	/
	18700/1860	QPSK 50%RB 0 Offset	1:1	23	22.96	0.16	1.020	1.01	1.029	/
Test position of Body with 100%RB (Battery 1,Distance 10mm)										
Bottom Edge	18700/1860	QPSK100%RB 0Offset	1:1	23	22.98	0.1	0.998	1.00	1.003	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Bottom Edge	18900/1880	QPSK 1RB 0 Offset	1:1	24	23.55	0.026	1.300	1.11	1.442	Figure30
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										
Bottom Edge	18900/1880	QPSK 1RB 0 Offset	1:1	24	23.55	0.14	1.280	1.11	1.420	/

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

Table 24: SAR Measurement Variability Results (LTE Band 2/20MHz)

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Bottom Edge	18900/1880	1.300	1.280	1.02	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

7.3.6. LTE Band 4

Table 25: SAR Values (LTE Band 4/20MHz)

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 (Battery 1)										
Left/Cheek	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	-0.024	0.636	1.07	0.678	Figure31
Left/Tilt	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	0.028	0.217	1.07	0.231	/
Right/Cheek	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	0.03	0.541	1.07	0.577	/
Right/Tilt	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	0.17	0.320	1.07	0.341	/
Test Position of Head with 50% RB (Battery 1)										
Left/Cheek	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	0.035	0.513	1.01	0.518	/
Left/Tilt	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	0.17	0.174	1.01	0.176	/
Right/Cheek	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	0.026	0.441	1.01	0.445	/
Right/Tilt	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	0.21	0.253	1.01	0.255	/
Worst Case Position of Head with Battery 2										
Left/Cheek	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	0.17	0.635	1.07	0.677	/
Test position of Body with 1RB (Battery 1,Distance 10mm)										
Back Side	20300/1745	QPSK 1RB 0 Offset	1:1	24	23.65	0.01	1.080	1.08	1.171	/
	20175/1732.5	QPSK 1RB 0 Offset	1:1	24.1	23.51	0.12	1.060	1.15	1.214	Figure32
	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	-0.04	1.070	1.07	1.141	/
Front Side	20300/1745	QPSK 1RB 0 Offset	1:1	24	23.65	0.07	0.899	1.08	0.974	/
	20175/1732.5	QPSK 1RB 0 Offset	1:1	24.1	23.51	-0.05	0.904	1.15	1.036	/
	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	-0.05	0.867	1.07	0.925	/
Left Edge	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	0.07	0.211	1.07	0.225	/
Right Edge	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	-0.02	0.261	1.07	0.278	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	20300/1745	QPSK 1RB 0 Offset	1:1	24	23.65	-0.02	1.310	1.08	1.420	/
	20175/1732.5	QPSK 1RB 0 Offset	1:1	24.1	23.51	0.09	1.160	1.15	1.329	/
	20050/1720	QPSK 1RB 0 Offset	1:1	24.1	23.82	-0.18	1.160	1.07	1.237	/
Test position of Body with 50%RB (Battery 1,Distance 10mm)										
Back Side	20300/1745	QPSK 50%RB 0 Offset	1:1	23	22.85	-0.1	0.866	1.04	0.896	/
	20175/1732.5	QPSK 50%RB 0 Offset	1:1	23.1	22.74	-0.04	0.844	1.09	0.917	/
	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	-0.02	0.834	1.01	0.842	/
Front Side	20300/1745	QPSK 50%RB 0 Offset	1:1	23	22.85	-0.07	0.738	1.04	0.764	/
	20175/1732.5	QPSK 50%RB 0 Offset	1:1	23.1	22.74	-0.1	0.705	1.09	0.766	/
	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	-0.02	0.710	1.01	0.717	/

Left Edge	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	-0.01	0.177	1.01	0.179	/
Right Edge	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	0.06	0.208	1.01	0.210	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	20300/1745	QPSK 50%RB 0 Offset	1:1	23	22.85	0.01	1.040	1.04	1.077	/
	20175/1732.5	QPSK 50%RB 0 Offset	1:1	23.1	22.74	-0.05	0.959	1.09	1.042	/
	20050/1720	QPSK 50%RB 0 Offset	1:1	23.1	23.06	-0.02	1.030	1.01	1.040	/
Test position of Body with 100%RB (Battery 1,Distance 10mm)										
Bottom Edge	20050/1720	QPSK100%RB 0Offset	1:1	23.1	23.08	0.02	1.01	1.00	1.015	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Bottom Edge	20300/1745	QPSK 1RB 0 Offset	1:1	24	23.65	-0.19	1.260	1.08	1.366	/
Worst Case Position of SAR(1st Repeated SAR, Distance 10mm)										
Bottom Edge	20300/1745	QPSK 1RB 0 Offset	1:1	24	23.65	-0.05	1.330	1.08	1.442	Figure33
Note: 1.The value with blue color is the maximum SAR Value of each test band.										

Table 26: SAR Measurement Variability Results (LTE Band 4/20MHz)

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Bottom Edge	20300/1745	1.310	1.330	1.02	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

7.3.7. LTE Band 7

Table 27: 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 (Battery 1)										
Left/Cheek	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.1	0.527	1.20	0.631	/
Left/Tilt	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.17	0.399	1.20	0.477	/
Right/Cheek	21350/2560	QPSK 1RB 0 Offset	1:1	24	23.19	0.027	0.999	1.21	1.204	Figure34
	21100/2535	QPSK 1RB 0 Offset	1:1	24	23.17	0.032	0.824	1.21	0.998	/
	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	-0.09	0.698	1.20	0.835	/
Right/Tilt	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.02	0.26	1.20	0.311	/
Test Position of Head with 50% RB (Battery 1)										
Left/Cheek	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	0.047	0.429	1.15	0.494	/
Left/Tilt	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	0.19	0.338	1.15	0.389	/
Right/Cheek	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	0.051	0.571	1.15	0.657	/
Right/Tilt	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	-0.2	0.226	1.15	0.260	/
Worst Case Position of Head with Battery 2										
Right/Cheek	21350/2560	QPSK 1RB 0 Offset	1:1	24	23.19	0.024	0.996	1.21	1.200	/
Worst Case Position of SAR(1st Repeated SAR)										
Right/Cheek	21350/2560	QPSK 1RB 0 Offset	1:1	24	23.19	0.21	0.986	1.21	1.188	/
Test position of Body with 1RB (Battery 1,Distance 10mm)										
Back Side	21350/2560	QPSK 1RB 0 Offset	1:1	24	23.19	0.09	0.604	1.21	0.728	/
	21100/2535	QPSK 1RB 0 Offset	1:1	24	23.17	0.028	0.705	1.21	0.853	/
	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.08	0.795	1.20	0.951	/
Front Side	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	-0.06	0.411	1.20	0.492	/
Left Edge	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.01	0.18	1.20	0.215	/
Right Edge	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.07	0.208	1.20	0.249	/
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	QPSK 1RB 0 Offset	1:1	24	23.19	-0.13	0.809	1.21	0.975	/
	21100/2535	QPSK 1RB 0 Offset	1:1	24	23.17	0.14	0.837	1.21	1.013	/
	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	-0.01	0.848	1.20	1.015	/
Test position of Body with 50%RB (Battery 1,Distance 10mm)										
Back Side	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	0.02	0.666	1.15	0.766	/
Front Side	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	-0.07	0.334	1.15	0.384	/
Left Edge	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	0.03	0.151	1.15	0.174	/
Right Edge	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	0.02	0.168	1.15	0.193	/

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	QPSK 50%RB 25 Offset	1:1	23	22.16	0.18	0.655	1.21	0.795	/
	21100/2535	QPSK 50%RB 50 Offset	1:1	23	22.27	0.15	0.676	1.18	0.800	/
	20850/2510	QPSK 50%RB 25 Offset	1:1	23	22.39	-0.04	0.717	1.15	0.825	/
Test position of Body with 100%RB (Battery 1,Distance 10mm)										
Bottom Side	20850/2510	QPSK 100%RB 0 Offset	1:1	23	22.35	0.03	0.722	1.16	0.839	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Bottom Edge	20850/2510	QPSK 1RB 0 Offset	1:1	24	23.22	0.047	0.878	1.20	1.051	Figure35

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

Table 28: 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)
Right/Cheek	21350/2560	0.999	0.986	1.01	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

7.3.8. LTE Band 17

Table 29: SAR Values (LTE Band 17/10MHz)

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 (Battery 1)										
Left/Cheek	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	-0.17	0.222	1.37	0.304	Figure36
Left/Tilt	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.081	0.135	1.37	0.185	/
Right/Cheek	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.053	0.205	1.37	0.281	/
Right/Tilt	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.2	0.136	1.37	0.186	/
Test Position of Head with 50% RB (Battery 1)										
Left/Cheek	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.077	0.186	1.28	0.238	/
Left/Tilt	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.042	0.115	1.28	0.147	/
Right/Cheek	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.049	0.171	1.28	0.219	/
Right/Tilt	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.18	0.115	1.28	0.147	/
Worst Case Position of Head with Battery 2										
Left/Cheek	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.1	0.184	1.37	0.252	/
Test position of Body with 1RB (Battery 1,Distance 10mm)										
Back Side	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	-0.08	0.27	1.37	0.370	/
Front Side	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.13	0.176	1.37	0.241	/
Left Edge	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	-0.09	0.0934	1.37	0.128	/
Right Edge	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	-0.03	0.101	1.37	0.138	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.09	0.0681	1.37	0.093	/
Test position of Body with 50%RB (Battery 1,Distance 10mm)										
Back Side	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.01	0.226	1.28	0.289	/
Front Side	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.15	0.141	1.28	0.180	/
Left Edge	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	-0.14	0.076	1.28	0.097	/
Right Edge	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	-0.05	0.0837	1.28	0.107	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Bottom Edge	23800/711	QPSK 50%RB 13 Offset	1:1	22.5	21.43	0.01	0.0552	1.28	0.071	/
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Back Side	23800/711	QPSK 1RB 0 Offset	1:1	23.5	22.13	0.04	0.314	1.37	0.430	Figure37

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

7.3.9. WIFI

Table 30: 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 with Battery 1										
Left/Cheek	11/2462	DSSS	1:1	17	15.13	0.17	0.447	1.54	0.688	/
	6/2437	DSSS	1:1	17	15.2	0.022	0.528	1.51	0.799	Figure38
	1/2412	DSSS	1:1	16.5	14.65	-0.09	0.381	1.53	0.583	/
Left/Tilt	11/2462	DSSS	1:1	17	15.13	0.15	0.294	1.54	0.452	/
	6/2437	DSSS	1:1	17	15.2	0.19	0.384	1.51	0.581	/
	1/2412	DSSS	1:1	16.5	14.65	0.021	0.278	1.53	0.426	/
Right/Cheek	11/2462	DSSS	1:1	17	15.13	-0.18	0.268	1.54	0.412	/
	6/2437	DSSS	1:1	17	15.2	-0.17	0.295	1.51	0.447	Figure39
	1/2412	DSSS	1:1	16.5	14.65	-0.05	0.228	1.53	0.349	/
Right/Tilt	11/2462	DSSS	1:1	17	15.13	0.031	0.267	1.54	0.411	/
	6/2437	DSSS	1:1	17	15.2	0.029	0.358	1.51	0.542	/
	1/2412	DSSS	1:1	16.5	14.65	0.044	0.257	1.53	0.393	/
Worst Case Position of Head with Battery 2										
Left/Cheek	6/2437	DSSS	1:1	17	15.2	0.021	0.488	1.51	0.739	/
Test position of Body with Battery 1 (Distance 10mm)										
Back Side	11/2462	DSSS	1:1	17	15.13	0.076	0.328	1.54	0.505	/
Front Side	11/2462	DSSS	1:1	17	15.13	0.051	0.0739	1.54	0.114	/
Left Edge	11/2462	DSSS	1:1	17	15.13	0.058	0.0196	1.54	0.030	/
Right Edge	11/2462	DSSS	1:1	17	15.13	0.034	0.0488	1.54	0.075	/
Top Edge	11/2462	DSSS	1:1	17	15.13	0.049	0.144	1.54	0.221	/
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Worst Case Position of Body with Battery 2 (Distance 10mm)										
Back Side	11/2462	DSSS	1:1	17	15.13	0.057	0.331	1.54	0.509	Figure40

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

2. 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.

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.

7.4. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	SimultaneousTransmissions	Voice Over Digital Transport (Data)
GSM	850	Voice	Yes BT or WIFI	NA
	1900	Voice		
	GPRS	Data		
	EGPRS	Data		
WCDMA	UMTS Band II	Voice	Yes BT or WIFI	NA
	UMTS Band V	Voice		
	RMC	Data		
	HSDPA	Data		
	HSUPA	Data		
	HSPA+	Data		
	DC-HSDPA	Data		
LTE	Band 2	Data	Yes BT or WIFI	NA
	Band 4	Data		
	Band 7	Data		
	Band 17	Data		
WIFI	2450	Data	Yes GSM,GPRS,EGPRS, WCDMA	Yes
Bluetooth (BT)	2450	Data	Yes GSM,GPRS,EGPRS, WCDMA	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 $SAR_{Max.BT}$ = [$10^{(6.5/10)}$/5] * ($2.480^{1/2}$/7.5)= 0.188W/kg
Body Estimated $SAR_{Max.BT}$ = [$10^{(6.5/10)}$/10] * ($2.480^{1/2}$/7.5)= 0.094 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/UMTS/LTE antenna

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	LTE 2	LTE 4	LTE 7	LTE 17	BT	MAX. ΣSAR_{1g}	Peak location separation ratio
Left, Touch	0.557	0.415	0.684	0.575	**0.762**	0.678	0.631	0.304	**0.188**	0.950	NA
Left, Tilt	0.325	0.094	0.169	0.354	0.230	0.231	**0.477**	0.185	**0.188**	0.665	NA
Right, Touch	0.446	0.337	0.528	0.434	0.707	0.577	**1.204**	0.281	**0.188**	1.392	NA
Right, Tilt	0.295	0.157	0.299	0.308	0.324	**0.341**	0.311	0.186	**0.188**	0.529	NA
Back Side	1.006	0.710	1.132	0.662	**1.330**	1.214	0.951	0.430	**0.094**	1.424	NA
Front Side	0.515	0.573	0.786	0.424	**1.081**	1.036	0.492	0.241	**0.094**	1.175	NA
Left Edge	**0.608**	0.130	0.169	0.297	0.254	0.225	0.215	0.128	**0.094**	0.702	NA
Right Edge	**0.552**	0.250	0.333	0.360	0.373	0.278	0.249	0.138	**0.094**	0.646	NA
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**0.094**	0.094	NA
Bottom Edge	0.140	1.156	1.387	0.147	**1.442**	1.442	1.051	0.093	**0.094**	1.536	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} = 1.536 W/kg <1.6 W/kg, so the Simultaneous transimition SAR with volum scan are not required for BT and GSM/UMTS/LTE antenna.

About WIFI and GSM/UMTS/LTE antenna

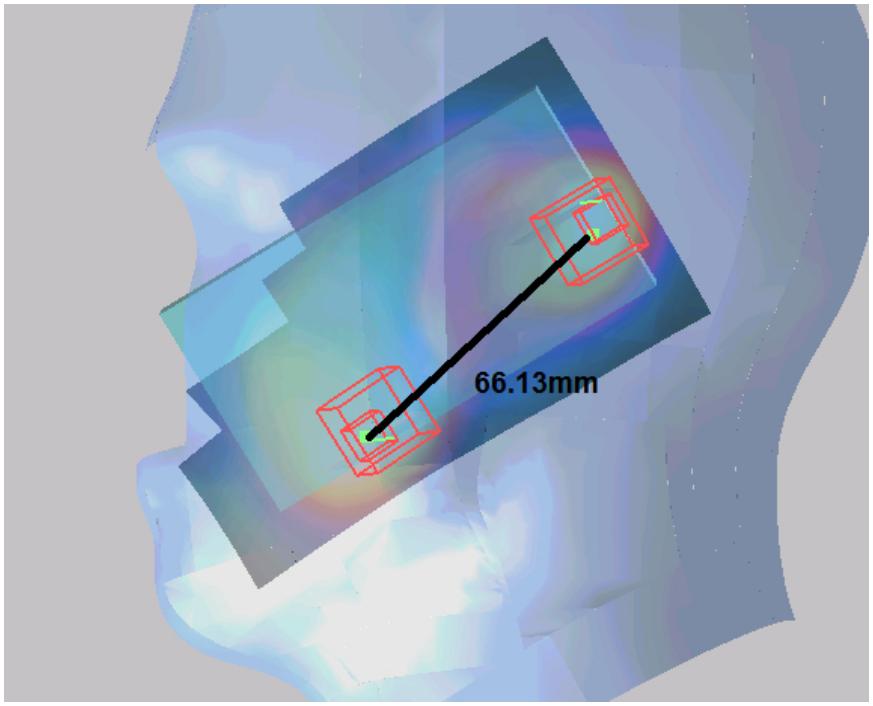
SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	LTE 2	LTE 4	LTE 7	LTE 17	WIFI	MAX. ΣSAR_{1g}	Peak location separation ratio
Left, Touch	0.557	0.415	0.684	0.575	**0.762**	0.678	0.631	0.304	**0.799**	1.561	NA
Left, Tilt	0.325	0.094	0.169	0.354	0.230	0.231	**0.477**	0.185	**0.581**	1.058	NA
Right, Touch	0.446	0.337	0.528	0.434	0.707	0.577	**1.204**	0.281	**0.447**	1.651	Yes
Right, Tilt	0.295	0.157	0.299	0.308	0.324	**0.341**	0.311	0.186	**0.542**	0.883	NA
Back Side	1.006	0.710	1.132	0.662	**1.330**	1.214	0.951	0.430	**0.509**	1.839	Yes
Front Side	0.515	0.573	0.786	0.424	**1.081**	1.036	0.492	0.241	**0.114**	1.195	NA
Left Edge	**0.608**	0.130	0.169	0.297	0.254	0.225	0.215	0.128	**0.030**	0.638	NA
Right Edge	**0.552**	0.250	0.333	0.360	0.373	0.278	0.249	0.138	**0.075**	0.627	NA
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**0.221**	0.221	NA
Bottom Edge	0.140	1.156	1.387	0.147	**1.442**	1.442	1.051	0.093	**N/A**	1.442	NA

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

Simultaneous Transmission for test position of right touch

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	LTE 2	LTE 4	LTE 7	LTE 17	WIFI	MAX. ΣSAR_{1g}	Peak location separation ratio
Right Touch	0.446	/	/	/	/	/	/	/	**0.447**	0.893	NA
	/	0.337	/	/	/	/	/	/	**0.447**	0.784	NA
	/	/	0.528	/	/	/	/	/	**0.447**	0.975	NA
	/	/	/	0.434	/	/	/	/	**0.447**	0.881	NA
	/	/	/	/	0.707	/	/	/	**0.447**	1.154	NA
	/	/	/	/	/	0.577	/	/	**0.447**	1.024	NA
	/	/	/	/	/	/	1.204	/	**0.447**	1.651	0.03
	/	/	/	/	/	/	/	0.281	**0.447**	0.728	NA

The position $SAR_{LTE\ 7}$ is (x_1=56.62, y_1=-256.1,z_1= -172.6),
The position $SAR_{Max.WIFI}$ is (x_2= 8.16, y_2=-301.1,z_2= -172.6)
so the distance between the $SAR_{Max.LTE\ 7}$ and $SAR_{Max.WIFI}$ is 66.13mm.



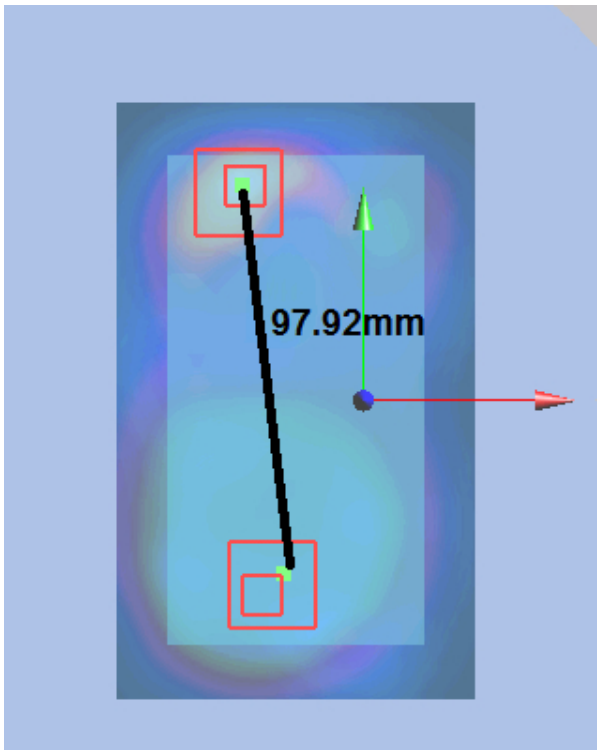
The peak location separation ratio is 0.03, so the Simultaneous transimition SAR with volum scan are not required for WIFI and LTE 7 antenna.

Simultaneous Transmission for test position of back side

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	LTE 2	LTE 4	LTE 7	LTE 17	WIFI	MAX. ΣSAR_{1g}	Peak location separation ratio
Back side	1.006	/	/	/	/	/	/	/	**0.509**	1.515	NA
	/	0.710	/	/	/	/	/	/	**0.509**	1.219	NA
	/	/	1.132	/	/	/	/	/	**0.509**	1.641	0.02
	/	/	/	0.662	/	/	/	/	**0.509**	1.171	NA
	/	/	/	/	1.330	/	/	/	**0.509**	1.839	0.02
	/	/	/	/	/	1.214	/	/	**0.509**	1.723	0.02
	/	/	/	/	/	/	0.951	/	**0.509**	1.460	NA
	/	/	/	/	/	/	/	0.430	**0.509**	0.939	NA

- **Pair Simultaneous Transmission for UMTS Band II and WIFI**

The position $SAR_{UMTS\ Band\ II}$ is (x_1= -21.5, y_1= -43.5, z_1= -179.2),
The position $SAR_{Max.WIFI}$ is (x_2= -30.5, y_2=54, z_2= -179.2)
so the distance between the $SAR_{Max.UMTS\ Band\ II}$ and $SAR_{Max.WIFI}$ is 97.92mm.

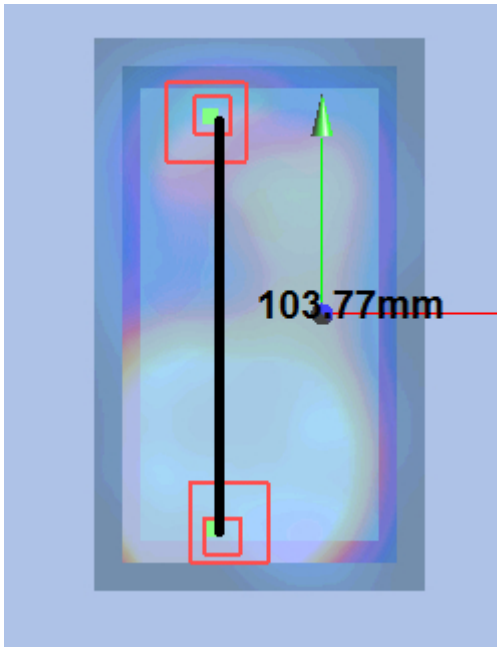


The peak location separation ratio is 0.02, so the Simultaneous transimition SAR with volum scan are not required for WIFI and UMTS Band II antenna.

- **Pair Simultaneous Transmission for LTE 2 and WIFI**

The position $SAR_{LTE\ 2}$ is (x_1= -23, y_1= -49.5, z_1= -179.2),
The position $SAR_{Max.WIFI}$ is (x_2= -30.5, y_2=54, z_2= -179.2)

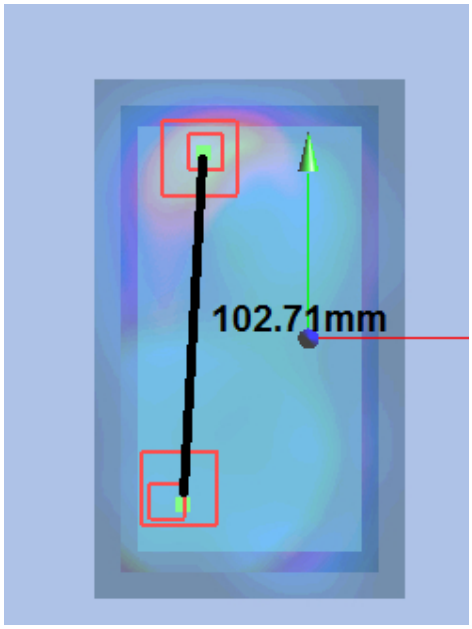
so the distance between the $SAR_{Max.LTE2}$ and $SAR_{Max.WIFI}$ is 103.77mm.



The peak location separation ratio is 0.02, so the Simultaneous transimition SAR with volum scan are not required for WIFI and LTE 2 antenna.

- **Pair Simultaneous Transmission for LTE 4 and WIFI**

The position $SAR_{LTE\ 4}$ is (x_1= -36.5, y_1= -48, z_1= -179.2),
The position $SAR_{Max.WIFI}$ is (x_2= -30.5, y_2=54, z_2= -179.2)
so the distance between the $SAR_{Max.LTE\ 4}$ and $SAR_{Max.WIFI}$ is 102.71mm.



The peak location separation ratio is 0.02, so the Simultaneous transimition SAR with volum scan are not required for WIFI and LTE 4 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 31: List of Main Instruments

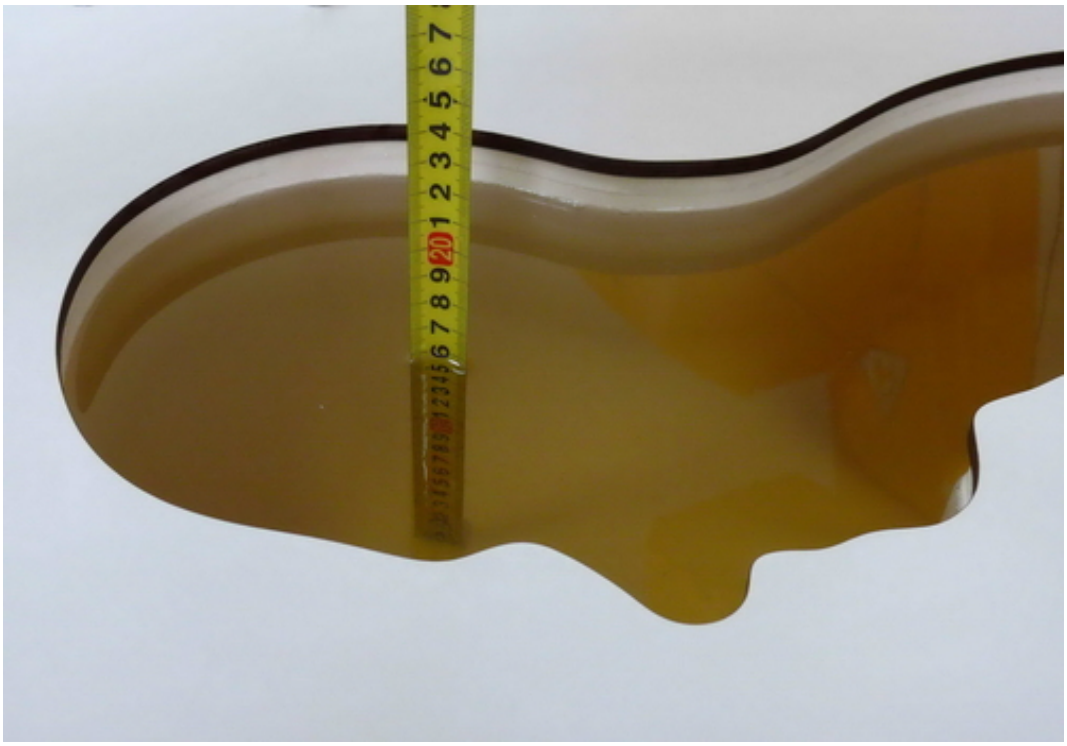
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 10, 2013	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 9, 2014	One year
04	Power sensor	Agilent N8481H	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 750MHz	D750V3	1045	September 29,2011	Three years
15	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Three years
16	Validation Kit 1750MHz	D1750V2	1033	January 26, 2014	Three years
17	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Three years
18	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Three years
19	Validation Kit 2600MHz	D2600V2	1012	May 02, 2012	Three years
20	Temperature Probe	JM222	AA1009129	March 13, 2014	One year
21	Hygrothermograph	WS-1	64591	September 26, 2013	One year

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

ANNEX A: Test Layout

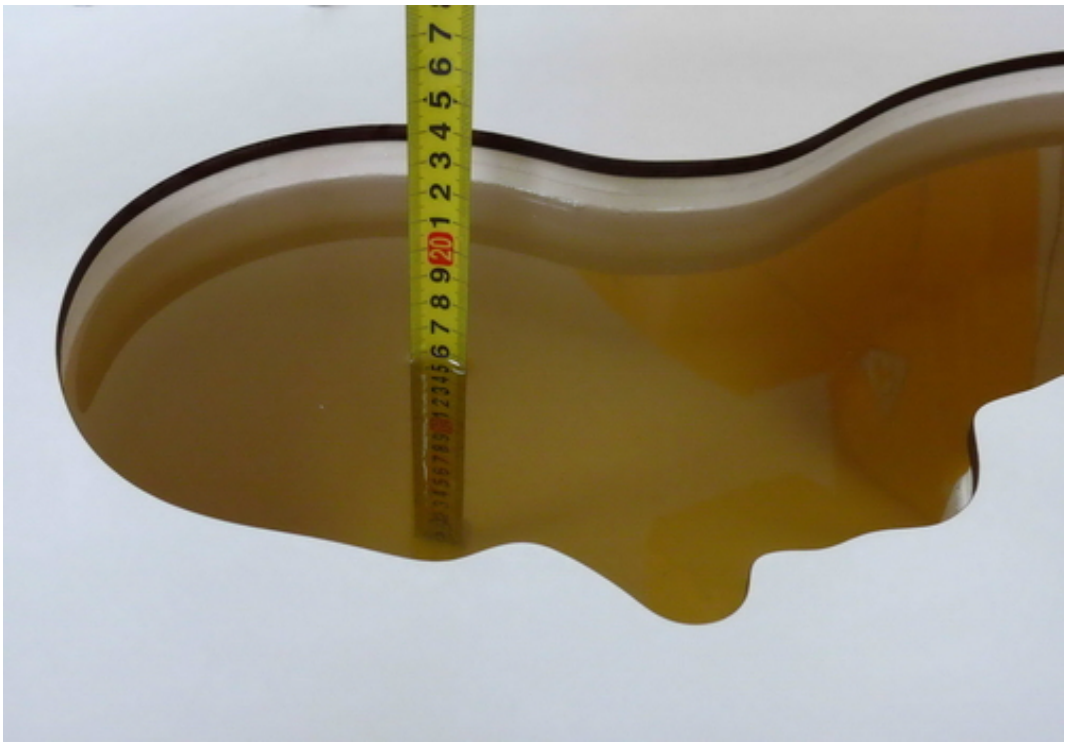
Picture 1: Specific Absorption Rate Test Layout

Picture 2: Liquid depth in the flat Phantom (750MHz, 15.4cm depth)

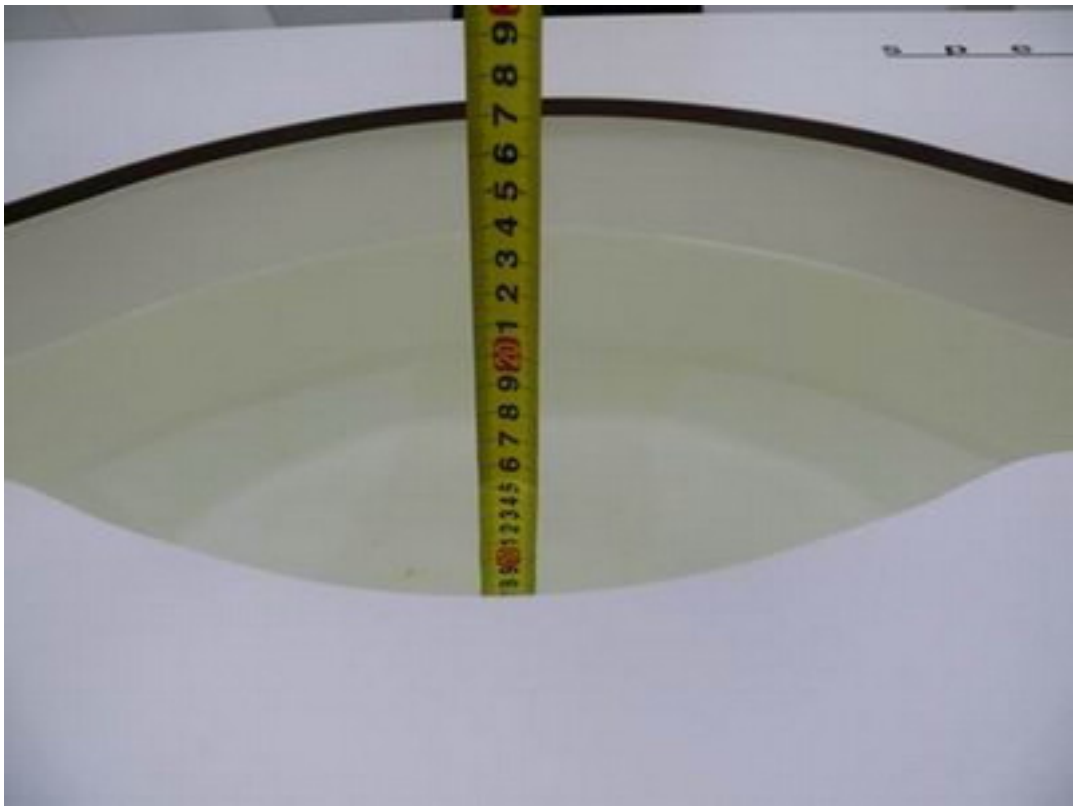


Picture 3: Liquid depth in the head Phantom (750MHz, 15.3cm depth)

Picture 4: Liquid depth in the flat Phantom (835MHz, 15.4cm depth)

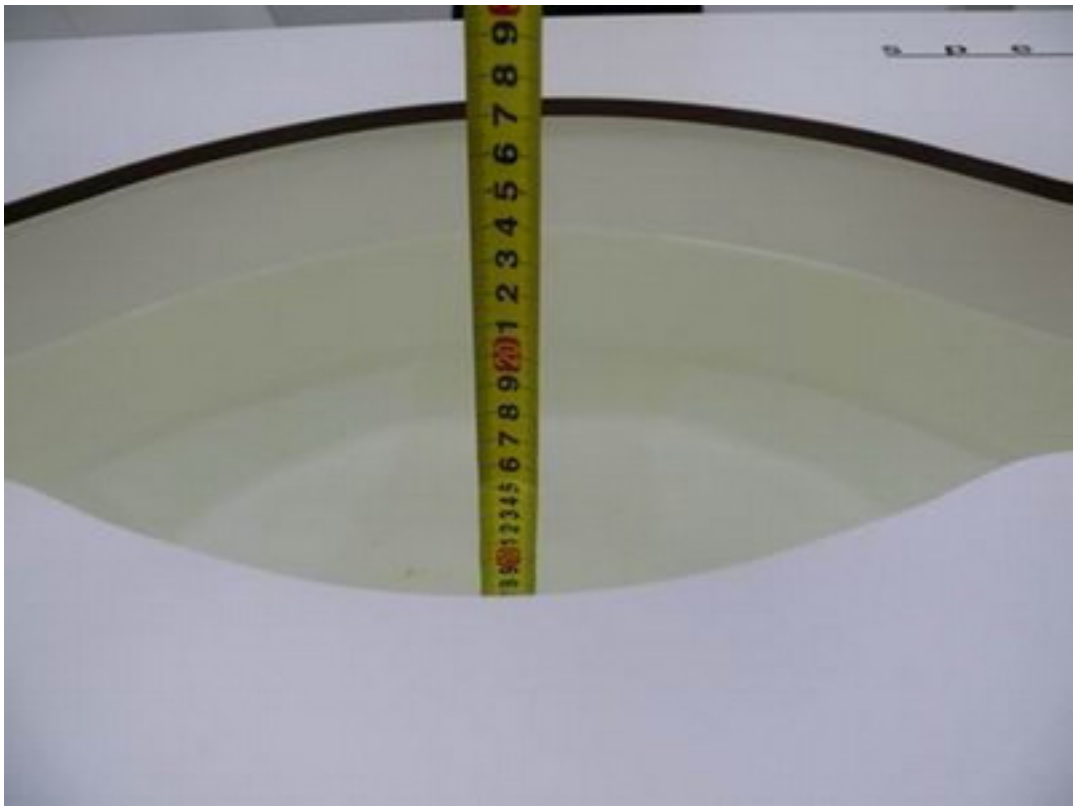


Picture 5: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



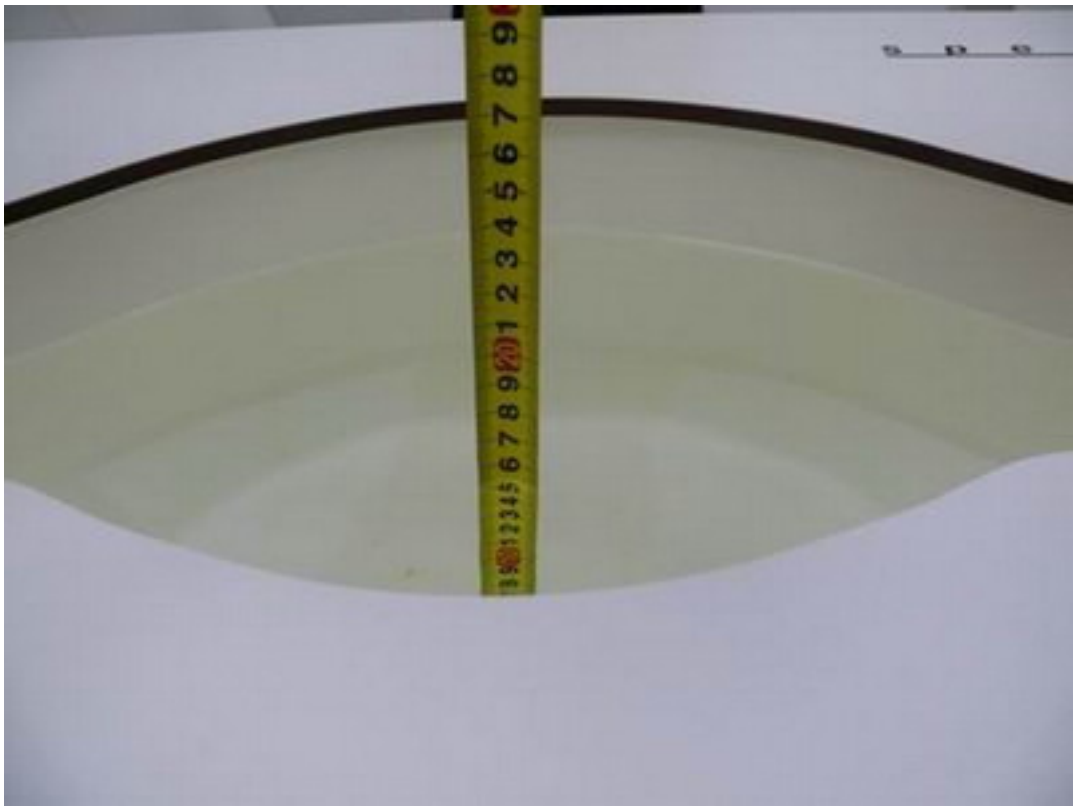
Picture 6: Liquid depth in the flat Phantom (1750 MHz, 15.2cm depth)

Picture 7: liquid depth in the head Phantom (1750 MHz, 15.3cm depth)



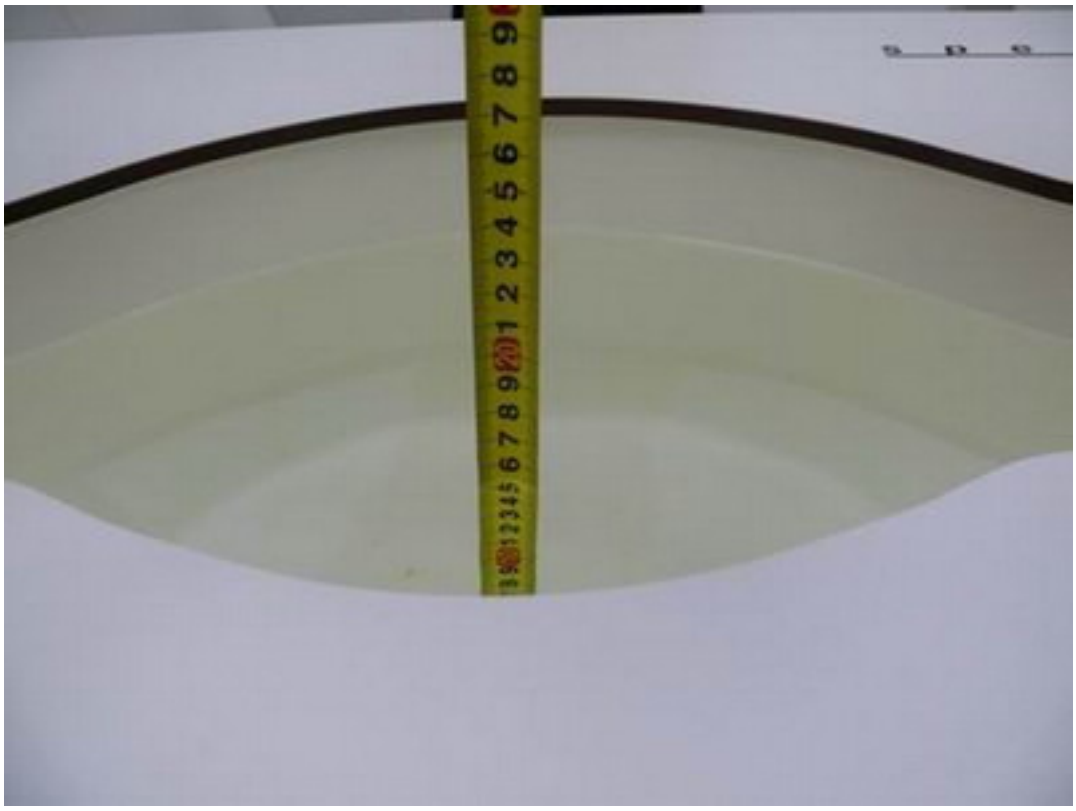
Picture 8: Liquid depth in the flat Phantom (1900 MHz, 15.2cm depth)

Picture 9: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



Picture 10: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)

Picture 11: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)



Picture 12: Liquid depth in the flat Phantom (2600 MHz, 15.3cm depth)

Picture 13: Liquid depth in the head Phantom (2600 MHz, 15.4cm depth)

ANNEX B: System Check Results

System Performance Check at 750 MHz Head TSL

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1045

Date/Time: 5/6/2014

Communication System:CW (0); Frequency: 750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.90 S/m; ε_r = 41.9; 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(9.94, 9.94, 9.94); 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): Interpolated grid: dx=15mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.29 W/kg

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

Reference Value = 50.653 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.16 W/kg

SAR(1 g) = 2.13 W/kg; SAR(10 g) = 1.41 W/kg

Maximum value of SAR (measured) = 2.29 W/kg

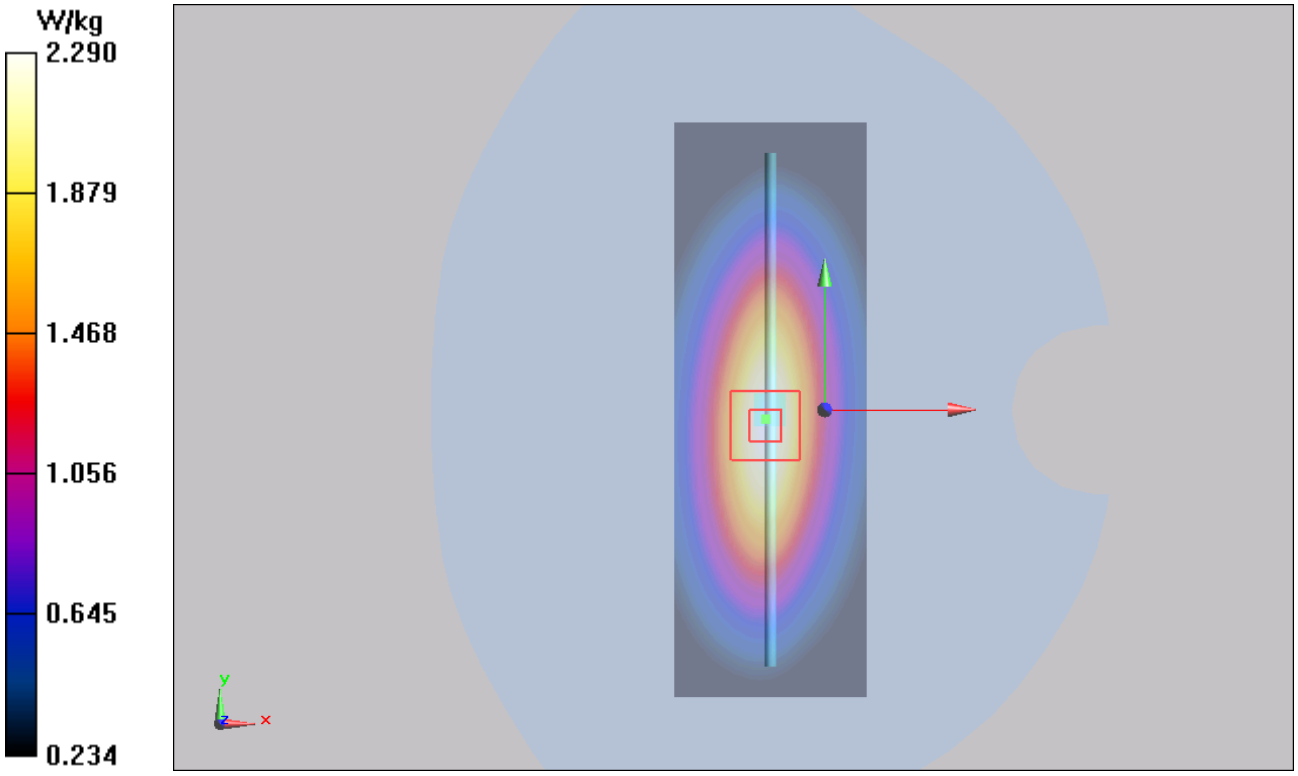


Figure 7 System Performance Check 750MHz 250mW

System Performance Check at 750 MHz Body TSL

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1045

Date/Time: 5/6/2014

Communication System:CW (0); Frequency: 750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 750 MHz; σ = 0.97 S/m; ε_r = 54.3; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 - SN3677; ConvF(9.72, 9.72, 9.72); 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): Interpolated grid: dx=15mm, dy=15 mm

Maximum value of SAR (interpolated) = 2.36 W/kg

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

Reference Value = 48.998 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.24 W/kg

SAR(1 g) = 2.22 W/kg; SAR(10 g) = 1.49 W/kg

Maximum value of SAR (measured) = 2.39 W/kg

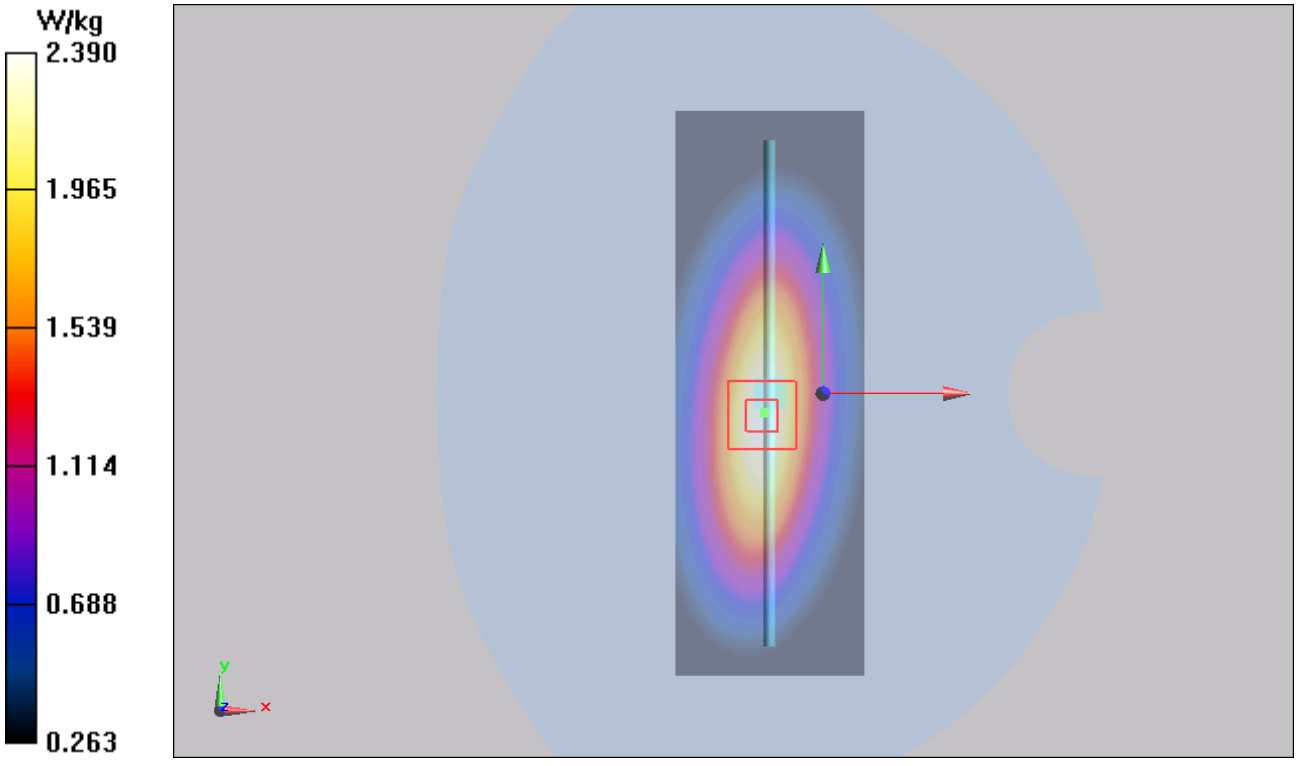


Figure 8 System Performance Check 750MHz 250mW

System Performance Check at 835 MHz Head TSL

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

Date/Time: 5/7/2014

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

Medium parameters used: f = 835 MHz; σ = 0.90 mho/m; ε_r = 41.8; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(9.41, 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

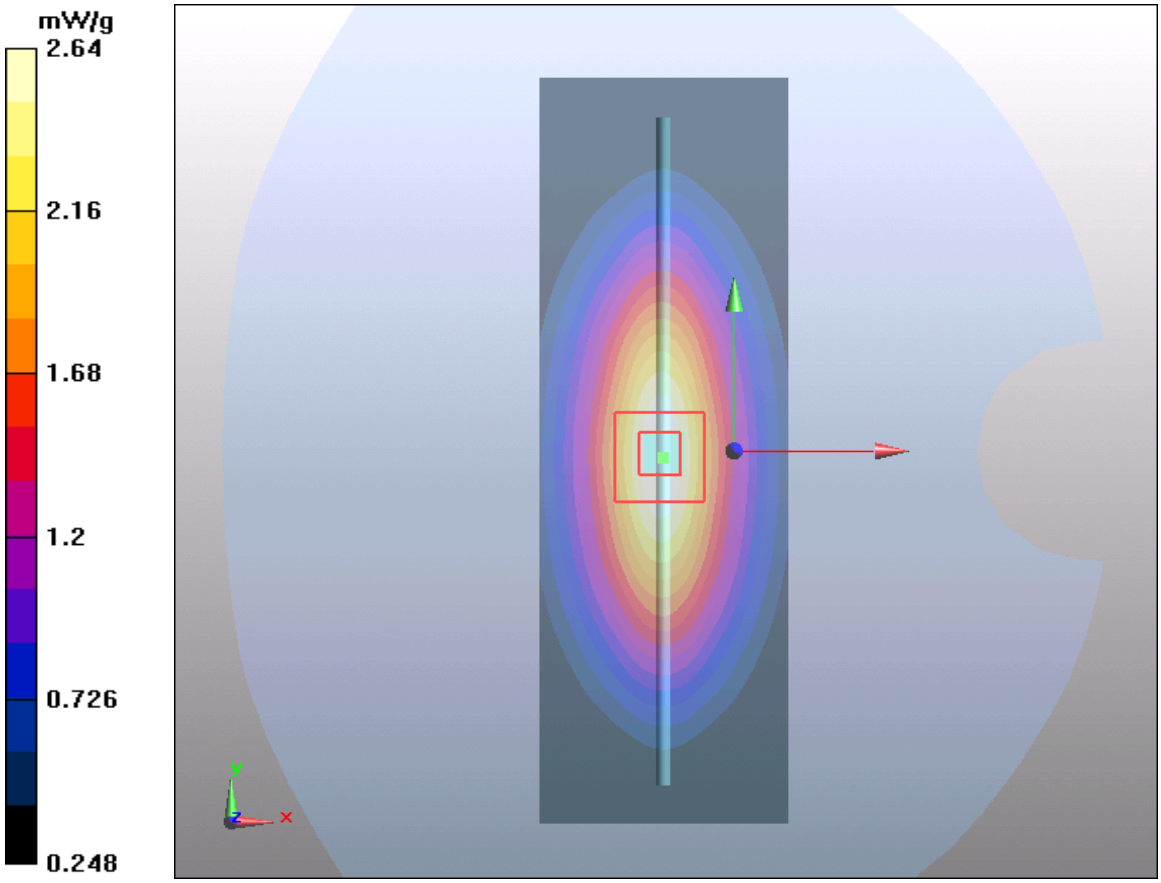


Figure 9 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

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

Date/Time: 5/7/2014

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

Medium parameters used: f = 835 MHz; σ = 0.97 mho/m; ε_r = 54.5; 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

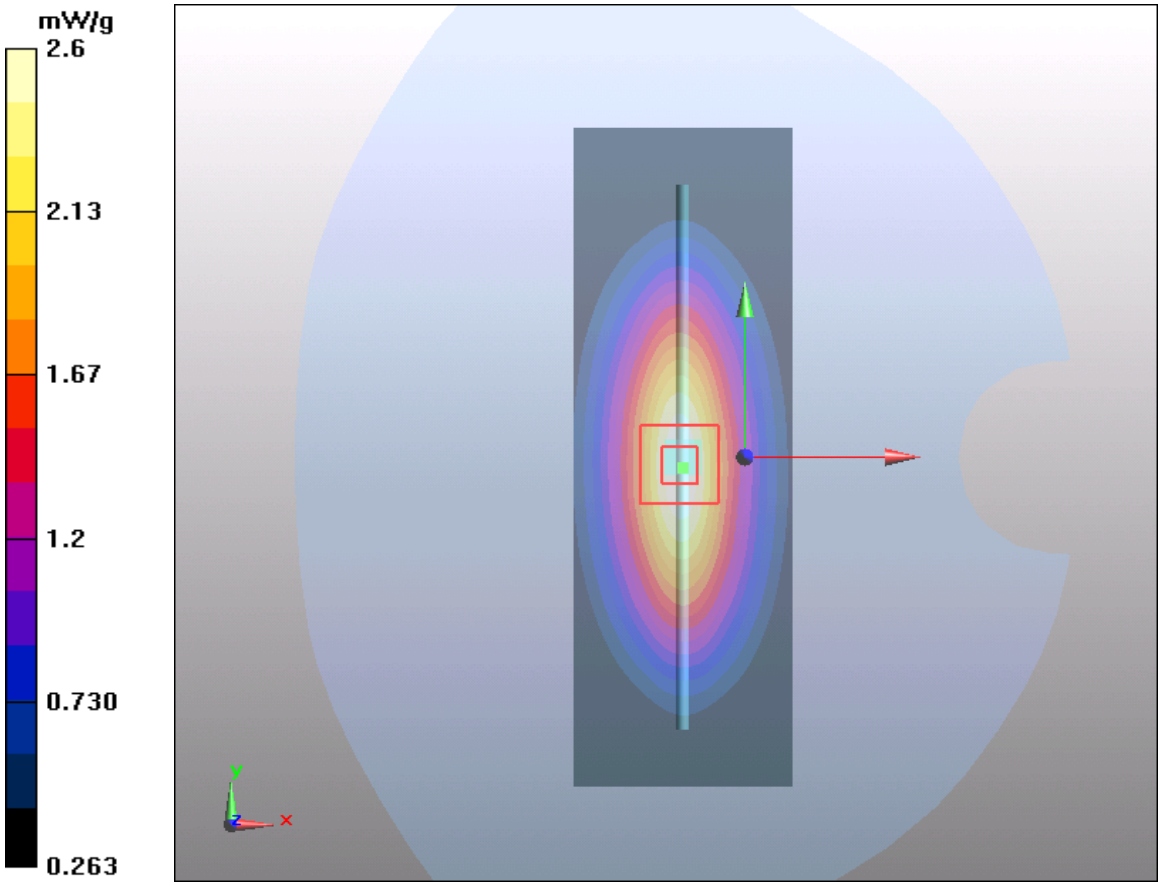


Figure 10 System Performance Check 835MHz 250Mw

System Performance Check at 1750 MHz Head TSL

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033

Date/Time: 5/10/2014

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.34 mho/m; ε_r = 40.9; 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(8.22, 8.22, 8.22); 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 9.78 mW/g

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

Reference Value = 80 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 15.5 W/kg

SAR(1 g) = 8.75 mW/g; SAR(10 g) = 4.5 mW/g

Maximum value of SAR (measured) = 9.46 mW/g

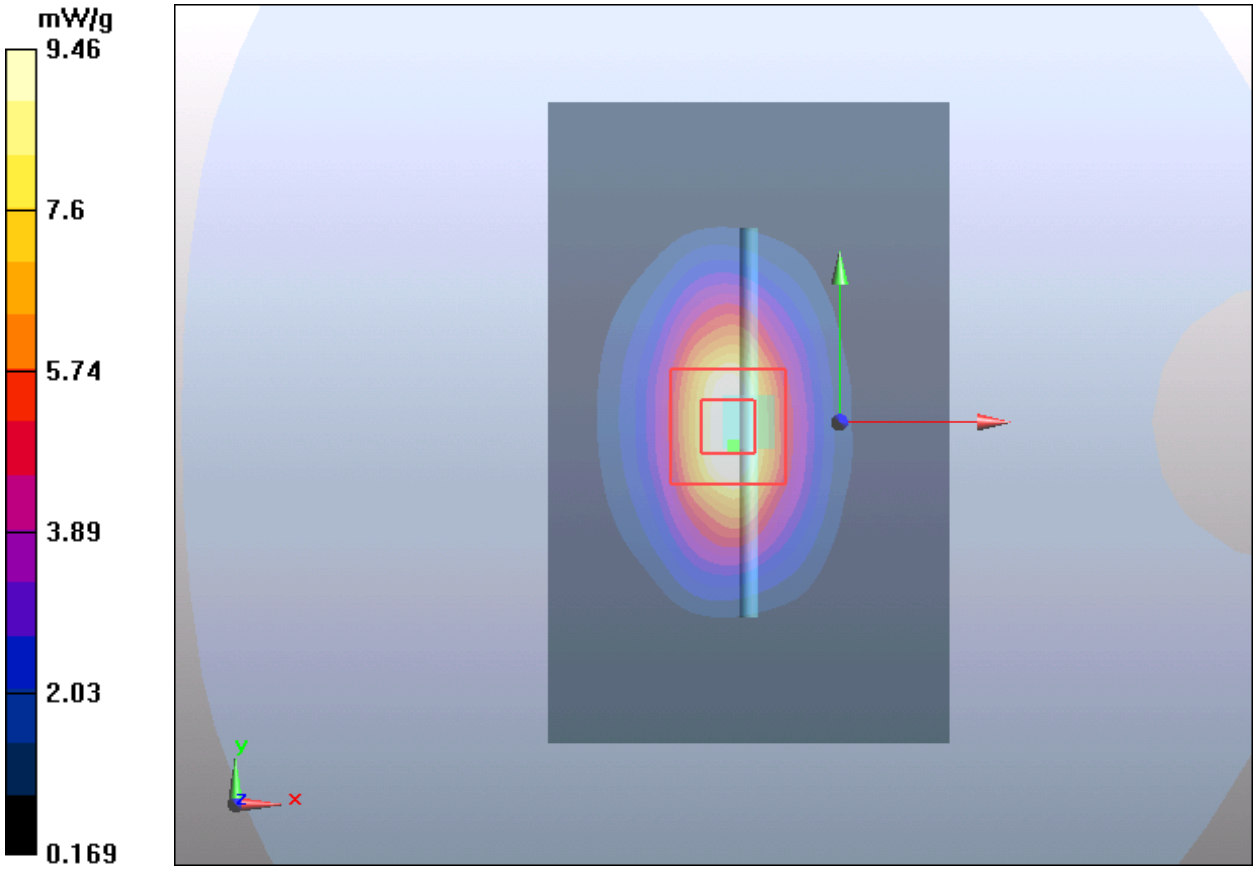


Figure 11 System Performance Check 1750MHz 250mW

System Performance Check at 1750 MHz Body TSL

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1033

Date/Time: 5/10/2014

Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.47 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.7℃

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.77, 7.77, 7.77); 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 (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 10.6 mW/g

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

Reference Value = 77.7 V/m; Power Drift = 0.097 dB

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 9.24 mW/g; SAR(10 g) = 4.9 mW/g

Maximum value of SAR (measured) = 10.3 mW/g

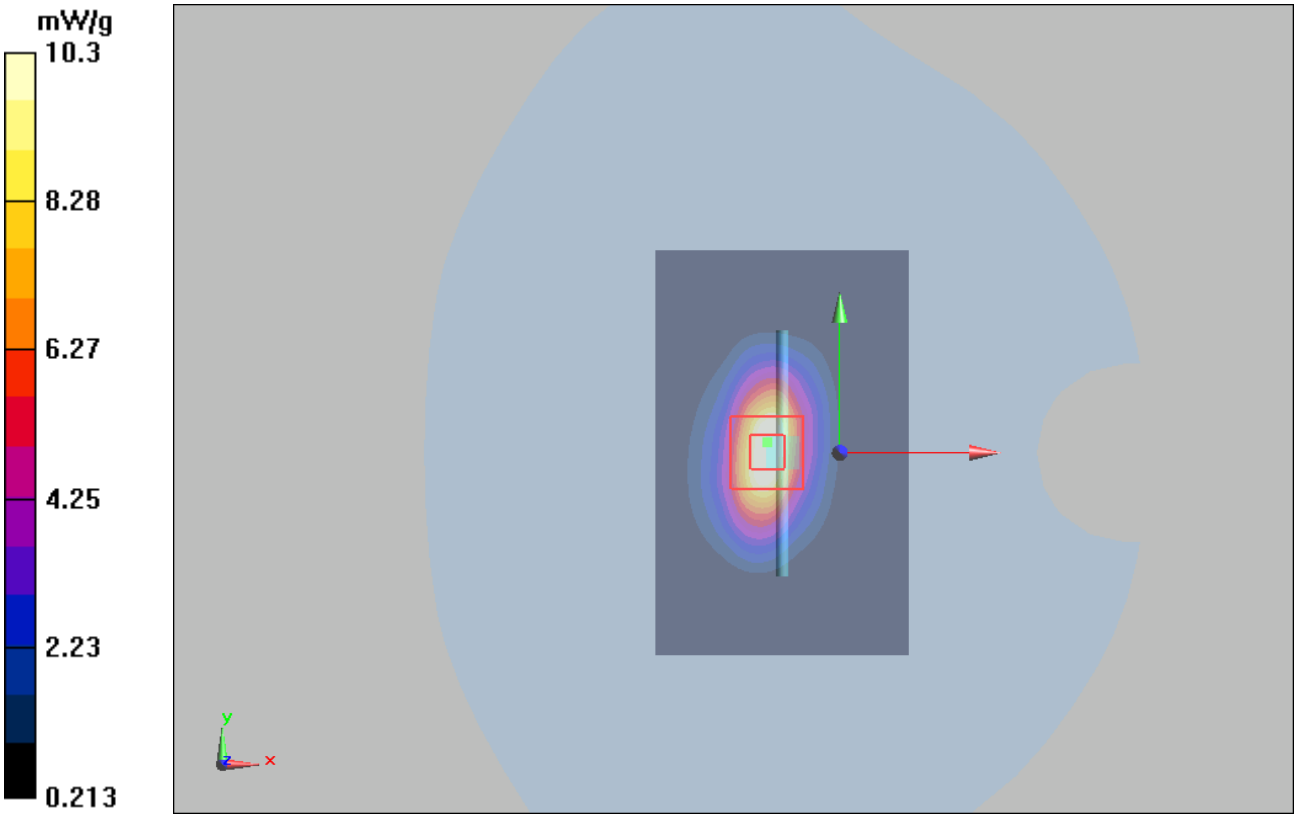


Figure 12 System Performance Check 1750MHz 250mW

System Performance Check at 1900 MHz Head TSL

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

Date/Time: 5/9/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.34 mho/m; ε_r = 39.7; 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

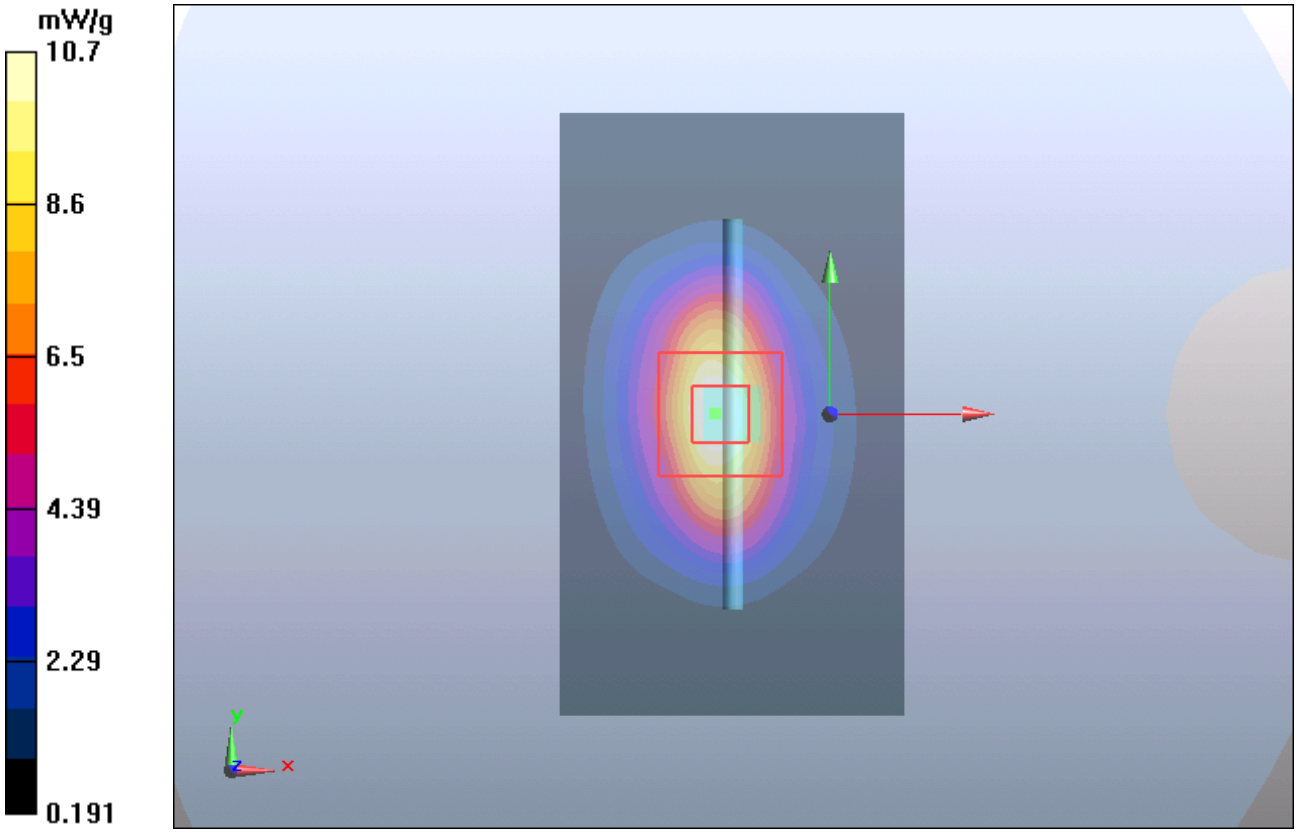


Figure 13 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

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

Date/Time: 5/11/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 52.9; 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(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

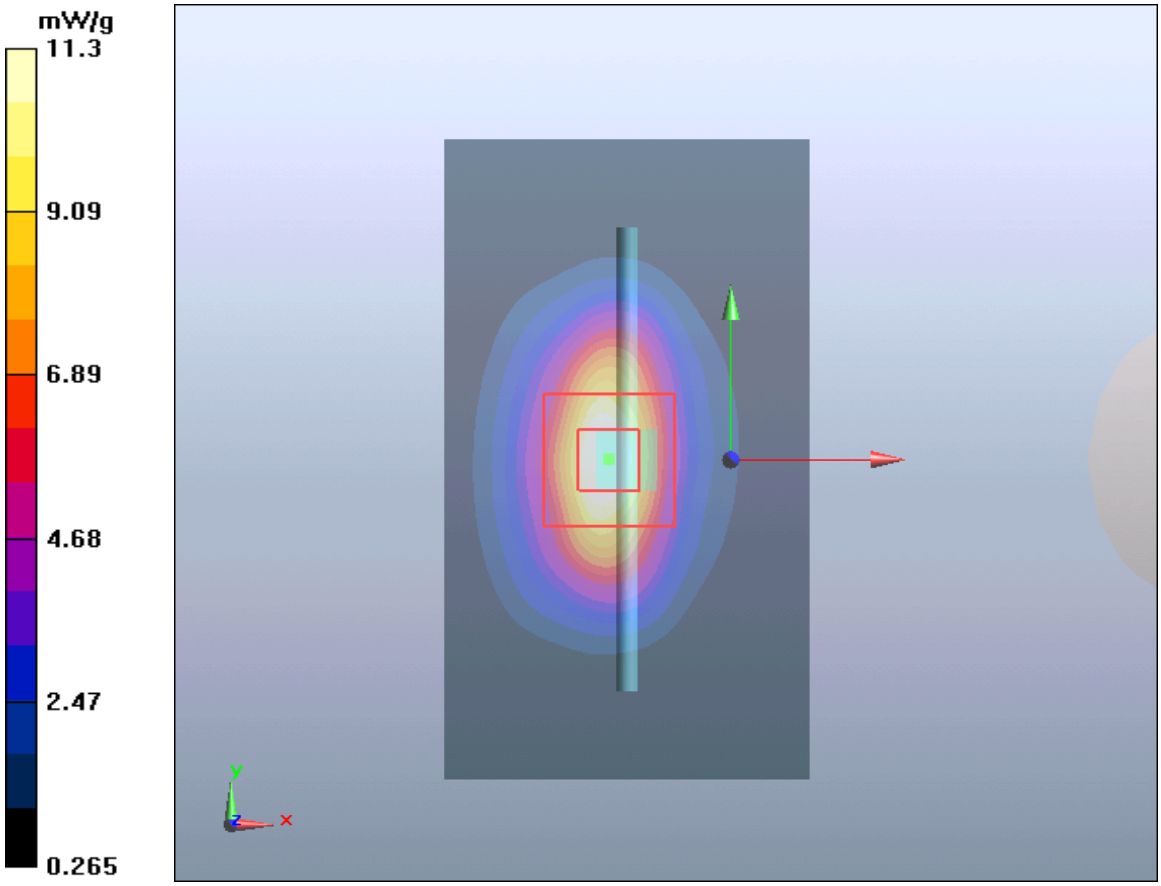


Figure 14 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

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

Date/Time: 5/5/2014

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

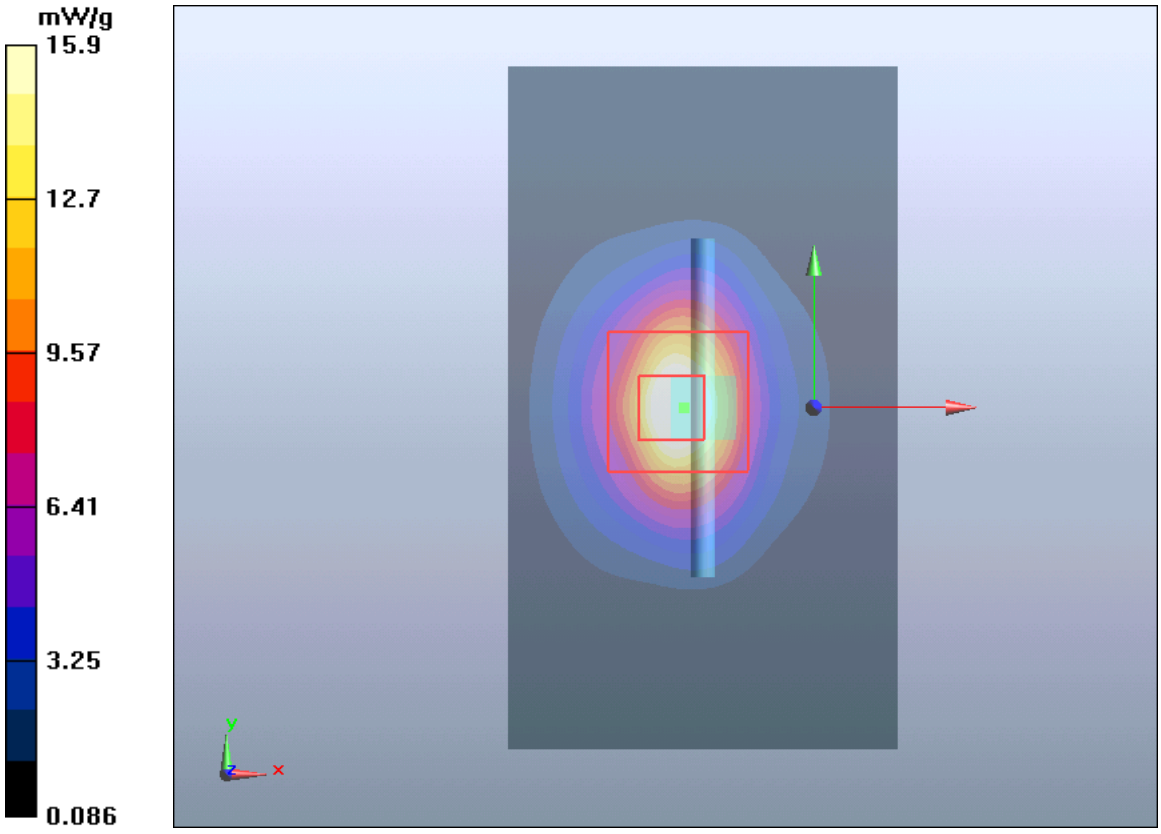


Figure 15 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

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

Date/Time: 5/5/2014

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=12mm, dy=12mm

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

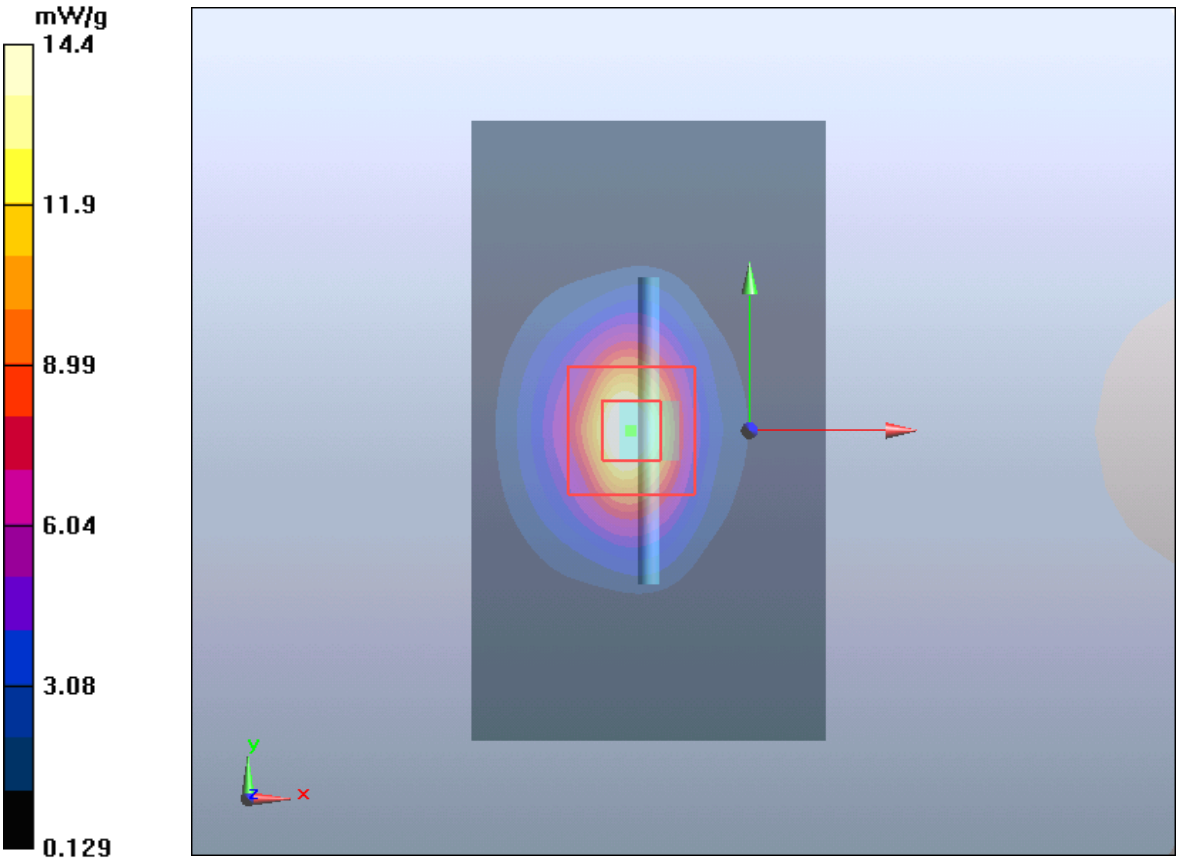


Figure 16 System Performance Check 2450MHz 250mW

System Performance Check at 2600 MHz Head TSL

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

Date/Time: 5/8/2014

Communication System: CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz; σ = 1.98 mho/m; ε_r = 38.5; 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: SAM1; Type: SAM; Serial: TP-1534

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

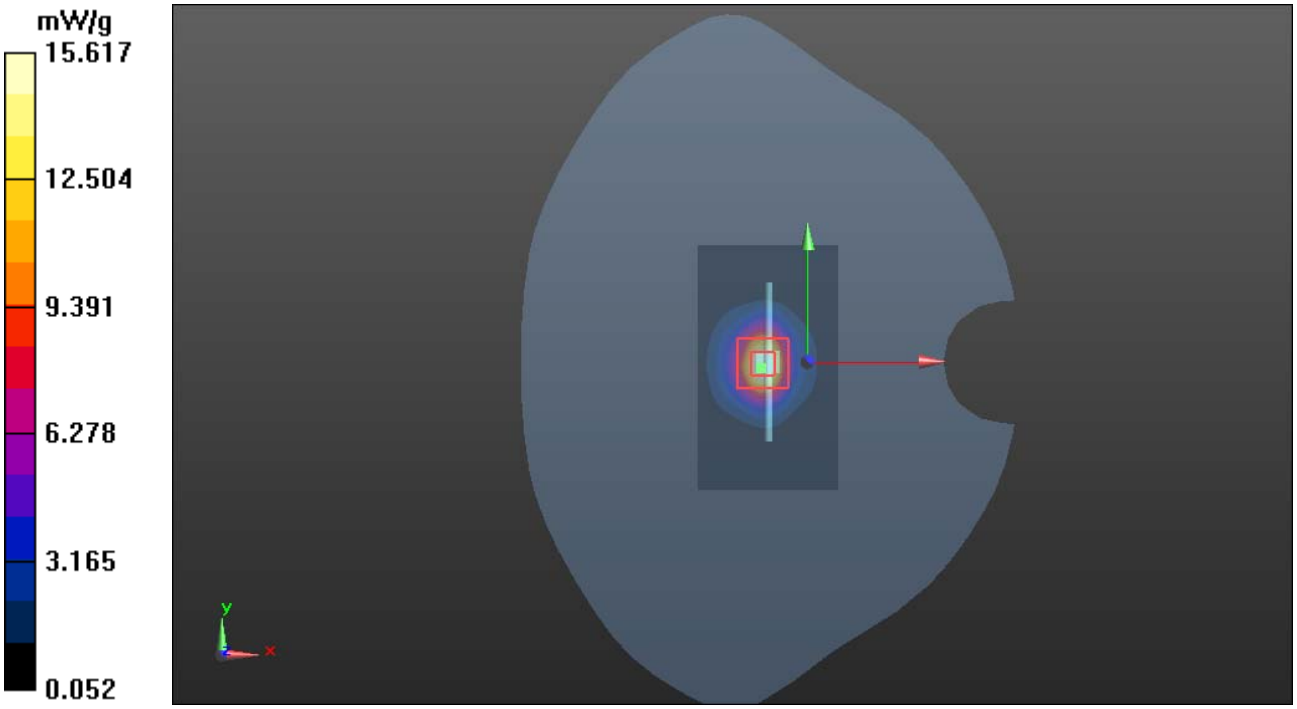


Figure 17 System Performance Check 2600MHz 250mW

System Performance Check at 2600 MHz Body TSL

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

Date/Time: 5/8/2014

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

DASY4 Configuration:

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

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=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

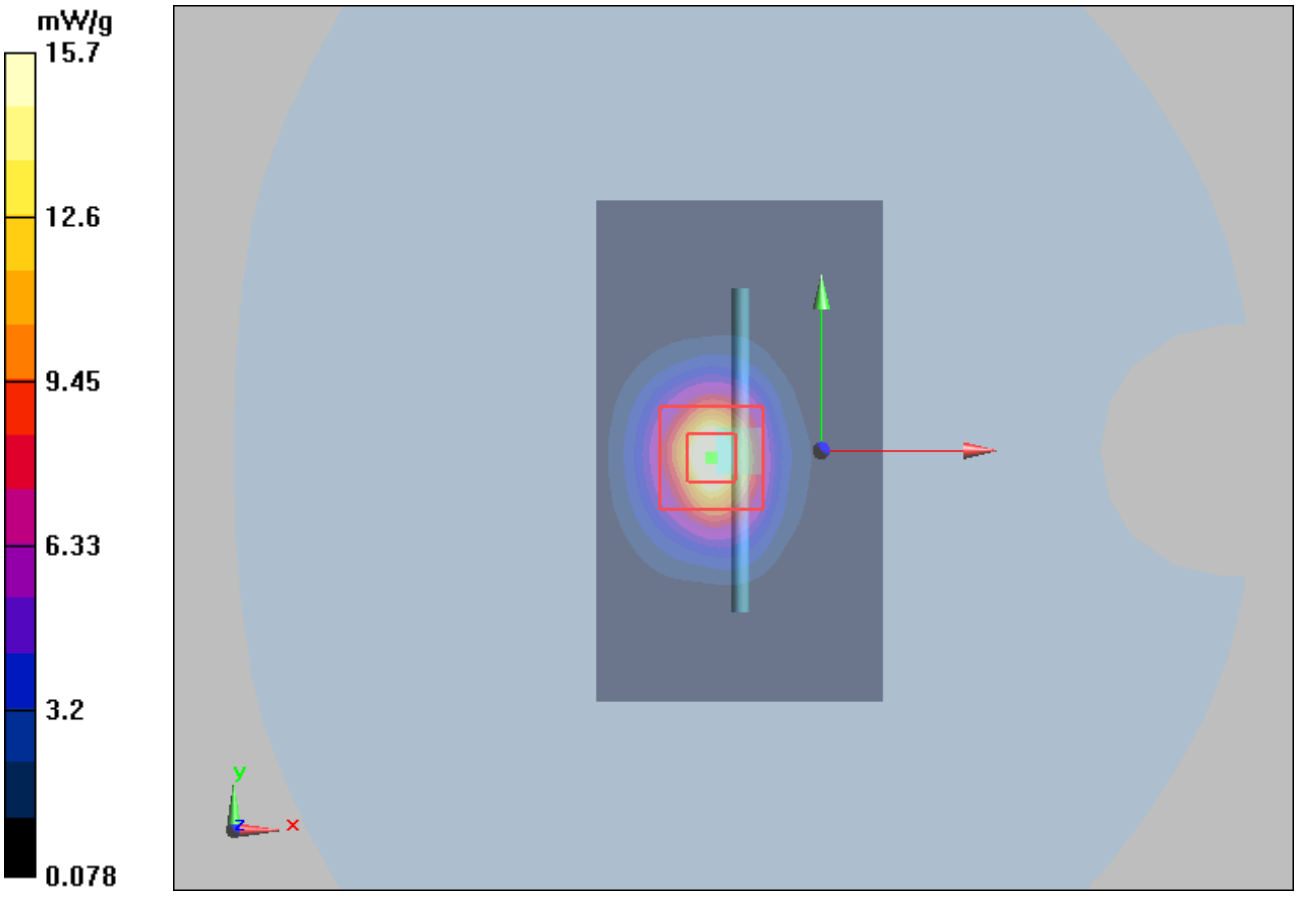


Figure 18 System Performance Check 1900MHz 250mW

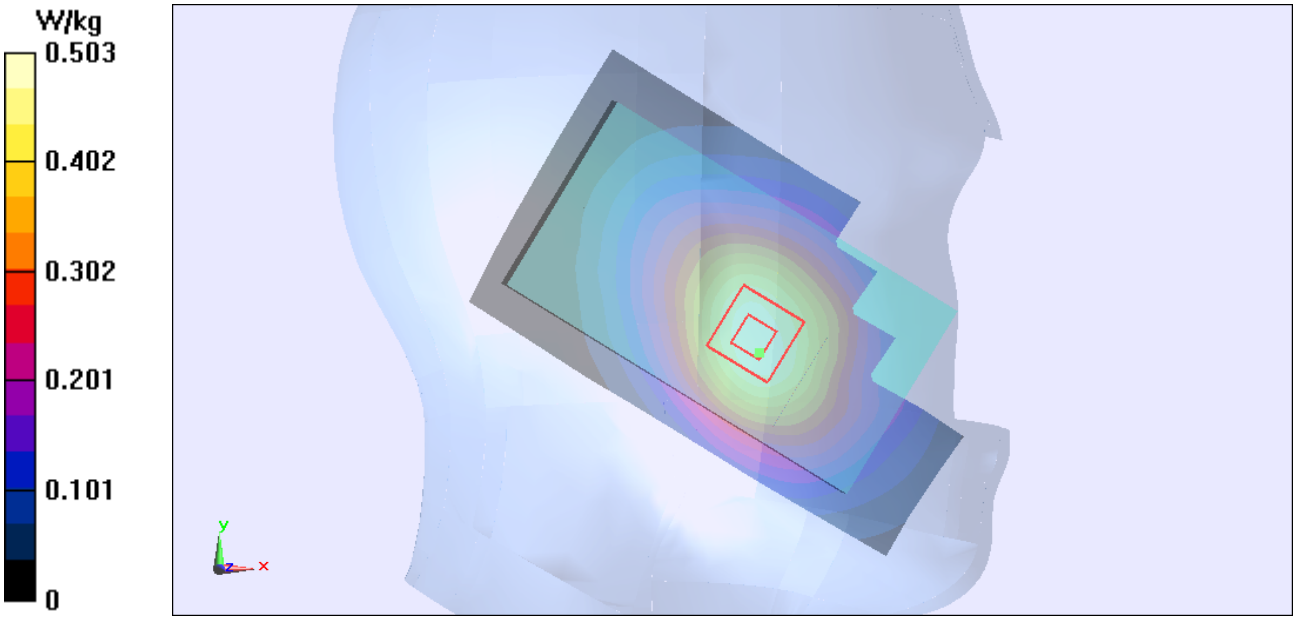
ANNEX C: Graph Results

GSM 850 Left Cheek High (Battery 2)

Date: 5/7/2014
Communication System: GSM; 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: Left 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)

Left Cheek High/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.503 W/kg

Left Cheek High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.521 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.591 W/kg
SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.358 W/kg
Maximum value of SAR (measured) = 0.494 W/kg



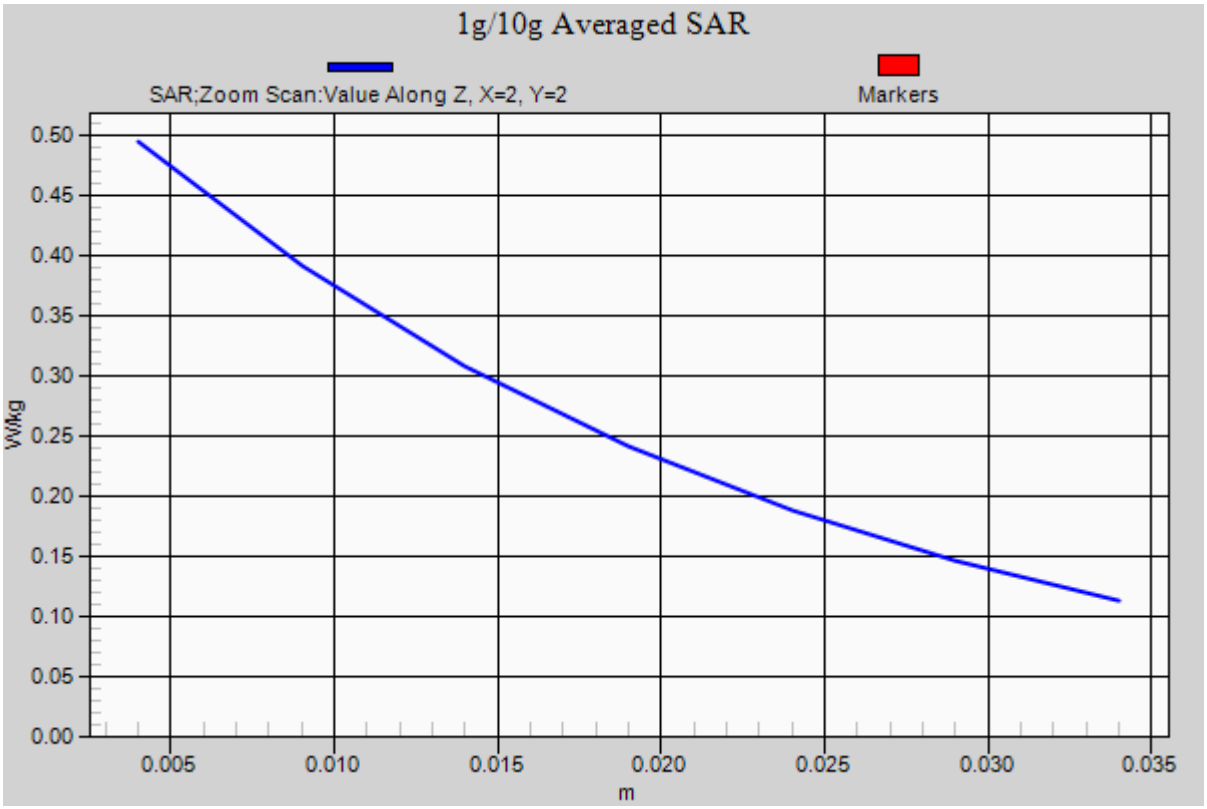


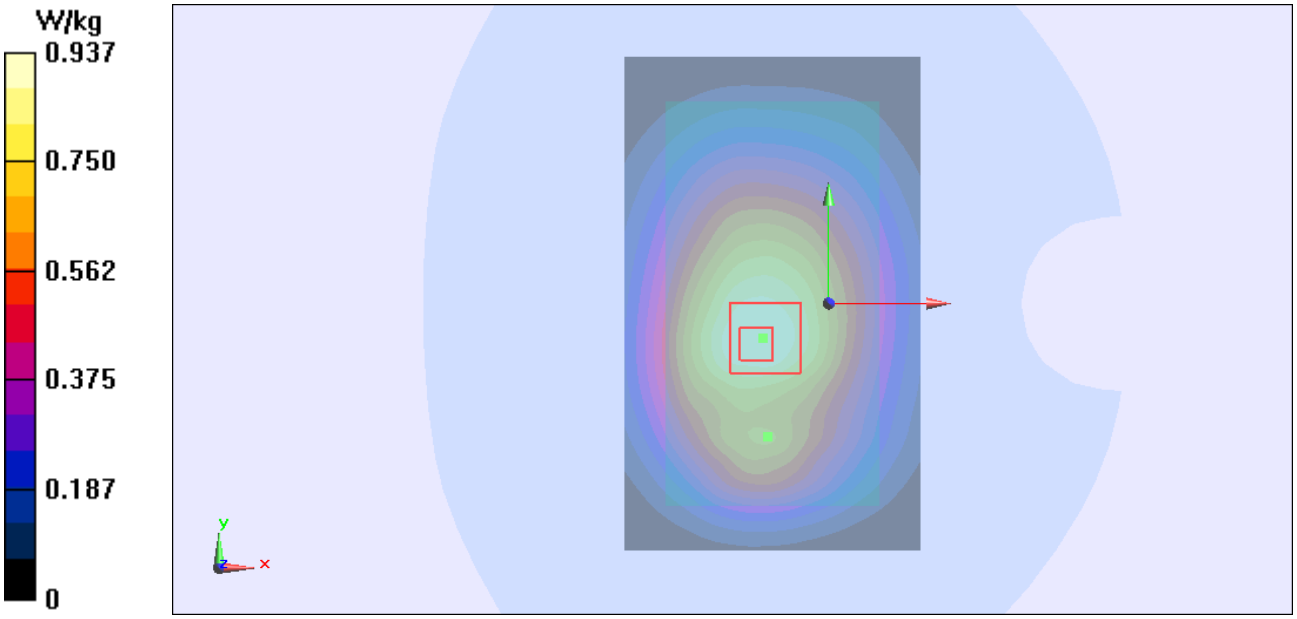
Figure 19 Left Hand Touch Cheek GSM 850 Channel 251

GSM 850 GPRS (2Txslots) Back Side High (Battery 2)

Date: 5/7/2014
Communication System: GPRS(2UP); Frequency: 848.8 MHz;Duty Cycle: 1:4.14954
Medium parameters used: f = 849 MHz; σ = 1.007 S/m; ε_r = 54.952; 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) = 0.943 W/kg

Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.326 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.18 W/kg
SAR(1 g) = 0.882 W/kg; SAR(10 g) = 0.606 W/kg
Maximum value of SAR (measured) = 0.937 W/kg



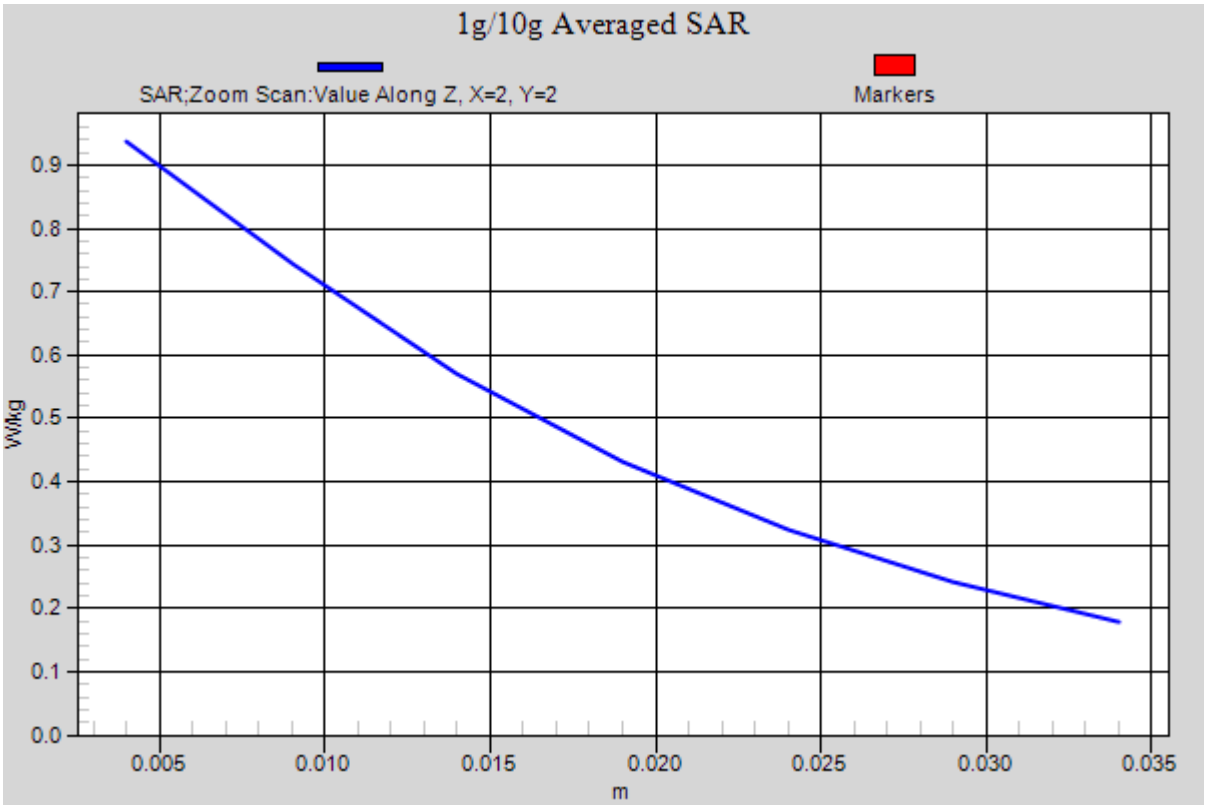


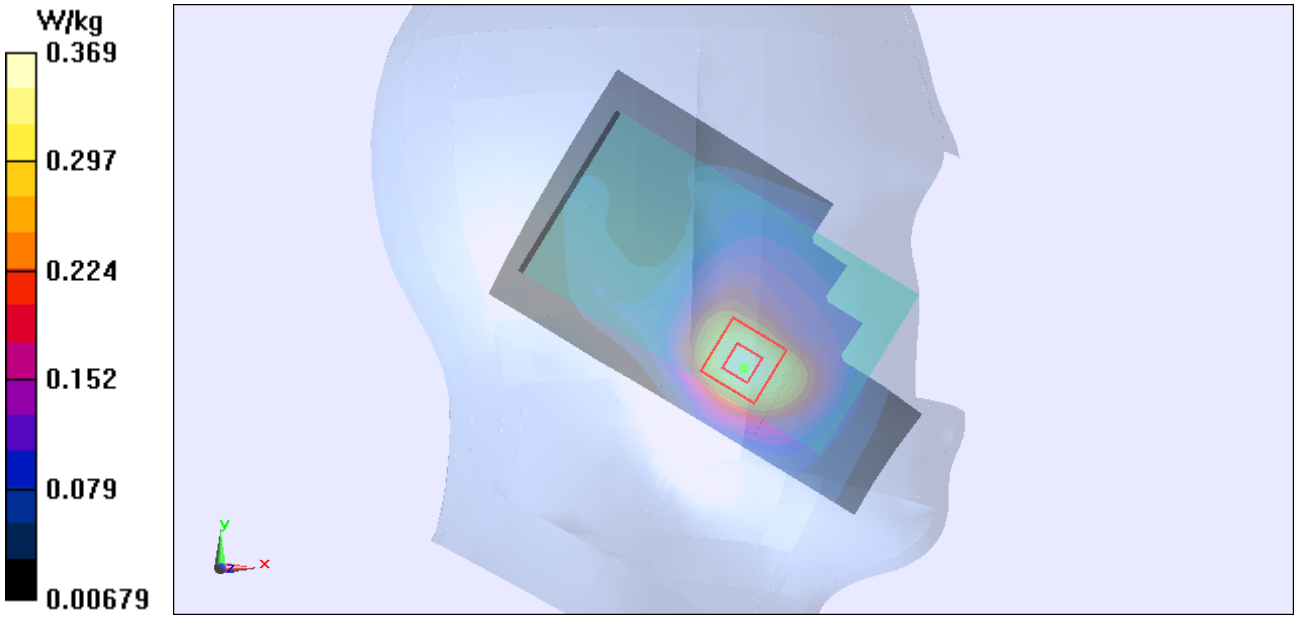
Figure 20 Body, Back Side, GSM 850 GPRS (2Txslots) Channel 251

GSM 1900 Left Cheek Low (Battery 2)

Date: 5/9/2014
Communication System: GSM; Frequency: 1850.2 MHz;Duty Cycle: 1:8.30042
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.386 S/m; ε_r = 39.813; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Low/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.372 W/kg

Left Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.299 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 0.516 W/kg
SAR(1 g) = 0.343 W/kg; SAR(10 g) = 0.214 W/kg
Maximum value of SAR (measured) = 0.369 W/kg



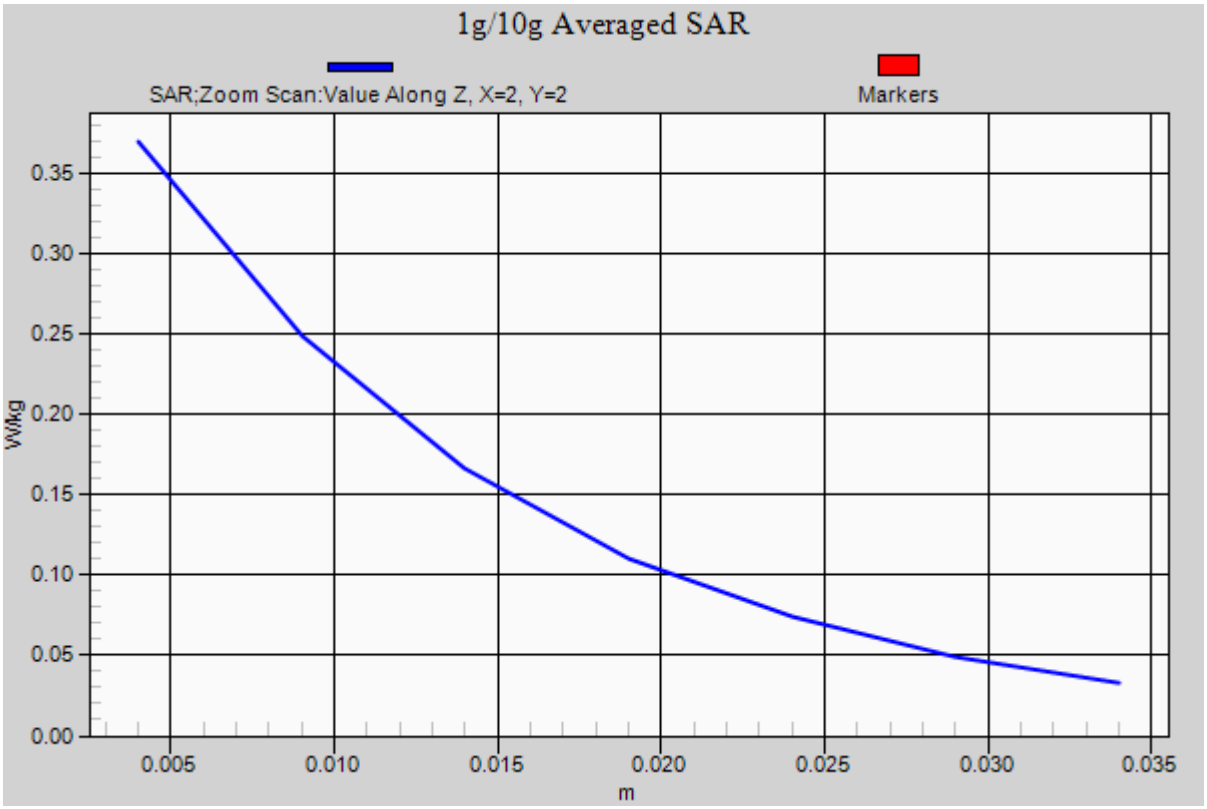


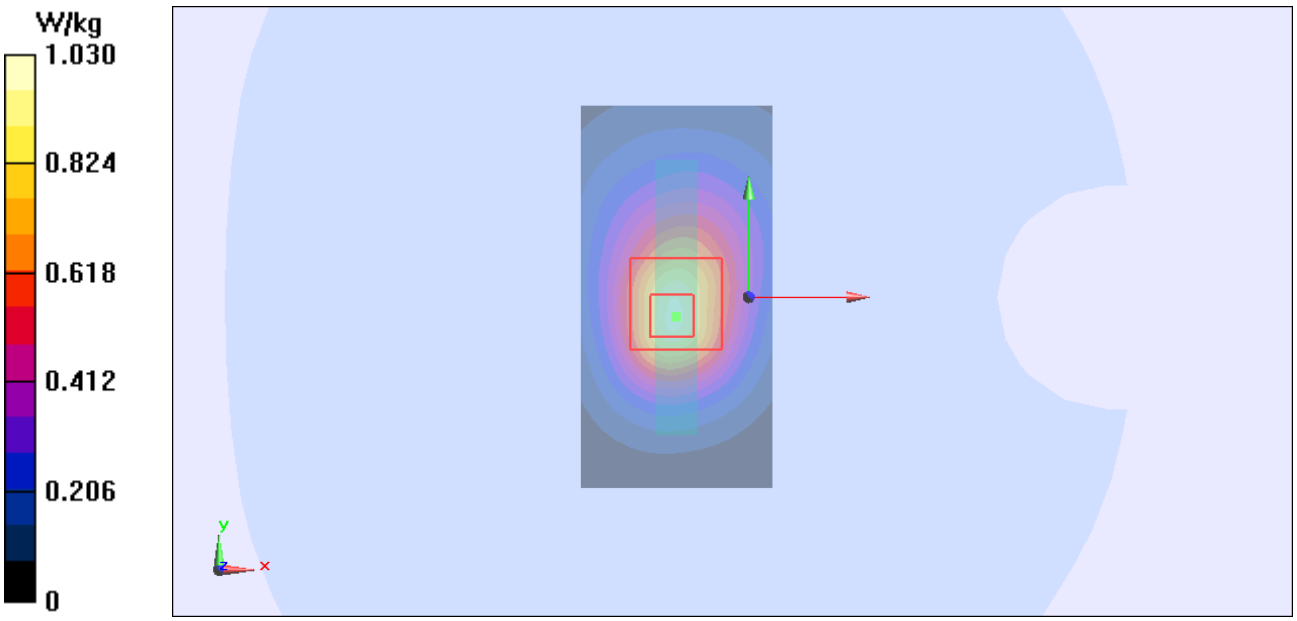
Figure 21 Left Hand Touch Cheek GSM 1900 Channel 512

GSM 1900 GPRS (4Txslots) Bottom Edge Low

Date: 5/11/2014
Communication System: GPRS(4UP); Frequency: 1850.2 MHz;Duty Cycle: 1:2.07491
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.476 S/m; ε_r = 53.266; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Bottom Edge Low/Area Scan (41x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.09 W/kg

Bottom Edge Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.594 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 0.933 W/kg; SAR(10 g) = 0.519 W/kg
Maximum value of SAR (measured) = 1.03 W/kg



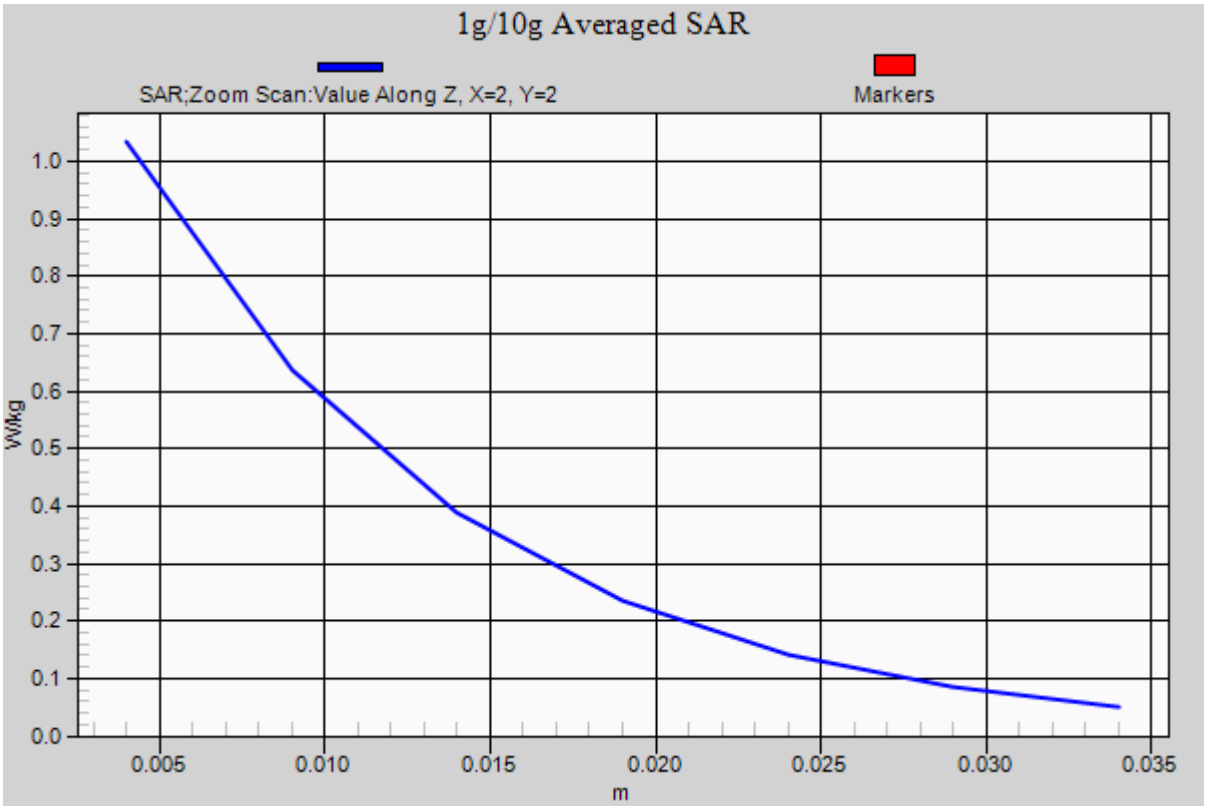


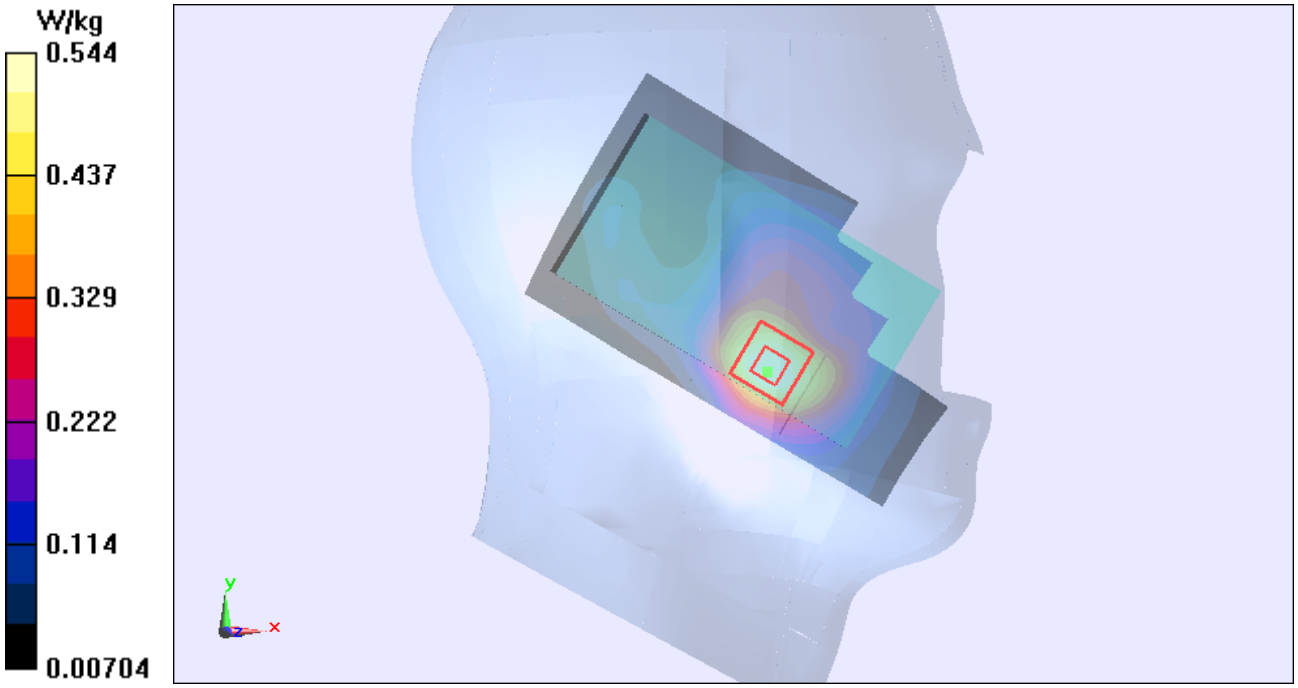
Figure 22 Body, Bottom Edge, GSM 1900 GPRS (4Txslots) Channel 512

UMTS Band II Left Cheek Low (Battery 2)

Date: 5/9/2014
Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.389 S/m; ε_r = 39.803; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Low/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.575 W/kg

Left Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.609 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.758 W/kg
SAR(1 g) = 0.513 W/kg; SAR(10 g) = 0.327 W/kg
Maximum value of SAR (measured) = 0.544 W/kg



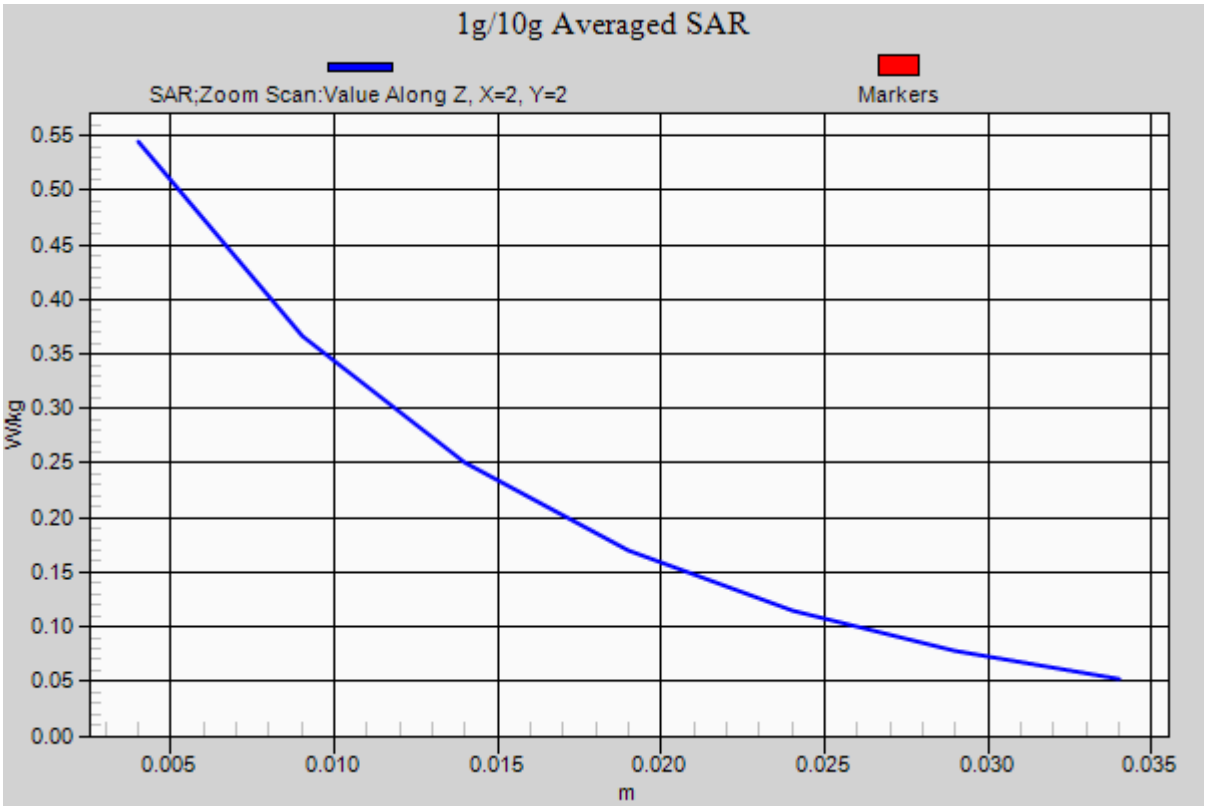


Figure 23 Left Hand Touch Cheek UMTS Band II Channel 9262

UMTS Band II with Earphone1 Back Side Low

Date: 5/11/2014

Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1

Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.477 S/m; ε_r = 53.168; 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: SAM1; Type: SAM; Serial: TP-1534

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

Back Side Low /Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.963 W/kg

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

Reference Value = 9.053 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.39 W/kg

SAR(1 g) = 0.849 W/kg; SAR(10 g) = 0.498 W/kg

Maximum value of SAR (measured) = 0.909 W/kg

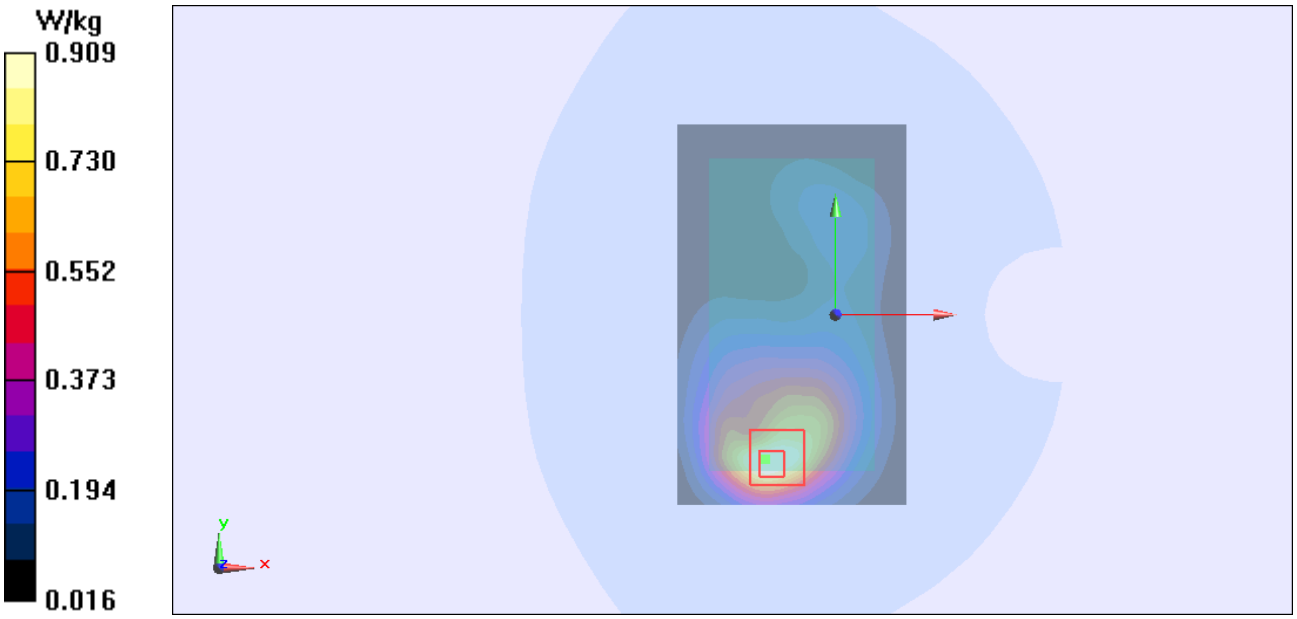


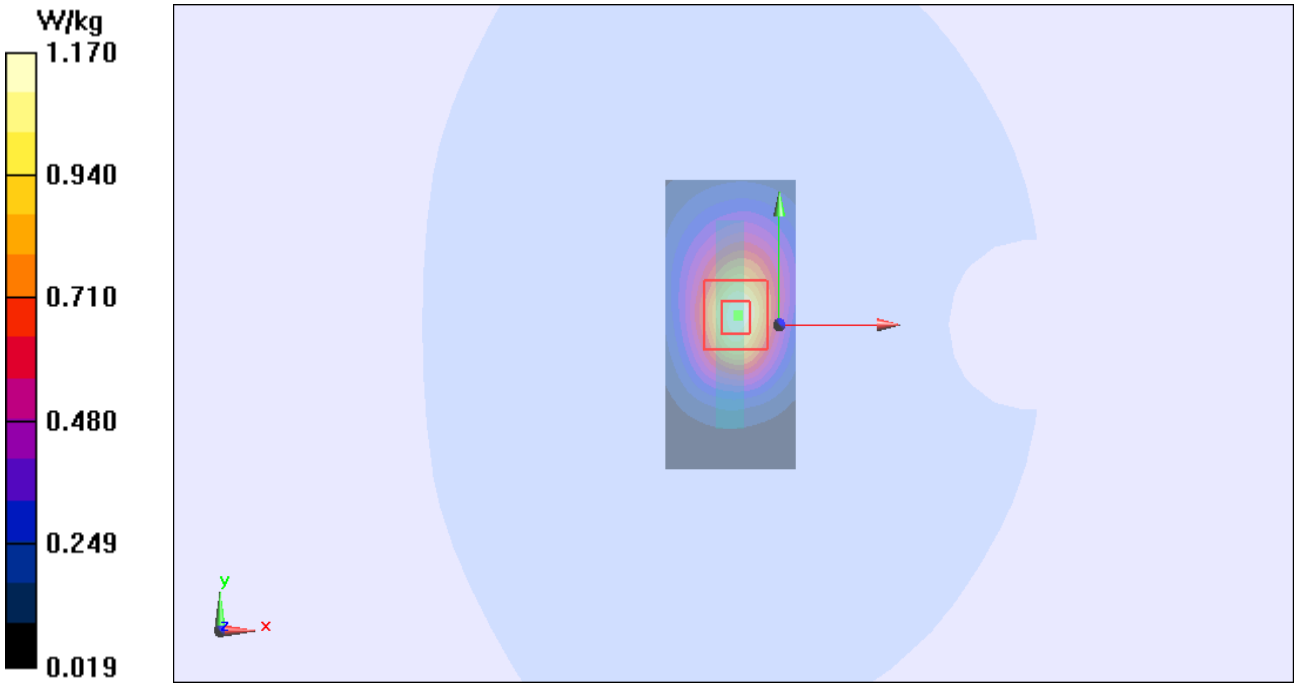
Figure 24 Body with Earphone1, Back Side, UMTS Band II Channel 9262

UMTS Band II Bottom Edge Low (Battery 2)

Date: 5/11/2014
Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.477 S/m; ε_r = 53.168; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Bottom Edge Low/Area Scan (41x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.18 W/kg

Bottom Edge Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.308 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 1.04 W/kg; SAR(10 g) = 0.575 W/kg
Maximum value of SAR (measured) = 1.17 W/kg



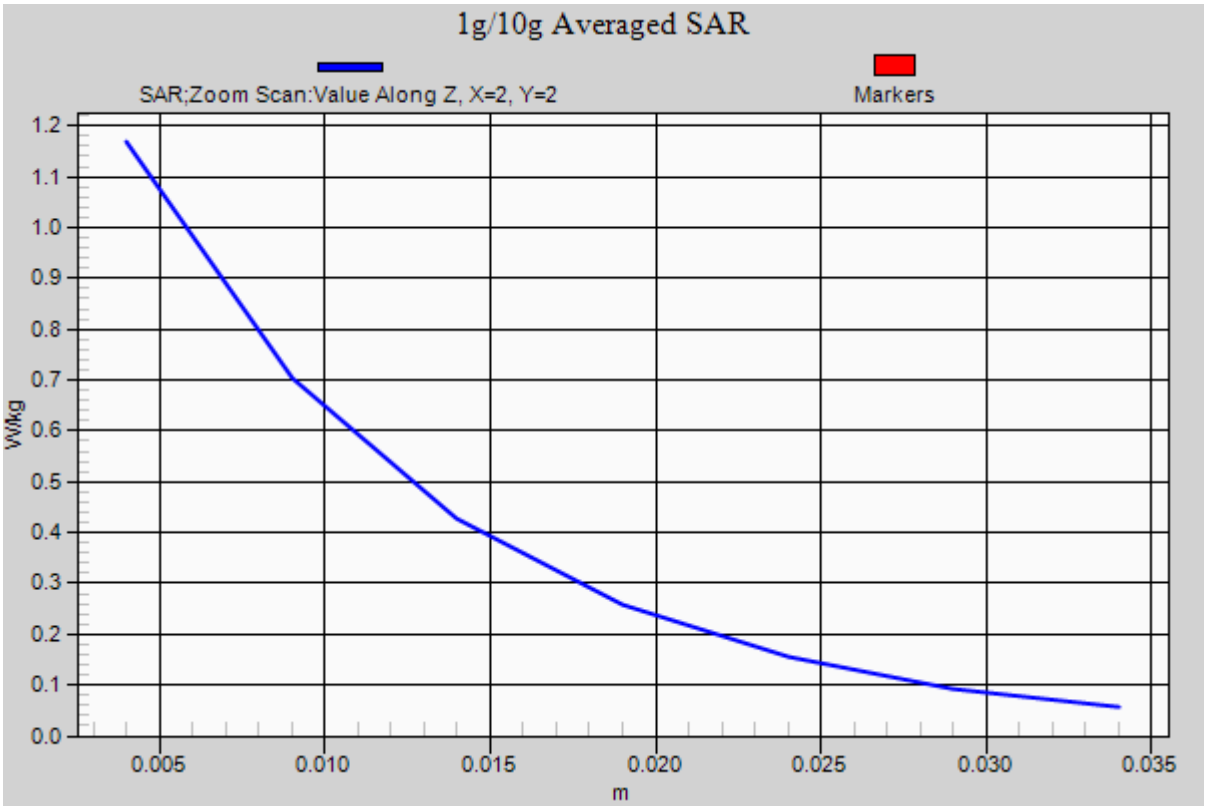


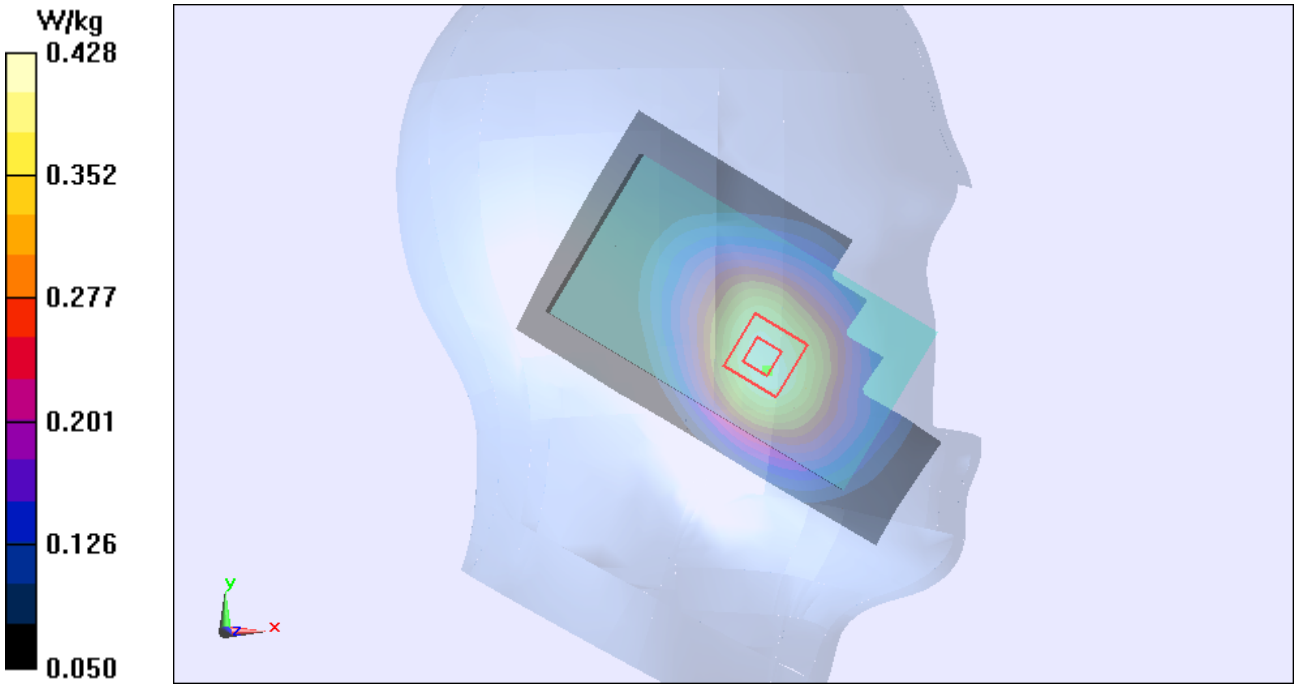
Figure 25 Body, Bottom Edge, UMTS Band II Channel 9262

UMTS Band V Left Cheek Low (Battery 2)

Date: 5/7/2014
Communication System: WCDMA; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.921 S/m; ε_r = 41.437; 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(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)

Left Cheek Low/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.426 W/kg

Left Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.345 V/m; Power Drift = 0.062 dB
Peak SAR (extrapolated) = 0.512 W/kg
SAR(1 g) = 0.411 W/kg; SAR(10 g) = 0.311 W/kg
Maximum value of SAR (measured) = 0.428 W/kg



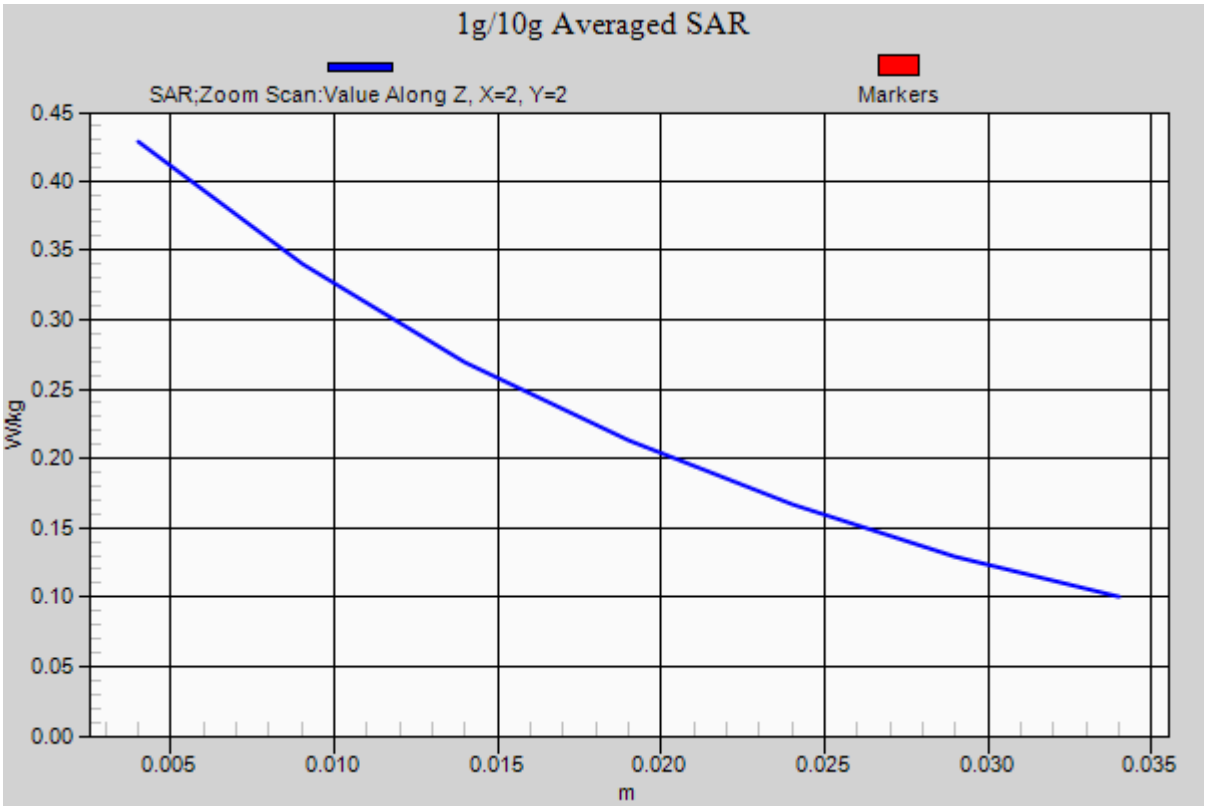


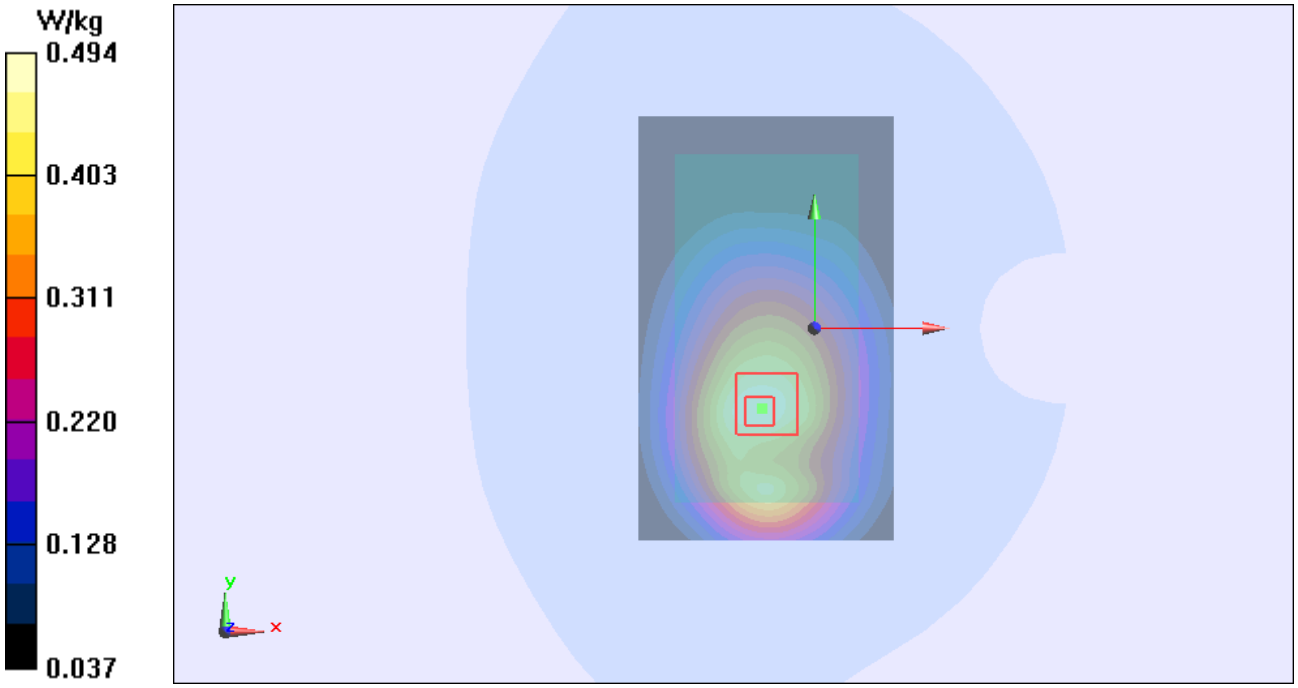
Figure 26 Left Hand Touch Cheek UMTS Band V Channel 4132

UMTS Band V Back Side Middle (Battery 2)

Date: 5/7/2014
Communication System: WCDMA; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.995 S/m; ε_r = 55.073; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(9.51, 9.51, 9.51); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side Middle/Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.497 W/kg

Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.741 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.600 W/kg
SAR(1 g) = 0.473 W/kg; SAR(10 g) = 0.352 W/kg
Maximum value of SAR (measured) = 0.494 W/kg



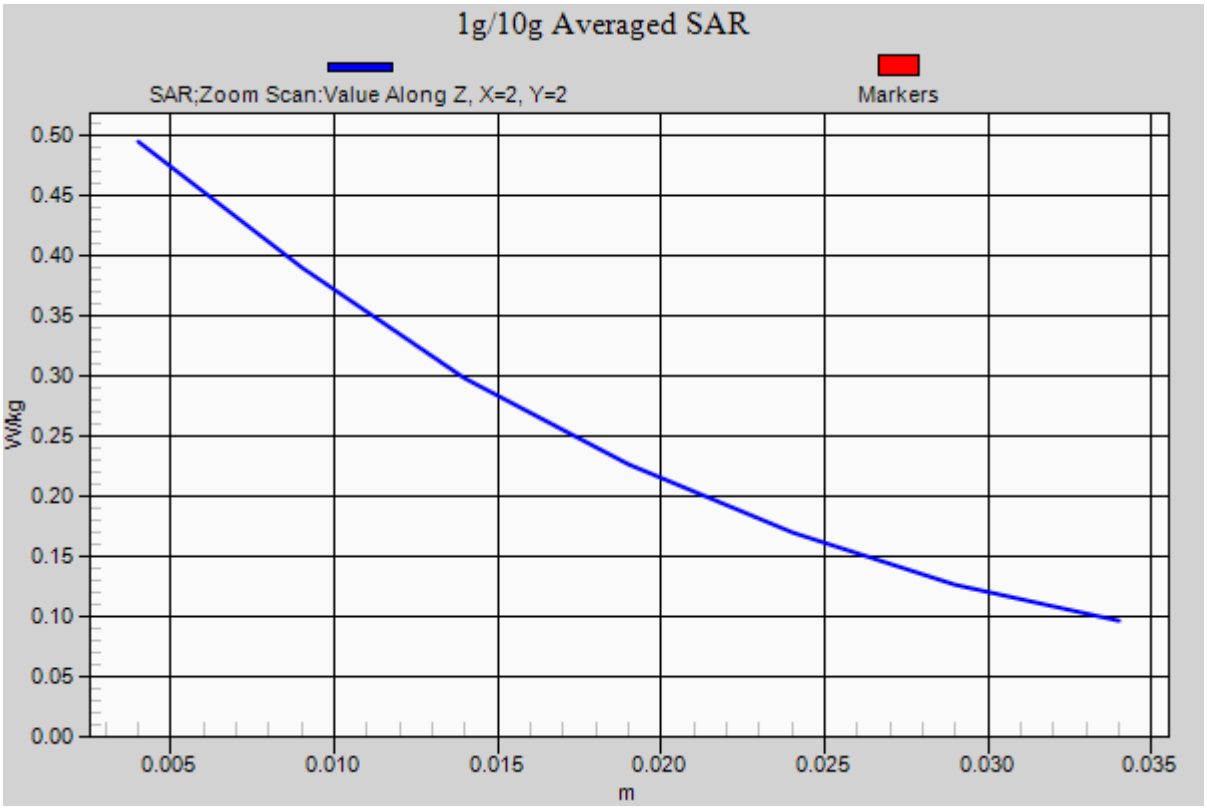


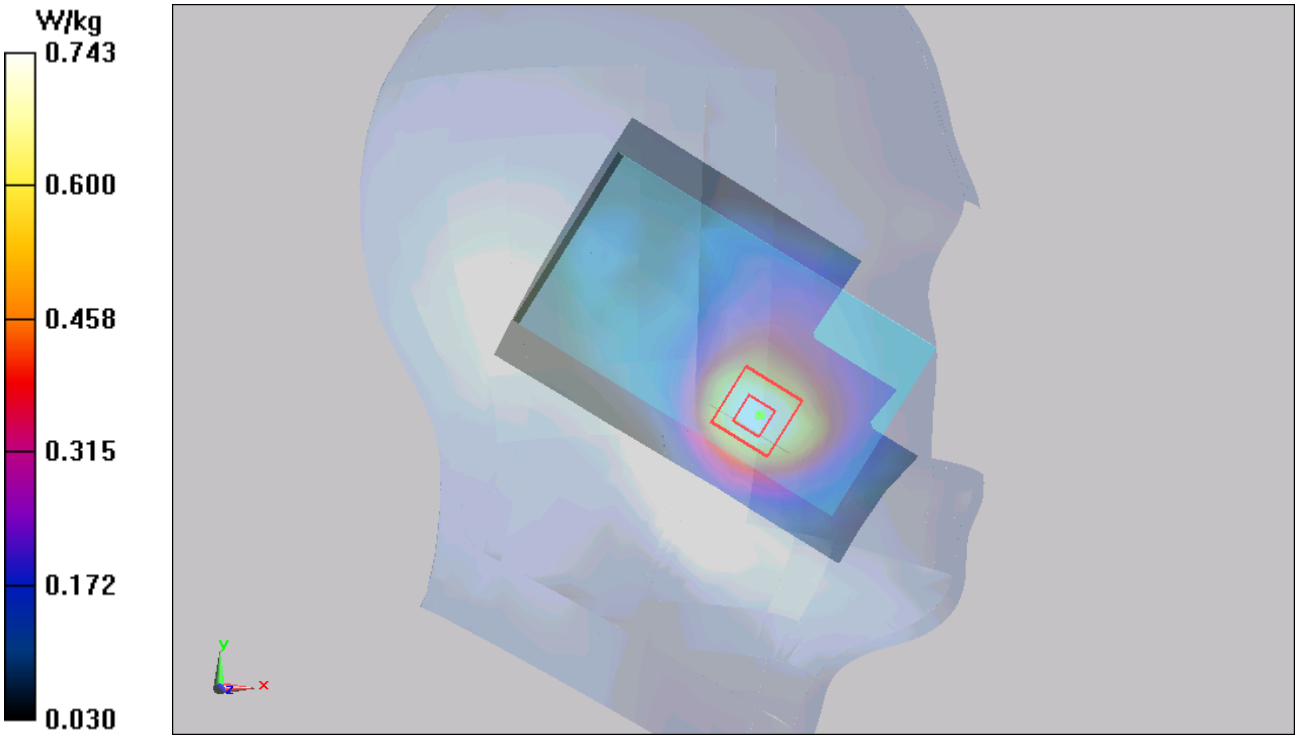
Figure 27 Body, Back Side, UMTS Band V Channel 4183

LTE Band 2 1RB Left Cheek Low (Battery 2)

Date: 5/9/2014
Communication System: UID 0, LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.396 S/m; ε_r = 39.766; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Low/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.748 W/kg

Left Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.238 V/m; Power Drift = 0.034 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.714 W/kg; SAR(10 g) = 0.452 W/kg
Maximum value of SAR (measured) = 0.743 W/kg



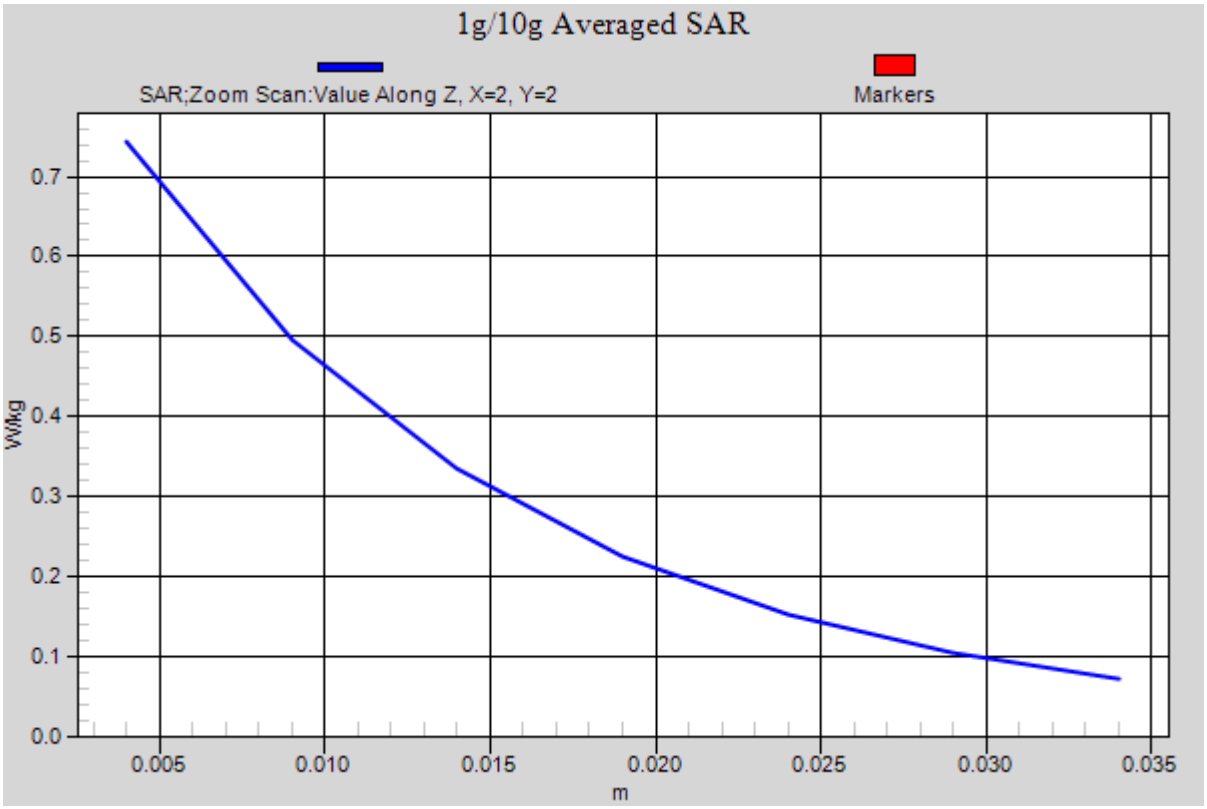


Figure 28 Left Hand Touch Cheek LTE Band 2 1RB Channel 18700

LTE Band 2 1RB Back Side High

Date: 5/11/2014
Communication System: UID 0, LTE (0); Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.524 S/m; ε_r = 53.079; 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: 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) = 1.27 W/kg

Back Side High /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.390 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 1.84 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.716 W/kg
Maximum value of SAR (measured) = 1.27 W/kg

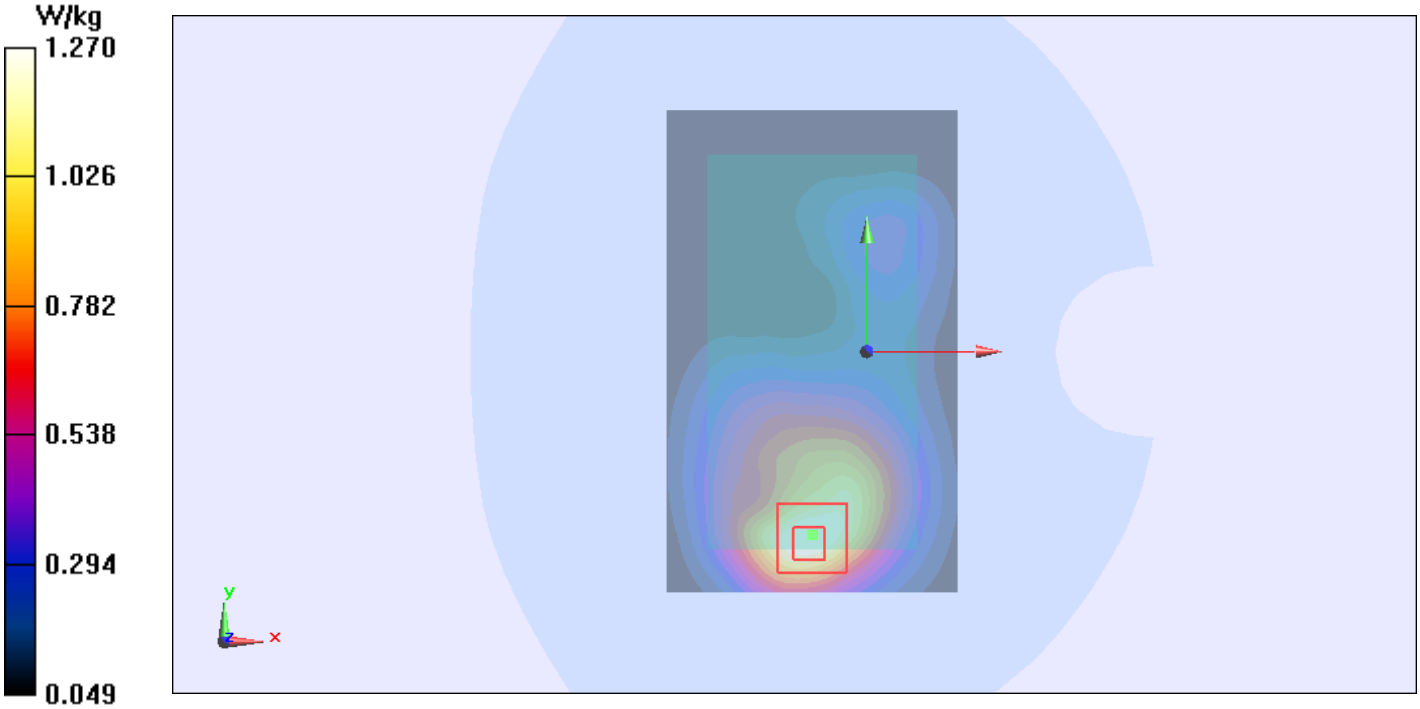


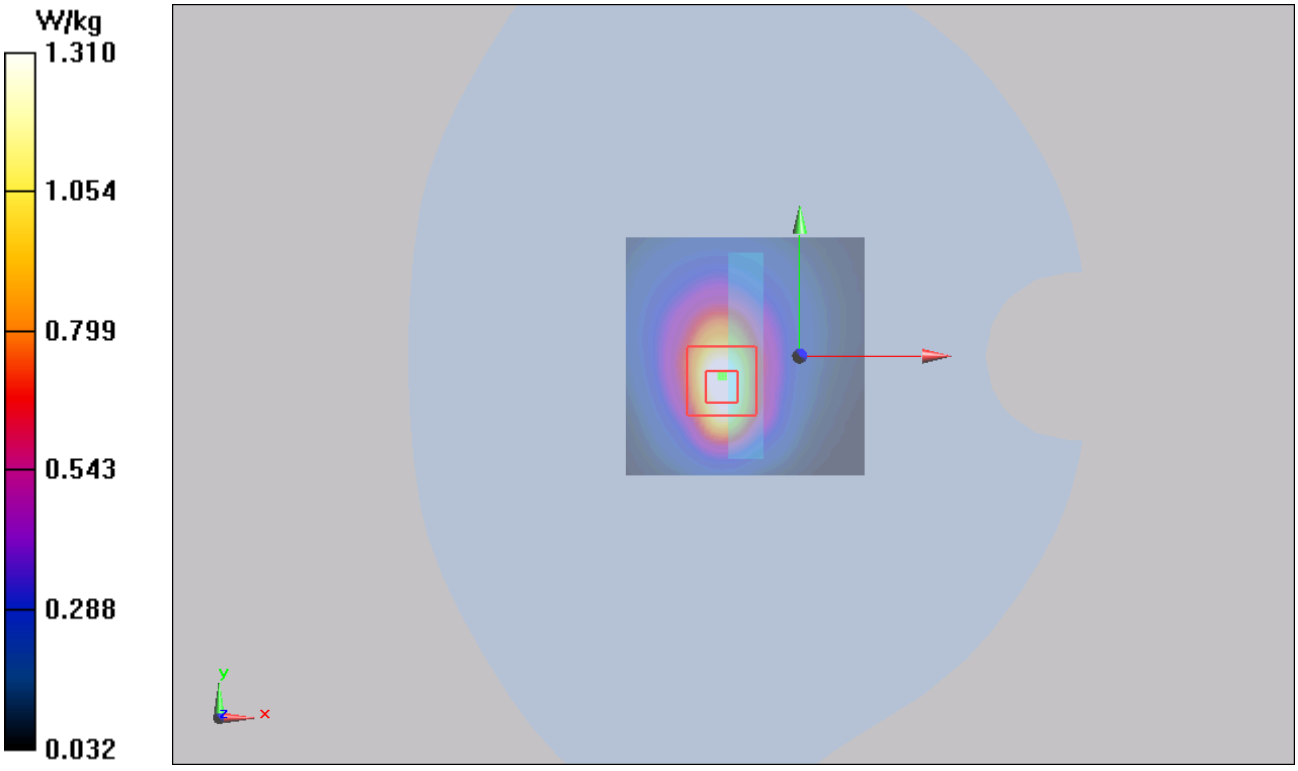
Figure 29 Body, Back Side, LTE Band 2 1RB Channel 19100

LTE Band 2 1RB Bottom Edge Middle (Battery 2)

Date: 5/11/2014
Communication System: UID 0, LTE (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.504 S/m; ε_r = 53.137; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.63, 7.63, 7.63); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Bottom Edge Middle/Area Scan (41x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.46 W/kg

Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.710 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 1.3 W/kg; SAR(10 g) = 0.711 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



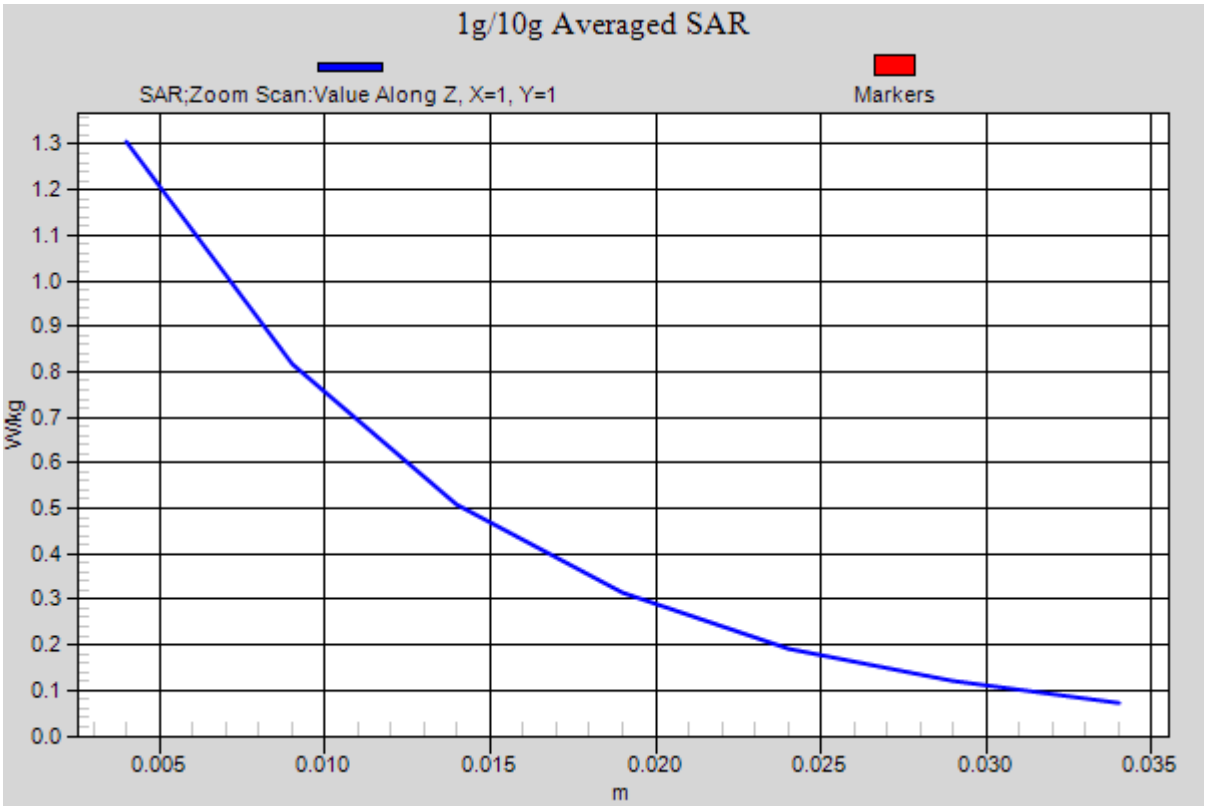


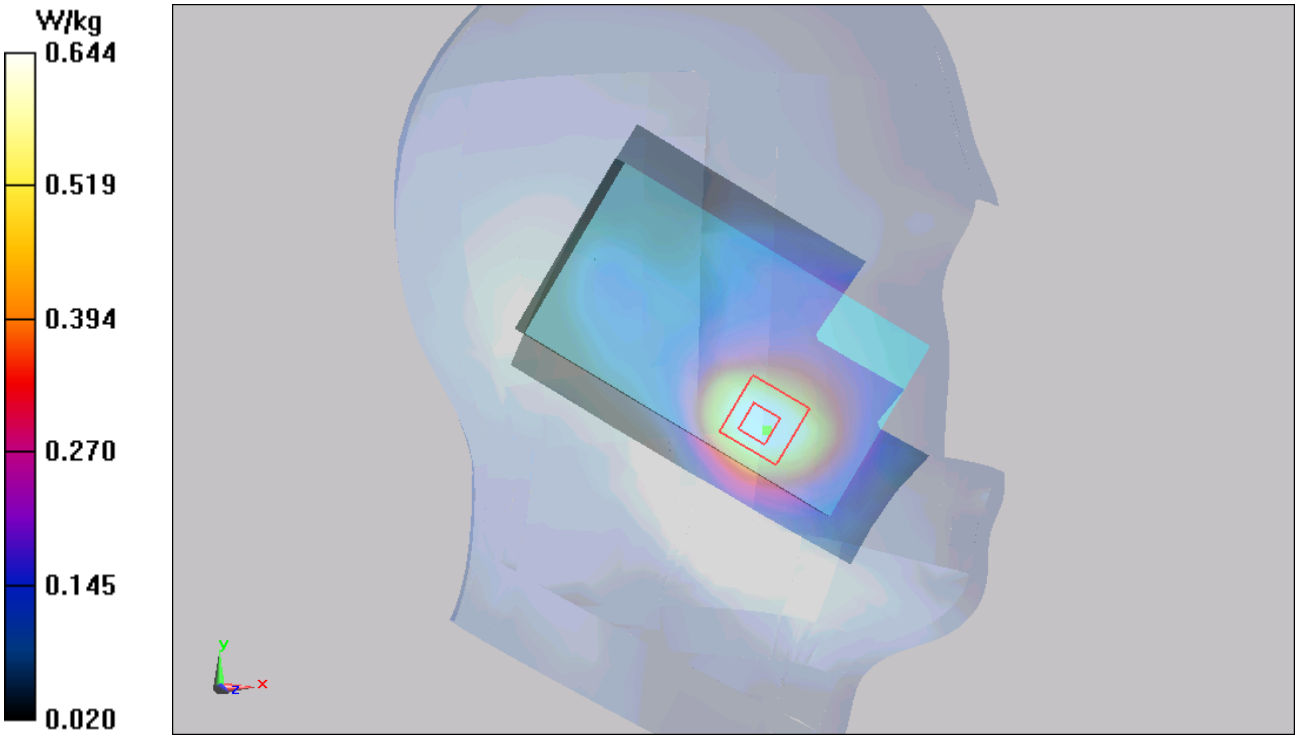
Figure 30 Body, Bottom Edge, LTE Band 2 1RB Channel 18900

LTE Band 4 1RB Left Cheek Low

Date: 5/10/2014
Communication System: UID 0, LTE (0); Frequency: 1720 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1720 MHz; σ = 1.295 S/m; ε_r = 39.8; 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(8.22, 8.22, 8.22); 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)

Left Cheek Low/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.684 W/kg

Left Cheek Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.898 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.918 W/kg
SAR(1 g) = 0.636 W/kg; SAR(10 g) = 0.412 W/kg
Maximum value of SAR (measured) = 0.644 W/kg



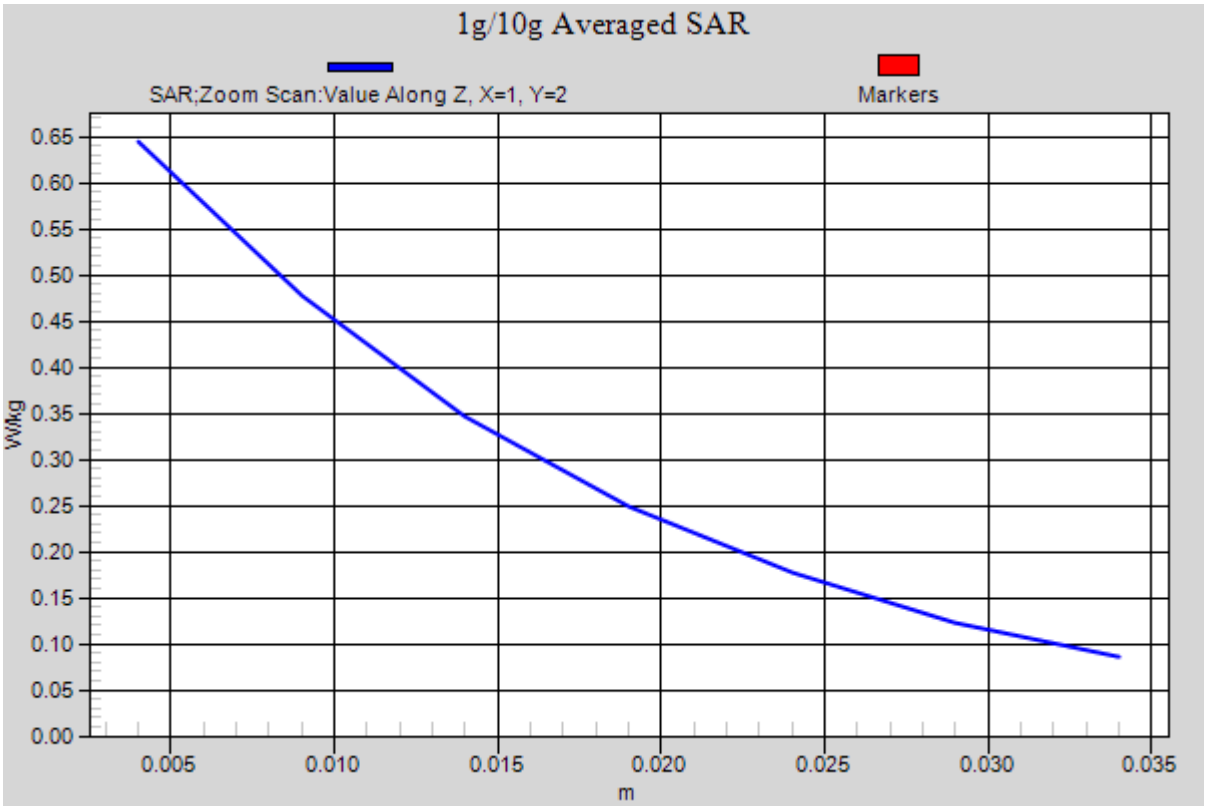


Figure 31 Left Hand Touch Cheek LTE Band 4 1RB Channel 20050

LTE Band 4 1RB Back Side Middle

Date: 5/10/2014
Communication System: UID 0, LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.488 S/m; ε_r = 52.928; 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(7.77, 7.77, 7.77); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Back Side Middle /Area Scan (61x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.29 W/kg

Back Side Middle /Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.230 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.75 W/kg
SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.670 W/kg
Maximum value of SAR (measured) = 1.13 W/kg

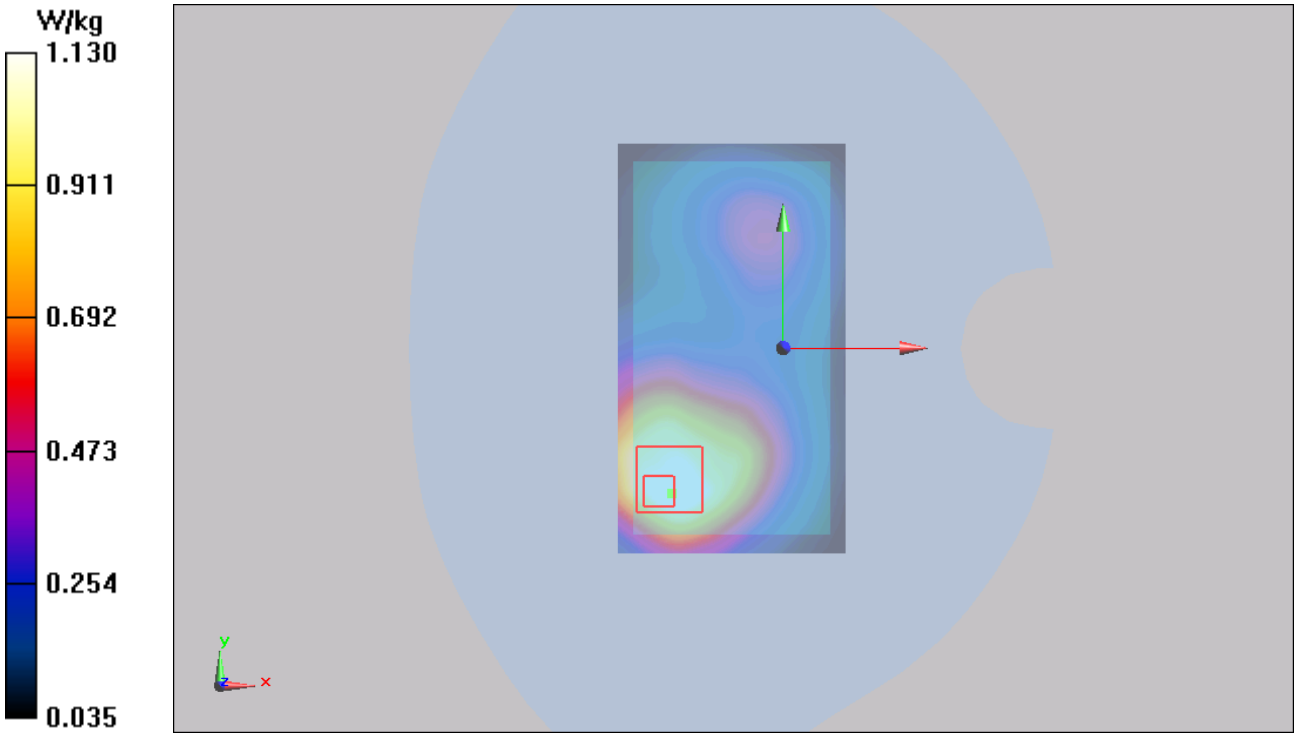


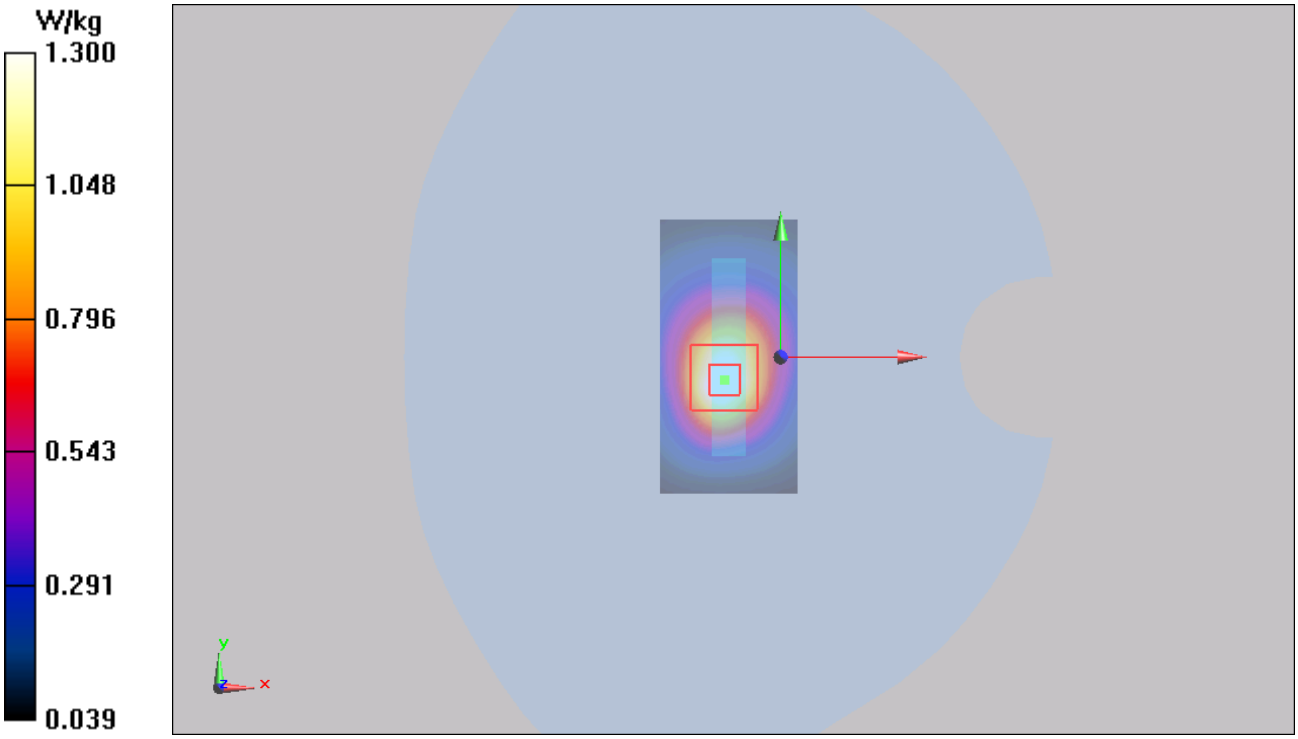
Figure 32 Body, Back Side, LTE Band 4 1RB Channel 20175

LTE Band 4 1RB Bottom Edge High (Repeated SAR)

Date: 5/10/2014
Communication System: UID 0, LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1745 MHz; σ = 1.498 S/m; ε_r = 52.918; 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(7.77, 7.77, 7.77); 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)

Bottom Edge High/Area Scan (41x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.52 W/kg

Bottom Edge High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 29.992 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.14 W/kg
SAR(1 g) = 1.33 W/kg; SAR(10 g) = 0.763 W/kg
Maximum value of SAR (measured) = 1.30 W/kg



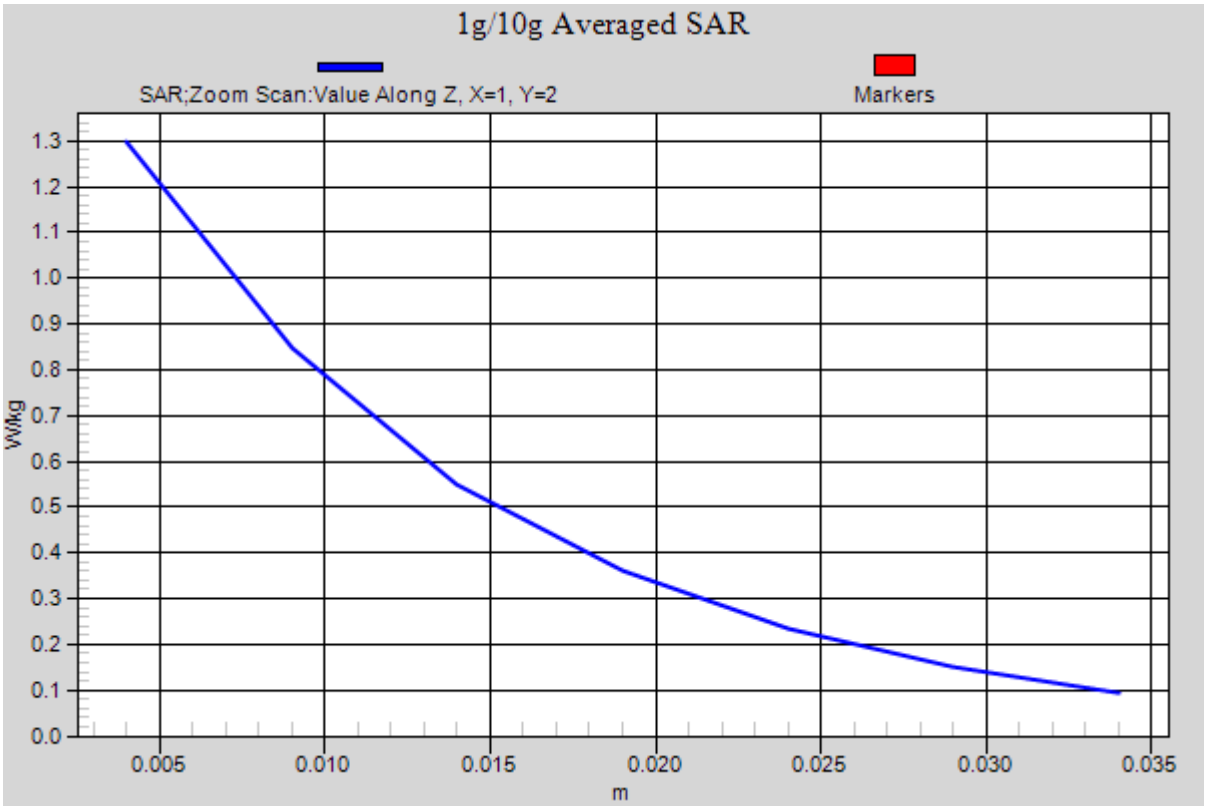


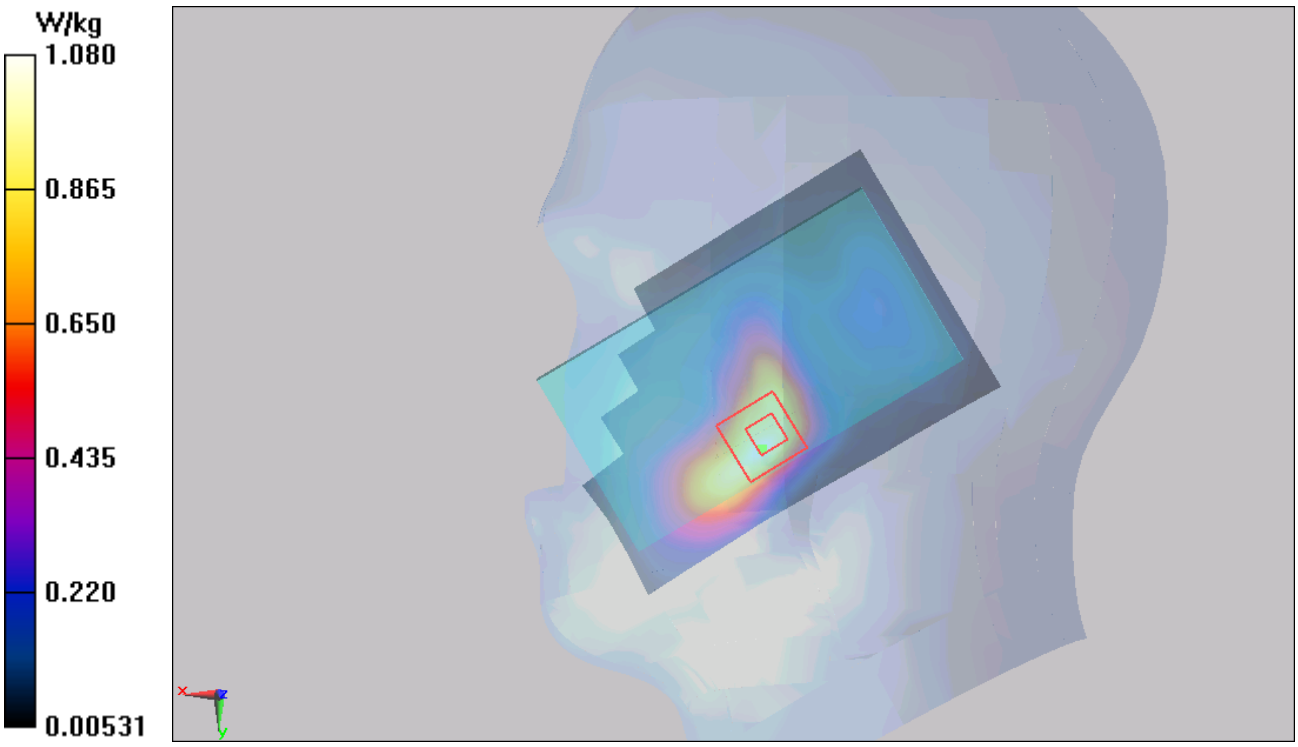
Figure 33 Body, Bottom Edge, LTE Band 4 1RB Channel 20300

LTE Band 7 1RB Right Cheek High

Date: 5/8/2014
Communication System: UID 0, LTE (0); Frequency: 2560 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2560 MHz; σ = 1.941 S/m; ε_r = 38.761; 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 - SN3816; ConvF(7.26, 7.26, 7.26); Calibrated: 6/4/2013;
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 (71x111x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.08 W/kg

Right Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.437 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.999 W/kg; SAR(10 g) = 0.542 W/kg
Maximum value of SAR (measured) = 1.08 W/kg



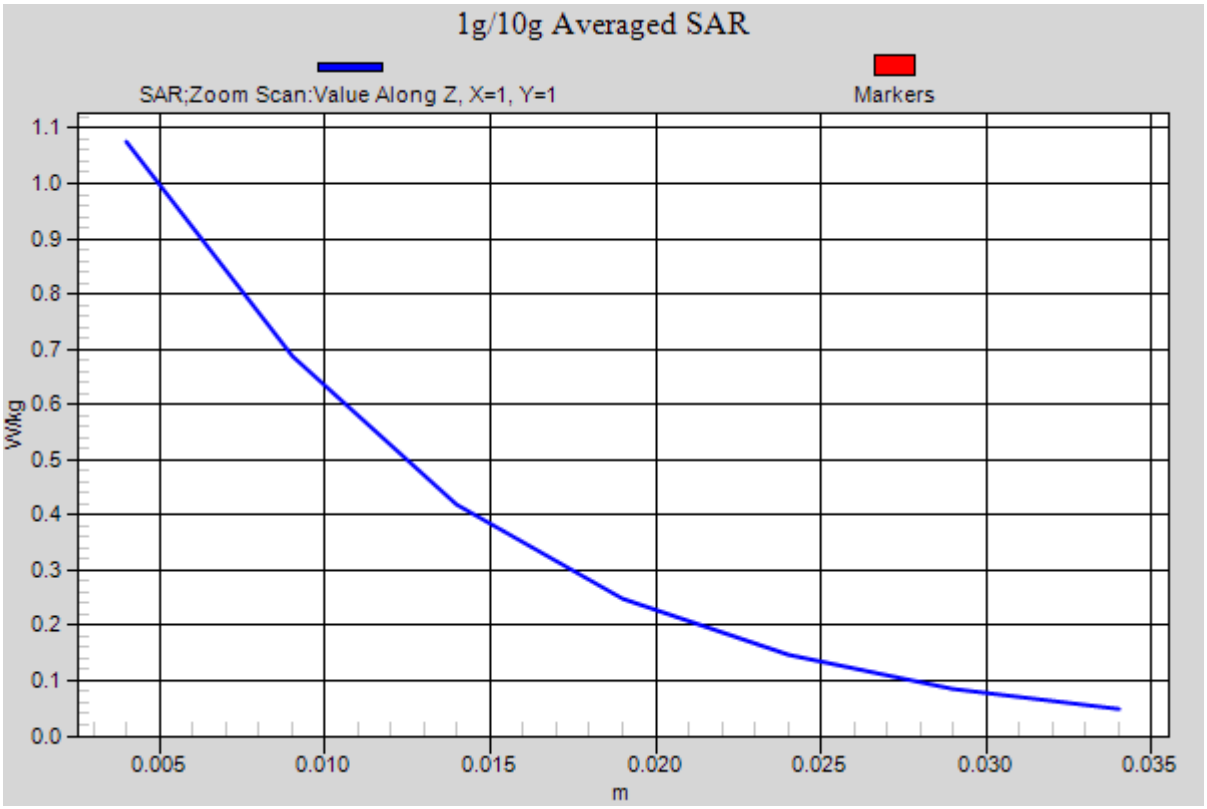


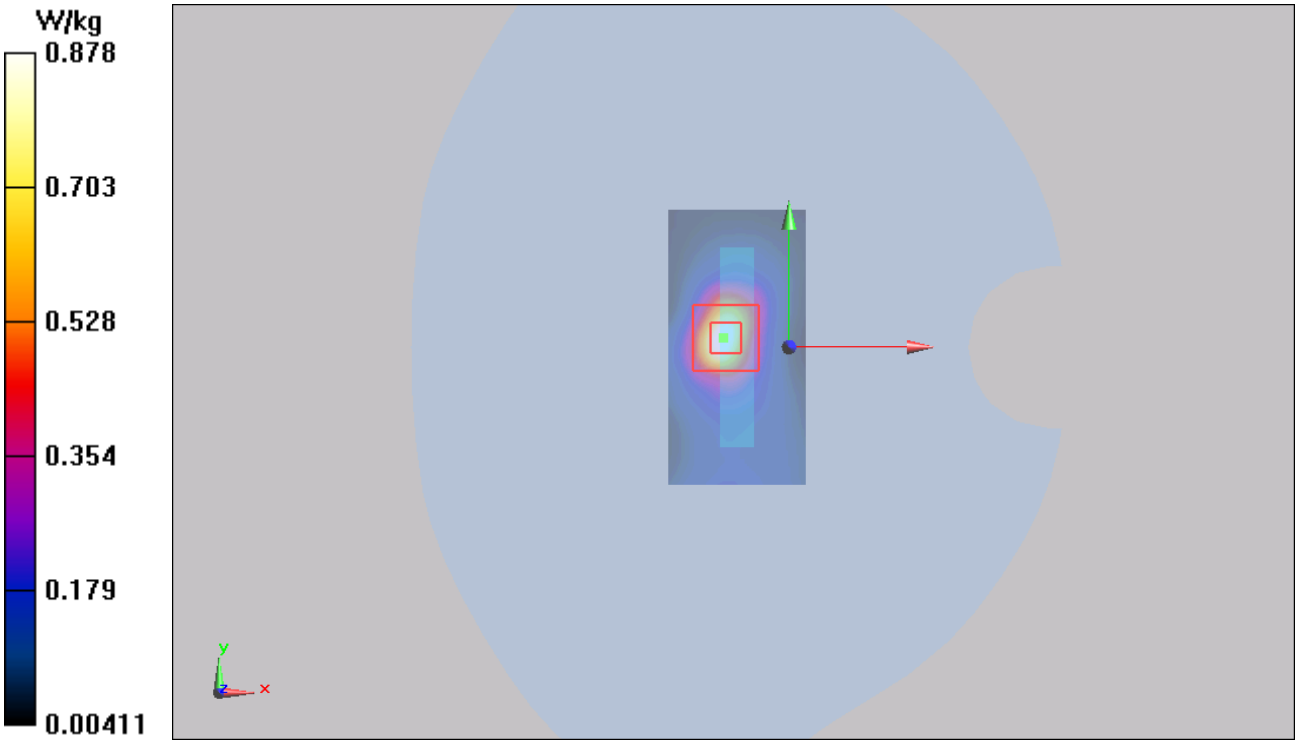
Figure 34 Right Hand Touch Cheek LTE Band 7 1RB Channel 21350

LTE Band 7 1RB Bottom Edge Low (Battery 2)

Date: 5/8/2014
Communication System: UID 0, LTE (0); Frequency: 2510 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2510 MHz; σ = 2.093 S/m; ε_r = 52.611; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Bottom Edge Low/Area Scan (41x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.999 W/kg

Bottom Edge Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.683 V/m; Power Drift = 0.047 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 0.878 W/kg; SAR(10 g) = 0.388 W/kg
Maximum value of SAR (measured) = 0.878 W/kg



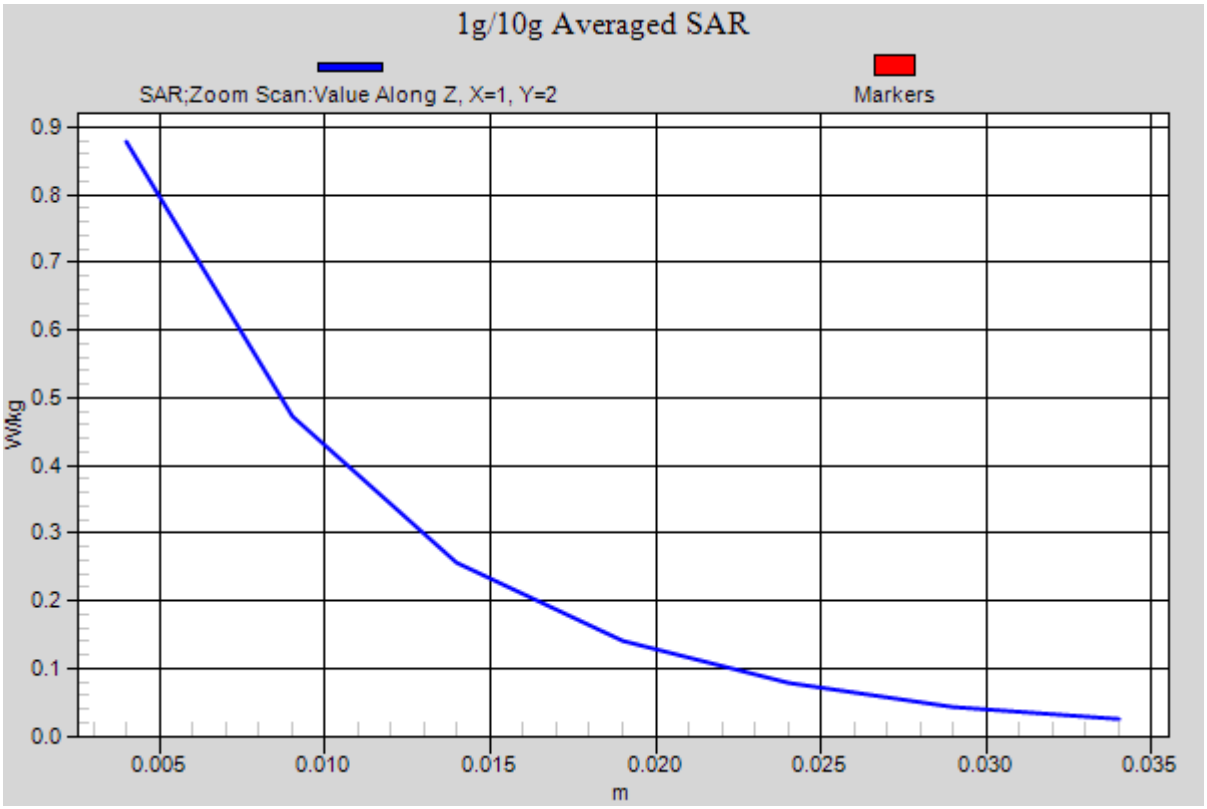


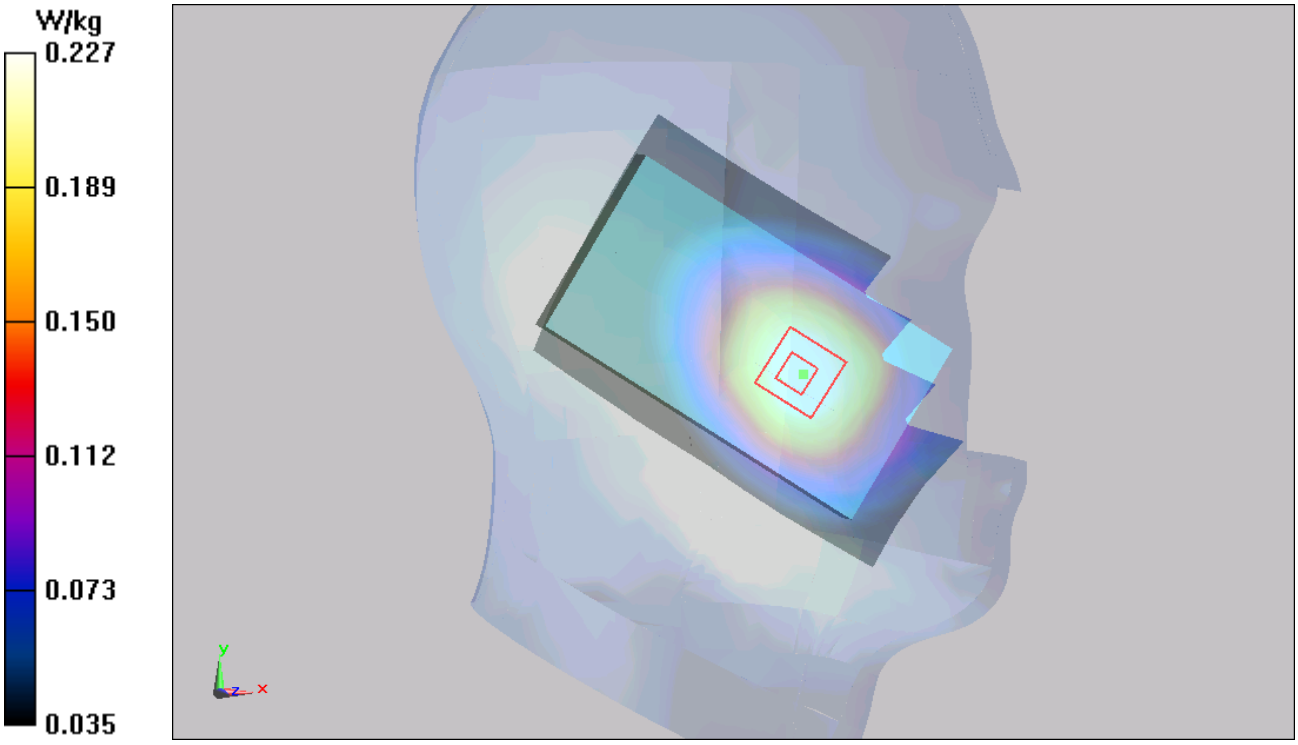
Figure 35 Body, Bottom Edge, LTE Band 7 1RB Channel 20850

LTE Band 17 1RB Left Cheek High

Date: 5/6/2014
Communication System: UID 0, LTE (0); Frequency: 711 MHz;Duty Cycle: 1:1
Medium parameters used: f = 711 MHz; σ = 0.871 S/m; ε_r = 42.542; 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(9.94, 9.94, 9.94); 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)

Left Cheek High/Area Scan (61x91x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.230 W/kg

Left Cheek High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.477 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.266 W/kg
SAR(1 g) = 0.222 W/kg; SAR(10 g) = 0.173 W/kg
Maximum value of SAR (measured) = 0.227 W/kg



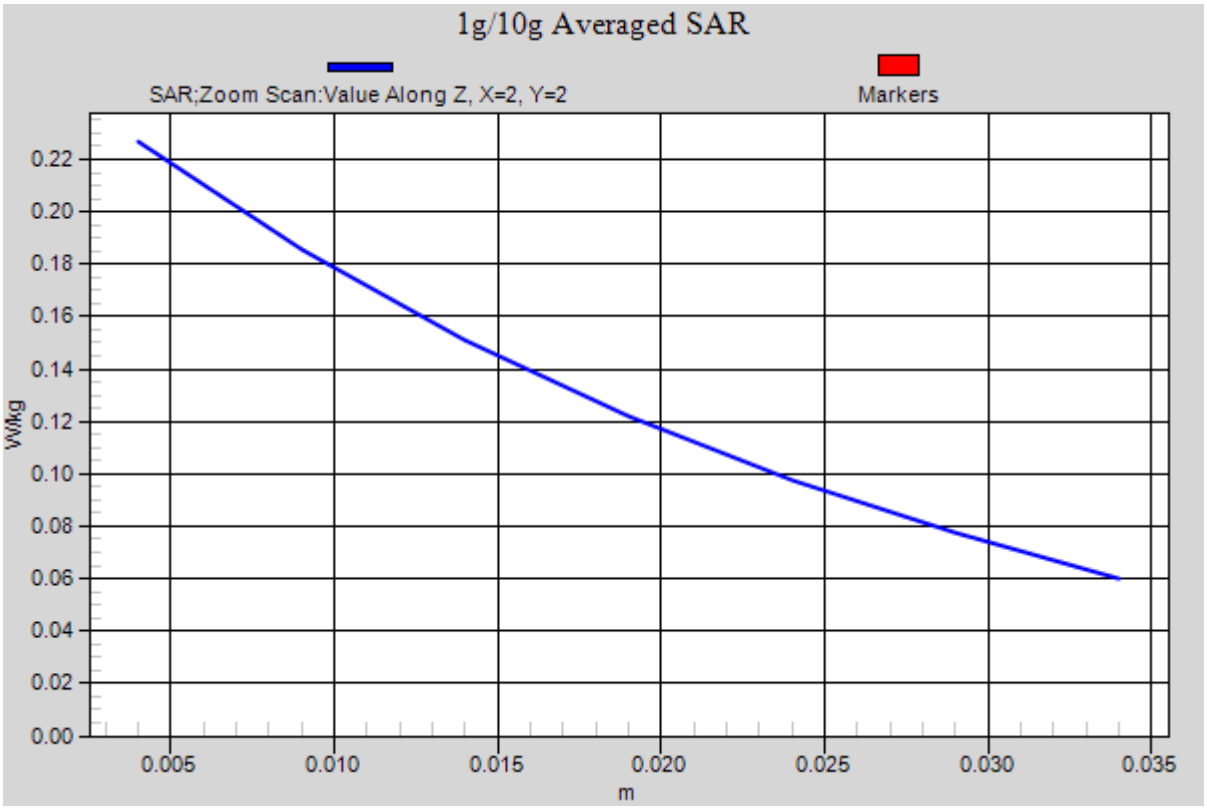


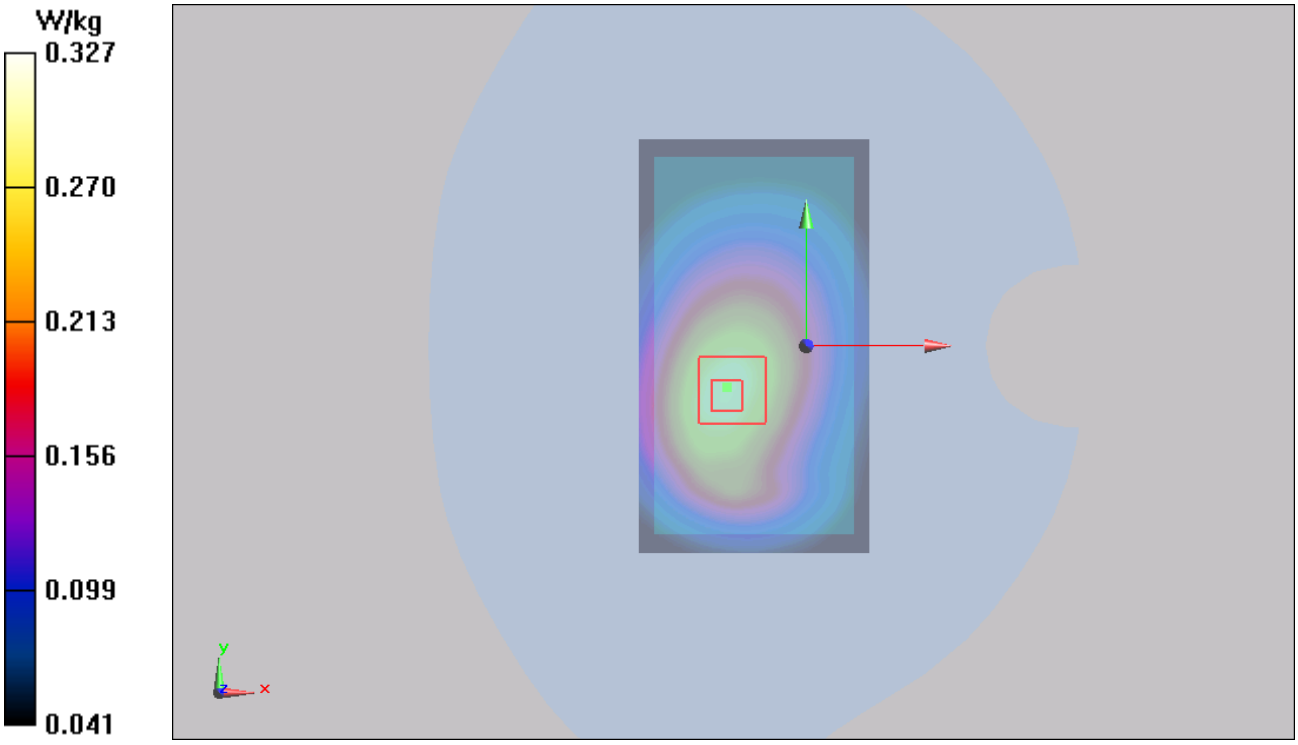
Figure 36 Left Hand Touch Cheek LTE Band 17 1RB Channel 23800

LTE Band 17 1RB Back Side High (Battery 2)

Date: 5/6/2014
Communication System: UID 0, LTE (0); Frequency: 711 MHz;Duty Cycle: 1:1
Medium parameters used: f = 711 MHz; σ = 0.932 S/m; ε_r = 54.73; 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(9.72, 9.72, 9.72); 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) = 0.288 W/kg

Back Side High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.375 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.414 W/kg
SAR(1 g) = 0.314 W/kg; SAR(10 g) = 0.232 W/kg
Maximum value of SAR (measured) = 0.327 W/kg



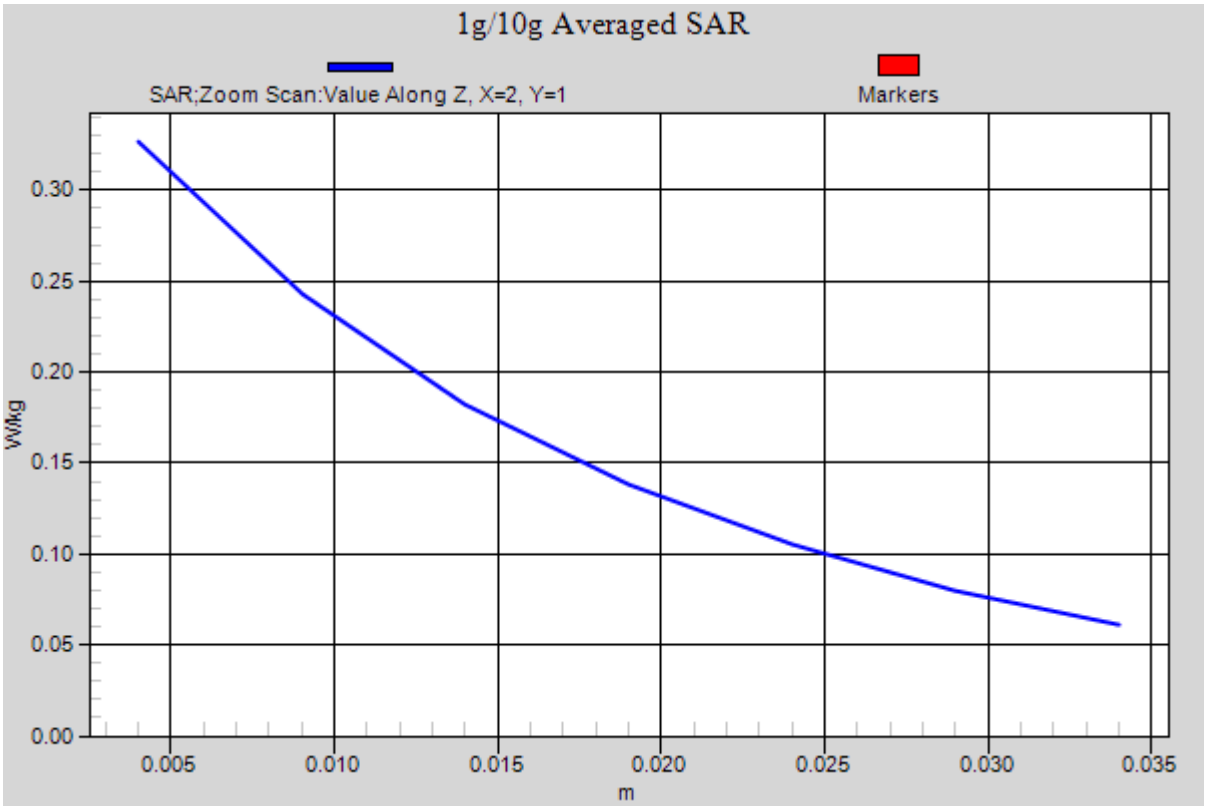


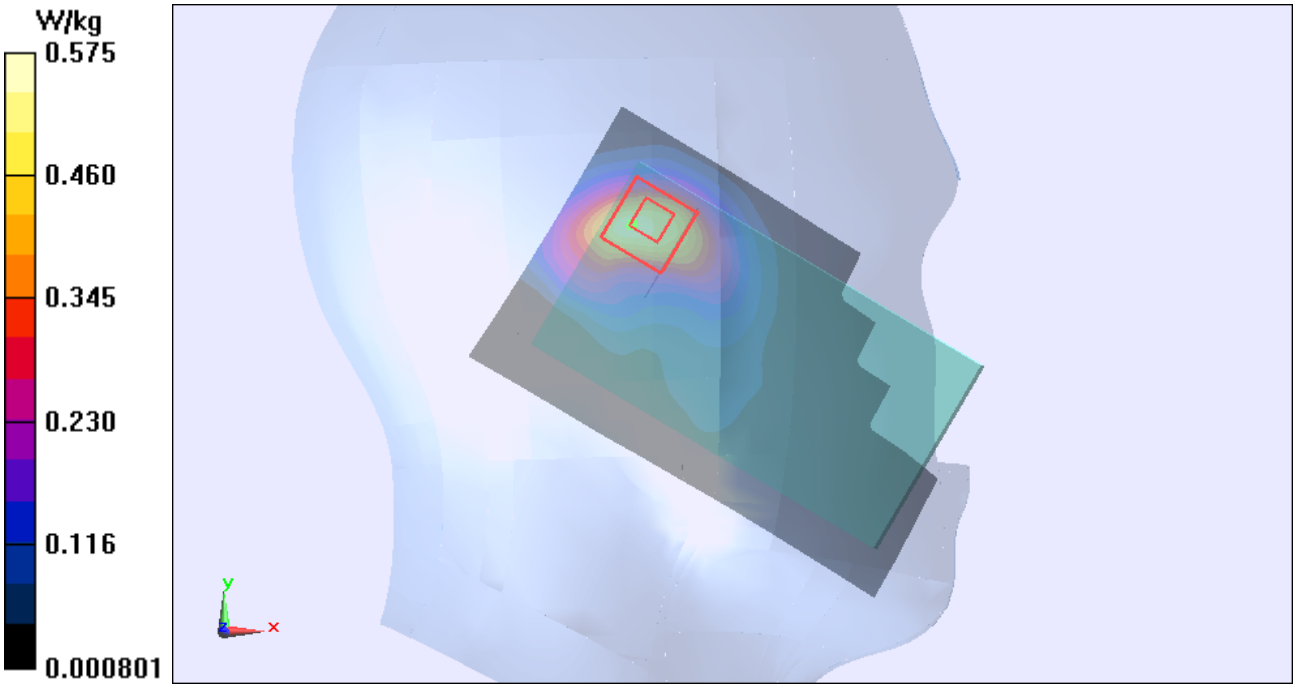
Figure 37 Body, Back Side, LTE Band 17 1RB Channel 23800

802.11b Left Cheek Middle

Date: 5/5/2014
Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.787 S/m; ε_r = 39.20; 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: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Left Cheek Middle/Area Scan (71x121x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.535 W/kg

Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.379 V/m; Power Drift = 0.022 dB
Peak SAR (extrapolated) = 1.10 W/kg
SAR(1 g) = 0.528 W/kg; SAR(10 g) = 0.252 W/kg
Maximum value of SAR (measured) = 0.575 W/kg



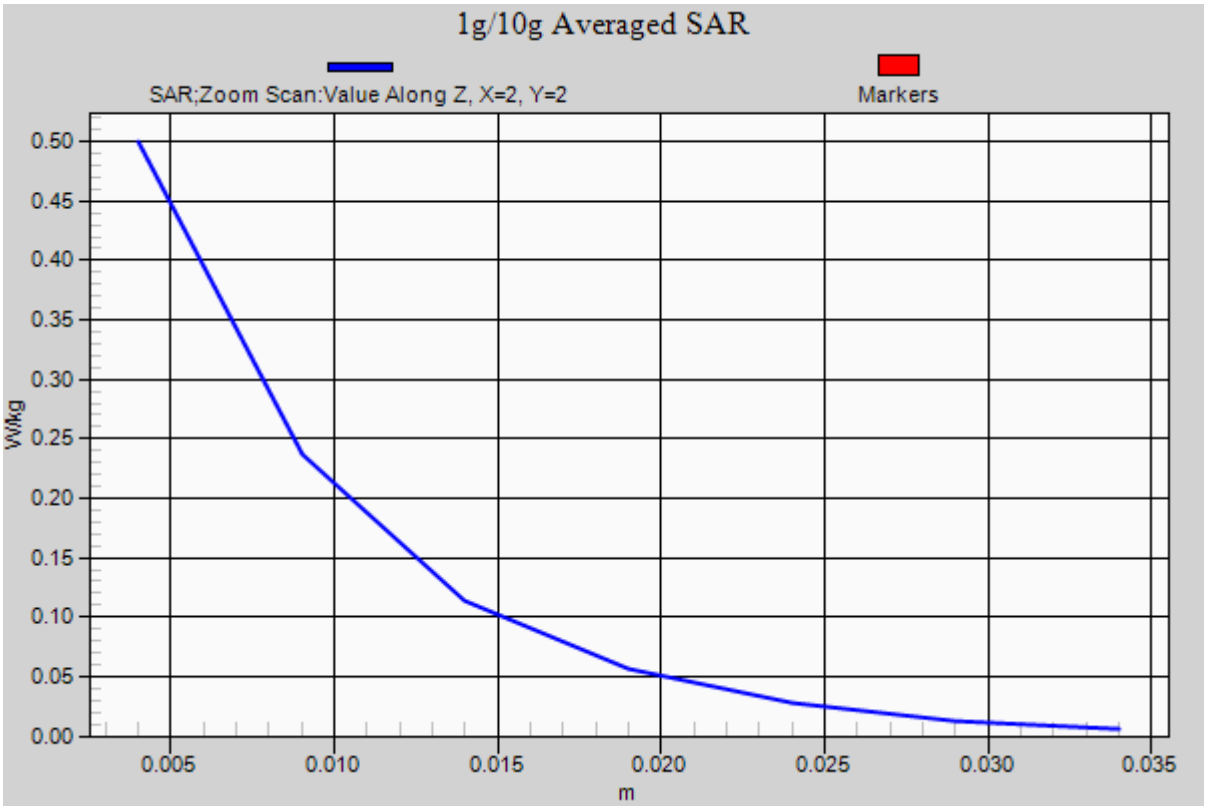


Figure 38 Left Hand Touch Cheek 802.11b Channel 6

802.11b Right Cheek Middle

Date: 5/5/2014
Communication System: 802.11b; 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: Right Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.64, 7.64, 7.64); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM1; Type: SAM; Serial: TP-1534
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Right/Cheek Middle/Area Scan (71x121x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.351 W/kg

Right/Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.780 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.588 W/kg
SAR(1 g) = 0.295 W/kg; SAR(10 g) = 0.157 W/kg
Maximum value of SAR (measured) = 0.317 W/kg

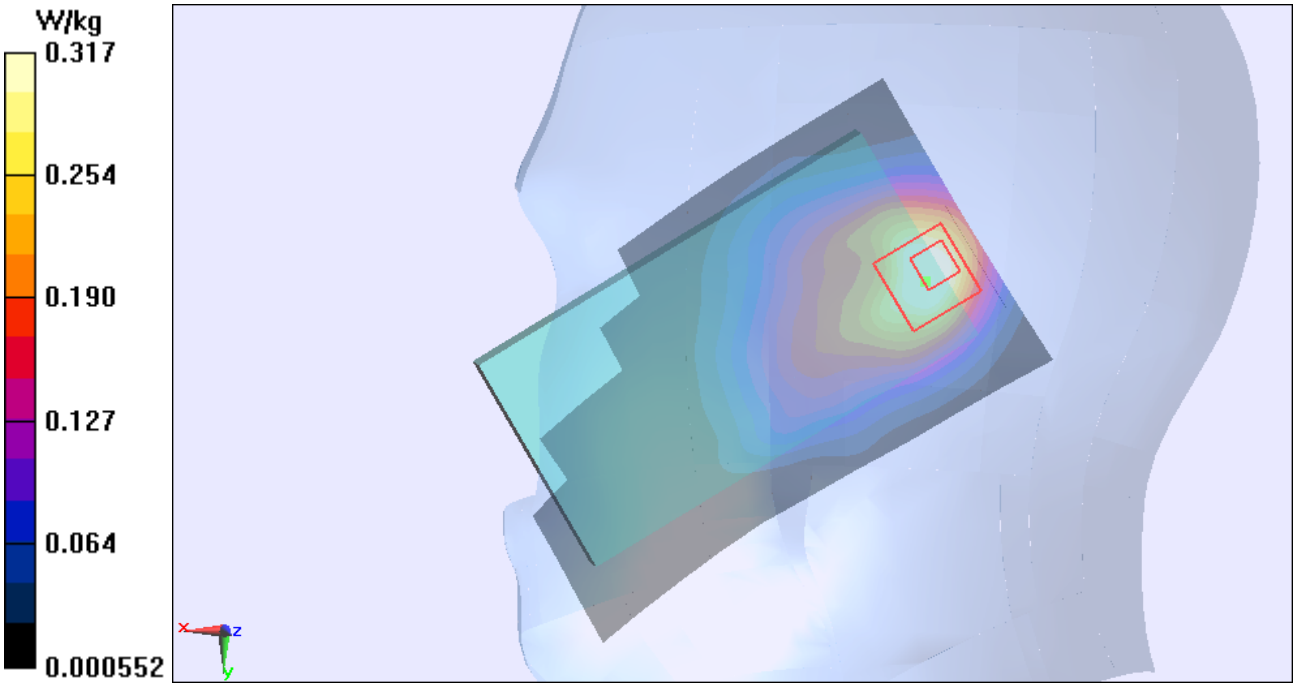


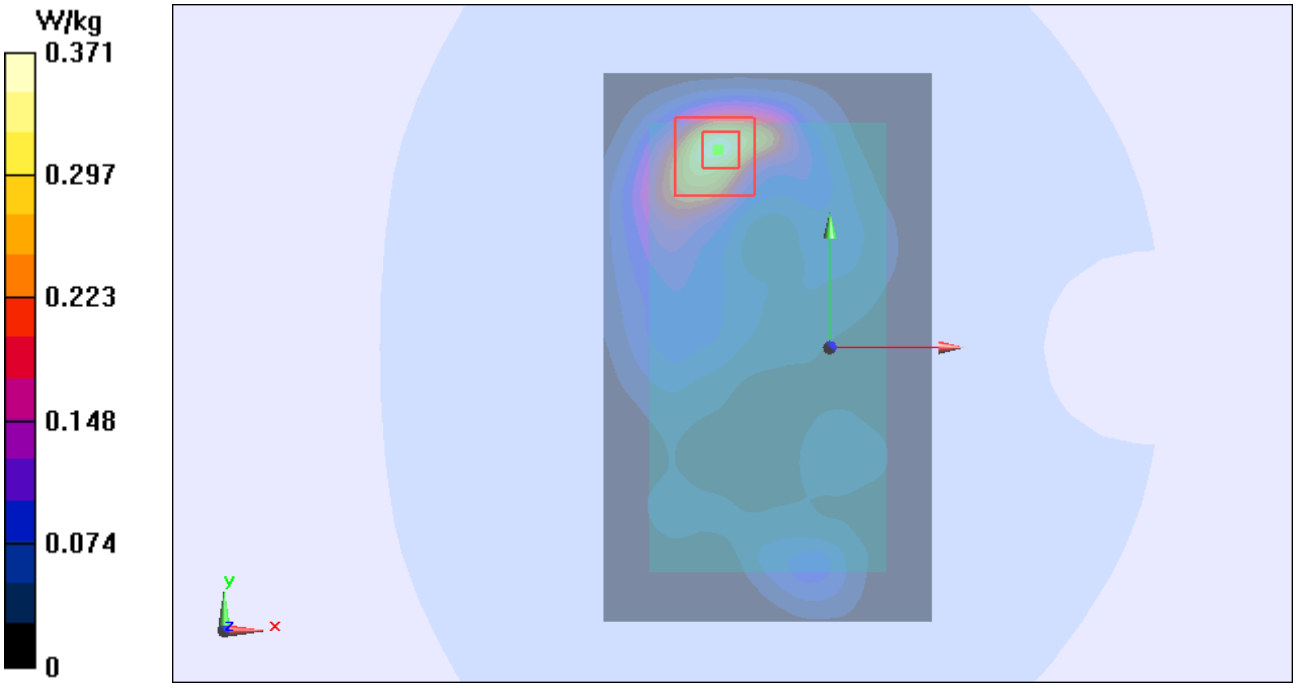
Figure 39 Right Hand Touch Cheek 802.11b Channel 6

802.11b Back Side High (Battery 2)

Date: 5/5/2014
Communication System: 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2.009 S/m; ε_r = 52.109; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 - SN3677; ConvF(7.61, 7.61, 7.61); 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 (71x121x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.371 W/kg

Back Side High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.468 V/m; Power Drift = 0.057 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.331 W/kg; SAR(10 g) = 0.150 W/kg
Maximum value of SAR (measured) = 0.371 W/kg



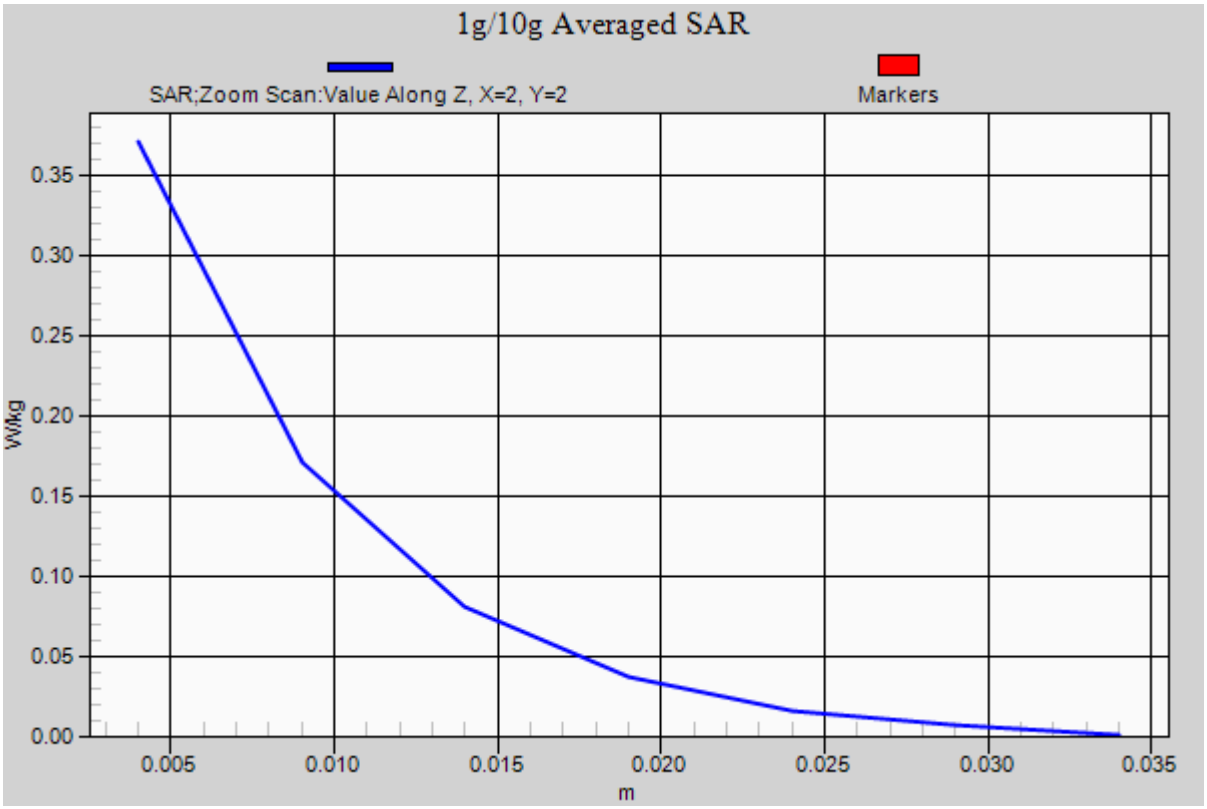


Figure 40 Body, Back Side, 802.11b Channel 11

ANNEX D: Probe Calibration Certificate(SN:3677)

In Collaboration with
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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
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

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

In Collaboration with
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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

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).

In Collaboration with
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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

Probe EX3DV4

SN: 3677

Calibrated: November 28, 2013

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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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

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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Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
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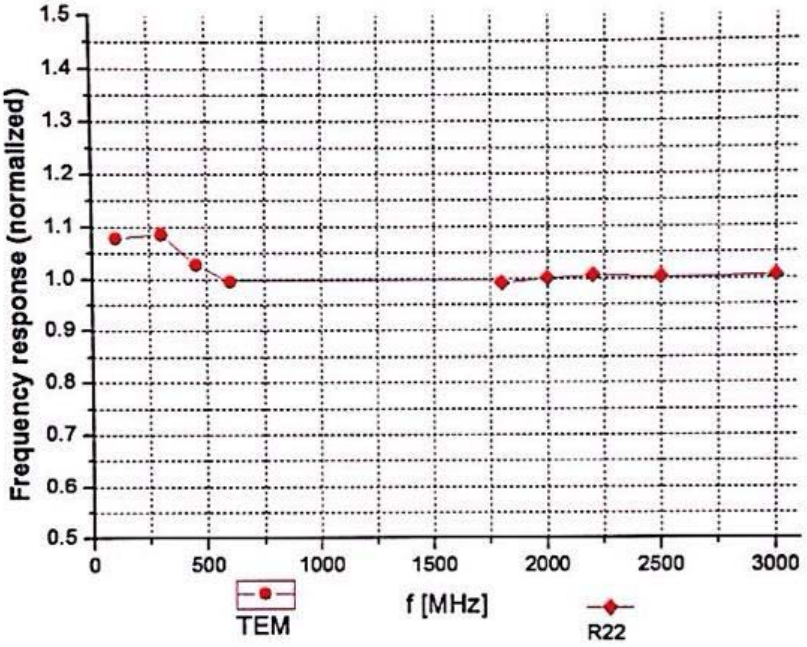
Frequency Response of E-Field
(TEM-Cell: ifi110 EXX, Waveguide: R22)



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

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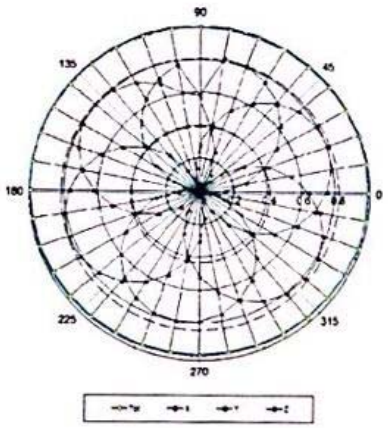
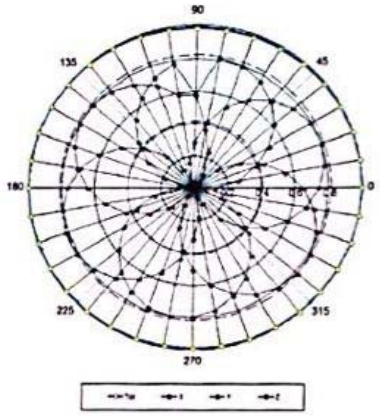
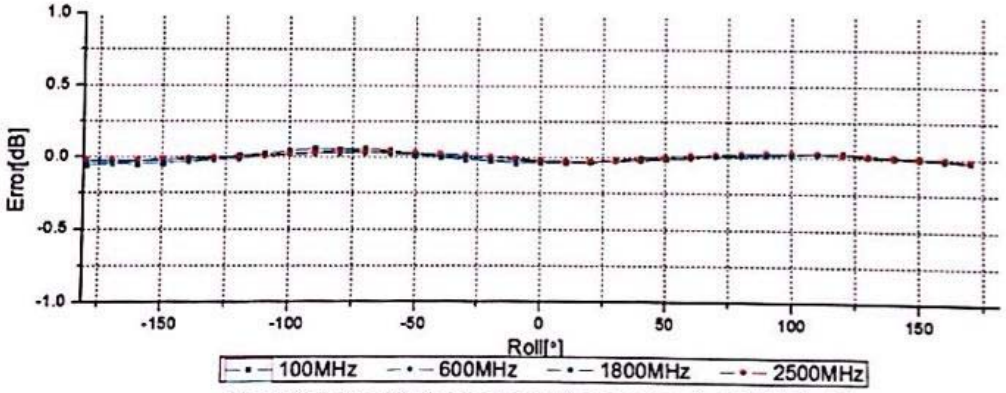
Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM



f=1800 MHz, R22





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

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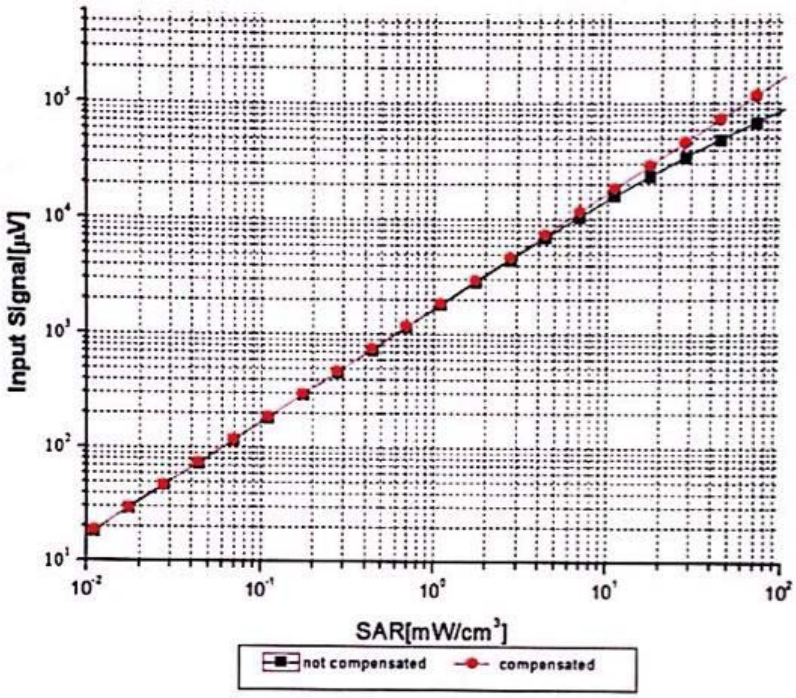
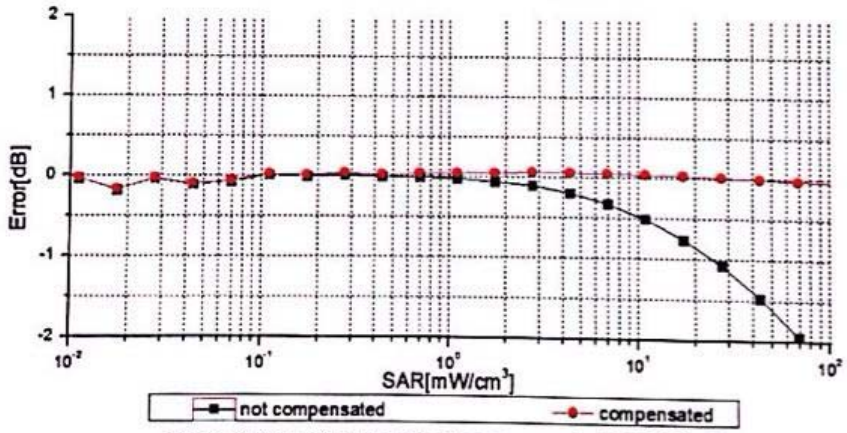
Dynamic Range f(SAR_{head})
(TEM cell, f = 900 MHz)





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

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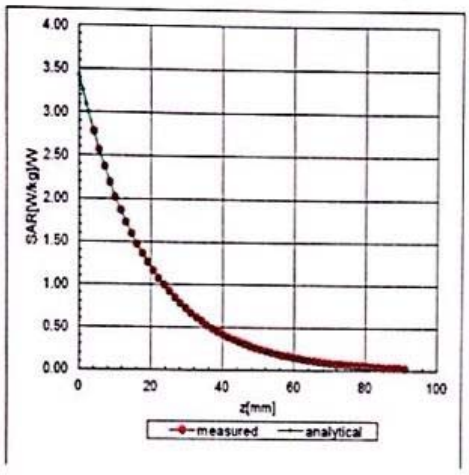
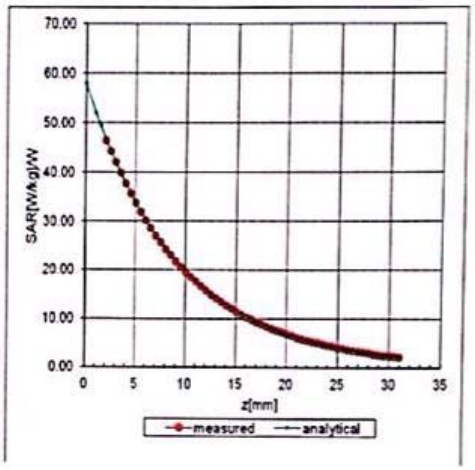
Conversion Factor Assessment

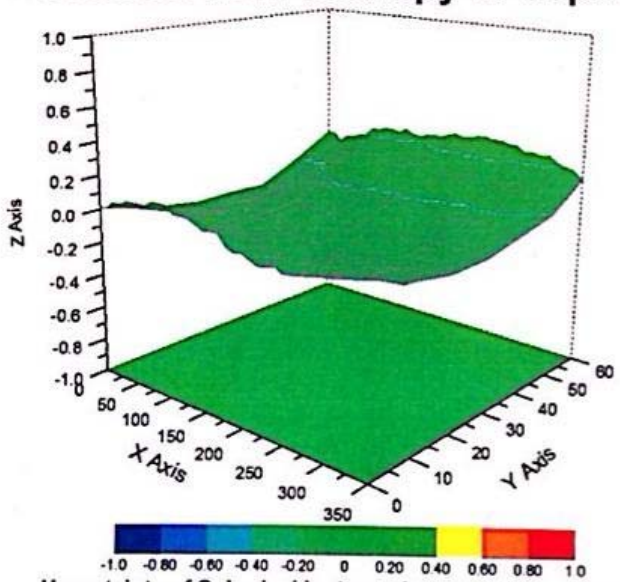
f=850 MHz, WGLS R9(H_convF)



f=2450 MHz, WGLS R26(H_convF)



Deviation from Isotropy in Liquid



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

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DASY - Parameters of Probe: EX3DV4 - SN: 3677

Other Probe Parameters

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

ANNEX 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
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Accreditation No.: SCS 108

Glossary:

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

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!)