



OET 65

TEST REPORT

Product Name	Smart Phone
Model Name	A076, GP353, SPA376
FCC ID	Q7Q-A076
Client	Shenzhen Skyworth Wireless Technology Co., Ltd.
Manufacturer	Shenzhen Skyworth Wireless Technology Co., Ltd.
Date of issue	June 13, 2013

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GENERAL SUMMARY

Reference Standard(s)	<p>FCC 47CFR §2.1093 Radiofrequency Radiation Exposure Evaluation: Portable Devices</p> <p>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)</p> <p>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.</p> <p>SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438, published June 2002: Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions.</p> <p>KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r01: SAR Measurement Requirements for 100 MHz to 6 GHz</p> <p>KDB 447498 D01 Mobile Portable RF Exposure v05r01: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies</p> <p>KDB 648474 D04 SAR Handsets Multi Xmitter and Ant v01r01: SAR Evaluation Considerations for Wireless Handsets.</p> <p>KDB 941225 D01 SAR test for 3G devices v02: SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA</p> <p>KDB 941225 D03 Test Reduction GSM_GPRS_EDGE v01:Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE</p> <p>KDB 941225 D06 Hot Spot SAR v01r01:SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities</p>
Conclusion	<p>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.</p> <p>General Judgment: Pass</p>
Comment	<p>The test result only responds to the measured sample.</p>

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1. General Information

1.1. Notes of the Test Report

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

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

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

This report standalone dose 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 electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing Laboratory

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1.3. Applicant Information

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1.4. Manufacturer Information

Company: Shenzhen Skyworth Wireless Technology Co., Ltd.
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Shenzhen, China.
City: shenzhen
Postal Code: 518000
Country: P. R. China

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1.5. Information of EUT

General Information

Device Type:	Portable Device		
Exposure Category:	Uncontrolled Environment / General Population		
State of Sample:	Prototype Unit		
Product IMEI:	004402160012344		
Hardware Version:	/		
Software Version:	/		
Antenna Type:	Internal Antenna		
Device Operating Configurations :			
Supporting Mode(s):	GSM 850/GSM 1900; (tested) UMTS Band II/UMTS Band V; (tested) WiFi (802.11b/g/n HT20/HT40); (untested) Bluetooth; (untested)		
Test Modulation:	(GSM)GMSK; (UMTS)QPSK		
Device Class:	B		
HSDPA UE Category:	8		
HSUPA UE Category:	6		
GPRS Multislot Class(32):	Max Number of Timeslots in Uplink	3	
	Max Number of Timeslots in Downlink	5	
	Max Total Timeslot	6	
EGPRS Multislot Class(32):	Max Number of Timeslots in Uplink	3	
	Max Number of Timeslots in Downlink	5	
	Max Total Timeslot	6	
Operating Frequency Range(s):	Mode	Tx (MHz)	Rx (MHz)
	GSM 850	824.2 ~ 848.8	869.2 ~ 893.8
	GSM 1900	1850.2 ~ 1909.8	1930.2 ~ 1989.8
	UMTS Band II	1852.4 ~ 1907.6	1932.4 ~ 1987.6
	UMTS Band V	826.4 ~ 846.6	871.4 ~ 891.6
Power Class:	GSM 850: 4		
	GSM 1900: 1		
	UMTS Band II: 3		
	UMTS Band V: 3		
Power Level	GSM 850: tested with power level 5		

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	GSM 1900: tested with power level 0		
	UMTS Band II: tested with power control all up bits		
	UMTS Band V: tested with power control all up bits		
Test Channel: (Low - Middle - High)	128 - 190 - 251	(GSM 850)	(tested)
	512 - 661 - 810	(GSM 1900)	(tested)
	9262 - 9400 - 9538	(UMTS Band II)	(tested)
	4132 - 4183 - 4233	(UMTS Band V)	(tested)

Auxiliary Equipment Details

AE1: Battery

Model: ADF444455AL

Manufacturer: /

S/N: Yimi

Equipment Under Test (EUT) has a GSM/UMTS antenna that is used for Tx/Rx, the other is BT/WIFI antenna that can be used for Tx/Rx. It has Personal Wireless Routers (hot spots) function. The detail about EUT and Lithium Battery is in chapter 1.5 in this report.

The sample under test was selected by the Client.

Components list please refer to documents of the manufacturer.

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1.6. The Maximum Reported SAR_{1g}

Head SAR Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR _{1g} 1.6 W/kg	
			Measured SAR _{1g} (W/kg)	Reported SAR _{1g} (W/kg)
GSM 850	Left Cheek	190/836.6	0.262	0.325
GSM 1900	Right Cheek	661/1880	0.473	0.614
UMTS Band II	Right Cheek	9400/1880	1.260	1.304
UMTS Band V	Right Cheek	4183/836.6	0.426	0.503

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)
3Txslots GPRS 850	Back Side	190/836.6	0.530	0.684
3Txslots EGPRS 1900	Back Side	661/1880	0.659	0.794
UMTS Band II	Back Side	9400/1880	1.150	1.190
UMTS Band V	Back Side	4183/836.6	0.384	0.453

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)
3Txslots GPRS 850	Back Side	190/836.6	0.530	0.684
3Txslots EGPRS 1900	Back Side	661/1880	0.659	0.794
UMTS Band II	Back Side	9400/1880	1.150	1.190
UMTS Band V	Back Side	4183/836.6	0.384	0.453

1.7. Test Date

The test performed from June 2, 2013 to June 5, 2013.

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.

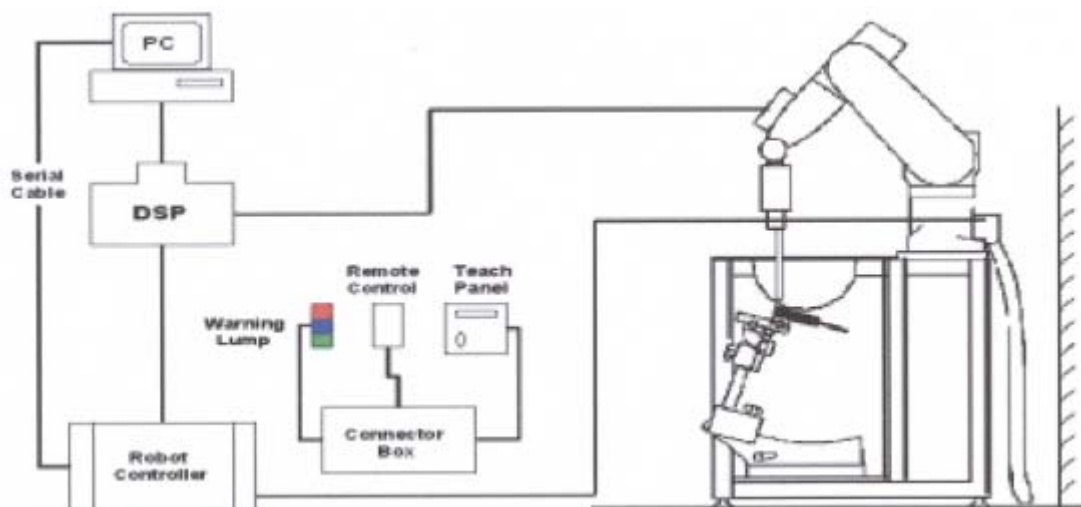


Figure 1 SAR Lab Test Measurement Set-up

2.2. DASY5 E-field Probe System

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

2.2.1. ES3DV3 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors 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 4 GHz Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones



Figure 2.ES3DV3 E-field Probe



Figure 3. ES3DV3 E-field probe

2.2.2. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$. 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 below 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.

$$\text{SAR} = C \frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
 ΔT = Temperature increase due to RF exposure.
Or

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

Where:
 σ = Simulated tissue conductivity,
 ρ = Tissue density (kg/m^3).

2.3. Other Test Equipment

2.3.1. Device Holder for Transmitters

The DASY device holder is designed to cope with the different 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 influence 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) Available 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. $\pm 5\%$.
- 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 $\pm 0.1\text{mm}$). 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 $\pm 30^\circ$.)
- 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

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spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged.

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

- **Zoom Scan**

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

- **Spatial Peak Detection**

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

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

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

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

They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation.

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

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01

Frequency	Maximum Area Scan Resolution (mm) ($\Delta x_{\text{area}}, \Delta y_{\text{area}}$)	Maximum Zoom Scan Resolution (mm) ($\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}}$)	Maximum Zoom Scan Spatial Resolution (mm) $\Delta z_{\text{zoom}}(n)$	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.

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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/cm³

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.

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

with **P_{pwe}** = equivalent power density of a plane wave in mW/cm²

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

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

3. Laboratory Environment

Table 2: The Requirements of the Ambient Conditions

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards.	
Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

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4. Tissue-equivalent Liquid

4.1. Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The table 3 and table 4 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

Table 3: Composition of the Head Tissue Equivalent Matter

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

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Parameters Target Value	f=1900MHz $\epsilon=40.0$ $\sigma=1.40$

Table 4: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz $\epsilon=55.2$ $\sigma=0.97$

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz $\epsilon=53.3$ $\sigma=1.52$

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4.2. Tissue-equivalent Liquid Properties

Table 5: Dielectric Performance of Tissue Simulating Liquid

Frequency	Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
			ϵ_r	$\sigma(\text{s/m})$	ϵ_r	$\sigma(\text{s/m})$	Dev $\epsilon_r(\%)$	Dev $\sigma(\%)$
835MHz (head)	2013-6-2	21.5	41.81	0.896	41.50	0.90	0.75	-0.44
1900MHz (head)	2013-6-3	21.5	39.59	1.423	40.00	1.40	-1.02	1.64
835MHz (body)	2013-6-4	21.5	54.54	0.968	55.20	0.97	-1.20	-0.21
1900MHz (body)	2013-6-5	21.5	52.87	1.528	53.30	1.52	-0.81	0.53

5. System Check

5.1. Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 6 and table 7.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system ($\pm 10\%$).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

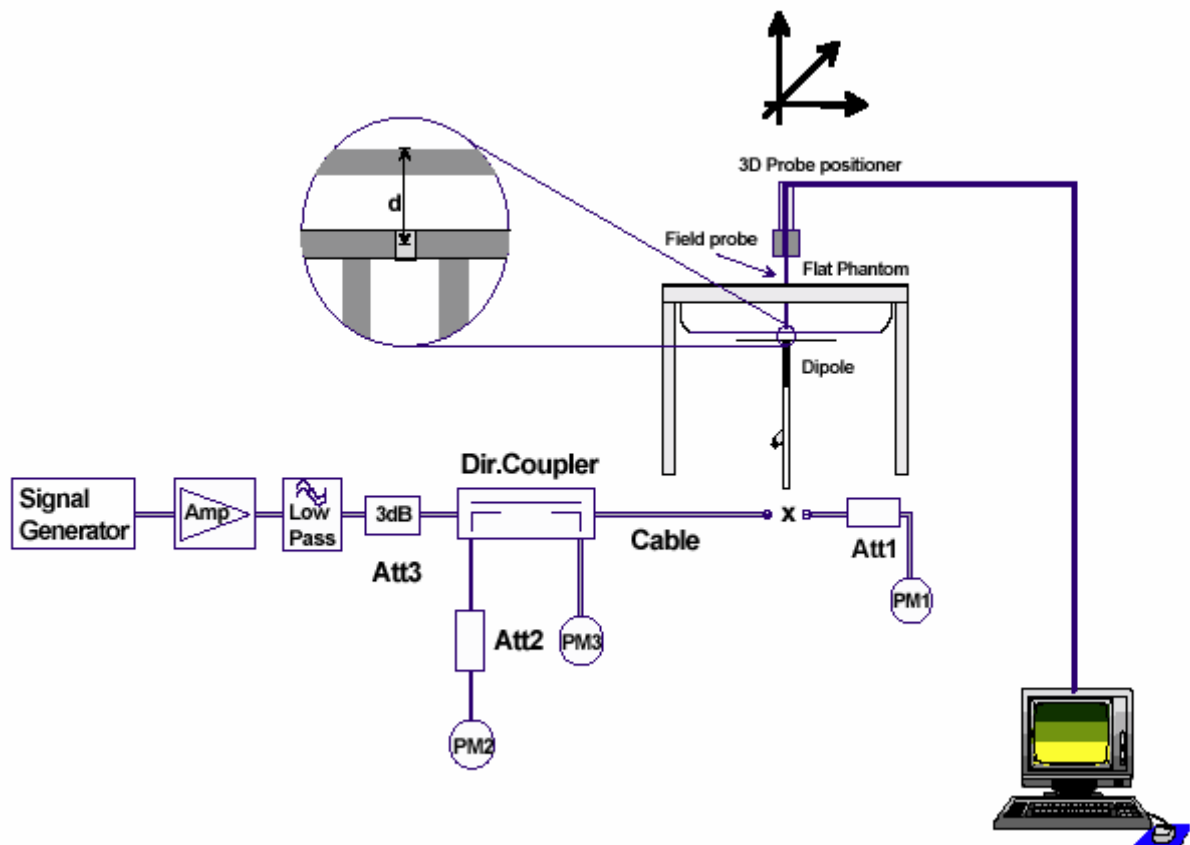


Figure 6 System Check Set-up

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Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 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 Publication 865664:

Dipole D835V2 SN: 4d020				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	$\Delta\Omega$
8/26/2011	-27.7	/	52.9	/
8/25/2012	-29.1	5.0%	55.0	2.1 Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	$\Delta\Omega$
8/26/2011	-25.1	/	48.7	/
8/25/2012	-24.3	3.2 %	50.6	1.9 Ω

Dipole D1900V2 SN: 5d060				
Head Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	$\Delta\Omega$
8/31/2011	-22.3	/	52.6	/
8/30/2012	-21.7	2.7%	51.4	1.2 Ω
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	$\Delta\Omega$
8/31/2011	-21.3	/	47.3	/
8/30/2012	-20.9	1.9%	45.9	1.4 Ω

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5.2. System Check Results

Table 6: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR _{1g}	1W Normalized SAR _{1g}	1W Target SAR _{1g}	Limit (±10% Deviation)
		ε _r	σ(s/m)		(°C)	(W/kg)		
835MHz	2013-6-2	41.81	0.896	21.5	2.44	9.76	9.34	4.50%
1900MHz	2013-6-3	39.59	1.423	21.5	9.48	37.92	40.30	-5.91%

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

Table 7: System Check in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		Temp	250mW Measured SAR _{1g}	1W Normalized SAR _{1g}	1W Target SAR _{1g}	Limit (±10% Deviation)
		ε _r	σ(s/m)					
835MHz	2013-6-4	54.54	0.968	21.5	2.41	9.64	9.46	1.90%
1900MHz	2013-6-5	52.87	1.528	21.5	9.93	39.72	41.70	-4.75%

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 E5515C, and the EUT is set to maximum output power by E5515C. 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. Devices with a headset output should be tested with a headset connected to the device.

Based upon KDB941225 D06 V01 with a form factor > 9 cm x 5 cm, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested. The distance between the device and the phantom was kept 10mm of wireless routers.

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_v01, 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_v05 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 D01v01, 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 performed 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 E5515C the power lever is set to “5” for GSM 850, set to “0” for GSM 1900. Since the GPRS class is 32 for this EUT, it has at most 3 timeslots in uplink and at most 5 timeslots in downlink, the maximum total timeslots is 6; the EGPRS class is 32 for this EUT, it has at most 3 timeslots in uplink and at most 5 timeslots in downlink, the maximum total timeslots is 6.

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 51.010-1(10.3.0) 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:

Table 8: 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

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 34.121-1(10.5.0), 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

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constant rate of active CQI slots. DPCCH and DPDCH gain factors(β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) should be set according to values indicated in the Table below.32 The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.

Table 9: 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: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$

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, Δ_{ACK} and $\Delta_{NACK} = 8$ ($A_{hs} = 30/15$) with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 7$ ($A_{hs} = 24/15$) with $\beta_{hs} = 24/15 * \beta_c$.

Note3: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 β_c/β_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 $\beta_c = 11/15$ and $\beta_d = 15/15$.

Table 10: 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

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Table 11: HSDPA UE category

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum Transport Bits/HS-DSCH	Total Channel
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

6.4.4. 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 $\frac{1}{4}$ 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.⁴¹ 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.

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Table 12: Sub-Test 5 Setup for Release 6 HSUPA

Sub-set	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	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} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 β_c/β_d 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 $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d 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 $\beta_c = 14/15$ and $\beta_d = 15/15$.

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: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Table 13: 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)

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7. Test Results

7.1. Conducted Power Results

Table 14: 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		32.74	32.56	32.38	-9.03 dB	23.71	23.53	23.35
GPRS (GMSK)	1Txslot	32.68	32.5	32.36	-9.03dB	23.65	23.47	23.33
	2Txslots	30.6	30.37	30.09	-6.02dB	24.58	24.35	24.07
	3Txslots	29.65	29.39	29.09	-4.26dB	25.39	25.13	24.83
EGPRS (GMSK)	1Txslot	32.74	32.55	32.38	-9.03dB	23.71	23.52	23.35
	2Txslots	30.58	30.34	30.05	-6.02dB	24.56	24.32	24.03
	3Txslots	29.63	29.37	29.08	-4.26dB	25.37	25.11	24.82
EGPRS (8PSK)	1Txslot	26.66	25.94	25.48	-9.03dB	17.63	16.91	16.45
	2Txslots	24.09	23.52	22.82	-6.02dB	18.07	17.5	16.8
	3Txslots	23.06	22.43	21.76	-4.26dB	18.80	18.17	17.5
GSM 1900		Burst Conducted Power(dBm)				Average power(dBm)		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM		29.52	29.37	29.24	-9.03dB	20.49	20.34	20.21
GPRS (GMSK)	1Txslot	29.54	29.37	29.25	-9.03dB	20.51	20.34	20.22
	2Txslots	27.15	27.04	26.92	-6.02dB	21.13	21.02	20.9
	3Txslots	26.64	26.61	26.42	-4.26dB	22.38	22.35	22.16
EGPRS (GMSK)	1Txslot	29.5	29.31	29.21	-9.03dB	20.47	20.28	20.18
	2Txslots	27.15	27.04	26.93	-6.02dB	21.13	21.02	20.91
	3Txslots	26.65	26.69	26.42	-4.26dB	22.39	22.43	22.16
EGPRS (8PSK)	1Txslot	25.26	24.83	24.24	-9.03dB	16.23	15.8	15.21
	2Txslots	22.53	22.32	21.58	-6.02dB	16.51	16.3	15.56
	3Txslots	21.52	21.19	20.45	-4.26dB	17.26	16.93	16.19

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

2) Average power numbers

The maximum power numbers are marks in bold.

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UMTS Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
RMC	12.2kbps RMC	22.86	22.85	22.66
	64kbps RMC	22.78	22.94	22.42
	144kbps RMC	22.72	22.9	22.43
	384kbps RMC	22.66	22.82	22.33
HSDPA	Sub - Test 1	22.86	22.85	22.66
	Sub - Test 2	22.78	22.94	22.42
	Sub - Test 3	22.72	22.9	22.43
	Sub - Test 4	22.66	22.82	22.33
HSUPA	Sub - Test 1	21.36	21.17	21.16
	Sub - Test 2	20.06	19.87	19.86
	Sub - Test 3	20.56	20.37	20.36
	Sub - Test 4	20.06	19.87	19.86
	Sub - Test 5	21.36	21.17	21.16
UMTS Band V		Conducted Power (dBm)		
		Channel 4132	Channel 4183	Channel 4233
RMC	12.2kbps RMC	23.52	23.28	23.45
	64kbps RMC	23.68	23.42	23.5
	144kbps RMC	23.45	23.35	23.42
	384kbps RMC	23.50	23.32	23.53
HSDPA	Sub - Test 1	23.52	23.28	23.45
	Sub - Test 2	23.68	23.42	23.5
	Sub - Test 3	23.45	23.35	23.42
	Sub - Test 4	23.5	23.32	23.53
HSUPA	Sub - Test 1	22.02	21.78	21.95
	Sub - Test 2	20.82	20.48	20.65
	Sub - Test 3	21.12	20.98	21.14
	Sub - Test 4	20.82	20.48	20.65
	Sub - Test 5	22.02	21.78	21.95

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BT Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz
GFSK (dBm)	5.45	5.61	4.51
Pi/4QPSK(dBm)	4.74	4.97	3.91
8DPSK(dBm)	4.74	4.97	3.96

Mode	Channel	Data rate (Mbps)	PK Power (dBm)	AV Power (dBm)
11b	1	1	7.28	5.94
		2	7.23	5.92
		5.5	7.22	5.93
		11	7.19	5.89
	6	1	7.18	5.84
		2	7.16	5.85
		5.5	7.15	5.86
		11	7.13	5.83
	11	1	7.17	5.83
		2	7.16	5.85
		5.5	7.14	5.85
		11	7.12	5.82
11g	1	6	7.20	5.9
		9	7.19	5.88
		12	7.16	5.88
		18	7.16	5.88
		24	7.15	5.79
		36	7.13	5.78
		48	7.15	5.81
		54	7.14	5.81
	6	6	7.11	5.81
		9	7.11	5.8
		12	7.10	5.82
		18	7.08	5.8
		24	7.08	5.72
		36	7.07	5.72

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		48	7.05	5.71
		54	7.05	5.72
	11	6	7.00	5.7
		9	6.98	5.67
		12	6.99	5.71
		18	6.96	5.68
		24	6.97	5.61
		36	6.95	5.6
		48	6.94	5.6
		54	6.95	5.62
		11n HT20	1	MCS 0
MCS 1	6.89			5.58
MCS 2	6.88			5.6
MCS 3	6.88			5.6
MCS 4	6.86			5.5
MCS 5	6.87			5.52
MCS 6	6.88			5.54
MCS 7	6.84			5.51
6	MCS 0		6.82	5.52
	MCS 1		6.82	5.51
	MCS 2		6.81	5.53
	MCS 3		6.81	5.53
	MCS 4		6.79	5.43
	MCS 5		6.79	5.44
	MCS 6		6.80	5.46
	MCS 7		6.77	5.44
11	MCS 0		6.94	5.64
	MCS 1		6.92	5.61
	MCS 2		6.92	5.64
	MCS 3		6.91	5.63
	MCS 4		6.90	5.54
	MCS 5		6.88	5.53
	MCS 6		6.86	5.52
	MCS 7		6.85	5.52

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11n HT40	3	MCS 0	6.00	4.7
		MCS 1	5.99	4.68
		MCS 2	5.97	4.69
		MCS 3	5.97	4.69
		MCS 4	5.96	4.6
		MCS 5	5.95	4.6
		MCS 6	5.96	4.62
		MCS 7	5.94	4.61
	6	MCS 0	5.97	4.67
		MCS 1	5.96	4.65
		MCS 2	5.94	4.66
		MCS 3	5.94	4.66
		MCS 4	5.95	4.59
		MCS 5	5.94	4.59
		MCS 6	5.93	4.59
		MCS 7	5.93	4.6
	9	MCS 0	5.85	4.55
		MCS 1	5.84	4.53
		MCS 2	5.83	4.55
		MCS 3	5.83	4.55
		MCS 4	5.81	4.45
		MCS 5	5.81	4.46
		MCS 6	5.80	4.46
		MCS 7	5.80	4.47

7.2. Standalone SAR Test Exclusion Considerations

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

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

Based on the above equation, Bluetooth SAR was not required;

$$\text{Head Evaluation} = [10^{(6/10)}/5] * (2.480^{1/2}) = 1.3 < 3.0$$

$$\text{Body Evaluation} = [10^{(6/10)}/10] * (2.480^{1/2}) = 0.6 < 3.0$$

Based on the above equation, WiFi SAR was not required;

$$\text{Head Evaluation} = [10^{(6/10)}/5] * (2.462^{1/2}) = 1.2 < 3.0$$

$$\text{Body Evaluation} = [10^{(6/10)}/10] * (2.462^{1/2}) = 0.6 < 3.0$$

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7.3. SAR Test Results

7.3.1. GSM 850 (GPRS/EGPRS)

Table 15: SAR Values [GSM 850 (GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR _{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	190/836.6	GSM	1:8.3	33.5	32.56	-0.050	0.262	1.24	0.325	Figure11
Left/Tilt	190/836.6	GSM	1:8.3	33.5	32.56	0.031	0.212	1.24	0.263	Figure12
Right/Cheek	190/836.6	GSM	1:8.3	33.5	32.56	-0.093	0.207	1.24	0.257	Figure13
Right/Tilt	190/836.6	GSM	1:8.3	33.5	32.56	0.020	0.156	1.24	0.194	Figure14
Worst Case Position of Head with SIM2										
Left/Cheek	190/836.6	GSM	1:8.3	33.5	32.56	-0.026	0.205	1.24	0.255	Figure15
Test position of Body (Distance 10mm)										
Back Side	190/836.6	3 Txslots	1:2.77	30.5	29.39	0.180	0.530	1.29	0.684	Figure16
Front Side	190/836.6	3 Txslots	1:2.77	30.5	29.39	0.035	0.412	1.29	0.532	Figure17
Left Edge	190/836.6	3 Txslots	1:2.77	30.5	29.39	0.040	0.144	1.29	0.186	Figure18
Right Edge	190/836.6	3 Txslots	1:2.77	30.5	29.39	-0.160	0.160	1.29	0.207	Figure19
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	190/836.6	3 Txslots	1:2.77	30.5	29.39	-0.130	0.045	1.29	0.058	Figure20
Worst Case Position of Body with EGPRS (GMSK, Distance 10mm)										
Back Side	190/836.6	3 Txslots	1:2.77	30.5	29.37	0.000	0.264	1.30	0.342	Figure21
Worst Case Position of Body with SIM 2 (Distance 10mm)										
Back Side	190/836.6	3 Txslots	1:2.77	30.5	29.39	0.021	0.519	1.29	0.670	Figure22

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

- Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
- WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX H). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
- When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
- 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.
- 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.

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7.3.2. GSM 1900 (GPRS/EGPRS)

Table 16: SAR Values [GSM 1900(GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR _{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR _{1g} (W/kg)	Scaling Factor	Reported SAR _{1g} (W/kg)	Graph Results
Test Position of Head										
Left/Cheek	661/1880	GSM	1:8.3	30.5	29.37	-0.029	0.327	1.30	0.424	Figure23
Left/Tilt	661/1880	GSM	1:8.3	30.5	29.37	0.090	0.119	1.30	0.154	Figure24
Right/Cheek	661/1880	GSM	1:8.3	30.5	29.37	0.059	0.473	1.30	0.614	Figure25
Right/Tilt	661/1880	GSM	1:8.3	30.5	29.37	0.070	0.144	1.30	0.187	Figure26
Worst Case Position of Head with SIM2										
Right/Cheek	661/1880	GSM	1:8.3	30.5	29.37	-0.093	0.387	1.30	0.502	Figure27
Test position of Body (Distance 10mm)										
Back Side	661/1880	3 Txslots	1:2.77	27.5	26.61	0.021	0.639	1.23	0.784	Figure28
Front Side	661/1880	3 Txslots	1:2.77	27.5	26.61	0.100	0.613(max.cube)	1.23	0.752	Figure29
Left Edge	661/1880	3 Txslots	1:2.77	27.5	26.61	0.180	0.095	1.23	0.116	Figure30
Right Edge	661/1880	3 Txslots	1:2.77	27.5	26.61	0.060	0.146	1.23	0.179	Figure31
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	661/1880	3 Txslots	1:2.77	27.5	26.61	-0.010	0.421	1.23	0.517	Figure32
Worst Case Position of Body with EGPRS (GMSK, Distance 10mm)										
Back Side	661/1880	3 Txslots	1:2.77	27.5	26.69	0.150	0.659	1.21	0.794	Figure33
Worst Case Position of Body with SIM 2 (Distance 10mm)										
Back Side	661/1880	3 Txslots	1:2.77	27.5	26.61	0.180	0.630	1.23	0.773	Figure34

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

- Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
- WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX H). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
- When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.
- 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.
- 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.
- The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above.

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

Table 17: 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										
Left/Cheek	9538/1907.6	RMC 12.2k	1:1	23	22.66	0.041	0.729(max.cube)	1.08	0.788	Figure35
	9400/1880	RMC 12.2k	1:1	23	22.85	0.000	0.854(max.cube)	1.08	0.884	Figure36
	9262/1852.4	RMC 12.2k	1:1	23	22.86	0.070	0.689(max.cube)	1.03	0.712	Figure37
Left/Tilt	9400/1880	RMC 12.2k	1:1	23	22.85	0.000	0.344	1.08	0.356	Figure38
Right/Cheek	9538/1907.6	RMC 12.2k	1:1	23	22.66	0.042	1.050	1.08	1.136	Figure39
	9400/1880	RMC 12.2k	1:1	23	22.85	-0.036	1.250	1.08	1.294	Figure40
	9262/1852.4	RMC 12.2k	1:1	23	22.86	-0.037	0.966	1.03	0.998	Figure41
Right/Tilt	9400/1880	RMC 12.2k	1:1	23	22.85	0.140	0.379	1.08	0.392	Figure42
Worst Case Position of Head with SIM 2										
Right/Cheek	9400/1880	RMC 12.2k	1:1	23	22.85	-0.060	1.260	1.08	1.304	Figure43
Test position of Body (Distance 10mm)										
Back Side	9538/1907.6	RMC 12.2k	1:1	23	22.66	0.054	1.010	1.08	1.092	Figure44
	9400/1880	RMC 12.2k	1:1	23	22.85	0.024	1.150	1.08	1.190	Figure45
	9262/1852.4	RMC 12.2k	1:1	23	22.86	-0.100	0.825	1.03	0.852	Figure46
Front Side	9538/1907.6	RMC 12.2k	1:1	23	22.66	0.043	0.860(max.cube)	1.08	0.930	Figure47
	9400/1880	RMC 12.2k	1:1	23	22.85	0.028	1.140(max.cube)	1.08	1.180	Figure48
	9262/1852.4	RMC 12.2k	1:1	23	22.86	-0.044	0.864(max.cube)	1.03	0.892	Figure49
Left Edge	9400/1880	RMC 12.2k	1:1	23	22.85	0.080	0.484	1.08	0.501	Figure50
Right Edge	9400/1880	RMC 12.2k	1:1	23	22.85	-0.046	0.354	1.08	0.366	Figure51
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	9400/1880	RMC 12.2k	1:1	23	22.85	0.070	0.688	1.08	0.712	Figure52
Worst Case Position of Body with SIM 2 (Distance 10mm)										
Back Side	9400/1880	RMC 12.2k	1:1	23	22.85	0.080	1.140	1.08	1.180	Figure53
Worst Case Position of Body with 1 st Repeated SAR (Distance 10mm)										
Back Side	9400/1880	RMC 12.2k	1:1	23	22.85	-0.034	1.130	1.08	1.170	Figure54

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

2. Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX H). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
4. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which was within 2.0dB of the highest peak. The value of the highest cube is given in the table above.
5. WCDMA mode were tested under RMC 12.2kbps with 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.
6. 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 18: SAR Measurement Variability Results [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1 st Repeated SAR (1g)	Ratio	2 nd Repeated SAR (1g)	3 rd Repeated SAR (1g)
Back Side	9400/1880	1.140	1.130	1.08	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.

2) A second repeated measurement was performed 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 ($\sim 10\%$ 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

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7.3.4. UMTS Band V (WCDMA/HSDPA/HSUPA)

Table 19: 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										
Left/Cheek	4183/836.6	RMC 12.2k	1:1	24	23.28	-0.042	0.226	1.18	0.267	Figure55
Left/Tilt	4183/836.6	RMC 12.2k	1:1	24	23.28	-0.167	0.201	1.18	0.237	Figure56
Right/Cheek	4183/836.6	RMC 12.2k	1:1	24	23.28	0.100	0.426	1.18	0.503	Figure57
Right/Tilt	4183/836.6	RMC 12.2k	1:1	24	23.28	0.140	0.271	1.18	0.320	Figure58
Worst Case Position of Head with SIM 2										
Left/Cheek	4183/836.6	RMC 12.2k	1:1	24	23.28	0.006	0.401	1.18	0.473	Figure59
Test position of Body (Distance 10mm)										
Back Side	4183/836.6	RMC 12.2k	1:1	24	23.28	-0.045	0.384	1.18	0.453	Figure60
Front Side	4183/836.6	RMC 12.2k	1:1	24	23.28	0.033	0.322	1.18	0.380	Figure61
Left Edge	4183/836.6	RMC 12.2k	1:1	24	23.28	0.110	0.103	1.18	0.122	Figure62
Right Edge	4183/836.6	RMC 12.2k	1:1	24	23.28	0.140	0.140	1.18	0.165	Figure63
Top Edge	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bottom Edge	4183/836.6	RMC 12.2k	1:1	24	23.28	0.038	0.032	1.18	0.037	Figure64
Worst Case Position of Body with SIM 2 (Distance 10mm)										
Back Side	4183/836.6	RMC 12.2k	1:1	24	23.28	0.060	0.313	1.18	0.369	Figure65

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

- Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
- WWAN antenna is located at bottom edge; antenna-to-top edge distance is more than 2.5 cm (see ANNEX H). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
- WCDMA mode were tested under RMC 12.2kbps with 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.
- 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.

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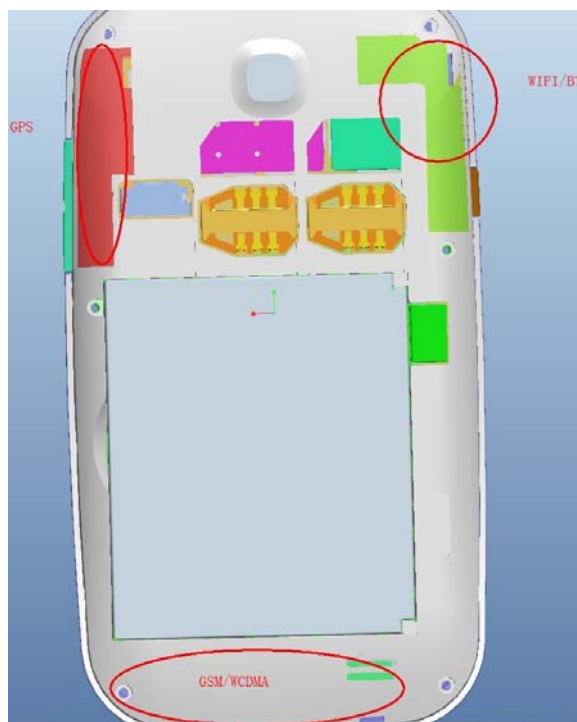
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7.4. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	Simultaneous Transmissions	Voice Over Digital Transport (Data)
GSM	850	VO	Yes WIFI or BT	No
	1900	VO		
	850	DT		
	1900	DT		
UMTS	850	VO	Yes WIFI or BT	No
	1900	VO		
	850	DT		
	1900	DT		
WIFI	2450	DT	Yes GSM/WCDMA, GPRS,EGPRS,HSDPA,HSUPA	No
Bluetooth (BT)	2400	DT	Yes GSM/WCDMA, GPRS,EGPRS,HSDPA,HSUPA	No
Note: VO Voice Service only DT Digital Transport				

The location of the antennas:



Back Side

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

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

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.

$$\text{Ratio} = \frac{(\text{SAR}_1 + \text{SAR}_2)^{1.5}}{(\text{peak location separation, mm})} < 0.04$$

Estimated SAR_{BT.Head}=[10^(6/10)/5] * (2.480^{1/2})/7.5=0.167

Estimated SAR_{BT.body}=[10^(6/10)/10] * (2.480^{1/2})/7.5=0.084

Estimated SAR_{WIFI.Head}=[10^(6/10)/5]* (2.462^{1/2})/7.5=0.16

Estimated SAR_{WIFI.body}=[10^(6/10)/10]* (2.462^{1/2})/7.5=0.08

GSM/UMTS & BT Mode

Reported SAR _{1g} (W/kg) Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	BT	MAX. Σ SAR _{1g}
Left hand, Touch cheek	0.325	0.424	0.884	0.267	0.167	1.051
Left hand, Tilt 15 Degree	0.263	0.154	0.356	0.237	0.167	0.523
Right hand, Touch cheek	0.257	0.614	1.304	0.503	0.167	1.471
Right hand, Tilt 15 Degree	0.194	0.187	0.409	0.320	0.167	0.576
Body, Back Side	0.684	0.794	1.19	0.453	0.084	1.274
Body, Front Side	0.532	0.752	1.180	0.380	0.084	1.264
Body, Left Edge	0.186	0.116	0.501	0.122	0.084	0.585
Body, Right Edge	0.207	0.179	0.366	0.165	0.084	0.45
Body, Top Edge	NA	NA	NA	NA	0.084	NA
Body, Bottom Edge	0.058	0.517	0.712	0.037	0.084	0.796

Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value.

2. MAX. ΣSAR_{1g} = Reported SAR_{Max.BT} + Reported SAR_{Max.GSM/UMTS}

MAX. ΣSAR_{1g} =1.471 W/kg <1.6 W/kg

So the Simultaneous SAR are not required for BT and GSM/UMTS antenna.

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GSM/UMTS & WIFI Mode

Reported SAR _{1g} (W/kg) Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band V	WIFI	MAX. Σ SAR _{1g}
Left hand, Touch cheek	0.325	0.424	0.884	0.267	0.16	1.044
Left hand, Tilt 15 Degree	0.263	0.154	0.356	0.237	0.16	0.516
Right hand, Touch cheek	0.257	0.614	1.304	0.503	0.16	1.464
Right hand, Tilt 15 Degree	0.194	0.187	0.409	0.320	0.16	0.569
Body, Back Side	0.684	0.794	1.190	0.453	0.08	1.270
Body, Front Side	0.532	0.752	1.180	0.380	0.08	1.26
Body, Left Edge	0.186	0.116	0.501	0.122	0.08	0.581
Body, Right Edge	0.207	0.179	0.366	0.165	0.08	0.446
Body, Top Edge	NA	NA	NA	NA	0.08	NA
Body, Bottom Edge	0.058	0.517	0.712	0.037	0.08	0.792
Note: 1.The value with blue color is the maximum ΣSAR _{1g} Value. 2. MAX. ΣSAR _{1g} = Reported SAR _{Max.WIFI} + Reported SAR _{Max.GSM/UMTS}						

MAX. ΣSAR_{1g} = 1.464 W/kg < 1.6 W/kg

So the Simultaneous SAR are not required for WIFI and GSM/UMTS antenna.

BT antenna and WIFI antenna can't be simultaneous transmission.

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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	∞
6	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	-readout Electronics	B	1.0	N	1	1	1.0	∞
10	-response time	B	0	R	$\sqrt{3}$	1	0	∞
11	-integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	-noise	B	0	R	$\sqrt{3}$	1	0	∞
13	-RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	2.9	71
18	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
19	-Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								
20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞

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21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	∞
22	-liquid conductivity (measurement uncertainty)	B	2.5	N	1	0.64	1.6	9
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	2.5	N	1	0.6	1.5	9
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{24} c_i^2 u_i^2}$					11.50	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		23.00	

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9. Main Test Instruments

Table 20: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 11, 2012	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 10, 2013	One year
04	Power sensor	Agilent N8481H	MY50350004	September 24, 2012	One year
05	Power sensor	E9327A	US40441622	January 2, 2013	One year
06	Signal Generator	HP 8341B	2730A00804	September 10, 2012	One year
07	Dual directional coupler	778D-012	50519	March 25, 2013	One year
08	Dual directional coupler	777D	50146	March 25, 2013	One year
09	Amplifier	IXA-020	0401	No Calibration Requested	
10	BTS	E5515C	MY48360988	December 1, 2012	One year
11	E-field Probe	ES3DV3	3189	June 22, 2012	One year
12	DAE	DAE4	1317	January 25, 2013	One year
13	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Two years
14	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Two years
15	Temperature Probe	JM222	AA1009129	March 14, 2013	One year
16	Hygrothermograph	WS-1	64591	September 27, 2012	One year

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

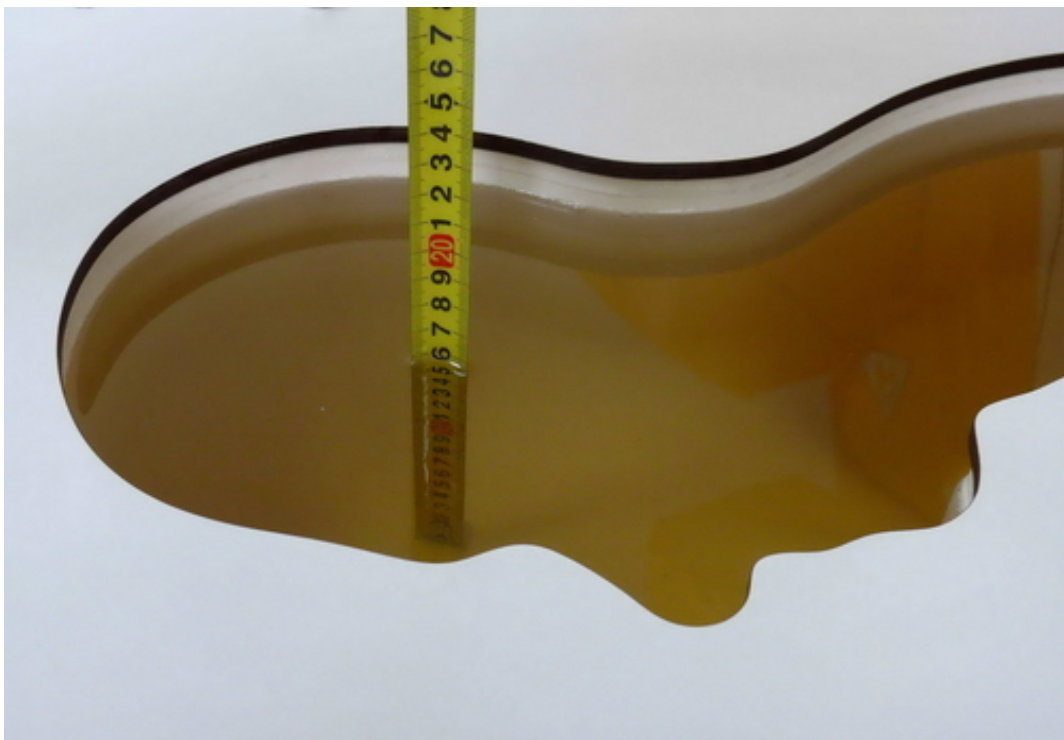
ANNEX A: Test Layout



Picture 1: Specific Absorption Rate Test Layout



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

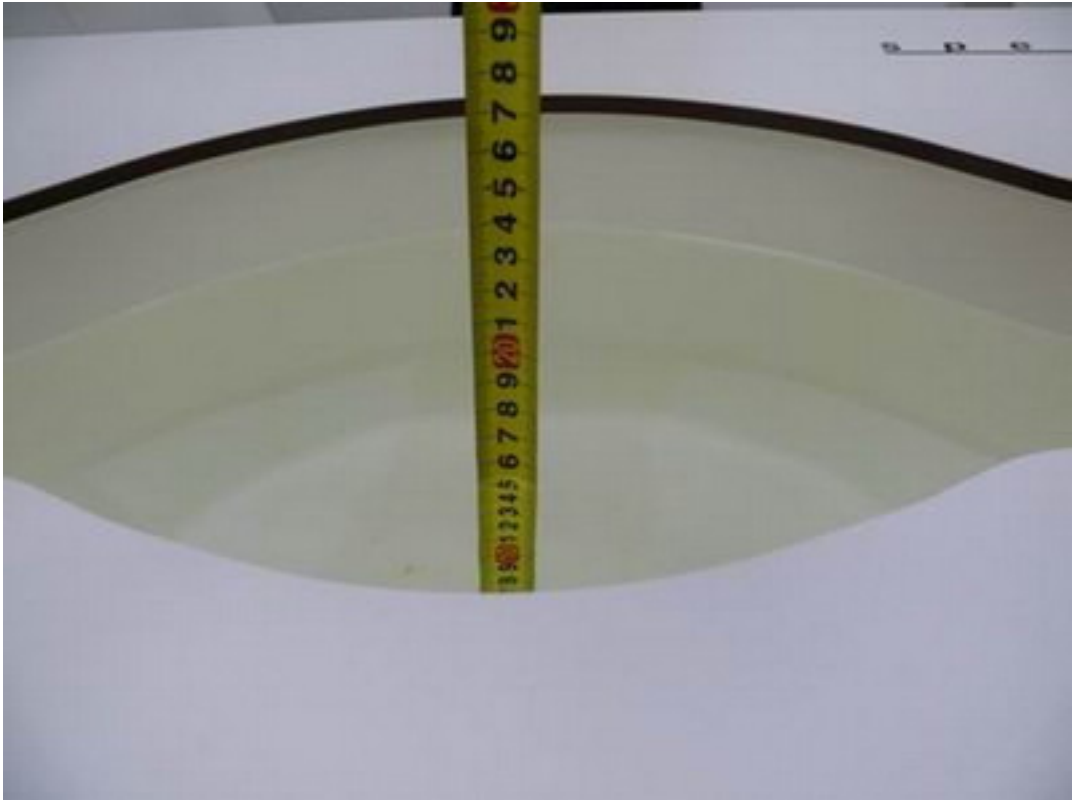


Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)

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



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

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

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

Date/Time: 02.06.2013 10:11:05

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

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.896 \text{ mho/m}$; $\epsilon_r = 41.81$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.3°C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

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

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

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

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

Peak SAR (extrapolated) = 3.67 W/kg

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

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

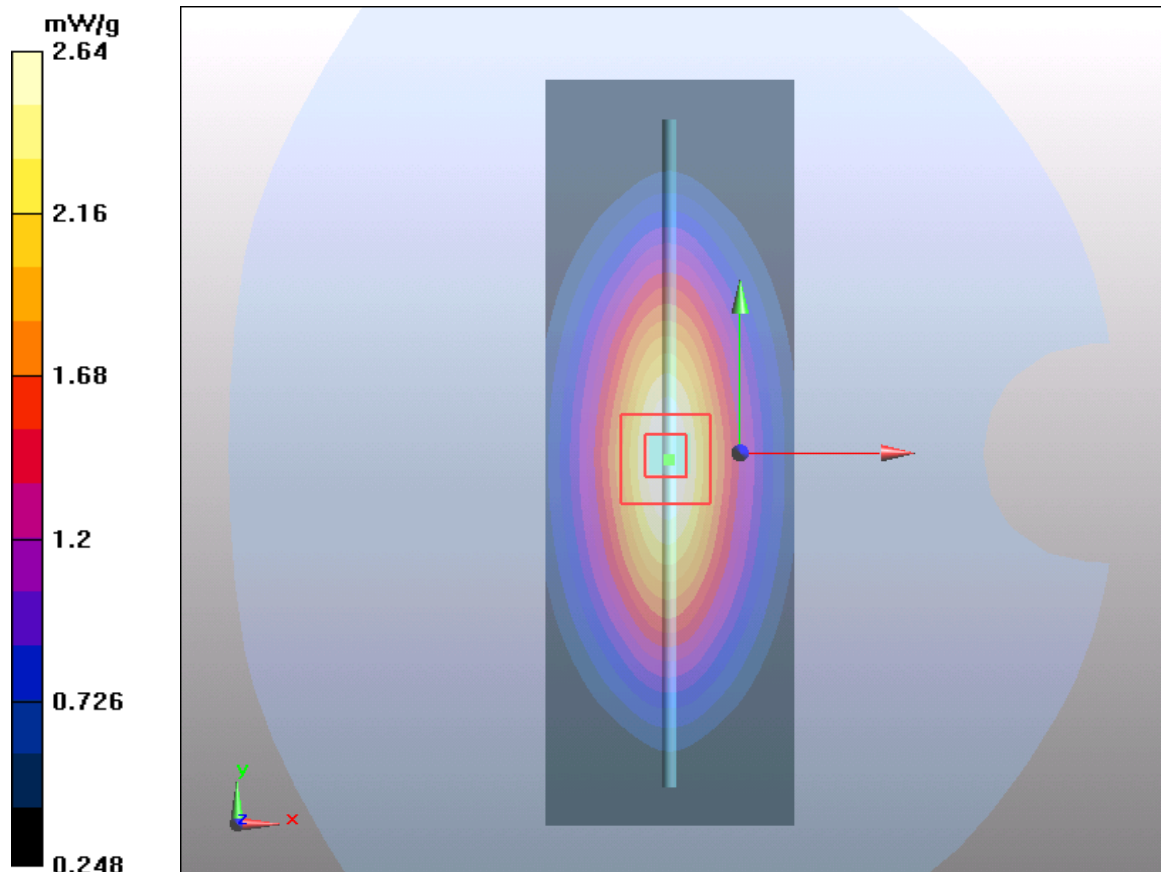


Figure 7 System Performance Check 835MHz 250mW

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System Performance Check at 835 MHz Body TSL

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

Date/Time: 04.06.2013 07:32:12

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

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.968 \text{ mho/m}$; $\epsilon_r = 54.54$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature: 22.3°C Liquid Temperature: 21.5°C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

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

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

Peak SAR (extrapolated) = 3.5 W/kg

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

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

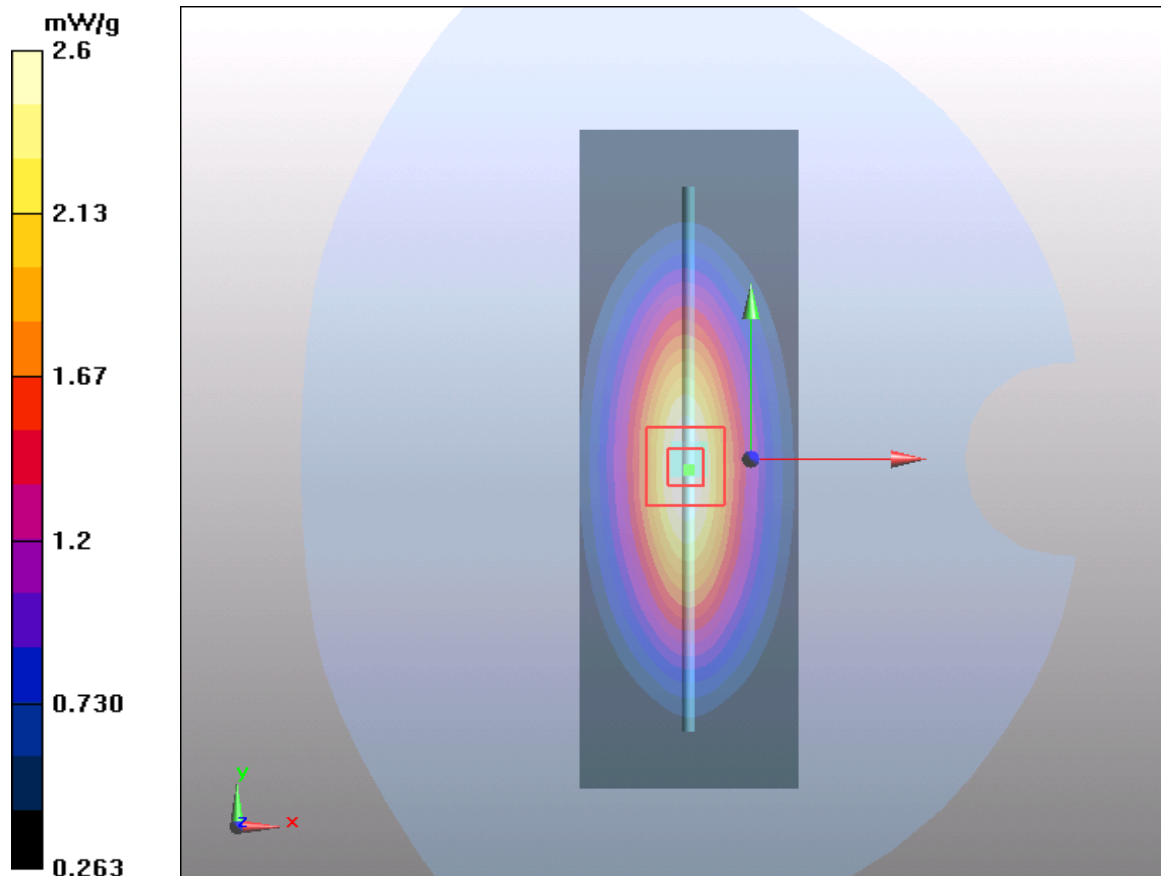


Figure 8 System Performance Check 835MHz 250mW

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System Performance Check at 1900 MHz Head TSL

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

Date/Time: 03.06.2013 09:40:27

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.423$ mho/m; $\epsilon_r = 39.59$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.69, 4.69, 4.69); Calibrated: 22.06.2012

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

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

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

Peak SAR (extrapolated) = 17.8 W/kg

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

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

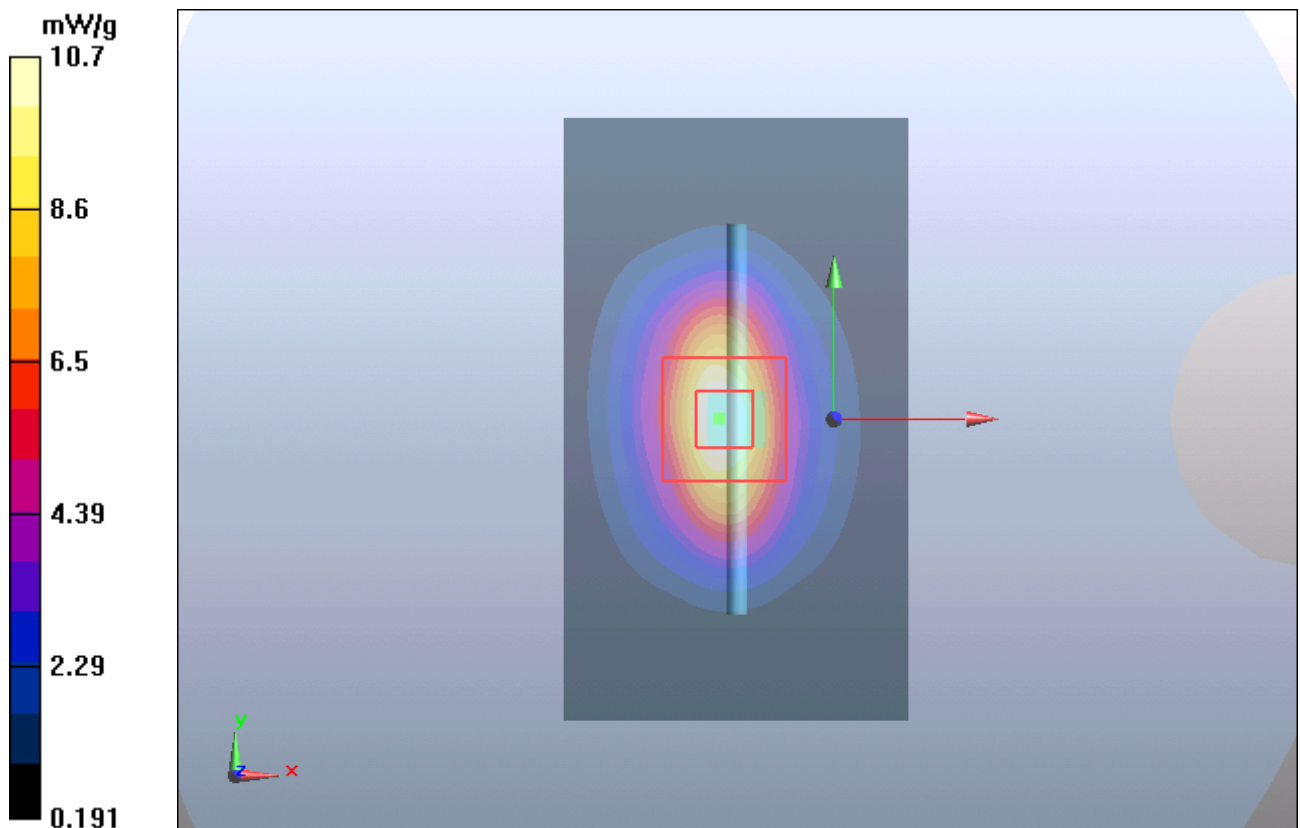


Figure 9 System Performance Check 1900MHz 250mW

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System Performance Check at 1900 MHz Body TSL

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

Date/Time: 05.06.2013 08:35:38

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.528$ mho/m; $\epsilon_r = 52.87$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

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

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

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

Peak SAR (extrapolated) = 17.8 W/kg

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

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

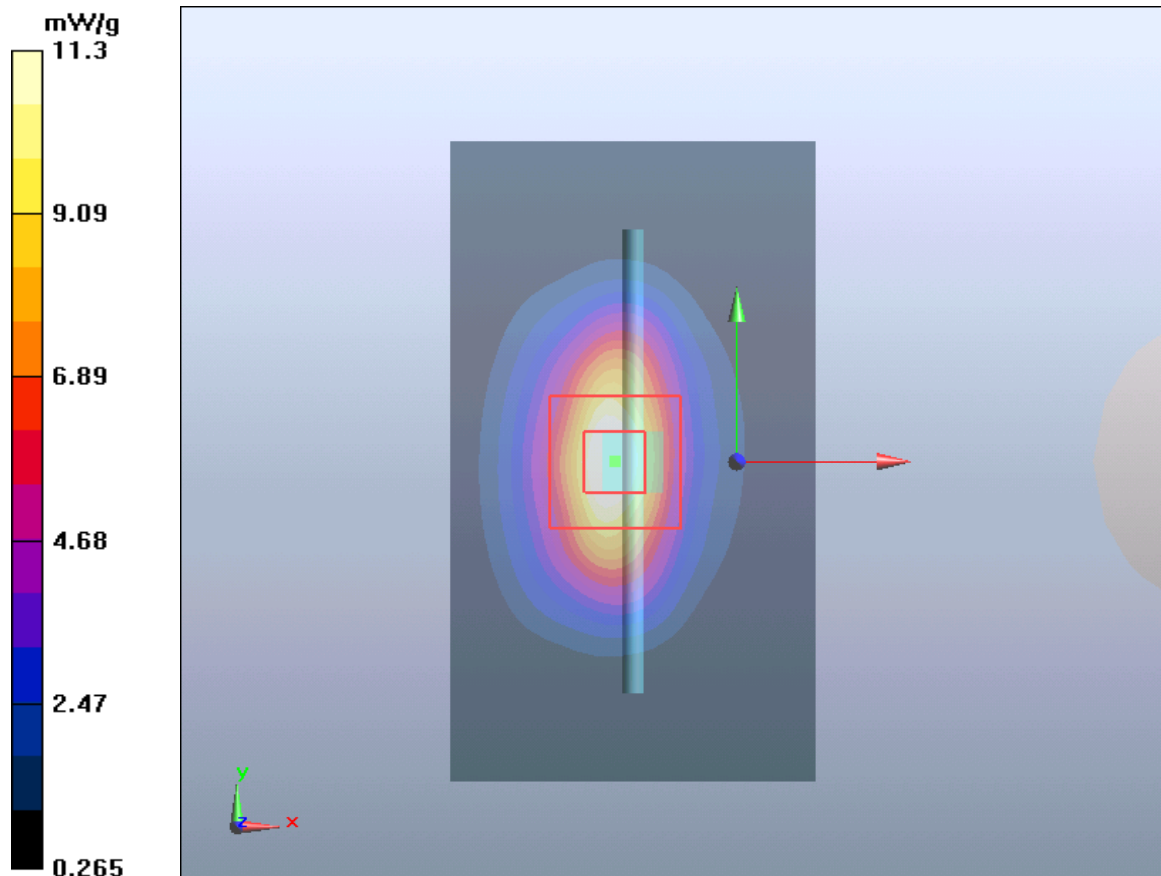


Figure 10 System Performance Check 1900MHz 250mW

ANNEX C: Graph Results

GSM 850 Left Cheek Middle

Date/Time: 02.06.2013 12:30:41

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 41.78$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Cheek Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.279 W/kg

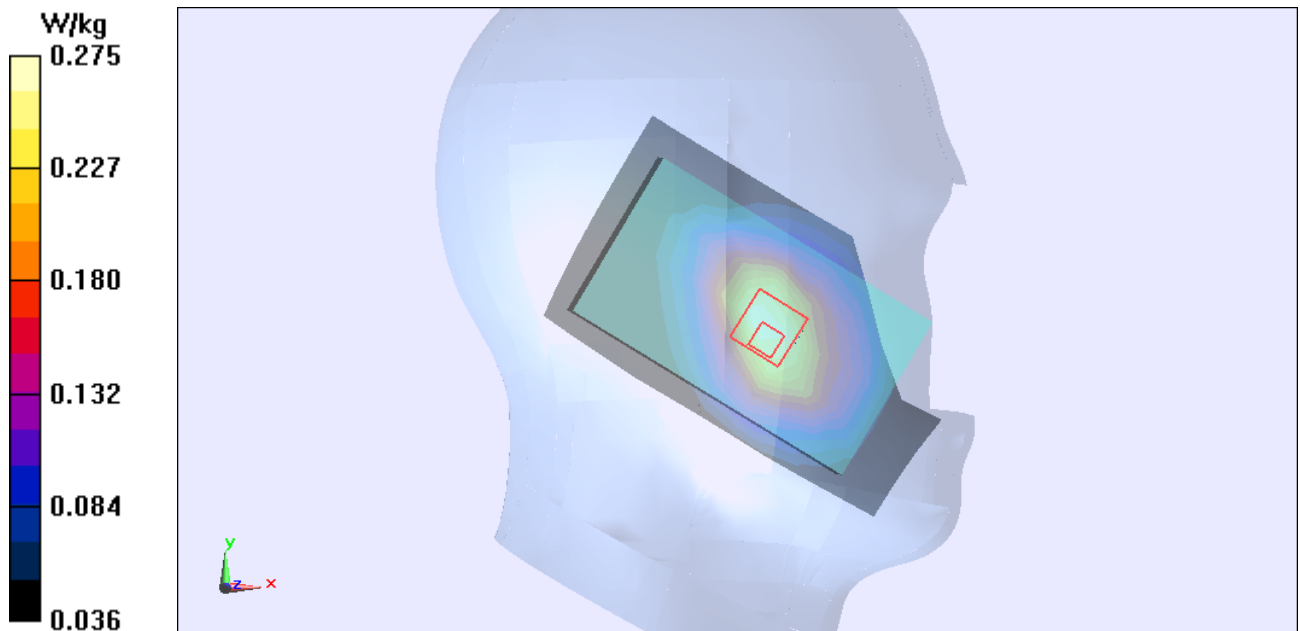
Left Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.808 V/m; Power Drift = -0.050 dB

Peak SAR (extrapolated) = 0.345 W/kg

SAR(1 g) = 0.262 W/kg; SAR(10 g) = 0.197 W/kg

Maximum value of SAR (measured) = 0.275 W/kg



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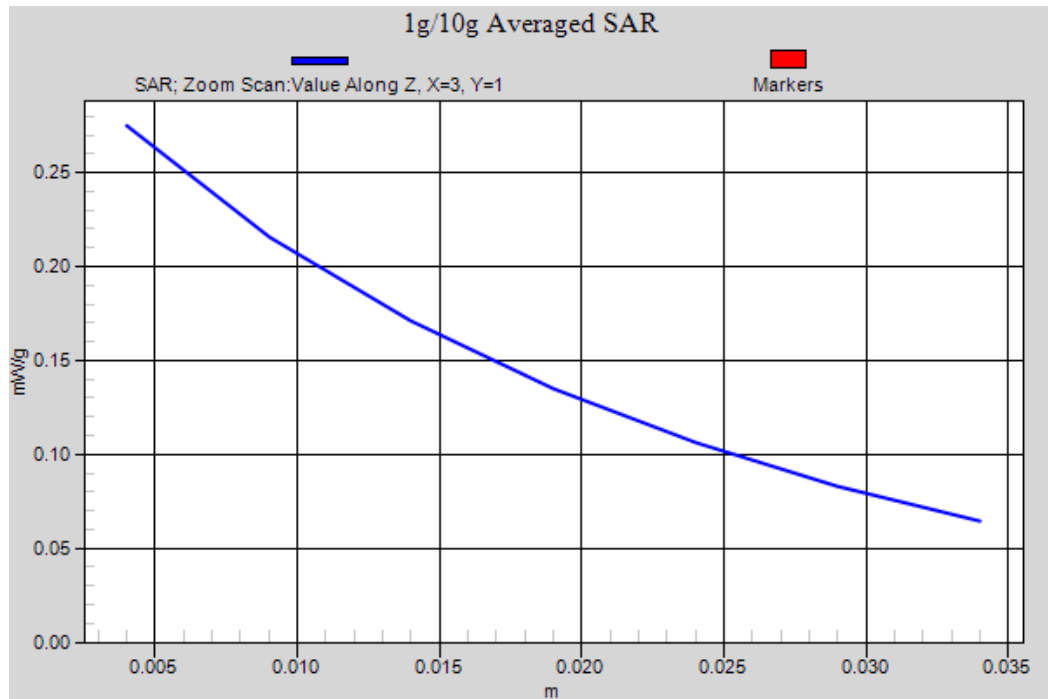


Figure 11 Left Hand Touch Cheek GSM 900 Channel 190

GSM 850 Left Tilt Middle

Date/Time: 02.06.2013 12:49:29

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 41.78$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Tilt Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.209 W/kg

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

Reference Value = 11.457 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.262 W/kg

SAR(1 g) = 0.212 W/kg; SAR(10 g) = 0.161 W/kg

Maximum value of SAR (measured) = 0.228 W/kg

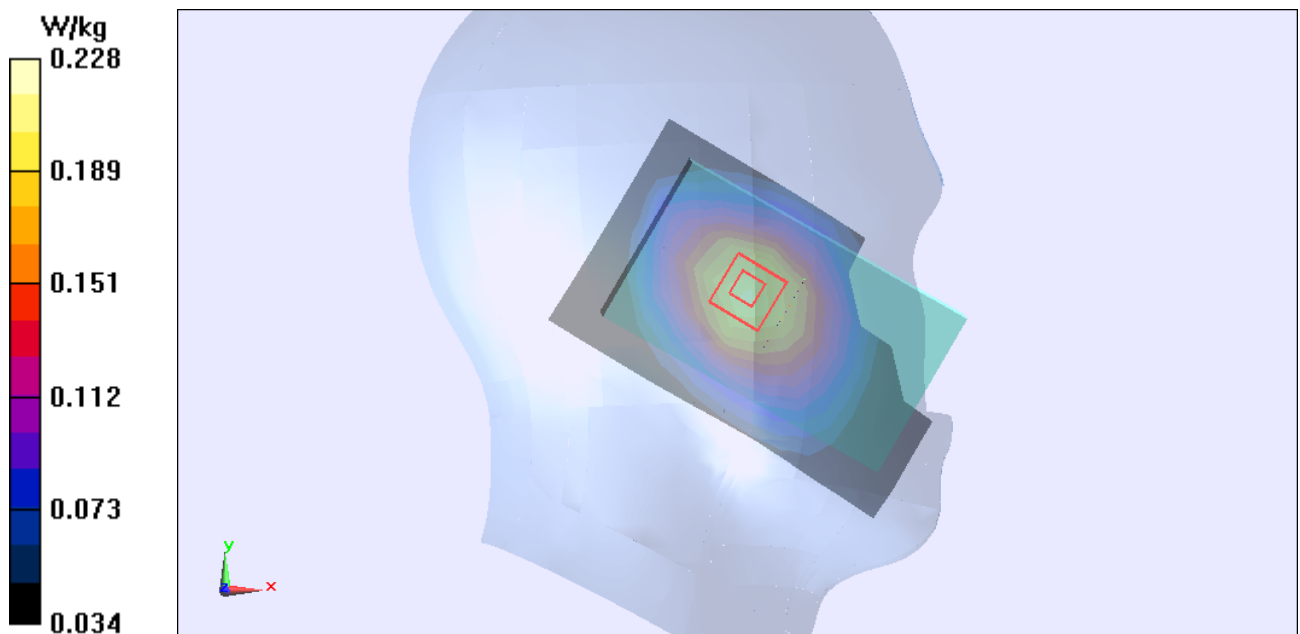


Figure 12 Left Hand Tilt 15° GSM 900 Channel 190

GSM 850 Right Cheek Middle

Date/Time: 02.06.2013 13:17:36

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 41.78$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Cheek Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.213 W/kg

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

Reference Value = 6.196 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.253 W/kg

SAR(1 g) = 0.207 W/kg; SAR(10 g) = 0.160 W/kg

Maximum value of SAR (measured) = 0.216 W/kg

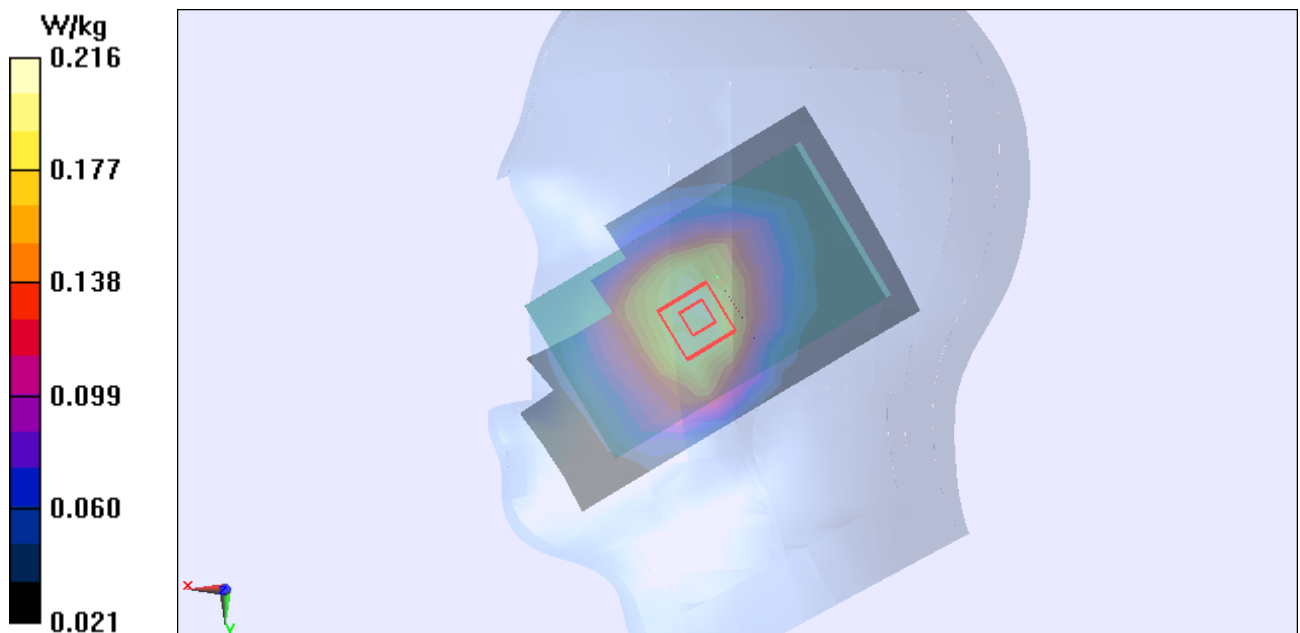


Figure 13 Right Hand Touch Cheek GSM 900 Channel 190

GSM 850 Right Tilt Middle

Date/Time: 02.06.2013 13:40:42

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 41.78$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Tilt Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.162 W/kg

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

Reference Value = 9.908 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 0.186 W/kg

SAR(1 g) = 0.156 W/kg; SAR(10 g) = 0.123 W/kg

Maximum value of SAR (measured) = 0.163 W/kg

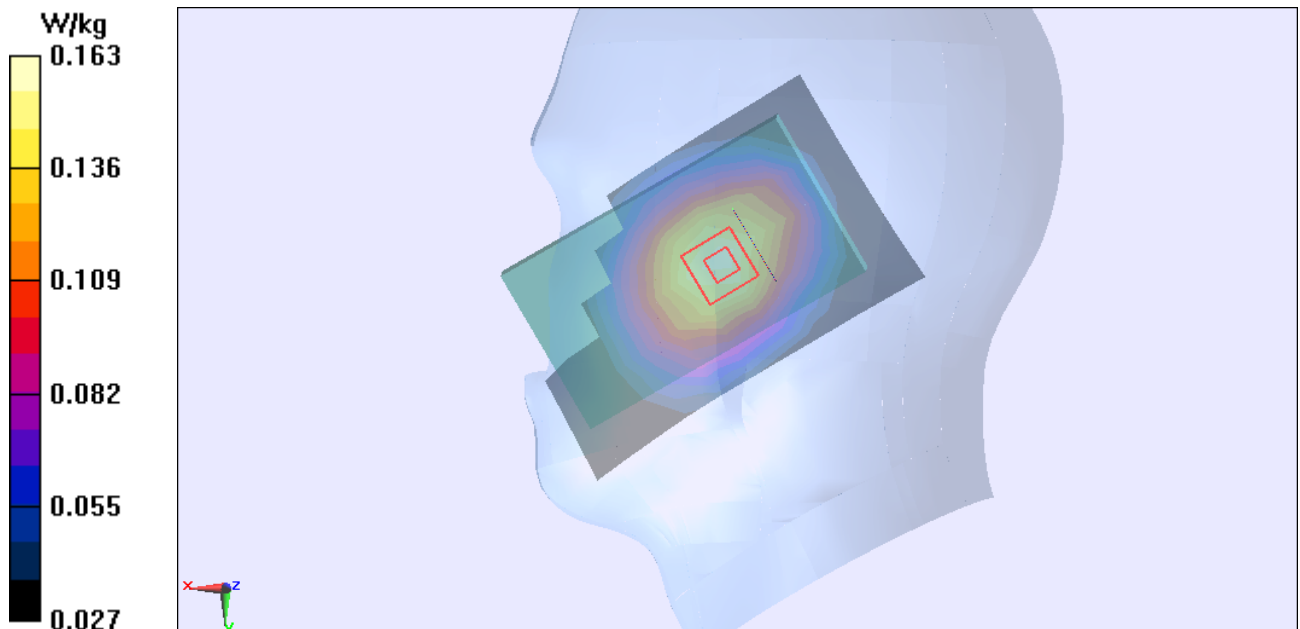


Figure 14 Right Hand Tilt 15° GSM 900 Channel 190

GSM 850 Left Cheek Middle (SIM2)

Date/Time: 02.06.2013 14:03:36

Communication System: GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 837$ MHz; $\sigma = 0.896$ S/m; $\epsilon_r = 41.78$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Cheek Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.197 W/kg

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

Reference Value = 6.420 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 0.287 W/kg

SAR(1 g) = 0.205 W/kg; SAR(10 g) = 0.149 W/kg

Maximum value of SAR (measured) = 0.216 W/kg

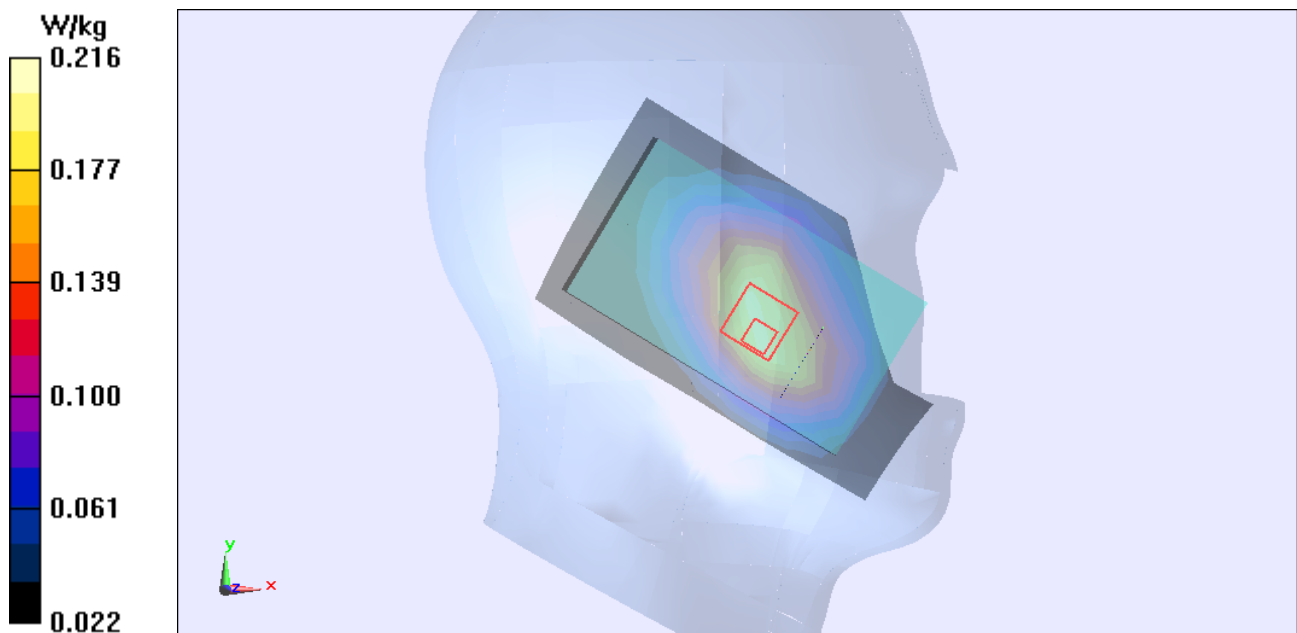


Figure 15 Left Hand Touch Cheek GSM 900 Channel 190

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GSM 850 GPRS (3Txslots) Back Side Middle

Date/Time: 04.06.2013 10:09:50

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Back Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.535 W/kg

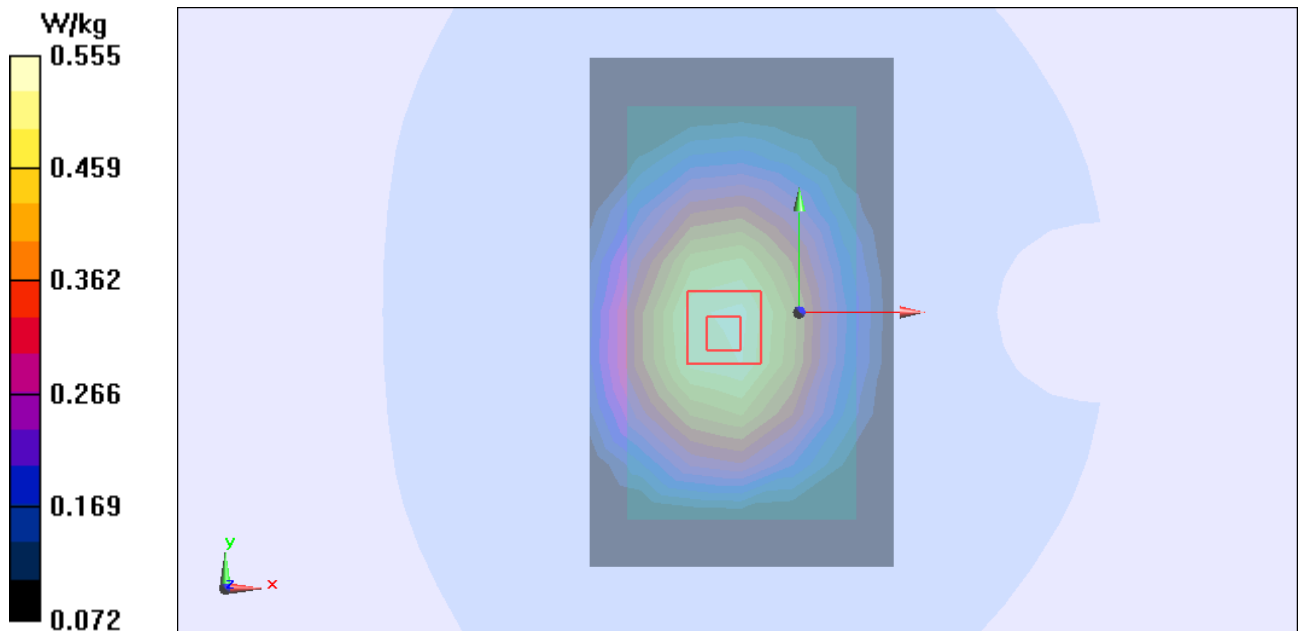
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 23.665 V/m; Power Drift = 0.180 dB

Peak SAR (extrapolated) = 0.640 W/kg

SAR(1 g) = 0.530 W/kg; SAR(10 g) = 0.406 W/kg

Maximum value of SAR (measured) = 0.555 W/kg



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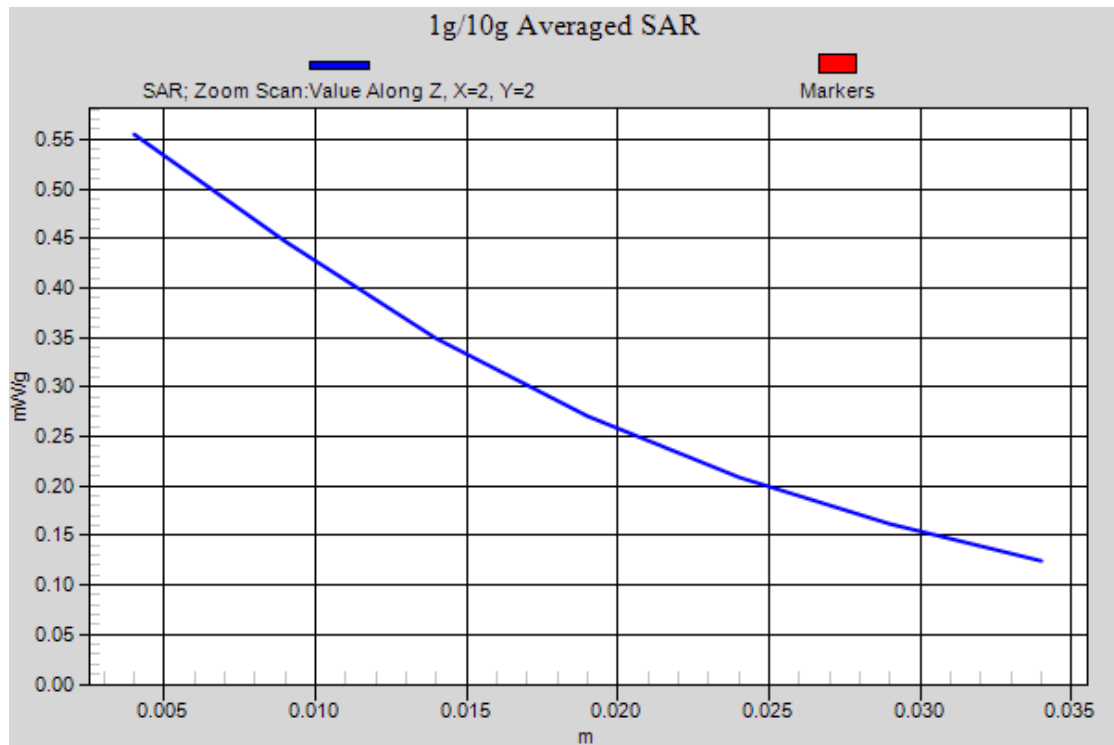


Figure 16 Body, Back Side, GSM 850 GPRS (3Txslots) Channel 190

GSM 850 GPRS (3Txslots) Front Side Middle

Date/Time: 04.06.2013 09:50:44

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Front Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.431 W/kg

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

Reference Value = 14.312 V/m; Power Drift = 0.035 dB

Peak SAR (extrapolated) = 0.488 W/kg

SAR(1 g) = 0.412 W/kg; SAR(10 g) = 0.322 W/kg

Maximum value of SAR (measured) = 0.431 W/kg

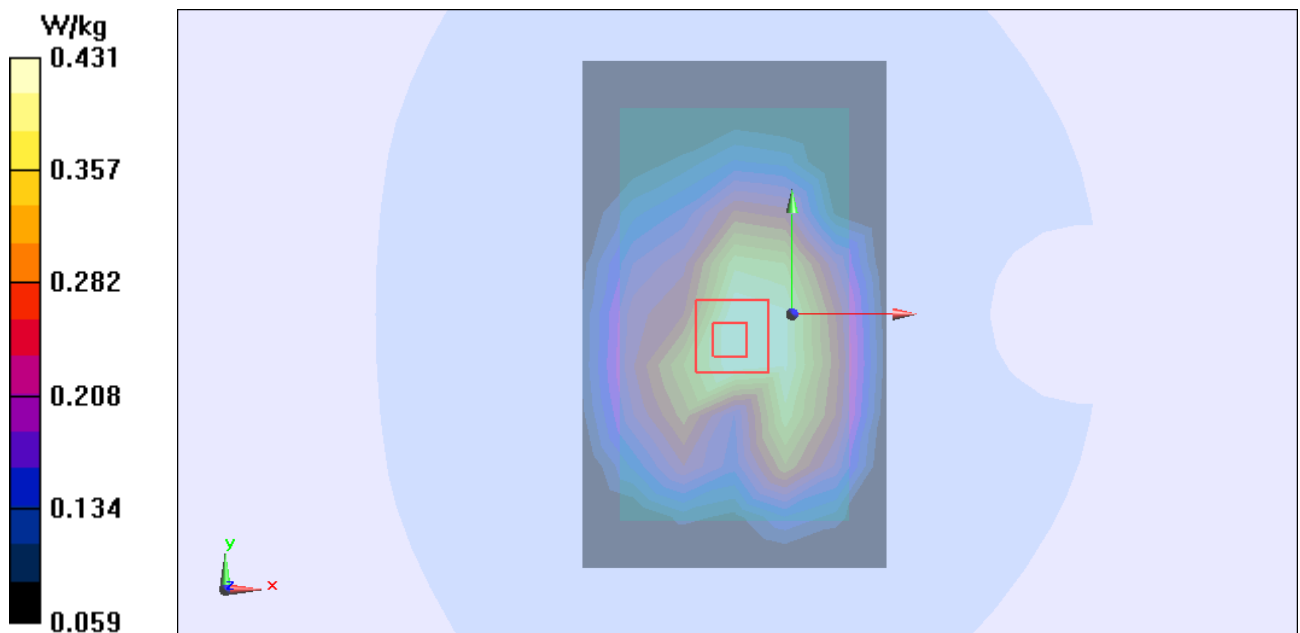


Figure 17 Body, Front Side, GSM 850 GPRS (3Txslots) Channel 190

GSM 850 GPRS (3Txslots) Left Edge Middle

Date/Time: 04.06.2013 20:23:34

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Edge Middle/Area Scan (4x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.145 W/kg

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

Reference Value = 12.731 V/m; Power Drift = 0.040 dB

Peak SAR (extrapolated) = 0.188 W/kg

SAR(1 g) = 0.144 W/kg; SAR(10 g) = 0.102 W/kg

Maximum value of SAR (measured) = 0.154 W/kg

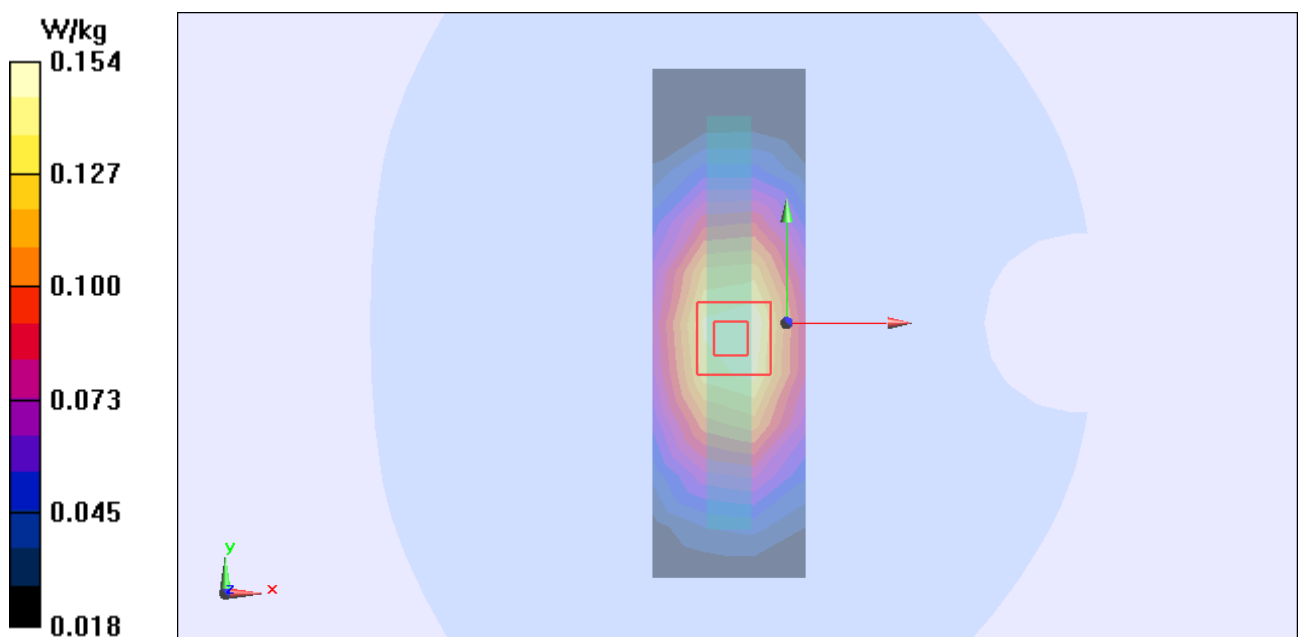


Figure 18 Body, Left Edge, GSM 850 GPRS (3Txslots) Channel 190

GSM 850 GPRS (3Txslots) Right Edge Middle

Date/Time: 04.06.2013 20:41:57

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Edge Middle /Area Scan (4x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.156 W/kg

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

Reference Value = 13.358 V/m; Power Drift = -0.160 dB

Peak SAR (extrapolated) = 0.220 W/kg

SAR(1 g) = 0.160 W/kg; SAR(10 g) = 0.109 W/kg

Maximum value of SAR (measured) = 0.172 W/kg

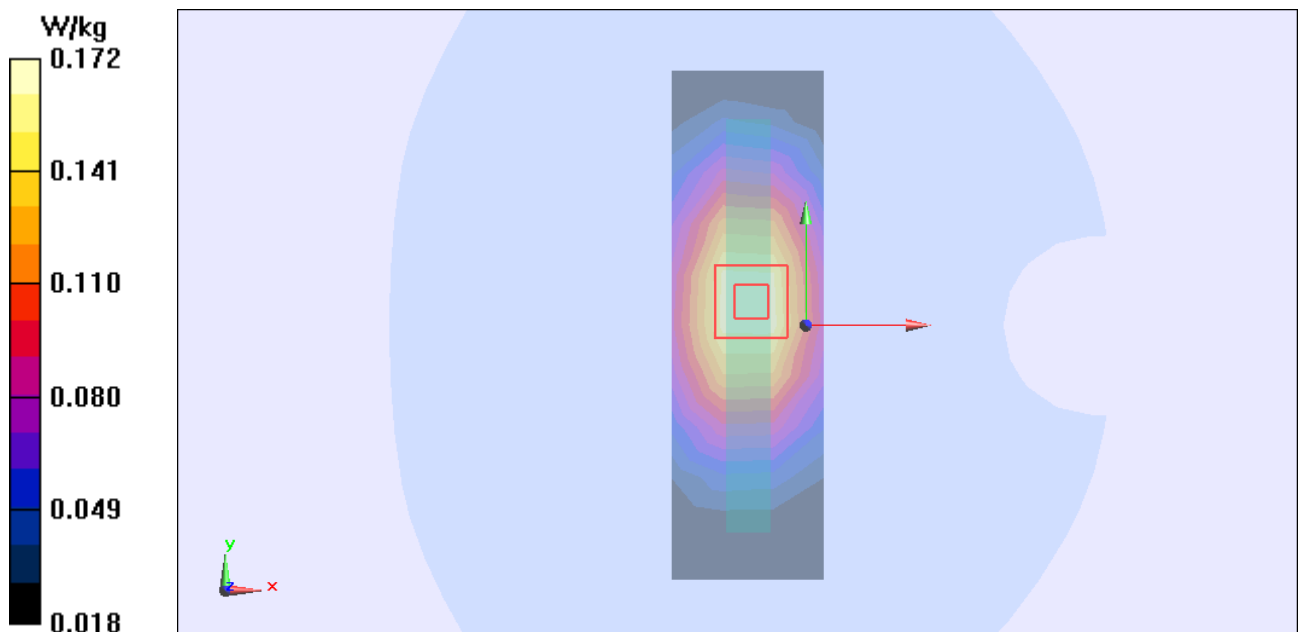


Figure 19 Body, Right Edge, GSM 850 GPRS (3Txslots) Channel 190

GSM 850 GPRS (3Txslots) Bottom Edge Middle

Date/Time: 04.06.2013 21:02:00

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Bottom Edge Middle /Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0471 W/kg

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

Reference Value = 5.749 V/m; Power Drift = -0.130 dB

Peak SAR (extrapolated) = 0.0700 W/kg

SAR(1 g) = 0.045 W/kg; SAR(10 g) = 0.028 W/kg

Maximum value of SAR (measured) = 0.0487 W/kg

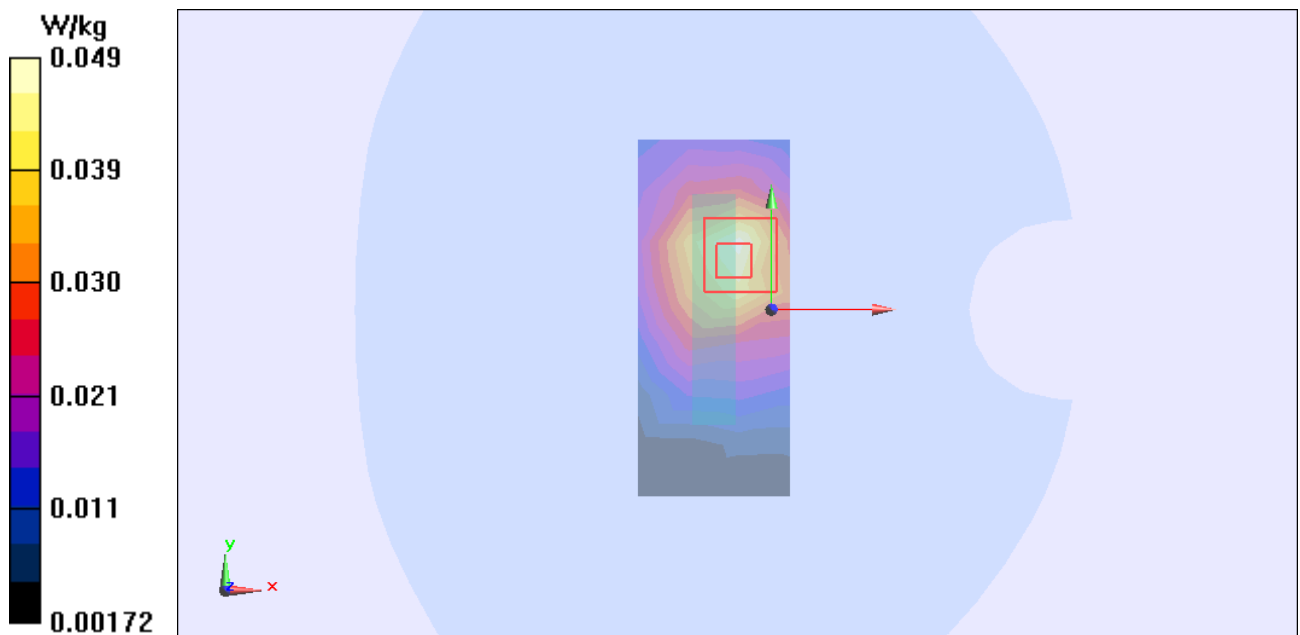


Figure 20 Body, Bottom Edge, GSM 850 GPRS (3Txslots) Channel 190

GSM 850 EGPRS (3Txslots) Back Side Middle

Date/Time: 04.06.2013 19:43:49

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Back Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.274 W/kg

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

Reference Value = 17.141 V/m; Power Drift = 0.000 dB

Peak SAR (extrapolated) = 0.317 W/kg

SAR(1 g) = 0.264 W/kg; SAR(10 g) = 0.202 W/kg

Maximum value of SAR (measured) = 0.276 W/kg

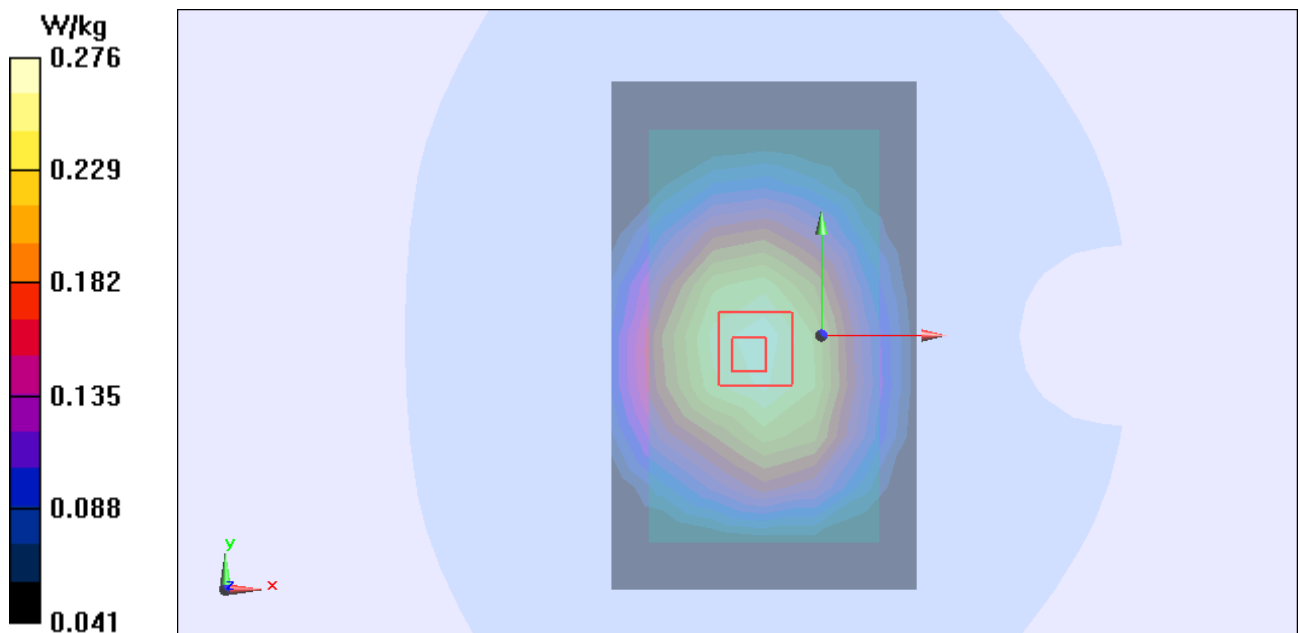


Figure 21 Body, Back Side, GSM 850 EGPRS (3Txslots) Channel 190

GSM 850 GPRS (3Txslots) Back Side Middle(SIM2)

Date/Time: 04.06.2013 10:32:03

Communication System: GPRS(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 837$ MHz; $\sigma = 0.971$ S/m; $\epsilon_r = 54.509$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Back Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.517 W/kg

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

Reference Value = 23.064 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 0.623 W/kg

SAR(1 g) = 0.519 W/kg; SAR(10 g) = 0.396 W/kg

Maximum value of SAR (measured) = 0.545 W/kg

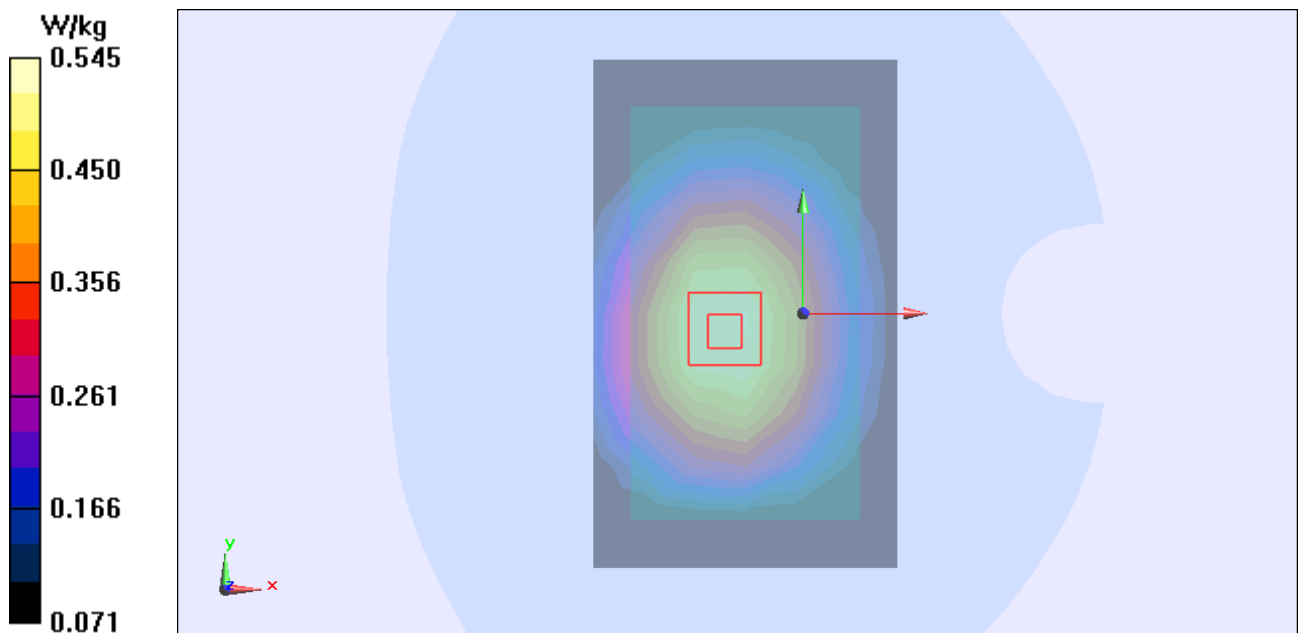


Figure 22 Body, Back Side, GSM 850 GPRS (3Txslots) Channel 190

GSM 1900 Left Cheek Middle

Date/Time: 03.06.2013 11:00:35

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.408$ S/m; $\epsilon_r = 39.625$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.69, 4.69, 4.69); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Cheek Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.336 W/kg

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

Reference Value = 5.807 V/m; Power Drift = -0.029 dB

Peak SAR (extrapolated) = 0.470 W/kg

SAR(1 g) = 0.327 W/kg; SAR(10 g) = 0.212 W/kg

Maximum value of SAR (measured) = 0.353 W/kg

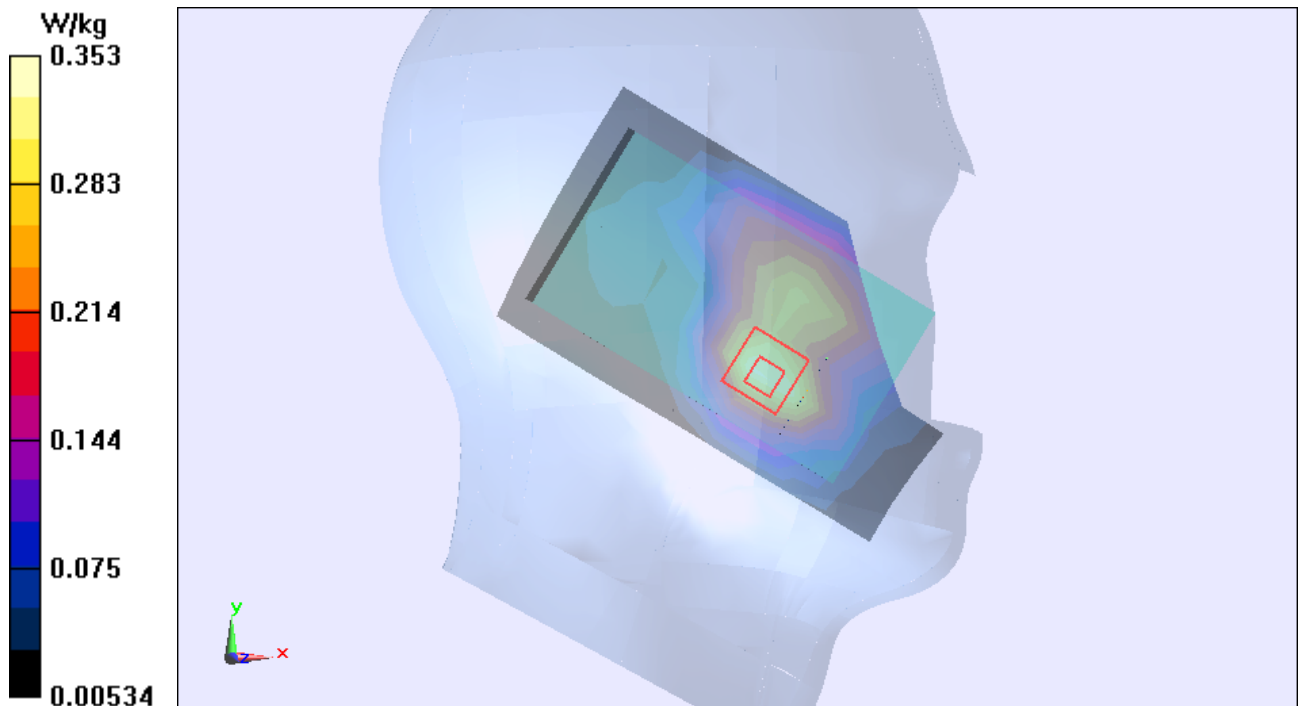


Figure 23 Left Hand Touch Cheek GSM 900 Channel 661

GSM 1900 Left Tilt Middle

Date/Time: 03.06.2013 11:23:52

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.408$ S/m; $\epsilon_r = 39.625$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Left Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.69, 4.69, 4.69); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Tilt Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.116 W/kg

A076 GSM 1900 Left/Tilt Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.441 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 0.183 W/kg

SAR(1 g) = 0.119 W/kg; SAR(10 g) = 0.070 W/kg

Maximum value of SAR (measured) = 0.126 W/kg

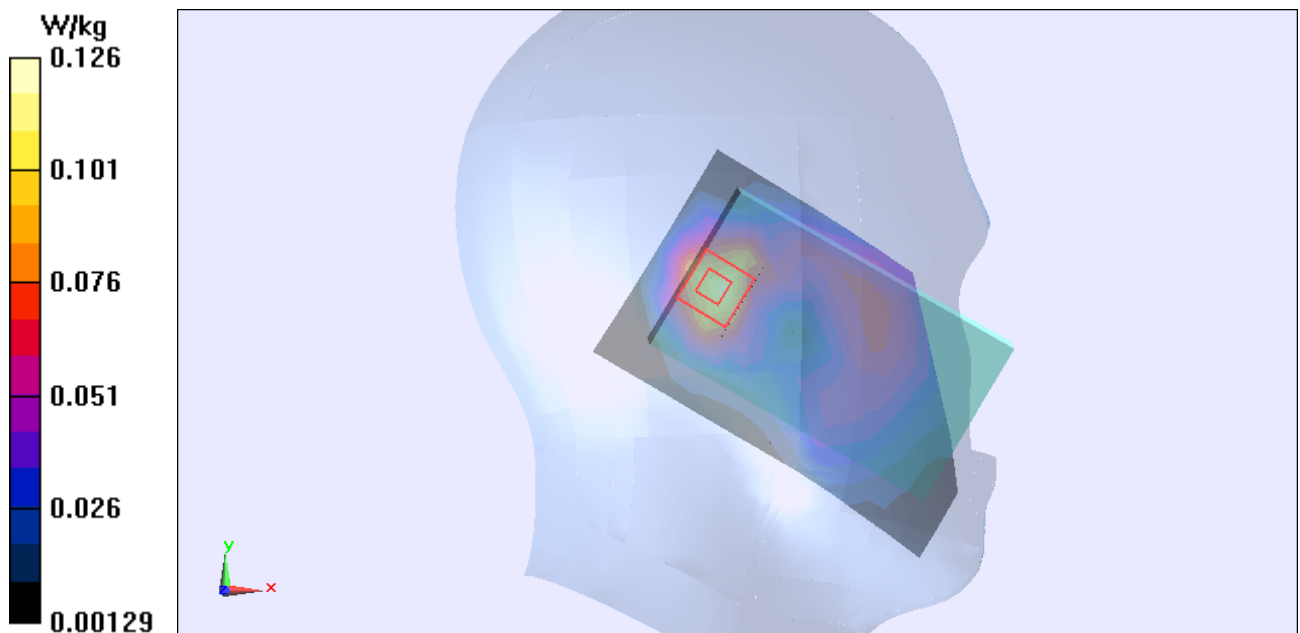


Figure 24 Left Hand Tilt 15° GSM 900 Channel 661

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GSM 1900 Right Cheek Middle

Date/Time: 03.06.2013 11:47:54

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.408$ S/m; $\epsilon_r = 39.625$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.69, 4.69, 4.69); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Cheek Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.486 W/kg

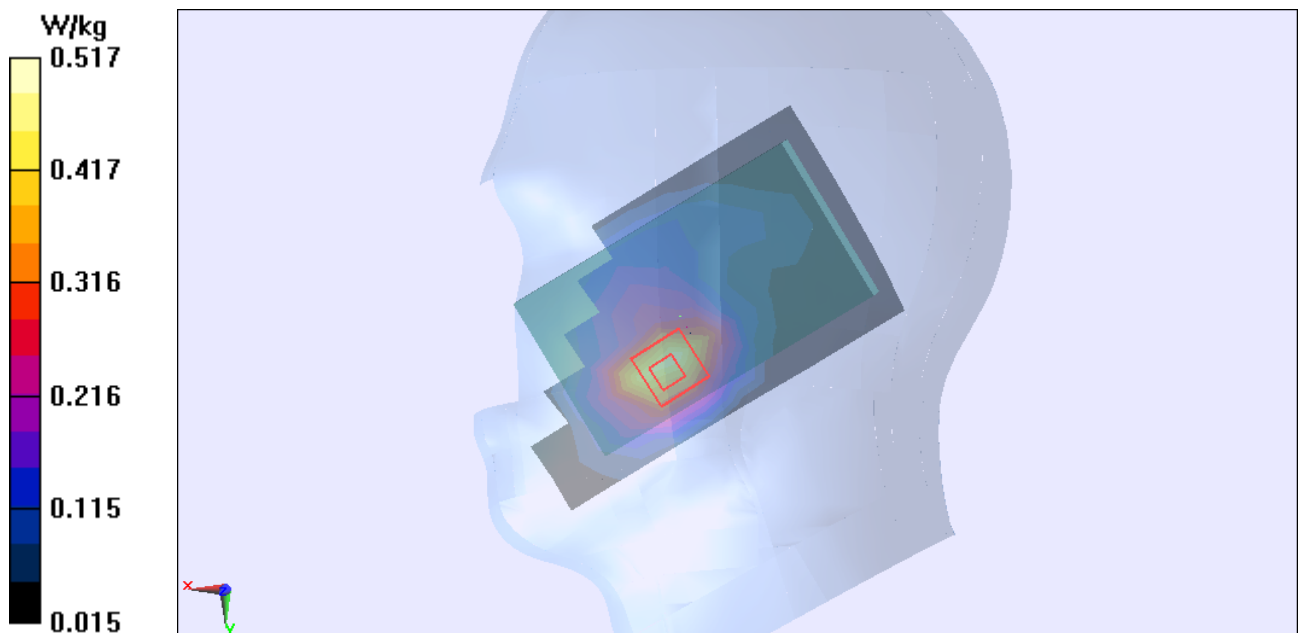
Right Cheek Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.332 V/m; Power Drift = 0.059 dB

Peak SAR (extrapolated) = 0.720 W/kg

SAR(1 g) = 0.473 W/kg; SAR(10 g) = 0.287 W/kg

Maximum value of SAR (measured) = 0.517 W/kg



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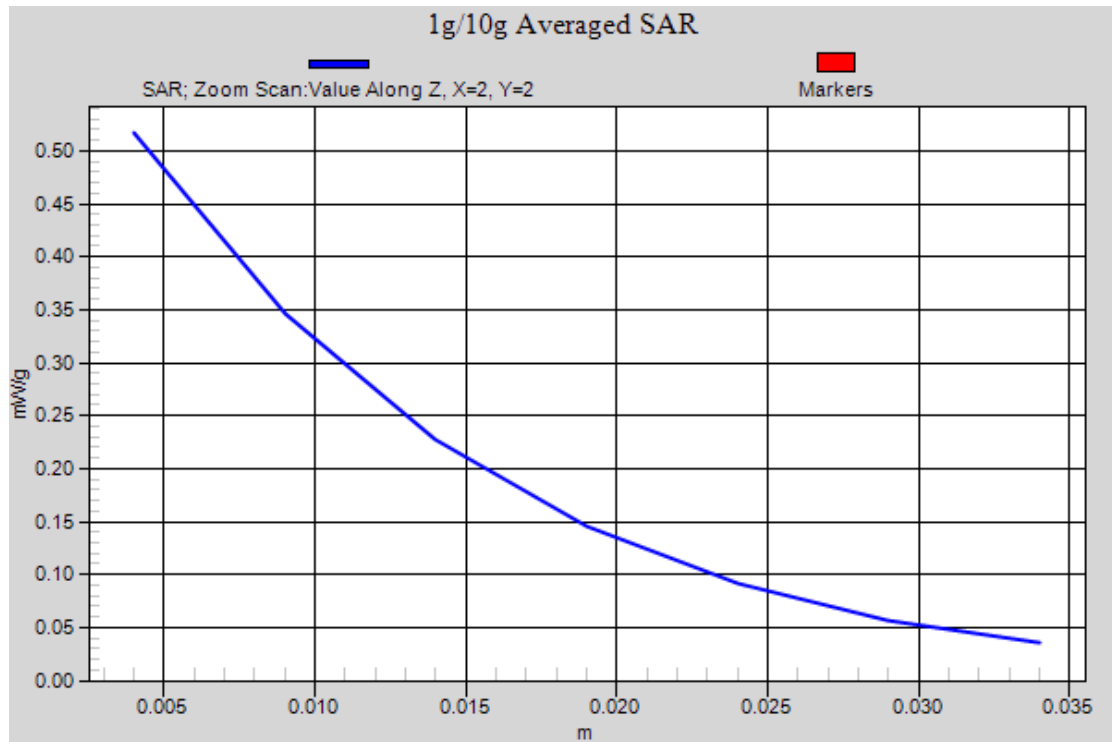


Figure 25 Right Hand Touch Cheek GSM 900 Channel 661

GSM 1900 Right Tilt Middle

Date/Time: 03.06.2013 12:12:07

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.408$ S/m; $\epsilon_r = 39.625$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.69, 4.69, 4.69); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Tilt Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.129 W/kg

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

Reference Value = 9.958 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 0.226 W/kg

SAR(1 g) = 0.144 W/kg; SAR(10 g) = 0.085 W/kg

Maximum value of SAR (measured) = 0.158 W/kg

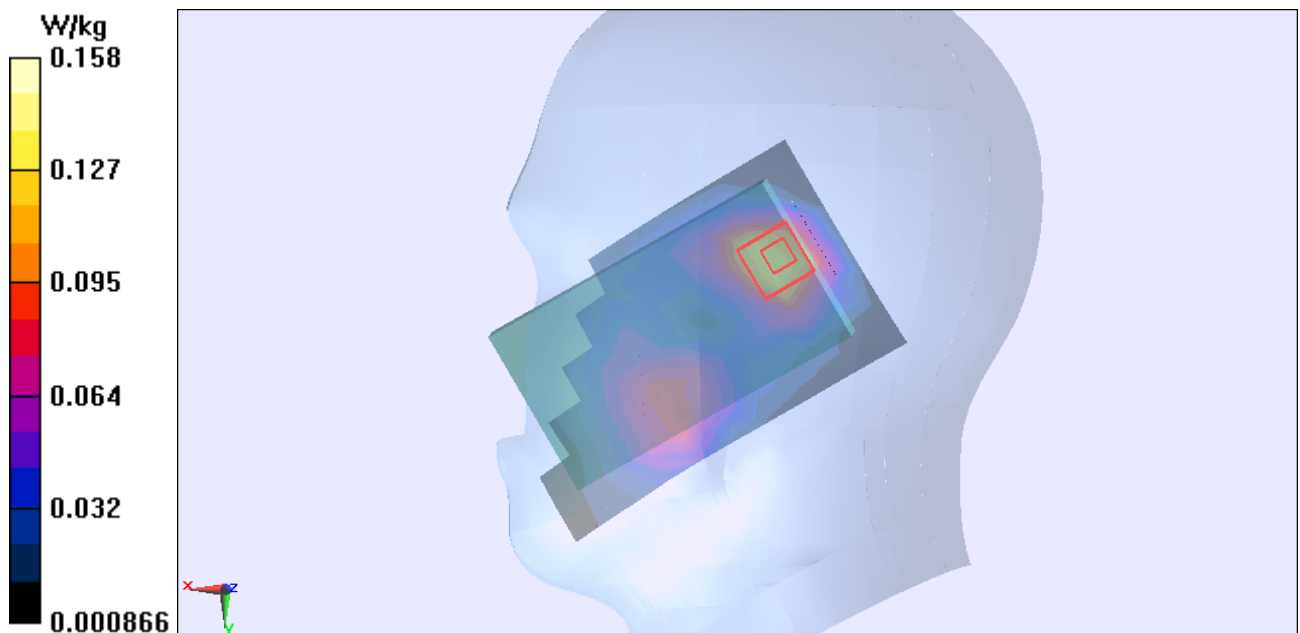


Figure 26 Right Hand Tilt 15° GSM 900 Channel 661

GSM 1900 Right Cheek Middle (SIM2)

Date/Time: 03.06.2013 13:17:36

Communication System: GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.30042

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.408$ S/m; $\epsilon_r = 39.625$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.69, 4.69, 4.69); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 2; Type: QD000P40CD; Serial: TP1667

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Cheek Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.399 W/kg

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

Reference Value = 6.754 V/m; Power Drift = -0.093 dB

Peak SAR (extrapolated) = 0.474 W/kg

SAR(1 g) = 0.387 W/kg; SAR(10 g) = 0.299 W/kg

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

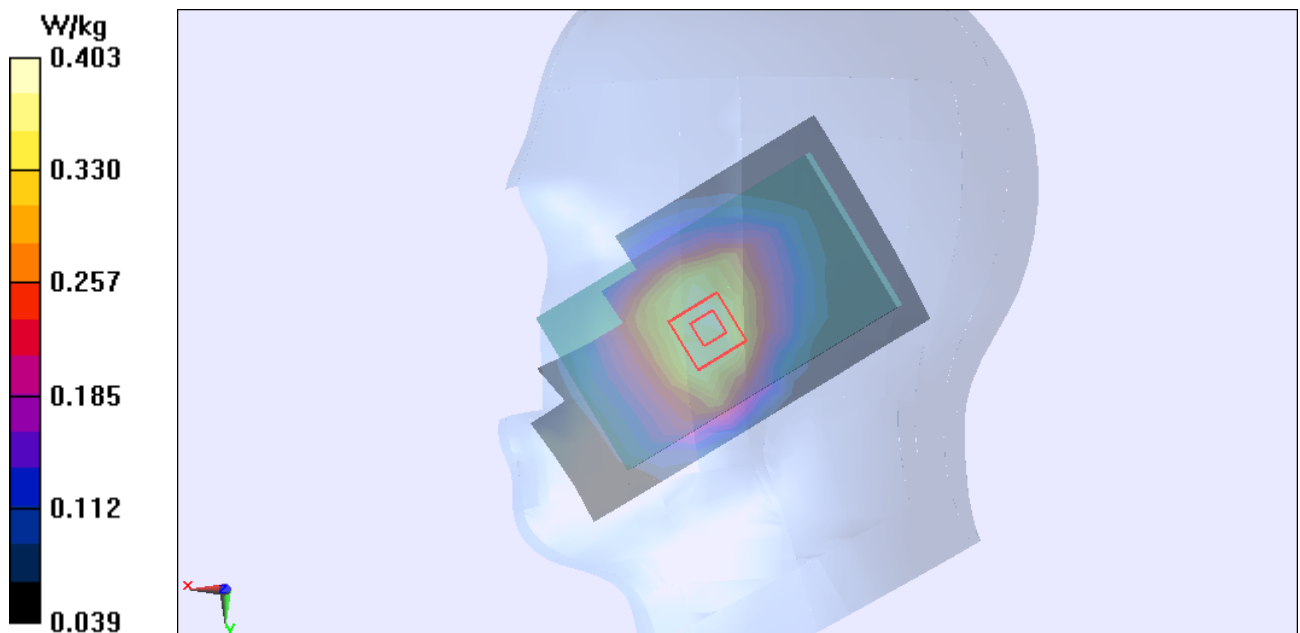


Figure 27 Right Hand Touch Cheek GSM 900 Channel 661

GSM 1900 GPRS (3Txslots) Back Side Middle

Date/Time: 05.06.2013 10:10:18

Communication System: GPRS(3UP); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.508$ S/m; $\epsilon_r = 52.874$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Back Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.685 W/kg

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

Reference Value = 8.917 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.639 W/kg; SAR(10 g) = 0.394 W/kg

Maximum value of SAR (measured) = 0.692 W/kg

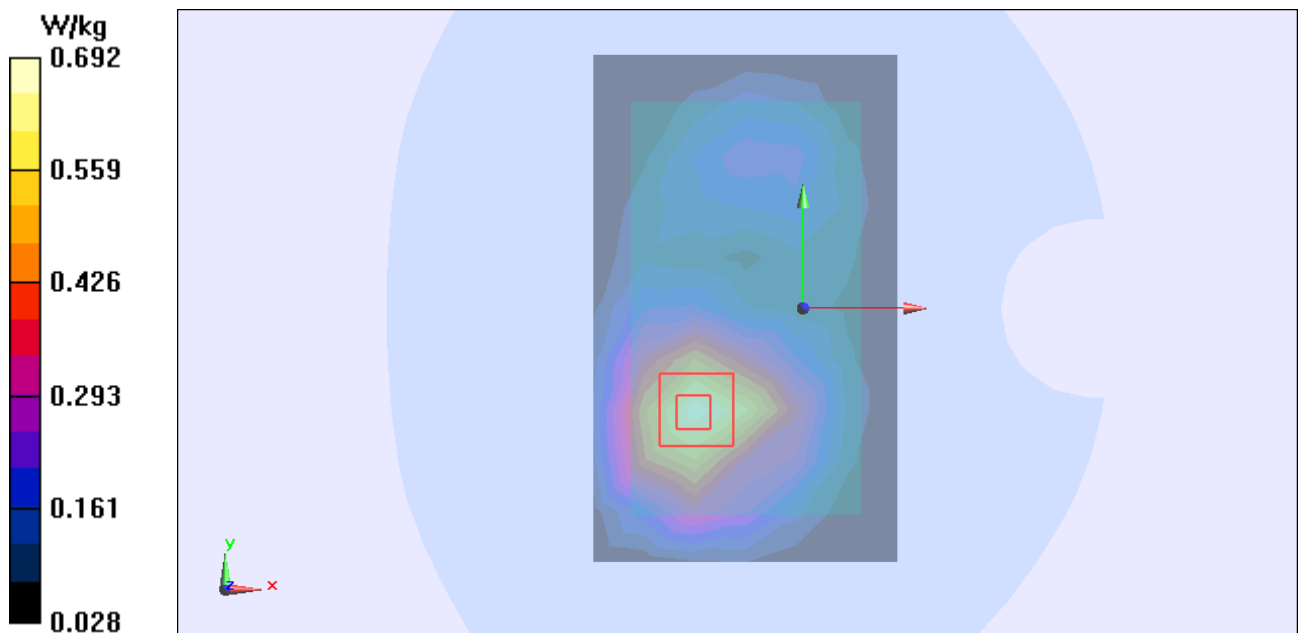


Figure 28 Body, Back Side, GSM 1900 GPRS (3Txslots) Channel 661

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GSM 1900 GPRS (3Txslots) Front Side Middle

Date/Time: 05.06.2013 09:39:19

Communication System: GPRS(3UP); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.508$ S/m; $\epsilon_r = 52.874$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Front Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.605 W/kg

Front Side Middle/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.936 V/m; Power Drift = 0.100 dB

Peak SAR (extrapolated) = 0.875 W/kg

SAR(1 g) = 0.510 W/kg; SAR(10 g) = 0.324 W/kg

Maximum value of SAR (measured) = 0.591 W/kg

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

Reference Value = 8.936 V/m; Power Drift = 0.100 dB

Peak SAR (extrapolated) = 0.978 W/kg

SAR(1 g) = 0.613 W/kg; SAR(10 g) = 0.377 W/kg

Maximum value of SAR (measured) = 0.649 W/kg

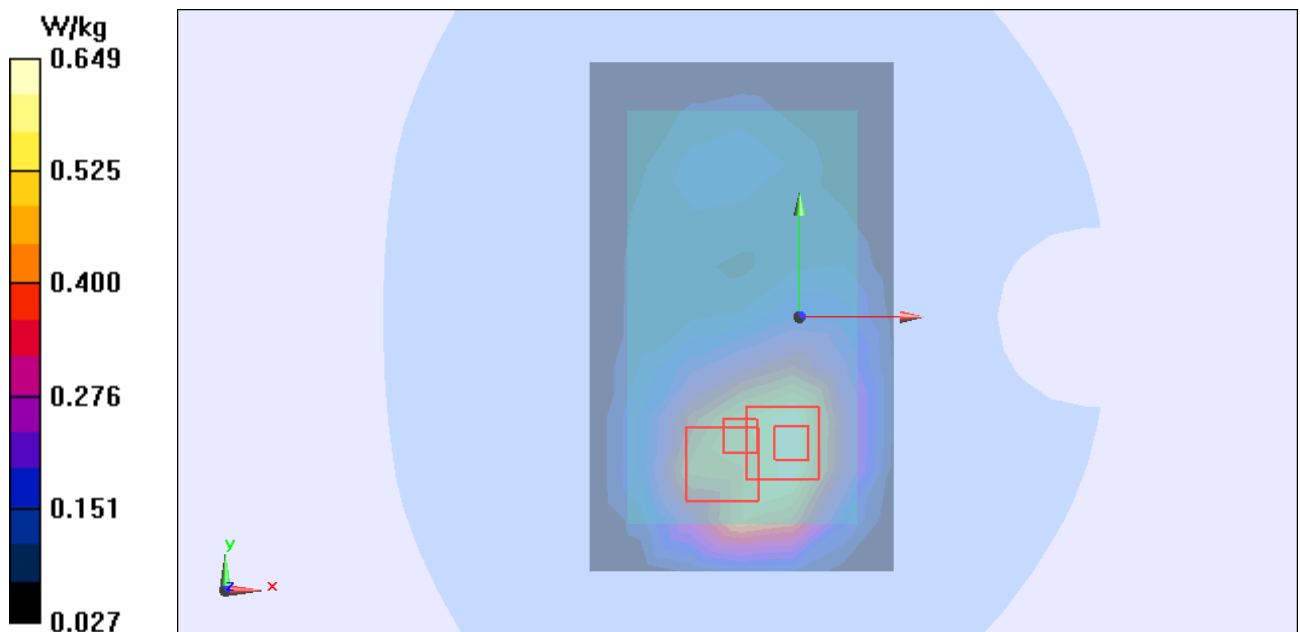


Figure 29 Body, Front Side, GSM 1900 GPRS (3Txslots) Channel 661

GSM 1900 GPRS (3Txslots) Left Edge Middle

Date/Time: 05.06.2013 10:54:07

Communication System: GPRS(3UP); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.508$ S/m; $\epsilon_r = 52.874$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Left Edge Middle/Area Scan (4x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.0951 W/kg

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

Reference Value = 6.118 V/m; Power Drift = 0.180 dB

Peak SAR (extrapolated) = 0.144 W/kg

SAR(1 g) = 0.095 W/kg; SAR(10 g) = 0.060 W/kg

Maximum value of SAR (measured) = 0.102 W/kg

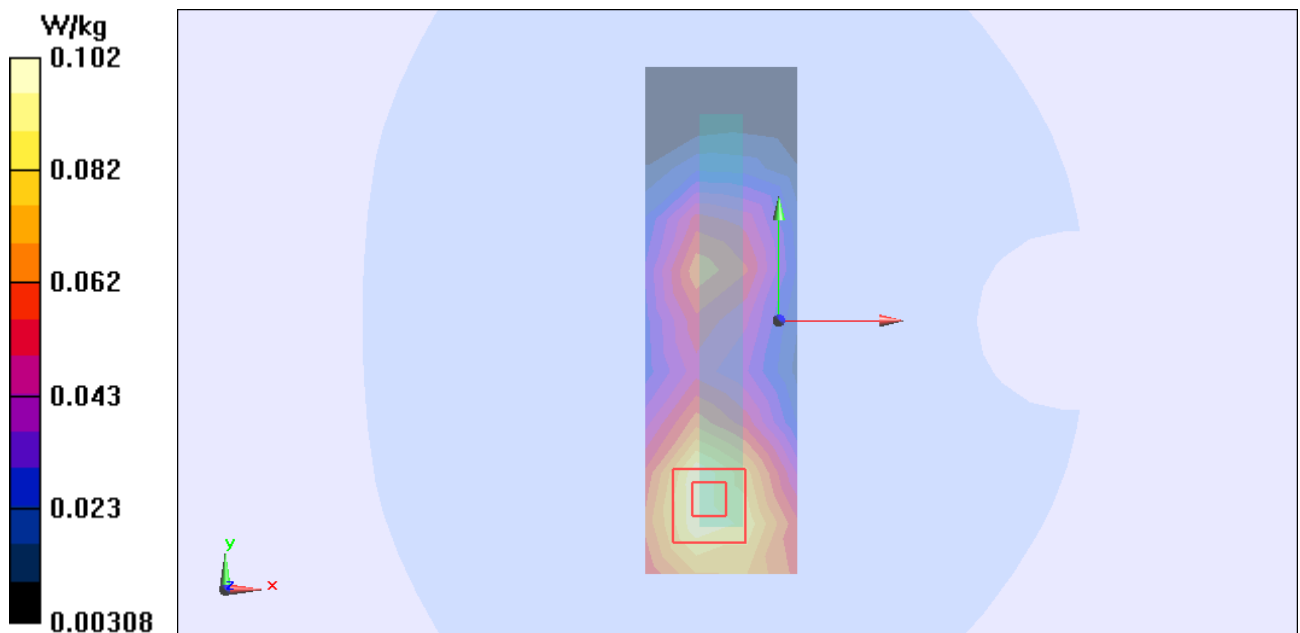


Figure 30 Body, Left Edge, GSM 1900 GPRS (3Txslots) Channel 661

GSM 1900 GPRS (3Txslots) Right Edge Middle

Date/Time: 05.06.2013 11:12:09

Communication System: GPRS(3UP); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.508$ S/m; $\epsilon_r = 52.874$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Right Edge Middle/Area Scan (4x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.143 W/kg

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

Reference Value = 10.238 V/m; Power Drift = 0.060 dB

Peak SAR (extrapolated) = 0.225 W/kg

SAR(1 g) = 0.146 W/kg; SAR(10 g) = 0.091 W/kg

Maximum value of SAR (measured) = 0.158 W/kg

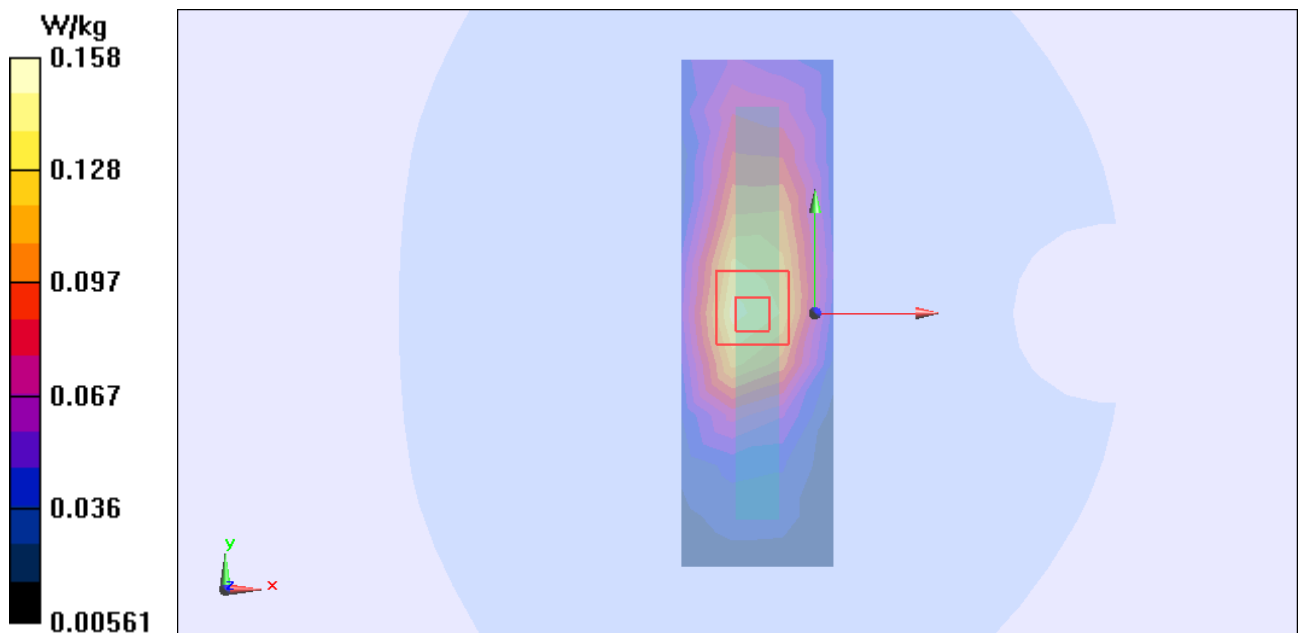


Figure 31 Body, Right Edge, GSM 1900 GPRS (3Txslots) Channel 661

GSM 1900 GPRS (3Txslots) Bottom Edge Middle

Date/Time: 05.06.2013 11:29:20

Communication System: GPRS(3UP); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.508$ S/m; $\epsilon_r = 52.874$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Bottom Edge Middle/Area Scan (4x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.382 W/kg

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

Reference Value = 17.693 V/m; Power Drift = -0.010 dB

Peak SAR (extrapolated) = 0.672 W/kg

SAR(1 g) = 0.421 W/kg; SAR(10 g) = 0.245 W/kg

Maximum value of SAR (measured) = 0.469 W/kg

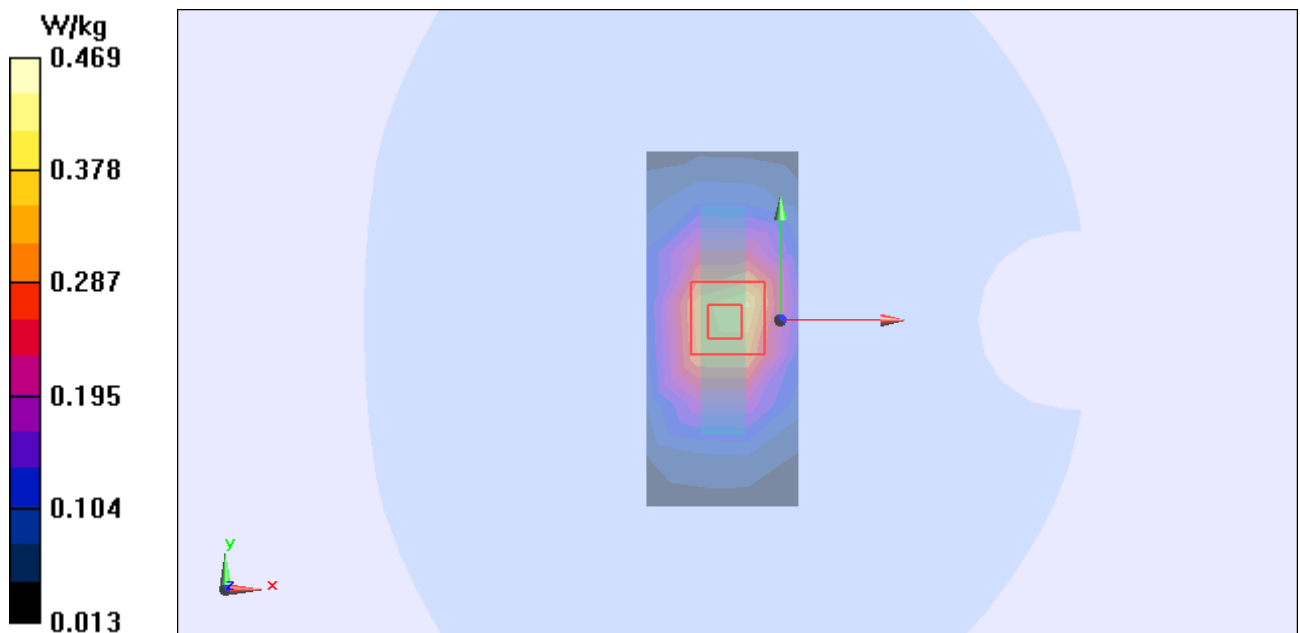


Figure 32 Body, Bottom Edge, GSM 1900 GPRS (3Txslots) Channel 661

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GSM 1900 EGPRS (3Txslots) Back Side Middle

Date/Time: 05.06.2013 11:47:49

Communication System: EGPRS(3UP); Frequency: 1880 MHz; Duty Cycle: 1:2.76694

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.508$ S/m; $\epsilon_r = 52.874$; $\rho = 1000$ kg/m³

Ambient Temperature: 22.3 °C Liquid Temperature: 21.5 °C

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 22.06.2012;

Electronics: DAE4 Sn1317; Calibrated: 25.01.2013

Phantom: SAM 1; Type: QD000P40CD; Serial: TP:1666

Measurement SW: DASY52, Version 52.8 (5); SEMCAD X Version 14.6.8 (7028)

Back Side Middle/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.708 W/kg

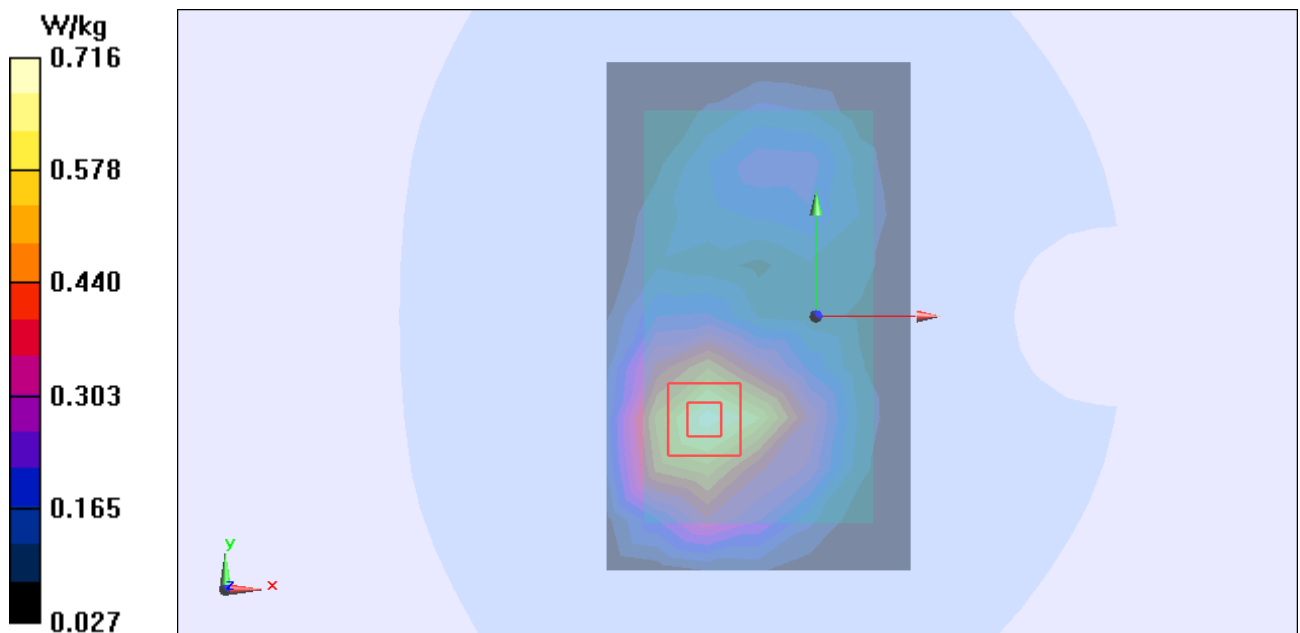
Back Side Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.864 V/m; Power Drift = 0.150 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.659 W/kg; SAR(10 g) = 0.406 W/kg

Maximum value of SAR (measured) = 0.716 W/kg



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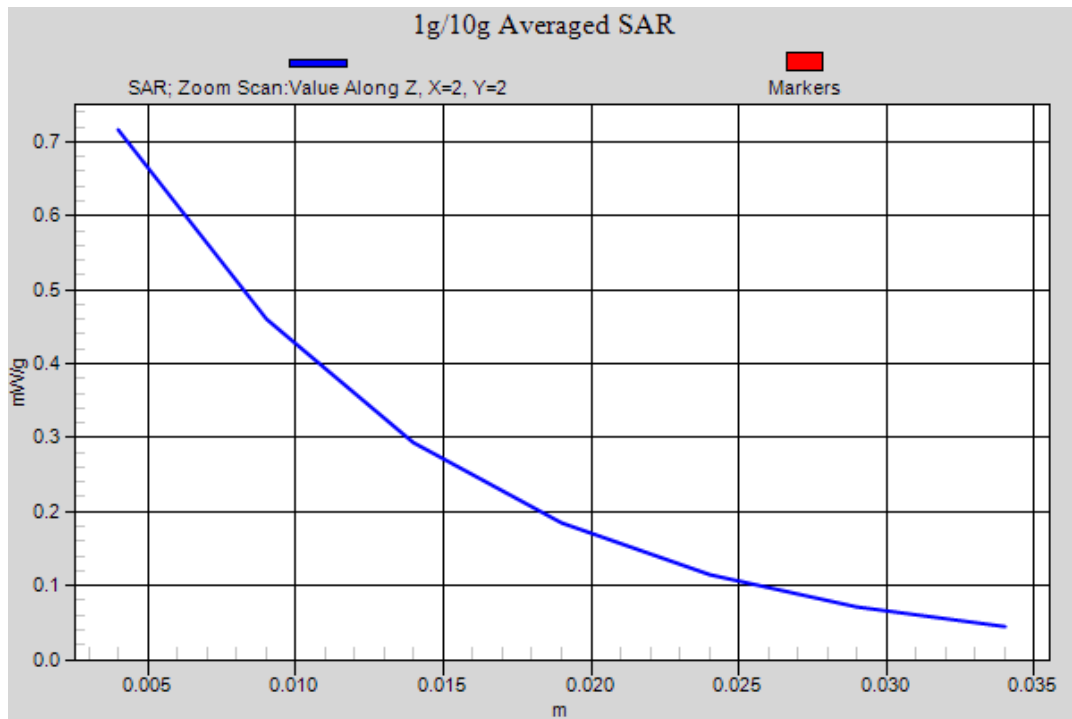


Figure 33 Body, Back Side, GSM 1900 EGPRS (3Txslots) Channel 661