TESTING
No. L2264

SAR TEST REPORT

Product Name	Neptune pine
Model	P312
FCC ID	2ABWUP312
Client	NEPTUNE COMPUTER INC.
Manufacturer	NEPTUNE COMPUTER INC.
Date of issue	June 10, 2014

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Reference Standard(s)	**FCC 47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **ANSI C95.1, 1992:** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991) **IEEE Std 1528™-2003:** IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques. **KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03:** SAR Measurement Requirements for 100 MHz to 6 GHz **KDB 447498 D01 Mobile Portable RF Exposure v05r02:** Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies **KDB 648474 D04 Handset SAR v01r02:** SAR Evaluation Considerations for Wireless Handsets. **KDB 941225 D01 SAR test for 3G devices v02:** SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA **KDB 941225 D02 HSPA and 1x Advanced v02r02** SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced **KDB 941225 D03 Test Reduction GSM_GPRS_EDGE v01:**Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE **KDB 248227 D01 SAR meas for 802 11 a b g v01r02:** SAR Measurement Procedures for 802.11a/b/g Transmitters.
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards for the tested bands only. General Judgment: **Pass**
Comment	The test result only responds to the measured sample.

Approved by_____ **Revised by**_____ **Performed by**_____

Weizhong Yang	Minbao Ling	Yi Zhang
Director	SAR Manager	SAR Engineer

TABLE OF CONTENT

1. General Information 5
1.1. Notes of the Test Report 5
1.2. Testing Laboratory 5
1.3. Applicant Information 6
1.4. Manufacturer Information 6
1.5. Information of EUT 7
1.6. EUT Antenna Locations 9
1.7. The Maximum Reported SAR 10
1.8. Test Date 11
2. SAR Measurements System Configuration 12
2.1. SAR Measurement Set-up 12
2.2. DASY5 E-field Probe System 13
2.2.1. EX3DV4 Probe Specification 13
2.2.2. E-field Probe Calibration 14
2.3. Other Test Equipment 14
2.3.1. Device Holder for Transmitters 14
2.3.2. Phantom 15
2.4. Scanning Procedure 15
2.5. Data Storage and Evaluation 17
2.5.1. Data Storage 17
2.5.2. Data Evaluation by SEMCAD 17
3. Laboratory Environment 19
4. Tissue-equivalent Liquid 20
4.1. Tissue-equivalent Liquid Ingredients 20
4.2. Tissue-equivalent Liquid Properties 22
5. System Check 23
5.1. Description of System Check 23
5.2. System Check Results 25
6. Operational Conditions during Test 27
6.1. General Description of Test Procedures 27
6.2. Test Positions 27
6.2.1. For wrist watch mode (strap/wristband attached) 27
6.2.2. For stand-alone mode (no strap/wristband) 27
6.3. Measurement Variability 28
6.4. Test Configuration 29
6.4.1. GSM Test Configuration 29
6.4.2. UMTS Test Configuration 30
6.4.3. HSDPA Test Configuration 30
6.4.4. HSUPA Test Configuration 32
6.4.5. WIFI Test Configuration 33

7. Test Results 34
7.1. Conducted Power Results 34
7.2. Standalone SAR Test Exclusion Considerations 40
7.3. SAR Test Results 41
7.3.1. GSM 850 (GSM/GPRS/EGPRS) 41
7.3.2. GSM 1900 (GSM/GPRS/EGPRS) 43
7.3.3. UMTS Band II (WCDMA/HSDPA/HSUPA) 45
7.3.4. UMTS Band IV (WCDMA/HSDPA/HSUPA) 47
7.3.5. UMTS Band V (WCDMA/HSDPA/HSUPA) 49
7.3.6. WIFI 51
7.4. Simultaneous Transmission Conditions 52
8. 700MHz to 3GHz Measurement Uncertainty 61
9. Main Test Instruments 64
ANNEX A: Test Layout 65
ANNEX B: System Check Results 70
ANNEX C: Graph Results 78
ANNEX D: Volume Scan Graph Results 114
ANNEX E: Probe Calibration Certificate 123
ANNEX F: D835V2 Dipole Calibration Certificate 134
ANNEX G: D1750V2 Dipole Calibration Certificate 142
ANNEX H: D1900V2 Dipole Calibration Certificate 150
ANNEX I: D2450V2 Dipole Calibration Certificate 158
ANNEX J: DAE4 Calibration Certificate 166
ANNEX K: The EUT Appearances and Test Configuration 169

1. General Information

1.1. Notes of the Test Report

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

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

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

1.2. Testing Laboratory

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1.3. Applicant Information

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1.4. Manufacturer Information

Company:	NEPTUNE COMPUTER INC.
Address:	666 SHERBROOKE ST. W., SUITE 1000 MONTREAL H3A 1E7 CANADA

1.5. Information of EUT

General Information

Device Type:	Portable Device	
Exposure Category:	Uncontrolled Environment / General Population	
State of Sample:	Prototype Unit	
Product IMEI:	354727049900673	
Hardware Version:	P1	
Software Version:	JB_V0.29	
Antenna Type:	Internal Antenna	
Device Operating Configurations :		
Test Mode(s):	GSM 850/GSM 1900; UMTS Band II/UMTS Band IV/ UMTS Band V; 802.11b/g/n HT20; Bluetooth; Bluetooth 4.0;	
Test Modulation:	(GSM)GMSK; (UMTS)QPSK;(802.11b)CCK; (802.11g/n) 64QAM;	
Device Class:	B	
HSDPA UE Category:	8	
HSUPA UE Category:	6	
GPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4
	Max Number of Timeslots in Downlink	4
	Max Total Timeslot	5
EGPRS Multislot Class(12):	Max Number of Timeslots in Uplink	4
	Max Number of Timeslots in Downlink	4
	Max Total Timeslot	5
Operating Frequency Range(s):	Mode	Tx (MHz)
	GSM 850	824.2 ~ 848.8
	GSM 1900	1850.2 ~ 1909.8
	UMTS Band II	1852.4 ~ 1907.6
	UMTS Band IV	1712.4 ~ 1752.6
	UMTS Band V	826.4 ~ 846.6
	Bluetooth/ Bluetooth 4.0	2402 ~2480
	WIFI	2412 ~2462
Power Class:	GSM 850: 4	
	GSM 1900: 1	
	UMTS Band II/IV/V: 3	
Power Level	GSM 850: level 5	

	GSM 1900: level 0
	UMTS Band II/IV/V: all up bits
Operating Channel/ Frequency(MHz): (Low - Middle - High)	128/824.4 – 190/836.6 – 251/848.8 (GSM 850) 512/1850.2 – 661/1880 – 810/1909.8 (GSM 1900) 9262/1852.4 – 9400/1880 – 9538/1907.6 (UMTS Band II) 1312/1712.4 – 1413/1732.6 – 1513/1752.6 (UMTS Band IV) 4132/826.4 – 4183/836.6 – 4233/846.6 (UMTS Band V) 1/2412 – 6/2437 – 11/2462 (802.11b/g/n HT20)

Auxiliary Equipment Details

AE:Battery

Model:	Mini Phone
Manufacturer:	Tian Yu Communication Technology (Kun Shan) CO.,Ltd
S/N:	OFD43007J2701
capacity:	810mAh
voltage	3.7V

1.6. EUT Antenna Locations

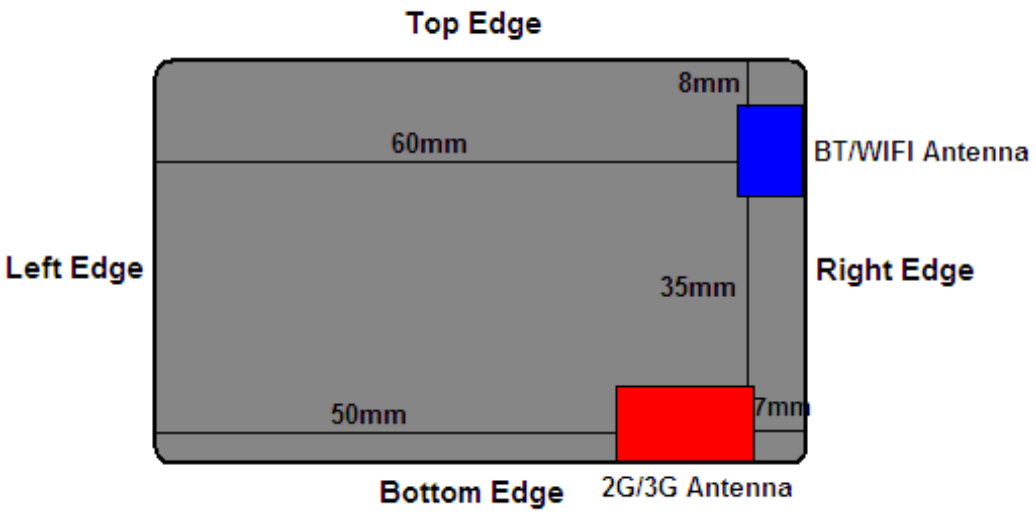

Table 1: Mobile Hotspot Sides for SAR Testing

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

1.7. The Maximum Reported SAR

For wrist watch mode (strap/wristband attached)

Mode	Test Position	Channel /Frequency (MHz)	Distance (mm)	Limit SAR_{1g} 1.6 W/kg	
				Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
GSM 850	Front Side	190/836.6	10mm	0.208	0.222
GSM 1900	Front Side	661/1880	10mm	0.341	0.359
UMTS Band II	Front Side	9400/1880	10mm	0.342	0.357
UMTS Band IV	Front Side	1413/1732.6	10mm	0.306	0.353
UMTS Band V	Front Side	4183/836.6	10mm	0.146	0.150
WiFi(802.11b)	Front Side	11/2462	10mm	0.129	0.169
Mode	**Test Position**	**Channel /Frequency(MHz)**	**Distance (mm)**	**Limit SAR_{10g} 4.0 W/kg**	
				Measured SAR_{10g} (W/kg)	**Reported SAR_{10g} (W/kg)**
GPRS 850 2Tx slots	Back Side	190/836.6	0mm	0.550	0.559
GPRS 1900 4Tx slots	Back Side	661/1880	0mm	0.181	0.183
UMTS Band II	Back Side	9400/1880	0mm	0.217	0.227
UMTS Band IV	Back Side	1413/1732.6	0mm	0.344	0.397
UMTS Band V	Back Side	4183/836.6	0mm	0.491	0.504
WiFi(802.11b)	Back Side	11/2462	0mm	0.130	0.170

For stand-alone mode (no strap/wristband)

Mode	Test Position	Channel /Frequency(MHz)	Distance (mm)	Limit SAR_{1g} 1.6 W/kg	
				Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
GPRS 850 2Tx slots	Back Side	128/824.2	2mm	1.340	1.368
GSM 1900	Back Side	661/1880	2mm	1.320	1.389
UMTS Band II	Back Side	9262/1852.4	2mm	1.360	1.411
UMTS Band IV	Back Side	1312/1712.4	2mm	1.250	1.367
UMTS Band V	Back Side	4183/836.6	2mm	1.150	1.179
WiFi(802.11b)	Back Side	11/2462	2mm	0.317	0.415
Mode	**Test Position**	**Channel /Frequency(MHz)**	**Distance (mm)**	**Limit SAR_{10g} 4 W/kg**	
				Measured SAR_{10g} (W/kg)	**Reported SAR_{10g} (W/kg)**
GPRS 850 2Tx slots	Bottom Edge	190/836.6	0mm	0.261	0.265
GPRS 1900 4Tx slots	Bottom Edge	661/1880	0mm	1.250	1.262
UMTS Band II	Bottom Edge	9400/1880	0mm	1.630	1.703
UMTS Band IV	Bottom Edge	1413/1732.6	0mm	1.150	1.326
UMTS Band V	Bottom Edge	4183/836.6	0mm	0.366	0.375
WiFi(802.11b)	Right Edge	11/2462	0mm	0.341	0.446

1.8. Test Date

The test performed from April 24, 2014 to April 28, 2014.

2. SAR Measurements System Configuration

2.1. SAR Measurement Set-up

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

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

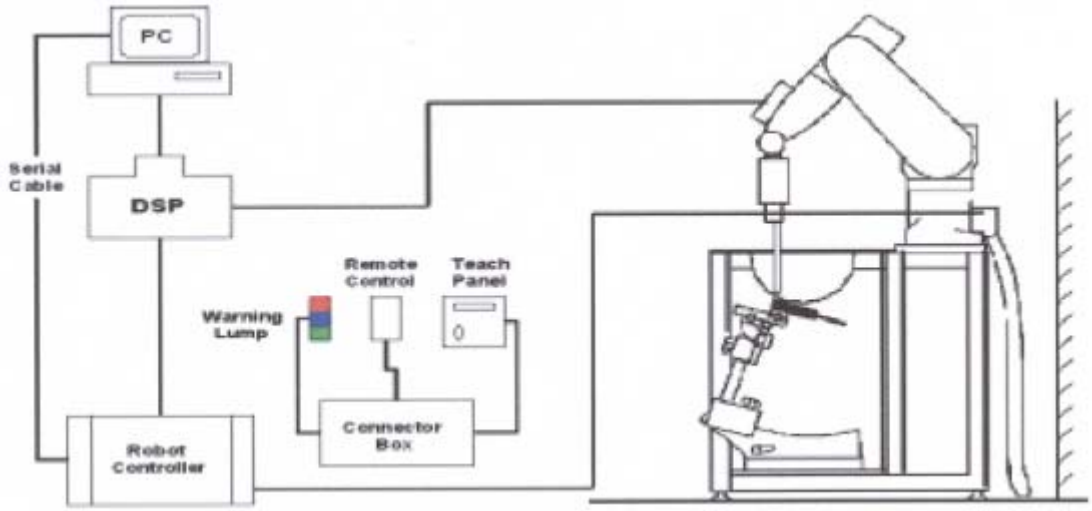

Figure 1 SAR Lab Test Measurement Set-up

2.2. DASY5 E-field Probe System

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

2.2.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to > 100 mW/g Linearity: ± 0.2dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

Figure 2.EX3DV4 E-field Probe

Figure 3. EX3DV4 E-field probe

2.2.2. E-field Probe Calibration

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

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

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

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

Where:
σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m3).

2.3. Other Test Equipment

2.3.1. Device Holder for Transmitters

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

Figure 4 Device Holder

2.3.2. Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden Figure. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness 2±0.1 mm
Filling Volume Approx. 20 liters
Dimensions 810 x 1000 x 500 mm (H x L x W) Aailable Special

Figure 5 Generic Twin Phantom

2.4. Scanning Procedure

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

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

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

- Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid

spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged.
After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

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

- Spatial Peak Detection
  The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:
  • maximum search
  • extrapolation
  • boundary correction
  • peak search for averaged SAR
  During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation.
- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 2: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01

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

2.5. Data Storage and Evaluation

2.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

2.5.2. Data Evaluation by SEMCAD

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

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

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

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

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

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

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

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

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

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

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)^2] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

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

f = carrier frequency [GHz]

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

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

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

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

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

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

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

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

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

= equivalent tissue density in g/cm^3

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

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

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

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

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

3. Laboratory Environment

Table 3: The Requirements of the Ambient Conditions

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

4. Tissue-equivalent Liquid

4.1. Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The table 4 and table 5 show the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB 865664 D01.

Table 4: Composition of the Head Tissue Equivalent Matter

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

MIXTURE%	FREQUENCY(Brain) 1750MHz
Water	55.24
Glycol	44.45
Salt	0.31
Dielectric Parameters Target Value	f=1750MHz ε=40.1 σ=1.37

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

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

Table 5: Composition of the Body Tissue Equivalent Matter

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

MIXTURE%	FREQUENCY(Body) 1750MHz
Water	69.91
Glycol	29.97
Salt	0.12
Dielectric Parameters Target Value	f=1750MHz ε=53.4 σ=1.49

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

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

4.2. Tissue-equivalent Liquid Properties

Table 6: Dielectric Performance of Tissue Simulating Liquid

Frequency	Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
			ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r(%)	Dev σ(%)
835MHz (head)	2014-4-24	21.5	41.4	0.92	41.5	0.90	-0.24	2.22
1750MHz (head)	2014-4-24	21.5	39.7	1.32	40.1	1.37	-1.00	-3.65
1900MHz (head)	2014-4-24	21.5	39.6	1.43	40.0	1.40	-1.00	2.14
2450MHz (head)	2014-4-24	21.5	39.1	1.80	39.2	1.80	-0.26	0.00
835MHz (body)	2014-4-25	21.5	55.1	0.99	55.2	0.97	-0.18	2.06
1750MHz (body)	2014-4-27	21.5	52.9	1.50	53.4	1.49	-0.94	0.67
1900MHz (body)	2014-4-26	21.5	53.1	1.52	53.3	1.52	-0.38	0.00
2450MHz (body)	2014-4-28	21.5	52.1	1.99	52.7	1.95	-1.14	2.05

5. System Check

5.1. Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 7 and table 8.

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

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

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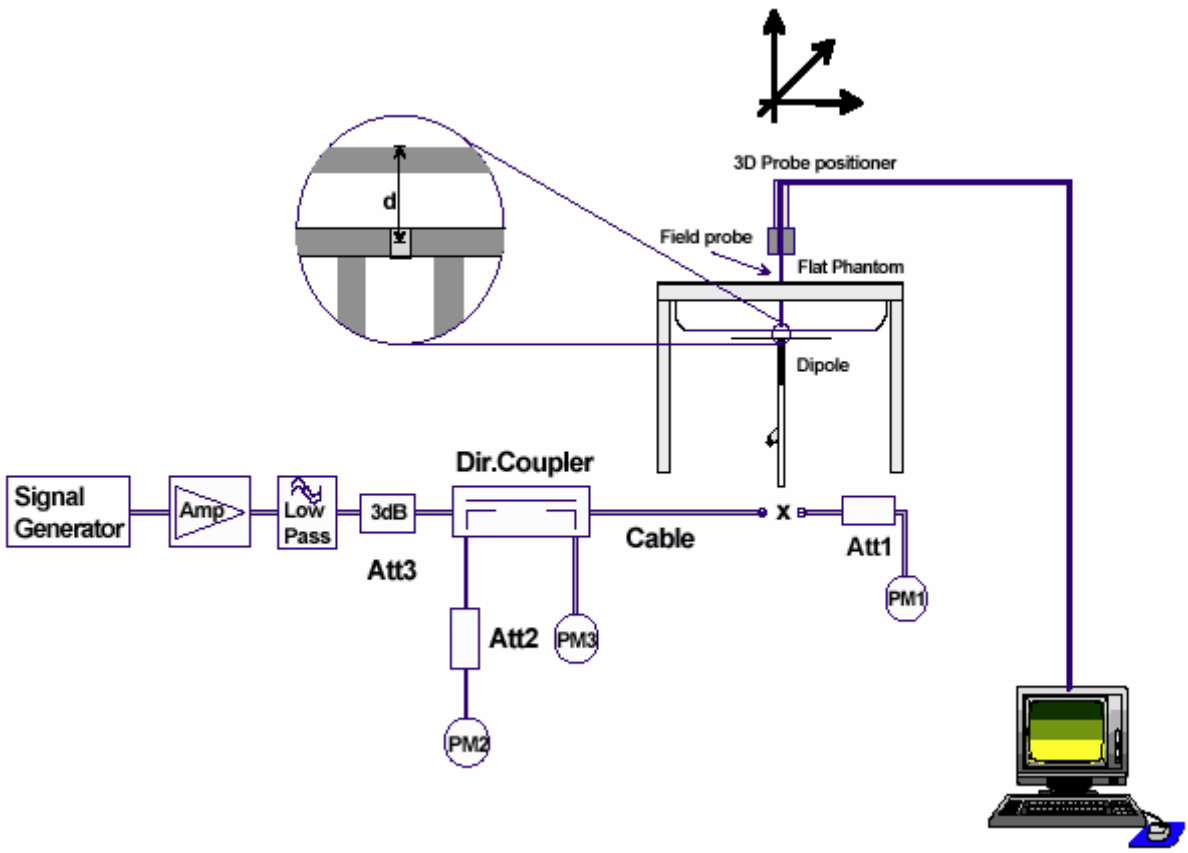


Figure 6 System Check Set-up

Justification for Extended SAR Dipole Calibrations

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

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

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

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

5.2. System Check Results

Table 7: System Check in Head Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
835MHz	2014-4-24	41.4	0.92	2.44	9.76	9.34	4.50%
1750MHz	2014-4-24	39.7	1.32	8.75	35.0	37.20	-5.91%
1900MHz	2014-4-24	39.6	1.43	9.48	37.92	40.30	-5.91%
2450MHz	2014-4-24	39.1	1.80	13.70	54.80	53.80	1.86%

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

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR_{10g}	1W Normalized SAR_{10g}	1W Target SAR_{10g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
835MHz	2014-4-24	41.4	0.92	1.60	6.40	6.11	4.75%
1750MHz	2014-4-24	39.7	1.32	4.50	18.00	19.80	-5.05%
1900MHz	2014-4-24	39.6	1.43	4.90	19.60	21.10	-7.11%
2450MHz	2014-4-24	39.1	1.80	6.22	24.88	25.40	-2.05%

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

Table 8: System Check in Body Tissue Simulating Liquid

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR_{1g}	1W Normalized SAR_{1g}	1W Target SAR_{1g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
835MHz	2014-4-25	55.1	0.99	2.41	9.64	9.46	1.90%
1750MHz	2014-4-27	52.9	1.50	9.24	36.96	38.80	-4.74%
1900MHz	2014-4-26	53.1	1.52	9.93	39.72	41.70	-4.75%
2450MHz	2014-4-28	52.1	1.99	12.50	50.00	51.70	-3.29%

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

Frequency	Test Date	Dielectric Parameters		250mW Measured SAR_{10g}	1W Normalized SAR_{10g}	1W Target SAR_{10g}	Limit (±10% Deviation)
		ε_r	σ(s/m)	(W/kg)			
835MHz	2014-4-25	55.1	0.99	1.60	6.4	6.26	2.24%
1750MHz	2014-4-27	52.9	1.50	4.90	19.6	20.60	-4.85%
1900MHz	2014-4-26	53.1	1.52	5.25	21	22.00	-4.55%
2450MHz	2014-4-28	52.1	1.99	6.20	24.8	24.20	2.48%

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

6. Operational Conditions during Test

6.1. General Description of Test Procedures

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

Connection to the EUT is established via air interface with CMW 500, and the EUT is set to maximum output power by CMW 500. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

6.2. Test Positions

Per PBA response by FCC, the following test procedure will be complied.

6.2.1. For wrist watch mode (strap/wristband attached)

1-gram SAR, 10 mm from the flat phantom with head tissue medium (for front/screen of device) and 10-gram SAR with 0 mm/direct contact with the neck/jaw region of the phantom with body tissue medium (for rear of device). This will show compliance for the device when utilizing the gain provided by the metal/antenna in the wristband.

6.2.2. For stand-alone mode (no strap/wristband)

1-gram SAR, 2 mm from the flat phantom with body tissue medium for both the front/screen and back side of the device. Also provide 10 gram SAR with 0 mm/direct contact with the flat phantom with body tissue medium for the narrow side of the device containing the main 3G antenna and the narrow side next to the main 3G antenna. 10 gram SAR testing for the remaining 2 narrow sides is not required. This will show compliance for the device when placed next to the body and when held in the hand.

6.3. Measurement Variability

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

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

6.4. Test Configuration

6.4.1. GSM Test Configuration

For the body SAR tests for GSM 900 and GSM 1800, a communication link is set up with a System Simulator (SS) by air link. Using CMW 500 the power level is set to “5” for GSM 900, set to “0” for GSM 1800. The GPRS class is 12 for this EUT; it has at most 4Timesolts in uplink and at most 4Timesolts in downlink, the maximum total Timesolts is 5. The EGPRS class is 12 for this EUT; it has at most 4 Timesolts in uplink and at most 4 Timesolts in downlink, the maximum total Timesolts is 5.

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

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

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

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

6.4.2. UMTS Test Configuration

6.4.2.1. Output power Verification

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

6.4.2.2. Head SAR Measurements

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

6.4.2.3. Body SAR Measurements

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

6.4.3. HSDPA Test Configuration

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

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

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

Table 10: Subtests for UMTS Release 5 HSDPA

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

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

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

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

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

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

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

6.4.4. HSUPA Test Configuration

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

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

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

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

Note 1: Δ_{ACK}, ΔNACK and Δ_{CQI} = 8 ⇔ $A_{hs} = \underline{\beta}_{hs}/\underline{\beta}_c$ = 30/15 ⇔ $\underline{\beta}_{hs}$= 30/15 *β_c.

Note 2: CM = 1 for βc/βd =12/15, $\underline{\beta}_{hs}/\underline{\beta}_c$ =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 βc/βd ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the
signaled gain factors for the reference TFC (TF1, TF1) to βc = 10/15 and βd = 15/15.

Note 4: For subtest 5 the βc/βd ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the
signaled gain factors for the reference TFC (TF1, TF1) to βc = 14/15 and βd = 15/15.

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

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

Table 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)

6.4.5. WIFI Test Configuration

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. The Tx power is set to 15 by software.This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

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

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

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

7. Test Results

7.1. Conducted Power Results

Table 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	Results	29.19	29.22	29.04	-9.03dB	20.16	20.19	20.01
GPRS (GMSK)	1Txslot	29.17	29.19	29.09	-9.03dB	20.14	20.16	20.06
	2Txslots	26.71	26.73	26.6	-6.02dB	**20.69**	**20.71**	**20.58**
	3Txslots	24.69	24.71	24.62	-4.26dB	20.43	20.45	20.36
	4Txslots	23.16	23.18	23.11	-3.01dB	20.15	20.17	20.1
EGPRS (GMSK)	1Txslot	29.24	29.26	29.14	-9.03dB	20.21	20.23	20.11
	2Txslots	26.77	26.79	26.68	-6.02dB	**20.75**	**20.77**	**20.66**
	3Txslots	24.75	24.77	24.67	-4.26dB	20.49	20.51	20.41
	4Txslots	23.23	23.25	23.15	-3.01dB	20.22	20.24	20.14
EGPRS (8PSK)	1Txslot	27.03	27.21	27.06	-9.03dB	18	18.18	18.03
	2Txslots	24.12	24.12	24.08	-6.02dB	18.1	18.1	18.06
	3Txslots	23.05	23.08	23.07	-4.26dB	18.79	18.82	18.81
	4Txslots	22.11	22.14	22.07	-3.01dB	19.1	19.13	19.06
GSM 1900		**Burst Conducted Power(dBm)**				**Average power(dBm)**		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GSM	Results	28.59	28.58	28.42	-9.03dB	19.56	19.55	19.39
GPRS (GMSK)	1Txslot	28.56	28.55	28.48	-9.03dB	19.53	19.52	19.45
	2Txslots	25.47	25.47	25.41	-6.02dB	19.45	19.45	19.39
	3Txslots	23.57	23.57	23.51	-4.26dB	19.31	19.31	19.25
	4Txslots	22.56	22.56	22.5	-3.01dB	**19.55**	**19.55**	**19.49**
EGPRS (GMSK)	1Txslot	28.42	28.57	28.4	-9.03dB	19.39	19.54	19.37
	2Txslots	25.32	25.47	25.32	-6.02dB	19.3	19.45	19.3
	3Txslots	23.42	23.57	23.43	-4.26dB	19.16	19.31	19.17
	4Txslots	22.4	22.56	22.42	-3.01dB	**19.39**	**19.55**	**19.41**
EGPRS (8PSK)	1Txslot	23.9	24.03	23.92	-9.03dB	14.87	15	14.89
	2Txslots	22.38	22.54	22.42	-6.02dB	16.36	16.52	16.4
	3Txslots	21.38	21.52	21.43	-4.26dB	17.12	17.26	17.17

	4Txslots	20.87	21.02	20.91	-3.01dB	17.86	18.01	17.9

Note:

1) Division Factors

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

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

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

2Txslots = 2 transmit time slots out of 8 time slots

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

3Txslots = 3 transmit time slots out of 8 time slots

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

4Txslots = 4 transmit time slots out of 8 time slots

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

2) Average power numbers

The maximum power numbers are marks in bold.

UMTS Band II		Conducted Power (dBm)		
		Channel 9262	Channel 9400	Channel 9538
RMC	12.2kbps RMC	19.84	19.81	19.74
	64kbps RMC	19.84	19.74	19.69
	144kbps RMC	19.34	19.37	19.31
	384kbps RMC	19.40	19.11	19.20
HSDPA	Sub - Test 1	19.85	19.53	19.48
	Sub - Test 2	19.85	19.44	19.53
	Sub - Test 3	19.35	19.1	19.12
	Sub - Test 4	19.41	19.09	19.12
HSUPA	Sub - Test 1	19.41	18.63	18.96
	Sub - Test 2	17.89	17.99	17.54
	Sub - Test 3	18.78	18.21	18.11
	Sub - Test 4	18.09	17.92	18.3
	Sub - Test 5	20.19	18.84	19.09
UMTS Band IV		Conducted Power (dBm)		
		Channel 1312	Channel 1413	Channel 1513
RMC	12.2kbps RMC	19.11	18.88	19.06
	64kbps RMC	19.01	18.70	19.03
	144kbps RMC	18.75	18.42	18.91
	384kbps RMC	18.81	18.40	18.77
HSDPA	Sub - Test 1	19.28	18.78	19.2
	Sub - Test 2	19.09	18.7	19.17
	Sub - Test 3	18.77	18.39	18.84
	Sub - Test 4	18.79	18.38	18.73
HSUPA	Sub - Test 1	18.33	17.77	18.49
	Sub - Test 2	17.39	16.98	17.42
	Sub - Test 3	17.61	17.16	17.89
	Sub - Test 4	17.5	16.87	17.61

	Sub - Test 5	18.82	18.08	18.57
UMTS Band V		**Conducted Power (dBm)**		
		Channel 4132	Channel 4183	Channel 4233
RMC	12.2kbps RMC	20.2	20.39	20.45
	64kbps RMC	19.93	20.33	20.42
	144kbps RMC	19.45	19.88	20.01
	384kbps RMC	19.5	19.85	19.98
HSDPA	Sub - Test 1	20.00	20.36	20.54
	Sub - Test 2	19.9	20.31	20.5
	Sub - Test 3	19.4	19.83	19.96
	Sub - Test 4	19.47	19.82	19.96
HSUPA	Sub - Test 1	19.19	19.6	19.87
	Sub - Test 2	18.03	18.33	18.5
	Sub - Test 3	18.3	18.69	18.86
	Sub - Test 4	18.05	18.44	18.63
	Sub - Test 5	18.96	19.34	19.52

The average output power of BT antenna is as following:

Channel	**Ch 0 2402 MHz**	**Ch 39 2441 MHz**	**Ch 78 2480 MHz**
GFSK(dBm)	5.43	6.25	6.30
π/4DQPSK(dBm)	4.95	6.21	6.29
8DPSK(dBm)	5.74	6.33	6.32
BT 4.0 Channel	**Ch 0 2402 MHz**	**Ch 19 2440 MHz**	**Ch 39 2480 MHz**
Test results(dBm)	-1.97	-0.99	-1.07

The output power of WIFI antenna is as following:

Mode	Channel	Data rate (Mbps)	Peak Power (dBm)
802.11b	1	1	15.3
		2	15.35
		5.5	15.87
		11	16.08
	6	1	15.8
		2	16.27
		5.5	16.33
		11	16.73
	11	1	15.83
		2	15.9
		5.5	16.38
		11	16.75
802.11g	1	6	13.85
		9	13.8
		12	13.92
		18	13.91
		24	15.32
		36	14.51
		48	13.22
		54	13.3
	6	6	15.43
		9	15.57
		12	15.68
		18	15.85
		24	17.03
		36	16.45
		48	14.87

		54	15.3
	11	6	15.34
		9	14.86
		12	15.13
		18	15.22
		24	16.56
		36	16.33
		48	15.17
		54	15.44
802.11n HT20	1	MCS0	14.42
		MCS1	14.67
		MCS2	14.55
		MCS3	15.88
		MCS4	13.19
		MCS5	13.06
		MCS6	11.42
		MCS7	11.33
	6	MCS0	15.99
		MCS1	16.04
		MCS2	15.99
		MCS3	17.17
		MCS4	14.51
		MCS5	14.92
		MCS6	12.88
		MCS7	12.86
	11	MCS0	15.21
		MCS1	15.25
		MCS2	15.1
		MCS3	16.94
		MCS4	14.19
		MCS5	13.99
		MCS6	12.21
		MCS7	11.99

7.2. Standalone SAR Test Exclusion Considerations

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

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

Based on the above equation, Bluetooth SAR was not required;
Front Evaluation = $[10^{(6.5/10)}/10] * (2.480^{1/2}) = 0.70 < 3.0$
Back Evaluation = $[10^{(6.5/10)}/5] * (2.480^{1/2}) = 1.40 < 3.0$

Based on the above equation, WIFI SAR was required;
Front Evaluation = $[10^{(17.5/10)}/10]* (2.462^{1/2)} = 8.82 > 3.0$
Back Evaluation = $[10^{(17.5/10)}/5]* (2.462^{1/2)} = 17.64 > 3.0$

7.3. SAR Test Results

7.3.1. GSM 850 (GSM/GPRS/EGPRS)

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

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Front face with strap attached (Distance 10mm)										
Front Side	190/836.6	GSM	1:8.3	29.5	29.22	-0.026	0.208	1.07	0.222	Figure 15
Test Position of Body without strap attached (Distance 2mm)										
Back Side	251/848.8	2Txslots	1:4.15	26.8	26.6	0.080	0.802	1.05	0.840	/
	190/836.6	2Txslots	1:4.15	26.8	26.73	0.050	1.040	1.02	1.057	/
	128/824.2	2Txslots	1:4.15	26.8	26.71	-0.120	1.320	1.02	1.348	/
Front Side	190/836.6	2Txslots	1:4.15	26.8	26.73	-0.120	0.516	1.02	0.524	/
Worst Test Position of Body with EGPRS without strap attached (Distance 2mm)										
Back Side	128/824.2	2Txslots	1:4.15	26.8	26.77	0.037	1.290	1.01	1.299	/
Worst Test Position of Body with Earphone without strap attached (Distance 2mm)										
Back Side	128/824.2	GSM	1:8.3	29.5	29.19	-0.036	1.210	1.07	1.300	/
Worst Case Position of SAR(1st Repeated SAR, Distance 2mm)										
Back Side	128/824.2	2Txslots	1:4.15	26.8	26.71	-0.035	1.340	1.02	1.368	Figure 16

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. When multiple slots can be used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. 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.

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{10g} 4.0 W/kg			
						Drift (dB)	Measured SAR_{10g} (W/kg)	Scaling Factor	Reported SAR_{10g} (W/kg)	Graph Results
Test Position of Jaw with strap attached (Distance 0mm)										
Back Side	190/836.6	2Txslots	1:4.15	26.8	26.73	-0.023	0.550	1.02	0.559	Figure 17
Test Position of Body without strap attached (Distance 0mm)										
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Right Edge	190/836.6	2Txslots	1:4.15	26.8	26.73	-0.190	0.175	1.02	0.178	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Bottom Edge	190/836.6	2Txslots	1:4.15	26.8	26.73	-0.025	0.261	1.02	0.265	/

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 ≤ 2 W/kg then testing at the other channels is not required for such test configuration(s).

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

Table 16: SAR Measurement Variability Results [GSM 850(GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	128/824.2	1.32	1.34	1.02	N/A	N/A

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

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.3.2. GSM 1900 (GSM/GPRS/EGPRS)

Table 17: SAR Values [GSM 1900(GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Front face with strap attached (Distance 10mm)										
Front Side	661/1880	GSM	1:8.3	28.8	28.58	0.030	0.341	1.05	0.359	Figure 18
Test Position of Body without strap attached (Distance 2mm)										
Back Side	810/1909.8	4Txslots	1:2.07	22.6	22.5	-0.050	1.310	1.02	1.341	/
	661/1880	4Txslots	1:2.07	22.6	22.56	0.030	1.370	1.01	1.383	/
	512/1850.2	4Txslots	1:2.07	22.6	22.56	0.090	1.320	1.01	1.332	/
Front Side	661/1880	4Txslots	1:2.07	22.6	22.56	0.021	0.712	1.01	0.719	/
Worst Test Position of Body with EGPRS without strap attached (Distance 2mm)										
Back Side	661/1880	4Txslots	1:2.07	22.6	22.56	-0.010	1.130	1.01	1.140	/
Worst Test Position of Body with Earphone without strap attached (Distance 2mm)										
Back Side	661/1880	GSM	1:8.3	28.8	28.58	0.070	1.320	1.05	1.389	Figure 19
Worst Case Position of SAR(1st Repeated SAR, Distance 2mm)										
Back Side	661/1880	4Txslots	1:2.07	22.6	22.56	0.030	1.300	1.01	1.312	/

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. When multiple slots can be used, SAR should be tested to account for the maximum source-based time-averaged output power.
4. 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.

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{10g} 4.0 W/kg			
						Drift (dB)	Measured SAR_{10g} (W/kg)	Scaling Factor	Reported SAR_{10g} (W/kg)	Graph Results
Test Position of Jaw with strap attached (Distance 0mm)										
Back Side	661/1880	4Txslots	1:2.07	22.6	22.56	-0.080	0.181	1.01	0.183	/
Test Position of Body without strap attached (Distance 0mm)										
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Right Edge	661/1880	4Txslots	1:2.07	22.6	22.56	0.096	0.410	1.01	0.414	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Bottom Edge	661/1880	4Txslots	1:2.07	22.6	22.56	0.110	1.250	1.01	1.262	Figure 20

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 ≤ 2 W/kg then testing at the other channels is not required for such test configuration(s).

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

Table 18: SAR Measurement Variability Results [GSM 1900(GSM/GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	661/1880	1.37	1.3	1.05	N/A	N/A

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

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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

Table 19: 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 Front face with strap attached (Distance 10mm)										
Front Side	9400/1880	RMC 12.2K	1:1	20	19.81	-0.050	0.342	1.04	0.357	Figure 21
Test Position of Body without strap attached (Distance 2mm)										
Back Side	9538/1907.6	RMC 12.2K	1:1	20	19.74	0.120	1.100	1.06	1.168	/
	9400/1880	RMC 12.2K	1:1	20	19.81	-0.110	1.130	1.04	1.181	/
	9262/1852.4	RMC 12.2K	1:1	20	19.84	0.180	1.360	1.04	1.411	Figure 22
Front Side	9538/1907.6	RMC 12.2K	1:1	20	19.74	0.060	0.594	1.06	0.631	/
	9400/1880	RMC 12.2K	1:1	20	19.81	0.060	0.798	1.04	0.834	/
	9262/1852.4	RMC 12.2K	1:1	20	19.84	0.040	0.750	1.04	0.778	/
Worst Test Position of Body with Earphone without strap attached (Distance 2mm)										
Back Side	9262/1852.4	RMC 12.2K	1:1	20	19.84	0.050	1.150	1.04	1.193	/
Worst Test Position of Body with HSDPA without strap attached (Distance 2mm)										
Back Side	9262/1852.4	RMC 12.2K	1:1	20	19.85	-0.060	1.360	1.04	1.408	/
Worst Test Position of Body with HSUPA without strap attached (Distance 2mm)										
Back Side	9262/1852.4	RMC 12.2K	1:1	21	20.19	0.050	1.150	1.21	1.386	/
Worst Case Position of SAR(1st Repeated SAR, Distance 2mm)										
Back Side	9262/1852.4	RMC 12.2K	1:1	20	19.84	0.028	1.340	1.04	1.390	/

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. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.

Test Position	Channel/ Frequency (MHz)	Channel Type	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{10g} 4.0 W/kg			
						Drift (dB)	Measured SAR_{10g} (W/kg)	Scaling Factor	Reported SAR_{10g} (W/kg)	Graph Results
Test Position of Jaw with strap attached (Distance 0mm)										
Back Side	9400/1880	RMC 12.2K	1:1	20	19.81	-0.150	0.217	1.04	0.227	/
Test Position of Body without strap attached (Distance 0mm)										
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Right Edge	9400/1880	RMC 12.2K	1:1	20	19.81	-0.024	0.586	1.04	0.612	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Bottom Edge	9400/1880	RMC 12.2K	1:1	20	19.81	-0.050	1.630	1.04	1.703	Figure 23

Note: 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 ≤ 2 W/kg then testing at the other channels is not required for such test configuration(s).

3. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.

Table 20: SAR Measurement Variability Results [UMTS Band II (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	9262/1852.4	1.36	1.34	1.01	N/A	N/A

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

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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

Table 21: SAR Values [UMTS Band IV (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 Front face with strap attached (Distance 10mm)										
Front Side	1413/1732.6	RMC 12.2K	1:4.14	19.5	18.88	0.043	0.306	1.06	0.353	Figure 24
Test Position of Body without strap attached (Distance 2mm)										
Back Side	1513/1752.6	RMC 12.2K	1:1	19.5	19.06	-0.010	0.996	1.11	1.102	/
	1413/1732.6	RMC 12.2K	1:1	19.5	18.88	-0.140	1.180	1.06	1.361	/
	1312/1712.4	RMC 12.2K	1:1	19.5	19.11	0.010	1.250	1.09	1.367	Figure 25
Front Side	1413/1732.6	RMC 12.2K	1:1	19.5	18.88	-0.024	0.701	1.06	0.809	/
Worst Test Position of Body with Earphone without strap attached (Distance 2mm)										
Back Side	1312/1712.4	RMC 12.2K	1:1	19.5	19.11	0.120	1.190	1.09	1.302	/
Worst Test Position of Body with HSDPA without strap attached (Distance 2mm)										
Back Side	1312/1712.4	RMC 12.2K	1:1	19.5	19.28	0.020	1.280	1.05	1.347	/
Worst Test Position of Body with HSUPA without strap attached (Distance 2mm)										
Back Side	1312/1712.4	RMC 12.2K	1:1	19	18.82	0.050	1.070	1.04	1.115	/
Worst Case Position of SAR(1st Repeated SAR, Distance 2mm)										
Back Side	1312/1712.4	RMC 12.2K	1:1	19.5	19.11	0.110	1.240	1.09	1.357	/

Note: 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. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.

Test Position	Channel/ Frequency (MHz)	Channel Type	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{10g} 4.0 W/kg			
						Drift (dB)	Measured SAR_{10g} (W/kg)	Scaling Factor	Reported SAR_{10g} (W/kg)	Graph Results
Test Position of Jaw with strap attached (Distance 0mm)										
Back Side	1413/1732.6	RMC 12.2K	1:4.14	19.5	18.88	-0.026	0.344	1.06	0.397	/
Test Position of Body without strap attached (Distance 0mm)										
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Right Edge	1413/1732.6	RMC 12.2K	1:1	19.5	18.88	0.170	0.738	1.06	0.851	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Bottom Edge	1413/1732.6	RMC 12.2K	1:1	19.5	18.88	-0.090	1.150	1.06	1.326	Figure 26

Note: 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 ≤ 2W/kg then testing at the other channels is not required for such test configuration(s).

3. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.

Table 22: SAR Measurement Variability Results [UMTS Band IV (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	1312/1712.4	1.28	1.24	1.03	N/A	N/A

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

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

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

Table 23: 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 Front face with strap attached (Distance 10mm)										
Front Side	4183/836.6	RMC 12.2K	1:1	20.5	20.39	-0.070	0.146	1.03	0.150	Figure 27
Test Position of Body without strap attached (Distance 2mm)										
Back Side	4233/846.6	RMC 12.2K	1:1	20.5	20.45	-0.050	0.904	1.11	0.914	/
	4183/836.6	RMC 12.2K	1:1	20.5	20.39	0.170	1.150	1.03	1.179	Figure 28
	4132/826.4	RMC 12.2K	1:1	20.5	20.2	-0.150	1.040	1.07	1.114	/
Front Side	4183/836.6	RMC 12.2K	1:1	20.5	20.39	-0.020	0.271	1.03	0.278	/
Worst Test Position of Body with Earphone without strap attached (Distance 2mm)										
Back Side	4183/836.6	RMC 12.2K	1:1	20.5	20.39	0.060	1.110	1.03	1.138	/
Worst Case Position of SAR(1st Repeated SAR, Distance 2mm)										
Back Side	4183/836.6	RMC 12.2K	1:1	20.5	20.39	0.030	1.030	1.03	1.056	/

Note: 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. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.

Test Position	Channel/ Frequency (MHz)	Channel Type	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{10g} 4.0 W/kg			
						Drift (dB)	Measured SAR_{10g} (W/kg)	Scaling Factor	Reported SAR_{10g} (W/kg)	Graph Results
Test Position of Jaw with strap attached (Distance 0mm)										
Back Side	4183/836.6	RMC 12.2K	1:1	20.5	20.39	0.092	0.491	1.03	0.504	Figure 29
Test Position of Body without strap attached (Distance 0mm)										
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Right Edge	4183/836.6	RMC 12.2K	1:1	20.5	20.39	-0.035	0.126	1.03	0.129	/
Top Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Bottom Edge	4183/836.6	RMC 12.2K	1:1	20.5	20.39	-0.040	0.366	1.03	0.375	/

Note: 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 ≤ 2 W/kg then testing at the other channels is not required for such test configuration(s).

3. WCDMA mode were tested under RMC 12.2kbps without HSPA (HSDPA/HSUPA) inactive per KDB Publication 941225 D01. HSPA (HSDPA/HSUPA) SAR for body was required since the maximum SAR for 12.2kbps RMC was above 75% SAR limit.

Table 24: SAR Measurement Variability Results [UMTS Band V (WCDMA/HSDPA/HSUPA)]

Test Position	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Back Side	4183/836.6	1.15	1.03	1.17	N/A	N/A

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

2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.3.6. WIFI

Table 25: SAR Values(802.11b/g/n)

Test Position	Channel/ Frequency (MHz)	Service	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit 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 Front face with strap attached (802.11b,Distance 10mm)										
Front Side	11/2462	DSSS	1:1	17	15.83	-0.022	0.129	1.31	0.169	Figure 30
Test Position of Body without strap attached (802.11b,Distance 2mm)										
Back Side	11/2462	DSSS	1:1	17	15.83	0.170	0.317	1.31	0.415	Figure 31
Front Side	11/2462	DSSS	1:1	17	15.83	-0.020	0.315	1.31	0.412	/
Worst Test position of Body with 5.5Mbps (802.11b,Distance 2mm)										
Back Side	11/2462	DSSS	1:1	17	16.38	0.073	0.306	1.15	0.353	/
Worst Test position of Body with 11Mbps (802.11b,Distance 2mm)										
Back Side	11/2462	DSSS	1:1	17	16.75	-0.150	0.353	1.06	0.374	/
Worst Test Position of Body with 802.11g (24Mbps,Distance 2mm)										
Back Side	6/2437	OFDM	1:1	17.5	17.03	-0.080	0.215	1.11	0.240	/
Worst Test Position of Body with 802.11n (MCS3,Distance 2mm)										
Back Side	6/2437	OFDM	1:1	17.5	17.17	0.074	0.229	1.08	0.247	/

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 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).

Test Position	Channel/ Frequency (MHz)	Service	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{10g} 4.0 W/kg			
						Drift (dB)	Measured SAR_{10g} (W/kg)	Scaling Factor	Reported SAR_{10g} (W/kg)	Graph Results
Test Position of Jaw with strap attached (802.11b,Distance 0mm)										
Back Side	11/2462	DSSS	1:1	17	15.83	0.021	0.130	1.31	0.170	/
Test Position of Body without strap attached (802.11b,Distance 0mm)										
Left Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/
Right Edge	11/2462	DSSS	1:1	17	15.83	0.033	0.341	1.31	0.446	Figure 32
Top Edge	11/2462	DSSS	1:1	17	15.83	0.150	0.142	1.31	0.186	/
Bottom Edge	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	/

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

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

7.4. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	SimultaneousTransmissions	Voice Over Digital Transport (Data)
GSM	850	Voice	Yes BT or WIFI	NA
	1900	Voice		
	GPRS	Data		
	EGPRS	Data		
WCDMA	UMTS Band II	Voice	Yes BT or WIFI	NA
	UMTS Band IV	Voice		
	UMTS Band V	Voice		
	RMC	Data		
	HSDPA	Data		
	HSUPA	Data		
WIFI	2450	Data	Yes GSM,GPRS,EGPRS, WCDMA	Yes
Bluetooth (BT)	2450	Data	Yes GSM,GPRS,EGPRS, WCDMA	NA

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

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

So,1g Estimated SAR:

Front Estimated $SAR_{Max.BT}$ = $[10^{(6.5/10)}/10] * (2.480^{1/2}/7.5)$= 0.094W/kg

Back Estimated $SAR_{Max.BT}$ = $[10^{(6.5/10)}/5] * (2.480^{1/2}/7.5)$= 0.188 W/kg

10g Estimated SAR:

Estimated $SAR_{Max.BT}$ = $[10^{(6.5/10)}/5] * (2.480^{1/2}/18.75)$= 0.075 W/kg

Per FCC KDB 447498 D01, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 (4.0)W/kg. When the sum is greater than the SAR limit, SAR test exclusion is determined by the SAR to peak location separation ratio.

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

About BT and GSM/UMTS antenna

SAR_{10g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band IV	UMTS Band V	BT	MAX. ΣSAR_{10g}	Peak location separation ratio
Back Side(Distance 0mm)	**0.559**	0.183	0.227	0.397	0.504	**0.075**	0.634	No
Left Edge(Distance 0mm)	N/A	N/A	N/A	N/A	N/A	**0.075**	0.075	No
Right Edge(Distance 0mm)	0.178	0.414	0.612	**0.851**	0.129	**0.075**	0.926	No
Top Edge(Distance 0mm)	N/A	N/A	N/A	N/A	N/A	**0.075**	0.075	No
Bottom Edge(Distance 0mm)	0.265	1.262	**1.703**	1.326	0.375	**0.075**	1.778	No

Note: 1.The value with blue color is the maximum ΣSAR_{10g} Value.
2. MAX. ΣSAR_{10g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. ΣSAR_{10g} = 1.778 W/kg < 4.0 W/kg, so the Simultaneous transimition SAR with volum scan are not required for BT and GSM/UMTS antenna.

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band IV	UMTS Band V	BT	MAX. ΣSAR_{1g}	Peak location separation ratio
Front Side(Distance 10mm)	0.222	**0.359**	0.357	0.353	0.150	**0.094**	0.453	No
Back Side(Distance 2mm)	1.368	1.389	**1.411**	1.367	1.179	**0.188**	1.599	No
Front Side(Distance 2mm)	0.524	0.719	**0.834**	0.809	0.278	**0.188**	1.022	No

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

MAX. ΣSAR_{1g} = 1.599 W/kg <1.6 W/kg, so the Simultaneous transimition SAR with volum scan are not required for BT and GSM/UMTS antenna.

About WIFI and GSM/UMTS antenna

SAR_{10g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band IV	UMTS Band V	WIFI	MAX. ΣSAR_{10g}	Peak location separation ratio
Back Side(Distance 0mm)	**0.559**	0.183	0.227	0.397	0.504	**0.170**	0.729	No
Left Edge(Distance 0mm)	N/A	N/A	N/A	N/A	N/A	**N/A**	N/A	No
Right Edge(Distance 0mm)	0.178	0.414	0.612	**0.851**	0.129	**0.446**	1.297	No
Top Edge(Distance 0mm)	N/A	N/A	N/A	N/A	N/A	**0.186**	0.186	No
Bottom Edge(Distance 0mm)	0.265	1.262	**1.703**	1.326	0.375	**N/A**	1.703	No

Note: 1.The value with blue color is the maximum ΣSAR_{10g} Value.
2. MAX. ΣSAR_{10g} =Unlicensed SAR_{MAX} +Licensed SAR_{MAX}

MAX. ΣSAR_{10g} = 1.703 W/kg < 4.0 W/kg, So the Simultaneous SAR are not required for WIFI and GSM/UMTS antenna.

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band IV	UMTS Band V	WIFI	MAX. ΣSAR_{1g}	Peak location separation ratio
Front Side(Distance 10mm)	0.222	**0.359**	0.357	0.353	0.150	**0.169**	0.528	No
Back Side(Distance 2mm)	1.368	1.389	**1.411**	1.367	1.179	**0.415**	1.826	Yes
Front Side(Distance 2mm)	0.524	0.719	**0.834**	0.809	0.278	**0.412**	1.246	No

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

MAX. ΣSAR_{1g} = 1.826 W/kg > 1.6 W/kg,

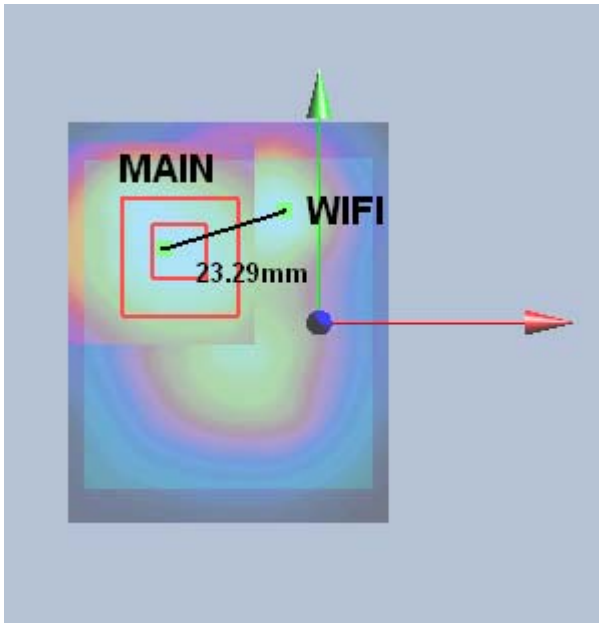
Simultaneous Transmission for test position of Back Side

SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	UMTS Band II	UMTS Band IV	UMTS Band V	WIFI	MAX. ΣSAR_{1g}	Peak location separation ratio
Back Side	1.368	/	/	/	/	0.415	1.783	0.10
	/	1.389	/	/	/	0.415	1.804	0.10
	/	/	1.411	/	/	0.415	1.826	0.10
	/	/	/	1.367	/	0.415	1.782	0.16
	/	/	/	/	1.179	0.415	1.594	No

Pair Simultaneous Transmission for GSM 850 Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	GSM 850	WIFI	MAX. Σ SAR_{1g}
Body, Back Side	1.368	0.415	1.783

The position $SAR_{GSM\ 850}$ is (x_1=-29, y_1= 15, z_1=-205.9),
The position $SAR_{Max.WIFI}$ is (x_2= -6.5, y_2=21,z_2= -205.6)
so the distance between the $SAR_{Max.GSM\ 850}$ and $SAR_{Max.WIFI}$ is 23.29mm.

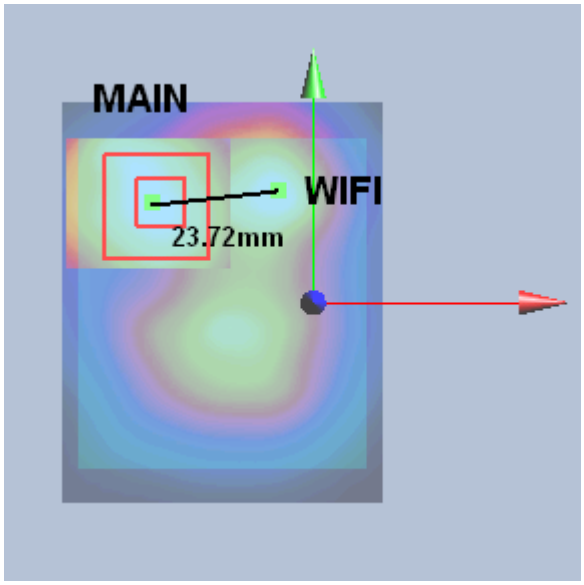


Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.368W/kg +(Reported $SAR_{Max.WIFI}$) 0.415W/kg]$^{3/2}$ /Peak SAR Location Separation =1.783$^{3/2}$ /23.29=0.1 >0.04
So Simultaneous SAR testing for GSM 850 and Wifi is required.

Pair Simultaneous Transmission for GSM 1900 Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	GSM 1900	WIFI	MAX. Σ SAR_{1g}
Body, Back Side	1.389	0.415	1.804

The position $SAR_{GSM\ 850}$ is (x_1=-29, y_1= 13.5, z_1=-205.6),
The position $SAR_{Max.WIFI}$ is (x_2= -6.5, y_2=21,z_2= -205.6)
so the distance between the $SAR_{Max.GSM\ 850}$ and $SAR_{Max.WIFI}$ is 23.72mm.

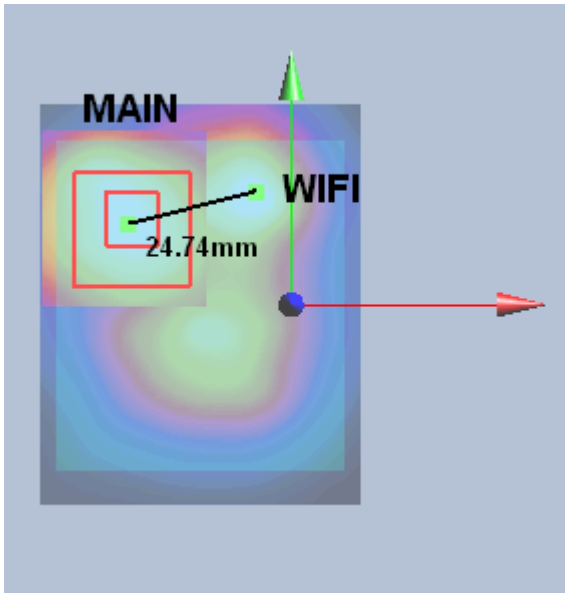


Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.389W/kg +(Reported $SAR_{Max.WIFI}$) 0.415W/kg]$^{3/2}$ /Peak SAR Location Separation =1.804$^{3/2}$ /23.72=0.1 >0.04
So Simultaneous SAR testing for GSM 1900 and Wifi is required.

Pair Simultaneous Transmission for WCDMA II Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	WCDMA II	WIFI	MAX. Σ SAR_{1g}
Body, Back Side	1.411	0.415	1.826

The position $SAR_{GSM\ 850}$ is (x_1=-30.5, y_1= 15, z_1=-205.7),
The position $SAR_{Max.WIFI}$ is (x_2= -6.5, y_2=21,z_2= -205.6)
so the distance between the $SAR_{Max.GSM\ 850}$ and $SAR_{Max.WIFI}$ is 24.74mm.

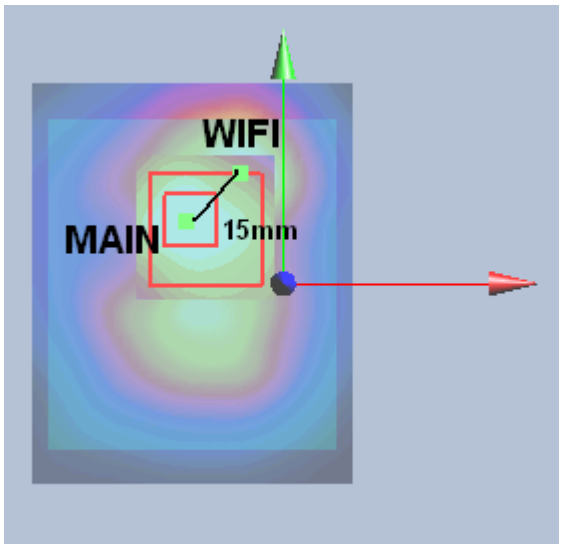


Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.411W/kg +(Reported $SAR_{Max.WIFI}$) 0.415W/kg]$^{3/2}$ /Peak SAR Location Separation =1.826$^{3/2}$ /24.74=0.1 >0.04
So Simultaneous SAR testing for WCDMA II and Wifi is required.

Pair Simultaneous Transmission for WCDMA IV Band and Wifi

Reported SAR_{1g}(W/kg) / Test Position	WCDMA IV	WIFI	MAX. Σ SAR_{1g}
Body, Back Side	1.367	0.415	1.782

The position $SAR_{GSM\ 850}$ is (x_1=-18.5, y_1= 12, z_1=-205.3),
The position $SAR_{Max.WIFI}$ is (x_2= -6.5, y_2=21,z_2= -205.6)
so the distance between the $SAR_{Max.GSM\ 850}$ and $SAR_{Max.WIFI}$ is 15mm.



Ratio =[(Reported $SAR_{Max.GSM/UMTS}$) 1.367W/kg +(Reported $SAR_{Max.WIFI}$) 0.415W/kg]$^{3/2}$ /Peak SAR Location Separation =1.782$^{3/2}$ /15=0.16 >0.04
So Simultaneous SAR testing for WCDMA IV and Wifi is required.

GSM 850 & WIFI Multi Band (Combined) Results

Test Position	Multi Band	Channel/ Frequency (MHz)	Zoom scan	Test Results (mW/g)	
				Volume scan	Combined
Back Side	GSM 850	128/824.2	1.368	1.360	1.49
	WIFI	11/2462	0.415	0.264	

GSM 1900 & WIFI Multi Band (Combined) Results

Test Position	Multi Band	Channel/ Frequency (MHz)	Zoom scan	Test Results (mW/g)	
				Volume scan	Combined
Back Side	GSM 1900	661/1880	1.389	1.230	1.41
	WIFI	11/2462	0.415	0.264	

UMTS Band II & WIFI Multi Band (Combined) Results

Test Position	Multi Band	Channel/ Frequency (MHz)	Zoom scan	Test Results (mW/g)	
				Volume scan	Combined
Back Side	UMTS Band II	9262/1852.4	1.411	1.330	1.50
	WIFI	11/2462	0.415	0.264	

UMTS Band IV & WIFI Multi Band (Combined) Results

Test Position	Multi Band	Channel/ Frequency (MHz)	Zoom scan	Test Results (mW/g)	
				Volume scan	Combined
Back Side	UMTS Band IV	1312/1712.4	1.367	1.210	1.33
	WIFI	11/2462	0.415	0.264	

WIFI & BT Mode

BT and WIFI antenna cannot transmit simultaneously.

8. 700MHz to 3GHz Measurement Uncertainty

1g SAR

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

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

10g SAR

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	N	1	1	6	∞
3	-axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	- Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
5	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
6	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
7	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
8	-readout Electronics	B	1.0	N	1	1	1.0	∞
9	-response time	B	0	R	$\sqrt{3}$	1	0	∞
10	-integration time	B	4.3	R	$\sqrt{3}$	1	2.5	∞
11	-noise	B	0	R	$\sqrt{3}$	1	0	∞

12	-RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.7	∞
13	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
14	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
15	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
16	-Test Sample Positioning	A	2.9	N	1	1	2.9	71
17	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
18	-Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								
19	-phantom Uncertainty	B	4.0	R	$\sqrt{3}$	1	2.3	∞
20	Algorithm for correcting SAR for deviations in permittivity and conductivity	B	1.9	N	1	0.84	0.9	∞
21	-Liquid conductivity (measurement uncertainty)	B	2.5	N	1	0.71	1.8	9
22	-Liquid permittivity (measurement uncertainty)	B	2.5	N	1	0.26	0.7	9
23	-Liquid conductivity -temperature uncertainty	B	1.7	R	$\sqrt{3}$	0.71	0.7	∞
24	-Liquid permittivity -temperature uncertainty	B	0.3	R	$\sqrt{3}$	0.26	0.05	∞
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{24} c_i^2 u_i^2}$					11.24	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		22.48	

9. Main Test Instruments

Table 26: List of Main Instruments

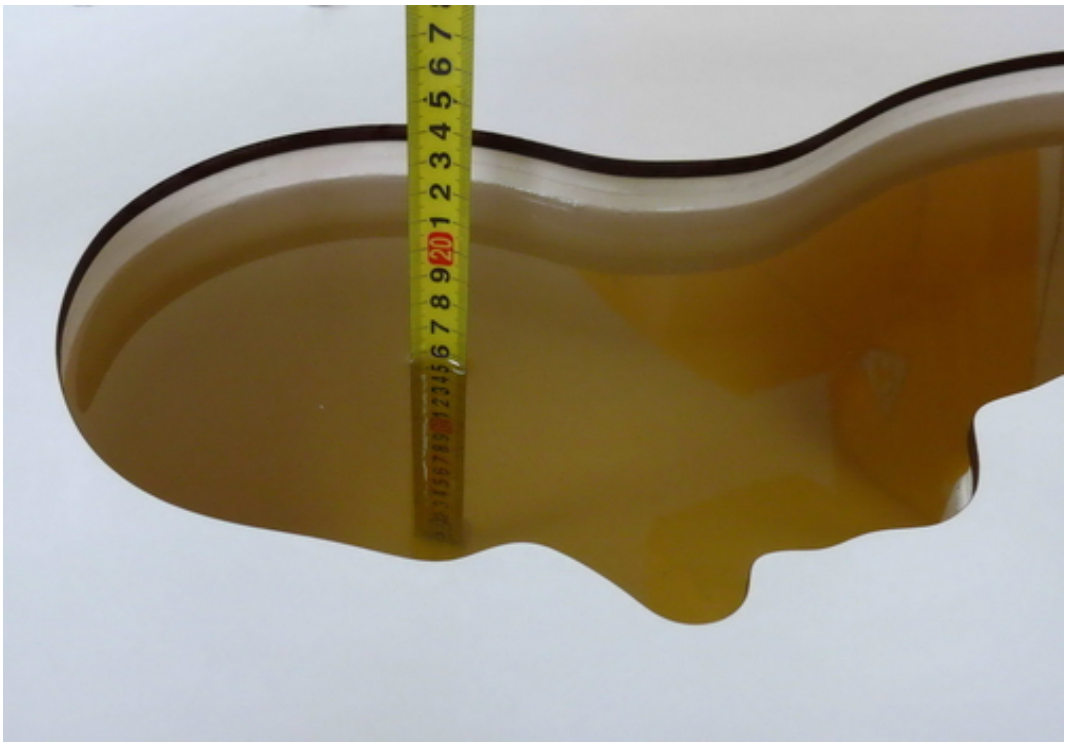
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 10, 2013	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 9, 2014	One year
04	Power sensor	Agilent N8481H	MY50350004	September 23, 2013	One year
05	Power sensor	E9327A	US40441622	January 1, 2014	One year
06	Signal Generator	HP 8341B	2730A00804	September 9,2013	One year
07	Dual directional coupler	778D-012	50519	March 24, 2014	One year
08	Dual directional coupler	777D	50146	March 24, 2014	One year
09	Amplifier	IXA-020	0401	No Calibration Requested	
10	Wideband radio communication tester	CMW 500	113645	August 29, 2013	One year
11	E-field Probe	EX3DV4	3677	November 28, 2013	One year
12	DAE	DAE4	1317	January 16, 2014	One year
13	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Three years
14	Validation Kit 1750MHz	D1750V2	1033	January 26, 2014	Three years
15	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Three years
16	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Three years
17	Temperature Probe	JM222	AA1009129	March 13, 2014	One year
18	Hygrothermograph	WS-1	64591	September 26, 2013	One year

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

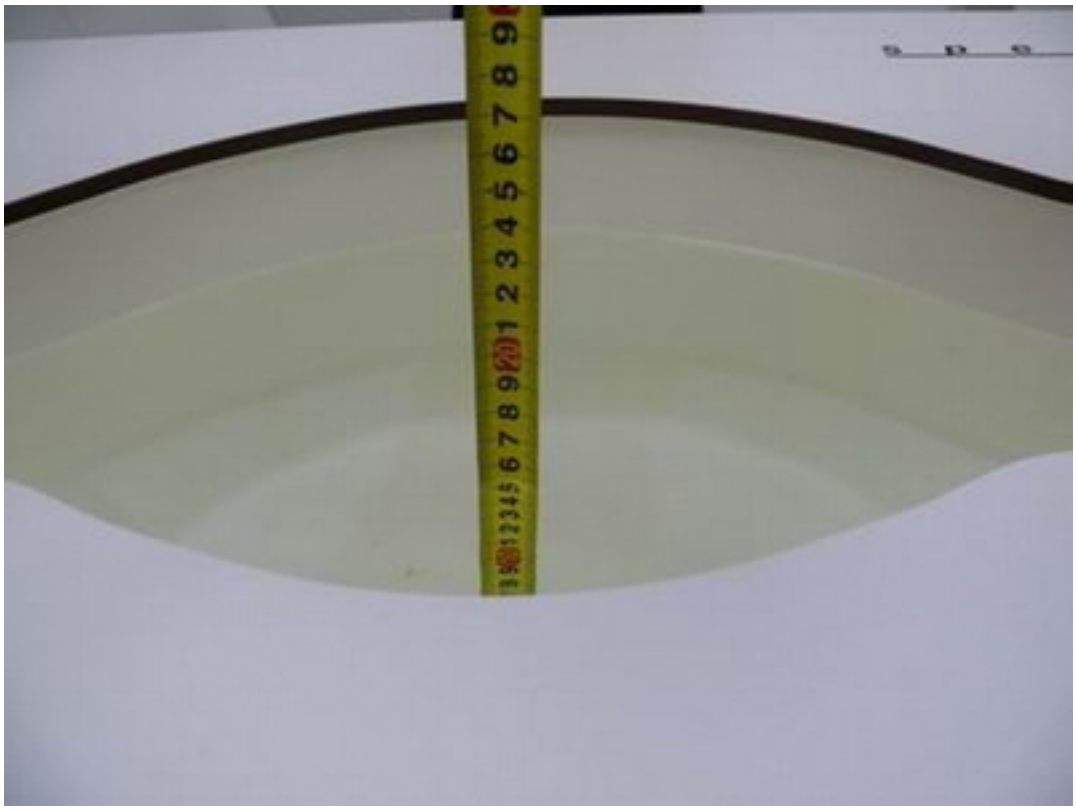
ANNEX A: Test Layout

Picture 1: Specific Absorption Rate Test Layout

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

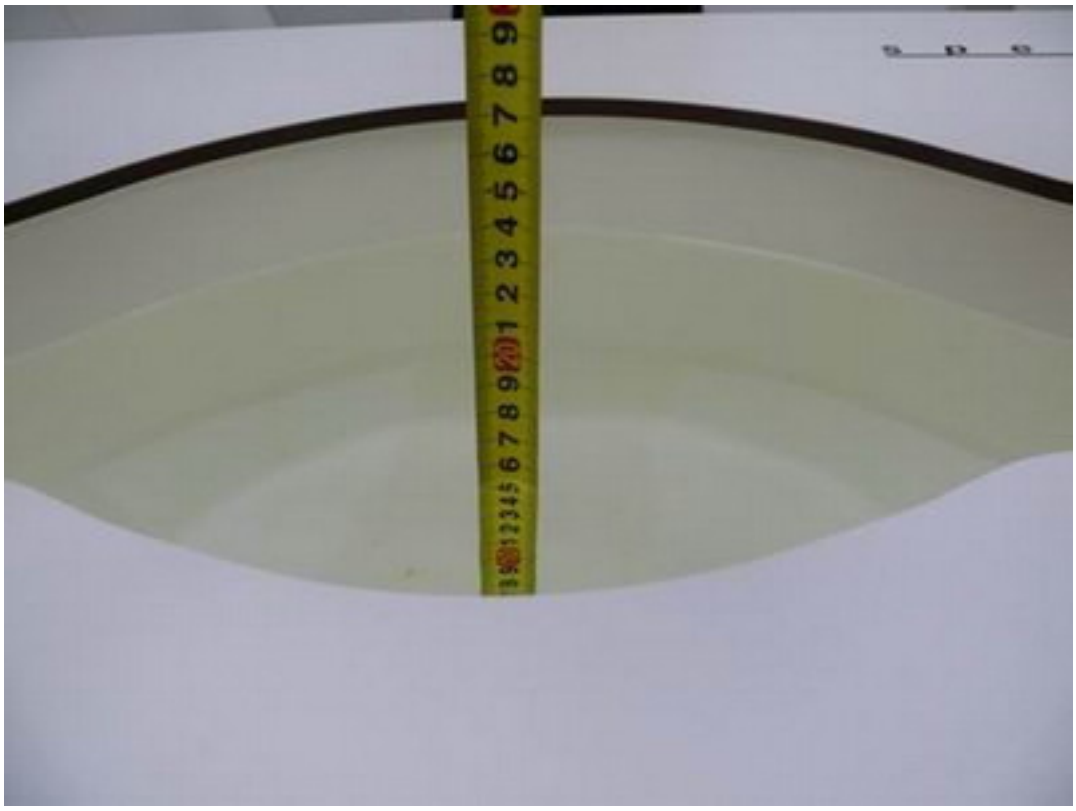


Picture 3: Liquid depth in the head Phantom (835MHz, 15.3cm depth)



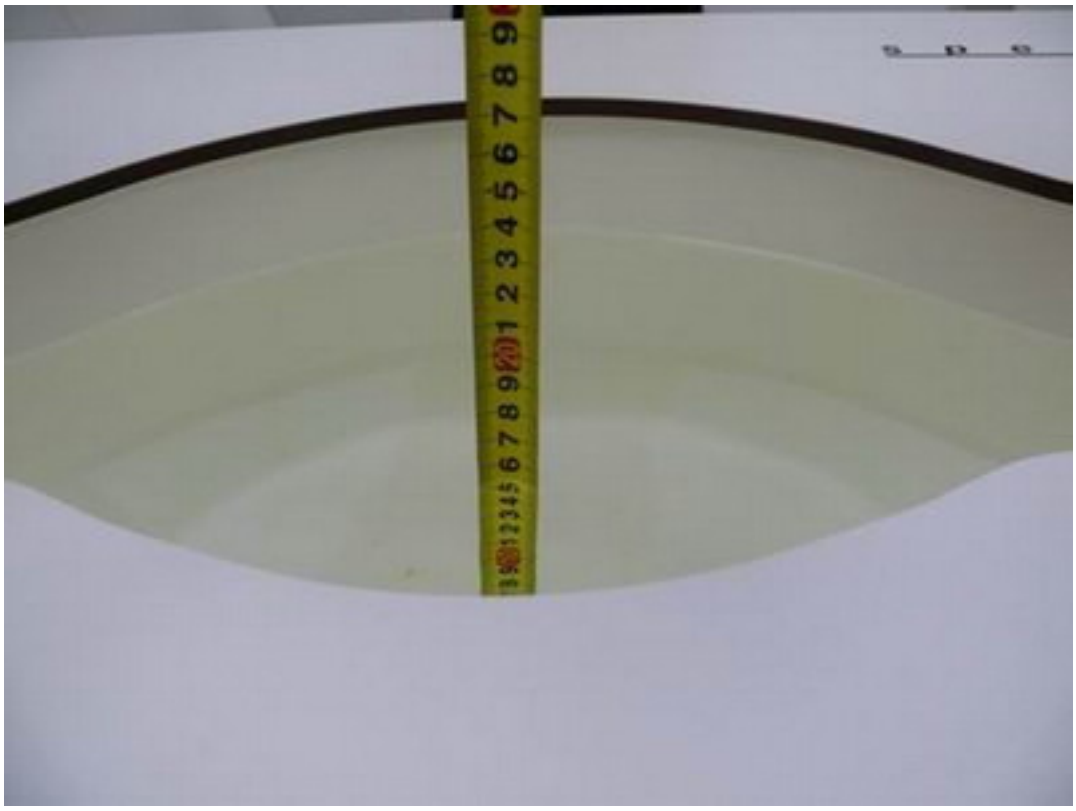
Picture 4: Liquid depth in the flat Phantom (1750 MHz, 15.2cm depth)

Picture 5: liquid depth in the head Phantom (1750 MHz, 15.3cm depth)



Picture 6: Liquid depth in the flat Phantom (1900 MHz, 15.2cm depth)

Picture 7: liquid depth in the head Phantom (1900 MHz, 15.3cm depth)



Picture 8: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)

Picture 9: Liquid depth in the head Phantom (2450 MHz, 15.4cm depth)

ANNEX B: System Check Results

System Performance Check at 835 MHz Head TSL

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

Date: 4/24/2014

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

Medium parameters used: f = 835 MHz; σ = 0.92 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM1; Type: SAM;

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

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

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

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

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

Peak SAR (extrapolated) = 3.67 W/kg

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

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

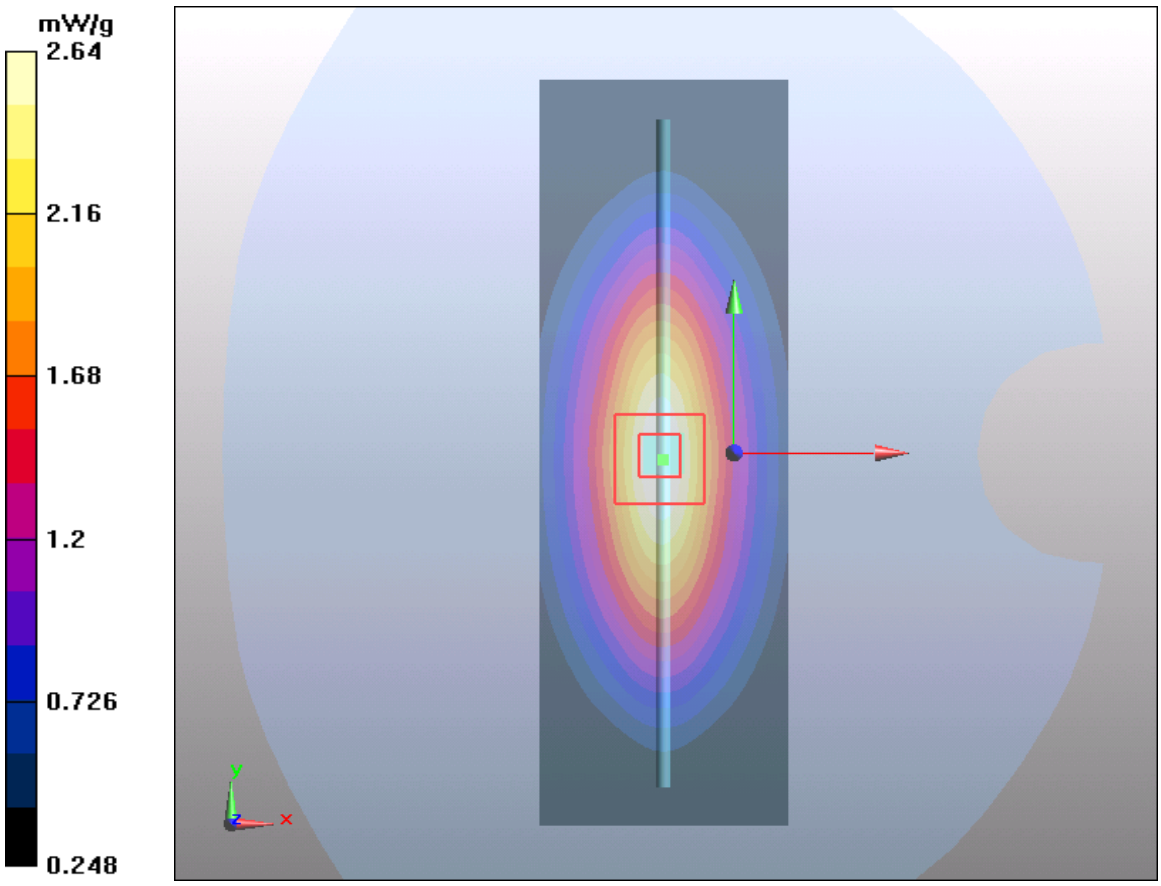


Figure 7 System Performance Check 835MHz 250mW

System Performance Check at 835 MHz Body TSL

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

Date: 4/25/2014

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

Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM1; Type: SAM;

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

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

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

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

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

Peak SAR (extrapolated) = 3.5 W/kg

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

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

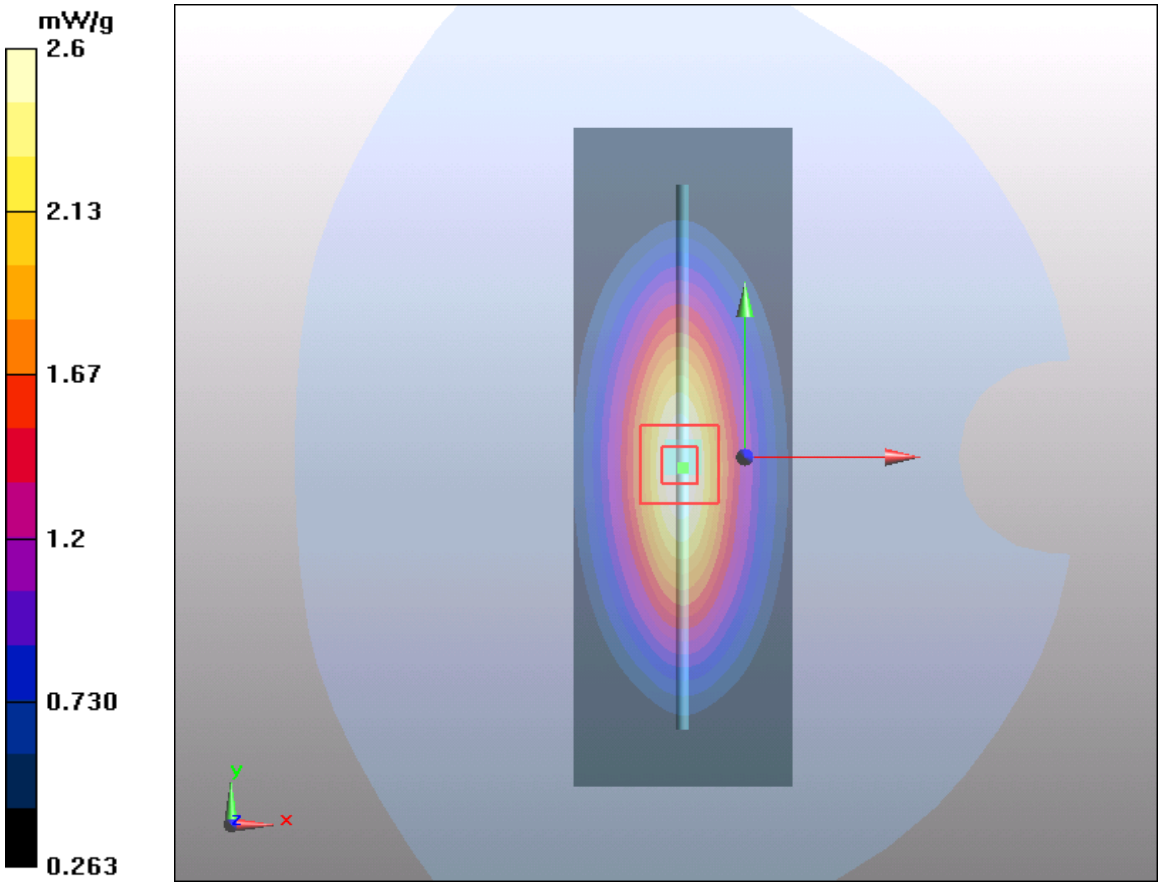


Figure 8 System Performance Check 835MHz 250Mw

System Performance Check at 1750 MHz Head TSL

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

Date: 4/24/2014

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

Medium parameters used: f = 1750 MHz; σ = 1.32 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(8.22, 8.22, 8.22); Calibrated: 11/28/2013;

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

Phantom: SAM2; Type: SAM;

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

d=10mm, Pin=250mW/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

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

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

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

Peak SAR (extrapolated) = 15.5 W/kg

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

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

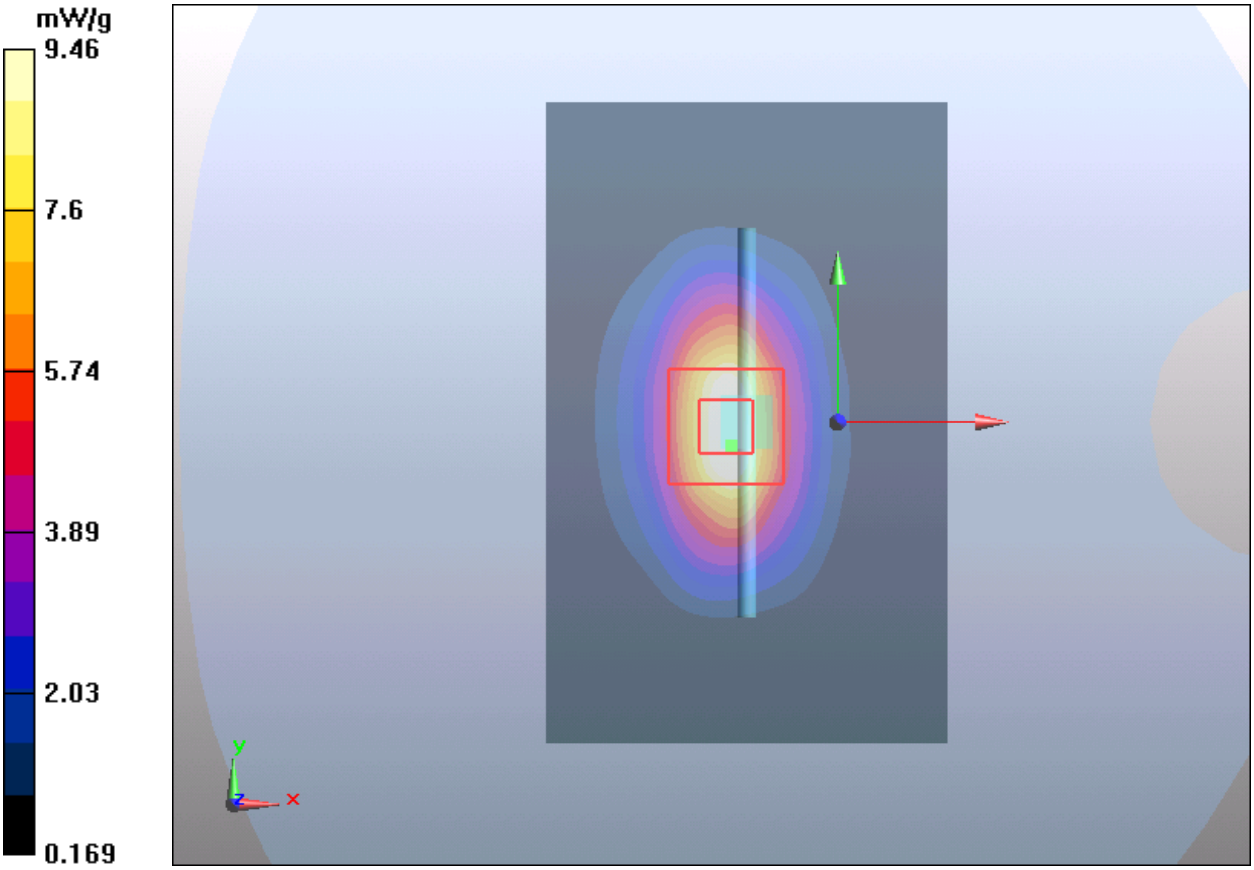


Figure 9 System Performance Check 1750MHz 250mW

System Performance Check at 1750 MHz Body TSL

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

Date: 4/27/2014

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

Medium parameters used: f = 1750 MHz; σ = 1.50 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.7℃

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

Probe: EX3DV4 – SN3677; ConvF(7.77, 7.77, 7.77); Calibrated: 11/28/2013;

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

Phantom: SAM2; Type: SAM;

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

d=10mm, Pin=250mW/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

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

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

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

Peak SAR (extrapolated) = 16.8 W/kg

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

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

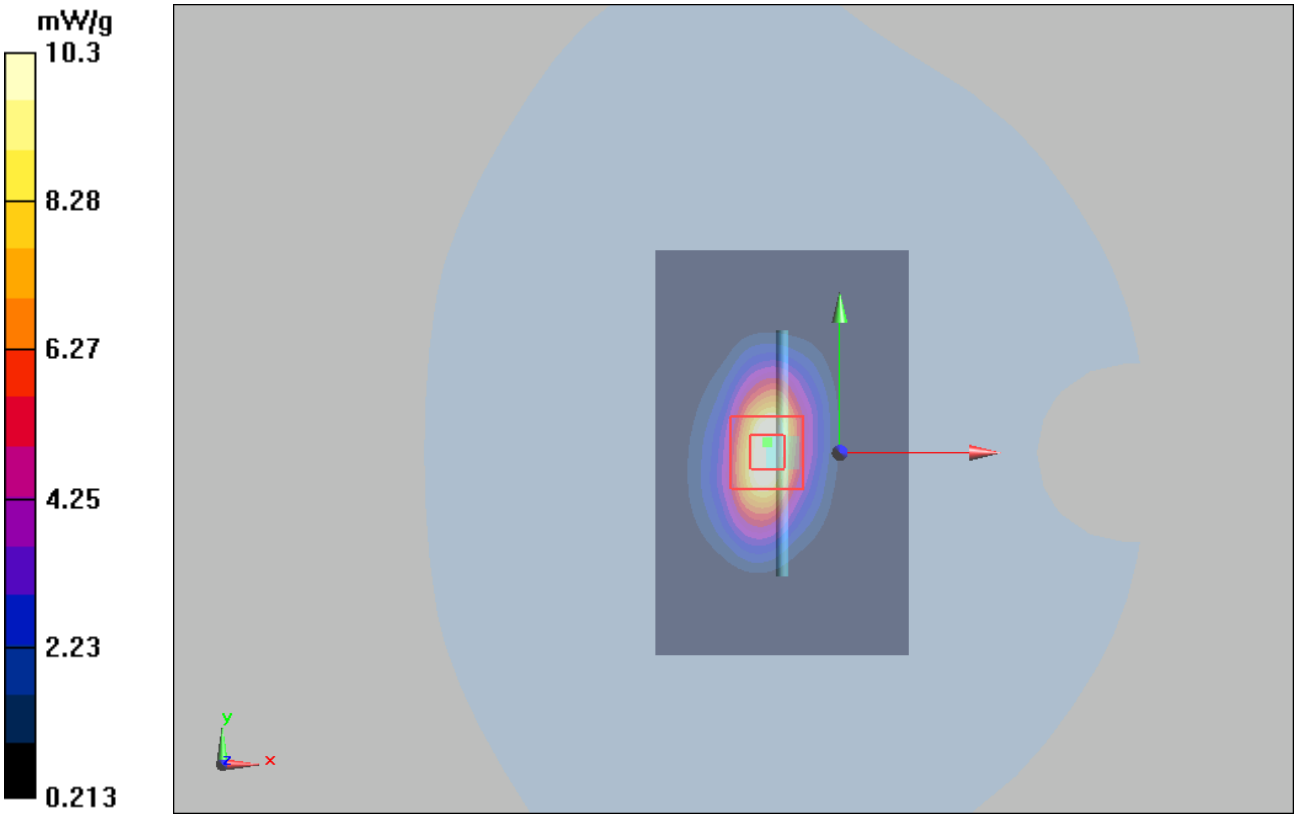


Figure 10 System Performance Check 1750MHz 250mW

System Performance Check at 1900 MHz Head TSL

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

Date: 4/24/2014

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

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM2; Type: SAM;

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

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

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

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

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

Peak SAR (extrapolated) = 17.8 W/kg

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

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

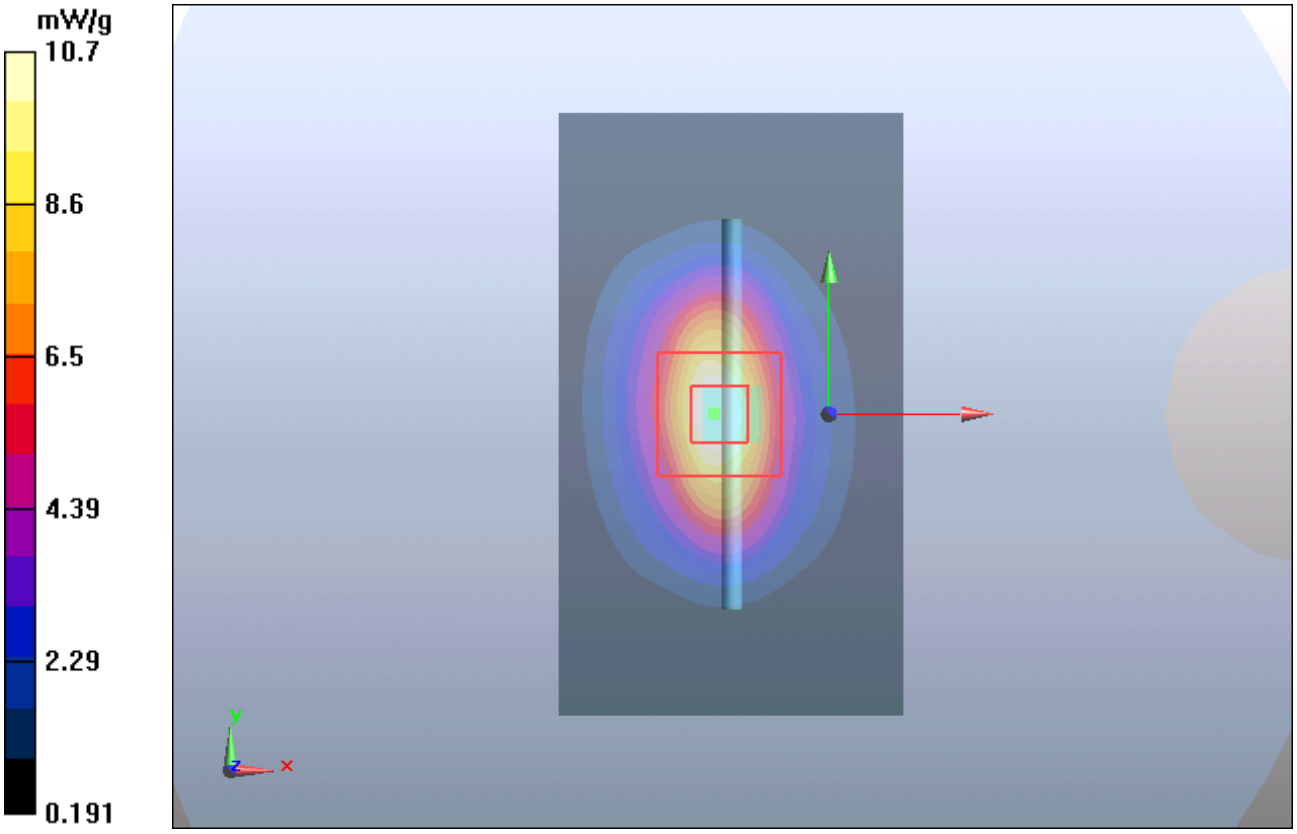


Figure 11 System Performance Check 1900MHz 250mW

System Performance Check at 1900 MHz Body TSL

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

Date: 4/26/2014

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

Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM2; Type: SAM;

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

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

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

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

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

Peak SAR (extrapolated) = 17.8 W/kg

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

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

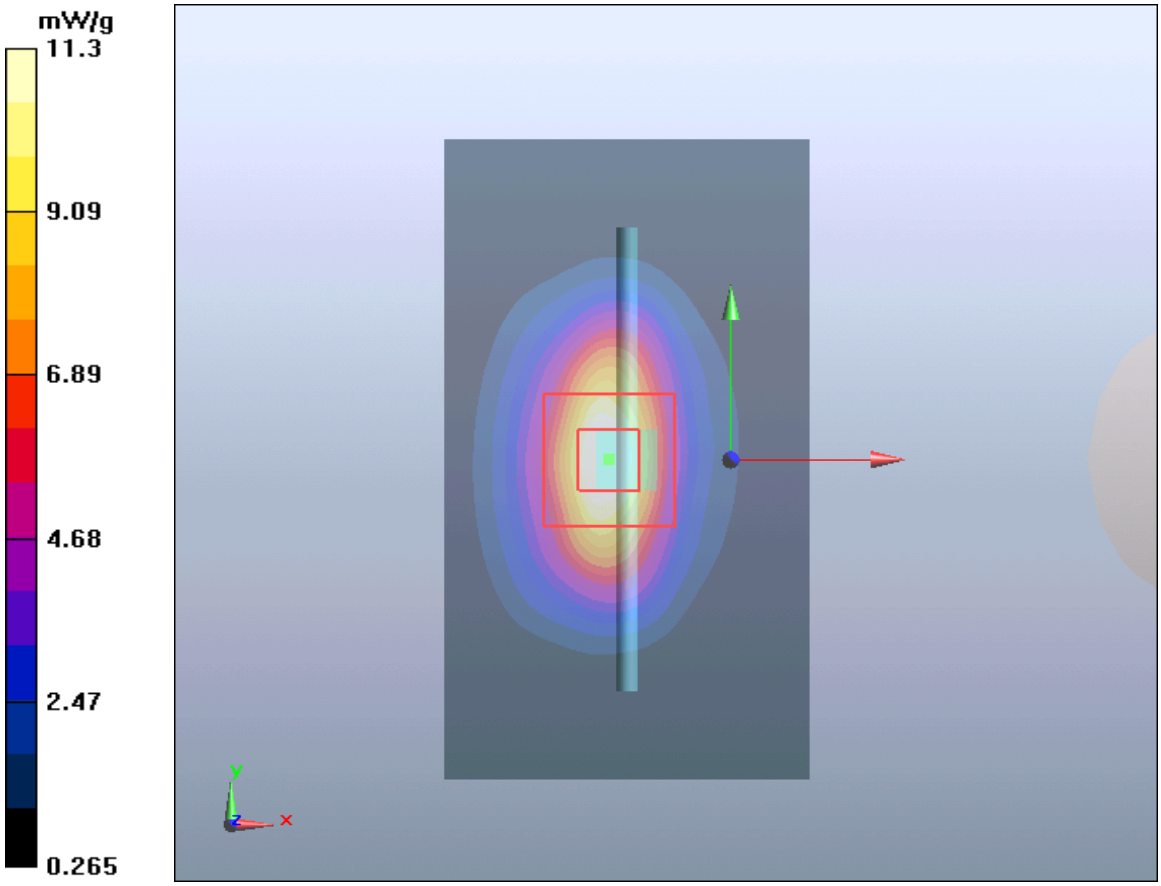


Figure 12 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Head TSL

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

Date: 4/24/2014

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

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM2; Type: SAM;

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

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

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

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

Reference Value = 88.8 V/m; Power Drift = 0.075 dB

Peak SAR (extrapolated) = 30 W/kg

SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.22 mW/g

Maximum value of SAR (measured) = 15.9 mW/g

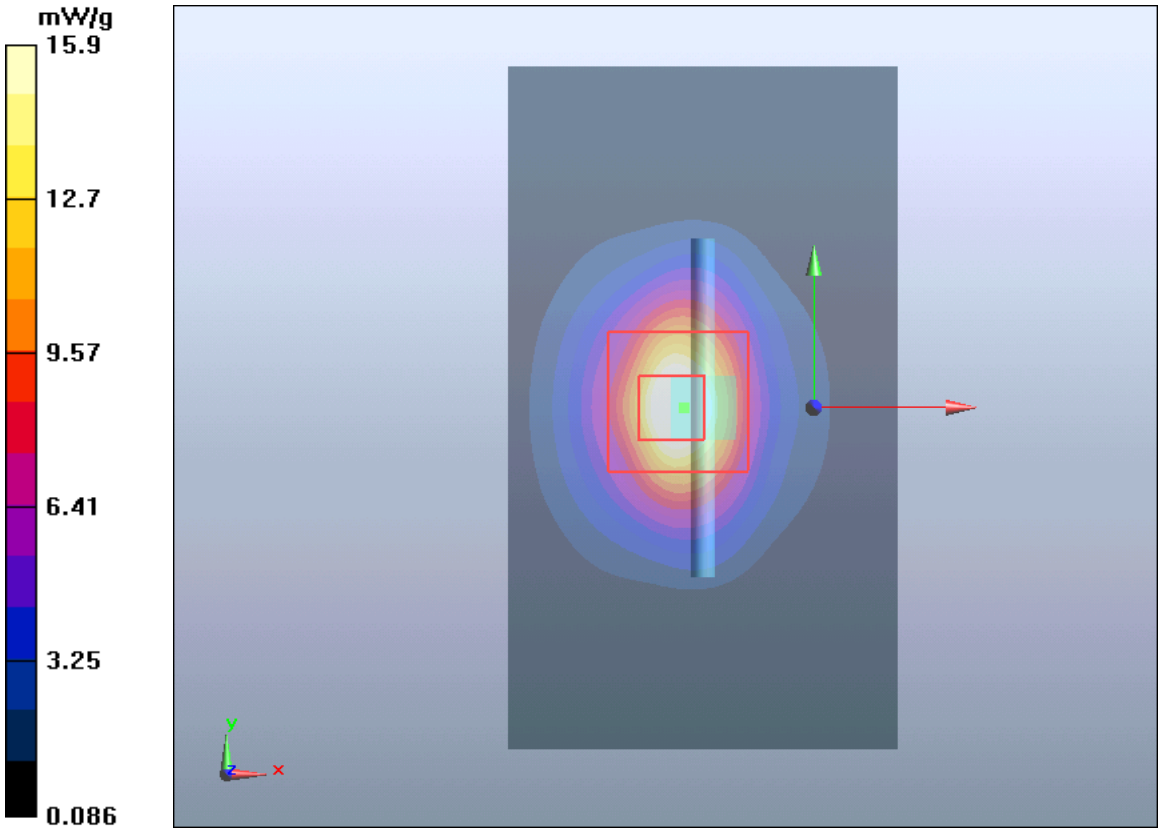


Figure 13 System Performance Check 2450MHz 250mW

System Performance Check at 2450 MHz Body TSL

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

Date: 4/28/2014

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

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM2; Type: SAM;

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

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=12mm, dy=12mm

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

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

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

Peak SAR (extrapolated) = 25.4 W/kg

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

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

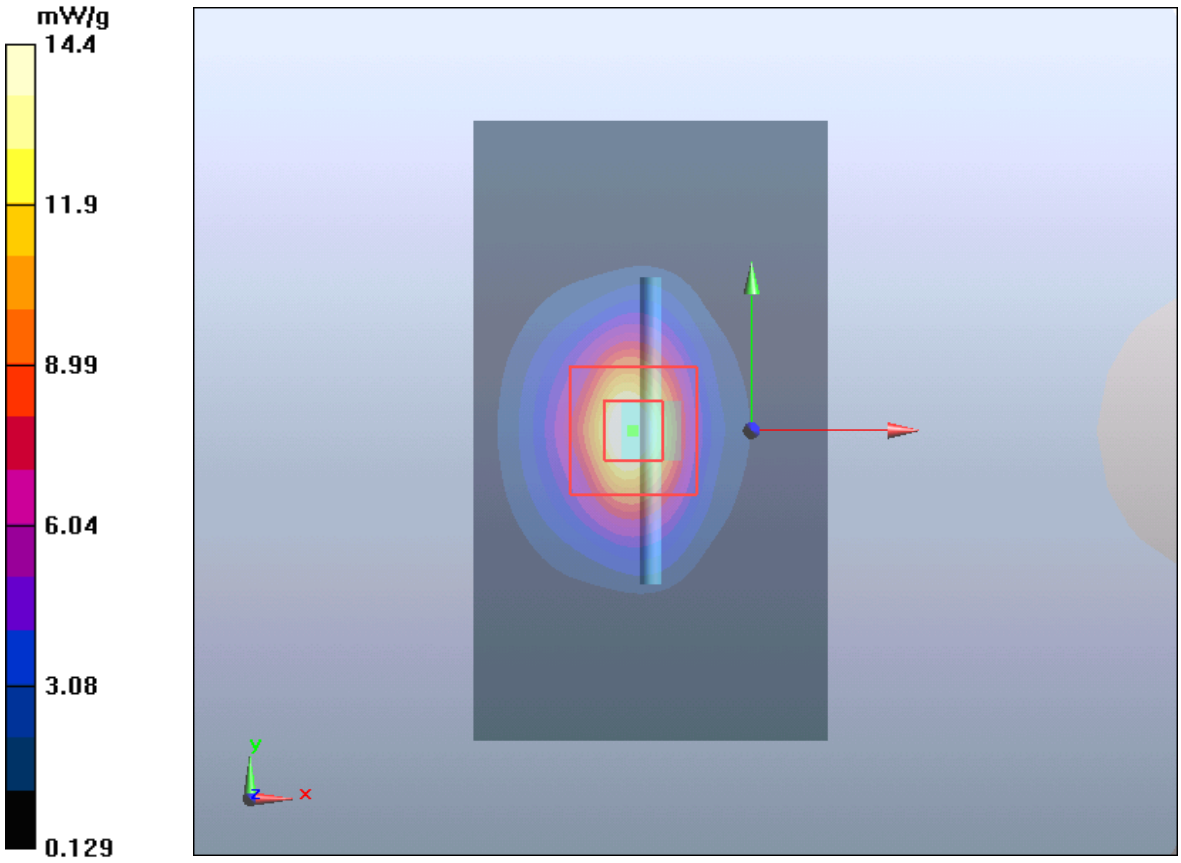


Figure 14 System Performance Check 2450MHz 250mW

ANNEX C: Graph Results

GSM 850 Front Side Middle

Date: 4/24/2014

Communication System: UID 0, GSM (0); Frequency: 836.6 MHz;Duty Cycle: 1:8.30042

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM1; Type: SAM;

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

Front Side Middle/Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 0.231 W/kg

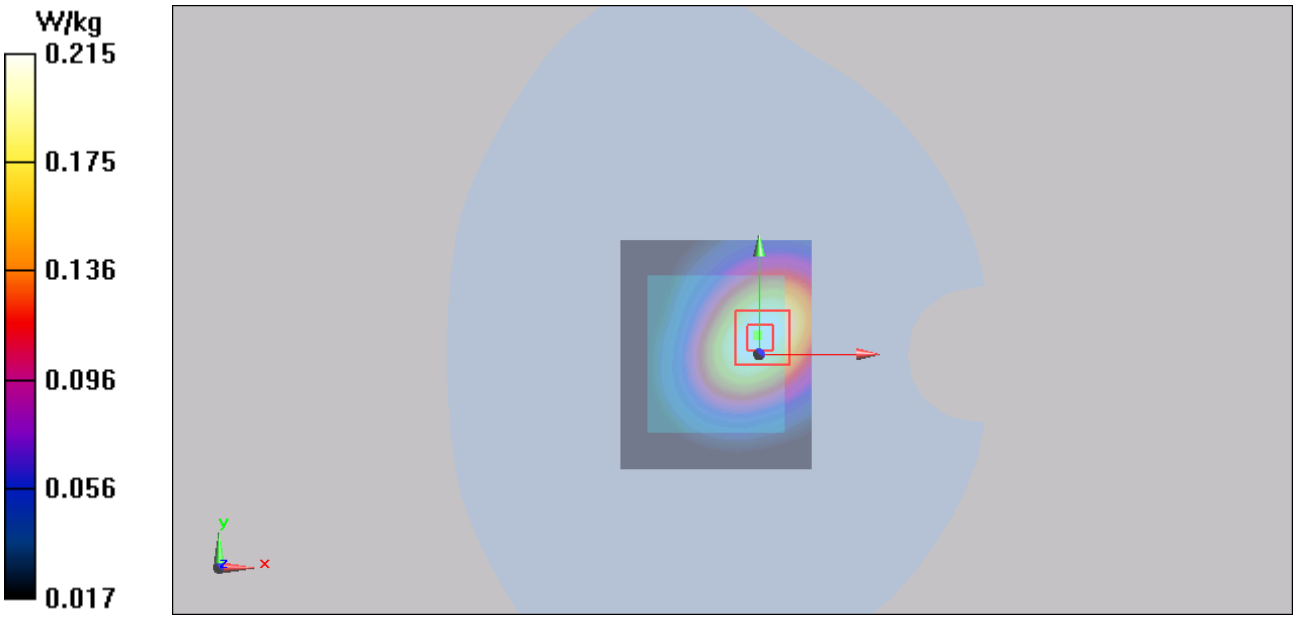
Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.611 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 0.306 W/kg

SAR(1 g) = 0.208 W/kg; SAR(10 g) = 0.135 W/kg

Maximum value of SAR (measured) = 0.215 W/kg



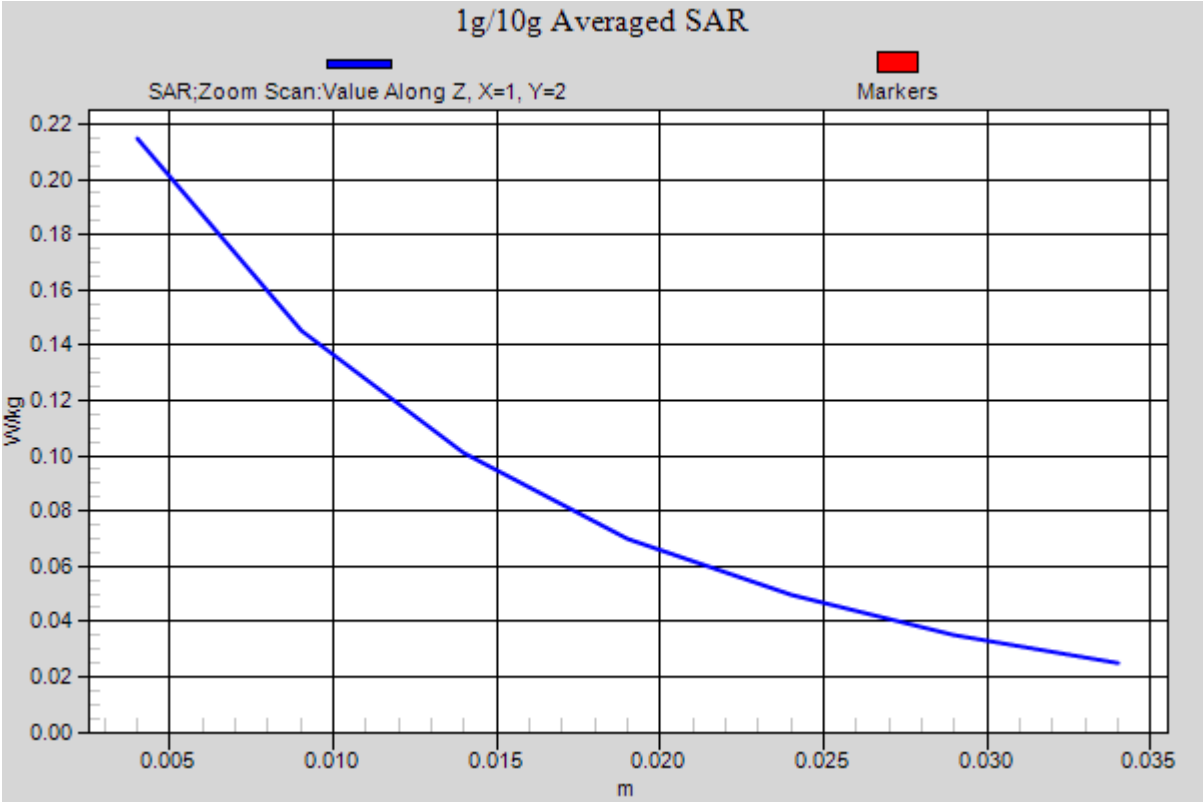


Figure 15 Front Side, GSM 850 Channel 190

GSM 850 GPRS (2Txslots) Back Side Low(1st Repeated)

Date: 4/25/2014

Communication System: UID 0, GPRS 2TX (0); Frequency: 824.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.982 S/m; ε_r = 55.199; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM1; Type: SAM;

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

Back Side Low/Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.67 W/kg

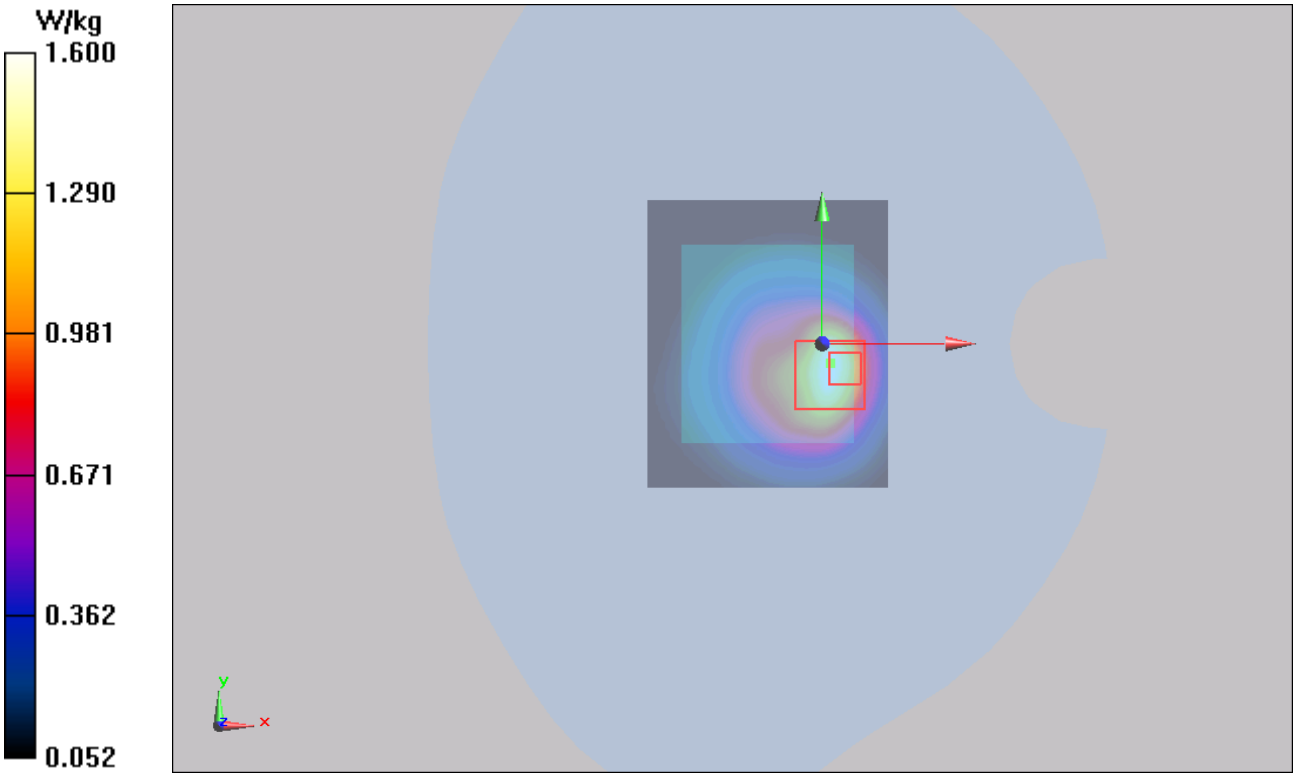
Back Side Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.794 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 2.71 W/kg

SAR(1 g) = 1.34 W/kg; SAR(10 g) = 0.701 W/kg

Maximum value of SAR (measured) = 1.60 W/kg



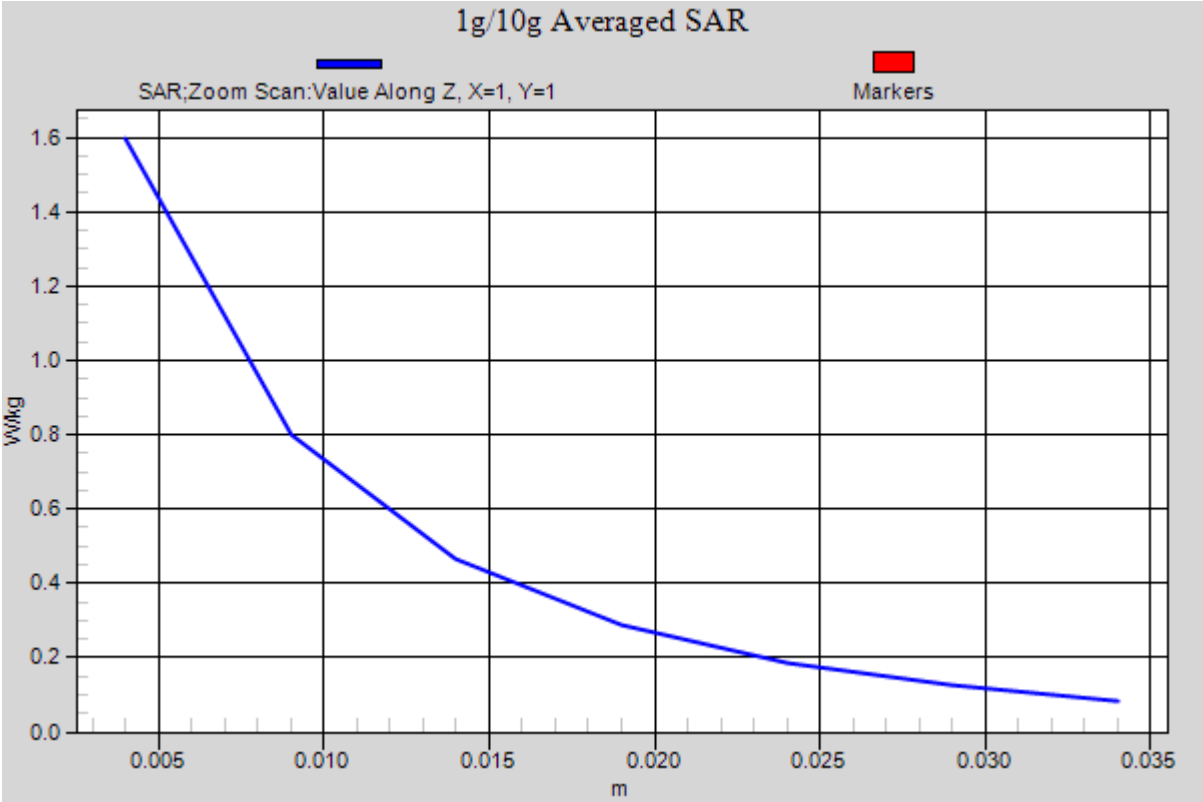


Figure 16 Back Side, GSM 850 GPRS (2Txslots) Channel 128

GSM 850 GPRS (2Txslots) Back Side Middle

Date: 4/25/2014

Communication System: UID 0, GPRS 2TX (0); Frequency: 836.6 MHz;Duty Cycle: 1:4.14954

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Right Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM1; Type: SAM;

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

Back Side Middle/Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.12 W/kg

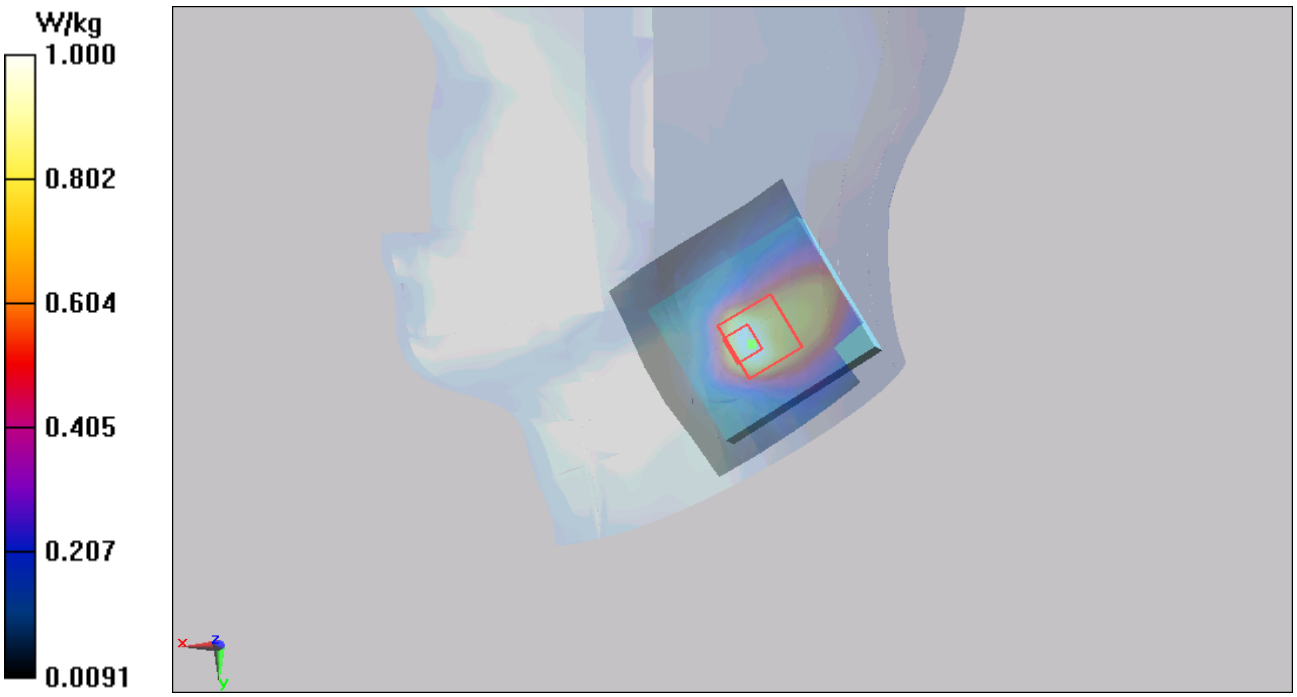
Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.377 V/m; Power Drift = -0.023 dB

Peak SAR (extrapolated) = 1.75 W/kg

SAR(1 g) = 0.934 W/kg; SAR(10 g) = 0.550 W/kg

Maximum value of SAR (measured) = 1.00 W/kg



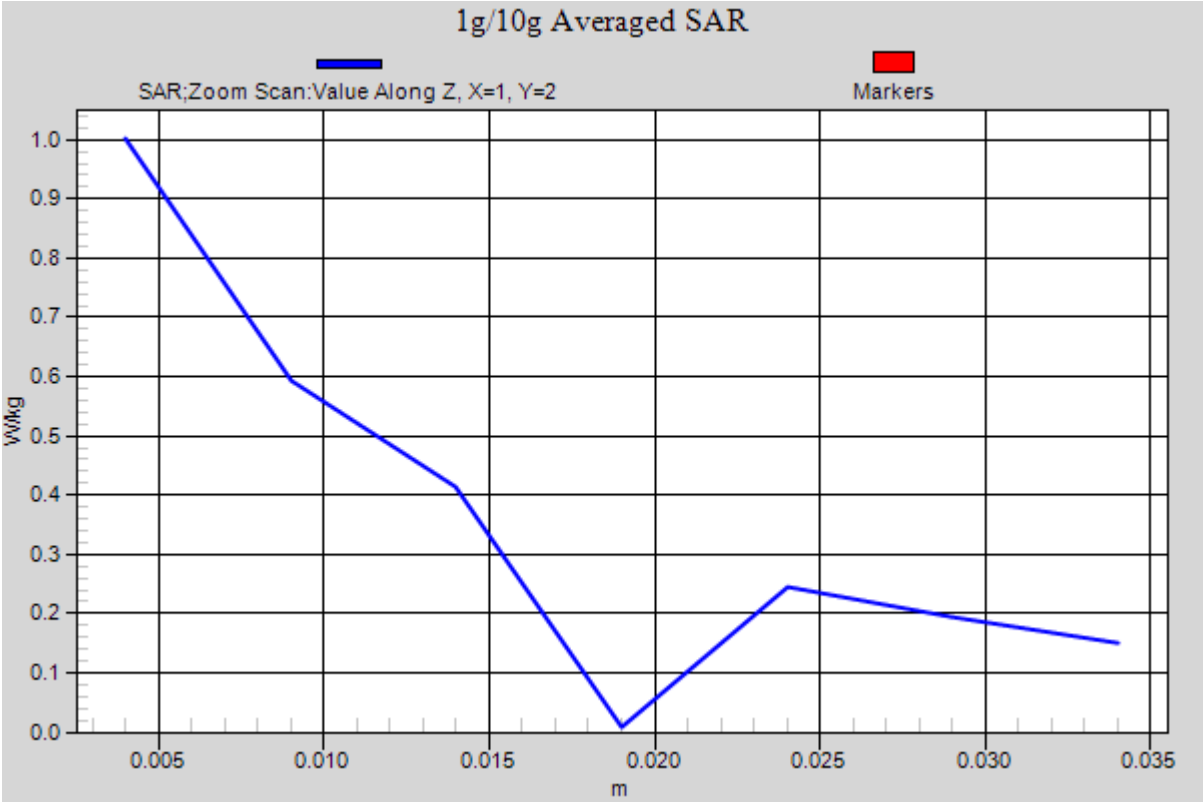


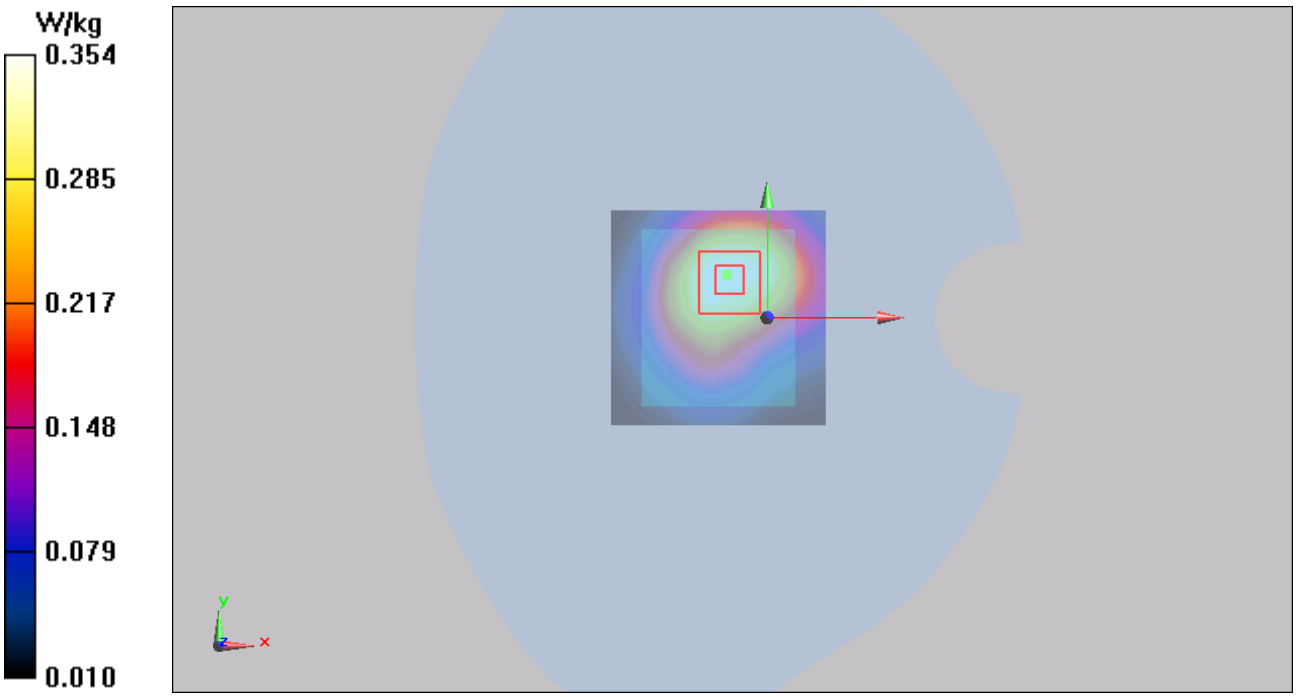
Figure 17 Back Side, GSM 850 GPRS (2Txslots) Channel 190

GSM 1900 Front Side Middle

Date: 4/24/2014
Communication System: UID 0, GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Front Side Middle/Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.366 W/kg

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.110 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.528 W/kg
SAR(1 g) = 0.341 W/kg; SAR(10 g) = 0.213 W/kg
Maximum value of SAR (measured) = 0.354 W/kg



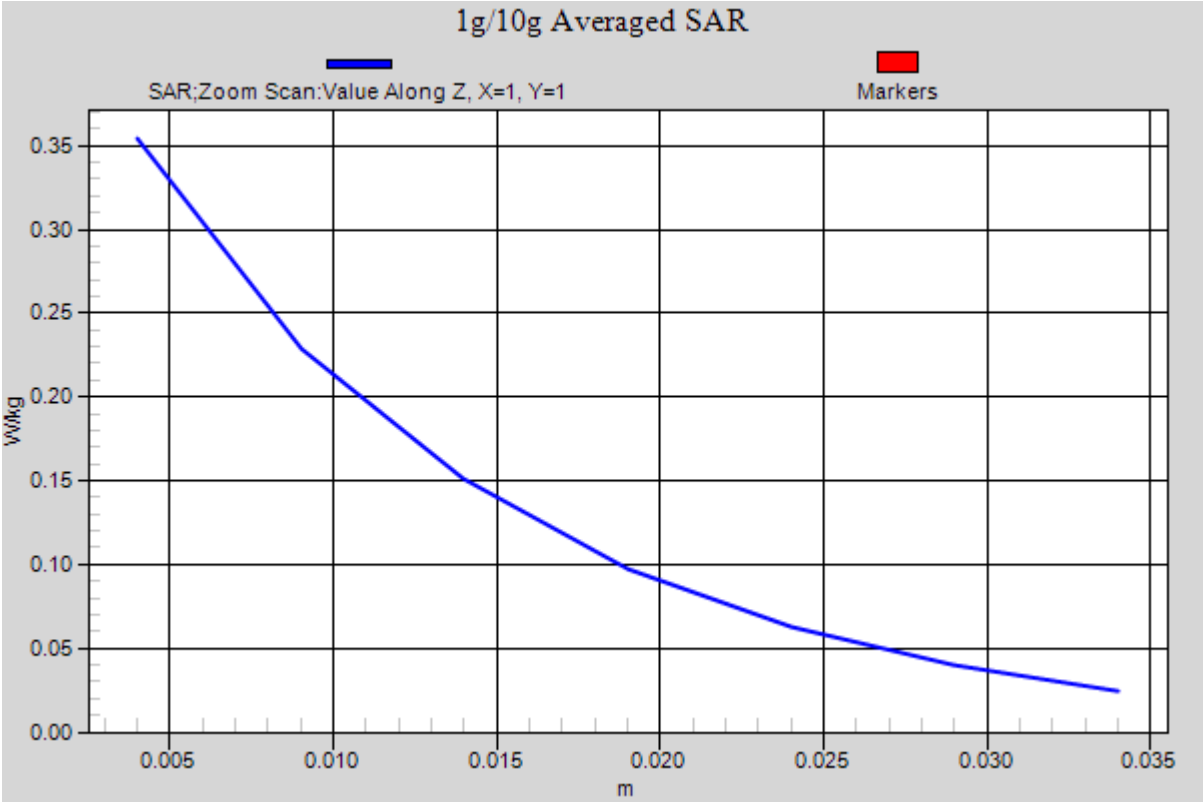


Figure 18 Front Side, GSM 1900 Channel 661

GSM 1900 with Earphone Back Side Middle

Date: 4/26/2014

Communication System: UID 0, GSM (0); Frequency: 1880 MHz;Duty Cycle: 1:8.30042

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM 2; Type: SAM;

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

Back Side Middle/Area Scan (81x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 1.42 W/kg

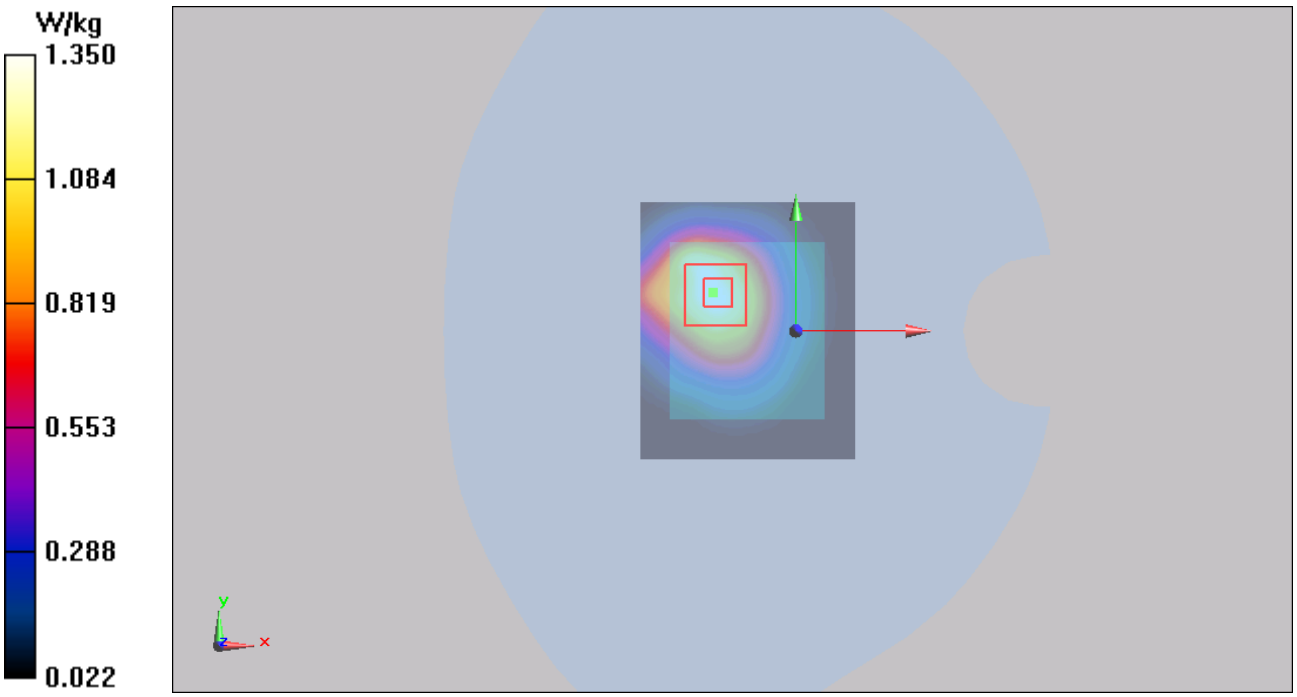
Back Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.100 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 2.04 W/kg

SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.808 W/kg

Maximum value of SAR (measured) = 1.35 W/kg



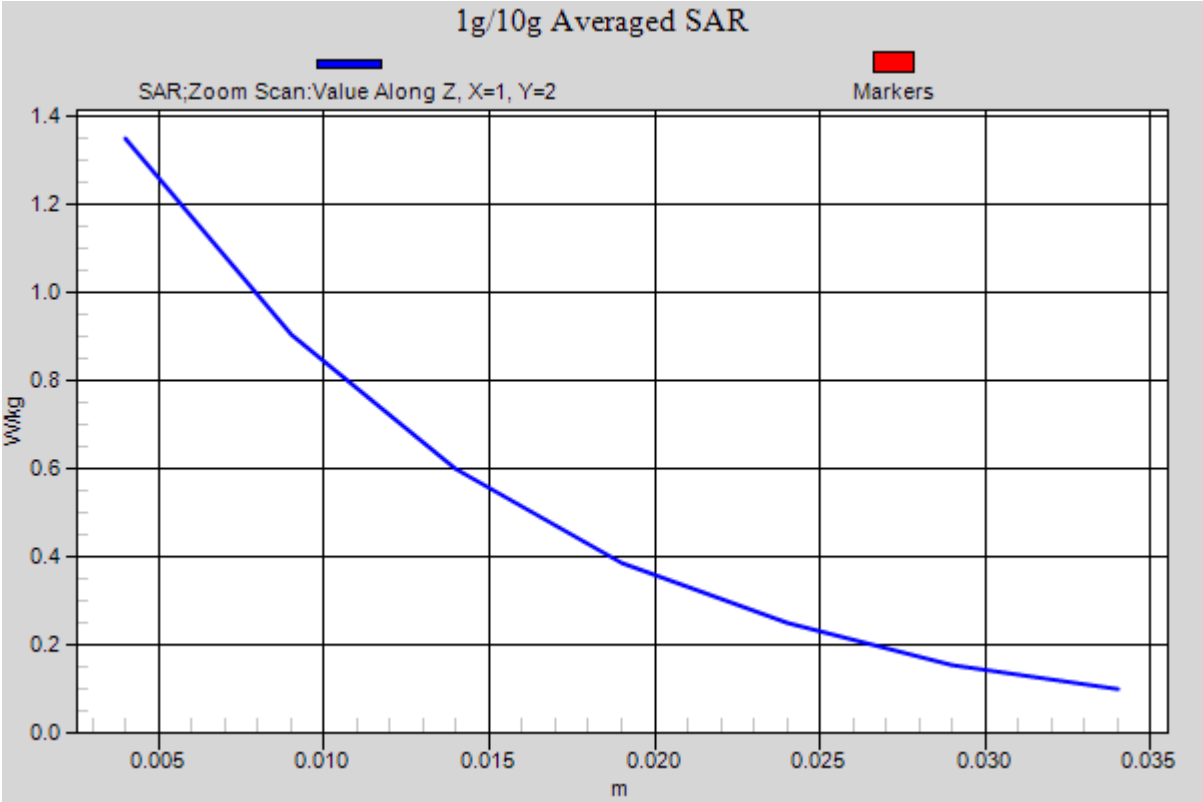


Figure 19 Back Side with Earphone, GSM 1900 Channel 661

GSM 1900 GPRS (4Txslots) Bottom Edge Middle

Date: 4/26/2014

Communication System: UID 0, GPRS 4TX (0); Frequency: 1880 MHz;Duty Cycle: 1:2.07491

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

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Sensor-Surface: 4mm (Mechanical Surface Detection)

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

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

Phantom: SAM 2; Type: SAM;

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

Bottom Edge Middle/Area Scan (31x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm

Maximum value of SAR (interpolated) = 4.18 W/kg

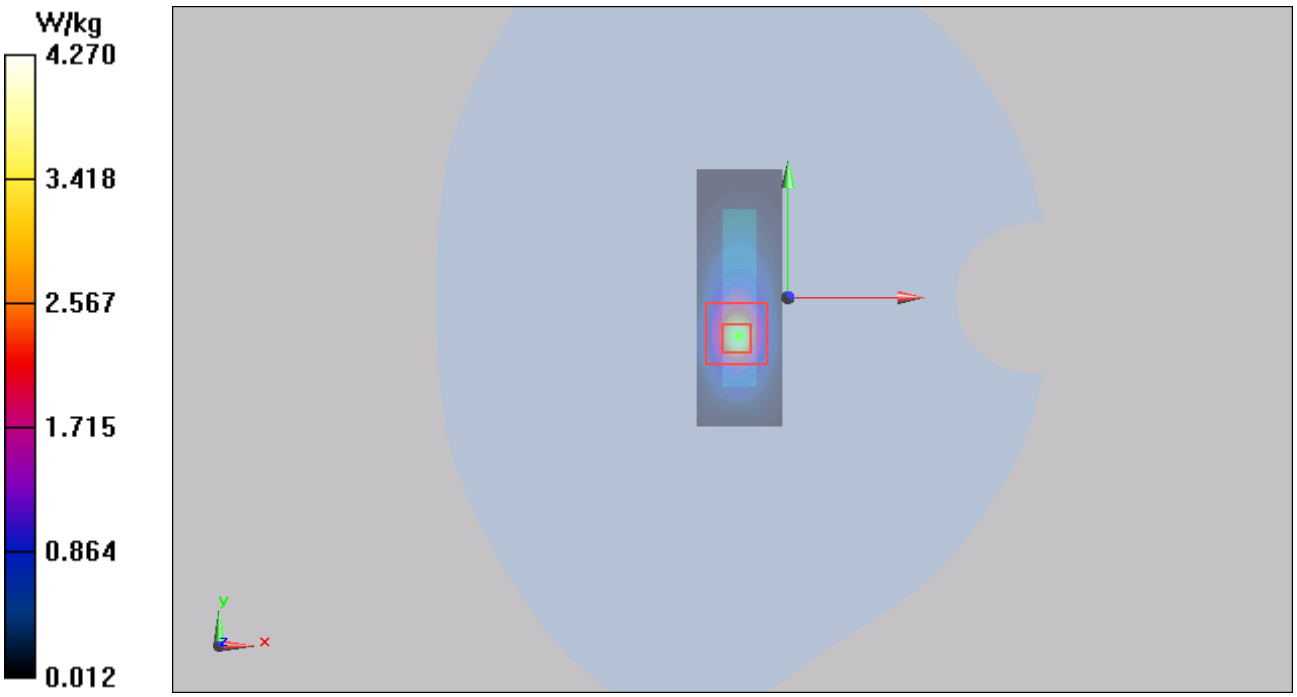
Bottom Edge Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 33.409 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 8.01 W/kg

SAR(1 g) = 3.34 W/kg; SAR(10 g) = 1.25 W/kg

Maximum value of SAR (measured) = 4.27 W/kg



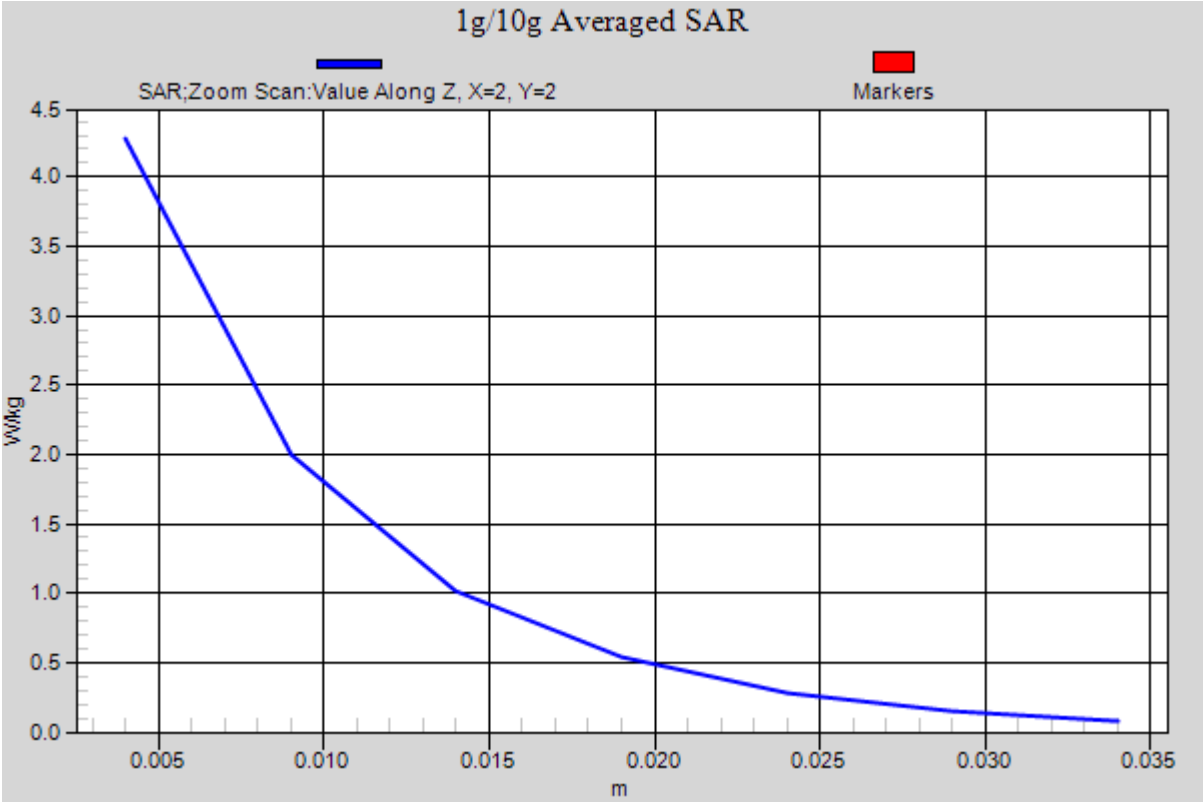
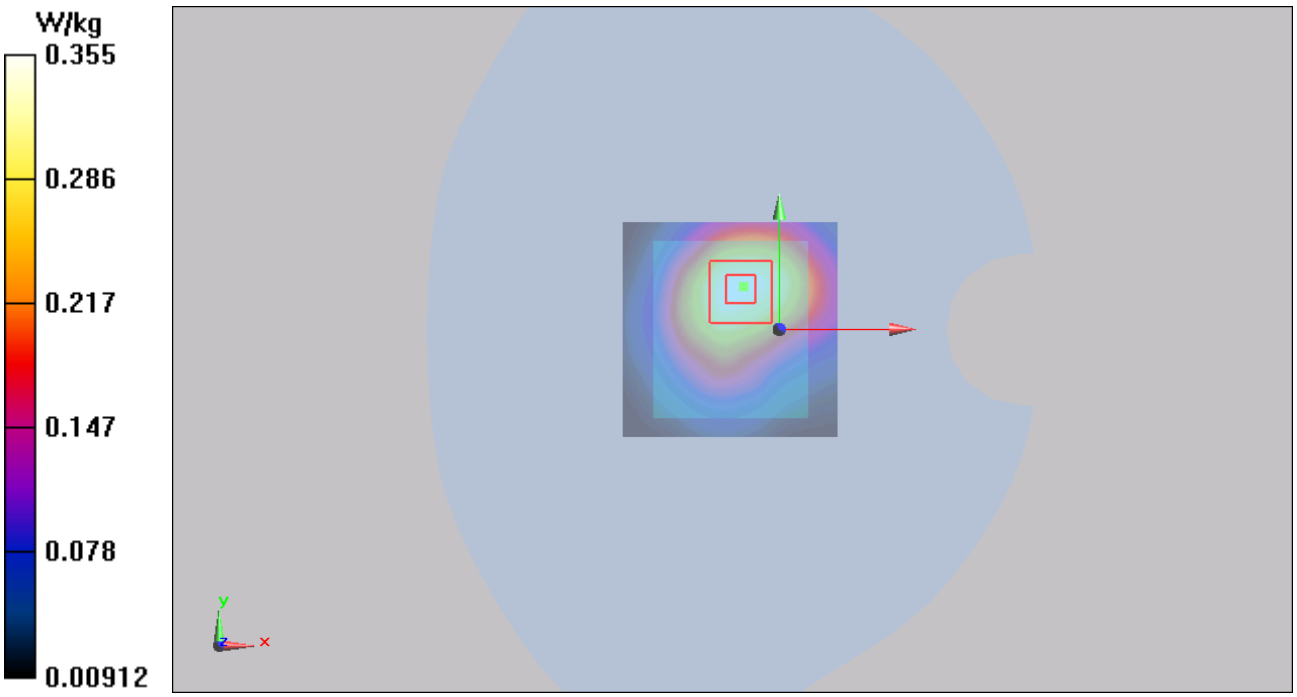


Figure 20 Bottom Edge, GSM 850 GPRS (4Txslots) Channel 661

UMTS Band II Front Side Middle

Date: 4/24/2014
Communication System: UID 0, WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.413 S/m; ε_r = 39.689; ρ = 1000 kg/m^3
Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃
Phantom section: Flat Section
DASY5 Configuration:
Sensor-Surface: 4mm (Mechanical Surface Detection)
Probe: EX3DV4 – SN3677; ConvF(8.15, 8.15, 8.15); Calibrated: 11/28/2013;
Electronics: DAE4 Sn1317; Calibrated: 1/16/2014
Phantom: SAM 2; Type: SAM;
Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Front Side Middle/Area Scan (71x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 0.361 W/kg

Front Side Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.097 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.526 W/kg
SAR(1 g) = 0.342 W/kg; SAR(10 g) = 0.213 W/kg
Maximum value of SAR (measured) = 0.355 W/kg