Shenzhen Huatongwei International Inspection Co., Ltd.
Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
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ilac-MRA
ACCREDITED
Testing Cert #: 2243.01

TEST REPORT

Report Reference No.................... :	**TRE14030193**	R/C……….:	45288
FCC ID... :	SIT-KA-K1190318		
Applicant's name.......................... :	KAISSEN TECHNOLOGY LLC		
Address..:	7412 SW 48st., Suite B, Miami, FL33155		
Manufacturer......................................:	Cosmo Electronics Technology Limited		
Address..:	13R,10/F, Youse Building, Chegongmiao,Futian District, Shenzhen		
Test item description .... :	GSM Phone		
Trade Mark ....:	Kaissen		
Model/Type reference......................:	K119		
List Model ....:	/		
Standard .... :	**ANSI C95.1–1999** **47CFR §2.1093**		
Date of receipt of test sample………..:	March 27, 2014		
Date of testing…………………………:	March 28-29, 2014		
Date of issue……………………………..:	April 16, 2014		
Result................. ……………………..:	**PASS**		

Compiled by (position+printed name+signature)..:	File administrators Jerome Luo	Jerome Luo
Supervised by (position+printed name+signature)..:	Test Engineer Yuchao Wang	yuchao.wang
Approved by (position+printed name+signature)..:	Manager Hans Hu	Hans Hu

Testing Laboratory Name .... :	**Shenzhen Huatongwei International Inspection Co., Ltd**
Address..:	Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China

Contents

1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:

IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 KHz to 300 GHz. It specifies the maximum exposure limit of 1.6 W/kg as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.
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 447498 D01 Mobile Portable RF Exposure v05r01: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies
KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01: SAR Measurement Requirements for 100 MHz to 6 GHz
KDB865664 D02 SAR Reporting v01: RF Exposure Compliance Reporting and Documentation Considerations
FCC Part 2.1093 Radiofrequency Radiation Exposure Evaluation:Portable Devices
KDB648474 D04 SAR Handsets Multi Xmiter and Ant v01: SAR Evaluation Considerations for Wireless Handsets.
KDB941225 D03 Test Reduction GSM_GPRS_EDGE V01 : Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE
KDB248227: SAR measurement procedures for 802.112abg transmitters

1.2. Test Description

The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power

2. SUMMARY

2.1. Client Information

Applicant:	KAISSEN TECHNOLOGY LLC
Address:	7412 SW 48st., Suite B, Miami, FL33155
Manufacturer:	Cosmo Electronics Technology Limited
Address:	13R,10/F, Youse Building, Chegongmiao,Futian District, Shenzhen

2.2. Product Description

Name of EUT	GSM Phone
Trade Mark:	Kaissen
Model No.:	K119
List Model:	/
Power supply:	DC 3.7V for lithium battery
Adapter information:	Model No.:K119 Input: AC 100~240V, 50/60Hz, 0.12A Output: DC 5.0V 500mA
Mobile Phone	
Support Network:	GSM, GPRS, EGPRS
Support Band:	GSM850, DCS1900
Modulation:	GSM/GPRS: GMSK EGPRS: GMSK / 8PSK
Transmit Frequency:	GSM850: 824.20MHz-848.80MHz PCS1900: 1850.20MHz-1909.80MHz
Receive Frequency:	GSM850: 869.20MHz-893.80MHz PCS1900: 1930.20MHz-1989.80MHz
GPRS Class:	12
EGPRS Class:	12
Antenna type:	Intergal Antenna
Antenna gain:	1dBi
Software version:	F017_DZ_A119_TXT08
Hardware version:	F017_MB_V1.0

2.3. EUT operation mode

The EUT has been tested under typical operating condition and The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Test Laboratory: Shenzhen Huatongwei International Inspection Co., Ltd
Address: Keji Nan No.12 Road, Hi-tech Park, Shenzhen, China
Phone: 86-755-26715686 Fax: 86-755-26748089

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: Mar. 29, 2012. Valid time is until Feb. 28, 2015.

A2LA-Lab Cert. No. 2243.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until Sept. 30, 2013.

FCC-Registration No.: 662850

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. Registration 662850, Renewal date June. 01, 2012, valid time is until June. 01, 2015.

IC-Registration No.: 5377A

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Jan. 25, 2011, valid time is until Jan. 24, 2014.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

The 3m Semi-anechoic chamber (12.2m×7.95m×6.7m) and Shielded Room (8m×4m×3m) of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2010. Valid time is until Dec. 23, 2013.

Main Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: C-2726. Date of Registration: Dec. 20, 2012. Valid time is until Dec. 19, 2015.
Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	18-25 ° C
Humidity:	40-65 %
Atmospheric pressure:	950-1050mbar

3.4. SAR Limits

FCC Limit (1g Tissue)

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

3.5. Summary SAR Results

The maximum of results of SAR found during testing for K119 are follows:

Exposure Configuration	Technolohy Band	Highest Reported SAR 1g(W/Kg)	Equipment Class
Head (Separation Distance 0mm)	GSM850	**0.552**	PCE
	PCS1900	0.364	
Body-worn (Separation Distance 10mm)	GSM850	**0.669**	PCE
	PCS1900	0.328	

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6W/Kg as averaged over any 1g tissue accordintg to the ANSI C95.1-1999.
For body worn operation,this devices has been tested and meets FCC RF exposure guidelines when used with any accessory that conrtains no metal and which provides a minimum separation distance of 10mm between this devices and the body of the user.User of other accessories may not ensure compliance with FCC RF exposure guidelines.
The EUT battery must be fully charged and checked periodically during the test to ascertain iniform power output.
The highest reported SAR values is obtained at the case of,and the values are:**0.552 W/Kg(1g)** for Head and **0.669 W/Kg(1g)** for Body.

3.6. Equipments Used during the Test

Test Equipment	Manufacturer	Type/Model	Serial Number	Calibration	
				Last Calibration	Calibration Interval
Data Acquisition Electronics DAEx	SPEAG	DAE4	1315	2013/11/25	1
E-field Probe	SPEAG	EX3DV4	3842	2013/06/06	1
System Validation Dipole 835V2	SPEAG	D835V2	4d134	2013/12/13	1
System Validation Dipole 1900V2	SPEAG	D1900V2	5d150	2013/12/12	1
Dielectric Probe Kit	Agilent	85070E	US44020288	/	/
Power meter	Agilent	E4417A	GB41292254	2013/12/26	1
Power sensor	Agilent	8481H	MY41095360	2013/12/26	1
Network analyzer	Agilent	8753E	US37390562	2013/12/25	1
Universal Radio Communication Tester	ROHDE & SCHWARZ	CMU200	112012	2013/10/23	1

4. SAR Measurements System configuration

4.1. 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.

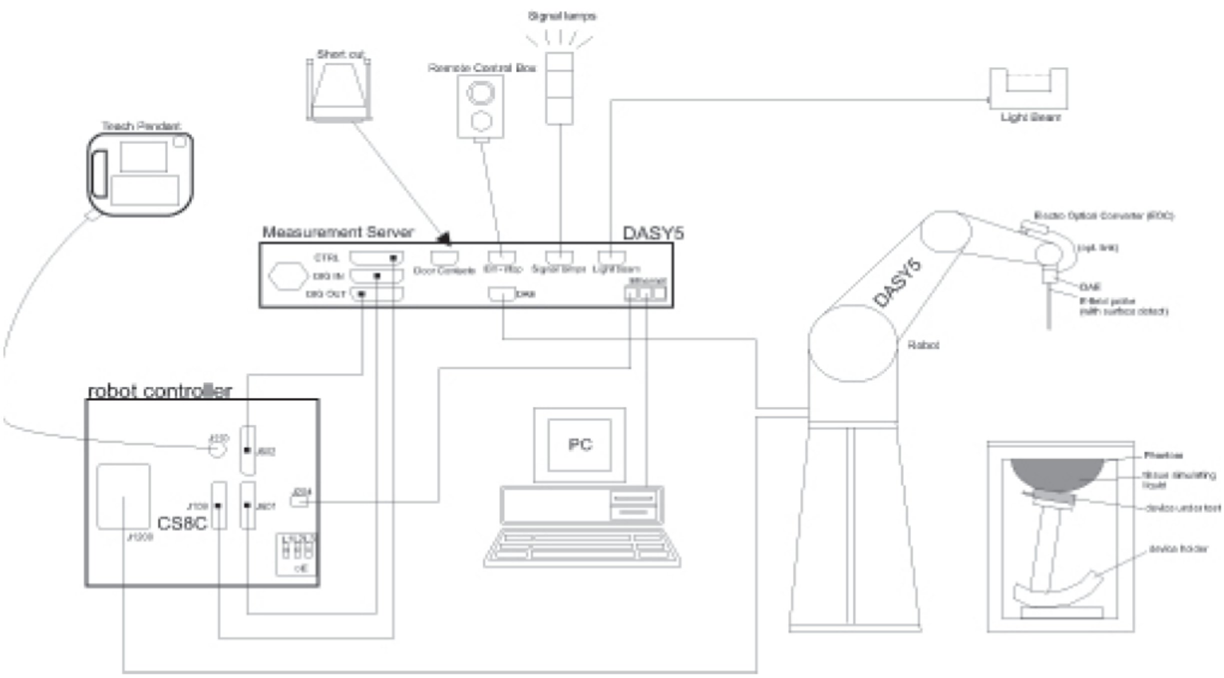
Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.

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.



4.2. DASY5 E-field Probe System

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

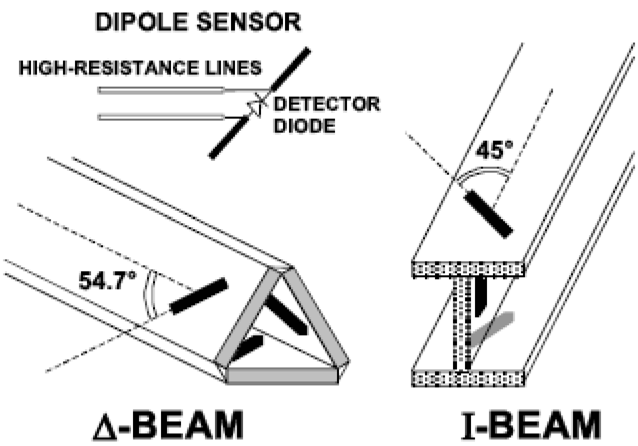
Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

Isotropic E-Field Probe

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



4.3. Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twin-headed "SAM Phantom", manufactured by SPEAG. The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6mm).
System checking was performed using the flat section, whilst Head SAR tests used the left and right head profile sections. Body SAR testing also used the flat section between the head profiles.

SAM Twin Phantom

4.4. Device Holder

The device was placed in the device holder (illustrated below) that is supplied by SPEAG as an integral part of the DASY system.
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

Device holder supplied by SPEAG

4.5. 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 of 15 mm x 15 mm is set. During the 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
Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

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. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

4.6. Data Storage and Evaluation

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 “.DA4”. 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.

Data Evaluation

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, ai0, ai1, ai2
	- Conversion factor	ConvFi
	- Diode compression point	Dcpi
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

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:

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

With	Vi = compensated signal of channel i	(i = x, y, z)
	Ui = input signal of channel i	(i = x, y, z)
	cf = crest factor of exciting field	(DASY parameter)
	dcpi = diode compression point	(DASY parameter)

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

$$\text{E} - \text{fieldprobes :} \qquad E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

$$\text{H} - \text{fieldprobes :} \qquad H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

With	Vi	= compensated signal of channel i	(i = x, y, z)
	Normi	= sensor sensitivity of channel i [mV/(V/m)2] for E-field Probes	(i = x, y, z)
	ConvF	= sensitivity enhancement in solution	
	aij	= sensor sensitivity factors for H-field probes	
	f	= carrier frequency [GHz]	
	Ei	= electric field strength of channel i in V/m	
	Hi	= magnetic field strength of channel i in A/m	

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

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

with	SAR	= local specific absorption rate in mW/g
	Etot	= total field strength in V/m
	σ	= conductivity in [mho/m] or [Siemens/m]
	ρ	= equivalent tissue density in g/cm3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

4.7. Tissue Dielectric Parameters for Head and Body Phantoms

The liquid is consisted of water,salt,Glycol,Sugar,Preventol and Cellulose.The liquid has previously been proven to be suited for worst-case.The table 3 and table 4 show the detail solition.It's satisfying the latest tissue dielectric parameters requirements proposed by the KDB865664.

Table 3:Composition of the Head Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	41.45
Sugar	56
Salt	1.45
Preventol	0.12
Cellulose	1.0
Dielectric Paramters Target Value	f=835MHz ε=41.50 σ=0.9

MIXTURE%	FREQUENCY(Brain) 1750MHz
Water	55.24
Glycol	44.45
Salt	0.31
Dielectric Paramters Target Value	f=1750MHz ε=40.10 σ=1.37

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	55.242
Glycol monobutyl	44.452
Salt	0.306
Dielectric Paramters Target Value	f=1900MHz ε=40.00 σ=1.40

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	62.70
Glycol	36.80
Salt	0.50
Dielectric Paramters Target Value	f=2450MHz ε=39.20 σ=1.80

Table 4:Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Brain) 835MHz
Water	52.50
Sugar	45
Salt	1.40
Preventol	0.10
Cellulose	1.00
Dielectric Paramters Target Value	f=835MHz ε=55.20 σ=0.97

MIXTURE%	FREQUENCY(Brain) 1750MHz
Water	69.61
Glycol	29.97
Salt	0.12
Dielectric Paramters Target Value	f=1750MHz ε=53.40 σ=1.49

MIXTURE%	FREQUENCY(Brain) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Paramters Target Value	f=1900MHz ε=53.30 σ=1.52

MIXTURE%	FREQUENCY(Brain) 2450MHz
Water	73.20
Glycol	26.70
Salt	0.10
Dielectric Paramters Target Value	f=2450MHz ε=52.70 σ=1.95

4.8. Tissue equivalent liquid properties

Dielectric performance of Head and Body tissue simulating liquid

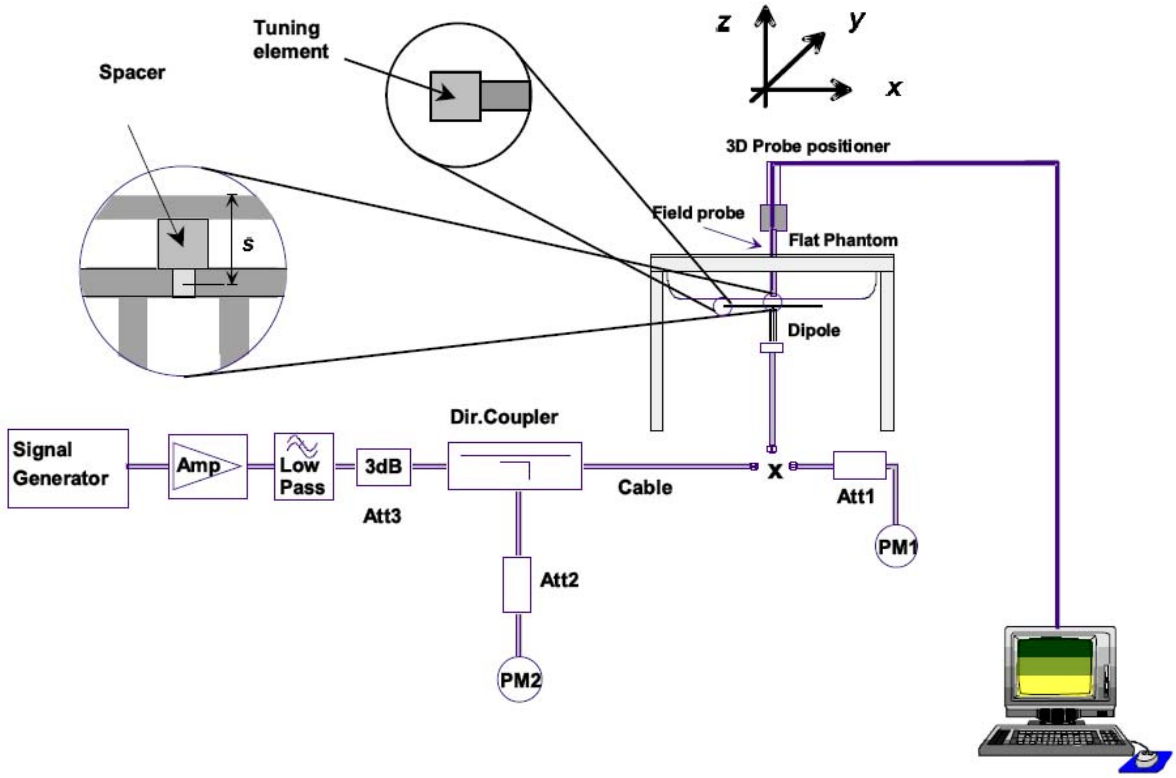
Frequency	Description	Dielectric paramenters	
		ε_r	σ
835MHz(Head)	Target Value ±5%	41.5 (39.4～43.6)	0.90 (0.86～0.95)
	Measurement Value 2014-03-28	41.90	0.88
835MHz(Body)	Target Value ±5%	55.2 (52.44～57.96)	0.97 (0.90～1.00)
	Measurement Value 2014-03-28	56.70	0.95
1900MHz(Head)	Target Value ±5%	40.0 (38.0～42.0)	1.40 (1.33～1.47)
	Measurement Value 2014-03-29	40.46	1.42
1900MHz(Body)	Target Value ±5%	53.3 (50.64～55.97)	1.52 (1.44～1.60)
	Measurement Value 2014-03-29	53.15	1.46

4.9. System Check

The purpose of the system check is to verify that the system operates within its specifications at the decice test frequency.The system check is simple check of repeatability to make sure that the system works correctly at the time of the compliance test;

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.



The output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.

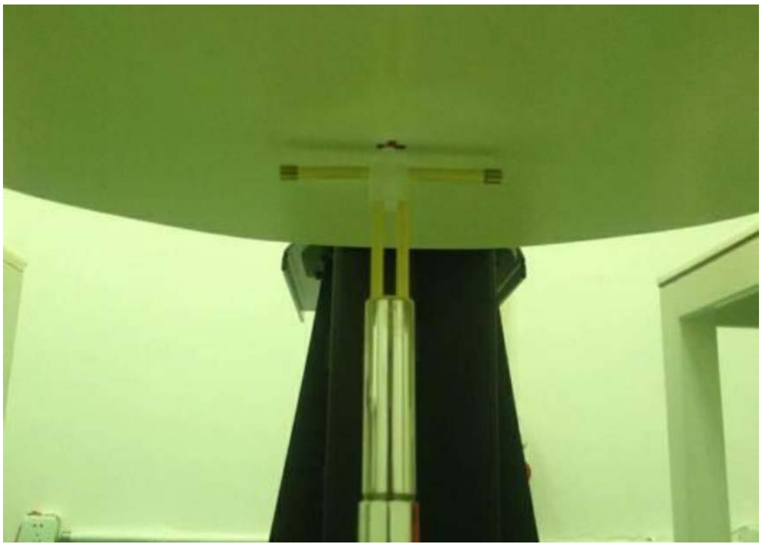


Photo of Dipole Setup

System Validation of Head

Measurement is made at temperature 22.0 ℃ and relative humidity 55%.							
Measurement Date: 835MHz Mar 28th, 2014;							
Verification results	Frequency (MHz)	Target value (W/kg)		Measured value (W/kg)		Deviation	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
	835	2.38	1.55	2.32	1.50	-2.52%	-3.23%

Measurement is made at temperature 22.0 ℃ and relative humidity 55%.							
Measurement Date: 1900MHz Mar 29th, 2014;							
Verification results	Frequency (MHz)	Target value (W/kg)		Measured value (W/kg)		Deviation	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
	1900	9.71	5.08	9.56	5.01	-1.54%	-1.38%

System Validation of Body

Measurement is made at temperature 22.0 ℃ and relative humidity 55%.							
Measurement Date: 835MHz Mar 28th, 2014;							
Verification results	Frequency (MHz)	Target value (W/kg)		Measured value (W/kg)		Deviation	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
	835	2.32	1.54	2.20	1.41	-5.17%	-8.44%

Measurement is made at temperature 22.0 ℃ and relative humidity 55%.							
Measurement Date: 1900MHz Mar 29th, 2014;							
Verification results	Frequency (MHz)	Target value (W/kg)		Measured value (W/kg)		Deviation	
		1 g Average	10 g Average	1 g Average	10 g Average	1 g Average	10 g Average
	1900	9.98	5.26	9.83	5.04	-1.50%	-4.18%

4.10. SAR measurement procedure

4.10.1 Tests to be performed

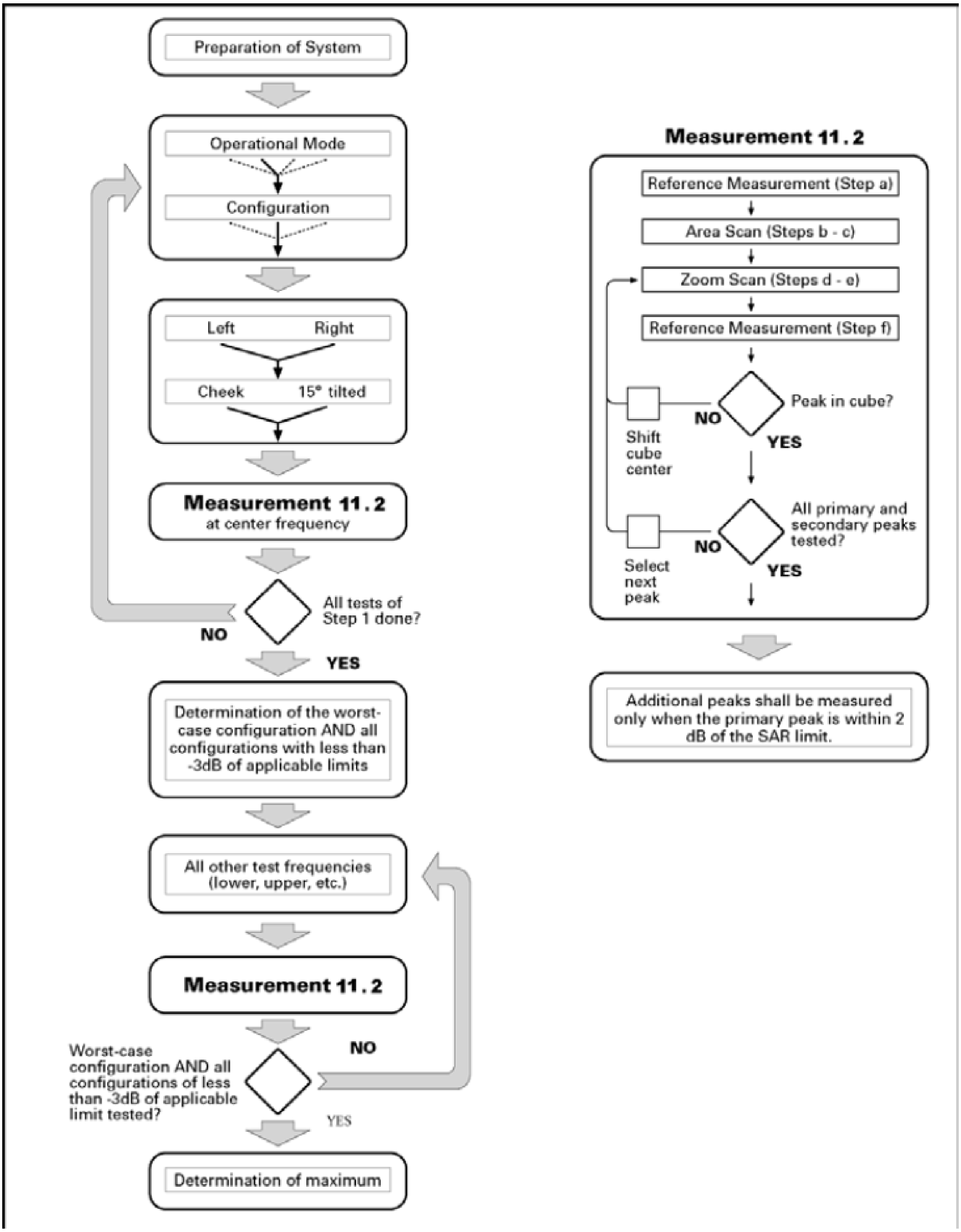
In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in Picture 11.1.

Step 1: The tests described in 11.2 shall be performed at the channel that is closest to the centre of the transmit frequency band (f_c) for:

a). all device positions (cheek and tilt, for both left and right sides of the SAM phantom;

b). all configurations for each device position in a), e.g., antenna extended and retracted, and

c). all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.
If more than three frequencies need to be tested according to 11.1 (i.e., $N_c > 3$), then all frequencies, configurations and modes shall be tested for all of the above test conditions.
Step 2: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 11.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.
Step 3: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.



Picture 10.1 Block diagram of the tests to be performed

4.10.2 General Measurement Procedure

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements and fully documented in SAR reports to qualify for TCB approval. Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std 1528-2003. The results should be documented as part of the system validation records and may be requested to support test results when all the measurement parameters in the following table are not satisfied.

			$\leq$ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$\frac{1}{2}\cdot\delta\cdot\ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			$\leq$ 2 GHz: $\leq$ 15 mm 2 – 3 GHz: $\leq$ 12 mm	3 – 4 GHz: $\leq$ 12 mm 4 – 6 GHz: $\leq$ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			$\leq$ 2 GHz: $\leq$ 8 mm 2 – 3 GHz: $\leq$ 5 mm*	3 – 4 GHz: $\leq$ 5 mm* 4 – 6 GHz: $\leq$ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		$\leq$ 5 mm	3 – 4 GHz: $\leq$ 4 mm 4 – 5 GHz: $\leq$ 3 mm 5 – 6 GHz: $\leq$ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	$\leq$ 4 mm	3 – 4 GHz: $\leq$ 3 mm 4 – 5 GHz: $\leq$ 2.5 mm 5 – 6 GHz: $\leq$ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5\cdot\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		$\geq$ 30 mm	3 – 4 GHz: $\geq$ 28 mm 4 – 5 GHz: $\geq$ 25 mm 5 – 6 GHz: $\geq$ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

4.10.3 GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a System Simulator (SS) by air link. Using E5515C the power level is set to “5” for GSM 850, set to “0” for GSM 1900. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

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

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

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

4.10.4 Bluetooth & Wi-Fi Measurement Procedures for SAR

Normal network operating configurations are not suitable for measuring the SAR of 802.11 transmitters in general. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure that the results are consistent and reliable.
Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in a test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

4.10.5 Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 14.1 to Table 14.11 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

4.10.6 Area Scan Based 1-g SAR

4.10.6.1 Requirement of KDB

According to the KDB447498 D01 v05, when the implementation is based the specific polynomial fit algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007) and the estimated 1-g SAR is ≤ 1.2 W/kg, a zoom scan measurement is not required provided it is also not needed for any other purpose; for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between distinctive peaks and scattered noisy SAR distributions from area scans.
There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements, peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-g SAR is within 3% of the zoom scan 1-g SAR (See Annex B). When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

4.10.6.2 Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empirically determined by analyzing a large number of phones. The MOTOROLA FAST SAR was developed and validated by the MOTOROLA Research Group in Ft. Lauderdale.
In the initial study, an approximation algorithm based on Linear fit was developed. The accuracy of the algorithm has been demonstrated across a broad frequency range (136-2450 MHz) and for both 1- and 10-g averaged SAR using a sample of 264 SAR measurements from 55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithm are 1.2% and 5.8% for 1- and 10-g averaged SAR, respectively
In the second step, the same research group optimized the fitting algorithm to an Polynomial fit whereby the frequency validity was extended to cover the range 30-6000MHz. Details of this study can be found in the BEMS 2007 Proceedings.
Both algorithms are implemented in DASY software.

5. TEST CONDITIONS AND RESULTS

5.1. Conducted Power Results

Max Conducted power measurement results and power drift from tune-up tolerance provide by manufacturer:

The conducted power measurement results for GSM850/1900

Test Mode	Conducted Power (dBm)		
GSM850	Channel 251(848.8MHz)	Channel 190(836.6MHz)	Channel 128(824.2MHz)
	31.38	31.49	31.16
GSM1900	Channel 810(1909.8MHz)	Channel 661(1880.0MHz)	Channel 512(1850.2MHz)
	30.36	30.44	30.04

The conducted power measurement results for GPRS/EGPRS

Test Mode	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
GSM850 GPRS (GMSK)	Test Channel				Test Channel		
	251	190	128		251	190	128
1 Txslot	31.11	31.24	31.12	-9.03	22.08	22.21	22.09
2 Txslot	29.22	29.10	29.26	-6.02	23.20	23.08	23.24
3 Txslot	28.37	28.39	28.31	-4.26	24.11	24.13	24.05
4 Txslot	**27.41**	**27.44**	**27.47**	**-3.01**	**24.40**	**24.43**	**24.46**
Test Mode	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
GSM850 EGPRS (GMSK)	Test Channel				Test Channel		
	251	190	128		251	190	128
1 Txslot	31.15	31.18	31.17	-9.03	22.12	22.15	22.14
2 Txslot	29.22	29.19	29.20	-6.02	23.20	23.17	23.18
3 Txslot	28.31	28.35	28.31	-4.26	24.05	24.09	24.05
4 Txslot	**27.43**	**27.49**	**27.46**	**-3.01**	**24.42**	**24.48**	**24.45**
Test Mode	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
GSM1900 GPRS (GMSK)	Test Channel				Test Channel		
	810	661	512		810	661	512
1 Txslot	28.42	29.16	29.27	-9.03	19.39	20.13	20.24
2 Txslot	27.16	27.29	27.33	-6.02	21.14	21.27	21.31
3 Txslot	26.27	26.73	26.81	-4.26	22.01	22.47	22.55
4 Txslot	**25.44**	**26.18**	**26.42**	**-3.01**	**22.43**	**23.17**	**23.41**
Test Mode	Measured Power (dBm)			Calculation (dB)	Averaged Power (dBm)		
GSM1900 EGPRS (GMSK)	Test Channel				Test Channel		
	810	661	512		810	661	512
1 Txslot	28.26	29.13	29.24	-9.03	19.23	20.10	20.21
2 Txslot	27.33	27.22	27.32	-6.02	21.31	21.20	21.30
3 Txslot	26.01	26.66	26.75	-4.26	21.75	22.40	22.49
4 Txslot	**25.25**	**26.04**	**26.32**	**-3.01**	**22.24**	**23.03**	**23.31**

NOTES:
1) Division Factors
To average the power, the division factor is as follows:
1TX-slot = 1 transmit time slot out of 8 time slots=> conducted power divided by (8/1) => -9.03dB
2TX-slots = 2 transmit time slots out of 8 time slots=> conducted power divided by (8/2) => -6.02dB
3TX-slots = 3 transmit time slots out of 8 time slots=> conducted power divided by (8/3) => -4.26dB
4TX-slots = 4 transmit time slots out of 8 time slots=> conducted power divided by (8/4) => -3.01dB
According to the conducted power as above, the body measurements are performed with 4Txslots for GPRS850 and GPRS1900.
***Note:* According to the KDB941225 D03, "when SAR tests for EDGE or EGPRS mode is necessary, GMSK modulation should be used".**

Manufacturing tolerance

GSM Speech

GSM850			
Channel	Channel 251	Channel 190	Channel 190
Target (dBm)	30.5	30.5	30.5
Tolerance ±(dB)	1	1	1
GSM1900			
Channel	Channel 810	Channel 661	Channel 512
Target (dBm)	29.5	29.5	29.5
Tolerance ±(dB)	1	1	1

GPRS/EGPRS (GMSK Modulation)

GSM850 GPRS				
Channel		251	190	128
1 Txslot	Target (dBm)	30.5	30.5	30.5
	Tolerance ±(dB)	1	1	1
2 Txslot	Target (dBm)	28.5	28.5	28.5
	Tolerance ±(dB)	1	1	1
3 Txslot	Target (dBm)	27.5	27.5	27.5
	Tolerance ±(dB)	1	1	1
4 Txslot	Target (dBm)	26.5	26.5	26.5
	Tolerance ±(dB)	1	1	1
GSM850 EGPRS				
Channel		251	190	128
1 Txslot	Target (dBm)	30.5	30.5	30.5
	Tolerance ±(dB)	1	1	1
2 Txslot	Target (dBm)	28.5	28.5	28.5
	Tolerance ±(dB)	1	1	1
3 Txslot	Target (dBm)	27.5	27.5	27.5
	Tolerance ±(dB)	1	1	1
4 Txslot	Target (dBm)	26.5	26.5	26.5
	Tolerance ±(dB)	1	1	1
GSM1900 GPRS				
Channel		810	661	512
1 Txslot	Target (dBm)	28.5	28.5	28.5
	Tolerance ±(dB)	1	1	1
2 Txslot	Target (dBm)	26.5	26.5	26.5
	Tolerance ±(dB)	1	1	1
3 Txslot	Target (dBm)	26.0	26.0	26.0
	Tolerance ±(dB)	1	1	1
4 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance ±(dB)	1	1	1
GSM1900 EGPRS				
Channel		810	661	512
1 Txslot	Target (dBm)	28.5	28.5	28.5
	Tolerance ±(dB)	1	1	1
2 Txslot	Target (dBm)	26.5	26.5	26.5
	Tolerance ±(dB)	1	1	1
3 Txslot	Target (dBm)	26.0	26.0	26.0
	Tolerance ±(dB)	1	1	1
4 Txslot	Target (dBm)	25.5	25.5	25.5
	Tolerance ±(dB)	1	1	1

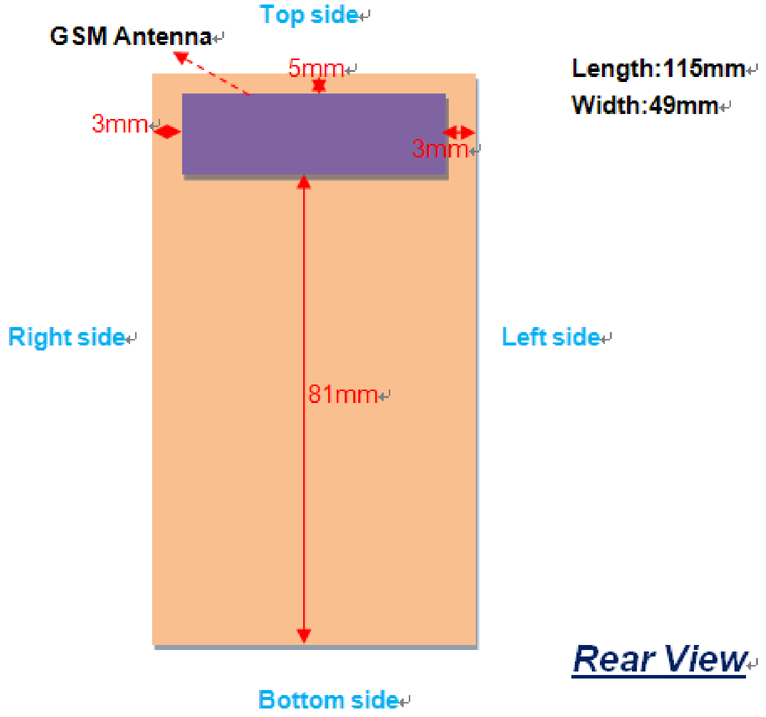
5.2. Simultaneous TX SAR Considerations

5.2.1 Introduction

Simultaneous multi-band transmision means that the device can transmit multiple transmission modes at the same time. The time-averaged output power of a secondary transmitter may be much lower than that of the primary transmitter.In some cases,the secondary transmitter can be exclused from SAR testing when used alone.However ,when the primary and secondary transmitters are used together,the SAR limits may still be exceed.A means of determing the threshold power for the secondary transmitter allows it to be exclused from SAR testing is needed.

For the DUT ,it has GSM antenna only, So we do not have to evaluating the simultaneous SAR.

5.2.2 Transmit Antenna Separation Distances



5.2.2 SAR Measurement Positions

According to the KDB941225 D06 Hot Spot SAR v01, the edges with less than 2.5 cm distance to the antennas need to be tested for SAR.

SAR measurement positions						
Mode	Front	Rear	Left edge	Right edge	Top edge	Bottom edge
Main antenna(GSM)	Yes	Yes	Yes	Yes	Yes	No

5.2.3 Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

Appendix A

SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

Picture 12.2 Power Thresholds

5.2.3 Estimated SAR

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

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

Per FCC KD B447498 D01,simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the transmitting antenna in a specific a physical test configuration is ≤1.6 W/Kg.When the sum is greater than the SAR limit,SAR test exclusion is determined by the SAR to peak location separation ratio.

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

5.3. SAR Measurement Results

The product with 2 SIMs and 2 SIMs(SIM1 and SIM2) can not used Simultaneous, we tested 2 SIMs(SIM1 and SIM2) and recorded worst case at SIM 1

It is determined by user manual for the distance between the EUT and the phantom bottom.The distance is 10mm and just applied to the condition of body worn accessory.

The calculated SAR is obtained by the following formula:

Reported SAR=Measured SAR*$10^{(Ptarget-Pmeasured))/10}$

Scaling factor=$10^{(Ptarget-Pmeasured))/10}$

Reported SAR= Measured SAR* Scaling factor

Where P_{target} is the power of manufacturing upper limit;

$P_{measured}$ is the measured power;

Measured SAR is measured SAR at measured power which including power drift)

Reported SAR which including Power Drift and Scaling factor

Duty Cycle

Test Mode	Duty Cycle
Speech for GSM850/1900	1:8.3
GPRS/EGPRS for GSM850/1900	1:2

SAR Values (GSM850-Head)

Test Frequency		Side	Test Position	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Measurement SAR over 1g(W/kg)	Power drift	Scaling Factor	Reported SAR over 1g(W/kg)	SAR limit 1g (W/kg)	Ref. Plot #
Ch	MHz										
128	824.20	Left	Touch	31.50	31.16	0.506	0.01	1.08	0.546	1.60	--
190	836.60	Left	Touch	31.50	31.49	0.527	-0.16	1.00	0.527	1.60	--
251	848.80	Left	Touch	31.50	31.38	0.508	0.05	1.03	0.523	1.60	--
128	824.20	Left	Tilt	31.50	31.16	0.511	-0.10	1.08	0.552	1.60	1
190	836.60	Left	Tilt	31.50	31.49	0.514	-0.16	1.00	0.514	1.60	--
251	848.80	Left	Tilt	31.50	31.38	0.505	0.14	1.03	0.520	1.60	--
128	824.20	Right	Touch	31.50	31.16	0.457	-0.04	1.08	0.494	1.60	--
190	836.60	Right	Touch	31.50	31.49	0.461	-0.13	1.00	0.461	1.60	--
251	848.80	Right	Touch	31.50	31.38	0.450	-0.18	1.03	0.464	1.60	--
128	824.20	Right	Tilt	31.50	31.16	0.425	0.11	1.08	0.459	1.60	--
190	836.60	Right	Tilt	31.50	31.49	0.430	-0.12	1.00	0.430	1.60	--
251	848.80	Right	Tilt	31.50	31.38	0.408	0.15	1.03	0.420	1.60	--

SAR Values (GSM850-Body)

Test Frequency		Mode (number of timeslots)	Test Position	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Measurement SAR over 1g(W/kg)	Power drift	Scaling Factor	Reported SAR over 1g(W/kg)	SAR limit 1g (W/kg)	Ref. Plot #
Ch	MHz										
190	836.60	GPRS (4)	Front	27.50	27.44	0.452	-0.18	1.01	0.457	1.60	--
190	836.60	GPRS (4)	Rear	27.50	27.44	0.662	-0.23	1.01	0.669	1.60	2
128	824.20	GPRS (4)	Rear	27.50	27.47	0.643	-0.15	1.01	0.649	1.60	--
251	848.80	GPRS (4)	Rear	27.50	27.41	0.637	-0.05	1.01	0.643	1.60	--
190	836.60	GPRS (4)	Left	27.50	27.44	0.257	-0.17	1.01	0.260	1.60	--
190	836.60	GPRS (4)	Right	27.50	27.44	0.160	-0.13	1.01	0.162	1.60	--
190	836.60	GPRS (4)	Top	27.50	27.44	0.106	-0.08	1.01	0.107	1.60	--
190	836.60	GPRS (4)	Bottom	27.50	27.44	N/A	N/A	N/A	N/A	N/A	--
190	836.60	EGPRS (4)	Rear	27.50	27.49	0.357	0.14	1.00	0.357	1.60	--
190	836.60	Speech	Rear with Headset	31.50	31.49	0.398	-0.20	1.00	0.398	1.60	--

Note: The distance between the EUT and the phantom bottom is 10mm.

SAR Values (PCS1900-Head)

Test Frequency		Side	Test Position	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Measurement SAR over 1g(W/kg)	Power drift	Scaling Factor	Reported SAR over 1g(W/kg)	SAR limit 1g (W/kg)	Ref. Plot #
Ch	MHz										
512	1850.2	Left	Touch	30.50	30.04	0.328	0.18	1.11	0.364	1.60	3
661	1880.0	Left	Touch	30.50	30.44	0.347	-0.14	1.01	0.350	1.60	--
810	1909.8	Left	Touch	30.50	30.36	0.314	0.04	1.03	0.323	1.60	--
512	1850.2	Left	Tilt	30.50	30.04	0.297	0.10	1.11	0.330	1.60	--
661	1880.0	Left	Tilt	30.50	30.44	0.312	-0.15	1.01	0.315	1.60	--
810	1909.8	Left	Tilt	30.50	30.36	0.290	0.16	1.03	0.299	1.60	--
512	1850.2	Right	Touch	30.50	30.04	0.259	-0.10	1.11	0.287	1.60	--
661	1880.0	Right	Touch	30.50	30.44	0.275	-0.13	1.01	0.278	1.60	--
810	1909.8	Right	Touch	30.50	30.36	0.231	0.17	1.03	0.238	1.60	--
512	1850.2	Right	Tilt	30.50	30.04	0.238	-0.03	1.11	0.264	1.60	--
661	1880.0	Right	Tilt	30.50	30.44	0.254	-0.12	1.01	0.257	1.60	--
810	1909.8	Right	Tilt	30.50	30.36	0.212	-0.11	1.03	0.218	1.60	--

SAR Values (PCS1900-Body)

Test Frequency		Mode (number of timeslots)	Test Position	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Measurement SAR over 1g(W/kg)	Power drift	Scaling Factor	Reported SAR over 1g(W/kg)	SAR limit 1g (W/kg)	Ref. Plot #
Ch	MHz										
661	1880.0	GPRS (4)	Front	26.50	26.18	0.294	-0.15	1.08	0.318	1.60	--
661	1880.0	GPRS (4)	Rear	26.50	26.18	0.304	-0.04	1.08	0.328	1.60	4
512	1850.2	GPRS (4)	Rear	26.50	26.42	0.286	0.08	1.02	0.292	1.60	--
810	1909.8	GPRS (4)	Rear	26.50	25.44	0.244	-0.11	1.27	0.310	1.60	--
661	1880.0	GPRS (4)	Left	26.50	26.18	0.187	-0.02	1.08	0.202	1.60	--
661	1880.0	GPRS (4)	Right	26.50	26.18	0.167	0.13	1.08	0.180	1.60	--
661	1880.0	GPRS (4)	Top	26.50	26.18	0.145	-0.02	1.08	0.157	1.60	--
661	1880.0	GPRS (4)	Bottom	26.50	26.18	N/A	N/A	N/A	N/A	N/A	--
661	1880.0	EGPRS (4)	Rear	26.50	26.04	0.252	-0.12	1.11	0.280	1.60	--
661	1880.0	Speech	Rear with Headset	30.50	30.44	0.260	-0.16	1.03	0.268	1.60	--

Note: 1.The distance between the EUT and the phantom bottom is 10mm.
2.According to KDB447498,When the 1-g SAR for the mid-band channel,or the channel with highest output power satidfy the following conditions,testing of the other channels in the band is not required.
⩽0.8W/Kg and transmission band ⩽100MHz;
⩽0.6W/Kg and 100MHz ⩽transmission band ⩽200MHz;
⩽ 0.4W/Kg and transmission band >200MHz
3.Acciding to KDB 248227,Each channel should be tested at the lowest data rate in each mode.

5.4. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ⩾ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ⩾ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ⩾ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

5.5. Measurement Uncertainty (300MHz-3GHz)

No.	Error Description	Type	Uncertainty Value	Probably Distribution	Div.	(Ci) 1g	(Ci) 10g	Std. Unc. (1g)	Std. Unc. (10g)	Degree of freedom
Measurement System										
1	Probe calibration	B	5.50%	N	1	1	1	5.50%	5.50%	∞
2	Axial isotropy	B	4.70%	R	$\sqrt{3}$	0.7	0.7	1.90%	1.90%	∞
3	Hemispherical isotropy	B	9.60%	R	$\sqrt{3}$	0.7	0.7	3.90%	3.90%	∞
4	Boundary Effects	B	1.00%	R	$\sqrt{3}$	1	1	0.60%	0.60%	∞
5	Probe Linearity	B	4.70%	R	$\sqrt{3}$	1	1	2.70%	2.70%	∞
6	Detection limit	B	1.00%	R	$\sqrt{3}$	1	1	0.60%	0.60%	∞
7	RF ambient	B	0.00%	R	$\sqrt{3}$	1	1	0.00%	0.00%	∞

	conditions-noise									
8	RF ambient conditions-reflection	B	0.00%	R	$\sqrt{3}$	1	1	0.00%	0.00%	∞
9	Response time	B	0.80%	R	$\sqrt{3}$	1	1	0.50%	0.50%	∞
10	Integration time	B	5.00%	R	$\sqrt{3}$	1	1	2.90%	2.90%	∞
11	RF ambient	B	3.00%	R	$\sqrt{3}$	1	1	1.70%	1.70%	∞
12	Probe positioned mech. restrictions	B	0.40%	R	$\sqrt{3}$	1	1	0.20%	0.20%	∞
13	Probe positioning with respect to phantom shell	B	2.90%	R	$\sqrt{3}$	1	1	1.70%	1.70%	∞
14	Max.SAR evalation	B	3.90%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
Test Sample Related										
15	Test sample positioning	A	1.86%	N	1	1	1	1.86%	1.86%	∞
16	Device holder uncertainty	A	1.70%	N	1	1	1	1.70%	1.70%	∞
17	Drift of output power	B	5.00%	R	$\sqrt{3}$	1	1	2.90%	2.90%	∞
Phantom and Set-up										
18	Phantom uncertainty	B	4.00%	R	$\sqrt{3}$	1	1	2.30%	2.30%	∞
19	Liquid conductivity (target)	B	5.00%	R	$\sqrt{3}$	0.64	0.43	1.80%	1.20%	∞
20	Liquid conductivity (meas.)	A	0.50%	N	1	0.64	0.43	0.32%	0.26%	∞
21	Liquid permittivity (target)	B	5.00%	R	$\sqrt{3}$	0.64	0.43	1.80%	1.20%	∞
22	Liquid cpermittivity (meas.)	A	0.16%	N	1	0.64	0.43	0.10%	0.07%	∞
Combined standard uncertainty	$u_c=\sqrt{\sum_{i=1}^{22} c_i^2 u_i^2}$		/	/	/	/	/	10.20%	10.00%	∞
Expanded uncertainty (confidence interval of 95 %)	$u_e = 2u_c$		/	R	K=2	/	/	20.40%	20.00%	∞

5.6. System Check Results

System Performance Check at 835 MHz Head

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d134

Date/Time: 28/03/2014 AM

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

Medium parameters used (interpolated): f = 835 MHz; σ = 0.88 S/m; ε_r = 41.90; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3842; ConvF(8.83, 8.83, 8.83); Calibrated: 06/06/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.5 (6469)

Area Scan (61x91x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 2.54W/kg

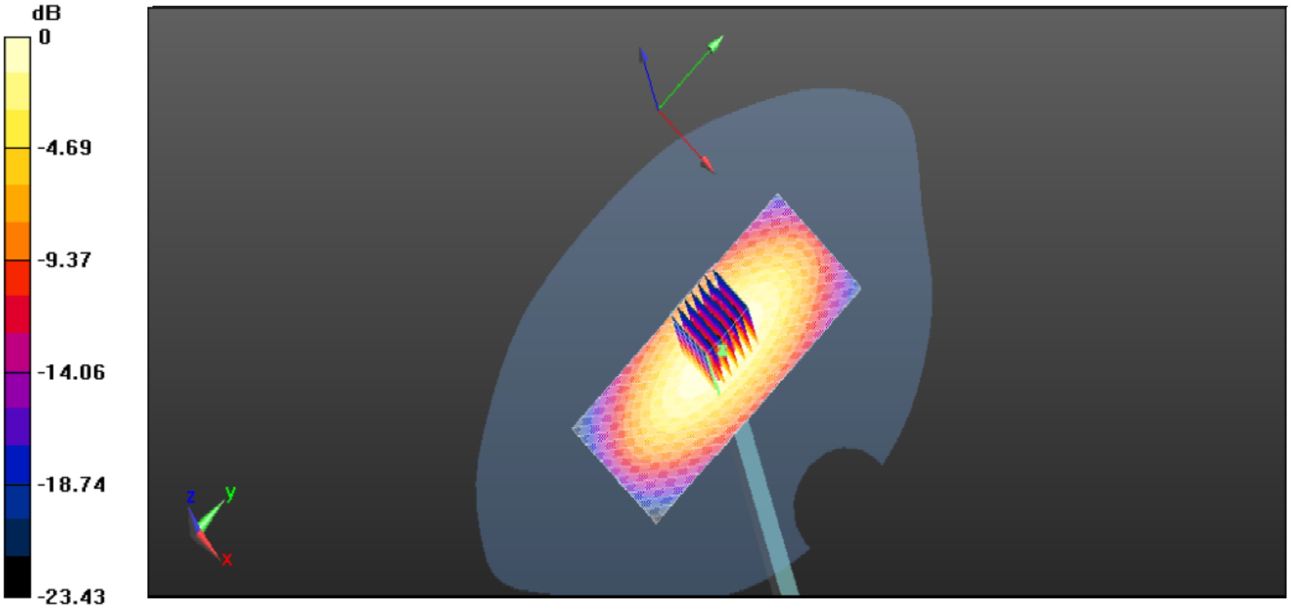
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.131 V/m; Power Drift = 0.085 dB

Peak SAR (extrapolated) = 3.479 W/kg

SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.50 mW/g

Maximum value of SAR (measured) = 2.55 mW/g



0 dB = 2.54mW/g=8.10dB mW/g

System Performance Check 835MHz Head 250mW

System Performance Check at 835 MHz Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d134

Date/Time: 28/03/2014 PM

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

Medium parameters used (interpolated): f = 835 MHz; σ = 0.95 S/m; ε_r = 56.70; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3842; ConvF(9.09, 9.09, 9.09); Calibrated: 06/06/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.5 (6469)

Area Scan (61x91x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

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

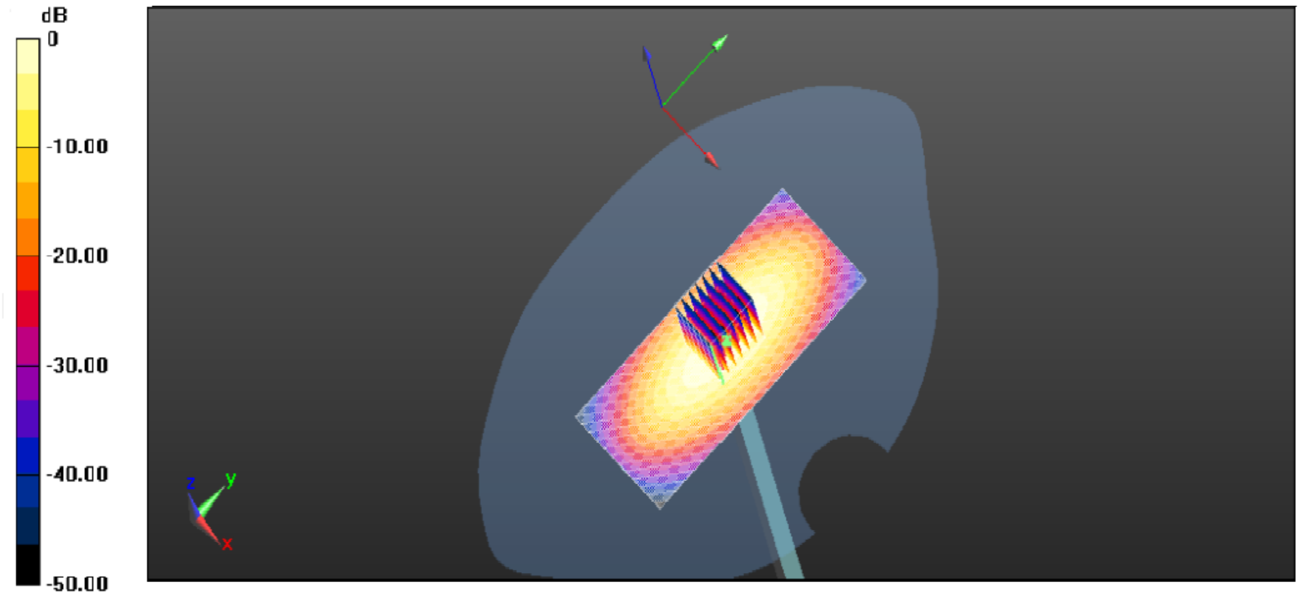
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 46.603 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.586 W/kg

SAR(1 g) = 2.20 mW/g; SAR(10 g) = 1.41 mW/g

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



0 dB = 2.58 mW/g = 8.23 dB mW/g

System Performance Check 835MHz Body 250mW

System Performance Check at 1900 MHz Head

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d150

Date/Time: 29/03/2014 AM

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

Medium parameters used (interpolated): f = 1900 MHz; σ = 1.42 S/m; εr = 40.46; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3842; ConvF(7.55, 7.55, 7.55); Calibrated: 06/06/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Area Scan (61x91x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 10.9 W/kg

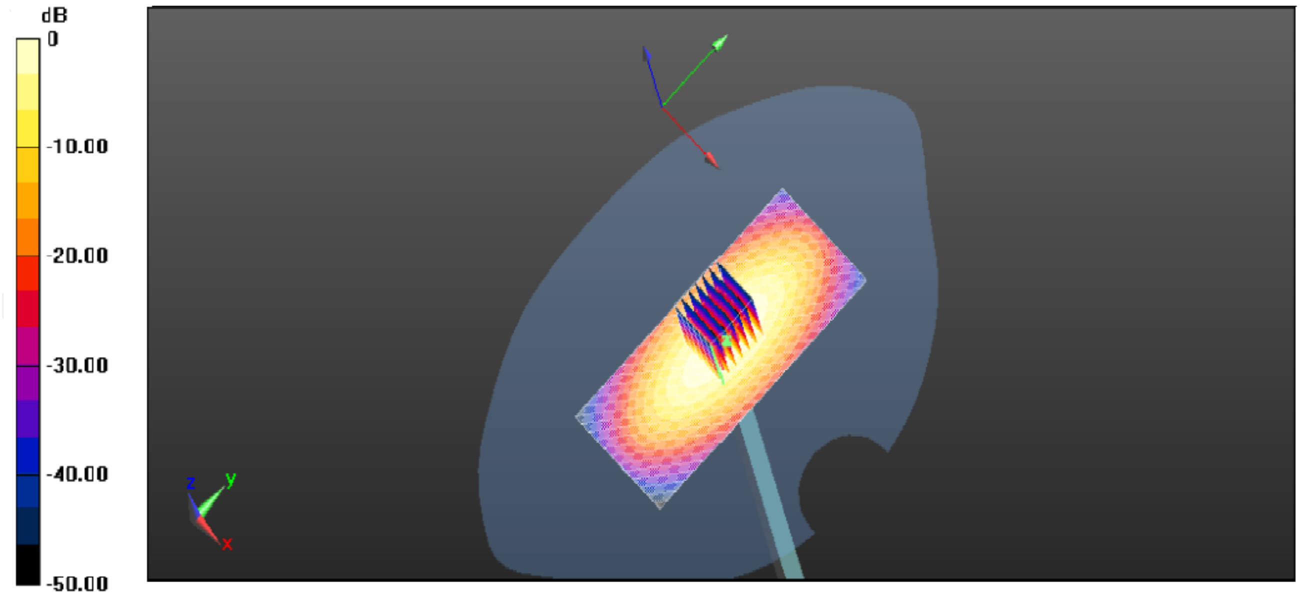
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.167 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 17.874 W/kg

SAR(1 g) = 9.56 W/kg; SAR(10 g) = 5.01 W/kg

Maximum value of SAR (measured) = 10.8 W/kg



0 dB = 10.9 W/kg = 20.75 dB W/kg

System Performance Check 1900MHz Head 250mW

System Performance Check at 1900 MHz Body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d150

Date/Time: 29/03/2014 PM

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

Medium parameters used (interpolated): f = 1900 MHz; σ = 1.46 S/m; ε_r =53.15; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3842; ConvF(7.43, 7.43, 7.43); Calibrated: 06/06/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Area Scan (61x91x1): Measurement grid: dx=15.00 mm, dy=15.00 mm

Maximum value of SAR (interpolated) = 11.5 mW/g

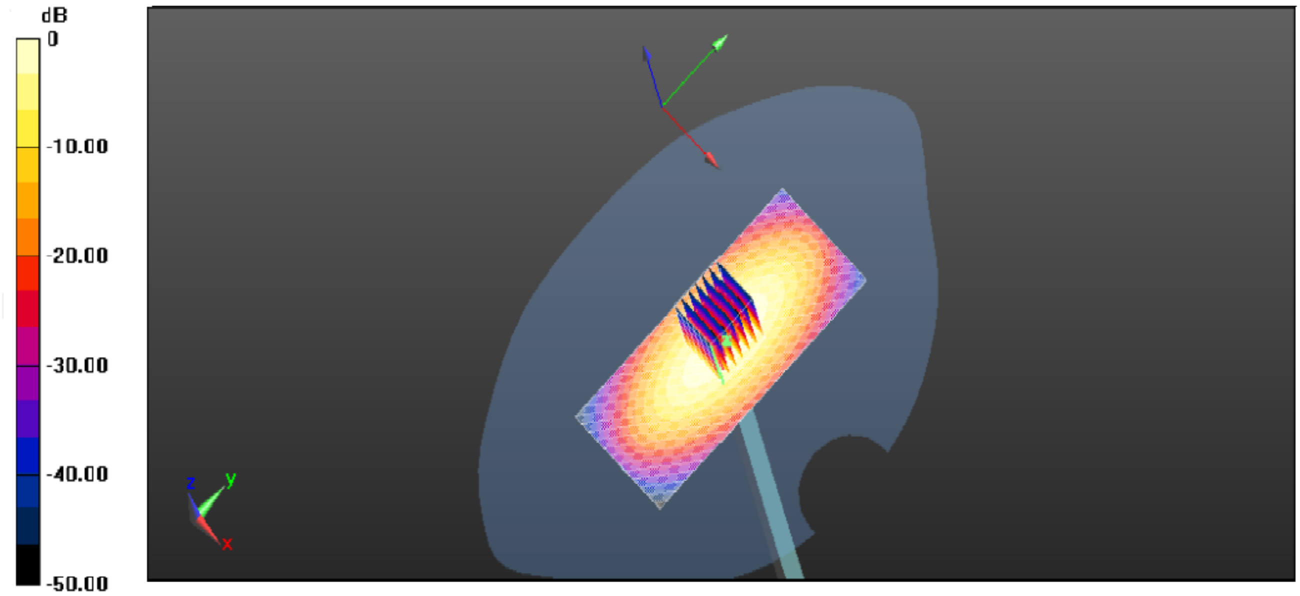
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 85.137 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 16.68 W/kg

SAR(1 g) = 9.83 mW/g; SAR(10 g) = 5.04 mW/g

Maximum value of SAR (measured) = 11.6 mW/g



0 dB = 11.5 mW/g = 21.21 dB mW/g

System Performance Check 1900MHz Body 250mW

5.7. SAR Test Graph Results

GSM850 Left Head Tilt Low Channel

Communication System: Customer System; Frequency: 824.2 MHz;Duty Cycle:1:8.3

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.95 S/m; ε_r = 42.25; ρ = 1000 kg/m^3

Phantom section : Left Head Section

Probe: ES3DV3 - SN3842; ConvF(8.83, 8.83, 8.83); Calibrated: 06/06/2013;

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.559 W/kg

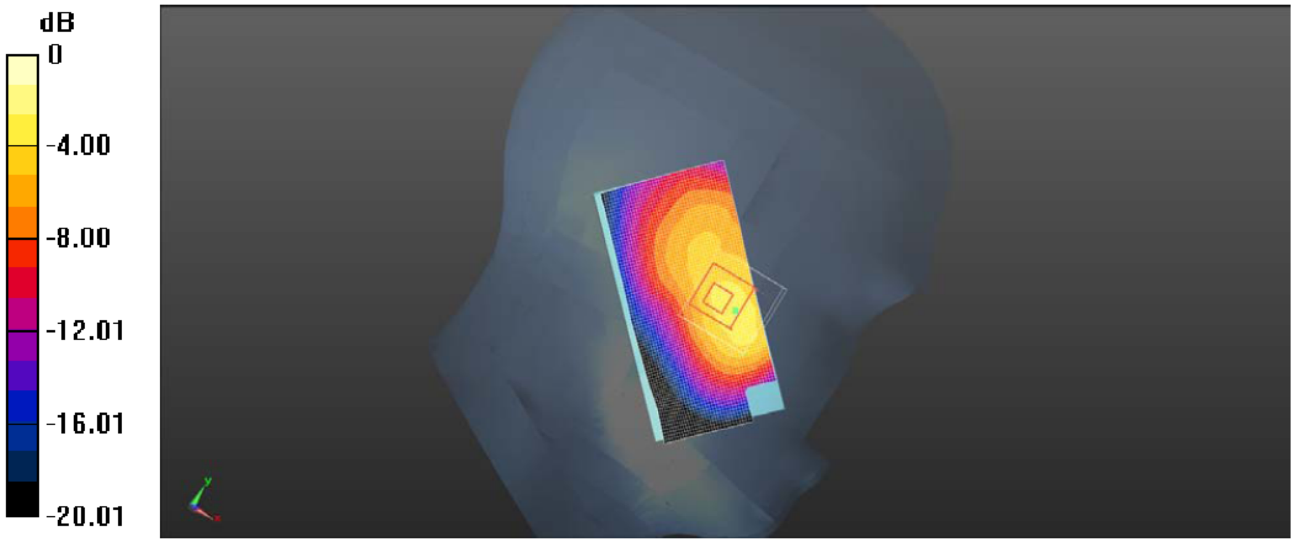
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.210 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.965 W/Kg

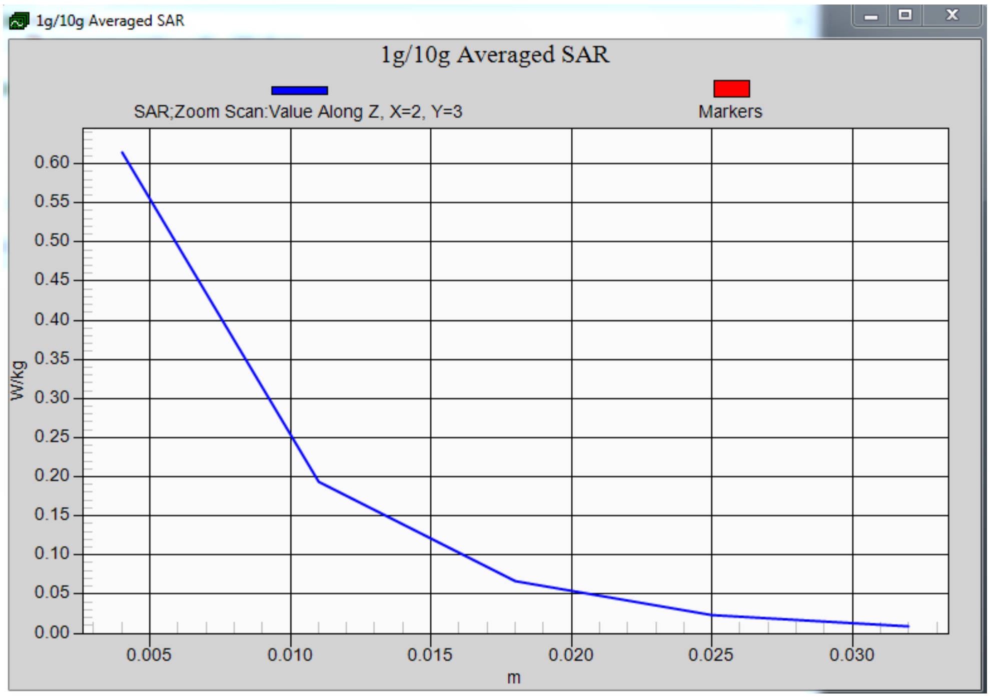
SAR(1 g) = 0.511 W/Kg; SAR(10 g) = 0.270 W/Kg

Maximum value of SAR (measured) = 0.668 W/kg



0dB = 0.668 W/kg = -1.52 dBW/kg

Plot 1: Left Head Tilt (GSM850 Low Channel)



Z-Scan at power reference point- Left Head Tilt (GSM850 Low Channel)

GSM850 GPRS 4TS Body Rear Side Middle Channel

Communication System: Customer System; Frequency: 836.6 MHz;Duty Cycle:1:2

Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.95 S/m; ε_r = 55.50; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3842; ConvF(9.09, 9.09, 9.09); Calibrated: 06/06/2013;

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

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

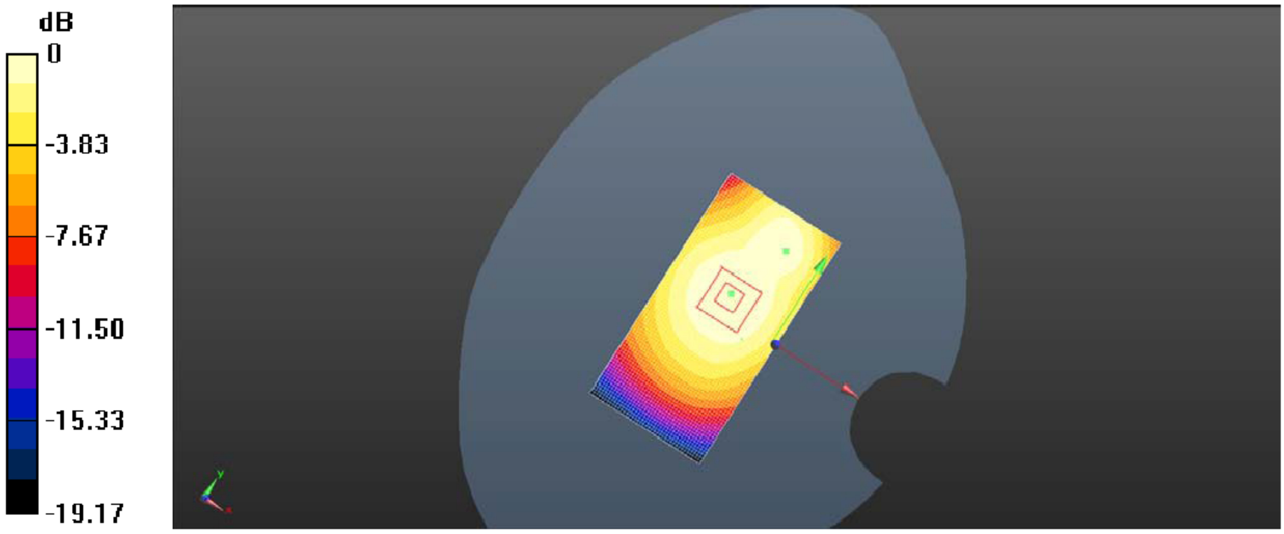
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.635 V/m; Power Drift = -0.23 dB

Peak SAR (extrapolated) = 0.827 W/Kg

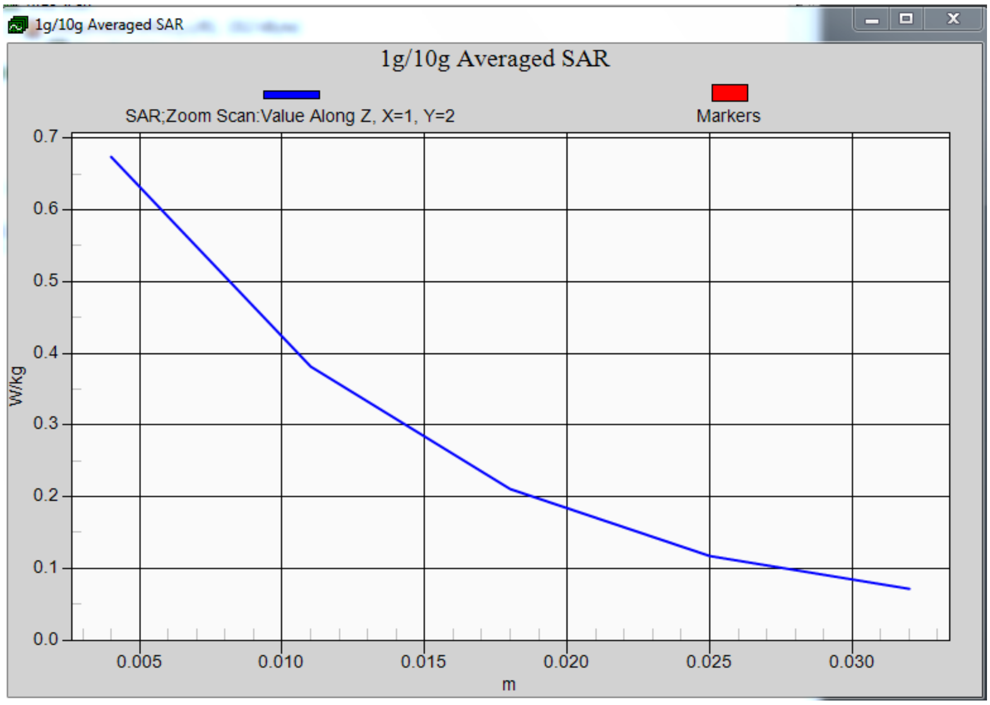
SAR(1 g) = 0.662 W/Kg; SAR(10 g) = 0.484 W/Kg

Maximum value of SAR (measured) = 0.694 W/kg



0dB = 0.692 W/kg = -1.60 dBW/kg

Plot 2: Body Rear Side (GSM850 GPRS 4TS Middle Channel)



Z-Scan at power reference point- Body Rear Side (GSM850 GPRS 4TS Middle Channel)

PCS1900 Left Head Touch Low Channel

Communication System: Customer System; Frequency: 1850.2 MHz;Duty Cycle:1:8.3

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.38 S/m; ε_r = 40.90; ρ = 1000 kg/m^3

Phantom section : Left Head Section

Probe: ES3DV3 - SN3842; ConvF(7.55, 7.55, 7.55); Calibrated: 06/06/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.335 W/kg

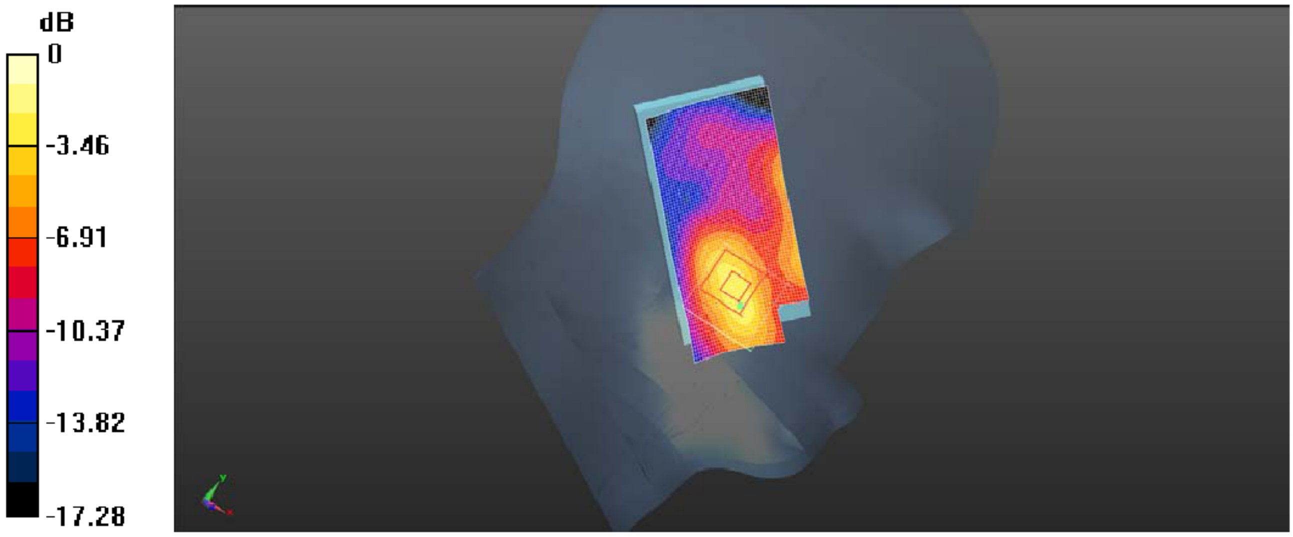
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.264 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.468 W/Kg

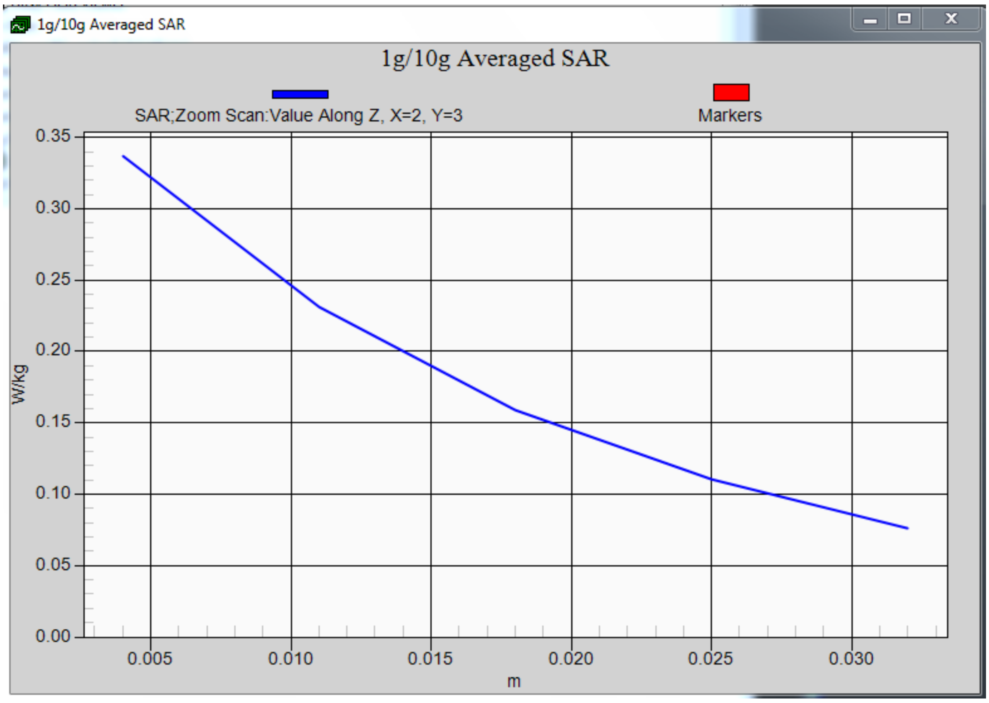
SAR(1 g) = 0.328 W/Kg; SAR(10 g) = 0.191 W/Kg

Maximum value of SAR (measured) = 0.457 W/kg



0dB = 0.457 W/kg = -3.86 dBW/kg

Plot 3: Left Head Touch (PCS1900 Low Channel)



Z-Scan at power reference point- Left Head Touch (PCS1900 Low Channel)

PCS1900 GPRS 4TS Body Rear Side Middle Channel

Communication System: Customer System; Frequency: 1880.0 MHz;Duty Cycle:1:2

Medium parameters used (interpolated): f = 1880.0 MHz; σ =1.41 S/m; $ε_r$ = 52.30; ρ = 1000 kg/m^3

Phantom section : Body- worn

Probe: ES3DV3 - SN3842; ConvF(7.43, 7.43, 7.43); Calibrated: 06/06/2013;

Sensor-Surface: 4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1315; Calibrated: 25/11/2013

Phantom: SAM 1; Type: SAM;

Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

Area Scan (81x101x1): Measurement grid: dx=1.50 mm, dy=1.50 mm

Maximum value of SAR (interpolated) = 0.354 W/kg

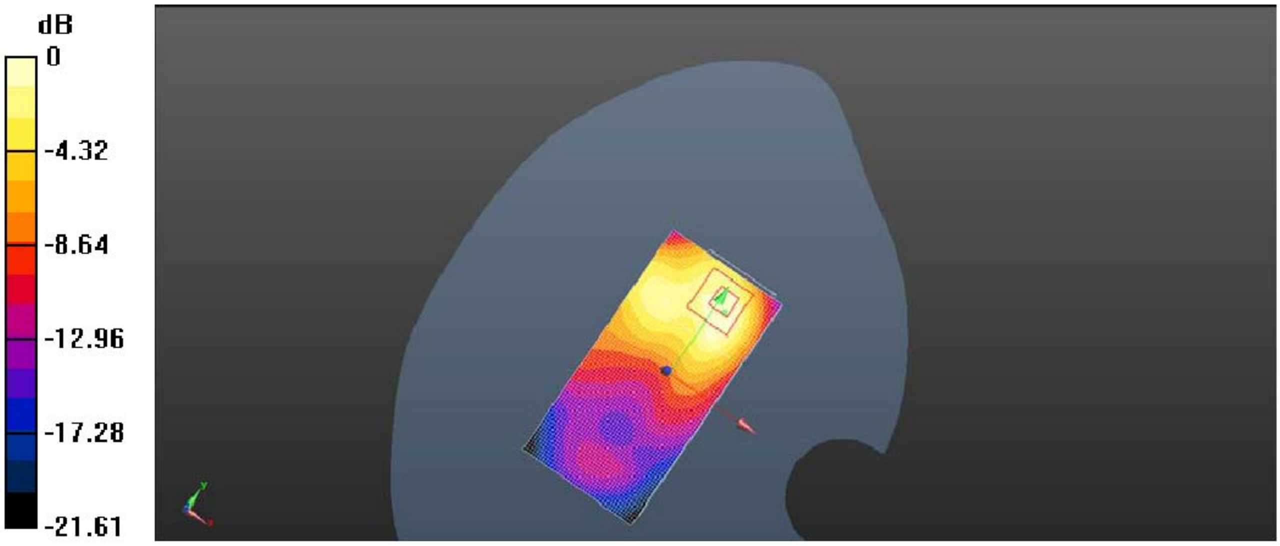
Zoom Scan (5x5x5)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.358 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.483 W/Kg

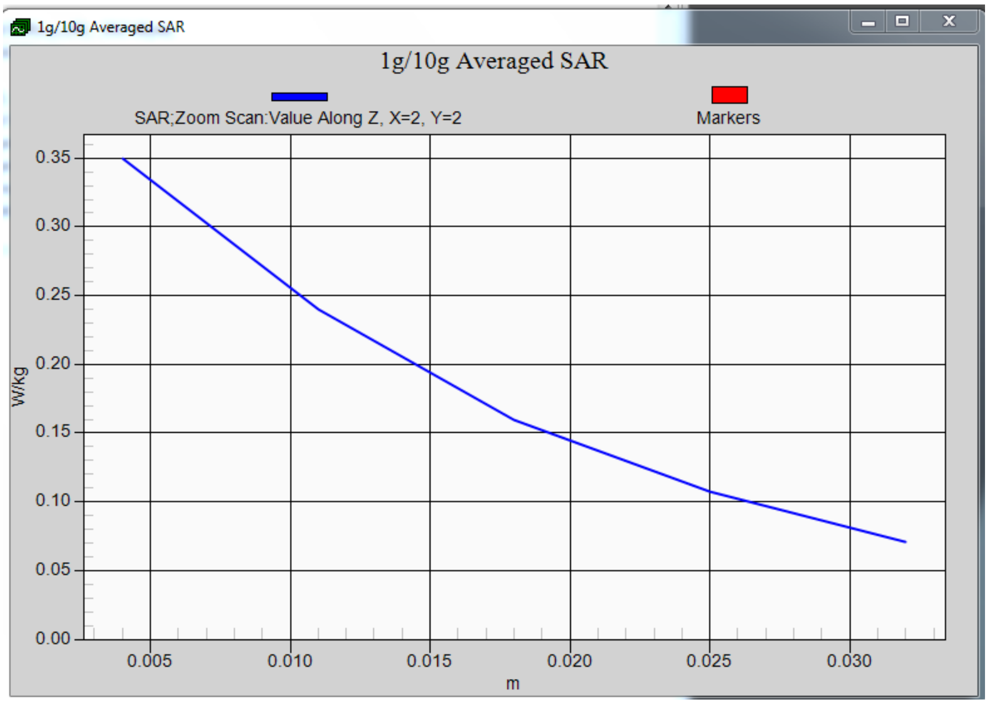
SAR(1 g) = 0.304 W/Kg; SAR(10 g) = 0.168 W/Kg

Maximum value of SAR (measured) = 0.483 W/kg



0dB = 0.483 W/kg = -3.51 dBW/kg

Plot 4: Body Rear Side (PCS1900 GPRS 4TS Middle Channel)



Z-Scan at power reference point- Body Rear Side (PCS1900 GPRS 4TS Middle Channel)