SAR TEST REPORT

No. 2010SAR00050

For

Motorola (China) Technology Ltd

HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth

Model Name: EX300

Type Name: DVT6-33411A11

With

Hardware Version: HD1U751M Ver.B

Software Version: M2V100R001ENGC01B118

FCCID: IHDP56LP2

Issued Date: 2010-06-29

Deutscher Akkreditierungs Rat

No. **DGA-PL-114/01-02**

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

Test Laboratory:

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1 Test Laboratory

1.1 Testing Location

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	No 52, Huayuan beilu, Haidian District, Beijing,P.R.China
Postal Code:	100191
Telephone:	+86-10-62304633
Fax:	+86-10-62304793

1.2 Testing Environment

Temperature:	18°C~25 °C,
Relative humidity:	30%~ 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.

1.3 Project Data

Project Leader:	Qi Dianyuan
Test Engineer:	Lin Xiaojun
Testing Start Date:	June 12, 2010
Testing End Date:	June 12, 2010

1.4 Signature

Lin Xiaojun

(Prepared this test report)

Qi Dianyuan

(Reviewed this test report)

Xiao Li

Deputy Director of the laboratory

(Approved this test report)

2 Client Information

2.1 Applicant Information

Company Name:	Motorola (China) Technology Ltd
Address /Post:	Beijing Chaoyang wangjing technology Zone
City:	Beijing
Postal Code:	/
Country:	P.R. China
Contact Person:	Zhao xinping
Contact Email	DGVJ84@motorola.com
Telephone:	84732768
Fax:	/

2.2 Manufacturer Information

Company Name:	Motorola (China) Technology Ltd
Address /Post:	Beijing Chaoyang wangjing technology Zone
City:	Beijing
Postal Code:	/
Country:	P.R. China
Contact Person:	Zhao xinping
Contact Email	DGVJ84@motorola.com
Telephone:	84732768
Fax:	/

3 Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1 About EUT

EUT Description:	HSDPA/UMTS/GPRS/GSM/EDGE Mobile Phone with Bluetooth
Model Name:	EX300
Type Name:	DVT6-33411A11
Frequency Band:	PCS1900
GPRS Multislot Class:	10
GPRS capability Class:	B
EGPRS Multislot Class:	10

3.2 Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	358345030061458	HD1U751M Ver.B	M2V100R001ENGC01B118

*EUT ID: is used to identify the test sample in the lab internally.

3.3 Internal Identification of AE used during the test

AE ID*	Description	Model	SN	Manufacturer
AE1	Battery	OM5B	FM1005155000409	Motorola (China) Electronics Ltd.
AE2	Charger	SPN5404A	\	Motorola (China) Electronics Ltd.
AE3	Charger	SPN5409A	\	Motorola (China) Electronics Ltd.
AE4	Charger	SPN5410A	\	Motorola (China) Electronics Ltd.
AE5	Charger	SPN5414A	\	Motorola (China) Electronics Ltd.
AE6	Charger	SPN5415A	\	Motorola (China) Electronics Ltd.

*AE ID: is used to identify the test sample in the lab internally.

4 CHARACTERISTICS OF THE TEST

4.1 Applicable Limit Regulations

EN 50360–2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.
It specifies the maximum exposure limit of **2.0 W/kg** as averaged over any 10 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.
ANSI 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.

4.2 Applicable Measurement Standards

EN 62209-1–2006: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz).

IEEE 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01): Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.

IEC 62209-1: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1:Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)

KDB648474 D01 SAR Handsets Multi Xmiter and Ant, v01r05: SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas.

5 OPERATIONAL CONDITIONS DURING TEST

5.1 Schematic Test Configuration

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 512, 661 and 810 respectively in the case of PCS 1900 MHz. The EUT is commanded to operate at maximum transmitting power.

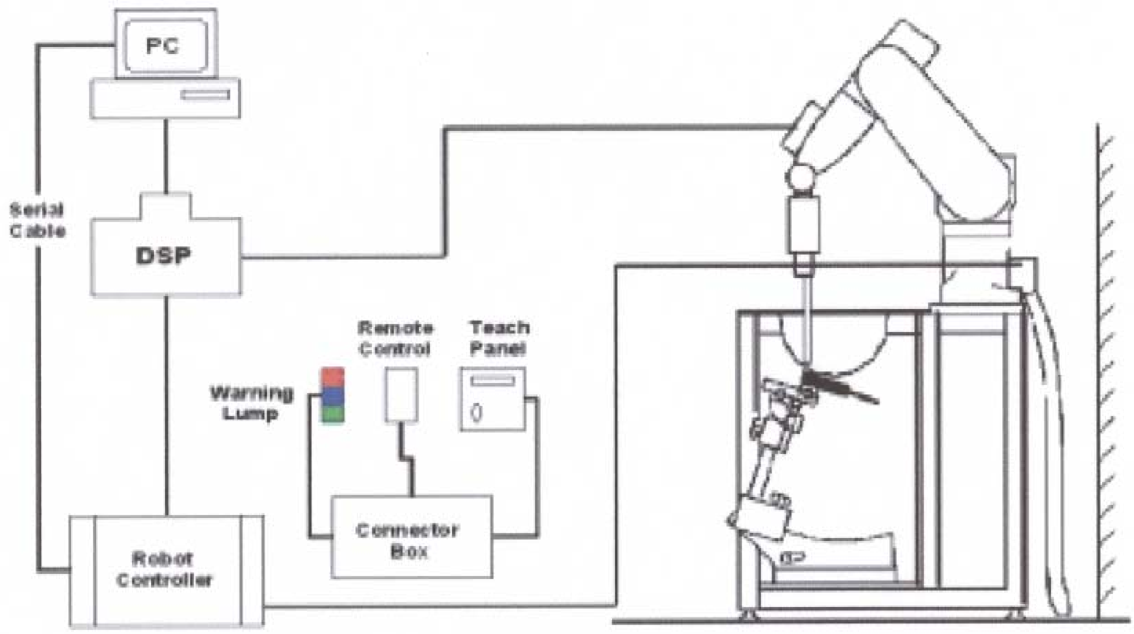
The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 30 dB.

According to the 3 dB rule, if the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tile/Ear, extended and retracted) is at least 3 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). So the test channels have been set first to the middle and then to low and high if necessary.

5.2 SAR Measurement Set-up

These measurements were performed with the automated near-field scanning system DASY4 Professional from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9m), which positions the probes with a positional repeatability of better than ± 0.02mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length =300mm) to the data acquisition unit.

A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the Micron Pentium III 800 MHz computer with Windows 2000 system and SAR Measurement Software DASY4 Professional, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.



Picture 2: SAR Lab Test Measurement Set-up

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

5.3 Dasy4 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. The probe has been calibrated according to the standard procedure with an accuracy of better than ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB.

ES3DV3 Probe Specification

Construction	Symmetrical design with triangular core
	Interleaved sensors
	Built-in shielding against static charges

PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Picture 3: ES3DV3 E-field

Calibration Basic Broad Band Calibration in air
Conversion Factors (CF) for HSL 900 and HSL 1810
Additional CF for other liquids and frequencies upon request

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: 330 mm (Tip: 20 mm)
Tip diameter: 3.9 mm (Body: 12 mm)
Distance from probe tip to dipole centers: 2.0 mm

Application General dosimetry up to 4 GHz
Dosimetry in strong gradient fields
Compliance tests of mobile phones

Picture4:ES3DV3 E-field probe

5.4 E-field Probe Calibration

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

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

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

Or

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

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

Picture 5: Device Holder

5.5 Other Test Equipment

5.5.1 Device Holder for Transmitters

In combination with the Generic Twin Phantom V3.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatable positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

5.5.2 Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden table. 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. l mm
Filling Volume	Approx. 20 liters
Dimensions	810 x l000 x 500 mm (H x L x W)
Available	Special

Picture 6: Generic Twin Phantom

5.6 Equivalent Tissues

The liquid used for the frequency range of 800-2000 MHz consisted of water, sugar, salt and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 1 and 2 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528.

Table 1. Composition of the Head Tissue Equivalent Matter

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

Table 2. Composition of the Body Tissue Equivalent Matter

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

5.7 System Specifications

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX90L
Repeatability: ±0.02 mm
No. of Axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: Pentium III
Clock Speed: 800 MHz
Operating System: Windows 2000

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic
Software: DASY4 software
Connecting Lines: Optical downlink for data and status info.
Optical uplink for commands and clock

6 LABORATORY ENVIRONMENT

Table 3: The Ambient Conditions during EMF Test

Temperature	Min. = 15 °C, Max. = 30 °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 surroundi objects is minimized and in compliance with requirement of standards.	

7 CONDUCTED OUTPUT POWER MEASUREMENT

7.1 Summary

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMU-200) to ensure the maximum power transmission and proper modulation. This result contains conducted output power for the EUT. In all cases, the measured output power should be greater and within 5% than EMI measurement.

7.2 Conducted Power

7.2.1 Measurement Methods

The EUT was set up for the max output power. The channel power was measured with Agilent Spectrum Analyzer E4440A. These measurements were done at low, middle and high channels.

7.2.2 Measurement result

The conducted power for PCS1900 is as following:

GSM 1900MHZ	Conducted Power		
	Channel 512 (1850.2MHz)	**Channel 661 (1880MHz)**	**Channel 810 (1909.8MHz)**
	29.50	29.71	30.00
GSM 1900MHz GPRS	**Conducted Power**		
	Channel 512 (1850.2MHz)	**Channel 661 (1880MHz)**	**Channel 810 (1909.8MHz)**
1 slot Result (dBm)	27.98	28.17	28.42
2 slot Result (dBm)	27.97	28.20	28.43
GSM 1900MHz EGPRS	**Conducted Power**		
	Channel 512 (1850.2MHz)	**Channel 661 (1880MHz)**	**Channel 810 (1909.8MHz)**
1 slot Result (dBm)	24.66	24.85	25.04
2 slot Result (dBm)	24.63	24.82	25.00

7.2.3 Power Drift

To control the output power stability during the SAR test, DASY4 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 8 and Table 9 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

manufacture tolerance:

PCS1900:29.5(+/-1) dBm

GPRS1900:28(+/-1) dBm

EGPRS1900:25(+/-1) dBm

According to the conducted power and manufacture tolerance above, the SAR results shall be extrapolated to the upper tune-up tolerance limit in order to capture the maximum of SAR (see table 8 and table 9).

8 TEST RESULTS

8.1 Dielectric Performance

Table 4: Dielectric Performance of Head Tissue Simulating Liquid

Measurement is made at temperature 23.0 °C and relative humidity 40%.
Liquid temperature during the test: 22.5°C
Measurement Date : 1900 MHz **June 12, 2010**

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	1900 MHz	40.0	1.40
Measurement value (Average of 10 tests)	1900 MHz	39.5	1.41

Table 5: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 23.0 °C and relative humidity 40%.
Liquid temperature during the test: 22.5°C
Measurement Date : 1900 MHz **June 12, 2010**

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	1900 MHz	53.3	1.52
Measurement value (Average of 10 tests)	1900 MHz	51.7	1.53

8.2 System Validation

Table 6: System Validation of Head

Measurement is made at temperature 23.0 °C and relative humidity 40%.
Liquid temperature during the test: 22.5°C
Measurement Date : 1900 MHz **June 12, 2010**

<table>
<tr><td rowspan="3">Liquid parameters</td><td rowspan="2">Dipole calibration Target value</td><td>Frequency</td><td colspan="2">Permittivity ε</td><td colspan="2">Conductivity σ (S/m)</td></tr>
<tr><td>1900 MHz</td><td colspan="2">39.6</td><td colspan="2">1.40</td></tr>
<tr><td>Actural Measurement value</td><td>1900 MHz</td><td colspan="2">39.5</td><td colspan="2">1.41</td></tr>
<tr><td rowspan="3">Verification results</td><td rowspan="2">Frequency</td><td colspan="2">Target value (W/kg)</td><td colspan="2">Measured value (W/kg)</td><td colspan="2">Deviation</td></tr>
<tr><td>10 g Average</td><td>1 g Average</td><td>10 g Average</td><td>1 g Average</td><td>10 g Average</td><td>1 g Average</td></tr>
<tr><td>1900 MHz</td><td>5.05</td><td>9.91</td><td>4.88</td><td>9.69</td><td>-3.37%</td><td>-2.22%</td></tr>
</table>

Note：Target values are the data of the dipole validation results, please check Annex F for the Dipole Calibration Certificate.

Table 7: System Validation of Body

Measurement is made at temperature 23.0 °C and relative humidity 40%. Liquid temperature during the test: 22.5°C Measurement Date : 1900 MHz **June 12, 2010**							
Liquid parameters	Dipole calibration Target value	**Frequency**		**Permittivity ε**		**Conductivity σ (S/m)**	
		1900 MHz		52.5		1.51	
	Actural Measurement value	1900 MHz		51.7		1.53	
Verification results	**Frequency**	**Target value (W/kg)**		**Measured value (W/kg)**		**Deviation**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**
	1900 MHz	5.24	10.4	5.28	10.2	0.76%	-1.92%

Note：Target values are the data of the dipole validation results, please check Annex F for the Dipole Calibration Certificate.

8.3 Summary of Measurement Results

Table 8: SAR Values (1900MHz-Head)

Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**10 g Average**	**1 g Average**	**Power Drift (dB)**
	2.0	1.6	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		**Extrapolated Result (W/kg)**		
	10 g Average	**1 g Average**	**10 g Average**	**1 g Average**	
Left hand, Touch cheek, Top frequency (See Fig.1)	0.408	0.742	0.458	0.833	0.191
Left hand, Touch cheek, Mid frequency (See Fig.2)	0.279	0.511	0.335	0.613	-0.116
Left hand, Touch cheek, Bottom frequency (See Fig.3)	0.220	0.401	0.277	0.505	0.178
Left hand, Tilt 15 Degree, Mid frequency (See Fig.4)	0.097	0.154	0.116	0.185	0.044
Right hand, Touch cheek, Mid frequency (See Fig.5)	0.205	0.332	0.246	0.398	0.153
Right hand, Tilt 15 Degree, Mid frequency (See Fig.6)	0.084	0.139	0.101	0.167	-0.159

Table 9: SAR Values (1900MHz-Body)

Limit of SAR (W/kg)	10 g Average	1g Average	10 g Average	1g Average	Power Drift (dB)
	2.0	1.6	2.0	1.6	
Test Case	Measurement Result (W/kg)		Extrapolated Result (W/kg)		
	10 g Average	1 g Average	10 g Average	1 g Average	
Body, Towards Ground, Top frequency with GPRS (See Fig.7)	0.260	0.435	0.296	0.496	0.186
Body, Towards Ground, Mid frequency with GPRS (See Fig.8)	0.176	0.297	0.211	0.357	0.127
Body, Towards Ground, Bottom frequency with GPRS (See Fig.9)	0.140	0.234	0.177	0.296	0.094
Body, Towards Phantom, Top frequency with GPRS (See Fig.10)	0.174	0.292	0.198	0.333	0.006
Body, Towards Phantom, Mid frequency with GPRS (See Fig.11)	0.114	0.193	0.137	0.232	0.060
Body, Towards Phantom, Bottom frequency with GPRS (See Fig.12)	0.092	0.153	0.117	0.194	0.009
Body, Towards Ground, Top frequency with EGPRS (See Fig.13)	0.115	0.196	0.145	0.247	0.125

Note: For the body measurement, the tests are performed with GPRS in all configurations (back side/front side, High/Middle/Low channels). And it is tested with EGPRS in the configuration having the maximum value of SAR. The distances between DUT and the surface of phantom is 15mm (see Picture B7 and B8).

8.4 Summary of Measurement Results (Bluetooth function)

The distance between BT antenna and GSM antenna is 1cm. The location of the antennas inside mobile phone is shown below:

The output power of BT antenna is as following:

Channel	Ch 0 2402 MHz	Ch 39 2441 Mhz	Ch 78 2480 MHz
Peak Conducted Output Power(dBm)	6.07	6.28	6.81

According to the output power measurement result and the SAR values, we can draw the conclusion that : stand-alone SAR and simultaneous transmission SAR are not required for BT transmitter, because the all SAR measurement results of GSM transmitter are ＜1.2W/kg and BT antenna is ＜2.5cm from other antenna.

8.5 Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 4.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 4.1 of this test report.

The maximum SAR values are obtained at the case of **PCS 1900 MHz Band, Left hand, Touch cheek, Top frequency (Table 8)**, and the measurement value is: **0.742 (1g)**, the extrapolated value is: **0.833 (1g)**.

9 Measurement Uncertainty

No.	Error Description	Type	Tolerance (±%)	Probability Distribution	Divisor	c_i	Standard Uncertainty (%) u_i' (%)	Degree of freedom V_{eff} or v_i
1	System repeatability	A	0.5	N	1	1	0.5	9
	Measurement system							
2	—probe calibration	B	3.5	N	1	1	3.5	∞
3	—axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	0.5	4.3	∞
4	—hemisphere isotropy of the probe	B	9.4	R	$\sqrt{3}$			
5	—space resolution	B	0	R	$\sqrt{3}$	1	0	∞
6	—boundary effect	B	11.0	R	$\sqrt{3}$	1	6.4	∞
7	—probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	—detection limit	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	—readout electronics	B	1.0	N	1	1	1.0	∞
10	—RF Ambient Conditions	B	3.0	R	$\sqrt{3}$	1	1.73	∞
11	—Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
12	—Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
13	—Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
	Test sample Related							
14	—Test Sample Positioning	A	4.9	N	1	1	4.9	5
15	—Device Holder	A	6.1	N	1	1	6.1	5
16	—Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
	Phantom and Tissue Parameters							
17	—Phantom Uncertainty (shape and thickness	B	1.0	R	$\sqrt{3}$	1	0.6	∞

	tolerances)							
18	— liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
19	— liquid conductivity (measurement error)	A	0.23	N	1	1	0.23	9
20	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
21	— liquid permittivity (measurement error)	A	0.46	N	1	1	0.46	9
Combined standard uncertainty		$u_c' = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$		/			12.2	88.7
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		24.4	/

10 MAIN TEST INSTRUMENTS

Table 12: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 29,2009	One year
02	Power meter	NRVD	101253	September 4, 2009	One year
03	Power sensor	NRV-Z5	100333		
04	Signal Generator	E4433B	US37230472	September 3, 2009	One Year
05	Amplifier	VTL5400	0505	No Calibration Requested	
06	BTS	CMU 200	113312	August 10, 2009	One year
07	E-field Probe	SPEAG ES3DV3	3149	September 25, 2009	One year
08	DAE	SPEAG DAE4	771	November 19, 2009	One year
09	Dipole Validation Kit	SPEAG D1900V2	541	February 26, 2010	Two years

END OF REPORT BODY

ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the reference point was measured and was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of the phantom was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the flat phantom and the horizontal grid spacing was 10 mm x 10 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

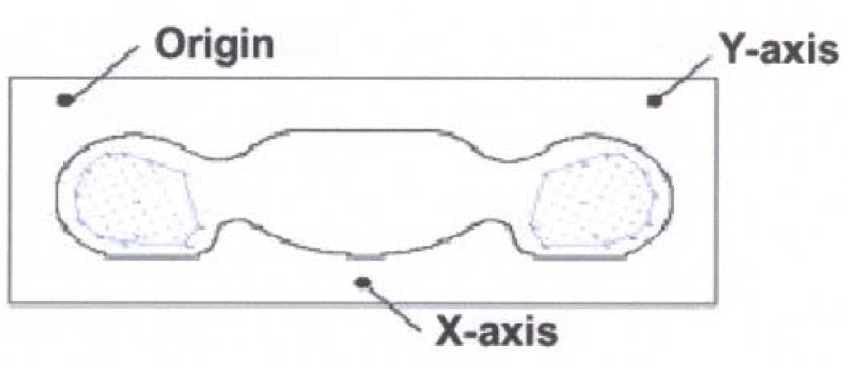
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

b. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 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 integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

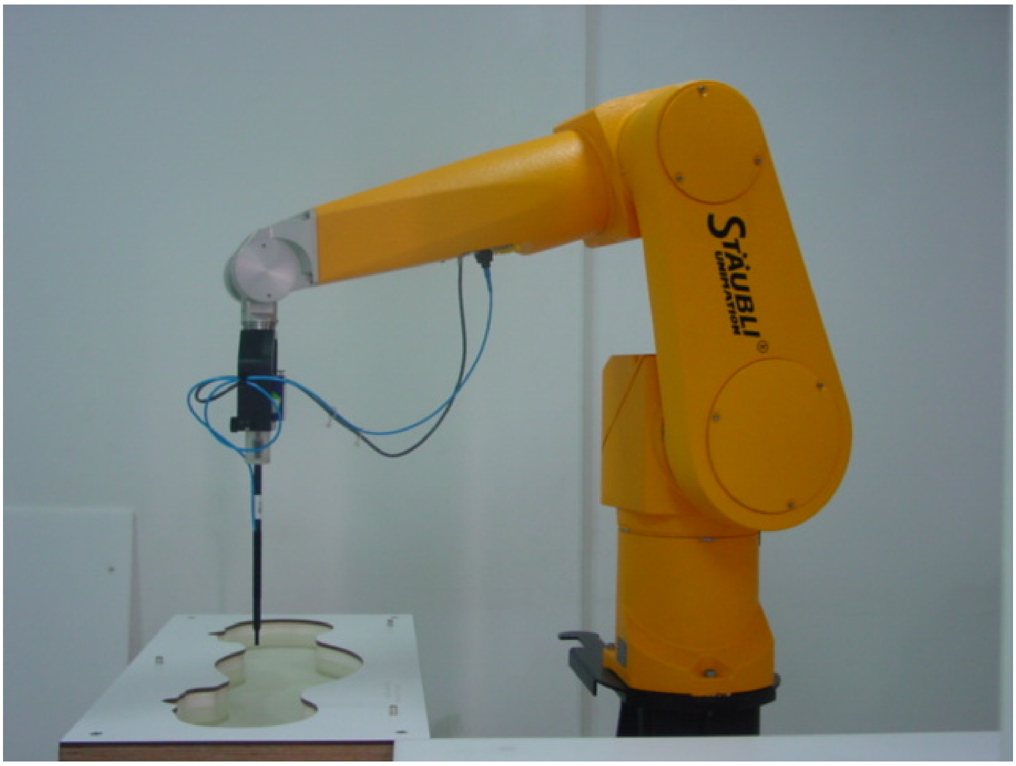
c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation is repeated.

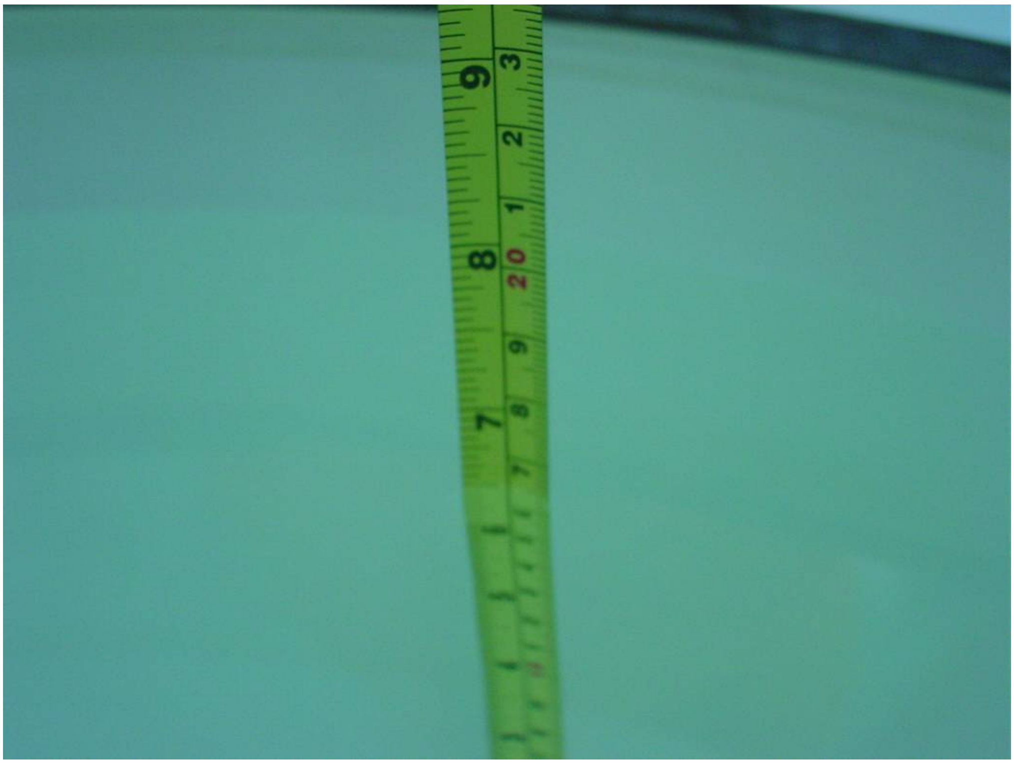


Picture A: SAR Measurement Points in Area Scan

ANNEX B TEST LAYOUT



Picture B1: Specific Absorption Rate Test Layout



Picture B2 Liquid depth in the Flat Phantom (1900MHz)

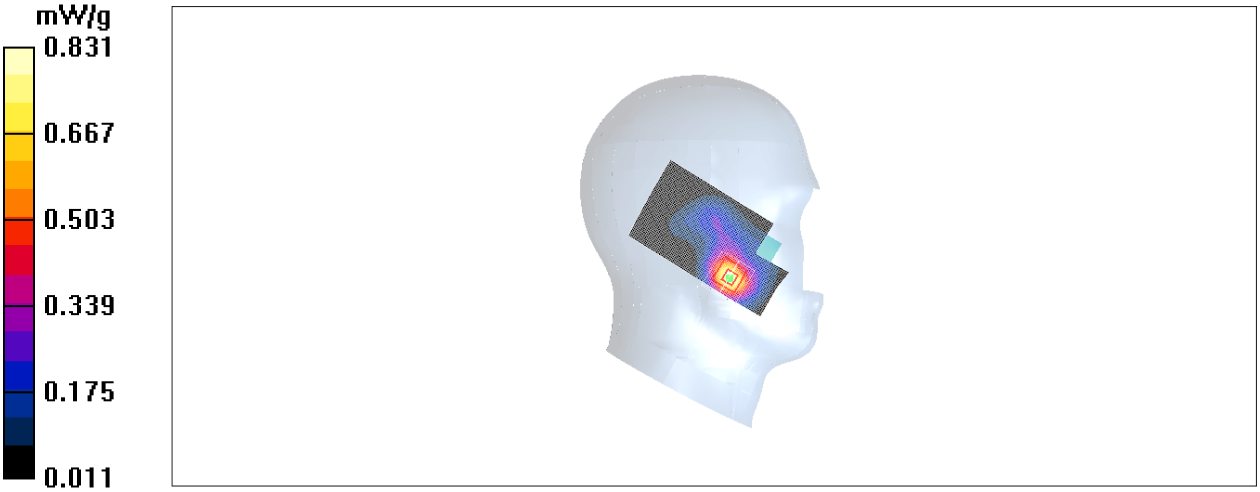
ANNEX C GRAPH RESULTS

1900 Left Cheek High

Date/Time: 2010-6-12 9:14:03
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used: f = 1910 MHz; σ = 1.42 mho/m; εr = 39.4; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz Frequency: 1909.8 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Cheek High/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.833 mW/g

Cheek High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.73 V/m; Power Drift = 0.191 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.408 mW/g
Maximum value of SAR (measured) = 0.831 mW/g



0 dB = 0.831mW/g

Fig. 1 1900 MHz CH810

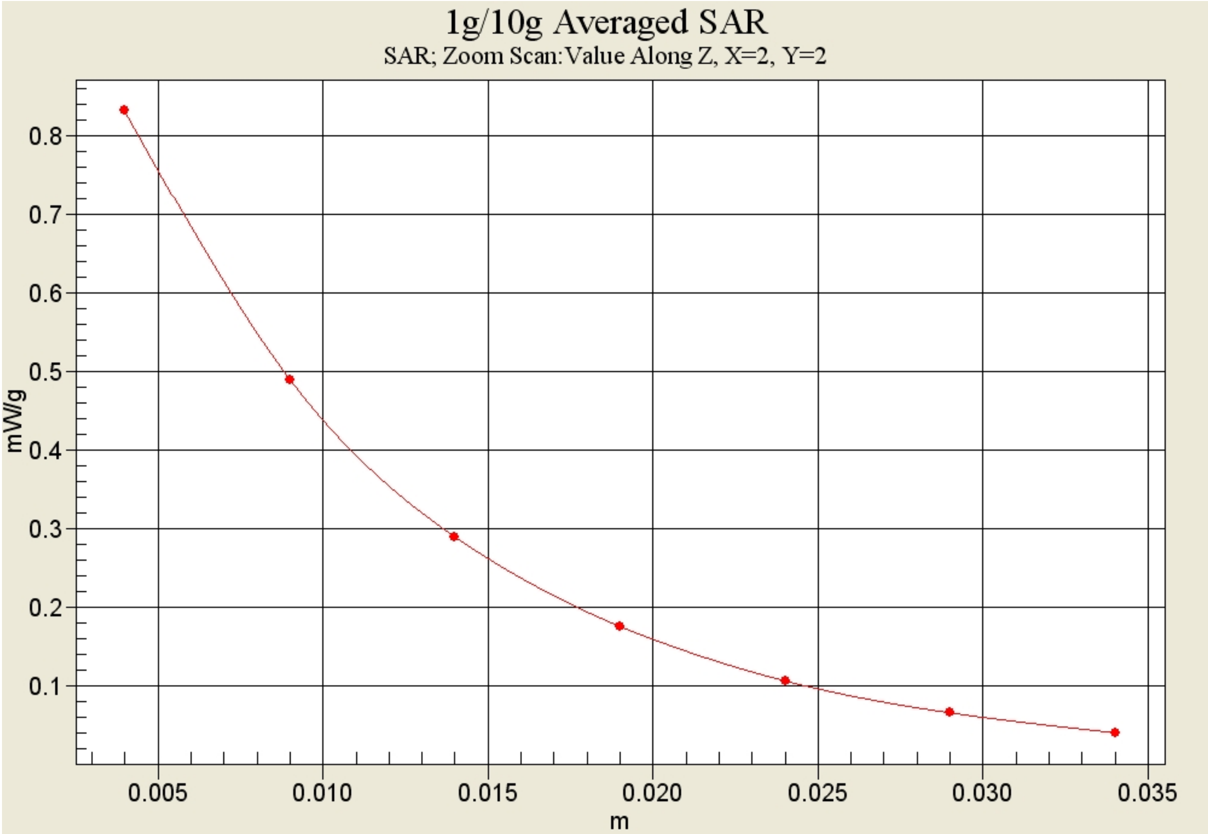
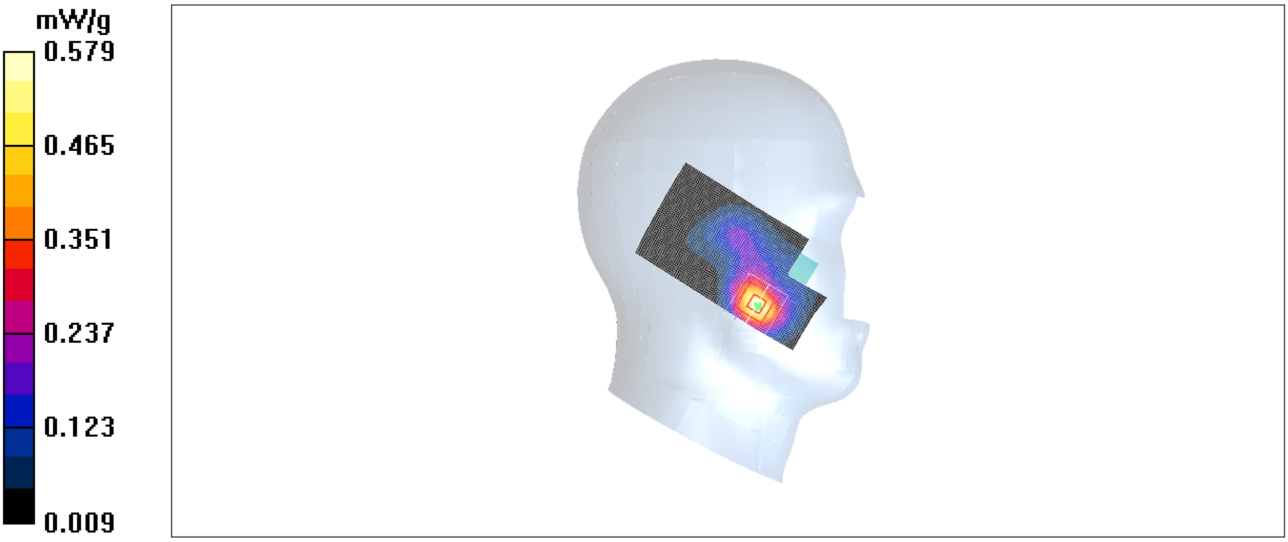


Fig. 1-1 Z-Scan at power reference point (1900 MHz CH810)

1900 Left Cheek Middle
Date/Time: 2010-6-12 8:15:23
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used: f = 1880 MHz; σ = 1.40 mho/m; εr = 39.5; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.578 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.57 V/m; Power Drift = -0.116 dB
Peak SAR (extrapolated) = 0.890 W/kg
SAR(1 g) = 0.511 mW/g; SAR(10 g) = 0.279 mW/g
Maximum value of SAR (measured) = 0.579 mW/g



0 dB = 0.579mW/g

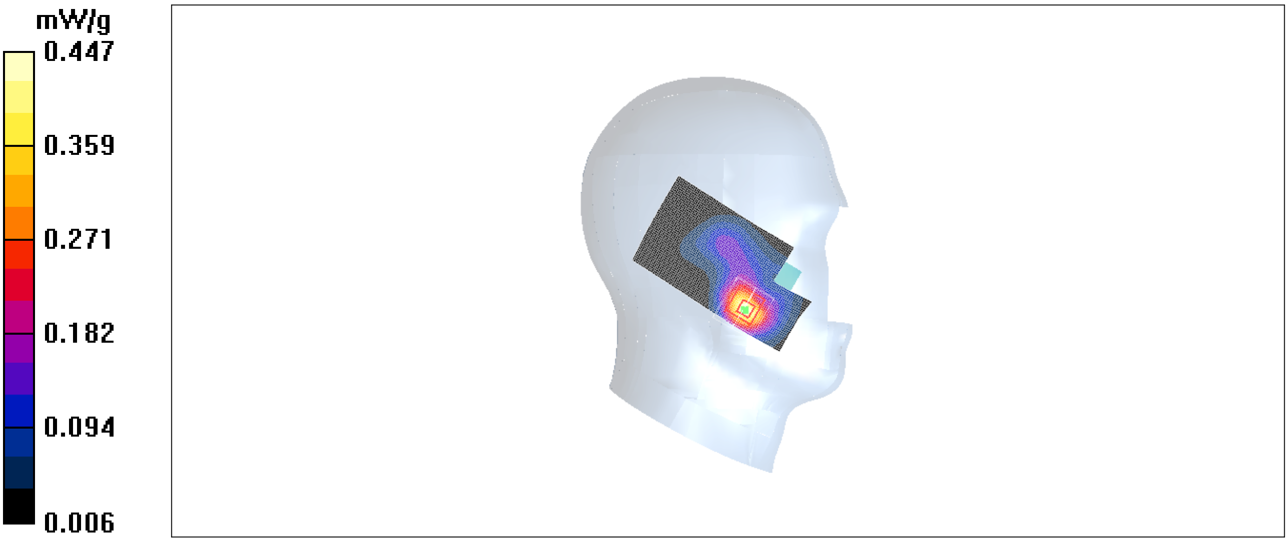
Fig. 2 1900 MHz CH661

1900 Left Cheek Low

Date/Time: 2010-6-12 9:28:24
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.37 mho/m; εr = 39.6; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz Frequency: 1850.2 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Cheek Low/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.443 mW/g

Cheek Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.79 V/m; Power Drift = 0.178 dB
Peak SAR (extrapolated) = 0.684 W/kg
SAR(1 g) = 0.401 mW/g; SAR(10 g) = 0.220 mW/g
Maximum value of SAR (measured) = 0.447 mW/g



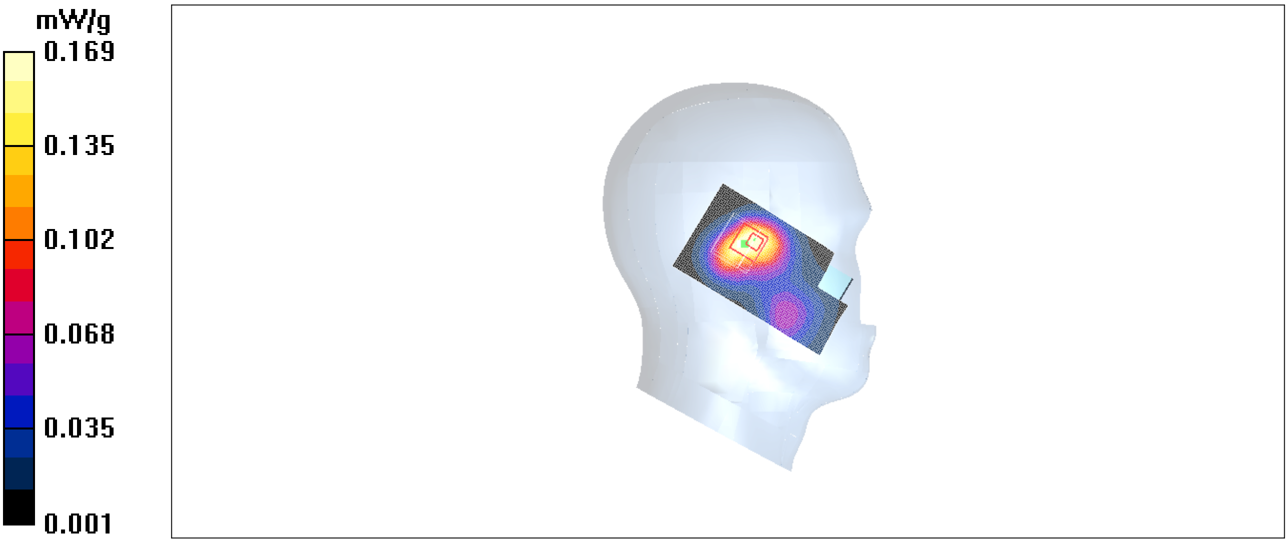
0 dB = 0.447mW/g

Fig. 3 1900 MHz CH512

1900 Left Tilt Middle
Date/Time: 2010-6-12 8:29:44
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used: f = 1880 MHz; σ = 1.40 mho/m; εr = 39.5; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.181 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.40 V/m; Power Drift = 0.044 dB
Peak SAR (extrapolated) = 0.229 W/kg
SAR(1 g) = 0.154 mW/g; SAR(10 g) = 0.097 mW/g
Maximum value of SAR (measured) = 0.169 mW/g



0 dB = 0.169mW/g

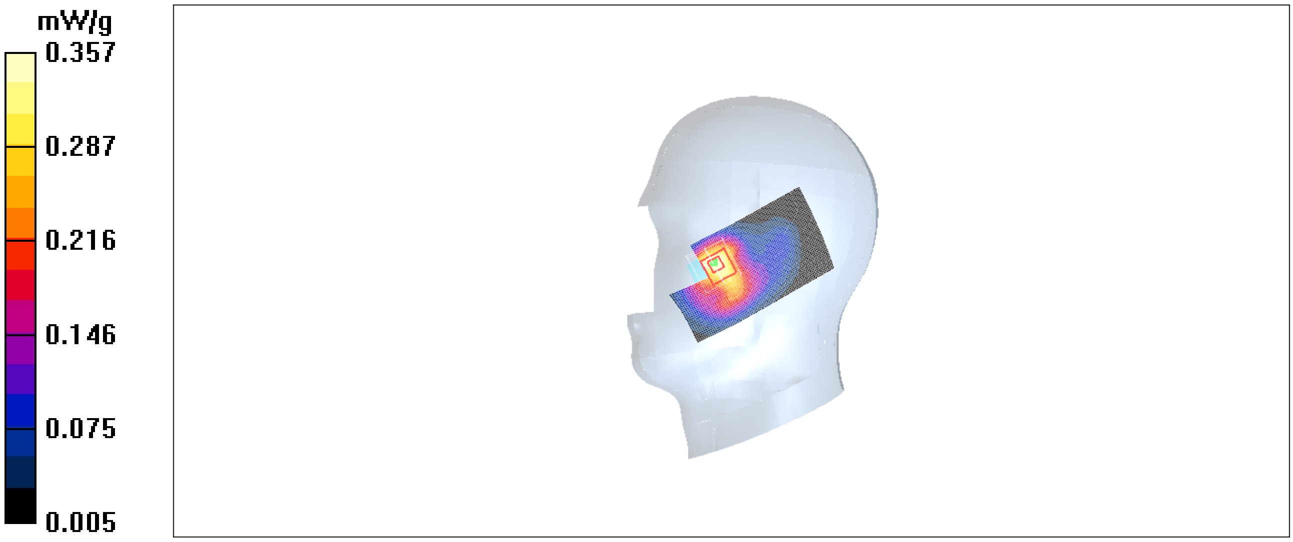
Fig. 4 1900 MHz CH661

1900 Right Cheek Middle

Date/Time: 2010-6-12 8:44:12
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used: f = 1880 MHz; σ = 1.40 mho/m; εr = 39.5; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C   Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Cheek Middle/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.369 mW/g

Cheek Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.54 V/m; Power Drift = 0.153 dB
Peak SAR (extrapolated) = 0.503 W/kg
SAR(1 g) = 0.332 mW/g; SAR(10 g) = 0.205 mW/g
Maximum value of SAR (measured) = 0.357 mW/g



0 dB = 0.357mW/g

Fig. 5 1900 MHz CH661

1900 Right Tilt Middle
Date/Time: 2010-6-12 8:58:31
Electronics: DAE4 Sn771
Medium: 1900 Head
Medium parameters used: f = 1880 MHz; σ = 1.40 mho/m; εr = 39.5; ρ = 1000 kg/m^3
Ambient Temperature:23.0^{o}C Liquid Temperature: 22.5^{o}C
Communication System: GSM 1900MHz Frequency: 1880 MHz Duty Cycle: 1:8.3
Probe: ES3DV3 - SN3149 ConvF(5.03, 5.03, 5.03)

Tilt Middle/Area Scan (51x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.186 mW/g

Tilt Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.0 V/m; Power Drift = -0.159 dB
Peak SAR (extrapolated) = 0.224 W/kg
SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.084 mW/g
Maximum value of SAR (measured) = 0.148 mW/g

0 dB = 0.148mW/g

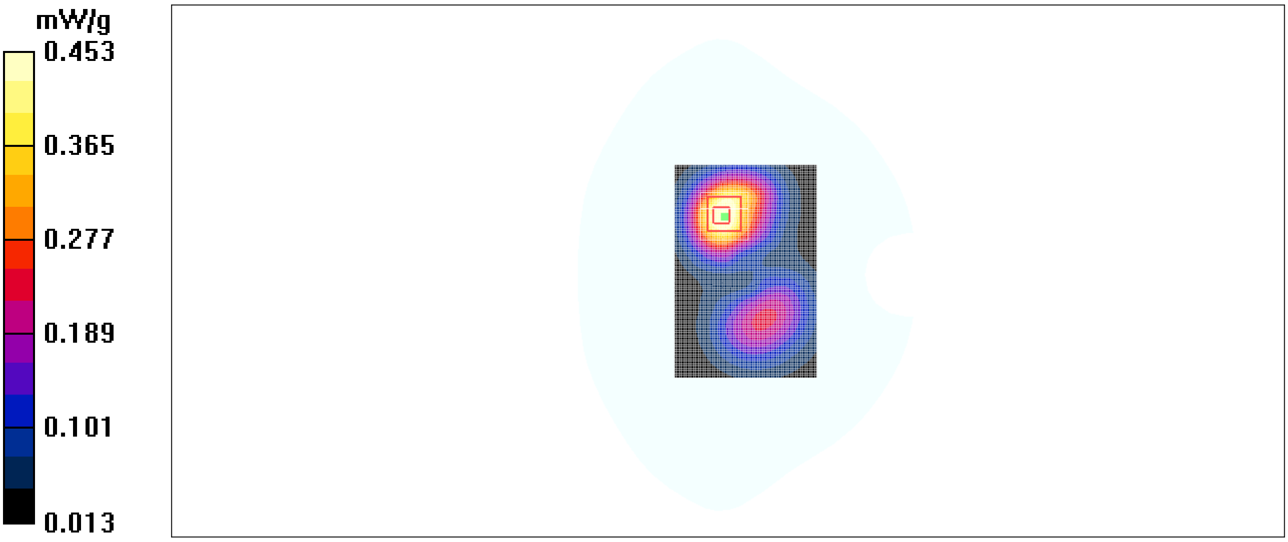
Fig.6 1900 MHz CH661

1900 Body Towards Ground High with GPRS

Date/Time: 2010-6-12 13:47:20
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1910 MHz; σ = 1.54 mho/m; εr = 51.7; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz GPRS Frequency: 1909.8 MHz Duty Cycle: 1:4
Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

Toward Ground High/Area Scan (61x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.486 mW/g

Toward Ground High/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.74 V/m; Power Drift = 0.186 dB
Peak SAR (extrapolated) = 0.718 W/kg
SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.260 mW/g
Maximum value of SAR (measured) = 0.453 mW/g



0 dB = 0.453mW/g

Fig. 7 1900 MHz CH810

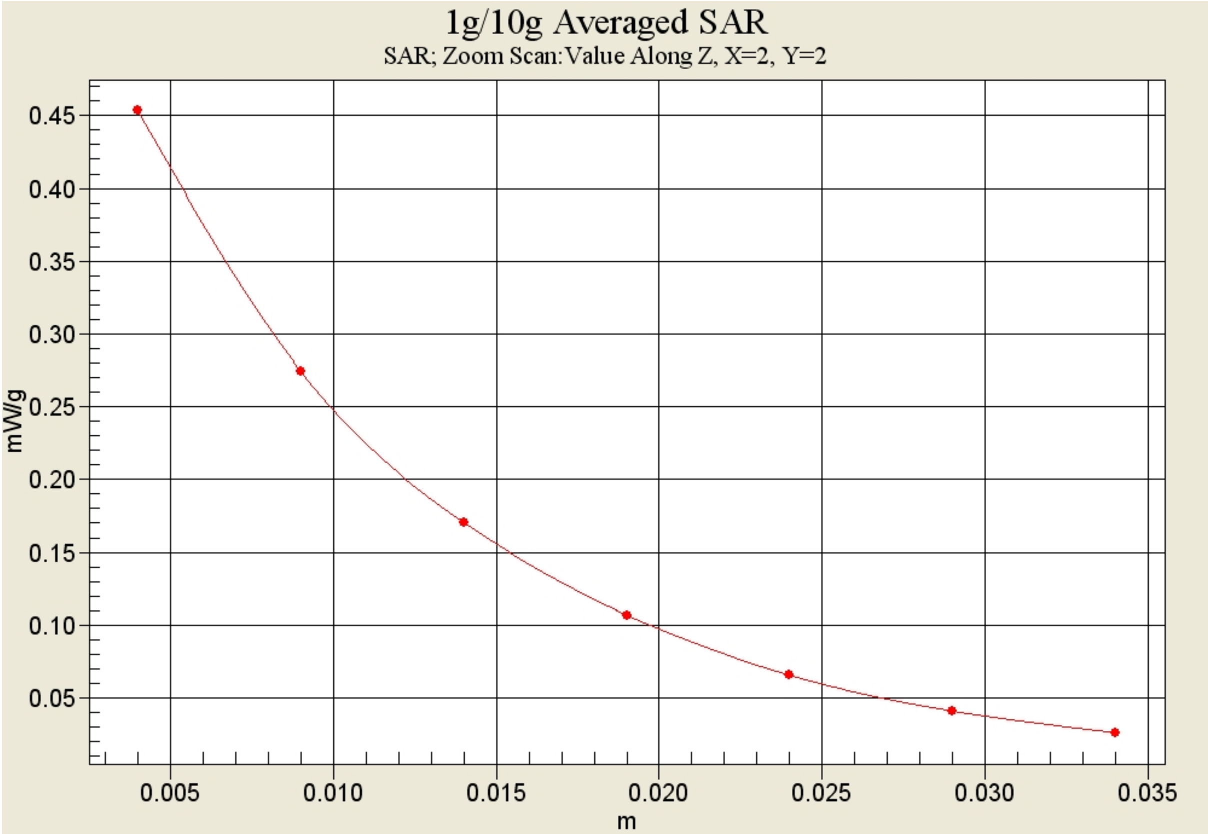
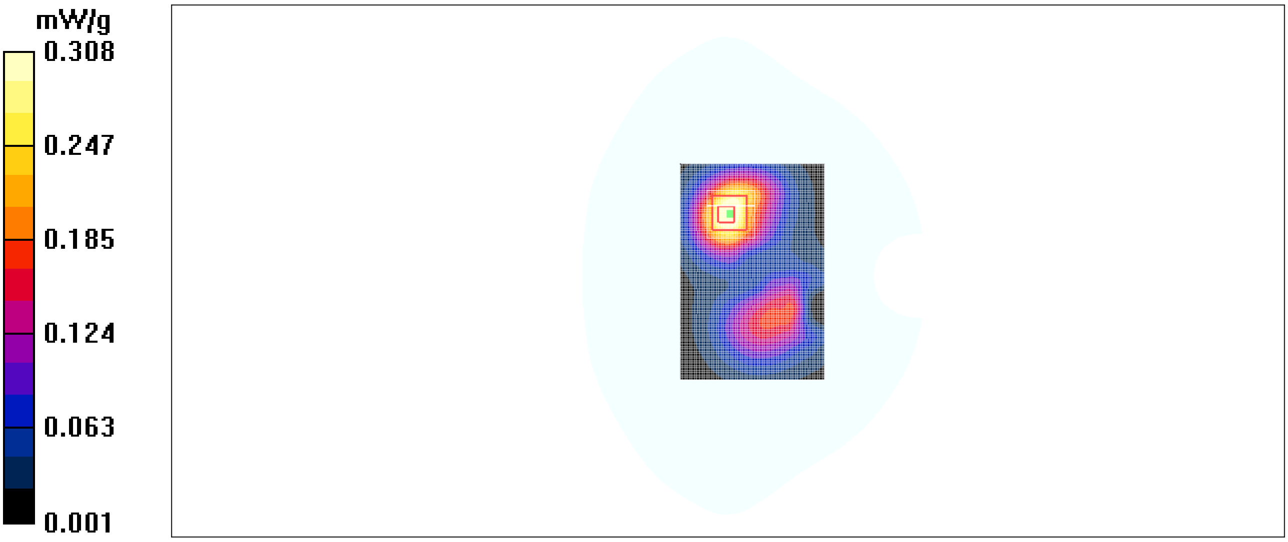


Fig. 7-1 Z-Scan at power reference point (1900 MHz CH810)

1900 Body Towards Ground Middle with GPRS
Date/Time: 2010-6-12 14:02:39
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; εr = 51.8; ρ = 1000 kg/m^3
Ambient Temperature:23.0^{o}C Liquid Temperature: 22.5^{o}C
Communication System: GSM 1900MHz GPRS Frequency: 1880 MHz Duty Cycle: 1:4
Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

Toward Ground Middle/Area Scan (61x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.326 mW/g

Toward Ground Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.40 V/m; Power Drift = 0.127 dB
Peak SAR (extrapolated) = 0.492 W/kg
SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.176 mW/g
Maximum value of SAR (measured) = 0.308 mW/g



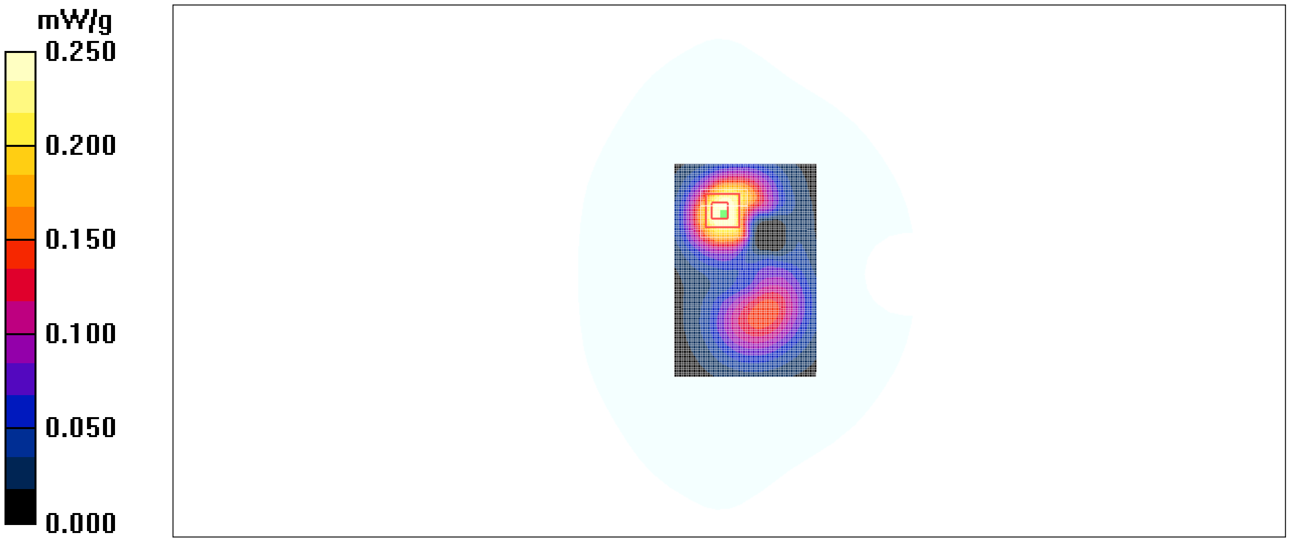
0 dB = 0.308mW/g

Fig. 8 1900 MHz CH661

1900 Body Towards Ground Low with GPRS
Date/Time: 2010-6-12 14:18:00
Electronics: DAE4 Sn771
Medium: Body 1900 MHz
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.49 mho/m; εr = 51.8; ρ = 1000 kg/m^3
Ambient Temperature:23.0°C   Liquid Temperature: 22.5°C
Communication System: GSM 1900MHz GPRS Frequency: 1850.2 MHz Duty Cycle: 1:4
Probe: ES3DV3 - SN3149 ConvF(4.68, 4.68, 4.68)

Toward Ground Low/Area Scan (61x91x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.259 mW/g

Toward Ground Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.61 V/m; Power Drift = 0.094 dB
Peak SAR (extrapolated) = 0.367 W/kg
SAR(1 g) = 0.234 mW/g; SAR(10 g) = 0.140 mW/g
Maximum value of SAR (measured) = 0.250 mW/g



0 dB = 0.250mW/g

Fig. 9 1900 MHz CH512