



---

## CONFORMANCE TEST REPORT FOR HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS

---

Report No. : SRTC2010-H024-E0045

Product Name: GSM Wireless Phone

Product Model: ZTE WP651

Applicant: ZTE Corporation

Manufacture: ZTE Corporation

Specification: FCC OET Bulletin 65 (Edition 97-01)

Supplement C (Edition 01-01)

47CFR 2.1093

FCC ID: Q78-ZTEWP651

The State Radio\_monitoring\_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

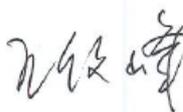
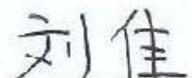
Tel: 86-10-68009202 Fax: 86-10-68009205

## Executive summary

<b>Test report no.:</b>	<b>SRTC2010-H024-E0045</b>
<b>Product Model:</b>	<b>ZTE WP651</b>
<b>Date of test:</b>	<b>2010.12.7</b>
<b>Date of report:</b>	<b>2010.12.14</b>
<b>Laboratory:</b>	<b>The State Radio_monitoring_center Testing Center (SRTC)</b>
<b>Test has been Carried out in accordance with:</b>	<p>47CFR §2.1093</p> <p>Radiofrequency Radiation Exposure Evaluation: Portable Devices</p> <p><b>FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)</b></p> <p>Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields</p> <p><b>RSS-102</b></p> <p>Evaluation Procedure for Mobile and Portable Radio Transmitters with Respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields</p> <p><b>IEEE 1528 - 2003</b></p> <p>IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Technique</p>
<b>Documentation:</b>	<b>The documentation of the testing performed on the tested devices is archived for 5 years at SRTC</b>

## Result summary:

Mode	CH/f(MHz)	Power	Position	Sar Limit (1g avg) (mW/g)	Measured value (1g avg)(mW/g)	Result
GSM850	189/836.4	32.8dBm	Right cheek	1.6	<b>1.53</b>	PASS

<p>This Test Report Is Issued by: Mr. Song Qizhu Director of the test lab</p> 	<p>Checked by: Mr. Wang Junfeng Deputy director of the test lab</p> 
<p>Tested by: Ms. Liu Jia Test engineer</p> 	<p>Issued date:  <b>2011.01.10</b></p>

**Tables of contents**

1. GENERAL INFORMATION ..... 3  
 1.1 Notes of the test report ..... 3  
 1.2 Information about the testing laboratory ..... 3  
 1.5 Test Details ..... 4  
 1.6 Maximum Results ..... 4  
     1.6.1 Head Configuration ..... 4  
 2. DESCRIPTION OF THE DEVICE UNDER TEST ..... 5  
 2.1 Description of the Antenna ..... 5  
 2.2 Picture of the EUT ..... 5  
 2.3 Test Positions for the Device under test ..... 6  
 2.4 Picture to demonstrate the required liquid depth ..... 7  
 3. TEST CONDITIONS ..... 7  
 3.1 Temperature and Humidity ..... 7  
     3.2 Test Signal, Frequencies and Output Power ..... 7  
 4. DESCRIPTION OF THE TEST EQUIPMENT ..... 8  
 4.1 Measurement System and Components ..... 8  
     4.1.1 Isotropic E-field Probe Type ES3DV3 ..... 8  
 4.2 Phantoms ..... 9  
 4.3 Tissue Simulants ..... 9  
     4.3.1 Tissue Simulant Recipes ..... 9  
     4.3.2 System Checking ..... 10  
     4.3.3 Tissue Simulants used in the Measurements ..... 11  
 5. DESCRIPTION OF THE TEST PROCEDURE ..... 12  
 5.1 Device Holder ..... 12  
 5.2 Test positions ..... 12  
     5.2.1 Against Phantom Head ..... 12  
     5.2.2 Body Worn Configuration ..... 12  
 5.3 scan procedure ..... 13  
 5.4 SAR Averaging Methods ..... 13  
 6. MEASUREMENT UNCERTAINTY ..... 14  
 7. RESULTS ..... 15  
     7.1 Test result ..... 15  
     7.2 Conducted power ..... 16  
 APPENDIX A: SYSTEM CHECKING SCANS ..... 17  
 APPENDIX B: MEASUREMENT SCANS ..... 19  
 APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S) ..... 35  
 APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S) .. 41

---

## 1. GENERAL INFORMATION

### 1.1 Notes of the test report

The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written permission of The State Radio\_monitoring\_center Testing Center (SRTC).

The test results relate only to individual items of the samples which have been tested.

### 1.2 Information about the testing laboratory

Company: The State Radio\_monitoring\_center Testing Center (SRTC)  
Address: No.80 Beilishi Road, Xicheng District, Beijing China  
City: Beijing  
Country or Region: China  
Contacted person: Wang Junfeng  
Tel: +86 10 68009181 +86 10 68009202  
Fax: +86 10 68009195 +86 10 68009205  
Email: wangjf@srrc.org.cn / wangjunfeng@srtc.org.cn

### 1.3 Applicant's details

Company: ZTE Corporation  
Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,  
Nanshan District, 518057  
City: Shenzhen  
Country or Region: P.R.China  
Grantee Code: Q78  
Contacted person: Min Zhang  
Tel: +86-021-68897541  
Fax: +86-021-50801070  
Email: zhang.min13@zte.com.cn

### 1.4 Manufacturer's details

Company: ZTE Corporation  
Address: ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park,  
Nanshan District, 518057  
City: Shenzhen  
Country or Region: P.R.China  
Contacted person: Min Zhang  
Tel: +86-021-68897541  
Fax: +86-021-50801070  
Email: zhang.min13@zte.com.cn

## 1.5 Test Details

Period of test	2010.12.7
Batteries used in testing	Ni3607T30P3S473211/BYD Company Limited
State of sample	production unit
H/W Version	f87B
S/W Version	IS_WP650PV1.0.0B01
IMEI	863725000000578

## 1.6 Maximum Results

The maximum measured SAR values for Head configuration and Body Worn configuration are given in section 1.6.1 and 1.6.2 respectively. The device conforms to the requirements of the standard(s) when the maximum measured SAR value is less than or equal to the limit.

### 1.6.1 Head Configuration

Mode	CH/f(MHz)	Power	Position	Sar Limit (1g avg) (mW/g)	Measured value (1g avg)(mW/g)	Result
GSM850	189/836.4	32.8dBm	Right cheek	1.6	<b>1.53</b>	PASS
GSM1900	661/1880.0	29.7 dBm	Left cheek	1.6	<b>1.02</b>	PASS

## 2. DESCRIPTION OF THE DEVICE UNDER TEST

Device category	production unit
Exposure environment	General population/uncontrolled

Mode and bands of operation	GSM 850/1900
Modulation Mode	GMSK
Duty Cycle	1/8
Transmitter Frequency Range(MHz)	824-849 1850-1910

### 2.1 Description of the Antenna

The device has an internal antenna.

### 2.2 Picture of the EUT



### 2.3 Test Positions for the Device under test

	
<b>Cheek position, left side</b>	<b>Tilt position, left side</b>
	
<b>Cheek position, Right side</b>	<b>Tilt position, Right side</b>

## 2.4 Picture to demonstrate the required liquid depth

the liquid depth in the used SAM phantoms



**Liquid depth for SAR Measurement**

## 3. TEST CONDITIONS

### 3.1 Temperature and Humidity

Ambient temperature (° C)	21.0 to 23.0
Ambient humidity ( RH %)	30 to 45

### 3.2 Test Signal, Frequencies and Output Power

The device was put into operation by using a call tester. Communication between the device and the call tester was established by air link.

The device output power was set to maximum power level for all tests; a fully charged battery was used for every test sequence.

In all operating bands the measurements were performed on lowest, middle and highest channels.

## 4. DESCRIPTION OF THE TEST EQUIPMENT

### 4.1 Measurement System and Components

The measurements were performed using an automated near-field scanning system, DASY4, manufactured by Schmid & Partner Engineering AG (SPEAG) in Switzerland. The SAR extrapolation algorithm used in all measurements was the 'advanced extrapolation' algorithm.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE4	720	1year	2011.01
Dosimetric E-field Probe ES3DV3	3128	1year	2011.06
Dipole Validation Kit, D835V2	473	2 years	2012.06
Dipole Validation Kit, D1900V2	5d024	2 years	2012.06
DASY4 software Version	4.7	N/A	N/A

Note: the Dipole Calibration interval is 24 months

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
Signal Generator	E4428C	MY45280865	1year	2011.08
Amplifier	5S1G4	0323472	N/A	N/A
Power meter	E4417A	MY45101182	1year	2011.08
Power Sensor	E4412A	MY41502214	1year	2011.08
Power Sensor	E4412A	MY41502130	1year	2011.08
Call Tester	8960	GB43194054	1year	2011.08
Network Analyzer	8714ET	US40372083	1year	2011.08
Dielectric Probe Kit	85070D	US33030365	N/A	N/A

#### 4.1.1 Isotropic E-field Probe Type ES3DV3

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	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz; Linearity: $\pm 0.2$ dB (30 MHz to 4 GHz)
Optical Surface Detection	$\pm 0.2$ mm repeatability in air and clear liquids over diffuse reflecting surfaces

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
Dynamic Range	5 $\mu$ W/g to > 100 mW/g; Linearity: $\pm$ 0.2 dB
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

## 4.2 Phantoms

The phantom used for all tests i.e. for both system checks and device testing, was the twinheaded "SAM Phantom", manufactured by SPEAG. The phantom conforms to the requirements of IEEE 1528 - 2003.

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.

The SPEAG device holder (see Section 5.1) was used to position the device in all tests whilst a tripod was used to position the validation dipoles against the flat section of phantom.

## 4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants whose dielectric parameters were within  $\pm$  5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.

The depth of the tissue simulant was 15.0  $\pm$  0.5 cm measured from the ear reference point during system checking and device measurements.

### 4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue stimulant(s):

#### 800MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Water	40.29	50.75
Sugar	57.90	48.21
Nacl	1.38	0.94
Cellulose	0.24	0
Preventol	0.18	0.10

**1900MHz band**

Ingredient	Head (% by weight)	Body (% by weight)
Water	44.45	70.17
DGBE	55.24	29.44
Nacl	0.31	0.39

**4.3.2 System Checking**

The manufacturer calibrates the probes annully. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system checking results (dielectric parameters and SAR values) are given in the table below. Test Date is 2010.8.27

**System checking,head tissue simulant**

		SAR <sub>1g</sub> [w/kg]	$\epsilon_r$	$\sigma$ [S/m]	Temperature	
					Ambient[°C]	Liquid[°C]
900MHz	Target Value	10.8	41.5±2.1	0.97±0.05	15-30	-
	Measured Value	10.9	41.5	0.98	24.0	22.3

All SAR values are normalized to 1W forward power

		SAR <sub>1g</sub> [w/kg]	$\epsilon_r$	$\sigma$ [S/m]	Temperature	
					Ambient[°C]	Liquid[°C]
1800MHz	Target Value	38.1	40±1.9	1.40±0.07	15-30	-
	Measured Value	38.8	39.4	1.35	24.0	22.3

All SAR values are normalized to 1W forward power

Plots of the system checking scans are given in Appendix A.

### 4.3.3 Tissue Simulants used in the Measurements

For the measurement of the following parameters the HP 85070D dielectric probe kit is used, representing the open-ended coaxial probe measurement procedure. Liquid temperature during the test: 22.3° C. Tested date is 2010.8.27

Head		$\epsilon_r$	$\sigma$ [S/m]	Temperature	
				Ambient [°C]	Liquid [°C]
850MHz	Recommended Value	41.5±2.1	0.97±0.05	15-30	-
	Measured Value	41.5	0.98	24.0	22.3
1900MHz	Recommended Value	40±1.9	1.40±0.07	15-30	-
	Measured Value	39.0	1.44	24.0	22.3

Body		$\epsilon_r$	$\sigma$ [S/m]	Temperature	
				Ambient [°C]	Liquid [°C]
850MHz	Recommended Value	55.0±2.8	1.05±0.05	15-30	-
	Measured Value	54.6	1.00	24.0	22.3
1900MHz	Recommended Value	53.3±2.7	1.52±0.08	15-30	-
	Measured Value	54.6	1.49	24.0	22.3

---

## 5. DESCRIPTION OF THE TEST PROCEDURE

### 5.1 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.



**Device holder supplied by SPEAG**

### 5.2 Test positions

#### 5.2.1 Against Phantom Head

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

The positions used in the measurements were according to IEEE 1528 - 2003 "IEEE

Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques".

#### 5.2.2 Body Worn Configuration

The device was placed in the SPEAG holder below the flat section of the phantom. The distance between the device and the phantom was kept at the separation distance using a separate flat spacer that was removed before the start of the measurements. The device was oriented with its antenna facing the phantom since this orientation gives higher results.

---

### 5.3 scan procedure

First, area scans were used for determination of the field distribution. Next, a zoom scan, a minimum of 7 x 7x7 points covering a volume of at least 30x30x30mm, was performed around the highest E-field value to determine the averaged SAR value. Drift was determined by measuring the same point at the start of the area scan and again at the end of the zoom scan.

### 5.4 SAR Averaging Methods

The maximum SAR value was averaged over a cube of tissue using interpolation and extrapolation.

The interpolation, extrapolation and maximum search routines within Dasy4 are all based on the modified Quadratic Shepard's method (Robert J. Renka, "Multivariate Interpolation Of Large Sets Of Scattered Data", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988, pp. 139-148).

The interpolation scheme combines a least-square fitted function method with a weighted average method. A trivariate 3-D / bivariate 2-D quadratic function is computed for each measurement point and fitted to neighbouring points by a least-square method. For the zoom scan, inverse distance weighting is incorporated to fit distant points more accurately. The interpolating function is finally calculated as a weighted average of the quadratics.

In the zoom scan, the interpolation function is used to extrapolate the Peak SAR from the deepest measurement points to the inner surface of the phantom.

## 6. MEASUREMENT UNCERTAINTY

DASY4 Uncertainty Budget								
Error description	Uncertainty value	Prob. Dist.	Div.	( $c_i$ ) 1g	( $c_i$ ) 10g	Std.Unc (1g).	Std.Unc. (10g)	( $v_i$ ) $V_{eff}$
<b>Measurement system</b>								
Probe calibration	±5.9%	N	1	1	1	±5.9%	±5.9%	∞
Axial isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary effects	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System detection limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Readout electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF ambient noise	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
RF ambient reflections	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe positioner	±0.4%	R	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
Probe positioning	±2.9%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Max.SAR Eval.	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
<b>Test Sample Related</b>								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
<b>Phantom and Setup</b>								
Phantom uncertainty	±4.0%	R	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
Liquid conductivity(target)	±5.0%	R	$\sqrt{3}$	0.64	0.43	±1.8%	±1.2%	∞
Liquid conductivity(meas.)	±2.5%	N	1	0.64	0.43	±1.6%	±1.1%	∞
Liquid conductivity(target)	±5.0%	R	$\sqrt{3}$	0.6	0.49	±1.7%	±1.4%	∞
Liquid onductivity(means.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
Combined std. Uncertainty						±10.9%	±10.7%	387
<b>Expanded STD Uncertainty</b>						<b>±21.9%</b>	<b>±21.4%</b>	

**Table 6.1 – Measurement uncertainty evaluation**

## 7. RESULTS

### 7.1 Test result

The measured Head SAR values for the test device are tabulated below:

**Mode: GSM 850**

$f_L$ (MHz)=824.2MHz

$f_M$ (MHz)=836.4 MHz

$f_H$ (MHz)= 848.8MHz

SAR Values (Head, 850MHz Band)

Limit of SAR (W/kg)	1 g Average
	1.6
Test Case	Measurement Result ( mW/g)
	1 g Average
Left hand, Touch cheek, $f_H$	1.13
Left hand, Touch cheek, $f_M$	1.11
Left hand, Touch cheek, $f_L$	1.04
Left hand, Tilt 15 Degree, $f_M$	0.43
Right hand, Touch cheek, $f_H$	1.20
Right hand, Touch cheek, $f_M$	<b>1.53</b>
Right hand, Touch cheek, $f_L$	1.10
Right hand, Tilt 15 Degree, $f_M$	0.58

So, the maximum SAR is

Phantom Configuration	Device Test Position	SAR(mW/g)		
		$f_L$ (MHz)	$f_M$ (MHz)	$f_H$ (MHz)
Right hand	Cheek	---	<b>1.53</b>	---

**Mode: GSM1900**

$f_L$ (MHz)=1850.2MHz       $f_M$ (MHz)=1880.0MHz       $f_H$ (MHz)=1909.8MHz

SAR Values (Head, 1900MHz Band)

Limit of SAR (W/kg)	1 g Average	
	1.6	
Test Case	Measurement Result ( mW/g)	
	1 g Average	
Left hand, Touch cheek , $f_H$	0.98	
Left hand, Touch cheek, $f_M$	<b>1.02</b>	
Left hand, Touch cheek , $f_L$	0.92	
Left hand, Tilt 15 Degree, $f_M$	0.38	
Right hand, Touch cheek , $f_H$	0.95	
Right hand, Touch cheek, $f_M$	0.94	
Right hand, Touch cheek $f_L$	0.90	
Right hand, Tilt 15 Degree, $f_M$	0.36	

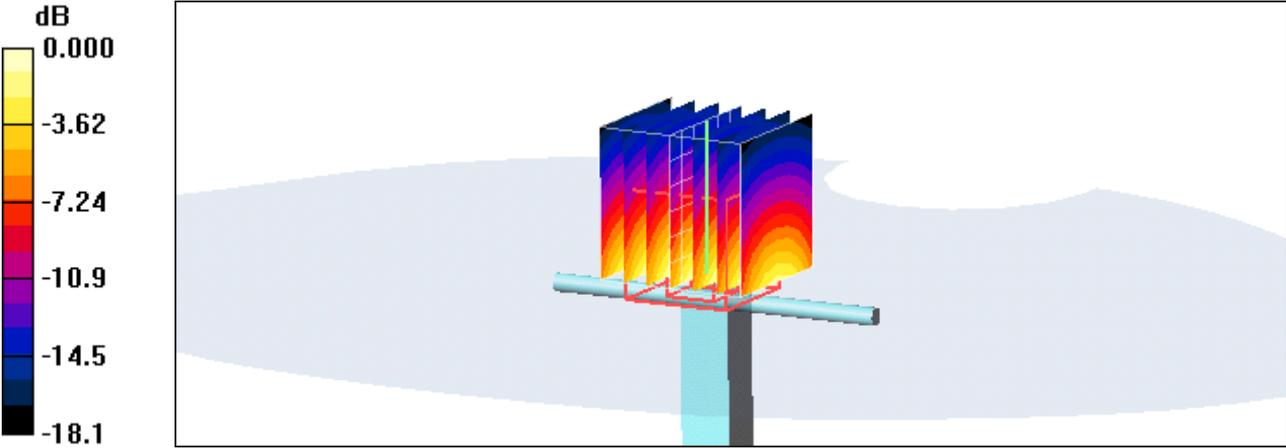
So, the maximum SAR is

Phantom Configuration	Device Test Position	SAR(mW/g)		
		$f_L$ (MHz)	$f_M$ (MHz)	$f_H$ (MHz)
Left Side	cheek	---	<b>1.02</b>	---

**7.2 Conducted power**

Mode	GSM850(Head) Duty cycle: 1:8(12.5%)			GSM1900(Head) Duty cycle: 1:8(12.5%)		
	128	189	251	512	661	810
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Measured Power(dBm)	32.8	32.8	32.8	29.7	29.7	29.7

## APPENDIX A: SYSTEM CHECKING SCANS

SYSTEM CHECKING SCANS	835MHz
<p><b>DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023</b></p> <p>Medium parameters used (interpolated): <math>f = 835 \text{ MHz}</math>; <math>\sigma = 0.98 \text{ mho/m}</math>; <math>\epsilon_r = 41.5</math>; <math>\rho = 1000 \text{ kg/m}^3</math></p> <p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1560; Type: SAM; Serial: 1560</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul> <p><b>d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid:</b>  <math>dx=5\text{mm}</math>, <math>dy=5\text{mm}</math>, <math>dz=5\text{mm}</math></p> <p>Reference Value = <math>56.3\text{V/m}</math>; Power Drift = <math>-0.047 \text{ dB}</math></p> <p>Peak SAR (extrapolated) = <math>4.08 \text{ W/kg}</math></p> <p><b>SAR(1 g) = 2.72 mW/g; SAR(10 g) = 1.32 mW/g</b></p> <p>Maximum value of SAR (measured) = <math>2.9 \text{ mW/g}</math></p> <div style="text-align: center;">  </div> <p>0 dB = <math>2.9 \text{ mW/g}</math></p>	

**SYSTEM CHECKING SCANS**

**1900 MHz**

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d113**

Medium parameters used (interpolated):  $f = 1900$  MHz;  $\sigma = 1.44$  mho/m;  $\epsilon_r = 39$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 - SN720; Calibrated: 1/18/2010
- Phantom: SAM 1559; Type: SAM; Serial: 1559
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

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

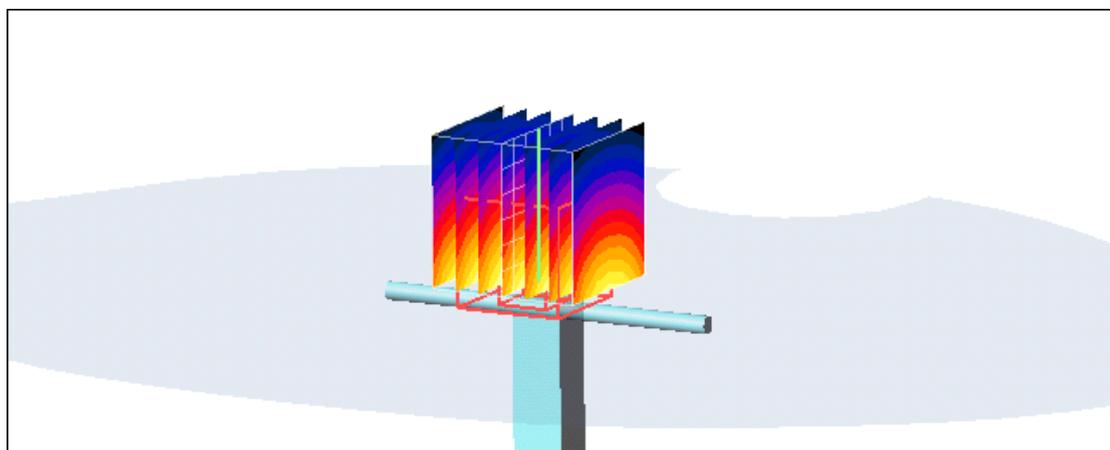
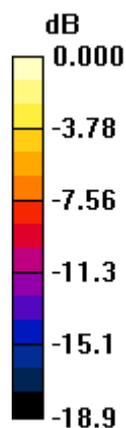
dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.3V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 17.8 W/kg

**SAR(1 g) = 9.98 mW/g; SAR(10 g) = 5.32 mW/g**

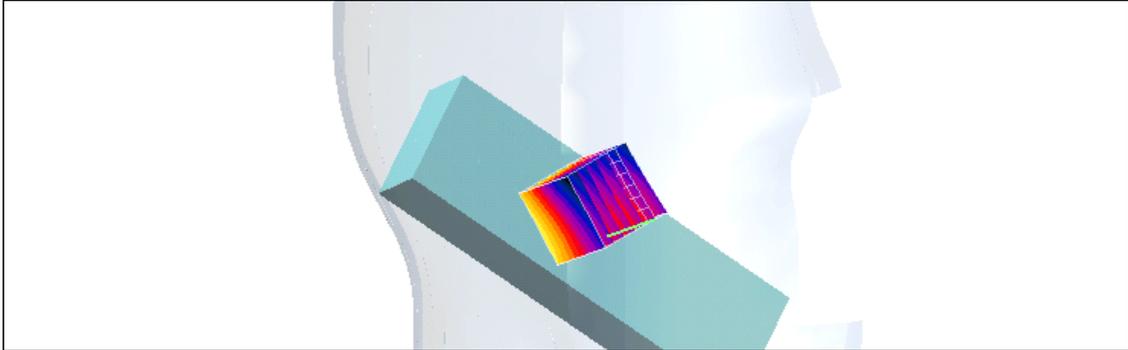
Maximum value of SAR (measured) = 11.6 mW/g



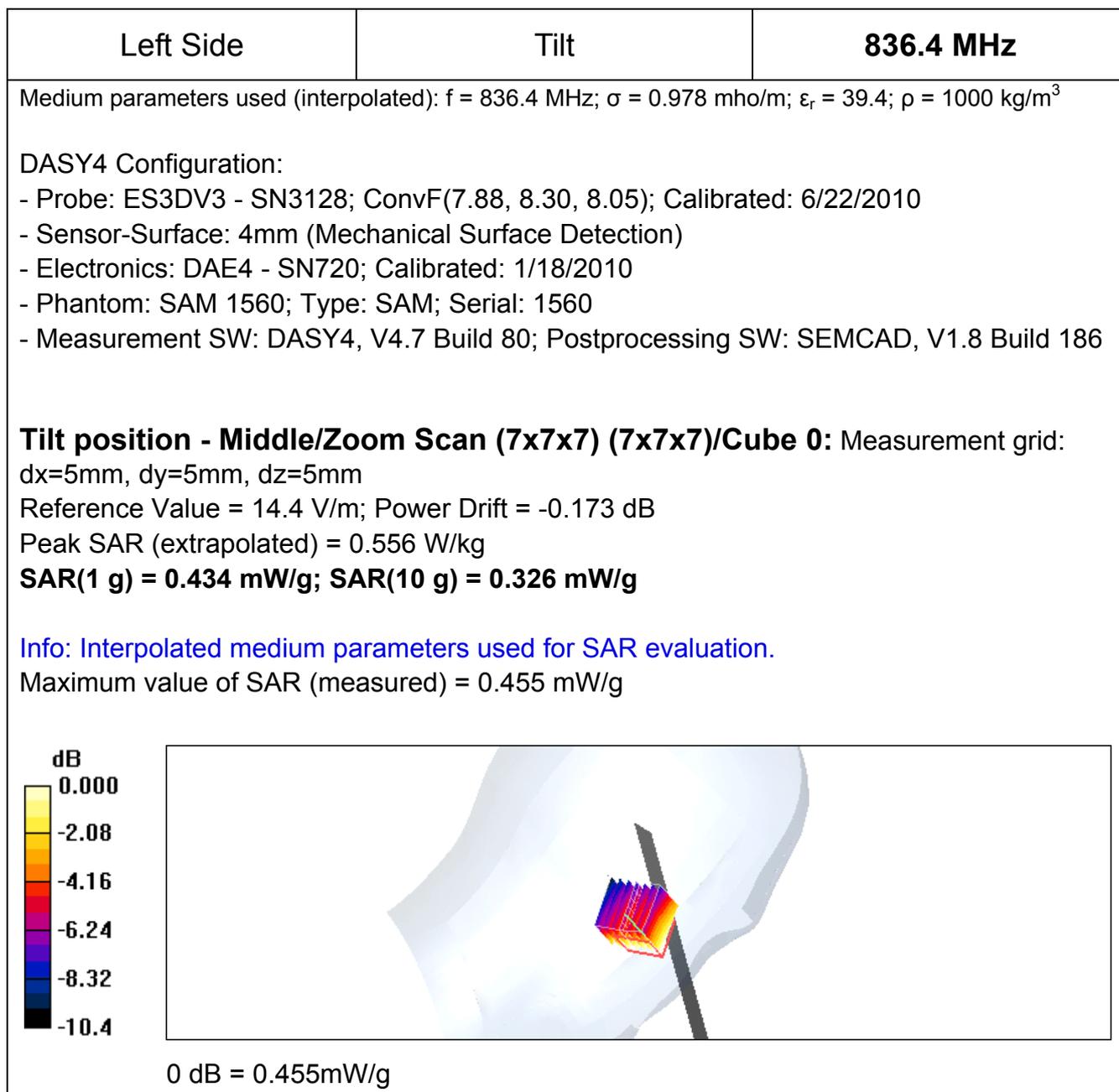
0 dB = 11.6 mW/g

**APPENDIX B: MEASUREMENT SCANS**

**GSM (850MHz/Head)**

Left Side	Cheek	836.4 MHz						
<p>Medium parameters used (interpolated): <math>f = 836.4</math> MHz; <math>\sigma = 0.978</math> mho/m; <math>\epsilon_r = 39.4</math>; <math>\rho = 1000</math> kg/m<sup>3</sup></p>								
<p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1560; Type: SAM; Serial: 1560</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul>								
<p><b>Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid:  <math>dx=5</math>mm, <math>dy=5</math>mm, <math>dz=5</math>mm            Reference Value = 19.8 V/m; Power Drift = -0.039 dB            Peak SAR (extrapolated) = 1.43 W/kg  <b>SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.802 mW/g</b></p> <p><a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a>            Maximum value of SAR (measured) = 1.16 mW/g</p>								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td>0.000</td></tr> <tr><td>-2.10</td></tr> <tr><td>-4.20</td></tr> <tr><td>-6.30</td></tr> <tr><td>-8.40</td></tr> <tr><td>-10.5</td></tr> </table> </div> <div style="flex-grow: 1;">  <p>0 dB = 1.16mW/g</p> </div> </div>			0.000	-2.10	-4.20	-6.30	-8.40	-10.5
0.000								
-2.10								
-4.20								
-6.30								
-8.40								
-10.5								

**Fig1 SAR Test result**



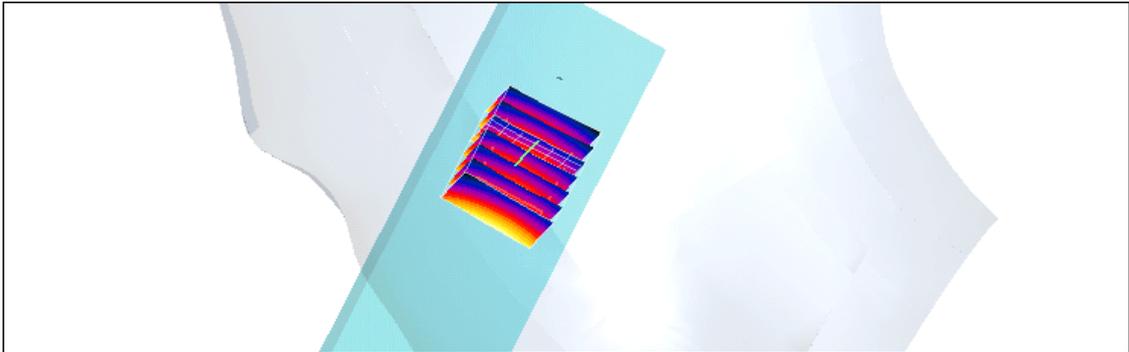
**Fig2 SAR Test result**

Left Side	Cheek	824.2 MHz
<p>Medium parameters used (interpolated): <math>f = 824.2</math> MHz; <math>\sigma = 0.961</math> mho/m; <math>\epsilon_r = 39.6</math>; <math>\rho = 1000</math> kg/m<sup>3</sup></p> <p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1560; Type: SAM; Serial: 1560</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul> <p><b>Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 19.8 V/m; Power Drift = -0.209 dB Peak SAR (extrapolated) = 1.32 W/kg <b>SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.746 mW/g</b></p> <p><a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a></p> <p>Maximum value of SAR (measured) = 1.10 mW/g</p> <div data-bbox="212 1339 1382 1691"> </div>		

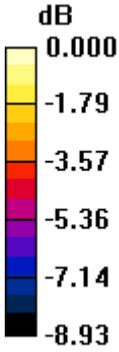
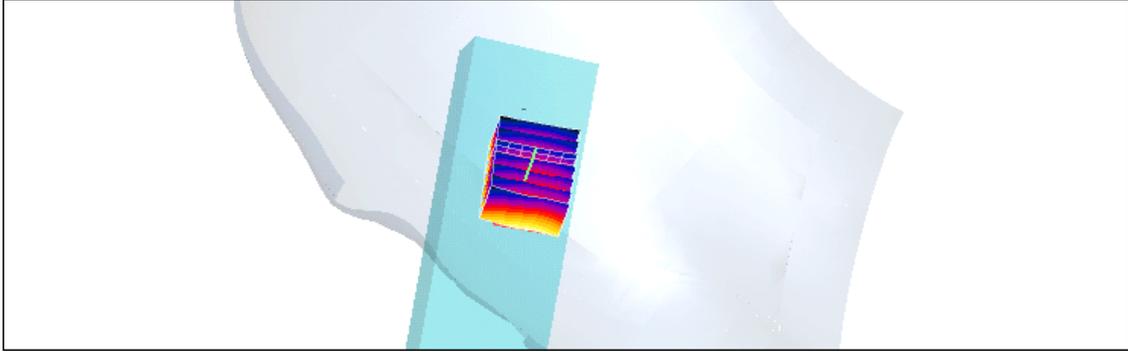
**Fig3 SAR Test result**

Left Side	Cheek	848.8MHz
<p>Medium parameters used (interpolated): <math>f = 848.8</math> MHz; <math>\sigma = 0.987</math> mho/m; <math>\epsilon_r = 40.3</math>; <math>\rho = 1000</math> kg/m<sup>3</sup></p>		
<p>DASY4 Configuration:            - Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010            - Sensor-Surface: 4mm (Mechanical Surface Detection)            - Electronics: DAE4 - SN720; Calibrated: 1/18/2010            - Phantom: SAM 1560; Type: SAM; Serial: 1560            - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</p>		
<p><b>Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: dx=5mm, dy=5mm, dz=5mm            Reference Value = 19.7 V/m; Power Drift = -0.003 dB            Peak SAR (extrapolated) = 1.46 W/kg  <b>SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.808 mW/g</b></p>		
<p><a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a>            Maximum value of SAR (measured) = 1.18 mW/g</p>		
<div style="display: flex; align-items: center;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <p>0.000 -2.08 -4.16 -6.24 -8.32 -10.4</p> </div> <div style="flex-grow: 1;"> </div> </div> <p style="text-align: center;">0 dB = 1.18mW/g</p>		

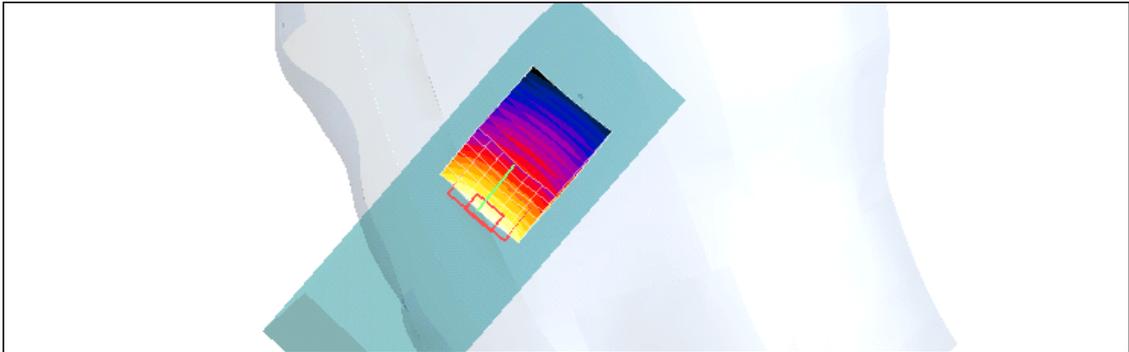
**Fig4 SAR Test result**

Right Side	Cheek	836.4 MHz						
<p>Medium parameters used (interpolated): <math>f = 836.4</math> MHz; <math>\sigma = 0.978</math> mho/m; <math>\epsilon_r = 39.4</math>; <math>\rho = 1000</math> kg/m<sup>3</sup></p>								
<p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1560; Type: SAM; Serial: 1560</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul>								
<p><b>Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: dx=5mm, dy=5mm, dz=5mm            Reference Value = 26.3 V/m; Power Drift = -0.130 dB            Peak SAR (extrapolated) = 2.07 W/kg  <b>SAR(1 g) = 1.53 mW/g; SAR(10 g) = 1.07 mW/g</b></p> <p><a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a></p> <p>Maximum value of SAR (measured) = 1.64 mW/g</p>								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td>0.000</td></tr> <tr><td>-1.98</td></tr> <tr><td>-3.96</td></tr> <tr><td>-5.93</td></tr> <tr><td>-7.91</td></tr> <tr><td>-9.89</td></tr> </table> </div> <div style="flex-grow: 1;">  </div> </div> <p>0 dB = 1.64mW/g</p>			0.000	-1.98	-3.96	-5.93	-7.91	-9.89
0.000								
-1.98								
-3.96								
-5.93								
-7.91								
-9.89								

**Fig5 SAR Test result**

Right Side	Tilt	836.4 MHz
Medium parameters used (interpolated): $f = 836.4$ MHz; $\sigma = 0.978$ mho/m; $\epsilon_r = 39.4$ ; $\rho = 1000$ kg/m <sup>3</sup>		
<b>DASY4 Configuration:</b> - Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010 - Sensor-Surface: 4mm (Mechanical Surface Detection) - Electronics: DAE4 - SN720; Calibrated: 1/18/2010 - Phantom: SAM 1560; Type: SAM; Serial: 1560 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186		
<b>Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm Reference Value = 17.9 V/m; Power Drift = -0.157 dB Peak SAR (extrapolated) = 0.768 W/kg <b>SAR(1 g) = 0.577 mW/g; SAR(10 g) = 0.422 mW/g</b>  <a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a> Maximum value of SAR (measured) = 0.611 mW/g		
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p>  <p>0.000 -1.79 -3.57 -5.36 -7.14 -8.93</p> </div> <div style="flex-grow: 1;">  </div> </div> <p>0 dB = 0.611mW/g</p>		

**Fig6 SAR Test result**

Right Side	Cheek	824.2 MHz						
Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.961$ mho/m; $\epsilon_r = 39.6$ ; $\rho = 1000$ kg/m <sup>3</sup>								
<b>DASY4 Configuration:</b> - Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010 - Sensor-Surface: 4mm (Mechanical Surface Detection) - Electronics: DAE4 - SN720; Calibrated: 1/18/2010 - Phantom: SAM 1560; Type: SAM; Serial: 1560 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186								
<b>Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm Reference Value = 19.6 V/m; Power Drift = -0.135 dB Peak SAR (extrapolated) = 1.48 W/kg <b>SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.712 mW/g</b>								
<a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a>								
Maximum value of SAR (measured) = 1.20 mW/g								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td>0.000</td></tr> <tr><td>-2.54</td></tr> <tr><td>-5.08</td></tr> <tr><td>-7.62</td></tr> <tr><td>-10.2</td></tr> <tr><td>-12.7</td></tr> </table> </div>  <p style="margin-top: 10px;">0 dB = 1.20mW/g</p> </div>			0.000	-2.54	-5.08	-7.62	-10.2	-12.7
0.000								
-2.54								
-5.08								
-7.62								
-10.2								
-12.7								

**Fig7 SAR Test result**

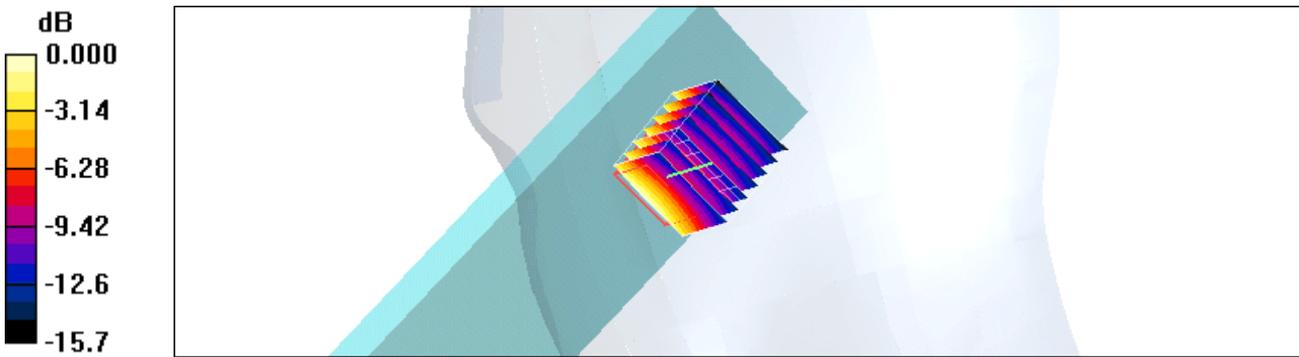
Right Side	Cheek	848.8 MHz						
Medium parameters used (interpolated): $f = 848.8 \text{ MHz}$ ; $\sigma = 0.987 \text{ mho/m}$ ; $\epsilon_r = 40.3$ ; $\rho = 1000 \text{ kg/m}^3$								
<p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(7.88, 8.30, 8.05); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1560; Type: SAM; Serial: 1560</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul>								
<p><b>Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid:  <math>dx=5\text{mm}</math>, <math>dy=5\text{mm}</math>, <math>dz=5\text{mm}</math>            Reference Value = <math>19.4 \text{ V/m}</math>; Power Drift = <math>-0.038 \text{ dB}</math>            Peak SAR (extrapolated) = <math>1.54 \text{ W/kg}</math>  <b>SAR(1 g) = <math>1.2 \text{ mW/g}</math>; SAR(10 g) = <math>0.862 \text{ mW/g}</math></b></p>								
<p><a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a></p>								
<p>Maximum value of SAR (measured) = <math>1.27 \text{ mW/g}</math></p>								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td style="background-color: yellow;">0.000</td></tr> <tr><td style="background-color: orange;">-2.12</td></tr> <tr><td style="background-color: red;">-4.24</td></tr> <tr><td style="background-color: purple;">-6.36</td></tr> <tr><td style="background-color: blue;">-8.48</td></tr> <tr><td style="background-color: black;">-10.6</td></tr> </table> </div> <div style="flex-grow: 1;"> <p style="text-align: center;">0 dB = 1.2 mW/</p> </div> </div>			0.000	-2.12	-4.24	-6.36	-8.48	-10.6
0.000								
-2.12								
-4.24								
-6.36								
-8.48								
-10.6								

**Fig8 SAR Test result**

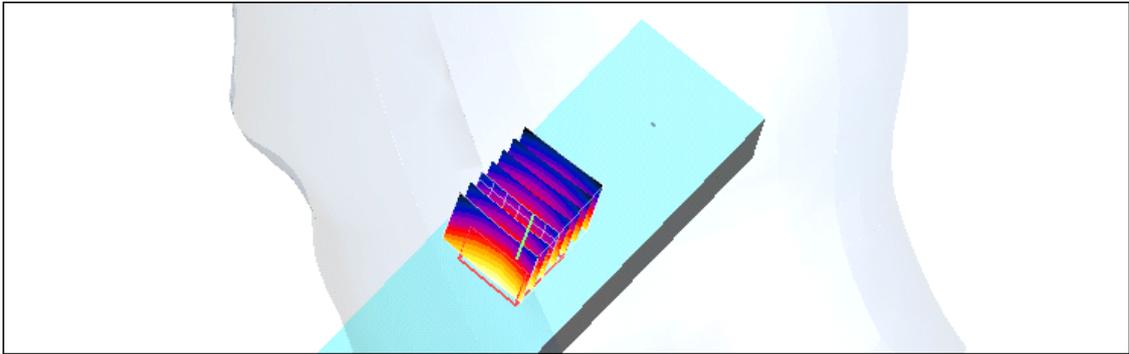
## GSM (1900MHz/Head)

Right Side	Touch	1880 MHz
<p>Medium parameters used: <math>f = 1880 \text{ MHz}</math>; <math>\sigma = 1.44 \text{ mho/m}</math>; <math>\epsilon_r = 39</math>; <math>\rho = 1000 \text{ kg/m}^3</math></p> <p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1559; Type: SAM; Serial: 1559</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul> <p><b>Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: dx=5mm, dy=5mm, dz=5mm Reference Value = 17.1 V/m; Power Drift = 0.009 dB Peak SAR (extrapolated) = 1.40 W/kg <b>SAR(1 g) = 0.935 mW/g; SAR(10 g) = 0.565 mW/g</b> Maximum value of SAR (measured) = 1.02 mW/g</p> <div data-bbox="140 1240 1442 1594"> </div> <p>0 dB = 1.02mW g</p>		

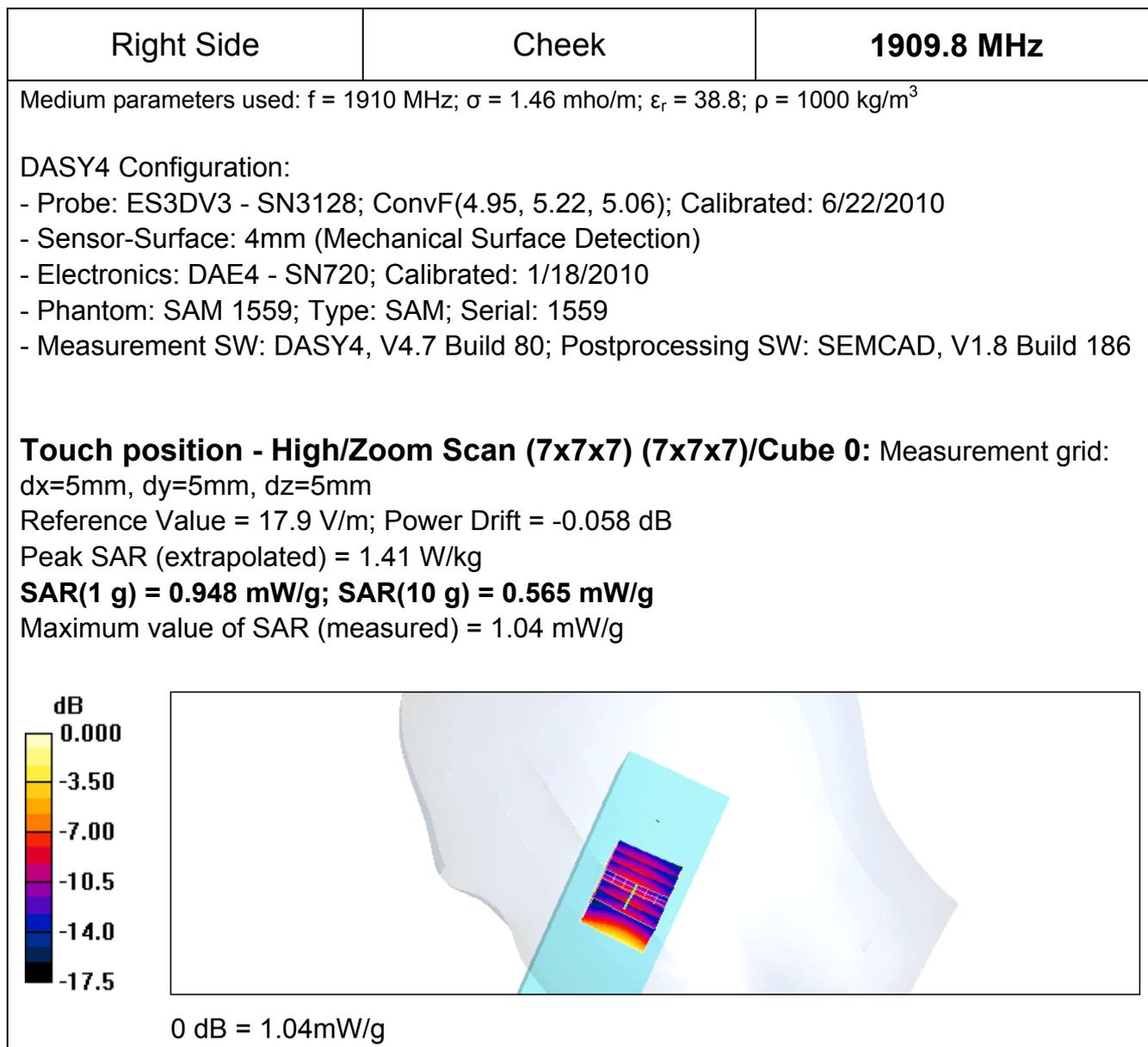
**Fig9 SAR Test result**

Right Side	Tilt	1880 MHz
Medium parameters used: $f = 1880 \text{ MHz}$ ; $\sigma = 1.44 \text{ mho/m}$ ; $\epsilon_r = 39$ ; $\rho = 1000 \text{ kg/m}^3$		
<b>DASY4 Configuration:</b> - Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010 - Sensor-Surface: 4mm (Mechanical Surface Detection) - Electronics: DAE4 - SN720; Calibrated: 1/18/2010 - Phantom: SAM 1559; Type: SAM; Serial: 1559 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186		
<b>Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: $dx=5\text{mm}$ , $dy=5\text{mm}$ , $dz=5\text{mm}$ Reference Value = 15.8 V/m; Power Drift = -0.024 dB Peak SAR (extrapolated) = 0.581 W/kg <b>SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.221 mW/g</b> Maximum value of SAR (measured) = 0.392 mW/g		
 <p>0 dB = 0.392mW/g</p>		

**Fig10 SAR Test result**

Right Side	Cheek	1850.2MHz						
Medium parameters used (interpolated): $f = 1850.2 \text{ MHz}$ ; $\sigma = 1.41 \text{ mho/m}$ ; $\epsilon_r = 39.2$ ; $\rho = 1000 \text{ kg/m}^3$								
DASY4 Configuration: - Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010 - Sensor-Surface: 4mm (Mechanical Surface Detection) - Electronics: DAE4 - SN720; Calibrated: 1/18/2010 - Phantom: SAM 1559; Type: SAM; Serial: 1559 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186								
<b>Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: $dx=5\text{mm}$ , $dy=5\text{mm}$ , $dz=5\text{mm}$ Reference Value = 17.6 V/m; Power Drift = -0.012 dB Peak SAR (extrapolated) = 1.35 W/kg <b>SAR(1 g) = 0.896 mW/g; SAR(10 g) = 0.535 mW/g</b>  <a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a> Maximum value of SAR (measured) = 0.987 mW/g								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td>0.000</td></tr> <tr><td>-3.46</td></tr> <tr><td>-6.92</td></tr> <tr><td>-10.4</td></tr> <tr><td>-13.8</td></tr> <tr><td>-17.3</td></tr> </table> </div> <div style="flex-grow: 1;">  </div> </div> <p>0 dB = 0.987mW/g</p>			0.000	-3.46	-6.92	-10.4	-13.8	-17.3
0.000								
-3.46								
-6.92								
-10.4								
-13.8								
-17.3								

**Fig11 SAR Test result**



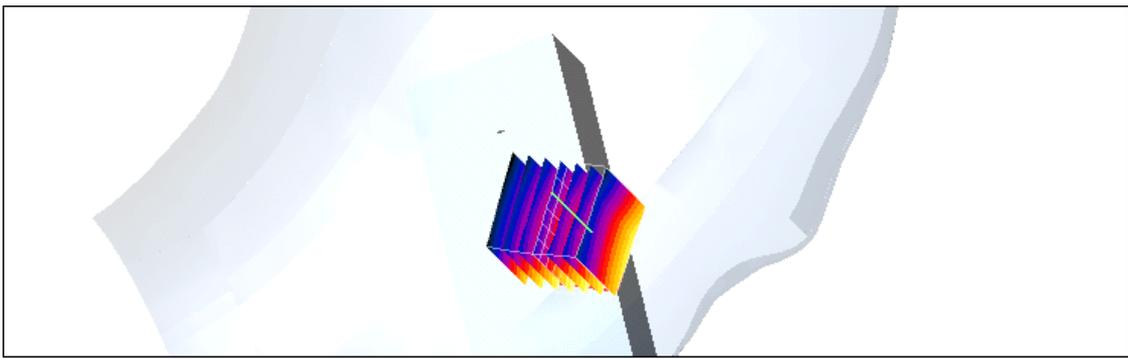
**Fig12 SAR Test result**

Left Side	Cheek	1880 MHz
<p>Medium parameters used: <math>f = 1880 \text{ MHz}</math>; <math>\sigma = 1.44 \text{ mho/m}</math>; <math>\epsilon_r = 39</math>; <math>\rho = 1000 \text{ kg/m}^3</math></p> <p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1559; Type: SAM; Serial: 1559</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul> <p><b>Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: <math>dx=5\text{mm}</math>, <math>dy=5\text{mm}</math>, <math>dz=5\text{mm}</math></p> <p>Reference Value = 17.3 V/m; Power Drift = -0.153 dB</p> <p>Peak SAR (extrapolated) = 1.55 W/kg</p> <p><b>SAR(1 g) = 1.02 mW/g; SAR(10 g) = 0.611 mW/g</b></p> <p>Maximum value of SAR (measured) = 1.10 mW/g</p> <div style="display: flex; align-items: flex-start;"> <div data-bbox="145 1122 264 1473" style="margin-right: 10px;"> <p><b>dB</b></p> <p>0.000 -3.42 -6.84 -10.3 -13.7 -17.1</p> </div> <div data-bbox="316 1122 1444 1473"> </div> </div> <p>0 dB = 1.10mW/g</p>		

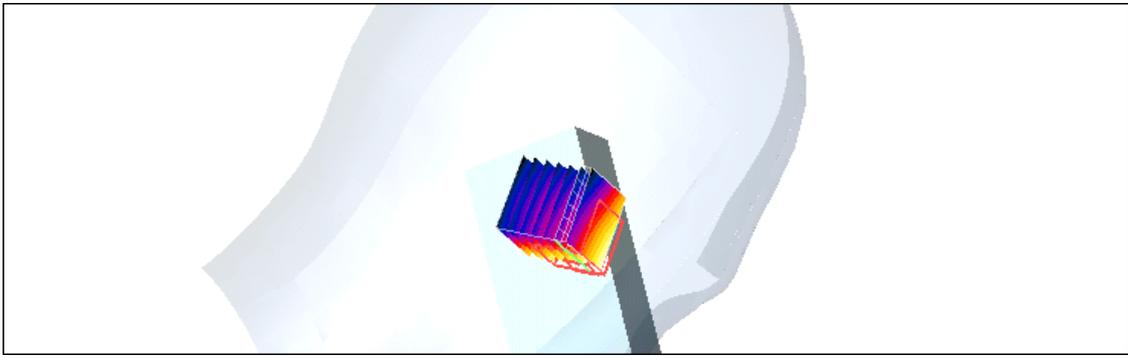
**Fig13 SAR Test result**

Left Side	Tilt	1880 MHz
<p>Medium parameters used: <math>f = 1880 \text{ MHz}</math>; <math>\sigma = 1.44 \text{ mho/m}</math>; <math>\epsilon_r = 39</math>; <math>\rho = 1000 \text{ kg/m}^3</math></p> <p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1559; Type: SAM; Serial: 1559</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul> <p><b>Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid:  <math>dx=5\text{mm}</math>, <math>dy=5\text{mm}</math>, <math>dz=5\text{mm}</math>            Reference Value = 15.7 V/m; Power Drift = -0.036 dB            Peak SAR (extrapolated) = 0.613 W/kg  <b>SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.224 mW/g</b></p> <p>Maximum value of SAR (measured) = 0.421 mW/g</p> <div data-bbox="129 1211 1444 1568"> <p>dB            0.000            -3.44            -6.88            -10.3            -13.8            -17.2</p> </div> <p>0 dB = 0.421mW/g</p>		

**Fig14 SAR Test result**

Left Side	Cheek	1850.2 MHz						
<p>Medium parameters used (interpolated): <math>f = 1850.2 \text{ MHz}</math>; <math>\sigma = 1.41 \text{ mho/m}</math>; <math>\epsilon_r = 39.2</math>; <math>\rho = 1000 \text{ kg/m}^3</math></p> <p>DASY4 Configuration:</p> <ul style="list-style-type: none"> <li>- Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010</li> <li>- Sensor-Surface: 4mm (Mechanical Surface Detection)</li> <li>- Electronics: DAE4 - SN720; Calibrated: 1/18/2010</li> <li>- Phantom: SAM 1559; Type: SAM; Serial: 1559</li> <li>- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186</li> </ul> <p><b>Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: dx=5mm, dy=5mm, dz=5mm</p> <p>Reference Value = 17.2 V/m; Power Drift = -0.087 dB</p> <p>Peak SAR (extrapolated) = 1.46 W/kg</p> <p><b>SAR(1 g) = 0.916 mW/g; SAR(10 g) = 0.541 mW/g</b></p> <p><a href="#">Info: Interpolated medium parameters used for SAR evaluation.</a></p> <p>Maximum value of SAR (measured) = 0.987 mW/g</p>								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td style="background-color: yellow;">0.000</td></tr> <tr><td style="background-color: orange;">-3.38</td></tr> <tr><td style="background-color: red;">-6.76</td></tr> <tr><td style="background-color: purple;">-10.1</td></tr> <tr><td style="background-color: blue;">-13.5</td></tr> <tr><td style="background-color: black;">-16.9</td></tr> </table> </div> <div style="flex-grow: 1;">  <p>0 dB = 0.987mW/g</p> </div> </div>			0.000	-3.38	-6.76	-10.1	-13.5	-16.9
0.000								
-3.38								
-6.76								
-10.1								
-13.5								
-16.9								

**Fig15 SAR Test result**

Left Side	Cheek	1909.8MHz						
Medium parameters used: $f = 1910 \text{ MHz}$ ; $\sigma = 1.46 \text{ mho/m}$ ; $\epsilon_r = 38.8$ ; $\rho = 1000 \text{ kg/m}^3$								
<b>D DASY4 Configuration:</b> - Probe: ES3DV3 - SN3128; ConvF(4.95, 5.22, 5.06); Calibrated: 6/22/2010 - Sensor-Surface: 4mm (Mechanical Surface Detection) - Electronics: DAE4 - SN720; Calibrated: 1/18/2010 - Phantom: SAM 1559; Type: SAM; Serial: 1559 - Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186								
<b>Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0:</b> Measurement grid: $dx=5\text{mm}$ , $dy=5\text{mm}$ , $dz=5\text{mm}$ Reference Value = 17.3 V/m; Power Drift = 0.042 dB Peak SAR (extrapolated) = 1.57 W/kg <b>SAR(1 g) = 0.982 mW/g; SAR(10 g) = 0.577 mW/g</b> Maximum value of SAR (measured) = 1.07 mW/g								
<div style="display: flex; align-items: flex-start;"> <div style="margin-right: 20px;"> <p><b>dB</b></p> <table border="1"> <tr><td style="background-color: yellow;">0.000</td></tr> <tr><td style="background-color: orange;">-3.42</td></tr> <tr><td style="background-color: red;">-6.84</td></tr> <tr><td style="background-color: purple;">-10.3</td></tr> <tr><td style="background-color: blue;">-13.7</td></tr> <tr><td style="background-color: black;">-17.1</td></tr> </table> </div> <div style="flex-grow: 1;">  </div> </div> <p style="margin-top: 10px;">0 dB = 1.07mW/g</p>			0.000	-3.42	-6.84	-10.3	-13.7	-17.1
0.000								
-3.42								
-6.84								
-10.3								
-13.7								
-17.1								

**Fig16 SAR Test result**

## APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

The State Radio\_monitoring\_center Testing Center

---

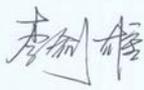
**Calibration Certificate**



Dosimetric E-field Probe

Instrument	
Type/Model	ES3DV3
Manufacturer	Schmid & Partner Engineering AG
Serial No	SN:3128
Name of Client	The State Radio_monitoring_center Testing Center
Address of Client	No.98 Bei Lishi Road XiCheng District
Calibration Date	2010.6.22

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3) °C and humidity<70%

Approved by  

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 1 of 6 Certificate No.SRTC2010-CAL002-004

The State Radio\_monitoring\_center Testing Center

Reference documents of the measurement(Code, Name) SRTC3003-V1.0.0 Working procedure for calibration——SAR testing system
Place and environmental condition of the measurement Temperature 22.1℃ Humidity 24.8% Location SRTC226 room

Primary Calibration Equipment used	Model/Type	ID#	Cal Date	Scheduled Calibration
Power meter	E4417A	SN: MY45101004	2009.8	2010.8
Power sensor	E9300B	SN: MY41496001	2009.8	2010.8
Power sensor	E9300B	SN: MY41496003	2009.8	2010.8
Reference DAE	DAE4	SN: 720	2010.1	2011.1
Signal generator	SML03	SN:103514	2009.8	2010.8
Network analyzer	8714ET	SN:US40372083	2009.8	2010.8
Secondary Calibration Equipment used	Model/Type	ID#		
Waveguide	WGLS R9	SN:1006		
Waveguide	WGLS R14	SN:1003		
Waveguide	WGLS R22	SN:1006		

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 2 of 6 Certificate No.SRTC2010-CAL002-004

---

**The State Radio\_monitoring\_center Testing Center**

---

**Note:**

1. This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
2. This calibration certificate is not permitted to be reproduced except in full without written the approval of the only laboratory
3. SRTC is responsible for the whole of certificate only with stamp of SRTC.
4. The calibration results would be valid only for the items calibration.
5. The certification is written by Chinese and English. Exact meaning should be explained only on Chinese version.

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 3 of 6 Certificate No.SRTC2010-CAL002-004

## The State Radio\_monitoring\_center Testing Center

### Glossary

TSL	Tissue Simulating Liquid
NORM <sub>x, y, z</sub>	The sensitivity in free space
ConvF	The sensitivity of the TSL/The sensitivity in free space
DCP	Diode Compression Point
Angle $\phi$	$\phi$ rotation around probe axis
Angle $\theta$	$\theta$ rotation around an axis that is in the plane normal to probe axis i.e. $\theta=0$ , means that is normal to probe axis

### Calibration is performed according to the Following Standards

IEEE Std 1528-2003  
IEC 62209-1-2005  
Federal Communication Commission Office of Engineering & Technology (FCC OET)

### Methods Applied and Interpretation of Parameters

- NORM<sub>x, y, z</sub>: Assessed for E-field polarization  $\theta=0$  for XY sensors and  $\theta=90$  for Z sensor
- NORM(f)<sub>x, y, z</sub>= NORM<sub>x, y, z</sub> \* frequency\_response. And this linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the states uncertainty of ConvF.
- DCP<sub>x,y,z</sub>: DCP are numerical linearization parameters assessed based on the data of power sweep(no uncertainty required). DCP does not depend on frequency and medium.
- ConvF and boundary effect: Assessed in flat phantom using E-field and inside waveguide using analytical field distributions based on power measurements for  $f > 800\text{MHz}$ . The same setups are used for assessment of the parameters applied for boundary compensation(alpha,depth)of which typical uncertainty values are given. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50\text{MHz}$  to  $\pm 100\text{MHz}$ .
- Spherical isotropy: in a locally homogeneous field realized using an open waveguide setup.

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R .China

Page 4 of 6 Certificate No.SRTC2010-CAL002-004

## The State Radio\_monitoring\_center Testing Center

### Measurement Conditions

DASY versions	DSAY 5	V5.0 Build 126
Model	Flat phantom	——

### Probe Sensitivity Parameters

	Value	Unit
Axis X	1.00	$\mu V / (V / m)^2$
Axis Y	1.00	$\mu V / (V / m)^2$
Axis Z	1.00	$\mu V / (V / m)^2$

### 1. Diode Compression Point

	Value	Unit	Uncertainty (k=2)
Axis X	97.4	mV	10.82%
Axis Y	101.4	mV	10.82%
Axis Z	100.7	mV	10.82%

### 2. Probe Conversion Factors: Head Tissue Liquid

Frequency (MHz)	Validity (MHz)	Permittivity	Conductivity (mho/m)	Alpha	Depth (mm)	ConvFx / ConvFy / ConvFz	Uncertainty (k = 2)
835	±100	41.93	0.916	0.448	1.499	7.880 8.301 8.050	13.02%
900	±100	42.72	0.968	0.607	1.271	9.029 9.525 9.201	13.02%
1800	±100	39.61	1.354	0.312	2.126	6.154 6.495 6.273	13.02%
1900	±100	39.11	1.463	0.381	1.832	4.947 5.220 5.055	13.02%

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R. China

Page 5 of 6 Certificate No.SRTC2010-CAL002-004

The State Radio\_monitoring\_center Testing Center

3. Probe Conversion Factors: Body Tissue Liquid

Frequency (MHz)	Validity (MHz)	Permittivity	Conductivity (mho/m)	Alpha	Depth (mm)	ConvFx/ ConvFy/ConvFz			Uncertainty (k = 2)
						$\mu V / (V / m)^2$			
835	±100	54.05	0.983	0.508	1.412	6.776	7.019	6.804	13.02%
900	±100	54.48	1.055	0.672	1.244	8.755	9.243	8.919	13.02%
1800	±100	53.74	1.567	0.316	2.446	5.702	6.018	5.816	13.02%
1900	±100	54.42	1.465	0.330	2.414	4.532	4.785	4.632	13.02%

4. Probe Isotropy

	Value	Unit	Uncertainty(k=2)
Axial Isotropy	-0.071	dB	10.18%
Spherical Isotropy	-0.171	dB	10.18%

Calibrated by 张明远

Checked by 刘 梅

**APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)**

The State Radio\_monitoring\_center Testing Center

**Calibration Certificate**



Instrument Dipole

Type/Model D900V2

Manufacturer Schmid & Partner Engineering AG

Serial No SN:171

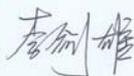
Name of Client The State Radio\_monitoring\_center Testing Center

Address of Client No.98 Bei Lishi Road XiCheng District

Calibration Date 2010.6.11

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3) °C and humidity<70%

Approved by



Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 1 of 8 Certificate No.SRTC2010-CAL003-003

**The State Radio\_monitoring\_center Testing Center**

Reference documents of the measurement(Code, Name)
SRTC3003-V1.0.0 Working procedure for calibration of SAR Testing system
Place and environmental condition of the measurement
Temperature 21.6℃ Humidity 30.7%
Location SRTC Room226

Primary Calibration Equipment used	Model/Type	ID#	Cal Date	Scheduled Calibration
Power meter	E4417A	SN: MY45101004	2009.8	2010.8
Power sensor	E9300B	SN: MY41496001	2009.8	2010.8
Power sensor	E9300B	SN: MY41496003	2009.8	2010.8
Reference DAE	DAE4	SN: 720	2010.1	2011.1
Reference probe	ES3DV3	SN: 3128	2009.6	2010.6
Secondary Calibration Equipment used	Model/Type	ID#	Cal Date	Scheduled Calibration
Signal generator	SML03	SN:103514	2009.8	2010.8
Network analyzer	8714ET	SN:US40372083	2009.8	2010.8

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 2 of 8 Certificate No.SRTC2010-CAL003-003

---

**The State Radio\_monitoring\_center Testing Center**

---

**Note:**

1. This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
2. This calibration certificate is not permitted to be reproduced except in full without written the approval of the only laboratory
3. SRTC is responsible for the whole of certificate only with stamp of SRTC.
4. The calibration results would be valid only for the items calibration.
5. The certification is written by Chinese and English. Exact meaning should be explained only on Chinese version.

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R. China

Page 3 of 8 Certificate No.SRTC2010-CAL003-003

---

## The State Radio\_monitoring\_center Testing Center

---

### Glossary

TSL	Tissue Simulating Liquid
ConvF	The sensitivity of the TSL / sensitivity in TSL/NORM x, y, z
N/A	not applicable or not measured

### Calibration is preformed according to the Following Standards

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in Human Head from Wireless Communication Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz) ", February 2005
- c) Federal Communication Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

### Additional Documentation:

- e) DASY System Handbook

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 4 of 8 Certificate No.SRTC2010-CAL003-003

---

**The State Radio\_monitoring\_center Testing Center**

---

**Methods Applied and Interpretation of Parameters**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- SAR measured: SAR measured at the stated antenna input power
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

**Measurement Conditions**

DASY Version	DSAY 5	V5.0 Build 126
Extrapolation	Advanced Extrapolation	——
Phantom	ELI4	——
Distance Dipole Center-TSL	15mm	With spacer (See note)
Area Scan Resolution	dx,dy=15mm	——
Zoom Scan Resolution	dx,dy,dz=5mm	——
Frequency	900MHz	——

Note: As client can not provide a spacer for their dipole, we used a alternate method to define the distance from dipole center to TSL. Pictures in Annex 3 show the details.

The State Radio\_monitoring\_center Testing Center

Head TSL Parameters

The following parameters and calculation were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0°C	41.5	0.97mho/m
Measured Head TSL parameters	(22±0.5)°C	41.2	0.95m±5%
Head TSL temperature during test	(21.6±0.6)°C	——	——

1. SAR-Head TSL

SAR -1g SAR averaged over 1cm <sup>3</sup> (1g) of Head TSL	Condition	——
SAR measured	250mW input power	2.70mW/g
SAR normalized	normalized to 1W	10.80mW/g
SAR for nominal Head TSL parameters	normalized to 1W	10.71 mW/g±15.20%(k=2)

SAR-10g SAR averaged over 10cm <sup>3</sup> (10g) of Head TSL	Condition	——
SAR measured	250mW input power	1.72mW/g
SAR normalized	normalized to 1W	6.88mW/g
SAR for nominal Head TSL parameters	normalized to 1W	6.80mW/g±14.38%(k=2)

## The State Radio\_monitoring\_center Testing Center

### 2. Annex

#### Annex 1

Date/Time: 6/11/2010 8:30:47 AM

Test Laboratory: SRTC, Beijing, China

DUT: Dipole 900 MHz; Type: D900V2; Serial: D900V2 - SN:171

Communication System: CW; Frequency: 900 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 900$  MHz;  $\sigma = 0.949$  mho/m;  $\epsilon_r = 41.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC)

DASY4 Configuration:

- Probe: ES3DV3 - SN3128; ConvF(5.52, 5.52, 5.52); Calibrated: 6/22/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 1/18/2010
- Phantom: ELI 4.0; Type: QDOVA001BA
- Measurement SW: DASYS, V5.0 Build 126; SEMCAD X Version 13.4 Build 125

Pin=250mW; d=15mm /Zoom Scan (7x7x7) (7x7x7)/Cube 0:

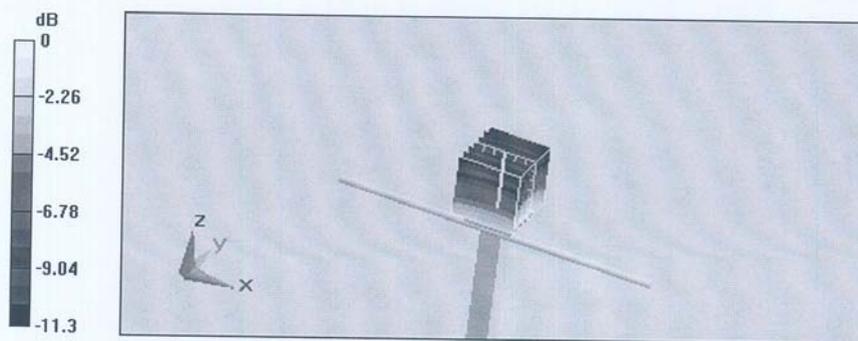
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.3 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 4.18 W/kg

SAR(1 g) = 2.7 mW/g; SAR(10 g) = 1.72 mW/g

Maximum value of SAR (measured) = 2.93 mW/g



0 dB = 2.93mW/g

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

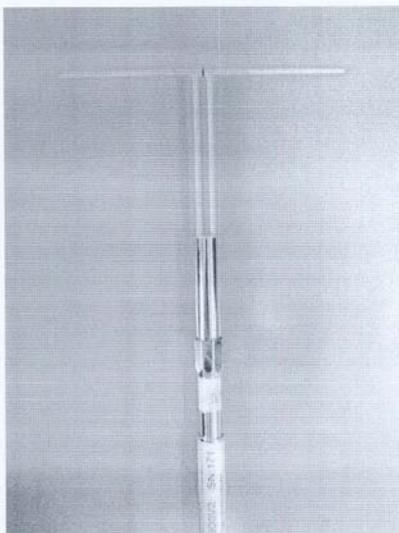
Page 7 of 8 Certificate No.SRTC2010-CAL003-003

---

The State Radio\_monitoring\_center Testing Center

---

Annex 2



Calibrated by

张明远

Checked by

刘

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R .China

Page 8 of 8 Certificate No.SRTC2010-CAL003-003

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zoughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

**Glossary:**

TSL tissue simulating liquid  
ConvF sensitivity in TSL / NORM x,y,z  
N/A not applicable or not measured

**Calibration is Performed According to the Following Standards:**

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- d) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result..

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.4 $\pm$ 6 %	0.88 mho/m $\pm$ 6 %
Head TSL temperature during test	(22.0 $\pm$ 0.2) °C	---	---

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.37 mW / g
SAR normalized	normalized to 1W	9.48 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>9.46 mW / g <math>\pm</math> 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 mW / g
SAR normalized	normalized to 1W	6.24 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>6.21 mW / g <math>\pm</math> 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.4 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	---	---

**SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.42 mW / g
SAR normalized	normalized to 1W	9.68 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>9.36 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR normalized	normalized to 1W	6.40 mW / g
SAR for nominal Body TSL parameters <sup>2</sup>	normalized to 1W	<b>6.24 mW / g ± 16.5 % (k=2)</b>

<sup>2</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	54.9 $\Omega$ - 2.6 j $\Omega$
Return Loss	-25.5 dB

**Antenna Parameters with Body TSL**

Impedance, transformed to feed point	50.3 $\Omega$ - 4.5 j $\Omega$
Return Loss	- 27.0 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.390 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	July 04, 2005

### DASY4 Validation Report for Head TSL

Date/Time: 16.06.2008 10:59:00

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023**

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

Medium: HSL 900 MHz;

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.88$  mho/m;  $\epsilon_r = 40.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

#### DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.97, 5.97, 5.97); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

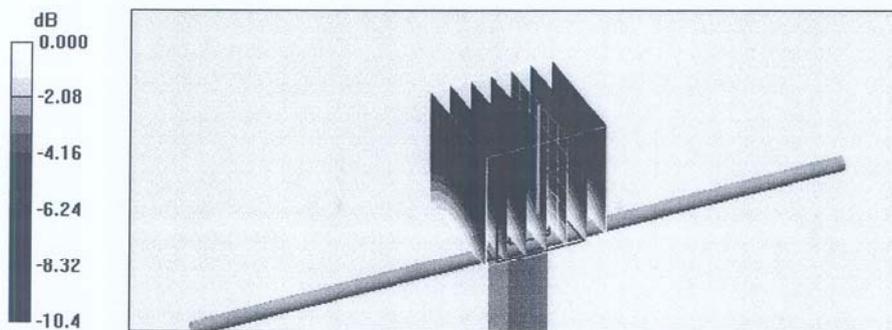
**Pin=250mW; dip=15mm; dist=3.4mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.5 V/m; Power Drift = -0.056 dB

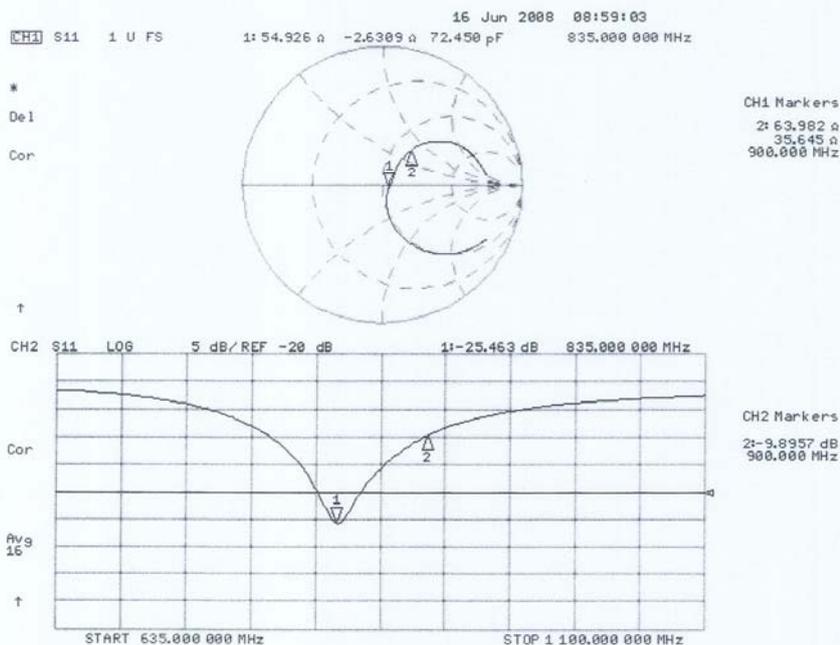
Peak SAR (extrapolated) = 3.48 W/kg

**SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.56 mW/g**

Maximum value of SAR (measured) = 2.68 mW/g



**Impedance Measurement Plot for Head TSL**



### DASY4 Validation Report for Body TSL

Date/Time: 06.06.2008 12:44:11

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d023**

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

Medium: MSL900;

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 53.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: ES3DV2 - SN3025; ConvF(5.9, 5.9, 5.9); Calibrated: 28.04.2008
- Sensor-Surface: 3.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 14.03.2008
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; ;
- Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

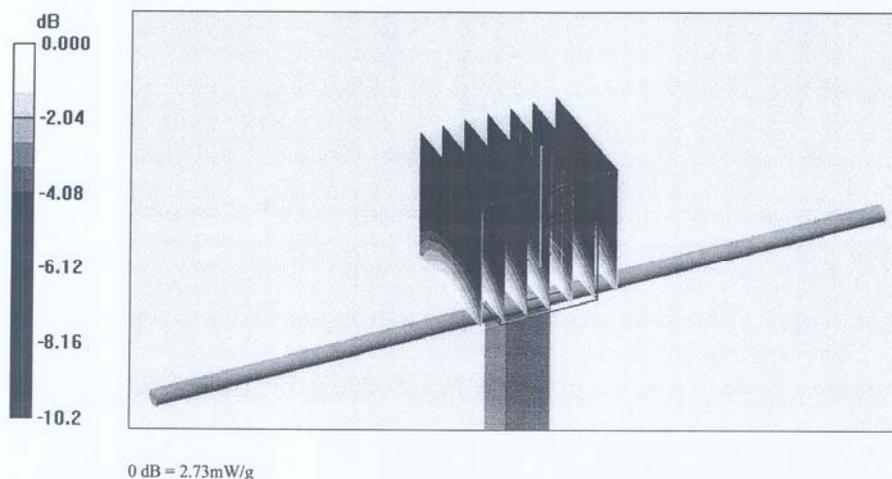
**Pin = 250mW, d = 15mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 53.7 V/m; Power Drift = 0.008 dB

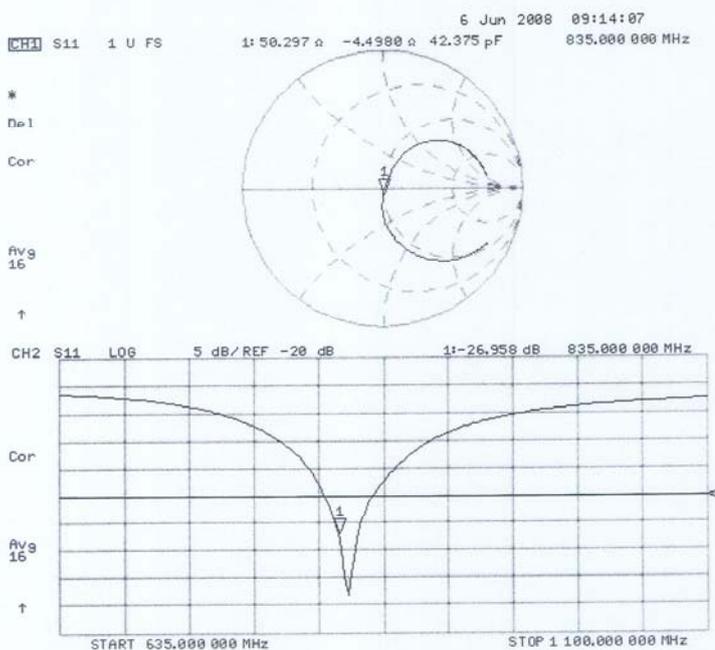
Peak SAR (extrapolated) = 3.49 W/kg

**SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.6 mW/g**

Maximum value of SAR (measured) = 2.73 mW/g



**Impedance Measurement Plot for Body TSL**



The State Radio\_monitoring\_center Testing Center

Calibration Certificate



Instrument Dipole

Type/Model D1800V2

Manufacturer Schmid & Partner Engineering AG

Serial No SN:2d084

Name of Client The State Radio\_monitoring\_center Testing Center

Address of Client No.98 Bei Lishi Road XiCheng District

Calibration Date 2010.6.11

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3) °C and humidity<70%

Approved by

A handwritten signature in black ink, appearing to be '李刚' (Li Gang).



Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R .China

Page 1 of 8 Certificate No.SRTC2010-CAL003-004

**The State Radio\_monitoring\_center Testing Center**

Reference documents of the measurement(Code, Name)	
SRMC3003-V1.0.0 Working procedure for calibration of SAR Testing system	
Place and environmental condition of the measurement	
Temperature 21.6℃	Humidity 30.7%
Location SRTC Room226	

Primary Calibration Equipment used	Model/Type	ID#	Cal Date	Scheduled Calibration
Power meter	E4417A	SN: MY45101004	2009.8	2010.8
Power sensor	E9300B	SN: MY41496001	2009.8	2010.8
Power sensor	E9300B	SN: MY41496003	2009.8	2010.8
Reference DAE	DAE4	SN: 720	2010.1	2011.1
Reference probe	ES3DV3	SN: 3128	2009.6	2010.6
Secondary Calibration Equipment used	Model/Type	ID#	Cal Date	Scheduled Calibration
Signal generator	SML03	SN:103514	2009.8	2010.8
Network analyzer	8714ET	SN:US40372083	2009.8	2010.8

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 2 of 8 Certificate No.SRTC2010-CAL003-004

---

**The State Radio\_monitoring\_center Testing Center**

---

**Note:**

1. This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.
2. This calibration certificate is not permitted to be reproduced except in full without written the approval of the only laboratory
3. SRTC is responsible for the whole of certificate only with stamp of SRTC.
4. The calibration results would be valid only for the items calibration.
5. The certification is written by Chinese and English. Exact meaning should be explained only on Chinese version.

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R. China

Page 3 of 8 Certificate No.SRTC2010-CAL003-004

---

## The State Radio\_monitoring\_center Testing Center

---

### Glossary

TSL	Tissue Simulating Liquid
ConvF	The sensitivity of the TSL / sensitivity in TSL/NORM x, y, z
N/A	not applicable or not measured

### Calibration is preformed according to the Following Standards

- a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in Human Head from Wireless Communication Devices: Measurement Techniques", December 2003
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005
- c) Federal Communication Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

### Additional Documentation:

- e) DASY System Handbook

---

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 4 of 8 Certificate No.SRTC2010-CAL003-004

## The State Radio\_monitoring\_center Testing Center

### Methods Applied and Interpretation of Parameters

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- SAR measured: SAR measured at the stated antenna input power
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

### Measurement Conditions

DASY Version	DSAY 5	V5.0 Build 126
Extrapolation	Advanced Extrapolation	———
Phantom	ELI4	———
Distance Dipole Center-TSL	10mm	With spacer (See note)
Area Scan Resolution	dx,dy=10mm	———
Zoom Scan Resolution	dx,dy,dz=5mm	———
Frequency	1800MHz	———

Note: As client can not provide a spacer for their dipole, we used a alternate method to define the distance from dipole center to TSL. Pictures in Annex 3 show the details.

The State Radio\_monitoring\_center Testing Center

**Head TSL Parameters**

The following parameters and calculation were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0°C	40.0	1.40mho/m
Measured Head TSL parameters	(22±0.5)°C	39.2	1.35m±5%
Head TSL temperature during test	(21.6±0.6)°C	——	——

**1. SAR-Head TSL**

SAR -1g SAR averaged over 1cm <sup>3</sup> (1g) of Head TSL	Condition	——
SAR measured	250mW input power	9.55mW/g
SAR normalized	normalized to 1W	38.20mW/g
SAR for nominal Head TSL parameters	normalized to 1W	<b>37.62 mW/g±15.20%(k=2)</b>

SAR-10g SAR averaged over 10cm <sup>3</sup> (10g) of Head TSL	Condition	——
SAR measured	250mW input power	5.09mW/g
SAR normalized	normalized to 1W	20.36mW/g
SAR for nominal Head TSL parameters	normalized to 1W	<b>20.13mW/g±14.38%(k=2)</b>

The State Radio\_monitoring\_center Testing Center

2. Annex

Annex 1

Date/Time: 6/11/2010 8:30:47 AM

Test Laboratory: SRTC, Beijing, China

DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d084

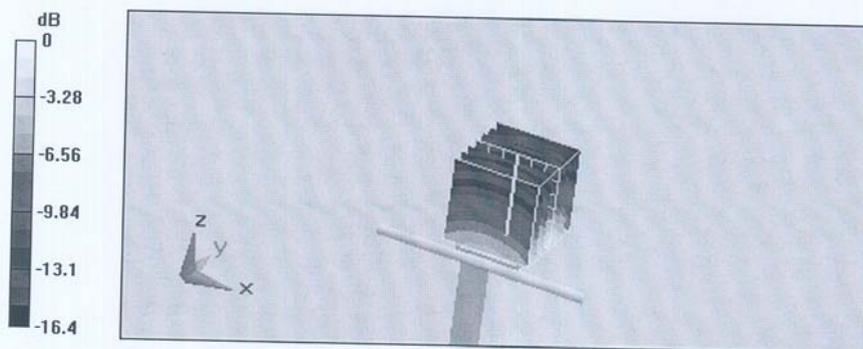
Communication System: CW; Frequency: 1800 MHz; Duty Cycle: 1:1  
Medium parameters used:  $f = 1800$  MHz;  $\sigma = 1.35$  mho/m;  $\epsilon_r = 39.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASYS (IEEE/IEC)

DASY4 Configuration:

- Probe: ES3DV3 - SN3128; ConvF(4.93, 4.93, 4.93); Calibrated: 6/22/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn720; Calibrated: 1/18/2010
- Phantom: ELI 4.0; Type: QDOVA001BA
- Measurement SW: DASYS, V5.0 Build 126; SEMCAD X Version 13.4 Build 125

Pin=250mW;d=10mm/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 89 V/m; Power Drift = -0.119 dB  
Peak SAR (extrapolated) = 17.2 W/kg  
SAR(1 g) = 9.55 mW/g; SAR(10 g) = 5.09 mW/g  
Maximum value of SAR (measured) = 10.7 mW/g



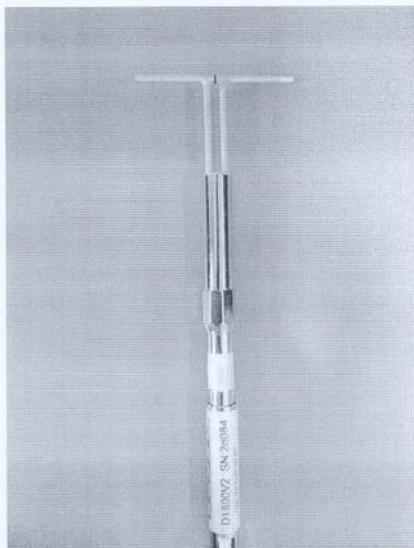
0 dB = 10.7mW/g

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R.China

Page 7 of 8 Certificate No.SRTC2010-CAL003-004

The State Radio\_monitoring\_center Testing Center

Annex 2



Calibrated by 张明远

Checked by 孙海

Tel: +86-10-68009202 68009203 Fax: +86-10-68009205 68009195  
Add: No.80 Bei Lishi Road, Xi Cheng District Beijing 100037, P.R. China

Page 8 of 8 Certificate No.SRTC2010-CAL003-004

**Calibration Laboratory of  
Schmid & Partner  
Engineering AG**  
Zeughausstrasse 43, 8004 Zurich, Switzerland



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** Servizio svizzero di taratura  
**S** Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)  
The Swiss Accreditation Service is one of the signatories to the EA  
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

**Glossary:**

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

**Calibration is Performed According to the Following Standards:**

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001
- Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

- DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- Measurement Conditions:** Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL:** The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss:** These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay:** One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured:** SAR measured at the stated antenna input power.
- SAR normalized:** SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters:** The measured TSL parameters are used to calculate the nominal SAR result.

### Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V5.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

### Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	1.45 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	condition	
SAR measured	250 mW input power	10.2 mW / g
SAR normalized	normalized to 1W	40.8 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>40.1 mW / g ± 17.0 % (k=2)</b>

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	5.32 mW / g
SAR normalized	normalized to 1W	21.3 mW / g
SAR for nominal Head TSL parameters <sup>1</sup>	normalized to 1W	<b>21.1 mW / g ± 16.5 % (k=2)</b>

<sup>1</sup> Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

**Appendix**

**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	50.5 $\Omega$ + 5.5 j $\Omega$
Return Loss	- 25.2 dB

**General Antenna Parameters and Design**

Electrical Delay (one direction)	1.202 ns
----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

**Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	July 24, 2009

### DASY5 Validation Report for Head TSL

Date/Time: 05.08.2009 14:47:20

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d113**

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

Medium: HSL U11 BB

Medium parameters used:  $f = 1900$  MHz;  $\sigma = 1.45$  mho/m;  $\epsilon_r = 40.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 07.03.2009
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 120; SEMCAD X Version 13.4 Build 45

**Pin = 250 mW; dip = 10 mm, scan at 3.0 mm/Zoom Scan (dist=3.0 mm, probe 0deg)**

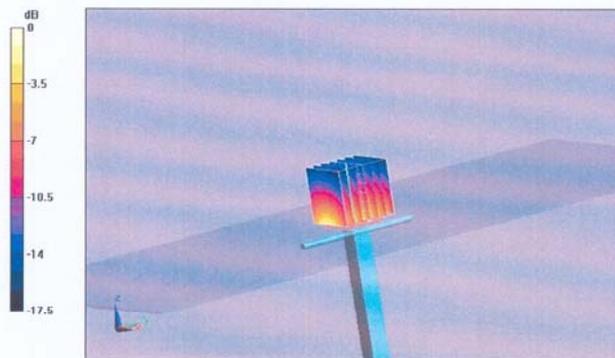
**(7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.4 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 18.6 W/kg

**SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.32 mW/g**

Maximum value of SAR (measured) = 12.5 mW/g



0 dB = 12.5mW/g

Impedance Measurement Plot for Head TSL

