Deutscher Akkreditierungs Rat

DAT-P-174/04-00

NO.L0447

Registration No.612767

CONFORMANCE TEST REPORT FOR

HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS

Report No. : SRMC2007-H024-E0016

Product Name: GSM Mobile Phone

Product Model: My103L

FCC ID: U9S-MY103L

Manufacture: i-sirius Co., Ltd

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

Supplement C (Edition 01-01)

The State Radio Monitoring Center, Equipment Testing Division

The State Radio Spectrum Monitoring and Testing Center

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Executive Summary

The Myl03L is a GSM mobile phone operating in the 850MHz and 1900MHz frequency range. The device has a internal integrated antenna .The system concepts used are the GSM850 and GSM1900 standards.

The objective of the measurements done by SRMC (State radio monitoring center) was the dosimetric assessment of one device in the GSM850 and GSM1900 standards. The examinations have been carried out with the dosimetric assessment system, “DASY4”.

The measurements were made according to FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01) Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields .All measurements have been performed in accordance to the recommendations given by SPEAG.

The maximum SAR of the My103L mobile phone is

Mode	CH/*f*(MHz)	Power	Position	Limit (mW/g)/1g	Measured (mW/g)	Result
M 850	189/836.4	32.6dBm	Towards Ground	1.6	**1.42**	PASS

Checked By: ....

Tested By: ....

This Test Report Is Issued By:..

Issued date:..

Tables of Contents

1. General information

1.1 Notes of the test report

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

1.2 Information about the testing laboratory

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Fax:	82-2-3481-1535
Email:	andy.dong@i-sirius.co.kr

1.5 Application details

Date of receipt of application: 2007-9-28

Date of receipt of test samples: 2007-10-8

Date of test: 2007-10-8 to 2007-10-24

1.6 Information of Test Sample

□Name of EUT	GSM Mobile Phone
□type	My103L
□Frequency range	824-849MHz 1850-1910MHz
□Power Level	GSM:5 (33dBm) PCS:0 (30dBm)
□Channel spacing	200kHz
□Modulation	GMSK
□Power supply	3.8V
□Test condition of declaration	Normal
□IMEI Number	004999010640000

1.7 Auxiliary Equipment (AE)

AE No.	Name	Model	Manufacturer	Serial Number
AE 1	Adapter	---	MACROWAY	---
AE 2	Battery	611A020000F	SMC	---

1.8 Reference Specification

FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01) Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields .

IEC 62209-1-2005: 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)

ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 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.

[DAY4]

Schmid & partner Engineering AG: DAY4 Manual. Nov.2003

2．Subject of Investigation

The MY103L mobile phone (Portable Device) is is operating in the 850MHz and 1900MHz frequency range. The system concepts used are the GSM850 and PCS1900 standards.

Fig 1: picture of the device under test

The objective of the measurements done by SRMC was the domestic assessment of one device in the GSM 850 and PCS 1900 standard . Equipment Under Test (EUT) is a model of Dual-Working Smartphone (MS) with integrated antenna.It consists of Handset and normal options: Lithium Battery and AC/DC Adapter.The xaminations have been carried out with the domestic assessment system “DASY4”described below.

2.1 The IEEE Standard C95.1 and the FCC Exposure Criteria

In the USA the FCC exposure criteria [OET 65] are based on the withdrawn IEEE Standard C95.1-1999 [IEEE C95.1-1999]. This version was replaced by the IEEE Standard C95.1-2005 [IEEE C95.1-2005] in October, 2005.

Both IEEE standards sets limits for human exposure to radio frequency electromagnetic fields in the frequency range 3 kHz to 300 GHz. One of the major differences in the newly revised C95.1-2005 is the change in the basic restrictions for localized exposure, from 1.6 W/kg averaged over 1 g tissue to 2.0 W/kg averaged over 10 g tissue, which is now identical to the ICNIRP guidelines [ICNIRP 1998].

2.2 Distinction Between Exposed Population, Duration of Exposure and Frequencies

The American Standard [IEEE C95.1-1999] distinguishes between controlled and uncontrolled environment. Controlled environments are locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a concomitant of employment or by other cognizant persons. Uncontrolled environments are locations where there is the exposure of individuals who have no knowledge or control of their exposure. The exposures may occur in living quarters or workplaces. For exposure in controlled environments higher field strengths are admissible. In addition the duration of exposure is considered.

Due to the influence of frequency on important parameters, as the penetration depth of the electromagnetic fields into the human body and the absorption capability of different tissues, the limits in general vary with frequency.

2.3 Distinction between Maximum Permissible Exposure and SAR Limits

The biological relevant parameter describing the effects of electromagnetic fields in the frequency range of interest is the specific absorption rate SAR (dimension: power/mass).It is a measure of the power absorbed per unit mass. The SAR may be spatially averaged over the total mass of an exposed body or its pads-The SAR is calculated from the r.m.s. electric field strength E inside the human body, the conductivity σ and the mass density p of the biological tissue:

$$SAR = \frac{\sigma E_i^2}{\rho}$$

$$SAR = c_i \left. \frac{dT}{dt} \right|_{t=0}$$

The specific absorption rate describes the initial rate of temperature rise dT/dt as a function of the specific heat capacity c of the tissue. A limitation of the specific absorption rate prevents an excessive heating of the human body by electromagnetic energy.

As it is sometimes difficult to determine the SAR directly by measurement (e.g. whole body averaged SAR), the standard specifies more readily measurable maximum permissible exposures in terms of external electric E and magnetic field strength H and power density S, derived from the SAR limits .The limits for E, H and
the SAR limits. The limits for E, H and S have been fixed so that even under worst case conditions, the limits for the specific absorption rate SAR are not exceeded.

For the relevant frequency range the maximum permissible exposure may be exceeded if the exposure can be shown by appropriate techniques to produce SAR values below the corresponding limits.

2.4 SAR Limit

In this report the comparison between the American exposure limits and the measured

data is made using the spatial peak SAR; the power level of the device under test

guarantees that the whole body averaged SAR is not exceeded. Having in mind a worst case consideration, the SAR limit is valid for uncontrolled environment and mobile respectively portable transmitters. According to Table 1 the SAR values have to be averaged over a mass of 1 g (SAR1g) with the shape of a cube.

Standards	Status	SAR limit [w/kg]
IEEE C95.1-1999	Replaced	1.6

Table 1: Relevant spatial peak SAR limit averaged over a mass of 1 g.

3 The FCC Measurement Procedure

The Federal Communications Commission (FCC) has published a report and order on the 1st of August 1996 [FCC 96-326], which requires routine dosimetric assessment of mobile telecommunications devices, either by laboratory measurement techniques or by computational modeling, prior to equipment authorization or use. In 2001 the Commission's Office of Engineering and Technology has released Edition 01-01 of Supplement C to OET Bulletin 65. This revised edition, which replaces Edition 97-01, provides additional guidance and information for evaluating compliance of mobile and Portable devices with FCC limits for human exposure to radiofrequency emissions [OET 65].

3.1 General Requirements

The test shall be performed using a miniature probe that is automatically positioned to measure the internal E-field distribution in a phantom model representing the human head exposed to the EM fields produced by mobile phones. From the measured E-field values, the SAR distribution and the maximum mass averaged SAR value shall be calculated.

The test shall be performed in a laboratory conforming to the following environmental conditions:

- the ambient temperature shall be in the range of 15 °C to 30°C and the variation shall not exceed 2 °C during the test;

- the mobile phone shall not interact with the local mobile networks;
- care shall be taken to avoid significant influence on SAR measurements by ambient EMsources;
- care shall be taken to avoid significant influence on SAR measurements by any
  reflection from the environment (such as floor, positioner, etc.).
- Validation of the system shall be done at least once a year according to the protocol defined in annex D of IEC 62209-1-2005 Standard.

3.2 Phantom specifications (shell and liquid)

Phantom requirements

The physical characteristics of the phantom model (size and shape) shall resemble the head and neck of a user since the shape is a dominant parameter for exposure. The phantom shall be made from material with dielectric properties similar to those of head tissues. To enable field scanning within it, the material shall be liquid contained in a head and neck shaped shell model. The shell model acts as a shaped container and shall be as unobtrusive as possible. The hand shall not be modeled.

The shell of the phantom shall be made of low loss and low permittivity material: *tan (δ)* ≤ 0,05 and ε ≤ 5. The thickness of the phantom is defined in the CAD files and the tolerance shall be ± 0, 2 mm in the area defined in the CAD files (where the phone touches the head).

Reference points on the phantom:

The probe positioning shall be defined in relation to three well defined points on the phantom. These points R1, R2 and R3 shall be used to calibrate the positioning system. Three other points, M for mouth, LE for left ear and/or RE for right ear (maximum acoustic coupling), shall be defined on the phantom(s) (see Figure 2). These points shall be used to allow reproducible positioning of the mobile phone in relation to the phantom.

3.3 Specifications of the SAR measurement equipment

The measurement equipment shall be calibrated as a complete system. The probe shall be calibrated together with the amplifier, measurement device and data acquisition system.

The measurement equipment shall be calibrated in each tissue equivalent liquid at the appropriate operating frequency and temperature according to the methodology defined in IEC 62209-1-2005 .The minimum detection limit shall be lower than 0,02 W/kg and the maximum detection limit shall be higher than 100 W/kg. The linearity shall be within 0,5 dB over the SAR range from 0,02 to 100 W/kg. The isotropy shall be within 1 dB. Sensitivity, linearity and isotropy shall be determined in the tissue equivalent liquid. The response time shall be specified. .

3.4 Scanning system specifications

The scanning system holding the probe shall be able to scan the whole exposed volume of the phantom in order to evaluate the three-dimensional SAR distribution. The mechanical structure of the scanning system shall not interfere with the SAR measurements.

The accuracy of the probe tip positioning over the measurement area shall be less than 0,2 mm. The sampling resolution shall be 1 mm or less.

3.5 Mobile phone holder specifications

The mobile phone holder shall permit the phone to be positioned according to a tolerance of 1° in the tilt angle. It shall be made of low loss and low permittivity material(s): *tan (δ)* ≤ 0, 05 and ε≤ 5.

4. Measurement preparation

4.1 General preparation

The dielectric properties of the tissue equivalent materials shall be measured prior to the SAR measurements and at the same temperature with a tolerance of 2° C. The measured values shall comply with the values defined at the specific frequencies in IEC 62209-1-2005 6.1.1. with a tolerance of 5 % for relative permittivity and conductivity.

The phantom shell shall be filled with the tissue equivalent liquid. The depth of the tissue equivalent liquid inside the phantom and at the vertical position of the ear canal shall be at least 15 cm. The liquid shall be carefully stirred before the measurement and it shall be free of air bubbles. The coordinate system of the scanning system shall be aligned to the coordinate system of the phantom with a tolerance of 0, 2 mm.

4.2Simplified performance checking

The purpose of the simplified performance check is to verify that the system operates within its specifications, check is a simple test of repeatability to make sure that the system works correctly during the compliance test. The check shall be performed in order to detect possible drift over short time periods and other errors in the system,

The simplified performance check shall be carried out according to annex D of IEC 62209-1-2005. The simplified performance check shall be performed prior to compliance tests and the result shall be within ± 10 % of the target value. After the system validation check. The simplified performance check shall be performed at a central frequency of each transmitting band of the mobile phone.

4.3 Preparation of the mobile phone under test

The tested mobile phone shall use its internal transmitter. The battery shall be fully charged before each measurement .The output power and frequency (channel) shall be controlled by 8960(base station simulator). MY103L transmit its highest output peak power level allowed by the system. , The BTS antenna shall be placed at least 50 cm from the phone. The signal emitted by the emulator at antenna feed point shall be lower than the output level of the phone by at least 30 dB.

4.4 Position of the mobile phone in relation to the phantom

The mobile phone shall be tested in the cheek and tilted positions on left and right sides of the phantom.

Definition of the cheek position:

a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE;

b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until the phone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

Definition of the tilted position:

a) Position the device in the Tilt position described above;

b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost. (see Figure 2)

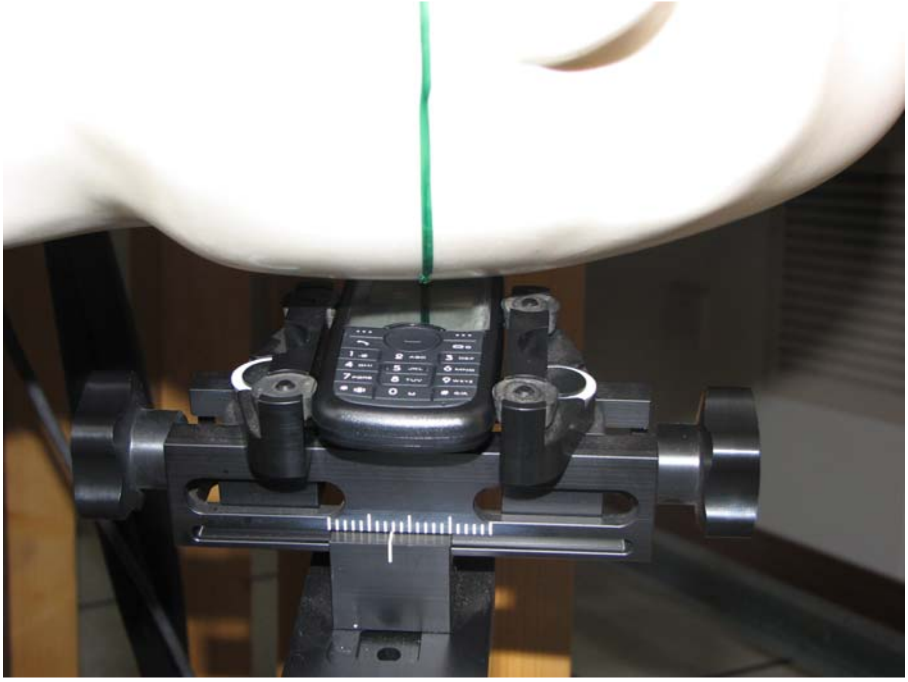


Fig 2 - Definition of the reference lines and points, on the phone and on the phantom and initial position

4.5Tests to be performed

Tests shall be performed with both phone positions described in 4.4, on the left and right sides of the head and using the centre frequency of each operating band. The configuration giving rise to the maximum mass-averaged SAR shall be used to test the low-end and the high-end frequencies of the transmitting band. If the mobile phone has a retractable antenna, all of the tests described above shall be performed both with

The antenna extended and with it retracted. When considering multi- mode and multi-band mobile phones, all of the above tests shall be performed in each transmitting mode/band with the corresponding maximum peak power level.

5. The Measurement system

5.1 DASY4 Information

DASY4is an abbreviation of "Dosimetric Assessment System" and describes a system that is able to determine the SAR distribution inside a phantom of a human being according to different standards. The DASY4 system consists of the following items as shown in Fig3. Fig4 shows the installation in the SRMC laboratory [DASY2004].

- High precision robot with controller
- Measurement server(for surveillance of the robot operation and signal filtering)
- Data acquisition electronics DAE (for signal amplification and altering)
- Field probes calibrated for use in liquids
- Electro-optical converter EOC (conversion from the optical into a digital signal)
- Light beam (improving of the absolute probe positioning accuracy)
- Two SAM phantoms filled with tissue simulating liquid
- DASY4 software
- SEMCAD

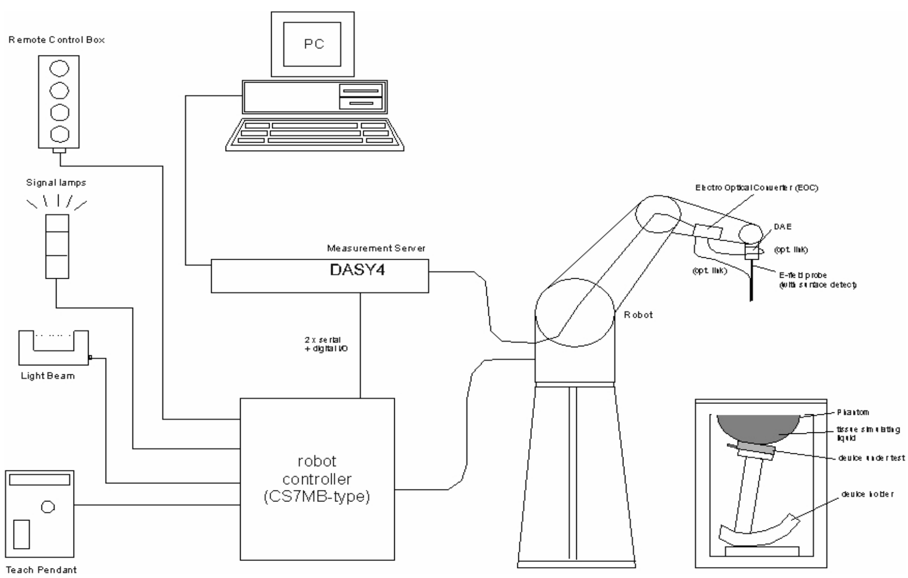


Fig3. The DASY4 measurement system

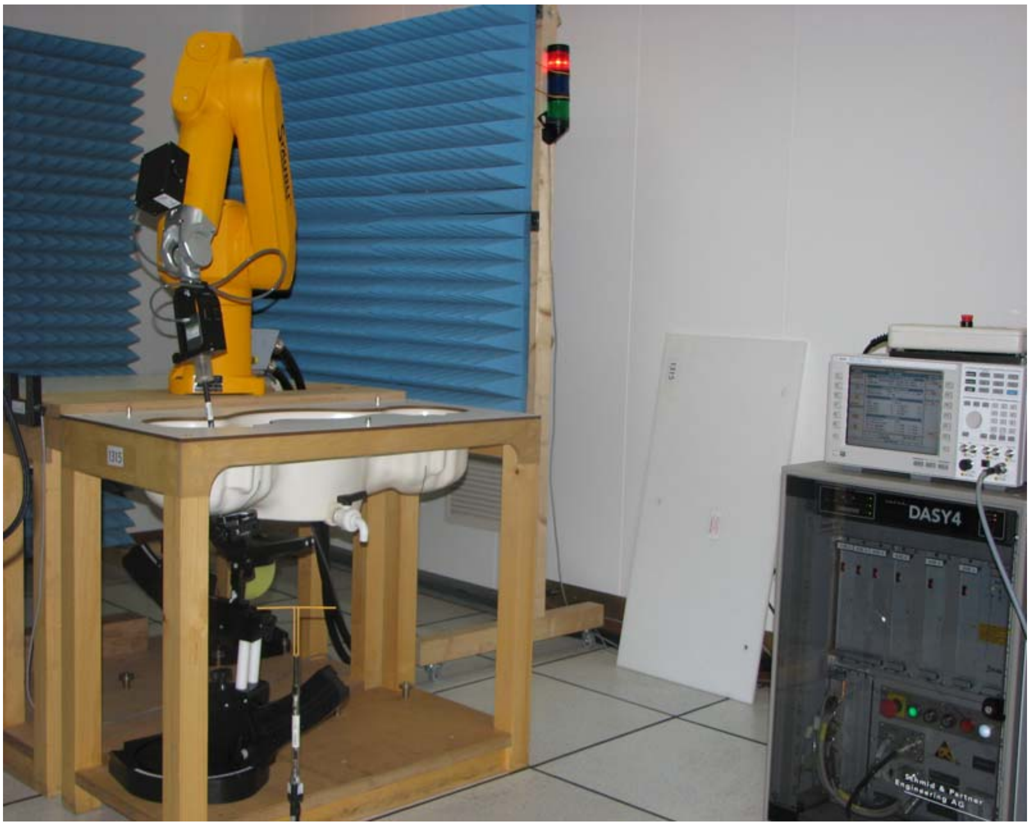


Fig 4. The measurement set-up with two SAM phantoms containing tissue simulating liquid

5.2Test Equipments:

Name		Serial Number	Cal. Data
DASY4 SYSTEM			
Software Version	V4.2	N/A	N/A
Dosimetric E-Field probe	ES3DV3	3127	2007.1
Data Acquisition Electronics	DAE4	720	2006.10.20
Data Acquisition Electronics	DAE4	725	2007.2.26
Phantom	SAM	1267	N/A
Phantom	SAM	1315	N/A
Performance checking			
System Validation Dipole	D900V2	171	2006.3
System Validation Dipole	D1800V2	2d084	2006.3
RF source	ESG-D2000A	US36260147	2007.3
RF Amplifier	5S1G4	301305	N/A
Power Meter	NRVS	8363331050	2007.8
Power Meter probe	NRV-Z55	834558/008	2007.8
Power Meter probe	N1922A	US44510189	2007.8
Power Meter	N1911A	GB45100295	2007.8
Attenuator	2	BM0059	2007.8
Attenuator	2	BM6452	2007.8
Attenuator	2	BM8993	2007.8
Directional Coupler	778D-012	13733	2007.8
Material Measurement			
Network Analyzer	8714ET	US40372083	2007.8
Dielectric Probe Kit	85070D	US33030365	N/A
General			
Radio Tester	8960	GB43194054	2007.8
Call Tester	CMU200	100313	2007.8

Note: the Dipole Calibration interval is 24 months

Table 1. Test Equipments lists

5.3 Uncertainty Assessment

DASY4 Uncertainty Budget **According to IEC 62209-1 [3]**								
Error description	Uncertainty value	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std.Unc (1g).	Std.Unc. (10g)	(v_i) V_{eff}
Measurement system								
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%	∞
Test Sample Related								
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%	∞
Phantom and Setup								
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
Expanded STD Uncertainty						**±21.9%**	**±21.4%**	

Table 2. Uncertainty assessment

6. Test Results

6.1Test Environment:

Ambient Temperature: 24.0℃ Relative Humidity: 35.5% Atmosphere: 101.0kPa

6.2Test Method and Procedure

a) Measure the local SAR at a test point within 10 mm of the inner surface of the phantom. The test point shall also be close to the ear;

b) verify that the measured SAR at the point used in item 1 is stable after 3 minutes within ± 5 % in order to ensure that there is no drift due to the mobile phone electronics;

c) Measure the SAR distribution within the phantom. The spatial grid step shall be less than 20 mm. If surface scanning is used, then the distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be constant within ± 0,5 mm and less than 8 mm. If volume scanning is performed, then the scanning volume shall be as close as possible to the inner surface of the phantom (less than 8 mm), the grid step shall be 5 mm or less, the grid shall extend to a depth of 25 mm and then go directly to item 6;

d) From the scanned SAR distribution, identify the position of the maximum SAR value, as well as the positions of any local maxima with SAR values of more than 50 % of the maximum value;

e) Measure SAR with a grid step less than 5 mm in a volume with a minimum size of 30 mm by 30 mm and 25 mm in depth. Separate grids shall be centred on each of the local SAR maxima;

f) Use interpolation and extrapolation procedures defined in annex C of IEC 62209-1-2005 to determine the local SAR values at the spatial resolution needed for mass averaging;

g) Repeat the SAR measurement at the initial test point used in item 1. If the two results differ by more than ± 5 % from the final value obtained in item 2, the measurements shall be repeated with a fully charged battery or the actual drift shall be included in the uncertainty evaluation.

Tests shall be performed with both phone positions of cheek and tilted, on the left and right sides of the head and using the centre frequency of each operating band. Then the configuration giving rise to the maximum mass-averaged SAR shall be used to test the low-end and the high-end frequencies of the transmitting band. If the mobile phone has a retractable antenna, all of the tests described above shall be performed both with the antenna extended and with it retracted. When considering multi- mode and multi-band mobile phones, all of the above tests shall be performed in each transmitting mode/band with the corresponding maximum peak power level.

6.3Test Configuration

The test shall be performed in the shield room.

Please refer to chapter 7.8; 7.9 of this test report for photo of this test setup.

6.4Test Results

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 and ERP for the EUT. In all cases, the measured peak output power should be greater and within 5% than EMI measurement.

Mode: GSM 850

f_L (MHz) =890.2 MHz f_M(MHz) =902.4 MHz f_H(MHz)= 914.8 MHz

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	---
Left hand, Touch cheek, f_M	0.584
Left hand, Touch cheek, f_L	---
Left hand, Tilt 15 Degree, f_M	0.395
Right hand, Touch cheek, f_H	---
Right hand, Touch cheek, f_M	**0.595**
Right hand, Touch cheek, f_L	---
Right hand, Tilt 15 Degree, f_M	0.439

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	---	**0.595**	---

Table 3. SAR Results

Mode: GSM 850

f_L (MHz) =824.2 MHz f_M(MHz) =836.4MHz f_H(MHz)= 848.8 MHz

SAR Values（Body, 850MHz Band）

Limit of SAR (W/kg)		**1g Average**
		1.6
Test Case		**Measurement Result (mW/g)**
		1g Average
Towards ground	f_H	0.737
Towards ground	f_M	**1.420**
Towards ground	f_L	0.456
Back ground	f_H	---
Back ground	f_M	0.505
Back ground	f_L	---

So, the maximum SAR is

Phantom Configuration	SAR(mW/g)		
	f_L(MHz)	f_M(MHz)	f_H(MHz)
Towards ground	**---**	**1.420**	---

Table 4. SAR Results

Mode: PCS1900

f_L(MHz)=1850.2MHz f_M(MHz)=1880.0 MHz 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	1.260
Left hand, Touch cheek, f_M	1.130
Left hand, Touch cheek , f_L	0.872
Left hand, Tilt 15 Degree, f_H	0.858
Left hand, Tilt 15 Degree, f_M	1.270
Left hand, Tilt 15 Degree, f_L	0.901
Right hand, Touch cheek , f_H	0.915
Right hand, Touch cheek, f_M	0.948
Right hand, Touch cheek , f_L	0.565
Right hand, Tilt 15 Degree f_H	1.400
Right hand, Tilt 15 Degree, f_M	1.170
Right hand, Tilt 15 Degree f_L	0.774

So, the maximum SAR is

Phantom Configuration	Device Test Position	SAR(mW/g)		
		f_L(MHz)	f_M(MHz)	f_H(MHz)
Right Side	tilt	---	---	1.400

Note1: Please refer to 7.7 of this test report for graphical results.

Table 5. SAR Results

Mode: PCS1900

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

SAR Values（Body, 1900MHz Band）

Limit of SAR (W/kg)	1g Average 1.6
Test Case	**Measurement Result (mW/g)** **1g Average**
Towards ground f_H	---
Towards ground f_M	0.434
Towards ground f_L	---
Back ground f_H	---
Back ground f_M	---
Back ground f_L	---

So, the maximum SAR is

Phantom Configuration	SAR(mW/g)		
	f_L(MHz)	f_M(MHz)	f_H(MHz)
Back ground	---	0.434	---

Table 6. SAR Results

7. Appendix

7.1 Administrative Data

Date of measurement: 850MHz, 1900MHz: Oct.8. 2007

Data stored: SRMC2007-H024-E0016

7.2 Device under Test and Test Conditions

TYPE: My103L

Date of receipt: Oct.8. 2007

IMEI: **004999010640000**

Equipment class: Portable device
Power Class: GSM850, tested with power level 5 (33dBm)
PCS1900, tested with power level 0(30dBm)
RF exposure environment: General Population
Power supply: Internal Battery (Other batteries not available)
Measurement Standards: GSM 850, PCS1900
Method to establish a call: GSM 850&PCS1900: Base station simulator, using the air interface
Modulation: GMSK
TX range: GSM850:824MHz~849MHz PCS1900:1850~1910MHz
RX range: GSM850:869MHz~894MHz PCS1900:1930~1990MHz
Used TX Channels: L: ch128; M: ch189; H: ch251
Used TX Channels: L: ch512; M: ch661; H: ch810 (refer to the table 5)

Mode	**GSM850**			**PCS1900**		
Channel	128	189	251	512	661	810
Frequency(MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
Measured Power(dBm)	32.0	32.6	32.4	29.0	29.2	28.9

Table7. Frequency and Measured power of EUT's Tx channels

Used Phantom: SAM Twin Phantom V4.0, as defined by IEC 62209-1-2005 and delivered by Schmid&Parb1er Engineering AG

7.3 Tissue Recipes

Head Tissue Simulant

The following recipes are provided in percentage by weight.

850MHz:

57.90%	Sugar;
40.29%	de-ionised water
1.38%	Salt
0.24%	Cellulose
0.18%	Preventol

1900 MHz:

44,45 %	2-(2-butoxyethoxy) ethanol
55.24 %	de-ionised water
0.31 %	NaCl salt

Body Tissue Simulant

The following recipes are provided in percentage by weight.

850MHz:

50.75%	de-ionised water
48.21%	sugar
0.94%	salt
0.1	Preventol

1900MHz:

70.17%	de-ionised water
29.44%	DGBE
0.39 %	Salt

7.4 Material Parameters

For the measurement of the following parameters the HP 85070D dielectric probe kit is used, representing the open-ended coaxial probe measurement procedure.

Head		**εr**	**σ[S/m]**	**Temperature**	
				Ambient [℃]	**Liquid [℃]**
850MHz	Recommended Value	41.5±2.1	0.90±0.04	15-30	-
	Measured Value	41.5	0.89	24.0	22.3
1900MHz	Recommended Value	40±1.9	1.40±0.07	15-30	-
	Measured Value	39.5	1.44	24.0	22.3

Body		**εr**	**σ[S/m]**	**Temperature**	
				Ambient [℃]	**Liquid [℃]**
850MHz	Recommended Value	55.0±2.8	1.05±0.10	15-30	-
	Measured Value	53.7	1.00	24.0	22.3
1900MHz	Recommended Value	53.3±2.7	1.52±0.15	15-30	-
	Measured Value	51.5	1.55	24.0	22.3

Table8: Parameters of the head tissue simulating liquids

7.5 Setup for System Performance Check

(see also Chapter 15 System Performance Check of DAY 4 System handbook)

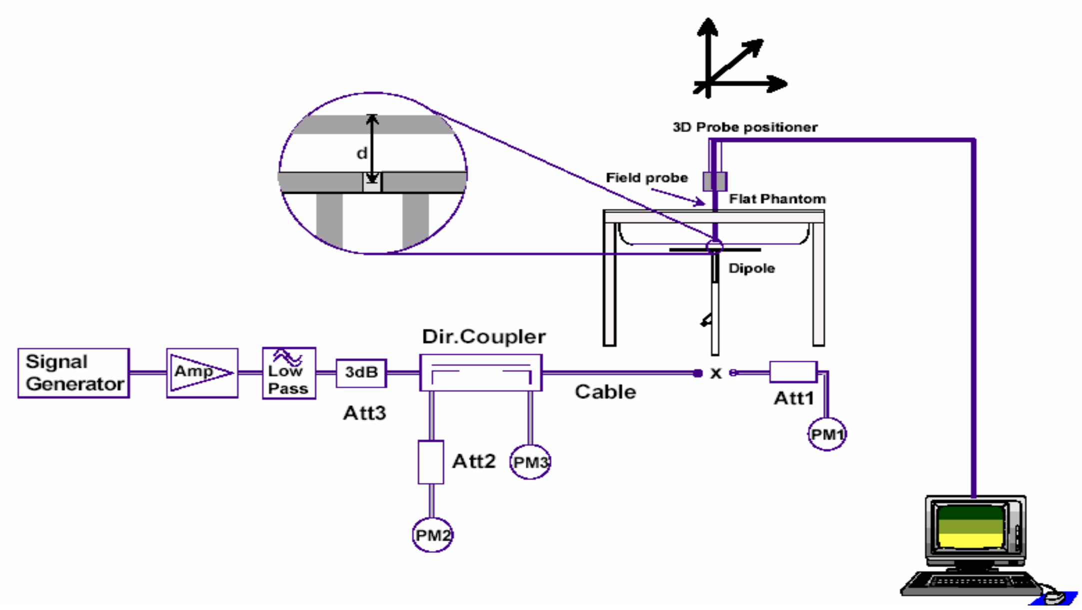


Fig5.Setup for system performance Check

First the power meter PM1 is connected to the cable and it measures the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the (Att1) value) and the power meter PM2 is read at that level. Then after connecting the cable to the dipole, the signal generator is readjusted for the same reading at the power meter PM2. If the signal generator does not allow a setting in 0,01 dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole and ensures that the value is not changed from the previous value. The reflected power should be 20 dB below the forwarded power.

Error description	ToL.	Prob. Dist.	Div.	(c_i) 1g	(c_i) 10g	Std.Unc (1g).	Std.Unc. (10g)	(v_i) V_{eff}
Measurement system								
Probe calibration	±5.9%	N	1	1	1	±5.9%	±5.9%	∞
Axial isotropy	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
Hemispherical isotropy	±9.6%	R	$\sqrt{3}$	0	0	0	0	∞
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	R	$\sqrt{3}$	1	1	0	0	∞
Integration time	0	R	$\sqrt{3}$	1	1	0	0	∞
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%	∞
Algorithms for Max.SAR Eval.	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Dipole								
Dipole Axis to Liquid Distance	±2.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
Input power and SAR drift meas.	±4.7%	N	1	1	1	±2.7%	±2.7%	∞
Phantom and Tissue Param								
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 conductivity (means.)	±2.5%	N	1	0.6	0.49	±1.5%	±1.2%	∞
Combined std. Uncertainty						±9.2%	±8.9%	∞
Coverage Factor for 95%		$k_p = 2$						
Expanded STD Uncertainty						**±18.4%**	**±17.8%**	

Table 9:Uncertainty Budget for the system performance check

7.6Test Results

850MHz/Head

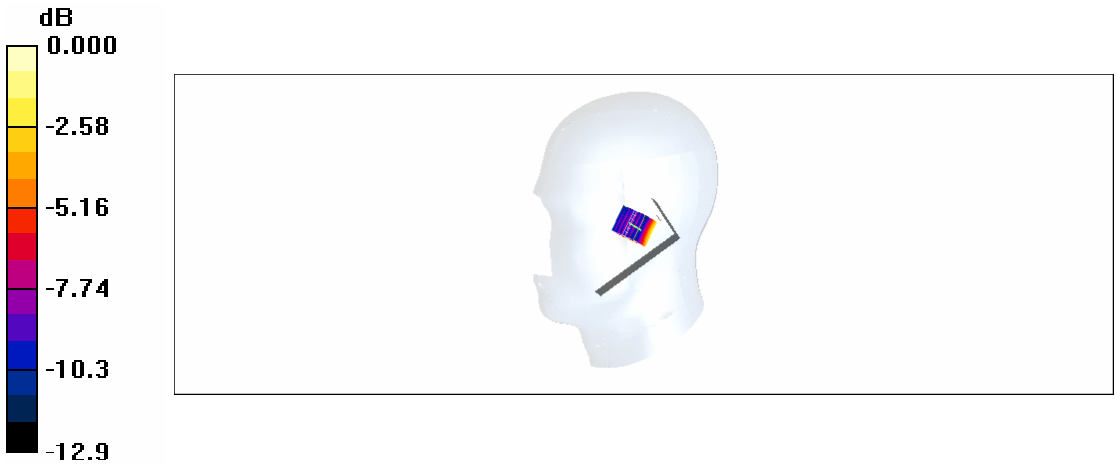
Right Side	Cheek	**836.4 MHz**

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 0.629 mW/g

Touch position - Middle /Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.7V/m; Power Drift =-0.098 dB
Peak SAR (extrapolated) = 0.769W/kg

SAR(1 g) = 0.595mW/g; SAR(10 g) = 0.423 mW/g

Maximum value of SAR (measured) = 0.629mW/g



0 dB = 0.629 mW/g

Fig12 SAR Test result

Right Side	Tilt	**836.4 MHz**

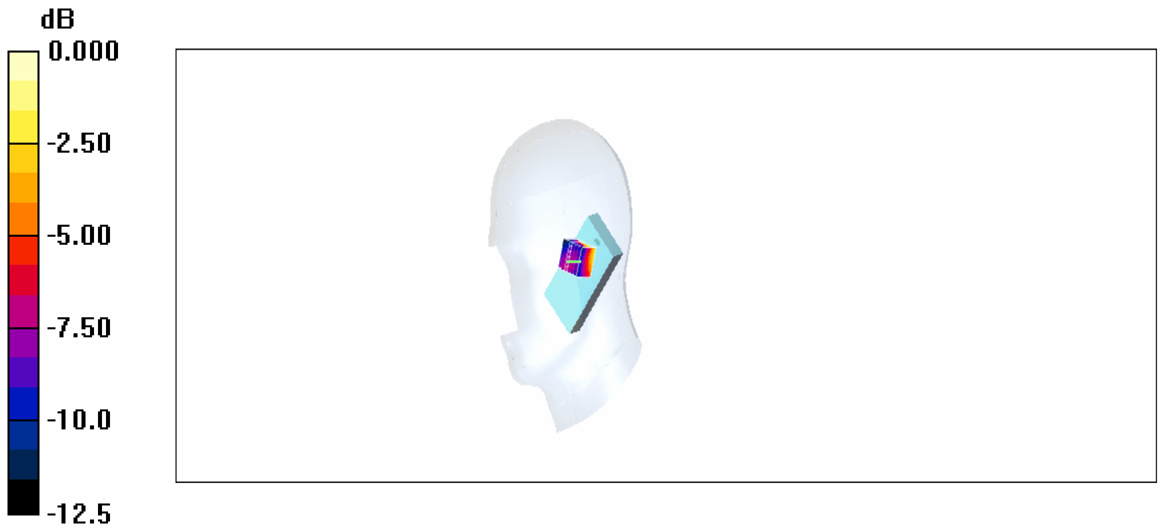
Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 0.468 mW/g

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.5 V/m; Power Drift = -0.120 dB
Peak SAR (extrapolated) = 0.569 W/kg

SAR(1 g) = 0.439 mW/g; SAR(10 g) = 0.314 mW/g

Maximum value of SAR (measured) = 0.468 mW/g



0 dB = 0.468mW/g

Fig13 SAR Test result

Left Side	Cheek	**836.4 MHz**

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 0.622 mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

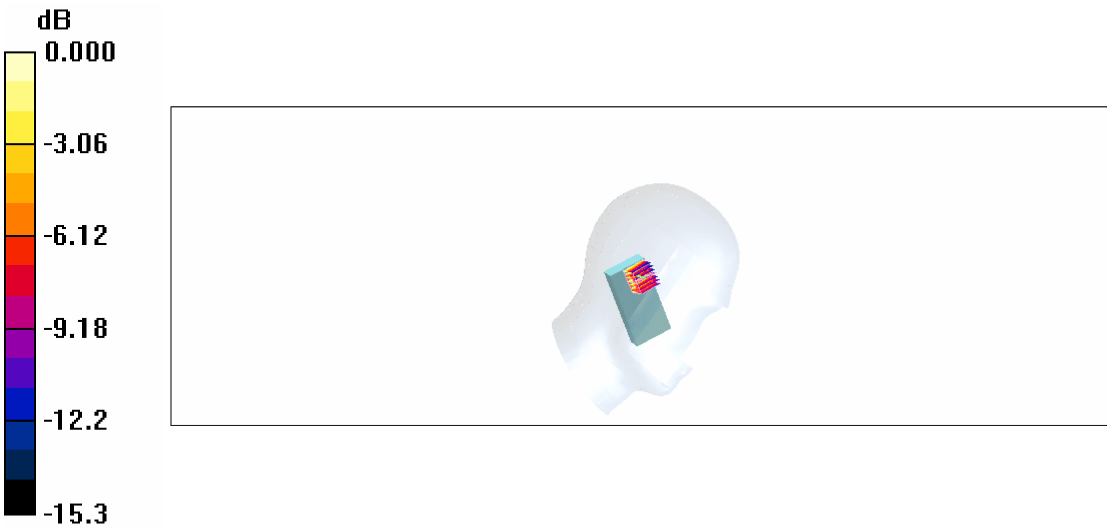
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.4 V/m; Power Drift = -0.139 dB
Peak SAR (extrapolated) = 0.772 W/kg
SAR(1 g) = 0.584 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 0.622 mW/g

0 dB = 0.622mW/g

Fig14 SAR Test result

Left Side	Tilt	**836.4 MHz**

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) =0.423 mW/g
Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.9 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 0.555 W/kg
SAR(1 g) = 0.395 mW/g; SAR(10 g) = 0.272 mW/g
Maximum value of SAR (measured) = 0.423 mW/g



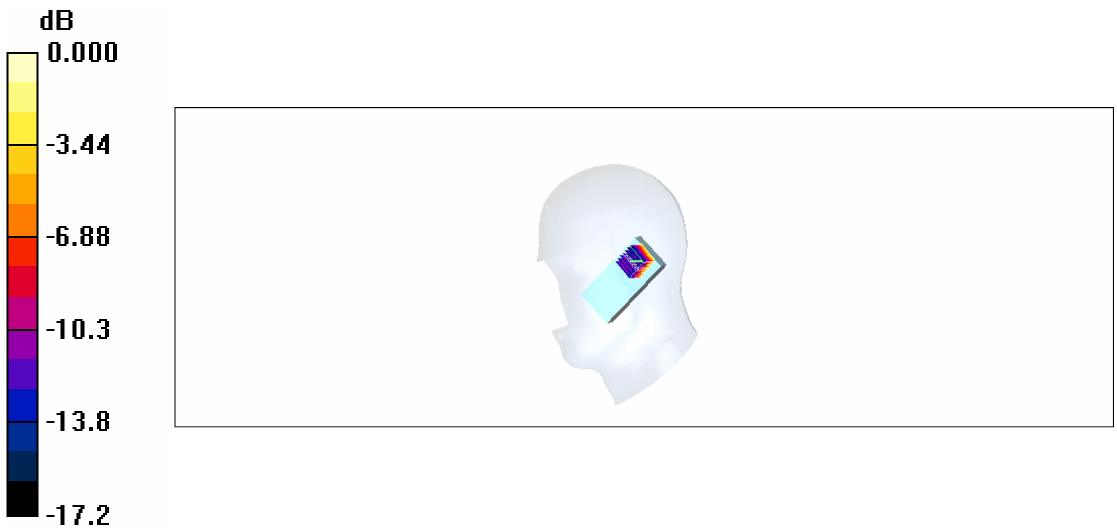
0 dB = 0.423mW/g

Fig15 SAR Test result

1900MHz/Head

Right Side	Touch	**1880 MHz**

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 1.05 mW/g
Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 1.80 W/kg
SAR(1 g) = 0.948 mW/g; SAR(10 g) = 0.510 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



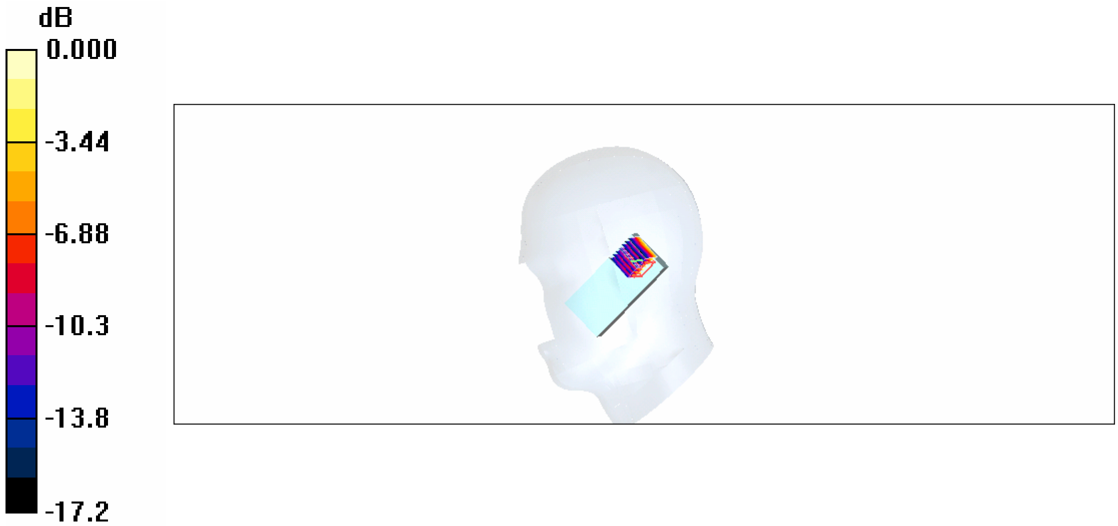
0 dB =1.05 mW/g

Fig16 SAR Test result

Right Side	Touch	**1909.8 MHz**

Touch position -High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 0.997 mW/g

Touch position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.0 V/m; Power Drift = -0.119 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 0.915 mW/g; SAR(10 g) = 0.511 mW/g
Maximum value of SAR (measured) = 0.997 mW/g



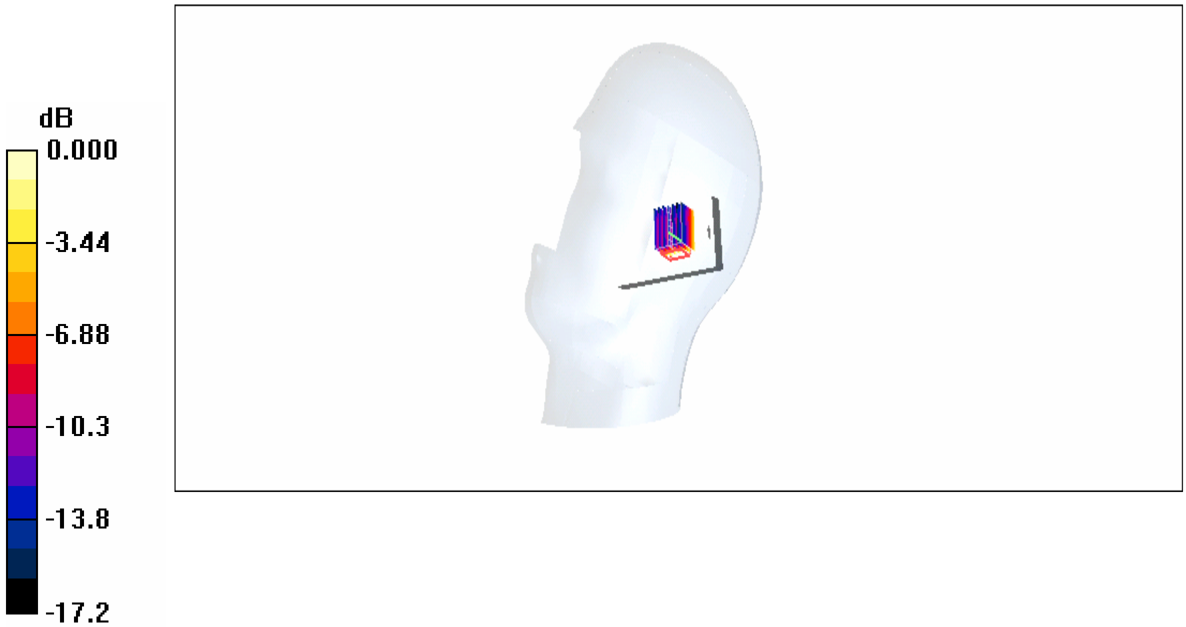
0 dB = 0.997 mW/g

Fig17 SAR Test result

Right Side	Touch	**1850.2 MHz**

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) =0.609 mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.968 W/kg
SAR(1 g) = 0.565 mW/g; SAR(10 g) = 0.323 mW/g
Maximum value of SAR (measured) = 0.609 mW/g

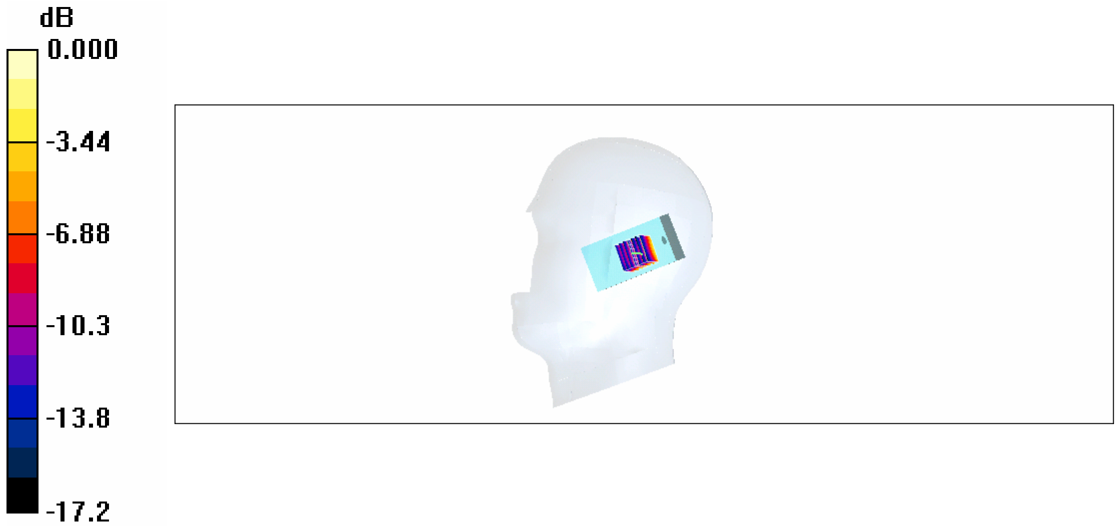


0 dB =0.609 mW/g

Fig18 SAR Test result

Right Side	Tilt	**1880 MHz**

Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 1.29mW/g
Tilt position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 27.3 V/m; Power Drift = -0.145 dB
Peak SAR (extrapolated) = 2.21 W/kg
SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.616 mW/g
Maximum value of SAR (measured) = 1.29 mW/g

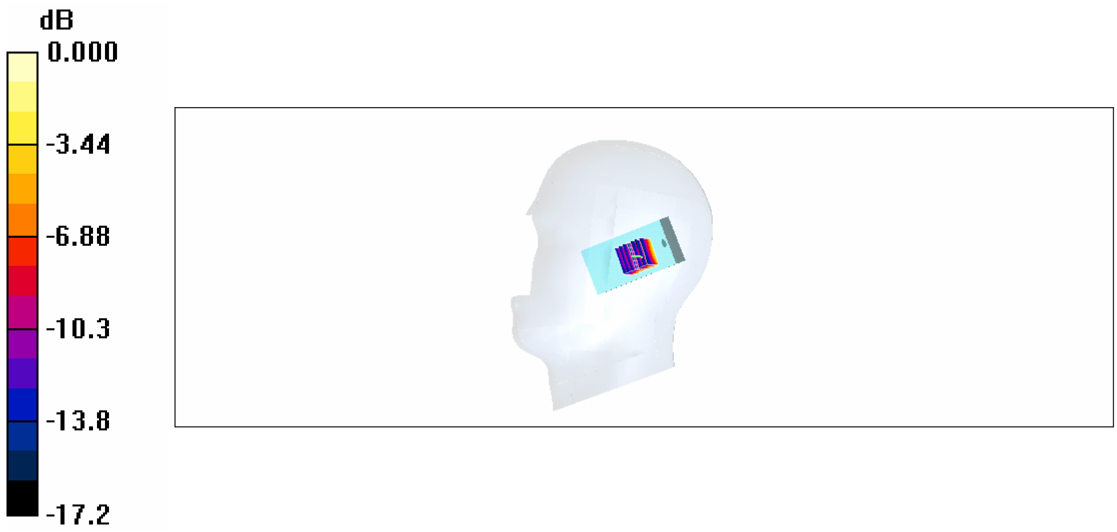


0 dB = 1.29mW/g

Fig19 SAR Test result

Right Side	Tilt	**1850.2 MHz**

Tilt position - low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 0.854mW/g
Tilt position - low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.7 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 1.41 W/kg
SAR(1 g) = 0.774 mW/g; SAR(10 g) = 0.413 mW/g
Maximum value of SAR (measured) = 0.854 mW/g



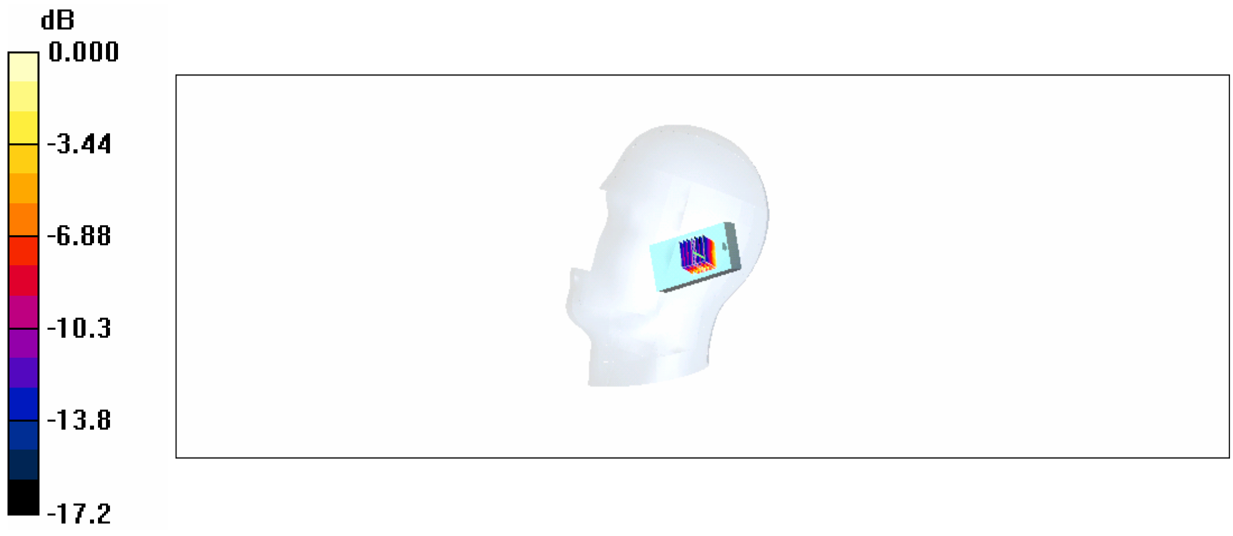
0 dB = 0.854 mW/g

Fig20 SAR Test result

Right Side	Tilt	**1909.8 MHz**

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 1.54mW/g

Tilt position - High/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 30.0 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 2.62 W/kg
SAR(1 g) = 1.4 mW/g; SAR(10 g) = 0.735 mW/g
Maximum value of SAR (measured) = 1.54 mW/g



0 dB = 1.54 mW/g

Fig21 SAR Test result

Left Side	Cheek	**1880 MHz**

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 1.24mW/g

Touch position - Middle/Zoom Scan (7x7x7) (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.1 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 2.21 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.576 mW/g
Maximum value of SAR (measured) = 1.24 mW/g

0 dB =1.24 mW/g

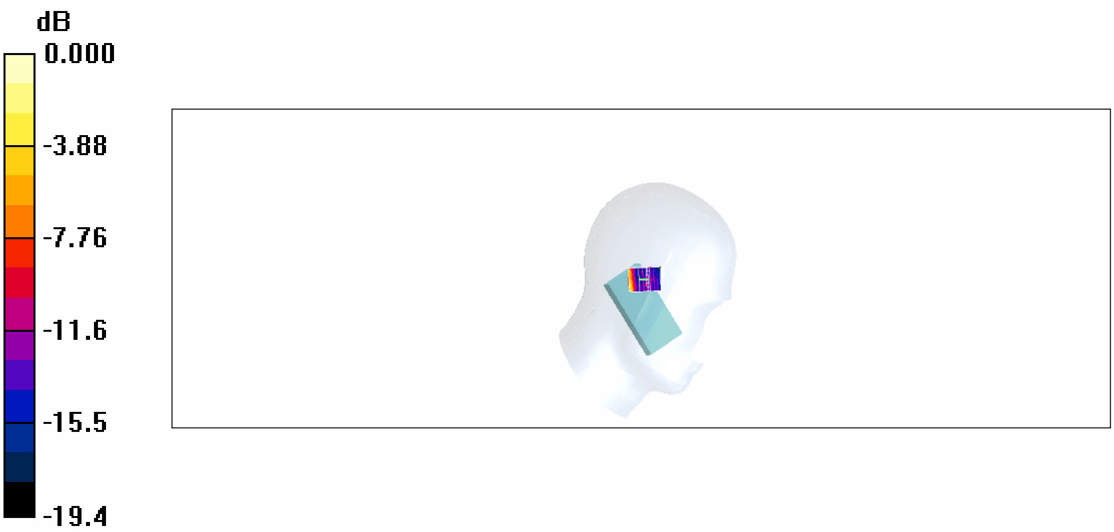
Fig22 SAR Test result

Left Side	Cheek	**1850.2 MHz**

Touch position -Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Maximum value of SAR (measured) = 0.965mW/g

Touch position - Low/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.2 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 1.65 W/kg
SAR(1 g) = 0.872 mW/g; SAR(10 g) = 0.454 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.965 mW/g



0 dB =0.965 mW/g

Fig23 SAR Test result