



No. L0442



No. DAT-P-114/01-10

TEST REPORT

No. EMF2003049

Test name	Electromagnetic Field (Specific Absorption Rate)
Product	Tri Band GSM Mobile Phone
Model	C8118
Client	CCT Mobile (HK) Limited
Type of test	Entrusted

Telecommunication Metrology Center
of Ministry of Information Industry



GENERAL TERMS

1. The test report is invalid if not marked with “exclusive stamp for the test report” or the stamp of the test center.
2. Any copy of the test report is invalid if not re-marked with the “exclusive stamp for the test report” or the stamp of the test center.
3. The test report is invalid if not marked with the stamps or the signatures of the persons responsible for performing, revising and approving the test report.
4. The test report is invalid if there is any evidence of erasure and/or falsification.
5. If there is any dissidence for the test report, please file objection to the test center within 15 days from the date of receiving the test report.
6. Normally, entrust test is only responsible for the samples that have undergone the test.
7. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permissions of the test center.

Address: No. 52, Huayuanbei Road, Beijing, P. R. China

Post code: 100083

Cable: 04282

Telephone: +86 10 62302041

Fax: +86 10 62304793

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 3 of 115

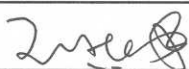
GENERAL SUMMARY

Product	Tri Band GSM Mobile Phone	Model	C8118																
		Trade mark																	
Client	CCT Mobile (HK) Limited	Manufacturer	Huiyang CCT Telecommunications Products Co.,Ltd.																
Type of test	Entrusted	Arrival Date of sample	Nov. 10th, 2003																
Place of sampling	(Blank)	Carrier of the samples	Feynman Li																
Quantity of the samples	One	Date of product	(Blank)																
Base of the samples	(Blank)	Items of test	SAR																
Series number	351597001983650																		
Standard(s)	EN 50360-2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. EN 50361-2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones. 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 1528-2002: DRAFT Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.																		
Conclusion	Localized Specific Absorption Rate (SAR) of this portable wireless equipment has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this test report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report. General Judgment: Pass (Stamp)  Date of issue: Nov. 19th, 2003																		
Comment	<table border="0" style="width: 100%;"> <tr> <td style="width: 33%;">TX Freq. Band:</td> <td style="width: 33%;">890-915 MHz</td> <td style="width: 33%;">1710-1785 MHz</td> <td style="width: 33%;">1850-1910 MHz</td> </tr> <tr> <td></td> <td>(GSM)</td> <td>(DCS)</td> <td>(PCS)</td> </tr> <tr> <td>Max. Power:</td> <td>2 Watt (GSM)</td> <td>1 Watt (DCS)</td> <td>1 Watt (PCS)</td> </tr> <tr> <td>Antenna Character:</td> <td colspan="3">/</td> </tr> </table> The test result only responds to the measured sample.			TX Freq. Band:	890-915 MHz	1710-1785 MHz	1850-1910 MHz		(GSM)	(DCS)	(PCS)	Max. Power:	2 Watt (GSM)	1 Watt (DCS)	1 Watt (PCS)	Antenna Character:	/		
TX Freq. Band:	890-915 MHz	1710-1785 MHz	1850-1910 MHz																
	(GSM)	(DCS)	(PCS)																
Max. Power:	2 Watt (GSM)	1 Watt (DCS)	1 Watt (PCS)																
Antenna Character:	/																		

Approved by


(Lu Minniu)

Revised by


(Wang Hongbo)

Performed by

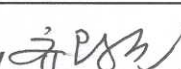

(Qi Dianyuan)

TABLE OF CONTENT

1 COMPETENCE AND WARRANTIES	6
2 GENERAL CONDITIONS	6
3 DESCRIPTION OF EUT	6
3.1 ADDRESSING INFORMATION RELATED TO EUT	6
3.2 CONSTITUENTS OF EUT	7
3.3 GENERAL DESCRIPTION.....	7
4 OPERATIONAL CONDITIONS DURING TEST	8
4.1 SCHEMATIC TEST CONFIGURATION	8
4.2 SAR MEASUREMENT SET-UP	8
4.3 DASY4 E-FIELD PROBE SYSTEM.....	9
4.4 E-FIELD PROBE CALIBRATION.....	10
4.5 OTHER TEST EQUIPMENT	11
4.5.1 DEVICE HOLDER FOR TRANSMITTERS	11
4.5.2 PHANTOM.....	11
4.6 EQUIVALENT TISSUES	11
4.7 SYSTEM SPECIFICATIONS.....	12
5 CHARACTERISTICS OF THE TEST	13
5.1 APPLICABLE LIMIT REGULATIONS.....	13
5.2 APPLICABLE MEASUREMENT STANDARDS.....	13
6 LABORATORY ENVIRONMENT	14
7 TEST RESULTS.....	14
7.1 DIELECTRIC PERFORMANCE.....	14
7.2 SYSTEM VALIDATION.....	15
7.3 SUMMARY OF MEASUREMENT RESULTS (HEAD, GSM 900 MHz BAND).....	15
7.4 SUMMARY OF MEASUREMENT RESULTS (HEAD, DCS 1800 MHz BAND)	16
7.5 SUMMARY OF MEASUREMENT RESULTS (HEAD, PCS 1900 MHz BAND).....	17
7.6 SUMMARY OF MEASUREMENT RESULTS (BODY-WORN, PCS 1900 MHz BAND)	18
7.7 CONCLUSION	18
8 MEASUREMENT UNCERTAINTY	19
9 MAIN TEST INSTRUMENTS	21
10 TEST PERIOD	21
11 TEST LOCATION	21

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 5 of 115

ANNEX A MEASUREMENT PROCESS	22
ANNEX B TEST LAYOUT.....	23
ANNEX C GRAPH RESULTS	29

1 COMPETENCE AND WARRANTIES

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory accredited by DAR (DATech) – Deutschen Akkreditierungs Rat (Deutsche Akkreditierungsstelle Technik) for the tests indicated in the Certificate No. **DAT-P-114/01-10**.

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory accredited by CNACL – China National Accreditation Committee for Laboratories, for the tests indicated in the Certificate No. **L0442**.

Telecommunication Metrology Center of Ministry of Information Industry is a test laboratory competent to carry out the tests described in this test report.

Telecommunication Metrology Center of Ministry of Information Industry guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at **Telecommunication Metrology Center of Ministry of Information Industry** at the time of execution of the test.

Telecommunication Metrology Center of Ministry of Information Industry is liable to the client for the maintenance by its personnel of the confidentiality of all information related to the items under test and the results of the test.

2 GENERAL CONDITIONS

- 2.1 This report only refers to the item that has undergone the test.
- 2.2 This report standalone dose not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities.
- 2.3 This document is only valid if complete; no partial reproduction can be made without written approval of Telecommunication Metrology Center of Ministry of Information Industry.
- 2.4 This report cannot be used partially or in full for publicity and/or promotional purposes without previous written approval of Telecommunication Metrology Center of Ministry of Information Industry and the Accreditation Bodies, if it applies.

3 DESCRIPTION OF EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant (The Client)

Name or Company	CCT Mobile (HK) Limited
Address/Post	15/F., CCT Telecom Bldg., 11 Wo Shing Street, Shatin, New Territories, Hong Kong
City	Hong Kong
Postal Code	/
Country	China
Telephone	852-26958333
Fax	852-26005278

Table 2: Manufacturer

Name or Company	Huiyang CCT Telecommunications Products Co.,Ltd.
Address/Post	CCT Technology Park, San He Economic Development Zone, Huiyang City, GuangDong, China
City	Huiyang
Postal Code	/
Country	China
Telephone	86-752-3500138
Fax	86-752-3500980

3.2 Constituents of EUT

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
Handset	C8118	351597001983650	Huiyang CCT Telecommunications Products Co.,Ltd.
Lithium Battery	/	/	Haier
AC/DC Adapter	DSA-0051-05 FCH 510 60 F	1903	Haier



Figure 1: Constituents of the sample (Lithium Battery is in the Handset)

3.3 General Description

Equipment Under Test (EUT) is a model of GSM Phase II portable Mobile Station (MS) with non-integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC

Adapter as Table 3 and Fig. 1. Since it is a Tri-Band MS (GSM/DCS/PCS), SAR is tested respectively for three bands.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer.

4 OPERATIONAL CONDITIONS DURING TEST

4.1 Schematic Test Configuration

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1, 62 and 123 respectively in the case of GSM 900 MHz, or to 512, 700 and 885 respectively in the case of DCS 1800 MHz, or to 512, 661 and 810 respectively in the case of PCS 1900 MHz. The EUT is commanded to operate at maximum transmitting power.

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

4.2 SAR Measurement Set-up

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

A cell controller system contains the power supply, robot controller, teaches pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the Micron Pentium III 800 MHz computer with Windows 2000 system and SAR Measurement Software DASY3, A/D interface card, monitor, mouse, and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

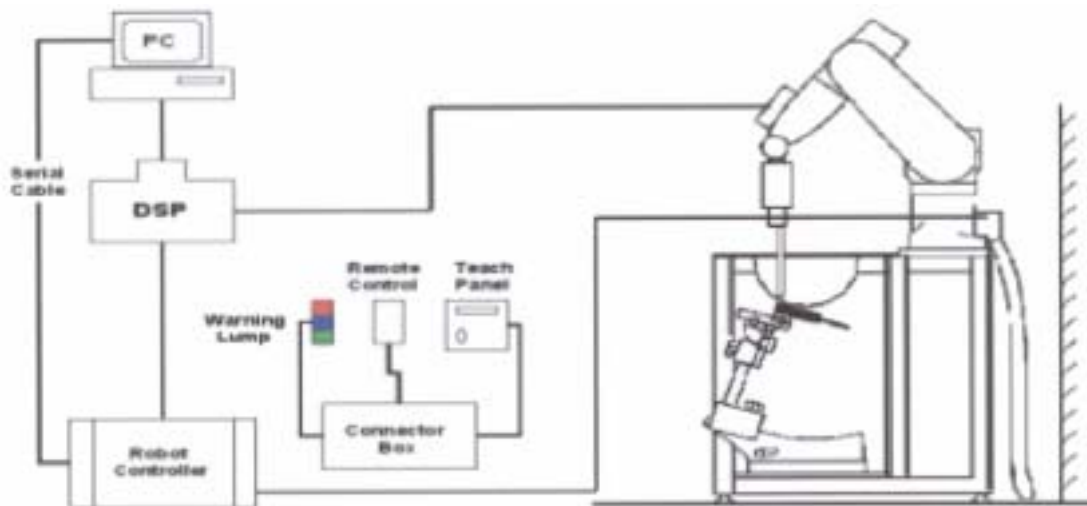


Figure 2. SAR Lab Test Measurement Set-up

The DAE3 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

4.3 Dasy4 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ET3DV6 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the standard procedure with an accuracy of better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$.

ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System(ET3DV6 only) Built-in shielding against static charges PEEK enclosure material(resistant to organic solvents, e.q., glycol)
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz and 1.8GHz (accuracy$\pm 8\%$) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz; Linearity: $\pm 0.2\text{ dB}$ (30 MHz to 3 GHz)
Directivity	$\pm 0.2\text{ dB}$ in brain tissue (rotation around probe axis)



Figure 3. ET3DV6 E-field Probe

	±0.4 dB in brain tissue (rotation normal probe axis)
Dynamic Range	5u W/g to > 100mW/g; Linearity: ±0.2dB
Surface Detection	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surface(ET3DV6 only)
Dimensions	Overall length: 330mm Tip length: 16mm Body diameter: 12mm Tip diameter: 6.8mm Distance from probe tip to dipole centers: 2.7mm
Application	General dosimetry up to 3GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms



4.4 E-field Probe Calibration

Figure 4. ET3DV6 E-field probe

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

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

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

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

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

Or

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m³).

4.5 Other Test Equipment

4.5.1 Device Holder for Transmitters

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



Figure 5. Device Holder

4.5.2 Phantom

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

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

4.6 Equivalent Tissues

The liquid used for the frequency range of 800-2000 MHz consisted of water, sugar, salt and Cellulose. The liquid has previously been proven to be suited for worst-case. The Table 4 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the IEEE 1528.



Figure 6. Generic Twin Phantom

Table 4. Composition of the Head Tissue Equivalent Matter

MIXTURE %	FREQUENCY 800-960MHz		
Water	40.29		
Sugar	57.90		
Salt	1.38		
Preventol	0.18		
Cellulose	0.24		
Dielectric Parameters Target Value	f=900MHz	$\epsilon = 41.5$	$\sigma = 0.97$

MIXTURE %	FREQUENCY 1710-1880MHz		
Water	55.242		
Glycol monobutyl	44.452		
Salt	0.306		
Dielectric Parameters Target Value	f=1800MHz	$\epsilon = 40.0$	$\sigma = 1.40$
	f=1900MHz	$\epsilon = 40.0$	$\sigma = 1.40$

Composition of the Body Tissue Equivalent Matter

MIXTURE %	FREQUENCY 1900MHz		
Water	69.91		
Glycol monobutyl	29.96		
Salt	0.13		
Dielectric Parameters Target Value	f=1900MHz	$\epsilon = 53.3$	$\sigma = 1.52$

4.7 System Specifications

4.7.1 Robotic System Specifications

Specifications

Positioner: Stäubli Unimation Corp. Robot Model: RX90L

Repeatability: ± 0.02 mm

No. of Axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: Pentium III

Clock Speed: 800 MHz

Operating System: Windows 2000

Data Converter

Features: Signal Amplifier, multiplexer, A/D converter, and control logic

Software: DASY3 software

Connecting Lines: Optical downlink for data and status info.

Optical uplink for commands and clock

5 CHARACTERISTICS OF THE TEST

5.1 Applicable Limit Regulations

EN 50360–2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.

It specifies the maximum exposure limit of **2.0 W/kg** as averaged over any 10 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

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

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue for portable devices being used within 20 cm of the user in the uncontrolled environment.

5.2 Applicable Measurement Standards

EN 50361–2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.

IEEE 1528–2002: DRAFT Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

The specify the measurement method for demonstration of compliance with the SAR limits for such equipments.

6 LABORATORY ENVIRONMENT

Table 5: The Ambient Conditions during EMF Test

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

7 TEST RESULTS

7.1 Dielectric Performance

Table 6: Dielectric Performance of Head Tissue Simulating Liquid

Measurement is made at temperature 22.5 °C and relative humidity 49%. Liquid temperature during the test: 21.4°C			
/	Frequency	Permittivity ϵ	Conductivity σ (S/m)
Target value	900 MHz	41.5	0.97
	1800 MHz	40.0	1.40
	1900 MHz	40.0	1.40
Measurement value (Average of 10 tests)	900 MHz	40.23	0.96
	1800 MHz	39.7	1.42
	1900 MHz	39.66	1.46

Table 7: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 22.6 °C and relative humidity 51%. Liquid temperature during the test: 22.0°C			
/	Frequency	Permittivity ϵ	Conductivity σ (S/m)
Target value	1900 MHz	53.30	1.52
Measurement value (Average of 10 tests)	1900 MHz	52.9	1.54

7.2 System Validation

Table 8: System Validation

Measurement is made at temperature 23.3 °C, relative humidity 47%, input power 250 mW. Liquid temperature during the test: 22.6°C					
Liquid parameters		Frequency	Permittivity ϵ		Conductivity σ (S/m)
		900 MHz	40.23		0.96
		1800 MHz	39.7		1.42
		1900 MHz	39.66		1.46
Verification results	Frequency	Target value (W/kg)		Measurement value (W/kg)	
		10 g Average	1 g Average	10 g Average	1 g Average
	900 MHz	1.69	2.60	1.70	2.64
	1800 MHz	4.72	8.79	4.72	9.14
	1900 MHz	5.04	9.59	4.91	9.8

7.3 Summary of Measurement Results (Head, GSM 900 MHz Band)

Table 9: SAR Values (GSM 900 MHz Band, head)

Temperature: 23.4 °C, humidity: 51%. Liquid temperature during the test: 22.5°C		
Limit of SAR (W/kg)	10 g Average	1 g Average
	2.0	1.6
Test Case	Measurement Result (W/kg)	
	10 g Average	1 g Average
Left hand, Touch cheek, Top frequency	0.537	0.806
Left hand, Touch cheek, Mid frequency	0.653	0.977
Left hand, Touch cheek, Bottom frequency	0.788	1.17
Left hand, Tilt 15 Degree, Top frequency	0.274	0.404
Left hand, Tilt 15 Degree, Mid frequency	0.339	0.5
Left hand, Tilt 15 Degree, Bottom frequency	0.417	0.61
Right hand, Touch cheek, Top frequency	0.485	0.73
Right hand, Touch cheek, Mid frequency	0.599	0.896
Right hand, Touch cheek, Bottom frequency	0.733	1.09
Right hand, Tilt 15 Degree, Top frequency	0.263	0.384
Right hand, Tilt 15 Degree, Mid frequency	0.33	0.479
Right hand, Tilt 15 Degree, Bottom frequency	0.398	0.573

7.4 Summary of Measurement Results (Head, DCS 1800 MHz Band)

Table 10: SAR Values (DCS 1800 MHz Band, head)

Temperature: 23.6 °C, humidity: 49%.		
Liquid temperature during the test: 22.1°C		
Limit of SAR (W/kg)	10 g Average	1 g Average
	2.0	1.6
Test Case	Measurement Result (W/kg)	
	10 g Average	1 g Average
Left hand, Touch cheek, Top frequency	0.247	0.415
Left hand, Touch cheek, Mid frequency	0.231	0.381
Left hand, Touch cheek, Bottom frequency	0.221	0.363
Left hand, Tilt 15 Degree, Top frequency	0.273	0.493
Left hand, Tilt 15 Degree, Mid frequency	0.244	0.435
Left hand, Tilt 15 Degree, Bottom frequency	0.225	0.396
Right hand, Touch cheek, Top frequency	0.225	0.396
Right hand, Touch cheek, Mid frequency	0.202	0.351
Right hand, Touch cheek, Bottom frequency	0.192	0.325
Right hand, Tilt 15 Degree, Top frequency	0.252	0.457
Right hand, Tilt 15 Degree, Mid frequency	0.219	0.392
Right hand, Tilt 15 Degree, Bottom frequency	0.203	0.362

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 17 of 115

7.5 Summary of Measurement Results (Head, PCS 1900 MHz Band)

Table 11: SAR Values (PCS 1900 MHz Band, head)

Temperature: 23.1 °C, humidity: 50%.			
Liquid temperature during the test: 22.4°C			
Limit of SAR (W/kg)	10 g Average	1 g Average	Conducted Power before/after each test (dBm)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, Top frequency	0.138	0.225	29.32/29.29
Left hand, Touch cheek, Mid frequency	0.22	0.363	29.89/29.93
Left hand, Touch cheek, Bottom frequency	0.286	0.47	29.66/29.71
Left hand, Tilt 15 Degree, Top frequency	0.127	0.221	29.30/29.35
Left hand, Tilt 15 Degree, Mid frequency	0.22	0.384	29.91/29.96
Left hand, Tilt 15 Degree, Bottom frequency	0.302	0.523	29.74/29.72
Right hand, Touch cheek, Top frequency	0.129	0.228	29.38/29.31
Right hand, Touch cheek, Mid frequency	0.223	0.391	29.85/29.88
Right hand, Touch cheek, Bottom frequency	0.295	0.518	29.64/29.67
Right hand, Tilt 15 Degree, Top frequency	0.124	0.223	29.34/29.29
Right hand, Tilt 15 Degree, Mid frequency	0.227	0.404	29.86/29.84
Right hand, Tilt 15 Degree, Bottom frequency	0.318	0.561	29.64/29.65

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 18 of 115

7.6 Summary of Measurement Results (Body-Worn, PCS 1900 MHz Band)

Table 12: SAR Values (PCS 1900 MHz Band, body-worn)

Temperature: 23.5 °C, humidity: 48%. Liquid temperature during the test: 22.4°C			
Limit of SAR (W/kg)	10 g Average	1 g Average	Conducted Power before/after each test (dBm)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Display of EUT towards the phantom, Top Frequency	0.152	0.243	29.30/29.33
Display of EUT towards the phantom, Mid Frequency	0.143	0.227	29.90/29.85
Display of EUT towards the phantom, Bottom Frequency	0.123	0.188	29.72/29.75
Display of EUT towards the ground, Top frequency	0.247	0.406	29.31/29.28
Display of EUT towards the ground, Mid frequency	0.241	0.391	29.83/29.91
Display of EUT towards the ground, Bottom frequency	0.191	0.317	29.68/29.65

7.7 Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 5.2 of this report. Maximum localized SAR is below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 19 of 115

8 Measurement Uncertainty

No.	Error source	Type	Uncertainty Value (%)	Probability Distribution	k	C _i	Standard Uncertainty (%) u_i (%)	Degree of freedom V_{eff} or v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	—probe calibration	B	7	N	2	1	3.5	∞
3	—axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	4.3	∞
4	—hemisphere isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$		
5	—spatial resolution	B	0	R	$\sqrt{3}$	1	0	∞
6	—boundary effect	B	11.0	R	$\sqrt{3}$	1	6.4	∞
7	—probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	—detection limit	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	—electronic readout	B	1.0	N	1	1	1.0	∞
10	—RF interference	B	3.0	R	$\sqrt{3}$	1	1.73	∞
11	— probe mechanical positioning constraint	B	0.4	R	$\sqrt{3}$	1	0.2	∞
12	— matching between probe and phantom references	B	2.9	R	$\sqrt{3}$	1	1.7	∞
13	— SAR interpolation and extrapolation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Uncertainties of the DUT								
14	—position of the DUT	A	4.9	N	1	1	4.9	5
15	—holder of the DUT	A	6.1	N	1	1	6.1	5
16	—drift of the output power	B	5.0	R	$\sqrt{3}$	1	2.9	∞
physical parameters								
17	—phantom shell	B	1.0	R	$\sqrt{3}$	1	0.6	∞
18	— liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
19	— liquid conductivity(measurement error)	B	10.0	R	$\sqrt{3}$	0.6	3.4	∞

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 20 of 115

20	— liquid permittivity(deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
21	— liquid permittivity(measurement error)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
Combined standard uncertainty		$u'_c = \sqrt{\sum_{i=1}^{21} c_i^2 u_i^2}$					13.5	88.7
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		27	

**Telecommunication Metrology Center
of Ministry of Information Industry**

No. EMF2003049

Page 21 of 115

9 MAIN TEST INSTRUMENTS

Table 13: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753C	3146A01905	May 22,2003	One year
02	S-parameter test set	HP 85047A	3033A02437		
03	Dielectric Probe Kit	Agilent 85070C	US99360113	No Calibration Requested	
04	Power meter	HP 436A	2101A11858	October 4,2003	One year
05	Power sensor	HP 8481H	2349A07289		
06	Signal Generator	MG 3633A	M73386	No Calibration Requested	
07	Amplifier	AT 50S1G4A	26549	No Calibration Requested	
08	Validation Kit 835MHz	SPEAG D 835V2	443	September 3, 2003	Two years
09	Validation Kit 900MHz	SPEAG D 900V2	125	September 3, 2003	Two years
10	Validation Kit 1800MHz	SPEAG D 1800V2	2d010	September 3, 2003	Two years
11	Validation Kit 1900MHz	1900 V2	541	September 3, 2003	Two years
12	BTS	CMD 55	831256/052	December 28, 2002	One year
13	BTS	CMU 200	100680	September 13, 2003	One year
14	E-field Probe	SPEAG ET3DV6	1738	December 9, 2002	Two years
15	DAE	SPEAG DAE3	536	October 24, 2002	Two years

10 TEST PERIOD

The test is performed from Nov 10, 2003 to Nov 18 2003.

11 TEST LOCATION

The test is performed at
Radio Communication & Electromagnetic Compatibility Laboratory of
Telecommunication Metrology Center of
Ministry of Information Industry of
The People's Republic of China

END OF REPORT BODY

ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

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

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20 mm x 20 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point, a volume of 32 mm x 32 mm x 34 mm was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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

b. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot"-condition (in x ~ y and z-directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

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

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

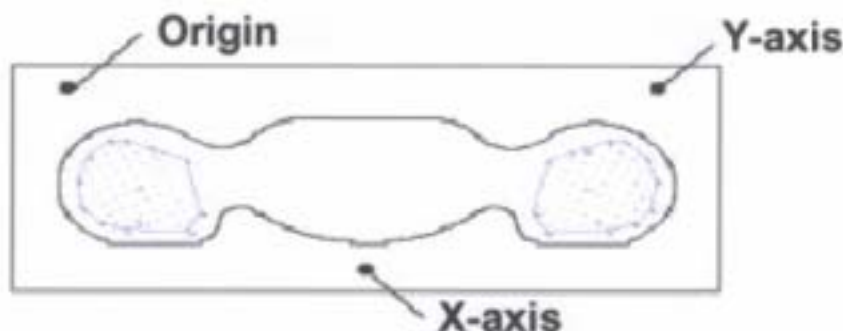
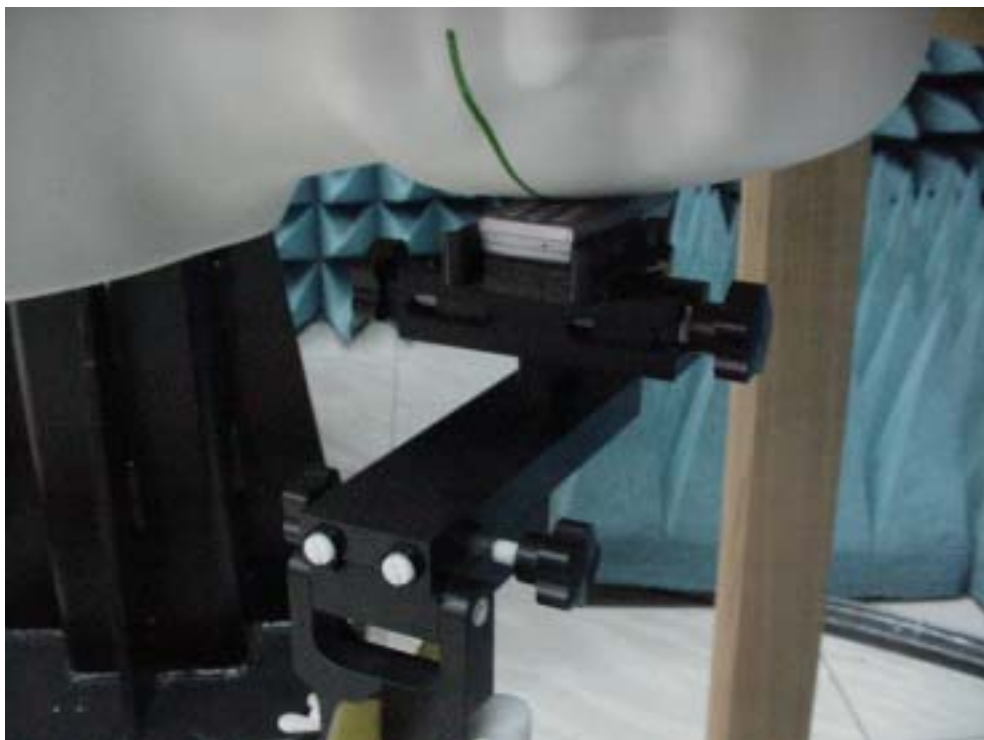


Figure 2 SAR Measurement Points in Area Scan

ANNEX B TEST LAYOUT



Picture 1 Specific Absorption Rate Test Layout



Picture 2 Left Hand Touch Cheek Position



Picture 3 Left Hand Tilt 15 ° Position



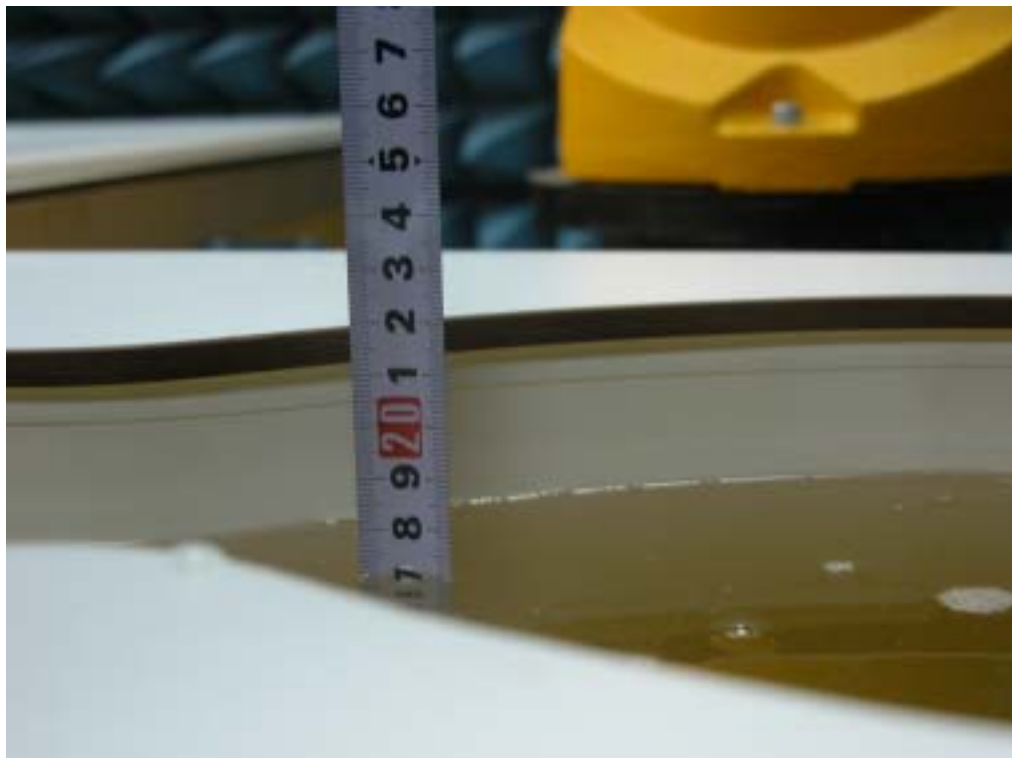
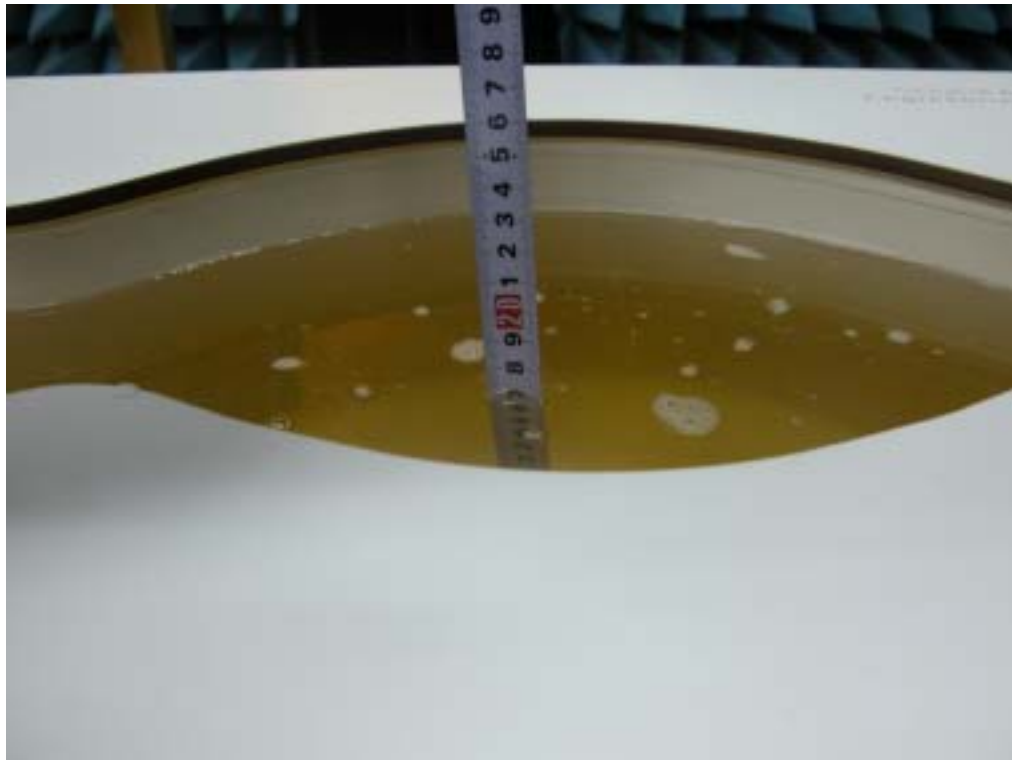
Picture 4 Right Hand Touch Cheek Position



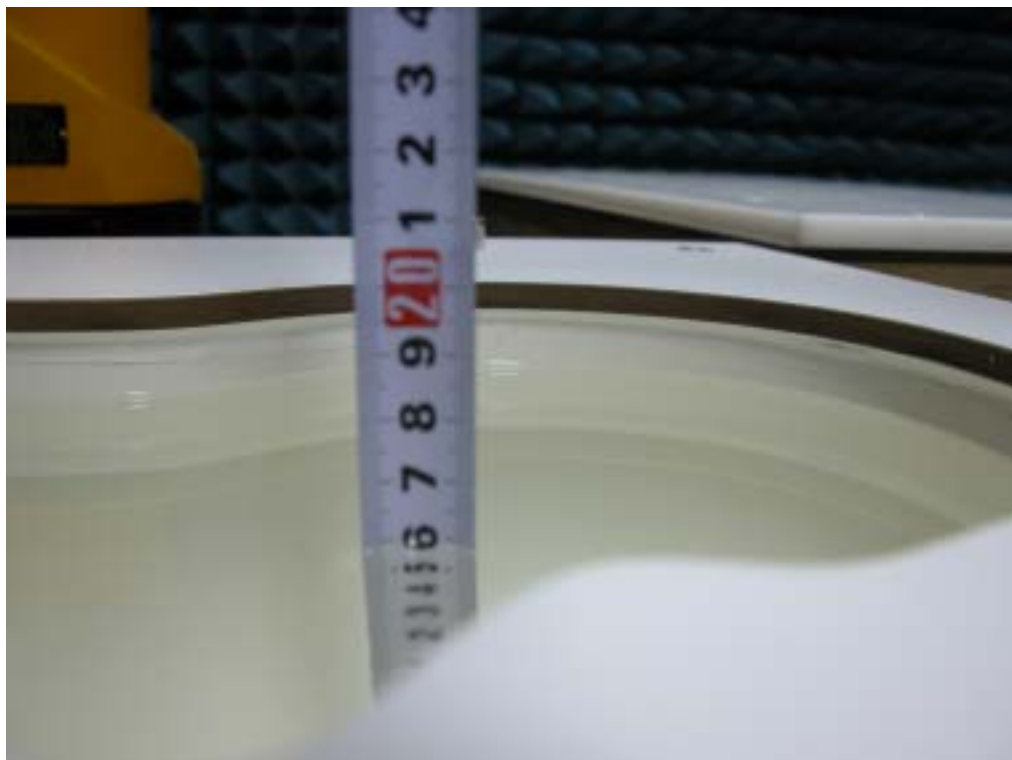
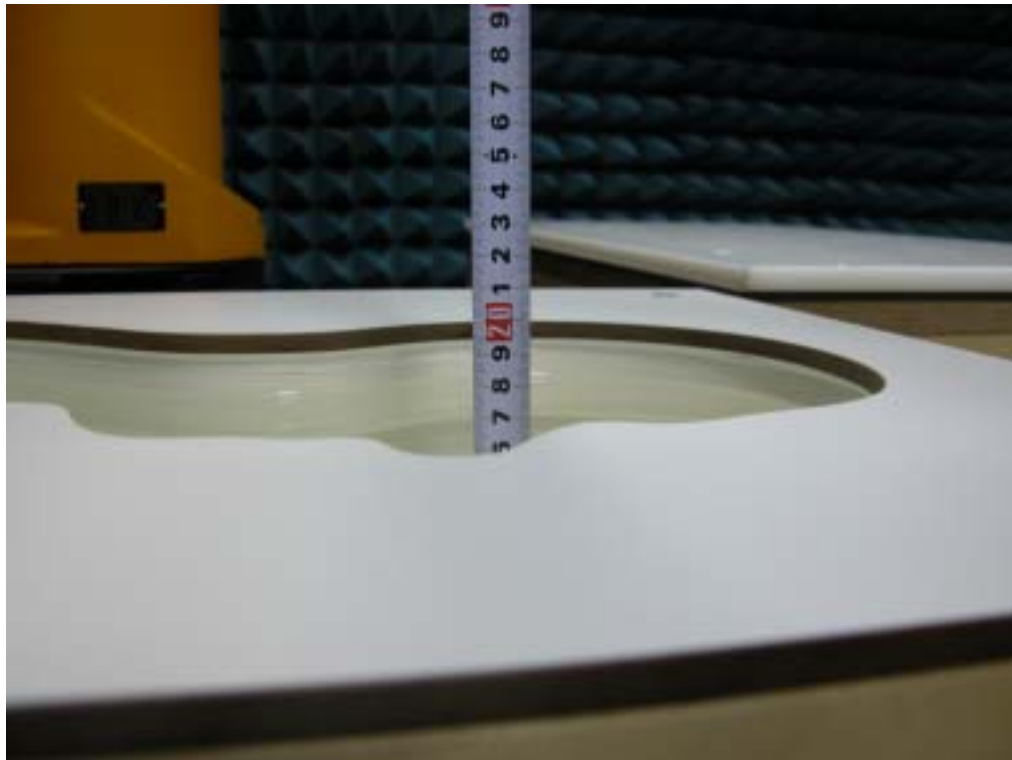
Picture 5 Right Hand Tilt 15 ° Position



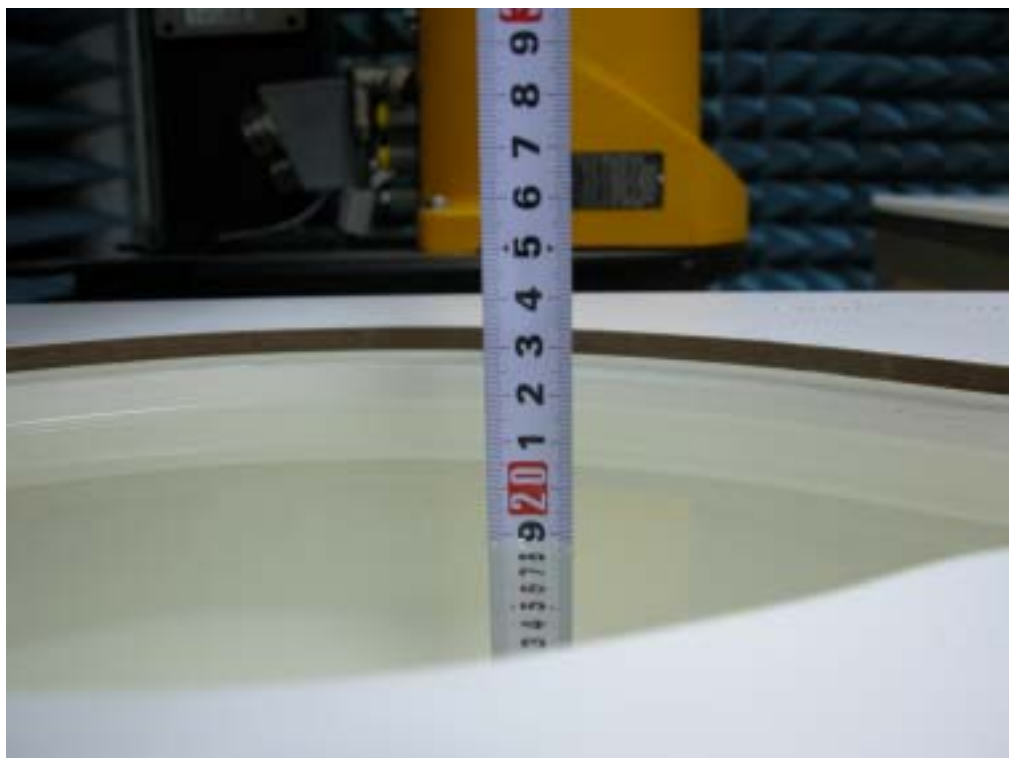
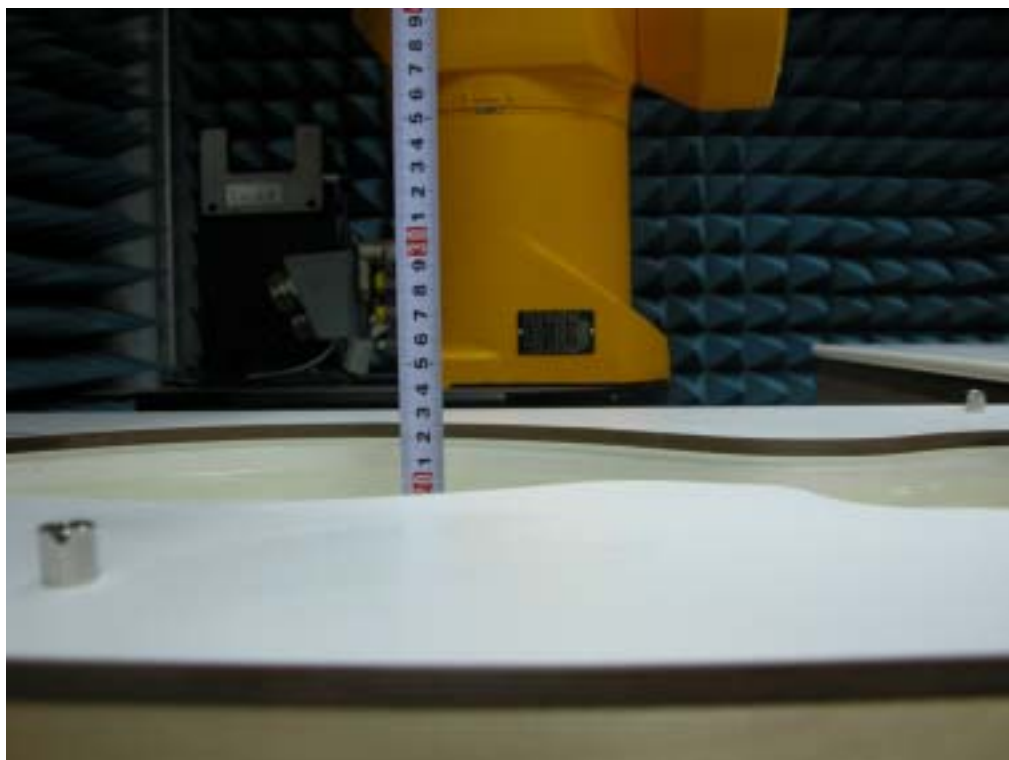
Picture 6 Flat Phantom -- Body-worn Position (the distance from handset to the bottom of the Phantom is 1.5cm)



Picture 7 Liquid depth in the Head Phantom (Head 900MHz)



Picture 8 Liquid depth in the Head Phantom (Head 1800MHz,1900MHz)



Picture 9 Liquid depth in the Flat Phantom (Body 1900MHz)

ANNEX C GRAPH RESULTS

Test Laboratory: TMC

File Name: SAR_Test GSM 900 Left.da4

DUT: CCT C8118 Type & Serial Number: 351597001983650

Program: SAR Test C8118 Left; C8118 GSM 900 Left Cheek L

Communication System: GSM 900; Frequency: 890.2 MHz; Duty Cycle: 1:8.3

Phantom section: LeftSection

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

Reference Value = 28.9 V/m

Peak SAR = 1.58 mW/g

SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.788 mW/g

Power Drift = -0.006 dB

Area Scan (61x121x1): Measurement grid: dx=10mm, dy=10mm

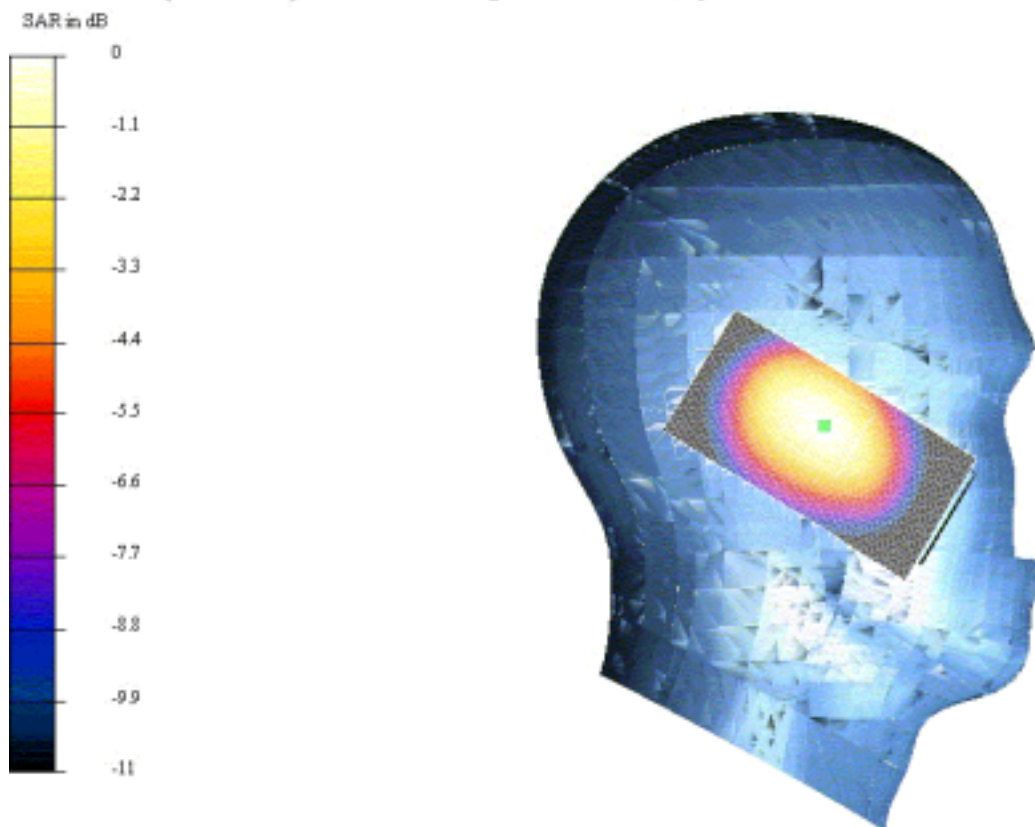


Fig. 1 Left Hand Touch Cheek 900MHz CH1