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DAR

No. DAT-P-114/01-01

TEST REPORT

No. SAR2006015

FCCID	RXSCT0598
Test name	Electromagnetic Field (Specific Absorption Rate)
Product	GSM/GPRS Mobile with BlueTooth function
Model	CT0598
Client	CEC Wireless R&D Ltd
Type of test	Non Type Approval

Telecommunication Metrology Center

of Ministry of Information Industry

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TABLE OF CONTENT

Product Name	GSM/GPRS Mobile with BlueTooth function	Sample Model	CT0598
Client	CEC Wireless R&D Ltd.	Type of test	None Type Approval
Factory	CEC Wireless R&D Ltd	Sampling arrival date	October 30th, 2006
Manufacturer	CEC Wireless R&D Ltd		
Sampling/ Sending sample	Sending Sample	Sample sent by	Jane Wang
Series number of the Sample	352556070000375		
Test basis	**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 1528–2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques **OET Bulletin 65 (Edition 97-01) and Supplement C(Edition 01-01):** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. **IEC 62209-1-2005:** 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)		
Test 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: November 27th, 2006**		
Note	TX Freq. Band: 1850-1910 MHz (PCS) Max. Power: 1 Watt (PCS) Antenna Character: / The test results relate only to the items tested of the sample(s).		

Approved by__________ **Reviewed by**__________ **Tested by**__________

(Lu Bingsong) (Wang Hongbo) (Qi Dianyuan)

Deputy Director of the laboratory

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3 DESCRIPTION OF EUT

3.1 Addressing Information Related to EUT

Table 1: Applicant (The Client)

Name or Company	CEC Wireless R&D Ltd
Address/Post	P. O. Box 707-27 West M5 Building , No.1 East Road Jiuxianqiao, ChaoYang District, Beijing, CHINA
City	Beijing
Postal Code	100016
Country	China
Telephone	86-10-58270302
Fax	86-10-84568718

Table 2: Manufacturer

Name or Company	CEC Wireless R&D Ltd
Address/Post	P. O. Box 707-27 West M5 Building , No.1 East Road Jiuxianqiao, ChaoYang District, Beijing, CHINA
City	Beijing
Postal Code	100016
Country	China
Telephone	86-10-58270302
Fax	86-10-84568718

3.2 About EUT

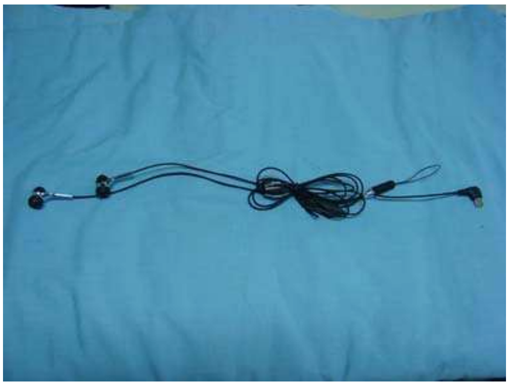
Model	CT0598
FCC ID:	RXSCT0598
Description	GSM/GPRS Mobile with BlueTooth function
Frequency	1850.2MHz –1909.8MHz for PCS 1900;
Type of modulation	GMSK for PCS 1900
Number of channels	299 for PCS 1900
Antenna	Internal
Power supply	Battery or Charger (AC Adaptor)
Output power	27.04dBm maximum EIRP measured for PCS 1900
Extreme vol. Limits	3.4VDC to 4.2VDC (nominal: 3.7 VDC)
Extreme temp. Tolerance	-30°C to +50°C
GPRS Class	10

Table 3: Constituents of Samples

Description	Model	Serial Number	Manufacturer
Handset	CT0598	352556070000375	CEC Wireless R&D Ltd
Lithium Battery	A20FCZ/OZP	MS511234	Shenzhen Xwoda Electronic Co., Ltd
AC/DC Adapter	DSA-0051-05C FEU	DVE00025143	DEE VAN Enterprise CO.,LTD.
Headset	ME-840B1	/	MINAMI ACOUSTICS LiMITED

Picture 1.a: Handset (flip closed)

Picture 1.b: Handset (flip open)



Picture 1.c: Headset

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

3.3 General Description

Equipment Under Test (EUT) is a model of GSM/GPRS Mobile Station with BlueTooth function with integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC Adapter as Table 3 and Picture 1. Its GPRS class is 10. SAR is tested for PCS 1900MHz band.

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

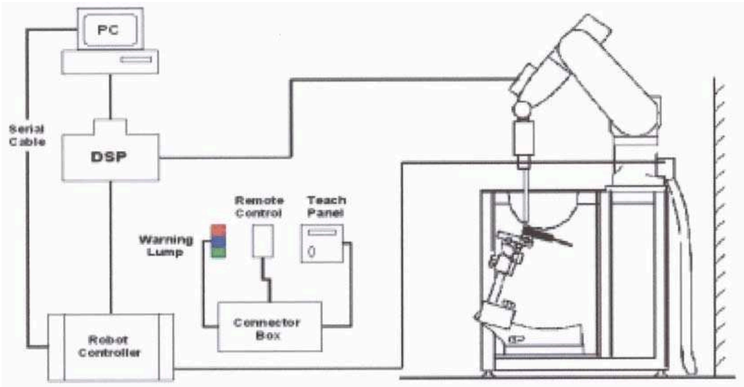
A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 512, 661 and 810 respectively in the case of PCS 1900 MHz. The EUT is commanded to operate at maximum transmitting power.

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

4.2 SAR Measurement Set-up

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

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



Picture 2: SAR Lab Test Measurement Set-up

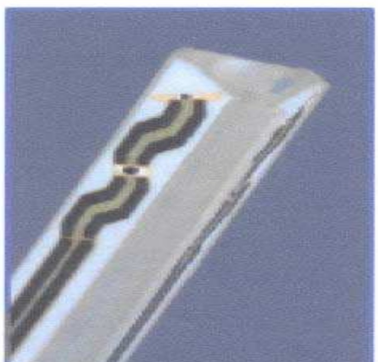
The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the PC-card is accomplished through an optical downlink for data and status information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

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 ± 10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB.

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±8%) Calibration for other liquids and frequencies upon request
Frequency	l 0 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)



Picture 3: ET3DV6 E-field Probe

Directivity	±0.2 dB in brain tissue (rotation around probe axis)
	±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 diarneter: 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

Picture4:ET3DV6 E-field probe

4.4 E-field Probe Calibration

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

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

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

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

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

Or

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

Where: σ = Simulated tissue conductivity,
ρ = Tissue density (kg/m3).

Note: Please see Annex E to check the probe calibration certificate.

Picture 5:Device Holder

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).

4.5.2 Phantom

Picture6:Generic Twin 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 all predefined phantom positions and measurement grids by the complete setup of manually teaching three points in the robot.

Shell Thickness 2±0. l mm

Filling Volume Approx. 20 liters

Dimensions 810 x l000 x 500 mm (H x L x W)

Available Special

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.

Table 4. Composition of the Head Tissue Equivalent Matter

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

Table 5. Composition of the Body Tissue Equivalent Matter

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

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: DASY4 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 mm 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 mm 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 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.
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)
OET Bulletin 65 (Edition 97-01) and Supplement C (Edition 01-01): Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.

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

6 LABORATORY ENVIRONMENT

Table 6: 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 CONDUCTED OUTPUT POWER MEASUREMENT

7.1 Summary

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

7.2 Conducted Power

7.2.1 Measurement Methods

The EUT was set up for the maximum output power. The channel power was measured with Agilent Spectrum Analyzer E4440A. These measurements were done at 3 channels, 512, 661 and 810 before SAR test and after SAR test.

7.2.2 Measurement result

Table 7: Conducted Power Measurement Results

	Conducted Power		
	Channel 512 (1850.2MHz)	**Channel 661 (1880MHz)**	**Channel 810 (1909.8MHz)**
Before Test (dBm)	29.51	29.17	29.27
After Test (dBm)	29.49	29.16	29.25

7.2.3 Power Drift

To control the output power stability during the SAR test, DASY4 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Table 11 to Table 14 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

7.3 Bluetooth Output Power

Bluetooth output power test result is **-1.29dBm= 0.743mW**.

Since the Bluetooth Radio falls below the low threashold of 10mW for RF evaluation, it exempt from Routine RF Evaluation individually.

8 TEST RESULTS

8.1 Dielectric Performance

Table 8: Dielectric Performance of Head Tissue Simulating Liquid

Measurement is made at temperature 23.3 °C and relative humidity 49%.
Liquid temperature during the test: 22.5°C
Test Date: 03/11/2006

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	1900MHz	40.0	1.40
Measurement value (Average of 10 tests)	1900MHz	40.3	1.42

Measurement is made at temperature 23.0 °C and relative humidity 51%.
Liquid temperature during the test: 22.1°C
Test Date: 25/11/2006

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	1900MHz	40.0	1.40
Measurement value (Average of 10 tests)	1900MHz	40.2	1.43

Table 9: Dielectric Performance of Body Tissue Simulating Liquid

Measurement is made at temperature 23.3 °C and relative humidity 49%.
Liquid temperature during the test: 22.0°C
Test Date: 03/11/2006

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	1900MHz	53.3	1.52
Measurement value (Average of 10 tests)	1900MHz	55.8	1.52

Measurement is made at temperature 23.0 °C and relative humidity 51%.
Liquid temperature during the test: 22.1°C
Test Date: 25/11/2006

/	Frequency	Permittivity ε	Conductivity σ (S/m)
Target value	1900MHz	53.3	1.52
Measurement value (Average of 10 tests)	1900MHz	55.6	1.51

8.2 System Validation

Table 10: System Validation

Measurement is made at temperature 23.3 °C, relative humidity 49%, input power 250 mW. Liquid temperature during the test: 22.5°C Test Date: 03/11/2006					
Liquid parameters		**Frequency**		**Permittivity ε**	**Conductivity σ (S/m)**
		1900 MHz		40.3	1.42
Verification results	**Frequency**	**Target value (W/kg)**		**Measurement value (W/kg)**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**
	1900 MHz	5.125	9.925	5.27	9.91
Measurement is made at temperature 23.0 °C, relative humidity 51%, input power 250 mW. Liquid temperature during the test: 22.1°C Test Date: 25/11/2006					
Liquid parameters		**Frequency**		**Permittivity ε**	**Conductivity σ (S/m)**
		1900 MHz		40.2	1.43
Verification results	**Frequency**	**Target value (W/kg)**		**Measurement value (W/kg)**	
		10 g Average	**1 g Average**	**10 g Average**	**1 g Average**
	1900 MHz	5.125	9.925	5.21	9.89

Note：Target Values used are one fourth of those in IEEE Std 1528-2003 (feeding power is normalized to 1 Watt), i.e. 250 mW is used as feeding power to the validation dipole (SPEAG using).

8.3 Summary of Measurement Results (PCS 1900Mhz Head tests)

Table 11: SAR Values (Head, 1900 MHz Band)

Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Power Drift (dB)**
	2.0	**1.6**	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Left hand, Touch cheek, Top frequency(See Fig.1)	0.093	0.178	-0.094
Left hand, Touch cheek, Mid frequency(See Fig.3)	0.113	0.212	-0.037
Left hand, Touch cheek, Bottom frequency(See Fig.5)	0.116	0.215	-0.031
Left hand, Tilt 15 Degree, Top frequency(See Fig.7)	0.070	0.131	-0.106
Left hand, Tilt 15 Degree, Mid frequency(See Fig.9)	0.087	0.160	-0.087
Left hand, Tilt 15 Degree, Bottom frequency(See Fig.11)	0.094	0.170	-0.016
Right hand, Touch cheek, Top frequency(See Fig.13)	0.070	0.115	-0.145
Right hand, Touch cheek, Mid frequency(See Fig.15)	0.083	0.137	-0.026
Right hand, Touch cheek, Bottom frequency(See Fig.17)	0.084	0.138	-0.115
Right hand, Tilt 15 Degree, Top frequency(See Fig.19)	0.089	0.161	0.014
Right hand, Tilt 15 Degree, Mid frequency(See Fig.21)	0.112	0.204	-0.118
Right hand, Tilt 15 Degree, Bottom frequency(See Fig.23)	0.115	0.207	0.038

8.4 Summary of Measurement Results (PCS 1900MHz Body tests)

In this section, the EUT is tested for body worn position both with the flip open and closed. When the flip is open, the tests are performed without the headset first, after determined the worst case, then retest at same configuration with the headset attached. When the flip is closed, the EUT is tested with the headset connected.

Table 12: SAR Values (Body, 1900 MHz Band-Flip open)

The separation between the EUT and the bottom of the phantom is 1.5 cm, which is implemented by a normative space block of 1.5cm (See Picture. B7 and B8)			
Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Power Drift (dB)**
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Body, Towards Phantom, Top frequency(See Fig.25)	0.090	0.145	-0.152
Body, Towards Phantom, Mid frequency(See Fig.27)	0.090	0.146	-0.158
Body, Towards Phantom, Bottom frequency(See Fig.29)	0.073	0.117	0.106
Body, Towards Ground, Top frequency(See Fig.31)	0.174	0.277	0.038
Body, Towards Ground, Mid frequency(See Fig.33)	0.176	0.279	0.200
Body, Towards Ground, Bottom frequency(See Fig.35)	0.149	0.235	-0.192

Table 13: SAR Values (Body, 1900 MHz Band-Flip open with headset)

The separation between the EUT and the bottom of the phantom is 1.5 cm, which is implemented by a normative space block of 1.5cm (See Picture. B9)			
Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Power Drift (dB)**
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Body, Towards Ground, Mid frequency(See Fig.37)	0.174	0.275	-0.112

Table 14: SAR Values (Body, 1900 MHz Band-Flip closed with headset)

The separation between the EUT and the bottom of the phantom is 1.5 cm, which is implemented by a normative space block of 1.5cm (See Picture. B10 and B11)			
Limit of SAR (W/kg)	**10 g Average**	**1 g Average**	**Power Drift (dB)**
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Body, Towards Phantom, Top frequency(See Fig.39)	0.033	0.053	-0.198
Body, Towards Phantom, Mid frequency(See Fig.41)	0.033	0.049	-0.138

Body, Towards Phantom, Bottom frequency(See Fig.43)	0.027	0.044	-0.003
Body, Towards Ground, Top frequency(See Fig.45)	0.146	0.232	-0.030
Body, Towards Ground, Mid frequency(See Fig.47)	0.138	0.220	-0.042
Body, Towards Ground, Bottom frequency(See Fig.49)	0.132	0.209	0.020

8.5 Summary of Measurement Results (PCS 1900MHz GPRS tests)

Table 15: SAR Values (Body, 1900 MHz GPRS-Flip open)

The separation between the EUT and the bottom of the phantom is 1.5 cm, which is implemented by a normative space block of 1.5cm (See Picture. B7 and B8)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Body, Towards Phantom, Top frequency(See Fig.51)	0.138	0.228	-0.185
Body, Towards Phantom, Mid frequency(See Fig.53)	0.128	0.209	-0.132
Body, Towards Phantom, Bottom frequency(See Fig.55)	0.099	0.165	0.157
Body, Towards Ground, Top frequency(See Fig.57)	0.235	0.372	-0.172
Body, Towards Ground, Mid frequency(See Fig.59)	0.234	0.369	0.051
Body, Towards Ground, Bottom frequency(See Fig.61)	0.212	0.331	0.175

Table 16: SAR Values (Body, 1900 MHz GPRS-Flip closed)

The separation between the EUT and the bottom of the phantom is 1.5 cm, which is implemented by a normative space block of 1.5cm (See Picture. B12 and B13)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	**Measurement Result (W/kg)**		
	10 g Average	**1 g Average**	
Body, Towards Phantom, Top frequency(See Fig.63)	0.074	0.134	0.173
Body, Towards Phantom, Mid frequency(See Fig.65)	0.067	0.115	0.095
Body, Towards Phantom, Bottom frequency(See Fig.67)	0.055	0.086	0.200
Body, Towards Ground, Top frequency(See Fig.69)	0.266	0.414	-0.022
Body, Towards Ground, Mid frequency(See Fig.71)	0.264	0.413	0.033
Body, Towards Ground, Bottom frequency(See Fig.73)	0.224	0.351	-0.200

8.6 Summary of Measurement Results (with Bluetooth function)

Since the EUT is tested both in head position and body position with the dominant transmitter ON and co-located Bluetooth transmitter OFF first with the results in section 8.3, 8.4 and 8.5. After that, the worst cases in head and body tests can be derived, and the tests are repeated with dominant transmitter and co-located Bluetooth transmitter both ON under the same conditions. The following results are derived from the EUT with its Bluetooth function under the same conditions with the worst cases.

Table 17: SAR Values (Head, 1900 MHz Band with Bluetooth)

Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Left hand, Touch cheek, Bottom frequency(See Fig.75)	0.118	0.219	-0.127

Table 18: SAR Values (Body, 1900 MHz Band with Bluetooth)

The separation between the EUT and the bottom of the phantom is 1.5 cm, which is implemented by a normative space block of 1.5cm (See Picture. B14 and B15)			
Limit of SAR (W/kg)	10 g Average	1 g Average	Power Drift (dB)
	2.0	1.6	
Test Case	Measurement Result (W/kg)		
	10 g Average	1 g Average	
Body GPRS, Towards Phantom, with Flip Open, Top frequency (See Fig.77)	0.139	0.230	0.116
Body GPRS, Towards Ground, with Flip Closed, Top frequency(See Fig.79)	0.267	0.415	0.087

8.7 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.

9 Measurement Uncertainty

SN	a	Type	c	d	e = f(d,k)	f	h = c x f / e	k
	Uncertainty Component		Tol. (± %)	Prob. Dist.	Div.	c_i (1 g)	1 g u_i (±%)	v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
	Measurement System							
2	Probe Calibration	B	5	N	2	1	2.5	∞
3	Axial Isotropy	B	4.7	R	√3	(1-cp) $^{1/2}$	4.3	∞
4	Hemispherical Isotropy	B	9.4	R	√3	$\sqrt{c_p}$		∞
5	Boundary Effect	B	0.4	R	√3	1	0.23	∞
6	Linearity	B	4.7	R	√3	1	2.7	∞
7	System Detection Limits	B	1.0	R	√3	1	0.6	∞
8	Readout Electronics	B	1.0	N	1	1	1.0	∞
9	RF Ambient Conditions	B	3.0	R	√3	1	1.73	∞
10	Probe Positioner Mechanical Tolerance	B	0.4	R	√3	1	0.2	∞
11	Probe Positioning with respect to Phantom Shell	B	2.9	R	√3	1	1.7	∞
12	Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	√3	1	2.3	∞
	Test sample Related							
13	Test Sample Positioning	A	4.9	N	1	1	4.9	N-1
14	Device Holder Uncertainty	A	6.1	N	1	1	6.1	N-1
15	Output Power Variation - SAR drift measurement	B	5.0	R	√3	1	2.9	∞
	Phantom and Tissue Parameters							
16	Phantom Uncertainty (shape and thickness tolerances)	B	1.0	R	√3	1	0.6	∞
17	Liquid Conductivity - deviation from target values	B	5.0	R	√3	0.64	1.7	∞
18	Liquid Conductivity - measurement uncertainty	B	5.0	N	1	0.64	1.7	M
19	Liquid Permittivity - deviation from target values	B	5.0	R	√3	0.6	1.7	∞
20	Liquid Permittivity - measurement uncertainty	B	5.0	N	1	0.6	1.7	M
	Combined Standard Uncertainty			RSS			11.25	
	Expanded Uncertainty (95% CONFIDENCE INTERVAL)			K=2			22.5	

10 MAIN TEST INSTRUMENTS

Table19: List of Main Instruments

No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	HP 8753E	US38433212	August 30,2006	One year
02	Power meter	NRVD	101253	June 20, 2006	One year
03	Power sensor	NRV-Z5	100333		
04	Power sensor	NRV-Z6	100011	September 3, 2006	One year
05	Signal Generator	E4433B	US37230472	September 5, 2006	One Year
06	Amplifier	VTL5400	0505	No Calibration Requested	
07	BTS	CMU 200	105948	August 15, 2006	One year
08	E-field Probe	SPEAG ET3DV6	1736	November 25, 2005	One year
09	DAE	SPEAG DAE3	536	July 11, 2006	One year

11 TEST PERIOD

The test is performed on November 3rd, 2006 and November 25th, 2006.

12 TEST LOCATION

The test is performed at Radio Communication & Electromagnetic Compatibility Laboratory of Telecommunication Metrology Center

END OF REPORT BODY

ANNEX A MEASUREMENT PROCESS

The evaluation was performed with the following procedure:

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

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

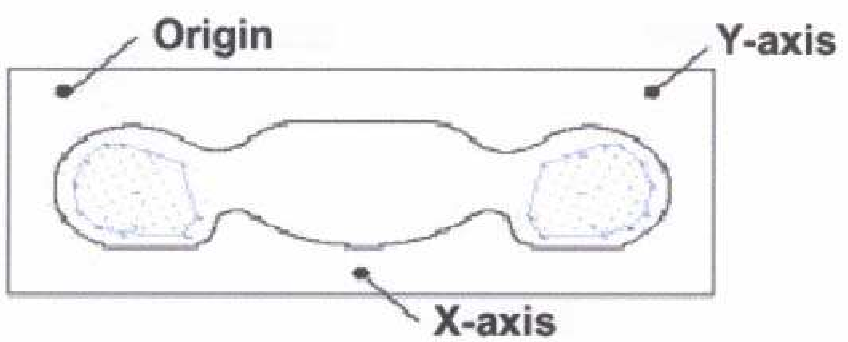
Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7 x 7x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

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

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

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

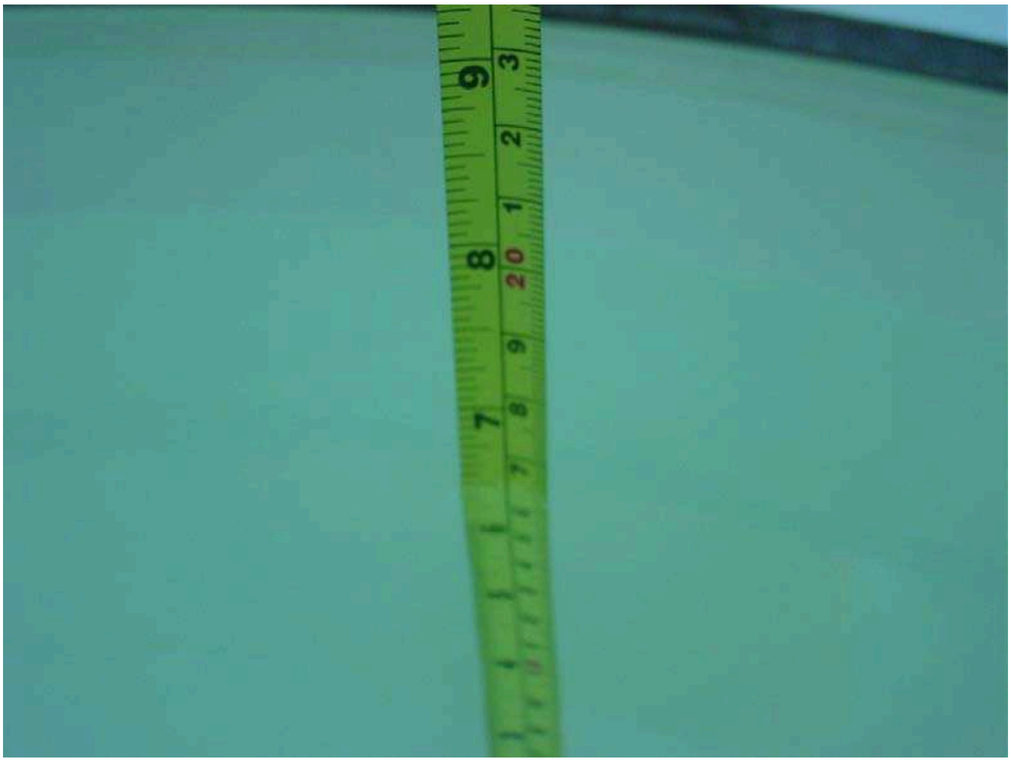
Step 4: Re-measurement the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation is repeated.



Picture A: SAR Measurement Points in Area Scan

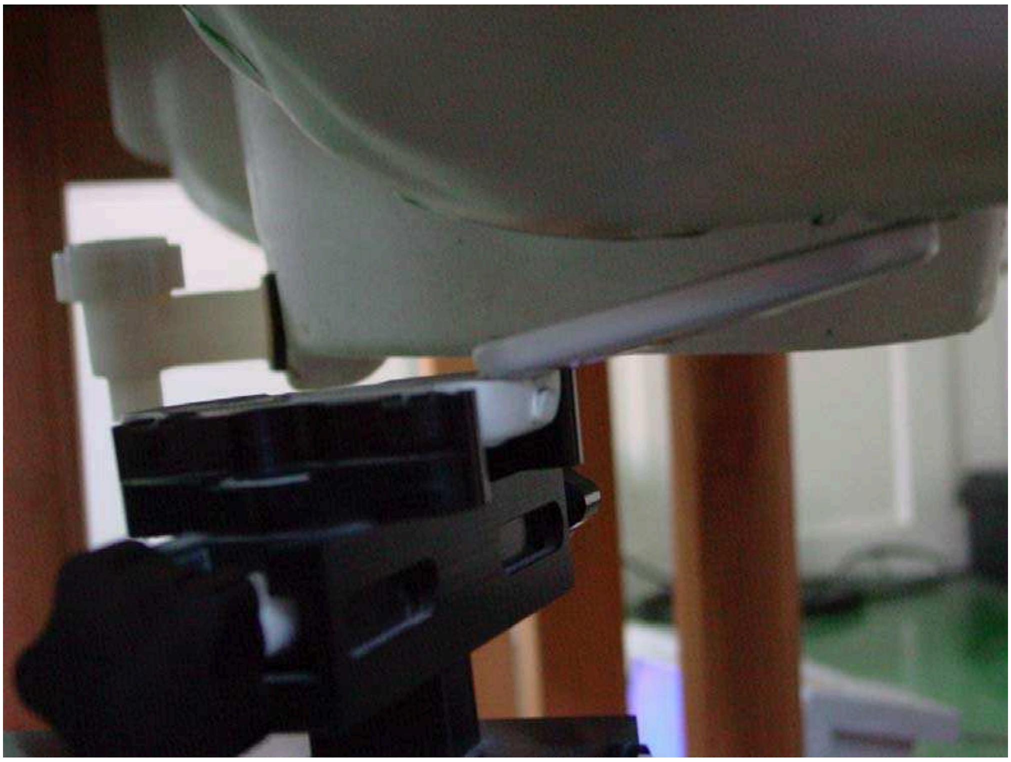
ANNEX B TEST LAYOUT

Picture B1: Specific Absorption Rate Test Layout



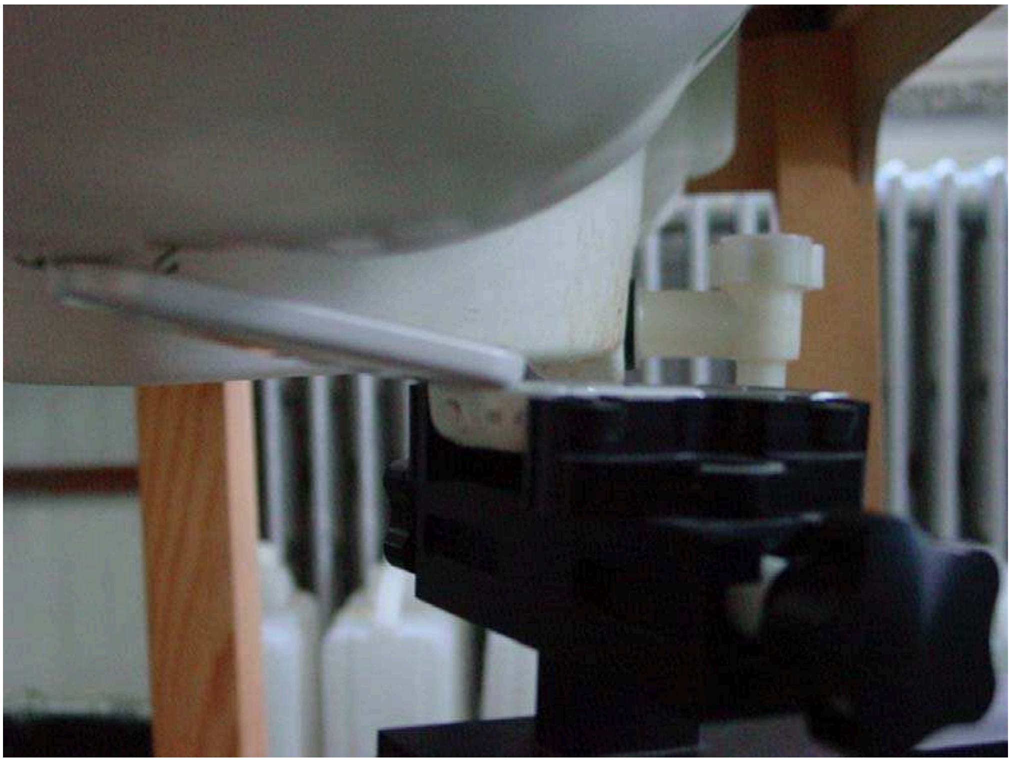
Picture B2: Liquid depth in the Flat Phantom (PCS 1900MHz)

Picture B4: Left Hand Touch Cheek Position

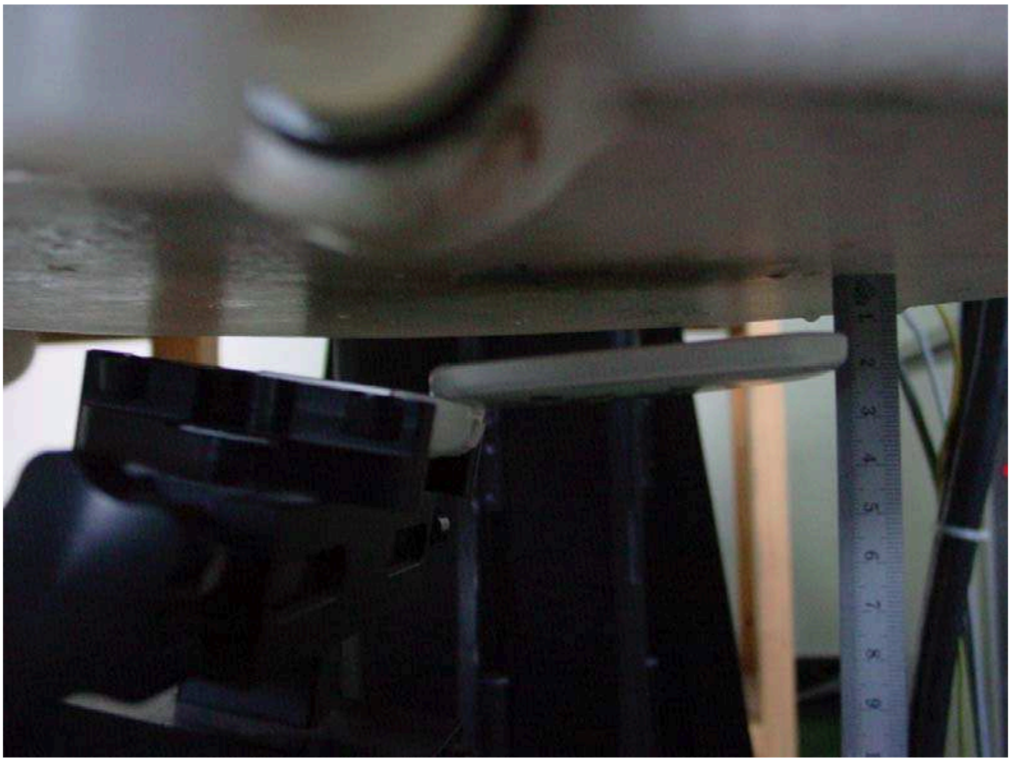


Picture B5: Left Hand Tilt 15° Position

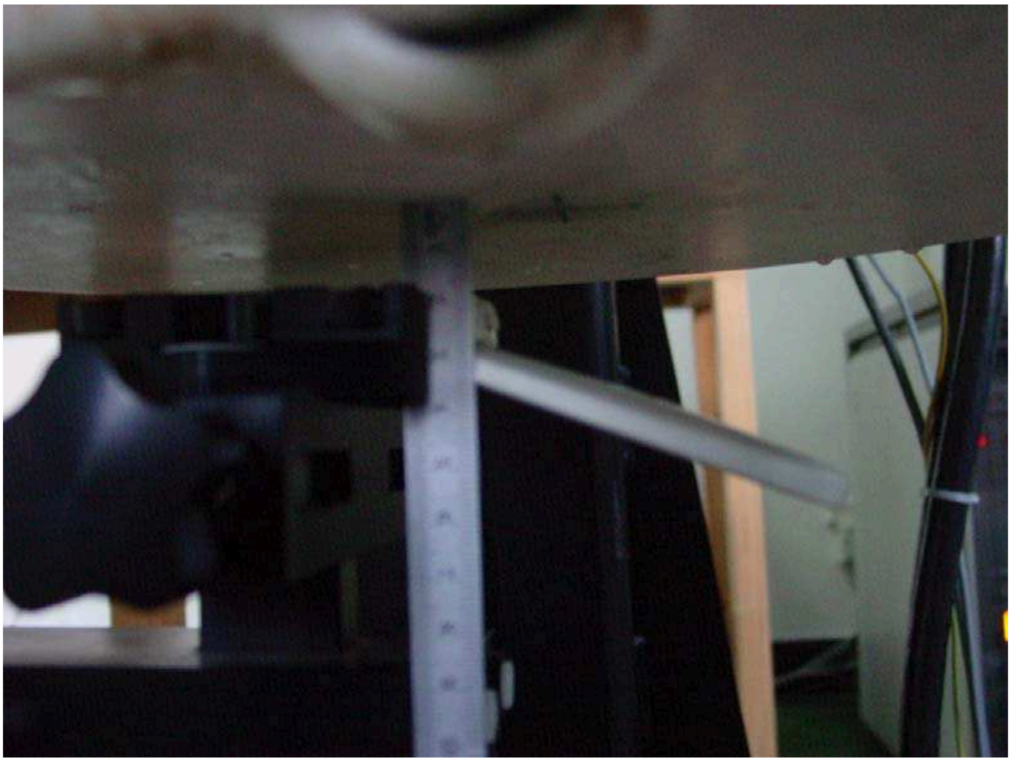
Picture B6: Right Hand Touch Cheek Position



Picture B7: Right Hand Tilt 15° Position



Picture B7: Body-worn Position with Flip Open (toward phantom, the distance from handset to the bottom of the Phantom is 1.5cm)

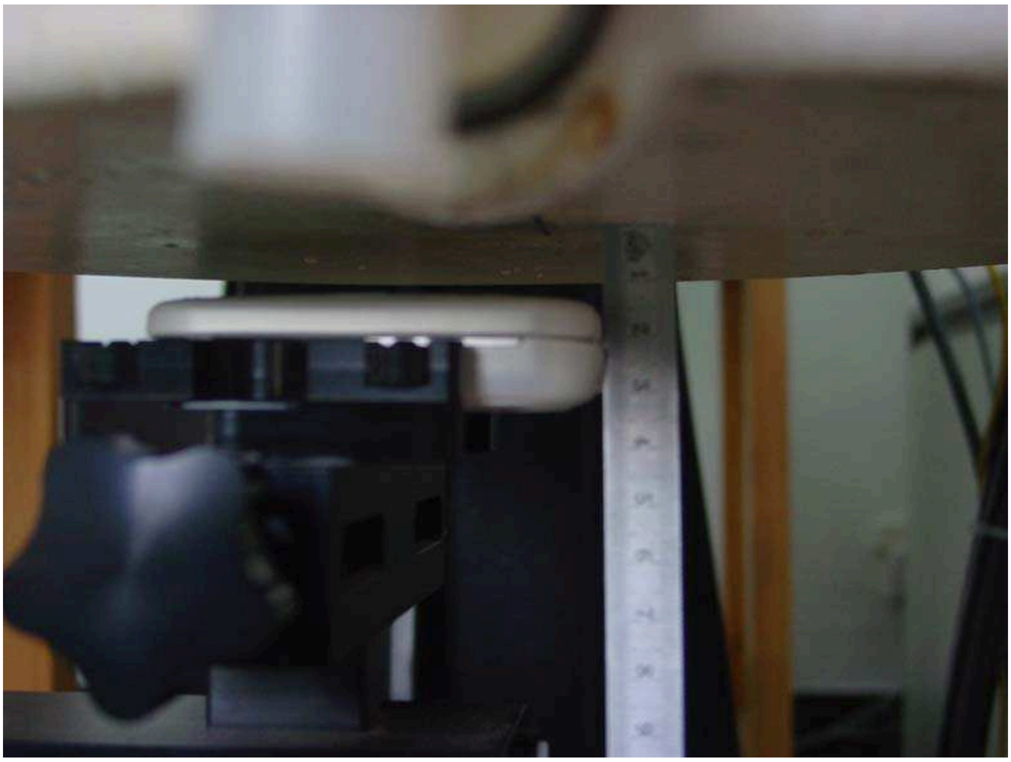


Picture B8: Body-worn Position with Flip Open (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)

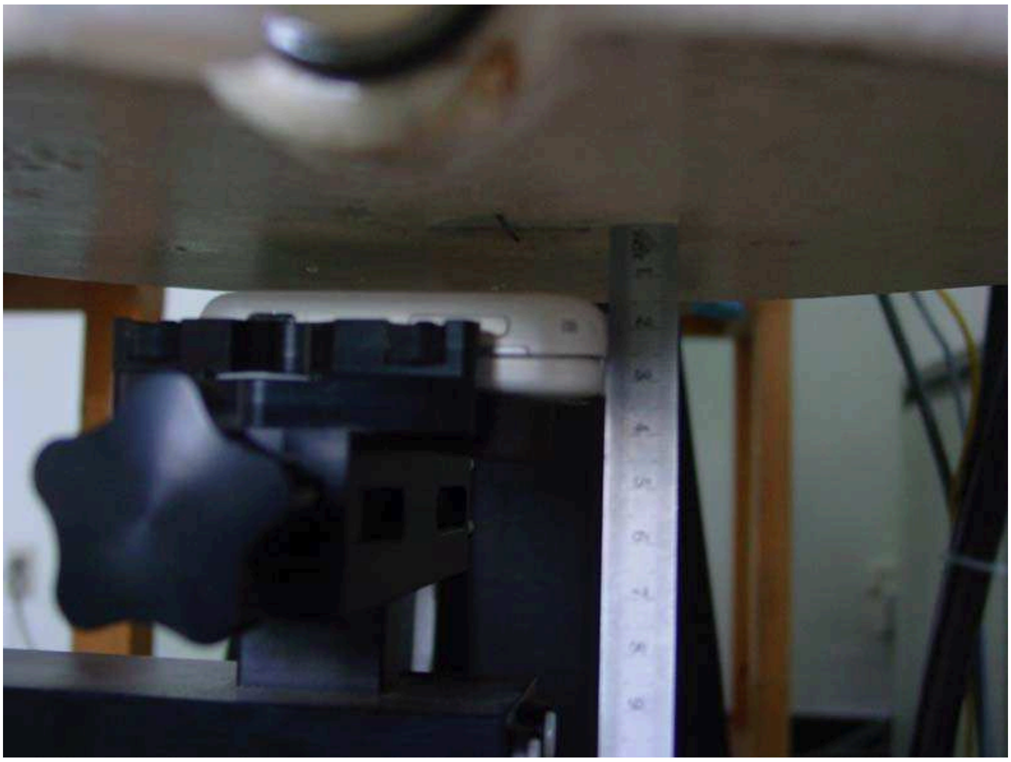
Picture B9: Body-worn Position with Flip Open and Headset (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)

Picture B10: Body-worn Position with Flip Closed and Headset (toward phantom, the distance from handset to the bottom of the Phantom is 1.5cm)

Picture B11: Body-worn Position with Flip Closed and Headset (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)



Picture B12: GPRS Body-worn Position with Flip Closed (toward phantom, the distance from handset to the bottom of the Phantom is 1.5cm)



Picture B13: GPRS Body-worn Position with Flip Closed (toward ground, the distance from handset to the bottom of the Phantom is 1.5cm)

Picture B14: GPRS Body-worn Position with Bluetooth transmitter-flip open (towards phantom, the distance from handset to the bottom of the Phantom is 1.5cm)

Picture B15: GPRS Body-worn Position with Bluetooth transmitter-flip closed (towards ground, the distance from handset to the bottom of the Phantom is 1.5cm)