No. CNAS L2264

**NO.: RZA2007-0779**

# TEST REPORT

| | |
|---|---|
| **Test name** | Electromagnetic Field (Specific Absorption Rate) |
| **Product** | CDMA 1X Digital Mobile Telephone |
| **Model** | HUAWEI C2605 |
| **FCC ID** | QISC2605 |
| **Client** | HUAWEI Technologies Co., Ltd. |

**TA Technology (Shanghai) Co., Ltd.**

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# GENERAL SUMMARY

<table>
<tr><td>Product</td><td>CDMA 1X Digital Mobile Telephone</td><td>Model</td><td>HUAWEI C2605</td></tr>
<tr><td>Client</td><td>HUAWEI Technologies Co., Ltd.</td><td>Type of test</td><td>Entrusted</td></tr>
<tr><td>Manufacturer</td><td>HUAWEI Technologies Co., Ltd.</td><td>Arrival Date of sample</td><td>Aug.24th, 2007</td></tr>
<tr><td>Place of sampling</td><td>(Blank)</td><td>Carrier of the samples</td><td>Yaohui Gu</td></tr>
<tr><td>Quantity of the samples</td><td>One</td><td>Date of product</td><td>(Blank)</td></tr>
<tr><td>Base of the samples</td><td>(Blank)</td><td>Items of test</td><td>SAR</td></tr>
<tr><td>Series number</td><td colspan="3">0F8B62E7</td></tr>
<tr><td>Standard(s)</td><td colspan="3">EN 50360–2001: Product standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.<br>EN 50361–2001: Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones.<br>ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz<br>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.<br>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.<br>IEC 62209-1: Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)</td></tr>
<tr><td>Conclusion</td><td colspan="3">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.<br>General Judgment: Pass<br>(Stamp)<br>Date of issue: Sep. 3rd, 2007</td></tr>
<tr><td>Comment</td><td colspan="3">TX Freq. Band: 824–849MHz (CDMA) Max. Power: 0.25W(CDMA)<br>The test result only responds to the measured sample.</td></tr>
</table>

**Approved by**________ **Revised by**________ **Performed by**________

# TABLE OF CONTENT

# 1 COMPETENCE AND WARRANTIES

**TA Technology (Shanghai) Co., Ltd.** is a test laboratory competent to carry out the tests described in this test report.

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# 3 DESCRIPTION OF EUT

## 3.1 Addressing Information Related to EUT

**Table 1: Applicant (The Client)**

| | |
|---|---|
| Name or Company | HUAWEI Technologies Co., Ltd. |
| Address/Post | Bantian, Longgang District |
| City | Shenzhen |
| Postal Code | 518129 |
| Country | P.R. China |
| Telephone | 0755-28780808 |
| Fax | 0755-28780808 |

**Table 2: Manufacturer**

| | |
|---|---|
| Name or Company | HUAWEI Technologies Co., Ltd. |
| Address/Post | Bantian, Longgang District |
| City | Shenzhen |
| Postal Code | 518129 |
| Country | P.R. China |
| Telephone | 0755-28780808 |
| Fax | 0755-28780808 |

### 3.2 Constituents of EUT

**Table 3: Constituents of Samples**

| Description | Model | Serial Number | Manufacturer |
|---|---|---|---|
| Handset | HUAWEI C2605 | 0F8B62E7 | HUAWEI Technologies Co., Ltd. |
| Lithium Battery | HBL6A | HGY761102172 | Shenzhen BYD Co., Ltd. |
| AC/DC Adapter | NTPCA-053065C | TPI6B2500367 | TECH-POWER Electronics （Shenzhen） Co., Ltd. |


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

### 3.3 General Description

Equipment Under Test (EUT) is a model of CDMA 1X portable Mobile Station (MS) with integrated antenna. It consists of Handset and normal options: Lithium Battery and AC/DC Adapter as Table 3 and Figure 1. SAR is tested for CDMA Cellular.

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 1013, 384 and 777 respectively in the case of CDMA Cellular. 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.

Test communication setup meet as followings:

| | |
|---|---|
| Communication standard between mobile station and base station simulator | 3GPP2 C.S0011-B |
| Radio configuration | RC3（Supporting CDMA 1X） |
| Spreading Rate | SR1 |
| Data Rate | 9600bps |
| Service Options | SO55 （loop back mode） |
| Service Options | SO3 （voice mode） |
| Multiplex Options | The mobile station does not support this service. |

Test Parameter setup for maximum RF output power according to section 4.4.5 of 3GPP2

| Parameter | Units | Value |
|---|---|---|
| I or | dBm/1.23MHz | -104 |
| PilotE c /I or | dB | -7 |
| *TrafficE* c /I or | dB | -7.4 |

For SAR test, the maximum power output is very important and essential; it is identical under the measurement uncertainty. It is proper to use typical Test Mode 3 (FW RC3, RVS RC3, SO55) as the worst case for SAR test.
Under the loop back mode between mobile station and E5515C, the transmitter continuously emits with maximum power more strong than voice mode, so the SAR test was done with loop back mode. To make the mobile emits maximum power; the output power of E5515C would be adjusted to minimum power with the sensitivity of the mobile station to build steady connection with mobile station. The power level control parameter “all up” and it means that requires mobile station to emit with maximum power.

### 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 ± 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.

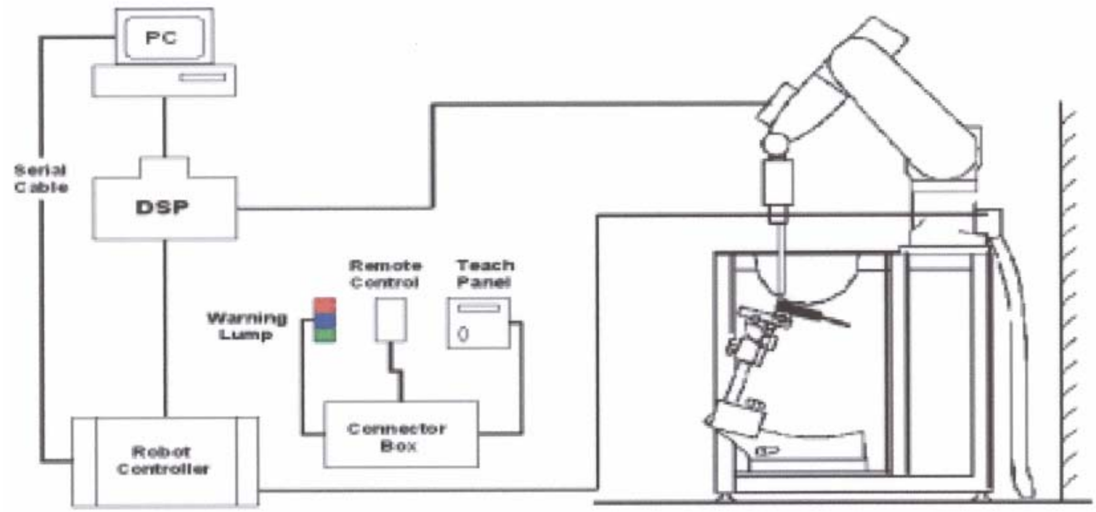



**Figure1. SAR Lab Test Measurement Set-up**

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

## ET3DV6 Probe Specification

| | |
|---|---|
| Construction | Symmetrical design with triangular core<br>Built-in optical fiber *for* surface detection System(ET3DV6 only)<br>Built-in shielding against static charges<br>PEEK enclosure material(resistant to organic solvents, e.q., glycol) |
| Calibration | In air from 10 MHz to 2.5 GHz<br>In brain and muscle simulating tissue at frequencies of 450MHz, 900MHz and 1.8GHz (accuracy±8%)<br>Calibration for other liquids and frequencies upon request |
| Frequency | l 0 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz) |
| Directivity | ±0.2 dB in brain tissue (rotation around probe axis)<br>±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<br>Tip length: 16mm<br>Body diameter: 12mm<br>Tip diarneter: 6.8mm<br>Distance from probe tip to dipole centers: 2.7mm |
| Application | General dosimetry up to 3GHz<br>Compliance tests of mobile phones<br>Fast automatic scanning in arbitrary phantoms |

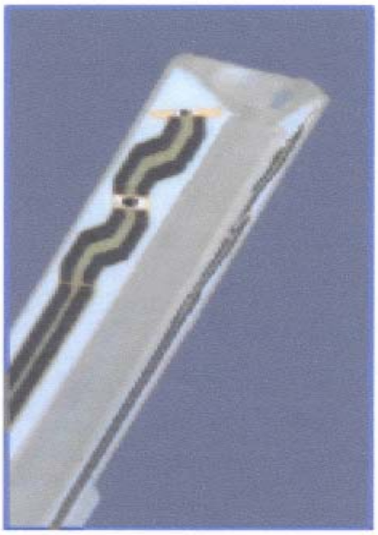


**Figure2. ET3DV6 E-field Probe**

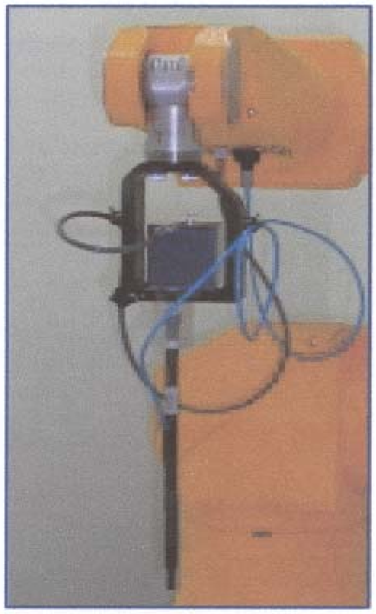


**Figure3. ET3DV6 E-field probe**

## 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.

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

Where: $\Delta t$ = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
$\Delta T$ = Temperature increase due to RF exposure.

Or

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

Where:
$\sigma$ = Simulated tissue conductivity,
$\rho$ = 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).

**Figure4. 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 l000 x 500 mm (H x L x W) |
| Available | Special |

**Figure5. Generic Twin Phantom**

## 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(Brain) 835MHz |
|---|---|
| Water | 41.5 |
| Sugar | 56 |
| Salt | 1.45 |
| Preventol | 0.1 |
| Cellulose | 1.0 |
| Dielectric Parameters Target Value | f=835MHz ε=41.5 σ=0.9 |

**Table 5: Composition of the Body Tissue Equivalent Matter**

| MIXTURE% | FREQUENCY(Body)835MHz |
|---|---|
| Water | 52.5 |
| Sugar | 45 |
| Salt | 1.4 |
| Preventol | 0.1 |
| Cellulose | 1.0 |
| Dielectric Parameters Target Value | f=835MHz ε=55.2 σ=0.97 |

## 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 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.
It specifies the measurement method for demonstration of compliance with the SAR limits for such equipments.
**IEEE 1528–2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.
**OET Bulletin 65 (Edition 97-01) and Supplement C (Edition 01-01):** Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits.
**IEC 62209-1:** Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures –Part 1: Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)

# 6 LABORATORY ENVIRONMENT

**Table 6: The Ambient Conditions during Test**

| | |
|---|---|
| Temperature | Min. = 18 °C, Max. = 25 °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.<br>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 Digital Radio Communication tester 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. These measurements were done at 3 channels 1013, 384 and 777 before SAR test and after SAR test.

### 7.2.2 Measurement result

**Table 7: Conducted Power Measurement Results**

| | **Conducted Power** | | |
|---|---|---|---|
| | **Channel 1013** | **Channel 384** | **Channel 777** |
| Before Test (dBm) | **24.5** | **24.3** | **24.1** |
| After Test (dBm) | **24.4** | **24.3** | **24.1** |

### 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 12 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

# 8 TEST RESULTS

## 8.1 Dielectric Performance

**Table 8: Dielectric Performance of Head Tissue Simulating Liquid**

| Measurement is made at temperature 22.5 °C and relative humidity 51%.<br>Liquid temperature during the test: 22.3°C | | | |
|---|---|---|---|
| / | **Frequency** | **Permittivity ε** | **Conductivity σ (S/m)** |
| **Target value** | 835 MHz | 41.50 | 0.90 |
| **Measurement value (Average of 10 tests)** | 835 MHz | 41.57 | 0.93 |

**Table 9: Dielectric Performance of Body Tissue Simulating Liquid**

| Measurement is made at temperature 22.5 °C and relative humidity 51%.<br>Liquid temperature during the test: 22.3°C | | | |
|---|---|---|---|
| / | **Frequency** | **Permittivity ε** | **Conductivity σ (S/m)** |
| **Target value** | 835 MHz | 55.20 | 0.97 |
| **Measurement value (Average of 10 tests)** | 835 MHz | 55.39 | 0.99 |

## 8.2 System Validation

**Table 10: System Validation**

| Measurement is made at temperature 23.2 °C, relative humidity 50%, input power 250 mW.<br>Liquid temperature during the test: 22.3°C | | | | | |
|---|---|---|---|---|---|
| **Liquid parameters** | | **Frequency** | **Permittivity ε** | **Conductivity σ (S/m)** | |
| | | 835 MHz | 42.8 | 0.89 | |
| **Verification results** | **Frequency** | **Target value (W/kg)** | | **Measurement value (W/kg)** | |
| | | **10 g Average** | **1 g Average** | **10 g Average** | **1 g Average** |
| | 835 MHz | 1.60 | 2.48 | 1.53 | 2.34 |

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 (Head, CDMA Cellular)

**Table 11: SAR Values (Head, CDMA Cellular)**

| Liquid Temperature: 22.5℃ | | | |
|---|---|---|---|
| **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, High frequency (See Fig.7) | 0.702 | 1.010 | -0.163 |
| Left hand, Touch cheek, Mid frequency(See Fig.9) | 0.552 | 0.803 | -0.138 |
| Left hand, Touch cheek, Low frequency (See Fig.11) | 0.764 | 1.100 | -0.151 |
| Left hand, Tilt 15 Degree, High frequency(See Fig.13) | 0.373 | 0.545 | -0.099 |
| Left hand, Tilt 15 Degree, Mid frequency(See Fig.15) | 0.303 | 0.432 | -0.147 |
| Left hand, Tilt 15 Degree, Low frequency(See Fig.17) | 0.406 | 0.576 | -0.166 |
| Right hand, Touch cheek, High frequency(See Fig.19) | 0.763 | 1.120 | -0.137 |
| Right hand, Touch cheek, Mid frequency(See Fig.21) | 0.649 | 0.948 | 0.092 |
| Right hand, Touch cheek, Low frequency(See Fig.23) | 0.817 | 1.200 | 0.097 |
| Right hand, Tilt 15 Degree, High frequency(See Fig.25) | 0.348 | 0.499 | 0.045 |
| Right hand, Tilt 15 Degree, Mid frequency(See Fig.27) | 0.293 | 0.419 | 0.133 |
| Right hand, Tilt 15 Degree, Low frequency(See Fig.29) | 0.387 | 0.550 | -0.128 |

## 8.4 Summary of Measurement Results (Body, CDMA Cellular)

**Table 12: SAR Values (Body, CDMA Cellular, Distance 20mm)**

| Liquid Temperature: 22.4℃ | | | |
|---|---|---|---|
| **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, High frequency(See Fig.31) | 0.295 | 0.413 | -0.107 |
| Body, Towards Phantom, Mid frequency(See Fig.33) | 0.255 | 0.355 | -0.197 |
| Body, Towards Phantom, Low frequency(See Fig.35) | 0.322 | 0.449 | -0.146 |
| Body, Towards Ground, High frequency(See Fig.37) | 0.650 | 0.897 | -0.110 |
| Body, Towards Ground, Mid frequency(See Fig.39) | 0.583 | 0.805 | 0.037 |
| Body, Towards Ground, Low frequency(See Fig.41) | 0.689 | 0.949 | 0.148 |

### 8.5 Conclusion

Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause 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<br>(95% CONFIDENCE INTERVAL) | | | K=2 | | | 22.5 | |

## 10 MAIN TEST INSTRUMENTS

**Table 13: List of Main Instruments**

| No. | Name | Type | Serial Number | Calibration Date | Valid Period |
|---|---|---|---|---|---|
| 01 | Network analyzer | Agilent 8753E | US37390326 | September 19, 2006 | One year |
| 02 | Dielectric Probe Kit | Agilent 85070E | US44020115 | No Calibration Requested | |
| 03 | Power meter | Agilent E4417A | GB41291714 | January 25, 2007 | One year |
| 04 | Power sensor | Agilent 8481H | MY41091316 | January 25, 2007 | |
| 05 | Signal Generator | HP 8341B | 2730A00804 | September 15 2006 | One year |
| 06 | Amplifier | IXA-020 | 0401 | No Calibration Requested | |
| 07 | Validation Kit 835MHz | SPEAG D835V2 | 443 | February 19, 2007 | Two years |
| 08 | BTS | E5515C | GB46490218 | December 16,2006 | One year |
| 09 | E-field Probe | ET3DV6 | 1737 | February 20, 2007 | One year |
| 10 | DAE | DAE3 | 452 | September 18, 2006 | One year |

## 11 TEST PERIOD

The test is performed from Aug. 28th, 2007 to Aug.29th, 2007.

## 12 TEST LOCATION

The test is performed at TA Technology (Shanghai) Co., Ltd.

***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 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.

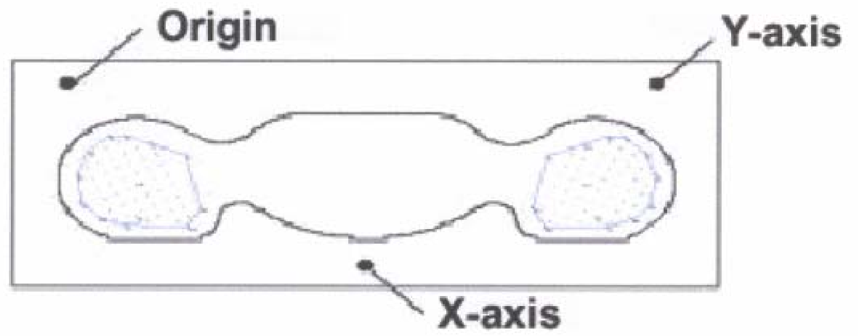
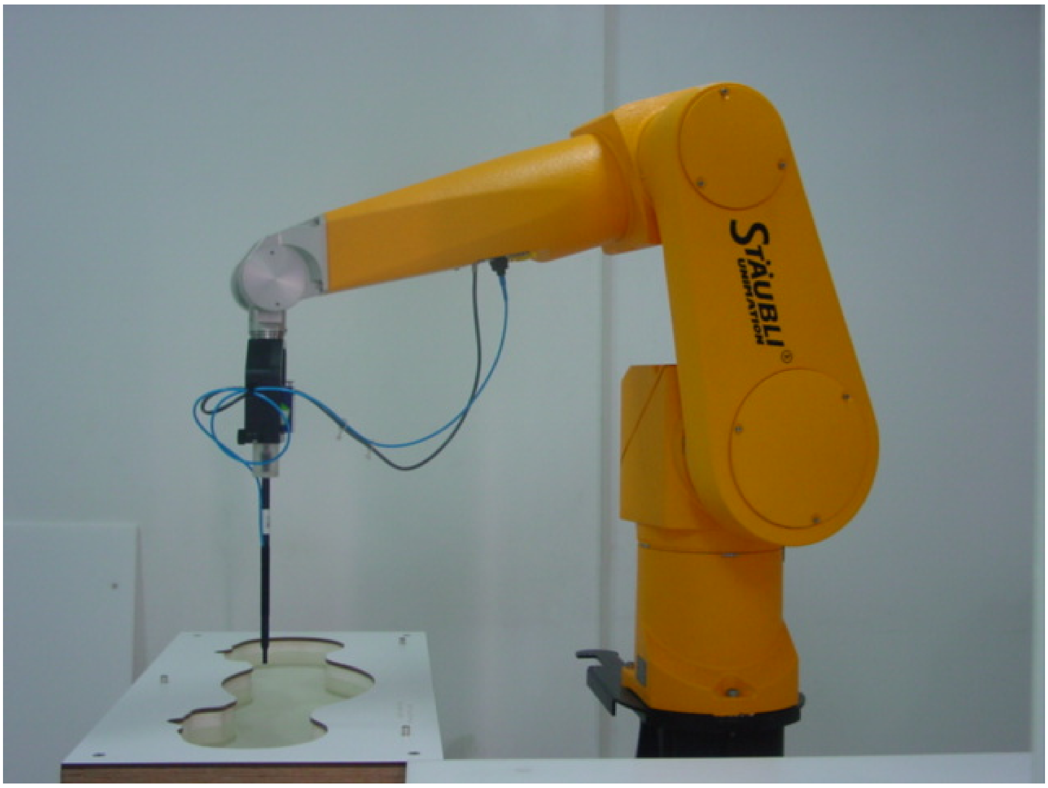
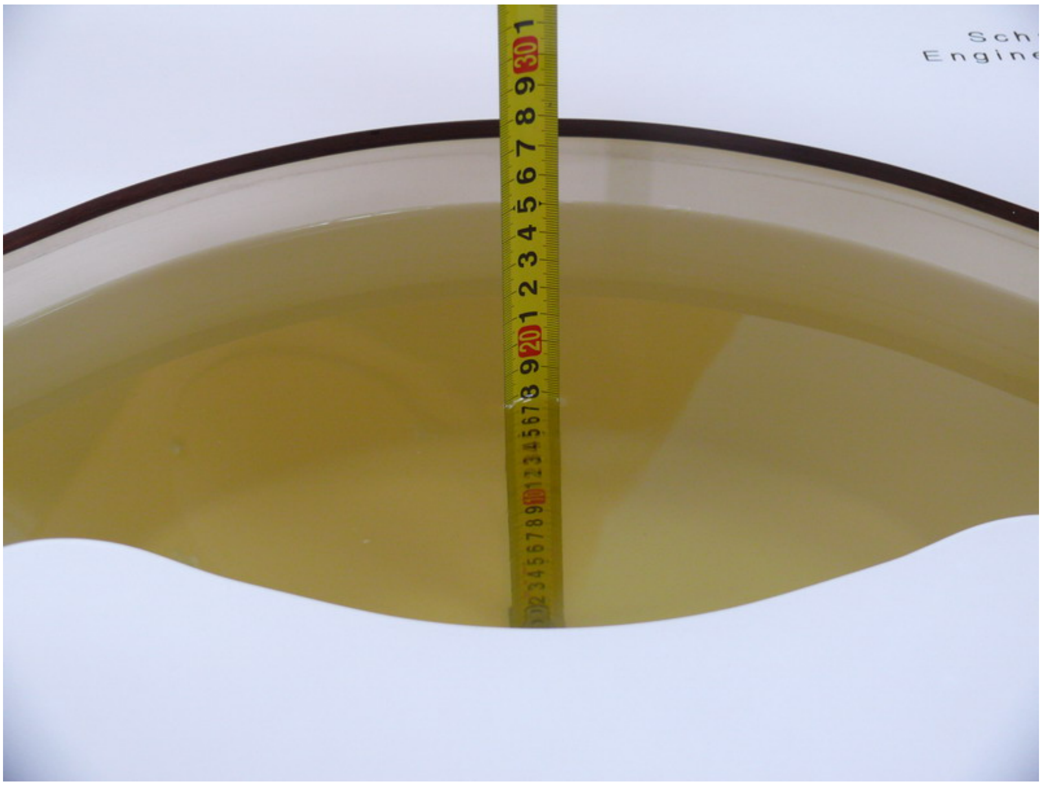



**Figure 6 SAR Measurement Points in Area Scan**

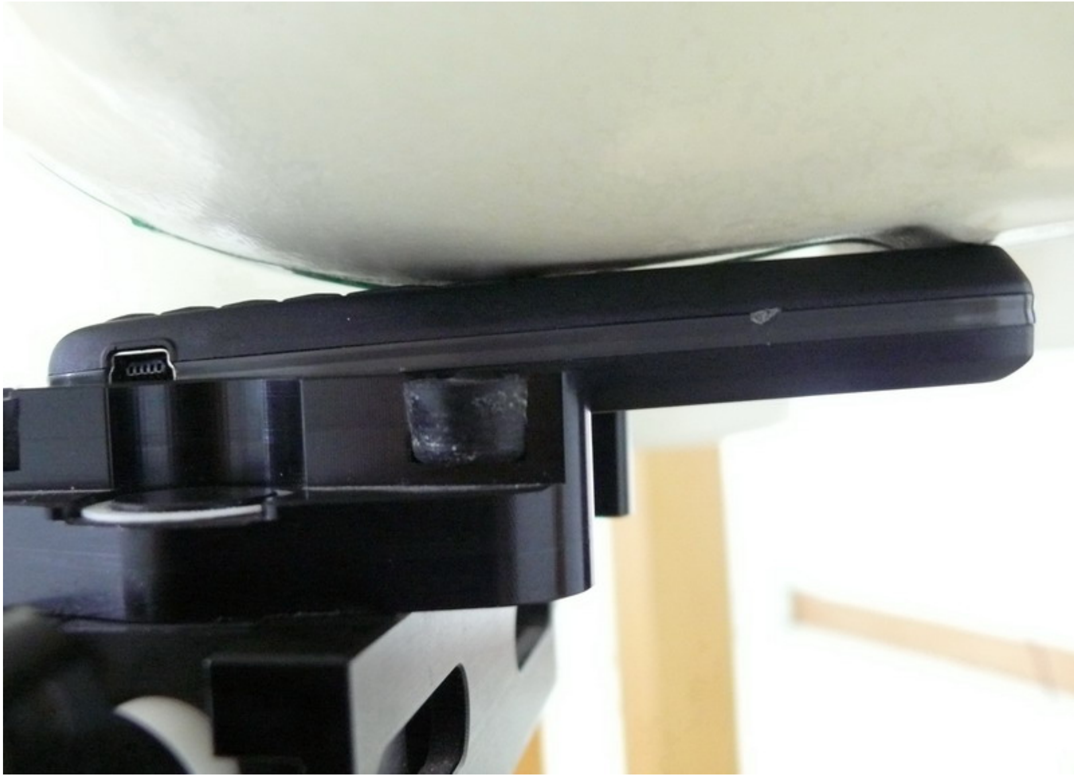
## ANNEX B: TEST LAYOUT



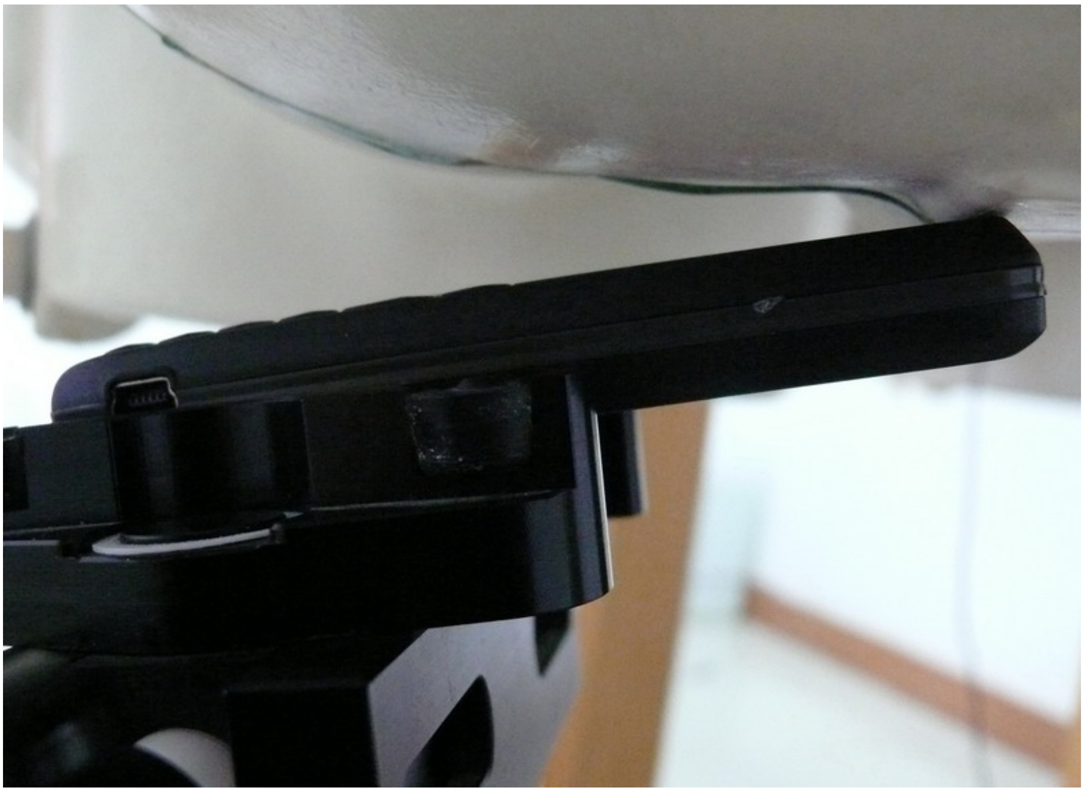

Picture 2 Specific Absorption Rate Test Layout



Picture 3 Liquid depth in the Flat Phantom (835 MHz)

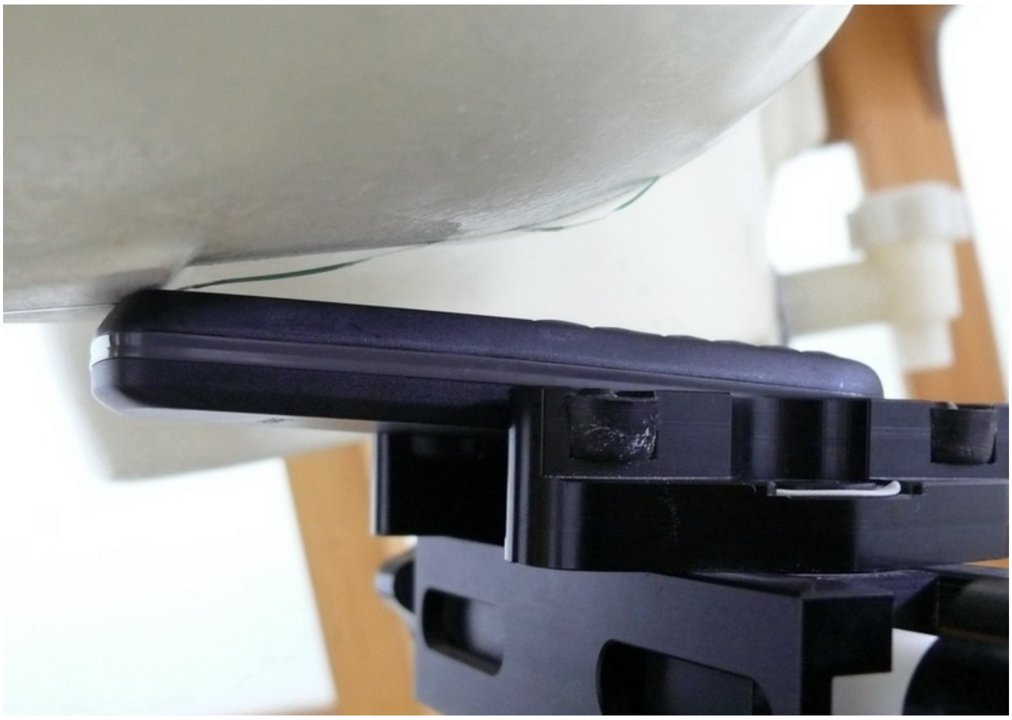


Picture 4 Left Hand Touch Cheek Position



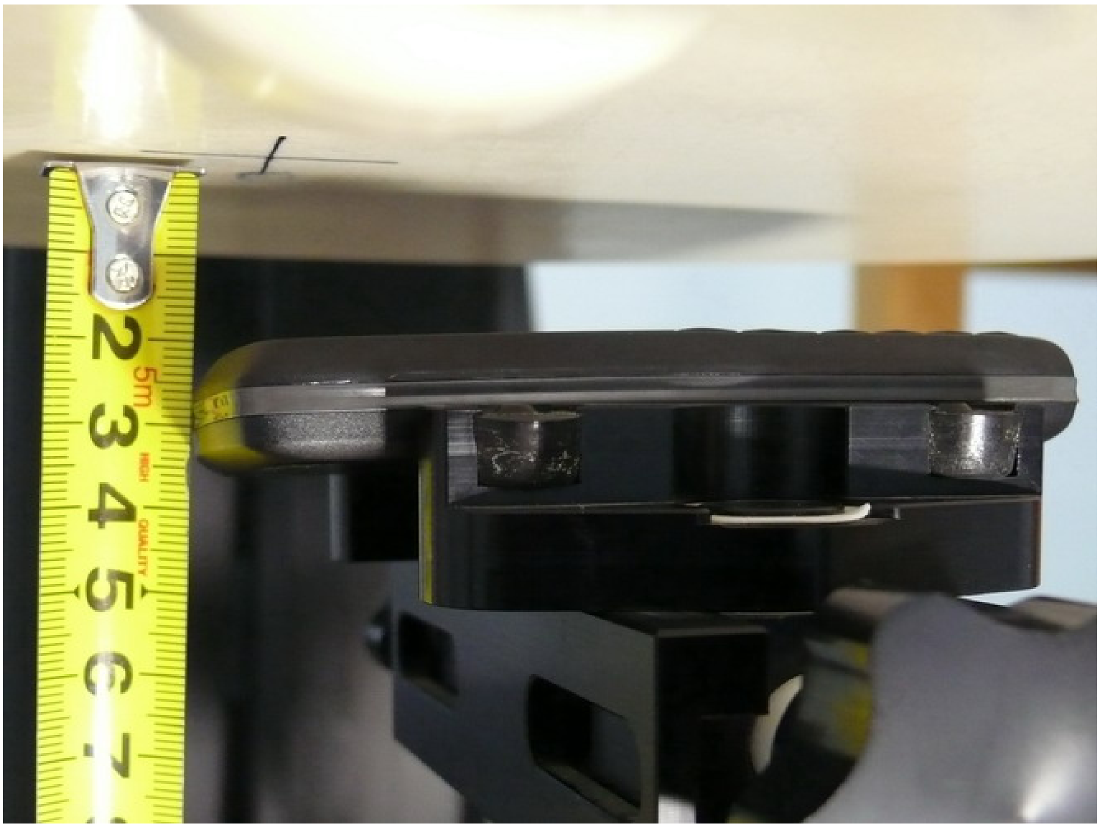
Picture 5 Left Hand Tilt 15 Degree Position

Picture 6 Right Hand Touch Cheek Position



Picture 7 Right Hand Tilt 15 Degree Position

Picture 8 Body, towards the ground, the distance from handset to the bottom of the Phantom is 20mm)



Picture 9 Body, towards the Phantom, the distance from handset to the bottom of the Phantom is 20mm)

## ANNEX C： GRAPH RESULTS

**CDMA Cellular Left Cheek High**

Communication System: CDMA Cellular; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: Head 835MHz

Medium parameters used (interpolated): f = 848.31 MHz; $\sigma$ = 0.942 mho/m; $\varepsilon_r$ = 41.5; $\rho$ = 1000 kg/m$^3$

- Probe: ET3DV6 - SN1737 ConvF(6.85, 6.85, 6.85);
- Electronics: DAE3 Sn452;

**Left Cheek High/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.16 mW/g

**Left Cheek High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.2 V/m; Power Drift = -0.163 dB

Peak SAR (extrapolated) = 1.37 W/kg

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.702 mW/g**

Maximum value of SAR (measured) = 1.09 mW/g

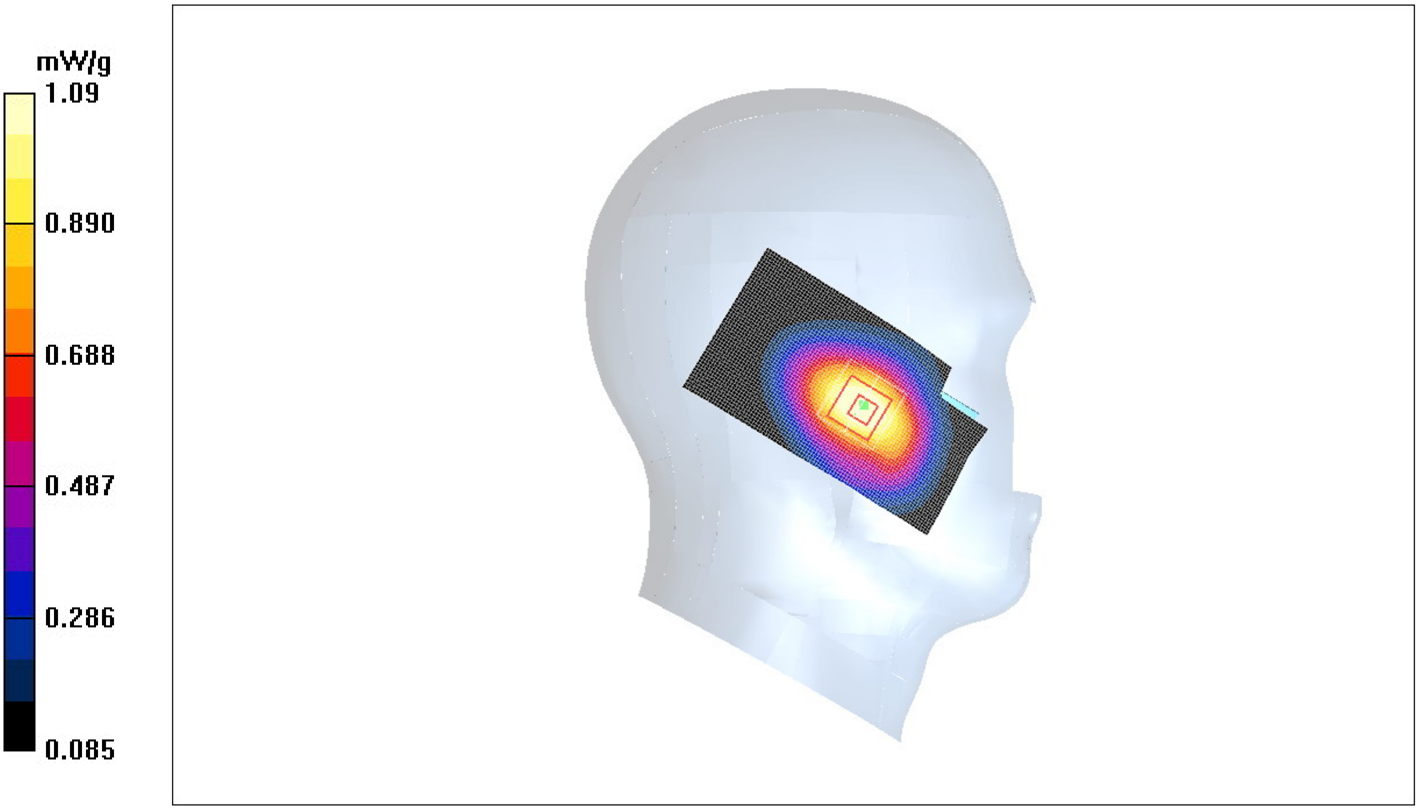



**Fig. 7 Left Hand Touch Cheek CDMA Cellular CH777**

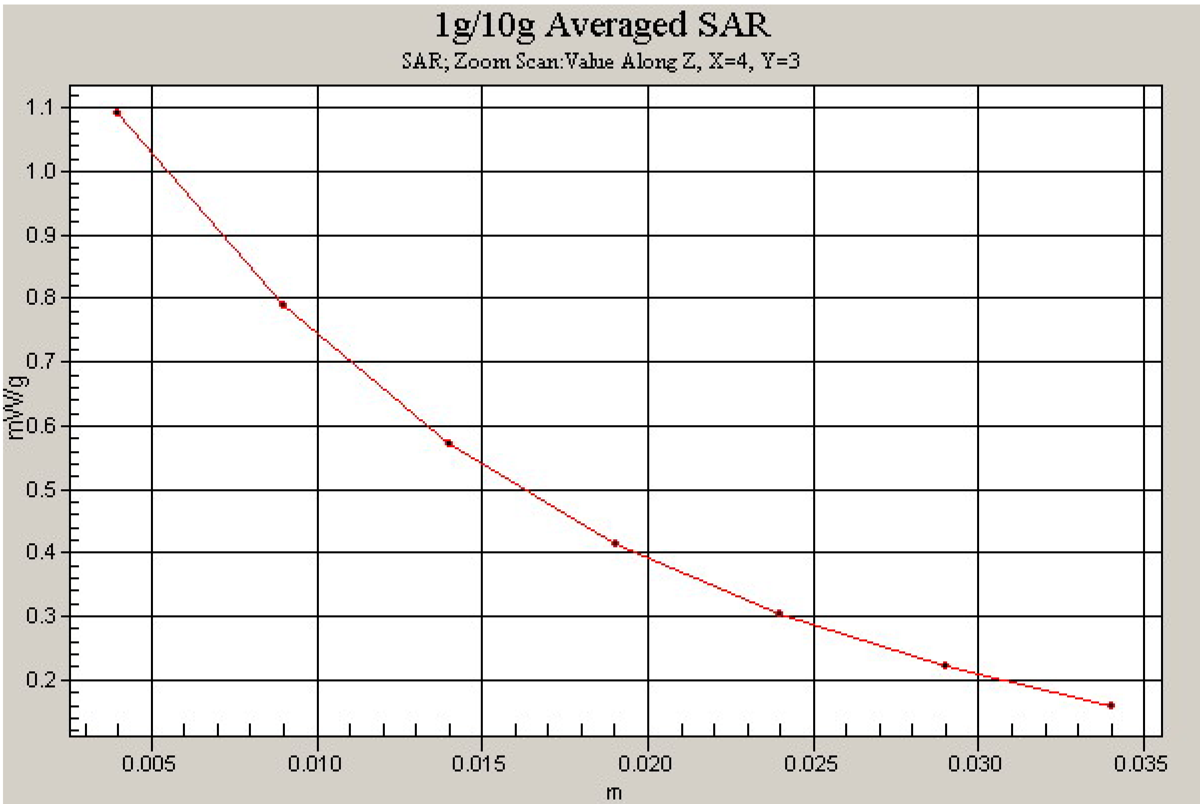



**Fig. 8 Z-Scan at power reference point (CDMA Cellular CH777)**

**CDMA Cellular Left Cheek Middle**
Communication System: CDMA Cellular; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: Head 835MHz
Medium parameters used: f = 837 MHz; σ = 0.936 mho/m; $\varepsilon_r$ = 41.8; ρ = 1000 kg/$m^3$
- Probe: ET3DV6 - SN1737 ConvF(6.85, 6.85, 6.85);
- Electronics: DAE3 Sn452;

**Left Cheek Middle/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.924 mW/g

**Left Cheek Middle/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.0 V/m; Power Drift = -0.138 dB
Peak SAR (extrapolated) = 1.16 W/kg
**SAR(1 g) = 0.803 mW/g; SAR(10 g) = 0.552 mW/g**
Maximum value of SAR (measured) = 0.878 mW/g

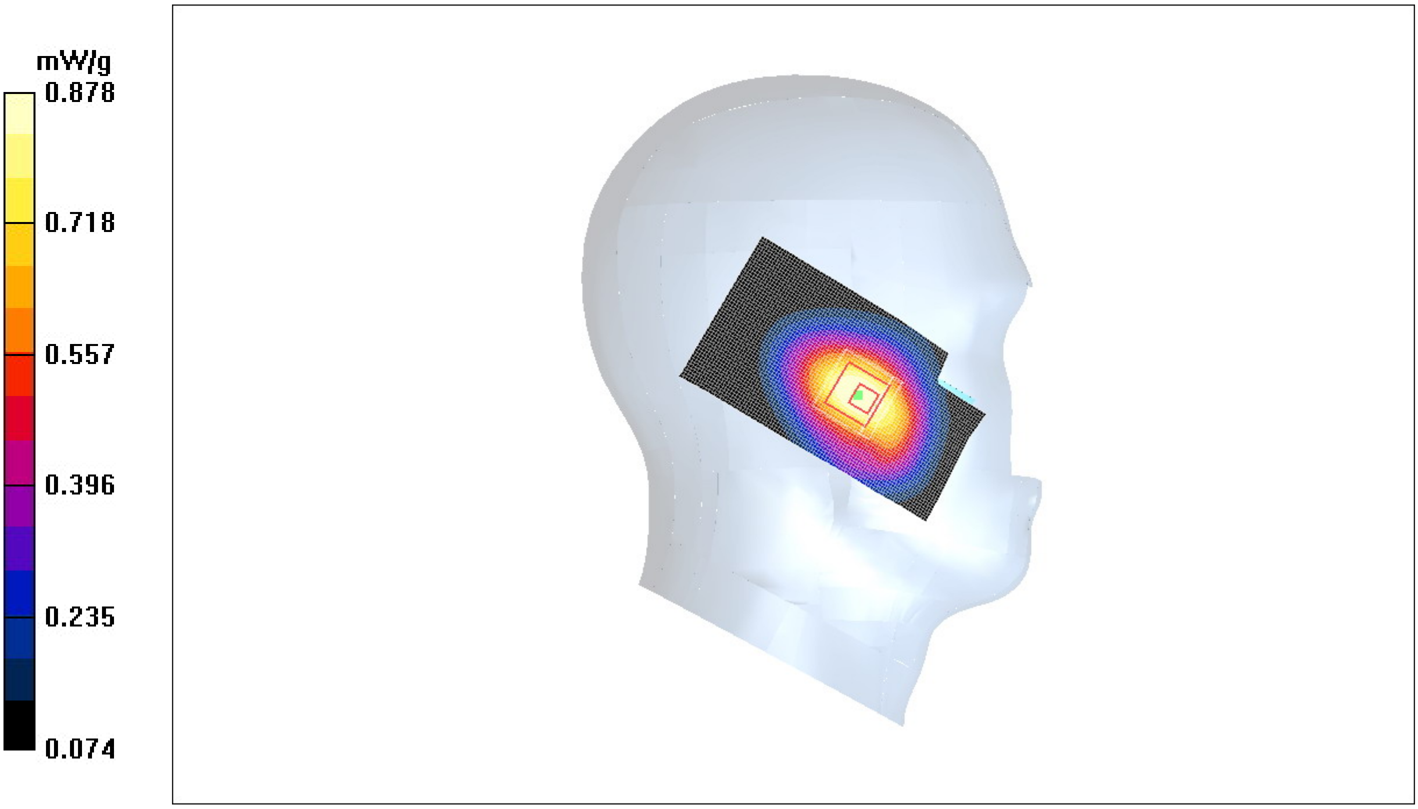



**Fig. 9 Left Hand Touch Cheek CDMA Cellular CH384**

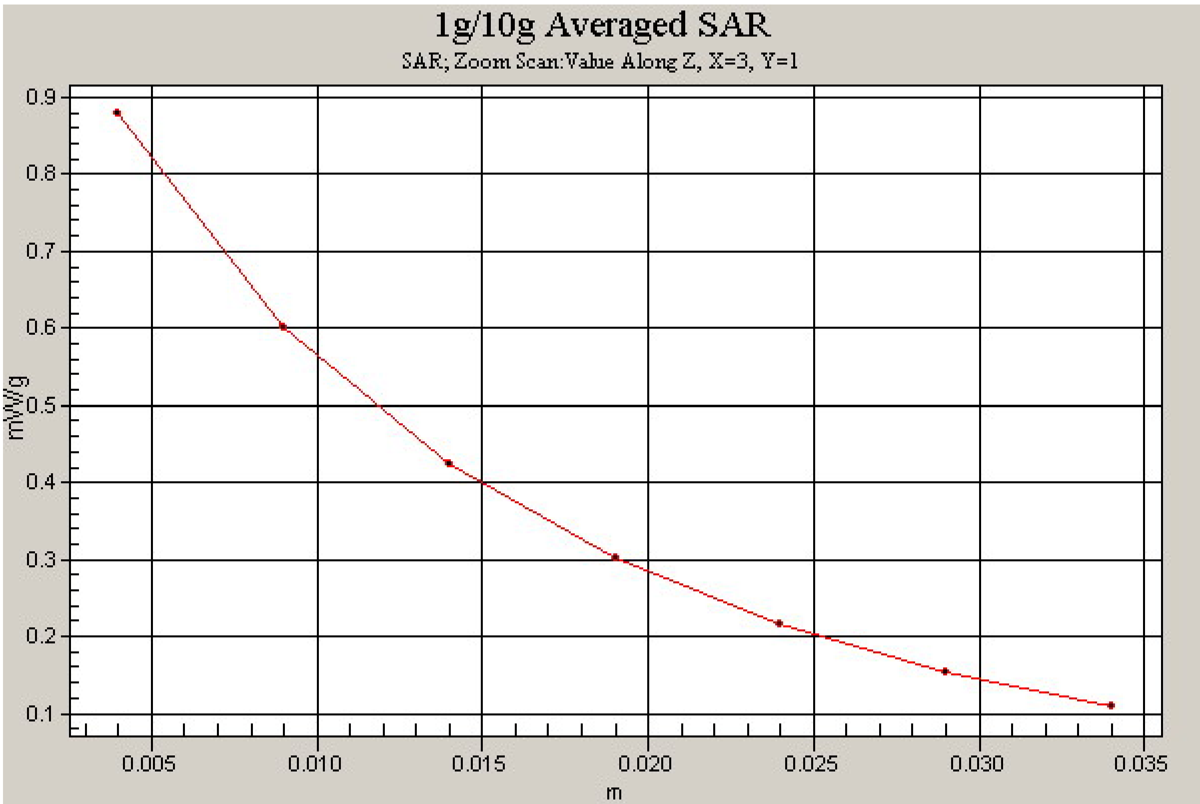



**Fig. 10 Z-Scan at power reference point (CDMA Cellular CH384)**

**CDMA Cellular Left Cheek Low**
Communication System: CDMA Cellular; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: Head 835MHz
Medium parameters used: f = 825 MHz; σ = 0.925 mho/m; $\varepsilon_r$ = 42; ρ = 1000 kg/$m^3$
- Probe: ET3DV6 - SN1737 ConvF(6.85, 6.85, 6.85);
- Electronics: DAE3 Sn452;

**CDMA Cellular Left Cheek Low/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.22 mW/g

**CDMA Cellular Left Cheek Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.151 dB
Peak SAR (extrapolated) = 1.55 W/kg
**SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.764 mW/g**
Maximum value of SAR (measured) = 1.18 mW/g

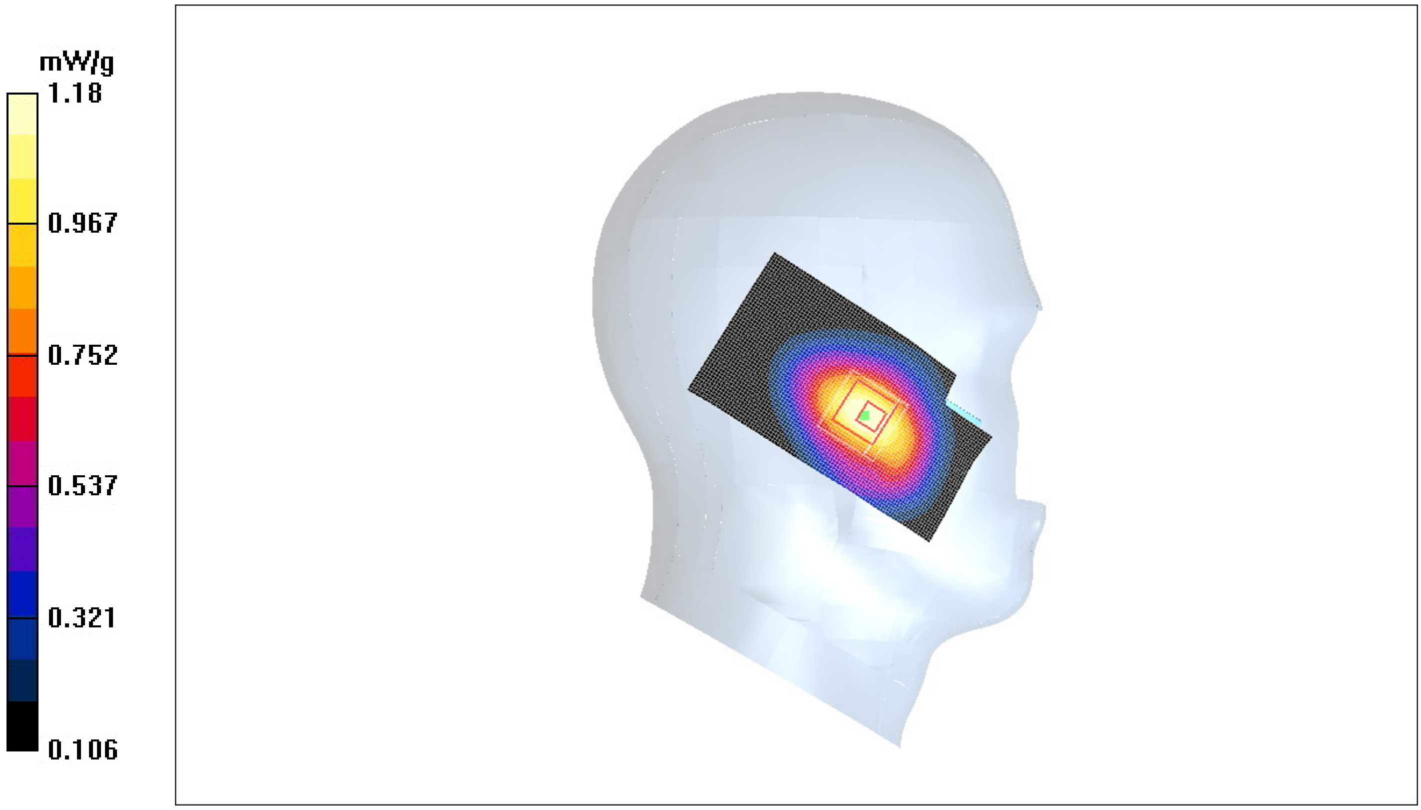



**Fig. 11 Left Hand Touch Cheek CDMA Cellular CH1013**

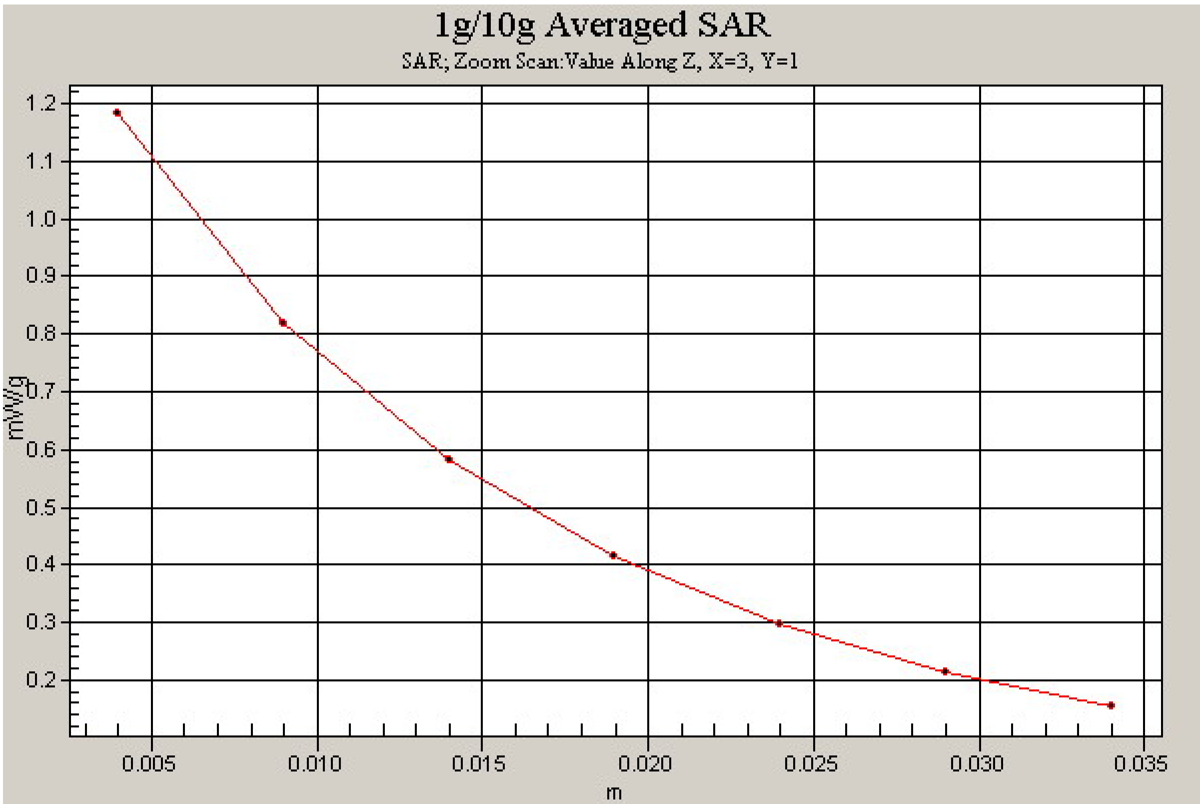



**Fig. 12 Z-Scan at power reference point (CDMA Cellular CH1013)**

**CDMA Cellular Left Tilt High**
Communication System: CDMA Cellular; Frequency: 848.31 MHz; Duty Cycle: 1:1
Medium: Head 835MHz
Medium parameters used (interpolated): f = 848.31 MHz; σ = 0.942 mho/m; $\varepsilon_r$ = 41.5; ρ = 1000 kg/m$^3$
- Probe: ET3DV6 - SN1737 ConvF(6.85, 6.85, 6.85);
- Electronics: DAE3 Sn452;

**CDMA Cellular Left Tilt High/Area Scan (51x91x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.613 mW/g

**CDMA Cellular Left Tilt High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = -0.099 dB
Peak SAR (extrapolated) = 0.759 W/kg
**SAR(1 g) = 0.545 mW/g; SAR(10 g) = 0.373 mW/g`**
Maximum value of SAR (measured) = 0.582 mW/g

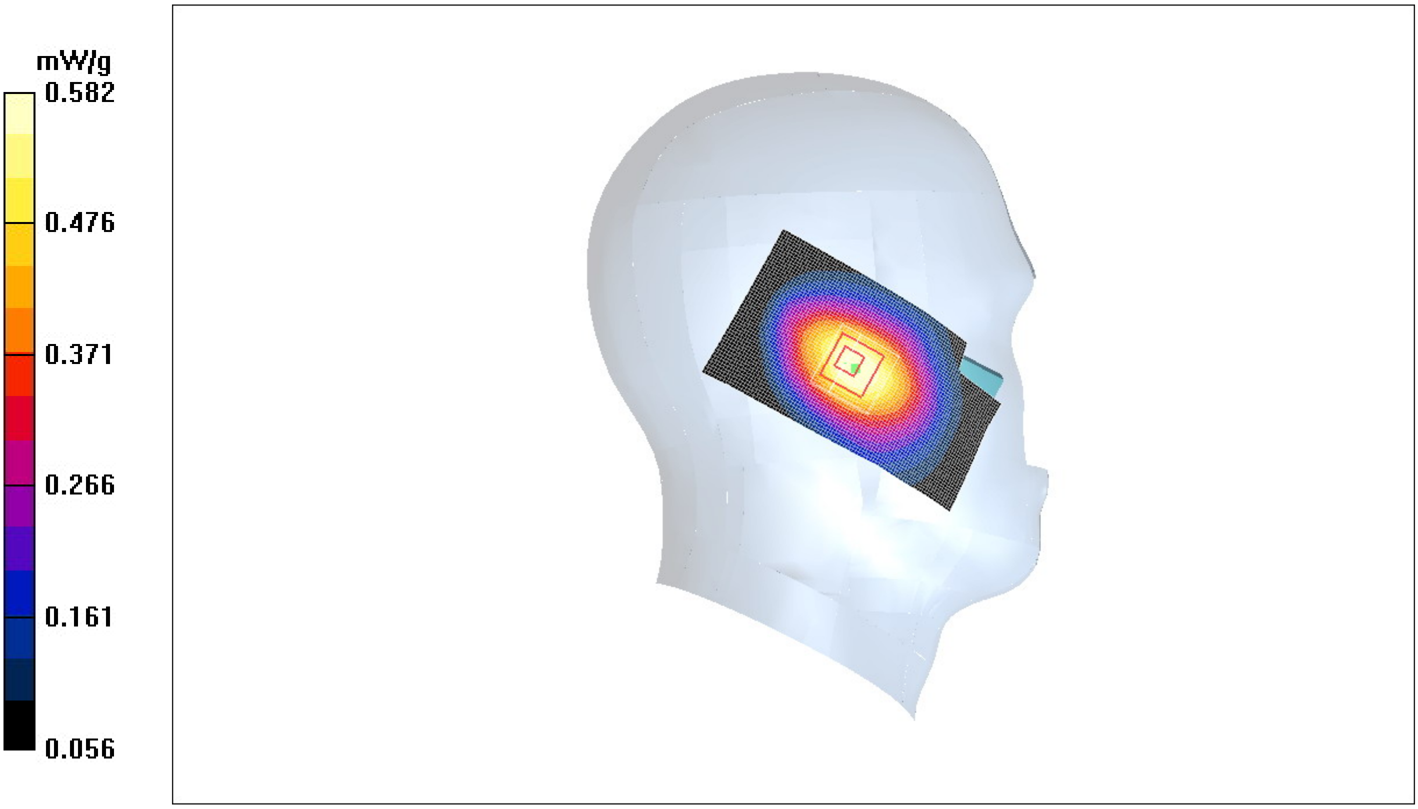



**Fig. 13 Left Hand Tilt 15° CDMA Cellular CH777**

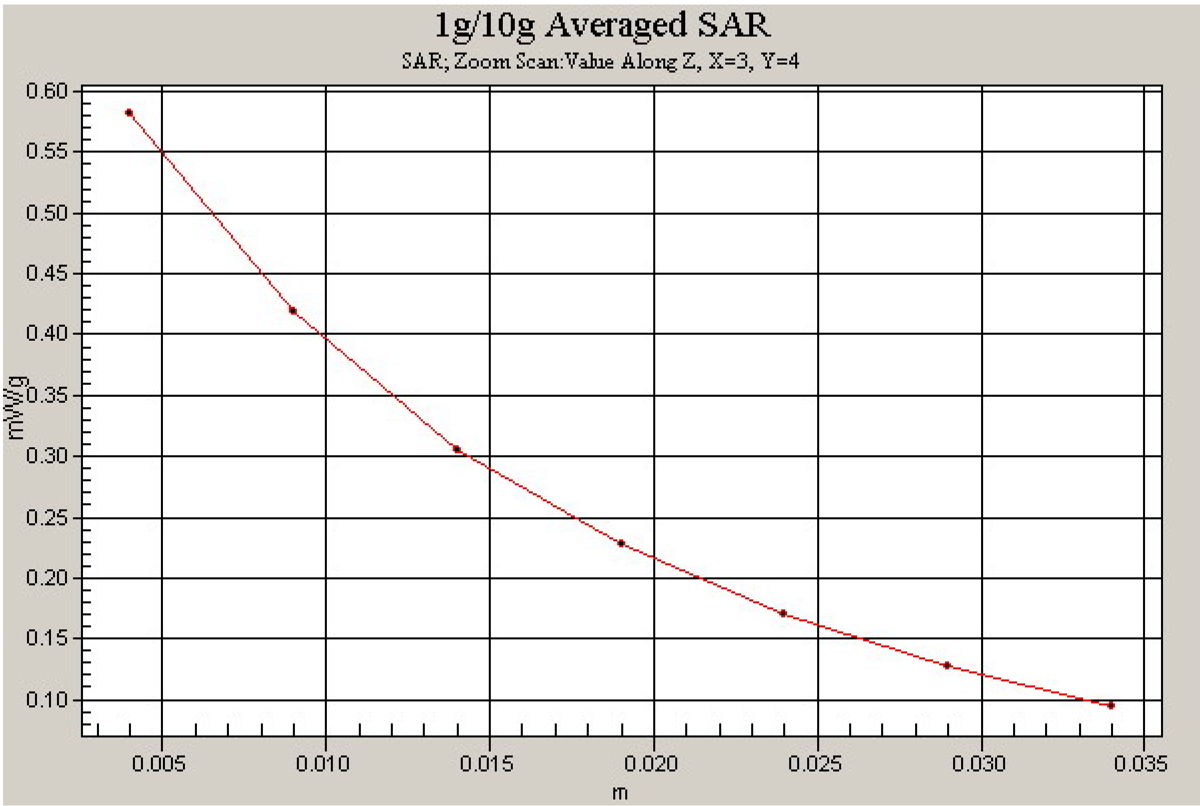



**Fig. 14 Z-Scan at power reference point (CDMA Cellular CH777)**