

FCC SAR

TEST REPORT

of

CDMA 1X digital mobile phone

Model Name: one touch 219C

Brand Name: ALCATEL

Trade Name: ALCATEL

Report No: SH11100011S01

FCC ID: R5C219C

prepared for

Huizhou TCL Mobile Communication Co.,Ltd
NO.23 Zone, ZhongKai High Technology Development Zone



prepared by

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Report No: SH11100011S01

GENERAL SUMMARY

| | | | |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|------------------------------------------|
| Product Name | CDMA 1X digital mobile phone | Model | one touch 219C |
| Trade Name | ALCATEL | Carrier | Ji Jianjun |
| Quantity of EUT | One | Manufacturer | Huizhou TCL Mobile Communication Co.,Ltd |
| Standard(s) | <p>ANSI C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fieldst.</p> <p>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.</p> <p>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.</p> <p>KDB941225 D01 SAR test for 3G devices v02: SAR Measurement Procedures for 3G Devices CDMA 2000/EV-Do WCDMA/HSDPA/HSPA</p> | | |
| Conclusion | <p>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.</p> <p>General Judgment: Pass</p> <p>Date of issue: Oct 24. 2011</p> | | |
| Comment | <p>TX Freq. Band:824.70-848.31MHz(CDMA2000 1xRTT Cellular)</p> <p>RX Freq. Band:869.70-893.37MHz(CDMA2000 1xRTT Cellular)</p> <p>Antenna: build outside</p> <p>The test result only responds to the measured sample.</p> | | |

Tested by: Shi Feng, Date: 2011. 10. 26

Checked by: Zhang Jun, Date: 2011. 10. 26

Approved by: Wei Bei, Date: 2011. 10. 26.

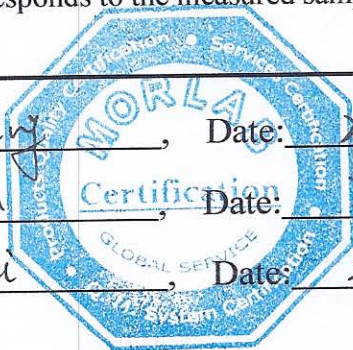


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1 GENERAL CONDITIONS

This report only refers to the item that has undergone the test. This report standalone does not constitute or imply by its own an approval of the product by the certification Bodies or competent Authorities.

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2 Administrative Data

2.1 Identification of the Responsible Testing Laboratory

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**Responsible Test Lab
Managers:** Mr. Shu Luan

2.2 Identification of the Responsible Testing Location(s)

Company Name: Shenzhen Electronic Product Quality Testing Center Morlab
Laboratory
Address: 3Fl, Electronic Testing Building, ShaHe Road, NanShan District,
Shenzhen, P. R. China

2.3 Organization Item

Morlab Report No.: SH11100011S01
Morlab Project Leader: Mr. Zhang Jun
**Morlab Responsible for
Accreditation scope:** Mrs. Wei Bei
Start of Testing: 2011-10-24
End of Testing: 2011-10-24

2.4 Identification of Applicant

Company Name: Huizhou TCL Mobile Communication Co.,Ltd
Address: NO.23 Zone, ZhongKai High-Technology Development Zone
Contact person: Ji Jianjun
Telephone: 0755-33035352
Fax: 0755-33313007

2.5. Identification of Manufacture

Company Name: Huizhou TCL Mobile Communication Co.,Ltd
Address: NO.23 Zone, ZhongKai High-Technology Development Zone

Notes: This data is based on the information offered by the applicant.

3 Equipment Under Test (EUT)

3.1. Identification of the Equipment under Test

| | | | | |
|-----------------------------|------------------------------|-------------------------------------------|--|--|
| Product Name: | CDMA 1X digital mobile phone | | | |
| Brand name: | ALCATEL | | | |
| Model No: | one touch 219C | | | |
| General description: | Test frequency | CDMA2000 1xRTT Cellular | | |
| | Accessories | Battery,Charger, | | |
| | Battery Model | CAB23X0002C1 | | |
| | Battery specification | 3.7V 1200mAh | | |
| | Battery Manufacture | Zhuhai sunnda Technology co.,LTD | | |
| | | NO 16DexiangRd,LianwanDist,Pingsha | | |
| | | Town,Jinwan,Zhuhai | | |
| | Charger Model | WIN350mA5V00_00 | | |
| | Charger specification | AC100-240V, 150mA,50-60Hz | | |
| | | DC5V,350mA | | |
| | Charger Manufacture | BYD COMPANY LIMITED | | |
| | | NO.1,BAO PING ROAD,BAOLONG | | |
| | | INDUSTRIAL TOWN, LONGGANG | | |
| | | SHENZHEN,518116,P.R.CHINA | | |
| | Antenna type | CDMA2000 1xRTT | | |
| | Modulation mode | BPSK 、 8PSK 、 QPSK 、 HPSK 、 16QAM 、 OQPSK | | |

3.2. Identification of all used Test Sample of the Equipment under Test

| EUT Code | Serial Number | Hardware Version | Software Version | IMEI |
|----------|---------------|------------------|--------------------------|------|
| #1 | N.A | CS11_V1.2 | CS11_MTIN_V1.1(20110924) | / |

NOTE:

1. The EUT consists of CDMA 1X digital mobile phone and normal options: Charger, Lithium Battery as listed above.
2. Please refer to Appendix C for the photographs of the EUT. For a more detailed features description of the EUT, please refer to its User's Manual.
3. Testing for General Population/Uncontrolled limits.
4. The EUT is production unit.

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 TCH is allocated to is allocated to 1013, 384 and 777 respectively in the case of CDMA2000 1x RTT Cellular. The EUT is commanded to operate at maximum transmitting power.

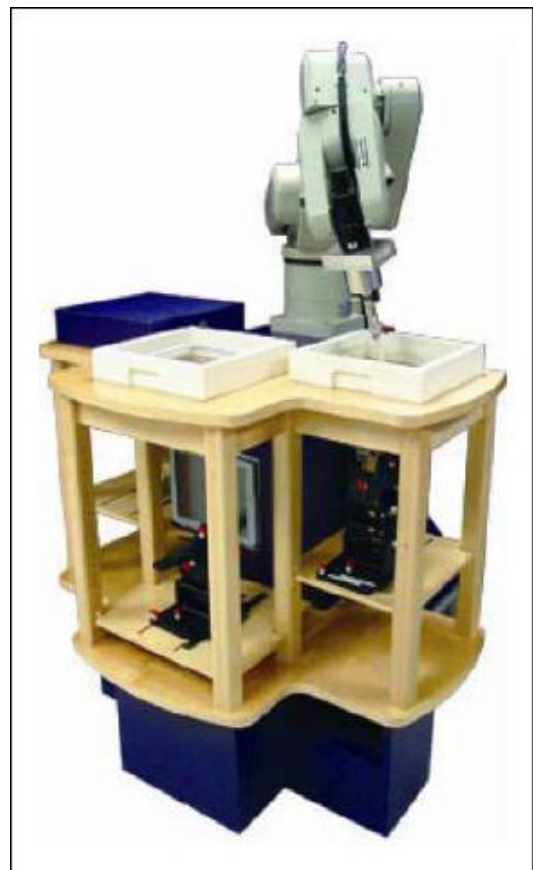
The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the 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 35 dB.

4.2 SAR Measurement System

ALSAS-10-U is fully compliant with the technical and scientific requirements of IEEE 1528, IEC 62209, CENELEC, ARIB, ACA, and the Federal Communications Commission. The system comprises of a six axes articulated robot which utilizes a dedicated controller. ALSAS-10U uses the latest methodologies and FDTD order to provide a platform which is repeatable with minimum uncertainty.

Applications Predefined measurement procedures compliant with the guidelines of CENELEC, IEEE, IEC, FCC, etc are utilized during the assessment for the device. Automatic detection for all SAR maxima are embedded within the core architecture for the system, ensuring that peak locations used for centering the zoom scan are within a 1mm resolution and a 0.05mm repeatable position. System operation range currently is available up to 6 GHz in simulated tissue.



4.2.1 Robot system specification

ALSAS-10U utilizes a six articulated robot, which is controlled using a Pentium based real-time movement controller. The movement kinematics engine utilizes proprietary (Thermo CRS) interpolation and extrapolation algorithms, which allow full freedom of movement for each of the six joints within the working envelop. Utilization of joint 6 allows for full probe rotation with a tolerance better than 0.05mm around the central axis.



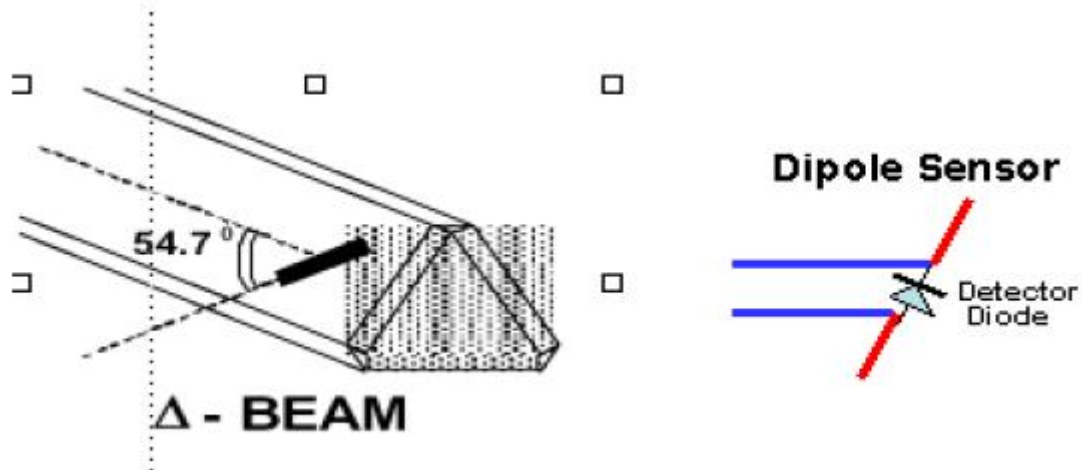
| | |
|--------------------------------------|-----------------------------------|
| Robot/Controller Manufacturer | Thermo CRS |
| Number of Axis | Six independently controlled axis |
| Positioning Repeatability | 0.05mm |
| Controller Type | Single phase Pentium based C500C |
| Robot Reach | 710mm |
| Communication | RS232 and LAN compatible |

4.2.2 Probe Specification

The isotropic E-Field probe has been fully calibrated and assessed for isotropic, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change. A number of methods is used for calibrating probes, and these are outlined in the table below:

| Calibration Frequency | Air Calibration | Tissue Calibration |
|------------------------------|------------------------|---------------------------|
| 850MHZ | TEM Cell | Temperature |
| 1900MHZ | TEM Cell | Temperature |

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



SAR is assessed with a calibrated probe which moves at a default height of 5mm from the center of the diode, which is mounted to the sensor, to the phantom surface (in the Z Axis). The 5mm offset height has been selected so as to minimize any resultant boundary effect due to the probe being in close proximity to the phantom surface.

The following algorithm is an example of the function used by the system for linearization of the output from the probe when measuring complex modulation schemes.

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

Isotropic E-Field Probe Specification

| | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| Calibration in Air | Frequency Dependent Below 2GHz Calibration in air performed in a TEM Cell Above 2GHz Calibration in air performed in waveguide |
| Sensitivity | 0.70 $\mu\text{V}/(\text{V}/\text{m})^2$ to 0.85 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Dynamic Range | 0.0005 W/kg to 100W/kg |
| Isotropic Response | Better than 0.2dB |
| Diode Compression point (DCP) | Calibration for Specific Frequency |
| Probe Tip Radius | < 5mm |
| Sensor Offset | 1.56 (+/- 0.02mm) |
| Probe Length | 290mm |
| Video Bandwidth | @ 500 Hz: 1dB @1.02 KHz: 3dB |
| Boundary Effect | Less than 2% for distance greater than 2.4mm |
| Spatial Resolution | Diameter less than 5mm Compliant with Standards |

Boundary detection Unit and Probe Mounting Device

ALSAS-10U incorporates a boundary detection unit with a sensitivity of 0.05mm for detecting all types of surfaces. The robust design allows for detecting during probe tilt (probe normalize) exercises, and utilizes a second stage emergency stop. The signal electronics are directly into the robot controller for high accuracy surface detection in lateral and axial detection modes (X, Y, &Z). The probe is mounted directly onto the Boundary Detection unit for accurate tooling and displacement calculations controlled by the robot kinematics. The probe is connected to an isolated probe interconnect where the output stage of the probe is fed directly into the amplifier stage of the Daq-Paq.

Daq-Paq (Analog to Digital Electronics)

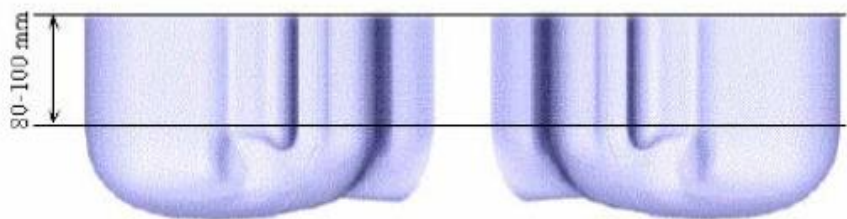
ALSAS-10U incorporates a fully calibrated Daq-Paq (analog to digital conversion system) which has a 4 channel input stage, sent via a 2 stage auto-set amplifier module. The input signal is amplified accordingly so as to offer a dynamic range from $5\mu\text{ V}$ to 800mV. Integration of the fields measured is carried out at board level utilizing a Co-Processor which then sends the measured fields down into the main computational module in digitized form via a RS232 communications port. Probe linearity and duty cycle compensation is carried out within the main Daq-Paq module.

| | |
|--------------------------|-----------------------------------------------------------------|
| ADC | 12 Bit |
| Amplifier Range | 20mV to 200mV and 150mV to 800mV |
| Field Integration | Local Co-Processor utilizing proprietary integration algorithms |
| Number of Input Channels | 4 in total 3 dedicated and 1 spare |
| Communication | Packet data via RS232 |

4.2.3 Phantoms, Device Holder and Simulant Liquid

4.2.3.1 Sam Phantom

The SAM phantoms developed using the IEEE SAM CAD file. They are fully compliant with the requirements for both IEEE 1528 and FCC Supplement C. Both the left and right SAM phantoms are interchangeable, transparent and include the IEEE 1528 grid with visible NF and MB lines.



APREL Laboratories Universal Phantom

The Universal Phantom is used on the ALSAS-10U as a system validation phantom. The Universal Phantom has been fully validated both experimentally from 800MHz to 6GHz and numerically using XFDTD numerical software. The shell thickness is 2mm overall, with a 4mm spacer located at the NF/MB intersection providing an overall thickness of 6mm in line with the requirements of IEEE-1528.

The design allows for fast and accurate measurements, of handsets, by allowing the conservative SAR to be evaluated at on frequency for both left and right head experiments in one measurement.



Device and Dipole Holder

ALSAS Universal Workstation

ALSAS Universal workstation allows for repeatability and fast adaptability. It allows users to do calibration, testing and measurement using different types of phantoms with one set up, which significantly speeds up the measurement process.

Universal Device Positioner

The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales which form the design used to indicate positioning for any given test scenario in all major axes. A 15° tilt movements for head SAR analysis. Overall uncertainty for measurements has been reduced due to the design of the Universal device positioner, which allows positioning of a device in as near to a free-space scenario as possible, and by providing the means for complete repeatability.



4.2.3.2 Tissue Simulating Liquids

There is no simulating liquids that can cover all frequency bands. Therefore, our system is using different liquids for the measured band as explained bellows.

The parameters of the simulating solution strongly influence the SAR values. The different normalization organizations have defined adapted solutions for the each mobile system.

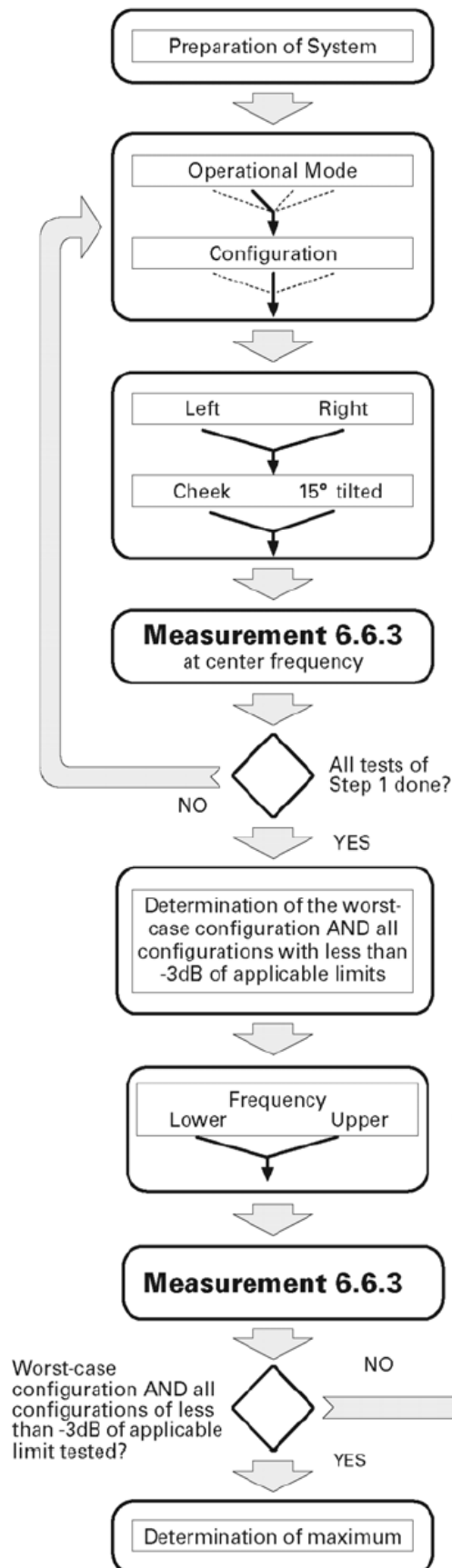
GSM liquid: is made of Sugar, de-ionized water and NaCl, reconstituting the electric properties of human tissues at 850MHz.

PCS Liquid: is made of de-ionized water, Glycol monobutyl and NaCl, reconstituting the electric properties of human tissues at 1900MHz.

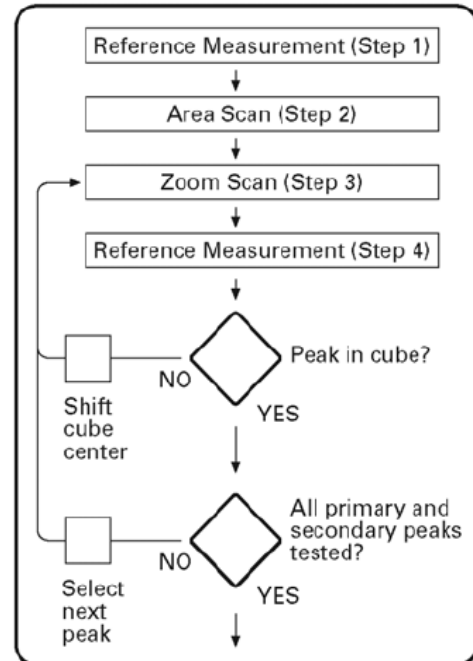
Several measurement systems are available for measuring the dielectric parameters.

Antennessa has developed its own software, based on a coaxial probe. This method allows measurement of liquid permittivity between 300 MHz and 6GHz.

4.2.4 SAR measurement procedure



Measurement 6.6.3



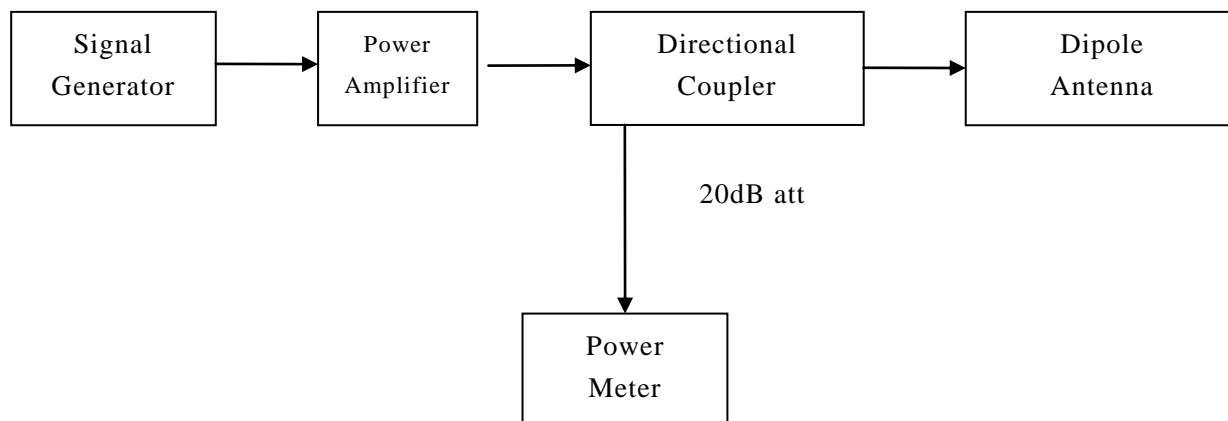
| Channel | Left | | | | Right | | | |
|---------|-----------|----------|------------|------------|-----------|----------|------------|------------|
| | Cheek | | Tilt | | Cheek | | Tilt | |
| | Retracted | Extended | Retracted | Extended | Retracted | Extended | Retracted | Extended |
| Mode 1: | | | | | | | | |
| High | | | S2(-1.4dB) | S2(-0.4dB) | | | S2(-2.2dB) | S2(-1.4dB) |
| Middle | S1(-4dB) | S1(-4dB) | S1(-1.5dB) | S1(-0.5dB) | S1(-5dB) | S1(-5dB) | S1(-2.5dB) | S1(-1.5dB) |
| Low | | | S2(-1.3dB) | S2(-0.7dB) | | | S2(-2.7dB) | S2(-0.6dB) |
| Mode 2: | | | | | | | | |
| High | | | S2(-2.7dB) | S2(-1.1dB) | | | | |
| Middle | S1(-5dB) | S1(-5dB) | S1(-2.5dB) | S1(-1dB) | S1(-6dB) | S1(-6dB) | S1(-5dB) | S1(-5dB) |
| Low | | | S2(-2.2dB) | S2(-0.8dB) | | | | |

After an area scan has been done at a fixed distance of 8mm from the surface of the phantom on the source side, a 3D scan is set up around the location of the maximum spot SAR. First, a point within the scan area is visited by the probe and a SAR reading taken at the start of testing. At the end of testing, the probe is returned to the same point and a second reading is taken. Comparison between these start and end readings enables the power drift during measurement to be assessed.

Above is the scanning procedure flow chart and table from the IEEE P1528 standard. This is the procedure for which all compliant testing should be carried out to ensure that all variations of the device position and transmission behavior are tested.

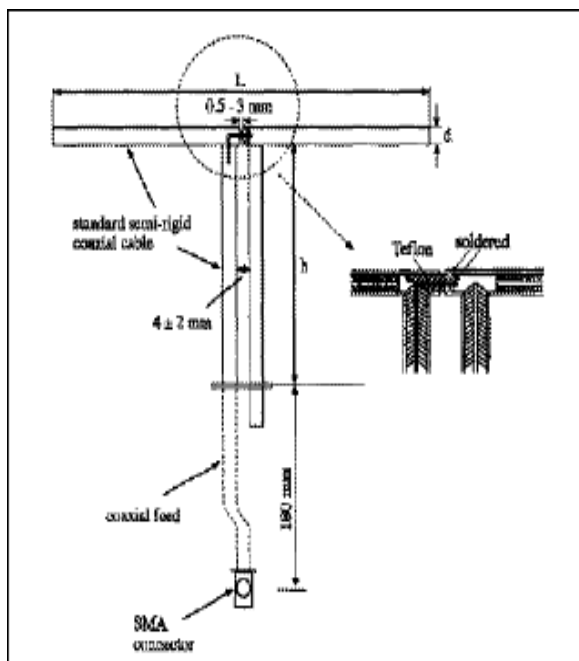
4.2.5 Validation Test Using Flat Phantom

The following procedure, recommended for performing validation tests using flat phantom is based on the procedures described in the IEEE standard P1528. Setup according to the setup diagram below:



4.2.5.1 Setting up the Box Phantom for Validation Testing

Validation Dipoles



The dipoles used are based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of both IEEE and FCC Supplement C. The table below provides details for the mechanical and electrical specifications for the dipoles.

| Frequency | L(mm) | h(mm) | d(mm) |
|-----------|-------|-------|-------|
| 850MHZ | 161.0 | 89.8 | 3.6 |
| 1900MHZ | 67.1 | 38.9 | 3.6 |

Validation Result

System Performance Check at 850MHz

Validation Kit: ASL-D-850-S-2

| Frequency(MHz) | Description | SAR(W/Kg) 1g | SAR(W/Kg) 10g | Tissue Temp.(°C) |
|----------------|----------------------------|--------------|---------------|------------------|
| 835MHz Head | Reference result | 9.590 | 6.003 | N/A |
| | Value(1W) 2011-10-24 | 9.888 | 6.020 | 20.7 |
| | Value(0.25W) 2011-10-24 | 2.472 | 1.505 | 20.7 |

Validation Kit: ASL-D-850-S-2

| Frequency(MHz) | Description | SAR(W/Kg) 1g | SAR(W/Kg) 10g | Tissue Temp.(°C) |
|----------------|----------------------------|--------------|---------------|------------------|
| 835MHz body | Reference result | 9.981 | 6.006 | N/A |
| | Value(1W) 2011-10-24 | 9.752 | 5.932 | 20.7 |
| | Value(0.25W) 2011-10-24 | 2.438 | 1.483 | 20.7 |

Note: Validation SAR values are normalized to 1W forward power

4.2.6 Measurement Procedure

The following steps are used for each test position

Establish a call with the maximum output power with a base station simulator. The connection between the mobile phone and the base station simulator is established via air interface.

Measurement of the local E-field distribution is done with a grid of 8 to 16mm*8 to 16mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolating scheme.

Around this point, a cube of 30*30*30mm or 32*32*32mm is assessed by measuring 5 or 8*5 or 8*4 or 5mm. With these data, the peak spatial-average SAR value can be calculated.

4.2.7 Description of Interpolation/Extrapolation Scheme

The local SAR inside the phantom is measured using small dipole sensing elements inside a probe

body. The probe tip must not be in contact with the phantom surface in order to minimise measurements errors, but the highest local SAR will occur at the surface of the phantom.

An extrapolation is using to determinate this highest local SAR values. The extrapolation is base on a fourth-order least square polynomial fit of measured data. The local SAR value is then extrapolated from the liquid surface with a 1mm step.

The measurements have to be performed over a limited (due to the duration of the battery) so the step of measurement is high. It could vary between 5 and 8mm. to obtain an accurate assessment of the maximum SAR averaged over 10 grams and 1gram requires a very fine resolution in the three-dimensional scanned data array.

5 CHARACTERISTICS OF THE TEST

5.1 Applicable Limit Regulations

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

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.

KDB941225 D01 SAR test for 3G devices v02: SAR Measurement Procedures for 3G Devices CDMA 2000/EV-Do WCDMA/HSDPA/HSPA

6 LABORATORY ENVIRONMENT

Table: The Ambient Conditions during SAR Test

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Temperature | Min. =15 °C, Max. =30 °C |
| Relative humidity | Min. =30%, Max. =70% |
| Ground system resistance | <0.5Ω |
| 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 Explain

The EUT has been tested under the operating conditions.

7.2 Dielectric Performance

For head measurement, the device was tested at the lowest, middle and highest frequencies in the transmit band.

Table 1: Dielectric Performance of Head Tissue Simulating Liquid

Temperature: 23.0~23.8 °C, humidity: 54~60%.

| / | Frequency | Permittivity ϵ | Conductivity σ (S/m) |
|-------------------------------------|-----------|-------------------------|-----------------------------|
| Target value | 835 MHZ | 41.5 | 0.90 |
| Validation value (Oct 24) | 835 MHZ | 41.427 | 0.925 |

For body-worn measurements, the device was tested against flat phantom representing the user body. Under measurement phone was put on in the belt holder.

Table 2: Dielectric Performance of Body Tissue Simulating Liquid

Temperature: 23.0~23.8 °C, humidity: 54~60%.

| / | Frequency | Permittivity ϵ | Conductivity σ (S/m) |
|-------------------------------------|-----------|-------------------------|-----------------------------|
| Target value | 835 MHz | 55.2 | 0.97 |
| Validation value (Oct 24) | 835 MHz | 55.431 | 0.987 |

7.3 Conducted Power

The conducted power for CDMA2000 Cellular is as following:

| Test Mode | Test Status | Channel | Conducted power(dBm) |
|--------------------|-------------|------------|----------------------|
| CDMA 2000 1xRTT | FCH_RC1 | 1013 (Low) | 24.30 |
| | | 384 (Mid) | 24.05 |
| | | 777 (High) | 24.47 |
| | FCH_RC3 | 1013 (Low) | 24.11 |
| | | 384 (Mid) | 23.91 |
| | | 777 (High) | 24.35 |
| | FCH+SCH_RC3 | 1013 (Low) | 24.18 |
| | | 384 (Mid) | 23.95 |
| | | 777 (High) | 24.38 |

Note: According to KDB 941225, the Head SAR is measured in CDMA 2000 1x RC3_SO55. And the body SAR is measured in CDMA 2000 1x RC3_SO32.

7.4 Summary of Measurement Results

Table1: SAR Values (Head)

| Temperature: 21.0~23.5 °C, Relative Humidity: 60~65%. | | | | |
|--------------------------------------------------------------|---------------------------|----------------|----------------|-------------------|
| Limit of SAR (W/kg) | 1 g Average | | | |
| | 1.6 | | | |
| Test Configuration | Measurement Result (W/kg) | | | |
| | 1 g Average (W/kg) | Power Drift(%) | Scaling Factor | Scaled SAR (W/kg) |
| Left head ,Touch cheek, Low Channel | 0.686 | -3.440 | 1.047 | 0.718 |
| Left head ,Touch cheek, Middle Channel | 0.827 | -4.393 | 1.109 | 0.917 |
| Left head ,Touch cheek, High Channel | 1.083 | 0.869 | 1.007 | 1.091 |
| Left head ,Tilt 15 Degree, Middle Channel | 0.621 | -1.069 | 1.109 | 0.689 |
| Right head ,Touch cheek, Middle Channel | 0.783 | 4.646 | 1.109 | 0.868 |
| Right head ,Tilt 15 Degree, Middle Channel | 0.558 | 0.926 | 1.109 | 0.619 |

Table 2: SAR Values (Body)
Temperature: 21.0~23.5 °C, Relative Humidity: 60~65%.

| Limit of SAR (W/kg) | 1 g Average | | | |
|-------------------------------------------------------|---------------------------|----------------|----------------|-------------------|
| | 1.6 | | | |
| Test Configuration | Measurement Result (W/kg) | | | |
| | 1 g Average (W/kg) | Power Drift(%) | Scaling Factor | Scaled SAR (W/kg) |
| Frontside Towards Phantom Middle Channel | 0.566 | -1.607 | 1.109 | 0.628 |
| Backside Towards Phantom Low Channel | 0.744 | -0.969 | 1.047 | 0.779 |
| Backside Towards Phantom Middle Channel | 0.790 | -0.751 | 1.109 | 0.876 |
| Backside Towards Phantom High Channel | 0.878 | -2.454 | 1.007 | 0.884 |
| Backside Towards Phantom High Channel (with Earphone) | 0.873 | -3.588 | 1.007 | 0.879 |

REMARK:

1. The distance between the surface of the antenna and the bottom of the flat phantom is 15 mm.
2. The tune-up power tolerance is as below.
CDMA2000 Cellular : 24 dBm [±0.5dB]
Scaling Factor = Tune-up Maximum Power (Watt) / Measured Maximum Power (Watt)
Scaled SAR = Measure SAR * Scaling Factor

7.5 Conclusion

Peak Spatial-Average Specific Absorption Rate (SAR) of this portable wireless device has been measured in all configurations requested by the relevant standards cited in Clause 5.2 of this report. SAR values are below exposure limits specified in the relevant standards cited in Clause 5.1 of this test report.

8 Measurement Uncertainties

The following table includes the uncertainty table of the IEEE 1528. The values are determined by Antennessa.

UNCERTAINTY EVALUATION FOR HANDSET SAR TEST

| Source of Uncertainty | Tolerance Value | Probability Distribution | Divisor | ci1 (1-g) | ci1 (10-g) | Standard Uncertainty (1-g) % | Standard Uncertainty (10-g) % |
|-------------------------------------------------|-----------------|--------------------------|------------|----------------|----------------|------------------------------|-------------------------------|
| Measurement System | | | | | | | |
| Probe Calibration | 3.5 | normal | 1 | 1 | 1 | 3.5 | 3.5 |
| Axial Isotropy | 3.7 | rectangular | $\sqrt{3}$ | $(1-cp)^{1/2}$ | $(1-cp)^{1/2}$ | 1.5 | 1.5 |
| Hemispherical Isotropy | 10.9 | rectangular | $\sqrt{3}$ | \sqrt{cp} | \sqrt{cp} | 4.4 | 4.4 |
| Boundary Effect | 1.0 | rectangular | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 |
| Linearity | 4.7 | rectangular | $\sqrt{3}$ | 1 | 1 | 2.7 | 2.7 |
| Detection Limit | 1.0 | rectangular | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 |
| Readout Electronics | 1.0 | normal | 1 | 1 | 1 | 1.0 | 1.0 |
| Response Time | 0.8 | rectangular | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 |
| Integration Time | 1.7 | rectangular | $\sqrt{3}$ | 1 | 1 | 1.0 | 1.0 |
| RF Ambient Condition | 3.0 | rectangular | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 |
| Probe Positioner Mech. | 0.4 | rectangular | $\sqrt{3}$ | 1 | 1 | 0.2 | 0.2 |
| Restriction | | | | | | | |
| Probe Positioning with respect to Phantom Shell | 2.9 | rectangular | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 |
| Extrapolation and Integration | 3.7 | rectangular | $\sqrt{3}$ | 1 | 1 | 2.1 | 2.1 |
| Test Sample | 4.0 | normal | 1 | 1 | 1 | 4.0 | 4.0 |

| | | | | | | | |
|--------------------------------------------------|-----|-------------|------------|-----|-----|------|------|
| Positioning | | | | | | | |
| Device Holder Uncertainty | 2.0 | normal | 1 | 1 | 1 | 2.0 | 2.0 |
| Drift of Output Power | 0.6 | rectangular | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 |
| Phantom and Setup | | | | | | | |
| Phantom Uncertainty(shape & thickness tolerance) | 3.4 | rectangular | $\sqrt{3}$ | 1 | 1 | 2.0 | 2.0 |
| Liquid Conductivity(target) | 5.0 | rectangular | $\sqrt{3}$ | 0.7 | 0.5 | 2.0 | 1.4 |
| Liquid Conductivity(meas.) | 0.0 | normal | 1 | 0.7 | 0.5 | 0.0 | 0.0 |
| Liquid Permittivity(target) | 5.0 | rectangular | $\sqrt{3}$ | 0.6 | 0.5 | 1.7 | 1.4 |
| Liquid Permittivity(meas.) | 2.4 | normal | 1 | 0.6 | 0.5 | 1.4 | 1.2 |
| Combined Uncertainty | | RSS | | | | 9.3 | 9.2 |
| Combined Uncertainty (coverage factor=2) | | Normal(k=2) | | | | 18.7 | 18.3 |

9 MAIN TEST INSTRUMENTS

| Instrument | Manufacture | Model No. | Serial No. | Last Calibration |
|------------------------------------------------------------|---------------|----------------|------------|------------------|
| Universal Work Station | Aprel | ALS-UWS | 100-00154 | Jun.2011 |
| Data Acquisition Package | Aprel | ALS-DAQ-PAQ-3 | 110-00215 | Jun.2011 |
| Probe Mounting Device and Boundary Detection Sensor System | Aprel | ALS-PMDPS-3 | 120-00265 | Jun.2011 |
| Miniature E-Field Probe | Aprel | E-020 | 500-00273 | Oct.2011 |
| Left ear SAM Phantom | Aprel | ALS-P-SAM-L | 130-00312 | N/A |
| Right ear SAM Phantom | Aprel | ALS-P-SAM-R | 140-00362 | N/A |
| Universal SAM Phantom | Aprel | ALS-P-SU-1 | 150-00410 | N/A |
| Reference Validation Dipole 835MHz | Aprel | ALS-D-835-S-2 | 180-00556 | May 2011 |
| Reference Validation Dipole 1900MHz | Aprel | ALS-D-1900-S-2 | 210-00707 | May 2011 |
| Dielectric Probe Kit | Aprel | ALS-PR-DIEL | 260-00955 | N/A |
| Device Holder 2.0 | Aprel | ALS-H-E-SET-2 | 170-00506 | N/A |
| SAR software | Aprel | ALS-SAR-AL-10 | Ver.2.3.6 | N/A |
| CRS C500C Controller | Thermo | ALS-C500 | RCF0504291 | N/A |
| CRS F3 Robot | Aprel | ALS-F3-SW | N/A | N/A |
| Power Amplifier | Mini-Circuit | SN0974 | 040306 | N/A |
| Directional Coupler | Agilent | 778D-012 | N/A | N/A |
| Universal Radio Communication Tester | Rohde&Schwarz | CMU200 | 104845 | Jan.2011 |
| Vector Network | Anritsu | MS4623B | N/A | Nov.2011 |
| Signal Generator | Agilent | E8257D | N/A | Jan.2011 |
| Power Meter | Rohde&Schwarz | NRP | N/A | Jan.2011 |

ANNEX A- Accreditation Certificate

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(No. CNAS L1659)

China National Accreditation Service for Conformity Assessment has accredited

Shenzhen Electronic Product Quality Testing Center

Electronic Testing Building, Shahe Road, Xili, Nanshan District,

Shenzhen, Guangdong, China

to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing and calibration.

The scope of accreditation is detailed in the attached schedule bearing the same accreditation number as above. The schedule forms an integral part of this certificate.

Date of Issue: 2009-09-29

Date of Expiry: 2012-09-28

Date of Initial Accreditation: 1999-08-03



Signed on behalf of China National Accreditation Service
for Conformity Assessment

China National Accreditation Service for Conformity Assessment(CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation systems for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA), and the signatory to Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).

ANNEX B- Test Layout

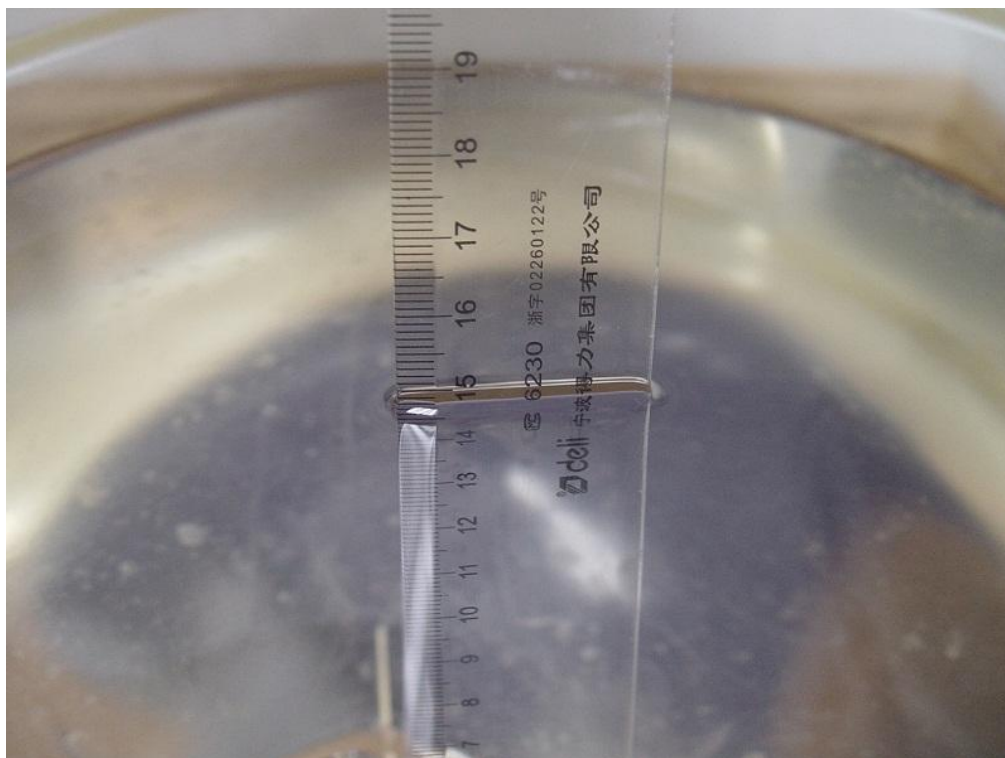


Figure B.1 Depth of Simulating Liquid in SAM Body Phantom

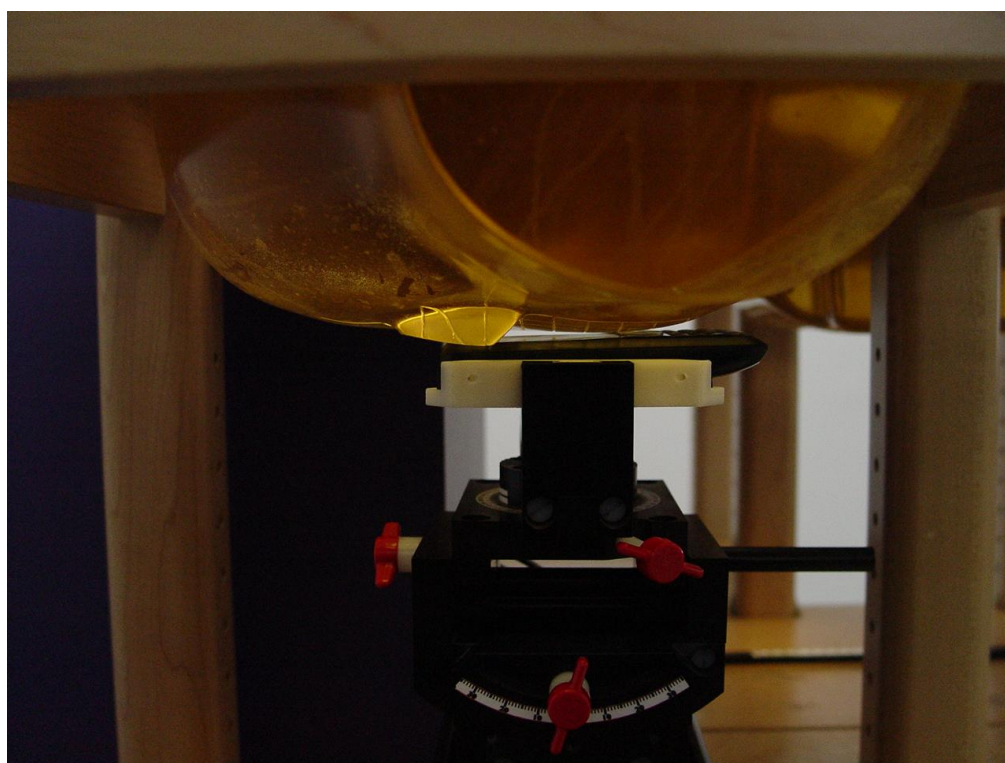


Figure B.2 EUT Left Cheek Position

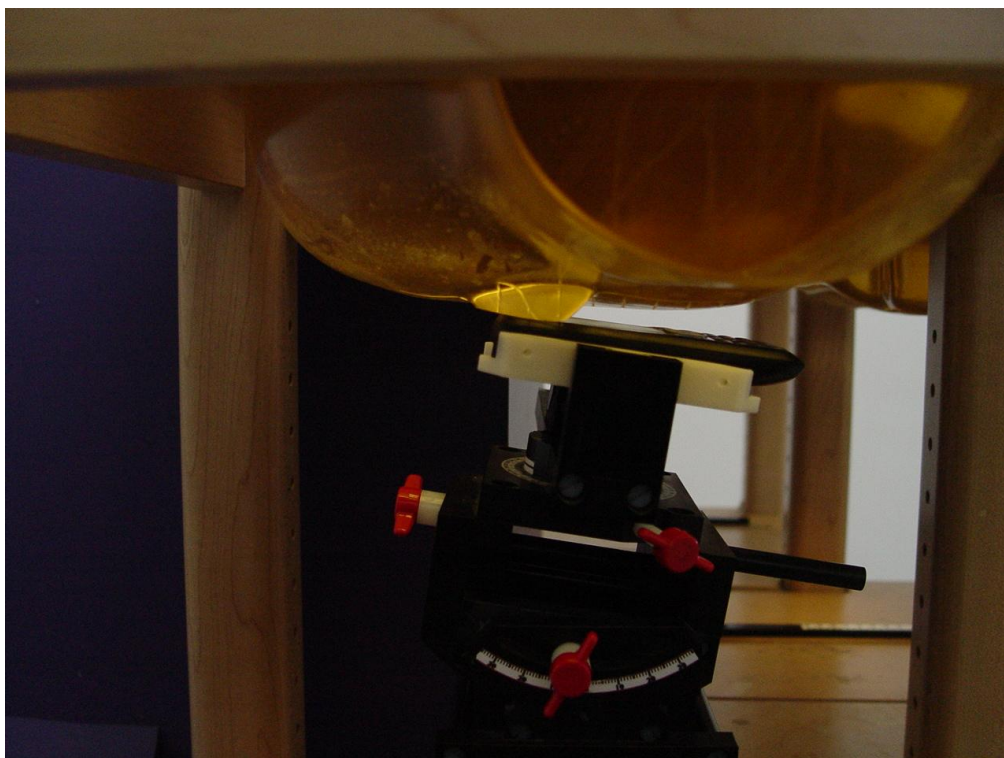


Figure B.3 EUT Left Tilt Position



Figure B.4 EUT Right Cheek Position

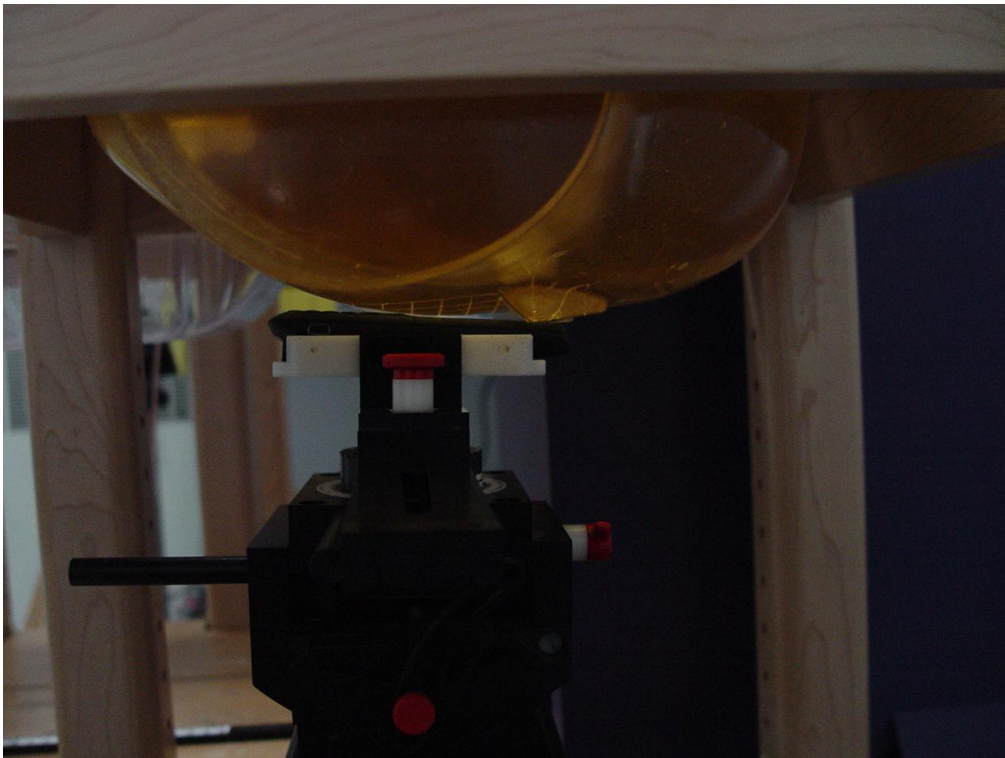


Figure B.5 EUT Right Tilt Position

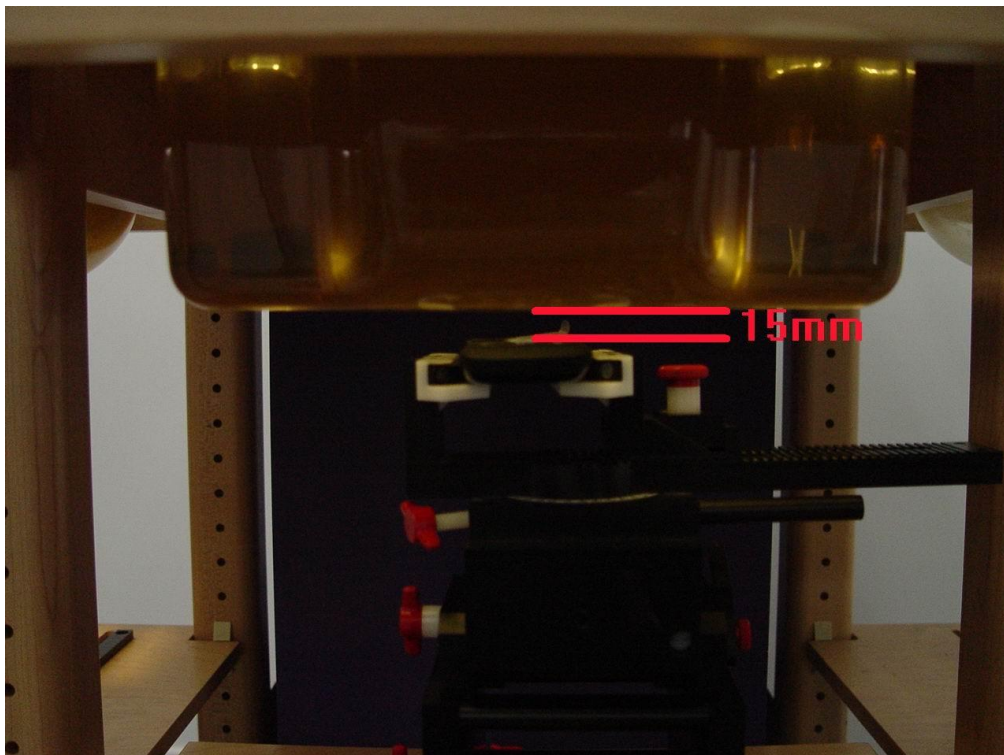


Figure B.6 EUT Body Frontside Position

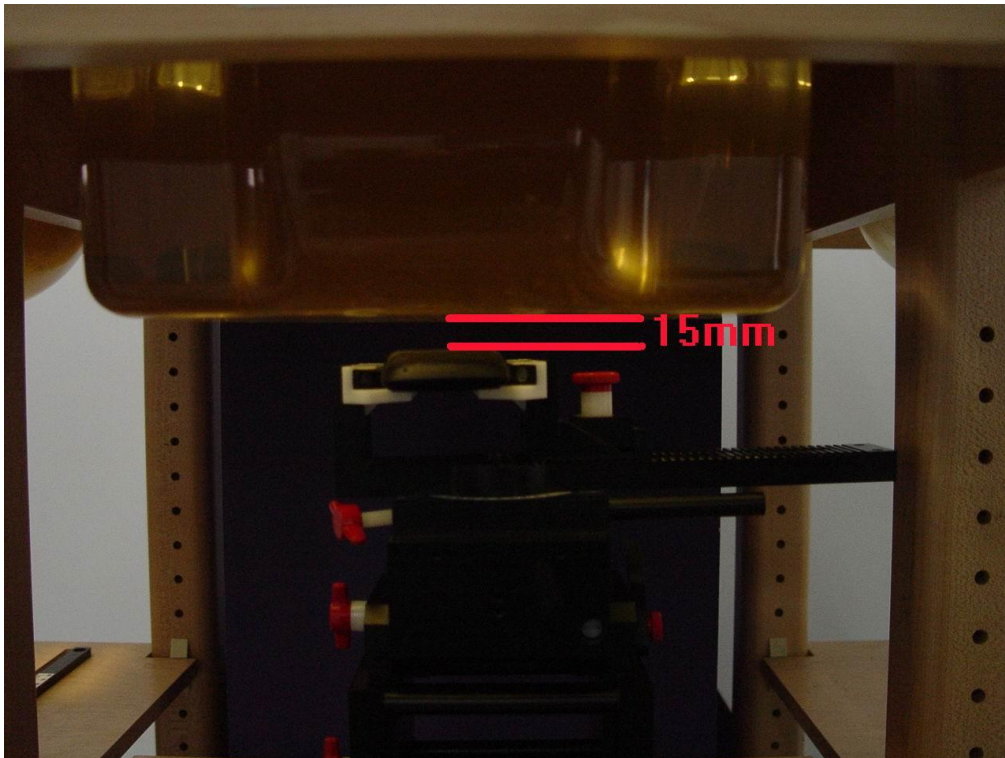


Figure B.7 EUT Body Backside Position

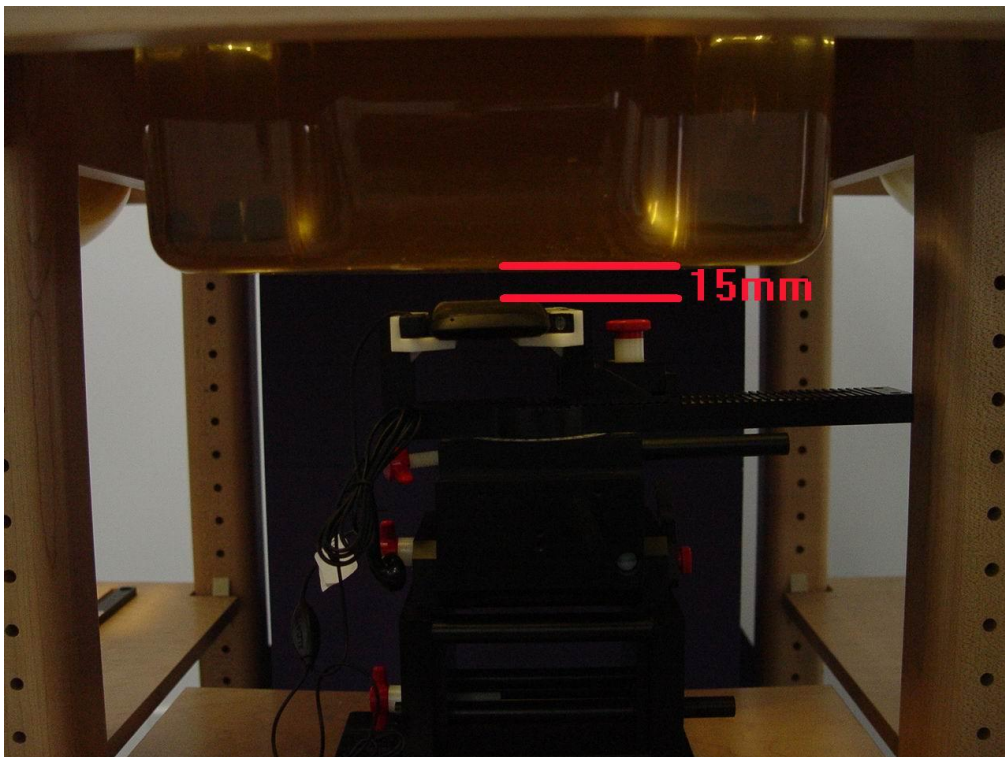


Figure B.7 EUT Body Backside with Earphone Position

ANNEX C- Sample Photographs

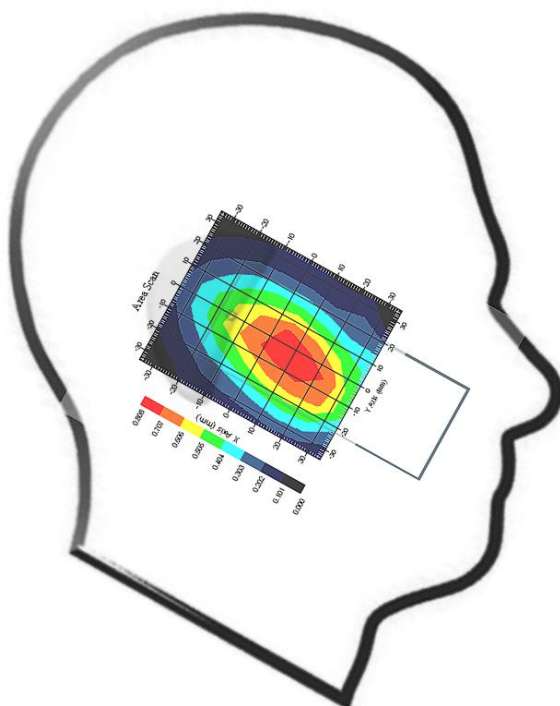


Photograph of the Equipment under Test

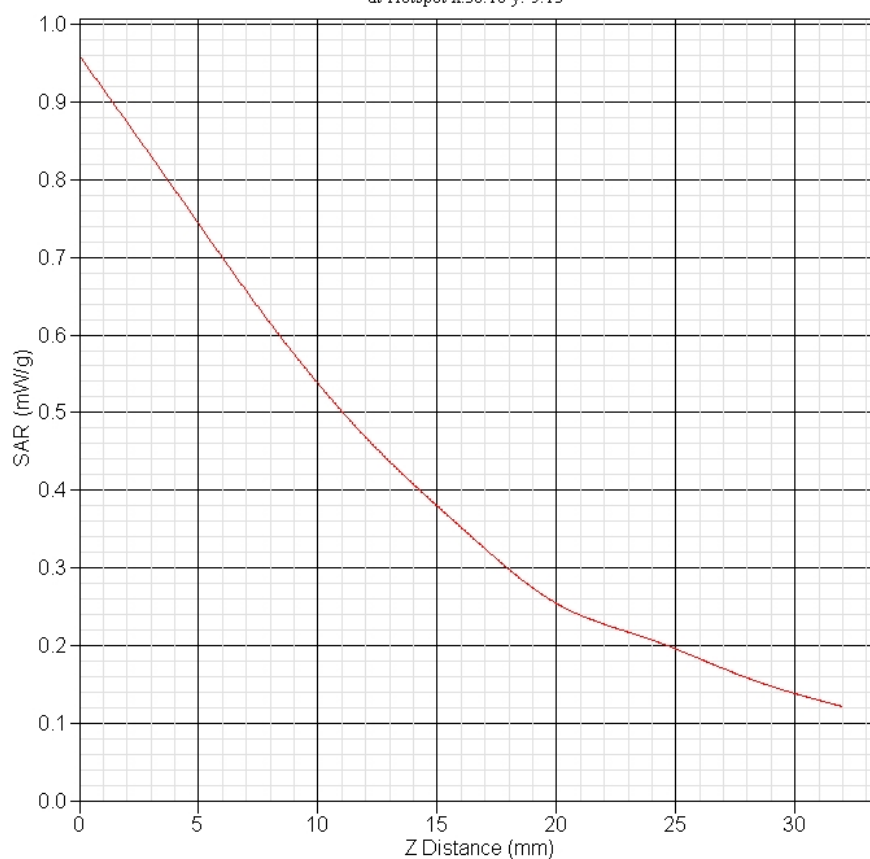
ANNEX D- Graph Test Results

CDMA2000 1xRTT Cellular Left Cheek Low (1013ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 824.7 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | -3.440 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



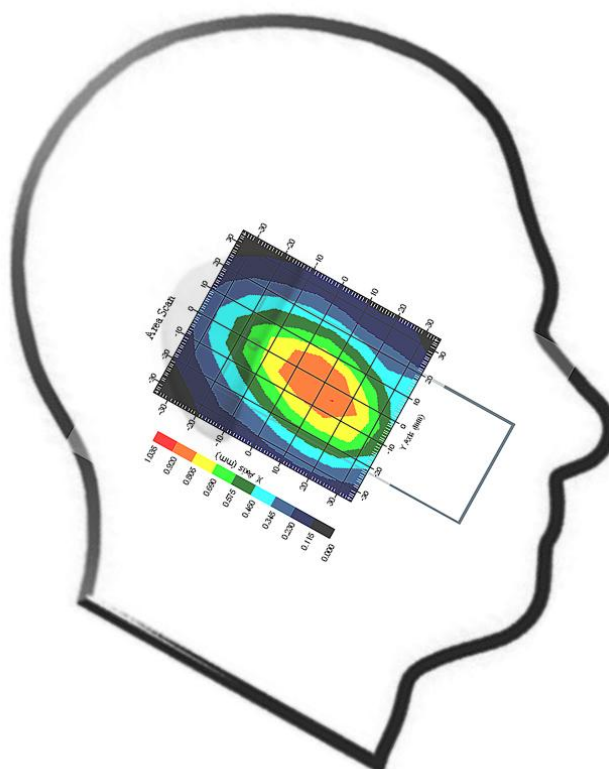
SAR-Z Axis
at Hotspot x:30.16 y:-5.13



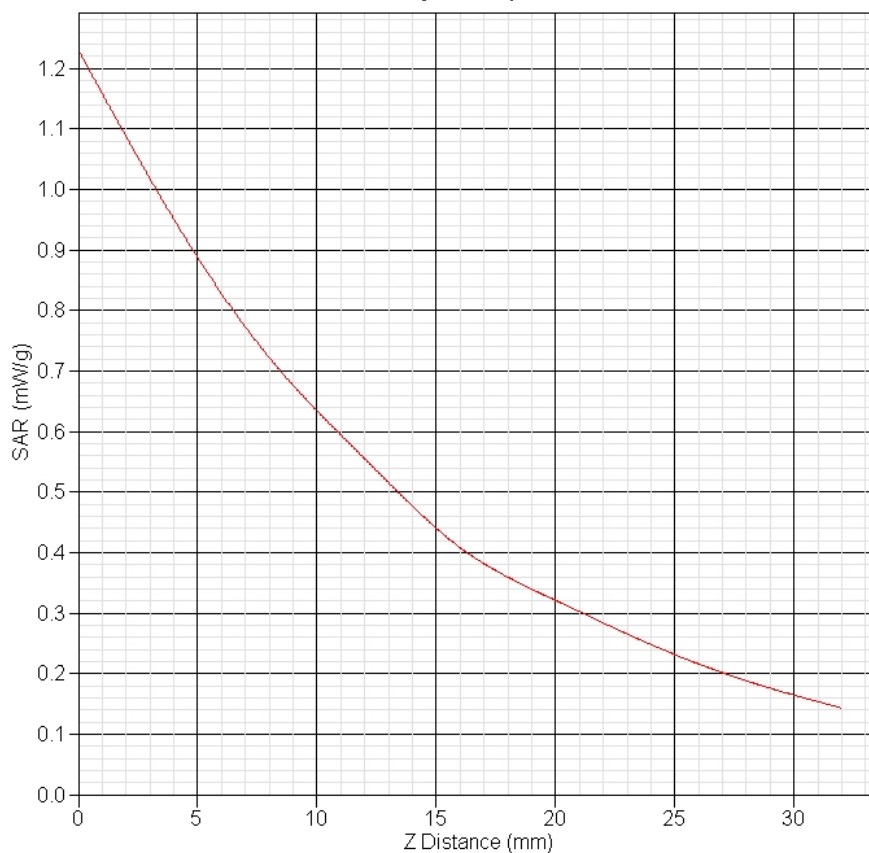
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.419 |
| SAR 1g (W/Kg) | 0.686 |

CDMA2000 1xRTT Cellular Left Cheek Middle (384ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 836.52 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | -4.393 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



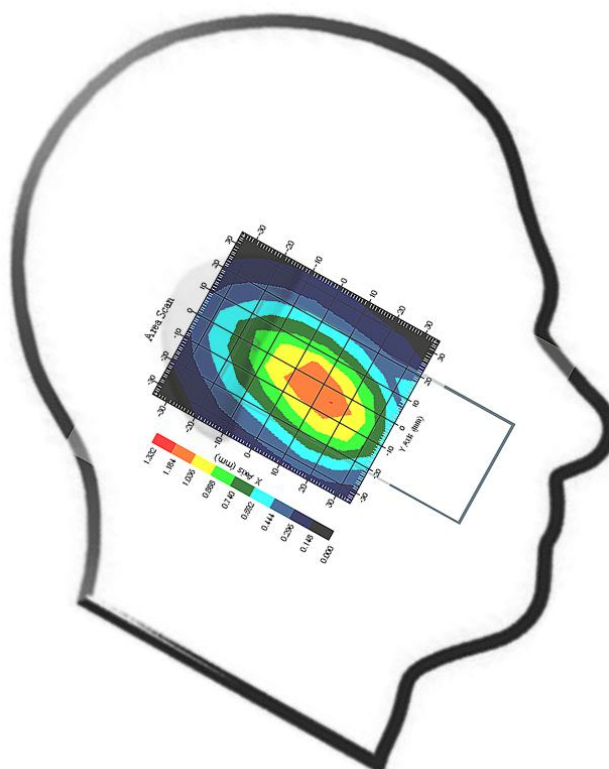
SAR-Z Axis
at Hotspot x:30.10 y:-5.05



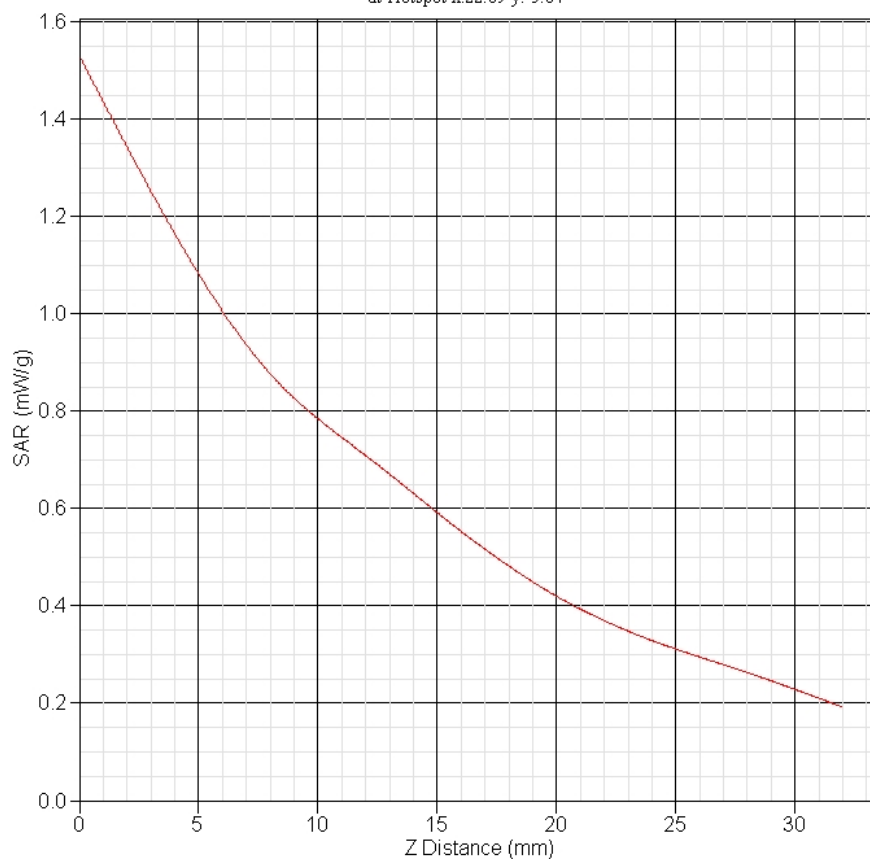
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.534 |
| SAR 1g (W/Kg) | 0.827 |

CDMA2000 1xRTT Cellular Left Cheek High (777ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 848.31 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | 0.869 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



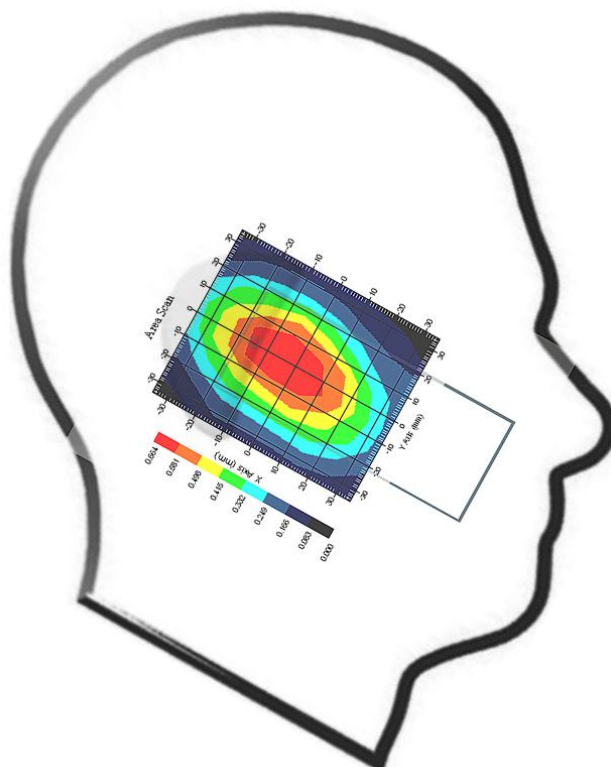
SAR-Z Axis
at Hotspot x:22.09 y:-5.04



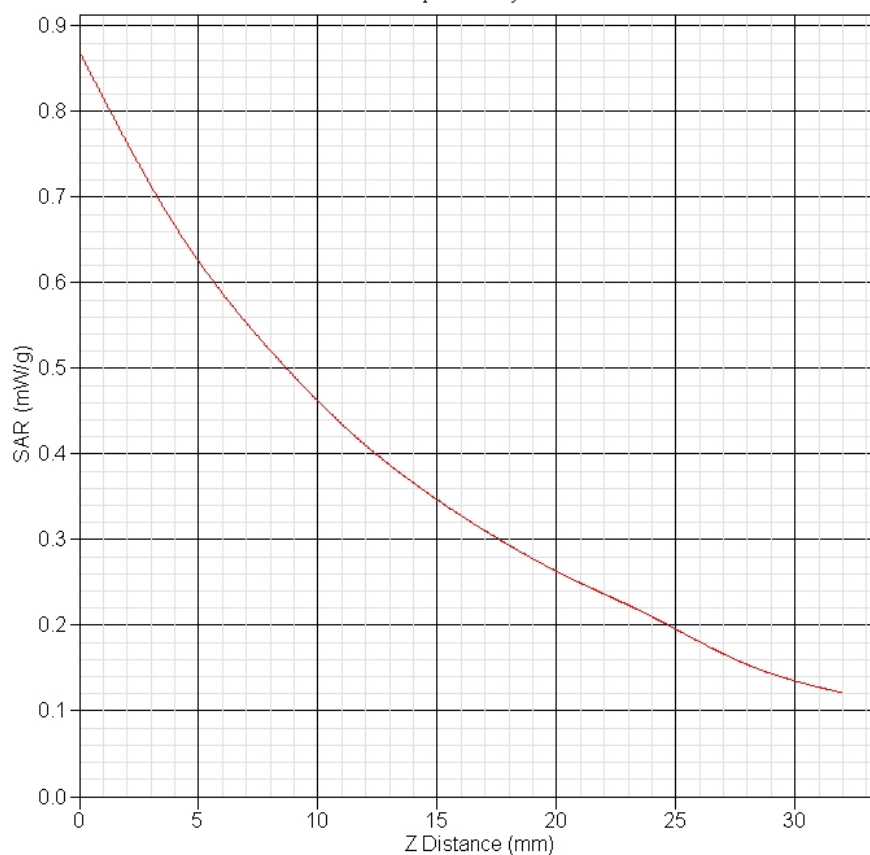
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.727 |
| SAR 1g (W/Kg) | 1.083 |

CDMA2000 1xRTT Cellular Left Tilt Middle (384ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 836.52 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | -1.069 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



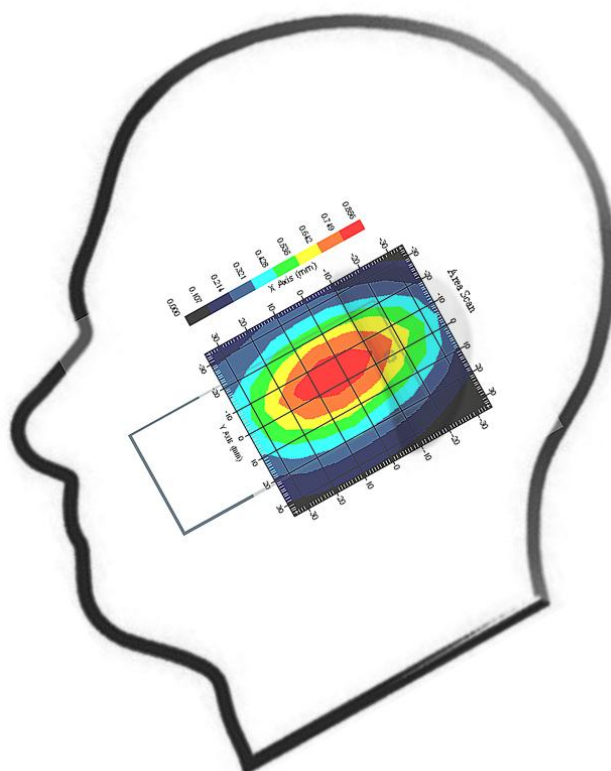
SAR-Z Axis
at Hotspot x:18.12 y:-3.06



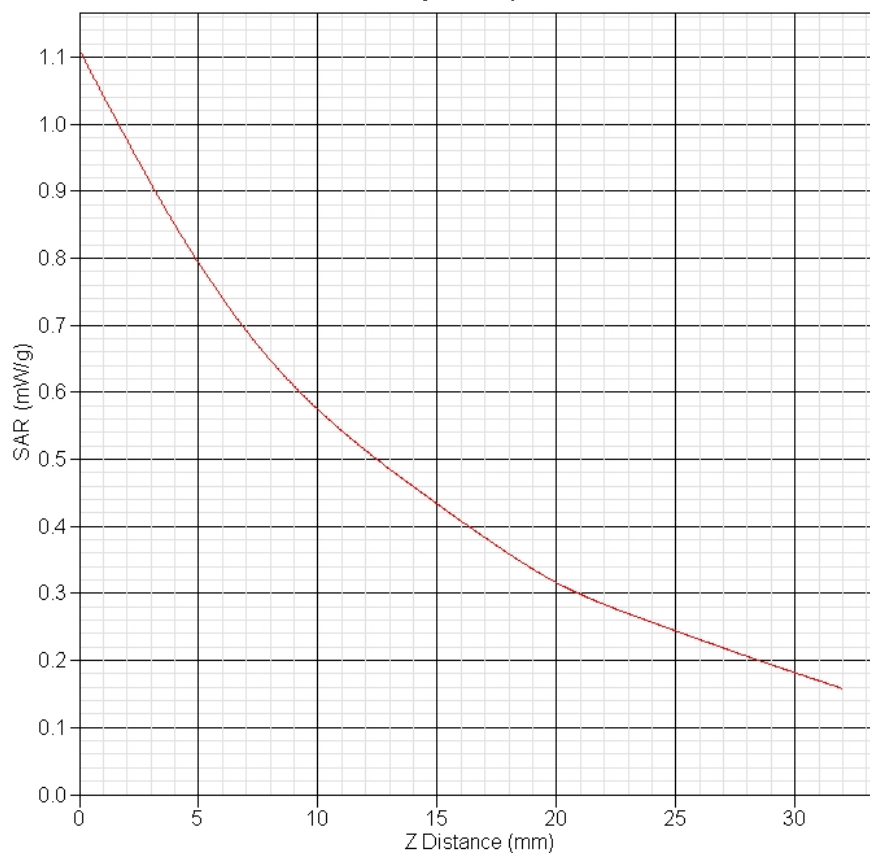
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.429 |
| SAR 1g (W/Kg) | 0.621 |

CDMA2000 1xRTT Cellular Right Cheek Middle(384ch)

| | |
|-----------------------------------|---------------------------------------------|
| Frequency (MHz) | 836.52 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | 4.646 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V/m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



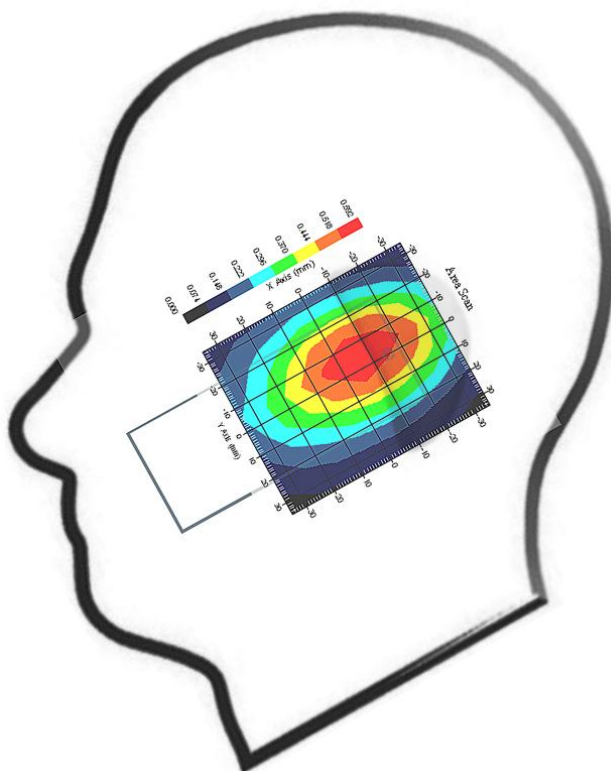
SAR-Z Axis
at Hotspot x:12.15 y:-4.89



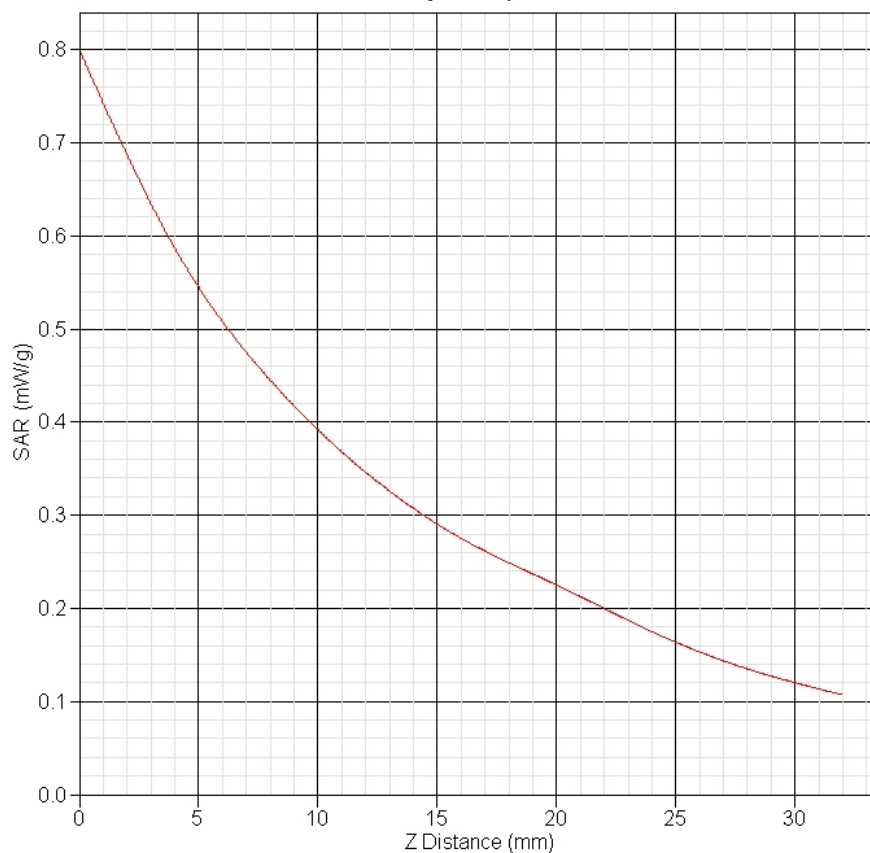
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.532 |
| SAR 1g (W/Kg) | 0.783 |

CDMA2000 1xRTT Cellular Right Tilt Middle(384ch)

| | |
|------------------------------------------|---------------------------------------------------------------|
| Frequency (MHz) | 836.52 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | 0.926 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V/m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



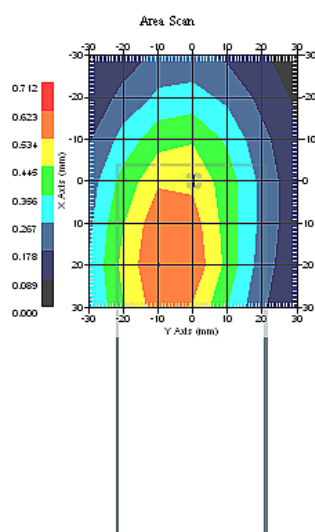
SAR-Z Axis
at Hotspot x:2.06 y:-4.99



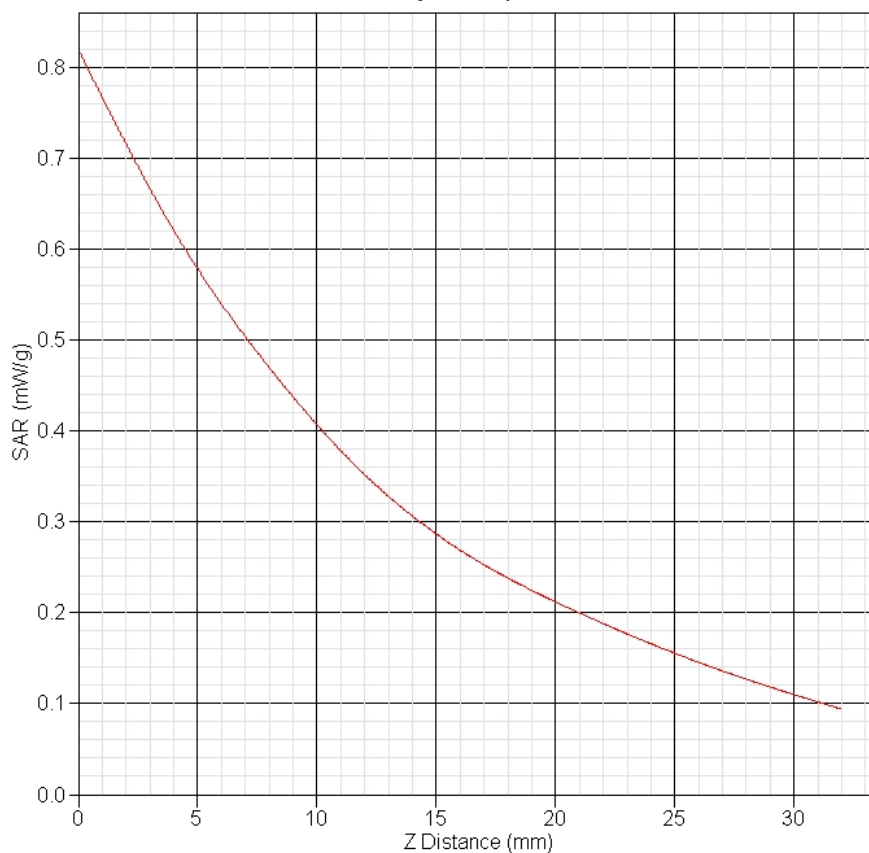
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.377 |
| SAR 1g (W/Kg) | 0.558 |

CDMA2000 1xRTT Cellular Frontside Towards Phantom Middle (384ch)

| | |
|-----------------------------------|---------------------------------------------|
| Frequency (MHz) | 836.52 |
| Relative permittivity (real part) | 55.431 |
| Conductivity (S/m) | 0.987 |
| Variation (%) | -1.607 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.4 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V/m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



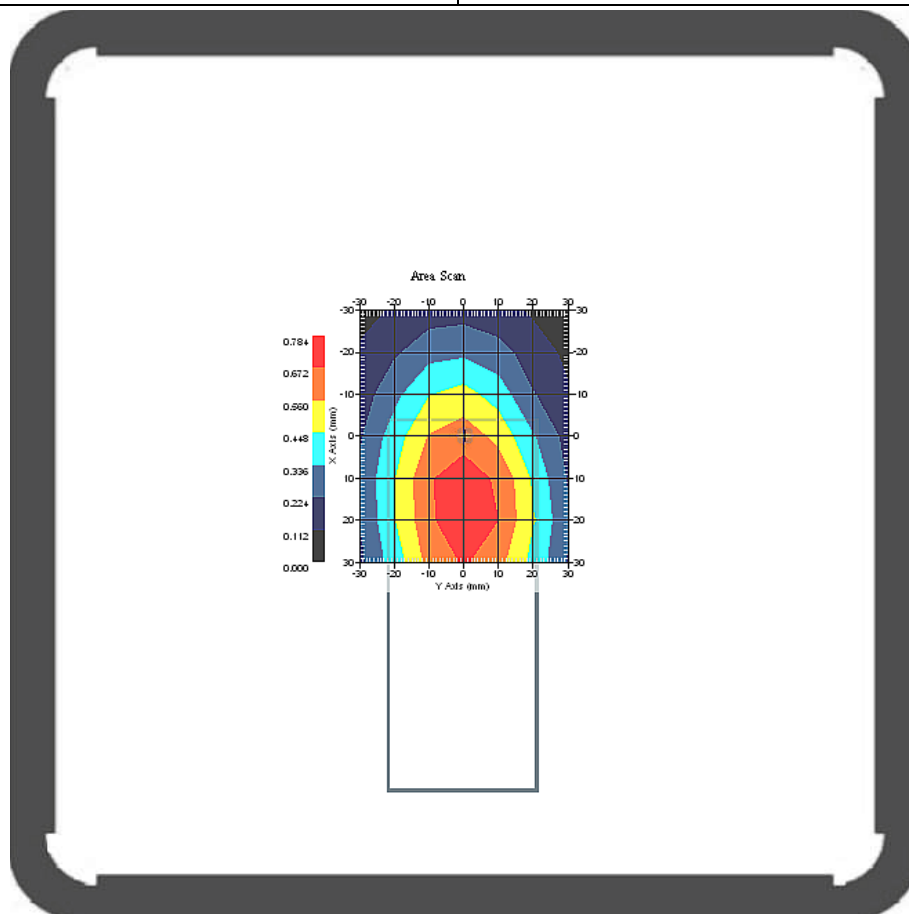
SAR-Z Axis
at Hotspot x:20.02 y:-10.13



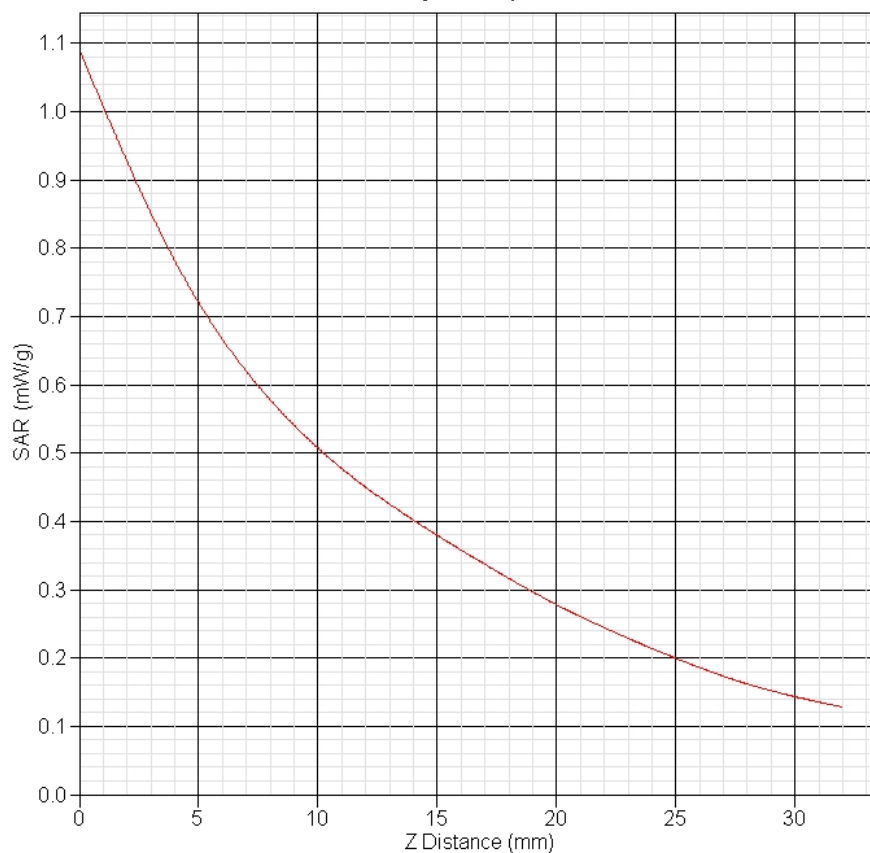
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.357 |
| SAR 1g (W/Kg) | 0.566 |

CDMA2000 1xRTT Cellular Backside Towards Phantom Low (1013ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 824.7 |
| Relative permittivity (real part) | 55.431 |
| Conductivity (S/m) | 0.987 |
| Variation (%) | -0.969 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.4 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



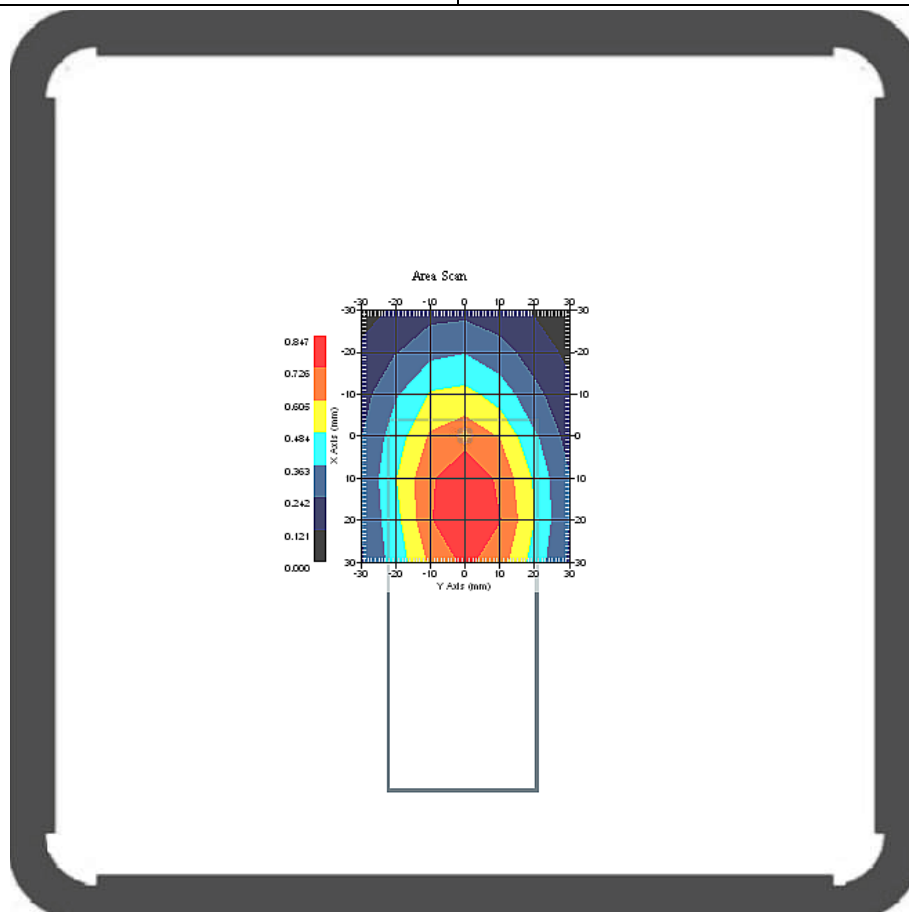
SAR-Z Axis
at Hotspot x:19.99 y:-0.08



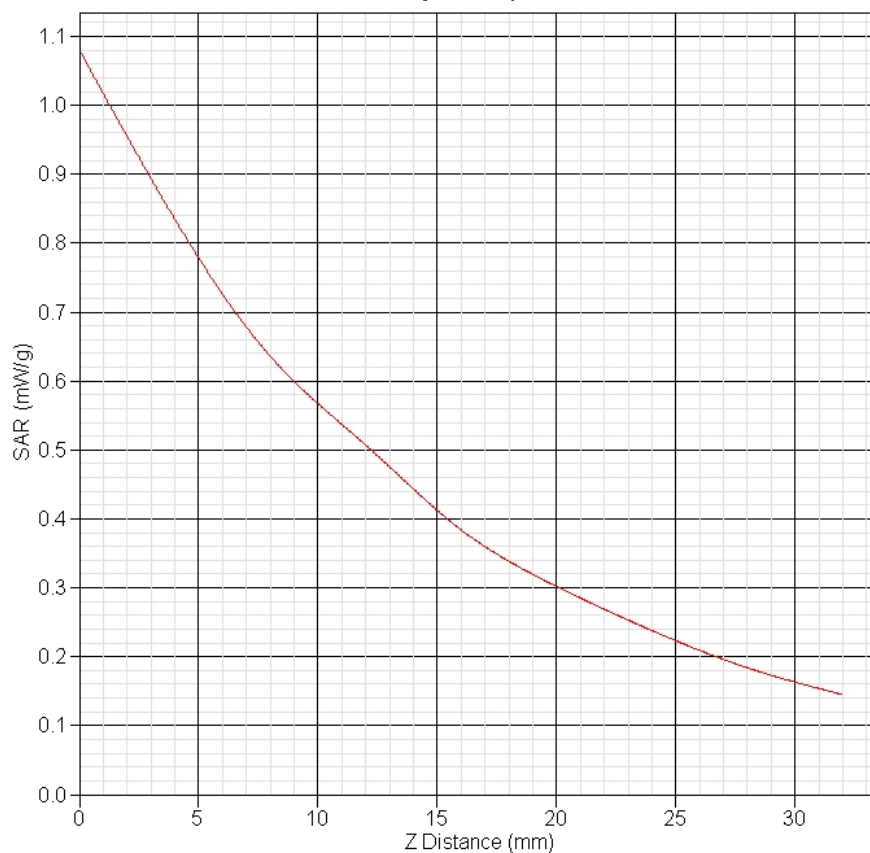
| | |
|-----------------------|--------------|
| SAR 10g (W/Kg) | 0.496 |
| SAR 1g (W/Kg) | 0.744 |

CDMA2000 1xRTT Cellular Backside Towards Phantom Middle (384ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 836.52 |
| Relative permittivity (real part) | 55.431 |
| Conductivity (S/m) | 0.987 |
| Variation (%) | 0.751 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.4 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



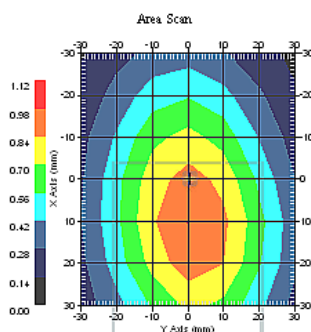
SAR-Z Axis
at Hotspot x:12.02 y:-0.11



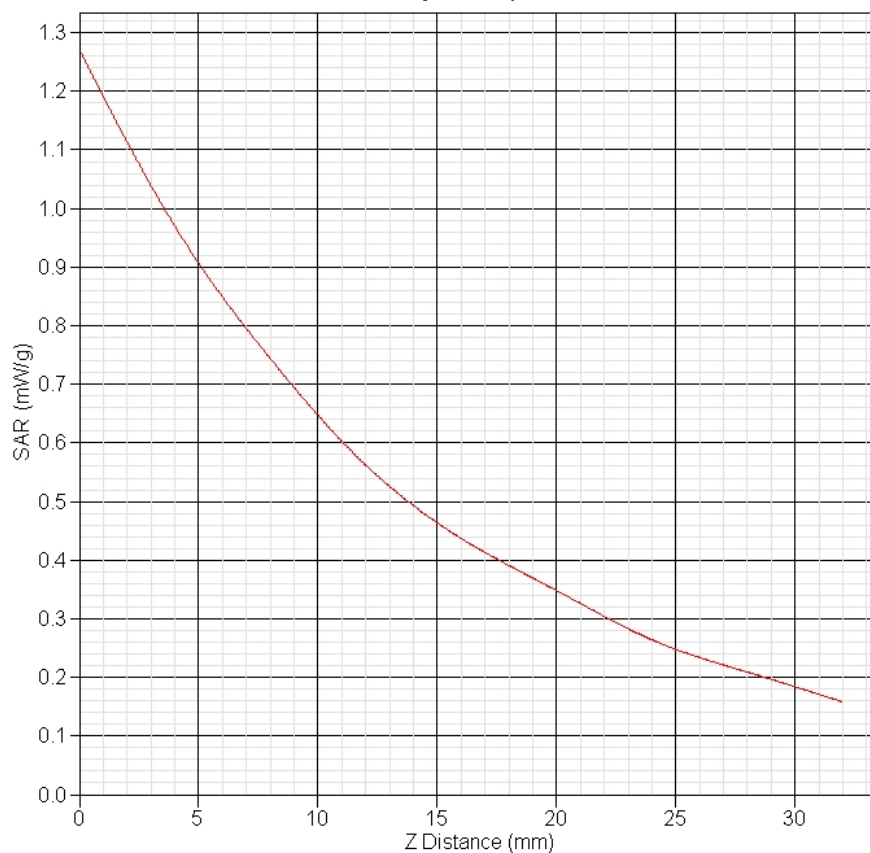
| | |
|-----------------------|--------------|
| SAR 10g (W/Kg) | 0.533 |
| SAR 1g (W/Kg) | 0.790 |

CDMA2000 1xRTT Cellular Backside Towards Phantom High (777ch)

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 848.31 |
| Relative permittivity (real part) | 55.431 |
| Conductivity (S/m) | 0.987 |
| Variation (%) | -2.454 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.4 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



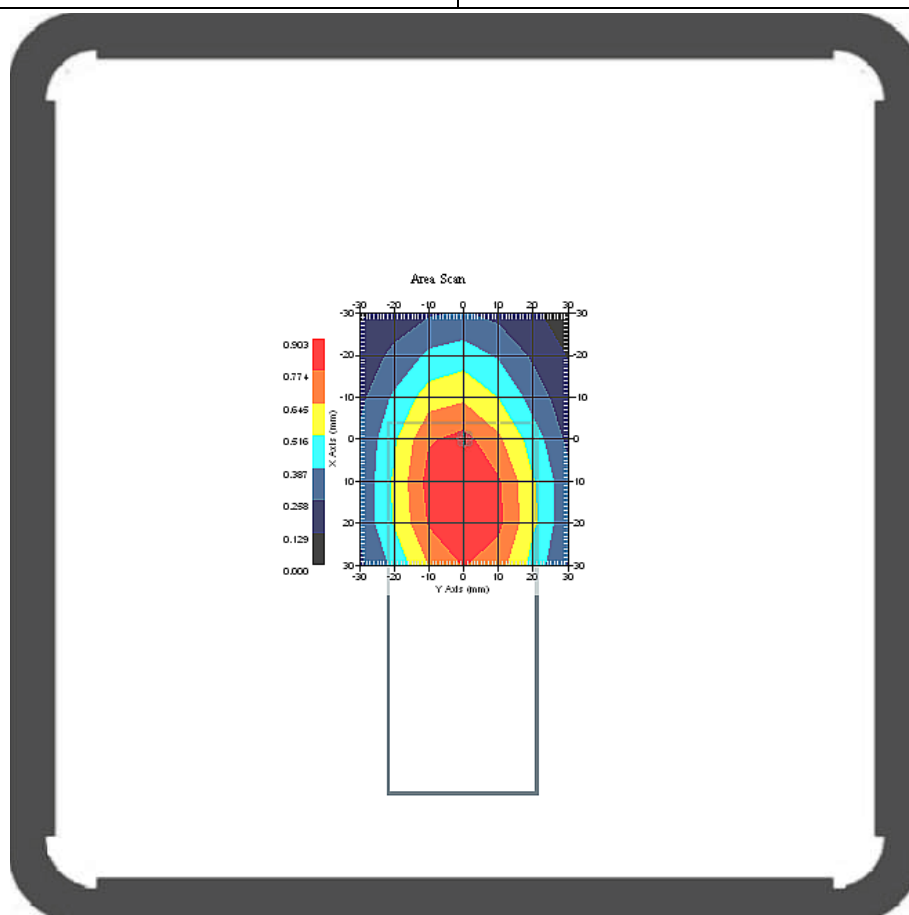
SAR-Z Axis
at Hotspot x:10.04 y:-0.11



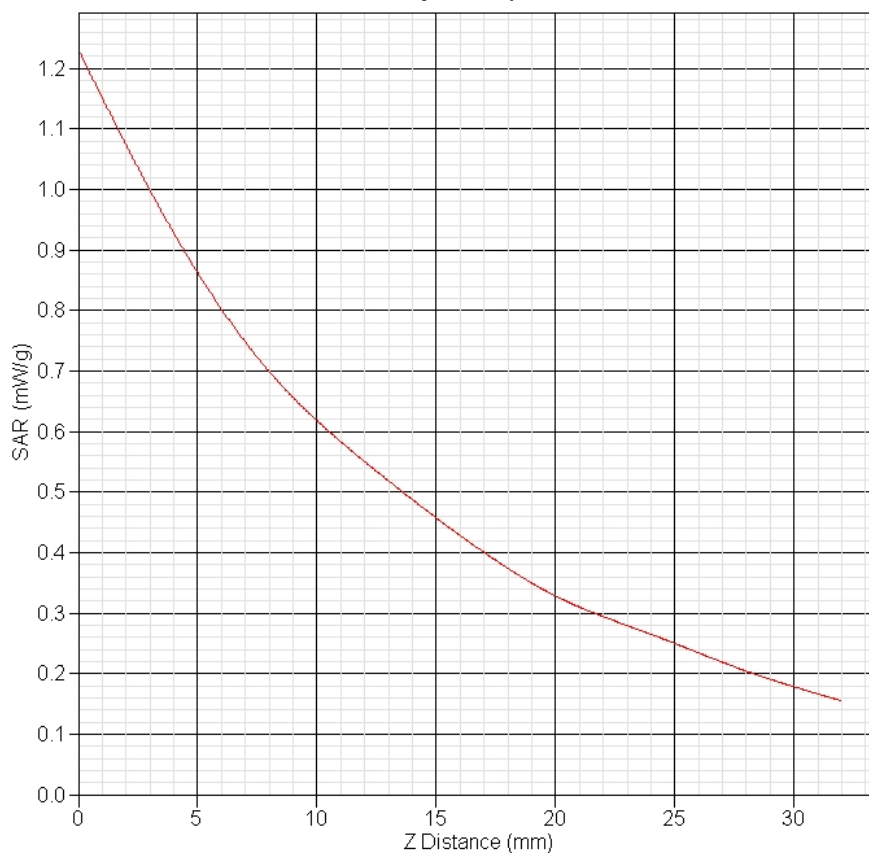
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.574 |
| SAR 1g (W/Kg) | 0.878 |

CDMA2000 1xRTT Cellular Backside Towards Phantom High (777ch) with Earphone

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 848.31 |
| Relative permittivity (real part) | 55.431 |
| Conductivity (S/m) | 0.987 |
| Variation (%) | -3.588 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.4 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Data | 2011-10-24 |



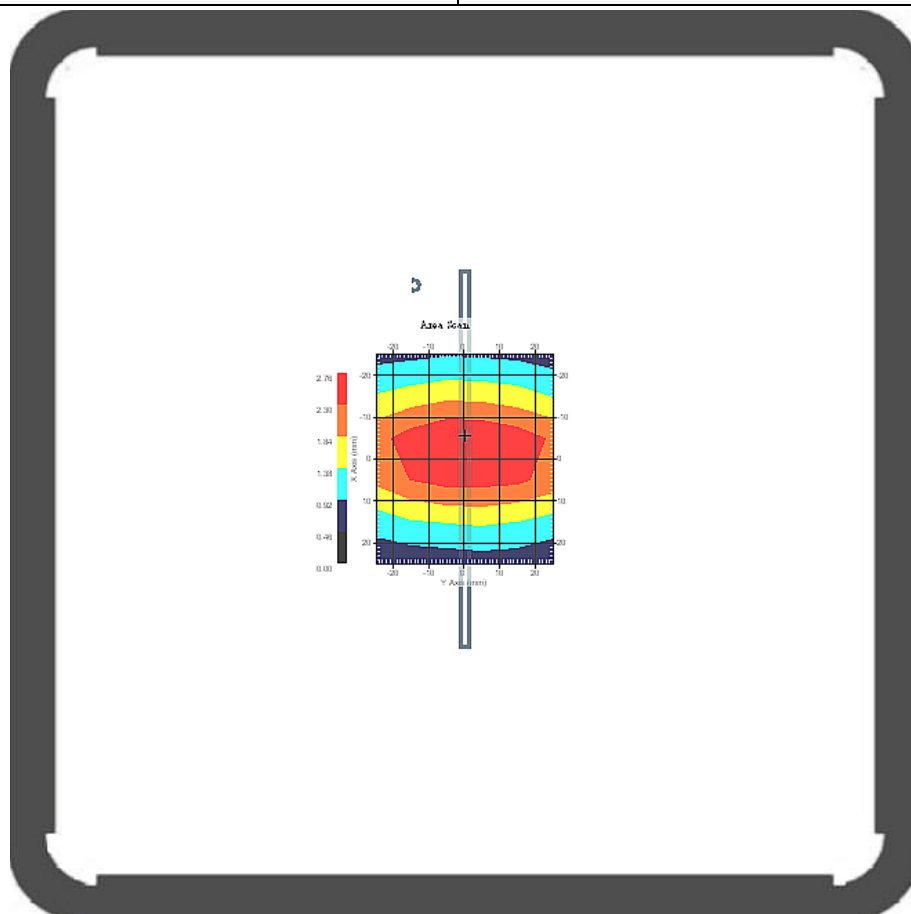
SAR-Z Axis
at Hotspot x:10.10 y:-0.16



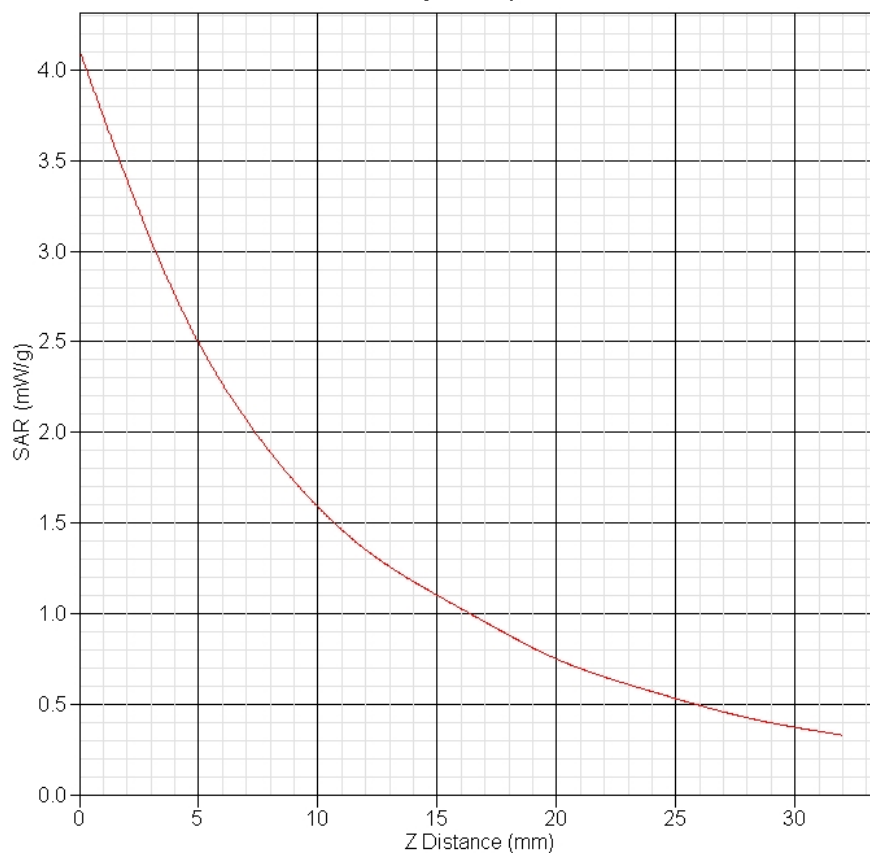
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 0.592 |
| SAR 1g (W/Kg) | 0.873 |

System Performance Check at 835MHz Head

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 835 |
| Relative permittivity (real part) | 41.427 |
| Conductivity (S/m) | 0.925 |
| Variation (%) | -0.415 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.5 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Date | 2011-10-24 |



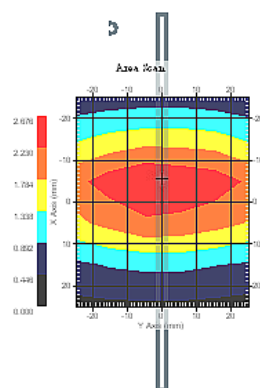
SAR-Z Axis
at Hotspot x:-4.98 y:-5.11



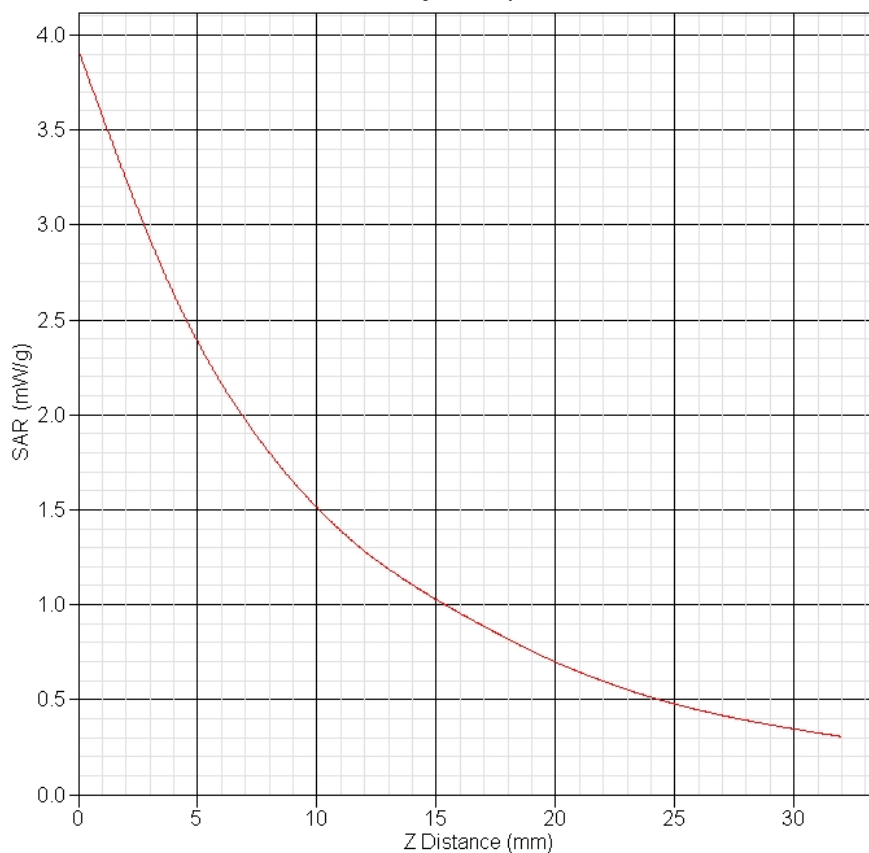
| | |
|----------------|-------|
| SAR 10g (W/Kg) | 1.505 |
| SAR 1g (W/Kg) | 2.472 |

System Performance Check at 835MHz Body

| | |
|-----------------------------------|----------------------------------------------------|
| Frequency (MHz) | 835 |
| Relative permittivity (real part) | 55.431 |
| Conductivity (S/m) | 0.987 |
| Variation (%) | -0.281 |
| Duty Cycle Factor | 1 |
| Crest Factor | 1 |
| Conversion Factor | 6.4 |
| Probe Sensitivity | 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$ |
| Temperature | Ambient:22.1°C Liquid:20.7°C |
| Date | 2011-10-24 |



SAR-Z Axis
at Hotspot x:-4.94 y:-5.14



| | |
|----------------|-------|
| SAR 10g (W/Kg) | 1.483 |
| SAR 1g (W/Kg) | 2.438 |

** END OF REPORT **