# SAR TEST REPORT

**REPORT NO.:** SA971030L03-1
**MODEL NO.:** RAPH700
**RECEIVED:** Oct. 30, 2008
**TESTED:** Nov. 07 ~ Nov. 10, 2008
**ISSUED:** Nov. 19, 2008

**APPLICANT:** HTC Corporation

**ADDRESS:** No. 23, Xinghua Rd., Taoyuan City, 330, Taiwan, R.O.C.

**ISSUED BY:** Advance Data Technology Corporation

**LAB ADDRESS:** No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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Testing Laboratory
0528

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# 1. CERTIFICATION

**PRODUCT:** Pocket PC Phone
**MODEL:** RAPH700
**APPLICANT:** HTC Corporation
**TESTED:** Nov. 07 ~ Nov. 10, 2008
**TEST SAMPLE:** ENGINEERING SAMPLE
**STANDARDS:** **FCC Part 2 (Section 2.1093)**
**FCC OET Bulletin 65, Supplement C (01-01)**
**RSS-102**

The above equipment (model: RAPH700) has been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**PREPARED BY** : Andrea Hsia / Specialist , **DATE:** Nov. 19, 2008

**TECHNICAL ACCEPTANCE** : Long Chen / Senior Engineer , **DATE:** Nov. 19, 2008
Responsible for RF

**APPROVED BY** : Gary Chang / Assistant Manager , **DATE:** Nov. 19, 2008

# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

<table>
<tr><td>EUT</td><td colspan="2">Pocket PC Phone</td></tr>
<tr><td>MODEL NO.</td><td colspan="2">RAPH700</td></tr>
<tr><td>FCC ID</td><td colspan="2">NM8RAPH700</td></tr>
<tr><td>POWER SUPPLY</td><td colspan="2">3.7Vdc from rechargeable lithium battery<br>5.0Vdc from power adapter<br>5.0Vdc from host equipment</td></tr>
<tr><td>CLASSIFICATION</td><td colspan="2">Portable device, production unit</td></tr>
<tr><td>MODULATION TYPE</td><td colspan="2">OQPSK, HPSK</td></tr>
<tr><td>FREQUENCY RANGE</td><td colspan="2">Tx Frequency: 824.2MHz ~ 848.8MHz<br>Rx Frequency: 869.2MHz ~ 893.8MHz</td></tr>
<tr><td rowspan="3">CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER</td><td>CDMA850 band: SO55</td><td>0.241W / 824.7MHz for channel 1013<br>0.251W / 836.5MHz for channel 384<br>0.245W / 848.3MHz for channel 777</td></tr>
<tr><td>CDMA850 band: SO32</td><td>0.248W / 836.5MHz for channel 384</td></tr>
<tr><td>EVDO850 band: FTAP</td><td>0.239W / 836.5MHz for channel 384</td></tr>
<tr><td rowspan="2">MAX. AVERAGE SAR (1g)</td><td>Head:</td><td>0.438W/kg</td></tr>
<tr><td>Body:</td><td>0.442W/kg</td></tr>
<tr><td>ANTENNA TYPE</td><td colspan="2">PIFA antenna with 0.14dBi gain</td></tr>
<tr><td>DATA CABLE</td><td colspan="2">1.25m shielded USB cable without core</td></tr>
<tr><td>I/O PORTS</td><td colspan="2">Refer to user’s manual</td></tr>
<tr><td>ACCESSORY DEVICES</td><td colspan="2">Adapter, Battery, Earphone (Brand: hTC, model: HS S300, 1.90m)</td></tr>
</table>

**NOTE:**

1. The EUT is a Pocket PC Phone. The functions of EUT listed as below:

| | REFERENCE REPORT |
|---|---|
| CDMA 850 + CDMA 1900 | SA971013L03-1 |
| WLAN 802.11b/g | SA971013L03 |
| Bluetooth | SA971013L03-2 |

2. The communicated functions of EUT listed as below:

<table>
<tr><td colspan="2"></td><td>850MHz</td><td rowspan="3">With WLAN 802.11b/g + BT 2.0 with EDR+ GPS</td></tr>
<tr><td rowspan="2">3G</td><td>CDMA</td><td>V</td></tr>
<tr><td>1*EVDO</td><td>V</td></tr>
</table>

3. The EUT has lithium battery listed as below:

| | |
|---|---|
| **BRAND:** | hTC |
| **MODEL:** | DIAM171 |
| **RATING:** | 3.7Vdc, 1340mAh |

4. The EUT was operated with following power adapter:

| | |
|---|---|
| **BRAND:** | hTC |
| **MODEL:** | TC P300 |
| **INPUT:** | 100-240Vac, 0.2A, 50-60Hz |
| **OUTPUT:** | 5Vdc, 1A |
| **POWER LINE:** | 1.25m non-shielded USB cable without core |

5. Refer to following table for MEID no.:

| MEID NO. |
|---|
| A1000007****** |

6. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

## 2.2 SAR MEASUREMENT CONDITIONS FOR CDMA

The following procedures were followed according to FCC “SAR Measurement Procedures 3G Devices”, Oct. 2007.

➢ **Output Power Verification**

Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Results for at least steps 3, 4 and 10 of the power measurement procedures should be tabulated in the SAR report. Steps 3 and 4 should be measured using SO55 with power control bits in “All Up” condition. TDSO / SO32 may be used instead of SO55 for step 4. Step 10 should be measured using TDSO / SO32 with power control bits in the “Bits Hold” condition (i.e. alternative Up/Down Bits). All power measurements defined in C.S0011/TIA-98-E that are inapplicable to the DUT or cannot be measured due to technical or equipment limitations should be clearly identified in the test report.6

➢ **Head SAR Measurement**

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

➢ **Body SAR Measurements**

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCHn) is not required when the maximum average output of each RF channel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCHn) with FCH at full rate and SCH0 enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only.

When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR in RC1 is not required when the maximum average output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

➢ **Handsets with Ev-Do**

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than ¼ dB higher than that measured in RC3 (1x RTT), body SAR for Ev-Do is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at **153.6 kbps** using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than ¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots should be configured in the downlink for both Rev. 0 and Rev. A.

| CONDUCTED POWER (1x EV-DO) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| CHANNEL | FREQ. (MHz) | RAW VALUE (dBm) | | CORR. FACTOR (dB) | OUTPUT POWER | | | |
| | | | | | RTAP | | FTAP | |
| | | RTAP | FTAP | | dBm | Watt | dBm | Watt |
| 1013 | 824.7 | 19.88 | 20.04 | 3.50 | 23.38 | 0.218 | 23.54 | 0.226 |
| 384 | 836.5 | 20.15 | 20.29 | 3.50 | 23.65 | 0.232 | 23.79 | 0.239 |
| 777 | 848.3 | 20.02 | 20.18 | 3.50 | 23.52 | 0.225 | 23.68 | 0.233 |

| CDMA 2000 CONDUCTED POWER | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHAN. | FREQ. (MHz) | CDMA 2000 | RAW VALUE (dBm) | | | | | CORR. FACTOR (dB) | OUTPUT POWER (dBm) | | | | |
| | | RC | SO2 | SO55 | TDSO SO32 (FCH) | TDSO SO32 (FCH+ SCH) | SO3 | | SO2 | SO55 | TDSO SO32 (FCH) | TDSO SO32 (FCH+ SCH) | SO3 |
| 1013 | 824.7 | RC1 | 20.28 | 20.24 | 20.12 | 20.17 | 20.02 | 3.50 | 23.78 | 23.74 | 23.62 | 23.67 | 23.52 |
| | | RC3 | 20.31 | 20.32 | 20.28 | 20.19 | 20.21 | 3.50 | 23.81 | 23.82 | 23.78 | 23.69 | 23.71 |
| 384 | 836.5 | RC1 | 20.44 | 20.42 | 20.35 | 20.31 | 20.34 | 3.50 | 23.94 | 23.92 | 23.85 | 23.81 | 23.84 |
| | | RC3 | 20.46 | 20.49 | 20.44 | 20.36 | 20.37 | 3.50 | 23.96 | 23.99 | 23.94 | 23.86 | 23.87 |
| 777 | 848.3 | RC1 | 20.31 | 20.36 | 20.25 | 20.18 | 20.12 | 3.50 | 23.81 | 23.86 | 23.75 | 23.68 | 23.62 |
| | | RC3 | 20.38 | 20.39 | 20.31 | 20.33 | 20.29 | 3.50 | 23.88 | 23.89 | 23.81 | 23.83 | 23.79 |

## 2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturer, this product must comply with the requirements of the following standards:

**FCC Part 2 (2.1093)**

**FCC OET Bulletin 65, Supplement C (01- 01)**

**RSS-102**

**IEEE 1528-2003**

All test items have been performed and recorded as per the above standards.

## 2.4 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY4 **(software 4.7 Build 53)** consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY4 software defined. The DASY4 software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

### ET3DV6 ISOTROPIC E-FIELD PROBE

| | |
|---|---|
| **CONSTRUCTION** | Symmetrical design with triangular core.<br>Built-in optical fiber for surface detection system.<br>Built-in shielding against static charges.<br>PEEK enclosure material (resistant to organic solvents, e.g., glycolether). |
| **FREQUENCY** | 10MHz to 3GHz; Linearity: ± 0.2dB (30MHz to 3GHz) |
| **DYNAMIC RANGE** | 5µW/g to > 100mW/g; Linearity: ± 0.2dB |
| **OPTICAL SURFACE DETECTION** | ± 0.2mm repeatability in air and clear liquids over diffuse reflecting surfaces |
| **DIMENSIONS** | Overall length: 330mm (Tip Length: 16mm)<br>Tip diameter: 6.8mm (Body diameter: 12mm)<br>Distance from probe tip to dipole centers: 2.7mm |
| **APPLICATION** | General dosimetric measurements up to 3GHz<br>Compliance tests of mobile phones<br>Fast automatic scanning in arbitrary phantoms (ET3DV6) |

**NOTE**

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX D” for the Calibration Certification Report.
2. For frequencies above 800MHz, calibration in a rectangular wave-guide is used, because wave-guide size is manageable.
3. For frequencies below 800MHz, temperature transfer calibration is used because the wave-guide size becomes relatively large.

## TWIN SAM V4.0

| | |
|---|---|
| **CONSTRUCTION** | The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, EN 62209-1 and IEC 62209. 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 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 with the robot. |
| **SHELL THICKNESS** | 2 ± 0.2mm |
| **FILLING VOLUME** | Approx. 25liters |
| **DIMENSIONS** | Height: 810mm; Length: 1000mm; Width: 500mm |

## SYSTEM VALIDATION KITS:

| | |
|---|---|
| **CONSTRUCTION** | Symmetrical dipole with l/4 balun enables measurement of feedpoint impedance with NWA matched for use near flat phantoms filled with brain simulating solutions.<br>Includes distance holder and tripod adaptor |
| **CALIBRATION** | Calibrated SAR value for specified position and input power at the flat phantom in brain simulating solutions |
| **FREQUENCY** | 850MHz |
| **RETURN LOSS** | > 20dB at specified validation position |
| **POWER CAPABILITY** | > 100W (f < 1GHz); > 40W (f > 1GHz) |
| **OPTIONS** | Dipoles for other frequencies or solutions and other calibration conditions upon request |

## DEVICE HOLDER FOR SAM TWIN PHANTOM

**CONSTRUCTION**

The device holder for the mobile phone device is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\varepsilon$ =3 and loss tangent $\delta$ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered. The device holder for the portable device makes up of the polyethylene foam. The dielectric parameters of material close to the dielectric parameters of the air.

## DATA ACQUISITION ELECTRONICS

**CONSTRUCTION**

The data acquisition electronics (DAE3) consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain-switching multiplex, a fast 16 bit AD converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The mechanical probe is mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

## 2.5 GENERAL DESCRIPTION OF THE SPATIAL PEAK SAR EVALUATION

The DASY4 post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the micro-volt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

| | | |
|---|---|---|
| Probe parameters: | - Sensitivity | $Norm_i$, $a_{i0}$, $a_{i1}$, $a_{i2}$ |
| | - Conversion factor | $ConvF_i$ |
| | - Diode compression point | $dcp_i$ |
| Device parameters: | - Frequency | F |
| | - Crest factor | Cf |
| Media parameters: | - Conductivity | $\sigma$ |
| | - Density | $\rho$ |

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

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

| | | |
|---|---|---|
| $V_i$ | =compensated signal of channel i | (i = x, y, z) |
| $U_i$ | =input signal of channel I | (i = x, y, z) |
| Cf | =crest factor of exciting field | (DASY parameter) |
| $dcp_i$ | =diode compression point | (DASY parameter) |

From the compensated input signals the primary field data for each channel can be evaluated:

$$\text{E-fieldprobes: } E_i = \sqrt{\frac{V_1}{Norm_i \cdot ConvF}}$$

$$\text{H-fieldprobes: } H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

| | | |
|---|---|---|
| $V_i$ | =compensated signal of channel I | (i = x, y, z) |
| $Norm_i$ | =sensor sensitivity of channel i μV/(V/m)2 for E-field Probes | (i = x, y, z) |
| ConvF | = sensitivity enhancement in solution | |
| $a_{ij}$ | = sensor sensitivity factors for H-field probes | |
| F | = carrier frequency [GHz] | |
| $E_i$ | = electric field strength of channel i in V/m | |
| $H_i$ | = magnetic field strength of channel i in A/m | |

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

The primary field data are used to calculate the derived field units.

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

| | |
|---|---|
| SAR | = local specific absorption rate in mW/g |
| $E_{tot}$ | = total field strength in V/m |
| $\sigma$ | = conductivity in [mho/m] or [Siemens/m] |
| $\rho$ | = equivalent tissue density in g/cm3 |

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid. The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1g and 10g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

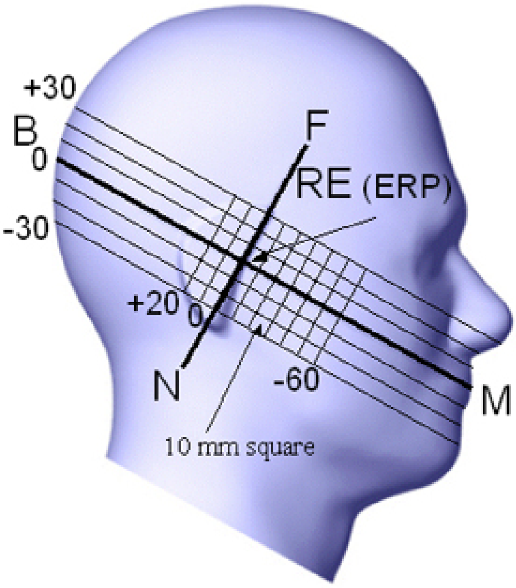
The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7 x 7 x 7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30 x 30 x 30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid (42875 points). In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

## 3. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

## 4. DESCRIPTION OF TEST MODES AND CONFIGURATIONS

### 4.1. DESCRIPTION OF TEST POSITION



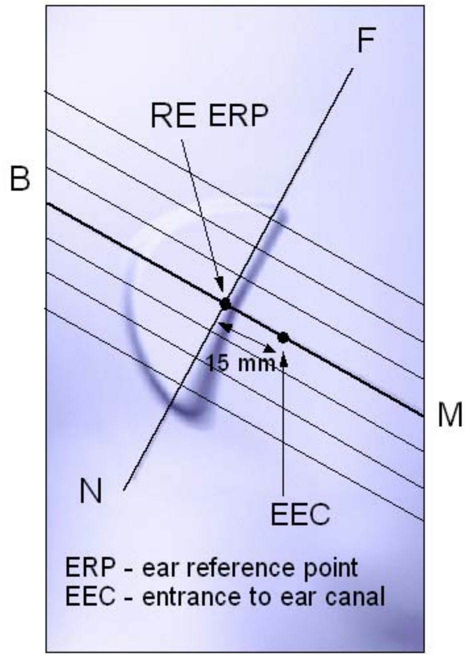




**FIGURE 3.1**

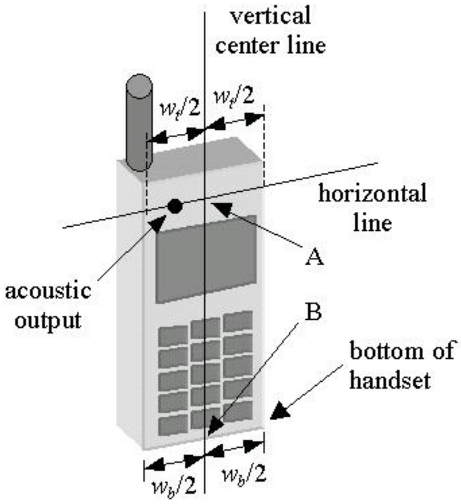



**FIGURE 3.1a**

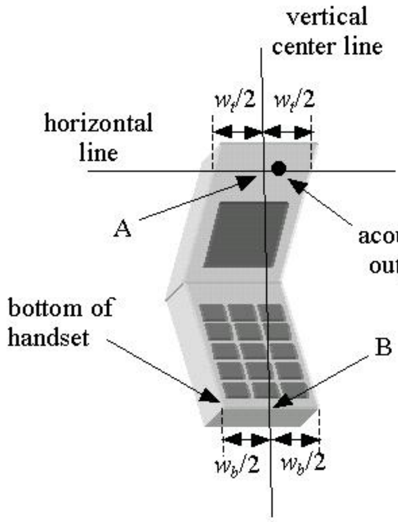
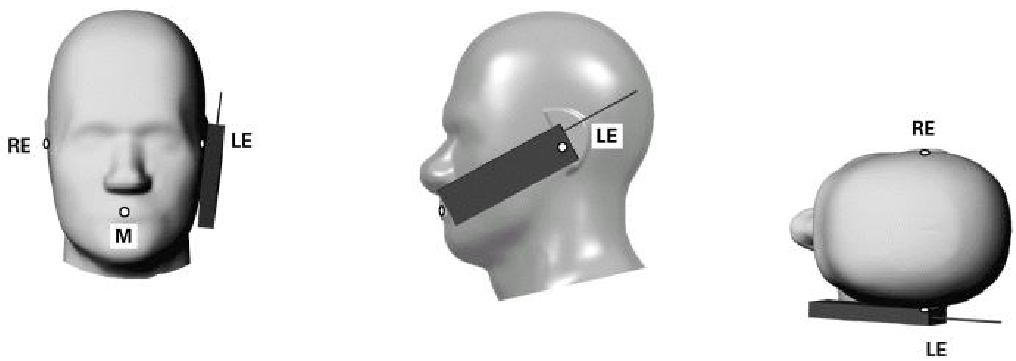



**FIGURE 3.1b**

## 4.2.1 TOUCH/CHEEK TEST POSITION

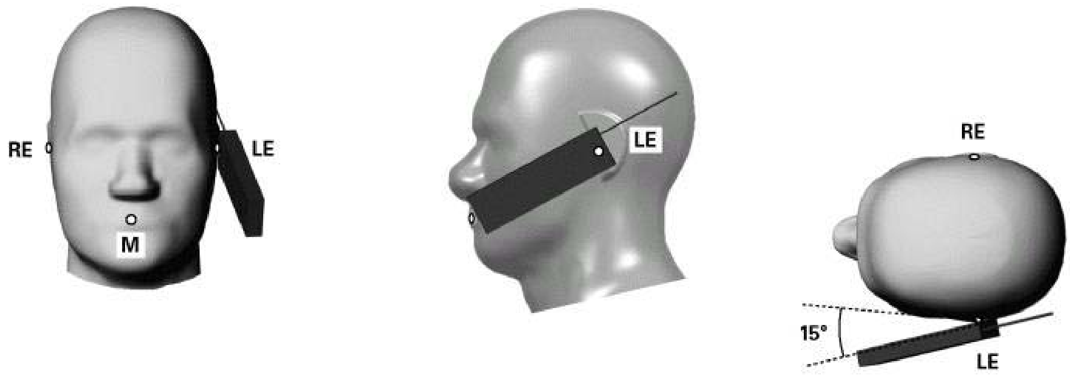
The head position in Figure 3.1, the ear reference points ERP are 15mm above entrance to ear canal along the B-M line. The line N-F (Neck-Front) is perpendicular to the B-M (Back Mouth) line. The handset device in Figure 3.1a and 3.1b,The vertical centerline pass through two points on the front side of handset: the midpoint of the width wt of the handset at the level of the acoustic output (point A) and the midpoint of the width Wb of the bottom of the handset (point B). The vertical centerline is perpendicular to the horizontal line and pass through the center of the acoustic output. The point A touches the ERP and the vertical centerline of the handset is parallel to the B-M line. While maintaining the point A contact with the ear(ERP), rotate the handset about the line NF until any point on handset is in contact with the cheek of the phantom




**TOUCH/CHEEK POSITION FIGURE**

#### 4.2.2 TILT TEST POSITION

Adjust the device in the cheek position. While maintaining a point of the handset contact in the ear, move the bottom of the handset away from the mouth by an angle of 15 degrees.




**TILT POSITION FIGURE**

#### 4.2.3 BODY-WORN CONFIGURATION

The handset device attached the belt clip or the holster. The keypad face of the handset is against with the bottom of the flat phantom face and the bottom of the keypad face contact to the bottom of the flat phantom.

When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only accessory that dictates the closest spacing to the body must be tested.

## 4.2. DESCRIPTION OF TEST MODE

| TEST MODE | COMMUNICATION MODE | MODULATION TYPE | ASSESSMENT POSTITION | TESTED CHANNEL | REMARK |
|---|---|---|---|---|---|
| 1 | CDMA850 SO55 | OQPSK | A / Cheek | 1013, 384, 777 | - |
| 2 | | | A / Tilt | 1013, 384, 777 | - |
| 3 | | | B / Cheek | 1013, 384, 777 | - |
| 4 | | | B / Tilt | 1013, 384, 777 | - |
| 5 | CDMA850 SO32 | OQPSK | C : Body / Bottom | 384 | Slider off |
| 6 | EVDO850 FTAP | HPSK | C : Body / Front | 384 | Slider off |
| 7 | CDMA850 SO32 | OQPSK | C : Body / Bottom | 384 | Slider off |
| 8 | EVDO850 FTAP | HPSK | C : Body / Front | 384 | Slider off |
| 9 | CDMA850 SO32 | OQPSK | C : Body / Bottom | 384 | Slider on |
| 10 | EVDO850 FTAP | HPSK | C : Body / Front | 384 | Slider on |
| 11 | CDMA850 SO32 | OQPSK | C : Body / Bottom | 384 | Slider on |
| 12 | EVDO850 FTAP | HPSK | C : Body / Front | 384 | Slider on |

**NOTE:** Assessment position A: Right head position, B: Left head position, C: Body position, please refer to appendix E for the photo.

**Enhanced Energy Coupling At Increased Separation Distances**

**Initial Position:**

The probe tip is positioned at the peak SAR location of low channel in test mode 1, at a distance of one half the probe tip diameter from the phantom surface. Under this condition to get a single sar value.

**5mm Increments From Initial Position:**

With the probe fixed at this location, the device is moved away from the phantom in 5 mm increments from the initial touching or minimum separation position. A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the initial position.

| TEST POSITION | SAR VALUE (mW/g) |
|---|---|
| INITIAL POSITION | 0.647 |
| 5mm INCREMENTS FROM INITIAL POSITION | 0.419 |
| 10mm INCREMENTS FROM INITIAL POSITION | 0.281 |

**THE WORST POSITION FROM EVALUATED RESULT:** Initial position.

## 4.3. SUMMARY OF TEST RESULTS

| ITEM | | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| PART OF ASSESSMENT | | HEAD POSITION | | | |
| COMMUNICATION MODE | | CDMA850 SO55 | | | |
| CHAN. | FREQ. (MHz) | MEASURED VALUE OF 1g SAR ( W/kg) | | | |
| 1013 | 824.7 (Low) | 0.243 | 0.291 | 0.261 | 0.112 |
| 384 | 836.5 (Mid.) | **0.438** | 0.190 | 0.399 | 0.187 |
| 777 | 848.3 (High) | 0.409 | 0.169 | 0.381 | 0.177 |

| ITEM | | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|
| PART OF ASSESSMENT | | BODY POSITION | | | | | | | |
| COMMUNICATION MODE | | CDMA850 SO32 | CDMA850 FTAP | CDMA850 SO32 | CDMA850 FTAP | CDMA850 SO32 | CDMA850 FTAP | CDMA850 SO32 | CDMA850 FTAP |
| CHAN. | FREQ. (MHz) | MEASURED VALUE OF 1g SAR ( W/kg) | | | | | | | |
| 384 | 836.5 (Mid.) | 0.441 | **0.442** | 0.156 | 0.155 | 0.412 | 0.414 | 0.264 | 0.247 |

**NOTE:** The worst value of each communication has been marked by boldface.

# 5. TEST RESULTS

## 5.1 TEST PROCEDURES

The EUT makes a phone call to the communication simulator station. Establish the simulation communication configuration rather the actual communication. Then the EUT could continuous the transmission mode. Adjust the PCL of the base station could controlled the EUT to transmitted the maximum output power. The base station also could control the transmission channel. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY4 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528 / EN 62209-1, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- Power reference measurement
- Verification of the power reference measurement
- Area scan
- Zoom scan
- Power reference measurement

The area scan was performed for the highest spatial SAR location. The zoom scan with 30mm x 30mm x 30mm volume was performed for SAR value averaged over 1g and 10g spatial volumes.

In the zoom scan, the distance between the measurement point at the probe sensor location (geometric center behind the probe tip) and the phantom surface is 3mm and maintained at a constant distance of ±0.5mm during a zoom scan to determine peak SAR locations. The distance is 3mm between the first measurement point and the bottom surface of the phantom. The secondary measurement point to the bottom surface of the phantom is with 8mm separation distance. The cube size is 7 x 7 x 7 points consists of 343 points and the grid space is 5mm.

The measurement time is 0.5s at each point of the zoom scan. The probe boundary effect compensation shall be applied during the SAR test. Because of the tip of the probe to the Phantom surface separated distances are longer than half a tip probe diameter.

In the area scan, the separation distance is 3mm between the each measurement point and the phantom surface. The scan size shall be included the transmission portion of the EUT. The measurement time is the same as the zoom scan. At last the reference power drift shall be less than ±5%.

## 5.2 MEASURED SAR RESULTS

**CDMA850 BAND RIGHT HEAD POSITION**

| ENVIRONMENTAL CONDITION | Air Temperature：23.2°C, Liquid Temperature：22.0°C<br>Humidity：62%RH | | | | | | |
|---|---|---|---|---|---|---|---|
| TESTED BY | Sam Onn | | | DATE | | Nov. 07, 2008 | |
| CHAN. | FREQ. (MHz) | MODULATION TYPE | CONDUCTED POWER (W) | | POWER DRIFT (%) | DEVICE TEST POSITION MODE | MEASURED 1g SAR (W/kg) |
| | | | BEGIN TEST | AFTER TEST | | | |
| **1013** | **824.7 (Low)** | **OQPSK** | 0.241 | 0.238 | -1.24 | 1 | 0.243 |
| **384** | **836.5 (Mid.)** | **OQPSK** | 0.251 | 0.247 | -1.59 | 1 | **0.438** |
| **777** | **848.3 (High)** | **OQPSK** | 0.245 | 0.241 | -1.63 | 1 | 0.409 |
| **1013** | **824.7 (Low)** | **OQPSK** | 0.241 | 0.237 | -1.66 | 2 | 0.291 |
| **384** | **836.5 (Mid.)** | **OQPSK** | 0.251 | 0.246 | -1.99 | 2 | 0.190 |
| **777** | **848.3 (High)** | **OQPSK** | 0.245 | 0.240 | -2.04 | 2 | 0.169 |

**NOTE:**

1. Test configuration of each mode is described in section 4.3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A for the data.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

## CDMA850 BAND LEFT HEAD POSITION

| ENVIRONMENTAL CONDITION | Air Temperature：23.2°C, Liquid Temperature：22.0°C<br>Humidity：62%RH | | |
|---|---|---|---|
| TESTED BY | Sam Onn | DATE | Nov. 07, 2008 |

| CHAN. | FREQ. (MHz) | MODULATION TYPE | CONDUCTED POWER (W) | | POWER DRIFT (%) | DEVICE TEST POSITION MODE | MEASURED 1g SAR (W/kg) |
|---|---|---|---|---|---|---|---|
| | | | BEGIN TEST | AFTER TEST | | | |
| 1013 | 824.7 (Low) | OQPSK | 0.241 | 0.236 | -2.07 | 3 | 0.261 |
| 384 | 836.5 (Mid.) | OQPSK | 0.251 | 0.245 | -2.39 | 3 | 0.399 |
| 777 | 848.3 (High) | OQPSK | 0.245 | 0.239 | -2.45 | 3 | 0.381 |
| 1013 | 824.7 (Low) | OQPSK | 0.241 | 0.235 | -2.49 | 4 | 0.112 |
| 384 | 836.5 (Mid.) | OQPSK | 0.251 | 0.244 | -2.79 | 4 | 0.187 |
| 777 | 848.3 (High) | OQPSK | 0.245 | 0.238 | -2.86 | 4 | 0.177 |

**NOTE:**

1.Test configuration of each mode is described in section 4.3.

2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.

3. Please see the Appendix A for the data.

4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

**CDMA850 SO55 / EVDO850 FTAP**
**BAND BODY POSITION**

| ENVIRONMENTAL CONDITION | Air Temperature：23.0°C, Liquid Temperature：21.8°C<br>Humidity：60%RH | | | | | | |
|---|---|---|---|---|---|---|---|
| TESTED BY | Sam Onn | | | DATE | | Nov. 10, 2008 | |
| CHAN. | FREQ. (MHz) | MODULATION TYPE | CONDUCTED POWER (W) | | POWER DRIFT (%) | DEVICE TEST POSITION MODE | MEASURED 1g SAR (W/kg) |
| | | | BEGIN TEST | AFTER TEST | | | |
| 384 | 836.5 (Mid.) | OQPSK | 0.248 | 0.244 | -1.61 | 5 | 0.441 |
| 384 | 836.5 (Mid.) | HPSK | 0.239 | 0.235 | -1.67 | 6 | **0.442** |
| 384 | 836.5 (Mid.) | OQPSK | 0.248 | 0.243 | -2.02 | 7 | 0.156 |
| 384 | 836.5 (Mid.) | HPSK | 0.239 | 0.234 | -2.09 | 8 | 0.155 |
| 384 | 836.5 (Mid.) | OQPSK | 0.248 | 0.242 | -2.42 | 9 | 0.412 |
| 384 | 836.5 (Mid.) | HPSK | 0.239 | 0.233 | -2.51 | 10 | 0.414 |
| 384 | 836.5 (Mid.) | OQPSK | 0.248 | 0.241 | -2.82 | 11 | 0.264 |
| 384 | 836.5 (Mid.) | HPSK | 0.239 | 0.232 | -2.93 | 12 | 0.247 |

**NOTE:**

1. Test configuration of each mode is described in section 4.3.
2. In this testing, the limit for General Population Spatial Peak averaged over **1g, 1.6W/kg**, is applied.
3. Please see the Appendix A for the data.
4. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.

## 5.3 SAR LIMITS

| HUMAN EXPOSURE | SAR (W/kg) | |
|---|---|---|
| | (GENERAL POPULATION / UNCONTROLLED EXPOSURE ENVIRONMENT) | (OCCUPATIONAL / CONTROLLED EXPOSURE ENVIRONMENT) |
| Spatial Average (whole body) | 0.08 | 0.4 |
| Spatial Peak (averaged over 1 g) | **1.6** | 8.0 |
| Spatial Peak (hands / wrists / feet / ankles averaged over 10 g) | 4.0 | 20.0 |

**NOTE:**

1. This limits accord to 47 CFR 2.1093 – Safety Limit.
2. The EUT property been complied with the partial body exposure limit under the general population environment.

## 5.4 RECIPES FOR TISSUE SIMULATING LIQUIDS

For the measurement of the field distribution inside the SAM phantom, the phantom must be filled with 25 litters of tissue simulation liquid.

The following ingredients are used：

- **WATER-** Deionized water (pure H20), resistivity _16 M - as basis for the liquid
- **SUGAR-** Refined sugar in crystals, as available in food shops - to reduce relative permittivity
- **SALT-** Pure NaCl - to increase conductivity
- **CELLULOSE-** Hydroxyethyl-cellulose, medium viscosity (75-125mPa.s, 2% in water, 20_C), CAS # 54290 - to increase viscosity and to keep sugar in solution
- **PRESERVATIVE-** Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 - to prevent the spread of bacteria and molds
- **DGMBE-** Diethylenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS # 112-34-5 - to reduce relative permittivity

**THE RECIPES FOR 835MHz SIMULATING LIQUID TABLE**

| INGREDIENT | HEAD SIMULATING LIQUID 835MHz (HSL-835) | MUSCLE SIMULATING LIQUID 835MHz (MSL-835) |
|---|---|---|
| Water | 40.28% | 50.07% |
| Cellulose | 02.41% | NA |
| Salt | 01.38% | 0.94% |
| Preventtol D-7 | 00.18% | 0.09% |
| Sugar | 57.97% | 48.2% |
| Dielectric Parameters at 22℃ | f = 835MHz<br>ε= 41.5 ± 5%<br>σ= 0.97 ± 5% S/m | f= 835MHz<br>ε= 55.0 ± 5%<br>σ= 1.05 ± 5% S/m |

Testing the liquids using the Agilent Network Analyzer E8358A and Agilent Dielectric Probe Kit 85070D.The testing procedure is following as

1. Turn Network Analyzer on and allow at least 30min. warm up.
2. Mount dielectric probe kit so that interconnecting cable to Network Analyzer will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature (±1°).
4. Set water temperature in Agilent-Software (Calibration Setup).
5. Perform calibration.
6. Validate calibration with dielectric material of known properties (e.g. polished ceramic slab with >8mm thickness ε'=10.0, ε''=0.0). If measured parameters do not fit within tolerance, repeat calibration (±0.2 for ε': ±0.1 for ε'').
7. Conductivity can be calculated from ε'' by $\sigma = \omega \varepsilon_0 \varepsilon'' = \varepsilon'' f\,[GHz] / 18$.
8. Measure liquid shortly after calibration. Repeat calibration every hour.
9. Stir the liquid to be measured. Take a sample (~ 50ml) with a syringe from the center of the liquid container.
10. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
11. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
12. Perform measurements.
13. Adjust medium parameters in DASY4 for the frequencies necessary for the measurements (‘Setup Config’, select medium (e.g. Brain 900MHz) and press ‘Option’-button.
14. Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 900MHz).

# FOR CDMA 850 BAND
# SIMULATING LIQUID

| **LIQUID TYPE** | | HSL-835 | | MSL-835 | |
|---|---|---|---|---|---|
| **SIMULATING LIQUID TEMP.** | | 22.0 | | 21.8 | |
| **TESTED DATE** | | Nov. 07, 2008 | | Nov. 10, 2008 | |
| **TESTED BY** | | Sam Onn | | Sam Onn | |
| **FREQ. (MHz)** | **LIQUID PARAMETER** | **STANDARD VALUE** | **MEASUREMENT VALUE** | **STANDARD VALUE** | **MEASUREMENT VALUE** |
| 824.7 | Permitivity (ε) | 41.60 | 43.10 | 55.20 | 53.00 |
| 835.0 | | 41.50 | 43.00 | 55.20 | 53.00 |
| 836.5 | | 41.50 | 43.00 | 55.20 | 53.00 |
| 848.3 | | 41.50 | 42.80 | 55.20 | 52.80 |
| 824.7 | Conductivity (σ) S/m | 0.90 | 0.92 | 0.97 | 0.97 |
| 835.0 | | 0.90 | 0.93 | 0.97 | 0.97 |
| 836.5 | | 0.90 | 0.93 | 0.97 | 0.97 |
| 848.3 | | 0.91 | 0.94 | 0.99 | 0.98 |
| **Dielectric Parameters Required at 22℃** | | **f= 835MHz**<br>**ε= 41.5 ± 5%**<br>**σ= 0.97 ± 5% S/m** | | **f= 835MHz**<br>**ε= 55.0 ± 5%**<br>**σ= 1.05 ± 5% S/m** | |

## 5.5 TEST EQUIPMENT FOR TISSUE PROPERTY

| ITEM | NAME | BRAND | TYPE | SERIES NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|---|---|
| 1 | Network Analyzer | Agilent | E8358A | US41480538 | Nov. 11, 2008 | Nov. 10, 2009 |
| 2 | Dielectric Probe | Agilent | 85070D | US01440176 | NA | NA |

**NOTE:**

1. Before starting, all test equipment shall be warmed up for 30min.
2. The tolerance (k=1) specified by Agilent for general dielectric measurements, deriving from inaccuracies in the calibration data, analyzer drift, and random errors, are usually ±2.5% and ±5% for measured permittivity and conductivity, respectively. However, the tolerances for the conductivity is smaller for material with large loss tangents, i.e., less than ±2.5% (k=1). It can be substantially smaller if more accurate methods are applied.

# 6. SYSTEM VALIDATION

The system validation was performed in the flat phantom with equipment listed in the following table. Since the SAR value is calculated from the measured electric field, dielectric constant and conductivity of the body tissue and the SAR is proportional to the square of the electric field. So, the SAR value will be also proportional to the RF power input to the system validation dipole under the same test environment. In our system validation test, 250mW RF input power was used.

## 6.1 TEST EQUIPMENT

| ITEM | NAME | BRAND | TYPE | SERIES NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|---|---|
| 1 | SAM Phantom | S & P | QD000 P40 CA | TP-1150 | NA | NA |
| 2 | Signal Generator | Anritsu | 68247B | 984703 | May 27, 2008 | May 26, 2009 |
| 3 | E-Field Probe | S & P | EX3DV6 | 1790 | Mar. 13, 2008 | Mar. 12, 2009 |
| 4 | DAE | S & P | DAE | 579 | Mar. 13, 2008 | Mar. 12, 2009 |
| 5 | Robot Positioner | Staubli Unimation | NA | NA | NA | NA |
| 6 | Validation Dipole | S & P | D835V2 | 4d021 | May 11, 2008 | May 12, 2009 |

**NOTE:** Before starting the measurement, all test equipment shall be warmed up for 30min.

## 6.2 TEST PROCEDURE

Before the system performance check, we need only to tell the system which components (probe, medium, and device) are used for the system performance check; the system will take care of all parameters. The dipole must be placed beneath the flat section of the SAM Twin Phantom with the correct distance holder in place. The distance holder should touch the phantom surface with a light pressure at the reference marking (little cross) and be oriented parallel to the long side of the phantom. Accurate positioning is not necessary, since the system will search for the peak SAR location, except that the dipole arms should be parallel to the surface. The device holder for mobile phones can be left in place but should be rotated away from the dipole.

1. The ”Power Reference Measurement” and ”Power Drift Measurement” jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the amplifier output power. If it is too high (above ±0.1 dB), the system performance check should be repeated; some amplifiers have very high drift during warm-up. A stable amplifier gives drift results in the DASY system below ±0.02dB.

2. The ”Surface Check” job tests the optical surface detection system of the DASY system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ±0.1mm). In that case it is better to abort the system performance check and stir the liquid. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within $\pm 30^{O}$.) However, varying breaking indices of different liquid compositions might also influence the distance. If the indicated difference varies from the actual setting, the probe parameter ”optical surface

3. The ”Area Scan” job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable. If a finer graphic is desired, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result.

4. The ”Zoom Scan” job measures the field in a volume around the peak SAR value assessed in the previous ”Area Scan” job (for more information see the application note on SAR evaluation).

About the validation dipole positioning uncertainty, the constant and low loss dielectric spacer is used to establish the correct distance between the top surface of the dipole and the bottom surface of the phantom, the error component introduced by the uncertainty of the distance between the liquid (i.e., phantom shell) and the validation dipole in the DASY4 system is less than ±0.1mm.

$$SAR_{tolerance}[\%] = 100 \times \left(\frac{(a+d)^2}{a^2} - 1\right)$$

As the closest distance is 10mm, the resulting tolerance $SAR_{tolerance}[\%]$ is <2%.

## 6.3 VALIDATION RESULTS

| SYSTEM VALIDATION TEST OF SIMULATING LIQUID | | | | | |
|---|---|---|---|---|---|
| **FREQUENCY (MHz)** | **REQUIRED SAR (mW/g)** | **MEASURED SAR (mW/g)** | **DEVIATION (%)** | **SEPARATION DISTANCE** | **TESTED DATE** |
| MSL835 | 2.31 (1g) | 2.24 | -3.03 | 10mm | Nov. 07, 2008 |
| MSL835 | 2.34 (1g) | 2.18 | -6.84 | 10mm | Nov. 10, 2008 |
| **TESTED BY** | Sam Onn | | | | |

**NOTE:** Please see Appendix for the photo of system validation test.

## 6.4 SYSTEM VALIDATION UNCERTAINTIES

In the table below, the system validation uncertainty with respect to the analytically assessed SAR value of a dipole source as given in the IEEE 1528 standard is given. This uncertainty is smaller than the expected uncertainty for mobile phone measurements due to the simplified setup and the symmetric field distribution.

| Error Description | Tolerance (±%) | Probability Distribution | Divisor | ($C_i$) | | Standard Uncertainty (±%) | | ($v_i$) |
|---|---|---|---|---|---|---|---|---|
| | | | | (1g) | (10g) | (1g) | (10g) | |
| **Measurement System** | | | | | | | | |
| Probe Calibration | 5.90 | Normal | 1 | 1 | 1 | 5.90 | 5.90 | ∞ |
| Axial Isotropy | 4.70 | Rectangular | $\sqrt{3}$ | 0.7 | 0.7 | 1.90 | 1.90 | ∞ |
| Hemispherical Isotropy | 9.60 | Rectangular | $\sqrt{3}$ | 0.7 | 0.7 | 3.88 | 3.88 | ∞ |
| Boundary effects | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Linearity | 4.70 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.71 | 2.71 | ∞ |
| System Detection Limits | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| Readout Electronics | 0.30 | Normal | 1 | 1 | 1 | 0.30 | 0.30 | ∞ |
| Response Time | 0.80 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.46 | 0.46 | ∞ |
| Integration Time | 2.60 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.50 | 1.50 | ∞ |
| RF Ambient Noise | 3.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| RF Ambient Reflections | 3.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| Probe Positioner | 0.40 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.23 | 0.23 | ∞ |
| Probe Positioning | 2.90 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.67 | 1.67 | ∞ |
| Max. SAR Eval. | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Dipole Related** | | | | | | | | |
| Dipole Axis to Liquid Distance | 2.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.15 | 1.15 | 145 |
| Input Power Drift | 4.70 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.71 | 2.71 | ∞ |
| **Phantom and Tissue parameters** | | | | | | | | |
| Phantom Uncertainty | 4.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.31 | 2.31 | ∞ |
| Liquid Conductivity (target) | 5.00 | Rectangular | $\sqrt{3}$ | 0.64 | 0.43 | 1.85 | 1.24 | ∞ |
| Liquid Conductivity (measurement) | 3.19 | Normal | 1 | 0.64 | 0.43 | 2.04 | 1.37 | ∞ |
| Liquid Permittivity (target) | 5.00 | Rectangular | $\sqrt{3}$ | 0.6 | 0.49 | 1.73 | 1.41 | ∞ |
| Liquid Permittivity (measurement) | 3.67 | Normal | 1 | 0.6 | 0.49 | 2.20 | 1.80 | ∞ |
| **Combined Standard Uncertainty** | | | | | | **10.13** | **9.79** | |
| **Coverage Factor for 95%** | | | | | | **Kp=2** | | |
| **Expanded Uncertainty (K=2)** | | | | | | **20.27** | **19.59** | |

**NOTE:** About the system validation uncertainty assessment, please reference the section 7.

# 7. MEASUREMENT SAR PROCEDURE UNCERTAINTIES

The assessment of spatial peak SAR of the hand handheld devices is according to IEEE 1528 / EN 62209-1. All testing situation shall be met below these requirements.

- The system is used by an experienced engineer who follows the manual and the guidelines taught during the training provided by SPEAG.
- The probe has been calibrated within the requested period and the stated uncertainty for the relevant frequency bands does not exceed 4.8% (k=1).
- The validation dipole has been calibrated within the requested period and the system performance check has been successful.
- The DAE unit has been calibrated within the within the requested period.
- The minimum distance between the probe sensor and inner phantom shell is selected to be between 4 and 5mm.
- The operational mode of the DUT is CW, CDMA, FDMA or TDMA (GSM, DCS, PCS, IS136 and PDC) and the measurement/integration time per point is >500 ms.
- The dielectric parameters of the liquid have been assessed using Agilent 85070D dielectric probe kit or a more accurate method.
- The dielectric parameters are within 5% of the target values.
- The DUT has been positioned as described in section 3.

## 7.1. PROBE CALIBRATION UNCERTAINTY

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO17025. The uncertainties are stated on the calibration certificate. For the most relevant frequency bands, these values do not exceed 4.8% (k=1). If evaluations of other bands are performed for which the uncertainty exceeds these values, the uncertainty tables given in the summary have to be revised accordingly.

## 7.2. ISOTROPY UNCERTAINTY

The axial isotropy tolerance accounts for probe rotation around its axis while the hemispherical isotropy error includes all probe orientations and field polarizations. These parameters are assessed by SPEAG during initial calibration. In 2001, SPEAG further tightened its quality controls and warrants that the maximal deviation from axial isotropy is ±0.20dB, while the maximum deviation of hemispherical isotropy is ±0.40dB, corresponding to ±4.7% and ±9.6%, respectively. A weighting factor of cp equal to 0.5 can be applied, since the axis of the probe deviates less than 30 degrees from the normal surface orientation.

## 7.3. BOUNDARY EFFECT UNCERTAINTY

The effect can be estimated according to the following error approximation formula

$$SAR_{tolerance}[\%] = SAR_{be}[\%] \times \frac{(d_{be} + d_{step})^2}{2d_{step}} \frac{e^{-\frac{d_{be}}{\delta/2}}}{\delta/2}$$

$$d_{be} + d_{step} < 10mm$$

The parameter $d_{be}$ is the distance in mm between the surface and the closest measurement point used in the averaging process; $d_{step}$ is the separation distance in mm between the first and second measurement points; δ is the minimum penetration depth in mm within the head tissue equivalent liquids (i.e., δ= 13.95mm at 3GHz); $SAR_{be}$ is the deviation between the measured SAR value at the distance $d_{be}$ from the boundary and the wave-guide analytical value $SAR_{ref}$.DASY4 applies a boundary effect compensation algorithm according to IEEE 1528, which is possible since the axis of the probe never deviates more than 30 degrees from the normal surface orientation. $SAR_{be}$[%] is assessed during the calibration process and SPEAG warrants that the uncertainty at distances larger than 4mm is always less than 1%.In summary, the worst case boundary effect SAR tolerance[%] for scanning distances larger than 4mm is < ± 0.8%.

## 7.4. PROBE LINEARITY UNCERTAINTY

Field probe linearity uncertainty includes errors from the assessment and compensation of the diode compression effects for CW and pulsed signals with known duty cycles. This error is assessed using the procedure described in IEEE 1528 / EN 62209-1. For SPEAG field probes, the measured difference between CW and pulsed signals, with pulse frequencies between 10Hz and 1kHz and duty cycles between 1 and 100, is < ±0.20dB (< ±4.7%).

## 7.5. READOUT ELECTRONICS UNCERTAINTY

All uncertainties related to the probe readout electronics (DAE unit), including the gain and linearity of the instrumentation amplifier, its loading effect on the probe, and accuracy of the signal conversion algorithm, have been assessed accordingly to IEEE 1528 / EN 62209-1.The combination (root-sum-square RSS method) of these components results in an overall maximum error of ±1.0%.

## 7.6. RESPONSE TIME UNCERTAINTY

The time response of the field probes is assessed by exposing the probe to a well-controlled electric field producing SAR larger than 2.0W/kg at the tissue medium surface. The signal response time is evaluated as the time required by the system to reach 90% of the expected final value after an on/of switch of the power source. Analytically, it can be expressed as:

$$SAR_{tolerance}[\%] = 100 \times \left(\frac{T_m}{T_m + \tau e^{-T_m/\tau} - \tau} - 1\right)$$

where Tm is 500 ms, i.e., the time between measurement samples, and $\tau$ the time constant. The response time $\tau$ of SPEAG's probes is <5ms. In the current implementation, DASY4 waits longer than 100 ms after having reached the grid point before starting a measurement, i.e., the response time uncertainty is negligible.

## 7.7. INTEGRATION TIME UNCERTAINTY

If the device under test does not emit a CW signal, the integration time applied to measure the electric field at a specific point may introduce additional uncertainties due to the discretization and can be assessed as follows

$$SAR_{tolerance}[\%] = 100 \times \sum_{allsub-frames} \frac{t_{frame}}{t_{integration}} \frac{slot_{idle}}{slot_{total}}$$

The tolerances for the different systems are given in Table 7.1, whereby the worst-case $SAR_{tolerance}$ is 2.6%.

| System | $SAR_{tolerance}$ % |
|---|---|
| CW | 0 |
| CDMA* | 0 |
| WCDMA* | 0 |
| FDMA | 0 |
| IS-136 | 2.6 |
| PDC | 2.6 |
| GSM/DCS/PCS | 1.7 |
| DECT | 1.9 |
| Worst-Case | 2.6 |

**TABLE 7.1**

## 7.8. PROBE POSITIONER MECHANICAL TOLERANCE

The mechanical tolerance of the field probe positioner can introduce probe positioning uncertainties. The resulting SAR uncertainty is assessed by comparing the SAR obtained according to the specifications of the probe positioner with respect to the actual position defined by the geometric enter of the probe sensors. The tolerance is determined as:

$$SAR_{tolerance}[\%] = 100 \times \frac{d_{ph}}{\delta/2}$$

The specified repeatability of the RX robot family used in DASY4 systems is ±25μm. The absolute accuracy for short distance movements is better than ±0.1mm, i.e., the $SAR_{tolerance}$[%] is better than 1.5% (rectangular).

## 7.9. PROBE POSITIONING

The probe positioning procedures affect the tolerance of the separation distance between the probe tip and the phantom surface as:

$$SAR_{tolerance}[\%] = 100 \times \frac{d_{ph}}{\delta/2}$$

where $d_{ph}$ is the maximum deviation of the distance between the probe tip and the phantom surface. The optical surface detection has a precision of better than 0.2mm, resulting in an $SAR_{tolerance}$[%] of <2.9% (rectangular distribution). Since the mechanical detection provides better accuracy, 2.9% is a worst-case figure for DASY4 system.

## 7.10. PHANTOM UNCERTAINTY

The SAR measurement uncertainty due to SPEAG phantom shell production tolerances has been evaluated using

$$SAR_{tolerance}[\%] \cong 100 \times \frac{2d}{a}, \qquad d << a$$

For a maximum deviation d of the inner and outer shell of the phantom from that specified in the CAD file of ±0.2mm, and a 10mm spacing a between source and tissue liquid, the calculated phantom uncertainty is ±4.0%.

## 7.11. DASY4 UNCERTAINTY BUDGET

| Error Description | Tolerance (±%) | Probability Distribution | Divisor | ($C_i$) (1g) | ($C_i$) (10g) | Standard Uncertainty (±%) (1g) | Standard Uncertainty (±%) (10g) | ($v_i$) |
|---|---|---|---|---|---|---|---|---|
| **Measurement Equipment** | | | | | | | | |
| **Probe Calibration** | 5.90 | Normal | 1 | 1 | 1 | 5.90 | 5.90 | ∞ |
| **Axial Isotropy** | 4.70 | Rectangular | $\sqrt{3}$ | 0.7 | 0.7 | 1.90 | 1.90 | ∞ |
| **Hemispherical Isotropy** | 9.60 | Rectangular | $\sqrt{3}$ | 0.7 | 0.7 | 3.88 | 3.88 | ∞ |
| **Boundary effects** | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Linearity** | 4.70 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.71 | 2.71 | ∞ |
| **System Detection Limits** | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Readout Electronics** | 0.30 | Normal | 1 | 1 | 1 | 0.30 | 0.30 | ∞ |
| **Response Time** | 0.80 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.46 | 0.46 | ∞ |
| **Integration Time** | 2.60 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.50 | 1.50 | ∞ |
| **RF Ambient Noise** | 3.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| **RF Ambient Reflections** | 3.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | ∞ |
| **Probe Positioner** | 0.40 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.23 | 0.23 | ∞ |
| **Probe Positioning** | 2.90 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.67 | 1.67 | ∞ |
| **Max. SAR Eval.** | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Test Sample Related** | | | | | | | | |
| **Device Positioning** | 0.69 | Normal | 1 | 1 | 1 | 0.69 | 0.69 | 10 |
| **Device Holder** | 3.60 | Normal | 1 | 1 | 1 | 3.60 | 3.60 | 5 |
| **Power Drift** | 5.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.89 | 2.89 | ∞ |
| **Phantom and Tissue parameters** | | | | | | | | |
| **Phantom Uncertainty** | 4.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.31 | 2.31 | ∞ |
| **Liquid Conductivity (target)** | 5.00 | Rectangular | $\sqrt{3}$ | 0.64 | 0.43 | 1.85 | 1.24 | ∞ |
| **Liquid Conductivity (measurement)** | 3.19 | Normal | 1 | 0.64 | 0.43 | 2.04 | 1.37 | ∞ |
| **Liquid Permittivity (target)** | 5.00 | Rectangular | $\sqrt{3}$ | 0.6 | 0.49 | 1.73 | 1.41 | ∞ |
| **Liquid Permittivity (measurement)** | 3.67 | Normal | 1 | 0.6 | 0.49 | 2.20 | 1.80 | ∞ |
| **Combined Standard Uncertainty** | | | | | | **10.76** | **10.44** | |
| **Coverage Factor for 95%** | | | | | | **kp=2** | | |
| **Expanded Uncertainty (K=2)** | | | | | | **21.52** | **20.88** | |

**TABLE 7.2**

The table 7.2: Worst-Case uncertainty budget for DASY4 assessed according to IEEE 1528. The budget is valid for the frequency range 300MHz ~ 3GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

# 8. INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

| | |
|---|---|
| **USA** | FCC, UL |
| **GERMANY** | TUV Rheinland |
| **JAPAN** | VCCI |
| **NORWAY** | NEMKO |
| **CANADA** | INDUSTRY CANADA, CSA |
| **R.O.C.** | TAF, BSMI, NCC |
| **NETHERLANDS** | Telefication |
| **SINGAPORE** | GOST-ASIA (MOU) |
| **RUSSIA** | CERTIS (MOU) |

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml. If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab**:
Tel: 886-2-26052180
Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab**:
Tel: 886-3-5935343
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab**:
Tel: 886-3-3183232
Fax: 886-3-3185050
**Web Site**: www.adt.com.tw

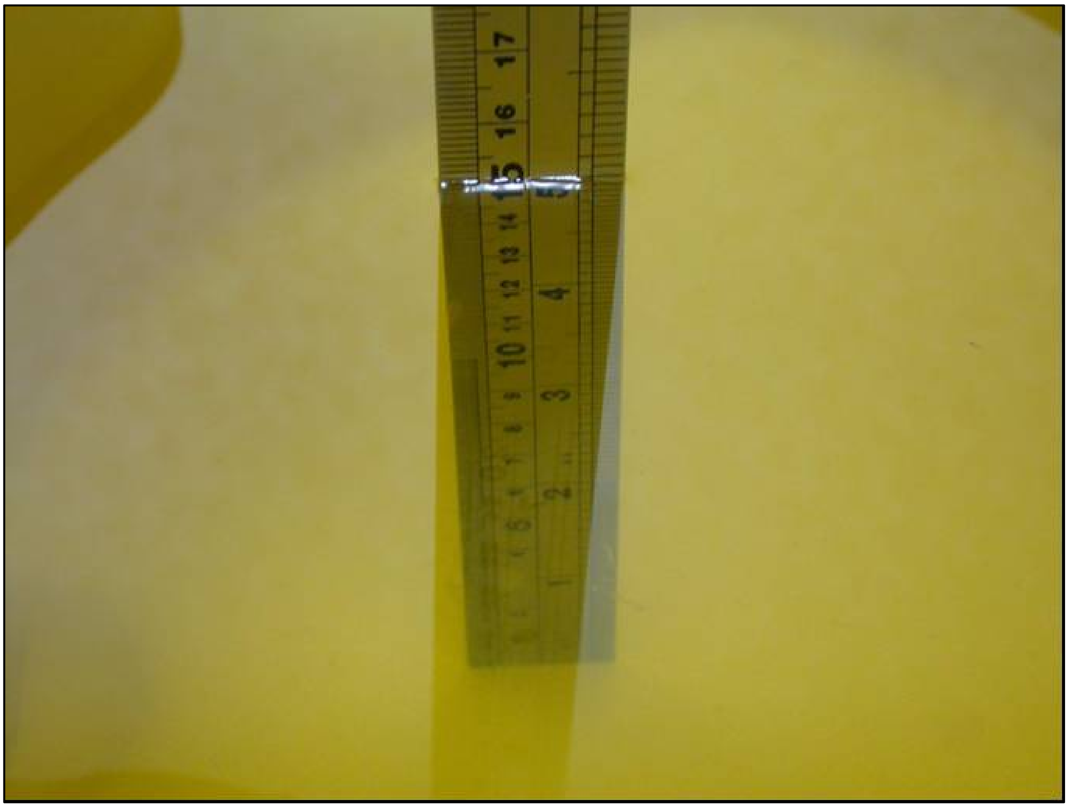
The address and road map of all our labs can be found in our web site also.

**---END---**

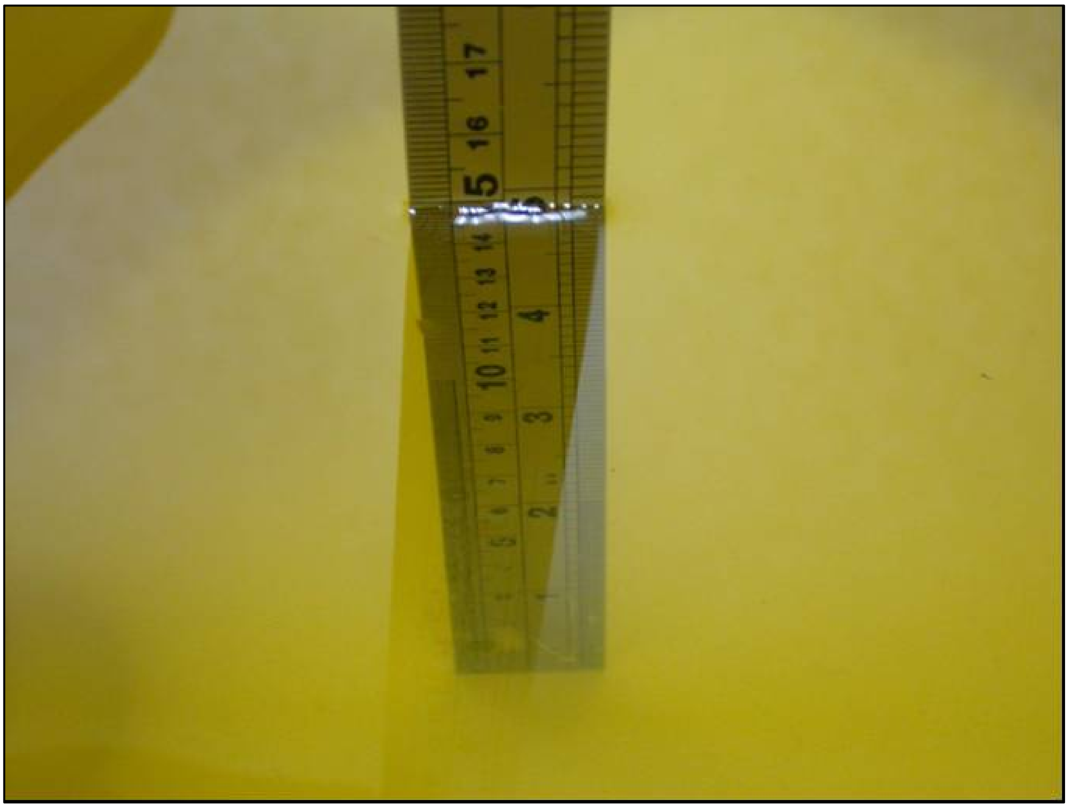
# APPENDIX A: TEST DATA

## Liquid Level Photo

**Tissue HSL835MHz D=152mm**



**Tissue MSL835MHz D=150mm**



Date/Time: 2008/11/7 13:22:17

Test Laboratory: Advance Data Technology

## M01-Right Head-Cheek-CDMA850-Ch1013

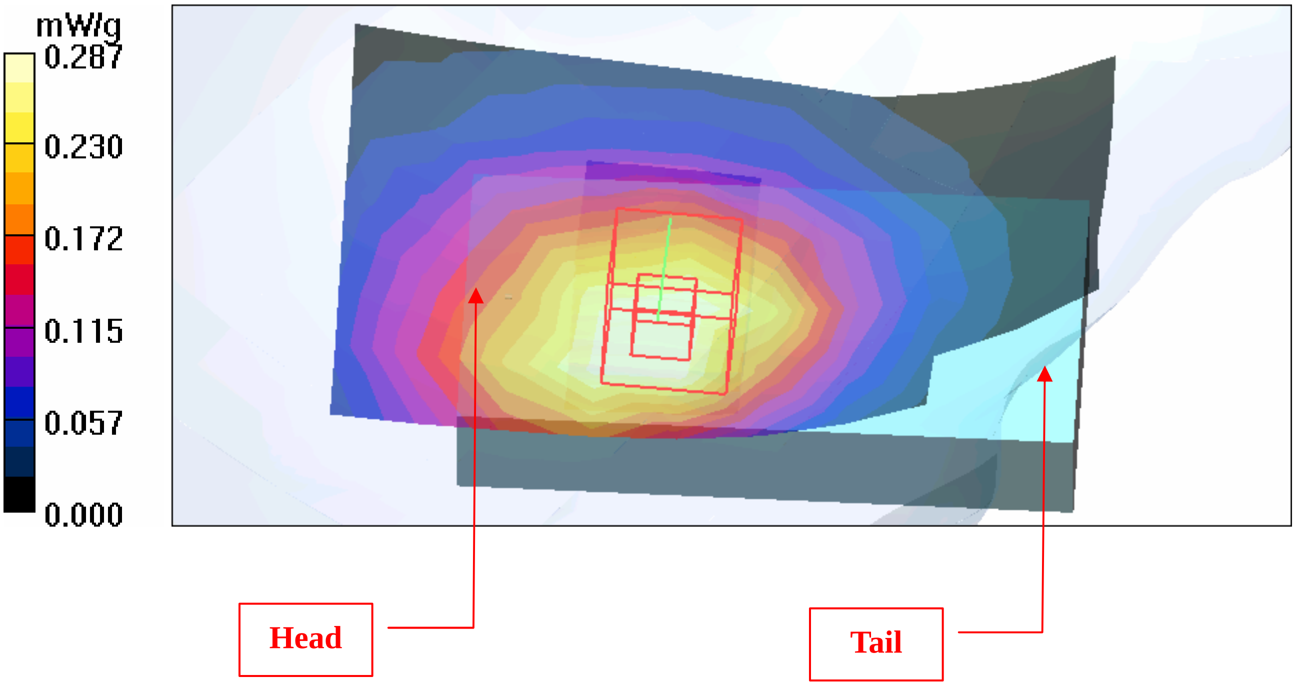
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 824.7 MHz ; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 824.7 MHz; $\sigma$ = 0.92 mho/m; $\varepsilon_r$ = 43.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Touch position - Low Channel 1013/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.287 mW/g

**Touch position - Low Channel 1013/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.0 V/m
Peak SAR (extrapolated) = 0.284 W/kg
**SAR(1 g) = 0.243 mW/g; SAR(10 g) = 0.189 mW/g**
Maximum value of SAR (measured) = 0.264 mW/g



Date/Time: 2008/11/7 13:42:44

Test Laboratory: Advance Data Technology

## M01-Right Head-Cheek-CDMA850-Ch384

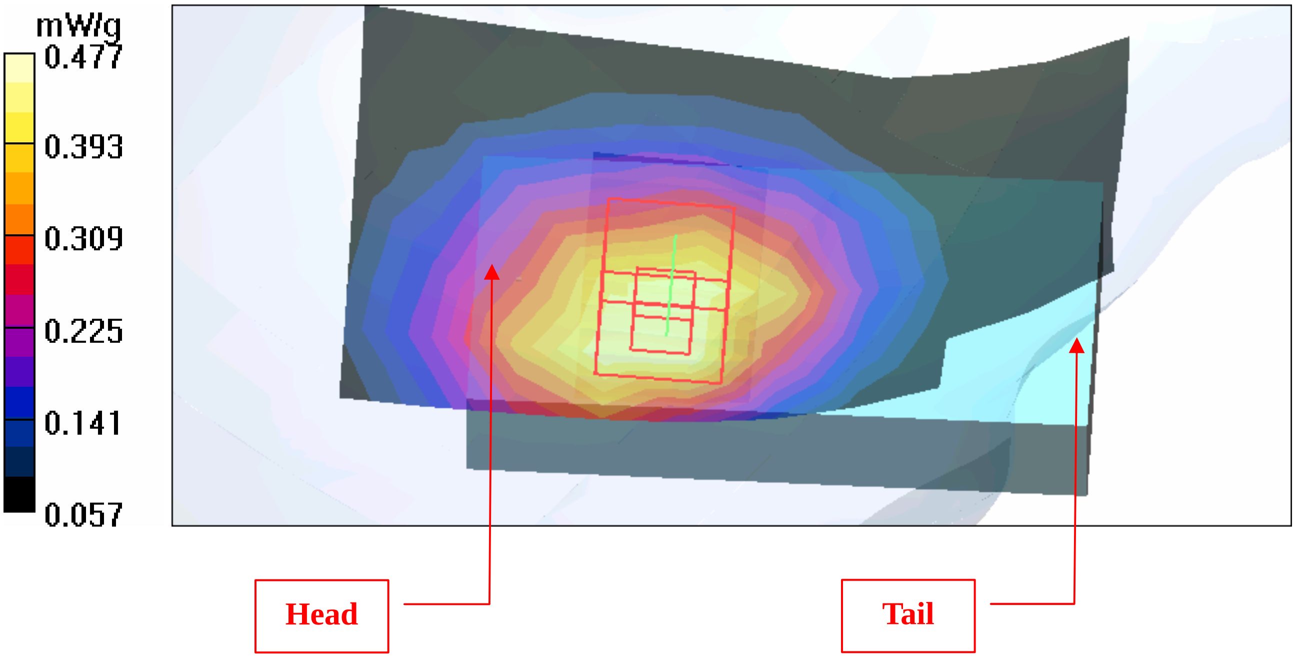
**DUT: Pocket PC Phone ; Type: RAPH700**

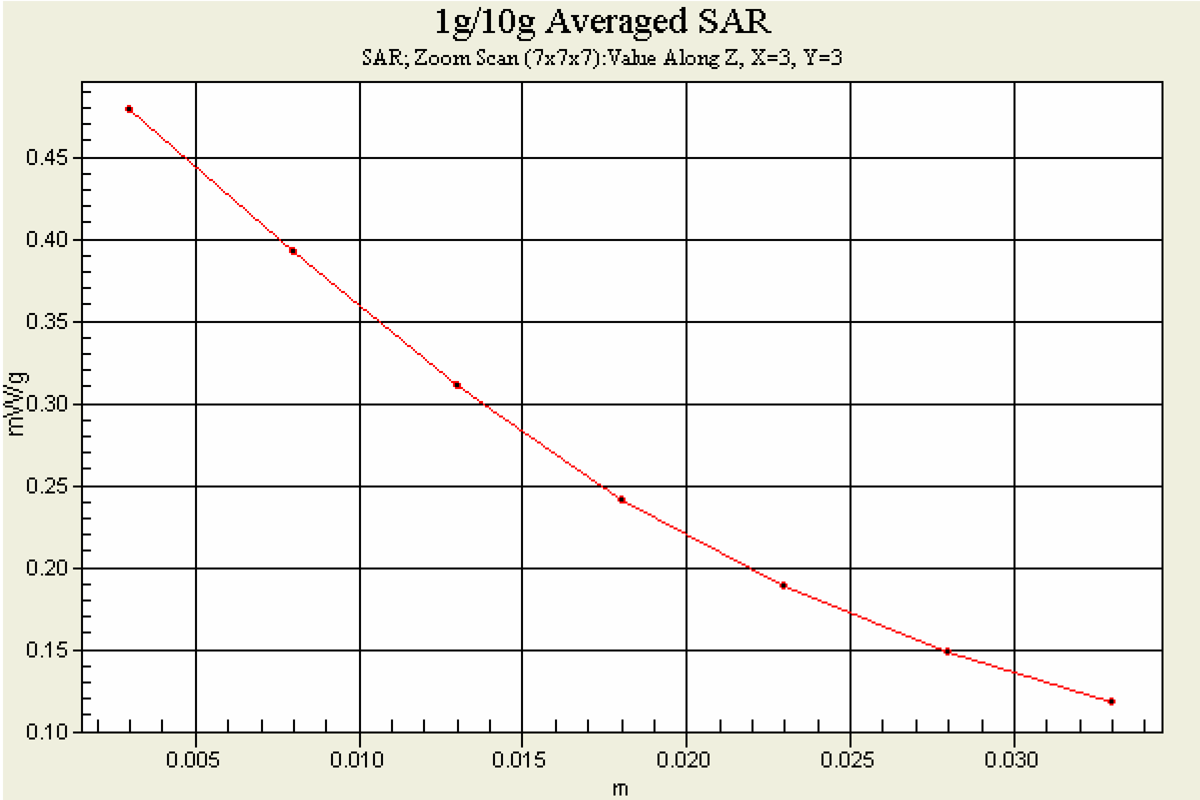
Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.93 mho/m; $\varepsilon_r$ = 43; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Touch position - Mid Channel 384/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.449 mW/g

**Touch position - Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.1 V/m
Peak SAR (extrapolated) = 0.523 W/kg
**SAR(1 g) = 0.438 mW/g; SAR(10 g) = 0.333 mW/g**
Maximum value of SAR (measured) = 0.477 mW/g




1g/10g Averaged SAR
SAR; Zoom Scan (7x7x7):Value Along Z, X=3, Y=3
mW/g
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.005
0.010
0.015
0.020
0.025
0.030
m

Date/Time: 2008/11/7 14:00:54

Test Laboratory: Advance Data Technology

## M01-Right Head-Cheek-CDMA850-Ch777

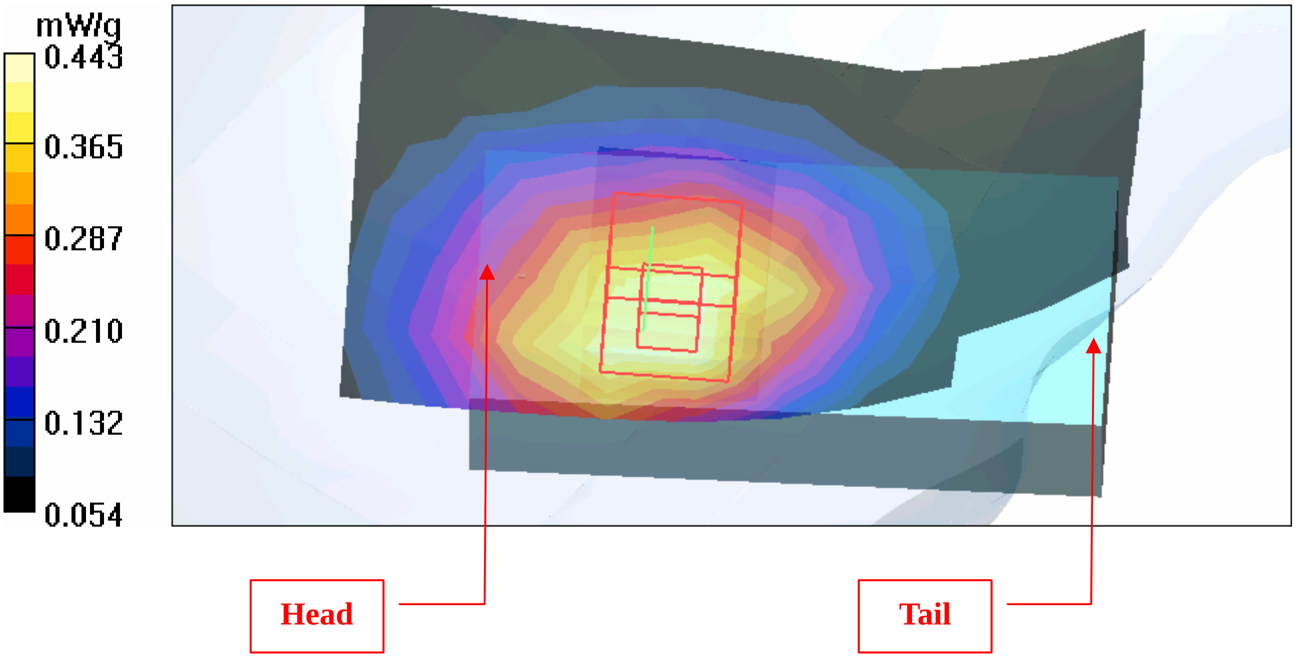
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 848.3 MHz ; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 848.3 MHz; $\sigma = 0.94$ mho/m; $\varepsilon_r = 42.8$; $\rho = 1000$ kg/m$^3$
Phantom section: Right Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Touch position - High Channel 777/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.419 mW/g

**Touch position - High Channel 777/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.6 V/m
Peak SAR (extrapolated) = 0.492 W/kg
**SAR(1 g) = 0.409 mW/g; SAR(10 g) = 0.311 mW/g**
Maximum value of SAR (measured) = 0.443 mW/g



Date/Time: 2008/11/7 14:19:26

Test Laboratory: Advance Data Technology

## M02-Right Head-Tilt-CDMA850-Ch1013

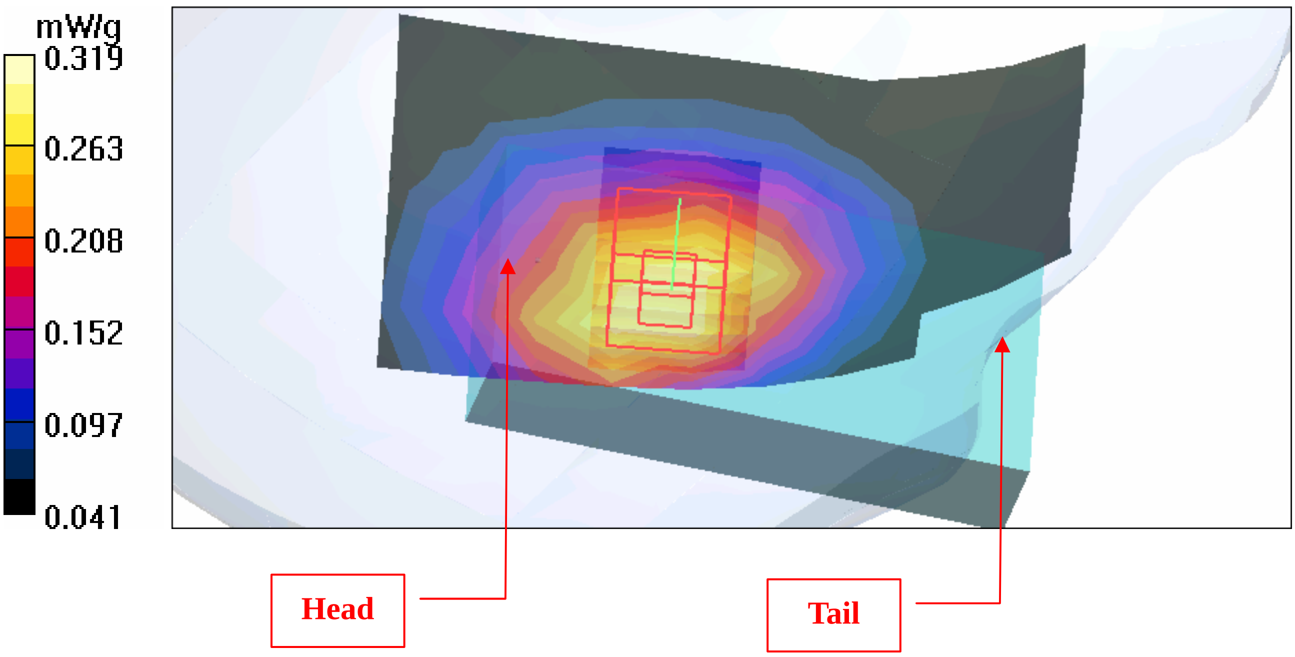
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 824.7 MHz; $\sigma$ = 0.92 mho/m; $\varepsilon_r$ = 43.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section ; DUT test position : Tilt ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Tilt position - Low Channel 1013/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.298 mW/g

**Tilt position - Low Channel 1013/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.0 V/m
Peak SAR (extrapolated) = 0.346 W/kg
**SAR(1 g) = 0.291 mW/g; SAR(10 g) = 0.222 mW/g**
Maximum value of SAR (measured) = 0.319 mW/g



Date/Time: 2008/11/7 14:42:50

Test Laboratory: Advance Data Technology

## M02-Right Head-Tilt-CDMA850-Ch384

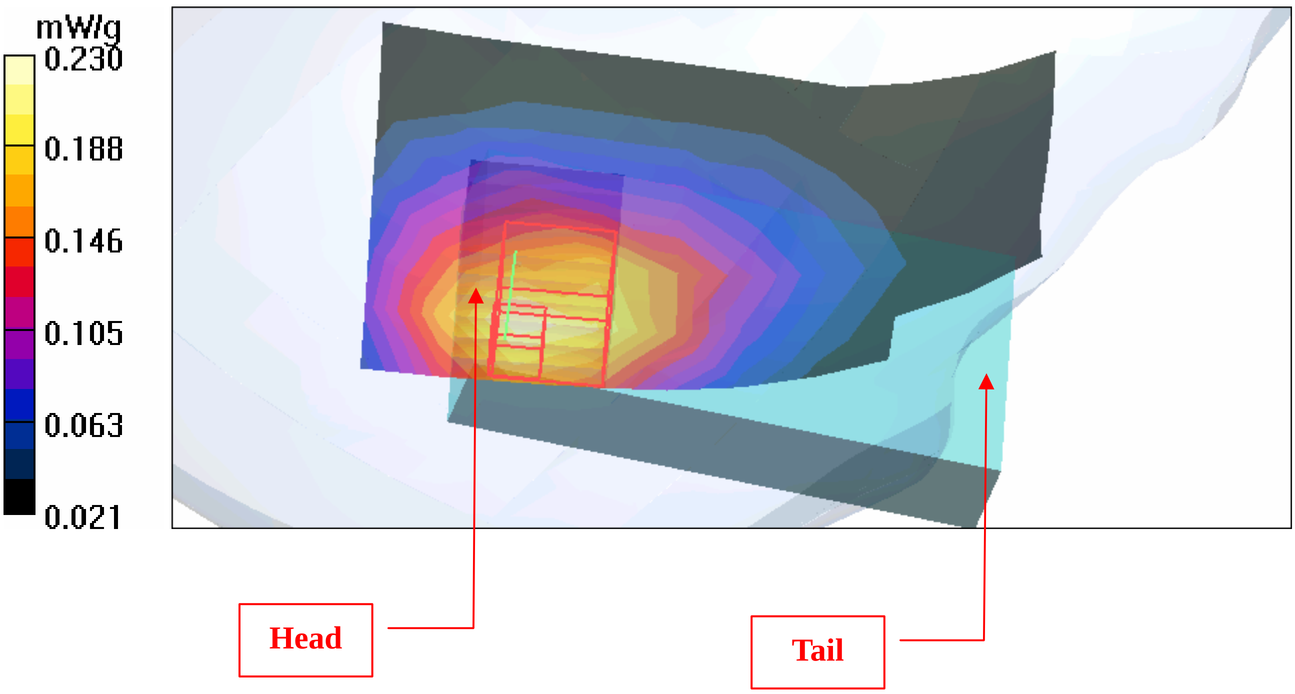
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.93 mho/m; $\varepsilon_r$ = 43; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section ; DUT test position : Tilt ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Tilt position - Mid Channel 384/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.228 mW/g

**Tilt position - Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.9 V/m
Peak SAR (extrapolated) = 0.279 W/kg
**SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.132 mW/g**
Maximum value of SAR (measured) = 0.230 mW/g



Date/Time: 2008/11/7 15:01:19

Test Laboratory: Advance Data Technology

## M02-Right Head-Tilt-CDMA850-Ch777

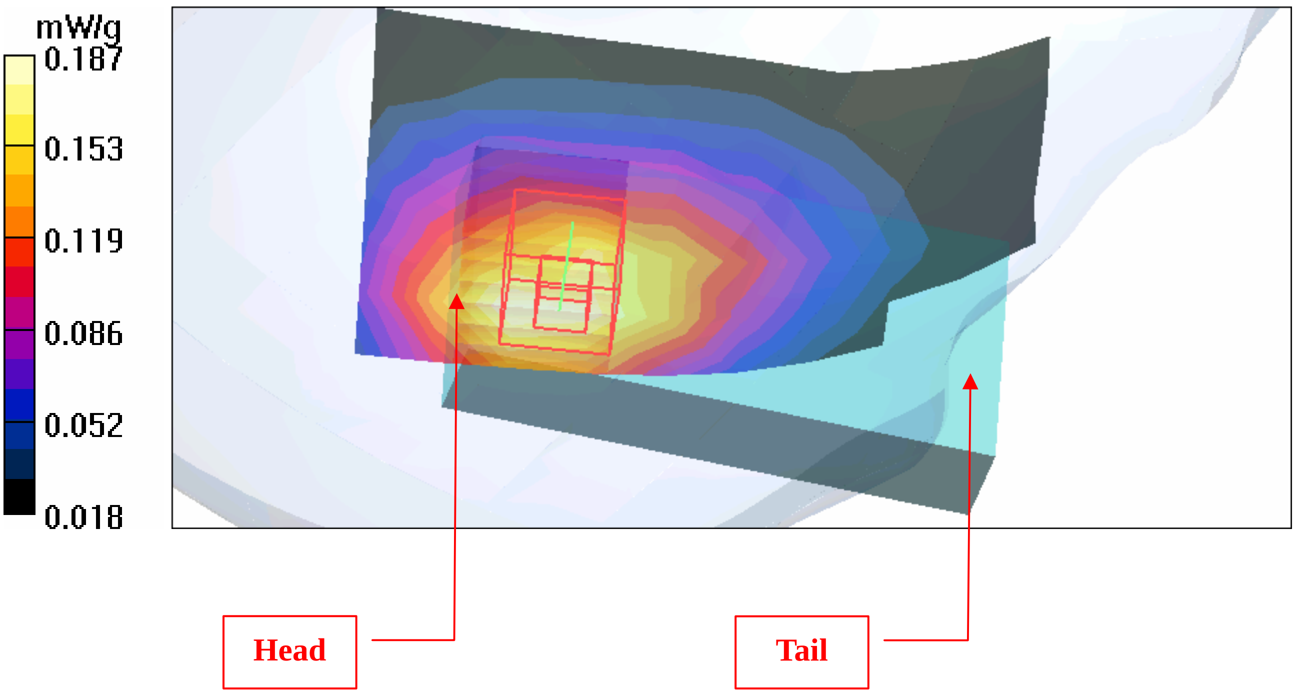
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 848.3 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 848.3 MHz; $\sigma$ = 0.94 mho/m; $\varepsilon_r$ = 42.8; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section ; DUT test position : Tilt ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Tilt position - High Channel 777/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.190 mW/g

**Tilt position - High Channel 777/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.9 V/m
Peak SAR (extrapolated) = 0.231 W/kg
**SAR(1 g) = 0.169 mW/g; SAR(10 g) = 0.125 mW/g**
Maximum value of SAR (measured) = 0.187 mW/g



Date/Time: 2008/11/7 15:23:27

Test Laboratory: Advance Data Technology

## M03-Left Head-Cheek-CDMA850-Ch1013

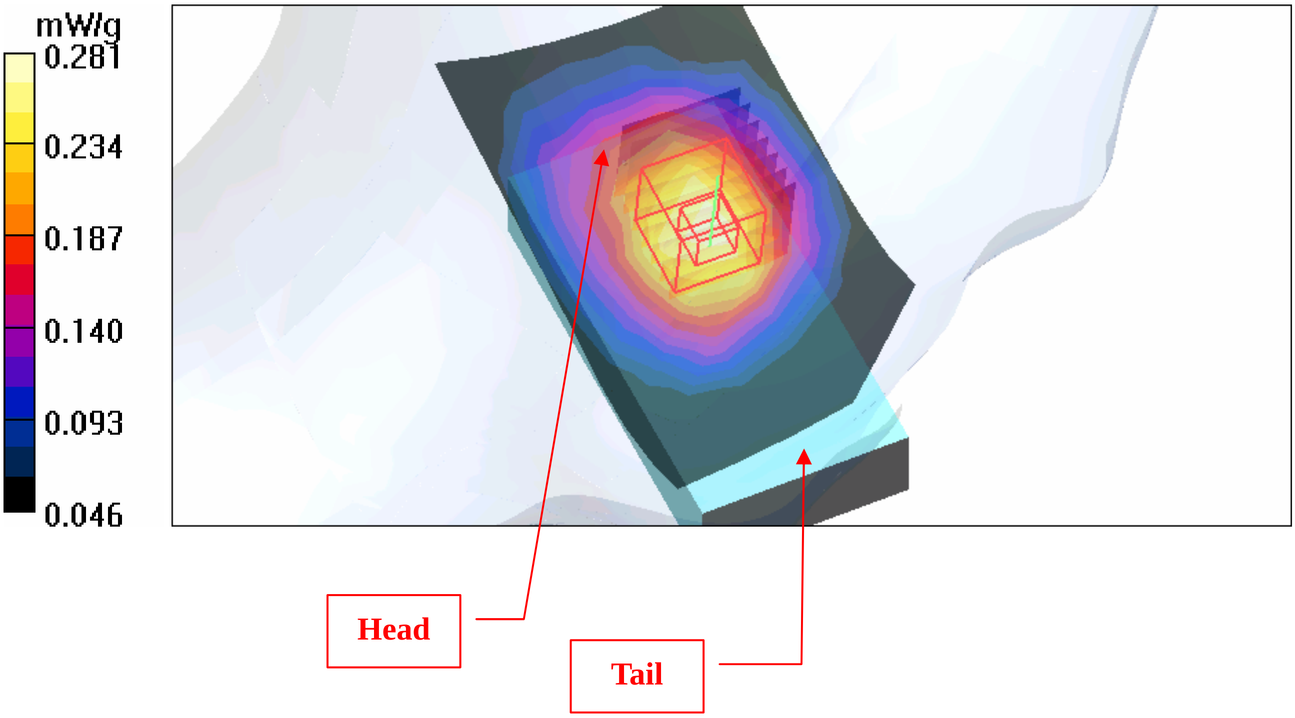
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 824.7 MHz ; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 824.7 MHz; $\sigma$ = 0.92 mho/m; $\varepsilon_r$ = 43.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Touch position - Low Channel 1013/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.282 mW/g

**Touch position - Low Channel 1013/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.8 V/m
Peak SAR (extrapolated) = 0.308 W/kg
**SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.201 mW/g**
Maximum value of SAR (measured) = 0.281 mW/g



Date/Time: 2008/11/7 15:42:53

Test Laboratory: Advance Data Technology

## M03-Left Head-Cheek-CDMA850-Ch384

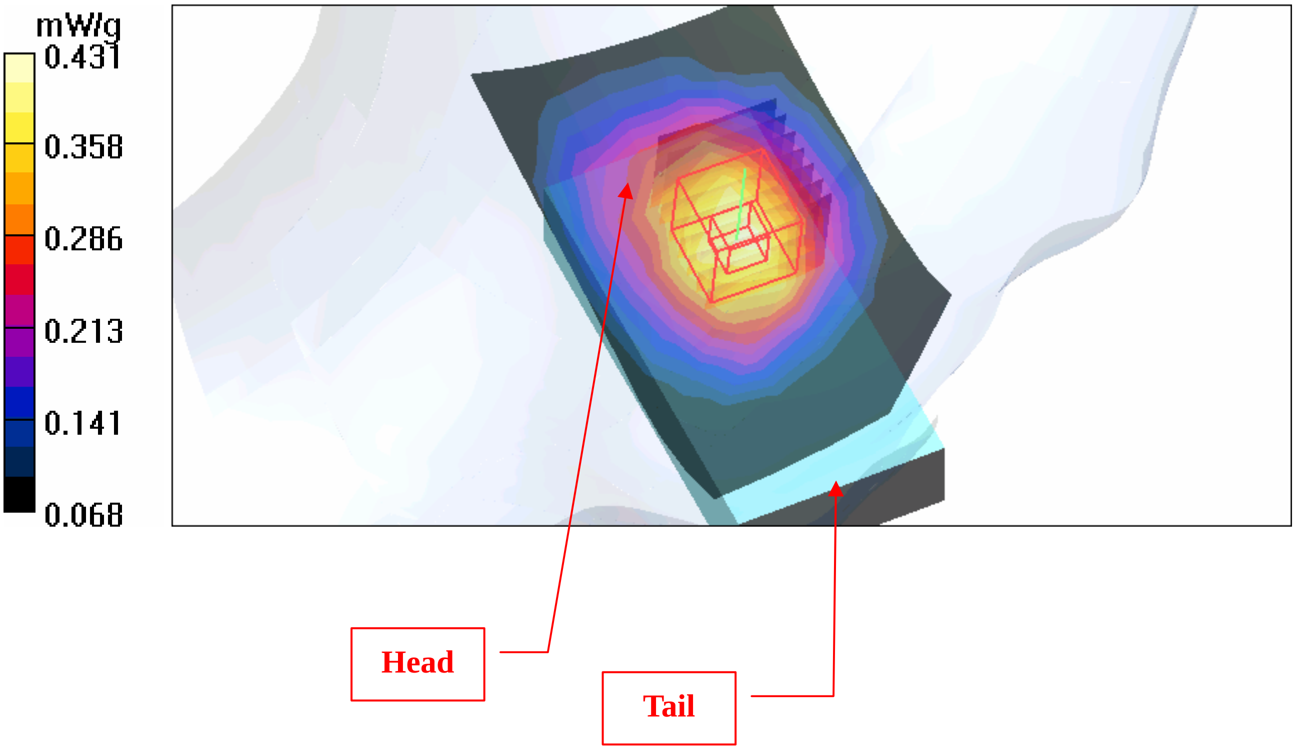
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.93 mho/m; $\varepsilon_r$ = 43; $\rho$ = 1000 kg/$m^3$
Phantom section: Left Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Touch position - Mid Channel 384/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.422 mW/g

**Touch position - Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 17.0 V/m
Peak SAR (extrapolated) = 0.467 W/kg
**SAR(1 g) = 0.399 mW/g; SAR(10 g) = 0.307 mW/g**
Maximum value of SAR (measured) = 0.431 mW/g



Date/Time: 2008/11/7 16:02:22

Test Laboratory: Advance Data Technology

## M03-Left Head-Cheek-CDMA850-Ch777

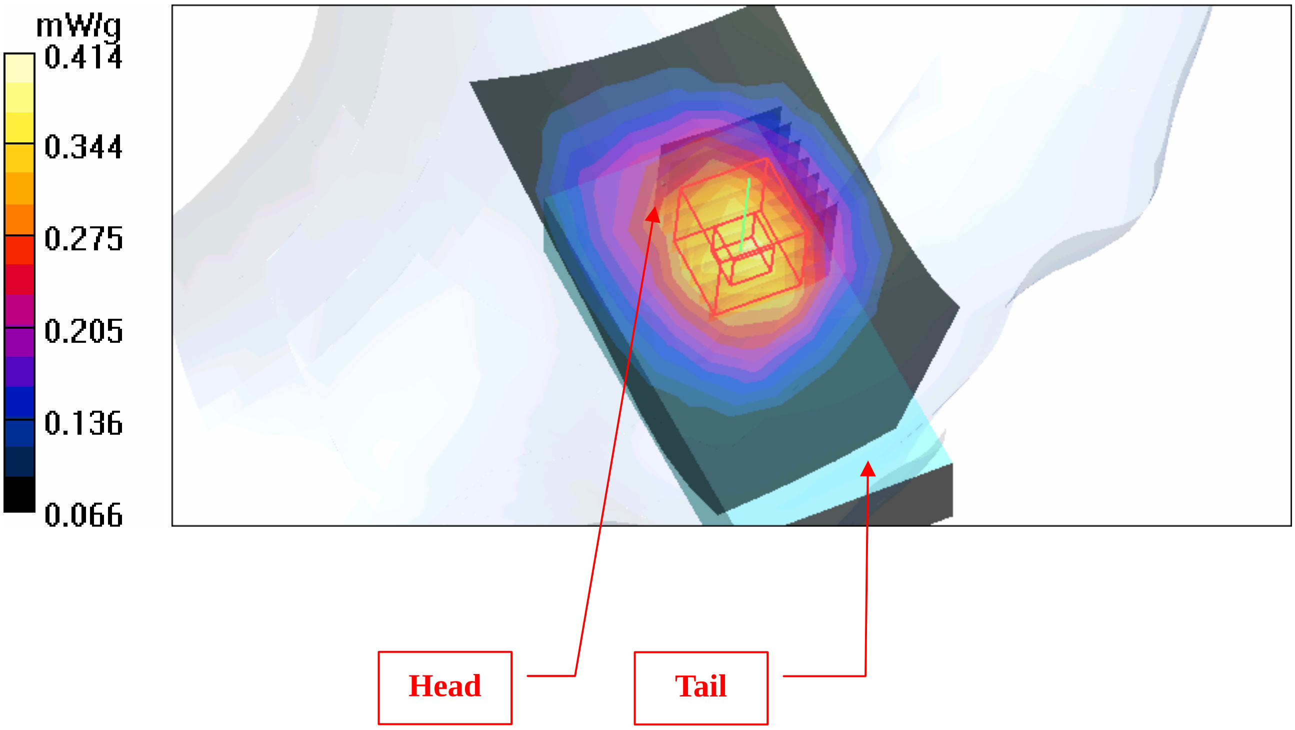
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 848.3 MHz ; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 848.3 MHz; $\sigma$ = 0.94 mho/m; $\varepsilon_r$ = 42.8; $\rho$ = 1000 $kg/m^3$
Phantom section: Left Section ; DUT test position : Cheek ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Touch position - High Channel 777/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.403 mW/g

**Touch position - High Channel 777/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.5 V/m
Peak SAR (extrapolated) = 0.444 W/kg
**SAR(1 g) = 0.381 mW/g; SAR(10 g) = 0.292 mW/g**
Maximum value of SAR (measured) = 0.414 mW/g



Date/Time: 2008/11/7 16:22:47

Test Laboratory: Advance Data Technology

## M04-Left Head-Tilt-CDMA850-Ch1013

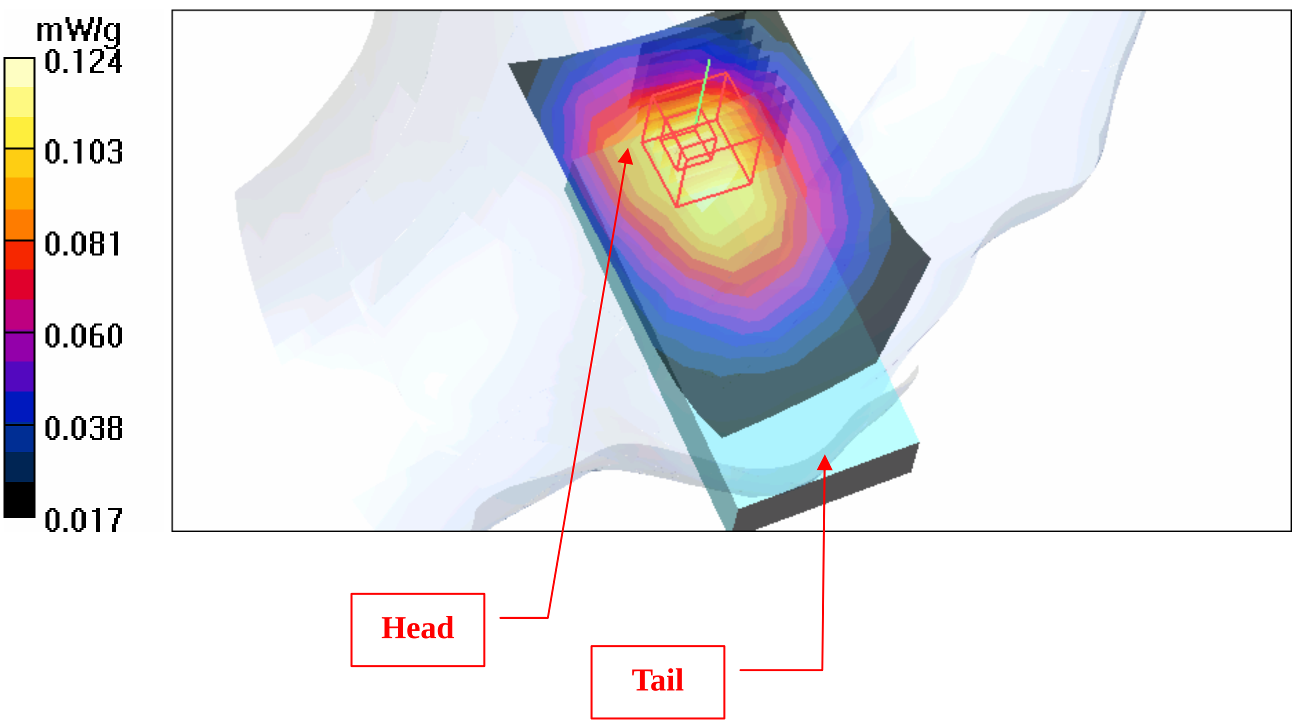
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 824.7 MHz; $\sigma$ = 0.92 mho/m; $\varepsilon_r$ = 43.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section ; DUT test position : Tilt ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Tilt position - Low Channel 1013/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.119 mW/g

**Tilt position - Low Channel 1013/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.3 V/m
Peak SAR (extrapolated) = 0.140 W/kg
**SAR(1 g) = 0.112 mW/g; SAR(10 g) = 0.088 mW/g**
Maximum value of SAR (measured) = 0.124 mW/g



Date/Time: 2008/11/7 16:46:31

Test Laboratory: Advance Data Technology

## M04-Left Head-Tilt-CDMA850-Ch384

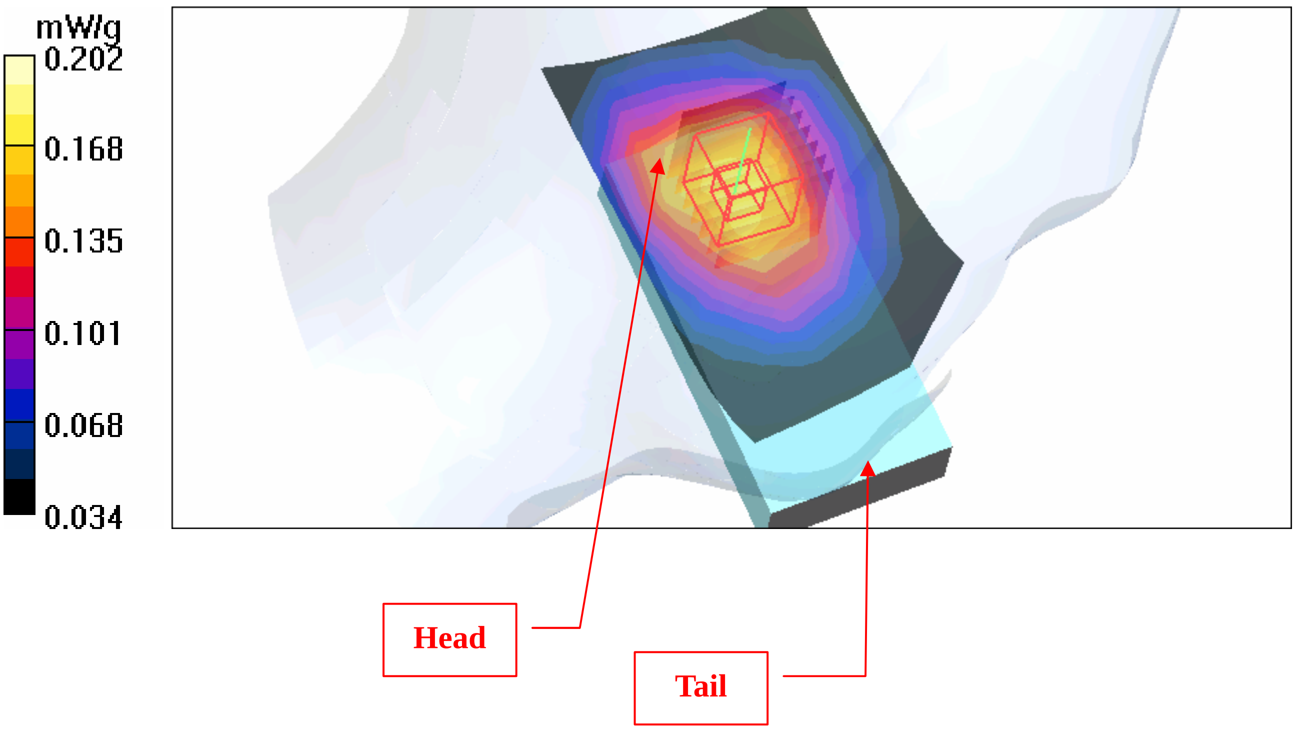
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.93 mho/m; $\varepsilon_r$ = 43; $\rho$ = 1000 kg/$m^3$
Phantom section: Left Section ; DUT test position : Tilt ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Tilt position - Mid Channel 384/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.178 mW/g

**Tilt position - Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.5 V/m
Peak SAR (extrapolated) = 0.216 W/kg
**SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.145 mW/g**
Maximum value of SAR (measured) = 0.202 mW/g



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Test Laboratory: Advance Data Technology

## M04-Left Head-Tilt-CDMA850-Ch777

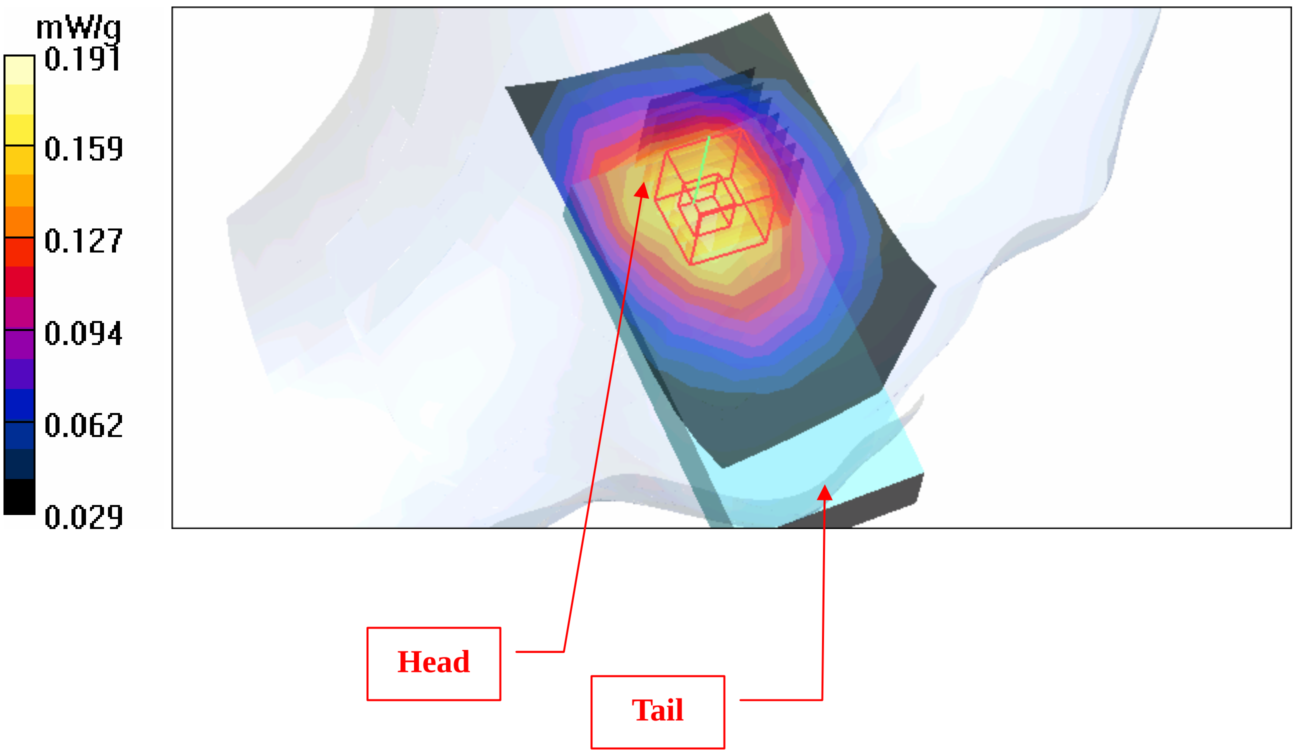
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 848.3 MHz; Duty Cycle: 1:1
Medium: HSL835 Medium parameters used: f = 848.3 MHz; $\sigma$ = 0.94 mho/m; $\varepsilon_r$ = 42.8; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section ; DUT test position : Tilt ; Modulation type: OQPSK

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**Tilt position - High Channel 777/Area Scan (6x10x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.194 mW/g

**Tilt position - High Channel 777/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.5 V/m
Peak SAR (extrapolated) = 0.205 W/kg
**SAR(1 g) = 0.177 mW/g; SAR(10 g) = 0.137 mW/g**
Maximum value of SAR (measured) = 0.191 mW/g



Test Laboratory: Advance Data Technology

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## M05-Body-CDMA850 SO32-Ch384

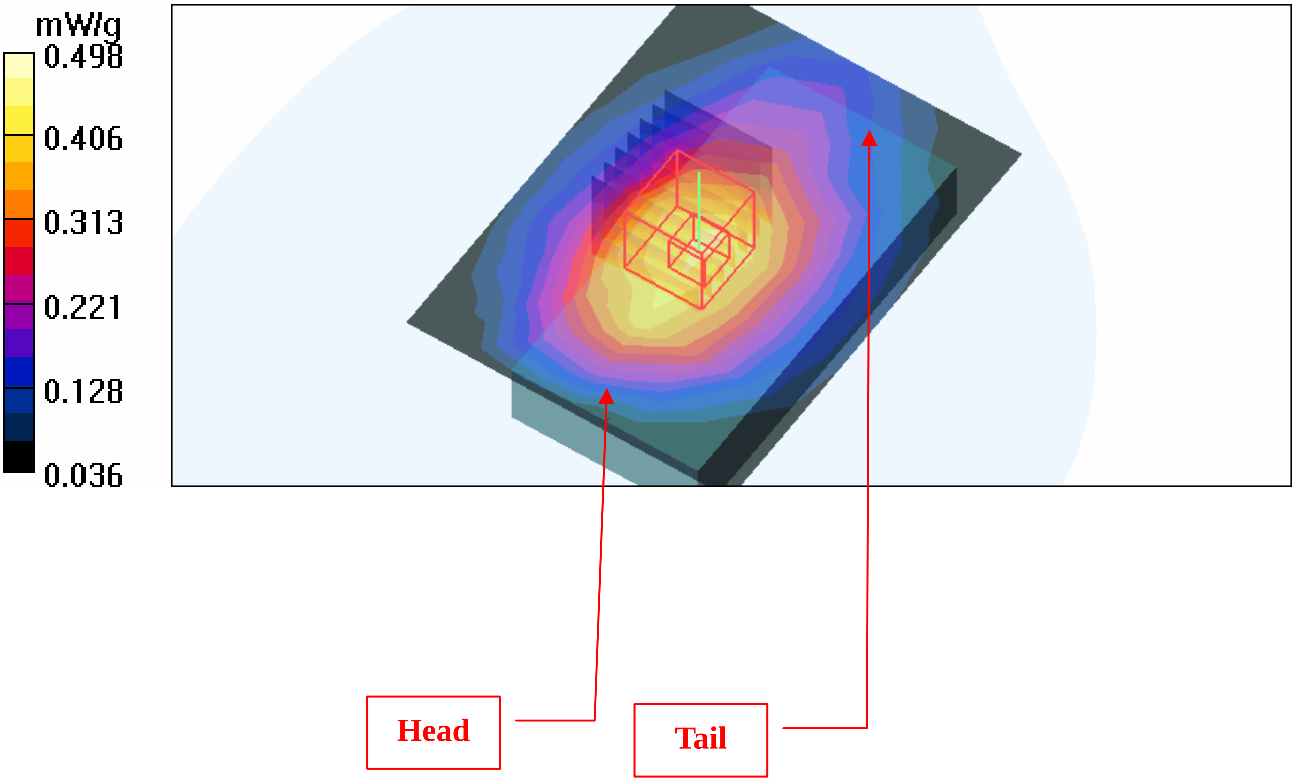
### DUT: Pocket PC Phone ; Type: RAPH700

Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: OQPSK
Separation Distance : 15 mm ( The bottom side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.453 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.5 V/m
Peak SAR (extrapolated) = 0.591 W/kg
**SAR(1 g) = 0.441 mW/g; SAR(10 g) = 0.303 mW/g**
Maximum value of SAR (measured) = 0.498 mW/g



Date/Time: 2008/11/10 13:08:26

Test Laboratory: Advance Data Technology

## M06-Body-EVDO850 FTAP-Ch384

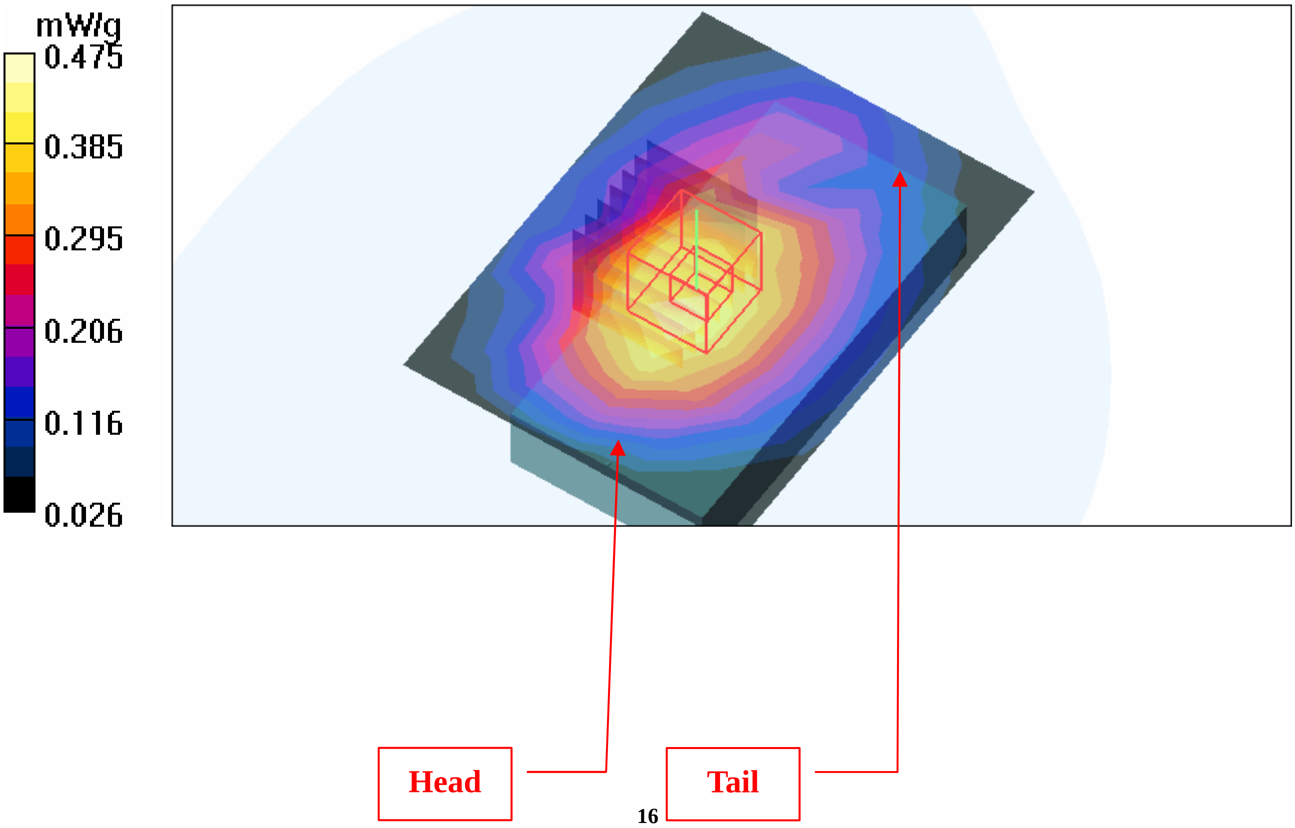
**DUT: Pocket PC Phone ; Type: RAPH700**

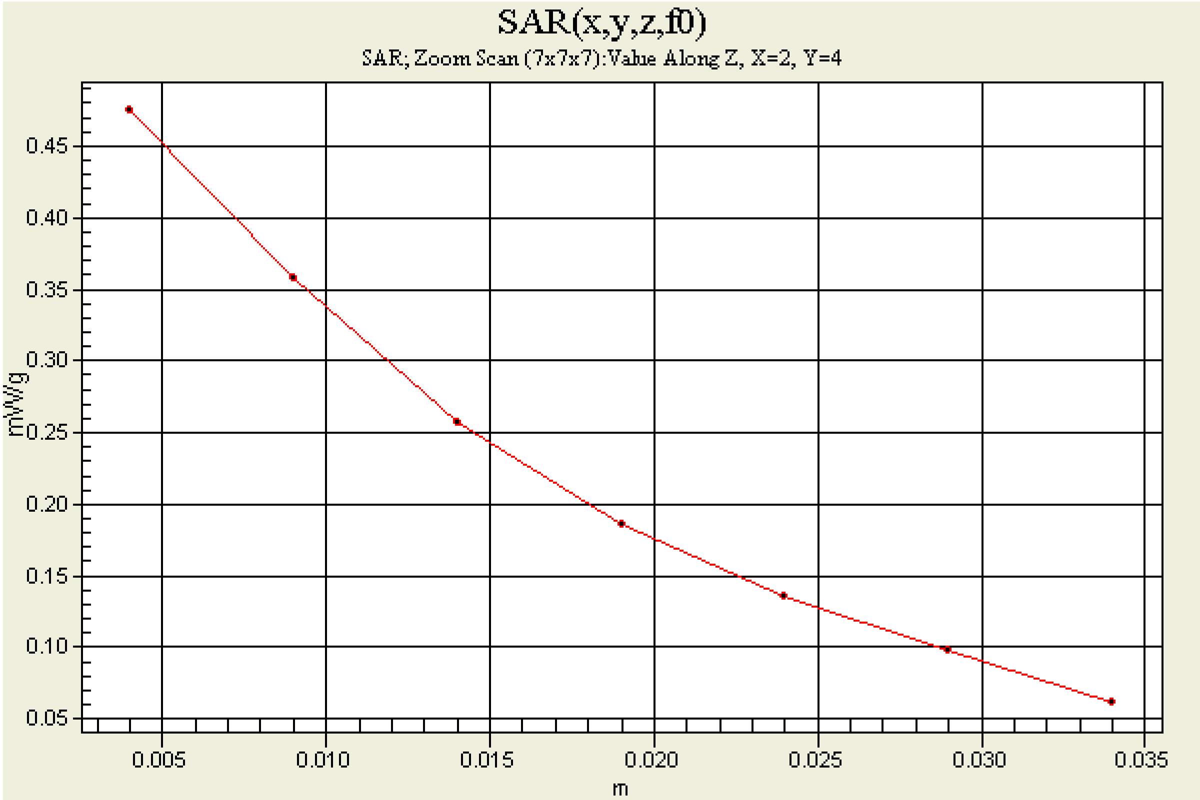
Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma = 0.97$ mho/m; $\varepsilon_r = 53$; $\rho = 1000$ kg/m$^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: HPSK
Separation Distance : 15 mm ( The bottom side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.446 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.6 V/m
Peak SAR (extrapolated) = 0.592 W/kg
**SAR(1 g) = 0.442 mW/g; SAR(10 g) = 0.306 mW/g**
Maximum value of SAR (measured) = 0.475 mW/g





SAR(x,y,z,f0)
SAR; Zoom Scan (7x7x7):Value Along Z, X=2, Y=4
mW/g
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date/Time: 2008/11/10 14:28:12

Test Laboratory: Advance Data Technology

## M07-Body-CDMA850 SO32-Ch384

**DUT: Pocket PC Phone ; Type: RAPH700**

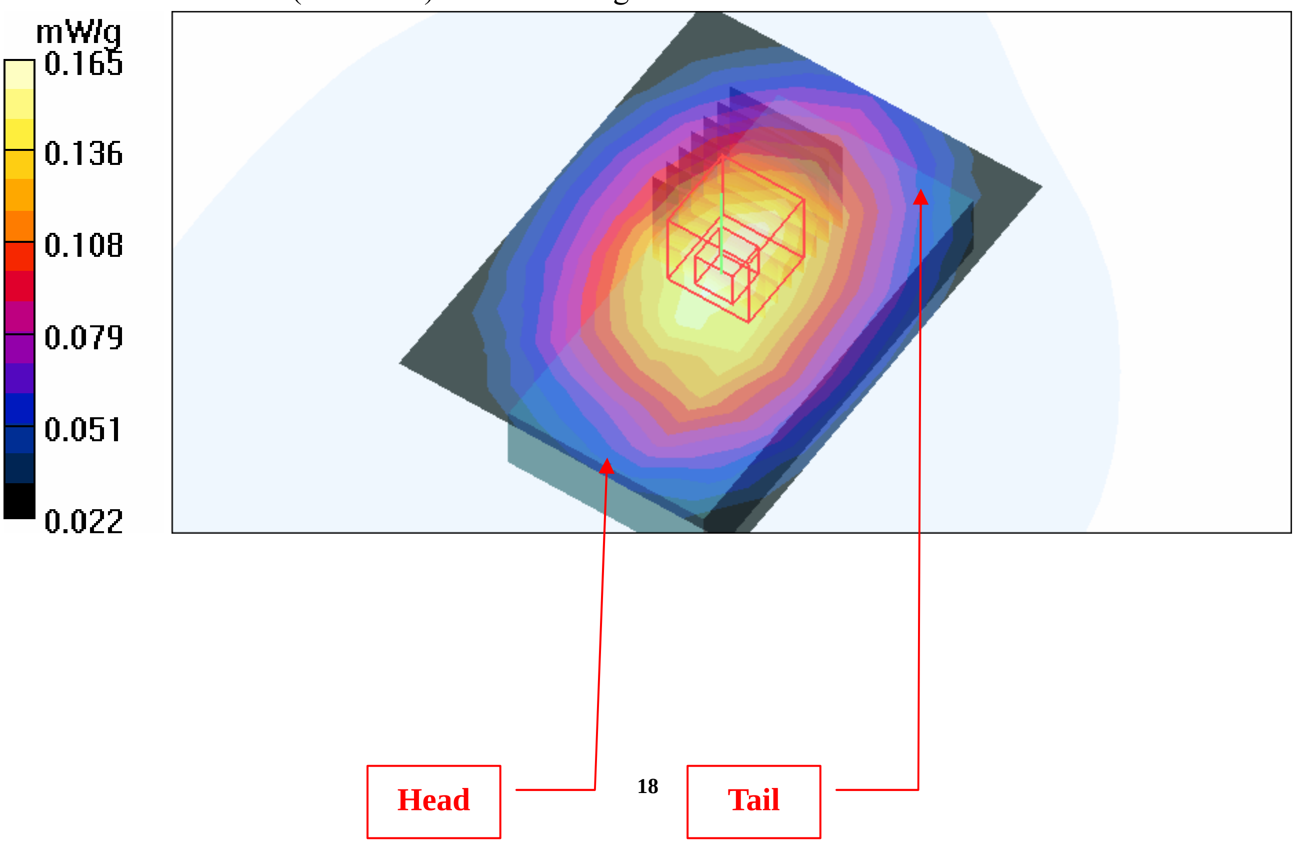
Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/$m^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: OQPSK
Separation Distance : 15 mm ( The front side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.162 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.23 V/m
Peak SAR (extrapolated) = 0.187 W/kg
**SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.117 mW/g**
Maximum value of SAR (measured) = 0.165 mW/g



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Test Laboratory: Advance Data Technology

## M08-Body-EVDO850 FTAP-Ch384

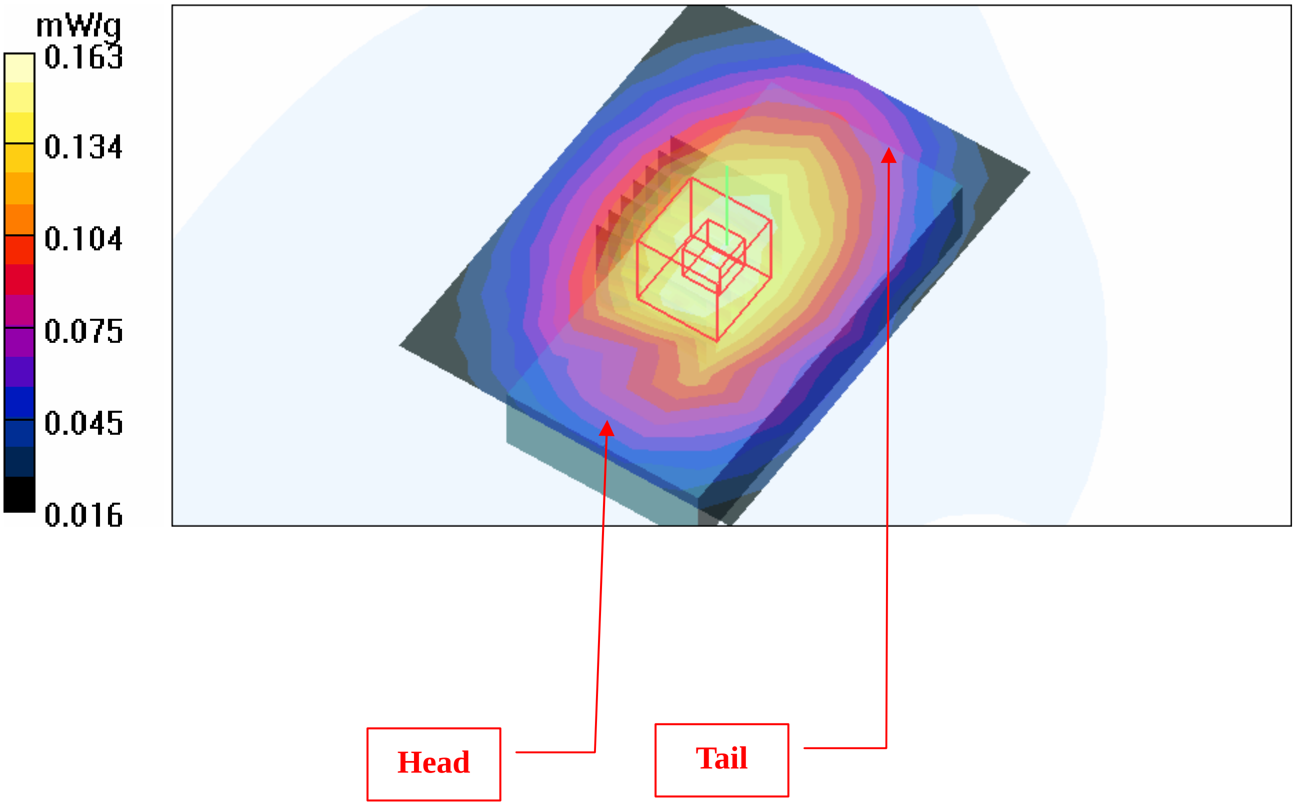
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/$m^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: HPSK
Separation Distance : 15 mm ( The front side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.154 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.14 V/m
Peak SAR (extrapolated) = 0.248 W/kg
**SAR(1 g) = 0.155 mW/g; SAR(10 g) = 0.113 mW/g**
Maximum value of SAR (measured) = 0.163 mW/g



Date/Time: 2008/11/10 15:38:23

Test Laboratory: Advance Data Technology

## M09-Body-CDMA850 SO32-Ch384

**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1

Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/m$^3$

Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: OQPSK

Separation Distance : 15 mm ( The bottom side of the EUT with leather to the Phantom)

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (8x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.425 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.1 V/m

Peak SAR (extrapolated) = 0.522 W/kg

**SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.285 mW/g**

Maximum value of SAR (measured) = 0.440 mW/g

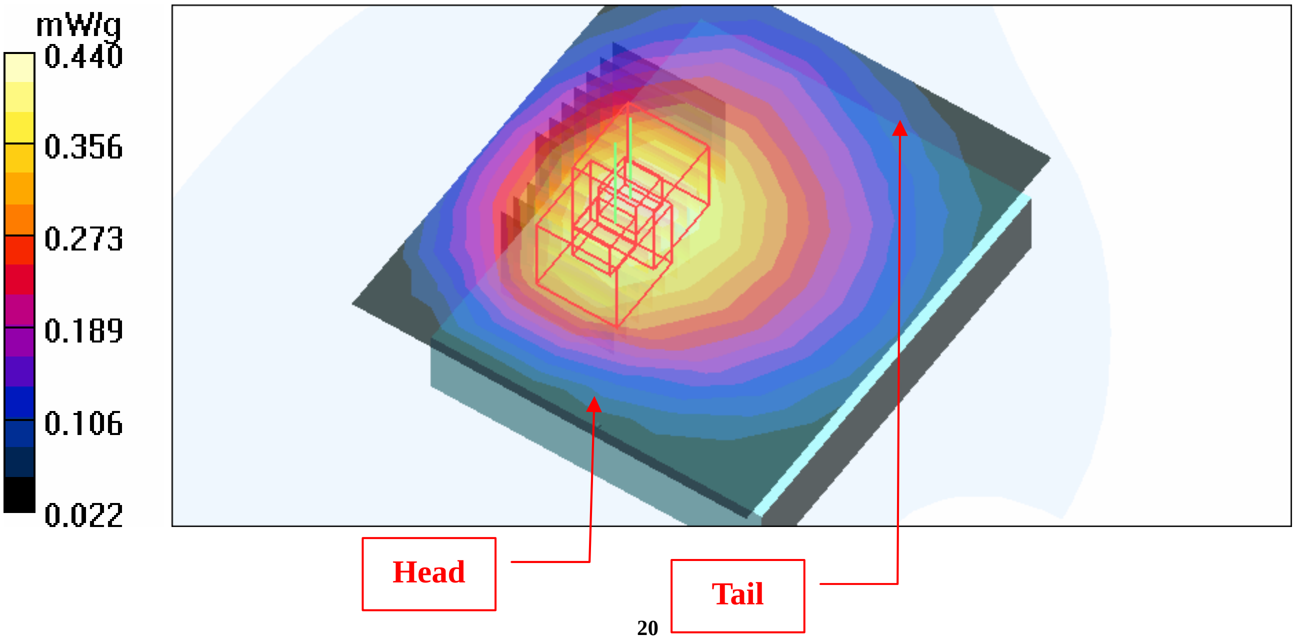
**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.1 V/m

Peak SAR (extrapolated) = 0.520 W/kg

**SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.281 mW/g**

Maximum value of SAR (measured) = 0.434 mW/g



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Test Laboratory: Advance Data Technology

## M10-Body-EVDO850 Ftap-Ch384

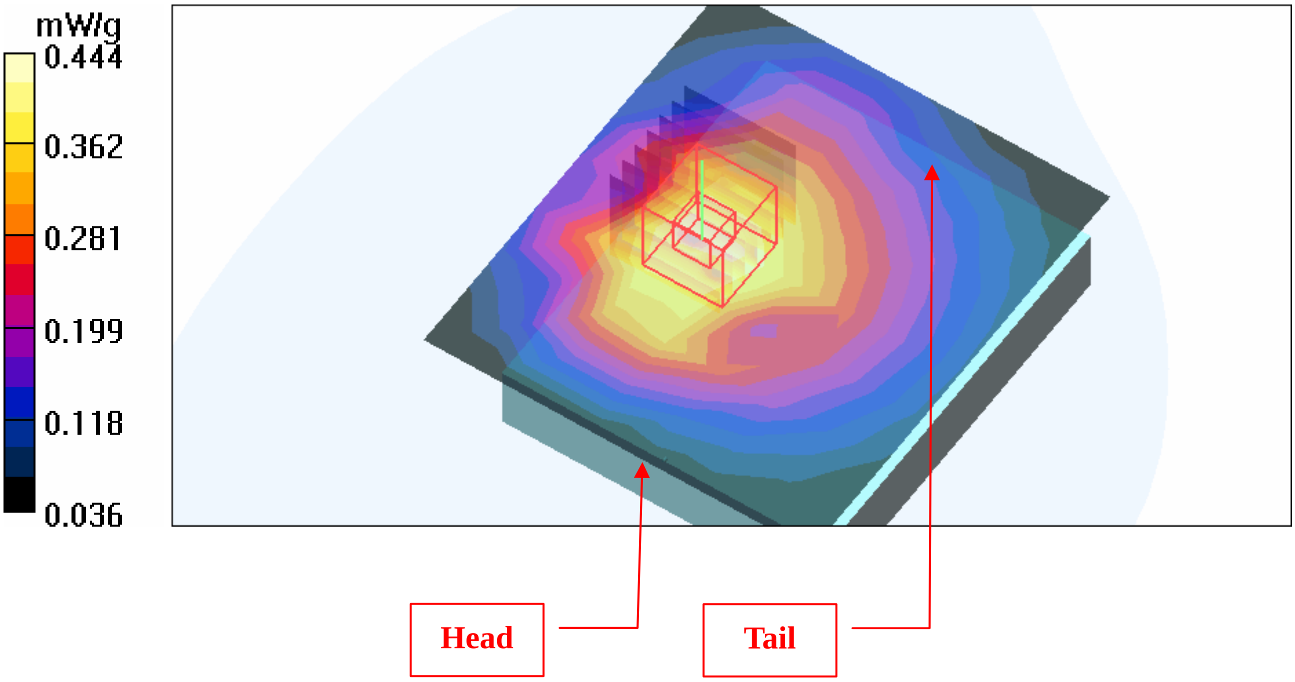
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/$m^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: HPSK
Separation Distance : 15 mm ( The bottom side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (8x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.431 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.90 V/m
Peak SAR (extrapolated) = 0.776 W/kg
**SAR(1 g) = 0.414 mW/g; SAR(10 g) = 0.290 mW/g**
Maximum value of SAR (measured) = 0.444 mW/g



Date/Time: 2008/11/10 16:51:37

Test Laboratory: Advance Data Technology

## M11-Body-CDMA850 SO32-Ch384

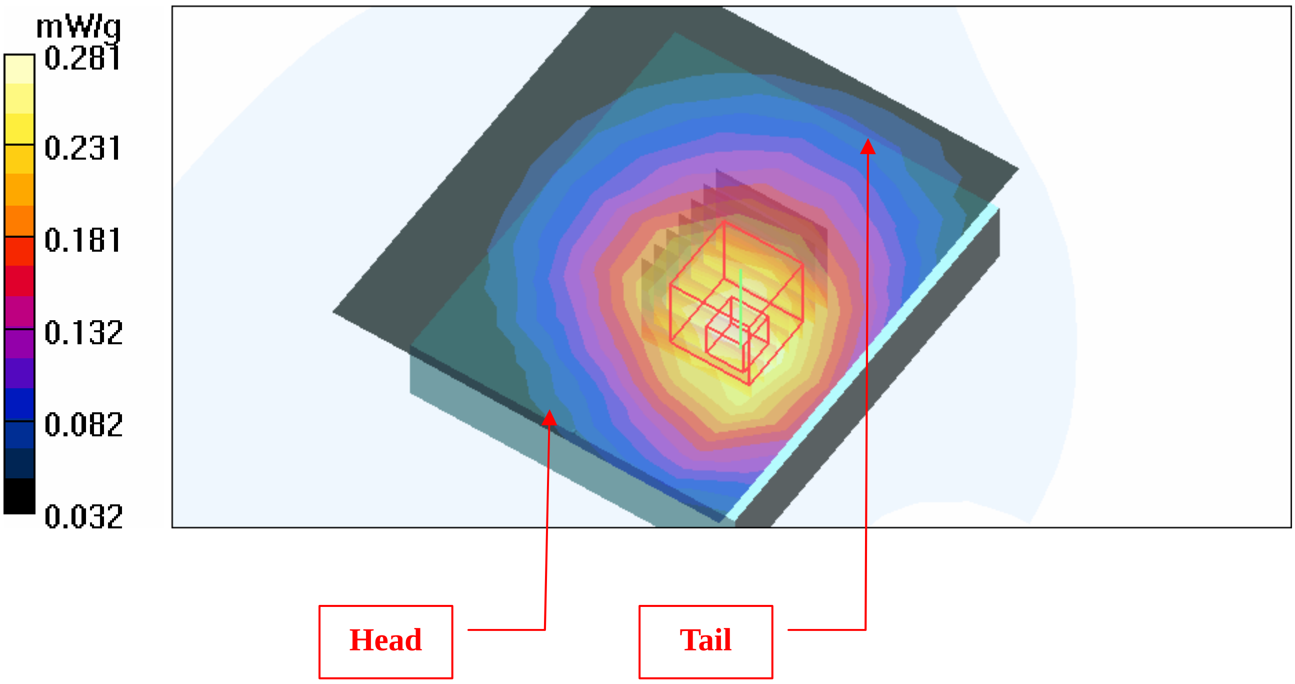
**DUT: Pocket PC Phone ; Type: RAPH700**

Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: HPSK
Separation Distance : 15 mm ( The front side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (8x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.277 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.35 V/m
Peak SAR (extrapolated) = 0.342 W/kg
**SAR(1 g) = 0.264 mW/g; SAR(10 g) = 0.188 mW/g**
Maximum value of SAR (measured) = 0.281 mW/g



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Test Laboratory: Advance Data Technology

## M12-Body-EVDO850 Ftap-Ch384

**DUT: Pocket PC Phone ; Type: RAPH700**

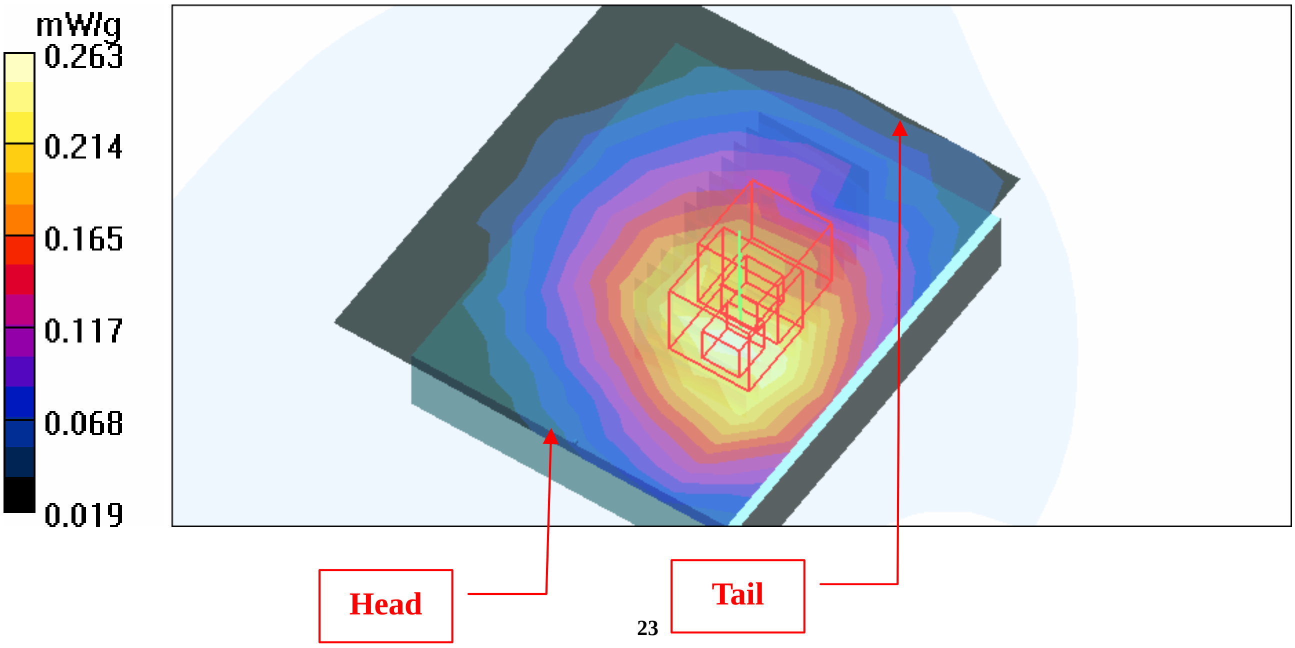
Communication System: CDMA ; Frequency: 836.5 MHz ; Duty Cycle: 1:1
Medium: MSL835 Medium parameters used: f = 836.5 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; DUT test position : Body ; Modulation Type: HPSK
Separation Distance : 15 mm ( The front side of the EUT with leather to the Phantom)

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2008/3/13
- Phantom: SAM 12 ; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 384/Area Scan (8x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.261 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.97 V/m
Peak SAR (extrapolated) = 0.336 W/kg
**SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.174 mW/g**
Maximum value of SAR (measured) = 0.263 mW/g

**Mid Channel 384/Zoom Scan (7x7x7) (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.97 V/m
Peak SAR (extrapolated) = 0.402 W/kg
**SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.155 mW/g**
Maximum value of SAR (measured) = 0.260 mW/g



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Test Laboratory: Advance Data Technology

## System Validation Check-HSL 835MHz

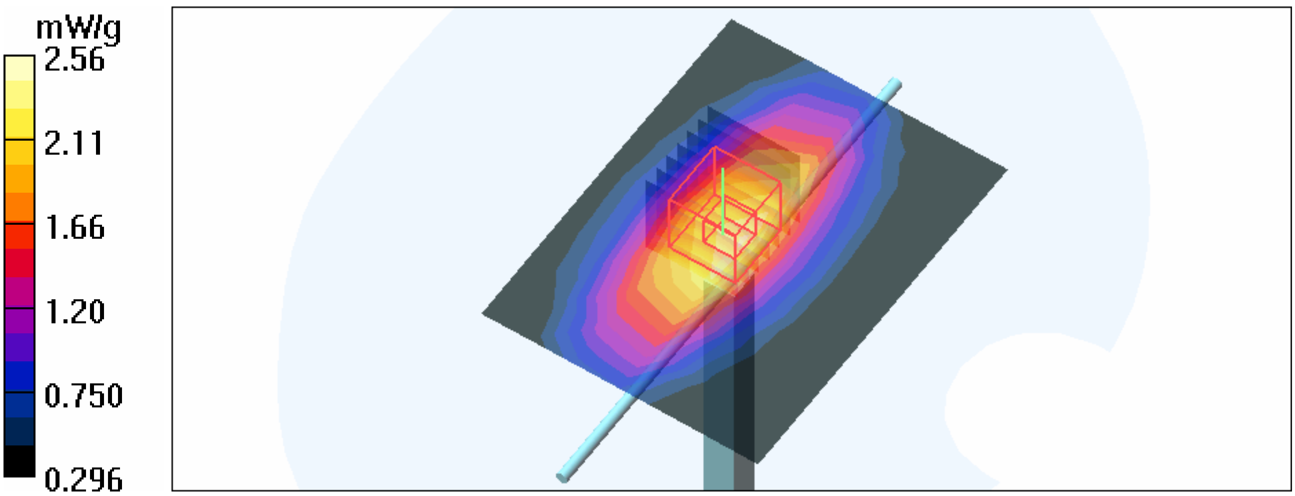
**DUT: Dipole 850 MHz ; Type: D835V2 ; Serial: 4d021 ; Test Frequency: 835 MHz**

Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: HSL835;Medium parameters used: f = 835 MHz; $\sigma$ = 0.93 mho/m; $\varepsilon_r$ = 43; $\rho$ = 1000 kg/m$^3$ ;
Liquid level : 152 mm
Phantom section: Flat Section ; Separation distance : 15 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.2 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.65, 6.65, 6.65) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**d=15mm, Pin=250mW/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.45 mW/g

**d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.9 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 3.07 W/kg
**SAR(1 g) = 2.24 mW/g; SAR(10 g) = 1.48 mW/g**
Maximum value of SAR (measured) = 2.56 mW/g



Date/Time: 2008/11/10 10:58:33

Test Laboratory: Advance Data Technology

## System Validation Check-MSL 835MHz

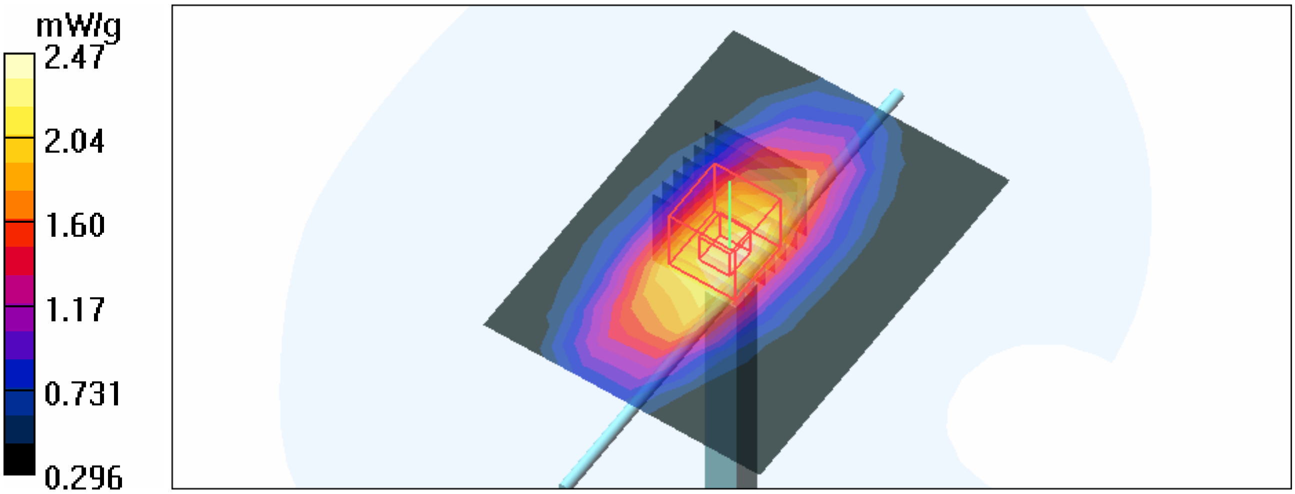
**DUT: Dipole 850 MHz ; Type: D835V2 ; Serial: 4d021 ; Test Frequency: 835 MHz**

Communication System: CW ; Frequency: 835 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL835;Medium parameters used: f = 835 MHz; $\sigma$ = 0.97 mho/m; $\varepsilon_r$ = 53; $\rho$ = 1000 kg/$m^3$ ;
Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 15 mm (The feetpoint of the dipole to the Phantom)Air temp. : 23.0 degrees ; Liquid temp. : 21.8 degrees

DASY4 Configuration:
- Probe: ET3DV6 - SN1790 ; ConvF(6.15, 6.15, 6.15) ; Calibrated: 2007/11/20
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2008/3/13
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**d=15mm, Pin=250mW/Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.39 mW/g

**d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.8 V/m; Power Drift = -0.095 dB
Peak SAR (extrapolated) = 2.79 W/kg
**SAR(1 g) = 2.18 mW/g; SAR(10 g) = 1.45 mW/g**
Maximum value of SAR (measured) = 2.47 mW/g



APPENDIX B: ADT SAR MEASUREMENT SYSTEM

# APPENDIX C: PHOTOGRAPHS OF SYSTEM VALIDATION