

**MOTOROLA**

## Portable Cellular Phone SAR Test Report

**Tests Requested By:** Motorola Mobile Devices  
600 N. US Highway 45  
Libertyville, IL 60048

**Test Report #:** 23641-1F  
**Date of Report:** Mar-10-2010  
**Date of Test:** Jan-21-2010 to Mar-09-2010  
**FCC ID #:** IHDP56KZ2  
**Generic Name:** MURQ7-3334411B11

**Test Laboratory:** Motorola Mobile Devices Business Product Safety & Compliance Laboratory  
600 N. US Highway 45  
Libertyville, IL 60048

**Report Author:** Thomas Knipple  
Senior RF Engineer

This laboratory is accredited to ISO/IEC 17025-2005 to perform the following tests:

**Accreditation:** Tests:  
Electromagnetic Specific Absorption Rate

Procedures:  
IEC 62209-1  
RSS-102  
IEEE 1528 - 2003  
FCC OET Bulletin 65 (*including Supplement C*)  
Australian Communications Authority Radio  
Communications (Electromagnetic Radiation – Human  
Exposure) Standard 2003  
CENELEC EN 50360  
ARIB Std. T-56 (2002)



TESTING CERT #2518-02

**Statement of  
Compliance:**

On the following products or types of products:

Wireless Communications Devices (Examples): Two Way Radios; Portable Phones (including Cellular, Licensed Non-Broadcast and PCS); Low Frequency Readers; and Pagers

Motorola declares under its sole responsibility that the portable cellular telephone model to which this declaration relates, is in conformity with the appropriate General Population/Uncontrolled RF exposure standards, recommendations and guidelines (FCC 47 CFR §2.1093) as well as with CENELEC en50360:2001 and ANSI / IEEE C95.1. It also declares that the product was tested in accordance with IEEE 1528 / CENELEC EN62209-1 (2006), as well as other appropriate measurement standards, guidelines and recommended practices. Any deviations from these standards, guidelines and recommended practices are noted below:

(none)

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## **1. Introduction**

The Motorola Mobile Devices Business Product Safety Laboratory has performed measurements of the maximum potential exposure to the user of the portable cellular phone covered by this test report. The Specific Absorption Rate (SAR) of this product was measured. The portable cellular phone was tested in accordance with [1], [4] and [5]. The SAR values measured for the portable cellular phone are below the maximum recommended levels of 1.6 W/kg in a 1 g average set in [3] and 2.0 W/kg in a 10 g average set in [2].

For ANSI / IEEE C95.1 (1 g), the final SAR reading for this phone is 1.03 W/kg for head adjacent use and 1.42 W/kg for body worn use. These measurements were performed using a Dasy4™ v4.7 system manufactured by Schmid & Partner Engineering AG (SPEAG), of Zurich Switzerland.

## 2. Description of the Device Under Test

### 2.1 Antenna description

| Type          | Internal                   |        |
|---------------|----------------------------|--------|
| Location      | Bottom Rear of Transceiver |        |
| Dimensions    | Width                      | 130 mm |
|               | Length                     | 13 mm  |
| Configuration | EB-FICA                    |        |

### 2.2 Device description

|                                                               |                                                                                |                   |                     |                     |                   |                     |                     |                     |                     |
|---------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------|---------------------|---------------------|-------------------|---------------------|---------------------|---------------------|---------------------|
| <b>Serial Number(s)</b>                                       | 358340030006850, 358340030006983, 358340030045593, 358340030046039, TA113000VR |                   |                     |                     |                   |                     |                     |                     |                     |
| <b>Mode(s) of Operation</b>                                   | GSM 850                                                                        | GSM 900           | GSM 1800            | GSM 1900            | WCDMA 850         | WCDMA 1900          | WCDMA 2100          | Wi-Fi 802.11b/g     | Bluetooth           |
| <b>Modulation Mode(s)</b>                                     | GSMK                                                                           | GSMK              | GSMK                | GSMK                | QPSK              | QPSK                | QPSK                | BPSK                | GFSK                |
| <b>Maximum Output Power Setting</b>                           | 32.5 dBm                                                                       | 33.0 dBm          | 30.5 dBm            | 31.5 dBm            | 24.0 dBm          | 24.0 dBm            | 24.0 dBm            | 18 dBm              | 10 dBm              |
| <b>Duty Cycle</b>                                             | 1:8                                                                            | 1:8               | 1:8                 | 1:8                 | 1:1               | 1:1                 | 1:1                 | 1:1                 | 1:1                 |
| <b>Transmitting Frequency Range(s)</b>                        | 824.2 - 848.8 MHz                                                              | 880.2 - 914.8 MHz | 1710.2 - 1784.8 MHz | 1850.2 - 1909.8 MHz | 826.4 - 846.6 MHz | 1852.4 - 1907.6 MHz | 1922.4 - 1977.6 MHz | 2412.0 - 2462.5 MHz | 2402.0 - 2483.5 MHz |
| <b>Production Unit or Identical Prototype (47 CFR §2.908)</b> | Identical Prototype                                                            |                   |                     |                     |                   |                     |                     |                     |                     |
| <b>Device Category</b>                                        | Portable                                                                       |                   |                     |                     |                   |                     |                     |                     |                     |
| <b>RF Exposure Limits</b>                                     | General Population / Uncontrolled                                              |                   |                     |                     |                   |                     |                     |                     |                     |

|                                        |                   |             |      |      |                   |             |      |      |                     |             |      |      |                     |             |      |      |
|----------------------------------------|-------------------|-------------|------|------|-------------------|-------------|------|------|---------------------|-------------|------|------|---------------------|-------------|------|------|
| <b>Mode(s) of Operation</b>            | GPRS 850          |             |      |      | GPRS 900          |             |      |      | GPRS 1800           |             |      |      | GPRS 1900           |             |      |      |
| <b>Modulation</b>                      | GMSK              |             |      |      | GMSK              |             |      |      | GMSK                |             |      |      | GMSK                |             |      |      |
| <b>Maximum Output Power Setting</b>    | 32.5              | <b>30.5</b> | 28.5 | 26.5 | 33.0              | <b>31.0</b> | 29.0 | 27.0 | 30.5                | <b>28.5</b> | 26.5 | 24.5 | 31.5                | <b>29.5</b> | 27.5 | 25.5 |
| <b>Duty Cycle</b>                      | 1:8               | <b>2:8</b>  | 3:8  | 4:8  | 1:8               | <b>2:8</b>  | 3:8  | 4:8  | 1:8                 | <b>2:8</b>  | 3:8  | 4:8  | 1:8                 | <b>2:8</b>  | 3:8  | 4:8  |
| <b>Transmitting Frequency Range(s)</b> | 824.2 - 848.8 MHz |             |      |      | 880.2 - 914.8 MHz |             |      |      | 1710.2 - 1784.8 MHz |             |      |      | 1850.2 - 1909.8 MHz |             |      |      |

|                                        |                   |             |      |      |                   |             |      |      |                     |             |      |      |                     |             |      |      |
|----------------------------------------|-------------------|-------------|------|------|-------------------|-------------|------|------|---------------------|-------------|------|------|---------------------|-------------|------|------|
| <b>Mode(s) of Operation</b>            | EDGE 850          |             |      |      | EDGE 900          |             |      |      | EDGE 1800           |             |      |      | EDGE 1900           |             |      |      |
| <b>Modulation</b>                      | 8PSK              |             |      |      | 8PSK              |             |      |      | 8PSK                |             |      |      | 8PSK                |             |      |      |
| <b>Maximum Output Power Setting</b>    | 27.5              | <b>25.5</b> | 23.5 | 21.5 | 28.0              | <b>26.0</b> | 24.0 | 22.0 | 27.0                | <b>25.0</b> | 23.0 | 21.0 | 28.0                | <b>26.0</b> | 24.0 | 22.0 |
| <b>Duty Cycle</b>                      | 1:8               | <b>2:8</b>  | 3:8  | 4:8  | 1:8               | <b>2:8</b>  | 3:8  | 4:8  | 1:8                 | <b>2:8</b>  | 3:8  | 4:8  | 1:8                 | <b>2:8</b>  | 3:8  | 4:8  |
| <b>Transmitting Frequency Range(s)</b> | 824.2 - 848.8 MHz |             |      |      | 880.2 - 914.8 MHz |             |      |      | 1710.2 - 1784.8 MHz |             |      |      | 1850.2 - 1909.8 MHz |             |      |      |

Note: Bolded entries indicate data mode configurations of highest time-average power output per band and data mode type.

### 3. Test Equipment Used

#### 3.1 Dosimetric System

The Motorola Mobile Devices Business Product Safety & Compliance Laboratory utilizes a Dosimetric Assessment System (Dasy4™ v4.7) manufactured by Schmid & Partner Engineering AG (SPEAG™), of Zurich Switzerland. All the SAR measurements are taken within a shielded enclosure. The overall 10 g RSS uncertainty of the measurement system is  $\pm 10.8\%$  (K=1) with an expanded uncertainty of  $\pm 21.6\%$  (K=2). The overall 1 g RSS uncertainty of the measurement system is  $\pm 11.1\%$  (K=1) with an expanded uncertainty of  $\pm 22.2\%$  (K=2). The measurement uncertainty budget is given in Appendix 5. Per IEEE 1528, this uncertainty budget is applicable to the SAR range of 0.4 W/kg to 10 W/kg.

The list of calibrated equipment used for the measurements is shown in the following table.

| Description                                | Serial Number | Cal Due Date |
|--------------------------------------------|---------------|--------------|
| DASY4™ DAE V1                              | 650           | Aug-21-2010  |
| E-Field Probe ES3DV3                       | 3184          | Sep-18-2010  |
| DASY4™ DAE V1                              | 703           | Sep-17-2010  |
| E-Field Probe ES3DV3                       | 3037          | Sep-18-2010  |
| S.A.M. Phantom used for 800/900 MHz        | TP-1005       |              |
| S.A.M. Phantom used for 1800/1900/2450 MHz | TP-1139       |              |
| S.A.M. Phantom used for 1800/1900/2450 MHz | TP-1250       |              |
| Dipole Validation Kit, DV835V2             | 417TR         | Oct-13-2010  |
| Dipole Validation Kit, DV1800V2            | 259TR         | Apr-01-2010  |
| Dipole Validation Kit, DV2450V2            | 740           | Apr-01-2010  |

#### 3.2 Additional Equipment

| Description                   | Serial Number | Cal Due Date |
|-------------------------------|---------------|--------------|
| Signal Generator HP8648C      | 3847A04822    | Apr-22-2010  |
| Power Meter E4419B            | GB39511082    | Apr-24-2011  |
| Power Sensor #1 - E9301A      | US39210917    | Jun-04-2010  |
| Power Sensor #2 - E9301A      | US39210918    | Jun-04-2010  |
| Signal Generator HP8648C      | 3847A04843    | Apr-22-2010  |
| Power Meter E4419B            | GB39511084    | Jun-17-2010  |
| Power Sensor #1 - E9301A      | US39210931    | Apr-23-2010  |
| Power Sensor #2 - E9301A      | US39210932    | Apr-23-2010  |
| Network Analyzer HP8753ES     | US39172529    | Jun-11-2010  |
| Dielectric Probe Kit HP85070C | US99360070    |              |

#### 4. Electrical parameters of the tissue simulating liquid

Prior to conducting SAR measurements, the relative permittivity,  $\epsilon_r$ , and the conductivity,  $\sigma$ , of the tissue simulating liquids were measured with a HP85070 Dielectric Probe Kit. These values, along with the temperature of the simulated tissue are shown in the table below. The recommended limits for permittivity and conductivity are also shown. A mass density of  $\rho = 1 \text{ g/cm}^3$  was entered into the system in all the cases. It can be seen that the measured parameters are within tolerance of the recommended limits specified in [1] and [5].

| $f$<br>(MHz) | Tissue<br>type | Limits / Measured     | Dielectric Parameters |                |           |
|--------------|----------------|-----------------------|-----------------------|----------------|-----------|
|              |                |                       | $\epsilon_r$          | $\sigma$ (S/m) | Temp (°C) |
| 835          | Head           | Measured, Mar-09-2010 | 43.0                  | 0.93           | 19.5      |
|              |                | Recommended Limits    | 41.5 $\pm$ 5%         | 0.90 $\pm$ 5%  | 18-25     |
|              | Body           | Measured, Mar-04-2010 | 53.8                  | 0.99           | 19.6      |
|              |                | Recommended Limits    | 55.2 $\pm$ 5%         | 0.97 $\pm$ 5%  | 18-25     |
| 1880         | Head           | Measured, Mar-02-2010 | 38.4                  | 1.46           | 20.0      |
|              |                | Measured, Mar-03-2010 | 38.1                  | 1.47           | 19.4      |
|              |                | Recommended Limits    | 40.0 $\pm$ 5%         | 1.40 $\pm$ 5%  | 18-25     |
|              | Body           | Measured, Mar-04-2010 | 52.1                  | 1.58           | 19.6      |
|              |                | Recommended Limits    | 53.3 $\pm$ 5%         | 1.52 $\pm$ 5%  | 18-25     |
|              |                |                       |                       |                |           |
| 2450         | Head           | Measured, Feb-19-2010 | 38.0                  | 1.80           | 19.9      |
|              |                | Measured, Mar-05-2010 | 37.9                  | 1.84           | 19.0      |
|              |                | Recommended Limits    | 39.2 $\pm$ 10%        | 1.80 $\pm$ 5%  | 18-25     |
|              | Body           | Measured, Jan-21-2010 | 50.9                  | 1.92           | 19.6      |
|              |                | Measured, Mar-08-2010 | 50.8                  | 2.01           | 20.0      |
|              |                | Recommended Limits    | 52.7 $\pm$ 10%        | 1.95 $\pm$ 5%  | 18-25     |

The list of ingredients and the percent composition used for the tissue simulates are indicated in the table below.

| Ingredient | 835 MHz /<br>900 MHz<br>Head | 835 MHz /<br>900 MHz<br>Body | 1800 MHz /<br>1900 MHz<br>Head | 1800 MHz /<br>1900 MHz<br>Body | 2450 MHz<br>Head | 2450 MHz<br>Body |
|------------|------------------------------|------------------------------|--------------------------------|--------------------------------|------------------|------------------|
| Sugar      | 57                           | 44.9                         | --                             | --                             | --               | --               |
| DGBE       | --                           | --                           | 47                             | 30.8                           | --               | 30               |
| Diacetin   | --                           | --                           | --                             | --                             | 51               |                  |
| Water      | 40.45                        | 53.06                        | 52.62                          | 68.8                           | 48.75            | 70               |
| Salt       | 1.45                         | 0.94                         | 0.38                           | 0.4                            | 0.15             | --               |
| HEC        | 1                            | 1                            | --                             | --                             | --               | --               |
| Bact.      | 0.1                          | 0.1                          | --                             | --                             | 0.1              | --               |

## 5. System Accuracy Verification

A system accuracy verification of the DASY4™ was performed using the measurement equipment listed in Section 3.1. The daily system accuracy verification occurs within the flat section of the SAM phantom.

A SAR measurement was performed to verify the measured SAR was within  $\pm 10\%$  from the target SAR indicated in Appendix 6. These frequencies are within  $\pm 10\%$  of the compliance test mid-band frequency as required in [1] and [5]. The test was conducted on the same days as the measurement of the DUT. Recommended limits for permittivity and conductivity, specified in [5], are shown in the table below. The obtained results from the system accuracy verification are also displayed in the table below. SAR values are normalized to 1 W forward power delivered to the dipole. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values. The distributions of SAR compare well with those of the reference measurements (see Appendix 1). The tissue stimulant depth was verified to be 15.0 cm  $\pm$  0.5 cm. Z-axis scans showing the SAR penetration are also included in Appendix 1.

| $f$<br>(MHz) | Description           | SAR (W/kg),<br>1 gram | Dielectric Parameters |                | Ambient<br>Temp (°C) | Tissue<br>Temp (°C) |
|--------------|-----------------------|-----------------------|-----------------------|----------------|----------------------|---------------------|
|              |                       |                       | $\epsilon_r$          | $\sigma$ (S/m) |                      |                     |
| 835          | Measured, Mar-03-2010 | 9.575                 | 41.9                  | 0.92           | 20.2                 | 20.1                |
|              | Measured, Mar-04-2010 | 9.50                  | 41.8                  | 0.91           | 20.5                 | 20.1                |
|              | Measured, Mar-09-2010 | 9.725                 | 43.0                  | 0.93           | 20.5                 | 20.4                |
|              | Recommended Limits    | 9.69                  | 41.5 $\pm 5\%$        | 0.90 $\pm 5\%$ | 18-25                | 18-25               |
| 1800         | Measured, Mar-02-2010 | 39.425                | 38.8                  | 1.37           | 20.7                 | 19.9                |
|              | Measured, Mar-03-2010 | 39.975                | 38.5                  | 1.38           | 20.2                 | 19.6                |
|              | Measured, Mar-04-2010 | 39.50                 | 39.8                  | 1.37           | 20.5                 | 19.8                |
|              | Recommended Limits    | 37.91                 | 40.0 $\pm 5\%$        | 1.4 $\pm 5\%$  | 18-25                | 18-25               |
| 2450         | Measured, Jan-21-2010 | 53.75                 | 37.6                  | 1.88           | 20.2                 | 19.9                |
|              | Measured, Feb-19-2010 | 54.50                 | 38.0                  | 1.80           | 20.2                 | 19.9                |
|              | Measured, Mar-04-2010 | 56.25                 | 37.9                  | 1.84           | 20.2                 | 19.7                |
|              | Measured, Mar-07-2010 | 58.00                 | 36.3                  | 1.81           | 20.2                 | 19.1                |
|              | Recommended Limits    | 56.68                 | 39.2 $\pm 10\%$       | 1.80 $\pm 5\%$ | 18-25                | 18-25               |

The following probe conversion factors were used on the E-Field probe(s) used for the system accuracy verification measurements:

| Description             | Serial Number | $f$<br>(MHz) | Conversion Factor | Cal Cert<br>pg # |
|-------------------------|---------------|--------------|-------------------|------------------|
| E-Field Probe<br>ES3DV3 | 3184          | 835          | 6.26              | 8 of 9           |
|                         |               | 1810         | 5.14              | 8 of 9           |
|                         |               | 2450         | 4.44              | 8 of 9           |
| E-Field Probe<br>ES3DV3 | 3037          | 835          | 6.25              | 8 of 9           |
|                         |               | 1810         | 5.05              | 8 of 9           |
|                         |               | 2450         | 4.41              | 8 of 9           |

## 6. Test Results

The test sample was operated using an actual transmission through a base station simulator. The base station simulator was set up to the proper channel, transmitter power level and transmit mode of operation. The phone was tested in the configurations stipulated in [1], [4] and [5]. The phone was positioned into these configurations using the device holder supplied with the DASY4™ SAR measurement system. The measured dielectric constant of the material used for the device holder is less than 2.9 and the loss tangent is less than 0.02 ( $\pm 30\%$ ) at 850 MHz. The default settings for the “coarse” and “cube” scans were chosen and used for measurements. The grid spacing of the course scan was set to 15 mm as shown in the SAR plots included in Appendix 2 and 3. Please refer to the DASY4™ manual for additional information on SAR scanning procedures and algorithms used.

The Cellular Phone model covered by this report has the following battery options:  
Model SNN5843A - 1390 mAH Battery

This battery was used to do all of the SAR testing. The phone was placed in the SAR measurement system with a fully charged battery.

Per “SAR Measurement Procedures for 3G Devices” released in October, 2007, 12.2 kbps RMC, 12.2 kbps AMR, HS-DPCCH Sub-test 1-4, and E-DCH Sub-test 1-5 modes were considered. The conducted power measurements (per section 5.2 of 3GPP TS 34.121) for each mode are shown in the table below.

| Band       | Channel | Conducted power (dBm) for WCDMA modes |       | Conducted Power (dBm) for WCDMA – HSDPA (Rel 5) Modes |           |           |           | Conducted Power (dBm) for WCDMA – HSPA (HSUPA/HSDPA-Rel 6) Modes |           |           |           |           |
|------------|---------|---------------------------------------|-------|-------------------------------------------------------|-----------|-----------|-----------|------------------------------------------------------------------|-----------|-----------|-----------|-----------|
|            |         | RMC                                   | AMR   | Subtest 1                                             | Subtest 2 | Subtest 3 | Subtest 4 | Subtest 1                                                        | Subtest 2 | Subtest 3 | Subtest 4 | Subtest 5 |
| WCDMA 850  | 4132    | 24.14                                 | 24.08 | 24.18                                                 | 24.16     | 24.20     | 24.17     | 24.07                                                            | 24.13     | 24.14     | 24.16     | 24.16     |
|            | 4180    | 23.97                                 | 24.03 | 24.04                                                 | 24.09     | 24.06     | 24.12     | 24.14                                                            | 24.11     | 24.01     | 24.15     | 24.1      |
|            | 4233    | 24.10                                 | 24.04 | 24.09                                                 | 24.13     | 24.17     | 24.17     | 24.18                                                            | 24.17     | 24.17     | 24.14     | 24.19     |
| WCDMA 1900 | 9262    | 23.87                                 | 24.02 | 24.11                                                 | 24.07     | 24.09     | 24.09     | 23.98                                                            | 24.13     | 24.19     | 24.13     | 24.12     |
|            | 9400    | 23.99                                 | 24.02 | 24.08                                                 | 24.03     | 24.09     | 24.09     | 24.02                                                            | 24.07     | 24.14     | 24.14     | 24.08     |
|            | 9538    | 23.84                                 | 23.48 | 23.57                                                 | 23.60     | 23.66     | 23.68     | 23.85                                                            | 23.68     | 23.51     | 23.52     | 23.63     |

### Maximum Power Reduction (MPR)

According to 3GPP 25.101 sub-clause 6.2.2, the maximum output power is allowed to be reduced by following the table.

**Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH**

| UE transmit channel configuration                                                                                                                                                                   | CM (dB)              | MPR (dB)      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------|
| For all combinations of; DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH                                                                                                                                | $0 \leq CM \leq 3.5$ | MAX (CM-1, 0) |
| Note 1: CM = 1 for $\beta_c/\beta_d=12/15$ , $\beta_{hs}/\beta_c=24/15$ . For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference. |                      |               |

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to-average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).



When E-DPDCH channels are present, the beta gains on those channels are reduced first to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done. However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a mechanism to compensate for the power back-off by increasing the gain of TX\_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

Per “SAR Measurement Procedures for 802.11 a/b/g Transmitters” (FCC KDB 248227), power measurements were performed for 802.11 operational modes. The conducted power measurements for each mode are shown in the table below. SAR testing for 802.11 modes was performed with the transmitter mode and data rate set to the configurations highlighted in bold below.

| Band          | Channel | Conducted Power (dBm) for<br>802.11b Mode Data Rates |              |              |            | Conducted Power (dBm) for<br>802.11g Mode Data Rates |           |            |            |            |            |            |            |
|---------------|---------|------------------------------------------------------|--------------|--------------|------------|------------------------------------------------------|-----------|------------|------------|------------|------------|------------|------------|
|               |         | 1<br>Mbps                                            | 2<br>Mbps    | 5.5<br>Mbps  | 11<br>Mbps | 6<br>Mbps                                            | 9<br>Mbps | 12<br>Mbps | 18<br>Mbps | 24<br>Mbps | 36<br>Mbps | 48<br>Mbps | 54<br>Mbps |
| Wi-Fi<br>2450 | 1       | <b>21.60</b>                                         | 21.50        | <b>22.90</b> | 21.45      | 17.16                                                | 17.32     | 17.46      | 17.43      | 17.37      | 17.58      | 17.86      | 16.06      |
|               | 6       | <b>21.90</b>                                         | 20.67        | 21.53        | 21.53      | 16.27                                                | 16.32     | 16.52      | 16.48      | 16.43      | 16.41      | 17.16      | 15.24      |
|               | 11      | <b>21.34</b>                                         | <b>22.08</b> | <b>22.25</b> | 21.54      | 16.63                                                | 16.94     | 16.73      | 16.88      | 17.29      | 17.40      | 17.44      | 15.32      |

## 6.1 Head Adjacent Test Results

The SAR results shown in tables 1 through 4 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the simulated tissue after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is  $\text{New SAR} = \text{Old SAR} * 10^{(-\text{drift}/10)}$ . The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. Note that 800 MHz digital mode SAR measurements were performed in accordance with [4].

The left head and right head SAR contour distributions are similar. Because of this similarity, the cheek/touch and 15° tilt test conditions with the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 2. All other test conditions measured lower SAR values than those included in Appendix 2. The tables below also include the highest SAR value summations for primary and secondary co-located transmitters, with the results indicated in italics.

The SAR measurements were performed using the SAM phantoms listed in section 3.1. Since the same phantoms and simulated tissue were used for the system accuracy verification and the device SAR measurements, the Z-axis scans included in Appendix 1 are applicable for verification of simulated tissue depth to be 15.0 cm ± 0.5 cm.

The following probe conversion factors were used on the E-Field probe(s) used for head-adjacent measurements:

| Description          | Serial Number | f (MHz) | Conversion Factor | Cal Cert pg # |
|----------------------|---------------|---------|-------------------|---------------|
| E-Field Probe ES3DV3 | 3184          | 835     | 6.26              | 8 of 9        |
|                      |               | 1810    | 5.14              | 8 of 9        |
|                      |               | 2450    | 4.44              | 8 of 9        |
| E-Field Probe ES3DV3 | 3037          | 835     | 6.25              | 8 of 9        |
|                      |               | 1810    | 5.05              | 8 of 9        |
|                      |               | 2450    | 4.41              | 8 of 9        |

| Left Head Cheek Position |              |                              |           |            |                 |                     |                 |                     |
|--------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                     | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                          |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850                  | Channel 128  | 32.36                        |           |            |                 |                     |                 |                     |
|                          | Channel 190  | 32.36                        | 20.0      | -0.037     | 0.253           | 0.26                | 0.333           | 0.34                |
|                          | Channel 251  | 32.35                        |           |            |                 |                     |                 |                     |
| GSM 1900                 | Channel 512  | 31.68                        |           |            |                 |                     |                 |                     |
|                          | Channel 661  | 31.37                        | 19.5      | -0.013     | 0.343           | 0.34                | 0.534           | 0.54                |
|                          | Channel 810  | 31.36                        |           |            |                 |                     |                 |                     |
| WCDMA 850                | Channel 4132 | 24.14                        |           |            |                 |                     |                 |                     |
|                          | Channel 4180 | 23.97                        | 19.1      | -0.265     | 0.217           | 0.23                | 0.285           | 0.30                |
|                          | Channel 4233 | 24.10                        |           |            |                 |                     |                 |                     |
| WCDMA 1900               | Channel 9262 | 23.87                        | 19.3      | -0.027     | 0.447           | 0.45                | 0.704           | 0.71                |
|                          | Channel 9400 | 23.99                        | 19.1      | 0.022      | 0.660           | 0.66                | 1.03            | 1.03                |
|                          | Channel 9538 | 23.84                        | 19.0      | -0.288     | 0.429           | 0.46                | 0.684           | 0.73                |
| WI-FI 2450 1 Mbps        | Channel 1    | 21.60                        |           |            |                 |                     |                 |                     |
|                          | Channel 6    | 21.90                        | 19.4      | -0.019     | 0.152           | 0.15                | 0.317           | 0.32                |
|                          | Channel 11   | 21.34                        |           |            |                 |                     |                 |                     |
| GSM 850 + WI-FI          |              |                              |           |            |                 | 0.41                |                 | 0.66                |
| GSM 1900 + WI-FI         |              |                              |           |            |                 | 0.49                |                 | 0.86                |
| WCDMA 850 + WI-FI        |              |                              |           |            |                 | 0.38                |                 | 0.62                |
| WCDMA 1900 + WI-FI       |              |                              |           |            |                 | 0.81                |                 | 1.35                |

**Table 1: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.**

| Right Head Cheek Position |              |                              |           |            |                 |                     |                 |                     |
|---------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                      | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                           |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850                   | Channel 128  | 32.36                        |           |            |                 |                     |                 |                     |
|                           | Channel 190  | 32.36                        | 19.1      | -0.127     | 0.253           | 0.26                | 0.334           | 0.34                |
|                           | Channel 251  | 32.35                        |           |            |                 |                     |                 |                     |
| GSM 1900                  | Channel 512  | 31.68                        |           |            |                 |                     |                 |                     |
|                           | Channel 661  | 31.37                        | 19.7      | 0.015      | 0.342           | 0.34                | 0.515           | 0.52                |
|                           | Channel 810  | 31.36                        |           |            |                 |                     |                 |                     |
| WCDMA 850                 | Channel 4132 | 24.14                        |           |            |                 |                     |                 |                     |
|                           | Channel 4180 | 23.97                        | 19.7      | 0.007      | 0.197           | 0.20                | 0.261           | 0.26                |
|                           | Channel 4233 | 24.10                        |           |            |                 |                     |                 |                     |
| WCDMA 1900                | Channel 9262 | 23.87                        |           |            |                 |                     |                 |                     |
|                           | Channel 9400 | 23.99                        | 19.0      | 0.127      | 0.522           | 0.52                | 0.781           | 0.78                |
|                           | Channel 9538 | 23.84                        |           |            |                 |                     |                 |                     |
| WI-FI 2450 1 Mbps         | Channel 1    | 21.60                        | 19.0      | -0.027     | 0.208           | 0.21                | 0.454           | 0.46                |
|                           | Channel 6    | 21.90                        | 19.9      | 0.288      | 0.290           | 0.29                | 0.629           | 0.63                |
|                           | Channel 11   | 21.34                        | 19.0      | 0.161      | 0.162           | 0.16                | 0.358           | 0.36                |
| WI-FI 2450 2 Mbps         | Channel 1    | 21.50                        |           |            |                 |                     |                 |                     |
|                           | Channel 6    | 20.67                        |           |            |                 |                     |                 |                     |
|                           | Channel 11   | 22.08                        | 19.4      | 0.036      | 0.232           | 0.23                | 0.517           | 0.52                |
| WI-FI 2450 5.5 Mbps       | Channel 1    | 22.90                        | 18.8      | -0.066     | 0.149           | 0.15                | 0.330           | 0.34                |
|                           | Channel 6    | 21.53                        |           |            |                 |                     |                 |                     |
|                           | Channel 11   | 22.25                        | 18.9      | 0.079      | 0.172           | 0.17                | 0.382           | 0.38                |
| GSM 850 + WI-FI           |              |                              |           |            |                 | 0.55                |                 | 0.97                |
| GSM 1900 + WI-FI          |              |                              |           |            |                 | 0.63                |                 | 1.15                |
| WCDMA 850 + WI-FI         |              |                              |           |            |                 | 0.49                |                 | 0.89                |
| WCDMA 1900 + WI-FI        |              |                              |           |            |                 | 0.81                |                 | 1.41                |

**Table 2: SAR measurement results at the highest possible output power, measured in a head cheek position against the ICNIRP and ANSI SAR Limit.**

| Left Head 15° Tilt Position |              |                              |           |            |                 |                     |                 |                     |
|-----------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                        | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                             |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850                     | Channel 128  | 32.36                        |           |            |                 |                     |                 |                     |
|                             | Channel 190  | 32.36                        | 20.0      | -0.018     | 0.191           | 0.19                | 0.253           | 0.25                |
|                             | Channel 251  | 32.35                        |           |            |                 |                     |                 |                     |
| GSM 1900                    | Channel 512  | 31.68                        |           |            |                 |                     |                 |                     |
|                             | Channel 661  | 31.37                        | 19.5      | 0.029      | 0.214           | 0.21                | 0.339           | 0.34                |
|                             | Channel 810  | 31.36                        |           |            |                 |                     |                 |                     |
| WCDMA 850                   | Channel 4132 | 24.14                        |           |            |                 |                     |                 |                     |
|                             | Channel 4180 | 23.97                        | 19.6      | -0.024     | 0.168           | 0.17                | 0.222           | 0.22                |
|                             | Channel 4233 | 24.10                        |           |            |                 |                     |                 |                     |
| WCDMA 1900                  | Channel 9262 | 23.87                        |           |            |                 |                     |                 |                     |
|                             | Channel 9400 | 23.99                        | 19.1      | -0.058     | 0.418           | 0.42                | 0.663           | 0.67                |
|                             | Channel 9538 | 23.84                        |           |            |                 |                     |                 |                     |
| WI-FI 2450 1 Mbps           | Channel 1    | 21.60                        |           |            |                 |                     |                 |                     |
|                             | Channel 6    | 21.90                        | 19.5      | -0.234     | 0.017           | 0.02                | 0.33            | 0.03                |
|                             | Channel 11   | 21.34                        |           |            |                 |                     |                 |                     |
| GSM 850 + WI-FI             |              |                              |           |            |                 | 0.21                |                 | 0.28                |
| GSM 1900 + WI-FI            |              |                              |           |            |                 | 0.23                |                 | 0.37                |
| WCDMA 850 + WI-FI           |              |                              |           |            |                 | 0.19                |                 | 0.25                |
| WCDMA 1900 + WI-FI          |              |                              |           |            |                 | 0.44                |                 | 0.70                |

**Table 3: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.**

| Right Head 15° Tilt Position |              |                              |           |            |                 |                     |                 |                     |
|------------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                         | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                              |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850                      | Channel 128  | 32.36                        |           |            |                 |                     |                 |                     |
|                              | Channel 190  | 32.36                        | 19.5      | 0.024      | 0.202           | 0.20                | 0.266           | 0.27                |
|                              | Channel 251  | 32.35                        |           |            |                 |                     |                 |                     |
| GSM 1900                     | Channel 512  | 31.68                        |           |            |                 |                     |                 |                     |
|                              | Channel 661  | 31.37                        | 20.0      | -0.019     | 0.264           | 0.27                | 0.427           | 0.43                |
|                              | Channel 810  | 31.36                        |           |            |                 |                     |                 |                     |
| WCDMA 850                    | Channel 4132 | 24.14                        |           |            |                 |                     |                 |                     |
|                              | Channel 4180 | 23.97                        | 18.8      | -0.031     | 0.162           | 0.16                | 0.214           | 0.22                |
|                              | Channel 4233 | 24.10                        |           |            |                 |                     |                 |                     |
| WCDMA 1900                   | Channel 9262 | 23.87                        | 19.2      | -0.044     | 0.308           | 0.31                | 0.491           | 0.50                |
|                              | Channel 9400 | 23.99                        | 19.4      | -0.035     | 0.497           | 0.50                | 0.813           | 0.82                |
|                              | Channel 9538 | 23.84                        | 18.7      | -0.006     | 0.352           | 0.35                | 0.581           | 0.58                |
| WI-FI 2450 1 Mbps            | Channel 1    | 21.60                        |           |            |                 |                     |                 |                     |
|                              | Channel 6    | 21.90                        | 19.0      | -0.306     | 0.019           | 0.02                | 0.035           | 0.04                |
|                              | Channel 11   | 21.34                        |           |            |                 |                     |                 |                     |
| GSM 850 + WI-FI              |              |                              |           |            |                 | 0.22                |                 | 0.31                |
| GSM 1900 + WI-FI             |              |                              |           |            |                 | 0.29                |                 | 0.47                |
| WCDMA 850 + WI-FI            |              |                              |           |            |                 | 0.18                |                 | 0.26                |
| WCDMA 1900 + WI-FI           |              |                              |           |            |                 | 0.52                |                 | 0.86                |

**Table 4: SAR measurement results at the highest possible output power, measured in a head 15° Tilt position against the ICNIRP and ANSI SAR Limit.**

## 6.2 Body Worn Test Results

The SAR results shown in tables 5 through 10 are maximum SAR values averaged over 1 gram of phantom tissue, to demonstrate compliance to [3] and also over 10 grams of phantom tissue, to demonstrate compliance to the [6]. Also shown are the measured conducted output power levels, the temperature of the test facility during the test, the temperature of the tissue simulate after the test, the measured drift and the extrapolated SAR. The exact method of extrapolation is  $\text{New SAR} = \text{Old SAR} * 10^{(-\text{drift}/10)}$ . The SAR reported at the end of the measurement process by the DASY4™ measurement system can be scaled up by the measured drift to determine the SAR at the beginning of the measurement process. This is the most conservative SAR because it corresponds to the average output power at the beginning of the SAR test. This extrapolation has been done because when the DUT is operating properly it may exhibit a slump in radiated power and SAR over time. This is verified by measuring the SAR drift after the test. Note that 800 MHz digital mode SAR measurements were performed in accordance with [4].

The test conditions that produced the highest SAR values in each band are indicated as bold numbers in the following tables and are included in Appendix 3. All other test conditions measured lower SAR values than those included in Appendix 3. The tables below also include the highest SAR value summations for primary and secondary co-located transmitters, with the results indicated in italics.

A “flat” phantom was for the body-worn tests. This “flat” phantom is made out of 1” thick natural High Density Polyethylene with a thickness at the bottom equal to 2.0 mm. It measures 52.7 cm(long) x 26.7 cm(wide) x 21.2 cm(tall). The measured dielectric constant of the material used is less than 2.3 and the loss tangent is less than 0.0046 all the way up to 2.184 GHz.

The tissue stimulant depth was verified to be 15.0 cm ± 0.5 cm. The same device holder described in section 6 was used for positioning the phone. The functional accessories were divided into two categories, the ones with metal components and the ones with non-metal components. For non-metallic component accessories’, testing was performed on the accessory that displayed the closest proximity to the flat phantom. Each metallic component accessory, if any, was checked for uniqueness of metal component so that each is tested with the device. If multiple accessories shared an identical metal component, only the accessory that dictates the closest spacing to the body was tested. The cellular phone was tested with a headset connected to the device for all body-worn SAR measurements.

There are no body-worn accessories available for this phone at the time of testing thus the device was tested per the Supplement C testing guidelines for devices that do not have body-worn accessories. A separation distance of 15 mm between the device and the flat phantom was used for testing body-worn SAR. The device was tested with the front and back of the device facing the phantom.

The cellular phone was also tested in data mode operations. For these tests, a separation distance of 25 mm between the device and the flat phantom was used. The device was tested in the worst-case SAR position and channel configuration from the voice-mode body-worn testing.

The following probe conversion factors were used on the E-Field probe(s) used for body-worn measurements:

| Description          | Serial Number | f (MHz) | Conversion Factor | Cal Cert pg # |
|----------------------|---------------|---------|-------------------|---------------|
| E-Field Probe ES3DV3 | 3184          | 835     | 6.08              | 8 of 9        |
|                      |               | 1810    | 4.84              | 8 of 9        |
|                      |               | 2450    | 4.28              | 8 of 9        |
| E-Field Probe ES3DV3 | 3037          | 835     | 6.17              | 8 of 9        |
|                      |               | 1810    | 4.96              | 8 of 9        |
|                      |               | 2450    | 4.78              | 8 of 9        |

| Body-Worn; Front of Phone 15 mm from Phantom |              |                              |           |            |                 |                     |                 |                     |
|----------------------------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                                         | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                                              |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850                                      | Channel 128  | 32.36                        |           |            |                 |                     |                 |                     |
|                                              | Channel 190  | 32.36                        | 19.6      | -0.050     | 0.284           | 0.29                | 0.39            | 0.39                |
|                                              | Channel 251  | 32.35                        |           |            |                 |                     |                 |                     |
| GSM 1900                                     | Channel 512  | 31.68                        |           |            |                 |                     |                 |                     |
|                                              | Channel 661  | 31.37                        | 19.6      | -0.025     | 0.159           | 0.16                | 0.257           | 0.26                |
|                                              | Channel 810  | 31.36                        |           |            |                 |                     |                 |                     |
| WCDMA 850                                    | Channel 4132 | 24.14                        |           |            |                 |                     |                 |                     |
|                                              | Channel 4180 | 23.97                        | 19.4      | 0.011      | 0.285           | 0.29                | 0.391           | 0.39                |
|                                              | Channel 4233 | 24.10                        |           |            |                 |                     |                 |                     |
| WCDMA 1900                                   | Channel 9262 | 23.87                        |           |            |                 |                     |                 |                     |
|                                              | Channel 9400 | 23.99                        | 19.6      | 0.098      | 0.295           | 0.30                | 0.475           | 0.48                |
|                                              | Channel 9538 | 23.84                        |           |            |                 |                     |                 |                     |
| WI-FI 2450 1 Mbps                            | Channel 1    | 21.60                        |           |            |                 |                     |                 |                     |
|                                              | Channel 6    | 21.90                        | 19.5      | -0.055     | 0.022           | 0.02                | 0.038           | 0.04                |
|                                              | Channel 11   | 21.34                        |           |            |                 |                     |                 |                     |
| Bluetooth 2450                               | Channel 0    |                              |           |            |                 |                     |                 |                     |
|                                              | Channel 39   | 10.13                        | 19.6      | 1.63       | 0.00000246      | 0.00                | 0.0000122       | 0.00                |
|                                              | Channel 78   |                              |           |            |                 |                     |                 |                     |
| GSM 850 + WI-FI                              |              |                              |           |            |                 | 0.31                |                 | 0.43                |
| GSM 1900 + WI-FI                             |              |                              |           |            |                 | 0.18                |                 | 0.30                |
| WCDMA 850 + WI-FI                            |              |                              |           |            |                 | 0.31                |                 | 0.43                |
| WCDMA 1900 + WI-FI                           |              |                              |           |            |                 | 0.32                |                 | 0.52                |

Table 5: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.



| Body-Worn; Back of Phone 15 mm from Phantom |              |                              |           |            |                 |                     |                 |                     |
|---------------------------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                                        | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                                             |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850                                     | Channel 128  | 32.36                        |           |            |                 |                     |                 |                     |
|                                             | Channel 190  | 32.36                        | 19.5      | -0.016     | 0.248           | 0.25                | 0.346           | 0.35                |
|                                             | Channel 251  | 32.35                        |           |            |                 |                     |                 |                     |
| GSM 1900                                    | Channel 512  | 31.68                        |           |            |                 |                     |                 |                     |
|                                             | Channel 661  | 31.37                        | 19.6      | 0.046      | 0.347           | 0.35                | 0.625           | 0.63                |
|                                             | Channel 810  | 31.36                        |           |            |                 |                     |                 |                     |
| WCDMA 850                                   | Channel 4132 | 24.14                        |           |            |                 |                     |                 |                     |
|                                             | Channel 4180 | 23.97                        | 19.4      | -0.078     | 0.219           | 0.22                | 0.303           | 0.31                |
|                                             | Channel 4233 | 24.10                        |           |            |                 |                     |                 |                     |
| WCDMA 1900                                  | Channel 9262 | 23.87                        | 19.6      | 0.102      | 0.748           | 0.75                | 1.42            | 1.42                |
|                                             | Channel 9400 | 23.99                        | 19.6      | 0.112      | 0.592           | 0.59                | 1.11            | 1.11                |
|                                             | Channel 9538 | 23.84                        | 19.6      | 0.255      | 0.601           | 0.60                | 1.08            | 1.08                |
| WI-FI 2450 1 Mbps                           | Channel 1    | 21.60                        | 20.0      | 0.782      | 0.049           | 0.05                | 0.089           | 0.09                |
|                                             | Channel 6    | 21.90                        | 19.2      | 0.030      | 0.066           | 0.07                | 0.126           | 0.13                |
|                                             | Channel 11   | 21.34                        | 20.0      | 0.253      | 0.070           | 0.07                | 0.129           | 0.13                |
| WI-FI 2450 2.2 Mbps                         | Channel 1    | 21.50                        |           |            |                 |                     |                 |                     |
|                                             | Channel 6    | 20.67                        |           |            |                 |                     |                 |                     |
|                                             | Channel 11   | 22.08                        | 18.8      | 0.046      | 0.054           | 0.05                | 0.103           | 0.10                |
| WI-FI 2450 5 Mbps                           | Channel 1    | 22.90                        | 18.7      | 0.107      | 0.042           | 0.04                | 0.081           | 0.08                |
|                                             | Channel 6    | 21.53                        |           |            |                 |                     |                 |                     |
|                                             | Channel 11   | 22.25                        | 20.0      | -0.101     | 0.059           | 0.06                | 0.112           | 0.11                |
| Bluetooth 2450                              | Channel 0    |                              |           |            |                 |                     |                 |                     |
|                                             | Channel 39   | 10.13                        | 19.6      | 0.615      | 0.000179        | 0.00                | 0.000552        | 0.00                |
|                                             | Channel 78   |                              |           |            |                 |                     |                 |                     |
| GSM 850 + WI-FI                             |              |                              |           |            |                 | 0.32                |                 | 0.48                |
| GSM 1900 + WI-FI                            |              |                              |           |            |                 | 0.42                |                 | 0.76                |
| WCDMA 850 + WI-FI                           |              |                              |           |            |                 | 0.29                |                 | 0.34                |
| WCDMA 1900 + WI-FI                          |              |                              |           |            |                 | 0.82                |                 | 1.55                |

Table 6: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

| Body-Worn, <i>Noted facing of Phone 25 mm from Phantom</i> |             |                              |           |            |                 |                     |                 |                     |
|------------------------------------------------------------|-------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                                                       | Description | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                                                            |             |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| WI-FI 2450<br>1 Mbps<br><i>Front of Phone</i>              | Channel 1   | 21.60                        |           |            |                 |                     |                 |                     |
|                                                            | Channel 6   | 21.90                        | 19.0      | 0.358      | 0.008           | 0.01                | 0.014           | 0.01                |
|                                                            | Channel 11  | 21.34                        |           |            |                 |                     |                 |                     |
| WI-FI 2450<br>1 Mbps<br><i>Back of Phone</i>               | Channel 1   | 21.60                        |           |            |                 |                     |                 |                     |
|                                                            | Channel 6   | 21.90                        | 19.7      | -0.074     | 0.024           | 0.02                | 0.043           | 0.04                |
|                                                            | Channel 11  | 21.34                        |           |            |                 |                     |                 |                     |

Table 7: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

| GPRS Class 10 (2 Uplink Timeslots) Body-Worn; <i>Noted facing of Phone 25 mm from Phantom</i> |             |                              |           |            |                 |                     |                 |                     |
|-----------------------------------------------------------------------------------------------|-------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                                                                                          | Description | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                                                                                               |             |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| GSM 850<br><i>Front of Phone</i>                                                              | Channel 128 | 30.65                        |           |            |                 |                     |                 |                     |
|                                                                                               | Channel 190 | 30.57                        | 19.4      | -0.204     | 0.259           | 0.27                | 0.351           | 0.37                |
|                                                                                               | Channel 251 | 30.42                        |           |            |                 |                     |                 |                     |
| GSM 1900<br><i>Back of Phone</i>                                                              | Channel 512 | 29.72                        |           |            |                 |                     |                 |                     |
|                                                                                               | Channel 661 | 29.65                        | 19.6      | -0.049     | 0.111           | 0.11                | 0.177           | 0.18                |
|                                                                                               | Channel 810 | 29.48                        |           |            |                 |                     |                 |                     |
| GSM 850<br>+ WI-FI                                                                            |             |                              |           |            |                 | 0.28                |                 | 0.38                |
| GSM 1900<br>+ WI-FI                                                                           |             |                              |           |            |                 | 0.13                |                 | 0.22                |

Table 8: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

| EDGE Class 10 (2 Uplink Timeslots) Body-Worn; <i>Noted facing of Phone 25 mm from Phantom</i> |             |                                    |              |               |                    |                        |                    |                        |
|-----------------------------------------------------------------------------------------------|-------------|------------------------------------|--------------|---------------|--------------------|------------------------|--------------------|------------------------|
| Mode                                                                                          | Description | Conducted<br>Output Power<br>(dBm) | Temp<br>(°C) | Drift<br>(dB) | 10 g SAR value     |                        | 1 g SAR value      |                        |
|                                                                                               |             |                                    |              |               | Measured<br>(W/kg) | Extrapolated<br>(W/kg) | Measured<br>(W/kg) | Extrapolated<br>(W/kg) |
| GSM 850<br><i>Front of Phone</i>                                                              | Channel 128 | 25.60                              |              |               |                    |                        |                    |                        |
|                                                                                               | Channel 190 | 25.56                              | 19.4         | -0.068        | 0.083              | 0.08                   | 0.118              | 0.12                   |
|                                                                                               | Channel 251 | 25.41                              |              |               |                    |                        |                    |                        |
| GSM 1900<br><i>Back of Phone</i>                                                              | Channel 512 | 25.98                              |              |               |                    |                        |                    |                        |
|                                                                                               | Channel 661 | 25.99                              | 19.0         | -0.102        | 0.067              | 0.07                   | 0.107              | 0.11                   |
|                                                                                               | Channel 810 | 25.78                              |              |               |                    |                        |                    |                        |
| GSM 850<br>+ WI-FI                                                                            |             |                                    |              |               |                    | 0.09                   |                    | 0.13                   |
| GSM 1900<br>+ WI-FI                                                                           |             |                                    |              |               |                    | 0.09                   |                    | 0.15                   |

Table 9: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

| HSPA (HSUPA/HSDPA Rel. 6) Subtest 3 Body-Worn; Back of Phone 25 mm from Phantom |              |                              |           |            |                 |                     |                 |                     |
|---------------------------------------------------------------------------------|--------------|------------------------------|-----------|------------|-----------------|---------------------|-----------------|---------------------|
| Mode                                                                            | Description  | Conducted Output Power (dBm) | Temp (°C) | Drift (dB) | 10 g SAR value  |                     | 1 g SAR value   |                     |
|                                                                                 |              |                              |           |            | Measured (W/kg) | Extrapolated (W/kg) | Measured (W/kg) | Extrapolated (W/kg) |
| WCDMA 1900                                                                      | Channel 9262 | 23.87                        |           |            |                 |                     |                 |                     |
|                                                                                 | Channel 9400 | 23.99                        | 19.6      | 0.013      | 0.180           | 0.18                | 0.283           | 0.28                |
|                                                                                 | Channel 9538 | 23.84                        |           |            |                 |                     |                 |                     |
| WCDMA 850 + WI-FI                                                               |              |                              |           |            |                 | 0.20                |                 | 0.32                |

Table 10: SAR measurement results at the highest possible output power, measured in a body-worn position against the ICNIRP and ANSI SAR Limit.

## References

- [1] CENELEC, en62209-1:2006 “Human Exposure to Radio Frequency Fields From Hand - Held and Body - Mounted Wireless Communication Devices – Human Models, Instrumentation, and Procedures”
- [2] CENELEC, en50360:2001 “Product standard to demonstrate the compliance of mobile phones with the basic restrictions related to human exposure to electromagnetic fields (300MHz – 3GHz)”.
- [3] ANSI / IEEE, C95.1 1999 Edition “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz”
- [4] FCC OET Bulletin 65 Supplement C 01-01
- [5] IEEE 1528 2003 Edition “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”
- [6] ICNIRP Guidelines “Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz)”

## **Appendix 1**

### **SAR distribution comparison for the system accuracy verification**

## Test Laboratory: Motorola - Mar-03-2010 835 MHz

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 417TR; FCC ID: IHDP56KZ2**

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 417tr; Input Power = 200 mW

Sim.Temp@meas = 20.1°C; Sim.Temp@SPC = 20.1°C; Room Temp @ SPC = 20.2°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.92 \text{ mho/m}$ ;  $\epsilon_r = 41.9$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (4x9x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 1.84 mW/g

### Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 48.8 V/m; Power Drift = -0.022 dB; Peak SAR (extrapolated) = 2.84 W/kg

**SAR(1 g) = 1.95 mW/g; SAR(10 g) = 1.28 mW/g;** Maximum value of SAR (measured) = 2.11 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

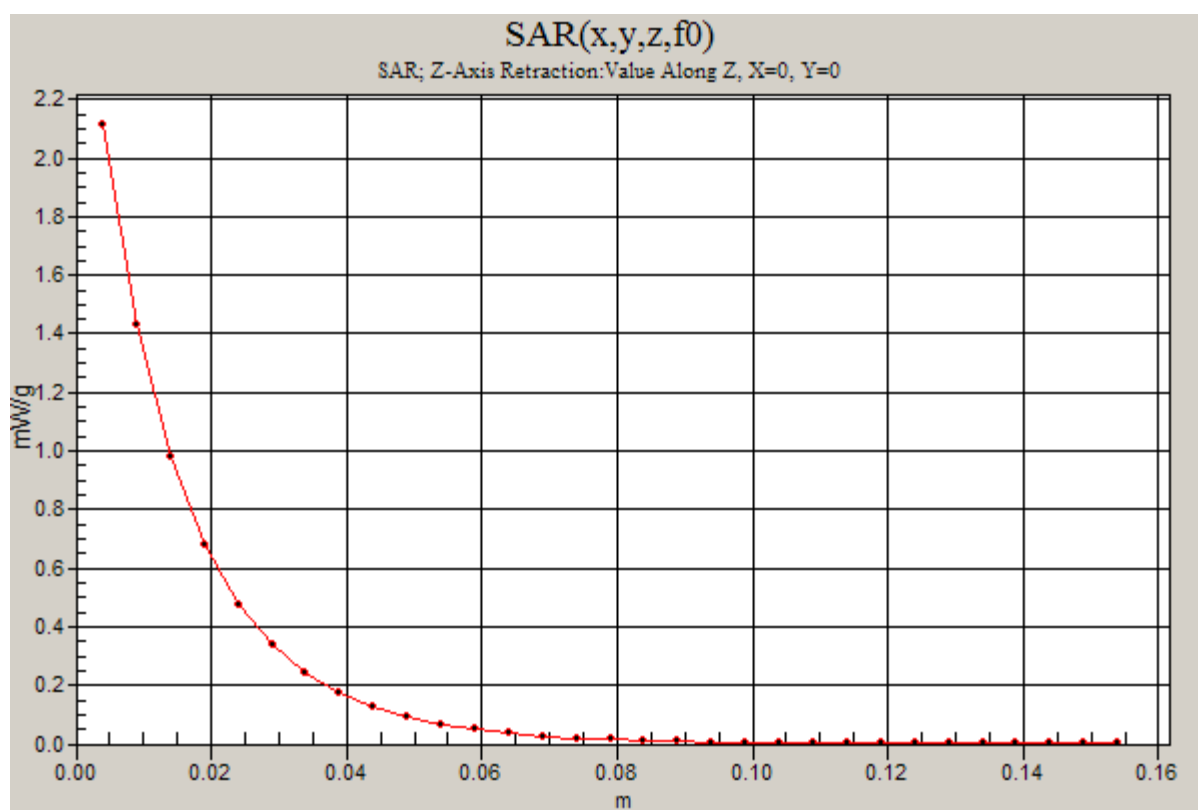
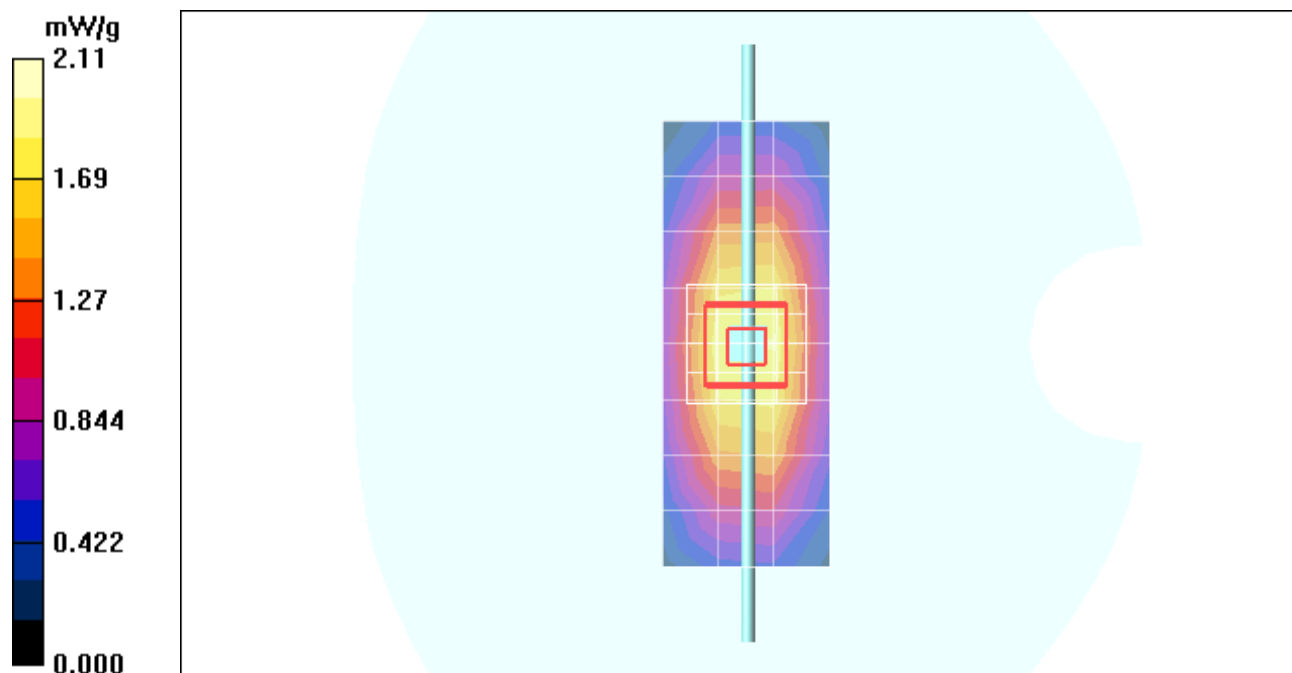
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 48.8 V/m; Power Drift = -0.022 dB; Peak SAR (extrapolated) = 2.73 W/kg

**SAR(1 g) = 1.88 mW/g; SAR(10 g) = 1.23 mW/g;** Maximum value of SAR (measured) = 2.03 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$



## Test Laboratory: Motorola - Mar-04-2010 835 MHz

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 417TR; FCC ID: IHDP56KZ2**

Procedure Notes: 835MHz System Performance Check; Dipole Sn# 417tr; Input Power = 200 mW

Sim.Temp@meas = 20.1°C; Sim.Temp@SPC = 20.1°C; Room Temp @ SPC = 20.5°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.91 \text{ mho/m}$ ;  $\epsilon_r = 41.8$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (4x9x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 1.91 mW/g

### Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 48.9 V/m; Power Drift = -0.006 dB; Peak SAR (extrapolated) = 2.82 W/kg

**SAR(1 g) = 1.93 mW/g; SAR(10 g) = 1.27 mW/g;** Maximum value of SAR (measured) = 2.08 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

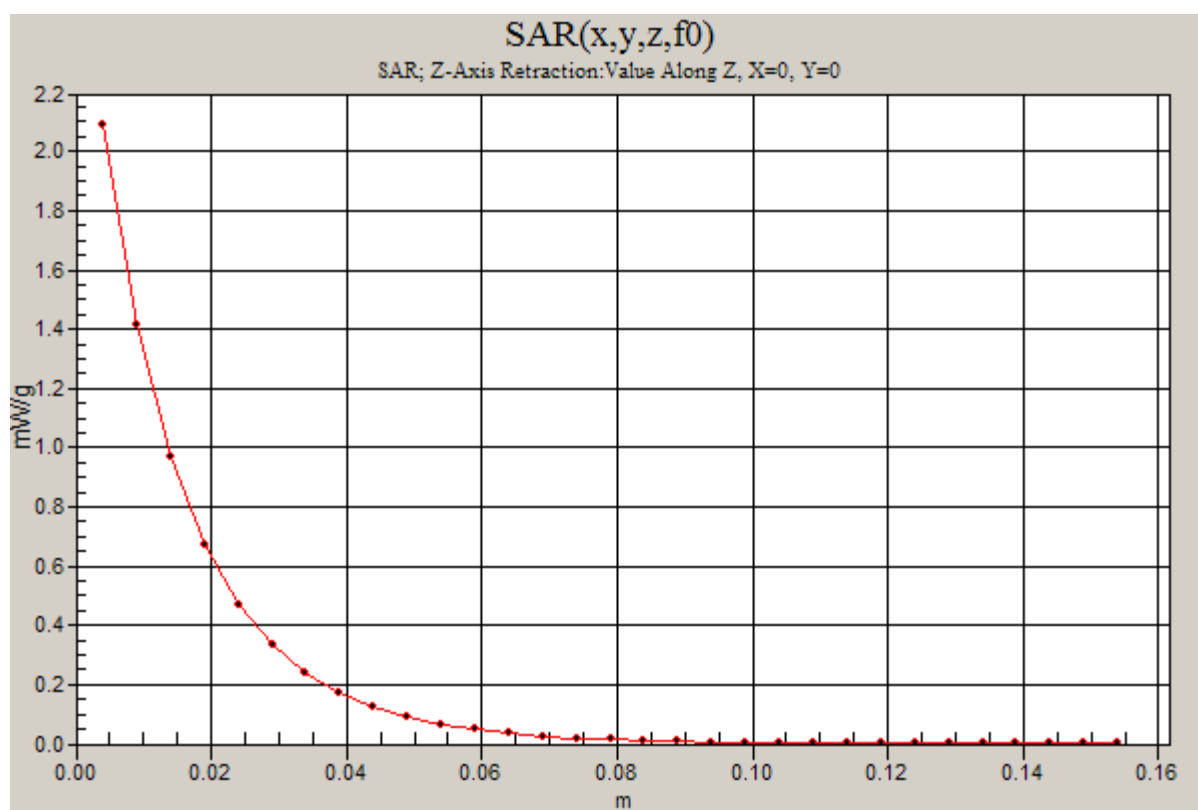
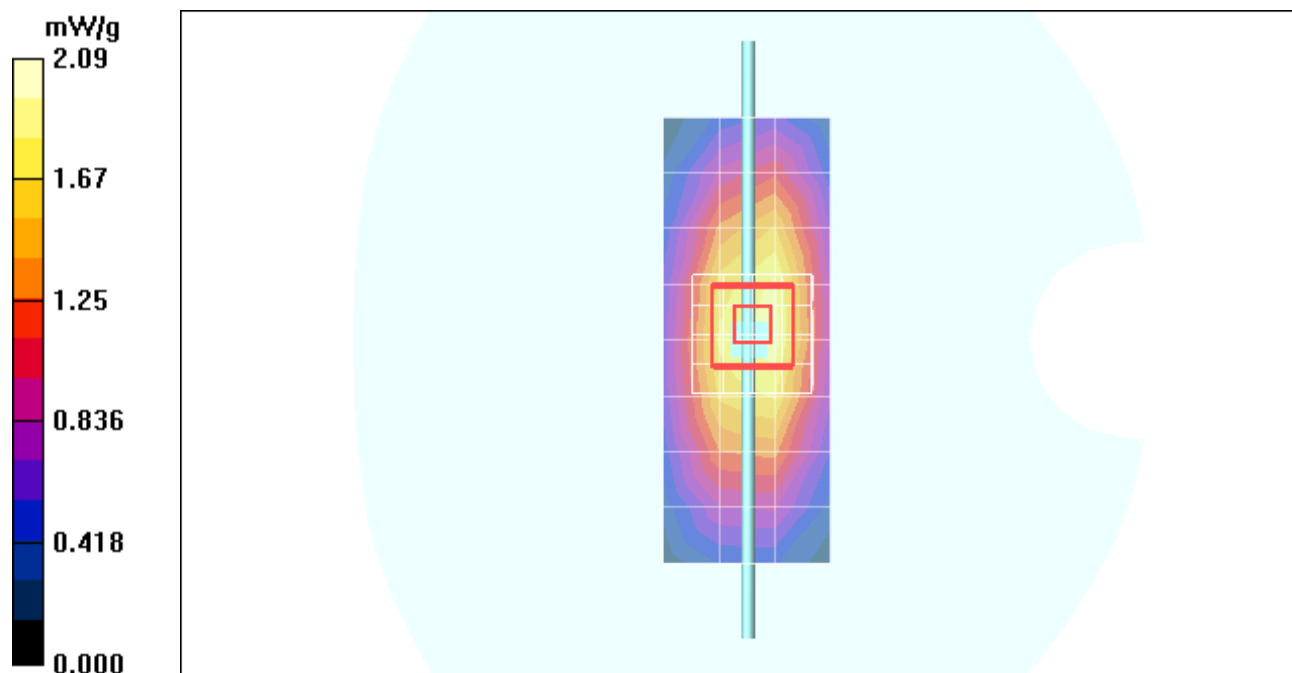
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 48.9 V/m; Power Drift = -0.006 dB; Peak SAR (extrapolated) = 2.73 W/kg

**SAR(1 g) = 1.87 mW/g; SAR(10 g) = 1.23 mW/g;** Maximum value of SAR (measured) = 2.02 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$ ; Maximum value of SAR (measured) = 2.09 mW/g





## Test Laboratory: Motorola - Mar-09-2010 835 MHz

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 417TR; FCC ID: IHDP56KZ2**

Procedure Notes: 835 MHz System Performance Check; Dipole Sn# 417TR; Input Power = 200 mW

Sim.Temp@meas = 20.4°C; Sim.Temp@SPC = 20.4°C; Room Temp @ SPC = 20.5°C

Communication System: CW - Dipole; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 835 \text{ MHz}$ ;  $\sigma = 0.93 \text{ mho/m}$ ;  $\epsilon_r = 43$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (4x9x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 2.02 mW/g

### Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 48.0 V/m; Power Drift = -0.017 dB; Peak SAR (extrapolated) = 2.89 W/kg

**SAR(1 g) = 1.98 mW/g; SAR(10 g) = 1.29 mW/g;** Maximum value of SAR (measured) = 2.15 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

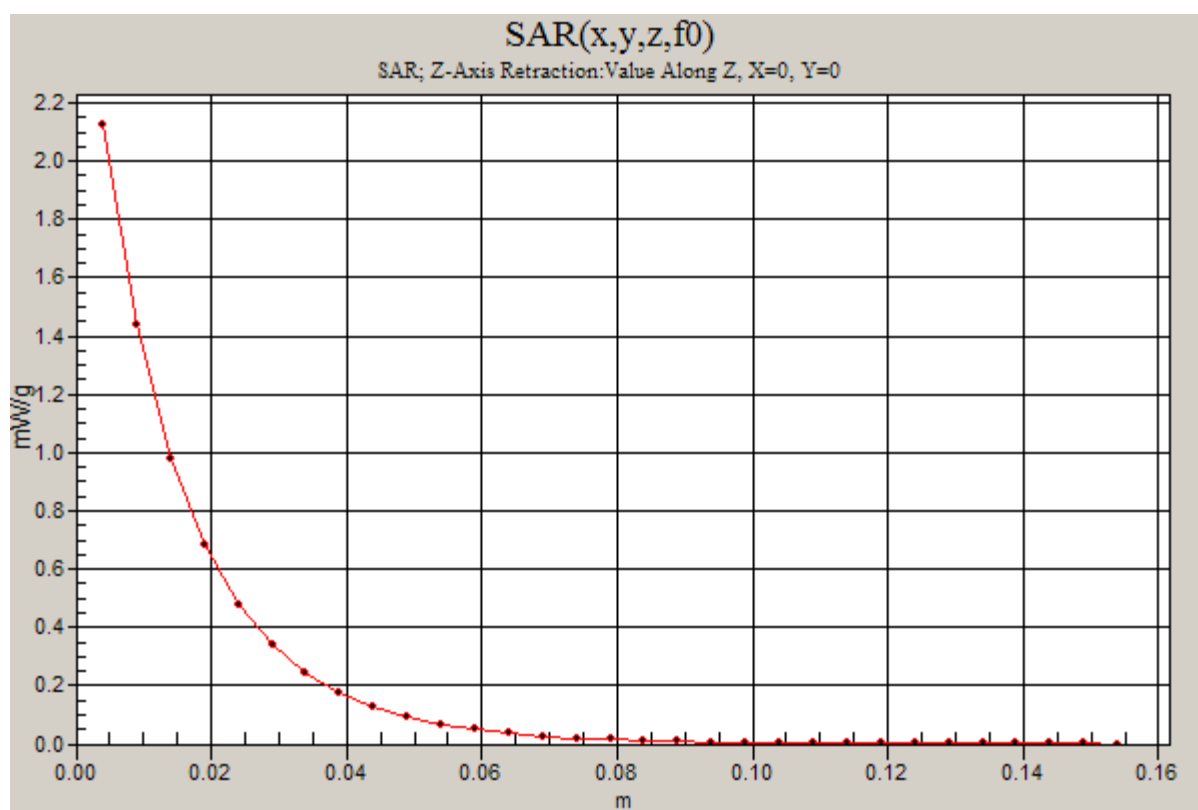
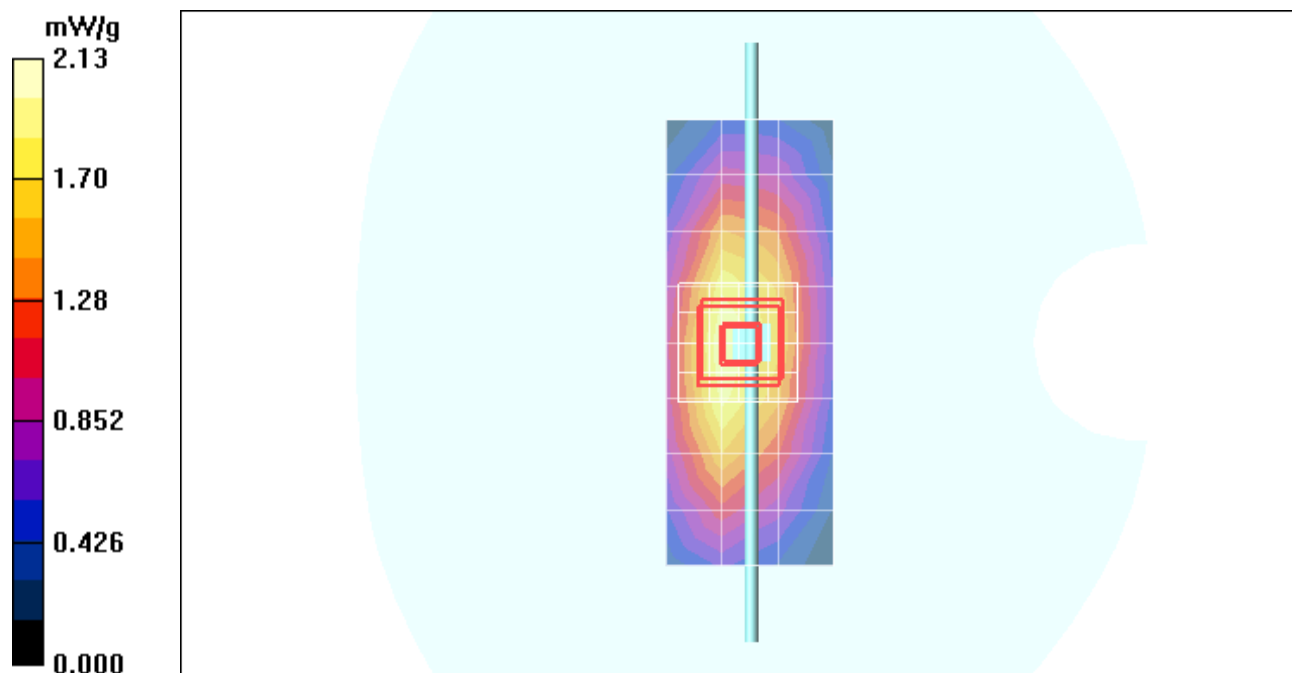
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 48.0 V/m; Power Drift = -0.017 dB; Peak SAR (extrapolated) = 2.78 W/kg

**SAR(1 g) = 1.91 mW/g; SAR(10 g) = 1.25 mW/g;** Maximum value of SAR (measured) = 2.06 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$ ; Maximum value of SAR (measured) = 2.13 mW/g



## Test Laboratory: Motorola - Mar-02-2010 1800 MHz

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 259TR; FCC ID: IHDP56KZ2**

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 259tr; Input Power = 200 mW

Sim.Temp@meas = 19.9 °C; Sim.Temp@SPC = 19.9 °C; Room Temp @ SPC = 20.7 °C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 1800 \text{ MHz}$ ;  $\sigma = 1.37 \text{ mho/m}$ ;  $\epsilon_r = 38.8$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 7.58 mW/g

### Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 80.7 V/m; Power Drift = -0.058 dB; Peak SAR (extrapolated) = 14.7 W/kg

**SAR(1 g) = 8.07 mW/g; SAR(10 g) = 4.26 mW/g;** Maximum value of SAR (measured) = 8.99 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

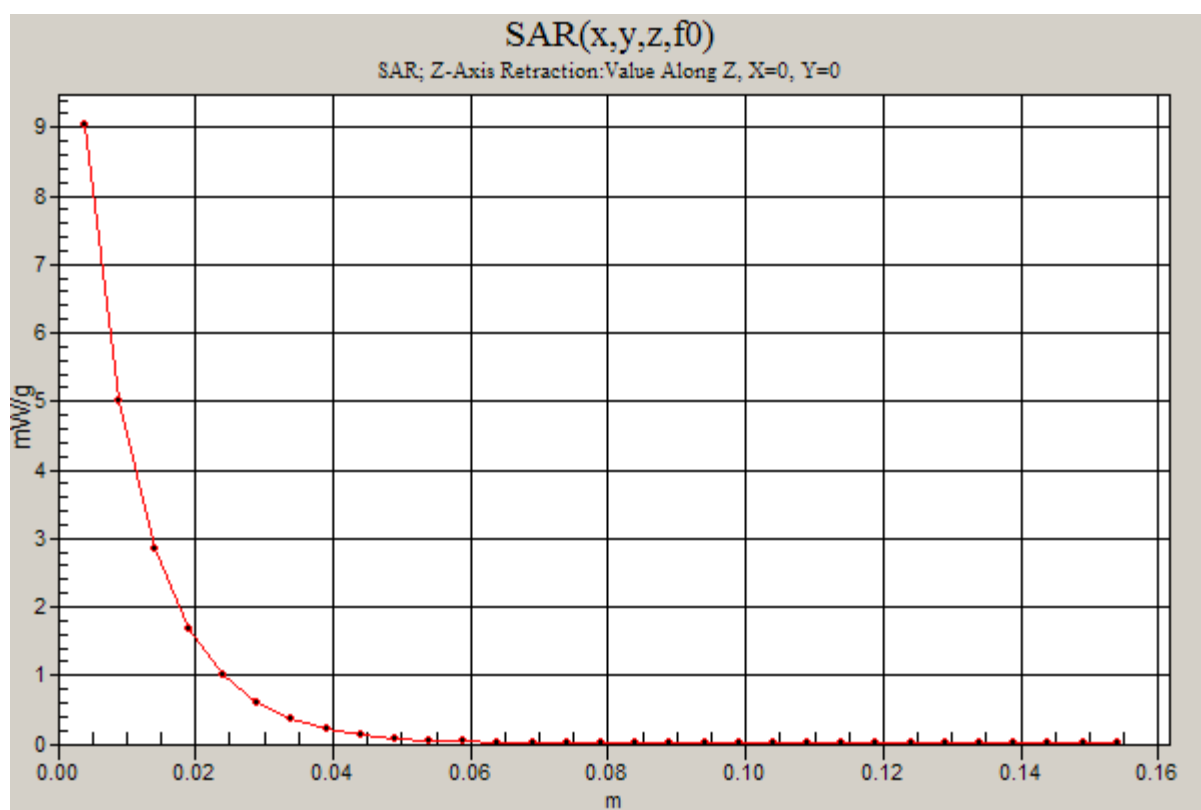
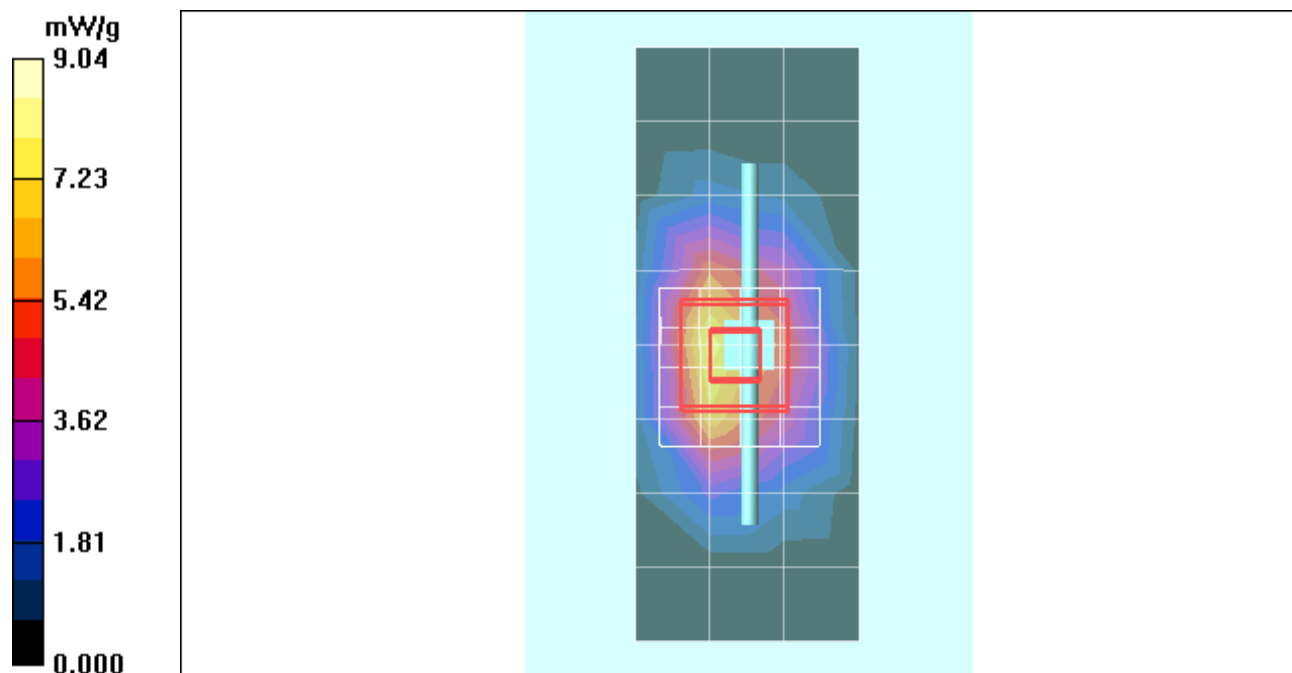
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 80.7 V/m; Power Drift = -0.058 dB; Peak SAR (extrapolated) = 13.9 W/kg

**SAR(1 g) = 7.7 mW/g; SAR(10 g) = 4.09 mW/g;** Maximum value of SAR (measured) = 8.51 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$ ; Maximum value of SAR (measured) = 9.04 mW/g



## Test Laboratory: Motorola - Mar-03-2010 1800 MHz

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 259TR; FCC ID: IHDP56KZ2**

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 259tr; Input Power = 200 mW

Sim.Temp@meas = 19.6°C; Sim.Temp@SPC = 19.6°C; Room Temp @ SPC = 20.2°C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 1800 \text{ MHz}$ ;  $\sigma = 1.38 \text{ mho/m}$ ;  $\epsilon_r = 38.5$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (4x9x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 7.79 mW/g

### Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 80.8 V/m; Power Drift = -0.020 dB; Peak SAR (extrapolated) = 14.6 W/kg

**SAR(1 g) = 8.16 mW/g; SAR(10 g) = 4.32 mW/g;** Maximum value of SAR (measured) = 9.12 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

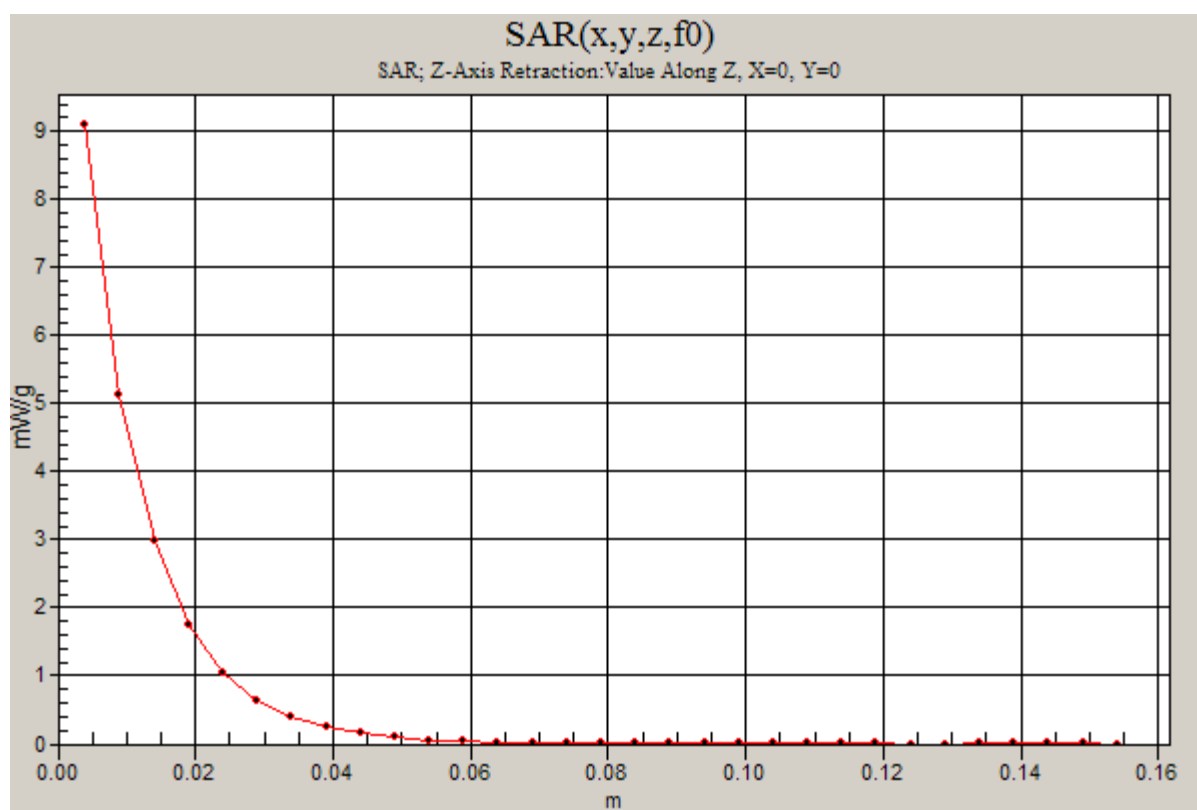
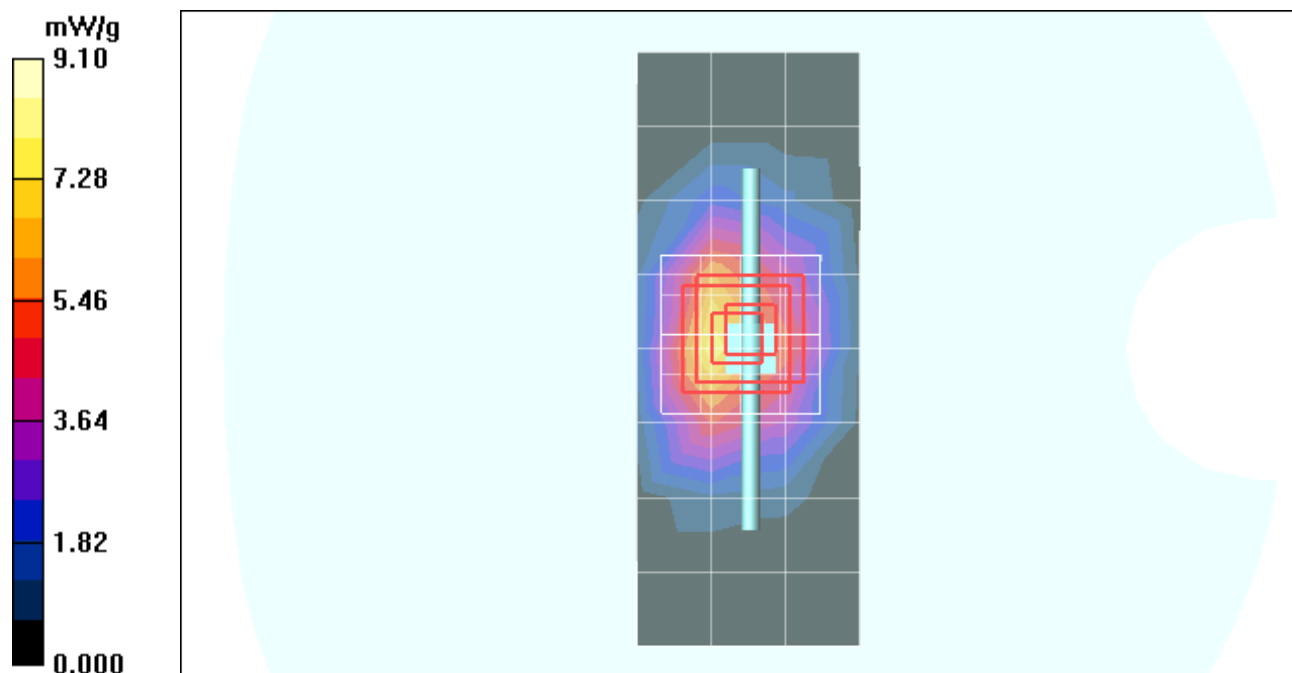
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 80.8 V/m; Power Drift = -0.020 dB; Peak SAR (extrapolated) = 14.0 W/kg

**SAR(1 g) = 7.83 mW/g; SAR(10 g) = 4.16 mW/g;** Maximum value of SAR (measured) = 8.57 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$ ; Maximum value of SAR (measured) = 9.10 mW/g



## Test Laboratory: Motorola - Mar-04-2010 1800 MHz

**DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 259TR; FCC ID: IHDP56KZ2**

Procedure Notes: 1800 MHz System Performance Check; Dipole Sn# 259tr; Input Power = 200 mW

Sim.Temp@meas = 19.8 °C; Sim.Temp@SPC = 19.8 °C; Room Temp @ SPC = 20.5 °C

Communication System: CW - Dipole; Frequency: 1800 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 1800 \text{ MHz}$ ;  $\sigma = 1.37 \text{ mho/m}$ ;  $\epsilon_r = 39.8$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_ Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 7.65 mW/g

### Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 79.9 V/m; Power Drift = -0.053 dB; Peak SAR (extrapolated) = 14.6 W/kg

**SAR(1 g) = 8.02 mW/g; SAR(10 g) = 4.24 mW/g;** Maximum value of SAR (measured) = 8.80 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

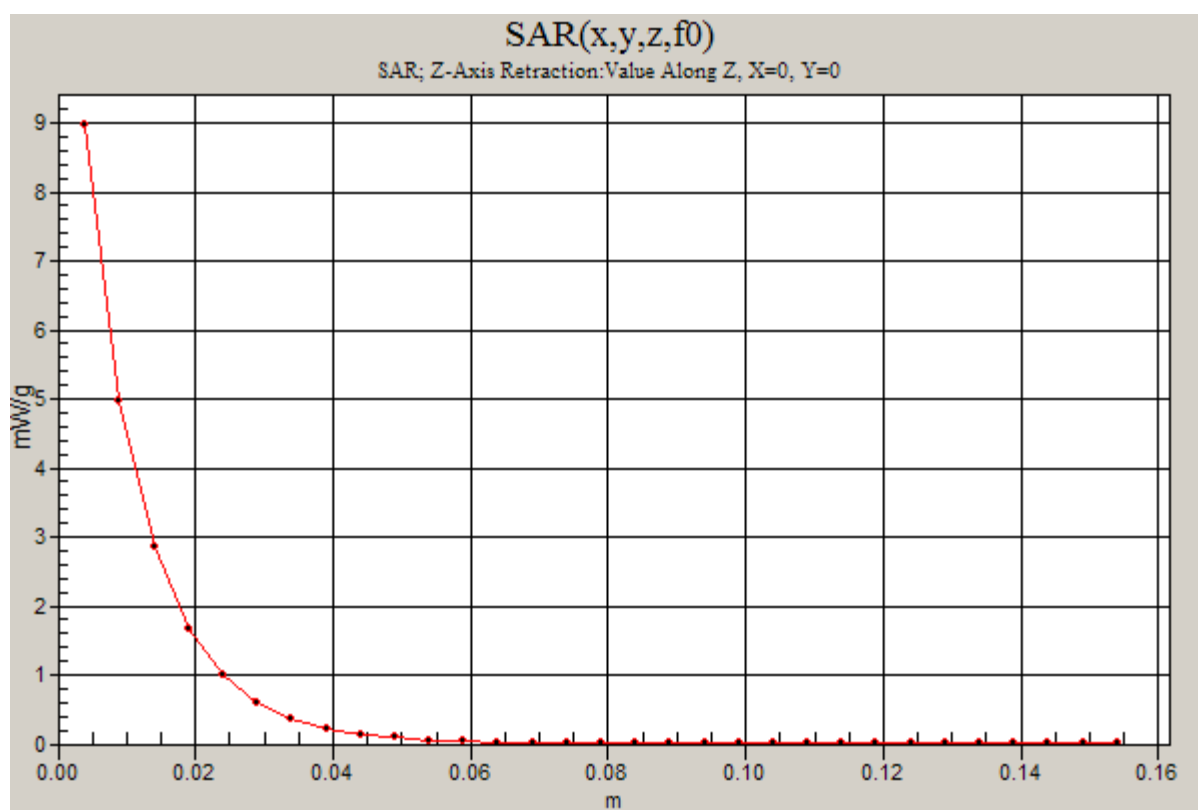
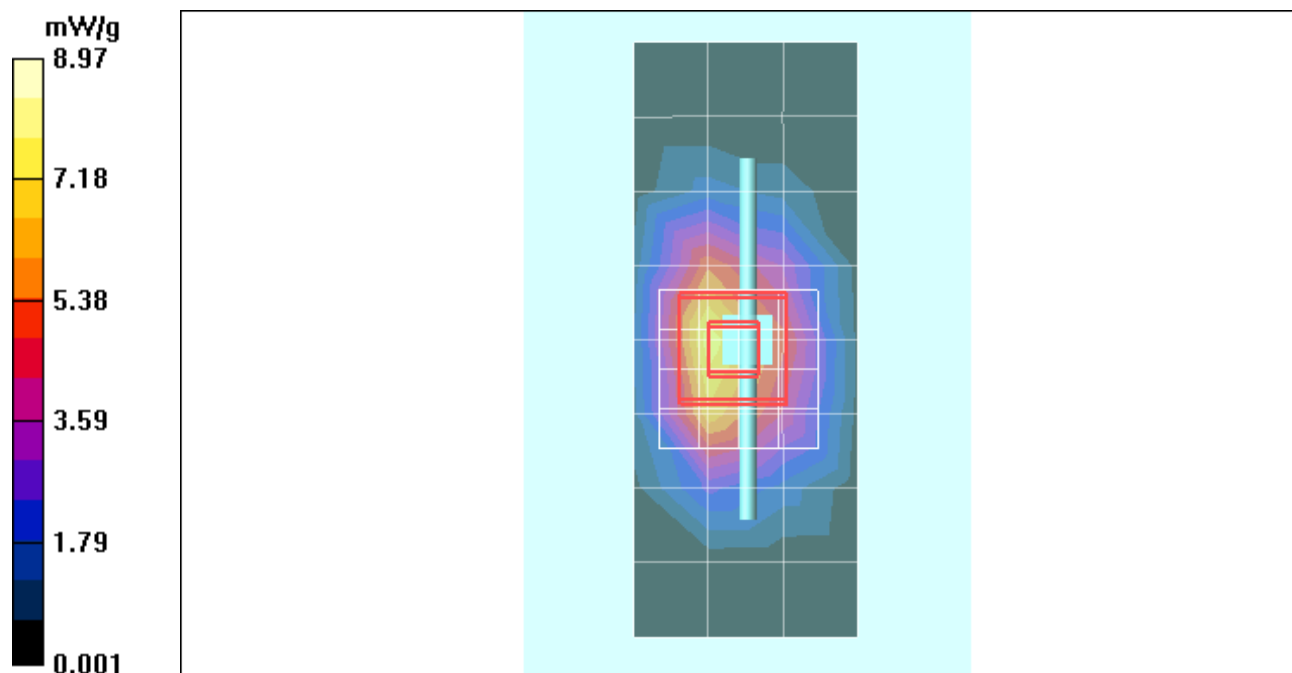
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 79.9 V/m; Power Drift = -0.053 dB; Peak SAR (extrapolated) = 14.2 W/kg

**SAR(1 g) = 7.78 mW/g; SAR(10 g) = 4.1 mW/g;** Maximum value of SAR (measured) = 8.61 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$ ; Maximum value of SAR (measured) = 8.97 mW/g





## Test Laboratory: Motorola - Jan-21-2010 2450 MHz

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 740; FCC ID: IHDP56KZ2**

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 740; Input Power = 200 mW

Sim.Temp@meas = 19.7°C; Sim.Temp@SPC = 19.9°C; Room Temp @ SPC = 20.2°C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.88$  mho/m;  $\epsilon_r = 37.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 8/21/2009
- Phantom: R4 : Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 7.75 mW/g

### Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 76.9 V/m; Power Drift = -0.002 dB; Peak SAR (extrapolated) = 22.8 W/kg

**SAR(1 g) = 10.7 mW/g; SAR(10 g) = 4.82 mW/g;** Maximum value of SAR (measured) = 12.2 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

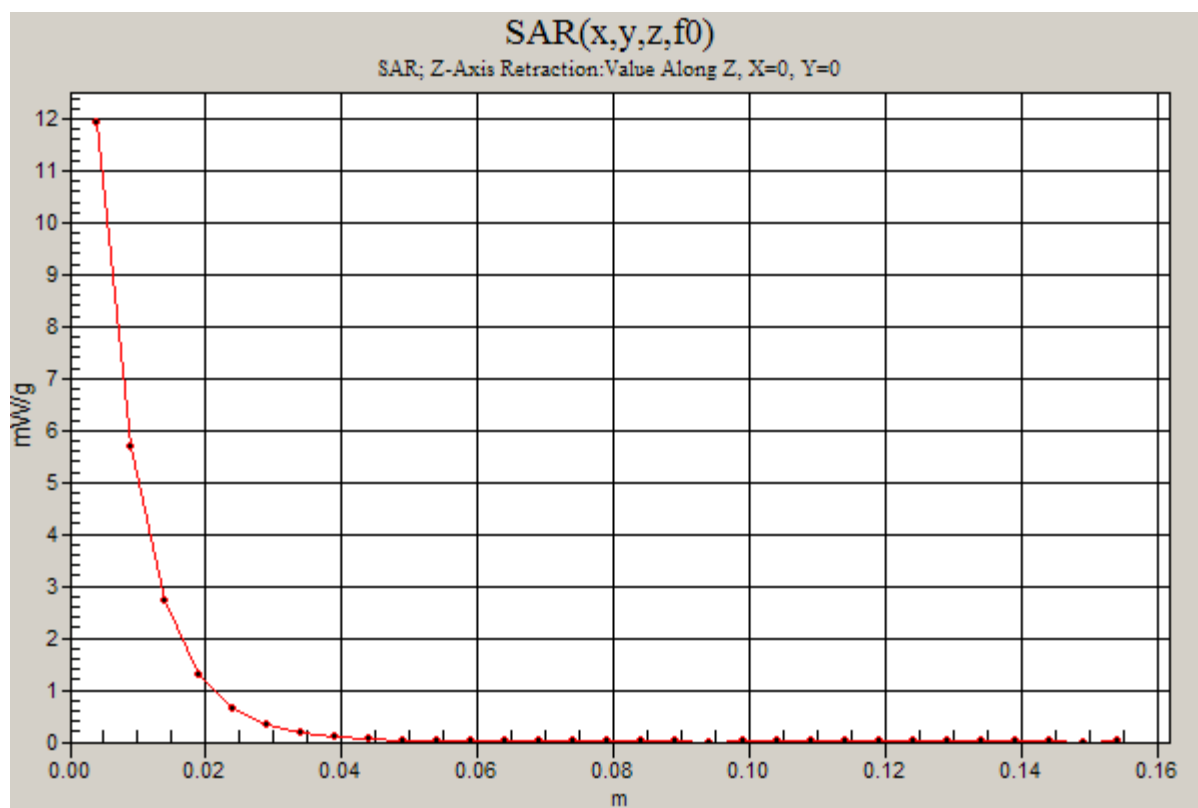
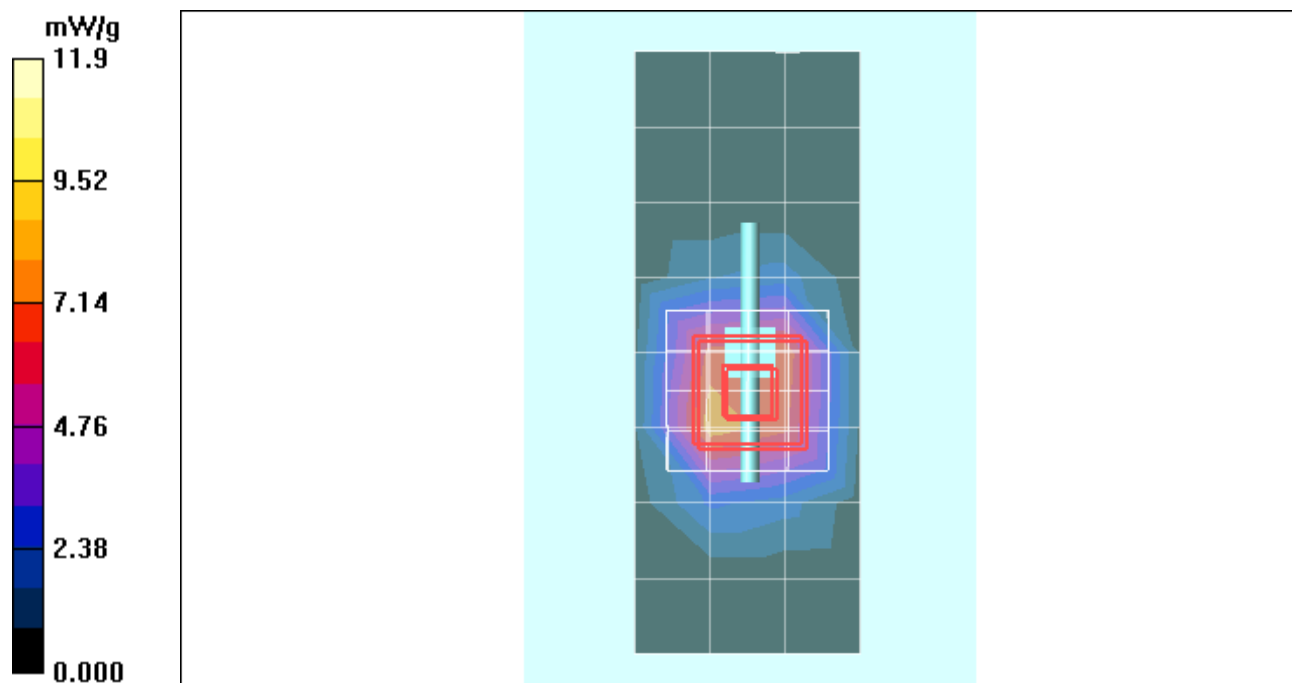
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 76.9 V/m; Power Drift = -0.002 dB; Peak SAR (extrapolated) = 22.9 W/kg

**SAR(1 g) = 10.8 mW/g; SAR(10 g) = 4.9 mW/g;** Maximum value of SAR (measured) = 12.3 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 11.9 mW/g



## Test Laboratory: Motorola - Feb-19-2010 2450 Mhz

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 740; FCC ID: IHDP56KZ2**

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 740; Input Power = 200 mW

Sim.Temp@meas = 19.9°C; Sim.Temp@SPC = 19.9°C; Room Temp @ SPC = 20.2°C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 2450 \text{ MHz}$ ;  $\sigma = 1.8 \text{ mho/m}$ ;  $\epsilon_r = 38$ ;  $\rho = 1000 \text{ kg/m}^3$

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 8/21/2009
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (4x9x1):

Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$ ; Maximum value of SAR (measured) = 10.0 mW/g

### Daily SPC Check/0-Degree, 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 83.4 V/m; Power Drift = 0.011 dB; Peak SAR (extrapolated) = 21.5 W/kg

**SAR(1 g) = 10.8 mW/g; SAR(10 g) = 5.08 mW/g;** Maximum value of SAR (measured) = 12.3 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

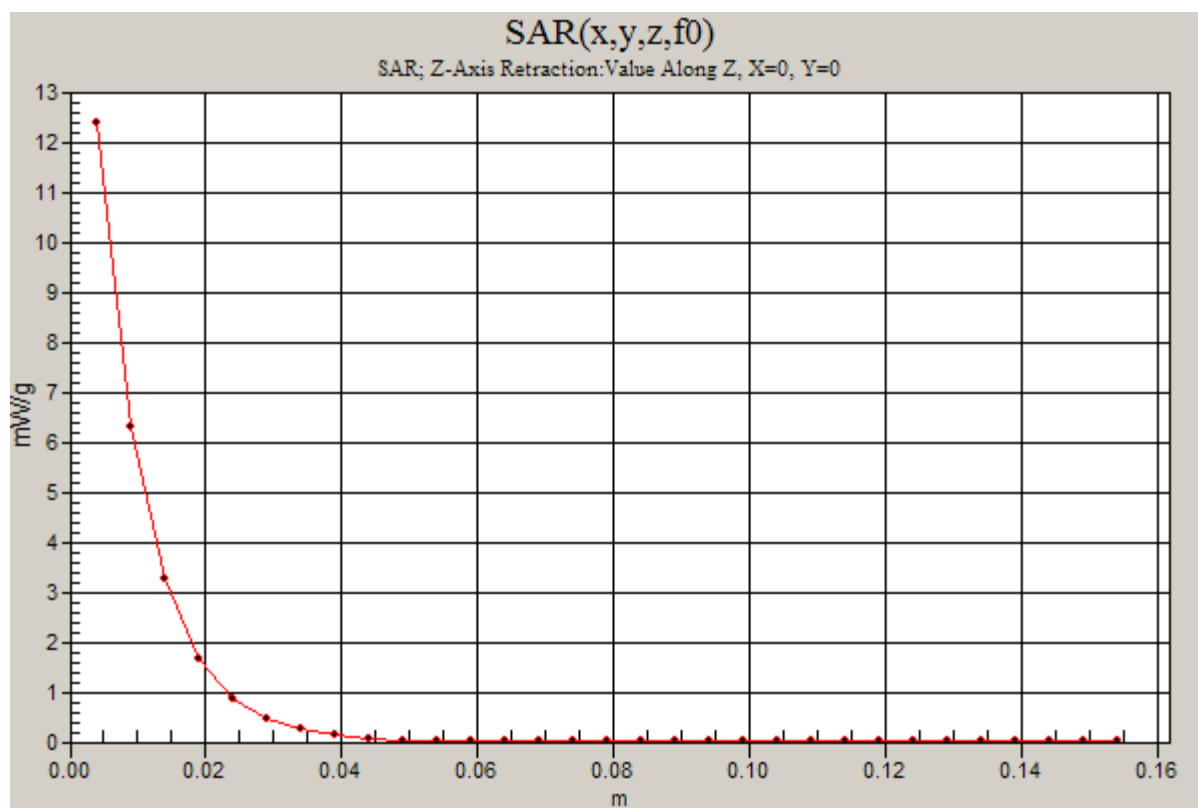
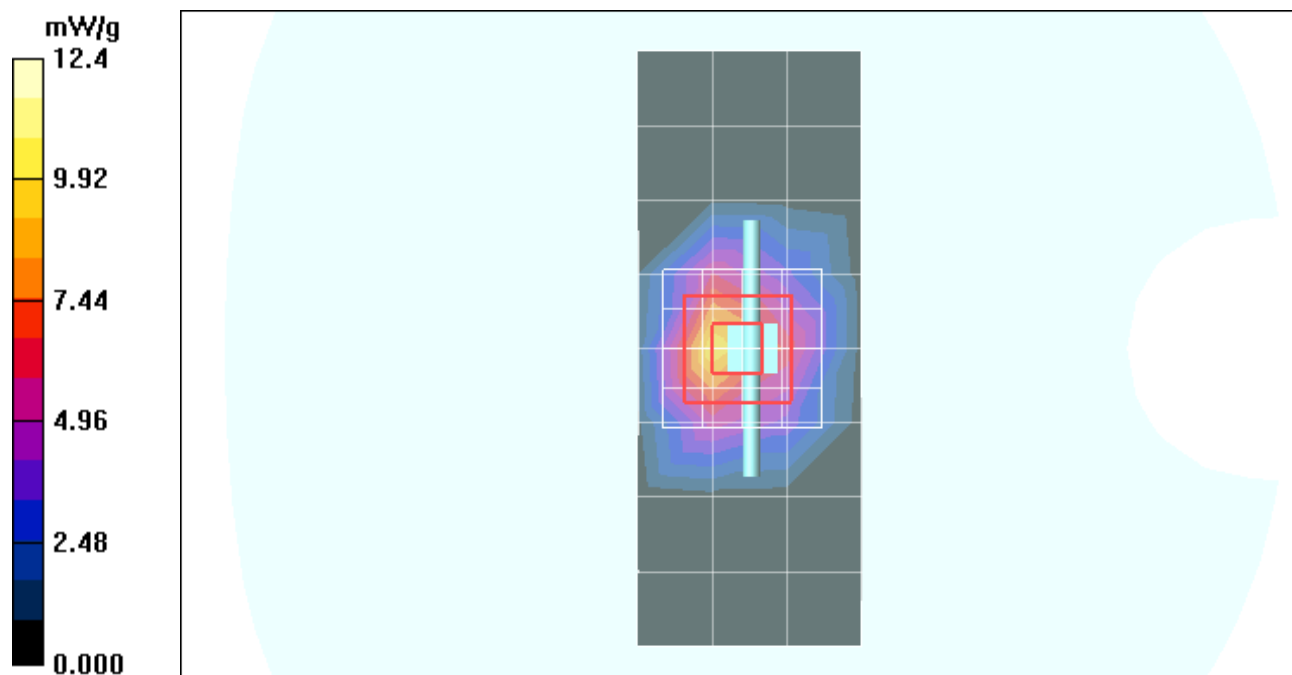
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 83.4 V/m; Power Drift = 0.011 dB; Peak SAR (extrapolated) = 21.9 W/kg

**SAR(1 g) = 11 mW/g; SAR(10 g) = 5.13 mW/g;** Maximum value of SAR (measured) = 12.4 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid:  $dx=20\text{mm}$ ,  $dy=20\text{mm}$ ,  $dz=5\text{mm}$



## Test Laboratory: Motorola - Mar-04-2010 2450 MHz

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 740; FCC ID: IHDP56KZ2**

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 740; Input Power = 200 mW

Sim.Temp@meas = 19.6°C; Sim.Temp@SPC = 19.7°C; Room Temp @ SPC = 20.2°C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.84$  mho/m;  $\epsilon_r = 37.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.41, 4.41, 4.41); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 9.32 mW/g

### Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.6 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 23.2 W/kg

**SAR(1 g) = 11.4 mW/g; SAR(10 g) = 5.31 mW/g;** Maximum value of SAR (measured) = 12.8 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

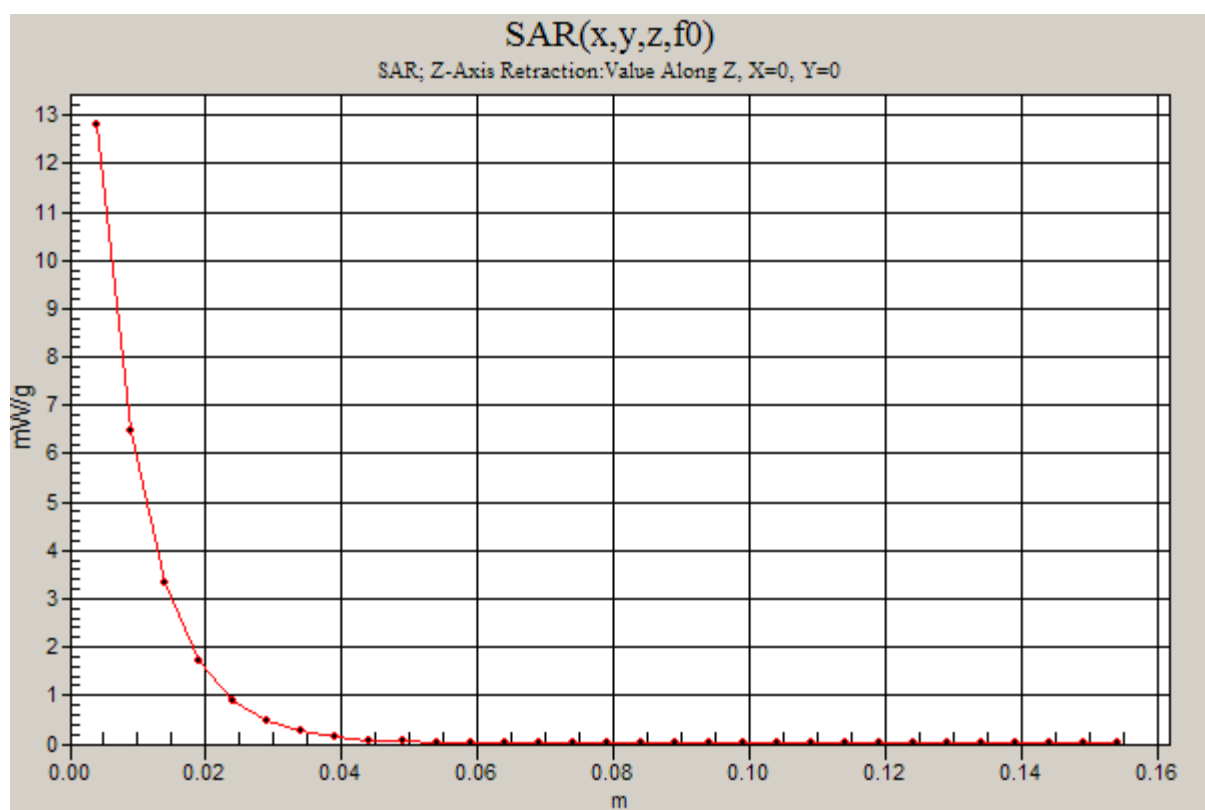
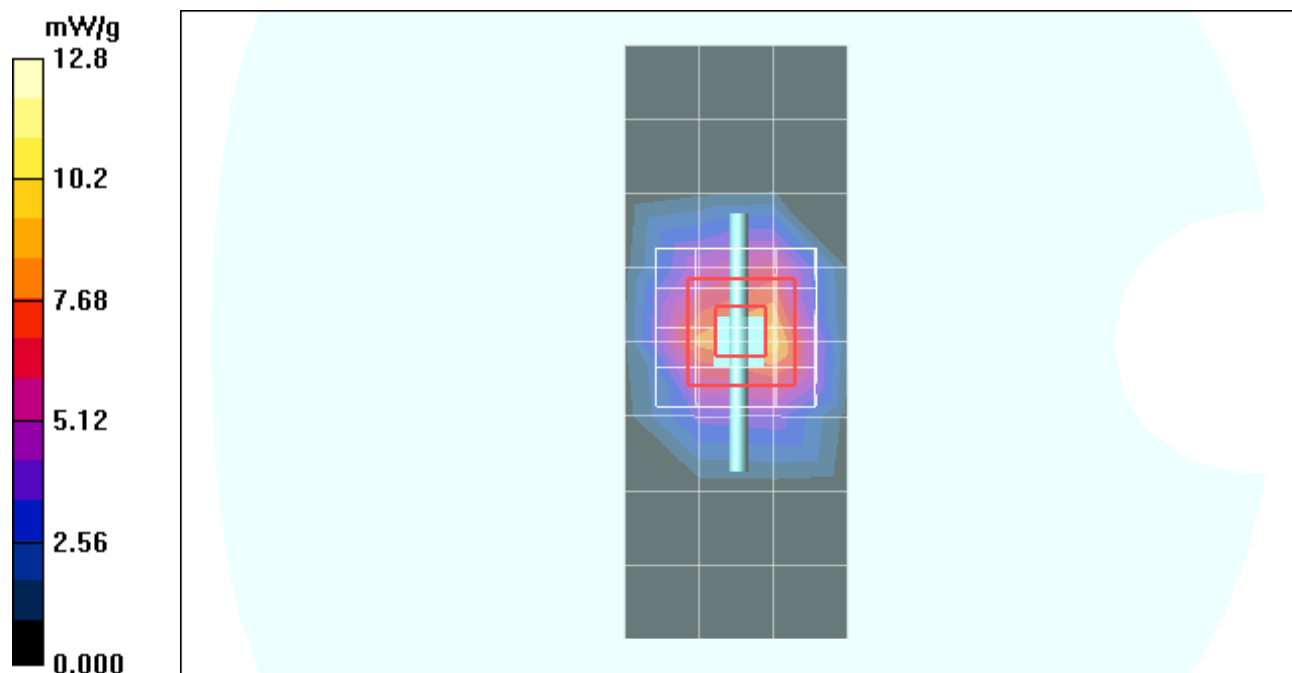
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.6 V/m; Power Drift = -0.015 dB; Peak SAR (extrapolated) = 22.7 W/kg

**SAR(1 g) = 11.1 mW/g; SAR(10 g) = 5.15 mW/g;** Maximum value of SAR (measured) = 12.5 mW/g

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm



## Test Laboratory: Motorola - Mar-07-2010 2450 MHz

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 740; FCC ID: IHDP56KZ2**

Procedure Notes: 2450 MHz System Performance Check; Dipole Sn# 740; Input Power = 200 mW

Sim.Temp@meas = 18.9°C; Sim.Temp@SPC = 19.1°C; Room Temp @ SPC = 20.2°C

Communication System: CW - Dipole; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: VALIDATION Only

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.81$  mho/m;  $\epsilon_r = 36.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 8/21/2009
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Daily SPC Check/Dipole Area Scan (9x4x1):

Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 11.3 mW/g

### Daily SPC Check/0-Degree 5x5x7 Cube (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.9 V/m; Power Drift = 0.004 dB; Peak SAR (extrapolated) = 23.7 W/kg

**SAR(1 g) = 11.5 mW/g; SAR(10 g) = 5.33 mW/g;** Maximum value of SAR (measured) = 13.0 mW/g

### Daily SPC Check/90-Degree 5x5x7 Cube (5x5x7)/Cube 0:

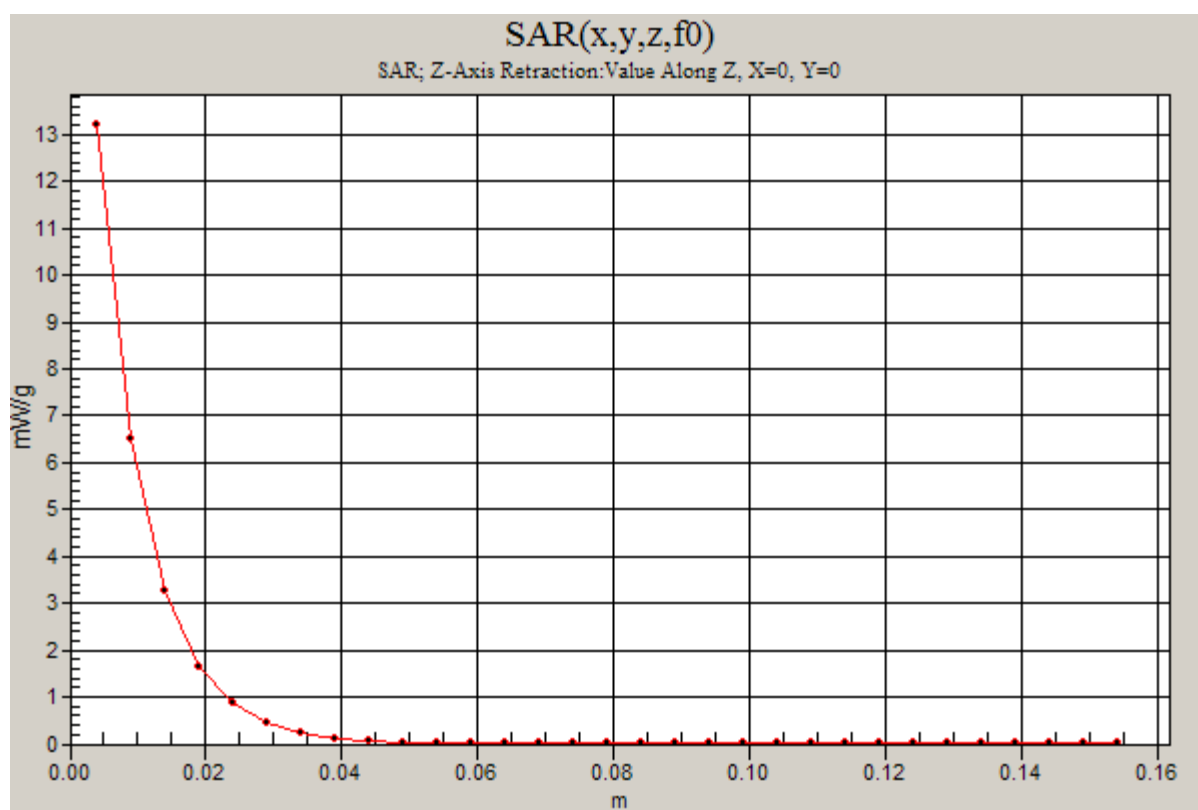
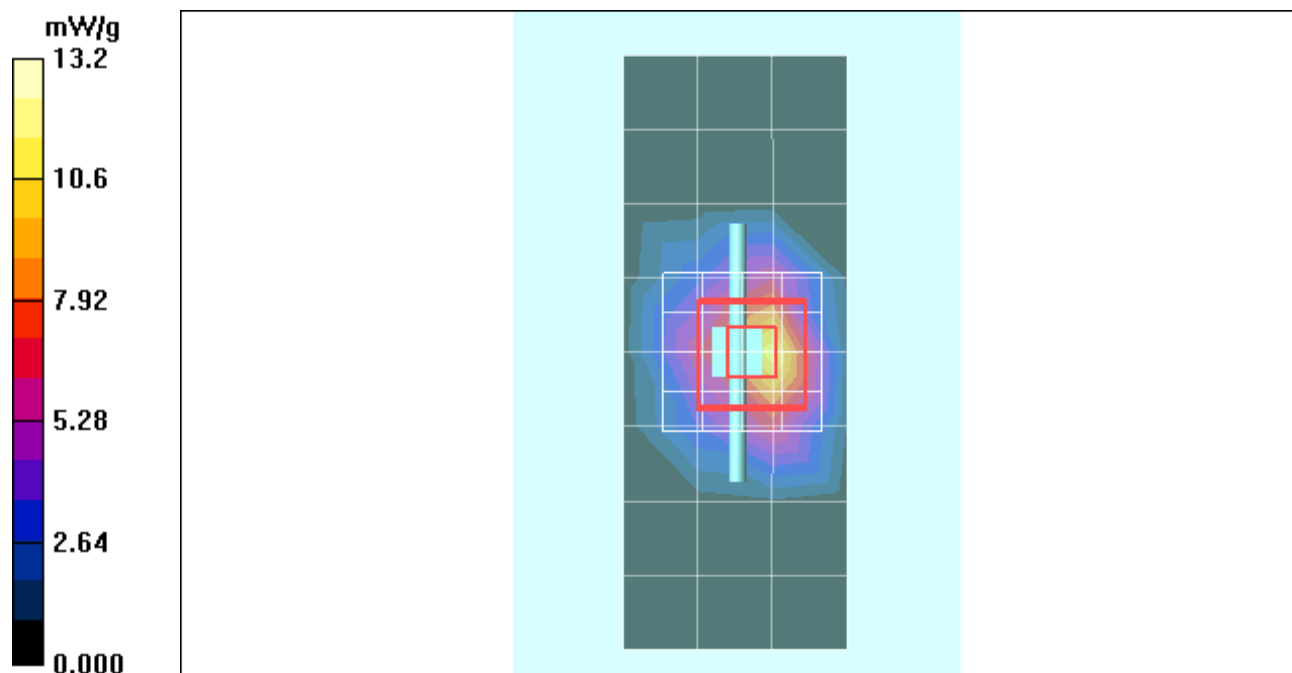
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 85.9 V/m; Power Drift = 0.004 dB; Peak SAR (extrapolated) = 23.7 W/kg

**SAR(1 g) = 11.7 mW/g; SAR(10 g) = 5.4 mW/g;**

### Daily SPC Check/Z-Axis Retraction (1x1x31):

Measurement grid: dx=20mm, dy=20mm, dz=5mm; Maximum value of SAR (measured) = 13.2 mW/g





## **Appendix 2**

### **SAR distribution plots for Phantom Head Adjacent Use**

## Test Laboratory: Motorola - GSM 850 Cheek

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.3

Medium: Low Freq Head

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.93$  mho/m;  $\epsilon_r = 43$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Right Head Template/Area Scan - Normal (15mm) (7x17x1):

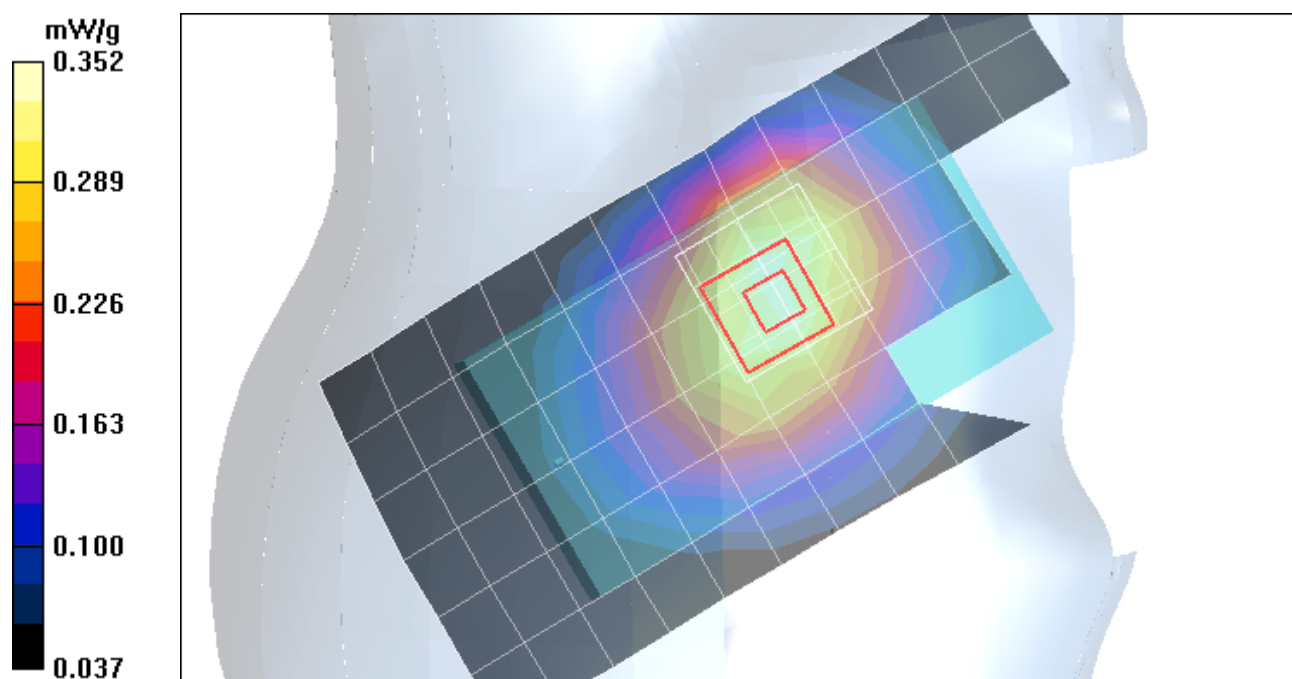
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.348 mW/g

### Right Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 19.3 V/m; Power Drift = -0.127 dB; Peak SAR (extrapolated) = 0.412 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.253 mW/g; Maximum value of SAR (measured) = 0.352 mW/g



## Test Laboratory: Motorola - GSM 1900 Cheek

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Left Head Template/Area Scan - Normal (10mm) (10x25x1):

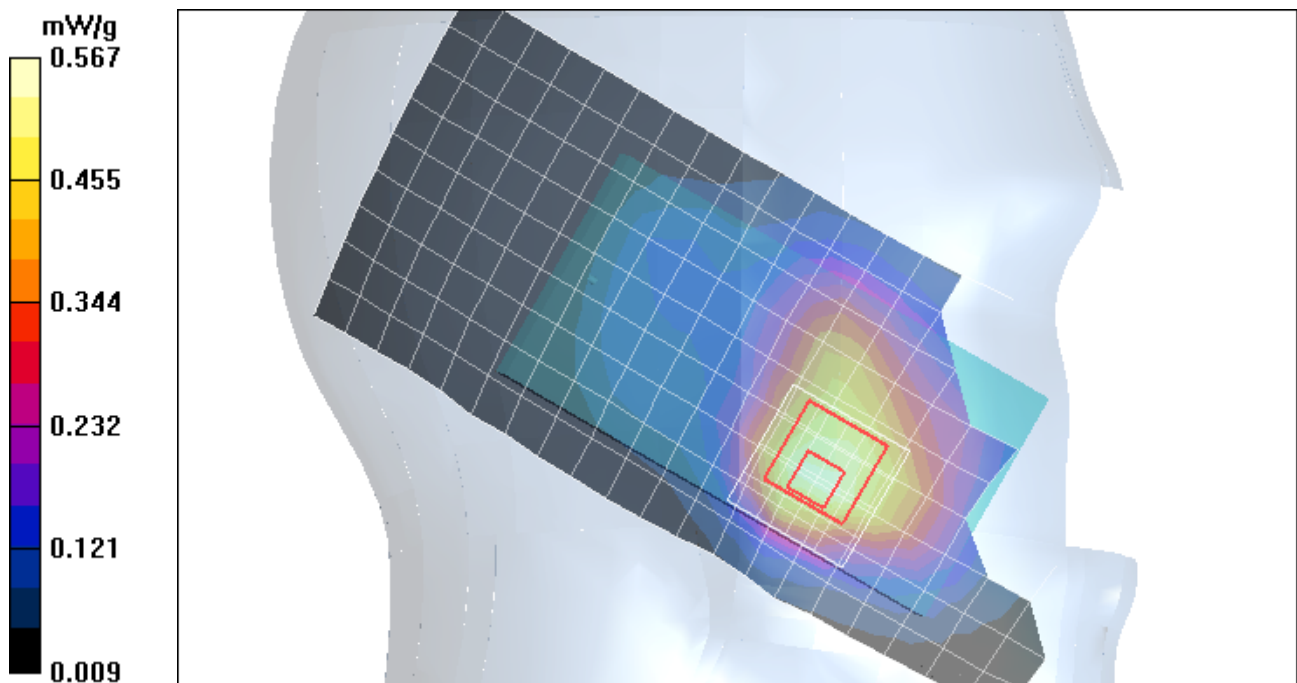
Measurement grid:  $dx=10$ mm,  $dy=10$ mm; Maximum value of SAR (measured) = 0.553 mW/g

### Left Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 19.3 V/m; Power Drift = -0.013 dB; Peak SAR (extrapolated) = 0.841 W/kg

**SAR(1 g) = 0.534 mW/g; SAR(10 g) = 0.343 mW/g; Maximum value of SAR (measured) = 0.567 mW/g**



## Test Laboratory: Motorola - WCDMA 850 Cheek

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.93$  mho/m;  $\epsilon_r = 43$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Left Head Template/Area Scan - Normal (15mm) (7x17x1):

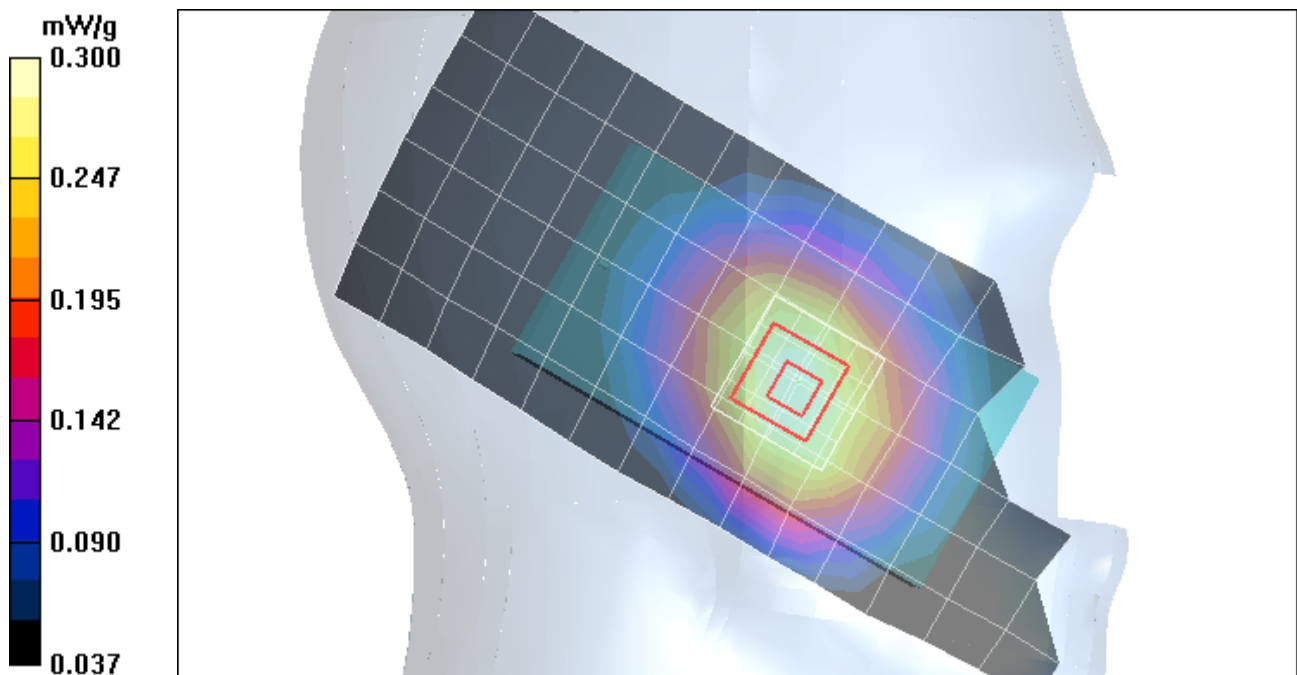
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.310 mW/g

### Left Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 18.9 V/m; Power Drift = -0.265 dB; Peak SAR (extrapolated) = 0.342 W/kg

SAR(1 g) = 0.285 mW/g; SAR(10 g) = 0.217 mW/g; Maximum value of SAR (measured) = 0.300 mW/g



## Test Laboratory: Motorola - WCDMA 1900 Cheek

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Cheek

Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Left Head Template/Area Scan - Normal (10mm) (10x25x1):

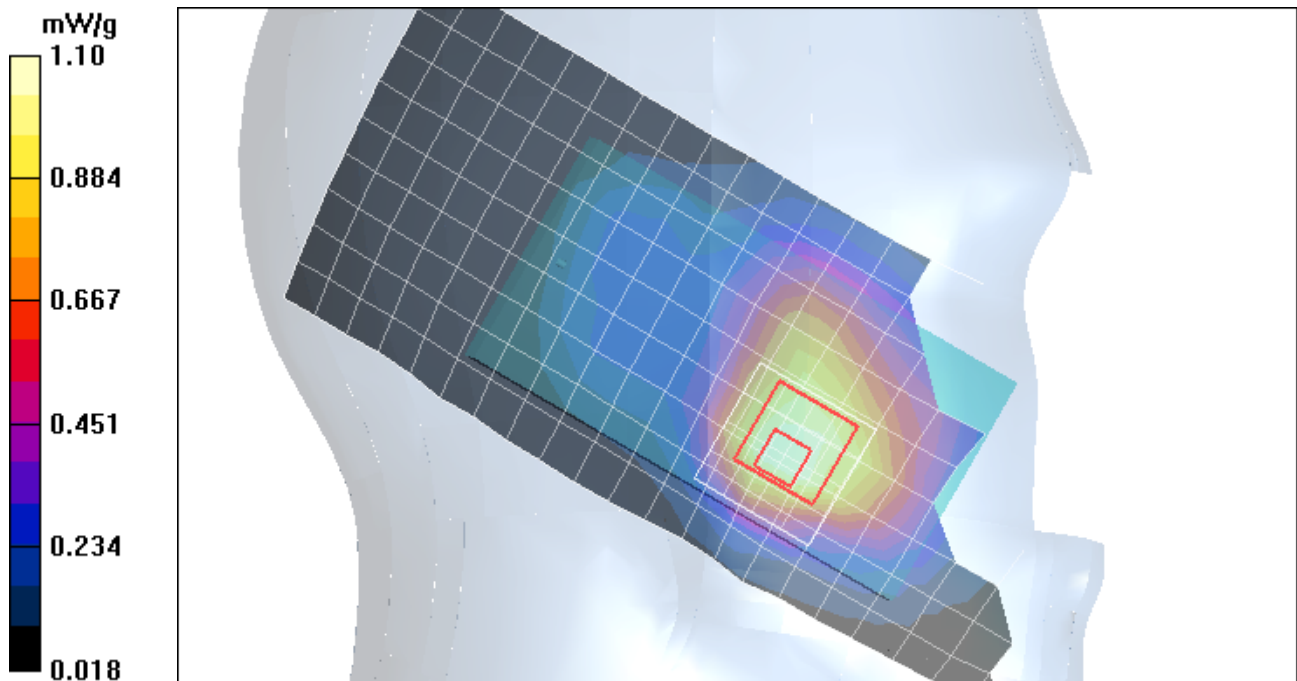
Measurement grid:  $dx=10$ mm,  $dy=10$ mm; Maximum value of SAR (measured) = 1.10 mW/g

### Left Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 27.0 V/m; Power Drift = 0.022 dB; Peak SAR (extrapolated) = 1.60 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.660 mW/g



## Test Laboratory: Motorola - Wi-Fi 2450 Cheek

**Serial: 358340030006983; FCC ID: IHDP56KZ2**

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION: Cheek

Device Mode: 802.11b, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Head

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.8$  mho/m;  $\epsilon_r = 38$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.44, 4.44, 4.44); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 8/21/2009
- Phantom: R#4 Glycol SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1250;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Right Head Template/Area Scan - Normal (15mm) (7x17x1):

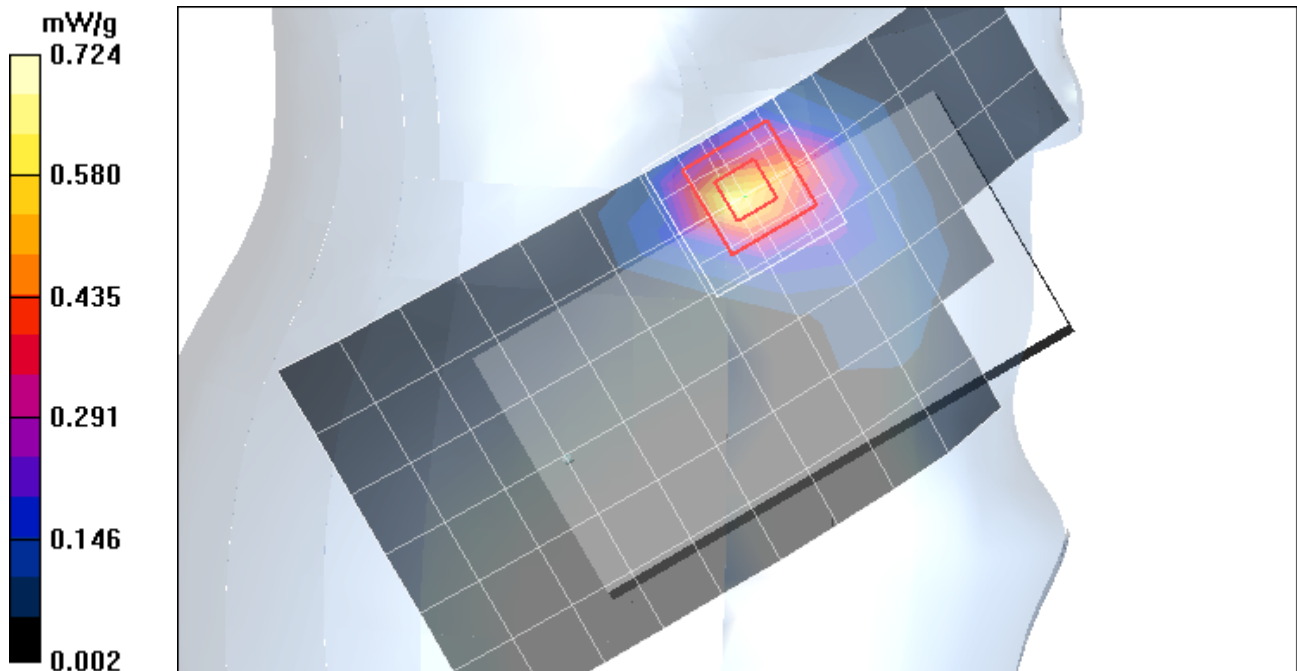
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.659 mW/g

### Right Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 8.82 V/m; Power Drift = 0.288 dB; Peak SAR (extrapolated) = 1.33 W/kg

**SAR(1 g) = 0.629 mW/g; SAR(10 g) = 0.290 mW/g; Maximum value of SAR (measured) = 0.724 mW/g**



## Test Laboratory: Motorola - GSM 850 Tilt

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.3

Medium: Low Freq Head

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.93$  mho/m;  $\epsilon_r = 43$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Right Head Template/Area Scan - Normal (15mm) (7x17x1):

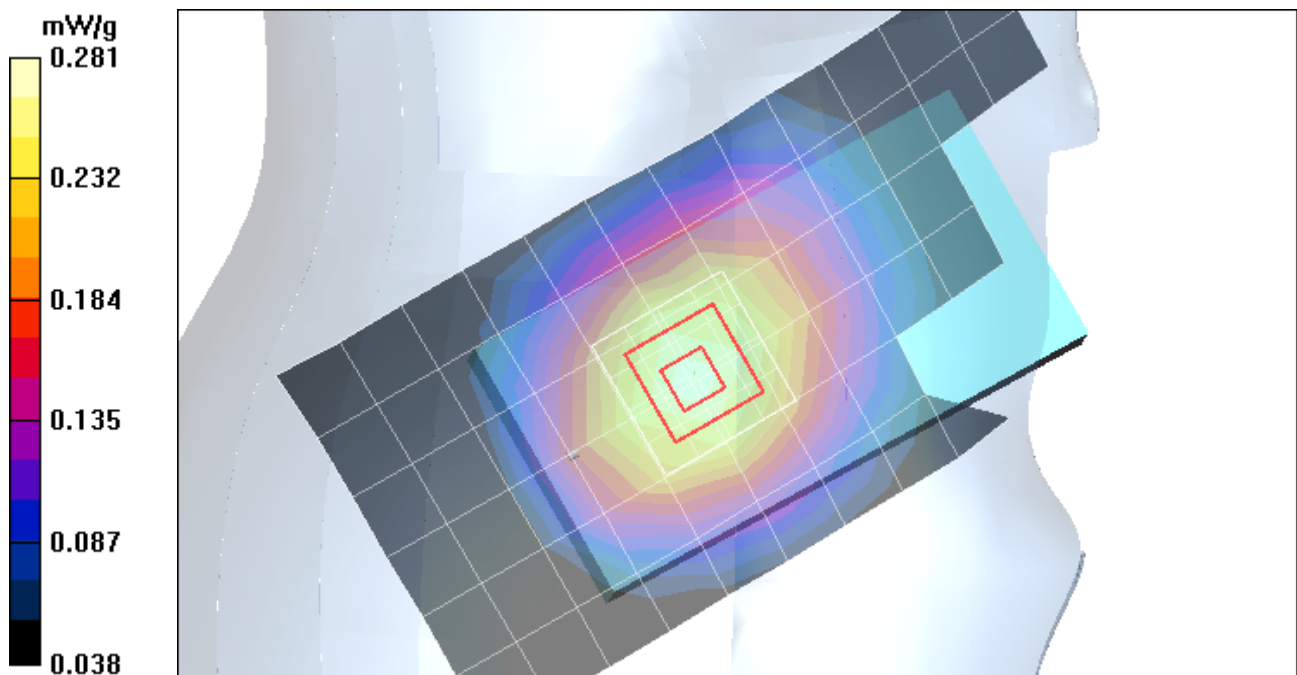
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.281 mW/g

### Right Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 17.2 V/m; Power Drift = 0.024 dB; Peak SAR (extrapolated) = 0.324 W/kg

SAR(1 g) = 0.266 mW/g; SAR(10 g) = 0.202 mW/g





## Test Laboratory: Motorola - GSM 1900 Tilt

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (check or rotated): Rotated

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.46$  mho/m;  $\epsilon_r = 38.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Right Head Template/Area Scan - Normal (10mm) (10x25x1):

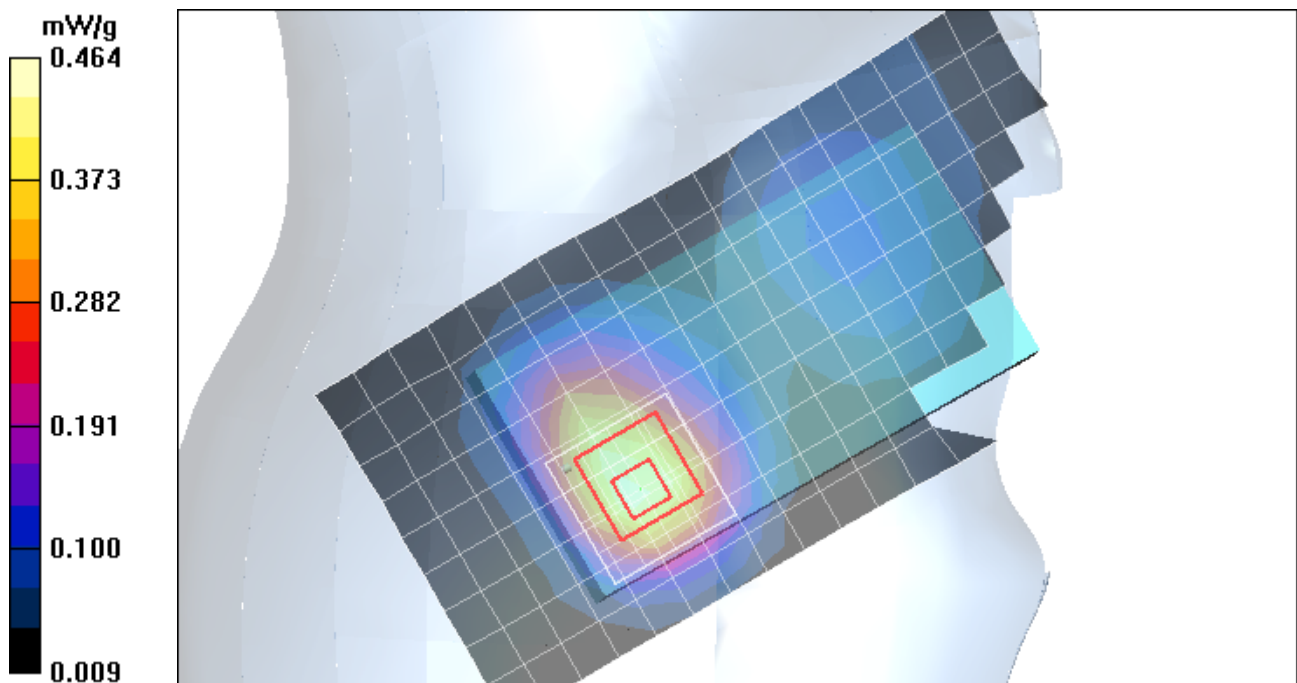
Measurement grid:  $dx=10$ mm,  $dy=10$ mm; Maximum value of SAR (measured) = 0.449 mW/g

### Right Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 18.0 V/m; Power Drift = -0.019 dB; Peak SAR (extrapolated) = 0.634 W/kg

SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.264 mW/g; Maximum value of SAR (measured) = 0.464 mW/g





## Test Laboratory: Motorola - WCDMA 850 Tilt

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated

Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Head

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.93$  mho/m;  $\epsilon_r = 43$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.25, 6.25, 6.25); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Sugar SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1005;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Left Head Template/Area Scan - Normal (15mm) (7x17x1):

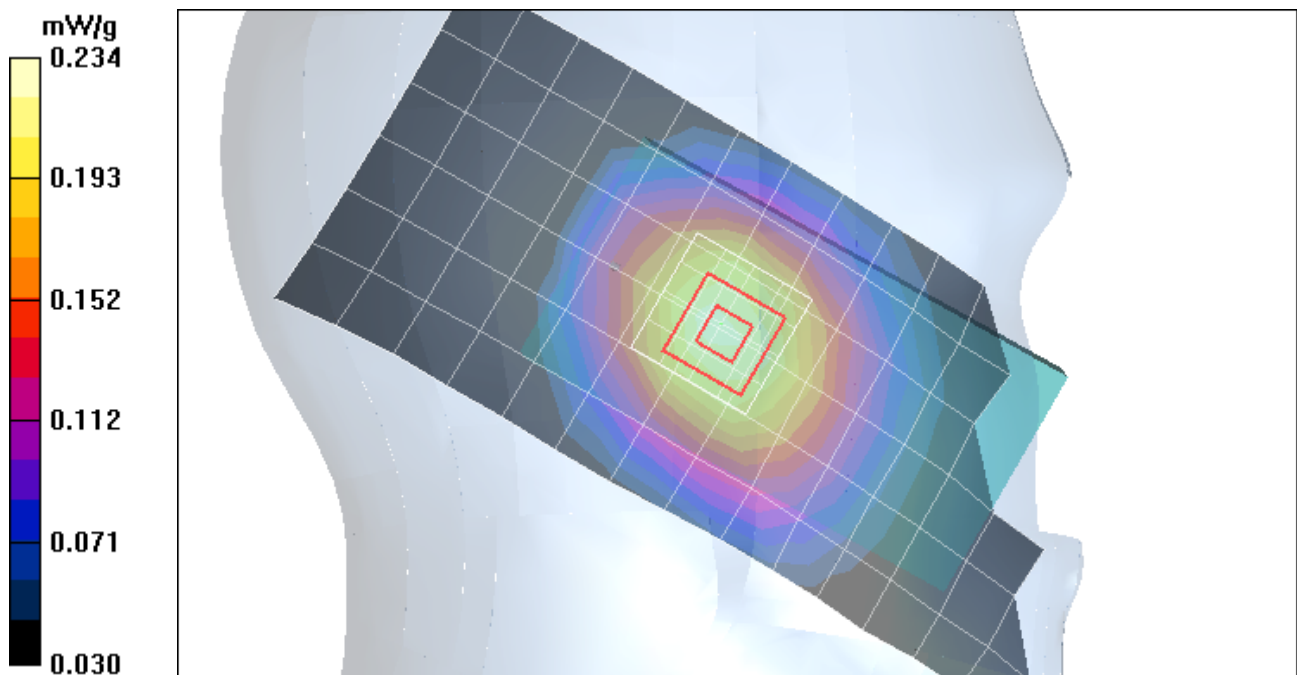
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.230 mW/g

### Left Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 15.3 V/m; Power Drift = -0.024 dB; Peak SAR (extrapolated) = 0.271 W/kg

**SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.168 mW/g; Maximum value of SAR (measured) = 0.234 mW/g**



## Test Laboratory: Motorola - WCDMA 1900 Tilt

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated

Communication System: WCDMA 1900; Frequency: 1880 MHz; Channel Number: 9400; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.47$  mho/m;  $\epsilon_r = 38.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(5.05, 5.05, 5.05); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Right Head Template/Area Scan - Normal (10mm) (10x25x1):

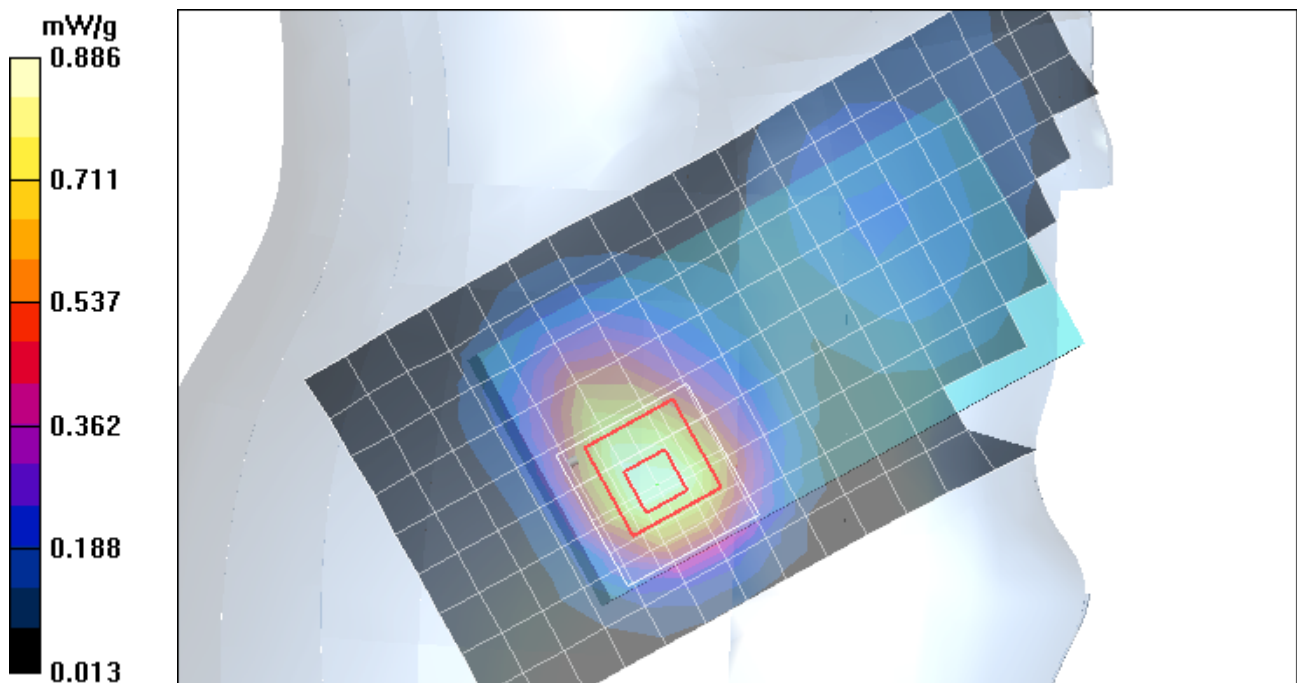
Measurement grid:  $dx=10$ mm,  $dy=10$ mm; Maximum value of SAR (measured) = 0.851 mW/g

### Right Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 24.5 V/m; Power Drift = -0.035 dB; Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.813 mW/g; SAR(10 g) = 0.497 mW/g; Maximum value of SAR (measured) = 0.886 mW/g



## Test Laboratory: Motorola - Wi-Fi 2450 Tilt

Serial: 358340030006983; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Accessory Model #: N/A

Battery Model #: SNN5843A; DEVICE POSITION (cheek or rotated): Rotated

Device Mode: 802.11b, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2437 MHz; Channel Number: 6; Duty Cycle: 1:1

Medium: 2450 Glycol Head

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.84$  mho/m;  $\epsilon_r = 37.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.41, 4.41, 4.41); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Glycol, SAM (extended range), Rev.1 (25-Mar-05); Type: SAM v4.0; Serial: TP-1139;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Right Head Template/Area Scan - Normal (15mm) (7x17x1):

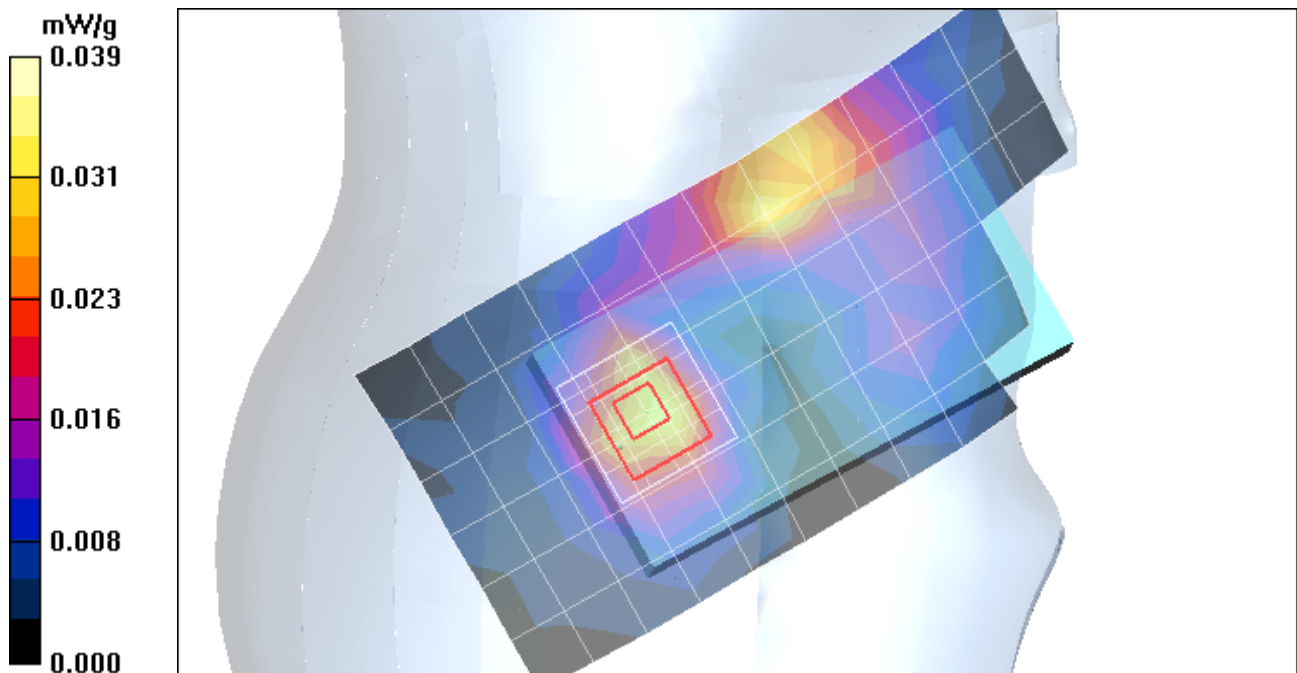
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.034 mW/g

### Right Head Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 4.78 V/m; Power Drift = -0.306 dB; Peak SAR (extrapolated) = 0.063 W/kg

SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.019 mW/g; Maximum value of SAR (measured) = 0.039 mW/g



## **Appendix 3**

### **SAR distribution plots for Body Worn Configuration**

## Test Laboratory: Motorola - GSM 850 Body-Worn

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: 5; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Front of Phone 15 mm from Phantom

Communication System: GSM 850; Frequency: 836.6 MHz; Channel Number: 190; Duty Cycle: 1:8.3

Medium: Low Freq Body

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.17, 6.17, 6.17); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

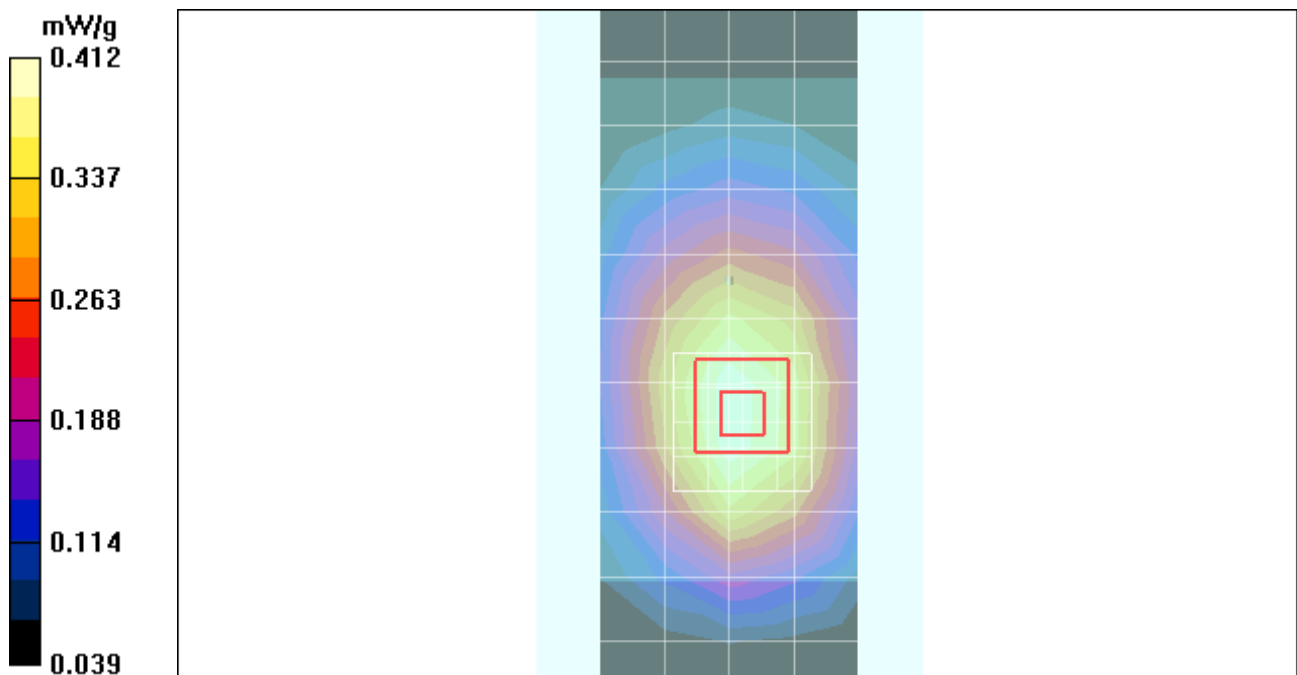
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.408 mW/g

### Amy Twin Phone Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 20.1 V/m; Power Drift = -0.050 dB; Peak SAR (extrapolated) = 0.514 W/kg

**SAR(1 g) = 0.390 mW/g; SAR(10 g) = 0.284 mW/g; Maximum value of SAR (measured) = 0.412 mW/g**



## Test Laboratory: Motorola - GSM 1900 Body-Worn

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: 0; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

Communication System: GSM 1900; Frequency: 1880 MHz; Channel Number: 661; Duty Cycle: 1:8.3

Medium: Regular Glycol Head 1750/1880

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 52.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.96, 4.96, 4.96); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

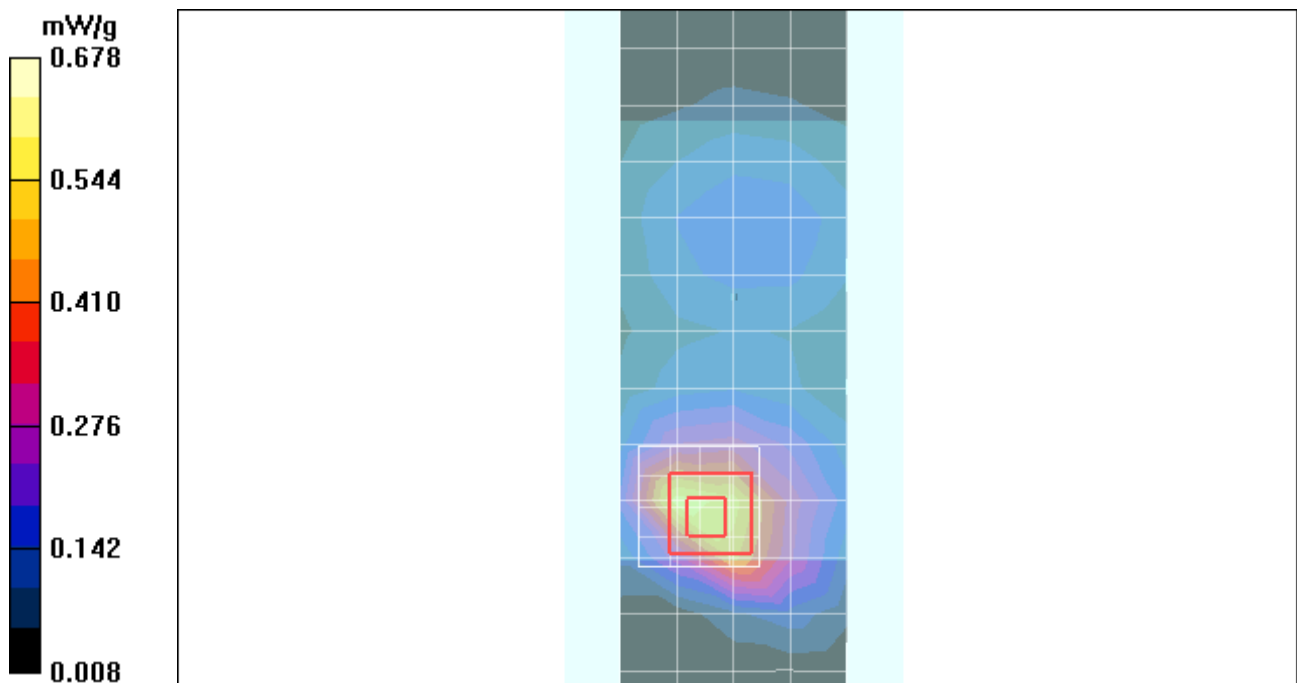
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.573 mW/g

### Amy Twin Phone Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 17.0 V/m; Power Drift = 0.046 dB; Peak SAR (extrapolated) = 1.05 W/kg

**SAR(1 g) = 0.625 mW/g; SAR(10 g) = 0.347 mW/g; Maximum value of SAR (measured) = 0.678 mW/g**



## Test Laboratory: Motorola - WCDMA 850 Body-Worn

Serial: 358340030006850; FCC ID: IHDP56KZ2

Procedure Notes: Pwr Step: All up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Front of Phone 15 mm from Phantom

Communication System: WCDMA 850; Frequency: 836 MHz; Channel Number: 4180; Duty Cycle: 1:1

Medium: Low Freq Body

Medium parameters used:  $f = 835$  MHz;  $\sigma = 0.99$  mho/m;  $\epsilon_r = 53.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(6.17, 6.17, 6.17); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Section 1, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

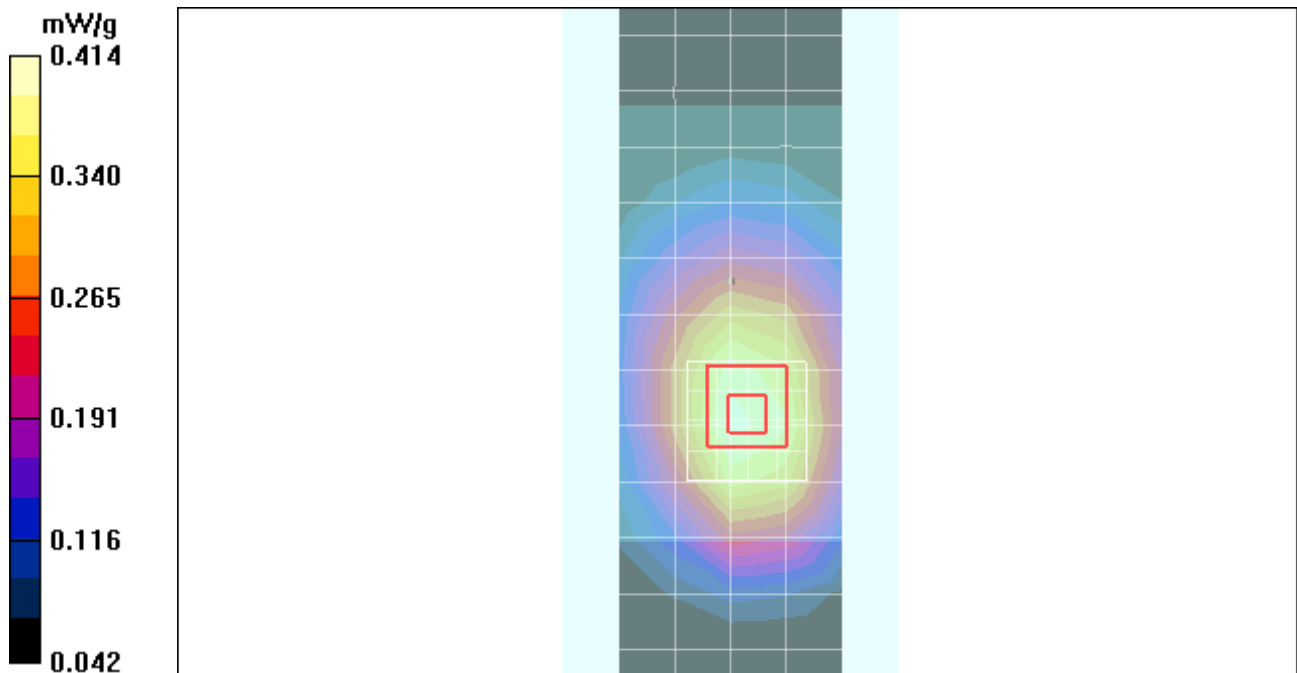
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.402 mW/g

### Amy Twin Phone Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 19.5 V/m; Power Drift = 0.011 dB; Peak SAR (extrapolated) = 0.507 W/kg

**SAR(1 g) = 0.391 mW/g; SAR(10 g) = 0.285 mW/g; Maximum value of SAR (measured) = 0.414 mW/g**



## Test Laboratory: Motorola - WCDMA 1900 Body-Worn

**Serial: 358340030006850; FCC ID: IHDP56KZ2**

Procedure Notes: Pwr Step: All Up Bits; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

Communication System: WCDMA 1900; Frequency: 1852.5 MHz; Channel Number: 9262; Duty Cycle: 1:1

Medium: Regular Glycol Head 1750/1880

Medium parameters used:  $f = 1880$  MHz;  $\sigma = 1.58$  mho/m;  $\epsilon_r = 52.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3037; ConvF(4.96, 4.96, 4.96); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn703; Calibrated: 9/17/2009
- Phantom: R1\_Section 2, Amy Twin, Rev3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

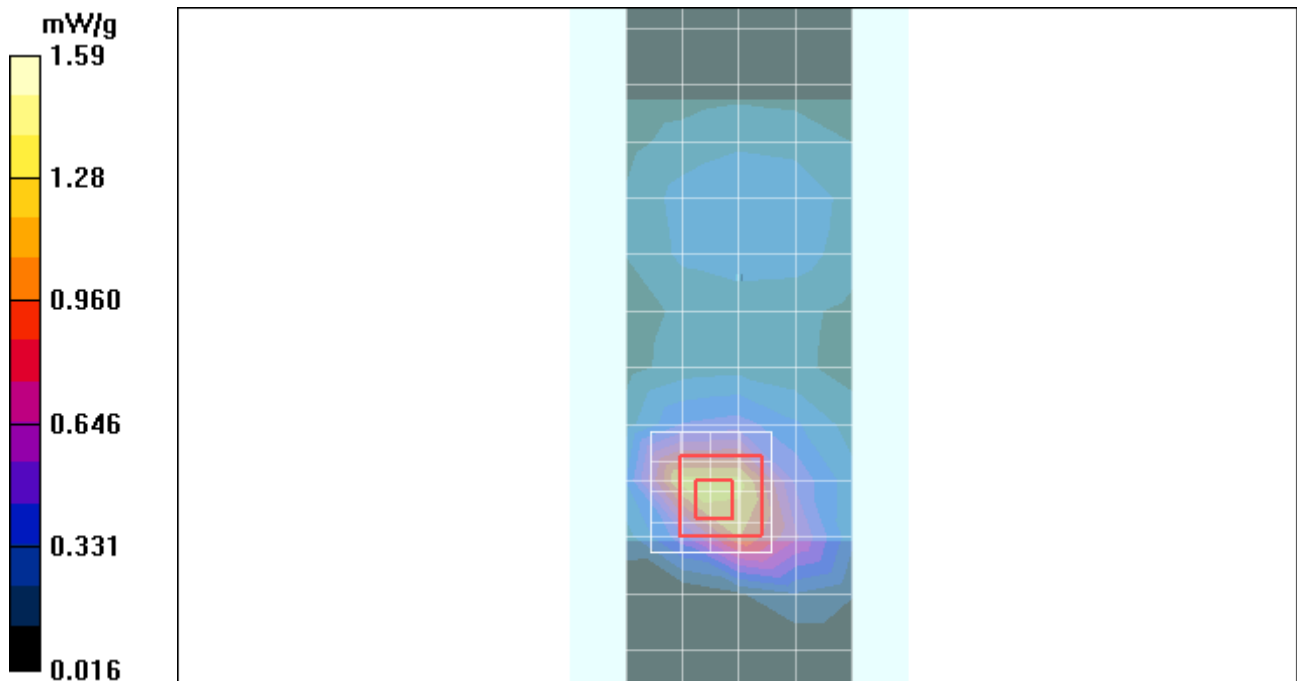
Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 1.13 mW/g

### Amy Twin Phone Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 23.7 V/m; Power Drift = 0.102 dB; Peak SAR (extrapolated) = 2.44 W/kg

**SAR(1 g) = 1.42 mW/g; SAR(10 g) = 0.748 mW/g; Maximum value of SAR (measured) = 1.59 mW/g**





## Test Laboratory: Motorola - Wi-Fi 2450 Body-Worn

**Serial: 358340030006983; FCC ID: IHDP56KZ2**

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

Device Mode: 802.11b, 1 Mbps data rate

Communication System: Wi-Fi 2450; Frequency: 2462 MHz; Channel Number: 11; Duty Cycle: 1:1

Medium: 2450 Glycol Body

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2.01$  mho/m;  $\epsilon_r = 50.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.28, 4.28, 4.28); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 8/21/2009
- Phantom: R4 : Sect.1, Amy Twin, Rev.3 (3-Feb-10); Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

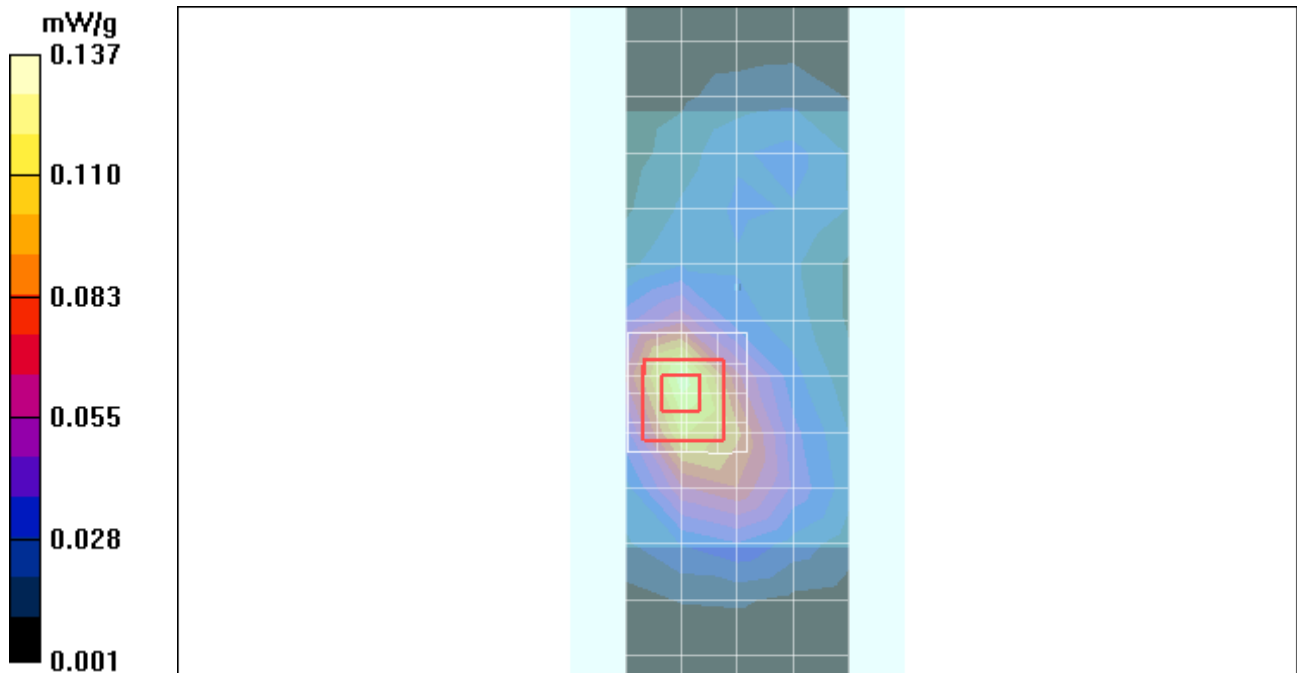
Measurement grid: dx=15mm, dy=15mm; Maximum value of SAR (measured) = 0.126 mW/g

### Amy Twin Phone Template/5x5x7 Zoom Scan (<=3GHz) (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.39 V/m; Power Drift = 0.253 dB; Peak SAR (extrapolated) = 0.266 W/kg

**SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.070 mW/g; Maximum value of SAR (measured) = 0.137 mW/g**



## Test Laboratory: Motorola - Bluetooth Body-Worn

**Serial: 358340030045593; FCC ID: IHDP56KZ2**

Procedure Notes: Pwr Step: N/A; Antenna Position: Internal; Battery Model #: SNN5843A

Device Position: Body Worn, Back of Phone 15 mm from Phantom

Communication System: Bluetooth; Frequency: 2441 MHz; Channel Number: 39; Duty Cycle: 1:1

Medium: 2450 Glycol Body

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.92$  mho/m;  $\epsilon_r = 50.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

DASY4 Configuration:

- Probe: ES3DV3 - SN3184; ConvF(4.28, 4.28, 4.28); Calibrated: 9/18/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn650; Calibrated: 8/21/2009
- Phantom: R4 : Sect.1, Amy Twin; Type: Amy Twin Flat; Serial: n/a;
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

### Amy Twin Phone Template/Area Scan - Normal Extended Body (15mm) (16x7x1):

Measurement grid:  $dx=15$ mm,  $dy=15$ mm; Maximum value of SAR (measured) = 0.002 mW/g

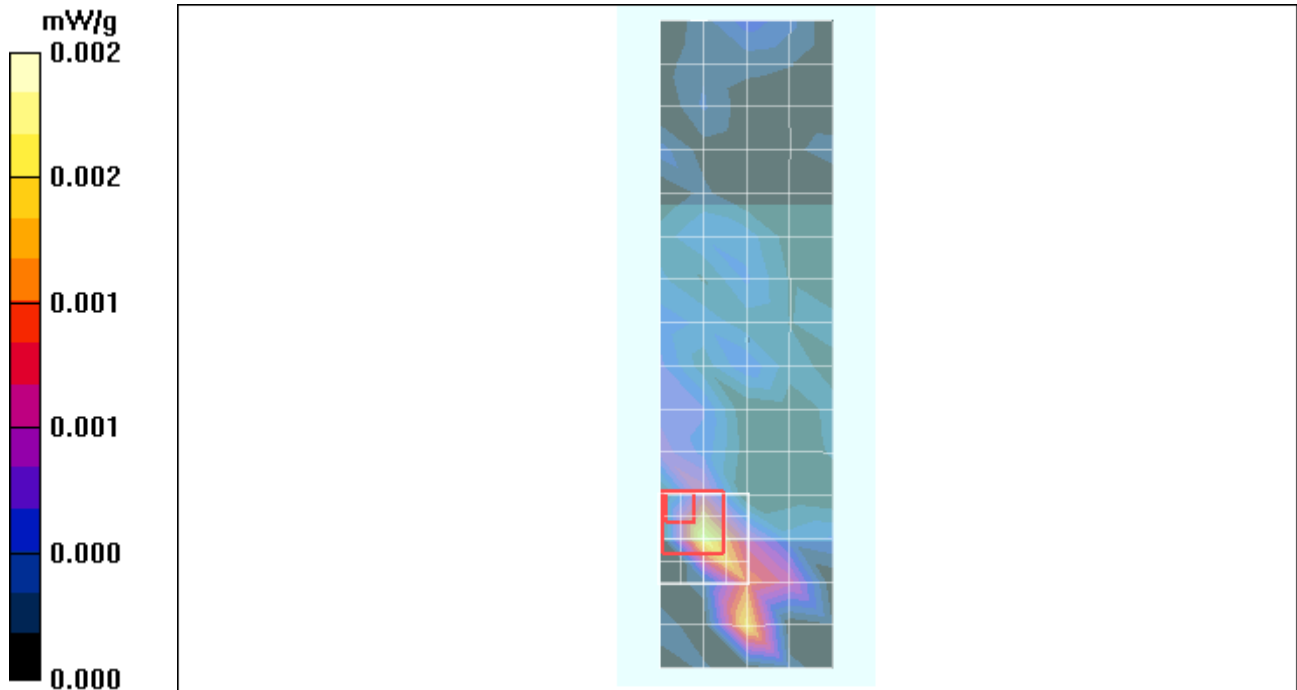
### Amy Twin Phone Template/5x5x7 Zoom Scan ( $\leq 3$ GHz) (5x5x7)/Cube 0:

Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 0.705 V/m; Power Drift = 0.615 dB; Peak SAR (extrapolated) = 0.003 W/kg

**SAR(1 g) = 0.000552 mW/g; SAR(10 g) = 0.000179 mW/g;**

Maximum value of SAR (measured) = 0.001 mW/g



## **Appendix 4**

### **Probe Calibration Certificate**



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **Motorola MDB**

Certificate No: **ES3-3184\_Sep09**

## CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3184**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2  
 Calibration procedure for dosimetric E-field probes**

Calibration date: **September 18, 2009**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID #            | Cal Date (Certificate No.)    | Scheduled Calibration |
|----------------------------|-----------------|-------------------------------|-----------------------|
| Power meter E4419B         | GB41293874      | 1-Apr-09 (No. 217-01030)      | Apr-10                |
| Power sensor E4412A        | MY41495277      | 1-Apr-09 (No. 217-01030)      | Apr-10                |
| Power sensor E4412A        | MY41498087      | 1-Apr-09 (No. 217-01030)      | Apr-10                |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 31-Mar-09 (No. 217-01026)     | Mar-10                |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 31-Mar-09 (No. 217-01028)     | Mar-10                |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 31-Mar-09 (No. 217-01027)     | Mar-10                |
| Reference Probe ES3DV2     | SN: 3013        | 2-Jan-09 (No. ES3-3013_Jan09) | Jan-10                |
| DAE4                       | SN: 660         | 9-Sep-08 (No. DAE4-660_Sep08) | Sep-09                |

| Secondary Standards       | ID #         | Check Date (in house)             | Scheduled Check        |
|---------------------------|--------------|-----------------------------------|------------------------|
| RF generator HP 8648C     | US3642U01700 | 4-Aug-99 (in house check Oct-07)  | In house check: Oct-09 |
| Network Analyzer HP 8753E | US37390585   | 18-Oct-01 (in house check Oct-08) | In house check: Oct-09 |

|                |                |                       |                  |
|----------------|----------------|-----------------------|------------------|
|                | <b>Name</b>    | <b>Function</b>       | <b>Signature</b> |
| Calibrated by: | Jeton Kastrati | Laboratory Technician |                  |
| Approved by:   | Katja Pokovic  | Technical Manager     |                  |

Issued: September 21, 2009

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



Accredited by the Swiss Accreditation Service (SAS)  
 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

### Glossary:

|                          |                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                      | tissue simulating liquid                                                                                                                             |
| NORM <sub>x,y,z</sub>    | sensitivity in free space                                                                                                                            |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                           |
| DCP                      | diode compression point                                                                                                                              |
| Polarization $\varphi$   | $\varphi$ rotation around probe axis                                                                                                                 |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* *frequency\_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ES3DV3

## SN:3184

|                  |                    |
|------------------|--------------------|
| Manufactured:    | August 19, 2008    |
| Last calibrated: | September 22, 2008 |
| Recalibrated:    | September 18, 2009 |

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

## DASY - Parameters of Probe: ES3DV3 SN:3184

### Sensitivity in Free Space<sup>A</sup>

### Diode Compression<sup>B</sup>

|       |                     |                                     |       |              |
|-------|---------------------|-------------------------------------|-------|--------------|
| NormX | <b>1.28</b> ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP X | <b>91</b> mV |
| NormY | <b>1.36</b> ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP Y | <b>92</b> mV |
| NormZ | <b>1.27</b> ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP Z | <b>95</b> mV |

### Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

### Boundary Effect

**TSL**                      **835 MHz**      **Typical SAR gradient: 5 % per mm**

|                                           |                              |               |               |
|-------------------------------------------|------------------------------|---------------|---------------|
| Sensor Center to Phantom Surface Distance |                              | <b>3.0 mm</b> | <b>4.0 mm</b> |
| SAR <sub>be</sub> [%]                     | Without Correction Algorithm | 11.1          | 7.3           |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.8           | 0.5           |

**TSL**                      **1810 MHz**      **Typical SAR gradient: 10 % per mm**

|                                           |                              |               |               |
|-------------------------------------------|------------------------------|---------------|---------------|
| Sensor Center to Phantom Surface Distance |                              | <b>3.0 mm</b> | <b>4.0 mm</b> |
| SAR <sub>be</sub> [%]                     | Without Correction Algorithm | 12.1          | 8.3           |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.8           | 0.4           |

### Sensor Offset

Probe Tip to Sensor Center                      **2.0 mm**

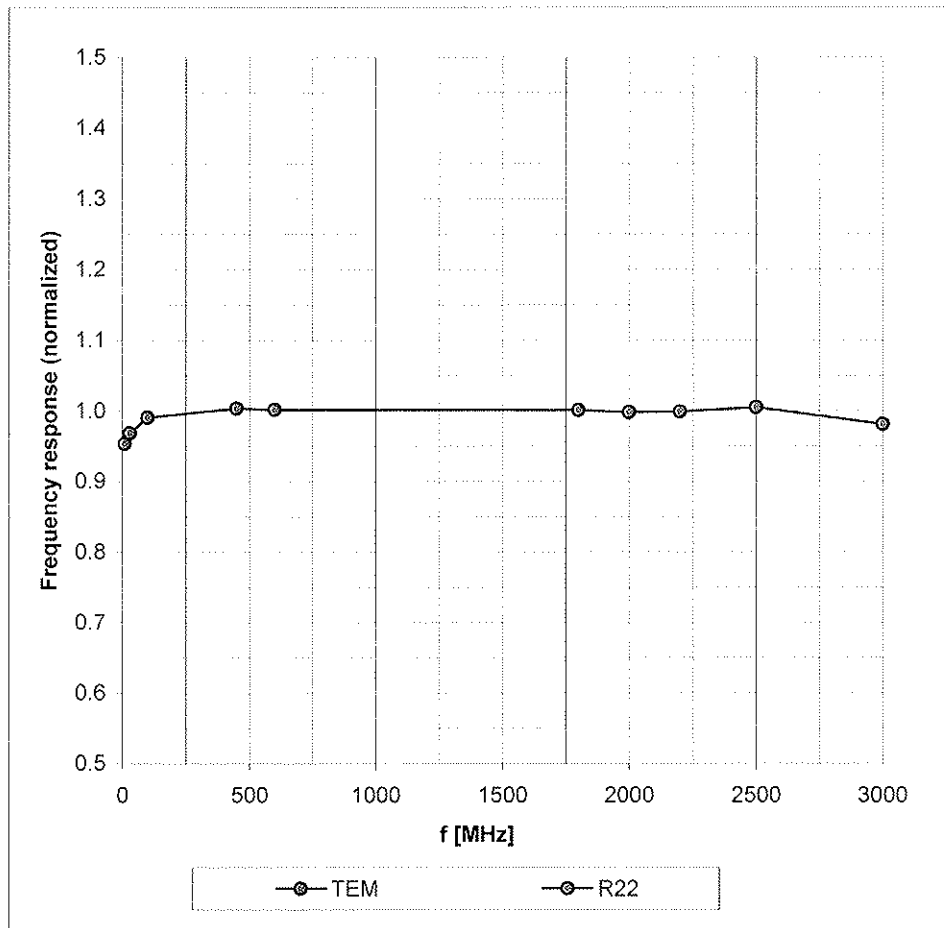
**The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.**

<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

## Frequency Response of E-Field

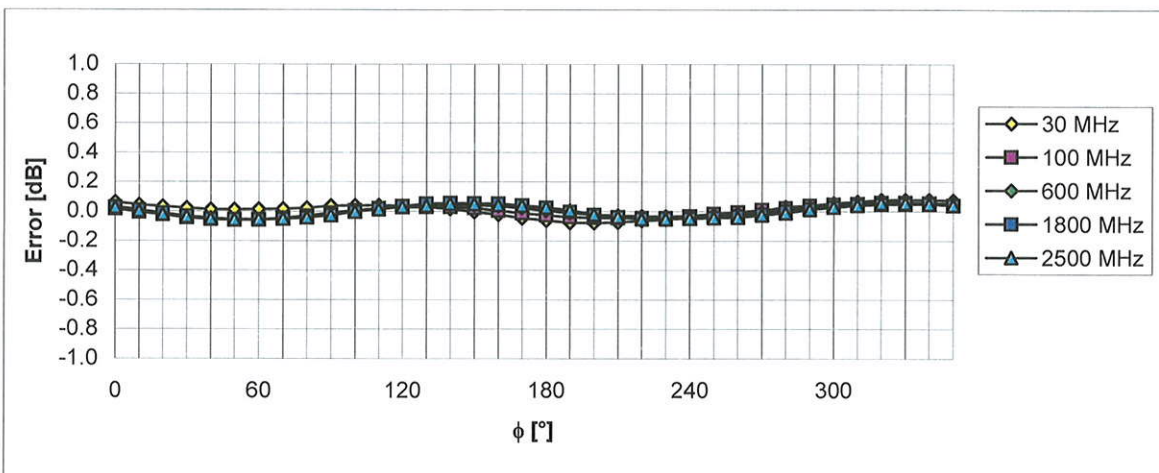
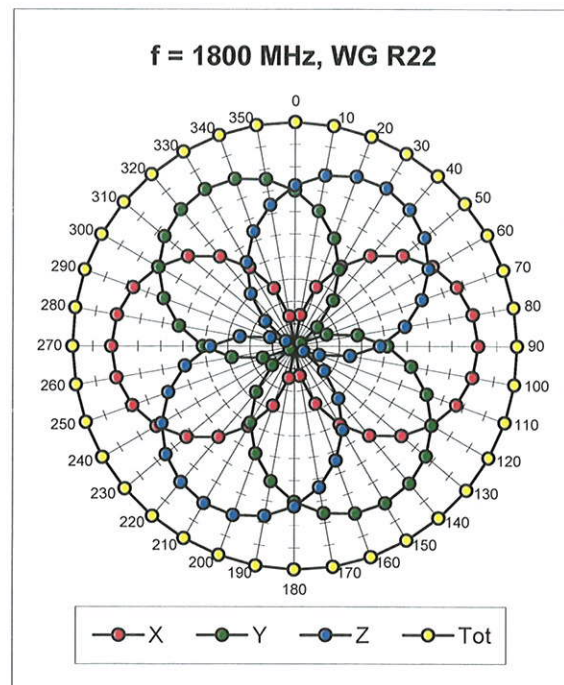
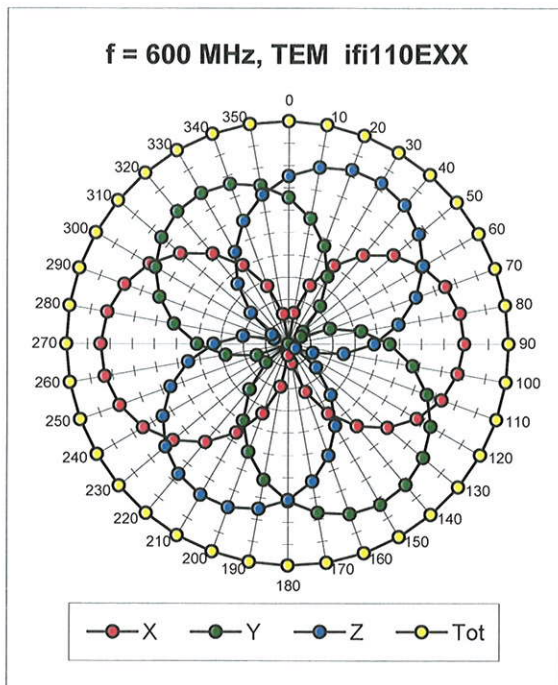
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

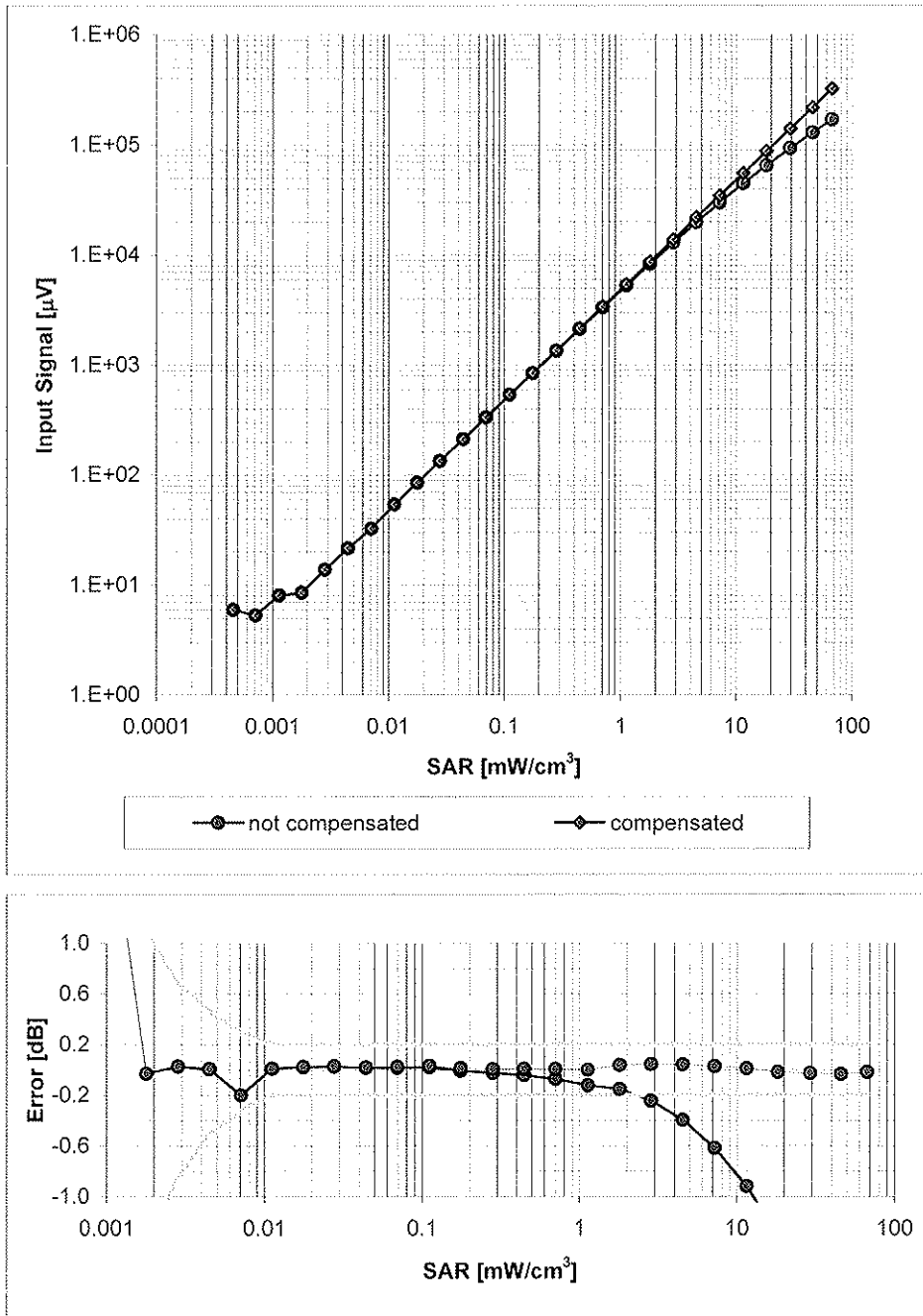


## Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$



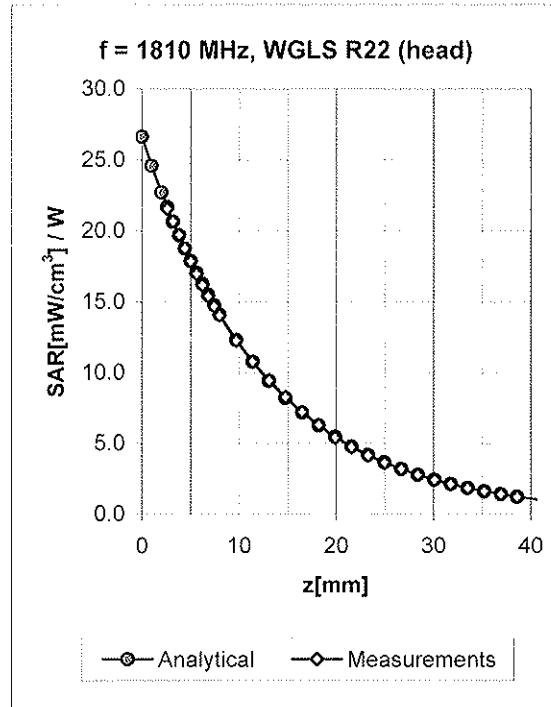
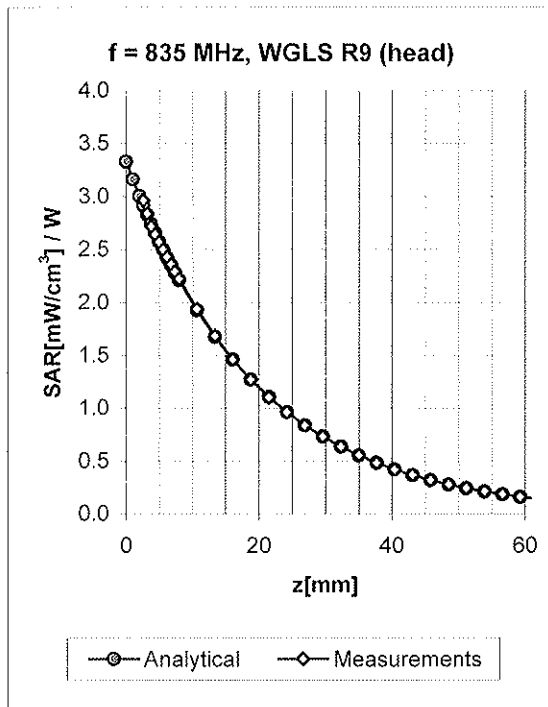
Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

# Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$ )



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment

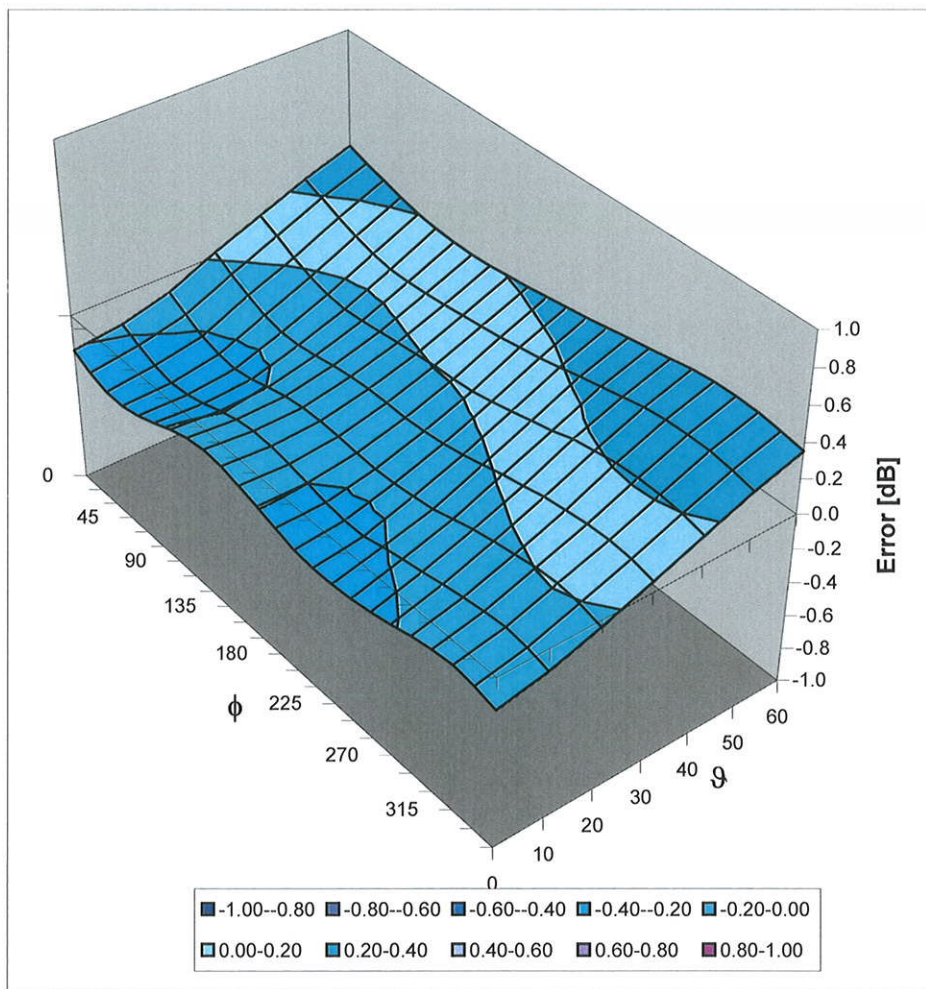


| f [MHz] | Validity [MHz] <sup>c</sup> | TSL  | Permittivity | Conductivity | Alpha | Depth | ConvF Uncertainty  |
|---------|-----------------------------|------|--------------|--------------|-------|-------|--------------------|
| 835     | ± 50 / ± 100                | Head | 41.5 ± 5%    | 0.90 ± 5%    | 0.27  | 2.21  | 6.26 ± 11.0% (k=2) |
| 1810    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.26  | 2.94  | 5.14 ± 11.0% (k=2) |
| 1950    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.23  | 3.55  | 4.94 ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Head | 39.2 ± 5%    | 1.80 ± 5%    | 0.34  | 2.33  | 4.44 ± 11.0% (k=2) |
|         |                             |      |              |              |       |       |                    |
| 835     | ± 50 / ± 100                | Body | 55.2 ± 5%    | 0.97 ± 5%    | 0.32  | 1.92  | 6.08 ± 11.0% (k=2) |
| 1810    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.37  | 2.02  | 4.84 ± 11.0% (k=2) |
| 1950    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.30  | 2.95  | 4.81 ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Body | 52.7 ± 5%    | 1.95 ± 5%    | 0.99  | 1.20  | 4.28 ± 11.0% (k=2) |

<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Deviation from Isotropy in HSL

Error ( $\phi$ ,  $\vartheta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )





Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Client **Motorola MDB**

Certificate No: **ES3-3037\_Sep09**

## CALIBRATION CERTIFICATE

Object **ES3DV3 - SN:3037**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2  
 Calibration procedure for dosimetric E-field probes**

Calibration date: **September 18, 2009**

Condition of the calibrated item **In Tolerance**

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).  
 The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)^{\circ}\text{C}$  and humidity  $< 70\%$ .

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards          | ID #            | Cal Date (Certificate No.)        | Scheduled Calibration  |
|----------------------------|-----------------|-----------------------------------|------------------------|
| Power meter E4419B         | GB41293874      | 1-Apr-09 (No. 217-01030)          | Apr-10                 |
| Power sensor E4412A        | MY41495277      | 1-Apr-09 (No. 217-01030)          | Apr-10                 |
| Power sensor E4412A        | MY41498087      | 1-Apr-09 (No. 217-01030)          | Apr-10                 |
| Reference 3 dB Attenuator  | SN: S5054 (3c)  | 31-Mar-09 (No. 217-01026)         | Mar-10                 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 31-Mar-09 (No. 217-01028)         | Mar-10                 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 31-Mar-09 (No. 217-01027)         | Mar-10                 |
| Reference Probe ES3DV2     | SN: 3013        | 2-Jan-09 (No. ES3-3013_Jan09)     | Jan-10                 |
| DAE4                       | SN: 660         | 9-Sep-08 (No. DAE4-660_Sep08)     | Sep-09                 |
| Secondary Standards        | ID #            | Check Date (in house)             | Scheduled Check        |
| RF generator HP 8648C      | US3642U01700    | 4-Aug-99 (in house check Oct-07)  | In house check: Oct-09 |
| Network Analyzer HP 8753E  | US37390585      | 18-Oct-01 (in house check Oct-08) | In house check: Oct-09 |

|                |                |                       |                  |
|----------------|----------------|-----------------------|------------------|
|                | <b>Name</b>    | <b>Function</b>       | <b>Signature</b> |
| Calibrated by: | Jeton Kastrati | Laboratory Technician |                  |
| Approved by:   | Katja Pokovic  | Technical Manager     |                  |

Issued: September 21, 2009

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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 The Swiss Accreditation Service is one of the signatories to the EA  
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

### Glossary:

|                          |                                                                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|
| TSL                      | tissue simulating liquid                                                                                                                             |
| NORM <sub>x,y,z</sub>    | sensitivity in free space                                                                                                                            |
| ConvF                    | sensitivity in TSL / NORM <sub>x,y,z</sub>                                                                                                           |
| DCP                      | diode compression point                                                                                                                              |
| Polarization $\varphi$   | $\varphi$ rotation around probe axis                                                                                                                 |
| Polarization $\vartheta$ | $\vartheta$ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis |

### Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

### Methods Applied and Interpretation of Parameters:

- NORM<sub>x,y,z</sub>**: Assessed for E-field polarization  $\vartheta = 0$  ( $f \leq 900$  MHz in TEM-cell;  $f > 1800$  MHz: R22 waveguide). NORM<sub>x,y,z</sub> are only intermediate values, i.e., the uncertainties of NORM<sub>x,y,z</sub> does not effect the E<sup>2</sup>-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)<sub>x,y,z</sub>** = NORM<sub>x,y,z</sub> \* *frequency\_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP<sub>x,y,z</sub>**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for  $f \leq 800$  MHz) and inside waveguide using analytical field distributions based on power measurements for  $f > 800$  MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM<sub>x,y,z</sub> \* *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from  $\pm 50$  MHz to  $\pm 100$  MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

# Probe ES3DV3

## SN:3037

|                  |                    |
|------------------|--------------------|
| Manufactured:    | August 21, 2003    |
| Last calibrated: | September 23, 2008 |
| Recalibrated:    | September 18, 2009 |

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

## DASY - Parameters of Probe: ES3DV3 SN:3037

### Sensitivity in Free Space<sup>A</sup>

|       |                     |                                     |       |              |
|-------|---------------------|-------------------------------------|-------|--------------|
| NormX | <b>1.17</b> ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP X | <b>95</b> mV |
| NormY | <b>0.81</b> ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP Y | <b>97</b> mV |
| NormZ | <b>0.97</b> ± 10.1% | $\mu\text{V}/(\text{V}/\text{m})^2$ | DCP Z | <b>97</b> mV |

### Diode Compression<sup>B</sup>

### Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

### Boundary Effect

**TSL**                      **835 MHz**      **Typical SAR gradient: 5 % per mm**

|                                           |                              |               |               |
|-------------------------------------------|------------------------------|---------------|---------------|
| Sensor Center to Phantom Surface Distance |                              | <b>3.0 mm</b> | <b>4.0 mm</b> |
| SAR <sub>be</sub> [%]                     | Without Correction Algorithm | 10.0          | 6.2           |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.8           | 0.6           |

**TSL**                      **1810 MHz**      **Typical SAR gradient: 10 % per mm**

|                                           |                              |               |               |
|-------------------------------------------|------------------------------|---------------|---------------|
| Sensor Center to Phantom Surface Distance |                              | <b>3.0 mm</b> | <b>4.0 mm</b> |
| SAR <sub>be</sub> [%]                     | Without Correction Algorithm | 9.3           | 5.9           |
| SAR <sub>be</sub> [%]                     | With Correction Algorithm    | 0.6           | 0.4           |

### Sensor Offset

Probe Tip to Sensor Center                      **2.0 mm**

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor  $k=2$ , which for a normal distribution corresponds to a coverage probability of approximately 95%.

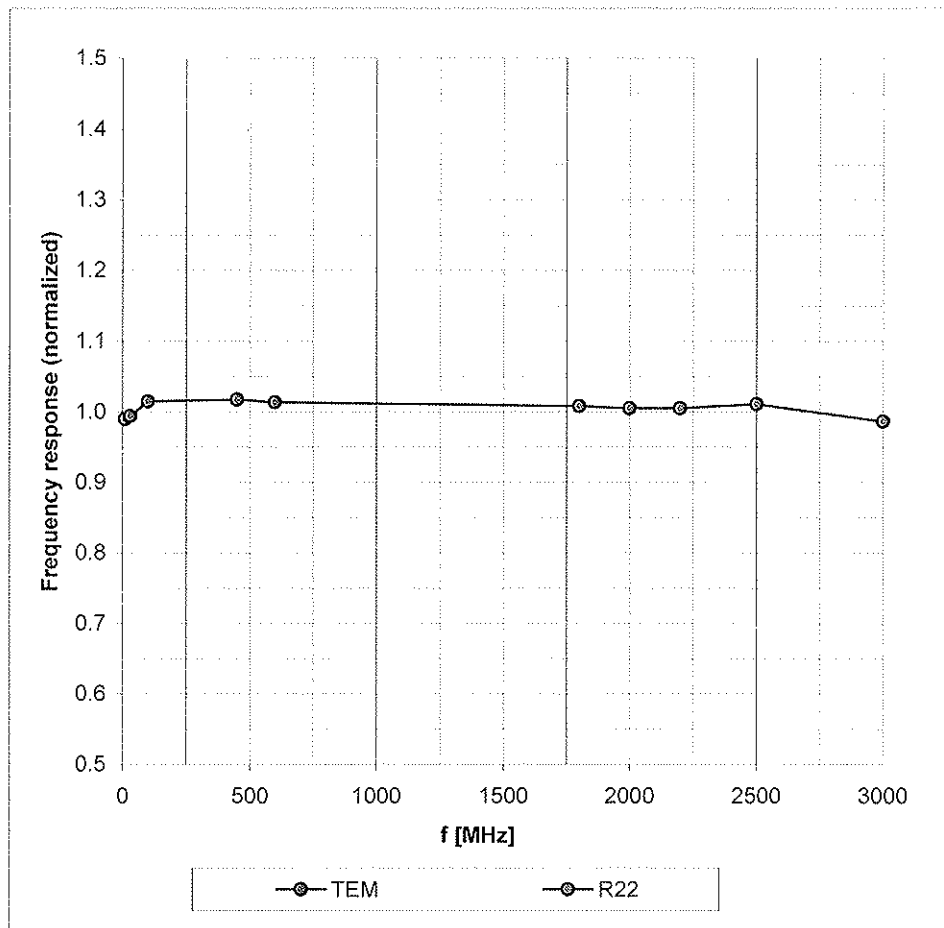
<sup>A</sup> The uncertainties of NormX,Y,Z do not affect the  $E^2$ -field uncertainty inside TSL (see Page 8).

<sup>B</sup> Numerical linearization parameter; uncertainty not required.

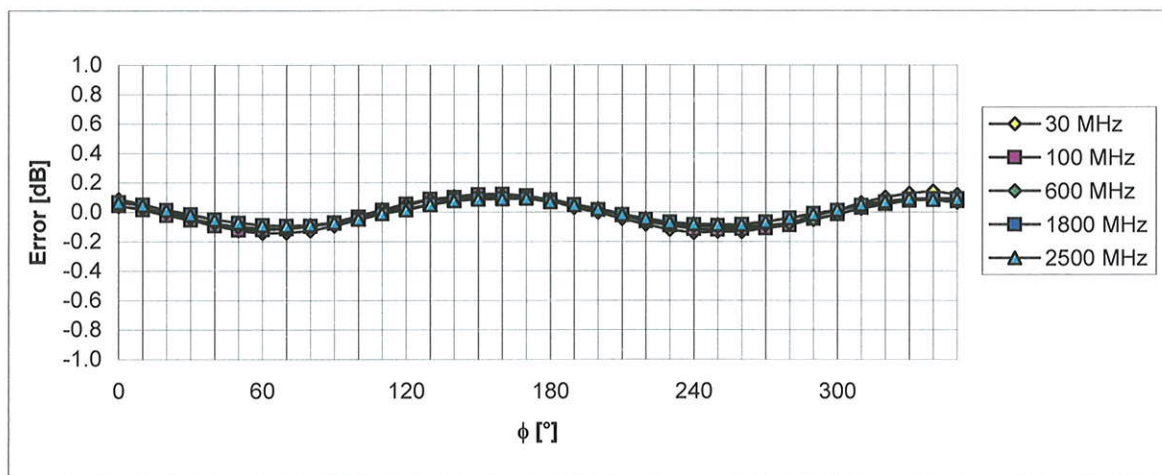
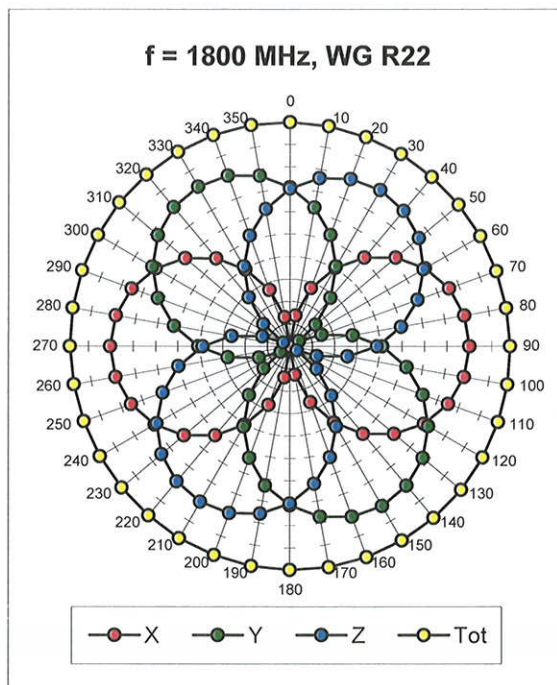
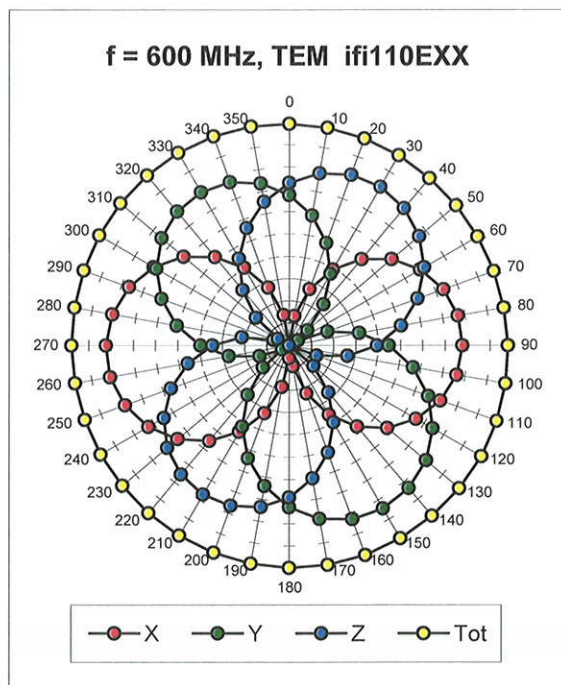


## Frequency Response of E-Field

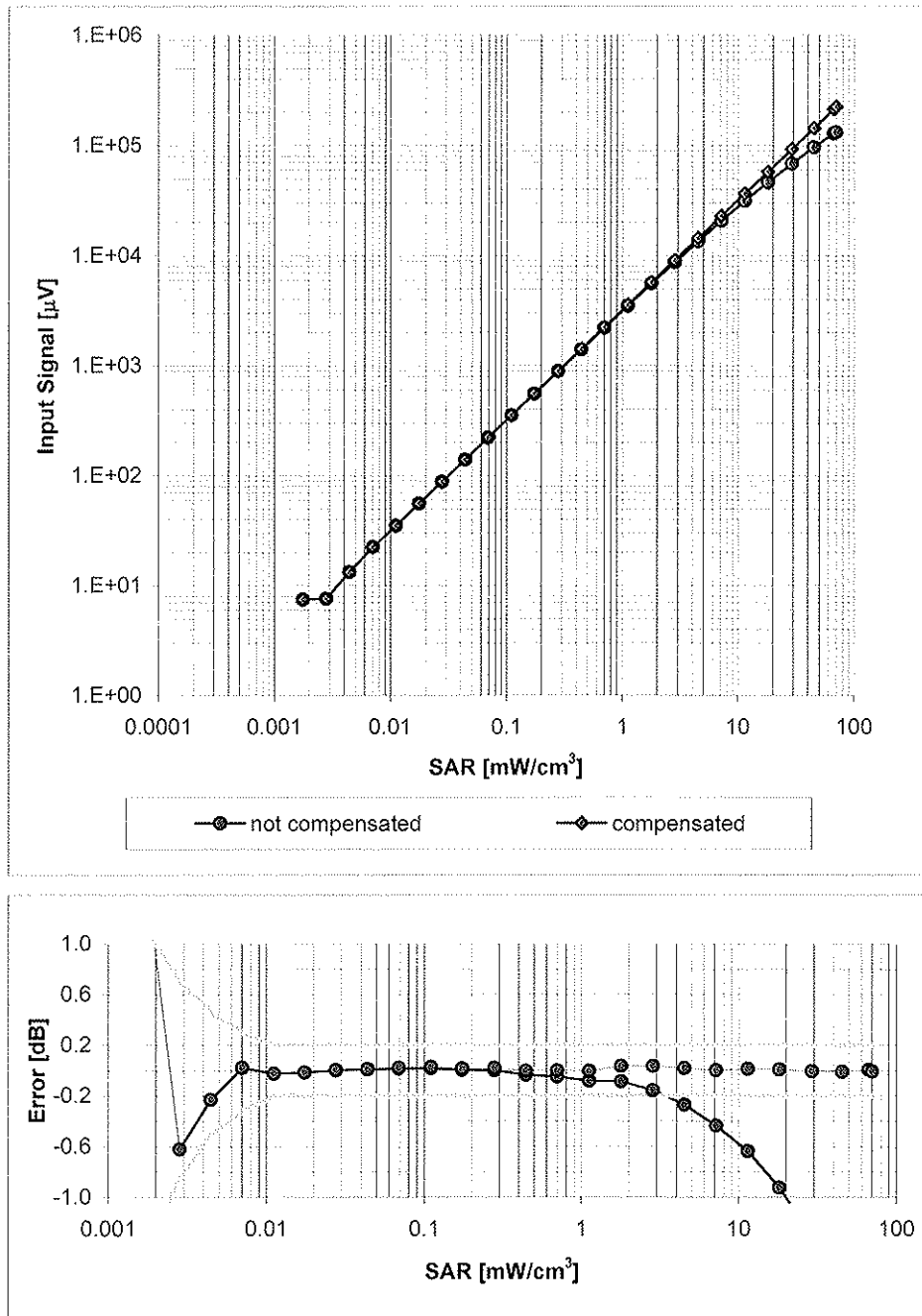
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field:  $\pm 6.3\%$  ( $k=2$ )

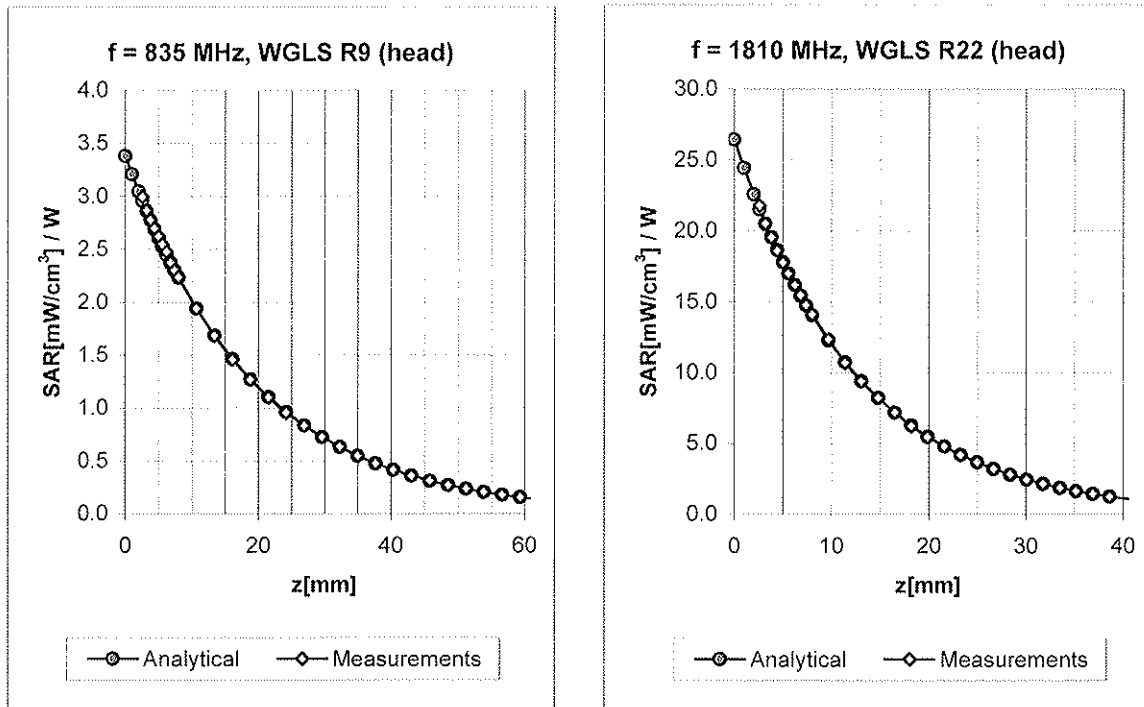
Receiving Pattern ( $\phi$ ),  $\vartheta = 0^\circ$ Uncertainty of Axial Isotropy Assessment:  $\pm 0.5\%$  ( $k=2$ )

# Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$ )



Uncertainty of Linearity Assessment:  $\pm 0.6\%$  ( $k=2$ )

## Conversion Factor Assessment

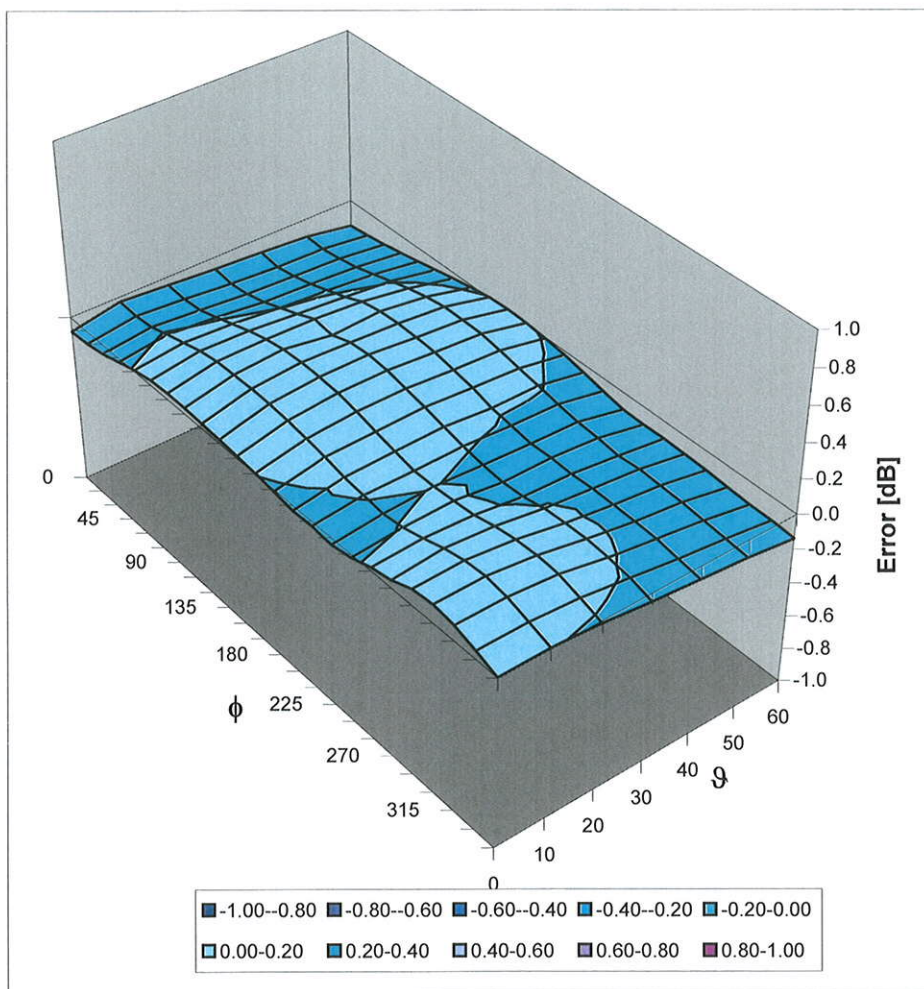


| f [MHz] | Validity [MHz] <sup>c</sup> | TSL  | Permittivity | Conductivity | Alpha | Depth | ConvF Uncertainty  |
|---------|-----------------------------|------|--------------|--------------|-------|-------|--------------------|
| 835     | ± 50 / ± 100                | Head | 41.5 ± 5%    | 0.90 ± 5%    | 0.34  | 1.78  | 6.25 ± 11.0% (k=2) |
| 1810    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.37  | 1.74  | 5.05 ± 11.0% (k=2) |
| 1950    | ± 50 / ± 100                | Head | 40.0 ± 5%    | 1.40 ± 5%    | 0.40  | 1.62  | 4.87 ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Head | 39.2 ± 5%    | 1.80 ± 5%    | 0.35  | 1.96  | 4.41 ± 11.0% (k=2) |
|         |                             |      |              |              |       |       |                    |
| 835     | ± 50 / ± 100                | Body | 55.2 ± 5%    | 0.97 ± 5%    | 0.75  | 1.16  | 6.17 ± 11.0% (k=2) |
| 1810    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.36  | 1.94  | 4.96 ± 11.0% (k=2) |
| 1950    | ± 50 / ± 100                | Body | 53.3 ± 5%    | 1.52 ± 5%    | 0.27  | 3.10  | 4.78 ± 11.0% (k=2) |
| 2450    | ± 50 / ± 100                | Body | 52.7 ± 5%    | 1.95 ± 5%    | 0.70  | 1.18  | 4.29 ± 11.0% (k=2) |

<sup>c</sup> The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

## Deviation from Isotropy in HSL

Error ( $\phi$ ,  $\vartheta$ ),  $f = 900$  MHz



Uncertainty of Spherical Isotropy Assessment:  $\pm 2.6\%$  ( $k=2$ )

## **Appendix 5**

### **Measurement Uncertainty Budget**

| <i>a</i>                                               | <i>b</i>                | <i>c</i>              | <i>d</i>             | <i>e =<br/>f(d,k)</i> | <i>f</i>                              | <i>g</i>                               | <i>h =<br/>c x f<br/>/ e</i>                 | <i>i =<br/>c x g<br/>/ e</i>                  | <i>k</i>                    |
|--------------------------------------------------------|-------------------------|-----------------------|----------------------|-----------------------|---------------------------------------|----------------------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------|
| <b>Uncertainty Component</b>                           | IEEE<br>1528<br>section | <b>Tol.<br/>(± %)</b> | <b>Prob<br/>Dist</b> | <b>Div.</b>           | <b><i>c<sub>i</sub></i><br/>(1 g)</b> | <b><i>c<sub>i</sub></i><br/>(10 g)</b> | <b>1 g<br/><i>u<sub>i</sub></i><br/>(±%)</b> | <b>10 g<br/><i>u<sub>i</sub></i><br/>(±%)</b> | <b><i>v<sub>i</sub></i></b> |
| <b>Measurement System</b>                              |                         |                       |                      |                       |                                       |                                        |                                              |                                               |                             |
| Probe Calibration                                      | E.2.1                   | 5.9                   | N                    | 1.00                  | 1                                     | 1                                      | 5.9                                          | 5.9                                           | ∞                           |
| Axial Isotropy                                         | E.2.2                   | 4.7                   | R                    | 1.73                  | 0.707                                 | 0.707                                  | 1.9                                          | 1.9                                           | ∞                           |
| Hemispherical Isotropy                                 | E.2.2                   | 9.6                   | R                    | 1.73                  | 0.707                                 | 0.707                                  | 3.9                                          | 3.9                                           | ∞                           |
| Boundary Effect                                        | E.2.3                   | 1.0                   | R                    | 1.73                  | 1                                     | 1                                      | 0.6                                          | 0.6                                           | ∞                           |
| Linearity                                              | E.2.4                   | 4.7                   | R                    | 1.73                  | 1                                     | 1                                      | 2.7                                          | 2.7                                           | ∞                           |
| System Detection Limits                                | E.2.5                   | 1.0                   | R                    | 1.73                  | 1                                     | 1                                      | 0.6                                          | 0.6                                           | ∞                           |
| Readout Electronics                                    | E.2.6                   | 0.3                   | N                    | 1.00                  | 1                                     | 1                                      | 0.3                                          | 0.3                                           | ∞                           |
| Response Time                                          | E.2.7                   | 1.1                   | R                    | 1.73                  | 1                                     | 1                                      | 0.6                                          | 0.6                                           | ∞                           |
| Integration Time                                       | E.2.8                   | 1.1                   | R                    | 1.73                  | 1                                     | 1                                      | 0.6                                          | 0.6                                           | ∞                           |
| RF Ambient Conditions - Noise                          | E.6.1                   | 3.0                   | R                    | 1.73                  | 1                                     | 1                                      | 1.7                                          | 1.7                                           | ∞                           |
| RF Ambient Conditions - Reflections                    | E.6.1                   | 0.0                   | R                    | 1.73                  | 1                                     | 1                                      | 0.0                                          | 0.0                                           | ∞                           |
| Probe Positioner Mech. Tolerance                       | E.6.2                   | 0.4                   | R                    | 1.73                  | 1                                     | 1                                      | 0.2                                          | 0.2                                           | ∞                           |
| Probe Positioning w.r.t Phantom                        | E.6.3                   | 1.4                   | R                    | 1.73                  | 1                                     | 1                                      | 0.8                                          | 0.8                                           | ∞                           |
| Max. SAR Evaluation (ext., int., avg.)                 | E.5                     | 3.4                   | R                    | 1.73                  | 1                                     | 1                                      | 2.0                                          | 2.0                                           | ∞                           |
| <b>Test sample Related</b>                             |                         |                       |                      |                       |                                       |                                        |                                              |                                               |                             |
| Test Sample Positioning                                | E.4.2                   | 3.2                   | N                    | 1.00                  | 1                                     | 1                                      | 3.2                                          | 3.2                                           | 29                          |
| Device Holder Uncertainty                              | E.4.1                   | 4.0                   | N                    | 1.00                  | 1                                     | 1                                      | 4.0                                          | 4.0                                           | 8                           |
| SAR drift                                              | 6.6.2                   | 5.0                   | R                    | 1.73                  | 1                                     | 1                                      | 2.9                                          | 2.9                                           | ∞                           |
| <b>Phantom and Tissue Parameters</b>                   |                         |                       |                      |                       |                                       |                                        |                                              |                                               |                             |
| Phantom Uncertainty                                    | E.3.1                   | 4.0                   | R                    | 1.73                  | 1                                     | 1                                      | 2.3                                          | 2.3                                           | ∞                           |
| Liquid Conductivity (target)                           | E.3.2                   | 5.0                   | R                    | 1.73                  | 0.64                                  | 0.43                                   | 1.8                                          | 1.2                                           | ∞                           |
| Liquid Conductivity (measurement)                      | E.3.3                   | 3.3                   | N                    | 1.00                  | 0.64                                  | 0.43                                   | 2.1                                          | 1.4                                           | ∞                           |
| Liquid Permittivity (target)                           | E.3.2                   | 5.0                   | R                    | 1.73                  | 0.6                                   | 0.49                                   | 1.7                                          | 1.4                                           | ∞                           |
| Liquid Permittivity (measurement)                      | E.3.3                   | 1.9                   | N                    | 1.00                  | 0.6                                   | 0.49                                   | 1.1                                          | 0.9                                           | ∞                           |
| <b>Combined Standard Uncertainty</b>                   |                         |                       | RSS                  |                       |                                       |                                        | 11.1                                         | 10.8                                          | 411                         |
| <b>Expanded Uncertainty<br/>(95% CONFIDENCE LEVEL)</b> |                         |                       | <i>k</i> =2          |                       |                                       |                                        | 22.2                                         | 21.6                                          |                             |

## **Appendix 6**

### **Dipole Characterization Certificate**



# Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

|                                                                      |                                                                                                        |        |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------|
|                                                                      | 835 MHz                                                                                                |        |
| Reference Target:                                                    | 9.56                                                                                                   | (W/kg) |
| Measurement Uncertainty (k=1):                                       | 9.0%                                                                                                   |        |
|                                                                      |                                                                                                        |        |
| Measurement Period:                                                  | 26-Aug-09 to 8-Oct-09                                                                                  |        |
| # of tests performed:                                                | 48                                                                                                     |        |
| Grand Average:                                                       | 9.69                                                                                                   | (W/kg) |
| % Delta (Average - Reference Target)                                 | 1.4%                                                                                                   |        |
|                                                                      |                                                                                                        |        |
| Is % Delta <= Expanded Measurement Uncertainty (k=2)?                | Yes                                                                                                    |        |
|                                                                      |                                                                                                        |        |
| Accept/Reject <u>Average</u> as new system performance check target? | ACCEPT                                                                                                 |        |
|                                                                      | Applies to Dipole SN's:<br>432tr, 417tr, 420tr, 422tr, 423tr, 424tr, 425tr, 431tr, 434tr, 421tr, 436tr |        |

-New System Performance Check Targets- per WI-0396  
(based on analysis of historical data)

| Frequency | SAR Target (W/kg) | Permittivity Target +/- % | Conductivity (S/m) Target +/- % |
|-----------|-------------------|---------------------------|---------------------------------|
| 835 MHz   | 9.69              | 41.5 +/- 5%               | 0.90 +/- 5%                     |

-Approvals-

Submitted by: Marge Kaunas

Date: 12-Oct-09

Signed: Marge Kaunas

Comments:

Approved by: Steve Hauswirth

Date: 13-Oct-09

Signed: Steve Hauswirth

Comments:

# Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

|                                                                      |                                                                                                                                                  |        |
|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|--------|
|                                                                      | 1800 MHz                                                                                                                                         |        |
| Reference Target:                                                    | 38.4                                                                                                                                             | (W/kg) |
| Measurement Uncertainty (k=1):                                       | 9.0%                                                                                                                                             |        |
| Measurement Period:                                                  | 15April08 - 26March09                                                                                                                            |        |
| # of tests performed:                                                | 929                                                                                                                                              |        |
| Grand Average:                                                       | 37.91                                                                                                                                            | (W/kg) |
| % Delta (Average - Reference Target)                                 | -1.3%                                                                                                                                            |        |
| Is % Delta <= Expanded Measurement Uncertainty (k=2)?                | Yes                                                                                                                                              |        |
| Accept/Reject <u>Average</u> as new system performance check target? | ACCEPT                                                                                                                                           |        |
|                                                                      | <u>Applies to Dipole SN's:</u><br>246tr, 250tr, 251tr, 259tr, 263tr, 271tr, 272tr, 276tr, 277tr, 279tr, 280tr, 281tr, 283tr, 284tr, 2d128, 2d129 |        |

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

| Frequency | SAR Target (W/kg) | Permittivity Target +/- % | Conductivity (S/m) Target +/- % |
|-----------|-------------------|---------------------------|---------------------------------|
| 1800 MHz  | 37.91             | 40.0 +/- 5%               | 1.40 +/- 5%                     |

-Approvals-

Submitted by: Marge Kaunas Date: 1-Apr-09

Signed: Marge Kaunas

Comments: Data file available upon request.

Approved by: Steve Hauswirth Date: 1-Apr-09

Signed: Steve Hauswirth

Comments:

# Certification of System Performance Check Targets

FCD-1806, rev-1

-Historical Data-

|                                                                      |                         |        |
|----------------------------------------------------------------------|-------------------------|--------|
|                                                                      | 2450 MHz                |        |
| Reference Target:                                                    | 52.4                    | (W/kg) |
| Measurement Uncertainty (k=1):                                       | 9.0%                    |        |
| Measurement Period:                                                  | 15April08 - 26March09   |        |
| # of tests performed:                                                | 150                     |        |
| Grand Average:                                                       | 56.68                   | (W/kg) |
| % Delta (Average - Reference Target)                                 | 8.2%                    |        |
| Is % Delta <= Expanded Measurement Uncertainty (k=2)?                | Yes                     |        |
| Accept/Reject <u>Average</u> as new system performance check target? | ACCEPT                  |        |
|                                                                      | Applies to Dipole SN's: |        |
|                                                                      | 740, 766, 767, 788, 789 |        |

-New System Performance Check Targets- per WI-0396

(based on analysis of historical data)

| Frequency | SAR Target (W/kg) | Permittivity Target +/- % | Conductivity (S/m) Target +/- % |
|-----------|-------------------|---------------------------|---------------------------------|
| 2450 MHz  | 56.68             | 39.2 +/- 10%              | 1.80 +/- 5%                     |

-Approvals-

Submitted by: Marge Kaunas Date: 1-Apr-09

Signed: Marge Kaunas

Comments: Data file available upon request.

Approved by: Steve Hauswirth Date: 1-Apr-09

Signed: Steve Hauswirth

Comments:

**END OF REPORT**