# SAR TEST REPORT

**REPORT NO.:** SA110420C26-1
**MODEL NO.:** WIXFMM-122
**FCC ID:** MXFWIXFMM-122
**RECEIVED:** Apr. 20, 2011
**TESTED:** May 16 ~ May 18, 2011
**ISSUED:** May 26, 2011

**APPLICANT:** Gemtek Technology Co., Ltd.

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**ISSUED BY:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

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# RELEASE CONTROL RECORD

| ISSUE NO. | REASON FOR CHANGE | DATE ISSUED |
|---|---|---|
| Original release | N/A | May 26, 2011 |

# 1. CERTIFICATION

**PRODUCT:** 2.5GHz CLEAR 4G Spot
**MODEL NO.:** WIXFMM-122
**BRAND:** CLEAR
**APPLICANT:** Gemtek Technology Co., Ltd.
**TESTED:** May 16 ~ May 18, 2011
**TEST SAMPLE:** Engineering Sample
**STANDARDS:** **FCC Part 2 (Section 2.1093)**
**FCC OET Bulletin 65, Supplement C (01-01)**
**RSS-102 Issue 4 (2010-03)**

The above equipment (model: WIXFMM-122) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , DATE : May 26, 2011
Pettie Chen / Specialist

APPROVED BY : _____ , DATE : May 26, 2011
Gary Chang / Assistant Manager

# 2. GENERAL INFORMATION

## 2.1 GENERAL DESCRIPTION OF EUT

| | | |
|---|---|---|
| **EUT** | 2.5GHz CLEAR 4G Spot | |
| **MODEL NO.** | WIXFMM-122 | |
| **FCC ID** | MXFWIXFMM-122 | |
| **POWER SUPPLY** | 5Vdc | |
| **CODED TYPE/MODULATION/ CODING RATE** | **UL** | QPSK: 1/2, 3/4 |
| | | 16QAM: 1/2, 3/4 |
| | **DL** | QPSK: 1/2, 3/4 |
| | | 16QAM: 1/2, 3/4 |
| | | 64QAM: 1/2, 2/3, 3/4, 5/6 |
| **MULTIPLE ACCESS METHOD** | TDMA | |
| **MODULATION TECHNOLOGY** | OFDMA | |
| **DUPLEX METHOD** | TDD | |
| **TX / RX FUNCTION** | WiFi support 1TX / 1RX , WiMAX supports 1TX / 2RX (TX switching diversity) | |
| **MIMO FUNCTION** | Not supported | |
| **OPERATING FREQUENCY** | 2498.5MHz to 2687.5Mz | |
| **CHANNEL BANDWIDTH** | 5MHz, 10MHz | |
| **AVERAGE SAR (1g)** | 1.180W/kg | |
| **ANTENNA TYPE** | Antenna 1: Metal (Monopole) antenna with 2.5dBi gain<br>Antenna 2: Metal (Monopole) antenna with 1.8dBi gain | |
| **DATA CABLE** | 0.95m shielded USB cable without core | |
| **I/O PORTS** | USB | |
| **ACCESSORY DEVICES** | Adapter | |
| **MAX DL:UL ratio** | 29:18 | |

**NOTE:**

1. The EUT is a 2.5GHz CLEAR 4G Spot. The test data are separated into following test reports.

| | **REFERENCE REPORT** |
|---|---|
| **WLAN** | SA110420C26 |
| **WiMAX** | SA110420C26-1 |

2. The EUT were powered by the following adapter:

| | |
|---|---|
| **BRAND:** | DVE |
| **MODEL:** | DSC-5PFC-05 FUS 050100 |
| **INPUT:** | 100-240Vac~, 0.2A, 50/60Hz |
| **OUTPUT:** | +5Vdc, 1.0A |

3. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

## 1.2 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

**FCC Part 2 (2.1093)**

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

**RSS-102 Issue 4 (2010-03)**

**IEEE 1528-2003**

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

## 1.3 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY52 (Version 52.6) consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY52 software defined. The DASY52 software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

## EX3DV4 ISOTROPIC E-FIELD PROBE

| | |
|---|---|
| **CONSTRUCTION** | Symmetrical design with triangular core<br>Built-in shielding against static charges<br>PEEK enclosure material (resistant to organic solvents, e.g., DGBE) |
| **FREQUENCY** | 10 MHz to > 6 GHz<br>Linearity: ± 0.2 dB (30 MHz to 6 GHz) |
| **DIRECTIVITY** | ± 0.3 dB in HSL (rotation around probe axis)<br>± 0.5 dB in tissue material (rotation normal to probe axis) |
| **DYNAMIC RANGE** | 10 μW/g to > 100 mW/g<br>Linearity: ± 0.2 dB (noise: typically < 1 μW/g) |
| **DIMENSIONS** | Overall length: 330 mm (Tip: 20 mm)<br>Tip diameter: 2.5 mm (Body: 12 mm)<br>Typical distance from probe tip to dipole centers: 1 mm |
| **APPLICATION** | High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%. |

**NOTE**

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

## TWIN SAM V4.0

| | |
|---|---|
| **CONSTRUCTION** | The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, EN 62209-1 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot. |
| **SHELL THICKNESS** | 2 ± 0.2mm |
| **FILLING VOLUME** | Approx. 25liters |
| **DIMENSIONS** | Height: 810mm; Length: 1000mm; Width: 500mm |

## SYSTEM VALIDATION KITS:

| | |
|---|---|
| **CONSTRUCTION** | Symmetrical dipole with l/4 balun enables measurement of feedpoint impedance with NWA matched for use near flat phantoms filled with brain simulating solutions.<br>Includes distance holder and tripod adaptor |
| **CALIBRATION** | Calibrated SAR value for specified position and input power at the flat phantom in brain simulating solutions |
| **FREQUENCY** | 2600MHz |
| **RETURN LOSS** | > 20dB at specified validation position |
| **POWER CAPABILITY** | > 100W (f < 1GHz); > 40W (f > 1GHz) |
| **OPTIONS** | Dipoles for other frequencies or solutions and other calibration conditions upon request |

## DEVICE HOLDER FOR SAM TWIN PHANTOM

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

## DATA ACQUISITION ELECTRONICS

**CONSTRUCTION**

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

## 1.4 TEST EQUIPMENT

**FOR SAR MEASURENENT**

| ITEM | NAME | BRAND | TYPE | SERIES NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|---|---|
| 1 | SAM Phantom | S & P | QD000 P40 C | TP 1485 | NA | NA |
| 2 | Signal Generator | Anritsu | 68247B | 984703 | May 31, 2010 | May 30, 2011 |
| 3 | E-Field Probe | S & P | EX3DV4 | 3650 | Jan. 24, 2011 | Jan. 23, 2012 |
| 4 | DAE | S & P | DAE 3 | 510 | Oct. 04, 2010 | Oct. 03, 2011 |
| 5 | Robot Positioner | Staubli Unimation | NA | NA | NA | NA |
| 6 | Validation Dipole | S & P | D2600V2 | 1003 | Jan. 27, 2011 | Jan. 26, 2012 |

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

**FOR TISSUE PROPERTY**

| ITEM | NAME | BRAND | TYPE | SERIES NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|---|---|---|---|---|---|
| 1 | Network Analyzer | Agilent | E8358A | US41480539 | Dec. 30, 2010 | Dec. 29, 2011 |
| 2 | Dielectric Probe | Agilent | 85070D | US01440176 | NA | NA |

**NOTE:**

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

## 1.5 GENERAL DESCRIPTION OF THE SPATIAL PEAK SAR EVALUATION

The DASY52 post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the micro-volt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

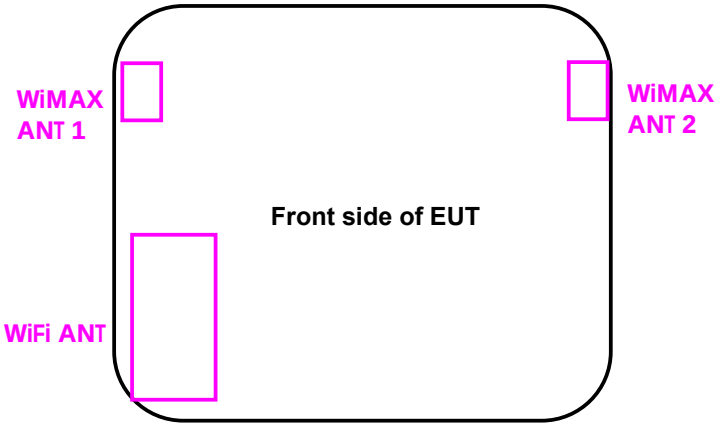
The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved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

## 3. DESCRIPTION OF SUPPORT UNITS

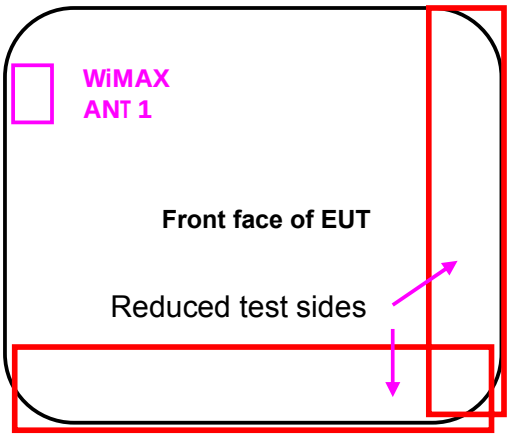
The EUT has been tested as an independent unit.

# 4. DESCRIPTION OF ANTENNA LOCATION

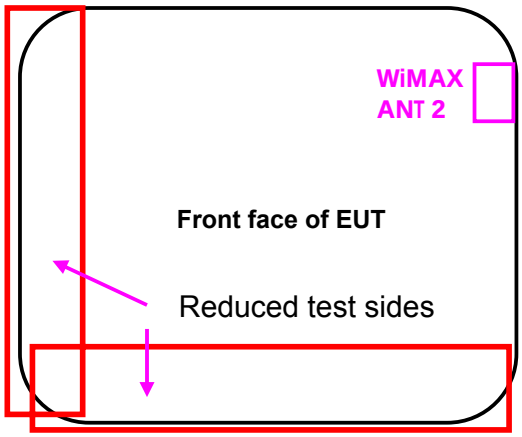
Picture 1: Antenna location




Picture 2:
Reduced test sides for Wimax antenna 1




Picture 3:
Reduced test sides for Wimax antenna 2




Since 2 WiMAX antennas cannot transmit at same time, the two sides that are apart from the transmitting antenna as shown in above illustration were not tested as the antenna in that sides were not turned on and the separation distance from transmitting antenna was longer than 2.5cm. A KDB inquiry was submitted for test distance and 10 mm separation distance was approved in KDB tracking no. 432311

## 5. RECIPES FOR TISSUE SIMULATING LIQUIDS

For the measurement of the field distribution inside the SAM phantom, the phantom must be filled with tissue simulation liquid at least 15cm deep from the ERP (Ear Reference Point).

The following ingredients are used：

- **WATER-** Deionized water (pure H20), resistivity _16 M - as basis for the liquid
- **DGMBE-** Diethylenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS # 112-34-5 - to reduce relative permittivity

**THE RECIPES FOR 2600MHz SIMULATING LIQUID TABLE**

| Ingredient | Muscle Simulating Liquid 2600MHz (MSL-2600) |
|---|---|
| Water | 69.83% |
| DGMBE | 30.17% |
| Salt | NA |
| Dielectric Parameters at 22℃ | f= 2600MHz<br>ε= 52.5 ± 5%<br>σ= 2.16 ± 5% S/m |

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

1. Turn Network Analyzer on and allow at least 30min. warm up.
2. Mount dielectric probe kit so that interconnecting cable to Network Analyzer will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature (±1°).
4. Set water temperature in Agilent-Software (Calibration Setup).
5. Perform calibration.
6. Validate calibration with dielectric material of known properties (e.g. polished ceramic slab with >8mm thickness ε'=10.0, ε''=0.0). If measured parameters do not fit within tolerance, repeat calibration (±0.2 for ε': ±0.1 for ε'').
7. Conductivity can be calculated from ε'' by $\sigma = \omega\ \varepsilon_0\ \varepsilon'' = \varepsilon''\ f\ [GHz] / 18$.
8. Measure liquid shortly after calibration. Repeat calibration every hour.
9. Stir the liquid to be measured. Take a sample (~ 50ml) with a syringe from the center of the liquid container.
10. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
11. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
12. Perform measurements.
13. Adjust medium parameters in DASY52 for the frequencies necessary for the measurements.
14. Select the current medium for the frequency of the validation.

## FOR SIMULATING LIQUID

| | | | | | |
|---|---|---|---|---|---|
| **LIQUID TYPE** | | MSL-2600 | | | |
| **SIMULATING LIQUID TEMP.** | | 21.7 | | | |
| **TEST DATE** | | May 16, 2011 | | | |
| **TESTED BY** | | Van Lin | | | |
| **FREQ. (MHz)** | **LIQUID PARAMETER** | **STANDARD VALUE** | **MEASUREMENT VALUE** | **ERROR PERCENTAGE (%)** | **LIMIT(%)** |
| 2498.5 | Permitivity ( $\varepsilon$ ) | 52.64 | 54.01 | 2.60 | ±5 |
| 2501.0 | | 52.64 | 53.97 | 2.53 | |
| 2593.0 | | 52.52 | 53.64 | 2.13 | |
| 2600.0 | | 52.51 | 53.53 | 1.94 | |
| 2685.0 | | 52.4 | 53.37 | 1.85 | |
| 2687.5 | | 52.4 | 53.35 | 1.81 | |
| 2498.5 | Conductivity ( $\sigma$ ) S/m | 2.02 | 2.04 | 0.99 | |
| 2501.0 | | 2.02 | 2.07 | 2.48 | |
| 2593.0 | | 2.15 | 2.16 | 0.47 | |
| 2600.0 | | 2.16 | 2.17 | 0.46 | |
| 2685.0 | | 2.28 | 2.25 | -1.32 | |
| 2687.5 | | 2.29 | 2.26 | -1.31 | |

| LIQUID TYPE | | MSL-2600 | | | |
|---|---|---|---|---|---|
| SIMULATING LIQUID TEMP. | | 21.4 | | | |
| TEST DATE | | May 17, 2011 | | | |
| TESTED BY | | Van Lin | | | |
| FREQ. (MHz) | LIQUID PARAMETER | STANDARD VALUE | MEASUREMENT VALUE | ERROR PERCENTAGE (%) | LIMIT(%) |
| 2498.5 | Permitivity ( $\varepsilon$ ) | 52.64 | 54.26 | 3.08 | ±5 |
| 2501.0 | | 52.64 | 54.22 | 3.00 | |
| 2593.0 | | 52.52 | 53.98 | 2.78 | |
| 2600.0 | | 52.51 | 53.86 | 2.57 | |
| 2685.0 | | 52.40 | 53.66 | 2.40 | |
| 2687.5 | | 52.40 | 53.63 | 2.35 | |
| 2498.5 | Conductivity ( $\sigma$ ) S/m | 2.02 | 2.03 | 0.50 | |
| 2501.0 | | 2.02 | 2.06 | 1.98 | |
| 2593.0 | | 2.15 | 2.15 | 0.00 | |
| 2600.0 | | 2.16 | 2.16 | 0.00 | |
| 2685.0 | | 2.28 | 2.23 | -2.19 | |
| 2687.5 | | 2.29 | 2.24 | -2.18 | |

| LIQUID TYPE | | MSL-2600 | | | |
|---|---|---|---|---|---|
| SIMULATING LIQUID TEMP. | | 21.6 | | | |
| TEST DATE | | May 18, 2011 | | | |
| TESTED BY | | Van Lin | | | |
| FREQ. (MHz) | LIQUID PARAMETER | STANDARD VALUE | MEASUREMENT VALUE | ERROR PERCENTAGE (%) | LIMIT(%) |
| 2498.5 | Permitivity ( $\varepsilon$ ) | 52.64 | 54.48 | 3.50 | ±5 |
| 2501.0 | | 52.64 | 54.43 | 3.40 | |
| 2593.0 | | 52.52 | 54.15 | 3.10 | |
| 2600.0 | | 52.51 | 54.07 | 2.97 | |
| 2685.0 | | 52.40 | 53.84 | 2.75 | |
| 2687.5 | | 52.40 | 53.81 | 2.69 | |
| 2498.5 | Conductivity ( $\sigma$ ) S/m | 2.02 | 2.04 | 0.99 | |
| 2501.0 | | 2.02 | 2.07 | 2.48 | |
| 2593.0 | | 2.15 | 2.13 | -0.93 | |
| 2600.0 | | 2.16 | 2.14 | -0.93 | |
| 2685.0 | | 2.28 | 2.24 | -1.75 | |
| 2687.5 | | 2.29 | 2.25 | -1.75 | |

# 6. SYSTEM VALIDATION

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

## 6.1. TEST PROCEDURE

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

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

2. The ”Surface Check” job tests the optical surface detection system of the DASY system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ±0.1mm). In that case it is better to abort the system performance check and stir the liquid.

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

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

About the validation dipole positioning uncertainty, the constant and low loss dielectric spacer is used to establish the correct distance between the top surface of the dipole and the bottom surface of the phantom, the error component introduced by the uncertainty of the distance between the liquid (i.e., phantom shell) and the validation dipole in the DASY52 system is less than ±0.1mm.

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

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

## 6.2. VALIDATION RESULTS

| SYSTEM VALIDATION TEST OF SIMULATING LIQUID | | | | | |
|---|---|---|---|---|---|
| FREQUENCY (MHz) | REQUIRED SAR (mW/g) | MEASURED SAR (mW/g) | DEVIATION (%) | SEPARATION DISTANCE | TESTED DATE |
| MSL 2600 | 14.4 (1g) | 14.6 | 1.39 | 10mm | May 16, 2011 |
| MSL 2600 | 14.4 (1g) | 14.8 | 2.78 | 10mm | May 17, 2011 |
| MSL 2600 | 14.4 (1g) | 15.2 | 5.56 | 10mm | May 18, 2011 |

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

## 6.3. SYSTEM VALIDATION UNCERTAINTIES

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

| Error Description | Tolerance (±%) | Probability Distribution | Divisor | ($C_i$) | | Standard Uncertainty (±%) | | ($v_i$) |
|---|---|---|---|---|---|---|---|---|
| | | | | (1g) | (10g) | (1g) | (10g) | |
| **Measurement System** | | | | | | | | |
| **Probe Calibration** | 5.50 | Normal | 1 | 1 | 1 | 5.50 | 5.50 | ∞ |
| **Axial Isotropy** | 0.25 | Rectangular | $\sqrt{3}$ | 0.7 | 0.7 | 0.10 | 0.10 | ∞ |
| **Hemispherical Isotropy** | 1.30 | Rectangular | $\sqrt{3}$ | 0.7 | 0.7 | 0.53 | 0.53 | ∞ |
| **Boundary effects** | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Linearity** | 0.30 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.17 | 0.17 | ∞ |
| **System Detection Limits** | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Readout Electronics** | 0.30 | Normal | 1 | 1 | 1 | 0.30 | 0.30 | ∞ |
| **Response Time** | 0.80 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.46 | 0.46 | ∞ |
| **Integration Time** | 2.60 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.50 | 1.50 | ∞ |
| **RF Ambient Noise** | 3.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | 9 |
| **RF Ambient Reflections** | 3.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.73 | 1.73 | 9 |
| **Probe Positioner** | 0.40 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.23 | 0.23 | ∞ |
| **Probe Positioning** | 2.90 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.67 | 1.67 | ∞ |
| **Max. SAR Eval.** | 1.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.58 | 0.58 | ∞ |
| **Test sample related** | | | | | | | | |
| **Sample positioning** | 1.90 | Normal | 1 | 1 | 1 | 1.90 | 1.90 | 4 |
| **Device holder uncertainty** | 2.80 | Normal | 1 | 1 | 1 | 2.80 | 2.80 | 4 |
| **Output power variation-SAR drift measurement** | 4.50 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.60 | 2.60 | 1 |
| **Dipole Related** | | | | | | | | |
| **Dipole Axis to Liquid Distance** | 1.60 | Rectangular | $\sqrt{3}$ | 1 | 1 | 0.92 | 0.92 | 4 |
| **Input Power Drift** | 3.04 | Rectangular | $\sqrt{3}$ | 1 | 1 | 1.75 | 1.75 | 1 |
| **Phantom and Tissue parameters** | | | | | | | | |
| **Phantom Uncertainty** | 4.00 | Rectangular | $\sqrt{3}$ | 1 | 1 | 2.31 | 2.31 | ∞ |
| **Liquid Conductivity (target)** | 5.00 | Rectangular | $\sqrt{3}$ | 0.64 | 0.43 | 1.85 | 1.24 | ∞ |
| **Liquid Conductivity (measurement)** | 2.48 | Normal | 1 | 0.64 | 0.43 | 1.59 | 1.07 | 9 |
| **Liquid Permittivity (target)** | 5.00 | Rectangular | $\sqrt{3}$ | 0.6 | 0.49 | 1.73 | 1.41 | ∞ |
| **Liquid Permittivity (measurement)** | 3.50 | Normal | 1 | 0.6 | 0.49 | 2.10 | 1.72 | 9 |
| **Combined Standard Uncertainty** | | | | | | **9.15** | **8.84** | |
| **Coverage Factor for 95%** | | | | | | **Kp=2** | | |
| **Expanded Uncertainty (K=2)** | | | | | | **18.31** | **17.67** | |

# 7. 802.16e/WiMax DEVICE AND SYSTEM OPERATING PARAMETERS

| Description | Parameter | | Comment |
|---|---|---|---|
| FCC ID | MXFWIXFMM-122 | | Identify all related FCC ID |
| Radio Service | Part 27 Subpart M | | Rule parts |
| Transmit Frequency Range (MHz) | 5MHz BW : 2498.5 MHz to 2687.5 MHz<br>10MHz BW : 2501.0 MHz to 2685.0 MHz | | System parameter |
| System/Channel Bandwidth (MHz) | 5 MHz | 10 MHz | System parameter |
| System Profile | Revision 1.7.0 | | Defined by WiMAX Forum |
| Modulation Schemes | QPSK, 16QAM | | Identify all applicable UL modulations |
| Sampling Factor | 28/25 | | System parameter |
| Sampling Frequency (MHz) | 5.6 MHz | 11.2 MHz | ($F_S$) |
| Sample Time (ns) | 178.57 ns | 89.29 ns | ($1/F_S$) |
| FFT Size ($N_{FFT}$) | 512 | 1024 | ($N_{FFT}$) |
| Sub-Carrier Spacing (kHz) | 10.94 kHz | | ($\Delta f$) |
| Useful Symbol Time (μs) | 91.4286 μs | | ($T_b=1/\Delta f$) |
| Guard Time (μs) | 11.4286 μs | | ($T_g$=Tb/cp); cp = cyclic prefix |
| OFDMA Symbol Time (μs) | 102.857 μs | | ($T_S=T_b+T_g$) |
| Frame Size (ms) | 5 ms | | System parameter |
| TTG + RTG (μs or number of symbols) | 165.72 μs | | Idle time, system parameter |
| Number of DL OFDMA Symbols per Frame | 29 | | Identify the allowed & maximum symbols, including both traffic & control symbols |
| Number of UL OFDMA Symbols per Frame | 18 | | |
| DL:UL Symbol Ratios | 29:18 | | For determining UL duty factor |
| Power Class (dBm) | Power Class 2, 25.5±0.5 dBm | | Identify power class and tolerance |
| Wave1 / Wave2 | Wave2: Two antennas for Tx/Rx diversity. ANT1 and ANT2 cannot transmit simultaneously. | | Describe antenna diversity info and MIMO requirements separately |
| UL Zone Types (FUSC, PUSC, OFUSC, OPUSC, AMC, TUSC1, TUSC2) | PUSC mode only for current FW. | | Describe separately the symbol and sub-carrier/sub-channel structures applicable to each zone type |
| Maximum Number of UL Sub-Carriers | 420 | 840 | Identify the allowed and tested / to be tested parameters; include separate explanations on the types of control symbols and how the power levels are determined |
| Measured UL Burst Maximum Average Conducted Power | 26 dBm | | |
| UL Control Symbol Configuration | 3 PUSC symbols (used for ranging, CQICH and ACK/NACK) | | |
| UL Control Symbol Maximum Conducted Average Power | 117.09 mW | 56.87 mW | |
| UL Burst Peak-to-Average (Conducted) Power Ratio (PAPR) | PAPR is between 6.58 ~ 8.21 dB | | Identify the expected range and measured/tested PAR; explain separately the methods used / to be used to address SAR probe calibration and measurement error issues |
| Frame Averaged UL Transmission Duty Factor (%) | 18/48 * 100 % = 37.5 % | | Show calculations separately and explain how the applicable CF (*crest factor*) used / to be use in the SAR measurements is derived and how the control symbols are accounted for |

# 8. WIMAX/802.16e DEVICE SPECIFICATION

## 8.1. WIMAX ZONE TYPES

The device and its system are both transmitting using only PUSC zone type. This enables multiple users to transmit simultaneously within the system. FUSC, AMC and other zone types are not used by the test device for uplink transmission. The maximum DL:UL symbol ratio can be determined according to the PUSC requirements. The system transmit an odd number of symbols using DL-PUSC consisting of even multiples of traffics and control symbols plus one symbol for the preamble. Multiples of three symbols are transmitted by the device using UL-PUSC. The OFDMA symbol time allows up to 48 downlink and uplink symbols in each 5 ms frame. TTG and RTG are also included in each frame as DL/UL transmission gaps; therefore, the system can only allow 47 or less symbols per frame

## 8.2. POWER MEASUREMENT

Set the transmitter under transmission condition continuously at specific mode with maximum output.

The power meter was used to read the response of the power sensor. Record the power level and PK to AV ratio. The maximum conducted output power is measured for the uplink burst at DL:UL ratio=**29:18** that is measured for the uplink bursts through triggering and gating.

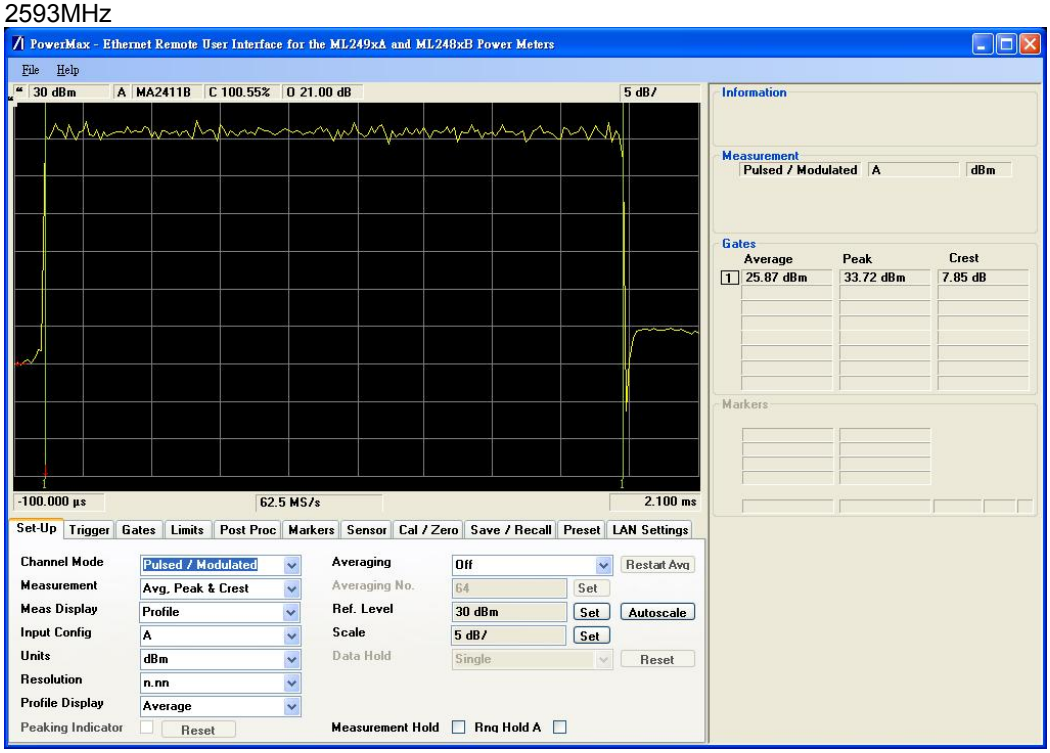
The measured results are as below table:

| Conducted power table of Antenna 1 (dBm) | | | | | |
|---|---|---|---|---|---|
| **Bandwidth(MHz)** | **Frequency(MHz)** | **Modulation** | **Average** | **Peak** | **Peak to Average (dB)** |
| 5 | 2498.5 | QPSK | 25.84 | 34.05 | 8.21 |
| | | 16QAM | 25.80 | 33.98 | 8.18 |
| | 2593 | QPSK | 25.87 | 33.72 | 7.85 |
| | | 16QAM | 25.84 | 33.67 | 7.84 |
| | 2687.5 | QPSK | 25.82 | 32.60 | 6.77 |
| | | 16QAM | 25.80 | 32.60 | 6.80 |
| 10 | 2501 | QPSK | 25.84 | 33.86 | 8.02 |
| | | 16QAM | 25.76 | 33.97 | 8.21 |
| | 2593 | QPSK | 25.88 | 33.50 | 7.62 |
| | | 16QAM | 25.80 | 33.64 | 7.84 |
| | 2685 | QPSK | 25.83 | 32.57 | 6.74 |
| | | 16QAM | 25.79 | 32.55 | 6.76 |

**Test plots of conducted power and PAR ratio for middle channel**

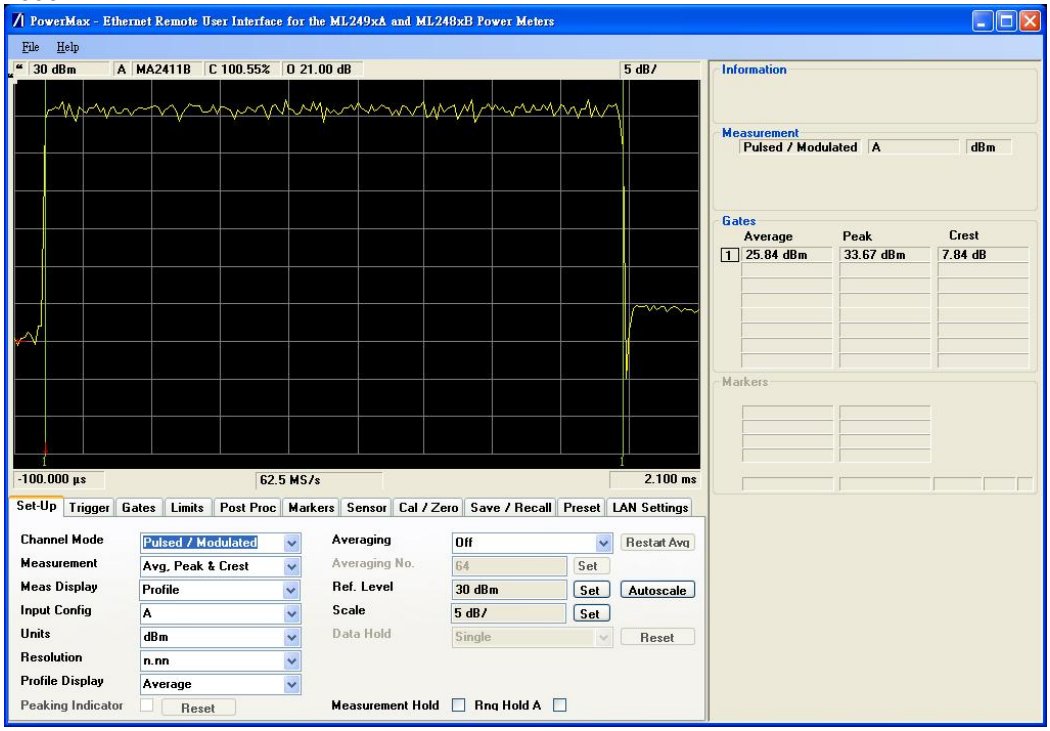
**Bandwidth 5MHz / Modulation : QPSK 1/2**

2593MHz



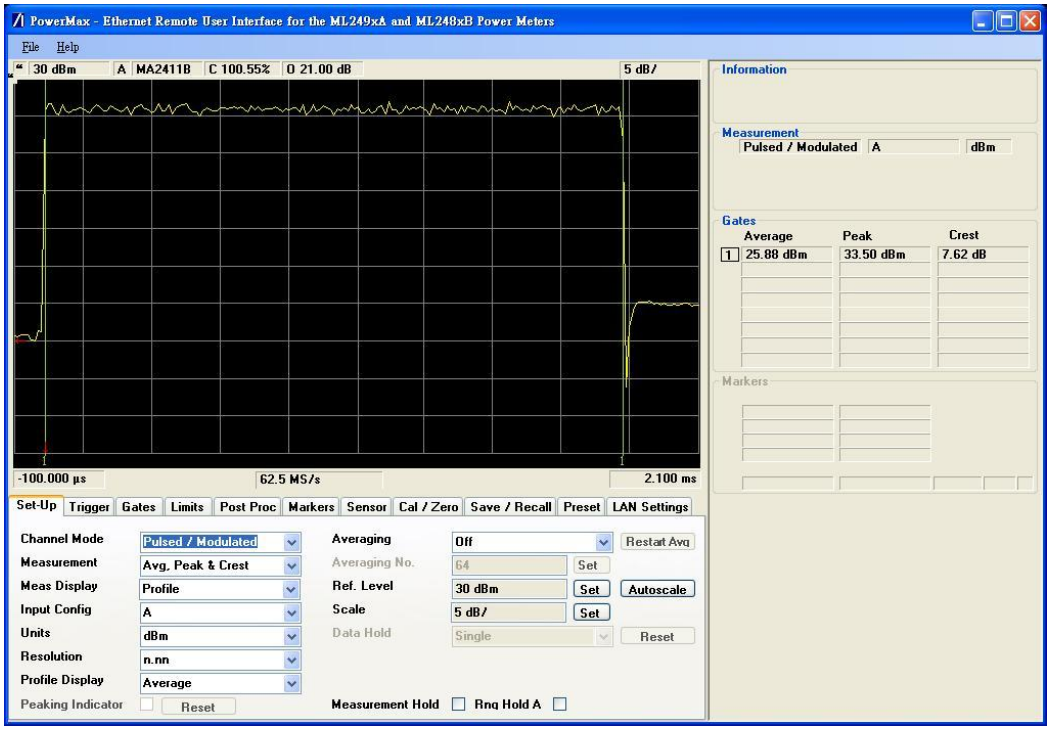

**Bandwidth 5MHz / Modulation : 16QAM 1/2**

2593MHz



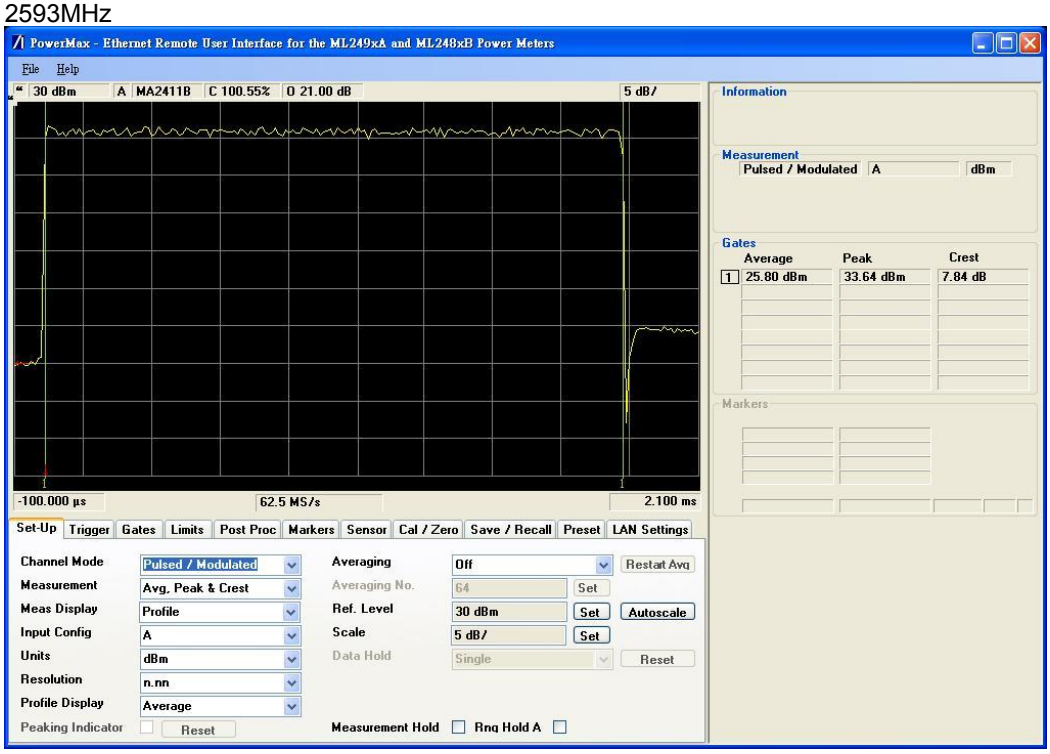
## Bandwidth 10MHz / Modulation : QPSK 1/2

2593MHz




## Bandwidth 10MHz / Modulation : 16QAM 1/2

2593MHz

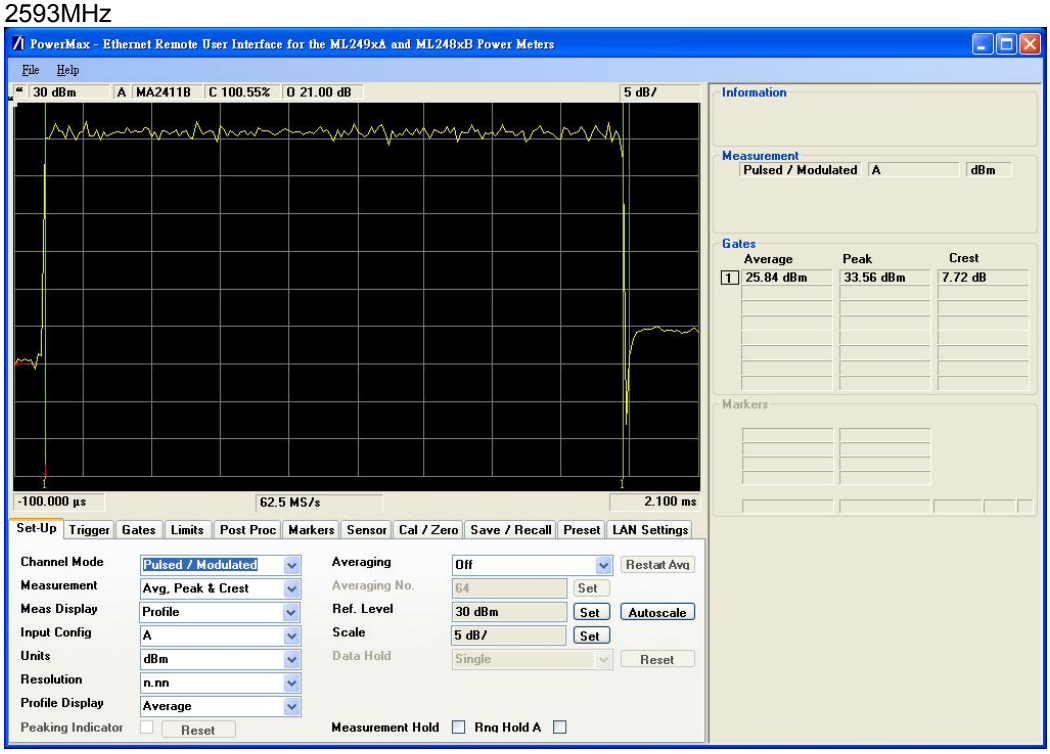


| Conducted power table of Antenna 2 (dBm) | | | | | |
|---|---|---|---|---|---|
| **Bandwidth(MHz)** | **Frequency(MHz)** | **Modulation** | **Average** | **Peak** | **Peak to Average (dB)** |
| 5 | 2498.5 | QPSK | 25.81 | 33.98 | 8.17 |
| | | 16QAM | 25.77 | 33.91 | 8.14 |
| | 2593 | QPSK | 25.84 | 33.56 | 7.72 |
| | | 16QAM | 25.81 | 33.51 | 7.70 |
| | 2687.5 | QPSK | 25.79 | 32.40 | 6.61 |
| | | 16QAM | 25.76 | 32.50 | 6.74 |
| 10 | 2501 | QPSK | 25.80 | 33.86 | 8.06 |
| | | 16QAM | 25.73 | 33.87 | 8.14 |
| | 2593 | QPSK | 25.84 | 33.33 | 7.49 |
| | | 16QAM | 25.78 | 33.51 | 7.74 |
| | 2685 | QPSK | 25.79 | 32.43 | 6.65 |
| | | 16QAM | 25.76 | 32.35 | 6.58 |

## Test plots of conducted power and PAR ratio for middle channel

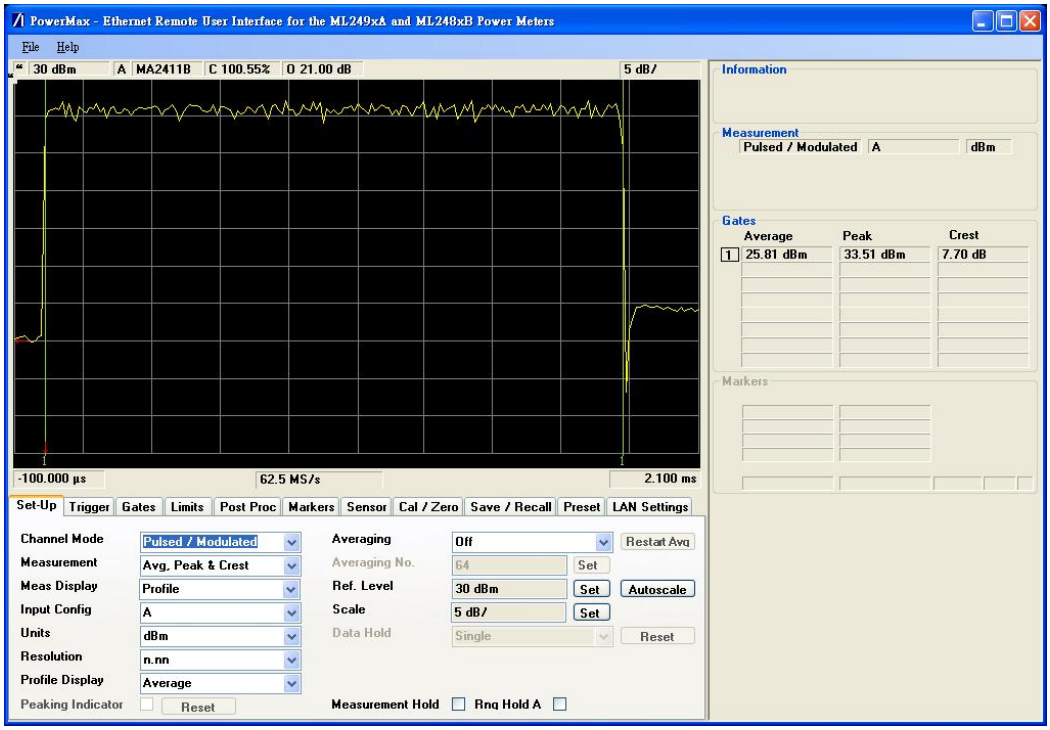
### Bandwidth 5MHz / Modulation : QPSK 1/2

2593MHz



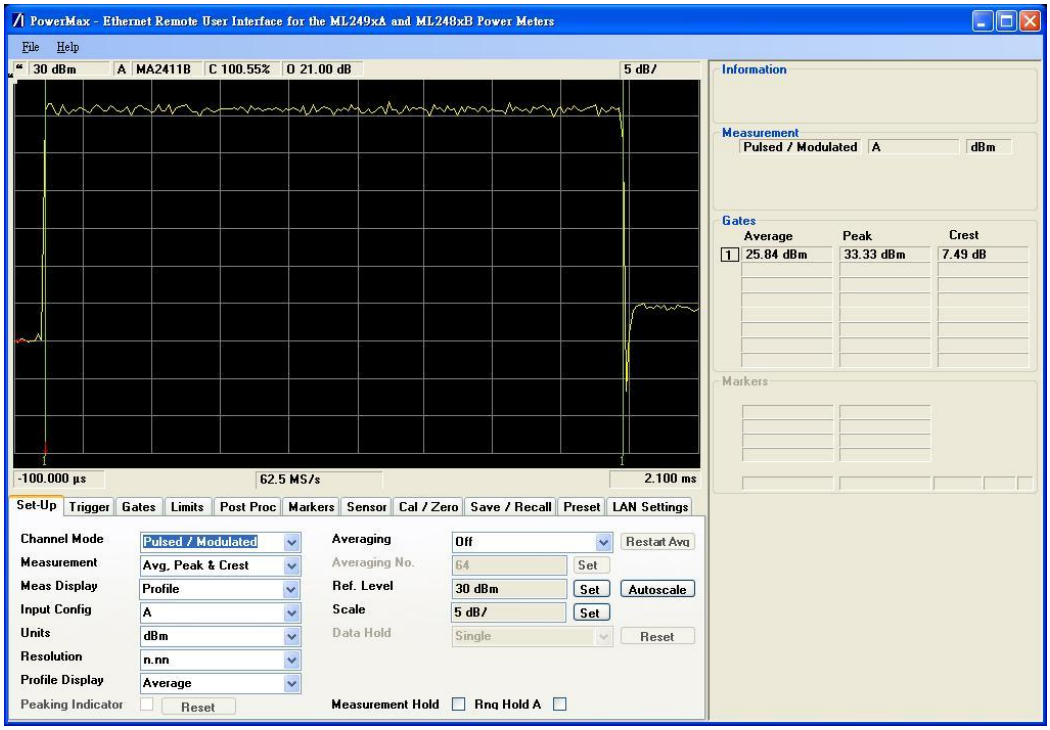

### Bandwidth 5MHz / Modulation : 16QAM 1/2

2593MHz



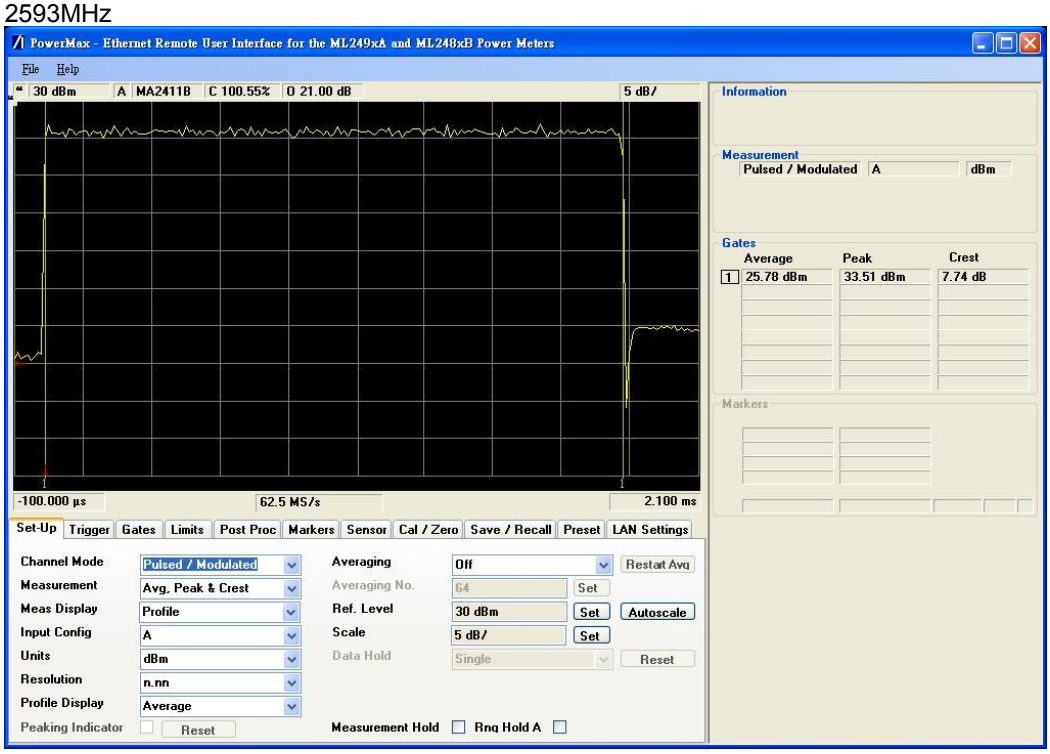
## Bandwidth 10MHz / Modulation : QPSK 1/2

2593MHz




## Bandwidth 10MHz / Modulation : 16QAM 1/2

2593MHz



## 8.3. DUTY FACTOR

Maximum DL/UL symbol ratio for the EUT is 29:18.
The duty cycle = 18/48 =0.375
Duty Factor = 1/(duty cycle)=2.67

The SAR measurement is compensated using factors is as the below list:

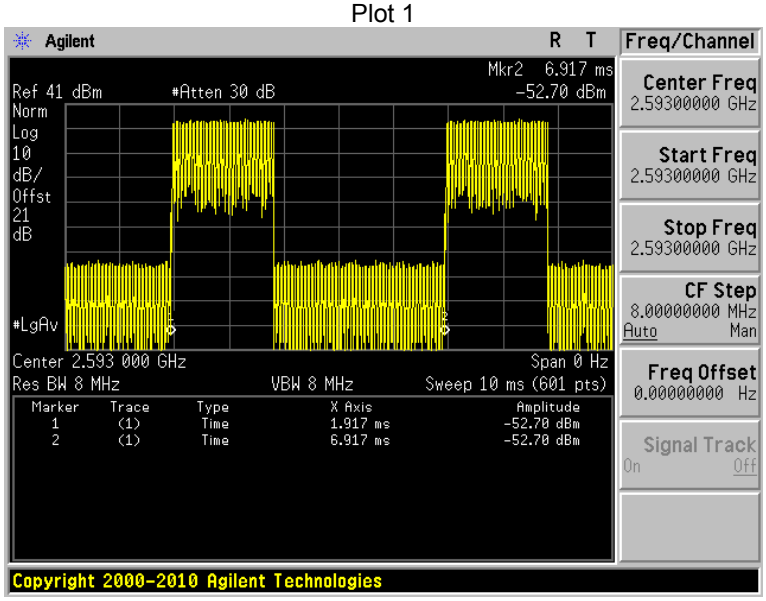
| Channel BW | UL zone type | DL/UL Ratio | UL duty cycle | *cf factor* | UL modulation |
|---|---|---|---|---|---|
| **5MHz** | PUSC | 29/18 | 37.5 % | *2.67* | QPSK 16QAM |
| **10MHz** | PUSC | 29/18 | 37.5 % | *2.67* | QPSK 16QAM |

## Test plot of Duty cycle

**5MHz BW Middle channel / Modulation : QPSK ½**

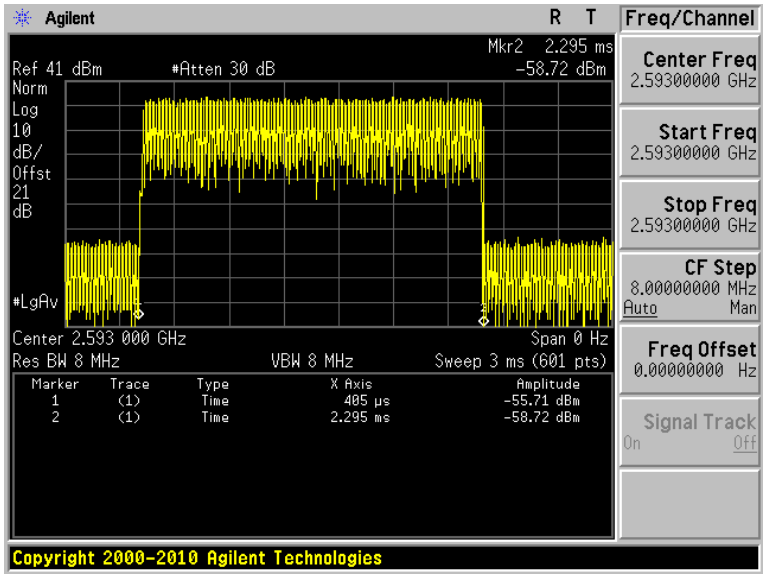
2 plots are measured for duty cycle to each condition shown on above summary table
Plot 1 is used to get the burst length of test signal.
Burst length = Mark 2 – Mark 1=6.917ms-1.617ms=5ms

Plot 1




Plot 2 is used to get the UL time of test signal.
Mark 2 – Mark 1 =UL time =2.295ms-0.405ms=1.89ms

Plot 2




Duty cycle = UL time / Burst length *100 %
= 1.89 / 5 *100 %
= 37.8 %

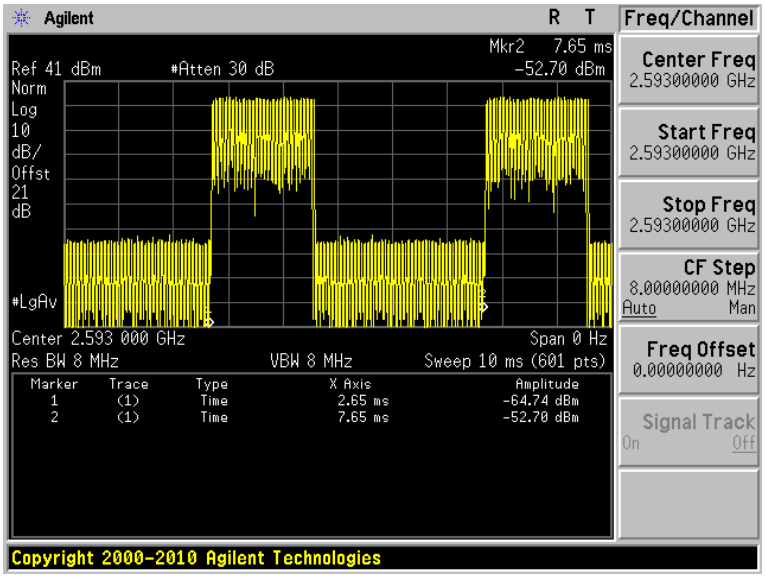
**5MHz BW Middle channel / Modulation : 16QAM 1/2**

2 plots are measured for duty cycle to each condition shown on above summary table

Plot 1 is used to get the burst length of test signal.

Burst length = Mark 2 – Mark 1=7.65ms-2.65ms=5ms

Plot 1

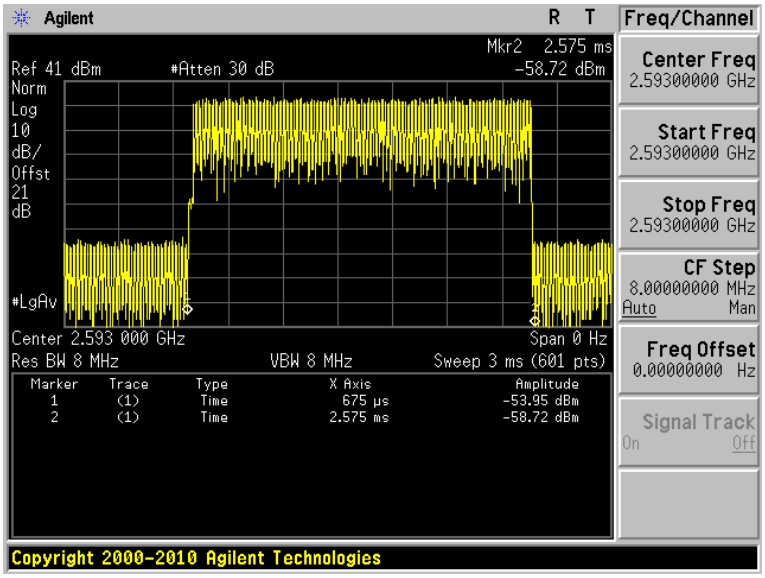



Plot 2 is used to get the UL time of test signal.

Mark 2 – Mark 1 = First 3 symbols UL time=935us-625us=310us

Mark 2 – Mark 1 =UL time =2.575ms-0.675ms=1.90ms

Plot 2




Duty cycle = UL time / Burst length *100 %

= 1.9 / 5 *100 %

= 38 %

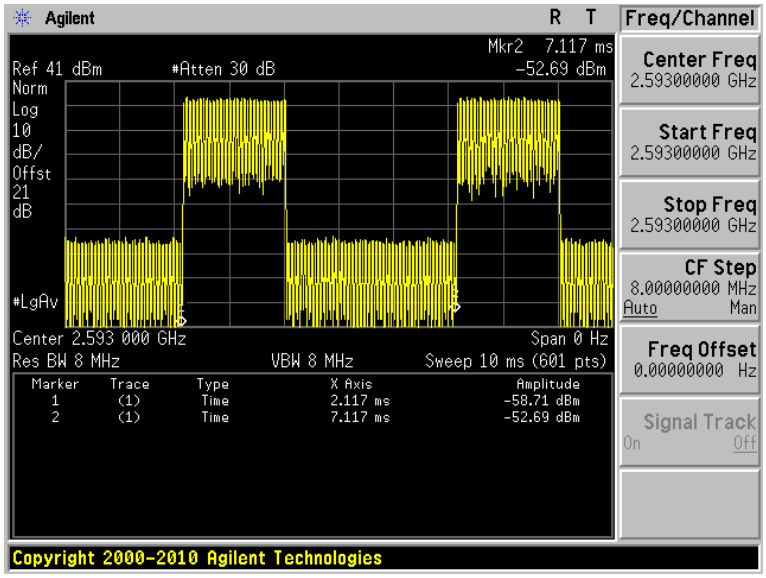
**10MHz BW Middle channel / Modulation : QPSK 1/2**

2 plots are measured for duty cycle to each condition shown on above summary table

Plot 1 is used to get the burst length of test signal.

Burst length = Mark 2 – Mark 1=7.117ms-2.117ms=5ms

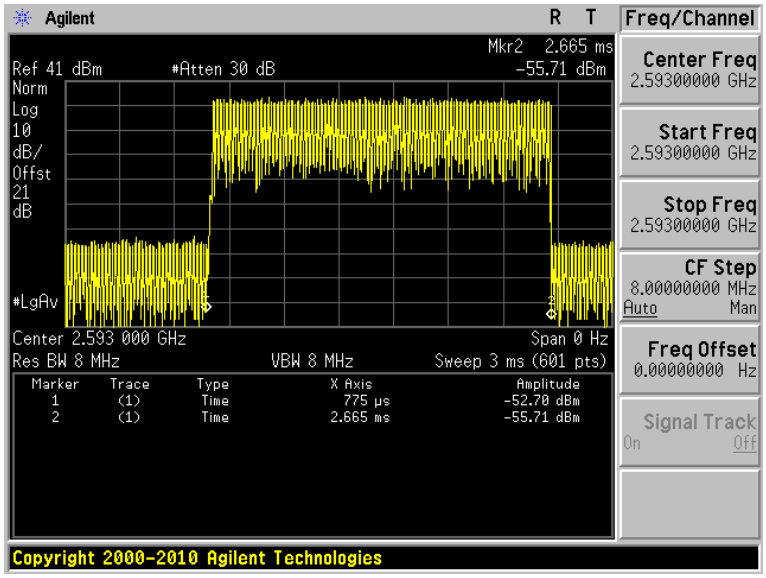
Plot 1




Plot 2 is used to get the UL time of test signal.

Mark 2 – Mark 1 = UL time =2.665ms-0.775ms=1.89ms

Plot 2




Duty cycle = UL time / Burst length *100 %

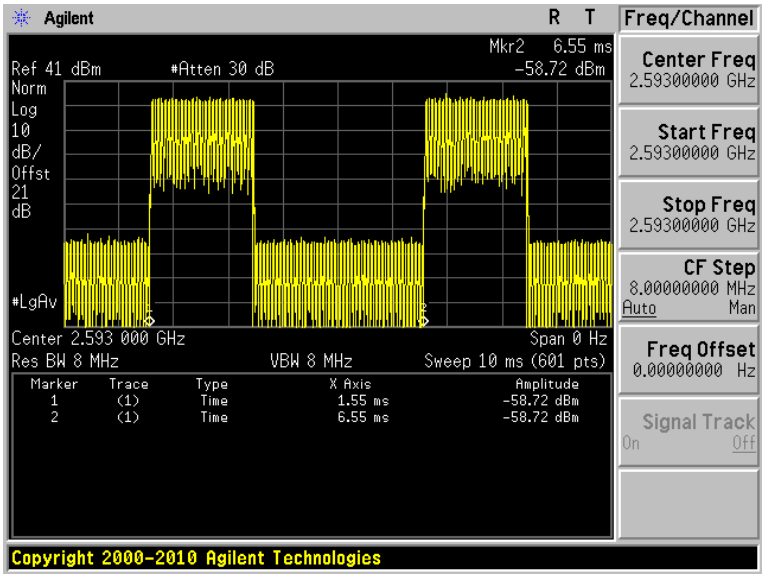
= 1.89 / 5 *100 %

= 37.8 %

**10MHz BW Middle channel / Modulation : 16QAM 1/2**

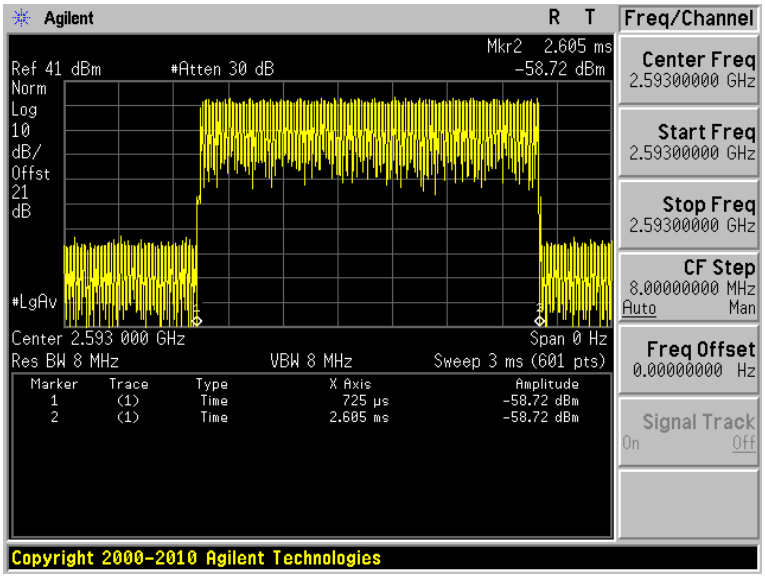
2 plots are measured for duty cycle to each condition shown on above summary table
Plot 1 is used to get the burst length of test signal.
Burst length = Mark 2 – Mark 1=6.55ms-1.55ms=5ms

Plot 1




Plot 2 is used to get the UL time of test signal.
Mark 2 – Mark 1 =UL time =2.605ms-0.725ms=1.88ms

Plot 2

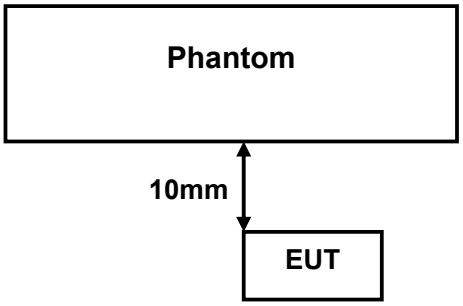



Duty cycle = UL time / Burst length *100 %
= 1.88 / 5 *100 %
= 37.6 %

# 9. TEST SETUP

**Test setup**

The test set-up is shown in the following picture. The WiMAX Router (DUT) is connected to the notebook computer by a USB cable. MTK Test tool is provided by client. This tool can control EUT to transmit at specific channel bandwidth, modulation type, coding rate, power level and frequency without signal generator. When EUT starts to transmit, the USB cable can be disconnected and removed during SAR test period.




**Test Signal detail**
The WIXFMM-122 is 2.5 GHz WiMAX transceiver in a USB Router configuration using Mediatek chipset which supports 1Tx (Tx Switching Diversity) and 2Rx for this device. Its uplink is capable of both 10 MHz and 5 MHz bandwidths.

**PUSC zone type**

For the 10 MHz bandwidth, it has 35 sub-channels structured from 1024 subcarriers per OFDMA symbol and each sub-channel is spanned over 3 OFDMA symbols and consists of 72 subcarriers including 48 data and 24 pilot subcarriers. For each symbol, there are 184 guard subcarriers, leaving 840 available subcarriers for transmission. For the 5 MHz bandwidth, it contains 17 sub-channels using 512 subcarriers including 104 guard subcarriers per symbol and leaving 408 available subcarriers for transmission.

The control channels may occupy up to 5 slots during normal operation. A slot is a sub-channel with the duration of 3 symbols. There are a total of 35 (17) slots in the 10 MHz (5 MHz) channel configuration. The maximum power for each control symbol has been determined to be 56.87(5/35 of 398.11mW) for 10MHz and 117.09(5/17 of 398.11mW) for 5MHz. A maximum of two simultaneous CQICH reports are possible, which can occupy up to 2 slots. A maximum of three slots can be used for HARQ ACK/NAK by the five possible DL HARQ bursts in the previous DL frame. The 5 ACK/NAK bits each occupies ½ a slot. These 5 slots correspond to 5/35 (5/17) of the total number of uplink slots. When the device is transmitting at its maximum rated power of 26 dBm (398.11 mW), the output power for these control channels is 56.87(5/35 of 398.11mW) for 10MHz and 117.09(5/17 of 398.11mW) for 5MHz. Due to the limitation of the test mode software which cannot control the device to output typical control symbols (3symbols with 5 slots occupied). The EUT was programmed to output full power at 26dBm per symbol and this represents the max worst case power which a transmitted symbol can get (no matter it is data symbol or control symbol, the 26dBm is the max output power that this device can output). Since max output power was used during the SAR test, we concluded that no further SAR scaling up is required after the SAR measurement.

The up-link sub-frame is triggered by an Allocation Start Time contained in the information of UL-MAP. This information specifies the starting times of the Uplink and Downlink frames. In any UL sub-frame, the duty factor and bandwidth information is used to ensure optimal system operation. In the real usage, the data burst power will be adjusted according to the signal strength of the communication. In this way, by using the test mode arrangement we are transmitting at a worst case RF level.

The test mode instructs the mobile station MS to transmit for 18 symbols in the UL data zone. This UL transmission is repeated every 5 milliseconds. The TX power of the mobile station is set to maximum power.

As mentioned above that all 18 symbols (3 control symbols plus 15 data symbols) were all transmitted at full power, so we are sure that the device is working at worst SAR condition and no further SAR scaling up is required.

# 10. TEST RESULTS

## 10.1. TEST PROCEDURES

Use the software to control the EUT channel and transmission power. Then record the conducted power before the testing. Place the EUT to the specific test location. After the testing, must writing down the conducted power of the EUT into the report. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY52 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528 standards, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

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

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

In the zoom scan, the distance between the measurement point at the probe sensor location (geometric center behind the probe tip) and the phantom surface is 3mm and maintained at a constant distance of ±0.5mm during a zoom scan to determine peak SAR locations. The distance is 2mm between the first measurement point and the bottom surface of the phantom. The secondary measurement point to the bottom surface of the phantom is with 7mm separation distance. The cube size is 7 x 7 x 7 points consists of 343 points and the grid space is 5mm.

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

In the area scan, the separation distance is 2mm between the each measurement point and the phantom surface. The scan size shall be included the transmission portion of the EUT. The measurement time is the same as the zoom scan. At last the reference power drift shall be less than ±5%.

## 10.2. DESCRIPTION OF TEST CONDITION

| TEST DATE | TEMPERATURE(°C) | | HUMIDITY(%RH) | TESTED BY |
|---|---|---|---|---|
| | AIMBENT | LIQUID | | |
| May 16, 2011 | 22.9 | 21.7 | 58 | Van Lin |
| May 17, 2011 | 22.3 | 21.4 | 62 | Van Lin |
| May 18, 2011 | 22.5 | 21.6 | 60 | Van Lin |

## 10.3. MEASURED SAR RESULTS

**For 5MHz, Modulation: QPSK 1/2, TX antenna: Antenna 1**

| SAR (W/kg) / Chan. | Back Face | Front Face | Left Edge | Top Edge |
|---|---|---|---|---|
| Low | 0.556 | 0.936 | 0.594 | 0.297 |
| Mid. | 0.698 | 1.100 | 0.791 | 0.418 |
| High | 0.596 | 0.935 | 0.840 | 0.382 |

**For 5MHz, Modulation: 16QAM 1/2, TX antenna: Antenna 1**

| SAR (W/kg) / Chan. | Back Face | Front Face | Left Edge | Top Edge |
|---|---|---|---|---|
| Low | Note 6 | 0.928 | 0.574 | Note 6 |
| Mid. | | 1.110 | 0.763 | |
| High | | 0.944 | 0.862 | |

**For 5MHz, Modulation: QPSK 1/2, TX antenna: Antenna 2**

| SAR (W/kg) / Chan. | Back Face | Front Face | Right Edge | Top Edge |
|---|---|---|---|---|
| Low | 0.374 | 0.530 | 0.476 | 0.194 |
| Mid. | 0.536 | 0.603 | 0.689 | 0.222 |
| High | 0.651 | 0.932 | 0.915 | 0.344 |

**For 5MHz, Modulation: 16QAM 1/2, TX antenna: Antenna 2**

| SAR (W/kg) / Chan. | Back Face | Front Face | Right Edge | Top Edge |
|---|---|---|---|---|
| Low | Note 6 | 0.521 | 0.467 | Note 6 |
| Mid. | | 0.591 | 0.675 | |
| High | | 0.936 | 0.897 | |

**NOTE:**

1. In this testing, the limit for General Population Spatial Peak averaged over 1g, **1.6 W/kg**, is applied.
2. Please see the Appendix A for the data.
3. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.
4. When scaled SAR is less than 0.4W/kg, SAR of other channels under the same configuration will be reduced.
5. Use the lowest coding rate for each modulation is mentioned on TCB workshop April, 2010 RF Exposure Procedures Update. Therefore only coding rate 1/2 is tested
6. 16QAM maximum output power is < ¼ dB higher than QPSK and QPSK SAR is < 0.8 W/kg, so SAR for 16QAM is not required. This reduction condition is mentioned on TCB workshop Oct, 2010 RF Exposure Procedures Update

### For 10MHz, Modulation: QPSK 1/2, TX antenna: Antenna 1

| SAR (W/kg) / Chan. | Back Face | Front Face | Left Edge | Top Edge |
|---|---|---|---|---|
| Low | 0.316 | 0.922 | 0.611 | 0.319 |
| Mid. | 0.427 | 1.160 | 0.799 | 0.459 |
| High | 0.583 | 0.976 | 0.841 | 0.403 |

### For 10MHz, Modulation: 16QAM 1/2, TX antenna: Antenna 1

| SAR (W/kg) / Chan. | Back Face | Front Face | Left Edge | Top Edge |
|---|---|---|---|---|
| Low | Note 6 | 0.939 | 0.632 | Note 6 |
| Mid. | | **1.180** | 0.812 | |
| High | | 0.984 | 0.863 | |

### For 10MHz, Modulation: QPSK 1/2, TX antenna: Antenna 2

| SAR (W/kg) / Chan. | Back Face | Front Face | Right Edge | Top Edge |
|---|---|---|---|---|
| Low | 0.379 | 0.535 | 0.502 | 0.209 |
| Mid. | 0.544 | 0.628 | 0.679 | 0.226 |
| High | 0.664 | 0.939 | 0.934 | 0.333 |

### For 10MHz, Modulation: 16QAM 1/2, TX antenna: Antenna 2

| SAR (W/kg) / Chan. | Back Face | Front Face | Right Edge | Top Edge |
|---|---|---|---|---|
| Low | Note 6 | 0.524 | 0.492 | Note 6 |
| Mid. | | 0.615 | 0.665 | |
| High | | 0.905 | 0.869 | |

**NOTE:**

1. In this testing, the limit for General Population Spatial Peak averaged over 1g, **1.6 W/kg**, is applied.
2. Please see the Appendix A for the data.
3. The variation of the EUT conducted power measured before and after SAR testing should not over 5%.
4. When scaled SAR is less than 0.4W/kg, SAR of other channels under the same configuration will be reduced.
5. Use the lowest coding rate for each modulation is mentioned on TCB workshop April, 2010 RF Exposure Procedures Update. Therefore only coding rate 1/2 is tested
6. 16QAM maximum output power is < ¼ dB higher than QPSK and QPSK SAR is < 0.8 W/kg, so SAR for 16QAM is not required. This reduction condition is mentioned on TCB workshop Oct, 2010 RF Exposure Procedures Update

## 10.4. NO SIMULTANEOUS SAR JUSTIFICATION

The product is a 2.5GHz CLEAR 4G Spot which supports 2.4 GHz WI-Fi and 2.5GHz WiMAX function. Both wireless functions can work at the same time. Wi-Fi has only one antenna for Tx/Rx and WiMAX has 2 built-in antennas. However, 2 built-in WiMAX antennas cannot transmit at same time (switching diversity only) but can do Rx at same time with two antennas.

**Simultaneous Transmission Configurations**

| | |
|---|---|
| 1 | WiFi antenna + WiMAX antenna 1 |
| 2 | WiFi antenna + WiMAX antenna 2 |

**Σ of the highest measured 1-g SAR (W/kg)**

| Configuration | SAR of Wi-Fi | SAR of WiMAX antenna 1 | Sum |
|---|---|---|---|
| 1 | 0.308 | 1.180 | 1.488 |

| Configuration | SAR of Wi-Fi | SAR of WiMAX antenna 2 | Sum |
|---|---|---|---|
| 2 | 0.308 | 0.934 | 1.242 |

Antenna separation

| | WiMAX ant 1 | WiMAX ant 2 | Wi-Fi |
|---|---|---|---|
| **WiMAX ant 1** | | 78 mm | 18.55 mm |
| **WiMAX ant 2** | 78 mm | | 67.69 mm |
| **Wi-Fi** | 18.55 mm | 67.69 mm | |

**Conclusion:**

Sum of SAR is < 1.6 W/ kg. Accordingly, simultaneous Transmission SAR is not required for this device

## 10.5.POWER DRIFT TABLE

| Test Mode | Test Position | Communication Mode | Modulation | Test Channel | Power (dBm) | | Power drift (%) | Tx Ant. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Begin | After | | |
| 1 | Back Face 10mm | WiMax_5M | QPSK | L | 25.84 | 25.80 | -0.92 | 1 |
| | | | | M | 25.87 | 25.82 | -1.14 | 1 |
| | | | | H | 25.82 | 25.76 | -1.37 | 1 |
| 2 | Back Face 10mm | WiMax_5M | QPSK | L | 25.81 | 25.74 | -1.60 | 2 |
| | | | | M | 25.84 | 25.76 | -1.83 | 2 |
| | | | | H | 25.79 | 25.70 | -2.05 | 2 |
| 3 | Back Face 10mm | WiMax_10M | QPSK | L | 25.84 | 25.74 | -2.28 | 1 |
| | | | | M | 25.88 | 25.77 | -2.50 | 1 |
| | | | | H | 25.83 | 25.71 | -2.73 | 1 |
| 4 | Back Face 10mm | WiMax_10M | QPSK | L | 25.80 | 25.67 | -2.95 | 2 |
| | | | | M | 25.84 | 25.70 | -3.17 | 2 |
| | | | | H | 25.79 | 25.64 | -3.39 | 2 |
| 5 | Front Face 10mm | WiMax_5M | QPSK | L | 25.84 | 25.68 | -3.62 | 1 |
| | | | | M | 25.87 | 25.70 | -3.84 | 1 |
| | | | | H | 25.82 | 25.64 | -4.06 | 1 |
| 6 | Front Face 10mm | WiMax_5M | 16QAM | L | 25.80 | 25.61 | -4.28 | 1 |
| | | | | M | 25.84 | 25.64 | -4.50 | 1 |
| | | | | H | 25.80 | 25.79 | -0.23 | 1 |
| 7 | Front Face 10mm | WiMax_5M | QPSK | L | 25.81 | 25.79 | -0.46 | 2 |
| | | | | M | 25.84 | 25.81 | -0.69 | 2 |
| | | | | H | 25.79 | 25.75 | -0.92 | 2 |
| 8 | Front Face 10mm | WiMax_5M | 16QAM | L | 25.77 | 25.72 | -1.14 | 2 |
| | | | | M | 25.81 | 25.75 | -1.37 | 2 |
| | | | | H | 25.76 | 25.69 | -1.60 | 2 |
| 9 | Front Face 10mm | WiMax_10M | QPSK | L | 25.84 | 25.76 | -1.83 | 1 |
| | | | | M | 25.88 | 25.79 | -2.05 | 1 |
| | | | | H | 25.83 | 25.73 | -2.28 | 1 |
| 10 | Front Face 10mm | WiMax_10M | 16QAM | L | 25.76 | 25.65 | -2.50 | 1 |
| | | | | M | 25.80 | 25.68 | -2.73 | 1 |
| | | | | H | 25.79 | 25.66 | -2.95 | 1 |
| 11 | Front Face 10mm | WiMax_10M | QPSK | L | 25.80 | 25.66 | -3.17 | 2 |
| | | | | M | 25.84 | 25.69 | -3.39 | 2 |
| | | | | H | 25.79 | 25.63 | -3.62 | 2 |
| 12 | Front Face 10mm | WiMax_10M | 16QAM | L | 25.73 | 25.56 | -3.84 | 2 |
| | | | | M | 25.78 | 25.60 | -4.06 | 2 |
| | | | | H | 25.76 | 25.57 | -4.28 | 2 |

| Test Mode | Test Position | Communication Mode | Modulation | Test Channel | Power (dBm) | | Power drift (%) | Tx Ant. |
|---|---|---|---|---|---|---|---|---|
| | | | | | Begin | After | | |
| 13 | Right Edge 10mm | WiMax_5M | QPSK | L | 25.81 | 25.61 | -4.50 | 2 |
| | | | | M | 25.84 | 25.83 | -0.23 | 2 |
| | | | | H | 25.79 | 25.77 | -0.46 | 2 |
| 14 | Right Edge 10mm | WiMax_5M | 16QAM | L | 25.77 | 25.74 | -0.69 | 2 |
| | | | | M | 25.81 | 25.77 | -0.92 | 2 |
| | | | | H | 25.76 | 25.71 | -1.14 | 2 |
| 15 | Right Edge 10mm | WiMax_10M | QPSK | L | 25.80 | 25.74 | -1.37 | 2 |
| | | | | M | 25.84 | 25.77 | -1.60 | 2 |
| | | | | H | 25.79 | 25.71 | -1.83 | 2 |
| 16 | Right Edge 10mm | WiMax_10M | 16QAM | L | 25.73 | 25.64 | -2.05 | 2 |
| | | | | M | 25.78 | 25.68 | -2.28 | 2 |
| | | | | H | 25.76 | 25.65 | -2.50 | 2 |
| 17 | Left Edge 10mm | WiMax_5M | QPSK | L | 25.84 | 25.72 | -2.73 | 1 |
| | | | | M | 25.87 | 25.74 | -2.95 | 1 |
| | | | | H | 25.82 | 25.68 | -3.17 | 1 |
| 18 | Left Edge 10mm | WiMax_5M | 16QAM | L | 25.80 | 25.65 | -3.39 | 1 |
| | | | | M | 25.84 | 25.68 | -3.62 | 1 |
| | | | | H | 25.80 | 25.63 | -3.84 | 1 |
| 19 | Left Edge 10mm | WiMax_10M | QPSK | L | 25.84 | 25.66 | -4.06 | 1 |
| | | | | M | 25.88 | 25.69 | -4.28 | 1 |
| | | | | H | 25.83 | 25.63 | -4.50 | 1 |
| 20 | Left Edge 10mm | WiMax_10M | 16QAM | L | 25.76 | 25.75 | -0.23 | 1 |
| | | | | M | 25.80 | 25.78 | -0.46 | 1 |
| | | | | H | 25.79 | 25.76 | -0.69 | 1 |
| 21 | Top Edge 10mm | WiMax_5M | QPSK | L | 25.84 | 25.80 | -0.92 | 1 |
| | | | | M | 25.87 | 25.82 | -1.14 | 1 |
| | | | | H | 25.82 | 25.76 | -1.37 | 1 |
| 22 | Top Edge 10mm | WiMax_5M | QPSK | L | 25.81 | 25.74 | -1.60 | 2 |
| | | | | M | 25.84 | 25.76 | -1.83 | 2 |
| | | | | H | 25.79 | 25.70 | -2.05 | 2 |
| 23 | Toip Edge 10mm | WiMax_10M | QPSK | L | 25.84 | 25.74 | -2.28 | 1 |
| | | | | M | 25.88 | 25.77 | -2.50 | 1 |
| | | | | H | 25.83 | 25.71 | -2.73 | 1 |
| 24 | Top Edge 10mm | WiMax_10M | QPSK | L | 25.80 | 25.67 | -2.95 | 2 |
| | | | | M | 25.84 | 25.70 | -3.17 | 2 |
| | | | | H | 25.79 | 25.64 | -3.39 | 2 |

## 11. SAR LIMITS

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

**NOTE:**

1. This limits accord to 47 CFR 2.1093 – Safety Limit.

## 12. SAR ERROR CONSIDERATION

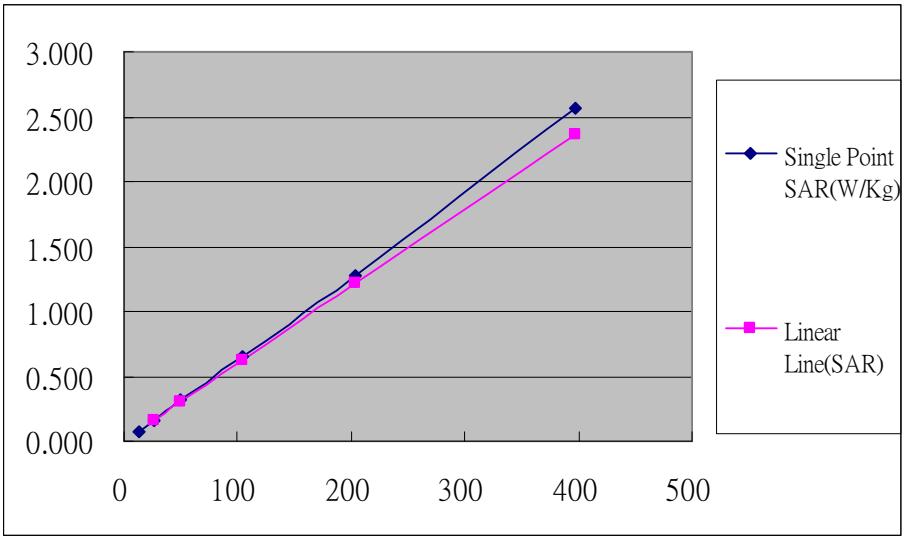
In order to estimate the measurement error due to PAR issues, the configuration with the highest SAR in each channel bandwidth and frequency band is measured at various power level. Test conditions are as below

Test position: Front side
Test distance: 10mm
TX antenna: Antenna 1
Test frequency: 2593MHz for 5MHz bandwidth
2593MHz for 10MHz bandwidth
Modulation: QPSK 1/2, 16QAM 1/2

By tuning different power on this EUT and measuring the relative SAR to verify the high PAR of OFDM/OFDMA is as below:

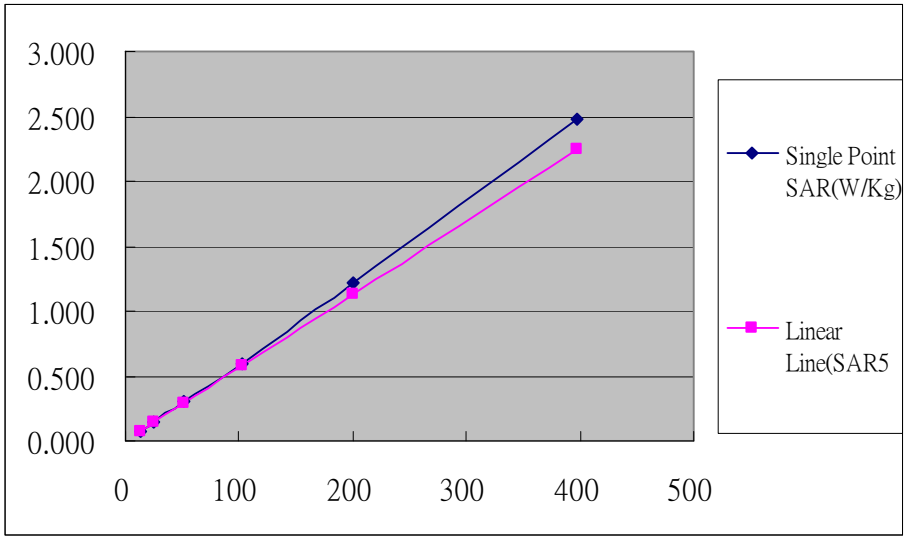
5MHz / QPSK 1/2

| SAR (W/kg) | Power (mW) | 12.63 | 26.30 | 50.33 | 104.71 | 204.17 | 398.11 |
|---|---|---|---|---|---|---|---|
| 5MHz | Point SAR | 0.075 | 0.158 | 0.312 | 0.658 | 1.275 | 2.562 |
| | Linear line | 0.075 | 0.156 | 0.299 | 0.622 | 1.214 | 2.367 |
| | Deviation(%) | 0.00% | 1.28% | 4.35% | 5.79% | 5.02% | 8.24% |



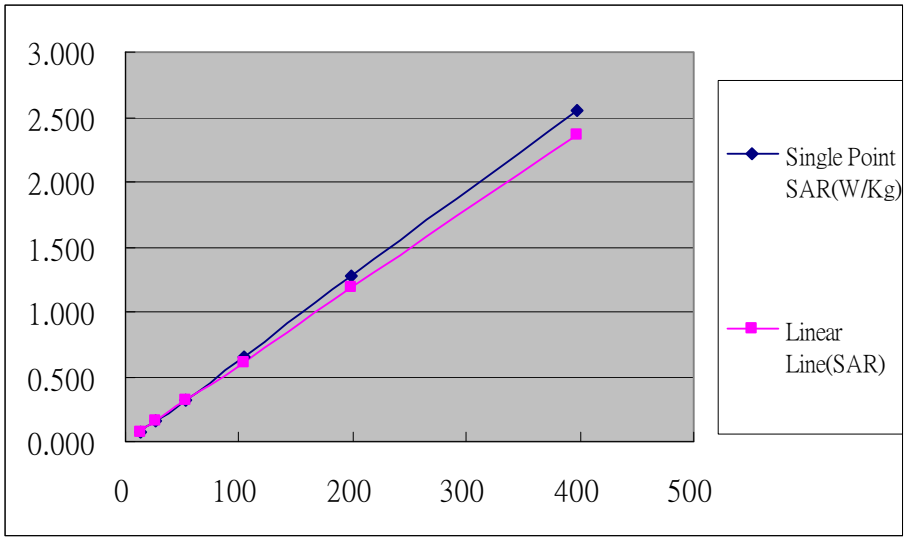
5MHz / 16QAM 1/2

| SAR (W/kg) | Power (mW) | 12.88 | 25.35 | 51.88 | 102.33 | 199.53 | 398.11 |
|---|---|---|---|---|---|---|---|
| 5MHz | Point SAR | 0.073 | 0.145 | 0.302 | 0.595 | 1.215 | 2.474 |
| | Linear line | 0.073 | 0.143 | 0.292 | 0.577 | 1.124 | 2.243 |
| | Deviation(%) | 0.00% | 1.40% | 3.42% | 3.12% | 8.10% | 10.30% |



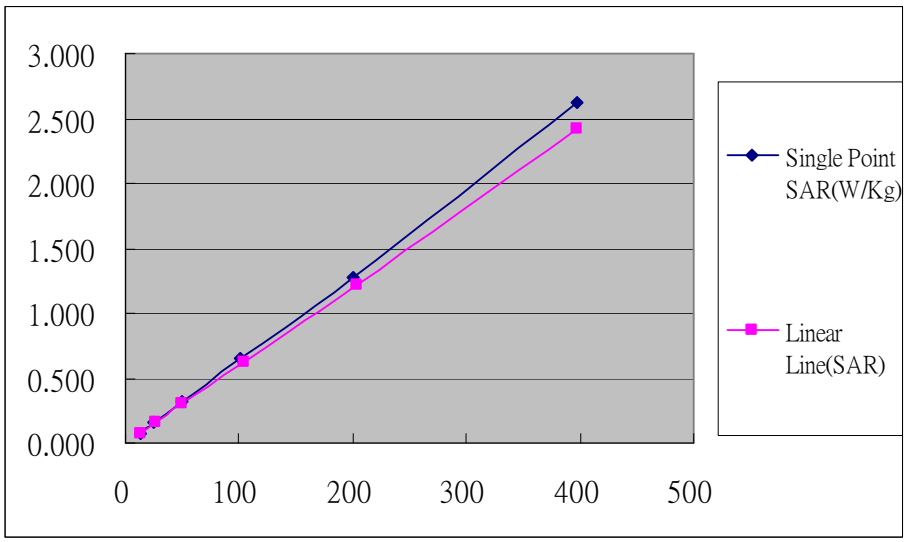
10MHz / QPSK 1/2

| SAR (W/kg) | Power (mW) | 12.89 | 25.84 | 52.48 | 103.54 | 199.23 | 398.11 |
|---|---|---|---|---|---|---|---|
| 10MHz | Point SAR | 0.077 | 0.158 | 0.312 | 0.658 | 1.275 | 2.549 |
| | Linear line | 0.077 | 0.154 | 0.312 | 0.615 | 1.184 | 2.366 |
| | Deviation(%) | 0.00% | 2.60% | 0.00% | 6.99% | 7.69% | 7.73% |



10MHz / 16QAM 1/2

| SAR (W/kg) | Power (mW) | 12.87 | 25.20 | 50.08 | 101.63 | 200.95 | 398.11 |
|---|---|---|---|---|---|---|---|
| 10MHz | Point SAR | 0.078 | 0.158 | 0.312 | 0.658 | 1.275 | 2.625 |
| | Linear line | 0.078 | 0.153 | 0.305 | 0.619 | 1.224 | 2.425 |
| | Deviation(%) | 0.00% | 3.27% | 2.30% | 6.30% | 4.17% | 8.25% |



## 13. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

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

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

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

**Hwa Ya EMC/RF/Safety/Telecom Lab**:
Tel: 886-3-3183232
Fax: 886-3-3185050

**Web Site**: www.adt.com.tw

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

**---END---**

# APPENDIX A: TEST DATA

**Product Name: 2.5GHz CLEAR 4G Spot ; Model Number: WIXFMM-122**

## Liquid Level Photo

**Tissue 2600MHz D=150mm**

Date/Time: 2011/5/16 01:52:55

## M01-Back face-WiMax 5M-Ch0_Ant 1

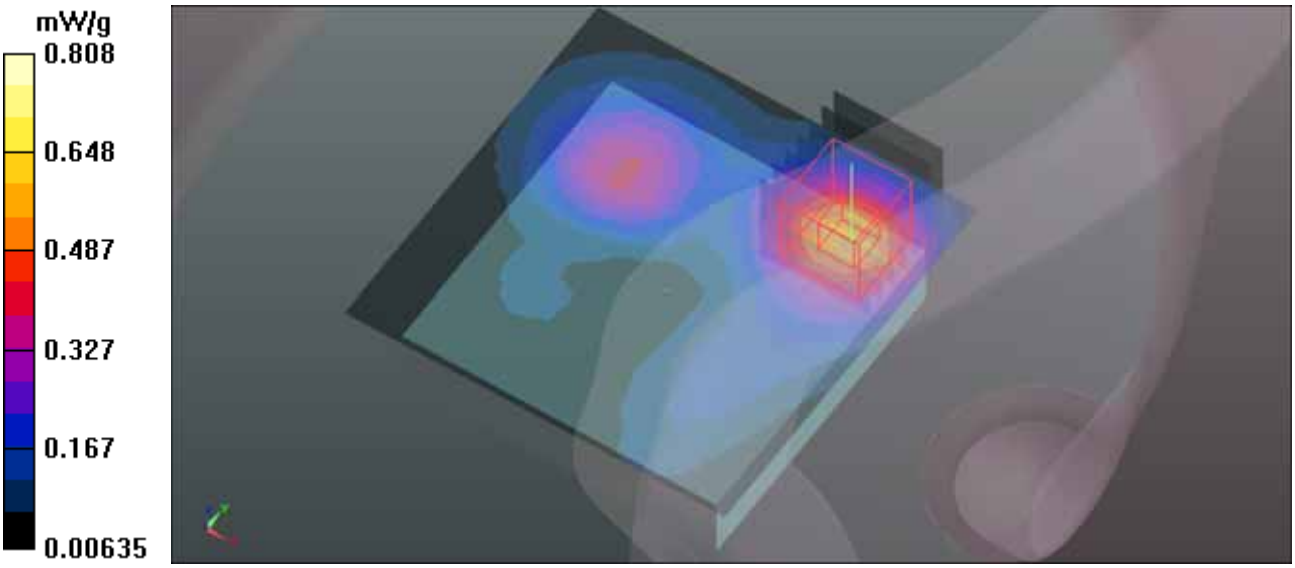
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.04 mho/m; $\varepsilon_r$ = 54.01; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (14x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.808 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.206 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 1.110 W/kg
**SAR(1 g) = 0.556 mW/g; SAR(10 g) = 0.285 mW/g**
Maximum value of SAR (measured) = 0.820 mW/g



Date/Time: 2011/5/16 02:35:30

## M01-Back face-WiMax 5M-Ch378_Ant 1

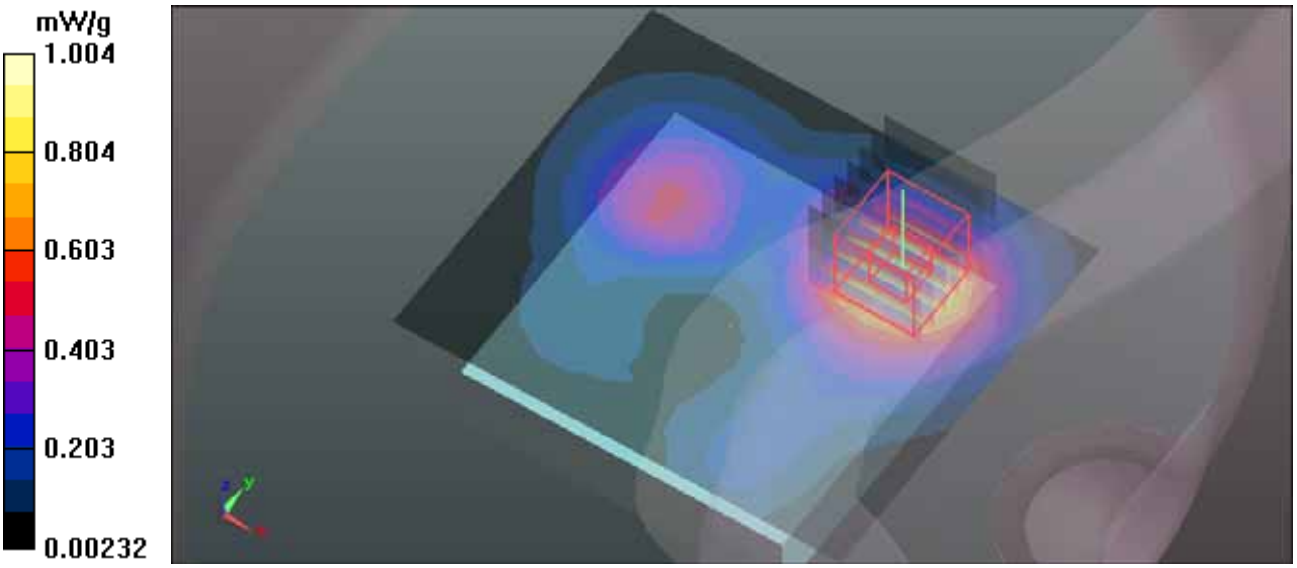
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.004 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.290 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.406 W/kg
**SAR(1 g) = 0.698 mW/g; SAR(10 g) = 0.365 mW/g**
Maximum value of SAR (measured) = 1.028 mW/g



## M01-Back face-WiMax 5M-Ch756_Ant 1

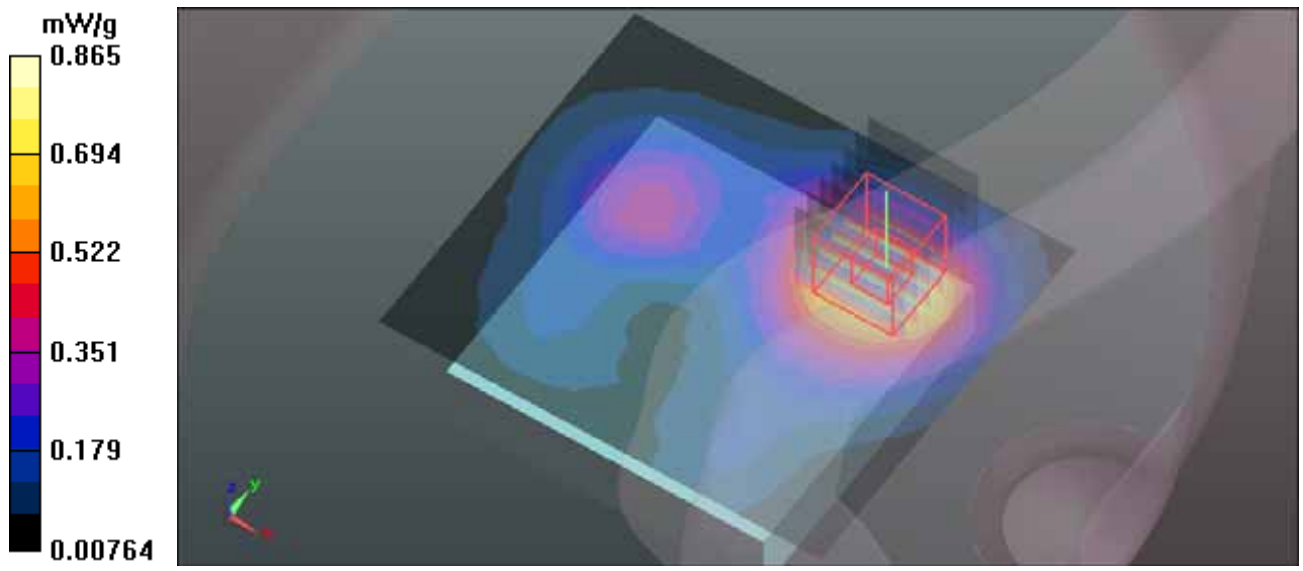
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; $\sigma$ = 2.26 mho/m; $\varepsilon_r$ = 53.35; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.865 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.916 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.225 W/kg
**SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.314 mW/g**
Maximum value of SAR (measured) = 0.877 mW/g



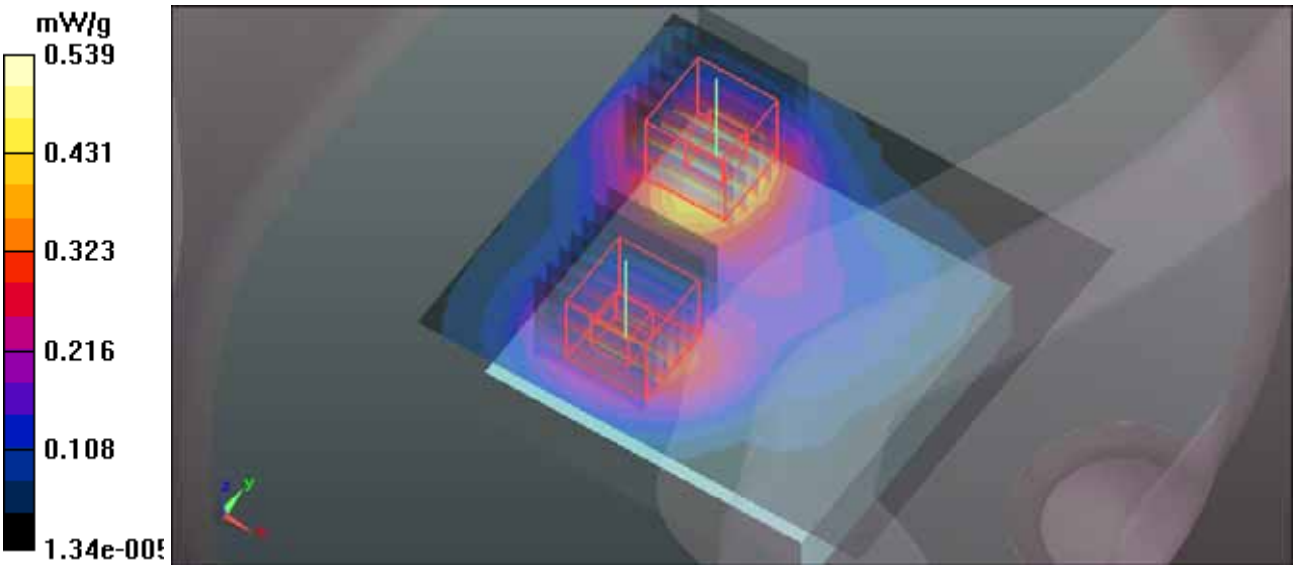
Date/Time: 2011/5/16 04:13:30

## M02-Back face-WiMax 5M-Ch0_Ant 2

Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; $\sigma$ = 2.04 mho/m; $\varepsilon_r$ = 54.01; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.539 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.472 V/m; Power Drift = -0.0064 dB
Peak SAR (extrapolated) = 0.759 W/kg
**SAR(1 g) = 0.374 mW/g; SAR(10 g) = 0.195 mW/g**
Maximum value of SAR (measured) = 0.553 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.472 V/m; Power Drift = -0.0064 dB
Peak SAR (extrapolated) = 0.485 W/kg
**SAR(1 g) = 0.269 mW/g; SAR(10 g) = 0.149 mW/g**
Maximum value of SAR (measured) = 0.374 mW/g



## M02-Back face-WiMax 5M-Ch378_Ant 2

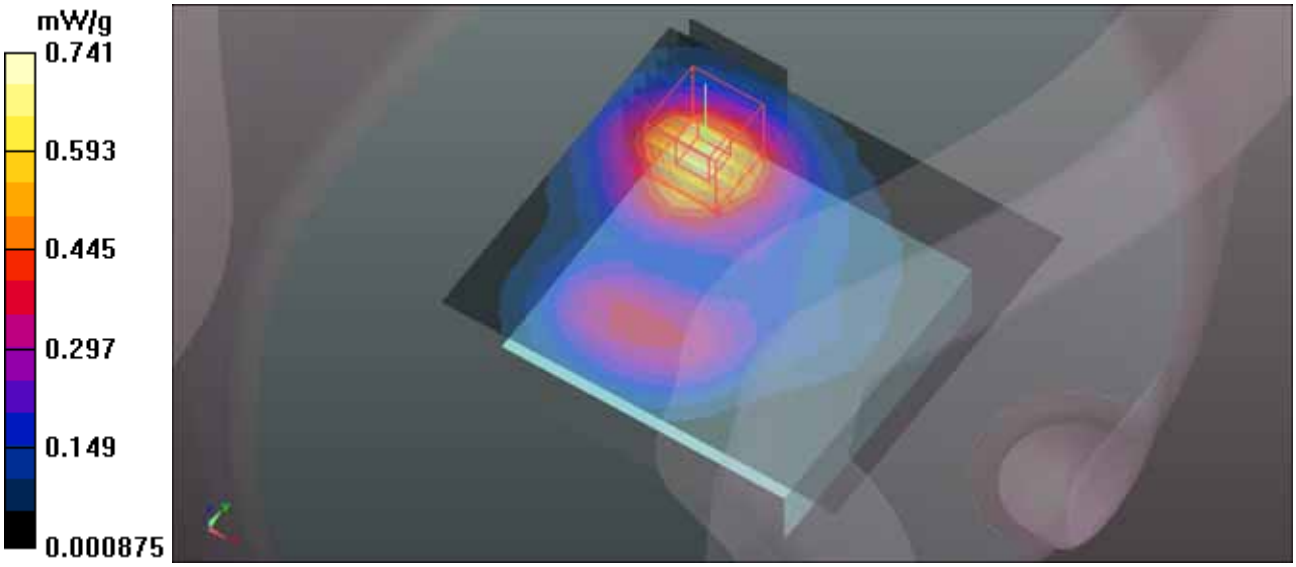
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.741 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.976 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.104 W/kg
**SAR(1 g) = 0.536 mW/g; SAR(10 g) = 0.277 mW/g**
Maximum value of SAR (measured) = 0.798 mW/g



Date/Time: 2011/5/16 05:37:00

## M02-Back face-WiMax 5M-Ch756_Ant 2

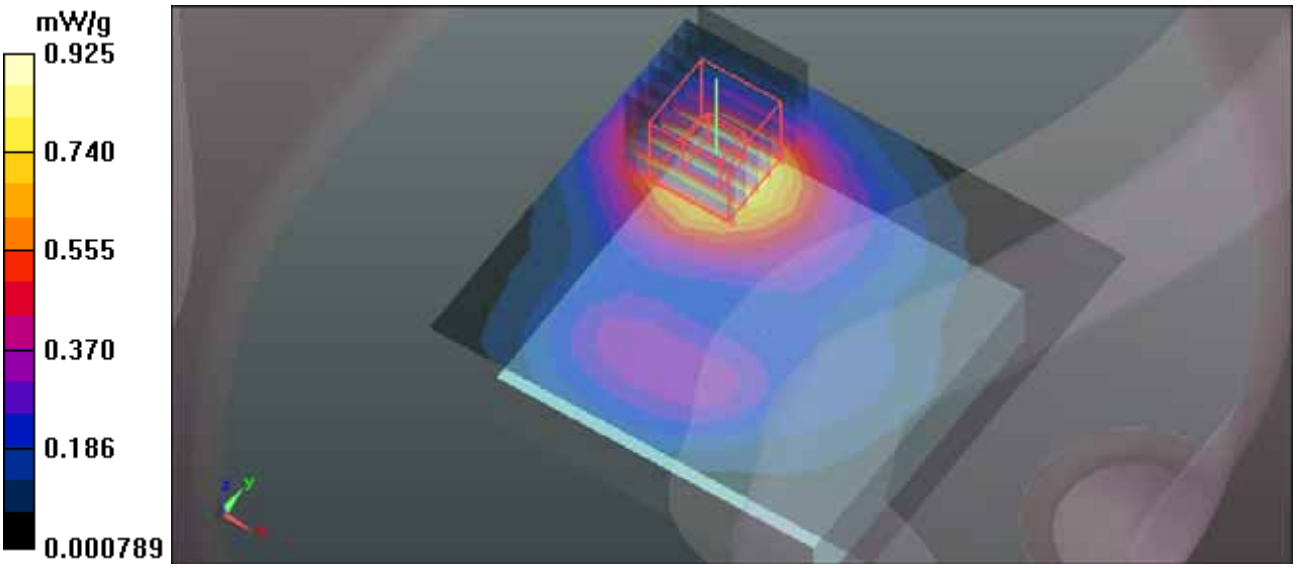
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.26 mho/m; $\varepsilon_r$ = 53.35; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.925 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.399 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.368 W/kg
**SAR(1 g) = 0.651 mW/g; SAR(10 g) = 0.336 mW/g**
Maximum value of SAR (measured) = 0.976 mW/g

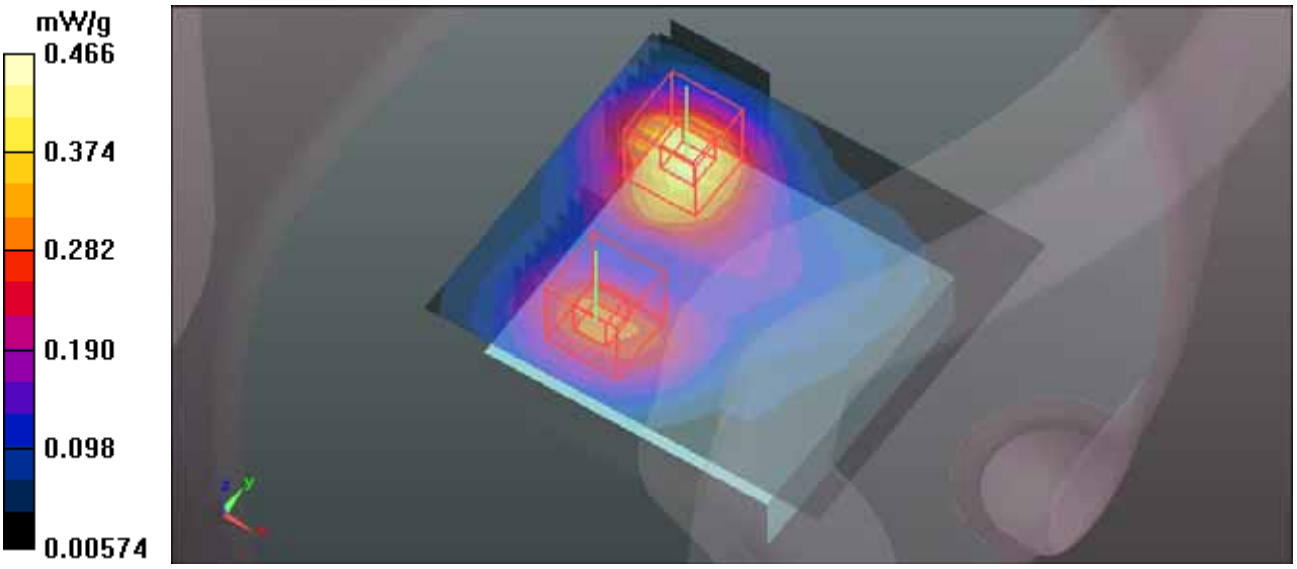


## M03-Back face-WiMax 10M-Ch0_Ant 1

Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.07 mho/m; $\varepsilon_r$ = 53.97; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.428 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.459 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.631 W/kg
**SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.168 mW/g**
Maximum value of SAR (measured) = 0.466 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.459 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.409 W/kg
**SAR(1 g) = 0.230 mW/g; SAR(10 g) = 0.129 mW/g**
Maximum value of SAR (measured) = 0.317 mW/g



Date/Time: 2011/5/16 05:50:09

## M03-Back face-WiMax 10M-Ch368_Ant 1

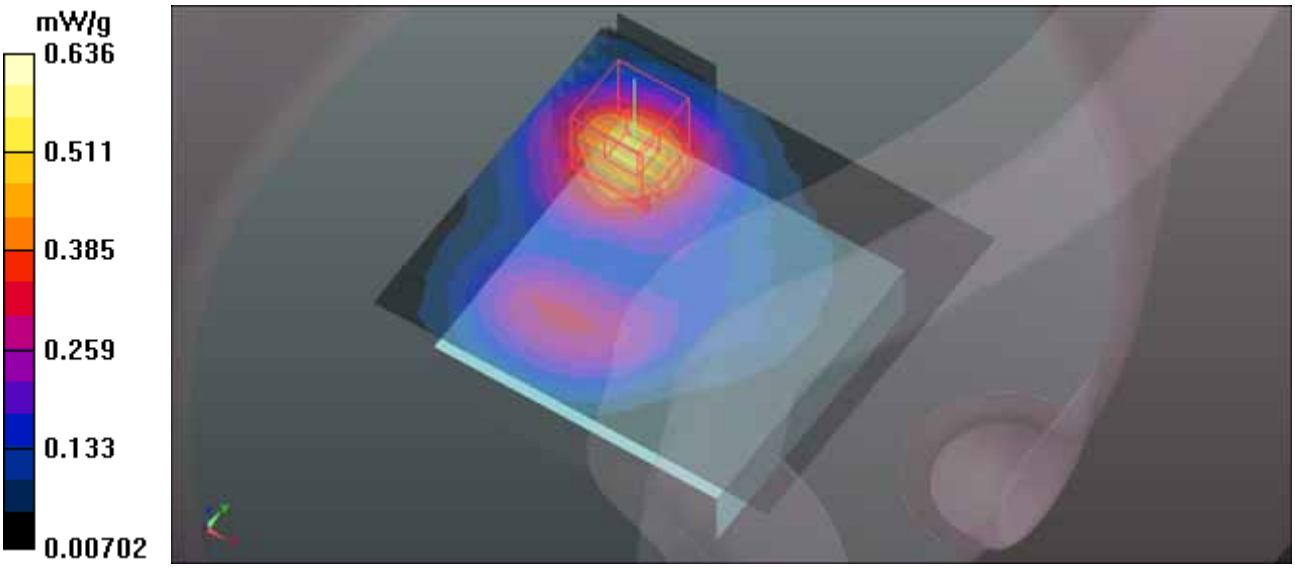
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.597 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.532 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.878 W/kg
**SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.223 mW/g**
Maximum value of SAR (measured) = 0.636 mW/g



## M03-Back face-WiMax 10M-Ch736_Ant 1

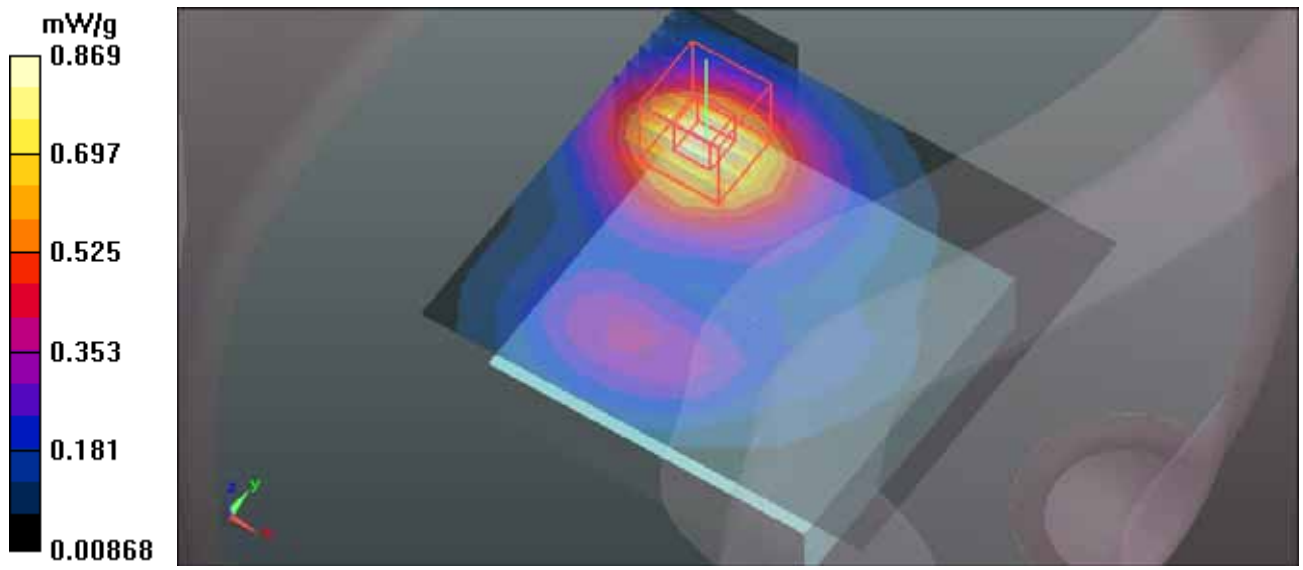
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.25 mho/m; $\varepsilon_r$ = 53.37; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.826 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.890 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 1.211 W/kg
**SAR(1 g) = 0.583 mW/g; SAR(10 g) = 0.304 mW/g**
Maximum value of SAR (measured) = 0.869 mW/g



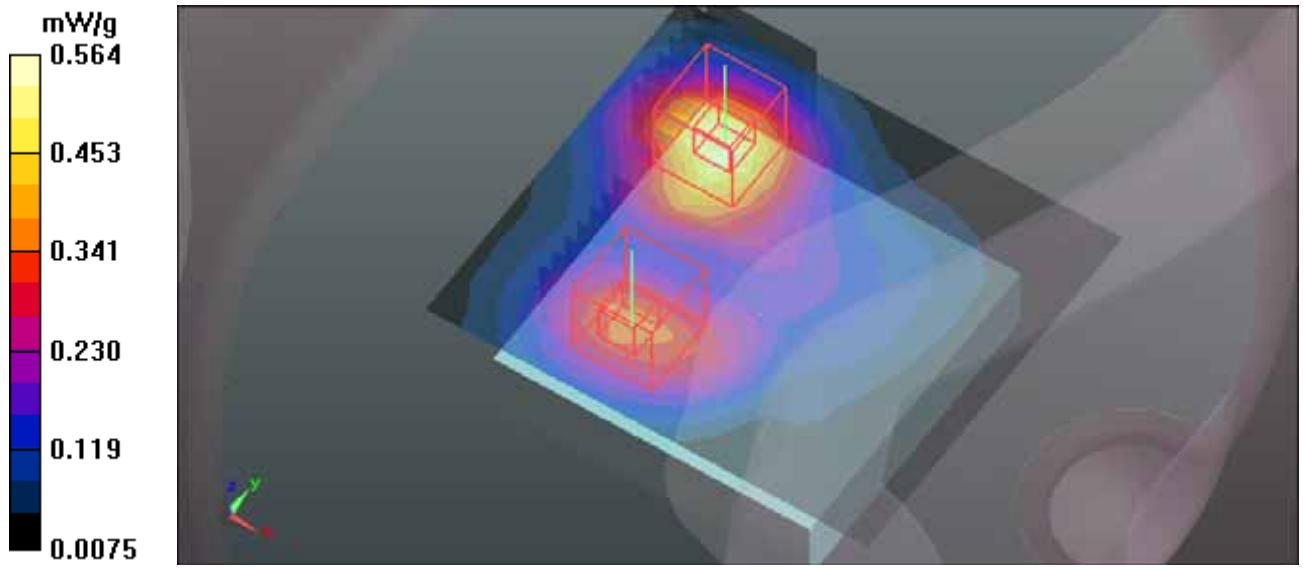
Date/Time: 2011/5/16 03:45:37

## M04-Back face-WiMax 10M-Ch0_Ant 2

Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; $\sigma$ = 2.07 mho/m; $\varepsilon_r$ = 53.97; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.545 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.357 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.778 W/kg
**SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.198 mW/g**
Maximum value of SAR (measured) = 0.564 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.357 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.487 W/kg
**SAR(1 g) = 0.270 mW/g; SAR(10 g) = 0.150 mW/g**
Maximum value of SAR (measured) = 0.375 mW/g



## M04-Back face-WiMax 10M-Ch368_Ant 2

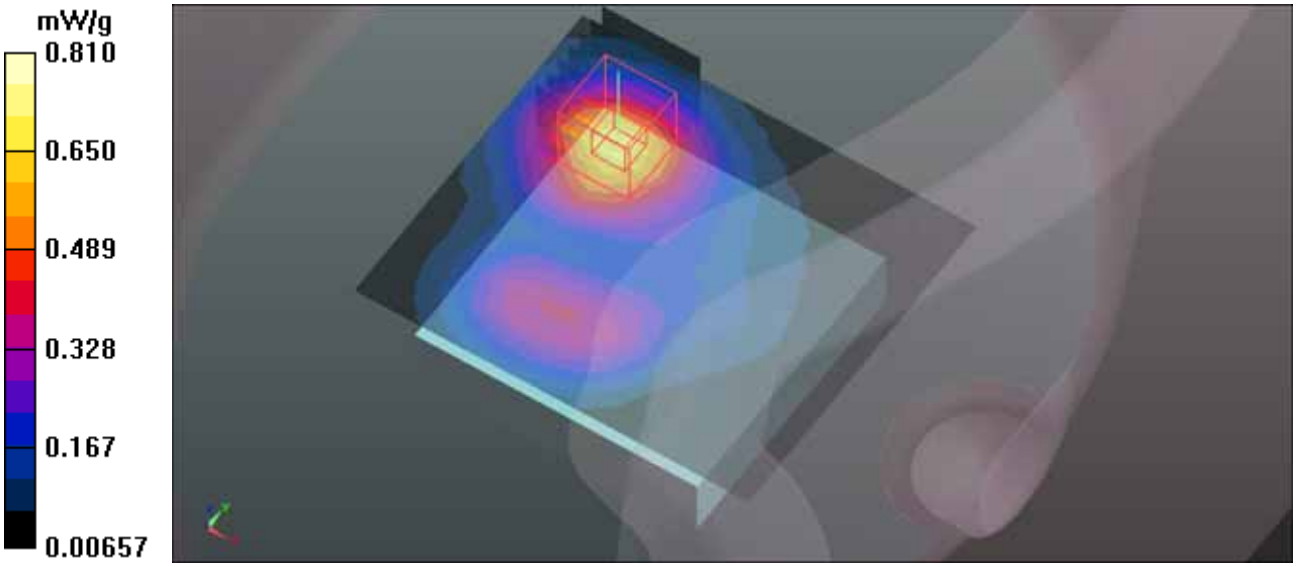
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.791 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.965 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.123 W/kg
**SAR(1 g) = 0.544 mW/g; SAR(10 g) = 0.281 mW/g**
Maximum value of SAR (measured) = 0.810 mW/g



Date/Time: 2011/5/16 07:56:57

## M04-Back face-WiMax 10M-Ch736_Ant 2

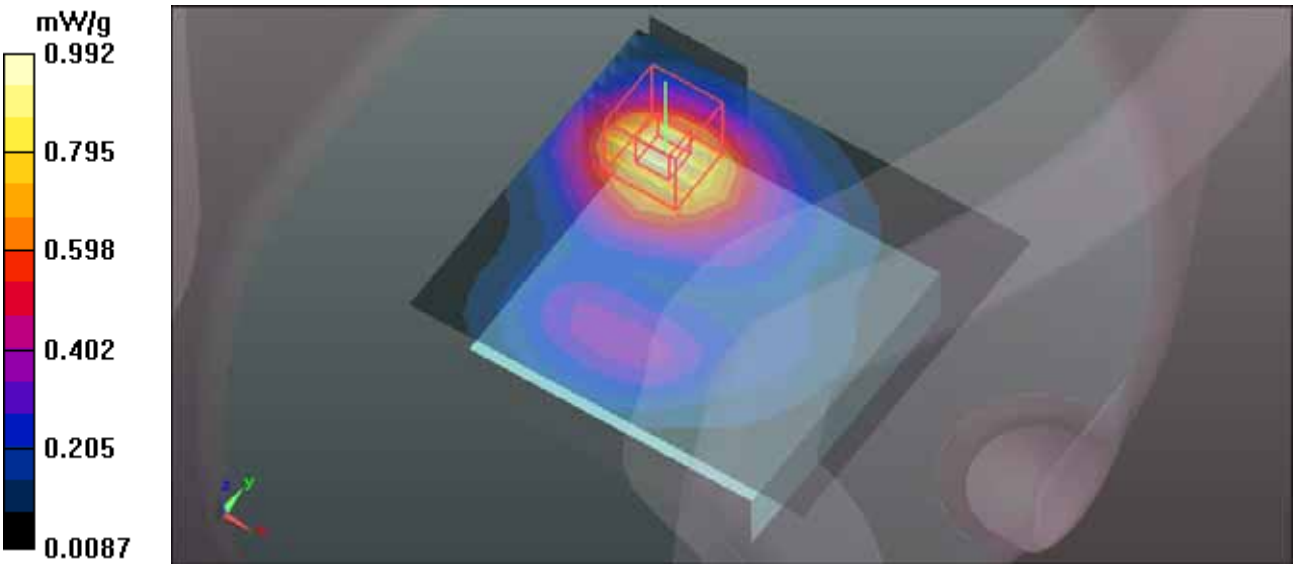
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.25 mho/m; $\varepsilon_r$ = 53.37; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Back face of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.938 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.525 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.388 W/kg
**SAR(1 g) = 0.664 mW/g; SAR(10 g) = 0.343 mW/g**
Maximum value of SAR (measured) = 0.992 mW/g



## M05-Front face-WiMax 5M-Ch0_Ant 1

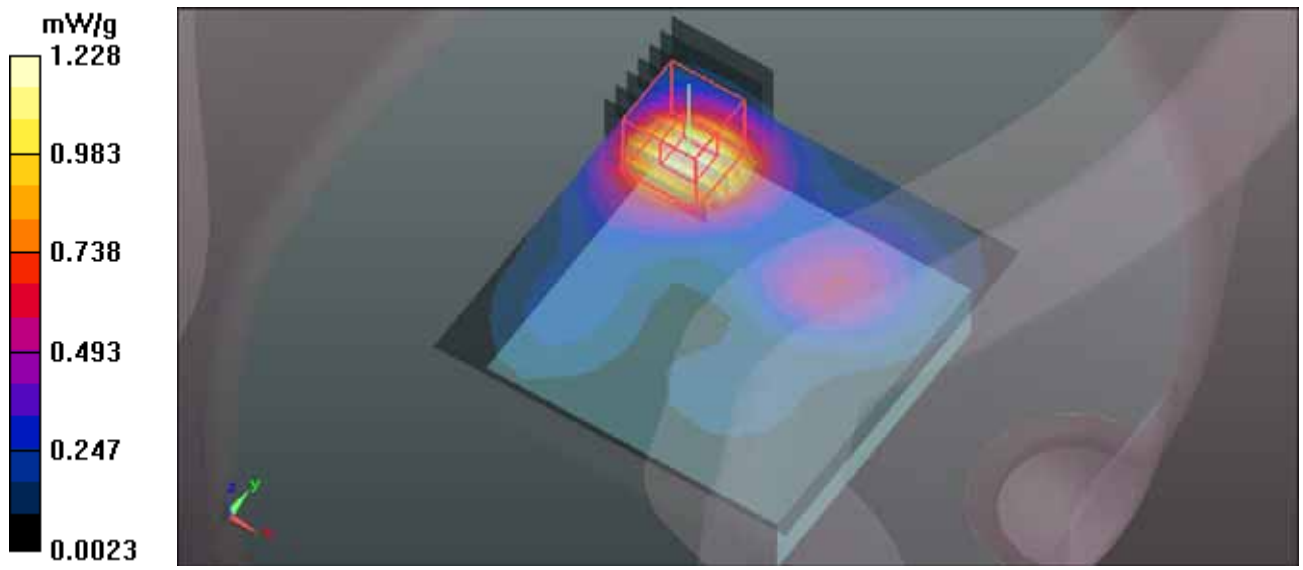
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.04 mho/m; $\varepsilon_r$ = 54.01; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (14x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.228 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.328 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 1.929 W/kg
**SAR(1 g) = 0.936 mW/g; SAR(10 g) = 0.466 mW/g**
Maximum value of SAR (measured) = 1.392 mW/g



## M05-Front face-WiMax 5M-Ch378_Ant 1

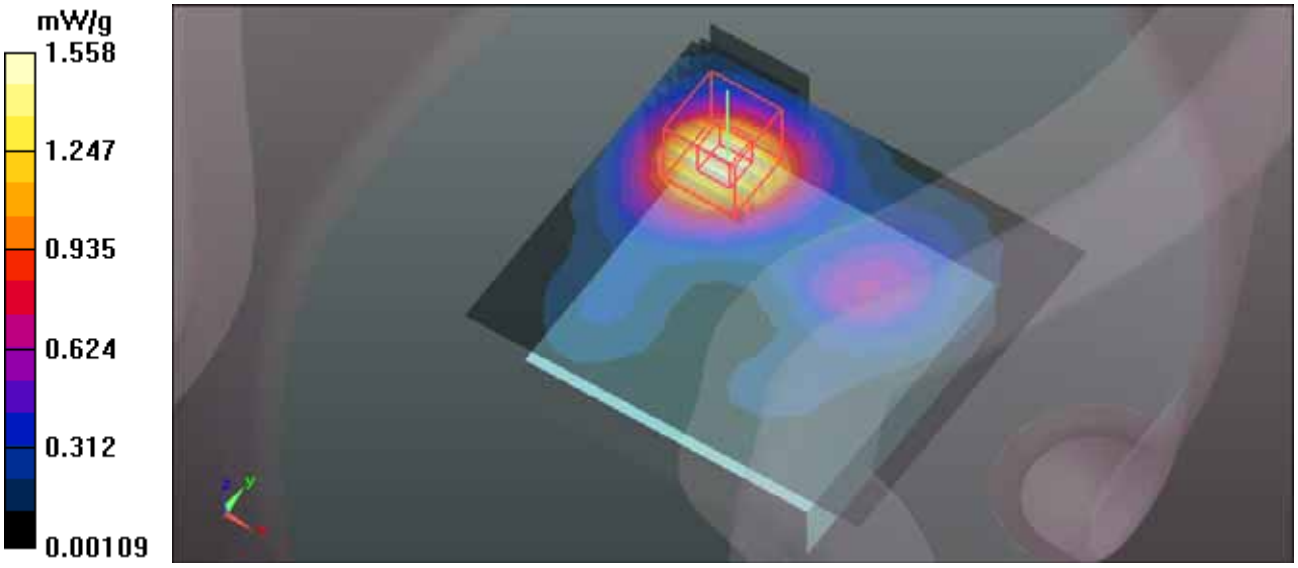
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.558 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.316 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 2.293 W/kg
**SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.561 mW/g**
Maximum value of SAR (measured) = 1.646 mW/g



## M05-Front face-WiMax 5M-Ch756_Ant 1

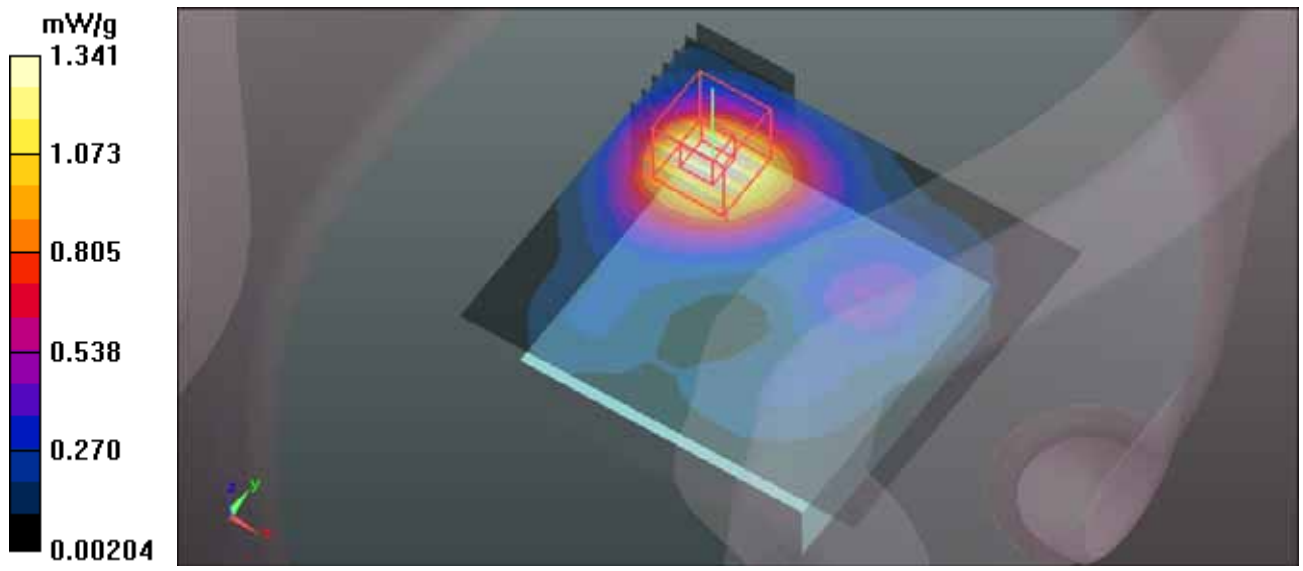
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.26 mho/m; $\varepsilon_r$ = 53.35; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.341 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.899 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.978 W/kg
**SAR(1 g) = 0.935 mW/g; SAR(10 g) = 0.485 mW/g**
Maximum value of SAR (measured) = 1.401 mW/g



## M06-Front face-WiMax 5M-Ch0_Ant 1 16QAM

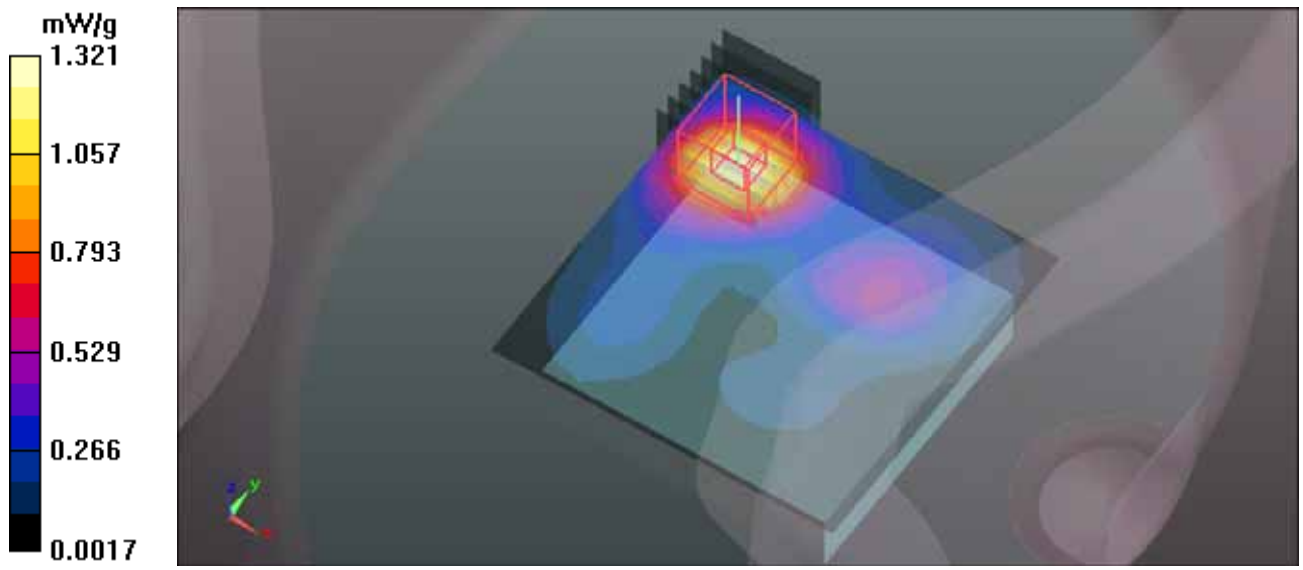
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.04 mho/m; $\varepsilon_r$ = 54.01; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low /Area Scan (14x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.321 mW/g

**Flat-Section MSL/Flat Section 10mm Low /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.300 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.902 W/kg
**SAR(1 g) = 0.928 mW/g; SAR(10 g) = 0.470 mW/g**
Maximum value of SAR (measured) = 1.382 mW/g



## M06-Front face-WiMax 5M-Ch378_Ant 1 16QAM

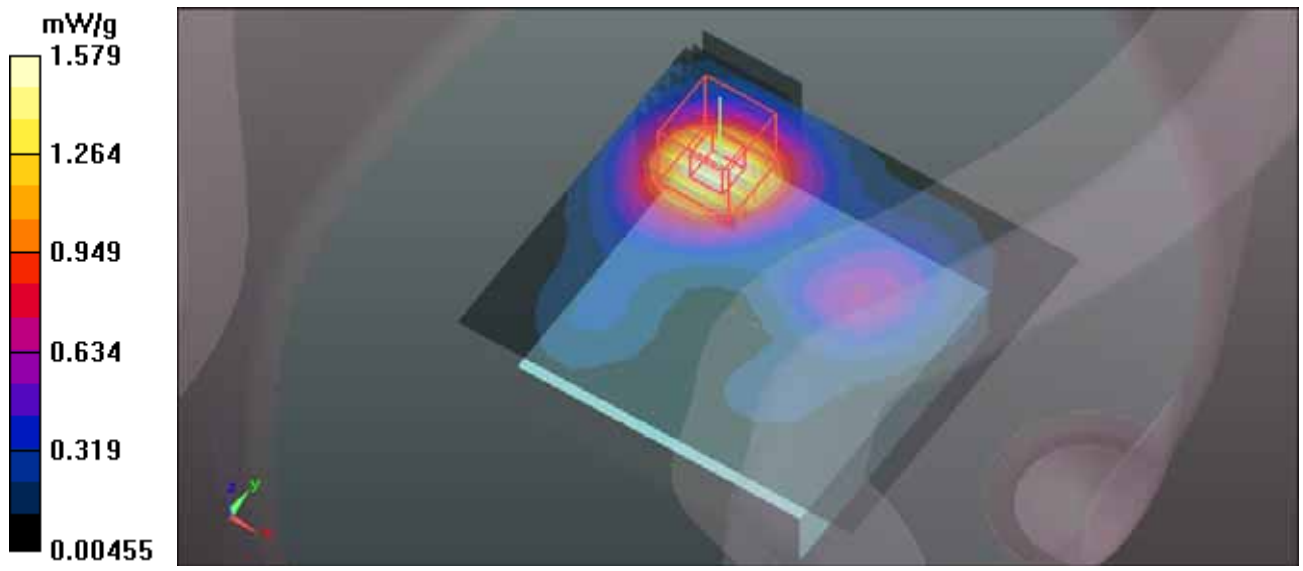
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.579 mW/g

**Flat-Section MSL/Flat Section 10mm Mid /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.498 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 2.291 W/kg
**SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.567 mW/g**
Maximum value of SAR (measured) = 1.647 mW/g



## M06-Front face-WiMax 5M-Ch756_Ant 1 16QAM

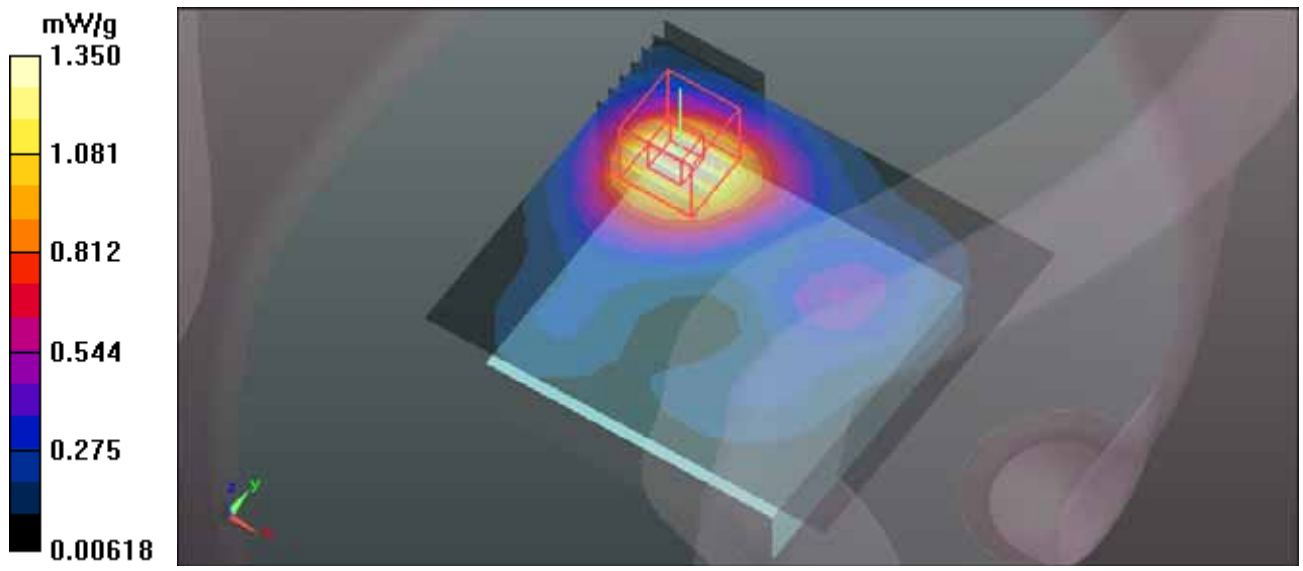
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.26 mho/m; $\varepsilon_r$ = 53.35; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.350 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.784 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.983 W/kg
**SAR(1 g) = 0.944 mW/g; SAR(10 g) = 0.492 mW/g**
Maximum value of SAR (measured) = 1.405 mW/g

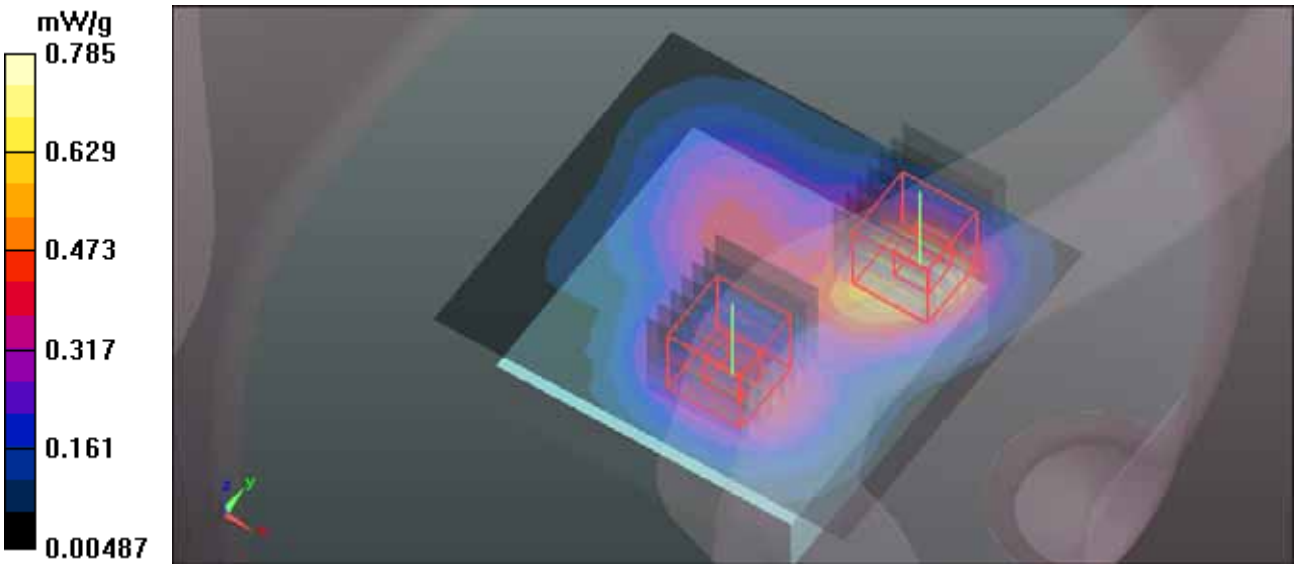


## M07-Front face-WiMax 5M-Ch0_Ant 2

Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; $\sigma$ = 2.04 mho/m; $\varepsilon_r$ = 54.01; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.785 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.216 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.077 W/kg
**SAR(1 g) = 0.530 mW/g; SAR(10 g) = 0.275 mW/g**
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.216 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.668 W/kg
**SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.204 mW/g**
Maximum value of SAR (measured) = 0.514 mW/g



## M07-Front face-WiMax 5M-Ch378_Ant 2

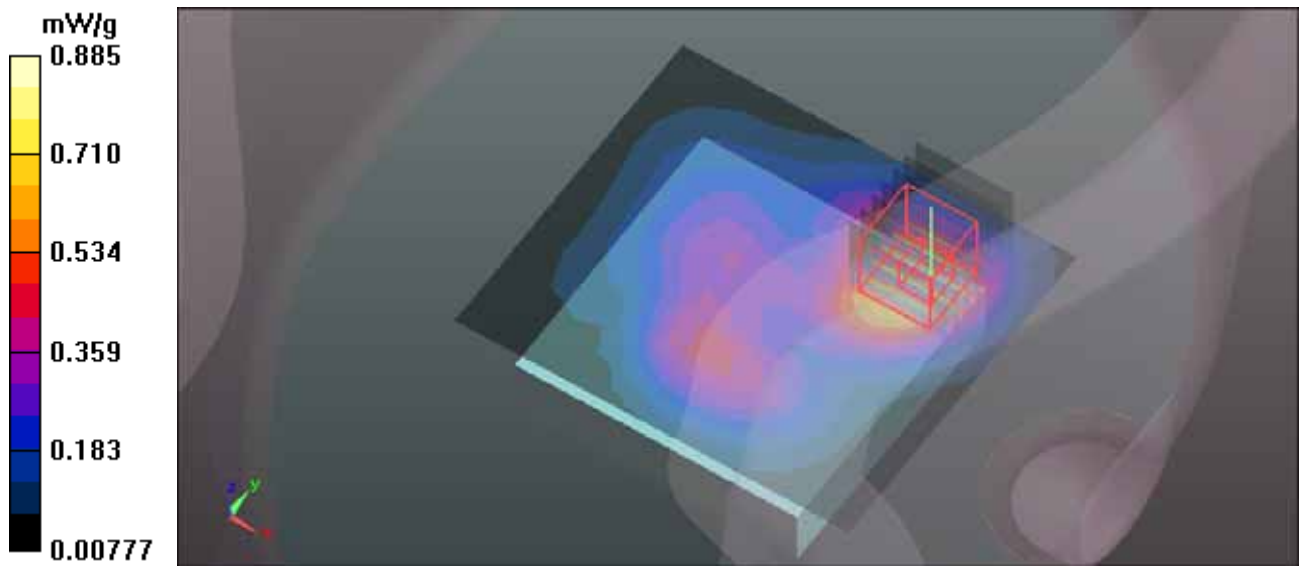
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.885 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.425 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.231 W/kg
**SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.309 mW/g**
Maximum value of SAR (measured) = 0.892 mW/g



## M07-Front face-WiMax 5M-Ch756_Ant 2

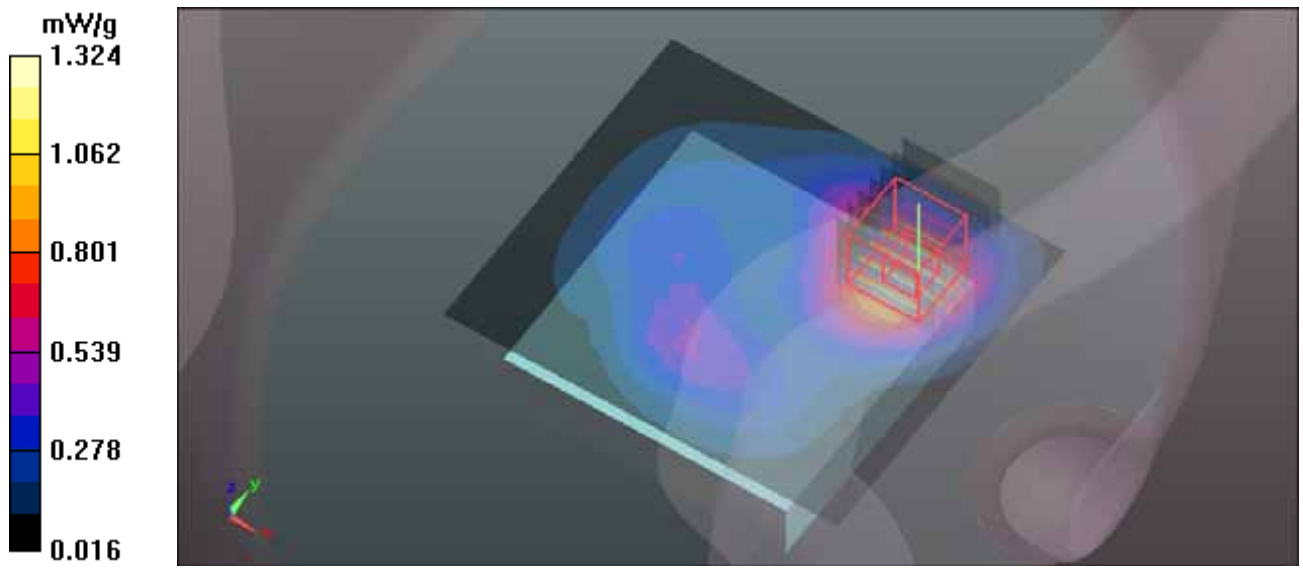
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.26 mho/m; $\varepsilon_r$ = 53.35; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.324 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.074 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.952 W/kg
**SAR(1 g) = 0.932 mW/g; SAR(10 g) = 0.468 mW/g**
Maximum value of SAR (measured) = 1.399 mW/g

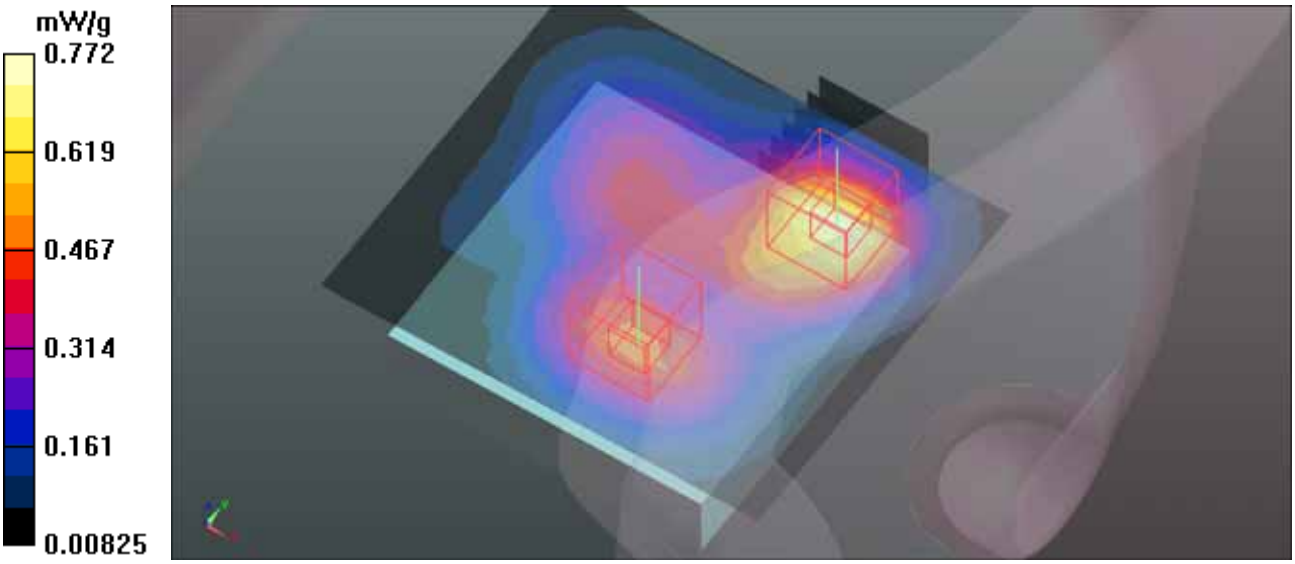


## M08-Front face-WiMax 5M-Ch0_Ant 2 16QAM

Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.04 mho/m; $\varepsilon_r$ = 54.01; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.772 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.768 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.059 W/kg
**SAR(1 g) = 0.521 mW/g; SAR(10 g) = 0.270 mW/g**
Maximum value of SAR (measured) = 0.764 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.768 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.654 W/kg
**SAR(1 g) = 0.360 mW/g; SAR(10 g) = 0.201 mW/g**
Maximum value of SAR (measured) = 0.504 mW/g



## M08-Front face-WiMax 5M-Ch378_Ant 2 16QAM

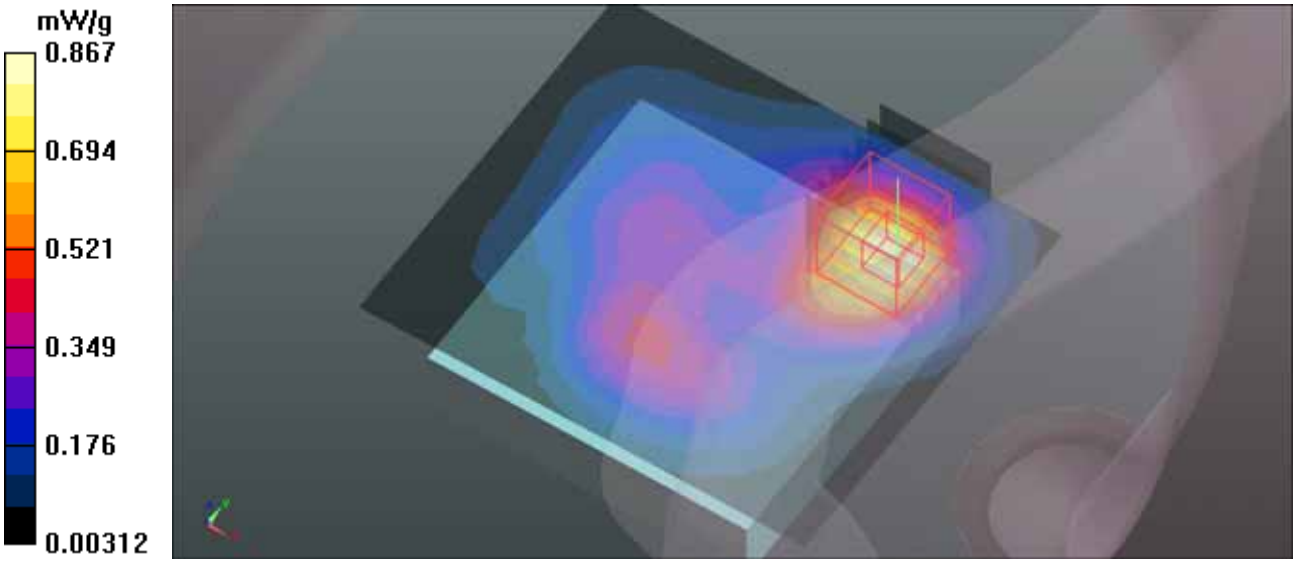
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.867 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.107 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.206 W/kg
**SAR(1 g) = 0.591 mW/g; SAR(10 g) = 0.303 mW/g**
Maximum value of SAR (measured) = 0.874 mW/g



## M08-Front face-WiMax 5M-Ch756_Ant 2 16QAM

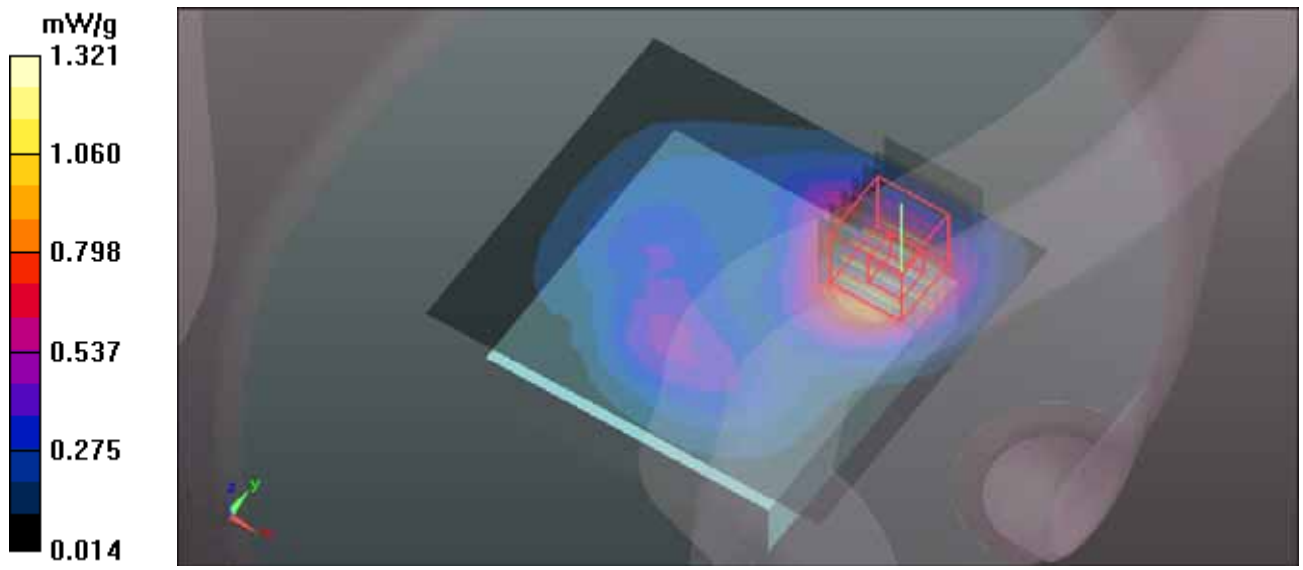
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.26 mho/m; $\varepsilon_r$ = 53.35; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.321 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.074 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.943 W/kg
**SAR(1 g) = 0.936 mW/g; SAR(10 g) = 0.472 mW/g**
Maximum value of SAR (measured) = 1.398 mW/g



## M09-Front face-WiMax 10M-Ch0_Ant 1

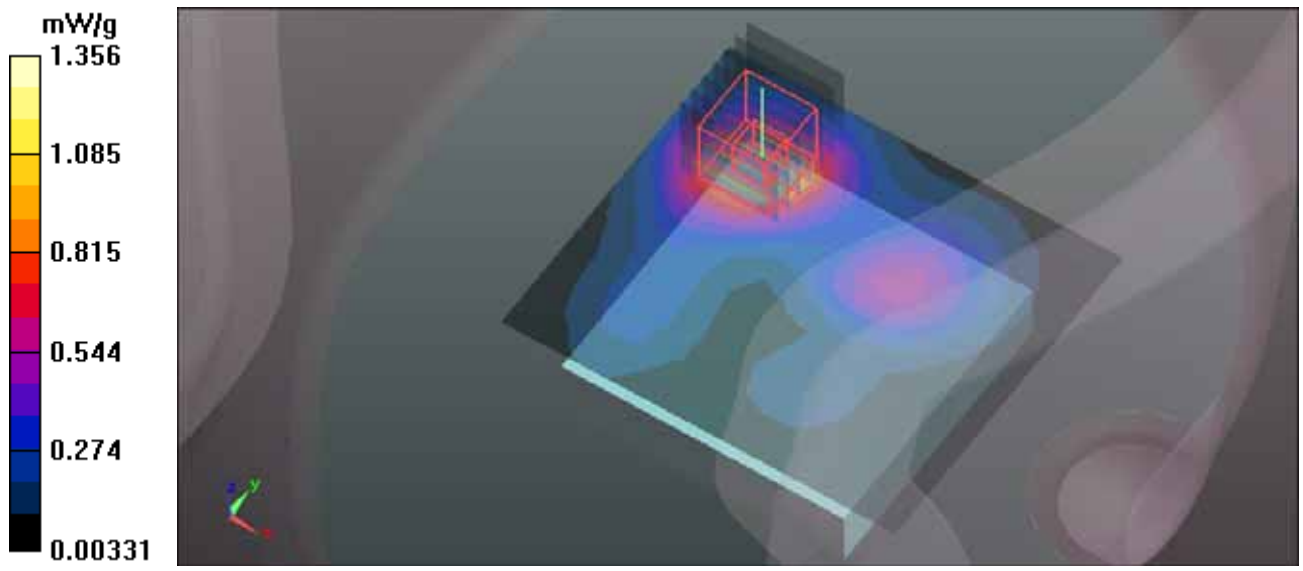
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.07 mho/m; $\varepsilon_r$ = 53.97; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.356 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.449 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.870 W/kg
**SAR(1 g) = 0.922 mW/g; SAR(10 g) = 0.469 mW/g**
Maximum value of SAR (measured) = 1.014 mW/g



## M09-Front face-WiMax 10M-Ch368_Ant 1

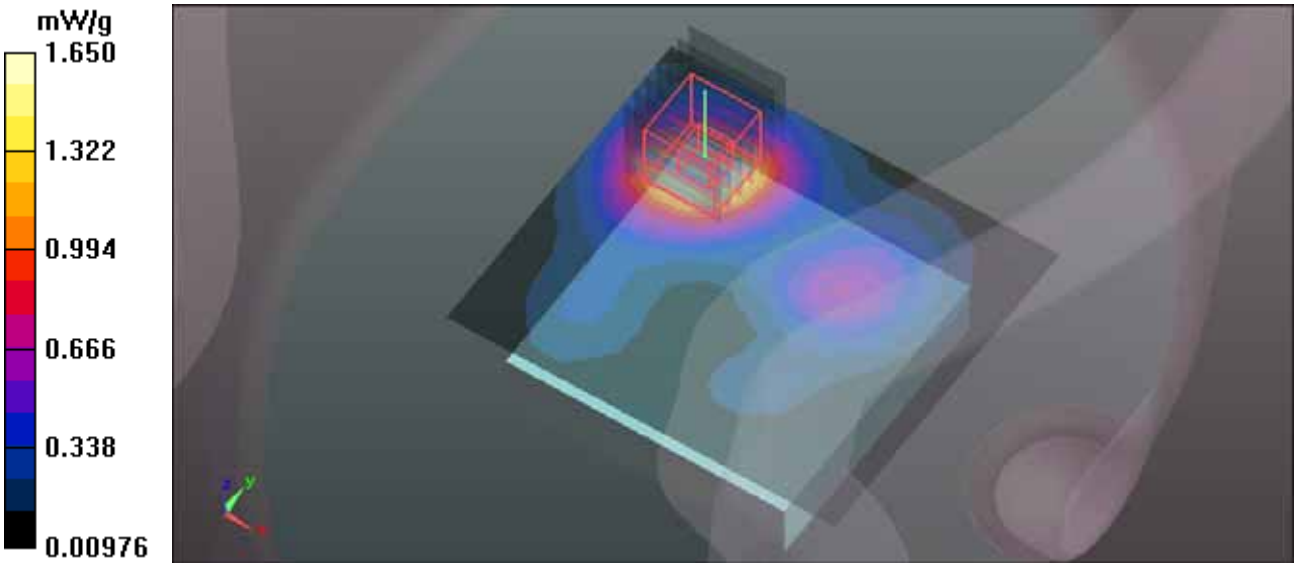
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.650 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.838 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.389 W/kg
**SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.596 mW/g**
Maximum value of SAR (measured) = 1.263 mW/g



## M09-Front face-WiMax 10M-Ch736_Ant 1

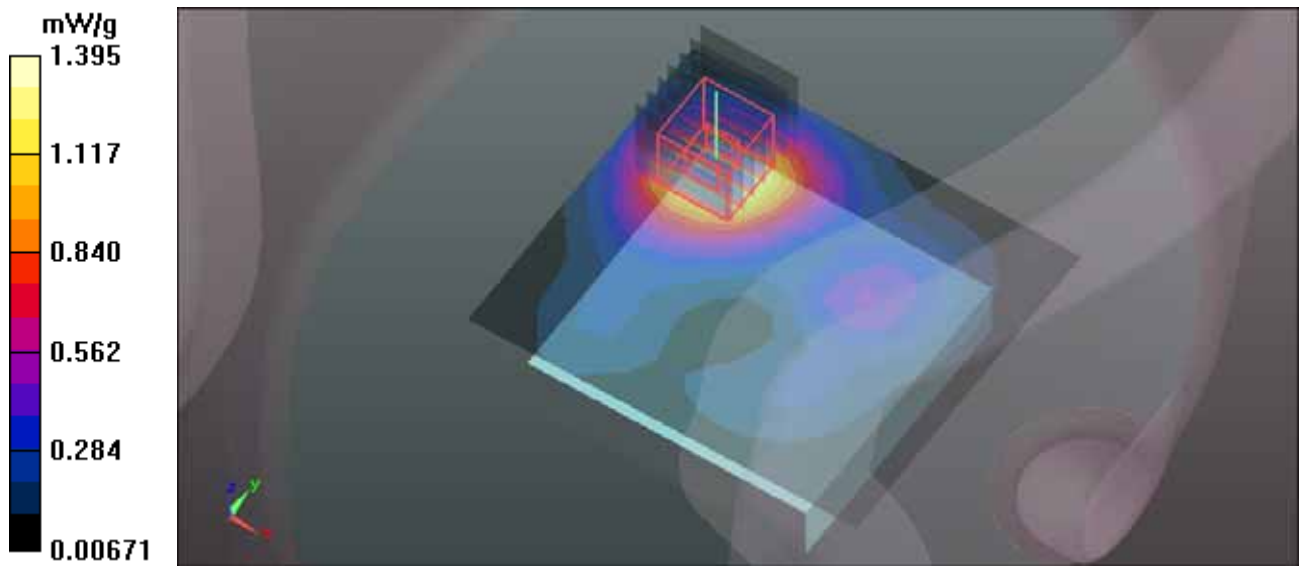
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.25 mho/m; $\varepsilon_r$ = 53.37; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.395 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.121 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.032 W/kg
**SAR(1 g) = 0.976 mW/g; SAR(10 g) = 0.509 mW/g**
Maximum value of SAR (measured) = 1.049 mW/g



## M10-Front face-WiMax 10M-Ch0_Ant 1 16QAM

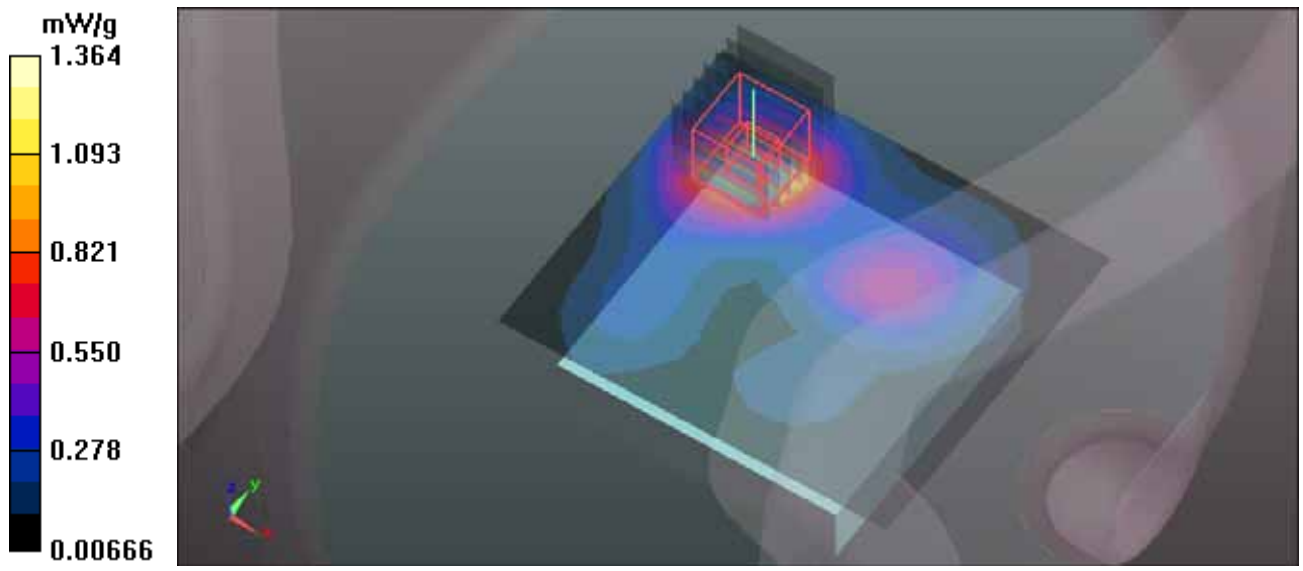
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.07 mho/m; $\varepsilon_r$ = 53.97; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.364 mW/g

**Flat-Section MSL/Flat Section 10mm Low /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.259 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.912 W/kg
**SAR(1 g) = 0.939 mW/g; SAR(10 g) = 0.478 mW/g**
Maximum value of SAR (measured) = 1.031 mW/g



## M10-Front face-WiMax 10M-Ch368_Ant 1 16QAM

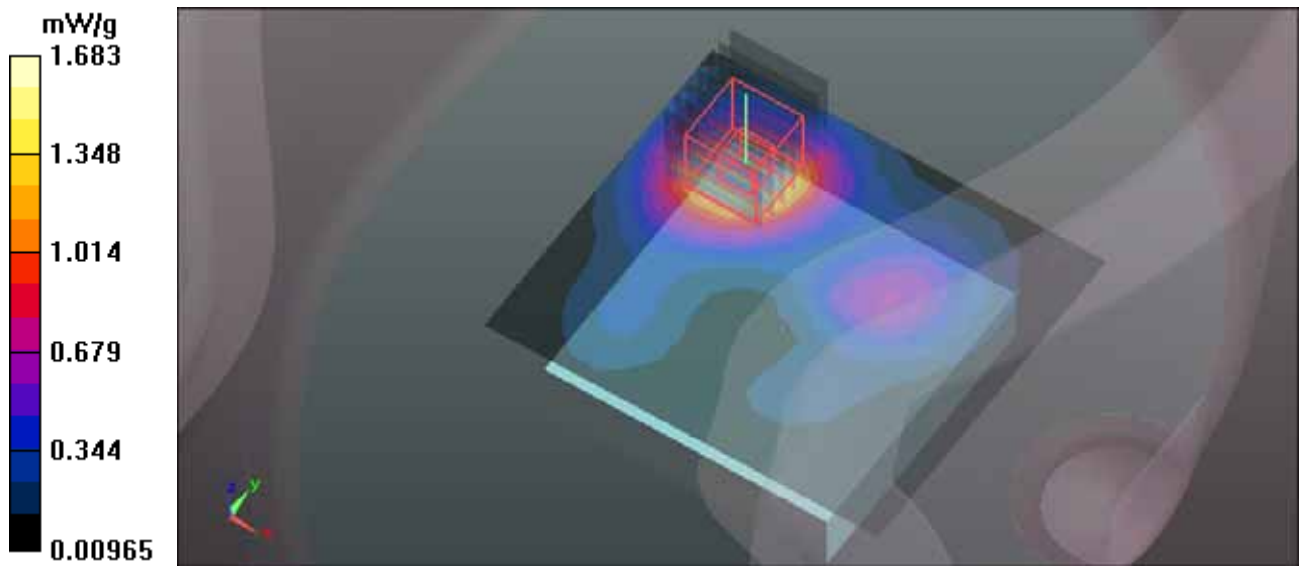
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

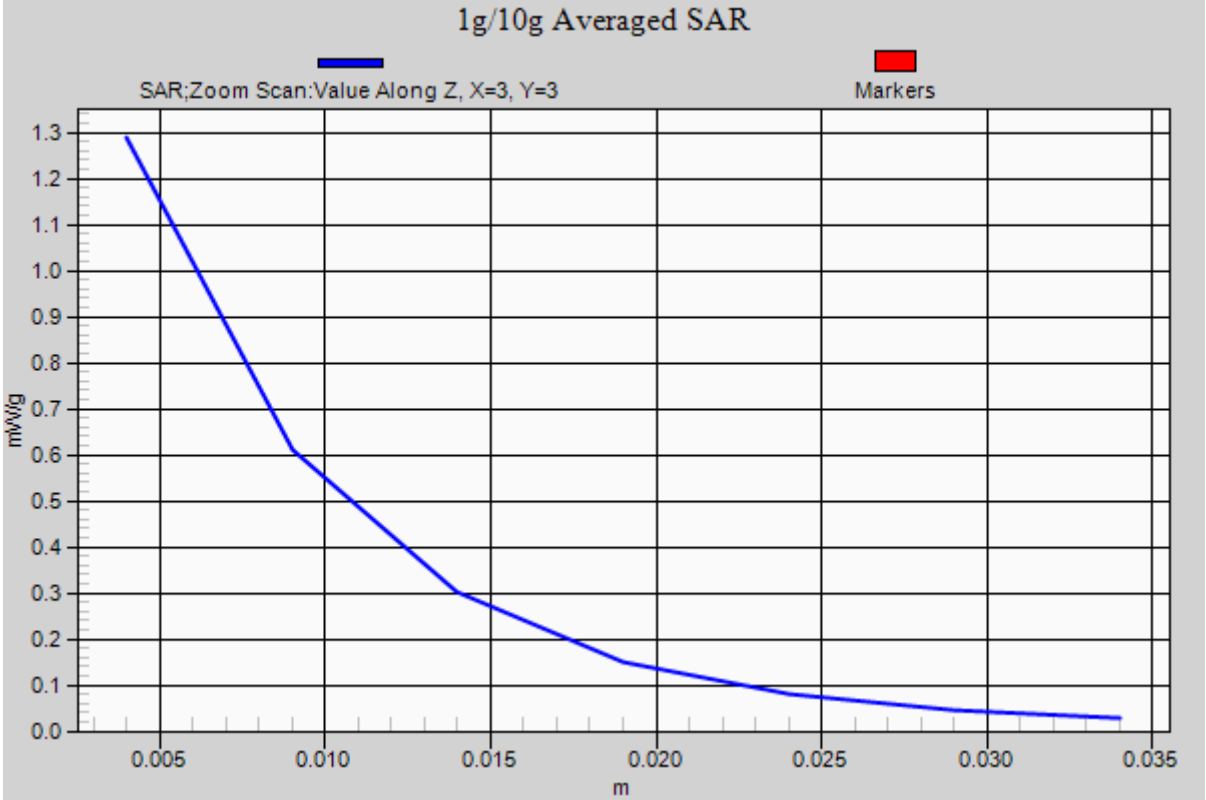
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.683 mW/g

**Flat-Section MSL/Flat Section 10mm Mid /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.976 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 2.446 W/kg
**SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.611 mW/g**
Maximum value of SAR (measured) = 1.289 mW/g




1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=3, Y=3
Markers
mW/g
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Date/Time: 2011/5/16 20:22:49

## M10-Front face-WiMax 10M-Ch736_Ant 1 16QAM

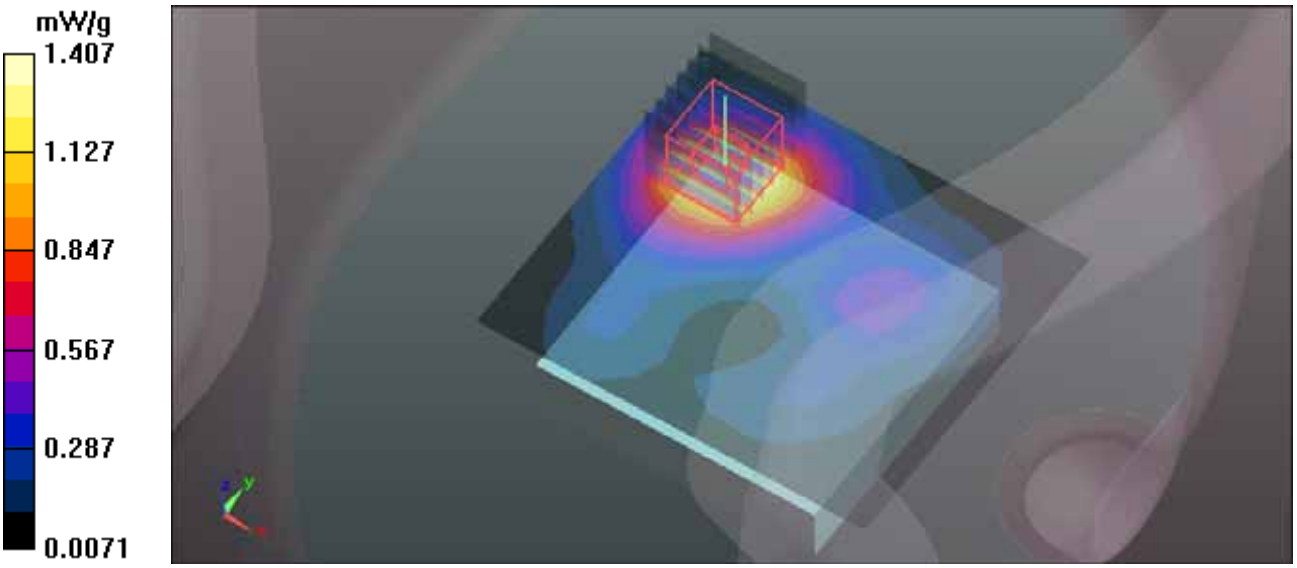
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.25 mho/m; $\varepsilon_r$ = 53.37; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.407 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.197 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.059 W/kg
**SAR(1 g) = 0.984 mW/g; SAR(10 g) = 0.515 mW/g**
Maximum value of SAR (measured) = 1.457 mW/g



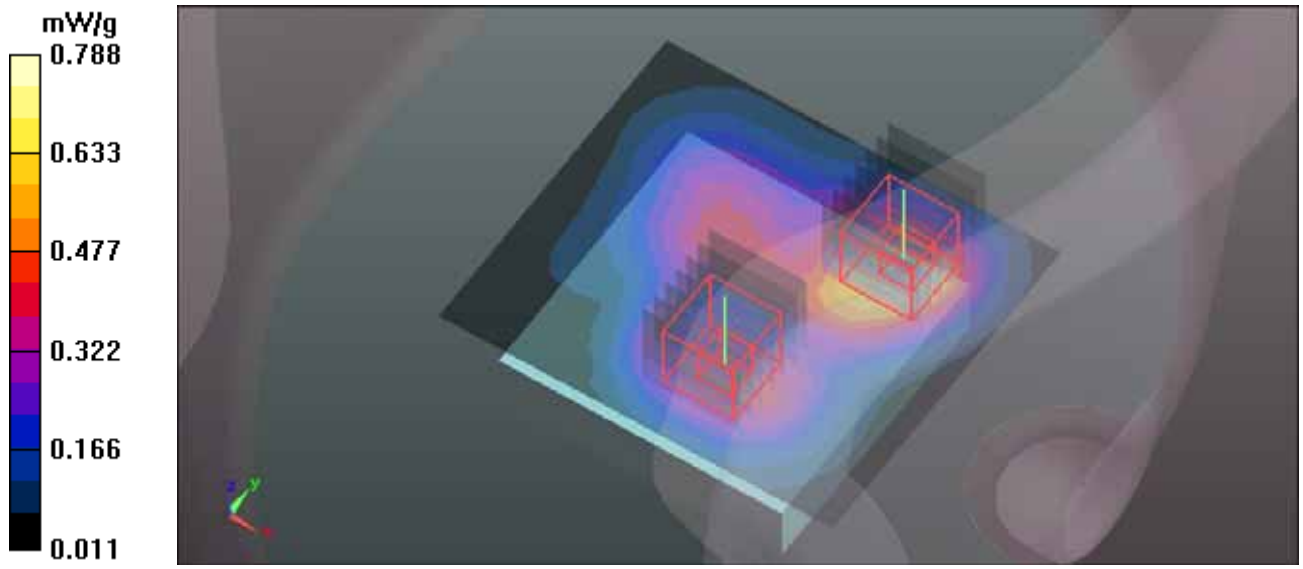
Date/Time: 2011/5/16 21:19:58

## M11-Front face-WiMax 10M-Ch0_Ant 2

Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; $\sigma$ = 2.07 mho/m; $\varepsilon_r$ = 53.97; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.788 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.672 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.079 W/kg
**SAR(1 g) = 0.535 mW/g; SAR(10 g) = 0.279 mW/g**
Maximum value of SAR (measured) = 0.583 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.672 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.671 W/kg
**SAR(1 g) = 0.370 mW/g; SAR(10 g) = 0.208 mW/g**
Maximum value of SAR (measured) = 0.402 mW/g



Date/Time: 2011/5/16 22:01:15

## M11-Front face-WiMax 10M-Ch368_Ant 2

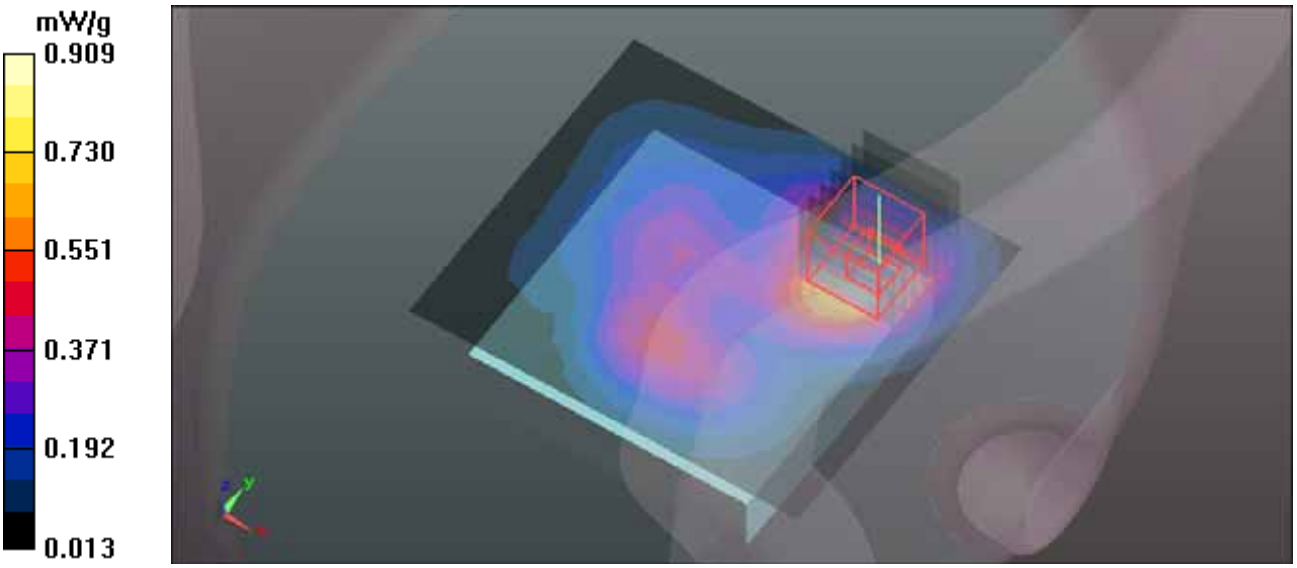
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.64; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.909 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.585 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.274 W/kg
**SAR(1 g) = 0.628 mW/g; SAR(10 g) = 0.324 mW/g**
Maximum value of SAR (measured) = 0.689 mW/g



Date/Time: 2011/5/16 22:43:43

## M11-Front face-WiMax 10M-Ch736_Ant 2

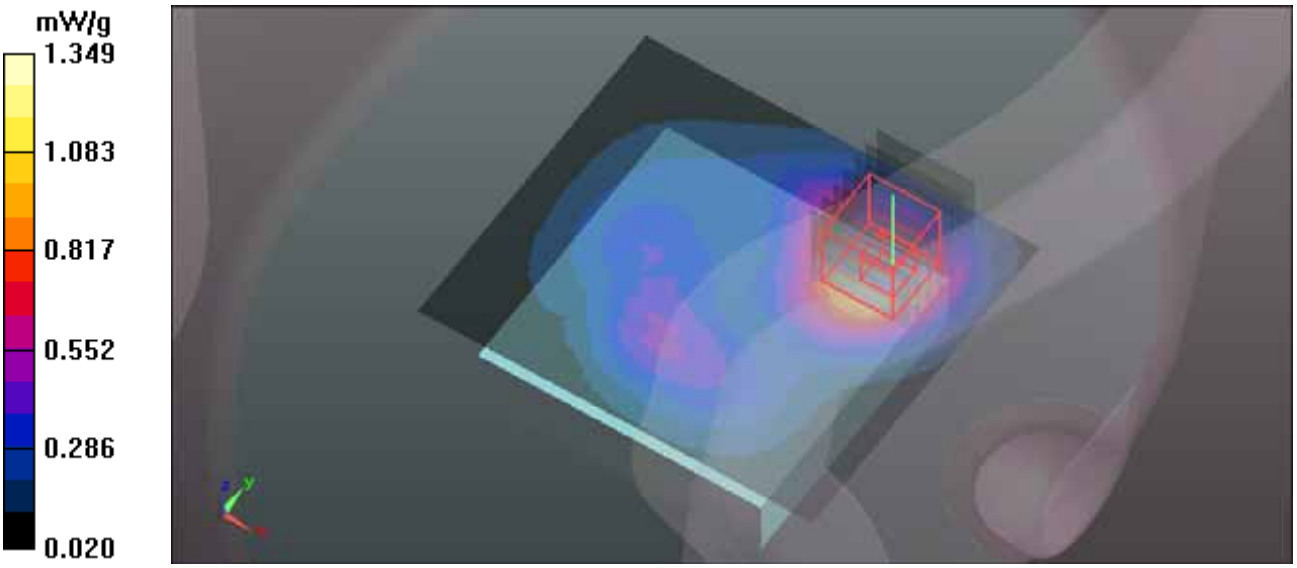
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.25 mho/m; $\varepsilon_r$ = 53.37; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.349 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.363 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.953 W/kg
**SAR(1 g) = 0.939 mW/g; SAR(10 g) = 0.473 mW/g**
Maximum value of SAR (measured) = 1.032 mW/g



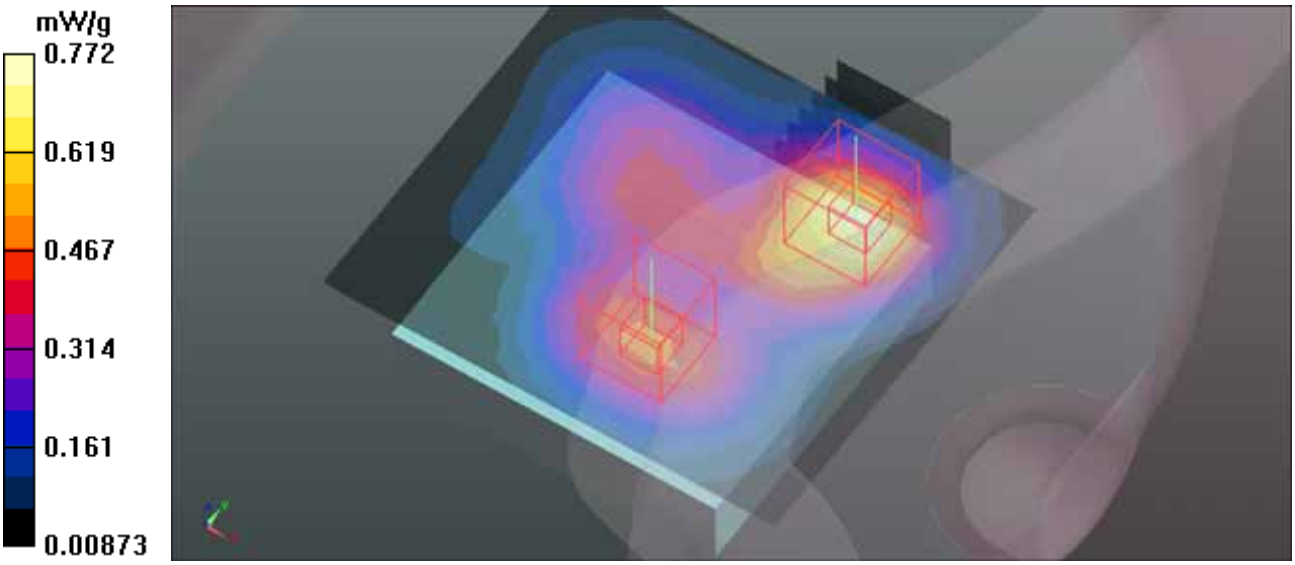
Date/Time: 2011/5/16 23:39:58

## M12-Front face-WiMax 10M-Ch0_Ant 2 16QAM

Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2501 MHz; $\sigma$ = 2.07 mho/m; $\varepsilon_r$ = 53.97; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.772 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.983 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.057 W/kg
**SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.273 mW/g**
Maximum value of SAR (measured) = 0.571 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.983 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.658 W/kg
**SAR(1 g) = 0.363 mW/g; SAR(10 g) = 0.204 mW/g**
Maximum value of SAR (measured) = 0.394 mW/g



Date/Time: 2011/5/17 02:04:15

## M12-Front face-WiMax 10M-Ch368_Ant 2 16QAM

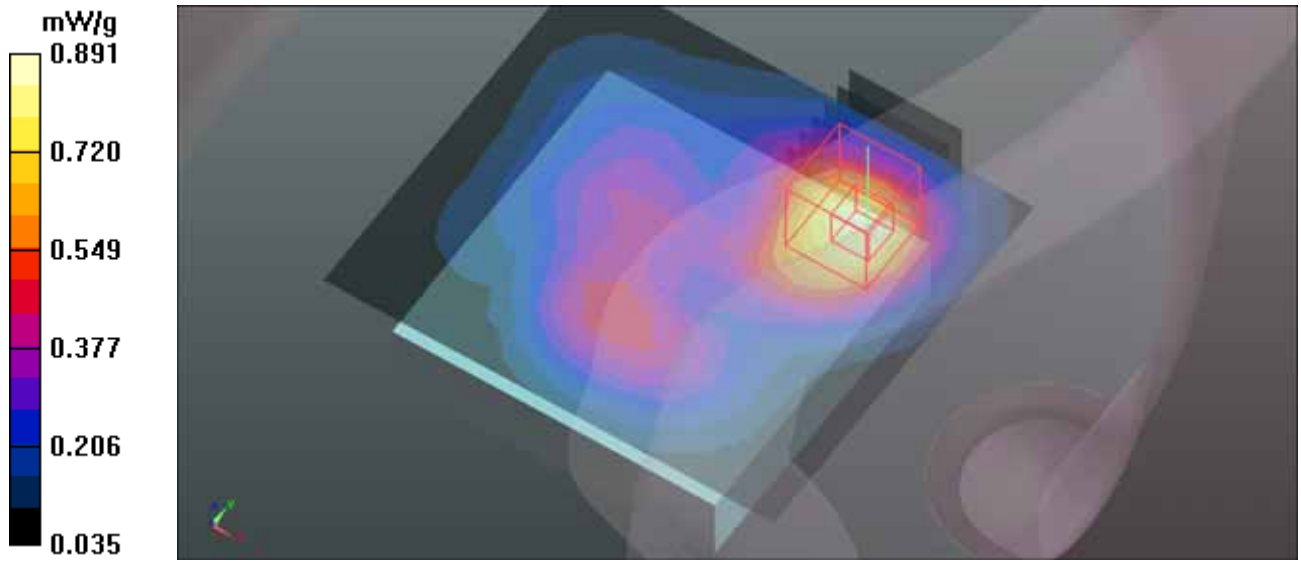
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.891 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.917 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.249 W/kg
**SAR(1 g) = 0.615 mW/g; SAR(10 g) = 0.318 mW/g**
Maximum value of SAR (measured) = 0.675 mW/g



Date/Time: 2011/5/17 02:45:15

## M12-Front face-WiMax 10M-Ch736_Ant 2 16QAM

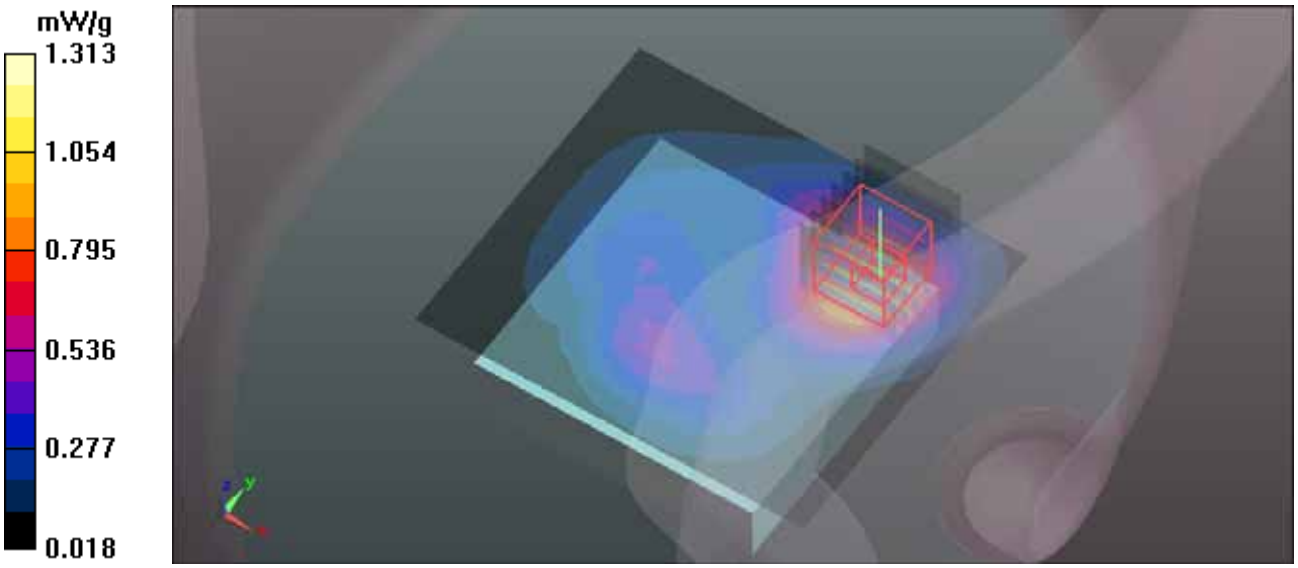
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.23 mho/m; $\varepsilon_r$ = 53.66; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Front face side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (16x14x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.313 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.138 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 1.875 W/kg
**SAR(1 g) = 0.905 mW/g; SAR(10 g) = 0.457 mW/g**
Maximum value of SAR (measured) = 1.352 mW/g



Date/Time: 2011/5/17 03:26:45

## M13-Right edge-WiMax 5M-Ch0_Ant 2

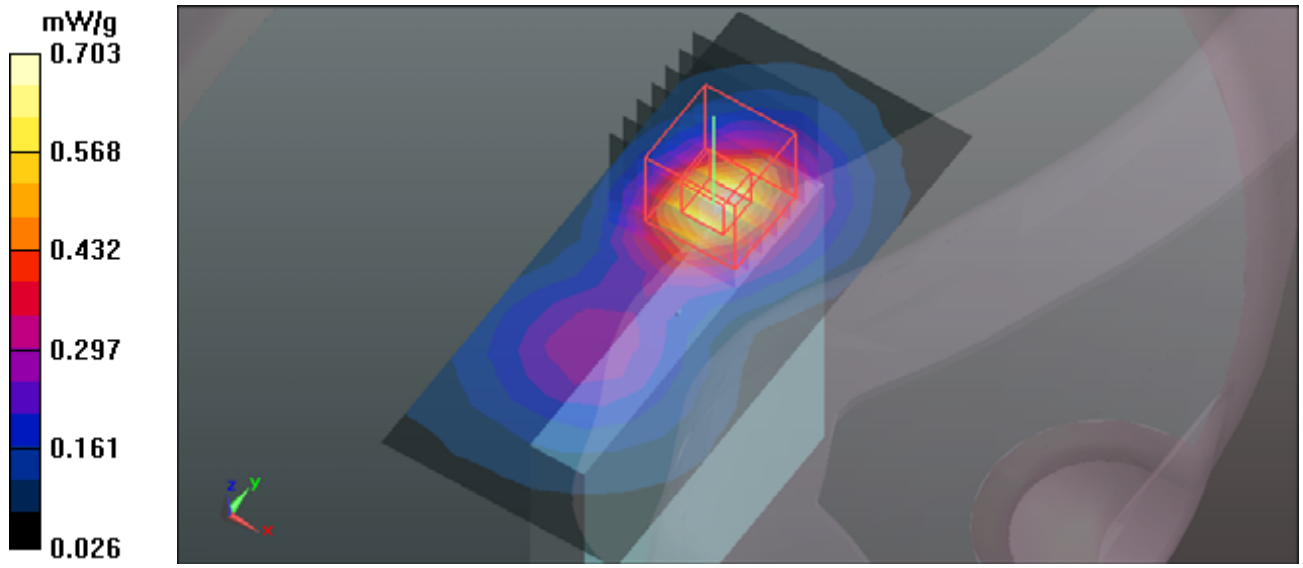
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.03 mho/m; $\varepsilon_r$ = 54.26; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.703 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.275 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.982 W/kg
**SAR(1 g) = 0.476 mW/g; SAR(10 g) = 0.227 mW/g**
Maximum value of SAR (measured) = 0.724 mW/g



Date/Time: 2011/5/17 03:56:29

## M13-Right edge-WiMax 5M-Ch378_Ant 2

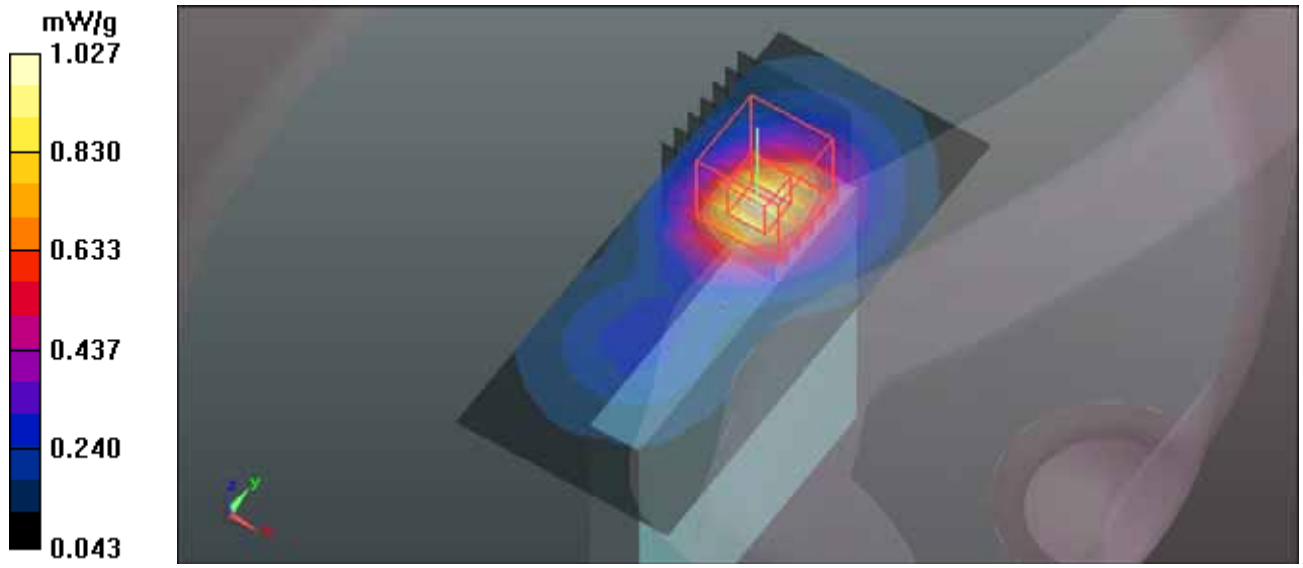
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.027 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.319 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.444 W/kg
**SAR(1 g) = 0.689 mW/g; SAR(10 g) = 0.328 mW/g**
Maximum value of SAR (measured) = 1.051 mW/g



Date/Time: 2011/5/17 04:26:09

## M13-Right edge-WiMax 5M-Ch756_Ant 2

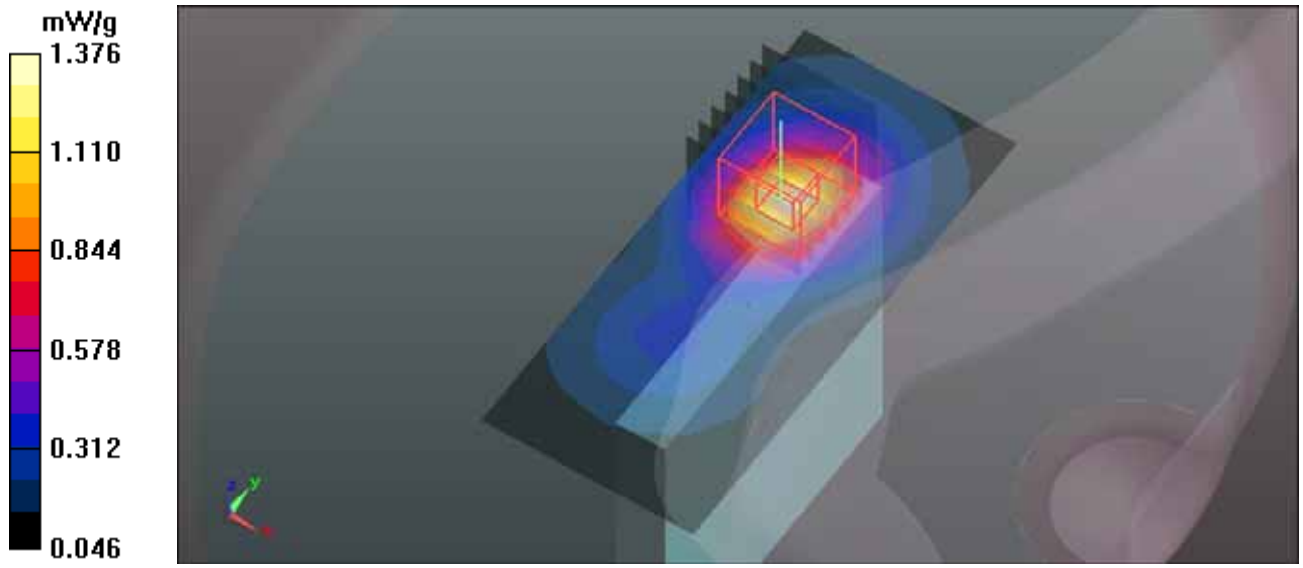
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; $\sigma$ = 2.24 mho/m; $\varepsilon_r$ = 53.63; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.376 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.978 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.972 W/kg
**SAR(1 g) = 0.915 mW/g; SAR(10 g) = 0.430 mW/g**
Maximum value of SAR (measured) = 1.413 mW/g



Date/Time: 2011/5/17 04:56:23

## M14-Right edge-WiMax 5M-Ch0_Ant 2 16QAM

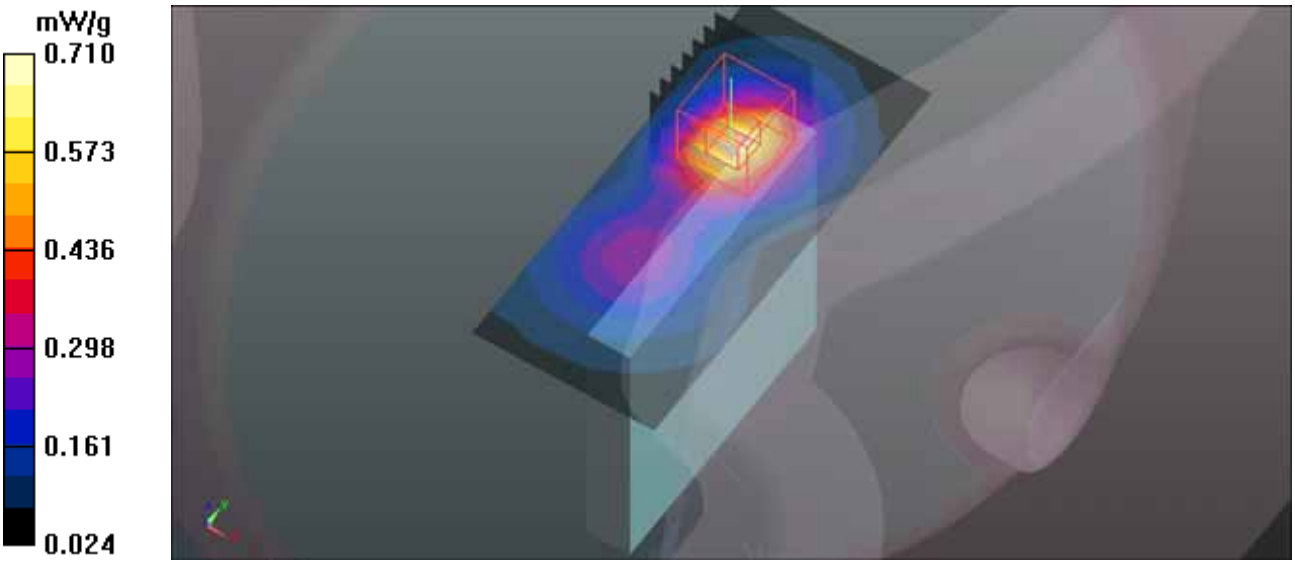
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.03 mho/m; $\varepsilon_r$ = 54.26; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.689 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.021 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.961 W/kg
**SAR(1 g) = 0.467 mW/g; SAR(10 g) = 0.222 mW/g**
Maximum value of SAR (measured) = 0.710 mW/g



Date/Time: 2011/5/17 05:25:17

## M14-Right edge-WiMax 5M-Ch378_Ant 2 16QAM

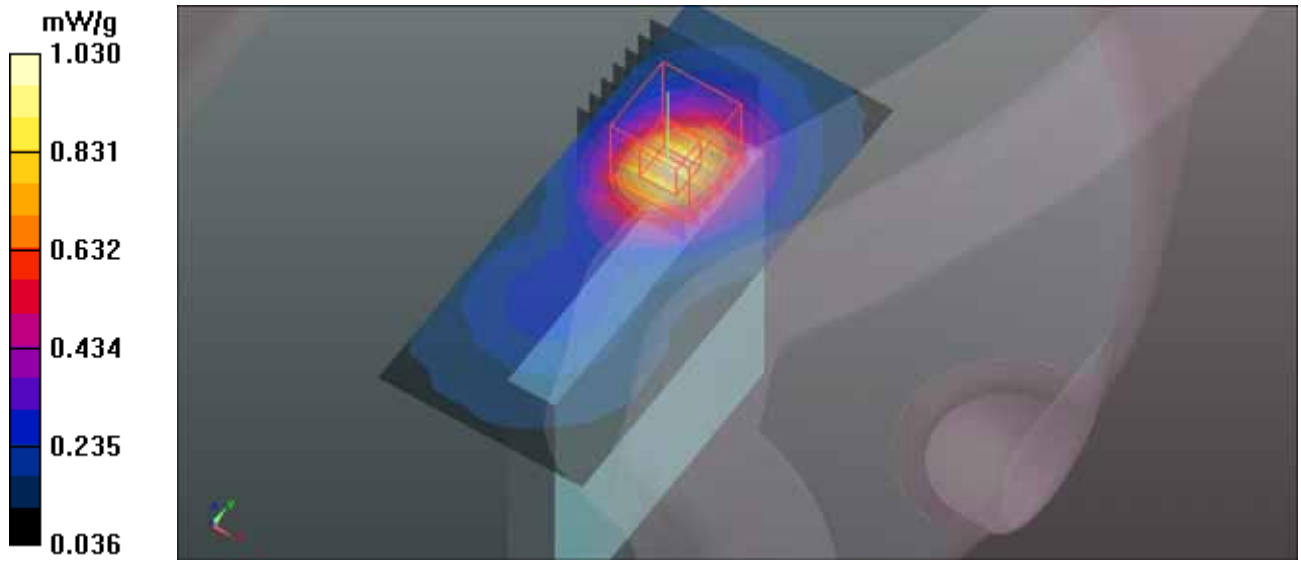
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.006 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.058 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.415 W/kg
**SAR(1 g) = 0.675 mW/g; SAR(10 g) = 0.321 mW/g**
Maximum value of SAR (measured) = 1.030 mW/g



Date/Time: 2011/5/17 09:51:00

## M14-Right edge-WiMax 5M-Ch756_Ant 2 16QAM

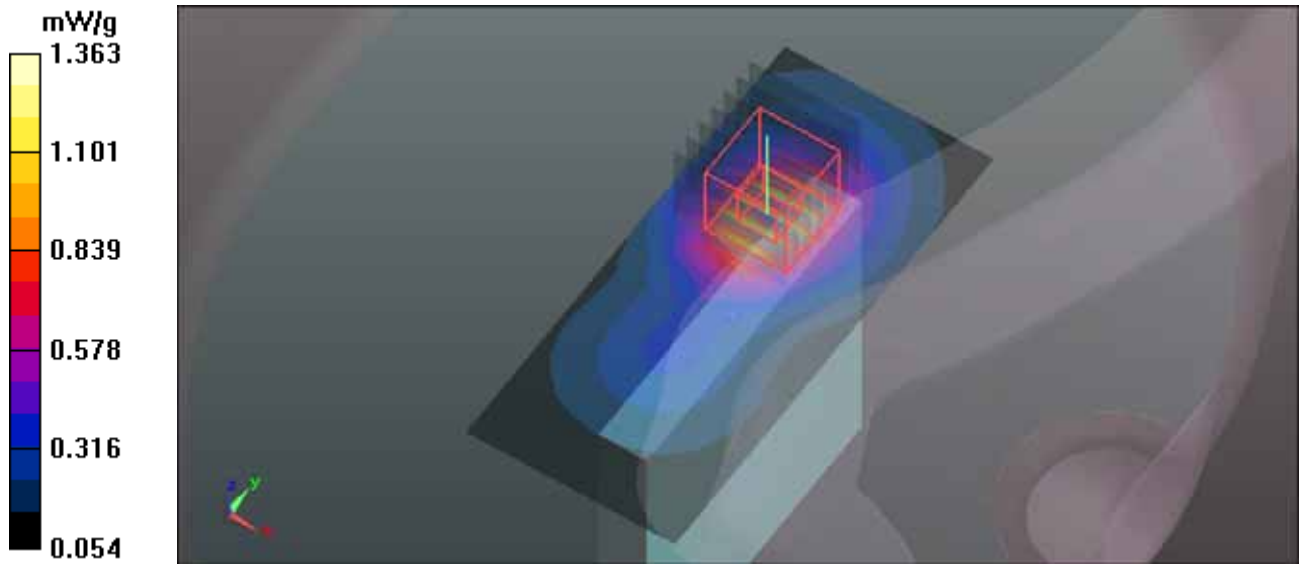
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.24 mho/m; $\varepsilon_r$ = 53.63; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.363 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.186 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.919 W/kg
**SAR(1 g) = 0.897 mW/g; SAR(10 g) = 0.426 mW/g**
Maximum value of SAR (measured) = 1.382 mW/g



Date/Time: 2011/5/17 06:57:02

## M15-Right edge-WiMax 10M-Ch0_Ant 2

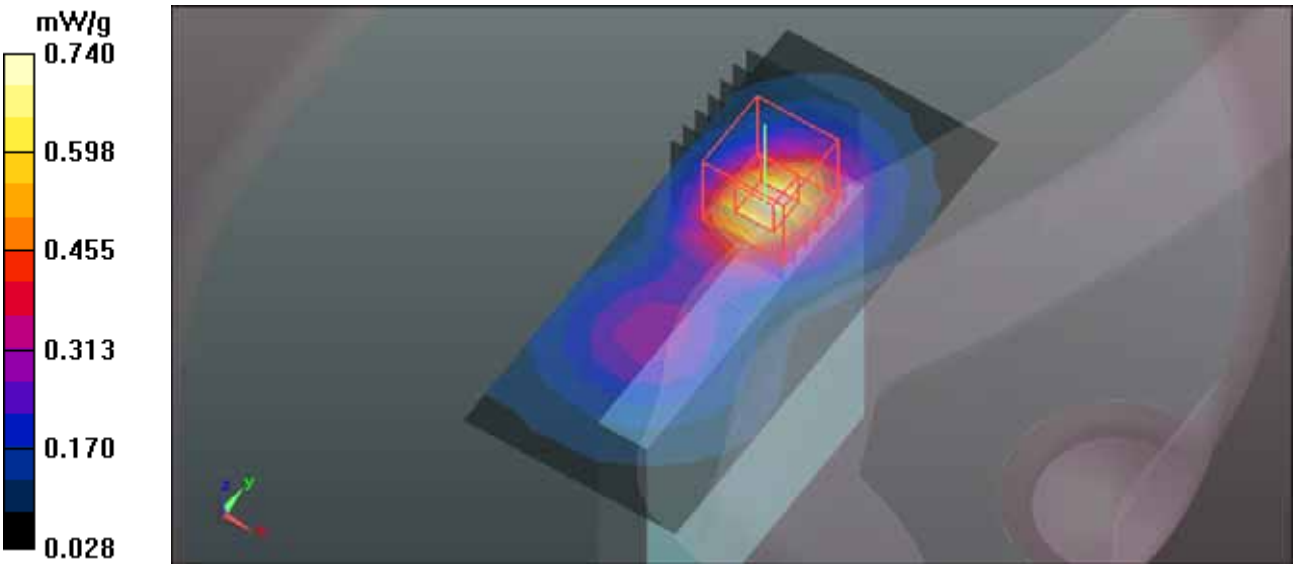
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.06 mho/m; $\varepsilon_r$ = 54.22; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.740 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.139 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.027 W/kg
**SAR(1 g) = 0.502 mW/g; SAR(10 g) = 0.240 mW/g**
Maximum value of SAR (measured) = 0.759 mW/g



Date/Time: 2011/5/17 07:26:48

## M15-Right edge-WiMax 10M-Ch368_Ant 2

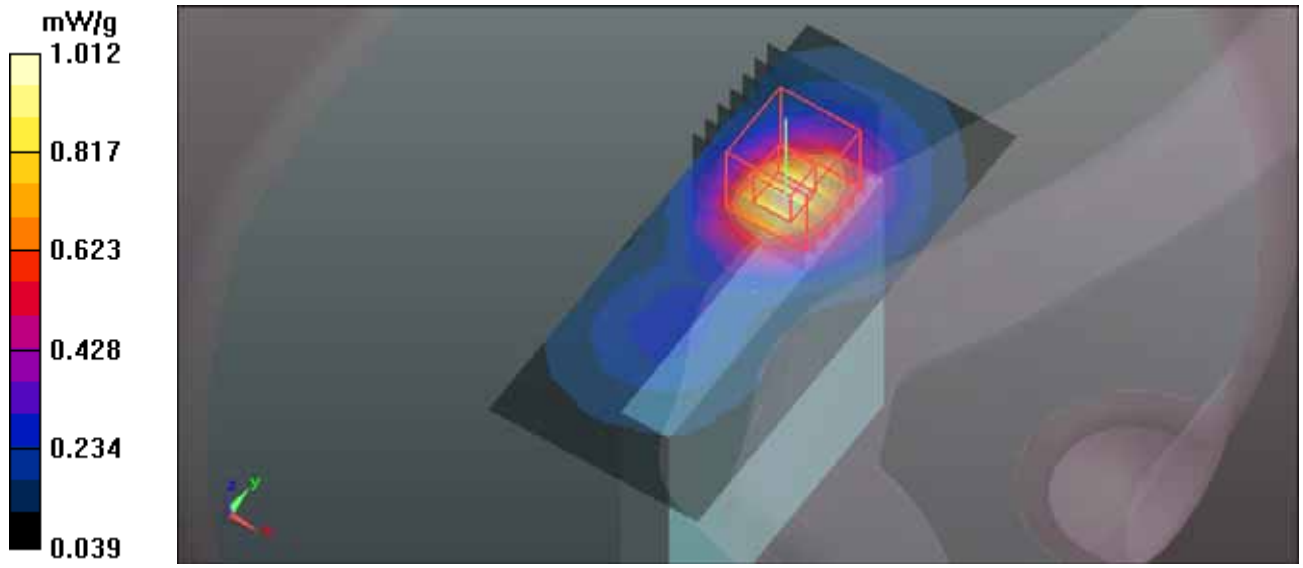
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.012 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.195 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.500 W/kg
**SAR(1 g) = 0.679 mW/g; SAR(10 g) = 0.326 mW/g**
Maximum value of SAR (measured) = 1.043 mW/g



Date/Time: 2011/5/17 07:56:24

## M15-Right edge-WiMax 10M-Ch736_Ant 2

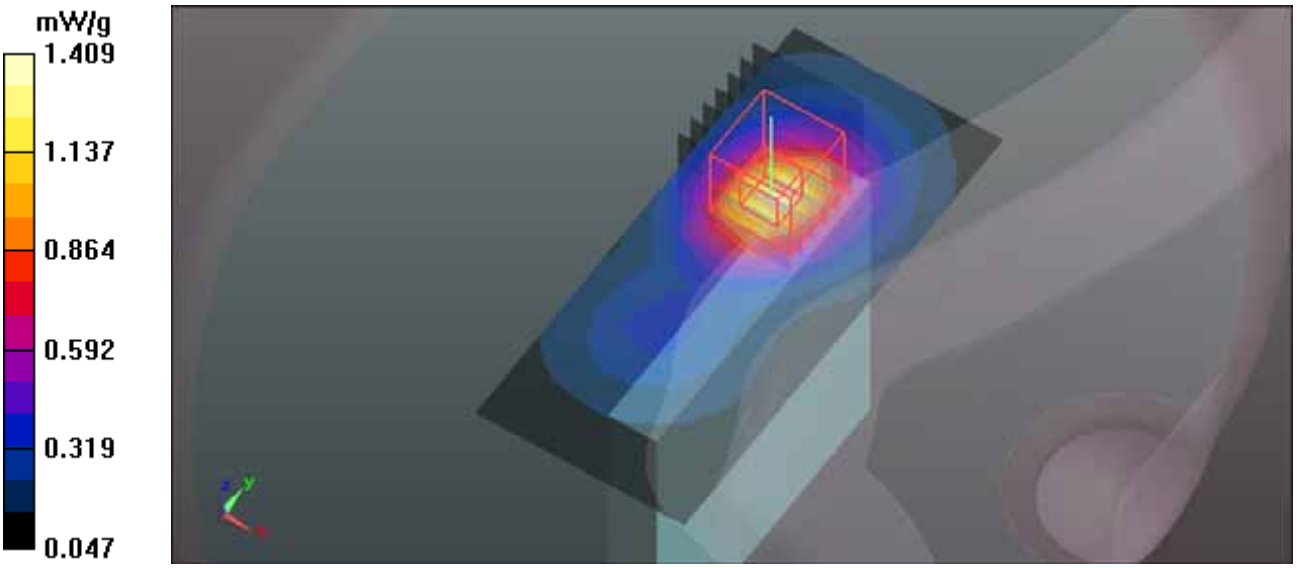
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.23 mho/m; $\varepsilon_r$ = 53.66; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.409 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.132 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 2.148 W/kg
**SAR(1 g) = 0.934 mW/g; SAR(10 g) = 0.440 mW/g**
Maximum value of SAR (measured) = 1.456 mW/g



Date/Time: 2011/5/17 05:57:45

## M16-Right edge-WiMax 10M-Ch0_Ant 2 16QAM

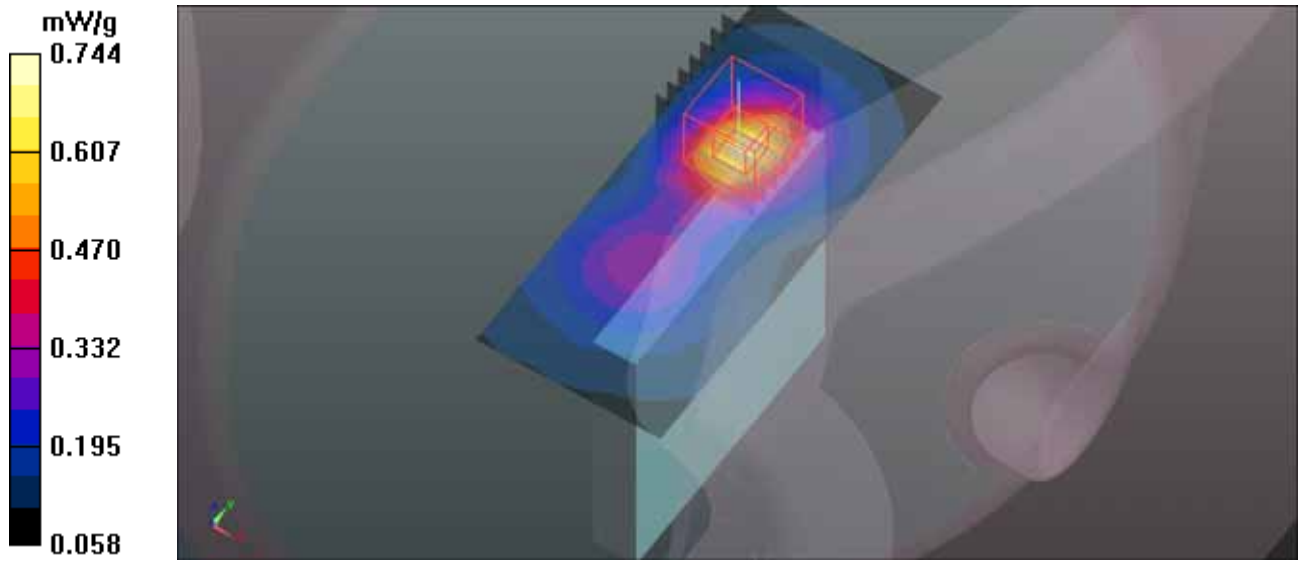
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.06 mho/m; $\varepsilon_r$ = 54.22; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.725 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.021 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.006 W/kg
**SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.235 mW/g**
Maximum value of SAR (measured) = 0.744 mW/g



Date/Time: 2011/5/17 06:27:29

## M16-Right edge-WiMax 10M-Ch368_Ant 2 16QAM

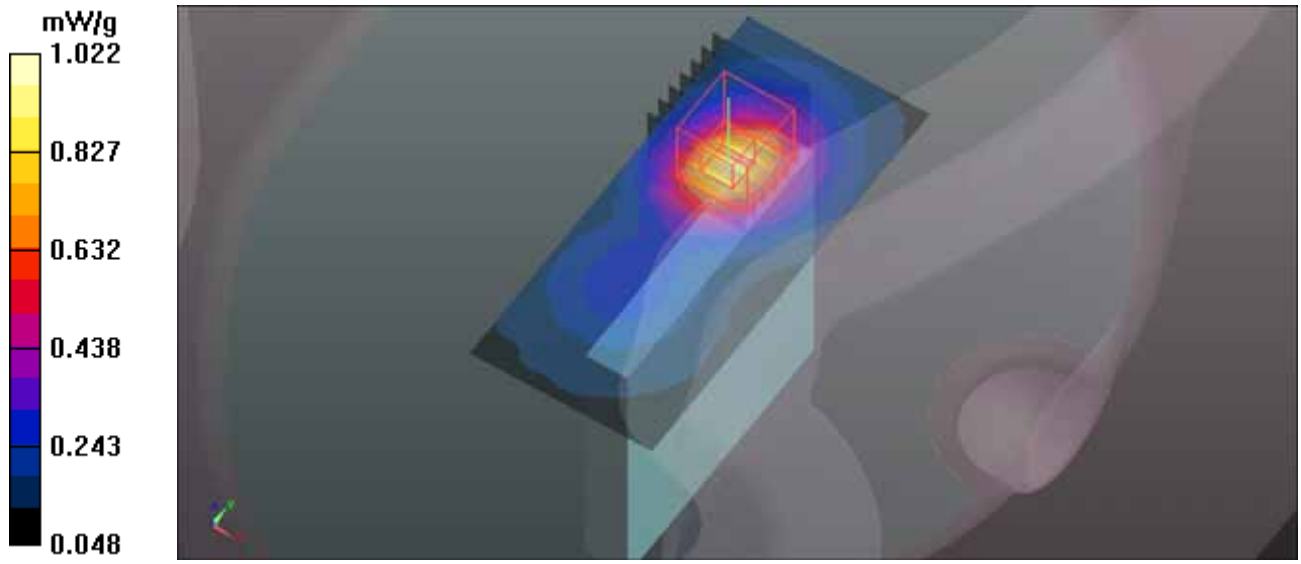
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.992 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.872 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.472 W/kg
**SAR(1 g) = 0.665 mW/g; SAR(10 g) = 0.319 mW/g**
Maximum value of SAR (measured) = 1.022 mW/g



Date/Time: 2011/5/17 10:20:56

## M16-Right edge-WiMax 10M-Ch736_Ant 2 16QAM

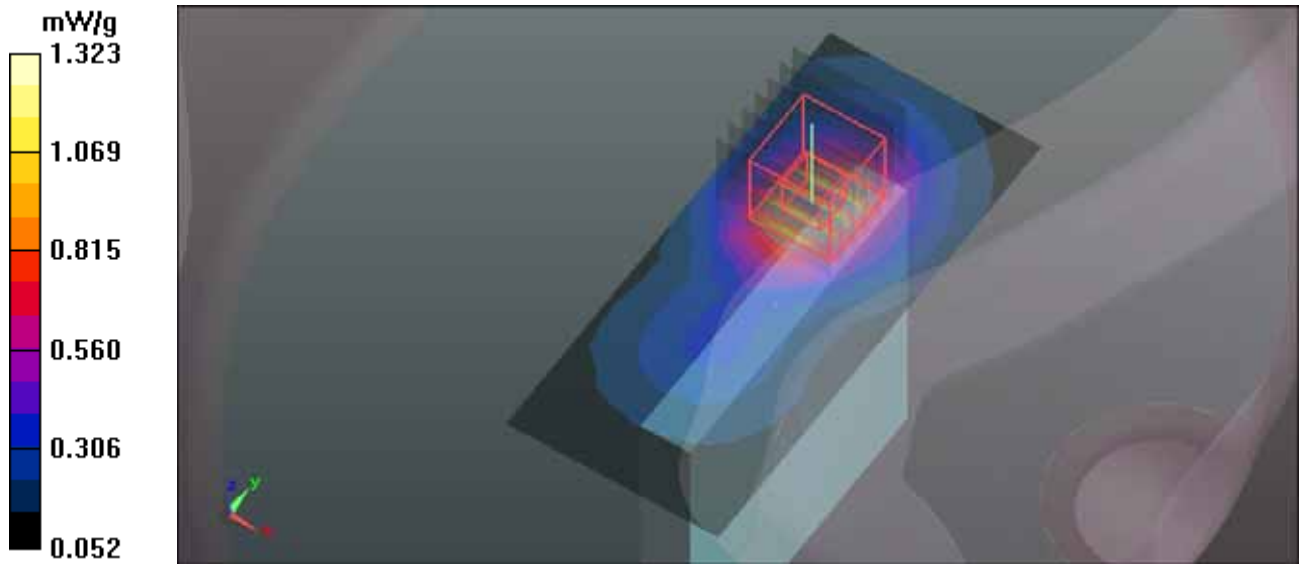
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.23 mho/m; $\varepsilon_r$ = 53.66; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The right edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.323 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.090 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.851 W/kg
**SAR(1 g) = 0.869 mW/g; SAR(10 g) = 0.413 mW/g**
Maximum value of SAR (measured) = 1.334 mW/g



Date/Time: 2011/5/17 08:03:26

## M17-Left edge-WiMax 5M-Ch0_Ant 1

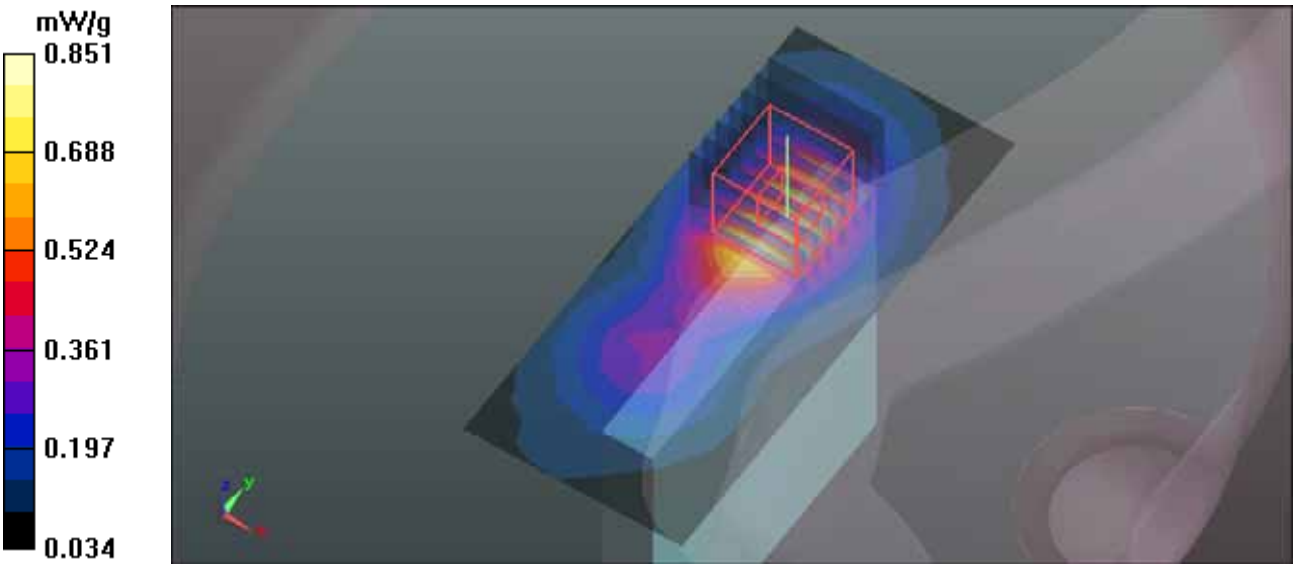
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.03 mho/m; $\varepsilon_r$ = 54.26; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.851 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.019 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.197 W/kg
**SAR(1 g) = 0.594 mW/g; SAR(10 g) = 0.297 mW/g**
Maximum value of SAR (measured) = 0.885 mW/g



Date/Time: 2011/5/17 11:33:14

## M17-Left edge-WiMax 5M-Ch378_Ant 1

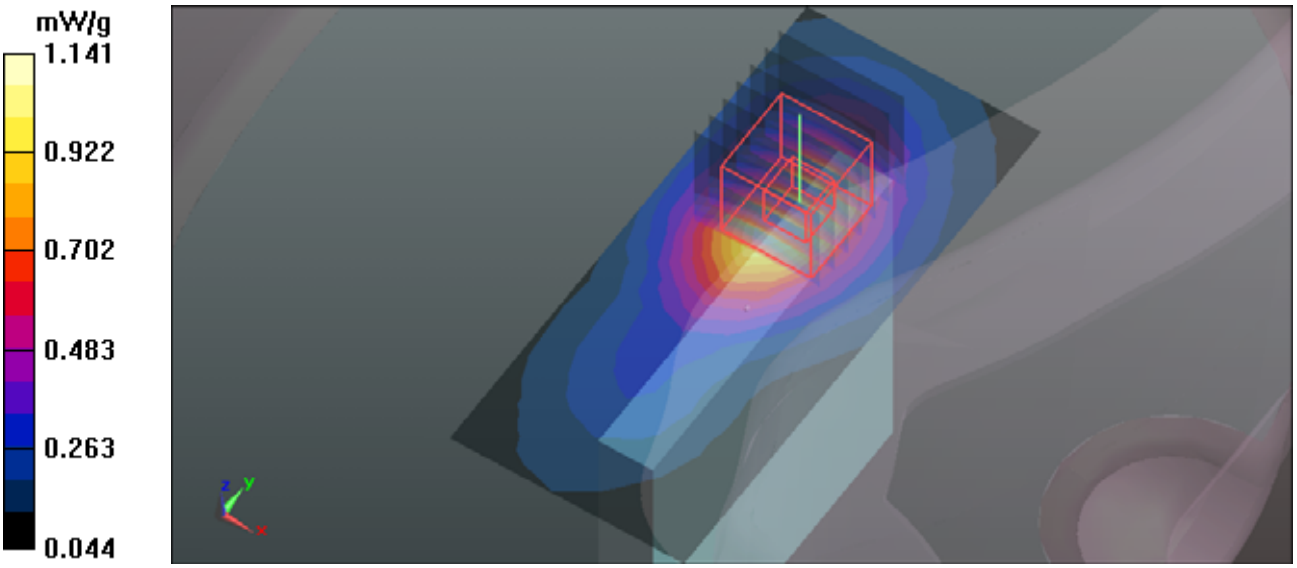
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.141 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.744 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.651 W/kg
**SAR(1 g) = 0.791 mW/g; SAR(10 g) = 0.392 mW/g**
Maximum value of SAR (measured) = 0.879 mW/g



Date/Time: 2011/5/17 12:04:03

## M17-Left edge-WiMax 5M-Ch756_Ant 1

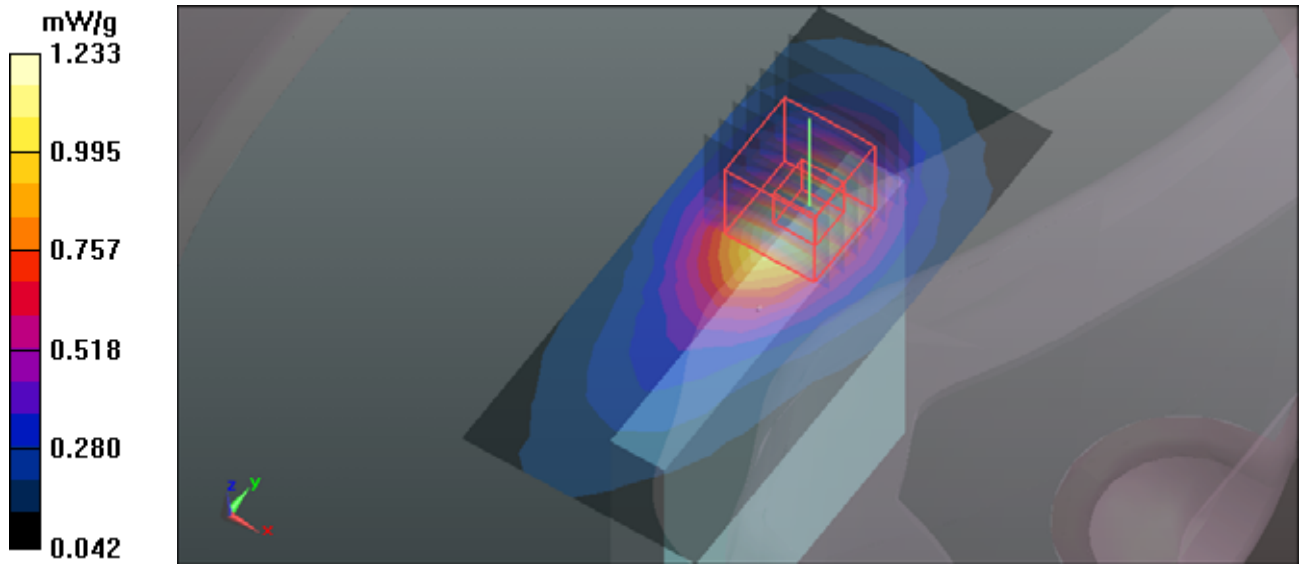
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.24 mho/m; $\varepsilon_r$ = 53.63; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.233 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.756 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.801 W/kg
**SAR(1 g) = 0.840 mW/g; SAR(10 g) = 0.409 mW/g**
Maximum value of SAR (measured) = 0.936 mW/g



Date/Time: 2011/5/17 12:54:13

## M18-Left edge-WiMax 5M-Ch0_Ant 1 16QAM

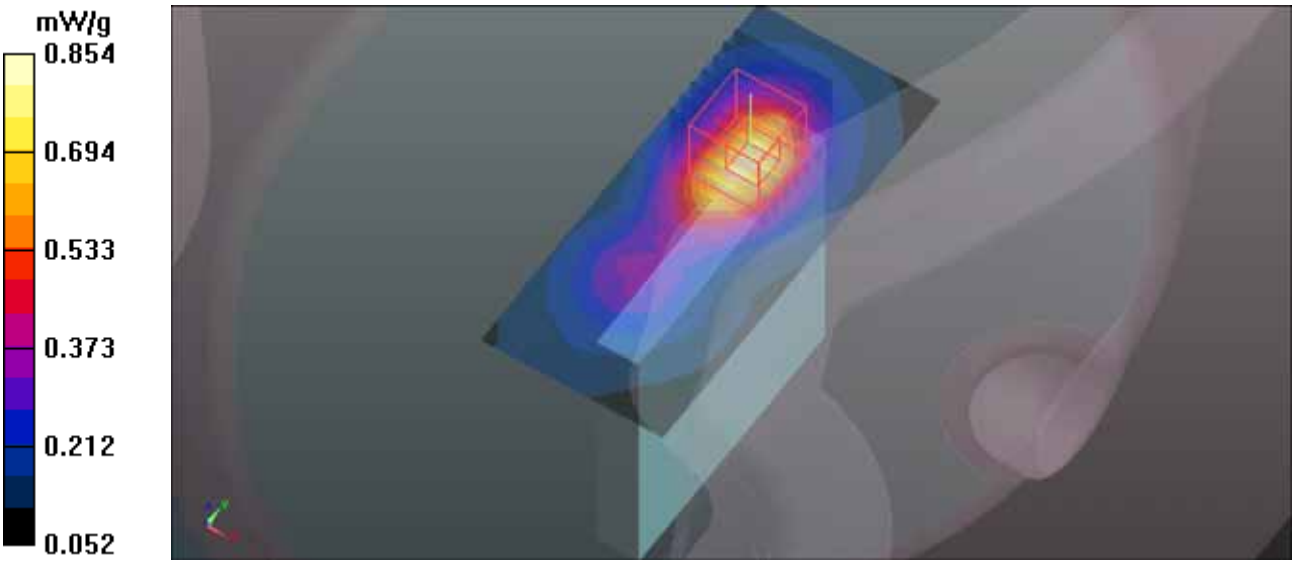
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.03 mho/m; $\varepsilon_r$ = 54.26; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.823 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.832 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.155 W/kg
**SAR(1 g) = 0.574 mW/g; SAR(10 g) = 0.286 mW/g**
Maximum value of SAR (measured) = 0.854 mW/g



Date/Time: 2011/5/17 13:38:06

## M18-Left edge-WiMax 5M-Ch378_Ant 1 16QAM

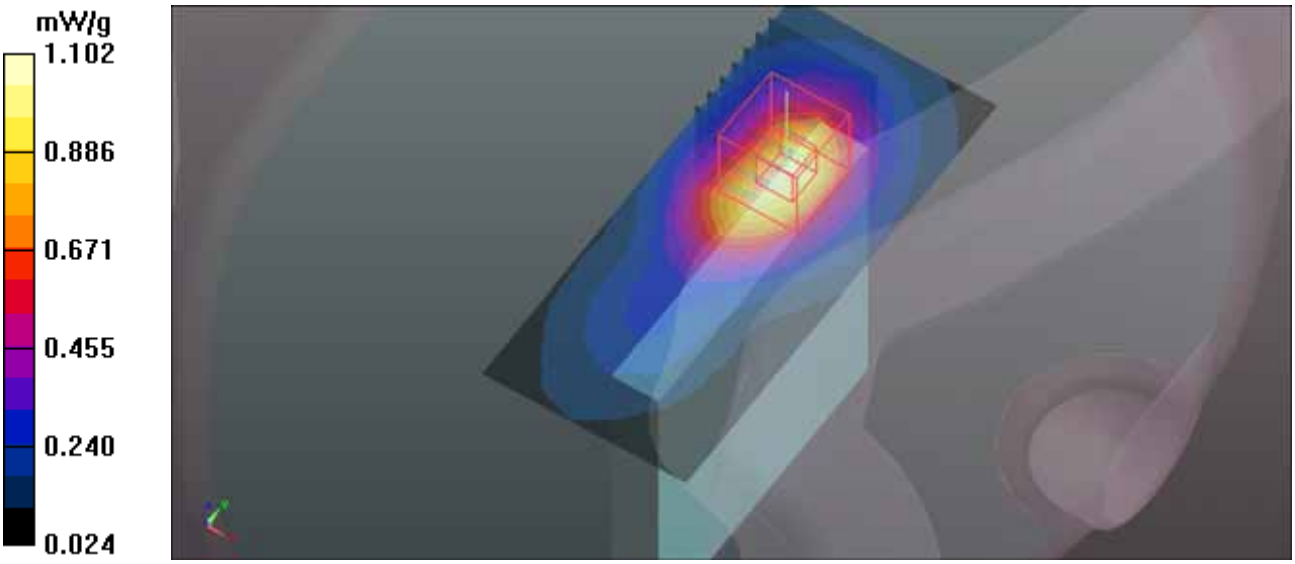
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.102 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.219 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.593 W/kg
**SAR(1 g) = 0.763 mW/g; SAR(10 g) = 0.375 mW/g**
Maximum value of SAR (measured) = 0.849 mW/g



Date/Time: 2011/5/17 14:53:50

## M18-Left edge-WiMax 5M-Ch756_Ant 1 16QAM

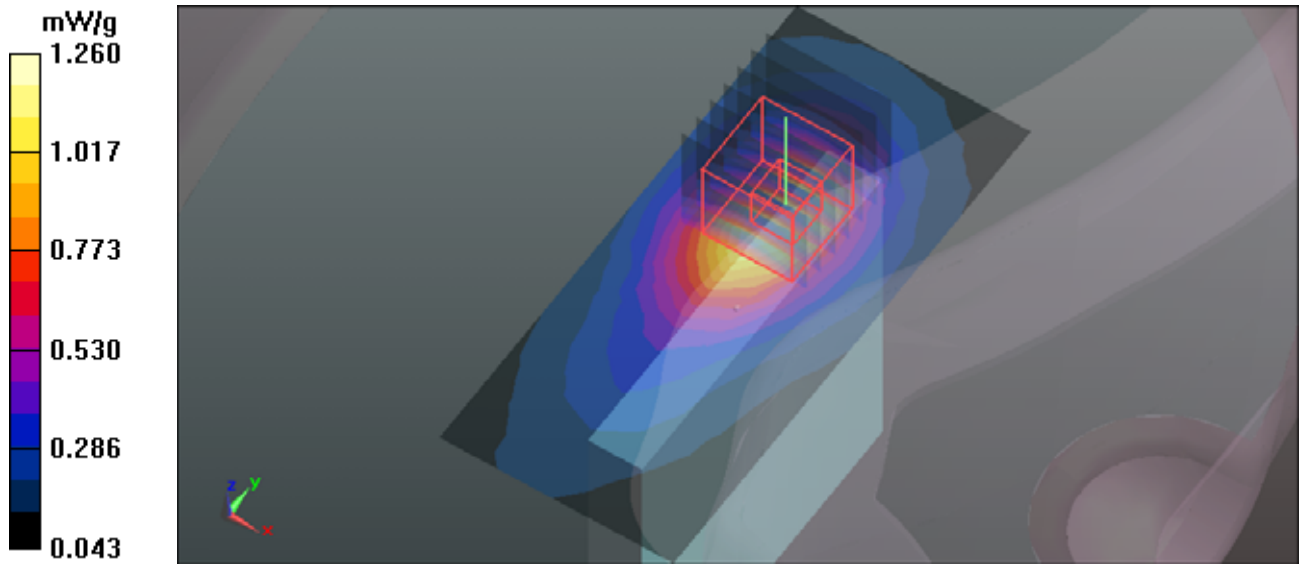
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.24 mho/m; $\varepsilon_r$ = 53.63; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.260 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.981 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.856 W/kg
**SAR(1 g) = 0.862 mW/g; SAR(10 g) = 0.420 mW/g**
Maximum value of SAR (measured) = 0.961 mW/g



Date/Time: 2011/5/17 15:24:48

## M19-Left edge-WiMax 10M-Ch0_Ant 1

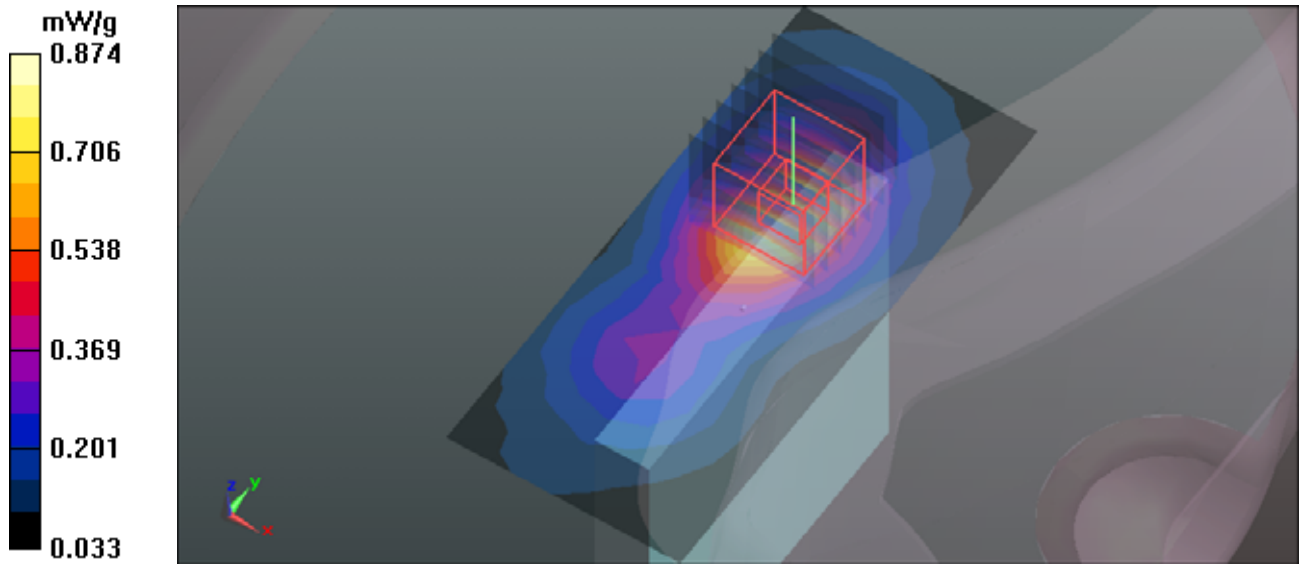
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.06 mho/m; $\varepsilon_r$ = 54.22; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.874 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.855 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 1.239 W/kg
**SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.305 mW/g**
Maximum value of SAR (measured) = 0.684 mW/g



Date/Time: 2011/5/17 16:06:51

## M19-Left edge-WiMax 10M-Ch368_Ant 1

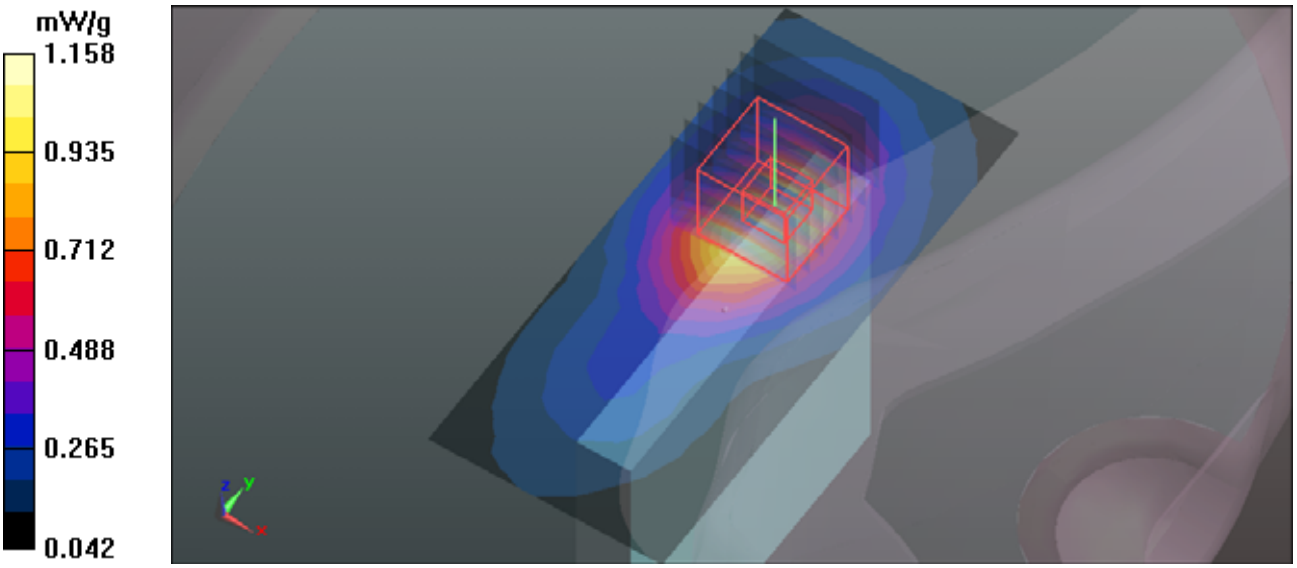
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.158 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 18.952 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.663 W/kg
**SAR(1 g) = 0.799 mW/g; SAR(10 g) = 0.396 mW/g**
Maximum value of SAR (measured) = 0.890 mW/g



Date/Time: 2011/5/17 16:43:34

## M19-Left edge-WiMax 10M-Ch736_Ant 1

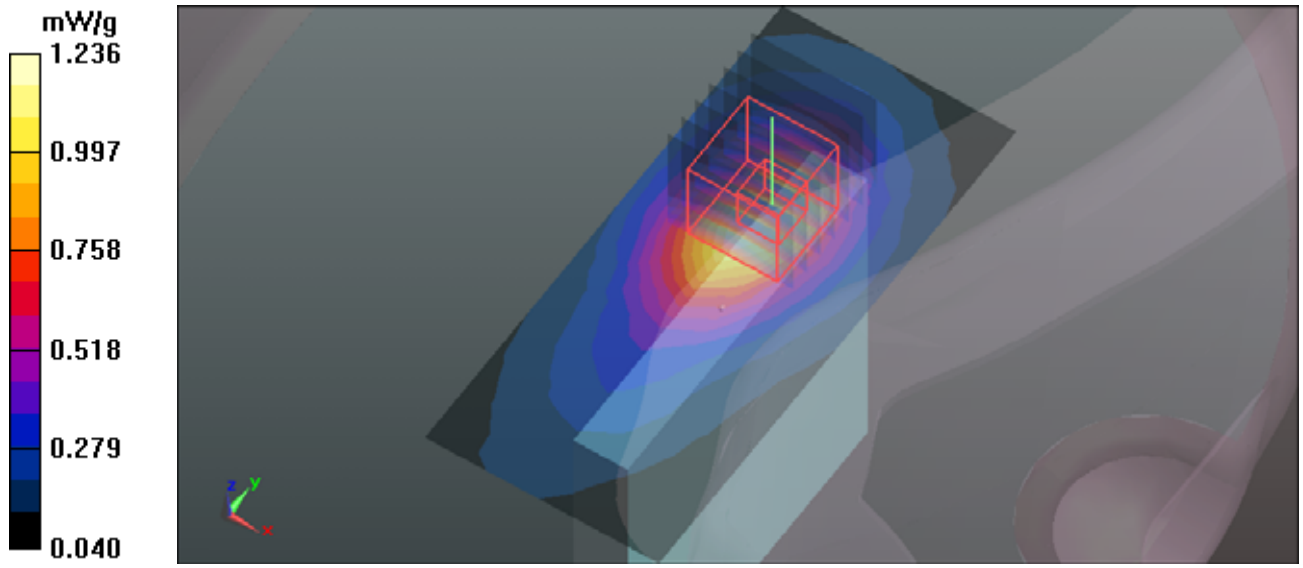
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.23 mho/m; $\varepsilon_r$ = 53.66; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.236 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.733 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.795 W/kg
**SAR(1 g) = 0.841 mW/g; SAR(10 g) = 0.411 mW/g**
Maximum value of SAR (measured) = 0.940 mW/g



Date/Time: 2011/5/17 17:28:06

## M20-Left edge-WiMax 10M-Ch0_Ant 1 16QAM

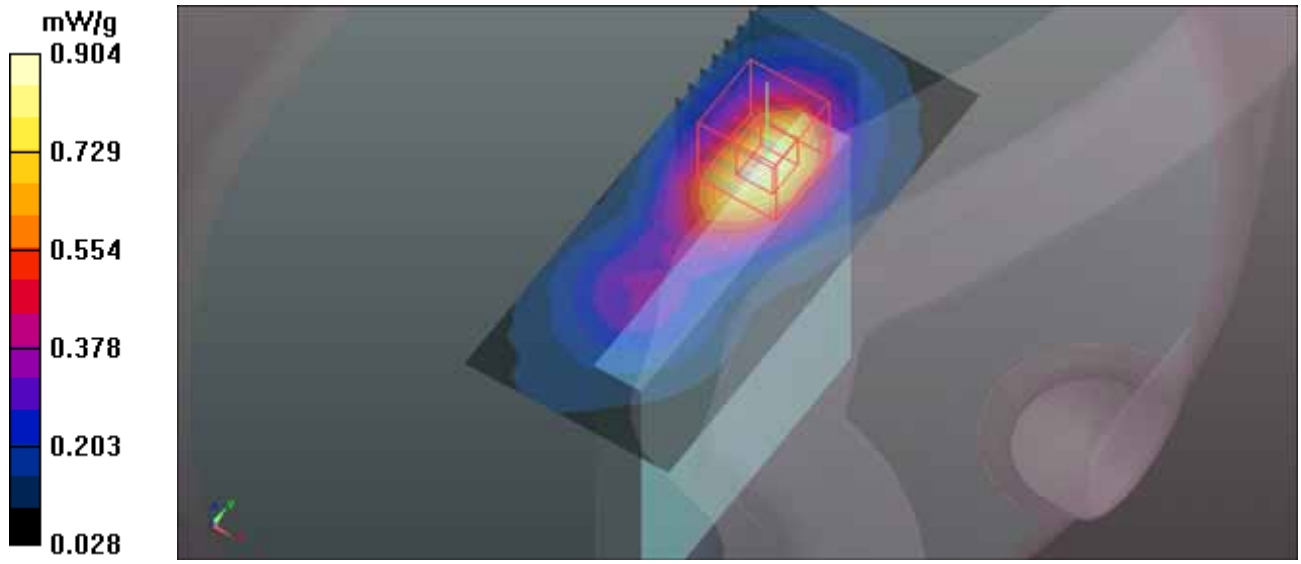
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.06 mho/m; $\varepsilon_r$ = 54.22; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.904 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.038 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.282 W/kg
**SAR(1 g) = 0.632 mW/g; SAR(10 g) = 0.316 mW/g**
Maximum value of SAR (measured) = 0.708 mW/g



Date/Time: 2011/5/17 18:11:27

## M20-Left edge-WiMax 10M-Ch368_Ant 1 16QAM

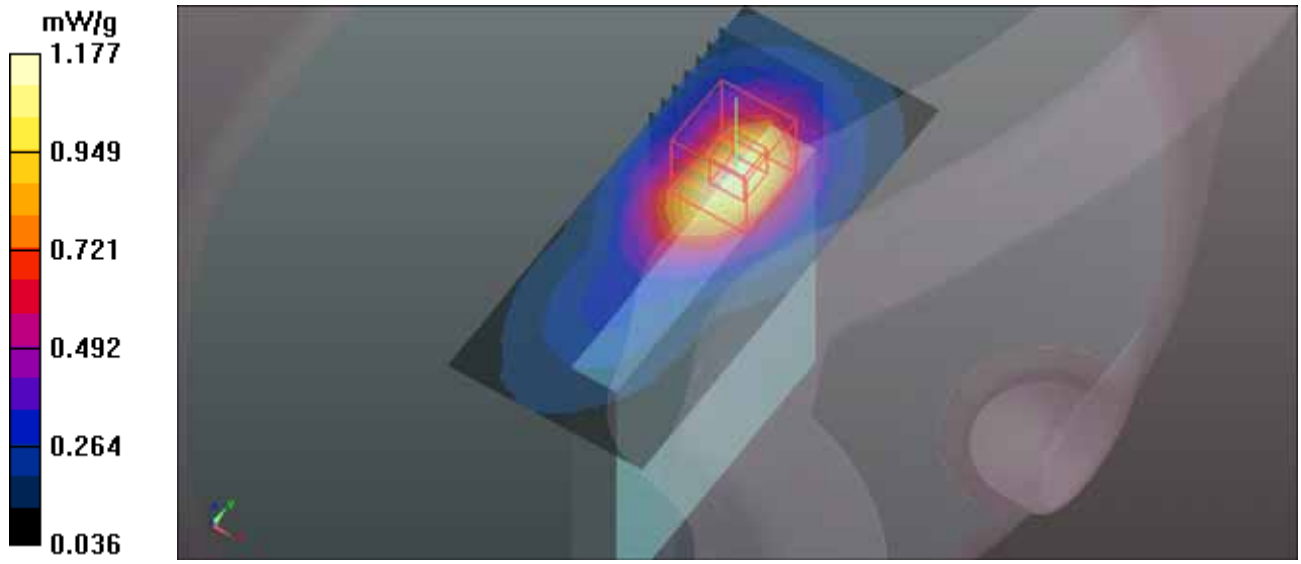
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.177 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.162 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.691 W/kg
**SAR(1 g) = 0.812 mW/g; SAR(10 g) = 0.402 mW/g**
Maximum value of SAR (measured) = 0.904 mW/g



Date/Time: 2011/5/17 19:11:44

## M20-Left edge-WiMax 10M-Ch736_Ant 1 16QAM

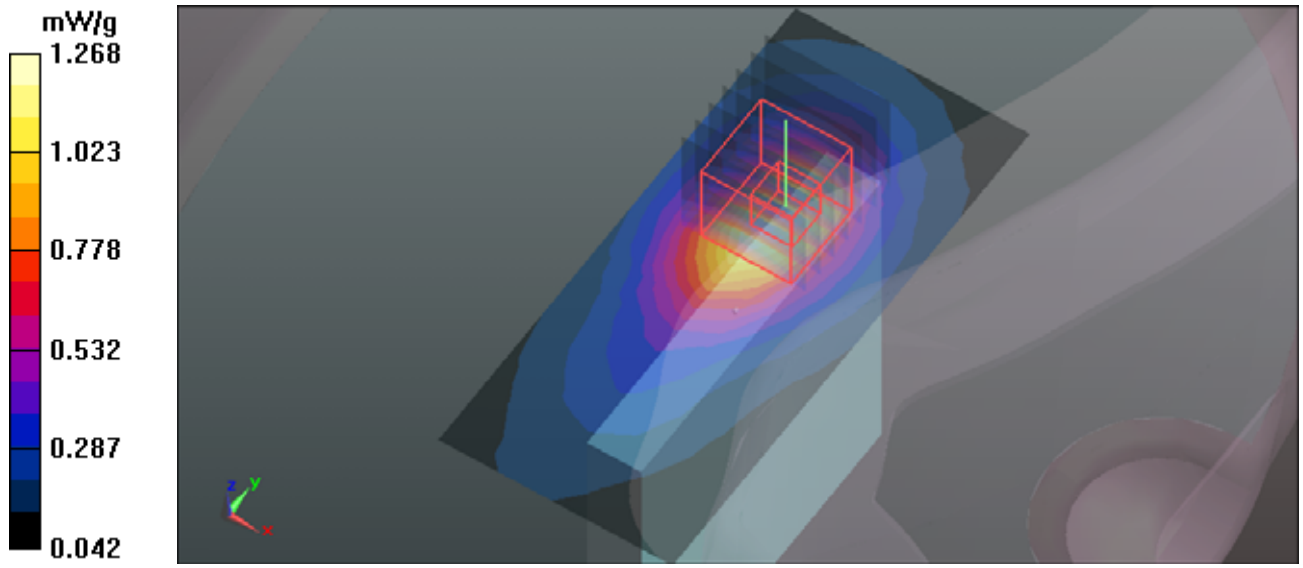
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: 16QAM
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.23 mho/m; $\varepsilon_r$ = 53.66; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The left edge side of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High /Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 1.268 mW/g

**Flat-Section MSL/Flat Section 10mm High /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.890 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.843 W/kg
**SAR(1 g) = 0.863 mW/g; SAR(10 g) = 0.420 mW/g**
Maximum value of SAR (measured) = 0.961 mW/g

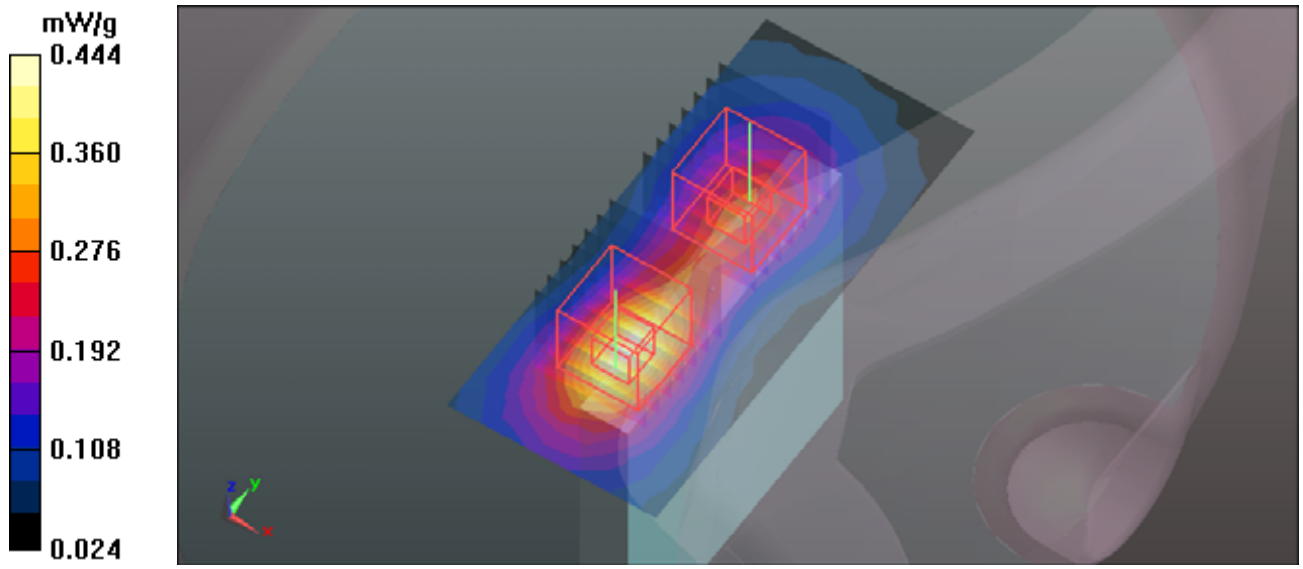


## M21-Top edge-WiMax 5M-Ch0_Ant 1

Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.03 mho/m; $\varepsilon_r$ = 54.26; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.444 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.856 V/m; Power Drift = 0.0024 dB
Peak SAR (extrapolated) = 0.603 W/kg
**SAR(1 g) = 0.297 mW/g; SAR(10 g) = 0.150 mW/g**
Maximum value of SAR (measured) = 0.436 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.856 V/m; Power Drift = 0.0024 dB
Peak SAR (extrapolated) = 0.401 W/kg
**SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.112 mW/g**
Maximum value of SAR (measured) = 0.301 mW/g



## M21-Top edge-WiMax 5M-Ch378_Ant 1

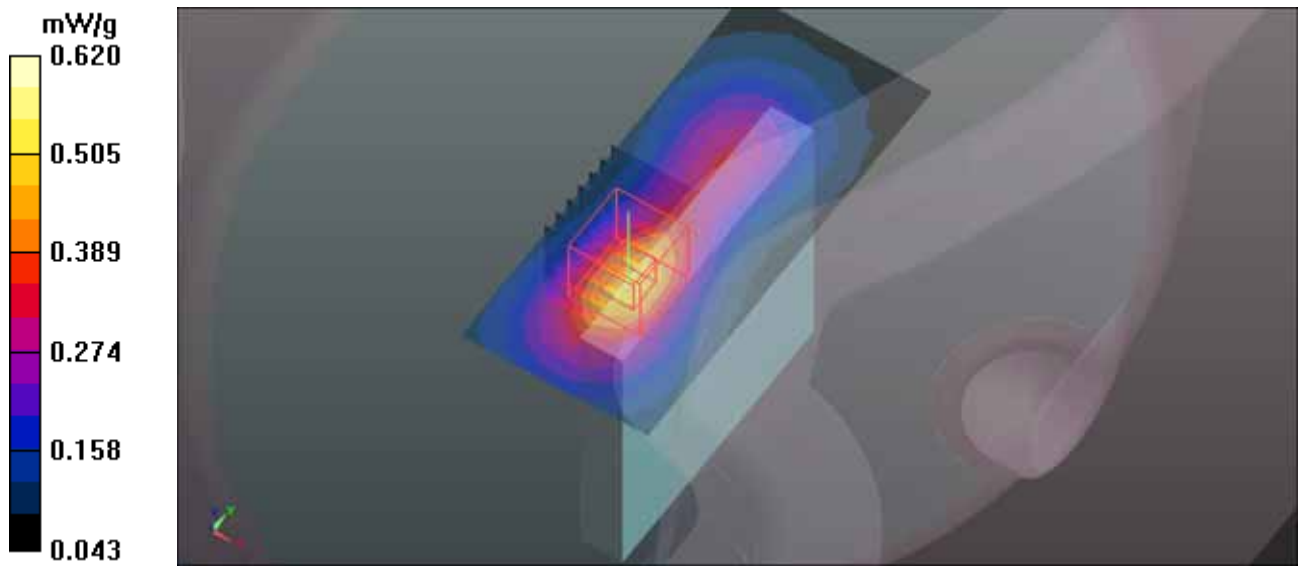
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.620 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.199 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.876 W/kg
**SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.211 mW/g**
Maximum value of SAR (measured) = 0.632 mW/g



Date/Time: 2011/5/17 22:02:33

## M21-Top edge-WiMax 5M-Ch756_Ant 1

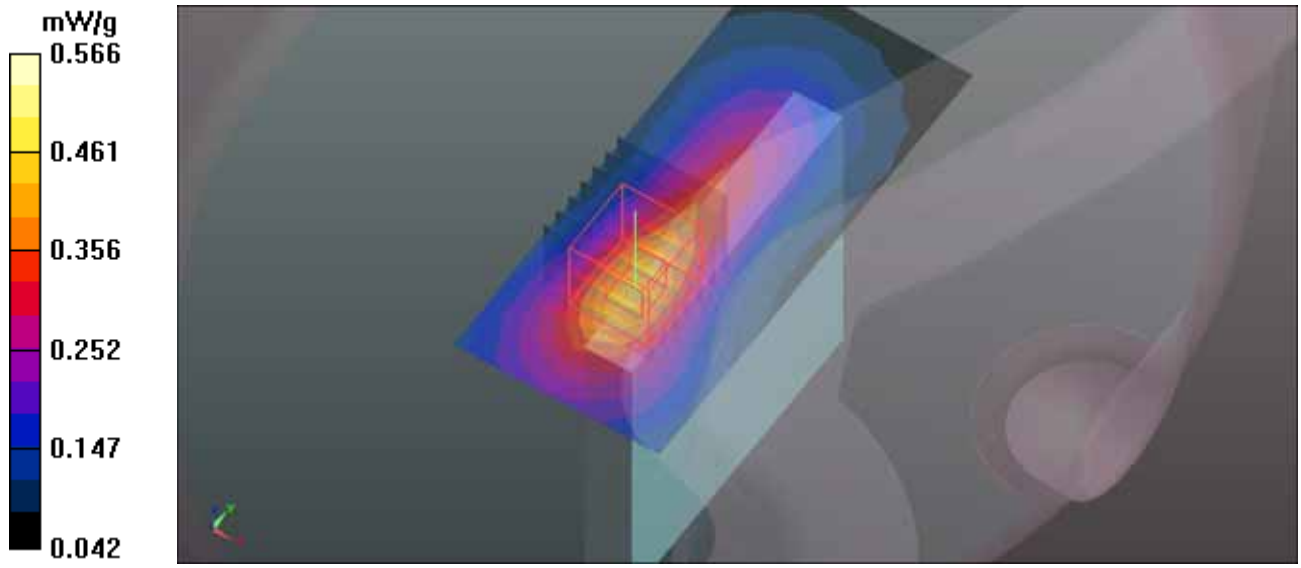
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; σ = 2.24 mho/m; $\varepsilon_r$ = 53.63; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.566 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.091 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.811 W/kg
**SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.195 mW/g**
Maximum value of SAR (measured) = 0.578 mW/g



Date/Time: 2011/5/17 23:26:55

## M22-Top edge-WiMax 5M-Ch0_Ant 2

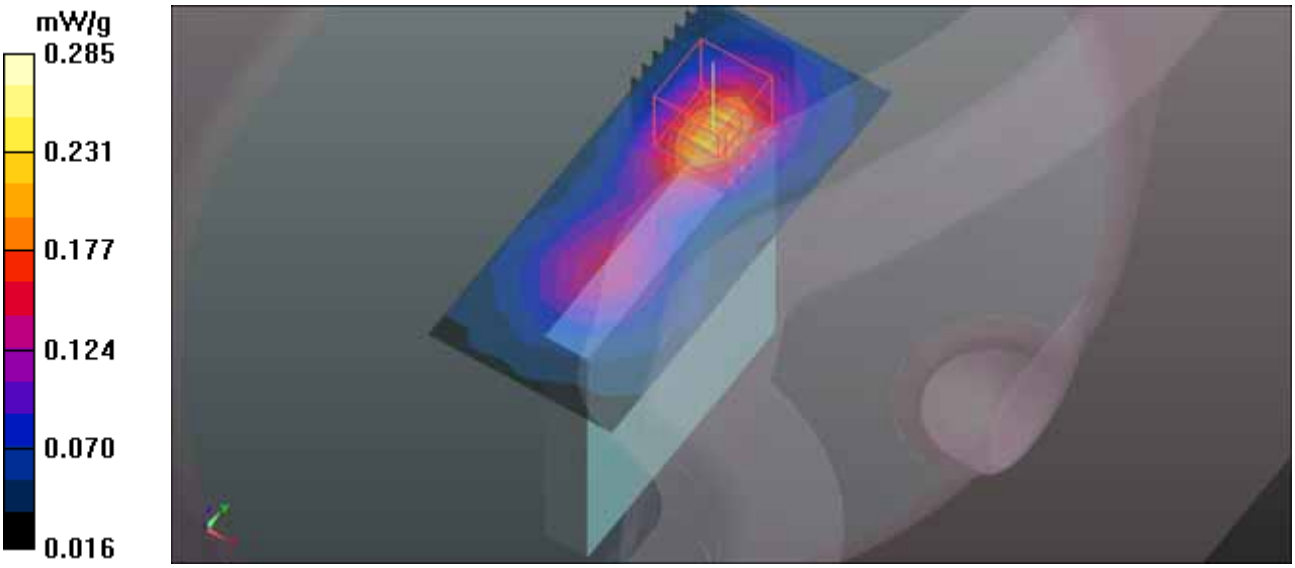
Communication System: Wimax_2.6GHz 5M ; Frequency: 2498.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2498.5 MHz; σ = 2.03 mho/m; $\varepsilon_r$ = 54.26; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(7.05, 7.05, 7.05); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.285 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.171 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.396 W/kg
**SAR(1 g) = 0.194 mW/g; SAR(10 g) = 0.098 mW/g**
Maximum value of SAR (measured) = 0.292 mW/g



Date/Time: 2011/5/17 23:56:34

## M22-Top edge-WiMax 5M-Ch378_Ant 2

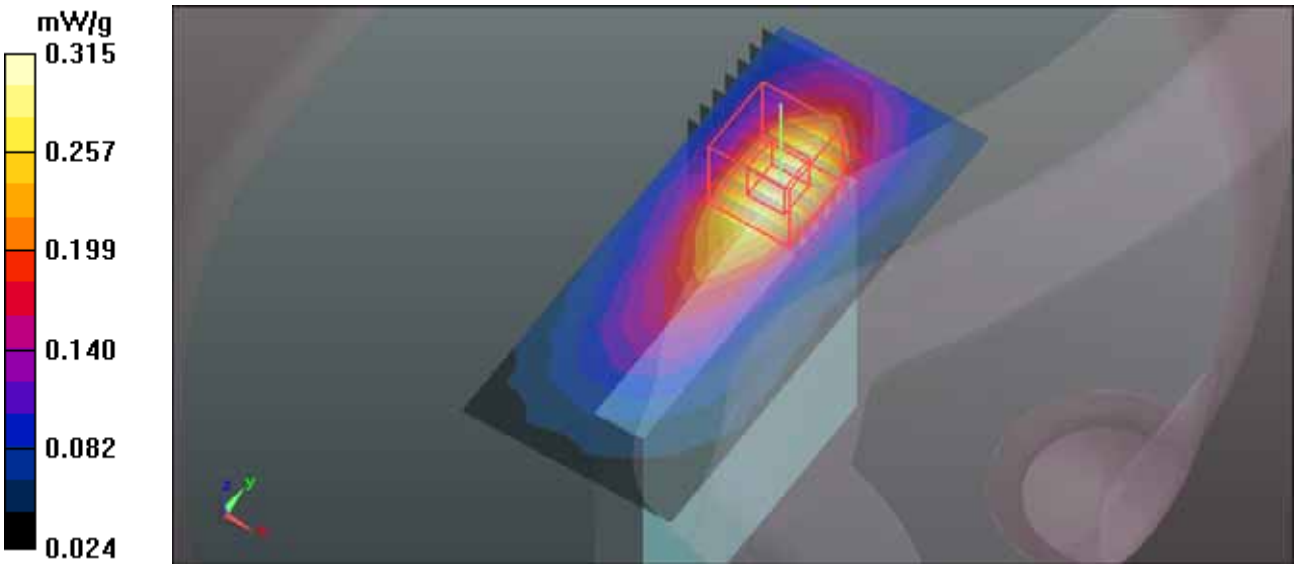
Communication System: Wimax_2.6GHz 5M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.15 mho/m; $\varepsilon_r$ = 53.98; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.315 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.075 V/m; Power Drift = 0.198 dB
Peak SAR (extrapolated) = 0.464 W/kg
**SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.113 mW/g**
Maximum value of SAR (measured) = 0.336 mW/g



Date/Time: 2011/5/18 02:26:19

## M22-Top edge-WiMax 5M-Ch756_Ant 2

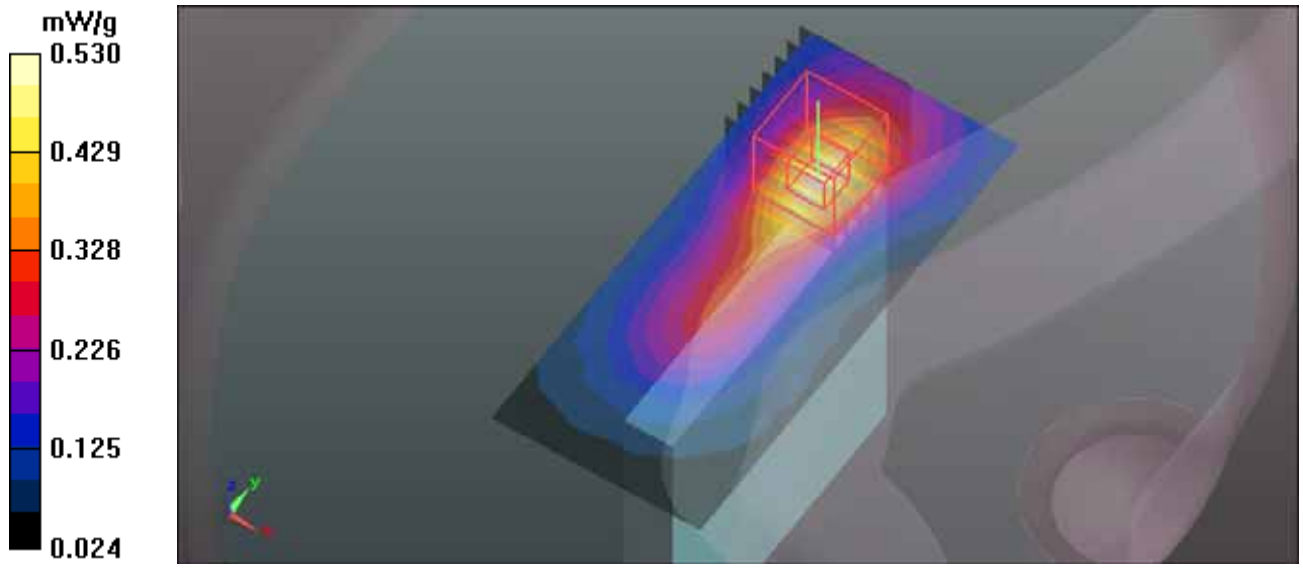
Communication System: Wimax_2.6GHz 5M ; Frequency: 2687.5 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2687.5 MHz; $\sigma$ = 2.25 mho/m; $\varepsilon_r$ = 53.81; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.530 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.894 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.739 W/kg
**SAR(1 g) = 0.344 mW/g; SAR(10 g) = 0.171 mW/g**
Maximum value of SAR (measured) = 0.525 mW/g

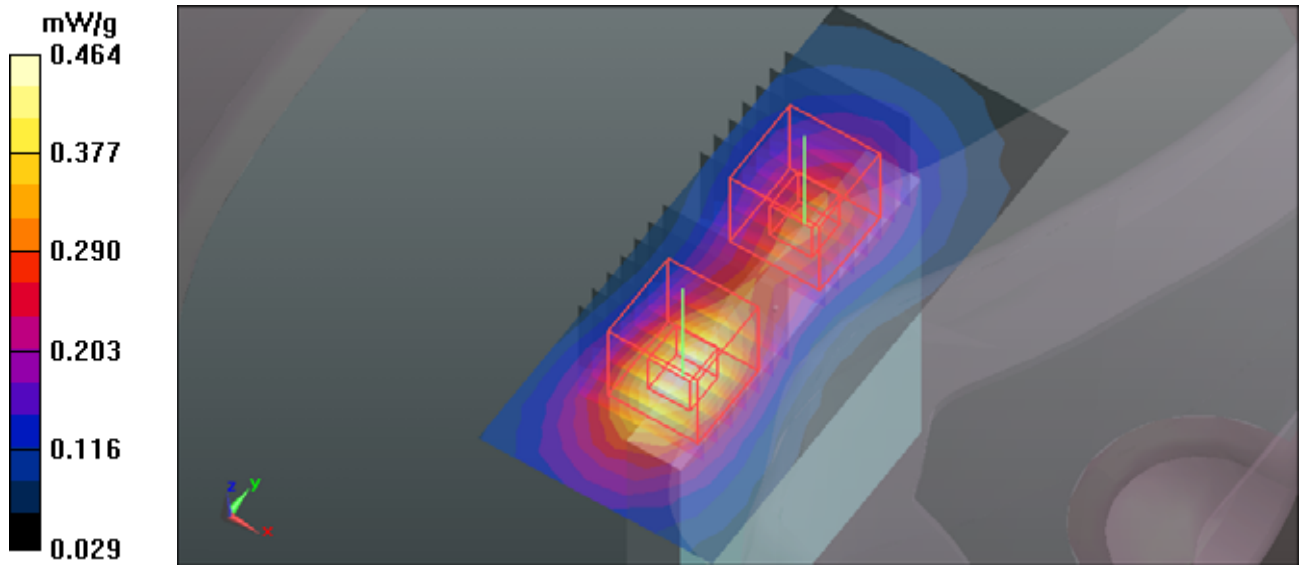


## M23-Top edge-WiMax 10M-Ch0_Ant 1

Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.07 mho/m; $\varepsilon_r$ = 54.43; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)
DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.464 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.735 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.648 W/kg
**SAR(1 g) = 0.319 mW/g; SAR(10 g) = 0.163 mW/g**
Maximum value of SAR (measured) = 0.474 mW/g
**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 1:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.735 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.420 W/kg
**SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.120 mW/g**
Maximum value of SAR (measured) = 0.316 mW/g



Date/Time: 2011/5/18 03:40:25

## M23-Top edge-WiMax 10M-Ch368_Ant 1

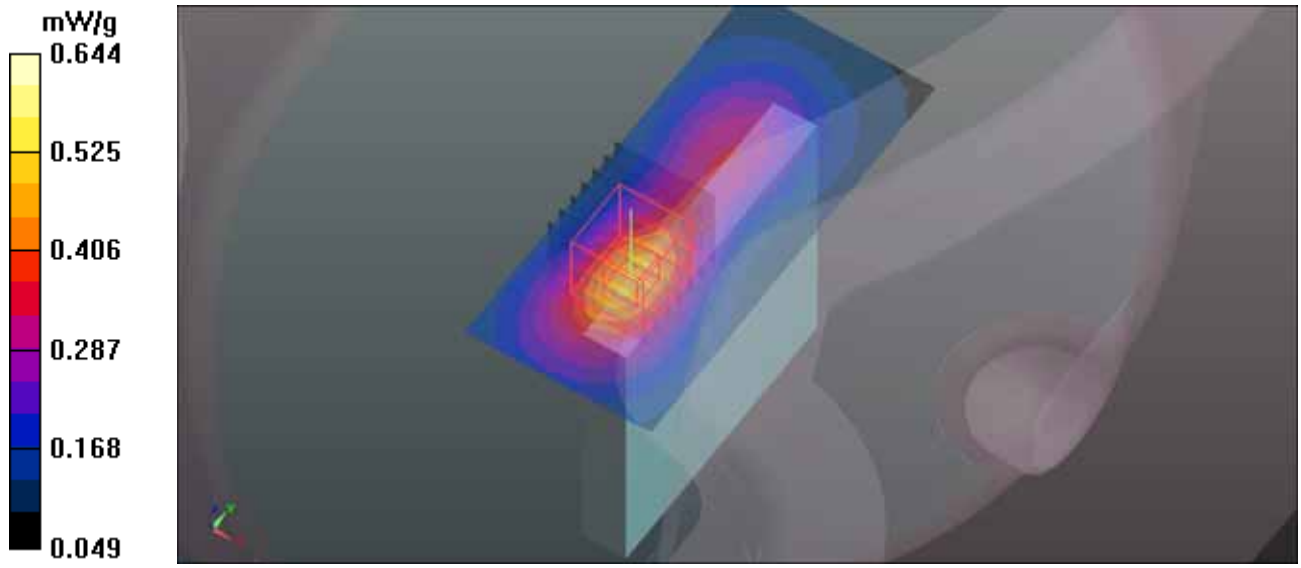
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.13 mho/m; $\varepsilon_r$ = 54.15; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.644 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.647 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.953 W/kg
**SAR(1 g) = 0.459 mW/g; SAR(10 g) = 0.233 mW/g**
Maximum value of SAR (measured) = 0.689 mW/g



## M23-Top edge-WiMax 10M-Ch736_Ant 1

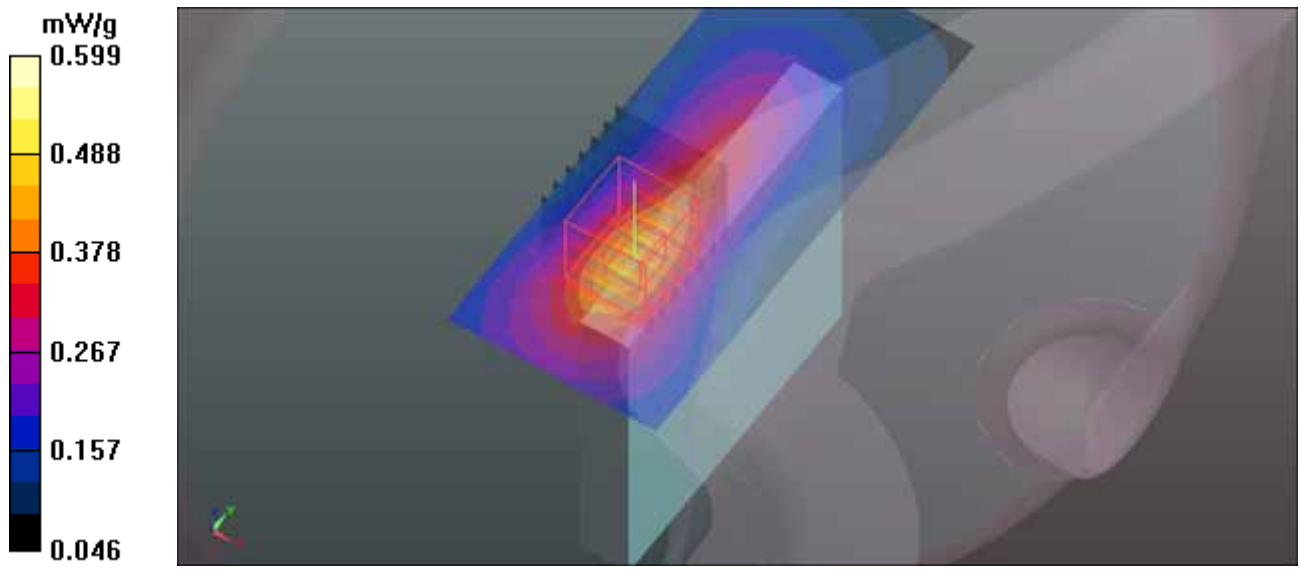
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.24 mho/m; $\varepsilon_r$ = 53.84; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.599 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.312 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.854 W/kg
**SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.207 mW/g**
Maximum value of SAR (measured) = 0.608 mW/g



Date/Time: 2011/5/18 04:40:09

## M24-Top edge-WiMax 10M-Ch0_Ant 2

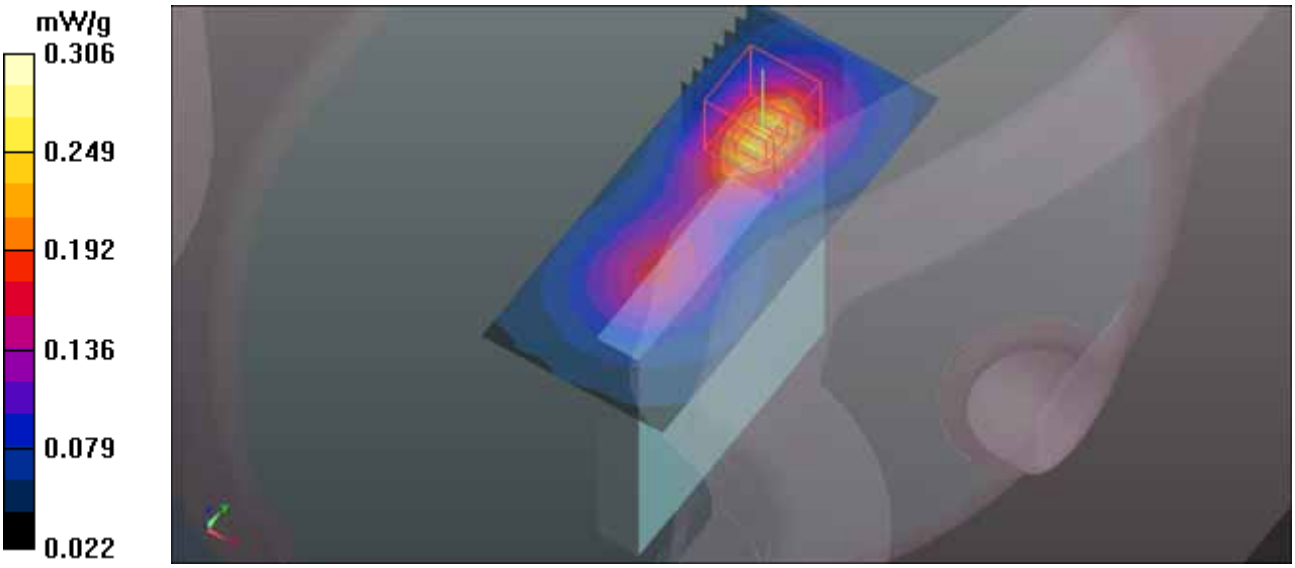
Communication System: Wimax_2.6GHz 10M ; Frequency: 2501 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2501 MHz; σ = 2.07 mho/m; $\varepsilon_r$ = 54.43; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Low/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.306 mW/g

**Flat-Section MSL/Flat Section 10mm Low/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.207 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.426 W/kg
**SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.106 mW/g**
Maximum value of SAR (measured) = 0.313 mW/g



## M24-Top edge-WiMax 10M-Ch368_Ant 2

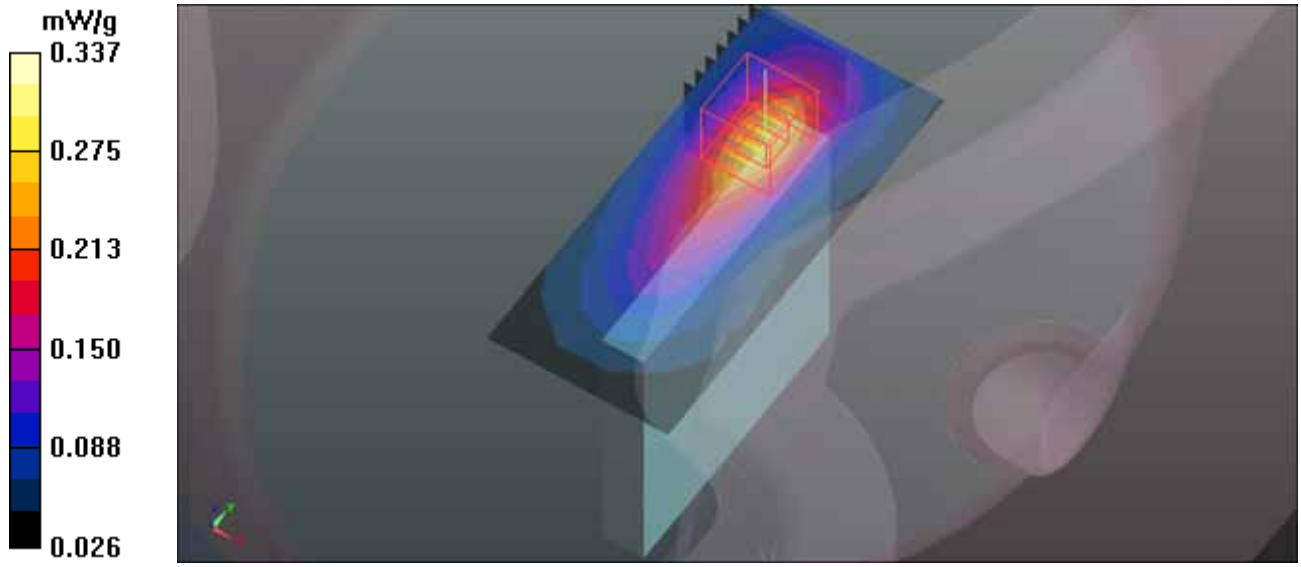
Communication System: Wimax_2.6GHz 10M ; Frequency: 2593 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2593 MHz; σ = 2.13 mho/m; $\varepsilon_r$ = 54.15; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm Mid/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.337 mW/g

**Flat-Section MSL/Flat Section 10mm Mid/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.106 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.469 W/kg
**SAR(1 g) = 0.226 mW/g; SAR(10 g) = 0.116 mW/g**
Maximum value of SAR (measured) = 0.342 mW/g



## M24-Top edge-WiMax 10M-Ch736_Ant 2

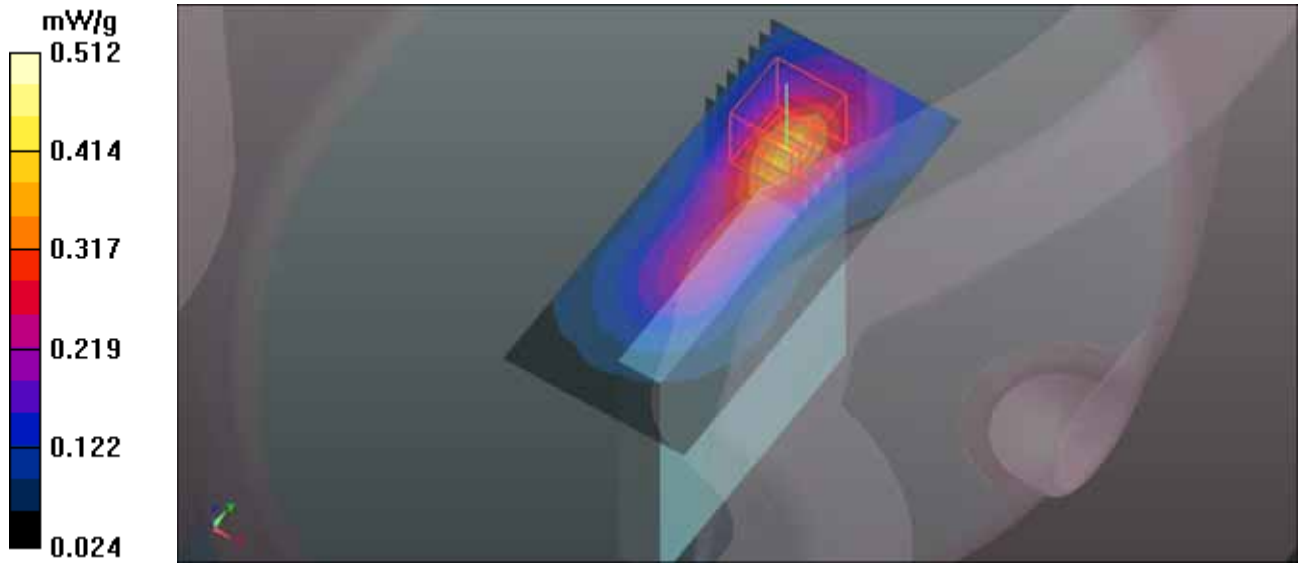
Communication System: Wimax_2.6GHz 10M ; Frequency: 2685 MHz ; Duty Cycle: 1:2.67 ; Modulation type: QPSK
Medium: MSL2600 Medium parameters used: f = 2685 MHz; σ = 2.24 mho/m; $\varepsilon_r$ = 53.84; ρ = 1000 kg/m$^3$
Phantom section: Flat Section ; Separation distance : 10 mm (The Top edge of the EUT to the Phantom)

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Flat-Section MSL/Flat Section 10mm High/Area Scan (8x17x1):** Measurement grid: dx=8mm, dy=8mm
Maximum value of SAR (measured) = 0.512 mW/g

**Flat-Section MSL/Flat Section 10mm High/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.785 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.708 W/kg
**SAR(1 g) = 0.333 mW/g; SAR(10 g) = 0.166 mW/g**
Maximum value of SAR (measured) = 0.507 mW/g



## SystemPerformanceCheck-D2600V2-MSL2600 MHz

**DUT: Dipole 2600 MHz ; Type: D2600V2 ; Serial: D2600V2 - SN:1003 ; Test Frequency: 2600 MHz**

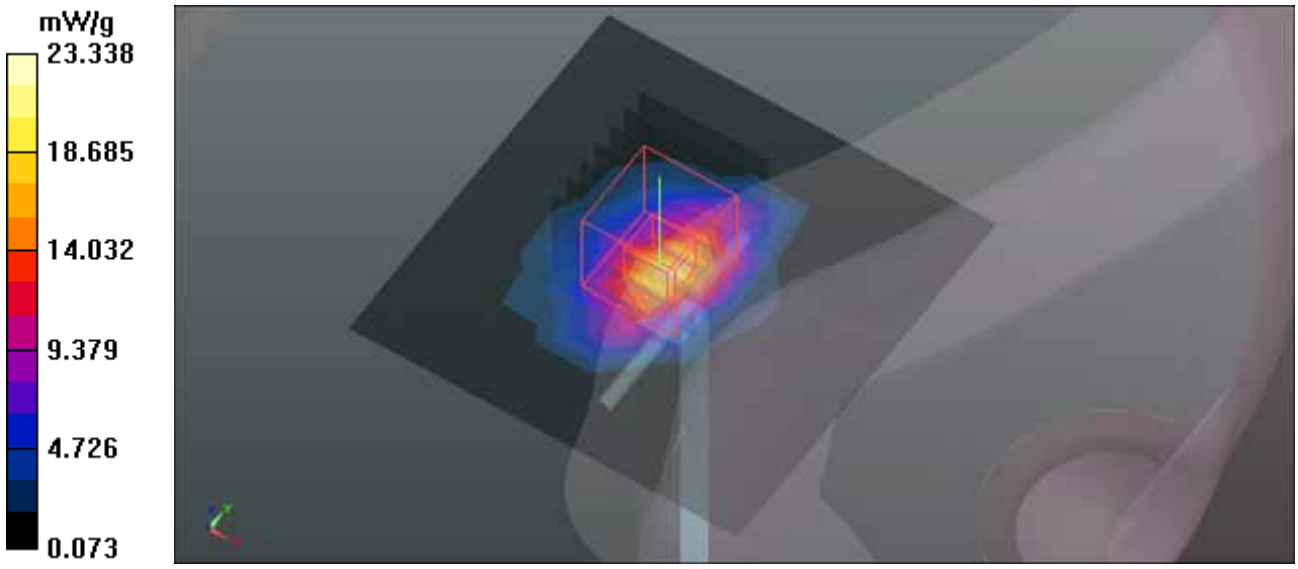
Communication System: CW ; Frequency: 2600 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL2600;Medium parameters used: f = 2600 MHz; σ = 2.17 mho/m; $\varepsilon_r$ = 53.53; ρ = 1000 kg/m$^3$ ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feet point of the dipole to the Phantom)Air temp. : 22.9 degrees ; Liquid temp. : 21.7 degrees

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (7x7x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 22.260 mW/g

**System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.474 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 32.685 W/kg
**SAR(1 g) = 14.6 mW/g; SAR(10 g) = 6.34 mW/g**
Maximum value of SAR (measured) = 23.338 mW/g



## SystemPerformanceCheck-D2600V2-MSL2600 MHz

**DUT: Dipole 2600 MHz ; Type: D2600V2 ; Serial: D2600V2 - SN:1003 ; Test Frequency: 2600 MHz**

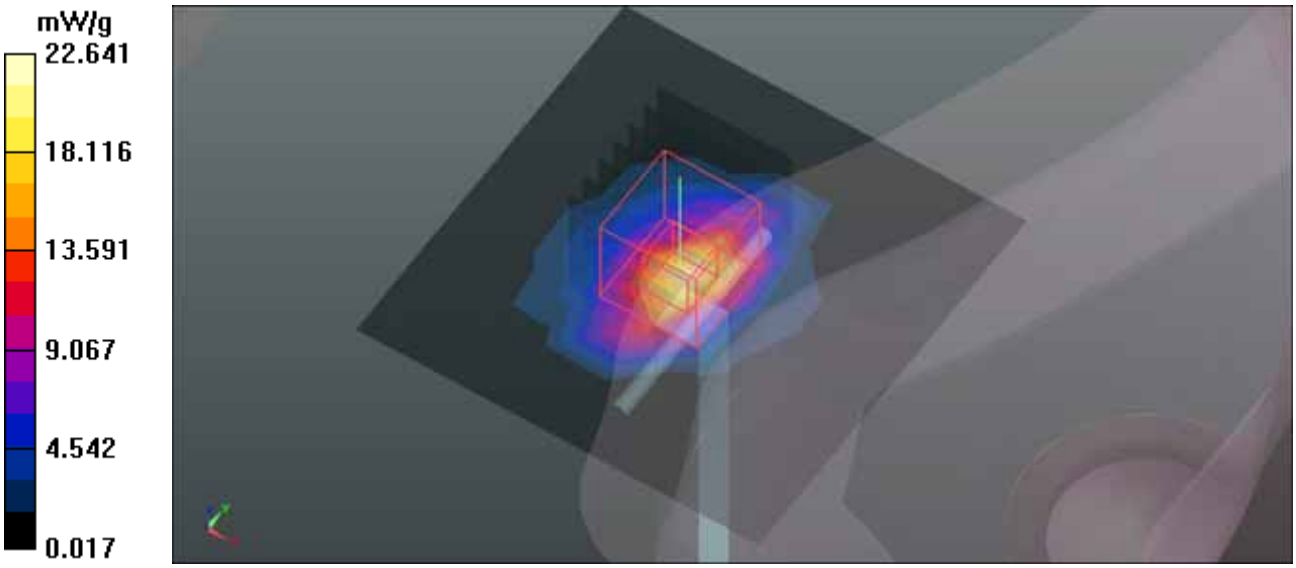
Communication System: CW ; Frequency: 2600 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL2600;Medium parameters used: f = 2600 MHz; σ = 2.16 mho/m; $\varepsilon_r$ = 53.86; ρ = 1000 kg/m$^3$ ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feet point of the dipole to the Phantom)Air temp. : 22.3 degrees ; Liquid temp. : 21.4 degrees

DASY5 Configuration:

- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Area Scan (7x7x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 22.641 mW/g

**System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe)/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.1 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 34.548 W/kg
**SAR(1 g) = 14.8 mW/g; SAR(10 g) = 6.41 mW/g**
Maximum value of SAR (measured) = 17.010 mW/g



## SystemPerformanceCheck-D2600V2-MSL2600 MHz

**DUT: Dipole 2600 MHz ; Type: D2600V2 ; Serial: D2600V2 - SN:1003 ; Test Frequency: 2600 MHz**

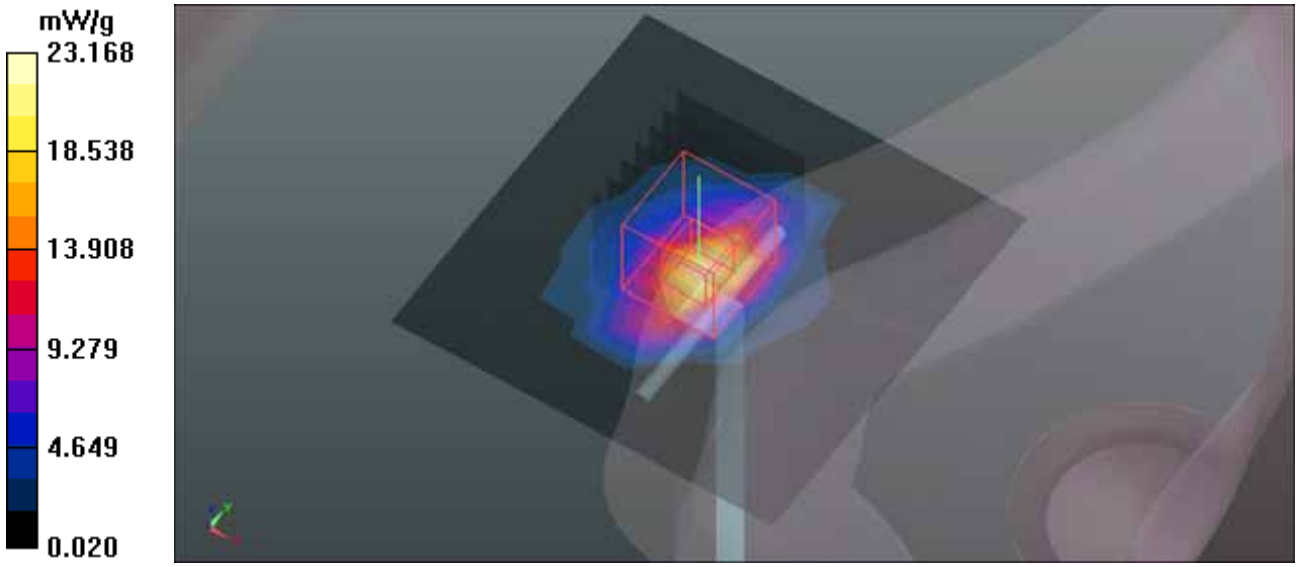
Communication System: CW ; Frequency: 2600 MHz; Duty Cycle: 1:1; Modulation type: CW
Medium: MSL2600;Medium parameters used: f = 2600 MHz; σ = 2.14 mho/m; $\varepsilon_r$ = 54.07; ρ = 1000 kg/m$^3$ ; Liquid level : 150 mm
Phantom section: Flat Section ; Separation distance : 10 mm (The feet point of the dipole to the Phantom)Air temp. : 22.5 degrees ; Liquid temp. : 21.6 degrees

DASY5 Configuration:

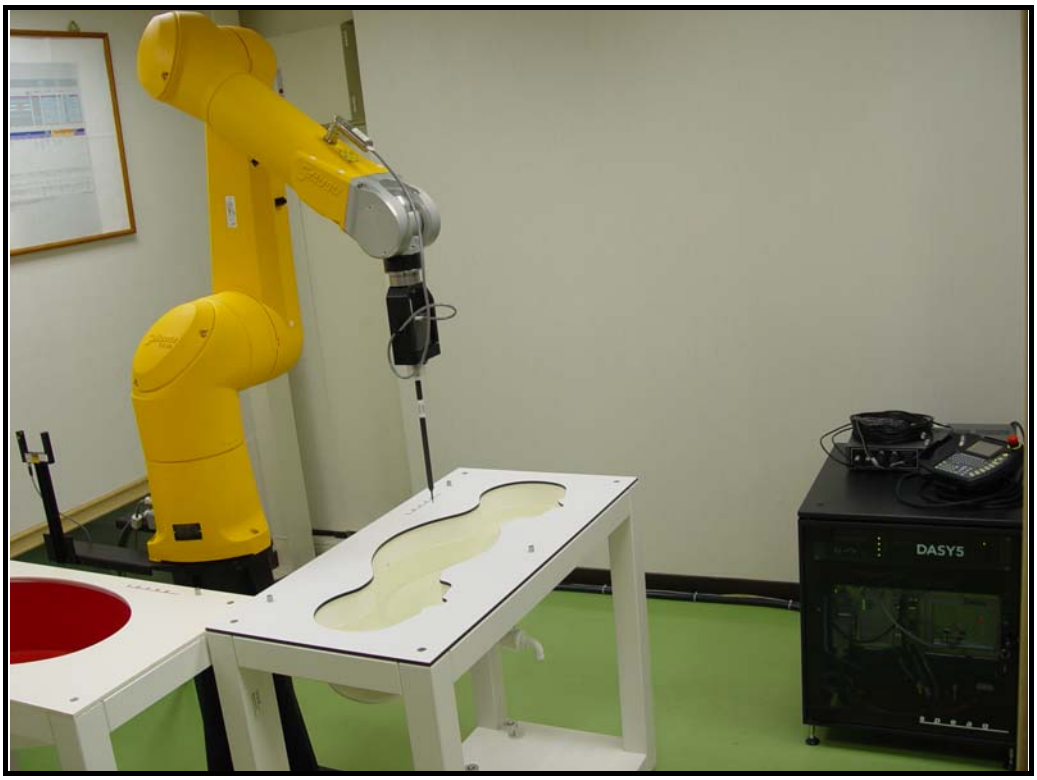
- Probe: EX3DV4 - SN3650; ConvF(6.92, 6.92, 6.92); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Twin Phantom V4.0; Type: QD 000 P40 C; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe) /Area Scan (7x7x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 23.168 mW/g

**System Performance Check at Frequencies above 1 GHz/d=10mm, Pin=250 mW, dist=2.0mm (EX-Probe) /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.4 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 35.312 W/kg
**SAR(1 g) = 15.2 mW/g; SAR(10 g) = 6.6 mW/g**
Maximum value of SAR (measured) = 17.413 mW/g



# APPENDIX B: BV ADT SAR MEASUREMENT SYSTEM



# APPENDIX C: PHOTOGRAPHS OF SYSTEM VALIDATION

## APPENDIX D: SYSTEM CERTIFICATE & CALIBRATION

### D1: PHANTOM

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

## Certificate of Conformity / First Article Inspection

| | |
|---|---|
| Item | SAM Twin Phantom V4.0 |
| Type No | QD 000 P40 C |
| Series No | TP-1150 and higher |
| Manufacturer | SPEAG<br>Zeughausstrasse 43<br>CH-8004 Zürich<br>Switzerland |

**Tests**

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series items (called samples) or are tested at each item.

| Test | Requirement | Details | Units tested |
|---|---|---|---|
| Dimensions | Compliant with the geometry according to the CAD model. | IT'IS CAD File (*) | First article, Samples |
| Material thickness of shell | Compliant with the requirements according to the standards | 2mm +/- 0.2mm in flat and specific areas of head section | First article, Samples, TP-1314 ff. |
| Material thickness at ERP | Compliant with the requirements according to the standards | 6mm +/- 0.2mm at ERP | First article, All items |
| Material parameters | Dielectric parameters for required frequencies | 300 MHz – 6 GHz: Relative permittivity < 5, Loss tangent < 0.05 | Material samples |
| Material resistivity | The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material compatibility. | DEGMBE based simulating liquids | Pre-series, First article, Material samples |
| Sagging | Compliant with the requirements according to the standards. Sagging of the flat section when filled with tissue simulating liquid. | < 1% typical < 0.8% if filled with 155mm of HSL900 and without DUT below | Prototypes, Sample testing |

**Standards**

[1] CENELEC EN 50361
[2] IEEE Std 1528-2003
[3] IEC 62209 Part I
[4] FCC OET Bulletin 65, Supplement C, Edition 01-01
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

**Conformity**

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standards [1] to [4].

**Date** 07.07.2005

**Signature / Stamp**

## D2: DOSIMETRIC E-FIELD PROBE

**Calibration Laboratory of**
Schmid & Partner
Engineering AG
**Zeughausstrasse 43, 8004 Zurich, Switzerland**

**S** Schweizerischer Kalibrierdienst
**C** Service suisse d'étalonnage
Servizio svizzero di taratura
**S** Swiss Calibration Service

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**

Client **B.V. ADT (Auden)**

Certificate No: **EX3-3650_Jan11**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | EX3DV4 - SN:3650 |
| Calibration procedure(s) | QA CAL-01.v7, QA CAL-14.v3, QA CAL-23.v4 and QA CAL-25.v3<br>Calibration procedure for dosimetric E-field probes |
| Calibration date: | January 24, 2011 |

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 ± 3)°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-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41495277 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Power sensor E4412A | MY41498087 | 1-Apr-10 (No. 217-01136) | Apr-11 |
| Reference 3 dB Attenuator | SN: S5054 (3c) | 30-Mar-10 (No. 217-01159) | Mar-11 |
| Reference 20 dB Attenuator | SN: S5086 (20b) | 30-Mar-10 (No. 217-01161) | Mar-11 |
| Reference 30 dB Attenuator | SN: S5129 (30b) | 30-Mar-10 (No. 217-01160) | Mar-11 |
| Reference Probe ES3DV2 | SN: 3013 | 29-Dec-10 (No. ES3-3013_Dec10) | Dec-11 |
| DAE4 | SN: 660 | 20-Apr-10 (No. DAE4-660_Apr10) | Apr-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| RF generator HP 8648C | US3642U01700 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Katja Pokovic | Technical Manager | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: January 25, 2011

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

## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A, B, C | modulation dependent linearization parameters |
| Polarization φ | φ rotation around probe axis |
| Polarization ϑ | ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis |

## Calibration is Performed According to the Following Standards:

a) 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
b) 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:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * 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*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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 *NORMx,y,z * 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 ± 50 MHz to ± 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 EX3DV4

## SN:3650

| | |
|---|---|
| Manufactured: | March 18, 2008 |
| Last calibrated: | July 5, 2008 |
| Recalibrated: | January 24, 2011 |

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3650

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm ($\mu V/(V/m)^2$)[A] | 0.45 | 0.40 | 0.49 | ± 10.1% |
| DCP (mV)[B] | 93.4 | 96.5 | 95.5 | |

## Modulation Calibration Parameters

| UID | Communication System Name | PAR | | A dB | B dBuV | C | VR mV | Unc[E] (k=2) |
|---|---|---|---|---|---|---|---|---|
| 10000 | CW | 0.00 | X | 0.00 | 0.00 | 1.00 | 137.0 | ± 3.4 % |
| | | | Y | 0.00 | 0.00 | 1.00 | 141.2 | |
| | | | Z | 0.00 | 0.00 | 1.00 | 144.7 | |

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%.

[A] The uncertainties of NormX,Y,Z do not affect the $E^2$-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3650

## Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz][C] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth | Unc (k=2) |
|---|---|---|---|---|---|---|---|---|---|
| 750 | ± 50 / ± 100 | 41.9 ± 5% | 0.89 ± 5% | 9.46 | 9.46 | 9.46 | 0.43 | 0.72 | ± 11.0% |
| 835 | ± 50 / ± 100 | 41.5 ± 5% | 0.90 ± 5% | 8.95 | 8.95 | 8.95 | 0.55 | 0.67 | ± 11.0% |
| 1450 | ± 50 / ± 100 | 40.5 ± 5% | 1.20 ± 5% | 8.86 | 8.86 | 8.86 | 0.78 | 0.64 | ± 11.0% |
| 1750 | ± 50 / ± 100 | 40.1 ± 5% | 1.37 ± 5% | 8.17 | 8.17 | 8.17 | 0.75 | 0.60 | ± 11.0% |
| 1950 | ± 50 / ± 100 | 40.0 ± 5% | 1.40 ± 5% | 7.57 | 7.57 | 7.57 | 0.57 | 0.66 | ± 11.0% |
| 2450 | ± 50 / ± 100 | 39.2 ± 5% | 1.80 ± 5% | 7.10 | 7.10 | 7.10 | 0.36 | 0.88 | ± 11.0% |
| 2600 | ± 50 / ± 100 | 39.0 ± 5% | 1.96 ± 5% | 6.93 | 6.93 | 6.93 | 0.38 | 0.88 | ± 11.0% |
| 5200 | ± 50 / ± 100 | 36.0 ± 5% | 4.66 ± 5% | 4.69 | 4.69 | 4.69 | 0.40 | 1.80 | ± 13.1% |
| 5300 | ± 50 / ± 100 | 35.9 ± 5% | 4.76 ± 5% | 4.33 | 4.33 | 4.33 | 0.45 | 1.80 | ± 13.1% |
| 5500 | ± 50 / ± 100 | 35.6 ± 5% | 4.96 ± 5% | 4.42 | 4.42 | 4.42 | 0.45 | 1.80 | ± 13.1% |
| 5600 | ± 50 / ± 100 | 35.5 ± 5% | 5.07 ± 5% | 3.96 | 3.96 | 3.96 | 0.60 | 1.80 | ± 13.1% |
| 5800 | ± 50 / ± 100 | 35.3 ± 5% | 5.27 ± 5% | 4.27 | 4.27 | 4.27 | 0.45 | 1.80 | ± 13.1% |

[C] 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.

# DASY/EASY - Parameters of Probe: EX3DV4 SN:3650

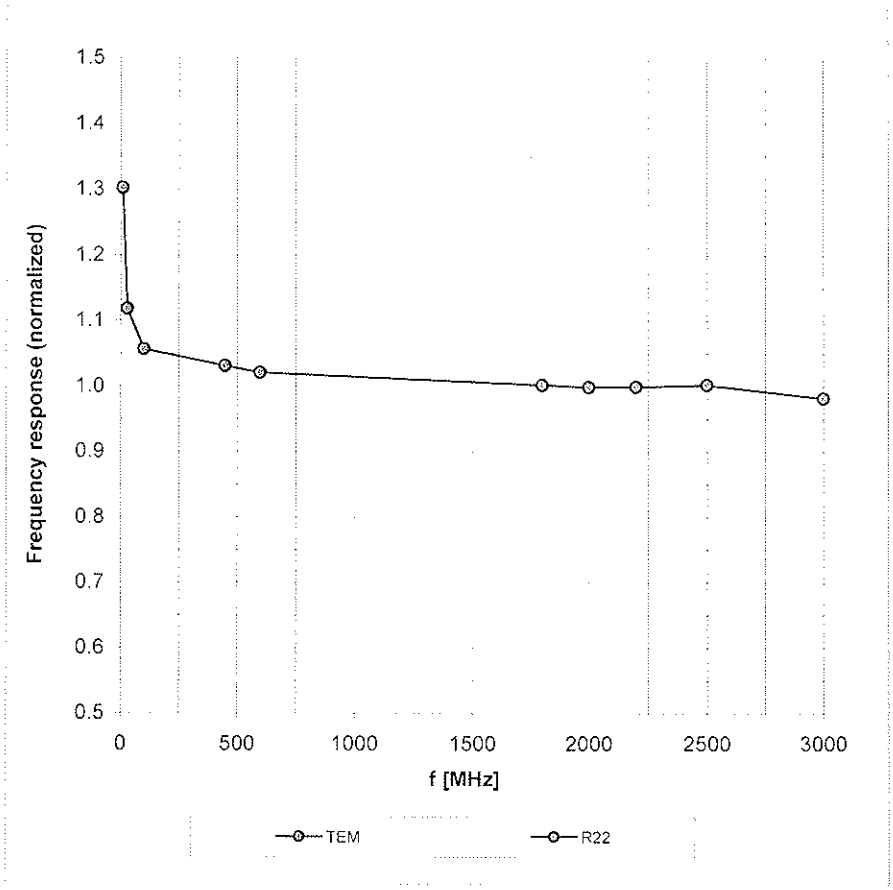
## Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz][C] | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth | Unc (k=2) |
|---|---|---|---|---|---|---|---|---|---|
| 750 | ± 50 / ± 100 | 55.5 ± 5% | 0.96 ± 5% | 9.25 | 9.25 | 9.25 | 0.53 | 0.71 | ± 11.0% |
| 835 | ± 50 / ± 100 | 55.2 ± 5% | 0.97 ± 5% | 9.12 | 9.12 | 9.12 | 0.36 | 0.88 | ± 11.0% |
| 1450 | ± 50 / ± 100 | 54.0 ± 5% | 1.30 ± 5% | 7.97 | 7.97 | 7.97 | 0.71 | 0.63 | ± 11.0% |
| 1750 | ± 50 / ± 100 | 53.4 ± 5% | 1.49 ± 5% | 7.46 | 7.46 | 7.46 | 0.78 | 0.61 | ± 11.0% |
| 1950 | ± 50 / ± 100 | 53.3 ± 5% | 1.52 ± 5% | 7.52 | 7.52 | 7.52 | 0.79 | 0.59 | ± 11.0% |
| 2450 | ± 50 / ± 100 | 52.7 ± 5% | 1.95 ± 5% | 7.05 | 7.05 | 7.05 | 0.54 | 0.74 | ± 11.0% |
| 2600 | ± 50 / ± 100 | 52.5 ± 5% | 2.16 ± 5% | 6.92 | 6.92 | 6.92 | 0.45 | 0.80 | ± 11.0% |
| 5200 | ± 50 / ± 100 | 49.0 ± 5% | 5.30 ± 5% | 4.25 | 4.25 | 4.25 | 0.50 | 1.90 | ± 13.1% |
| 5300 | ± 50 / ± 100 | 48.9 ± 5% | 5.42 ± 5% | 3.96 | 3.96 | 3.96 | 0.50 | 1.90 | ± 13.1% |
| 5500 | ± 50 / ± 100 | 48.6 ± 5% | 5.65 ± 5% | 3.76 | 3.76 | 3.76 | 0.55 | 1.90 | ± 13.1% |
| 5600 | ± 50 / ± 100 | 48.5 ± 5% | 5.77 ± 5% | 3.55 | 3.55 | 3.55 | 0.58 | 1.90 | ± 13.1% |
| 5800 | ± 50 / ± 100 | 48.2 ± 5% | 6.00 ± 5% | 3.86 | 3.86 | 3.86 | 0.60 | 1.90 | ± 13.1% |

[C] 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.

# Frequency Response of E-Field

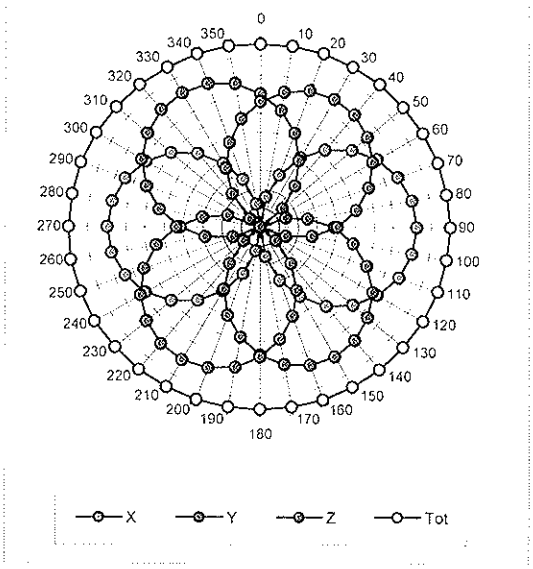
(TEM-Cell:ifi110 EXX, Waveguide: R22)



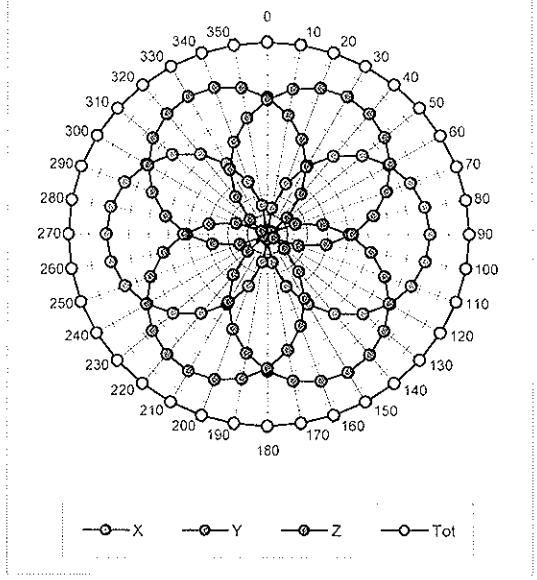

Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

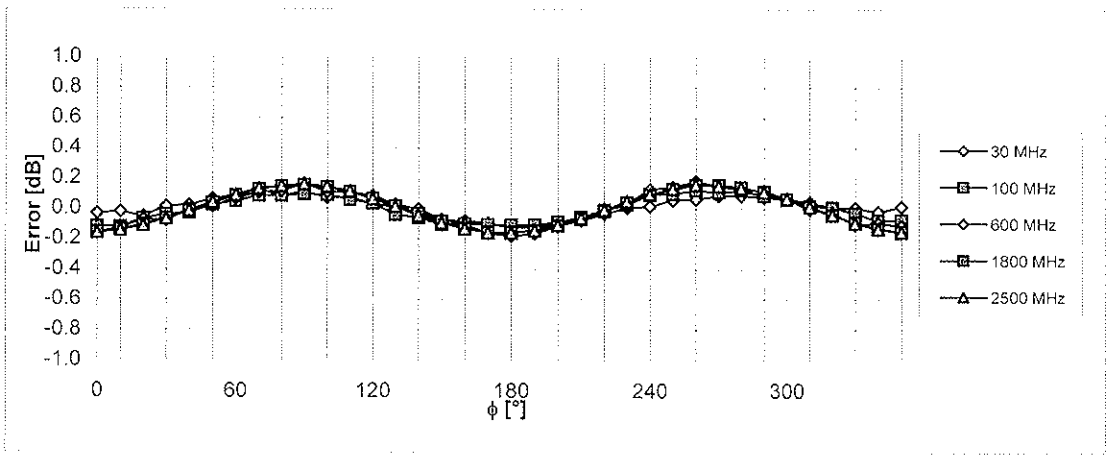
# Receiving Pattern (ϕ), ϑ = 0°

f = 600 MHz, TEM ifi110EXX




f = 1800 MHz, WG R22

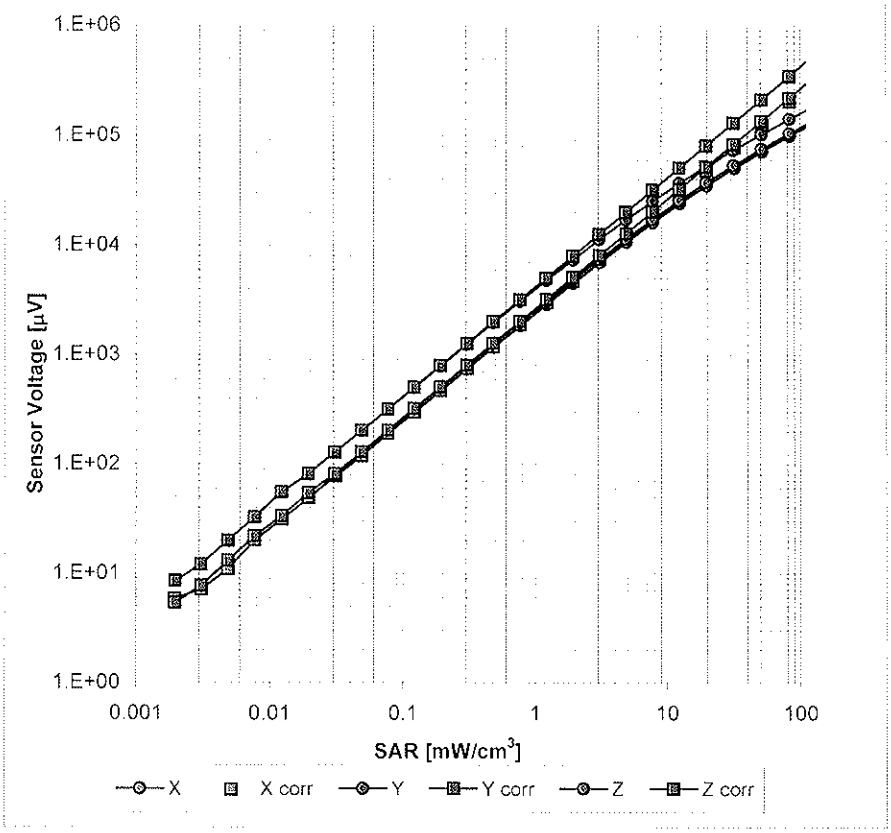


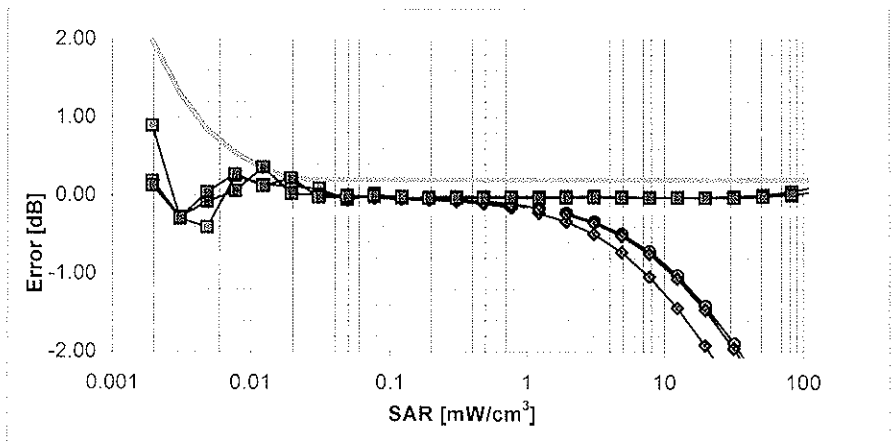




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

# Dynamic Range f($SAR_{head}$)

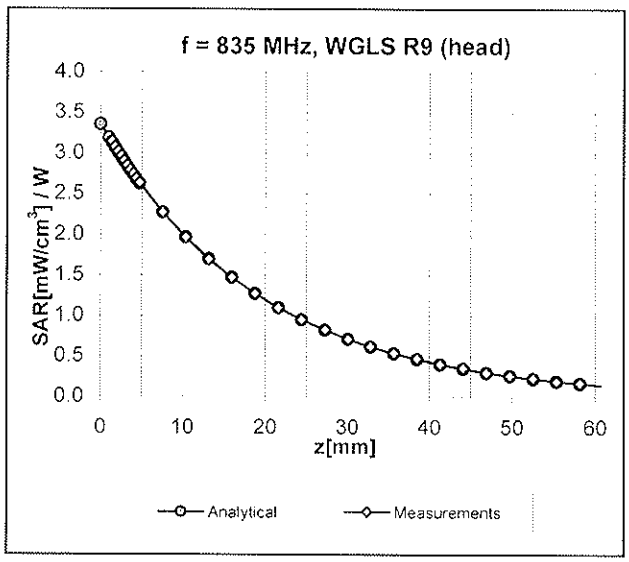
(TEM cell, f = 900 MHz)

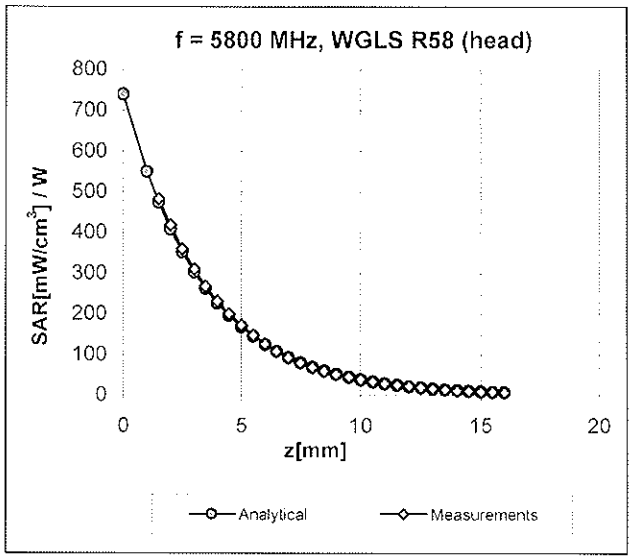



Uncertainty of Linearity Assessment: ± 0.6% (k=2)

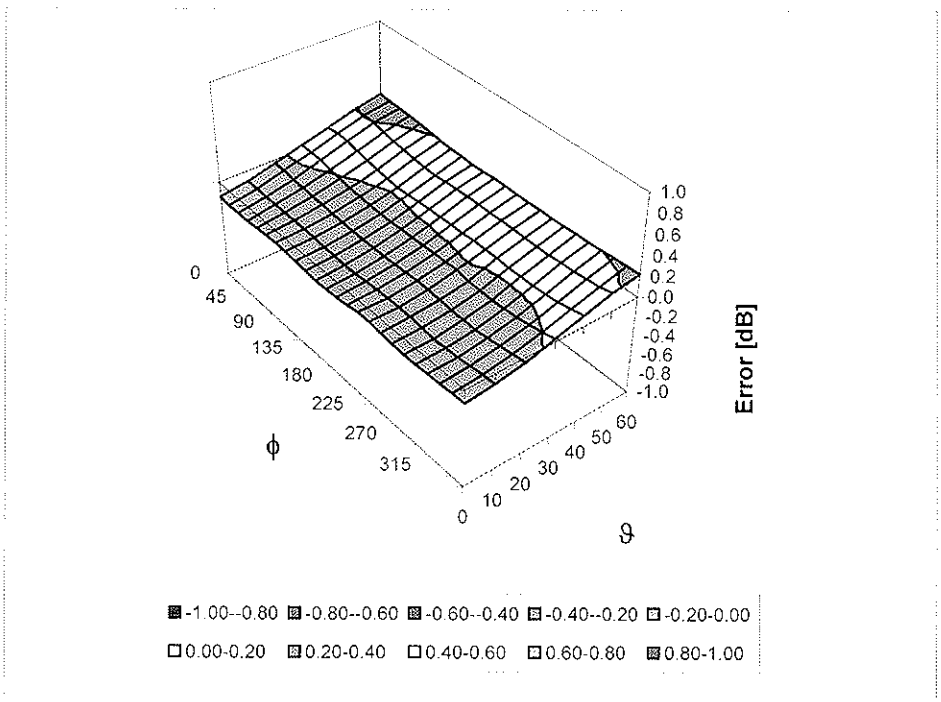
# Conversion Factor Assessment




# Deviation from Isotropy in HSL

**Error (ϕ, ϑ), f = 900 MHz**




**Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)**

# Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | Not applicable |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disabled |
| Probe Overall Length | 337 mm |
| Probe Body Diameter | 10 mm |
| Tip Length | 9 mm |
| Tip Diameter | 2.5 mm |
| Probe Tip to Sensor X Calibration Point | 1 mm |
| Probe Tip to Sensor Y Calibration Point | 1 mm |
| Probe Tip to Sensor Z Calibration Point | 1 mm |
| Recommended Measurement Distance from Surface | 2 mm |

**D3: DAE**

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 44 245 9700, Fax +41 44 245 9779
info@speag.com, http://www.speag.com

# IMPORTANT NOTICE

## USAGE OF THE DAE 3

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

**Battery Exchange**: The battery cover of the DAE3 unit is connected to a fragile 3-pin battery connector. Customer is responsible to apply outmost caution not to bend or damage the connector when changing batteries.

**Shipping of the DAE**: Before shipping the DAE to SPEAG for calibration the customer shall remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts transportation. The package shall be marked to indicate that a fragile instrument is inside.

**E-Stop Failures**: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, Customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

**Repair**: Minor repairs are performed at no extra cost during the annual calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

**DASY Configuration Files:** Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

**Important Note:**
**Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.**

**Important Note:**
**Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the annual calibration procedure.**

**Important Note:**
**To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.**

**Calibration Laboratory of**
Schmid & Partner
Engineering AG
**Zeughausstrasse 43, 8004 Zurich, Switzerland**

**S** Schweizerischer Kalibrierdienst
**C** Service suisse d'étalonnage
Servizio svizzero di taratura
**S** Swiss Calibration Service

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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**

**Client** **ADT (Auden)**

**Certificate No: DAE3-510_Oct10**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE3 - SD 000 D03 AA - SN: 510 |
| Calibration procedure(s) | QA CAL-06.v22<br>Calibration procedure for the data acquisition electronics (DAE) |
| Calibration date: | October 4, 2010 |

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Keithley Multimeter Type 2001 | SN: 0810278 | 28-Sep-10 (No:10376) | Sep-11 |
| **Secondary Standards** | **ID #** | **Check Date (in house)** | **Scheduled Check** |
| Calibrator Box V1.1 | SE UMS 006 AB 1004 | 07-Jun-10 (in house check) | In house check: Jun-11 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Dominique Steffen | Technician | |
| Approved by: | Fin Bomholt | R&D Director | |

Issued: October 4, 2010

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

## Glossary

| | |
|---|---|
| DAE | data acquisition electronics |
| Connector angle | information used in DASY system to align probe sensor X to the robot coordinate system. |

## Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

## DC Voltage Measurement

A/D - Converter Resolution nominal

| | | | | |
|---|---|---|---|---|
| High Range: | 1LSB = | 6.1μV , | full range = | -100...+300 mV |
| Low Range: | 1LSB = | 61nV , | full range = | -1.....+3mV |

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| Calibration Factors | X | Y | Z |
|---|---|---|---|
| **High Range** | 404.204 ± 0.1% (k=2) | 404.261 ± 0.1% (k=2) | 404.619 ± 0.1% (k=2) |
| **Low Range** | 3.97841 ± 0.7% (k=2) | 3.96431 ± 0.7% (k=2) | 3.98318 ± 0.7% (k=2) |

## Connector Angle

| | |
|---|---|
| **Connector Angle** to be used in DASY system | 280.0 ° ± 1 ° |

## Appendix

### 1. DC Voltage Linearity

| High Range | | Reading (μV) | Difference (μV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 200002.6 | 1.33 | 0.00 |
| Channel X | + Input | 20001.52 | 1.72 | 0.01 |
| Channel X | - Input | -19997.99 | 1.81 | -0.01 |
| Channel Y | + Input | 200010.4 | 0.89 | 0.00 |
| Channel Y | + Input | 20000.89 | 1.39 | 0.01 |
| Channel Y | - Input | -19998.10 | 1.60 | -0.01 |
| Channel Z | + Input | 200007.2 | -1.37 | -0.00 |
| Channel Z | + Input | 19998.21 | -1.29 | -0.01 |
| Channel Z | - Input | -20001.73 | -2.13 | 0.01 |

| Low Range | | Reading (μV) | Difference (μV) | Error (%) |
|---|---|---|---|---|
| Channel X | + Input | 2000.1 | 0.23 | 0.01 |
| Channel X | + Input | 200.27 | 0.27 | 0.13 |
| Channel X | - Input | -199.76 | 0.04 | -0.02 |
| Channel Y | + Input | 2000.8 | 0.66 | 0.03 |
| Channel Y | + Input | 199.56 | -0.44 | -0.22 |
| Channel Y | - Input | -200.06 | -0.16 | 0.08 |
| Channel Z | + Input | 1999.4 | -0.75 | -0.04 |
| Channel Z | + Input | 199.53 | -0.57 | -0.28 |
| Channel Z | - Input | -201.06 | -1.16 | 0.58 |

### 2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| | Common mode Input Voltage (mV) | High Range Average Reading (μV) | Low Range Average Reading (μV) |
|---|---|---|---|
| Channel X | 200 | 17.87 | 16.44 |
| | - 200 | -15.36 | -17.11 |
| Channel Y | 200 | 14.99 | 14.97 |
| | - 200 | -16.63 | -16.47 |
| Channel Z | 200 | -8.65 | -8.74 |
| | - 200 | 7.23 | 7.63 |

### 3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| | Input Voltage (mV) | Channel X (μV) | Channel Y (μV) | Channel Z (μV) |
|---|---|---|---|---|
| Channel X | 200 | - | 4.37 | -3.14 |
| Channel Y | 200 | 6.07 | - | 3.36 |
| Channel Z | 200 | 3.03 | -0.24 | - |

## 4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| | High Range (LSB) | Low Range (LSB) |
|---|---|---|
| **Channel X** | 15917 | 15639 |
| **Channel Y** | 16112 | 16210 |
| **Channel Z** | 16121 | 16322 |

## 5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

| | Average (μV) | min. Offset (μV) | max. Offset (μV) | Std. Deviation (μV) |
|---|---|---|---|---|
| **Channel X** | 0.61 | 0.06 | 2.59 | 0.30 |
| **Channel Y** | 1.72 | -0.56 | 3.01 | 0.39 |
| **Channel Z** | -1.94 | -2.73 | -0.59 | 0.30 |

## 6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

## 7. Input Resistance (Typical values for information)

| | Zeroing (kOhm) | Measuring (MOhm) |
|---|---|---|
| **Channel X** | 200 | 200 |
| **Channel Y** | 200 | 200 |
| **Channel Z** | 200 | 200 |

## 8. Low Battery Alarm Voltage (Typical values for information)

| Typical values | Alarm Level (VDC) |
|---|---|
| **Supply (+ Vcc)** | +7.9 |
| **Supply (- Vcc)** | -7.6 |

## 9. Power Consumption (Typical values for information)

| Typical values | Switched off (mA) | Stand by (mA) | Transmitting (mA) |
|---|---|---|---|
| **Supply (+ Vcc)** | +0.01 | +6 | +14 |
| **Supply (- Vcc)** | –0.01 | -8 | -9 |

## D4: SYSTEM VALIDATION DIPOLE

**Calibration Laboratory of**
Schmid & Partner
Engineering AG
**Zeughausstrasse 43, 8004 Zurich, Switzerland**

**S** Schweizerischer Kalibrierdienst
**C** Service suisse d'étalonnage
Servizio svizzero di taratura
**S** Swiss Calibration Service

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**

**Client** **B.V. ADT (Auden)**

**Certificate No: D2600V2_1003_Jan11**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D2600V2 - SN: 1003 |
| Calibration procedure(s) | QA CAL-05.v8<br>Calibration procedure for dipole validation kits |
| Calibration date: | January 27, 2011 |

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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM-442A | GB37480704 | 06-Oct-09 (No. 217-01086) | Oct-10 |
| Power sensor HP 8481A | US37292783 | 06-Oct-09 (No. 217-01086) | Oct-10 |
| Reference 20 dB Attenuator | SN: 5086 (20g) | 30-Mar-10 (No. 217-01158) | Mar-11 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 30-Mar-10 (No. 217-01162) | Mar-11 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Apr-10 (No. ES3-3205_Apr10) | Apr-11 |
| DAE4 | SN: 601 | 10-Jun-10 (No. DAE4-601_Jun10) | Jun-11 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-09) | In house check: Oct-11 |
| RF generator R&S SMT-06 | 100005 | 4-Aug-99 (in house check Oct-09) | In house check: Oct-11 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-10) | In house check: Oct-11 |

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

Issued: January 27, 2011

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

## Glossary:

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORM x,y,z |
| N/A | not applicable or not measured |

## Calibration is Performed According to the Following Standards:

a) 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
b) 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
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

## Additional Documentation:

d) DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.6 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom V5.0 | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 2600 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 39.0 | 1.96 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 38.9 ± 6 % | 2.03 mho/m ± 6 % |
| **Head TSL temperature during test** | (21.5 ± 0.2) °C | ------- | ------ |

## SAR result with Head TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 15.0 mW / g |
| SAR normalized | normalized to 1W | 60.0 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **58.9 mW / g ± 17.0 % (k=2)** |

| **SAR averaged over 10 $cm^3$ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 6.57 mW / g |
| SAR normalized | normalized to 1W | 26.3 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **26.1 mW / g ± 16.5 % (k=2)** |

## Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Body TSL parameters** | 22.0 °C | 52.5 | 2.16 mho/m |
| **Measured Body TSL parameters** | (22.0 ± 0.2) °C | 52.3 ± 6 % | 2.10 mho/m ± 6 % |
| **Body TSL temperature during test** | (20.8 ± 0.2) °C | ------- | ------ |

## SAR result with Body TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Body TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 14.4 mW / g |
| SAR normalized | normalized to 1W | 57.6 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **58.1 mW / g ± 17.0 % (k=2)** |

| **SAR averaged over 10 $cm^3$ (10 g) of Body TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 6.41 mW / g |
| SAR normalized | normalized to 1W | 25.6 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **25.7 mW / g ± 16.5 % (k=2)** |

## Appendix

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 50.5 Ω - 0.4 jΩ |
| Return Loss | - 44.2 dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 46.2 Ω + 0.0 jΩ |
| Return Loss | - 28.1 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.147 ns |

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

| | |
|---|---|
| Manufactured by | SPEAG |
| Manufactured on | December 23, 2006 |

## DASY5 Validation Report for Head TSL

Date/Time: 27.01.2011 15:40:46

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1003**

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: HSL BB1.9
Medium parameters used: f = 2600 MHz; $\sigma$ = 2.04 mho/m; $\varepsilon_r$ = 38.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

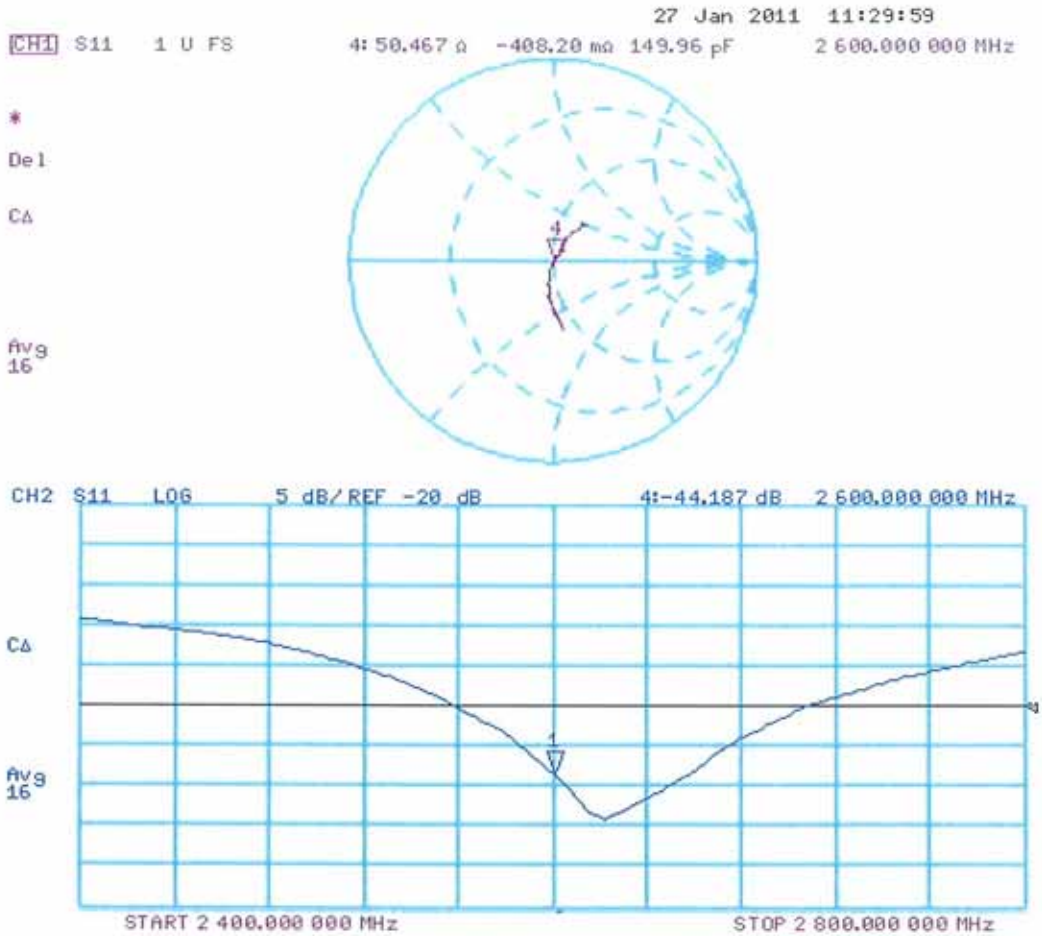
DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.47, 4.47, 4.47); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

**Pin=250 mW/d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.3 V/m; Power Drift = 0.00081 dB
Peak SAR (extrapolated) = 32.976 W/kg
**SAR(1 g) = 15 mW/g; SAR(10 g) = 6.57 mW/g**
Maximum value of SAR (measured) = 19.719 mW/g

0 dB = 19.720mW/g

## Impedance Measurement Plot for Head TSL



## DASY5 Validation Report for Body TSL

Date/Time: 05.01.2011 14:25:38

Test Laboratory: SPEAG, Zurich, Switzerland

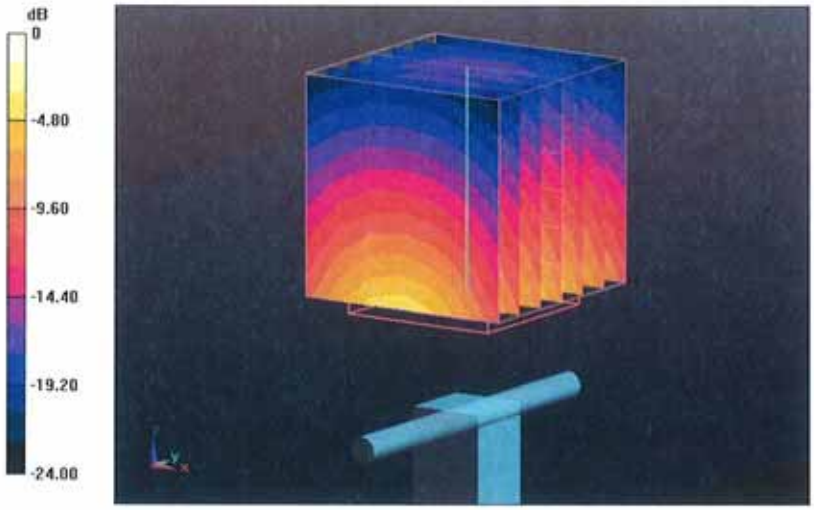
**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN:1003**

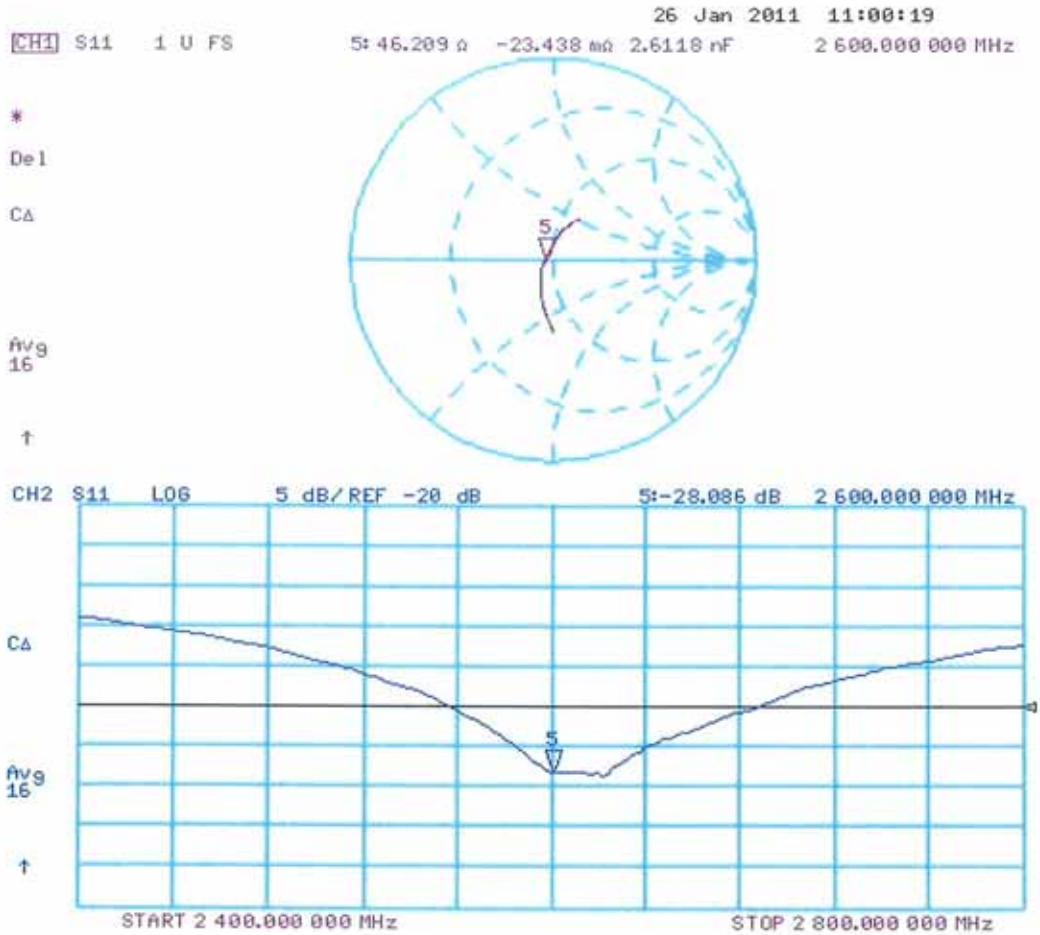
Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: MSL U12 BB
Medium parameters used: f = 2600 MHz; $\sigma$ = 2.12 mho/m; $\varepsilon_r$ = 52.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.18, 4.18, 4.18); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

**Pin=250 mW/d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 97.717 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 31.466 W/kg
**SAR(1 g) = 14.4 mW/g; SAR(10 g) = 6.41 mW/g**
Maximum value of SAR (measured) = 19.133 mW/g




0 dB = 19.130mW/g

## Impedance Measurement Plot for Body TSL