

# SAR TEST REPORT

|                             |  |
|-----------------------------|--|
| <b>Equipment Under Test</b> | Mini-PCIe wireless LAN(62205ANHMW)card INSTALLED IN AN HP HSTNN-W82C SERIES LAPTOP |
| <b>Model Number of Host</b> | HSTNN-W82C   |
| <b>Module Model No.</b>     | 62205ANHMW   |
| <b>Mode of Operation</b>    | WLAN 802.11 a/b/g/n(20M,40M) band  |
| <b>Company Name</b>         | Intel Corporation  |
| <b>Company Address</b>      | 100 Center Point Circle Suite 200 Columbia South Carolina 29210 United States      |
| <b>Date of Receipt</b>      | 2010.11.18   |
| <b>Date of Test(s)</b>      | 2011.03.01-02 ; 2011.03.05   |
| <b>Date of Issue</b>        | 2011.03.18   |

Standards:


**FCC OET 65 supplement C,  
IEEE /ANSI C95.1, C95.3, IEEE 1528  
RSS-102**

In the configuration tested, the EUT complied with the standards specified above.

**Remarks:**

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

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Tested by : Antony Wu  Date : 2011.03.18  
Engineer

Approved by : Kelly Tsai  Date : 2011.03.18  
Supervisor

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### Version

| Version No. | Date          | Description                   |
|-------------|---------------|-------------------------------|
| 1.0         | Mar. 11, 2011 | Initial issue of report       |
| 1.1         | Mar. 17, 2011 | Modify 1 <sup>st</sup> report |
| 1.1         | Mar. 18, 2011 | Modify 2 <sup>nd</sup> report |

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# 1. General Information

## 1.1 Testing Laboratory

|  |   |
|--|---|
| SGS Taiwan Ltd. Electronics & Communication Laboratory |   |
| 134, Wu Kung Road, Wuku industrial zone                |   |
| Taipei county, Taiwan, R.O.C.                          |   |
| Telephone  | +886-2-2299-3279  |
| Fax  | +886-2-2298-0488  |
| Internet   | <a href="http://www.tw.sgs.com">http://www.tw.sgs.com</a> |

|                  |   |
|------------------|---|
| Testing Location | 1F, No.8, Alley 15, Lane 120, Sec .1, NeiHu Road NeiHu District Taipei City 114, Taiwan |
|------------------|---|

## 1.2 Details of Applicant

|                |   |
|----------------|---|
| Name           | Intel Corporation   |
| Address        | 100 Center Point Circle Suite 200 Columbia South Carolina 29210 United States |
| Telephone      | 803-216-2344  |
| Fax            | 803-216-2766  |
| Contact Person | Steven C Hackett  |
| E-mail         | Steven.c.hackett@intel.com  |

## 1.3 Description of EUT

|                      |  |
|----------------------|--|
| EUT Name             | Mini-PCIE wireless LAN(62205ANHMW) card<br>INSTALLED IN AN HP HSTNN-W82C SERIES LAPTOP |
| Model Number of Host | HSTNN-W82C   |
| Module Model No.     | 62205ANHMW   |

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|  |   |                      |                      |
|--|---|----------------------|----------------------|
| FCC ID   | PD962205ANHU  |                      |                      |
| IC Model No.   | 62205ANHU   |                      |                      |
| IC ID  | 1000M-62205ANHU   |                      |                      |
| Definition   | Production unit   |                      |                      |
| Mode of Operation  | WLAN 802.11 a/b/g/n(20M & 40M)band                                  |                      |                      |
| Duty Cycle   | WLAN 802.11 a/b/g/n(20M & 40M)                                      |                      |                      |
|  | 1   |                      |                      |
| TX Frequency range (MHz)   | WLAN802.11 b/g  | WLAN802.11 n (20M)   | WLAN802.11n (40M)    |
|  | 2412-2462   | 2412-2462            | 2422-2452            |
|  | WLAN 802.11a  | WLAN802.11n (20M) 5G | WLAN802.11n (40M) 5G |
|  | 5180-5825   | 5180-5825            | 5190-5795            |
| Channel Number (ARFCN)   | WLAN802.11 b/g  | WLAN802.11 n (20M)   | WLAN802.11n (40M)    |
|  | 1-11  | 1-11                 | 3-9                  |
|  | WLAN 802.11a  | WLAN802.11n (20M) 5G | WLAN802.11n (40M) 5G |
|  | 36-165  | 36-165               | 38-159               |
| Max. SAR Measured (1g)   | WLAN802.11a   |                      |                      |
|  | 1.18W/kg<br>(WLAN802.11a_WLAN AUX Antenna _ CH149_ Configuration 6) |                      |                      |
|  | WLAN802.11b   |                      |                      |
|  | 0.418W/kg<br>(WLAN802.11b_WLAN AUX Antenna _ CH6_ Configuration 6)  |                      |                      |
|  | WLAN802.11g   |                      |                      |
| 0.592W/kg<br>(WLAN802.11g _ WLAN AUX Antenna _ CH6_ Configuration 6) |   |                      |                      |

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|                        |  |
|------------------------|--|
| Max. SAR Measured (1g) | WLAN802.11n (20M)  |
|                        | 0.57W/kg<br>(WLAN802.11n(20M)_ WLAN AUX Antenna _ CH6_ Configuration 6)          |
|                        | WLAN802.11n (40M)  |
|                        | 0.499W/kg<br>(WLAN802.11n(40M)_ WLAN AUX Antenna _ CH6_ Configuration 6)         |
|                        | WLAN802.11n (20M)5G  |
|                        | <b>1.21W/kg</b><br>(WLAN802.11n(20M)_ WLAN AUX Antenna _ CH120_ Configuration 6) |
|                        | WLAN802.11n (40M)5G  |
|                        | 1.2W/kg<br>(WLAN802.11n(40M)_ WLAN AUX Antenna _ CH118_ Configuration 6)         |

Note:

1. The 1-g SAR for the highest output channel is less than 0.8 W/kg, where the transmission band corresponding to all channels is  $\leq 100$  MHz, testing for the other channels is not required.
2. The 1-g SAR for the highest output channel is less than 0.4 W/kg, where the transmission band corresponding to all channels is  $\leq 200$  MHz, testing for the other channels is not required.

Conducted Power

| EUT Mode    | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|-------------|-----------------|----|------------------|-----------------|----|------------------|
|             | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11b | 2412            | 1  | 15.44            | 2412            | 1  | 15.07            |
|             | 2437            | 6  | 15.48            | 2437            | 6  | 15.09            |
|             | 2462            | 11 | 15.31            | 2462            | 11 | 15.05            |

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| EUT Mode    | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|-------------|-----------------|----|------------------|-----------------|----|------------------|
|             | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11g | 2412            | 1  | 13.90            | 2412            | 1  | 13.68            |
|             | 2437            | 6  | 16.16            | 2437            | 6  | 16.43            |
|             | 2462            | 11 | 13.75            | 2462            | 11 | 13.77            |

| EUT Mode           | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|--------------------|-----------------|----|------------------|-----------------|----|------------------|
|                    | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11n<br>20M | 2412            | 1  | 12.74            | 2412            | 1  | 12.87            |
|                    | 2437            | 6  | 16.33            | 2437            | 6  | 16.30            |
|                    | 2462            | 11 | 12.40            | 2462            | 11 | 12.80            |

| EUT Mode           | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|--------------------|-----------------|----|------------------|-----------------|----|------------------|
|                    | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11n<br>40M | 2422            | 3  | 8.67             | 2422            | 3  | 9.27             |
|                    | 2437            | 6  | 15.71            | 2437            | 6  | 15.65            |
|                    | 2452            | 9  | 9.14             | 2452            | 9  | 9.97             |

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| EUT Mode                 | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|--------------------------|-----------------|----|------------------|-----------------|----|------------------|
|                          | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11n<br>20M(5.2G) | 5180            | 36 | 15.49            | 5180            | 36 | 15.12            |
|                          | 5260            | 52 | 15.81            | 5260            | 52 | 15.85            |
|                          | 5320            | 64 | 15.96            | 5320            | 64 | 15.82            |

| EUT Mode                 | Main Antenna    |     |                  | AUX Antenna     |     |                  |
|--------------------------|-----------------|-----|------------------|-----------------|-----|------------------|
|                          | Frequency (MHz) | CH  | AVG. Power (dBm) | Frequency (MHz) | CH  | AVG. Power (dBm) |
| WLAN802.11n<br>20M(5.5G) | 5500            | 100 | 15.94            | 5500            | 100 | 15.78            |
|                          | 5560            | 116 | 15.63            | 5560            | 116 | 15.71            |
|                          | 5600            | 120 | 15.39            | 5600            | 120 | 15.63            |
|                          | 5700            | 140 | 15.36            | 5700            | 140 | 15.84            |

| EUT Mode                 | Main Antenna    |     |                  | AUX Antenna     |     |                  |
|--------------------------|-----------------|-----|------------------|-----------------|-----|------------------|
|                          | Frequency (MHz) | CH  | AVG. Power (dBm) | Frequency (MHz) | CH  | AVG. Power (dBm) |
| WLAN802.11n<br>20M(5.8G) | 5745            | 149 | 15.71            | 5745            | 149 | 15.83            |
|                          | 5785            | 157 | 15.89            | 5785            | 157 | 15.82            |
|                          | 5825            | 165 | 15.78            | 5825            | 165 | 15.88            |

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| EUT Mode                 | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|--------------------------|-----------------|----|------------------|-----------------|----|------------------|
|                          | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11n<br>40M(5.2G) | 5190            | 38 | 10.59            | 5190            | 38 | 10.77            |
|                          | 5270            | 54 | 15.82            | 5270            | 54 | 15.92            |
|                          | 5310            | 62 | 10.6             | 5310            | 62 | 10.93            |

| EUT Mode                 | Main Antenna    |     |                  | AUX Antenna     |     |                  |
|--------------------------|-----------------|-----|------------------|-----------------|-----|------------------|
|                          | Frequency (MHz) | CH  | AVG. Power (dBm) | Frequency (MHz) | CH  | AVG. Power (dBm) |
| WLAN802.11n<br>40M(5.5G) | 5510            | 102 | 13.35            | 5510            | 102 | 13.43            |
|                          | 5590            | 118 | 15.94            | 5590            | 118 | 15.78            |
|                          | 5670            | 134 | 15.84            | 5670            | 134 | 15.68            |

| EUT Mode                 | Main Antenna    |     |                  | AUX Antenna     |     |                  |
|--------------------------|-----------------|-----|------------------|-----------------|-----|------------------|
|                          | Frequency (MHz) | CH  | AVG. Power (dBm) | Frequency (MHz) | CH  | AVG. Power (dBm) |
| WLAN802.11n<br>40M(5.8G) | 5755            | 151 | 15.72            | 5755            | 151 | 15.85            |
|                          | 5795            | 159 | 15.81            | 5795            | 159 | 15.94            |

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| EUT Mode              | Main Antenna    |    |                  | AUX Antenna     |    |                  |
|-----------------------|-----------------|----|------------------|-----------------|----|------------------|
|                       | Frequency (MHz) | CH | AVG. Power (dBm) | Frequency (MHz) | CH | AVG. Power (dBm) |
| WLAN802.11a<br>(5.2G) | 5180            | 36 | 15.91            | 5180            | 36 | 15.95            |
|                       | 5260            | 52 | 15.81            | 5260            | 52 | 15.98            |
|                       | 5320            | 64 | 15.75            | 5320            | 64 | 15.87            |

| EUT Mode              | Main Antenna    |     |                  | AUX Antenna     |     |                  |
|-----------------------|-----------------|-----|------------------|-----------------|-----|------------------|
|                       | Frequency (MHz) | CH  | AVG. Power (dBm) | Frequency (MHz) | CH  | AVG. Power (dBm) |
| WLAN802.11a<br>(5.5G) | 5500            | 100 | 15.88            | 5500            | 100 | 15.82            |
|                       | 5560            | 116 | 15.77            | 5560            | 116 | 15.94            |
|                       | 5600            | 120 | 15.14            | 5600            | 120 | 15.99            |
|                       | 5700            | 140 | 15.27            | 5700            | 140 | 15.86            |

| EUT Mode              | Main Antenna    |     |                  | AUX Antenna     |     |                  |
|-----------------------|-----------------|-----|------------------|-----------------|-----|------------------|
|                       | Frequency (MHz) | CH  | AVG. Power (dBm) | Frequency (MHz) | CH  | AVG. Power (dBm) |
| WLAN802.11a<br>(5.8G) | 5745            | 149 | 15.99            | 5745            | 149 | 15.79            |
|                       | 5785            | 157 | 15.77            | 5785            | 157 | 15.86            |
|                       | 5825            | 165 | 15.93            | 5825            | 165 | 15.97            |

## 1.4 Test Environment

Ambient Temperature :  $22 \pm 2^{\circ} \text{C}$

Tissue Simulating Liquid:  $22 \pm 2^{\circ} \text{C}$

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## 1.5 Operation description

Use chipset specific software to control the EUT, and makes it transmit in maximum power. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s).

The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.

We will test it with 2 configurations:

Configuration 1: Laptop mode. (WLAN/Main & WLAN/AUX –to-user separation distance is 236mm, so SAR test is not required) (Appendix-Fig.4)

**Configuration 2: Lap-held mode. (WLAN/Main & WLAN/AUX –to-user separation distance is 29mm) (Appendix-Fig.5)**

Configuration 3: Primary portrait mode. (WLAN/main-to-edge of screen distance is 185mm; WLAN/AUX-to-edge of screen distance is 86mm) (Appendix-Fig.6)

Configuration 4: Secondary portrait mode. (WLAN/Main-to-user separation distance is 86 mm; WLAN/AUX-to-user separation distance is 185 mm.) (Appendix-Fig.7)

Configuration 5: Primary Landscape mode.( WLAN/main & WLAN/AUX –to-edge of screen distance is 228 mm, so SAR test is not required) (Appendix-Fig.8)

**Configuration 6: Secondary landscape mode.( WLAN/main & WLAN/AUX –to-edge of screen distance is 4mm) (Appendix-Fig.9)**

# Configuration 3&4 This is not the most conservative antenna-to-user distance at edge mode. According to **KDB447498 4)b)ii)(2)**, SAR is required only for the edge with the most conservative exposure conditions.

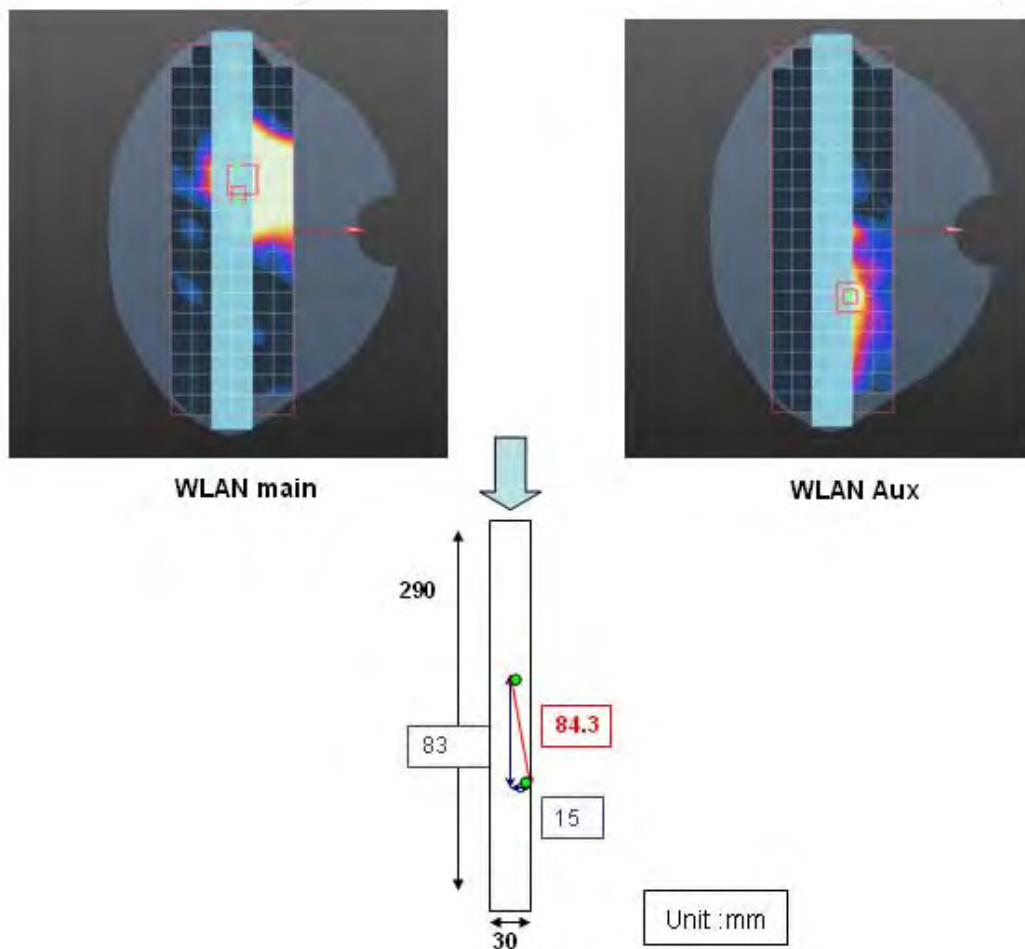
# All the test positions of device relative to body were measured placing the device in direct contact with the phantom surface, so the requirements mentioned at RSS-102

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Supplementary Procedures (SPR)-001 - SAR TESTING REQUIREMENTS WITH REGARD TO BYSTANDERS FOR LAPTOP TYPE COMPUTERS WITH ANTENNAS BUILT-IN ON DISPLAY SCREEN (LAPTOP MODE/TABLET MODE) are covered.

1. The maximum SAR value for licensed transmitter happens on WLAN 802.11n (20M) 5.5G Main antenna, happens on Secondary Landscape channel 100. The value is **0.859W/kg(1g)**. And the max SAR value for licensed transmitter WLAN 802.11n(20M)5.5G AUX antenna happens on Secondary Landscape channel 120, channel 120.The SAR value is **1.21W/kg (1g)** . The summation of the 1g SAR is  $0.859+1.21 = 2.069 \text{ W/kg}$ , which higher than the limit **1.6W/kg**.
2. By the way, the peak distance (hotspot to hotspot) for WLAN Main antenna and WLAN AUX antenna is 8.43 cm , we calculate the peak location separation ratio of simultaneous transmitting antenna pair , the value is **0.245** with less than 0.3. **NO simultaneous transmission SAR evaluation is necessary.**



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## 1.6 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. a. This SAR Measurement System uses a Computer-controlled 3-D stepper motor system ( SPEAG DASY 5 professional system ). A Model EX3DV4 field probe is used to determine the internal electric fields. The SAR can be obtained from the equation  $SAR = \sigma (|E_i|^2) / \rho$  where  $\sigma$  and  $\rho$  are the conductivity and mass density of the tissue-simulant.

The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc.

The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

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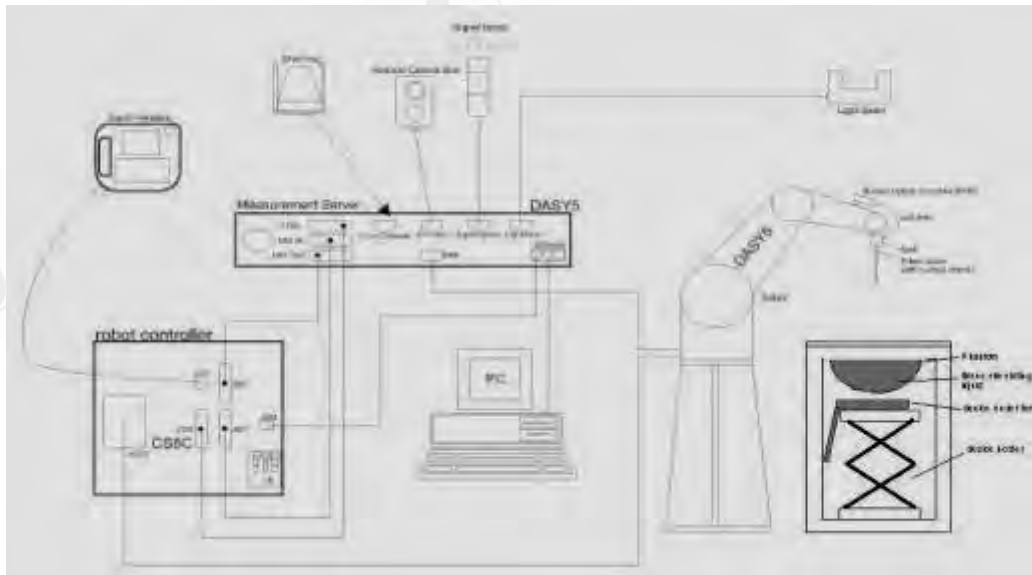


Fig.a The block diagram of SAR system

- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
  - A computer operating Windows 2000 or Windows XP.
  - DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
  - The SAM twin phantom enabling testing left-hand and right-hand usage.
  - The device holder for handheld mobile phones.
  - Tissue simulating liquid mixed according to the given recipes.
  - Validation dipole kits allowing to validate the proper functioning of the system.

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## 1.7 System Components


### EX3DV4 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)  |  |
| Calibration   | Basic Broad Band Calibration in air<br>Conversion Factors (CF) for<br>MSL2450/5200/5500/5800 MHZ Additional<br>CF for other liquids and frequencies upon request   |   |
| Frequency     | 10 MHz to > 6 GHz, Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)   |   |
| Directivity   | $\pm 0.3$ dB in HSL (rotation around probe axis)<br>$\pm 0.5$ dB in tissue material (rotation normal to probe axis)  |   |
| Dynamic Range | 10 $\mu$ W/g to > 100 mW/g<br>Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ W/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%. |   |


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### SAM PHANTOM V4.0C

|                 |  |   |
|-----------------|--|---|
| Construction    | <p>The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209.</p> <p>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.</p> |   |
| Shell Thickness | 2 ± 0.2 mm   |  |
| Filling Volume  | Approx. 25 liters  |   |
| Dimensions      | <p>Height: 850 mm;</p> <p>Length: 1000 mm;</p> <p>Width: 500 mm</p>  |   |

### DEVICE HOLDER

|              |  |   |
|--------------|--|---|
| Construction | <p>The device holder (Supporter) for Notebook is made by POM (polyoxymethylene resin) , which is non-metal and non-conductive. The height can be adjusted to fit varies kind of notebooks.</p> |  <p style="text-align: center;">Device Holder</p> |
|--------------|--|---|

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## 1.8 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within  $\pm 5\%$  from the target SAR values. These tests were done at 2450/5200/5500/5800 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1 (SAR values are normalized to 1W forward power delivered to the dipole). During the tests, the ambient temperature of the laboratory was in the range  $22.1^{\circ}\text{C}$ , the relative humidity was in the range 62% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

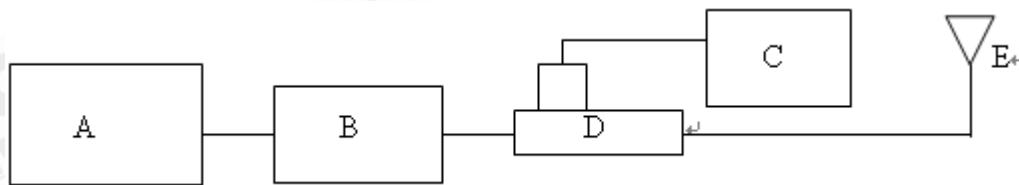
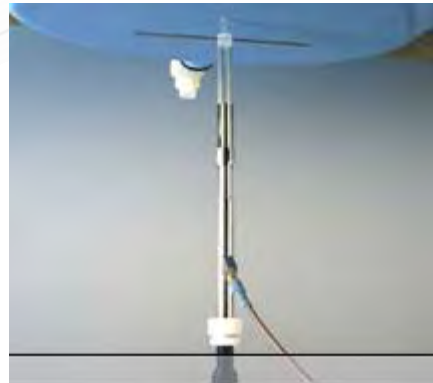


Fig.b The block diagram of system verification

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- A. Agilent Model 8648D Signal Generator
- B. Mini circuits Model ZHL-42 Amplifier
- C. Agilent Model U2001B Power Sensor
- D. Agilent Model 777D Dual directional coupling
- E. Reference dipole antenna



Photograph of the dipole Antenna

| Validation Kit       | Frequency Hz       | Target SAR (1g)<br>(Pin=250mW) | Measured SAR (1g) | Measured Date |
|----------------------|--------------------|--------------------------------|-------------------|---------------|
| D2450V2<br>S/N: 727  | 2450 MHz<br>(Body) | 13.4 mW/g                      | 13.1 mW/g         | 2011-03-01    |
| D5200V2<br>S/N:1040  | 5200 MHz<br>(Body) | 7.57 mW/g                      | 7.32 mW/g         | 2011-03-01    |
| D5500V2<br>S/N: 1040 | 5500 MHz<br>(Body) | 8.04 mW/g                      | 7.96 mW/g         | 2011-03-02    |
| D5800V2<br>S/N: 1040 | 5800 MHz<br>(Body) | 6.93 mW/g                      | 6.92 mW/g         | 2011-03-05    |

Table 1. Results of system validation

## 1.9 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this body-simulant fluid were measured by using the Agilent Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with HP 8753D Network Analyzer (30 KHz-6000 MHz) by using a procedure detailed in Section V.

All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the ear reference point of the phantom was  $15\text{cm} \pm 5\text{mm}$  during all tests. (Fig .2)

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| Frequency (MHz) | Tissue type | Measurement date/<br>Limits | Dielectric Parameters |                |                                   |
|-----------------|-------------|-----------------------------|-----------------------|----------------|-----------------------------------|
|                 |             |                             | $\rho$                | $\sigma$ (S/m) | Simulated Tissue Temperature(° C) |
| 2450            | Body        | Measured, 2011.03.01        | 52.5                  | 1.98           | 21.7                              |
|                 |             | Recommended Limits          | 51.49-56.91           | 1.91-2.11      | 20-24                             |
| 5200            | Body        | Measured, 2011.03.01        | 48.6                  | 5.3            | 21.7                              |
|                 |             | Recommended Limits          | 45.13-49.88           | 5.24-5.80      | 20-24                             |
| 5500            | Body        | Measured, 2011.03.02        | 47.9                  | 5.76           | 21.7                              |
|                 |             | Recommended Limits          | 44.46-49.14           | 5.60-6.18      | 20-24                             |
| 5800            | Body        | Measured, 2011.03.05        | 46.9                  | 6.17           | 21.7                              |
|                 |             | Recommended Limits          | 43.80-48.41           | 5.95-6.57      | 20-24                             |

Table 2. Dielectric Parameters of Tissue Simulant Fluid

### 1.10 Evaluation Procedures

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 1 g and 10 g 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

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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.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within -2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

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 7x7x7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30mm contains about 30g of tissue.

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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 the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is 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.

### 1.11 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate ("SAR") in Section 4.2 of "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," ANSI/IEEE C95.1-1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in "Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814.

SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter. Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

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- (1) Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over an 10 grams of tissue (defined as a tissue volume in the shape of a cube).
- (2) Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.
- (3) Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube). General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure. Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .4)

| Human Exposure                                      | Uncontrolled Environment<br>General Population | Controlled Environment<br>Occupational |
|---|--|--|
| <b>Spatial Peak SAR</b><br>(Brain)                  | 1.60 m W/g                                     | 8.00 m W/g                             |
| <b>Spatial Average SAR</b><br>(Whole Body)          | 0.08 m W/g                                     | 0.40 m W/g                             |
| <b>Spatial Peak SAR</b><br>(Hands/Feet/Ankle/Wrist) | 4.00 m W/g                                     | 20.00 m W/g                            |

Table .3 RF exposure limits

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Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

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## 2. Summary of Results

### WLAN802.11 b\_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                 |                   |
|---|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.48dBm                         | 0.00801           | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                 |                   |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.48dBm                         | 0.388             | 22.1            | 21.7              |

### WLAN802.11 b\_ WLAN AUX Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                 |                   |
|---|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.09dBm                         | 0.00764           | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                 |                   |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.09dBm                         | 0.418             | 22.1            | 21.7              |

### WLAN802.11 g \_WLAN MAIN Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                 |                   |
|--------------------------------|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                        | 6       | 2437 | 16.16dBm                         | 0.00875           | 22.1            | 21.7              |

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| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 2450MHz                                   | 6       | 2437 | 16.16dBm                         | 0.451             | 22.1           | 21.7             |

## WLAN802.11 g \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                |                  |
|--------------------------------|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 2450MHz                        | 6       | 2437 | 16.43dBm                         | 0.011             | 22.1           | 21.7             |

| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 2450MHz                                   | 6       | 2437 | 16.43dBm                         | 0.592             | 22.1           | 21.7             |

## WLAN802.11 n (20M) \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                |                  |
|--------------------------------|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 2450MHz                        | 6       | 2437 | 16.33dBm                         | 0.011             | 22.1           | 21.7             |

| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 2450MHz                                   | 6       | 2437 | 16.33dBm                         | 0.471             | 22.1           | 21.7             |

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## WLAN802.11 n (20M) \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode             |         |      |                                  |                   |                 |                   |
|--|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                    | 6       | 2437 | 16.30dBm                         | 0.00892           | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode. |         |      |                                  |                   |                 |                   |
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                    | 6       | 2437 | 16.30dBm                         | 0.57              | 22.1            | 21.7              |

## WLAN802.11 n (40M) \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                 |                   |
|---|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.71dBm                         | 0.00975           | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                 |                   |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.71dBm                         | 0.413             | 22.1            | 21.7              |

## WLAN802.11 n (40M) \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                 |                   |
|---|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.65dBm                         | 0.010             | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                 |                   |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 2450MHz                                   | 6       | 2437 | 15.65dBm                         | 0.499             | 22.1            | 21.7              |

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## WLAN802.11 n (20M) 5.2G \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                   | 64      | 5320 | 15.96dBm                         | 0.016             | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                   | 36      | 5180 | 15.49dBm                         | 0.583             | 22.1           | 21.7             |
|   | 52      | 5260 | 15.81dBm                         | 0.828             | 22.1           | 21.7             |
|   | 64      | 5320 | 15.96dBm                         | 0.814             | 22.1           | 21.7             |

## WLAN802.11 n (20M) 5.2G \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode             |         |      |                                  |                   |                |                  |
|--|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                    | 52      | 5260 | 15.85dBm                         | 0.00542           | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode. |         |      |                                  |                   |                |                  |
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                    | 36      | 5180 | 15.12dBm                         | 0.685             | 22.1           | 21.7             |
|  | 52      | 5260 | 15.85dBm                         | 0.967             | 22.1           | 21.7             |
|  | 64      | 5320 | 15.82dBm                         | 0.598             | 22.1           | 21.7             |

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## WLAN802.11 n (20M) 5.5G \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode             |         |      |                                  |                   |                 |                   |
|--|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5500MHz                                    | 100     | 5500 | 15.94dBm                         | 0.013             | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode. |         |      |                                  |                   |                 |                   |
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5500MHz                                    | 100     | 5500 | 15.94dBm                         | 0.859             | 22.1            | 21.7              |
|  | 116     | 5580 | 15.63dBm                         | 0.525             | 22.1            | 21.7              |
|  | 120     | 5600 | 15.39dBm                         | 0.416             | 22.1            | 21.7              |
|  | 140     | 5700 | 15.36dBm                         | 0.653             | 22.1            | 21.7              |

## WLAN802.11 n (20M) 5.5G \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode             |         |      |                                  |                   |                 |                   |
|--|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5500MHz                                    | 140     | 5700 | 15.84dBm                         | 0.018             | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode. |         |      |                                  |                   |                 |                   |
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5500MHz                                    | 100     | 5500 | 15.78dBm                         | 0.694             | 22.1            | 21.7              |
|  | 116     | 5580 | 15.71dBm                         | 1.03              | 22.1            | 21.7              |
|  | 120     | 5600 | 15.63dBm                         | <b>1.21</b>       | 22.1            | 21.7              |
|  | 140     | 5700 | 15.84dBm                         | 1.05              | 22.1            | 21.7              |

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## WLAN802.11 n (20M) 5.8G \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode             |         |      |                                  |                   |                 |                   |
|--|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5800MHz                                    | 157     | 5785 | 15.89dBm                         | 0.00932           | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode. |         |      |                                  |                   |                 |                   |
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5800MHz                                    | 157     | 5785 | 15.89dBm                         | 0.744             | 22.1            | 21.7              |

## WLAN802.11 n (20M) 5.8G \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                 |                   |
|---|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5800MHz                                   | 165     | 5825 | 15.88dBm                         | 0.028             | 22.1            | 21.7              |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                 |                   |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5800MHz                                   | 149     | 5745 | 15.83dBm                         | 1.13              | 22.1            | 21.7              |
|   | 157     | 5785 | 15.82dBm                         | 1.01              | 22.1            | 21.7              |
|   | 165     | 5825 | 15.88dBm                         | 1.20              | 22.1            | 21.7              |

## WLAN802.11 n (40M) 5.2G \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                 |                   |
|--------------------------------|---------|------|----------------------------------|-------------------|-----------------|-------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ ° C] | Liquid Temp[ ° C] |
| 5200MHz                        | 54      | 5270 | 15.82dBm                         | 0.016             | 22.1            | 21.7              |

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| <b>Configuration 6:</b> Secondary landscape mode. |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency   | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz   | 54      | 5270 | 15.82dBm                         | 0.723             | 22.1           | 21.7             |

## WLAN802.11 n (40M) 5.2G \_ WLAN AUX Antenna

| <b>Configuration 2:</b> Lap-held mode             |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency   | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz   | 54      | 5270 | 15.92dBm                         | 0.011             | 22.1           | 21.7             |
| <b>Configuration 6:</b> Secondary landscape mode. |         |      |                                  |                   |                |                  |
| Frequency   | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz   | 38      | 5190 | 10.77dBm                         | 0.2               | 22.1           | 21.7             |
|   | 54      | 5270 | 15.92dBm                         | 0.901             | 22.1           | 21.7             |
|   | 62      | 5310 | 10.93dBm                         | 0.228             | 22.1           | 21.7             |

## WLAN802.11 n (40M) 5.5G \_ WLAN MAIN Antenna

| <b>Configuration 2:</b> Lap-held mode            |         |      |                                  |                   |                |                  |
|--|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz  | 118     | 5590 | 15.94dBm                         | 0.023             | 22.1           | 21.7             |
| <b>Configuration 6:</b> Secondary landscape mode |         |      |                                  |                   |                |                  |
| Frequency  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz  | 118     | 5590 | 15.94dBm                         | 0.393             | 22.1           | 21.7             |

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## WLAN802.11 n(40M) 5.5G \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz                                   | 118     | 5590 | 15.78dBm                         | 0.00867           | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz                                   | 102     | 5510 | 13.43dBm                         | 0.472             | 22.1           | 21.7             |
|   | 118     | 5590 | 15.78dBm                         | 1.2               | 22.1           | 21.7             |
|   | 134     | 5670 | 15.68dBm                         | 1.03              | 22.1           | 21.7             |

## WLAN802.11 n(40M) 5.8G \_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode             |         |      |                                  |                   |                |                  |
|--|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                                    | 159     | 5795 | 15.81dBm                         | 0.00461           | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode. |         |      |                                  |                   |                |                  |
| Frequency                                  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                                    | 151     | 5755 | 15.72dBm                         | 0.816             | 22.1           | 21.7             |
|  | 159     | 5795 | 15.81dBm                         | 0.814             | 22.1           | 21.7             |

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## WLAN802.11 n(40M) 5.8G \_ WLAN AUX Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                                   | 159     | 5795 | 15.94dBm                         | 0.025             | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                                   | 151     | 5755 | 15.85dBm                         | 1.19              | 22.1           | 21.7             |
|   | 159     | 5795 | 15.94dBm                         | 1.17              | 22.1           | 21.7             |

## WLAN802.11 a 5.2G\_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                   | 36      | 5180 | 15.91dBm                         | 0.024             | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                   | 36      | 5180 | 15.91dBm                         | 0.492             | 22.1           | 21.7             |

## WLAN802.11 a 5.2G\_ WLAN AUX Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                |                  |
|--------------------------------|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                        | 52      | 5260 | 15.98dBm                         | 0.014             | 22.1           | 21.7             |

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| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5200MHz                                   | 36      | 5180 | 15.95dBm                         | 1.16              | 22.1           | 21.7             |
|   | 52      | 5260 | 15.98dBm                         | 1.09              | 22.1           | 21.7             |
|   | 64      | 5320 | 15.87dBm                         | 0.798             | 22.1           | 21.7             |

## WLAN802.11 a 5.5G\_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode            |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz                                   | 100     | 5500 | 15.88dBm                         | 0.038             | 22.1           | 21.7             |
| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz                                   | 100     | 5500 | 15.88dBm                         | 0.821             | 22.1           | 21.7             |
|   | 116     | 5580 | 15.77dBm                         | 0.413             | 22.1           | 21.7             |
|   | 120     | 5600 | 15.14dBm                         | 0.391             | 22.1           | 21.7             |
|   | 140     | 5700 | 15.27dBm                         | 0.696             | 22.1           | 21.7             |

## WLAN802.11 a 5.5G\_ WLAN AUX Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                |                  |
|--------------------------------|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz                        | 120     | 5600 | 15.99dBm                         | 0.022             | 22.1           | 21.7             |

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| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5500MHz                                   | 100     | 5500 | 15.82dBm                         | 0.703             | 22.1           | 21.7             |
|   | 116     | 5580 | 15.94dBm                         | 0.832             | 22.1           | 21.7             |
|   | 120     | 5600 | 15.99dBm                         | 0.846             | 22.1           | 21.7             |
|   | 140     | 5700 | 15.86dBm                         | 0.928             | 22.1           | 21.7             |

## WLAN802.11 a 5.8G\_ WLAN MAIN Antenna

| Configuration 2: Lap-held mode |         |      |                                  |                   |                |                  |
|--------------------------------|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                      | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                        | 149     | 5745 | 15.99dBm                         | 0.014             | 22.1           | 21.7             |

| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                                   | 149     | 5745 | 15.99dBm                         | 0.712             | 22.1           | 21.7             |

## WLAN802.11 a 5.8G\_ WLAN AUX Antenna

| Configuration 2: Lap-held Secondary landscape mode |         |      |                                  |                   |                |                  |
|--|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency  | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz  | 165     | 5825 | 15.97dBm                         | 0.012             | 22.1           | 21.7             |

| Configuration 6: Secondary landscape mode |         |      |                                  |                   |                |                  |
|---|---------|------|----------------------------------|-------------------|----------------|------------------|
| Frequency                                 | Channel | MHz  | Conducted Output Power (Average) | Measured(W/kg) 1g | Amb. Temp[ °C] | Liquid Temp[ °C] |
| 5800MHz                                   | 149     | 5745 | 15.79dBm                         | 1.18              | 22.1           | 21.7             |
|   | 157     | 5785 | 15.86dBm                         | 0.99              | 22.1           | 21.7             |
|   | 165     | 5825 | 15.97dBm                         | 1.01              | 22.1           | 21.7             |

Note: The SAR measurement results with transmitter at maximum output power.

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### 3. Instruments List

| Manufacturer                    | Device   | Type                 | Serial number | Date of last calibration |
|---------------------------------|--|----------------------|---------------|--------------------------|
| Schmid & Partner Engineering AG | Dosimetric E-Field Probe                         | EX3DV4               | 3703          | Jan.24.2011              |
| Schmid & Partner Engineering AG | 2450/5200/5500/5800 MHz System Validation Dipole | D2450V2              | 727           | Apr.29.2010              |
|                                 |  | D5GHzV2              | 1040          | Jun.23.2010              |
| Schmid & Partner Engineering AG | Data acquisition Electronics                     | DAE4                 | 856           | May.20.2010              |
| Schmid & Partner Engineering AG | Software   | DASY 5 V5.0 Build125 | N/A           | Calibration not required |
| Schmid & Partner Engineering AG | Phantom  | SAM                  | N/A           | Calibration not required |
| Agilent                         | Network Analyzer                                 | 8753D                | 3410A05662    | Mar.30.2010              |
| Agilent                         | Dielectric Probe Kit                             | 85070D               | US01440168    | Calibration not required |
| Agilent                         | Dual-directional coupler                         | 777D                 | 50114         | Aug.25.2010              |
| Agilent                         | RF Signal Generator                              | 8648D                | 3847M00432    | Jun.04.2010              |
| Agilent                         | Power Sensor                                     | U2001B               | MY48100169    | Apr.30.2010              |

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## 4. Measurements

Date: 3/1/2011

### Configuration 2\_WLAN802.11b\_CH6\_Main antenna

#### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.015 mW/g

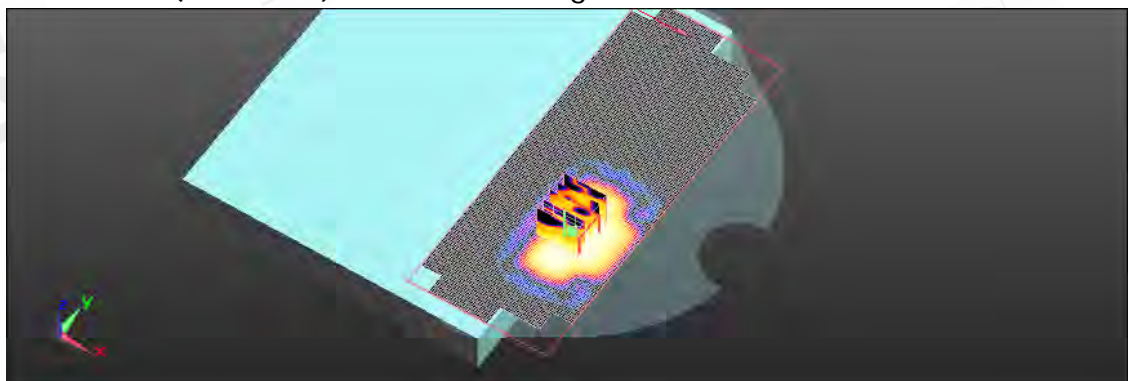
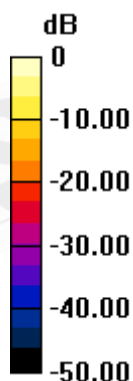
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.930 V/m; Power Drift = 0.144 dB

Peak SAR (extrapolated) = 0.020 W/kg

**SAR(1 g) = 0.00801 mW/g; SAR(10 g) = 0.00341 mW/g**

Maximum value of SAR (measured) = 0.00911 mW/g



0 dB = 0.0091mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 b\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.479 mW/g

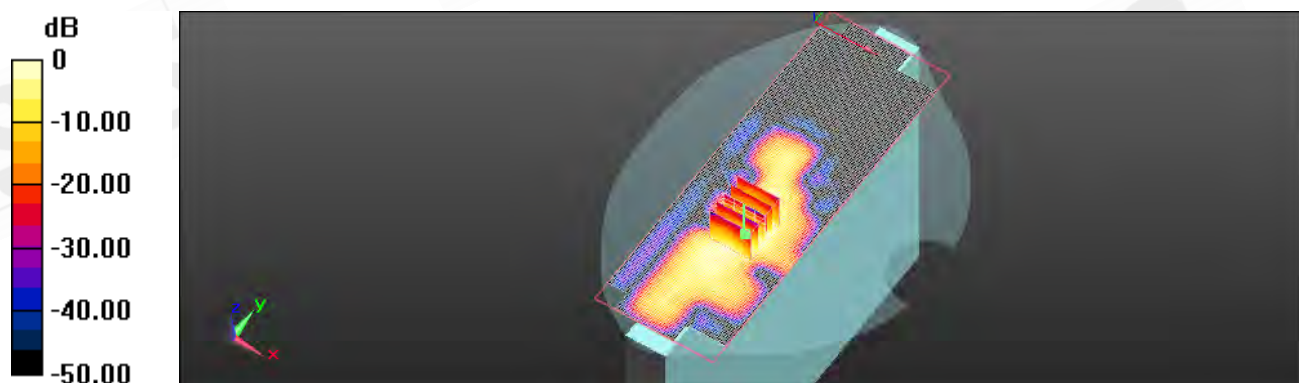
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.382 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.091 W/kg

**SAR(1 g) = 0.388 mW/g; SAR(10 g) = 0.155 mW/g**

Maximum value of SAR (measured) = 0.417 mW/g



0 dB = 0.420mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11b\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.014 mW/g

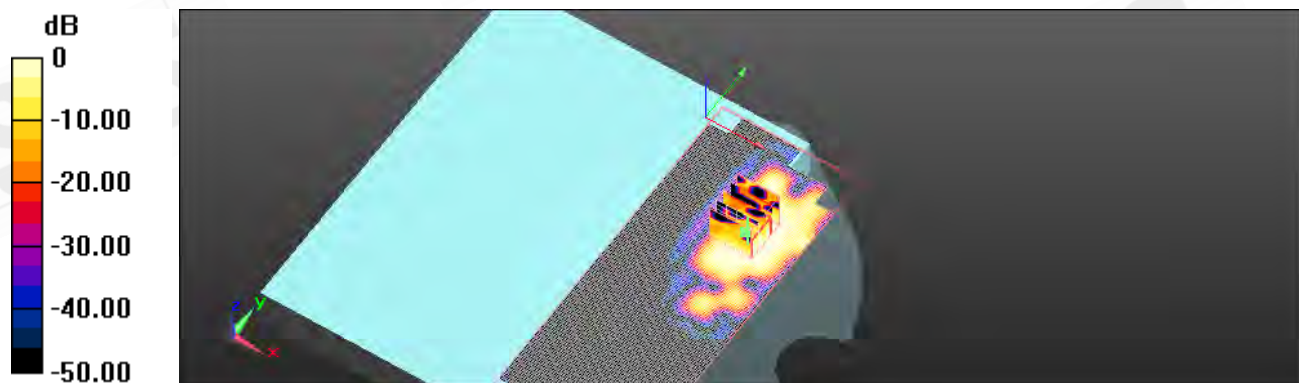
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.163 V/m; Power Drift = 0.147 dB

Peak SAR (extrapolated) = 0.018 W/kg

**SAR(1 g) = 0.00764 mW/g; SAR(10 g) = 0.00354 mW/g**

Maximum value of SAR (measured) = 0.00901 mW/g



0 dB = 0.009mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 b\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.486 mW/g

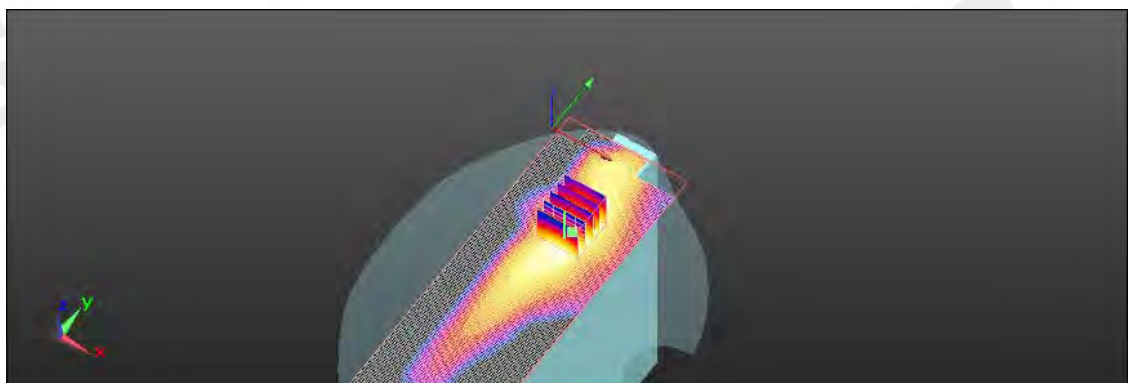
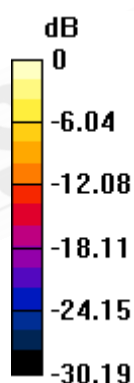
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.011 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 1.076 W/kg

**SAR(1 g) = 0.418 mW/g; SAR(10 g) = 0.194 mW/g**

Maximum value of SAR (measured) = 0.443 mW/g



0 dB = 0.440mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11g\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.022 mW/g

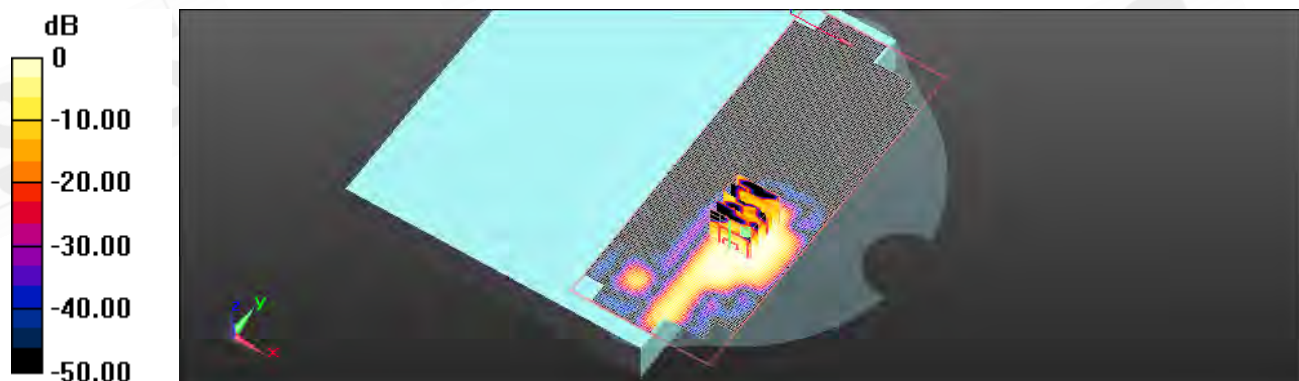
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.105 V/m; Power Drift = 0.145 dB

Peak SAR (extrapolated) = 0.027 W/kg

**SAR(1 g) = 0.00875 mW/g; SAR(10 g) = 0.00392 mW/g**

Maximum value of SAR (measured) = 0.011 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 g\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.432 mW/g

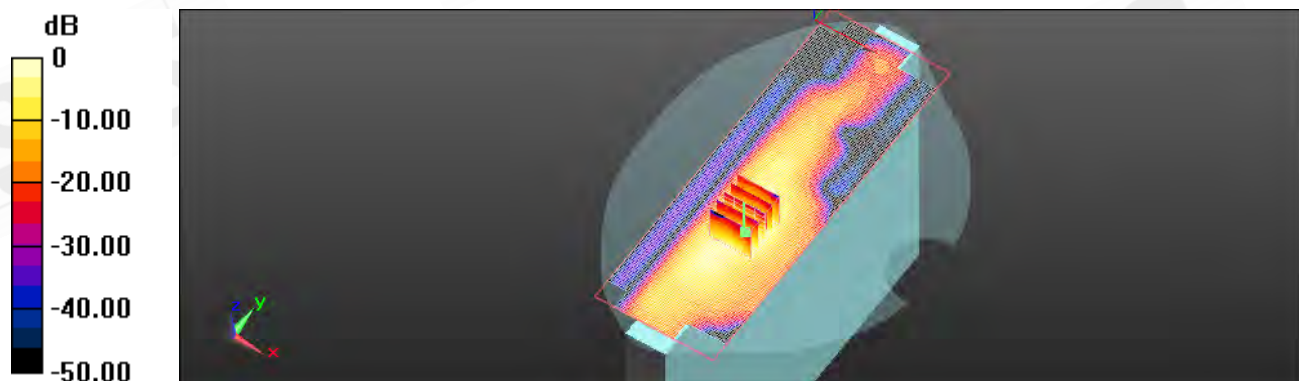
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.463 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.276 W/kg

**SAR(1 g) = 0.451 mW/g; SAR(10 g) = 0.180 mW/g**

Maximum value of SAR (measured) = 0.484 mW/g



0 dB = 0.480mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11g\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.016 mW/g

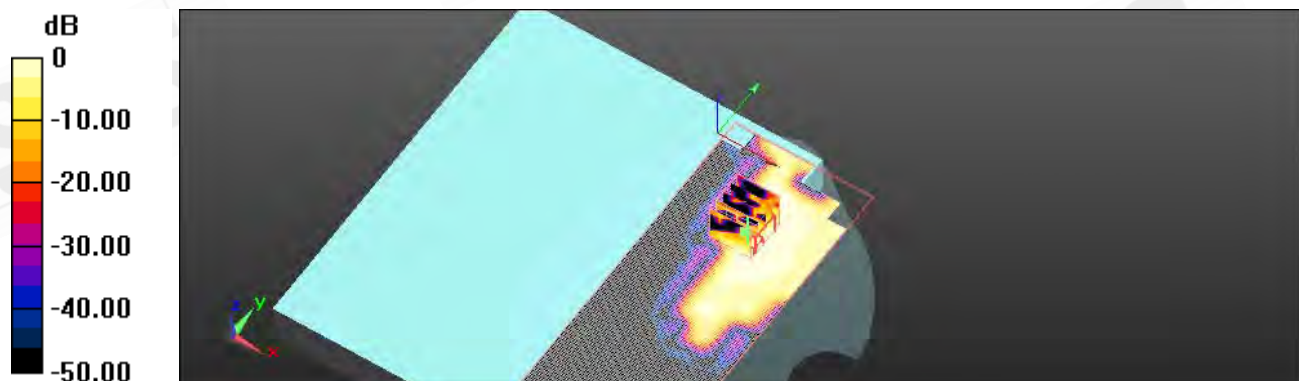
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.122 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.037 W/kg

**SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00474 mW/g**

Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 g\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.685 mW/g

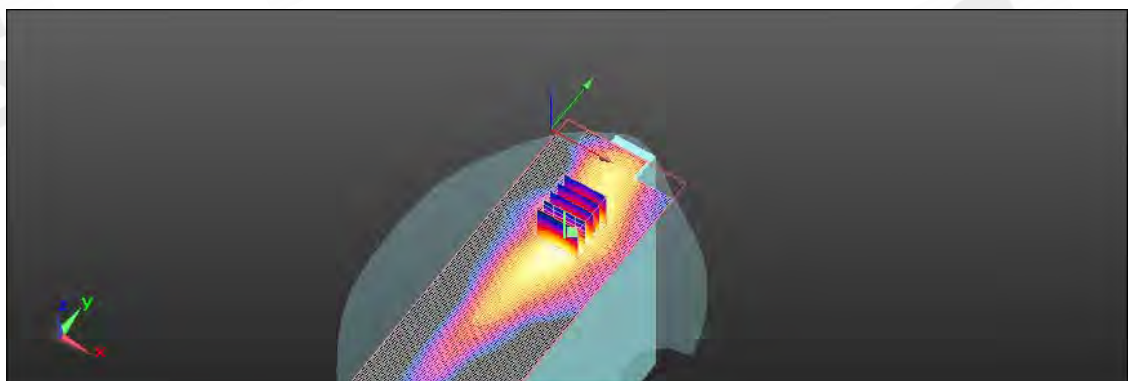
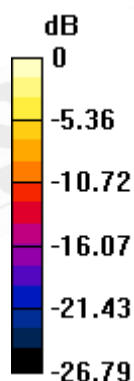
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.667 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.510 W/kg

**SAR(1 g) = 0.592 mW/g; SAR(10 g) = 0.274 mW/g**

Maximum value of SAR (measured) = 0.633 mW/g



0 dB = 0.630mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11 n(20M)\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz  
Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)  
DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.017 mW/g

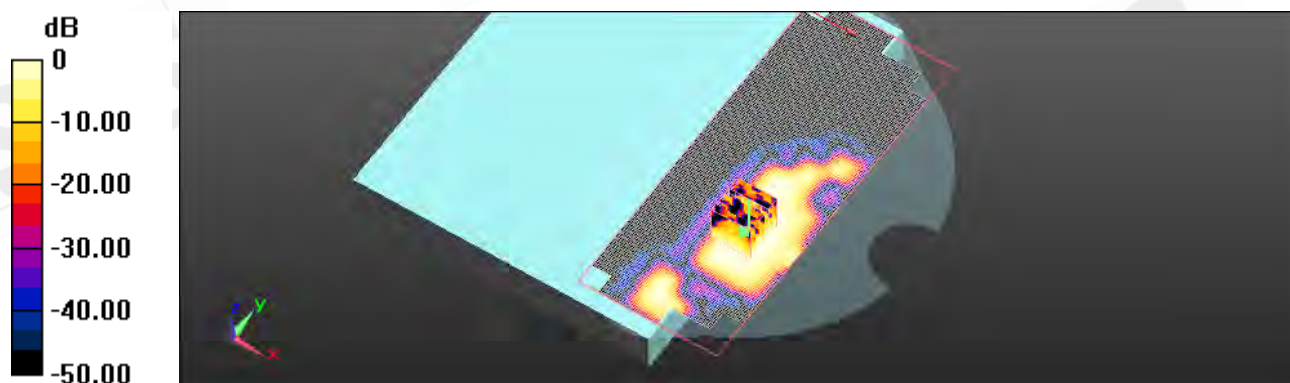
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.475 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.035 W/kg

**SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00489 mW/g**

Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.455 mW/g

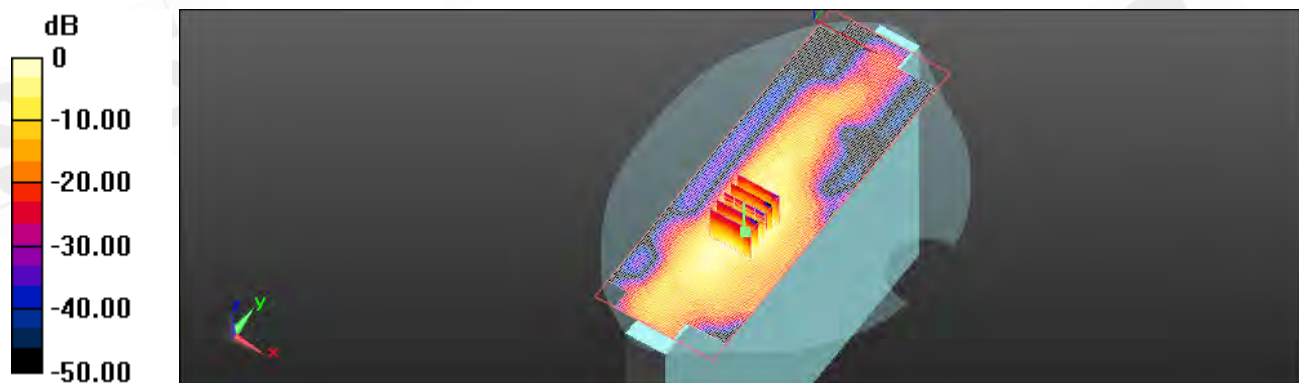
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.545 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 1.333 W/kg

**SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.188 mW/g**

Maximum value of SAR (measured) = 0.505 mW/g



0 dB = 0.500mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11 n(20M)\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.018 mW/g

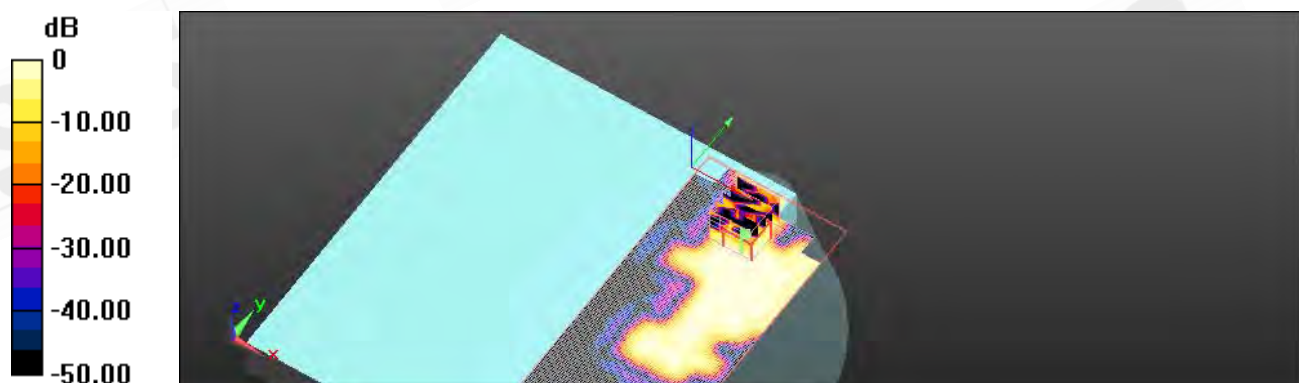
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.462 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.037 W/kg

**SAR(1 g) = 0.00892 mW/g; SAR(10 g) = 0.00378 mW/g**

Maximum value of SAR (measured) = 0.011 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz  
Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)  
DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.661 mW/g

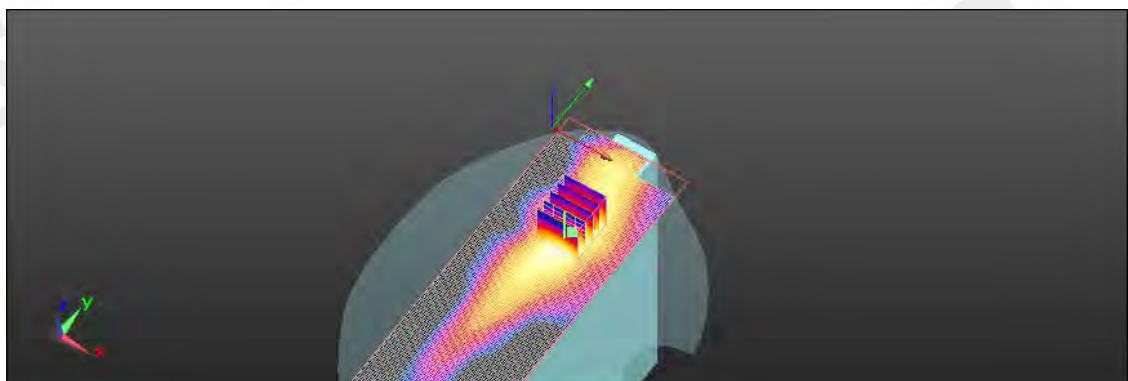
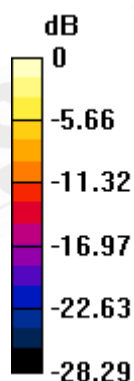
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.563 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.482 W/kg

**SAR(1 g) = 0.570 mW/g; SAR(10 g) = 0.264 mW/g**

Maximum value of SAR (measured) = 0.603 mW/g



0 dB = 0.600mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11n(40M)\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz  
Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)  
DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.015 mW/g

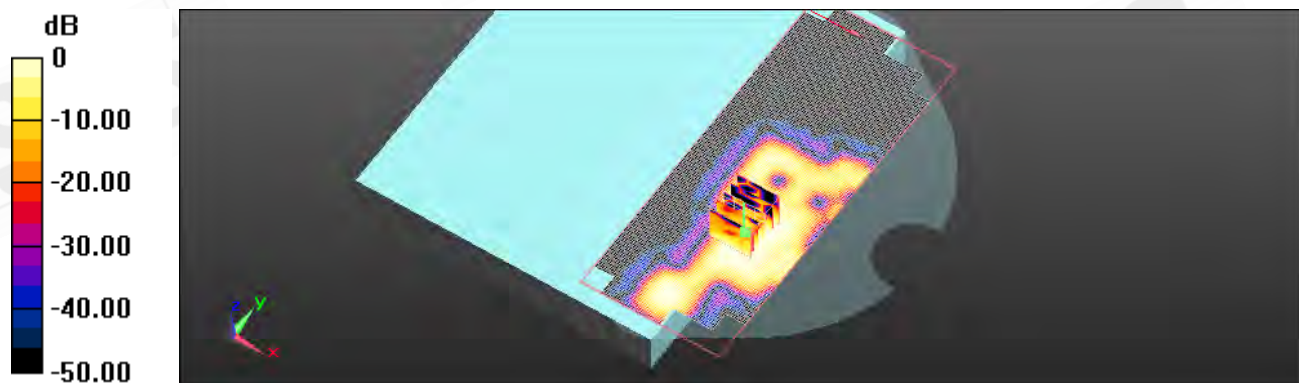
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.638 V/m; Power Drift = -0.191 dB

Peak SAR (extrapolated) = 0.026 W/kg

**SAR(1 g) = 0.00975 mW/g; SAR(10 g) = 0.00446 mW/g**

Maximum value of SAR (measured) = 0.011 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(40M)\_CH6\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.394 mW/g

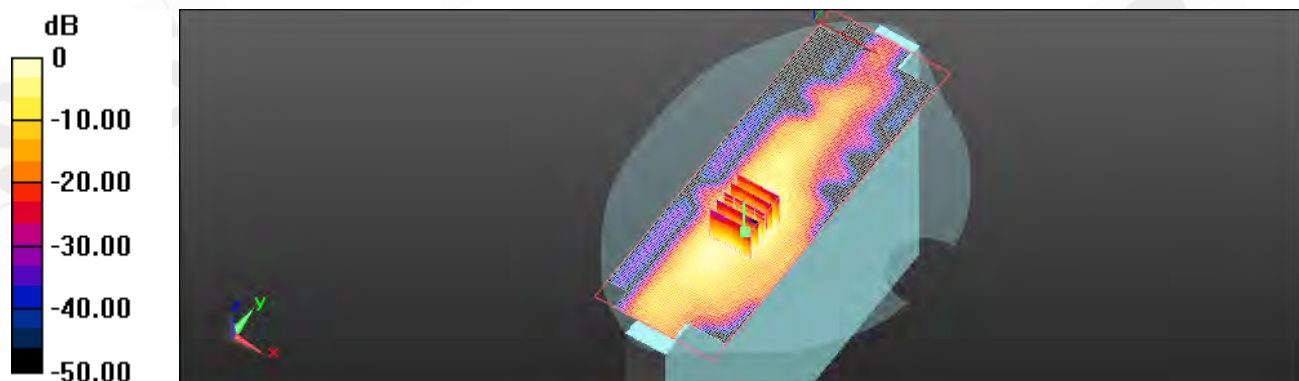
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.291 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.159 W/kg

**SAR(1 g) = 0.413 mW/g; SAR(10 g) = 0.165 mW/g**

Maximum value of SAR (measured) = 0.443 mW/g



0 dB = 0.440mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11n(40M)\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz  
Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)  
DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.014 mW/g

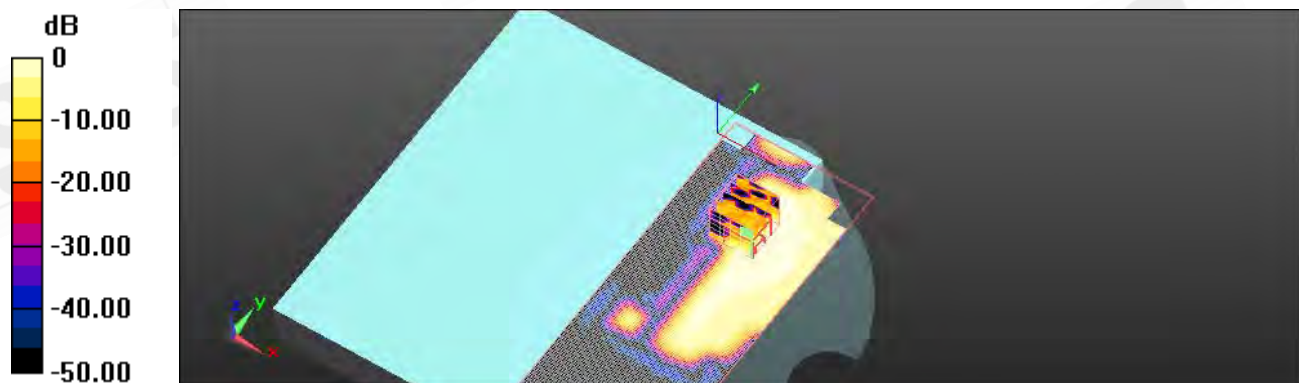
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.408 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.027 W/kg

**SAR(1 g) = 0.010 mW/g; SAR(10 g) = 0.00425 mW/g**

Maximum value of SAR (measured) = 0.011 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(40M)\_CH6\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN802.11 b & g & n(20M)(40M); Frequency: 2437 MHz

Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.952$  mho/m;  $\epsilon_r = 52.813$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.577 mW/g

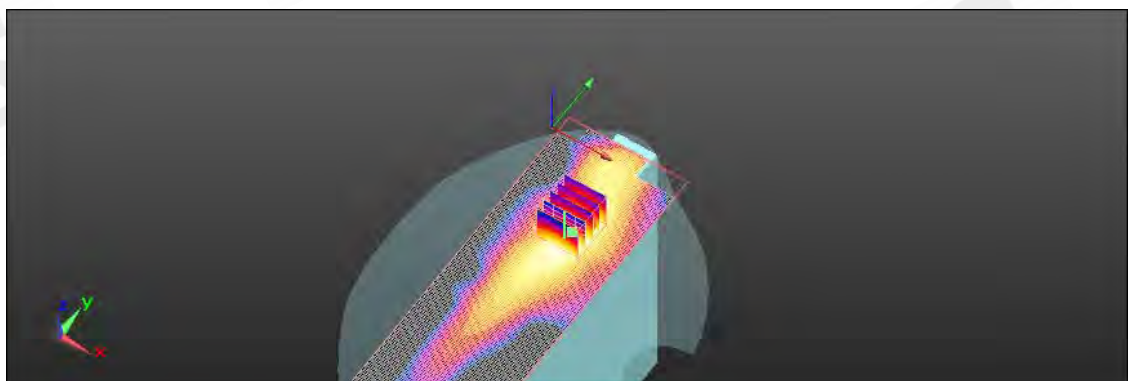
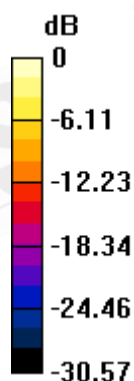
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.250 V/m; Power Drift = 0.0027 dB

Peak SAR (extrapolated) = 1.291 W/kg

**SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.230 mW/g**

Maximum value of SAR (measured) = 0.529 mW/g



0 dB = 0.530mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11 n(20M)5.2G\_CH64\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5320 MHz

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.529$  mho/m;  $\epsilon_r = 48.047$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.014 mW/g

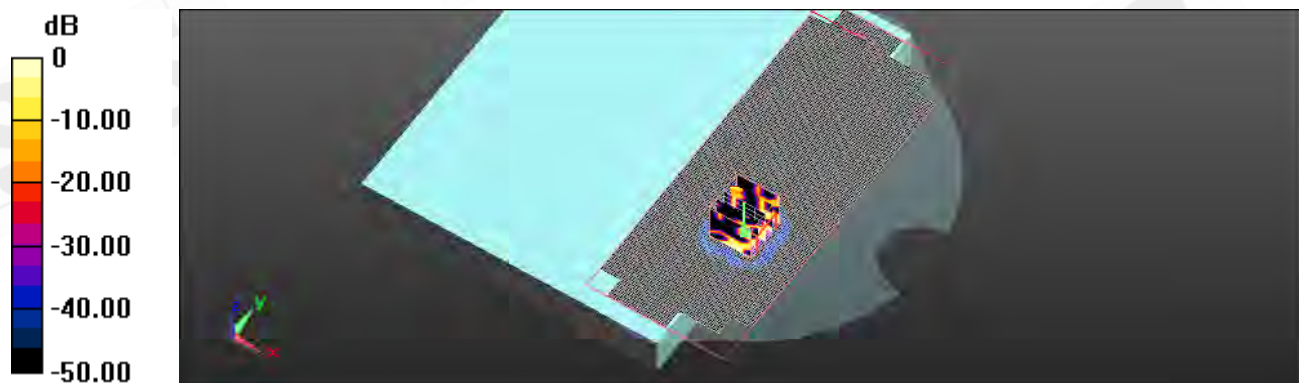
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.679 V/m; Power Drift = 0.139 dB

Peak SAR (extrapolated) = 0.074 W/kg

**SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.00481 mW/g**

Maximum value of SAR (measured) = 0.013 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)5.2G\_CH36\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5180 MHz

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.273$  mho/m;  $\epsilon_r = 48.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.671 mW/g

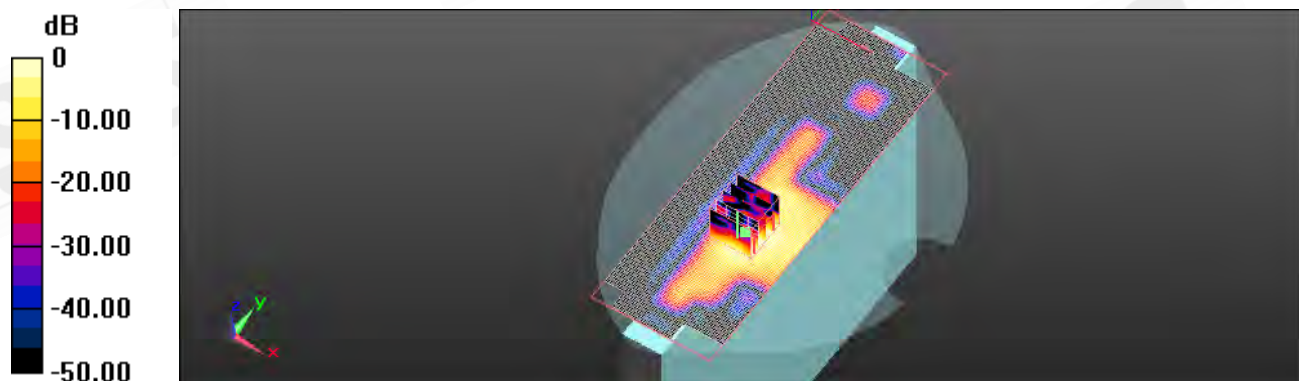
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.580 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 2.210 W/kg

**SAR(1 g) = 0.583 mW/g; SAR(10 g) = 0.199 mW/g**

Maximum value of SAR (measured) = 0.678 mW/g



0 dB = 0.680mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)5.2G\_CH52\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5260 MHz

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.422$  mho/m;  $\epsilon_r = 48.196$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.170 mW/g

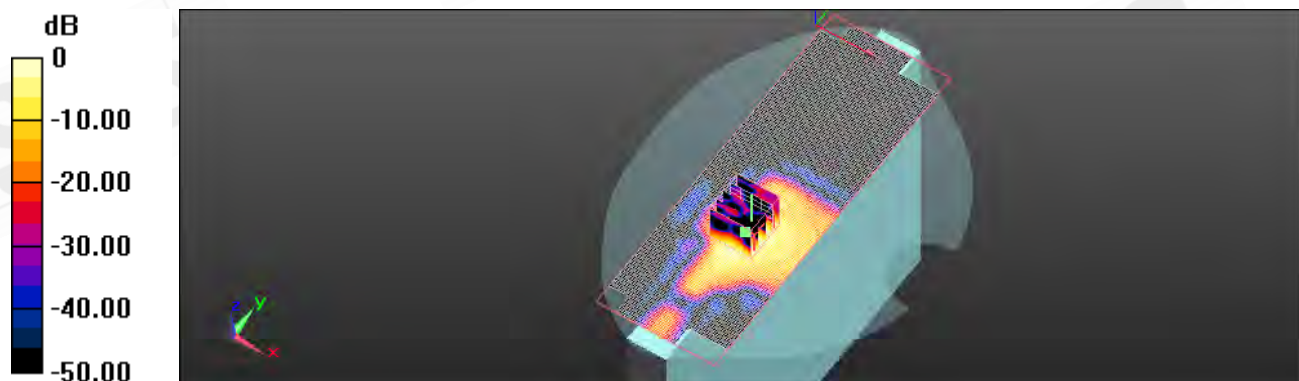
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.845 V/m; Power Drift = 0.021 dB

Peak SAR (extrapolated) = 3.608 W/kg

**SAR(1 g) = 0.828 mW/g; SAR(10 g) = 0.323 mW/g**

Maximum value of SAR (measured) = 1.064 mW/g



0 dB = 1.060mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)5.2G\_CH64\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5320 MHz

Medium parameters used :  $f = 5320$  MHz;  $\sigma = 5.529$  mho/m;  $\epsilon_r = 48.047$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.058 mW/g

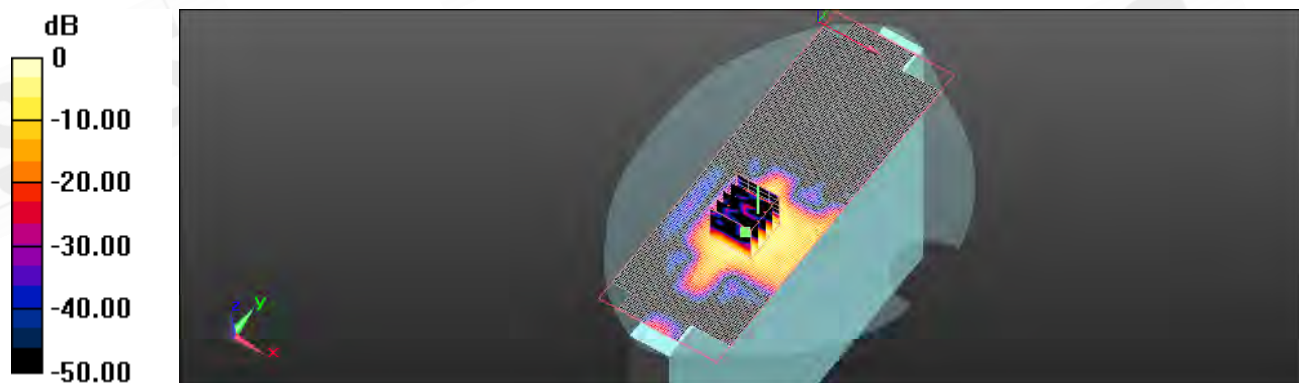
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.787 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 7.566 W/kg

**SAR(1 g) = 0.814 mW/g; SAR(10 g) = 0.271 mW/g**

Maximum value of SAR (measured) = 1.388 mW/g



0 dB = 1.390mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11 n(20M)5.2G\_CH52\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5260 MHz

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.422$  mho/m;  $\epsilon_r = 48.196$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.012 mW/g

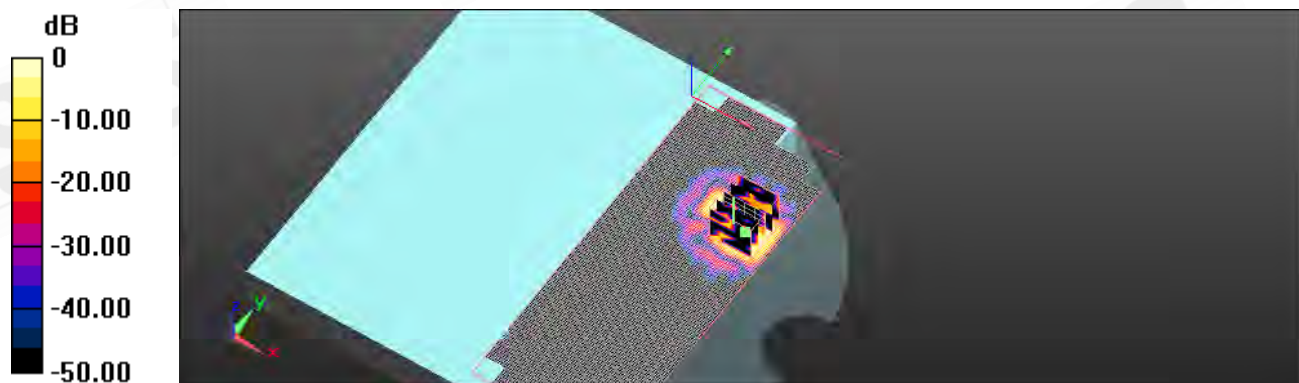
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.814 V/m; Power Drift = 0.171 dB

Peak SAR (extrapolated) = 0.038 W/kg

**SAR(1 g) = 0.00542 mW/g; SAR(10 g) = 0.00095 mW/g**

Maximum value of SAR (measured) = 0.012 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)5.2G\_CH36\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5180 MHz

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.273$  mho/m;  $\epsilon_r = 48.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.745 mW/g

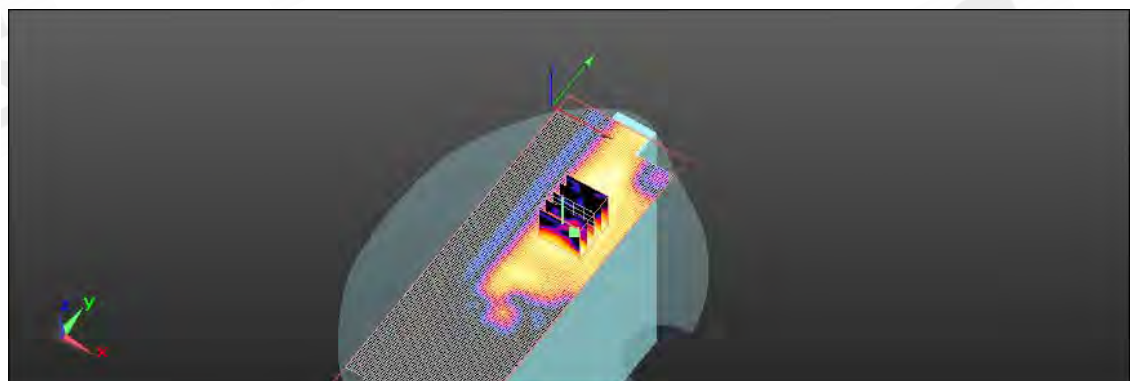
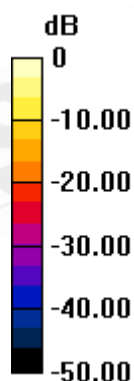
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.210 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 1.992 W/kg

**SAR(1 g) = 0.685 mW/g; SAR(10 g) = 0.219 mW/g**

Maximum value of SAR (measured) = 0.894 mW/g



0 dB = 0.890mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)5.2G\_CH52\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5260 MHz

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.422$  mho/m;  $\epsilon_r = 48.196$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.05 mW/g

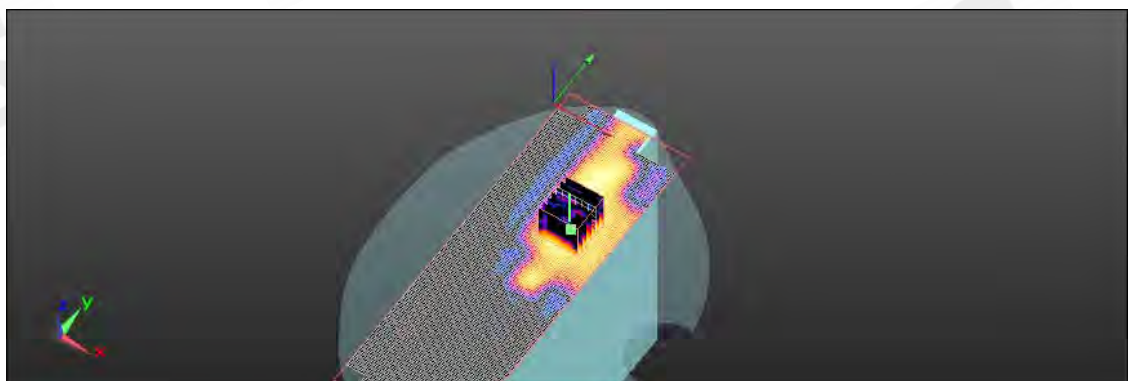
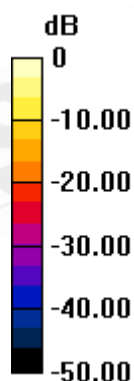
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.990 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 5.628 W/kg

**SAR(1 g) = 0.967 mW/g; SAR(10 g) = 0.243 mW/g**

Maximum value of SAR (measured) = 1.029 mW/g



0 dB = 1.030mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(20M)5.2G\_CH64\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5320 MHz

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.529$  mho/m;  $\epsilon_r = 48.047$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.645 mW/g

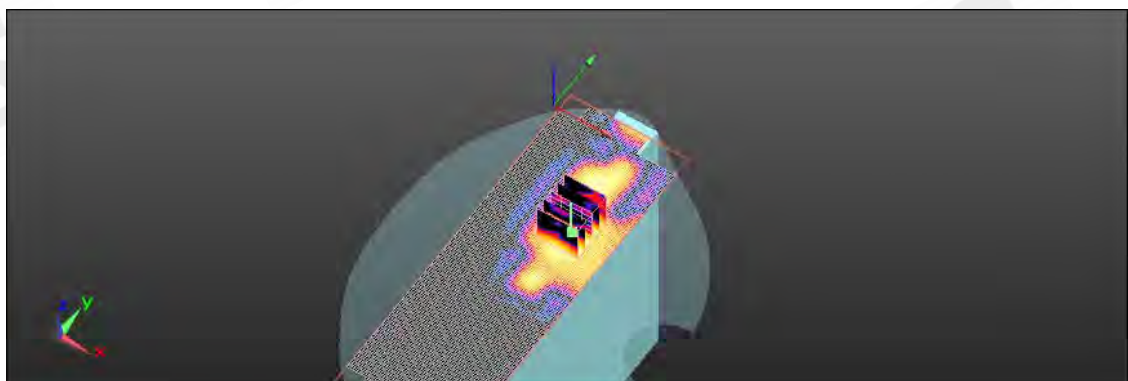
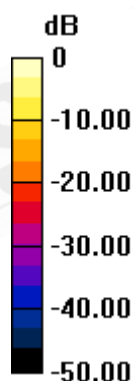
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 5.064 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.703 W/kg

**SAR(1 g) = 0.598 mW/g; SAR(10 g) = 0.181 mW/g**

Maximum value of SAR (measured) = 0.712 mW/g



0 dB = 0.710mW/g

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Date: 3/2/2011

## Configuration 2\_WLAN802.11 n(20M)5.5G\_CH100\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5500 MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.757$  mho/m;  $\epsilon_r = 47.595$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.015 mW/g

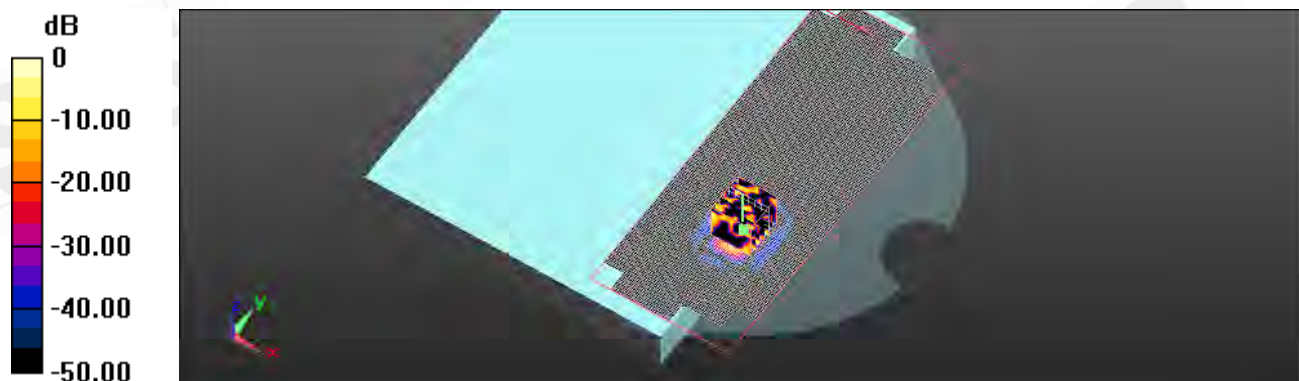
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0 V/m; Power Drift = 0.109 dB

Peak SAR (extrapolated) = 0.075 W/kg

**SAR(1 g) = 0.013 mW/g; SAR(10 g) = 0.00225 mW/g**

Maximum value of SAR (measured) = 0.023 mW/g



0 dB = 0.020mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH100\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5500 MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.757$  mho/m;  $\epsilon_r = 47.595$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.233 mW/g

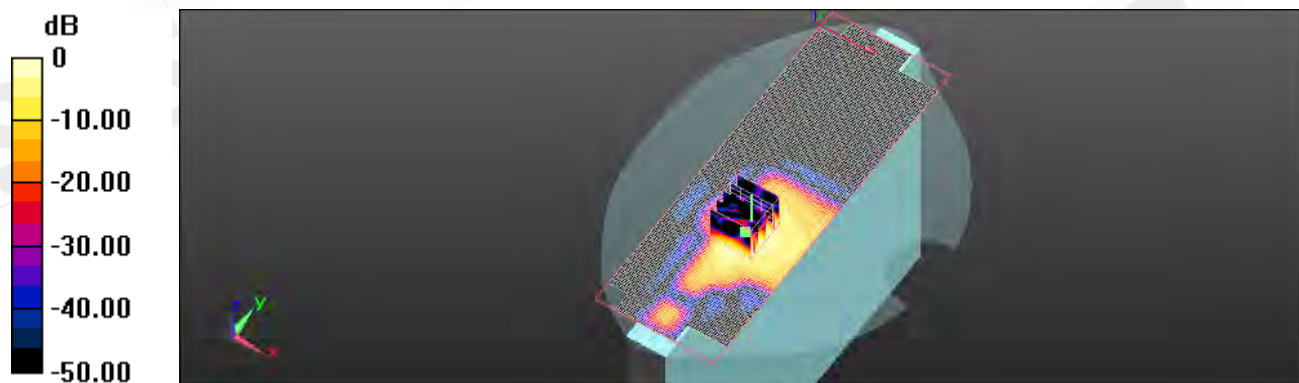
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.116 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 3.235 W/kg

**SAR(1 g) = 0.859 mW/g; SAR(10 g) = 0.278 mW/g**

Maximum value of SAR (measured) = 1.077 mW/g



0 dB = 1.080mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH116\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5580 MHz

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.896$  mho/m;  $\epsilon_r = 47.456$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.927 mW/g

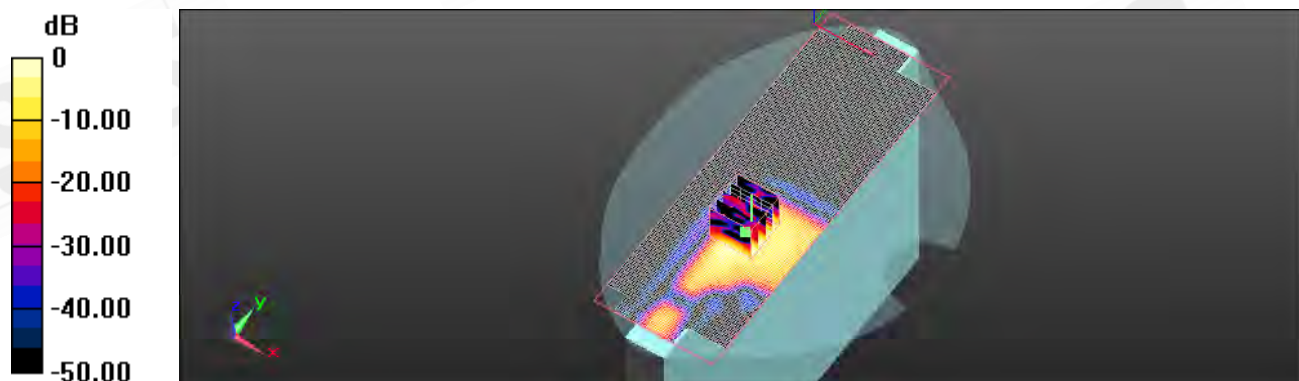
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.957 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 1.761 W/kg

**SAR(1 g) = 0.525 mW/g; SAR(10 g) = 0.160 mW/g**

Maximum value of SAR (measured) = 0.767 mW/g



0 dB = 0.770mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH120\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5600 MHz

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.911$  mho/m;  $\epsilon_r = 47.396$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.770 mW/g

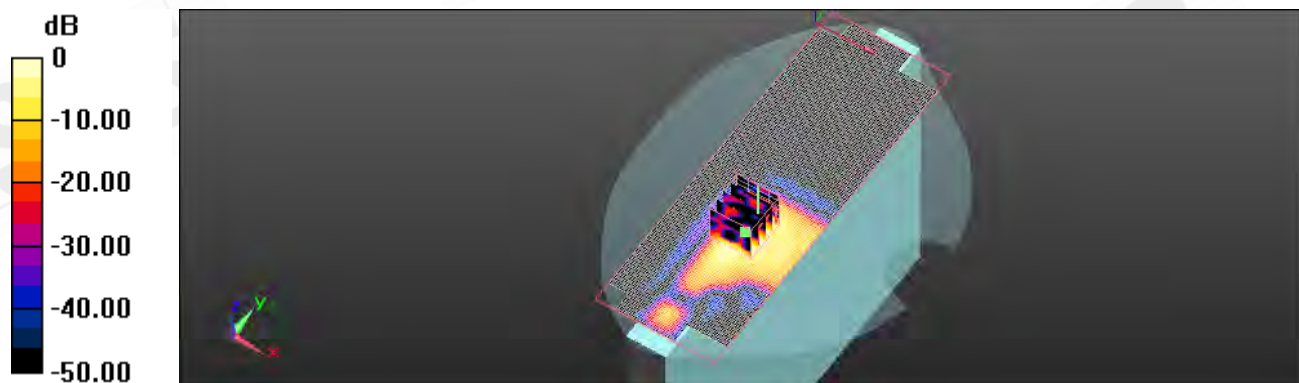
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.705 V/m; Power Drift = -0.207 dB

Peak SAR (extrapolated) = 2.493 W/kg

**SAR(1 g) = 0.416 mW/g; SAR(10 g) = 0.134 mW/g**

Maximum value of SAR (measured) = 0.574 mW/g



0 dB = 0.570mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH140\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5700 MHz

Medium parameters used:  $f = 5700$  MHz;  $\sigma = 6.059$  mho/m;  $\epsilon_r = 46.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.994 mW/g

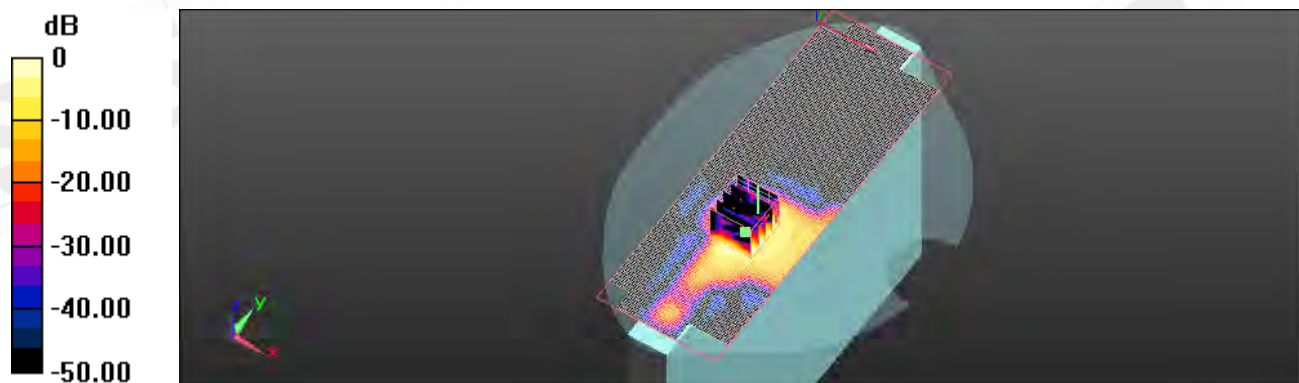
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.938 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 2.642 W/kg

**SAR(1 g) = 0.653 mW/g; SAR(10 g) = 0.225 mW/g**

Maximum value of SAR (measured) = 1.191 mW/g



0 dB = 1.190mW/g

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Date: 3/2/2011

## Configuration 2\_WLAN802.11 n(20M)5.5G\_CH140\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5700 MHz

Medium parameters used:  $f = 5700$  MHz;  $\sigma = 6.059$  mho/m;  $\epsilon_r = 46.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0266 mW/g

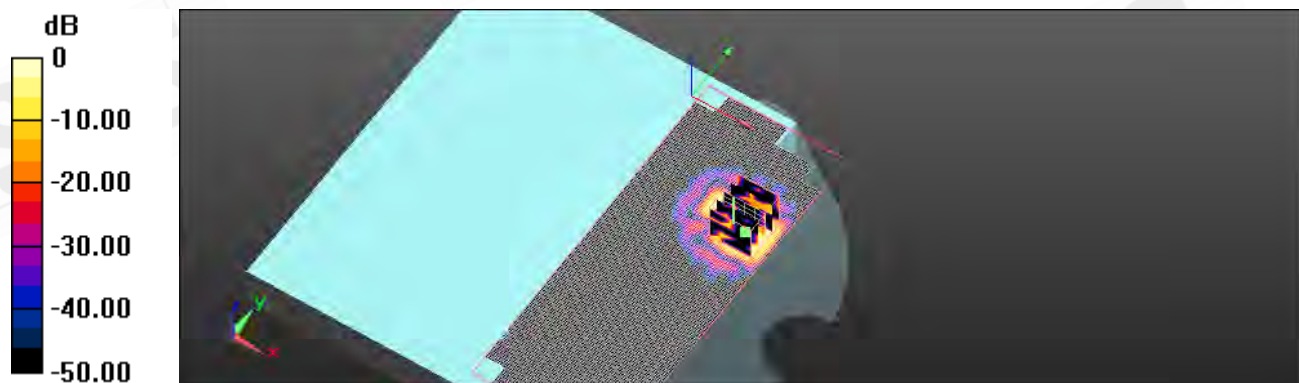
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.430 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.086 W/kg

**SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00657 mW/g**

Maximum value of SAR (measured) = 0.017 mW/g



0 dB = 0.020mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH100\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5500 MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.757$  mho/m;  $\epsilon_r = 47.595$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.762 mW/g

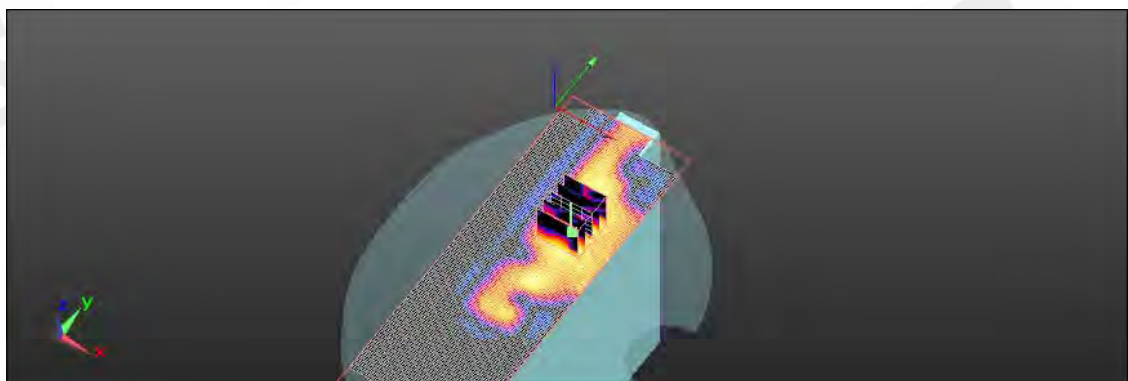
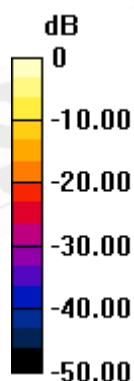
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.927 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 2.027 W/kg

**SAR(1 g) = 0.694 mW/g; SAR(10 g) = 0.206 mW/g**

Maximum value of SAR (measured) = 0.944 mW/g



0 dB = 0.940mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH116\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5580 MHz

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.896$  mho/m;  $\epsilon_r = 47.456$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

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

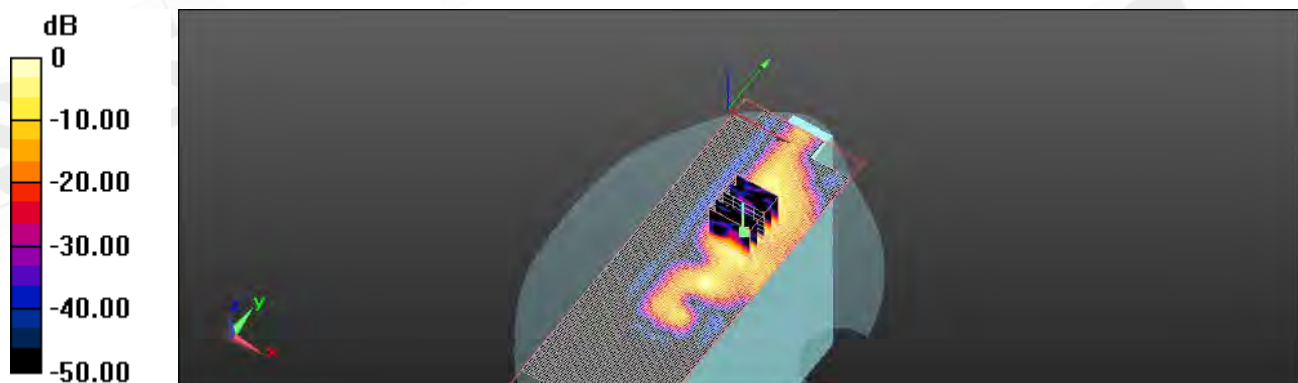
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.792 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.111 W/kg

**SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.293 mW/g**

Maximum value of SAR (measured) = 1.573 mW/g



0 dB = 1.570mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH120\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5600 MHz

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.911$  mho/m;  $\epsilon_r = 47.396$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.361 mW/g

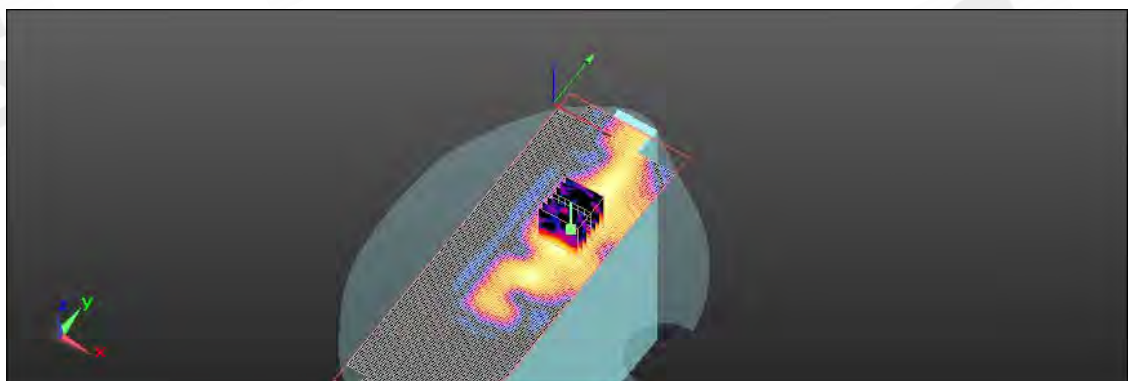
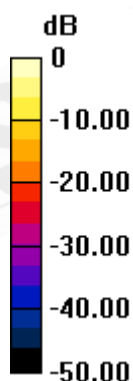
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.418 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 11.540 W/kg

**SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.391 mW/g**

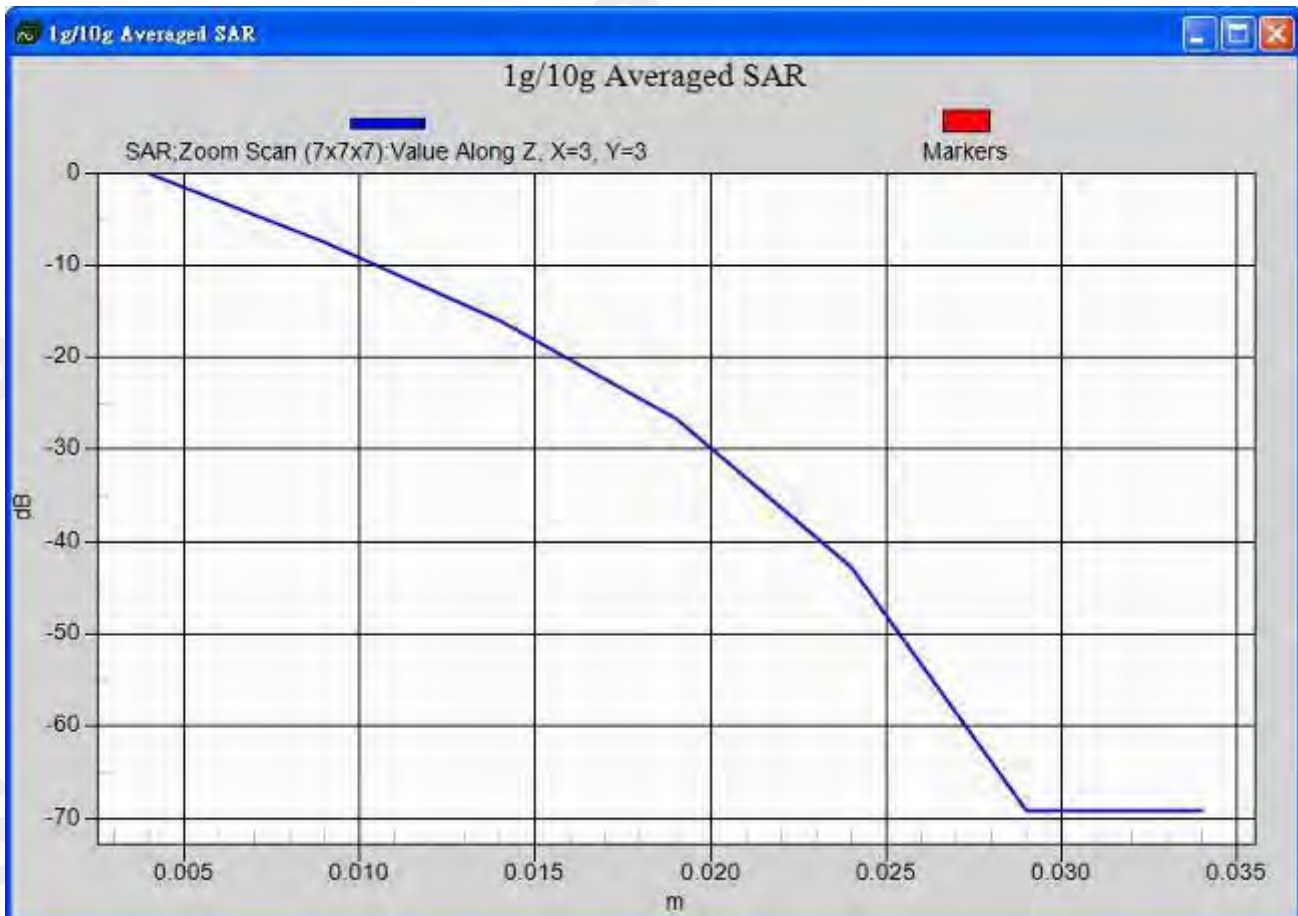
Maximum value of SAR (measured) = 1.450 mW/g



0 dB = 1.450mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(20M)5.5G\_CH140\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5700 MHz

Medium parameters used:  $f = 5700$  MHz;  $\sigma = 6.059$  mho/m;  $\epsilon_r = 46.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASYS2, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.112 mW/g

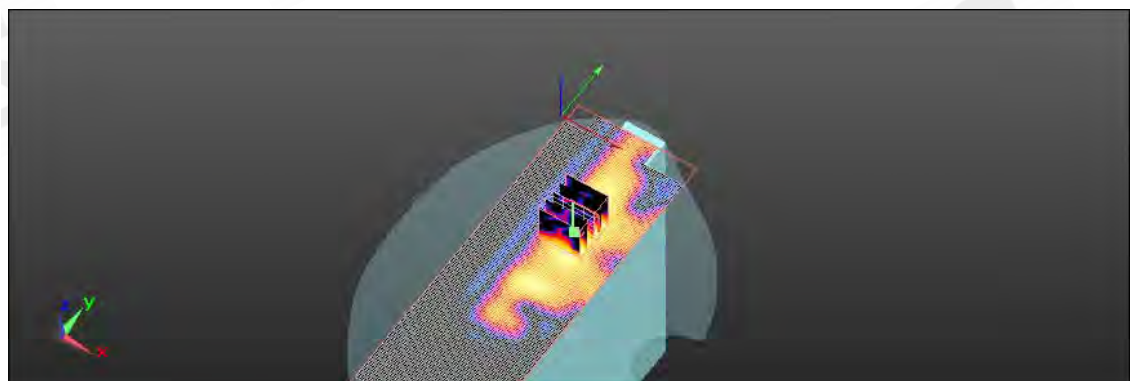
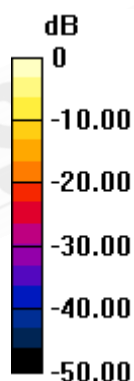
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.244 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 3.168 W/kg

**SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.308 mW/g**

Maximum value of SAR (measured) = 1.417 mW/g



0 dB = 1.420mW/g

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Date: 3/5/2011

## Configuration 2\_WLAN802.11 n(20M)5.8G\_CH157\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5785 MHz

Medium parameters used :  $f = 5785$  MHz;  $\sigma = 6.186$  mho/m;  $\epsilon_r = 46.693$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0103 mW/g

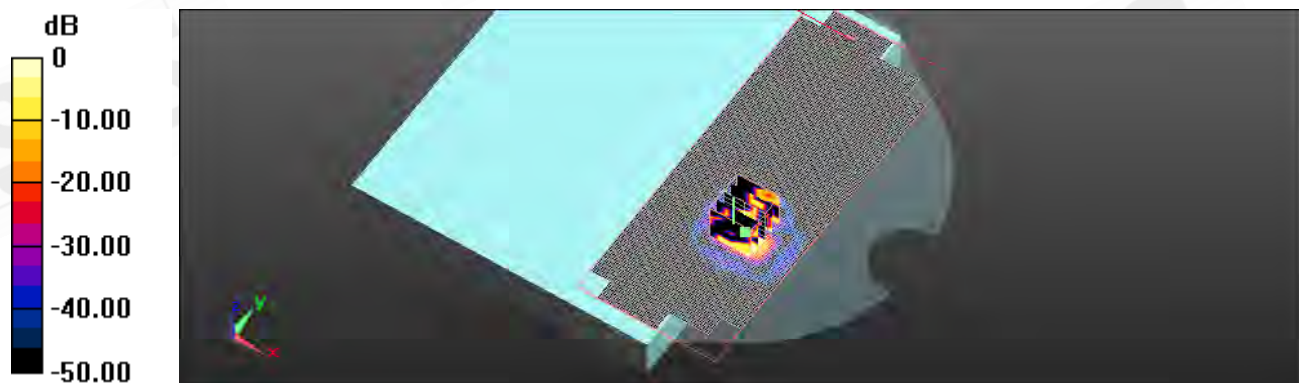
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.823 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.013 W/kg

**SAR(1 g) = 0.00932 mW/g; SAR(10 g) = 0.00268 mW/g**

Maximum value of SAR (measured) = 0.0064 mW/g



0 dB = 0.0064mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(20M)5.8G\_CH157\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5785 MHz

Medium parameters used :  $f = 5785$  MHz;  $\sigma = 6.186$  mho/m;  $\epsilon_r = 46.693$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.085 mW/g

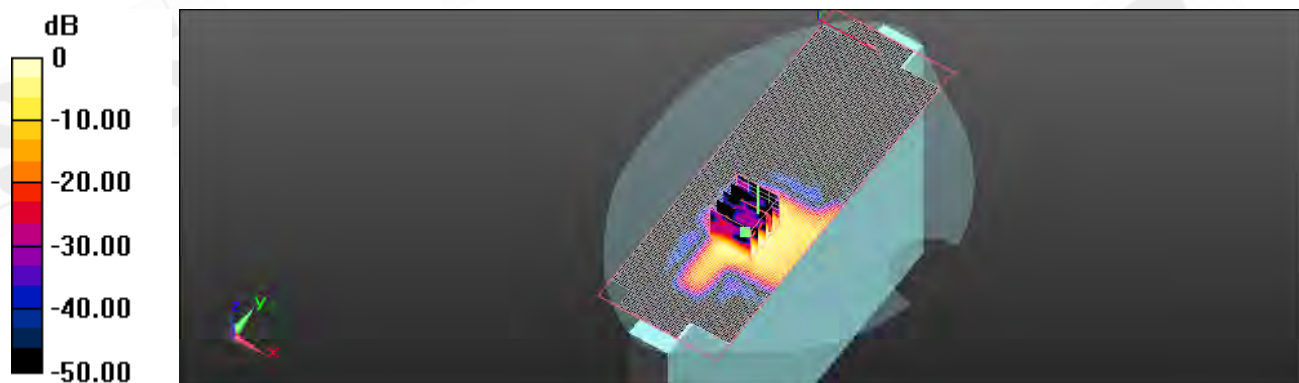
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.829 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 4.122 W/kg

**SAR(1 g) = 0.744 mW/g; SAR(10 g) = 0.240 mW/g**

Maximum value of SAR (measured) = 1.254 mW/g



0 dB = 1.250mW/g

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Date: 3/5/2011

## Configuration 2\_WLAN802.11 n(20M)5.8G\_CH165\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5825 MHz

Medium parameters used :  $f = 5825$  MHz;  $\sigma = 6.234$  mho/m;  $\epsilon_r = 46.518$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0337 mW/g

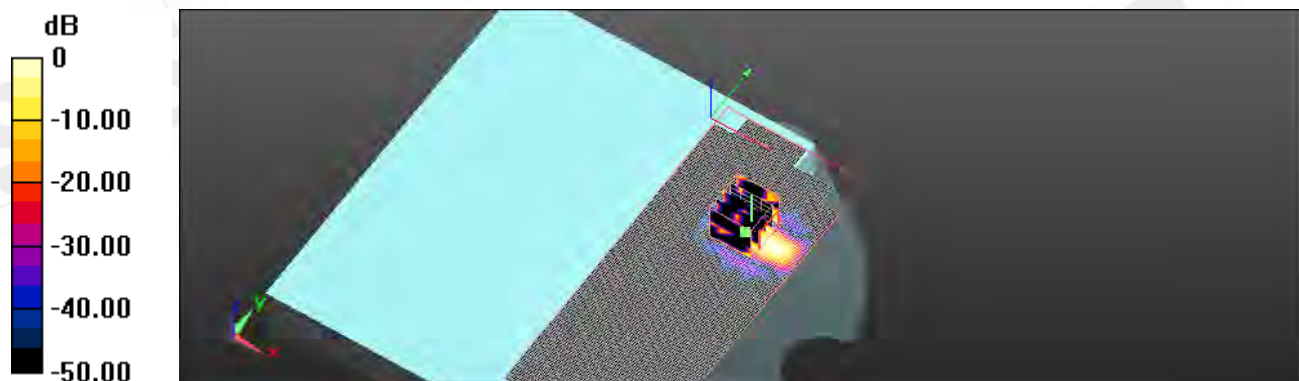
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.689 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.128 W/kg

**SAR(1 g) = 0.028 mW/g; SAR(10 g) = 0.010 mW/g**

Maximum value of SAR (measured) = 0.023 mW/g



0 dB = 0.020mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(20M)5.8G\_CH149\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5745 MHz

Medium parameters used :  $f = 5745$  MHz;  $\sigma = 6.107$  mho/m;  $\epsilon_r = 46.867$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.054 mW/g

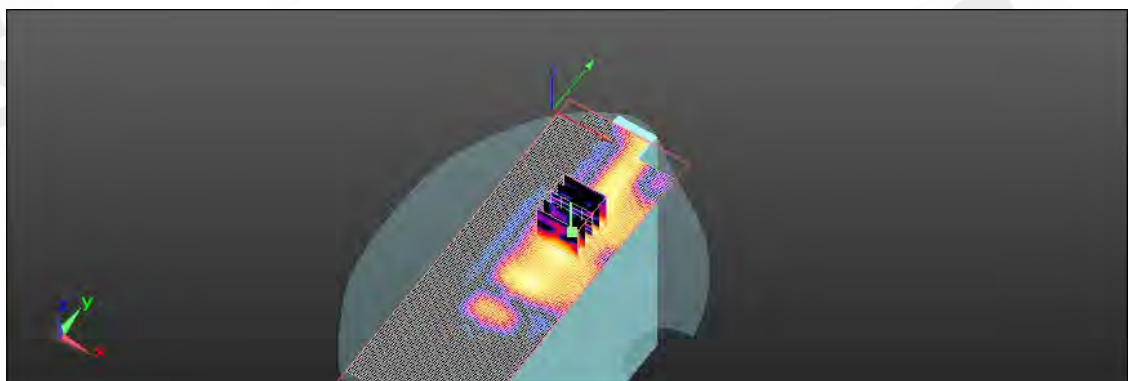
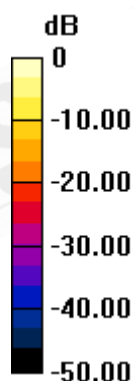
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.213 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 7.823 W/kg

**SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.370 mW/g**

Maximum value of SAR (measured) = 1.385 mW/g



0 dB = 1.390mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(20M)5.8G\_CH157\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5785 MHz

Medium parameters used :  $f = 5785$  MHz;  $\sigma = 6.186$  mho/m;  $\epsilon_r = 46.693$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.981 mW/g

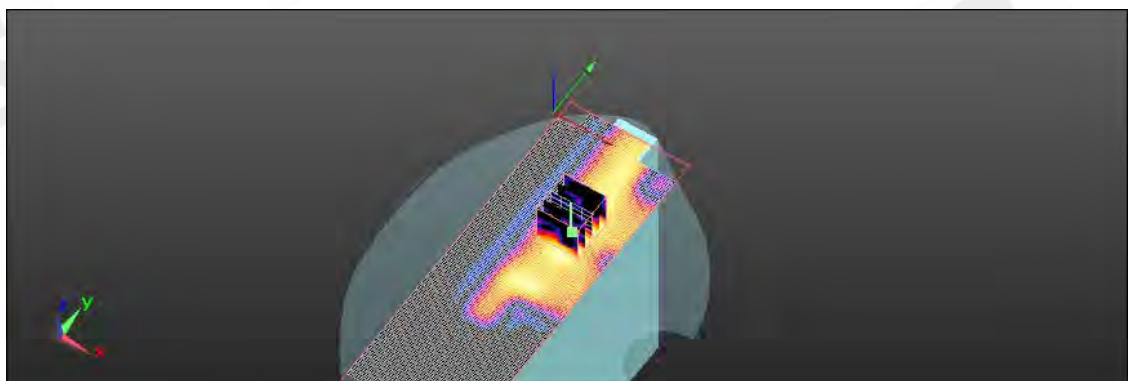
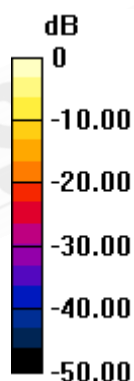
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.256 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 3.190 W/kg

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.293 mW/g**

Maximum value of SAR (measured) = 1.448 mW/g



0 dB = 1.450mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(20M)5.8G\_CH165\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5825 MHz

Medium parameters used :  $f = 5825$  MHz;  $\sigma = 6.234$  mho/m;  $\epsilon_r = 46.518$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.313 mW/g

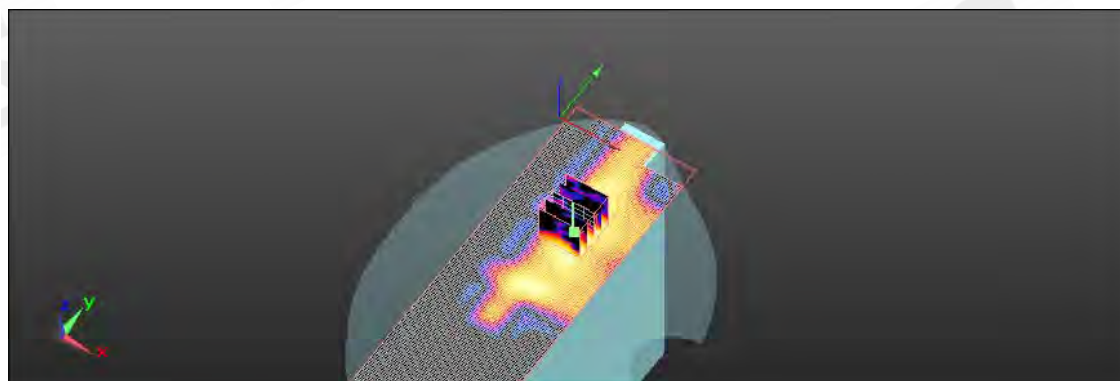
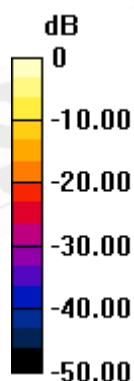
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.863 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.706 W/kg

**SAR(1 g) = 1.20 mW/g; SAR(10 g) = 0.371 mW/g**

Maximum value of SAR (measured) = 1.559 mW/g



0 dB = 1.560mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11 n(40M)5.2G\_CH54\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5270 MHz

Medium parameters used :  $f = 5270$  MHz;  $\sigma = 5.437$  mho/m;  $\epsilon_r = 48.155$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.021 mW/g

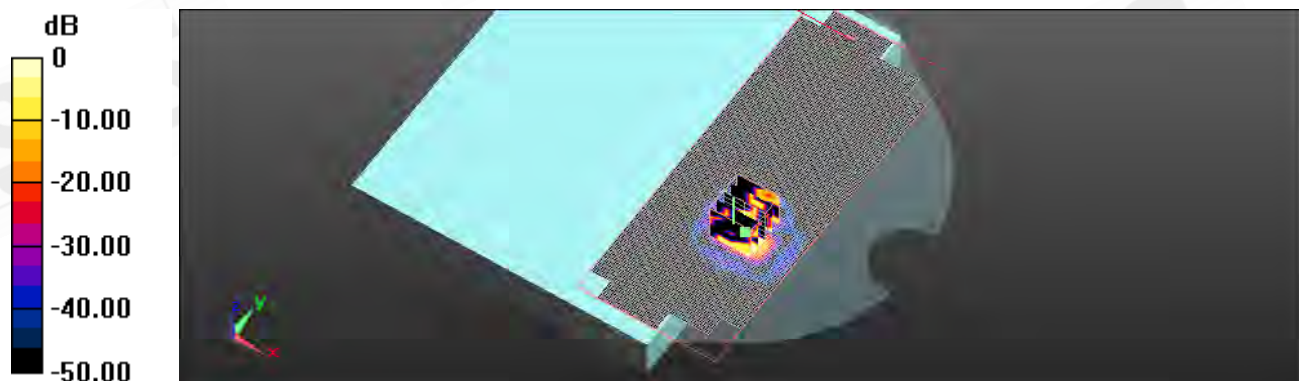
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.6559 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.070 W/kg

**SAR(1 g) = 0.016 mW/g; SAR(10 g) = 0.0057 mW/g**

Maximum value of SAR (measured) = 0.014 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(40M)5.2G\_CH54\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5270 MHz

Medium parameters used :  $f = 5270$  MHz;  $\sigma = 5.437$  mho/m;  $\epsilon_r = 48.155$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.812 mW/g

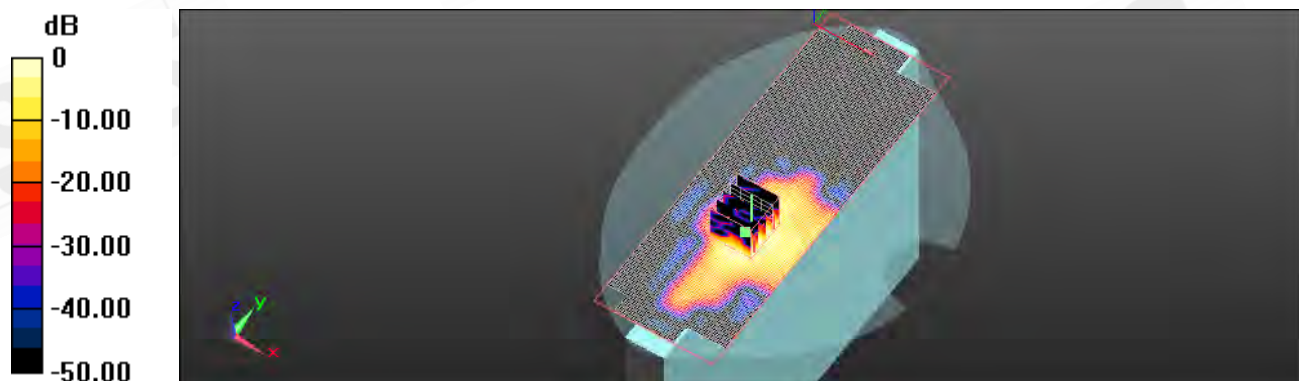
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.151 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 2.680 W/kg

**SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.256 mW/g**

Maximum value of SAR (measured) = 0.871 mW/g



0 dB = 0.870mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11 n(40M)5.2G\_CH54\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5270 MHz

Medium parameters used :  $f = 5270$  MHz;  $\sigma = 5.437$  mho/m;  $\epsilon_r = 48.155$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0217 mW/g

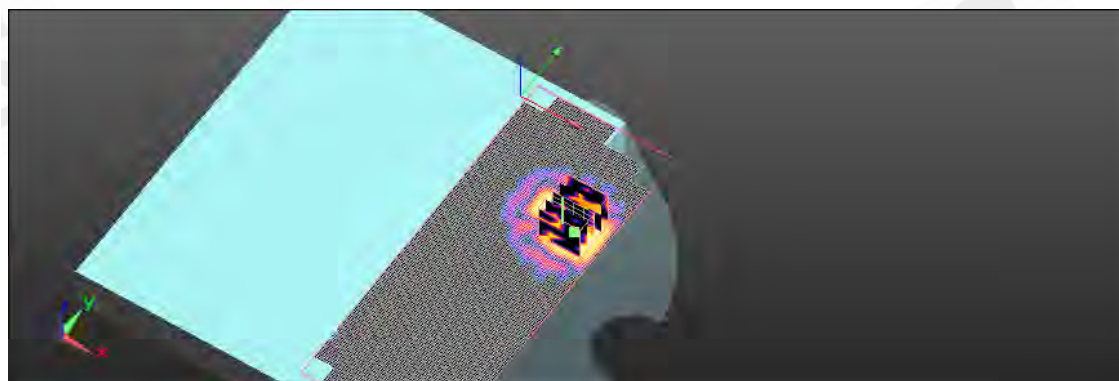
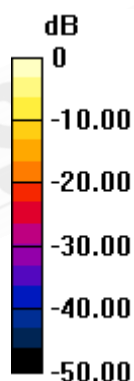
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.954 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.051 W/kg

**SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.00208 mW/g**

Maximum value of SAR (measured) = 0.014 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(40M)5.2G\_CH38\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5190 MHz

Medium parameters used :  $f = 5190$  MHz;  $\sigma = 5.286$  mho/m;  $\epsilon_r = 48.353$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.234 mW/g

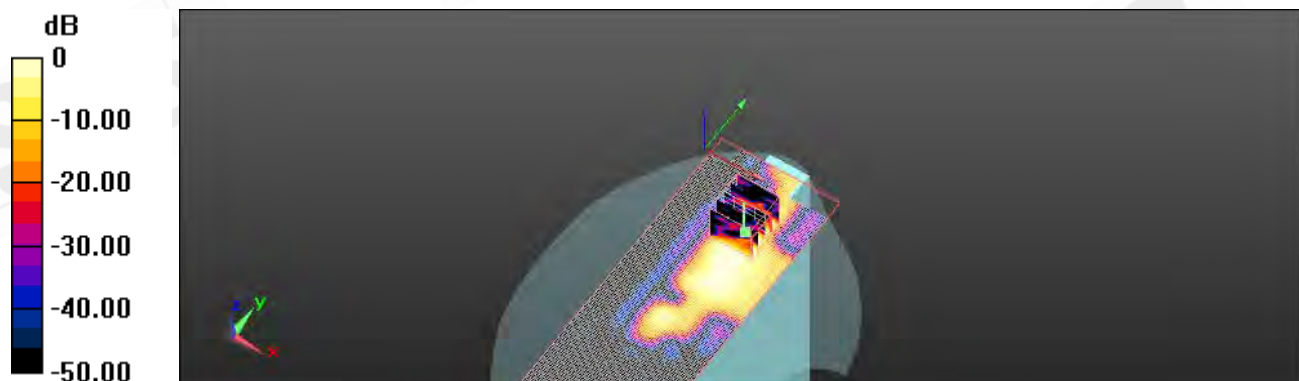
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.255 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.619 W/kg

**SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.065 mW/g**

Maximum value of SAR (measured) = 0.239 mW/g



0 dB = 0.240mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(40M)5.2G\_CH54 Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5270 MHz

Medium parameters used :  $f = 5270$  MHz;  $\sigma = 5.437$  mho/m;  $\epsilon_r = 48.155$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.887 mW/g

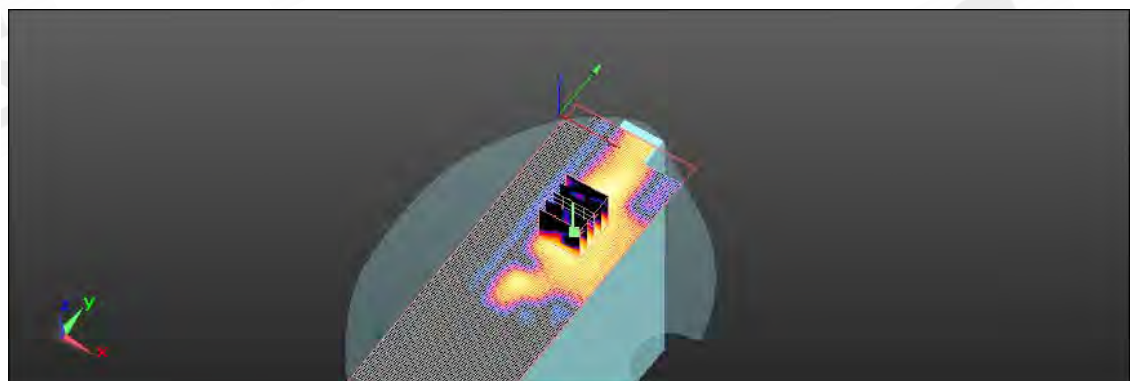
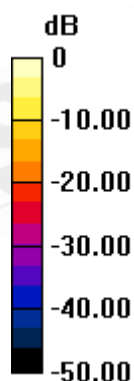
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.063 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 4.305 W/kg

**SAR(1 g) = 0.901 mW/g; SAR(10 g) = 0.233 mW/g**

Maximum value of SAR (measured) = 1.172 mW/g



0 dB = 1.170mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 n(40M)5.2G\_CH62 Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5310 MHz

Medium parameters used :  $f = 5310$  MHz;  $\sigma = 5.509$  mho/m;  $\epsilon_r = 48.067$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.225 mW/g

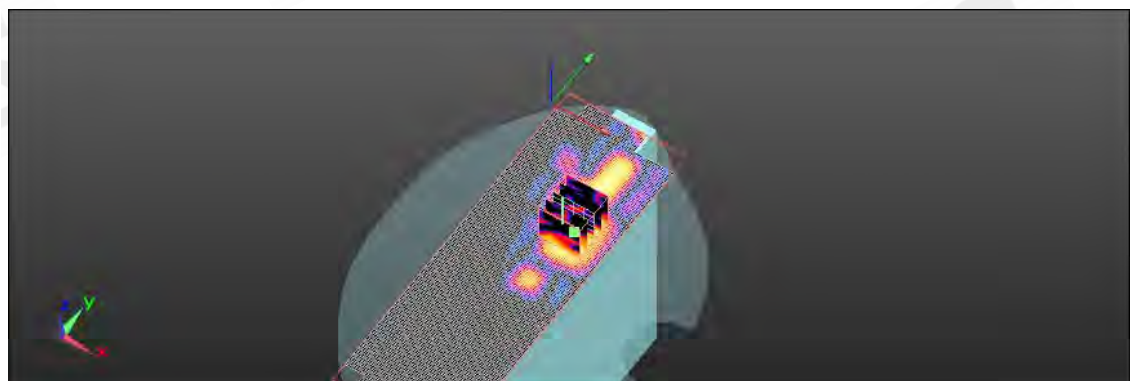
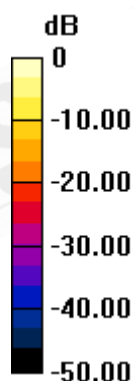
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.373 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.733 W/kg

**SAR(1 g) = 0.228 mW/g; SAR(10 g) = 0.063 mW/g**

Maximum value of SAR (measured) = 0.333 mW/g



0 dB = 0.330mW/g

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Date: 3/2/2011

## Configuration 2\_WLAN802.11 n(40M)5.5G\_CH118\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5590 MHz

Medium parameters used :  $f = 5590$  MHz;  $\sigma = 5.903$  mho/m;  $\epsilon_r = 47.426$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0208 mW/g

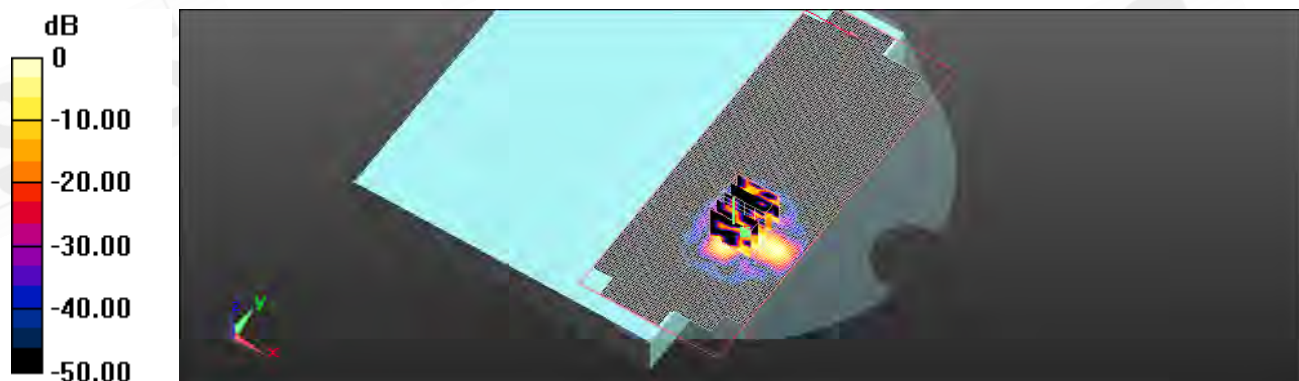
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.6559 V/m; Power Drift = 0.203 dB

Peak SAR (extrapolated) = 0.19 W/kg

**SAR(1 g) = 0.023 mW/g ; SAR(10 g) = 0.0076 mW/g**

Maximum value of SAR (measured) = 0.00564 mW/g



0 dB = 0.0036mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(40M)5.5G\_CH118\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5590 MHz

Medium parameters used :  $f = 5590$  MHz;  $\sigma = 5.903$  mho/m;  $\epsilon_r = 47.426$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.579 mW/g

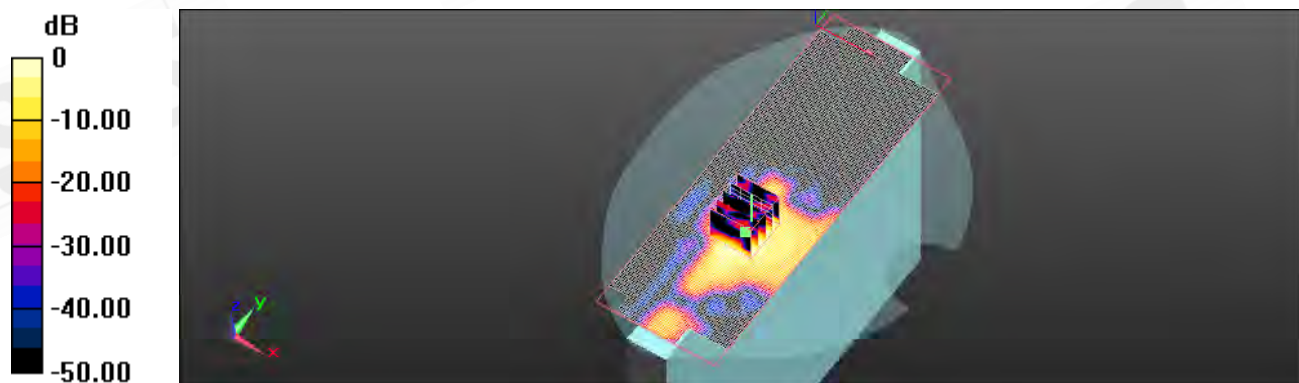
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.302 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 3.438 W/kg

**SAR(1 g) = 0.393 mW/g; SAR(10 g) = 0.194 mW/g**

Maximum value of SAR (measured) = 0.510 mW/g



0 dB = 0.510mW/g

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Date: 3/2/2011

## Configuration 2\_WLAN802.11 n(40M)5.5G\_CH118\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5590 MHz

Medium parameters used :  $f = 5590$  MHz;  $\sigma = 5.903$  mho/m;  $\epsilon_r = 47.426$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.00928 mW/g

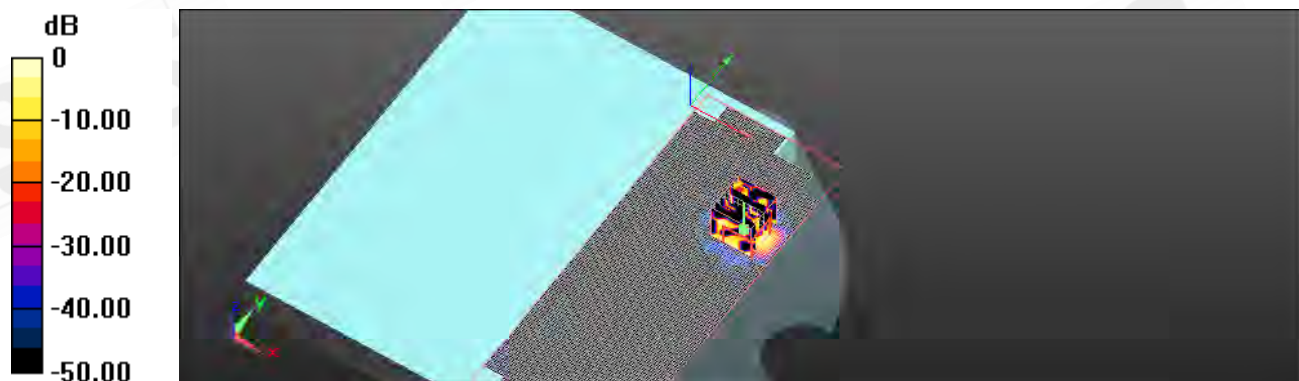
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.819 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 0.052 W/kg

**SAR(1 g) = 0.00867 mW/g; SAR(10 g) = 0.00215 mW/g**

Maximum value of SAR (measured) = 0.010 mW/g



0 dB = 0.010mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(40M)5.5G\_CH102 Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5510 MHz

Medium parameters used :  $f = 5510$  MHz;  $\sigma = 5.771$  mho/m;  $\epsilon_r = 47.584$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.533 mW/g

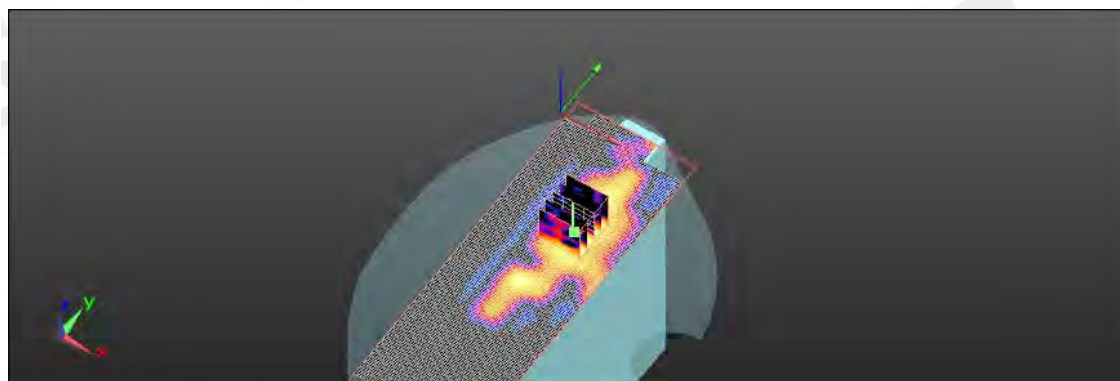
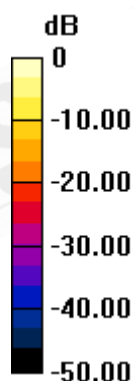
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.784 V/m; Power Drift = 0.0015 dB

Peak SAR (extrapolated) = 1.462 W/kg

**SAR(1 g) = 0.472 mW/g; SAR(10 g) = 0.130 mW/g**

Maximum value of SAR (measured) = 0.722 mW/g



0 dB = 0.720mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(40M)5.5G\_CH118\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5590 MHz

Medium parameters used :  $f = 5590$  MHz;  $\sigma = 5.903$  mho/m;  $\epsilon_r = 47.426$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.284 mW/g

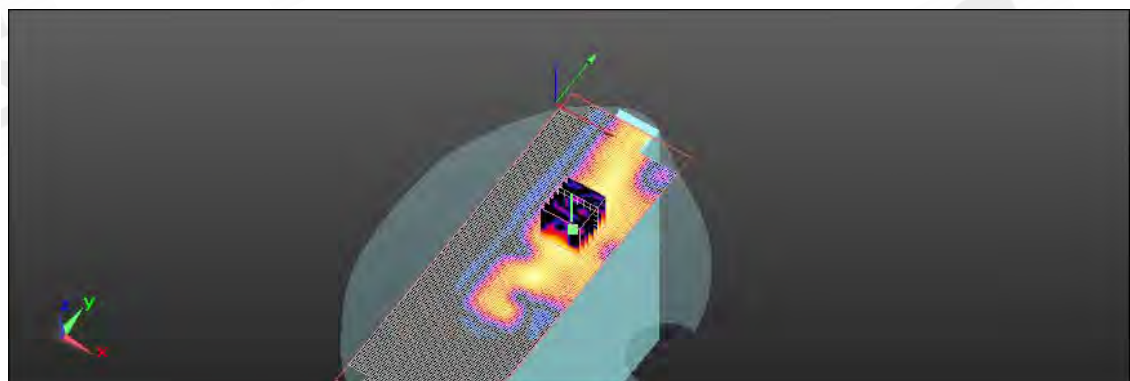
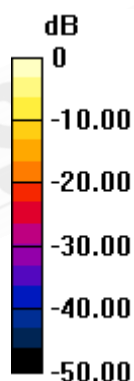
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.845 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 4.178 W/kg

**SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.353 mW/g**

Maximum value of SAR (measured) = 1.788 mW/g



0 dB = 1.790mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 n(40M)5.5G\_CH134 Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5670 MHz

Medium parameters used :  $f = 5670$  MHz;  $\sigma = 6.019$  mho/m;  $\epsilon_r = 46.988$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.186 mW/g

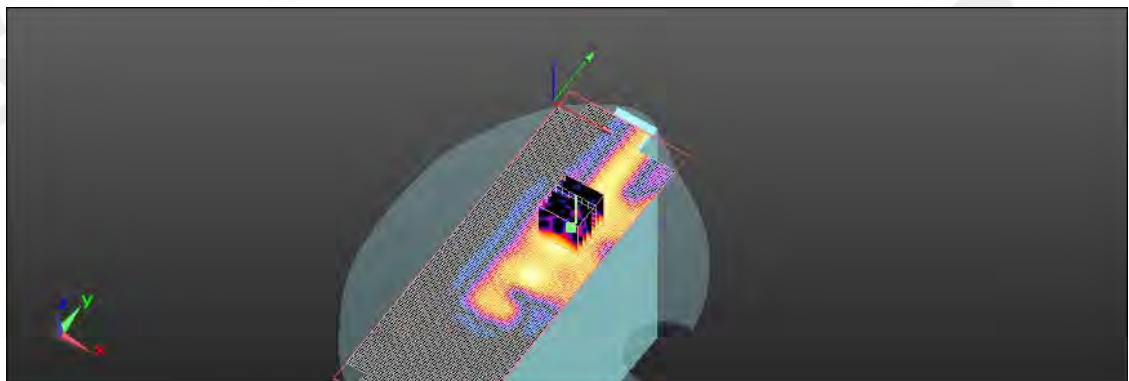
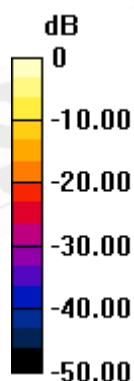
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.413 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 3.437 W/kg

**SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.280 mW/g**

Maximum value of SAR (measured) = 1.303 mW/g



0 dB = 1.300mW/g

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Date: 3/5/2011

## Configuration 2\_WLAN802.11 n(40M)5.8G\_CH159\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5795 MHz

Medium parameters used :  $f = 5795$  MHz;  $\sigma = 6.201$  mho/m;  $\epsilon_r = 46.665$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.00677 mW/g

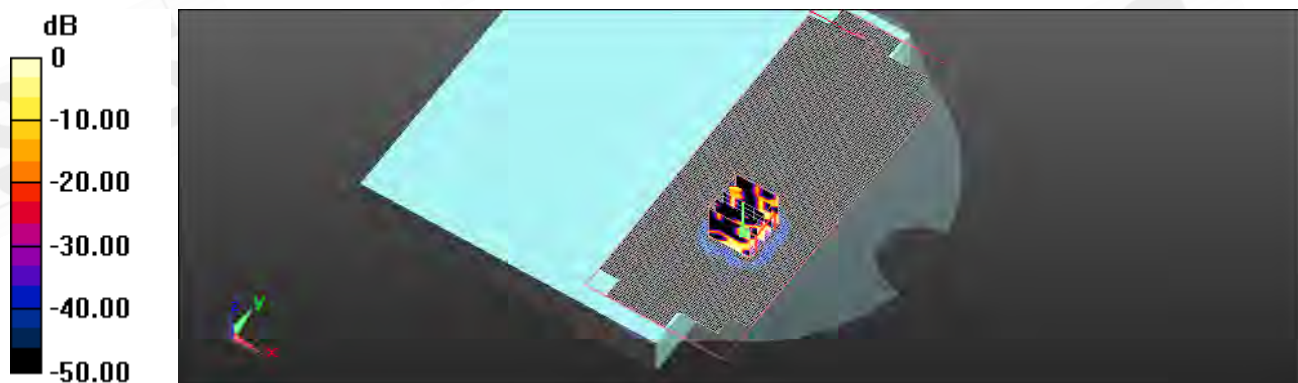
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.352 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.028 W/kg

**SAR(1 g) = 0.00461 mW/g; SAR(10 g) = 0.00109 mW/g**

Maximum value of SAR (measured) = 0.00819 mW/g



0 dB = 0.0082mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(40M)5.8G\_CH151\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5755 MHz

Medium parameters used :  $f = 5755$  MHz;  $\sigma = 6.125$  mho/m;  $\epsilon_r = 46.806$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.058 mW/g

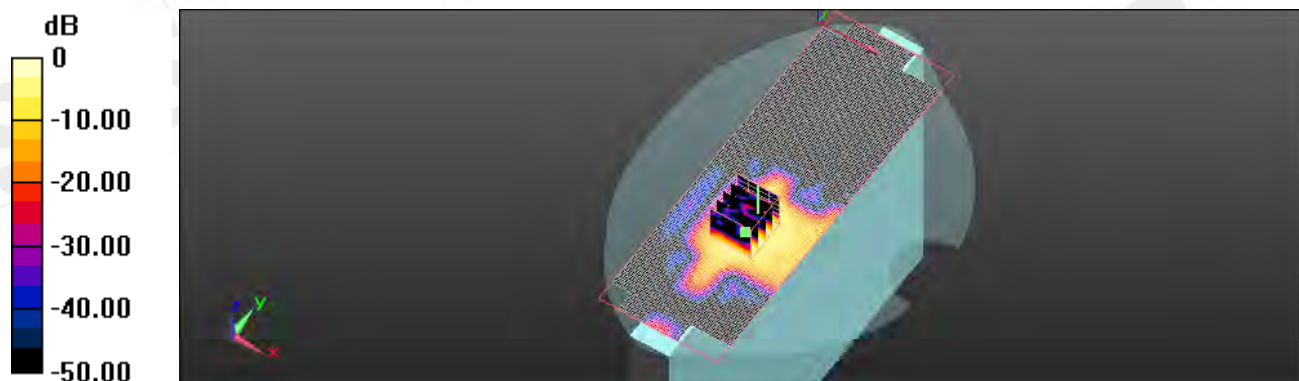
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.787 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 7.566 W/kg

**SAR(1 g) = 0.816 mW/g; SAR(10 g) = 0.271 mW/g**

Maximum value of SAR (measured) = 1.388 mW/g



0 dB = 1.390mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(40M)5.8G\_CH159\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5795 MHz

Medium parameters used :  $f = 5795$  MHz;  $\sigma = 6.201$  mho/m;  $\epsilon_r = 46.665$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.058 mW/g

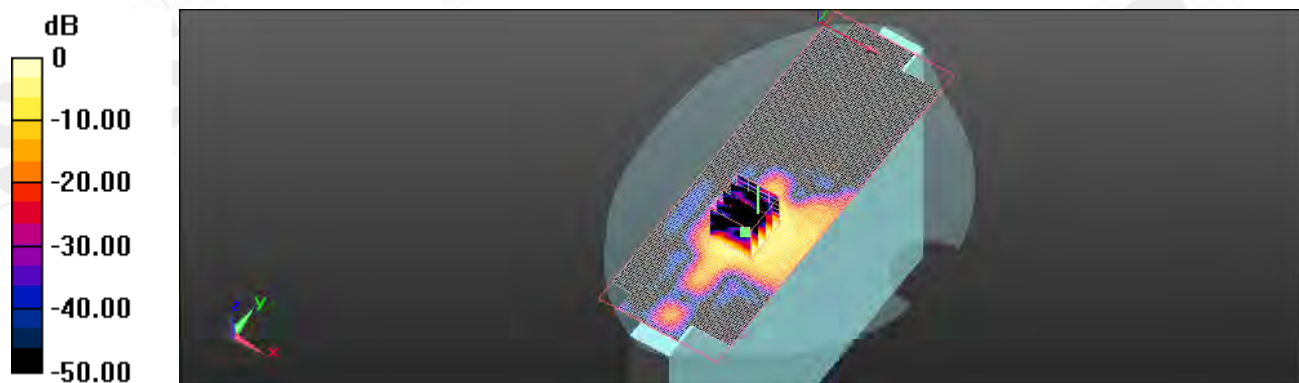
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.829 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 4.560 W/kg

**SAR(1 g) = 0.814 mW/g; SAR(10 g) = 0.263 mW/g**

Maximum value of SAR (measured) = 1.438 mW/g



0 dB = 1.440mW/g

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Date: 3/5/2011

## Configuration 2\_WLAN802.11 n(40M)5.8G\_CH159\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5795 MHz

Medium parameters used :  $f = 5795$  MHz;  $\sigma = 6.201$  mho/m;  $\epsilon_r = 46.665$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.0296 mW/g

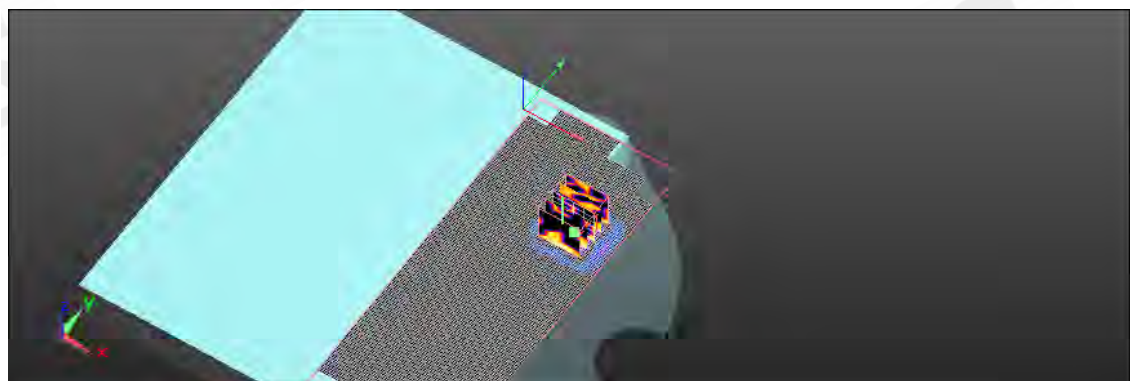
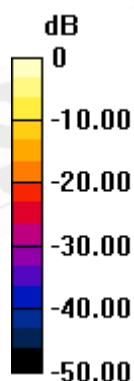
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.762 V/m; Power Drift = 0.141 dB

Peak SAR (extrapolated) = 0.119 W/kg

**SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.00923 mW/g**

Maximum value of SAR (measured) = 0.020 mW/g



0 dB = 0.020mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(40M)5.8G\_CH151\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5755 MHz

Medium parameters used :  $f = 5755$  MHz;  $\sigma = 6.125$  mho/m;  $\epsilon_r = 46.806$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.253 mW/g

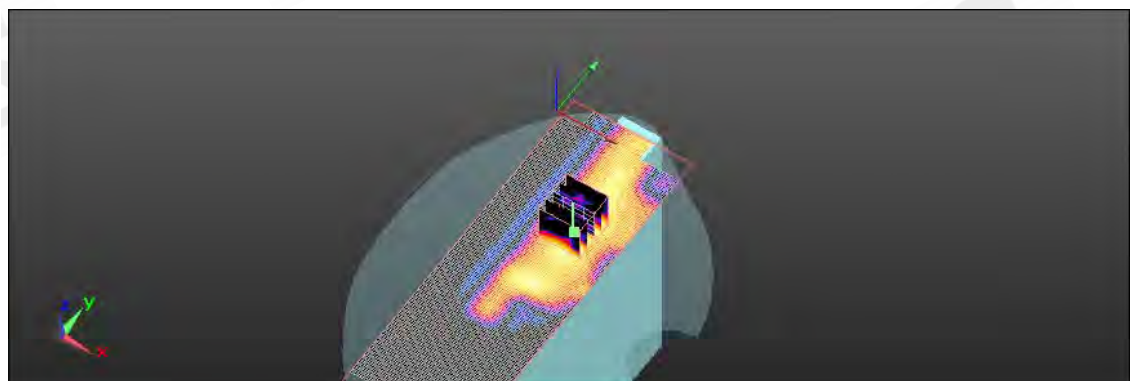
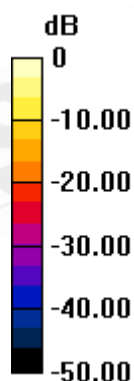
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.268 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 6.122 W/kg

**SAR(1 g) = 1.19 mW/g; SAR(10 g) = 0.346 mW/g**

Maximum value of SAR (measured) = 1.562 mW/g



0 dB = 1.560mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 n(40M)5.8G\_CH159\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5795 MHz

Medium parameters used :  $f = 5795$  MHz;  $\sigma = 6.201$  mho/m;  $\epsilon_r = 46.665$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.172 mW/g

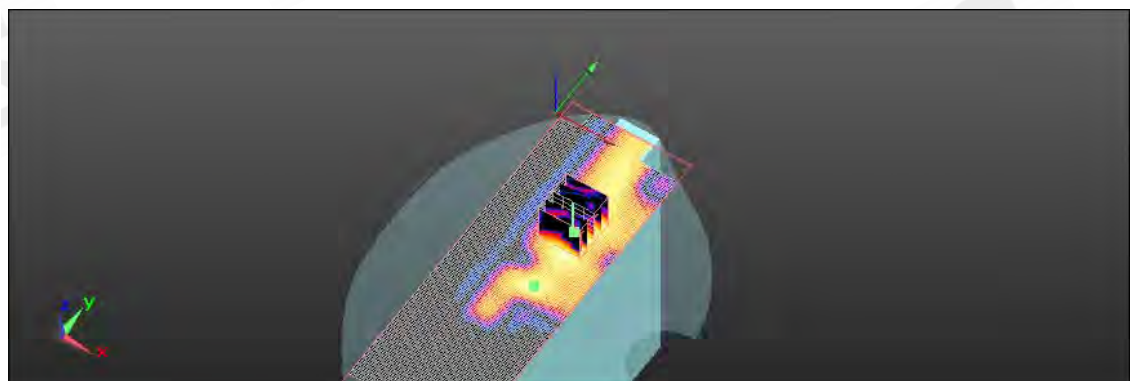
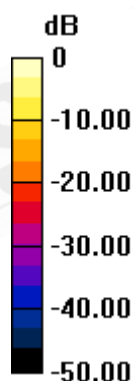
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.319 V/m; Power Drift = 0.22 dB

Peak SAR (extrapolated) = 3.660 W/kg

**SAR(1 g) = 1.17 mW/g; SAR(10 g) = 0.347 mW/g**

Maximum value of SAR (measured) = 1.687 mW/g



0 dB = 1.690mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11a 5.2G\_CH36\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5180 MHz

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.273$  mho/m;  $\epsilon_r = 48.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.030 mW/g

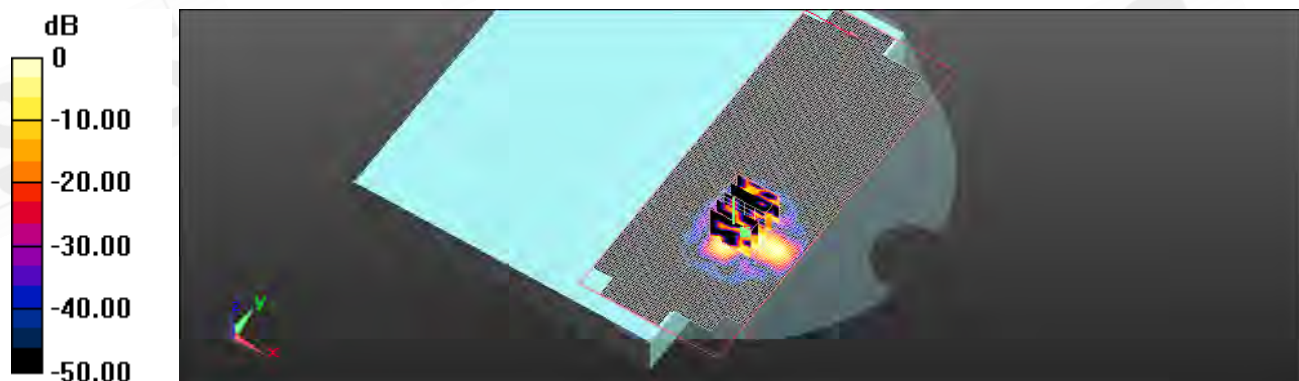
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.956 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.107 W/kg

**SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.00895 mW/g**

Maximum value of SAR (measured) = 0.021 mW/g



0 dB = 0.020mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 a 5.2G\_CH36\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5180 MHz

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.273$  mho/m;  $\epsilon_r = 48.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.736 mW/g

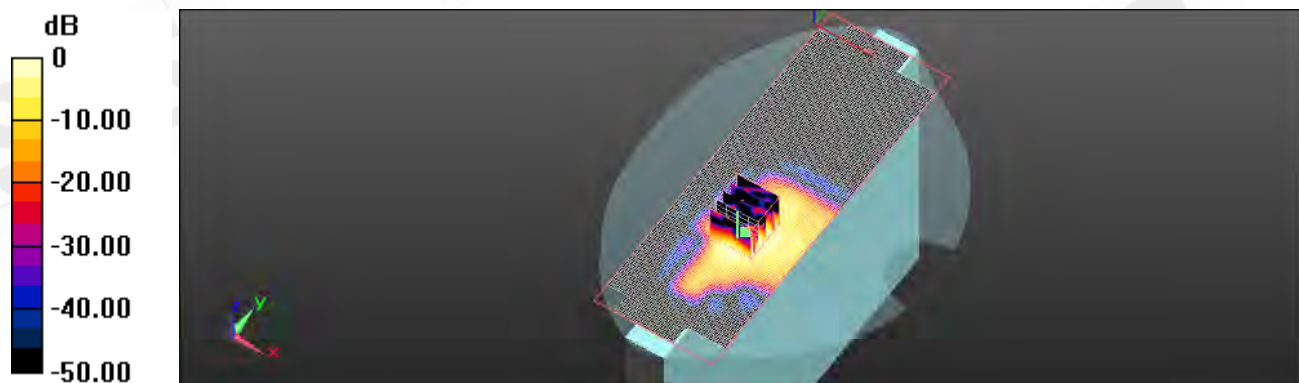
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.025 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.741 W/kg

**SAR(1 g) = 0.492 mW/g; SAR(10 g) = 0.168 mW/g**

Maximum value of SAR (measured) = 0.608 mW/g



0 dB = 0.610mW/g

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Date: 3/1/2011

## Configuration 2\_WLAN802.11a 5.2G\_CH52\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5260 MHz

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.422$  mho/m;  $\epsilon_r = 48.196$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.017 mW/g

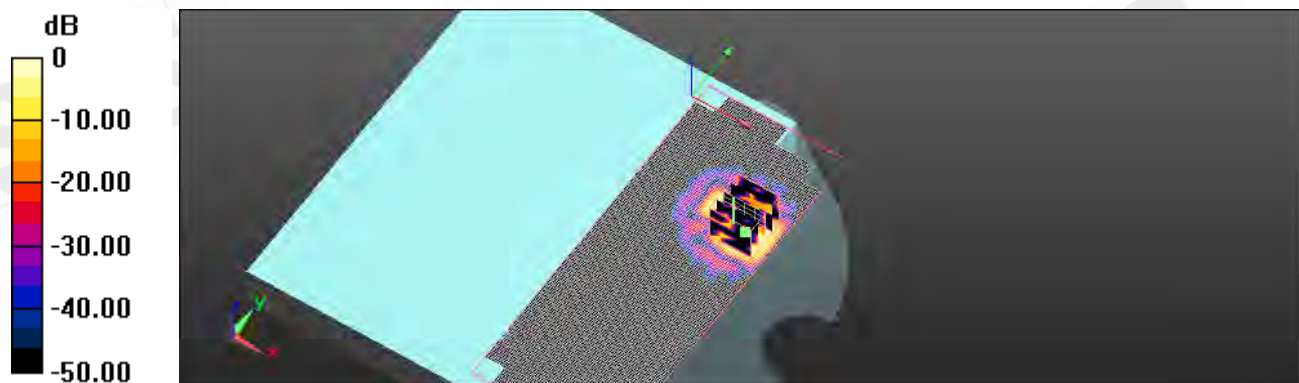
**Configuration/Body/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 0.901 V/m; Power Drift = -0.143 dB

Peak SAR (extrapolated) = 0.080 W/kg

**SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00759 mW/g**

Maximum value of SAR (measured) = 0.015 mW/g



0 dB = 0.010mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 a 5.2G\_CH36\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5180 MHz

Medium parameters used:  $f = 5180$  MHz;  $\sigma = 5.273$  mho/m;  $\epsilon_r = 48.384$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.402 mW/g

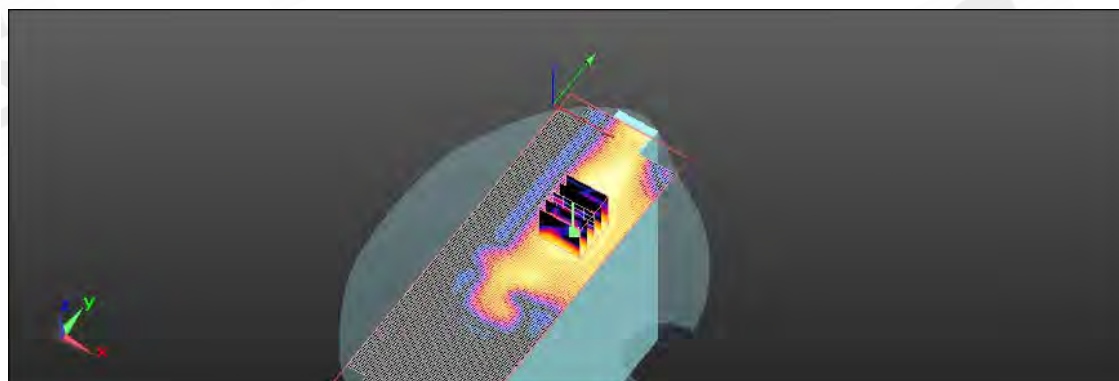
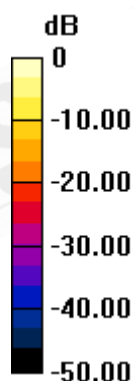
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.364 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 3.276 W/kg

**SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.369 mW/g**

Maximum value of SAR (measured) = 1.401 mW/g



0 dB = 1.400mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 a 5.2G\_CH52\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5260 MHz

Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.422$  mho/m;  $\epsilon_r = 48.196$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.018 mW/g

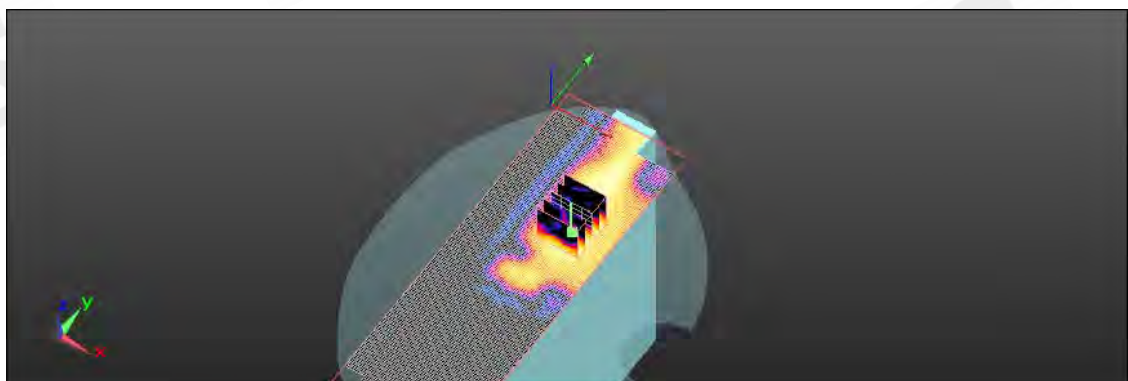
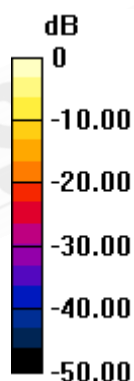
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.560 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 7.540 W/kg

**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.326 mW/g**

Maximum value of SAR (measured) = 1.043 mW/g



0 dB = 1.040mW/g

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Date: 3/1/2011

## Configuration 6\_WLAN802.11 a 5.2G\_CH64\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5320 MHz

Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.529$  mho/m;  $\epsilon_r = 48.047$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.73, 3.73, 3.73); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.863 mW/g

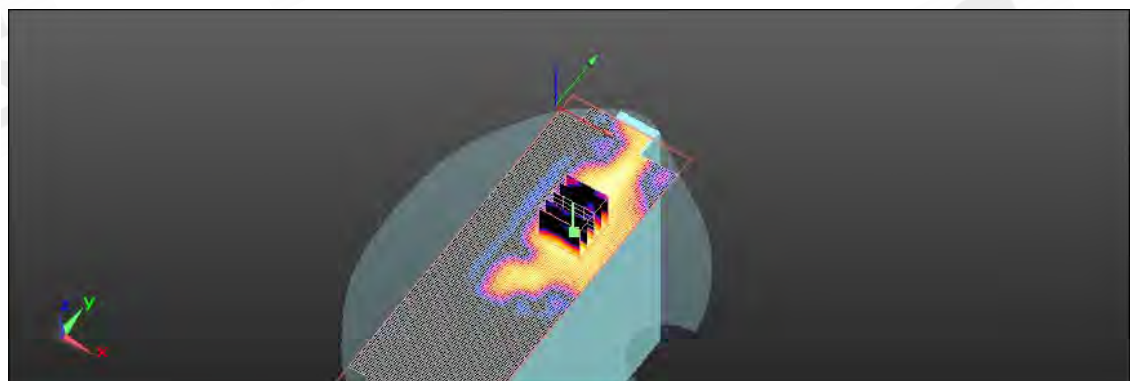
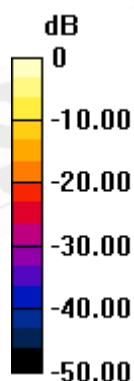
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 4.733 V/m; Power Drift = 0.21 dB

Peak SAR (extrapolated) = 2.302 W/kg

**SAR(1 g) = 0.798 mW/g; SAR(10 g) = 0.235 mW/g**

Maximum value of SAR (measured) = 1.136 mW/g



0 dB = 1.140mW/g

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Date: 3/2/2011

## Configuration 2\_WLAN802.11a 5.5G\_CH100\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5500 MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.757$  mho/m;  $\epsilon_r = 47.595$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.057 mW/g

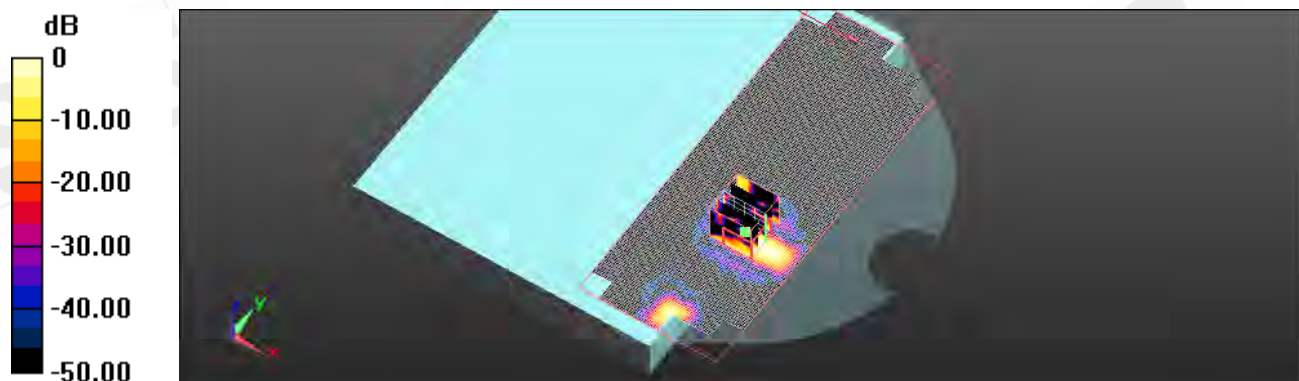
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.699 V/m; Power Drift = 0.162 dB

Peak SAR (extrapolated) = 0.179 W/kg

**SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.013 mW/g**

Maximum value of SAR (measured) = 0.030 mW/g



0 dB = 0.030mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH100\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5500 MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.757$  mho/m;  $\epsilon_r = 47.595$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.059 mW/g

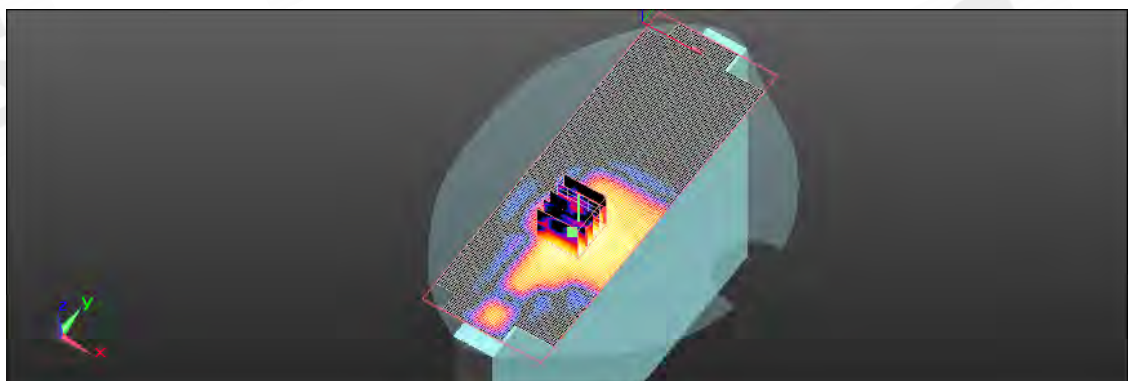
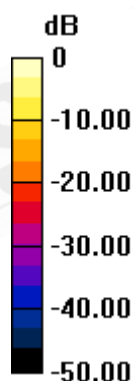
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 3.045 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 3.377 W/kg

**SAR(1 g) = 0.821 mW/g; SAR(10 g) = 0.259 mW/g**

Maximum value of SAR (measured) = 0.972 mW/g



0 dB = 0.970mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH116\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5580 MHz

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.896$  mho/m;  $\epsilon_r = 47.456$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.608 mW/g

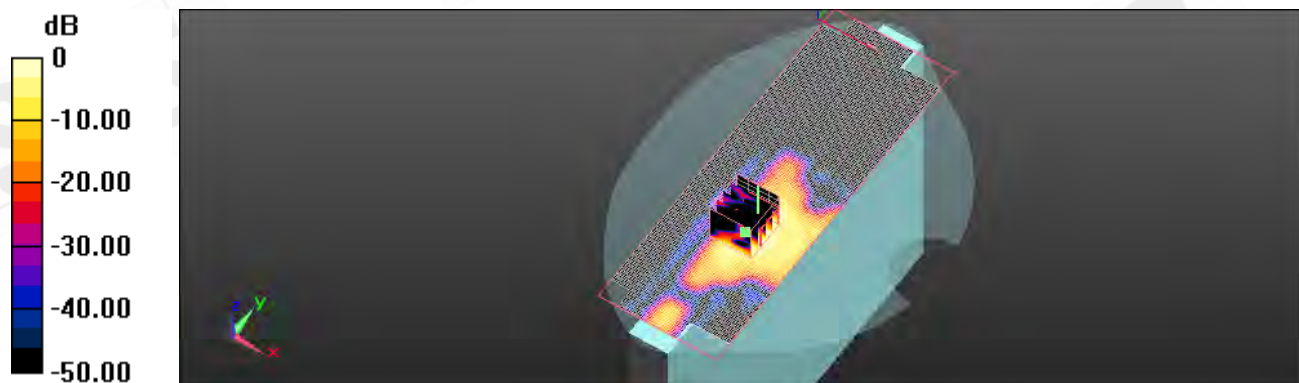
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.524 V/m; Power Drift = -0.031 dB

Peak SAR (extrapolated) = 1.585 W/kg

**SAR(1 g) = 0.413 mW/g; SAR(10 g) = 0.149 mW/g**

Maximum value of SAR (measured) = 0.661 mW/g



0 dB = 0.660mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH120\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5600 MHz

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.911$  mho/m;  $\epsilon_r = 47.396$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.636 mW/g

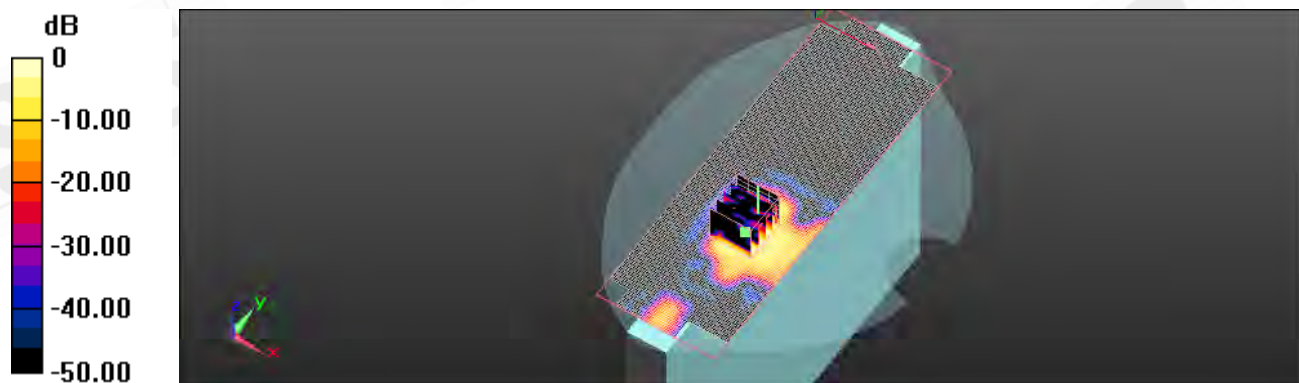
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.199 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.511 W/kg

**SAR(1 g) = 0.391 mW/g; SAR(10 g) = 0.135 mW/g**

Maximum value of SAR (measured) = 0.723 mW/g



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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH140\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5700 MHz

Medium parameters used:  $f = 5700$  MHz;  $\sigma = 6.059$  mho/m;  $\epsilon_r = 46.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.903 mW/g

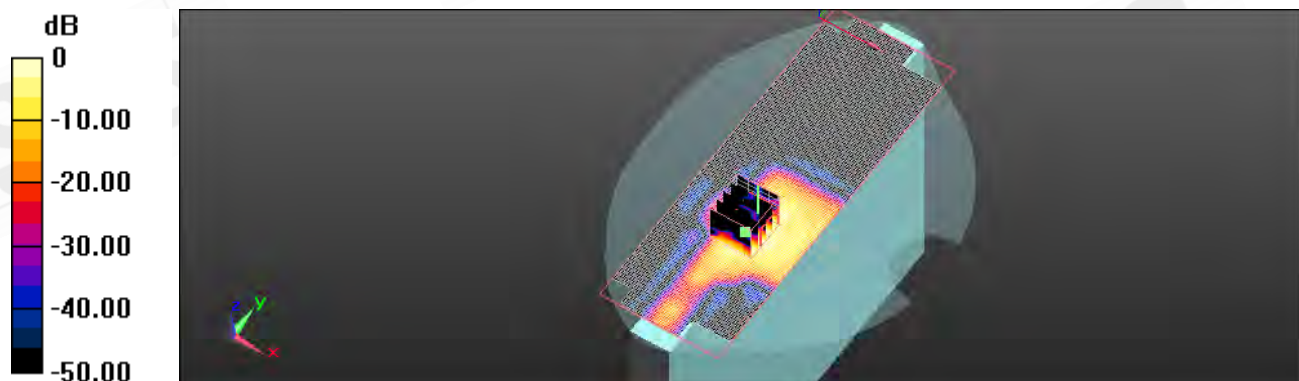
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.558 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 3.739 W/kg

**SAR(1 g) = 0.696 mW/g; SAR(10 g) = 0.255 mW/g**

Maximum value of SAR (measured) = 1.046 mW/g



0 dB = 1.050mW/g

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Date: 3/2/2011

## Configuration 2\_WLAN802.11a 5.5G\_CH120\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5600 MHz

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.911$  mho/m;  $\epsilon_r = 47.396$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.031 mW/g

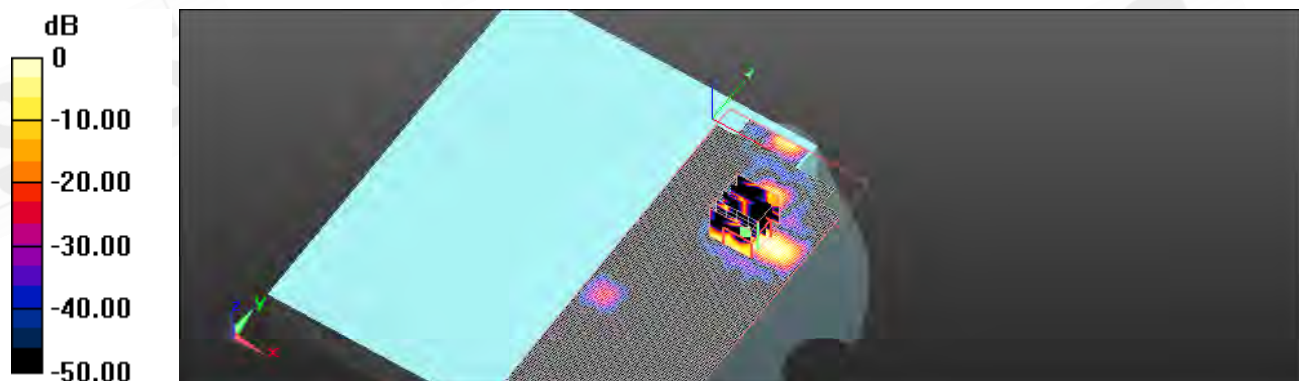
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 1.000 V/m; Power Drift = 0.111 dB

Peak SAR (extrapolated) = 0.110 W/kg

**SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.00737 mW/g**

Maximum value of SAR (measured) = 0.020 mW/g



0 dB = 0.020mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH100\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5500 MHz

Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.757$  mho/m;  $\epsilon_r = 47.595$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.610 mW/g

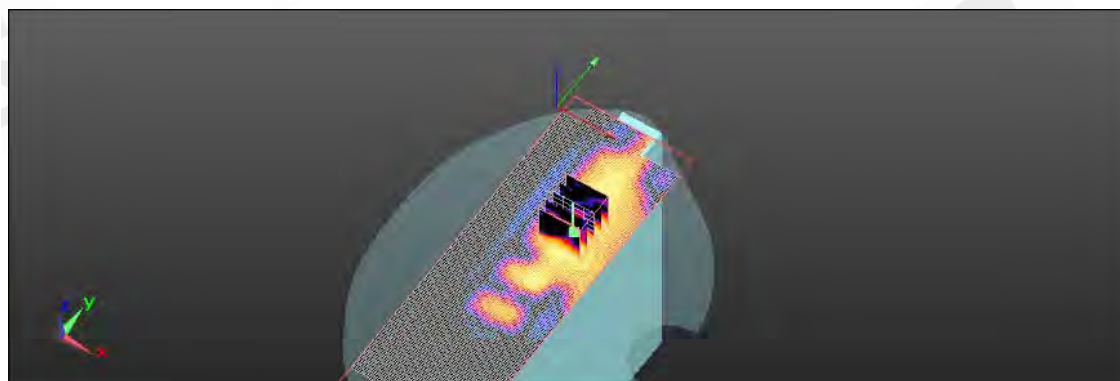
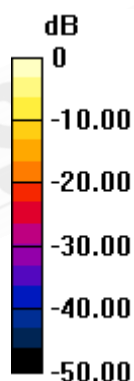
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.006 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 2.062 W/kg

**SAR(1 g) = 0.703 mW/g; SAR(10 g) = 0.205 mW/g**

Maximum value of SAR (measured) = 1.000 mW/g



0 dB = 1.000mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH116\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5580 MHz

Medium parameters used:  $f = 5580$  MHz;  $\sigma = 5.896$  mho/m;  $\epsilon_r = 47.456$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.931 mW/g

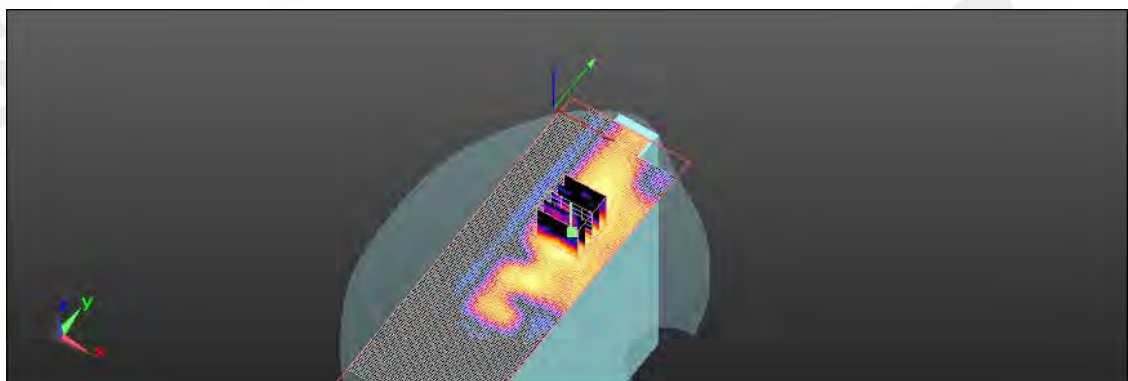
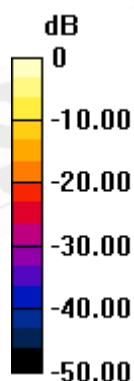
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.655 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 3.356 W/kg

**SAR(1 g) = 0.832 mW/g; SAR(10 g) = 0.328 mW/g**

Maximum value of SAR (measured) = 1.005 mW/g



0 dB = 1.005mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH120\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5600 MHz

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.911$  mho/m;  $\epsilon_r = 47.396$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.946 mW/g

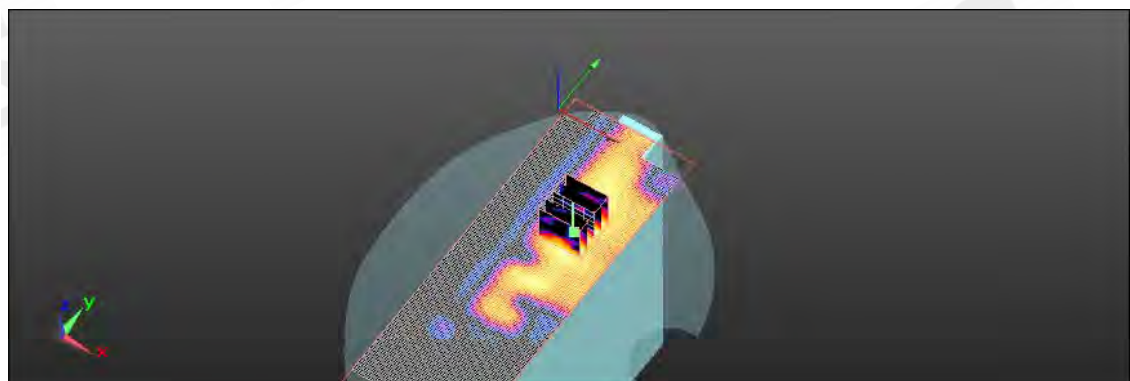
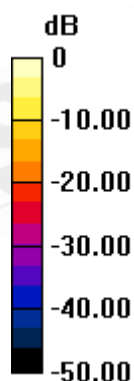
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.978 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 8.188 W/kg

**SAR(1 g) = 0.846 mW/g; SAR(10 g) = 0.350 mW/g**

Maximum value of SAR (measured) = 1.314 mW/g



0 dB = 1.314mW/g

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Date: 3/2/2011

## Configuration 6\_WLAN802.11 a 5.5G\_CH140\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5700 MHz

Medium parameters used:  $f = 5700$  MHz;  $\sigma = 6.059$  mho/m;  $\epsilon_r = 46.989$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.896 mW/g

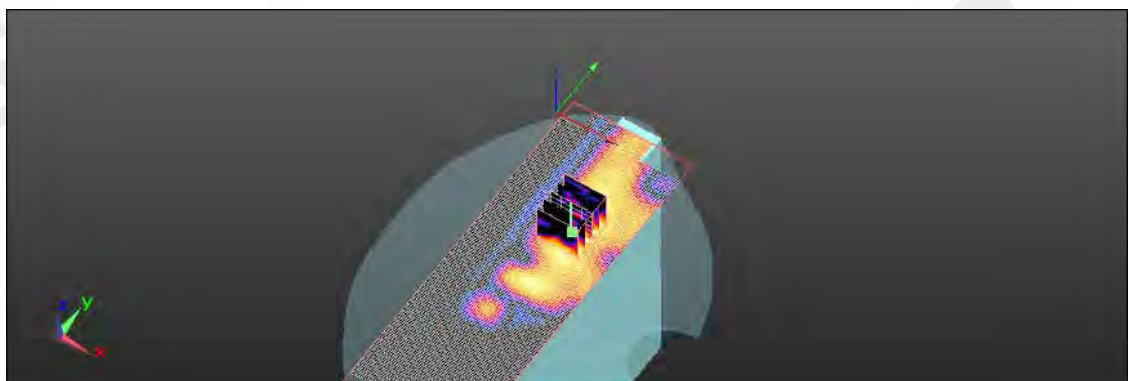
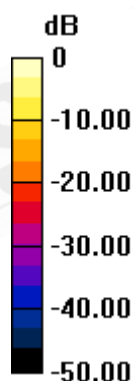
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.202 V/m; Power Drift = 0.104 dB

Peak SAR (extrapolated) = 4.697 W/kg

**SAR(1 g) = 0.928 mW/g; SAR(10 g) = 0.253 mW/g**

Maximum value of SAR (measured) = 1.085 mW/g



0 dB = 1.080mW/g

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Date: 3/5/2011

## Configuration 2\_WLAN802.11 a 5.8G\_CH149\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5745 MHz

Medium parameters used :  $f = 5745$  MHz;  $\sigma = 6.107$  mho/m;  $\epsilon_r = 46.867$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.014 mW/g

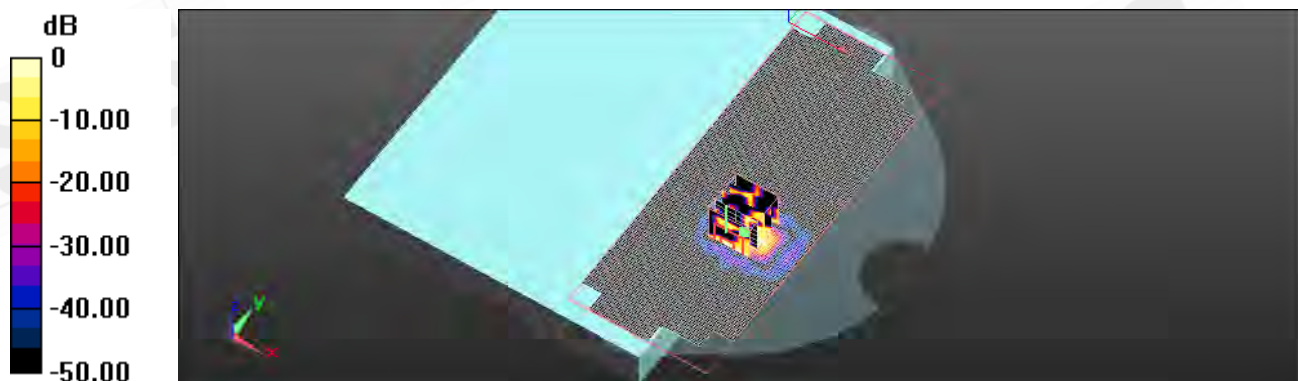
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.764 V/m; Power Drift = -0.158 dB

Peak SAR (extrapolated) = 0.065 W/kg

**SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00378 mW/g**

Maximum value of SAR (measured) = 0.013 mW/g



0 dB = 0.010mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 a 5.8G\_CH149\_Main antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5745 MHz

Medium parameters used :  $f = 5745$  MHz;  $\sigma = 6.107$  mho/m;  $\epsilon_r = 46.867$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.961 mW/g

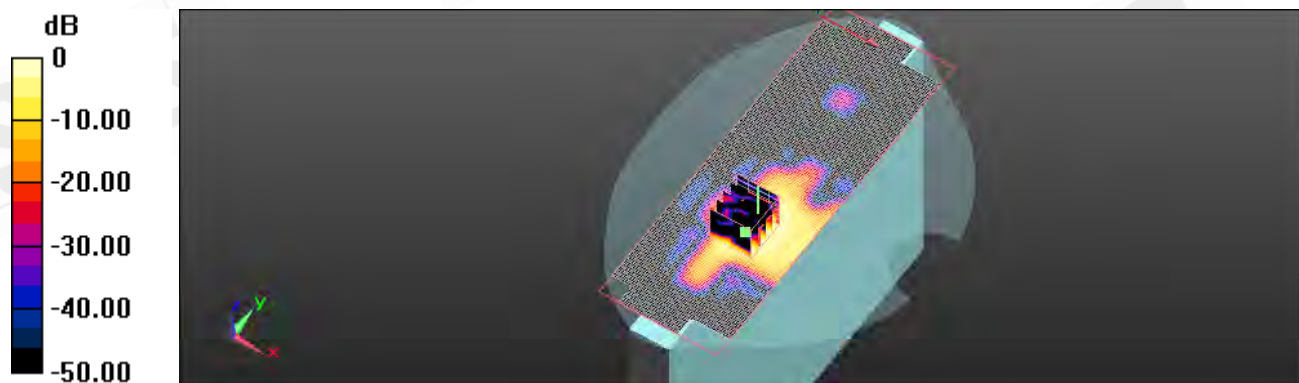
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 2.553 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 2.141 W/kg

**SAR(1 g) = 0.712 mW/g; SAR(10 g) = 0.256 mW/g**

Maximum value of SAR (measured) = 0.997 mW/g



0 dB = 1.000mW/g

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Date: 3/5/2011

## Configuration 2\_WLAN802.11 a 5.8G\_CH165\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5825 MHz

Medium parameters used :  $f = 5825$  MHz;  $\sigma = 6.234$  mho/m;  $\epsilon_r = 46.518$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (71x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.011 mW/g

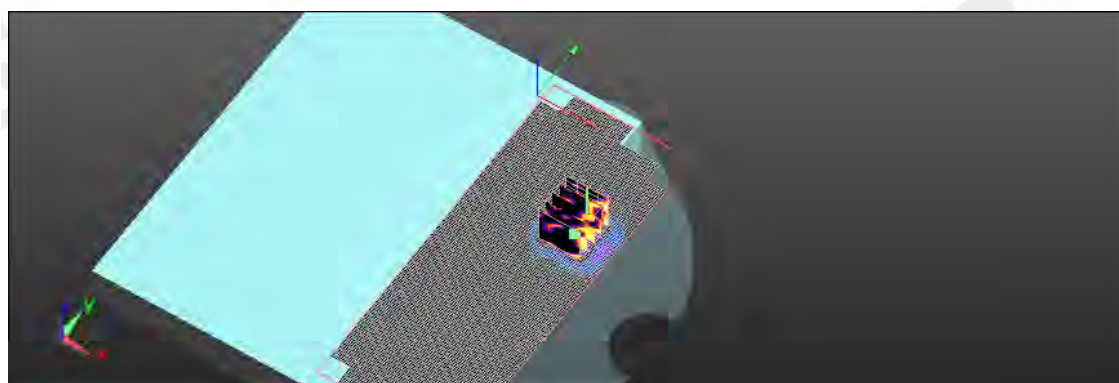
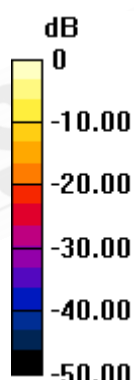
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.898 V/m; Power Drift = -0.126 dB

Peak SAR (extrapolated) = 0.064 W/kg

**SAR(1 g) = 0.012 mW/g; SAR(10 g) = 0.00264 mW/g**

Maximum value of SAR (measured) = 0.010 mW/g



0 dB = 0.010mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 a 5.8G\_CH149\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5745 MHz

Medium parameters used :  $f = 5745$  MHz;  $\sigma = 6.107$  mho/m;  $\epsilon_r = 46.867$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.423 mW/g

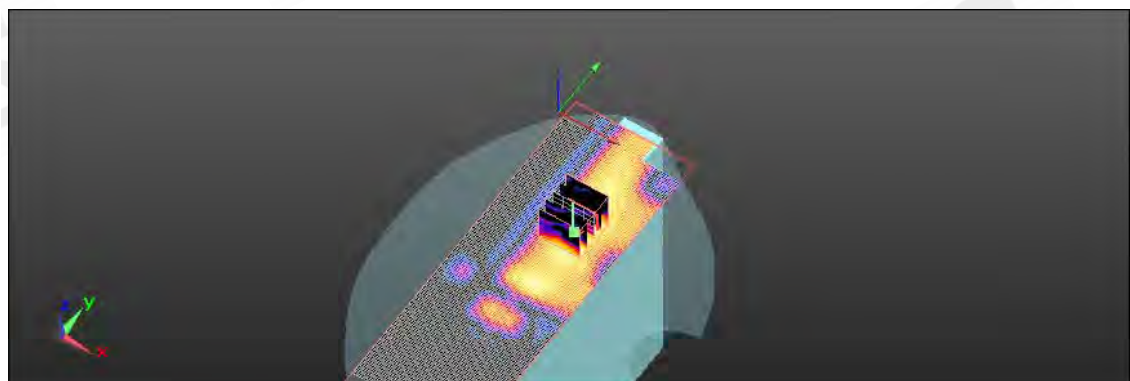
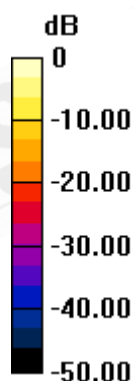
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.799 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 8.440 W/kg

**SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.372 mW/g**

Maximum value of SAR (measured) = 1.255 mW/g



0 dB = 1.255mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 a 5.8G\_CH157\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5785 MHz

Medium parameters used :  $f = 5785$  MHz;  $\sigma = 6.186$  mho/m;  $\epsilon_r = 46.693$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.850 mW/g

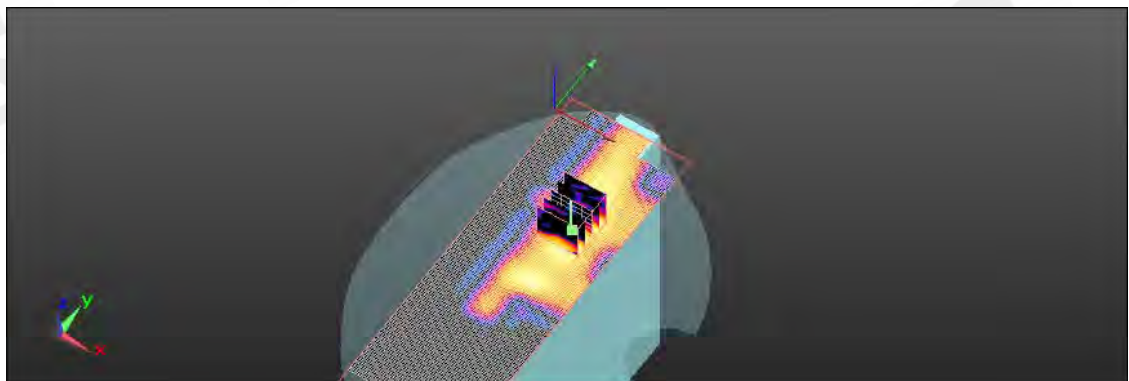
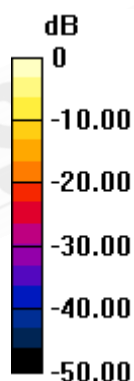
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.093 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 3.379 W/kg

**SAR(1 g) = 0.990 mW/g; SAR(10 g) = 0.288 mW/g**

Maximum value of SAR (measured) = 1.347 mW/g



0 dB = 1.350mW/g

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Date: 3/5/2011

## Configuration 6\_WLAN802.11 a 5.8G\_CH165\_Aux antenna

### DUT: HSTNN-W82C

Communication System: WLAN 802.11n/a(5G) FCC; Frequency: 5825 MHz

Medium parameters used :  $f = 5825$  MHz;  $\sigma = 6.234$  mho/m;  $\epsilon_r = 46.518$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASYS (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY52, Version 52.6 (1); SEMCAD X Version 14.4.2 (2595)

**Configuration/Body/Area Scan (61x221x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.060 mW/g

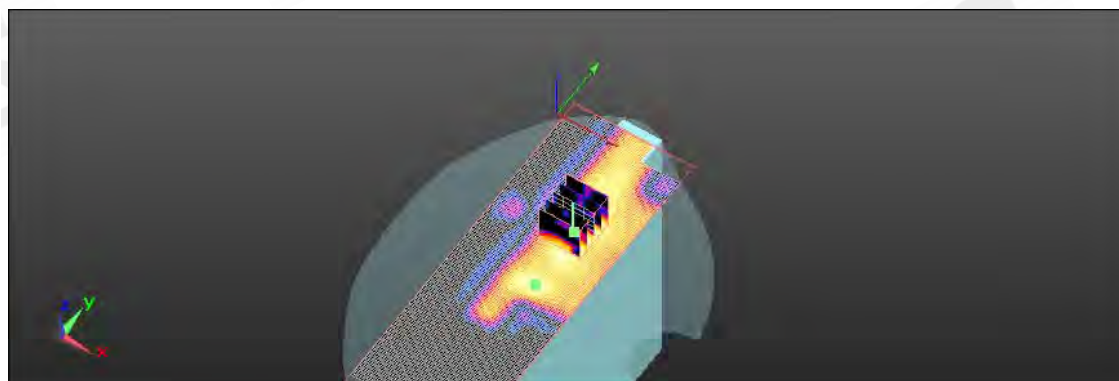
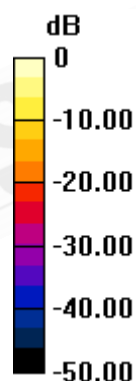
**Configuration/Body/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.349 V/m; Power Drift = -0.136 dB

Peak SAR (extrapolated) = 3.213 W/kg

**SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.301 mW/g**

Maximum value of SAR (measured) = 1.359 mW/g



0 dB = 1.360mW/g

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## 5. SAR System Performance Verification

Date: 3/1/2011

**DUT: Dipole 2450 MHz;**

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium: HSL2450 Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.982$  mho/m;  $\epsilon_r = 52.533$ ;;  
 $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(6.82, 6.82, 6.82); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**d=10mm, Pin=250mW, dist=4mm** : Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 17.3 mW/g

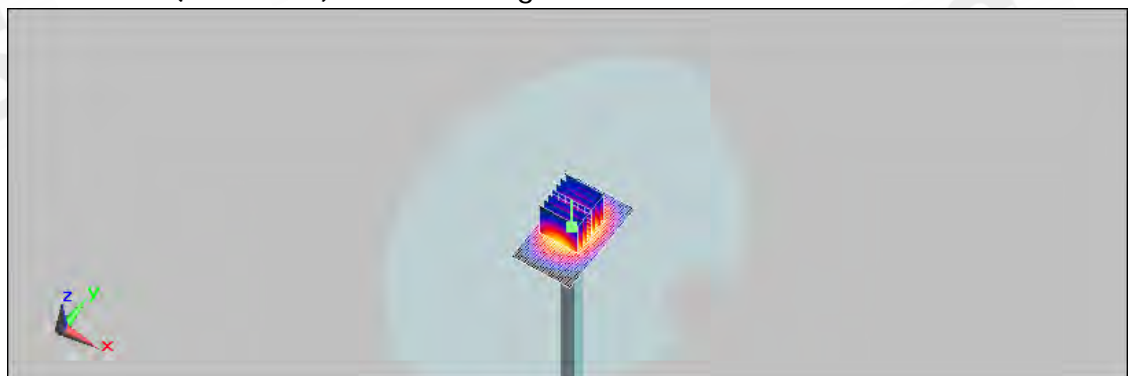
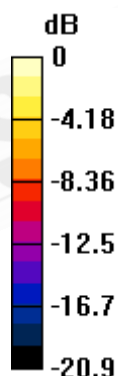
**d=10mm, Pin=250mW, dist=4mm** : Measurement grid: dx=5mm, dy=5mm,  
dz=5mm

Reference Value = 94 V/m; Power Drift = -0.025 dB

Peak SAR (extrapolated) = 28.1 W/kg

**SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.17 mW/g**

Maximum value of SAR (measured) = 16.8 mW/g



0 dB = 16.8mW/g

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Date: 3/1/2011

## DUT: Dipole 5200MHz;

Communication System: CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: body 5200 Medium parameters used:  $f = 5200 \text{ MHz}$ ;  $\sigma = 5.363 \text{ mho/m}$ ;  $\epsilon_r = 48.654$ ;  
 $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

### DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(4, 4, 4); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**d=10mm, Pin=250mW**, : Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.7 mW/g

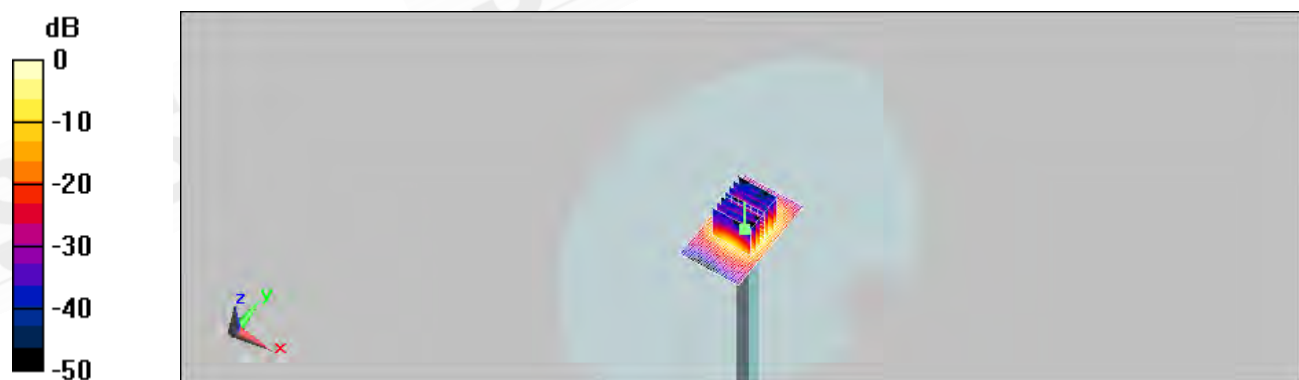
**d=10mm, Pin=250mW**, : Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 49.8 V/m; Power Drift = -0.100 dB

Peak SAR (extrapolated) = 32.1 W/kg

**SAR(1 g) = 7.32 mW/g; SAR(10 g) = 2.18 mW/g**

Maximum value of SAR (measured) = 8.92 mW/g



0 dB = 8.92mW/g

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Date: 3/2/2011

## DUT: Dipole 5500MHz;

Communication System: CW; Frequency: 5500 MHz; Duty Cycle: 1:1  
Medium: body 5500 Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.767$  mho/m;  $\epsilon_r = 47.895$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section

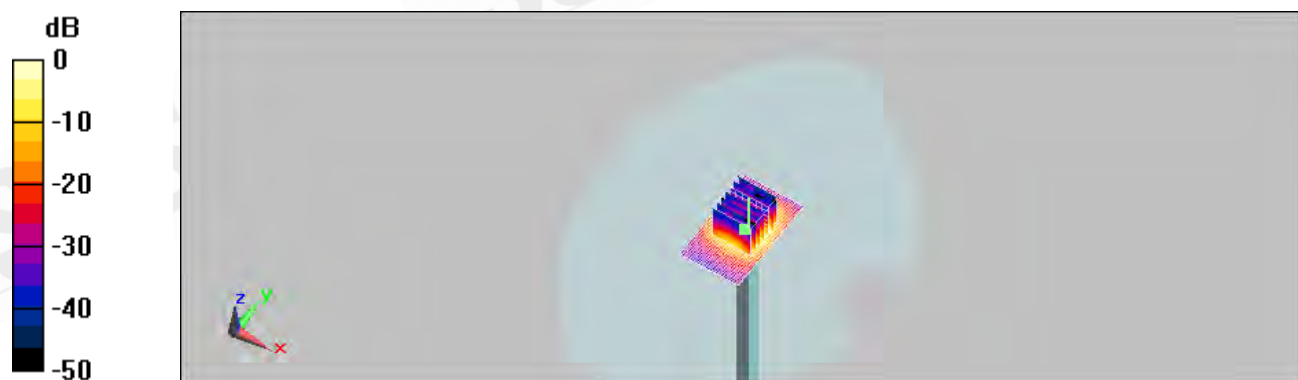
### DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.42, 3.42, 3.42); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**d=10mm, Pin=250mW,** : Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 11.8 mW/g

**d=10mm, Pin=250mW,** : Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 50.2 V/m; Power Drift = -0.06 dB  
Peak SAR (extrapolated) = 34.8 W/kg

**SAR(1 g) = 7.96 mW/g; SAR(10 g) = 2.41 mW/g**  
Maximum value of SAR (measured) = 9.88 mW/g



0 dB = 9.88mW/g

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Date: 3/5/2011

## DUT: Dipole 5800MHz;

Communication System: CW; Frequency: 5800 MHz; Duty Cycle: 1:1  
Medium: body 5800 Medium parameters used:  $f = 5800 \text{ MHz}$ ;  $\sigma = 6.174 \text{ mho/m}$ ;  $\epsilon_r = 46.903$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section

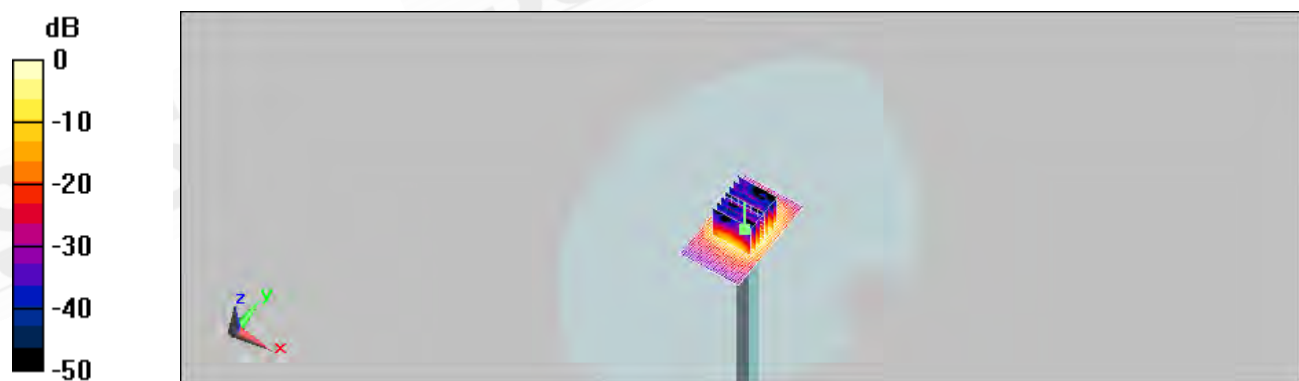
### DASY5 Configuration:

- Probe: EX3DV4 - SN3703; ConvF(3.67, 3.67, 3.67); Calibrated: 1/24/2011
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn856; Calibrated: 5/20/2010
- Phantom: SAM with CRP Left; Type: SAM;
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

**d=10mm, Pin=250mW**, : Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (interpolated) = 11.4 mW/g

**d=10mm, Pin=250mW**, : Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 45 V/m; Power Drift = -0.13 dB  
Peak SAR (extrapolated) = 30.3 W/kg

**SAR(1 g) = 6.92 mW/g; SAR(10 g) = 2.1 mW/g**  
Maximum value of SAR (measured) = 8.58 mW/g



0 dB = 8.58mW/g

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## 6. DAE & Probe Calibration certificate

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




S Schweizerischer Kalibrierdienst  
C Service suisse d'étalonnage  
S 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: **SGS-TW (Auden)** Certificate No: **DAE4-856\_May10**

| CALIBRATION CERTIFICATE   |   |                            |   |
|---|---|----------------------------|---|
| Object  | DAE4 - SD 000 D04 BJ - SN: 856  |                            |   |
| Calibration procedure(s)  | QA CAL-05.v21<br>Calibration procedure for the data acquisition electronics (DAE) |                            |   |
| Calibration date:   | May 20, 2010  |                            |   |
| This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).<br>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   |
| Ketley Multimeter Type 2001   | SN: 0810278   | 1-Oct-09 (No: 9055)        | Oct-10  |
| Secondary Standards   | ID #  | Check Date (in house)      | Scheduled Check   |
| Calibrator Box V1.1   | SE UMS 006 AB 1004  | 05-Jun-09 (in house check) | In house check: Jun-10  |
| Calibrated by:  | Name:<br>Dominique Steffen  | Function:<br>Technician    | Signature:<br> |
| Approved by:  | Name:<br>Fin Bannhof  | Function:<br>R&D Director  | Signature:<br> |
|   |   |                            | Issued: May 20, 2010  |
| This calibration certificate shall not be reproduced except in full without written approval of the laboratory.   |   |                            |   |

Certificate No: DAE4-856\_May10

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** 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 **SGS-TW (Auden)**

Certificate No: **EX3-3703\_Jan11**

## CALIBRATION CERTIFICATE

Object: **EX3DV4 - SN:3703**

Calibration procedure(s): **QA CAL-01.v7, QA CAL-14.v3, QA CAL-23.v4 and QA CAL-25.v3  
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 |

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

Issued: January 25, 2011

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Certificate No: EX3-3703\_Jan11

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



**S** Schweizerischer Kalibrierdienst  
**S** Service suisse d'étalonnage  
**C** Servizio svizzero di taratura  
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Accreditation No.: **SCS 108**

### Glossary:

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

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

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

### Methods Applied and Interpretation of Parameters:

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

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EX3DV4 SN:3703

January 24, 2011

# Probe EX3DV4

## SN:3703

|                  |                   |
|------------------|-------------------|
| Manufactured:    | July 21, 2009     |
| Last calibrated: | December 30, 2009 |
| Recalibrated:    | January 24, 2011  |

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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EX3DV4 SN:3703

January 24, 2011

**DASY/EASY - Parameters of Probe: EX3DV4 SN:3703**

**Basic Calibration Parameters**

|   | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|----------|----------|----------|-----------|
| Norm ( $\mu\text{V}/(\text{V}/\text{m})^2$ ) <sup>A</sup> | 0.52     | 0.52     | 0.54     | ± 10.1%   |
| DCP (mV) <sup>B</sup>                                     | 98.8     | 94.8     | 99.6     |           |

**Modulation Calibration Parameters**

| UID   | Communication System Name | PAR  |   | A<br>dB | B<br>dBuV | C    | VR<br>mV | Unc <sup>E</sup><br>(k=2) |
|-------|---------------------------|------|---|---------|-----------|------|----------|---------------------------|
| 10000 | CW                        | 0.00 | X | 0.00    | 0.00      | 1.00 | 154.8    | ± 3.1 %                   |
|       |                           |      | Y | 0.00    | 0.00      | 1.00 | 118.0    |                           |
|       |                           |      | Z | 0.00    | 0.00      | 1.00 | 156.4    |                           |

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

<sup>A</sup> The uncertainties of NormX, Y, Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

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

<sup>E</sup> Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

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EX3DV4 SN:3703

January 24, 2011

## DASY/EASY - Parameters of Probe: EX3DV4 SN:3703

### Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz] | Validity [MHz] <sup>c</sup> | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|-----------------------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 750     | ± 50 / ± 100                | 41.9 ± 5%    | 0.89 ± 5%    | 9.21    | 9.21    | 9.21    | 0.73  | 0.65 ± 11.0%    |
| 835     | ± 50 / ± 100                | 41.5 ± 5%    | 0.90 ± 5%    | 8.83    | 8.83    | 8.83    | 0.79  | 0.61 ± 11.0%    |
| 900     | ± 50 / ± 100                | 41.5 ± 5%    | 0.97 ± 5%    | 8.78    | 8.78    | 8.78    | 0.73  | 0.63 ± 11.0%    |
| 1750    | ± 50 / ± 100                | 40.1 ± 5%    | 1.37 ± 5%    | 8.02    | 8.02    | 8.02    | 0.50  | 0.71 ± 11.0%    |
| 1900    | ± 50 / ± 100                | 40.0 ± 5%    | 1.40 ± 5%    | 7.67    | 7.67    | 7.67    | 0.39  | 0.82 ± 11.0%    |
| 2000    | ± 50 / ± 100                | 40.0 ± 5%    | 1.40 ± 5%    | 7.63    | 7.63    | 7.63    | 0.35  | 0.86 ± 11.0%    |
| 2450    | ± 50 / ± 100                | 39.2 ± 5%    | 1.80 ± 5%    | 7.00    | 7.00    | 7.00    | 0.32  | 0.91 ± 11.0%    |
| 2600    | ± 50 / ± 100                | 39.0 ± 5%    | 1.96 ± 5%    | 6.75    | 6.75    | 6.75    | 0.30  | 1.02 ± 11.0%    |

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

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EX3DV4 SN:3703

January 24, 2011

## DASY/EASY - Parameters of Probe: EX3DV4 SN:3703

### Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz] | Validity [MHz] <sup>c</sup> | Permittivity | Conductivity | ConvF X | ConvF Y | ConvF Z | Alpha | Depth Unc (k=2) |
|---------|-----------------------------|--------------|--------------|---------|---------|---------|-------|-----------------|
| 750     | ± 50 / ± 100                | 55.5 ± 5%    | 0.96 ± 5%    | 9.06    | 9.06    | 9.06    | 0.57  | 0.73 ± 11.0%    |
| 835     | ± 50 / ± 100                | 55.2 ± 5%    | 0.97 ± 5%    | 8.85    | 8.85    | 8.85    | 0.46  | 0.83 ± 11.0%    |
| 900     | ± 50 / ± 100                | 55.0 ± 5%    | 1.05 ± 5%    | 8.74    | 8.74    | 8.74    | 0.45  | 0.83 ± 11.0%    |
| 1750    | ± 50 / ± 100                | 53.4 ± 5%    | 1.49 ± 5%    | 7.26    | 7.26    | 7.26    | 0.58  | 0.70 ± 11.0%    |
| 1900    | ± 50 / ± 100                | 53.3 ± 5%    | 1.52 ± 5%    | 7.04    | 7.04    | 7.04    | 0.44  | 0.82 ± 11.0%    |
| 2000    | ± 50 / ± 100                | 53.3 ± 5%    | 1.52 ± 5%    | 7.13    | 7.13    | 7.13    | 0.61  | 0.70 ± 11.0%    |
| 2450    | ± 50 / ± 100                | 52.7 ± 5%    | 1.95 ± 5%    | 6.82    | 6.82    | 6.82    | 0.41  | 0.82 ± 11.0%    |
| 2600    | ± 50 / ± 100                | 52.5 ± 5%    | 2.16 ± 5%    | 6.78    | 6.78    | 6.78    | 0.33  | 0.89 ± 11.0%    |
| 5200    | ± 50 / ± 100                | 49.0 ± 5%    | 5.30 ± 5%    | 4.00    | 4.00    | 4.00    | 0.50  | 1.95 ± 13.1%    |
| 5300    | ± 50 / ± 100                | 48.9 ± 5%    | 5.42 ± 5%    | 3.73    | 3.73    | 3.73    | 0.55  | 1.95 ± 13.1%    |
| 5600    | ± 50 / ± 100                | 48.5 ± 5%    | 5.77 ± 5%    | 3.42    | 3.42    | 3.42    | 0.65  | 1.95 ± 13.1%    |
| 5800    | ± 50 / ± 100                | 48.2 ± 5%    | 6.00 ± 5%    | 3.67    | 3.67    | 3.67    | 0.65  | 1.95 ± 13.1%    |

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

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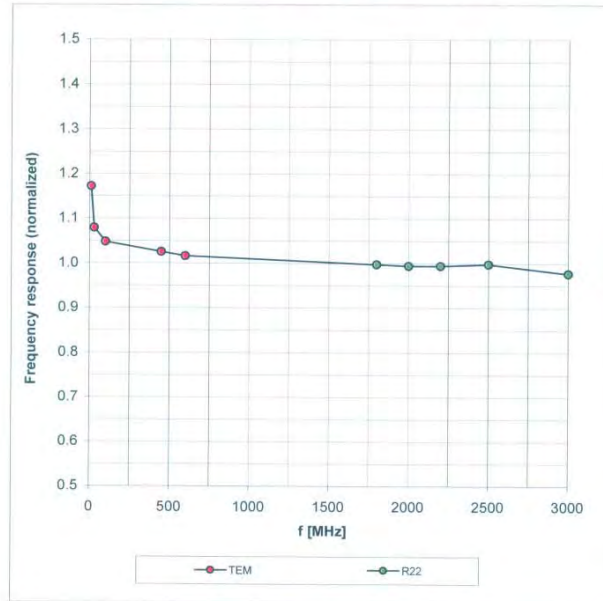
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### Frequency Response of E-Field

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



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

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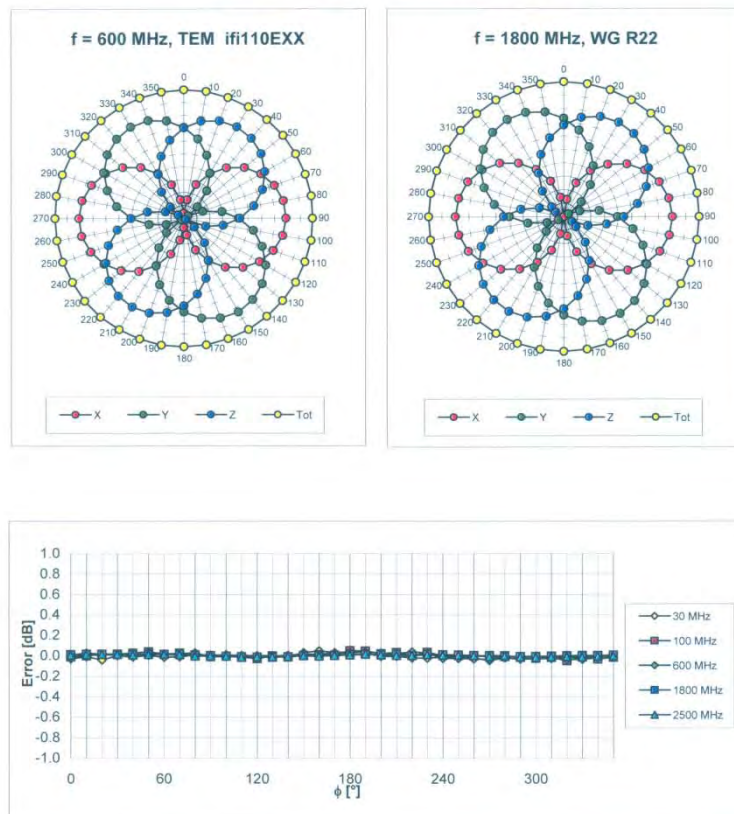
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## Receiving Pattern ( $\phi$ ), $\vartheta = 0^\circ$



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

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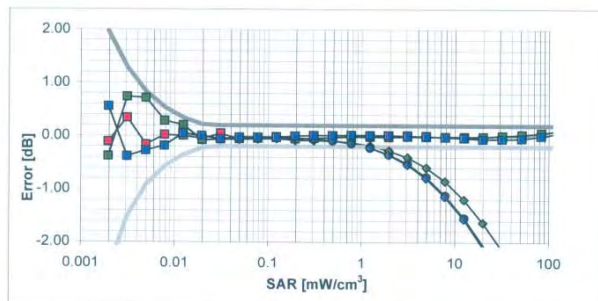
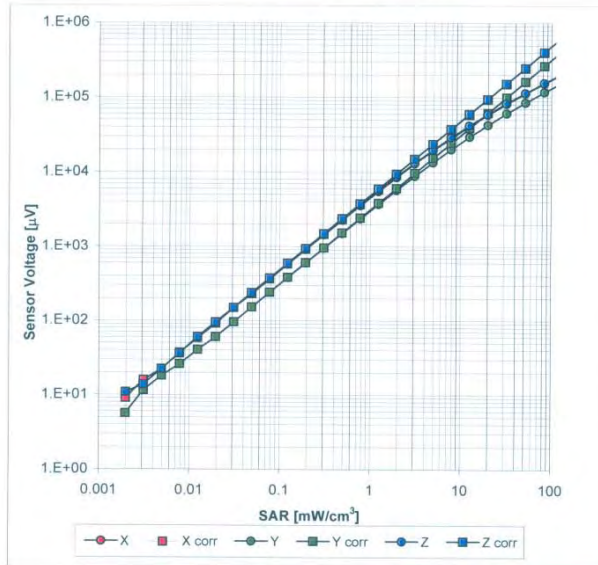
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## Dynamic Range f(SAR<sub>head</sub>) (TEM cell, f = 900 MHz)



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

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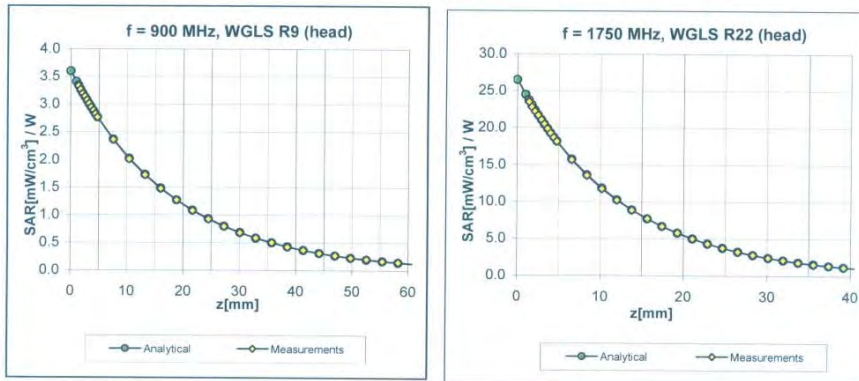
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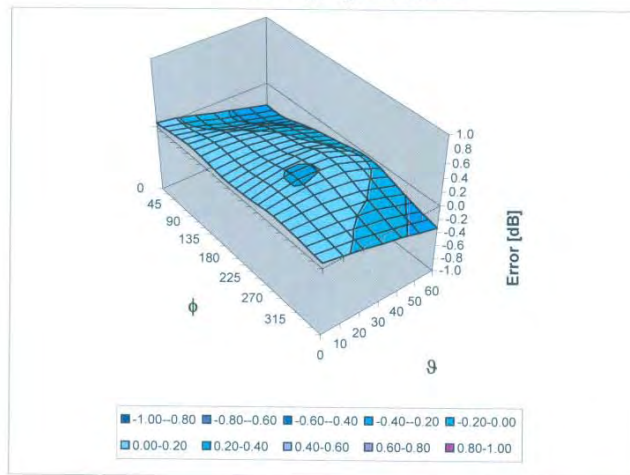
January 24, 2011

## Conversion Factor Assessment



## Deviation from Isotropy in HSL

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



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

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EX3DV4 SN:3703  
**Other Probe Parameters**

January 24, 2011

|   |                |
|---|----------------|
| 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 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           |

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## 7. Uncertainty Budget

**DASY5 Uncertainty Budget**  
According to IEEE 1528 [1]

| Error Description            | Uncertainty value | Prob. Dist. | Div. | ( $c_1$ ) 1g | ( $c_2$ ) 10g | Std. Unc. (1g) | Std. Unc. (10g) | ( $c_3$ ) $v_{eff}$ |
|------------------------------|-------------------|-------------|------|--------------|---------------|----------------|-----------------|---------------------|
| <b>Measurement System</b>    |                   |             |      |              |               |                |                 |                     |
| Probe Calibration            | ±5.9%             | N           | 1    | 1            | 1             | ±5.9%          | ±5.9%           | ∞                   |
| Axial Isotropy               | ±4.7%             | R           | √3   | 0.7          | 0.7           | ±1.9%          | ±1.9%           | ∞                   |
| Hemispherical Isotropy       | ±9.6%             | R           | √3   | 0.7          | 0.7           | ±3.9%          | ±3.9%           | ∞                   |
| Boundary Effects             | ±1.0%             | R           | √3   | 1            | 1             | ±0.6%          | ±0.6%           | ∞                   |
| Linearity                    | ±4.7%             | R           | √3   | 1            | 1             | ±2.7%          | ±2.7%           | ∞                   |
| System Detection Limits      | ±1.0%             | R           | √3   | 1            | 1             | ±0.6%          | ±0.6%           | ∞                   |
| Readout Electronics          | ±0.3%             | N           | 1    | 1            | 1             | ±0.3%          | ±0.3%           | ∞                   |
| Response Time                | ±0.8%             | R           | √3   | 1            | 1             | ±0.5%          | ±0.5%           | ∞                   |
| Integration Time             | ±2.6%             | R           | √3   | 1            | 1             | ±1.5%          | ±1.5%           | ∞                   |
| RF Ambient Noise             | ±3.0%             | R           | √3   | 1            | 1             | ±1.7%          | ±1.7%           | ∞                   |
| RF Ambient Reflections       | ±3.0%             | R           | √3   | 1            | 1             | ±1.7%          | ±1.7%           | ∞                   |
| Probe Positioner             | ±0.4%             | R           | √3   | 1            | 1             | ±0.2%          | ±0.2%           | ∞                   |
| Probe Positioning            | ±2.9%             | R           | √3   | 1            | 1             | ±1.7%          | ±1.7%           | ∞                   |
| Max. SAR Eval.               | ±1.0%             | R           | √3   | 1            | 1             | ±0.6%          | ±0.6%           | ∞                   |
| <b>Test Sample Related</b>   |                   |             |      |              |               |                |                 |                     |
| Device Positioning           | ±2.9%             | N           | 1    | 1            | 1             | ±2.9%          | ±2.9%           | 145                 |
| Device Holder                | ±3.6%             | N           | 1    | 1            | 1             | ±3.6%          | ±3.6%           | 5                   |
| Power Drift                  | ±5.0%             | R           | √3   | 1            | 1             | ±2.9%          | ±2.9%           | ∞                   |
| <b>Phantom and Setup</b>     |                   |             |      |              |               |                |                 |                     |
| Phantom Uncertainty          | ±4.0%             | R           | √3   | 1            | 1             | ±2.3%          | ±2.3%           | ∞                   |
| Liquid Conductivity (target) | ±5.0%             | R           | √3   | 0.64         | 0.43          | ±1.8%          | ±1.2%           | ∞                   |
| Liquid Conductivity (meas.)  | ±2.5%             | N           | 1    | 0.64         | 0.43          | ±1.6%          | ±1.1%           | ∞                   |
| Liquid Permittivity (target) | ±5.0%             | R           | √3   | 0.6          | 0.49          | ±1.7%          | ±1.4%           | ∞                   |
| Liquid Permittivity (meas.)  | ±2.5%             | N           | 1    | 0.6          | 0.49          | ±1.5%          | ±1.2%           | ∞                   |
| Combined Std. Uncertainty    |                   |             |      |              |               | ±10.9%         | ±10.7%          | 387                 |
| Expanded STD Uncertainty     |                   |             |      |              |               | ±21.0%         | ±21.4%          |                     |

Table 19.6: Worst-Case uncertainty budget for DASY5 assessed according to IEEE 1528 [1]. The budget is valid for the frequency range 300 MHz - 3 GHz and represents a worst-case analysis. For specific tests and configurations, the uncertainty could be considerable smaller.

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## 8. Phantom Description

Schmid & Partner Engineering AG **s p e a g**  
 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 Zurich<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:<br>Relative permittivity < 5,<br>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 OUT below | Prototypes, Sample testing                  |

#### Standards

- [1] CENELEC EN 50351
- [2] IEEE Std 1528-2003
- [3] IEC 62209 Part 1
- [4] FCC DET 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

**s p e a g**

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 info@speag.com, http://www.speag.com

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## 9. System Validation from Original equipment supplier

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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** 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 **SGS-TW (Auden)**

Certificate No: **D2450V2-727\_Apr10**

### CALIBRATION CERTIFICATE

Object **D2450V2 - SN: 727**

Calibration procedure(s) **QA CAL-05.v7  
Calibration procedure for dipole validation kits**

Calibration date: **April 29, 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  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| 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           | 26-Jun-09 (No. ES3-3205_Jun09)    | Jun-10                 |
| DAE4                        | SN: 601            | 02-Mar-10 (No. DAE4-601_Mar10)    | Mar-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-09) | In house check: Oct-10 |

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

Issued: April 29, 2010

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

Certificate No: D2450V2-727\_Apr10

Page 1 of 9

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

**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.

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### Measurement Conditions

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

|                              |                           |             |
|------------------------------|---------------------------|-------------|
| DASY Version                 | DASY5                     | V5.2        |
| Extrapolation                | Advanced Extrapolation    |             |
| Phantom                      | Modular Flat Phantom V4.9 |             |
| Distance Dipole Center - TSL | 10 mm                     | with Spacer |
| Zoom Scan Resolution         | dx, dy, dz = 5 mm         |             |
| Frequency                    | 2450 MHz ± 1 MHz          |             |

### Head TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters      | 22.0 °C         | 39.2         | 1.80 mho/m       |
| Measured Head TSL parameters     | (22.0 ± 0.2) °C | 39.8 ± 6 %   | 1.78 mho/m ± 6 % |
| Head TSL temperature during test | (21.5 ± 0.2) °C | ----         | ----             |

### SAR result with Head TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | Condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 250 mW input power | 13.2 mW / g                       |
| SAR normalized  | normalized to 1W   | 52.8 mW / g                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>53.2 mW / g ± 17.0 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 250 mW input power | 6.22 mW / g                       |
| SAR normalized  | normalized to 1W   | 24.9 mW / g                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>25.0 mW / g ± 16.5 % (k=2)</b> |

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### Body TSL parameters

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 52.7         | 1.95 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 54.2 ± 6 %   | 2.01 mho/m ± 6 % |
| Body TSL temperature during test | (22.5 ± 0.2) °C | ---          | ---              |

### SAR result with Body TSL

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | Condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 250 mW input power | 13.4 mW / g                       |
| SAR normalized  | normalized to 1W   | 53.6 mW / g                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>53.2 mW / g ± 17.0 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 250 mW input power | 6.23 mW / g                       |
| SAR normalized  | normalized to 1W   | 24.9 mW / g                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>24.9 mW / g ± 16.5 % (k=2)</b> |

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**Appendix**

**Antenna Parameters with Head TSL**

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 53.3 $\Omega$ + 1.7 j $\Omega$ |
| Return Loss                          | - 28.9 dB                      |

**Antenna Parameters with Body TSL**

|                                      |                                |
|--------------------------------------|--------------------------------|
| Impedance, transformed to feed point | 50.3 $\Omega$ + 3.6 j $\Omega$ |
| Return Loss                          | - 29.0 dB                      |

**General Antenna Parameters and Design**

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1.150 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 | January 09, 2003 |

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## DASY5 Validation Report for Head TSL

Date/Time: 22.04.2010 16:30:51

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727**

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

Medium: HSL U11 BB

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.78$  mho/m;  $\epsilon_r = 39.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

### DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

**Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement**

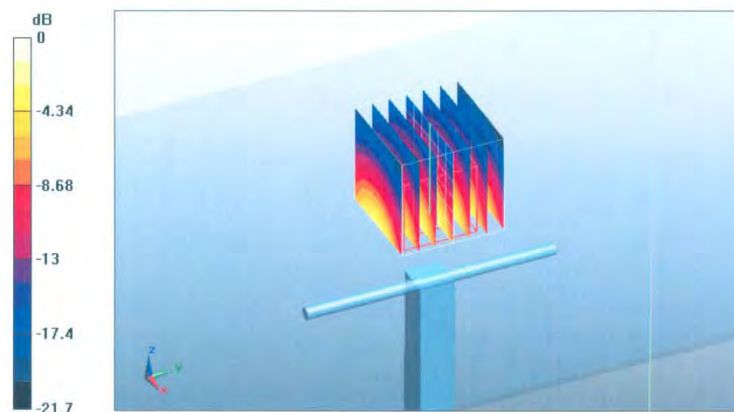
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.0 V/m; Power Drift = 0.064 dB

Peak SAR (extrapolated) = 26.8 W/kg

**SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.22 mW/g**

Maximum value of SAR (measured) = 16.9 mW/g



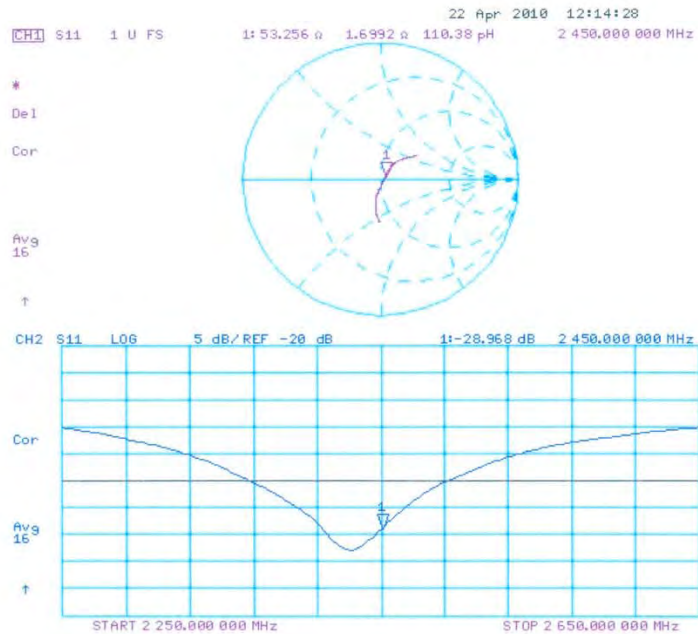
0 dB = 16.9mW/g

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### Impedance Measurement Plot for Head TSL



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## DASY5 Validation Report for Body

Date/Time: 29.04.2010 14:57:43

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:727**

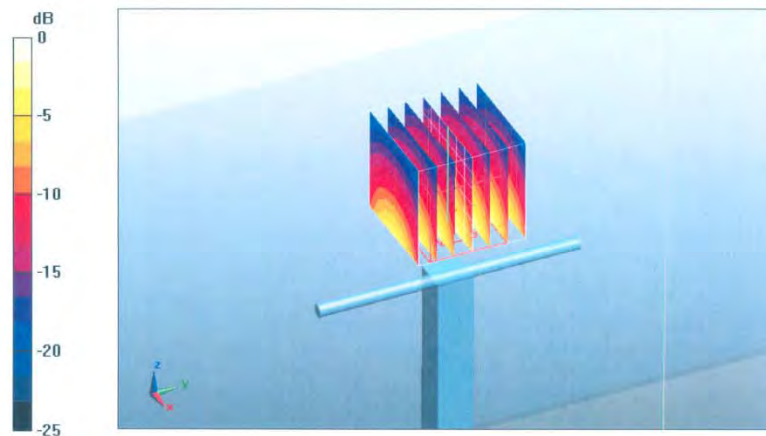
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1  
Medium: MSL U11 BB  
Medium parameters used:  $f = 2450$  MHz;  $\sigma = 2$  mho/m;  $\epsilon_r = 54.1$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section  
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

### DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 26.06.2009
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 02.03.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 57

### Pin250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement

grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 96.1 V/m; Power Drift = 0.00929 dB  
Peak SAR (extrapolated) = 27.7 W/kg  
**SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.23 mW/g**  
Maximum value of SAR (measured) = 17.6 mW/g

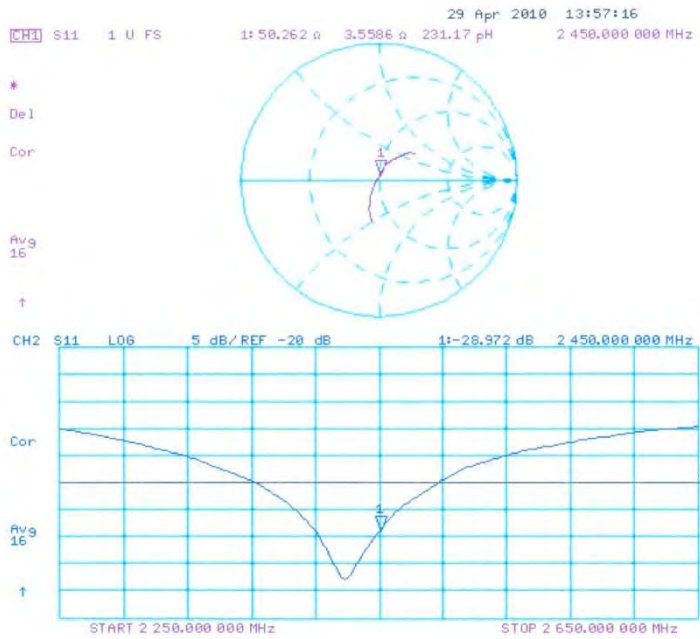


0 dB = 17.6mW/g

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### Impedance Measurement Plot for Body TSL



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



**S** Schweizerischer Kalibrierdienst  
**C** Service suisse d'étalonnage  
**S** 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: **Auden**

Certificate No: **D5GHzV2-1040\_Jun10**

## CALIBRATION CERTIFICATE

Object: **D5GHzV2 - SN: 1040**

Calibration procedure(s): **QA CAL-22.v1  
Calibration procedure for dipole validation kits between 3-6 GHz**

Calibration date: **June 23, 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  |
|-----------------------------|--------------------|-----------------------------------|------------------------|
| 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: 5095 (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 EX3DV4      | SN: 3503           | 09-Mar-10 (No. EX3-3503_Mar10)    | Mar-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-09 (in house check Oct-09)  | In house check: Oct-11 |
| Network Analyzer HP 8753E   | US37390585 54206   | 18-Oct-01 (in house check Oct-09) | In house check: Oct-10 |

Calibrated by: **Jeton Kasrati** (Name) / **Laboratory Technician** (Function) / *[Signature]* (Signature)

Approved by: **Katja Pokolic** (Name) / **Technical Manager** (Function) / *[Signature]* (Signature)

Issued: June 23, 2010

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Accreditation No.: **SCS 108**

**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) IEC Std 62209 Part 2, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation, and Procedures", Part 2: "Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitters", Draft Version 0.9, December 2004.
- b) 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:**

- c) 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.

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### Measurement Conditions

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

|                              |  |             |
|------------------------------|--|-------------|
| DASY Version                 | DASY5  | V52.2       |
| Extrapolation                | Advanced Extrapolation                                   |             |
| Phantom                      | Modular Flat Phantom V5.0                                |             |
| Distance Dipole Center - TSL | 10 mm  | with Spacer |
| Area Scan resolution         | dx, dy = 10 mm   |             |
| Zoom Scan Resolution         | dx, dy = 4.0 mm, dz = 2.5 mm                             |             |
| Frequency                    | 3200 MHz ± 1 MHz<br>5500 MHz ± 1 MHz<br>5800 MHz ± 1 MHz |             |

### Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity      |
|----------------------------------|-----------------|--------------|-------------------|
| Nominal Head TSL parameters      | 22,0 °C         | 36,0         | 4,66 mho/m        |
| Measured Head TSL parameters     | (22,0 ± 0,2) °C | 36,5 ± 6, %  | 4,57 mho/m ± 8, % |
| Head TSL temperature during test | (22,5 ± 0,2) °C | —            | —                 |

### SAR result with Head TSL at 5200 MHz

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 8,23 mW / g                       |
| SAR normalized  | normalized to 1W   | 82,3 mW / g                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>82,5 mW / g ± 19,9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 2,35 mW / g                       |
| SAR normalized  | normalized to 1W   | 23,5 mW / g                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23,5 mW / g ± 19,5 % (k=2)</b> |

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### Head TSL parameters at 5500 MHz

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters      | 22.0 °C         | 35.6         | 4.96 mho/m       |
| Measured Head TSL parameters     | (22.0 ± 0.2) °C | 35.9 ± 6 %   | 4.84 mho/m ± 6 % |
| Head TSL temperature during test | (22.5 ± 0.2) °C | —            | —                |

### SAR result with Head TSL at 5500 MHz

| SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 8.79 mW / g                       |
| SAR normalized  | normalized to 1W   | 87.9 mW / g                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>86.0 mW / g ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 2.48 mW / g                       |
| SAR normalized  | normalized to 1W   | 24.8 mW / g                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>24.8 mW / g ± 19.5 % (k=2)</b> |

### Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Head TSL parameters      | 22.0 °C         | 35.3         | 5.27 mho/m       |
| Measured Head TSL parameters     | (22.0 ± 0.2) °C | 35.4 ± 6 %   | 5.09 mho/m ± 6 % |
| Head TSL temperature during test | (22.5 ± 0.2) °C | —            | —                |

### SAR result with Head TSL at 5800 MHz

| SAR averaged over 1 cm <sup>2</sup> (1 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 8.13 mW / g                       |
| SAR normalized  | normalized to 1W   | 81.3 mW / g                       |
| SAR for nominal Head TSL parameters                   | normalized to 1W   | <b>81.2 mW / g ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>2</sup> (10 g) of Head TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 2.30 mW / g                       |
| SAR normalized  | normalized to 1W   | 23.0 mW / g                       |
| SAR for nominal Head TSL parameters                     | normalized to 1W   | <b>23.0 mW / g ± 19.5 % (k=2)</b> |



**Body TSL parameters at 5200 MHz**

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 49.0         | 5.30 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 49.0 ± 6 %   | 5.47 mho/m ± 6 % |
| Body TSL temperature during test | (22.5 ± 0.2) °C | —            | —                |

**SAR result with Body TSL at 5200 MHz**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 7.57 mW / g                       |
| SAR normalized  | normalized to 1W   | 7.57 mW / g                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>75.7 mW / g ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 2.11 mW / g                       |
| SAR normalized  | normalized to 1W   | 21.1 mW / g                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>21.1 mW / g ± 19.5 % (k=2)</b> |

**Body TSL parameters at 5500 MHz**

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 48.6         | 5.65 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 48.3 ± 6 %   | 5.83 mho/m ± 6 % |
| Body TSL temperature during test | (22.5 ± 0.2) °C | —            | —                |

**SAR result with Body TSL at 5500 MHz**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 8.04 mW / g                       |
| SAR normalized  | normalized to 1W   | 80.4 mW / g                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>80.3 mW / g ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 2.23 mW / g                       |
| SAR normalized  | normalized to 1W   | 22.3 mW / g                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>22.3 mW / g ± 19.5 % (k=2)</b> |

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**Body TSL parameters at 5800 MHz**

The following parameters and calculations were applied.

|                                  | Temperature     | Permittivity | Conductivity     |
|----------------------------------|-----------------|--------------|------------------|
| Nominal Body TSL parameters      | 22.0 °C         | 48.2         | 6.00 mho/m       |
| Measured Body TSL parameters     | (22.0 ± 0.2) °C | 47.7 ± 6 %   | 6.18 mho/m ± 6 % |
| Body TSL temperature during test | (22.5 ± 0.2) °C | ----         | ----             |

**SAR result with Body TSL at 5800 MHz**

| SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 6.93 mW / g                       |
| SAR normalized  | normalized to 1W   | 69.3 mW / g                       |
| SAR for nominal Body TSL parameters                   | normalized to 1W   | <b>69.2 mW / g ± 19.9 % (k=2)</b> |

| SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL | condition          |                                   |
|---|--------------------|-----------------------------------|
| SAR measured  | 100 mW input power | 1.92 mW / g                       |
| SAR normalized  | normalized to 1W   | 19.2 mW / g                       |
| SAR for nominal Body TSL parameters                     | normalized to 1W   | <b>19.2 mW / g ± 19.5 % (k=2)</b> |

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**Appendix**

**Antenna Parameters with Head TSL at 5200 MHz**

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $49.9 \Omega - 7.6 j\Omega$ |
| Return Loss                          | -22.4 dB                    |

**Antenna Parameters with Head TSL at 5500 MHz**

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $52.5 \Omega + 5.4 j\Omega$ |
| Return Loss                          | -24.8 dB                    |

**Antenna Parameters with Head TSL at 5800 MHz**

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $55.9 \Omega - 1.7 j\Omega$ |
| Return Loss                          | -24.7 dB                    |

**Antenna Parameters with Body TSL at 5200 MHz**

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $51.0 \Omega - 4.8 j\Omega$ |
| Return Loss                          | -26.1 dB                    |

**Antenna Parameters with Body TSL at 5500 MHz**

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $53.9 \Omega - 3.4 j\Omega$ |
| Return Loss                          | -26.1 dB                    |

**Antenna Parameters with Body TSL at 5800 MHz**

|                                      |                             |
|--------------------------------------|-----------------------------|
| Impedance, transformed to feed point | $56.9 \Omega + 2.2 j\Omega$ |
| Return Loss                          | -23.4 dB                    |

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### General Antenna Parameters and Design

|                                  |          |
|----------------------------------|----------|
| Electrical Delay (one direction) | 1,211 ns |
|----------------------------------|----------|

After long term use with 40 W 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 30, 2005 |

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## DASY5 Validation Report for Head TSL

Date/Time: 22.06.2010 12:12:25

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1040**

Communication System: CW; Frequency: 5200 MHz; Frequency: 5500 MHz; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: HSL 5000

Medium parameters used:  $f = 5200$  MHz;  $\sigma = 4.56$  mho/m;  $\epsilon_r = 36.5$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Medium parameters

used:  $f = 5500$  MHz;  $\sigma = 4.82$  mho/m;  $\epsilon_r = 35.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Medium parameters used:  $f = 5800$

MHz;  $\sigma = 5.07$  mho/m;  $\epsilon_r = 35.4$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

### DASY5 Configuration:

- Probe: EX3DV4 - SN3303; ConvF1(3.36, 3.36, 3.36), ConvF4(4.85, 4.85, 4.85), ConvF1(4.74, 4.74, 4.74) Calibrated: 09.03.2010
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DA64 Sn001; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (firm) Type: QDD00P50AA; Serial: 100
- Measurement SW: DASY52; V52.2 Build 0; Version: 52.2.0 (163)
- Postprocessing SW: SEMCAD X; V14.2 Build 2; Version: 14.2.2 (1685)

**D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=2.5mm**

Reference Value = 62.2 V/m; Power Drift = 0.079 dB

Peak SAR (extrapolated) = 31.1 W/kg

**SAR(1 g) = 8.23 mW/g; SAR(10 g) = 2.35 mW/g**

Maximum value of SAR (measured) = 16 mW/g

**D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5500 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=2.5mm**

Reference Value = 62.7 V/m; Power Drift = 0.090 dB

Peak SAR (extrapolated) = 35.2 W/kg

**SAR(1 g) = 8.79 mW/g; SAR(10 g) = 2.48 mW/g**

Maximum value of SAR (measured) = 17.3 mW/g

**D5GHzV2 Dipole (Head)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0; Measurement grid: dx=4mm, dy=4mm, dz=2.5mm**

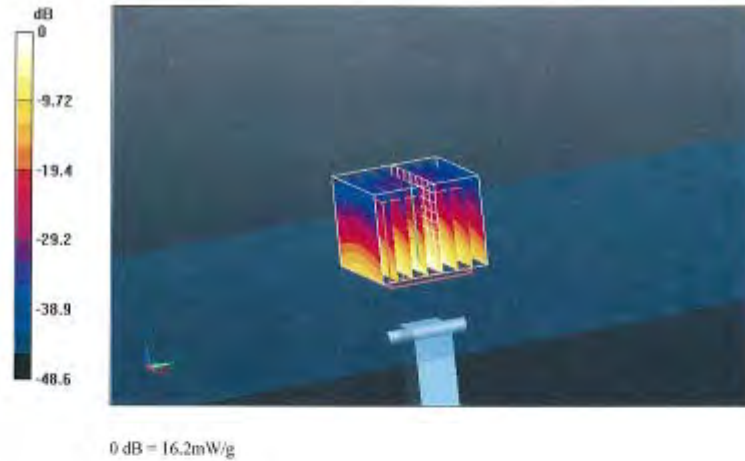
Reference Value = 59.6 V/m; Power Drift = 0.078 dB

Peak SAR (extrapolated) = 33.7 W/kg

**SAR(1 g) = 8.13 mW/g; SAR(10 g) = 2.3 mW/g**

Maximum value of SAR (measured) = 16.2 mW/g

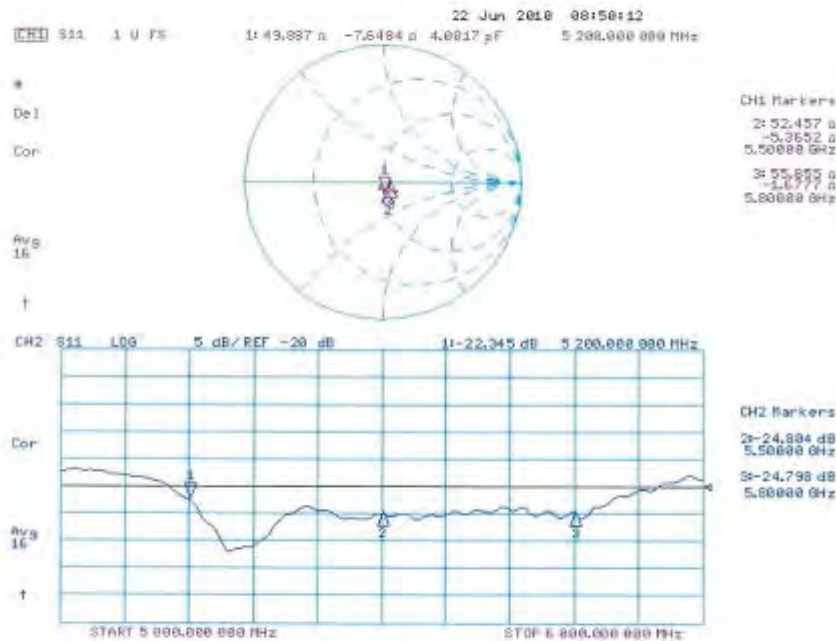




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### Impedance Measurement Plot for Head TSL



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**DASY5 Validation Report for Body TSL**

Date/Time: 23.06.2010 12:48:48

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN:1040**

Communication System: CW; Frequency: 5200 MHz; Frequency: 5500 MHz; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: MSL 5000 MHz

Medium parameters used:  $f = 5200$  MHz;  $\sigma = 5.44$  mho/m;  $\epsilon_r = 49$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.8$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Medium parameters used:  $f = 5800$  MHz;  $\sigma = 6.14$  mho/m;  $\epsilon_r = 47.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

**DASY5 Configuration:**

- Probe: EX3DV4 - SN3503; ConnF14 88; 4.88; 4.88; ConnF14 37; 4.37; 4.37; ConnF14 37; 4.37; 4.37; Calibration: 05.03.2010
- Sense-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DA-E4 50601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY5L V5L2 Build 0; Version 82.2.0 (163)
- Postprocessing SW: SEMCAD X-V14.2 Build 2; Version 14.2.2 (1685)

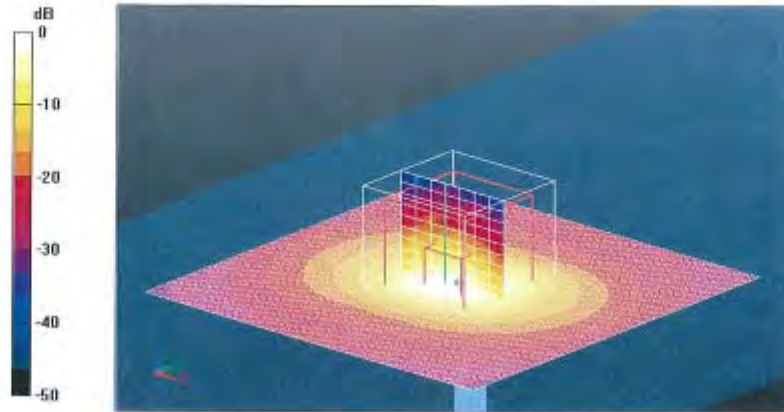
**D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5200 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 58.4 V/m; Power Drift = -0.057 dB  
Peak SAR (extrapolated) = 28.8 W/kg  
**SAR(1 g) = 7.57 mW/g; SAR(10 g) = 2.11 mW/g**  
Maximum value of SAR (measured) = 14.8 mW/g

**D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5500 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 58.9 V/m; Power Drift = -0.052 dB  
Peak SAR (extrapolated) = 32.5 W/kg  
**SAR(1 g) = 8.04 mW/g; SAR(10 g) = 2.23 mW/g**  
Maximum value of SAR (measured) = 15.9 mW/g

**D5GHzV2 Dipole (Body)/d=10mm, Pin=100mW, f=5800 MHz/Zoom Scan (4x4x2.5mm), dist=2mm (8x8x10)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=2.5mm  
Reference Value = 53.2 V/m; Power Drift = -0.037 dB  
Peak SAR (extrapolated) = 29.8 W/kg  
**SAR(1 g) = 6.93 mW/g; SAR(10 g) = 1.92 mW/g**  
Maximum value of SAR (measured) = 14 mW/g

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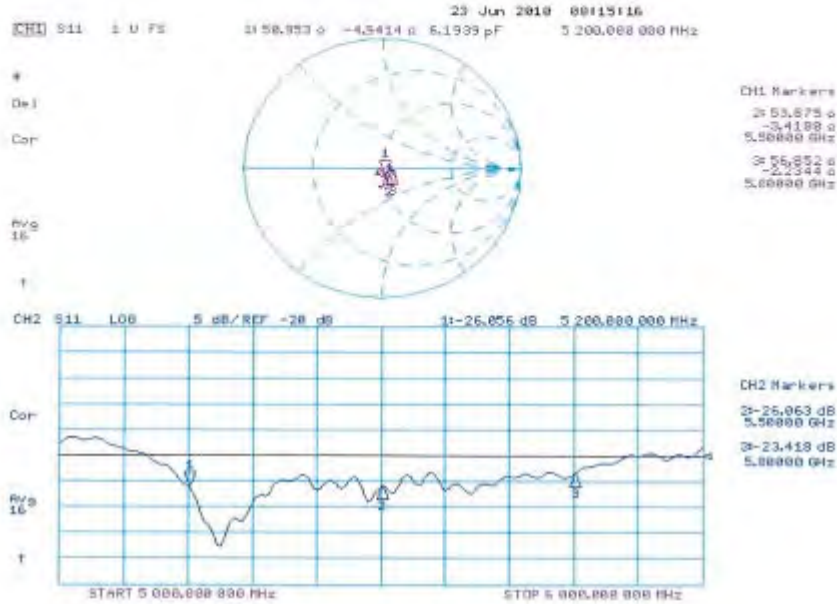
0 dB = 14mW/g

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### Impedance Measurement Plot for Body TSL



End of 1<sup>st</sup> part of report

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