



# SAR TEST REPORT

**REPORT NO.:** SA960626H06

**MODEL NO.:** WEC600N

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**APPLICANT:** Cisco-Linksys LLC

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## 1. CERTIFICATION

**PRODUCT:** Dual-band Wireless-N ExpressCard  
**MODEL:** WEC600N  
**BRAND:** Linksys  
**APPLICANT:** Cisco-Linksys LLC  
**TESTED :** Aug. 14 ~ Aug. 15, 2007  
**TEST SAMPLE:** R&D SAMPLE  
**STANDARDS:** **FCC Part 2 (Section 2.1093)**  
**FCC OET Bulletin 65, Supplement C (01-01)**  
**RSS-102**  
**IEEE 1528-2003**

The above equipment (model: WEC600N) have been tested by **Advance Data Technology Corporation**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

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Gary Chang / Assistant Manager



## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	Dual-band Wireless-N ExpressCard	
<b>MODEL NO.</b>	WEC600N	
<b>FCC ID</b>	Q87-WEC600N	
<b>POWER SUPPLY</b>	3.3Vdc from host equipment	
<b>CLASSIFICATION</b>	Portable device, production unit	
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS, 64QAM, 16QAM, QPSK, BPSK for OFDM	
<b>RADIO TECHNOLOGY</b>	DSSS, OFDM	
<b>TRANSFER RATE</b>	802.11b: 11 / 5.5 / 2 / 1Mbps 802.11g: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps 802.11a: 54 / 48 / 36 / 24 / 18 / 12 / 9 / 6Mbps Draft 802.11n (20MHz): 130 / 117 / 104 / 78 / 65 / 58.5 / 52 / 39 / 26 / 19.5 / 13 / 6.5Mbps Draft 802.11n (40MHz): 270 / 243 / 216 / 162 / 135 / 121.5 / 108 / 81 / 54 / 40.5 / 27 / 13.5Mbps s	
<b>FREQUENCY RANGE</b>	2.4GHz: 2400 ~ 2483.5MHz 5.0GHz: 5150 ~ 5350MHz, 5470 ~ 5725MHz, 5725 ~ 5850MHz	
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, draft 802.11n (20MHz) 7 for draft 802.11n (40MHz) <b>5.0GHz:</b> 5150 ~ 5350MHz, 5470 ~ 5725MHz: 19 for 802.11a; 4 draft 802.11n (20MHz) 3 for draft 802.11n (40MHz) 5725 ~ 5850MHz: 5 for 802.11a 5 draft 802.11n (20MHz); 3 for draft 802.11n (40MHz)	
<b>CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER FOR 2.4GHz</b>	<b>802.11b:</b>	<b>802.11g:</b>
	94.406mW / Ch1: 2412MHz 105.925mW / Ch6: 2437MHz 89.125mW / Ch11: 2462MHz	70.795mW / Ch1: 2412MHz 79.433mW / Ch6: 2437MHz 63.096mW / Ch11: 2462MHz
	<b>DRAFT 802.11n (20MHz):</b>	<b>DRAFT 802.11n (40MHz):</b>
	159.920mW / Ch1: 2412MHz 141.589mW / Ch6: 2437MHz 141.589mW / Ch11: 2462MHz	112.468mW / Ch1: 2422MHz 141.589mW / Ch4: 2437MHz 126.191mW / Ch7: 2452MHz

<b>CHANNEL FREQUENCIES UNDER TEST AND ITS CONDUCTED OUTPUT POWER FOR 5GHz</b>	<b>802.11a:</b>	
	19.275mW / Ch36: 5180MHz	45.499mW / Ch120: 5600MHz
	30.620mW / Ch48: 5240MHz	43.152mW / Ch124: 5620MHz
	33.651mW / Ch52: 5260MHz	29.648mW / Ch136: 5680MHz
	46.026mW / Ch64: 5320MHz	28.576mW / Ch140: 5700MHz
	50.234mW / Ch100: 5500MHz	79.433mW / Ch149: 5745MHz
	48.865mW / Ch104: 5520MHz	70.795mW / Ch157: 5785MHz
	45.814mW / Ch116: 5580MHz	89.125mW / Ch165: 5825MHz
	<b>DRAFT 802.11N (20MHz):</b>	
	33.362mW / Ch36: 5180MHz	100.237mW / Ch149: 5745MHz
48.143mW / Ch48: 5240MHz	103.822mW / Ch157: 5785MHz	
	100.344mW / Ch165: 5825MHz	
<b>DRAFT 802.11N (40MHz):</b>		
35.316mW / Ch38: 5190MHz	159.226mW / Ch151: 5755MHz	
45.037mW / Ch46: 5230MHz	135.539mW / Ch159: 5795MHz	
<b>AVERAGE SAR (1g)</b>	1.470W/kg for 2.4GHz 1.160W/kg for 5GHz	
<b>ANTENNA TYPE</b>	2.4GHz: Chip antenna with 2.4dBi gain 5.0GHz: Chip antenna with 1.0dBi gain	
<b>DATA CABLE</b>	NA	
<b>I/O PORTS</b>	NA	
<b>ACCESSORY DEVICES</b>	NA	

**NOTE:**

1. The EUT incorporates a MIMO function. Physically, the card provides two completed transmitters and two receivers.
2. The EUT is 2 \* 2 spatial MIMO (2Tx & 2Rx) without beam forming function that only operate dual chain configuration (both chain 0 and chain 1 transceivers are operational).
3. When the EUT operating in 802.11b, 802.11g, 802.11a, the software operation, which is defined by manufacturer, only set single Tx.
4. When the EUT operating in draft 802.11n, the software operation, which is defined by manufacturer, only set 0 ~ 15 of "MCS" (MCS: Modulation and Coding Schemes) for dual Tx.
5. The EUT complies with draft 802.11n standards and backwards compatible with 802.11b, 802.11g, 802.11a products.
6. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 270Mbps.
7. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.



## **2.2 GENERAL DESCRIPTION OF APPLIED STANDARDS**

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

**FCC Part 2 (2.1093)**

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

**RSS-102**

**IEEE 1528-2003**

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



## 2.3 GENERAL INFORMATION OF THE SAR SYSTEM

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

### ET3DV6 ISOTROPIC E-FIELD PROBE (FREQUENCY BAND < 3GHz)

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



## **EX3DV3 ISOTROPIC E-FIELD PROBE (FREQUENCY BAND 5 ~ 6GHz)**

<b>DIMENSIONS</b>	Overall length: 330 mm (Tip Length: 20 mm) Tip diameter: 2.5 mm (Body diameter: 12 mm) Distance from probe tip to dipole centers: 1.0 mm
<b>APPLICATION</b>	General dosimetric measurements range 5 ~ 6 GHz. Fast automatic scanning in arbitrary phantoms (EX3DV3)

### **NOTE**

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

## **TWIN SAM V4.0**

<b>CONSTRUCTION</b>	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.
<b>SHELL THICKNESS</b>	$2 \pm 0.2\text{mm}$
<b>FILLING VOLUME</b>	Approx. 25liters
<b>DIMENSIONS</b>	Height: 810mm; Length: 1000mm; Width: 500mm

### **SYSTEM VALIDATION KITS:**

<b>CONSTRUCTION</b>	Symmetrical dipole with 1/4 balun enables measurement of feedpoint impedance with NWA matched for use near flat phantoms filled with brain simulating solutions. Includes distance holder and tripod adaptor
<b>CALIBRATION</b>	Calibrated SAR value for specified position and input power at the flat phantom in brain simulating solutions
<b>FREQUENCY</b>	2450 , 5200, 5800 MHz





<b>RETURN LOSS</b>	> 20dB at specified validation position
<b>POWER CAPABILITY</b>	> 100W (f < 1GHz); > 40W (f > 1GHz)
<b>OPTIONS</b>	Dipoles for other frequencies or solutions and other calibration conditions upon request

## **DEVICE HOLDER FOR SAM TWIN PHANTOM**

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

## **DATA ACQUISITION ELECTRONICS**

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

## 2.4 GENERAL DESCRIPTION OF THE SPATIAL PEAK SAR EVALUATION

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

Probe parameters:	- Sensitivity	Norm <sub>i</sub> , a <sub>i0</sub> , a <sub>i1</sub> , a <sub>i2</sub>
	- Conversion factor	ConvF <sub>i</sub>
	- Diode compression point	dcp <sub>i</sub>
Device parameters:	- Frequency	F
	- Crest factor	Cf
Media parameters:	- Conductivity	$\sigma$
	- Density	$\rho$

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

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

V <sub>i</sub>	=compensated signal of channel i	(i = x, y, z)
U <sub>i</sub>	=input signal of channel I	(i = x, y, z)
Cf	=crest factor of exciting field	(DASY parameter)
dcp <sub>i</sub>	=diode compression point	(DASY parameter)

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

$$\text{E-field probes: } E_i = \sqrt{\frac{V_i}{\text{Norm}_i \cdot \text{ConvF}}}$$

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

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

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

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

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

$$SAR = E_{tot}^2 \cdot \frac{S}{r \cdot 1'000}$$

- SAR = local specific absorption rate in mW/g
- $E_{tot}$  = total field strength in V/m
- $\sigma$  = conductivity in [mho/m] or [Siemens/m]
- $\rho$  = equivalent tissue density in g/cm<sup>3</sup>



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

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

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

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 -2dB 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 1g and 10g 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 7 x 7 x 7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30 x 30 x 30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid (42875 points). In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.



### 3. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	D820	21498926752	FCC DoC Approved
2	NOTEBOOK	DELL	D640	2FTFN1S	FCC DoC Approved
3	NOTEBOOK	HP	nx6215	CND5390CMP	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA
3	NA

**NOTE:** All power cords of the above support units are non shielded (1.8m).




## 4. DESCRIPTION OF TEST MODES AND CONFIGURATIONS

### 4.1. DESCRIPTION OF ANTENNA LOCATION



## 4.2. DESCRIPTION OF ASSESSMENT POSITION

The following test configurations have been applied in this test report:

	
<p><b>A: NOTEBOOK MODEL: D820</b></p> <p>The bottom of the EUT face to the phantom with 5mm-separation distance.</p>	<p><b>B: NOTEBOOK MODEL: D640</b></p> <p>The bottom of the EUT face to the phantom with 8mm-separation distance.</p>
 <p><b>C: NOTEBOOK MODEL: NX6215</b></p> <p>The bottom of the EUT face to the phantom with 12mm-separation distance.</p>	

**NOTE:** The bottom of the notebook contacts to the bottom of the flat phantom with 0mm-separation distance.



### 4.3. DESCRIPTION OF TEST MODE

ITEM	TEST MODE	MODULATION	ASSESSMENT POSITION	TESTED CHANNEL
<b>FOR 2.4GHz</b>				
1	802.11b	DBPSK	A	L, M, H
2	802.11g	BPSK	A	L, M, H
3	Draft 802.11n (20MHz)	BPSK	A	L, M, H
4	Draft 802.11n (40MHz)	BPSK	A	L, M, H
5	802.11b	DBPSK	B	M
6	802.11g	BPSK	B	M
7	Draft 802.11n (20MHz)	BPSK	B	L
8	Draft 802.11n (40MHz)	BPSK	B	M
9	802.11b	DBPSK	C	M
10	802.11g	BPSK	C	M
11	Draft 802.11n (20MHz)	BPSK	C	L
12	Draft 802.11n (40MHz)	BPSK	C	M
<b>FOR 5GHz</b>				
13	802.11a	BPSK	A	36, 48, 52, 64, 100, 104, 116, 120, 124, 136, 140, 149, 157, 165
14	Draft 802.11n (20MHz)	BPSK	A	36, 48, 149, 157, 165
15	Draft 802.11n (40MHz)	BPSK	A	38, 46, 151, 159
16	802.11a	BPSK	B	64, 100, 165
17	Draft 802.11n (20MHz)	BPSK	B	48, 157
18	Draft 802.11n (40MHz)	BPSK	B	46, 151
19	802.11a	BPSK	C	64, 100, 165
20	Draft 802.11n (20MHz)	BPSK	C	48, 157
21	Draft 802.11n (40MHz)	BPSK	C	46, 151

#### 4.4. SUMMARY OF TEST RESULTS

COMMUNICATION MODE	802.11b	802.11g	Draft 802.11n (20MHz)	Draft 802.11n (40MHz)
TEST MODE	1	2	3	4
MEASURED VALUE OF 1g SAR ( W/kg)				
CHANNEL	ASSESSMENT POSITION (A)			
LOW	0.465	0.363	1.280	1.360
MIDDLE	0.687	0.414	1.000	<b>1.470</b>
HIGH	0.323	0.284	0.818	1.070

COMMUNICATION MODE	802.11b	802.11g	Draft 802.11n (20MHz)	Draft 802.11n (40MHz)
TEST MODE	5	6	7	8
MEASURED VALUE OF 1g SAR ( W/kg)				
CHANNEL	ASSESSMENT POSITION (B)			
LOW	-	-	0.903	-
MIDDLE	0.520	0.293	-	1.050
HIGH	-	-	-	-

COMMUNICATION MODE	802.11b	802.11g	Draft 802.11n (20MHz)	Draft 802.11n (40MHz)
TEST MODE	9	10	11	12
MEASURED VALUE OF 1g SAR ( W/kg)				
CHANNEL	ASSESSMENT POSITION (C)			
LOW	-	-	0.427	-
MIDDLE	0.259	0.140	-	0.466
HIGH	-	-	-	-

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

COMMUNICATION MODE	802.11a	Draft 802.11n (20MHz)
TEST MODE	13	14
<b>MEASURED VALUE OF 1g SAR ( W/kg)</b>		
CHANNEL	ASSESSMENT POSITION (A)	
36	0.578	0.649
48	0.728	1.070
52	0.788	-
64	0.970	-
100	<b>1.160</b>	-
104	1.130	-
116	1.090	-
120	1.120	-
124	1.070	-
136	0.993	-
140	0.911	-
149	0.564	0.429
157	0.504	0.567
165	0.914	0.524

COMMUNICATION MODE	Draft 802.11n (40MHz)	
TEST MODE	15	
<b>MEASURED VALUE OF 1g SAR ( W/kg)</b>		
CHANNEL	ASSESSMENT POSITION (A)	
38	0.611	
46	0.799	
151	0.812	
159	0.694	



COMMUNICATION MODE	802.11a	
TEST MODE	16	19
MEASURED VALUE OF 1g SAR ( W/kg)		
CHANNEL	ASSESSMENT POSITION (B)	ASSESSMENT POSITION (C)
64	0.788	0.370
100	0.954	0.479
165	0.845	0.454

COMMUNICATION MODE	Draft 802.11n (20MHz)	
TEST MODE	17	20
MEASURED VALUE OF 1g SAR ( W/kg)		
CHANNEL	ASSESSMENT POSITION (B)	ASSESSMENT POSITION (C)
48	0.854	0.389
157	0.470	0.295

COMMUNICATION MODE	Draft 802.11n (40MHz)	
TEST MODE	18	21
MEASURED VALUE OF 1g SAR ( W/kg)		
CHANNEL	ASSESSMENT POSITION (B)	ASSESSMENT POSITION (C)
46	0.690	0.330
151	0.724	0.411

## 5. TEST RESULTS

### 5.1 TEST PROCEDURES

The EUT plugged into the notebook. Use the software to control the EUT channel and transmission power. Then record the conducted power before the testing. Place the EUT to the specific test location. After the testing, must writing down the conducted power of the EUT into the report. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY4 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528 standards, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

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

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



In the zoom scan, the distance between the measurement point at the probe sensor location (geometric center behind the probe tip) and the phantom surface is 4.0mm and maintained at a constant distance of  $\pm 1.0$ mm during a zoom scan to determine peak SAR locations. The distance is 4mm between the first measurement point and the bottom surface of the phantom. The secondary measurement point to the bottom surface of the phantom is with 9mm separation distance. The cube size is 7 x 7 x 7 points consist of 343 points and the grid space is 5mm.

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

In the area scan, the separation distance is 4mm between the each measurement point and the phantom surface. The scan size shall be included the transmission portion of the EUT. The measurement time is the same as the zoom scan. At last the reference power drift shall be less than  $\pm 5\%$ .

## 5.2 MEASURED SAR RESULTS

ENVIRONMENTAL CONDITION		Air Temperature : 23.3°C, Liquid Temperature : 22.0°C Humidity : 57%RH						
TESTED BY		Sam Onn			DATE		Aug. 14, 2007	
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)	
			BEGIN TEST	AFTER TEST				
1	2412 (Low)	802.11b	94.406	93.594	-0.86	1	0.465	
6	2437 (Mid.)	802.11b	105.925	104.950	-0.92	1	0.687	
11	2462 (High)	802.11b	89.125	88.243	-0.99	1	0.323	
1	2412 (Low)	802.11g	70.795	70.069	-1.03	2	0.363	
6	2437 (Mid.)	802.11g	79.433	78.543	-1.12	2	0.414	
11	2462 (High)	802.11g	63.096	62.320	-1.23	2	0.284	

**NOTE:**

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

<b>ENVIRONMENTAL CONDITION</b>		Air Temperature : 23.3°C, Liquid Temperature : 22.0°C Humidity : 57%RH					
<b>TESTED BY</b>		Sam Onn			<b>DATE</b>		Aug. 14, 2007
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST			
1	2412 (Low)	DRAFT 802.11n (20MHz)	159.920	157.920	-1.25	3	1.280
6	2437 (Mid.)	DRAFT 802.11n (20MHz)	141.589	139.734	-1.31	3	1.000
11	2462 (High)	DRAFT 802.11n (20MHz)	141.589	139.621	-1.39	3	0.818
1	2422 (Low)	DRAFT 802.11n (40MHz)	112.468	110.882	-1.41	4	1.360
4	2437 (Mid.)	DRAFT 802.11n (40MHz)	141.589	139.479	-1.49	4	1.470
7	2452 (High)	DRAFT 802.11n (40MHz)	126.191	124.273	-1.52	4	1.070

**NOTE:**

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



ENVIRONMENTAL CONDITION		Air Temperature : 23.3°C, Liquid Temperature : 22.0°C Humidity : 57%RH						
TESTED BY		Sam Onn			DATE		Aug. 14, 2007	
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)	
			BEGIN TEST	AFTER TEST				
6	2437 (Mid.)	802.11b	105.925	104.802	-1.06	5	0.520	
6	2437 (Mid.)	802.11g	79.433	78.527	-1.14	6	0.293	
1	2412 (Low)	DRAFT 802.11n (20MHz)	159.920	157.990	-1.21	7	0.903	
4	2437 (Mid.)	DRAFT 802.11n (40MHz)	141.589	139.805	-1.26	8	1.050	
6	2437 (Mid.)	802.11b	105.925	105.131	-0.75	9	0.259	
6	2437 (Mid.)	802.11g	79.433	78.774	-0.83	10	0.140	
1	2412 (Low)	DRAFT 802.11n (20MHz)	159.920	158.470	-0.91	11	0.427	
4	2437 (Mid.)	DRAFT 802.11n (40MHz)	141.589	140.088	-1.06	12	0.466	

**NOTE:**

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

ENVIRONMENTAL CONDITION		Air Temperature : 23.5°C, Liquid Temperature : 22.3°C Humidity : 60%RH					
TESTED BY		Sam Onn			DATE		Aug. 15, 2007
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST			
36	5180.000	802.11a	19.275	19.167	-0.56	13	0.578
48	5240.000	802.11a	30.620	30.427	-0.63	13	0.728
52	5260.000	802.11a	33.651	33.409	-0.72	13	0.788
64	5320.000	802.11a	46.026	45.644	-0.83	13	0.970
100	5500.000	802.11a	50.234	49.772	-0.92	13	<b>1.160</b>
104	5520.000	802.11a	48.865	48.347	-1.06	13	1.130
116	5580.000	802.11a	45.814	45.296	-1.13	13	1.090
120	5600.000	802.11a	45.499	44.926	-1.26	13	1.120
124	5620.000	802.11a	43.152	42.569	-1.35	13	1.070
136	5680.000	802.11a	29.648	29.230	-1.41	13	0.993
140	5700.000	802.11a	28.576	28.150	-1.49	13	0.911
149	5745.000	802.11a	79.433	78.226	-1.52	13	0.564
157	5785.000	802.11a	70.795	69.641	-1.63	13	0.504
165	5825.000	802.11a	89.125	87.601	-1.71	13	0.914

**NOTE:**

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

ENVIRONMENTAL CONDITION		Air Temperature : 23.5°C, Liquid Temperature : 22.3°C Humidity : 60%RH						
TESTED BY		Sam Onn			DATE		Aug. 15, 2007	
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)	
			BEGIN TEST	AFTER TEST				
36	5180.000	DRAFT 802.11n (20MHz)	33.362	33.152	-0.63	14	0.649	
48	5240.000	DRAFT 802.11n (20MHz)	48.143	47.801	-0.71	14	1.070	
149	5745.000	DRAFT 802.11n (20MHz)	100.237	99.395	-0.84	14	0.429	
157	5785.000	DRAFT 802.11n (20MHz)	103.822	102.867	-0.92	14	0.567	
165	5825.000	DRAFT 802.11n (20MHz)	100.344	99.320	-1.02	14	0.524	
38	5190.000	DRAFT 802.11n (40MHz)	35.316	34.906	-1.16	15	0.611	
46	5230.000	DRAFT 802.11n (40MHz)	45.037	44.461	-1.28	15	0.799	
151	5755.000	DRAFT 802.11n (40MHz)	159.226	157.092	-1.34	15	0.812	
159	5795.000	DRAFT 802.11n (40MHz)	135.539	133.601	-1.43	15	0.694	

**NOTE:**

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



<b>ENVIRONMENTAL CONDITION</b>		Air Temperature : 23.5°C, Liquid Temperature : 22.3°C Humidity : 60%RH					
<b>TESTED BY</b>		Sam Onn			<b>DATE</b>		Aug. 15, 2007
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST			
64	5320.000	802.11a	46.026	45.754	-0.59	16	0.788
100	5500.000	802.11a	50.234	49.897	-0.67	16	0.954
165	5825.000	802.11a	89.125	88.474	-0.73	16	0.845
48	5240.000	DRAFT 802.11n (20MHz)	48.143	47.739	-0.84	17	0.854
157	5785.000	DRAFT 802.11n (20MHz)	103.822	102.836	-0.96	17	0.470
46	5230.000	DRAFT 802.11n (40MHz)	45.037	44.582	-1.01	18	0.690
151	5755.000	DRAFT 802.11n (40MHz)	159.226	157.427	-1.13	18	0.724

**NOTE:**

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



<b>ENVIRONMENTAL CONDITION</b>		Air Temperature : 23.5°C, Liquid Temperature : 22.3°C Humidity : 60%RH					
<b>TESTED BY</b>		Sam Onn			<b>DATE</b>		Aug. 15, 2007
CHAN.	FREQ. (MHz)	TEST MODE	CONDUCTED POWER (mW)		POWER DRIFT (%)	DEVICE TEST POSITION MODE	MEASURED 1g SAR (W/kg)
			BEGIN TEST	AFTER TEST			
64	5320.000	802.11a	46.026	45.672	-0.77	19	0.370
100	5500.000	802.11a	50.234	49.810	-0.85	19	0.479
165	5825.000	802.11a	89.125	88.296	-0.93	19	0.454
48	5240.000	DRAFT 802.11n (20MHz)	48.143	47.623	-1.08	20	0.389
157	5785.000	DRAFT 802.11n (20MHz)	103.822	102.618	-1.16	20	0.295
46	5230.000	DRAFT 802.11n (40MHz)	45.037	44.483	-1.23	21	0.330
151	5755.000	DRAFT 802.11n (40MHz)	159.226	157.045	-1.37	21	0.411

**NOTE:**

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

### 5.3 SAR LIMITS

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

**NOTE:**

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

## 5.4 RECIPES FOR TISSUE SIMULATING LIQUIDS

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

The following ingredients are used :

- **WATER-** Deionized water (pure H<sub>2</sub>O), resistivity  $\approx 16$  M - as basis for the liquid
- **SUGAR-** Refined sugar in crystals, as available in food shops - to reduce relative permittivity
- **SALT-** Pure NaCl - to increase conductivity
- **CELLULOSE-** Hydroxyethyl-cellulose, medium viscosity (75-125mPa.s, 2% in water, 20°C),  
CAS # 54290 - to increase viscosity and to keep sugar in solution
- **PRESERVATIVE-** Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 - to prevent the spread of bacteria and molds
- **DGMBE-** Diethylenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS # 112-34-5 - to reduce relative permittivity

**THE RECIPES FOR 2450MHz SIMULATING LIQUID TABLE**

INGREDIENT	HEAD SIMULATING LIQUID 2450MHz (HSL-2450)	MUSCLE SIMULATING LIQUID 2450MHz (MSL-2450)
Water	45%	69.83%
DGMBE	55%	30.17%
Salt	NA	NA
Dielectric Parameters at 22°C	f= 2450MHz $\epsilon = 39.2 \pm 5\%$ $\sigma = 1.80 \pm 5\%$ S/m	f= 2450MHz $\epsilon = 52.7 \pm 5\%$ $\sigma = 1.95 \pm 5\%$ S/m



## THE INFORMATION FOR 5GHz SIMULATING LIQUID

**The 5GHz liquids were purchased from SPEAG.**

**Body liquid model:** HSL 5800, P/N: SL AAH 5800 AA

**Head liquid model:** M 5800, P/N: SL AAM 580 AD

**5GHz liquids contain the following ingredients:**

Water 64 - 78%

Mineral Oil 11 - 18%

Emulsifiers 9 - 15%

Additives and Salt 2 - 3%

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

1. Turn Network Analyzer on and allow at least 30min. warm up.
2. Mount dielectric probe kit so that interconnecting cable to Network Analyzer will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature ( $\pm 1^\circ$ ).
4. Set water temperature in Agilent-Software (Calibration Setup).
5. Perform calibration.
6. Validate calibration with dielectric material of known properties (e.g. polished ceramic slab with  $>8\text{mm}$  thickness  $\epsilon' = 10.0$ ,  $\epsilon'' = 0.0$ ). If measured parameters do not fit within tolerance, repeat calibration ( $\pm 0.2$  for  $\epsilon'$ :  $\pm 0.1$  for  $\epsilon''$ ).
7. Conductivity can be calculated from  $\epsilon''$  by  $\sigma = \omega \epsilon_0 \epsilon'' = \epsilon'' f [\text{GHz}] / 18$ .
8. Measure liquid shortly after calibration. Repeat calibration every hour.
9. Stir the liquid to be measured. Take a sample ( $\sim 50\text{ml}$ ) with a syringe from the center of the liquid container.
10. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
11. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
12. Perform measurements.
13. Adjust medium parameters in DASY4 for the frequencies necessary for the measurements ('Setup Config', select medium (e.g. Brain 900MHz) and press 'Option'-button.
14. Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 900MHz).





**FOR 2.4GHz BAND SIMULATING LIQUID**

LIQUID TYPE		HSL-2450		MSL-2450	
<b>SIMULATING LIQUID TEMP.</b>		NA		22.0	
<b>TEST DATE</b>		NA		Aug. 14, 2007	
<b>TESTED BY</b>		NA		Sam Onn	
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	STANDARD VALUE	MEASUREMENT VALUE
2412.0	Permittivity ( $\epsilon$ )	NA	NA	52.80	53.50
2422.0		NA	NA	52.70	53.40
2437.0		NA	NA	52.70	53.30
2450.0		NA	NA	52.70	53.10
2452.0		NA	NA	52.70	53.10
2462.0		NA	NA	52.70	53.00
2412.0	Conductivity ( $\sigma$ ) S/m	NA	NA	1.91	1.95
2422.0		NA	NA	1.92	1.96
2437.0		NA	NA	1.94	1.98
2450.0		NA	NA	1.95	1.99
2452.0		NA	NA	1.95	1.99
2462.0		NA	NA	1.96	2.00
<b>Dielectric Parameters Required at 22°C</b>		<b>f= 2450MHz</b> <b><math>\epsilon= 39.2 \pm 5\%</math></b> <b><math>\sigma= 1.80 \pm 5\% \text{ S/m}</math></b>		<b>f= 2450MHz</b> <b><math>\epsilon= 52.7 \pm 5\%</math></b> <b><math>\sigma= 1.95 \pm 5\% \text{ S/m}</math></b>	



**FOR 5.0GHz BAND SIMULATING LIQUID**

**BAND (5.150 ~ 5.350GHz)**

LIQUID TYPE		HSL-5200		MSL-5200	
SIMULATING LIQUID TEMP.		NA		22.3	
TEST DATE		NA		Aug. 15, 2007	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	STANDARD VALUE	MEASUREMENT VALUE
5180	Permittivity ( $\epsilon$ )	NA	NA	49.00	49.40
5190		NA	NA	49.00	49.40
5200		NA	NA	49.00	49.40
5230		NA	NA	49.00	49.30
5240		NA	NA	49.00	49.30
5260		NA	NA	48.90	49.30
5320		NA	NA	48.90	49.20
5180	Conductivity ( $\sigma$ ) S/m	NA	NA	5.28	5.27
5190		NA	NA	5.29	5.28
5200		NA	NA	5.30	5.29
5230		NA	NA	5.33	5.34
5240		NA	NA	5.35	5.36
5260		NA	NA	5.37	5.38
5320		NA	NA	5.44	5.47
<b>Dielectric Parameters Required at 21°C</b>					



**BAND (5.470 ~ 5.850GHz)**

<b>LIQUID TYPE</b>		HSL-5200		MSL-5200	
<b>SIMULATING LIQUID TEMP.</b>		NA		22.3	
<b>TEST DATE</b>		NA		Aug. 15, 2007	
<b>TESTED BY</b>		NA		Sam Onn	
<b>FREQ. (MHz)</b>	<b>LIQUID PARAMETER</b>	<b>STANDARD VALUE</b>	<b>MEASUREMENT VALUE</b>	<b>STANDARD VALUE</b>	<b>MEASUREMENT VALUE</b>
5500	Permittivity ( $\epsilon$ )	NA	NA	48.60	48.80
5520		NA	NA	48.60	48.80
5580		NA	NA	48.50	48.60
5590		NA	NA	48.50	48.60
5600		NA	NA	48.50	48.60
5620		NA	NA	48.40	48.60
5680		NA	NA	48.40	48.40
5700		NA	NA	48.30	48.40
5745		NA	NA	48.30	48.30
5755		NA	NA	48.30	48.30
5785		NA	NA	48.20	48.30
5795		NA	NA	48.20	48.20
5800		NA	NA	48.20	48.20
5825		NA	NA	48.20	48.20
<b>Dielectric Parameters Required at 21°C</b>					



LIQUID TYPE		HSL-5200		MSL-5200	
SIMULATING LIQUID TEMP.		NA		22.3	
TEST DATE		NA		Aug. 15, 2007	
TESTED BY		NA		Sam Onn	
FREQ. (MHz)	LIQUID PARAMETER	STANDARD VALUE	MEASUREMENT VALUE	STANDARD VALUE	MEASUREMENT VALUE
5500	Conductivity ( $\sigma$ ) S/m	NA	NA	5.65	5.74
5520		NA	NA	5.67	5.76
5580		NA	NA	5.74	5.85
5590		NA	NA	5.75	5.87
5600		NA	NA	5.77	5.88
5620		NA	NA	5.79	5.91
5680		NA	NA	5.86	6.01
5700		NA	NA	5.88	6.04
5745		NA	NA	5.94	6.11
5755		NA	NA	5.95	6.12
5785		NA	NA	5.98	6.17
5795		NA	NA	5.99	6.19
5800		NA	NA	6.00	6.19
5825		NA	NA	6.03	6.23
<b>Dielectric Parameters Required at 21°C</b>					



## 5.5 TEST EQUIPMENT FOR TISSUE PROPERTY

ITEM	NAME	BAND	TYPE	SERIES NO.	CALIBRATED UNTIL
1	Network Analyzer	Agilent	E8358A	US41480538	Nov. 06, 2007
2	Dielectric Probe	Agilent	85070D	US01440176	NA

**NOTE:**

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

## 6. SYSTEM VALIDATION

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

### 6.1 TEST EQUIPMENT

ITEM	NAME	BAND	TYPE	SERIES NO.	CALIBRATED UNTIL
1	SAM Phantom	S & P	QD000 P40 CA	PT-1150	NA
2	Signal Generator	Anritsu	68247B	984703	May 18, 2008
3	E-Field Probe	Speaq	EX3DV3	3506	Mar. 19, 2008
4	E-Field Probe	Speaq	ET3DV6	1790	Nov. 22, 2007
5	DAE	Speaq	DAE	579	Mar. 22, 2008
6	Robot Positioner	Staubli Unimation	NA	NA	NA
7	Validation Dipole	Speaq	D2450V2	737	Apr. 23, 2008
8	Validation Dipole	Speaq	D5GHzV2	1018	Apr. 18, 2008
9	Power Meter	Agilent	E4416A	GB41291763	May 27, 2008
10	Peak and Average Power Sensor	Agilent	E9327A	US40441181	May 27, 2008

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



## 6.2 TEST PROCEDURE

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

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

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



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

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

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

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

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



### 6.3 VALIDATION RESULTS

2450MHz SYSTEM VALIDATION TEST IN THE MUSCLE SIMULATING LIQUID					
TEST FREQUENCY (MHz)	REQUIRED SAR (mW/g)	MEASURED SAR (mW/g)	DEVIATION (%)	SEPARATION DISTANCE	TEST DATE
MSL2450	12.90 (1g)	13.10	1.55	10mm	Aug. 14, 2007
MSL5200	19.50 (1g)	19.20	-1.54	10mm	Aug. 15, 2007
MSL5500	19.60 (1g)	19.00	-3.06	10mm	Aug. 15, 2007
MSL5800	17.60 (1g)	16.80	-4.55	10mm	Aug. 15, 2007
<b>TESTED BY</b>	Sam Onn				

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

## 6.4 SYSTEM VALIDATION UNCERTAINTIES

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

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C <sub>i</sub> )		Standard Uncertainty (±%)		(v <sub>i</sub> )
				(1g)	(10g)	(1g)	(10g)	
<b>Measurement System</b>								
Probe Calibration	4.8	Normal	1	1	1	4.8	4.8	∞
Axial Isotropy	4.7	Rectangular	$\sqrt{3}$	1	1	2.7	2.7	∞
Hemispherical Isotropy	0	Rectangular	$\sqrt{3}$	1	1	0	0	∞
Boundary effect	1.0	Rectangular	$\sqrt{3}$	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	$\sqrt{3}$	1	1	2.7	2.7	∞
System Detection Limit	1.0	Rectangular	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	1.0	Normal	1	1	1	1.0	1.0	∞
Response Time	0	Rectangular	$\sqrt{3}$	1	1	0	0	∞
Integration Time	0	Rectangular	$\sqrt{3}$	1	1	0	0	∞
RF Ambient Conditions	3.0	Rectangular	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	0.4	Rectangular	$\sqrt{3}$	1	1	0.2	0.2	∞
Probe positioning	2.9	Rectangular	$\sqrt{3}$	1	1	1.7	1.7	∞
Algorithms for Max. SAR Evaluation	1.0	Rectangular	$\sqrt{3}$	1	1	0.6	0.6	∞
<b>Dipole</b>								
Dipole Axis to Liquid Distance	2.0	Rectangular	$\sqrt{3}$	1	1	1.2	1.2	∞
Input power and SAR drift measurement	4.7	Rectangular	$\sqrt{3}$	1	1	2.7	2.7	∞
<b>Phantom and Tissue Parameters</b>								
Phantom Uncertainty	4.0	Rectangular	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	Rectangular	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	2.5	Normal	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	Rectangular	$\sqrt{3}$	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	2.5	Normal	1	0.6	0.49	1.5	1.2	∞
<b>Combined Standard Uncertainty</b>						8.4	8.1	∞
<b>Coverage Factor for 95%</b>						kp=2		
<b>Expanded Uncertainty (K=2)</b>						16.8	16.2	

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

## 7. MEASUREMENT SAR PROCEDURE UNCERTAINTIES

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

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

### 7.1. PROBE CALIBRATION UNCERTAINTY

SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN50361, IEC 62209, etc.) under ISO17025. The uncertainties are stated on the calibration certificate. For the most relevant frequency bands, these values do not exceed 4.8% (k=1). If evaluations of other bands are performed for which the uncertainty exceeds these values, the uncertainty tables given in the summary have to be revised accordingly.

## 7.2. ISOTROPY UNCERTAINTY

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

## 7.3. BOUNDARY EFFECT UNCERTAINTY

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

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

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

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

#### 7.4. PROBE LINEARITY UNCERTAINTY

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

#### 7.5. READOUT ELECTRONICS UNCERTAINTY

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

#### 7.6. RESPONSE TIME UNCERTAINTY

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

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

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

## 7.7. INTEGRATION TIME UNCERTAINTY

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

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

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

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

**TABLE 7.1**

## 7.8. PROBE POSITIONER MECHANICAL TOLERANCE

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

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

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

## 7.9. PROBE POSITIONING

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

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

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

## 7.10. PHANTOM UNCERTAINTY

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

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

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



### 7.11. DASY4 UNCERTAINTY BUDGET (FOR 2.4GHz)

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C <sub>i</sub> )		Standard Uncertainty (±%)		(v <sub>i</sub> )
				(1g)	(10g)	(1g)	(10g)	
<b>Measurement Equipment</b>								
Probe Calibration	4.8	Normal	1	1	1	4.8	4.8	∞
Axial Isotropy	4.7	Rectangular	√3	1	1	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	√3	1	1	3.9	3.9	∞
Boundary effect	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	√3	1	1	2.7	2.7	∞
System Detection Limit	1.0	Rectangular	√3	1	1	0.6	0.6	∞
Readout Electronics	1.0	Normal	1	1	1	1.0	1.0	∞
Response Time	0.8	Normal	1	1	1	0.8	0.8	∞
Integration Time	2.6	Normal	1	1	1	2.6	2.6	∞
Noise	0.0	Normal	1	0	0	0	0	∞
<b>Mechanical Constraints</b>								
Scanning System	0.4	Rectangular	√3	1	1	0.2	0.2	∞
Phantom Shell	4.0	Rectangular	√3	1	1	2.3	2.3	∞
Probe Positioning	2.9	Rectangular	√3	1	1	1.7	1.7	∞
Device Positioning	2.9	Normal	1	1	1	2.9	2.9	875
<b>Physical Parameters</b>								
Liquid Conductivity (target)	5.0	Rectangular	√3	0.7	0.5	2	1.4	∞
Liquid Conductivity (measurement)	4.3	Rectangular	√3	0.7	0.5	1.7	1.2	∞
Liquid Permittivity (target)	5.0	Rectangular	√3	0.6	0.5	1.7	1.4	∞
Liquid Permittivity (measurement)	4.3	Rectangular	√3	0.6	0.5	1.5	1.2	∞
Power Drift	5	Rectangular	√3	1	1	2.9	2.9	∞
RF Ambient Conditions	3.0	Rectangular	√3	1	1	1.7	1.7	∞
<b>Post-Processing</b>								
Extrapolation and Integration	1	Rectangular	√3	1	1	0.6	0.6	∞
<b>Combined Standard Uncertainty</b>						<b>9.9</b>	<b>9.7</b>	
<b>Coverage Factor for 95%</b>						<b>kp=2</b>		
<b>Expanded Uncertainty (K=2)</b>						<b>19.9</b>	<b>19.3</b>	

**TABLE 7.2**

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

### 7.12.DASY4 UNCERTAINTY BUDGET (FOR 5 ~ 6GHz)

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C <sub>i</sub> )		Standard Uncertainty (±%)		(v <sub>i</sub> )
				(1g)	(10g)	(1g)	(10g)	
<b>Measurement System</b>								
Probe Calibration	6.8	Normal	1	1	1	6.8	6.8	∞
Axial Isotropy	4.7	Rectangular	$\sqrt{3}$	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	$\sqrt{3}$	0.7	0.7	3.9	3.9	∞
Boundary effect	2.0	Rectangular	$\sqrt{3}$	1	1	1.2	1.2	∞
Linearity	4.7	Rectangular	$\sqrt{3}$	1	1	2.7	2.7	∞
System Detection Limit	1.0	Rectangular	$\sqrt{3}$	1	1	0.6	0.6	∞
Readout Electronics	1.0	Normal	1	1	1	1.0	1.0	∞
Response Time	0.8	Rectangular	$\sqrt{3}$	1	1	0.5	0.5	∞
Integration Time	2.6	Rectangular	$\sqrt{3}$	1	1	1.5	1.5	∞
RF Ambient Conditions	3.0	Rectangular	$\sqrt{3}$	1	1	1.7	1.7	∞
Probe Positioner	0.8	Rectangular	$\sqrt{3}$	1	1	0.5	0.5	∞
Probe positioning	5.7	Normal	1	1	1	5.7	5.7	∞
Algorithms for Max. SAR Evaluation	4.0	Rectangular	$\sqrt{3}$	1	1	2.3	2.3	∞
<b>Test EUT Related</b>								
Device Positioning	2.9	Normal	1	1	1	2.9	2.9	145
Device Holder	3.6	Normal	1	1	1	3.6	3.6	5
Power Drift	5.0	Rectangular	$\sqrt{3}$	1	1	2.9	2.9	∞
<b>Phantom and Tissue Parameters</b>								
Phantom Uncertainty	4.0	Rectangular	$\sqrt{3}$	1	1	2.3	2.3	∞
Liquid Conductivity (target)	5.0	Rectangular	$\sqrt{3}$	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measurement)	2.5	Normal	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity (target)	5.0	Rectangular	$\sqrt{3}$	0.60	0.49	1.7	1.4	∞
Liquid Permittivity (measurement)	2.5	Normal	1	0.60	0.49	1.5	1.2	∞
<b>Combined Standard Uncertainty</b>						12.8	12.7	330
<b>Expanded STD Uncertainty</b>						<b>25.7</b>	<b>25.3</b>	

**TABLE 7.3**

The table 7.3: Worst-Case uncertainty budget for DASY4 valid for the frequency range 5 ~ 6 GHz. Probe calibration error reflects uncertainty of the narrow-bandwidth EX3DV3 probe conversion factor (±50 MHz).



## 8. INFORMATION ON THE TESTING LABORATORIES

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

<b>USA</b>	FCC, UL, A2LA
<b>GERMANY</b>	TUV Rheinland
<b>JAPAN</b>	VCCI
<b>NORWAY</b>	NEMKO
<b>CANADA</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>NETHERLANDS</b>	Telefication
<b>SINGAPORE</b>	PSB , GOST-ASIA (MOU)
<b>RUSSIA</b>	CERTIS (MOU)

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site:

[www.adt.com.tw/index.5/phtml](http://www.adt.com.tw/index.5/phtml). If you have any comments, please feel free to contact us at the following:

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**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

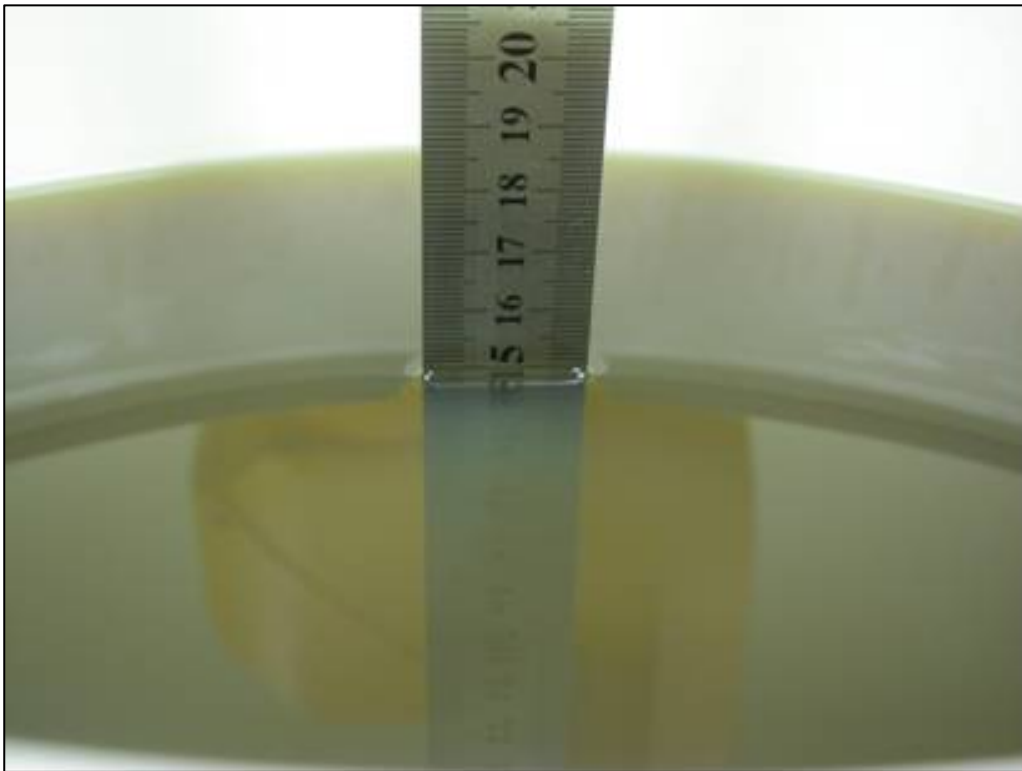
The address and road map of all our labs can be found in our web site also.

**APPENDIX A: TEST DATA**  
**Liquid Level Photo**

**MSL 2450MHz D=151mm**



**MSL 5800MHz D=150mm**



Test Laboratory: Advance Data Technology

### D820-11b-Ch1-M01

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2412 MHz

Communication System: 802.11b ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK  
Medium: MSL2450 Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.95$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Low Channel 1/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.424 mW/g

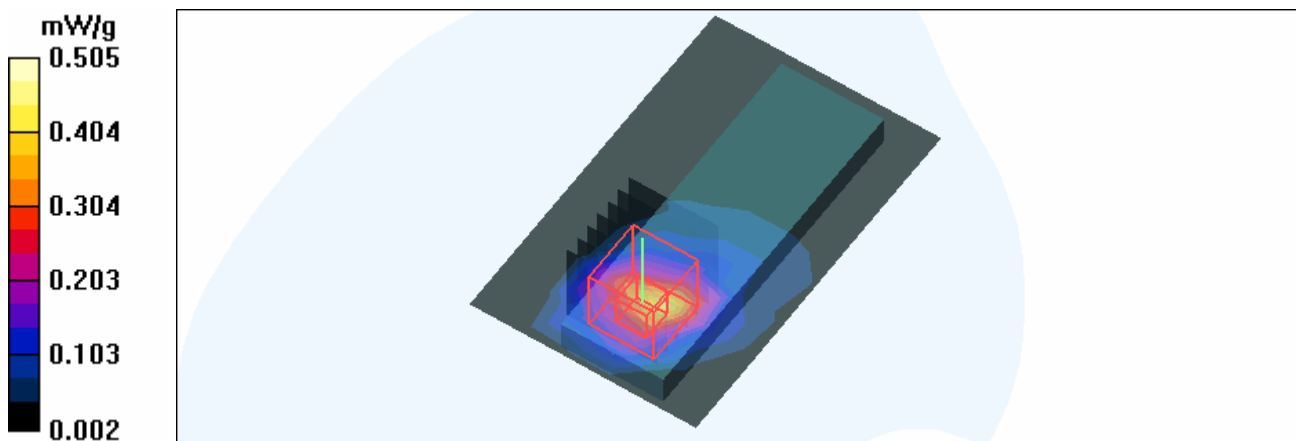
#### Low Channel 1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.2 V/m

Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.465 mW/g; SAR(10 g) = 0.203 mW/g

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



Test Laboratory: Advance Data Technology

## D820-11b-Ch6-M01

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz

Communication System: 802.11b ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK  
Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 6/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.619 mW/g

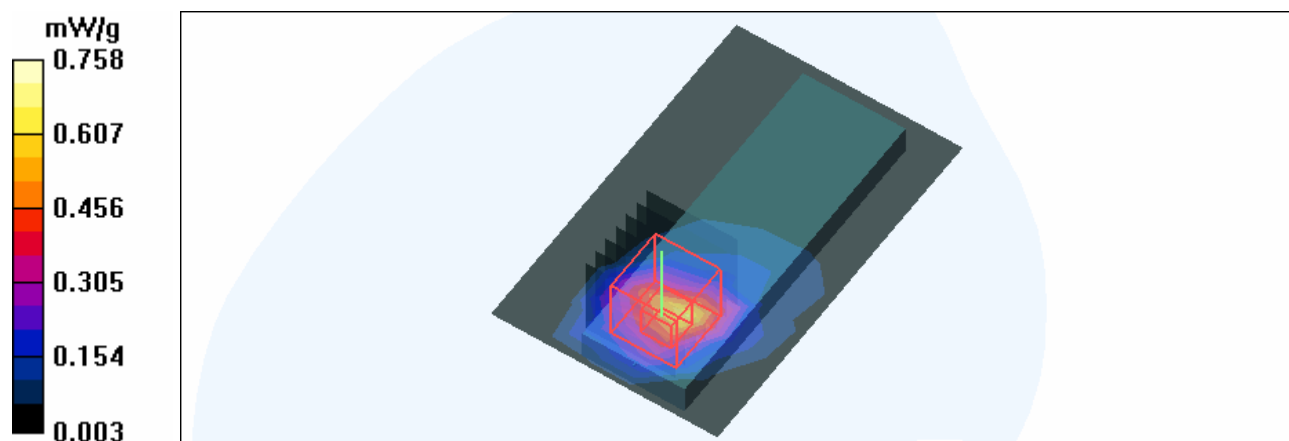
#### Mid Channel 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.2 V/m

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = **0.687 mW/g**; SAR(10 g) = 0.298 mW/g

Maximum value of SAR (measured) = 0.758 mW/g



Test Laboratory: Advance Data Technology

**D820-11b-Ch11-M01**

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2462 MHz**

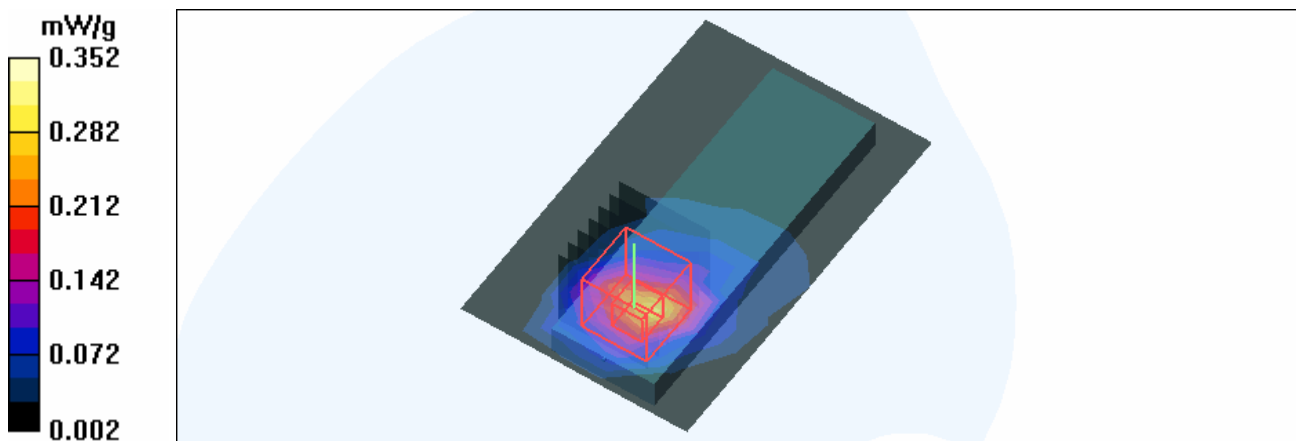
Communication System: 802.11b ; Frequency: 2462 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK  
 Medium: MSL2450 Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma = 2 \text{ mho/m}$ ;  $\epsilon_r = 53$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 151 mm  
 Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**High Channel 11/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (measured) = 0.290 mW/g

**High Channel 11/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
 Reference Value = 9.05 V/m  
 Peak SAR (extrapolated) = 0.851 W/kg  
**SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.141 mW/g**  
 Maximum value of SAR (measured) = 0.352 mW/g



Test Laboratory: Advance Data Technology

## D820-11g-Ch1-M02

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2412 MHz

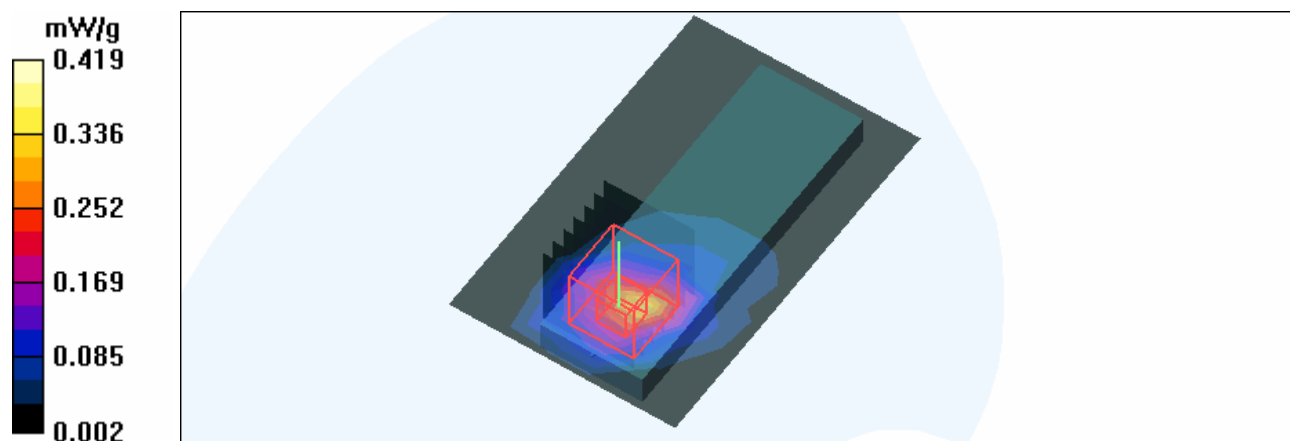
Communication System: 802.11g ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL2450 Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.95$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 1/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm  
Maximum value of SAR (measured) = 0.337 mW/g

**Low Channel 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 10.2 V/m  
Peak SAR (extrapolated) = 0.915 W/kg  
**SAR(1 g) = 0.363 mW/g; SAR(10 g) = 0.156 mW/g**  
Maximum value of SAR (measured) = 0.419 mW/g





Test Laboratory: Advance Data Technology

## D820-11g-Ch6-M02

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz

Communication System: 802.11g ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 6/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.377 mW/g

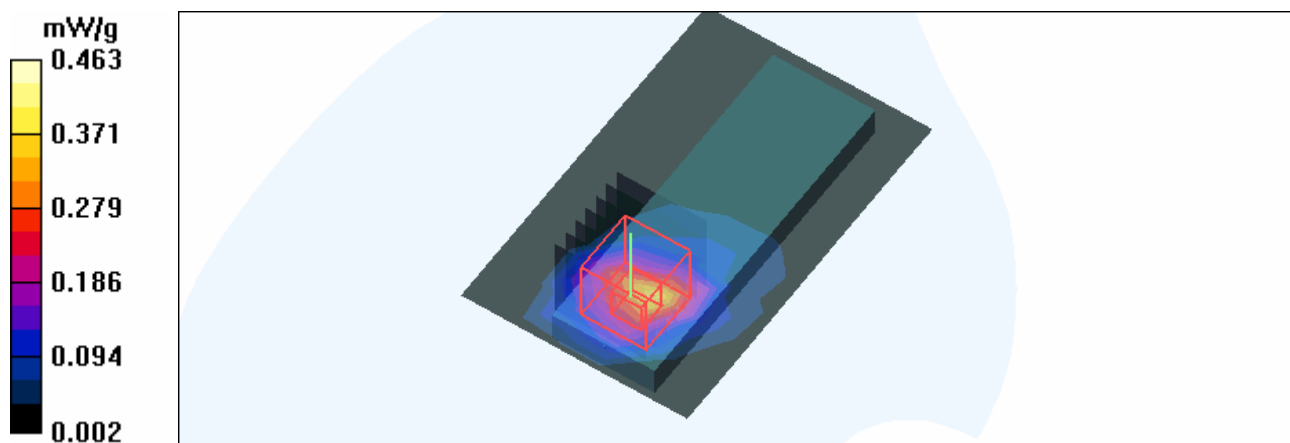
#### Mid Channel 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 10.9 V/m

Peak SAR (extrapolated) = 1.05 W/kg

SAR(1 g) = **0.414 mW/g**; SAR(10 g) = **0.178 mW/g**

Maximum value of SAR (measured) = 0.463 mW/g



Test Laboratory: Advance Data Technology

## D820-11g-Ch11-M02

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2462 MHz

Communication System: 802.11g ; Frequency: 2462 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL2450 Medium parameters used:  $f = 2462$  MHz;  $\sigma = 2$  mho/m;  $\epsilon_r = 53$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### High Channel 11/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.261 mW/g

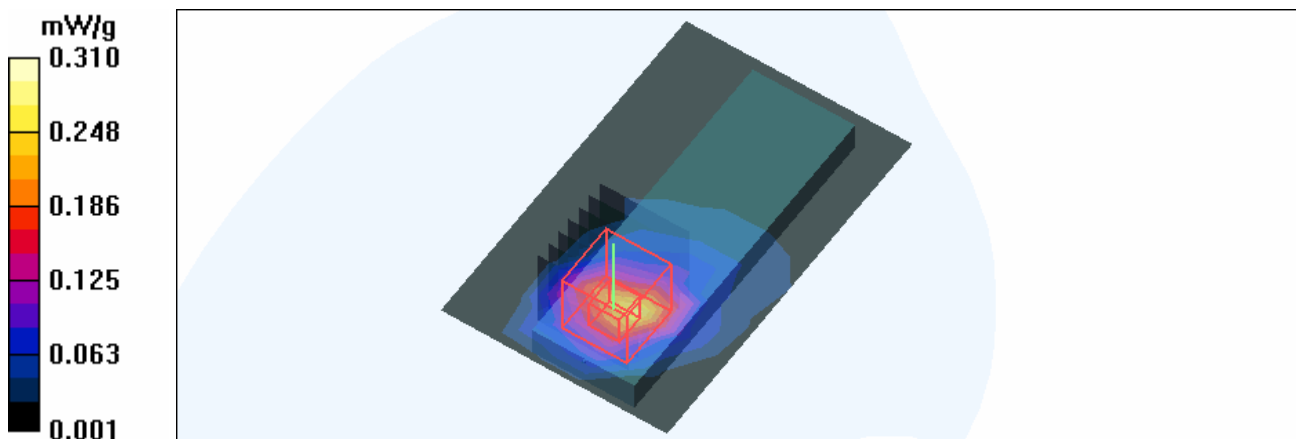
#### High Channel 11/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.78 V/m

Peak SAR (extrapolated) = 0.738 W/kg

SAR(1 g) = 0.284 mW/g; SAR(10 g) = 0.124 mW/g

Maximum value of SAR (measured) = 0.310 mW/g



Test Laboratory: Advance Data Technology

### D820-11n 2.4G Span 20-Ch1-M03

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2412 MHz**

Communication System: 2.4G 11n span20 ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.95$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 1/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.10 mW/g

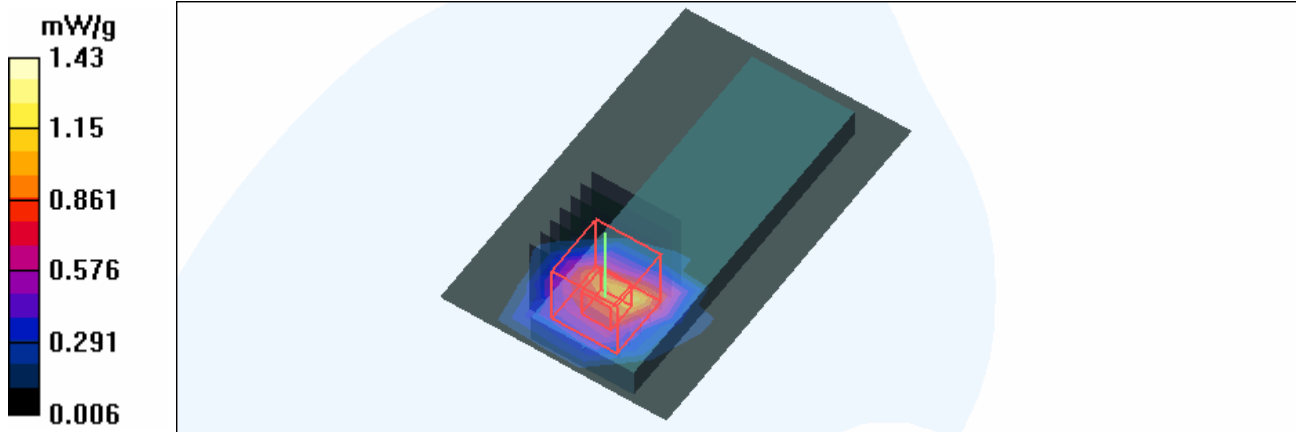
**Low Channel 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.2 V/m

Peak SAR (extrapolated) = 3.03 W/kg

**SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.549 mW/g**

Maximum value of SAR (measured) = 1.43 mW/g



Test Laboratory: Advance Data Technology

### D820-11n 2.4G Span 20-Ch6-M03

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz**

Communication System: 2.4G 11n span20 ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 6/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.797 mW/g

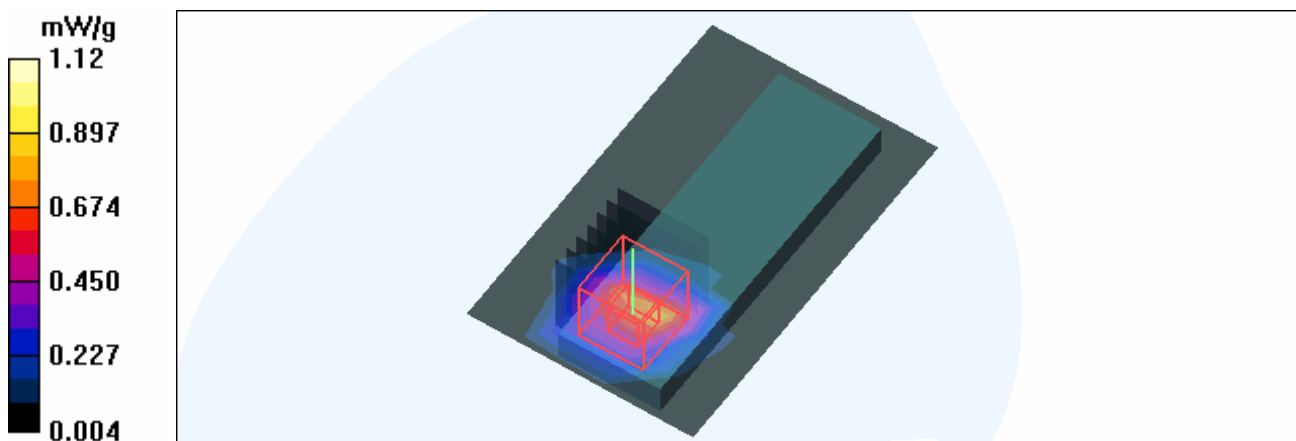
**Mid Channel 6/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.6 V/m

Peak SAR (extrapolated) = 2.43 W/kg

**SAR(1 g) = 1 mW/g; SAR(10 g) = 0.428 mW/g**

Maximum value of SAR (measured) = 1.12 mW/g



Test Laboratory: Advance Data Technology

### D820-11n 2.4G Span 20-Ch11-M03

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2462 MHz**

Communication System: 2.4G 11n span20 ; Frequency: 2462 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2462$  MHz;  $\sigma = 2$  mho/m;  $\epsilon_r = 53$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**High Channel 11/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.698 mW/g

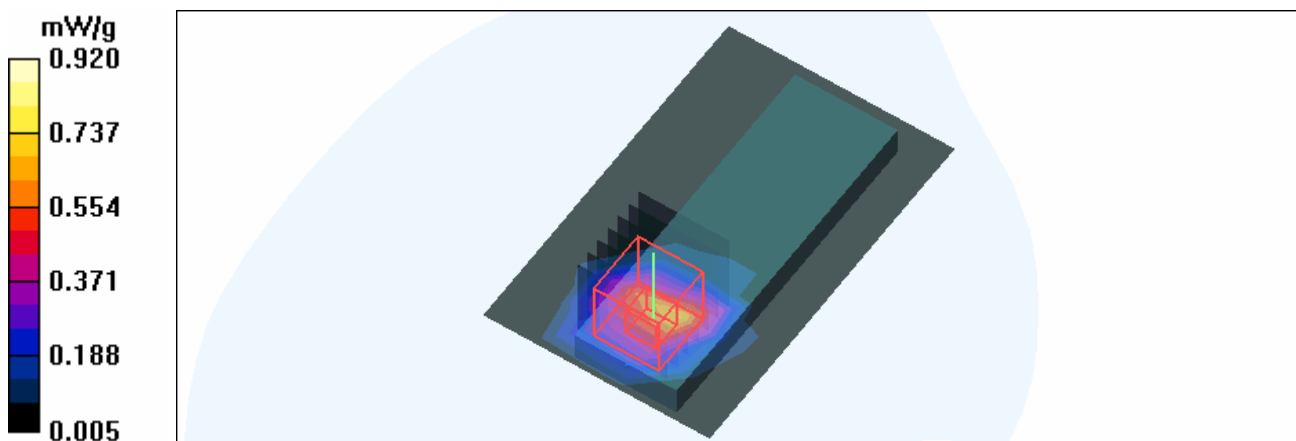
**High Channel 11/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 16.4 V/m

Peak SAR (extrapolated) = 2.03 W/kg

**SAR(1 g) = 0.818 mW/g; SAR(10 g) = 0.348 mW/g**

Maximum value of SAR (measured) = 0.920 mW/g



Test Laboratory: Advance Data Technology

### D820-11n 2.4G Span 40-Ch1-M04

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2422 MHz**

Communication System: 802.11n 40MHz ; Frequency: 2422 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2422$  MHz;  $\sigma = 1.96$  mho/m;  $\epsilon_r = 53.4$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 1/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.11 mW/g

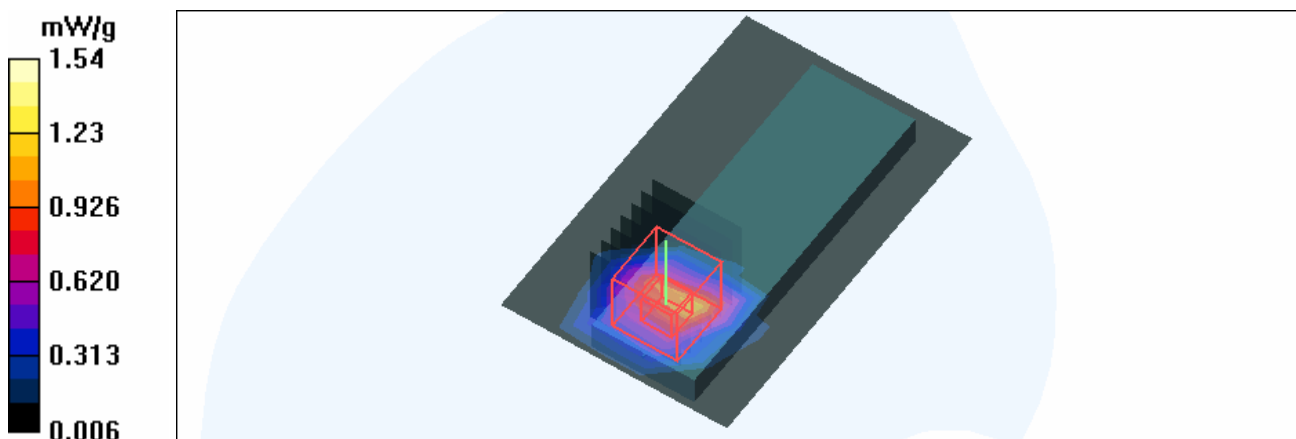
**Low Channel 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.2 V/m

Peak SAR (extrapolated) = 3.26 W/kg

**SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.581 mW/g**

Maximum value of SAR (measured) = 1.54 mW/g



Test Laboratory: Advance Data Technology

### D820-11n 2.4G Span 40-Ch4-M04

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz**

Communication System: 802.11n 40MHz ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 4/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.26 mW/g

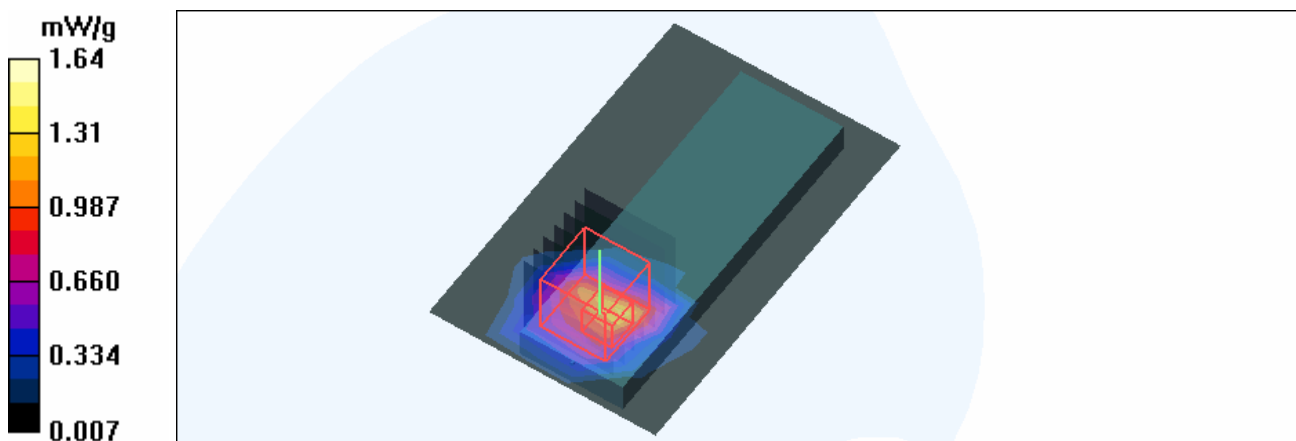
**Mid Channel 4/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

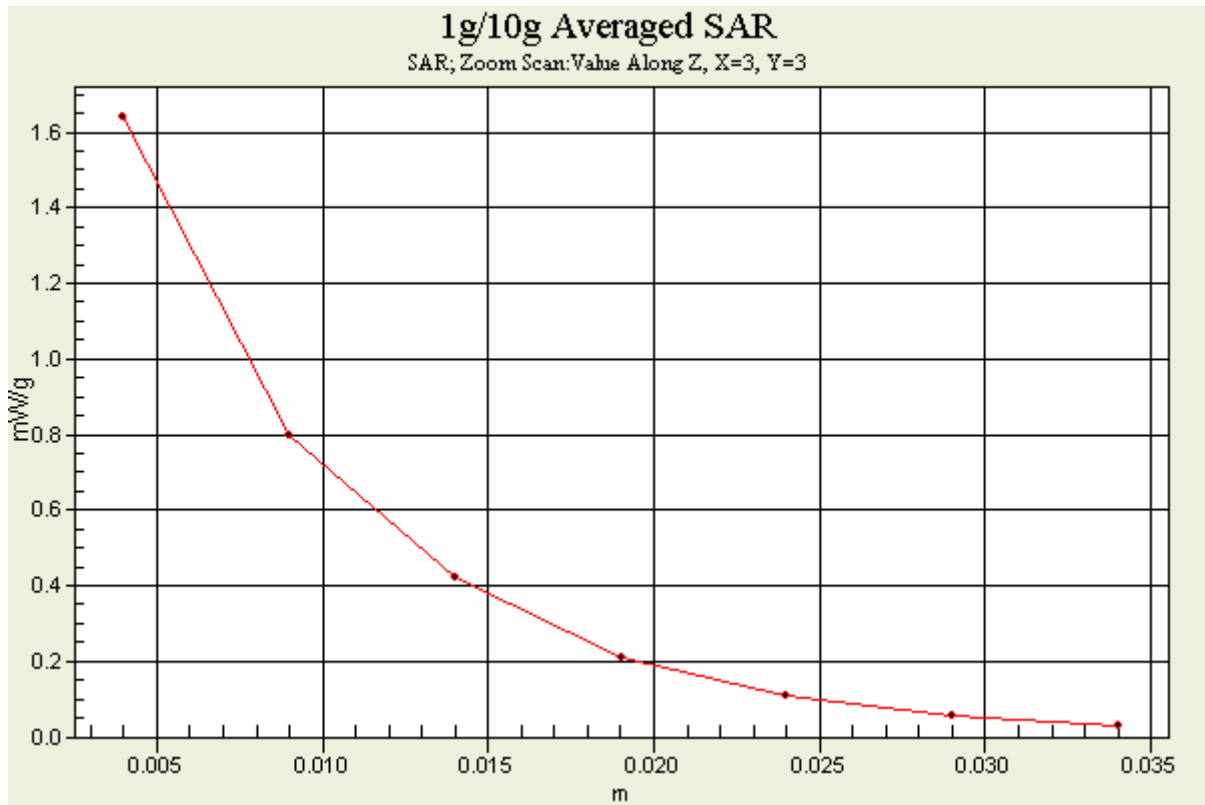
Reference Value = 23.0 V/m

Peak SAR (extrapolated) = 3.48 W/kg

**SAR(1 g) = 1.47 mW/g; SAR(10 g) = 0.630 mW/g**

Maximum value of SAR (measured) = 1.64 mW/g







Test Laboratory: Advance Data Technology

## D820-11n 2.4G Span 40-Ch7-M04

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2452 MHz**

Communication System: 802.11n 40MHz ; Frequency: 2452 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2452$  MHz;  $\sigma = 1.99$  mho/m;  $\epsilon_r = 53.1$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**High Channel 7/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.862 mW/g

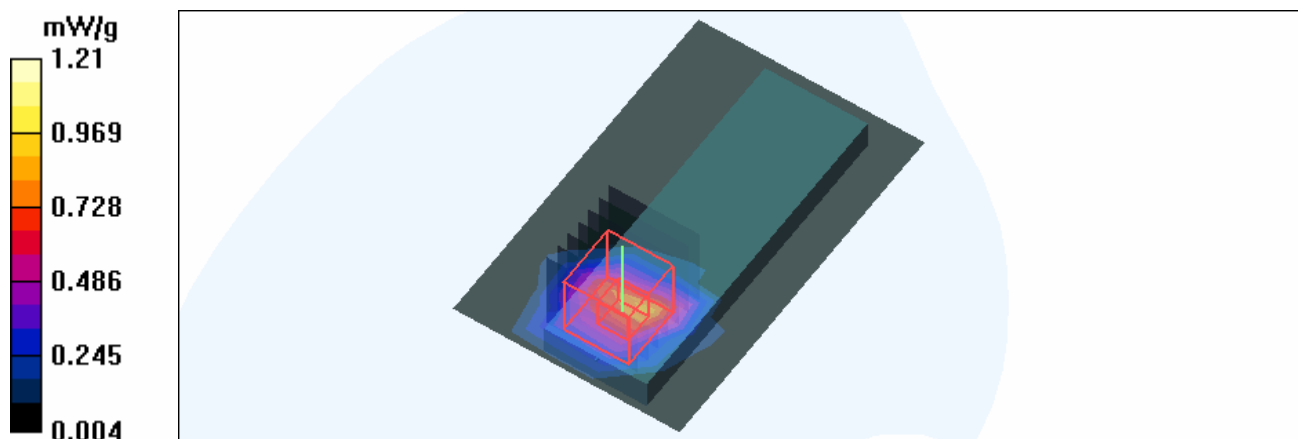
**High Channel 7/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.0 V/m

Peak SAR (extrapolated) = 2.66 W/kg

**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.458 mW/g**

Maximum value of SAR (measured) = 1.21 mW/g



Test Laboratory: Advance Data Technology

## D640-11b-Ch6-M05

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz

Communication System: 802.11b ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK  
 Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 6/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.431 mW/g

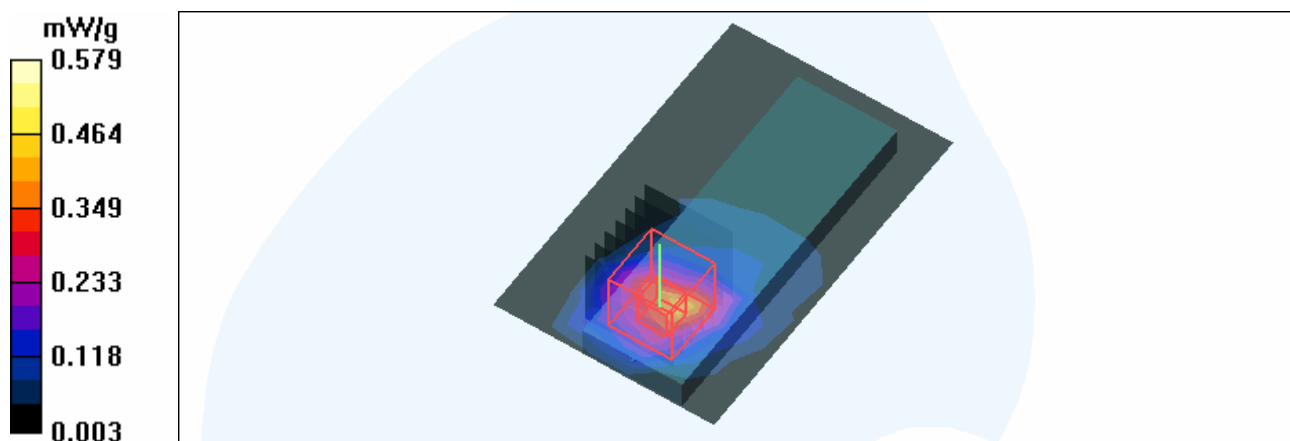
#### Mid Channel 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 12.2 V/m

Peak SAR (extrapolated) = 1.26 W/kg

SAR(1 g) = **0.520 mW/g**; SAR(10 g) = 0.232 mW/g

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



Test Laboratory: Advance Data Technology

## D640-11g-Ch6-M06

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz

Communication System: 802.11g ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 6/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.263 mW/g

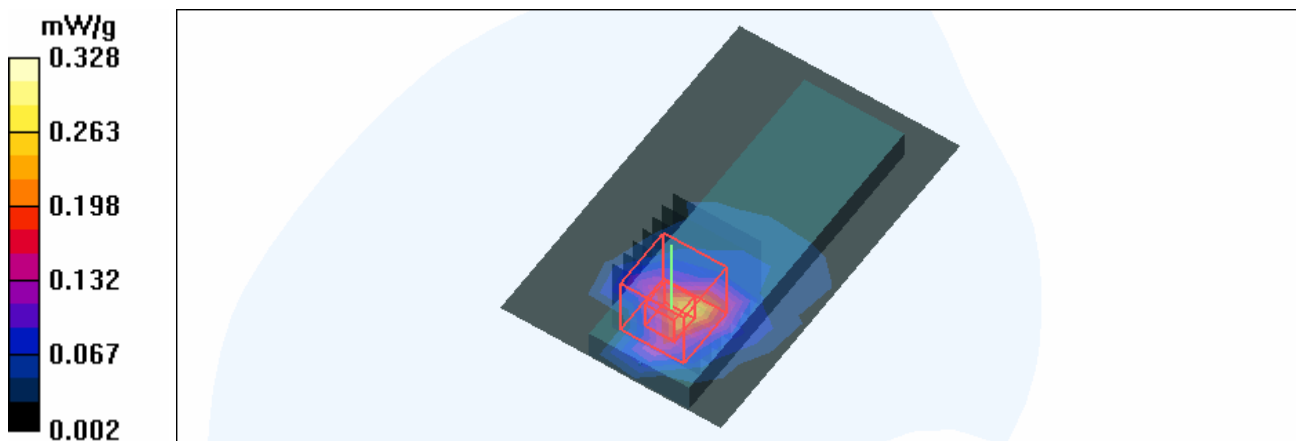
#### Mid Channel 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.64 V/m

Peak SAR (extrapolated) = 0.692 W/kg

SAR(1 g) = **0.293 mW/g**; SAR(10 g) = **0.130 mW/g**

Maximum value of SAR (measured) = 0.328 mW/g



Test Laboratory: Advance Data Technology

### D640-11n 2.4G Span 20-Ch1-M07

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2412 MHz**

Communication System: 2.4G 11n span20 ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.95$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 1/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.909 mW/g

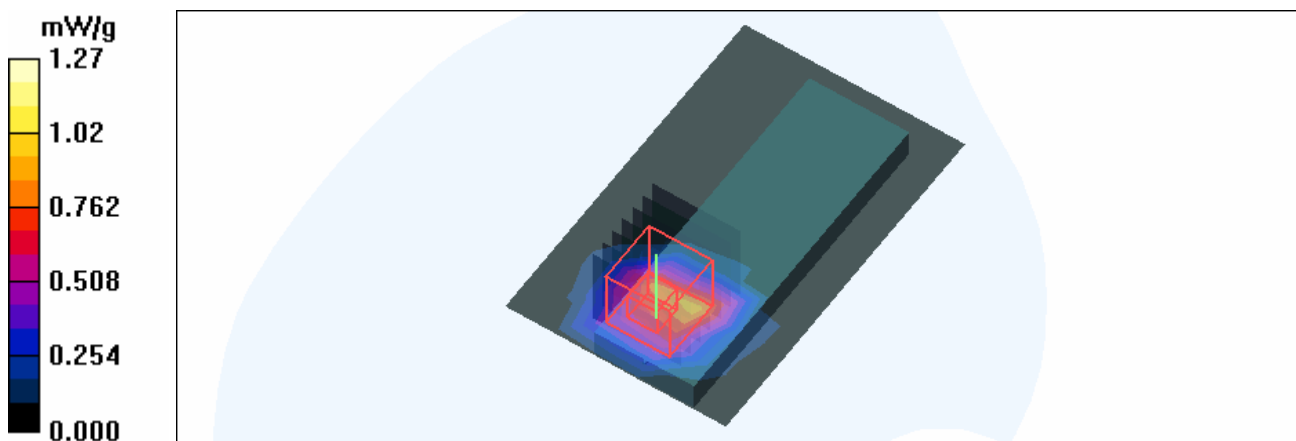
**Low Channel 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 20.9 V/m

Peak SAR (extrapolated) = 2.32 W/kg

**SAR(1 g) = 0.903 mW/g; SAR(10 g) = 0.262 mW/g**

Maximum value of SAR (measured) = 1.27 mW/g



Test Laboratory: Advance Data Technology

## D640-11n 2.4G Span 40-Ch4-M08

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz**

Communication System: 802.11n 40MHz ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 4/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.787 mW/g

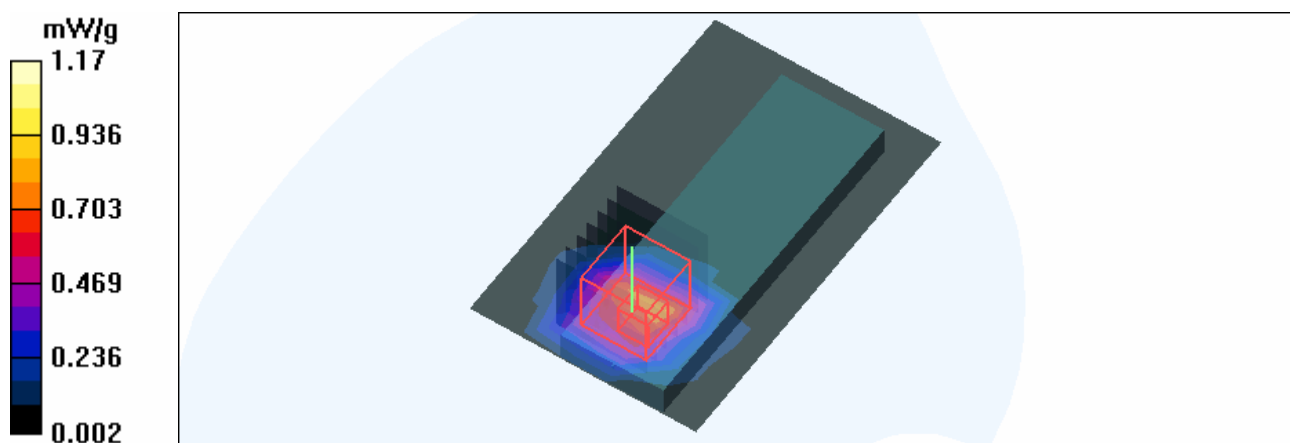
**Mid Channel 4/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.8 V/m

Peak SAR (extrapolated) = 3.14 W/kg

**SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.403 mW/g**

Maximum value of SAR (measured) = 1.17 mW/g



Test Laboratory: Advance Data Technology

## NX6125-11b-Ch6-M09

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz

Communication System: 802.11b ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: DBPSK  
 Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm  
 Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

#### DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 6/Area Scan (6x9x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.168 mW/g

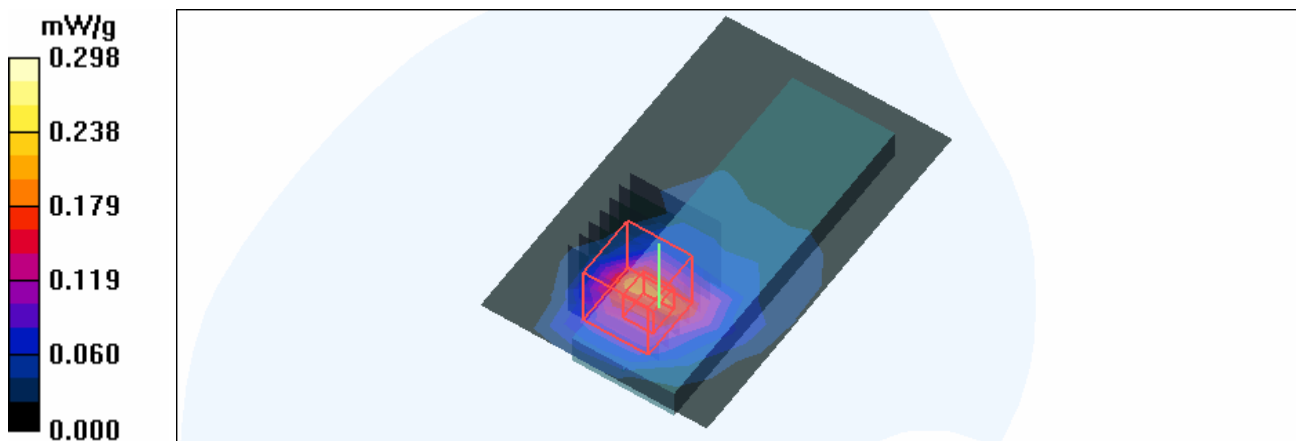
#### Mid Channel 6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.52 V/m

Peak SAR (extrapolated) = 0.592 W/kg

SAR(1 g) = **0.259 mW/g**; SAR(10 g) = **0.111 mW/g**

Maximum value of SAR (measured) = 0.298 mW/g



Test Laboratory: Advance Data Technology

**NX6125-11g-Ch6-M10****DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz**

Communication System: 802.11g ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

## DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 6/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.129 mW/g

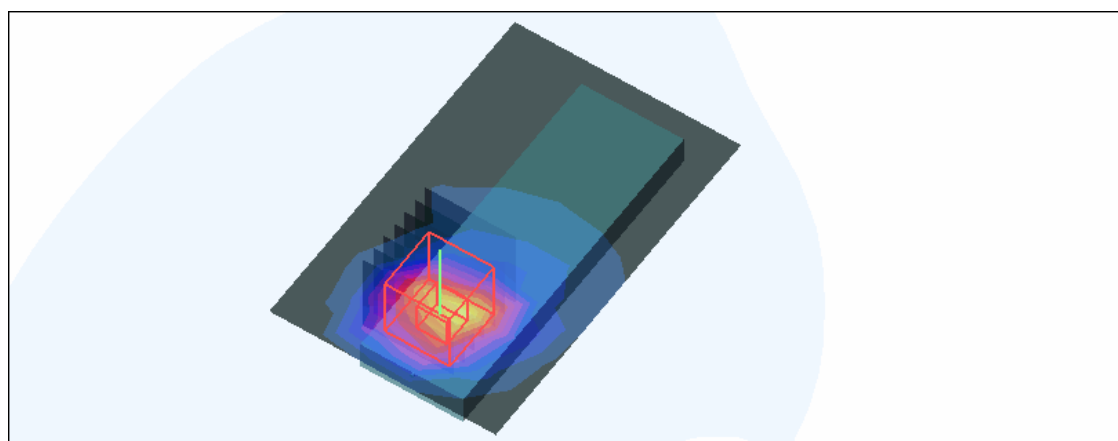
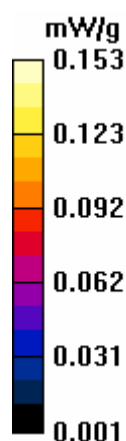
**Mid Channel 6/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.99 V/m

Peak SAR (extrapolated) = 0.341 W/kg

**SAR(1 g) = 0.140 mW/g; SAR(10 g) = 0.065 mW/g**

Maximum value of SAR (measured) = 0.153 mW/g



Test Laboratory: Advance Data Technology

## NX6125-11n 2.4G Span 20-Ch1-M11

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2412 MHz**

Communication System: 2.4G 11n span20 ; Frequency: 2412 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2412$  MHz;  $\sigma = 1.95$  mho/m;  $\epsilon_r = 53.5$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 1/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.367 mW/g

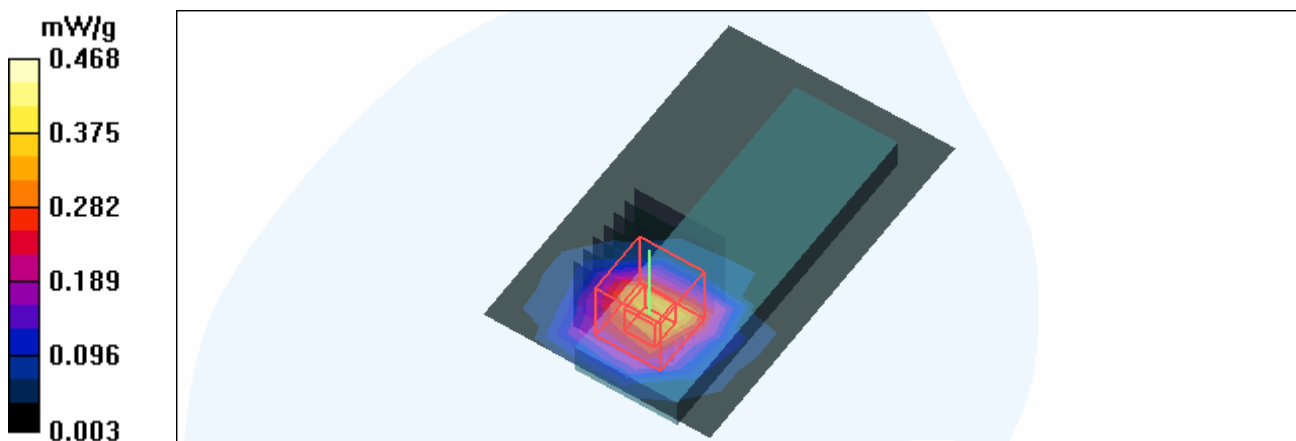
**Low Channel 1/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.3 V/m

Peak SAR (extrapolated) = 0.976 W/kg

**SAR(1 g) = 0.427 mW/g; SAR(10 g) = 0.199 mW/g**

Maximum value of SAR (measured) = 0.468 mW/g





Test Laboratory: Advance Data Technology

### **NX6125-11n 2.4G Span 40-Ch4-M12**

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 2437 MHz**

Communication System: 802.11n 40MHz ; Frequency: 2437 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL2450 Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.98$  mho/m;  $\epsilon_r = 53.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 4/Area Scan (6x9x1):** Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.413 mW/g

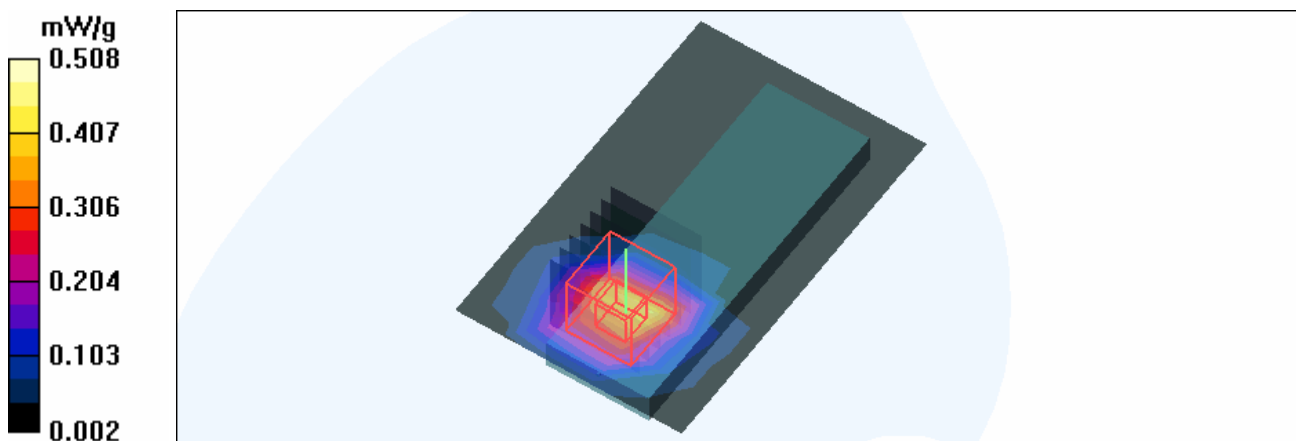
**Mid Channel 4/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.5 V/m

Peak SAR (extrapolated) = 1.07 W/kg

**SAR(1 g) = 0.466 mW/g; SAR(10 g) = 0.218 mW/g**

Maximum value of SAR (measured) = 0.508 mW/g



Test Laboratory: Advance Data Technology

## D820-11a-Ch36-M13

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5180 MHz

Communication System: 802.11a ; Frequency: 5180 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.27 \text{ mho/m}$ ;  $\epsilon_r = 49.4$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Low Channel 36/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.760 mW/g

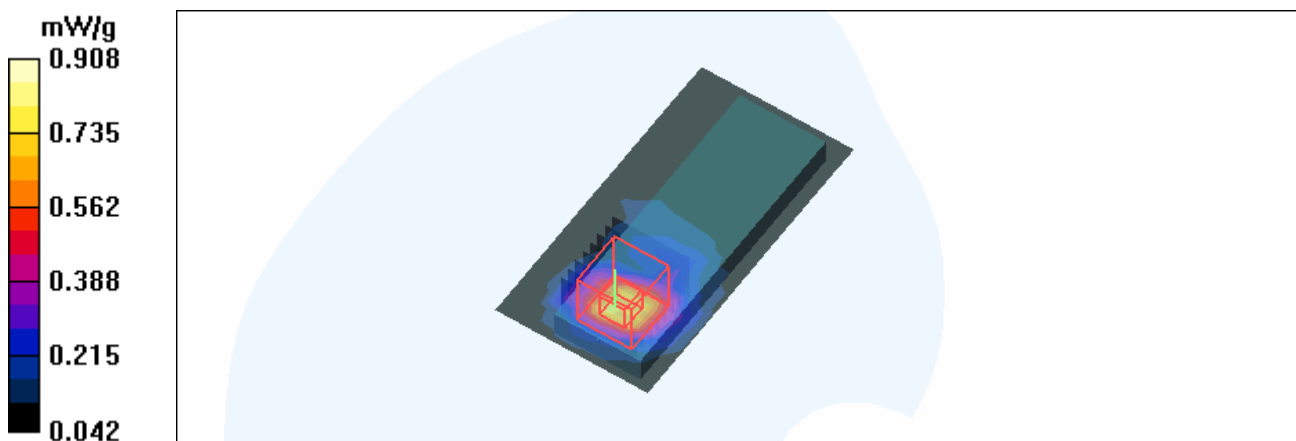
#### Low Channel 36/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.64 V/m

Peak SAR (extrapolated) = 1.75 W/kg

SAR(1 g) = 0.578 mW/g; SAR(10 g) = 0.239 mW/g

Maximum value of SAR (measured) = 0.908 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch48-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5240 MHz

Communication System: 802.11a ; Frequency: 5240 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5240 \text{ MHz}$ ;  $\sigma = 5.36 \text{ mho/m}$ ;  $\epsilon_r = 49.3$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 48/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.933 mW/g

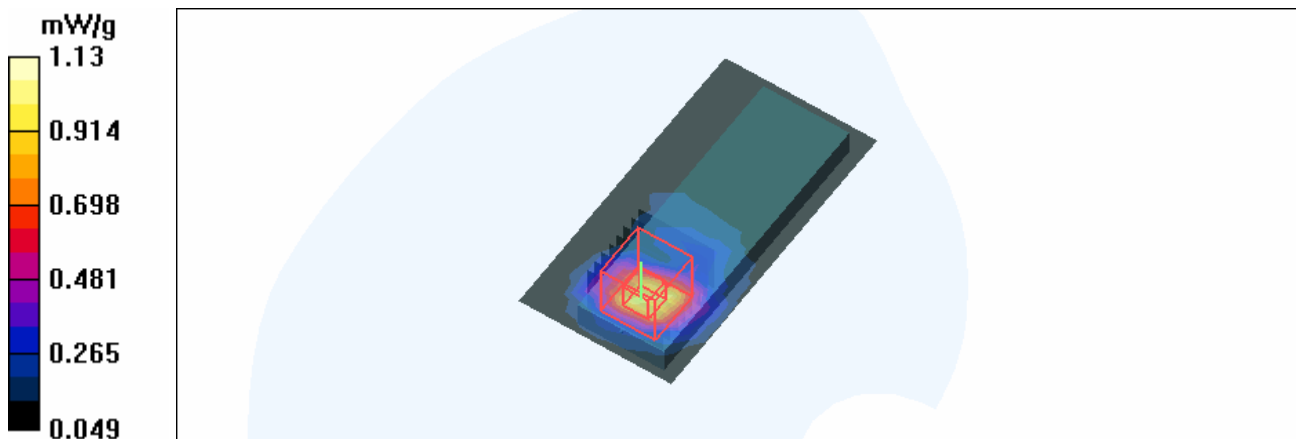
#### Mid Channel 48/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.53 V/m

Peak SAR (extrapolated) = 2.30 W/kg

**SAR(1 g) = 0.728 mW/g; SAR(10 g) = 0.300 mW/g**

Maximum value of SAR (measured) = 1.13 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch52-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5260 MHz

Communication System: 802.11a ; Frequency: 5260 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5260$  MHz;  $\sigma = 5.38$  mho/m;  $\epsilon_r = 49.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.14, 4.14, 4.14) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 52/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.04 mW/g

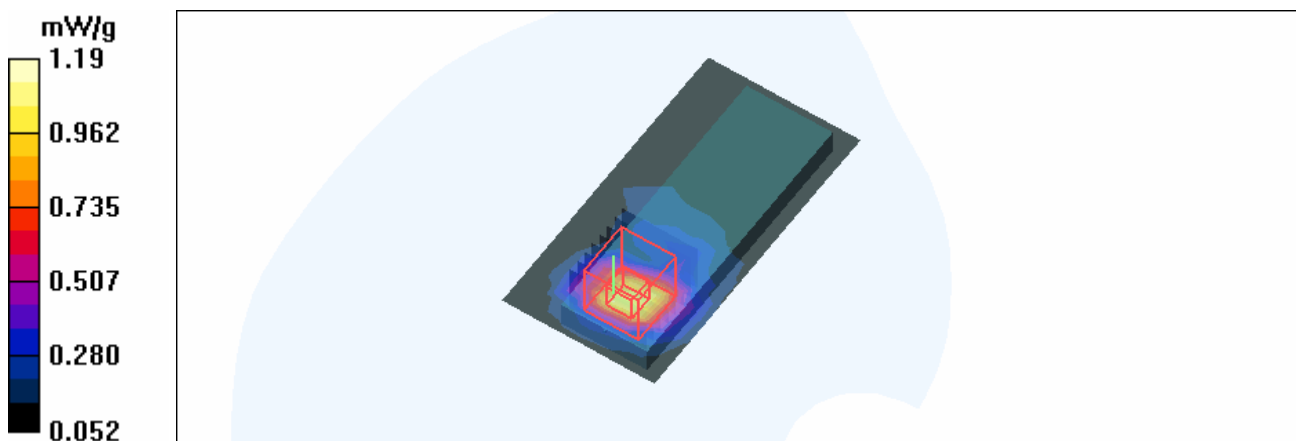
#### Mid Channel 52/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.91 V/m

Peak SAR (extrapolated) = 2.37 W/kg

SAR(1 g) = **0.788** mW/g; SAR(10 g) = 0.329 mW/g

Maximum value of SAR (measured) = 1.19 mW/g



Test Laboratory: Advance Data Technology

## D820-11a-Ch64-M13

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5320 MHz

Communication System: 802.11a ; Frequency: 5320 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.47$  mho/m;  $\epsilon_r = 49.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.14, 4.14, 4.14) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 64/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.35 mW/g

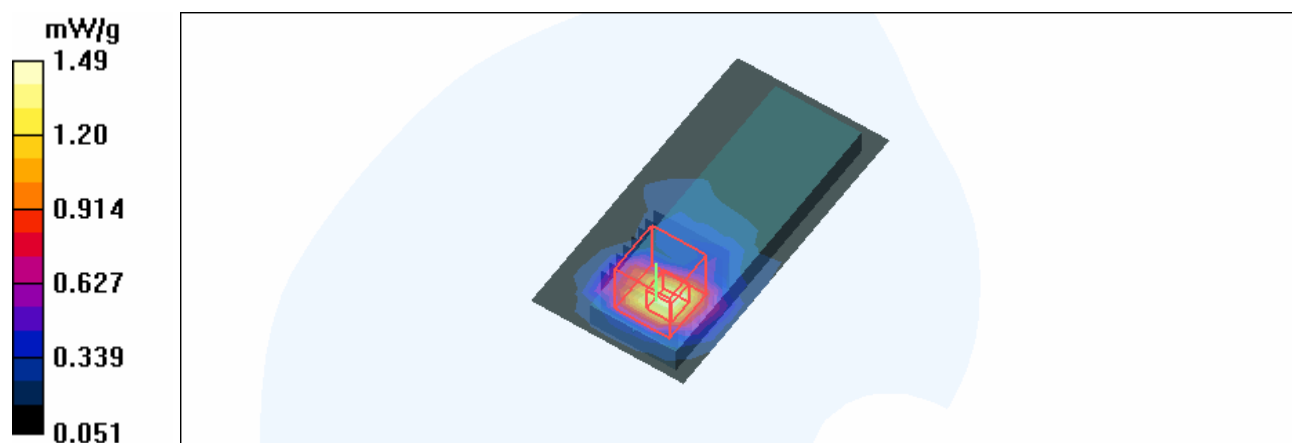
#### Mid Channel 64/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 10.3 V/m

Peak SAR (extrapolated) = 3.12 W/kg

SAR(1 g) = 0.970 mW/g; SAR(10 g) = 0.400 mW/g

Maximum value of SAR (measured) = 1.49 mW/g



Test Laboratory: Advance Data Technology

## D820-11a-Ch100-M13

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5500 MHz

Communication System: 802.11a ; Frequency: 5500 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.74$  mho/m;  $\epsilon_r = 48.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 100/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (measured) = 1.51 mW/g

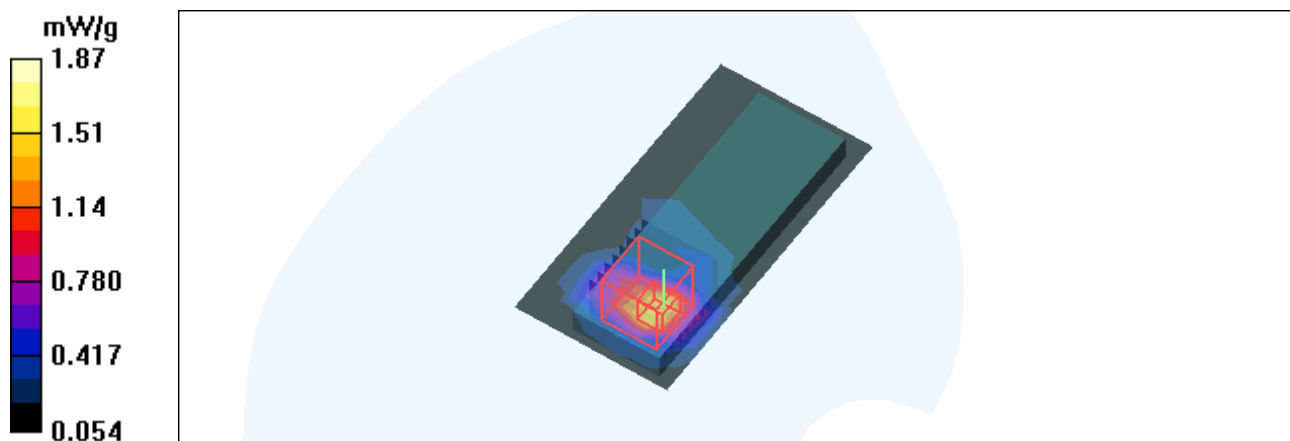
**Mid Channel 100/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

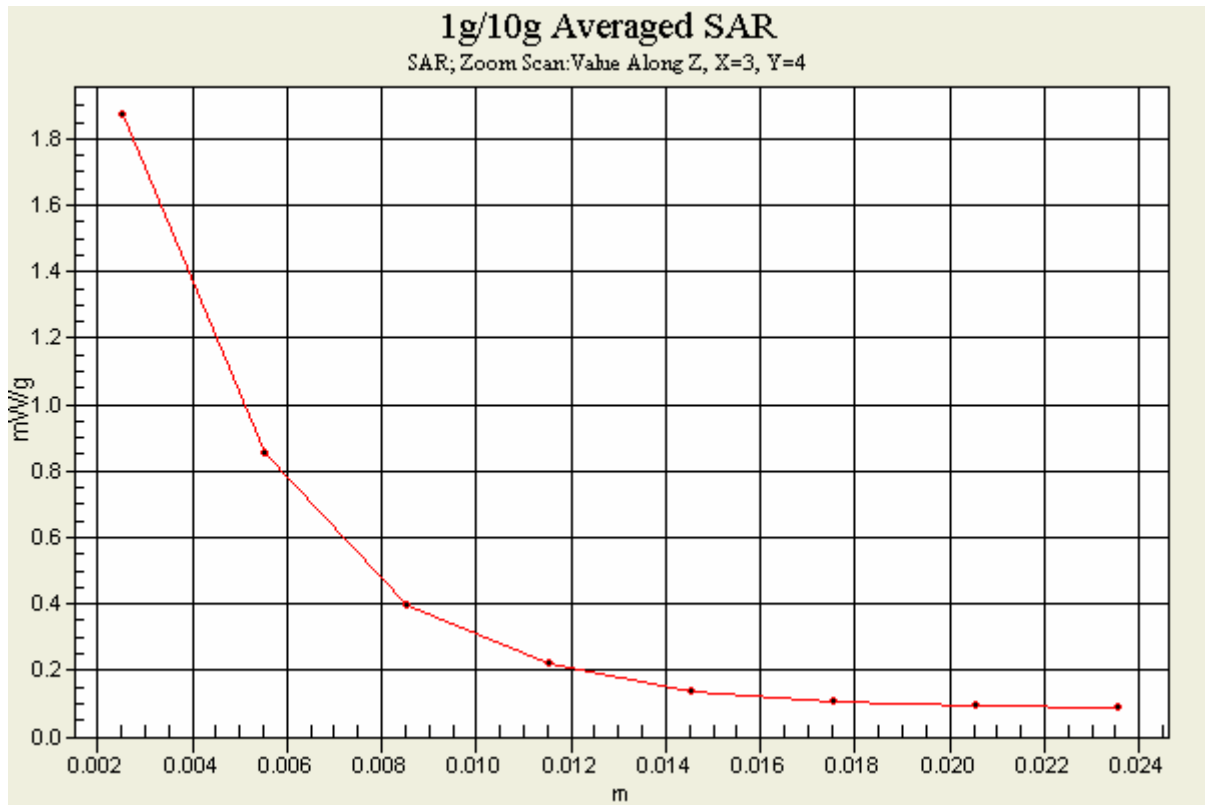
Reference Value = 9.15 V/m

Peak SAR (extrapolated) = 4.10 W/kg

**SAR(1 g) = 1.16 mW/g; SAR(10 g) = 0.439 mW/g**

Maximum value of SAR (measured) = 1.87 mW/g





Test Laboratory: Advance Data Technology

### D820-11a-Ch104-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5520 MHz

Communication System: 802.11a ; Frequency: 5520 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5520$  MHz;  $\sigma = 5.76$  mho/m;  $\epsilon_r = 48.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 104/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.46 mW/g

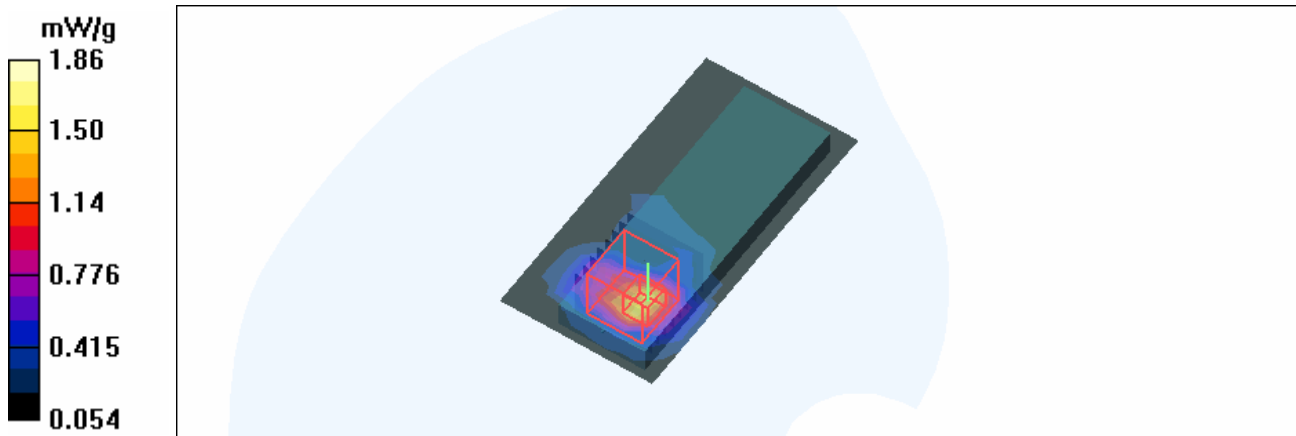
#### Mid Channel 104/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.91 V/m

Peak SAR (extrapolated) = 3.88 W/kg

SAR(1 g) = **1.13 mW/g**; SAR(10 g) = **0.427 mW/g**

Maximum value of SAR (measured) = 1.86 mW/g





Test Laboratory: Advance Data Technology

**D820-11a-Ch116-M13**

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5580 MHz**

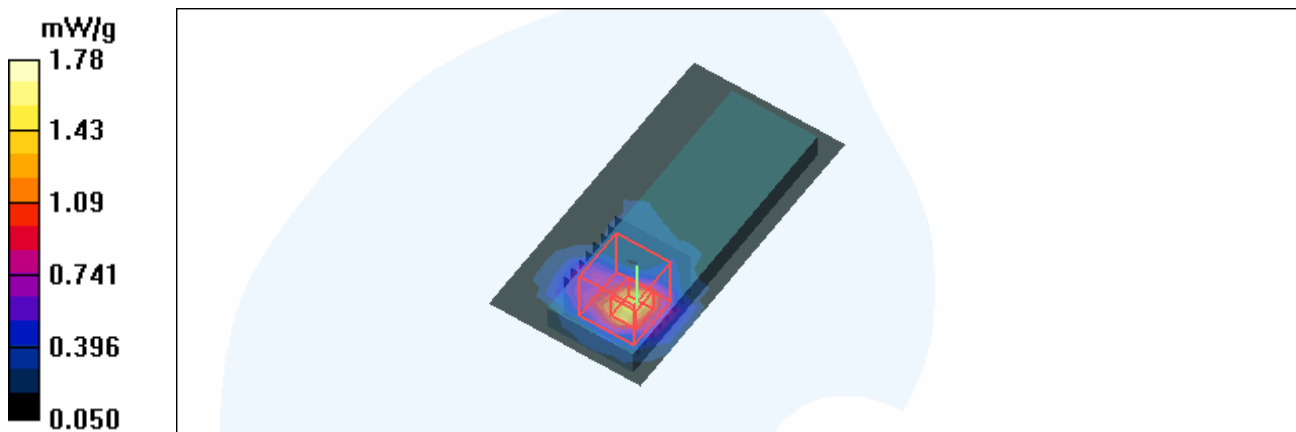
Communication System: 802.11a ; Frequency: 5580 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5580 \text{ MHz}$ ;  $\sigma = 5.85 \text{ mho/m}$ ;  $\epsilon_r = 48.6$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

**DASY4 Configuration:**

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 116/Area Scan (7x13x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$   
 Maximum value of SAR (measured) = 1.47 mW/g

**Mid Channel 116/Zoom Scan (8x8x8)/Cube 0:** Measurement grid:  $dx=4.3\text{mm}$ ,  $dy=4.3\text{mm}$ ,  $dz=3\text{mm}$   
 Reference Value = 8.38 V/m  
 Peak SAR (extrapolated) = 3.56 W/kg  
**SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.404 mW/g**  
 Maximum value of SAR (measured) = 1.78 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch120-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5600 MHz

Communication System: 802.11a ; Frequency: 5600 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.88$  mho/m;  $\epsilon_r = 48.6$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 120/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.53 mW/g

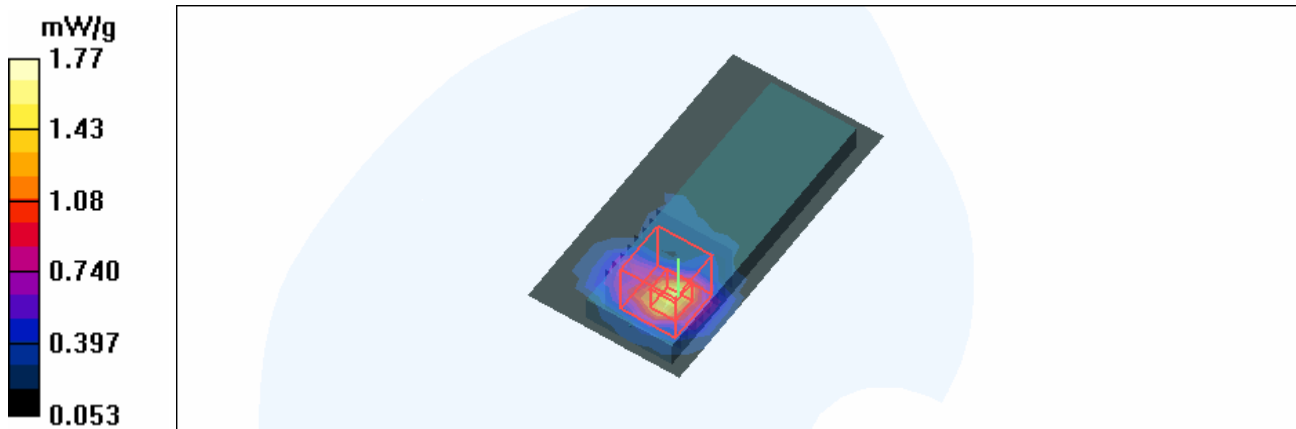
#### Mid Channel 120/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.34 V/m

Peak SAR (extrapolated) = 3.78 W/kg

SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.414 mW/g

Maximum value of SAR (measured) = 1.77 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch124-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5620 MHz

Communication System: 802.11a ; Frequency: 5620 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5620 \text{ MHz}$ ;  $\sigma = 5.91 \text{ mho/m}$ ;  $\epsilon_r = 48.6$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 124/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.46 mW/g

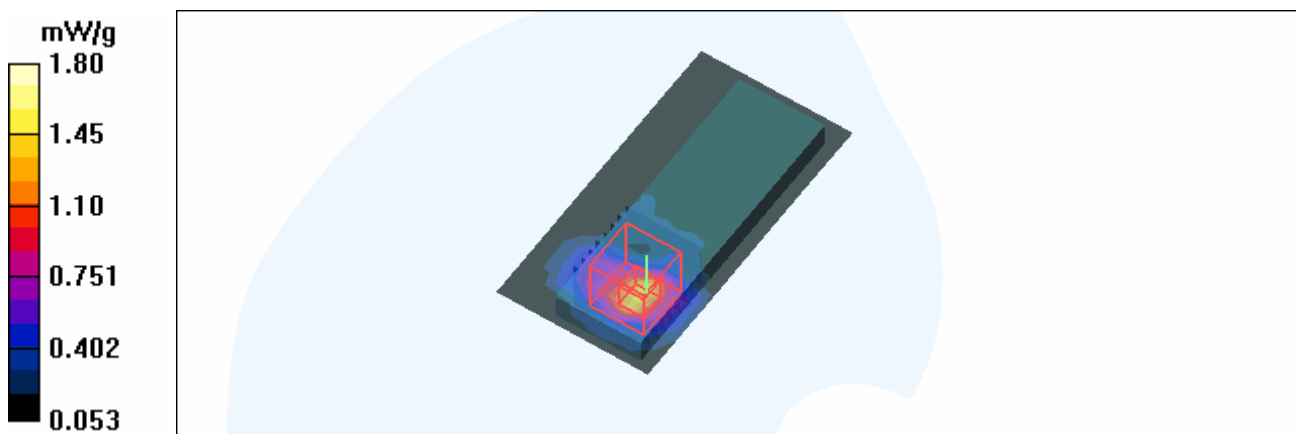
#### Mid Channel 124/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.01 V/m

Peak SAR (extrapolated) = 4.10 W/kg

SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.396 mW/g

Maximum value of SAR (measured) = 1.80 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch136-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5680 MHz

Communication System: 802.11a ; Frequency: 5680 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5680$  MHz;  $\sigma = 6.01$  mho/m;  $\epsilon_r = 48.4$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 136/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 1.32 mW/g

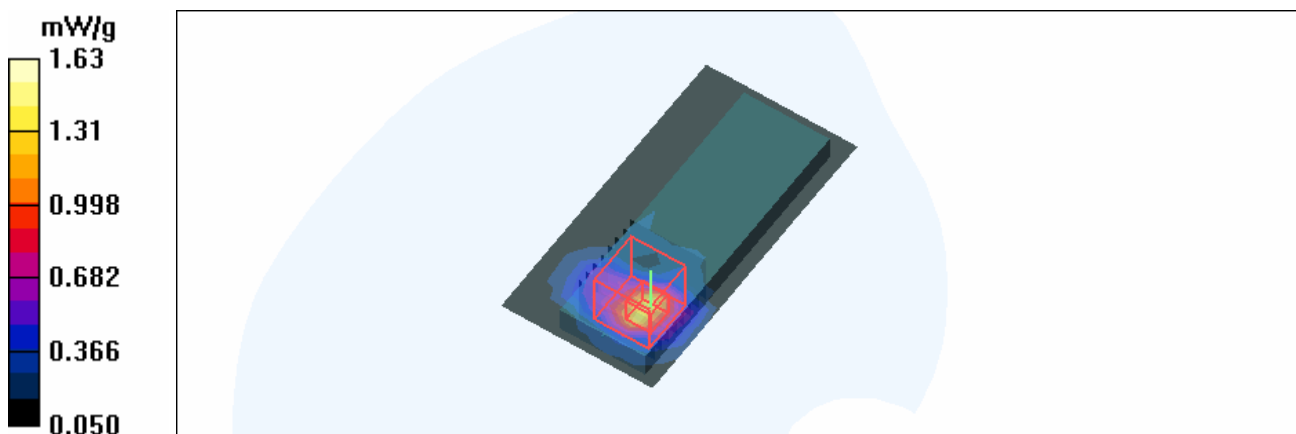
**Mid Channel 136/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.33 V/m

Peak SAR (extrapolated) = 3.64 W/kg

**SAR(1 g) = 0.993 mW/g; SAR(10 g) = 0.362 mW/g**

Maximum value of SAR (measured) = 1.63 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch140-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5700 MHz

Communication System: 802.11a ; Frequency: 5700 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5700$  MHz;  $\sigma = 6.04$  mho/m;  $\epsilon_r = 48.4$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 140/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.20 mW/g

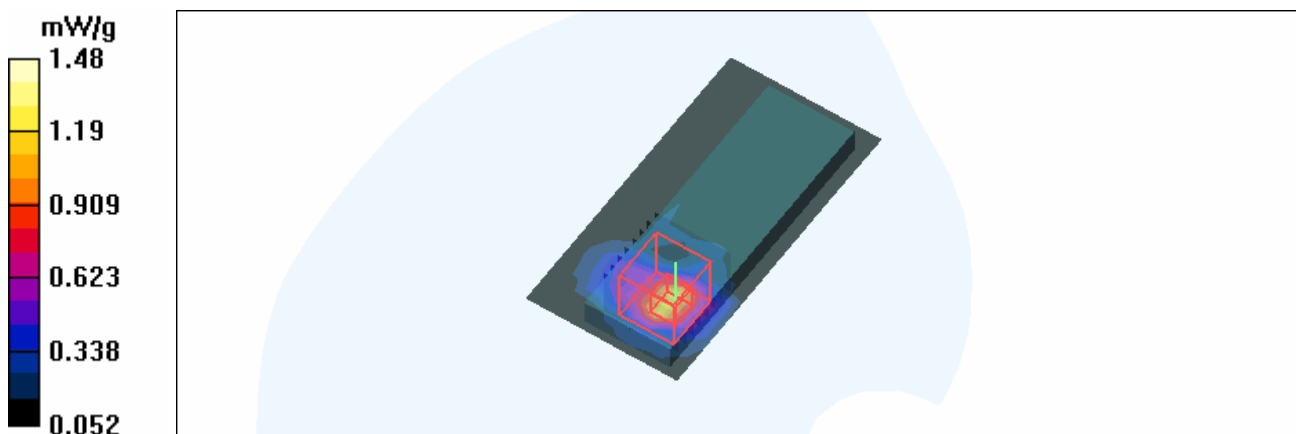
#### Mid Channel 140/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.92 V/m

Peak SAR (extrapolated) = 3.34 W/kg

SAR(1 g) = **0.911 mW/g**; SAR(10 g) = 0.330 mW/g

Maximum value of SAR (measured) = 1.48 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch149-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5745 MHz

Communication System: 802.11a ; Frequency: 5745 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5745 \text{ MHz}$ ;  $\sigma = 6.11 \text{ mho/m}$ ;  $\epsilon_r = 48.3$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 149/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.730 mW/g

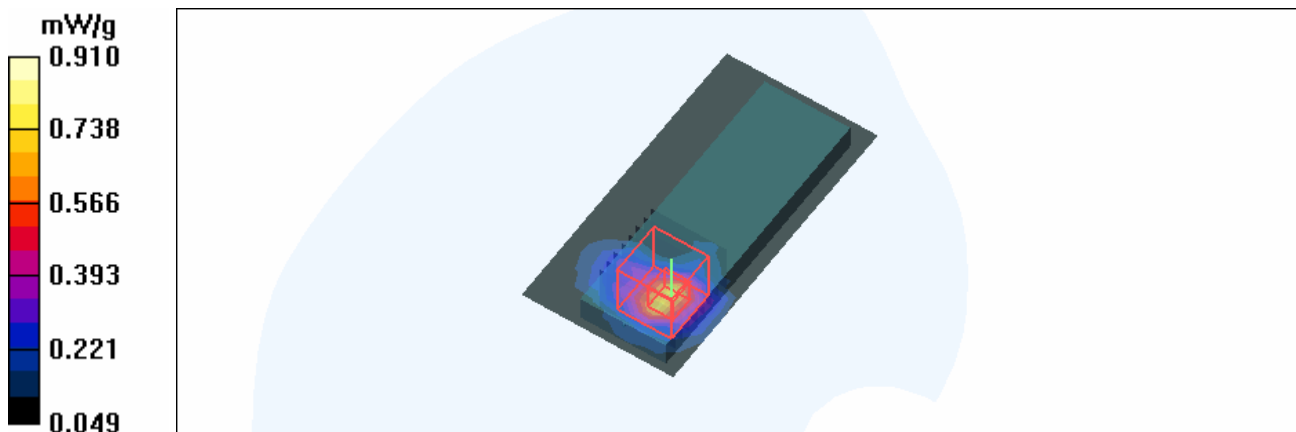
#### Mid Channel 149/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 5.43 V/m

Peak SAR (extrapolated) = 2.07 W/kg

**SAR(1 g) = 0.564 mW/g; SAR(10 g) = 0.216 mW/g**

Maximum value of SAR (measured) = 0.910 mW/g



Test Laboratory: Advance Data Technology

### D820-11a-Ch157-M13

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5785 MHz

Communication System: 802.11a ; Frequency: 5785 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 6.17 \text{ mho/m}$ ;  $\epsilon_r = 48.3$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 157/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.655 mW/g

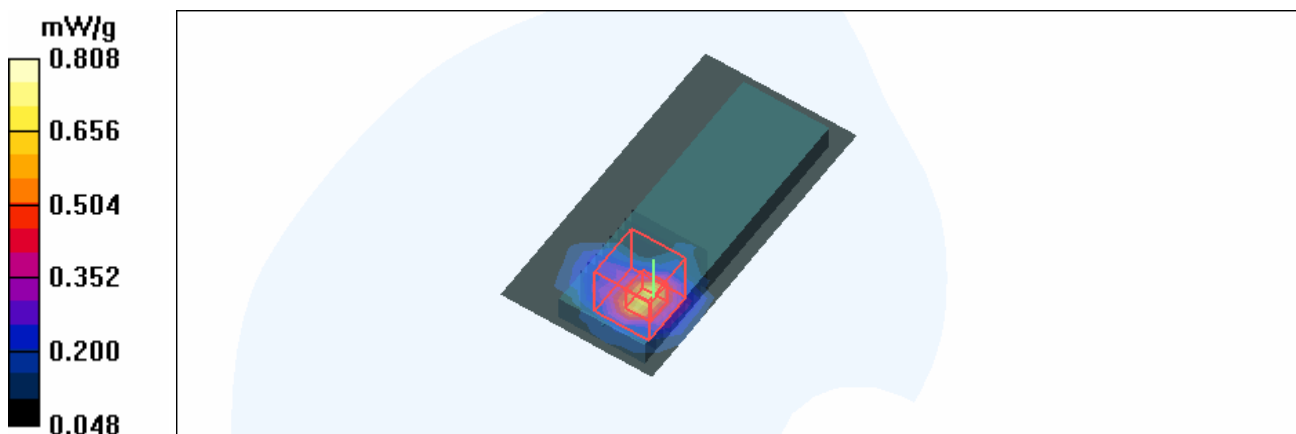
#### Mid Channel 157/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 5.19 V/m

Peak SAR (extrapolated) = 1.76 W/kg

SAR(1 g) = 0.504 mW/g; SAR(10 g) = 0.198 mW/g

Maximum value of SAR (measured) = 0.808 mW/g



Test Laboratory: Advance Data Technology

## D820-11a-Ch165-M13

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5825 MHz

Communication System: 802.11a ; Frequency: 5825 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5825$  MHz;  $\sigma = 6.23$  mho/m;  $\epsilon_r = 48.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### High Channel 165/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.20 mW/g

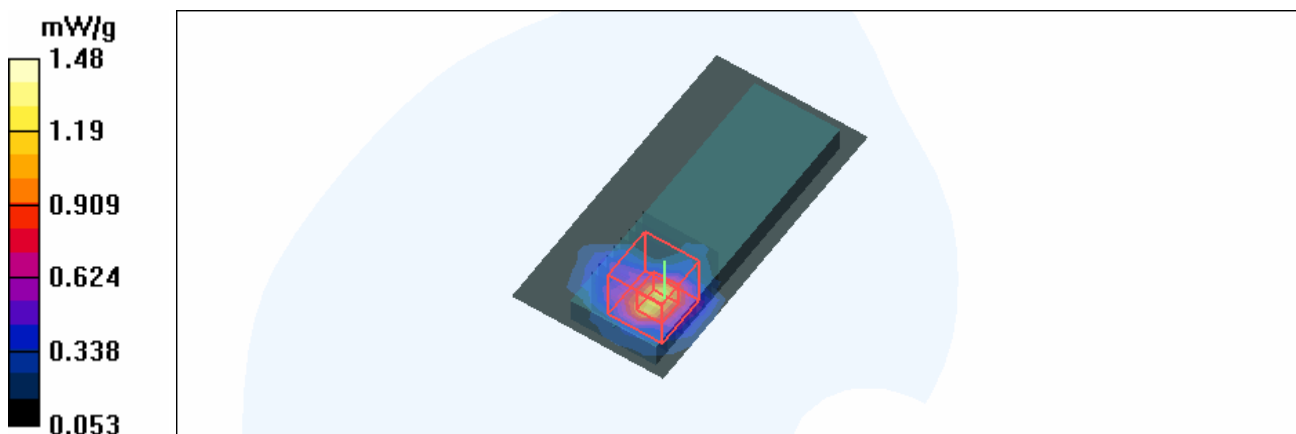
#### High Channel 165/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.75 V/m

Peak SAR (extrapolated) = 3.33 W/kg

SAR(1 g) = 0.914 mW/g; SAR(10 g) = 0.332 mW/g

Maximum value of SAR (measured) = 1.48 mW/g





Test Laboratory: Advance Data Technology

## D820-11a Span20-Ch36-M14

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5180 MHz**

Communication System: 11n 5G span20 ; Frequency: 5180 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.27 \text{ mho/m}$ ;  $\epsilon_r = 49.4$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 36/Area Scan (7x13x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 0.895 mW/g

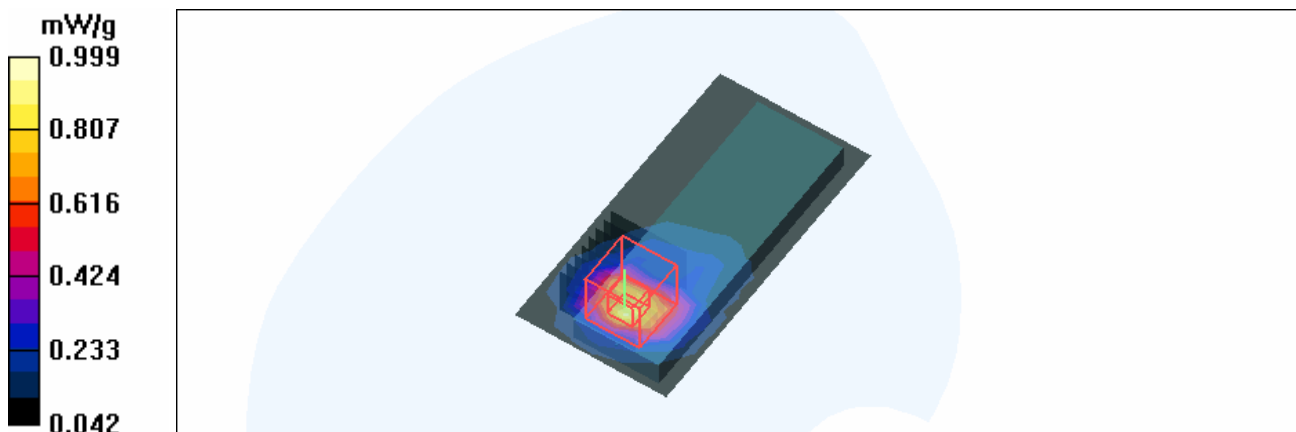
**Low Channel 36/Zoom Scan (8x8x8)/Cube 0:** Measurement grid:  $dx=4.3\text{mm}$ ,  $dy=4.3\text{mm}$ ,  $dz=3\text{mm}$

Reference Value = 9.30 V/m

Peak SAR (extrapolated) = 1.80 W/kg

**SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.266 mW/g**

Maximum value of SAR (measured) = 0.999 mW/g



Test Laboratory: Advance Data Technology

## D820-11a Span20-Ch48-M14

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5240 MHz**

Communication System: 11n 5G span20 ; Frequency: 5240 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5240$  MHz;  $\sigma = 5.36$  mho/m;  $\epsilon_r = 49.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 48/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.51 mW/g

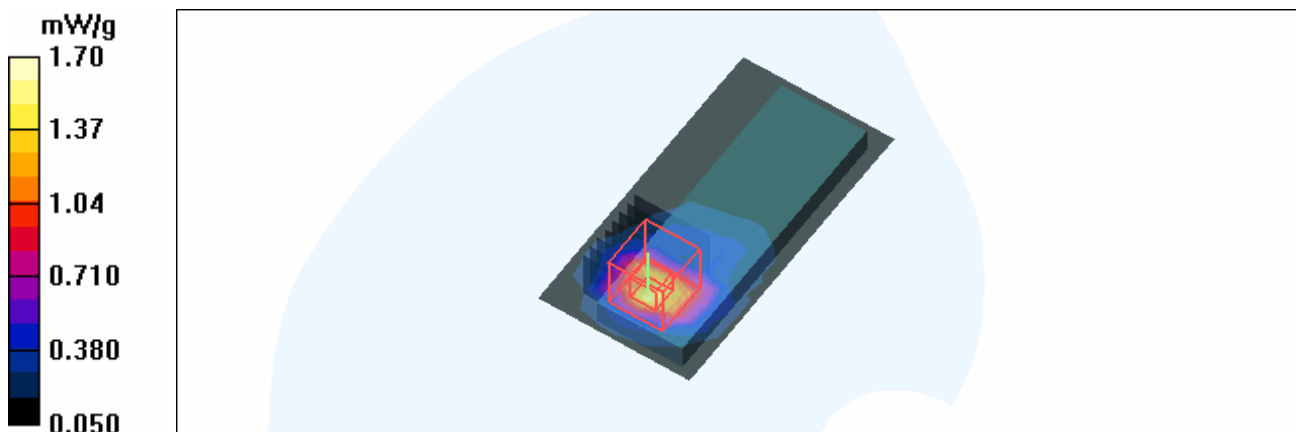
**Mid Channel 48/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 11.0 V/m

Peak SAR (extrapolated) = 3.36 W/kg

**SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.410 mW/g**

Maximum value of SAR (measured) = 1.70 mW/g



Test Laboratory: Advance Data Technology

### D820-11a Span20-Ch149-M14

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5745 MHz**

Communication System: 11n 5G span20 ; Frequency: 5745 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5745$  MHz;  $\sigma = 6.11$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 149/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.535 mW/g

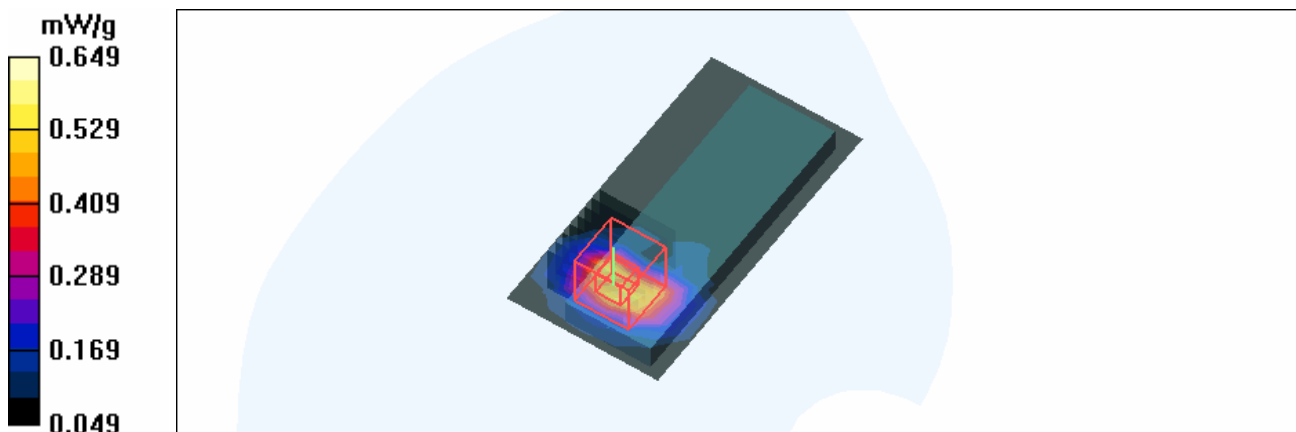
**Mid Channel 149/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.30 V/m

Peak SAR (extrapolated) = 1.49 W/kg

**SAR(1 g) = 0.429 mW/g; SAR(10 g) = 0.189 mW/g**

Maximum value of SAR (measured) = 0.649 mW/g



Test Laboratory: Advance Data Technology

## D820-11a Span20-Ch157-M14

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5785 MHz**

Communication System: 11n 5G span20 ; Frequency: 5785 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5785$  MHz;  $\sigma = 6.17$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 157/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.744 mW/g

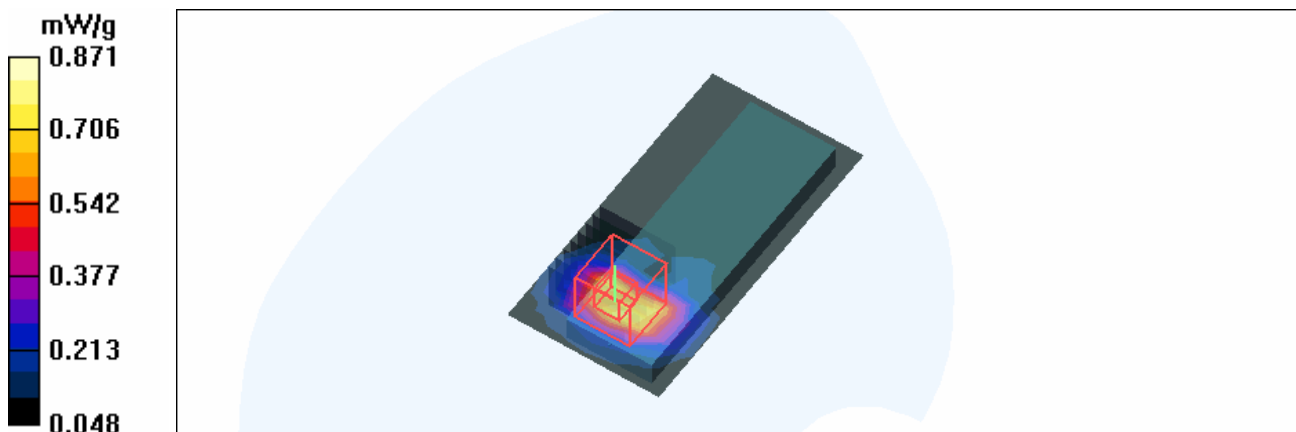
**Mid Channel 157/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.55 V/m

Peak SAR (extrapolated) = 2.12 W/kg

**SAR(1 g) = 0.567 mW/g; SAR(10 g) = 0.243 mW/g**

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



Test Laboratory: Advance Data Technology

## D820-11a Span20-Ch165-M14

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5825 MHz**

Communication System: 11n 5G span20 ; Frequency: 5825 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5825$  MHz;  $\sigma = 6.23$  mho/m;  $\epsilon_r = 48.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**High Channel 165/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.659 mW/g

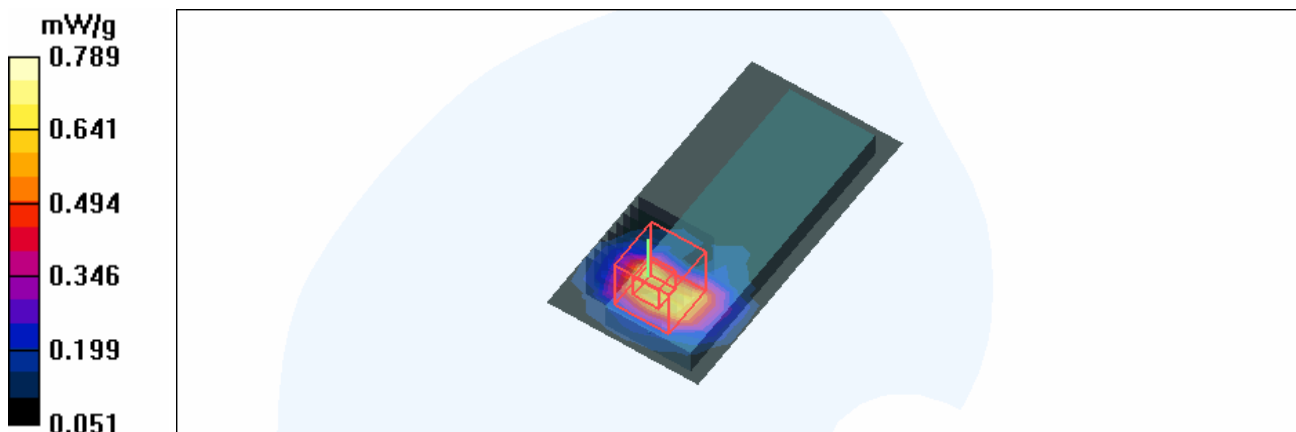
**High Channel 165/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.93 V/m

Peak SAR (extrapolated) = 1.78 W/kg

**SAR(1 g) = 0.524 mW/g; SAR(10 g) = 0.227 mW/g**

Maximum value of SAR (measured) = 0.789 mW/g



Test Laboratory: Advance Data Technology

### D820-11a Span40-Ch38-M15

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5190 MHz**

Communication System: 11n 5G span40 ; Frequency: 5190 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5190$  MHz;  $\sigma = 5.28$  mho/m;  $\epsilon_r = 49.4$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Low Channel 38/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.820 mW/g

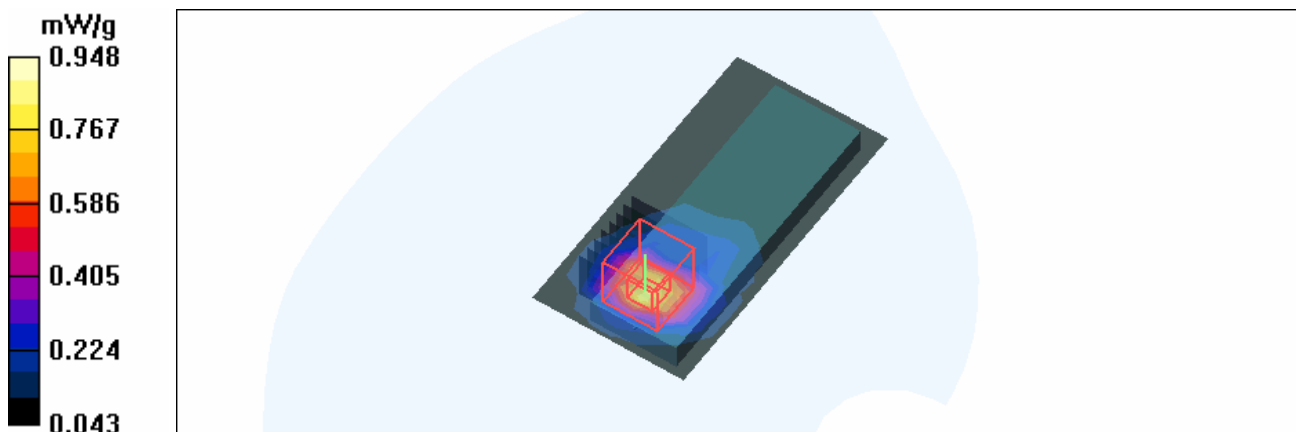
**Low Channel 38/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.61 V/m

Peak SAR (extrapolated) = 1.74 W/kg

**SAR(1 g) = 0.611 mW/g; SAR(10 g) = 0.250 mW/g**

Maximum value of SAR (measured) = 0.948 mW/g



Test Laboratory: Advance Data Technology

## D820-11a Span40-Ch46-M15

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5230 MHz**

Communication System: 11n 5G span40 ; Frequency: 5230 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5230$  MHz;  $\sigma = 5.34$  mho/m;  $\epsilon_r = 49.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 46/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.04 mW/g

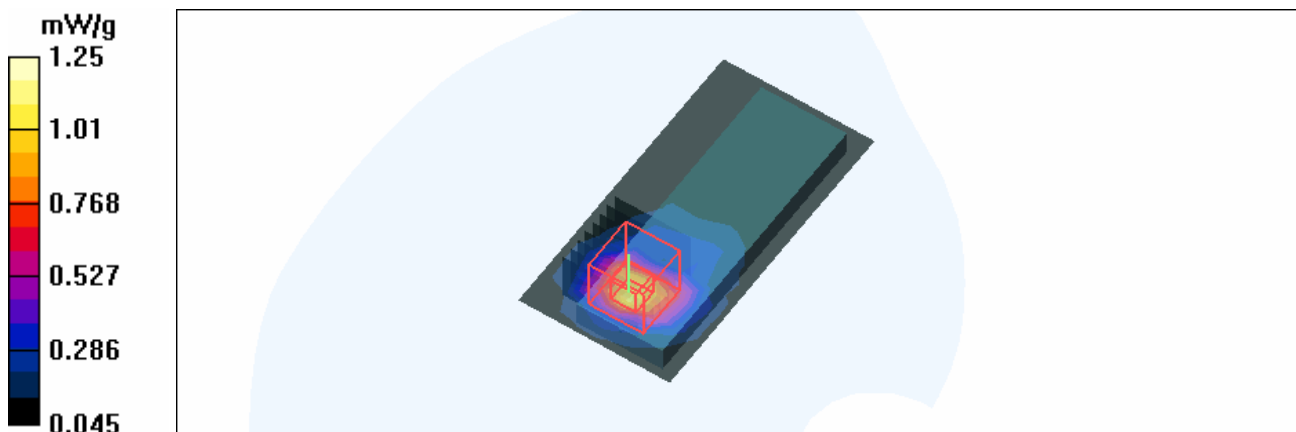
**Mid Channel 46/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 9.36 V/m

Peak SAR (extrapolated) = 2.29 W/kg

**SAR(1 g) = 0.799 mW/g; SAR(10 g) = 0.317 mW/g**

Maximum value of SAR (measured) = 1.25 mW/g



Test Laboratory: Advance Data Technology

### D820-11a Span40-Ch151-M15

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5755 MHz**

Communication System: 11n 5G span40 ; Frequency: 5755 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5755$  MHz;  $\sigma = 6.12$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 151/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

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

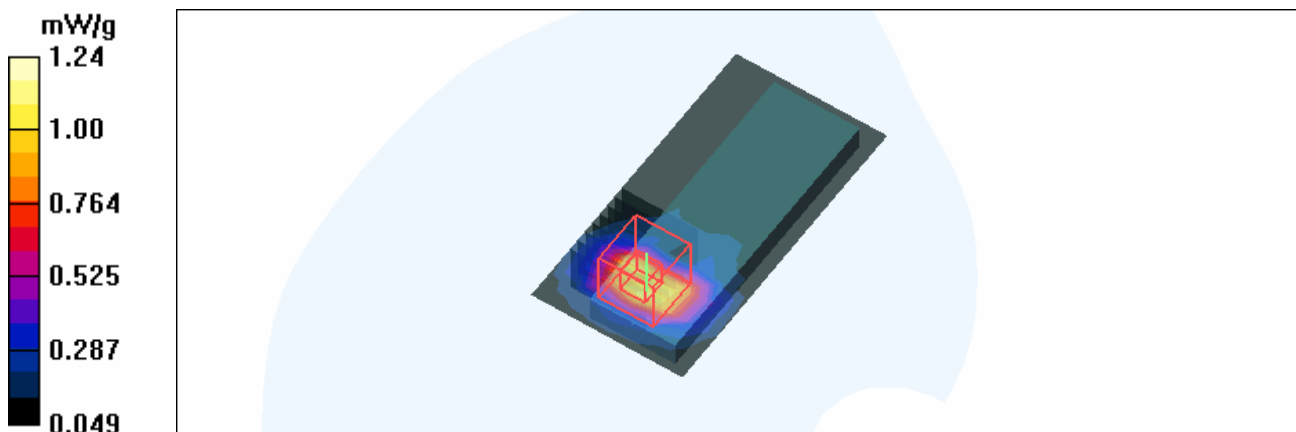
**Mid Channel 151/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.93 V/m

Peak SAR (extrapolated) = 2.77 W/kg

**SAR(1 g) = 0.812 mW/g; SAR(10 g) = 0.333 mW/g**

Maximum value of SAR (measured) = 1.24 mW/g





Test Laboratory: Advance Data Technology

## D820-11a Span40-Ch159-M15

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5795 MHz**

Communication System: 11n 5G span40 ; Frequency: 5795 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5795$  MHz;  $\sigma = 6.19$  mho/m;  $\epsilon_r = 48.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 5 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**High Channel 159/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.904 mW/g

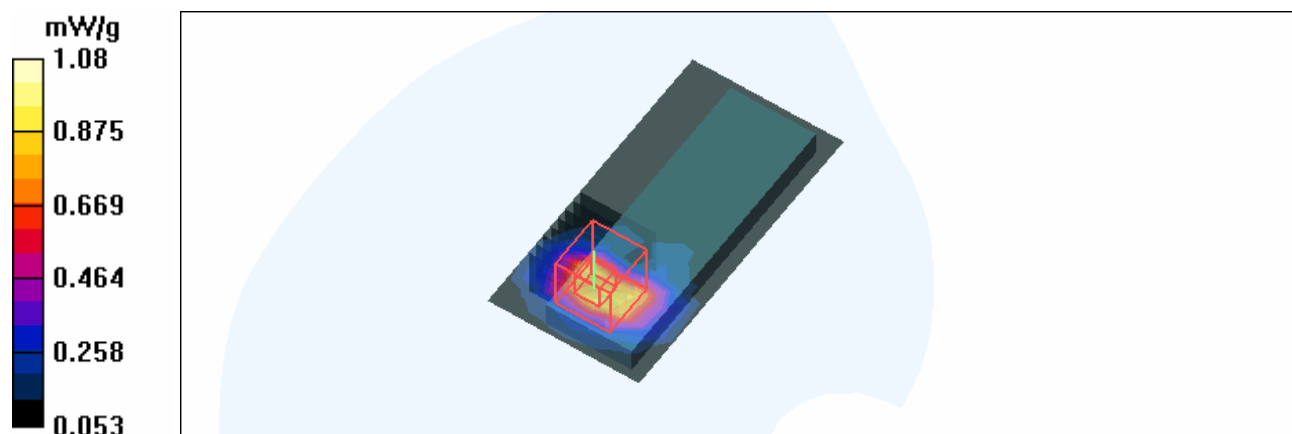
**High Channel 159/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.91 V/m

Peak SAR (extrapolated) = 2.37 W/kg

**SAR(1 g) = 0.694 mW/g; SAR(10 g) = 0.292 mW/g**

Maximum value of SAR (measured) = 1.08 mW/g



Test Laboratory: Advance Data Technology

## D640-11a-Ch64-M16

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5320 MHz

Communication System: 802.11a ; Frequency: 5320 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.47$  mho/m;  $\epsilon_r = 49.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.14, 4.14, 4.14) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 64/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.20 mW/g

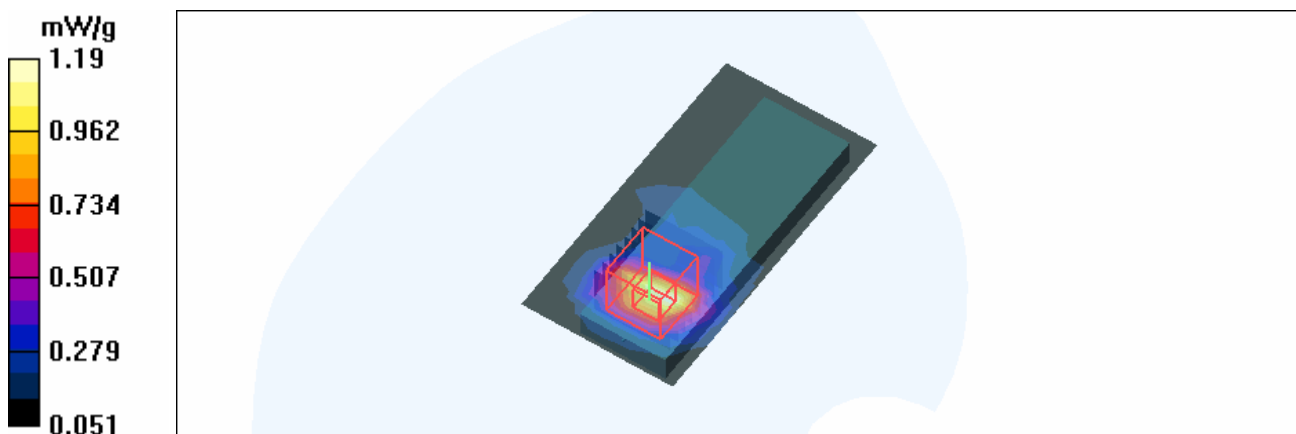
#### Mid Channel 64/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.57 V/m

Peak SAR (extrapolated) = 2.23 W/kg

**SAR(1 g) = 0.788 mW/g; SAR(10 g) = 0.333 mW/g**

Maximum value of SAR (measured) = 1.19 mW/g



Test Laboratory: Advance Data Technology

### D640-11a-Ch100-M16

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5500 MHz

Communication System: 802.11a ; Frequency: 5500 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.74$  mho/m;  $\epsilon_r = 48.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 100/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.49 mW/g

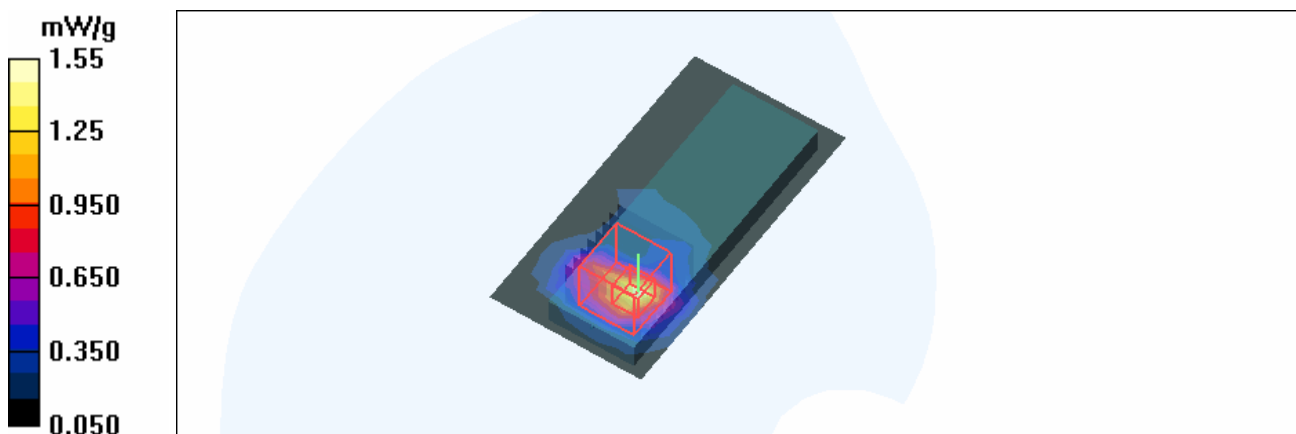
#### Mid Channel 100/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.34 V/m

Peak SAR (extrapolated) = 3.19 W/kg

SAR(1 g) = 0.954 mW/g; SAR(10 g) = 0.374 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



Test Laboratory: Advance Data Technology

### D640-11a-Ch165-M16

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5825 MHz

Communication System: 802.11a ; Frequency: 5825 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5825 \text{ MHz}$ ;  $\sigma = 6.23 \text{ mho/m}$ ;  $\epsilon_r = 48.2$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### High Channel 165/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.35 mW/g

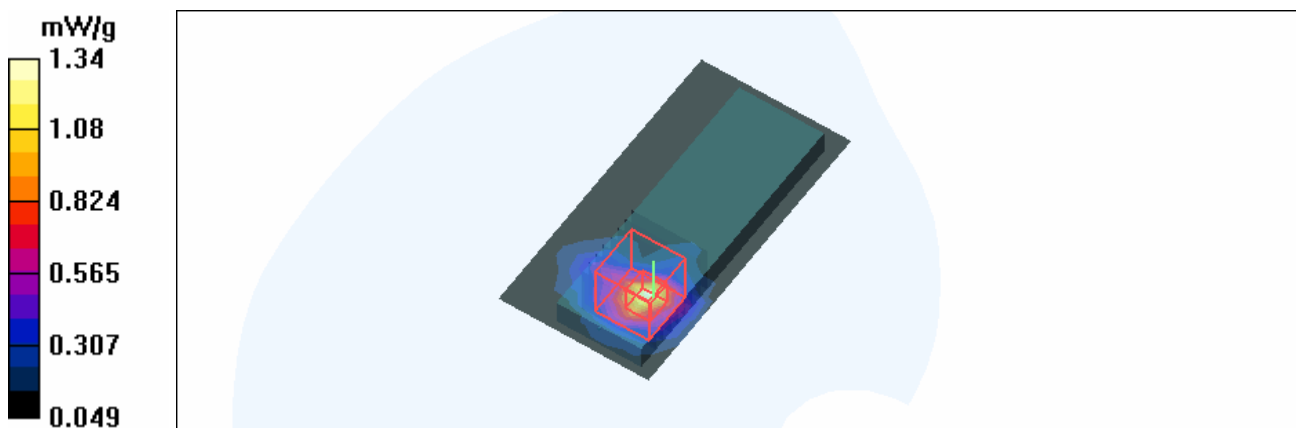
#### High Channel 165/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.00 V/m

Peak SAR (extrapolated) = 3.05 W/kg

SAR(1 g) = **0.845 mW/g**; SAR(10 g) = 0.312 mW/g

Maximum value of SAR (measured) = 1.34 mW/g



Test Laboratory: Advance Data Technology

### D640-11a Span20-Ch48-M17

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5240 MHz**

Communication System: 11n 5G span20 ; Frequency: 5240 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5240 \text{ MHz}$ ;  $\sigma = 5.36 \text{ mho/m}$ ;  $\epsilon_r = 49.3$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 48/Area Scan (7x13x1):** Measurement grid:  $dx=10\text{mm}$ ,  $dy=10\text{mm}$

Maximum value of SAR (measured) = 1.18 mW/g

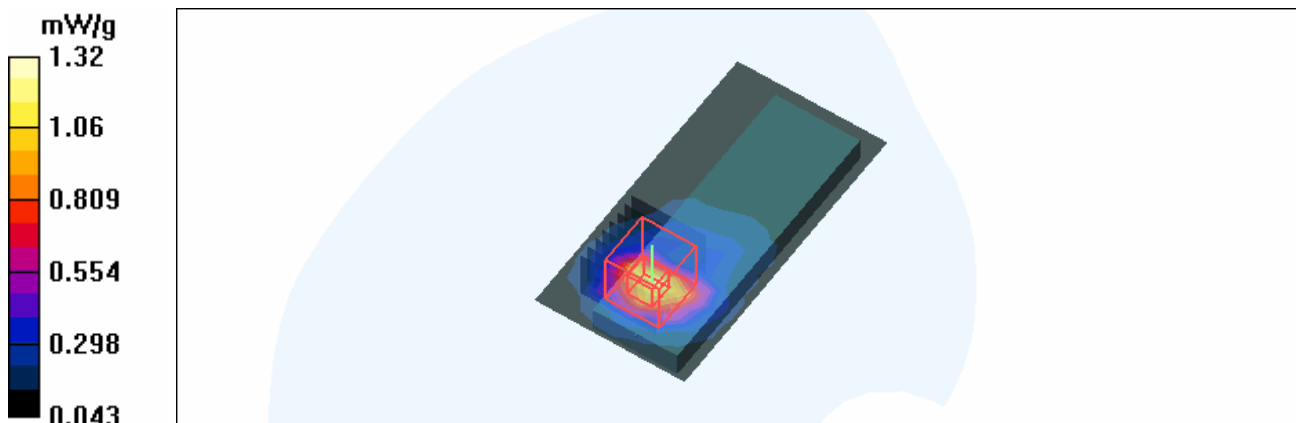
**Mid Channel 48/Zoom Scan (8x8x8)/Cube 0:** Measurement grid:  $dx=4.3\text{mm}$ ,  $dy=4.3\text{mm}$ ,  $dz=3\text{mm}$

Reference Value = 8.81 V/m

Peak SAR (extrapolated) = 2.47 W/kg

**SAR(1 g) = 0.854 mW/g; SAR(10 g) = 0.338 mW/g**

Maximum value of SAR (measured) = 1.32 mW/g



Test Laboratory: Advance Data Technology

### D640-11a Span20-Ch157-M17

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5785 MHz**

Communication System: 11n 5G span20 ; Frequency: 5785 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5785$  MHz;  $\sigma = 6.17$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 157/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.682 mW/g

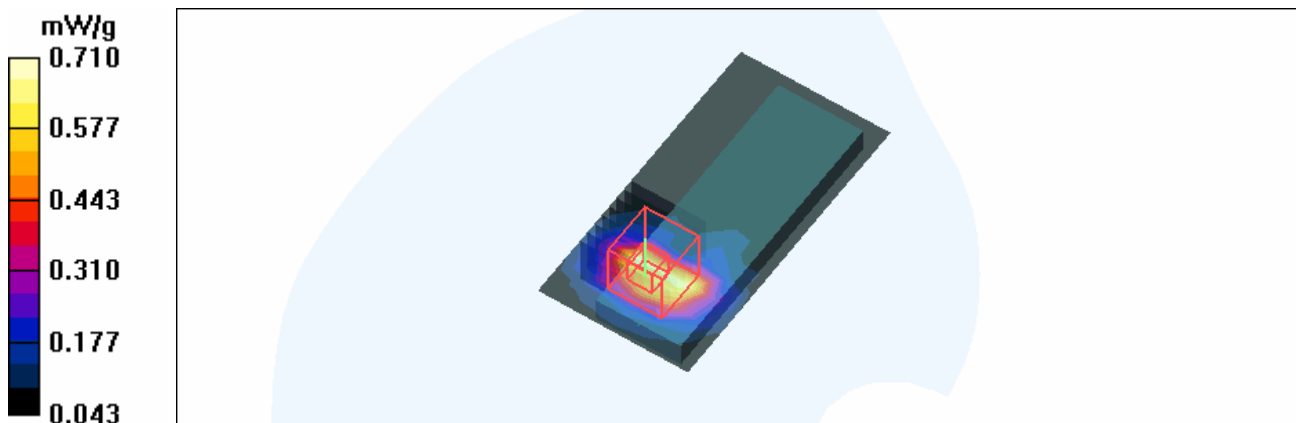
**Mid Channel 157/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.12 V/m

Peak SAR (extrapolated) = 1.60 W/kg

**SAR(1 g) = 0.470 mW/g; SAR(10 g) = 0.205 mW/g**

Maximum value of SAR (measured) = 0.710 mW/g



Test Laboratory: Advance Data Technology

## D640-11a Span40-Ch46-M18

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5230 MHz**

Communication System: 11n 5G span40 ; Frequency: 5230 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5230$  MHz;  $\sigma = 5.34$  mho/m;  $\epsilon_r = 49.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 46/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.976 mW/g

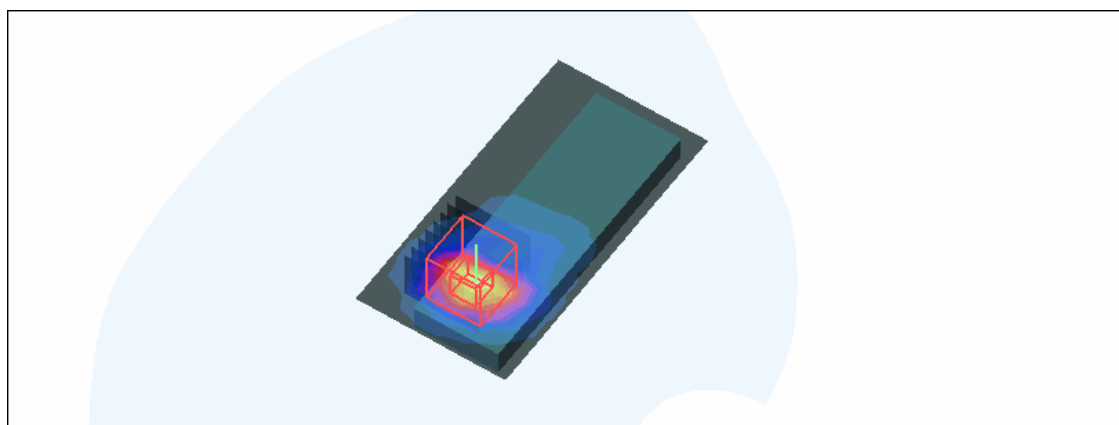
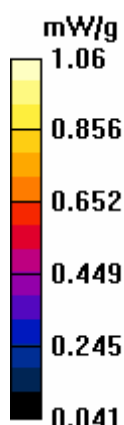
**Mid Channel 46/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 8.04 V/m

Peak SAR (extrapolated) = 2.03 W/kg

**SAR(1 g) = 0.690 mW/g; SAR(10 g) = 0.279 mW/g**

Maximum value of SAR (measured) = 1.06 mW/g



Test Laboratory: Advance Data Technology

**D640-11a Span40-Ch151-M18****DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5755 MHz**

Communication System: 11n 5G span40 ; Frequency: 5755 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5755$  MHz;  $\sigma = 6.12$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 8 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 151/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 1.03 mW/g

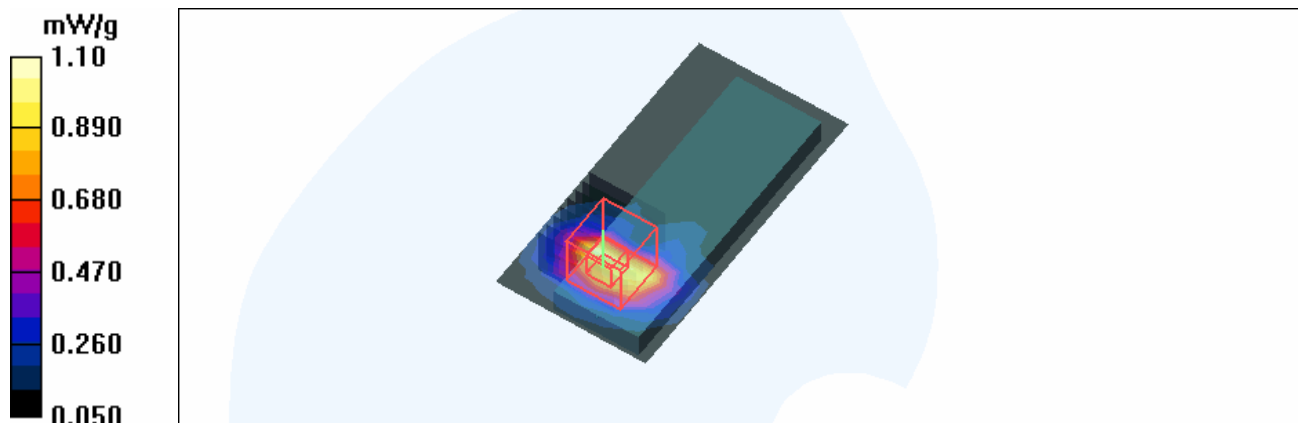
**Mid Channel 151/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.61 V/m

Peak SAR (extrapolated) = 2.43 W/kg

**SAR(1 g) = 0.724 mW/g; SAR(10 g) = 0.304 mW/g**

Maximum value of SAR (measured) = 1.10 mW/g





Test Laboratory: Advance Data Technology

### NX6125-11a-Ch64-M19

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5320 MHz

Communication System: 802.11a ; Frequency: 5320 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5320$  MHz;  $\sigma = 5.47$  mho/m;  $\epsilon_r = 49.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.14, 4.14, 4.14) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### Mid Channel 64/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.532 mW/g

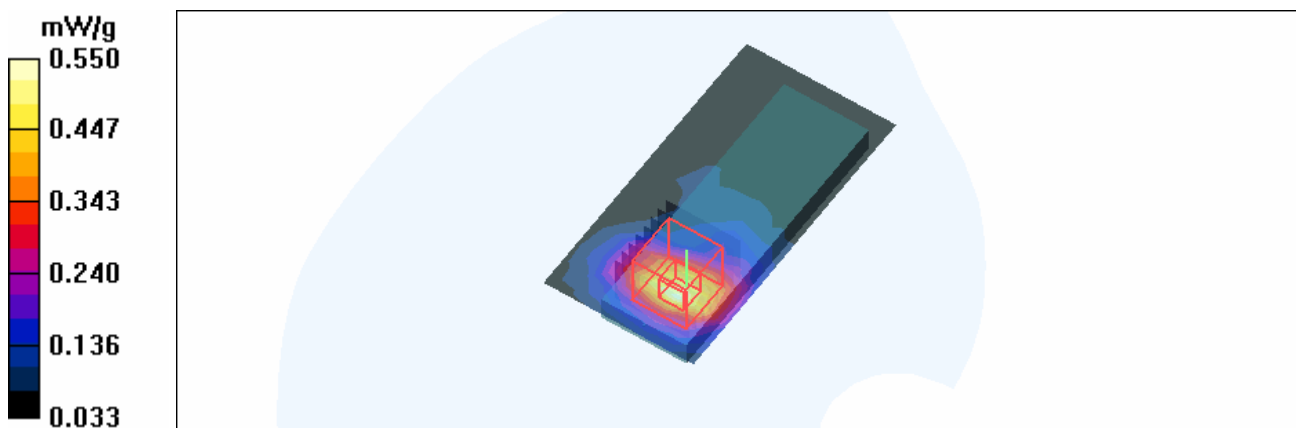
#### Mid Channel 64/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.75 V/m

Peak SAR (extrapolated) = 0.983 W/kg

SAR(1 g) = 0.370 mW/g; SAR(10 g) = 0.175 mW/g

Maximum value of SAR (measured) = 0.550 mW/g



Test Laboratory: Advance Data Technology

### NX6125-11a-Ch100-M19

#### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5500 MHz

Communication System: 802.11a ; Frequency: 5500 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
Medium: MSL5800 Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.74$  mho/m;  $\epsilon_r = 48.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)  
Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 100/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm  
Maximum value of SAR (measured) = 0.688 mW/g

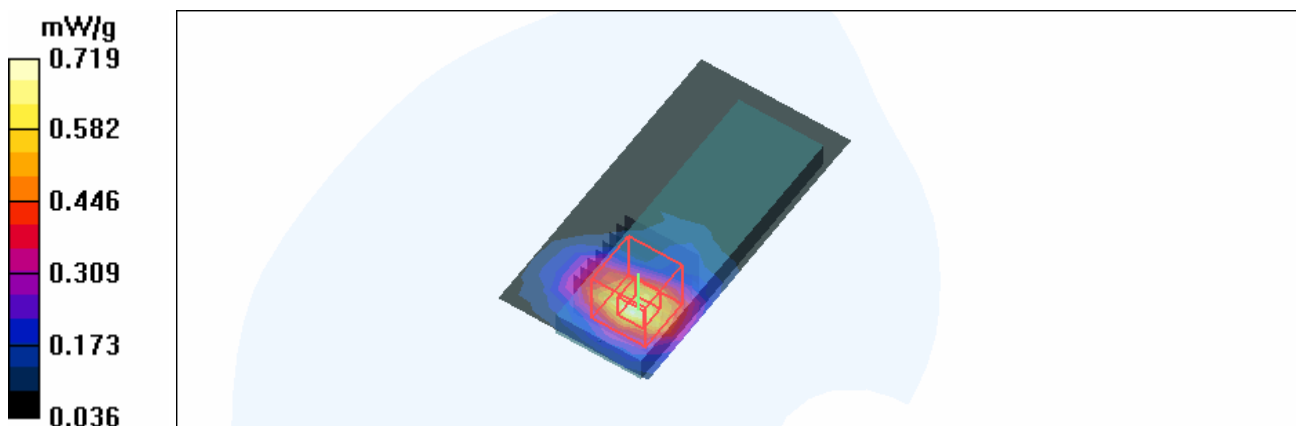
**Mid Channel 100/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.23 V/m

Peak SAR (extrapolated) = 1.43 W/kg

**SAR(1 g) = 0.479 mW/g; SAR(10 g) = 0.214 mW/g**

Maximum value of SAR (measured) = 0.719 mW/g



Test Laboratory: Advance Data Technology

## NX6125-11a-Ch165-M19

### DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5825 MHz

Communication System: 802.11a ; Frequency: 5825 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK  
 Medium: MSL5800 Medium parameters used:  $f = 5825 \text{ MHz}$ ;  $\sigma = 6.23 \text{ mho/m}$ ;  $\epsilon_r = 48.2$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)  
 Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

#### DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

#### High Channel 165/Area Scan (7x13x1): Measurement grid: dx=10mm, dy=10mm

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

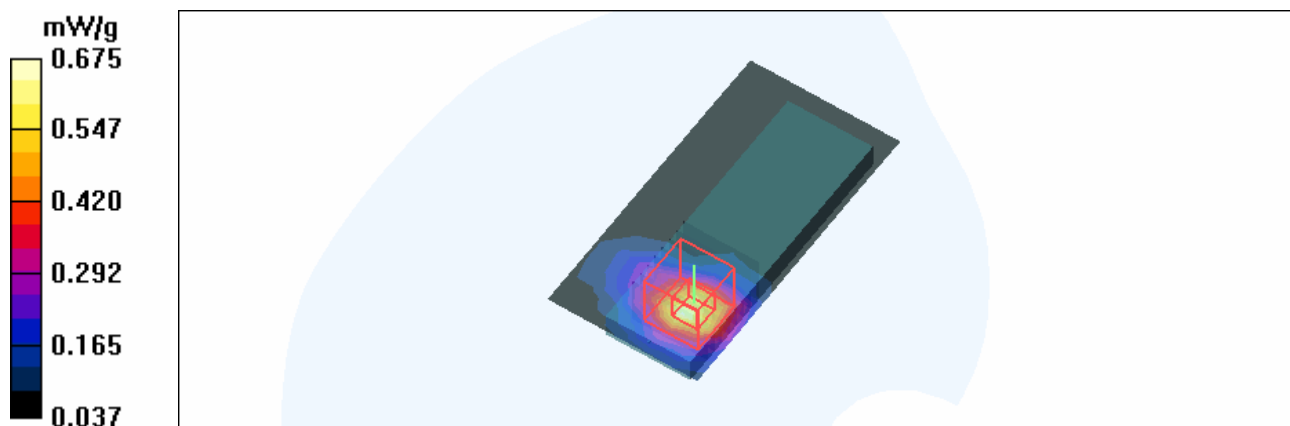
#### High Channel 165/Zoom Scan (8x8x8)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.10 V/m

Peak SAR (extrapolated) = 1.49 W/kg

**SAR(1 g) = 0.454 mW/g; SAR(10 g) = 0.197 mW/g**

Maximum value of SAR (measured) = 0.675 mW/g



Test Laboratory: Advance Data Technology

### **NX6125-11a Span20-Ch48-M20**

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5240 MHz**

Communication System: 11n 5G span20 ; Frequency: 5240 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5240$  MHz;  $\sigma = 5.36$  mho/m;  $\epsilon_r = 49.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 48/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.561 mW/g

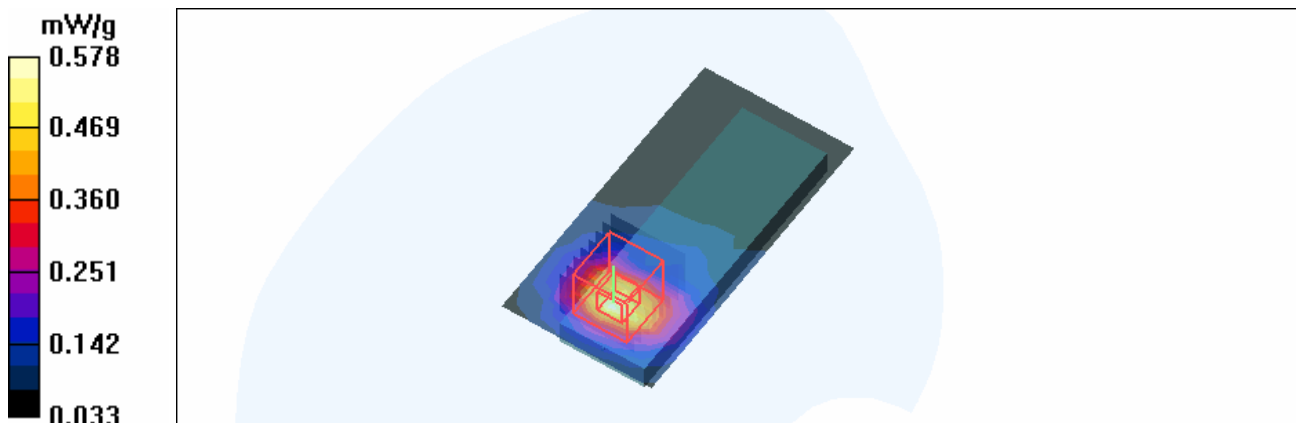
**Mid Channel 48/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.82 V/m

Peak SAR (extrapolated) = 1.02 W/kg

**SAR(1 g) = 0.389 mW/g; SAR(10 g) = 0.177 mW/g**

Maximum value of SAR (measured) = 0.578 mW/g



Test Laboratory: Advance Data Technology

## NX6125-11a Span20-Ch157-M20

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5785 MHz**

Communication System: 11n 5G span20 ; Frequency: 5785 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used:  $f = 5785$  MHz;  $\sigma = 6.17$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 157/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.433 mW/g

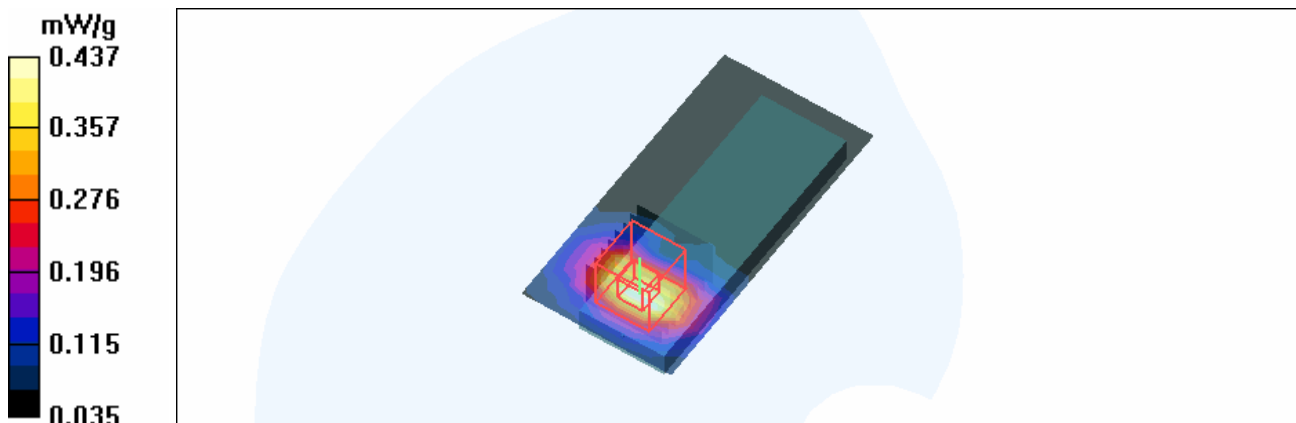
**Mid Channel 157/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 6.61 V/m

Peak SAR (extrapolated) = 0.867 W/kg

**SAR(1 g) = 0.295 mW/g; SAR(10 g) = 0.142 mW/g**

Maximum value of SAR (measured) = 0.437 mW/g



Test Laboratory: Advance Data Technology

### **NX6125-11a Span40-Ch46-M21**

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5230 MHz**

Communication System: 11n 5G span40 ; Frequency: 5230 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5230 \text{ MHz}$ ;  $\sigma = 5.34 \text{ mho/m}$ ;  $\epsilon_r = 49.3$ ;  $\rho = 1000 \text{ kg/m}^3$  ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 46/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

Maximum value of SAR (measured) = 0.482 mW/g

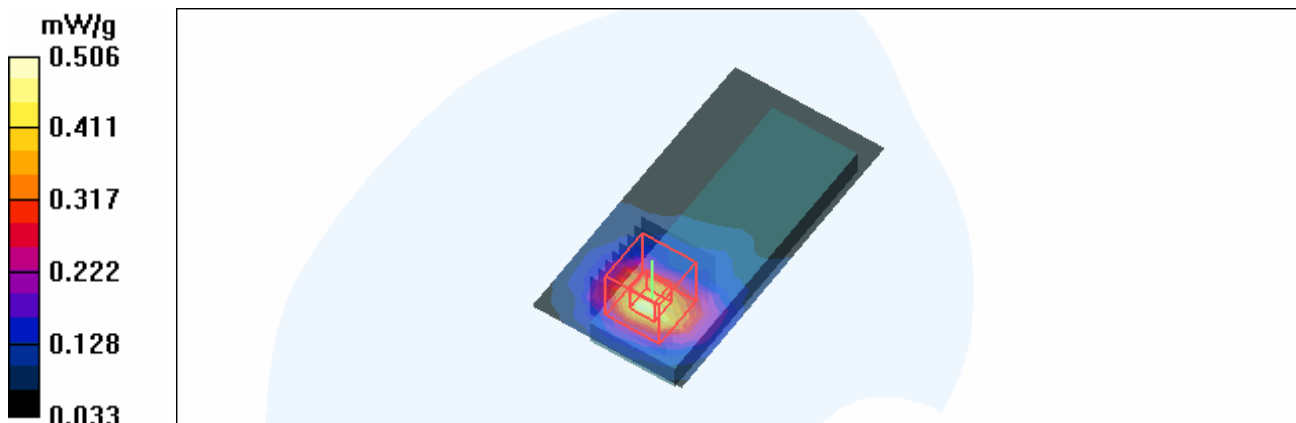
**Mid Channel 46/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.22 V/m

Peak SAR (extrapolated) = 0.890 W/kg

**SAR(1 g) = 0.330 mW/g; SAR(10 g) = 0.152 mW/g**

Maximum value of SAR (measured) = 0.506 mW/g



Test Laboratory: Advance Data Technology

### **NX6125-11a Span40-Ch151-M21**

**DUT: Dual band Wireless-N ExpressCard ; Type: WEC600N ; Test Frequency: 5755 MHz**

Communication System: 11n 5G span40 ; Frequency: 5755 MHz ; Duty Cycle: 1:1 ; Modulation type: BPSK

Medium: MSL5800 Medium parameters used :  $f = 5755$  MHz;  $\sigma = 6.12$  mho/m;  $\epsilon_r = 48.3$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm

Phantom section: Flat Section ; Separation distance : 12 mm (The bottom side of the EUT to the Phantom)

Antenna type : Chip Antenna ; Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579 ; Calibrated: 2007/3/23
- Phantom: SAM 12 ; Type: SAM V4.0 ; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53 ; Postprocessing SW: SEMCAD, V1.8 Build 172

**Mid Channel 151/Area Scan (7x13x1):** Measurement grid: dx=10mm, dy=10mm

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

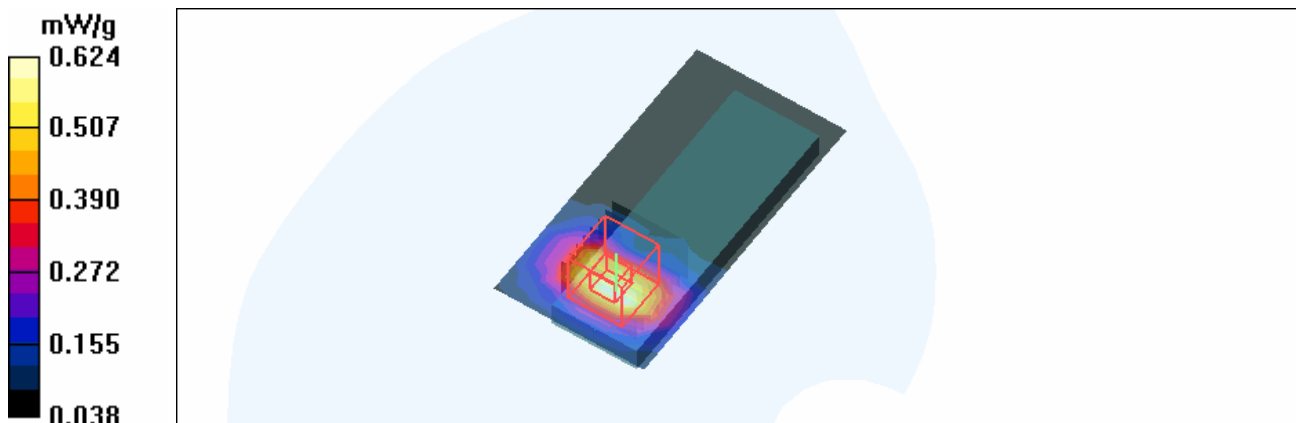
**Mid Channel 151/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 7.20 V/m

Peak SAR (extrapolated) = 1.25 W/kg

**SAR(1 g) = 0.411 mW/g; SAR(10 g) = 0.192 mW/g**

Maximum value of SAR (measured) = 0.624 mW/g



Test Laboratory: Advance Data Technology

## System Validation Check-MSL 2450MHz

**DUT: Dipole 2450 MHz ; Type: D2450V2 ; Serial: 737 ; Test Frequency: 2450 MHz**

Communication System: CW ; Frequency: 2450 MHz; Duty Cycle: 1:1; Modulation type: CW  
 Medium: MSL2450; Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.99$  mho/m;  $\epsilon_r = 53.1$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 151 mm  
 Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom) Air temp. : 23.3 degrees ; Liquid temp. : 22.0 degrees

DASY4 Configuration:

- Probe: ET3DV6 - SN1790 ; ConvF(4.35, 4.35, 4.35) ; Calibrated: 2006/11/23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**d=10mm, Pin=250mW/Area Scan (5x7x1):** Measurement grid: dx=15mm, dy=15mm  
 Maximum value of SAR (measured) = 14.4 mW/g

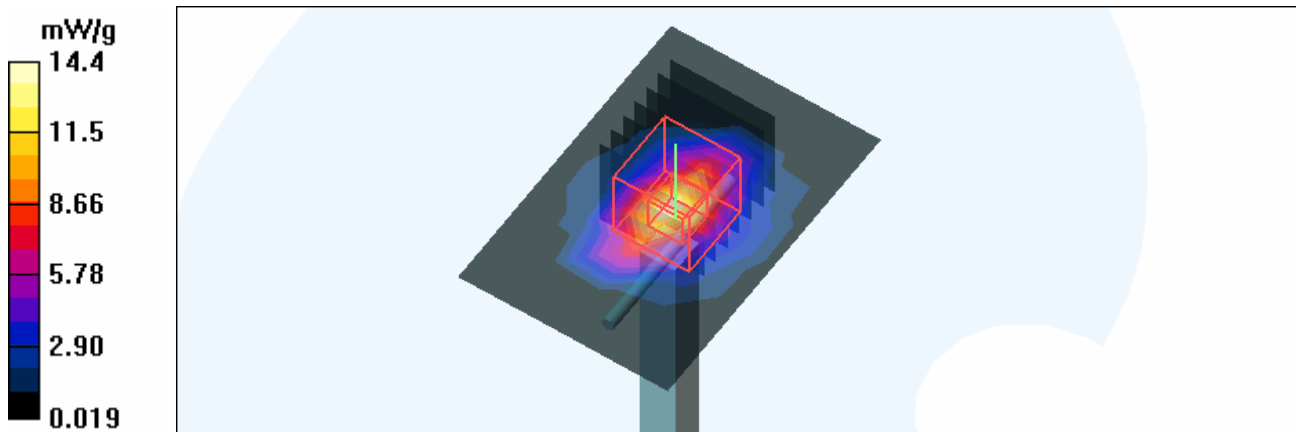
**d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.5 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 31.2 W/kg

**SAR(1 g) = 13.1 mW/g; SAR(10 g) = 5.88 mW/g**

Maximum value of SAR (measured) = 14.3 mW/g





Test Laboratory: Advance Data Technology

## System Validation Check-MSL 5200MHz

**DUT: Dipole 5 GHz ; Type: D5GHzV2 ; Serial: 1018 ; Test Frequency: 5200 MHz**

Communication System: CW ; Frequency: 5200 MHz; Duty Cycle: 1:1; Modulation type: CW  
 Medium: MSL5800; Medium parameters used:  $f = 5200$  MHz;  $\sigma = 5.29$  mho/m;  $\epsilon_r = 49.4$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom) Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.48, 4.48, 4.48) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**f=5200, d=10mm, Pin=250mW/Area Scan (6x6x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (measured) = 22.3 mW/g

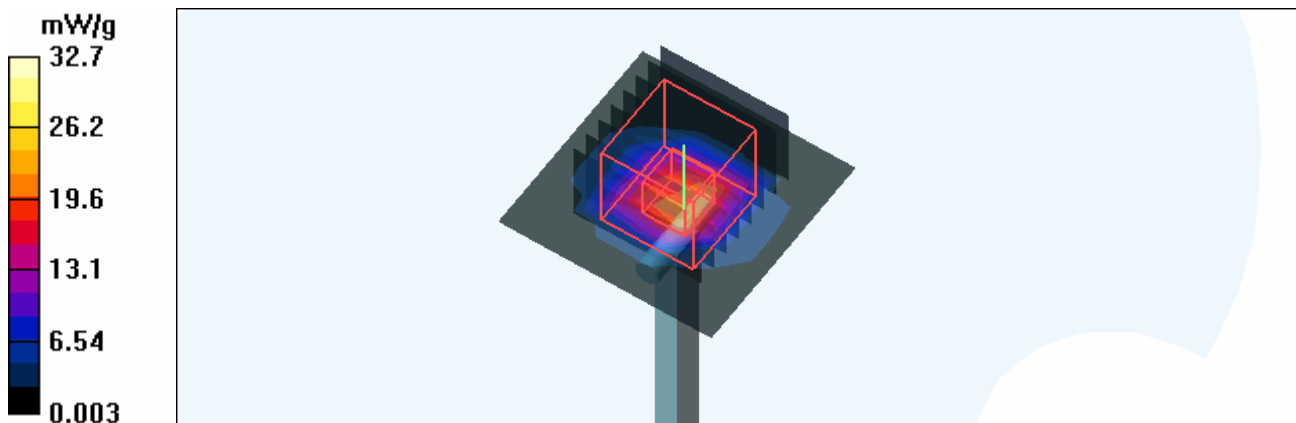
**f=5200, d=10mm, Pin=250mW/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 87.7 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 78.6 W/kg

**SAR(1 g) = 19.2 mW/g; SAR(10 g) = 5.27 mW/g**

Maximum value of SAR (measured) = 32.7 mW/g



Test Laboratory: Advance Data Technology

## System Validation Check-MSL 5500MHz

**DUT: Dipole 5 GHz ; Type: D5GHzV2 ; Serial: 1018 ; Test Frequency: 5500 MHz**

Communication System: CW ; Frequency: 5500 MHz; Duty Cycle: 1:1; Modulation type: CW  
 Medium: MSL5800; Medium parameters used:  $f = 5500$  MHz;  $\sigma = 5.74$  mho/m;  $\epsilon_r = 48.8$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom) Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.11, 4.11, 4.11) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**f=5500, d=10mm, Pin=250mW/Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (measured) = 35.4 mW/g

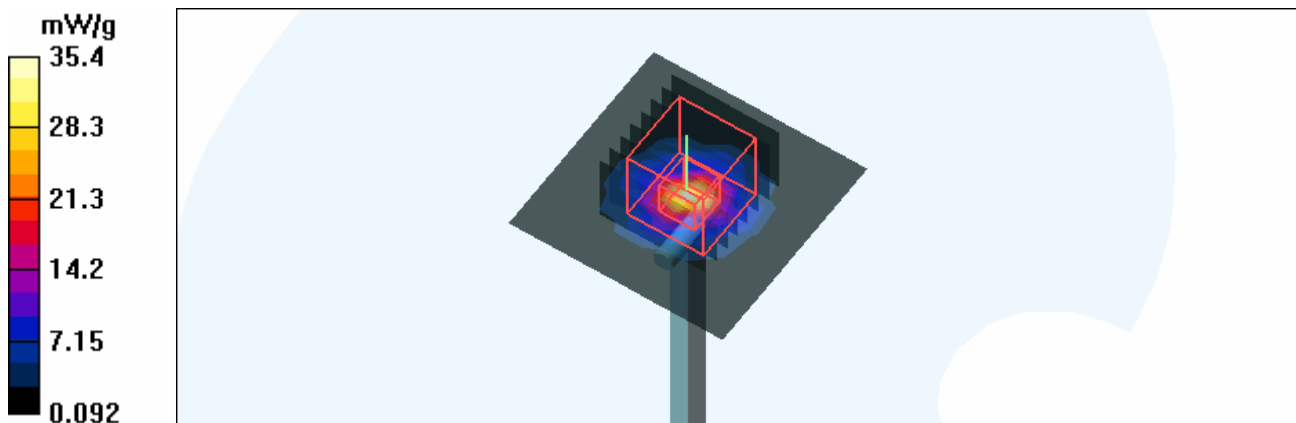
**f=5500, d=10mm, Pin=250mW/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 79.8 V/m; Power Drift = -0.082 dB

Peak SAR (extrapolated) = 82.9 W/kg

**SAR(1 g) = 19 mW/g; SAR(10 g) = 5.23 mW/g**

Maximum value of SAR (measured) = 31.4 mW/g



Test Laboratory: Advance Data Technology

## System Validation Check-MSL 5800MHz

**DUT: Dipole 5 GHz ; Type: D5GHzV2 ; Serial: 1018 ; Test Frequency: 5800 MHz**

Communication System: CW ; Frequency: 5800 MHz; Duty Cycle: 1:1; Modulation type: CW  
 Medium: MSL5800; Medium parameters used:  $f = 5800$  MHz;  $\sigma = 6.19$  mho/m;  $\epsilon_r = 48.2$ ;  $\rho = 1000$  kg/m<sup>3</sup> ; Liquid level : 150 mm  
 Phantom section: Flat Section ; Separation distance : 10 mm (The feetpoint of the dipole to the Phantom) Air temp. : 23.5 degrees ; Liquid temp. : 22.3 degrees

DASY4 Configuration:

- Probe: EX3DV3 - SN3506 ; ConvF(4.2, 4.2, 4.2) ; Calibrated: 2007/3/20
- Sensor-Surface: 2.5mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn579; Calibrated: 2007/3/23
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY4, V4.7 Build 53; Postprocessing SW: SEMCAD, V1.8 Build 172

**f=5800, d=10mm, Pin=250mW/Area Scan (6x6x1):** Measurement grid: dx=10mm, dy=10mm  
 Maximum value of SAR (measured) = 19.4 mW/g

**f=5800, d=10mm, Pin=250mW/Zoom Scan (8x8x8)/Cube 0:** Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm

Reference Value = 71.3 V/m; Power Drift = -0.051 dB

Peak SAR (extrapolated) = 81.3 W/kg

**SAR(1 g) = 16.8 mW/g; SAR(10 g) = 4.61 mW/g**

Maximum value of SAR (measured) = 28.2 mW/g

