

# SAR TEST REPORT

for

Razer Inc.

Notebook

Model No.: RZ09-0168

FCC ID: RWO-RZ090168

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**SAR TEST REPORT**

Applicant : Razer Inc.  
 Manufacturer : Razer Inc.  
 EUT Description : Notebook  
 (A) Model No. : RZ09-0168  
 (B) Serial No. : N/A  
 (C) Test Voltage : DC 11.4V

## Measurement Standard Used:

- FCC 47 CFR Part 2 (2.1093)
- IEEE C95.1-1999
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v05r02
- FCC KDB 248227 D01 v02r01
- FCC KDB 616217 D04 v01r01
- FCC KDB 865664 D01 v01r04
- FCC KDB 865664 D02 v01r01

The device described above is tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. This report contains data that are not covered by the NVLAP accreditation. Also, this report shows that the EUT is technically compliant with the FCC SAR test requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology (Shenzhen) Co., Ltd.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Aug.23~24, 2015 Report of date: Sep.24, 2015

Prepared by : Kayli He Reviewed by : Sunny Lu  
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Approved & Authorized Signer: David Jin  
 David Jin / Manager

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

Product Name	: Notebook
Model Number	: RZ09-0168
Radio	: IEEE802.11 a/b/g/n/ac; Bluetooth V3.0+EDR; Bluetooth V4.1
Operation Frequency	: IEEE 802.11a: 5180MHz—5240MHz; 5260MHz—5320MHz 5500MHz—5700MHz; 5745MHz—5825MHz IEEE 802.11ac VHT20: 5180MHz—5240MHz; 5260MHz—5320MHz 5500MHz—5700MHz; 5745MHz—5825MHz IEEE 802.11ac VHT40: 5190MHz—5230MHz; 5270MHz—5310MHz 5510MHz—5670MHz; 5755MHz—5795MHz IEEE 802.11ac VHT80: 5210MHz, 5290MHz; 5530MHz; 5775MHz IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE802.11nHT20: 2412MHz—2462MHz; 5180MHz—5240MHz; 5260MHz—5320MHz 5500MHz—5700MHz; 5745MHz—5825MHz IEEE802.11nHT40: 2422MHz—2452MHz; 5190MHz—5230MHz; 5270MHz—5310MHz 5510MHz—5670MHz; 5755MHz—5795MHz Bluetooth : 2402-2480MHz
Modulation Technology	: IEEE 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE 802.11a/g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac VHT20, VHT40, VHT80: OFDM(16QAM, 64QAM, 256QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 6QAM,QPSK,BPSK) Bluetooth V3.0+EDR: GFSK, $\pi/4$ DQPSK,8-DPSK Bluetooth V4.1:GFSK
Antenna Gain	Assembly : Antenna Type: PISA Bluetooth: 2.84dBi WIFI 2.4GHz:ANT 0: 2.84dBi; ANT 1: 2.37dBi U-NII 5180-5240MHz Band: ANT 0: -0.18dBi; ANT 1: -0.78dBi U-NII 5260-5320MHz Band: ANT 0: 0.32dBi; ANT 1: -0.08dBi U-NII 5500-5700MHz Band: ANT 0: 3.52dBi; ANT 1: 3.07dBi U-NII 5745-5825MHz Band: ANT 0: 3.48dBi; ANT 1: 3.18dBi

Applicant	: Razer Inc. 9 Pasteur, Suite 100 Irvine, California 92618, United States
Manufacturer	: Razer Inc. 9 Pasteur, Suite 100 Irvine, California 92618, United States
Factory	: BYD Precision Manufacture Co., Ltd No.3001, Baohe Road, Baolong Industrial, Longgang, Shenzhen, 518116, P.R., China
Power Adapter	: Manufacturer: Razer Inc. M/N: RC30-0168 Input: 100-240 Vac,50/60Hz, 2.0A Output: 20V,2.25A
Date of Test	: Aug.23~24, 2015
Date of Receipt	: Aug.17, 2015

## 2. GENERAL DESCRIPTION

### 2.1. Product Description For EUT

[None]

### 2.2. Applied Standards

The Specific Absorption Rate (SAR) testing specification, method and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- IEEE C95.1-1999
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v05r02
- FCC KDB 248227 D01 v02r01
- FCC KDB 616217 D04 v01r01
- FCC KDB 865664 D01 v01r04
- FCC KDB 865664 D02 v01r01

### 2.3. Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

### 2.4. Test Conditions

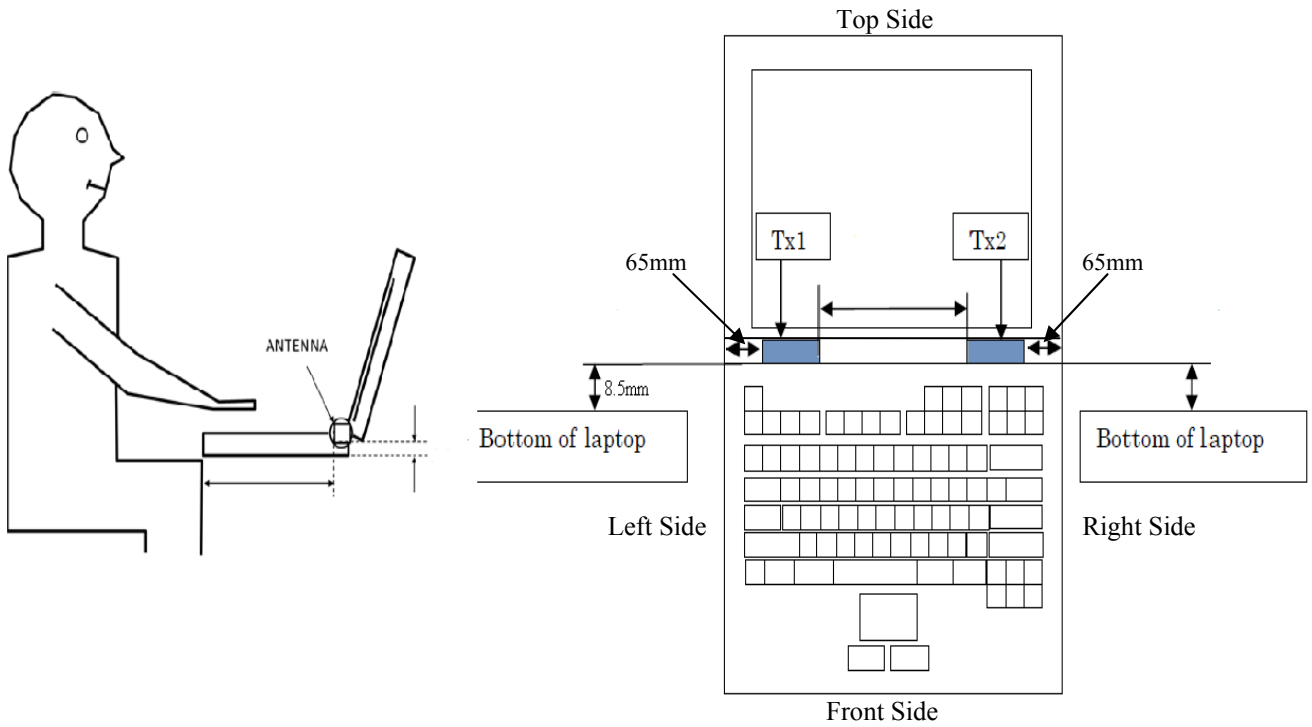
#### 2.4.1. Ambient Condition

Ambient Temperature	20 to 24 °C
Humidity	< 60 %

#### 2.4.2. Test Configuration

The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during all tests.

## 2.5. Exposure Positions Consideration



■ : WiFi Antenna  
(Front View)

Antenna	Description
WiFi Antenna	802.11 a/b/g/nHT20/nHT40/acVHT20/ acVHT40/acVHT80/

**Note:**

1. The distance from the WLAN antenna to the screen back surface is 4.5mm.
2. The distance from the WLAN antenna to the bottom surface is 8.5mm.
3. The distance from WLAN antenna to Top side and Front side is larger than 20cm.

Sides for Body SAR tests Test distance: 0 mm						
Band	Screen Back	Front	Top	Bottom	Right	Left
WLAN 2.4GHz	✓	X	X	✓	X	X
WLAN 5GHz	✓	X	X	✓	X	X

**Note:**

1. Per KDB447498 Appendix B, The side which has a distance to the WLAN antenna is more than 60mm can be exclude from SAR evaluation.

At test separation distance 60mm:

F(MHz)	SAR test exclusion threshold	Max Output power(dBm)	Sides more than 60mm distance from Antenna can be Excused ?
2450	196mW(22.9dBm)	17.47	Yes
5200	166mW(22.2dBm)	15.42	Yes
5400	165mW(22.17dBm)	15.48	Yes
5800	162mW(22.10dBm)	14.89	Yes



## 2.6. Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied. The 1-g SAR test exclusion threshold for 100 MHz to 6 GHz at test separation distances  $\leq 50$  mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10 mW, 5.2GHz is 7 mW, 5.4GHz and 5.8GHz is 6mW

### Appendix A

#### SAR Test Exclusion Thresholds for 100 MHz – 6 GHz and $\leq 50$ mm

Approximate SAR Test Exclusion Power Thresholds at Selected Frequencies and Test Separation Distances are illustrated in the following Table.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

#### Standalone SAR test exclusion considerations

Band/Mode	F(GHz)	SAR test exclusion threshold (mW)	RF output power		SAR test exclusion
			dBm	mW	
Bluetooth	2.441	10	3.231	2.10	YES
2.4GHz WLAN	2.45	10	17.86	61.09	NO
5.2GHz WLAN	5.2&5.3	7	15.42	34.83	NO
5.6GHz WLAN	5.6	6	15.48	35.32	NO
5.8GHz WLAN	5.8	6	14.89	30.83	NO

2.7. EUT Configuration and operation conditions for test.



( EUT: Notebook)

2.8. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal Date	Cal. Interval
1.	DASY5 SAR Test System	Speag	TX60 L speag	F09/5B1H1/01	July.12,15	1Year
2.	Wireless Communication Test Set	Agilent	E5515C	GB44300243	Apr.28,15	1Year
3.	Power Meter	Anritsu	ML2487A	6K00002472	Aug.21,15	1 Year
4.	Power Sensor	Anritsu	MA2491A	0033005	Aug.21,15	1 Year
5.	Signal Generator	HP	83732B	VS34490501	Apr.28,15	1 Year
6.	Amplifier	Milmega	ZHL-42W	C620601316	NCR	N/A
7.	Dipole Validation Kits	Speag	D2450V2	862	May.29,14	3Year
8.	Dipole Validation Kits	Speag	D5GHzV2	1102	Jun.16,14	3Year
9.	Attenuator	Mini-Circuits	VAT-10+	NO.1	Apr.28,15	1Year
10.	Data Acquisition Electronics	Speag	DAE4	899	Feb.07,14	2Year
11.	E-Field Probe	Speag	ES3DV3	3139	Aug.10,15	3Year
12.	E-Field Probe	Speag	EX3DV4	3767	Jan.30,15	3Year
13.	Network Analyzer	Agilent	E5071B	MY42403549	Apr.28,15	1Year
14.	Test Software	Schmid&Partner Englinnering AG	DASY5	52.8.7.1137	N/A	N/A

Note: Dipole antenna calibration interval is 3 year

## 2.9. Laboratory Environment

Temperature	Min:20°C,Max.25°C
Relative humidity	Min. = 30%, Max. = 70%
Note: Ambient noise is checked and found very low and in compliance with requirement of standards.	

## 2.10. Measurement Uncertainty

Test Item	Uncertainty
Uncertainty for SAR test	1g: 21.14
	10g: 20.64
Uncertainty for test site temperature and humidity	0.6°C

Source	Type	Uncertainty Value (%)	Probability Distribution	K	C1(1g)	C1(10g)	Standard uncertainty y ul(%)1g	Standard uncertainty y ul(%)10g	Degree of freedom Veff or Vi
<b>Measurement system repetivity</b>	A	0.5	N	1		1	0.5	0.5	9
Probe calibration	B	5.9	N	1	1	1	5.9	5.9	∞
Isotropy	B	4.7	R	√3	1	1	2.7	2.7	∞
Linearity	B	4.7	R	√3	1	1	2.7	2.7	∞
Probe modulation response	B	0	R	√3	1	1	0	0	∞
Detection limits	B	1.0	R	√3	1	1	0.6	0.6	∞
Boundary effect	B	1.9	R	√3	1	1	1.1	1.1	∞
Readout electronics	B	1.0	N	1	1	1	1.0	1.0	∞
Response time	B	0	R	√3	1	1	0	0	∞
Integration time	B	4.32	R	√3	1	1	2.5	2.5	∞
RF ambient conditions – noise	B	0	R	√3	1	1	0	0	∞
RF ambient conditions – reflections	B	3	R	√3	1	1	1.73	1.73	∞
Probe positioner mech. restrictions	B	0.4	R	√3	1	1	0.2	0.2	∞
Probe positioning with respect to phantom shell	B	2.9	R	√3	1	1	1.7	1.7	∞
Post-processing	B	0	R	√3	1	1	0	0	∞
<b>Test sample related</b>									
Device holder uncertainty	A	2.94	N	1	1	1	2.94	2.94	M-1
Test sample positioning	A	4.1	N	1	1	1	4.1	4.1	M-1
Power scaling	B	5.0	R	√3	1	1	2.9	2.9	∞
Drift of output power (measured SAR drift)	B	5.0	R	√3	1	1	2.9	2.9	∞
<b>Phantom and set-up</b>									
Phantom uncertainty (shape and thickness tolerances)	B	4.0	R	√3	1	1	2.3	2.1	∞
Algorithm for correcting SAR for deviations in permittivity and conductivity	B	1.9	N	1	1	0,84	1,9	1,6	∞
Liquid conductivity (meas.)	A	0.55	N	1	0.78	0.71	0.24	0.21	M-1
Liquid permittivity (meas.)	A	0.19	N	1	0.23	0.26	0.09	0.06	M
Liquid permittivity – temperature uncertainty	A	5.0	R	√3	0,78	0,71	1.4	1.1	∞
Liquid conductivity – temperature uncertainty	A	5.0	R	√3	0.23	0,26	1.2	0.8	∞
<b>Combined standard uncertainty</b>	$u_c = \sqrt{\sum_{i=1}^{23} c_i^2 u_i^2}$						<b>10.57</b>	<b>10.32</b>	
<b>Expanded uncertainty (95 % conf. interval)</b>	$u_e = 2u_c$		N		K=2		<b>21.14</b>	<b>20.64</b>	

### 3. MEASURE PROCEDURES

#### 3.1. General description of test procedures

For the 802.11a/b/g SAR body tests, a communication link is set up with the test mode software for WIFI mode test. The Absolute Radiofrequency Channel Number (ARFCN) is allocated to 1,6 and 11 respectively in the case of 2450 MHz. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g modes are tested on channels 1,6,11; however, if output power reduction is necessary for channels 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels must be tested instead.

SAR is not required for 802.11g channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels. When the maximum average output channel in each frequency band is not included in the “default test channels”, the maximum channel should be tested instead of an adjacent “default test channels”, these are referred to as the “required test channels” and are illustrated in table 1.

Please apply the following guidance for SAR testing:

1. Please use a 0 mm (touching) test separation distance on the flat phantom during SAR testing of this device. This separation distance is based on the guidance found in FCC KDB Publication 447498 D01, Section 5.2.3 3)
2. Please utilize a body tissue simulating liquid (TSL) of the appropriate frequency during SAR testing.
3. Please use the guidance found in FCC KDB Publication 447498 D01 to determine which sides of the device need to be tested for SAR.
4. FCC KDB Publication 248227 D01 should be used for selection of the WiFi channels, data rates, etc.

Table C.4 – Reported SAR of initial test configuration determined according to Table C.3 with frequency band test reduction taken into consideration

802.11 Modes		a	g	n (HT) <sup>@</sup>		ac (VHT) <sup>@</sup>			
Channel Bandwidth (MHz)		20	20	20	40	20	40	80	160
§15.247 (2.4 GHz)			1/6/11	1/6/11	6				
		SAR not required for OFDM; 802.11b adjusted SAR ≤ 1.2 W/kg							
U-NII-1	Ch. #	36/40/44/48		36/40/44/48	38/46	36/40/44/48	38/46	42	
		U-NII-2A exclusion applied							
U-NII-2A	W/kg	52/56/60/64		52/56/60/64	54/62	52/56/60/64	54/62	58	
		0.85							
U-NII-1 + U-NII-2A									50
U-NII-2C		100/112/116/128		100/112/116/128	102/110/118/126	100/112/116/128	102/110/118/126	106/112	114
		0.95							
U-NII-3		132/149/165		132/149/165	134/142/151/159	132/149/165	134/142/151/159	138/155	
§15.247 (5.8 GHz)		132/149/165		132/149/165	134/142/151/159	132/149/165	134/142/151/159	138/155	
		1.08							

- This example assumes the device has a fixed exposure test position; therefore, initial test position SAR test reduction does not apply.
- It is also assumed that the test separation distance and measured power (illustrated in Table C.3) do not qualify for the standalone SAR test exclusion provisions in KDB Publication 447498 D01.
- SAR probe(s) are assumed to have valid calibrations at 5.25, 5.60 and 5.75 GHz.
- The illustrated SAR values are already scaled to 100% transmission duty factor and according to reported SAR procedure.
- U-NII-1 and U-NII-2A bands have the same specified maximum output and tolerance; SAR is measured for U-NII-2A band first. Adjusted SAR of U-NII-2A band is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.

### 3.2. Position of module in Portable devices

SAR is required for Front, back, edge, Top and bottom with the most conservative exposure conditions, The EUT is tested at the following test positions:

- (1) Test Position Vertical- Back Side: The Vertical-Back Side of the EUT towards and directed tightly to touch the flat phantom.
- (2) Test Position Bottom of the EUT towards and directed tightly to touch the flat phantom.

(The distance is more than 2.5 cm between antenna and Front, Top, Left, Right side)

## 4. SAR MEASUREMENTS SYSTEM

### 4.1. SAR Measurement Set-up

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

- (1) A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- (2) A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage. It issues simulating liquid. The probe is equipped with an optical surface detector system.
- (3) A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- (4) A unit to operate the optical surface detector which is connected to the EOC.
- (5) The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- (6) The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003.
- (7) DASY5 software and SEMCAD data evaluation software.
- (8) Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- (9) The generic twin phantom enabling the testing of left-hand and right-hand usage.
- (10) The device holder for handheld mobile phones.
- (11) Tissue simulating liquid mixed according to the given recipes.
- (12) System validation dipoles allowing to validate the proper functioning of the system.

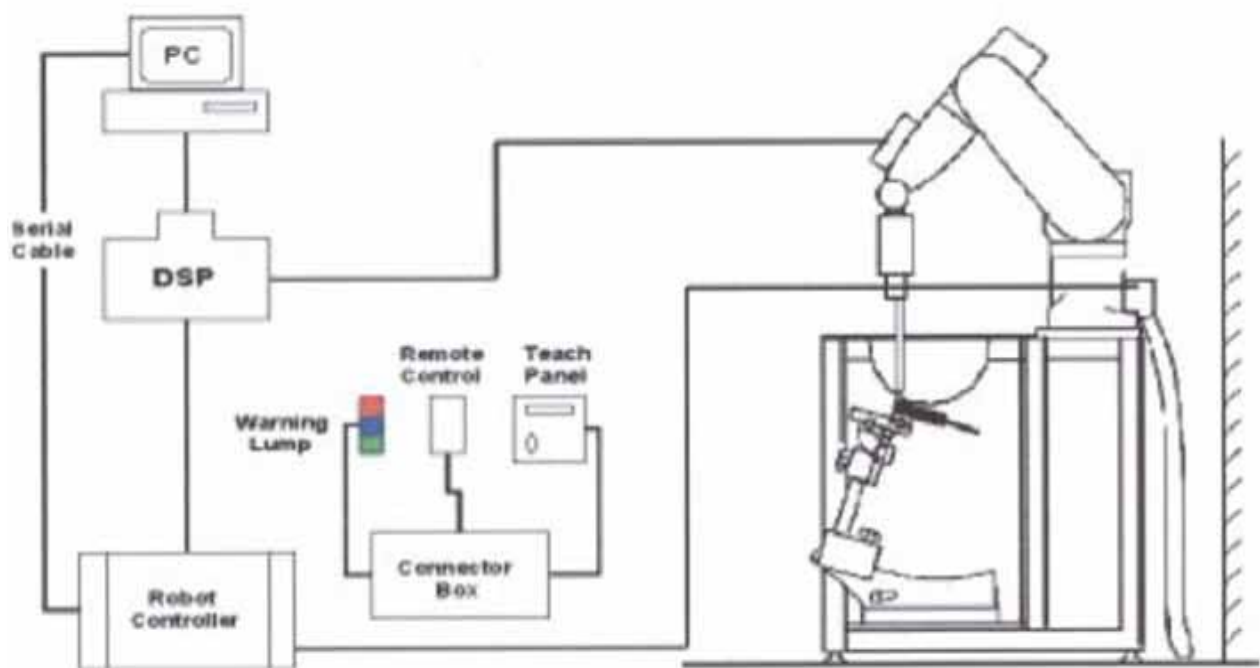


Figure 4.1 SAR Lab Test Measurement Set-up

#### 4.2. ELI Phantom

Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.



Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters
Wooden Support	SPEAG standard phantom table

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.

##### **Figure 6.2 Top View of Twin Phantom**

A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters.

On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

The phantom can be used with the following tissue simulating liquids:

- \*Water-sugar based liquid
- \*Glycol based liquids



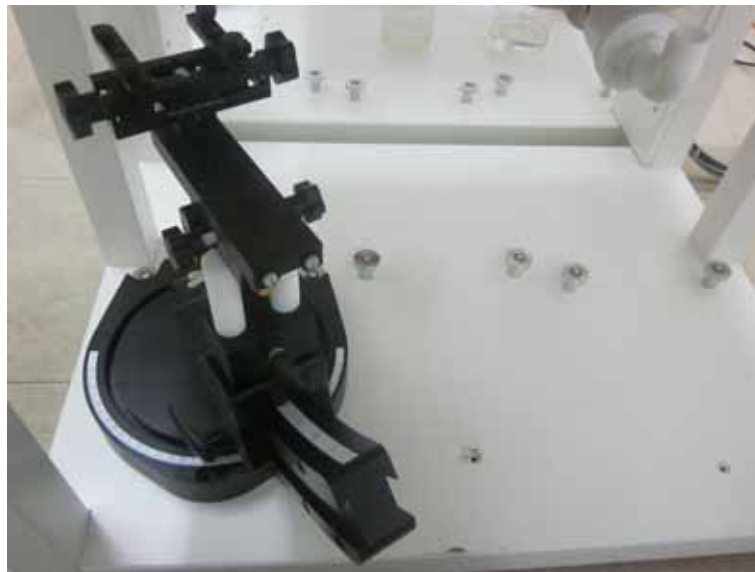
### 4.3. Device Holder for SAM Twin Phantom

The SAR in the Phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source in 5 mm distance, a positioning uncertainty of  $\pm 0.5\text{mm}$  would produce a SAR uncertainty of  $\pm 20\%$ . An accurate device position is therefore crucial for accurate and repeatable measurement. The position in which the devices must be measured, are defined by the standards.

The DASY5 device holder 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 (EPR).

Thus the device needs no repositioning when changing the angles.

The DASY5 device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity  $\epsilon_r' = 3$  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.



**Figure 4.3 Device Holder**

#### 4.4. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.



Figure 4.4 EX3DV4 E-field Probe

##### 4.4.1. EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to > 6 GHz Linearity: $\pm 0.2$ dB (30 MHz to 6 GHz)
Directivity	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 $\mu$ W/g to > 100 mW/g Linearity: $\pm 0.2$ dB (noise: typically < 1 $\mu$ W/g)
Dimensions	Overall length: PRS-T2 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

#### 4.5. E-field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

Where:  $\Delta t$  = Exposure time (30 seconds),  
 $C$  = Heat capacity of tissue (brain or muscle),  
 $\Delta T$  = Temperature increase due to RF exposure.  
 Or

$$SAR = \frac{|E|^2 \sigma}{\rho}$$

Where:  
 $\sigma$  = Simulated tissue conductivity,  
 $\rho$  = Tissue density (kg/m<sup>3</sup>).

## 4.6. Scanning procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The "reference" and "drift" measurements 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 EUT's output power and should vary max.  $\pm 5\%$ .

The "surface check" measurement tests the optical surface detection system of the DASY5 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  $\pm 0.1\text{mm}$ ). To prevent wrong results tests are only executed when the liquid is free of air bubbles.

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  $\pm 30^\circ$ .)

### **Area Scan**

The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.

After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

### **Zoom Scan**

Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.

### **Spatial Peak Detection**

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

## 5. DATA STORAGE AND EVALUATION

### 5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DA4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm<sup>2</sup>], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

### 5.2. Data Evaluation by SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters: - Sensitivity	Normi, ai0, ai1, ai2
- Conversion factor	ConvFi
- Diode compression point	Dcpi

Device parameters: - Frequency	f
- Crest factor	cf

Media parameters: - Conductivity	
- Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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:

$$V_i = U_i + U_{i2} \cdot c f / d c p i$$

With  $V_i$  = compensated signal of channel  $i$  ( $i = x, y, z$ )

$U_i$  = input signal of channel  $i$  ( $i = x, y, z$ )

$cf$  = crest factor of exciting field (DASY parameter)

$dcp_i$  = diode compression point (DASY parameter)

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

E-field probes:  $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes:  $H_i = (V_i)^{1/2} \cdot (ai_0 + ai_1 f + ai_2 f^2) / f$

With  $V_i$  = compensated signal of channel  $i$  ( $i = x, y, z$ )

$Norm_i$  = sensor sensitivity of channel  $i$  ( $i = x, y, z$ )

$ConvF$  = sensitivity enhancement in solution

$ai_j$  = 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):

$$E_{tot} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

$$SAR = (E_{tot}^2 \cdot \rho) / (\sigma \cdot 1000)$$

with

$SAR$  = local specific absorption rate in mW/g

$E_{tot}$  = total field strength in V/m

$\rho$  = conductivity in [mho/m] or [Siemens/m]

$\sigma$  = equivalent tissue density in g/cm<sup>3</sup>

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with  $P_{pwe}$  = equivalent power density of a plane wave in mW/cm<sup>2</sup>

$E_{tot}$  = total electric field strength in V/m

$H_{tot}$  = total magnetic field strength in A/m

## 6. SYSTEM CHECK

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulates were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulates, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the ANNEX A.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system ( $\pm 10\%$ ).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

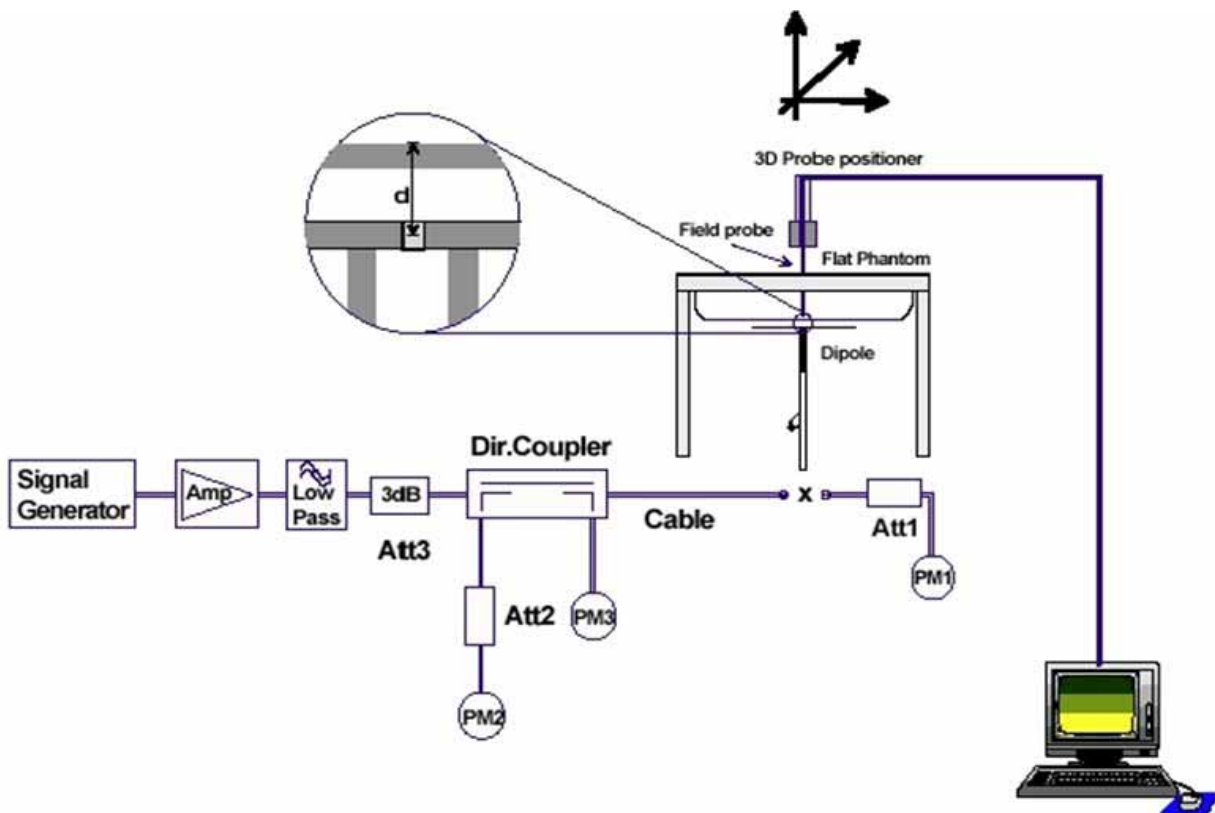


Figure 6.1: System Check Set-up



## 7. TEST RESULTS

### 7.1. Duty Cycle

2.4GHz	
Test Mode	Duty Cycle
11b	0.9669
11n HT20	0.9655

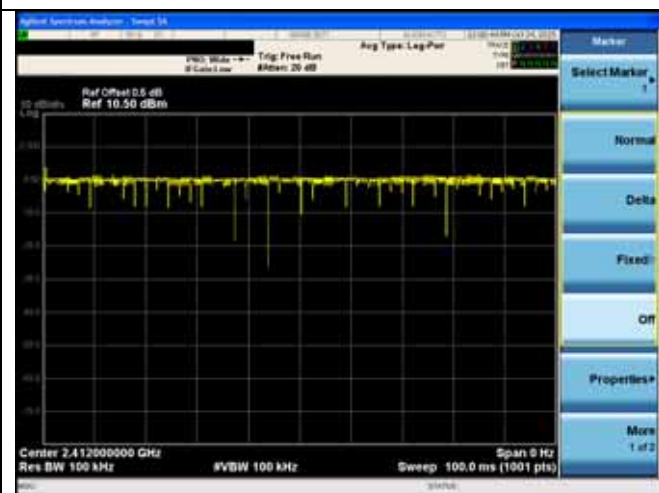
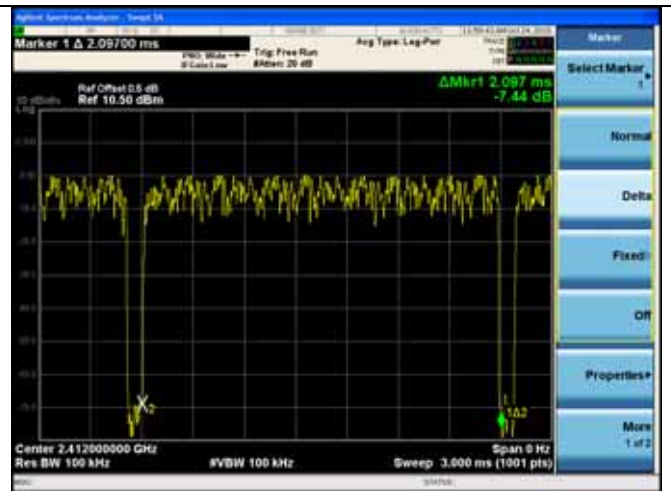
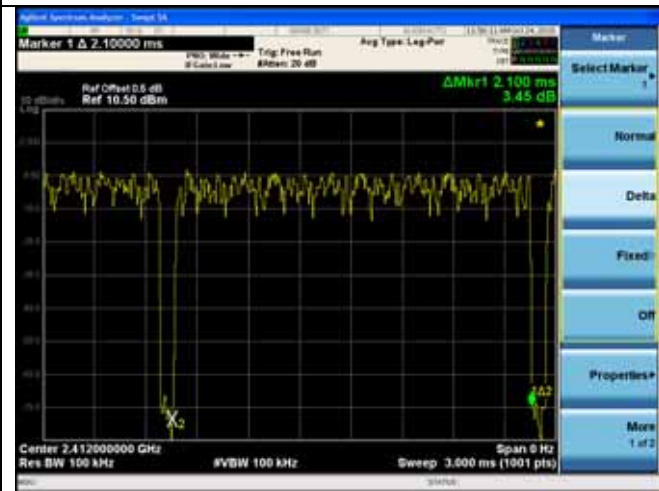
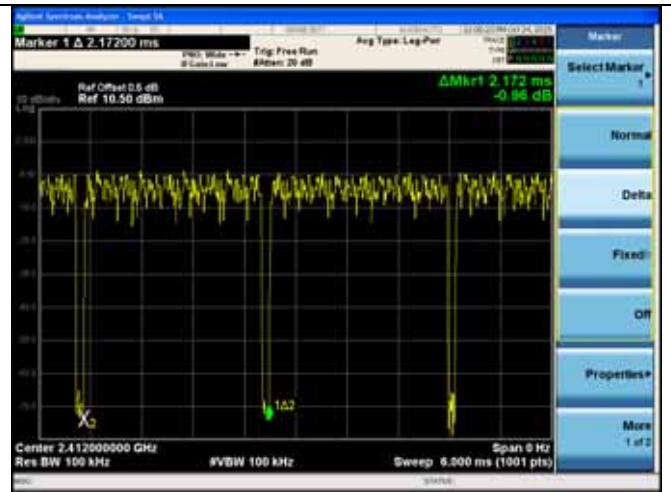
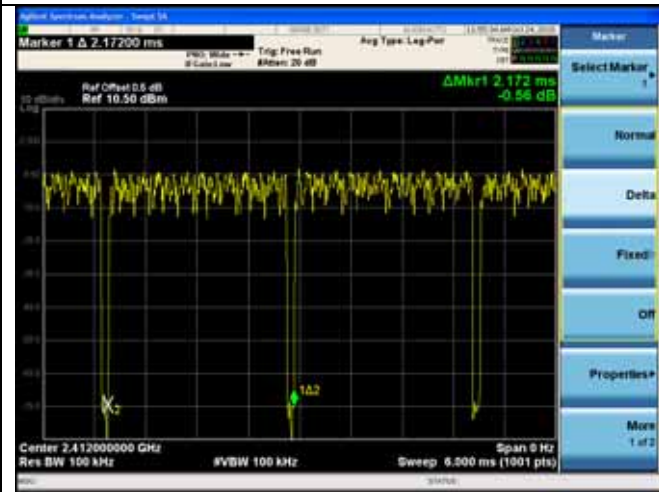
5GHz	
Test Mode	Duty Cycle
11a	0.9641
11n HT20	0.9659
11ac VHT40	0.9718

Note: Please see the duty cycle test plot in next page.

2.4GHz:

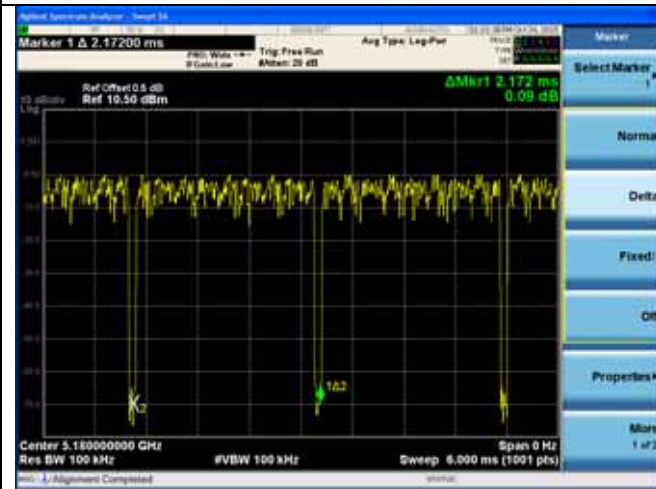
11b

11n HT20

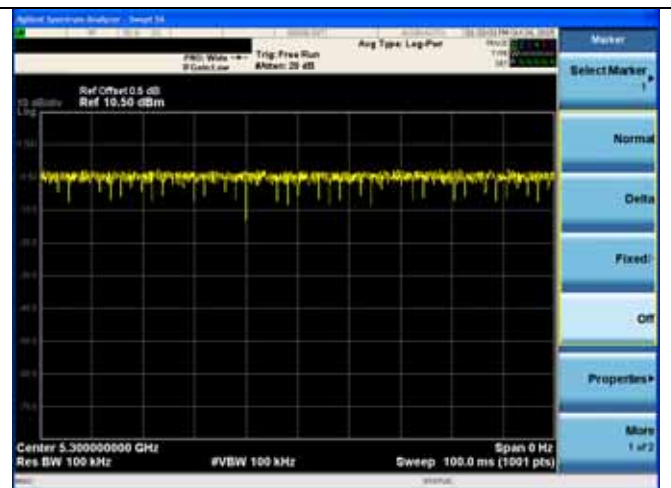
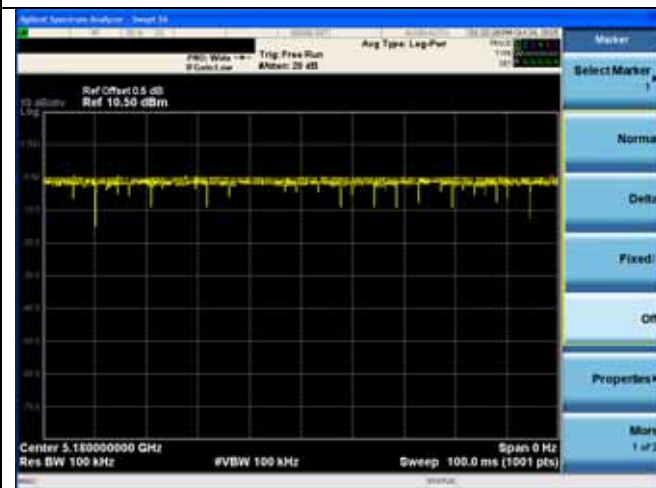
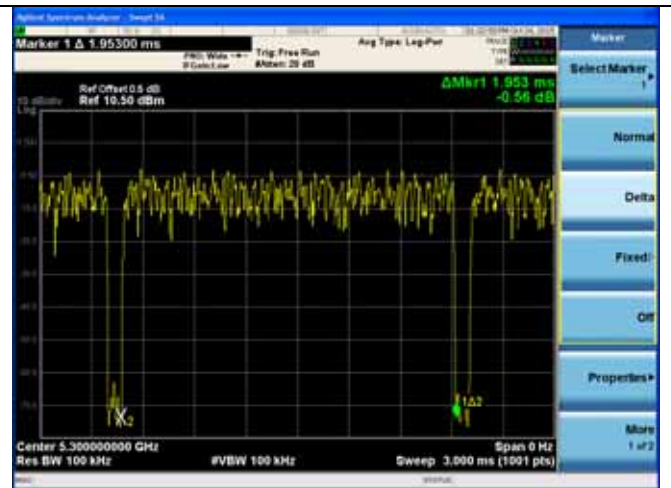
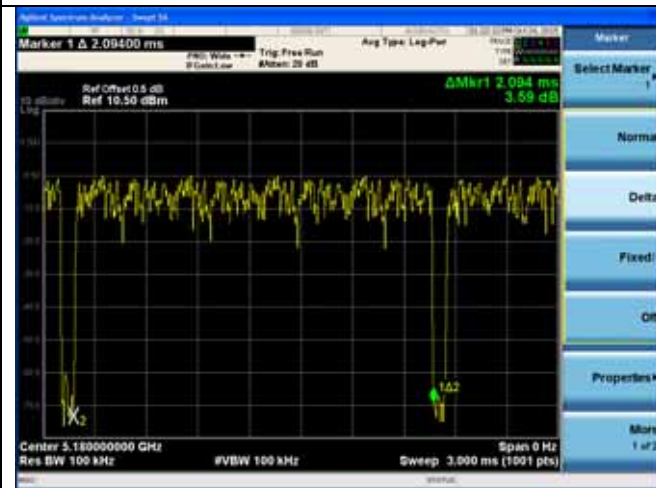
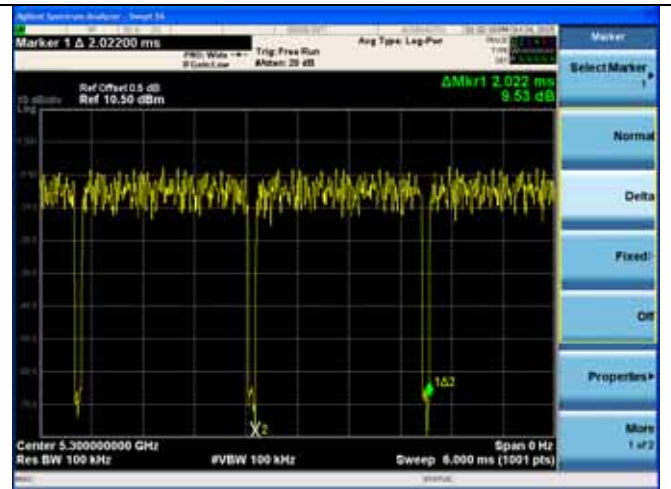


5GHz:

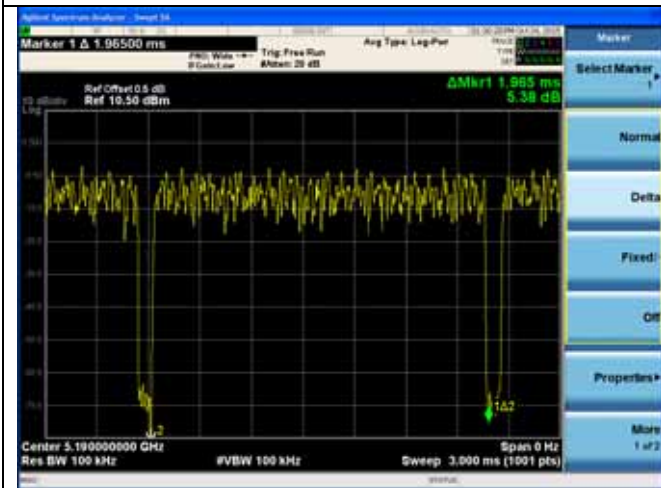
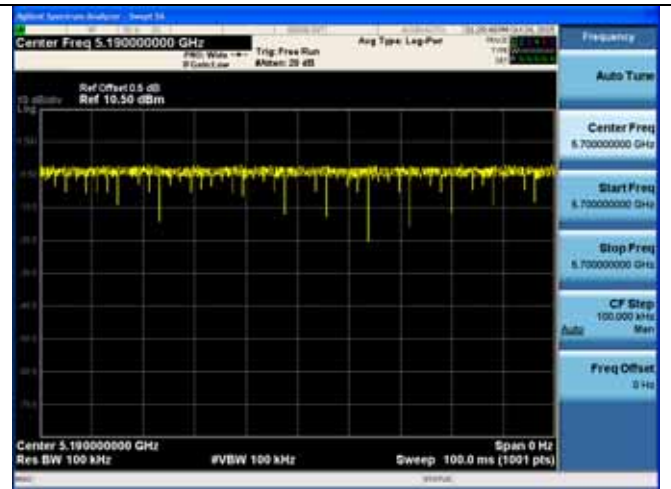
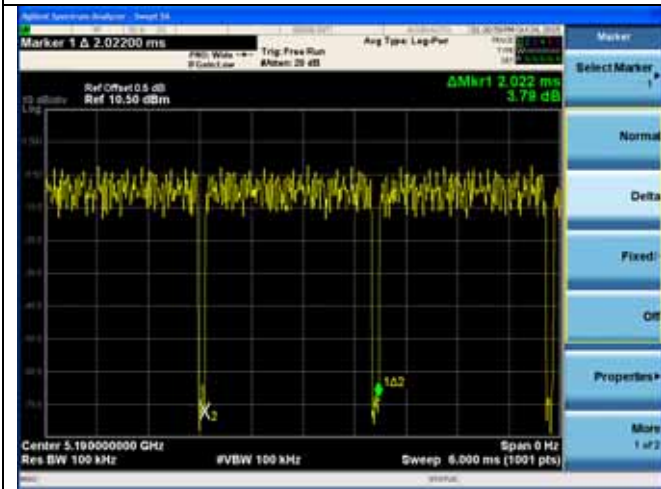
11a



11n HT20



11ac VHT40



## 7.2. Output power

(BT 3.0)

Test Mode	Frequency (MHz)	output Power (dBm)
GFSK	2402	2.274
	2441	3.122
	2480	3.231
8-DPSK	2402	1.532
	2441	2.396
	2480	2.438

(BT 4.1)

Test Mode	Frequency (MHz)	output Power (dBm)
GFSK	2402	-1.430
	2440	-0.710
	2480	-0.591

(WIFI 2.4G)

Test Mode	CH	output Power (dBm)		
		Chain 0	Chain 1	Total
11b	CH1	15.39	14.07	N/A
	CH6	15.58	14.53	N/A
	CH11	15.51	14.65	N/A
11g	CH1	15.67	14.25	N/A
	CH6	15.05	14.45	N/A
	CH11	15.56	14.52	N/A
11n HT20	CH1	16.55	15.26	19.08
	CH6	16.77	15.25	19.20
	CH11	17.47	15.27	19.52
11n HT40	CH3	14.48	13.58	17.06
	CH6	14.58	13.47	17.07
	CH9	14.97	13.42	17.27

### Notes:

1. Per KDB 248227, 11g output power is less than 1/4 dB higher than 11b mode, thus the SAR can be excluded.
2. Use the data rate with the maximum output level for the SAR test.
3. BT and WIFI 2.4GHz can not transmit at same time.

(WIFI 5G)

Band	Mode	Frequency ( MHz )	output Power ( dBm )		
			Chain 0	Chain 1	Total
1	11a	5180	14.82	15.42	N/A
		5200	14.71	15.07	N/A
		5240	13.53	13.88	N/A
	11n HT20	5180	14.56	15.35	17.98
		5200	14.48	15.00	17.76
		5240	13.25	14.01	16.66
	11n HT40	5190	14.39	14.98	17.71
		5230	12.57	13.86	16.27
	11ac VHT20	5180	14.75	15.15	17.96
		5200	14.46	14.90	17.70
		5240	13.45	13.67	16.57
	11ac VHT40	5190	13.91	15.03	17.52
5230		12.55	13.84	16.25	
11ac VHT80	5210	12.14	12.42	15.29	

Band	Mode	Frequency ( MHz )	output Power ( dBm )		
			Chain 0	Chain 1	Total
2	11a	5260	13.73	14.32	N/A
		5300	13.59	14.33	N/A
		5320	13.52	13.01	N/A
	11n HT20	5260	13.49	14.28	16.91
		5300	14.28	14.35	17.33
		5320	13.30	13.07	16.20
	11n HT40	5270	12.89	14.46	16.76
		5310	12.87	13.49	16.20
	11ac VHT20	5260	13.40	14.11	16.78
		5300	14.36	14.06	17.22
		5320	13.30	12.78	16.06
	11ac VHT40	5270	12.66	14.38	16.61
		5310	13.38	13.49	16.45
	11ac VHT80	5290	11.80	11.87	14.85

Band	Mode	Frequency ( MHz )	output Power ( dBm )		
			Chain 0	Chain 1	Total
3	11a	5500	14.81	13.64	N/A
		5600	14.97	14.38	N/A
		5700	15.48	14.94	N/A
	11n HT20	5500	14.53	13.69	17.14
		5600	14.69	14.36	17.54
		5700	15.21	15.00	18.12
	11n HT40	5510	14.17	12.89	16.59
		5590	14.43	14.08	17.27
		5670	14.54	14.62	17.59
	11ac VHT20	5500	14.58	13.41	17.04
		5600	14.73	14.14	17.46
		5700	15.22	14.66	17.96
	11ac VHT40	5510	13.73	12.95	16.37
		5590	14.38	14.24	17.32
		5670	14.11	14.73	17.44
11ac VHT80	5530	12.87	11.13	15.10	

Band	Mode	Frequency ( MHz )	output Power ( dBm )		
			Chain 0	Chain 1	Total
4	11a	5745	14.48	13.54	N/A
		5785	14.89	14.38	N/A
		5825	14.88	13.96	N/A
	11n HT20	5745	14.40	13.17	16.84
		5785	14.52	14.11	17.33
		5825	14.47	13.67	17.10
	11n HT40	5755	14.09	13.20	16.68
		5790	14.61	14.15	17.40
	11ac VHT20	5745	14.14	13.14	16.68
		5785	14.55	14.07	17.33
		5825	14.30	13.75	17.04
	11ac VHT40	5755	13.96	13.17	16.59
		5790	14.88	14.15	17.54
	11ac VHT80	5775	13.27	12.45	15.89

**Notes:**

1. Use the data rate with the maximum output level for the SAR test.
2. BT and WIFI 5GHz can not transmit at same time.

7.3. System Check for Body Tissue simulating liquid

Frequency	Description	SAR(W/kg) (±10% window)		Dielectric Parameters (±5% window)		Temp
		1g	10g	$\epsilon_r$	$\sigma$ (s/m)	°C
2450MHz	Recommended value	12.8 11.52 — 14.08	5.86 5.27 — 6.45	52.7	1.95	/
	Measurement value 2015-08-23	13.14	6.04	52.824	1.988	20.05
5200MHz	Recommended value	19.125 17.21 — 21.04	5.4 4.86 — 5.94	49	5.3	/
	Measurement value 2015-08-24	19.14	5.41	50.134	5.255	20.21
5300MHz	Recommended value	19.125 17.21 — 21.04	5.4 4.86 — 5.94	49	5.3	/
	Measurement value 2015-08-24	19.24	5.48	49.82	5.41	20.20
5600MHz	Recommended value	20.347 17.55 — 21.45	5.652 4.93 — 6.02	48.6	5.65	/
	Measurement value 2015-08-24	20.95	5.87	49.29	5.471	20.22
5800MHz	Recommended value	19.041 17.55 — 21.45	5.239 4.93 — 6.02	48.2	6	/
	Measurement value 2015-08-24	19.48	5.47	48.51	5.673	20.27

**Note:** Recommended Values used derive from the calibration certificate and 250 mW is used as feeding power to the calibrated dipole.



7.4. Test Results

**WIFI 2.4G:  
ANT0:**

Mode	Channel	Test Position	Output Power		Measured Results		Final Scaled Result		Power Drift (dBm)
			Max. AV Power (dBm)	Measured AV Power (dBm)	SAR1g (W/kg)	SAR10g (W/kg)	SAR1g (W/kg)	SAR10g (W/kg)	
11b	CH6	Bottom	16.00	15.58	0.583	0.205	0.664	0.234	0.09
		Screen Back	16.00	15.58	0.217	0.100	0.247	0.114	-0.17
11n HT20	CH11	Bottom	17.50	17.47	0.597	0.217	0.623	0.226	-0.01
		Screen Back	17.50	17.47	0.235	0.111	0.245	0.116	0.01

Conclusion: PASS

Note :

Factor= Max. AV Power(W)/Measured Power(W)  
 Final Scaled SAR= (Measured SAR\*Factor)\*Duty cycle factor  
 The Max. Scaled SAR : **0.664W/kg for 1g SAR**

**ANT1:**

Mode	Channel	Test Position	Output Power		Measured Results		Final Scaled Result		Power Drift (dBm)
			Max. AV Power (dBm)	Measured AV Power (dBm)	SAR1g (W/kg)	SAR10g (W/kg)	SAR1g (W/kg)	SAR10g (W/kg)	
11b	CH11	Bottom	15.00	14.65	0.602	0.215	0.675	0.241	0.09
		Screen Back	15.00	14.65	0.211	0.113	0.237	0.127	-0.11
11n HT20	CH11	Bottom	15.50	15.27	0.531	0.201	0.580	0.220	0.10
		Screen Back	15.50	15.27	0.145	0.112	0.158	0.122	0.07

Conclusion: PASS

Note :

Factor= Max. AV Power(W)/Measured Power(W)  
 Final Scaled SAR= (Measured SAR\*Factor)\*Duty cycle factor  
 The Max. Scaled SAR : **0.675W/kg for 1g SAR**

**Notes:**

1. The Max. Scaled AV power get from measured AV power base on the duty cycle.
2. For 11b mode, choose the channel which has the max output level for test, because the test result is less then 0.8W/kg and 11b Max. Scaled SAR<1.2W/kg, so 11b other channel and 11g mode can be excluded from SAR test.
3. 11n HT20 mode channel 11 has the max output power, so choose it for the MIMO SAR test. Because the SAR result for channel 11 is less than 0.8W/kg, so other channel can be excluded, and Max. Scaled SAR less then 1.2W/kg, so 11n HT40 mode can be excluded.
4. Because Max SAR for ANT0+ANT1<1.6W/kg, so simultaneously can be excluded.

**WIFI 5G:  
ANT0:**

Mode	Channel	Test Position	Output Power		Measured Results		Final Scaled Result		Power Drift (dBm)
			Max. AV Power (dBm)	Measured AV Power (dBm)	SAR1g (W/kg)	SAR10g (W/kg)	SAR1g (W/kg)	SAR10g (W/kg)	
11a	CH36	Bottom	15.50	15.42	0.647	0.193	0.684	0.204	-0.01
		Screen Back	15.50	15.42	0.114	0.042	0.120	0.044	0.11
	CH52	Bottom	14.00	13.73	0.646	0.235	0.713	0.260	0.10
		Screen Back	14.00	13.73	0.276	0.143	0.305	0.158	-0.11
	CH136	Bottom	15.50	15.32	0.637	0.233	0.689	0.252	0.17
		Screen Back	15.50	15.32	0.304	0.150	0.329	0.162	0.10
CH157	Bottom	15.00	14.89	0.549	0.153	0.584	0.163	0.13	
	Screen Back	15.00	14.89	0.128	0.047	0.136	0.050	-0.04	
11n HT20	CH36	Bottom	15.00	14.56	0.558	0.214	0.639	0.245	0.04
		Screen Back	15.00	14.56	0.256	0.138	0.293	0.158	0.12
	CH60	Bottom	14.50	14.28	0.051	0.256	0.056	0.279	0.16
		Screen Back	14.50	14.28	0.197	0.125	0.215	0.136	0.02
	CH140	Bottom	15.50	15.21	0.673	0.255	0.745	0.282	-0.07
		Screen Back	15.50	15.21	0.305	0.126	0.338	0.139	0.02
11ac VHT40	CH158	Bottom	15.00	14.88	0.548	0.211	0.580	0.223	0.08
		Screen Back	15.00	14.88	0.205	0.140	0.217	0.148	0.07

Conclusion: PASS

Note :

Factor= Max. AV Power(W)/Measured Power(W)  
 Final Scaled SAR=(Measured SAR\*Factor)\*Duty cycle factor  
 The Max. Scaled SAR : **0.745W/kg for 1g SAR**

**ANT1:**

Mode	Channel	Test Position	Output Power		Measured Results		Final Scaled Result		Power Drift (dBm)
			Max. AV Power (dBm)	Measured AV Power (dBm)	SAR1g (W/kg)	SAR10g (W/kg)	SAR1g (W/kg)	SAR10g (W/kg)	
11a	CH36	Bottom	15.50	15.42	0.633	0.156	0.669	0.165	-0.10
		Screen Back	15.50	15.42	0.132	0.100	0.139	0.106	0.09
	CH52	Bottom	14.50	14.32	0.607	0.138	0.656	0.149	-0.18
		Screen Back	14.50	14.32	0.141	0.102	0.152	0.110	0.08
	CH136	Bottom	15.00	14.79	0.653	0.361	0.711	0.393	0.10
		Screen Back	15.00	14.79	0.345	0.198	0.376	0.216	0.02
CH157	Bottom	14.50	14.38	0.694	0.290	0.740	0.309	-0.09	
	Screen Back	14.50	14.38	0.345	0.195	0.368	0.208	0.01	
11n HT20	CH36	Bottom	15.50	15.35	0.619	0.153	0.663	0.164	0.06
		Screen Back	15.50	15.35	0.154	0.117	0.165	0.125	0.03
	CH60	Bottom	14.50	14.35	0.621	0.194	0.666	0.208	-0.03
		Screen Back	14.50	14.35	0.188	0.128	0.201	0.137	0.04
	CH140	Bottom	15.50	15.00	0.647	0.302	0.752	0.351	0.04
		Screen Back	15.50	15.00	0.208	0.103	0.242	0.120	0.03
11ac VHT40	CH158	Bottom	14.50	14.15	0.694	0.225	0.752	0.244	-0.01
		Screen Back	14.50	14.15	0.217	0.121	0.235	0.131	0.03

Conclusion: PASS

Note :

Factor= Max.AV Power(W)/Measured Power(W)  
 Final Scaled SAR=(Measured SAR\*Factor)\*Duty cycle factor  
 The Max. Scaled SAR : **0.752W/kg for 1g SAR**

**Notes:**

1. The Max. Scaled AV power get from measured AV power base on the duty cycle.
2. For 11a mode, choose the channel which has the max output level for test, because the test result is less then 0.8W/kg, so other channel can be excluded from SAR test.
3. 11n HT20 mode has the max output power, so choose the channel which has max. output in this mode for the MIMO SAR test. Because the SAR result is less than 0.8W/kg, so other channel can be excluded, and Max. Scaled SAR less then 1.2W/kg, so other mode can be excluded.
4. Because Max SAR for ANT0+ANT1<1.6W/kg, so simultaneously can be excluded.

### 7.5. Simultaneous Transmission

#### 7.5.1. Simultaneous transmission of MIMO in 802.11 WIFI Configurations

When the sum of SAR is less than the limit, the Simultaneous transmission for MIMO SAR evaluation can be excluded, When the sum of SAR is larger than the limit, The ratio is determined by  $(SAR1 + SAR2)^{1.5}/R_i$ , rounded to two decimal digits, and must be  $\leq 0.04$  for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

Frequency (GHz)	Test Position (Body)	ANT 0 Max SAR(W/Kg)	ANT1 Max SAR(W/Kg)	Simultaneous Transmission (W/Kg)	Antenna Pair in mm	Peak Location Separation ratio
2.4	Bottom	0.664	0.675	1.339	N/A	N/A
2.4	Screen Back	0.247	0.237	0.484	N/A	N/A
5	Bottom	0.745	0.752	1.497	N/A	N/A
5	Screen Back	0.338	0.376	0.714	N/A	N/A

The sum of The sum of value is less than 1.6W/Kg, thus simultaneous SAR testing is no need.

#### 7.5.2. Simultaneous Transmission of WIFI and other wireless technologies

According to KDB 447498 D01 Section 4.3.2, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion.

**$(\text{max. power of channel, mW})/(\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})}/7.5]$**

Mode	Frequency (MHz)	Max. Power (mW)	Test separation distance,(mm)	Estimated SAR(W/Kg)
Bluetooth	2480	2.10	5	0.09

Note : A test separation distance of 5 mm must be applied to determine test exclusion according to the SAR Test Exclusion Threshold requirements

Mode	WLAN Max SAR(W/Kg)	Estimated BT SAR(W/Kg)	Simultaneous Transmission (W/Kg)	Antenna Pair in mm	Peak Location Separation ratio
WIFI 2.4G	0.675	0.09	0.765	N/A	N/A
WIFI 5GHz	0.752		0.842	N/A	N/A

The sum of value is less than 1.6W/Kg, thus simultaneous SAR testing is no need.

7.6. Dielectric Performance for Body Tissue simulating liquid

Frequency	Description	Dielectric Parameters (±5% window)		Temp
		$\epsilon_r$	$\sigma$ (s/m)	°C
2450MHz	Recommended value	52.7	1.95	/
	Measurement value 2015-08-23	52.824	1.988	20.05
5200MHz	Recommended value	49	5.3	/
	Measurement value 2015-08-24	50.134	5.255	20.21
5300MHz	Recommended value	49	5.3	/
	Measurement value 2015-08-24	49.82	5.41	20.20
5600MHz	Recommended value	48.6	5.65	/
	Measurement value 2015-08-24	49.29	5.471	20.22
5800MHz	Recommended value	48.2	6	/
	Measurement value 2015-08-24	48.51	5.673	20.27



Figure 4.4: Liquid depth in the Flat Phantom

## 8. ANNEX A: SYSTEM CHECK RESULTS

Test Laboratory: Audix SAR Lab

Date: 23/08/2015

**CW 2450**

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2 - SN:862

Communication System: UID 0, CW ; Frequency: 2450 MHz

Medium parameters used:  $f = 2450$  MHz;  $\sigma = 1.988$  S/m;  $\epsilon_r = 52.824$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

**DASY5 Configuration:**

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/CW 2450/Area Scan (41x61x1):**

Interpolated grid:  $dx=1.500$  mm,  $dy=1.500$  mm

Maximum value of SAR (interpolated) = 15.27 W/kg

**Configuration/ CW 2450/Zoom Scan (7x7x7)/Cube 0:**

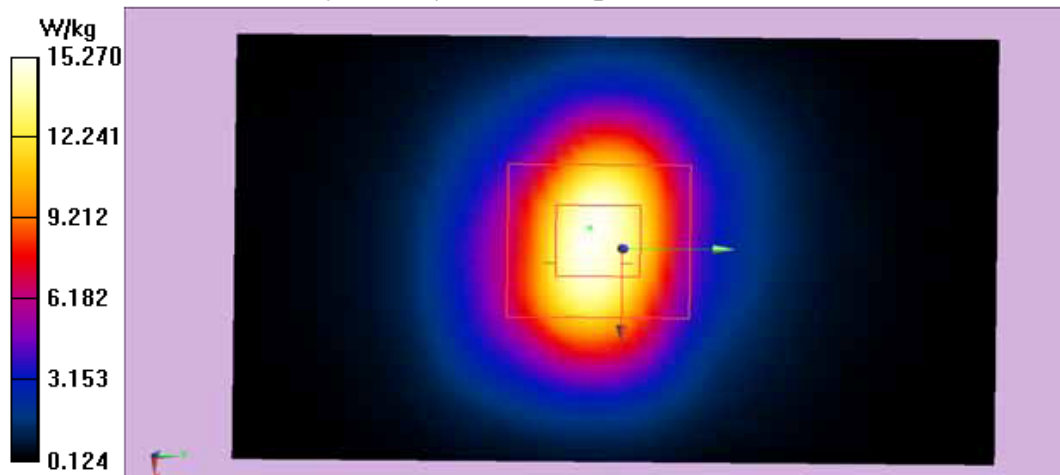
Measurement grid:  $dx=5$ mm,  $dy=5$ mm,  $dz=5$ mm

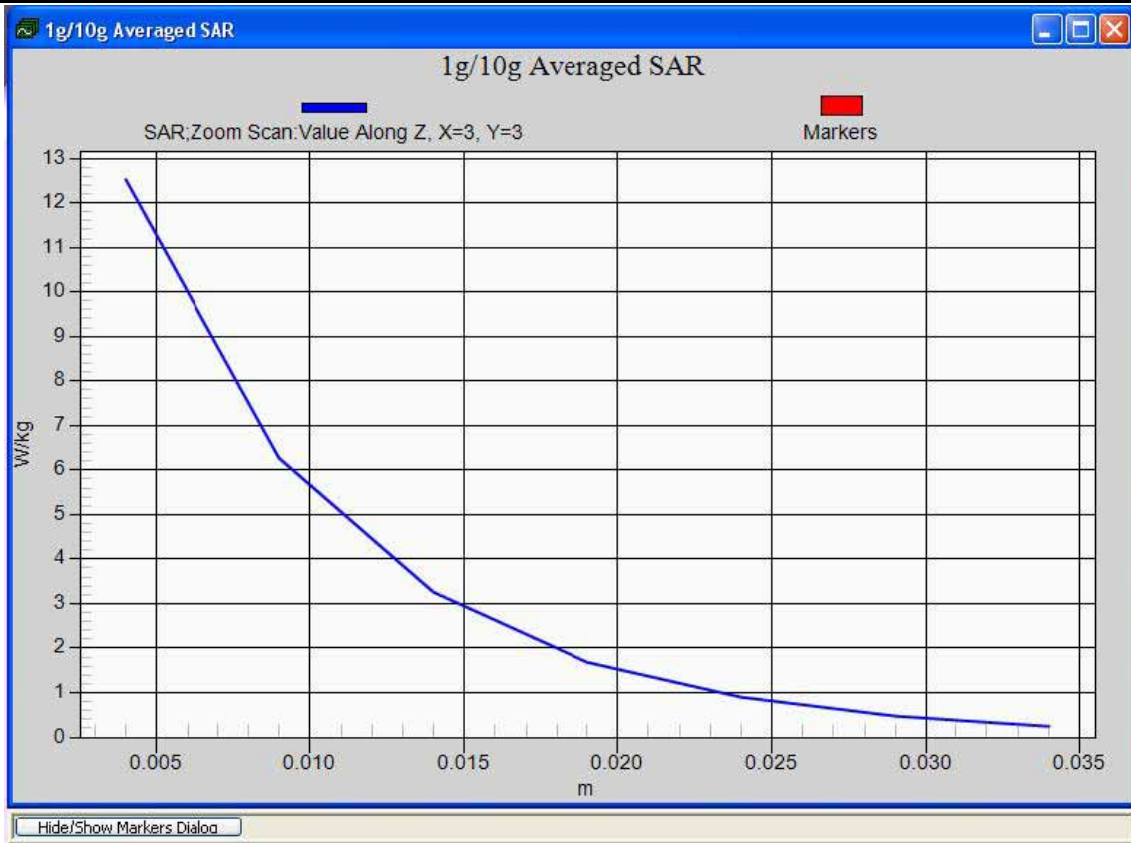
Reference Value = 56.7 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 20.6 W/kg

**SAR(1 g) = 13.14 W/kg; SAR(10 g) = 6.04 W/kg**

Maximum value of SAR (measured) = 15.86 W/kg





Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CW 5200**

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1102

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5200 MHz; Communication System PAR: 0 dB

Medium parameters used:  $f = 5200$  MHz;  $\sigma = 5.255$  S/m;  $\epsilon_r = 50.134$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/CW 5200/Area Scan (51x61x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 21.47 W/kg

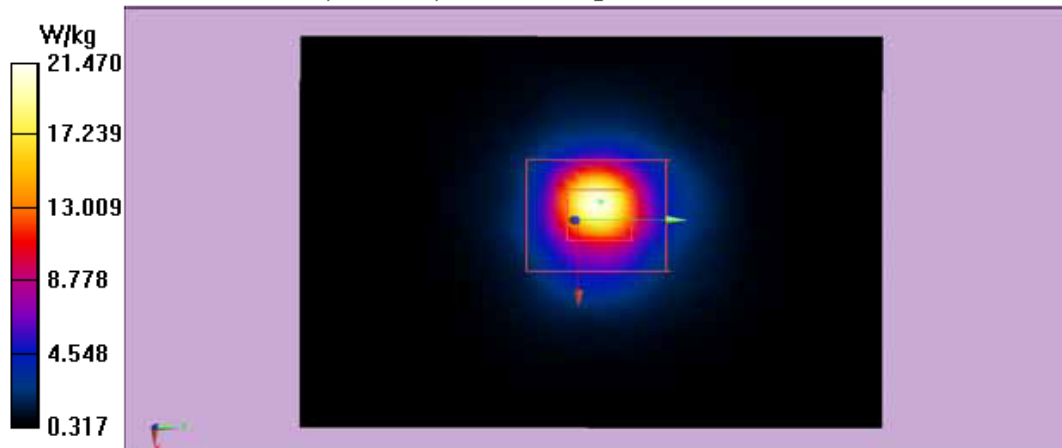
**Configuration/CW 5200/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.26 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 45.62 W/kg

**SAR(1 g) = 19.14 W/kg; SAR(10 g) = 5.41 W/kg**

Maximum value of SAR (measured) = 21.72 W/kg





Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CW 5300**

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1102

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5300 MHz; Communication System PAR: 0 dB

Medium parameters used:  $f = 5300$  MHz;  $\sigma = 5.41$  S/m;  $\epsilon_r = 49.82$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/CW 5300/Area Scan (51x61x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 21.86 W/kg

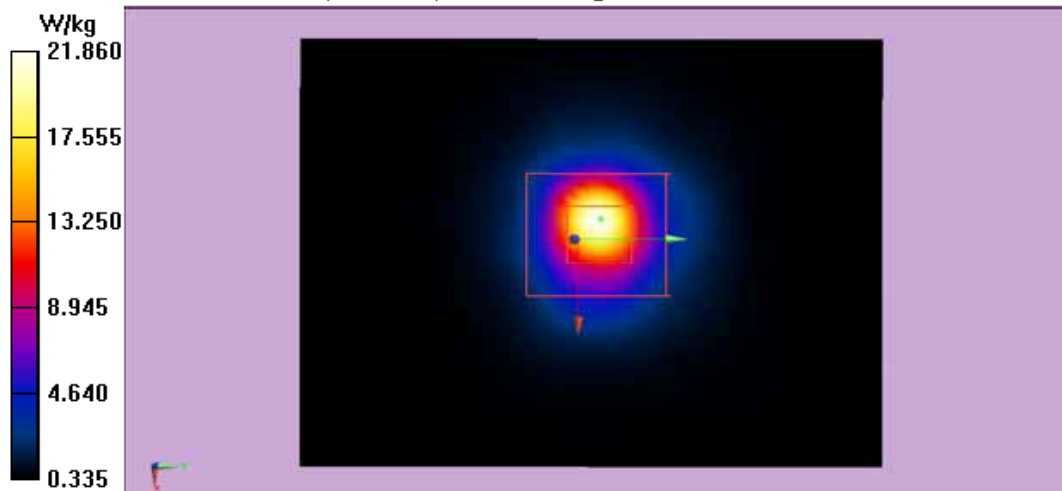
**Configuration/CW 5300/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.44 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 46.73 W/kg

**SAR(1 g) = 19.24 W/kg; SAR(10 g) = 5.48 W/kg**

Maximum value of SAR (measured) = 21.97 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CW 5600**

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1102

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5600 MHz; Communication System PAR: 0 dB

Medium parameters used:  $f = 5600$  MHz;  $\sigma = 5.471$  S/m;  $\epsilon_r = 49.29$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.83, 4.83, 4.83); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/CW 5600/Area Scan (41x61x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 23.57 W/kg

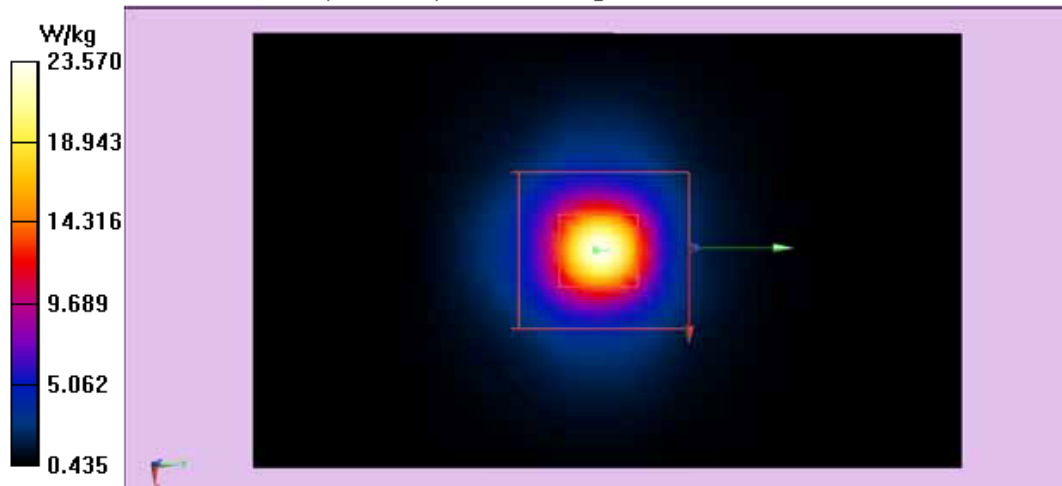
**Configuration/CW 5600/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

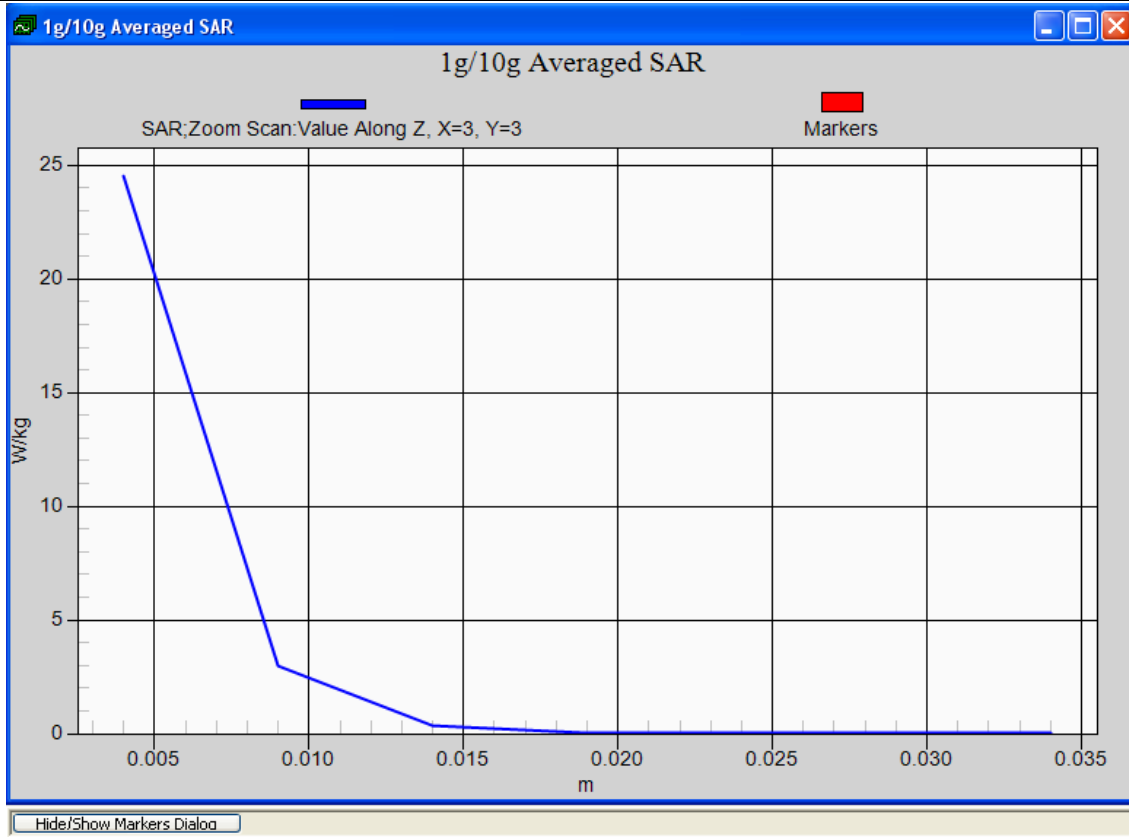
Reference Value = 93.44 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 64.88 W/kg

**SAR(1 g) = 20.95 W/kg; SAR(10 g) = 5.87 W/kg**

Maximum value of SAR (measured) = 23.63 W/kg





Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CW 5800**

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1102

Communication System: UID 0, CW (0); Communication System Band: D5GHz (5000.0 - 6000.0 MHz); Frequency: 5800 MHz; Communication System PAR: 0 dB

Medium parameters used:  $f = 5800$  MHz;  $\sigma = 5.673$  S/m;  $\epsilon_r = 48.51$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.65, 4.65, 4.65); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/CW 5800/Area Scan (41x61x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 22.85 W/kg

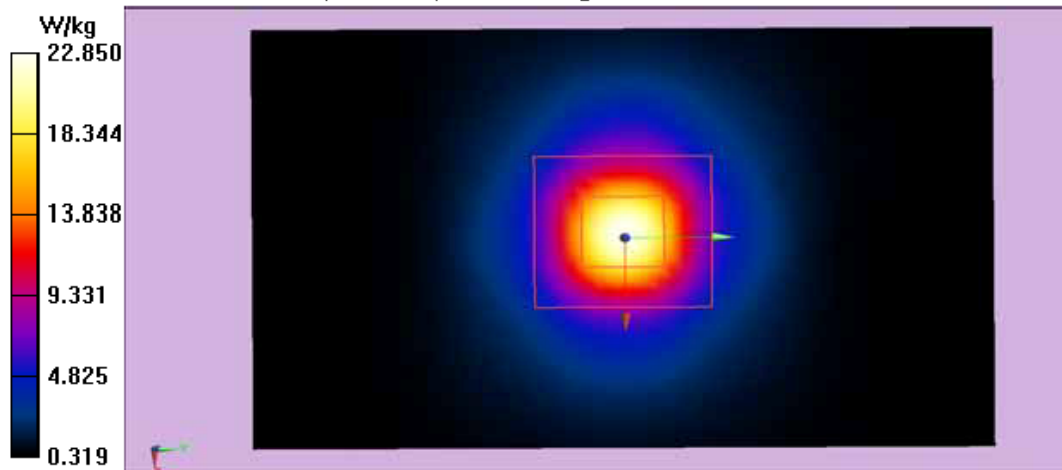
**Configuration/CW 5800/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 84.86 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 53.04 W/kg

**SAR(1 g) = 19.48 W/kg; SAR(10 g) = 5.47 W/kg**

Maximum value of SAR (measured) = 22.9 W/kg



## 9. ANNEX B: GRAPH RESULTS WITH BANDS OF WATCH

### WIFI 2.4G

#### ANT0:

Test Laboratory: Audix SAR Lab

Date: 23/08/2015

#### 11b CH6(2437MHz Bottom)

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);  
 Communication System Band: ISM 2.4GHz Band (2400.0-2483.5MHz); Frequency: 2437 MHz;  
 Communication System PAR: 0 dB, Medium parameters used:  $f = 2437$  MHz;  $\sigma = 1.934$  S/m;  $\epsilon_r = 52.658$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/CH6(2437MHz Bottom)/Area Scan (71x101x1):** Interpolated grid: dx=2.000 mm, dy=2.000 mm

Maximum value of SAR (interpolated) = 0.701 W/kg

#### **Configuration/CH6(2437MHz Bottom)/Zoom Scan (5x5x7)/Cube 0:**

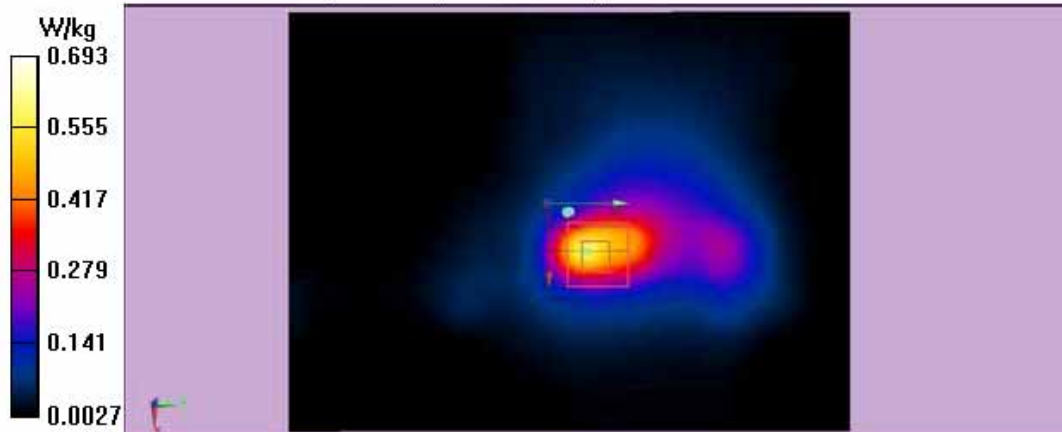
Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.457 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.968 W/kg

**SAR(1 g) = 0.583 W/kg; SAR(10 g) = 0.205 W/kg**

Maximum value of SAR (measured) = 0.693 W/kg



**Test Laboratory: Audix SAR Lab**

Date: 23/08/2015

**11b CH6(2437MHz Screen Back)**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);

Communication System Band: ISM 2.4GHz Band (2400.0-2483.5MHz); Frequency: 2437

MHz; Communication System PAR: 0 dB, Medium parameters used:  $f = 2437$  MHz;  $\sigma =$

$1.934$  S/m;  $\epsilon_r = 52.658$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11b CH6(2437MHz Screen Back)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000$  mm,  $dy=2.000$  mm

Maximum value of SAR (interpolated) = 0.252 W/kg

**Configuration/11b CH6(2437MHz Screen Back)/Zoom Scan (5x5x7)/Cube 0:**

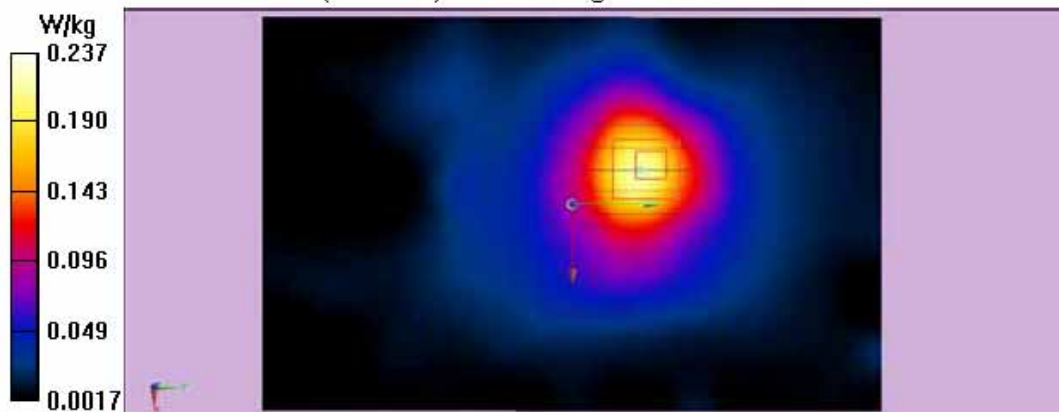
Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 5.116 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.458 W/kg

**SAR(1 g) = 0.217 W/kg; SAR(10 g) = 0.100 W/kg**

Maximum value of SAR (measured) = 0.237 W/kg



**Test Laboratory: Audix SAR Lab**

Date: 23/08/2015

**11n20 CH11(2462MHz Bottom)**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11nHT20 WiFi 2.4 GHz (OFDM, 6.5 Mbps) (0);

Communication System Band: ISM 2.4GHz Band(2400-2483.5MHz); Frequency: 2462

MHz; Communication System PAR: 0 dB, Medium parameters used:  $f = 2462$  MHz;  $\sigma =$

$1.949$  S/m;  $\epsilon_r = 52.138$ ;  $\rho = 1000$  kg/m<sup>3</sup>; Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n20 CH11(2462MHz Bottom)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000$  mm,  $dy=2.000$  mm

Maximum value of SAR (interpolated) = 0.621 W/kg

**Configuration/11n20 CH11(2462MHz Bottom)/Zoom Scan (5x5x7)/Cube 0:**

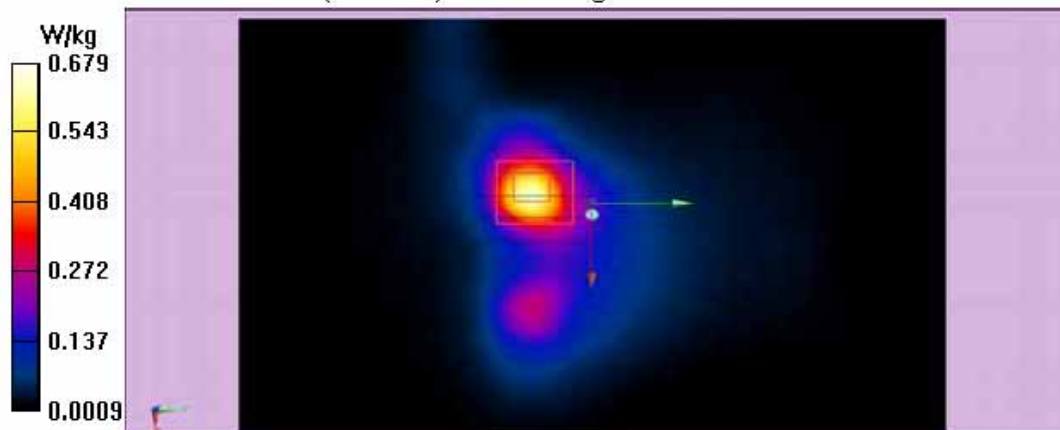
Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 12.323 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.41 W/kg

**SAR(1 g) = 0.612 W/kg; SAR(10 g) = 0.306 W/kg**

Maximum value of SAR (measured) = 0.679 W/kg



**Test Laboratory: Audix SAR Lab**

Date: 23/08/2015

**11n20 CH11(2462MHz Screen Back)**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11nHT20 WiFi 2.4 GHz (OFDM, 6.5 Mbps) (0);

Communication System Band: ISM 2.4GHz Band(2400-2483.5MHz); Frequency: 2462

MHz;Communication System PAR: 0 dB,Medium parameters used:  $f = 2462$  MHz;  $\sigma =$

$1.949$  S/m;  $\epsilon_r = 52.138$ ;  $\rho = 1000$  kg/m<sup>3</sup>;Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n20 CH11(2462MHz Screen Back)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000$  mm,  $dy=2.000$  mm

Maximum value of SAR (interpolated) = 0.307 W/kg

**Configuration/11n20 CH11(2462MHz Screen Back)/Zoom Scan**

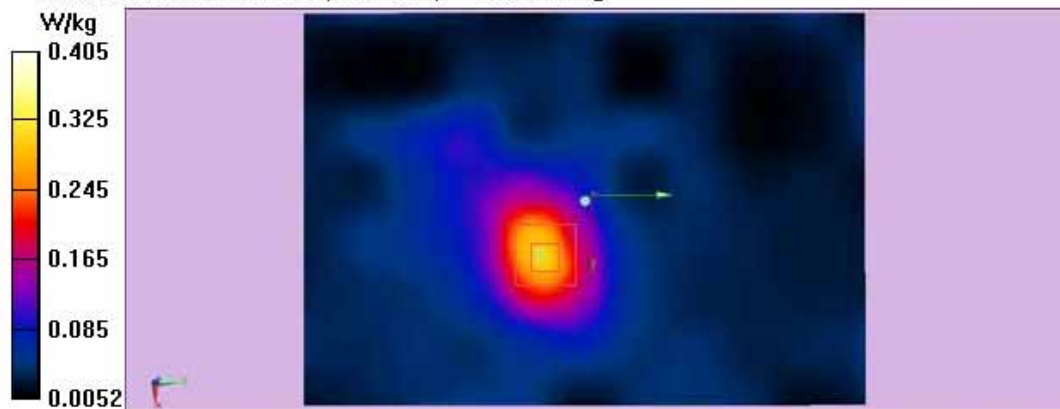
**(5x5x7)/Cube 0:** Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 7.227 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.707 W/kg

**SAR(1 g) = 0.361 W/kg; SAR(10 g) = 0.190 W/kg**

Maximum value of SAR (measured) = 0.405 W/kg





**WIFI 2.4G**  
**ANT1:**

**Test Laboratory: Audix SAR Lab**

Date: 23/08/2015

**Ch11(2462MHz Bottom)**

**DUT: Notebook M/N:RZ09-0168**

Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);  
Communication System Band: ISM 2.4GHz Band (2400.0-2483.5MHz); Frequency: 2462 MHz; Communication System PAR: 0 dB. Medium parameters used  $f = 2462 \text{ MHz}$ ;  $\sigma = 1.949 \text{ S/m}$ ;  $\epsilon_r = 52.138$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/Ch11(2462MHz Bottom)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.176 \text{ W/kg}$

**Configuration/Ch11(2462MHz Bottom)/Zoom Scan (5x5x7)/Cube 0:**

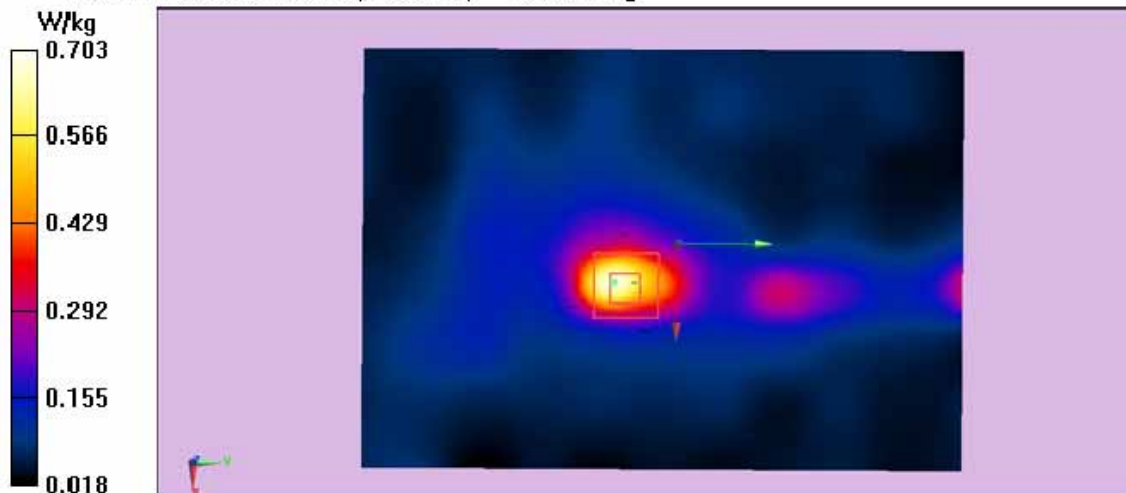
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $5.518 \text{ V/m}$ ; Power Drift =  $0.09 \text{ dB}$

Peak SAR (extrapolated) =  $0.419 \text{ W/kg}$

**SAR(1 g) =  $0.602 \text{ W/kg}$ ; SAR(10 g) =  $0.215 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.703 \text{ W/kg}$



**Test Laboratory: Audix SAR Lab**

Date: 23/08/2015

**Ch11(2462MHz Screen Back)**

**DUT: Notebook M/N:RZ09-0168**

Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);

Communication System Band: ISM 2.4GHz Band (2400.0-2483.5MHz); Frequency: 2462

MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 2462 \text{ MHz}$ ;  $\sigma =$

$1.949 \text{ S/m}$ ;  $\epsilon_r = 52.138$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/Ch11(2462MHz Screen Back)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.255 \text{ W/kg}$

**Configuration/Ch11(2462MHz Screen Back)/Zoom Scan (5x5x7)/Cube 0:**

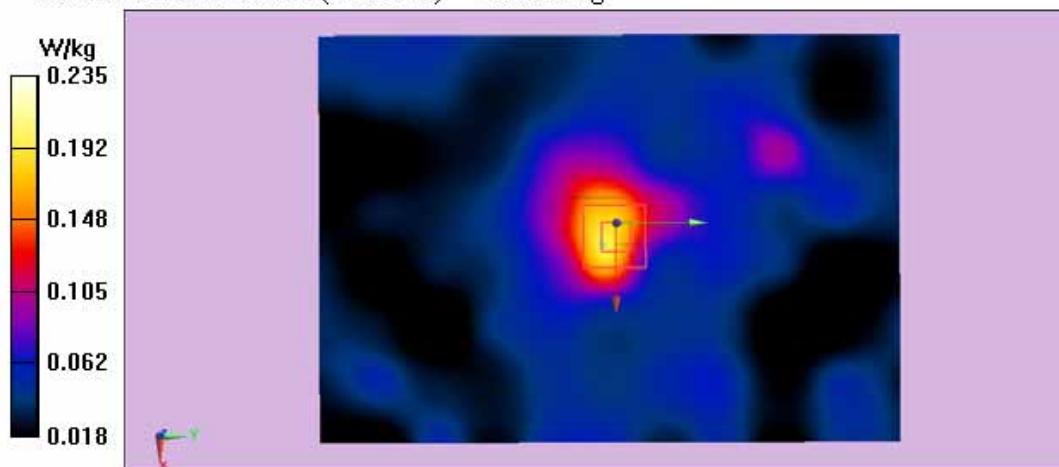
Measurement grid:  $dx=8\text{mm}$ ,  $dy=8\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $6.685 \text{ V/m}$ ; Power Drift =  $-0.11 \text{ dB}$

Peak SAR (extrapolated) =  $0.128 \text{ W/kg}$

**SAR(1 g) =  $0.211 \text{ W/kg}$ ; SAR(10 g) =  $0.113 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.235 \text{ W/kg}$



**Test Laboratory: Audix SAR Lab**

Date: 23/08/2015

**Ch11(2462MHz Bottom)**

**DUT: Notebook M/N:RZ09-0168**

Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);

Communication System Band: ISM 2.4GHz Band (2400.0-2483.5MHz); Frequency: 2462

MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 2437$  MHz;  $\sigma =$

$1.934$  S/m;  $\epsilon_r = 52.658$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/Ch11(2462MHz Bottom)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000$  mm,  $dy=2.000$  mm

Maximum value of SAR (interpolated) = 0.338 W/kg

**Configuration/Ch11(2462MHz Bottom)/Zoom Scan (5x5x7)/Cube 0:**

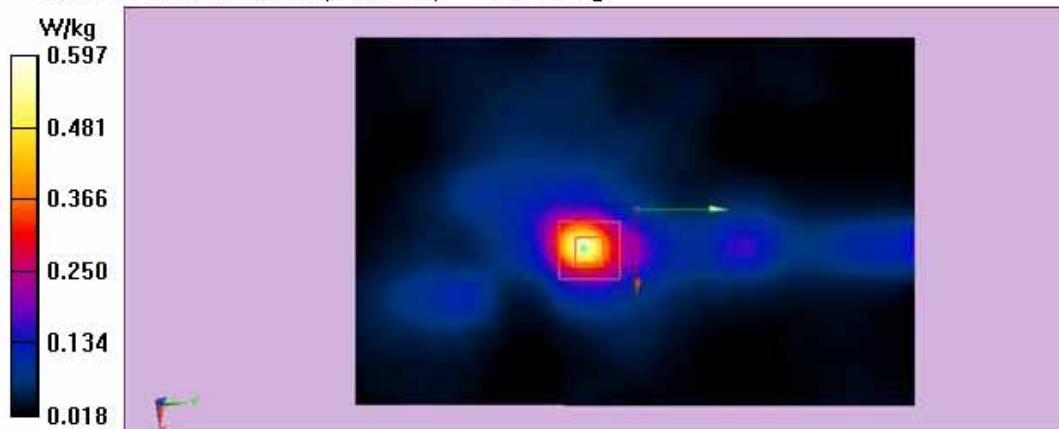
Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 6.107 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.728 W/kg

**SAR(1 g) = 0.531 W/kg; SAR(10 g) = 0.201 W/kg**

Maximum value of SAR (measured) = 0.597 W/kg



Test Laboratory: Audix SAR Lab

Date: 23/08/2015

**Ch11(2462MHz Screen Back)**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps) (0);

Communication System Band: ISM 2.4GHz Band (2400.0-2483.5MHz); Frequency: 2462

MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 2412$  MHz;  $\sigma =$

$1.917$  S/m;  $\epsilon_r = 52.937$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

DASY5 Configuration:

- Probe: ES3DV3 - SN3139; ConvF(4.01, 4.01, 4.01); Calibrated: 10/08/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/Ch11(2462MHz Screen Back)/Area Scan (71x101x1):**

Interpolated grid:  $dx=2.000$  mm,  $dy=2.000$  mm

Maximum value of SAR (interpolated) = 0.129 W/kg

**Configuration/Ch11(2462MHz Screen Back)/Zoom Scan (5x5x7)/Cube 0:**

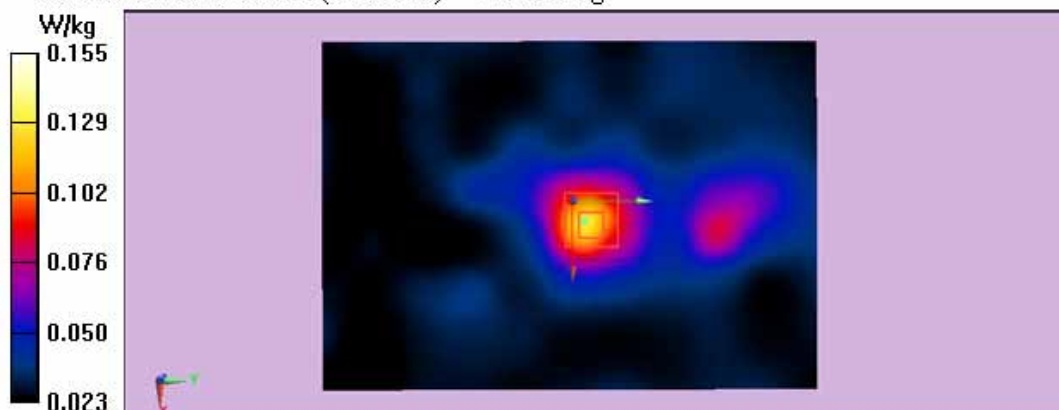
Measurement grid:  $dx=8$ mm,  $dy=8$ mm,  $dz=5$ mm

Reference Value = 7.420 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.267 W/kg

**SAR(1 g) = 0.145 W/kg; SAR(10 g) = 0.112 W/kg**

Maximum value of SAR (measured) = 0.155 W/kg



**WIFI 5G  
ANT0:**

**Test Laboratory: Audix SAR Lab**

Date: 24/08/2015

**CH36 (5180MHz)-Bottom**

**DUT: Notebook M/N:RZ09-0168**

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.37 \text{ S/m}$ ;  $\epsilon_r = 50.28$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ 11a CH36(5180MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.385 \text{ W/kg}$

**Configuration/11a CH36(5180MHz)-Bottom/Zoom Scan (7x7x7)/Cube 0:**

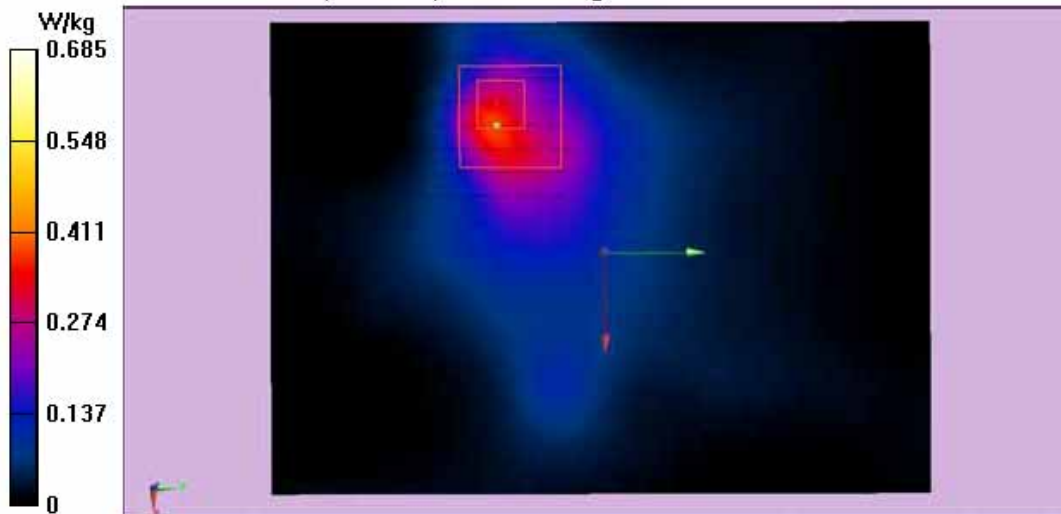
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value =  $4.638 \text{ V/m}$ ; Power Drift =  $-0.01 \text{ dB}$

Peak SAR (extrapolated) =  $3.37 \text{ W/kg}$

**SAR(1 g) =  $0.647 \text{ W/kg}$ ; SAR(10 g) =  $0.193 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.685 \text{ W/kg}$



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH36 (5180MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.37 \text{ S/m}$ ;  $\epsilon_r = 50.28$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11a CH36(5180MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.245 W/kg

**Configuration/ \_11a CH36(5180MHz)-Screen Back/Zoom Scan (7x7x7)/Cube**

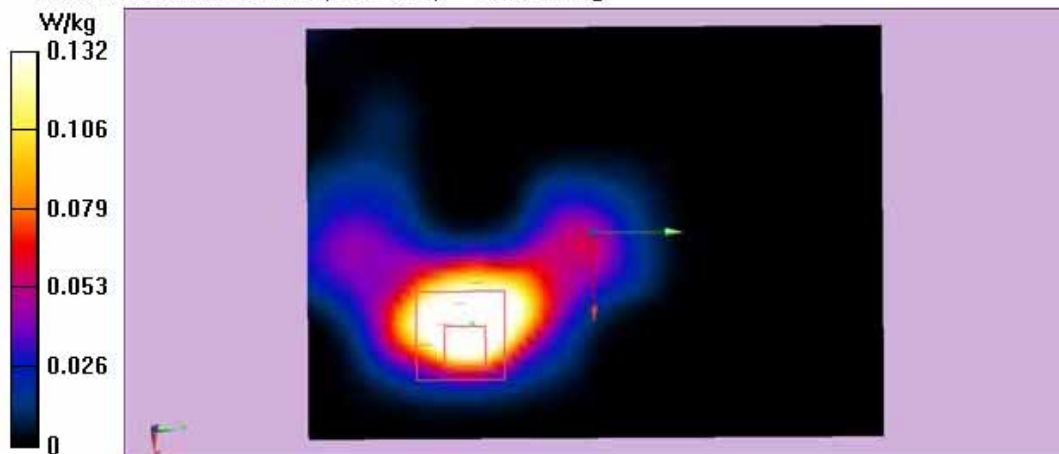
**0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 2.574 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.344 W/kg

**SAR(1 g) = 0.114 W/kg; SAR(10 g) = 0.042 W/kg**

Maximum value of SAR (measured) = 0.132 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH52 (5260MHz)-Bottom**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5260 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5260 \text{ MHz}$ ;  $\sigma = 5.42 \text{ S/m}$ ;  $\epsilon_r = 49.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11a CH48(5240MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.858 W/kg

**Configuration/ \_11a CH48(5240MHz)-Bottom/Zoom Scan (7x7x7)/Cube 0:**

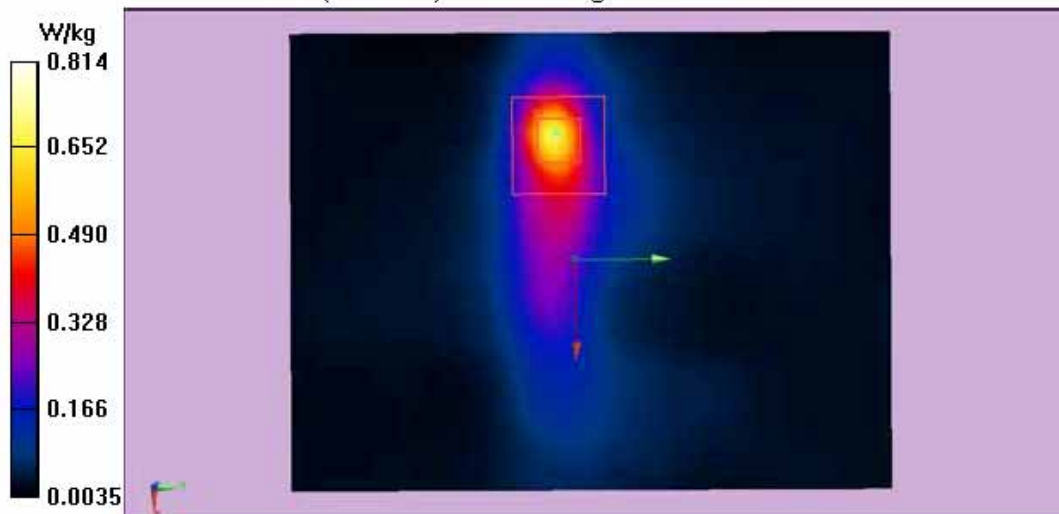
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 10.558 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 3.26 W/kg

**SAR(1 g) = 0.646 W/kg; SAR(10 g) = 0.235 W/kg**

Maximum value of SAR (measured) = 0.814 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH52 (5260MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.3GHz (0); Communication System Band: IEEE 802.11a WiFi 5.3GHz ; Frequency: 5260 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5260 \text{ MHz}$ ;  $\sigma = 5.42 \text{ S/m}$ ;  $\epsilon_r = 49.9$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11 a CH52(5260MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.277 W/kg

**Configuration/ \_11 a CH52(5260MHz)-Screen Back/Zoom Scan (7x7x7)/Cube**

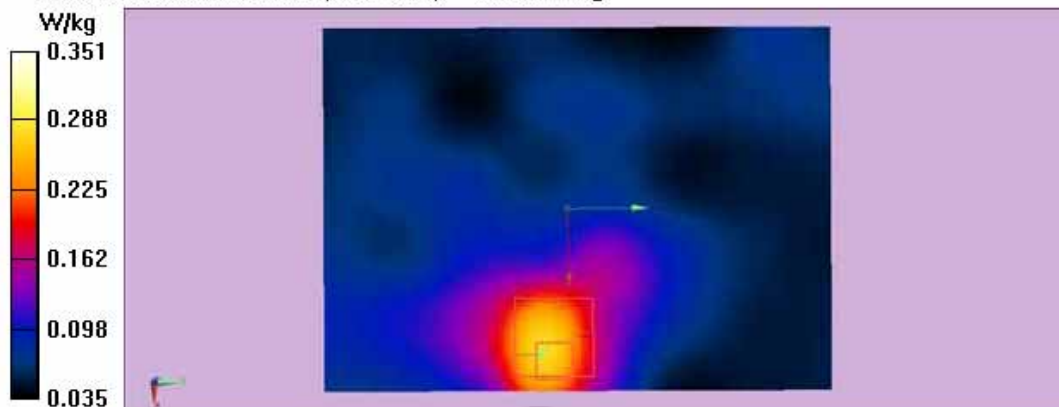
**0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.222 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.827 W/kg

**SAR(1 g) = 0.276 W/kg; SAR(10 g) = 0.143 W/kg**

Maximum value of SAR (measured) = 0.351 W/kg





Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH136 (5680MHz)-Bottom**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5680 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5680 \text{ MHz}$ ;  $\sigma = 5.54 \text{ S/m}$ ;  $\epsilon_r = 49.0$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.73, 4.73, 4.73); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11 a CH136(5680MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.873 W/kg

**Configuration/ \_11 a CH136(5680MHz)-Bottom/Zoom Scan (7x7x7)/Cube 0:**

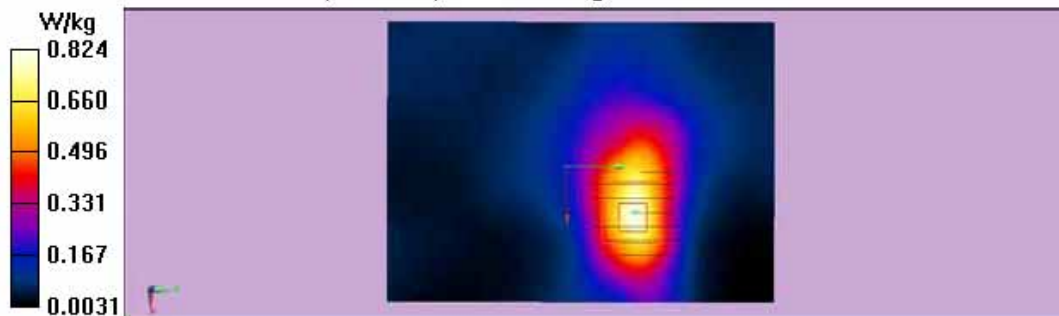
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 12.847 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 4.89 W/kg

**SAR(1 g) = 0.637 W/kg; SAR(10 g) = 0.233 W/kg**

Maximum value of SAR (measured) = 0.824 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH136 (5680MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.5GHz (0); Communication System Band: IEEE 802.11a WiFi 5.5GHz; Frequency: 5680 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5680 \text{ MHz}$ ;  $\sigma = 5.54 \text{ S/m}$ ;  $\epsilon_r = 49.0$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.73, 4.73, 4.73); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11a CH136(5680MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.296 W/kg

**Configuration/ \_11a CH136(5680MHz)-Screen Back/Zoom Scan**

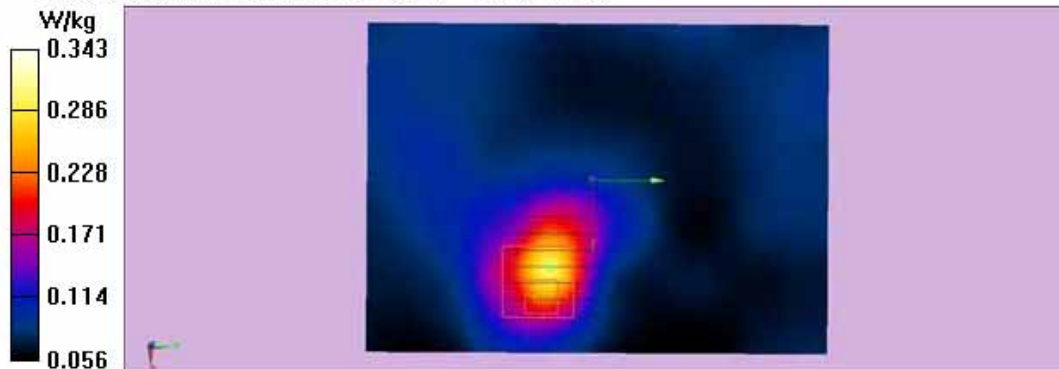
(7x7x7)/Cube 0: Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 5.452 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.813 W/kg

**SAR(1 g) = 0.304 W/kg; SAR(10 g) = 0.150 W/kg**

Maximum value of SAR (measured) = 0.343 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH157 (5785MHz)-Bottom**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz; Frequency: 5785 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 5.62 \text{ S/m}$ ;  $\epsilon_r = 48.7$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.65, 4.65, 4.65); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11 a CH157(5785MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.443 W/kg

**Configuration/ \_11 a CH157(5785MHz)-Bottom/Zoom Scan (7x7x7)/Cube 0:**

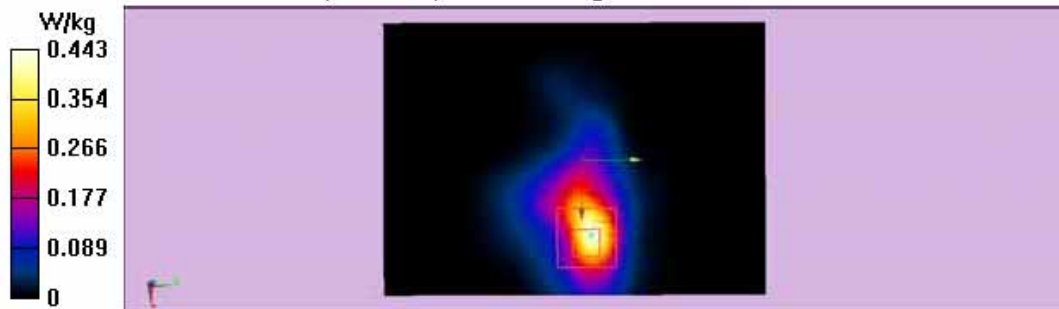
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 5.318 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 1.94 W/kg

**SAR(1 g) = 0.549 W/kg; SAR(10 g) = 0.153 W/kg**

Maximum value of SAR (measured) = 0.679 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH157 (5785MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.8GHz (0); Communication System Band: IEEE 802.11a WiFi 5.8GHz; Frequency: 5785 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5785 \text{ MHz}$ ;  $\sigma = 5.62 \text{ S/m}$ ;  $\epsilon_r = 48.7$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(4.65, 4.65, 4.65); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/ \_11a CH157(5785MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.223 W/kg

**Configuration/ \_11a CH157(5785MHz)-Screen Back/Zoom Scan**

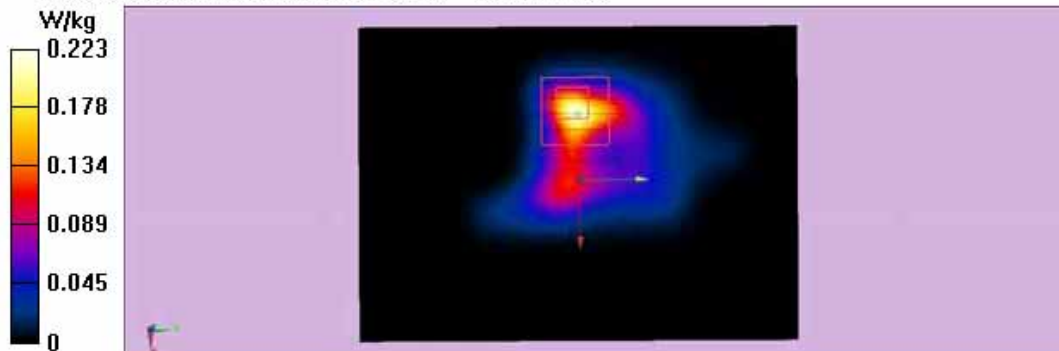
(7x7x7)/Cube 0: Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.430 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.500 W/kg

**SAR(1 g) = 0.128 W/kg; SAR(10 g) = 0.047 W/kg**

Maximum value of SAR (measured) = 0.128 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11ac40 CH158 (5790MHz)-Bottom**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11ac VHT40 WiFi 5.8GHz (0); Communication System Band: IEEE 802.11ac VHT40 WiFi 5.8GHz; Frequency: 5790MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5790 \text{ MHz}$ ;  $\sigma = 5.64 \text{ S/m}$ ;  $\epsilon_r = 48.73$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11ac VHT40 CH158(5790MHz)-Bottom/Area Scan**

**(51x71x1):** Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.509 W/kg

**Configuration/11ac VHT40 CH158(5790MHz)-Bottom/Zoom Scan**

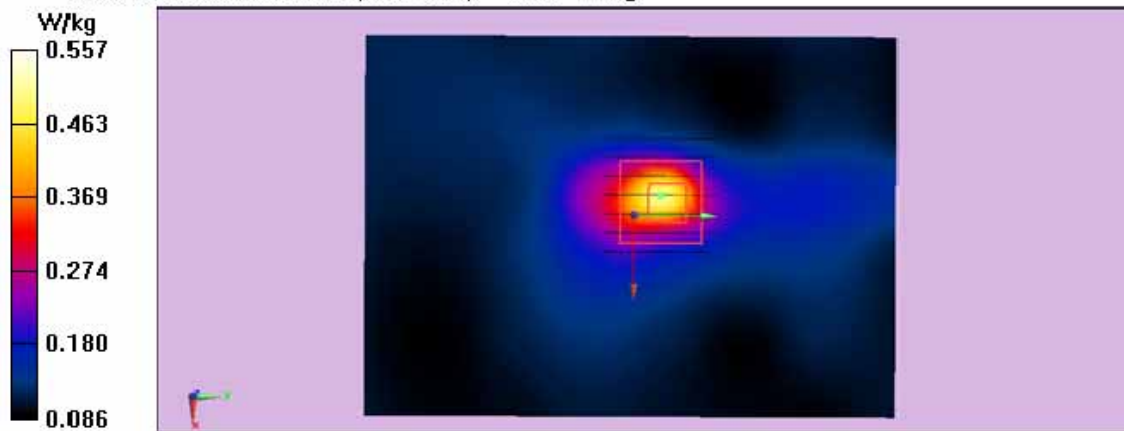
**(7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 6.983 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.34 W/kg

**SAR(1 g) = 0.548 W/kg; SAR(10 g) = 0.211 W/kg**

Maximum value of SAR (measured) = 0.557 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11ac40 CH158 (5790MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11ac VHT40 WiFi 5.8GHz (0); Communication System Band: IEEE 802.11ac VHT40 WiFi 5.8GHz; Frequency: 5790MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5790 \text{ MHz}$ ;  $\sigma = 5.64 \text{ S/m}$ ;  $\epsilon_r = 48.73$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11ac VHT40 CH158(5790MHz)-Screen Back/Area Scan**

**(51x71x1):** Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.262 W/kg

**Configuration/11ac VHT40 CH158(5790MHz)-Screen Back/Zoom Scan**

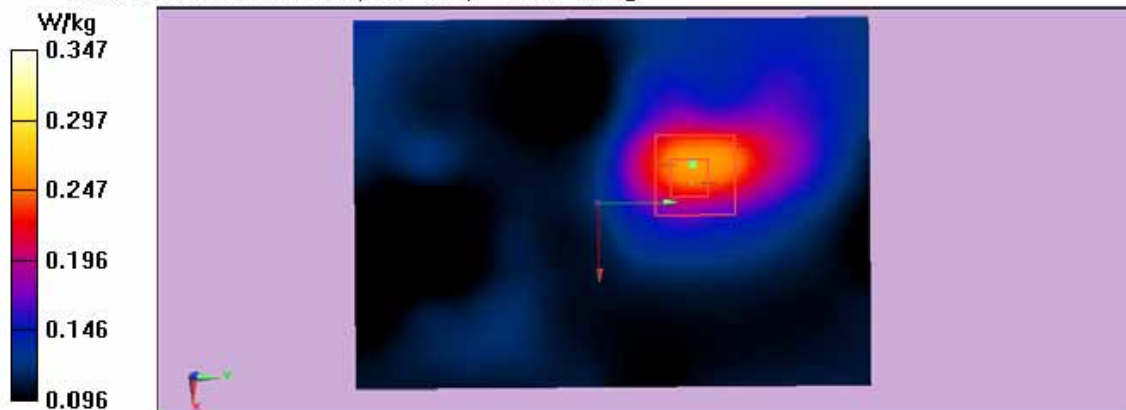
**(7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.140 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.743 W/kg

**SAR(1 g) = 0.205 W/kg; SAR(10 g) = 0.140 W/kg**

Maximum value of SAR (measured) = 0.347 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11n20 CH36 (5180MHz)-Bottom**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11n HT20 WiFi 5.2GHz (0); Communication System Band: IEEE 802.11n HT20 WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.37 \text{ S/m}$ ;  $\epsilon_r = 50.28$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n HT20 CH36(5180MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.569 W/kg

**Configuration/11n HT20 CH36(5180MHz)-Bottom/Zoom Scan (7x7x7)/Cube**

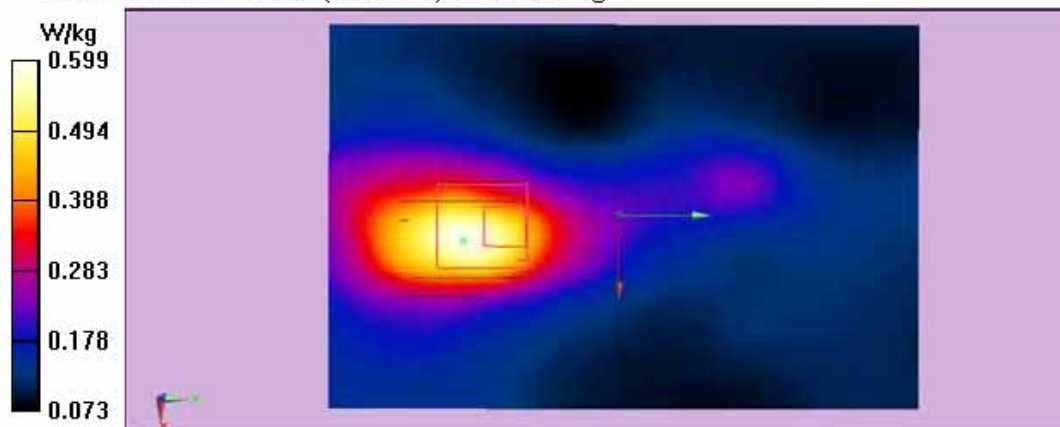
**0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 7.329 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 4.53 W/kg

**SAR(1 g) = 0.558 W/kg; SAR(10 g) = 0.214 W/kg**

Maximum value of SAR (measured) = 0.599 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11n20 CH36 (5180MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11n HT20 WiFi 5.2GHz (0); Communication System Band: IEEE 802.11n HT20 WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.37 \text{ S/m}$ ;  $\epsilon_r = 50.28$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n HT20 CH36(5180MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.316 W/kg

**Configuration/11n HT20 CH36(5180MHz)-Screen Back/Zoom Scan**

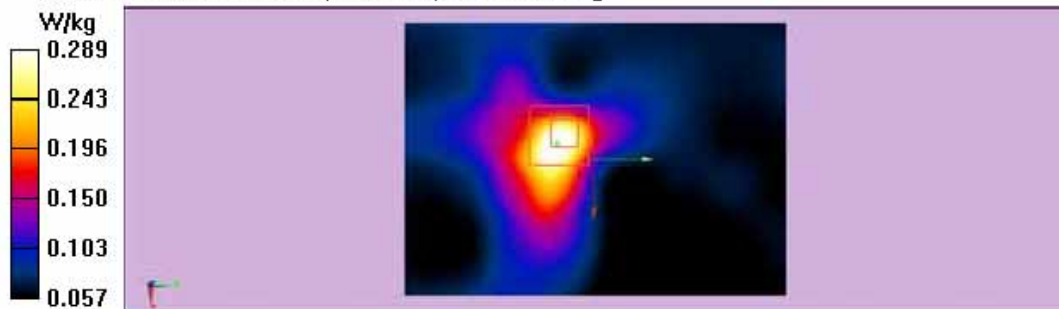
(7x7x7)/Cube 0: Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 5.321 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.661 W/kg

**SAR(1 g) = 0.256 W/kg; SAR(10 g) = 0.138 W/kg**

Maximum value of SAR (measured) = 0.289 W/kg





Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11n20 CH60 (5300MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11n HT20 WiFi 5.3GHz (0); Communication System Band: IEEE 802.11n HT20 WiFi 5.3GHz ; Frequency: 5300 MHz, Communication System PAR: 0 dB. Medium parameters used (extrapolated):  $f = 5300 \text{ MHz}$ ;  $\sigma = 5.41 \text{ S/m}$ ;  $\epsilon_r = 49.82$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n HT20 CH60(5300MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.212 W/kg

**Configuration/11n HT20 CH60(5300MHz)-Screen Back/Zoom Scan**

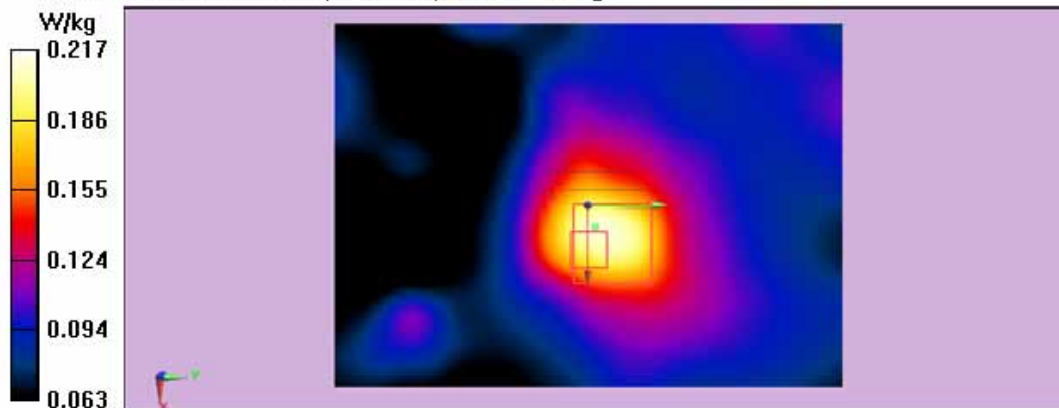
(7x7x7)/Cube 0: Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 6.045 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.438 W/kg

**SAR(1 g) = 0.197 W/kg; SAR(10 g) = 0.125 W/kg**

Maximum value of SAR (measured) = 0.217 W/kg



**Test Laboratory: Audix SAR Lab**

Date: 24/08/2015

**11n20 CH60 (5300MHz)-Bottom**

**DUT: Notebook M/N:RZ09-0168**

Communication System: UID 0, IEEE 802.11n HT20 WiFi 5.3GHz (0); Communication System Band: IEEE 802.11n HT20 WiFi 5.3GHz ; Frequency: 5300 MHz, Communication System PAR: 0 dB. Medium parameters used (extrapolated):  $f = 5300 \text{ MHz}$ ;  $\sigma = 5.41 \text{ S/m}$ ;  $\epsilon_r = 49.82$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n HT20 CH60(5300MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.824 W/kg

**Configuration/11n HT20 CH60(5300MHz)-Screen Back/Zoom Scan**

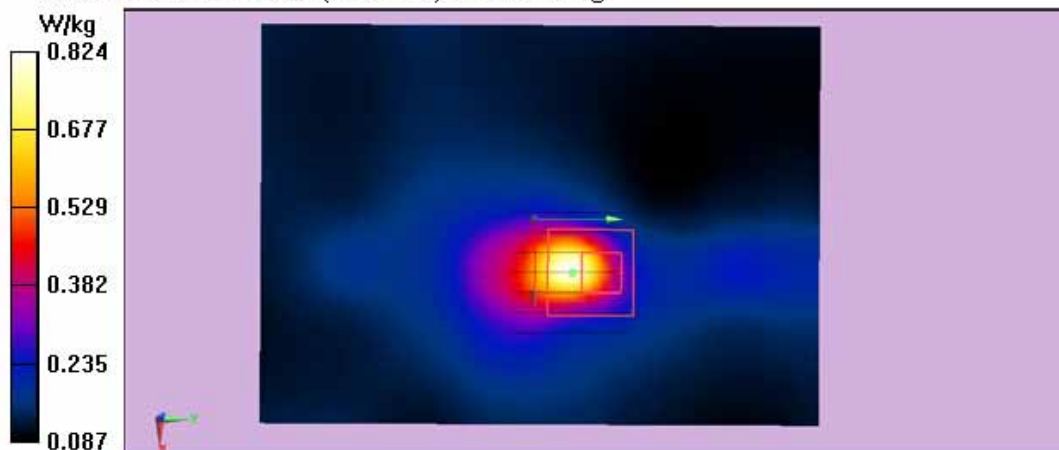
**(7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 8.555 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 2.26 W/kg

**SAR(1 g) = 0.651 W/kg; SAR(10 g) = 0.256 W/kg**

Maximum value of SAR (measured) = 0.964 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11n20 CH140 (5700MHz)-Bottom**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11n HT20 WiFi 5.7GHz (0); Communication System Band: IEEE 802.11n HT20 WiFi 5.7GHz; Frequency: 5700 Hzmmunication System PAR: 0 dB.Medium parameters used:  $f = 5700 \text{ MHz}$ ;  $\sigma = 5.52 \text{ S/m}$ ;  $\epsilon_r = 49.17$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n HT20 CH140(5700MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.893 W/kg

**Configuration/11n HT20 CH140(5700MHz)-Bottom/Zoom Scan**

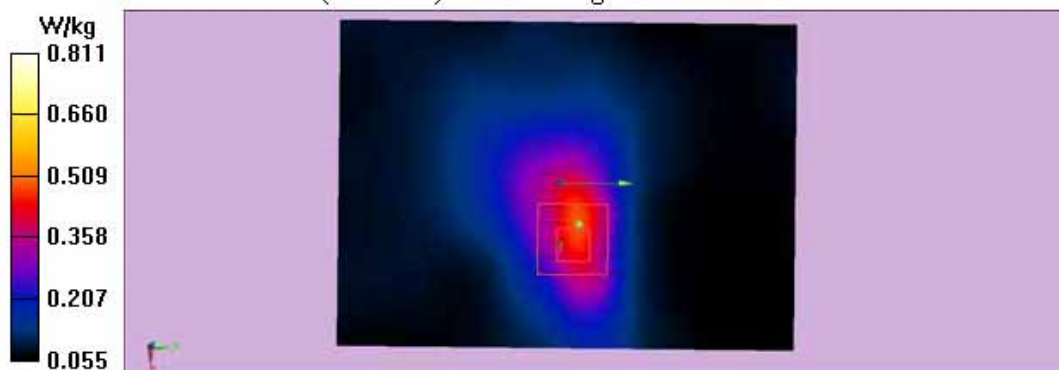
(7x7x7)/Cube 0: Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 9.652 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 2.15 W/kg

**SAR(1 g) = 0.673 W/kg; SAR(10 g) = 0.255 W/kg**

Maximum value of SAR (measured) = 0.811 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**11n20 CH140 (5700MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11n HT20 WiFi 5.7GHz (0); Communication System Band: IEEE 802.11n HT20 WiFi 5.7GHz; Frequency: 5700 Hzmmunication System PAR: 0 dB. Medium parameters used:  $f = 5700 \text{ MHz}$ ;  $\sigma = 5.52 \text{ S/m}$ ;  $\epsilon_r = 49.17$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/01/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/11n HT20 CH140(5700MHz)-Screen Back/Area Scan**

**(51x71x1):** Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.422 W/kg

**Configuration/11n HT20 CH140(5700MHz)-Screen Back/Zoom Scan**

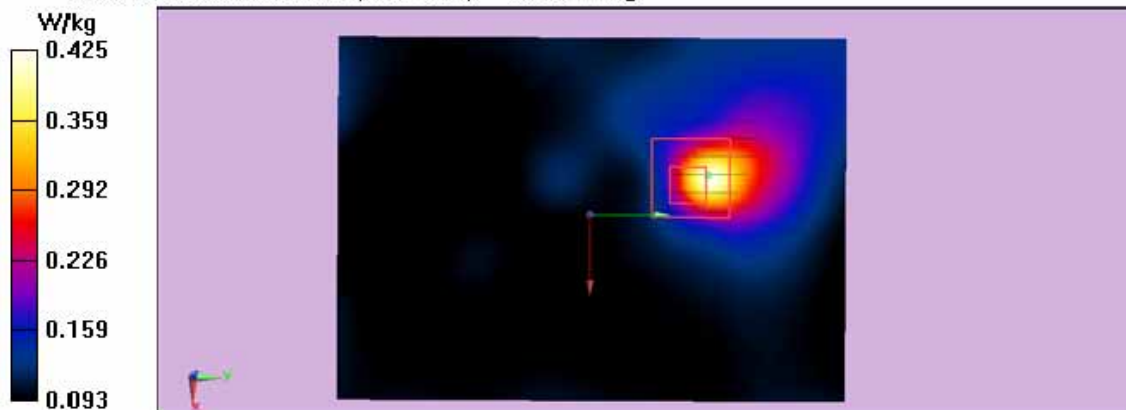
**(7x7x7)/Cube 0:** Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 4.343 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.958 W/kg

**SAR(1 g) = 0.305 W/kg; SAR(10 g) = 0.126 W/kg**

Maximum value of SAR (measured) = 0.425 W/kg



**WIFI 5G**  
**ANT1:**

**Test Laboratory: Audix SAR Lab**

Date: 24/08/2015

**CH36 (5180MHz)-Bottom**

**DUT: Notebook M/N:RZ09-0168**

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.37 \text{ S/m}$ ;  $\epsilon_r = 50.28$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/\_ 11a CH36(5180MHz)-Bottom/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.170 W/kg

**Configuration/\_ 11a CH36(5180MHz)-Bottom/Zoom Scan (7x7x7)/Cube 0:**

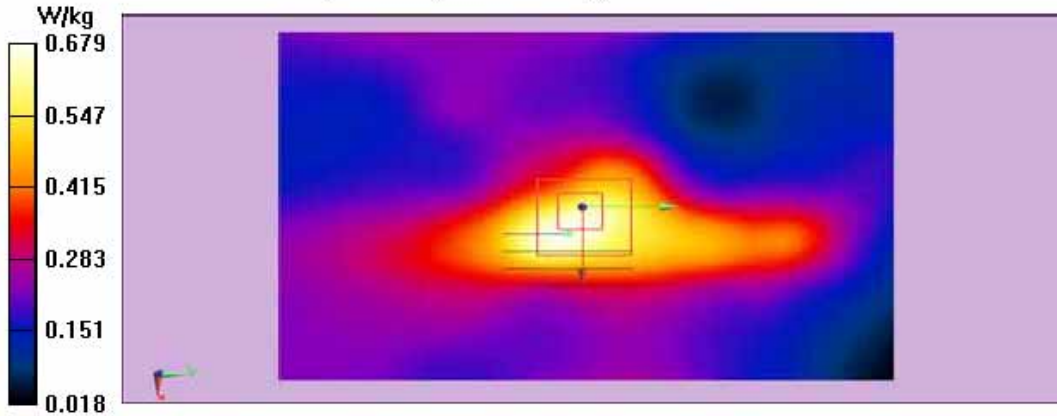
Measurement grid:  $dx=5\text{mm}$ ,  $dy=5\text{mm}$ ,  $dz=5\text{mm}$

Reference Value = 9.630 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.879 W/kg

**SAR(1 g) = 0.633 W/kg; SAR(10 g) = 0.156 W/kg**

Maximum value of SAR (measured) = 0.679 W/kg



Test Laboratory: Audix SAR Lab

Date: 24/08/2015

**CH36 (5180MHz)-Screen Back**

DUT: Notebook M/N:RZ09-0168

Communication System: UID 0, IEEE 802.11a WiFi 5.2GHz (0); Communication System Band: IEEE 802.11a WiFi 5.2GHz; Frequency: 5180 MHz; Communication System PAR: 0 dB. Medium parameters used:  $f = 5180 \text{ MHz}$ ;  $\sigma = 5.37 \text{ S/m}$ ;  $\epsilon_r = 50.28$ ;  $\rho = 1000 \text{ kg/m}^3$ ;

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3767; ConvF(5.44, 5.44, 5.44); Calibrated: 30/02/2015;
- Modulation Compensation:
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn899; Calibrated: 07/02/2014
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1112
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Configuration/\_ 11a CH36(5180MHz)-Screen Back/Area Scan (51x71x1):**

Interpolated grid:  $dx=2.000 \text{ mm}$ ,  $dy=2.000 \text{ mm}$

Maximum value of SAR (interpolated) =  $0.119 \text{ W/kg}$

**Configuration/\_ 11a CH36(5180MHz)-Screen Back/Zoom Scan (7x7x7)/Cube**

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

Reference Value =  $5.320 \text{ V/m}$ ; Power Drift =  $0.09 \text{ dB}$

Peak SAR (extrapolated) =  $0.218 \text{ W/kg}$

**SAR(1 g) =  $0.132 \text{ W/kg}$ ; SAR(10 g) =  $0.100 \text{ W/kg}$**

Maximum value of SAR (measured) =  $0.145 \text{ W/kg}$

