FCC SAR Report

Report No.	:	**SESF1508098**
Client/Manufacturer	:	**Broadcom Corporation**
Address	:	**190 Mathilda Place Sunnyvale CA 94086 U.S.A.**
Product	:	**802.11b/g/n/a/ac WLAN + Bluetooth PCI-E NGFF 2230 Card**
Brand	:	**Broadcom**
Model	:	**BCM94350ZAE**
FCC ID	:	**QDS-BRCM1087**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:2005 / IEEE 1528-2013 / KDB 865664 D01 v01r04 / KDB 248227 D01 v02r01 / KDB 447498 D01 v05r02 / KDB 616217 D04 v01r01**
Test Date	:	**October 8th, 2015~ October 11th, 2015**

Statement of Compliance:

The SAR values measured for the test sample are below the maximum recommended level of 1.6W/kg averaged over any 1g tissue according to FCC Knowledge Data Base/ FCC 47CFR Part 2 (2.1093) / IEEE Std.1528-2013.

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

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Approved By: Miro Chueh

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Testing Laboratory
2877

Release Version

Report No.	Issue Date	Description
SESF1508098	2015-10-12	Initial release

Contents

1. Summary of Maximum SAR Value

Equipment Class	Highest Reported SAR_{1-g}(W/kg)
DTS	1.03
U-NII	1.24
DSS	0.4
Highest Simultaneous SAR	
DTS	1.890
UNII	1.908

2. Description of Equipment under Test

Product Name	802.11b/g/n/a/ac WLAN + Bluetooth PCI-E NGFF 2230 Card
Model No.	BCM94350ZAE
Brand Name	Broadcom
Product Type	WLAN (2TX, 2RX)
Antenna Type	PIFA
Antenna Peak Gain	Amphenol: 2.4G:0.53dBi,5.2G:0.58 dBi,5.5G:1.11dBi,5.8G:0.55dBi Speed: 2.4G:0.33dBi,5.2G:0.16 dBi,5.5G:0.49dBi,5.8G:0.49dBi
Bus Interface	PCIE
Device Category	Portable
RF Exposure Environment	Uncontrolled
Bluetooth	
Bluetooth Frequency	2402~2480MHz
Data Rate	1 Mbps, 2Mbps and Up to 3Mbps
Channel Separation	1MHz for BT3.0, 2MHz for BLE
Modulation technology	BLE4.0 (GFSK), V3.0+EDR(GFSK), V3.0+EDR(8-DPSK)
Wi-Fi	
Modulation Techniques:	**802.11b:** CCK, DQPSK, DBPSK **802.11a/g:** 64QAM, 16QAM, QPSK, BPSK **802.11n:** BPSK, QPSK, 16QAM, 64QAM
Data Rate	802.11b: 11, 5.5, 2, 1 Mbps 802.11a/g: 54, 48, 36, 24, 18, 12, 9, 6 Mbps 802.11n: MCS 0 to 15 for HT20MHz, MCS 0 to 15 for HT40MHz 802.11ac: MCS 0 to 8 for HT20MHz, MCS 0 to 9 for HT40MHz, MCS 0 to 9 for HT80MHz
Wi-Fi Frequency	**For 15.247:** 2.4GHz: 2.412 ~ 2.472GHz
	For 15.407: 802.11a: 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.5~5.72GHz, 5.745 ~ 5.825GHz
Modulation Technology	**For 15.247(2.4GHz):** 802.11b, 802.11g, 802.11n (HT20), 802.11n (HT40)
	For 15.247(5GHz): 802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT80)
	For 15.407: 802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT80)

Antenna information,

Ant Type	Manufacturer	Part Number
1	Amphenol	Main Antenna: DC33001EA20 / Aux Antenna: DC33001EA30
2	Speed	Main Antenna: DC33001E910 / Aux Antenna: DC33001E900

3. General Information

Host Details,

Host Manufacture	Host Type	Host Model
Lenovo	Tablet PC	Lenovo ideapad MIIX 700-12ISK

Our Lab,

Test Site	Cerpass Technology (Suzhou) Co.,Ltd
Test Site Location	No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China

4. Basic restrictions and Standards

4.1. Test Standards

1. IEEE 1528-2013
2. FCC KDB Publication 447498 D01 General RF Exposure Guidance v05r02
3. FCC KDB Publication 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
4. FCC KDB Publication 616217 D04 SAR for laptop and tablets v01r01
5. FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r01

4.2. Environment Condition

Item	Target	Measured
Ambient Temperature(℃)	18~25	21.5±2
Temperature of Simulant(℃)	20~22	21±2
Relative Humidity(%RH)	30~70	52

4.3. RF Exposure Limits

Human Exposure	Basic restrictions for electric, magnetic and electromagnetic fields. (Unit in mW/g or W/kg)
Spatial Peak SAR[1](Head and Body)	1.60
Spatial Average SAR[2](Whole Body)	0.08
Spatial Peak SAR[3](Arms and Legs)	4.00

Notes:

1. The Spatial Peak value of the SAR averaged over any 1gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over appropriate averaging time.

5. DASY5 Measurement System

DASY5 Measurement System

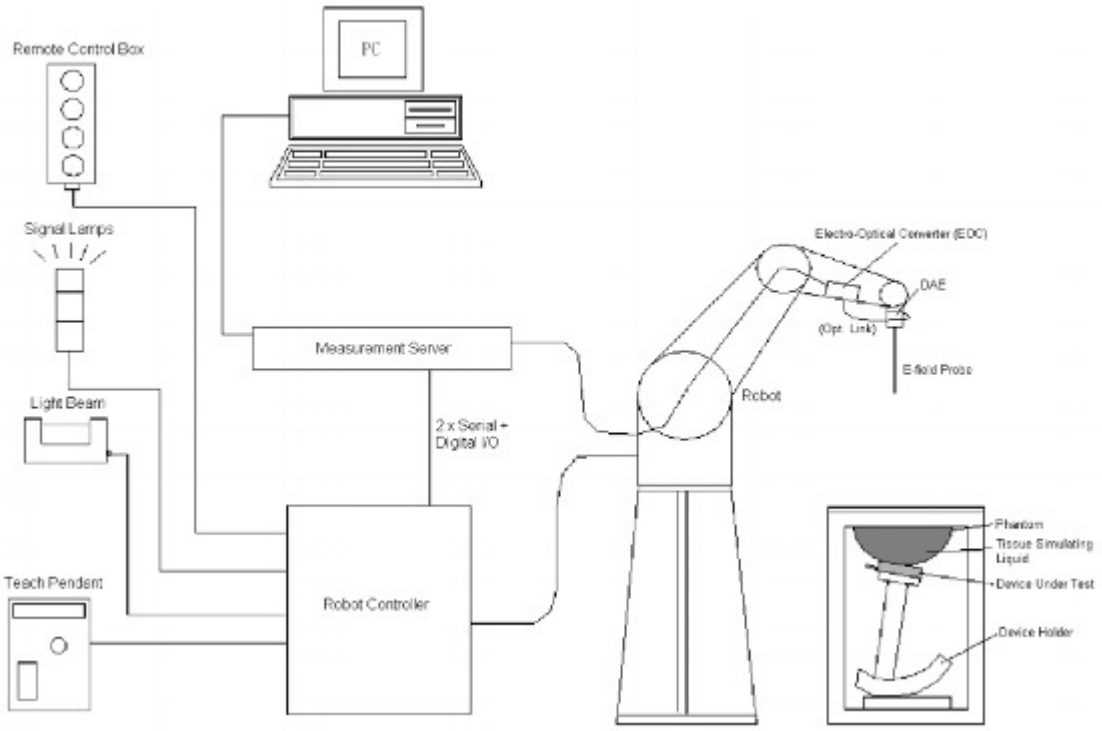


Figure 2.1 SPEAG DASY5 System Configurations

The DASY5 system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic(DAE)attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter(ECO)performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows 7
- DASY5 software
- Remove control with teach pendant additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

5.1. Uncertainty of Inter-/Extrapolation and Averaging

In order to evaluate the uncertainty of the interpolation, extrapolation and averaged SAR calculation algorithms of the Postprocessor, DASY5 allows the generation of measurement grids which are artificially predefined by analytically based test functions. Therefore, the grids of area scans and zoom scans can be filled with uncertainty test data, according to the SAR benchmark functions of IEEE 1528.The three analytical functions shown in equations as below are used to describe the possible range of the expected SAR distributions for the tested handsets. The field gradients are covered by the spatially flat distribution f1, the spatially steep distribution f3 and f2 accounts for H-field cancellation on the phantom/tissue surface.

$$f_1(x,y,z) = Ae^{-\frac{z}{2a}}\cos^2\left(\frac{\pi}{2}\frac{\sqrt{x'^2+y'^2}}{5a}\right)$$

$$f_2(x,y,z) = Ae^{-\frac{z}{a}}\frac{a^2}{a^2+x'^2}\left(3-e^{-\frac{2z}{a}}\right)\cos^2\left(\frac{\pi}{2}\frac{y'}{3a}\right)$$

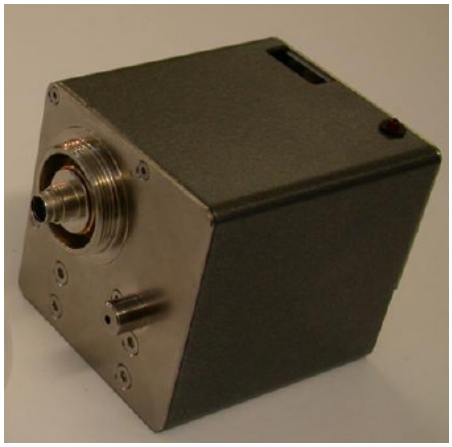
$$f_3(x,y,z) = A\frac{a^2}{\frac{a^2}{4}+x'^2+y'^2}\left(e^{-\frac{2z}{a}}+\frac{a^2}{2(a+2z)^2}\right)$$

5.2. DASY5 E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SPEAG. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.
SPEAG conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528, EN 62209-1, IEC 62209, etc.) under ISO 17025. The calibration data are in Appendix D.

Model	EX3DV4	
Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 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%.	

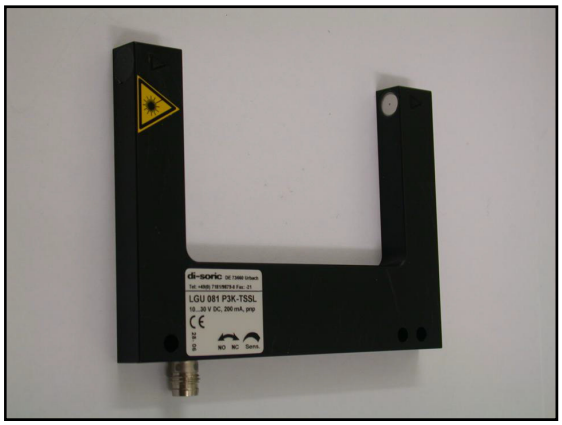
5.3. Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The input impedance of the DAE4 is 200M Ohm; the inputs are symmetrical and floating. Common mode rejection is above 80dB.	

5.4. Robot

The DASY5 system uses the high precision robots TX90 XL type out of the newer series from Stäubli SA (France). For the 6-axis controller DASY5 system, the CS8C robot controller version from Stäubli is used. The XL robot series have many features that are important for our application: ■ High precision (repeatability 0.02 mm) ■ High reliability (industrial design) ■ Jerk-free straight movements ■ Low ELF interference (the closed metallic construction shields against motor control fields) ■ 6-axis controller	

5.5. Light Beam Unit

The light beam switch allows automatic "tooling" of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip. The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.	

5.6. Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with the DAE electronics box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.	

5.7. SAM Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas: ■ Left head ■ Right head ■ Flat phantom	
The ELI4 Phantom also is a fiberglass shell phantom with 2mm shell thickness. It has 30 liters filling volume, and with a dimension of 600mm for major ellipse axis, 400mm for minor axis. It is intended for compliance testing of handheld and body-mounted wireless devices in frequency range of 30 MHz to 6GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.	
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. 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.	

5.8. Device Holder

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 center 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 εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.	
The laptop extension is lightweight and made of POM, acrylic glass and foam. It fits easily on upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.	

5.9. Test Equipment List

Instrument	Manufacturer	Model No.	Serial No.	Cali. Due Date
Stäubli Robot TX60L	Stäubli	TX60L	5P6VA1/A/01	only once
Robot Controller	Stäubli	CS8C	5P6VA1/C/01	only once
Dipole Validation Kits	Speag	D2450V2	914	2017.05.18
Dipole Validation Kits	Speag	D5GHzV2	1156	2017.05.21
SAM ELI Phantom	Speag	SAM	1211	N/A
Laptop Holder	Speag	SM LH1 001CD	N/A	N/A
Data Acquisition Electronic	Speag	DAE4	1379	2016.05.19
E-Field Probe	Speag	EX3DV4	3927	2016.05.26
SAR Software	Speag	DASY5	V5.2 Build 162	N/A
Power Amplifier	Mini-Circuit	ZVA-183W-S+	MN136701248	2016.09.02
Directional Coupler	Agilent	772D	MY52180104	2016.09.02
Spectrum Analyzer	R&S	FSP40	100324	2016.03.22
Vector Network	Agilent	E5071C	MY4631693	2016.01.14
Signal Generator	R&S	SML	103287	2016.03.08
Power Meter	BONN	BLWA0830-160/100/40D	76659	2015.11.10
AUG Power Sensor	R&S	NRP-Z91	100384	2016.03.08

6. The SAR Measurement Procedure

6.1. System Performance Check

6.1.1 Purpose

1. To verify the simulating liquids are valid for testing.
2. To verify the performance of testing system is valid for testing.

6.1.2 Tissue Dielectric Parameters for Head and Body Phantoms

Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
850	41.5	0.92	55.2	0.99
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 – 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	**52.7**	**1.95**
3000	38.5	2.40	52.0	2.73
5200	36.0	4.66	**49.0**	**5.30**
5300	35.87	4.76	48.88	5.42
5600	35.5	5.07	**48.5**	**5.77**
5800	35.3	5.27	**48.2**	**6.00**

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

6.1.3 Tissue Calibration Result

■ The dielectric parameters of the liquids were verified prior to the SAR evaluation using DASY5 Diel -ectric Assessment Kit and Agilent Vector Network Analyzer E5071C.

Tissue parameter for body							
Fre. <MHz>	Permittivity	Conductivity	Target Permittivity	Target Conductivity	Delta Permittivity%	Delta Conductivity %	Tissue Temperature℃
08-10-2015							
2450	52.46	1.95	52.70	1.95	0.00	0.00	21.0
2412	52.56	1.92	52.70	1.90	0.00	0.01	21.0
2437	52.51	1.94	52.70	1.93	0.00	0.01	21.0
2462	52.42	1.96	52.70	1.97	-0.01	-0.01	21.0
09-10-2015							
5200	49.16	5.32	49.00	5.30	0.00	0.00	21.0
10-10-2015							
5600	48.51	5.78	48.50	5.77	0.00	0.00	21.0
11-10-2015							
5800	48.41	5.96	48.20	6.00	0.00	-0.01	21.0

■ Refer to KDB 865664 D01 v01r04, The depth of body tissue-equivalent liquid in a phantom must be ≥ 15.0 cm with ≤ ± 0.5 cm variation for SAR measurements ≤ 3 GHz and ≥ 10.0 cm with ≤ ± 0.5 cm variation for measurements > 3 GHz.

6.1.4 System Performance Check Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and the system performance check. They are read-only document files and destined as fully defined but unmeasured masks, so the finished system performance check must be saved under a different name. The system performance check document requires the SAM Twin Phantom or ELI4 Phantom, so the phantom must be properly installed in your system. (User defined measurement procedures can be created by opening a new document or editing an existing document file). Before you start the system performance check, you need only to tell the system with which components (probe, medium, and device) you are performing the system performance check; the system will take care of all parameters.

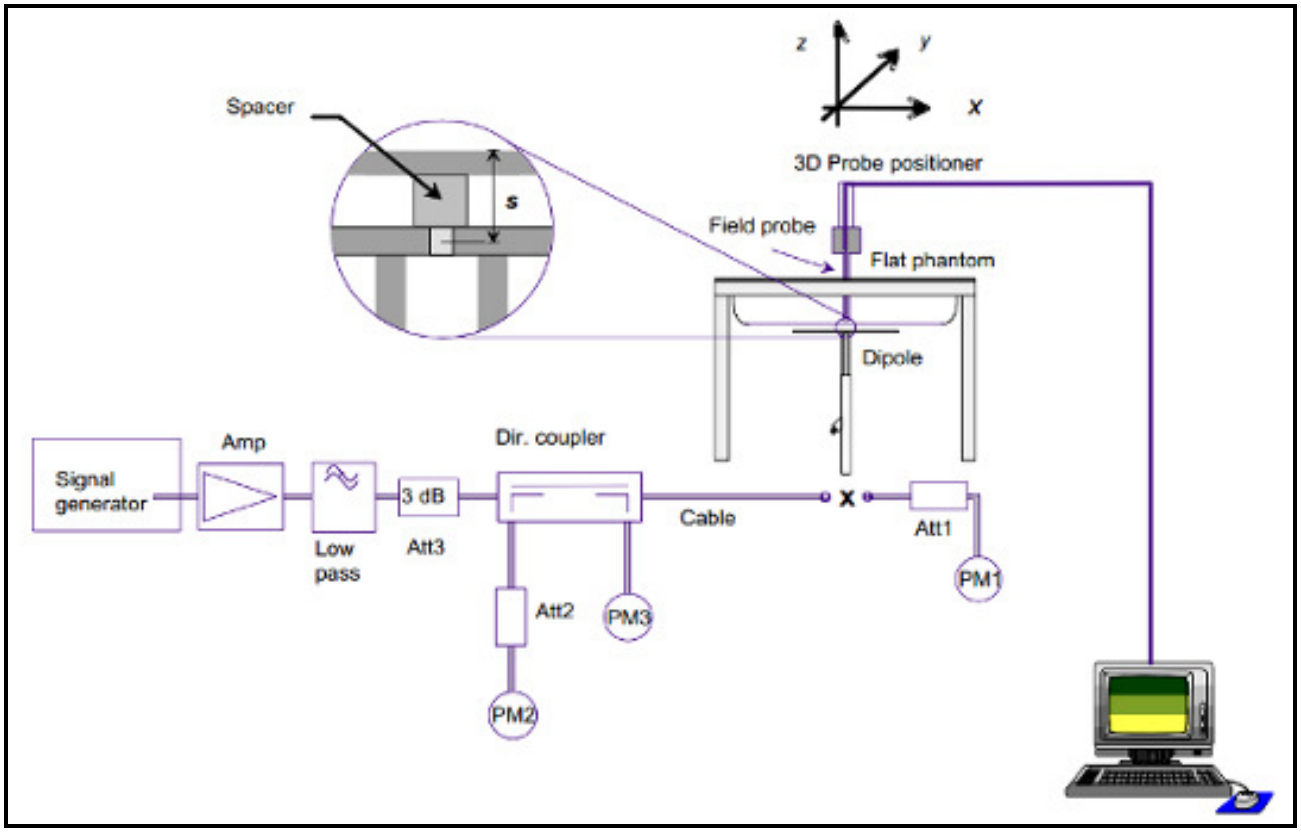
■ **The Power Reference Measurement and Power Drift Measurement** jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the Dipole output power. If it is too high (above ±0.2 dB), the system performance check should be repeated;

■ **The Surface Check** job 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 ±0.1mm). In that case it is better to abort the system performance check and stir the liquid;

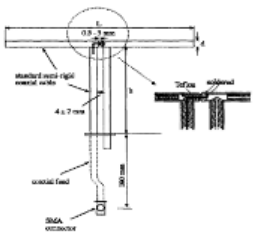
■ **The Area Scan** job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable;

■ **The Zoom Scan** job measures the field in a volume around the peak SAR value assessed in the previous Area Scan job (for more information see the application note on SAR evaluation). If the system performance check gives reasonable results. The dipole input power(forward power) was 250mW, 1 g and 10 g spatial average SAR values normalized to 1W dipole input power give reference data for comparisons and it's equal to 10x(dipole forward power). The next sections analyze the expected uncertainties of these values, as well as additional checks for further information or troubleshooting.

6.1.5 System Performance Check Setup



6.1.6 Validation Dipoles

The dipoles use is based on the IEEE Std.1528-2013 and FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04 standard, and is complied with mechanical and electrical specifications in line with the requirements of both EN62209-1 and EN62209-2. The table below provides details for the mechanical and electrical specifications for the dipoles.	

6.1.7 Result of System Performance Check: Valid Result

System Performance Check at 2450MHz, 5200MHz, 5600MHz and 5800MHz for Body.

Validation Dipole: D2450V2-SN 914

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
2450 MHz	Reference result ± 10% window	52.5 47.25 to 57.75	24.6 22.14 to 27.06	21.0
	08-10-2015	53.6	24.4	

Validation Dipole: D5GHzV2-SN1156

Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
5200MHz	Reference result ± 10% window	75.0 67.5 to 82.5	21.0 18.9 to 23.1	21.0
	09-10-2015	79	22	
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
5600MHz	Reference result ± 10% window	79.5 71.55 to 87.45	22.0 19.8 to 24.2	21.0
	10-10-2015	82.7	23.1	
Frequency [MHz]	Description	SAR [w/kg] 1g	SAR [w/kg] 10g	Tissue Temp. [°C]
5800MHz	Reference result ± 10% window	76.6 68.94 to 84.26	21.1 18.99 to 23.21	21.0
	11-10-2015	81.4	22.6	

Note: All SAR values are normalized to 1W forward power.

6.2. Test Requirements

6.2.1 Test Procedures

Step 1 Setup a Connection

First, engineer should record the conducted power before the test. Then establish a call in handset at the maximum power level with a base station simulator via air interface, or make the EUT estimate by itself in testing band. Place the EUT to the specific test location. After the testing, must export SAR test data by SEMCAD. Then writing down the conducted power of the EUT into the report, also the SAR values tested.

Step 2 Power Reference Measurements

To measure the local E-field value at a fixed location which value will be taken as a reference value for calculating a possible power drift.

Step 3 Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in dB) is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE Standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan). If only one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of Zoom Scans has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01v01r04

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 4 Zoom Scan

Zoom Scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The Zoom Scan measures points (refer to table below) within a cube whose base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the Zoom Scan evaluates the averaged SAR for 1 g and 10 g and displays these values next to the job's label.

Zoom Scan Parameters extracted from KDB 865664 D01 v01r04

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Step 5 Power Drift Measurements

Repetition of the E-field measurement at the fixed location mentioned in Step 1 to make sure the two results differ by less than ± 0.2 dB.

6.2.2 Test Channel

Per KDB248227 D01 v02r01, channel selection procedures below apply to both the initial test configu -ration and subsequent test configureation(s):

1) 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n.

2) The largest channel bandwidth configuration is selected among the multiple configurations in a freq -uency band with the same specified maximum output power.

3) If multiple configurations have the same specified maximum output power and largest channel bandwidth, the lowest order modulation among the largest channel bandwidth configurations is sele -cted.

4) If multiple configurations have the same specified maximum output power, largest channel band -width and lowest order modulation, the lowest data rate configuration among these configurations is seleced.

5) The same procedures also apply to subsequent highest output power channel(s) selection.

a> The channel closest to mid-band frequency is selected for SAR measurement.

b> For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

7. Wi-Fi/Bluetooth SAR Exclusion and Results

7.1. Maximum Tune-up Conducted Average Power

<BCM94350ZAE _WIFI 2x2Tx_ Single Chain Power> (Unit: dBm)

Ch./Modes	11b(Legacy)& 2x2 mode	11g(legacy)& 11n 20MHz 1x1 mode	11a(legacy)& 11n 20MHz 1x1 mode	11b/n 20MHz mode 2x2	11n 20MHz mode 2x2 STBC/SDM	11n 40MHz mode SISO	11n 40MHz mode 2x2 CDD/SDM/STBC	11ac 80MHz mode SISO	11ac 80MHz mode 2x2 CDD/SDM/STBC
1	13.5	13.5		13.5	13.5				
2	13.5	13.5		13.5	13.5				
3	13.5	13.5		13.5	13.5	13.5	13.5		
4 to 8	13.5	13.5		13.5	13.5	13.5	13.5		
9	13.5	13.5		13.5	13.5	13.5	13.5		
10	13.5	13.5		13.5	13.5	12.5	12.5		
11	13.5	13.5		13.5	13.5	11.5	11.5		
12	13.5	13.5		12.0	12.0				
13	13.5	10.5		7.0	7.0				
36			13.5	13.5	13.5				
38						13.5	13.5		
40			13.5	13.5	13.5				
42								13.5	13.5
44			13.5	13.5	13.5				
46						13.5	13.5		
48			13.5	13.5	13.5				
52			13.5	13.5	13.5				
54						13.5	13.5		
56			13.5	13.5	13.5				
58								13.5	13.5
60			13.5	13.5	13.5				
62						13.5	13.5		
64			13.5	13.5	13.5				
100			13.5	13.5	13.5				
102						13.5	13.5		
104			13.5	13.5	13.5				
106								13.5	13.5
110						13.5	13.5		
122								13.5	13.5
126						13.5	13.5		
134						13.5	13.5		
136			13.5	13.5	13.5				
138								13.5	13.5
140			13.5	13.5	13.5				
142						13.5	13.5		
144			13.5	13.5	13.5				
149			13.5	13.5	13.5				
151						13.5	13.5		
153			13.5	13.5	13.5				
155								13.5	13.5
157			13.5	13.5	13.5				
159						13.5	13.5		
161			13.5	13.5	13.5				
165			13.5	13.5	13.5				

Note: As declared by applicant, two chains transmit the same power level when WIFI 2x2Tx is on.

<BCM94350ZAE _Bluetooth > (Unit: dBm)

Max. Bluetooth Power	8.75

7.2. Measured Conducted Average Power

Amphenol Antenna Host

<BCM94350ZAE_Chian1_Main> (Unit: dBm)

Configurations	Mode				
	Channel / Frequency (MHz)				
2.4GHz WLAN Average Power (Main)	802.11b				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.39	13.48	13.21	13.20	13.19
	802.11g				
	1/2412	6/2437	11/2462	12/2462	13/2472
	13.36	13.27	13.42	13.31	10.30
	802.11n(HT20)				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.29	13.28	13.31	11.84	6.82
	802.11n(HT40)				
	3/2422	6/2437	9/2452	10/2457	11/2462
	13.34	13.37	12.28	12.22	11.24
5.2GHz WLAN Average Power (Main)	802.11a				
	36/5180	40/5200	44/5220	48/5240	
	13.30	13.39	13.48	13.45	
	802.11n(HT20)				
	36/5180	40/5200	44/5220	48/5240	
	13.35	13.36	13.28	13.32	
	802.11n(HT40)				
	38/5190		46/5230		
	13.37		13.38		
	802.11ac(VHT80)				
	42/5210				
	13.33				

Configurations	Mode						
	Channel / Frequency (MHz)						
5.3GHz WLAN Average Power (Main)	802.11a						
	52/5260	56/5280	60/5300	64/5320			
	13.37	13.33	13.34	13.29			
	802.11n(HT20)						
	52/5260	56/5280	60/5300	64/5320			
	13.28	13.35	13.32	13.37			
	802.11n(HT40)						
	54/5270		62/5310				
	13.35		13.32				
	802.11ac(VHT80)						
	58/5290						
	13.45						
5.6GHz WLAN Average Power (Main)	802.11a						
	100/5500	108/5540	116/5580	120/5600	132/5660	136/5680	140/5700
	13.35	13.36	13.28	13.27	13.44	13.31	13.32
	802.11n(HT20)						
	100/5500	104/5520	116/5580	120/5600	124/5620	136/5680	140/5700
	13.27	13.37	13.35	13.37	13.44	13.42	13.31
	802.11n(HT40)						
	102/5510		110/5550		134/5670		142/5710
	13.29		13.38		13.27		13.34
	802.11ac(VHT80)						
	124/5610				138/5690		
	13.49				13.36		
5.8GHz WLAN Average Power (Main)	802.11a						
	149/5745	153/5765	157/5785	161/5805	165/5825		
	13.29	13.30	13.48	13.28	13.29		
	802.11n(HT20)						
	149/5745	153/5765	157/5785	161/5805	165/5825		
	13.36	13.34	13.38	13.29	13.34		
	802.11n(HT40)						
	151/5755				159/5795		
	13.25				13.37		
	802.11ac(VHT80)						
	155/5775						
	13.30						

<BCM94350ZAE_Chian0_Aux> (Unit: dBm)

Configurations	Mode				
	Channel / Frequency (MHz)				
2.4GHz WLAN Average Power (Aux)	802.11b				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.24	13.26	13.28	13.21	13.18
	802.11g				
	1/2412	6/2437	11/2462	12/2462	13/2472
	13.37	13.44	13.36	13.30	10.32
	802.11n(HT20)				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.36	13.36	13.37	11.82	6.81
	802.11n(HT40)				
	3/2422	6/2437	9/2452	10/2457	11/2462
	13.30	13.38	13.32	12.23	11.21
5.2GHz WLAN Average Power (Aux)	802.11a				
	36/5180	40/5200	44/5220	48/5240	
	13.42	13.36	13.40	13.39	
	802.11n(HT20)				
	36/5180	40/5200	44/5220	48/5240	
	13.27	13.36	13.38	13.44	
	802.11n(HT40)				
	38/5190		46/5230		
	13.34		13.35		
	802.11ac(VHT80)				
	42/5210				
	13.30				
5.3GHz WLAN Average Power (Aux)	802.11a				
	52/5260	56/5280	60/5300	64/5320	
	13.21	13.28	13.46	13.48	
	802.11n(HT20)				
	52/5260	56/5280	60/5300	64/5320	
	13.39	13.37	13.36	13.32	
	802.11n(HT40)				
	54/5270		62/5310		
	13.34		13.27		
	802.11ac(VHT80)				
	58/5290				
	13.37				

Configurations	Mode					
	Channel / Frequency (MHz)					
5.6GHz WLAN Average Power (Aux)	802.11a					
	100/5500	108/5540	116/5580	120/5600	132/5660	140/5700
	13.33	13.41	13.48	13.35	13.37	13.47
	802.11n(HT20)					
	100/5500	104/5520	116/5580	124/5620	136/5680	140/5700
	13.27	13.29	13.39	13.26	13.34	13.38
	802.11n(HT40)					
	102/5510		110/5550	134/5670		142/5710
	13.35		13.34	13.41		13.44
	802.11ac(VHT80)					
	124/5610			138/5690		
	13.23			13.41		
5.8GHz WLAN Average Power (Aux)	802.11a					
	149/5745	153/5765	157/5785	161/5805	165/5825	
	13.41	13.27	13.31	13.29	13.30	
	802.11n(HT20)					
	149/5745	153/5765	157/5785	161/5805	165/5825	
	13.39	13.27	13.32	13.32	13.38	
	802.11n(HT40)					
	151/5755			159/5795		
	13.29			13.33		
	802.11ac(VHT80)					
	155/5775					
	13.45					

<BCM94350ZAE _Bluetooth > (Unit: dBm)

Max. Bluetooth Power	
2441MHz GFSK	8.45

Note:

Due to legacy, SISO and MIMO modes have the same power/chain declared by applicant, MIMO mode had been taken into considerations, and legacy and SISO mode is covered.

Speed Antenna Host

<BCM94350ZAE_Chian1_Main> (Unit: dBm)

Configurations	Mode				
	Channel / Frequency (MHz)				
2.4GHz WLAN Average Power (Main)	802.11b				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.26	13.37	13.18	13.23	13.17
	802.11g				
	1/2412	6/2437	11/2462	12/2462	13/2472
	13.43	13.21	13.32	13.29	10.31
	802.11n(HT20)				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.31	13.29	13.30	11.84	6.81
	802.11n(HT40)				
	3/2422	6/2437	9/2452	10/2457	11/2462
	13.33	13.36	12.29	12.22	11.24
5.2GHz WLAN Average Power (Main)	802.11a				
	36/5180	40/5200	44/5220	48/5240	
	13.39	13.29	13.27	13.28	
	802.11n(HT20)				
	36/5180	40/5200	44/5220	48/5240	
	13.34	13.37	13.26	13.31	
	802.11n(HT40)				
	38/5190		46/5230		
	13.36		13.37		
	802.11ac(VHT80)				
	42/5210				
	13.32				
5.3GHz WLAN Average Power (Main)	802.11a				
	52/5260	56/5280	60/5300	64/5320	
	13.30	13.36	13.33	13.27	
	802.11n(HT20)				
	52/5260	56/5280	60/5300	64/5320	
	13.26	13.34	13.34	13.35	
	802.11n(HT40)				
	54/5270		62/5310		
	13.37		13.34		
	802.11ac(VHT80)				
	58/5290				
	13.41				

Configurations	Mode						
	Channel / Frequency (MHz)						
5.6GHz WLAN Average Power (Main)	802.11a						
	100/5500	108/5540	116/5580	120/5600	132/5660	136/5680	140/5700
	13.30	13.28	13.28	13.26	13.26	13.29	13.38
	802.11n(HT20)						
	100/5500	104/5520	116/5580	120/5600	124/5620	136/5680	140/5700
	13.26	13.38	13.31	13.35	13.38	13.41	13.35
	802.11n(HT40)						
	102/5510		110/5550		134/5670		142/5710
	13.27		13.34		13.26		13.28
	802.11ac(VHT80)						
	106/5530				124/5610		
	13.42				13.43		
5.8GHz WLAN Average Power (Main)	802.11a						
	149/5745	153/5765	157/5785	161/5805	165/5825		
	13.34	13.31	13.47	13.25	13.34		
	802.11n(HT20)						
	149/5745	153/5765	157/5785	161/5805	165/5825		
	13.37	13.32	13.33	13.30	13.37		
	802.11n(HT40)						
	151/5755				159/5795		
	13.29				13.38		
	802.11ac(VHT80)						
	155/5775						
	13.47						

<BCM94350ZAE_Chian0_Aux> (Unit: dBm)

Configurations	Mode				
	Channel / Frequency (MHz)				
2.4GHz WLAN Average Power (Aux)	802.11b				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.33	13.44	13.25	13.24	13.21
	802.11g				
	1/2412	6/2437	11/2462	12/2462	13/2472
	13.15	13.33	13.45	13.26	10.28
	802.11n(HT20)				
	1/2412	6/2437	11/2462	12/2467	13/2472
	13.31	13.33	13.39	11.85	6.82
	802.11n(HT40)				
	3/2422	6/2437	9/2452	10/2457	11/2462
	13.29	13.34	13.26	12.25	11.20
5.2GHz WLAN Average Power (Aux)	802.11a				
	36/5180	40/5200	44/5220	48/5240	
	13.30	13.47	13.49	13.45	
	802.11n(HT20)				
	36/5180	40/5200	44/5220	48/5240	
	13.28	13.32	13.35	13.36	
	802.11n(HT40)				
	38/5190		46/5230		
	13.31		13.34		
	802.11ac(VHT80)				
	42/5210				
	13.46				
5.3GHz WLAN Average Power (Aux)	802.11a				
	52/5260	56/5280	60/5300	64/5320	
	13.47	13.44	13.33	13.24	
	802.11n(HT20)				
	52/5260	56/5280	60/5300	64/5320	
	13.34	13.31	13.34	13.37	
	802.11n(HT40)				
	54/5270		62/5310		
	13.36		13.28		
	802.11ac(VHT80)				
	58/5290				
	13.33				

Configurations	Mode					
	Channel / Frequency (MHz)					
5.6GHz WLAN Average Power (Aux)	802.11a					
	100/5500	108/5540	116/5580	120/5600	132/5660	140/5700
	13.37	13.44	13.30	13.32	13.30	13.37
	802.11n(HT20)					
	100/5500	104/5520	116/5580	124/5620	136/5680	140/5700
	13.29	13.27	13.35	13.27	13.33	13.33
	802.11n(HT40)					
	102/5510		110/5550	134/5670		142/5710
	13.32		13.35	13.38		13.34
	802.11ac(VHT80)					
	106/5530		124/5610		138/5690	
	13.41		13.35		13.37	
5.8GHz WLAN Average Power (Aux)	802.11a					
	149/5745	153/5765	157/5785	161/5805	165/5825	
	13.47	13.28	13.46	13.32	13.39	
	802.11n(HT20)					
	149/5745	153/5765	157/5785	161/5805	165/5825	
	13.37	13.29	13.34	13.35	13.36	
	802.11n(HT40)					
	151/5755			159/5795		
	13.28			13.34		
	802.11ac(VHT80)					
	155/5775					
	13.35					

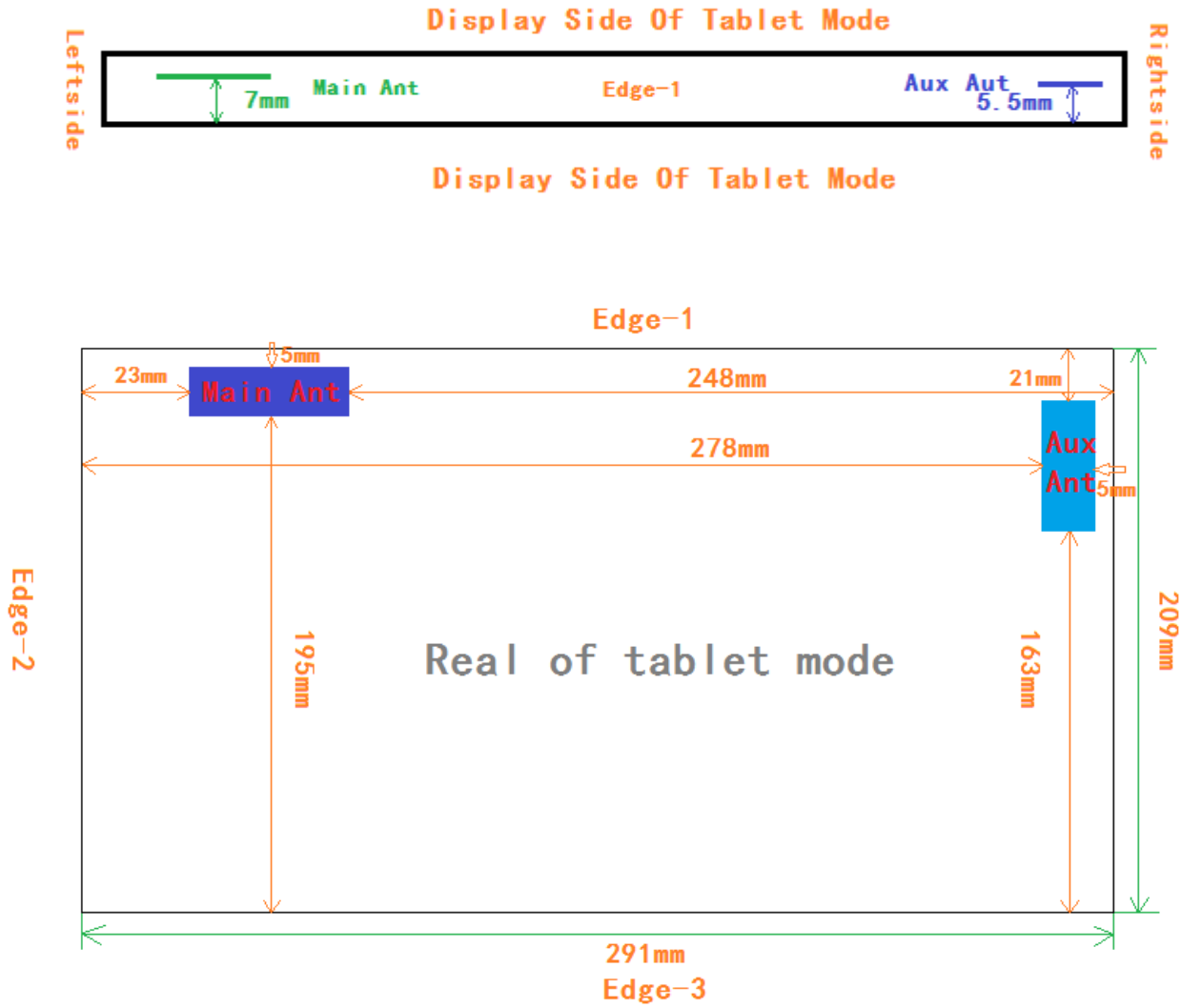
<BCM94350ZAE _Bluetooth > (Unit: dBm)

Max. Bluetooth Power	
2441MHz GFSK	8.49

Note:

Due to legacy, SISO and MIMO modes have the same power/chain declared by applicant, MIMO mode had been taken into considerations, and legacy and SISO mode is covered.

7.3. Antenna Location



Antenna	Antenna Distance to Edges(mm)				
	Back	Edge_1	Edge_2	Edge_3	Edge_4
Main(Tx1)	7	5	23	195	248
Aux(Tx2)	5.5	21	278	163	5

7.4. SAR exclusion

Per FCC KDB 447498 D01v05r02 for 100MHz~6GHz:

1) The 1g-SAR exclusion threshold for distances<50mm is defined by the following equation:

$$\frac{Max\ Power\ of\ \ Channel(mW)}{Test\ Separation\ Distance(mm)} \times \sqrt{Frequency(GHz)} \le 3.0$$

5mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	5	10	8.75	7	N
802.11b	2437	5	10	13.5	22	Y
802.11g	2437	5	10	13.5	22	Y
802.11n(HT20)	2437	5	10	13.5	22	Y
802.11n(HT40)	2437	5	10	13.5	22	Y
802.11a	5220	5	7	13.5	22	Y
802.11n(HT20)	5220	5	7	13.5	22	Y
802.11n(HT40)	5230	5	7	13.5	22	Y
802.11ac(VHT80)	5210	5	7	13.5	22	Y
802.11a	5300	5	7	13.5	22	Y
802.11n(HT20)	5300	5	7	13.5	22	Y
802.11n(HT40)	5310	5	7	13.5	22	Y
802.11ac(VHT80)	5290	5	7	13.5	22	Y
802.11a	5540	5	6	13.5	22	Y
802.11n(HT20)	5540	5	6	13.5	22	Y
802.11n(HT40)	5550	5	6	13.5	22	Y
802.11ac(VHT80)	5530	5	6	13.5	22	Y
802.11a	5785	5	6	13.5	22	Y
802.11n(HT20)	5785	5	6	13.5	22	Y
802.11n(HT40)	5795	5	6	13.5	22	Y
802.11ac(VHT80)	5775	5	6	13.5	22	Y

5.5mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	5.5	11	8.75	7	N
802.11b	2437	5.5	11	13.5	22	Y
802.11g	2437	5.5	11	13.5	22	Y
802.11n(HT20)	2437	5.5	11	13.5	22	Y
802.11n(HT40)	2437	5.5	11	13.5	22	Y
802.11a	5220	5.5	7	13.5	22	Y
802.11n(HT20)	5220	5.5	7	13.5	22	Y
802.11n(HT40)	5230	5.5	7	13.5	22	Y
802.11ac(VHT80)	5210	5.5	7	13.5	22	Y
802.11a	5300	5.5	7	13.5	22	Y
802.11n(HT20)	5300	5.5	7	13.5	22	Y
802.11n(HT40)	5310	5.5	7	13.5	22	Y
802.11ac(VHT80)	5290	5.5	7	13.5	22	Y
802.11a	5540	5.5	7	13.5	22	Y
802.11n(HT20)	5540	5.5	7	13.5	22	Y
802.11n(HT40)	5550	5.5	7	13.5	22	Y
802.11ac(VHT80)	5530	5.5	7	13.5	22	Y
802.11a	5785	5.5	7	13.5	22	Y
802.11n(HT20)	5785	5.5	7	13.5	22	Y
802.11n(HT40)	5795	5.5	7	13.5	22	Y
802.11ac(VHT80)	5775	5.5	7	13.5	22	Y

7mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	7	13	8.75	7	N
802.11b	2437	7	13	13.5	22	Y
802.11g	2437	7	13	13.5	22	Y
802.11n(HT20)	2437	7	13	13.5	22	Y
802.11n(HT40)	2437	7	13	13.5	22	Y
802.11a	5220	7	9	13.5	22	Y
802.11n(HT20)	5220	7	9	13.5	22	Y
802.11n(HT40)	5230	7	9	13.5	22	Y
802.11ac(VHT80)	5210	7	9	13.5	22	Y
802.11a	5300	7	9	13.5	22	Y
802.11n(HT20)	5300	7	9	13.5	22	Y
802.11n(HT40)	5310	7	9	13.5	22	Y
802.11ac(VHT80)	5290	7	9	13.5	22	Y
802.11a	5540	7	9	13.5	22	Y
802.11n(HT20)	5540	7	9	13.5	22	Y
802.11n(HT40)	5550	7	9	13.5	22	Y
802.11ac(VHT80)	5530	7	9	13.5	22	Y
802.11a	5785	7	9	13.5	22	Y
802.11n(HT20)	5785	7	9	13.5	22	Y
802.11n(HT40)	5795	7	9	13.5	22	Y
802.11ac(VHT80)	5775	7	9	13.5	22	Y

21mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	21	40	8.75	7	N
802.11b	2437	21	40	13.5	22	N
802.11g	2437	21	40	13.5	22	N
802.11n(HT20)	2437	21	40	13.5	22	N
802.11n(HT40)	2437	21	40	13.5	22	N
802.11a	5220	21	28	13.5	22	N
802.11n(HT20)	5220	21	28	13.5	22	N
802.11n(HT40)	5230	21	28	13.5	22	N
802.11ac(VHT80)	5210	21	28	13.5	22	N
802.11a	5300	21	27	13.5	22	N
802.11n(HT20)	5300	21	27	13.5	22	N
802.11n(HT40)	5310	21	27	13.5	22	N
802.11ac(VHT80)	5290	21	27	13.5	22	N
802.11a	5540	21	27	13.5	22	N
802.11n(HT20)	5540	21	27	13.5	22	N
802.11n(HT40)	5550	21	27	13.5	22	N
802.11ac(VHT80)	5530	21	27	13.5	22	N
802.11a	5785	21	26	13.5	22	N
802.11n(HT20)	5785	21	26	13.5	22	N
802.11n(HT40)	5795	21	26	13.5	22	N
802.11ac(VHT80)	5775	21	26	13.5	22	N

23mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	23	44	8.75	7	N
802.11b	2437	23	44	13.5	22	N
802.11g	2437	23	44	13.5	22	N
802.11n(HT20)	2437	23	44	13.5	22	N
802.11n(HT40)	2437	23	44	13.5	22	N
802.11a	5220	23	30	13.5	22	N
802.11n(HT20)	5220	23	30	13.5	22	N
802.11n(HT40)	5230	23	30	13.5	22	N
802.11ac(VHT80)	5210	23	30	13.5	22	N
802.11a	5300	23	30	13.5	22	N
802.11n(HT20)	5300	23	30	13.5	22	N
802.11n(HT40)	5310	23	30	13.5	22	N
802.11ac(VHT80)	5290	23	30	13.5	22	N
802.11a	5540	23	29	13.5	22	N
802.11n(HT20)	5540	23	29	13.5	22	N
802.11n(HT40)	5550	23	29	13.5	22	N
802.11ac(VHT80)	5530	23	29	13.5	22	N
802.11a	5785	23	29	13.5	22	N
802.11n(HT20)	5785	23	29	13.5	22	N
802.11n(HT40)	5795	23	29	13.5	22	N
802.11ac(VHT80)	5775	23	29	13.5	22	N

2) At test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following:

a. [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50mm)·(f (MHz)/150)] mW, at 100 MHz to 1500 MHz

b. [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

163mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	163	1226	8.75	7	N
802.11b	2437	163	1226	13.5	22	N
802.11g	2437	163	1226	13.5	22	N
802.11n(HT20)	2437	163	1226	13.5	22	N
802.11n(HT40)	2437	163	1226	13.5	22	N
802.11a	5220	163	1196	13.5	22	N
802.11n(HT20)	5220	163	1196	13.5	22	N
802.11n(HT40)	5230	163	1196	13.5	22	N
802.11ac(VHT80)	5210	163	1196	13.5	22	N
802.11a	5300	163	1195	13.5	22	N
802.11n(HT20)	5300	163	1195	13.5	22	N
802.11n(HT40)	5310	163	1195	13.5	22	N
802.11ac(VHT80)	5290	163	1195	13.5	22	N
802.11a	5540	163	1194	13.5	22	N
802.11n(HT20)	5540	163	1194	13.5	22	N
802.11n(HT40)	5550	163	1194	13.5	22	N
802.11ac(VHT80)	5530	163	1194	13.5	22	N
802.11a	5785	163	1192	13.5	22	N
802.11n(HT20)	5785	163	1192	13.5	22	N
802.11n(HT40)	5795	163	1192	13.5	22	N
802.11ac(VHT80)	5775	163	1192	13.5	22	N

195mm Test Separation

Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Thresholds (mW)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	SAR Test(Y/N
Bluetooth	2441	195	1546	8.75	7	N
802.11b	2437	195	1546	13.5	22	N
802.11g	2437	195	1546	13.5	22	N
802.11n(HT20)	2437	195	1546	13.5	22	N
802.11n(HT40)	2437	195	1546	13.5	22	N
802.11a	5220	195	1516	13.5	22	N
802.11n(HT20)	5220	195	1516	13.5	22	N
802.11n(HT40)	5230	195	1516	13.5	22	N
802.11ac(VHT80)	5210	195	1516	13.5	22	N
802.11a	5300	195	1515	13.5	22	N
802.11n(HT20)	5300	195	1515	13.5	22	N
802.11n(HT40)	5310	195	1515	13.5	22	N
802.11ac(VHT80)	5290	195	1515	13.5	22	N
802.11a	5540	195	1514	13.5	22	N
802.11n(HT20)	5540	195	1514	13.5	22	N
802.11n(HT40)	5550	195	1514	13.5	22	N
802.11ac(VHT80)	5530	195	1514	13.5	22	N
802.11a	5785	195	1512	13.5	22	N
802.11n(HT20)	5785	195	1512	13.5	22	N
802.11n(HT40)	5795	195	1512	13.5	22	N
802.11ac(VHT80)	5775	195	1512	13.5	22	N

Note: The exclusion calculation tables for antenna-to-user separation distances greater than 200 mm are unnecessary since these are mobile RF exposure conditions.

7.5. Required Edges for SAR Testing

Test Mode	Main Antenna					Aux Antenna				
	Back	Edge_1	Edge_2	Edge_3	Edge_4	Back	Edge_1	Edge_2	Edge_3	Edge_4
BT(GFSK)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
802.11b	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11g	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT20)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT40)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11a	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT20)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT40)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11ac(VHT	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11a	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT20)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT40)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11ac(VHT	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11a	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT20)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT40)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11ac(VHT	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11a	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT20)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11n(HT40)	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES
802.11ac(VHT	YES	YES	NO	NO	NO	YES	NO	NO	NO	YES

Note: According to KDB 248227 D01 v02r01, SAR configuration may be reduced.

7.6. Estimated SAR

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is≤1.6W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r02 4.3.2 2, the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$Estimated\ SAR = \frac{\sqrt{f(GHz)}}{7.5} * \frac{(Max\ Power\ of\ channel, mW)}{Min.\ Separation, mm}$$

WIFI/ Bluetooth

Test Position	Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	Estimated SAR(W/kg)
Back	Bluetooth	2441	5.5	8.75	7	0.28
Edge_4	Bluetooth	2441	5	8.75	7	0.31
Edge_1	Bluetooth	2441	21	8.75	7	0.07
Edge_1	802.11b	2437	21	13.5	22	0.22
Edge_1	802.11g	2437	21	13.5	22	0.22
Edge_1	802.11n(HT20)	2437	21	13.5	22	0.22
Edge_1	802.11n(HT40)	2437	21	13.5	22	0.22
Edge_1	802.11a	5220	21	13.5	22	0.32
Edge_1	802.11n(HT20)	5220	21	13.5	22	0.32
Edge_1	802.11n(HT40)	5230	21	13.5	22	0.33
Edge_1	802.11ac(VHT80)	5210	21	13.5	22	0.32
Edge_1	802.11a	5300	21	13.5	22	0.33
Edge_1	802.11n(HT20)	5300	21	13.5	22	0.33
Edge_1	802.11n(HT40)	5310	21	13.5	22	0.33
Edge_1	802.11ac(VHT80)	5290	21	13.5	22	0.33
Edge_1	802.11a	5540	21	13.5	22	0.33
Edge_1	802.11n(HT20)	5540	21	13.5	22	0.33
Edge_1	802.11n(HT40)	5550	21	13.5	22	0.33
Edge_1	802.11ac(VHT80)	5530	21	13.5	22	0.33
Edge_1	802.11a	5785	21	13.5	22	0.34
Edge_1	802.11n(HT20)	5785	21	13.5	22	0.34
Edge_1	802.11n(HT40)	5795	21	13.5	22	0.34
Edge_1	802.11ac(VHT80)	5775	21	13.5	22	0.34

Test Position	Test Mode	Frq.(MHz)	Antenna-to-user distance (mm)	Max. Tune-up Power(dBm)	Max. Tune-up Power(mW)	Estimated SAR(W/kg)
Edge_2	802.11b	2437	23	13.5	22	0.20
Edge_2	802.11g	2437	23	13.5	22	0.20
Edge_2	802.11n(HT20)	2437	23	13.5	22	0.20
Edge_2	802.11n(HT40)	2437	23	13.5	22	0.20
Edge_2	802.11a	5220	23	13.5	22	0.30
Edge_2	802.11n(HT20)	5220	23	13.5	22	0.30
Edge_2	802.11n(HT40)	5230	23	13.5	22	0.30
Edge_2	802.11ac(VHT80)	5210	23	13.5	22	0.30
Edge_2	802.11a	5300	23	13.5	22	0.30
Edge_2	802.11n(HT20)	5300	23	13.5	22	0.30
Edge_2	802.11n(HT40)	5310	23	13.5	22	0.30
Edge_2	802.11ac(VHT80)	5290	23	13.5	22	0.30
Edge_2	802.11a	5540	23	13.5	22	0.31
Edge_2	802.11n(HT20)	5540	23	13.5	22	0.31
Edge_2	802.11n(HT40)	5550	23	13.5	22	0.31
Edge_2	802.11ac(VHT80)	5530	23	13.5	22	0.31
Edge_2	802.11a	5785	23	13.5	22	0.31
Edge_2	802.11n(HT20)	5785	23	13.5	22	0.31
Edge_2	802.11n(HT40)	5795	23	13.5	22	0.31
Edge_2	802.11ac(VHT80)	5775	23	13.5	22	0.31

7.7. SAR Test Results Summary

■ **Tablet Mode- DTS_WLAN 2.4GHz**

Plot No.	Ant Type	Ant Port	Band	Mode	Test Position	Dist. mm	Ch.	Fre.	Max. Tune-up Power(dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
Initial Test configuration of Amphenol Main&Aux Antenna														
	1	main	802.11b	CCK	Back	0	1	2412	13.5	13.39	1.01	0.11	0.836	0.843
	1	main	802.11b	CCK	Back	0	6	2437	13.5	13.48	1.00	-0.15	0.903	0.904
	1	main	802.11b	CCK	Back	0	11	2462	13.5	13.21	1.02	Reduced1		
	1	main	802.11b	CCK	Edge_1	0	6	2437	13.5	13.48	1.00	0.01	0.522	0.523
	1	aux	802.11b	CCK	Edge_4	0	1	2412	13.5	13.24	1.02	Reduced1		
	1	aux	802.11b	CCK	Edge_4	0	6	2437	13.5	13.26	1.02	0.12	0.858	0.87
	1	aux	802.11b	CCK	Edge_4	0	11	2462	13.5	13.28	1.02	0.03	0.896	0.911
	1	aux	802.11b	CCK	Back	0	11	2462	13.5	13.28	1.02	-0.19	0.676	0.687
Initial Test configuration of Speed Main&Aux Antenna														
	2	main	802.11b	CCK	Back	0	1	2412	13.5	13.26	1.02	0.04	0.84	0.855
	2	main	802.11b	CCK	Back	0	6	2437	13.5	13.37	1.01	-0.15	0.852	0.860
	2	main	802.11b	CCK	Back	0	11	2462	13.5	13.18	1.02	Reduced1		
	2	main	802.11b	CCK	Edge_1	0	6	2437	13.5	13.37	1.01	0.13	0.427	0.431
	2	aux	802.11b	CCK	Back	0	1	2412	13.5	13.33	1.01	0.01	0.985	0.998
01	2	aux	802.11b	CCK	Back	0	6	2437	13.5	13.44	1.00	0.00	1.03	**1.03**
	2	aux	802.11b	CCK	Back*	0	6	2437	13.5	13.44	1.00	0.00	1.01	1.01
	2	aux	802.11b	CCK	Back	0	11	2462	13.5	13.25	1.02	Reduced1		
	2	aux	802.11b	CCK	Edge_4	0	6	2437	13.5	13.44	1.00	-0.14	0.968	0.972

Note:

1. **"Reduced1", per KDB248227 D01 v02r01 section 5.2.1 2), when the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.**

■ Tablet Mode- U-NII-2A _WLAN 5.3GHz

Plot No.	Ant Type	Ant Port	Band	Mode	Test Position	Dist. mm	Ch.	Fre.	Max.Tune-up Power(dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
Initial Test configuration of Amphenol Main&Aux Antenna														
	1	main	802.11ac	VHT80	Edge_1	0	58	5290	13.5	13.45	1.00	0.00	1.01	1.01
	1	main	802.11ac	VHT80	Back	0	58	5290	13.5	13.45	1.00	0.00	0.775	0.778
02	1	aux	802.11ac	VHT80	Back	0	58	5290	13.5	13.37	1.01	0.00	1.03	**1.04**
	1	aux	802.11ac	VHT80	Back*	0	58	5290	13.5	13.37	1.01	0.00	1.01	1.02
	1	aux	802.11ac	VHT80	Edge_4	0	58	5290	13.5	13.37	1.01	0.00	1.02	1.03
Initial Test configuration of Speed Main&Aux Antenna														
	2	main	802.11ac	VHT80	Back	0	58	5290	13.5	13.32	1.01	0.00	0.973	0.986
	2	main	802.11ac	VHT80	Edge_1	0	58	5290	13.5	13.32	1.01	0.00	0.777	0.788
	2	aux	802.11ac	VHT80	Edge_4	0	58	5290	13.5	13.33	1.01	0.00	0.647	0.655
	2	aux	802.11ac	VHT80	Back	0	58	5290	13.5	13.33	1.01	0.00	0.583	0.590

Note:

1. **When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the largest channel bandwidth configuration is selected for initial test.**

■ Tablet Mode- U-NII-2C_ WLAN 5.6GHz

Plot No.	Ant Type	Ant Port	Band	Mode	Test Position	Dist. mm	Ch.	Fre.	Max. Tune-up Power(dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
Initial Test configuration of Amphenol Main&Aux Antenna														
	1	main	802.11ac	VHT80	Edge_1	0	122	5610	13.5	13.49	1.00	0.00	1.09	1.09
	1	main	802.11ac	VHT80	Edge_1	0	138	5690	13.5	13.36	1.01	0.00	1.03	1.04
	1	main	802.11ac	VHT80	Back	0	122	5610	13.5	13.49	1.00	0.00	0.703	0.704
	1	aux	802.11ac	VHT80	Edge_4	0	122	5610	13.5	13.23	1.02	0.00	1.06	1.08
	1	aux	802.11ac	VHT80	Edge_4	0	138	5690	13.5	13.41	1.01	0.00	0.966	0.97
	1	aux	802.11ac	VHT80	Back	0	122	5610	13.5	13.23	1.02	0.00	1.06	1.08
Initial Test configuration of Speed Main&Aux Antenna														
	2	main	802.11ac	VHT80	Back	0	106	5530	13.5	13.42	1.01	0.00	0.996	1.002
	2	main	802.11ac	VHT80	Back	0	122	5610	13.5	13.43	1.01	0.00	0.883	0.888
	2	main	802.11ac	VHT80	Edge_1	0	106	5530	13.5	13.42	1.01	0.00	0.793	0.798
	2	aux	802.11ac	VHT80	Edge_4	0	106	5530	13.5	13.41	1.01	0.00	1.06	1.07
03	2	aux	802.11ac	VHT80	Edge_4	0	122	5610	13.5	13.35	1.01	0.00	1.23	**1.24**
	2	aux	802.11ac	VHT80	Edge_4*	0	122	5610	13.5	13.35	1.01	0.00	1.22	1.23
	2	aux	802.11ac	VHT80	Edge_4	0	138	5690	13.5	13.37	1.01	0.00	1.13	1.14
	2	aux	802.11ac	VHT80	Back	0	122	5610	13.5	13.35	1.01	0.00	1.06	1.07
Subsequent Test configuration of Speed Aux Antenna														
	2	aux	802.11a	OFDM	Edge_4	0	108	5540	13.5	13.44	1.00	0.00	0.95	0.95
	2	aux	802.11a	OFDM	Edge_4	0	140	5700	13.5	13.37	1.01	0.00	0.91	0.92

Note:

1. **When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the largest channel bandwidth configuration is selected for initial test.**
2. **Subsequent test configurations is required for Speed antenna, due the adjusted SAR is >1.2W/kg.**

■ Tablet Mode- U-NII-3_ WLAN 5.8GHz

Plot No.	Ant Type	Ant Port	Band	Mode	Test Position	Dist. mm	Ch.	Fre.	Max. Tune-up Power(dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
Initial Test configuration of Amphenol Main&Aux Antenna														
	1	main	802.11ac	VHT80	Edge_1	0	155	5775	13.5	13.30	1.02	0.00	0.759	0.77
	1	main	802.11ac	VHT80	Back	0	155	5775	13.5	13.30	1.02	0.00	0.418	0.424
	1	Aux	802.11ac	VHT80	Edge_4	0	155	5775	13.5	13.45	1.00	0.00	1.21	1.21
	1	Aux	802.11ac	VHT80	Back	0	155	5775	13.5	13.45	1.00	0.00	0.887	0.890
Subsequent Test configuration of Amphenol Aux Antenna														
	1	Aux	802.11a	OFDM	Edge_4	0	149	5745	13.5	13.41	1.01	0.00	0.968	0.97
	1	Aux	802.11a	OFDM	Edge_4	0	157	5785	13.5	13.31	1.01	0.00	1.13	1.15
04	1	Aux	802.11a	OFDM	Edge_4	0	165	5825	13.5	13.30	1.02	0.00	1.2	**1.22**
	1	Aux	802.11a	OFDM	Edge_4*	0	165	5825	13.5	13.30	1.02	0.00	1.18	1.20
Initial Test configuration of Speed Main&Aux Antenna														
	2	main	802.11ac	VHT80	Edge_1	0	155	5775	13.5	13.47	1.00	0.00	0.997	1.00
	2	main	802.11ac	VHT80	Back	0	155	5775	13.5	13.47	1.00	0.00	0.864	0.866
	2	Aux	802.11ac	VHT80	Edge_4	0	155	5775	13.5	13.35	1.01	0.00	1.2	1.21
	2	Aux	802.11ac	VHT80	Back	0	155	5775	13.5	13.35	1.01	0.00	1.03	1.042
Subsequent Test configuration of Speed Aux Antenna														
	2	Aux	802.11a	OFDM	Edge_4	0	157	5785	13.5	13.31	1.01	0.00	1.07	1.09
	2	Aux	802.11a	OFDM	Edge_4	0	165	5825	13.5	13.30	1.02	0.00	1.14	1.16

Note:

1. **When multiple channel bandwidth configurations in a frequency band have the same specified maximum output power, the largest channel bandwidth configuration is selected for initial test.**
2. **Subsequent test configurations is required for Amphenol antenna, due the adjusted SAR is >1.2W/kg.**

■ Bluetooth

Plot No.	Ant Type	Ant Port	Band	Mode	Test Position	Dist. mm	Ch.	Fre.	Max. Tune-up Power(dBm)	Measured Conducted Power (dBm)	Scaling Factor	Power Drift(dB)	Measured SAR-1g (W/kg)	Scaled SAR-1g (W/kg)
Initial Test configuration of Amphenol Aux Antenna														
	1	Aux	Bluetooth	GFSK	Edge-4	0	39	2441	8.75	8.45	1.04	0.04	0.00736	<0.01
Initial Test configuration of Speed Aux Antenna														
	2	Aux	Bluetooth	GFSK	Edge-4	0	39	2441	8.75	8.49	1.03	0.04	0.00619	<0.01

Note:

1. **Bluetooth SAR was carried out for conservative results.**

8. Simultaneous Transmission Analysis

8.1. Max. Simultaneous SAR

■ **WLAN1 + WLAN2(Main Ant+ Aux Ant)**

Amphenol Antenna

Configurations	WLAN1 SAR (W/kg)	WLAN2 SAR (W/kg)	Peak SAR1 Coordinate			Peak SAR2 Coordinates			Ri	Separation Ratio	∑ SAR(W/kg)	Conclusion
			x, mm	y, mm	z, mm	x, mm	y, mm	z, mm				
Tablet Mode 802.11b CH6	0.904	0.69	N/A								1.591	Pass
Tablet Mode 802.11ac CH58	0.778	1.040	87.0	115.0	-1.4	57.6	-138.8	-1.7	255	0.0096	1.818	Pass
Tablet Mode 802.11ac	0.704	1.082	86.4	114.7	-1.3	57.1	-137.4	-1.4	254	0.0094	1.786	Pass
Tablet Mode 802.11ac	0.424	0.890	N/A								1.314	Pass

Speed Antenna

Configurations	WLAN1 SAR (W/kg)	WLAN2 SAR (W/kg)	Peak SAR1 Coordinate			Peak SAR2 Coordinates			Ri	Separation Ratio	∑ SAR(W/kg)	Conclusion
			x, mm	y, mm	z, mm	x, mm	y, mm	z, mm				
Tablet Mode 802.11b CH6	0.860	1.03	84.1	112.4	-1.3	55.3	-137.1	-1.9	251	0.0103	1.890	Pass
Tablet Mode 802.11ac CH58	0.986	0.590	N/A								1.576	Pass
Tablet Mode 802.11ac	0.888	1.07	85.7	113.7	-1.5	55.9	-139.4	-1.3	255	0.0108	1.958	Pass
Tablet Mode 802.11ac	0.866	1.042	83.4	116.6	-1.6	55.1	-138.6	-1.4	257	0.0103	1.908	Pass

Note: When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio per KDB 447498 D01v05r01; *Ratio* = $(SAR_1+SAR_2)^{1.5}/R_i \leq 0.04$ for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. The peak separation distance R_i is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated and interpolated peak SAR locations in the zoom scan.

■**WLAN+ Bluetooth**

Amphenol Antenna

Configurations	Test Position	WLAN SAR(W/kg)	BT SAR(W/kg)	∑ SAR(W/kg)
WLAN(DTS) + BT(DSS)	Body-Back	0.904	0.28	1.184
	Body-Edge_1	0.523	0.07	0.593
	Body-Edge_2	0.4	0.4	0.8
	Body-Edge_3	0.4	0.4	0.8
	Body-Edge_4	0.4	0.01	0.41
WLAN(UNII) + BT(DSS)	Body-Back	1.08	0.28	1.36
	Body-Edge_1	1.09	0.07	1.16
	Body-Edge_2	0.31	0.4	0.71
	Body-Edge_3	0.4	0.4	0.8
	Body-Edge_4	1.22	0.01	1.23

Speed Antenna

Configurations	Test Position	WLAN SAR(W/kg)	BT SAR(W/kg)	∑ SAR(W/kg)
WLAN(DTS) + BT(DSS)	Body-Back	1.03	0.28	1.31
	Body-Edge_1	0.431	0.07	0.501
	Body-Edge_2	0.4	0.4	0.8
	Body-Edge_3	0.4	0.4	0.8
	Body-Edge_4	0.4	0.01	0.41
WLAN(UNII) + BT(DSS)	Body-Back	1.07	0.28	1.35
	Body-Edge_1	1.00	0.07	1.07
	Body-Edge_2	0.31	0.4	0.71
	Body-Edge_3	0.4	0.4	0.8
	Body-Edge_4	1.24	0.01	1.25

Note:

1.An estimated SAR of 0.4 W/kg was used to determine simultaneous transmission SAR for test separate on distances >50mm per 447498 D01v05r02.

2. DTS WiFi cannot transmit simultaneously with BT by aux chain, which share the same antenna.

8.2. Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r02.

9. Measurement Uncertainty

Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std.Unc. (1g)	Std. nc. (10g)	(vi) veff
Measurement System								
Probe Calibration	±6.0%	N	1	1	1	±6.0%	±6.0%	∞
Axial Isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Modulation Response	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.4%	R	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
Probe Positioning	±2.9%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Max.SAR Eval.	±2.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Power Scalingp	±0%	R	$\sqrt{3}$	0	0	±0%	±0%	∞
Phantom and Setup								
Phantom Uncertainty	±6.1%	R	$\sqrt{3}$	1	1	±3.5%	±3.5%	∞
SAR correction	±1.9%	R	$\sqrt{3}$	1	0.84	±1.1%	±0.9%	∞
Liquid Conductivity (mea.)DAK	±2.5%	R	$\sqrt{3}$	0.78	0.71	±1.1%	±1.0%	∞
Liquid Permittivity (mea.)DAK	±2.5%	R	$\sqrt{3}$	0.26	0.26	±0.3%	±0.4%	∞
Temp. unc. –ConductivityBB	±3.4%	R	$\sqrt{3}$	0.78	0.71	±1.5%	±1.4%	∞
Temp. unc. – PermittivityBB	±0.4%	R	$\sqrt{3}$	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty						±11.2%	±11.1%	361
Expanded STD Uncertainty(k=2)						**±22.3%**	**±22.2%**	

DASY5 Uncertainty Budget, according to IEEE 1528/2011 and IEC 62209-1/2011(0.3-3GHz)

Error Description	Uncert. value	Prob. Dist.	Div.	(ci) 1g	(ci) 10g	Std.Unc. (1g)	Std. nc. (10g)	(vi) veff
Measurement System								
Probe Calibration	±6.55%	N	1	0	0			
Axial Isotropy	±4.7%	R	$\sqrt{3}$	0.7	0.7	±1.9%	±1.9%	∞
Hemispherical Isotropy	±9.6%	R	$\sqrt{3}$	0.7	0.7	±3.9%	±3.9%	∞
Boundary Effects	±2.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
Linearity	±4.7%	R	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
System Detection Limits	±1.0%	R	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Modulation Response^{m}	±2.4%	R	$\sqrt{3}$	1	1	±1.4%	±1.4%	∞
Readout Electronics	±0.3%	N	1	1	1	±0.3%	±0.3%	∞
Response Time	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Integration Time	±2.6%	R	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
RF Ambient Noise	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
RF Ambient Reflections	±3.0%	R	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
Probe Positioner	±0.8%	R	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
Probe Positioning	±6.7%	R	$\sqrt{3}$	1	1	±3.9%	±3.9%	∞
Max.SAR Eval.	±2.0%	R	$\sqrt{3}$	1	1	±1.2%	±1.2%	∞
Test Sample Related								
Device Positioning	±2.9%	N	1	1	1	±2.9%	±2.9%	145
Device Holder	±3.6%	N	1	1	1	±3.6%	±3.6%	5
Power Drift	±5.0%	R	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Power Scaling^{p}	±0%	R	$\sqrt{3}$	0	0	±0%	±0%	∞
Phantom and Setup								
Phantom Uncertainty	±6.6%	R	$\sqrt{3}$	1	1	±3.8%	±3.8%	∞
SAR correction	±1.9%	R	$\sqrt{3}$	1	0.84	±1.1%	±0.9%	∞
Liquid Conductivity (mea.)^{DAK}	±2.5%	R	$\sqrt{3}$	0.78	0.71	±1.1%	±1.0%	∞
Liquid Permittivity (mea.)^{DAK}	±2.5%	R	$\sqrt{3}$	0.26	0.26	±0.3%	±0.4%	∞
Temp. unc. –Conductivity^{BB}	±3.4%	R	$\sqrt{3}$	0.78	0.71	±1.5%	±1.4%	∞
Temp. unc. – Permittivity^{BB}	±0.4%	R	$\sqrt{3}$	0.23	0.26	±0.1%	±0.1%	∞
Combined Std. Uncertainty						±12.3%	±12.2%	748
Expanded STD Uncertainty(Coverage factor=2)						**±24.6%**	**±24.5%**	

DASY5 Uncertainty Budget, according to IEEE 1528/2011 and IEC 62209-1/2011(3-6GHz)

--END--

APPENDIX A. SAR System Verification Data

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Date/Time: 08/10/2015

Test Laboratory: Cerpass Lab

SystemPerformanceCheck-D2450 Body

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2

Communication System: CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz; σ = 1.95 S/m; εr = 52.46; ρ = 1000 kg/m3

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22℃; Input power-250mW

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(7.54, 7.54, 7.54); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection), Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0; Type: QDOVA002AA
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

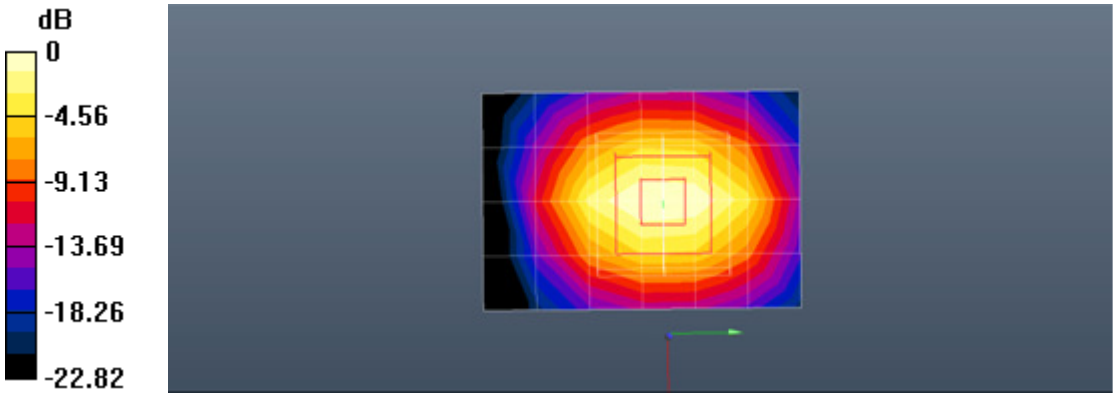
Configuration/SystemPerformanceCheck-D2450 Body/Area Scan (5x7x1):

Measurement grid: dx=12mm, dy=12mm, Maximum value of SAR (measured) = 17.1 W/kg

Configuration/SystemPerformanceCheck-D2450 Body/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm, Reference Value = 78.75 V/m; Power Drift = 0.01 dB, Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.1 W/kg Maximum value of SAR (measured) = 15.5 W/kg



0 dB = 15.5 W/kg = 11.90 dBW/kg

Date/Time: 09/10/2015

Test Laboratory: Cerpass Lab

Dipole Calibration for Body Tissue Pin=100mW, dist=10mm, f=5200 MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2

Communication System: CW; Frequency: 5200 MHz

Medium parameters used: f = 5200 MHz; σ = 5.32 S/m; εr = 49.16; ρ = 1000 kg/m3

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22℃; Input power-250mW

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

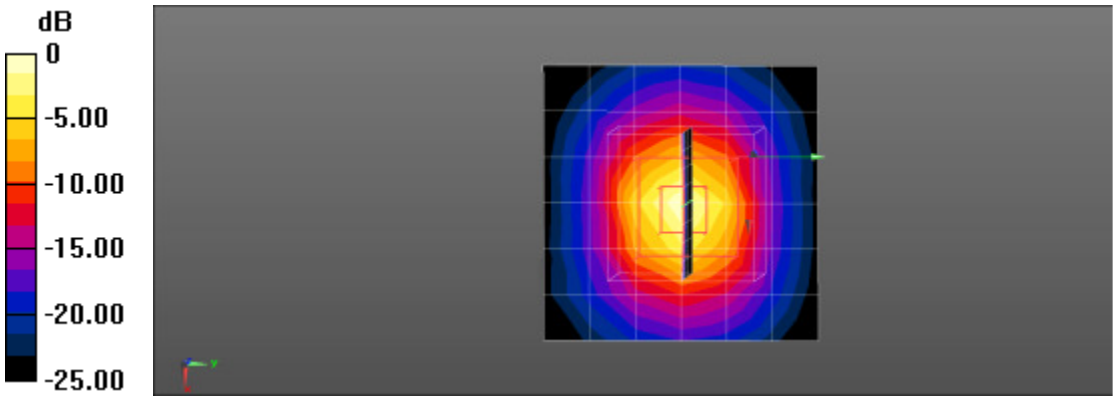
DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(4.6, 4.6, 4.6); Calibrated: 2015/5/27;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0; Type: QDOVA002AA
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 19.8 W/kg

Configuration/Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm, Reference Value = 41.35 V/m; Power Drift = -0.00 dB, Peak SAR (extrapolated) = 32.5 W/kg

SAR(1 g) = 7.9 W/kg; SAR(10 g) = 2.2 W/kg Maximum value of SAR (measured) = 20.2 W/kg



0 dB = 20.2 W/kg = 13.05 dBW/kg

Date/Time: 10/10/2015

Test Laboratory: Cerpass Lab

Dipole Calibration for Body Tissue Pin=100mW, dist=10mm, f=5600 MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2

Communication System: CW; Frequency: 5600 MHz

Medium parameters used: f = 5600 MHz; σ = 5.78 S/m; εr = 48.51; ρ = 1000 kg/m3

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22℃; Input power-250mW

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

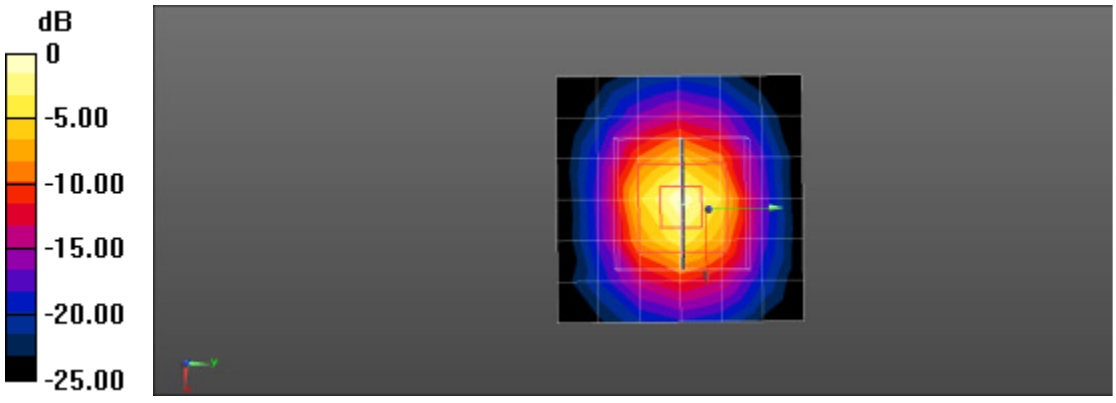
DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(4.03, 4.03, 4.03); Calibrated: 2015/5/27;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0; Type: QDOVA002AA
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 21.1 W/kg

Configuration/Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm, Reference Value = 41.79 V/m; Power Drift = -0.05 dB, Peak SAR (extrapolated) = 38.4 W/kg

SAR(1 g) = 8.27 W/kg; SAR(10 g) = 2.31 W/kg Maximum value of SAR (measured) = 22.1 W/kg



0 dB = 22.1 W/kg = 13.44 dBW/kg

Date/Time: 11/10/2015

Test Laboratory: Cerpass Lab

Dipole Calibration for Body Tissue Pin=100mW, dist=10mm, f=5800 MHz

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2

Communication System: CW; Frequency: 5800 MHz

Medium parameters used: f = 5800 MHz; σ = 5.96 S/m; εr = 48.41; ρ = 1000 kg/m3

Phantom section: Flat Section; Meas. Ambient Temp (celsius) -22℃; Input power-250mW

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

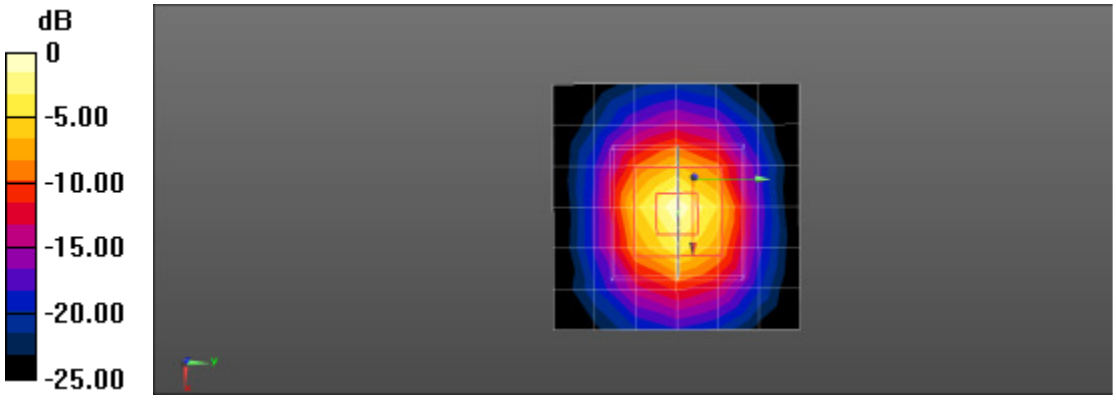
DASY Configuration:

- Probe: EX3DV4 - SN3927; ConvF(4.16, 4.16, 4.16); Calibrated: 2015/5/27;
- Sensor-Surface: 2mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0; Type: QDOVA002AA
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Configuration/Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 21.0 W/kg

Configuration/Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm, Reference Value = 39.76 V/m; Power Drift = -0.07 dB, Peak SAR (extrapolated) = 38.0 W/kg

SAR(1 g) = 8.14 W/kg; SAR(10 g) = 2.26 W/kg Maximum value of SAR (measured) = 22.0 W/kg



0 dB = 22.0 W/kg = 13.42 dBW/kg

APPENDIX B. SAR measurement Data

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination, and measured SAR > 1.5 W/kg are shown as follows.

Plot1 **Date/Time: 08/10/2015**

Test Laboratory: Cerpass Lab

DUT: MIIX 700-12ISK; Type: BCM94350ZAE

Procedure Name: 802.11b 2437MHz Tablet-Back-Aux

Communication System Band: 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2437 MHz; σ = 1.94 S/m; εr = 52.51; ρ = 1000 kg/m3

Phantom section: Flat Section; Tissue Temp (celsius) - 21℃

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

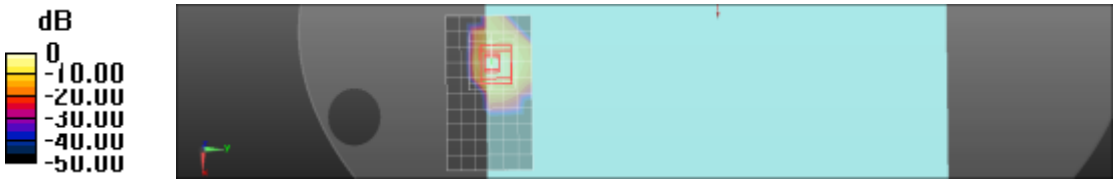
DASY5 Configuration:

- Probe: EX3DV4 - SN3927; ConvF(7.54, 7.54, 7.54); Calibrated: 2015/5/27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/802.11b 2437MHz Tablet-Back-Aux/Area Scan (9x7x1): Measurement grid: dx=12mm, dy=12mm, Maximum value of SAR (measured) = 1.55 W/kg

Configuration/802.11b 2437MHz Tablet-Back-Aux/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 0 V/m; Power Drift = 0.00 dB, Peak SAR (extrapolated) = 2.39 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.403 W/kg Maximum value of SAR (measured) = 1.58 W/kg



0 dB = 1.58 W/kg = 1.99 dBW/kg

Plot2 **Date/Time: 09/10/2015**

Test Laboratory: Cerpass Lab

DUT: MIIX 700-12ISK; Type: BCM94350ZAE

Procedure Name: 802.11ac(80MHz) 5290MHz Tablet-Back Aux

Communication System Band: 802.11ac(80MHz); Frequency: 5290 MHz; Duty Cycle: 1:1

Medium parameters used: f = 5290 MHz; σ = 5.41 S/m; εr = 49.08; ρ = 1000 kg/m3

Phantom section: Flat Section; Tissue Temp (celsius) - 21℃

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

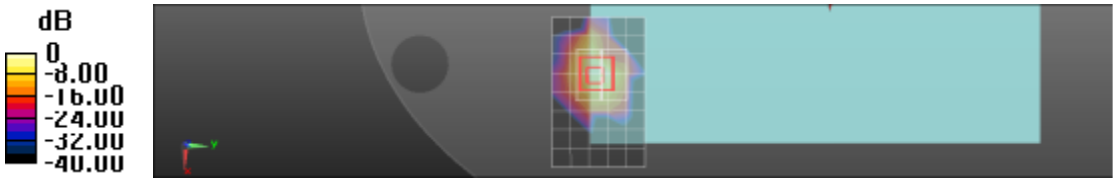
DASY5 Configuration:

- Probe: EX3DV4 - SN3927; ConvF(4.37, 4.37, 4.37); Calibrated: 2015/5/27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/802.11ac(80MHz) 5290MHz Tablet-Back Aux/Area Scan (9x6x1): Measurement grid: dx=12mm, dy=12mm, Maximum value of SAR (measured) = 1.98 W/kg

Configuration/802.11ac(80MHz) 5290MHz Tablet-Back Aux/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 0 V/m; Power Drift = 0.00 dB, Peak SAR (extrapolated) = 6.54 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.278 W/kg Maximum value of SAR (measured) = 2.94 W/kg



0 dB = 2.94 W/kg = 4.68 dBW/kg

Plot3 **Date/Time: 10/10/2015**

Test Laboratory: Cerpass Lab

DUT: MIIX 700-12ISK; Type: BCM94350ZAE

Procedure Name: 802.11ac(80MHz) 5610MHz Tablet-edge_4_Aux

Communication System Band: 802.11ac(80MHz); Frequency: 5610 MHz; Duty Cycle: 1:1

Medium parameters used: f = 5610 MHz; σ = 5.79 S/m; εr = 48.49; ρ = 1000 kg/m3

Phantom section: Flat Section; Tissue Temp (celsius) - 21℃

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

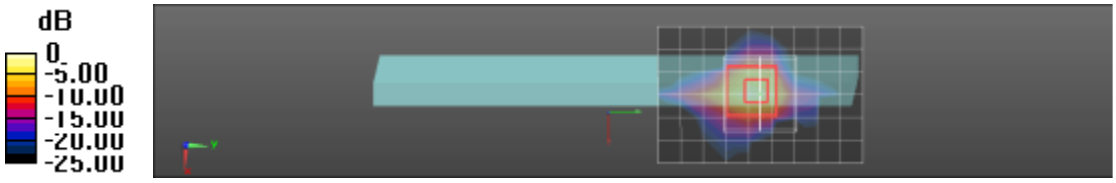
DASY5 Configuration:

- Probe: EX3DV4 - SN3927; ConvF(4.03, 4.03, 4.03); Calibrated: 2015/5/27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA
- Measurement SW: DASY52, Version 52.8 (8);

Configuration/802.11ac(80MHz) 5610MHz Tablet-edge_4_Aux/Area Scan (7x10x1): Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 2.40 W/kg

Configuration/802.11ac(80MHz) 5610MHz Tablet-edge_4_Aux/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 0 V/m; Power Drift = 0.00 dB, Peak SAR (extrapolated) = 6.57 W/kg

SAR(1 g) = 1.23 W/kg; SAR(10 g) = 0.291 W/kg Maximum value of SAR (measured) = 2.92 W/kg



0 dB = 2.92 W/kg = 4.65 dBW/kg

Plot4 **Date/Time: 11/10/2015**

Test Laboratory: Cerpass Lab

DUT: MIIX 700-12ISK; Type: BCM94350ZAE

Procedure Name: 802.11a 5825MHz Tablet-edge_4_Aux

Communication System Band: 802.11a (20MHz); Frequency: 5825 MHz; Duty Cycle: 1:1

Medium parameters used: f = 5825 MHz; σ = 5.98 S/m; εr = 48.38; ρ = 1000 kg/m3

Phantom section: Flat Section; Tissue Temp (celsius) - 21℃

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY5 Configuration:

- Probe: EX3DV4 - SN3927; ConvF(4.16, 4.16, 4.16); Calibrated: 2015/5/27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1379; Calibrated: 2015/5/20
- Phantom: ELI v5.0 (30deg probe tilt); Type: QDOVA002AA
- Measurement SW: DASY52, Version 52.8 (8);

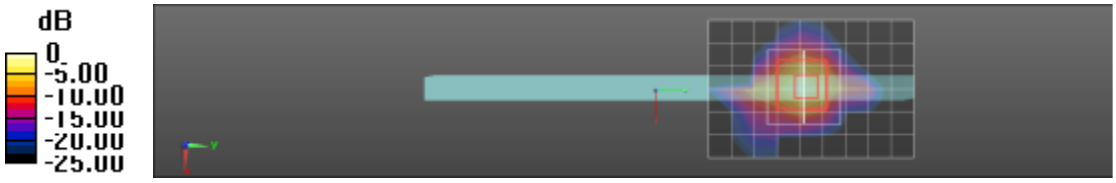
Configuration/802.11a 5825MHz Tablet-edge_4_Aux/Area Scan (7x10x1):

Measurement grid: dx=10mm, dy=10mm, Maximum value of SAR (measured) = 2.50 W/kg

Configuration/802.11a 5825MHz Tablet-edge_4_Aux/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm, Reference Value = 0 V/m; Power Drift = 0.00 dB, Peak SAR (extrapolated) = 6.41 W/kg

SAR(1 g) = 1.2 W/kg; SAR(10 g) = 0.302 W/kg Maximum value of SAR (measured) = 2.74 W/kg



0 dB = 2.74 W/kg = 4.38 dBW/kg

APPENDIX C. Calibration Data for Probe, Dipole and DAE

Please refer to attached files.

APPENDIX D. Photographs of EUT and Setup

Please refer to attached files.