FCC SAR Test Report

APPLICANT	:	Lenovo (Shanghai) Electronics Technology Co., Ltd.
EQUIPMENT	:	Portable Tablet Computer
BRAND NAME	:	Lenovo
MODEL NAME	:	Lenovo YB1-X91F
FCC ID	:	O57YB1X91F
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA631602-01	Rev. 01	Initial issue of report	Apr. 28, 2016

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Lenovo (Shanghai) Electronics Technology Co., Ltd., Portable Tablet Computer, Lenovo YB1-X91F,** are as follows.

Equipment Class	Frequency Band		Highest SAR Summary	Highest Simultaneous Transmission (1g SAR W/kg)
			Body	
			1g SAR (W/kg)	
DTS	WLAN	2.4GHz WLAN	**1.17**	0.96
NII		5GHz WLAN	1.11	1.18
DSS	2.4GHz Band	Bluetooth	0.49	
Date of Testing:			2016/4/21 ~ 2016/4/23	

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958

Applicant	
Company Name	Lenovo(Shanghai) Electronics Technology Co., Ltd.
Address	NO.68 BUILDING, 199 FENJU RD, China (Shanghai) Pilot Free Trade Zone, 200131, CHINA

Manufacturer	
Company Name	Lenovo PC HK Limited
Address	23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong

3. Guidance Standard

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)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Portable Tablet Computer
Brand Name	Lenovo
Model Name	Lenovo YB1-X91F
FCC ID	O57YB1X91F
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	· 802.11b/g/n HT20 · 802.11a/n HT20/HT40 · 802.11ac VHT20/VHT40/VHT80 · Bluetooth v3.0+EDR, Bluetooth v4.0 LE
HW Version	Lenovopad YB1-X91F
SW Version	LenovoYETI_W10_S100_160301_001
EUT Stage	Identical Prototype
Remark: 1. 802.11n-HT40 is not supported in 2.4GHz WLAN. 2. Proximity sensor is active at WLAN 2.4GHz and WLAN 5GHz; power reduction is applicable for WLAN.	

4.2 Component List

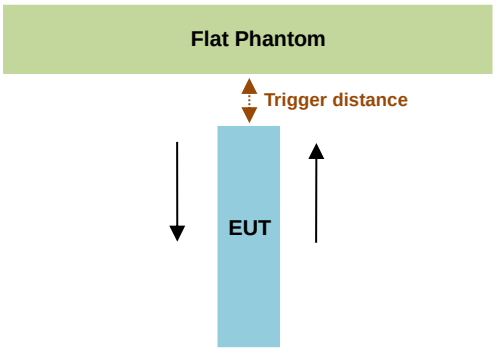
Note: There are two types of EUT; the details refer the following table. According to the difference, the sample 1 to perform full test and the sample 2 to verify worse mode for SAR test.

Component	Sample 1	Sample 2
CPU	Intel Intel® Atom™ x5-Z8550 Processor	Intel Intel® Atom™ x5-Z8550 Processor
Flash	Semtech W25Q64FWZPIG	Semtech W25Q64FWZPIG
eMMC	Samsung KLMCG8WEBD-B031	Samsung KLMCG4JENB-B041
DDR	Samsung K3QF2F20EM-AGCE	Micron MT52L256M64D2PP-107WT
LCD	INX P101KDA-AK0;10.1;IPS;1200×1920;MIPI;2.5	AUO B101UAN07.1;10.1;IPS1200×1920MIPI;2.5
TP	O-Film TP_GFF_OF/MCF-101-2292	GIS TP_GFF_GIS/TC101GFL11 V.A
Front Camera	Primax CCM L202V 2M OV2740 COB 24PIN BtoB	Primax CCM L202V 2M OV2740 COB 24PIN BtoB
Back Camera	Ofilm CCM L8858A20 8M OV8858 COB 31PIN ZIF	Ofilm CCM L8858A20 8M OV8858 COB 31PIN ZIF
Battery	CELXPERT L15C2P31 3.8V;32.3Wh;8500mAh; 2cell bty	CELXPERT L15C2P31 3.8V;32.3Wh;8500mAh; 2cell bty

5. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance (KDB 616217 D04 section 6.2)>:

Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed. The details are illustrated in the exhibit “P-Sensor operational description”, and the shortest triggering distances were reported and used for SAR assessment.
In the preliminary triggering distance testing, the tissue-equivalent medium for different frequency bands were used for verification; no other frequency bands tissue-equivalent medium was found to result in shortest triggering distance than that for 2450MHz, and the tissue-equivalent medium for 2450MHz was used for formal proximity sensor triggering testing.



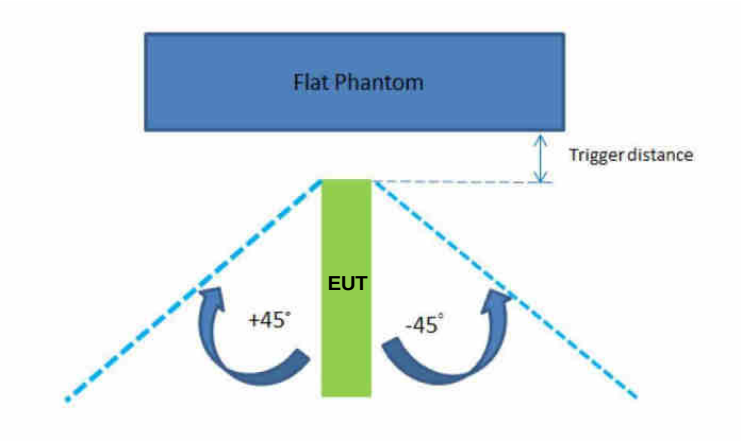
Proximity Sensor Trigger Distance (mm)		
Position	Bottom Face	Edge 4
Minimum	8	6

<Proximity Sensor Triggering Coverage (KDB 616217 D04 section 6.3)>:

If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. For p-sensor coverage testing, the device is moved and “along the direction of maximum antenna and sensor offset”.
Illustrated in the internal photo exhibit, although the senor is spatially offset, there is no trigger condition where the antenna is next to the user but the sensor is laterally further away, therefore proximity sensor coverage testing is not required.
This procedure is not required because antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

<Tablet Tilt angle influences to proximity sensor triggering (KDB 616217 D04 section 6.4)>:

The influence of table tilt angles to proximity sensor triggering was determined by positioning each tablet edge that contains a transmitting antenna, perpendicular to the flat phantom, at 6 mm separation.
Rotating the tablet around the edge next to the phantom in ≤ 10° increments until the tablet is ± 45° from the vertical position at 0°, and the maximum output power remains in the reduced mode.



The Sensor Trigger Distance (mm)	
Position	Edge 4
Minimum	6

Proximity sensor power reduction

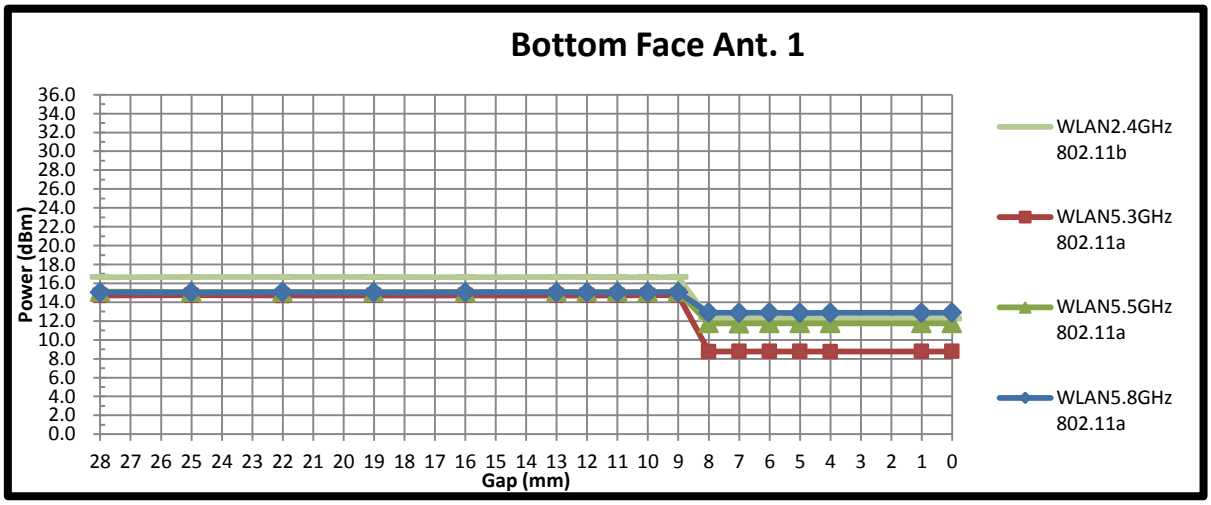
Exposure Position / wireless mode	Bottom Face(1)	Edge 1	Edge 2	Edge 3	Edge 4(1)
WLAN 2.4GHz 802.11b 1Mbps Ant.1	4.5 dB	0 dB	0 dB	0 dB	4.5 dB
WLAN 2.4GHz 802.11b 1Mbps Ant.2	4.0 dB	0 dB	0 dB	0 dB	4.0 dB
WLAN 2.4GHz 802.11n-HT20 MCS0 Ant.1+2	0.5 dB	0 dB	0 dB	0 dB	0.5 dB
WLAN 5.3GHz 802.11a 6Mbps Ant.1	6.0 dB	0 dB	0 dB	0 dB	6.0 dB
WLAN 5.3GHz 802.11a 6Mbps Ant.1	6.0 dB	0 dB	0 dB	0 dB	6.0 dB
WLAN 5.3GHz 802.11a 6Mbps Ant.2	7.5 dB	0 dB	0 dB	0 dB	7.5 dB
WLAN 5.3GHz 802.11ac-VHT20 MCS0 Ant.1+2	3.5 dB	0 dB	0 dB	0 dB	3.5 dB
WLAN 5.3GHz 802.11n-HT20 MCS0 Ant.1+2	1.5 dB	0 dB	0 dB	0 dB	1.5 dB
WLAN 5.5GHz 802.11a 6Mbps Ant.1	3.5 dB	0 dB	0 dB	0 dB	3.5 dB
WLAN 5.5GHz 802.11a 6Mbps Ant.2	8.5 dB	0 dB	0 dB	0 dB	8.5 dB
WLAN 5.5GHz 802.11n-HT40 MCS0 Ant.1+2	3.5 dB	0 dB	0 dB	0 dB	3.5 dB
WLAN 5.5GHz 802.11n-HT20 MCS0 Ant.1+2	1.5 dB	0 dB	0 dB	0 dB	1.5 dB
WLAN 5.8GHz 802.11a 6Mbps Ant.1	2.5 dB	0 dB	0 dB	0 dB	2.5 dB
WLAN 5.8GHz 802.11a 6Mbps Ant.2	7.5 dB	0 dB	0 dB	0 dB	7.5 dB
WLAN 5.8GHz 802.11n-HT20 MCS0 Ant.1+2	3.5 dB	0 dB	0 dB	0 dB	3.5 dB

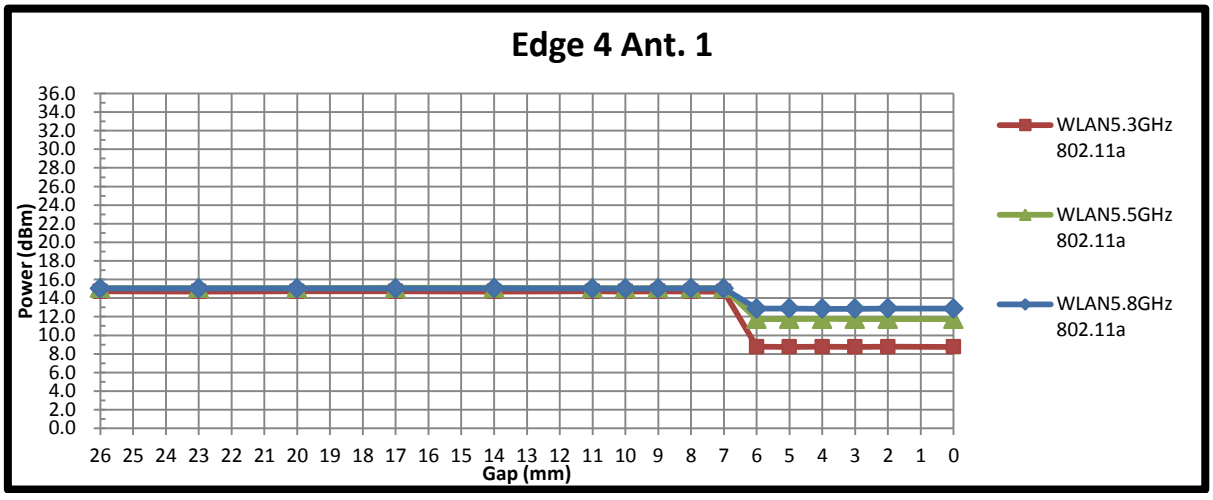
Remark:

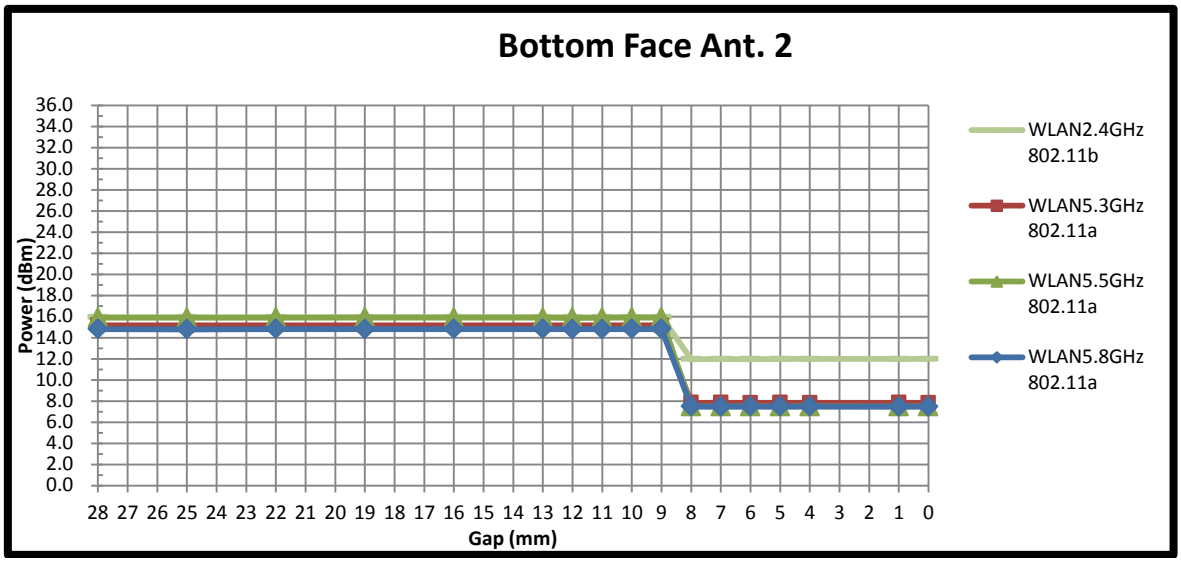
1. (1): Reduced maximum limit applied by activation of proximity sensor.
2. Power reduction is not applicable for Bluetooth.
3. Tests were performed in accordance with KDB 616217 D04 section 6.1, 6.2, 6.3, 6.4 and 6.5.
4. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance was performed:
   - Bottom Face: 7 mm
   - Edge4: 5 mm

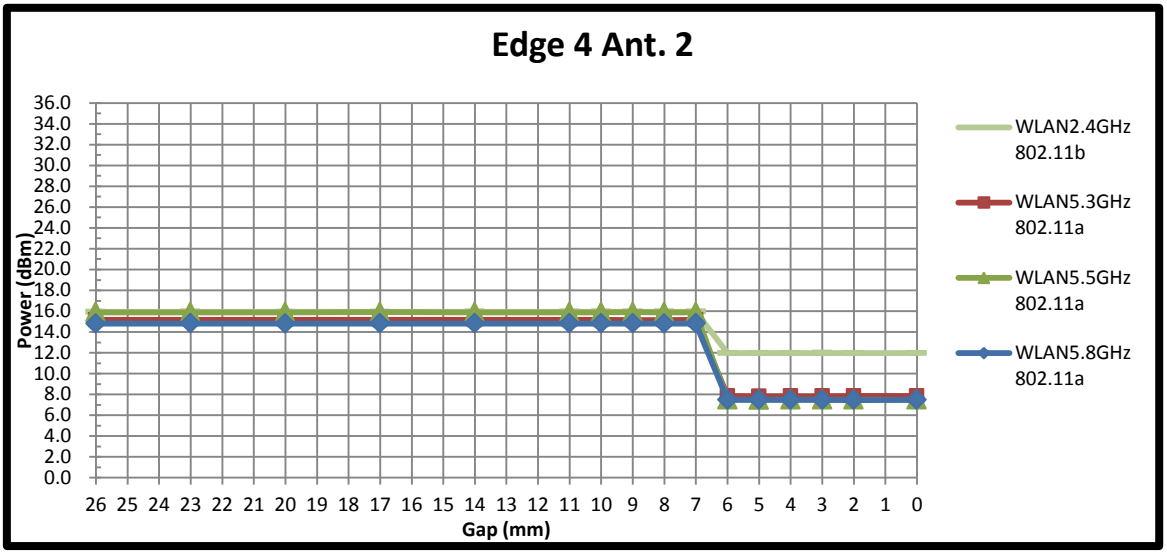
Power Measurement during Sensor Trigger distance testing

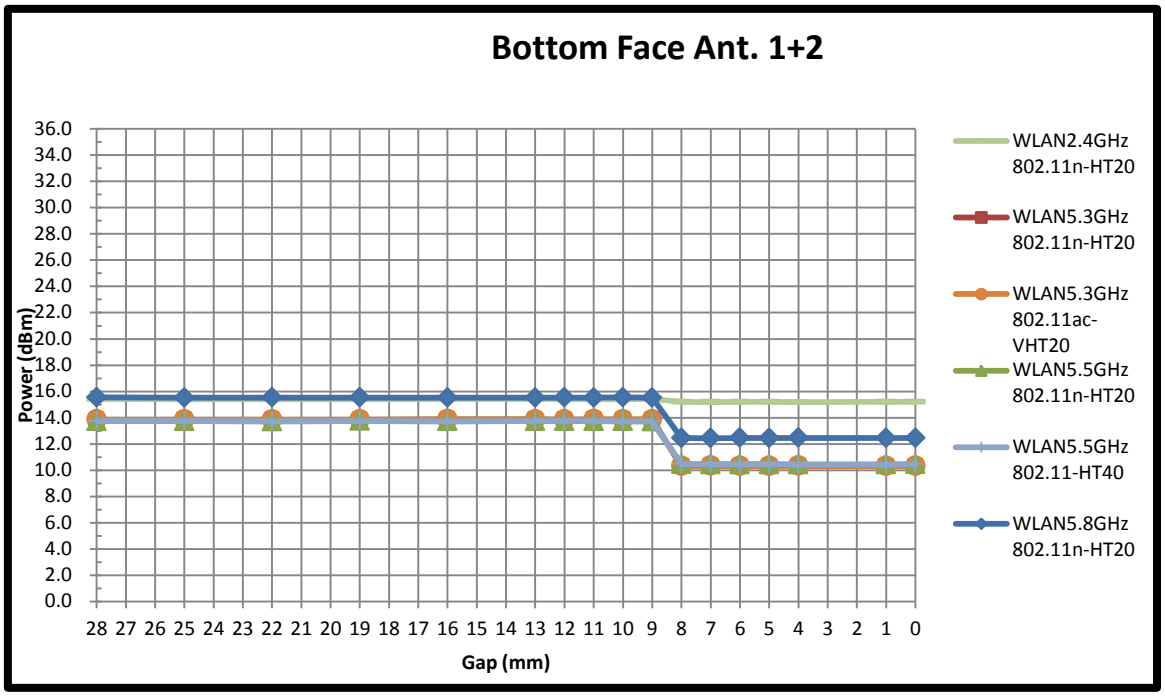
Band/Mode	Ch #	Measured power reduction (dBm)		Reduction Levels
		w/o power back-off	w/ power back-off	(dB)
WLAN 2.4GHz 802.11b 1Mbps Ant.1	11	16.64	12.24	4.40
WLAN 2.4GHz 802.11b 1Mbps Ant.2	11	15.93	11.96	3.97
WLAN 2.4GHz 802.11n-HT20 MCS0 Ant.1+2	11	15.40	15.18	0.22
WLAN 5.3GHz 802.11a 6Mbps Ant.1	52	14.70	8.75	5.95
WLAN 5.3GHz 802.11a 6Mbps Ant.1	64	14.53	8.85	5.68
WLAN 5.3GHz 802.11a 6Mbps Ant.2	64	15.15	7.82	7.33
WLAN 5.3GHz 802.11ac-VHT20 MCS0 Ant.1+2	64	13.85	10.44	3.41
WLAN 5.3GHz 802.11n-HT20 MCS0 Ant.1+2	64	12.04	10.55	1.49
WLAN 5.5GHz 802.11a 6Mbps Ant.1	140	15.07	11.74	3.33
WLAN 5.5GHz 802.11a 6Mbps Ant.2	100	15.88	7.47	8.41
WLAN 5.5GHz 802.11n-HT40 MCS0 Ant.1+2	110	13.72	10.44	3.28
WLAN 5.5GHz 802.11n-HT20 MCS0 Ant.1+2	100	12.53	11.41	1.12
WLAN 5.8GHz 802.11a 6Mbps Ant.1	165	15.02	12.85	2.17
WLAN 5.8GHz 802.11a 6Mbps Ant.2	165	14.79	7.46	7.33
WLAN 5.8GHz 802.11n-HT20 MCS0 Ant.1+2	165	15.52	12.44	3.08

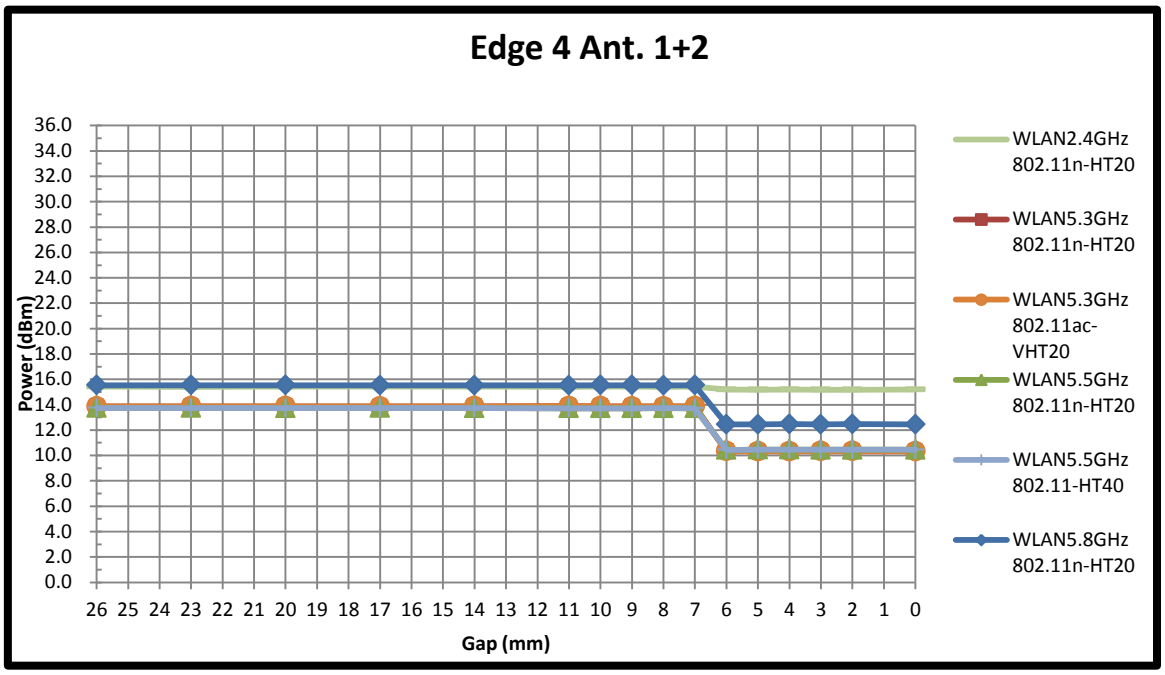





Bottom Face Ant. 2
Power (dBm)
36.0 34.0 32.0 30.0 28.0 26.0 24.0 22.0 20.0 18.0 16.0 14.0 12.0 10.0 8.0 6.0 4.0 2.0 0.0
28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Gap (mm)
WLAN2.4GHz 802.11b
WLAN5.3GHz 802.11a
WLAN5.5GHz 802.11a
WLAN5.8GHz 802.11a


Edge 4 Ant. 2
Power (dBm)
36.0 34.0 32.0 30.0 28.0 26.0 24.0 22.0 20.0 18.0 16.0 14.0 12.0 10.0 8.0 6.0 4.0 2.0 0.0
26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Gap (mm)
WLAN2.4GHz 802.11b
WLAN5.3GHz 802.11a
WLAN5.5GHz 802.11a
WLAN5.8GHz 802.11a


Bottom Face Ant. 1+2
Power (dBm)
36.0 34.0 32.0 30.0 28.0 26.0 24.0 22.0 20.0 18.0 16.0 14.0 12.0 10.0 8.0 6.0 4.0 2.0 0.0
28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Gap (mm)
WLAN2.4GHz 802.11n-HT20
WLAN5.3GHz 802.11n-HT20
WLAN5.3GHz 802.11ac-VHT20
WLAN5.5GHz 802.11n-HT20
WLAN5.5GHz 802.11-HT40
WLAN5.8GHz 802.11n-HT20


Edge 4 Ant. 1+2
Power (dBm)
36.0 34.0 32.0 30.0 28.0 26.0 24.0 22.0 20.0 18.0 16.0 14.0 12.0 10.0 8.0 6.0 4.0 2.0 0.0
26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0
Gap (mm)
WLAN2.4GHz 802.11n-HT20
WLAN5.3GHz 802.11n-HT20
WLAN5.3GHz 802.11ac-VHT20
WLAN5.5GHz 802.11n-HT20
WLAN5.5GHz 802.11-HT40
WLAN5.8GHz 802.11n-HT20

6. RF Exposure Limits

6.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

1. Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

7. Specific Absorption Rate (SAR)

7.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

7.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$\mathbf{SAR} = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\mathbf{dm}}\right) = \frac{\mathbf{d}}{\mathbf{dt}}\left(\frac{\mathbf{dW}}{\boldsymbol{\rho}\mathbf{dv}}\right)$$

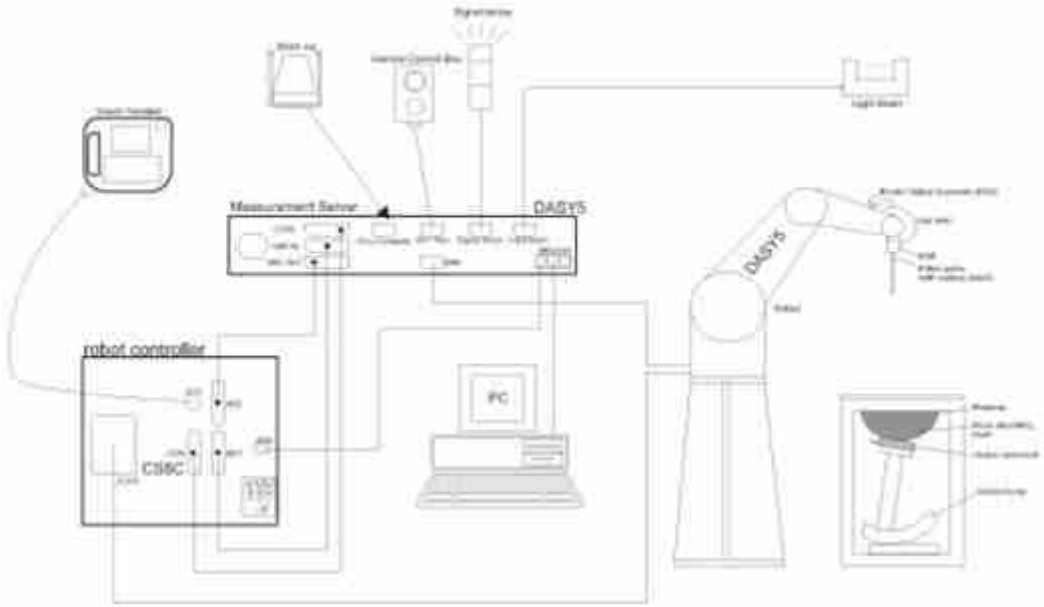
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

8. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

8.1 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. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

8.2 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 DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom

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.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)
Filling Volume	Approx. 30 liters
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

8.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

Mounting Device for Laptops

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(b) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Engineering software to configure EUT WLAN/BT continuously transmissions, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix D demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

(a) Power reference measurement
(b) Area scan
(c) Zoom scan
(d) Power drift measurement

9.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

(a) Extraction of the measured data (grid and values) from the Zoom Scan
(b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
(c) Generation of a high-resolution mesh within the measured volume
(d) Interpolation of all measured values form the measurement grid to the high-resolution grid
(e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
(f) Calculation of the averaged SAR within masses of 1g and 10g

9.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

9.3 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 found in the scanned area, within a range of the global maximum. The range (in dB0 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 FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 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.	

9.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes 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 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 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.

9.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

9.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	840	Nov. 25, 2015	Nov. 24, 2016
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Nov. 26, 2015	Nov. 25, 2016
SPEAG	5000MHz System Validation Kit	D5GHzV2	1167	Jul. 27, 2015	Jul. 26, 2016
SPEAG	Data Acquisition Electronics	DAE4	1338	Nov. 23, 2015	Nov. 22, 2016
SPEAG	Data Acquisition Electronics	DAE4	1210	May 21, 2015	May 20, 2016
SPEAG	Data Acquisition Electronics	DAE4	905	Jul. 16, 2015	Jul. 15, 2016
SPEAG	Data Acquisition Electronics	DAE4	1303	Nov. 24, 2015	Nov. 23, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	May 28, 2015	May 27, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	Nov. 27, 2015	Nov. 26, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 27, 2015	Nov. 26, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3935	Nov. 27, 2015	Nov. 26, 2016
SPEAG	ELI4 Phantom	QD OVA 001 BB	TP-1079	NCR	NCR
SPEAG	ELI4 Phantom	QD OVA 001 BB	TP-1127	NCR	NCR
SPEAG	ELI4 Phantom	QD OVA 002 AA	TP-1149	NCR	NCR
SPEAG	ELI4 Phantom	QDOVA001BB	TP-1225	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	May 04, 2015	May 03, 2016
Agilent	Network Analyzer	E5071C	MY46523671	Dec. 31, 2015	Dec. 30, 2016
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Nov. 24, 2015	Nov. 23, 2016
SPEAG	DAK Kit	DAK3.5	1144	Nov. 24, 2015	Nov. 23, 2016
R&S	Signal Generator	SMBV100A	258305	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Senor	MA2411B	0917070	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Meter	ML2495A	1005002	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Senor	MA2411B	1339163	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Meter	ML2495A	1435004	Jan. 20, 2016	Jan. 19, 2017
Anritsu	Power Senor	MA2411B	1306099	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Meter	ML2495A	1349001	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Sensor	MA2411B	1207253	Jan. 12, 2016	Jan. 11, 2017
Anritsu	Power Meter	ML2495A	1218010	Jan. 12, 2016	Jan. 11, 2017
ARRA	Power Divider	A3200-2	N/A	NA	NA
R&S	CBT BLUETOOTH TESTER	CBT	100783	Aug. 10, 2015	Aug. 09, 2016
R&S	Spectrum Analyzer	FSV7	101631	Aug. 10, 2015	Aug. 09, 2016
R&S	Spectrum Analyzer	FSP7	101634	Aug. 07, 2015	Aug. 06, 2016

Agilent	Dual Directional Coupler	778D	50422	Note
PASTERNACK	Dual Directional Coupler	PE2214-10	N/A	Note
AR	Amplifier	5S1G4	333096	Note
mini-circuits	Amplifier	ZVE-3W-83+	162601250	Note
MCL	Attenuation1	BW-S10W5+	N/A	Note
MCL	Attenuation2	BW-S10W5+	N/A	Note
MCL	Attenuation3	BW-S10W5+	N/A	Note

General Note:
Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.

11. System Verification

11.1 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Body								
2450	68.6	0	0	0	0	31.4	1.95	52.7

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	Body	22.6	1.983	51.430	1.95	52.70	1.69	-2.41	±5	2016/4/21
5250	Body	22.9	5.340	48.224	5.36	48.95	-0.37	-1.38	±5	2016/4/22
5600	Body	22.8	5.875	50.255	5.77	48.50	1.82	3.62	±5	2016/4/23
5750	Body	22.6	6.058	47.348	5.94	48.3	1.99	-1.97	±5	2016/4/22

11.2 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2016/4/21	2450	Body	250	840	3857	1210	12.30	51.10	49.2	-3.72
2016/4/22	5250	Body	100	1113	3954	905	7.65	76.50	76.5	0.00
2016/4/23	5600	Body	100	1167	3819	1303	8.62	80.60	86.2	6.95
2016/4/22	5750	Body	100	1167	3935	1338	7.84	75.60	78.4	3.70

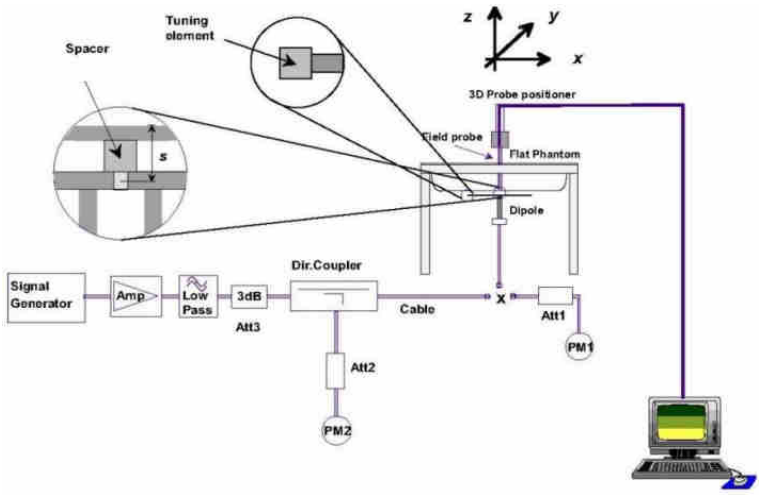


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

12. RF Exposure Positions

12.1 SAR Testing for Tablet

This device can be used also in full sized tablet exposure conditions, due to its size. Per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR exclusion threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

13. Conducted RF Output Power (Unit: dBm)

<WLAN Conducted Power>

General Note:

a. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.

b. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).

c. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.

d. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.

Full Power

<2.4GHz WLAN Ant. 1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant. 1	802.11b	CH 1	2412	1Mbps	16.28	17.00	99.08
		CH 6	2437		16.52	17.00	
		CH 11	2462		**16.64**	17.00	
	802.11g	CH 1	2412	6Mbps	13.40	14.50	93.74
		CH 6	2437		13.99	14.50	
		CH 11	2462		13.71	14.50	
	802.11n-HT20	CH 1	2412	MCS0	14.51	15.00	92.93
		CH 6	2437		14.63	15.00	
		CH 11	2462		14.80	15.00	

<2.4GHz WLAN Ant. 2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant. 2	802.11b	CH 1	2412	1Mbps	15.37	16.50	98.83
		CH 6	2437		15.44	16.50	
		CH 11	2462		**15.93**	16.50	
	802.11g	CH 1	2412	6Mbps	12.95	13.50	93.34
		CH 6	2437		12.86	13.50	
		CH 11	2462		12.73	13.50	
	802.11n-HT20	CH 1	2412	MCS0	14.46	15.50	92.92
		CH 6	2437		14.67	15.50	
		CH 11	2462		14.95	15.50	

<2.4GHz WLAN Ant. 1+2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant. 1+2	802.11n-HT20	CH 1	2412	MCS0	14.97	16.00	93.06
		CH 6	2437		15.29	16.00	
		CH 11	2462		**15.40**	16.00	

<5GHz WLAN Ant. 1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.1	802.11a	CH 36	5180	6Mbps	14.57	15.50	93.46
		CH 40	5200		14.31	15.50	
		CH 44	5220		14.58	15.50	
		CH 48	5240		**14.70**	15.50	
	802.11n-HT20	CH 36	5180	MCS0	11.24	12.50	92.90
		CH 40	5200		11.37	12.50	
		CH 44	5220		11.79	12.50	
		CH 48	5240		11.88	12.50	
	802.11n-HT40	CH 38	5190	MCS0	11.87	12.50	90.19
		CH 46	5230		11.83	12.50	
	802.11ac-VHT20	CH 36	5180	MCS0	10.41	11.50	92.59
		CH 40	5200		10.56	11.50	
		CH 44	5220		10.88	11.50	
		CH 48	5240		10.91	11.50	
	802.11ac-VHT40	CH 38	5190	MCS0	10.65	11.50	87.27
		CH 46	5230		10.95	11.50	
	802.11ac-VHT80	CH 42	5210	MCS0	10.47	11.50	76.85

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN Ant.1	802.11a	CH 52	5260	6Mbps	**14.70**	15.50	93.46
		CH 56	5280		14.46	15.50	
		CH 60	5300		14.51	15.50	
		CH 64	5320		14.53	15.50	
	802.11n-HT20	CH 52	5260	MCS0	11.38	12.00	92.90
		CH 56	5280		11.35	12.00	
		CH 60	5300		11.12	12.00	
		CH 64	5320		11.42	12.00	
	802.11n-HT40	CH 54	5270	MCS0	11.13	11.50	90.19
		CH 62	5310		11.22	11.50	
	802.11ac-VHT20	CH 52	5260	MCS0	11.16	12.00	92.59
		CH 56	5280		11.18	12.00	
		CH 60	5300		11.09	12.00	
		CH 64	5320		11.19	12.00	
	802.11ac-VHT40	CH 54	5270	MCS0	11.33	12.00	87.27
		CH 62	5310		11.42	12.00	
	802.11ac-VHT80	CH 58	5290	MCS0	11.08	12.00	76.85

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN Ant.1	802.11a	CH 100	5500	6Mbps	14.98	15.50	93.46
		CH 116	5580		14.07	15.50	
		CH 124	5620		14.95	15.50	
		CH 132	5660		14.86	15.50	
		CH 140	5700		**15.07**	15.50	
	802.11n-HT20	CH 100	5500	MCS0	12.68	13.50	92.90
		CH 116	5580		11.72	13.50	
		CH 124	5620		11.76	13.50	
		CH 132	5660		12.49	13.50	
		CH 140	5700		12.53	13.50	
	802.11n-HT40	CH 102	5510	MCS0	10.93	11.50	90.19
		CH 110	5550		10.88	11.50	
		CH 126	5630		10.70	11.50	
		CH 134	5670		10.57	11.50	
	802.11ac-VHT20	CH 100	5500	MCS0	10.72	11.00	92.59
		CH 116	5580		9.49	11.00	
		CH 124	5620		10.62	11.00	
		CH 132	5660		9.22	11.00	
		CH 140	5700		10.66	11.00	
	802.11ac-VHT40	CH 102	5510	MCS0	11.04	11.50	87.27
		CH 110	5550		10.88	11.50	
		CH 126	5630		10.83	11.50	
		CH 134	5670		10.75	11.50	
	802.11ac-VHT80	CH 106	5530	MCS0	10.32	11.00	76.85
		CH 122	5610		10.37	11.00	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.1	802.11a	CH 149	5745	MCS0	14.95	15.50	93.46
		CH 157	5785		14.75	15.50	
		CH 165	5825		**15.02**	15.50	
	802.11n-HT20	CH 149	5745	MCS0	12.47	13.50	92.90
		CH 157	5785		12.35	13.50	
		CH 165	5825		12.74	13.50	
	802.11n-HT40	CH 151	5755	MCS0	10.90	11.50	90.19
		CH 159	5795		11.06	11.50	
	802.11ac-VHT20	CH 149	5745	MCS0	9.36	11.00	92.59
		CH 157	5785		10.51	11.00	
		CH 165	5825		10.60	11.00	
	802.11ac-VHT40	CH 151	5755	MCS0	10.82	11.50	87.27
		CH 159	5795		11.14	11.50	
	802.11ac-VHT80	CH 155	5775	MCS0	10.51	11.00	76.85

<5GHz WLAN Ant. 2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant. 2	802.11a	CH 36	5180	6Mbps	14.65	15.50	93.44
		CH 40	5200		14.97	15.50	
		CH 44	5220		15.14	15.50	
		CH 48	5240		**15.39**	15.50	
	802.11n-HT20	CH 36	5180	MCS0	10.53	12.00	93.05
		CH 40	5200		10.73	12.00	
		CH 44	5220		11.09	12.00	
		CH 48	5240		11.33	12.00	
	802.11n-HT40	CH 38	5190	MCS0	10.16	11.00	90.46
		CH 46	5230		10.49	11.00	
	802.11ac-VHT20	CH 36	5180	MCS0	10.49	12.00	93.10
		CH 40	5200		10.92	12.00	
		CH 44	5220		11.18	12.00	
		CH 48	5240		11.29	12.00	
	802.11ac-VHT40	CH 38	5190	MCS0	10.22	11.00	87.34
		CH 46	5230		10.55	11.00	
	802.11ac-VHT80	CH 42	5210	MCS0	10.96	11.50	76.85

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN Ant. 2	802.11a	CH 52	5260	6Mbps	15.12	15.50	93.44
		CH 56	5280		14.98	15.50	
		CH 60	5300		15.06	15.50	
		CH 64	5320		**15.15**	15.50	
	802.11n-HT20	CH 52	5260	MCS0	10.77	11.50	93.05
		CH 56	5280		10.63	11.50	
		CH 60	5300		10.89	11.50	
		CH 64	5320		11.00	11.50	
	802.11n-HT40	CH 54	5270	MCS0	11.10	11.50	90.46
		CH 62	5310		11.19	11.50	
	802.11ac-VHT20	CH 52	5260	MCS0	10.73	11.50	93.10
		CH 56	5280		10.80	11.50	
		CH 60	5300		10.83	11.50	
		CH 64	5320		10.90	11.50	
	802.11ac-VHT40	CH 54	5270	MCS0	11.11	11.50	87.34
		CH 62	5310		11.20	11.50	
	802.11ac-VHT80	CH 58	5290	MCS0	10.78	11.50	76.85

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN Ant. 2	802.11a	CH 100	5500	6Mbps	**15.88**	16.00	93.44
		CH 116	5580		14.99	16.00	
		CH 124	5620		15.79	16.00	
		CH 132	5660		15.25	16.00	
		CH 140	5700		15.39	16.00	
	802.11n-HT20	CH 100	5500	MCS0	12.40	13.00	93.05
		CH 116	5580		12.35	13.00	
		CH 124	5620		12.38	13.00	
		CH 132	5660		12.25	13.00	
		CH 140	5700		12.28	13.00	
	802.11n-HT40	CH 102	5510	MCS0	10.99	11.50	90.46
		CH 110	5550		10.89	11.50	
		CH 126	5630		10.95	11.50	
		CH 134	5670		10.43	11.50	
	802.11ac-VHT20	CH 100	5500	MCS0	10.73	11.00	93.10
		CH 116	5580		10.63	11.00	
		CH 124	5620		10.49	11.00	
		CH 132	5660		10.22	11.00	
		CH 140	5700		10.29	11.00	
	802.11ac-VHT40	CH 102	5510	MCS0	11.07	11.50	87.34
		CH 110	5550		10.85	11.50	
		CH 126	5630		10.91	11.50	
		CH 134	5670		10.43	11.50	
	802.11ac-VHT80	CH 106	5530	MCS0	10.37	11.50	76.85
		CH 122	5610		10.62	11.50	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant. 2	802.11a	CH 149	5745	MCS0	14.51	15.50	93.44
		CH 157	5785		14.21	15.50	
		CH 165	5825		**14.79**	15.50	
	802.11n-HT20	CH 149	5745	MCS0	12.84	14.00	93.05
		CH 157	5785		13.03	14.00	
		CH 165	5825		13.39	14.00	
	802.11n-HT40	CH 151	5755	MCS0	11.49	12.50	90.46
		CH 159	5795		11.86	12.50	
	802.11ac-VHT20	CH 149	5745	MCS0	11.03	12.00	93.10
		CH 157	5785		11.22	12.00	
		CH 165	5825		11.59	12.00	
	802.11ac-VHT40	CH 151	5755	MCS0	11.54	12.00	87.34
		CH 159	5795		11.91	12.00	
	802.11ac-VHT80	CH 155	5775	MCS0	11.03	12.00	76.85

<5GHz WLAN Ant. 1+2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant. 1+2	802.11n-HT20	CH 36	5180	MCS0	11.85	12.50	87.41
		CH 40	5200		11.88	12.50	
		CH 44	5220		11.84	12.50	
		CH 48	5240		12.03	12.50	
	802.11n-HT40	CH 38	5190	MCS0	12.16	13.00	82.67
		CH 46	5230		12.52	13.00	
	802.11ac-VHT20	CH 36	5180	MCS0	14.11	15.00	87.25
		CH 40	5200		14.11	15.00	
		CH 44	5220		14.18	15.00	
		CH 48	5240		**14.29**	15.00	
	802.11ac-VHT40	CH 38	5190	MCS0	10.82	11.50	78.26
		CH 46	5230		11.24	11.50	
	802.11ac-VHT80	CH 42	5210	MCS0	11.82	12.50	65.75

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN Ant. 1+2	802.11n-HT20	CH 52	5260	MCS0	11.49	12.50	87.41
		CH 56	5280		11.70	12.50	
		CH 60	5300		11.89	12.50	
		CH 64	5320		12.04	12.50	
	802.11n-HT40	CH 54	5270	MCS0	13.32	14.00	82.67
		CH 62	5310		13.52	14.00	
	802.11ac-VHT20	CH 52	5260	MCS0	13.64	15.00	87.25
		CH 56	5280		13.56	15.00	
		CH 60	5300		13.73	15.00	
		CH 64	5320		**13.85**	15.00	
	802.11ac-VHT40	CH 54	5270	MCS0	11.98	12.50	78.26
		CH 62	5310		12.28	12.50	
	802.11ac-VHT80	CH 58	5290	MCS0	12.77	13.50	65.75

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN Ant. 1+2	802.11n-HT20	CH 100	5500	MCS0	12.53	13.00	87.41
		CH 116	5580		12.49	13.00	
		CH 124	5620		12.33	13.00	
		CH 132	5660		12.10	13.00	
		CH 140	5700		12.17	13.00	
	802.11n-HT40	CH 102	5510	MCS0	13.58	14.00	82.67
		CH 110	5550		**13.72**	14.00	
		CH 126	5630		13.62	14.00	
		CH 134	5670		13.50	14.00	
	802.11ac-VHT20	CH 100	5500	MCS0	13.56	14.00	87.25
		CH 116	5580		13.48	14.00	
		CH 124	5620		13.49	14.00	
		CH 132	5660		13.21	14.00	
		CH 140	5700		13.30	14.00	
	802.11ac-VHT40	CH 102	5510	MCS0	12.78	13.00	78.26
		CH 110	5550		12.66	13.00	
		CH 126	5630		12.60	13.00	
		CH 134	5670		12.31	13.00	
	802.11ac-VHT80	CH 106	5530	MCS0	11.05	12.00	65.75
		CH 122	5610		10.93	12.00	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant. 1+2	802.11n-HT20	CH 149	5745	MCS0	15.33	16.00	87.41
		CH 157	5785		15.22	16.00	
		CH 165	5825		**15.52**	16.00	
	802.11n-HT40	CH 151	5755	MCS0	13.44	14.00	82.67
		CH 159	5795		13.64	14.00	
	802.11ac-VHT20	CH 149	5745	MCS0	13.26	14.00	87.25
		CH 157	5785		13.19	14.00	
		CH 165	5825		13.55	14.00	
	802.11ac-VHT40	CH 151	5755	MCS0	13.49	14.00	78.26
		CH 159	5795		13.67	14.00	
	802.11ac-VHT80	CH 155	5775	MCS0	13.27	14.00	65.75

Reduced Power

<2.4GHz WLAN Ant.1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant.1	802.11b	CH 1	2412	1Mbps	11.93	12.50	98.62
		CH 6	2437		11.83	12.50	
		CH 11	2462		**12.24**	12.50	
	802.11g	CH 1	2412	6Mbps	11.22	11.50	93.46
		CH 6	2437		10.67	11.50	
		CH 11	2462		10.80	11.50	
	802.11n-HT20	CH 1	2412	MCS0	10.88	11.50	95.07
		CH 6	2437		10.75	11.50	
		CH 11	2462		10.65	11.50	

<2.4GHz WLAN Ant.2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant.2	802.11b	CH 1	2412	1Mbps	11.60	12.00	99.31
		CH 6	2437		11.75	12.00	
		CH 11	2462		**11.96**	12.00	
	802.11g	CH 1	2412	6Mbps	11.25	11.50	93.48
		CH 6	2437		11.11	11.50	
		CH 11	2462		10.84	11.50	
	802.11n-HT20	CH 1	2412	MCS0	11.32	11.50	94.95
		CH 6	2437		10.89	11.50	
		CH 11	2462		10.76	11.50	

<2.4GHz WLAN Ant.1+2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN Ant.1+2	802.11n-HT20	CH 1	2412	MCS0	14.81	15.30	90.66
		CH 6	2437		14.87	15.30	
		CH 11	2462		**15.18**	15.30	

<5GHz WLAN Ant.1>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.1	802.11a	CH 36	5180	6Mbps	8.89	9.50	93.97
		CH 40	5200		8.83	9.50	
		CH 44	5220		8.92	9.50	
		CH 48	5240		**9.05**	9.50	
	802.11n-HT20	CH 36	5180	MCS0	8.86	9.00	95.07
		CH 40	5200		8.68	9.00	
		CH 44	5220		8.80	9.00	
		CH 48	5240		8.76	9.00	
	802.11n-HT40	CH 38	5190	MCS0	7.66	8.00	90.19
		CH 46	5230		7.50	8.00	
	802.11ac-VHT20	CH 36	5180	MCS0	7.50	8.00	94.63
		CH 40	5200		7.58	8.00	
		CH 44	5220		7.47	8.00	
		CH 48	5240		7.69	8.00	
	802.11ac-VHT40	CH 38	5190	MCS0	7.74	8.00	86.75
		CH 46	5230		7.56	8.00	
	802.11ac-VHT80	CH 42	5210	MCS0	8.68	9.00	77.31

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN Ant.1	802.11a	CH 52	5260	6Mbps	8.75	9.50	93.97
		CH 56	5280		8.54	9.50	
		CH 60	5300		8.63	9.50	
		CH 64	5320		**8.85**	9.50	
	802.11n-HT20	CH 52	5260	MCS0	7.30	7.50	95.07
		CH 56	5280		6.90	7.50	
		CH 60	5300		7.04	7.50	
		CH 64	5320		6.96	7.50	
	802.11n-HT40	CH 54	5270	MCS0	7.20	7.50	90.19
		CH 62	5310		7.47	7.50	
	802.11ac-VHT20	CH 52	5260	MCS0	7.18	7.50	94.63
		CH 56	5280		7.14	7.50	
		CH 60	5300		7.09	7.50	
		CH 64	5320		7.40	7.50	
	802.11ac-VHT40	CH 54	5270	MCS0	7.26	8.00	86.75
		CH 62	5310		7.51	8.00	
	802.11ac-VHT80	CH 58	5290	MCS0	8.53	9.00	77.31

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN Ant.1	802.11a	CH 100	5500	6Mbps	11.53	12.00	93.97
		CH 116	5580		11.51	12.00	
		CH 124	5620		11.40	12.00	
		CH 132	5660		11.27	12.00	
		CH 140	5700		**11.74**	12.00	
	802.11n-HT20	CH 100	5500	MCS0	10.54	11.00	95.07
		CH 116	5580		10.33	11.00	
		CH 124	5620		10.30	11.00	
		CH 132	5660		10.25	10.50	
		CH 140	5700		10.29	10.50	
	802.11n-HT40	CH 102	5510	MCS0	10.88	11.00	90.19
		CH 110	5550		10.74	11.00	
		CH 126	5630		10.54	11.00	
		CH 134	5670		10.47	11.00	
	802.11ac-VHT20	CH 100	5500	MCS0	10.61	11.00	94.63
		CH 116	5580		10.35	11.00	
		CH 124	5620		10.32	11.00	
		CH 132	5660		9.96	10.50	
		CH 140	5700		10.28	10.50	
	802.11ac-VHT40	CH 102	5510	MCS0	10.98	11.50	86.75
		CH 110	5550		10.75	11.50	
		CH 126	5630		10.73	11.50	
		CH 134	5670		10.64	11.50	
	802.11ac-VHT80	CH 106	5530	MCS0	11.68	11.80	77.31
		CH 122	5610		11.48	11.80	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.1	802.11a	CH 149	5745	MCS0	12.68	13.00	93.97
		CH 157	5785		12.61	13.00	
		CH 165	5825		**12.85**	13.00	
	802.11n-HT20	CH 149	5745	MCS0	11.60	12.00	95.07
		CH 157	5785		11.88	12.00	
		CH 165	5825		11.44	12.00	
	802.11n-HT40	CH 151	5755	MCS0	12.01	12.50	90.19
		CH 159	5795		12.14	12.50	
	802.11ac-VHT20	CH 149	5745	MCS0	11.98	12.50	94.63
		CH 157	5785		11.79	12.50	
		CH 165	5825		11.65	12.50	
	802.11ac-VHT40	CH 151	5755	MCS0	12.15	12.50	86.75
		CH 159	5795		12.04	12.50	
	802.11ac-VHT80	CH 155	5775	MCS0	12.65	12.80	77.31

<5GHz WLAN Ant.2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.2	802.11a	CH 36	5180	6Mbps	7.78	8.00	93.46
		CH 40	5200		7.72	8.00	
		CH 44	5220		7.82	8.00	
		CH 48	5240		**7.87**	8.00	
	802.11n-HT20	CH 36	5180	MCS0	6.73	7.00	94.96
		CH 40	5200		6.48	7.00	
		CH 44	5220		6.60	7.00	
		CH 48	5240		6.33	7.00	
	802.11n-HT40	CH 38	5190	MCS0	6.91	7.00	90.65
		CH 46	5230		6.78	7.00	
	802.11ac-VHT20	CH 36	5180	MCS0	6.82	7.00	95.10
		CH 40	5200		6.50	7.00	
		CH 44	5220		6.61	7.00	
		CH 48	5240		6.45	7.00	
	802.11ac-VHT40	CH 38	5190	MCS0	6.56	7.00	86.86
		CH 46	5230		6.92	7.00	
	802.11ac-VHT80	CH 42	5210	MCS0	6.41	7.00	76.50

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN Ant.2	802.11a	CH 52	5260	6Mbps	7.72	8.00	93.46
		CH 56	5280		7.42	8.00	
		CH 60	5300		7.54	8.00	
		CH 64	5320		**7.82**	8.00	
	802.11n-HT20	CH 52	5260	MCS0	7.68	8.00	94.96
		CH 56	5280		7.38	8.00	
		CH 60	5300		7.46	8.00	
		CH 64	5320		7.60	8.00	
	802.11n-HT40	CH 54	5270	MCS0	6.39	7.00	90.65
		CH 62	5310		6.72	7.00	
	802.11ac-VHT20	CH 52	5260	MCS0	6.44	7.00	95.10
		CH 56	5280		6.17	7.00	
		CH 60	5300		6.37	7.00	
		CH 64	5320		6.28	7.00	
	802.11ac-VHT40	CH 54	5270	MCS0	6.60	7.00	86.86
		CH 62	5310		6.72	7.00	
	802.11ac-VHT80	CH 58	5290	MCS0	6.27	7.00	76.50

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN Ant.2	802.11a	CH 100	5500	6Mbps	**7.47**	7.50	93.46
		CH 116	5580		7.17	7.50	
		CH 124	5620		6.96	7.50	
		CH 132	5660		6.90	7.50	
		CH 140	5700		7.01	7.50	
	802.11n-HT20	CH 100	5500	MCS0	7.34	7.50	94.96
		CH 116	5580		6.92	7.50	
		CH 124	5620		7.03	7.50	
		CH 132	5660		6.85	7.50	
		CH 140	5700		7.08	7.50	
	802.11n-HT40	CH 102	5510	MCS0	6.11	6.50	90.65
		CH 110	5550		6.35	6.50	
		CH 126	5630		6.15	6.50	
		CH 134	5670		5.63	6.50	
	802.11ac-VHT20	CH 100	5500	MCS0	7.31	7.50	95.10
		CH 116	5580		7.04	7.50	
		CH 124	5620		7.17	7.50	
		CH 132	5660		6.90	7.50	
		CH 140	5700		7.15	7.50	
	802.11ac-VHT40	CH 102	5510	MCS0	6.32	6.50	86.86
		CH 110	5550		5.98	6.50	
		CH 126	5630		6.09	6.50	
		CH 134	5670		5.49	6.50	
	802.11ac-VHT80	CH 106	5530	MCS0	6.05	6.50	76.50
		CH 122	5610		5.80	6.50	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.2	802.11a	CH 149	5745	MCS0	7.02	8.00	93.46
		CH 157	5785		7.03	8.00	
		CH 165	5825		**7.46**	8.00	
	802.11n-HT20	CH 149	5745	MCS0	6.77	7.50	94.96
		CH 157	5785		7.38	7.50	
		CH 165	5825		6.90	7.50	
	802.11n-HT40	CH 151	5755	MCS0	5.84	6.50	90.65
		CH 159	5795		5.92	6.50	
	802.11ac-VHT20	CH 149	5745	MCS0	5.75	6.50	95.10
		CH 157	5785		6.14	6.50	
		CH 165	5825		5.36	6.50	
	802.11ac-VHT40	CH 151	5755	MCS0	6.13	6.50	86.86
		CH 159	5795		5.99	6.50	
	802.11ac-VHT80	CH 155	5775	MCS0	7.02	7.50	76.50

<5GHz WLAN Ant.1+2>

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN Ant.1+2	802.11n-HT20	CH 36	5180	MCS0	**10.83**	11.00	90.63
		CH 40	5200		10.40	11.00	
		CH 44	5220		10.60	11.00	
		CH 48	5240		10.58	11.00	
	802.11n-HT40	CH 38	5190	MCS0	9.65	10.00	83.44
		CH 46	5230		9.48	10.00	
	802.11ac-VHT20	CH 36	5180	MCS0	9.13	10.00	87.56
		CH 40	5200		9.17	10.00	
		CH 44	5220		9.40	10.00	
		CH 48	5240		9.18	10.00	
	802.11ac-VHT40	CH 38	5190	MCS0	9.49	10.00	78.63
		CH 46	5230		9.63	10.00	
	802.11ac-VHT80	CH 42	5210	MCS0	9.39	10.00	65.75

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN Ant.1+2	802.11n-HT20	CH 52	5260	MCS0	10.41	11.00	90.63
		CH 56	5280		10.35	11.00	
		CH 60	5300		10.29	11.00	
		CH 64	5320		**10.55**	11.00	
	802.11n-HT40	CH 54	5270	MCS0	8.98	9.50	83.44
		CH 62	5310		9.21	9.50	
	802.11ac-VHT20	CH 52	5260	MCS0	10.21	10.50	87.56
		CH 56	5280		10.16	10.50	
		CH 60	5300		10.44	10.50	
		CH 64	5320		10.32	10.50	
	802.11ac-VHT40	CH 54	5270	MCS0	9.03	9.50	78.63
		CH 62	5310		9.28	9.50	
	802.11ac-VHT80	CH 58	5290	MCS0	10.24	10.50	65.75

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN Ant.1+2	802.11n-HT20	CH 100	5500	MCS0	**11.41**	12.00	90.63
		CH 116	5580		11.14	12.00	
		CH 124	5620		11.07	12.00	
		CH 132	5660		10.89	12.00	
		CH 140	5700		11.18	12.00	
	802.11n-HT40	CH 102	5510	MCS0	10.50	11.00	83.44
		CH 110	5550		10.44	11.00	
		CH 126	5630		10.28	11.00	
		CH 134	5670		9.99	11.00	
	802.11ac-VHT20	CH 100	5500	MCS0	10.18	10.50	87.56
		CH 116	5580		9.79	10.50	
		CH 124	5620		9.88	10.50	
		CH 132	5660		9.84	10.50	
		CH 140	5700		9.85	10.50	
	802.11ac-VHT40	CH 102	5510	MCS0	10.43	11.00	78.63
		CH 110	5550		10.64	11.00	
		CH 126	5630		10.20	11.00	
		CH 134	5670		10.13	11.00	
	802.11ac-VHT80	CH 106	5530	MCS0	11.22	11.50	65.75
		CH 122	5610		11.04	11.50	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN Ant.1+2	802.11n-HT20	CH 149	5745	MCS0	12.25	12.50	90.63
		CH 157	5785		12.02	12.50	
		CH 165	5825		**12.44**	12.50	
	802.11n-HT40	CH 151	5755	MCS0	11.16	11.50	83.44
		CH 159	5795		11.28	11.50	
	802.11ac-VHT20	CH 149	5745	MCS0	11.07	11.50	87.56
		CH 157	5785		10.88	11.50	
		CH 165	5825		10.81	11.50	
	802.11ac-VHT40	CH 151	5755	MCS0	11.20	11.50	78.63
		CH 159	5795		11.34	11.50	
	802.11ac-VHT80	CH 155	5775	MCS0	11.13	11.50	65.75

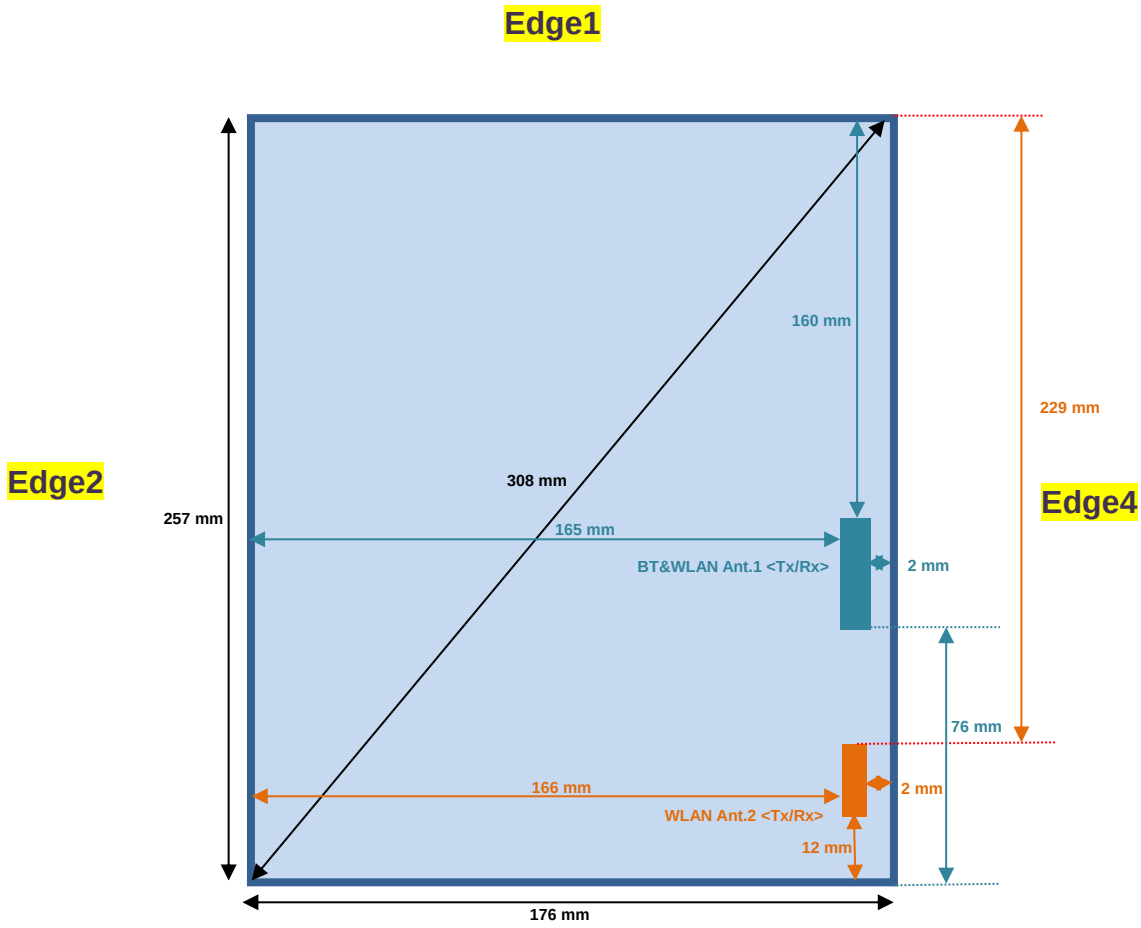
<2.4GHz Bluetooth>

General Note:
For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.

Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
v3.0 with EDR	CH 00	2402	9.88	7.49	7.35
	CH 39	2441	**10.03**	7.31	7.16
	CH 78	2480	9.47	6.10	6.25
Tune-up Limit			10.50	7.50	7.50

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.0 with LE	CH 00	2402	7.85
	CH 19	2440	**9.22**
	CH 39	2480	8.00
Tune-up Limit			9.50

14. Antenna Location



Back View

<SAR test exclusion table>

General Note:

1. The below table, when the distance is < 50 mm exclusion threshold is "Ratio", when the distance is > 50 mm exclusion threshold is "mW"
2. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
3. Per KDB 447498 D01v06, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
4. Per KDB 447498 D01v06, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
5. Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - 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
6. Per KDB 447498 D01v06, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

Exposure Position	Wireless Interface	BT	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	2.4GHz WLAN Ant.1+2	5.8GHz WLAN Ant.1	5.8GHz WLAN Ant.2	5.8GHz WLAN Ant.1+2
	Calculated Frequency	2480MHz	2462MHz	2462MHz	2462MHz	5825MHz	5720MHz	5825MHz
	Maximum power (dBm)	10.5	17	16.5	16	15.5	16	16
	Maximum rated power(mW)	11.0	50.0	45.0	40.0	35.0	40.0	40.0
Bottom Face	Separation distance(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	exclusion threshold	3.5	15.7	14.1	12.6	16.9	19.3	15.5
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Edge 1	Separation distance(mm)	160.0	160.0	229.0	160.0	160.0	229.0	160.0
	exclusion threshold	1195.0	1196.0	1886.0	1196.0	1162.0	1852.0	1162.0
	Testing required?	No	No	No	No	No	No	No
Edge 2	Separation distance(mm)	165.0	165.0	166.0	165.0	165.0	166.0	165.0
	exclusion threshold	1245.0	1246.0	1256.0	1246.0	1212.0	1222.0	1212.0
	Testing required?	No	No	No	No	No	No	No
Edge 3	Separation distance(mm)	76.0	76.0	12.0	12.0	76.0	12.0	12.0
	exclusion threshold	355.0	356.0	5.9	5.2	322.0	8.1	6.4
	Testing required?	No	No	Yes	Yes	No	Yes	Yes
Edge 4	Separation distance(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	exclusion threshold	3.5	15.7	14.1	12.6	16.9	19.3	15.5
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bottom of Laptop	Separation distance(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	exclusion threshold	3.5	15.7	14.1	12.6	16.9	19.3	15.5
	Testing required?	Yes	Yes	Yes	Yes	Yes	Yes	Yes

15. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
   d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. For the exposure positions that proximity sensor power reduction is applied for SAR compliance, additional SAR testing with EUT transmitting full power in normal mode was performed; 7mm for bottom face, 5mm for edge4.
3. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
4. Per KDB 248227 D01v02r02, for U-NII-1 Body SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
5. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
6. During SAR testing the WLAN transmission was verified using a spectrum analyzer.
7. For Laptop mode, the antenna at the bottom of keyboard, so evaluated bottom of laptop SAR.

15.1 Body SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 1	On	11	2462	1	12.24	12.50	1.062	98.62	1.014	0.03	0.918	0.988
#01	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 1	On	1	2412	1	11.93	12.50	1.140	98.62	1.014	0.05	0.953	**1.102**
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 1	On	6	2437	1	11.83	12.50	1.167	98.62	1.014	-0.06	0.886	1.048
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0	Ant 1	On	11	2462	1	12.24	12.50	1.062	98.62	1.014	0.15	0.556	0.599
	WLAN2.4GHz	802.11b 1Mbps	Edge4	0	Ant 1	On	11	2462	1	12.24	12.50	1.062	98.62	1.014	-0.12	0.206	0.222
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	7	Ant 1	Off	11	2462	1	16.64	17.00	1.086	99.08	1.009	0.05	0.322	0.353
	WLAN2.4GHz	802.11b 1Mbps	Edge4	5	Ant 1	Off	11	2462	1	16.64	17.00	1.086	99.08	1.009	-0.06	0.233	0.255
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 1	On	1	2412	2	11.93	12.50	1.140	98.62	1.014	-0.09	0.609	0.704
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	11	2462	1	11.96	12.00	1.009	99.31	1.007	-0.1	1.010	1.026
#02	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	1	2412	1	11.60	12.00	1.096	99.31	1.007	-0.12	1.060	**1.170**
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	6	2437	1	11.75	12.00	1.059	99.31	1.007	-0.06	1.030	1.099
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0	Ant 2	On	11	2462	1	11.96	12.00	1.009	99.31	1.007	0.15	0.620	0.630
	WLAN2.4GHz	802.11b 1Mbps	Edge 4	0	Ant 2	On	11	2462	1	11.96	12.00	1.009	99.31	1.007	0.05	0.098	0.100
	WLAN2.4GHz	802.11b 1Mbps	Edge 3	0	Ant 2	Off	11	2462	1	15.93	16.50	1.140	98.83	1.012	-0.12	0.277	0.320
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	7	Ant 2	Off	11	2462	1	15.93	16.50	1.140	98.83	1.012	-0.06	0.670	0.773
	WLAN2.4GHz	802.11b 1Mbps	Edge4	5	Ant 2	Off	11	2462	1	15.93	16.50	1.140	98.83	1.012	-0.06	0.137	0.158
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	1	2412	2	11.60	12.00	1.096	99.31	1.007	0.03	0.741	0.818
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	11	2462	2	11.96	12.00	1.009	99.31	1.007	0.05	0.891	0.906
	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	6	2437	2	11.75	12.00	1.059	99.31	1.007	-0.06	0.811	0.865
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	11	2462	1	15.18	15.30	1.028	90.66	1.103	0.02	0.739	0.838
#03	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	1	2412	1	14.81	15.30	1.119	90.66	1.103	0.05	0.781	**0.964**
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	6	2437	1	14.87	15.30	1.104	90.66	1.103	0.13	0.791	0.963
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	11	2462	1	15.18	15.30	1.028	90.66	1.103	0.05	0.593	0.672
	WLAN2.4GHz	802.11n-HT20 MCS0	Edge 4	0	Ant 1+2	On	11	2462	1	15.18	15.30	1.028	90.66	1.103	-0.14	0.224	0.254
	WLAN2.4GHz	802.11n-HT20 MCS0	Edge 3	0	Ant 1+2	Off	11	2462	1	15.40	16.00	1.148	98.83	1.012	0.1	0.230	0.267
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom Face	7	Ant 1+2	Off	11	2462	1	15.40	16.00	1.148	93.06	1.075	0.09	0.353	0.436
	WLAN2.4GHz	802.11n-HT20 MCS0	Edge 4	5	Ant 1+2	Off	11	2462	1	15.40	16.00	1.148	93.06	1.075	-0.05	0.126	0.156
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	1	2412	2	14.81	15.30	1.119	90.66	1.103	0.1	0.653	0.806
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	11	2462	2	15.18	15.30	1.028	90.66	1.103	0.08	0.763	0.865
	WLAN2.4GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	6	2437	2	14.87	15.30	1.104	90.66	1.103	0.05	0.610	0.743

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.3GHz	802.11a 6Mbps	Bottom of Laptop	0	Ant 1	On	64	5320	1	8.85	9.50	1.161	93.97	1.064	0.02	0.243	0.300
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	64	5320	1	8.85	9.50	1.161	93.97	1.064	0.03	0.453	0.560
	WLAN5.3GHz	802.11a 6Mbps	Edge4	0	Ant 1	On	64	5320	1	8.85	9.50	1.161	93.97	1.064	0.15	0.233	0.288
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	7	Ant 1	Off	52	5260	1	14.70	15.50	1.202	93.46	1.070	-0.17	0.447	0.575
#04	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 1	Off	52	5260	1	14.70	15.50	1.202	93.46	1.070	-0.05	0.682	**0.877**
	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 1	Off	60	5300	1	14.51	15.50	1.255	93.46	1.070	-0.05	0.456	0.612
	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 1	Off	64	5320	1	14.53	15.50	1.249	93.46	1.070	-0.05	0.509	0.680
	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 1	Off	52	5260	2	14.70	15.50	1.202	93.46	1.070	-0.01	0.520	0.669
	WLAN5.3GHz	802.11a 6Mbps	Bottom of Laptop	0	Ant 2	On	64	5320	1	7.82	8.00	1.042	93.46	1.070	0	0.231	0.258
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	64	5320	1	7.82	8.00	1.042	93.46	1.070	0.01	0.669	0.746
	WLAN5.3GHz	802.11a 6Mbps	Edge4	0	Ant 2	On	64	5320	1	7.82	8.00	1.042	93.46	1.070	0.12	0.551	0.615
	WLAN5.3GHz	802.11a 6Mbps	Edge3	0	Ant 2	Off	64	5320	1	15.15	15.5	1.084	93.44	1.070	-0.09	0.148	0.172
	WLAN5.3GHz	802.11a 6Mbps	Bottom Face	7	Ant 2	Off	64	5320	1	15.15	15.5	1.084	93.44	1.070	0.05	0.628	0.728
	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 2	Off	64	5320	1	15.15	15.5	1.084	93.44	1.070	-0.13	0.858	0.995
#05	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 2	Off	52	5260	1	15.12	15.5	1.091	93.44	1.070	0.09	0.946	**1.105**
	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 2	Off	60	5300	1	15.06	15.5	1.107	93.44	1.070	-0.09	0.805	0.953
	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 2	Off	52	5260	2	15.12	15.5	1.091	93.44	1.070	-0.03	0.411	0.480
	WLAN5.3GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	64	5320	1	10.55	11.00	1.109	90.63	1.103	0.15	0.316	0.387
#06	WLAN5.3GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	64	5320	1	10.55	11.00	1.109	90.63	1.103	0.16	0.655	**0.801**
	WLAN5.3GHz	802.11n-HT20 MCS0	Edge4	0	Ant 1+2	On	64	5320	1	10.55	11.00	1.109	90.63	1.103	-0.13	0.609	0.745
	WLAN5.3GHz	802.11ac-VHT20 MCS0	Edge3	0	Ant 1+2	Off	64	5320	1	13.85	15.00	1.303	87.25	1.146	0.03	0.058	0.087
	WLAN5.3GHz	802.11ac-VHT20 MCS0	Bottom Face	7	Ant 1+2	Off	64	5320	1	13.85	15.00	1.303	87.25	1.146	-0.05	0.272	0.406
	WLAN5.3GHz	802.11ac-VHT20 MCS0	Edge4	5	Ant 1+2	Off	64	5320	1	13.85	15.00	1.303	87.25	1.146	-0.02	0.386	0.576
	WLAN5.3GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	52	5260	1	10.41	11.00	1.146	90.63	1.103	0.14	0.519	0.656
	WLAN5.3GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	56	5280	1	10.35	11.00	1.161	90.63	1.103	0.17	0.555	0.711
	WLAN5.3GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	64	5320	2	10.55	11.00	1.109	90.63	1.103	0	0.543	0.664

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	140	5700	1	11.74	12	1.062	93.97	1.064	-0.07	0.847	0.957
	WLAN5.5GHz	802.11a 6Mbps	Bottom of Laptop	0	Ant 1	On	140	5700	1	11.74	12	1.062	93.97	1.064	-0.08	0.537	0.607
	WLAN5.5GHz	802.11a 6Mbps	Edge 4	0	Ant 1	On	140	5700	1	11.74	12	1.062	93.97	1.064	0.02	0.241	0.272
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	100	5500	1	11.53	12	1.114	93.97	1.064	-0.14	0.567	0.672
#07	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	116	5580	1	11.51	12	1.119	93.97	1.064	-0.06	0.806	**0.960**
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	7	Ant 1	Off	140	5700	1	15.07	15.5	1.103	93.46	1.070	0.03	0.311	0.367
	WLAN5.5GHz	802.11a 6Mbps	Edge 4	5	Ant 1	Off	140	5700	1	15.07	15.5	1.103	93.46	1.070	0.13	0.296	0.349
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	116	5580	2	11.51	12	1.119	93.97	1.064	0.05	0.658	0.784
#08	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	100	5500	1	7.47	7.5	1.006	93.46	1.070	-0.03	0.678	**0.730**
	WLAN5.5GHz	802.11a 6Mbps	Bottom of Laptop	0	Ant 2	On	100	5500	1	7.47	7.5	1.006	93.46	1.070	-0.02	0.390	0.420
	WLAN5.5GHz	802.11a 6Mbps	Edge 4	0	Ant 2	On	100	5500	1	7.47	7.5	1.006	93.46	1.070	0.06	0.485	0.522
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	116	5580	1	7.17	7.5	1.079	93.46	1.070	0.08	0.527	0.608
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	140	5700	1	7.01	7.5	1.119	93.46	1.070	-0.03	0.488	0.585
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	7	Ant 2	Off	100	5500	1	15.88	16	1.027	93.44	1.070	0.09	0.662	0.727
	WLAN5.5GHz	802.11a 6Mbps	Edge 3	0	Ant 2	Off	100	5500	1	15.88	16	1.027	93.44	1.070	0.03	0.106	0.116
	WLAN5.5GHz	802.11a 6Mbps	Edge 4	5	Ant 2	Off	100	5500	1	15.88	16	1.027	93.44	1.070	-0.13	0.321	0.353
	WLAN5.5GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	100	5500	2	7.47	7.5	1.006	93.46	1.070	0.15	0.498	0.536
#09	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	100	5500	1	11.41	12	1.145	90.63	1.103	0.14	0.932	**1.177**
	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	100	5500	1	11.41	12	1.145	90.63	1.103	-0.09	0.469	0.592
	WLAN5.5GHz	802.11n-HT20 MCS0	Edge 4	0	Ant 1+2	On	100	5500	1	11.41	12	1.145	90.63	1.103	0.04	0.702	0.886
	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	116	5580	1	11.14	12	1.220	90.63	1.103	-0.05	0.638	0.858
	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	140	5700	1	11.18	12	1.208	90.63	1.103	-0.06	0.568	0.757
	WLAN5.5GHz	802.11n-HT20 MCS0	Edge 4	0	Ant 1+2	On	140	5700	1	11.18	12	1.208	90.63	1.103	0.15	0.269	0.359
	WLAN5.5GHz	802.11n-HT40 MCS0	Bottom Face	7	Ant 1+2	Off	110	5550	1	13.72	14	1.066	82.67	1.21	0.02	0.275	0.355
	WLAN5.5GHz	802.11n-HT40 MCS0	Edge 3	0	Ant 1+2	Off	110	5550	1	13.72	14	1.066	82.67	1.21	-0.06	0.079	0.102
	WLAN5.5GHz	802.11n-HT40 MCS0	Edge 4	5	Ant 1+2	Off	110	5550	1	13.72	14	1.066	82.67	1.21	0.01	0.36	0.464
	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	100	5500	2	11.41	12	1.145	90.63	1.103	0.13	0.794	1.002
	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	140	5700	2	11.18	12	1.208	90.63	1.103	-0.02	0.762	1.016

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	165	5825	1	12.85	13	1.035	93.97	1.064	0.01	0.514	0.566
	WLAN5.8GHz	802.11a 6Mbps	Bottom of Laptop	0	Ant 1	On	165	5825	1	12.85	13	1.035	93.97	1.064	0.05	0.296	0.326
	WLAN5.8GHz	802.11a 6Mbps	Edge 4	0	Ant 1	On	165	5825	1	12.85	13	1.035	93.97	1.064	0.02	0.183	0.202
#10	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	149	5745	1	12.68	13	1.076	93.97	1.064	-0.02	0.696	**0.797**
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	157	5785	1	12.61	13	1.094	93.97	1.064	-0.03	0.569	0.662
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	7	Ant 1	Off	165	5825	1	15.02	15.5	1.117	93.46	1.070	-0.01	0.234	0.280
	WLAN5.8GHz	802.11a 6Mbps	Edge 4	5	Ant 1	Off	165	5825	1	15.02	15.5	1.117	93.46	1.070	-0.02	0.166	0.198
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 1	On	149	5745	2	12.68	13	1.076	93.97	1.064	0.16	0.674	0.772
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	165	5825	1	7.46	8	1.131	93.46	1.070	-0.01	0.564	0.683
	WLAN5.8GHz	802.11a 6Mbps	Bottom of Laptop	0	Ant 2	On	165	5825	1	7.46	8	1.131	93.46	1.070	0.02	0.290	0.351
	WLAN5.8GHz	802.11a 6Mbps	Edge 4	0	Ant 2	On	165	5825	1	7.46	8	1.131	93.46	1.070	0.02	0.300	0.363
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	149	5745	1	7.02	8	1.252	93.46	1.070	-0.09	0.574	0.769
#11	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	157	5785	1	7.03	8	1.249	93.46	1.070	0.07	0.635	**0.849**
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	7	Ant 2	Off	165	5825	1	14.79	15.5	1.18	93.44	1.07	-0.03	0.411	0.517
	WLAN5.8GHz	802.11a 6Mbps	Edge 3	0	Ant 2	Off	165	5825	1	14.79	15.5	1.18	93.44	1.07	0.02	0.25	0.315
	WLAN5.8GHz	802.11a 6Mbps	Edge 4	5	Ant 2	Off	165	5825	1	14.79	15.5	1.18	93.44	1.07	0.06	0.394	0.496
	WLAN5.8GHz	802.11a 6Mbps	Bottom Face	0	Ant 2	On	157	5785	2	7.03	8	1.249	93.46	1.070	0.12	0.493	0.659
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	165	5825	1	12.44	12.5	1.013	90.63	1.103	-0.07	0.886	0.990
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom of Laptop	0	Ant 1+2	On	165	5825	1	12.44	12.5	1.013	90.63	1.103	0.06	0.399	0.446
	WLAN5.8GHz	802.11n-HT20 MCS0	Edge 4	0	Ant 1+2	On	165	5825	1	12.44	12.5	1.013	90.63	1.103	-0.04	0.492	0.550
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	149	5745	1	12.25	12.5	1.059	90.63	1.103	-0.05	0.911	1.064
#12	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	157	5785	1	12.02	12.5	1.117	90.63	1.103	-0.03	0.904	**1.114**
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	7	Ant 1+2	Off	165	5825	1	15.52	16	1.116	87.41	1.144	-0.09	0.333	0.425
	WLAN5.8GHz	802.11n-HT20 MCS0	Edge 3	0	Ant 1+2	Off	165	5825	1	15.52	16	1.116	87.41	1.144	0.01	0.178	0.227
	WLAN5.8GHz	802.11n-HT20 MCS0	Edge 4	5	Ant 1+2	Off	165	5825	1	15.52	16	1.116	87.41	1.144	-0.07	0.257	0.328
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	157	5785	2	12.02	12.5	1.117	90.63	1.103	-0.05	0.667	0.822
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	165	5825	2	12.44	12.5	1.013	90.63	1.103	-0.06	0.724	0.809
	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	149	5745	2	12.25	12.5	1.059	90.63	1.103	-0.09	0.681	0.796

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
#13	Bluetooth	1Mbps	Bottom of Laptop	0	Ant 1	39	2441	1	10.03	10.50	1.114	0.05	0.438	**0.488**
	Bluetooth	1Mbps	Bottom Face	0	Ant 1	39	2441	1	10.03	10.50	1.114	0.1	0.300	0.334
	Bluetooth	1Mbps	Edge4	0	Ant 1	39	2441	1	10.03	10.50	1.114	-0.14	0.118	0.131
	Bluetooth	1Mbps	Bottom of Laptop	0	Ant 1	0	2402	1	9.88	10.50	1.153	0.09	0.374	0.431
	Bluetooth	1Mbps	Bottom of Laptop	0	Ant 1	78	2480	1	9.47	10.50	1.268	-0.05	0.332	0.421
	Bluetooth	1Mbps	Bottom of Laptop	0	Ant 1	39	2441	2	10.03	10.50	1.114	0.15	0.375	0.418

15.2 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	1	2412	1	11.60	12.00	1.096	99.31	1.007	-0.12	1.060	1	1.170
2nd	WLAN2.4GHz	802.11b 1Mbps	Bottom of Laptop	0	Ant 2	On	1	2412	1	11.60	12.00	1.096	99.31	1.007	0.06	1.030	1.029	1.137
1st	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 2	Off	52	5260	1	15.12	15.5	1.091	93.44	1.070	0.09	0.946	1	1.105
2nd	WLAN5.3GHz	802.11a 6Mbps	Edge4	5	Ant 2	Off	52	5260	1	15.12	15.5	1.091	93.44	1.070	0.08	0.938	1.009	1.095
1st	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	100	5500	1	11.41	12	1.145	90.63	1.103	0.14	0.932	1	1.177
2nd	WLAN5.5GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	100	5500	1	11.41	12	1.145	90.63	1.103	-0.16	0.880	1.059	1.111
1st	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	149	5745	1	12.25	12.5	1.059	90.63	1.103	-0.05	0.911	1	1.064
2nd	WLAN5.8GHz	802.11n-HT20 MCS0	Bottom Face	0	Ant 1+2	On	149	5745	1	12.25	12.5	1.059	90.63	1.103	-0.05	0.899	1.013	1.05

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Supported
1.	WLAN 2.4GHz Antenna 1 + WLAN 2.4GHz Antenna 2	Yes
2.	WLAN 5GHz Antenna 1 + WLAN 5GHz Antenna 2	Yes

Note:

1. 802.11n-HT40 does not support at WLAN 2.4GHz.
2. Bluetooth and WLAN share the same antenna 1, and cannot transmit simultaneously.
3. According to the EUT character, WLAN 2 and Bluetooth Antenna 1 can not transmit simultaneously.
4. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
5. WLAN 2.4GHz MIMO SAR and WLAN 5GHz MIMO SAR evaluated separately and complied, so no need add SAR test results of each antenna in SISO mode for co-located analysis.

Test Engineer: Frank Qiao

17. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[a]	1/k[b]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 17.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.4%	11.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						22.9%	22.7%

Table 17.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	7.0	N	1	1	1	7.0	7.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.8%	12.7%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.5%	25.4%

Table 17.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz

18. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[8] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[9] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.4.21

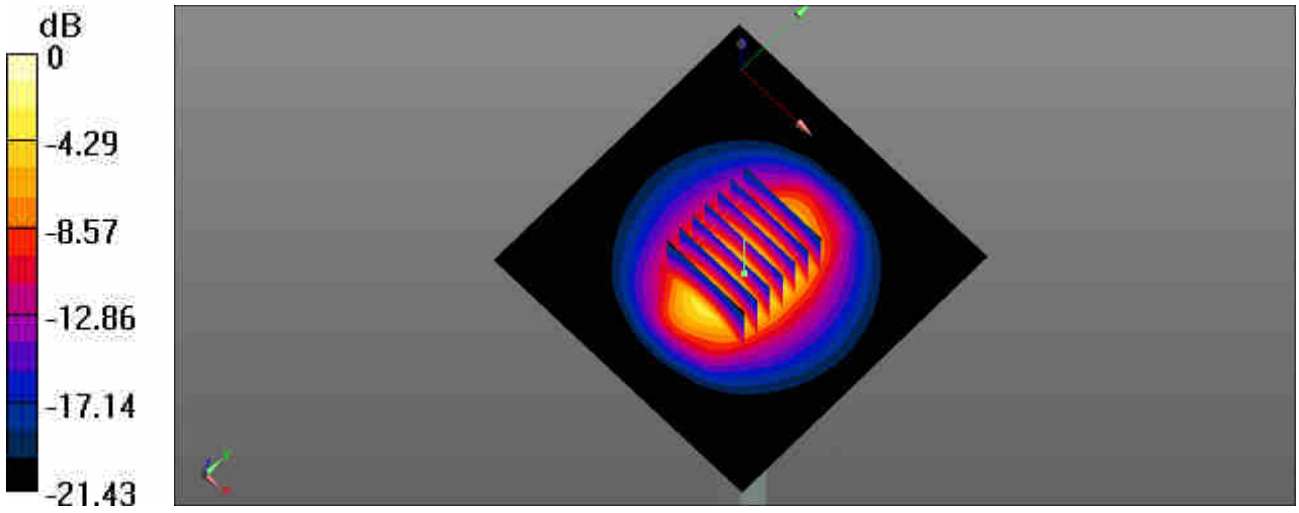
System Check_Body_2450MHz_160421

Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: MSL_2450_160421 Medium parameters used: f = 2450 MHz; σ = 1.983 S/m; ε_r = 51.43; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.29, 7.29, 7.29); Calibrated: 2015.5.28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2015.5.21
- Phantom: SAM3; Type: SAM; Serial: TP-1079
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 18.3 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 84.58 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 24.6 W/kg
SAR(1 g) = 12.3 W/kg; SAR(10 g) = 5.77 W/kg
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 18.5 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.4.22

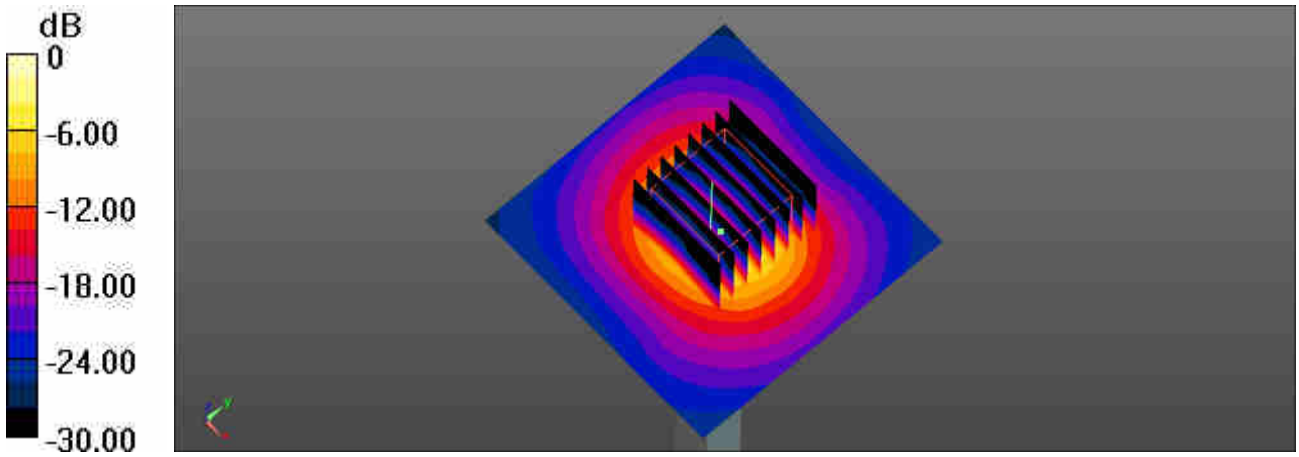
System Check_Body_5250MHz_160422

Communication System: UID 0, CW (0); Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: MSL_5000_160422 Medium parameters used: f = 5250 MHz; σ = 5.34 S/m; ε_r = 48.224; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃； Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM3; Type: SAM; Serial: TP-1127
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.9 W/kg

Pin=100mW/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 41.89 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 7.65 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 18.0 W/kg



0 dB = 18.0 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2016.04.23

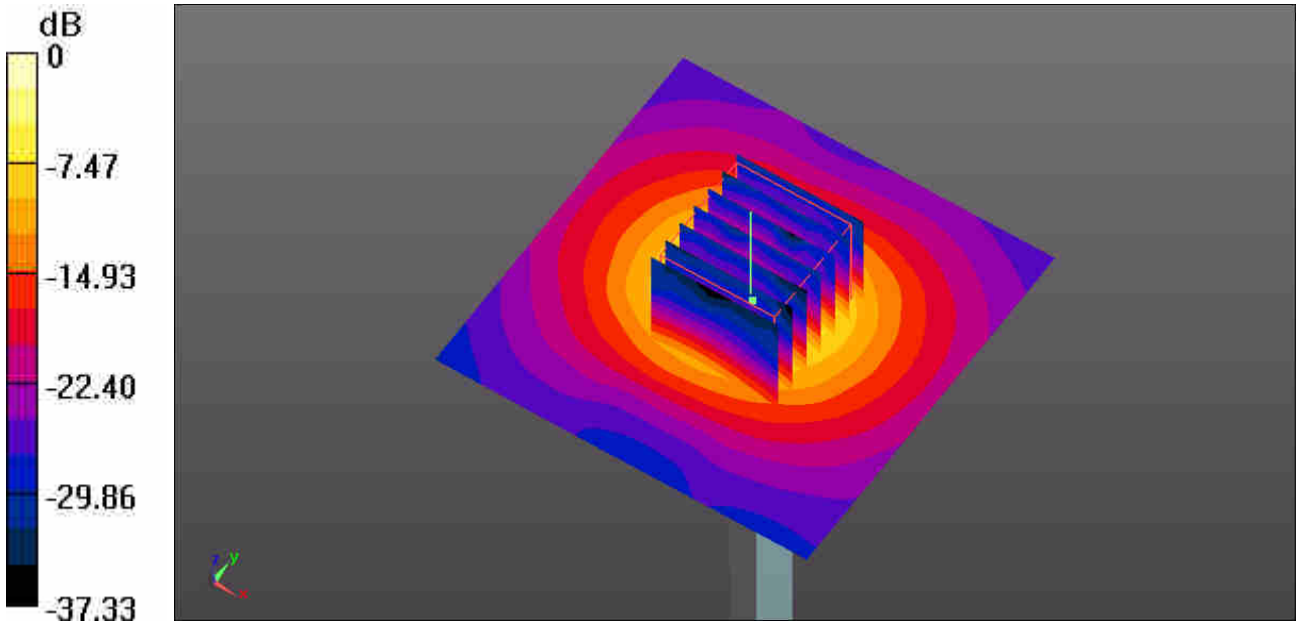
System Check_Body_5600MHz_160423

Communication System: UID 0, CW (0); Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: MSL_5600_160423 Medium parameters used: f = 5600 MHz; σ = 5.875 S/m; ε_r = 50.255; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃； Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(3.67, 3.67, 3.67); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2015.11.24
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 20.4 W/kg

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 48.96 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 34.6 W/kg
SAR(1 g) = 8.62 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 22.2 W/kg



0 dB = 20.4 W/kg

Test Laboratory:Sporton International Inc SAR Testing Lab Date: 2016.4.22

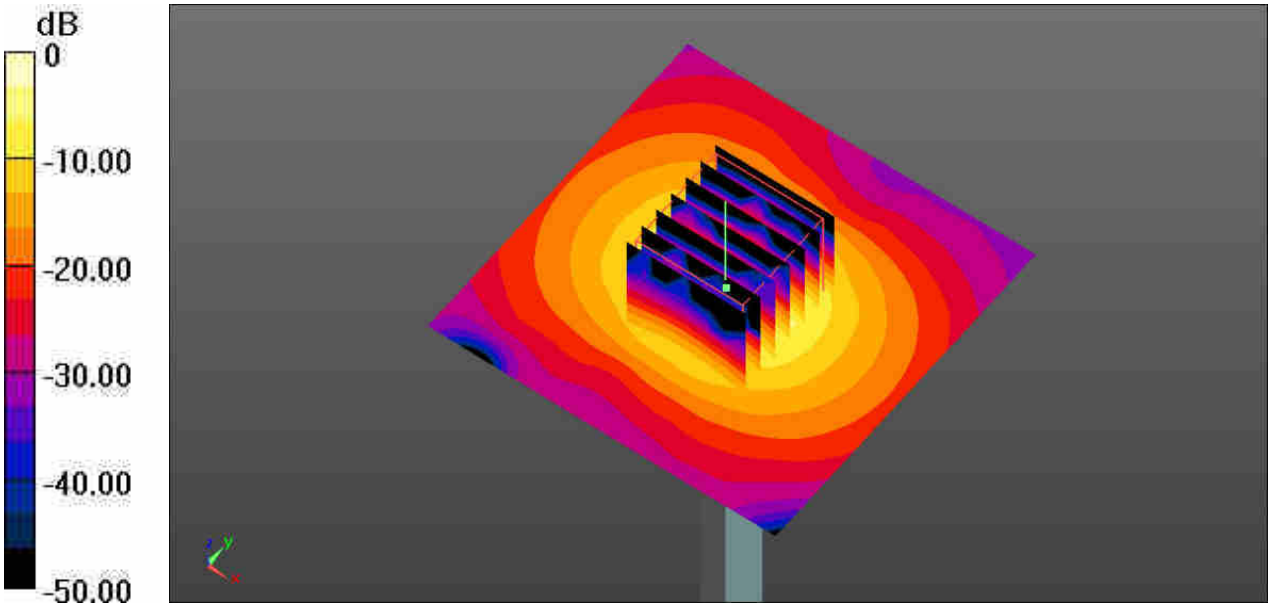
System Check_Body_5750MHz_160422

Communication System: UID 0, CW (0); Frequency: 5750 MHz;Duty Cycle: 1:1
Medium: MSL_5750_160422 Medium parameters used: f = 5750 MHz; σ = 6.058 S/m; ε_r = 47.348; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(3.81, 3.81, 3.81); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: ELI v5.0(Right); Type: QDOVA001BB; Serial: TP:1225
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Pin=100mW/Area Scan (71x71x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 18.9 W/kg

Pin=100mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 47.72 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 32.3 W/kg
SAR(1 g) = 7.84 W/kg; SAR(10 g) = 2.1 W/kg
Maximum value of SAR (measured) = 20.0 W/kg



0 dB = 18.9 W/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

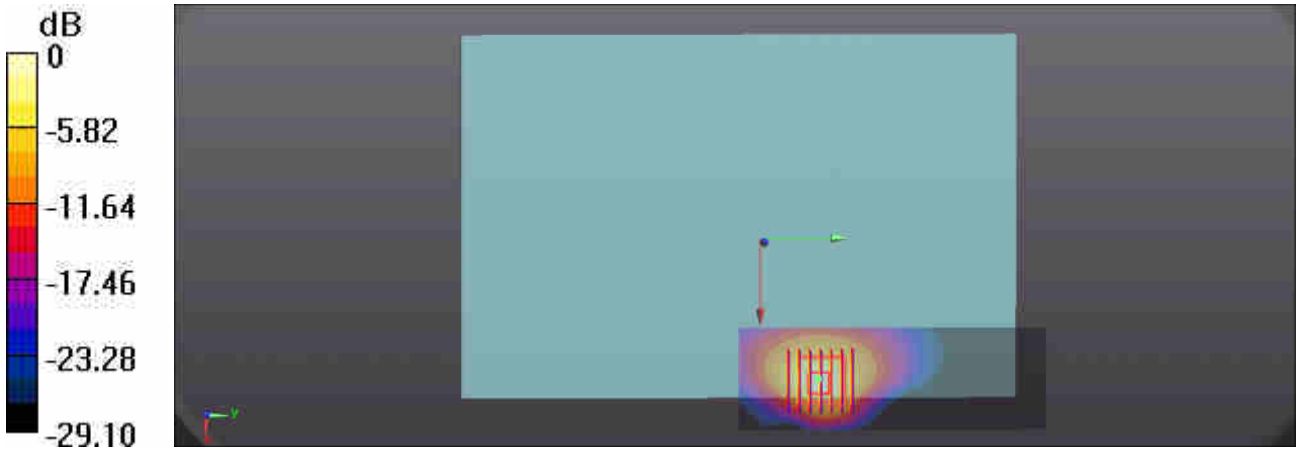
#01_WLAN2.4GHz_802.11b 1Mbps_Bottom of Laptop_0mm_Ant 1_Ch1_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1.014
Medium: MSL_2450_160421 Medium parameters used: f = 2412 MHz; σ = 1.928 S/m; ε_r = 51.536; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.29, 7.29, 7.29); Calibrated: 2015.5.28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2015.5.21
- Phantom: SAM3; Type: SAM; Serial: TP-1079
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (41x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.71 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 2.53 W/kg
SAR(1 g) = 0.953 W/kg; SAR(10 g) = 0.376 W/kg
Maximum value of SAR (measured) = 1.65 W/kg



0 dB = 1.65 W/kg = 2.17 dBW/kg

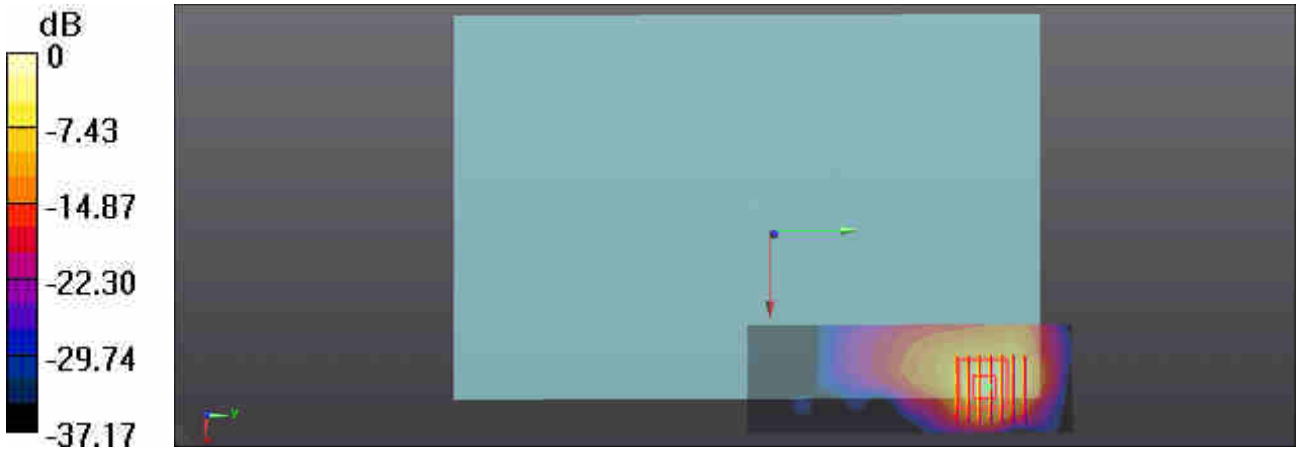
#02_WLAN2.4GHz_802.11b 1Mbps_Bottom of Laptop_0mm_Ant 2_Ch1_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1.007
Medium: MSL_2450_160421 Medium parameters used: f = 2412 MHz; σ = 1.928 S/m; ε_r = 51.536; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.29, 7.29, 7.29); Calibrated: 2015.5.28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2015.5.21
- Phantom: SAM3; Type: SAM; Serial: TP-1079
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (41x121x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.63 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 2.90 W/kg
SAR(1 g) = 1.060 W/kg; SAR(10 g) = 0.380 W/kg
Maximum value of SAR (measured) = 1.94 W/kg



0 dB = 1.94 W/kg = 2.88 dBW/kg

#03_WLAN2.4GHz_802.11n-HT20 MCS0_Bottom of Laptop_Ant 1+2_0mm_Ch1_Sensor On

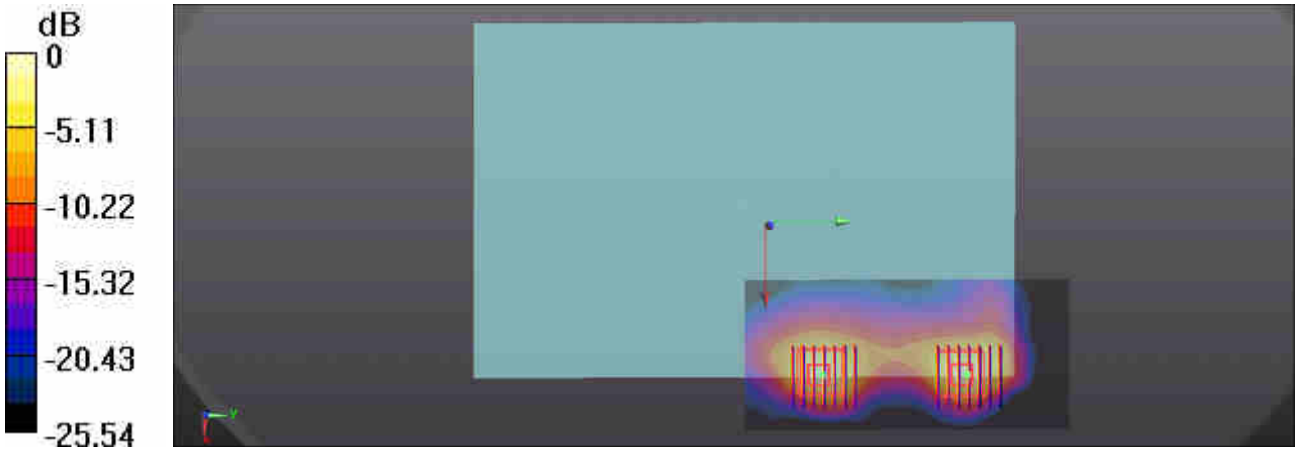
Communication System: UID 0, WIFI (0); Frequency: 2412 MHz;Duty Cycle: 1:1.103
Medium: MSL_2450_160421 Medium parameters used: f = 2412 MHz; σ = 1.928 S/m; ε_r = 51.536; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.29, 7.29, 7.29); Calibrated: 2015.5.28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2015.5.21
- Phantom: SAM3; Type: SAM; Serial: TP-1079
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch1/Area Scan (61x131x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.51 W/kg

Ch1/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.14 W/kg
SAR(1 g) = 0.781 W/kg; SAR(10 g) = 0.277 W/kg
Maximum value of SAR (measured) = 1.36 W/kg

Configuration/Ch1/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 1.74 W/kg
SAR(1 g) = 0.678 W/kg; SAR(10 g) = 0.269 W/kg
Maximum value of SAR (measured) = 1.14 W/kg



0 dB = 1.14 W/kg

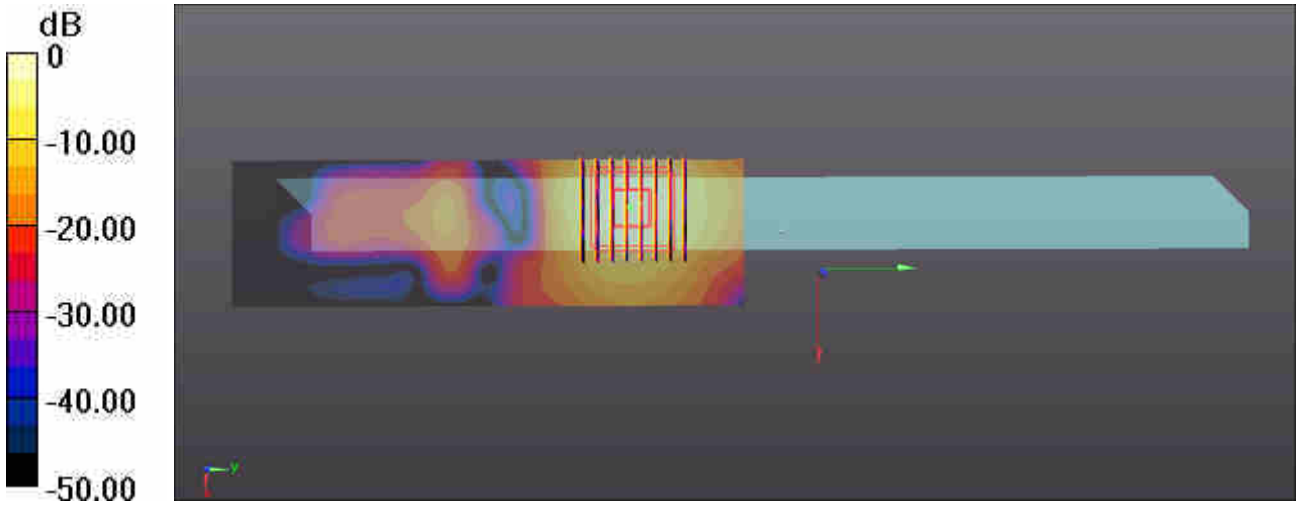
#04_WLAN5.3GHz_802.11a 6Mbps_Edge4_5mm_Ant 2_Ch52_Sensor Off

Communication System: UID 0, WIFI (0); Frequency: 5260 MHz;Duty Cycle: 1:1.07
Medium: MSL_5000_160422 Medium parameters used: f = 5260 MHz; σ = 5.353 S/m; ε_r = 48.198; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃； Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM3; Type: SAM; Serial: TP-1127
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch52/Area Scan (41x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.60 W/kg

Ch52/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.358 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.46 W/kg
SAR(1 g) = 0.682 W/kg; SAR(10 g) = 0.223 W/kg
Maximum value of SAR (measured) = 1.55 W/kg



0 dB = 1.55 W/kg = 1.90 dBW/kg

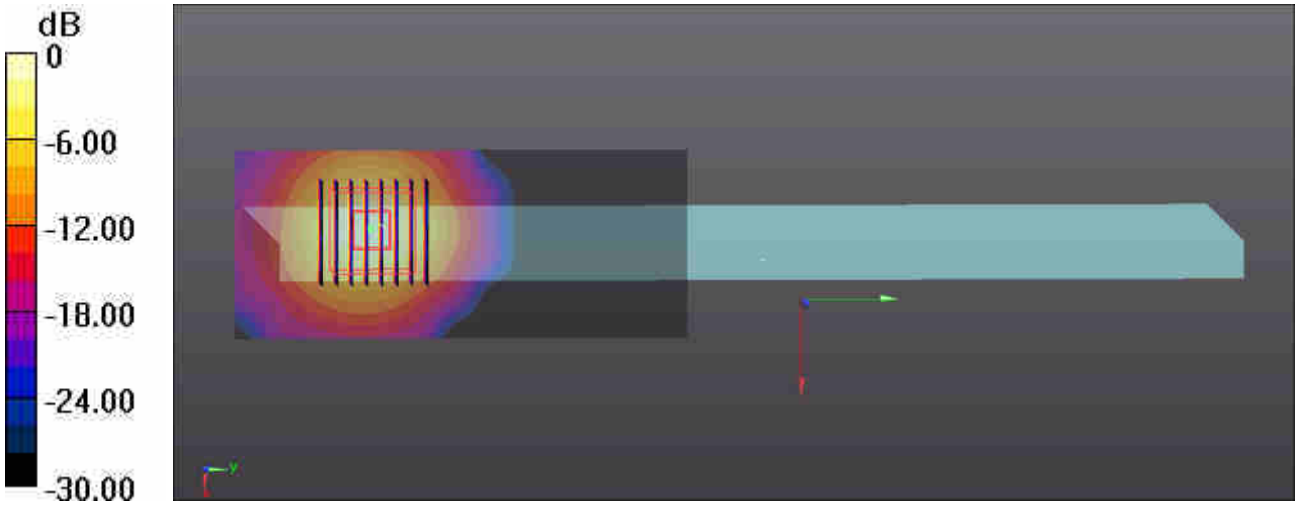
#05_WLAN5.3GHz_802.11a 6Mbps_Edge4_5mm_Ant 2_Ch52_Sensor Off

Communication System: UID 0, WIFI (0); Frequency: 5260 MHz;Duty Cycle: 1:1.070
Medium: MSL_5000_160422 Medium parameters used: f = 5260 MHz; σ = 5.353 S/m; ε_r = 48.198; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM3; Type: SAM; Serial: TP-1127
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch52/Area Scan (51x121x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.27 W/kg

Ch52/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 3.49 W/kg
SAR(1 g) = 0.946 W/kg; SAR(10 g) = 0.309 W/kg
Maximum value of SAR (measured) = 2.11 W/kg



0 dB = 2.11 W/kg

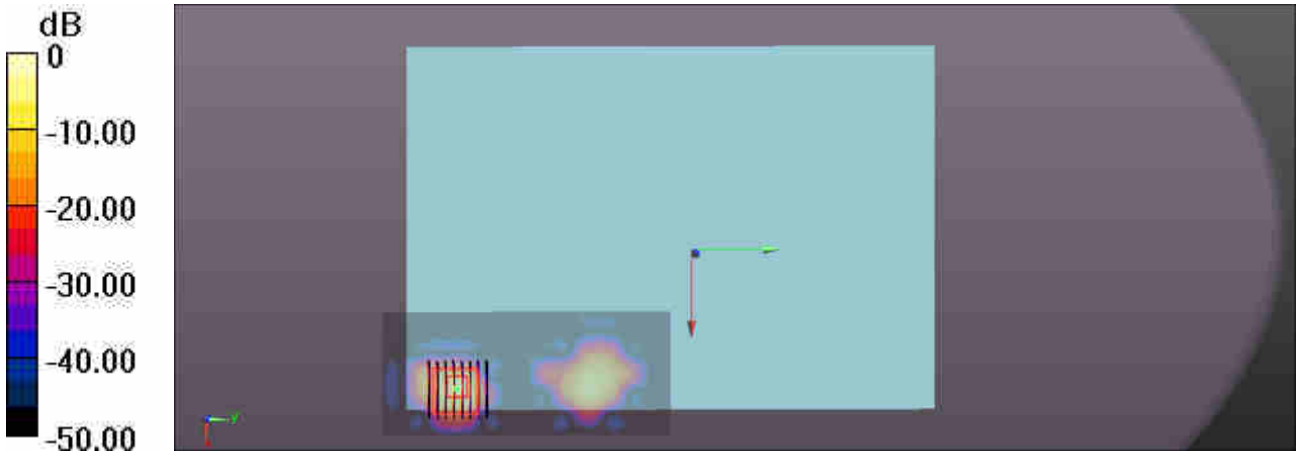
#06_WLAN5.3GHz_802.11n-HT20 MCS0_Bottom Face_0mm_Ant 1+2_Ch64_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5320 MHz;Duty Cycle: 1:1.103
Medium: MSL_5000_160422 Medium parameters used: f = 5320 MHz; σ = 5.434 S/m; ε_r = 48.032; ρ= 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.9 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3954; ConvF(4.25, 4.25, 4.25); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2015.7.16
- Phantom: SAM3; Type: SAM; Serial: TP-1127
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch64/Area Scan (61x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 1.58 W/kg

Ch64/Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 0 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 3.98 W/kg
SAR(1 g) = 0.655 W/kg; SAR(10 g) = 0.113 W/kg
Maximum value of SAR (measured) = 2.19 W/kg



0 dB = 2.19 W/kg

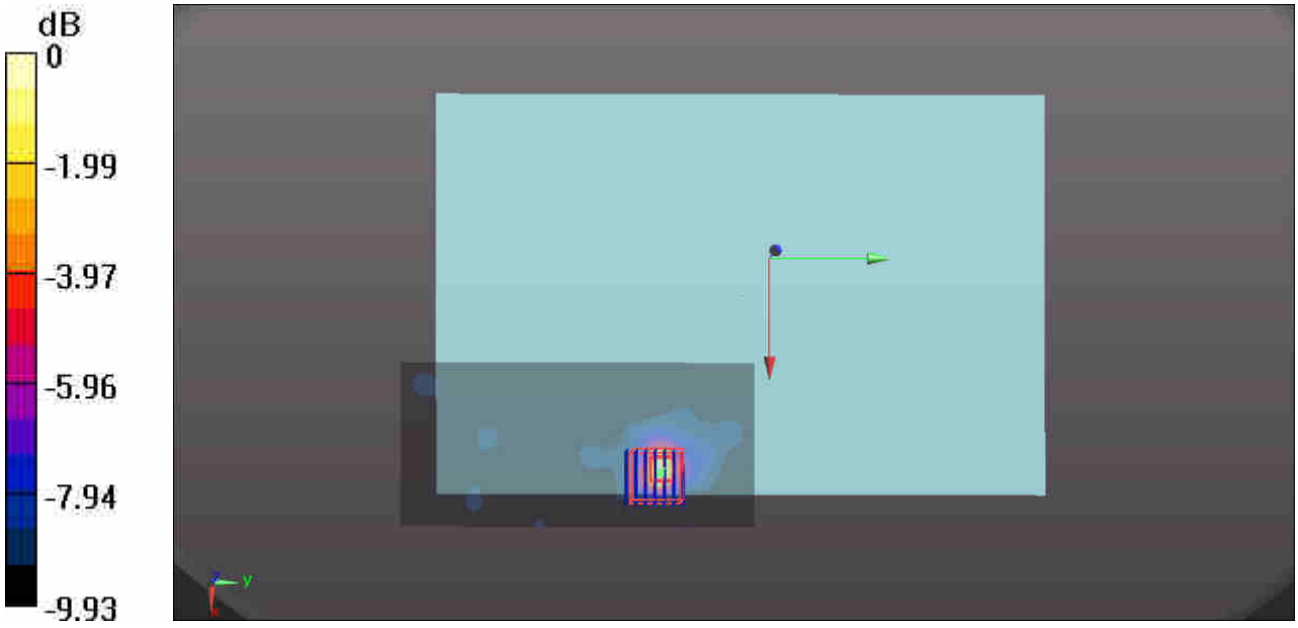
#07_WLAN5.5G_802.11a 6Mbps_Bottom Face_0mm_Ant 1_Ch116_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5580 MHz;Duty Cycle: 1:1.064
Medium: MSL_5600_160423 Medium parameters used: f = 5580 MHz; σ = 5.837 S/m; ε_r = 50.284; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(3.67, 3.67, 3.67); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2015.11.24
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch116/Area Scan (71x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.61 W/kg

Ch116/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 6.615 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.44 W/kg
SAR(1 g) = 0.806 W/kg; SAR(10 g) = 0.357 W/kg
Maximum value of SAR (measured) = 1.80 W/kg



0 dB = 1.61 W/kg

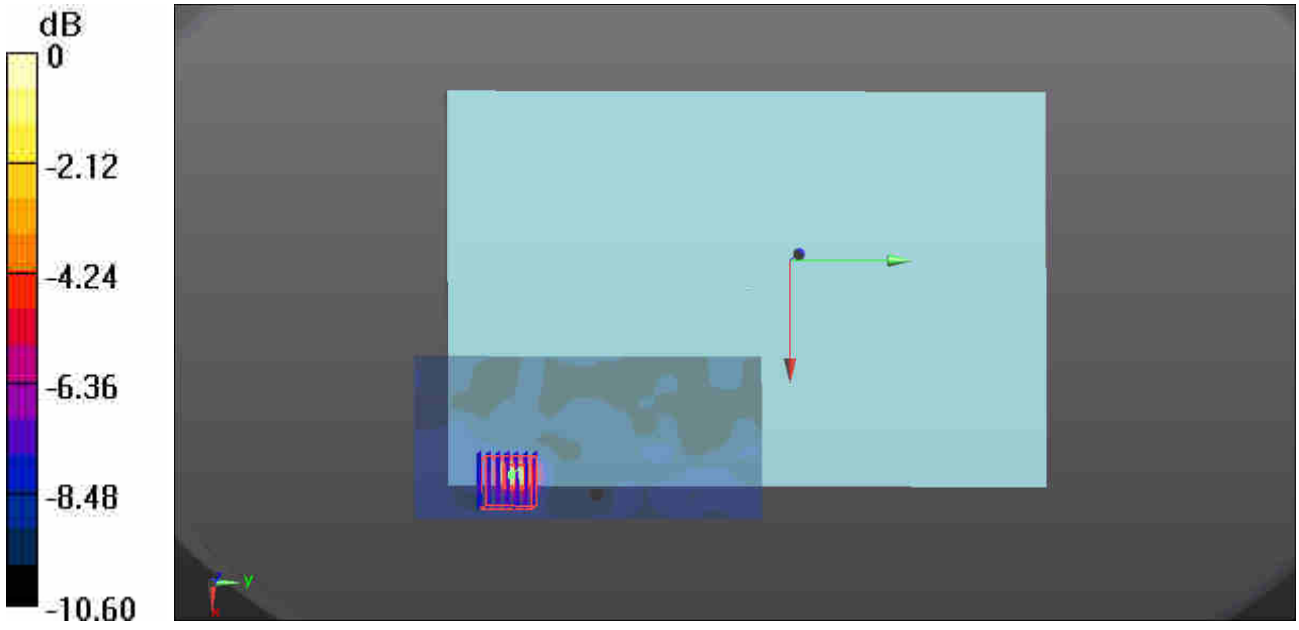
#08_WLAN5.5G_802.11a 6Mbps_Bottom Face_0mm_Ant 2_Ch100_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5500 MHz;Duty Cycle: 1:1.070
Medium: MSL_5600_160423 Medium parameters used: f = 5500 MHz; σ = 5.707 S/m; ε_r = 50.498; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(3.67, 3.67, 3.67); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2015.11.24
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch100/Area Scan (71x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.27 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 5.932 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 3.85 W/kg
SAR(1 g) = 0.678 W/kg; SAR(10 g) = 0.285 W/kg
Maximum value of SAR (measured) = 1.65 W/kg



0 dB = 1.27 W/kg

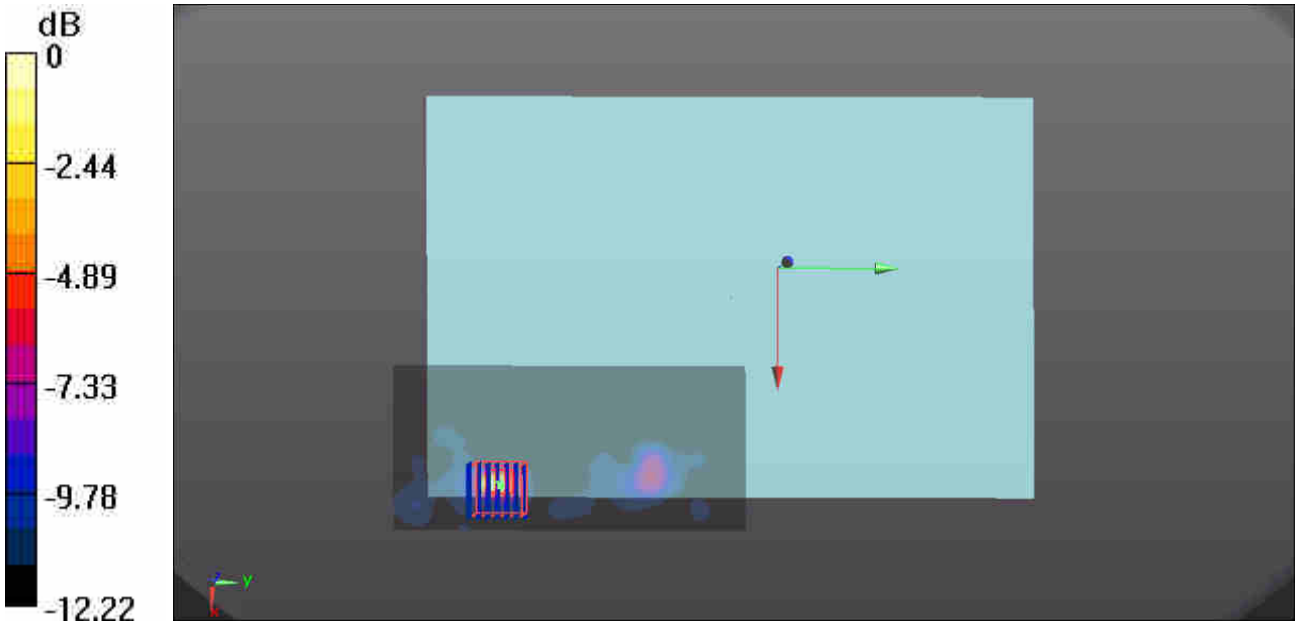
#09_WLAN5.5GHz_802.11n-HT20 MCS0_Bottom Face_0mm_Ant1+2_Ch100_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5500 MHz;Duty Cycle: 1:1.103
Medium: MSL_5600_160423 Medium parameters used: f = 5500 MHz; σ = 5.707 S/m; ε_r = 50.498; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(3.67, 3.67, 3.67); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1303; Calibrated: 2015.11.24
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch100/Area Scan (71x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 2.04 W/kg

Ch100/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 5.964 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 6.27 W/kg
SAR(1 g) = 0.932 W/kg; SAR(10 g) = 0.325 W/kg
Maximum value of SAR (measured) = 2.45 W/kg



0 dB = 2.04 W/kg

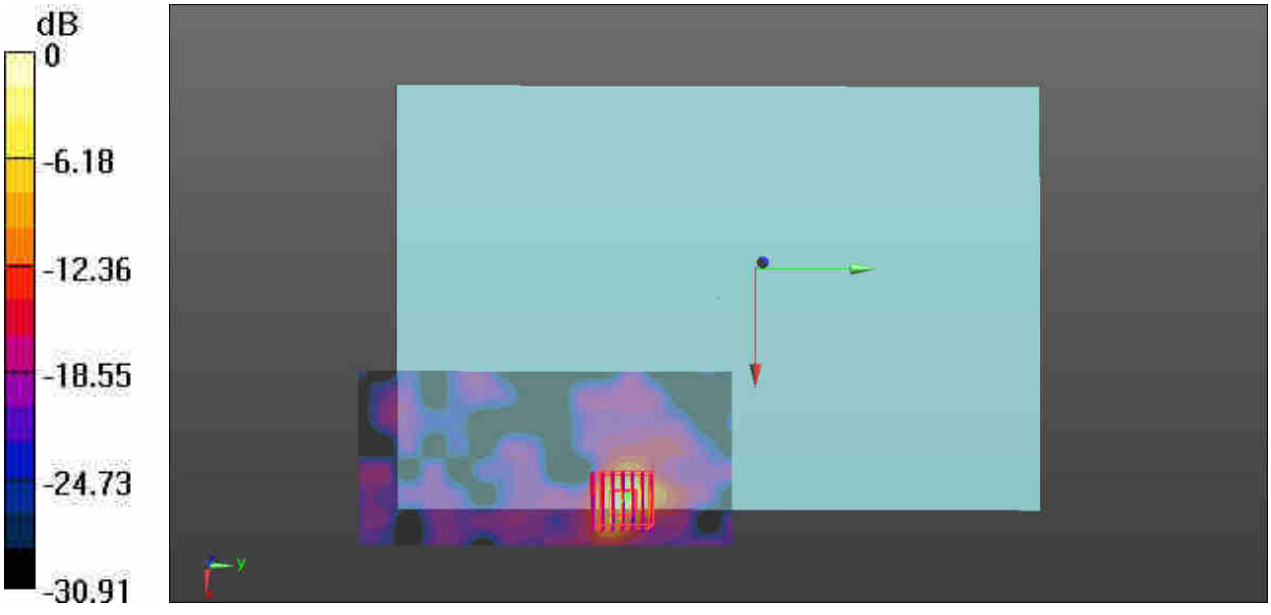
#10_WLAN5.8G_802.11a MCS0_Bottom Face_0mm_Ant1_Ch149_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5745 MHz;Duty Cycle: 1:1.064
Medium: MSL_5750_160422 Medium parameters used: f = 5745 MHz; σ = 6.051 S/m; ε_r = 47.358; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(3.81, 3.81, 3.81); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: ELI v5.0(Right); Type: QDOVA001BB; Serial: TP:1225
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch149/Area Scan (71x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.85 W/kg

Ch149/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 2.922 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 0.696 W/kg; SAR(10 g) = 0.168 W/kg
Maximum value of SAR (measured) = 1.98 W/kg



0 dB = 1.85 W/kg

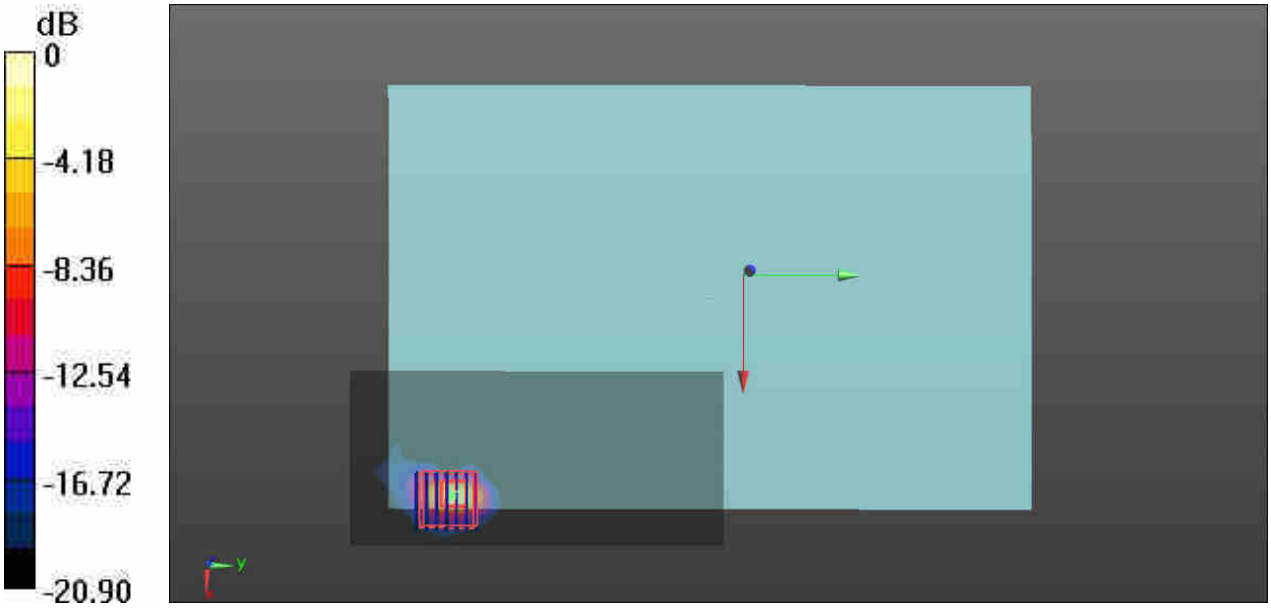
#11_WLAN5.8G_802.11a MCS0_Bottom Face_0mm_Ant2_Ch157_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5785 MHz;Duty Cycle: 1:1.070
Medium: MSL_5750_160422 Medium parameters used: f = 5785 MHz; σ = 6.096 S/m; ε_r = 47.214; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(3.81, 3.81, 3.81); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: ELI v5.0(Right); Type: QDOVA001BB; Serial: TP:1225
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch157/Area Scan (71x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.73 W/kg

Ch157/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 1.879 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 3.97 W/kg
SAR(1 g) = 0.635 W/kg; SAR(10 g) = 0.135 W/kg
Maximum value of SAR (measured) = 2.09 W/kg



0 dB = 1.73 W/kg

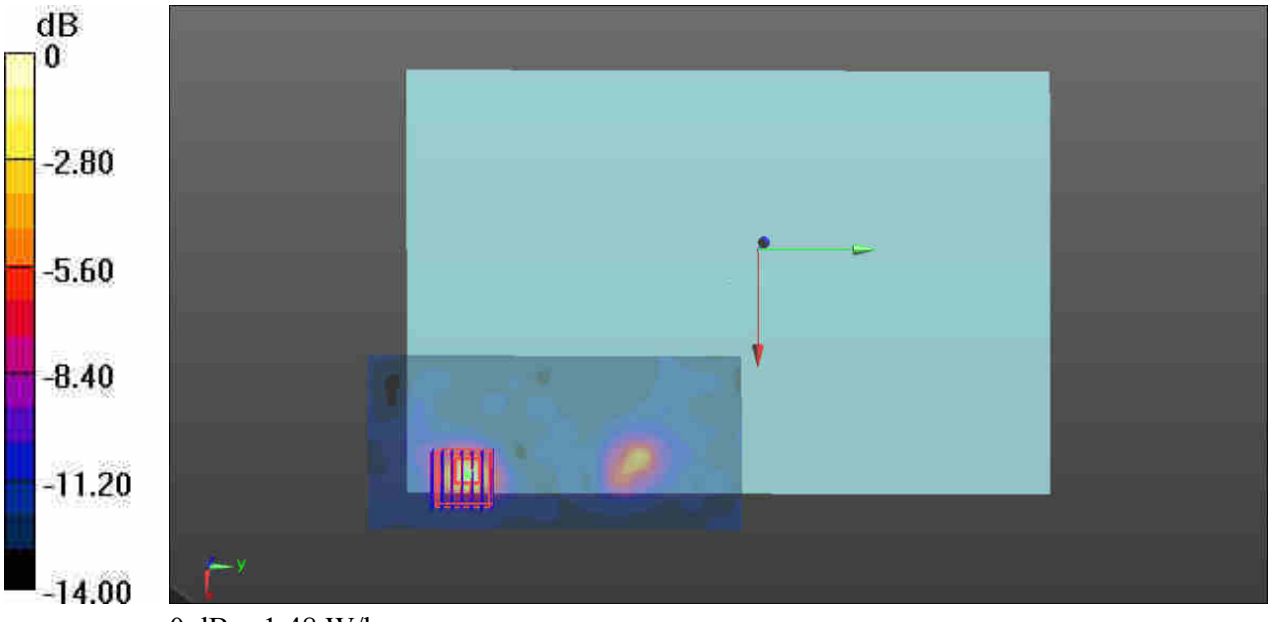
#12_WLAN5.8G_802.11n-HT20 MCS0_Bottom Face_0mm_Ant 1+2_Ch157_Sensor On

Communication System: UID 0, WIFI (0); Frequency: 5785 MHz;Duty Cycle: 1:1.103
Medium: MSL_5750_160422 Medium parameters used: f = 5785 MHz; σ = 6.096 S/m; ε_r = 47.214; ρ = 1000 kg/m^3
Ambient Temperature: 23.3 ℃ ; **Liquid Temperature**: 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(3.81, 3.81, 3.81); Calibrated: 2015.11.27;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1338; Calibrated: 2015.11.23
- Phantom: ELI v5.0(Right); Type: QDOVA001BB; Serial: TP:1225
- Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

Ch157/Area Scan (71x151x1): Interpolated grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.48 W/kg

Ch157/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 4.842 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 5.62 W/kg
SAR(1 g) = 0.904 W/kg; SAR(10 g) = 0.278 W/kg
Maximum value of SAR (measured) = 2.53 W/kg



0 dB = 1.48 W/kg

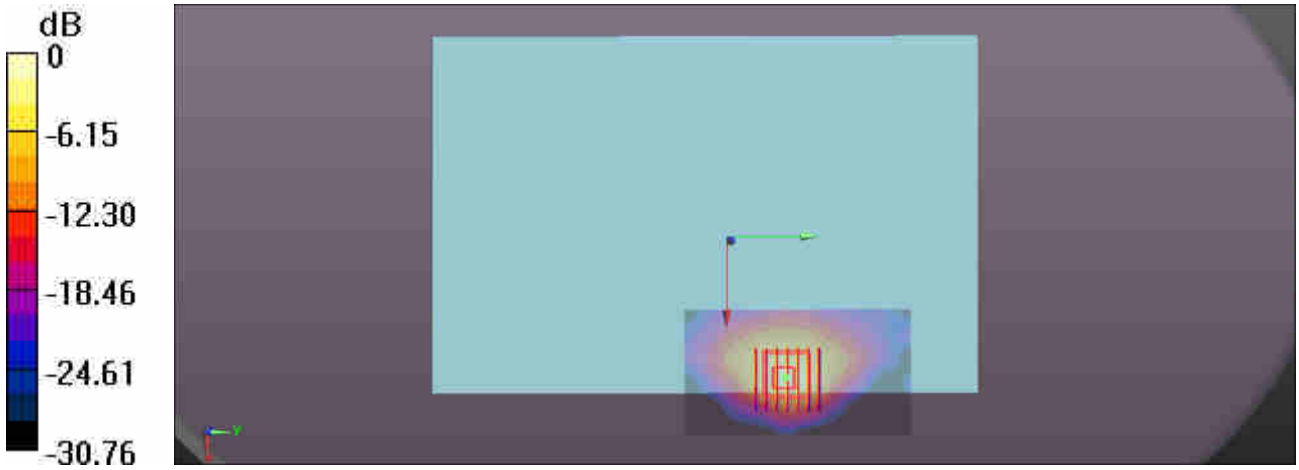
#13_Buletooth_1Mbps_Bottom of Laptop_0mm_Ant 1_Ch39

Communication System: UID 0, Bluetooth (0); Frequency: 2441 MHz;Duty Cycle: 1:1.2
Medium: MSL_2450_160421 Medium parameters used: f = 2441 MHz; σ = 1.97 S/m; ε_r = 51.455; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3857; ConvF(7.29, 7.29, 7.29); Calibrated: 2015.5.28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1210; Calibrated: 2015.5.21
- Phantom: SAM3; Type: SAM; Serial: TP-1079
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch39/Area Scan (51x91x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.874 W/kg

Ch39/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.438 W/kg; SAR(10 g) = 0.168 W/kg
Maximum value of SAR (measured) = 0.768 W/kg



0 dB = 0.768 W/kg = -1.15 dBW/kg