FCC SAR Test Report

APPLICANT	:	Xplore Technologies Corp.
EQUIPMENT	:	Wireless Module
BRAND NAME	:	Xplore Technologies Corp
MODEL NAME	:	7265NGW
FCC ID	:	Q2G7265NG
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2003

The product was installed into Rugged Tablet PC (Brand Name: Xplore Technologies Corp, Model Name: iX101B2) during test.

We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA520236-01	Rev. 01	Initial issue of report	Mar. 27, 2015

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Xplore Technologies Corp., Wireless Module, 7265NGW**, are as follows.

Equipment Class	Frequency Band	Highest SAR Summary	
		Body 1g SAR (W/kg)	Simultaneous Transmission 1g SAR (W/kg)
DTS	WLAN 2.4GHz Band	0.44	0.81
	WLAN 5.8GHz Band	0.42	
NII	WLAN 5.2GHz Band	**0.68**	1.12
	WLAN 5.3GHz Band	0.65	
	WLAN 5.5GHz Band	0.62	
Date of Testing:		2015/03/02 ~ 2015/03/04	

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 1528-2003.

2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Xplore Technologies Corp.
Address	14000 Summit Road Suite 900, Austin, Texas, 78728 USA

Manufacturer	
Company Name	Intel Corporation
Address	100 Center Point Circle Suite 200 Columbia, SC 29210

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 1528-2003
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r03
- FCC KDB 865664 D02 SAR Reporting v01r01
- FCC KDB 447498 D01 General RF Exposure Guidance v05r02
- FCC KDB 248227 D01 SAR meas for 802 11abg v01r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r01

4. Equipment Under Test (EUT)

4.1 General Information

Product Feature & Specification	
Equipment Name	Wireless Module
Brand Name	Xplore Technologies Corp
Model Name	7265NGW
FCC ID	Q2G7265NG
S/N	68100E01000545100084M000
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	・802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 ・Bluetooth v3.0+EDR，Bluetooth v4.0-LE
EUT Stage	Production Unit
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

Host Information	
Host Name	Rugged Tablet PC
Brand Name	Xplore Technologies Corp
Model Name	iX101B2
Antenna Type	WLAN: PIFA Antenna Bluetooth: PIFA Antenna

4.2 Maximum Tune-up Limit

Mode	Average Power (dBm)
Bluetooth v3.0+EDR	6.0
Bluetooth v4.0-LE	6.0

Band / Frequency (MHz)		IEEE 802.11 Average Power (dBm)									
		WLAN Antenna A				WLAN Antenna B				WLAN Antenna A+B	
		11b	11g	HT20	HT40	11b	11g	HT20	HT40	HT20	HT40
2.4GHz Band	2412	16.5	14.0	14.0		16.5	15.0	15.0		15.0	
	2422				14.0				15.0		12.5
	2437	17.5	17.5	17.5	17.5	18.0	18.0	18.0	18.0	20.0	16.5
	2452				12.5				13.0		12.5
	2462	17.0	12.5	12.5		17.0	13.0	13.0		15.0	

Band / Frequency (MHz)		IEEE 802.11 Average Power (dBm)																	
		Antenna A						Antenna B						Antenna A+B					
		11a	HT20	HT40	VHT 20	VHT 40	VHT 80	11a	HT20	HT40	VHT 20	VHT 40	VHT 80	HT20	HT40	VHT 20	VHT 40	VHT 80	
5.2GHz Band	5180	14.5	14.5		14.5			14.5	14.5		14.5			14.5		14.5			
	5190			12.0		12.0				13.5		13.5			13.0		13.0		
	5200	14.5	14.5		14.5			14.5	14.5		14.5			14.5		14.5			
	5210						14.5						14.5					15.0	
	5220	14.5	14.5		14.5			14.5	14.5		14.5			14.5		14.5			
	5230			16.5		16.5				16.5		16.5			17.0		17.0		
	5240	14.5	14.5		14.5			14.5	14.5		14.5			14.5		14.5			
5.3GHz Band	5260	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5270			16.5		16.5				16.5		16.5			19.5		19.5		
	5280	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5290						13.5						13.5					14.5	
	5300	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5310			13.5		13.5				13.5		13.5			15.0		15.0		
	5320	13.5	13.5		13.5			13.5	13.5		13.5			15.0		15.0			
5.5GHz Band	5500	14.0	14.0		14.0			13.5	13.5		13.5			13.5		13.5			
	5510			14.0		14.0				13.5		13.5			14.5		14.5		
	5520	14.0	14.0		14.0			13.5	13.5		13.5			13.5		13.5			
	5530						14.0						13.5					14.5	
	5540	14.0	14.0		14.0			13.5	13.5		13.5			13.5		13.5			
	5550			16.5		16.5				17.0		17.0			19.5		19.5		
	5560	15.5	15.5		15.5			16.5	16.5		16.5			18.0		18.0			
	5580	15.5	15.5		15.5			16.5	16.5		16.5			18.0		18.0			
	5660	15.5	15.5		15.5			16.5	16.5		16.5			18.0		18.0			
	5670			16.5		16.5				17.0		17.0			19.5		19.5		
	5680	15.5	15.5		15.5			16.5	16.5		16.5			18.0		18.0			
	5690						16.5						17.0					19.5	
	5700	13.0	13.0		13.0			13.5	13.5		13.5			14.5		14.5			
	5710			16.5		16.5				17.0		17.0			19.5		19.5		
	5720	13.0	13.0		15.5			13.5	13.5		16.5			14.5		15.5			
5.8GHz Band	5745	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5755			16.5		16.5				16.5		16.5			19.5		19.5		
	5765	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5775						16.5						17.0					19.5	
	5785	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5795			16.5		16.5				16.5		16.5			19.5		19.5		
	5805	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			
	5825	16.0	16.0		16.0			16.0	16.0		16.0			16.5		16.5			

5. RF Exposure Limits

5.1 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.

5.2 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.

6. Specific Absorption Rate (SAR)

6.1 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.

6.2 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:

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

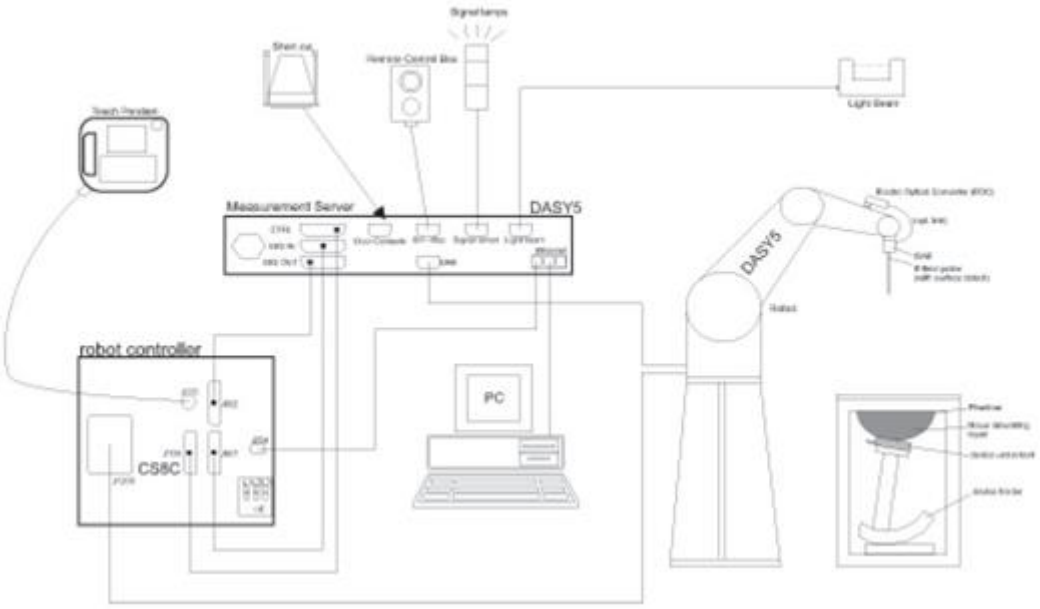
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. 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. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) 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
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, 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

8.1 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

8.2 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.

8.3 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 D01v01r03 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.	

8.4 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 D01v01r03 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.

8.5 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.

8.6 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.

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	924	Nov. 19, 2014	Nov. 18, 2015
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Sep. 25, 2014	Sep. 24, 2015
SPEAG	Data Acquisition Electronics	DAE4	1279	Jul. 23, 2014	Jul. 22, 2015
SPEAG	Dosimetric E-Field Probe	EX3DV4	3954	Nov. 21, 2014	Nov. 20, 2015
Wisewind	Thermometer	ETP-101	TM685	Oct. 21, 2014	Oct. 20, 2015
SPEAG	Device Holder	N/A	N/A	NCR	NCR
R&S	Signal Generator	SMU200A	102502	Jul. 07, 2014	Jul. 06, 2015
SPEAG	Dielectric Probe Kit	DAK-3.5	1138	Nov. 18, 2014	Nov. 17, 2015
Agilent	ENA Network Analyzer	E5071C	MY46101588	May. 31, 2014	May. 30, 2015
Anritsu	Power Meter	ML2495A	1036004	Aug. 09, 2014	Aug. 08, 2015
Anritsu	Power Sensor	MA2411B	1027253	Aug. 11, 2014	Aug. 10, 2015
R&S	Spectrum Analyzer	FSP 7	101131	Jul. 10, 2014	Jul. 09, 2015
Agilent	Dual Directional Coupler	778D	50422	Note1	
Woken	Attenuator 1	WK0602-XX	N/A	Note1	
PE	Attenuator 2	PE7005-10	N/A	Note1	
PE	Attenuator 3	PE7005- 3	N/A	Note1	
AR	Power Amplifier	5S1G4M2	0328767	Note1	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	Note1	
Mini-Circuits	Power Amplifier	ZHL-42W+	13440021344	Note1	

General Note:

1. 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.

10. System Verification

10.1 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 Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

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	MSL	22.2	2.019	54.592	1.95	52.70	3.54	3.59	±5	2015/3/2
5200	MSL	22.3	5.366	47.485	5.30	49.00	1.25	-3.09	±5	2015/3/2
5300	MSL	22.3	5.270	47.255	5.42	48.90	-2.77	-3.36	±5	2015/3/3
5600	MSL	22.3	5.653	46.801	5.77	48.50	-2.03	-3.50	±5	2015/3/3
5600	MSL	22.4	5.623	46.749	5.77	48.50	-2.55	-3.61	±5	2015/3/4
5800	MSL	22.4	5.956	46.473	6.00	48.20	-0.73	-3.58	±5	2015/3/4

10.2 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 (%)
2015/3/2	2450	MSL	250	D2450V2-924	EX3DV4 - SN3954	DAE4 Sn1279	13.30	51.40	53.20	3.50
2015/3/2	5200	MSL	100	D5GHzV2-1006	EX3DV4 - SN3954	DAE4 Sn1279	7.63	77.50	76.30	-1.55
2015/3/3	5300	MSL	100	D5GHzV2-1006	EX3DV4 - SN3954	DAE4 Sn1279	7.40	80.00	74.00	-7.50
2015/3/3	5600	MSL	100	D5GHzV2-1006	EX3DV4 - SN3954	DAE4 Sn1279	8.09	85.20	80.90	-5.05
2015/3/4	5600	MSL	100	D5GHzV2-1006	EX3DV4 - SN3954	DAE4 Sn1279	8.04	85.20	80.40	-5.63
2015/3/4	5800	MSL	100	D5GHzV2-1006	EX3DV4 - SN3954	DAE4 Sn1279	7.57	78.40	75.70	-3.44

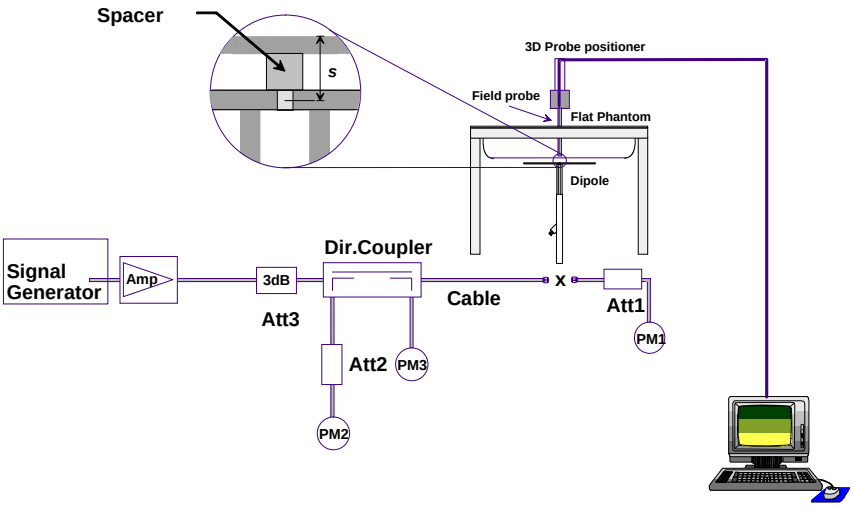


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 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 D01v05r02 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.

12. Conducted RF Output Power (Unit: dBm)

<WLAN Conducted Power>

General Note:

1. For SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
2. For IEEE802.11a/b/g SAR testing, highest average RF output power channel for the lowest data rate for 802.11a/b were selected for SAR evaluation. 802.11g were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of 802.11b mode.
3. For IEEE802.11n/ac, SAR testing can be conducted on channel with the highest output power when taking into consideration tune-up tolerance for same test configuration that was identified during SAR evaluations for IEEE802.11a/b/g (as applicable) provided bandwidth and test position are the same.
4. For IEEE802.11n/ac with multiple channel BW configurations, highest channel BW configuration with highest output power limit shall be tested.
5. Testing of lower BW configurations is not required when the maximum average output of the default test channels in each lower BW configuration is less than 1/4dB higher than the default test channel in the highest BW configuration.

<2.4GHz WLAN>

<Main Antenna A>

WLAN 2.4GHz 802.11b Average Power (dBm)					
Power vs. Channel			Power vs. Data Rate		
Channel	Frequency (MHz)	Data Rate	2Mbps	5.5Mbps	11Mbps
		1Mbps			
CH 1	2412	15.93	16.94	16.98	16.76
CH 6	2437	17.07			
CH 11	2462	16.53			

WLAN 2.4GHz 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
		6Mbps							
CH 1	2412	13.78	16.70	16.94	16.96	16.79	16.83	16.90	16.70
CH 6	2437	17.01							
CH 11	2462	11.96							

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0							
CH 1	2412	13.74	16.74	17.00	17.03	16.99	16.84	17.01	16.81
CH 6	2437	17.04							
CH 11	2462	12.01							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
		MCS0							
CH 3	2422	13.20	17.14	17.17	16.97	16.98	16.98	17.11	16.99
CH 6	2437	17.24							
CH 9	2452	12.26							

<Aux. Antenna B>

WLAN 2.4GHz 802.11b Average Power (dBm)					
Power vs. Channel			Power vs. Data Rate		
Channel	Frequency (MHz)	Data Rate 1Mbps	2Mbps	5.5Mbps	11Mbps
CH 1	2412	16.30	17.15	17.03	17.22
CH 6	2437	17.30			
CH 11	2462	16.13			

WLAN 2.4GHz 802.11g Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 1	2412	14.36	17.32	17.26	17.28	17.27	17.29	17.42	17.50
CH 6	2437	17.55							
CH 11	2462	12.56							

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 1	2412	14.52	17.67	17.60	17.67	17.53	17.51	17.55	17.63
CH 6	2437	17.80							
CH 11	2462	12.16							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 3	2422	13.27	17.05	16.95	16.92	16.87	17.10	17.12	16.88
CH 6	2437	17.16							
CH 9	2452	11.16							

<MIMO Antenna A+B>

WLAN 2.4GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 1	2412	14.50	19.66	19.56	19.51	19.74	19.46	19.51	19.76
CH 6	2437	19.77							
CH 11	2462	14.81							

WLAN 2.4GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 3	2422	12.40	16.00	16.04	16.12	16.09	16.24	16.10	16.06
CH 6	2437	16.27							
CH 9	2452	12.28							

<5GHz WLAN>

<Main Antenna A>

WLAN 5GHz 802.11a Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	14.04	14.30	14.28	14.29	14.11	14.28	14.10	14.21
CH 40	5200	14.11							
CH 44	5220	14.41							
CH 48	5240	14.12							
CH 52	5260	15.36	15.12	15.22	15.19	15.12	15.34	15.29	15.11
CH 56	5280	15.22							
CH 60	5300	15.34							
CH 64	5320	13.01							
CH 100	5500	13.58	15.13	15.20	15.11	15.03	15.07	15.10	15.11
CH 104	5520	13.51							
CH 108	5540	13.52							
CH 112	5560	15.21							
CH 116	5580	15.24							
CH 132	5660	15.12							
CH 136	5680	14.80							
CH 140	5700	12.96							
CH 144	5720	12.88							
CH 149	5745	15.24	15.54	15.48	15.48	15.30	15.31	15.36	15.37
CH 153	5765	15.21							
CH 157	5785	15.60							
CH 161	5805	15.35							
CH 165	5825	15.37							

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	13.53	14.29	14.17	14.36	14.37	14.28	14.31	14.38
CH 40	5200	13.76							
CH 44	5220	14.17							
CH 48	5240	14.48							
CH 52	5260	15.02	15.42	15.45	15.49	15.49	15.56	15.29	15.55
CH 56	5280	15.42							
CH 60	5300	15.58							
CH 64	5320	13.14							
CH 100	5500	13.28	14.88	14.82	14.89	14.83	14.93	15.01	14.88
CH 104	5520	13.12							
CH 108	5540	13.02							
CH 112	5560	15.03							
CH 116	5580	15.11							
CH 132	5660	14.88							
CH 136	5680	14.75							
CH 140	5700	12.67							
CH 144	5720	12.60							
CH 149	5745	15.47	15.17	15.33	15.24	15.46	15.25	15.25	15.34
CH 153	5765	15.21							
CH 157	5785	15.18							
CH 161	5805	15.31							
CH 165	5825	15.28							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	11.69	16.27	16.10	16.24	16.35	16.27	16.21	16.28
CH 46	5230	16.39							
CH 54	5270	15.95	15.79	15.64	15.67	15.74	15.72	15.71	15.94
CH 62	5310	13.19							
CH 102	5510	12.94	16.13	16.03	15.93	15.96	15.92	16.07	16.15
CH 110	5550	16.01							
CH 134	5670	16.21							
CH 142	5710	16.01							
CH 151	5755	15.94	15.99	16.01	15.99	16.10	16.05	15.86	15.88
CH 159	5795	16.14							

WLAN 5GHz 802.11ac-VHT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 36	5180	13.72	14.31	14.38	14.46	14.40	14.39	14.23	14.49	14.24
CH 40	5200	14.22								
CH 44	5220	14.33								
CH 48	5240	14.51								
CH 52	5260	14.68	15.30	15.25	15.24	15.20	15.30	15.30	15.22	15.24
CH 56	5280	15.32								
CH 60	5300	15.43								
CH 64	5320	13.19								
CH 100	5500	13.21	15.11	15.07	15.15	15.31	15.15	15.17	15.23	15.31
CH 104	5520	13.15								
CH 108	5540	13.16								
CH 112	5560	15.12								
CH 116	5580	15.17								
CH 132	5660	15.01								
CH 136	5680	14.97								
CH 140	5700	12.67								
CH 144	5720	15.34								
CH 149	5745	15.21	15.20	15.13	15.06	14.98	15.01	14.95	15.07	15.15
CH 153	5765	15.02								
CH 157	5785	14.93								
CH 161	5805	14.96								
CH 165	5825	14.99								

WLAN 5GHz 802.11ac-VHT40 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index								
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 38	5190	11.72	15.99	15.97	15.90	15.96	15.82	15.77	15.86	15.86	15.96
CH 46	5230	16.01									
CH 54	5270	15.98	15.68	15.81	15.96	15.97	15.92	15.77	15.75	15.79	15.79
CH 62	5310	12.95									
CH 102	5510	13.11	15.89	15.81	15.98	15.90	15.95	15.96	15.77	15.98	15.94
CH 110	5550	15.85									
CH 134	5670	16.06									
CH 142	5710	16.08									
CH 151	5755	16.15	16.03	15.91	15.91	16.02	16.14	16.10	15.86	15.86	16.02
CH 159	5795	16.14									

WLAN 5GHz 802.11ac-VHT80 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index								
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 42	5210	13.34	13.22	13.17	13.30	13.15	13.21	13.13	13.03	13.07	13.27
CH 58	5290	12.89	12.59	12.63	12.73	12.84	12.62	12.82	12.87	12.58	12.74
CH 106	5530	13.47	16.26	16.17	16.07	16.06	16.20	16.03	16.03	16.08	16.01
CH 138	5690	16.15									
CH 155	5775	16.37	16.33	16.14	16.23	16.24	16.11	16.22	16.09	16.11	16.18

<Aux. Antenna B>

WLAN 5GHz 802.11a Average Power (dBm)									
Power vs. Channel			Power vs. Data Rate						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	13.77	14.15	14.10	13.87	13.96	14.08	14.00	14.09
CH 40	5200	13.74							
CH 44	5220	14.01							
CH 48	5240	14.18							
CH 52	5260	15.54	15.25	15.53	15.51	15.33	15.36	15.45	15.42
CH 56	5280	15.32							
CH 60	5300	15.43							
CH 64	5320	13.09							
CH 100	5500	12.79	15.41	15.58	15.61	15.60	15.65	15.60	15.52
CH 104	5520	12.58							
CH 108	5540	12.56							
CH 112	5560	15.47							
CH 116	5580	15.68							
CH 132	5660	15.41							
CH 136	5680	15.56							
CH 140	5700	13.11							
CH 144	5720	12.85							
CH 149	5745	14.97	15.24	15.27	15.20	15.12	15.28	15.29	15.13
CH 153	5765	14.72							
CH 157	5785	14.65							
CH 161	5805	14.85							
CH 165	5825	15.34							

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	13.88	14.45	14.20	14.38	14.39	14.20	14.28	14.26
CH 40	5200	13.83							
CH 44	5220	14.46							
CH 48	5240	14.36							
CH 52	5260	15.76	15.61	15.50	15.77	15.60	15.53	15.54	15.58
CH 56	5280	15.71							
CH 60	5300	15.78							
CH 64	5320	13.07							
CH 100	5500	13.10	15.88	15.95	15.85	16.04	15.79	16.05	16.06
CH 104	5520	13.03							
CH 108	5540	13.04							
CH 112	5560	15.98							
CH 116	5580	16.08							
CH 132	5660	15.98							
CH 136	5680	15.76							
CH 140	5700	12.75							
CH 144	5720	12.55							
CH 149	5745	15.07	14.83	14.98	14.92	14.76	14.80	14.81	14.79
CH 153	5765	14.77							
CH 157	5785	14.86							
CH 161	5805	14.83							
CH 165	5825	14.64							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	13.00	15.89	16.08	15.97	16.03	16.18	16.01	16.15
CH 46	5230	16.19							
CH 54	5270	16.21	16.14	15.97	16.09	16.17	16.18	16.02	16.17
CH 62	5310	13.14							
CH 102	5510	13.21	16.35	16.61	16.62	16.55	16.61	16.47	16.43
CH 110	5550	16.15							
CH 134	5670	16.66							
CH 142	5710	16.02							
CH 151	5755	15.86	15.99	15.80	15.75	15.77	15.82	15.74	15.92
CH 159	5795	16.02							

WLAN 5GHz 802.11ac-VHT20 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 36	5180	13.89	14.22	14.11	14.25	14.32	14.20	14.08	14.21	14.19
CH 40	5200	14.19								
CH 44	5220	14.38								
CH 48	5240	14.15								
CH 52	5260	15.51	15.50	15.42	15.20	15.42	15.28	15.29	15.45	15.39
CH 56	5280	15.43								
CH 60	5300	15.41								
CH 64	5320	13.07								
CH 100	5500	13.17	15.90	15.95	16.00	15.96	15.76	15.84	15.84	15.85
CH 104	5520	13.16								
CH 108	5540	13.13								
CH 112	5560	15.98								
CH 116	5580	16.01								
CH 132	5660	15.75								
CH 136	5680	15.90								
CH 140	5700	12.57								
CH 144	5720	15.94								
CH 149	5745	15.07	14.83	14.89	14.79	14.89	15.06	15.02	14.97	14.91
CH 153	5765	14.69								
CH 157	5785	14.71								
CH 161	5805	14.68								
CH 165	5825	14.71								

WLAN 5GHz 802.11ac-VHT40 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 38	5190	13.09	15.76	15.58	15.83	15.83	15.57	15.63	15.75	15.55	15.73
CH 46	5230	15.86									
CH 54	5270	15.89	15.79	15.85	15.68	15.85	15.68	15.65	15.64	15.77	15.82
CH 62	5310	13.10									
CH 102	5510	13.20	16.46	16.42	16.47	16.29	16.37	16.46	16.32	16.47	16.34
CH 110	5550	15.92									
CH 134	5670	16.50									
CH 142	5710	16.15									
CH 151	5755	15.99	15.79	15.81	15.85	15.83	15.87	15.94	15.95	15.81	15.87
CH 159	5795	15.96									

WLAN 5GHz 802.11ac-VHT80 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 42	5210	13.49	13.18	13.19	13.30	13.40	13.45	13.40	13.25	13.38	13.26
CH 58	5290	12.89	12.75	12.86	12.58	12.75	12.78	12.76	12.78	12.80	12.64
CH 106	5530	13.39	16.28	16.05	16.09	16.11	16.03	16.16	16.22	16.10	16.06
CH 138	5690	16.20									
CH 155	5775	16.57	16.26	16.30	16.51	16.55	16.39	16.39	16.27	16.34	16.38

<MOMO Antenna A+B>

WLAN 5GHz 802.11n-HT20 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	Data Rate 6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 36	5180	13.81	14.32	14.26	14.27	14.36	14.22	14.38	14.26
CH 40	5200	14.16							
CH 44	5220	14.42							
CH 48	5240	14.27							
CH 52	5260	16.12	15.99	16.09	16.00	16.06	15.98	16.00	16.07
CH 56	5280	16.07							
CH 60	5300	16.23							
CH 64	5320	14.33							
CH 100	5500	13.30	17.40	17.44	17.41	17.37	17.37	17.46	17.22
CH 104	5520	13.11							
CH 108	5540	13.13							
CH 112	5560	17.28							
CH 116	5580	17.52							
CH 132	5660	17.07							
CH 136	5680	17.14							
CH 140	5700	14.00							
CH 144	5720	13.50							
CH 149	5745	15.79	15.91	16.03	15.92	15.93	15.92	16.02	15.90
CH 153	5765	15.74							
CH 157	5785	15.80							
CH 161	5805	15.43							
CH 165	5825	16.08							

WLAN 5GHz 802.11n-HT40 Average Power (dBm)									
Power vs. Channel			Power vs. MCS Index						
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 38	5190	12.77	16.77	16.63	16.73	16.87	16.87	16.81	16.89
CH 46	5230	16.93							
CH 54	5270	19.37	19.31	19.32	19.32	19.33	19.07	19.28	19.21
CH 62	5310	14.47							
CH 102	5510	14.40	19.44	19.21	19.40	19.27	19.34	19.27	19.23
CH 110	5550	19.50							
CH 134	5670	19.26							
CH 142	5710	19.41							
CH 151	5755	19.40	19.19	19.12	19.24	19.14	19.20	19.24	19.30
CH 159	5795	19.34							

WLAN 5GHz 802.11ac-VHT20 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 36	5180	14.22	14.09	14.12	14.30	14.18	14.33	14.13	14.26	14.18
CH 40	5200	14.23								
CH 44	5220	14.27								
CH 48	5240	14.37								
CH 52	5260	16.39	16.30	16.29	16.19	16.23	16.40	16.36	16.38	16.17
CH 56	5280	16.38								
CH 60	5300	16.42								
CH 64	5320	14.61								
CH 100	5500	13.12	17.49	17.55	17.60	17.50	17.61	17.34	17.37	17.46
CH 104	5520	13.11								
CH 108	5540	13.11								
CH 112	5560	17.61								
CH 116	5580	17.63								
CH 132	5660	17.53								
CH 136	5680	17.57								
CH 140	5700	14.01								
CH 144	5720	15.32								
CH 149	5745	16.16	16.04	16.23	16.03	16.01	16.03	16.00	16.02	16.22
CH 153	5765	16.14								
CH 157	5785	16.13								
CH 161	5805	16.12								
CH 165	5825	16.27								

WLAN 5GHz 802.11ac-VHT40 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 38	5190	12.56	16.36	16.59	16.49	16.46	16.55	16.37	16.41	16.54	16.47
CH 46	5230	16.66									
CH 54	5270	19.38	19.30	19.31	19.13	19.28	19.20	19.14	19.08	19.31	19.35
CH 62	5310	14.27									
CH 102	5510	14.05	19.37	19.31	19.47	19.24	19.20	19.17	19.24	19.45	19.17
CH 110	5550	19.48									
CH 134	5670	19.15									
CH 142	5710	19.41									
CH 151	5755	19.45	19.28	19.44	19.35	19.29	19.14	19.29	19.16	19.34	19.18
CH 159	5795	19.31									

WLAN 5GHz 802.11ac-VHT80 Average Power (dBm)										
Power vs. Channel			Power vs. MCS Index							
Channel	Frequency (MHz)	MCS Index MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 42	5210	14.64	14.41	14.36	14.61	14.54	14.61	14.60	14.45	14.42	14.35
CH 58	5290	14.22	13.98	13.92	14.11	14.16	14.04	14.04	14.12	13.99	14.07
CH 106	5530	14.37	19.28	19.25	19.20	19.44	19.37	19.23	19.32	19.37	19.19
CH 138	5690	19.00									
CH 155	5775	19.51	19.20	19.40	19.24	19.50	19.38	19.42	19.34	19.36	19.33

13. Bluetooth Exclusions Applied

Mode Band	Average power(dBm)	
	Bluetooth v3.0+EDR	Bluetooth v4.0+LE
2.4GHz Bluetooth	6.0	6.0

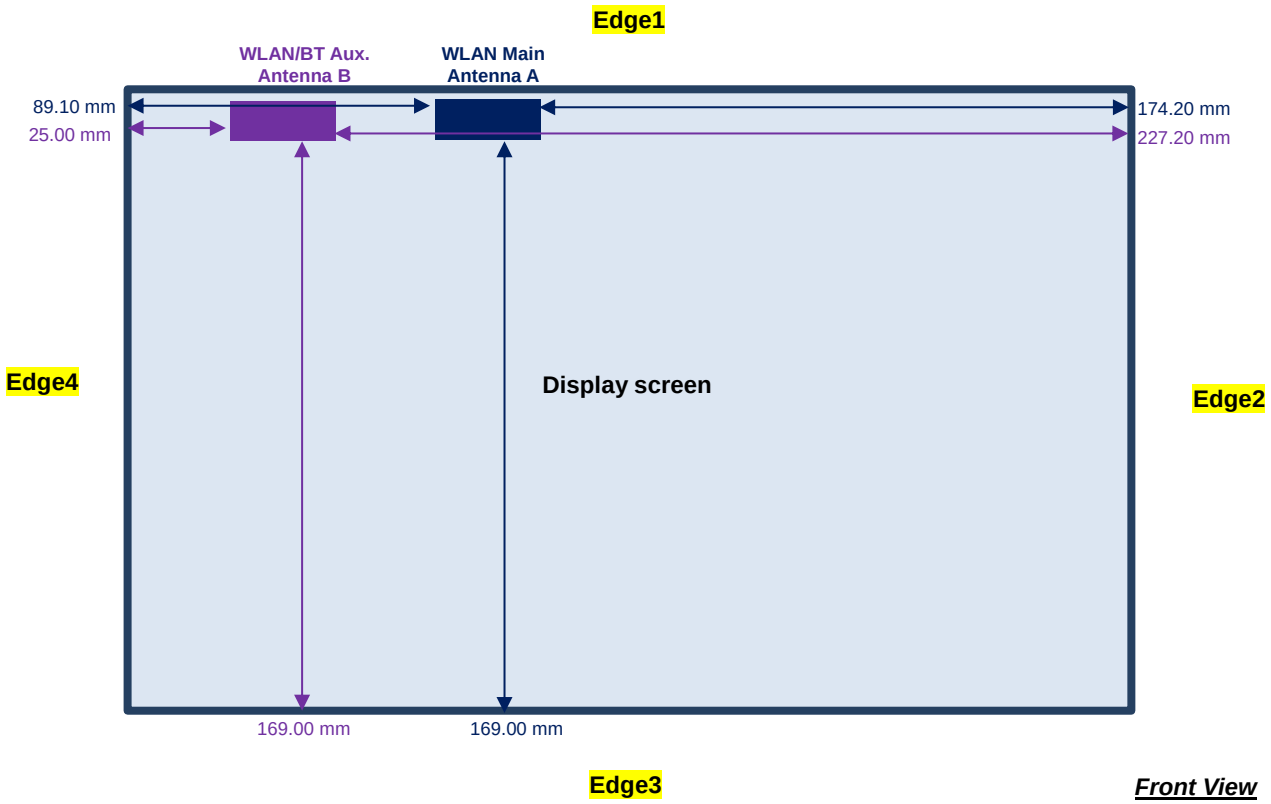
Note:

1. Per KDB 447498 D01v05r02, 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

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
6	< 5	2.48	1.26

Note:
Per KDB 447498 D01v05r02, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion. The test exclusion threshold is 1.26 which is <= 3, SAR testing is not required.

14. Antenna Location



Front 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 D01v05r02, 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 D01v05r02, 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 D01v05r02, 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 D01v05r02, 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	802.11b Ant A	802.11b Ant B	802.11a Ant A	802.11a Ant B
	Calculated Frequency	2462MHz	2462MHz	5825MHz	5825MHz
	Maximum power (dBm)	17.5.0	18.0	16.5.0	17.0
	Maximum rated power(mW)	56.0	63.0	45.0	50.0
Bottom Face	Separation distance(mm)	5	5	5	5
	exclusion threshold	17.6	19.8	21.7	24.1
	Testing required?	**Yes**	**Yes**	**Yes**	**Yes**
Edge 1	Separation distance(mm)	5.00	5.00	5.00	5.00
	exclusion threshold	17.6	19.8	21.7	24.1
	Testing required?	**Yes**	**Yes**	**Yes**	**Yes**
Edge 2	Separation distance(mm)	174.20	227.20	174.20	227.20
	exclusion threshold	1338.0	1868.0	1304.0	1834.0
	Testing required?	**No**	**No**	**No**	**No**
Edge 3	Separation distance(mm)	169.00	169.00	169.00	169.00
	exclusion threshold	1286.0	1286.0	1252.0	1252.0
	Testing required?	**No**	**No**	**No**	**No**
Edge 4	Separation distance(mm)	89.10	25.00	89.10	25.00
	exclusion threshold	487.0	4.0	453.0	4.8
	Testing required?	**No**	**Yes**	**No**	**Yes**

15. SAR Test Results

General Note:

1. Per KDB 447498 D01v05r02, 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 WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v05r02, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. When the minimum distance between antenna and device edge along the curve is less than bottom face and surface edge, the curved SAR is necessary, more detail information which can be referred to setup photo.
4. For SAR testing of the curved region of the device, the device was placed directly against the phantom at the point where the distance between the antenna and device exterior is a minimum.
5. Per KDB 865664 D01v01r03, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
6. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

15.1 Body SAR

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	Ch.	Freq. (MHz)	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 Face	0cm	Main	6	2437	17.07	17.50	1.105	98.7	1.013	-0.06	0.351	0.393
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0cm	Main	6	2437	17.07	17.50	1.105	98.7	1.013	-0.03	0.323	0.362
1	WLAN2.4GHz	802.11b 1Mbps	Curved surface of Edge 1	0cm	Main	6	2437	17.07	17.50	1.105	98.7	1.013	-0.06	0.392	**0.439**
	WLAN2.4GHz	802.11b 1Mbps	Curved surface of Edge 1	0cm	Main	1	2412	15.93	16.50	1.141	98.7	1.013	-0.07	0.301	0.348
	WLAN2.4GHz	802.11b 1Mbps	Curved surface of Edge 1	0cm	Main	11	2462	16.53	17.00	1.115	98.7	1.013	-0.02	0.366	0.413
	WLAN2.4GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Main	6	2437	17.24	17.50	1.062	98.46	1.016	-0.07	0.161	0.174
	WLAN2.4GHz	802.11b 1Mbps	Bottom Face	0cm	Aux	6	2437	17.30	18.00	1.175	98.7	1.013	-0.14	0.191	0.227
	WLAN2.4GHz	802.11b 1Mbps	Edge 1	0cm	Aux	6	2437	17.30	18.00	1.175	98.7	1.013	-0.05	0.215	0.256
	WLAN2.4GHz	802.11b 1Mbps	Edge 4	0cm	Aux	6	2437	17.30	18.00	1.175	98.7	1.013	-0.09	0.025	0.030
	WLAN2.4GHz	802.11b 1Mbps	Curved surface of Edge 1	0cm	Aux	6	2437	17.30	18.00	1.175	98.7	1.013	-0.04	0.281	0.334
	WLAN2.4GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	6	2437	17.16	18.00	1.213	95.92	1.043	-0.05	0.103	0.130

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	Ch.	Freq. (MHz)	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)
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	44	5220	14.41	14.50	1.021	98.57	1.015	-0.13	0.100	0.104
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	44	5220	14.41	14.50	1.021	98.57	1.015	-0.18	0.361	0.374
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	46	5230	16.39	16.50	1.027	96.93	1.032	-0.17	0.630	0.668
2	WLAN5GHz	802.11ac-VHT40 MCS0	Edge 1	0cm	Main	46	5230	16.01	16.50	1.119	96.97	1.031	-0.12	0.585	**0.675**
	WLAN5GHz	802.11ac-VHT40 MCS0	Edge 1	0cm	Main	38	5190	11.72	12.00	1.066	96.97	1.031	-0.1	0.222	0.244
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 1	0cm	Main	42	5210	13.34	14.50	1.308	94.07	1.063	-0.14	0.348	0.484
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Main	44	5220	14.41	14.50	1.021	98.57	1.015	0.09	0.186	0.193
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	48	5240	14.18	14.50	1.076	98.1	1.019	-0.14	0.144	0.158
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Aux	48	5240	14.18	14.50	1.076	98.1	1.019	-0.13	0.243	0.267
	WLAN5GHz	802.11a 6Mbps	Edge 4	0cm	Aux	48	5240	14.18	14.50	1.076	98.1	1.019	-0.07	0.038	0.042
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Aux	48	5240	14.18	14.50	1.076	98.1	1.019	-0.16	0.290	0.318
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	46	5230	16.19	16.50	1.075	96.93	1.032	-0.18	0.524	0.581
	WLAN5GHz	802.11ac-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	46	5230	15.86	16.50	1.160	97.56	1.025	-0.15	0.472	0.561
	WLAN5GHz	802.11ac-VHT80 MCS0	Curved surface of Edge 1	0cm	Aux	42	5210	13.49	14.50	1.263	94.07	1.063	-0.15	0.269	0.361
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	52	5260	15.36	16.00	1.159	98.57	1.015	-0.03	0.139	0.163
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	52	5260	15.36	16.00	1.159	98.57	1.015	-0.15	0.460	0.541
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	54	5270	15.95	16.50	1.136	96.93	1.032	-0.18	0.465	0.545
	WLAN5GHz	802.11ac-VHT20 MCS0	Edge 1	0cm	Main	60	5300	15.43	16.00	1.140	98.48	1.015	-0.04	0.482	0.558
3	WLAN5GHz	802.11ac-VHT40 MCS0	Edge 1	0cm	Main	54	5270	15.98	16.50	1.126	96.97	1.031	-0.1	0.562	**0.653**
	WLAN5GHz	802.11ac-VHT40 MCS0	Edge 1	0cm	Main	62	5310	12.95	13.50	1.134	96.97	1.031	-0.17	0.239	0.279
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 1	0cm	Main	58	5290	12.89	13.50	1.152	94.07	1.063	-0.14	0.285	0.349
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Main	52	5260	15.36	16.00	1.159	98.57	1.015	-0.11	0.246	0.289
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	52	5260	15.54	16.00	1.112	98.1	1.019	-0.12	0.191	0.216
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Aux	52	5260	15.54	16.00	1.112	98.1	1.019	-0.03	0.326	0.369
	WLAN5GHz	802.11a 6Mbps	Edge 4	0cm	Aux	52	5260	15.54	16.00	1.112	98.1	1.019	-0.03	0.044	0.050
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Aux	52	5260	15.54	16.00	1.112	98.1	1.019	-0.08	0.414	0.469
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	54	5270	16.21	16.50	1.070	96.93	1.032	-0.02	0.319	0.352
	WLAN5GHz	802.11ac-VHT20 MCS0	Curved surface of Edge 1	0cm	Aux	52	5260	15.51	16.00	1.120	97.97	1.021	-0.03	0.456	0.521
	WLAN5GHz	802.11ac-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	54	5270	15.89	16.50	1.152	97.56	1.025	-0.05	0.440	0.519
	WLAN5GHz	802.11ac-VHT80 MCS0	Curved surface of Edge 1	0cm	Aux	58	5290	12.89	13.50	1.152	94.07	1.063	-0.03	0.246	0.301

Plot No.	Band	Mode	Test Position	Gap (cm)	Antenna	Ch.	Freq. (MHz)	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)
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	116	5580	15.24	15.50	1.062	98.57	1.015	-0.14	0.141	0.152
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	116	5580	15.24	15.50	1.062	98.57	1.015	-0.03	0.499	0.538
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	100	5500	13.58	14.00	1.102	98.57	1.015	0.05	0.250	0.280
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	132	5660	15.12	15.50	1.091	98.57	1.015	0.04	0.419	0.464
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	134	5670	16.21	16.50	1.070	96.93	1.032	0.08	0.525	0.580
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	102	5510	12.94	14.00	1.278	96.93	1.032	-0.01	0.200	0.264
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	110	5550	16.01	16.50	1.121	96.93	1.032	0.14	0.522	0.604
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	142	5710	16.01	16.50	1.118	96.93	1.032	0.02	0.476	0.549
	WLAN5GHz	802.11n-VHT40 MCS0	Edge 1	0cm	Main	142	5710	16.08	16.50	1.102	96.97	1.031	0.06	0.492	0.559
	WLAN5GHz	802.11n-VHT40 MCS0	Edge 1	0cm	Main	102	5510	13.11	14.00	1.226	96.97	1.031	0.12	0.206	0.260
	WLAN5GHz	802.11n-VHT40 MCS0	Edge 1	0cm	Main	110	5550	15.85	16.50	1.160	96.97	1.031	-0.05	0.483	0.578
	WLAN5GHz	802.11n-VHT40 MCS0	Edge 1	0cm	Main	134	5670	16.06	16.50	1.106	96.97	1.031	-0.08	0.489	0.557
4	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 1	0cm	Main	138	5690	16.15	16.50	1.084	94.07	1.063	0.07	0.539	**0.621**
	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 1	0cm	Main	106	5530	13.47	14.00	1.131	94.07	1.063	0.04	0.249	0.299
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Main	116	5580	15.24	15.50	1.062	98.57	1.015	-0.07	0.163	0.176
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	116	5580	15.68	16.50	1.208	98.1	1.019	-0.15	0.213	0.262
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Aux	116	5580	15.68	16.50	1.208	98.1	1.019	-0.11	0.402	0.495
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Aux	100	5500	12.79	13.50	1.178	98.1	1.019	-0.14	0.282	0.338
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Aux	132	5660	15.41	16.50	1.285	98.1	1.019	-0.12	0.323	0.423
	WLAN5GHz	802.11a 6Mbps	Edge 4	0cm	Aux	116	5580	15.68	16.50	1.208	98.1	1.019	-0.18	0.054	0.066
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Aux	116	5580	15.68	16.50	1.208	98.1	1.019	-0.13	0.467	0.575
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Aux	100	5500	12.79	13.50	1.178	98.1	1.019	-0.18	0.309	0.371
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Aux	132	5660	15.41	16.50	1.285	98.1	1.019	-0.18	0.328	0.430
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	134	5670	16.66	17.00	1.083	96.93	1.032	-0.19	0.483	0.540
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	102	5510	13.21	13.50	1.070	96.93	1.032	-0.1	0.357	0.394
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	110	5550	16.15	17.00	1.217	96.93	1.032	-0.18	0.471	0.592
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	142	5710	16.02	17.00	1.254	96.93	1.032	-0.11	0.404	0.523
	WLAN5GHz	802.11n-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	134	5670	16.50	17.00	1.123	97.56	1.025	-0.02	0.442	0.509
	WLAN5GHz	802.11n-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	102	5510	13.20	13.50	1.072	97.56	1.025	-0.13	0.329	0.362
	WLAN5GHz	802.11n-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	110	5550	15.92	17.00	1.283	97.56	1.025	0.01	0.406	0.534
	WLAN5GHz	802.11n-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	142	5710	16.15	17.00	1.217	97.56	1.025	0.06	0.392	0.489
	WLAN5GHz	802.11ac-VHT80 MCS0	Curved surface of Edge 1	0cm	Aux	138	5690	16.20	17.00	1.203	94.07	1.063	-0.15	0.345	0.441
	WLAN5GHz	802.11ac-VHT80 MCS0	Curved surface of Edge 1	0cm	Aux	106	5530	13.39	13.50	1.027	94.07	1.063	-0.14	0.338	0.369
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Main	157	5785	15.60	16.00	1.096	98.57	1.015	-0.05	0.133	0.148
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Main	157	5785	15.60	16.00	1.096	98.57	1.015	-0.15	0.344	0.383
	WLAN5GHz	802.11n-HT40 MCS0	Edge 1	0cm	Main	159	5795	16.14	16.50	1.088	96.93	1.032	-0.18	0.312	0.350
	WLAN5GHz	802.11n-VHT40 MCS0	Edge 1	0cm	Main	151	5755	16.15	16.50	1.083	96.97	1.031	-0.14	0.306	0.342
5	WLAN5GHz	802.11ac-VHT80 MCS0	Edge 1	0cm	Main	155	5775	16.37	16.50	1.031	94.07	1.063	-0.11	0.384	**0.421**
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Main	157	5785	15.60	16.00	1.096	98.57	1.015	-0.12	0.120	0.134
	WLAN5GHz	802.11a 6Mbps	Bottom Face	0cm	Aux	165	5825	15.34	16.00	1.164	98.1	1.019	-0.02	0.118	0.140
	WLAN5GHz	802.11a 6Mbps	Edge 1	0cm	Aux	165	5825	15.34	16.00	1.164	98.1	1.019	-0.04	0.329	0.390
	WLAN5GHz	802.11a 6Mbps	Edge 4	0cm	Aux	165	5825	15.34	16.00	1.164	98.1	1.019	-0.08	0.055	0.065
	WLAN5GHz	802.11a 6Mbps	Curved surface of Edge 1	0cm	Aux	165	5825	15.34	16.00	1.164	98.1	1.019	-0.05	0.353	0.419
	WLAN5GHz	802.11n-HT40 MCS0	Curved surface of Edge 1	0cm	Aux	159	5795	16.02	16.50	1.118	96.93	1.032	-0.08	0.357	0.412
	WLAN5GHz	802.11n-VHT40 MCS0	Curved surface of Edge 1	0cm	Aux	151	5755	15.99	16.50	1.125	97.56	1.025	-0.03	0.348	0.401
	WLAN5GHz	802.11ac-VHT80 MCS0	Curved surface of Edge 1	0cm	Aux	155	5775	16.57	17.00	1.105	94.07	1.063	-0.08	0.345	0.405

16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Support
1.	WLAN Main Antenna + Bluetooth	Yes
2.	WLAN Main Antenna + WLAN Aux. Antenna	Yes

General Note:

1. For SAR testing was performed on single antenna RF power in SISO mode is larger or equal to the single antenna RF power in MIMO mode, and for RF exposure assessment of MIMO mode simultaneous transmission exclusion analysis was performed with SAR test results of each antenna in SISO mode.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. 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.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v05r02, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
   iii) If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.
   iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
6. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05r02 based on the formula below.
   i) (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
   iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is > 50 mm.
   iv) Bluetooth estimated SAR is conservatively determined by 5mm separation, for all applicable exposure positions.

Bluetooth Max Power	Exposure Position	All Positions
6.0 dBm	Estimated SAR (W/kg)	0.168 W/kg

16.1 Body Exposure Conditions

Band	Exposure Position	1	2	3	1+2 Summed SAR (W/kg)	1+3 Summed SAR (W/kg)
		WLAN Main Ant	WLAN Aux Ant	WLAN Bluetooth		
		SAR (W/kg)	SAR (W/kg)	Estimated SAR (W/kg)		
2.4GHz WLAN	Bottom Face at 0cm	0.393	0.227	0.168	**0.62**	**0.56**
	Edge1 at 0cm	0.362	0.256	0.168	**0.62**	**0.53**
	Edge4 at 0cm		0.030	0.168	**0.03**	**0.17**
	Curved surface of Edge1 at 0cm	0.439	0.334	0.168	**0.77**	**0.61**
5.2GHz WLAN	Bottom Face at 0cm	0.104	0.158	0.168	**0.26**	**0.27**
	Edge1 at 0cm	0.675	0.267	0.168	**0.94**	**0.84**
	Edge4 at 0cm		0.042	0.168	**0.04**	**0.17**
	Curved surface of Edge1 at 0cm	0.193	0.581	0.168	**0.77**	**0.36**
5.3GHz WLAN	Bottom Face at 0cm	0.163	0.216	0.168	**0.38**	**0.33**
	Edge1 at 0cm	0.653	0.369	0.168	**1.02**	**0.82**
	Edge4 at 0cm		0.050	0.168	**0.05**	**0.17**
	Curved surface of Edge1 at 0cm	0.289	0.521	0.168	**0.81**	**0.46**
5.5GHz WLAN	Bottom Face at 0cm	0.152	0.262	0.168	**0.41**	**0.32**
	Edge1 at 0cm	0.621	0.495	0.168	**1.12**	**0.79**
	Edge4 at 0cm		0.066	0.168	**0.07**	**0.17**
	Curved surface of Edge1 at 0cm	0.176	0.592	0.168	**0.77**	**0.34**
5.8GHz WLAN	Bottom Face at 0cm	0.148	0.140	0.168	**0.29**	**0.32**
	Edge1 at 0cm	0.421	0.390	0.168	**0.81**	**0.59**
	Edge4 at 0cm		0.065	0.168	**0.07**	**0.17**
	Curved surface of Edge1 at 0cm	0.134	0.419	0.168	**0.55**	**0.30**

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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/√3	1/√6	1/√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 Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 22.0 %**	**± 21.5 %**

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

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 25.6 %**	**± 25.2 %**

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. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

[6] FCC KDB 447498 D01 v05r02, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Feb 2014

[7] FCC KDB 616217 D04 v01r01, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, May 2013

[8] FCC KDB 865664 D01 v01r03, "SAR Measurement Requirements for 100 MHz to 6 GHz", Feb 2014.

[9] FCC KDB 865664 D02 v01r01, “RF Exposure Compliance Reporting and Documentation Considerations” May 2013.