Testing Laboratory 1190

FCC SAR TEST REPORT

FCC ID	:	**U4GSX5WB**
Equipment	:	**Rugged mobile computer with barcode reader**
Brand Name	:	**Datalogic**
Model Name	:	**Skorpio X5**
Marketing Name	:	**Skorpio X5**
Applicant	:	**Datalogic S.r.l.** **Via S. Vitalino 13, 40012 Lippo di Calderara di Reno (BO) - Italy**
Manufacturer	:	**Datalogic S.r.l.** **Via S. Vitalino 13, 40012 Lippo di Calderara di Reno (BO) - Italy**
Standard	:	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2013**

The product was received on Jun. 08, 2020 and testing was started from Jul. 09, 2020 and completed on Jul. 16, 2020. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

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History of this test report

Report No.	Version	Description	Issued Date
FA9N0606-03	01	Initial issue of report	Oct. 19, 2020

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Datalogic S.r.l., Rugged mobile computer with barcode reader, Skorpio X5, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary		Highest Simultaneous Transmission 1g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)
			Body-worn (Separation 0mm) 1g SAR (W/kg)	Extremity (Separation 0mm) 10g SAR (W/kg)		
DTS	WLAN	2.4GHz WLAN	0.34	1.77	0.34	1.77
NII		5GHz WLAN	1.19	1.98	1.20	1.98
DSS	2.4GHz Band	Bluetooth	0.01	0.01	1.20	1.98
Date of Testing:			2020/7/9 ~ 2020/7/16			

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Extremity 10g SAR) 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

Reviewed by: Jason Wang
Report Producer: Daisy Peng

2. Guidance Applied

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 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02

3. Equipment Under Test (EUT) Information

3.1 General Information

Product Feature & Specification	
Equipment Name	Rugged mobile computer with barcode reader
Brand Name	Datalogic
Model Name	Skorpio X5
Marketing Name	Skorpio X5
FCC ID	U4GSX5WB
SW Version	2.05.028.20200716 (OS: Android 10)
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8GHz Band: 5725 MHz ~ 5825 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
EUT Stage	Identical Prototype

Holster	Brand name	Datalogic
	Model name	BELT HOLSTER, SKORPIO X5

4. RF Exposure Limits

4.1 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.

4.2 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.

5. Specific Absorption Rate (SAR)

5.1 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.

5.2 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:

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

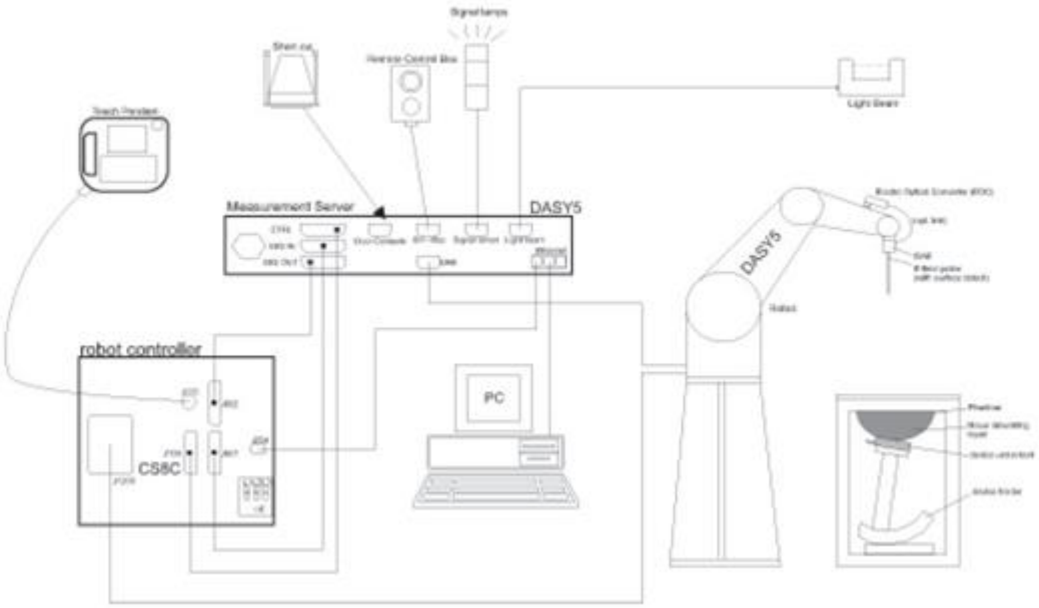
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

6. 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.

6.1 Test Side Location

Sporton Lab and below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 0007) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Test Side	SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory			
Test Site Location	TW1190 No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, CHINESE TAIPEI		TW0007 No. 58, Aly. 75, Ln. 564, Wehnua 3rd, Rd., Guishan Dist., Taoyuan City, CHINESE TAIPEI	
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY
	SAR06-HY	SAR10-HY		

6.2 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.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz – 4 GHz; Linearity: ±0.2 dB (30 MHz – 4 GHz)
Directivity	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)
Dynamic Range	5 µW/g – >100 mW/g; Linearity: ±0.2 dB
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm

<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

6.3 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

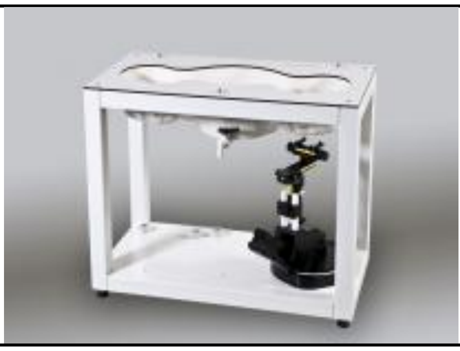
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.1 Photo of DAE

6.4 Phantom

<SAM Twin Phantom>

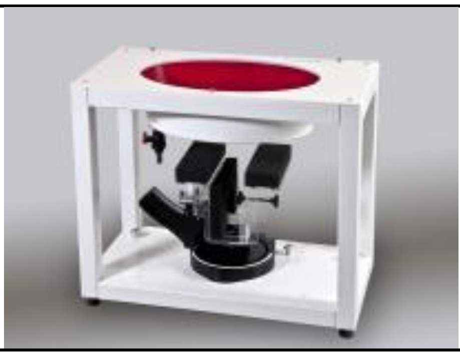
Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	Left Hand, Right Hand, Flat Phantom



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.

6.5 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

7. 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

7.1 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

7.2 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.

7.3 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.	

7.4 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.

<table>
<tr><th colspan="3"></th><th>$\leq$ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 22 mm</td></tr>
<tr><td colspan="5">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 $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 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.</td></tr>
</table>

7.5 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.

7.6 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.

8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit(2)	D2450V2	736	Aug. 31, 2018	Aug. 29, 2020
SPEAG	5GHz System Validation Kit(2)	D5GHzV2	1006	Sep. 27, 2018	Sep. 25, 2020
SPEAG	5GHz System Validation Kit	D5GHzV2	1128	Dec. 16, 2019	Dec. 15, 2020
SPEAG	Data Acquisition Electronics	DAE4	854	May. 26, 2020	May. 25, 2021
SPEAG	Data Acquisition Electronics	DAE4	1424	Jan. 24, 2020	Jan. 23, 2021
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Sep. 26, 2019	Sep. 25, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	7306	Jul. 22, 2019	Jul. 21, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	3887	Sep. 20, 2019	Sep. 19, 2020
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 12, 2019	Nov. 11, 2020
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 12, 2019	Nov. 11, 2020
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 20, 2019	Nov. 19, 2020
Agilent	ENA Network Analyzer	E5071C	MY46104758	Sep. 06, 2019	Sep. 05, 2020
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 18, 2019	Sep. 17, 2020
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3169	Sep. 10, 2019	Sep. 09, 2020
Anritsu	Power Meter	ML2495A	1036004	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Sensor	MA2411B	1027253	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Meter	ML2495A	1218006	Oct. 14, 2019	Oct. 13, 2020
Anritsu	Power Sensor	MA2411B	1207363	Oct. 14, 2019	Oct. 13, 2020
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 27, 2019	Aug. 26, 2020
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Mar. 12, 2020	Mar. 11, 2021
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2019	Oct. 15, 2020
Mini-Circuits	Power Amplifier	ZVE-8G+	6382	Aug. 12, 2019	Aug. 11, 2020
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

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.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

9. System Verification

9.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

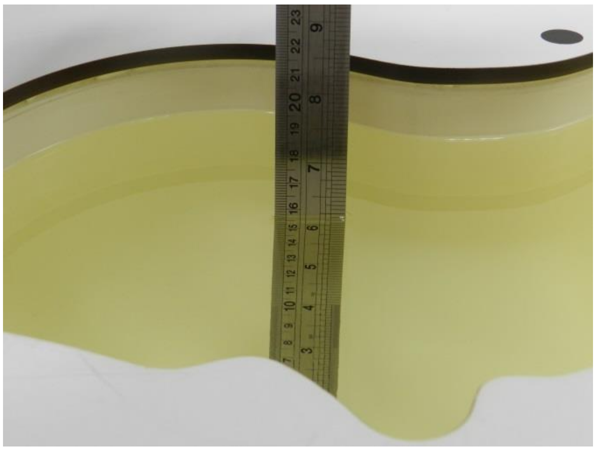


Fig 10.1Photo of Liquid Height for Head SAR

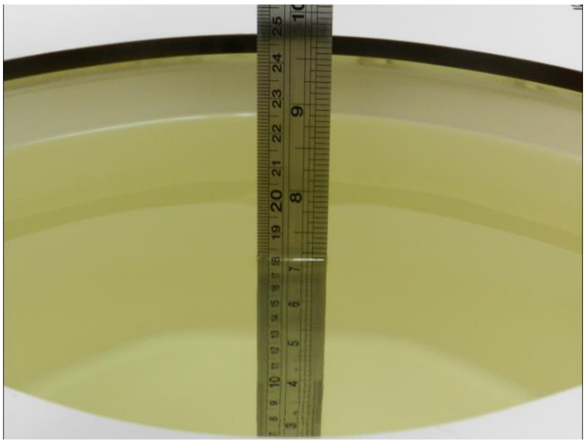


Fig 10.2 Photo of Liquid Height for Body SAR

9.2 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)
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

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)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	22.4	1.818	39.796	1.80	39.20	1.00	1.52	±5	2020/7/9
2450	22.2	1.819	39.836	1.80	39.20	1.06	1.62	±5	2020/7/11
5250	22.2	4.911	37.540	4.71	35.95	4.27	4.42	±5	2020/7/9
5250	22.2	4.911	37.540	4.71	35.95	4.27	4.42	±5	2020/7/9
5250	22.5	4.662	35.932	4.71	35.95	-1.02	-0.05	±5	2020/7/16
5600	22.2	4.848	35.261	5.07	35.50	-4.38	-0.67	±5	2020/7/10
5600	22.2	4.848	35.261	5.07	35.50	-4.38	-0.67	±5	2020/7/10
5600	22.5	5.001	35.457	5.07	35.50	-1.36	-0.12	±5	2020/7/16
5750	22.2	5.006	35.064	5.22	35.35	-4.10	-0.81	±5	2020/7/10
5750	22.5	5.158	35.251	5.22	35.35	-1.19	-0.28	±5	2020/7/16

9.3 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)	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 (%)
2020/7/9	2450	250	D2450V2-736	EX3DV4 - SN7306	DAE4 Sn1424	14.10	52.70	56.4	7.02
2020/7/11	2450	50	D2450V2-736	EX3DV4 - SN3887	DAE4 Sn1424	2.75	52.70	55	4.36
2020/7/9	5250	100	D5GHzV2-1128-5250	EX3DV4 - SN7306	DAE4 Sn1424	7.93	80.00	79.3	-0.88
2020/7/9	5250	50	D5GHzV2-1128-5250	EX3DV4 - SN3887	DAE4 Sn1424	4.25	80.00	85	6.25
2020/7/16	5250	100	D5GHzV2-1006-5250	EX3DV4 - SN3931	DAE4 Sn854	7.89	80.70	78.9	-2.23
2020/7/10	5600	100	D5GHzV2-1128-5600	EX3DV4 - SN7306	DAE4 Sn1424	8.21	82.40	82.1	-0.36
2020/7/10	5600	50	D5GHzV2-1128-5600	EX3DV4 - SN3887	DAE4 Sn1424	4.33	82.40	86.6	5.10
2020/7/16	5600	100	D5GHzV2-1006-5600	EX3DV4 - SN3931	DAE4 Sn854	8.68	83.30	86.8	4.20
2020/7/10	5750	50	D5GHzV2-1128-5750	EX3DV4 - SN3887	DAE4 Sn1424	3.88	79.10	77.6	-1.90
2020/7/16	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN3931	DAE4 Sn854	7.69	80.40	76.9	-4.35

Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2020/7/9	2450	250	D2450V2-736	EX3DV4 - SN7306	DAE4 Sn1424	6.49	24.60	25.96	5.53
2020/7/11	2450	50	D2450V2-736	EX3DV4 - SN3887	DAE4 Sn1424	1.13	24.60	22.6	-8.13
2020/7/9	5250	100	D5GHzV2-1128-5250	EX3DV4 - SN7306	DAE4 Sn1424	2.26	22.90	22.6	-1.31
2020/7/9	5250	50	D5GHzV2-1128-5250	EX3DV4 - SN3887	DAE4 Sn1424	1.21	22.90	24.2	5.68
2020/7/16	5250	100	D5GHzV2-1006-5250	EX3DV4 - SN3931	DAE4 Sn854	2.22	23.20	22.2	-4.31
2020/7/10	5600	100	D5GHzV2-1128-5600	EX3DV4 - SN7306	DAE4 Sn1424	2.29	23.60	22.9	-2.97
2020/7/10	5600	50	D5GHzV2-1128-5600	EX3DV4 - SN3887	DAE4 Sn1424	1.23	23.60	24.6	4.24
2020/7/16	5600	100	D5GHzV2-1006-5600	EX3DV4 - SN3931	DAE4 Sn854	2.43	23.80	24.3	2.10
2020/7/10	5750	50	D5GHzV2-1128-5750	EX3DV4 - SN3887	DAE4 Sn1424	1.10	22.60	22	-2.65
2020/7/16	5750	100	D5GHzV2-1006-5750	EX3DV4 - SN3931	DAE4 Sn854	2.16	22.90	21.6	-5.68

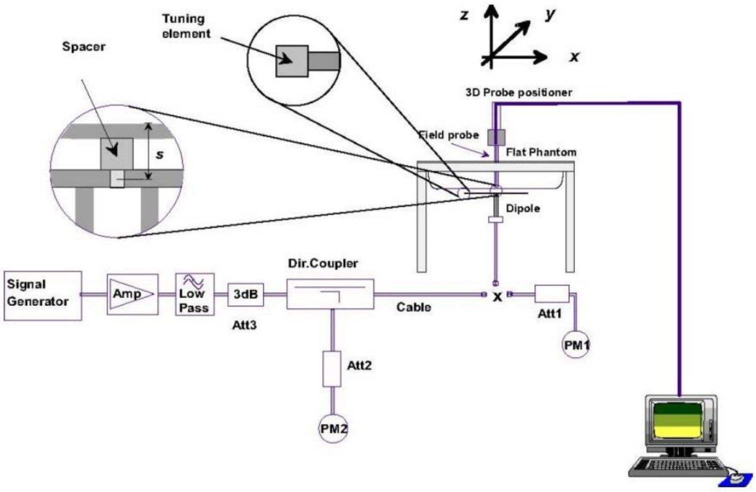


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

10. RF Exposure Positions

10.1 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 9.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are test with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

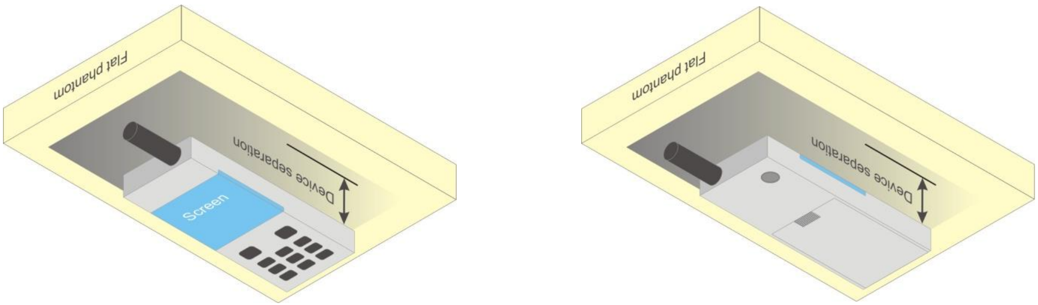


Fig 9.4 Body Worn Position

10.2 Extremity Exposure

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.

2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.6 The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

11. WiFi/Bluetooth Output Power (Unit: dBm)

General Note:

1. 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.
2. 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).
3. 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.
4. 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.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. 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.

<2.4GHz WLAN>

Transmit Antenna				Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		Duty Cycle %	Worst Case Scaling Factor		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit		Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
2.4GHz WLAN	802.11b 1Mbps	1	2412	20.14	21.00	20.46	21.00	23.31	24.0	99.20	1.219	1.132	1.172
		6	2437	20.41	21.00	20.32	21.00	23.38	24.0		1.146	1.169	1.153
		11	2462	20.40	21.00	20.01	21.00	23.22	24.0		1.148	1.256	1.197
	802.11g 6Mbps	1	2412	16.46	17.00	16.44	17.00	19.46	20.0	98.30	1.132	1.138	1.132
		6	2437	17.87	18.00	17.53	18.00	20.71	21.0		1.030	1.114	1.069
		11	2462	16.57	18.00	16.83	18.00	19.71	21.0		1.390	1.309	1.346
	802.11n-HT20 MCS0	1	2412	16.87	17.00	16.86	17.00	19.88	20.0	98.20	1.030	1.033	1.028
		6	2437	17.59	18.00	17.51	18.00	20.56	21.0		1.099	1.119	1.107
		11	2462	15.84	17.00	16.38	17.00	19.13	20.0		1.306	1.153	1.222
	802.11n-HT40 MCS0	3	2422	13.03	13.50	12.99	13.50	16.02	16.5	95.10	1.114	1.125	1.117
		6	2437	14.67	15.50	15.14	15.50	17.92	18.5		1.211	1.086	1.143
		9	2452	13.51	15.00	13.19	15.00	16.36	18.0		1.409	1.517	1.459

<5GHz WLAN>

Transmit Antenna				Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		Duty Cycle %	Worst Case Scaling Factor		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit		Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
5.2GHz WLAN	802.11a 6Mbps	36	5180	17.89	18.00	17.85	18.00	20.88	21.0	98.20	1.026	1.035	1.028
		40	5200	17.70	18.00	17.95	18.00	20.84	21.0		1.072	1.012	1.038
		44	5220	17.99	18.00	17.62	18.00	20.82	21.0		1.002	1.091	1.042
		48	5240	17.24	18.00	17.79	18.00	20.53	21.0		1.191	1.050	1.114
	802.11n-HT20 MCS0	36	5180	18.16	18.50	17.98	18.50	21.08	21.5	97.80	1.081	1.127	1.102
		40	5200	18.69	19.00	18.88	19.00	21.80	22.0		1.074	1.028	1.047
		44	5220	19.09	19.50	19.12	19.50	22.12	22.5		1.099	1.091	1.091
		48	5240	19.02	19.50	18.90	19.50	21.97	22.5		1.117	1.148	1.130
	802.11n-HT40 MCS0	38	5190	15.63	16.00	15.67	16.00	18.66	19.0	98.20	1.089	1.079	1.081
		46	5230	18.09	18.50	18.00	18.50	21.06	21.5		1.099	1.122	1.107
	802.11ac-VHT20 MCS0	36	5180	18.38	18.50	18.22	18.50	21.31	21.5	98.20	1.028	1.067	1.045
		40	5200	18.97	19.00	18.86	19.00	21.93	22.0		1.007	1.033	1.016
		44	5220	19.08	19.50	18.93	19.50	22.02	22.5		1.102	1.140	1.117
		48	5240	18.56	19.00	18.81	19.00	21.70	22.0		1.107	1.045	1.072
	802.11ac-VHT40 MCS0	38	5190	15.67	16.00	15.60	16.00	18.65	19.0	96.40	1.079	1.096	1.084
		46	5230	17.76	18.00	17.96	18.00	20.87	21.0		1.057	1.009	1.030
	802.11ac-VHT80 MCS0	42	5210	14.33	14.50	14.48	14.50	17.42	17.5	93.00	1.040	1.005	1.019

Transmit Antenna				Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		Duty Cycle %	Worst Case Scaling Factor		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit		Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
5.3GHz WLAN	802.11a 6Mbps	52	5260	17.14	18.00	17.74	18.00	20.46	21.0	98.20	1.219	1.062	1.132
		56	5280	17.52	18.00	17.18	18.00	20.36	21.0		1.117	1.208	1.159
		60	5300	16.97	18.00	17.57	18.00	20.29	21.0		1.268	1.104	1.178
		64	5320	16.65	17.50	17.25	17.50	19.97	20.5		1.216	1.059	1.130
	802.11n-HT20 MCS0	52	5260	18.30	19.50	18.78	19.50	21.56	22.5	97.80	1.318	1.180	1.242
		56	5280	18.70	19.50	18.44	19.50	21.58	22.5		1.202	1.276	1.236
		60	5300	17.90	19.50	18.60	19.50	21.27	22.5		1.445	1.230	1.327
		64	5320	17.13	18.00	17.85	18.00	20.52	21.0		1.222	1.035	1.117
	802.11n-HT40 MCS0	54	5270	17.80	18.00	17.63	18.00	20.73	21.0	98.20	1.047	1.089	1.064
		62	5310	13.77	14.00	13.42	14.00	16.61	17.0		1.054	1.143	1.094
	802.11ac-VHT20 MCS0	52	5260	18.49	19.50	18.71	19.50	21.61	22.5	98.20	1.262	1.199	1.227
		56	5280	18.66	19.50	18.51	19.50	21.60	22.5		1.213	1.256	1.230
		60	5300	18.16	19.50	18.74	19.50	21.47	22.5		1.361	1.191	1.268
		64	5320	17.48	18.50	18.12	18.50	20.82	21.5		1.265	1.091	1.169
	802.11ac-VHT40 MCS0	54	5270	17.29	18.00	17.80	18.00	20.56	21.0	96.40	1.178	1.047	1.107
		62	5310	13.09	14.50	14.10	14.50	16.63	17.5		1.384	1.096	1.222
	802.11ac-VHT80 MCS0	58	5290	11.22	12.00	11.92	12.00	14.59	15.0	93.00	1.197	1.019	1.099

Transmit Antenna				Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		Duty Cycle %	Worst Case Scaling Factor		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit		Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
5.5GHz WLAN	802.11a 6Mbps	100	5500	17.07	18.50	18.17	18.50	20.67	21.5	98.20	1.390	1.079	1.211
		116	5580	17.31	18.00	17.81	18.00	20.58	21.0		1.172	1.045	1.102
		124	5620	17.80	18.00	17.61	18.00	20.72	21.0		1.047	1.094	1.067
		132	5660	17.80	18.00	17.50	18.00	20.66	21.0		1.047	1.122	1.081
		144	5720	16.26	17.50	17.16	17.50	19.74	20.5		1.330	1.081	1.191
	802.11n-HT20 MCS0	100	5500	11.01	13.00	12.59	13.00	14.88	16.0	97.80	1.581	1.099	1.294
		116	5580	18.41	19.00	18.96	19.00	21.70	22.0		1.146	1.009	1.072
		124	5620	19.11	19.50	18.86	19.50	22.00	22.5		1.094	1.159	1.122
		132	5660	19.15	19.50	18.65	19.50	21.92	22.5		1.084	1.216	1.143
		144	5720	17.03	18.00	17.92	18.00	20.51	21.0		1.250	1.019	1.119
	802.11n-HT40 MCS0	102	5510	15.55	16.00	14.82	16.00	18.21	19.0	98.20	1.109	1.312	1.199
		110	5550	18.13	18.50	17.51	18.50	20.84	21.5		1.089	1.256	1.164
		126	5630	17.79	18.50	17.66	18.50	20.74	21.5		1.178	1.213	1.191
		134	5670	16.65	17.00	16.43	17.00	19.55	20.0		1.084	1.140	1.109
		142	5710	17.72	18.00	17.09	18.00	20.43	21.0		1.067	1.233	1.140
	802.11ac-VHT20 MCS0	100	5500	11.52	13.00	12.80	13.00	15.22	16.0	98.20	1.406	1.047	1.197
		116	5580	18.77	19.50	19.22	19.50	22.01	22.5		1.183	1.067	1.119
		124	5620	18.92	19.50	19.25	19.50	22.10	22.5		1.143	1.059	1.096
		132	5660	18.88	19.50	19.29	19.50	22.10	22.5		1.153	1.050	1.096
		144	5720	17.21	18.50	18.35	18.50	20.83	21.5		1.346	1.035	1.167
	802.11ac-VHT40 MCS0	102	5510	14.94	16.50	16.08	16.50	18.56	19.5	96.40	1.432	1.102	1.242
		110	5550	17.57	18.50	18.42	18.50	21.03	21.5		1.239	1.019	1.114
		126	5630	17.69	18.50	18.41	18.50	21.08	21.5		1.205	1.021	1.102
		134	5670	16.70	18.00	17.58	18.00	20.17	21.0		1.349	1.102	1.211
		142	5710	17.04	18.00	17.91	18.00	20.51	21.0		1.247	1.021	1.119
	802.11ac-VHT80 MCS0	106	5530	14.00	15.00	14.74	15.00	17.40	18.0	93.00	1.259	1.062	1.148
		122	5610	14.15	15.00	14.69	15.00	17.44	18.0		1.216	1.074	1.138
		138	5690	13.87	15.00	14.80	15.00	17.37	18.0		1.297	1.047	1.156

Transmit Antenna				Ant 1+2(1)		Ant 1+2(2)		Ant 1+2		Duty Cycle %	Worst Case Scaling Factor		
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit		Ant 1+2(1)	Ant 1+2(2)	Ant 1+2
5.8GHz WLAN	802.11a 6Mbps	149	5745	17.25	17.50	18.07	18.50	20.69	21.0	98.20	1.059	1.104	1.084
		157	5785	17.17	17.50	18.12	18.50	20.68	21.0		1.079	1.091	1.086
		165	5825	16.83	17.50	17.92	18.00	20.42	20.8		1.167	1.019	1.083
	802.11n-HT20 MCS0	149	5745	17.57	18.00	19.16	19.50	21.45	21.8	97.80	1.104	1.081	1.090
		157	5785	18.03	18.50	19.19	19.50	21.66	22.0		1.114	1.074	1.091
		165	5825	17.80	18.00	19.12	19.50	21.52	21.8		1.047	1.091	1.073
	802.11n-HT40 MCS0	151	5755	17.66	18.00	17.42	18.00	20.55	21.0	98.20	1.081	1.143	1.112
		159	5795	17.55	18.00	17.38	18.00	20.48	21.0		1.109	1.153	1.130
	802.11ac-VHT20 MCS0	149	5745	18.40	18.00	19.36	19.50	21.92	21.8	98.20	0.912	1.033	0.978
		157	5785	18.50	18.50	19.40	19.50	21.98	22.0		1.000	1.023	1.014
		165	5825	18.05	18.00	19.24	19.50	21.70	21.8		0.989	1.062	1.029
	802.11ac-VHT40 MCS0	151	5755	17.41	18.00	18.30	18.50	20.89	21.3	96.40	1.146	1.047	1.091
		159	5795	17.39	18.00	18.13	18.50	20.79	21.3		1.151	1.089	1.116
	802.11ac-VHT80 MCS0	155	5775	13.91	14.00	14.94	15.00	17.47	17.5	93.00	1.021	1.014	1.016

<2.4GHz Bluetooth>

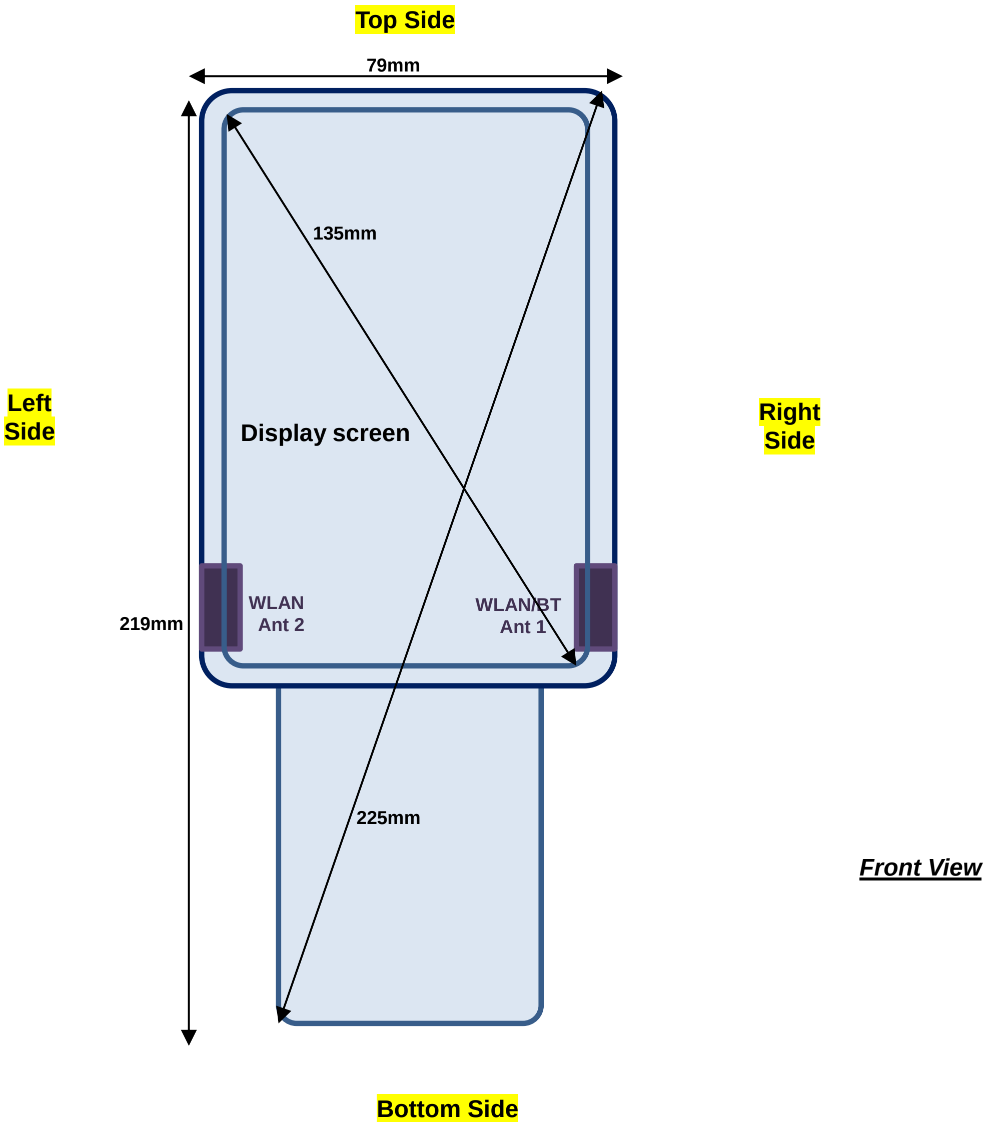
Mode	Channel	Frequency (MHz)	Average power (dBm)		
			1Mbps	2Mbps	3Mbps
BR / EDR	CH 00	2402	3.92	0.46	0.45
	CH 39	2441	4.83	1.44	1.41
	CH 78	2480	4.07	0.69	0.66
Tune-up Limit			5.00	2.00	2.00

Mode	Channel	Frequency (MHz)	Average power (dBm)	
			1Mbps	2Mbps
LE	CH 00	2402	-0.87	-1.03
	CH 19	2440	-0.24	-0.38
	CH 39	2480	-1.32	-1.47
Tune-up Limit			0	0

General Note:

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

12. Antenna Location



13. 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 WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, 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. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.

WLAN Note:

1. 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.
2. Per KDB 248227 D01v02r02, U-NII-1 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.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. 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.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.

13.1 Body Worn Accessory SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Sample	Battery	Accessories	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	Front	0mm	Ant 1+2	Wired(GUN)	STD	Trigger Handle+Holster	6	2437	20.32	21.00	1.169	99.2	1.008	0.06	0.187	0.220
	WLAN2.4GHz	802.11b 1Mbps	Front	0mm	Ant 1+2	Wireless	STD	Holster	6	2437	20.32	21.00	1.169	99.2	1.008	0.04	0.162	0.191
01	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2	Wireless	STD	Holster	6	2437	20.32	21.00	1.169	99.2	1.008	-0.08	0.284	0.335
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2	Wired	STD	Holster	6	2437	20.32	21.00	1.169	99.2	1.008	0.04	0.229	0.270
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2	Wireless	EXT	Holster	6	2437	20.32	21.00	1.169	99.2	1.008	-0.1	0.271	0.319
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2	Wireless	STD	Holster	1	2412	20.14	21.00	1.219	99.2	1.008	-0.03	0.265	0.326
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2	Wireless	STD	Holster	11	2462	20.01	21.00	1.256	99.2	1.008	-0.02	0.258	0.327
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wired(GUN)	STD	Trigger Handle+Holster	56	5280	18.44	19.50	1.276	97.8	1.022	-0.15	0.139	0.181
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wireless	STD	Holster	56	5280	18.44	19.50	1.276	97.8	1.022	0	0.269	0.351
02	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	Holster	56	5280	18.44	19.50	1.276	97.8	1.022	-0.1	0.517	0.674
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	STD	Holster	56	5280	18.44	19.50	1.276	97.8	1.022	0.07	0.407	0.531
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	56	5280	18.44	19.50	1.276	97.8	1.022	-0.03	0.476	0.621
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wired(GUN)	STD	Trigger Handle+Holster	124	5620	18.86	19.50	1.159	97.8	1.022	-0.12	0.154	0.182
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wireless	STD	Holster	124	5620	18.86	19.50	1.159	97.8	1.022	0.07	0.158	0.187
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	Holster	124	5620	18.86	19.50	1.159	97.8	1.022	-0.03	0.619	0.733
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	STD	Holster	124	5620	18.86	19.50	1.159	97.8	1.022	0.12	0.568	0.673
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	124	5620	18.86	19.50	1.159	97.8	1.022	-0.12	0.664	0.786
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	100	5500	11.01	13.00	1.581	97.8	1.022	-0.04	0.101	0.163
03	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	116	5580	18.41	19.00	1.072	97.8	1.022	0.04	0.876	0.959
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	132	5660	18.65	19.50	1.216	97.8	1.022	0.09	0.659	0.819
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	144	5720	17.03	18.00	1.140	97.8	1.022	-0.06	0.282	0.329
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wired(GUN)	STD	Trigger Handle+Holster	157	5785	18.03	18.50	1.114	97.8	1.022	0.18	0.121	0.138
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wireless	STD	Holster	157	5785	18.03	18.50	1.114	97.8	1.022	-0.09	0.129	0.147
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	Holster	157	5785	18.03	18.50	1.114	97.8	1.022	-0.01	0.884	1.007
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	STD	Holster	157	5785	18.03	18.50	1.114	97.8	1.022	0.17	0.966	1.100
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	EXT	Holster	157	5785	18.03	18.50	1.114	97.8	1.022	-0.06	1.040	1.184
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	Holster	149	5745	17.57	18.00	1.104	97.8	1.022	0.06	0.861	0.972
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	Holster	165	5825	19.12	19.50	1.091	97.8	1.022	0.02	0.873	0.974
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	STD	Holster	149	5745	17.57	18.00	1.104	97.8	1.022	-0.09	0.954	1.076
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	STD	Holster	165	5825	19.12	19.50	1.091	97.8	1.022	0.17	0.958	1.069
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	EXT	Holster	149	5745	17.57	18.00	1.104	97.8	1.022	-0.09	1.050	1.185
04	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	EXT	Holster	165	5825	19.12	19.50	1.091	97.8	1.022	-0.1	1.070	1.194

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Sample	Battery	Accessories	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	0mm	Ant 1	Wired(GUN)	STD	Trigger Handle+Holster	39	2441	4.83	5.00	1.040	0.06	0.001	0.001
	Bluetooth	1Mbps	Front	0mm	Ant 1	Wireless	STD	Holster	39	2441	4.83	5.00	1.040	0.05	0.001	0.001
05	Bluetooth	1Mbps	Back	0mm	Ant 1	Wireless	STD	Holster	39	2441	4.83	5.00	1.040	0.09	0.005	0.005
	Bluetooth	1Mbps	Back	0mm	Ant 1	Wired	STD	Holster	39	2441	4.83	5.00	1.040	-0.01	0.004	0.004
	Bluetooth	1Mbps	Back	0mm	Ant 1	Wired	EXT	Holster	39	2441	4.83	5.00	1.040	0.02	0.004	0.004
	Bluetooth	1Mbps	Back	0mm	Ant 1	Wireless	STD	Holster	00	2402	3.92	5.00	1.282	0.11	0.003	0.004
	Bluetooth	1Mbps	Back	0mm	Ant 1	Wireless	STD	Holster	78	2480	4.07	5.00	1.239	0.03	0.001	0.001

13.2 Extremity SAR

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Sample	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	0mm	Ant 1+2	Wireless	STD	6	2437	20.32	21.00	1.169	99.2	1.008	-0.02	0.212	0.250
	WLAN2.4GHz	802.11b 1Mbps	Back	0mm	Ant 1+2	Wireless	STD	6	2437	20.32	21.00	1.169	99.2	1.008	0.19	0.236	0.278
	WLAN2.4GHz	802.11b 1Mbps	Left Side	0mm	Ant 1+2	Wireless	STD	6	2437	20.32	21.00	1.169	99.2	1.008	0.1	1.150	1.356
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2	Wireless	STD	6	2437	20.32	21.00	1.169	99.2	1.008	0.08	1.370	1.615
	WLAN2.4GHz	802.11b 1Mbps	Top Side	0mm	Ant 1+2	Wireless	STD	6	2437	20.32	21.00	1.169	99.2	1.008	0.01	0.024	0.028
	WLAN2.4GHz	802.11b 1Mbps	Bottom Side	0mm	Ant 1+2	Wireless	STD	6	2437	20.32	21.00	1.169	99.2	1.008	-0.14	0.154	0.182
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2	Wireless	EXT	6	2437	20.32	21.00	1.169	99.2	1.008	-0.05	1.330	1.568
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2	Wireless	STD	1	2412	20.14	21.00	1.219	99.2	1.008	-0.05	1.300	1.597
06	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2	Wireless	STD	11	2462	20.01	21.00	1.256	99.2	1.008	0.03	1.400	1.773
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2	Wired(GUN)	STD	11	2462	20.01	21.00	1.256	99.2	1.008	0.01	1.310	1.659
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2	Wired	STD	11	2462	20.01	21.00	1.256	99.2	1.008	0.1	1.320	1.671
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wireless	STD	56	5280	18.44	19.50	1.276	97.8	1.022	-0.12	0.230	0.300
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	56	5280	18.44	19.50	1.276	97.8	1.022	-0.16	0.474	0.618
	WLAN5GHz	802.11n-HT20 MCS0	Left Side	0mm	Ant 1+2	Wireless	STD	56	5280	18.44	19.50	1.276	97.8	1.022	0.05	1.130	1.474
07	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	56	5280	18.44	19.50	1.276	97.8	1.022	-0.17	1.520	1.983
	WLAN5GHz	802.11n-HT20 MCS0	Top Side	0mm	Ant 1+2	Wireless	STD	56	5280	18.44	19.50	1.276	97.8	1.022	0.06	0.243	0.317
	WLAN5GHz	802.11n-HT20 MCS0	Bottom Side	0mm	Ant 1+2	Wireless	STD	56	5280	18.44	19.50	1.276	97.8	1.022	-0.04	0.076	0.099
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	EXT	56	5280	18.44	19.50	1.276	97.8	1.022	-0.17	1.390	1.813
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wired(GUN)	STD	56	5280	18.44	19.50	1.276	97.8	1.022	-0.02	1.420	1.852
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wired	STD	56	5280	18.44	19.50	1.276	97.8	1.022	-0.17	1.450	1.892
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wireless	STD	124	5620	18.86	19.50	1.159	97.8	1.022	-0.09	0.296	0.351
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	124	5620	18.86	19.50	1.159	97.8	1.022	-0.06	0.423	0.501
	WLAN5GHz	802.11n-HT20 MCS0	Left Side	0mm	Ant 1+2	Wireless	STD	124	5620	18.86	19.50	1.159	97.8	1.022	0.02	0.548	0.649
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	124	5620	18.86	19.50	1.159	97.8	1.022	0.14	0.782	0.926
	WLAN5GHz	802.11n-HT20 MCS0	Top Side	0mm	Ant 1+2	Wireless	STD	124	5620	18.86	19.50	1.159	97.8	1.022	0.08	0.201	0.238
	WLAN5GHz	802.11n-HT20 MCS0	Bottom Side	0mm	Ant 1+2	Wireless	STD	124	5620	18.86	19.50	1.159	97.8	1.022	0.08	0.056	0.066
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	EXT	124	5620	18.86	19.50	1.159	97.8	1.022	-0.11	0.741	0.878
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	100	5500	11.01	13.00	1.581	97.8	1.022	-0.04	0.138	0.223
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	116	5580	18.41	19.00	1.146	97.8	1.022	-0.15	0.802	0.939
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	132	5660	18.65	19.50	1.216	97.8	1.022	0.11	0.801	0.996
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	144	5720	17.03	18.00	1.250	97.8	1.022	-0.17	0.662	0.846
08	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wired(GUN)	STD	132	5660	18.65	19.50	1.216	97.8	1.022	-0.19	1.550	1.927
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wired	STD	132	5660	18.65	19.50	1.216	97.8	1.022	0.05	0.696	0.865
	WLAN5GHz	802.11n-HT20 MCS0	Front	0mm	Ant 1+2	Wireless	STD	157	5785	18.03	18.50	1.114	97.8	1.022	0.04	0.173	0.197
	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	STD	157	5785	18.03	18.50	1.114	97.8	1.022	-0.01	0.560	0.638
	WLAN5GHz	802.11n-HT20 MCS0	Left Side	0mm	Ant 1+2	Wireless	STD	157	5785	18.03	18.50	1.114	97.8	1.022	0.05	0.793	0.903
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	157	5785	18.03	18.50	1.114	97.8	1.022	-0.04	1.300	1.480
	WLAN5GHz	802.11n-HT20 MCS0	Top Side	0mm	Ant 1+2	Wireless	STD	157	5785	18.03	18.50	1.114	97.8	1.022	0.06	0.254	0.289
	WLAN5GHz	802.11n-HT20 MCS0	Bottom Side	0mm	Ant 1+2	Wireless	STD	157	5785	18.03	18.50	1.114	97.8	1.022	-0.08	0.055	0.063
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	EXT	157	5785	18.03	18.50	1.114	97.8	1.022	0.1	1.290	1.469
09	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	149	5745	17.57	18.00	1.104	97.8	1.022	-0.03	1.320	1.489
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wireless	STD	165	5825	19.12	19.50	1.091	97.8	1.022	-0.13	1.300	1.450
	WLAN5GHz	802.11n-HT20 MCS0	Right Side	0mm	Ant 1+2	Wired(GUN)	STD	149	5745	17.57	18.00	1.104	97.8	1.022	0.1	1.080	1.219

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Sample	Battery	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	Bluetooth	1Mbps	Front	0mm	Ant 1	Wireless	STD	39	2441	4.83	5.00	1.040	0.03	0.001	0.001
	Bluetooth	1Mbps	Back	0mm	Ant 1	Wireless	STD	39	2441	4.83	5.00	1.040	0.1	0.001	0.001
	Bluetooth	1Mbps	Left Side	0mm	Ant 1	Wireless	STD	39	2441	4.83	5.00	1.040	0.17	0.001	0.001
10	Bluetooth	1Mbps	Right Side	0mm	Ant 1	Wireless	STD	39	2441	4.83	5.00	1.040	0.08	0.001	0.001
	Bluetooth	1Mbps	Top Side	0mm	Ant 1	Wireless	STD	39	2441	4.83	5.00	1.040	-0.14	0.001	0.001
	Bluetooth	1Mbps	Bottom Side	0mm	Ant 1	Wireless	STD	39	2441	4.83	5.00	1.040	-0.05	0.001	0.001
	Bluetooth	1Mbps	Right Side	0mm	Ant 1	Wireless	EXT	39	2441	4.83	5.00	1.040	0.06	0.001	0.001
	Bluetooth	1Mbps	Right Side	0mm	Ant 1	Wireless	STD	00	2402	3.92	5.00	1.282	0.05	0.001	0.001
	Bluetooth	1Mbps	Right Side	0mm	Ant 1	Wireless	STD	78	2480	4.07	5.00	1.239	-0.01	0.001	0.001
	Bluetooth	1Mbps	Right Side	0mm	Ant 1	Wired(GUN)	STD	39	2441	4.83	5.00	1.040	0.03	0.001	0.001
	Bluetooth	1Mbps	Right Side	0mm	Ant 1	Wired	STD	39	2441	4.83	5.00	1.040	0.03	0.001	0.001

13.3 Repeated SAR Measurement

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Sample	Battery	Accessories	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)	Ratio	Reported 1g SAR (W/kg)
1st	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	116	5580	18.41	19.00	1.072	97.8	1.022	0.04	0.876		0.959
2nd	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wireless	EXT	Holster	116	5580	18.41	19.00	1.072	97.8	1.022	-0.01	0.824	1.06	0.902
1st	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	EXT	Holster	165	5825	19.12	19.50	1.091	97.8	1.022	-0.1	1.070		1.194
2nd	WLAN5GHz	802.11n-HT20 MCS0	Back	0mm	Ant 1+2	Wired	EXT	Holster	165	5825	19.12	19.50	1.091	97.8	1.022	-0.05	1.050	1.02	1.171

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. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured SAR*.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

14. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Body-worn	Product Specific
1.	5GHz WLAN Ant 1+2 + Bluetooth Ant 1	Yes	Yes

General Note:

1. 2.4GHz WLAN and Bluetooth cannot transmit simultaneously.
2. 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.
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v06, 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.

14.1 Body-Worn Accessory Exposure Conditions

Exposure Position	1	2	3	2+3 Summed 1g SAR (W/kg)
	2.4GHz WLAN Ant 1+2	5GHz WLAN Ant 1+2	Bluetooth Ant 1	
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
Front at 0mm	0.220	0.351	0.001	**0.352**
Back at 0mm	0.335	1.194	0.005	**1.199**

14.2 Extremity Exposure Conditions

Exposure Position	1	2	3	2+3 Summed 10g SAR (W/kg)
	2.4GHz WLAN Ant 1+2	5GHz WLAN Ant 1+2	Bluetooth Ant 1	
	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	
Front at 0mm	0.250	0.300	0.001	**0.301**
Back at 0mm	0.278	0.638	0.001	**0.639**
Left Side at 0mm	1.356	1.474	0.001	**1.475**
Right Side at 0mm	1.773	1.983	0.001	**1.984**
Top Side at 0mm	0.028	0.317	0.001	**0.318**
Bottom Side at 0mm	0.182	0.099	0.001	**0.100**

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15. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be ≤ 30%, for a confidence interval of k = 2. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

Declaration of Conformity:

The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

16. 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 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, 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.