FCC SAR Test Report

Report No.	:	**W7L-P22030011-1SA02**
Applicant	:	**Lenovo(Shanghai) Electronics Technology Co., Ltd.**
Address	:	**Section 304-305, Building No. 4, # 222, Meiyue Road, China (Shanghai) Pilot Free Trade Zone**
Manufacturer	:	**Lenovo PC HK Limited**
Address	:	**23/F, Lincoln House, Taikoo Place 979 King's Road, Quarry Bay, Hong Kong, China**
Product	:	**Portable Tablet Computer**
FCC ID	:	**O57TB132FU**
Brand	:	**Lenovo**
Model No.	:	**TB132FU**
Standards	:	**FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1992 / IEEE 1528:2013 KDB 865664 D01 v01r04 / KDB 865664 D02 v01r02 / KDB 248227 D01 v02r02 KDB 447498 D04 v01 / KDB 616217 D04 v01r02**
Sample Received Date	:	**Mar. 25, 2022**
Date of Testing	:	**Apr. 07, 2022 ~ May. 17, 2022**
FCC Designation No.	:	**CN1171 FCC Site Registration No. : 525120**

CERTIFICATION: The above equipment have been tested by **BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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Luke Lu / Manager

ACCREDITED
Certificate # 3939.01

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Release Control Record

Report No.	Reason for Change	Date Issued
W7L-P22030011SA02	Initial release	Apr. 22, 2022
W7L-P22030011-1SA02	Based on the original report W7L-P22030011SA02 (FCC ID: O57TB132FU), add 2nd source antenna. The worst case of original report was verified.	May. 20, 2022

1. Summary of Maximum SAR Value

Equipment Class	Mode	Highest Reported Body SAR_{1g} (W/kg)
DTS	2.4G WLAN	1.18
NII	5.2G WLAN	N/A
	5.3G WLAN	1.13
	5.6G WLAN	1.18
	5.8G WLAN	1.19
DSS	Bluetooth	0.45
Highest Simultaneous Transmission SAR		1.59

Note:

1. The SAR limit **(Head & Body: SAR_{1g} 1.6 W/kg, Extremity: SAR_{10g} 4.0 W/kg)** for general population / uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992.

2. Description of Equipment Under Test

EUT Type	Portable Tablet Computer
FCC ID	O57TB132FU
Brand Name	Lenovo
Model Name	TB132FU
HW Version	Lenovo Tablet TB132FU
SW Version	Lenovo TB132FU_RF01_220315
Tx Frequency Bands (Unit: MHz)	WLAN : 2412 ~ 2462, 5180 ~ 5240, 5260 ~ 5320, 5500 ~ 5720, 5745 ~ 5825 Bluetooth : 2402 ~ 2480 NFC : 13.56
Uplink Modulations	802.11b : DSSS 802.11a/g/n/ac : OFDM 802.11ax : OFDMA Bluetooth : GFSK, π/4-DQPSK, 8-DPSK NFC : ASK
Maximum Tune-up Conducted Power (Unit: dBm)	Please refer to section 4.5.1of this report.
Antenna Type	PIFA Antenna
EUT Stage	Identical Prototype

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. According to the product equivalence statement provided by the manufacturer, sample 1/2 was tested in this report. Sample 1 was full test, sample 2 verify the worst case.

SAMPLE	EUT CONFIGURATION INFORMATION
1	Front Camera 1 + Rear Camera 1 + Memory 1 + Motor 1 + PCB 1+ Battery 1+Antenna 1
2	Front Camera 2 + Rear Camera 2 + Memory 2 + Motor 2 + PCB 2+ Battery 2+Antenna 2

3. Except for sample 2 verified data, the data of sample 1 in this report are copied from the original report (Report No. : W7L-P22030011SA02, FCC ID: O57TB132FU).

WLAN scenarios:

Power Reduction	Test scenarios		CS0 SAR Sensor	CS2 SAR Sensor	CS4 SAR Sensor
Full Power	SISO / MIMO		Off	Off	Off
Reduced Power	SISO / MIMO	Ant 1	On	Off	Off
		Ant 2	Off	On(WLAN2.4G)	On(WLAN5G)
Reduced Power 1	MIMO	Ant 1	On	Off	Off
		Ant 2	Off	Off	Off
Reduced Power 2	MIMO	Ant 1	Off	Off	Off
		Ant 2	Off	On(WLAN2.4G)	On(WLAN5G)

3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

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.

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)

SAR measurement can be related to the electrical field in the tissue by

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

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

3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion form the optical into digital electric signal of the DAE and transfers data to the PC.

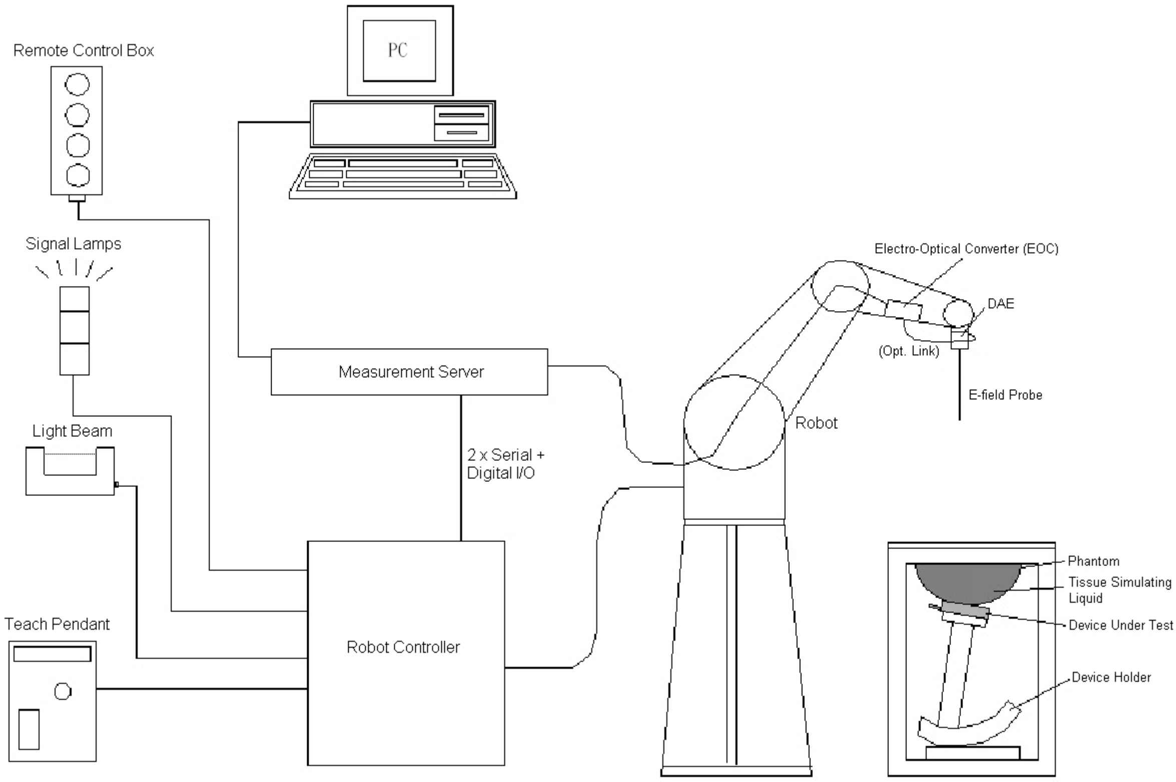


Fig-3.1 DASY System Setup

3.2.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig-3.2 DASY5

3.2.2 Probes

The SAR measurement is conducted with the dosimetric probe. 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.

Model	EX3DV4
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Model	ES3DV3
Construction	Symmetrical 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 to 4 GHz Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μW/g to 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: 2.0 mm

3.2.3 Data Acquisition Electronics (DAE)

Model	DAE3, DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 fA
Dimensions	60 x 60 x 68 mm

3.2.4 Phantoms

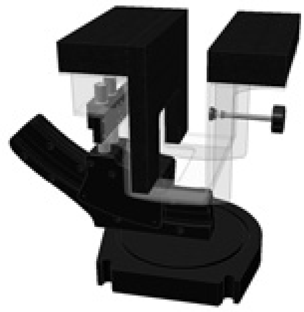
Model	Twin SAM
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters

Model	ELI
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
Material	Vinylester, glass fiber reinforced (VE-GF)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters

3.2.5 Device Holder

Model	Mounting Device
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).
Material	POM

Model	Laptop Extensions Kit
Construction	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.
Material	POM, Acrylic glass, Foam



3.2.6 System Validation Dipoles

Model	D-Serial
Construction	Symmetrical dipole with l/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.
Frequency	750 MHz to 5800 MHz
Return Loss	> 20 dB
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)

3.2.7 Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. 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. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.

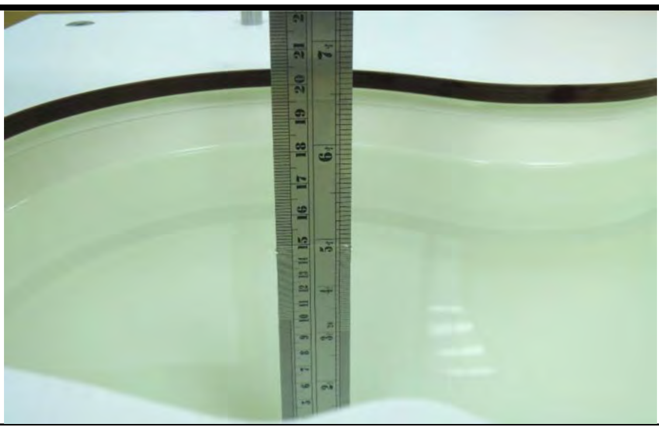
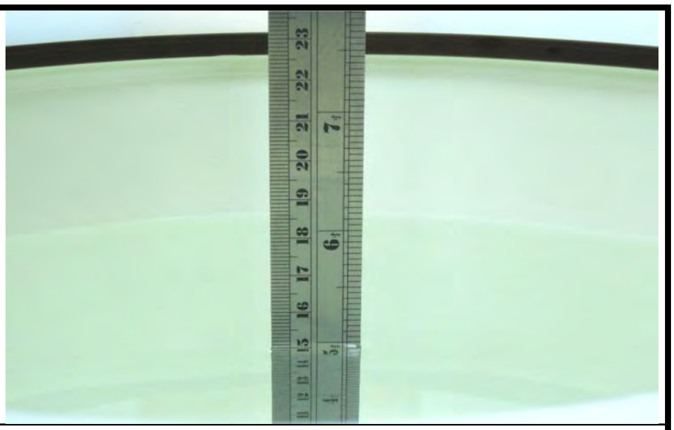
	

Photo of Liquid Height for Head Position	**Photo of Liquid Height for Body Position**

The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528, and KDB 865664 D01 Appendix A. For the body tissue simulating liquids, the dielectric properties are defined in KDB 865664 D01 Appendix A. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using a dielectric assessment kit and a network analyzer.

Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of ±5%	Target Conductivity	Range of ±5%
For Head				
750	41.9	39.8 ~ 44.0	0.89	0.85 ~ 0.93
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
900	41.5	39.4 ~ 43.6	0.97	0.92 ~ 1.02
1450	40.5	38.5 ~ 42.5	1.20	1.14 ~ 1.26
1640	40.3	38.3 ~ 42.3	1.29	1.23 ~ 1.35
1750	40.1	38.1 ~ 42.1	1.37	1.30 ~ 1.44
1800	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2000	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2300	39.5	37.5 ~ 41.5	1.67	1.59 ~ 1.75
2450	39.2	37.2 ~ 41.2	1.80	1.71 ~ 1.89
2600	39.0	37.1 ~ 41.0	1.96	1.86 ~ 2.06
3500	37.9	36.0 ~ 39.8	2.91	2.76 ~ 3.06
5200	36.0	34.2 ~ 37.8	4.66	4.43 ~ 4.89
5300	35.9	34.1 ~ 37.7	4.76	4.52 ~ 5.00
5500	35.6	33.8 ~ 37.4	4.96	4.71 ~ 5.21
5600	35.5	33.7 ~ 37.3	5.07	4.82 ~ 5.32
5800	35.3	33.5 ~ 37.1	5.27	5.01 ~ 5.53

The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H900	0.2	-	0.2	1.4	58.0	-	40.2	-
H1450	-	43.3	-	0.6	-	-	56.1	-
H1640	-	45.8	-	0.5	-	-	53.7	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1800	-	44.5	-	0.3	-	-	55.2	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2000	-	44.5	-	0.1	-	-	55.4	-
H2300	-	44.9	-	0.1	-	-	55.0	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H2600	-	45.1	-	0.1	-	-	54.8	-
H3500	-	8.0	-	0.2	-	20.0	71.8	-
H5G	-	-	-	-	-	17.2	65.5	17.3

3.3 SAR System Verification

The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

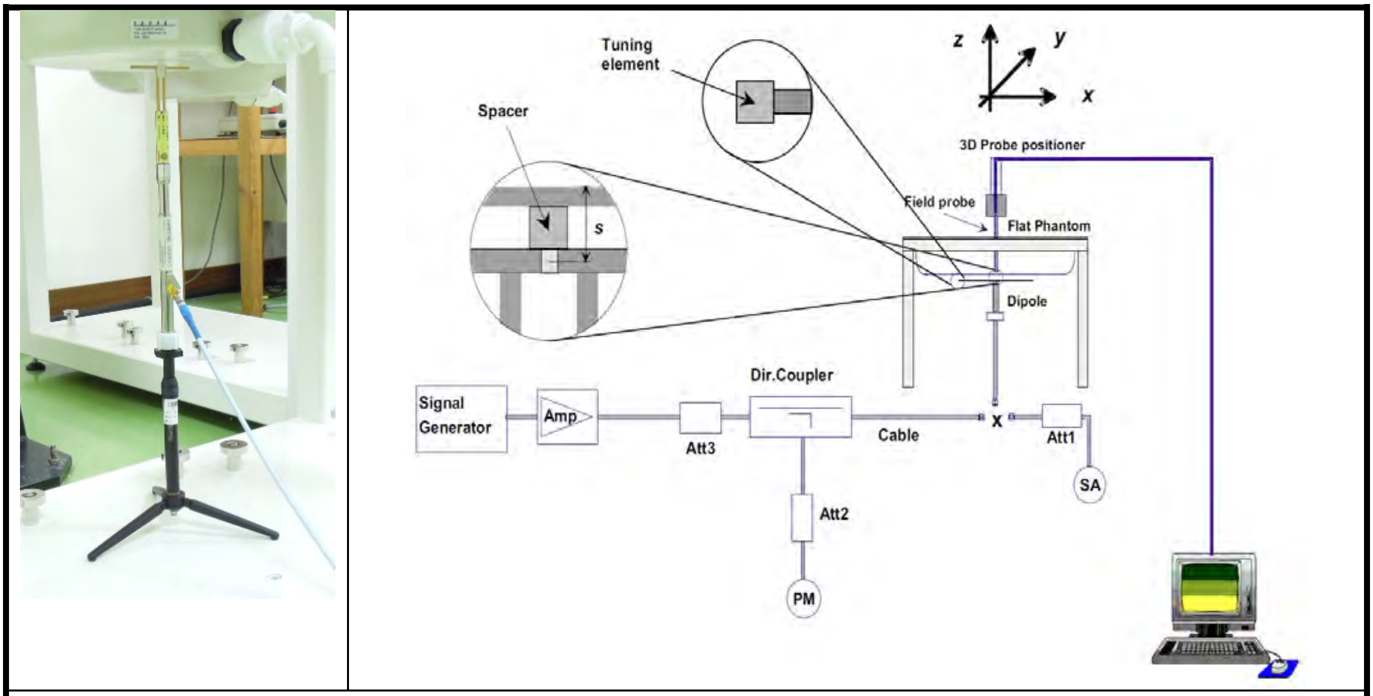


Fig-3.4 System Verification Setup

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The spectrum analyzer measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

3.4 SAR Measurement Procedure

According to the SAR 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

The SAR measurement procedures for each of test conditions are as follows:

(a) Make EUT to transmit maximum output power
(b) Measure conducted output power through RF cable
(c) Place the EUT in the specific position of phantom
(d) Perform SAR testing steps on the DASY system
(e) Record the SAR value

3.4.1 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. According to KDB 865664 D01, the resolution for Area and Zoom scan is specified in the table below.

Items	<= 2 GHz	2-3 GHz	3-4 GHz	4-5 GHz	5-6 GHz
Area Scan (Δx, Δy)	<= 15 mm	<= 12 mm	<= 12 mm	<= 10 mm	<= 10 mm
Zoom Scan (Δx, Δy)	<= 8 mm	<= 5 mm	<= 5 mm	<= 4 mm	<= 4 mm
Zoom Scan (Δz)	<= 5 mm	<= 5 mm	<= 4 mm	<= 3 mm	<= 2 mm
Zoom Scan Volume	>= 30 mm	>= 30 mm	>= 28 mm	>= 25 mm	>= 22 mm

Note:

When zoom scan is required and report SAR is <= 1.4 W/kg, the zoom scan resolution of Δx / Δy (2-3GHz: <= 8 mm, 3-4GHz: <= 7 mm, 4-6GHz: <= 5 mm) may be applied.

3.4.2 Volume Scan Procedure

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.

3.4.3 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 drift more than 5%, the SAR will be retested.

3.4.4 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

3.4.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

<Considerations Related to Proximity Sensor>

The device supports WLAN, and Bluetooth capabilities. It is designed with three proximity sensor which can trigger/not trigger power reduction for WLAN on Rear Face Left Side and Top Side of EUT for SAR compliance. Others RF capability (Bluetooth) have no power reduction. The power levels for all wireless technologies and the power reduction please refer to section 4.5 of this report.

Proximity Sensor Triggering Distances (KDB 616217 D04 §6.2)

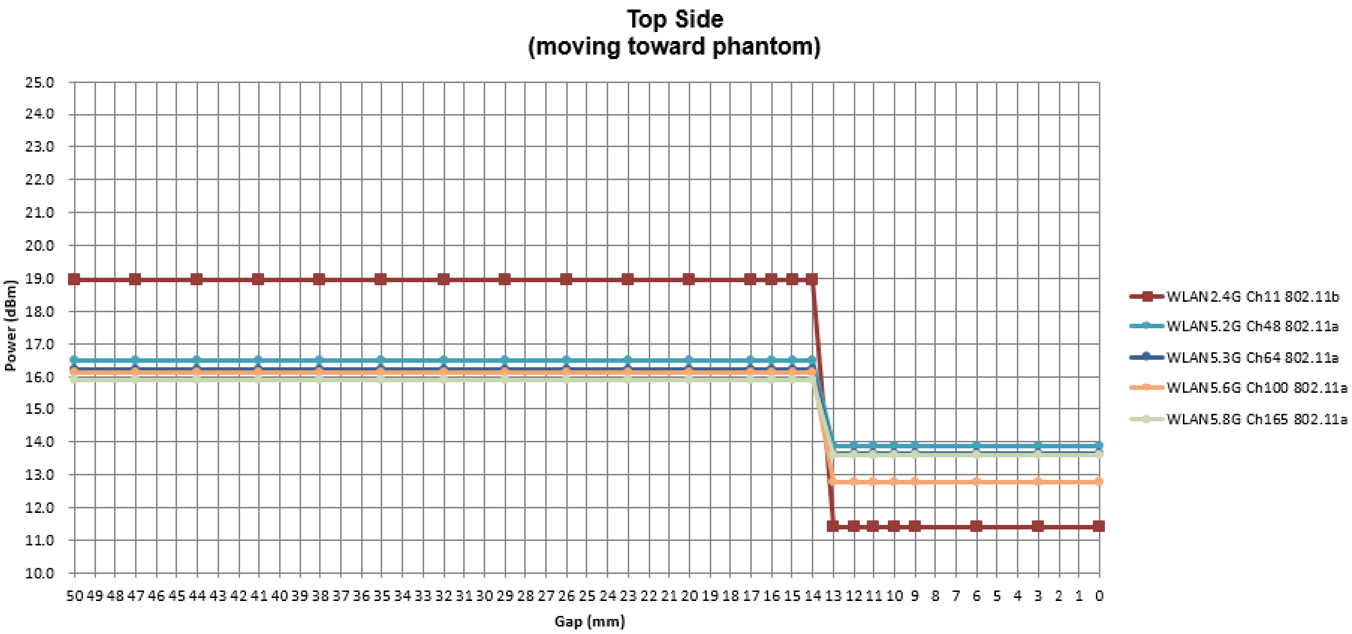
The proximity sensor triggering distance was determined per KDB 616217 for rear face and applicable edge. Summary for power verification per distance was tabulated in the below table.

cs0 Sensor

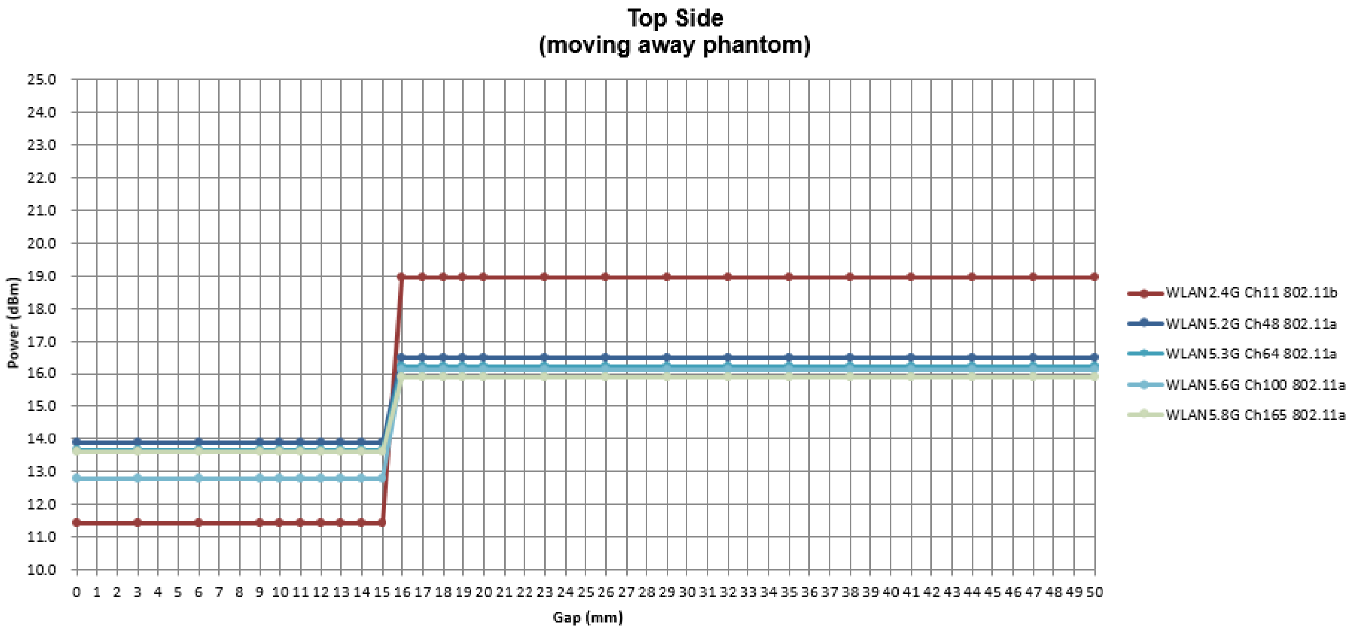
Output Power Verification in dBm for EUT Rear Face (moving toward phantom)											
Distance (mm)	9	10	11	12	13	14	15	16	17	18	19
WLAN2.4G Ch11 (802.11b)	11.42	11.42	11.42	11.42	11.42	18.94	18.94	18.94	18.94	18.94	18.94
WLAN5.2G Ch48 (802.11a)	13.87	13.87	13.87	13.87	13.87	16.48	16.48	16.48	16.48	16.48	16.48
WLAN5.3G Ch64 (802.11a)	13.66	13.66	13.66	13.66	13.66	16.19	16.19	16.19	16.19	16.19	16.19
WLAN5.6G Ch100 (802.11a)	12.79	12.79	12.79	12.79	12.79	16.12	16.12	16.12	16.12	16.12	16.12
WLAN5.8G Ch165 (802.11a)	13.60	13.60	13.60	13.60	13.60	15.89	15.89	15.89	15.89	15.89	15.89

Output Power Verification in dBm for EUT Rear Face (moving away phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN2.4G Ch11 (802.11b)	11.42	11.42	11.42	11.42	11.42	18.94	18.94	18.94	18.94	18.94	18.94
WLAN5.2G Ch48 (802.11a)	13.87	13.87	13.87	13.87	13.87	16.48	16.48	16.48	16.48	16.48	16.48
WLAN5.3G Ch64 (802.11a)	13.66	13.66	13.66	13.66	13.66	16.19	16.19	16.19	16.19	16.19	16.19
WLAN5.6G Ch100 (802.11a)	12.79	12.79	12.79	12.79	12.79	16.12	16.12	16.12	16.12	16.12	16.12
WLAN5.8G Ch165 (802.11a)	13.60	13.60	13.60	13.60	13.60	15.89	15.89	15.89	15.89	15.89	15.89

Output Power Verification in dBm for EUT Top Side (moving toward phantom)											
Distance (mm)	9	10	11	12	13	14	15	16	17	18	19
WLAN2.4G Ch11 （802.11b）	11.42	11.42	11.42	11.42	11.42	18.94	18.94	18.94	18.94	18.94	18.94
WLAN5.2G Ch48 （802.11a）	13.87	13.87	13.87	13.87	13.87	16.48	16.48	16.48	16.48	16.48	16.48
WLAN5.3G Ch64 （802.11a）	13.66	13.66	13.66	13.66	13.66	16.19	16.19	16.19	16.19	16.19	16.19
WLAN5.6G Ch100 （802.11a）	12.79	12.79	12.79	12.79	12.79	16.12	16.12	16.12	16.12	16.12	16.12
WLAN5.8G Ch165 （802.11a）	13.60	13.60	13.60	13.60	13.60	15.89	15.89	15.89	15.89	15.89	15.89



Output Power Verification in dBm for EUT Top Side (moving away phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN2.4G Ch11 （802.11b）	11.42	11.42	11.42	11.42	11.42	18.94	18.94	18.94	18.94	18.94	18.94
WLAN5.2G Ch48 （802.11a）	13.87	13.87	13.87	13.87	13.87	16.48	16.48	16.48	16.48	16.48	16.48
WLAN5.3G Ch64 （802.11a）	13.66	13.66	13.66	13.66	13.66	16.19	16.19	16.19	16.19	16.19	16.19
WLAN5.6G Ch100 （802.11a）	12.79	12.79	12.79	12.79	12.79	16.12	16.12	16.12	16.12	16.12	16.12
WLAN5.8G Ch165 （802.11a）	13.60	13.60	13.60	13.60	13.60	15.89	15.89	15.89	15.89	15.89	15.89



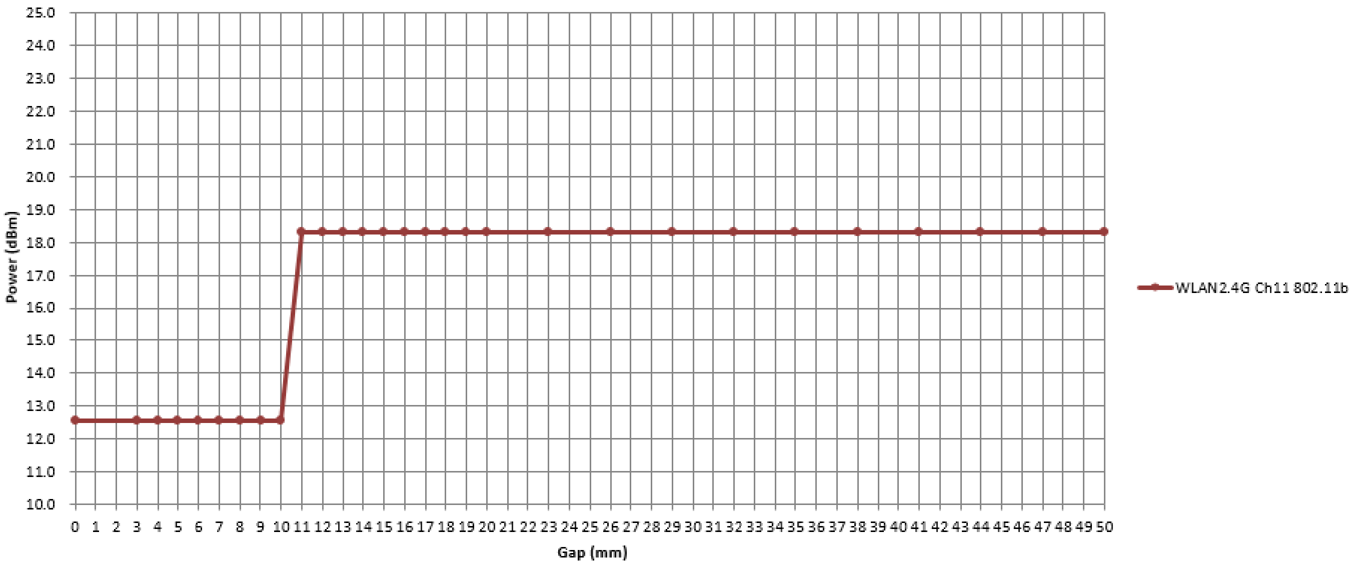
cs2 Sensor

Output Power Verification in dBm for EUT Rear Face (moving toward phantom)											
Distance (mm)	4	5	6	7	8	9	10	11	12	13	14
WLAN2.4G Ch11 (802.11b)	12.57	12.57	12.57	12.57	12.57	18.32	18.32	18.32	18.32	18.32	18.32

Rear Face (moving toward phantom)

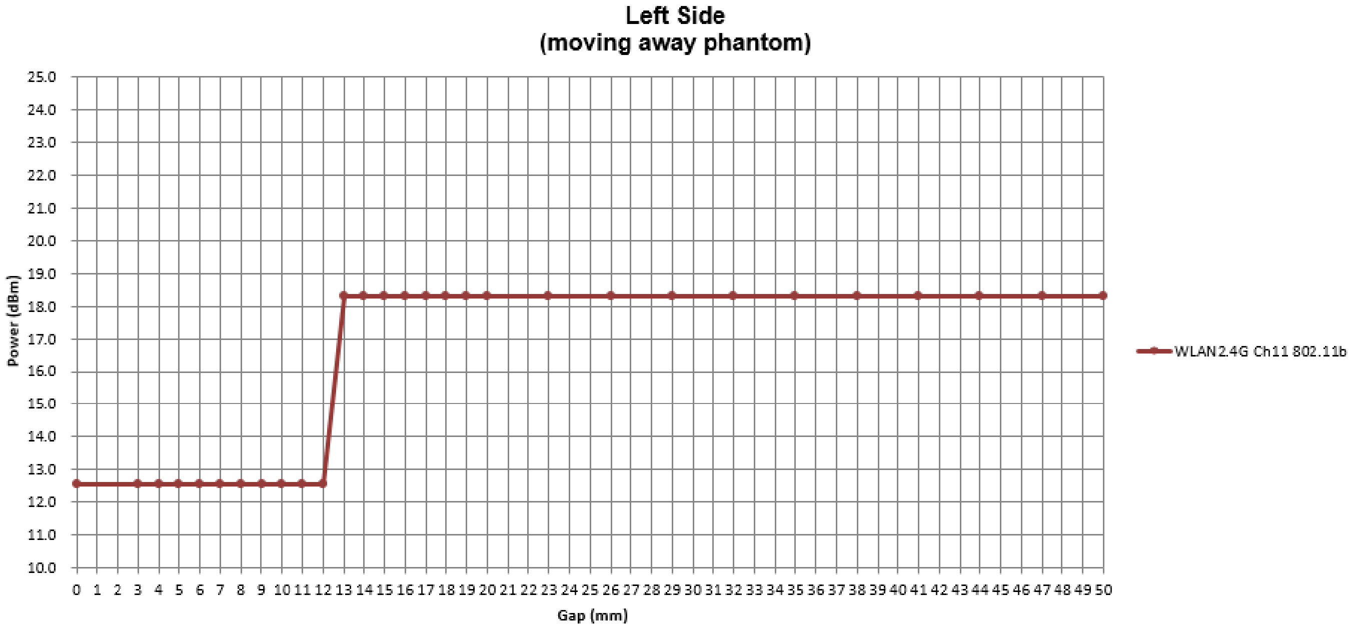
Output Power Verification in dBm for EUT Rear Face (moving away phantom)											
Distance (mm)	6	7	8	9	10	11	12	13	14	15	16
WLAN2.4G Ch11 (802.11b)	12.57	12.57	12.57	12.57	12.57	18.32	18.32	18.32	18.32	18.32	18.32

Rear Face (moving away phantom)



Output Power Verification in dBm for EUT Left Side (moving toward phantom)											
Distance (mm)	6	7	8	9	10	11	12	13	14	15	16
WLAN2.4G Ch11 （802.11b）	12.57	12.57	12.57	12.57	12.57	18.32	18.32	18.32	18.32	18.32	18.32

Output Power Verification in dBm for EUT Left Side (moving away phantom)											
Distance (mm)	8	9	10	11	12	13	14	15	16	17	18
WLAN2.4G Ch11 （802.11b）	12.57	12.57	12.57	12.57	12.57	18.32	18.32	18.32	18.32	18.32	18.32

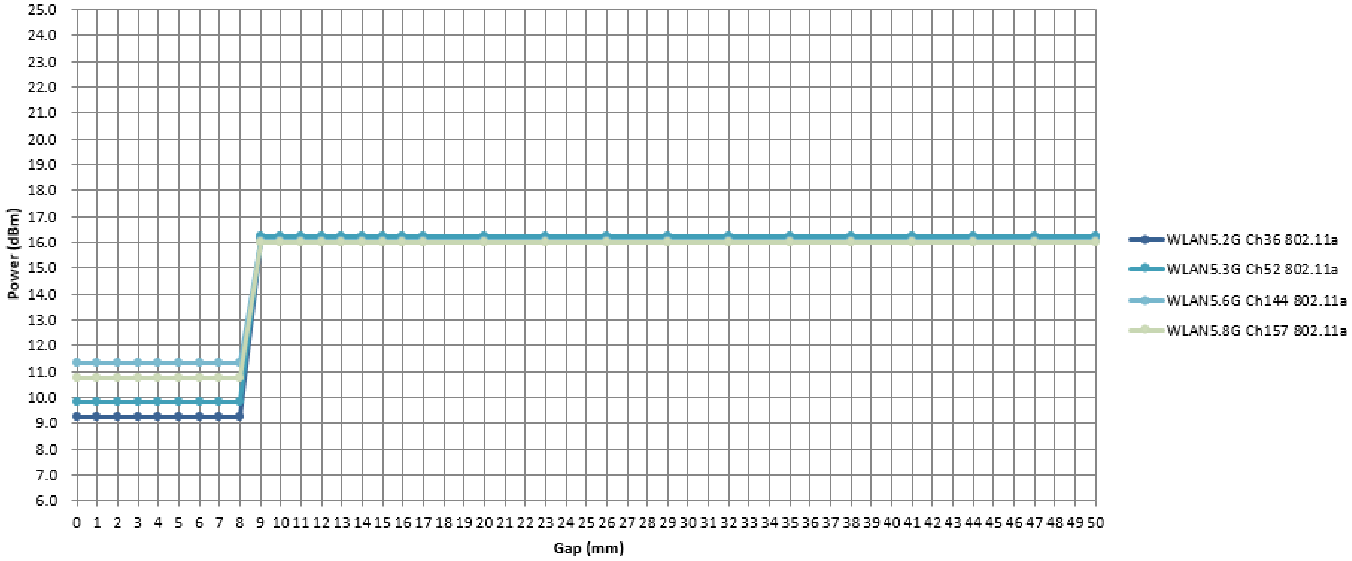


cs4 Sensor

Output Power Verification in dBm for EUT Rear Face (moving toward phantom)											
Distance (mm)	2	3	4	5	6	7	8	9	10	11	12
WLAN5.2G Ch36 (802.11a)	9.26	9.26	9.26	9.26	9.26	16.10	16.10	16.10	16.10	16.10	16.10
WLAN5.3G Ch52 (802.11a)	9.80	9.80	9.80	9.80	9.80	16.22	16.22	16.22	16.22	16.22	16.22
WLAN5.6G Ch144 (802.11a)	11.32	11.32	11.32	11.32	11.32	16.03	16.03	16.03	16.03	16.03	16.03
WLAN5.8G Ch157 (802.11a)	10.76	10.76	10.76	10.76	10.76	15.97	15.97	15.97	15.97	15.97	15.97

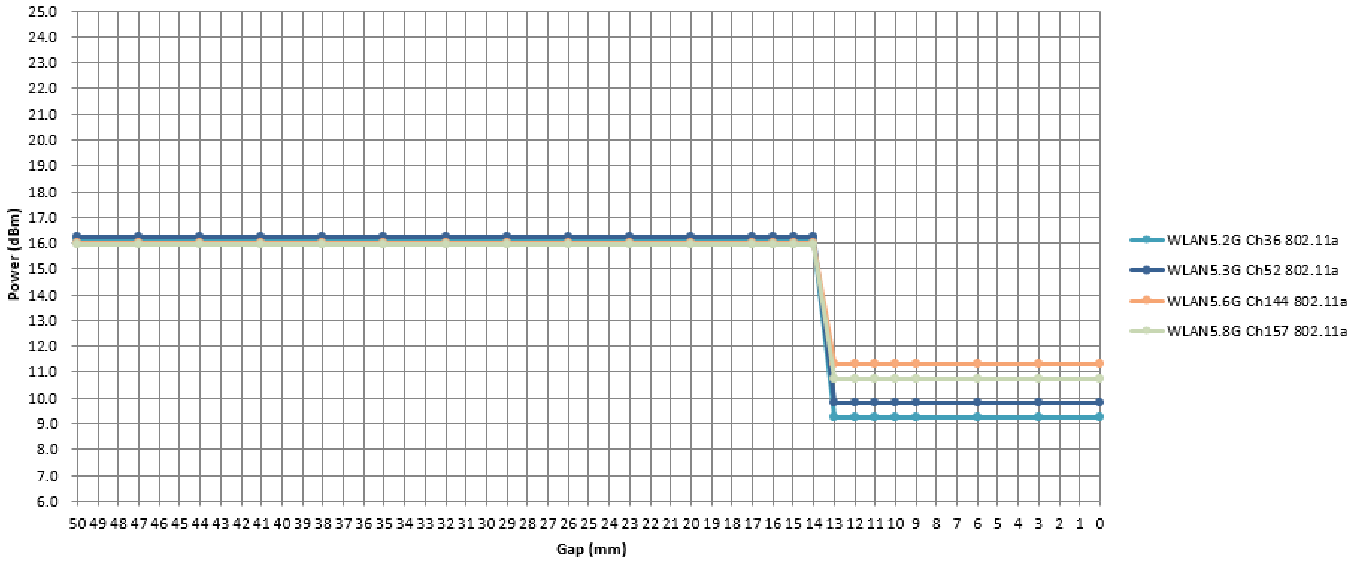
Output Power Verification in dBm for EUT Rear Face (moving away phantom)											
Distance (mm)	4	5	6	7	8	9	10	11	12	13	14
WLAN5.2G Ch36 (802.11a)	9.26	9.26	9.26	9.26	9.26	16.10	16.10	16.10	16.10	16.10	16.10
WLAN5.3G Ch52 (802.11a)	9.80	9.80	9.80	9.80	9.80	16.22	16.22	16.22	16.22	16.22	16.22
WLAN5.6G Ch144 (802.11a)	11.32	11.32	11.32	11.32	11.32	16.03	16.03	16.03	16.03	16.03	16.03
WLAN5.8G Ch157 (802.11a)	10.76	10.76	10.76	10.76	10.76	15.97	15.97	15.97	15.97	15.97	15.97

Rear Face
(moving away phantom)

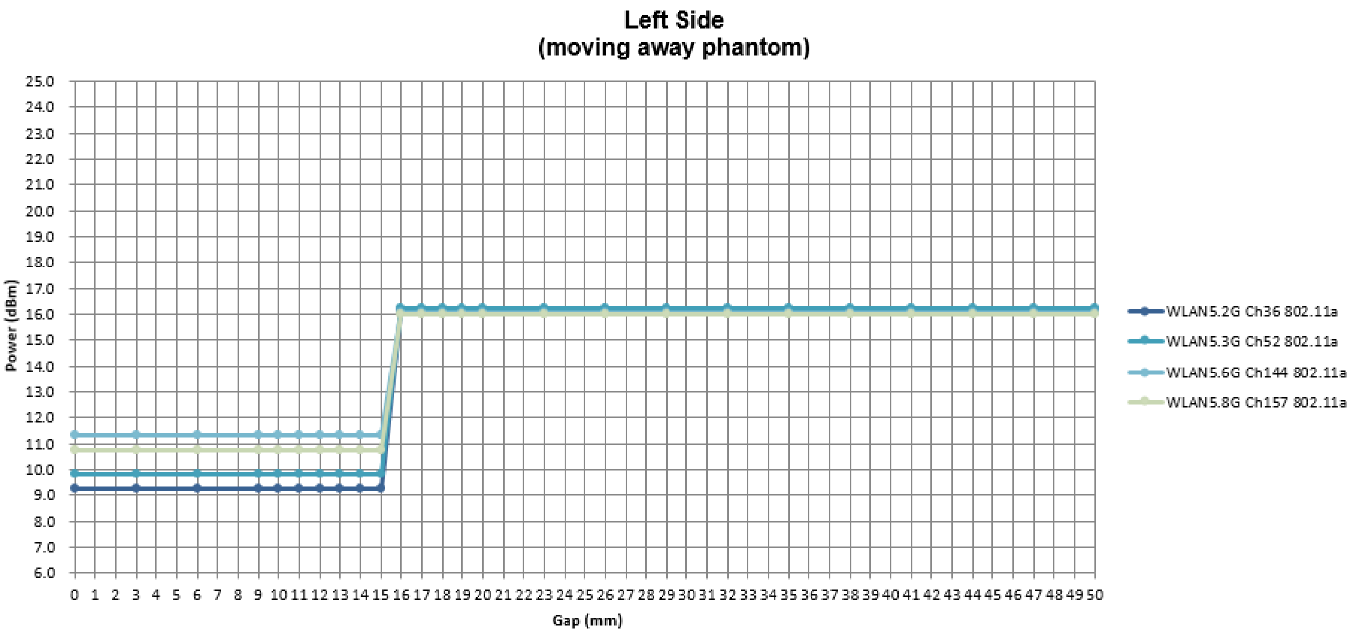


Output Power Verification in dBm for EUT Left Side (moving toward phantom)											
Distance (mm)	9	10	11	12	13	14	15	16	17	18	19
WLAN5.2G Ch36 (802.11a)	9.26	9.26	9.26	9.26	9.26	16.10	16.10	16.10	16.10	16.10	16.10
WLAN5.3G Ch52 (802.11a)	9.80	9.80	9.80	9.80	9.80	16.22	16.22	16.22	16.22	16.22	16.22
WLAN5.6G Ch144 (802.11a)	11.32	11.32	11.32	11.32	11.32	16.03	16.03	16.03	16.03	16.03	16.03
WLAN5.8G Ch157 (802.11a)	10.76	10.76	10.76	10.76	10.76	15.97	15.97	15.97	15.97	15.97	15.97

Left Side
(moving toward phantom)



Output Power Verification in dBm for EUT Left Side (moving away phantom)											
Distance (mm)	11	12	13	14	15	16	17	18	19	20	21
WLAN5.2G Ch36 （802.11a）	9.26	9.26	9.26	9.26	9.26	16.10	16.10	16.10	16.10	16.10	16.10
WLAN5.3G Ch52 （802.11a）	9.80	9.80	9.80	9.80	9.80	16.22	16.22	16.22	16.22	16.22	16.22
WLAN5.6G Ch144 （802.11a）	11.32	11.32	11.32	11.32	11.32	16.03	16.03	16.03	16.03	16.03	16.03
WLAN5.8G Ch157 （802.11a）	10.76	10.76	10.76	10.76	10.76	15.97	15.97	15.97	15.97	15.97	15.97



Proximity Sensor Coverage (KDB 616217 D04 §6.3)

Since the proximity sensor is collocated with antenna in one component, the procedure for proximity sensor coverage is not required.

Proximity Sensor Tilt Angle Influences(KDB 616217 D04 §6.4)

The proximity sensor tilt angle influence was determined per KDB 616217 for applicable edge. Summary for proximity sensor tilt angle influence is shown in below.

cs0 Sensor

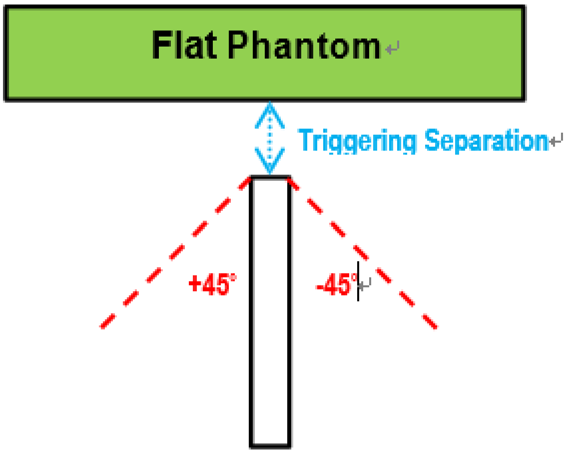
Orientation	Separation Distance (mm)	Tilt Angle										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
Top Side	13	On	On	On	On	On	On	On	On	On	On	On

cs2 Sensor

Orientation	Separation Distance (mm)	Tilt Angle										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
Left Side	10	On	On	On	On	On	On	On	On	On	On	On

cs4 Sensor

Orientation	Separation Distance (mm)	Tilt Angle										
		-45°	-40°	-30°	-20°	-10°	0°	10°	20°	30°	40°	45°
Left Side	6	On	On	On	On	On	On	On	On	On	On	On



Summary for Proximity Sensor Triggering Test

According to the procedures noticed in KDB 616217 D04,

The WLAN for proximity cs0 sensor triggering distance is 13 mm for EUT Rear Face and 13 mm for Top Side. The separation distance of 13 mm determined by the smallest triggering distance on Top Side is used to access the tilt angle influence and the sensor does not release during ±45 degree. Therefore, the smallest separation distance for tilt angle influence is 13 mm for the Top Side. The conservation triggering distances based on the separation distance for the sensor trigger / not triggered as EUT with power reduction at 0 mm, and EUT without power reduction at 12 mm for EUT Rear Face and 12 mm for Top Side were used to test SAR.

The WLAN for proximity cs2 sensor triggering distance is 8 mm for EUT Rear Face and 10 mm for Left Side. The separation distance of 10 mm determined by the smallest triggering distance on Left Side is used to access the tilt angle influence and the sensor does not release during ±45 degree. Therefore, the smallest separation distance for tilt angle influence is 10 mm for the Left Side. The conservation triggering distances based on the separation distance for the sensor trigger / not triggered as EUT with power reduction at 0 mm, and EUT without power reduction at 7 mm for EUT Rear Face and 9 mm for Left Side were used to test SAR.

The WLAN for proximity cs4 sensor triggering distance is 6 mm for EUT Rear Face and 6 mm for Left Side. The separation distance of 6 mm determined by the smallest triggering distance on Left Side is used to access the tilt angle influence and the sensor does not release during ±45 degree. Therefore, the smallest separation distance for tilt angle influence is 6 mm for the Left Side. The conservation triggering distances based on the separation distance for the sensor trigger / not triggered as EUT with power reduction at 0 mm, and EUT without power reduction at 5 mm for EUT Rear Face and 5 mm for Left Side were used to test SAR.

The power reduction is depends on the proximity sensor input. For a steady SAR test, the power reduction was enabled or disabled manually by engineering software during SAR testing.

<Considerations Related to WLAN for Setup and Testing>

In general, various vendor specific external test software and chipset based internal test modes are typically used for SAR measurement. These chipset based test mode utilities are generally hardware and manufacturer dependent, and often include substantial flexibility to reconfigure or reprogram a device. A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement. The test frequencies established using test mode must correspond to the actual channel frequencies. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. In addition, a periodic transmission duty factor is required for current generation SAR systems to measure SAR correctly. The reported SAR must be scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

According to KDB 248227 D01, this device has installed WLAN engineering testing software which can provide continuous transmitting RF signal. During WLAN SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

Initial Test Configuration

An initial test configuration is determined for OFDM transmission modes in 2.4 GHz and 5 GHz bands according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. 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 in the initial test configuration, for each frequency band.

Subsequent Test Configuration

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. Additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. When the highest reported SAR for the initial test configuration according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.

SAR Test Configuration and Channel Selection

When multiple channel bandwidth configurations in a frequency band have the same specified maximum output

power, the initial test configuration is using largest channel bandwidth, lowest order modulation, lowest data rate, and lowest order 802.11 mode (i.e., 802.11a is chosen over 802.11n then 802.11ac or 802.11g is chosen over 802.11n). After an initial test configuration is determined, if multiple test channels have the same measured maximum output power, the channel chosen for SAR measurement is determined according to the following.
1) The channel closest to mid-band frequency is selected for SAR measurement.
2) For channels with equal separation from mid-band frequency; for example, high and low channels or two mid-band channels, the higher frequency (number) channel is selected for SAR measurement.

Test Reduction for U-NII-1 (5.2 GHz) and U-NII-2A (5.3 GHz) Bands
For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following.
1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition).
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

<Considerations Related to Bluetooth for Setup and Testing>
This device has installed Bluetooth engineering testing software which can provide continuous transmitting RF signal. During Bluetooth SAR testing, this device was operated to transmit continuously at the maximum transmission duty with specified transmission mode, operating frequency, lowest data rate, and maximum output power.

4.2 EUT Testing Position

4.2.1 Body Exposure Conditions

For full-size tablet, according to KDB 616217 D04, SAR evaluation is required for back surface and edges of the devices. The back surface and edges of the tablet are tested with the tablet touching the phantom. Exposures from antennas through the front surface of the display section of a tablet are generally limited to the user's hands. Exposures to hands for typical consumer transmitters used in tablets are not expected to exceed the extremity SAR limit; therefore, SAR evaluation for the front surface of tablet display screens are generally not necessary. When voice mode is supported on a tablet and it is limited to speaker mode or headset operations only, additional SAR testing for this type of voice use is not required.

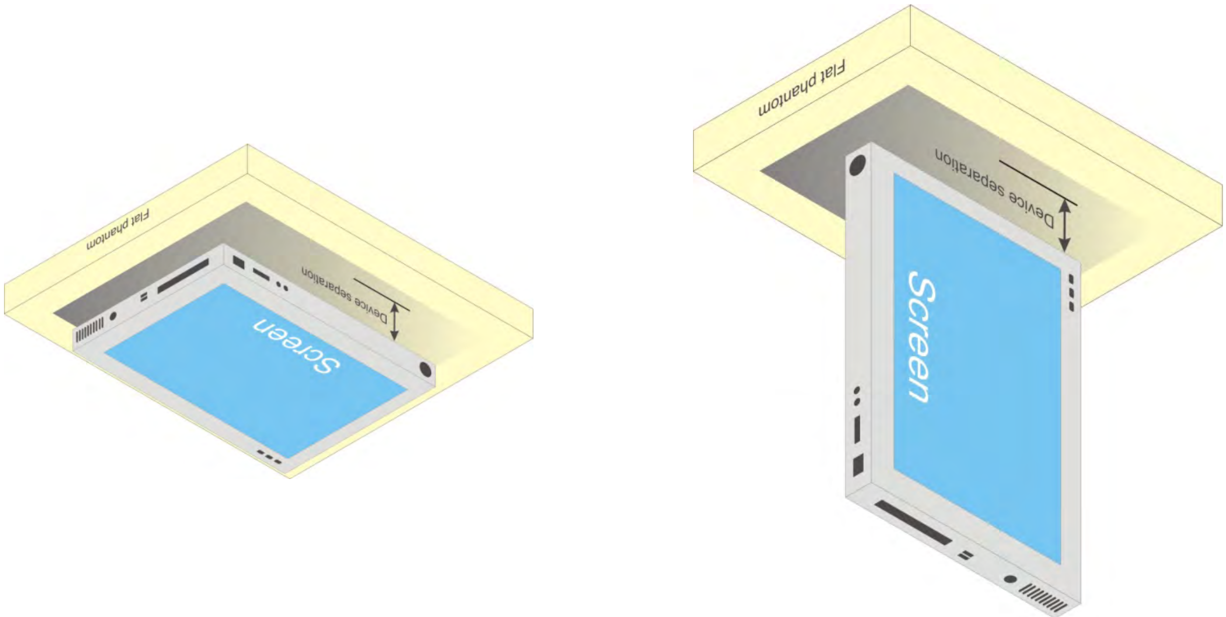


Fig-4.1 Illustration for Tablet Setup

4.2.2 SAR Test Exclusion Evaluations

According to KDB 447498 D04, the SAR test exclusion condition is based on source-based time-averaged maximum conducted output power, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions. The SAR exclusion threshold is determined by the following.

Exposure Position	Wireless Interface	BT	BLE	2.4GHz WLAN ANT 1	2.4GHz WLAN ANT 2	2.4GHz WLAN ANT 1+2	5GHz WLAN ANT 1	5GHz WLAN ANT 2	5GHz WLAN ANT 1+2
	Calculated Frequency	2480MHz	2480MHz	2462MHz	2462MHz	2462MHz	5825MHz	5825MHz	5825MHz
	Maximum power (dBm)	11	4.5	20.5	20.5	23.5	18	18	21
	Maximum rated power(mW)	13.0	2.82	112.0	112.0	224.0	63.0	63.0	126.0
Rear Face	Separation distance(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
	exclusion threshold	3.0	3.0	3.0	3.0	3.0	1.0	1.0	1.0
	Testing required?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Top Side	Separation distance(mm)	5.0	5.0	5.0	22.0	5.0	5.0	102.0	5.0
	exclusion threshold	3.0	3.0	3.0	46.0	3.0	1.0	749.0	1.0
	Testing required?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**	**No**	**Yes**
Right Side	Separation distance(mm)	156.0	156.0	156.0	242.0	156.0	156.0	242.0	156.0
	exclusion threshold	1906.0	1906.0	1907.0	4398.0	1907.0	1820.0	4558.0	1820.0
	Testing required?	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
Bottom Side	Separation distance(mm)	158.0	158.0	158.0	82.0	82.0	158.0	26.0	26.0
	exclusion threshold	1953.0	1953.0	1954.0	561.0	561.0	1870.0	43.0	43.0
	Testing required?	**No**	**No**	**No**	**No**	**No**	**No**	**Yes**	**Yes**
Left Side	Separation distance(mm)	44.0	44.0	44.0	5.0	5.0	44.0	5.0	5.0
	exclusion threshold	171.0	171.0	171.0	3.0	3.0	129.0	1.0	1.0
	Testing required?	**No**	**No**	**No**	**Yes**	**Yes**	**No**	**Yes**	**Yes**

For NFC, the maximum radiated emission at 3m of NFC recorded in report W7L-P22030011RF06 which was converted to EIRP is closed to zero, therefore it is not required for RF exposure.

4.2.3 Simultaneous Transmission Possibilities

The simultaneous transmission possibilities for this device are listed as below.

Simultaneous TX Combination	Capable Transmit Configurations	Body Exposure Condition
1	WLAN2.4G Ant2 + BT	Yes
2	WLAN2.4G Ant1 + WLAN2.4G Ant2	Yes
3	WLAN5G Ant1 + BT	Yes
4	WLAN5G Ant2 + BT	Yes
5	WLAN5G Ant1 + WLAN5G Ant2	Yes
6	WLAN5G Ant1 + WLAN5G Ant2 + BT	Yes
7	WLAN2.4G Ant1 + WLAN5G Ant2	Yes

4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Test Date	Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Measured Conductivity (σ)	Measured Permittivity (ε_r)	Target Conductivity (σ)	Target Permittivity (ε_r)	Conductivity Deviation (%)	Permittivity Deviation (%)
Apr. 07, 2022	Head	2450	22.5	1.853	38.060	1.80	39.20	2.94	-2.91
May. 17, 2022	Head	2450	22.6	1.786	40.406	1.80	39.20	-0.78	3.08
Apr. 09, 2022	Head	5250	22.5	4.767	36.978	4.71	35.90	1.21	3.00
Apr. 11, 2022	Head	5250	22.5	4.741	36.265	4.71	35.90	0.66	1.02
May. 17, 2022	Head	5250	22.2	4.764	36.965	4.71	35.90	1.15	2.97
Apr. 12, 2022	Head	5600	22.3	5.211	36.230	5.07	35.50	2.78	2.06
Apr. 13, 2022	Head	5600	22.2	5.099	35.754	5.07	35.50	0.57	0.72
May. 17, 2022	Head	5600	22.5	5.207	36.212	5.07	35.50	2.70	2.01
Apr. 14, 2022	Head	5800	22.4	5.445	35.778	5.27	35.30	3.32	1.35
Apr. 15, 2022	Head	5800	22.2	5.313	35.464	5.27	35.30	0.82	0.46
May. 17, 2022	Head	5800	22.4	5.440	35.764	5.27	35.30	3.23	1.31

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within ±5% of the target values. Liquid temperature during the SAR testing must be within ±2 ℃.

4.4 System Verification

The measuring result for system verification is tabulated as below.

Test Date	Mode	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Apr. 07, 2022	Head	2450	53.60	14.30	57.20	6.72	893	3873	1389
May. 17, 2022	Head	2450	53.60	14.10	56.40	5.22	893	3873	1389
Apr. 09, 2022	Head	5250	76.90	7.15	71.50	-7.02	1133	3873	1389
Apr. 11, 2022	Head	5250	76.90	7.11	71.10	-7.54	1133	3873	1389
May. 17, 2022	Head	5250	76.90	8.12	81.20	5.59	1133	3873	1389
Apr. 12, 2022	Head	5600	81.20	8.04	80.40	-0.99	1133	3873	1389
Apr. 13, 2022	Head	5600	81.20	8.03	80.30	-1.11	1133	3873	1389
May. 17, 2022	Head	5600	81.20	8.74	87.40	7.64	1133	3873	1389
Apr. 14, 2022	Head	5800	78.00	7.28	72.80	-6.67	1133	3873	1389
Apr. 15, 2022	Head	5800	78.00	8.41	84.10	7.82	1133	3873	1389

May. 17, 2022	Head	5800	78.00	7.28	72.80	-6.67	1133	3873	1389

Note:

Comparing to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.

4.5 Maximum Output Power

4.5.1 Maximum Conducted Power

The maximum conducted average power (Unit: dBm) including tune-up tolerance is shown as below.

<Full Power>

Mode	WLAN2.4G			WLAN5.2G		
	Ant 1	Ant 2	Ant 1+2	Ant 1	Ant 2	Ant 1+2
802.11a	N/A	N/A	N/A	17.5	17.5	20.5
802.11b	20.0	20.0	23.0	N/A	N/A	N/A
802.11g	19.0	18.5	22.0	N/A	N/A	N/A
802.11n-HT20	17.0	17.0	20.0	16.5	16.5	19.5
802.11n-HT40	17.0	16.5	20.0	16.5	16.5	19.5
802.11ac-VHT20	N/A	N/A	N/A	16.0	16.0	19.0
802.11ac-VHT40	N/A	N/A	N/A	15.5	15.5	18.5
802.11ac-VHT80	N/A	N/A	N/A	13.5	13.5	16.5
802.11ax-HE20	14.0	13.5	17.0	13.5	13.5	16.5
802.11ax-HE20/RU26	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE20/RU52	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE20/RU106	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE20/RU242	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE40	14.0	13.5	17.0	13.5	13.5	16.5
802.11ax-HE40/RU26	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE40/RU52	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE40/RU106	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE40/RU242	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE40/RU484	13.5	13.0	16.5	13.0	13.0	16.0
802.11ax-HE80	N/A	N/A	N/A	13.5	13.5	16.5
802.11ax-HE80/RU26	N/A	N/A	N/A	13.0	13.0	16.0
802.11ax-HE80/RU52	N/A	N/A	N/A	13.0	13.0	16.0
802.11ax-HE80/RU106	N/A	N/A	N/A	13.0	13.0	16.0
802.11ax-HE80/RU242	N/A	N/A	N/A	13.0	13.0	16.0
802.11ax-HE80/RU484	N/A	N/A	N/A	13.0	13.0	16.0
802.11ax-HE80/RU996	N/A	N/A	N/A	13.0	13.0	16.0

Mode	WLAN5.3G			WLAN5.6G		
	Ant 1	Ant 2	Ant 1+2	Ant 1	Ant 2	Ant 1+2
802.11a	17.5	17.5	20.5	17.5	17.5	20.5
802.11b	N/A	N/A	N/A	N/A	N/A	N/A
802.11g	N/A	N/A	N/A	N/A	N/A	N/A
802.11n-HT20	16.5	16.5	19.5	16.5	16.5	19.5
802.11n-HT40	16.5	16.5	19.5	16.5	16.5	19.5
802.11ac-VHT20	16.0	16.0	19.0	16.0	16.0	19.0
802.11ac-VHT40	15.5	15.5	18.5	15.5	15.5	18.5
802.11ac-VHT80	13.5	13.5	18.5	15.5	15.5	18.5
802.11ax-HE20	13.5	13.5	16.5	13.5	13.5	16.5
802.11ax-HE20/RU26	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE20/RU52	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE20/RU106	13.0	13.0	16.0	13.0	13.0	16.0

802.11ax-HE20/RU242	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE40	13.5	13.5	16.5	13.5	13.5	16.5
802.11ax-HE40/RU26	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE40/RU52	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE40/RU106	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE40/RU242	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE40/RU484	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE80	13.5	13.5	16.5	13.5	13.5	16.5
802.11ax-HE80/RU26	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE80/RU52	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE80/RU106	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE80/RU242	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE80/RU484	13.0	13.0	16.0	13.0	13.0	16.0
802.11ax-HE80/RU996	13.0	13.0	16.0	13.0	13.0	16.0

Mode	WLAN5.8G		
	Ant 1	Ant 2	Ant 1+2
802.11a	17.5	17.5	20.5
802.11b	N/A	N/A	N/A
802.11g	N/A	N/A	N/A
802.11n-HT20	16.5	16.5	19.5
802.11n-HT40	16.5	16.5	19.5
802.11ac-VHT20	16.0	16.0	19.0
802.11ac-VHT40	15.5	15.5	18.5
802.11ac-VHT80	15.5	13.5	18.5
802.11ax-HE20	13.5	13.5	16.5
802.11ax-HE20/RU26	13.0	13.0	16.0
802.11ax-HE20/RU52	13.0	13.0	16.0
802.11ax-HE20/RU106	13.0	13.0	16.0
802.11ax-HE20/RU242	13.0	13.0	16.0
802.11ax-HE40	13.5	13.5	16.5
802.11ax-HE40/RU26	13.0	13.0	16.0
802.11ax-HE40/RU52	13.0	13.0	16.0
802.11ax-HE40/RU106	13.0	13.0	16.0
802.11ax-HE40/RU242	13.0	13.0	16.0
802.11ax-HE40/RU484	13.0	13.0	16.0
802.11ax-HE80	13.5	13.5	16.5
802.11ax-HE80/RU26	13.0	13.0	16.0
802.11ax-HE80/RU52	13.0	13.0	16.0
802.11ax-HE80/RU106	13.0	13.0	16.0
802.11ax-HE80/RU242	13.0	13.0	16.0
802.11ax-HE80/RU484	13.0	13.0	16.0
802.11ax-HE80/RU996	13.0	13.0	16.0

Mode	2.4G Bluetooth
GFSK	8.0
π/4-DQPSK	5.0
8-DPSK	5.0
LE	4.5

<Reduced Power>

Mode	WLAN2.4G			WLAN5.2G		
	Ant 1	Ant 2	Ant 1+2	Ant 1	Ant 2	Ant 1+2
802.11a	N/A	N/A	N/A	14.5	10.5	14.0
802.11b	12.5	13.5	16.5	N/A	N/A	N/A
802.11g	12.0	12.5	16.0	N/A	N/A	N/A
802.11n-HT20	11.5	12.5	16.0	13.5	10.0	13.5
802.11n-HT40	11.5	12.5	15.5	13.5	10.0	13.5
802.11ac-VHT20	N/A	N/A	N/A	13.5	10.0	13.0
802.11ac-VHT40	N/A	N/A	N/A	13.0	9.5	13.0
802.11ac-VHT80	N/A	N/A	N/A	13.0	9.5	13.0
802.11ax-HE20	11.0	12.0	15.0	13.5	9.5	13.0
802.11ax-HE20/RU26	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE20/RU52	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE20/RU106	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE20/RU242	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE40	11.0	12.0	15.0	13.5	9.5	13.0
802.11ax-HE40/RU26	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE40/RU52	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE40/RU106	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE40/RU242	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE40/RU484	11.0	12.0	15.0	13.0	9.5	13.0
802.11ax-HE80	N/A	N/A	N/A	13.5	9.5	13.0
802.11ax-HE80/RU26	N/A	N/A	N/A	13.0	9.5	13.0
802.11ax-HE80/RU52	N/A	N/A	N/A	13.0	9.5	13.0
802.11ax-HE80/RU106	N/A	N/A	N/A	13.0	9.5	13.0
802.11ax-HE80/RU242	N/A	N/A	N/A	13.0	9.5	13.0
802.11ax-HE80/RU484	N/A	N/A	N/A	13.0	9.5	13.0
802.11ax-HE80/RU996	N/A	N/A	N/A	13.0	9.5	13.0

Mode	WLAN5.3G			WLAN5.6G		
	Ant 1	Ant 2	Ant 1+2	Ant 1	Ant 2	Ant 1+2
802.11a	14.5	10.5	14.0	14.0	11.5	15.0
802.11b	N/A	N/A	N/A	N/A	N/A	N/A
802.11g	N/A	N/A	N/A	N/A	N/A	N/A
802.11n-HT20	13.5	10.0	13.5	13.5	11.0	14.5
802.11n-HT40	13.5	10.0	13.5	13.0	11.0	14.5
802.11ac-VHT20	13.5	10.0	13.0	13.0	11.0	14.0
802.11ac-VHT40	13.0	9.5	13.0	12.5	10.5	14.0
802.11ac-VHT80	13.0	9.5	13.0	12.5	10.5	13.5
802.11ax-HE20	13.5	9.5	13.0	12.5	10.5	13.5
802.11ax-HE20/RU26	13.0	9.5	13.0	12.5	10.5	13.5
802.11ax-HE20/RU52	13.0	9.5	13.0	12.5	10.5	13.5
802.11ax-HE20/RU106	13.0	9.5	13.0	12.5	10.5	13.5
802.11ax-HE20/RU242	13.0	9.5	13.0	12.5	10.5	13.5
802.11ax-HE40	13.5	9.5	13.0	12.0	10.0	13.5
802.11ax-HE40/RU26	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE40/RU52	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE40/RU106	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE40/RU242	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE40/RU484	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80	13.5	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80/RU26	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80/RU52	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80/RU106	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80/RU242	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80/RU484	13.0	9.5	13.0	12.0	10.0	13.5
802.11ax-HE80/RU996	13.0	9.5	13.0	12.0	10.0	13.5

Mode	WLAN5.8G		
	Ant 1	Ant 2	Ant 1+2
802.11a	15.0	12.0	14.5
802.11b	N/A	N/A	N/A
802.11g	N/A	N/A	N/A
802.11n-HT20	14.5	11.5	14.0
802.11n-HT40	14.0	11.0	14.0
802.11ac-VHT20	14.0	11.5	13.5
802.11ac-VHT40	13.5	11.0	13.5
802.11ac-VHT80	13.5	10.5	13.5
802.11ax-HE20	13.5	10.5	13.0
802.11ax-HE20/RU26	13.0	10.5	13.0
802.11ax-HE20/RU52	13.0	10.5	13.0
802.11ax-HE20/RU106	13.0	10.5	13.0
802.11ax-HE20/RU242	13.0	10.5	13.0
802.11ax-HE40	13.0	10.5	13.0
802.11ax-HE40/RU26	13.0	10.5	13.0
802.11ax-HE40/RU52	13.0	10.5	13.0
802.11ax-HE40/RU106	13.0	10.5	13.0
802.11ax-HE40/RU242	13.0	10.5	13.0
802.11ax-HE40/RU484	13.0	10.5	13.0
802.11ax-HE80	13.0	10.5	13.0
802.11ax-HE80/RU26	13.0	10.5	13.0
802.11ax-HE80/RU52	13.0	10.5	13.0
802.11ax-HE80/RU106	13.0	10.5	13.0
802.11ax-HE80/RU242	13.0	10.5	13.0
802.11ax-HE80/RU484	13.0	10.5	13.0
802.11ax-HE80/RU996	13.0	10.5	13.0

< Reduced Power 1>

Mode	WLAN2.4G	WLAN5.2G	WLAN5.3G	WLAN5.6G	WLAN5.8G
	Ant 1+2	Ant 1+2	Ant 1+2	Ant 1+2	Ant 1+2
802.11a	N/A	18.5	18.5	18.5	18.5
802.11b	21.0	N/A	N/A	N/A	N/A
802.11g	19.5	N/A	N/A	N/A	N/A
802.11n-HT20	18.0	17.5	17.5	17.5	17.5
802.11n-HT40	18.0	17.5	17.5	17.5	17.5
802.11ac-VHT20	N/A	17.0	17.0	17.0	17.0
802.11ac-VHT40	N/A	16.5	16.5	16.5	16.5
802.11ac-VHT80	N/A	15.5	15.5	16.5	16.5
802.11ax-HE20	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU26	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU52	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU106	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU242	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU26	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU52	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU106	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU242	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU484	15.0	15.0	15.0	14.5	14.5
802.11ax-HE80	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU26	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU52	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU106	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU242	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU484	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU996	N/A	15.0	15.0	14.5	14.5

< Reduced Power 2>

Mode	WLAN2.4G	WLAN5.2G	WLAN5.3G	WLAN5.6G	WLAN5.8G
	Ant 1+2	Ant 1+2	Ant 1+2	Ant 1+2	Ant 1+2
802.11a	N/A	18.5	18.5	18.5	18.5
802.11b	21.0	N/A	N/A	N/A	N/A
802.11g	19.5	N/A	N/A	N/A	N/A
802.11n-HT20	18.0	17.5	17.5	17.5	17.5
802.11n-HT40	18.0	17.5	17.5	17.5	17.5
802.11ac-VHT20	N/A	17.0	17.0	17.0	17.0
802.11ac-VHT40	N/A	16.5	16.5	16.5	16.5
802.11ac-VHT80	N/A	15.5	15.5	16.5	16.5
802.11ax-HE20	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU26	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU52	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU106	15.0	15.0	15.0	14.5	14.5
802.11ax-HE20/RU242	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU26	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU52	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU106	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU242	15.0	15.0	15.0	14.5	14.5
802.11ax-HE40/RU484	15.0	15.0	15.0	14.5	14.5
802.11ax-HE80	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU26	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU52	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU106	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU242	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU484	N/A	15.0	15.0	14.5	14.5
802.11ax-HE80/RU996	N/A	15.0	15.0	14.5	14.5

4.5.2 Measured Conducted Power Result

The measuring conducted average power (Unit: dBm) is shown as below.

<Ant1>

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11b 1Mbps	1	2412	18.25	11.00	100
		6	2437	18.61	11.04	
		11	2462	18.94	11.42	

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	36	5180	16.37	13.83	100
		40	5200	16.45	13.69	
		44	5220	16.40	14.03	
		48	5240	16.48	13.87	

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	52	5260	15.87	13.25	100
		56	5280	16.07	13.31	
		60	5300	16.15	13.42	
		64	5320	16.19	13.66	

5.6GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	100	5500	16.12	12.79	100
		116	5580	16.11	12.75	
		124	5620	15.96	12.65	
		132	5660	16.03	12.73	
		140	5700	15.85	12.66	
		144	5720	15.78	12.54	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	149	5745	15.86	13.57	100
		157	5785	15.72	13.48	
		165	5825	15.89	13.60	

<Bluetooth>

Mode	**Bluetooth GFSK**		
Channel / Frequency (MHz)	**0 (2402)**	**39 (2441)**	**78 (2480)**
Average Power	6.55	7.07	7.35

<Ant2>

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11b 1Mbps	1	2412	18.15	12.19	100
		6	2437	18.23	12.53	
		11	2462	18.32	12.57	

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	36	5180	16.10	9.26	100
		40	5200	16.06	9.31	
		44	5220	16.04	9.38	
		48	5240	16.02	9.61	

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	52	5260	16.22	9.80	100
		56	5280	16.13	9.56	
		60	5300	16.18	9.78	
		64	5320	16.05	9.38	

5.6GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	100	5500	15.86	10.58	100
		116	5580	15.76	10.45	
		124	5620	15.90	10.63	
		132	5660	15.98	10.97	
		140	5700	15.93	10.89	
		144	5720	16.03	11.32	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	149	5745	15.93	10.56	100
		157	5785	15.97	10.76	
		165	5825	15.72	10.37	

<Ant1+2>

2.4GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11b 1Mbps	1	2412	21.21	15.05	100
		6	2437	21.44	15.04	
		11	2462	21.72	15.09	

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	36	5180	19.42	13.73	100
		40	5200	19.37	13.77	
		44	5220	19.40	13.93	
		48	5240	19.47	13.91	

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	52	5260	19.08	13.35	100
		56	5280	19.15	13.48	
		60	5300	19.25	13.54	
		64	5320	19.23	13.42	

5.6GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	100	5500	19.04	14.00	100
		116	5580	19.17	14.08	
		124	5620	18.97	13.96	
		132	5660	19.08	13.99	
		140	5700	18.95	13.75	
		144	5720	19.02	13.98	

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm) **(Full Power)**	Average power (dBm) **(Reduced Power)**	Duty Cycle %
	802.11a 6Mbps	149	5745	19.07	13.37	100
		157	5785	19.18	13.45	
		165	5825	19.06	13.32	

Note: The measured power only shows the maximum power mode of the SAR testing.

4.6 SAR Testing Results

4.6.1 SAR Test Reduction Considerations

<KDB 447498 D04, General RF Exposure Guidance>

Testing of other required channels within the operating mode of a frequency band is not required when the reported SAR for the mid-band or highest output power channel is:

(1) ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz

(2) ≤ 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

(3) ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz

<KDB 248227 D01, SAR Guidance for Wi-Fi Transmitters>

(1) For handsets operating next to ear, hotspot mode or mini-tablet configurations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When the reported SAR of initial test position is <= 0.4 W/kg, SAR testing for remaining test positions is not required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is <= 0.8 W/kg or all test positions are measured.

(2) For WLAN 2.4 GHz, the highest measured maximum output power channel for DSSS was selected for SAR measurement. When the reported SAR is <= 0.8 W/kg, no further SAR testing is required. Otherwise, SAR is evaluated at the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel. For OFDM modes (802.11g/n), SAR is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and it is <= 1.2 W/kg.

(3) For WLAN 5 GHz, the initial test configuration was selected according to the transmission mode with the highest maximum output power. When the reported SAR of initial test configuration is > 0.8 W/kg, SAR is required for the subsequent highest measured output power channel until the reported SAR result is <= 1.2 W/kg or all required channels are measured. For other transmission modes, SAR is not required when the highest reported SAR for initial test configuration is adjusted by the ratio of subsequent test configuration to initial test configuration specified maximum output power and it is <= 1.2 W/kg.

(4) For WLAN MIMO mode, the power-based standalone SAR test exclusion or the sum of SAR provision in KDB 447498 to determine simultaneous transmission SAR test exclusion should be applied. Otherwise, SAR for MIMO mode will be measured with all applicable antennas transmitting simultaneously at the specified maximum output power of MIMO operation.

4.6.2 SAR Results for Body Exposure Condition (Separation Distance is 0 cm Gap)

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Antenna	Power Reduction	Sample	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
	WLAN2.4G	802.11b	Rear Face	0	11	Ant1	Reduce Power	1	100	12.5	11.42	-0.04	0.679	1.00	1.28	0.87
	WLAN2.4G	802.11b	Top Side	0	11	Ant1	Reduce Power	1	100	12.5	11.42	0.08	0.496	1.00	1.28	0.64
	WLAN2.4G	802.11b	Rear Face	0	1	Ant1	Reduce Power	1	100	12.5	11.00	0	0.767	1.00	1.41	1.08
	WLAN2.4G	802.11b	Rear Face	0	6	Ant1	Reduce Power	1	100	12.5	11.04	0.04	0.575	1.00	1.40	0.80
	WLAN2.4G	802.11b	Rear Face	1.2	11	Ant1	Full Power	1	100	20.0	18.94	0	0.249	1.00	1.28	0.32
	WLAN2.4G	802.11b	Top Side	1.2	11	Ant1	Full Power	1	100	20.0	18.94	-0.15	0.369	1.00	1.28	0.47
1	WLAN2.4G	802.11b	Rear Face	0	11	Ant2	Reduce Power	1	100	13.5	12.57	0.08	0.951	1.00	1.24	**1.18**
	WLAN2.4G	802.11b	Left Side	0	11	Ant2	Reduce Power	1	100	13.5	12.57	-0.01	0.584	1.00	1.24	0.72
	WLAN2.4G	802.11b	Top Side	0	11	Ant2	Full Power	1	100	20.0	18.32	0.17	0.096	1.00	1.47	0.14
	WLAN2.4G	802.11b	Rear Face	0	1	Ant2	Reduce Power	1	100	13.5	12.19	0.01	0.712	1.00	1.35	0.96
	WLAN2.4G	802.11b	Rear Face	0	6	Ant2	Reduce Power	1	100	13.5	12.53	-0.17	0.875	1.00	1.25	1.09
	WLAN2.4G	802.11b	Rear Face	0.7	11	Ant2	Full Power	1	100	20.0	18.32	0.02	0.558	1.00	1.47	0.82
	WLAN2.4G	802.11b	Left Side	0.9	11	Ant2	Full Power	1	100	20.0	18.32	0.01	0.212	1.00	1.47	0.31
	WLAN2.4G	802.11b	Rear Face	0.7	1	Ant2	Full Power	1	100	20.0	18.15	0.02	0.744	1.00	1.53	1.14
	WLAN2.4G	802.11b	Rear Face	0.7	6	Ant2	Full Power	1	100	20.0	18.23	0.17	0.637	1.00	1.50	0.96
	WLAN2.4G	802.11b	Rear Face	0	11	Ant2	Reduce Power	2	100	13.5	12.57	0	0.932	1.00	1.24	1.15
	WLAN2.4G	802.11b	Rear Face	0	11	Ant1+2	Reduce Power	1	100	16.5	15.09	0.01	0.743	1.00	1.38	1.03
	WLAN2.4G	802.11b	Left Side	0	11	Ant1+2	Reduce Power	1	100	16.5	15.09	-0.04	0.630	1.00	1.38	0.87
	WLAN2.4G	802.11b	Top Side	0	11	Ant1+2	Reduce Power	1	100	16.5	15.09	0	0.304	1.00	1.38	0.42
	WLAN2.4G	802.11b	Rear Face	0	1	Ant1+2	Reduce Power	1	100	16.5	15.05	0.09	0.525	1.00	1.40	0.73
	WLAN2.4G	802.11b	Rear Face	0	6	Ant1+2	Reduce Power	1	100	16.5	15.04	0.04	0.645	1.00	1.40	0.90
	WLAN2.4G	802.11b	Left Side	0	1	Ant1+2	Reduce Power	1	100	16.5	15.05	0.08	0.445	1.00	1.40	0.62
	WLAN2.4G	802.11b	Left Side	0	6	Ant1+2	Reduce Power	1	100	16.5	15.04	-0.06	0.547	1.00	1.40	0.77
	WLAN2.4G	802.11b	Rear Face	0.7	11	Ant1+2	Full Power	1	100	23.0	21.72	-0.03	0.569	1.00	1.34	0.76
	WLAN2.4G	802.11b	Left Side	0.9	11	Ant1+2	Full Power	1	100	23.0	21.72	0.11	0.345	1.00	1.34	0.46
	WLAN2.4G	802.11b	Top Side	1.2	11	Ant1+2	Full Power	1	100	23.0	21.72	-0.11	0.139	1.00	1.34	0.19
	WLAN5G	802.11a	Rear Face	0	64	Ant1	Reduce Power	1	100	14.5	13.66	0	0.823	1.00	1.21	1.00
	WLAN5G	802.11a	Top Side	0	64	Ant1	Reduce Power	1	100	14.5	13.66	0.09	0.855	1.00	1.21	1.04
	WLAN5G	802.11a	Rear Face	0	52	Ant1	Reduce Power	1	100	14.5	13.25	-0.04	0.770	1.00	1.33	1.03
	WLAN5G	802.11a	Rear Face	0	56	Ant1	Reduce Power	1	100	14.5	13.31	0.1	0.794	1.00	1.32	1.04
	WLAN5G	802.11a	Rear Face	0	60	Ant1	Reduce Power	1	100	14.5	13.42	0.05	0.856	1.00	1.28	1.10
	WLAN5G	802.11a	Top Side	0	52	Ant1	Reduce Power	1	100	14.5	13.25	0.01	0.781	1.00	1.33	1.04
	WLAN5G	802.11a	Top Side	0	56	Ant1	Reduce Power	1	100	14.5	13.31	0.05	0.747	1.00	1.32	0.98
	WLAN5G	802.11a	Top Side	0	60	Ant1	Reduce Power	1	100	14.5	13.42	0.06	0.808	1.00	1.28	1.04
	WLAN5G	802.11a	Rear Face	1.2	64	Ant1	Full Power	1	100	17.5	16.19	-0.14	0.102	1.00	1.35	0.14
	WLAN5G	802.11a	Top Side	1.2	64	Ant1	Full Power	1	100	17.5	16.19	-0.02	0.142	1.00	1.35	0.19
	WLAN5G	802.11a	Rear Face	0	52	Ant2	Reduce Power	1	100	10.5	9.80	0	0.889	1.00	1.17	1.04
	WLAN5G	802.11a	Left Side	0	52	Ant2	Reduce Power	1	100	10.5	9.80	-0.17	0.757	1.00	1.17	0.89
	WLAN5G	802.11a	Bottom Side	0	52	Ant2	Reduce Power	1	100	17.5	16.22	0.07	0.553	1.00	1.34	0.74
	WLAN5G	802.11a	Rear Face	0	56	Ant2	Reduce Power	1	100	10.5	9.56	0	0.869	1.00	1.24	1.08
	WLAN5G	802.11a	Rear Face	0	60	Ant2	Reduce Power	1	100	10.5	9.78	0	0.853	1.00	1.18	1.01
	WLAN5G	802.11a	Rear Face	0	64	Ant2	Reduce Power	1	100	10.5	9.38	0	0.848	1.00	1.29	1.10
	WLAN5G	802.11a	Left Side	0	56	Ant2	Reduce Power	1	100	10.5	9.56	-0.19	0.749	1.00	1.24	0.93
	WLAN5G	802.11a	Left Side	0	60	Ant2	Reduce Power	1	100	10.5	9.78	-0.02	0.696	1.00	1.18	0.82
	WLAN5G	802.11a	Left Side	0	64	Ant2	Reduce Power	1	100	10.5	9.38	-0.07	0.723	1.00	1.29	0.94
	WLAN5G	802.11a	Rear Face	0.5	52	Ant2	Full Power	1	100	17.5	16.22	-0.03	0.793	1.00	1.34	1.06
	WLAN5G	802.11a	Left Side	0.5	52	Ant2	Full Power	1	100	17.5	16.22	-0.01	0.702	1.00	1.34	0.94
	WLAN5G	802.11a	Rear Face	0.5	56	Ant2	Full Power	1	100	17.5	16.13	0	0.670	1.00	1.37	0.92
	WLAN5G	802.11a	Rear Face	0.5	60	Ant2	Full Power	1	100	17.5	16.18	0	0.702	1.00	1.36	0.95
	WLAN5G	802.11a	Rear Face	0.5	64	Ant2	Full Power	1	100	17.5	16.05	0	0.592	1.00	1.40	0.83
	WLAN5G	802.11a	Left Side	0.5	56	Ant2	Full Power	1	100	17.5	16.13	-0.03	0.635	1.00	1.37	0.87
	WLAN5G	802.11a	Left Side	0.5	60	Ant2	Full Power	1	100	17.5	16.18	0.14	0.676	1.00	1.36	0.92
	WLAN5G	802.11a	Left Side	0.5	64	Ant2	Full Power	1	100	17.5	16.05	-0.05	0.679	1.00	1.40	0.95
2	WLAN5G	802.11a	Rear Face	0	60	Ant1+2	Reduce Power	1	100	14.0	13.54	0	1.020	1.00	1.11	**1.13**
	WLAN5G	802.11a	Left Side	0	60	Ant1+2	Reduce Power	1	100	14.0	13.54	-0.04	1.010	1.00	1.11	1.12
	WLAN5G	802.11a	Top Side	0	60	Ant1+2	Reduce Power	1	100	14.0	13.54	0	0.349	1.00	1.11	0.39
	WLAN5G	802.11a	Bottom Side	0	60	Ant1+2	Full Power	1	100	20.5	19.25	0.04	0.501	1.00	1.33	0.67
	WLAN5G	802.11a	Rear Face	0	52	Ant1+2	Reduce Power	1	100	14.0	13.35	0.01	0.967	1.00	1.16	1.12

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Antenna	Power Reduction	Sample	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
	WLAN5G	802.11a	Rear Face	0	56	Ant1+2	Reduce Power	1	100	14.0	13.48	0	0.993	1.00	1.13	1.12
	WLAN5G	802.11a	Rear Face	0	64	Ant1+2	Reduce Power	1	100	14.0	13.42	0	0.982	1.00	1.14	1.12
	WLAN5G	802.11a	Left Side	0	52	Ant1+2	Reduce Power	1	100	14.0	13.35	-0.09	0.960	1.00	1.16	1.11
	WLAN5G	802.11a	Left Side	0	56	Ant1+2	Reduce Power	1	100	14.0	13.48	-0.1	0.975	1.00	1.13	1.10
	WLAN5G	802.11a	Left Side	0	64	Ant1+2	Reduce Power	1	100	14.0	13.42	0.03	0.925	1.00	1.14	1.06
	WLAN5G	802.11a	Rear Face	0.5	60	Ant1+2	Full Power	1	100	20.5	19.25	0	0.538	1.00	1.33	0.72
	WLAN5G	802.11a	Left Side	0.5	60	Ant1+2	Full Power	1	100	20.5	19.25	-0.05	0.582	1.00	1.33	0.78
	WLAN5G	802.11a	Top Side	1.2	60	Ant1+2	Full Power	1	100	20.5	19.25	0.08	0.105	1.00	1.33	0.14
	WLAN5G	802.11a	Rear Face	0	60	Ant1+2	Reduce Power	2	100	14.0	13.54	0	0.935	1.00	1.11	1.04
	WLAN5G	802.11a	Rear Face	0	100	Ant1	Reduce Power	1	100	14.0	12.79	-0.04	0.546	1.00	1.32	0.72
	WLAN5G	802.11a	Top Side	0	100	Ant1	Reduce Power	1	100	14.0	12.79	0.1	0.641	1.00	1.32	0.85
	WLAN5G	802.11a	Top Side	0	116	Ant1	Reduce Power	1	100	14.0	12.75	0.09	0.681	1.00	1.33	0.91
	WLAN5G	802.11a	Top Side	0	124	Ant1	Reduce Power	1	100	14.0	12.65	-0.01	0.601	1.00	1.36	0.82
	WLAN5G	802.11a	Top Side	0	132	Ant1	Reduce Power	1	100	14.0	12.73	-0.09	0.713	1.00	1.34	0.96
	WLAN5G	802.11a	Top Side	0	140	Ant1	Reduce Power	1	100	14.0	12.66	0.12	0.545	1.00	1.36	0.74
	WLAN5G	802.11a	Top Side	0	144	Ant1	Reduce Power	1	100	14.0	12.54	0.03	0.742	1.00	1.40	1.04
	WLAN5G	802.11a	Rear Face	1.2	100	Ant1	Full Power	1	100	17.5	16.12	-0.14	0.055	1.00	1.37	0.08
	WLAN5G	802.11a	Top Side	1.2	100	Ant1	Full Power	1	100	17.5	16.12	0.01	0.097	1.00	1.37	0.13
	WLAN5G	802.11a	Rear Face	0	144	Ant2	Reduce Power	1	100	11.5	11.32	-0.04	1.030	1.00	1.04	1.07
	WLAN5G	802.11a	Left Side	0	144	Ant2	Reduce Power	1	100	11.5	11.32	0.02	0.759	1.00	1.04	0.79
	WLAN5G	802.11a	Bottom Side	0	144	Ant2	Reduce Power	1	100	17.5	16.03	0.03	0.560	1.00	1.40	0.79
	WLAN5G	802.11a	Rear Face	0	100	Ant2	Reduce Power	1	100	11.5	10.58	0.08	0.892	1.00	1.24	1.10
	WLAN5G	802.11a	Rear Face	0	116	Ant2	Reduce Power	1	100	11.5	10.45	0.1	0.907	1.00	1.27	1.16
3	WLAN5G	802.11a	Rear Face	0	124	Ant2	Reduce Power	1	100	11.5	10.63	0	0.963	1.00	1.22	**1.18**
	WLAN5G	802.11a	Rear Face	0	132	Ant2	Reduce Power	1	100	11.5	10.97	0	0.934	1.00	1.13	1.06
	WLAN5G	802.11a	Rear Face	0	140	Ant2	Full Power	1	100	11.5	10.89	0	0.989	1.00	1.15	1.14
	WLAN5G	802.11a	Rear Face	0.5	144	Ant2	Reduce Power	1	100	17.5	16.03	-0.02	0.551	1.00	1.40	0.77
	WLAN5G	802.11a	Left Side	0.5	144	Ant2	Reduce Power	1	100	17.5	16.03	0.03	0.809	1.00	1.40	1.13
	WLAN5G	802.11a	Left Side	0.5	100	Ant2	Reduce Power	1	100	17.5	15.86	0.08	0.602	1.00	1.46	0.88
	WLAN5G	802.11a	Left Side	0.5	116	Ant2	Reduce Power	1	100	17.5	15.76	-0.09	0.681	1.00	1.49	1.02
	WLAN5G	802.11a	Left Side	0.5	124	Ant2	Reduce Power	1	100	17.5	15.90	-0.06	0.666	1.00	1.45	0.96
	WLAN5G	802.11a	Left Side	0.5	132	Ant2	Reduce Power	1	100	17.5	15.98	0.09	0.761	1.00	1.42	1.08
	WLAN5G	802.11a	Left Side	0.5	140	Ant2	Full Power	1	100	17.5	15.93	0.03	0.764	1.00	1.44	1.10
	WLAN5G	802.11a	Rear Face	0	124	Ant2	Reduce Power	2	100	11.5	10.63	0	0.950	1.00	1.22	1.16
	WLAN5G	802.11a	Rear Face	0	116	Ant1+2	Reduce Power	1	100	15.0	14.08	-0.09	0.911	1.00	1.24	1.13
	WLAN5G	802.11a	Left Side	0	116	Ant1+2	Reduce Power	1	100	15.0	14.08	-0.1	0.819	1.00	1.24	1.01
	WLAN5G	802.11a	Top Side	0	116	Ant1+2	Reduce Power	1	100	15.0	14.08	0	0.313	1.00	1.24	0.39
	WLAN5G	802.11a	Bottom Side	0	116	Ant1+2	Full Power	1	100	20.5	19.17	0.1	0.127	1.00	1.36	0.17
	WLAN5G	802.11a	Rear Face	0	100	Ant1+2	Reduce Power	1	100	15.0	14.00	0.03	0.792	1.00	1.26	1.00
	WLAN5G	802.11a	Rear Face	0	124	Ant1+2	Reduce Power	1	100	15.0	13.96	0.07	0.889	1.00	1.27	1.13
	WLAN5G	802.11a	Rear Face	0	132	Ant1+2	Reduce Power	1	100	15.0	13.99	0	0.868	1.00	1.26	1.10
	WLAN5G	802.11a	Rear Face	0	140	Ant1+2	Reduce Power	1	100	15.0	13.75	0	0.793	1.00	1.33	1.06
	WLAN5G	802.11a	Rear Face	0	144	Ant1+2	Reduce Power	1	100	15.0	13.98	-0.04	0.900	1.00	1.27	1.14
	WLAN5G	802.11a	Left Side	0	100	Ant1+2	Reduce Power	1	100	15.0	14.00	0.02	0.890	1.00	1.26	1.12
	WLAN5G	802.11a	Left Side	0	124	Ant1+2	Reduce Power	1	100	15.0	13.96	0.02	0.694	1.00	1.27	0.88
	WLAN5G	802.11a	Left Side	0	132	Ant1+2	Reduce Power	1	100	15.0	13.99	-0.13	0.715	1.00	1.26	0.90
	WLAN5G	802.11a	Left Side	0	140	Ant1+2	Reduce Power	1	100	15.0	13.75	0.08	0.642	1.00	1.33	0.86
	WLAN5G	802.11a	Left Side	0	144	Ant1+2	Reduce Power	1	100	15.0	13.98	0.08	0.905	1.00	1.27	1.15
	WLAN5G	802.11a	Rear Face	0.5	116	Ant1+2	Full Power	1	100	20.5	19.17	-0.09	0.481	1.00	1.36	0.65
	WLAN5G	802.11a	Left Side	0.5	116	Ant1+2	Full Power	1	100	20.5	19.17	0.01	0.581	1.00	1.36	0.79
	WLAN5G	802.11a	Top Side	1.2	116	Ant1+2	Full Power	1	100	20.5	19.17	-0.11	0.112	1.00	1.36	0.15
	WLAN5G	802.11a	Rear Face	0	165	Ant1	Reduce Power	1	100	15.0	13.60	-0.01	0.408	1.00	1.38	0.56
	WLAN5G	802.11a	Top Side	0	165	Ant1	Reduce Power	1	100	15.0	13.60	0	0.655	1.00	1.38	0.90
	WLAN5G	802.11a	Top Side	0	149	Ant1	Reduce Power	1	100	15.0	13.57	0.01	0.790	1.00	1.39	1.10
	WLAN5G	802.11a	Top Side	0	157	Ant1	Reduce Power	1	100	15.0	13.48	0.07	0.707	1.00	1.42	1.00
	WLAN5G	802.11a	Rear Face	1.2	165	Ant1	Full Power	1	100	17.5	15.89	0	0.029	1.00	1.45	0.04
	WLAN5G	802.11a	Top Side	1.2	165	Ant1	Full Power	1	100	17.5	15.89	0.08	0.079	1.00	1.45	0.11
	WLAN5G	802.11a	Rear Face	0	157	Ant2	Reduce Power	1	100	12.0	10.76	0.04	0.748	1.00	1.33	1.00
	WLAN5G	802.11a	Left Side	0	157	Ant2	Reduce Power	1	100	12.0	10.76	0	0.717	1.00	1.33	0.95
	WLAN5G	802.11a	Bottom Side	0	157	Ant2	Full Power	1	100	17.5	15.97	0.11	0.549	1.00	1.42	0.78
	WLAN5G	802.11a	Rear Face	0	149	Ant2	Reduce Power	1	100	12.0	10.56	-0.06	0.722	1.00	1.39	1.01
	WLAN5G	802.11a	Rear Face	0	165	Ant2	Reduce Power	1	100	12.0	10.37	0.01	0.638	1.00	1.46	0.93

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Antenna	Power Reduction	Sample	Duty Cycle %	Max. Tune-up Power (dBm)	Measured Conducted Power (dBm)	Power Drift (dB)	Measured SAR-1g (W/kg)	Duty Cycle Scaling Factor	Tune-up Scaling Factor	Scaled SAR-1g (W/kg)
	WLAN5G	802.11a	Left Side	0	149	Ant2	Reduce Power	1	100	12.0	10.56	0	0.763	1.00	1.39	1.06
	WLAN5G	802.11a	Left Side	0	165	Ant2	Reduce Power	1	100	12.0	10.37	0.16	0.765	1.00	1.46	1.11
	WLAN5G	802.11a	Rear Face	0.5	157	Ant2	Full Power	1	100	17.5	15.97	0.01	0.632	1.00	1.42	0.90
	WLAN5G	802.11a	Left Side	0.5	157	Ant2	Full Power	1	100	17.5	15.97	0.06	0.729	1.00	1.42	1.04
	WLAN5G	802.11a	Rear Face	0.5	149	Ant2	Full Power	1	100	17.5	15.93	0	0.646	1.00	1.44	0.93
	WLAN5G	802.11a	Rear Face	0.5	165	Ant2	Full Power	1	100	17.5	15.72	0	0.547	1.00	1.51	0.82
	WLAN5G	802.11a	Left Side	0.5	149	Ant2	Full Power	1	100	17.5	15.93	0.05	0.740	1.00	1.44	1.06
	WLAN5G	802.11a	Left Side	0.5	165	Ant2	Full Power	1	100	17.5	15.72	0.09	0.750	1.00	1.51	1.13
	WLAN5G	802.11a	Rear Face	0	157	Ant1+2	Reduce Power	1	100	14.5	13.45	0.01	0.646	1.00	1.27	0.82
	WLAN5G	802.11a	Left Side	0	157	Ant1+2	Reduce Power	1	100	14.5	13.45	0.04	0.740	1.00	1.27	0.94
	WLAN5G	802.11a	Top Side	0	157	Ant1+2	Reduce Power	1	100	14.5	13.45	0.03	0.353	1.00	1.27	0.45
	WLAN5G	802.11a	Bottom Side	0	157	Ant1+2	Full Power	1	100	20.5	19.18	0.12	0.616	1.00	1.36	0.83
	WLAN5G	802.11a	Rear Face	0	149	Ant1+2	Reduce Power	1	100	14.5	13.37	0.12	0.783	1.00	1.30	1.02
	WLAN5G	802.11a	Rear Face	0	165	Ant1+2	Reduce Power	1	100	14.5	13.32	0.05	0.849	1.00	1.31	1.11
	WLAN5G	802.11a	Left Side	0	149	Ant1+2	Reduce Power	1	100	14.5	13.37	0.07	0.787	1.00	1.30	1.02
	WLAN5G	802.11a	Left Side	0	165	Ant1+2	Reduce Power	1	100	14.5	13.32	0.12	0.784	1.00	1.31	1.03
	WLAN5G	802.11a	Bottom Side	0	149	Ant1+2	Full Power	1	100	20.5	19.07	0.08	0.648	1.00	1.39	0.90
	WLAN5G	802.11a	Bottom Side	0	165	Ant1+2	Full Power	1	100	20.5	19.06	-0.11	0.692	1.00	1.39	0.96
	WLAN5G	802.11a	Rear Face	0.5	157	Ant1+2	Full Power	1	100	20.5	19.18	0	0.596	1.00	1.36	0.81
4	WLAN5G	802.11a	Left Side	0.5	157	Ant1+2	Full Power	1	100	20.5	19.18	-0.07	0.878	1.00	1.36	**1.19**
	WLAN5G	802.11a	Top Side	1.2	157	Ant1+2	Full Power	1	100	20.5	19.18	0.01	0.063	1.00	1.36	0.09
	WLAN5G	802.11a	Rear Face	0.5	149	Ant1+2	Full Power	1	100	20.5	19.07	0.02	0.618	1.00	1.39	0.86
	WLAN5G	802.11a	Rear Face	0.5	165	Ant1+2	Full Power	1	100	20.5	19.06	0.08	0.446	1.00	1.39	0.62
	WLAN5G	802.11a	Left Side	0.5	149	Ant1+2	Full Power	1	100	20.5	19.07	0.03	0.856	1.00	1.39	1.19
	WLAN5G	802.11a	Left Side	0.5	165	Ant1+2	Full Power	1	100	20.5	19.06	0.08	0.843	1.00	1.39	1.17
	WLAN5G	802.11a	Left Side	0.5	157	Ant1+2	Full Power	2	100	20.5	19.18	0.06	0.781	1.00	1.36	1.06
	BT	GFSK	Rear Face	0	78	Ant1	Full Power	1	76.8	8.0	7.35	0	0.214	1.30	1.16	0.32
	BT	GFSK	Top Side	0	78	Ant1	Full Power	1	76.8	8.0	7.35	0.08	0.167	1.30	1.16	0.25
5	BT	GFSK	Rear Face	0	0	Ant1	Full Power	1	76.8	8.0	6.55	0	0.247	1.30	1.40	**0.45**
	BT	GFSK	Rear Face	0	39	Ant1	Full Power	1	76.8	8.0	7.07	0	0.200	1.30	1.24	0.32
	BT	GFSK	Rear Face	0	0	Ant1	Full Power	2	76.8	8.0	6.55	0.09	0.189	1.30	1.40	0.34

4.6.3 SAR Measurement Variability

According to KDB 865664 D01, SAR measurement variability was assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. Alternatively, if the highest measured SAR for both head and body tissue-equivalent media are ≤ 1.45 W/kg and the ratio of these highest SAR values, i.e., largest divided by smallest value, is ≤ 1.10, the highest SAR configuration for either head or body tissue-equivalent medium may be used to perform the repeated measurement. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR repeated measurement procedure:

1. When the highest measured SAR is < 0.80 W/kg, repeated measurement is not required.
2. When the highest measured SAR is >= 0.80 W/kg, repeat that measurement once.
3. If the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20, or when the original or repeated measurement is >= 1.45 W/kg, perform a second repeated measurement.
4. If the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20, and the original, first or second repeated measurement is >= 1.5 W/kg, perform a third repeated measurement.

Band	Test Position	Ch.	Original Measured SAR-1g (W/kg)	1st Repeated SAR-1g (W/kg)	L/S Ratio	2nd Repeated SAR-1g (W/kg)	L/S Ratio	3rd Repeated SAR-1g (W/kg)	L/S Ratio
WLAN2.4G	Rear Face	11	0.951	0.939	1.01	N/A	N/A	N/A	N/A
WLAN5G	Rear Face	60	1.02	0.994	1.03	N/A	N/A	N/A	N/A
WLAN5G	Rear Face	144	1.03	0.988	1.04	N/A	N/A	N/A	N/A
WLAN5G	Left Side	157	0.878	0.861	1.02	N/A	N/A	N/A	N/A

4.6.4 Simultaneous Multi-band Transmission Evaluation

<SAR Summation Analysis>

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna. When the sum of SAR_{1g} of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR_{1g} 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR_{1g} is greater than the SAR limit (SAR_{1g} 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

Exposure Position	1	2	3	4	5	6	7	2+7 Summed 1g SAR (W/kg)	4+7 Summed 1g SAR (W/kg)	5+7 Summed 1g SAR (W/kg)	6+7 Summed 1g SAR (W/kg)	1+5 Summed 1g SAR (W/kg)
	2.4GHz WLAN Ant1	2.4GHz WLAN Ant2	2.4GHz WLAN Ant1+2	5GHz WLAN Ant1	5GHz WLAN Ant2	5GHz WLAN Ant1+2	Bluetooth					
	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)					
Rear Face at 0mm	1.083	1.178	1.029	1.098	1.177	1.134	0.449	**1.63**	**1.55**	**1.63**	**1.58**	**2.26**
Left Side at 0mm		0.723	0.873		1.113	1.146		**0.72**	**0.00**	**1.11**	**1.15**	**1.11**
Top Side at 0mm	0.636	0.141	0.421	1.098		0.450	0.253	**0.39**	**1.35**	**0.25**	**0.70**	**0.64**
Bottom Side at 0mm					0.786	0.964		**0.00**	**0.00**	**0.79**	**0.96**	**0.79**
Rear Face at 5mm	1.083	1.178	1.029	1.098	1.065	0.859	0.449	**1.63**	**1.55**	**1.51**	**1.31**	**2.15**
Rear Face at 7mm	1.083	1.139	0.764	1.098	1.065	0.859	0.449	**1.59**	**1.55**	**1.51**	**1.31**	**2.15**
Rear Face at 12mm	0.318	1.139	0.764	0.138	1.065	0.859	0.449	**1.59**	**0.59**	**1.51**	**1.31**	**1.38**
Left Side at 5mm		0.723	0.873		1.135	1.190		**0.72**	**0.00**	**1.13**	**1.19**	**1.13**
Left Side at 9mm		0.312	0.463		1.135	1.190		**0.31**	**0.00**	**1.13**	**1.19**	**1.13**
Top Side at 12mm	0.471		0.187	0.192		0.152	0.253	**0.25**	**0.44**	**0.25**	**0.40**	**0.47**

<SAR to Peak Location Separation Ratio Analysis>

The simultaneous transmitting antennas in each operating mode and exposure condition combination are considered one pair at a time to determine the SPLSR. When SAR is measured for both antennas in the pair, the peak location separation distance is computed by the following formula.

$$\text{Peak Location Separation Distance} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

Where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the area or zoom scans.

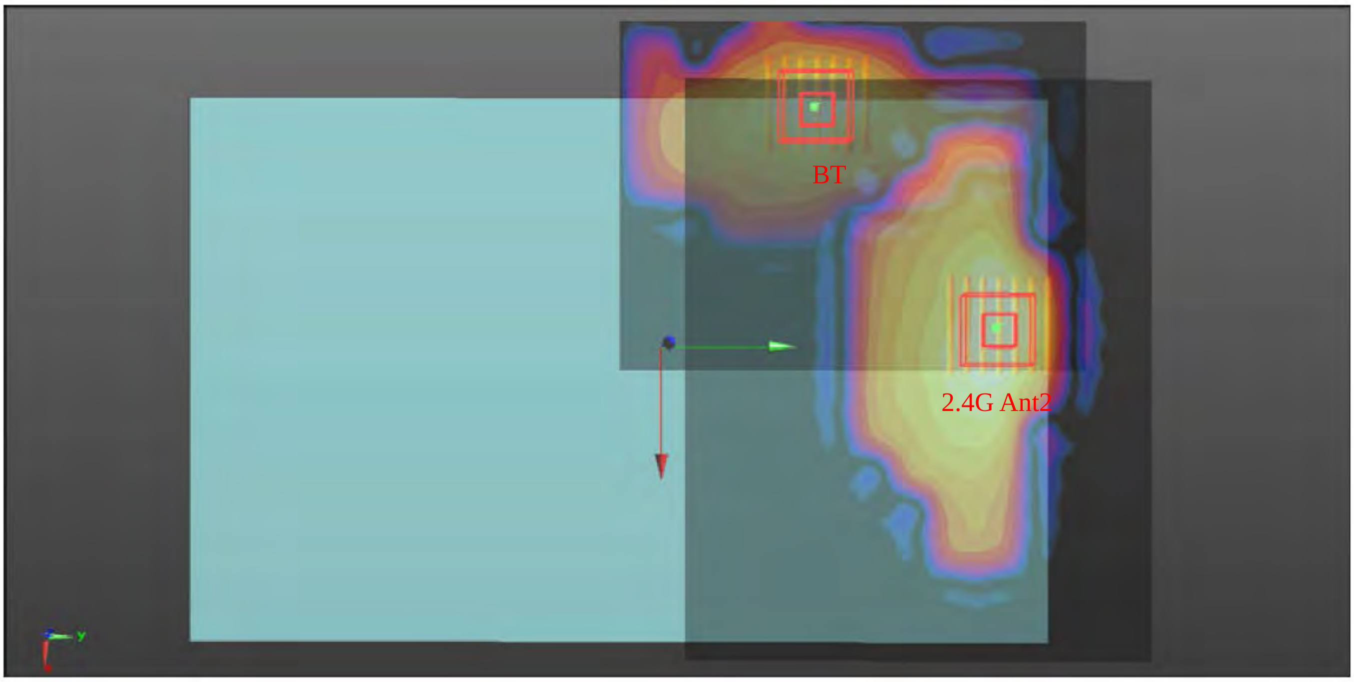
When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location will be translated onto the test device to determine the peak location separation for the antenna pair.

The SPLSR is determined by the following formula.

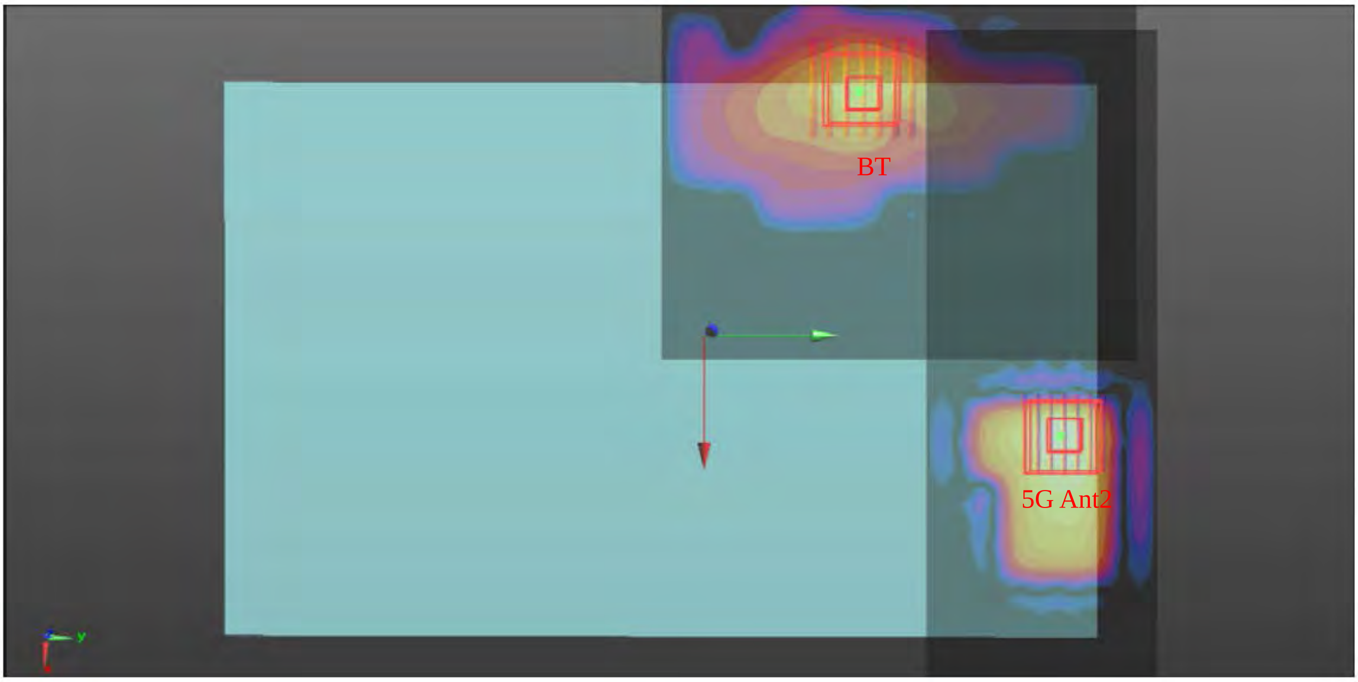
$$\mathrm{SPLSR} = \frac{(\mathrm{SAR}_1 + \mathrm{SAR}_2)^{1.5}}{\mathrm{R_i}}$$

Where SAR_1 and SAR_2 are the highest reported or estimated SAR for each antenna in the pair, and R_i is the separation distance between the peak SAR locations for the antenna pair in mm.
When the SPLSR is <= 0.04, the simultaneous transmission SAR is not required. Otherwise, the enlarged zoom scan and volume scan post-processing procedures will be performed.

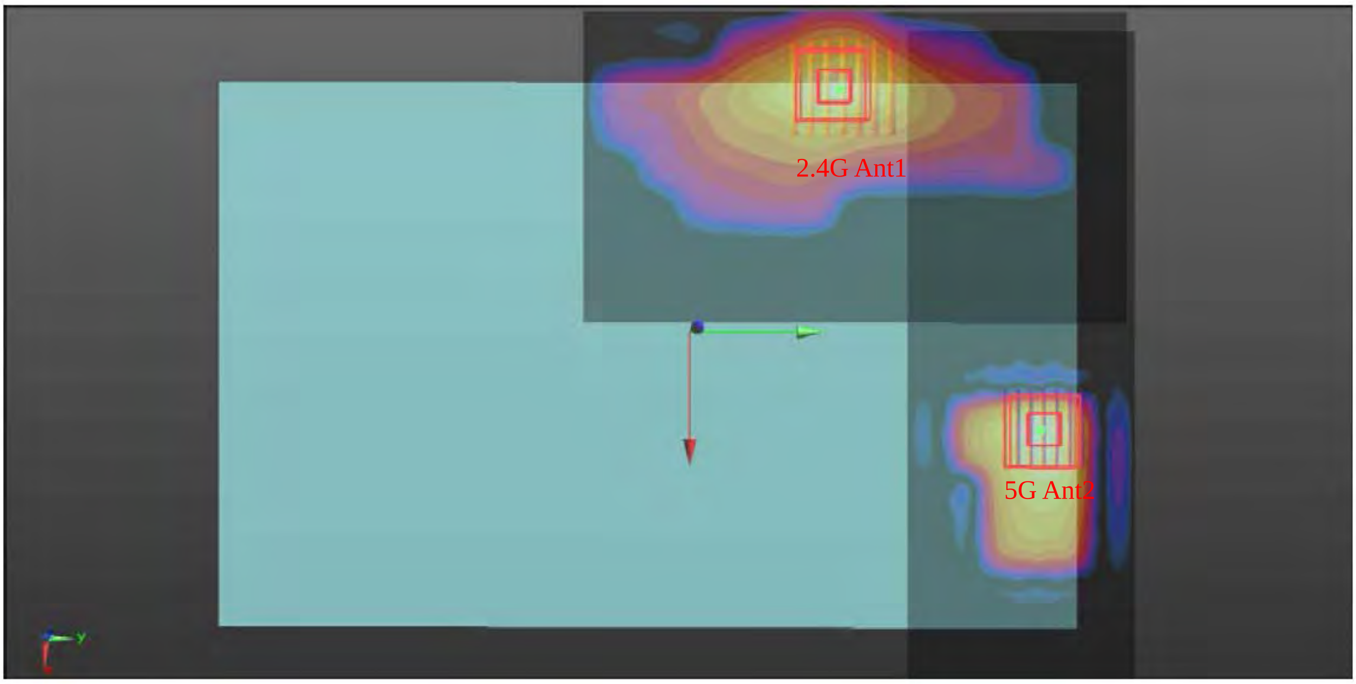
Band	Position	SAR (W/kg)	Gap	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
			(mm)	X	Y	Z				
802.11b	Rear Face	1.18	0	-0.0032	0.131	-0.18	102.5	1.63	0.02	Not required
BT		0.45	0	-0.0816	0.065	-0.18				



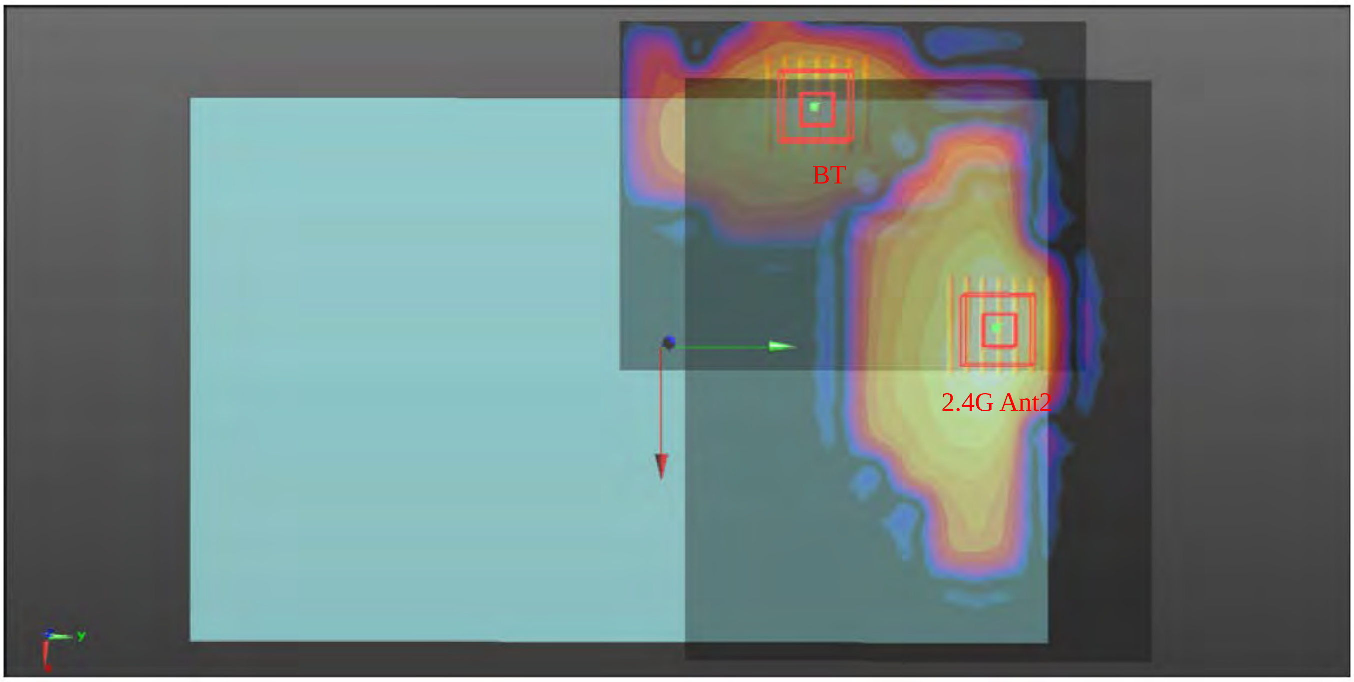
Band	Position	SAR (W/kg)	Gap	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
			(mm)	X	Y	Z				
802.11a	Rear Face	1.18	0	0.023	0.121	-0.175	118.8	1.63	0.02	Not required
BT		0.45	0	-0.0816	0.065	-0.18				



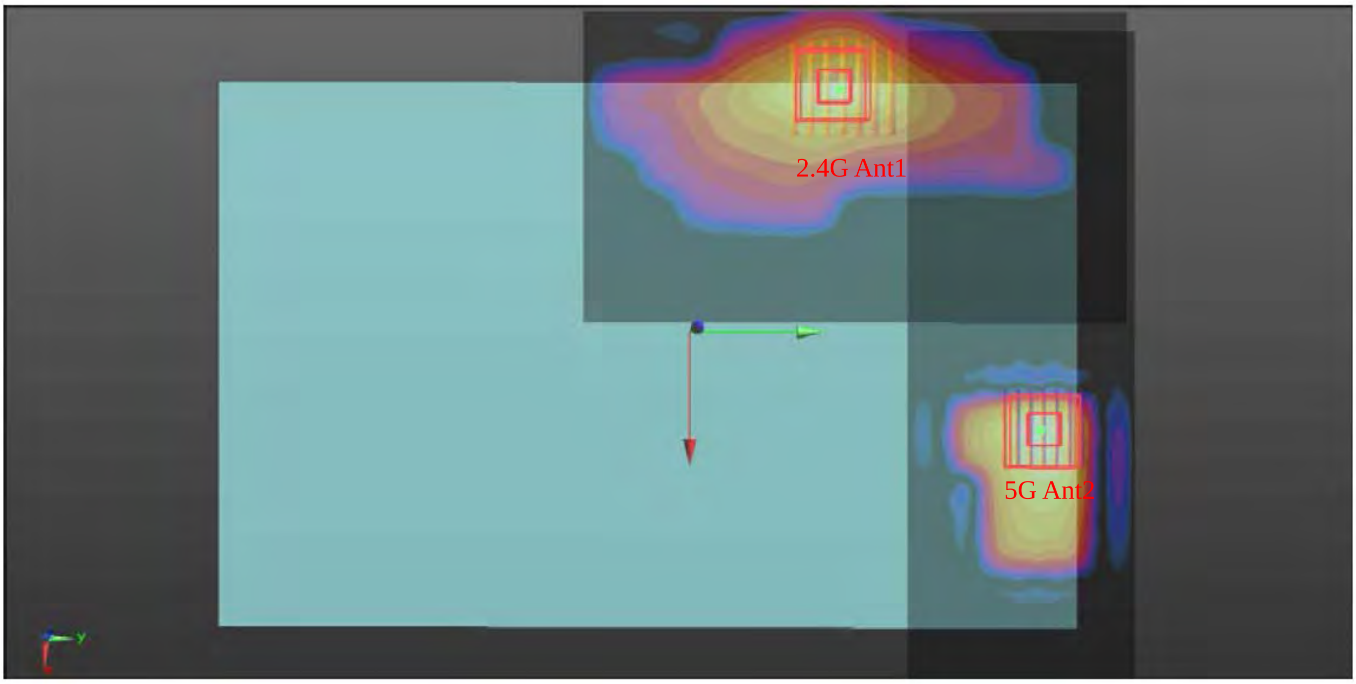
Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	SAR peak location (m) Y	SAR peak location (m) Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
802.11b	Rear Face	1.08	0	-0.082	0.0592	-0.18	121.9	2.26	0.03	Not required
802.11a		1.18	0	0.023	0.121	-0.175				



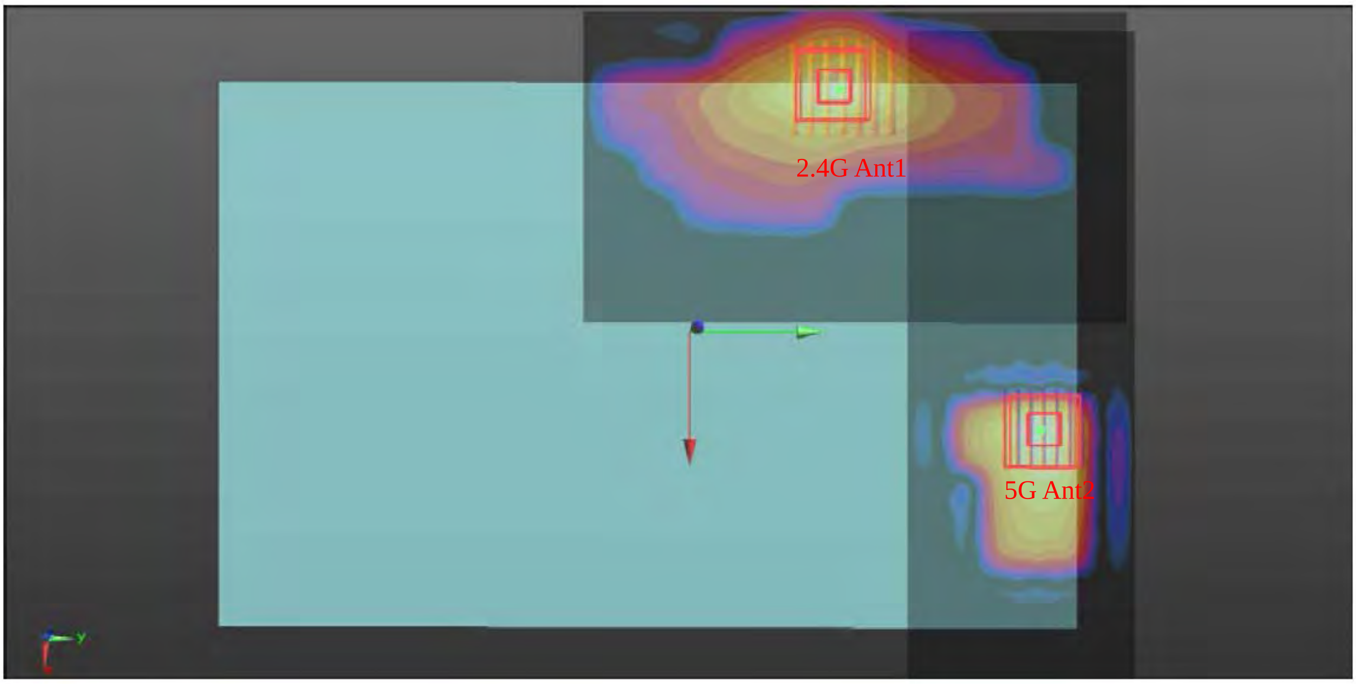
Band	Position	SAR (W/kg)	Gap	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
			(mm)	X	Y	Z				
802.11b	Rear Face	1.18	5	-0.0032	0.131	-0.18	102.5	1.63	0.02	Not required
BT		0.45	5	-0.0816	0.065	-0.18				



Band	Position	SAR (W/kg)	Gap	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
			(mm)	X	Y	Z				
802.11b	Rear Face	1.08	5	-0.082	0.0592	-0.18	125.7	2.15	0.03	Not required
802.11a		1.06	5	0.028	0.12	-0.183				



Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
802.11b	Rear Face	1.08	7	-0.082	0.0592	-0.18	125.7	2.15	0.03	Not required
802.11a		1.06	7	0.028	0.12	-0.183				



Test Engineer： Dennis Ye, and Rikou Lu

5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Dipole	SPEAG	D2450V2	893	Sep. 18, 2021	1 Year
System Validation Dipole	SPEAG	D5GHzV2	1133	Sep. 14, 2021	1 Year
Data Acquisition Electronics	SPEAG	DAE4	1389	Oct. 26, 2021	1 Year
Dosimetric E-Field Probe	SPEAG	EX3DV4	3873	Aug. 25, 2021	1 Year
ENA Series Network Analyzer	Agilent	E5071C	MY46214638	Jun. 03, 2021	1 Year
Spectrum Analyzer	KEYSIGHT	N9010A	MY54510355	Jun. 03, 2021	1 Year
MXG Analog Signal Generator	KEYSIGHT	N5183A	MY50143024	Feb. 18, 2022	1 Year
Power Meter	Agilent	N1914A	MY52180044	Feb. 19, 2022	1 Year
Power Sensor	Agilent	E9304A H18	MY52050011	Feb. 20, 2022	1 Year
Power Meter	ANRITSU	ML2495A	1506002	Feb. 22, 2022	1 Year
Power Sensor	ANRITSU	MA2411B	1339353	May. 06, 2022	1 Year
Temp. & Humi. Recorder	CLOCK	HTC-1	157248	Jun. 02, 2021	1 Year
Electronic Thermometer	YONGFA	YF-160A	120100323	Jun. 02, 2021	1 Year
Coupler	Woken	0110A056020-10	COM27RW1A3	Jun. 02, 2021	1 Year

6. Measurement Uncertainty

DASY5 Uncertainty Budget								
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**	**(Vi) Veff**
Measurement System								
Probe Calibration	6.0	N	1	1	1	6.0	6.0	∞
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9	∞
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6	∞
Linearity	4.7	R	1.732	1	1	2.7	2.7	∞
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6	∞
Modulation Response	3.2	R	1.732	1	1	1.8	1.8	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0.0	R	1.732	1	1	0.0	0.0	∞
Integration Time	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7	∞
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2	∞
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7	∞
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2	∞
Test Sample Related								
Device Positioning	3.0	N	1	1	1	3.0	3.0	35
Device Holder	3.6	N	1	1	1	3.6	3.6	12
Power Drift	5.0	R	1.732	1	1	2.9	2.9	∞
Power Scaling	0.0	R	1.732	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5	∞
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0	∞
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1	5
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0	∞
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0	∞
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0	5
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8	∞
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4	∞
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1	∞
Combined Std. Uncertainty						11.4%	11.4%	1013
Coverage Factor for 95 %						K=2	K=2	
Expanded STD Uncertainty						22.9%	22.7%	

Uncertainty budget for frequency range 30 MHz to 3 GHz

DASY5 Uncertainty Budget								
Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)	(Vi) Veff
Measurement System								
Probe Calibration	6.55	N	1	1	1	6.5	6.5	∞
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9	∞
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2	∞
Linearity	4.7	R	1.732	1	1	2.7	2.7	∞
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6	∞
Modulation Response	3.2	R	1.732	1	1	1.8	1.8	∞
Readout Electronics	0.3	N	1	1	1	0.3	0.3	∞
Response Time	0.0	R	1.732	1	1	0.0	0.0	∞
Integration Time	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7	∞
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7	∞
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2	∞
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9	∞
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3	∞
Test Sample Related								
Device Positioning	3.0	N	1	1	1	3.0	3.0	35
Device Holder	3.6	N	1	1	1	3.6	3.6	12
Power Drift	5.0	R	1.732	1	1	2.9	2.9	∞
Power Scaling	0.0	R	1.732	1	1	0.0	0.0	∞
Phantom and Setup								
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8	∞
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0	∞
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1	5
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0	∞
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0	∞
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0	5
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8	∞
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4	∞
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1	∞
Combined Std. Uncertainty						12.5%	12.5%	1458
Coverage Factor for 95 %						K=2	K=2	
Expanded STD Uncertainty						25.0%	24.9%	

Uncertainty budget for frequency range 3 GHz to 6 GHz

7. Information on the Testing Laboratories

We, BV 7LAYERS COMMUNICATIONS TECHNOLOGY (SHENZHEN) CO. LTD., were founded in 2015 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas.com

The road map of all our labs can be found in our web site also.

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Appendix A. SAR Plots of System Verification

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

System Check_HSL2450_20220407

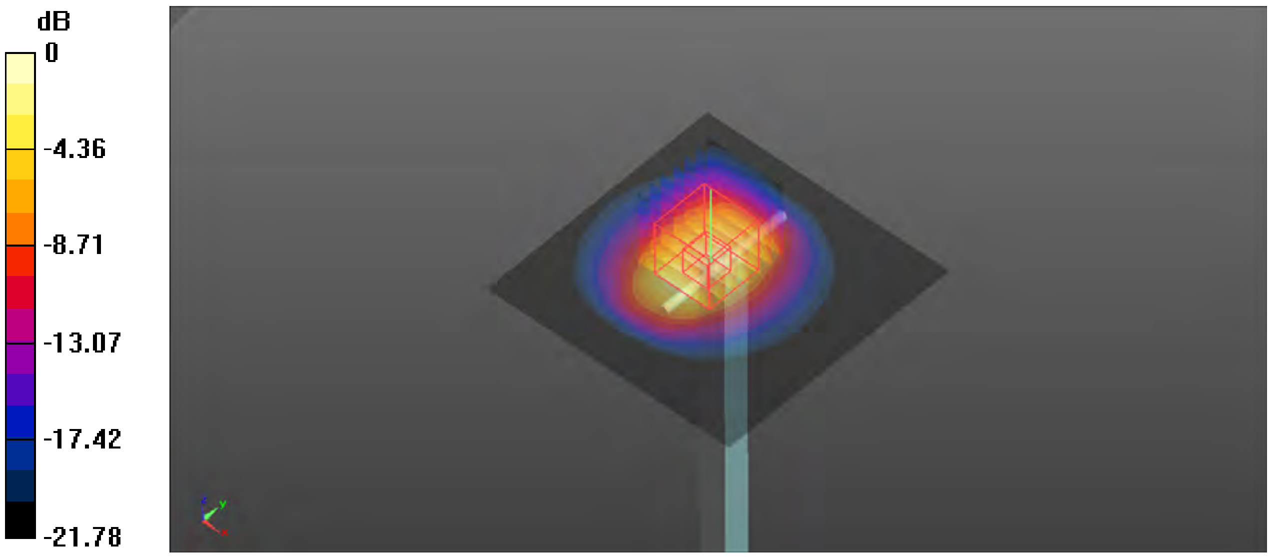
DUT: Dipole:2450 MHz;Type:D2450V2

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL2450_0407 Medium parameters used: f = 2450 MHz; σ = 1.853 S/m; ε_r = 38.06; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 16.9 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 77.958 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 29.4 W/kg
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.69 W/kg
Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 16.2 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab   Date: 2022/5/17

System Check_HSL2450_20220517

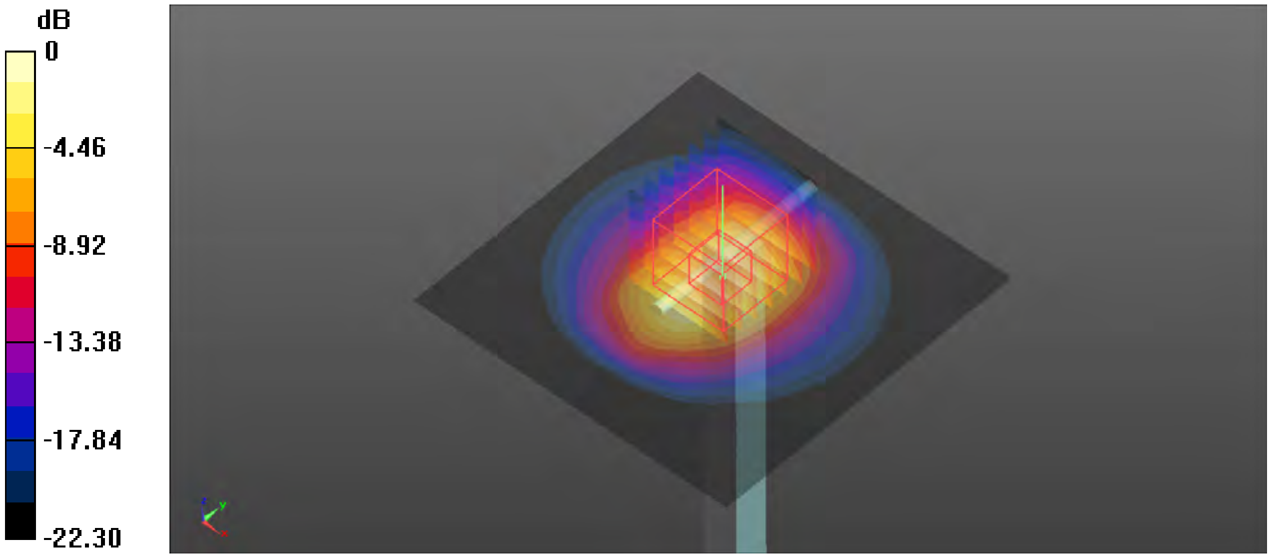
DUT: Dipole:2450 MHz;Type:D2450V2

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium: HSL2450_0517 Medium parameters used: f = 2450 MHz; σ = 1.786 S/m; ε_r = 40.406; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.6℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 24.9 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 114.2 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 29.0 W/kg
SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.57 W/kg
Maximum value of SAR (measured) = 23.6 W/kg



0 dB = 23.6 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/4/9

System Check_HSL5250_20220409

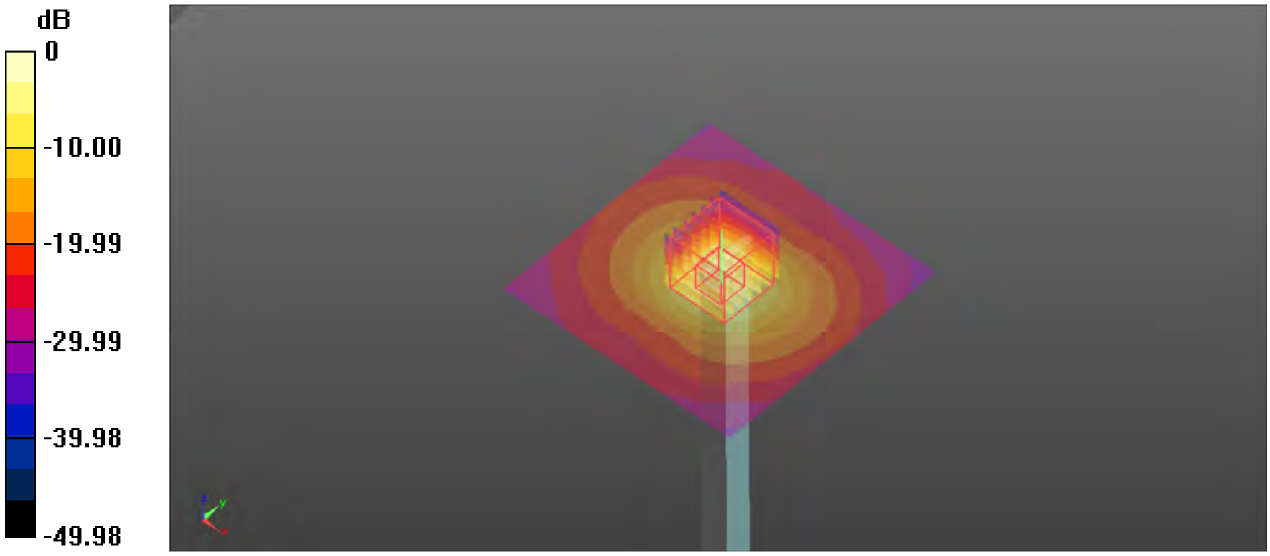
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: HSL5G_0409 Medium parameters used: f = 5250 MHz; σ = 4.767 S/m; ε_r = 36.978; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.8, 4.8, 4.8); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.8 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.239 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 27.9 W/kg
SAR(1 g) = 7.15 W/kg; SAR(10 g) = 2.07 W/kg
Maximum value of SAR (measured) = 17.6 W/kg



0 dB = 17.6 W/kg

System Check_HSL5250_20220411

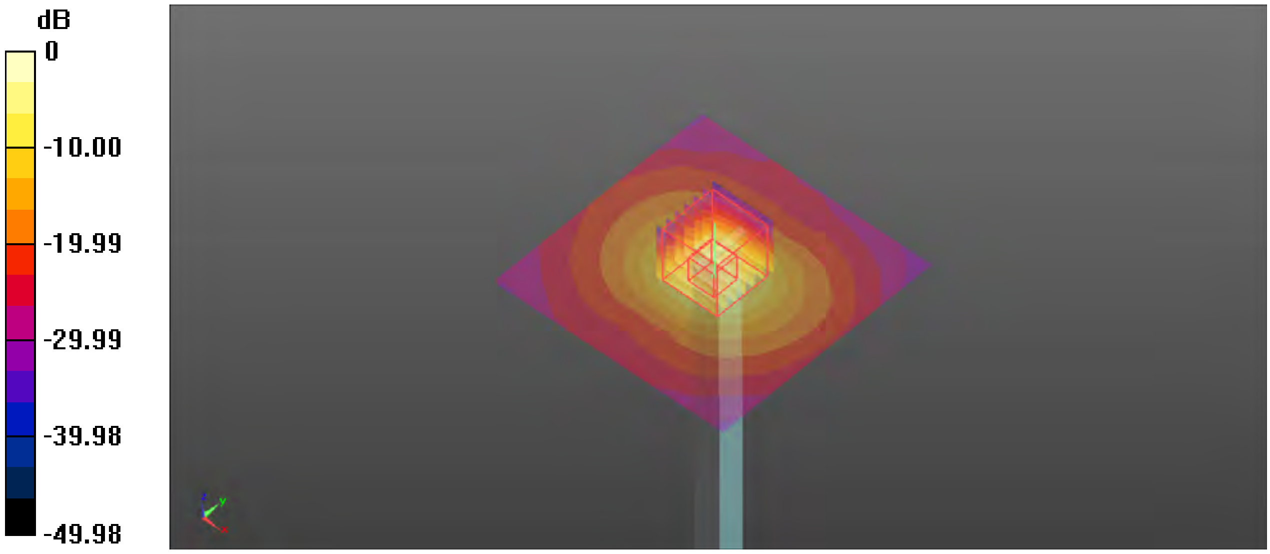
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: HSL5G_0411 Medium parameters used: f = 5250 MHz; σ = 4.741 S/m; ε_r = 36.265; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.8, 4.8, 4.8); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 17.7 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.239 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 7.11 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg

System Check_HSL5250_20220517

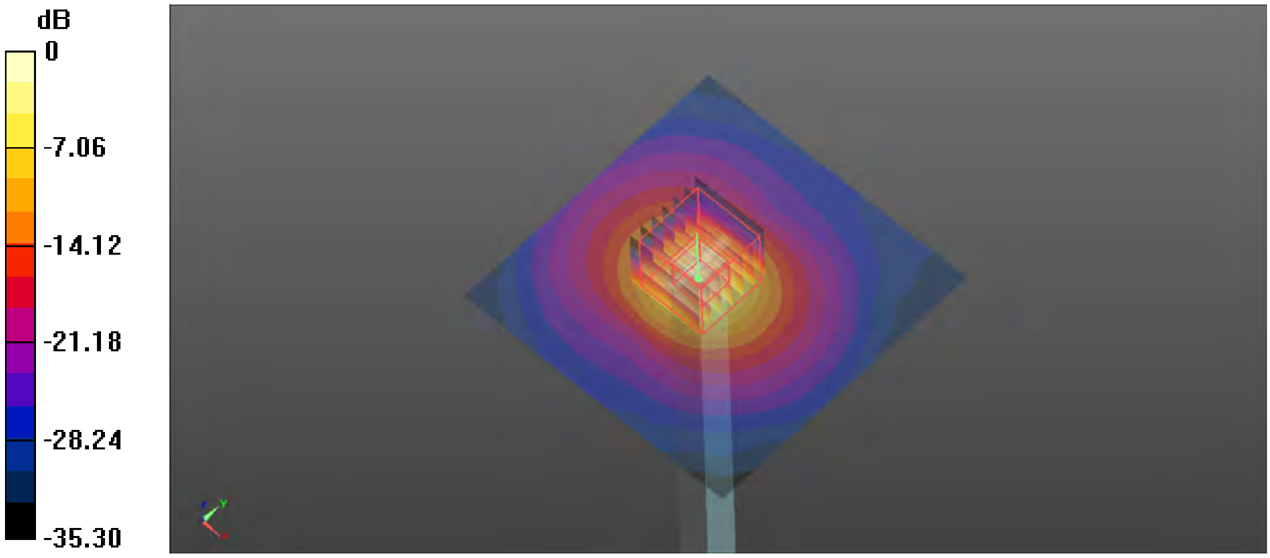
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5250 MHz;Duty Cycle: 1:1
Medium: HSL5G_0517 Medium parameters used: f = 5250 MHz; σ = 4.764 S/m; ε_r = 36.965; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.8, 4.8, 4.8); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.6 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 55.186 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 8.12 W/kg; SAR(10 g) = 2.29 W/kg
Maximum value of SAR (measured) = 20.7 W/kg



0 dB = 20.7 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/4/12

System Check_HSL5600_20220412

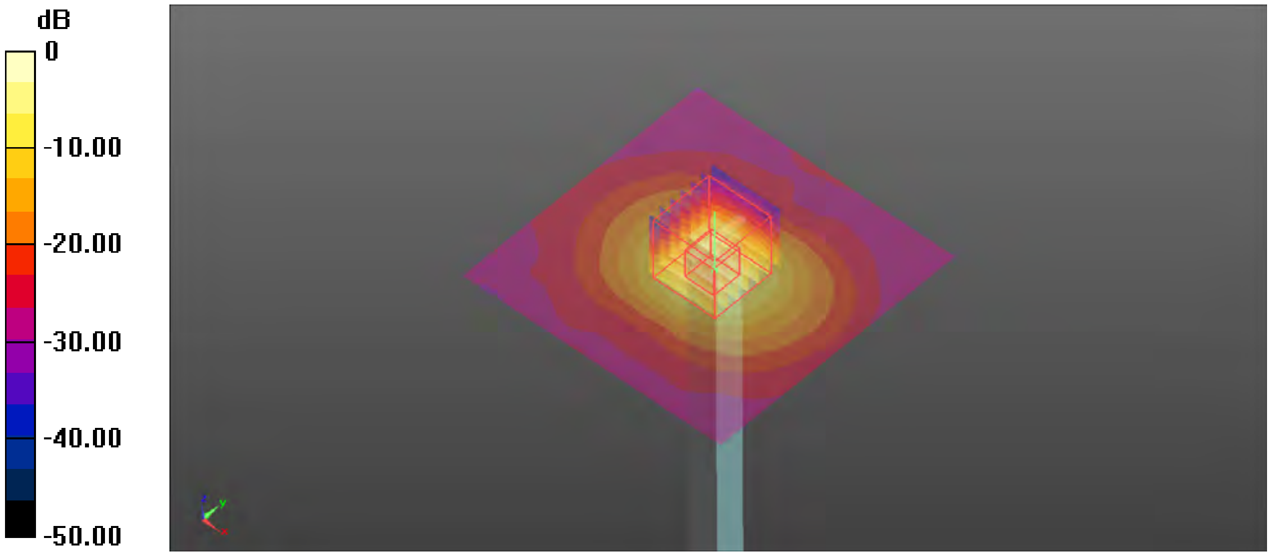
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: HSL5G_0412 Medium parameters used: f = 5600 MHz; σ = 5.211 S/m; ε_r = 36.23; ρ = 1000 kg/m^3
Ambient Temperature：23.2℃; Liquid Temperature：22.3℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.5, 4.5, 4.5); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.7 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 57.515 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 8.04 W/kg; SAR(10 g) = 2.31 W/kg
Maximum value of SAR (measured) = 20.3 W/kg



0 dB = 20.3 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/4/13

System Check_HSL5600_20220413

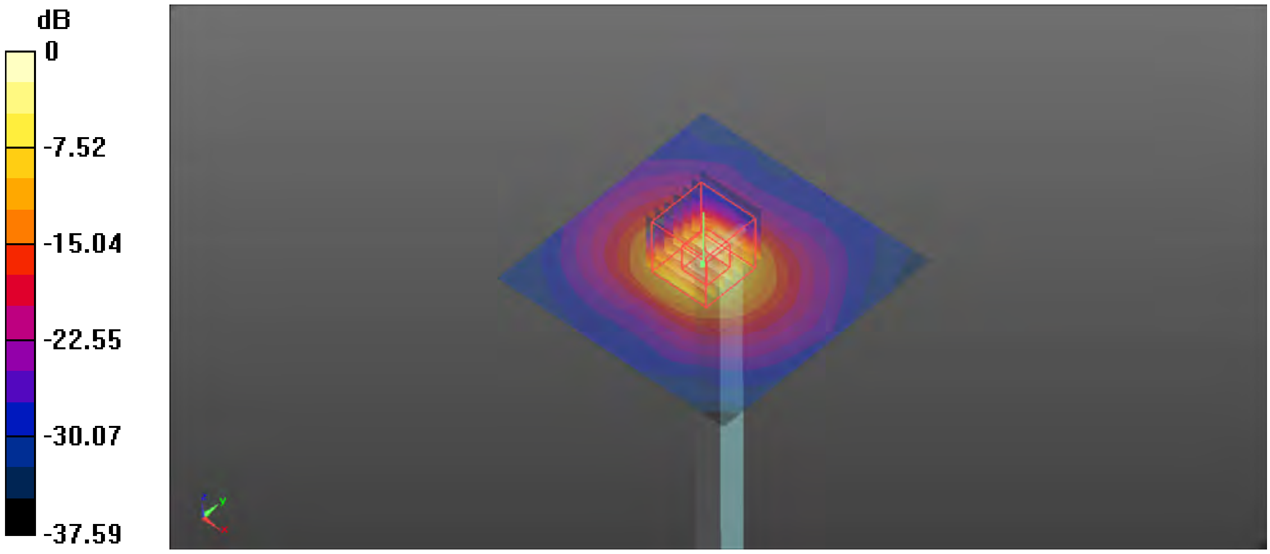
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: HSL5G_0413 Medium parameters used: f = 5600 MHz; $\sigma = 5.099$ S/m; $\varepsilon_r = 35.754$; $\rho = 1000$ kg/m^3
Ambient Temperature：23.5℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.5, 4.5, 4.5); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 19.5 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.777 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 35.1 W/kg
SAR(1 g) = 8.03 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 20.8 W/kg



0 dB = 20.8 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/5/17

System Check_HSL5600_20220517

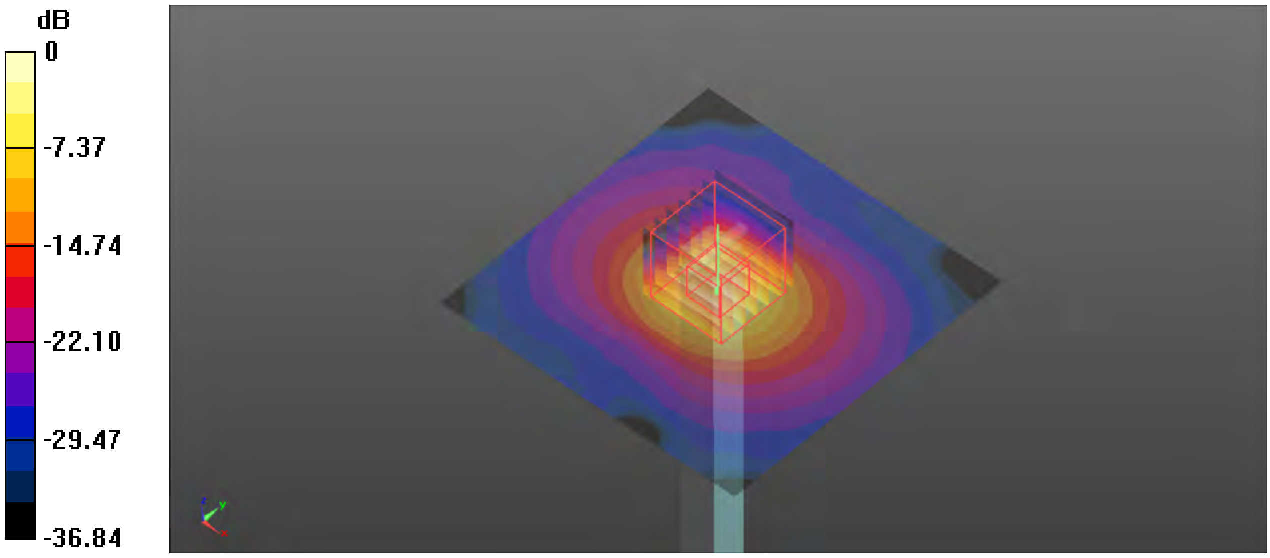
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5600 MHz;Duty Cycle: 1:1
Medium: HSL5G_0517 Medium parameters used: f = 5600 MHz; σ = 5.207 S/m; ε_r = 36.212; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.5, 4.5, 4.5); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 21.2 W/kg

Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 63.911 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 37.7 W/kg
SAR(1 g) = 8.74 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 22.9 W/kg



0 dB = 22.9 W/kg

System Check_HSL5800_20220414

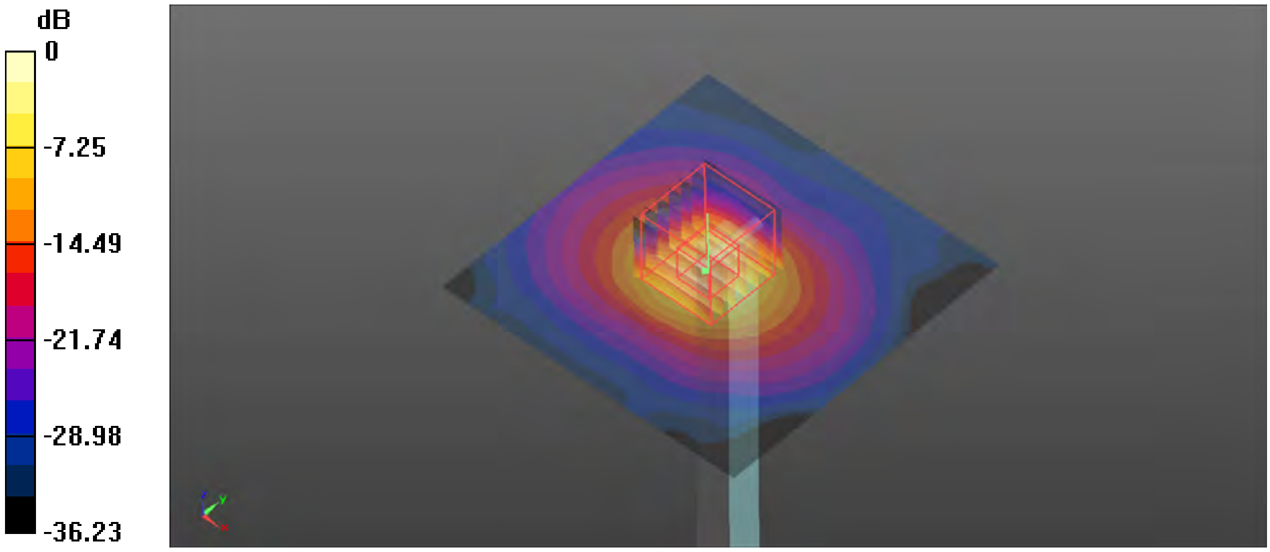
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: HSL5G_0414 Medium parameters used: f = 5800 MHz; σ = 5.445 S/m; ε_r = 35.778; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.4℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.49, 4.49, 4.49); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.2 W/kg

Pin=100mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 52.501 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.28 W/kg; SAR(10 g) = 2.03 W/kg
Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/4/15

System Check_HSL5800_20220415

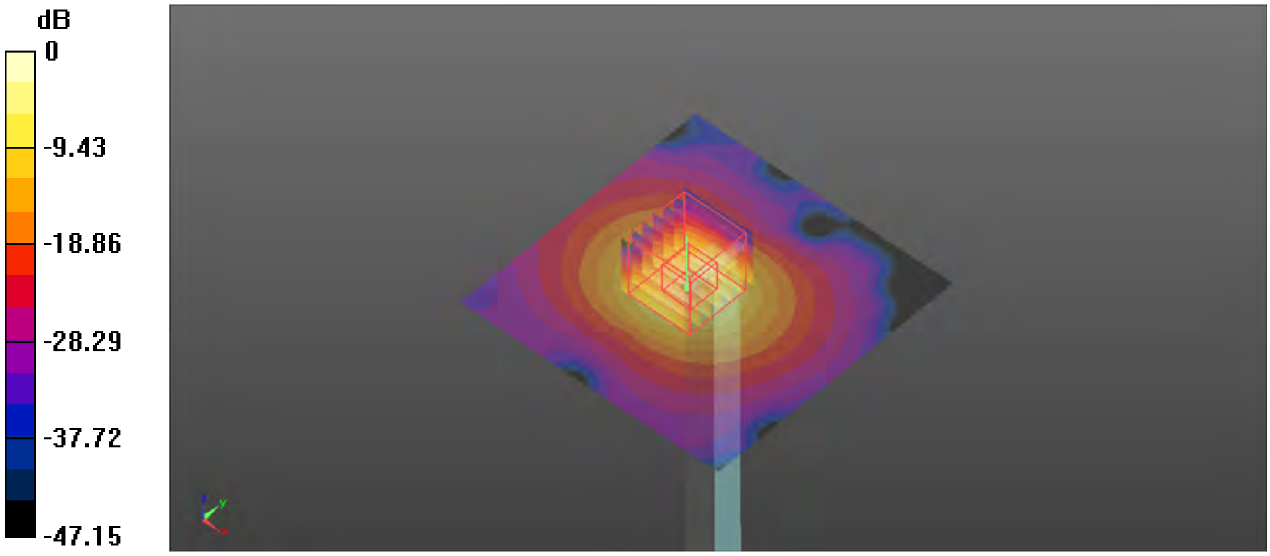
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: HSL5G_0415 Medium parameters used: f = 5800 MHz; σ = 5.313 S/m; ε_r = 35.464; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.49, 4.49, 4.49); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 21.7 W/kg

Pin=100mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 52.609 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 39.1 W/kg
SAR(1 g) = 8.41 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 22.5 W/kg



0 dB = 22.5 W/kg

System Check_HSL5800_20220517

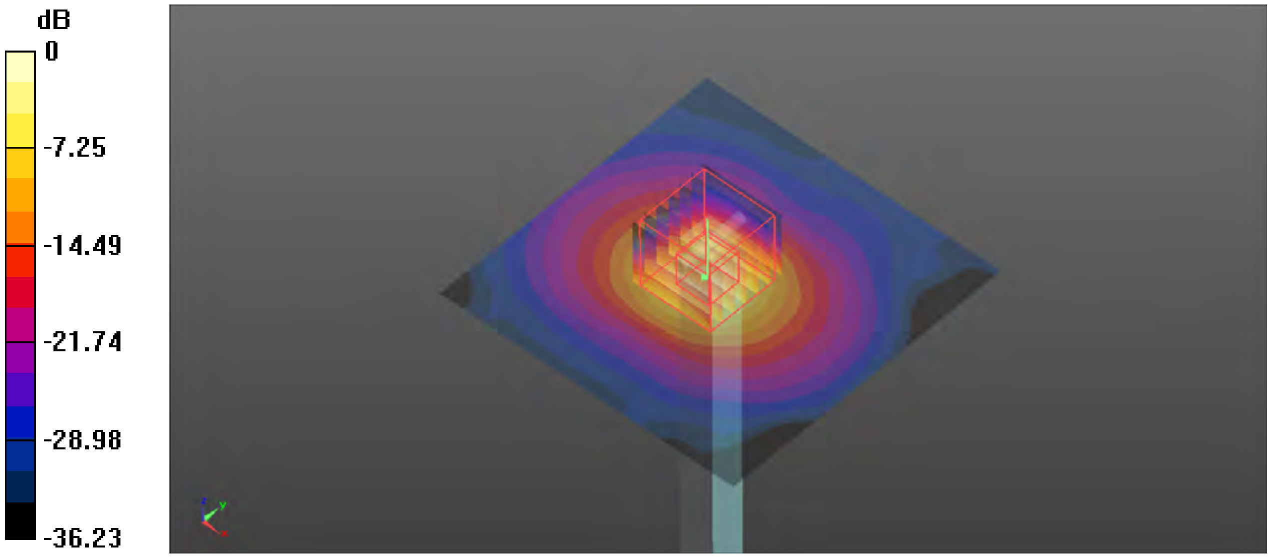
DUT: Dipole 5GHzV2;Type:D5GHzV2

Communication System: CW; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: HSL5G_0517 Medium parameters used: f = 5800 MHz; σ = 5.44 S/m; ε_r = 35.764; ρ = 1000 kg/m^3
Ambient Temperature：23.6℃; Liquid Temperature：22.4℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.49, 4.49, 4.49); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Pin=100mW/Area Scan (91x91x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 18.1 W/kg

Pin=100mW/Zoom Scan (7x7x11)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 52.501 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 34.1 W/kg
SAR(1 g) = 7.28 W/kg; SAR(10 g) = 2.08 W/kg
Maximum value of SAR (measured) = 19.4 W/kg



0 dB = 19.4 W/kg

Appendix B. SAR Plots of SAR Measurement

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

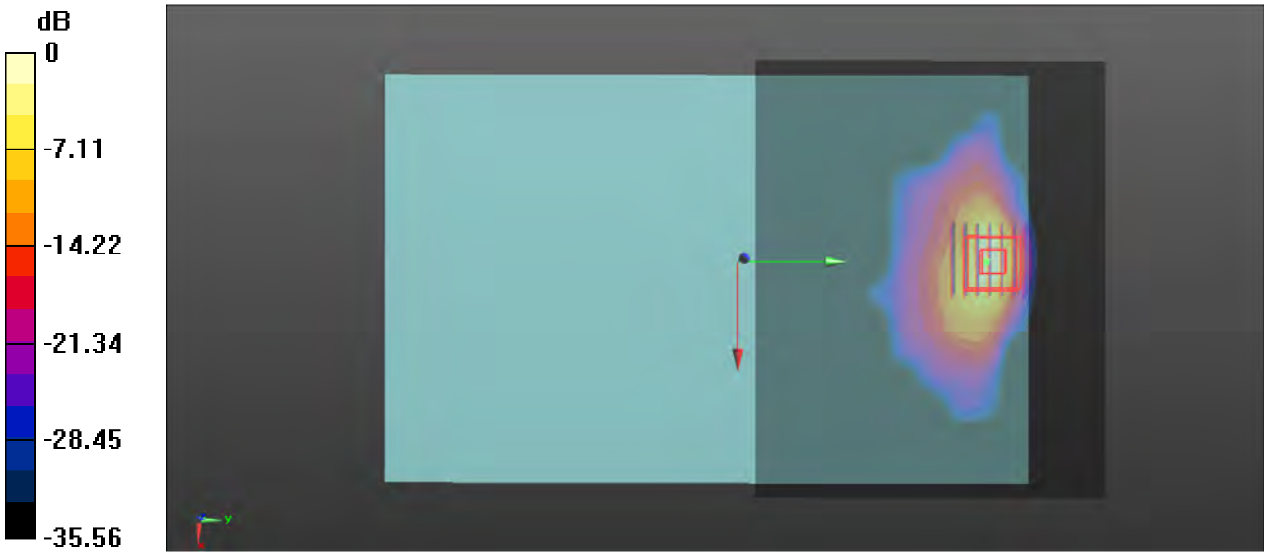
P01 WLAN2.4G_802.11b_Rear Face_0cm_Ch11_Ant2

Communication System: 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium: HSL2450_0407 Medium parameters used: f = 2462 MHz; σ = 1.862 S/m; ε_r = 38.034; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

- Area Scan (101x101x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 1.98 W/kg

- Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.104 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 3.25 W/kg
SAR(1 g) = 0.951 W/kg; SAR(10 g) = 0.325 W/kg
Maximum value of SAR (measured) = 2.07 W/kg



0 dB = 2.07 W/kg

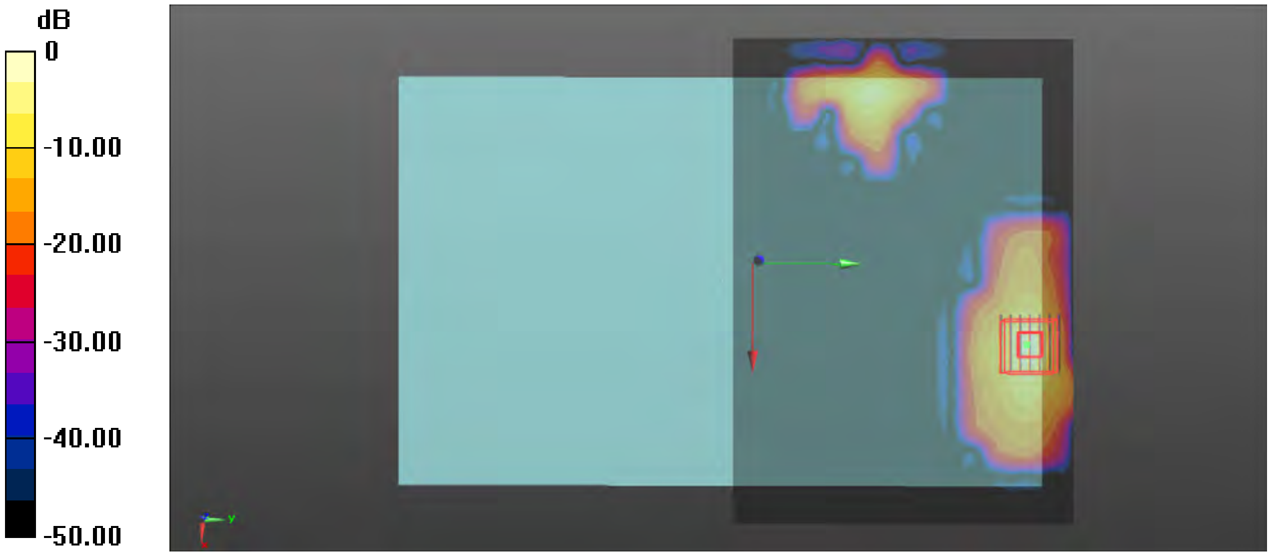
P02 WLAN5G_802.11a_Rear Face_0cm_Ch60_Ant1+2

Communication System: 802.11a; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: HSL5G_0411 Medium parameters used: f = 5300 MHz; σ = 4.794 S/m; ε_r = 36.18; ρ = 1000 kg/m^3
Ambient Temperature：23.4℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.8, 4.8, 4.8); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

- Area Scan (201x141x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.00 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.289 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 6.50 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.239 W/kg
Maximum value of SAR (measured) = 2.88 W/kg



0 dB = 2.88 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/4/13

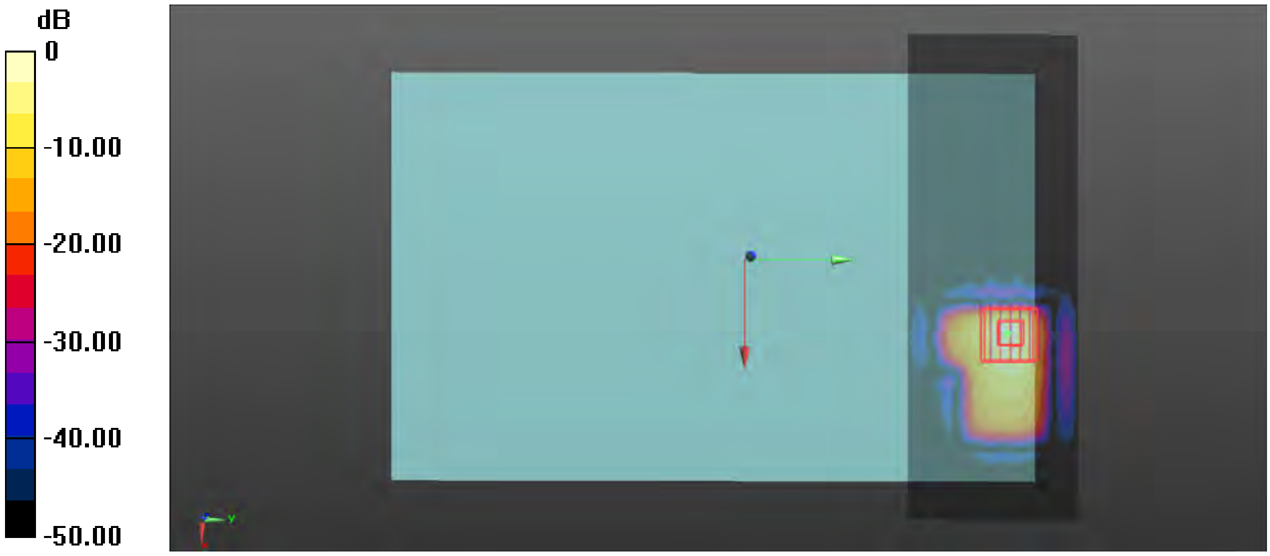
P03 WLAN5G_802.11a_Rear Face_0cm_Ch124_Ant2

Communication System: 802.11a; Frequency: 5620 MHz;Duty Cycle: 1:1
Medium: HSL5G_0413 Medium parameters used: f = 5620 MHz; σ = 5.121 S/m; ε_r = 35.722; ρ = 1000 kg/m^3
Ambient Temperature：23.5℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.5, 4.5, 4.5); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

- Area Scan (201x71x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 4.22 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 6.85 W/kg
SAR(1 g) = 0.963 W/kg; SAR(10 g) = 0.228 W/kg
Maximum value of SAR (measured) = 2.68 W/kg



0 dB = 2.68 W/kg

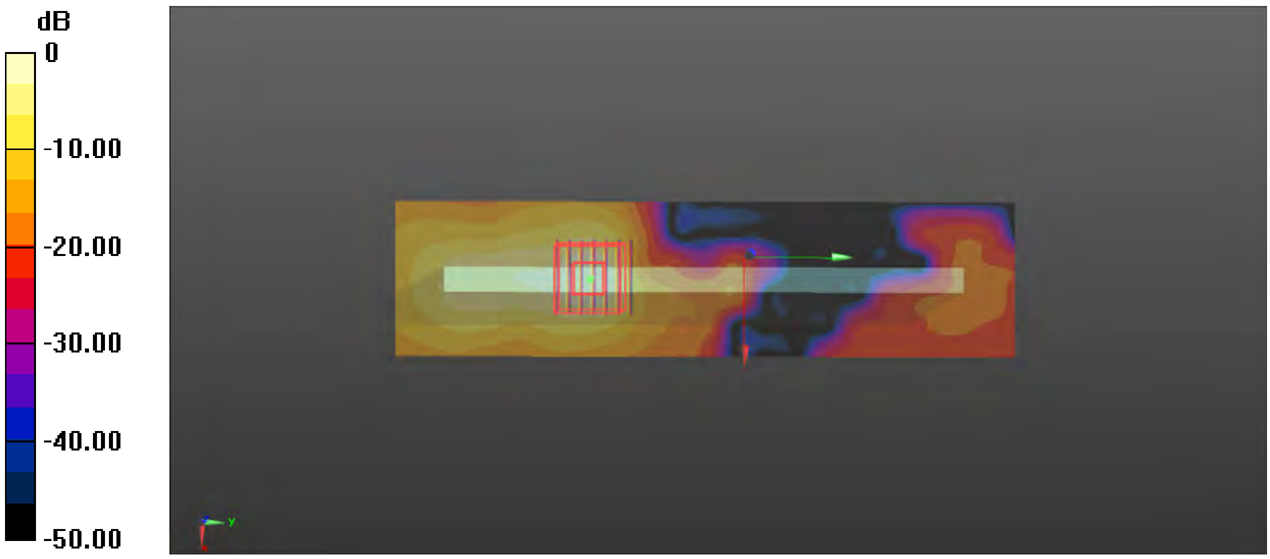
P04 WLAN5G_802.11a_Left Side_0.5cm_Ch157_Ant1+2

Communication System: 802.11a; Frequency: 5785 MHz;Duty Cycle: 1:1
Medium: HSL5G_0415 Medium parameters used: f = 5785 MHz; σ = 5.294 S/m; ε_r = 35.485; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.2℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(4.49, 4.49, 4.49); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

- Area Scan (51x201x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 2.34 W/kg

- Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.087 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 4.42 W/kg
SAR(1 g) = 0.878 W/kg; SAR(10 g) = 0.278 W/kg
Maximum value of SAR (measured) = 2.32 W/kg



0 dB = 2.32 W/kg

Test Laboratory: BV 7LAYERS SAR/HAC Testing Lab Date: 2022/4/7

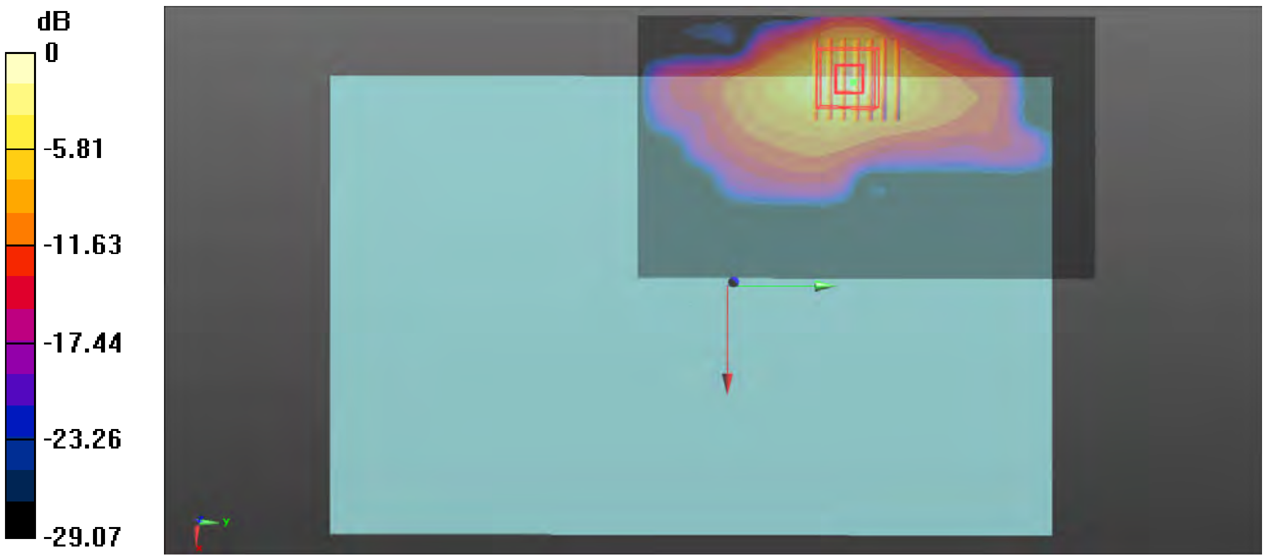
P05 BT_GFSK_Rear Face_0cm_Ch0

Communication System: BT; Frequency: 2402 MHz;Duty Cycle: 1:1.3
Medium: HSL2450_0407 Medium parameters used: f = 2402 MHz; σ = 1.817 S/m; ε_r = 38.15; ρ = 1000 kg/m^3
Ambient Temperature：23.3℃; Liquid Temperature：22.5℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3873; ConvF(7.88, 7.88, 7.88); Calibrated: 2021/8/25;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1389; Calibrated: 2021/10/26
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1214
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

- Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.252 W/kg

- Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.842 W/kg
SAR(1 g) = 0.302 W/kg; SAR(10 g) = 0.108 W/kg
Maximum value of SAR (measured) = 0.294 W/kg



0 dB = 0.294 W/kg

Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

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CNAS L0570

Client **B.V.ADT** **Certificate No: Z21-60338**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 893
Calibration Procedure(s)	FF-Z11-003-01 Calibration Procedures for dipole validation kits
Calibration date:	September 18, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Power sensor NRP8S	104291	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Reference Probe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	**ID #**	**Cal Date (Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzer E5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 26, 2021

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.79 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.6 W/kg ± 18.8 % (*k*=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	250 mW input power	6.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.4 W/kg ± 18.7 % (*k*=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0Ω+ 6.26jΩ
Return Loss	- 22.4dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.069 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG

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DASY5 Validation Report for Head TSL Date: 09.18.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 893

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.79 S/m; ε_r = 38.85; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(7.34, 7.34, 7.34) @ 2450 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Dipole Calibration/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 108.0 V/m; Power Drift = -0.01 dB

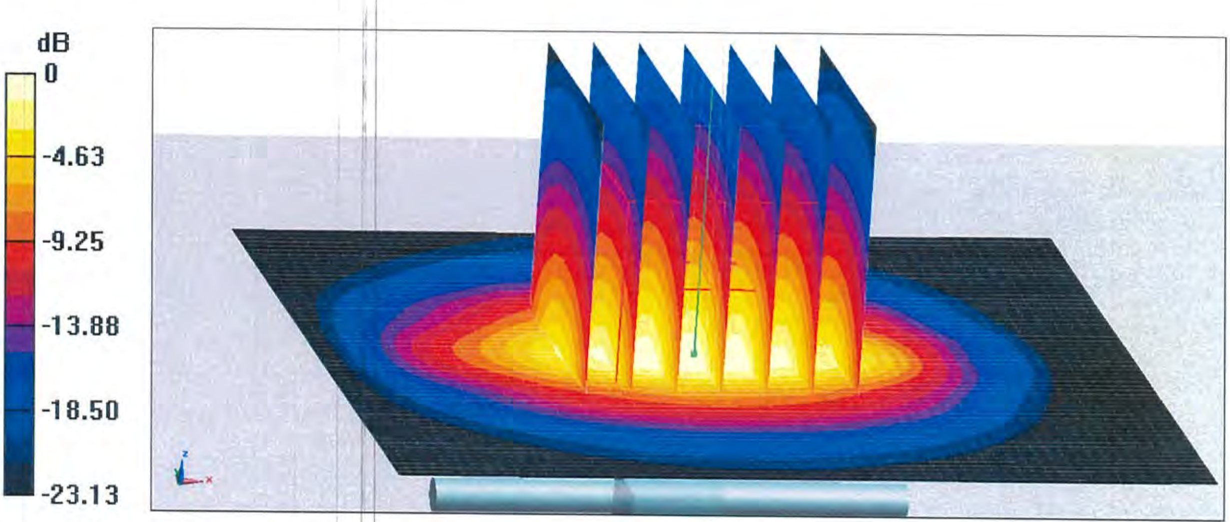
Peak SAR (extrapolated) = 28.3 W/kg

SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.1 W/kg

Smallest distance from peaks to all points 3 dB below = 9 mm

Ratio of SAR at M2 to SAR at M1 = 46.9%

Maximum value of SAR (measured) = 22.7 W/kg



0 dB = 22.7 W/kg = 13.56 dBW/kg

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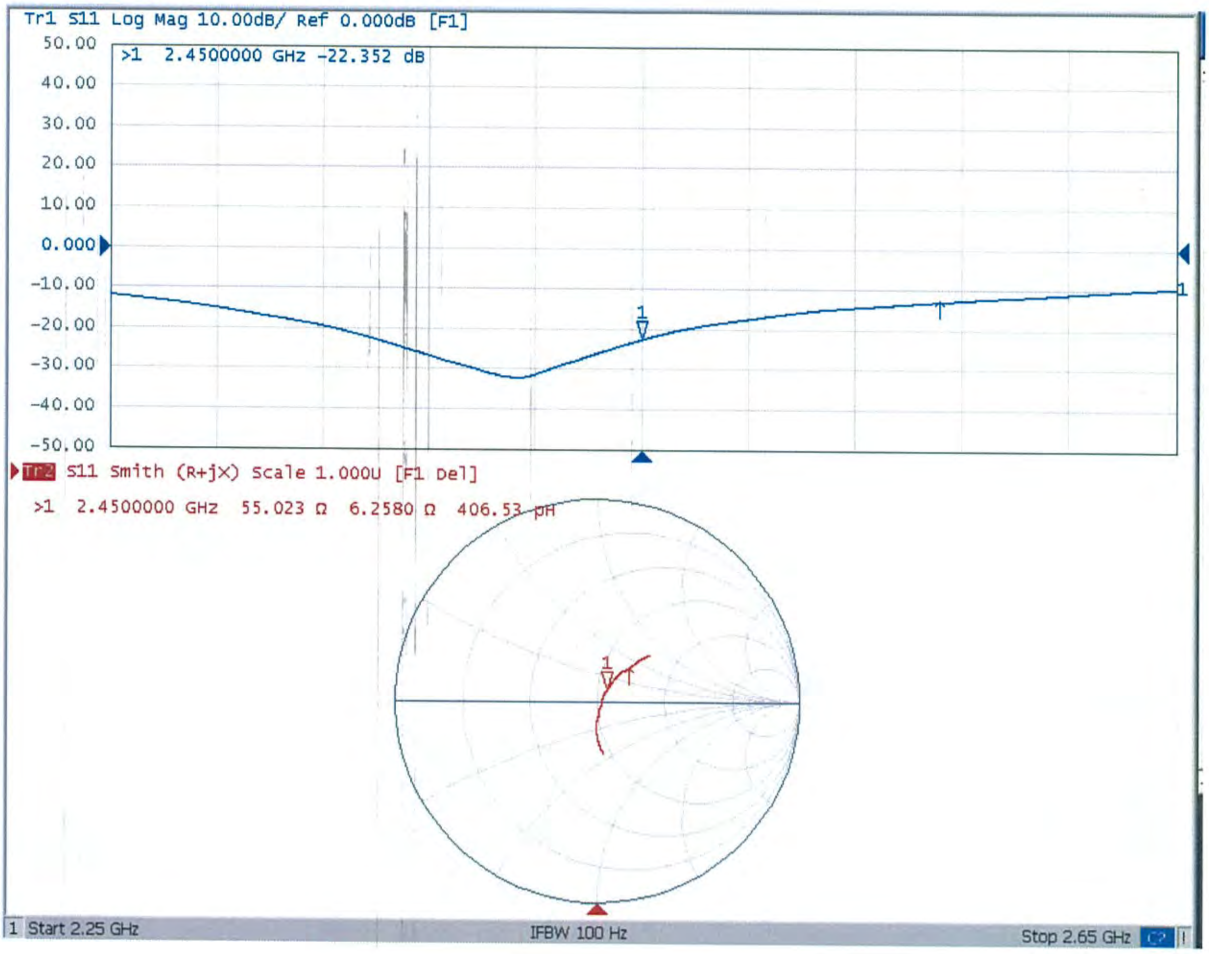
Impedance Measurement Plot for Head TSL



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CNAS L0570

Client B.V.ADT Certificate No: Z21-60340

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1133

Calibration Procedure(s) FF-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: September 14, 2021

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	106277	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
Power sensor NRP8S	104291	23-Sep-20 (CTTL, No.J20X08336)	Sep-21
ReferenceProbe EX3DV4	SN 7517	03-Feb-21(CTTL-SPEAG,No.Z21-60001)	Feb-22
DAE4	SN 1556	15-Jan-21(SPEAG,No.DAE4-1556_Jan21)	Jan-22
Secondary Standards	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Signal Generator E4438C	MY49071430	01-Feb-21 (CTTL, No.J21X00593)	Jan-22
NetworkAnalyzerE5071C	MY46110673	14-Jan-21 (CTTL, No.J21X00232)	Jan-22

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Lin Hao	SAR Test Engineer	
Approved by:	Qi Dianyuan	SAR Project Leader	

Issued: September 20, 2021

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Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORMx,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY52	V52.10.4
Extrapolation	Advanced Extrapolation	
Phantom	Triple Flat Phantom 5.1C	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.65 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.72 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**76.9 W/kg ± 24.4 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.1 W/kg ± 24.2 % (*k*=2)**

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Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.2 W/kg ± 24.4 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 24.2 % (*k*=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.23 mho/m ± 6 %
Head TSL temperature change during test	<1.0 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.84 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**78.0 W/kg ± 24.4 % (*k*=2)**
SAR averaged over 10 cm^3 (10 g) of Head TSL	Condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.1 W/kg ± 24.2 % (*k*=2)**

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Appendix (Additional assessments outside the scope of CNAS L0570)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	49.8Ω - 6.16jΩ
Return Loss	- 24.2dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	53.6Ω - 0.22jΩ
Return Loss	- 29.2dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	54.5Ω - 2.58jΩ
Return Loss	- 26.1dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.111 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

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DASY5 Validation Report for Head TSL Date: 09.14.2021

Test Laboratory: CTTL, Beijing, China

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1133

Communication System: CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz,

Medium parameters used: f = 5250 MHz; σ = 4.654 S/m; ε_r = 35.2; ρ = 1000 kg/m^3,

Medium parameters used: f = 5600 MHz; σ = 5.03 S/m; ε_r = 34.61; ρ = 1000 kg/m^3,

Medium parameters used: f = 5800 MHz; σ = 5.225 S/m; ε_r = 34.35; ρ = 1000 kg/m^3,

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7517; ConvF(5.42, 5.42, 5.42) @ 5250 MHz; ConvF(4.75, 4.75, 4.75) @ 5600 MHz; ConvF(4.82, 4.82, 4.82) @ 5800 MHz; Calibrated: 2021-02-03
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 2021-01-15
- Phantom: MFP_V5.1C (20deg probe tilt); Type: QD 000 P51 Cx; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (4); SEMCAD X Version 14.6.14 (7483)

Dipole Calibration /Pin=100mW, d=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 67.21 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 30.9 W/kg

SAR(1 g) = 7.72 W/kg; SAR(10 g) = 2.22 W/kg

Smallest distance from peaks to all points 3 dB below = 7.5 mm

Ratio of SAR at M2 to SAR at M1 = 65.5%

Maximum value of SAR (measured) = 18.3 W/kg

Dipole Calibration /Pin=100mW, d=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 67.99 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 34.5 W/kg

SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.33 W/kg

Smallest distance from peaks to all points 3 dB below = 7.6 mm

Ratio of SAR at M2 to SAR at M1 = 63.6%

Maximum value of SAR (measured) = 19.9 W/kg

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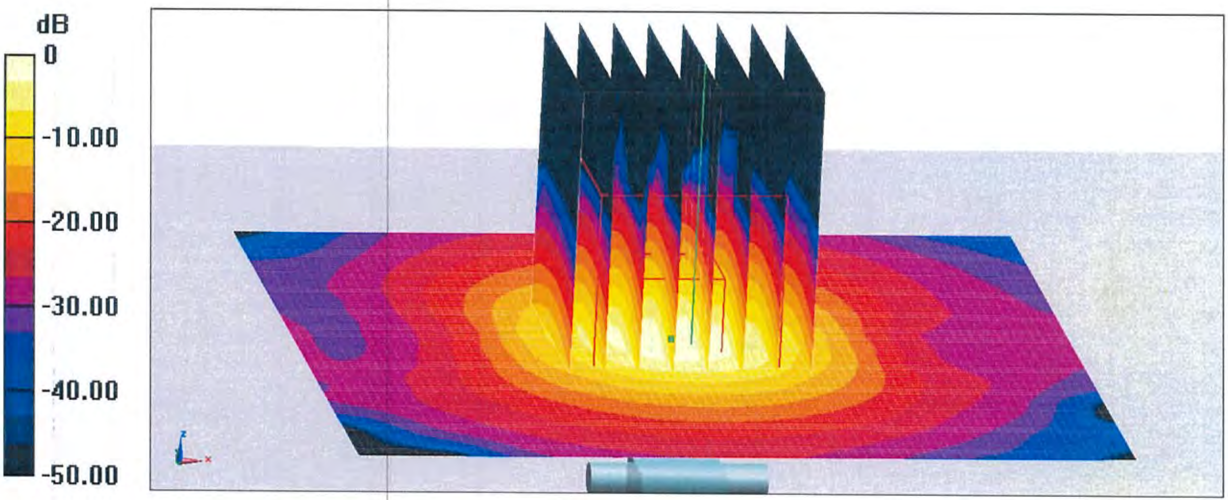
Dipole Calibration /Pin=100mW, d=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.20 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 34.9 W/kg
SAR(1 g) = 7.84 W/kg; SAR(10 g) = 2.23 W/kg
Smallest distance from peaks to all points 3 dB below = 7.6 mm
Ratio of SAR at M2 to SAR at M1 = 62.1%
Maximum value of SAR (measured) = 19.5 W/kg



0 dB = 19.5 W/kg = 12.90 dBW/kg