FCC SAR Test Report

APPLICANT	**: Weifang GoerTek Electronics Co.,Ltd.**
EQUIPMENT	**: SRH-S1**
BRAND NAME	**: SONY**
MODEL NAME	**: SRH-S1**
FCC ID	**: SZGSRHS1**
STANDARD	**: FCC 47 CFR Part 2 (2.1093)**

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. (Kunshan), the test report shall not be reproduced except in full.

Si Zhang

Approved by: Si Zhang

ilac-MRA

ACCREDITED
Cert #5145.02

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

Table of Contents

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA420222	Rev. 01	Initial issue of report.	Jul. 17, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Weifang GoerTek Electronics Co.,Ltd., SRH-S1, SRH-S1,** are as follows.

Highest 1g SAR Summary					
Equipment Class	Frequency Band		Head (Separation 0mm) 1g SAR (W/kg)	Highest Simultaneous Transmission 1g SAR (W/kg)	Measured APD Head (W/m^2)
DTS	WLAN	2.4GHz WLAN	**0.44**	0.78	
NII		5GHz WLAN	0.29	0.76	
6XD		6GHz WLAN	0.31	0.78	0.85
DSS	Bluetooth	2.4GHz Bluetooth	<0.10	0.77	
DTS	nRF	nRF	<0.10	0.78	

Highest 10g SAR Summary					
Equipment Class	Frequency Band		Extremity (Separation 0mm) 10g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)	Measured APD Extremity (W/m^2)
DTS	WLAN	2.4GHz WLAN	1.42	3.90	
NII		5GHz WLAN	**2.48**	3.90	
6XD		6GHz WLAN	0.45	2.69	6.61
DSS	Bluetooth	Bluetooth	<0.10	3.90	
DTS	nRF	nRF	<0.10	3.90	

Band	Tx Frequency (MHz)	Scaled PD psPD (W/m^2)
WLAN 6GHz	5925-7125	7.76
Date of Testing:		2024/6/10~2024/7/15

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) and Power density exposure limits (1 mW/cm^2 = 10 W/m^2) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992 and FCC 47 CFR Part1.1310, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

2. Administration Data

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory			
Test Firm	Sporton International Inc. (Kunshan)		
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR05-KS/ SAR04-KS	CN1257	314309

Applicant	
Company Name	Weifang GoerTek Electronics Co.,Ltd.
Address	Gaoxin 2 Road,Free Trade Zone,Weifang,Shandong,261205,P.R.China

Manufacturer	
Company Name	Sony Corporation
Address	1-7-1 Konan Minato-ku Tokyo, 108-0075 Japan

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- IEC/IEEE 62209-1528:2020
- SPEAG DASY6 Application Note (Interim Procedure for Device Operation at 6GHz-10GHz)
- IEC TR 63170:2018
- IEC 62479:2010
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	SRH-S1
Brand Name	SONY
Model Name	SRH-S1
FCC ID	SZGSRHS1
S/N	VHZJD2DVT21013
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz WLAN 6GHz U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6GHz U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6GHz U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7125 MHz Bluetooth: 2402 MHz ~ 2480 MHz nRF: 2402 MHz ~ 2480 MHz
Mode	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac VHT20/VHT40 WLAN 2.4GHz 802.11ax HE20/HE40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac/ax VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 WLAN 6GHz 802.11a/ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE nRF: GFSK
HW Version	R2
SW Version	V3
EUT Stage	Identical Prototype
Remark: 1. This device has no voice function. 2. The device does not support UNII-8_CH233 (BW=20M, Center Frequency = 7115MHz).	

5. RF Exposure Limits

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

5.3 RF Exposure limit for above 6GHz

According to ANSI/IEEE C95.1-1992, the criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio frequency (RF) radiation as specified in §1.1310. The unit of power density evaluation is W/m2 or mW/cm2.

Peak Spatially Averaged Power Density was evaluated over a square area of 4cm^2 per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3-3.0	614	1.63	*(100)	6
3.0-30	1842/f	4.89/f	*(900/f2)	6
30-300	61.4	0.163	1.0	6
300-1500			f/300	6
1500-100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f2)	30
30-300	27.5	0.073	0.2	30
300-1500			f/1500	30
1500-100,000			1.0	30

Note: 1.0 mW/cm^2 is 10 W/m^2

6. Specific Absorption Rate (SAR)

6.1 Introduction

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

6.2 SAR Definition

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

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

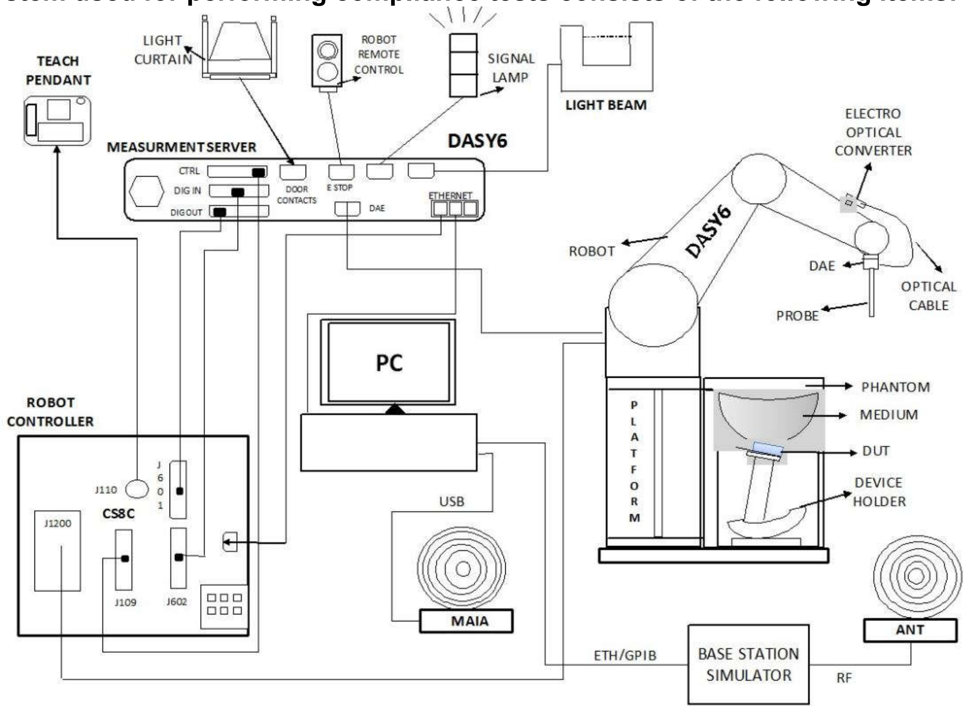
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 or Win10 and the DASY5 or DASY6(1) software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

Note: 1. DASY6 software used: DASY6 mmWave V3.0.0.841 and older generations and used the developed Plane-to-Plane Phase Reconstruction (PTP-PR) Algorithm which was used in PD measurement.

7.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	4 MHz – 10 GHz Linearity: ±0.2 dB (30 MHz – 10 GHz)
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 μW/g)
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

7.2 Data Acquisition Electronics (DAE)

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

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

Photo of DAE

7.3 Phantom

<SAM Twin Phantom>

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

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

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

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices or for evaluating transmitters operating at low frequencies. ELI is fully compatible with standard and all known tissue simulating liquids.

<SAM Head-Stand Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 10 liters
Measurement Areas	The top-head or around-the-head wireless accessories (head-belts and similar wireless head accessories etc.)

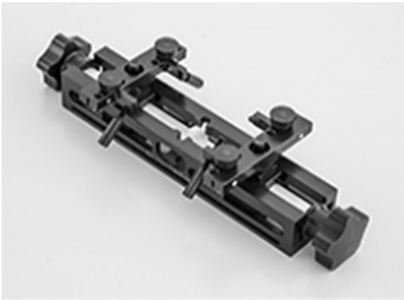
The Head-Stand phantom is a SAM phantom with the top of the head facing downward. It is truncated along a plane above the bottom of the ear reference point. Above this plane, an upper extension is added to ensure that the tissue simulating liquid is deep enough to measure in the relevant regions of the SAM phantom. The upper extension is flanged to allow better measurement probe access for the top of the head (bottom of the head-stand phantom).

7.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

8. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

8.1 Spatial Peak SAR Evaluation

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

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

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

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

8.2 Power Reference Measurement

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

8.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

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

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

8.4 Zoom Scan

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

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

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

8.5 Volume Scan Procedures

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

8.6 Power Drift Monitoring

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

9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit	D2450V2	1095	2024/2/8	2025/2/7
SPEAG	5000MHz System Validation Kit	D5GHzV2	1365	2024/2/13	2025/2/12
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	2022/9/23	2025/9/22
SPEAG	6500MHz System Validation Kit	D6.5GHzV2	1031	2023/2/22	2026/2/21
SPEAG	5G Verification Source	10GHz	2005	2023/11/20	2024/11/19
SPEAG	Data Acquisition Electronics	DAE4	1338	2024/3/18	2025/3/17
SPEAG	Data Acquisition Electronics	DAE4	690	2023/6/20	2024/6/19
SPEAG	Dosimetric E-Field Probe	EX3DV4	7764	2023/10/5	2024/10/4
SPEAG	EUmmWV Probe Tip Protection	EUmmWV4	9553	2023/10/18	2024/10/17
SPEAG	mmWave Phantom	mmWave	1065	NCR	NCR
SPEAG	SAM-HeadStand V10.0	SAM-HeadStand	1103	NCR	NCR
SPEAG	ELI Phantom	ELI V8.0	TP-2151	NCR	NCR
Testo	Thermo-Hygrometer	608-H1	1241332126	2023/7/10	2024/7/9
CHIGO	Thermo-Hygrometer	HTC-1	55009	2024/1/4	2025/1/3
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Rohde & Schwarz	Signal Generator	SMB100A	100455	2024/1/2	2025/1/1
Keysight	Preamplifier	83017A	MY57280111	2023/7/5	2024/7/4
Keysight	Preamplifier	83017A	MY57280106	2024/4/18	2025/4/17
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2023/7/5	2024/7/4
Agilent	ENA Series Network Analyzer	E5071C	MY46112129	2024/7/4	2025/7/3
SPEAG	Dielectric Probe Kit	DAK-3.5	1144	2023/8/17	2024/8/16
Anritsu	Vector Signal Generator	MG3710A	6201682672	2024/1/2	2025/1/1
Rohde & Schwarz	Power Meter	NRVD	102081	2023/7/5	2024/7/4
Rohde & Schwarz	Power Meter	NRVD	102081	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2023/7/5	2024/7/4
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2023/7/5	2024/7/4
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRP50S	101385	2023/10/11	2024/10/10
R&S	BLUETOOTH TESTER	CBT	100641	2024/1/2	2025/1/1
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2023/10/11	2024/10/10
TES	DIGITAC THERMOMETER	1310	200505600	2023/7/8	2024/7/7
TES	DIGITAC THERMOMETER	TYPE-K	220305411	2024/1/4	2025/1/3
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note 1	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
mini-circuits	amplifier	ZVE-3W-83+	162601250	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	

Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and

the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check

2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

10. System Verification

10.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.2.

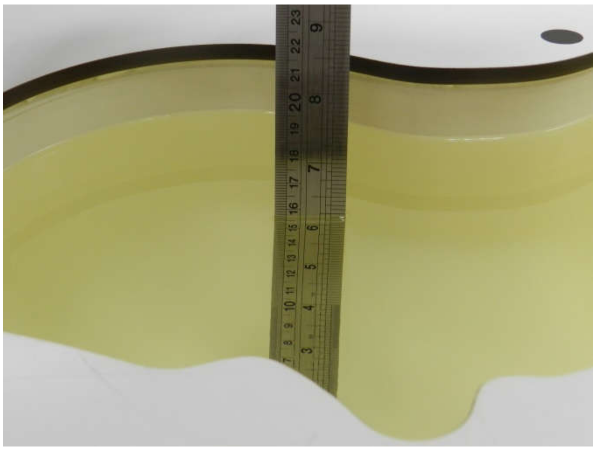


Fig 11.1 Photo of Liquid Height for Head SAR

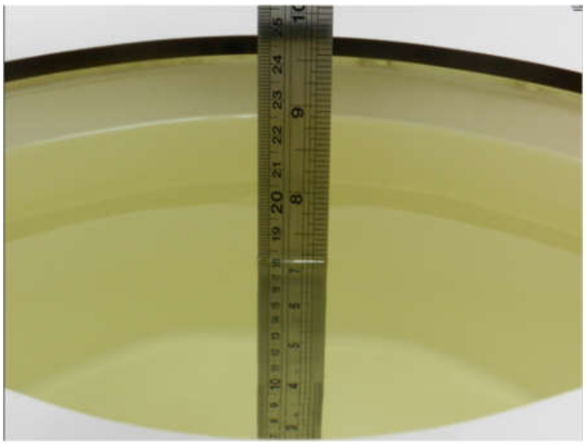


Fig 11.2 Photo of Liquid Height for Body SAR

10.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	Head	22.6	1.810	38.600	1.80	39.20	0.56	-1.53	±5	2024/6/12
5250	Head	22.7	4.560	36.100	4.71	35.90	-3.18	0.56	±5	2024/6/13
5600	Head	22.6	4.940	35.600	5.07	35.50	-2.56	0.28	±5	2024/6/14
5750	Head	22.9	5.100	35.400	5.22	35.40	-2.30	0.00	±5	2024/6/15
6500	Head	22.8	6.160	34.600	6.07	34.50	1.48	0.29	±5	2024/6/16
2450	Head	22.8	1.860	39.100	1.80	39.20	3.33	-0.26	±5	2024/7/15

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	Head	22.6	1.810	38.600	1.80	39.20	0.56	-1.53	±5	2024/6/12
5800	Head	22.8	5.170	35.300	5.27	35.30	-1.90	0.00	±5	2024/6/10
2450	Head	22.6	1.810	38.600	1.80	39.20	0.56	-1.53	±5	2024/6/12
5800	Head	22.8	5.170	35.300	5.27	35.30	-1.90	0.00	±5	2024/6/10
2450	Head	22.8	1.860	39.100	1.80	39.20	3.33	-0.26	±5	2024/7/15
2450	Head	22.8	1.860	39.100	1.80	39.20	3.33	-0.26	±5	2024/7/15

10.3 System Performance Check Results

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

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2024/6/12	2450	Head	50	1095	7764	1338	1.190	24.70	23.8	-3.64
2024/6/13	5250	Head	50	1113	7764	1338	1.110	23.30	22.2	-4.72
2024/6/14	5600	Head	50	1113	7764	1338	1.190	23.70	23.8	0.42
2024/6/15	5750	Head	50	1113	7764	1338	1.140	23.00	22.8	-0.87
2024/6/16	6500	Head	50	1031	7764	1338	2.620	54.80	52.4	-4.38
2024/7/15	2450	Head	50	1095	7764	1338	1.290	24.70	25.8	4.45

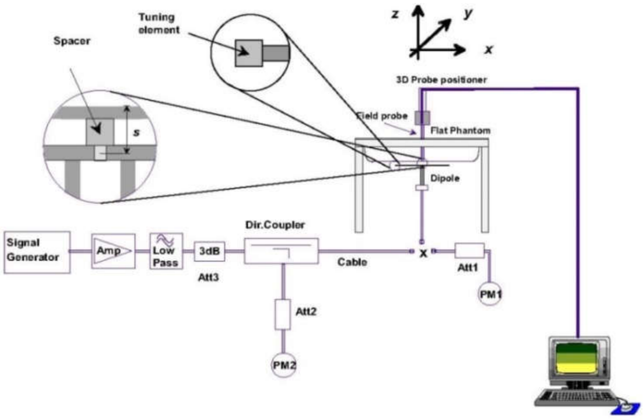


Fig 11.3.1 System Performance Check Setup

Fig 11.3.2 Setup Photo

10.4 Additional System Check on SAM Head-Stand phantom

When using DASY6 with Head-Stand phantom, additional system verifications were performed using the Head-Stand phantom itself. As recommended by the SAR system manufacture and confirmed as appropriate through KDB inquiry with the FCC, i.e. the Head-Stand Phantoms, is performed according to the validation points described in the SPEAG's DASY SAR manual. The locations of the nine points are shown in Figure below.

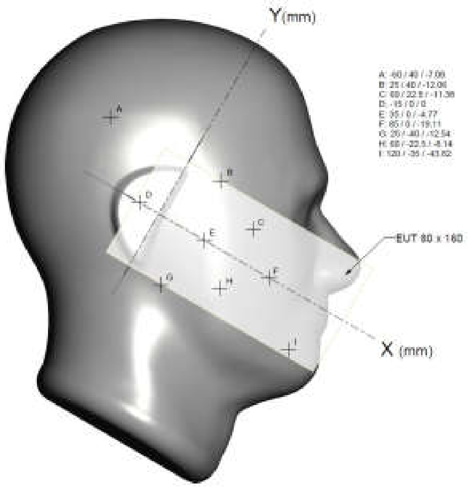


Fig 10.4.1 System check and validation locations for the head phantom

The target values vary slightly based on what angle the dipole is oriented in. The three possible dipole arm orientations for which target values are defined are shown below. The dipoles were placed in the orientation defined as 90º.

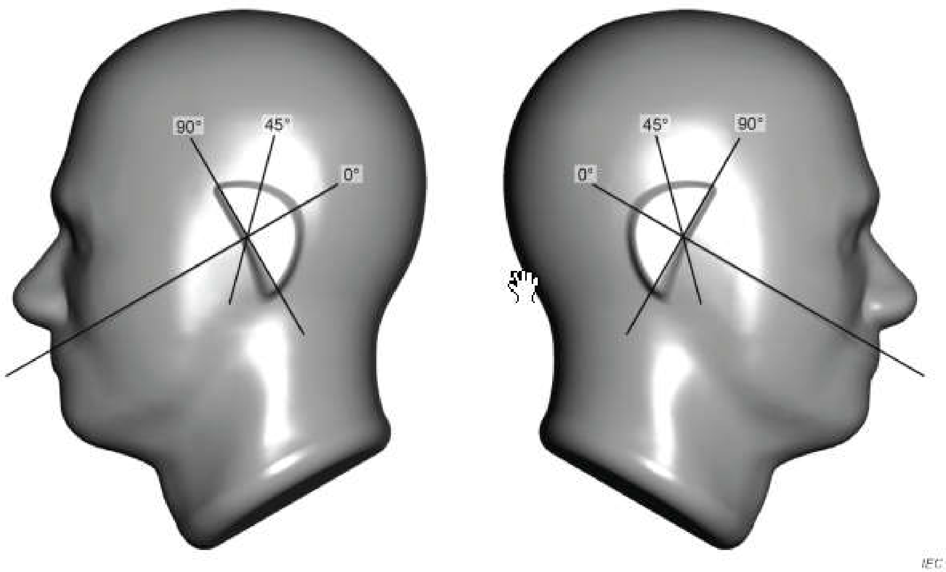


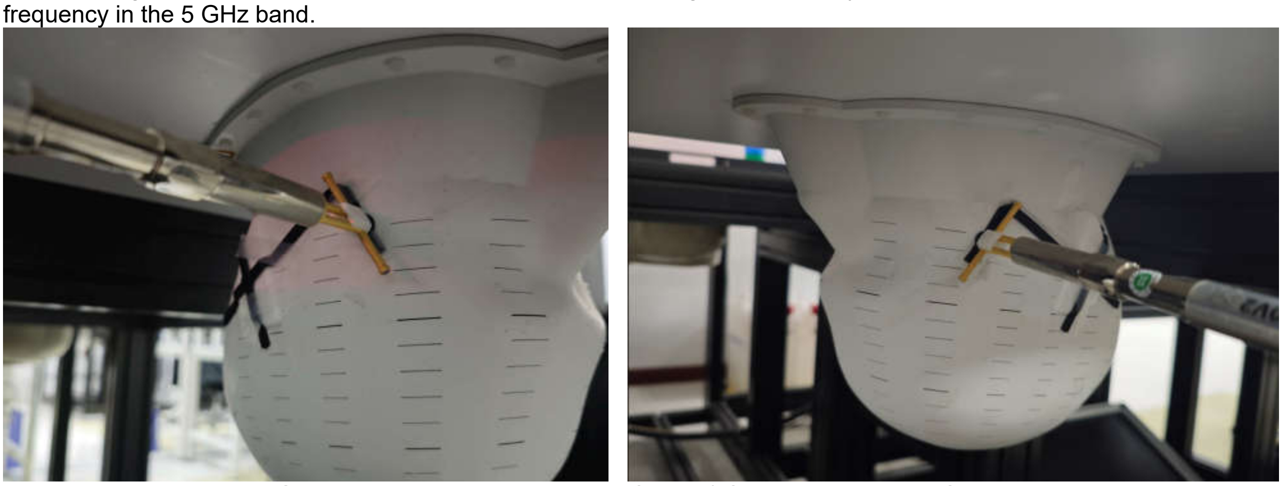
Fig 10.4.2 Definition of rotation angles for dipoles

Point C was chosen as it is the closest point to the portion of the phantom which is utilized for the EUT measurements. Since SPEAG dipole calibration does not provide system check target values for specific phantoms, the target values in Table 7.4.4 from SPEAG's DASY6/DASY8 SAR Manual (shown in Fig. 10.4.3) are used and tabulated in Table below. The detailed please refer to KDB inquiry with the FCC.

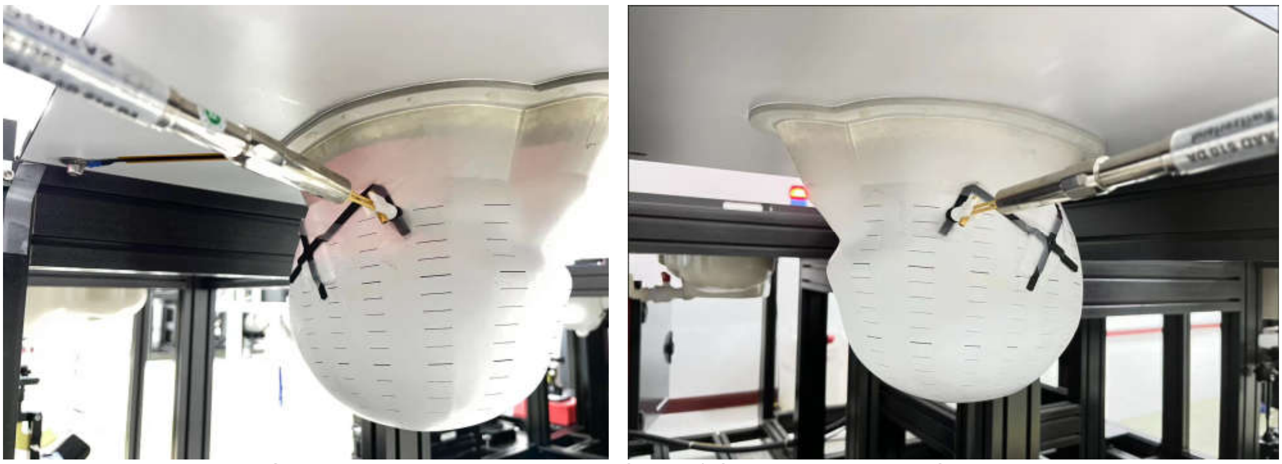
Point	Freq [MHz]	Rot [°]	d [mm]	Meas [W/kg]		Target [W/kg]		Dev [dB]		Probe Angle [°]	
				1 g	10 g	1 g	10 g	1 g	10 g	Max	Avg
A	835	90	15	9.04	5.89	9.00	6.02	0.02	−0.09	45.0	38.1
B	835	90	15	9.52	6.25	9.70	6.37	−0.08	−0.09	45.0	41.4
C	900	90	15	11.3	7.22	11.2	7.25	0.06	−0.02	50.0	39.9
A	1950	90	10	45.8	23.8	41.0	21.1	0.48	0.52	45.0	36.4
B	1950	90	10	46.2	23.8	41.7	21.2	0.44	0.51	45.0	41.4
B	1950	90	5	75.6	34.8	77.2	34.2	−0.09	0.07	45.0	41.9
A	2450	0	10	60.9	27.9	54.6	24.6	0.47	0.55	45.0	39.9
B	2450	90	10	60.1	27.7	53.8	24.3	0.48	0.57	45.0	41.8
C	2450	90	10	51.0	23.5	54.8	24.9	−0.31	−0.25	45.0	39.6
C	5800	90	25	19.0	6.78	17.1	5.97	0.45	0.55	40.0	39.4

Fig 10.4.3 Target Values for System Check on SAM Head-Stand Phantom

As confirmed as appropriate through KDB inquiry with the FCC and confirmation with the manufacturer, since SPEAG has not yet developed the specific phantom SAR system check target values for the 7 GHz band. Only the system checks using the Head Stand Phantom are to be performed using one frequency in the 2.4 GHz band and one frequency in the 5 GHz band.



2.4GHz Dipole Placed at Location C in 90º Orientation (10mm Spacer)



5GHz Dipole Placed at Location C in 90º Orientation (25mm Spacer)

10.5 System Performance Check Results on SAM Head-Stand phantom

Below table shows the target SAR and measured SAR after normalized to 1W input power. The dipole target values please refer to Fig. 10.4.3 in section 10.4. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Distance (mm)	Point	Rot [°]	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (dB)
2024/6/12	2450	Head	50	1095	7764	1338	10	C(Left Face)	90	2.610	54.80	52.2	-0.21
2024/6/10	5800	Head	50	1365	7764	1338	25	C(Left Face)	90	0.912	17.10	18.24	0.28
2024/6/12	2450	Head	50	1095	7764	1338	10	C(Right Face)	90	2.610	54.80	52.2	-0.21
2024/6/10	5800	Head	50	1365	7764	1338	25	C(Right Face)	90	0.926	17.10	18.51	0.34
2024/7/15	2450	Head	50	1095	7764	1338	10	C(Left Face)	90	2.910	54.80	58.2	0.26
2024/7/15	2450	Head	50	1095	7764	1338	10	C(Right Face)	90	2.800	54.80	56	0.09

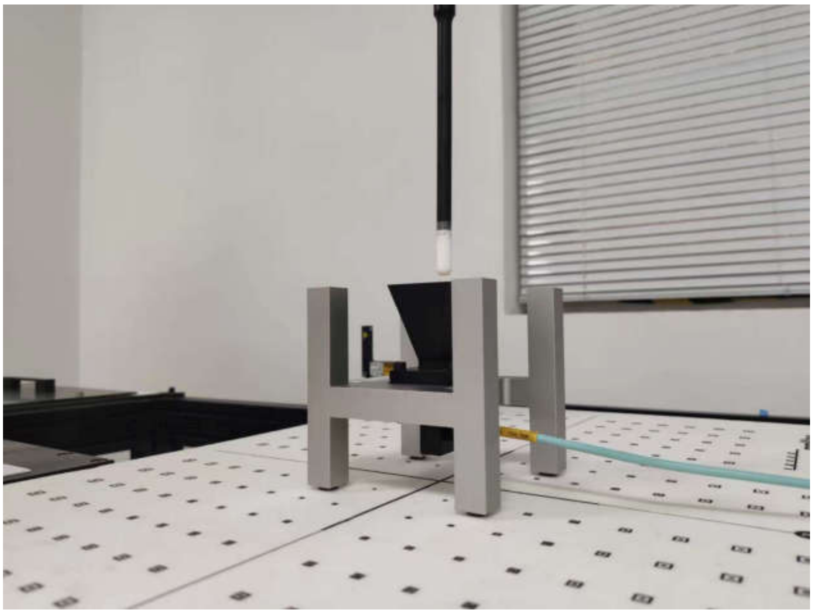
Note: The Expanded Uncertainty for measurement on a specific phantom of the measuring system (DASY6/DASY8). To be conservative, the smaller Expanded Uncertainty, which is from DASY6 – 1g SAR: 29.8%, 1.1 dB (k=2) – is used. Target values in Fig. 10.4.3 have an uncertainty of 0.4 dB (k=2). The Combined Uncertainty of target values (0.4 dB) and system uncertainty (1.1 dB) is 1.2 dB (k=2). All deviations between normalized SAR values and target values should be within this 1.2 dB measurement uncertainty to demonstrate a successful system check on the SAM Head-Stand Phantom.

10.6 PD System Verification Results

The system was verified to be within ±0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check. The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Input Power (mW)	Measured 4 cm^2 (W/m^2)	Normalized(1) 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)	Date
10	10GHz_2005	9553	690	10	63	61.7	155.2	161	-0.16	2024/6/18

Note: (1) means the measured PD was normalized to Prad power which can be referred to DASY Calibration Certificate in appendix C.



System Verification Setup Photo

11. RF Exposure Positions

11.1 Head SAR Testing for SRH-S1

The device was mounted on the SAM Head-Stand Phantom as it is intended to be worn, the detailed please refer to KDB inquiry with the FCC.

11.2 Extremity SAR Testing for SRH-S1

a) The device shall be placed directly against the flat phantom, for those sides of the device that are in contact with the hand during intended use.
b) To adjust the device parallel to the flat phantom.
c) To adjust the distance between the device surface and the flat phantom to 0cm.

<EUT Setup Photos>

Please refer to the test setup photos.

12. Conducted RF Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix D.

<WLAN Conducted Power>

General Note:

1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) 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. Additional output power measurements were not necessary.
2. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
3. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
4. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
5. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
   a. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
   b. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
   c. For all positions/configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
6. 802.11 ax supports both full tone size mode and partial tone size mode, after verification on partial tone size mode that partial size tone mode power will not be higher than full tone size mode, therefore, full tone mode power was chosen to be measured in this report.
7. The 2.4GHz/5GHz/6GHz WLAN can transmit in SISO and MIMO antenna mode.
8. For the conducted power measurement is MIMO chains transmitting simultaneously and measured the separately conducted power for both chains and then based on the conducted power of two SISO antennas respectively to calculate sum of the power for MIMO mode.
9. SISO and MIMO all supported by WLAN2.4GHz/WLAN5GHz/WLAN6GHz, for SISO mode power is less than per

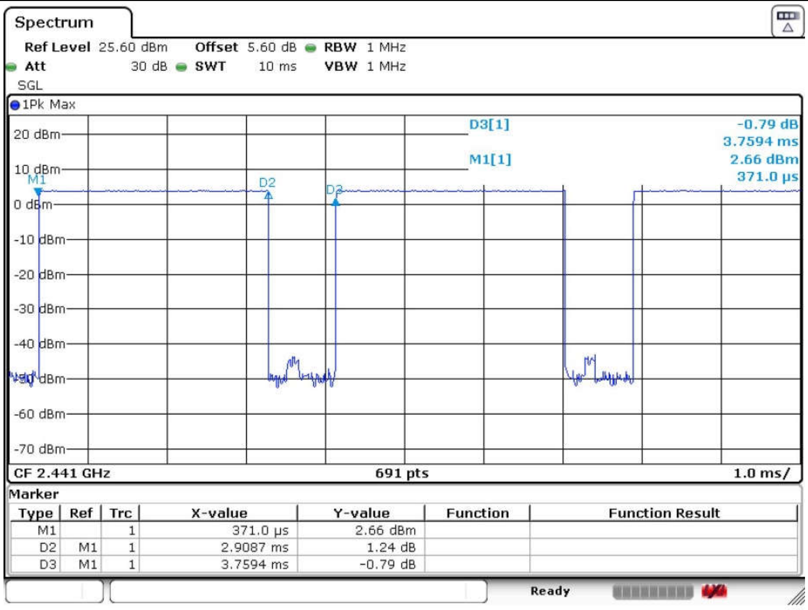
chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO mode to perform SAR testing.

<2.4GHz Bluetooth>

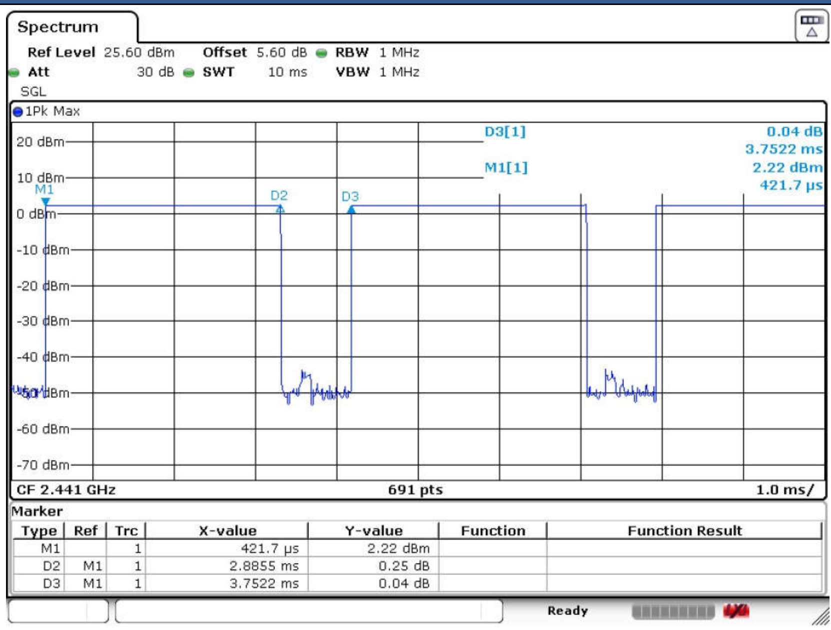
General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle are 77.37% with Ant 1 and 76.9% with Ant 2 as following figure, for Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to 83.3% for Bluetooth reported SAR calculation.

Bluetooth time-domain plot for Ant 1



Bluetooth time-domain plot for Ant 2

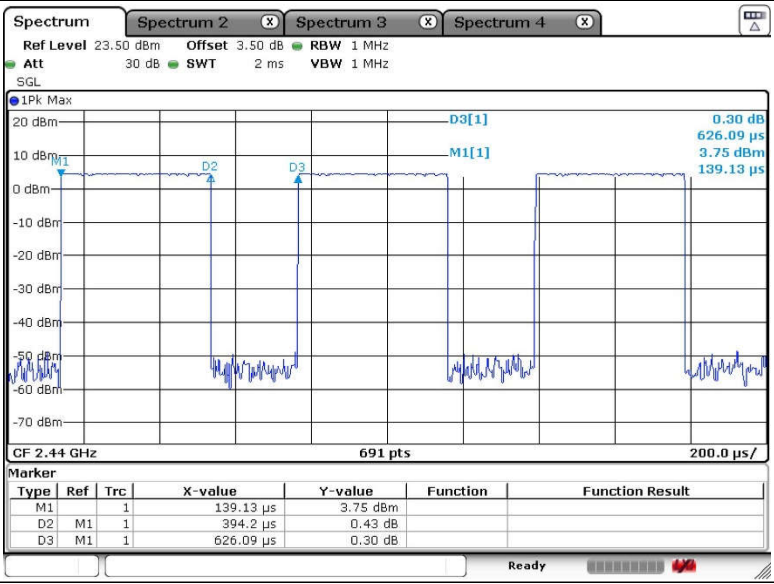


<2.4GHz nRF/BLE>

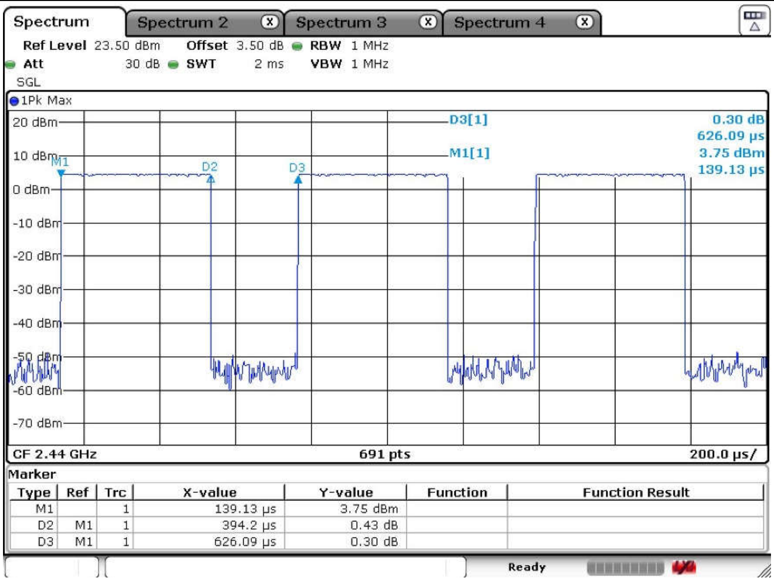
General Note:

1. The nRF/BLE duty cycle are 62.96% with Ant 3 as following figure, for nRF/BLE SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to 100% for nRF/BLE reported SAR calculation.

nRF time-domain plot for Ant 3



BLE time-domain plot for Ant 3



13. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

14. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN/ nRF signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For SAR testing of Bluetooth signal with 83.3% theoretical duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle) *83.3%".
   d. For BT/WLAN/nRF: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The device head SAR is performed against SAM Head-Stand Phantom. The device extremity SAR is performed against flat section of ELI phantom.
5. For determination of the scaling factor for report SAR of MIMO mode, if the hot spots are separated the scaling factors are individually determined from each transmit chain. Further simplification chose the worse SAR value and the worst scaling factor from each transmit chain perform reported SAR calculation conservatively. If the hot spots are not spatially separated, the scaling factor is determined from the worst number of each transmit chain.
6. A non-standard setup was used for SAR testing based on guidance from the FCC. The inquiry document contains additional information.
7. For WLAN6GHz doesn’t support wireless router capability.
8. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors.
9. Per October 2020 TCB Workshop Interim procedures, start instead with a minimum of 5 test channels across the full band, then adapt and apply conducted power and SAR test reduction procedures of KDB Pub. 248227 v02r02
10. Absorbed power density (APD) using a 4cm^2 averaging area is reported based on SAR measurements.

WLAN/Bluetooth Note:

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band.
3. When the reported SAR of the test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is ≤ 0.8 W/kg or all required test position are tested.
4. For all positions / configurations, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.
6. SISO and MIMO all supported by WLAN2.4GHz/WLAN5GHz/WLAN6GHz, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO mode to perform SAR testing.
7. When multiple transmission modes (802.11a/g/n/ac/ax) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, the lowest order 802.11 mode is selected; i.e., 802.11a is chosen over 802.11n then 802.11ac then 802.11ax or 802.11g is chosen over 802.11n.

14.1 Head SAR

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
2450MHz															
	WLAN2.4GHz	802.11b 1Mbps	inner face	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	-0.02	0.281	0.413
01	WLAN2.4GHz	802.11b 1Mbps	inner face	0mm	Ant 1+2(1)	1	2412	19.15	21.00	1.531	98.28	1.018	0.06	0.283	0.441
	WLAN2.4GHz	802.11b 1Mbps	inner face	0mm	Ant 1+2(2)	6	2437	19.34	21.00	1.466	98.28	1.018	0.05	0.216	0.322
	Bluetooth	1Mbps	inner face	0mm	Ant 1	78	2480	4.39	5.50	1.290	77.37	1.077	-0.06	0.009	0.013
	Bluetooth	1Mbps	inner face	0mm	Ant 1	39	2441	3.86	5.50	1.457	77.37	1.077	0.05	0.002	0.003
	Bluetooth	1Mbps	inner face	0mm	Ant 1	0	2402	3.72	5.50	1.505	77.37	1.077	0.04	0.000	0.000
	Bluetooth	1Mbps	inner face	0mm	Ant 2	0	2402	4.43	5.50	1.279	76.90	1.083	0.01	0.000	0.000
02	Bluetooth	1Mbps	inner face	0mm	Ant 2	39	2441	3.87	5.50	1.455	76.90	1.083	-0.03	0.009	0.014
	Bluetooth	1Mbps	inner face	0mm	Ant 2	78	2480	4.02	5.50	1.406	76.90	1.083	0.01	0.000	0.000
	Bluetooth	BLE 1Mbps	inner face	0mm	nRF Ant	0	2402	3.56	5.00	1.393	62.96	1.588	0.06	0.006	0.013
	Bluetooth	BLE 1Mbps	inner face	0mm	nRF Ant	19	2440	3.49	5.00	1.416	62.96	1.588	0.11	0.005	0.011
	Bluetooth	BLE 1Mbps	inner face	0mm	nRF Ant	39	2480	3.41	5.00	1.442	62.96	1.588	0.03	0.003	0.007
	nRF	1Mbps	inner face	0mm	nRF Ant	19	2440	3.73	5.50	1.503	62.96	1.588	0.01	0.009	0.021
03	nRF	1Mbps	inner face	0mm	nRF Ant	0	2402	3.68	5.50	1.521	62.96	1.588	0.04	0.013	0.031
	nRF	1Mbps	inner face	0mm	nRF Ant	39	2480	3.70	5.50	1.514	62.96	1.588	0.09	0.010	0.024
5000MHz															
	WLAN5.3GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	0.01	0.165	0.246
04	WLAN5.3GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(2)	56	5280	15.66	17.50	1.528	99.32	1.007	-0.06	0.166	0.255
	WLAN5.3GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(2)	64	5320	13.15	15.00	1.531	99.32	1.007	-0.01	0.105	0.162
05	WLAN5.5GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	-0.05	0.171	0.249
	WLAN5.5GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(1)	124	5620	14.94	16.50	1.432	99.32	1.007	0.08	0.136	0.196
	WLAN5.5GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(1)	100	5500	14.24	16.00	1.500	99.32	1.007	0.01	0.134	0.202
	WLAN5.5GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(1)	140	5700	13.95	15.50	1.429	99.32	1.007	0.03	0.074	0.106
06	WLAN5.8GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	-0.04	0.189	0.288
	WLAN5.8GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(2)	149	5745	15.60	17.50	1.549	99.32	1.007	-0.08	0.089	0.139
	WLAN5.8GHz	802.11a 6Mbps	inner face	0mm	Ant 1+2(2)	157	5785	15.55	17.50	1.567	99.32	1.007	0.1	0.096	0.151

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Measured APD (W/m^2)
6000MHz																
	WLAN6GHz	802.11ax HE160	inner face	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	-0.18	0.069	0.102	0.283
	WLAN6GHz	802.11ax HE160	inner face	0mm	Ant 1+2(1)	15	6025	0.67	2.50	1.524	100	1.000	0.1	0.011	0.017	0.045
	WLAN6GHz	802.11ax HE160	inner face	0mm	Ant 1+2(2)	47	6185	6.12	8.00	1.542	100	1.000	0.12	0.027	0.042	0.111
07	WLAN6GHz	802.11ax HE160	inner face	0mm	Ant 1+2(1)	111	6505	8.25	10.00	1.496	100	1.000	-0.03	0.208	0.311	0.852
	WLAN6GHz	802.11ax HE160	inner face	0mm	Ant 1+2(1)	143	6665	8.77	10.50	1.489	100	1.000	-0.17	0.009	0.013	0.037

14.2 Extremity SAR

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
2450MHz															
	WLAN2.4GHz	802.11b 1Mbps	Front Position 1	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	-0.08	0.540	0.793
	WLAN2.4GHz	802.11b 1Mbps	Front Position 2	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	-0.05	0.122	0.179
	WLAN2.4GHz	802.11b 1Mbps	Top Side Position 1	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	0.11	0.829	1.217
08	WLAN2.4GHz	802.11b 1Mbps	Top Side Position 2	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	0.03	0.970	1.424
	WLAN2.4GHz	802.11b 1Mbps	Left Side	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	-0.09	0.615	0.903
	WLAN2.4GHz	802.11b 1Mbps	Right Side	0mm	Ant 1+2(1)	11	2462	19.41	21.00	1.442	98.28	1.018	-0.17	0.289	0.424
	WLAN2.4GHz	802.11b 1Mbps	Top Side Position 2	0mm	Ant 1+2(1)	1	2412	19.15	21.00	1.531	98.28	1.018	0.03	0.836	1.303
	WLAN2.4GHz	802.11b 1Mbps	Top Side Position 2	0mm	Ant 1+2(2)	6	2437	19.34	21.00	1.466	98.28	1.018	0.15	0.735	1.097
	Bluetooth	1Mbps	Front Position 1	0mm	Ant 1	0	2402	4.43	5.50	1.279	76.90	1.083	0.01	0.004	0.006
	Bluetooth	1Mbps	Top Side Position 1	0mm	Ant 1	0	2402	4.43	5.50	1.279	76.90	1.083	0.02	0.003	0.004
	Bluetooth	1Mbps	Left Side	0mm	Ant 1	0	2402	4.43	5.50	1.279	76.90	1.083	-0.07	0.034	0.047
	Bluetooth	1Mbps	Left Side	0mm	Ant 1	39	2441	3.87	5.50	1.455	76.90	1.083	0.08	0.026	0.041
	Bluetooth	1Mbps	Left Side	0mm	Ant 1	78	2480	4.02	5.50	1.406	76.90	1.083	-0.08	0.019	0.029
	Bluetooth	1Mbps	Front Position 2	0mm	Ant 2	78	2480	4.39	5.50	1.290	77.37	1.077	0.01	0.001	0.001
	Bluetooth	1Mbps	Top Side Position 2	0mm	Ant 2	78	2480	4.39	5.50	1.290	77.37	1.077	0.01	0.020	0.028
	Bluetooth	1Mbps	Right Side	0mm	Ant 2	78	2480	4.39	5.50	1.290	77.37	1.077	-0.02	0.024	0.033
	Bluetooth	1Mbps	Right Side	0mm	Ant 2	39	2441	3.86	5.50	1.457	77.37	1.077	-0.01	0.032	0.050
09	Bluetooth	1Mbps	Right Side	0mm	Ant 2	0	2402	3.72	5.50	1.505	77.37	1.077	-0.05	0.041	0.066
	Bluetooth	BLE 1Mbps	Front	0mm	nRF Ant	19	2440	3.56	5.00	1.393	62.96	1.588	-0.05	0.001	0.002
	Bluetooth	BLE 1Mbps	Bottom Side	0mm	nRF Ant	19	2440	3.56	5.00	1.393	62.96	1.588	0.11	0.003	0.007
	Bluetooth	BLE 1Mbps	Bottom Side	0mm	nRF Ant	0	2402	3.49	5.00	1.416	62.96	1.588	0.09	0.001	0.002
	Bluetooth	BLE 1Mbps	Bottom Side	0mm	nRF Ant	39	2480	3.41	5.00	1.442	62.96	1.588	0.09	0.001	0.002
	nRF	1Mbps	Front	0mm	nRF Ant	19	2440	3.73	5.50	1.503	62.96	1.588	0.06	0.006	0.014
10	nRF	1Mbps	Bottom Side	0mm	nRF Ant	19	2440	3.73	5.50	1.503	62.96	1.588	0.07	0.009	0.021
	nRF	1Mbps	Bottom Side	0mm	nRF Ant	0	2402	3.68	5.50	1.521	62.96	1.588	0.01	0.007	0.017
	nRF	1Mbps	Bottom Side	0mm	nRF Ant	39	2480	3.70	5.50	1.514	62.96	1.588	0.08	0.001	0.002
5000MHz															
	WLAN5.3GHz	802.11a 6Mbps	Front Position 1	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	0.05	0.348	0.520
	WLAN5.3GHz	802.11a 6Mbps	Front Position 2	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	0.06	0.249	0.372
11	WLAN5.3GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	-0.16	1.660	2.478
	WLAN5.3GHz	802.11a 6Mbps	Top Side Position 2	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	0.15	1.300	1.941
	WLAN5.3GHz	802.11a 6Mbps	Left Side	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	-0.02	1.110	1.657
	WLAN5.3GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	52	5260	15.29	17.00	1.483	99.32	1.007	0.05	0.480	0.717
	WLAN5.3GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(2)	56	5280	15.66	17.50	1.528	99.32	1.007	0.05	1.600	2.461
	WLAN5.3GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(2)	64	5320	13.15	15.00	1.531	99.32	1.007	-0.14	0.838	1.292
	WLAN5.5GHz	802.11a 6Mbps	Front Position 1	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	-0.02	0.360	0.524
	WLAN5.5GHz	802.11a 6Mbps	Front Position 2	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	0.03	0.257	0.374
	WLAN5.5GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	-0.03	1.590	2.314
	WLAN5.5GHz	802.11a 6Mbps	Top Side Position 2	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	-0.17	1.050	1.528
	WLAN5.5GHz	802.11a 6Mbps	Left Side	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	0.07	1.300	1.892
	WLAN5.5GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	132	5660	14.90	16.50	1.445	99.32	1.007	-0.18	0.571	0.831
12	WLAN5.5GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(1)	124	5620	14.94	16.50	1.432	99.32	1.007	0.02	1.650	2.380
	WLAN5.5GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(1)	100	5500	14.24	16.00	1.500	99.32	1.007	-0.06	1.390	2.099
	WLAN5.5GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(1)	140	5700	13.95	15.50	1.429	99.32	1.007	0.17	1.350	1.943
	WLAN5.8GHz	802.11a 6Mbps	Front Position 1	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	0.06	0.324	0.494
	WLAN5.8GHz	802.11a 6Mbps	Front Position 2	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	-0.12	0.275	0.419
	WLAN5.8GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	-0.04	1.250	1.905
	WLAN5.8GHz	802.11a 6Mbps	Top Side Position 2	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	-0.08	1.010	1.539
	WLAN5.8GHz	802.11a 6Mbps	Left Side	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	0.08	1.130	1.722
	WLAN5.8GHz	802.11a 6Mbps	Right Side	0mm	Ant 1+2(1)	165	5825	14.70	16.50	1.514	99.32	1.007	0.01	0.604	0.921

13	WLAN5.8GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(2)	149	5745	15.60	17.50	1.549	99.32	1.007	0.11	1.280	**1.996**
	WLAN5.8GHz	802.11a 6Mbps	Top Side Position 1	0mm	Ant 1+2(2)	157	5785	15.55	17.50	1.567	99.32	1.007	-0.13	1.250	1.972

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	Measured APD (W/m^2)
6000MHz																
	WLAN6GHz	802.11ax HE160	Front Position 1	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.01	0.091	0.135	2.08
	WLAN6GHz	802.11ax HE160	Front Position 2	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.03	0.064	0.095	1.47
	WLAN6GHz	802.11ax HE160	Top Side Position 1	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	-0.15	0.146	0.216	3.39
	WLAN6GHz	802.11ax HE160	Top Side Position 2	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.03	0.142	0.211	3.34
	WLAN6GHz	802.11ax HE160	Left Side	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.06	0.203	0.301	4.73
	WLAN6GHz	802.11ax HE160	Right Side	0mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.02	0.183	0.271	4.24
	WLAN6GHz	802.11ax HE160	Left Side	0mm	Ant 1+2(1)	15	6025	0.67	2.50	1.524	100	1.000	-0.01	0.037	0.056	0.862
	WLAN6GHz	802.11ax HE160	Left Side	0mm	Ant 1+2(2)	47	6185	6.12	8.00	1.542	100	1.000	0.03	0.159	0.245	3.76
	WLAN6GHz	802.11ax HE160	Left Side	0mm	Ant 1+2(1)	111	6505	8.25	10.00	1.496	100	1.000	-0.05	0.275	0.411	6.3
14	WLAN6GHz	802.11ax HE160	Left Side	0mm	Ant 1+2(1)	143	6665	8.77	10.50	1.489	100	1.000	0.08	0.301	**0.448**	**6.61**

14.3 PD Test Result

Power Density General Notes:

1. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
2. The DUT was connected to a wall charger for some measurements due to the test duration. It was confirmed that the charger plugged into this DUT did not impact the near-field PD test results.
3. Absorbed power density (APD) using a 4cm^2 averaging area is reported based on SAR measurements.
4. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4.
5. The device was 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.
6. Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.68 dB (85.4%) was used to determine the psPD measurement scaling factor.
7. Per April 2021 TCB Workshop, For the highest SAR test configurations also measure incident PD (total) using power-density reconstruction method in 2 mm closest measurement plane. Therefore, a non-standard setup was used for PD testing based on guidance from the FCC. The detailed information refers to KDB inquiry with the FCC. The inquiry document contains additional information.
   1) Select highest Head SAR at 0 mm test distance and configurations evaluate power density, so the PD test was performed of a 2mm separation between Probe sensor and EUT Inner surface to Head exposure conditions of SRH-S1.
   2) Select highest extremity SAR at 0 mm test distance and configurations evaluate power density, so the PD test was performed of a 2mm separation between Probe sensor and EUT surface to extremity exposure conditions of SRH-S1.
   3) The details can be referred to KDB inquiry with the FCC
8. Per October 2020 TCB Workshop, PTP-PR algorithm was used during psPD measurement and calculations.
9. The measurement procedure consists of measuring the PDinc at two different distances: 2 mm (compliance distance) and λ/5. The grid extents should be large enough to fully capture the transmitted energy. The grid step should be fine enough to demonstrate that the integrated Power Density iPDn fulfill the criterion described below. Since iPD ratio between the two distances is≥ -1dB, the grid step (0.0625) was sufficient for determining compliance at d=2mm.

$$10 \cdot log_{10} \frac{iPD_n(2mm)}{iPD_n(\lambda/5)} \geq -1$$

<WLAN PD>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Grid Step (λ)	iPDn	iPD ratio (≥ -1)	Normal psPD (W/m^2)	Total psPD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(1)	15	6025	0.67	0.0625	0.783	0.42	0.414	0.457
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	10mm	Ant 1+2(1)	15	6025	0.67	0.15	0.711		0.235	0.255
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(1)	207	6985	8.79	0.0625	2	0.63	3.08	3.37
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	8.59mm	Ant 1+2(1)	207	6985	8.79	0.15	1.73		1.770	1.86

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Grid Step (λ)	Scaling Factor for measurement uncertainty	Power Drift (dB)	Normal psPD (W/m^2)	Scaled Normal psPD (W/m^2)	Total psPD (W/m^2)	Scaled Total psPD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(1)	15	6025	0.67	2.50	1.524	100	1.000	0.0625	1.5535	0.03	0.414	0.98	0.457	1.08
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(2)	47	6185	6.12	8.00	1.542	100	1.000	0.0625	1.5535	0.03	1.040	2.49	1.210	2.90
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(1)	111	6505	8.25	10.00	1.496	100	1.000	0.0625	1.5535	0.01	1.420	3.30	1.860	4.32
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(1)	143	6665	8.77	10.50	1.489	100	1.000	0.0625	1.5535	-0.04	1.140	2.64	1.520	3.52
01	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	-0.01	3.080	7.09	3.370	7.76
	WLAN6GHz	802.11ax-HE160 MCS0	Front Position 1	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	0.01	1.670	3.85	1.780	4.10
	WLAN6GHz	802.11ax-HE160 MCS0	Front Position 2	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	0.09	0.273	0.63	0.364	0.84
	WLAN6GHz	802.11ax-HE160 MCS0	Right Side	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	0.11	1.880	4.33	2.020	4.65
	WLAN6GHz	802.11ax-HE160 MCS0	Top Side Position 1	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	-0.03	0.695	1.60	0.935	2.15
	WLAN6GHz	802.11ax-HE160 MCS0	Top Side Position 2	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	0.04	0.411	0.95	0.503	1.16
	WLAN6GHz	802.11ax-HE160 MCS0	InnerSurface	2mm	Ant 1+2(1)	207	6985	8.79	10.50	1.483	100	1.000	0.0625	1.5535	0.02	0.311	0.72	0.523	1.20

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	SRH-S1	
		Head	Extremity
1.	BT(Ant 1/Ant 2) + 2.4G nRF Ant3	Yes	Yes
2.	WLAN2.4G (Ant 1+2 MIMO) + 2.4G nRF Ant3	Yes	Yes
3.	WLAN5G (Ant 1+2 MIMO) + 2.4G nRF Ant3	Yes	Yes
4.	WLAN6G (Ant 1+2 MIMO) + 2.4G nRF Ant3	Yes	Yes
5.	WLAN2.4G(Ant 1+2 MIMO) + WLAN5G (Ant 1+2 MIMO) + 2.4G nRF Ant3	Yes	Yes
6.	WLAN2.4G(Ant 1+2 MIMO) + WLAN6G (Ant 1+2 MIMO) + 2.4G nRF Ant3	Yes	Yes
7.	WLAN5G(Ant 1+2 MIMO) + WLAN6G (Ant 1+2 MIMO) + 2.4G nRF Ant3	Yes	Yes
8.	WLAN2.4G (Ant 1+2 MIMO) + 2.4G BLE Ant3	Yes	Yes
9.	WLAN5G (Ant 1+2 MIMO) + 2.4G BLE Ant3	Yes	Yes
10.	WLAN6G (Ant 1+2 MIMO) + 2.4G BLE Ant3	Yes	Yes
11.	WLAN2.4G(Ant 1+2 MIMO) + WLAN5G (Ant 1+2 MIMO) + 2.4G BLE Ant3	Yes	Yes
12.	WLAN2.4G(Ant 1+2 MIMO) + WLAN6G (Ant 1+2 MIMO) + 2.4G BLE Ant3	Yes	Yes
13.	WLAN5G(Ant 1+2 MIMO) + WLAN6G (Ant 1+2 MIMO) + 2.4G BLE Ant3	Yes	Yes

General Note:

1. The 2.4GHz/5GHz/6GHz WLAN can transmit in SISO/MIMO antenna mode and MIMO SAR can represent SISO SAR.
2. According to the EUT characteristic, WLAN2.4GHz/5GHz/6GHz/Bluetooth and nRF can transmit simultaneously.
3. According to the EUT characteristic, WLAN 5GHz/6GHz and WLAN 2.4GHz can transmit simultaneously.
4. According to the EUT characteristic, WLAN 2.4GHz+WLAN 5/6GHz+nRF can transmit simultaneously.
5. According to the EUT characteristic, WLAN (2.4GHz/5GHz/6GHz) and Bluetooth can't transmit simultaneously.
6. According to the EUT characteristic, WLAN 5GHz+WLAN 6GHz+ WLAN 2.4GHz can not transmit simultaneously.
7. According to the EUT characteristic, Bluetooth ant1 + ant2 cannot transmit simultaneously.
8. According to the EUT characteristic, WLAN 2.4GHz + WLAN 5GHz/6GHz + Bluetooth can't transmit simultaneously.
9. BLE Ant3 and nRF Ant 3 share the same antenna path and cannot transmit simultaneously.
10. BLE Ant3 and Bluetooth ant1/2 cannot transmit simultaneously.
11. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
12. When stand-alone SAR is not required for a transmitter or antenna, its SAR is considered zero in the SAR summing process to assess Multi-band transmission SAR compliance.
13. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
    i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
    ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
    iii) If SPLSR ≤ 0.04 for 1g SAR and SPLSR≤ 0.10 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
    iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.
14. The WLAN6GHz Sim-Tx analysis guidance with other transmitters was based on SAR test results. The simultaneous transmission and test exemption analysis were compliant with KDB 447498 D01. For the device does not support FR2 or other MPE field measurement, therefore section 15 in the SAR report has no TER analysis according to KDB 987594 requirement.

15.1 Head Exposure Conditions

Exposure Position	1	2	3	4	5	6	7	4+6	5+6	1+2+6	1+3+6	2+3+6	1+2+7	1+3+7	2+3+7
	WLAN2.4GHz Ant 1+2	WLAN5GHz Ant 1+2	WLAN6GHz Ant 1+2	Bluetooth Ant 1	Bluetooth Ant 2	nRF	Bluetooth Ant 3	Summed	Summed	Summed	Summed	Summed	Summed	Summed	Summed
	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)	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)	1g SAR (W/kg)
inner face	0.441	0.288	0.311	0.013	0.014	0.031	0.013	0.04	0.05	0.76	0.78	0.63	0.74	0.77	0.61

15.2 Extremity Exposure Conditions

Exposure Position	1	2	3	4	5	6	7	4+6	5+6	1+2+6	1+3+6	2+3+6	1+2+7	1+3+7	2+3+7
	WLAN2.4GHz Ant 1+2	WLAN5GHz Ant 1+2	WLAN6GHz Ant 1+2	Bluetooth Ant 1	Bluetooth Ant 2	nRF	Bluetooth Ant 3	Summed	Summed	Summed	Summed	Summed	Summed	Summed	Summed
	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)
Front	0.793	0.524	0.135	0.001	0.006	0.014	0.002	0.02	0.02	1.33	0.94	0.67	1.32	0.93	0.66
Left side	0.903	1.892	0.448	0.047				0.05	0.00	2.80	1.35	2.34	2.80	1.35	2.34
Right side	0.424	0.921	0.271		0.066			0.00	0.07	1.35	0.70	1.19	1.35	0.70	1.19
Top side	1.424	2.478	0.216	0.028	0.004			0.03	0.00	3.90	1.64	2.69	3.90	1.64	2.69
Bottom side						0.021	0.007	0.02	0.02	0.02	0.02	0.02	0.01	0.01	0.01

Test Engineer： Martin Li, Varus Wang, Ricky Gu, Light Wang

16. Uncertainty Assessment

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

Declaration of Conformity:
The test results with all measurement uncertainty excluded is presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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

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

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

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

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

(b) κ is the coverage factor

Standard Uncertainty for Assumed Distribution

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

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

The judgment of conformity in the report is based on the measurement results excluding the measurement uncertainty.

Uncertainty Budget According to IEC/IEEE 62209-1528 (Frequency band: 4 MHz - 10 GHz range)							
Error Description	Uncert. Value (±%)	Prob. Dist.	Div.	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System errors							
Probe calibration	18.6	N	2	1	1	9.3	9.3
Probe calibration drift	1.7	R	1.732	1	1	1.0	1.0
Probe linearity and detection Limit	4.7	R	1.732	1	1	2.7	2.7
Broadband signal	2.8	R	1.732	1	1	1.6	1.6
Probe isotropy	7.6	R	1.732	1	1	4.4	4.4
Other probe and data acquisition errors	2.4	N	1	1	1	2.4	2.4
RF ambient and noise	1.8	N	1	1	1	1.8	1.8
Probe positioning errors	0.006	N	1	0.5	0.5	0.0	0.0
Data processing errors	4.0	N	1	1	1	4.0	4.0
Phantom and Device Errors							
Measurement of phantom conductivity (σ)	2.5	N	1	0.78	0.71	2.0	1.8
Temperature effects (medium)	5.4	R	1.732	0.78	0.71	2.4	2.2
Shell permittivity	14.0	R	1.732	0.5	0.5	4.0	4.0
Distance between the radiating element of the DUT and the phantom medium	2.0	N	1	2	2	4.0	4.0
Repeatability of positioning the DUT or source against the phantom	1.0	N	1	1	1	1.0	1.0
Device holder effects	3.6	N	1	1	1	3.6	3.6
Effect of operating mode on probe sensitivity	2.4	R	1.732	1	1	1.4	1.4
Time-average SAR	1.7	R	1.732	1	1	1.0	1.0
Variation in SAR due to drift in output of DUT	2.5	N	1	1	1	2.5	2.5
Validation antenna uncertainty (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Uncertainty in accepted power (validation measurement only)	0.0	N	1	1	1	0.0	0.0
Correction to the SAR results							
Phantom deviation from target (ε´,σ)	1.9	N	1	1	0.84	1.9	1.6
SAR scaling	0.0	R	1.732	1	1	0.0	0.0
Combined Std. Uncertainty						**14.5%**	**14.4%**
Coverage Factor for 95 %						**K=2**	**K=2**
Expanded STD Uncertainty						**29.0%**	**28.8%**

SAR Uncertainty Budget for frequency range 4MHz to 10GHz

Uncertainty Budget According to IEC/IEEE 62209-1528, Specific Phantoms (Frequency band: 300 MHz - 3 GHz range)							
Error Description	Uncert. Value (±%)	Prob. Dist.	Div.	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System Errors							
Probe Calibration	12.0	N	2	1	1	6.0	6.0
Probe Calibration Drift	1.7	R	1.732	1	1	1.0	1.0
Probe Linearity	4.7	R	1.732	1	1	2.7	2.7
Broadband Signal	3.0	R	1.732	1	1	1.7	1.7
Probe Isotropy	9.6	R	1.732	1	1	5.5	5.5
Data Acquisition	0.3	N	1	1	1	0.3	0.3
RF Ambient	1.8	N	1	1	1	1.8	1.8
Probe Positioning	0.6	N	1	0.14	0.14	0.1	0.1
Data Processing	8.7	N	1	1	1	8.7	8.7
Phantom and Device Errors							
Conductivity (meas.)	2.5	N	1	0.78	0.71	2.0	1.8
Conductivity (temp.)	3.3	R	1.732	0.78	0.71	1.5	1.4
Phantom Permittivity	14.0	R	1.732	0	0	0.0	0.0
Distance DUT - TSL	2.0	N	1	2	2	4.0	4.0
Device Positioning (±0.5mm)	1.0	N	1	1	1	1.0	1.0
Device Holder	3.6	N	1	1	1	3.6	3.6
DUT Modulation	2.4	R	1.732	1	1	1.4	1.4
Time-average SAR	1.7	R	1.732	1	1	1.0	1.0
DUT drift	2.5	N	1	1	1	2.5	2.5
Val Antenna Unc.	0.0	N	1	1	1	0.0	0.0
Unc. Input Power	0.0	N	1	1	1	0.0	0.0
Correction to the SAR results							
Deviation to Target	1.9	N	1	1	0.84	1.9	1.6
SAR scaling	0.0	R	1.732	1	1	0.0	0.0
Combined Std. Uncertainty						14.3%	14.3%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						28.7%	28.5%

Uncertainty Budget According to IEC/IEEE 62209-1528, Specific Phantoms (Frequency band: 3 GHz - 6 GHz range)							
Error Description	**Uncert. Value (±%)**	**Prob. Dist.**	**Div.**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**
Measurement System Errors							
Probe Calibration	14.0	N	2	1	1	7.0	7.0
Probe Calibration Drift	1.7	R	1.732	1	1	1.0	1.0
Probe Linearity	4.7	R	1.732	1	1	2.7	2.7
Broadband Signal	2.6	R	1.732	1	1	1.5	1.5
Probe Isotropy	9.6	R	1.732	1	1	5.5	5.5
Data Acquisition	0.3	N	1	1	1	0.3	0.3
RF Ambient	1.8	N	1	1	1	1.8	1.8
Probe Positioning	0.5	N	1	0.29	0.29	0.1	0.1
Data Processing	8.7	N	1	1	1	8.7	8.7
Phantom and Device Errors							
Conductivity (meas.)	2.5	N	1	0.78	0.71	2.0	1.8
Conductivity (temp.)	3.4	R	1.732	0.78	0.71	1.5	1.4
Phantom Permittivity	14.0	R	1.732	0.25	0.25	2.0	2.0
Distance DUT - TSL	2.0	N	1	2	2	4.0	4.0
Device Positioning (±0.5mm)	1.0	N	1	1	1	1.0	1.0
Device Holder	3.6	N	1	1	1	3.6	3.6
DUT Modulation	2.4	R	1.732	1	1	1.4	1.4
Time-average SAR	1.7	R	1.732	1	1	1.0	1.0
DUT drift	2.5	N	1	1	1	2.5	2.5
Val Antenna Unc.	0.0	N	1	1	1	0.0	0.0
Unc. Input Power	0.0	N	1	1	1	0.0	0.0
Correction to the SAR results							
Deviation to Target	1.9	N	1	1	0.84	1.9	1.6
SAR scaling	0.0	R	1.732	1	1	0.0	0.0
Combined Std. Uncertainty						14.9%	14.8%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						29.8%	29.7%

cDASY6 Module mmWave Uncertainty Budget Evaluation Distances to the Antennas > λ/2π In Compliance with IEC TR 63170					
Error Description	**Uncertainty Value (±dB)**	**Probability**	**Divisor**	**(Ci)**	**Standard Uncertainty (±dB)**
Uncertainty terms dep endent on the measurement system					
Probe Calibration	0.49	N	1	1	0.49
Probe correction	0.00	R	1.732	1	0.00
Frequency response	0.20	R	1.732	1	0.12
Sensor cross coupling	0.00	R	1.732	1	0.00
Isotropy	0.50	R	1.732	1	0.29
Linearity	0.20	R	1.732	1	0.12
Probe scattering	0.00	R	1.732	1	0.00
Probe positioning offset	0.30	R	1.732	1	0.17
Probe positioning repeatability	0.04	R	1.732	1	0.02
Sensor mechanical offset	0.00	R	1.732	1	0.00
Probe spatial resolution	0.00	R	1.732	1	0.00
Field impedance dependence	0.00	R	1.732	1	0.00
Amplitude and phase drift	0.00	R	1.732	1	0.00
Amplitude and phase noise	0.04	R	1.732	1	0.02
Measurement area truncation	0.00	R	1.732	1	0.00
Data acquisition	0.03	N	1	1	0.03
Sampling	0.00	R	1.732	1	0.00
Field reconstruction	2.00	R	1.732	1	1.15
Forward transformation	0.00	R	1.732	1	0.00
Power density scaling	0.00	R	1.732	1	0.00
Spatial averaging	0.10	R	1.732	1	0.06
System detection limit	0.04	R	1.732	1	0.02
Uncertainty terms dep endent on the DUT and environmental factors					
Probe coupling with DUT	0.00	R	1.732	1	0.0
Modulation response	0.40	R	1.732	1	0.2
Integration time	0.00	R	1.732	1	0.0
Response time	0.00	R	1.732	1	0.0
Device holder influence	0.10	R	1.732	1	0.1
DUT alignment	0.00	R	1.732	1	0.0
RF ambient conditions	0.04	R	1.732	1	0.0
Ambient reflections	0.04	R	1.732	1	0.0
Immunity / secondary reception	0.00	R	1.732	1	0.0
Drift of the DUT		R	1.732	1	
Combined Std. Uncertainty					1.34
Expanded STD Uncertainty (95%)					**2.68**

PD Uncertainty Budget

17. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”
[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992
[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013
[4] SPEAG DASY System Handbook
[5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
[6] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.
[7] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.
[8] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015
[9] IEC/IEEE 62209-1528:2020, “Measurement procedure for the assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Part 1528: Human models, instrumentation, and procedures (Frequency range of 4 MHz to 10 GHz)”, Oct. 2020
[10] IEC 62479:2010 Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)
[11] IEC TR 63170: 2018 Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz
[12] SPEAG DASY6 System Handbook
[13] SPEAG DASY6 Application Note (Interim Procedures for Devices Operating at 6-10 GHz)

------THE END------