FCC SAR TEST REPORT

FCC ID	:	**UZ7KC50E22**
Equipment	:	**KC50E22 Kiosk Computer**
Brand Name	:	**Zebra**
Model Name	:	**KC50E22**
Applicant	:	**Zebra Technologies Corporation** **3 Overlook Point, Lincolnshire, IL 60069 USA**
Manufacturer	:	**Zebra Technologies Corporation** **3 Overlook Point, Lincolnshire, IL 60069 USA**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

The product was received on Jul. 08, 2024 and testing was started from Jul. 16, 2024 and completed on Jul. 18, 2024. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample provide by manufacturer and the test data has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been pass the FCC requirement.

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

Approved by: Cona Huang / Deputy Manager

Testing Laboratory 3786

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History of this test report

Report No.	Version	Description	Issued Date
FA470121	01	Initial issue of report	Aug. 19, 2024
FA470121	02	Update report to include data reuse approach in section 3, 4, 5, 14, 15	Aug. 28, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) for Zebra Technologies Corporation, KC50E22 Kiosk Computer, KC50E22, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary Body (Separation 0mm) 10g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)
DTS	WLAN	2.4GHz WLAN	0.49	1.49
NII		5GHz WLAN	0.37	1.49
6XD		6GHz WLAN	0.30	1.49
DSS	2.4GHz Band	Bluetooth	0.02	0.77
Equipment Class	Frequency Band		Reported APD (mW/cm^2)	Reported PD (mW/cm^2)
6XD	WLAN	6GHz WLAN	0.71	0.63
Date of Testing:			2024/7/16 ~ 2024/7/18	

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation and the FCC designation No. TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (4.0 W/kg for Extremity 10g SAR) specified in FCC 47 CFR part 2 (2.1093), Human Exposure to RF Radiation Limits (1.0 mW/cm^2=10 W/m^2) specified in FCC 47 CFR part 1.1310 and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.

Reviewed by: Jason Wang
Report Producer: Paula Chen

2. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards, the below KDB standard may not including in the TAF code without accreditation.

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

3. Data Reuse Approach

FCC ID: UZ7KC50A22 (parent model) and FCC ID: UZ7KC50E22 (variant model)

- **PCB**: The PCB layout is identical with parent model.
- **Component Positions**: The position of the components on the PCB is not changed
- **Enclosure, Materials, and From Factor**: the Enclosure, Materials, and From Factor are identical

Due to the same design are identical between parent model and variant model, SAR data reuse is requested and spot check data in this report is used to justify the SAR data reuse.
For variant model 1g SAR and 10g spot check SAR result in section 14 does not exceed 3dB and 1g SAR < 1.2W/kg, 10g SAR < 3.0W/kg of the parent model, the max SAR summary are identical with parent model.
The applicant should take full responsibility that the test data as referenced in this report represent compliance for this FCC ID: UZ7KC50E22

4. Model Difference Information

UZ7KC50A22 and UZ7KC50E22 use the identical internal printed circuit board layout, and the major differences which may relate to RF are listed below:

- Depopulated NFC and PoE related components
- Remove NFC SW and HW

The details of similarity and difference can be found in the confidential documents.

5. Reference detail Section

Rule Part	Equipment Class	Wireless Technology	Frequency Band (MHz)	FCC ID (parent)	Type Grant/ Permissive Change	Parent Report Title	FCC ID Filling (Variant)	Test on the variant
Part 2.1093 SAR	DSS	Bluetooth	2400~2483.5	UZ7KC50A22	Original Grant	FA450112	UZ7KC50E22	Spot check
	DTS	BLE WiFi	2400~2483.5	UZ7KC50A22	Original Grant	FA450112	UZ7KC50E22	Spot check
	NII	Wi-Fi	5150 ~ 5250 5250 ~ 5350 5470 ~ 5725 5725 ~ 5850	UZ7KC50A22	Original Grant	FA450112	UZ7KC50E22	Spot check
	6CD	Wi-Fi	5925 ~ 6425 6425 ~ 6525 6525 ~ 6875 6875 ~ 7125	UZ7KC50A22	Original Grant	FA450112	UZ7KC50E22	Spot check 6E SAR, Full Test on 6E PD, per KDB 484596.

6. Equipment Under Test (EUT) Information

6.1 General Information

Product Feature & Specification	
Equipment Name	KC50E22 Kiosk Computer
Brand Name	Zebra
Model Name	KC50E22
FCC ID	UZ7KC50E22
Wireless Technology and Frequency Range	WLAN 2.4 GHz Band: 2400 MHz ~ 2483.5 MHz WLAN 5.2 GHz Band: 5150 MHz ~ 5250 MHz WLAN 5.3 GHz Band: 5250 MHz ~ 5350 MHz WLAN 5.6 GHz Band: 5470 MHz ~ 5725 MHz WLAN 5.8 GHz Band: 5725 MHz ~ 5850 MHz WLAN 6E: 5925 MHz ~ 6425 MHz, 6425 MHz ~ 6525 MHz, 6525 MHz ~ 6875 MHz, 6875 MHz ~ 7125 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	WLAN: 802.11a/b/g/n/ac/ax HT20/HT40/VHT20/VHT40/VHT80/VHT160/HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
HW Version	EV
SW Version	13-30-27.00-TG-U01-STD-ATH-04
OS Version	Android 13
MFD	31MAY24
EUT Stage	Identical Prototype

Accessories Information				
AC Adapter 1	Brand Name	ZEBRA	Model Name	PS000088A01
USB C-C Cable	Brand Name	ZEBRA	P/N	CBL-EC5X-USBC3A-01
Stand	Brand Name	ZEBRA	P/N	3PTY-SC-2000-CF2-01
Printer	Brand Name	ZEBRA	Model Name	ZD230t
2nd display	Brand Name	ZEBRA	Model Name	TD50-15F00
Edge scanner	Brand Name	ZEBRA	P/N	ZFLX-SCNR-E00
Edge LED Light Bar	Brand Name	ZEBRA	P/N	ZFLX-LTBAR-200
USB Cable for printer	Brand Name	ZEBRA	P/N	300283-002

7. RF Exposure Limits

7.1 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.

7.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

7.3 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.

Peak Spatially Averaged Power Density was evaluated over a circular 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

8. Specific Absorption Rate (SAR)

8.1 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.

8.2 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:

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

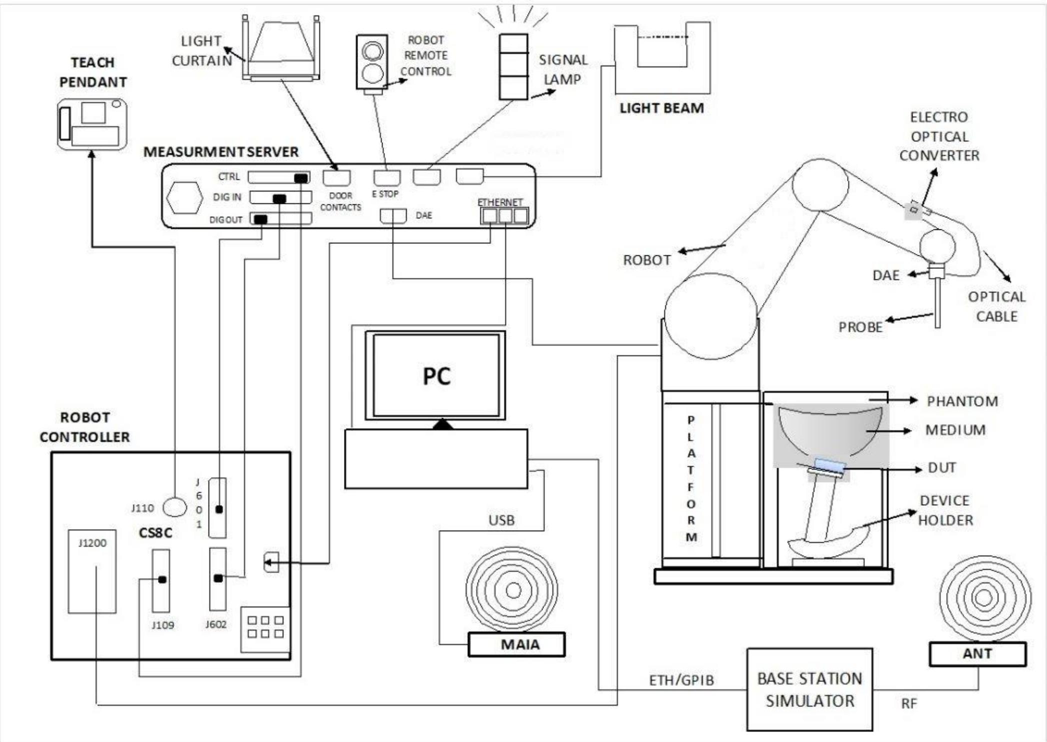
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

9. System Description and Setup

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



- The DASY system in SAR Configuration is shown above
- 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 windows software and the DASY 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.

9.1 Test Site Location

The SAR measurement facilities used to collect data are within both Sporton Lab list below test site location are accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190 and 3786) and the FCC designation No. TW1190 and TW3786 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test.

Laboratory	EMC & Wireless Communications Laboratory		Wensan Laboratory				
Test Site Location	TW1190 No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan		TW3786 No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan				
Test Site No.	SAR01-HY	SAR03-HY	SAR08-HY	SAR09-HY	SAR15-HY	SAR18-HY	SAR21-HY
	SAR04-HY	SAR05-HY	SAR11-HY	SAR12-HY	SAR16-HY	SAR19-HY	SAR22-HY
	SAR06-HY	SAR10-HY	SAR13-HY	SAR14-HY	SAR17-HY	SAR20-HY	

9.2 E-Field Probe

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

<ES3DV3 Probe>

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

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	4 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 μW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 μW/g)
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

9.3 Data Acquisition Electronics (DAE)

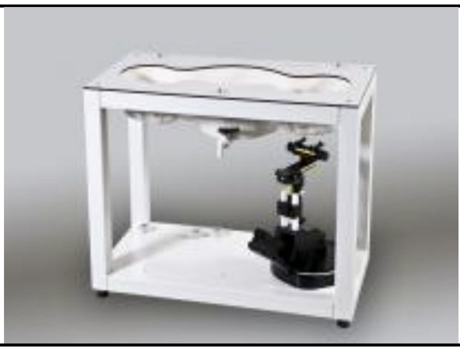
The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an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

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

Fig 5.1 Photo of DAE

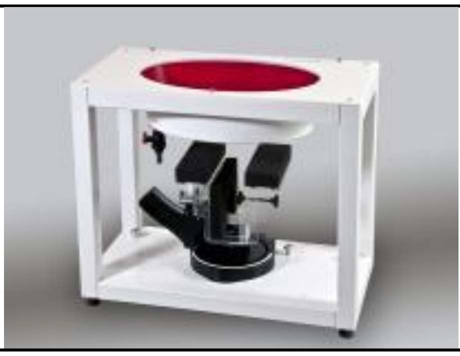
9.4 Phantom

<SAM Twin Phantom>

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

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

<ELI Phantom>

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

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

9.5 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters

Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

10. Measurement Procedures

The measurement procedures are as follows:

(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

10.1 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

10.2 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.

10.3 Area Scan

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

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

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

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

10.5 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.

10.6 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.

11. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	2450MHz System Validation Kit(2)	D2450V2	929	Nov. 21, 2022	Nov. 18, 2025
SPEAG	5GHz System Validation Kit(2)	D5GHzV2	1006	May. 25, 2023	May. 23, 2025
SPEAG	5GHz System Validation Kit(2)	D5GHzV2	1128	Feb. 22, 2023	Feb. 20, 2025
SPEAG	6500MHz System Validation Kit	D6.5GHzV2	1083	Oct. 20, 2023	Oct. 19, 2024
SPEAG	5G Verification Source	10GHz	1052	Oct. 13, 2023	Oct. 12, 2024
SPEAG	EUmmWV Probe Tip Protection	EUmmWV3	9424	Mar. 12, 2024	Mar. 11, 2025
SPEAG	Data Acquisition Electronics	DAE4	656	Jan. 18, 2024	Jan. 17, 2025
SPEAG	Data Acquisition Electronics	DAE4	1696	Oct. 23, 2023	Oct. 22, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	3728	Mar. 20, 2024	Mar. 19, 2025
Testo	Hygro meter	608-H1	45196600	Nov. 02, 2023	Nov. 01, 2024
R&S	BT Base Station	CBT	101136	Oct. 22, 2023	Oct. 21, 2024
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Sep. 27, 2023	Sep. 26, 2024
Keysight	ENA Network Analyzer	E5071C	MY46104758	Oct. 30, 2023	Oct. 29, 2024
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 19, 2023	Sep. 18, 2024
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3690	Aug. 09, 2023	Aug. 08, 2024
Anritsu	Power Meter	ML2495A	1419002	Aug. 17, 2023	Aug. 16, 2024
Anritsu	Power Sensor	MA2411B	1911176	Aug. 18, 2023	Aug. 17, 2024
Anritsu	Spectrum Analyzer	N9010A	MY53470118	Jan. 10, 2024	Jan. 09, 2025
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2023	Oct. 15, 2024
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4B1	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

General Note:

1. Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2. The dipole calibration interval can be extended to 3 years with justification according to KDB 865664 D01. The dipoles are also not physically damaged, or repaired during the interval. The justification data in appendix C can be found which the return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration for each dipole.

12. System Verification

12.1 Tissue Verification

The tissue dielectric parameters of tissue-equivalent media used for SAR measurements must be characterized within a temperature range of 18℃ to 25℃, measured with calibrated instruments and apparatuses, such as network analyzers and temperature probes. The temperature of the tissue-equivalent medium during SAR measurement must also be within 18℃ to 25℃ and within ± 2℃ of the temperature when the tissue parameters are characterized. The tissue dielectric measurement system must be calibrated before use. The dielectric parameters must be measured before the tissue-equivalent medium is used in a series of SAR measurements.
The liquid tissue depth was at least 15cm in the phantom for all SAR testing

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
2450	22.5	1.830	38.700	1.80	39.20	1.67	-1.28	±5	2024/7/16
5250	22.5	4.640	36.200	4.71	35.95	-1.49	0.70	±5	2024/7/16
5600	22.5	4.970	35.800	5.07	35.50	-1.97	0.85	±5	2024/7/16
5800	22.5	5.300	35.400	5.27	35.30	0.57	0.28	±5	2024/7/16
6500	22.5	6.000	34.400	6.07	34.50	-1.15	-0.29	±5	2024/7/16

12.2 System Performance Check Results

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

Test Site	Date	Frequency (MHz)	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
SAR-14	2024/7/16	2450	50	D2450V2-929	EX3DV4 - SN3728	DAE4 Sn656	1.140	24.700	22.8	-7.69
SAR-14	2024/7/16	5250	50	D5GHzV2-1006-5250	EX3DV4 - SN3728	DAE4 Sn656	1.090	23.200	21.8	-6.03
SAR-14	2024/7/16	5600	50	D5GHzV2-1006-5600	EX3DV4 - SN3728	DAE4 Sn656	1.210	24.200	24.2	0.00
SAR-14	2024/7/16	5800	100	D5GHzV2-1128-5800	EX3DV4 - SN3728	DAE4 Sn656	2.190	22.200	21.9	-1.35
SAR-14	2024/7/16	6500	100	D6.5GHzV2-1083	EX3DV4 - SN3728	DAE4 Sn656	5.180	54.000	51.8	-4.07

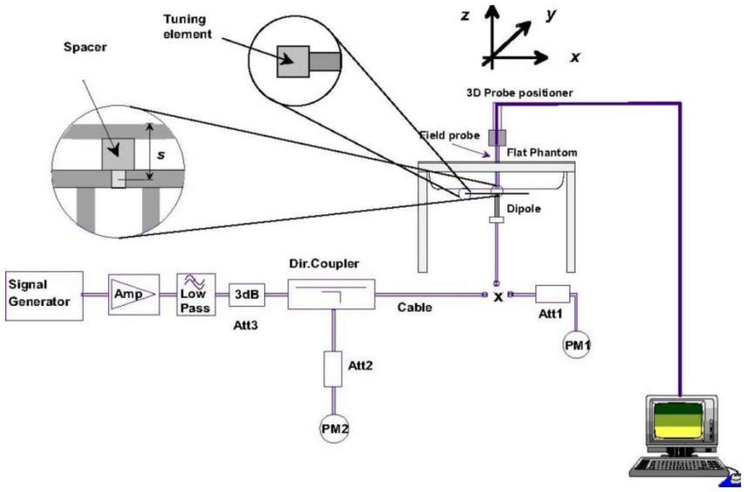


Fig 8.3.1 System Performance Check Setup

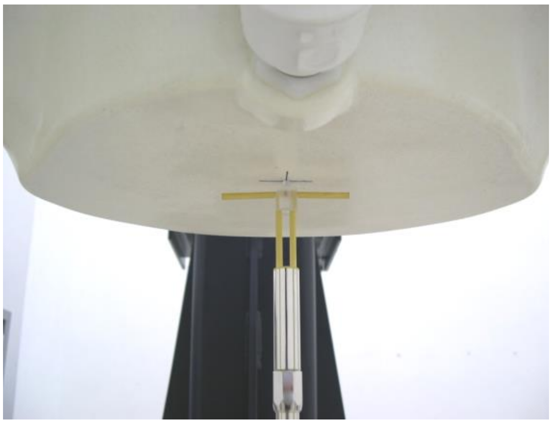


Fig 8.3.2 Setup Photo

12.3 PD System Performance Check 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

Test Location	Frequency (GHz)	5G Verification Source	Probe S/N	DAE S/N	Distance (mm)	Measured 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)	Date
SAR13	10G	10GHz_1052	EUmmWV3 - 9424	Sn1696	10	61.6	56.8	0.35	2024/7/18

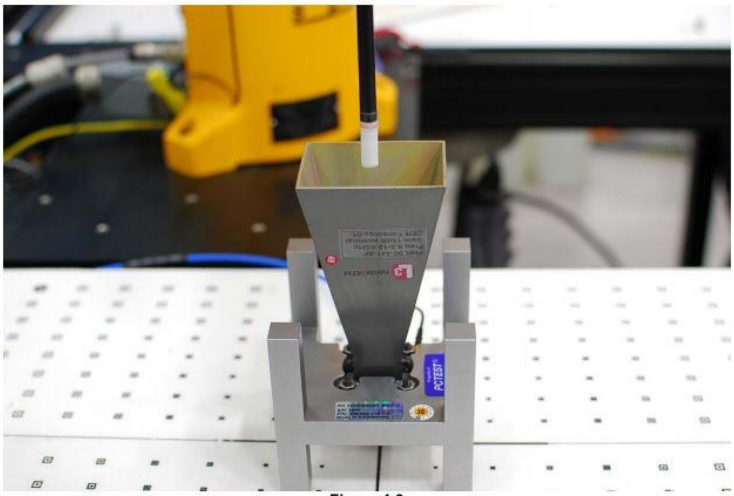
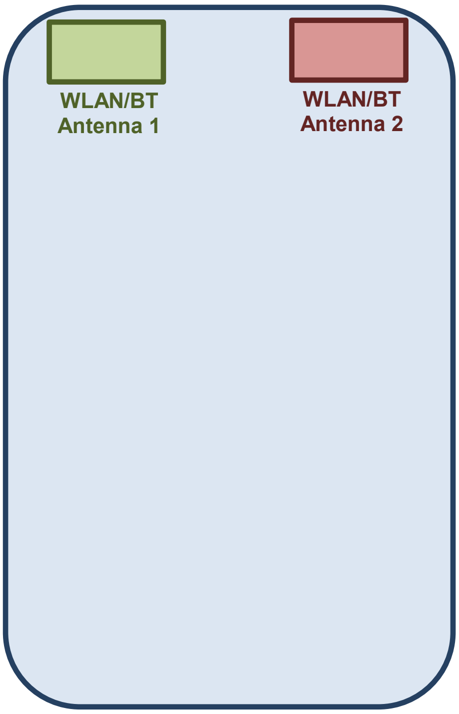


Figure 4-3
System Verification Setup Photo

System Performance Check Setup

13. Antenna Location



Back View

14. Spot Check SAR Results

General Note:

1. SAR spot check verification on the worst cases from the original model was performed to demonstrate the test data from original model remains representative for the variant model.
2. If the 1-g SAR spot check result "does not exceed 3dB, but larger than 1.2 W/kg for 1g SAR, 3.0W/kg for 10 SAR, more spot check on the next-higher exposure position until the spot check result does not exceed 1.2 W/kg for 1g SAR, 3.0W/kg for 10 SAR.
3. When the Report SAR is less than 1.0 W/kg for 10-g SAR, while the SAR hot-spot distribution does not change. Due to the low SAR value, even if Spot-check errors that are 3dB larger, a full test or the addition of more test data is not required.

1st as parent model
2nd as variant model

Plot No.	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)	Deviation (dB)
	1st	WLAN2.4GHz	802.11b 1Mbps	Front Face	0mm	Ant 1+2(1)	1	2412	23.60	24.00	1.096	98.2	1.018	-0.02	0.339	0.378	0.66
		WLAN2.4GHz	802.11b 1Mbps	Front Face	0mm	Ant 1+2(2)	1	2412	23.30	24.00	1.175	98.2	1.018	-0.02	0.408	0.488	
1	2nd	WLAN2.4GHz	802.11b 1Mbps	Front Face	0mm	Ant 1+2(1)	1	2412	23.50	24.00	1.122	98.2	1.018	-0.06	0.330	0.377	
		WLAN2.4GHz	802.11b 1Mbps	Front Face	0mm	Ant 1+2(2)	1	2412	23.20	24.00	1.202	98.2	1.018	-0.06	0.464	0.568	
	1st	WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(1)	54	5270	20.40	21.00	1.148	100	1.000	-0.07	0.096	0.110	1.04
		WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(2)	54	5270	19.40	21.00	1.445	100	1.000	-0.07	0.125	0.181	
2	2nd	WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(1)	54	5270	20.50	21.00	1.122	100	1.000	-0.04	0.092	0.103	
		WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(2)	54	5270	19.50	21.00	1.413	100	1.000	-0.04	0.163	0.230	
	1st	WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(1)	110	5550	20.60	21.00	1.096	100	1.000	-0.06	0.169	0.185	0.71
		WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(2)	110	5550	20.50	21.00	1.122	100	1.000	-0.06	0.123	0.138	
3	2nd	WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(1)	110	5550	20.70	21.00	1.072	100	1.000	0.12	0.203	0.218	
		WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(2)	110	5550	20.20	21.00	1.202	100	1.000	0.12	0.158	0.190	
	1st	WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(1)	151	5755	20.80	21.00	1.047	100	1.000	-0.07	0.215	0.225	-1.23
		WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(2)	151	5755	19.90	21.00	1.288	100	1.000	-0.07	0.286	0.368	
4	2nd	WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(1)	151	5755	20.70	21.00	1.072	100	1.000	-0.07	0.189	0.203	
		WLAN5GHz	802.11n-HT40 MCS0	Front Face	0mm	Ant 1+2(2)	151	5755	20.10	21.00	1.230	100	1.000	-0.07	0.225	0.277	
	1st	WLAN6GHz	802.11ax-HE80 MCS0	Front Face	0mm	Ant 1+2(1)	167	6785	19.90	20.00	1.023	99.29	1.007	-0.07	0.101	0.104	3.46(4)
		WLAN6GHz	802.11ax-HE80 MCS0	Front Face	0mm	Ant 1+2(2)	167	6785	19.80	20.00	1.047	99.29	1.007	-0.07	0.288	0.304	
5	2nd	WLAN6GHz	802.11ax-HE80 MCS0	Front Face	0mm	Ant 1+2(1)	167	6785	19.70	20.00	1.072	99.3	1.007	0	0.131	0.141	
		WLAN6GHz	802.11ax-HE80 MCS0	Front Face	0mm	Ant 1+2(2)	167	6785	19.50	20.00	1.122	99.3	1.007	0	0.597	0.675	
	1st	Bluetooth	1Mbps	Front Face	0mm	Ant 1	0	2402	5.01	6.00	1.256	76.86	1.084	0.02	0.016	0.022	1.66
6	2nd	Bluetooth	1Mbps	Front Face	0mm	Ant 1	0	2402	5.70	6.00	1.072	76.8	1.085	0.02	0.013	0.015	
	1st	Bluetooth	1Mbps	Front Face	0mm	Ant 2	39	2441	4.64	6.00	1.367	76.8	1.085	-0.16	0.015	0.022	1.66
	2nd	Bluetooth	1Mbps	Front Face	0mm	Ant 2	39	2441	5.80	6.00	1.047	76.8	1.085	-0.07	0.013	0.015	

Conclusion:

The spot check results don't show the SAR increase more than 3dB, and all below 3W/kg for 10-g SAR. Referring to the guidance in the KDB inquiry, SAR data reuse is justified.

15. 6GHz PD SAR Result

WLAN PD Note:

1. The WiFi 6E PD was performed according 2020 TCB workshop RF Exposure 5G RFX Policies Interim Procedures.
2. Per Interim Procedures. The 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
3. 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.
4. Absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements.
5. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4.
6. 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.
7. 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.

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

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-HE80 MCS0	Front	2mm	Ant 1+2(1)	7	5985	19.80	0.0625	6.82	1.262141986	2.76	3.18
WLAN6GHz	802.11ax-HE80 MCS0	Front	10mm	Ant 1+2(1)	7	5985	19.80	0.25	5.1		1.88	2.12
WLAN6GHz	802.11ax-HE160 MCS0	Front	2mm	Ant 1+2(2)	207	6985	12.60	0.0625	3.18	1.369391351	0.973	1.36
WLAN6GHz	802.11ax-HE160 MCS0	Front	8.43mm	Ant 1+2(2)	207	6985	12.60	0.25	2.32		0.732	1.03

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Accessory	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)
1	WLAN6GHz	802.11ax-HE80 MCS0	Front	2mm	Ant 1+2(1)	-	7	5985	19.80	20.00	1.047	99.24	1.008	0.0625	1.5535	-0.13	2.76	4.53	3.18	5.21
	WLAN6GHz	802.11ax-HE80 MCS0	Front	2mm	Ant 1+2(1)	-	71	6305	18.00	20.00	1.585	99.24	1.008	0.0625	1.5535	0.08	1.36	3.38	1.9	4.72
	WLAN6GHz	802.11ax-HE160 MCS0	Front	2mm	Ant 1+2(2)	-	111	6505	13.30	13.50	1.047	99.24	1.008	0.0625	1.5535	0.01	0.875	1.43	1.22	2.00
	WLAN6GHz	802.11ax-HE80 MCS0	Front	2mm	Ant 1+2(2)	-	167	6785	19.50	20.00	1.122	99.24	1.008	0.0625	1.5535	0.06	2.11	3.71	2.95	5.18
	WLAN6GHz	802.11ax-HE160 MCS0	Front	2mm	Ant 1+2(2)	-	207	6985	12.60	13.00	1.096	99.24	1.008	0.0625	1.5535	0.03	0.973	1.67	1.36	2.34
	WLAN6GHz	802.11ax-HE80 MCS0	Front	2mm	Ant 1+2(1)	Lightbar	7	5985	19.80	20.00	1.047	99.24	1.008	0.0625	1.5535	-0.08	1.48	2.43	2.08	3.41
	WLAN6GHz	802.11ax-HE80 MCS0	Front	2mm	Ant 1+2(1)	Scanner	7	5985	19.80	20.00	1.047	99.24	1.008	0.0625	1.5535	-0.08	1.38	2.26	1.93	3.16

Test Engineer： Sing Lim and Tony Wu

16. Uncertainty Assessment

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.

Applicable for SAR Measurements:

Uncertainty Budget (4 MHz - 10 GHz range)							
Error Description	**Uncertainty Value (±%)**	**Probability**	**Divisor**	**(Ci) 1g**	**(Ci) 10g**	**Standard Uncertainty (1g) (±%)**	**Standard Uncertainty (10g) (±%)**
Measurement System							
Probe Calibration	18.60	N	2	1	1	9.3	9.3
Axial Isotropy	4.70	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.60	R	1.732	0.7	0.7	3.9	3.9
Linearity	4.70	R	1.732	1	1	2.7	2.7
Modulation Response	4.68	R	1.732	1	1	2.7	2.7
System Detection Limits	1.00	R	1.732	1	1	0.6	0.6
Boundary Effects	2.00	R	1.732	1	1	1.2	1.2
Readout Electronics	0.30	N	1	1	1	0.3	0.3
Response Time	0.00	R	1.732	1	1	0.0	0.0
Integration Time	2.60	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.00	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.00	R	1.732	1	1	1.7	1.7
Probe Positioner	0.40	R	1.732	1	1	0.2	0.2
Probe Positioning	6.70	R	1.732	1	1	3.9	3.9
Post-processing	4.00	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Holder	3.60	N	1	1	1	3.6	3.6
Test sample Positioning	3.03	N	1	1	1	3.0	3.0
Power Scaling	0.00	R	1.732	1	1	0.0	0.0
Power Drift	5.00	R	1.732	1	1	2.9	2.9
Phantom and Setup							
Phantom Uncertainty	7.60	R	1.732	1	1	4.4	4.4
SAR correction	0.00	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.03	N	1	0.78	0.77	0.0	0.0
Liquid Conductivity (target)	5.00	R	1.732	0.78	0.77	2.3	2.2
Liquid Conductivity (mea.)	2.50	R	1.732	0.78	0.77	1.1	1.1
Temp. unc. - Conductivity	3.68	R	1.732	0.78	0.77	1.7	1.6
Liquid Permittivity Repeatability	0.02	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.00	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.50	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.84	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						14.5%	14.2%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						29.0%	28.4%

Applicable for Power Density Measurements:

Error Description	Uncertainty Value (±dB)	Probability	Divisor	(Ci)	Standard Uncertainty (±dB)
Probe Calibration	0.49	N	1	1	0.49
Probe correction	0.00	R	1.732	1	0.00
Frequency response (BW ≤ 1 GHz)	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 dependance	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**

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 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

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

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

[8] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” 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] SPEAG DASY6 System Handbook

[11] SPEAG DASY6 Application Note (Interim Procedure for Device Operation at 6GHz-10GHz)