FCC WLAN 6GHz RF Exposure

Applicant	:	**Luxottica Group S.p.A.**
Equipment	:	**SMART GLASSES**
Brand Name	:	**Ray-Ban Meta or Ray-Ban**
Model Name	:	**RW4006, RW4008, RW4009**
FCC ID	:	**2AYOA-4003**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

We, Sporton International Inc. (Shenzhen), 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. (Shenzhen), the test report shall not be reproduced except in full.

Si Zhang

Approved by: Si Zhang

ilac-MRA ACCREDITED Cert #5145.01

Sporton International Inc. (Shenzhen)
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People's Republic of China

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History of this test report

Report No.	Version	Description	Issued Date
FA272102-02A	01	Initial issue of report	Jul. 03, 2023
FA272102-02A	02	Update Equipment name, Brand name and address of Applicant & Manufacturer	Jul. 27, 2023

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Luxottica Group S.p.A., SMART GLASSES, RW4006, RW4008, RW4009**, are as follows.

Frequency Band	WLAN 6GHz					
Tx Frequency	5925-7125 MHz					
Exposure Condition	Head		Body			Extremity
	Face-Worn (Separation 0mm)	Rest-on-Head (Separation 0mm)	Rest-on-Shirt (Separation 0mm)	Pocketing (outside Charging Case) (Separation 5mm)	Pocketing(inside Charging Case) (Separation 5mm)	Handheld(inside Charging Case) (Separation 0mm)
Reported SAR	1g SAR (W/kg)					10g SAR (W/kg)
	0.27	0.15	**0.67**	<0.10	**0.52**	**0.28**
Measured APD	(W/m^2)					
	1.49	0.711	2.18	0.302	3.28	**4.70**
Scaled PD	psPD (W/m^2)					
	7.92					
Date of Testing:	2023/5/17 ~ 2023/6/6					

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), 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. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	**Sporton Site No.**	**FCC Designation No.**	**FCC Test Firm Registration No.**
	SAR02-SZ, SAR05-SZ	CN1256	421272

Applicant	
Company Name	Luxottica Group S.p.A.
Address	Piazzale Cadorna 3 20123 Milan, Italy

Manufacturer	
Company Name	Luxottica Group S.p.A.
Address	Piazzale Cadorna 3 20123 Milan, Italy

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 System Handbook
- 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
- November 2017, October 2018, April 2019, November 2019, October 2020, April 2021 TCBC Workshop Notes
- TCB workshop April 2019; RF Exposure Procedures (802.11ax SAR Testing)

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	SMART GLASSES
Brand Name	Ray-Ban Meta or Ray-Ban
Model Name	RW4006, RW4008, RW4009
FCC ID	2AYOA-4003
S/N	Sample 1: 2Q37B1WF3J008H Sample 2: 2Q37Q0YF3L004N Sample 3: 2Q37R0NF44004Y
Wireless Technology and Frequency Range	WLAN 2.4GHz Band: 2412 MHz ~ 2472 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz WLAN 6GHz U-NII-5: 5955 MHz ~ 6415 MHz WLAN 6GHz U-NII-6: 6435 MHz ~ 6515 MHz WLAN 6GHz U-NII-7: 6535 MHz ~ 6855 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7095 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 2.4GHz 802.11ac/ax VHT20/VHT40/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 WLAN 6GHz 802.11ax HE20/HE40/HE80/HE160 Bluetooth BR/EDR/LE
HW Version	EVT2
SW Version	12/SQ3A. 220605. 009. A1/49757590052300100:userdebug/test-keys
EUT Stage	Identical Prototype

Remark:

1. Power States and the related triggering mechanisms are following as: the detailed Sensor Fusion Algorithm and Power State Decision Logic Flow, Exposure Condition and SAR Requirement summary please refer to KDB inquiry with the FCC.

Power State	Exposure Condition
A	Face-Worn
	Rest-on-Head
B	Rest- on-Shirt
	Pocketing
C	Pocketing/Handheld (in Charging Case)
D	Free Space/Off Body

2. There are three samples of EUT. The manufacturer declares that all the equipment and models share the same radio characteristics and Software/Firmware, the only differences between each of them are color of frames, lenses, and sizes which certainly do not affect the test results. Therefore, choose sample 1 to perform full test, and the sample 2/3 are verified the difference with the sample 1.

Sample	Model Name
Sample 1	RW4006
Sample 2	RW4008
Sample 3	RW4009

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.

5.3 RF Exposure limit for below 6GHz

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

5.4 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/m^2 or mW/cm^2.

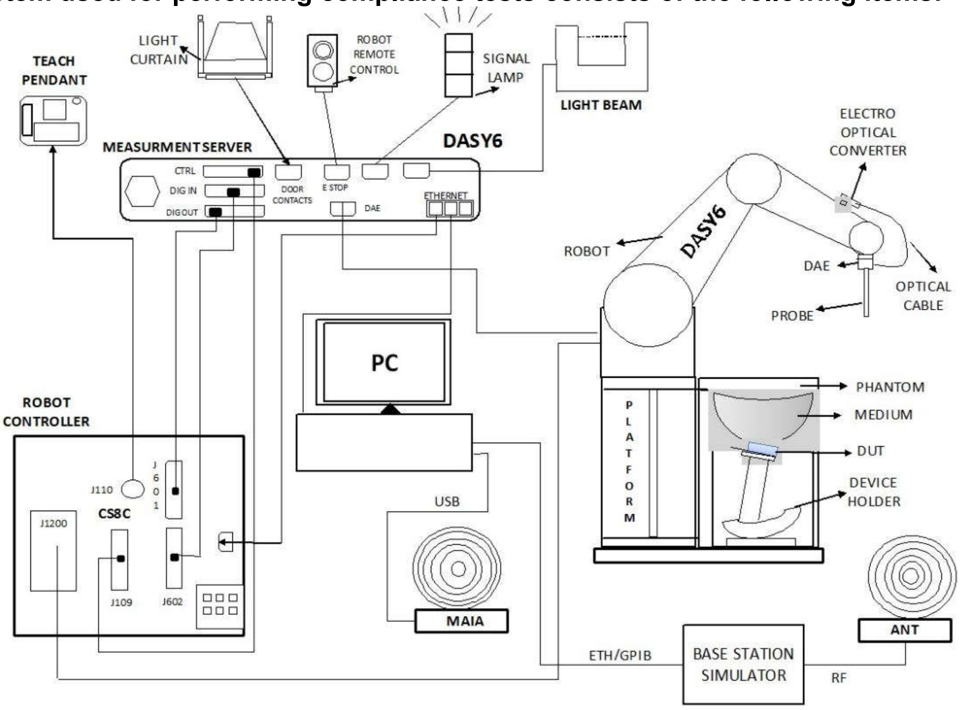
Peak Spatially Averaged Power Density was evaluated over a circular area of $4cm^2$ per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

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

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

6. System Description and Setup

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



- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Windows 10 and the DASY6 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.

7. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	6500MHz System Validation Kit	D6.5GHzV2	1026	Jan. 29, 2021	Jan. 27, 2024
SPEAG	5G Verification Source	10GHz	2002	Feb. 15, 2023	Feb. 14, 2024
SPEAG	Data Acquisition Electronics	DAE4	1386	Jun. 30, 2022	Jun. 29, 2023
SPEAG	Data Acquisition Electronics	DAE4	715	Jan. 23, 2023	Jan. 22, 2024
SPEAG	Dosimetric E-Field Probe	EX3DV4	7577	Nov. 23, 2022	Nov. 22, 2023
SPEAG	EUmmWV Probe Tip Protection	EUmmWV3	9432	Jan. 23, 2023	Jan. 22, 2024
SPEAG	SAM Twin Phantom	QD 000 P41 AA	2033	NCR	NCR
SPEAG	SAM Head-Stand	QD 012 003 CC	1024	NCR	NCR
SPEAG	mmWave Phantom	mmWave	N/A	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 17, 2022	Oct. 16, 2023
Speag	Dielectric Assessment KIT	DAK-3.5	1071	Feb. 20, 2023	Feb. 19, 2024
R&S	Signal Generator	SMB100A	175779	Dec. 28, 2022	Dec. 27, 2023
Keysight	Preamplifier	83017A	MY57280111	Jul. 11, 2022	Jul. 10, 2023
Anritsu	Power Senor	MA2411B	1306099	Oct. 17, 2022	Oct. 16, 2023
Anritsu	Power Meter	ML2495A	1349001	Oct. 17, 2022	Oct. 16, 2023
Anritsu	Power Sensor	MA2411B	1542004	Dec. 27, 2022	Dec. 26, 2023
Anritsu	Power Meter	ML2495A	1339473	Dec. 27, 2022	Dec. 26, 2023
R&S	Power Sensor	NRP50S	101254	Apr. 06, 2023	Apr. 05, 2024
R&S	Power Sensor	NRP50S	101548	Aug. 12, 2022	Aug. 11, 2023
R&S	Spectrum Analyzer	FSP7	100818	Jul. 07, 2022	Jul. 06, 2023
R&S	Spectrum Analyzer	FSV40	101893	Apr. 06, 2023	Apr. 05, 2024
TES	Hygrometer	1310	200505600	Jul. 12, 2022	Jul. 11, 2023
Anymetre	Thermo-Hygrometer	JR593	2020062101	Jul. 12, 2022	Jul. 11, 2023
Anymetre	Thermo-Hygrometer	JR593	2015030903	Dec. 30, 2022	Dec. 29, 2023
SPEAG	Device Holder	N/A	N/A	N/A	N/A
AR	Amplifier	5S1G4	0333096	Note 1	
Mini-Circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Warison	Directional Coupler	WCOU-10-50S-10	WR889BMC4BMC1	Note 1	
Weinschel	Attenuator 1	3M-10	N/A	Note 1	
Weinschel	Attenuator 2	3M-20	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.

8. SAR System Verification

8.1 SAR 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)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
6500	Head	22.8	6.120	34.200	6.07	34.50	0.82	-0.87	±5	2023/5/21
6500	Head	22.2	6.230	34.400	6.07	34.50	2.64	-0.29	±5	2023/5/27
6500	Head	22.4	6.290	34.800	6.07	34.50	3.62	0.87	±5	2023/6/6

8.2 SAR System Performance Check Results

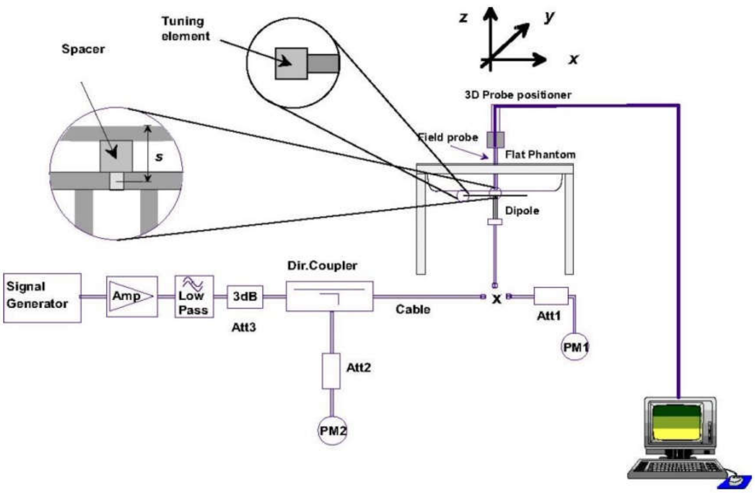
Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report. 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. The detailed System Check on SAM Head-Stand phantom please refer to Sporton Report Number FA272102-02.

<1g>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2023/5/21	6500	Head	100	1026	7577	1386	30.600	290.000	306	5.52
2023/5/27	6500	Head	100	1026	7577	1386	30.800	290.000	308	6.21
2023/6/6	6500	Head	100	1026	7577	1386	30.700	290.000	307	5.86

<10g>

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 (%)
2023/5/21	6500	Head	100	1026	7577	1386	5.720	53.400	57.2	7.12
2023/5/27	6500	Head	100	1026	7577	1386	5.740	53.400	57.4	7.49
2023/6/6	6500	Head	100	1026	7577	1386	5.600	53.400	56	4.87



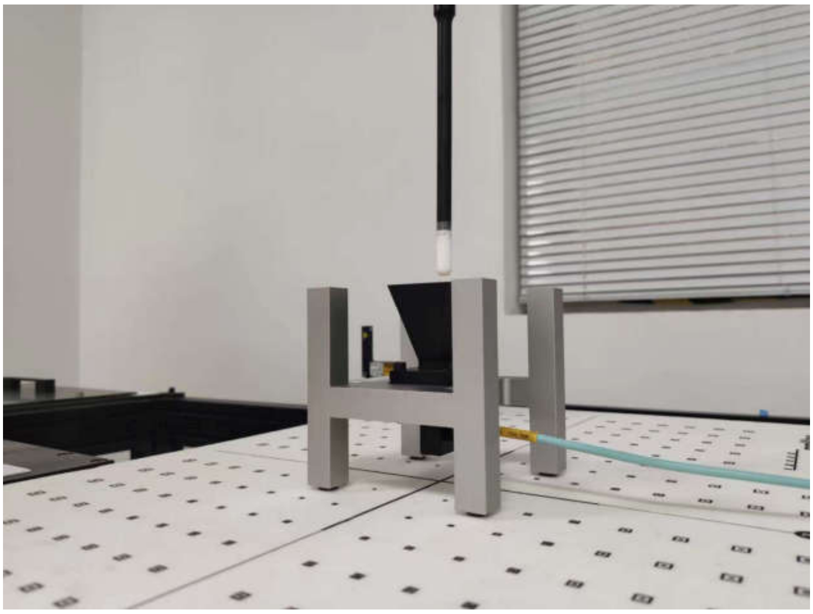
System Performance Check Setup

Setup Photo

8.3 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	Rrad (mW)	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
10G	10GHz_2002	132	9432	715	10mm	156	171	-0.40	2023/5/17
10G	10GHz_2002	132	9432	715	10mm	167	171	-0.10	2023/5/23
10G	10GHz_2002	132	9432	715	10mm	164	171	-0.18	2023/5/29



System Verification Setup Photo

9. RF Exposure Positions

9.1 Head SAR Testing for SMART GLASSES

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.

9.2 Body SAR Testing for SMART GLASSES

a) To position the device parallel to the phantom surface to 0mm with the Device's antenna is located on the left temple arm outer edge in Rest-on-Shirt exposure condition.

b) To position the device parallel to the phantom surface to 5mm with the Device's antenna is located on the left temple arm in Pocketing (outside Charging Case) exposure condition.

c) To position the device parallel to the phantom surface to 5mm with the EUT's top or bottom in Pocketing(inside Charging Case) exposure condition.

9.3 Extremity SAR Testing for SMART GLASSES

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 Appendix D for the test setup photos.

9.4 Miscellaneous Testing Considerations

- Evaluate SAR using 6-7 GHz parameters per IEC/IEEE 62209-1528:2020.
- Per procedures of KDB Pubs. 447498 and 248227.
- Where supported by the test system, also report estimated absorbed (epithelial) power density (for reference purposes only, not specifically for compliance) and estimated incident PD, derived from measured SAR.
- In addition, for the highest SAR test configurations evaluate incident PD using the mmw near-field probe and total-field/power-density reconstruction method (2 mm closest meas. plane)
  - Adjust measured results per amount that measurement uncertainty exceeds 30 % (see e.g. IEC 62479:2010)

10. WLAN 6GHz Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix E.

General Note:

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/ax mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
2. Per 201904 TCBC workshops, General principles of FCC KDB Publication 248227 D01 can be applied to determine the SAR Initial Test Configurations and test reduction for 802.11ax SAR testing. For the table below the 802.11ax maximum power is SU (non-OFDMA), and the SU maximum power also higher than RU (OFDMA)
3. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
4. For modes with the same maximum output power, the guidance from section 5.3.2 a) of FCC KDB Publication 248227 D01 should be applied, with 802.11ax being considered as the highest 802.11 mode for the appropriate frequency bands
5. 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 then 802.11be or 802.11g is chosen over 802.11n.
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.

11. Antenna Location

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

12. RF Exposure Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
   c. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   · ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   · ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
   · ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
4. For WLAN 6GHz doesn’t support wireless router capability.
5. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors.
6. 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.
7. Absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements.
8. The device head SAR is performed against SAM Head-Stand Phantom. Device Body and extremity SAR is performed against flat section of SAM Twin phantom.
9. Since power state D is less than power state C, so Power state C for SAR is evaluated more conservatively than power state D.
10. The following table “n/a” in the result means the SAR is too small to be detected.
11. Per FCC guidance, the WLAN 6GHz Sim-Tx analysis are using the SAR results with the conventional SPLSR etc procedures from KDB 447498 D01. And the Sim-Tx analysis result refer to Sporton SAR report no.: FA272102-02.

WLAN SAR Note:

1. 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.
2. 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.
3. During SAR testing the WLAN 6GHz transmission was verified using a spectrum analyzer.
4. When SAR testing for 802.11ax is required
   a. If the maximum output power is highest for OFDMA scenarios, choose the tone size with the maximum number of tones and the highest maximum output power
   b. Otherwise, consider the fully allocated channel for SAR testing
   c. When SAR testing is required on RU sizes less than the fully allocated channel, use the RU number closest to the middle of the channel, choosing the higher RU number when two RUs are equidistant to the middle of the channel.

12.1 Face-Worn SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	47	6185	1	9.56	10.75	1.315	98.91	1.011	0.02	0.118	0.157	0.859
	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	15	6025	1	9.34	10.75	1.384	98.91	1.011	-0.03	0.151	0.211	1.14
01	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	15	6025	3	9.34	10.75	1.384	98.91	1.011	0.02	0.194	0.271	1.49
	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	15	6025	2	9.34	10.75	1.384	98.91	1.011	0.18	0.154	0.215	1.19
	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	111	6505	1	8.91	10.25	1.361	98.91	1.011	0.06	0.127	0.175	0.971
	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	175	6825	1	6.87	8.50	1.455	98.91	1.011	0.01	0.100	0.147	0.765
	WLAN6GHz	802.11ax-HE160 MCS0	On the Front of the Face	0mm	Ant 1	A	207	6985	1	7.19	8.75	1.432	98.91	1.011	0.08	0.086	0.125	0.543

12.2 Rest-on-Head SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	47	6185	1	9.56	10.75	1.315	98.91	1.011	0.13	0.024	0.032	0.109
	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	15	6025	1	9.34	10.75	1.384	98.91	1.011	0.1	0.087	0.122	0.439
02	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	15	6025	3	9.34	10.75	1.384	98.91	1.011	-0.07	0.104	0.145	0.518
	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	15	6025	2	9.34	10.75	1.384	98.91	1.011	0.04	0.086	0.120	0.522
03	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	111	6505	1	8.91	10.25	1.361	98.91	1.011	0.05	0.085	0.117	0.711
	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	175	6825	1	6.87	8.50	1.455	98.91	1.011	0.01	0.069	0.102	0.542
	WLAN6GHz	802.11ax-HE160 MCS0	On of the head	0mm	Ant 1	A	207	6985	1	7.19	8.75	1.432	98.91	1.011	0.05	0.034	0.049	0.261

12.3 Rest-on-Shirt SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	111	6505	1	4.12	5.50	1.374	98.91	1.011	-0.05	0.361	0.501	1.93
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	15	6025	1	5.39	6.50	1.291	98.91	1.011	-0.17	0.405	0.529	2.12
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	47	6185	1	5.17	6.50	1.358	98.91	1.011	-0.05	0.363	0.498	1.95
04	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	175	6825	1	4.01	5.50	1.409	98.91	1.011	0.02	0.468	0.667	2.18
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	175	6825	3	4.01	5.50	1.409	98.91	1.011	0.01	0.386	0.550	2.02
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	175	6825	2	4.01	5.50	1.409	98.91	1.011	0.06	0.385	0.549	1.98
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom	0mm	Ant 1	B	207	6985	1	3.88	5.25	1.371	98.91	1.011	-0.03	0.358	0.496	1.65

12.4 Pocketing (outside Charging Case)SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	15	6025	1	5.39	6.50	1.291	98.91	1.011	-0.08	0.011	0.014	0.074
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	47	6185	1	5.17	6.50	1.358	98.91	1.011	-0.15	0.012	0.016	0.079
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	111	6505	1	4.12	5.50	1.374	98.91	1.011	-0.03	0.017	0.024	0.108
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	175	6825	1	4.01	5.50	1.409	98.91	1.011	-0.05	0.025	0.036	0.169
05	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	175	6825	3	4.01	5.50	1.409	98.91	1.011	0.02	0.047	0.067	0.302
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	175	6825	2	4.01	5.50	1.409	98.91	1.011	-0.08	0.031	0.044	0.214
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom	5mm	Ant 1	B	207	6985	1	3.88	5.25	1.371	98.91	1.011	0.01	0.023	0.032	0.153

12.5 Pocketing(inside Charging Case)SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
	WLAN6GHz	802.11ax-HE160 MCS0	Top Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	0.08	0.080	0.101	0.799
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	0.02	0.102	0.129	0.881
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	111	6505	1	14.90	16.00	1.288	98.91	1.011	-0.03	0.205	0.267	2.08
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	15	6025	1	15.81	17.00	1.315	98.91	1.011	-0.18	0.098	0.130	0.885
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	175	6825	1	12.81	13.50	1.172	98.91	1.011	0.05	0.361	0.428	3.19
06	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	207	6985	1	13.74	15.00	1.337	98.91	1.011	-0.01	0.384	**0.519**	**3.28**
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	207	6985	2	13.74	15.00	1.337	98.91	1.011	-0.11	0.299	0.404	2.52
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Edge Kept 5mm Distance from Phantom	5mm	Ant 1	C	207	6985	3	13.74	15.00	1.337	98.91	1.011	0.06	0.349	0.472	2.94

12.6 Handheld(inside Charging Case) SAR Test Result

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Sample	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)
	WLAN6GHz	802.11ax-HE160 MCS0	Front	0mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	-0.13	0.087	0.110	1.96
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	0.01	0.152	0.192	3.42
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	0mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	-	n/a	n/a	0
	WLAN6GHz	802.11ax-HE160 MCS0	Right side	0mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	-0.16	0.152	0.192	3.38
	WLAN6GHz	802.11ax-HE160 MCS0	Top Side	0mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	0.05	0.097	0.123	2.3
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Side	0mm	Ant 1	C	47	6185	1	16.03	17.00	1.250	98.91	1.011	-0.19	0.018	0.023	0.401
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	15	6025	1	15.81	17.00	1.315	98.91	1.011	-0.03	0.094	0.125	2.1
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	111	6505	1	14.90	16.00	1.288	98.91	1.011	-0.11	0.109	0.142	2.73
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	175	6825	1	12.81	13.50	1.172	98.91	1.011	-0.06	0.173	0.205	4.33
07	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	207	6985	1	13.74	15.00	1.337	98.91	1.011	0.04	0.206	**0.278**	**4.7**
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	207	6985	2	13.74	15.00	1.337	98.91	1.011	0.01	0.147	0.199	3.34
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 1	C	207	6985	3	13.74	15.00	1.337	98.91	1.011	-0.16	0.158	0.214	4.3

12.7 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%.
   a. At 2mm, the total expanded uncertainty of 2.68 dB (85.4%) was used to determine the psPD measurement scaling factor.
   b. At 5mm, the total expanded uncertainty of 2.18 dB (65.2%) was used to determine the psPD measurement scaling factor.
7. Per October 2020 TCB Workshop, for distances smaller than λ/5 using the developed Plane-to-Plane Phase Reconstruction (PTP-PR) Algorithm used in PD measurement.
8. 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) For PD data at Face-Worn and Rest-on-Head exposure conditions, the details can be referred to KDB inquiry with the FCC and Face-Worn PD data.
   2) Select highest Rest-on-Shirt 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 cover Rest-on-Shirt exposure conditions of SMART GLASSES.
   3) Select highest Pocketing (outside Charging Case) SAR at 5 mm test distance and configurations evaluate power density, so the PD test was performed of a 5mm separation between Probe sensor and EUT surface to cover Pocketing (outside Charging Case) exposure conditions of SMART GLASSES.
   4) Select highest Pocketing(inside Charging Case) body SAR at 5 mm and handheld SAR at 0mm test distance and there is no different PD limit on different exposure conditions, therefore select highest handheld SAR at 0 mm test distance and configurations evaluate power density. Since there is no different PD limit on different exposure conditions, therefore the PD test was performed of a 2mm separation between Probe sensor and EUT surface to cover Pocketing(inside Charging Case) exposure conditions of SMART GLASSES. IPD is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge
   c. 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 (0.05) was sufficient for determining compliance at d=2mm.

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

<WLAN PD>

Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Grid Step (λ)	iPD (W/m^2)	iPD ratio (≥ -1)	Normal psPD (W/m^2)	Total psPD (W/m^2)
Rest-on-Shirt												
WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	15	6025	5.39	0.05	2.44	-0.63	1.42	1.65
WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	10mm	Ant 1	15	6025	5.39	0.05	2.82		0.686	0.704
WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	207	6985	3.88	0.05	3.51	0.35	0.966	1.1
WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	8.59mm	Ant 1	207	6985	3.88	0.25	3.24		0.373	0.48
Pocketing (outside Charging Case)												
WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	15	6025	5.39	0.05	1.62	-0.98	0.429	0.458
WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	10mm	Ant 1	15	6025	5.39	0.125	2.03		0.444	0.454
WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	207	6985	3.88	0.05	2.02	-0.41	0.407	0.436
WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	8.59mm	Ant 1	207	6985	3.88	0.125	2.22		0.608	0.62

Handheld(inside Charging Case)												
WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	15	6025	15.81	0.05	12.7	4.17	3.18	3.19
WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	10mm	Ant 1	15	6025	15.81	0.25	4.86		1.44	1.54
WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	207	6985	13.74	0.05	4	-0.94	2.83	3.17
WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	8.59mm	Ant 1	207	6985	13.74	0.0625	4.97		2.04	2.13

Edge	Frequency (MHz)	Max Power (dBm)	Reported PD(W/m2)
Face-worn			
Inner	6025	10.75	**7.84**
Inner	6185	10.75	7.18
Inner	6505	10.25	7.54
Inner	6825	8.5	7.72
Inner	6985	8.75	7.62

Note: Based on approved KDB by OET, we followed the procedure to demonstrate PD compliance for the Face-Worn exposure condition, the detailed calculation is available in the operational description.

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)
Rest-on-Shirt																			
01	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	15	6025	5.39	6.50	1.291	98.91	1.011	0.05	1.5535	0.04	1.42	2.88	1.65	**3.35**
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	47	6185	5.17	6.50	1.359	98.91	1.011	0.05	1.5535	0.03	0.723	1.54	1.06	2.26
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	111	6505	4.12	5.50	1.374	98.91	1.011	0.05	1.5535	0.02	1.27	2.74	1.39	3.00
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	175	6825	4.01	5.50	1.409	98.91	1.011	0.05	1.5535	0.02	1.32	2.92	1.42	3.14
	WLAN6GHz	802.11ax-HE160 MCS0	Left Temple Arm Outer Edge Touching Phantom (B)	2mm	Ant 1	207	6985	3.88	5.25	1.371	98.91	1.011	0.05	1.5535	0.18	0.966	2.08	1.1	2.37
Pocketing (outside Charging Case)																			
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	15	6025	5.39	6.50	1.291	98.91	1.011	0.05	1.3520	0.03	0.429	0.76	0.458	0.81
02	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	47	6185	5.17	6.50	1.359	98.91	1.011	0.05	1.3520	0.05	0.708	1.32	0.724	**1.34**
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	111	6505	4.12	5.50	1.374	98.91	1.011	0.05	1.3520	-0.04	0.342	0.64	0.437	0.82
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	175	6825	4.01	5.50	1.409	98.91	1.011	0.05	1.3520	-0.08	0.589	1.13	0.614	1.18
	WLAN6GHz	802.11ax-HE160 MCS0	Left Lens Kept 5mm Distance from Phantom (B)	5mm	Ant 1	207	6985	3.88	5.25	1.371	98.91	1.011	0.05	1.3520	0.08	0.407	0.76	0.436	0.82
Handheld(inside Charging Case)																			
	WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	15	6025	15.81	17.00	1.315	98.91	1.011	0.05	1.5535	-0.05	3.18	6.57	3.19	6.59
	WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	47	6185	16.03	17.00	1.250	98.91	1.011	0.05	1.5535	-0.06	3.29	6.46	3.32	6.52
	WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	111	6505	14.90	16.00	1.288	98.91	1.011	0.05	1.5535	-0.02	3.68	7.45	3.73	7.55
03	WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	175	6825	12.81	13.50	1.172	98.91	1.011	0.05	1.5535	-0.05	4.02	7.40	4.3	**7.92**
	WLAN6GHz	802.11ax-HE160 MCS0	Back (C)	2mm	Ant 1	207	6985	13.74	15.00	1.337	98.91	1.011	0.05	1.5535	0.08	2.83	5.94	3.17	6.65
	WLAN6GHz	802.11ax-HE160 MCS0	Front (C)	2mm	Ant 1	175	6825	12.81	13.50	1.172	98.91	1.011	0.05	1.5535	-0.04	2.25	4.14	2.32	4.27
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side (C)	2mm	Ant 1	175	6825	12.81	13.50	1.172	98.91	1.011	0.05	1.5535	0.05	0.694	1.28	0.699	1.29
	WLAN6GHz	802.11ax-HE160 MCS0	Right side (C)	2mm	Ant 1	175	6825	12.81	13.50	1.172	98.91	1.011	0.05	1.5535	-0.08	2.19	4.03	2.29	4.22
	WLAN6GHz	802.11ax-HE160 MCS0	Top Side (C)	2mm	Ant 1	175	6825	12.81	13.50	1.172	98.91	1.011	0.05	1.5535	0.08	2.04	3.76	2.33	4.29
	WLAN6GHz	802.11ax-HE160 MCS0	Bottom Side (C)	2mm	Ant 1	175	6825	12.81	13.50	1.172	98.91	1.011	0.05	1.5535	0.14	0.582	1.07	0.606	1.12

Test Engineer : Hank Huang, Kevin Xu, David Dai, Bin He

13. 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.

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

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 at 2mm

cDASY6 Mo dule 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 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	1.48	R	1.732	1	0.85
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					1.09
Expanded STD Uncertainty (95%)					**2.18**

PD Uncertainty Budget at 5mm

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

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

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

[7] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

[8] 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

[9] 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)

[10] 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

[11] SPEAG DASY System Handbook

[12] SPEAG DASY6 Application Note (Interim Procedures for Devices Operating at 6-10 GHz)

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