FCC WLAN 6GHz RF Exposure

Applicant	:	**Zebra Technologies Corporation**
Equipment	:	**Enterprise Mobile**
Brand Name	:	**Zebra**
Model Name	:	**EM45A2**
FCC ID	:	**UZ7EM45A2**
Standard	:	**FCC 47 CFR Part 2 (2.1093)**

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

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

Si Zhang

Approved by: Si Zhang

ilac-MRA A2LA ACCREDITED Cert #5145.02

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

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History of this test report

Report No.	Version	Description	Issued Date
FA460505C	01	Initial issue of report	Sep. 06, 2024
FA460505C	02	Updated WLAN6GHz tune up and relevant data in Section 10 and 12.1. This report is an updated version, replacing the report issued on Sep. 06, 2024.	Oct. 08, 2024

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Zebra Technologies Corporation, Enterprise Mobile, EM45A2**, are as follows.

Band	Tx Frequency (MHz)	Reported SAR			Measured APD			Scaled PD
		Head (1g SAR W/kg)	Body Worn (1g SAR W/kg)	Phablet (10g SAR W/kg)	Head (W/m^2)	Body Worn (W/m^2)	Phablet (W/m^2)	psPD (W/m^2)
WLAN 6GHz	5925-7125	0.98	0.22	0.33	4.33	1.33	5.12	7.41
Date of Testing:		2024/8/29 ~ 2024/8/30						

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

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

Applicant	
Company Name	Zebra Technologies Corporation
Address	3 Overlook Point, Lincolnshire, IL 60069 USA

Manufacturer	
Company Name	Zebra Technologies Corporation
Address	3 Overlook Point, Lincolnshire, IL 60069 USA

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
- 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 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- SPEAG DASY6 System Handbook
- SPEAG DASY6 Application Note (Interim Procedure for Device Operation at 6GHz-10GHz)

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Enterprise Mobile
Brand Name	Zebra
Model Name	EM45A2
FCC ID	UZ7EM45A2
IMEI Code	IMEI1: 352991990035176 IMEI2: 352991990035390
Wireless Technology and Frequency Range	WLAN 6GHz U-NII-5: 5925 MHz ~ 6425 MHz WLAN 6GHz U-NII-6: 6425 MHz ~ 6525 MHz WLAN 6GHz U-NII-7: 6525 MHz ~ 6875 MHz WLAN 6GHz U-NII-8: 6875 MHz ~ 7125 MHz
Mode	WLAN 6GHz 802.11a/ax HE20/HE40/HE80/HE160
HW Version	EV2.5
SW Version	13-32-08.00-TG-U06-STD-ATH-04
MFD	08AUG24
EUT Stage	Identical Prototype

Remark:

1. The device does not support UNII-8_CH233 (BW=20M, Center Frequency = 7115MHz).
2. The device supports 1S2T (CDD & Tx Beamforming) and 2S2T (SDM) mode; 1S2T: Nss=1, MIMO 2Tx; 2S2T: Nss=2, MIMO 2Tx.
3. The device implements receiver detect mechanism trigger reduced power for the power management for SAR compliance at different exposure conditions (head, body-worn, extremity) will manage to ensure the power level not exceeding the associated power table. Details about the power management decision and receiver detection are provided in the operational description.
4. For WLAN when transmit simultaneous with WWAN, power reduction will be activated to head exposure condition.
5. The device support DBS (Dual Band Simultaneous) function, when the device WLAN 2.4GHz and WLAN 5GHz or WLAN 6GHz transmit at the same time the device will limit different output power for simultaneous transmission compliance.
6. This device has one EM45 Protective Case that does not contain metal components and any electronic circuitry, it has no effect on RF exposure and does not require evaluation for SAR.

Specification of Accessory				
AC Adapter 1 (Type C Wall Charger 1)	**Brand Name**	Zebra	**Model**	SAWA-102-22520A
			Part Number	PWR-WUA5V45W1US
AC Adapter 2 (Type A Wall Charger 2)	**Brand Name**	Zebra	**Model**	SAWA-65-20005A
			Part Number	PWR-WUA5V12W0US
Battery 1	**Brand Name**	Zebra	**Model**	BT-000501
			Part Number	BT-000501-2000
Earphone 1 (Wired headset USB-C)	**Brand Name**	Zebra	**Part Number**	HDST-USBC-PTT1-01
Earphone 2 (Rugged Bluetooth Headset)	**Brand Name**	Zebra	**Part Number**	HS3100-OTH
Earphone 3 (3.5mm PTT Headset)	**Brand Name**	Zebra	**Part Number**	HDST-35MM-PTT1-02
Earphone 4 (Rugged Headset)	**Brand Name**	Zebra	**Part Number**	HS2100-OTH
3.5mm to 3.5mm audio connector	**Brand Name**	Zebra	**Part Number**	CBL-HS2100-3MS1-01
Type C-Audio Cable (Type C to 3.5mm)	**Brand Name**	Zebra	**Part Number**	ADP-USBC-35MM1-01
USB Cable 1 (USB-C to C Cable)	**Brand Name**	Zebra	**Part Number**	CBL-EC5X-USBC3A-01

USB Cable 2 (USB-A to C Cable)	**Brand Name**	Zebra	**Part Number**	CBL-TC5X-USBC2A-01
EM45 Protective Case	**Brand Name**	Zebra	**Part Number**	SG-EM45EXO1-01

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.

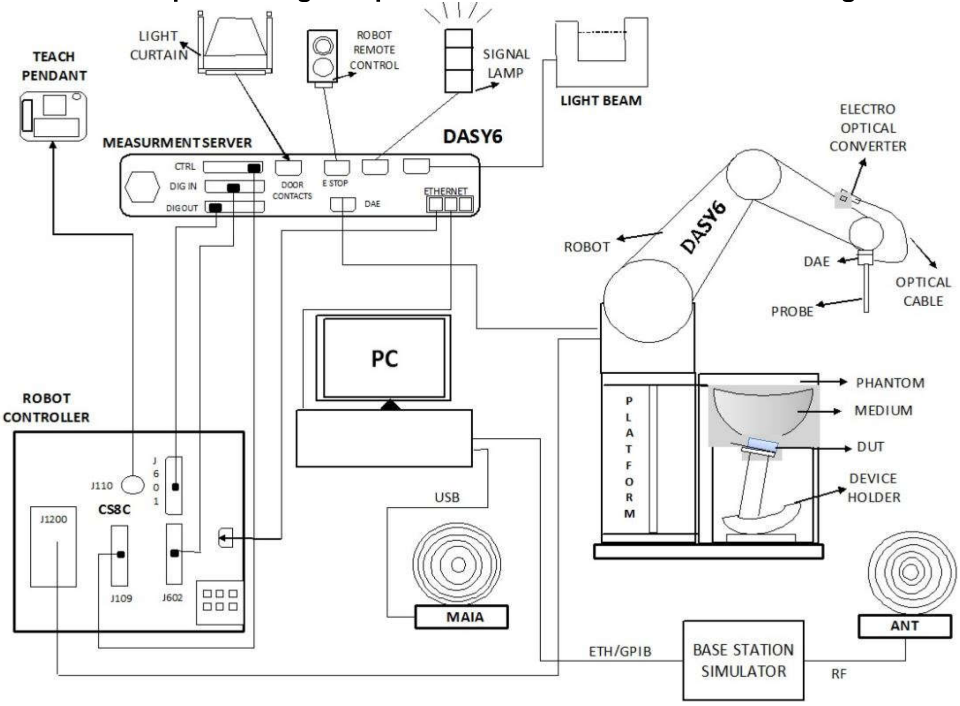
Peak Spatially Averaged Power Density was evaluated over a square area of $4cm^2$ per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes

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

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

6. 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[(1)] software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.
  Note: 1. DASY6 software used: DASY6 mmWave V3.0.0.841 and older generations and used the developed Plane-to-Plane Phase Reconstruction (PTP-PR) Algorithm which was used in PD measurement.

7. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	6500MHz System Validation Kit	D6.5GHzV2	1031	2023/2/22	2026/2/21
SPEAG	5G Verification Source	10GHz	2005	2023/11/20	2024/11/19
SPEAG	Data Acquisition Electronics	DAE4	1649	2024/7/3	2025/7/2
SPEAG	Data Acquisition Electronics	DAE4	1303	2023/11/20	2024/11/19
SPEAG	Dosimetric E-Field Probe	EX3DV4	7706	2024/1/24	2025/1/23
SPEAG	EUmmWV Probe Tip Protection	EUmmWV4	9553	2023/10/18	2024/10/17
SPEAG	SAM Twin Phantom	SAM Twin	TP-2024	NCR	NCR
SPEAG	mmWave Phantom	mmWave	1065	NCR	NCR
Testo	Thermo-Hygrometer	HTC-1	55009	2024/1/4	2025/1/3
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Rohde & Schwarz	Signal Generator	SMB100A	100455	2024/1/2	2025/1/1
Keysight	Preamplifier	83017A	MY57280106	2024/4/18	2025/4/17
Agilent	ENA Series Network Analyzer	E5071C	MY46112129	2024/7/4	2025/7/3
SPEAG	Dielectric Probe Kit	DAK-3.5	1071	2024/2/19	2025/2/18
Rohde & Schwarz	Power Meter	NRVD	102081	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRP50S	101385	2023/10/11	2024/10/10
Rohde & Schwarz	Power Sensor	NRV-Z5	100538	2024/7/4	2025/7/3
Rohde & Schwarz	Power Sensor	NRV-Z5	100539	2024/7/4	2025/7/3
Rohde & Schwarz	Spectrum Analyzer	FSV7	101631	2023/10/11	2024/10/10
TES	DIGITAC THERMOMETER	TYPE-K	220305411	2024/1/4	2025/1/3
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note 1	
mini-circuits	amplifier	ZVE-3W-83+	162601250	Note 1	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note 1	
Agilent	Dual Directional Coupler	778D	20500	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
MCL	Attenuation1	BW-S10W5+	N/A	Note 1	
MCL	Attenuation2	BW-S10W5+	N/A	Note 1	
MCL	Attenuation3	BW-S10W5+	N/A	Note 1	

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>

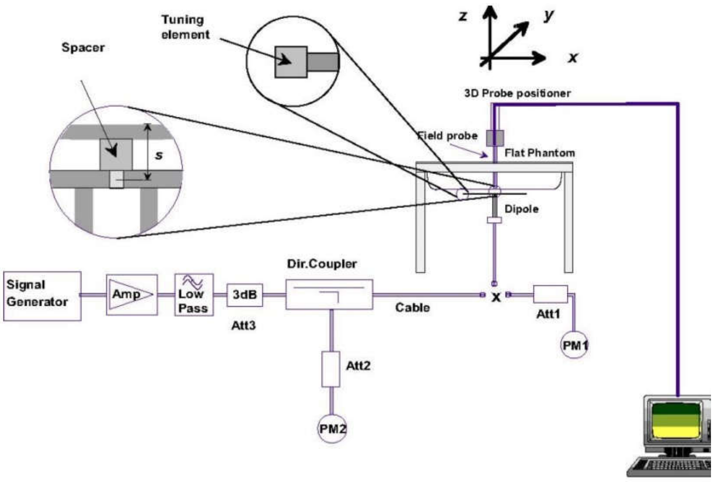
Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
6500	Head	22.8	6.16	34.6	6.07	34.50	1.48	0.29	±5	2024/8/29

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.

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 (%)
2024/8/29	6500	Head	50	1031	7706	1649	14.0	297.00	280	-5.72

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2024/8/29	6500	Head	50	1031	7706	1649	2.64	54.80	52.8	-3.65



System Performance Check Setup

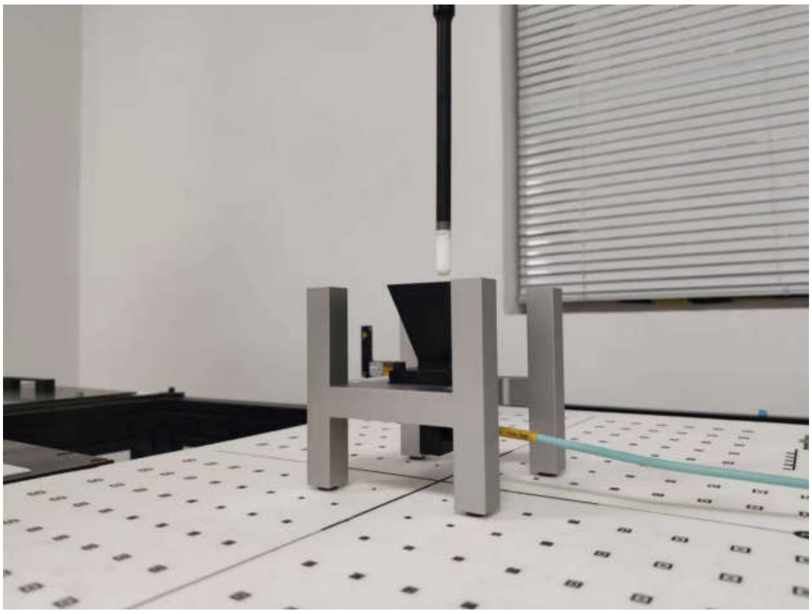
Setup Photo

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	Probe S/N	DAE S/N	Distance (mm)	Input Power (mW)	Measured 4 cm^2 (W/m^2)	Normalized(1) 4 cm^2 (W/m^2)	Targeted 4 cm^2 (W/m^2)	Deviation (dB)	Date
10	10GHz_2005	9553	1303	10	100	97.7	154.8	161	-0.17	2024/8/30

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



System Verification Setup Photo

9. RF Exposure Positions

9.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

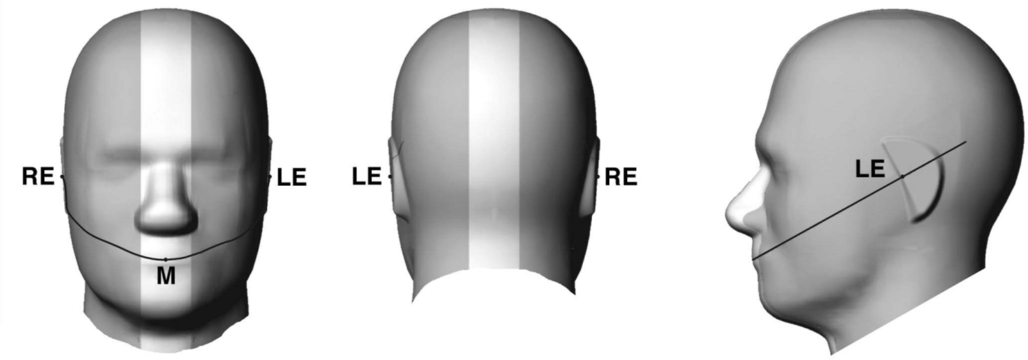


Fig 9.1.1 Front, back, and side views of SAM twin phantom

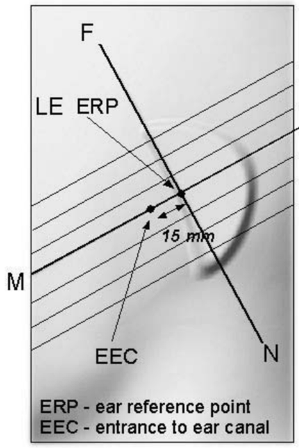


Fig 9.1.2 Close-up side view of phantom showing the ear region.

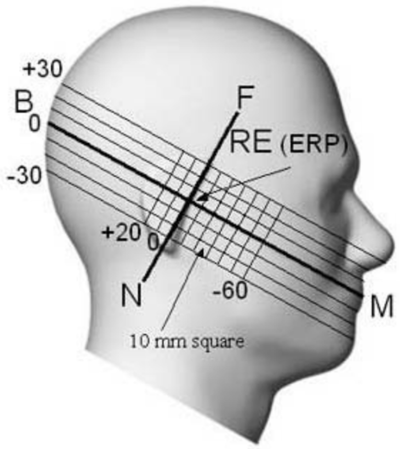


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

9.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

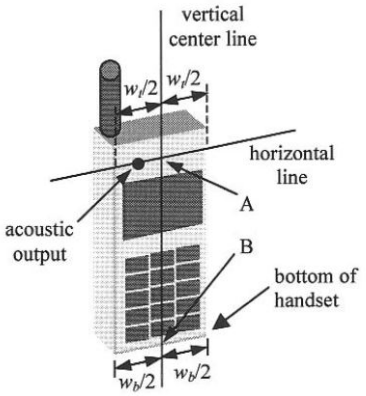


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

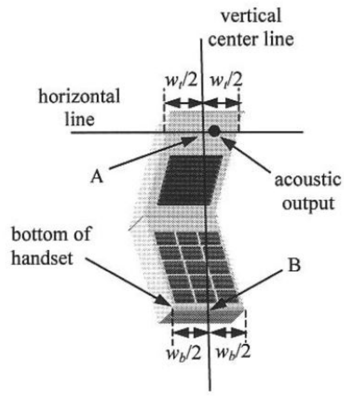


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

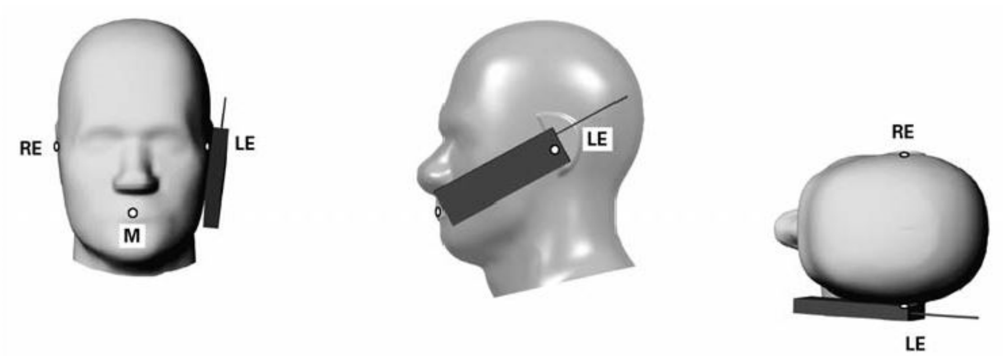


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

9.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

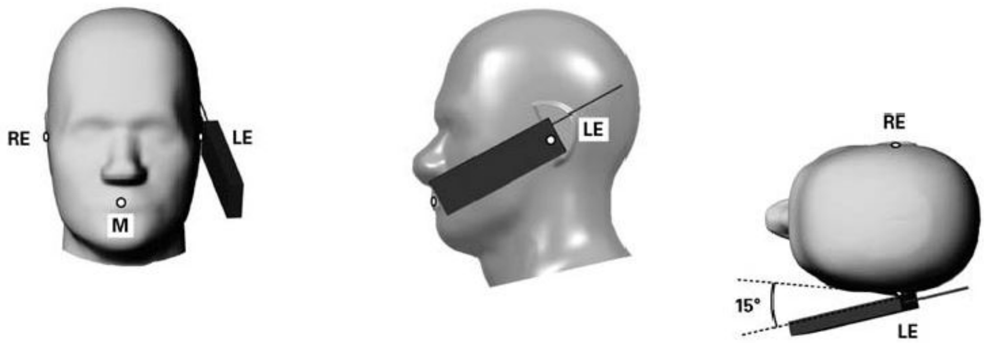


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

9.4 Body Worn Accessory

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

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

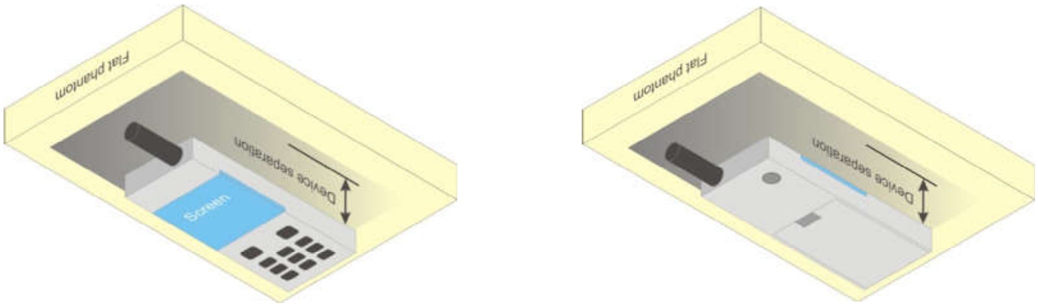


Fig 9.4 Body Worn Position

9.5 Product Specific/Extremity Exposure

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

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

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

9.6 Miscellaneous Testing Considerations

- Evaluate SAR using 6-7 GHz parameters per IEC/IEEE 62209-1528:2020.
- Per procedures of KDB Pubs. 447498 and 248227, and applicable product-specific procedures among KDB Pubs. 648474 (handsets/phablets).
- 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)

General Note:

1. The 6GHz WLAN can transmit in SISO/MIMO antenna mode, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, SAR and PD for MIMO was evaluated by making a measurement with both antennas transmitting simultaneously.
2. When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
3. 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)
4. In applying the test guidance, the IEEE 802.11 mode with the maximum output power (out of all modes) should be considered for testing
5. 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
6. 802.11 ax supports both full tone size mode and partial tone size mode, after verification on partial tone size mode that partial size tone mode power will not be higher than full tone size mode, therefore, full tone mode power was chosen to be measured in this report.
7. For WLAN SISO & MIMO(CDD) mode of 802.11a, and WLAN SISO mode is not greater than WLAN MIMO(CDD) mode, so conducted power of WLAN SISO mode is not required. For WLAN SISO & MIMO(CDD) & MIMO(SDM) & TX Beamforming mode of 802.11ax, and WLAN SISO & MIMO(CDD) & TX Beamforming mode is not greater than WLAN MIMO(SDM) mode, so conducted power of WLAN SISO & MIMO(CDD) &Tx Beamforming mode is not required.

<WiFi 6E> Standard Client

					Ant 8 For Default / Full Power Head Standalone Non DBS		Ant 10 For Default / Full Power Head Standalone Non DBS		Ant 8+10 For Default / Full Power Head Standalone Non DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	14.01	15.50	13.62	15.50	16.83	18.50	99.32
			45	6175	14.29	15.50	13.70	15.50	17.02	18.50	
			93	6415	13.80	15.50	13.19	15.00	16.52	18.30	
		802.11ax-HE20 MCS0	1	5955	13.97	15.50	13.58	15.50	16.79	18.50	100.00
			45	6175	14.23	15.50	13.62	15.50	16.95	18.50	
			93	6415	13.71	15.50	13.22	15.00	16.48	18.30	
		802.11ax-HE40 MCS0	3	5965	13.91	15.50	13.38	15.00	16.66	18.30	100.00
			43	6165	14.23	16.00	13.52	15.00	16.90	18.50	
			91	6405	13.77	15.50	12.99	14.50	16.41	18.00	
		802.11ax-HE80 MCS0	7	5985	13.86	15.50	13.06	15.00	16.49	18.30	100.00
			39	6145	14.16	16.00	13.49	15.00	16.85	18.50	
			87	6385	13.62	15.50	12.63	14.50	16.16	18.00	
		802.11ax-HE160 MCS0	15	6025	13.78	15.50	13.67	15.50	16.74	18.50	100.00
			47	6185	14.22	15.50	13.65	15.50	16.95	18.50	
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	13.80	15.50	13.27	15.00	16.56	18.30	99.32
			149	6695	13.56	15.50	13.49	15.00	16.54	18.30	
			181	6855	13.70	15.50	13.65	15.00	16.69	18.30	
		802.11ax-HE20 MCS0	117	6535	13.82	15.50	13.37	15.00	16.61	18.30	100.00
			149	6695	13.58	15.50	13.45	15.00	16.53	18.30	
			181	6855	13.62	15.50	13.54	15.00	16.59	18.30	
		802.11ax-HE40 MCS0	123	6565	13.74	15.50	13.27	15.00	16.52	18.30	100.00
			147	6685	13.65	15.50	13.22	15.00	16.45	18.30	
			179	6845	13.64	15.50	13.26	15.00	16.46	18.30	
		802.11ax-HE80 MCS0	135	6625	13.39	15.00	12.66	14.50	16.05	17.80	100.00
			151	6705	13.28	15.00	12.63	14.50	15.98	17.80	
			167	6785	13.62	15.50	13.21	15.00	16.43	18.30	
		802.11ax-HE160 MCS0	143	6665	13.68	15.50	13.12	15.00	16.42	18.30	100.00

					Ant 8 Body-Worn&Extremity Standalone Non DBS&Standalone DBS only&Simultaneous non DBS& Simultaneous DBS		Ant 10 Body-Worn&Extremity Standalone Non DBS&Standalone DBS only&Simultaneous non DBS& Simultaneous DBS		Ant 8+10 Body-Worn&Extremity Standalone Non DBS&Standalone DBS only&Simultaneous non DBS& Simultaneous DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	12.50	Not Required	12.50	Not Required	15.50	99.32
			45	6175		12.50		12.50		15.50	
			93	6415		12.50		12.50		15.50	
		802.11ax-HE20 MCS0	1	5955		12.50		12.50		15.50	100.00
			45	6175		12.50		12.50		15.50	
			93	6415		12.50		12.50		15.50	
		802.11ax-HE40 MCS0	3	5965		12.50		12.50		15.50	100.00
			43	6165		12.50		12.50		15.50	
			91	6405		12.50		12.50		15.50	
		802.11ax-HE80 MCS0	7	5985		12.50		12.50		15.50	100.00
			39	6145		12.50		12.50		15.50	
			87	6385		12.50		12.50		15.50	
		802.11ax-HE160 MCS0	15	6025	11.09	12.50	10.77	12.50	13.94	15.50	100.00
			47	6185	11.49	13.00	10.85	12.50	14.19	15.80	
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	12.50	Not Required	11.50	Not Required	15.00	99.32
			149	6695		12.50		11.50		15.00	
			181	6855		12.50		11.50		15.00	
		802.11ax-HE20 MCS0	117	6535		12.50		11.50		15.00	100.00
			149	6695		12.50		11.50		15.00	
			181	6855		12.50		11.50		15.00	
		802.11ax-HE40 MCS0	123	6565		12.50		11.50		15.00	100.00
			147	6685		12.50		11.50		15.00	
			179	6845		12.50		11.50		15.00	
		802.11ax-HE80 MCS0	135	6625		12.50		11.50		15.00	100.00
			151	6705		12.50		11.50		15.00	
			167	6785		12.50		11.50		15.00	
		802.11ax-HE160 MCS0	143	6665	10.78	12.50	9.94	11.50	13.39	15.00	100.00

				Ant 8 Head Standalone DBS only		Ant 10 Head Standalone DBS only		Ant 8+10 Head Standalone DBS only		
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	14.50	Not Required	14.00	Not Required	17.30	99.32
			45	6175		14.50		14.00		17.30	
			93	6415		14.50		14.00		17.30	
		802.11ax-HE20 MCS0	1	5955		14.50		14.00		17.30	100.00
			45	6175		14.50		14.00		17.30	
			93	6415		14.50		14.00		17.30	
		802.11ax-HE40 MCS0	3	5965		14.50		14.00		17.30	100.00
			43	6165		14.50		14.00		17.30	
			91	6405		14.50		14.00		17.30	
		802.11ax-HE80 MCS0	7	5985		14.50		14.00		17.30	100.00
			39	6145		14.50		14.00		17.30	
			87	6385		14.50		14.00		17.30	
		802.11ax-HE160 MCS0	15	6025	12.95	14.50	12.69	14.00	15.83	17.30	100.00
			47	6185	13.73	15.00	12.82	14.50	16.31	17.80	
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	13.50	Not Required	12.50	Not Required	16.00	99.32
			149	6695		13.50		12.50		16.00	
			181	6855		13.50		12.50		16.00	
		802.11ax-HE20 MCS0	117	6535		13.50		12.50		16.00	100.00
			149	6695		13.50		12.50		16.00	
			181	6855		13.50		12.50		16.00	
		802.11ax-HE40 MCS0	123	6565		13.50		12.50		16.00	100.00
			147	6685		13.50		12.50		16.00	
			179	6845		13.50		12.50		16.00	
		802.11ax-HE80 MCS0	135	6625		13.50		12.50		16.00	100.00
			151	6705		13.50		12.50		16.00	
			167	6785		13.50		12.50		16.00	
		802.11ax-HE160 MCS0	143	6665	11.85	13.50	10.92	12.50	14.42	16.00	100.00

					Ant 8 Head Simultaneous non DBS		Ant 10 Head Simultaneous non DBS		Ant 8+10 Head Simultaneous non DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	13.00	Not Required	13.00	Not Required	16.00	99.32
			45	6175		13.00		13.00		16.00	
			93	6415		13.00		13.00		16.00	
		802.11ax-HE20 MCS0	1	5955		13.00		13.00		16.00	100.00
			45	6175		13.00		13.00		16.00	
			93	6415		13.00		13.00		16.00	
		802.11ax-HE40 MCS0	3	5965		13.00		13.00		16.00	100.00
			43	6165		13.00		13.00		16.00	
			91	6405		13.00		13.00		16.00	
		802.11ax-HE80 MCS0	7	5985		13.00		13.00		16.00	100.00
			39	6145		13.00		13.00		16.00	
			87	6385		13.00		13.00		16.00	
		802.11ax-HE160 MCS0	15	6025	11.57	13.00	11.32	13.00	14.46	16.00	100.00
			47	6185	12.13	13.50	11.38	13.00	14.78	16.30	
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	11.50	Not Required	11.00	Not Required	14.30	99.32
			149	6695		11.50		11.00		14.30	
			181	6855		11.50		11.00		14.30	
		802.11ax-HE20 MCS0	117	6535		11.50		11.00		14.30	100.00
			149	6695		11.50		11.00		14.30	
			181	6855		11.50		11.00		14.30	
		802.11ax-HE40 MCS0	123	6565		11.50		11.00		14.30	100.00
			147	6685		11.50		11.00		14.30	
			179	6845		11.50		11.00		14.30	
		802.11ax-HE80 MCS0	135	6625		11.50		11.00		14.30	100.00
			151	6705		11.50		11.00		14.30	
			167	6785		11.50		11.00		14.30	
		802.11ax-HE160 MCS0	143	6665	10.26	11.50	9.37	11.00	12.85	14.30	100.00

					Ant 8 Head Simultaneous DBS		Ant 10 Head Simultaneous DBS		Ant 8+10 Head Simultaneous DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	10.00	Not Required	10.00	Not Required	13.00	99.32
			45	6175		10.00		10.00		13.00	
			93	6415		10.00		10.00		13.00	
		802.11ax-HE20 MCS0	1	5955		10.00		10.00		13.00	100.00
			45	6175		10.00		10.00		13.00	
			93	6415		10.00		10.00		13.00	
		802.11ax-HE40 MCS0	3	5965		10.00		10.00		13.00	100.00
			43	6165		10.00		10.00		13.00	
			91	6405		10.00		10.00		13.00	
		802.11ax-HE80 MCS0	7	5985		10.00		10.00		13.00	100.00
			39	6145		10.00		10.00		13.00	
			87	6385		10.00		10.00		13.00	
		802.11ax-HE160 MCS0	15	6025	8.79	10.00	8.42	10.00	11.62	13.00	100.00
			47	6185	9.38	11.00	8.51	10.00	11.98	13.50	
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	9.00	Not Required	8.00	Not Required	11.50	99.32
			149	6695		9.00		8.00		11.50	
			181	6855		9.00		8.00		11.50	
		802.11ax-HE20 MCS0	117	6535		9.00		8.00		11.50	100.00
			149	6695		9.00		8.00		11.50	
			181	6855		9.00		8.00		11.50	
		802.11ax-HE40 MCS0	123	6565		9.00		8.00		11.50	100.00
			147	6685		9.00		8.00		11.50	
			179	6845		9.00		8.00		11.50	
		802.11ax-HE80 MCS0	135	6625		9.00		8.00		11.50	100.00
			151	6705		9.00		8.00		11.50	
			167	6785		9.00		8.00		11.50	
		802.11ax-HE160 MCS0	143	6665	7.45	9.00	6.53	8.00	10.02	11.50	100.00

<WiFi 6E> Indoor Client

					Ant 8 Head Standalone Non DBS		Ant 10 Head Standalone Non DBS		Ant 8+10 Head Standalone Non DBS		
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Duty Cycle %
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	4.66	5.00	3.49	3.50	7.13	7.30	99.32
			45	6175	4.47	4.50	3.55	4.00	7.05	7.30	
			93	6415	2.58	3.00	2.13	2.50	5.37	5.80	
		802.11ax-HE20 MCS0	1	5955	8.05	8.50	7.01	7.50	10.57	11.00	100.00
			45	6175	8.28	8.50	6.95	7.50	10.68	11.00	
			93	6415	7.91	8.50	7.24	7.50	10.60	11.00	
		802.11ax-HE40 MCS0	3	5965	10.94	11.50	10.12	10.50	13.56	14.00	100.00
			43	6165	10.99	11.50	10.06	10.50	13.56	14.00	
			91	6405	10.62	11.50	10.28	10.50	13.46	14.00	
		802.11ax-HE80 MCS0	7	5985	13.86	14.00	13.06	13.50	16.49	16.80	100.00
			39	6145	13.69	14.00	12.45	13.00	16.12	16.50	
			87	6385	13.62	14.00	12.63	13.00	16.16	16.50	
		802.11ax-HE160 MCS0	15	6025	13.78	14.00	13.67	14.00	16.74	17.00	100.00
			47	6185	14.22	14.50	13.65	14.00	16.95	17.30	
	UNII 6 (6.425-6.525GHz)	802.11a 6Mbps	97	6435	4.25	4.50	3.78	4.00	7.03	7.30	99.32
			105	6475	5.05	5.50	4.14	4.50	7.63	8.00	
			113	6515	4.85	5.00	4.38	4.50	7.63	7.80	
		802.11ax-HE20 MCS0	97	6435	8.17	8.50	7.28	7.50	10.76	11.00	100.00
			105	6475	8.51	9.00	7.82	8.00	11.19	11.50	
			113	6515	8.11	8.50	7.28	7.50	10.73	11.00	
		802.11ax-HE40 MCS0	99	6445	11.21	11.50	10.41	10.50	13.84	14.00	100.00
			115	6525	9.97	10.00	9.14	9.50	12.59	12.80	
		802.11ax-HE80 MCS0	103	6465	13.69	14.00	12.99	13.00	16.36	16.50	100.00
			119	6545	13.19	13.50	12.22	12.50	15.74	16.00	
		802.11ax-HE160 MCS0	111	6505	13.77	14.00	13.14	13.50	16.48	16.80	100.00
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	3.61	4.00	3.22	3.50	6.43	6.80	99.32
			149	6695	3.11	3.50	3.03	3.50	6.08	6.50	
			181	6855	3.11	3.50	3.21	3.50	6.17	6.50	
		802.11ax-HE20 MCS0	117	6535	7.25	7.50	6.49	6.50	9.90	10.00	100.00
			149	6695	7.08	7.50	6.49	6.50	9.81	10.00	
			181	6855	6.94	7.00	6.62	7.00	9.79	10.00	
		802.11ax-HE40 MCS0	123	6565	10.14	10.50	9.27	9.50	12.74	13.00	100.00
			147	6685	9.73	10.00	9.53	10.00	12.64	13.00	
			179	6845	9.74	10.00	9.47	9.50	12.62	12.80	
		802.11ax-HE80 MCS0	135	6625	13.39	13.50	12.66	13.00	16.05	16.30	100.00
			151	6705	13.28	13.50	12.63	13.00	15.98	16.30	
			167	6785	13.06	13.50	12.42	13.00	15.76	16.30	
		802.11ax-HE160 MCS0	143	6665	13.68	14.00	13.12	13.50	16.42	16.80	100.00
	UNII 8 (6.885-7.125GHz)	802.11a 6Mbps	189	6895	2.31	2.50	2.40	2.50	5.37	5.50	100.00
			209	6995	2.45	2.50	2.17	2.50	5.32	5.50	
			229	7095	2.78	3.00	2.80	3.00	5.80	6.00	
			233	7115	2.38	2.50	2.37	2.50	5.39	5.50	
		802.11ax-HE20 MCS0	189	6895	5.89	6.00	6.31	6.50	9.12	9.30	100.00
			209	6995	6.17	6.50	5.77	6.00	8.98	9.30	
			229	7095	6.07	6.50	6.26	6.50	9.18	9.50	
			233	7115	-3.57	-3.50	-3.01	-2.50	-0.27	0.00	
		802.11ax-HE40 MCS0	187	6885	9.47	9.50	9.11	9.50	12.30	12.50	100.00
			203	6965	9.39	9.50	8.83	9.00	12.13	12.50	
			227	7085	9.42	9.50	9.37	9.50	12.41	12.50	

		802.11ax-HE80 MCS0	199	6945	13.06	13.50	12.59	13.00	15.84	16.30	100.00
			215	7025	11.71	12.00	11.18	11.50	14.46	14.80	
		802.11ax-HE160 MCS0	207	6985	13.91	14.00	13.67	14.00	16.80	17.00	100.00

					Ant 8 Body-Worn&Extremity Standalone Non DBS&Standalone DBS only&Simultaneous non DBS& Simultaneous DBS		Ant 10 Body-Worn&Extremity Standalone Non DBS&Standalone DBS only&Simultaneous non DBS& Simultaneous DBS		Ant 8+10 Body-Worn&Extremity Standalone Non DBS&Standalone DBS only&Simultaneous non DBS& Simultaneous DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	5.00	Not Required	3.50	Not Required	7.30	99.32
			45	6175		4.50		4.00		7.30	
			93	6415		3.00		2.50		5.80	
		802.11ax-HE20 MCS0	1	5955		8.50		7.50		11.00	100.00
			45	6175		8.50		7.50		11.00	
			93	6415		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	3	5965		11.50		10.50		14.00	100.00
			43	6165		11.50		10.50		14.00	
			91	6405		11.50		10.50		14.00	
		802.11ax-HE80 MCS0	7	5985		12.50		12.50		15.50	100.00
			39	6145		12.50		12.50		15.50	
			87	6385		12.50		12.50		15.50	
		802.11ax-HE160 MCS0	15	6025	11.09	12.50	10.77	12.50	13.94	15.50	100.00
			47	6185	11.49	13.00	10.85	12.50	14.19	15.80	
	UNII 6 (6.425-6.525GHz)	802.11a 6Mbps	97	6435	Not Required	4.50	Not Required	4.00	Not Required	7.30	99.32
			105	6475		5.50		4.50		8.00	
			113	6515		5.00		4.50		7.80	
		802.11ax-HE20 MCS0	97	6435		8.50		7.50		11.00	100.00
			105	6475		9.00		8.00		11.50	
			113	6515		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	99	6445		11.50		10.50		14.00	100.00
			115	6525		11.50		11.00		14.30	
		802.11ax-HE80 MCS0	103	6465		12.50		11.50		15.00	100.00
			119	6545		12.50		11.50		15.00	
		802.11ax-HE160 MCS0	111	6505	10.93	12.50	10.06	11.50	13.53	15.00	100.00
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	4.00	Not Required	3.50	Not Required	6.80	99.32
			149	6695		3.50		3.50		6.50	
			181	6855		3.50		3.50		6.50	
		802.11ax-HE20 MCS0	117	6535		7.50		6.50		10.00	100.00
			149	6695		7.50		6.50		10.00	
			181	6855		7.00		7.00		10.00	
		802.11ax-HE40 MCS0	123	6565		10.50		9.50		13.00	100.00
			147	6685		10.00		10.00		13.00	
			179	6845		10.00		9.50		12.80	
		802.11ax-HE80 MCS0	135	6625		12.50		11.50		15.00	100.00
			151	6705		12.50		11.50		15.00	
			167	6785		12.50		11.50		15.00	
		802.11ax-HE160 MCS0	143	6665	10.78	12.50	9.94	11.50	13.39	15.00	100.00
	UNII 8 (6.885-7.125GHz)	802.11a 6Mbps	189	6895	Not Required	2.50	Not Required	2.50	Not Required	5.50	100.00
			209	6995		2.50		2.50		5.50	
			229	7095		3.00		3.00		6.00	
			233	7115		2.50		2.50		5.50	
		802.11ax-HE20	189	6895		6.00		6.50		9.30	100.00

		MCS0	209	6995		6.50		6.00		9.30	
			229	7095		6.50		6.50		9.50	
			233	7115		-3.50		-2.50		0.00	
		802.11ax-HE40 MCS0	187	6885		9.50		9.50		12.50	100.00
			203	6965		9.50		9.00		12.50	
			227	7085		9.50		9.50		12.50	
		802.11ax-HE80 MCS0	199	6945		13.50		13.00		16.30	100.00
			215	7025		12.00		11.50		14.80	
		802.11ax-HE160 MCS0	207	6985	11.05	12.50	10.83	12.50	13.95	15.50	100.00

					Ant 8 Head Standalone DBS only		Ant 10 Head Standalone DBS only		Ant 8+10 Head Standalone DBS only		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	5.00	Not Required	3.50	Not Required	7.30	99.32
			45	6175		4.50		4.00		7.30	
			93	6415		3.00		2.50		5.80	
		802.11ax-HE20 MCS0	1	5955		8.50		7.50		11.00	100.00
			45	6175		8.50		7.50		11.00	
			93	6415		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	3	5965		11.50		10.50		14.00	100.00
			43	6165		11.50		10.50		14.00	
			91	6405		11.50		10.50		14.00	
		802.11ax-HE80 MCS0	7	5985		14.00		13.50		16.80	100.00
			39	6145		14.00		13.00		16.50	
			87	6385		14.00		13.00		16.50	
		802.11ax-HE160 MCS0	15	6025		14.00		14.00		17.00	100.00
			47	6185		14.50		14.00		17.30	
	UNII 6 (6.425-6.525GHz)	802.11a 6Mbps	97	6435		4.50		4.00		7.30	99.32
			105	6475		5.50		4.50		8.00	
			113	6515		5.00		4.50		7.80	
		802.11ax-HE20 MCS0	97	6435		8.50		7.50		11.00	100.00
			105	6475		9.00		8.00		11.50	
			113	6515		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	99	6445		11.50		10.50		14.00	100.00
			115	6525		10.00		9.50		12.80	
		802.11ax-HE80 MCS0	103	6465		14.00		13.00		16.50	100.00
			119	6545		13.50		12.50		16.00	
		802.11ax-HE160 MCS0	111	6505	13.77	14.00	12.76	13.50	16.31	16.80	100.00
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	4.00	Not Required	3.50	Not Required	6.80	99.32
			149	6695		3.50		3.50		6.50	
			181	6855		3.50		3.50		6.50	
		802.11ax-HE20 MCS0	117	6535		7.50		6.50		10.00	100.00
			149	6695		7.50		6.50		10.00	
			181	6855		7.00		7.00		10.00	
		802.11ax-HE40 MCS0	123	6565		10.50		9.50		13.00	100.00
			147	6685		10.00		10.00		13.00	
			179	6845		10.00		9.50		12.80	
		802.11ax-HE80 MCS0	135	6625		13.50		12.50		16.00	100.00
			151	6705		13.50		12.50		16.00	
			167	6785		13.50		12.50		16.00	
		802.11ax-HE160 MCS0	143	6665		13.50		12.50		16.00	100.00
	UNII 8	802.11a 6Mbps	189	6895		2.50		2.50		5.50	100.00

	(6.885-7.125GHz)		209	6995		2.50		2.50		5.50	
			229	7095		3.00		3.00		6.00	
			233	7115		2.50		2.50		5.50	
		802.11ax-HE20 MCS0	189	6895		6.00		6.50		9.30	100.00
			209	6995		6.50		6.00		9.30	
			229	7095		6.50		6.50		9.50	
			233	7115		-3.50		-2.50		0.00	
		802.11ax-HE40 MCS0	187	6885		9.50		9.50		12.50	100.00
			203	6965		9.50		9.00		12.50	
			227	7085		9.50		9.50		12.50	
		802.11ax-HE80 MCS0	199	6945		13.50		13.00		16.30	100.00
			215	7025		12.00		11.50		14.80	
		802.11ax-HE160 MCS0	207	6985	12.23	13.50	11.59	13.00	14.93	16.30	100.00

					Ant 8 Head Simultaneous non DBS		Ant 10 Head Simultaneous non DBS		Ant 8+10 Head Simultaneous non DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	5.00	Not Required	3.50	Not Required	7.30	99.32
			45	6175		4.50		4.00		7.30	
			93	6415		3.00		2.50		5.80	
		802.11ax-HE20 MCS0	1	5955		8.50		7.50		11.00	100.00
			45	6175		8.50		7.50		11.00	
			93	6415		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	3	5965		11.50		10.50		14.00	100.00
			43	6165		11.50		10.50		14.00	
			91	6405		11.50		10.50		14.00	
		802.11ax-HE80 MCS0	7	5985		13.00		13.00		16.00	100.00
			39	6145		13.00		13.00		16.00	
			87	6385		13.00		13.00		16.00	
		802.11ax-HE160 MCS0	15	6025		13.00		13.00		16.00	100.00
			47	6185		13.50		13.00		16.30	
	UNII 6 (6.425-6.525GHz)	802.11a 6Mbps	97	6435		4.50		4.00		7.30	99.32
			105	6475		5.50		4.50		8.00	
			113	6515		5.00		4.50		7.80	
		802.11ax-HE20 MCS0	97	6435		8.50		7.50		11.00	100.00
			105	6475		9.00		8.00		11.50	
			113	6515		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	99	6445		11.50		10.50		14.00	100.00
			115	6525		10.00		9.50		12.80	
		802.11ax-HE80 MCS0	103	6465		13.50		13.00		16.30	100.00
			119	6545		13.50		12.50		16.00	
		802.11ax-HE160 MCS0	111	6505	12.11	13.50	11.47	13.00	14.81	16.30	100.00
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	4.00	Not Required	3.50	Not Required	6.80	99.32
			149	6695		3.50		3.50		6.50	
			181	6855		3.50		3.50		6.50	
		802.11ax-HE20 MCS0	117	6535		7.50		6.50		10.00	100.00
			149	6695		7.50		6.50		10.00	
			181	6855		7.00		7.00		10.00	
		802.11ax-HE40 MCS0	123	6565		10.50		9.50		13.00	100.00
			147	6685		10.00		10.00		13.00	
			179	6845		10.00		9.50		12.80	
		802.11ax-HE80 MCS0	135	6625		11.50		11.00		14.30	100.00
			151	6705		11.50		11.00		14.30	

			167	6785		11.50		11.00		14.30	
		802.11ax-HE160 MCS0	143	6665		11.50		11.00		14.30	100.00
	UNII 8 (6.885-7.125GHz)	802.11a 6Mbps	189	6895		2.50		2.50		5.50	100.00
			209	6995		2.50		2.50		5.50	
			229	7095		3.00		3.00		6.00	
			233	7115		2.50		2.50		5.50	
		802.11ax-HE20 MCS0	189	6895		6.00		6.50		9.30	100.00
			209	6995		6.50		6.00		9.30	
			229	7095		6.50		6.50		9.50	
			233	7115		-3.50		-2.50		0.00	
		802.11ax-HE40 MCS0	187	6885		9.50		9.50		12.50	100.00
			203	6965		9.50		9.00		12.50	
			227	7085		9.50		9.50		12.50	
		802.11ax-HE80 MCS0	199	6945		12.50		11.50		15.00	100.00
			215	7025		12.00		11.50		14.80	
		802.11ax-HE160 MCS0	207	6985	10.88	12.50	9.98	11.50	13.46	15.00	100.00

					Ant 8 Head Simultaneous DBS		Ant 10 Head Simultaneous DBS		Ant 8+10 Head Simultaneous DBS		Duty Cycle %
	Band	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	Average power (dBm)	Tune-Up Limit	
WiFi 6E	UNII 5 (5.925-6.425GHz)	802.11a 6Mbps	1	5955	Not Required	5.00	Not Required	3.50	Not Required	7.30	99.32
			45	6175		4.50		4.00		7.30	
			93	6415		3.00		2.50		5.80	
		802.11ax-HE20 MCS0	1	5955		8.50		7.50		11.00	100.00
			45	6175		8.50		7.50		11.00	
			93	6415		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	3	5965		10.00		10.00		13.00	100.00
			43	6165		10.00		10.00		13.00	
			91	6405		10.00		10.00		13.00	
		802.11ax-HE80 MCS0	7	5985		10.00		10.00		13.00	100.00
			39	6145		10.00		10.00		13.00	
			87	6385		10.00		10.00		13.00	
		802.11ax-HE160 MCS0	15	6025		10.00		10.00		13.00	100.00
			47	6185		11.00		10.00		13.50	
	UNII 6 (6.425-6.525GHz)	802.11a 6Mbps	97	6435		4.50		4.00		7.30	99.32
			105	6475		5.50		4.50		8.00	
			113	6515		5.00		4.50		7.80	
		802.11ax-HE20 MCS0	97	6435		8.50		7.50		11.00	100.00
			105	6475		9.00		8.00		11.50	
			113	6515		8.50		7.50		11.00	
		802.11ax-HE40 MCS0	99	6445		11.00		10.00		13.50	100.00
			115	6525		10.00		10.00		12.80	
		802.11ax-HE80 MCS0	103	6465		11.00		10.00		13.50	100.00
			119	6545		11.00		10.00		13.50	
		802.11ax-HE160 MCS0	111	6505	9.45	11.00	8.56	10.00	12.04	13.50	100.00
	UNII 7 (6.525-6.885GHz)	802.11a 6Mbps	117	6535	Not Required	4.00	Not Required	3.50	Not Required	6.80	99.32
			149	6695		3.50		3.50		6.50	
			181	6855		3.50		3.50		6.50	
		802.11ax-HE20 MCS0	117	6535		7.50		6.50		10.00	100.00
			149	6695		7.50		6.50		10.00	
			181	6855		7.00		7.00		10.00	
		802.11ax-HE40	123	6565		9.00		8.00		11.50	100.00

		MCS0	147	6685		9.00		8.00		11.50	
			179	6845		9.00		8.00		11.50	
		802.11ax-HE80 MCS0	135	6625		9.00		8.00		11.50	100.00
			151	6705		9.00		8.00		11.50	
			167	6785		9.00		8.00		11.50	
		802.11ax-HE160 MCS0	143	6665		9.00		8.00		11.50	100.00
	UNII 8 (6.885-7.125GHz)	802.11a 6Mbps	189	6895		2.50		2.50		5.50	100.00
			209	6995		2.50		2.50		5.50	
			229	7095		3.00		3.00		6.00	
			233	7115		2.50		2.50		5.50	
		802.11ax-HE20 MCS0	189	6895		6.00		6.50		9.30	100.00
			209	6995		6.50		6.00		9.30	
			229	7095		6.50		6.50		9.50	
			233	7115		-3.50		-2.50		0.00	
		802.11ax-HE40 MCS0	187	6885		9.50		8.50		12.00	100.00
			203	6965		9.50		8.50		12.00	
			227	7085		9.50		8.50		12.00	
		802.11ax-HE80 MCS0	199	6945		9.50		8.50		12.00	100.00
			215	7025		9.50		8.50		12.00	
		802.11ax-HE160 MCS0	207	6985	7.99	9.50	6.95	8.50	10.51	12.00	100.00

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. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. Per KDB648474 D04v01r03, this device is considered a phablet since the display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm. Therefore, phablet SAR tests are required when wireless mode does not apply or if wireless router 1g SAR >1.2W/kg
6. SAR is not required because the distance from the antenna to the edge is > 25 mm as per KDB447498 D01v06.
7. For WLAN 6GHz doesn’t support wireless router capability.
8. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors.
9. Per October 2020 TCB Workshop Interim procedures, start instead with a minimum of 5 test channels across the full band, then adapt and apply conducted power and SAR test reduction procedures of KDB Pub. 248227 v02r02.
10. For testing the WIFI 6 GHz of this DUT, the selection of test channels was based on FCC guidance, with five channels selected across the entire WIFI 6 GHz Bands. For the U-NII-5/U-NII-7 band supporting Standard AP mode and indoor Client mode, the higher output mode was measured among the selected channels.
11. For WLAN SISO & MIMO(CDD) mode of 802.11a, and WLAN SISO mode is not greater than WLAN MIMO(CDD) mode; For WLAN SISO & MIMO(CDD) & MIMO(SDM) & TX Beamforming mode of 802.11ax, and WLAN SISO & MIMO(CDD) & TX Beamforming mode is not greater than WLAN SISO & MIMO(SDM) mode, so WLAN MIMO(SDM) mode SAR covers WLAN SISO & MIMO(CDD) &Tx Beamforming mode SAR.
12. For determination of the scaling factor for report SAR of MIMO mode, if the hot spots are separated the scaling factors are individually determined from each transmit chain. Further simplification chose the worse SAR value and the worst scaling factor from each transmit chain perform reported SAR calculation conservatively. If the hot spots are not spatially separated, the scaling factor is determined from the worst number of each transmit chain.
13. Absorbed power density (APD) using a 4cm^2 averaging area is reported based on SAR measurements.
14. 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.: FA460505.

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. The 6GHz WLAN can transmit in SISO/MIMO antenna mode, for SISO mode power is less than per chain power of MIMO mode. For WLAN SISO & MIMO mode, the whole testing has assessed only MIMO mode by referring to their higher conducted power, so only chose MIMO power to perform SAR testing. Per KDB 248227, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB 447498 by making a SAR measurement with both antennas transmitting simultaneously.
4. During SAR testing the WLAN 6GHz transmission was verified using a spectrum analyzer.
5. 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.
6. When multiple transmission modes (802.11a/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 802.11ax.

12.1 Head SAR Test Result

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Measured APD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Right Cheek	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	13.65	15.50	1.531	100	1.000	0.03	0.348	0.533	2.79
	WLAN6GHz	802.11ax-HE160 MCS0	Right Tilted	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	13.65	15.50	1.531	100	1.000	0.06	0.441	0.675	3.53
01	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	13.65	15.50	1.531	100	1.000	-0.12	0.639	0.978	4.33
	WLAN6GHz	802.11ax-HE160 MCS0	Left Tilted	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	13.65	15.50	1.531	100	1.000	0.03	0.516	0.790	3.55
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone Non DBS	15	6025	13.67	15.50	1.524	100	1.000	0.09	0.552	0.841	3.97
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone Non DBS	111	6505	13.14	13.50	1.086	100	1.000	0.01	0.411	0.447	2.68
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone Non DBS	143	6665	13.12	15.00	1.542	100	1.000	0.07	0.433	0.668	2.65
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Standalone Non DBS	207	6985	13.67	14.00	1.079	100	1.000	-0.17	0.608	0.656	3.93
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Standalone DBS only	15	6025	12.95	14.50	1.429	100	1.000	0.08	0.348	0.497	2.39
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone DBS only	47	6185	12.82	14.50	1.472	100	1.000	0.01	0.385	0.567	2.63
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone DBS only	111	6505	12.76	13.50	1.186	100	1.000	-0.08	0.290	0.344	1.9
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Standalone DBS only	143	6665	11.85	13.50	1.462	100	1.000	0.03	0.318	0.465	2.08
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Standalone DBS only	207	6985	11.59	13.00	1.384	100	1.000	-0.08	0.379	0.524	2.47
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Simultaneous non DBS	15	6025	11.32	13.00	1.472	100	1.000	0.1	0.258	0.380	1.77
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Simultaneous non DBS	47	6185	11.38	13.00	1.452	100	1.000	-0.18	0.263	0.382	1.96
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Simultaneous non DBS	111	6505	11.47	13.00	1.422	100	1.000	0.12	0.220	0.313	1.44
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Simultaneous non DBS	143	6665	9.37	11.00	1.455	100	1.000	0.1	0.228	0.332	1.49
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Simultaneous non DBS	207	6985	10.88	12.50	1.452	100	1.000	0.08	0.261	0.379	1.83
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Simultaneous DBS	15	6025	8.42	10.00	1.439	100	1.000	-0.17	0.128	0.184	0.881
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Simultaneous DBS	47	6185	9.38	11.00	1.452	100	1.000	-0.03	0.136	0.197	0.998
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Simultaneous DBS	111	6505	9.45	11.00	1.429	100	1.000	0.11	0.107	0.153	0.704
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(8)	Simultaneous DBS	143	6665	7.45	9.00	1.429	100	1.000	0.14	0.114	0.163	0.749
	WLAN6GHz	802.11ax-HE160 MCS0	Left Cheek	0mm	Ant 8+10(10)	Simultaneous DBS	207	6985	6.95	8.50	1.429	100	1.000	-0.05	0.131	0.187	0.921

12.2 Body Worn SAR Test Result

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Measured APD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Front	15mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	0.04	0.043	0.063	0.397
	WLAN6GHz	802.11ax-HE160 MCS0	Back	15mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	0.02	0.121	0.177	1.09
	WLAN6GHz	802.11ax-HE160 MCS0	Back	15mm	Ant 8+10(10)	Standalone Non DBS	15	6025	10.77	12.50	1.489	100	1.000	0.01	0.140	0.209	1.25
	WLAN6GHz	802.11ax-HE160 MCS0	Back	15mm	Ant 8+10(8)	Standalone Non DBS	111	6505	10.93	12.50	1.435	100	1.000	-0.05	0.130	0.187	1.16
	WLAN6GHz	802.11ax-HE160 MCS0	Back	15mm	Ant 8+10(8)	Standalone Non DBS	143	6665	10.78	12.50	1.486	100	1.000	0.01	0.139	0.207	1.21
02	WLAN6GHz	802.11ax-HE160 MCS0	Back	15mm	Ant 8+10(10)	Standalone Non DBS	207	6985	10.83	12.50	1.469	100	1.000	0.02	0.147	**0.216**	**1.33**

12.3 Product Specific SAR Test Result

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	Measured APD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Front	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	-0.15	0.088	0.129	2.46
03	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 8+10(10)	Standalone Non DBS	15	6025	10.77	12.50	1.489	100	1.000	-0.15	0.224	**0.334**	**5.12**
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	0.11	0.178	0.260	4.06
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 8+10(8)	Standalone Non DBS	111	6505	10.93	12.50	1.435	100	1.000	-0.08	0.109	0.156	2.55
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 8+10(8)	Standalone Non DBS	143	6665	10.78	12.50	1.486	100	1.000	-0.17	0.115	0.171	2.37
	WLAN6GHz	802.11ax-HE160 MCS0	Back	0mm	Ant 8+10(10)	Standalone Non DBS	207	6985	10.83	12.50	1.469	100	1.000	-0.08	0.134	0.197	3.09
	WLAN6GHz	802.11ax-HE160 MCS0	Left Side	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	-0.08	0.016	0.023	0.372
	WLAN6GHz	802.11ax-HE160 MCS0	Right Side	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	-0.04	0.072	0.105	1.63
	WLAN6GHz	802.11ax-HE160 MCS0	Top Side	0mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	0.17	0.161	0.235	3.59

12.4 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. Batteries are fully charged at the beginning of the measurements.
3. Absorbed power density (APD) using a 4cm^2 averaging area is reported based on SAR measurements.
4. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools.
6. Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.68 dB (85.4%) was used to determine the psPD measurement scaling factor.
7. Per April 2021 TCB Workshop, For the highest SAR test configurations also measure incident PD (total) using power-density reconstruction method in 2 mm closest measurement plane.
8. Since this device is considered a phablet and there is no different PD limit on different exposure conditions, therefore select highest phablet 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 Head exposure conditions (Front) at head power level and other exposure conditions at body power level of Phone respectively.
9. IPD is measured for all edges and surfaces of the device with a transmitting antenna located within 25 mm from that surface or edge.
10. Per October 2020 TCB Workshop, PTP-PR algorithm was used during psPD measurement and calculations.
11. The measurement procedure consists of measuring the PDinc at two different distances: 2 mm (compliance distance) and λ/5. The grid extents should be large enough to fully capture the transmitted energy. The grid step should be fine enough to demonstrate that the integrated Power Density iPDn fulfill the criterion described below. Since iPD ratio between the two distances is≥ -1dB, the grid step (0.0625) was sufficient for determining compliance at d=2mm.

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

<WLAN PD>

Band	Mode	Test Position	Gap (mm)	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Grid Step (λ)	iPDn	iPD ratio (≥ -1)	Normal psPD (W/m^2)	Total psPD (W/m^2)
WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(10)	15	6025	10.77	0.0625	3.08	-0.76	2.650	2.990
WLAN6GHz	802.11ax-HE160 MCS0	Back	8.59mm	Ant 8+10(10)	15	6025	10.77	0.15	3.67		1.6	1.68
WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(10)	207	6985	10.83	0.0625	3.83	-0.36	2.34	2.86
WLAN6GHz	802.11ax-HE160 MCS0	Back	10mm	Ant 8+10(10)	207	6985	10.83	0.15	4.16		1.82	1.89

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Grid Step (λ)	Scaling Factor for measurement uncertainty	Power Drift (dB)	Normal psPD (W/m^2)	Scaled Normal psPD (W/m^2)	Total psPD (W/m^2)	Scaled Total psPD (W/m^2)
	WLAN6GHz	802.11ax-HE160 MCS0	Front	2mm	Ant 8+10(10)	Standalone Non DBS	47	6185	13.65	15.50	1.531	100	1.000	0.0625	1.5535	-0.03	2.230	5.30	2.980	7.09
	WLAN6GHz	802.11ax-HE160 MCS0	Front	2mm	Ant 8+10(10)	Standalone Non DBS	47	6185	10.85	12.50	1.462	100	1.000	0.0625	1.5535	0.09	1.060	2.41	1.370	3.11
	WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(10)	Standalone Non DBS	47	6025	10.85	12.50	1.462	100	1.000	0.0625	1.5535	0.02	1.890	4.29	2.730	6.20
	WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(10)	Standalone Non DBS	15	6025	10.77	12.50	1.489	100	1.000	0.0625	1.5535	-0.09	2.000	4.63	2.930	6.78
	WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(8)	Standalone Non DBS	111	6505	10.93	12.50	1.435	100	1.000	0.0625	1.5535	0.05	2.230	4.97	3.130	6.98
01	WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(8)	Standalone Non DBS	143	6665	10.78	12.50	1.486	100	1.000	0.0625	1.5535	0.15	2.460	5.68	3.210	7.41
	WLAN6GHz	802.11ax-HE160 MCS0	Back	2mm	Ant 8+10(10)	Standalone Non DBS	207	6985	10.83	12.50	1.469	100	1.000	0.0625	1.5535	0.11	2.430	5.55	2.970	6.78
	WLAN6GHz	802.11ax-HE160 MCS0	Right Side	2mm	Ant 8+10(10)	Standalone Non DBS	47	6025	10.85	12.50	1.462	100	1.000	0.0625	1.5535	-0.08	1.430	3.25	1.350	3.07
	WLAN6GHz	802.11ax-HE160 MCS0	Top Side	2mm	Ant 8+10(10)	Standalone Non DBS	47	6025	10.85	12.50	1.462	100	1.000	0.0625	1.5535	0.02	1.310	2.98	1.520	3.45

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

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

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 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, 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] IEC 62479:2010 Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

[11] IEC TR 63170: 2018 Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz

[12] SPEAG DASY System Handbook

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

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

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Date: 2024-08-29

System Check_Head_6500MHz

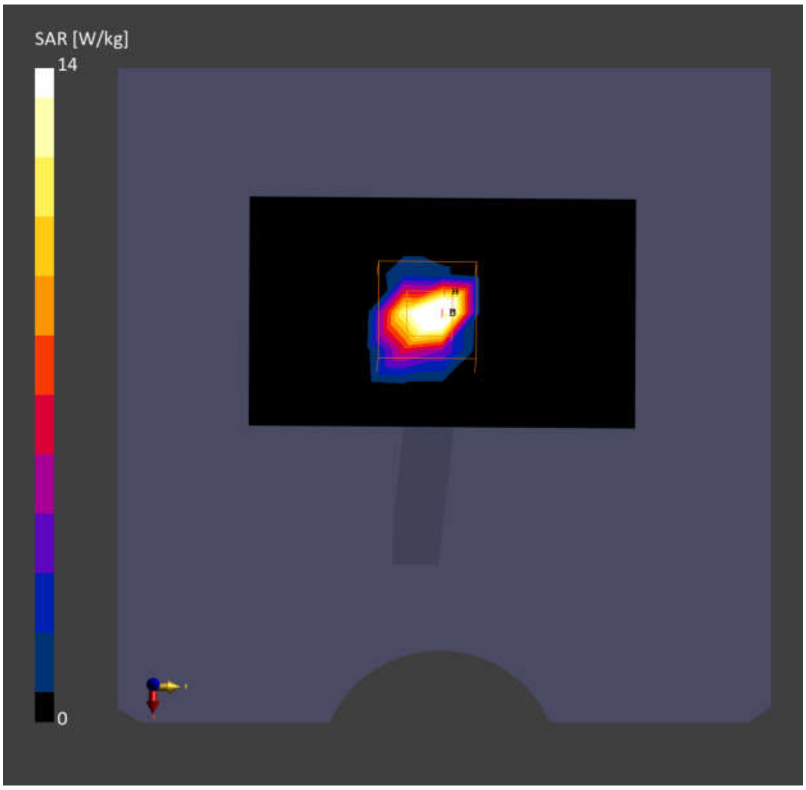
DUT: D6.5GHzV2 - SN1031

Communication System: CW; Frequency: 6500.000 MHz; Duty Cycle: 1:1
Medium: HSL Medium parameters used: f= 6500.000 MHz; σ= 6.16 S/m; ε_r = 34.6
Ambient Temperature: 23.3°C; Liquid Temperature: 22.8°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7706; ConvF(5.27, 6.32, 5.24); Calibrated: 2024-01-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1649; Calibrated: 2024-07-03
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2024; Section: Flat
- Measurement Software: 16.4.0.5005

Area Scan (51.0 mm x 85.0 mm): Measurement Grid: 8.5 mm x 8.5 mm
SAR (1g) = 11.9 W/kg; SAR (10g) = 2.52 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 3.4 mm x 3.4 mm x 1.4 mm
Power Drift = 0.04 dB
SAR (1g) = 14.0 W/kg; SAR (10g) = 2.64 W/kg
Smallest distance from peaks to all points 3 dB below = 4.4 mm
Ratio of SAR at M2 to SAR at M1 = 53.7 %
psAPD (4.0cm2, sq) = 63.8 [W/m2]



Measurement Report for Source 10G, FRONT, Validation band, CW, Channel 10000 (10000.0 MHz)

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Source 10G,	100.0 x 100.0 x 105.0		Source

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	FRONT, 10.00	Validation band	CW, 0--	10000.0, 10000	1.0

Hardware Setup

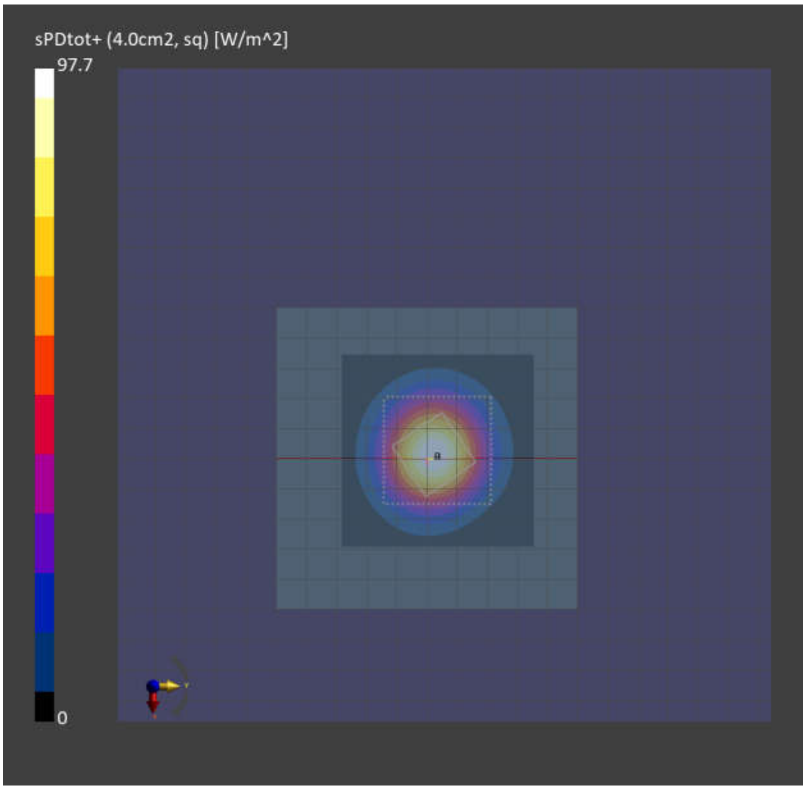
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - 1065	Air -	EUmmWV4 - SN9553_F1-55GHz, 2023-10-18	DAE4 Sn1303, 2023-11-20

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	60.0 x 60.0
Grid Steps [lambda]	0.125 x 0.125
Sensor Surface [mm]	10.0
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2024-08-30
Avg. Area [cm^2]	4.00
psPDn+ [W/m^2]	97.0
psPDtot+ [W/m^2]	97.7
psPDmod+ [W/m^2]	101
E_{max} [V/m]	238
Power Drift [dB]	0.01



Appendix B. Plots of SAR and PD Measurement

The plots are shown as follows.

Date: 2024-08-29

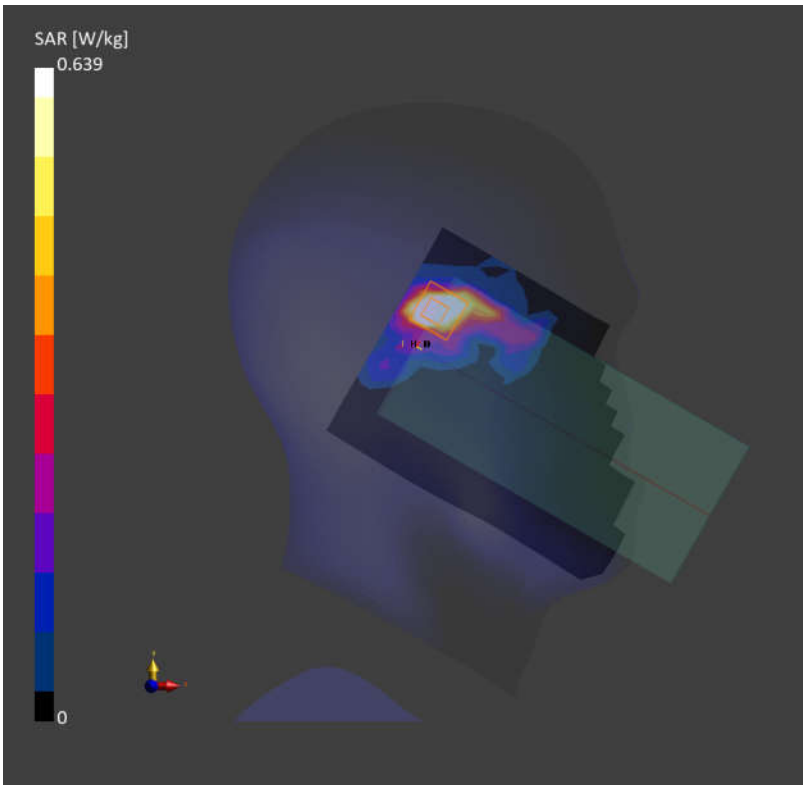
01_WLAN6GHz_802.11ax-HE160 MCS0_Left Cheek_0mm_Ch47

Communication System: IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)
Frequency: 6185.000MHz; Duty Cycle: 1:1
Medium: HSL Medium parameters used: f= 6185.000 MHz; σ= 5.77 S/m; ε_r = 35.1
Ambient Temperature: 23.5°C; Liquid Temperature: 22.5°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7706; ConvF(5.27, 6.32, 5.24); Calibrated: 2024-01-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1649; Calibrated: 2024-07-03
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2024; Section: LeftHead
- Measurement Software: 16.4.0.5005
- UID: WLAN, 10743-AAC

Area Scan (119.0 mm x 204.0 mm): Measurement Grid: 8.5 mm x 8.5 mm
SAR (1g) = 0.563 W/kg; SAR (10g) = 0.206 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 3.4 mm x 3.4 mm x 1.4 mm
Power Drift = -0.12 dB
SAR (1g) = 0.639 W/kg; SAR (10g) = 0.209 W/kg
Smallest distance from peaks to all points 3 dB below = 5.0 mm
Ratio of SAR at M2 to SAR at M1 = 56.7 %
psAPD (4.0cm2, sq) = 4.33 [W/m2]



Date: 2024-08-29

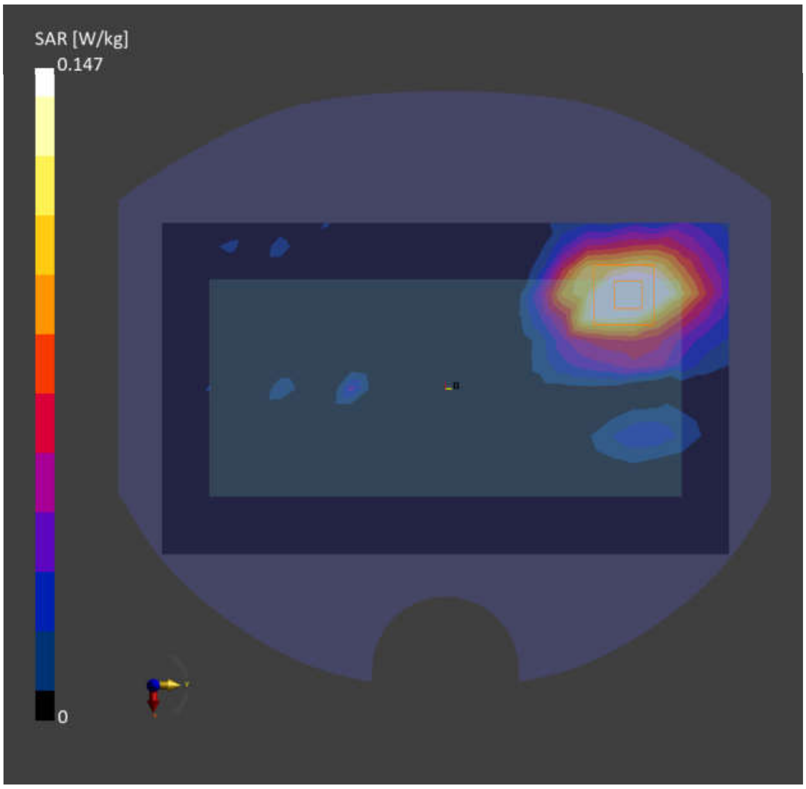
02_WLAN6GHz_802.11ax-HE160 MCS0_Back_15mm_Ch207

Communication System: IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)
Frequency: 6985.000MHz; Duty Cycle: 1:1
Medium: HSL Medium parameters used: f= 6985.000 MHz; σ= 6.75 S/m; ε_r = 33.7
Ambient Temperature: 23.5°C; Liquid Temperature: 22.5°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7706; ConvF(5.27, 6.32, 5.24); Calibrated: 2024-01-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1649; Calibrated: 2024-07-03
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2024; Section: Flat
- Measurement Software: 16.4.0.5005
- UID: WLAN, 10743-AAC

Area Scan (119.0 mm x 204.0 mm): Measurement Grid: 8.5 mm x 8.5 mm
SAR (1g) = 0.125 W/kg; SAR (10g) = 0.062 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 3.4 mm x 3.4 mm x 1.4 mm
Power Drift = 0.02 dB
SAR (1g) = 0.147 W/kg; SAR (10g) = 0.071 W/kg
Smallest distance from peaks to all points 3 dB below = 6.7 mm
Ratio of SAR at M2 to SAR at M1 = 41.6 %
psAPD (4.0cm2, sq) = 1.33 [W/m2]



Date: 2024-08-29

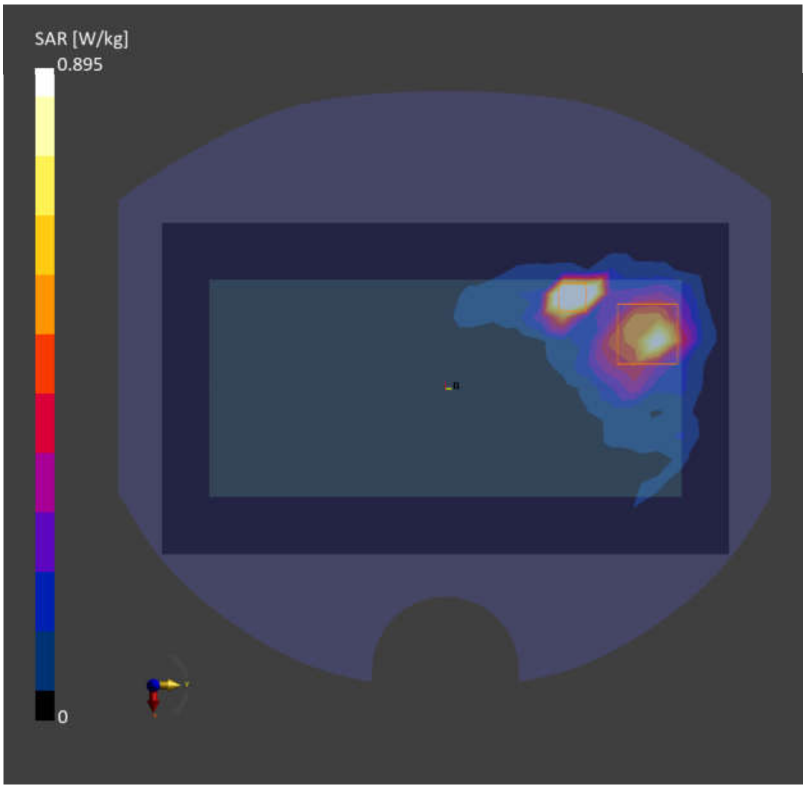
03_WLAN6GHz_802.11ax-HE160 MCS0_Back_0mm_Ch15

Communication System: IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)
Frequency: 6025.000MHz; Duty Cycle: 1:1
Medium: HSL Medium parameters used: f= 6025.000 MHz; σ= 5.57 S/m; ε_r = 35.4
Ambient Temperature: 23.5°C; Liquid Temperature: 22.5°C

DASY6 Configuration:
- Probe: EX3DV4 - SN7706; ConvF(5.27, 6.32, 5.24); Calibrated: 2024-01-24
- Sensor-Surface: 1.4 mm
- Electronics: DAE4 Sn1649; Calibrated: 2024-07-03
- Phantom: Twin-SAM V8.0 (30deg probe tilt); Serial: 2024; Section: Flat
- Measurement Software: 16.4.0.5005
- UID: WLAN, 10743-AAC

Area Scan (119.0 mm x 204.0 mm): Measurement Grid: 8.5 mm x 8.5 mm
SAR (1g) = 0.828 W/kg; SAR (10g) = 0.218 W/kg;

Zoom Scan (22.0 mm x 22.0 mm x 22.0 mm): Measurement Grid: 3.4 mm x 3.4 mm x 1.4 mm
Power Drift = -0.15 dB
SAR (1g) = 0.895 W/kg; SAR (10g) = 0.224 W/kg
Smallest distance from peaks to all points 3 dB below = 7.0 mm
Ratio of SAR at M2 to SAR at M1 = 54.7 %
psAPD (4.0cm2, sq) = 5.12 [W/m2]



01_WLAN6E_802.11ax-HE160 MCS0_Back_2mm_Ch143

Device Under Test Properties

Model, Manufacturer	Dimensions [mm]	IMEI	DUT Type
Device,	170.0 x 80.0 x 12.0		Phone

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz], Channel Number	Conversion Factor
5G	BACK, 2.00	U-NII-7	WLAN, 10743-AAC	6665.0, 143	1.0

Hardware Setup

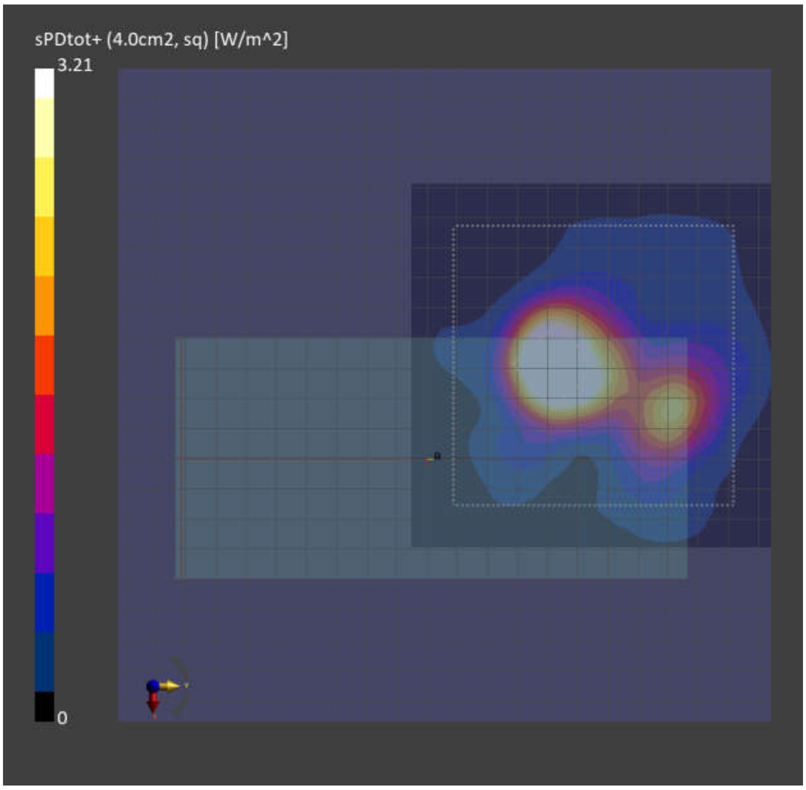
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave - 1065	Air -	EUmmWV4 - SN9553_F1-55GHz, 2023-10-18	DAE4 Sn1303, 2023-11-20

Scans Setup

Scan Type	5G Scan
Grid Extents [mm]	120.0 x 120.0
Grid Steps [lambda]	0.0625 x 0.0625
Sensor Surface [mm]	2.0
MAIA	N/A

Measurement Results

Scan Type	5G Scan
Date	2024-08-30
Avg. Area [cm^2]	2.71
psPDn+ [W/m^2]	2.46
psPDtot+ [W/m^2]	3.21
psPDmod+ [W/m^2]	4.32
E_{max} [V/m]	50.3
Power Drift [dB]	0.15



Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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C Service suisse d'étalonnage
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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Sporton**

Certificate No: D6.5GHzV2-1031_Feb23

CALIBRATION CERTIFICATE

Object: D6.5GHzV2 - SN:1031

Calibration procedure(s): QA CAL-22.v7
Calibration Procedure for SAR Validation Sources between 3-10 GHz

Calibration date: February 22, 2023

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power sensor R&S NRP33T	SN: 100967	01-Apr-22 (No. 217-03526)	Apr-23
Reference 20 dB Attenuator	SN: BH9394 (20k)	04-Apr-22 (No. 217-03527)	Apr-23
Mismatch combination	SN: 84224 / 360D	26-Apr-22 (No. 217-03545)	Apr-23
Reference Probe EX3DV4	SN: 7405	02-Jun-22 (No. EX3-7405_Jun22)	Jun-23
DAE4	SN: 908	27-Jun-22 (No. DAE4-908_Jun22)	Jun-23

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator Anapico APSIN20G	SN: 827	18-Dec-18 (in house check Dec-21)	In house check: Dec-23
Network Analyzer Keysight E5063A	SN:MY54504221	31-Oct-19 (in house check Oct-22)	In house check: Oct-25

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Niels Kuster	Quality Manager	

Issued: February 24, 2023

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEC/IEEE 62209-1528, "Measurement Procedure For The Assessment Of Specific Absorption Rate Of Human Exposure To Radio Frequency Fields From Hand-Held And Body-Worn Wireless Communication Devices - Part 1528: Human Models, Instrumentation And Procedures (Frequency Range Of 4 MHz To 10 GHz)", October 2020.

Additional Documentation:

b) DASY System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.
- *The absorbed power density (APD):* The absorbed power density is evaluated according to Samaras T, Christ A, Kuster N, "*Compliance assessment of the epithelial or absorbed power density above 6 GHz using SAR measurement systems*", Bioelectromagnetics, 2021 (submitted). The additional evaluation uncertainty of 0.55 dB (rectangular distribution) is considered.

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

Measurement Conditions

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

DASY Version	DASY6	V16.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	5 mm	with Spacer
Zoom Scan Resolution	dx, dy = 3.4 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	6500 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	34.5	6.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	33.8 ± 6 %	6.15 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	29.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**297 W/kg ± 24.7 % (k=2)**

SAR averaged over 8 cm³ (8 g) of Head TSL	Condition	
SAR measured	100 mW input power	6.72 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**66.9 W/kg ± 24.4 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	5.51 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**54.8 W/kg ± 24.4 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	48.3 Ω - 4.9 jΩ
Return Loss	- 25.5 dB

APD (Absorbed Power Density)

APD averaged over 1 cm²	Condition	
APD measured	100 mW input power	296 W/m²
APD measured	normalized to 1W	**2960 W/m² ± 29.2 % (k=2)**

APD averaged over 4 cm²	condition	
APD measured	100 mW input power	134 W/m²
APD measured	normalized to 1W	**1340 W/m² ± 28.9 % (k=2)**

*The reported APD values have been derived using the psSAR1g and psSAR8g.

General Antenna Parameters and Design

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

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

Additional EUT Data

Manufactured by	SPEAG

DASY6 Validation Report for Head TSL

Measurement Report for D6.5GHz-1031, UID 0 -, Channel 6500 (6500.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
D6.5GHz	16.0 x 6.0 x 300.0	SN: 1031	-

Exposure Conditions

Phantom Section, TSL	Position, Test Distance [mm]	Band	Group, UID	Frequency [MHz]	Conversion Factor	TSL Cond. [S/m]	TSL Permittivity
Flat, HSL	5.00	Band	CW,	6500	5.50	6.15	33.8

Hardware Setup

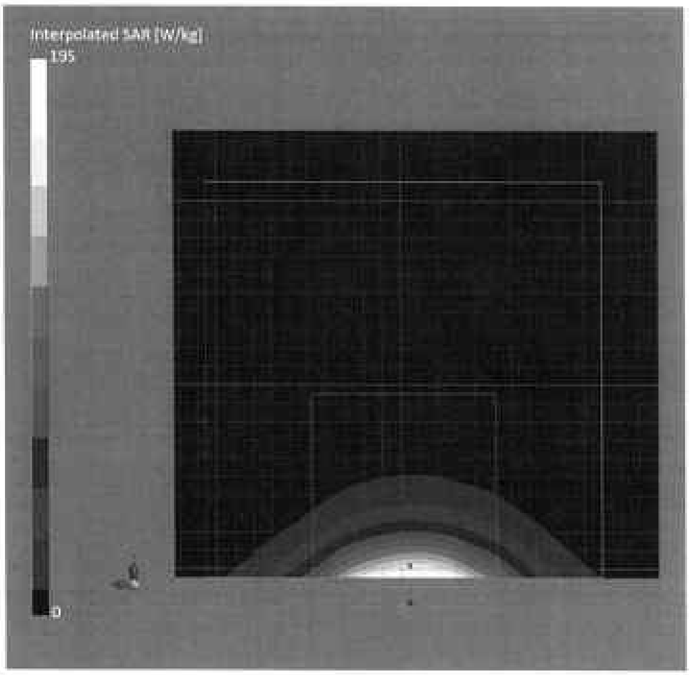
Phantom	TSL	Probe, Calibration Date	DAE, Calibration Date
MFP V8.0 Center - 1182	HBBL600-10000V6	EX3DV4 - SN7405, 2022-06-02	DAE4 Sn908, 2022-06-27

Scan Setup

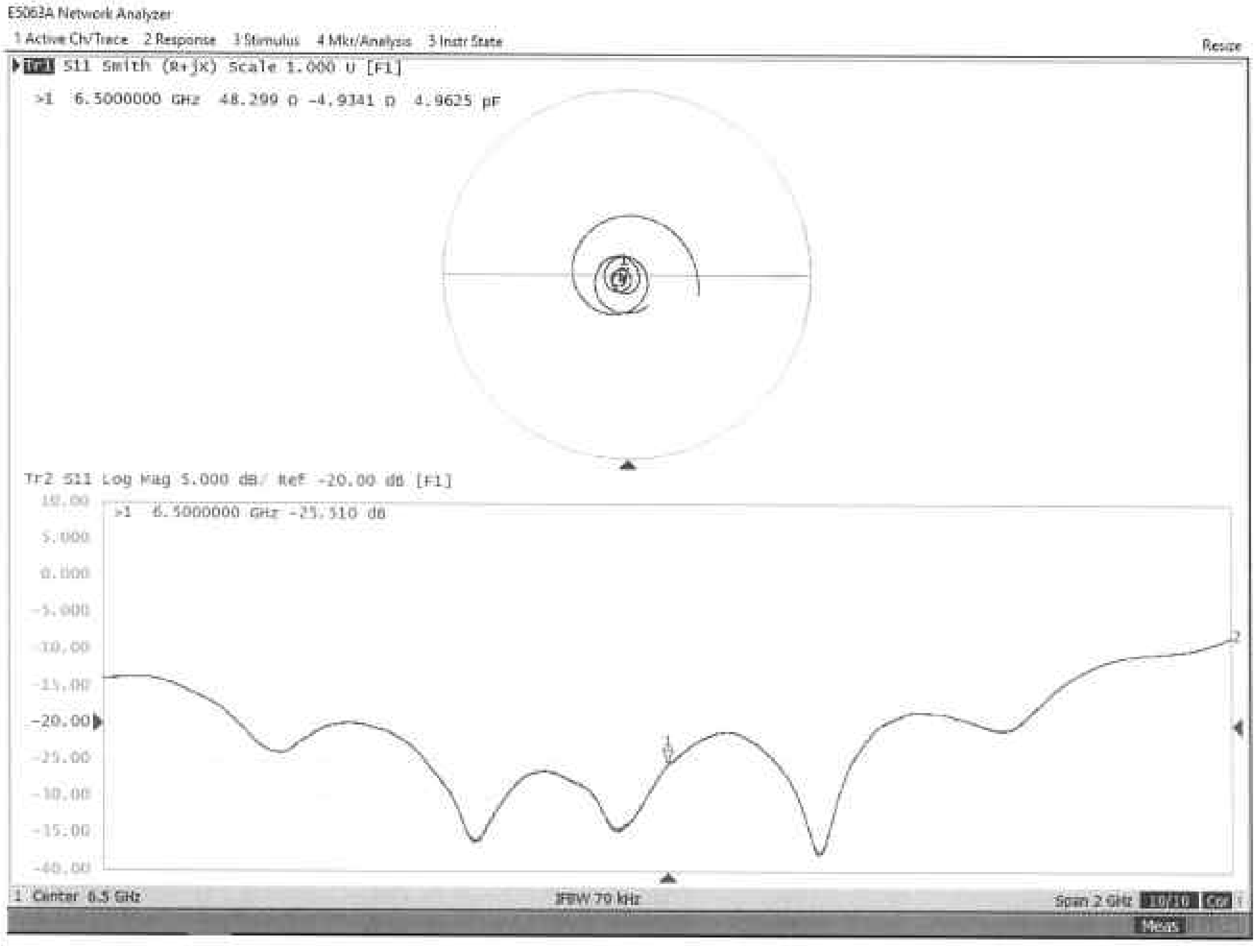
	Zoom Scan
Grid Extents [mm]	22.0 x 22.0 x 22.0
Grid Steps [mm]	3.4 x 3.4 x 1.4
Sensor Surface [mm]	1.4
Graded Grid	Yes
Grading Ratio	1.4
MAIA	N/A
Surface Detection	VMS + 6p
Scan Method	Measured

Measurement Results

	Zoom Scan
Date	2023-02-22, 11:41
psSAR1g [W/Kg]	29.8
psSAR8g [W/Kg]	6.72
psSAR10g [W/Kg]	5.51
Power Drift [dB]	0.00
Power Scaling	Disabled
Scaling Factor [dB]	
TSL Correction	No correction
M2/M1 [%]	49.5
Dist 3dB Peak [mm]	4.8



Impedance Measurement Plot for Head TSL



D6.5GV2, Serial No. 1031 Extended Dipole Calibrations

If dipoles are verified in return loss (<-20dB, within 20% of priorcalibration), and in impedance (within 5 ohm of prior calibration), the annual calibration is not necessary andthe calibration interval can be extended.

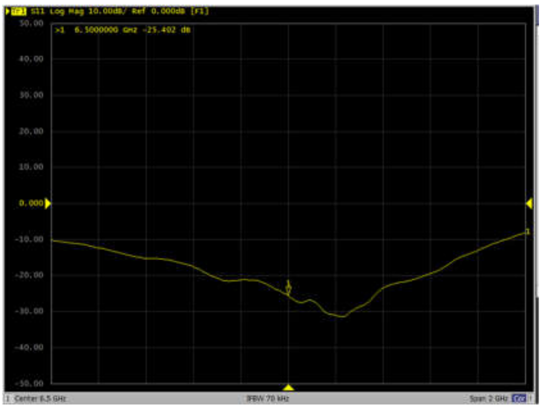
D6.5GV2 – serial no. 1031						
	6500 Head					
Date of Measurement	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2023.2.22	-25.510		48.299		-4.9341	
2024.2.21	-25.402	-0.42	45.342	2.957	-5.1388	0.2047

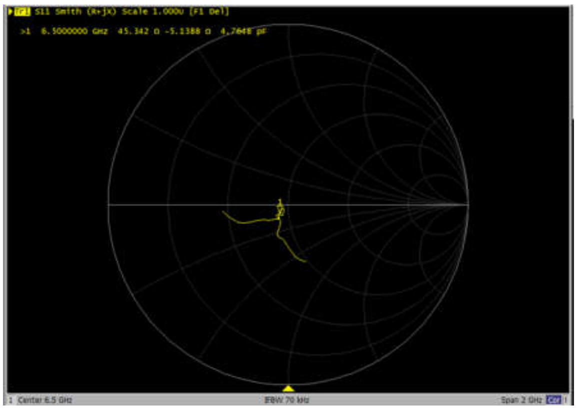
<Justification of the extended calibration>

The return loss is < -20dB, within 20% of prior calibration; the impedance is within 5 ohm of prior calibration. Therefore the verification result should support extended calibration.

Dipole Verification Data> D6.5GV2, serial no. 1031

6500MHz – Head - 2024.2.21





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Accreditation No.: **SCS 0108**

Client **Sporton**
Kunshan City

Certificate No. 5G-Veri-10-2005_Nov23/2

CALIBRATION CERTIFICATE (Replacement of No: 5G-Veri10-2005_Nov23)

Object: 5G Verification Source 10 GHz - SN: 2005

Calibration procedure(s): QA CAL-45.v4
Calibration procedure for sources in air above 6 GHz

Calibration date: November 20, 2023

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Reference Probe EUmmWV3	SN: 9374	22-May-23 (No. EUmm-9374_May23)	May-24
DAE4ip	SN: 1602	08-Nov-23 (No. DAE4ip-1602_Nov23)	Nov-24

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMF100A	SN: 100184	19-May-22 (in house check Nov-22)	In house check: Nov-23
Power sensor R&S NRP18S-10	SN: 101258	31-May-22 (in house check Nov-22)	In house check: Nov-23
Network Analyzer Keysight E5063A	SN: MY54504221	31-Oct-19 (in house check Oct-22)	In house check: Oct-25

	Name	Function	Signature
Calibrated by:	Joanna Lleshaj	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: December 1, 2023

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 0108**

Glossary

CW Continuous wave

Calibration is Performed According to the Following Standards

- Internal procedure QA CAL-45, Calibration procedure for sources in air above 6 GHz.
- IEC/IEEE 63195-1, "Assessment of power density of human exposure to radio frequency fields from wireless devices in close proximity to the head and body (frequency range of 6 GHz to 300 GHz)", May 2022

Methods Applied and Interpretation of Parameters

- *Coordinate System:* z-axis in the waveguide horn boresight, x-axis is in the direction of the E-field, y-axis normal to the others in the field scanning plane parallel to the horn flare and horn flange.
- *Measurement Conditions: (1) 10 GHz:* The radiated power is the forward power to the horn antenna minus ohmic and mismatch loss. The forward power is measured prior and after the measurement with a power sensor. During the measurements, the horn is directly connected to the cable and the antenna ohmic and mismatch losses are determined by far-field measurements. *(2) 30, 45, 60 and 90 GHz*: The verification sources are switched on for at least 30 minutes. Absorbers are used around the probe cub and at the ceiling to minimize reflections.
- *Horn Positioning:* The waveguide horn is mounted vertically on the flange of the waveguide source to allow vertical positioning of the EUmmW probe during the scan. The plane is parallel to the phantom surface. Probe distance is verified using mechanical gauges positioned on the flare of the horn.
- *E- field distribution:* E field is measured in two x-y-plane (10mm, 10mm + $\lambda/4$) with a vectorial E-field probe. The E-field value stated as calibration value represents the E-field-maxima and the averaged (1cm^2 and 4cm^2) power density values at 10mm in front of the horn.
- *Field polarization:* Above the open horn, linear polarization of the field is expected. This is verified graphically in the field representation.

Calibrated Quantity

- Local peak E-field (V/m) and average of peak spatial components of the poynting vector (W/m^2) averaged over the surface area of 1 cm^2 and 4cm^2 at the nominal operational frequency of the verification source. Both square and circular averaging results are listed.

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

Measurement Conditions

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

DASY Version	DASY8 Module mmWave	V3.2
Phantom	5G Phantom	
Distance Horn Aperture - plane	10 mm	
Number of measured planes	2 (10mm, 10mm + λ/4)	
Frequency	10 GHz ± 10 MHz	

Calibration Parameters, 10 GHz

Circular Averaging

Distance Horn Aperture to Measured Plane	***Prad***[1] ***(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm²	**4 cm²**	
10 mm	138	**277**	1.27 dB	**204**	**162**	1.28 dB

Distance Horn Aperture to Measured Plane	***Prad***[1] ***(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Power Density psPDn+, psPDtot+, psPDmod+ (W/m²)		Uncertainty (k = 2)
				1 cm²	**4 cm²**	
10 mm	138	**277**	1.27 dB	**203, 203, 205**	**160, 160, 165**	1.28 dB

Square Averaging

Distance Horn Aperture to Measured Plane	***Prad***[1] ***(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Avg Power Density Avg (psPDn+, psPDtot+, psPDmod+) (W/m²)		Uncertainty (k = 2)
				1 cm²	**4 cm²**	
10 mm	138	**277**	1.27 dB	**204**	**161**	1.28 dB

Distance Horn Aperture to Measured Plane	***Prad***[1] ***(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Power Density psPDn+, psPDtot+, psPDmod+ (W/m²)		Uncertainty (k = 2)
				1 cm²	**4 cm²**	
10 mm	138	**277**	1.27 dB	**203, 203, 205**	**159, 160, 164**	1.28 dB

Max Power Density

Distance Horn Aperture to Measured Plane	***Prad***[1] ***(mW)***	**Max E-field (V/m)**	Uncertainty (k = 2)	Max Power Density Sn, Stot, |Stot| (W/m²)	Uncertainty (k = 2)
10 mm	138	**277**	1.27 dB	**221, 221, 221**	1.28 dB

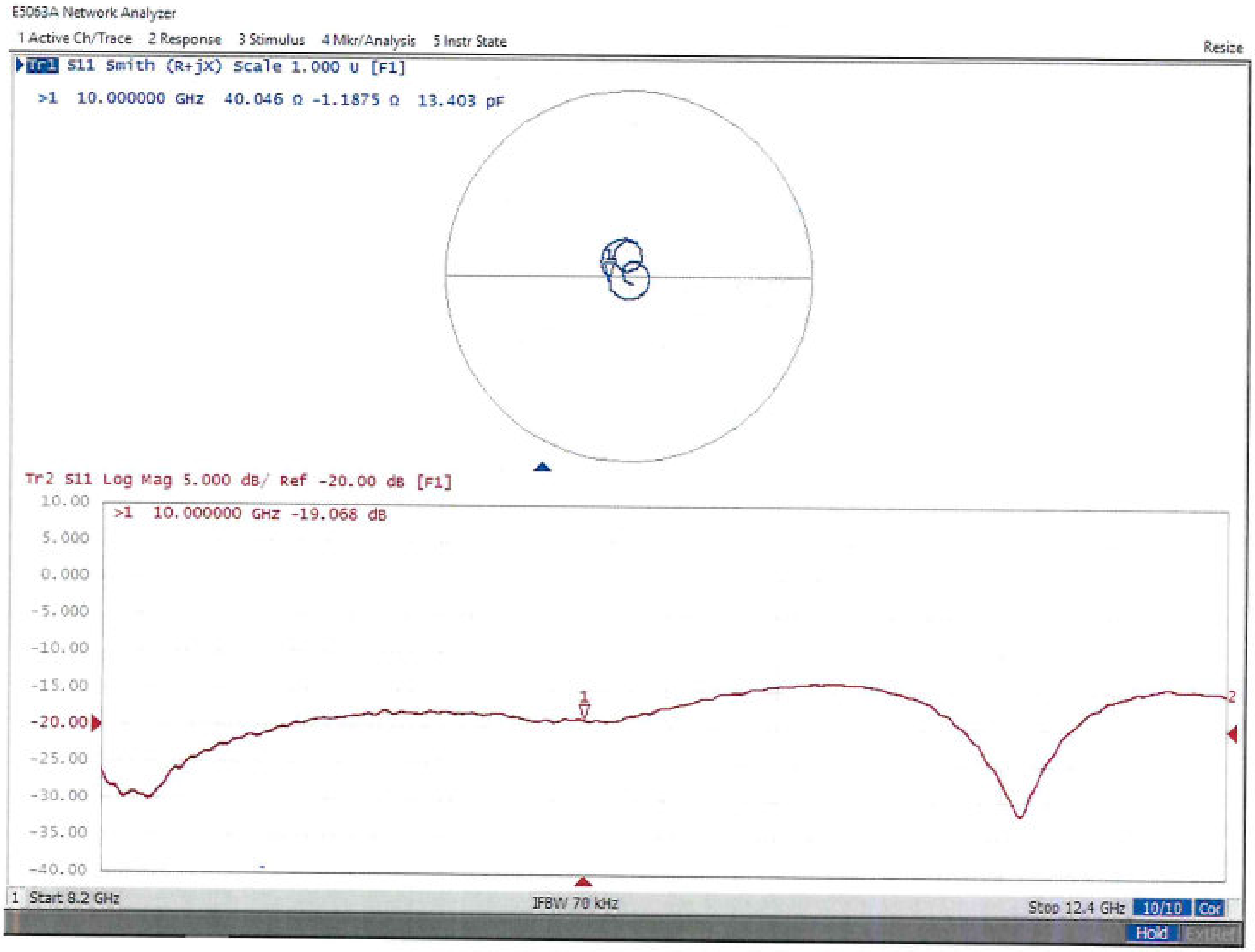
[1] Assessed ohmic and mismatch loss plus numerical offset: 0.60 dB

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters

Impedance, transformed to feed point	40.0 Ω - 1.2 jΩ
Return Loss	- 19.1 dB

Impedance Measurement Plot



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 100.0	SN: 2005	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

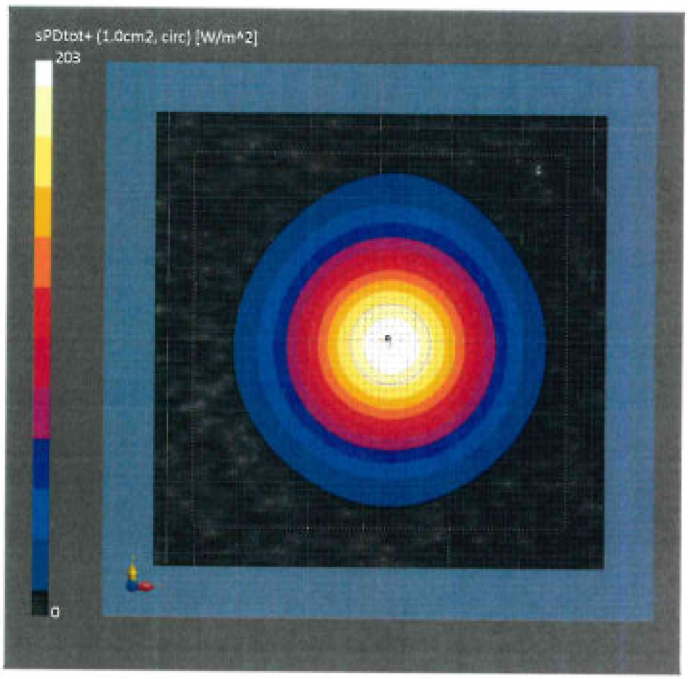
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-05-22	DAE4ip Sn1602, 2023-11-08

Scan Setup

	5G Scan
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-11-20, 11:08
Avg. Area [cm²]	1.00
Avg. Type	Circular Averaging
psPDn+ [W/m²]	203
psPDtot+ [W/m²]	203
psPDmod+ [W/m²]	205
Max(Sn) [W/m²]	221
Max(Stot) [W/m²]	221
Max(|Stot|) [W/m²]	221
E_{max} [V/m]	277
Power Drift [dB]	0.01



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 100.0	SN: 2005	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

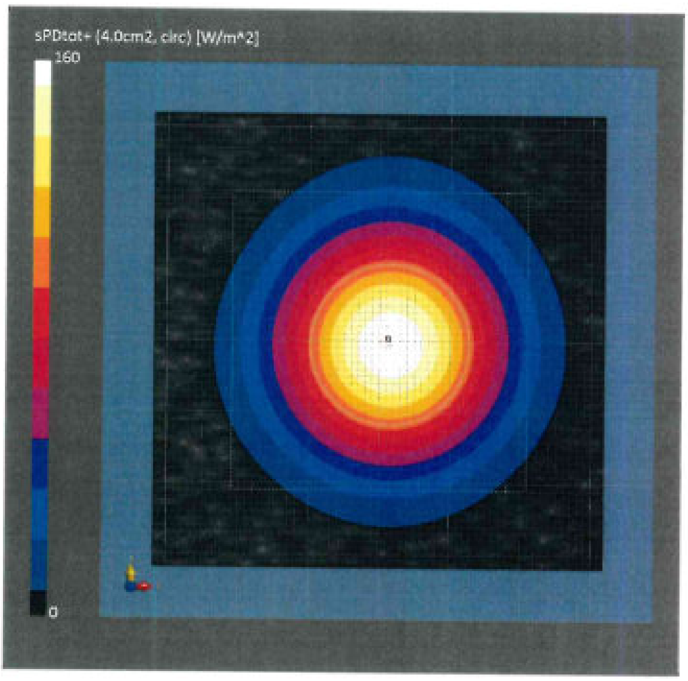
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-05-22	DAE4ip Sn1602, 2023-11-08

Scan Setup

	5G Scan
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-11-20, 11:08
Avg. Area [cm²]	4.00
Avg. Type	Circular Averaging
psPDn+ [W/m²]	160
psPDtot+ [W/m²]	160
psPDmod+ [W/m²]	165
Max(Sn) [W/m²]	221
Max(Stot) [W/m²]	221
Max(|Stot|) [W/m²]	221
E_{max} [V/m]	277
Power Drift [dB]	0.01



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 100.0	SN: 2005	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

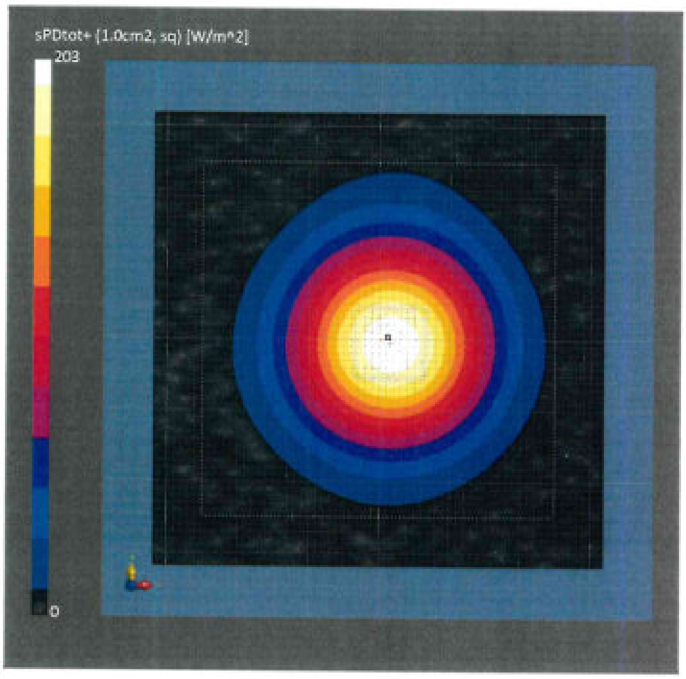
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-05-22	DAE4ip Sn1602, 2023-11-08

Scan Setup

	5G Scan
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-11-20, 11:08
Avg. Area [cm²]	1.00
Avg. Type	Square Averaging
psPDn+ [W/m²]	203
psPDtot+ [W/m²]	203
psPDmod+ [W/m²]	205
Max(Sn) [W/m²]	221
Max(Stot) [W/m²]	221
Max(|Stot|) [W/m²]	221
E_{max} [V/m]	277
Power Drift [dB]	0.01



DASY Report

Measurement Report for 5G Verification Source 10 GHz, UID 0 -, Channel 10000 (10000.0MHz)

Device under Test Properties

Name, Manufacturer	Dimensions [mm]	IMEI	DUT Type
5G Verification Source 10 GHz	100.0 x 100.0 x 100.0	SN: 2005	-

Exposure Conditions

Phantom Section	Position, Test Distance [mm]	Band	Group,	Frequency [MHz], Channel Number	Conversion Factor
5G -	10.0 mm	Validation band	CW	10000.0, 10000	1.0

Hardware Setup

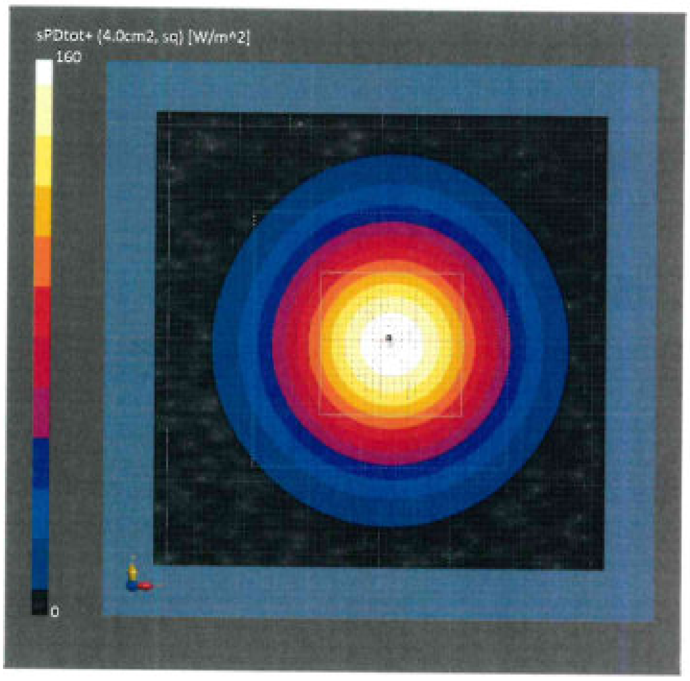
Phantom	Medium	Probe, Calibration Date	DAE, Calibration Date
mmWave Phantom - 1002	Air	EUmmWV3 - SN9374_F1-55GHz, 2023-05-22	DAE4ip Sn1602, 2023-11-08

Scan Setup

	5G Scan
Sensor Surface [mm]	10.0
MAIA	MAIA not used

Measurement Results

	5G Scan
Date	2023-11-20, 11:08
Avg. Area [cm²]	4.00
Avg. Type	Square Averaging
psPDn+ [W/m²]	159
psPDtot+ [W/m²]	160
psPDmod+ [W/m²]	164
Max(Sn) [W/m²]	221
Max(Stot) [W/m²]	221
Max(|Stot|) [W/m²]	221
E_{max} [V/m]	277
Power Drift [dB]	0.01



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IMPORTANT NOTICE

USAGE OF THE DAE4

The DAE unit is a delicate, high precision instrument and requires careful treatment by the user. There are no serviceable parts inside the DAE. Special attention shall be given to the following points:

Battery Exchange: The battery cover of the DAE4 unit is closed using a screw, over tightening the screw may cause the threads inside the DAE to wear out.

Shipping of the DAE: Before shipping the DAE to SPEAG for calibration, remove the batteries and pack the DAE in an antistatic bag. This antistatic bag shall then be packed into a larger box or container which protects the DAE from impacts during transportation. The package shall be marked to indicate that a fragile instrument is inside.

E-Stop Failures: Touch detection may be malfunctioning due to broken magnets in the E-stop. Rough handling of the E-stop may lead to damage of these magnets. Touch and collision errors are often caused by dust and dirt accumulated in the E-stop. To prevent E-stop failure, the customer shall always mount the probe to the DAE carefully and keep the DAE unit in a non-dusty environment if not used for measurements.

Repair: Minor repairs are performed at no extra cost during the calibration. However, SPEAG reserves the right to charge for any repair especially if rough unprofessional handling caused the defect.

DASY Configuration Files: Since the exact values of the DAE input resistances, as measured during the calibration procedure of a DAE unit, are not used by the DASY software, a nominal value of 200 MOhm is given in the corresponding configuration file.

Important Note:
Warranty and calibration is void if the DAE unit is disassembled partly or fully by the Customer.

Important Note:
Never attempt to grease or oil the E-stop assembly. Cleaning and readjusting of the E-stop assembly is allowed by certified SPEAG personnel only and is part of the calibration procedure.

Important Note:
To prevent damage of the DAE probe connector pins, use great care when installing the probe to the DAE. Carefully connect the probe with the connector notch oriented in the mating position. Avoid any rotational movement of the probe body versus the DAE while turning the locking nut of the connector. The same care shall be used when disconnecting the probe from the DAE.

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Sporton**
Kunshan City

Certificate No: DAE4-1649_Jul24

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BO - SN: 1649
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	July 03, 2024

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	29-Aug-23 (No:37421)	Aug-24
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	23-Jan-24 (in house check)	In house check: Jan-25
Calibrator Box V2.1	SE UMS 006 AA 1002	23-Jan-24 (in house check)	In house check: Jan-25

	Name	Function	Signature
Calibrated by:	Adrian Gehring	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	i.V.

Issued: July 3, 2024

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.663 ± 0.02% (k=2)	404.640 ± 0.02% (k=2)	404.450 ± 0.02% (k=2)
Low Range	3.95131 ± 1.50% (k=2)	3.98690 ± 1.50% (k=2)	3.97645 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	99.0 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200033.11	-1.59	-0.00
Channel X	+ Input	20001.90	-1.52	-0.01
Channel X	- Input	-20008.04	1.53	-0.01
Channel Y	+ Input	200034.18	-0.62	-0.00
Channel Y	+ Input	20000.91	-2.38	-0.01
Channel Y	- Input	-20011.90	-2.25	0.01
Channel Z	+ Input	200034.96	0.07	0.00
Channel Z	+ Input	19999.54	-3.71	-0.02
Channel Z	- Input	-20012.28	-2.66	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1998.71	0.42	0.02
Channel X	+ Input	197.91	-0.10	-0.05
Channel X	- Input	-202.34	-0.29	0.14
Channel Y	+ Input	1997.56	-0.38	-0.02
Channel Y	+ Input	197.05	-0.88	-0.44
Channel Y	- Input	-203.51	-1.17	0.58
Channel Z	+ Input	1998.06	0.10	0.00
Channel Z	+ Input	197.22	-0.45	-0.23
Channel Z	- Input	-203.22	-0.72	0.36

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	2.89	1.66
	- 200	-1.29	-2.59
Channel Y	200	-6.72	-6.95
	- 200	5.98	4.84
Channel Z	200	0.35	0.17
	- 200	-1.86	-1.85

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.65	-3.70
Channel Y	200	6.72	-	2.71
Channel Z	200	9.32	4.17	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15989	15937
Channel Y	16052	15877
Channel Z	16192	16625

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.29	-0.70	1.38	0.40
Channel Y	-0.60	-1.51	0.33	0.34
Channel Z	-0.54	-1.41	0.87	0.40

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **Sporton**
Kunshan City

Certificate No: DAE4-1303_Nov23

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 1303
Calibration procedure(s)	QA CAL-06.v30 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 20, 2023

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	29-Aug-23 (No:37421)	Aug-24
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	27-Jan-23 (in house check)	In house check: Jan-24
Calibrator Box V2.1	SE UMS 006 AA 1002	27-Jan-23 (in house check)	In house check: Jan-24

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Laboratory Technician	
Approved by:	Sven Kühn	Technical Manager	

Issued: November 20, 2023

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
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    - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
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    - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
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DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV

Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.997 ± 0.02% (k=2)	405.027 ± 0.02% (k=2)	404.749 ± 0.02% (k=2)
Low Range	3.94759 ± 1.50% (k=2)	4.01956 ± 1.50% (k=2)	3.99729 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	243.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200032.21	-5.32	-0.00
Channel X	+ Input	20006.02	-0.91	-0.00
Channel X	- Input	-20003.63	1.95	-0.01
Channel Y	+ Input	200032.29	-5.13	-0.00
Channel Y	+ Input	20006.14	-0.71	-0.00
Channel Y	- Input	-20005.73	-0.06	0.00
Channel Z	+ Input	200033.42	-4.08	-0.00
Channel Z	+ Input	20006.69	-0.16	-0.00
Channel Z	- Input	-20004.77	0.98	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2002.07	-0.09	-0.00
Channel X	+ Input	201.95	-0.12	-0.06
Channel X	- Input	-197.81	0.06	-0.03
Channel Y	+ Input	2002.26	0.20	0.01
Channel Y	+ Input	200.84	-1.03	-0.51
Channel Y	- Input	-199.12	-1.04	0.53
Channel Z	+ Input	2002.26	0.12	0.01
Channel Z	+ Input	201.32	-0.62	-0.31
Channel Z	- Input	-199.09	-1.01	0.51

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-21.25	-22.23
	- 200	23.33	21.70
Channel Y	200	-6.05	-6.51
	- 200	4.39	4.29
Channel Z	200	8.92	9.14
	- 200	-10.26	-10.58

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	0.01	-3.72
Channel Y	200	6.84	-	2.70
Channel Z	200	9.01	5.02	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15891	15473
Channel Y	15980	16700
Channel Z	15844	15203

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	0.89	-1.26	2.18	0.50
Channel Y	-0.72	-1.45	0.99	0.39
Channel Z	-0.59	-1.87	0.60	0.37

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9