FCC SAR Test Report

FCC ID: 2ABVH-AX211D2W

Report No.	:	BTL-FCC SAR-1-2310G005
Equipment	:	Intel WIFI 6E AX211
Model Name	:	AX211D2W
Applicant	:	Aava Mobile Oy
Address	:	Nahkatehtaankatu 2, FI-90130 Oulu, Finland
Standard(s)	:	**KDB447498 D01** General RF Exposure Guidance v06 **KDB248227 D01** 802.11 Wi-Fi SAR v02r02 **KDB865664 D01** SAR measurement 100 MHz to 6 GHz v01r04 **KDB865664 D02** SAR Reporting v01r02 **KDB616217 D04** SAR for laptop and Tablets v01r02 **FCC§2.1093** Radiofrequency radiation exposure evaluation: portable devices **IEEE C95.1:2019** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz. **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)
Date of Receipt	:	Nov. 01, 2023
Date of Test	:	Nov. 14, 2023 ~ Dec. 05, 2023
Issued Date	:	Jan. 17, 2024

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by :

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date	Note
R00	Original Issue.	Jan. 11, 2024	Invalid
R01	Modified the description of section 5.3.	Jan. 17, 2024	Valid

1 GENERAL INFORMATION

1.1 GENERAL DESCRIPTION OF EUT

Equipment	Intel WIFI 6E AX211		
Model Name	AX211D2W		
Host device information			
Equipment	Tablet		
Model Name	INARI-D-10-WIG-1		
Brand Name	AAVA		
Model Difference	N/A		
Power Rating	12V⎓2A		
Battery Information	Model Name : AMME4974 Rating : 7.7Vdc, 4830mAh		
WIFI+BT Module	Intel® Wi-Fi 6E AX211 / AX211NGW		
Operation Frequency	Function	Band	Frequency (MHz)
	WiFi	2.4G	TX : 2412 - 2472 MHz
		5G_UNII 1	TX : 5180 - 5250 MHz
		5G_UNII 2a	TX : 5250 - 5350 MHz
		5G_UNII 2c	TX : 5500 - 5700 MHz
		5G_UNII 3	TX : 5745 - 5825 MHz
		6E_UNII 5	TX : 5925 - 6425 MHz
		6E_UNII 6	TX : 6425 - 6525 MHz
		6E_UNII 7	TX : 6525 - 6875 MHz
		6E_UNII 8	TX : 6875 - 7125 MHz
	Bluetooth	Basic Rate (BR)	TX : 2402 - 2480 MHz
		Enhance Data Rate	TX : 2402 - 2480 MHz
		Bluetooth Low Energy	TX : 2402 - 2480 MHz
Test Model	INARI-D-10-WIG-1		
Sample Status	Engineering Sample: SSL2023110197		
EUT Modification(s)	N/A		

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

2 RF EMISSIONS MEASUREMENT

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is SAR Test room at the location of No. 68-1, Ln. 169, Sec.2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan.

2.2 MEASUREMENT UNCERTAINTY

Uncertainty Budget for Frequency range of 300 MHz to 3 GHz

Error Description	Uncertainty Value (± %)		Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)	Vi V_{eff}
Measurement System									
Probe Calibration	6.05		Normal	1	1	1	± 6.05 %	± 6.05 %	∞
Axial Isotropy	4.7		Rectangular	$\sqrt{3}$	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical Isotropy	9.6		Rectangular	$\sqrt{3}$	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary Effects	1		Rectangular	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Linearity	4.7		Rectangular	$\sqrt{3}$	1	1	± 2.7 %	± 2.7 %	∞
Detection Limits	1		Rectangular	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Modulation response	2.4		Rectangular	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	0.3		Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response Time	0.8		Rectangular	$\sqrt{3}$	1	1	± 0.5%	± 0.5 %	∞
Integration Time	2.6		Rectangular	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient – Noise	3		Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient–Reflections	3		Rectangula	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	0.4		Rectangular	$\sqrt{3}$	1	1	± 0.2 %	± 0.2 %	∞
Probe Positioning	2.9		Rectangular	$\sqrt{3}$	1	1	± 1.7 %	±1.7 %	∞
Post-processing	4		Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
Max.SAR Evaluation	2		Rectangular	$\sqrt{3}$	1	1	± 1.15 %	± 1.15 %	∞
Test Sample Related									
Device Positioning	1.6	1.8	Normal	1	1	1	± 1.6 %	± 1.8 %	145
Device Holder	1.5	1.7	Normal	1	1	1	± 1.5 %	± 1.7 %	5
Power Drift	5.0		Rectangular	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Setup									
Phantom Production Tolerances	6.1		Rectangular	$\sqrt{3}$	1	1	3.52	3.52	∞
SAR correction	1.9		Rectangular	$\sqrt{3}$	1	0.84	1.10	1.10	∞
Liquid Conductivity (mea.)	2.4		Rectangular	$\sqrt{3}$	0.78	0.71	1.08	1.08	∞
Liquid Permittivity (mea.)	2.4		Rectangular	$\sqrt{3}$	0.26	0.26	0.36	0.36	∞
Temp. unc. - Conductivity	3.4		Rectangular	$\sqrt{3}$	0.78	0.71	1.53	1.53	∞
Temp. unc. - Permittivity	0.4		Rectangular	$\sqrt{3}$	0.23	0.26	0.05	0.05	∞
Combined Standard Uncertainty (K = 1)							± 10.42 %	± 10.48 %	361
Expanded Uncertainty (K = 2)							**± 20.84 %**	**± 20.97 %**	

Uncertainty Budget for Frequency range of 3 GHz to 6 GHz

Error Description	Uncertainty Value (± %)		Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)	Vi V_{eff}
Measurement System									
Probe Calibration	6.65		Normal	1	1	1	± 6.65 %	± 6.65 %	∞
Axial Isotropy	4.7		Rectangular	$\sqrt{3}$	0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical Isotropy	9.6		Rectangular	$\sqrt{3}$	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary Effects	2		Rectangular	$\sqrt{3}$	1	1	± 1.2 %	± 1.2 %	∞
Linearity	4.7		Rectangular	$\sqrt{3}$	1	1	± 2.7 %	± 2.7 %	∞
Detection Limits	1		Rectangular	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Modulation response	2.4		Rectangular	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Readout Electronics	0.3		Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response Time	0.8		Rectangular	$\sqrt{3}$	1	1	± 0.5 %	± 0.5 %	∞
Integration Time	2.6		Rectangular	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient – Noise	3		Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient – Reflections	3		Rectangular	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	0.4		Rectangular	$\sqrt{3}$	1	1	± 0.2 %	± 0.2 %	∞
Probe Positioning	6.7		Rectangular	$\sqrt{3}$	1	1	± 3.9 %	±3.9 %	∞
Post-processing	4		Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
Max.SAR Evaluation	4		Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related									
Device Positioning	1.6	1.8	Normal	1	1	1	±1.6 %	± 1.8 %	145
Device Holder	1.5	1.7	Normal	1	1	1	± 1.5 %	± 1.7 %	5
Power Drift	5.0		Rectangular	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Setup									
Phantom Production Tolerances	6.6		Rectangular	$\sqrt{3}$	1	1	3.81	3.81	∞
SAR correction	1.9		Rectangular	$\sqrt{3}$	1	0.84	1.10	0.92	∞
Liquid Conductivity (mea.)	2.4		Rectangular	$\sqrt{3}$	0.78	0.71	1.08	0.98	∞
Liquid Permittivity (mea.)	2.4		Rectangular	$\sqrt{3}$	0.26	0.26	0.36	0.36	∞
Temp. unc. - Conductivity	3.4		Rectangular	$\sqrt{3}$	0.78	0.71	1.53	1.39	∞
Temp. unc. - Permittivity	0.4		Rectangu□ar	$\sqrt{3}$	0.23	0.26	0.05	0.06	∞
Combined Standard Uncertainty (K = 1)							± 11.65 %	± 11.66 %	361
Expanded Uncertainty (K = 2)							**± 23.29 %**	**± 23.33 %**	

Uncertainty Budget for Frequency range of 6 GHz to 10 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)	Vi V_{eff}
Measurement System								
Probe Calibration	18.6	Normal	2	1	1	±9.3 %	±9.3 %	∞
Probe Calibration Drift	1.7	Rectangular	$\sqrt{3}$	1	1	±1.0 %	±1.0 %	∞
Probe Linearity	4.7	Rectangular	$\sqrt{3}$	1	1	±2.7 %	±2.7 %	∞
Broadband Signal	2.8	Rectangular	$\sqrt{3}$	1	1	±1.6 %	±1.6 %	∞
ProbeIsotropy	7.6	Rectangular	$\sqrt{3}$	1	1	±4.4 %	±4.4 %	∞
Data Acquisition	0.3	Normal	1	1	1	± 0.3%	± 0.3%	∞
RF Ambient	1.8	Normal	1	1	1	±1.8 %	±1.8 %	∞
Probe Positioning	0.2	Normal	1	0.5	0.5	±0.25 %	±0.25 %	∞
Data Processing	3.5	Normal	1	1	1	±3.5 %	±3.5 %	∞
Phantom and Device Errors								
Conductivity(meas.)	2.5	Normal	1	0.78	0.71	±2.0 %	±1.8 %	∞
Conductivity(temp.)	2.4	Rectangular	$\sqrt{3}$	0.78	0.71	±1.1 %	±1.0 %	∞
PhantomPermittivity	14.0	Rectangular	$\sqrt{3}$	0.5	0.5	±4.0 %	±4.0 %	∞
Distance DUT - TSL	2.0	Normal	1	2	2	±4.0 %	±4.0 %	∞
Device Positioning	1.0	Normal	1	1	1	±1.0 %	±1.0 %	145
Device Holder	3.6	Normal	1	1	1	±3.6 %	±3.6 %	5
DUT Modulation	2.4	Rectangular	$\sqrt{3}$	1	1	±1.4 %	±1.4 %	∞
Time-average SAR	1.7	Rectangular	$\sqrt{3}$	1	1	±1.0 %	±1.0 %	∞
DUT drift	2.5	Normal	1	1	1	±2.5 %	±2.5 %	∞
Val Antenna Unc.	0	Normal	1	1	1	±0 %	±0 %	∞
Unc. Input Power	0	Normal	1	1	1	±0 %	±0 %	∞
Correction to the SAR results								
Deviation to Target	1.9	Normal	1	1	0.84	±1.9 %	±1.6 %	∞
SAR scaling	0	Rectangular	$\sqrt{3}$	1	1	±0 %	±0 %	∞
Combined Standard Uncertainty (K = 1)						± 14.00%	± 13.90%	361
Expanded Uncertainty (K = 2)						**± 28.00 %**	**± 27.90 %**	

Uncertainty Budget for mmWave

Error Description	Uncertainty Value (±dB)	Probability Distribution	Divisor	Ci	Standard Uncertainty	Vi V_{eff}
Uncertainty terms dependent on the measurement system						
Calibration Repeatability	0.21	Normal	1	1	±0.21dB	∞
Probe correction	0	Rectangular	$\sqrt{3}$	1	±0dB	∞
Frequency response(BW≤1GHz)	0.20	Rectangular	$\sqrt{3}$	0	±0 dB	∞
Sensor cross coupling	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Isotropy	0.30	Rectangular	$\sqrt{3}$	1	±0.17 dB	∞
Linearity	0.20	Rectangular	$\sqrt{3}$	1	±0.12 dB	∞
Probe scattering	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Probe Positioning offset	0.11	Rectangular	$\sqrt{3}$	1	±0.06 dB	∞
Probe Positioning repeatability	0.04	Rectangular	$\sqrt{3}$	1	±0.02 dB	∞
Sensor mechanical offset	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Probe spatial resolution	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Field impedance dependance	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Amplitude and phase drift	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Amplitude and phase noise	0.04	Rectangular	$\sqrt{3}$	0	± 0 dB	∞
Measurement area truncation	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Data acquisition	0.03	Normal	1	1	±0.03 dB	∞
Sampling	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Field reconstruction	0.60	Rectangular	$\sqrt{3}$	0.3	±0.3 dB	∞
Forward transformation	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Power density scaling	-	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Spatial averaging	0.10	Rectangular	$\sqrt{3}$	0	±0 dB	∞
System detection limit	0.04	Rectangular	$\sqrt{3}$	1	±0.02 dB	∞
Uncertainty terms dependent on the DUT and environmental factors						
Probe coupling with DUT	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Modulation response	0.40	Rectangular	$\sqrt{3}$	0	± 0 dB	∞
Integration time	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Response time	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
Device holder influence	0.10	Rectangular	$\sqrt{3}$	0	± 0 dB	∞
DUT alignment	0	Rectangular	$\sqrt{3}$	1	± 0 dB	∞
RF ambient conditions	0.04	Rectangular	$\sqrt{3}$	1	±0.02 dB	∞
Ambient Reflections	0.04	Rectangular	$\sqrt{3}$	1	±0.02 dB	∞
Immunity / secondary reception	0	Rectangular	$\sqrt{3}$	0	±0 dB	∞
Drift of the DUT	0.10	Rectangular	$\sqrt{3}$	1	±0.06 dB	∞
Combined Standard Uncertainty (K = 1)					± 0.33dB	∞
Expanded Uncertainty (K = 2)					**± 0.66dB**	

Uncertainty Budget for psSAR / psAPD System Check

UncertaintyBudgetforpsSAR/psAPDSystemCheck

(Frequency band: 6 – 10 GHz range)

Symbol	Error Description	Uncert.	Prob. Dist.	Div.	ci (1g) / (1 cm^2)	ci (8 g/10 g) / (4 cm^2)	Std. Unc. (1 g) / (1 cm^2)	Std. Unc. (8 g/10 g) / (4 cm^2)
psSAR	Module SAR V16.0 (Table 6.2.3)	±13.1%	N	1	1	1	±13.1%	±13.0%
PDC	Power Density Conversion	±13.5%	R	$\sqrt{3}$	0.8 ^{D}	0.8 ^{D}	±6.2%	±6.2%
u(Δ SAR)	Combined Uncertainty						±14.5%	±14.4 %
U	**Expanded Uncertainty**						±29.0%	±28.8%

Uncertainty Budget for psSAR / psAPD Assessments

UncertaintyBudgetforpsSAR/psAPDAssessments

(Frequency band: 6 – 10 GHz range)

Symbol	Error Description	Uncert.	Prob. Dist.	Div.	ci (1g) / (1 cm^2)	ci (8 g/10 g) / (4 cm^2)	Std. Unc. (1 g) / (1 cm^2)	Std. Unc. (8 g/10 g) / (4 cm^2)
psSAR	Module SAR V16.0 (Table 6.3.3)	±14.2/13.9%	N	1	1	1	±14.2%	±13.9%
PDC	Power Density Conversion	±13.5%	R	$\sqrt{3}$	1	1	±7.8%	±7.8%
u(Δ SAR)	Combined Uncertainty						±16.2%	±15.9 %
U	**Expanded Uncertainty** in dB						±32.4% ±1.2 dB	±31.9% ±1.2 dB

2.3 WLAN ANTENNA INFORMATION:

Ant.	Brand	Part Number	Type	Frequency Range	Gain (dBi)
Main (WiFi Chain A +BT)	Pulse	W3006	Chip	2400-2500	-0.6
				5150-5850	3.0
				5925-7125	2.8
Aux (WiFi Chain B)	Pulse	W3006	Chip	2400-2500	1.2
				5150-5850	3.0
				5925-7125	3.0

2.4 THE MAXIMUM SAR-1G VALUES

Band	Mode	Highest Body Reported SAR-1g(W/kg)
FHSS	Bluetooth_DH5	0.462
DTS	Wi-Fi 2.4G	0.893
UNII	Wi-Fi 5.2 & 5.3G	0.979
	Wi-Fi 5.6G	0.987
	Wi-Fi 5.8G	1.191
	Wi-Fi 6.2G	0.664
	Wi-Fi 6.5G	0.598
	Wi-Fi 6.7G	0.696
	Wi-Fi 7.0G	0.570

Band	Mode	Highest Averaged Power Density(mW/cm^2)
6E	Wi-Fi 6.2G	0.578
	Wi-Fi 6.5G	0.572
	Wi-Fi 6.7G	0.561
	Wi-Fi 7.0G	0.620

Note:

1) The device is in compliance with Specific Absorption Rate(SAR)for general population uncontrolled exposure limits according to the FCC rule §2.1093, the ANSI C95.1:2019/IEEE C95.1:2019, the NCRP Report Number 86 for uncontrolled environment and had been tested in accordance with the measurement methods and procedures specified in IEC/IEEE 62209-1528:2020.

2.5 LABORATORY ENVIRONMENT

Temperature	Min. = 20ºC, Max. = 24ºC
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

2.6 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	DASY5	Speag	DASY 5 (Version 52.10.4.1527)	N/A	N/A	N/A
2	DASY6	Speag	cDASY6 Module SAR (Version 16.2.4.2524)	N/A	N/A	N/A
3	mm Wave	Speag	cDASY 6 Module mm Wave (Version 3.2.2.2358)	N/A	N/A	N/A
4	Data Acquisition Electronics	Speag	DAE4	1486	Jun. 16, 2023	1 Year
5	E-field Probe	Speag	EX3DV4	7369	May 22, 2023	1 Year
6	Data Acquisition Electronics	Speag	DAE4	1289	Jun. 16, 2023	1 Year
7	E-field Probe	Speag	EX3DV4	7678	Aug. 17, 2023	1 Year
8	System Validation Dipole	Speag	D2450V2	973	Feb. 08, 2021	3 Year
9	System Validation Dipole	Speag	D5GHzV2	1221	Feb. 09, 2021	3 Year
10	System Validation Dipole	Speag	D6.5GHzV2	1041	Sep 02, 2021	3 Year
11	E-Field probe	Speag	EUmmWV4	9583	Apr 18, 2023	1 Year
12	5G Verification Source	Speag	5G Verification Source 10GHz	2011	Apr 20, 2023	1 Year
13	ELI4 Phantom	Speag	ELI4 Phantom V8.0	2149	N/A	N/A
14	ELI4 Phantom	Speag	ELI4 Phantom V5.0	1240	N/A	N/A
15	mmWave Phantom	Speag	QD 015 025 CA	1085	N/A	N/A
16	ENA Network Analyzer	Agilent	E5071C	MY46524658	Mar. 17, 2023	1 Year
17	Signal Generator	R&S	SMR40	100502	Feb. 23, 2023	1 Year
18	Spectrum Analyzer	R&S	FSV7	103032	Aug. 10, 2023	1 Year
19	Power Meter	Anritsu	ML2495A	1128008	May 12, 2023	1 Year
20	Power Sensor	Anritsu	MA2411B	1126001	May 12, 2023	1 Year
21	Dielectric Probe Kit	Agilent	85070E	2593	N/A	N/A
22	Low pass filter	Mini-Circuits	SLP-2950+	M108294	N/A	N/A
23	Power Amplifier	Mini-Circuits	ZVE-2W-272+	N650001538	N/A	N/A
24	Power Amplifier	Mini-Circuits	ZVE-8G+	N628801631	N/A	N/A
25	Power Amplifier	EMCI	EMC053035	980869	N/A	N/A
26	Thermometer	PA	TA298	h001	Mar. 21, 2023	1 Year
27	Directional Coupler	Woken	50W Coupler	DOM5CIW3E2	N/A	N/A
28	Attenuator	Woken	WATT-518FS-10	N/A	N/A	N/A

Remark: “N/A” denotes no model name, serial No. or calibration specified.

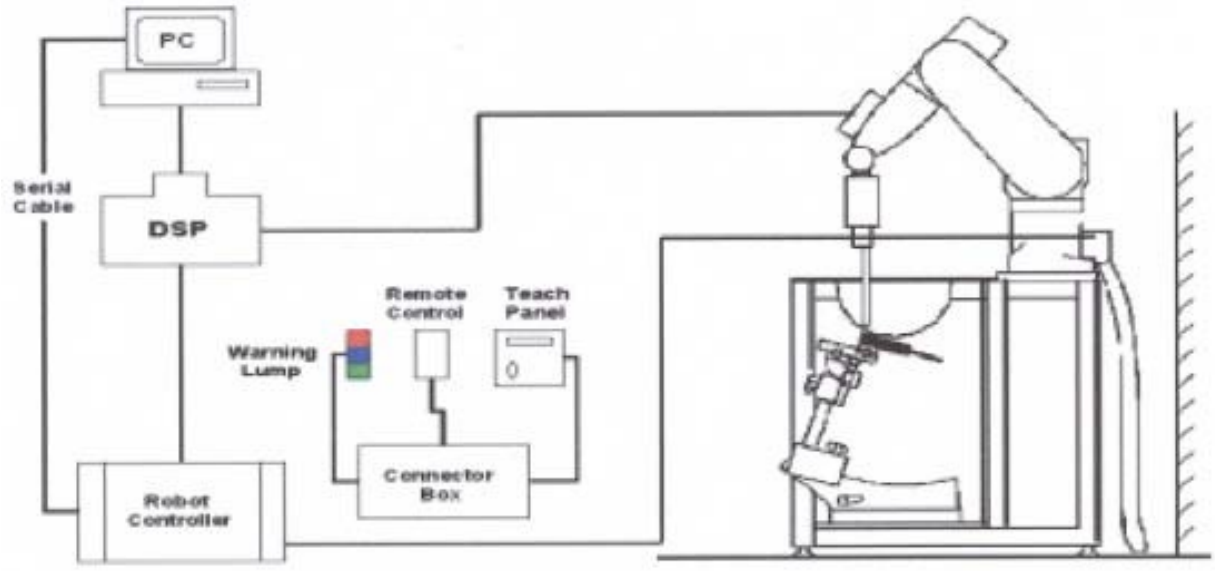
3 SAR MEASUREMENTS SYSTEM CONFIGURATION

3.1 SAR MEASUREMENT SETUP

The DASY5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (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.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows.
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

3.1.1 TEST SETUP LAYOUT

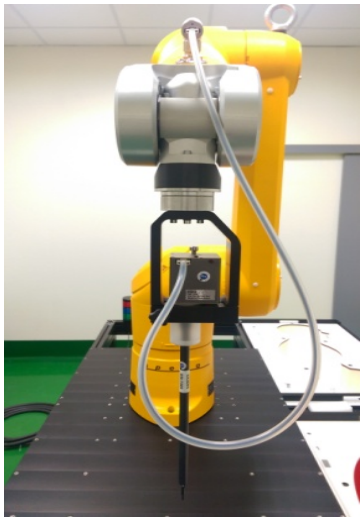


3.2 DASY5 E-FIELD PROBE SYSTEM

The SAR measurements were conducted with the dosimetric probe EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

3.2.1 EX3DV4 PROBE SPECIFICATION

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm



EX3DV4 E-field Probe

3.2.2 E-FIELD PROBE CALIBRATION

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

3.2.3 OTHER TEST EQUIPMENT

3.2.3.1. DEVICE HOLDER FOR TRANSMITTERS

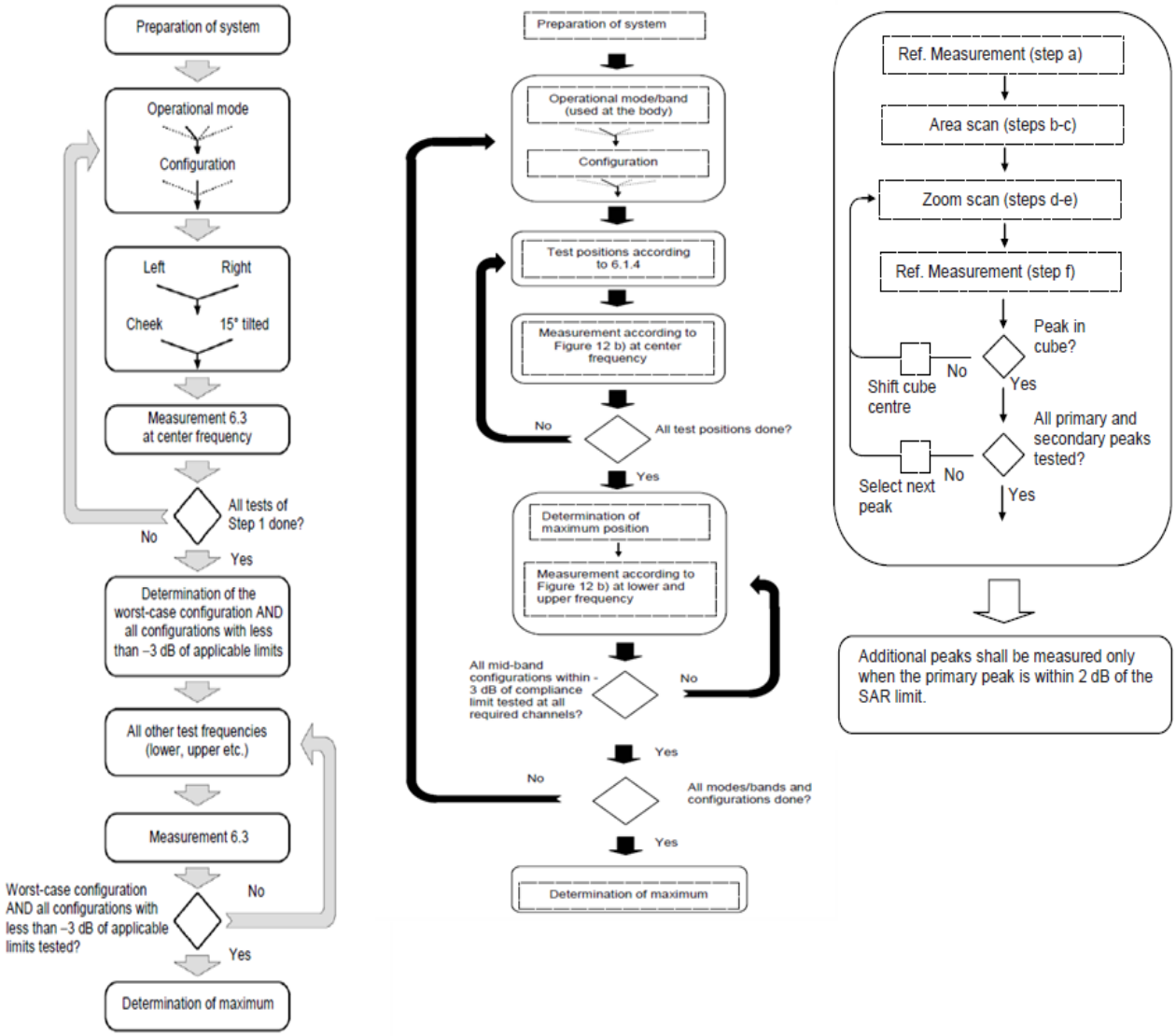
Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.) It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.
Material: POM, Acrylic glass, Foam

3.2.3.2 PHANTOM

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

3.2.4 SCANNING PROCEDURE

The SAR test against the head and body-worn phantom was carried out as follow:



After an area scan has been done at a fixed distance of 1.4mm from the surface of the phantom on the source side, a 3D scan is set up around the location of the maximum spot SAR. First, a point within the scan area is visited by the probe and a SAR reading taken at the start of testing. At the end of testing, the probe is returned to the same point and a second reading is taken. Comparison between these start and end readings enables the power drift during measurement to be assessed.

Above is the scanning procedure flow chart and table from the IEEE1528 standard.

This is the procedure for which all compliant testing should be carried out to ensure that all variations of the device position and transmission behavior are tested.

3.2.5 DATA STORAGE AND EVALUATION

3.2.5.1 DATA STORAGE

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “DAE4”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

3.2.6 DATA EVALUATION BY SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	Sensitivity	Normi, a_{i0}, a_{i1}, a_{i2}
	Conversion factor	$ConvF_i$
	Diode compression point	Dcp_i
Device parameters:	Frequency	f
	Crest factor	cf
Media parameters:	Conductivity	
	Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With	V_i = compensated signal of channel i	(i = x, y, z)
	U_i = input signal of channel i	(i = x, y, z)
	cf = crest factor of exciting field	(DASY parameter)
	dcp_i = diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $Ei = (Vi / Normi \cdot ConvF)^{1/2}$

H-field probes: $Hi = (Vi)^{1/2} \cdot (ai0 + ai1\ f + a_i2f^2) / f$

With Vi = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
$[mV/(V/m)^2]$ for E-field Probes

ConvF = sensitivity enhancement in solution

aij = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

Ei = electric field strength of channel i in V/m

Hi = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$Etot = (EX^2 + EY^2 + EZ^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (Etot)^2 \cdot \sigma / (\rho \cdot 1000)$$

With SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m
= conductivity in [mho/m] or [Siemens/m]
= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \text{ or } P_{pwe} = H_{tot}^2 \cdot 37.7$$

With P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total field strength in V/m
H_{tot} = total magnetic field strength in A/m

4 TISSUE-EQUIVALENT LIQUID

4.1 TISSUE-EQUIVALENT LIQUID INGREDIENTS

The liquid is consisted of water, salt and Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. The measured conductivity and relative permittivity should be within ±5% of the target values. The below table shows the detail solution.
It's satisfying the latest tissue dielectric parameters requirements proposed by the IEC 62209.

Composition of the Tissue Equivalent Matter

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
Head 2450	-	45.0	-	0.1	-	-	54.9	-
Head 5G	-	-	-	-	-	17.2	65.5	17.3

4.2 TISSUE-EQUIVALENT LIQUID PROPERTIES

Dielectric Performance of Tissue Simulating Liquid

Tissue Verification									
Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Date
Head	2450	21.2	1.882	37.956	1.80	39.2	4.56	-3.17	Nov. 14, 2023
Head	2450	21.5	1.879	38.103	1.80	39.2	4.39	-2.80	Nov. 30, 2023
Head	5300	21.1	4.732	35.969	4.66	36.0	1.55	-0.09	Nov. 15, 2023
Head	5300	21.4	4.880	35.252	4.66	36.0	4.72	-2.08	Dec. 04, 2023
Head	5600	21.1	5.081	35.260	5.07	35.5	0.22	-0.68	Nov. 15, 2023
Head	5600	21.4	5.264	34.496	5.07	35.5	3.83	-2.83	Dec. 04, 2023
Head	5800	21.8	5.332	34.780	5.27	35.3	1.18	-1.47	Nov. 17, 2023
Head	5800	21.2	5.503	34.001	5.27	35.3	4.42	-3.68	Dec. 05, 2023
Head	6500	21.2	6.200	33.200	6.07	34.5	2.14	-3.77	Nov. 16, 2023
Head	6500	21.5	6.290	35.900	6.07	34.5	3.62	4.06	Nov. 30, 2023

Note:
1)The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.
2)KDB 865664 was ensured to be applied for probe calibration frequencies greater than or equal to 50MHz of the EUT frequencies.
3)The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies. The SAR test plots may slightly differ from the table above since the DASY rounds to three significant digits.
4) According to FCC TCB workshop April, 2019 RF Exposure Procedures Update (Effective February 19,2019, FCC has permitted the use of single head-tissue simulating liquid specified in IEEE 62209-1- for all SAR tests.

5 SYSTEM CHECK

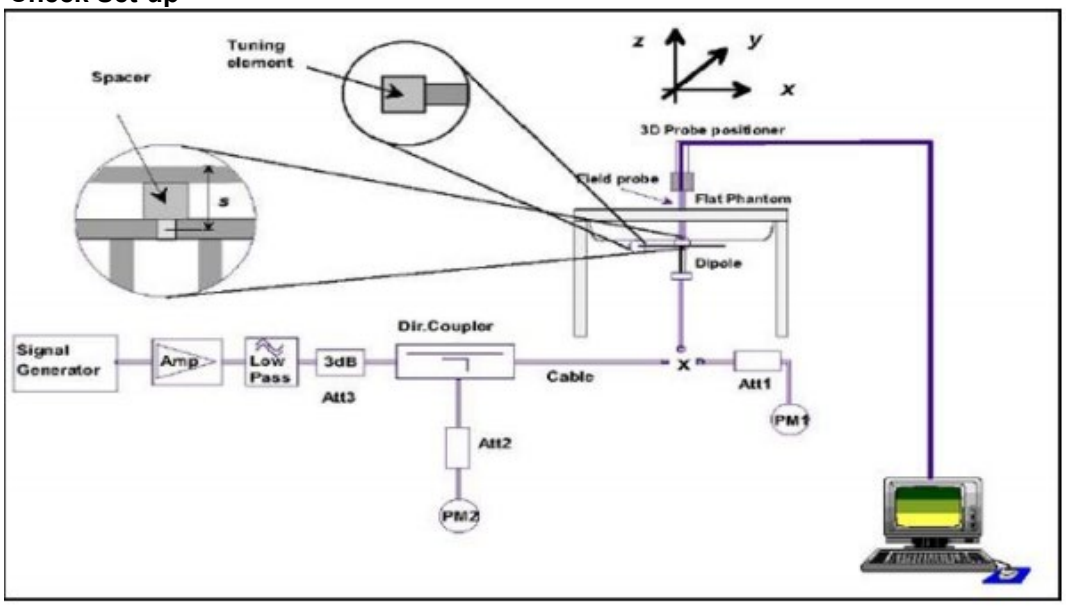
5.1 DESCRIPTION OF SYSTEM CHECK

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW (below 3GHz) or 100mW (3-6GHz), which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the 6.2.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

System Check Set-up



5.2 DESCRIPTION OF SYSTEM CHECK

System Check in Tissue Simulating Liquid

The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands and tissue liquids used during the tests.

System Check	Date	Frequency (MHz)	Targeted SAR 1g (W/kg)	Measured SAR 1g (W/kg)	normalized SAR 1g (W/kg)	Deviation (%)	Dipole S/N
Head	Nov. 14, 2023	2450	52.50	12.90	51.60	-1.71	973
Head	Nov. 30, 2023	2450	52.50	13.00	52.00	-0.95	973
Head	Nov. 15, 2023	5300	81.90	8.75	87.50	6.84	1221
Head	Dec. 04, 2023	5300	81.90	7.62	76.20	-6.96	1221
Head	Nov. 15, 2023	5600	84.50	9.10	91.00	7.69	1221
Head	Dec. 04, 2023	5600	84.50	8.07	80.70	-4.50	1221
Head	Nov. 17, 2023	5800	81.70	8.24	82.40	0.86	1221
Head	Dec. 05, 2023	5800	81.70	8.45	84.50	3.43	1221
Head	Nov. 16, 2023	6500	289.00	27.70	277.00	-4.15	1041
Head	Nov. 30, 2023	6500	289.00	28.30	283.00	-2.08	1041

5.3 POWER DENSITY SYSTEM CHECK

System check provides a fast and reliable method to routinely verify that the measurementsystem is operational with no system component failures, including probe defects, drifts ordeviation from target performance requirements. A system check also verifies the repeatabilityof the measurement system before compliance testing.

The measurement of a verification source is started from 5G probe installed and the phantom taught. The verification source is placed on the 5G phantom. Due to the internal distance from thehorn to the outer surface of the verification source, the measurement distance set in the software should be offsetby -4.45 mm;
e.g, for measurement of the verification source at 10 mm, the measurement distance set in thesoftware should be 5.55mm (10mm -4.45 mm).

The system check is a complete measurement using simple well-defined reference sources. According to the description of "Relative system check" in Section A.3 of Annex A to the IEC IEEE 63195-1 test standard, the uncertainty tolerance range of the system performance check can be converted to a percentage by referring to the uncertainty K=1 of the source calibration certificate. Here are some examples of A.5 and A.6 formulas! The uncertainty tolerance range of this calibration certificate is ±15.88%. According to the measured psPD 4cm² result, within the tolerance of the calibration certificate standard uncertainty, the system verification is successful. The instruments and procedures used for system inspection shall ensure that the system is ready to perform compliance tests.

Before starting DUT PD testing in any configuration, the acceptance criteria shall be met. The relative system check is successful if a) or b) is met:

a) All absolute differences between the measured values, $psPD_{meas}$ and target values $psPD_{tgt}$, with $psPD$ values averaged over 1 cm² and/or 4 cm², shall be within the combined uncertainty u_c of the measurement system and the source antenna, according to Formula (A.4) if the uncertainty is expressed in decibel, or according to Formula (A.5) if the uncertainty is expressed in percent, along with Formula (A.6).

$$\Delta psPD_{tgt} = \left| 10 \times \lg\left(\frac{psPD_{meas}}{psPD_{tgt}} \right) \right| < \min\left(2 \times |u_c|, 2\ \text{dB}\right) \quad \text{(A.4)}$$

or

$$\Delta psPD_{tgt} = \left| \frac{psPD_{meas} - psPD_{tgt}}{psPD_{tgt}} \right| < \min\left(2 \times |u_c|, 58\%\right) \quad \text{(A.5)}$$

$$u_c = \sqrt{u^2_{antenna\_cal} + u^2_{power} + u^2_{meas}} \quad \text{(A.6)}$$

where

- $psPD_{tgt}$ is the target value, derived from repeated measurement of source antenna, normalized to 0 dBm TRP;
- $u_{antenna\_cal}$ is the standard uncertainty (k = 1) of the $psPD$ of the antenna model;
- u_{power} is the standard uncertainty (k = 1) of the measured TRP (see Clause A.2);
- u_{meas} is the standard uncertainty (k = 1) of the $psPD$ measurement (probe calibration, electronics, and positioning).

System Check	Date	Frequency (GHz)	Distance (mm)	Targeted 4cm² (W/m²)	Measured 4cm² (W/m²)	Deviation For 4cm² (%)	Dipole S/N
Power Density	Nov. 22, 2023	10	10	171	166	-2.92	2011

5.4 TEST POSITION

5.4.1 BODY TEST CONFIGURATION

The overall diagonal dimension of the display section of a tablet is 32.4cm>20cm, per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the Tablet touching the phantom. SAR evaluation for the front surface of tablet display screens is generally not necessary. The SAR Exclusion Threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned adjacent the phantom and the edge containing the antenna positioned perpendicular to the phantom.

SAR test reduction and exclusion guidance

(1) The SAR exclusion threshold for distances<50mm is defined by the following equation:

$$\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} \cdot \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

(2) The SAR exclusion threshold for distances>50mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

a) at 100 MHz to1500 MHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) · ($f_{(MHz)}$/150)] mW

b) at >1500MHz and ≤6GHz

[Power allowed at numeric Threshold at 50 mm in step 1) + (test separation distance - 50 mm) ·10] mW

The distance < 50mm

Main Ant

Mode	Position	Distance (mm)	P_{max} (dBm)	P_{max} (mW)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
BT	Rear	1	9.5	8.91	2.48	14.04	3	Yes
	Right	5	9.5	8.91	2.48	2.81	3	No
2.4G WiFi	Rear	1	20	100.00	2.462	156.91	3	Yes
	Right	5	20	100.00	2.462	31.38	3	Yes
5.2G&5.3G WiFi	Rear	1	18	63.10	5.24	144.43	3	Yes
	Right	5	18	63.10	5.24	28.89	3	Yes
5.6G WiFi	Rear	1	16	39.81	5.7	95.05	3	Yes
	Right	5	16	39.81	5.7	19.01	3	Yes
5.8G WiFi	Rear	1	17	50.12	5.825	120.96	3	Yes
	Right	5	17	50.12	5.825	24.19	3	Yes
WiFi 6E	Rear	1	13	19.95	7115	1683.01	3	Yes
	Right	5	13	19.95	7115	336.60	3	Yes

Aux Ant

Mode	Position	Distance (mm)	P_{max} (dBm)	P_{max} (mW)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
2.4G WiFi	Rear	1	20	100.00	2.462	156.91	3	Yes
	Right	5	20	100.00	2.462	31.38	3	Yes
	Top	24	20	100.00	2.462	6.54	3	Yes
5.2G&5.3G WiFi	Rear	1	18	63.10	5.24	144.43	3	Yes
	Right	5	18	63.10	5.24	28.89	3	Yes
	Top	24	18	63.10	5.24	6.02	3	Yes
5.6G WiFi	Rear	1	16	39.81	5.7	95.05	3	Yes
	Right	5	16	39.81	5.7	19.01	3	Yes
	Top	24	16	39.81	5.7	3.96	3	Yes
5.8G WiFi	Rear	1	17	50.12	5.825	120.96	3	Yes
	Right	5	17	50.12	5.825	24.19	3	Yes
	Top	24	17	50.12	5.825	5.04	3	Yes
WiFi 6E	Rear	1	13	19.95	7115	1683.01	3	Yes
	Right	5	13	19.95	7115	336.60	3	Yes
	Top	24	13	19.95	7115	70.13	3	Yes

The distance > 50mm

Main Ant

Mode	Position	Distance (mm)	P_{max} (dBm)	P_{max} (mW)	f (GHz)	Power allowed at numeric Threshold at 50mm	SAR Exclusion Result	Test Requirement (Yes/No)
BT	Left	259	9.5	8.91	2.48	95.25	2185.25	No
	Top	103	9.5	8.91	2.48	95.25	625.25	No
	Bottom	76.5	9.5	8.91	2.48	95.25	360.25	No
2.4G WiFi	Left	259	20	100.00	2.462	95.60	2185.60	No
	Top	103	20	100.00	2.462	95.60	625.60	No
	Bottom	76.5	20	100.00	2.462	95.60	360.60	No
5.2G&5.3G WiFi	Left	259	18	63.10	5.24	65.53	2155.53	No
	Top	103	18	63.10	5.24	65.53	595.53	No
	Bottom	76.5	18	63.10	5.24	65.53	330.53	No
5.6G WiFi	Left	259	16	39.81	5.7	62.83	2152.83	No
	Top	103	16	39.81	5.7	62.83	592.83	No
	Bottom	76.5	16	39.81	5.7	62.83	327.83	No
5.8G WiFi	Left	259	17	50.12	5.825	62.15	2152.15	No
	Top	103	17	50.12	5.825	62.15	592.15	No
	Bottom	76.5	17	50.12	5.825	62.15	327.15	No
WiFi 6E	Left	259	13	19.95	7115	1.78	2091.78	No
	Top	103	13	19.95	7115	1.78	531.78	No
	Bottom	76.5	13	19.95	7115	1.78	266.78	No

Aux Ant

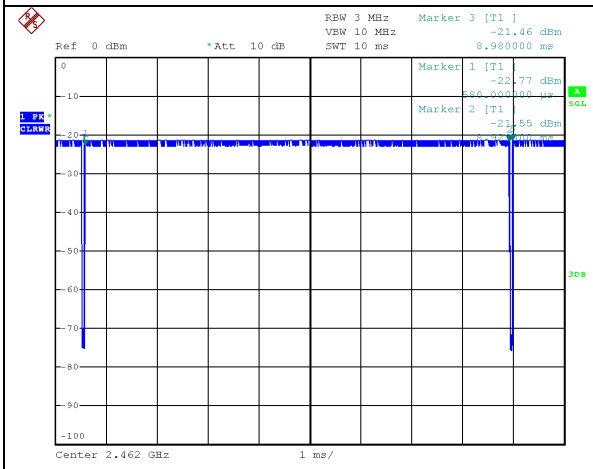
Mode	Position	Distance (mm)	P_{max} (dBm)	P_{max} (mW)	f (GHz)	Power allowed at numeric Threshold at 50mm	SAR Exclusion Result	Test Requirement (Yes/No)
2.4G WiFi	Left	259	20	100.00	2.462	95.60	2185.60	No
	Bottom	147	20	100.00	2.462	95.60	1065.60	No
5.2G&5.3G WiFi	Left	259	18	63.10	5.24	65.53	2155.53	No
	Bottom	147	18	63.10	5.24	65.53	1035.53	No
5.6G WiFi	Left	259	16	39.81	5.7	62.83	2152.83	No
	Bottom	147	16	39.81	5.7	62.83	1032.83	No
5.8G WiFi	Left	259	17	50.12	5.825	62.15	2152.15	No
	Bottom	147	17	50.12	5.825	62.15	1032.15	No
WiFi 6E	Left	259	13	19.95	7115	1.78	2091.78	No
	Bottom	147	13	19.95	7115	1.78	971.78	No

5.5 TEST CONFIGURATION

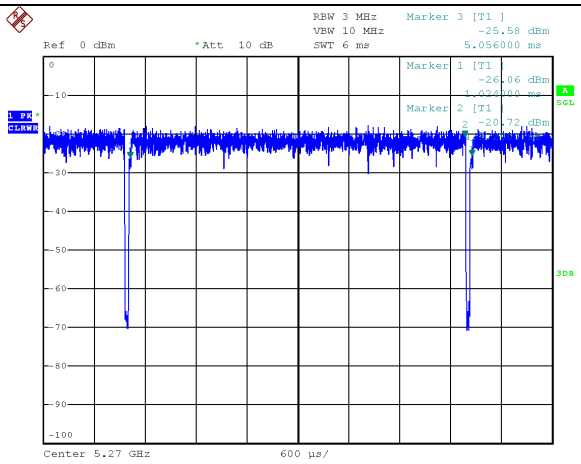
5.5.1 WIFI Test Configuration

For WLAN / BT SAR testing, WLAN / BT engineering testing software installed on the DUT can provide continuous transmitting RF signal.

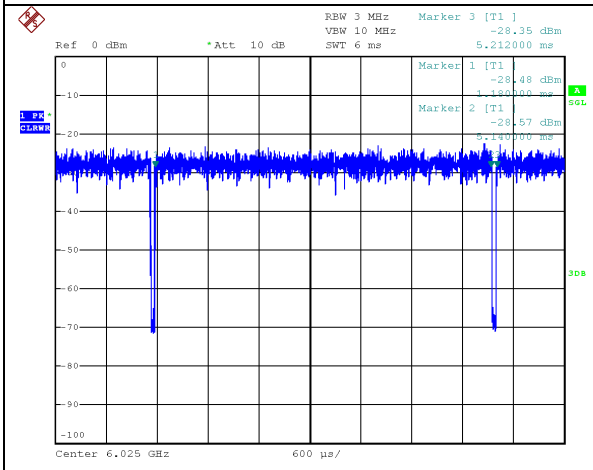
Duty Cycle
WiFi 2.4G
99.29%



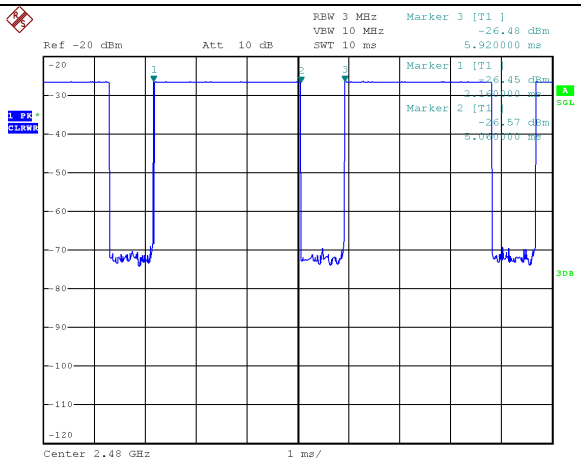
Duty Cycle
WiFi 5G
97.92%



Duty Cycle
WiFi 6E
98.21%



Duty Cycle
BT
77.13%



5.5.2 WLAN 2.4G SAR Test Requirements

802.11b DSSS SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:
1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
2) When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.
1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

SAR Test Requirements for OFDM configurations

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, each standalone and frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

5.5.3 WLAN 5G SAR TEST REQUIREMENTS

U-NII-1 and U-NII-2A Band

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.

U-NII-2C, U-NII-3 Bands

The frequency range covered by these bands is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification.
Unless band gap channels are permanently disabled, they must be considered for SAR testing.
To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels.11 When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

5.5.4 OFDM TRANSMISSION MODE AND SAR TEST CHANNEL SELECTION

For the 2.4GHz and 5GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations (for example 802.11a, 802.11n and 802.11ac, or 802.11g and 802.11n, with the same channel bandwidth, modulation, and data rate, etc.), the lower order 802.11 mode (i.e.802.11a then 802.11n and 802.11ac, or 802.11g then 802.11n) is used for SAR measurement. When the maximum output power is the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

5.5.5 INITIAL TEST CONFIGURATION PROCEDURE

For OFDM, in both 2.4G and 5GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. If the average RF output powers of the highest identical transmission modes are within 0.25 dB of each other, mid channel of the transmission mode with highest average RF output powers is the initial test channel. Otherwise, the channel of the transmission mode with the highest average RF output power will be the initial test configuration.
When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurement.

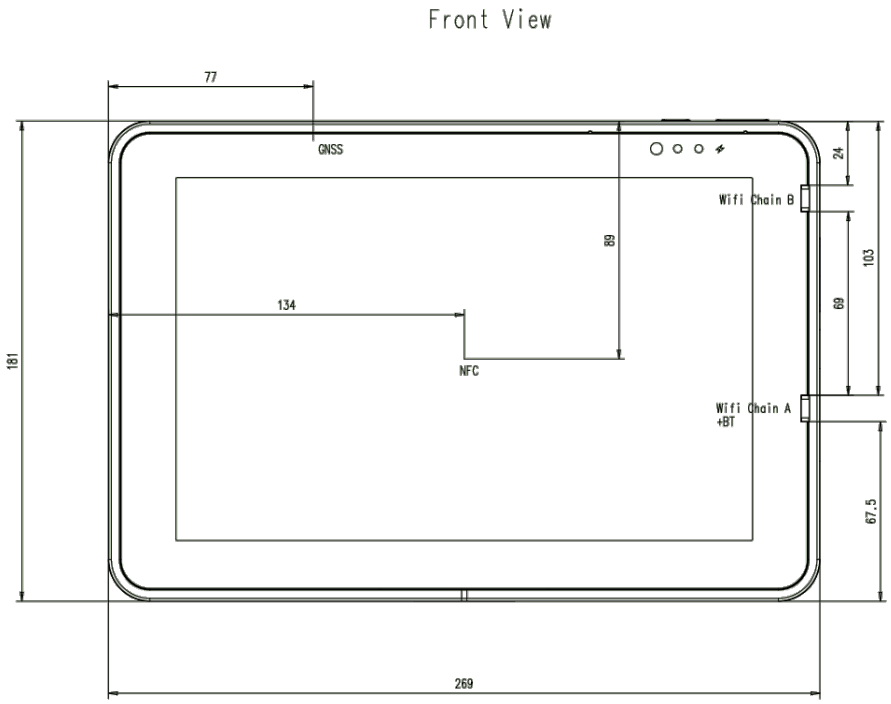
6 OPERATIONAL CONDITIONS DURING TEST

6.1 GENERAL DESCRIPTION OF TEST PROCEDURES

Connection to the EUT is established via air interface with base station An, and the EUT is Set to maximum output power by base station. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30dB.

6.2 TEST POSITION ANTENNA LOCATION

The location of the antennas inside the EUT is shown as below picture:



Unit: mm

The SAR measurement positions of each antenna are as below:

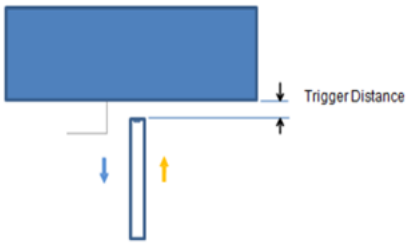
Antenna	Front Face	Rear Face	Left Side	Right Side	Top Side	Bottom Side
Main Ant (WiFi Chain A+BT)	Yes	Yes	No	Yes	No	Yes
Aux Ant (WiFi Chain B)	Yes	Yes	No	Yes	Yes	No

Note: According to the antenna location shown as above, particular DUT edges were not required to be evaluated for SAR if the antenna-to-edge distance is greater than 50mm.

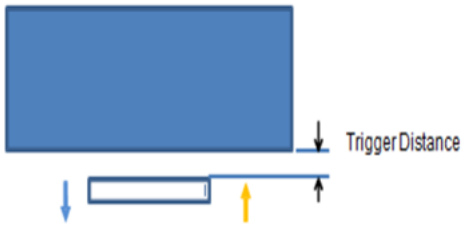
6.2.1 Proximity sensor coverage, distance and angle

6.2.1.1 Procedures for determining proximity sensor triggering distances

The device was tested by the test lab to determine the proximity sensor triggering distances for the front side, back side, bottom side and left side of the device. To ensure all production units are compliant, the smallest separation distance determined by the sensor triggering minus 1 mm, must be used as the test separation distance for SAR testing.
The proximity sensor triggering distance measurement method is as below:



Picture:Proximity sensor triggering distance assessment Top side and Left side



Picture:Proximity sensor triggering distance assessment Front side and Back side

Table 1: Summary of Trigger Distances

Band	Trigger distance –Rear Side		Trigger distance –Right Side		Trigger distance –Top Side	
	Moving toward phantom	Moving away phantom	Moving toward phantom	Moving away phantom	Moving toward phantom	Moving away phantom
WiFi 2.4G	15mm	15mm	8mm	8mm	5.5mm	5.5mm
WiFi 5G	15mm	15mm	8mm	8mm	5.5mm	5.5mm

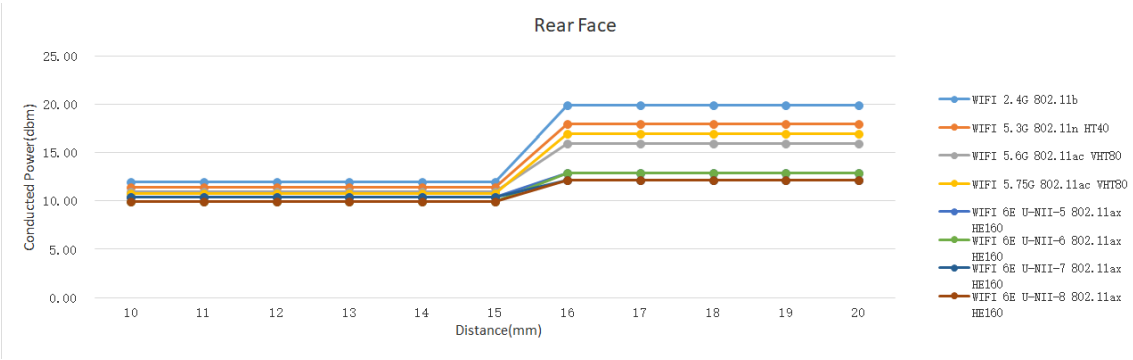
The proximity sensor is not triggered, when approaching from other sides. Therefore, the proximity sensor coverage is not evaluated on these orientations.

6.2.1.2 Procedures for determining antenna and proximity sensor coverage

The proximity sensor and main antenna use same metallic electrode, so there is no spatial offset.

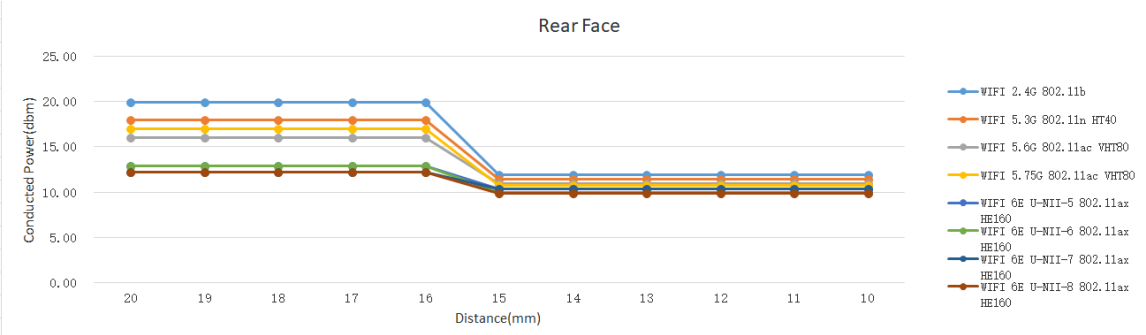
1) Rear Face(moving away from the phantom)_Main Ant

mode		distance(mm)										
		Rear Face										
		Sensor on						Sensor off				
		10	11	12	13	14	15	16	17	18	19	20
WIFI 2.4G	802.11b	11.95	11.95	11.95	11.95	11.95	11.95	19.88	19.88	19.88	19.88	19.88
WIFI 5.3G	802.11n HT40	11.38	11.38	11.38	11.38	11.38	11.38	17.98	17.98	17.98	17.98	17.98
WIFI 5.6G	802.11ac VHT80	10.92	10.92	10.92	10.92	10.92	10.92	15.96	15.96	15.96	15.96	15.96
WIFI 5.75G	802.11ac VHT80	10.76	10.76	10.76	10.76	10.76	10.76	16.94	16.94	16.94	16.94	16.94
WIFI 6E U-NII-5	802.11ax HE160	10.38	10.38	10.38	10.38	10.38	10.38	12.89	12.89	12.89	12.89	12.89
WIFI 6E U-NII-6	802.11ax HE160	9.92	9.92	9.92	9.92	9.92	9.92	12.89	12.89	12.89	12.89	12.89
WIFI 6E U-NII-7	802.11ax HE160	10.38	10.38	10.38	10.38	10.38	10.38	12.17	12.17	12.17	12.17	12.17
WIFI 6E U-NII-8	802.11ax HE160	9.89	9.89	9.89	9.89	9.89	9.89	12.18	12.18	12.18	12.18	12.18



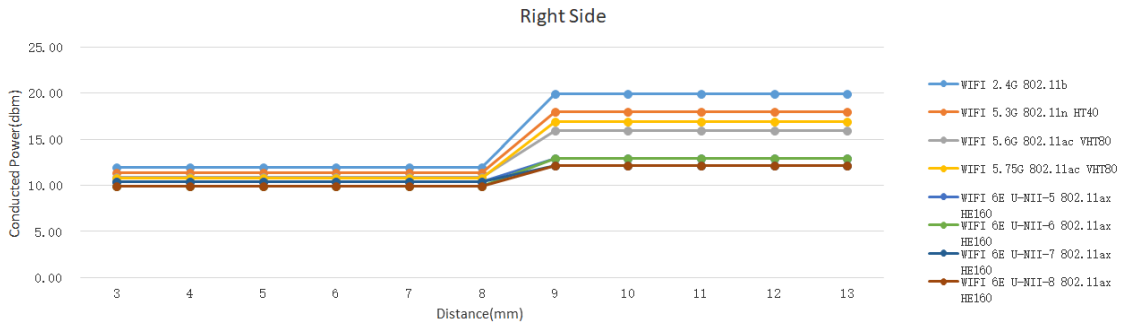
2) Rear Face(moving toward the phantom)_Main Ant

mode		distance(mm)										
		Rear Face										
		Sensor off					Sensor on					
		20	19	18	17	16	15	14	13	12	11	10
WIFI 2.4G	802.11b	19.88	19.88	19.88	19.88	19.88	11.95	11.95	11.95	11.95	11.95	11.95
WIFI 5.3G	802.11n HT40	17.98	17.98	17.98	17.98	17.98	11.38	11.38	11.38	11.38	11.38	11.38
WIFI 5.6G	802.11ac VHT80	15.96	15.96	15.96	15.96	15.96	10.92	10.92	10.92	10.92	10.92	10.92
WIFI 5.75G	802.11ac VHT80	16.94	16.94	16.94	16.94	16.94	10.76	10.76	10.76	10.76	10.76	10.76
WIFI 6E U-NII-5	802.11ax HE160	12.89	12.89	12.89	12.89	12.89	10.38	10.38	10.38	10.38	10.38	10.38
WIFI 6E U-NII-6	802.11ax HE160	12.89	12.89	12.89	12.89	12.89	9.92	9.92	9.92	9.92	9.92	9.92
WIFI 6E U-NII-7	802.11ax HE160	12.17	12.17	12.17	12.17	12.17	10.38	10.38	10.38	10.38	10.38	10.38
WIFI 6E U-NII-8	802.11ax HE160	12.18	12.18	12.18	12.18	12.18	9.89	9.89	9.89	9.89	9.89	9.89



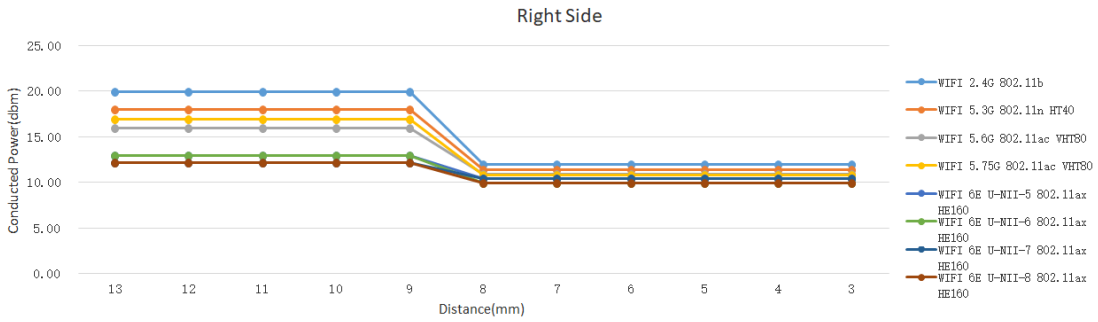
3) Right Side(moving away from the phantom)_Main Ant

mode		distance(mm)										
		Right Side										
		Sensor on						Sensor off				
		3	4	5	6	7	8	9	10	11	12	13
WIFI 2.4G	802.11b	11.95	11.95	11.95	11.95	11.95	11.95	19.88	19.88	19.88	19.88	19.88
WIFI 5.3G	802.11n HT40	11.38	11.38	11.38	11.38	11.38	11.38	17.98	17.98	17.98	17.98	17.98
WIFI 5.6G	802.11ac VHT80	10.92	10.92	10.92	10.92	10.92	10.92	15.96	15.96	15.96	15.96	15.96
WIFI 5.75G	802.11ac VHT80	10.76	10.76	10.76	10.76	10.76	10.76	16.94	16.94	16.94	16.94	16.94
WIFI 6E U-NII-5	802.11ax HE160	10.38	10.38	10.38	10.38	10.38	10.38	12.89	12.89	12.89	12.89	12.89
WIFI 6E U-NII-6	802.11ax HE160	9.92	9.92	9.92	9.92	9.92	9.92	12.89	12.89	12.89	12.89	12.89
WIFI 6E U-NII-7	802.11ax HE160	10.38	10.38	10.38	10.38	10.38	10.38	12.17	12.17	12.17	12.17	12.17
WIFI 6E U-NII-8	802.11ax HE160	9.89	9.89	9.89	9.89	9.89	9.89	12.18	12.18	12.18	12.18	12.18



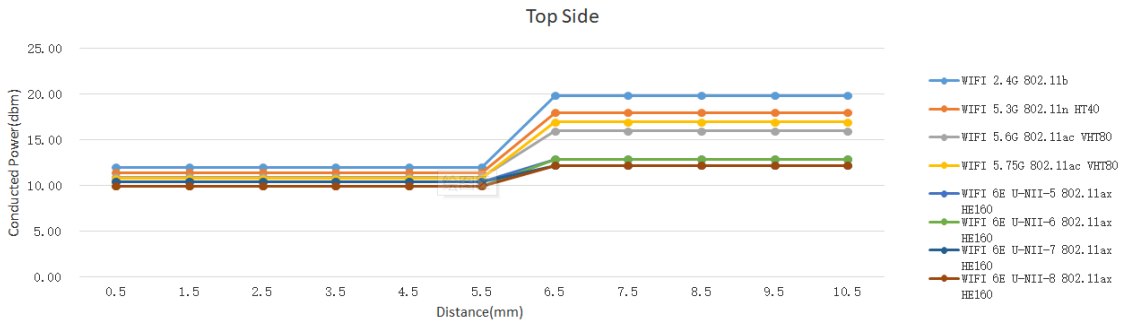
4) Right Side(moving toward the phantom)_Main Ant

mode		distance(mm)										
		Right Side										
		Sensor off					Sensor on					
		13	12	11	10	9	8	7	6	5	4	3
WIFI 2.4G	802.11b	19.88	19.88	19.88	19.88	19.88	11.95	11.95	11.95	11.95	11.95	11.95
WIFI 5.3G	802.11n HT40	17.98	17.98	17.98	17.98	17.98	11.38	11.38	11.38	11.38	11.38	11.38
WIFI 5.6G	802.11ac VHT80	15.96	15.96	15.96	15.96	15.96	10.92	10.92	10.92	10.92	10.92	10.92
WIFI 5.75G	802.11ac VHT80	16.94	16.94	16.94	16.94	16.94	10.76	10.76	10.76	10.76	10.76	10.76
WIFI 6E U-NII-5	802.11ax HE160	12.89	12.89	12.89	12.89	12.89	10.38	10.38	10.38	10.38	10.38	10.38
WIFI 6E U-NII-6	802.11ax HE160	12.89	12.89	12.89	12.89	12.89	9.92	9.92	9.92	9.92	9.92	9.92
WIFI 6E U-NII-7	802.11ax HE160	12.17	12.17	12.17	12.17	12.17	10.38	10.38	10.38	10.38	10.38	10.38
WIFI 6E U-NII-8	802.11ax HE160	12.18	12.18	12.18	12.18	12.18	9.89	9.89	9.89	9.89	9.89	9.89



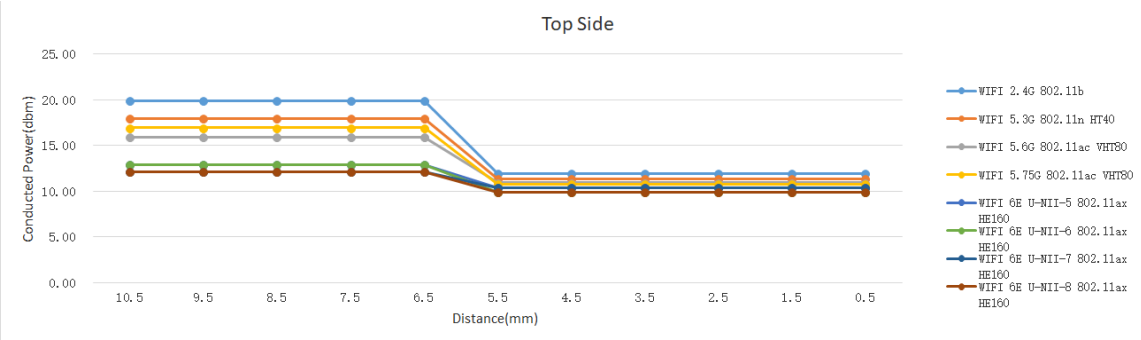
5) Top Side(moving away from the phantom)_Main Ant

mode		distance(mm)										
		Top Side										
		Sensor on						Sensor off				
		0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5
WIFI 2.4G	802.11b	11.95	11.95	11.95	11.95	11.95	11.95	19.88	19.88	19.88	19.88	19.88
WIFI 5.3G	802.11n HT40	11.38	11.38	11.38	11.38	11.38	11.38	17.98	17.98	17.98	17.98	17.98
WIFI 5.6G	802.11ac VHT80	10.92	10.92	10.92	10.92	10.92	10.92	15.96	15.96	15.96	15.96	15.96
WIFI 5.75G	802.11ac VHT80	10.76	10.76	10.76	10.76	10.76	10.76	16.94	16.94	16.94	16.94	16.94
WIFI 6E U-NII-5	802.11ax HE160	10.38	10.38	10.38	10.38	10.38	10.38	12.89	12.89	12.89	12.89	12.89
WIFI 6E U-NII-6	802.11ax HE160	9.92	9.92	9.92	9.92	9.92	9.92	12.89	12.89	12.89	12.89	12.89
WIFI 6E U-NII-7	802.11ax HE160	10.38	10.38	10.38	10.38	10.38	10.38	12.17	12.17	12.17	12.17	12.17
WIFI 6E U-NII-8	802.11ax HE160	9.89	9.89	9.89	9.89	9.89	9.89	12.18	12.18	12.18	12.18	12.18



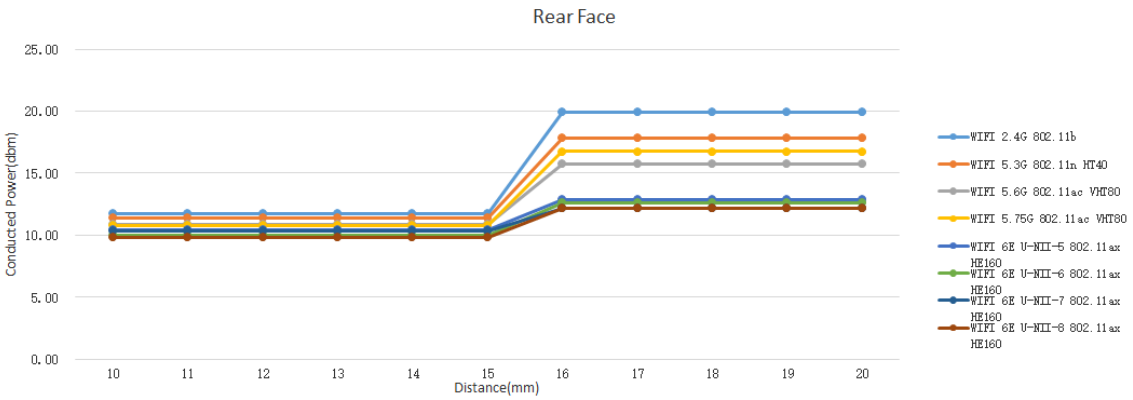
6) Top Side(moving toward the phantom)_Main Ant

mode		distance(mm)										
		Top Side										
		Sensor off					Sensor on					
		10.5	9.5	8.5	7.5	6.5	5.5	4.5	3.5	2.5	1.5	0.5
WIFI 2.4G	802.11b	19.88	19.88	19.88	19.88	19.88	11.95	11.95	11.95	11.95	11.95	11.95
WIFI 5.3G	802.11n HT40	17.98	17.98	17.98	17.98	17.98	11.38	11.38	11.38	11.38	11.38	11.38
WIFI 5.6G	802.11ac VHT80	15.96	15.96	15.96	15.96	15.96	10.92	10.92	10.92	10.92	10.92	10.92
WIFI 5.75G	802.11ac VHT80	16.94	16.94	16.94	16.94	16.94	10.76	10.76	10.76	10.76	10.76	10.76
WIFI 6E U-NII-5	802.11ax HE160	12.89	12.89	12.89	12.89	12.89	10.38	10.38	10.38	10.38	10.38	10.38
WIFI 6E U-NII-6	802.11ax HE160	12.89	12.89	12.89	12.89	12.89	9.92	9.92	9.92	9.92	9.92	9.92
WIFI 6E U-NII-7	802.11ax HE160	12.17	12.17	12.17	12.17	12.17	10.38	10.38	10.38	10.38	10.38	10.38
WIFI 6E U-NII-8	802.11ax HE160	12.18	12.18	12.18	12.18	12.18	9.89	9.89	9.89	9.89	9.89	9.89



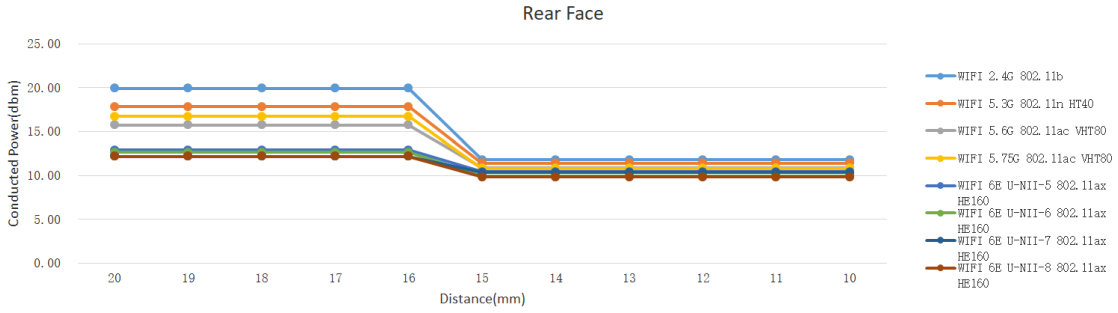
7) Rear Face(moving away from the phantom)_Aux Ant

mode		distance(mm)										
		Rear Face										
		Sensor on						Sensor off				
		10	11	12	13	14	15	16	17	18	19	20
WIFI 2.4G	802.11b	11.77	11.77	11.77	11.77	11.77	11.77	19.90	19.90	19.90	19.90	19.90
WIFI 5.3G	802.11n HT40	11.37	11.37	11.37	11.37	11.37	11.37	17.85	17.85	17.85	17.85	17.85
WIFI 5.6G	802.11ac VHT80	10.82	10.82	10.82	10.82	10.82	10.82	15.76	15.76	15.76	15.76	15.76
WIFI 5.75G	802.11ac VHT80	10.80	10.80	10.80	10.80	10.80	10.80	16.74	16.74	16.74	16.74	16.74
WIFI 6E U-NII-5	802.11ax HE160	10.42	10.42	10.42	10.42	10.42	10.42	12.88	12.88	12.88	12.88	12.88
WIFI 6E U-NII-6	802.11ax HE160	9.96	9.96	9.96	9.96	9.96	9.96	12.61	12.61	12.61	12.61	12.61
WIFI 6E U-NII-7	802.11ax HE160	10.34	10.34	10.34	10.34	10.34	10.34	12.15	12.15	12.15	12.15	12.15
WIFI 6E U-NII-8	802.11ax HE160	9.80	9.80	9.80	9.80	9.80	9.80	12.14	12.14	12.14	12.14	12.14



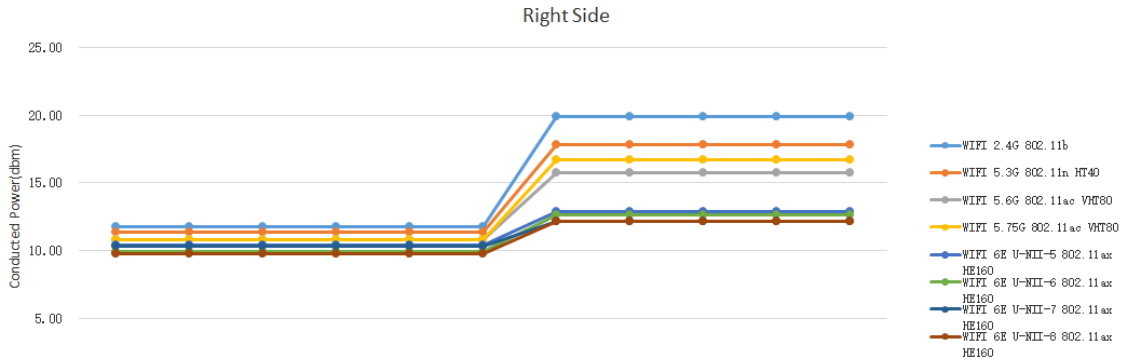
8) Rear Face(moving toward the phantom)_Aux Ant

mode		distance(mm)										
		Rear Face										
		Sensor off					Sensor on					
		20	19	18	17	16	15	14	13	12	11	10
WIFI 2.4G	802.11b	19.90	19.90	19.90	19.90	19.90	11.77	11.77	11.77	11.77	11.77	11.77
WIFI 5.3G	802.11n HT40	17.85	17.85	17.85	17.85	17.85	11.37	11.37	11.37	11.37	11.37	11.37
WIFI 5.6G	802.11ac VHT80	15.76	15.76	15.76	15.76	15.76	10.82	10.82	10.82	10.82	10.82	10.82
WIFI 5.75G	802.11ac VHT80	16.74	16.74	16.74	16.74	16.74	10.80	10.80	10.80	10.80	10.80	10.80
WIFI 6E U-NII-5	802.11ax HE160	12.88	12.88	12.88	12.88	12.88	10.42	10.42	10.42	10.42	10.42	10.42
WIFI 6E U-NII-6	802.11ax HE160	12.61	12.61	12.61	12.61	12.61	9.96	9.96	9.96	9.96	9.96	9.96
WIFI 6E U-NII-7	802.11ax HE160	12.15	12.15	12.15	12.15	12.15	10.34	10.34	10.34	10.34	10.34	10.34
WIFI 6E U-NII-8	802.11ax HE160	12.14	12.14	12.14	12.14	12.14	9.80	9.80	9.80	9.80	9.80	9.80



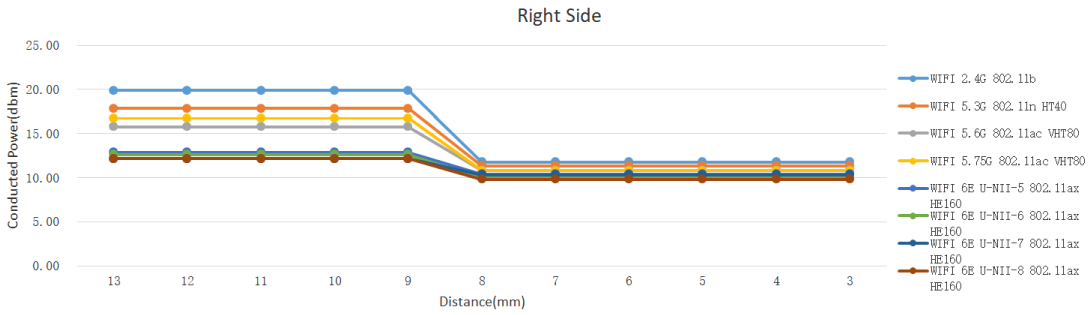
9) Right Side(moving away from the phantom)_Aux Ant

mode		distance(mm)										
		Right Side										
		Sensor on						Sensor off				
		3	4	5	6	7	8	9	10	11	12	13
WIFI 2.4G	802.11b	11.77	11.77	11.77	11.77	11.77	11.77	19.90	19.90	19.90	19.90	19.90
WIFI 5.3G	802.11n HT40	11.37	11.37	11.37	11.37	11.37	11.37	17.85	17.85	17.85	17.85	17.85
WIFI 5.6G	802.11ac VHT80	10.82	10.82	10.82	10.82	10.82	10.82	15.76	15.76	15.76	15.76	15.76
WIFI 5.75G	802.11ac VHT80	10.80	10.80	10.80	10.80	10.80	10.80	16.74	16.74	16.74	16.74	16.74
WIFI 6E U-NII-5	802.11ax HE160	10.42	10.42	10.42	10.42	10.42	10.42	12.88	12.88	12.88	12.88	12.88
WIFI 6E U-NII-6	802.11ax HE160	9.96	9.96	9.96	9.96	9.96	9.96	12.61	12.61	12.61	12.61	12.61
WIFI 6E U-NII-7	802.11ax HE160	10.34	10.34	10.34	10.34	10.34	10.34	12.15	12.15	12.15	12.15	12.15
WIFI 6E U-NII-8	802.11ax HE160	9.80	9.80	9.80	9.80	9.80	9.80	12.14	12.14	12.14	12.14	12.14



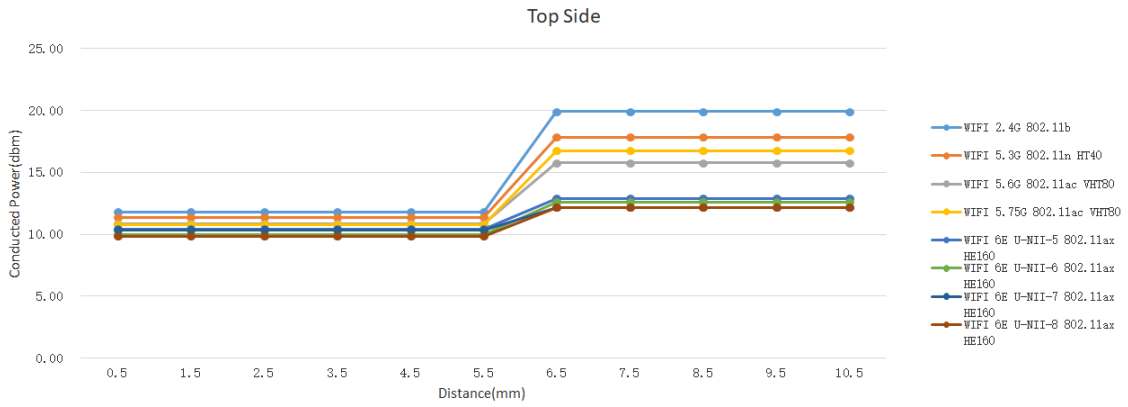
10) Right Side(moving toward the phantom)_Aux Ant

mode		distance(mm)										
		Right Side										
		Sensor off					Sensor on					
		13	12	11	10	9	8	7	6	5	4	3
WIFI 2.4G	802.11b	19.90	19.90	19.90	19.90	19.90	11.77	11.77	11.77	11.77	11.77	11.77
WIFI 5.3G	802.11n HT40	17.85	17.85	17.85	17.85	17.85	11.37	11.37	11.37	11.37	11.37	11.37
WIFI 5.6G	802.11ac VHT80	15.76	15.76	15.76	15.76	15.76	10.82	10.82	10.82	10.82	10.82	10.82
WIFI 5.75G	802.11ac VHT80	16.74	16.74	16.74	16.74	16.74	10.80	10.80	10.80	10.80	10.80	10.80
WIFI 6E U-NII-5	802.11ax HE160	12.88	12.88	12.88	12.88	12.88	10.42	10.42	10.42	10.42	10.42	10.42
WIFI 6E U-NII-6	802.11ax HE160	12.61	12.61	12.61	12.61	12.61	9.96	9.96	9.96	9.96	9.96	9.96
WIFI 6E U-NII-7	802.11ax HE160	12.15	12.15	12.15	12.15	12.15	10.34	10.34	10.34	10.34	10.34	10.34
WIFI 6E U-NII-8	802.11ax HE160	12.14	12.14	12.14	12.14	12.14	9.80	9.80	9.80	9.80	9.80	9.80



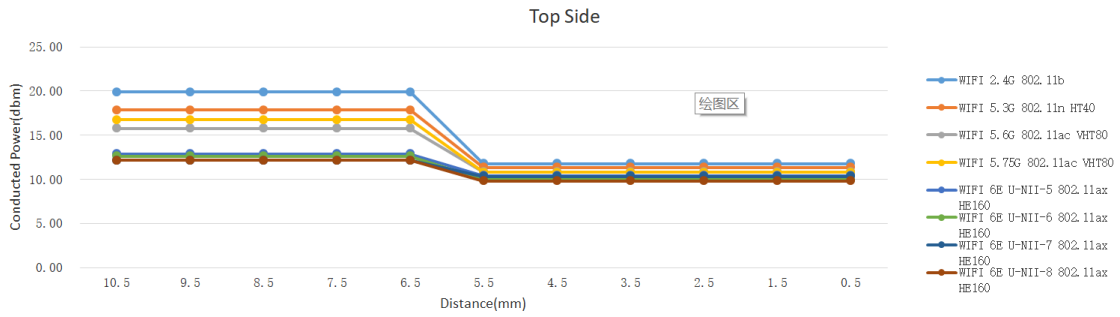
11) Top Side(moving away from the phantom)_Aux Ant

mode		distance(mm)										
		Top Side										
		Sensor on						Sensor off				
		0.5	1.5	2.5	3.5	4.5	5.5	6.5	7.5	8.5	9.5	10.5
WIFI 2.4G	802.11b	11.77	11.77	11.77	11.77	11.77	11.77	19.90	19.90	19.90	19.90	19.90
WIFI 5.3G	802.11n HT40	11.37	11.37	11.37	11.37	11.37	11.37	17.85	17.85	17.85	17.85	17.85
WIFI 5.6G	802.11ac VHT80	10.82	10.82	10.82	10.82	10.82	10.82	15.76	15.76	15.76	15.76	15.76
WIFI 5.75G	802.11ac VHT80	10.80	10.80	10.80	10.80	10.80	10.80	16.74	16.74	16.74	16.74	16.74
WIFI 6E U-NII-5	802.11ax HE160	10.42	10.42	10.42	10.42	10.42	10.42	12.88	12.88	12.88	12.88	12.88
WIFI 6E U-NII-6	802.11ax HE160	9.96	9.96	9.96	9.96	9.96	9.96	12.61	12.61	12.61	12.61	12.61
WIFI 6E U-NII-7	802.11ax HE160	10.34	10.34	10.34	10.34	10.34	10.34	12.15	12.15	12.15	12.15	12.15
WIFI 6E U-NII-8	802.11ax HE160	9.80	9.80	9.80	9.80	9.80	9.80	12.14	12.14	12.14	12.14	12.14



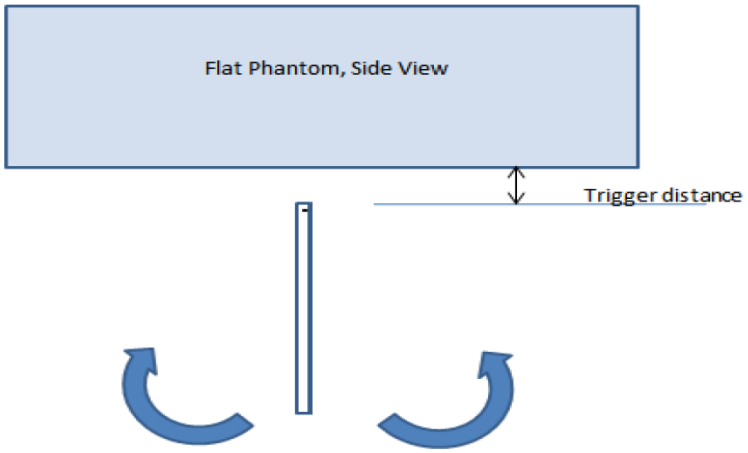
12) Top Side(moving toward the phantom)_Aux Ant

mode		distance(mm)										
		Top Side										
		Sensor off					Sensor on					
		10.5	9.5	8.5	7.5	6.5	5.5	4.5	3.5	2.5	1.5	0.5
WIFI 2.4G	802.11b	19.90	19.90	19.90	19.90	19.90	11.77	11.77	11.77	11.77	11.77	11.77
WIFI 5.3G	802.11n HT40	17.85	17.85	17.85	17.85	17.85	11.37	11.37	11.37	11.37	11.37	11.37
WIFI 5.6G	802.11ac VHT80	15.76	15.76	15.76	15.76	15.76	10.82	10.82	10.82	10.82	10.82	10.82
WIFI 5.75G	802.11ac VHT80	16.74	16.74	16.74	16.74	16.74	10.80	10.80	10.80	10.80	10.80	10.80
WIFI 6E U-NII-5	802.11ax HE160	12.88	12.88	12.88	12.88	12.88	10.42	10.42	10.42	10.42	10.42	10.42
WIFI 6E U-NII-6	802.11ax HE160	12.61	12.61	12.61	12.61	12.61	9.96	9.96	9.96	9.96	9.96	9.96
WIFI 6E U-NII-7	802.11ax HE160	12.15	12.15	12.15	12.15	12.15	10.34	10.34	10.34	10.34	10.34	10.34
WIFI 6E U-NII-8	802.11ax HE160	12.14	12.14	12.14	12.14	12.14	9.80	9.80	9.80	9.80	9.80	9.80



6.2.1.3 Procedures for determining device tilt angle influences to proximity sensor triggering

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with Bottom side parallel to the base of the flat phantom for each band.
The EUT was rotated about Top side for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.
The proximity sensor triggering tilt angle measurement method is as below:



Picture: Proximity sensor tilts angle assessment

Table 2: Summary of EUT Tilt Angle Influence to Proximity Sensor Triggering (Top side)

Mode	Minimum distance at which power reduction was maintained over +/-45°	Power reduction status(ON/OFF)										
		-45°	-40°	-30°	-20°	-10°	-0°	10°	20°	30°	40°	45°
WiFi 2.4G	5.5mm	on	on	on	on	on	on	on	on	on	on	on
WiFi 5G	5.5mm	on	on	on	on	on	on	on	on	on	on	on

Table 3: Summary of EUT Tilt Angle Influence to Proximity Sensor Triggering (Right side)

Mode	Minimum distance at which power reduction was maintained over +/-45°	Power reduction status(ON/OFF)										
		-45°	-40°	-30°	-20°	-10°	-0°	10°	20°	30°	40°	45°
WiFi 2.4G	8mm	on	on	on	on	on	on	on	on	on	on	on
WiFi 5G	8mm	on	on	on	on	on	on	on	on	on	on	on

Conclusion: It can be ensured that the proximity sensor can be valid triggered for the DUT tilt coverage exposure condition (WiFi 2.4G/5G with WiFi Antenna).

6.2.1.4 Summary SAR test Plan for Proximity sensor power reduction

The proximity sensor is used to indicate when the device is held close to a user's body exposure condition. SAR tests with proximity sensor power reduction are required for front side, back side, top side and right side of WiFi 2.4G and WiFi 5G with WiFi Antenna. For the other sides or other frequency bands of the device, SAR is still tested at the maximum power level with sensor off.

Per KDB616217, to ensure all production units are compliant, the smallest separation distance determined by the sensor triggering and sensor coverage for normal and tilt positions for all usage conditions, minus 1 mm, must be used as the test separation distance for additional SAR testing with sensor off.
For this device, as proximity sensor power reduction supports multiple power stages, so we plan that the additional SAR should be considered at the conservative distance, minus 1 mm, for each power stage.

7 SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

7.1 SAR MEASUREMENT VARIABILITY

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

The detailed repeated measurement results are shown in Section 8.2.

8 CONDUCTED POWER RESULTS

8.1 CONDUCTED POWER MEASUREMENT RESULTS OF BLUETOOTH

BT	Average Conducted Power(dBm)			
	Max. Tune up	CH0 2402MHz	CH39 2441MHz	CH78 2480MHz
DH5	9.50	**8.62**	**8.92**	**9.12**
2DH5	5.50	5.21	5.28	5.37
3DH5	5.50	5.30	5.23	5.36

BT	Average Conducted Power(dBm)			
	Max. Tune up	CH0 2402MHz	CH19 2440MHz	CH39 2480MHz
BLE(1M)	8.50	8.39	8.28	8.35
BLE(2M)	8.50	7.62	7.80	8.01

Note: The tested channel results are marks in bold.

8.2 CONDUCTED POWER MEASUREMENTS OF WI-FI 2.4GHZ BAND

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
2.4G WIFI _1TX _ANT Main	802.11b	1	2412	1	12.00	**11.94**
		6	2437		12.00	**11.85**
		11	2462		12.00	**11.95**
	802.11g	1	2412	6	12.00	11.52
		6	2437		12.00	11.69
		11	2462		12.00	11.58
	802.11n HT20	1	2412	HT0	12.00	Not Required
		6	2437		12.00	
		11	2462		12.00	
	802.11n HT40	3	2422	HT0	12.00	
		6	2437		12.00	
		9	2452		12.00	
	802.11ax HE20	1	2412	HE0	12.00	
		6	2437		12.00	
		11	2462		12.00	
	802.11ax HE40	3	2422	HE0	12.00	
		6	2437		12.00	
		9	2452		12.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
2.4G WIFI _1TX _ANT Aux	802.11b	1	2412	1	12.00	**11.76**
		6	2437		12.00	**11.77**
		11	2462		12.00	**11.76**
	802.11g	1	2412	6	12.00	11.47
		6	2437		12.00	11.72
		11	2462		12.00	11.59
	802.11n HT20	1	2412	HT0	12.00	Not Required
		6	2437		12.00	
		11	2462		12.00	
	802.11n HT40	3	2422	HT0	12.00	
		6	2437		12.00	
		9	2452		12.00	
	802.11ax HE20	1	2412	HE0	12.00	
		6	2437		12.00	
		11	2462		12.00	
	802.11ax HE40	3	2422	HE0	12.00	
		6	2437		12.00	
		9	2452		12.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
2.4G WIFI _2TX _ANT Main +Aux	802.11g	1	2412	6	11.52	11.47	15.00	14.51
		6	2437		11.69	11.72	15.00	14.72
		11	2462		11.58	11.59	15.00	14.60
	802.11n HT20	1	2412	HT8	-	-	15.00	Not Required
		6	2437		-	-	15.00	
		11	2462		-	-	15.00	
	802.11n HT40	3	2422	HT8	-	-	15.00	
		6	2437		-	-	15.00	
		9	2452		-	-	15.00	
	802.11ax HE20	1	2412	HE8	-	-	15.00	
		6	2437		-	-	15.00	
		11	2462		-	-	15.00	
	802.11ax HE40	3	2422	HE8	-	-	15.00	
		6	2437		-	-	15.00	
		9	2452		-	-	15.00	

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
2.4G WIFI _1TX _ANT Main	802.11b	1	2412	1	20.00	**19.87**
		6	2437		20.00	**19.88**
		11	2462		20.00	**19.75**
	802.11g	1	2412	6	17.25	17.07
		6	2437		20.00	19.69
		11	2462		17.00	16.72
	802.11n HT20	1	2412	HT0	17.25	Not Required
		6	2437		20.00	
		11	2462		17.00	
	802.11n HT40	3	2422	HT0	17.25	
		6	2437		20.00	
		9	2452		17.00	
	802.11ax HE20	1	2412	HE0	17.25	
		6	2437		20.00	
		11	2462		17.00	
	802.11ax HE40	3	2422	HE0	17.25	
		6	2437		20.00	
		9	2452		17.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
2.4G WIFI _1TX _ANT Aux	802.11b	1	2412	1	20.00	**19.88**
		6	2437		20.00	**19.90**
		11	2462		20.00	**19.86**
	802.11g	1	2412	6	17.25	17.11
		6	2437		20.00	19.72
		11	2462		17.25	17.19
	802.11n HT20	1	2412	HT0	17.25	Not Required
		6	2437		20.00	
		11	2462		17.25	
	802.11n HT40	3	2422	HT0	15.50	
		6	2437		16.75	
		9	2452		15.25	
	802.11ax HE20	1	2412	HE0	17.25	
		6	2437		20.00	
		11	2462		17.25	
	802.11ax HE40	3	2422	HE0	15.50	
		6	2437		16.75	
		9	2452		15.25	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
2.4G WIFI _2TX _ANT Main +Aux	802.11g	1	2412	6	15.25	15.15	18.50	18.21
		6	2437		19.69	19.72	23.00	22.72
		11	2462		15.34	15.28	18.50	18.32
	802.11n HT20	1	2412	HT8	-	-	18.50	Not Required
		6	2437		-	-	23.00	
		11	2462		-	-	18.50	
	802.11n HT40	3	2422	HT8	-	-	17.50	
		6	2437		-	-	18.25	
		9	2452		-	-	16.75	
	802.11ax HE20	1	2412	HE8	-	-	18.50	
		6	2437		-	-	23.00	
		11	2462		-	-	18.50	
	802.11ax HE40	3	2422	HE8	-	-	17.50	
		6	2437		-	-	18.25	
		9	2452		-	-	16.75	

Note: The tested channel results are marks in bold.

8.3 CONDUCTED POWER MEASUREMENTS OF 5G UNII_1

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.2G WIFI _1TX _ANT Main	802.11a	36	5180	6	11.50	Not Required
		40	5200		11.50	
		44	5220		11.50	
		48	5240		11.50	
	802.11n HT20	36	5180	HT0	11.50	
		40	5200		11.50	
		44	5220		11.50	
		48	5240		11.50	
	802.11n HT40	38	5190	HT0	11.50	
		46	5230		11.50	
	802.11ax HE20	36	5180	VHT0	11.50	
		40	5200		11.50	
		44	5220		11.50	
		48	5240		11.50	
	802.11ax HE40	38	5190	HE0	11.50	
		46	5230		11.50	
	802.11ac VHT80	42	5210	HE0	11.50	
	802.11ax HE80	42	5250	HE0	11.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.2G WIFI _1TX _ANT Aux	802.11a	36	5180	6	11.50	Not Required
		40	5200		11.50	
		44	5220		11.50	
		48	5240		11.50	
	802.11n HT20	36	5180	HT0	11.50	
		40	5200		11.50	
		44	5220		11.50	
		48	5240		11.50	
	802.11n HT40	38	5190	HT0	11.50	
		46	5230		11.50	
	802.11ax HE20	36	5180	VHT0	11.50	
		40	5200		11.50	
		44	5220		11.50	
		48	5240		11.50	
	802.11ax HE40	38	5190	HE0	11.50	
		46	5230		11.50	
	802.11ac VHT80	42	5210	HE0	11.50	
	802.11ax HE80	42	5250	HE0	11.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.2G WIFI _2TX _ANT Main +Aux	802.11a	36	5180	6	-	-	14.50	Not Required
		40	5200		-	-	14.50	
		44	5220		-	-	14.50	
		48	5240		-	-	14.50	
	802.11n HT20	36	5180	HT0	-	-	14.50	
		40	5200		-	-	14.50	
		44	5220		-	-	14.50	
		48	5240		-	-	14.50	
	802.11n HT40	38	5190	HT0	-	-	14.50	
		46	5230		-	-	14.50	
	802.11ax HE20	36	5180	VHT0	-	-	14.50	
		40	5200		-	-	14.50	
		44	5220		-	-	14.50	
		48	5240		-	-	14.50	
	802.11ax HE40	38	5190	HE0	-	-	14.50	
		46	5230		-	-	14.50	
	802.11ac VHT80	42	5210	HE0	-	-	14.50	
	802.11ax HE80	42	5250	HE0	-	-	14.50	

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.2G WIFI _1TX _ANT Main	802.11a	36	5180	6	18.00	Not Required
		40	5200		18.00	
		44	5220		18.00	
		48	5240		18.00	
	802.11n HT20	36	5180	HT0	18.00	
		40	5200		18.00	
		44	5220		18.00	
		48	5240		18.00	
	802.11n HT40	38	5190	HT0	18.00	
		46	5230		18.00	
	802.11ax HE20	36	5180	VHT0	18.00	
		40	5200		18.00	
		44	5220		18.00	
		48	5240		18.00	
	802.11ax HE40	38	5190	HE0	18.00	
		46	5230		18.00	
	802.11ac VHT80	42	5210	HE0	18.00	
	802.11ax HE80	42	5250	HE0	18.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.2G WIFI _1TX _ANT Aux	802.11a	36	5180	6	16.50	Not Required
		40	5200		16.50	
		44	5220		16.50	
		48	5240		16.50	
	802.11n HT20	36	5180	HT0	16.50	
		40	5200		16.50	
		44	5220		16.50	
		48	5240		16.50	
	802.11n HT40	38	5190	HT0	16.50	
		46	5230		16.50	
	802.11ax HE20	36	5180	VHT0	16.50	
		40	5200		16.50	
		44	5220		16.50	
		48	5240		16.50	
	802.11ax HE40	38	5190	HE0	16.50	
		46	5230		16.50	
	802.11ac VHT80	42	5210	HE0	16.50	
	802.11ax HE80	42	5250	HE0	16.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.2G WIFI _2TX _ANT Main +Aux	802.11a	36	5180	6	-	-	18.50	Not Required
		40	5200		-	-	20.25	
		44	5220		-	-	20.25	
		48	5240		-	-	20.25	
	802.11n HT20	36	5180	HT8	-	-	18.50	
		40	5200		-	-	20.25	
		44	5220		-	-	20.25	
		48	5240		-	-	20.25	
	802.11n HT40	38	5190	HT8	-	-	17.75	
		46	5230		-	-	19.75	
	802.11ax HE20	36	5180	VHT8	-	-	18.50	
		40	5200		-	-	20.25	
		44	5220		-	-	20.25	
		48	5240		-	-	20.25	
	802.11ax HE40	38	5190	HE8	-	-	17.75	
		46	5230		-	-	19.75	
	802.11ac VHT80	42	5210	HE8	-	-	18.00	
	802.11ax HE80	42	5250	HE8	-	-	18.00	

Note: The tested channel results are marks in bold.

8.4 CONDUCTED POWER MEASUREMENTS OF 5G UNII_2A

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.3G WIFI _1TX _ANT Main	802.11a	52	5260	6	11.50	Not Required
		56	5280		11.50	
		60	5300		11.50	
		64	5320		11.50	
	802.11n HT20	52	5260	HT0	11.50	
		56	5280		11.50	
		60	5300		11.50	
		64	5320		11.50	
	802.11ax HE20	52	5260	HE0	11.50	
		56	5280		11.50	
		60	5300		11.50	
		64	5320		11.50	
	802.11n HT40	54	5270	HT0	11.50	**11.37**
		62	5310		11.50	**11.32**
	802.11ax HE40	54	5270	HE0	11.50	11.24
		62	5310		11.50	11.27
	802.11ac VHT80	58	5290	VHT0	11.50	11.29
	802.11ax HE80	58	5290	HE0	11.50	11.26
	802.11ac VHT160	50	5250	VHT0	11.50	11.29
	802.11ax HE160	50	5250	HE0	11.50	11.28

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.3G WIFI _1TX _ANT Aux	802.11a	52	5260	6	11.50	Not Required
		56	5280		11.50	
		60	5300		11.50	
		64	5320		11.50	
	802.11n HT20	52	5260	HT0	11.50	
		56	5280		11.50	
		60	5300		11.50	
		64	5320		11.50	
	802.11ax HE20	52	5260	HE0	11.50	
		56	5280		11.50	
		60	5300		11.50	
		64	5320		11.50	
	802.11n HT40	54	5270	HT0	11.50	**11.38**
		62	5310		11.50	**11.36**
	802.11ax HE40	54	5270	HE0	11.50	11.30
		62	5310		11.50	11.34
	802.11ac VHT80	58	5290	VHT0	11.50	11.35
	802.11ax HE80	58	5290	HE0	11.50	11.33
	802.11ac VHT160	50	5250	VHT0	11.50	11.27
	802.11ax HE160	50	5250	HE0	11.50	11.34

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.3G WIFI _2TX _ANT Main +Aux	802.11a	52	5260	6	-	-	14.50	Not Required
		56	5280		-	-	14.50	
		60	5300		-	-	14.50	
		64	5320		-	-	14.50	
	802.11n HT20	52	5260	HT0	-	-	14.50	
		56	5280		-	-	14.50	
		60	5300		-	-	14.50	
		64	5320		-	-	14.50	
	802.11ax HE20	52	5260	HE0	-	-	14.50	
		56	5280		-	-	14.50	
		60	5300		-	-	14.50	
		64	5320		-	-	14.50	
	802.11n HT40	54	5270	HT0	11.37	11.38	14.50	14.39
		62	5310		11.32	11.36	14.50	14.35
	802.11ax HE40	54	5270	HE0	11.24	11.30	14.50	14.28
		62	5310		11.27	11.34	14.50	14.32
	802.11ac VHT80	58	5290	VHT0	11.29	11.35	14.50	14.33
	802.11ax HE80	58	5290	HE0	11.26	11.33	14.50	14.31
	802.11ac VHT160	50	5250	VHT0	11.29	11.27	14.50	14.29
	802.11ax HE160	50	5250	HE0	11.28	11.34	14.50	14.32

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.3G WIFI _1TX _ANT Main	802.11a	52	5260	6	18.00	Not Required
		56	5280		18.00	
		60	5300		18.00	
		64	5320		18.00	
	802.11n HT20	52	5260	HT0	18.00	
		56	5280		18.00	
		60	5300		18.00	
		64	5320		18.00	
	802.11ax HE20	52	5260	HE0	18.00	
		56	5280		18.00	
		60	5300		18.00	
		64	5320		18.00	
	802.11n HT40	54	5270	HT0	18.00	**17.98**
		62	5310		17.25	**17.19**
	802.11ax HE40	54	5270	HE0	18.00	Not Required
		62	5310		17.25	
	802.11ac VHT80	58	5290	VHT0	17.25	
	802.11ax HE80	58	5290	HE0	17.25	
	802.11ac VHT160	50	5250	VHT0	15.50	
	802.11ax HE160	50	5250	HE0	15.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.3G WIFI _1TX _ANT Aux	802.11a	52	5260	6	16.50	Not Required
		56	5280		16.50	
		60	5300		16.50	
		64	5320		16.50	
	802.11n HT20	52	5260	HT0	16.50	
		56	5280		16.50	
		60	5300		16.50	
		64	5320		16.50	
	802.11ax HE20	52	5260	HE0	16.50	
		56	5280		16.50	
		60	5300		16.50	
		64	5320		16.50	
	802.11n HT40	54	5270	HT0	18.00	**17.85**
		62	5310		16.00	**15.81**
	802.11ax HE40	54	5270	HE0	16.50	Not Required
		62	5310		16.00	
	802.11ac VHT80	58	5290	VHT0	16.50	
	802.11ax HE80	58	5290	HE0	16.50	
	802.11ac VHT160	50	5250	VHT0	14.00	
	802.11ax HE160	50	5250	HE0	14.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.3G WIFI _2TX _ANT Main +Aux	802.11a	52	5260	6	-	-	20.25	Not Required
		56	5280		-	-	20.25	
		60	5300		-	-	20.25	
		64	5320		-	-	19.00	
	802.11n HT20	52	5260	HT8	-	-	20.25	
		56	5280		-	-	20.25	
		60	5300		-	-	20.25	
		64	5320		-	-	19.00	
	802.11ax HE20	52	5260	HE8	-	-	20.25	
		56	5280		-	-	20.25	
		60	5300		-	-	20.25	
		64	5320		-	-	19.00	
	802.11n HT40	54	5270	HT8	17.44	17.59	20.75	20.53
		62	5310		15.36	15.54	18.50	18.46
	802.11ax HE40	54	5270	HE8	-	-	20.75	Not Required
		62	5310		-	-	18.50	
	802.11ac VHT80	58	5290	VHT8	-	-	18.00	
	802.11ax HE80	58	5290	HE8	-	-	18.00	
	802.11ac VHT160	50	5250	VHT08	-	-	15.25	
	802.11ax HE160	50	5250	HE0	-	-	15.25	

Note: The tested channel results are marks in bold.

8.5 CONDUCTED POWER MEASUREMENTS OF 5G UNII_2C

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.6G WIFI _1TX _ANT Main	802.11a	100	5500	6	11.00	Not Required
		104	5520		11.00	
		108	5540		11.00	
		112	5560		11.00	
		116	5580		11.00	
		120	5600		11.00	
		124	5620		11.00	
		128	5640		11.00	
	802.11n HT20	100	5500	HT0	11.00	
		104	5520		11.00	
		108	5540		11.00	
		112	5560		11.00	
		116	5580		11.00	
		120	5600		11.00	
		124	5620		11.00	
		128	5640		11.00	
	802.11ax HE20	100	5500	HE0	11.00	
		104	5520		11.00	
		108	5540		11.00	
		112	5560		11.00	
		116	5580		11.00	
		120	5600		11.00	
		124	5620		11.00	
		128	5640		11.00	
	802.11n HT40	102	5510	HT0	11.00	
		110	5550		11.00	
		118	5590		11.00	
		126	5630		11.00	
	802.11ax HE40	102	5510	HE0	11.00	
		110	5550		11.00	
		118	5590		11.00	
		126	5630		11.00	
	802.11ac VHT80	106	5530	VHT0	11.00	**10.80**
		122	5610		11.00	**10.82**
	802.11ax HE80	106	5530	HE0	11.00	10.70
		122	5610		11.00	10.76
	802.11ac VHT160	114	5570	VHT0	11.00	10.75
	802.11ax HE160	114	5570	HE0	11.00	10.72

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.6G WIFI _1TX _ANT Aux	802.11a	100	5500	6	11.00	Not Required
		104	5520		11.00	
		108	5540		11.00	
		112	5560		11.00	
		116	5580		11.00	
		120	5600		11.00	
		124	5620		11.00	
		128	5640		11.00	
	802.11n HT20	100	5500	HT0	11.00	
		104	5520		11.00	
		108	5540		11.00	
		112	5560		11.00	
		116	5580		11.00	
		120	5600		11.00	
		124	5620		11.00	
		128	5640		11.00	
	802.11ax HE20	100	5500	HE0	11.00	
		104	5520		11.00	
		108	5540		11.00	
		112	5560		11.00	
		116	5580		11.00	
		120	5600		11.00	
		124	5620		11.00	
		128	5640		11.00	
	802.11n HT40	102	5510	HT0	11.00	
		110	5550		11.00	
		118	5590		11.00	
		126	5630		11.00	
	802.11ax HE40	102	5510	HE0	11.00	
		110	5550		11.00	
		118	5590		11.00	
		126	5630		11.00	
	802.11ac VHT80	106	5530	VHT0	11.00	**10.90**
		122	5610		11.00	**10.92**
	802.11ax HE80	106	5530	HE0	11.00	10.82
		122	5610		11.00	10.88
	802.11ac VHT160	114	5570	VHT0	11.00	10.88
	802.11ax HE160	114	5570	HE0	11.00	10.89

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.6G WIFI _2TX _ANT Main +Aux	802.11a	100	5500	6	-	-	14.00	Not Required
		104	5520		-	-	14.00	
		108	5540		-	-	14.00	
		112	5560		-	-	14.00	
		116	5580		-	-	14.00	
		120	5600		-	-	14.00	
		124	5620		-	-	14.00	
		128	5640		-	-	14.00	
	802.11n HT20	100	5500	HT0	-	-	14.00	
		104	5520		-	-	14.00	
		108	5540		-	-	14.00	
		112	5560		-	-	14.00	
		116	5580		-	-	14.00	
		120	5600		-	-	14.00	
		124	5620		-	-	14.00	
		128	5640		-	-	14.00	
	802.11ax HE20	100	5500	HE0	-	-	14.00	
		104	5520		-	-	14.00	
		108	5540		-	-	14.00	
		112	5560		-	-	14.00	
		116	5580		-	-	14.00	
		120	5600		-	-	14.00	
		124	5620		-	-	14.00	
		128	5640		-	-	14.00	
	802.11n HT40	102	5510	HT0	-	-	14.00	
		110	5550		-	-	14.00	
		118	5590		-	-	14.00	
		126	5630		-	-	14.00	
	802.11ax HE40	102	5510	HE0	-	-	14.00	
		110	5550		-	-	14.00	
		118	5590		-	-	14.00	
		126	5630		-	-	14.00	
	802.11ac VHT80	106	5530	VHT0	10.80	10.90	14.00	13.86
		122	5610		10.82	10.92	14.00	13.88
	802.11ax HE80	106	5530	HE0	10.70	10.82	14.00	13.77
		122	5610		10.76	10.88	14.00	13.83
	802.11ac VHT160	114	5570	VHT0	10.75	10.88	14.00	13.83
	802.11ax HE160	114	5570	HE0	10.72	10.89	14.00	13.82

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.6G WIFI _1TX _ANT Main	802.11a	100	5500	6	16.00	Not Required
		104	5520		16.00	
		108	5540		16.00	
		112	5560		16.00	
		116	5580		16.00	
		120	5600		16.00	
		124	5620		16.00	
		128	5640		16.00	
	802.11n HT20	100	5500	HT0	16.00	
		104	5520		16.00	
		108	5540		16.00	
		112	5560		16.00	
		116	5580		16.00	
		120	5600		16.00	
		124	5620		16.00	
		128	5640		16.00	
	802.11ax HE20	100	5500	HE0	16.00	
		104	5520		16.00	
		108	5540		16.00	
		112	5560		16.00	
		116	5580		16.00	
		120	5600		16.00	
		124	5620		16.00	
		128	5640		16.00	
	802.11n HT40	102	5510	HT0	16.00	
		110	5550		16.00	
		118	5590		16.00	
		126	5630		16.00	
	802.11ax HE40	102	5510	HE0	16.00	
		110	5550		16.00	
		118	5590		16.00	
		126	5630		16.00	
	802.11ac VHT80	106	5530	VHT0	16.00	**15.92**
		122	5610		16.00	**15.96**
	802.11ax HE80	106	5530	HE0	16.00	Not Required
		122	5610		16.00	
	802.11ac VHT160	114	5570	VHT0	15.00	
	802.11ax HE160	114	5570	HE0	15.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.6G WIFI _1TX _ANT Aux	802.11a	100	5500	6	16.00	Not Required
		104	5520		16.00	
		108	5540		16.00	
		112	5560		16.00	
		116	5580		16.00	
		120	5600		16.00	
		124	5620		16.00	
		128	5640		16.00	
	802.11n HT20	100	5500	HT0	16.00	
		104	5520		16.00	
		108	5540		16.00	
		112	5560		16.00	
		116	5580		16.00	
		120	5600		16.00	
		124	5620		16.00	
		128	5640		16.00	
	802.11ax HE20	100	5500	HE0	16.00	
		104	5520		16.00	
		108	5540		16.00	
		112	5560		16.00	
		116	5580		16.00	
		120	5600		16.00	
		124	5620		16.00	
		128	5640		16.00	
	802.11n HT40	102	5510	HT0	16.00	
		110	5550		16.00	
		118	5590		16.00	
		126	5630		16.00	
	802.11ax HE40	102	5510	HE0	16.00	
		110	5550		16.00	
		118	5590		16.00	
		126	5630		16.00	
	802.11ac VHT80	106	5530	VHT0	16.00	**15.74**
		122	5610		16.00	**15.76**
	802.11ax HE80	106	5530	HE0	16.00	Not Required
		122	5610		16.00	
	802.11ac VHT160	114	5570	VHT0	15.25	
	802.11ax HE160	114	5570	HE0	15.25	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.6G WIFI _2TX _ANT Main +Aux	802.11a	100	5500	6	-	-	19.00	Not Required
		104	5520		-	-	19.00	
		108	5540		-	-	19.00	
		112	5560		-	-	19.00	
		116	5580		-	-	19.00	
		120	5600		-	-	19.00	
		124	5620		-	-	19.00	
		128	5640		-	-	19.00	
	802.11n HT20	100	5500	HT8	-	-	19.00	
		104	5520		-	-	19.00	
		108	5540		-	-	19.00	
		112	5560		-	-	19.00	
		116	5580		-	-	19.00	
		120	5600		-	-	19.00	
		124	5620		-	-	19.00	
		128	5640		-	-	19.00	
	802.11ax HE20	100	5500	HE8	-	-	19.00	
		104	5520		-	-	19.00	
		108	5540		-	-	19.00	
		112	5560		-	-	19.00	
		116	5580		-	-	19.00	
		120	5600		-	-	19.00	
		124	5620		-	-	19.00	
		128	5640		-	-	19.00	
	802.11n HT40	102	5510	HT8	-	-	19.00	
		110	5550		-	-	19.00	
		118	5590		-	-	19.00	
		126	5630		-	-	19.00	
	802.11ax HE40	102	5510	HE8	-	-	19.00	
		110	5550		-	-	19.00	
		118	5590		-	-	19.00	
		126	5630		-	-	19.00	
	802.11ac VHT80	106	5530	VHT8	15.79	15.81	19.00	18.81
		122	5610		15.65	15.86	19.00	18.77
	802.11ax HE80	106	5530	HE8	-	-	19.00	Not Required
		122	5610		-	-	19.00	
	802.11ac VHT160	114	5570	VHT8	-	-	16.50	
	802.11ax HE160	114	5570	HE8	-	-	16.50	

Note: The tested channel results are marks in bold.

8.6 CONDUCTED POWER MEASUREMENTS OF 5G UNII_3

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.8G WIFI _1TX _ANT Main	802.11a	132	5660	6	11.00	Not Required
		136	5680		11.00	
		140	5700		11.00	
		149	5745		11.00	
		153	5765		11.00	
		157	5785		11.00	
		161	5805		11.00	
		165	5825		11.00	
	802.11n HT20	132	5660	HT0	11.00	
		136	5680		11.00	
		140	5700		11.00	
		149	5745		11.00	
		153	5765		11.00	
		157	5785		11.00	
		161	5805		11.00	
		165	5825		11.00	
	802.11ax HE20	132	5660	HE0	11.00	
		136	5680		11.00	
		140	5700		11.00	
		149	5745		11.00	
		153	5765		11.00	
		157	5785		11.00	
		161	5805		11.00	
		165	5825		11.00	
	802.11n HT40	134	5670	HT0	11.00	
		142	5710		11.00	
		151	5755		11.00	
		159	5795		11.00	
	802.11ax HE40	134	5670	HE0	11.00	
		142	5710		11.00	
		151	5755		11.00	
		159	5795		11.00	
	802.11ac VHT80	138	5690	VHT0	11.00	**10.80**
		155	5775		11.00	**10.74**
	802.11ax HE80	138	5690	HE0	11.00	Not Required
		155	5775		11.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.8G WIFI _1TX _ANT Aux	802.11a	132	5660	6	11.00	Not Required
		136	5680		11.00	
		140	5700		11.00	
		149	5745		11.00	
		153	5765		11.00	
		157	5785		11.00	
		161	5805		11.00	
		165	5825		11.00	
	802.11n HT20	132	5660	HT0	11.00	
		136	5680		11.00	
		140	5700		11.00	
		149	5745		11.00	
		153	5765		11.00	
		157	5785		11.00	
		161	5805		11.00	
		165	5825		11.00	
	802.11ax HE20	132	5660	HE0	11.00	
		136	5680		11.00	
		140	5700		11.00	
		149	5745		11.00	
		153	5765		11.00	
		157	5785		11.00	
		161	5805		11.00	
		165	5825		11.00	
	802.11n HT40	134	5670	HT0	11.00	
		142	5710		11.00	
		151	5755		11.00	
		159	5795		11.00	
	802.11ax HE40	134	5670	HE0	11.00	
		142	5710		11.00	
		151	5755		11.00	
		159	5795		11.00	
	802.11ac VHT80	138	5690	VHT0	11.00	**10.76**
		155	5775		11.00	**10.73**
	802.11ax HE80	138	5690	HE0	11.00	Not Required
		155	5775		11.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.8G WIFI _2TX _ANT Main +Aux	802.11a	132	5660	6	-	-	14.00	Not Required
		136	5680		-	-	14.00	
		140	5700		-	-	14.00	
		149	5745		-	-	14.00	
		153	5765		-	-	14.00	
		157	5785		-	-	14.00	
		161	5805		-	-	14.00	
		165	5825		-	-	14.00	
	802.11n HT20	132	5660	HT0	-	-	14.00	
		136	5680		-	-	14.00	
		140	5700		-	-	14.00	
		149	5745		-	-	14.00	
		153	5765		-	-	14.00	
		157	5785		-	-	14.00	
		161	5805		-	-	14.00	
		165	5825		-	-	14.00	
	802.11ax HE20	132	5660	HE0	-	-	14.00	
		136	5680		-	-	14.00	
		140	5700		-	-	14.00	
		149	5745		-	-	14.00	
		153	5765		-	-	14.00	
		157	5785		-	-	14.00	
		161	5805		-	-	14.00	
		165	5825		-	-	14.00	
	802.11n HT40	134	5670	HT0	-	-	14.00	
		142	5710		-	-	14.00	
		151	5755		-	-	14.00	
		159	5795		-	-	14.00	
	802.11ax HE40	134	5670	HE0	-	-	14.00	
		142	5710		-	-	14.00	
		151	5755		-	-	14.00	
		159	5795		-	-	14.00	
	802.11ac VHT80	138	5690	VHT0	10.80	10.76	14.00	13.79
		155	5775		10.74	10.73	14.00	13.75
	802.11ax HE80	138	5690	HE0	-	-	14.00	Not Required
		155	5775		-	-	14.00	

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.8G WIFI _1TX _ANT Main	802.11a	132	5660	6	17.00	Not Required
		136	5680		17.00	
		140	5700		17.00	
		149	5745		17.00	
		153	5765		17.00	
		157	5785		17.00	
		161	5805		17.00	
		165	5825		17.00	
	802.11n HT20	132	5660	HT0	17.00	
		136	5680		17.00	
		140	5700		17.00	
		149	5745		17.00	
		153	5765		17.00	
		157	5785		17.00	
		161	5805		17.00	
		165	5825		17.00	
	802.11ax HE20	132	5660	HE0	17.00	
		136	5680		17.00	
		140	5700		17.00	
		149	5745		17.00	
		153	5765		17.00	
		157	5785		17.00	
		161	5805		17.00	
		165	5825		17.00	
	802.11n HT40	134	5670	HT0	17.00	
		142	5710		17.00	
		151	5755		17.00	
		159	5795		17.00	
	802.11ax HE40	134	5670	HE0	17.00	
		142	5710		17.00	
		151	5755		17.00	
		159	5795		17.00	
	802.11ac VHT80	138	5690	VHT0	17.00	**16.94**
		155	5775		17.00	**16.80**
	802.11ax HE80	138	5690	HE0	17.00	Not Required
		155	5775		17.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
5.8G WIFI _1TX _ANT Aux	802.11a	132	5660	6	14.50	Not Required
		136	5680		14.50	
		140	5700		14.50	
		149	5745		14.50	
		153	5765		14.50	
		157	5785		14.50	
		161	5805		14.50	
		165	5825		14.50	
	802.11n HT20	132	5660	HT0	14.50	
		136	5680		14.50	
		140	5700		14.50	
		149	5745		14.50	
		153	5765		14.50	
		157	5785		14.50	
		161	5805		14.50	
		165	5825		14.50	
	802.11ax HE20	132	5660	HE0	14.50	
		136	5680		14.50	
		140	5700		14.50	
		149	5745		14.50	
		153	5765		14.50	
		157	5785		14.50	
		161	5805		14.50	
		165	5825		14.50	
	802.11n HT40	134	5670	HT0	14.50	
		142	5710		14.50	
		151	5755		14.50	
		159	5795		14.50	
	802.11ax HE40	134	5670	HE0	14.50	
		142	5710		14.50	
		151	5755		14.50	
		159	5795		14.50	
	802.11ac VHT80	138	5690	VHT0	17.00	**16.74**
		155	5775		17.00	**16.70**
	802.11ax HE80	138	5690	HE0	14.50	Not Required
		155	5775		14.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
5.8G WIFI _2TX _ANT Main +Aux	802.11a	132	5660	6	-	-	20.00	Not Required
		136	5680		-	-	20.00	
		140	5700		-	-	20.00	
		149	5745		-	-	20.00	
		153	5765		-	-	20.00	
		157	5785		-	-	20.00	
		161	5805		-	-	20.00	
		165	5825		-	-	20.00	
	802.11n HT20	132	5660	HT8	-	-	20.00	
		136	5680		-	-	20.00	
		140	5700		-	-	20.00	
		149	5745		-	-	20.00	
		153	5765		-	-	20.00	
		157	5785		-	-	20.00	
		161	5805		-	-	20.00	
		165	5825		-	-	20.00	
	802.11ax HE20	132	5660	HE8	-	-	20.00	
		136	5680		-	-	20.00	
		140	5700		-	-	20.00	
		149	5745		-	-	20.00	
		153	5765		-	-	20.00	
		157	5785		-	-	20.00	
		161	5805		-	-	20.00	
		165	5825		-	-	20.00	
	802.11n HT40	134	5670	HT8	-	-	20.00	
		142	5710		-	-	20.00	
		151	5755		-	-	20.00	
		159	5795		-	-	20.00	
	802.11ax HE40	134	5670	HE8	-	-	20.00	
		142	5710		-	-	20.00	
		151	5755		-	-	20.00	
		159	5795		-	-	20.00	
	802.11ac VHT80	138	5690	VHT8	16.89	16.92	20.00	19.92
		155	5775		16.76	16.88	20.00	19.83
	802.11ax HE80	138	5690	HE8	-	-	20.00	Not Required
		155	5775		-	-	20.00	

Note: The tested channel results are marks in bold.

8.7 CONDUCTED POWER MEASUREMENTS OF 6E UNII_5

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-5 WIFI _1TX _ANT Main	802.11ax HE20	1	5955	MCS0	4.50	Not Required
		45	6175		4.50	
		93	6415		4.50	
	802.11ax HE40	3	5965	MCS0	7.75	
		43	6165		7.75	
		91	6405		7.75	
	802.11ax HE80	7	5985	MCS0	10.25	
		39	6145		10.25	
		87	6385		10.25	
	802.11ax HE160	15	6025	MCS0	10.50	**10.30**
		47	6185		10.50	**10.40**
		79	6345		10.50	**10.42**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-5 WIFI _1TX _ANT Aux	802.11ax HE20	1	5955	MCS0	4.50	Not Required
		45	6175		4.50	
		93	6415		4.50	
	802.11ax HE40	3	5965	MCS0	7.75	
		43	6165		7.75	
		91	6405		7.75	
	802.11ax HE80	7	5985	MCS0	10.25	
		39	6145		10.25	
		87	6385		10.25	
	802.11ax HE160	15	6025	MCS0	10.50	**10.46**
		47	6185		10.50	**10.45**
		79	6345		10.50	**10.30**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-5 WIFI _2TX _ANT Main +Aux	802.11ax HE20	1	5955	MCS0	-	-	4.50	Not Required
		45	6175		-	-	4.50	
		93	6415		-	-	4.50	
	802.11ax HE40	3	5965	MCS0	-	-	7.75	
		43	6165		-	-	7.75	
		91	6405		-	-	7.75	
	802.11ax HE80	7	5985	MCS0	-	-	10.25	
		39	6145		-	-	10.25	
		87	6385		-	-	10.25	
	802.11ax HE160	15	6025	MCS0	7.30	7.38	10.50	10.35
		47	6185		7.40	7.34	10.50	10.38
		79	6345		7.42	7.30	10.50	10.37

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-5 WIFI _2TX _ANT Main +Aux	802.11ax HE20	1	5955	MCS0	4.50	Not Required
		45	6175		4.50	
		93	6415		4.50	
	802.11ax HE40	3	5965	MCS0	7.75	
		43	6165		7.75	
		91	6405		7.75	
	802.11ax HE80	7	5985	MCS0	10.25	
		39	6145		10.25	
		87	6385		10.25	
	802.11ax HE160	15	6025	MCS0	13.00	**12.88**
		47	6185		13.00	**12.74**
		79	6345		13.00	**12.89**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-5 WIFI _1TX _ANT Aux	802.11ax HE20	1	5955	MCS0	4.50	Not Required
		45	6175		4.50	
		93	6415		4.50	
	802.11ax HE40	3	5965	MCS0	7.75	
		43	6165		7.75	
		91	6405		7.75	
	802.11ax HE80	7	5985	MCS0	10.25	
		39	6145		10.25	
		87	6385		10.25	
	802.11ax HE160	15	6025	MCS0	13.00	**12.88**
		47	6185		13.00	**12.70**
		79	6345		13.00	**12.75**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-5 WIFI _2TX _ANT Main +Aux	802.11ax HE20	1	5955	MCS8	-	-	4.50	Not Required
		45	6175		-	-	4.50	
		93	6415		-	-	4.50	
	802.11ax HE40	3	5965	MCS8	-	-	7.75	
		43	6165		-	-	7.75	
		91	6405		-	-	7.75	
	802.11ax HE80	7	5985	MCS8	-	-	10.25	
		39	6145		-	-	10.25	
		87	6385		-	-	10.25	
	802.11ax HE160	15	6025	MCS8	9.78	9.90	13.00	12.85
		47	6185		9.74	9.80	13.00	12.78
		79	6345		9.89	9.75	13.00	12.83

Note: The tested channel results are marks in bold.

8.8 CONDUCTED POWER MEASUREMENTS OF 6E UNII_6

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-6 WIFI _1TX _ANT Main	802.11ax HE20	97	6435	MCS0	4.50	Not Required
		105	6475		4.50	
		113	6515		4.50	
	802.11ax HE40	99	6445	MCS0	7.75	
		107	6485		7.75	
	802.11ax HE80	103	6465	MCS0	10.25	
		119	6545		10.25	
	802.11ax HE160	111	6505	MCS0	10.00	**9.96**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-6 WIFI _1TX _ANT Aux	802.11ax HE20	97	6435	MCS0	4.50	Not Required
		105	6475		4.50	
		113	6515		4.50	
	802.11ax HE40	99	6445	MCS0	7.75	
		107	6485		7.75	
	802.11ax HE80	103	6465	MCS0	10.25	
		119	6545		10.25	
	802.11ax HE160	111	6505	MCS0	10.00	**9.92**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-6 WIFI _2TX _ANT Main +Aux	802.11ax HE20	97	6435	MCS0	-	-	4.50	Not Required
		105	6475		-	-	4.50	
		113	6515		-	-	4.50	
	802.11ax HE40	99	6445	MCS0	-	-	7.75	
		107	6485		-	-	7.75	
	802.11ax HE80	103	6465	MCS0	-	-	10.00	
		119	6545		-	-	10.00	
	802.11ax HE160	111	6505	MCS0	6.96	6.92	10.00	9.95

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-6 WIFI _2TX _ANT Main +Aux	802.11ax HE20	97	6435	MCS0	4.50	Not Required
		105	6475		4.50	
		113	6515		4.50	
	802.11ax HE40	99	6445	MCS0	7.75	
		107	6485		7.75	
	802.11ax HE80	103	6465	MCS0	10.25	
		119	6545		10.25	
	802.11ax HE160	111	6505	MCS0	13.00	**12.89**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-6 WIFI _1TX _ANT Aux	802.11ax HE20	97	6435	MCS0	4.50	Not Required
		105	6475		4.50	
		113	6515		4.50	
	802.11ax HE40	99	6445	MCS0	7.75	
		107	6485		7.75	
	802.11ax HE80	103	6465	MCS0	10.25	
		119	6545		10.25	
	802.11ax HE160	111	6505	MCS0	13.00	**12.61**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-6 WIFI _2TX _ANT Main +Aux	802.11ax HE20	97	6435	MCS8	-	-	4.50	Not Required
		105	6475		-	-	4.50	
		113	6515		-	-	4.50	
	802.11ax HE40	99	6445	MCS8	-	-	7.75	
		107	6485		-	-	7.75	
	802.11ax HE80	103	6465	MCS8	-	-	10.25	
		119	6545		-	-	10.25	
	802.11ax HE160	111	6505	MCS8	9.87	9.85	13.00	12.87

Note: The tested channel results are marks in bold.

8.9 CONDUCTED POWER MEASUREMENTS OF 6E UNII_7

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-7 WIFI _1TX _ANT Main	802.11ax HE20	117	6535	MCS0	3.75	Not Required
		149	6695		3.75	
		181	6855		3.75	
	802.11ax HE40	115	6525	MCS0	7.75	
		147	6685		7.00	
		179	6845		7.00	
	802.11ax HE80	135	6625	MCS0	9.50	
		151	6705		9.50	
		167	6785		9.50	
	802.11ax HE160	143	6665	MCS0	10.50	**10.48**
		175	6825		10.50	**10.31**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-7 WIFI _1TX _ANT Aux	802.11ax HE20	117	6535	MCS0	3.75	Not Required
		149	6695		3.75	
		181	6855		3.75	
	802.11ax HE40	115	6525	MCS0	7.75	
		147	6685		7.00	
		179	6845		7.00	
	802.11ax HE80	135	6625	MCS0	9.50	
		151	6705		9.50	
		167	6785		9.50	
	802.11ax HE160	143	6665	MCS0	10.50	**10.38**
		175	6825		10.50	**10.36**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-7 WIFI _2TX _ANT Main +Aux	802.11ax HE20	117	6535	MCS0	-	-	3.75	Not Required
		149	6695		-	-	3.75	
		181	6855		-	-	3.75	
	802.11ax HE40	115	6525	MCS0	-	-	7.00	
		147	6685		-	-	7.00	
		179	6845		-	-	7.00	
	802.11ax HE80	135	6625	MCS0	-	-	9.50	
		151	6705		-	-	9.50	
		167	6785		-	-	9.50	
	802.11ax HE160	143	6665	MCS0	7.34	7.38	10.50	10.37
		175	6825		7.31	7.36	10.50	10.35

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-7 WIFI _2TX _ANT Main +Aux	802.11ax HE20	117	6535	MCS0	3.75	Not Required
		149	6695		3.75	
		181	6855		3.75	
	802.11ax HE40	115	6525	MCS0	7.75	
		147	6685		7.00	
		179	6845		7.00	
	802.11ax HE80	135	6625	MCS0	9.50	
		151	6705		9.50	
		167	6785		9.50	
	802.11ax HE160	143	6665	MCS0	12.25	**12.17**
		175	6825		12.25	**12.14**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-7 WIFI _1TX _ANT Aux	802.11ax HE20	117	6535	MCS0	3.75	Not Required
		149	6695		3.75	
		181	6855		3.75	
	802.11ax HE40	115	6525	MCS0	7.75	
		147	6685		7.00	
		179	6845		7.00	
	802.11ax HE80	135	6625	MCS0	9.50	
		151	6705		9.50	
		167	6785		9.50	
	802.11ax HE160	143	6665	MCS0	12.25	**12.15**
		175	6825		12.25	**12.04**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-7 WIFI _2TX _ANT Main +Aux	802.11ax HE20	117	6535	MCS8	-	-	3.75	Not Required
		149	6695		-	-	3.75	
		181	6855		-	-	3.75	
	802.11ax HE40	115	6525	MCS8	-	-	7.00	
		147	6685		-	-	7.00	
		179	6845		-	-	7.00	
	802.11ax HE80	135	6625	MCS8	-	-	9.50	
		151	6705		-	-	9.50	
		167	6785		-	-	9.50	
	802.11ax HE160	143	6665	MCS8	9.17	9.09	12.25	12.14
		175	6825		9.14	9.24	12.25	12.20

Note: The tested channel results are marks in bold.

8.10 CONDUCTED POWER MEASUREMENTS OF 6E UNII_8

Sensor on:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-8 WIFI _1TX _ANT Main	802.11ax HE20	185	6875	MCS0	3.75	Not Required
		209	6995		3.75	
		233	7115		3.75	
	802.11ax HE40	187	6885	MCS0	7.00	
		227	7085		7.00	
	802.11ax HE80	183	6865	MCS0	9.50	
		199	6945		9.50	
		215	7025		9.50	
	802.11ax HE160	207	6985	MCS0	10.00	**9.90**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-8 WIFI _1TX _ANT Aux	802.11ax HE20	185	6875	MCS0	3.75	Not Required
		209	6995		3.75	
		233	7115		3.75	
	802.11ax HE40	187	6885	MCS0	7.00	
		227	7085		7.00	
	802.11ax HE80	183	6865	MCS0	9.50	
		199	6945		9.50	
		215	7025		9.50	
	802.11ax HE160	207	6985	MCS0	10.00	**9.89**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-8 WIFI _2TX _ANT Main +Aux	802.11ax HE20	185	6875	MCS0	-	-	3.75	Not Required
		209	6995		-	-	3.75	
		233	7115		-	-	3.75	
	802.11ax HE40	187	6885	MCS0	-	-	7.00	
		227	7085		-	-	7.00	
	802.11ax HE80	183	6865	MCS0	-	-	9.50	
		199	6945		-	-	9.50	
		215	7025		-	-	9.50	
	802.11ax HE160	207	6985	MCS0	6.80	6.89	10.00	9.86

Sensor off:

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-8 WIFI _2TX _ANT Main +Aux	802.11ax HE20	185	6875	MCS0	3.75	Not Required
		209	6995		3.75	
		233	7115		3.75	
	802.11ax HE40	187	6885	MCS0	7.00	
		227	7085		7.00	
	802.11ax HE80	183	6865	MCS0	9.50	
		199	6945		9.50	
		215	7025		9.50	
	802.11ax HE160	207	6985	MCS0	12.25	**12.18**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power(dBm)
U-NII-8 WIFI _1TX _ANT Aux	802.11ax HE20	185	6875	MCS0	3.75	Not Required
		209	6995		3.75	
		233	7115		3.75	
	802.11ax HE40	187	6885	MCS0	7.00	
		227	7085		7.00	
	802.11ax HE80	183	6865	MCS0	9.50	
		199	6945		9.50	
		215	7025		9.50	
	802.11ax HE160	207	6985	MCS0	12.25	**12.14**

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT Main Average Power(dBm)	ANT Aux Average Power(dBm)	Max. Tune up	Total Average Power(dBm)
U-NII-8 WIFI _2TX _ANT Main +Aux	802.11ax HE20	185	6875	MCS8	-	-	3.75	Not Required
		209	6995		-	-	3.75	
		233	7115		-	-	3.75	
	802.11ax HE40	187	6885	MCS8	-	-	7.00	
		227	7085		-	-	7.00	
	802.11ax HE80	183	6865	MCS8	-	-	9.50	
		199	6945		-	-	9.50	
		215	7025		-	-	9.50	
	802.11ax HE160	207	6985	MCS8	9.08	9.14	12.25	12.12

Note: The tested channel results are marks in bold.

8.11 SAR TEST RESULTS

General Notes:

1. Per KDB447498 D01, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.

2. Per KDB447498 D01, 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. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

3. Per KDB865664 D01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8W/kg; if the deviation among the repeated measurement is ≤ 20%, and the measured SAR < 1.45W/kg, only one repeated measurement is required.

WLAN Notes:

1. For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

2. Justification for test configurations for WLAN per KDB Publication 248227 for 2.4GHz WIFI single transmission chain operations, the highest measured maximum output power Channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section7.1.4 for more information.

3. Justification for test configurations for WLAN per KDB Publication 248227 for 5GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed power. Other transmission mode was not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than1.2W/kg. See Section 7.1.4 for more information.

9 SAR TEST RESULTS

9.1 BODY SAR TEST RESULTS

SAR test results of Bluetooth

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Ant	Sensor	Data Rate	Duty Cycle (%)	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W13	DH5	78	Rear Face	0	Main	NA	1	77.13	9.5	9.12	0	0.400	0.144	0.437
W14	DH5	78	Right Side	0	Main	NA	1	77.13	9.5	9.12	0.14	**0.423**	0.161	**0.462**
W15	DH5	78	Bottom Side	0	Main	NA	1	77.13	9.5	9.12	0	0.011	0.004	0.011

Note: The value with boldface is the maximum SAR Value of each test band.

SAR test results of 2.4G WiFi

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Ant	Sensor	Data Rate	Duty Cycle (%)	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W01	802.11b	11	Rear Face	0	Main	On	1	99.29	12	11.95	-0.09	0.497	0.132	0.506
W02	802.11b	11	Right Side	0	Main	On	1	99.29	12	11.95	-0.01	0.545	0.210	0.555
W03	802.11b	11	Bottom Side	0	Main	On	1	99.29	12	11.95	0.02	0.012	0.006	0.012
W04	802.11b	1	Right Side	0	Main	On	1	99.29	12	11.94	0.01	0.454	0.177	0.464
W05	802.11b	6	Right Side	0	Main	On	1	99.29	12	11.85	0.02	0.491	0.190	0.512
W201	802.11b	11	Rear Face	1.5	Main	Off	1	99.29	20	19.75	-0.06	0.311	0.157	0.332
W202	802.11b	11	Right Side	0.7	Main	Off	1	99.29	20	19.75	-0.13	**0.875**	0.394	**0.933**
W250	802.11b	1	Right Side	0.7	Main	Off	1	99.29	20	19.87	0.07	0.698	0.313	0.724
W251	802.11b	6	Right Side	0.7	Main	Off	1	99.29	20	19.88	-0.03	0.766	0.342	0.793
W07	802.11b	6	Rear Face	0	Aux	On	1	99.29	12	11.77	0	0.743	0.270	0.789
W08	802.11b	6	Right Side	0	Aux	On	1	99.29	12	11.77	0.12	0.634	0.230	0.673
W09	802.11b	6	Top Side	0	Aux	On	1	99.29	12	11.77	0.13	0.118	0.054	0.125
W203	802.11b	6	Rear Face	1.5	Aux	Off	1	99.29	20	19.90	-0.09	0.222	0.116	0.229
W204	802.11b	6	Right Side	0.7	Aux	Off	1	99.29	20	19.90	-0.19	**0.773**	0.382	**0.797**
W205	802.11b	6	Top Side	0.45	Aux	Off	1	99.29	20	19.90	-0.15	0.326	0.164	0.336

Note: The value with boldface is the maximum SAR Value of each test band.

SAR test results of 5G WiFi

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Ant	Sensor	Data Rate	Duty Cycle (%)	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W19	802.11n HT40	54	Rear Face	0	Main	On	HT0	97.92	11.5	11.37	0	0.563	0.151	0.592
W20	802.11n HT40	54	Right Side	0	Main	On	HT0	97.92	11.5	11.37	0.06	0.735	0.182	0.773
W21	802.11n HT40	54	Bottom Side	0	Main	On	HT0	97.92	11.5	11.37	0	<0.001	<0.001	<0.001
W206	802.11n HT40	54	Rear Face	1.5	Main	Off	HT0	97.92	18	17.98	0	0.143	0.057	0.147
W207	802.11n HT40	54	Right Side	0.7	Main	Off	HT0	97.92	18	17.98	-0.18	**0.954**	0.342	**0.979**
W252	802.11n HT40	62	Right Side	0.7	Main	Off	HT0	97.92	17.25	17.19	-0.14	0.917	0.328	0.950
W25	802.11n HT40	54	Rear Face	0	Aux	On	HT0	97.92	11.5	11.38	0	0.433	0.127	0.455
W26	802.11n HT40	54	Right Side	0	Aux	On	HT0	97.92	11.5	11.38	-0.03	0.770	0.211	0.808
W27	802.11n HT40	54	Top Side	0	Aux	On	HT0	97.92	11.5	11.38	0	0.077	0.022	0.080
W208	802.11n HT40	54	Rear Face	1.5	Aux	Off	HT0	97.92	18	17.85	0	0.141	0.056	0.149
W209	802.11n HT40	54	Right Side	0.7	Aux	Off	HT0	97.92	18	17.85	-0.04	**0.863**	0.319	**0.912**
W210	802.11n HT40	54	Top Side	0.45	Aux	Off	HT0	97.92	18	17.85	-0.19	0.249	0.102	0.263
W253	802.11n HT40	62	Right Side	0.7	Aux	Off	HT0	97.92	16	15.81	0.08	0.587	0.229	0.626
W31	802.11ac VHT80	122	Rear Face	0	Main	On	VHT0	97.92	11	10.82	0	0.566	0.148	0.602
W32	802.11ac VHT80	122	Right Side	0	Main	On	VHT0	97.92	11	10.82	-0.1	0.809	0.202	0.861
W33	802.11ac VHT80	122	Bottom Side	0	Main	On	VHT0	97.92	11	10.82	0	<0.001	<0.001	<0.001
W34	802.11ac VHT80	106	Right Side	0	Main	On	VHT0	97.92	11	10.80	0	0.744	0.183	0.796
W211	802.11ac VHT80	122	Rear Face	1.5	Main	Off	VHT0	97.92	16	15.96	0	0.142	0.057	0.146
W212	802.11ac VHT80	122	Right Side	0.7	Main	Off	VHT0	97.92	16	15.96	-0.16	**0.958**	0.341	**0.987**
W254	802.11ac VHT80	106	Right Side	0.7	Main	Off	VHT0	97.92	16	15.92	0.1	0.938	0.331	0.976
W37	802.11ac VHT80	122	Rear Face	0	Aux	On	VHT0	97.92	11	10.92	0	0.393	0.101	0.409
W38	802.11ac VHT80	122	Right Side	0	Aux	On	VHT0	97.92	11	10.92	0.16	0.858	0.227	0.893
W39	802.11ac VHT80	122	Top Side	0	Aux	On	VHT0	97.92	11	10.92	0	0.072	0.024	0.075
W40	802.11ac VHT80	106	Right Side	0	Aux	On	VHT0	97.92	11	10.90	0	0.810	0.212	0.846
W213	802.11ac VHT80	122	Rear Face	1.5	Aux	Off	VHT0	97.92	16	15.76	0	0.097	0.040	0.105
W214	802.11ac VHT80	122	Right Side	0.7	Aux	Off	VHT0	97.92	16	15.76	-0.18	**0.880**	0.328	**0.950**
W215	802.11ac VHT80	122	Top Side	0.45	Aux	Off	VHT0	97.92	16	15.76	0.04	0.195	0.082	0.210
W255	802.11ac VHT80	106	Right Side	0.7	Aux	Off	VHT0	97.92	16	15.74	-0.1	0.831	0.310	0.901

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Ant	Sensor	Data Rate	Duty Cycle (%)	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W43	802.11ac VHT80	138	Rear Face	0	Main	On	VHT0	97.92	11	10.80	0	0.468	0.124	0.500
W44	802.11ac VHT80	138	Right Side	0	Main	On	VHT0	97.92	11	10.80	-0.11	0.690	0.166	0.738
W45	802.11ac VHT80	138	Bottom Side	0	Main	On	VHT0	97.92	11	10.80	0	<0.001	<0.001	<0.001
W216	802.11ac VHT80	138	Rear Face	1.5	Main	Off	VHT0	97.92	17	16.94	0	0.202	0.082	0.209
W217	802.11ac VHT80	138	Right Side	0.7	Main	Off	VHT0	97.92	17	16.94	-0.04	**1.150**	0.406	**1.191**
W256	802.11ac VHT80	155	Right Side	0.7	Main	Off	VHT0	97.92	17	16.80	0.19	1.010	0.367	1.080
W49	802.11ac VHT80	138	Rear Face	0	Aux	On	VHT0	97.92	11	10.76	0	0.399	0.105	0.431
W50	802.11ac VHT80	138	Right Side	0	Aux	On	VHT0	97.92	11	10.76	-0.09	0.837	0.222	0.903
W51	802.11ac VHT80	138	Top Side	0	Aux	On	VHT0	97.92	11	10.76	0	0.072	0.020	0.078
W52	802.11ac VHT80	155	Right Side	0	Aux	On	VHT0	97.92	11	10.73	-0.19	0.769	0.211	0.836
W218	802.11ac VHT80	138	Rear Face	1.5	Aux	Off	VHT0	97.92	17	16.74	0	0.106	0.043	0.115
W219	802.11ac VHT80	138	Right Side	0.7	Aux	Off	VHT0	97.92	17	16.74	-0.14	**0.942**	0.333	**1.021**
W220	802.11ac VHT80	138	Top Side	0.45	Aux	Off	VHT0	97.92	17	16.74	-0.16	0.283	0.120	0.307
W257	802.11ac VHT80	155	Right Side	0.7	Aux	Off	VHT0	97.92	17	16.70	0.11	0.720	0.272	0.788

Note: The value with boldface is the maximum SAR Value of each test band.

SAR test results of 6E WiFi

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Ant	sensor	Data Rate	Duty Cycle (%)	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	APD W/㎡ (4c ㎡)	Reported 10g SAR (W/kg)
W53	802.11ax HE160	79	Rear Face	0	Main	On	HE0	98.21	10.5	10.42	0.11	0.334	0.092	2.150	0.346
W54	802.11ax HE160	79	Right Side	0	Main	On	HE0	98.21	10.5	10.42	0.05	0.511	0.129	3.040	0.530
W55	802.11ax HE160	79	Bottom Side	0	Main	On	HE0	98.21	10.5	10.42	0.13	<0.001	<0.001	<0.001	<0.001
W56	802.11ax HE160	15	Right Side	0	Main	On	HE0	98.21	10.5	10.30	0.08	0.469	0.122	2.870	0.500
W57	802.11ax HE160	47	Right Side	0	Main	On	HE0	98.21	10.5	10.40	0.13	**0.527**	0.134	3.150	**0.549**
W211	802.11ax HE160	79	Rear Face	1.5	Main	Off	HE0	98.21	13	12.89	0.16	0.053	0.018	0.415	0.055
W212	802.11ax HE160	79	Right Side	0.7	Main	Off	HE0	98.21	13	12.89	-0.01	0.228	0.085	1.900	0.238
W59	802.11ax HE160	15	Rear Face	0	Aux	On	HE0	98.21	10.5	10.46	0.02	0.300	0.062	1.500	0.308
W60	802.11ax HE160	15	Right Side	0	Aux	On	HE0	98.21	10.5	10.46	0.07	0.555	0.140	3.310	0.570
W61	802.11ax HE160	15	Top Side	0	Aux	On	HE0	98.21	10.5	10.46	0.15	0.045	0.016	0.355	0.046
W62	802.11ax HE160	47	Right Side	0	Aux	On	HE0	98.21	10.5	10.45	-0.15	**0.645**	0.162	3.850	**0.664**
W63	802.11ax HE160	79	Right Side	0	Aux	On	HE0	98.21	10.5	10.30	0.11	0.594	0.152	3.590	0.633
W213	802.11ax HE160	15	Rear Face	1.5	Aux	Off	HE0	98.21	13	12.88	-0.13	0.042	0.016	0.369	0.044
W214	802.11ax HE160	15	Right Side	0.7	Aux	Off	HE0	98.21	13	12.88	0.15	0.226	0.084	1.880	0.237
W215	802.11ax HE160	15	Top Side	0.45	Aux	Off	HE0	98.21	13	12.88	-0.14	0.061	0.025	0.549	0.064
W71	802.11ax HE160	111	Rear Face	0	Main	On	HE0	98.21	10	9.96	0.15	0.335	0.077	1.810	0.344
W72	802.11ax HE160	111	Right Side	0	Main	On	HE0	98.21	10	9.96	-0.03	**0.543**	0.137	3.240	**0.558**
W73	802.11ax HE160	111	Bottom Side	0	Main	On	HE0	98.21	10	9.96	0.05	<0.001	<0.001	<0.001	<0.001
W216	802.11ax HE160	111	Rear Face	1.5	Main	Off	HE0	98.21	13	12.89	0.12	0.053	0.016	0.362	0.055
W217	802.11ax HE160	111	Right Side	0.7	Main	Off	HE0	98.21	13	12.89	0.15	0.19	0.073	1.640	0.198
W77	802.11ax HE160	111	Rear Face	0	Aux	On	HE0	98.21	10	9.92	0.05	0.275	0.054	1.320	0.285
W78	802.11ax HE160	111	Right Side	0	Aux	On	HE0	98.21	10	9.92	-0.01	**0.577**	0.144	3.420	**0.598**
W79	802.11ax HE160	111	Top Side	0	Aux	On	HE0	98.21	10	9.92	0.13	0.053	0.018	0.409	0.055
W218	802.11ax HE160	111	Rear Face	1.5	Aux	Off	HE0	98.21	13	12.61	-0.12	0.064	0.023	0.512	0.071
W219	802.11ax HE160	111	Right Side	0.7	Aux	Off	HE0	98.21	13	12.61	-0.09	0.217	0.081	1.810	0.242
W220	802.11ax HE160	111	Top Side	0.45	Aux	Off	HE0	98.21	13	12.61	0.00	0.059	0.024	0.524	0.066

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Ant	sensor	Data Rate	Duty Cycle (%)	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	APD W/㎡ (4c ㎡)	Reported 10g SAR (W/kg)
W83	802.11ax HE160	143	Rear Face	0	Main	On	HE0	98.21	10.5	10.48	0.06	0.424	0.092	2.200	0.434
W84	802.11ax HE160	143	Right Side	0	Main	On	HE0	98.21	10.5	10.48	-0.15	**0.671**	0.169	3.980	**0.686**
W85	802.11ax HE160	143	Bottom Side	0	Main	On	HE0	98.21	10.5	10.48	0.18	<0.001	<0.001	<0.001	<0.001
W86	802.11ax HE160	175	Right Side	0	Main	On	HE0	98.21	10.5	10.31	-0.12	0.585	0.149	3.510	0.622
W221	802.11ax HE160	143	Rear Face	1.5	Main	Off	HE0	98.21	12.25	12.17	-0.11	0.063	0.023	0.512	0.065
W222	802.11ax HE160	143	Right Side	0.7	Main	Off	HE0	98.21	12.25	12.17	-0.05	0.171	0.068	1.520	0.177
W89	802.11ax HE160	143	Rear Face	0	Aux	On	HE0	98.21	10.5	10.38	-0.17	0.467	0.091	2.240	0.489
W90	802.11ax HE160	143	Right Side	0	Aux	On	HE0	98.21	10.5	10.38	-0.04	**0.665**	0.166	3.930	**0.696**
W91	802.11ax HE160	143	Top Side	0	Aux	On	HE0	98.21	10.5	10.38	0.15	0.054	0.020	0.448	0.057
W92	802.11ax HE160	175	Right Side	0	Aux	On	HE0	98.21	10.5	10.36	-0.02	0.589	0.144	3.440	0.619
W223	802.11ax HE160	143	Rear Face	1.5	Aux	Off	HE0	98.21	12.25	12.15	-0.18	0.067	0.023	0.530	0.070
W224	802.11ax HE160	143	Right Side	0.7	Aux	Off	HE0	98.21	12.25	12.15	0.09	0.227	0.084	1.890	0.237
W225	802.11ax HE160	143	Top Side	0.45	Aux	Off	HE0	98.21	12.25	12.15	-0.13	0.054	0.021	0.463	0.056
W95	802.11ax HE160	207	Rear Face	0	Main	On	HE0	98.21	10	9.90	0.12	0.387	0.076	1.840	0.403
W96	802.11ax HE160	207	Right Side	0	Main	On	HE0	98.21	10	9.90	-0.1	**0.547**	0.135	3.200	**0.570**
W97	802.11ax HE160	207	Bottom Side	0	Main	On	HE0	98.21	10	9.90	-0.08	<0.001	<0.001	<0.001	<0.001
W226	802.11ax HE160	207	Rear Face	1.5	Main	Off	HE0	98.21	12.25	12.18	0.19	0.083	0.031	0.684	0.086
W227	802.11ax HE160	207	Right Side	0.7	Main	Off	HE0	98.21	12.25	12.18	-0.18	0.241	0.083	1.880	0.249
W101	802.11ax HE160	207	Rear Face	0	Aux	On	HE0	98.21	10.00	9.89	0.15	0.390	0.069	1.710	0.407
W102	802.11ax HE160	207	Right Side	0	Aux	On	HE0	98.21	10.00	9.89	0.11	**0.538**	0.134	3.170	**0.562**
W103	802.11ax HE160	207	Top Side	0	Aux	On	HE0	98.21	10.00	9.89	0.03	0.059	0.022	0.484	0.062
W228	802.11ax HE160	207	Rear Face	1.5	Aux	Off	HE0	98.21	12.25	12.14	0.09	0.08	0.029	0.649	0.084
W229	802.11ax HE160	207	Right Side	0.7	Aux	Off	HE0	98.21	12.25	12.14	0.11	0.236	0.089	2.000	0.246
W230	802.11ax HE160	207	Top Side	0.45	Aux	Off	HE0	98.21	12.25	12.14	0.04	0.052	0.020	0.445	0.054

Note: The value with boldface is the maximum SAR Value of each test band.

Power Density results of 6E WiFi

System&Posistion						DUT&Accessory	SAR								Power Density								
Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	Ant	Duty Cycle (%)	Maximum Tune up (dBm)	Conducted Power (dBm)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 10g SAR	APD W/m^2 (4cm^2)	Grid Step [λ]	IPD [W/m^2]	Scaling Factor for Measurement Uncertainty	Averaging Area [cm^2]	Power Drift [dB]	Normal PsPD [W/m^2]	Scaling Normal PsPD [W/m^2]	Total PsPD [W/m^2]	Scaling Total PsPD [W/m^2]
1	UNII-5	802.11ax HE160	47	Right Side	0.2	Aux	98.21	10.50	10.45	-0.15	**0.645**	0.162	0.664	3.85	0.0625	33.5	**1.55**	**4**	-0.06	2.35	3.75	3.62	5.78
2	UNII-6	802.11ax HE160	111	Right Side	0.2	Aux	98.21	10.00	9.96	-0.01	**0.577**	0.144	0.593	3.42	0.0625	35.7	1.55	4	-0.09	2.29	3.66	3.58	5.72
3	UNII-7	802.11ax HE160	143	Right Side	0.2	Aux	98.21	10.50	10.38	-0.04	**0.665**	0.166	0.696	3.93	0.0625	34.6	**1.55**	**4**	-0.11	2.33	3.78	3.46	5.61
4	UNII-8	802.11ax HE160	207	Right Side	0.2	Main	98.21	10.00	9.90	-0.1	**0.547**	0.135	0.570	3.2	0.0625	33.3	1.55	4	-0.14	2.15	3.47	3.84	6.20

Note:
1) Chose the worst case of WiFi 6E to test power density.
2) This device is in compliance with power density for general population or uncontrolled exposure limits, and has been tested in accordance with the measurement methods and procedures specified in TCBC workshop notes and IEC TR 63170.

10 SIMULTANEOUS TRANSMISSION CONDITIONS

10.1 STAND-ALONE SAR TEST EXCLUSION

SAR compliance for simultaneous transmission must be considered when the maximum duration of overlapping transmissions, including network hand-offs, is greater than 30 seconds. This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis.

The Simultaneous Transmission Possibilities of this device are as below:

NO.	Simultaneous Tx Combination	Body
1	WiFi 2.4G (Main Ant) + WiFi 2.4G (Aux Ant)	Yes
2	WiFi 5G (Main Ant) + WiFi 5G (Aux Ant)	Yes
3	WiFi 6E (Main Ant) + WiFi 6E (Aux Ant)	Yes
4	WiFi 2.4G (Aux Ant) + BT (Main Ant)	Yes
5	WiFi 5G (Aux Ant) + BT (Main Ant)	Yes
6	WiFi 6E (Aux Ant) + BT (Main Ant)	Yes

Note: Only the Main Ant supports BT function.

10.2 SAR UMMATION SCENARIO

Test Position / SAR_{1g}(W/Kg)		Rear Face	Right Side	Top Side	Bottom Side
ANT Main	WiFi 2.4G	0.506	0.933	-	0.012
	WiFi 5.2G&5.3G	0.592	0.979	-	<0.001
	WiFi 5.6G	0.602	0.987	-	<0.001
	WiFi 5.8G	0.500	1.191	-	<0.001
	WIFI 6E U-NII-5	0.346	0.549	-	<0.001
	WIFI 6E U-NII-6	0.344	0.558	-	<0.001
	WIFI 6E U-NII-7	0.434	0.686	-	<0.001
	WIFI 6E U-NII-8	0.403	0.570	-	<0.001
	BT	0.437	0.462	-	0.011
ANT Aux	WiFi 2.4G	0.789	0.797	0.336	-
	WiFi 5.2G&5.3G	0.455	0.912	0.263	-
	WiFi 5.6G	0.409	0.950	0.210	-
	WiFi 5.8G	0.431	1.021	0.307	-
	WIFI 6E U-NII-5	0.308	0.664	0.064	-
	WIFI 6E U-NII-6	0.285	0.598	0.066	-
	WIFI 6E U-NII-7	0.498	0.696	0.056	-
	WIFI 6E U-NII-8	0.407	0.562	0.054	-
MAX $\sum SAR_{1g}$		**1.295**	**Refer to SPLSR results**	**0.336**	**0.012**

Test Position / SAR_{1g}(W/Kg)		Rear Face	Right Side	Top Side	Bottom Side
ANT Main	BT	0.437	0.462	-	0.011
ANT Aux	WiFi 2.4G	0.789	0.797	0.336	-
	WiFi 5.2G&5.3G	0.455	0.912	0.263	-
	WiFi 5.6G	0.409	0.950	0.210	-
	WiFi 5.8G	0.431	1.021	0.307	-
	WIFI 6E U-NII-5	0.308	0.664	0.064	-
	WIFI 6E U-NII-6	0.285	0.598	0.066	-
	WIFI 6E U-NII-7	0.498	0.696	0.056	-
	WIFI 6E U-NII-8	0.407	0.562	0.054	-
MAX $\sum SAR_{1g}$		**1.226**	**1.483**	**0.336**	**0.011**

Test Position \ Reported SAR_{1g}		Aux_ 2.4G	Aux_ 5.2G& 5.3G	Aux_ 5.6G	Aux_ 5.8G	Aux_ U-NII-5	Aux_ U-NII-6	Aux_ U-NII-7	Aux_ U-NII-8	MAX $\sum SAR_{1g}$
Right Side	Main_2.4G	1.730	/	/	/	/	/	/	/	**Refer to SPLSR results (1)**
	Main_ 5.2G&5.3G	/	1.891	/	/	/	/	/	/	**Refer to SPLSR results (2)**
	Main_5.6G	/	/	1.937	/	/	/	/	/	**Refer to SPLSR results (3)**
	Main_5.8G	/	/	/	2.212	/	/	/	/	**Refer to SPLSR results (4)**
	Main_U-NII-5	/	/	/	/	1.213	/	/	/	1.213
	Main_U-NII-6	/	/	/	/	/	1.156	/	/	1.156
	Main_U-NII-7	/	/	/	/	/	/	1.382	/	1.382
	Main_U-NII-8	/	/	/	/	/	/	/	1.132	1.132

Note:
1) MAX. $\sum SAR_{1g}$<1.6 W/Kg, the SAR to peak location separation ratio should not be considered, otherwise, see section 7.3.3 for more information.
2) The highest simultaneous SAR value = 1.483 W/Kg, per KDB690783 D01.

Highest Simultaneous Transmission with Multiple transmitters	Total Exposure Radio	
SAR&Power Density	WIFI 6E U-NII-5	**0.993**
	WIFI 6E U-NII-6	0.943
	WIFI 6E U-NII-7	0.990
	WIFI 6E U-NII-8	0.976

Note:
1) This device is in compliance with power density for general population or uncontrolled exposure limits, and has been tested in accordance with the measurement methods and procedures specified in TCBC workshop notes and IEC TR 63170.
2) When the test result is a critical value, we will use the measurement uncertainty give the judgment result based on the 95% risk level.

10.3 SIMULTANEOUS TRANSMISSION CONDITIONS

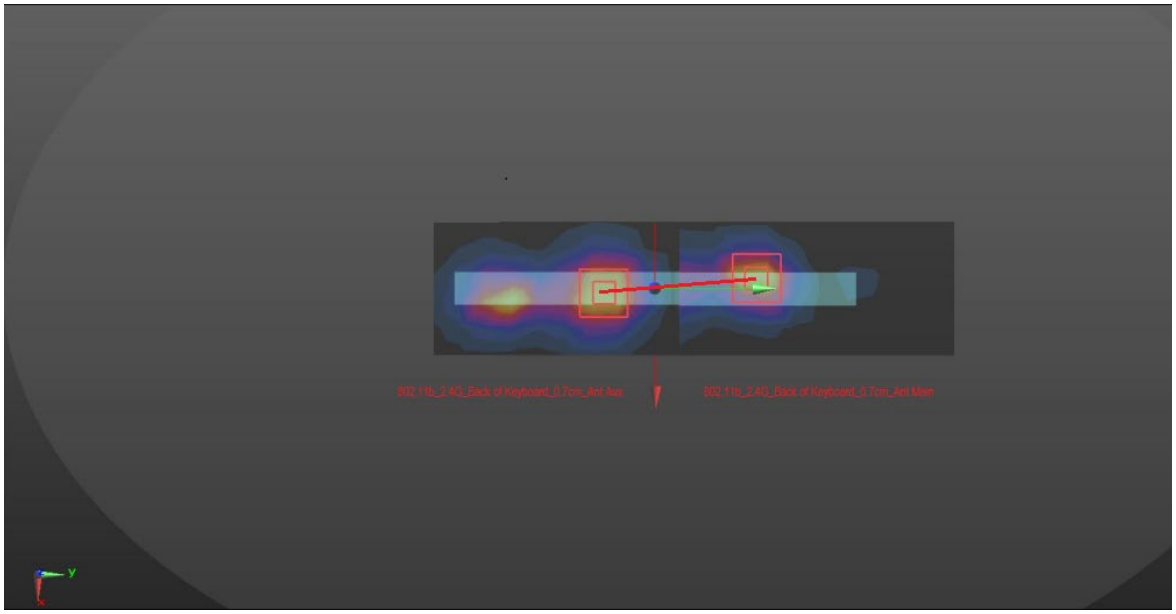
According to KDB447498 D04, When the sum of SAR is larger than limit, SAR test exclusion is determined by the SAR to peak location separation ratio (SPLSR). When the SAR to peak location ratio for each pair of antennas is 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be ≤ 0.10.
When SAR is measured for both antennas in the pair the peak location separation distance is computed by the following formula:

$$\text{Distance}_{\text{Tx1-Tx2}} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

$$\text{SPLS Ratio} = (SAR_1 + SAR_2)^{1.5}/R_i$$

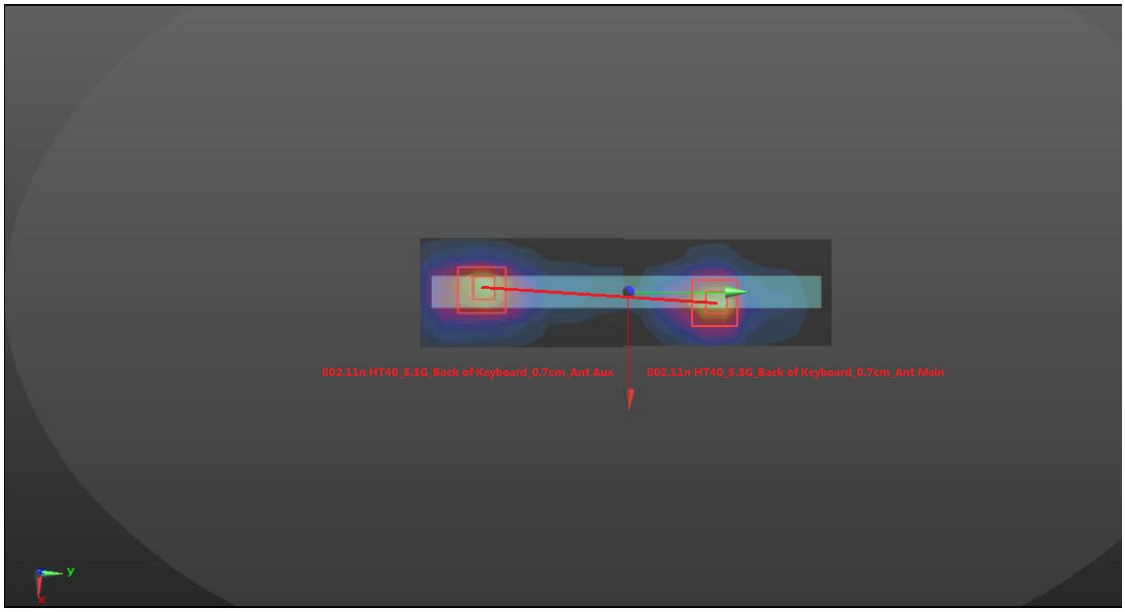
When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location should be translated onto the test device to determine the peak location separation for the antenna pair. The ERP location on the phantom is aligned with the ERP location on the handset, with 6mm separation in the z coordinate due to the ear spacer. A measured peak location can be translated onto the handset, with respect to the ERP location, by ignoring the 6 mm offset in the z coordinate. The assumed peak location of the antenna with estimated SAR can also be determined with respect to the ERP location on the handset. The peak location separation distance is estimated by the x and y coordinated of the peaks, referenced to the ERP location. While flat phantoms are not expected to have these issues, the same peak translation approach should be applied to determine peak location separation.

(1) The sum of aggregate 1g SAR was above 1.6 W/kg for Back of Keyboard configuration with WiFi 2.4G Main Ant and WiFi 2.4G Aux Ant.
The Peak SAR location is as below:



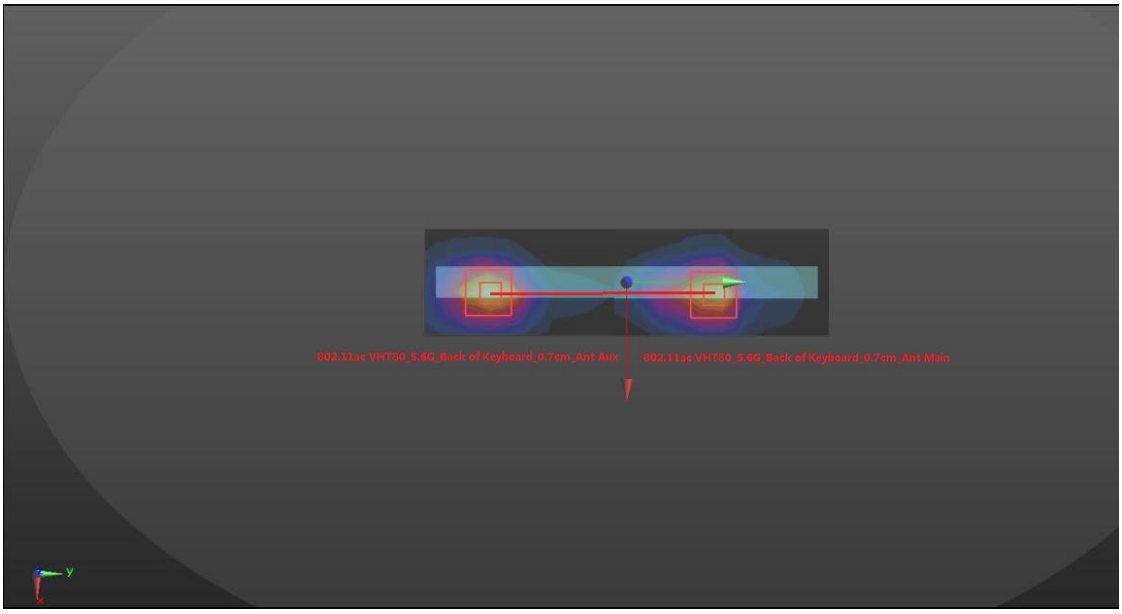
Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D (mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
Main Ant WiFi 2.4G	0.933	1.46	-0.0048	0.0452	-0.178	66.1	0.034	0.04	No
Aux Ant WiFi 2.4G	0.797	1.23	-0.0012	-0.0208	-0.176				

(2) The sum of aggregate 1g SAR was above 1.6 W/kg for Back of Keyboard configuration with WiFi 5.2G&5.3G Main Ant and WiFi 5.2G&5.3G Aux Ant.
The Peak SAR location is as below:



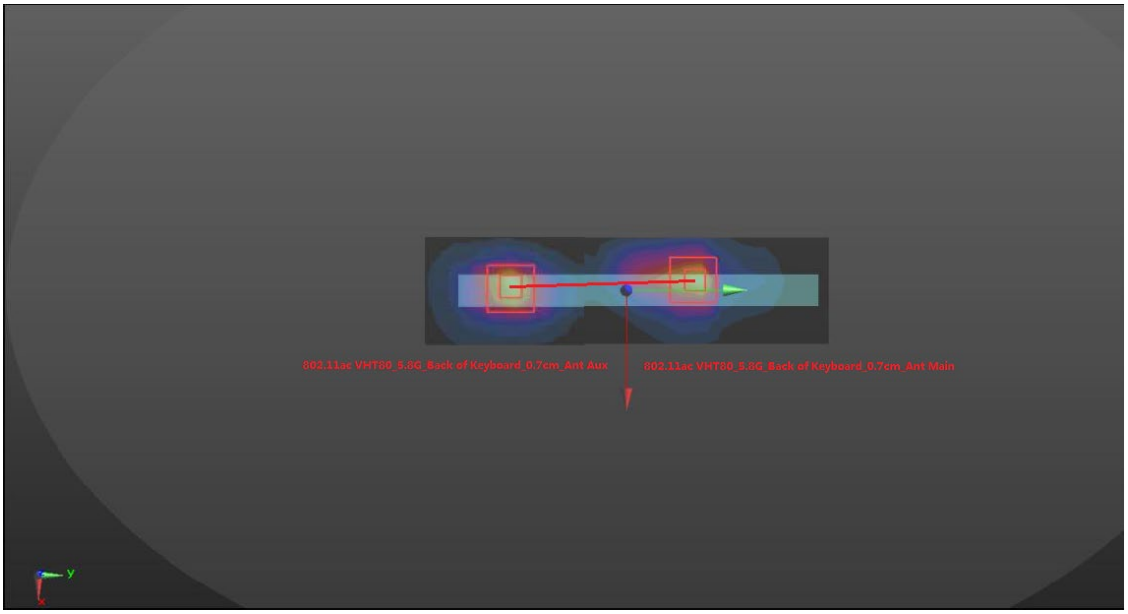
Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D (mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
Main Ant WiFi 5.2G&5.3G	0.979	2.210	0.005	0.041	-0.176	107.4	0.024	0.04	No
Aux Ant WiFi 5.2G&5.3G	0.912	2.050	-0.002	-0.066	-0.182				

(3) The sum of aggregate 1g SAR was above 1.6 W/kg for Back of Keyboard configuration with WiFi 5.6G Main Ant and WiFi 5.6G Aux Ant.
The Peak SAR location is as below:



Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D (mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
Main Ant WiFi 5.6G	0.987	2.310	0.005	0.042	-0.176	107.0	0.025	0.04	No
Aux Ant WiFi 5.6G	0.950	2.070	0.005	-0.065	-0.176				

(4) The sum of aggregate 1g SAR was above 1.6 W/kg for Back of Keyboard configuration with WiFi 5.8G Main Ant and WiFi 5.8G Aux Ant.
The Peak SAR location is as below:



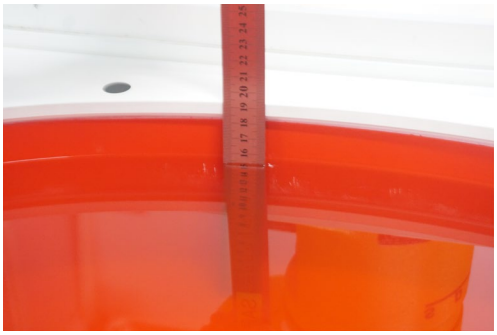
Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D (mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
Main Ant WiFi 5.8G	1.191	2.820	-0.005	0.032	-0.176	98.2	0.033	0.04	No
Aux Ant WiFi 5.8G	1.021	2.310	-0.002	-0.066	-0.182				

11 TEST LAYOUT

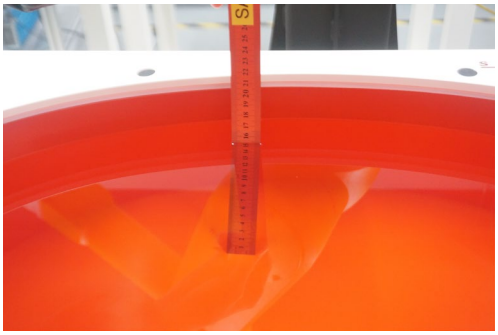
Specific Absorption Rate Test Layout

Liquid depth in the flat Phantom (≥15cm depth)

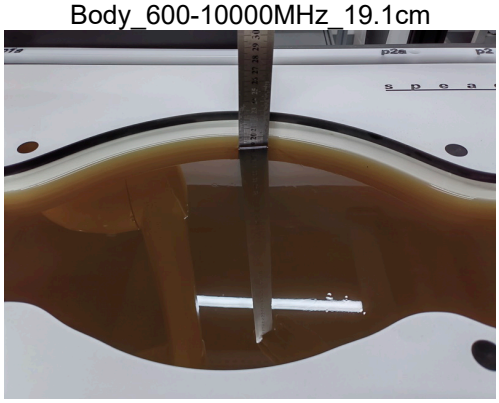
Body_2300-2700MHz_15.3cm



Body_4500-6000MHz_15.4cm



Body_600-10000MHz_19.1cm



Appendix A. SAR Plots of System Verification

(Pls See BTL-FCC SAR-1-2310G005_Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See BTL-FCC SAR-1-2310G005_Appendix B.)

Appendix C. Calibration Certificate

(Pls See BTL-FCC SAR-1-2310G005_Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See BTL-FCC SAR-1-2310G005_Appendix D.)

End of Test Report