



FCC SAR Test Report

FCC ID: 2ADUTLGPAU0G

Project No. : 2505C215
Equipment : WiFi 6E USB Adapter
Brand Name : Panda Wireless
Model Name : PAU0G, IGU0G
Date of Receipt : May 27, 2025
Date of Test : Jul. 14, 2025 ~ Sep. 02, 2025
Issued Date : Nov. 11, 2025
Test Sample : Engineering Sample No.: DG2025052774
Standard(s) : Please refer to page 2.
Applicant : Panda Wireless, Inc.
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Manufacturer : Panda Wireless, Inc.
Address : 15559 Union Ave., Suite 300, Los Gatos , CA95032, USA
Factory : Panda Wireless, Inc.
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The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc. (Dongguan)

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Standard(s)	: IEEE Std 1528™-2013 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques IEC TR 63170-2018 Measurement procedure for the evaluation of power density related to human exposure to radio frequency fields from wireless communication devices operating between 6 GHz and 100 GHz IEC/IEEE 63195-1-2022 Assessment of power density of human exposure to radio frequency fields from wireless devices in close proximity to the head and body (frequency range of 6 GHz to 300 GHz) – Part 1: Measurement procedure 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) KDB447498 D04 Interim General RF Exposure Guidance v01 KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
Test Method	: KDB447498 D02 SAR Procedures for Dongle Xmtr v02 KDB865664 D02 SAR Reporting v01r02 KDB248227 D01 802.11 Wi-Fi SAR v02r02

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** assumes no responsibility for the data provided by the customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by **BTL**.

The report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government.

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: 2017 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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REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-FCC SAR-1-2505C215	R00	Original Report.	Oct. 23, 2025	Invalid
BTL-FCC SAR-1-2505C215	R01	This report has below changes: a. Added the standard IEC/IEEE 62209-1528:2020 in page 2. b. Added the description in section 2.2. c. Added the measurement uncertainty in section 2.2. d. Updated the antenna name. It is a revision of the report with serial number BTL-FCC SAR-1-2505C215 R00. This is a newly released report, replacing the BTL-FCC SAR-1-2505C215 R00 report.	Nov. 11, 2025	Valid

1. GENERAL INFORMATION

1.1 STATEMENT OF COMPLIANCE

Mode	Highest Bodyworn SAR-1g (W/kg)
2.4G WLAN	1.400
5.2G WLAN	1.413
5.3G WLAN	1.257
5.6G WLAN	1.365
5.8 G WLAN	1.303
6E WLAN	0.341

Frequency Band	Highest Averaged Power Density (mW/cm ²)
WIFI 6E	0.769

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/IEEE C95.1, the NCRP Report Number 86 for uncontrolled environment, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528.

2) According to standard 47 CFR part 2.1093, the MPE limits specified in part 1.1310 apply to portable devices that transmit at frequencies above 6 GHz. The localized power density limit for general population exposure is 1.0 mW/cm² (equal to 10 W/m²) for frequency up to 100 GHz.

1.2 LABORATORY ENVIRONMENT

Temperature	Min. = 20°C, Max. = 24°C
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.	

1.3 GENERAL DESCRIPTION OF EUT

Equipment	WiFi 6E USB Adapter							
Brand Name	Panda Wireless							
Test Model	PAU0G							
Model Name	PAU0G, IGU0G							
Model Difference(s)	Only the model name is different, the product is the same.							
Hardware Version	PW-PAU0G-LG-V1.0							
Software Version	V1.0.0							
Modulation	WiFi(DSSS/OFDM/OFDMA)							
Operation Frequency Range(s)	Band			TX (MHz)			RX (MHz)	
	WIFI	2.4G		2400~2483.5				
		5G_UNII 1		5150~5250				
		5G_UNII 2a		5250~5350				
		5G_UNII 2c		5470~5725				
		5G_UNII 3		5725~5850				
		6E_UNII 5		5925~6425				
		6E_UNII 6		6425~6525				
		6E_UNII 7		6525~6875				
	6E_UNII 8		6875~7125					
Test Channels (low-mid-high)	1-6-11 (2.4G WiFi 802.11b/g/n HT20/ax HE20)							
	3-6-9 (2.4G WiFi 802.11n HT40/ax HE40)							
	Band	WiFi 5.2G&5.3G	WiFi 5.6G	WiFi 5.8G	WiFi 6.2G	WiFi 6.5G	WiFi 6.7G	WiFi 7.0G
	802.11a 802.11n HT20 802.11ac VHT20 802.11ax HE20	36-40-44 -48-52-56 -60-64	100-104-108 -112-116-132 -136-140-144	149-153 -157-161 -165	1-49 -93	97-105 -115	117-149 -181	185-209 -233
	802.11n HT40 802.11ac VHT40 802.11ax HE40	38-46-54 -62	102-110-118- 126-134-142	151-159	3-43 -91	99-107	115-147 -179	187-227
	802.11ac VHT80 802.11ax HE80	42-58	106-122-138	155	7-39 -87	103 -119	135-151 -167	183-199 -215

Antenna Information	Ant.	Brand	P/N	Type	Frequency Range (MHz)	Gain (dBi)
	ANT 1		AN2450-FPC3 43BX	FPC	2400-2500	2.95
					5150-5350	3.50
					5470-5725	3.50
					5725-5850	3.50
					5925-6425	3.30
					6425-6525	3.30
					6525-6875	3.30
					6875-7125	3.30
	ANT 2		AN2450-15BC 15RS-B	Dipole	2400-2500	3.01
					5150-5350	4.12
					5470-5725	4.12
					5725-5850	4.12
					5925-6425	3.92
					6425-6525	3.92
					6525-6875	3.92
					6875-7125	3.92

Note: The antenna gain is provided by the manufacturer.

1.4 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	Data Acquisition Electronics	Speag	DAE4	1390	Nov. 14, 2024	1 Year
2	Data Acquisition Electronics	Speag	DAE4	1717	Jun. 19, 2025	1 Year
3	E-field Probe	Speag	EX3DV4	7544	Jun. 19, 2025	1 Year
4	E-field Probe	Speag	EX3DV4	3809	Jan. 24, 2025	1 Year
5	E-field Probe	Speag	EX3DV4	7693	Nov. 20, 2024	1 Year
6	EUmmWV4 Probe	Speag	EUmmWV4	9561	Jun. 18, 2025	1 Year
7	System Validation Dipole	Speag	D2450V2	919	Apr. 22, 2024	3 Years
8	System Validation Dipole	Speag	D5GHzV2	1160	Apr. 25, 2024	3 Years
9	System Validation Dipole	Speag	D6.5GHzV2	1052	Nov. 13, 2024	3 Years
10	System Validation Source	Speag	5G Verification Source 10GHz	1041	May 27, 2025	1 Years
11	Twin Sam Phantom	Speag	SAM-Twim V8.0	2081	N/A	N/A
12	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1896	N/A	N/A
13	Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	May 29, 2025	1 Year
14	Power Amplifier	Mini-Circuits	ZVE-8G+	520701341	Jan. 12, 2025	1 Year
15	DC Source metter	Iteck	IT6154	0061041267682 01001	May 29, 2025	1 Year
16	Signal Generator	Agilent	N5172B	MY53050758	Jan. 11, 2025	1 Year
17	Signal Generator	Keysight	N5173B	MY59101420	Jan. 11, 2025	1 Year
18	Smart Power Sensor	R&S	NRP18S	101333	May 29, 2025	1 Year
19	Coupler	Woken	ATD10-400M-6G-A2	2021008	May 29, 2025	1 Year
20	Liquid Thermometer	Nscing Es	YZ6021S	/	Nov. 24, 2024	1 Year

Note:

1. "N/A" denotes no model name, serial No. or calibration specified.

2.

1) Per KDB865664 D01 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) The most recent return-loss result, measured at least annually, deviates by no more than 20% from the previous measurement;

d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a short block performed before measuring liquid parameters.

2. RF EMISSIONS MEASUREMENT

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is SAR room at the location of No.3, Jinshagang 1st Road, Dalang, Dongguan, Guangdong People's Republic of China.

BTL's Registration Number for FCC: 747969

BTL's Designation Number for FCC: CN1377

2.2 MEASUREMENT UNCERTAINTY

Note: Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, Per IECIEEE 62209-1528:2020 SAR Measurement 6 MHz to 10 GHz. When the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE 1528 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

Uncertainty Budget for Frequency range of 300 MHz to 3 GHz

Symbol	Input quantity X_i (source of uncertainty)	Unc. Value	Prob. Dist.	Div.	ci (1g)	ci (10g)	Std.Unc. (1g) (±%)	Std.Unc. (10g) (±%)
Measurement system errors								
CF	Probe calibration(±%)	11.0	N	2	1	1	5.5	5.5
CF_{drift}	Probe calibration drift(±%)	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
LIN	Probe linearity and detection limit(±%)	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
BBS	Broadband signal(±%)	3.0	R	$\sqrt{3}$	1	1	1.7	1.7
ISO	Probe isotropy(±%)	7.6	R	$\sqrt{3}$	1	1	4.4	4.4
DAE	Other probe and data acquisition errors(±%)	0.7	N	1	1	1	0.7	0.7
AMB	RF ambient and noise(±%)	1.8	N	1	1	1	1.8	1.8
Δ_{xyz}	Probe positioning errors(±mm)	0.006	N	1	0.14	0.14	0.08	0.08
DAT	Data processing errors(±%)	1.2	N	1	1	1	1.2	1.2
Phantom and device (DUT or validation antenna) errors								
LIQ(σ)	Conductivity (meas.)(±%)	0.8	N	1	0.78	0.71	0.7	0.6
LIQ(T_c)	Conductivity (temp.)(±%)	4.16	R	$\sqrt{3}$	0.78	0.71	1.9	1.7
EPS	Phantom Permittivity(±%)	14	R	$\sqrt{3}$	0	0	0.0	0.0
DIS	Distance DUT - TSL(±%)	2	N	1	2	2	4.0	4.0
D_{xyz}	Device Positioning(±%)	1.3	N	1	1	1	1.3	1.3
H	Device Holder(±%)	2	N	1	1	1	2.0	2.0
MOD	DUT Modulationm(±%)	2.4	R	$\sqrt{3}$	1	1	1.4	1.4
TAS	Time-average SAR(±%)	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
RF_{drift}	DUT drift(±%)	1.8	N	1	1	1	1.8	1.8
VAL	Val Antenna Unc.(±%)	0	N	1	1	1	0.0	0.0
P_{in}	Unc. Input Power(±%)	0	N	1	1	1	0.0	0.0
Corrections to the SAR result								
C(ϵ', σ)	Deviation to Target(±%)	1.9	N	1	1	0.84	1.9	1.6
C(R)	SAR scaling(±%)	0	R	$\sqrt{3}$	1	1	0.0	0.0
u(ΔSAR)	Combined uncertainty						10.1	10.0
	Coverage Factor for 95%						k=2	k=2
U	Expanded uncertainty					U =	20.1	20.0
a Other probability distributions and divisors may be used if they better represent available knowledge of the quantities concerned.								

Uncertainty Budget for Frequency range of 3 GHz to 6 GHz

Symbol	Input quantity X_i (source of uncertainty)	Unc. Value	Prob. Dist.	Div.	ci (1g)	ci (10g)	Std.Unc. (1g) (±%)	Std.Unc. (10g) (±%)
Measurement system errors								
CF	Probe calibration(±%)	13.1	N	2	1	1	6.6	6.6
CF_{drift}	Probe calibration drift(±%)	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
LIN	Probe linearity and detection limit(±%)	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
BBS	Broadband signal(±%)	2.6	R	$\sqrt{3}$	1	1	1.5	1.5
ISO	Probe isotropy(±%)	7.6	R	$\sqrt{3}$	1	1	4.4	4.4
DAE	Other probe and data acquisition errors(±%)	1.2	N	1	1	1	1.2	1.2
AMB	RF ambient and noise(±%)	1.8	N	1	1	1	1.8	1.8
Δ_{xyz}	Probe positioning errors(±mm)	0.005	N	1	0.29	0.29	0.15	0.15
DAT	Data processing errors(±%)	2.3	N	1	1	1	2.3	2.3
Phantom and device (DUT or validation antenna) errors								
LIQ(σ)	Conductivity (meas.)(±%)	0.7	N	1	0.78	0.71	0.6	0.5
LIQ(T_c)	Conductivity (temp.)(±%)	2.45	R	$\sqrt{3}$	0.78	0.71	1.1	1.0
EPS	Phantom Permittivity(±%)	14	R	$\sqrt{3}$	0.25	0.25	2.0	2.0
DIS	Distance DUT - TSL(±%)	2	N	1	2	2	4.0	4.0
D_{xyz}	Device Positioning(±%)	0.2	N	1	1	1	0.2	0.2
H	Device Holder(±%)	1.8	N	1	1	1	1.8	1.8
MOD	DUT Modulationm(±%)	2.4	R	$\sqrt{3}$	1	1	1.4	1.4
TAS	Time-average SAR(±%)	1.7	R	$\sqrt{3}$	1	1	1.0	1.0
RF_{drift}	DUT drift(±%)	1.5	N	1	1	1	1.5	1.5
VAL	Val Antenna Unc.(±%)	0	N	1	1	1	0.0	0.0
P_{in}	Unc. Input Power(±%)	0	N	1	1	1	0.0	0.0
Corrections to the SAR result								
C(ϵ', σ)	Deviation to Target(±%)	1.9	N	1	1	0.84	1.9	1.6
C(R)	SAR scaling(±%)	0	R	$\sqrt{3}$	1	1	0.0	0.0
u(ΔSAR)	Combined uncertainty						10.8	10.7
	Coverage Factor for 95%						k=2	k=2
U	Expanded uncertainty					U =	21.6	21.5
a Other probability distributions and divisors may be used if they better represent available knowledge of the quantities concerned.								

Uncertainty Budget for Frequency range of above 6 GHz

Symbol	Input quantity X_i (source of uncertainty)	Unc. Value	Prob. Dist.	Div.	ci (1g)	ci (10g)	Std.Unc. (1g) (±%)	Std.Unc. (10g) (±%)
Measurement system errors								
CF	Probe calibration(±%)	18.6	N	2	1	1	9.3	9.3
CF_{drift}	Probe calibration drift(±%)	1.7	N	1	1	1	1.0	1.0
LIN	Probe linearity and detection limit(±%)	4.7	R	1.732	1	1	2.7	2.7
BBS	Broadband signal(±%)	2.8	N	1	1	1	1.6	1.6
ISO	Probe isotropy(±%)	7.6	R	2	1	1	4.4	4.4
DAE	Other probe and data acquisition errors(±%)	2.4	N	1.732	1	1	1.4	1.4
AMB	RF ambient and noise(±%)	1.8	N	1	1	1	1.8	1.8
Δ_{xyz}	Probe positioning errors(±mm)	0.01	N	1	0.33	0.33	0.00	0.00
DAT	Data processing errors(±%)	3.5	N	1	1	1	3.5	3.5
Phantom and device (DUT or validation antenna) errors								
LIQ(σ)	Conductivity (meas.) DAK (±%)	2.0	N	1	0.78	0.71	1.6	1.4
LIQ(T_c)	Conductivity (temp.)(±%)	2.43	R	1.732	0.78	0.71	1.1	1.0
EPS	Phantom Permittivity(±%)	14	R	1.732	0.5	0.5	4.0	4.0
DIS	Distance DUT - TSL(±%)	2	N	1	2	2	4.0	4.0
D_{xyz}	Device Positioning(±%)	1.5	N	1	1	1	1.5	1.5
H	Device Holder(±%)	2	N	1	1	1	2.0	2.0
MOD	DUT Modulationm(±%)	2.4	R	1.732	1	1	1.4	1.4
TAS	Time-average SAR(±%)	1.7	R	1.732	1	1	1.0	1.0
RF_{drift}	DUT drift(±%)	2	N	1	1	1	2.0	2.0
VAL	Val Antenna Unc.(±%)	0	N	1	1	1	0.0	0.0
P_{in}	Unc. Input Power(±%)	0	N	1	1	1	0.0	0.0
Corrections to the SAR result								
C(ϵ', σ)	Deviation to Target(±%)	1.9	N	1	1	0.84	1.9	1.6
C(R)	SAR scaling(±%)	0	R	$\sqrt{3}$	1	1	0.0	0.0
u(ΔSAR)	Combined uncertainty						13.7	13.6
	Coverage Factor for 95%						k=2	k=2
U	Expanded uncertainty					U =	27.3	27.2
a Other probability distributions and divisors may be used if they better represent available knowledge of the quantities concerned.								

Uncertainty Budget for PD

Error Description	Uncertainty Value (±dB)	Probability	Divisor	(Ci)	(Ci) 10g	Standard Uncertainty (±dB)	Standard Uncertainty (10g) (±%)
Uncertainty terms dependent on the measurement system							
Probe Calibration	0.98	N	1	1	1	0.98	1.0
Probe correction	0.00	R	1.732	1	0.7	0.00	0.0
Frequency response (BW ≤ 1 GHz)	0.20	R	1.732	1	0.7	0.12	0.1
Sensor cross coupling	0.00	R	1.732	1	1	0.00	0.0
Isotropy	0.50	R	1.732	1	1	0.29	0.3
Linearity	0.20	R	1.732	1	1	0.12	0.1
Probe scattering	0.00	R	1.732	1	1	0.00	0.0
Probe positioning offset	0.30	R	1.732	1	1	0.17	0.2
Probe positioning repeatability	0.04	R	1.732	1	1	0.02	0.0
Sensor mechanical offset	0.00	R	1.732	1	1	0.00	0.0
Probe spatial resolution	0.00	R	1.732	1	1	0.00	0.0
Field impedance dependence	0.00	R	1.732	1	1	0.00	0.0
Amplitude and phase drift	0.00	R	1.732	1	1	0.00	0.0
Amplitude and phase noise	0.04	R	1.732	1	1	0.02	0.0
Measurement area truncation	0.00	R	1.732	1	1	0.00	0.0
Data acquisition	0.03	N	1	1	1	0.03	0.0
Sampling	0.00	R	1.732	1	1	0.00	0.0
Field reconstruction	2.00	R	1.732	1	1	1.15	1.2
Forward transformation	0.00	R	1.732	1	1	0.00	0.0
Power density scaling	0.00	R	1.732	1	1	0.00	0.0
Spatial averaging	0.10	R	1.732	1	1	0.06	0.1
System detection limit	0.04	R	1.732	1	1	0.02	0.0
Uncertainty terms dependent on the DUT and environmental factors							
Probe coupling with DUT	0.00	R	1.732	1	1	0.0	0.0
Modulation response	0.40	R	1.732	1	0.84	0.2	0.2
Integration time	0.00	R	1.732	1	0.71	0.0	0.0
Response time	0.00	R	1.732	1	0.71	0.0	0.0
Device holder influence	0.10	R	1.732	1	0.71	0.1	0.0
DUT alignment	0.00	R	1.732	1	0.71	0.0	0.0
RF ambient conditions	0.04	R	1.732	1	0.26	0.0	0.0
Ambient reflections	0.04	R	1.732	1	0.26	0.0	0.0
Immunity / secondary reception	0.00	R	1.732	1	0.26	0.0	0.0
Drift of the DUT	0.00	R	1.732	1	0.26	0.0	0.0
Combined Std. Uncertainty						1.59	1.6%
Coverage Factor for 95 %						k=2	k=2
Expanded STD Uncertainty (95%)						3.18	3.1%

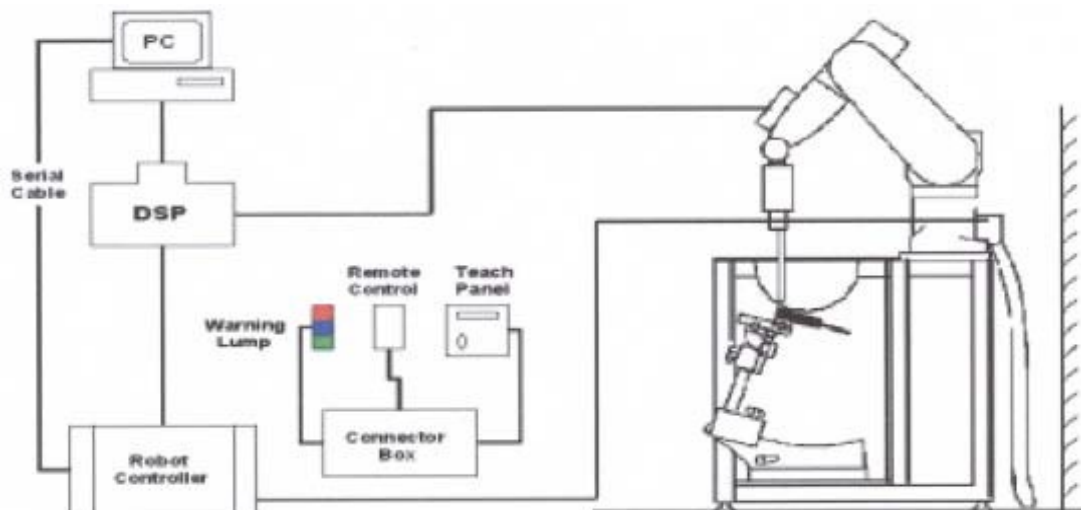
3. SAR MEASUREMENTS SYSTEM CONFIGURATION

3.1 SAR MEASUREMENT SET-UP

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 valuation.

3.2.1 PROBE SPECIFICATION

EX3DV4

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 μ W/g to > 100 mW/g Linearity: ± 0.2 dB
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



E-field Probe

3.2.2 E-FIELD PROBE CALIBRATION

Each probe is calibrated according to an dosimetric assessment procedure with accuracy better than $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$. 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 below 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.

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

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

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 (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, ELI 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	
Available	Special	

3.2.4 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. $\pm 5\%$.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above $\pm 0.1\text{mm}$). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within $\pm 30^\circ$.)

- Area Scan

The “area scan” measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension ($\leq 2\text{GHz}$), 12 mm in x- and y- dimension (2-4 GHz) and 10mm in x- and y- dimension (4-6GHz). If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.

- Zoom Scan

A “zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous “coarse” scan. This is a fine grid with maximum scan spatial resolution: $\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}} \leq 2\text{GHz} \rightarrow 8\text{mm}$, 2-4GHz $\rightarrow 5\text{mm}$ and 4-6 GHz $\rightarrow 4\text{mm}$; $\Delta z_{\text{zoom}} \leq 3\text{GHz} \rightarrow 5\text{mm}$, 3-4 GHz $\rightarrow 4\text{mm}$ and 4-6GHz $\rightarrow 2\text{mm}$ where the robot additionally moves the probe along the z-axis away from the bottom of the Phantom. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in Appendix B. Test results relevant for the specified standard (see chapter 1.4.) are shown in table form in chapter 7.2.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2 mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth.

The following table summarizes the area scan and zoom scan resolutions per FCC KDB 865664D01:

Frequency	Maximun Area Scan resolution ($\Delta x_{\text{area}}, \Delta y_{\text{area}}$)	Maximun Zoom Scan spatial resolution ($\Delta x_{\text{Zoom}}, \Delta y_{\text{Zoom}}$)	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{\text{Zoom}}(n)$	$\Delta z_{\text{Zoom}}(1)^*$	$\Delta z_{\text{Zoom}}(n>1)^*$	
$\leq 2\text{GHz}$	$\leq 15\text{mm}$	$\leq 8\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 1.5^* \Delta z_{\text{Zoom}}(n-1)$	$\geq 30\text{mm}$
2-3GHz	$\leq 12\text{mm}$	$\leq 5\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 1.5^* \Delta z_{\text{Zoom}}(n-1)$	$\geq 30\text{mm}$
3-4GHz	$\leq 12\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 3\text{mm}$	$\leq 1.5^* \Delta z_{\text{Zoom}}(n-1)$	$\geq 28\text{mm}$
4-5GHz	$\leq 10\text{mm}$	$\leq 4\text{mm}$	$\leq 3\text{mm}$	$\leq 2.5\text{mm}$	$\leq 1.5^* \Delta z_{\text{Zoom}}(n-1)$	$\geq 25\text{mm}$
5-6GHz	$\leq 10\text{mm}$	$\leq 4\text{mm}$	$\leq 2\text{mm}$	$\leq 2\text{mm}$	$\leq 1.5^* \Delta z_{\text{Zoom}}(n-1)$	$\geq 22\text{mm}$

3.2.5 SPATIAL PEAK SAR EVALUATION

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation are the SAR values measured at the points of the fine cube grid consisting of 5 x 5 x 7 points (with 8mm horizontal resolution) or 7 x 7 x 7 points (with 5mm horizontal resolution) or 8 x 8 x 7 points (with 4mm horizontal resolution). The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting "Graph Evaluated".
- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.
- All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computer mathematic, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computer mathematic, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY5 uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

3.2.6 DATA STORAGE AND EVALUATION

3.2.6.1 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 "DAE". 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.

3.2.7 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, ai0, ai1,ai2
	Conversion factor	ConvFi
	Diode compression point	Dcpj
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)
	dcpj=diode compression point	(DASY parameter)

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

$$\text{E-field probes: } E_i = (V_i / \text{Norm}_i \cdot \text{ConvF})^{1/2}$$

$$\text{H-field probes: } H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1}f + a_{i2}f^2) / f$$

With V_i = 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

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

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

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

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

$$E_{\text{tot}} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

$$\text{SAR} = (E_{\text{tot}})^2 \cdot \sigma / (\rho \cdot 1000)$$

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/cm³

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.

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

With P_{pwe} = equivalent power density of a plane wave in mW/cm²

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

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

4. SYSTEM VERIFICATION PROCEDURE

4.1 TISSUE VERIFICATION

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine if the dielectric parameters are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within $\pm 5\%$ of the target values.

The following materials are used for producing the tissue-equivalent materials.

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

Salt: 99+% Pure Sodium Chloride; Sugar: 98+% Pure Sucrose; Water: De-ionized, 16M + resistivity
HEC: Hydroxyethyl Cellulose; DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

Tissue Verification									
Tissue Type	Frequency (MHz)	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Targeted Conductivity (σ)	Targeted Permittivity (ϵ_r)	Deviation Conductivity (σ) (%)	Deviation Permittivity (ϵ_r) (%)	Date
Head	2450	22.2	1.874	38.301	1.80	39.2	4.11	-2.29	Aug. 28, 2025
Head	5250	22.5	4.781	37.107	4.71	36.0	1.51	3.22	Aug. 15, 2025
Head	5600	22.5	5.109	35.349	5.07	35.5	0.77	-0.43	Aug. 15, 2025
Head	5750	22.5	5.302	34.978	5.22	35.4	1.57	-1.05	Aug. 15, 2025
Head	6500	22.7	5.870	33.600	6.07	34.5	-3.29	-2.61	Sep. 01, 2025

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.

4.2 SYSTEM CHECK

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 1528 (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	Aug. 28, 2025	2450	53.10	5.33	53.30	0.38	919
Head	Aug. 15, 2025	5250	78.70	8.19	81.90	4.07	1160
Head	Aug. 15, 2025	5600	81.80	8.21	82.10	0.37	1160
Head	Aug. 15, 2025	5750	78.70	7.62	76.20	-3.18	1160
Head	Sep. 01, 2025	6500	291.00	27.90	279.00	-4.12	1052

4.2.1 POWER DENSITY SYSTEM CHECK

System check provides a fast and reliable method to routinely verify that the measurement system is operational with no system component failures, including probe defects, drifts or deviation from target performance requirements. A system check also verifies the repeatability of 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 the horn to the outer surface of the verification source, the measurement distance set in the software should be offset by -4.45 mm; e.g, for measurement of the verification source at 10 mm, the measurement distance set in the software 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 $\pm 15.88\%$. 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).

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

or

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

$$u_c = \sqrt{u_{antenna_cal}^2 + u_{power}^2 + u_{meas}^2} \quad (A.6)$$

where

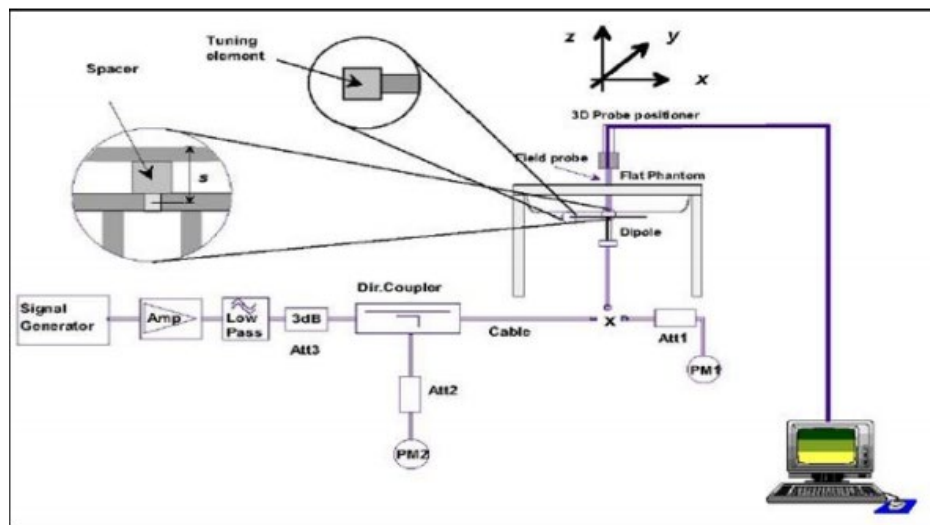
- $psPD_{tgt}$ is the target value, derived from repeated measurement of source antenna, normalized to 0 dBm TRP;
- $u_{antenna_cal}$ is the standard uncertainty ($k = 1$) of the $psPD$ of the antenna model;
- u_{power} is the standard uncertainty ($k = 1$) of the measured TRP (see Clause A.2);
- u_{meas}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

System Check	Date	Frequency (GHz)	Distance (mm)	Targeted 4cm ² (W/m ²)	Measured 4cm ² (W/m ²)	Deviation For 4cm ² (%)	Dipole S/N
Power Density	Aug. 29, 2025	10	10	57.5	60.8	5.74	1041

4.3 SYSTEM CHECK PROCEDURE

The system check is performed by using a system check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a plexiglass spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 250mW (below 3GHz) or 100mW (3-6GHz). To adjust this power a power meter is used.

The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system check to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test. System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system ($\pm 10\%$).



5. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

5.1 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 ($\sim 10\%$ 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 7.2.

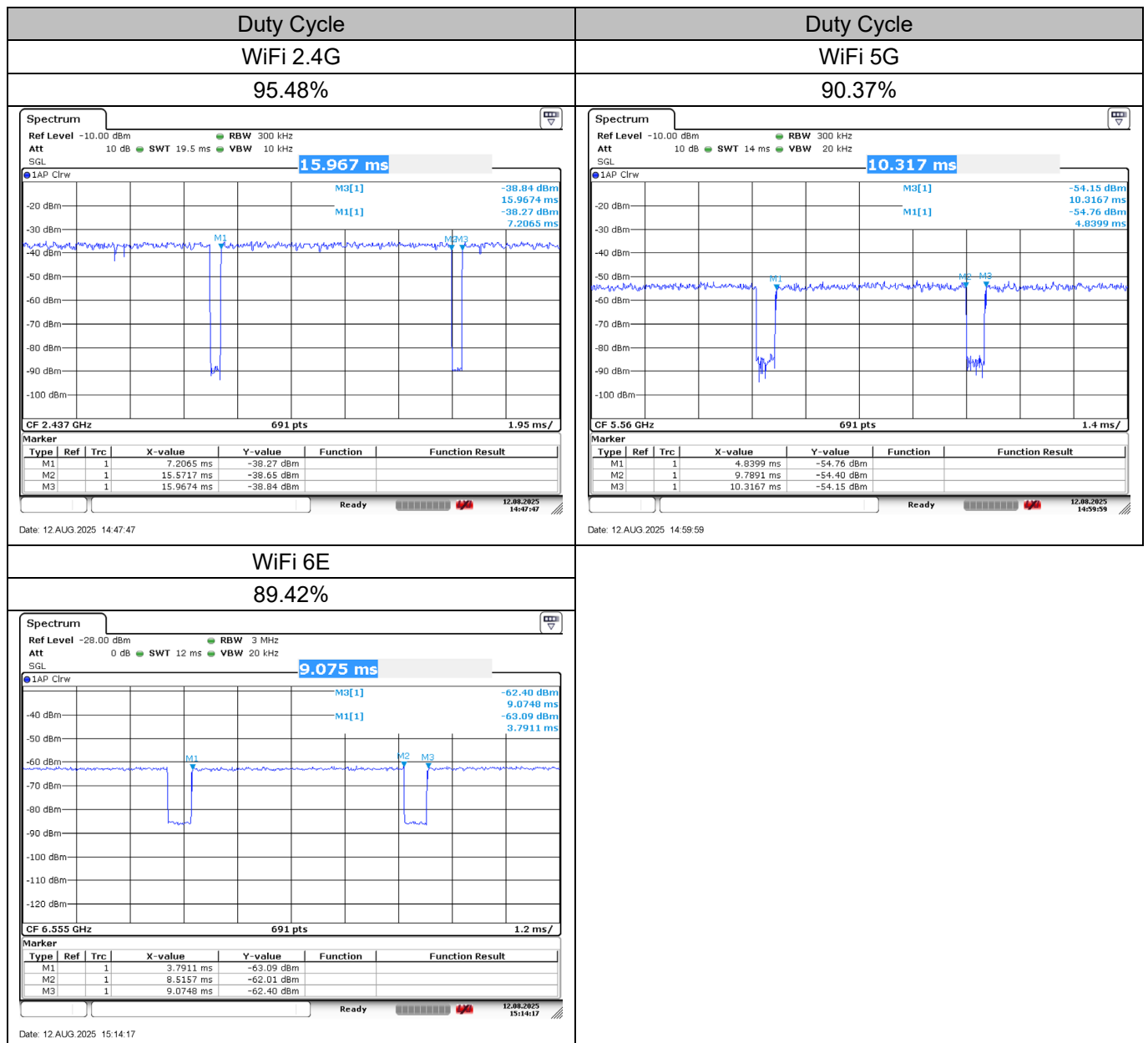
6. OPERATIONAL CONDITIONS DURING TEST

6.1 SAR TEST CONFIGURATION

6.1.1 WIFI TEST CONFIGURATION

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

For WiFi SAR testing, a communication link is set up with the test mode software for WiFi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. The test procedures in KDB 248227 D01 are applied.



6.1.1.1 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 stand alone. 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.

6.1.1.2 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.

6.1.1.3 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 are 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.

6.1.1.4 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.

6.2 TEST POSITION

Test all USB orientations [see figure below: (A) Horizontal-Up, (B) Horizontal-Down, (C) Vertical-Front, and (D) Vertical-Back and Tip] with a device-to-phantom separation distance of 5 mm.

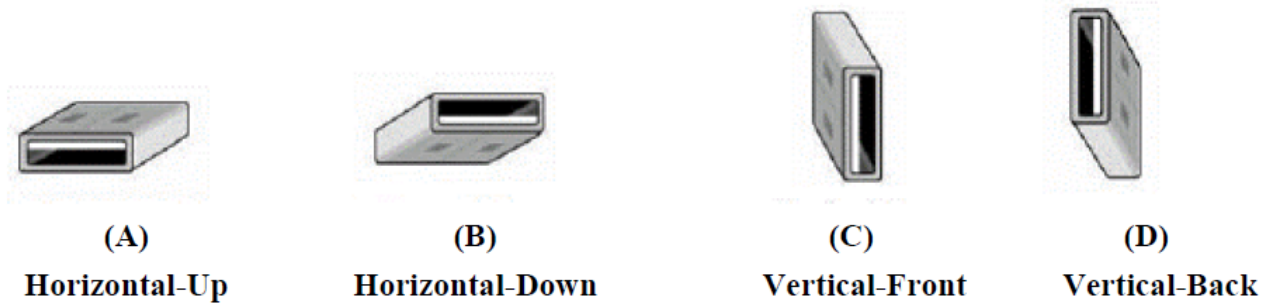
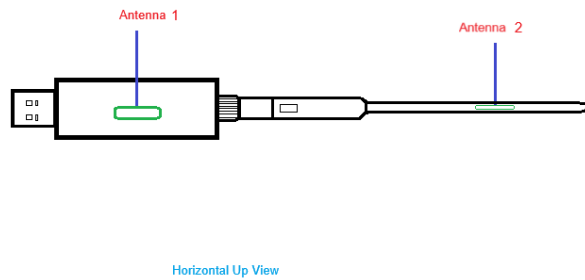


Fig: USB Connector Orientations Implemented on Laptop Computers

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



7. TEST RESULT

7.1 CONDUCTED POWER RESULTS

7.1.1 CONDUCTED POWER MEASUREMENTS OF WIFI

1. Conducted power measurements of WiFi 2.4G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power (dBm)
2.4G WIFI _ANT 2	802.11b	1	2412	1	14.00	13.29
		6	2437		14.00	13.40
		11	2462		14.00	14.23
	802.11g	1	2412	6	13.50	No Require
		6	2437		13.50	
		11	2462		13.50	
	802.11n HT20	1	2412	MCS0	13.50	
		6	2437		13.50	
		11	2462		13.50	
	802.11n HT40	3	2422	MCS0	13.50	
		7	2442		13.50	
		11	2462		13.50	
	802.11ax HE20	1	2412	MCS0	13.50	
		6	2437		13.50	
		11	2462		13.50	
	802.11ax HE40	3	2422	MCS0	13.50	
		7	2442		13.50	
		11	2462		13.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune up	Average Power (dBm)
2.4G WIFI _ANT 1	802.11b	1	2412	1	12.00	11.11
		6	2437		12.00	11.28
		11	2462		13.00	12.04
	802.11g	1	2412	6	11.50	No Require
		6	2437		11.50	
		11	2462		11.50	
	802.11n HT20	1	2412	HT0	11.50	
		6	2437		11.50	
		11	2462		11.50	
	802.11n HT40	3	2422	HT0	11.50	
		7	2442		11.50	
		11	2462		11.50	
	802.11ax HE20	1	2412	HT0	11.50	
		6	2437		11.50	
		11	2462		11.50	
	802.11ax HE40	3	2422	HT0	11.50	
		7	2442		11.50	
		11	2462		11.50	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune up	Total Average Power (dBm)
2.4G WIFI _ANT 1+ANT 2	802.11b	1	2412	1	13.29	11.11	16.00	15.35
		6	2437		13.40	11.28	16.00	15.48
		11	2462		14.23	12.04	16.50	16.28
	802.11g	1	2412	6	-	-	15.50	No Require
		6	2437		-	-	15.50	
		11	2462		-	-	15.50	
	802.11n HT20	1	2412	MCS8	-	-	15.50	
		6	2437		-	-	15.50	
		11	2462		-	-	15.50	
	802.11n HT40	3	2422	MCS8	-	-	15.50	
		7	2442		-	-	15.50	
		11	2462		-	-	15.50	
	802.11ax HE20	1	2412	MCS0	-	-	15.50	
		6	2437		-	-	15.50	
		11	2462		-	-	15.50	
	802.11ax HE40	3	2422	MCS0	-	-	15.50	
		7	2442		-	-	15.50	
		11	2462		-	-	15.50	

Note:

- 1) The Average conducted power of WiFi 2.4G is measured with RMS detector.
- 2) Per KDB248227 D01, for WiFi 2.4G, the highest measured maximum output power Channel for DSSS modes (802.11b) was selected for SAR measurement. SAR for OFDM modes (2.4GHz 802.11g/n/ac/ax) was not required When the highest reported SAR for DSSS is adjusted by the ratio of OFDM modes (802.11g/n/ac/ax) to DSSS modes (802.11b) specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
- 3) The tested channel results are marks in bold.

2. Conducted power measurements of WiFi 5.2G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.2G WIFI _ANT 2	802.11a	36	5180	6	9.5	No Require
		40	5200		9.5	
		48	5240		9.5	
	802.11n HT20	36	5180	MCS0	12	11.11
		40	5200		12	11.34
		48	5240		10	8.44
	802.11n HT40	38	5190	MCS0	9.5	No Require
		46	5230		9.5	
	802.11ac VHT20	36	5180	MCS0	9.5	
		40	5200		9.5	
		48	5240		9.5	
	802.11ac VHT40	38	5190	MCS0	9.5	
		46	5230		9.5	
	802.11ac VHT80	42	5210	MCS0	9.5	
	802.11ax HE20	36	5180	MCS0	9.5	
		40	5200		9.5	
		48	5240		9.5	
	802.11ax HE40	38	5190	MCS0	9.5	
		46	5230		9.5	
	802.11ax HE80	42	5210	MCS0	9.5	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.2G WIFI _ANT 1	802.11a	36	5180	6	10.5	No Require
		40	5200		10.5	
		48	5240		10.5	
	802.11n HT20	36	5180	MCS0	12	11.71
		40	5200		12	11.56
		48	5240		11	10.73
	802.11n HT40	38	5190	MCS0	10.5	No Require
		46	5230		10.5	
	802.11ac VHT20	36	5180	MCS0	10.5	
		40	5200		10.5	
		48	5240		10.5	
	802.11ac VHT40	38	5190	MCS0	10.5	
		46	5230		10.5	
	802.11ac VHT80	42	5210	MCS0	10.5	
	802.11ax HE20	36	5180	MCS0	10.5	
		40	5200		10.5	
		48	5240		10.5	
	802.11ax HE40	38	5190	MCS0	10.5	
		46	5230		10.5	
	802.11ax HE80	42	5210	MCS0	10.5	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
5.2G WIFI _ANT 1+ANT 2	802.11a	36	5180	6	-	-	13.00	No Require
		40	5200		-	-	13.00	
		48	5240		-	-	13.00	
	802.11n HT20	36	5180	MCS8	11.11	11.71	15.00	14.43
		40	5200		11.34	11.56	15.00	14.46
		48	5240		8.44	10.73	13.50	12.74
	802.11n HT40	38	5190	MCS8	-	-	13.00	No Require
		46	5230		-	-	13.00	
	802.11ac VHT20	36	5180	MCS0	-	-	13.00	
		40	5200		-	-	13.00	
		48	5240		-	-	13.00	
	802.11ac VHT40	38	5190	MCS0	-	-	13.00	
		46	5230		-	-	13.00	
	802.11ac VHT80	42	5210	MCS0	-	-	13.00	
	802.11ax HE20	36	5180	MCS0	-	-	13.00	
		40	5200		-	-	13.00	
		48	5240		-	-	13.00	
	802.11ax HE40	38	5190	MCS0	-	-	13.00	
		46	5230		-	-	13.00	
	802.11ax HE80	42	5210	MCS0	-	-	13.00	

Note:

- 1) The Average conducted power of WiFi 5.2G is measured with RMS detector.
- 2) The tested channel results are marks in bold.

3. Conducted power measurements of WiFi 5.3G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.3G WIFI _ANT 2	802.11a	52	5260	6	10.5	No Require
		60	5300		10.5	
		64	5320		10.5	
	802.11n HT20	52	5260	MCS0	10.5	9.67
		60	5300		12	11.55
		64	5320		11.5	11.02
	802.11n HT40	54	5270	MCS0	10.5	No Require
		62	5310		10.5	
	802.11ac VHT20	52	5260	MCS0	10.5	
		60	5300		10.5	
		64	5320		10.5	
	802.11ac VHT40	54	5270	MCS0	10.5	
		62	5310		10.5	
	802.11ac VHT80	58	5290	MCS0	10.5	
		52	5260		10.5	
		60	5300		10.5	
	802.11ax HE20	64	5320	MCS0	10.5	
		54	5270		10.5	
		62	5310		10.5	
	802.11ax HE40	58	5290	MCS0	10.5	
		52	5260		10.5	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.3G WIFI _ANT 1	802.11a	52	5260	6	9.5	No Require
		60	5300		9.5	
		64	5320		9.5	
	802.11n HT20	52	5260	MCS0	10.5	9.87
		60	5300		11	9.84
		64	5320		9.5	9.46
	802.11n HT40	54	5270	MCS0	9.5	No Require
		62	5310		9.5	
	802.11ac VHT20	52	5260	MCS0	9.5	
		60	5300		9.5	
		64	5320		9.5	
	802.11ac VHT40	54	5270	MCS0	9.5	
		62	5310		9.5	
	802.11ac VHT80	58	5290	MCS0	9.5	
	802.11ax HE20	52	5260	MCS0	9.5	
		60	5300		9.5	
		64	5320		9.5	
	802.11ax HE40	54	5270	MCS0	9.5	
		62	5310		9.5	
	802.11ax HE80	58	5290	MCS0	9.5	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
5.3G WIFI _ANT 1+ANT 2	802.11a	52	5260	6	-	-	13.00	No Require
		60	5300		-	-	13.00	
		64	5320		-	-	13.00	
	802.11n HT20	52	5260	MCS8	9.67	9.87	13.50	12.78
		60	5300		11.55	9.84	14.50	13.79
		64	5320		11.02	9.46	14.00	13.32
	802.11n HT40	54	5270	MCS8	-	-	13.00	No Require
		62	5310		-	-	13.00	
	802.11ac VHT20	52	5260	MCS0	-	-	13.00	
		60	5300		-	-	13.00	
		64	5320		-	-	13.00	
	802.11ac VHT40	54	5270	MCS0	-	-	13.00	
		62	5310		-	-	13.00	
	802.11ac VHT80	58	5290	MCS0	-	-	13.00	
	802.11ax HE20	52	5260	MCS0	-	-	13.00	
		60	5300		-	-	13.00	
		64	5320		-	-	13.00	
	802.11ax HE40	54	5270	MCS0	-	-	13.00	
		62	5310		-	-	13.00	
	802.11ax HE80	58	5290	MCS0	-	-	13.00	

Note:

- 1) The Average conducted power of WiFi 5.3G is measured with RMS detector.
- 2) The tested channel results are marks in bold.

4. Conducted power measurements of WiFi 5.6G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.6G WIFI _ANT 2	802.11a	100	5500	6	10	No Require
		120	5600		10	
		140	5700		10	
	802.11n HT20	100	5500	MCS0	11	10.02
		120	5600		10.5	9.64
		140	5700		10.5	10.23
	802.11n HT40	102	5510	MCS0	10	No Require
		118	5590		10	
		134	5670		10	
	802.11ac VHT20	100	5500	MCS0	10	
		120	5600		10	
		140	5700		10	
	802.11ac VHT40	102	5510	MCS0	10	
		118	5590		10	
		134	5670		10	
	802.11ac VHT80	106	5530	MCS0	10	
		122	5610		10	
	802.11ax HE20	100	5500	MCS0	10	
		120	5600		10	
		140	5700		10	
	802.11ax HE40	102	5510	MCS0	10	
		118	5590		10	
		134	5670		10	
	802.11ax HE80	106	5530	MCS0	10	
		122	5610		10	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.6G WIFI _ANT 1	802.11a	100	5500	6	10	No Require
		120	5600		10	
		140	5700		10	
	802.11n HT20	100	5500	MCS0	10	9.18
		120	5600		12.5	11.56
		140	5700		10.5	9.56
	802.11n HT40	102	5510	MCS0	10	No Require
		118	5590		10	
		134	5670		10	
	802.11ac VHT20	100	5500	MCS0	10	
		120	5600		10	
		140	5700		10	
	802.11ac VHT40	102	5510	MCS0	10	
		118	5590		10	
		134	5670		10	
	802.11ac VHT80	106	5530	MCS0	10	
		122	5610		10	
	802.11ax HE20	100	5500	MCS0	10	
		120	5600		10	
		140	5700		10	
	802.11ax HE40	102	5510	MCS0	10	
		118	5590		10	
		134	5670		10	
	802.11ax HE80	106	5530	MCS0	10	
		122	5610		10	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
5.6G WIFI _ANT 1+ANT 2	802.11a	100	5500	6	-	-	13.00	No Require
		120	5600		-	-	13.00	
		140	5700		-	-	13.00	
	802.11n HT20	100	5500	MCS8	10.02	9.18	13.50	12.63
		120	5600		9.64	11.56	14.50	13.72
		140	5700		10.23	9.56	13.50	12.92
	802.11n HT40	102	5510	MCS8	-	-	13.00	No Require
		118	5590		-	-	13.00	
		134	5670		-	-	13.00	
	802.11ac VHT20	100	5500	MCS0	-	-	13.00	
		120	5600		-	-	13.00	
		140	5700		-	-	13.00	
	802.11ac VHT40	102	5510	MCS0	-	-	13.00	
		118	5590		-	-	13.00	
		134	5670		-	-	13.00	
	802.11ac VHT80	106	5530	MCS0	-	-	13.00	
		122	5610		-	-	13.00	
	802.11ax HE20	100	5500	MCS0	-	-	13.00	
		120	5600		-	-	13.00	
		140	5700		-	-	13.00	
	802.11ax HE40	102	5510	MCS0	-	-	13.00	
		118	5590		-	-	13.00	
		134	5670		-	-	13.00	
	802.11ax HE80	106	5530	MCS0	-	-	13.00	
		122	5610		-	-	13.00	

Note:

- 1) The Average conducted power of WiFi 5.6G is measured with RMS detector.
- 2) The tested channel results are marks in bold.

5. Conducted power measurements of WiFi 5.8G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.8G WIFI _ANT 2	802.11a	149	5745	6	11	No Require
		157	5785		11	
		165	5825		11	
	802.11n HT20	149	5745	MCS0	12	11.23
		157	5785		11.5	10.75
		165	5825		11.5	10.47
	802.11n HT40	151	5755	MCS0	11	No Require
		159	5795		11	
	802.11ac VHT20	149	5745	MCS0	11	
		157	5785		11	
		165	5825		11	
	802.11ac VHT40	151	5755	MCS0	11	
		159	5795		11	
	802.11ac VHT80	155	5775	MCS0	11	
	802.11ax HE20	149	5745	MCS0	11	
		157	5785		11	
		165	5825		11	
	802.11ax HE40	151	5755	MCS0	11	
		159	5795		11	
	802.11ax HE80	155	5775	MCS0	11	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
5.8G WIFI _ANT 1	802.11a	149	5745	6	11	No Require
		157	5785		11	
		165	5825		11	
	802.11n HT20	149	5745	MCS0	12	11.66
		157	5785		11.5	11.03
		165	5825		12.5	11.78
	802.11n HT40	151	5755	MCS0	11	No Require
		159	5795		11	
	802.11ac VHT20	149	5745	MCS0	11	
		157	5785		11	
		165	5825		11	
	802.11ac VHT40	151	5755	MCS0	11	
		159	5795		11	
	802.11ac VHT80	155	5775	MCS0	11	
	802.11ax HE20	149	5745	MCS0	11	
		157	5785		11	
		165	5825		11	
	802.11ax HE40	151	5755	MCS0	11	
		159	5795		11	
	802.11ax HE80	155	5775	MCS0	11	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
5.8G WIFI _ANT 1+ANT 2	802.11a	149	5745	6	-	-	14.00	No Require
		157	5785		-	-	14.00	
		165	5825		-	-	14.00	
	802.11n HT20	149	5745	MCS8	11.23	11.66	15.00	14.46
		157	5785		10.75	11.03	14.50	13.90
		165	5825		10.47	11.78	15.00	14.18
	802.11n HT40	151	5755	MCS8	-	-	14.00	No Require
		159	5795		-	-	14.00	
	802.11ac VHT20	149	5745	MCS0	-	-	14.00	
		157	5785		-	-	14.00	
		165	5825		-	-	14.00	
	802.11ac VHT40	151	5755	MCS0	-	-	14.00	
		159	5795		-	-	14.00	
	802.11ac VHT80	155	5775	MCS0	-	-	14.00	
	802.11ax HE20	149	5745	MCS0	-	-	14.00	
		157	5785		-	-	14.00	
		165	5825		-	-	14.00	
	802.11ax HE40	151	5755	MCS0	-	-	14.00	
		159	5795		-	-	14.00	
	802.11ax HE80	155	5775	MCS0	-	-	14.00	

Note:

- 1) The Average conducted power of WiFi 5.8G is measured with RMS detector.
- 2) The tested channel results are marks in bold.

6. Conducted power measurements of WiFi 6.2G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
6.2G WIFI _ANT 2	802.11a	1	5955	6M	7.00	No Require
		45	6175		7.00	
		93	6415		7.00	
	802.11ax HE20	1	5955	HE0	7.50	7.09
		45	6175		7.50	7.32
		93	6415		7.50	6.77
	802.11ax HE40	3	5965	HE0	7.00	No Require
		43	6165		7.00	
		91	6405		7.00	
	802.11ax HE80	7	5985	HE0	7.00	
		39	6145		7.00	
		87	6385		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
6.2G WIFI _ANT 1	802.11a	1	5955	6M	7.00	No Require
		45	6175		7.00	
		93	6415		7.00	
	802.11ax HE20	1	5955	HE0	7.50	6.24
		45	6175		7.50	6.12
		93	6415		7.50	6.43
	802.11ax HE40	3	5965	HE0	7.00	No Require
		43	6165		7.00	
		91	6405		7.00	
	802.11ax HE80	7	5985	HE0	7.00	
		39	6145		7.00	
		87	6385		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
6.2G WIFI _ANT 1+ANT 2	802.11a	1	5955	6M	-	-	10.00	No Require
		45	6175		-	-	10.00	
		93	6415		-	-	10.00	
	802.11ax HE20	1	5955	MCS0	7.09	6.24	10.50	9.70
		45	6175		7.32	6.12	10.50	9.77
		93	6415		6.77	6.43	10.50	9.61
	802.11ax HE40	3	5965	MCS0	-	-	10.00	No Require
		43	6165		-	-	10.00	
		91	6405		-	-	10.00	
	802.11ax HE80	7	5985	MCS0	-	-	10.00	
		39	6145		-	-	10.00	
		87	6385		-	-	10.00	

Note:

1) The Average conducted power of WiFi 6.2G is measured with RMS detector.

2) The tested channel results are marks in bold.

7. Conducted power measurements of WiFi 6.5G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
6.5G WIFI _ANT 2	802.11a	97	6435	6M	7.00	No Require
		105	6475		7.00	
		113	6515		7.00	
	802.11ax HE20	97	6435	HE0	7.50	7.08
		105	6475		7.50	7.12
		113	6515		7.50	7.05
	802.11ax HE40	99	6445	HE0	7.00	No Require
		107	6485		7.00	
		115	6525		7.00	
	802.11ax HE80	103	6465	HE0	7.00	
		119	6545		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
6.5G WIFI _ANT 1	802.11a	97	6435	6M	7.00	No Require
		105	6475		7.00	
		113	6515		7.00	
	802.11ax HE20	97	6435	HE0	7.50	6.75
		105	6475		7.50	6.73
		113	6515		7.50	6.38
	802.11ax HE40	99	6445	HE0	7.00	No Require
		107	6485		7.00	
		115	6525		7.00	
	802.11ax HE80	103	6465	HE0	7.00	
		119	6545		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
6.5G WIFI _ANT 1+ANT 2	802.11a	97	6435	6M	-	-	10.00	No Require
		105	6475		-	-	10.00	
		113	6515		-	-	10.00	
	802.11ax HE20	97	6435	MCS0	7.08	6.75	10.50	9.93
		105	6475		7.12	6.73	10.50	9.94
		113	6515		7.05	6.38	10.50	9.74
	802.11ax HE40	99	6445	MCS0	-	-	10.00	No Require
		107	6485		-	-	10.00	
		115	6525		-	-	10.00	
	802.11ax HE80	103	6465	MCS0	-	-	10.00	
		119	6545		-	-	10.00	

Note:

1) The Average conducted power of WiFi 6.5G is measured with RMS detector.

2) The tested channel results are marks in bold.

8. Conducted power measurements of WiFi 6.7G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
6.7G WIFI _ANT 2	802.11a	117	6535	6M	7.00	No Require
		149	6695		7.00	
		181	6855		7.00	
	802.11ax HE20	117	6535	HE0	7.50	6.74
		149	6695		7.50	6.91
		181	6855		7.50	6.83
	802.11ax HE40	123	6565	HE0	7.00	No Require
		155	6725		7.00	
		179	6845		7.00	
	802.11ax HE80	151	6705	HE0	7.00	
		183	6865		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
6.7G WIFI _ANT 1	802.11a	117	6535	6M	7.00	No Require
		149	6695		7.00	
		181	6855		7.00	
	802.11ax HE20	117	6535	HE0	7.50	6.34
		149	6695		7.50	6.26
		181	6855		7.50	6.51
	802.11ax HE40	123	6565	HE0	7.00	No Require
		155	6725		7.00	
		179	6845		7.00	
	802.11ax HE80	151	6705	HE0	7.00	
		183	6865		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
6.7G WIFI _ANT 1+ANT 2	802.11a	117	6535	6M	-	-	10.00	No Require
		149	6695		-	-	10.00	
		181	6855		-	-	10.00	
	802.11ax HE20	117	6535	MCS0	6.74	6.34	10.50	9.55
		149	6695		6.91	6.26	10.50	9.61
		181	6855		6.83	6.51	10.50	9.68
	802.11ax HE40	123	6565	MCS0	-	-	10.00	No Require
		155	6725		-	-	10.00	
		179	6845		-	-	10.00	
	802.11ax HE80	151	6705	MCS0	-	-	10.00	
		183	6865		-	-	10.00	

Note:

1) The Average conducted power of WiFi 6.7G is measured with RMS detector.

2) The tested channel results are marks in bold.

9. Conducted power measurements of WiFi 7.0G

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
7.0G WIFI _ANT 2	802.11a	185	6875	6M	7.00	No Require
		209	6995		7.00	
		233	7115		7.00	
	802.11ax HE20	185	6875	HE0	7.50	6.52
		209	6995		7.50	6.57
		233	7115		7.50	6.50
	802.11ax HE40	187	6885	HE0	7.00	No Require
		211	7005		7.00	
		227	7085		7.00	
	802.11ax HE80	199	6945	HE0	7.00	
		215	7025		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Max. Tune-up	Average Power (dBm)
7.0G WIFI _ANT 1	802.11a	185	6875	6M	7.00	No Require
		209	6995		7.00	
		233	7115		7.00	
	802.11ax HE20	185	6875	HE0	7.50	6.63
		209	6995		7.50	6.12
		233	7115		7.50	6.48
	802.11ax HE40	187	6885	HE0	7.00	No Require
		211	7005		7.00	
		227	7085		7.00	
	802.11ax HE80	199	6945	HE0	7.00	
		215	7025		7.00	

Band	Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	ANT 1 Average Power (dBm)	ANT 2 Average Power (dBm)	Max. Tune-up	Total Average Power (dBm)
7.0G WIFI _ANT 1+ANT 2	802.11a	185	6875	6M	-	-	10.00	No Require
		209	6995		-	-	10.00	
		233	7115		-	-	10.00	
	802.11ax HE20	185	6875	MCS0	6.52	6.63	10.50	9.59
		209	6995		6.57	6.12	10.50	9.36
		233	7115		6.50	6.48	10.50	9.50
	802.11ax HE40	187	6885	MCS0	-	-	10.00	No Require
		211	7005		-	-	10.00	
		227	7085		-	-	10.00	
	802.11ax HE80	199	6945	MCS0	-	-	10.00	
		215	7025		-	-	10.00	

Note:

1) The Average conducted power of WiFi 7.0G is measured with RMS detector.

2) The tested channel results are marks in bold.

7.2 SAR TEST RESULTS

General Notes:

- 1) Per KDB447498 D04, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.
- 2) Per KDB447498 D04, 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 $> \frac{1}{2}$ 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 ≥ 0.8 W/kg; if the deviation among the repeated measurement is $\leq 20\%$, and the measured SAR < 1.45 W/kg, only one repeated measurement is required.
- 4) Per KDB941225 D06, the DUT Dimension is bigger than 9 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
- 5) Per KDB648474 D04, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is ≤ 1.2 W/kg, no additional SAR evaluations using a headset are required.
- 6) Per KDB865664 D02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing.

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 Section 7.1 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 modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2W/kg. See Section 7.1 for more information.

7.2.1 SAR MEASUREMENT RESULT

Separation Distance: 5 mm

1. SAR test results of WiFi 2.4G

Test No.	Mode	Channel	Test Position	Ant	Ant Angle	Maximum Tune-up (dBm)	Conducted Power (dBm)	Duty Cycle (%)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W01	802.11b	11	Horizontal Up	1+2	90	16.50	16.28	95.48	0.12	0.529	0.182	0.583
W02	802.11b	11	Horizontal Down	1+2	90	16.50	16.28	95.48	0.05	0.050	0.027	0.056
W03	802.11b	11	Vertical Back	1+2	90	16.50	16.28	95.48	-0.13	1.010	0.414	1.112
W04	802.11b	11	Vertical Front	1+2	90	16.50	16.28	95.48	0.06	1.140	0.464	1.255
W05	802.11b	11	Tip Side	1+2	90	16.50	16.28	95.48	0.08	0.598	0.259	0.659
W06	802.11b	11	Horizontal Up	1+2	180	16.50	16.28	95.48	0.04	0.511	0.220	0.563
W07	802.11b	11	Horizontal Down	1+2	180	16.50	16.28	95.48	-0.07	0.489	0.208	0.539
W08	802.11b	11	Vertical Back	1+2	180	16.50	16.28	95.48	-0.03	1.010	0.414	1.112
W09	802.11b	11	Vertical Front	1+2	180	16.50	16.28	95.48	0.15	1.070	0.432	1.178
W10	802.11b	11	Tip Side	1+2	180	16.50	16.28	95.48	-0.01	0.048	0.026	0.053
W11	802.11b	1	Vertical Front	1+2	90	16.00	15.35	95.48	0.02	1.150	0.474	1.400
W12	802.11b	6	Vertical Front	1+2	90	16.00	15.48	95.48	0.05	1.120	0.461	1.323

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

2. SAR test results of WiFi 5G

Test No.	Mode	Channel	Test Position	Ant	Ant Angle	Maximum Tune-up (dBm)	Conducted Power (dBm)	Duty Cycle (%)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W14	802.11n HT20	40	Horizontal Up	1+2	90	15.00	14.46	90.37	0.06	0.0742	0.028	0.093
W15	802.11n HT20	40	Horizontal Down	1+2	90	15.00	14.46	90.37	-0.06	0.0587	0.0215	0.074
W16	802.11n HT20	40	Vertical Back	1+2	90	15.00	14.46	90.37	0	0.432	0.164	0.541
W17	802.11n HT20	40	Vertical Front	1+2	90	15.00	14.46	90.37	-0.05	0.392	0.154	0.491
W18	802.11n HT20	40	Tip Side	1+2	90	15.00	14.46	90.37	0	0.540	0.188	0.676
W19	802.11n HT20	40	Horizontal Up	1+2	180	15.00	14.46	90.37	0.03	1.01	0.291	1.265
W20	802.11n HT20	40	Horizontal Down	1+2	180	15.00	14.46	90.37	-0.03	0.396	0.146	0.496
W21	802.11n HT20	40	Vertical Back	1+2	180	15.00	14.46	90.37	-0.02	0.357	0.111	0.447
W22	802.11n HT20	40	Vertical Front	1+2	180	15.00	14.46	90.37	0.06	0.398	0.153	0.499
W23	802.11n HT20	40	Tip Side	1+2	180	15.00	14.46	90.37	0.02	0.0632	0.0259	0.079
W24	802.11n HT20	36	Horizontal Up	1+2	180	15.00	14.43	90.37	0.07	1.12	0.311	1.413
W25	802.11n HT20	48	Horizontal Up	1+2	180	13.50	12.74	90.37	-0.09	1	0.252	1.317
W27	802.11n HT20	60	Horizontal Up	1+2	90	14.50	13.79	90.37	0.08	0.0622	0.0292	0.081
W28	802.11n HT20	60	Horizontal Down	1+2	90	14.50	13.79	90.37	0.04	0.0592	0.0222	0.077
W29	802.11n HT20	60	Vertical Back	1+2	90	14.50	13.79	90.37	0.03	0.238	0.114	0.310
W30	802.11n HT20	60	Vertical Front	1+2	90	14.50	13.79	90.37	0.07	0.255	0.125	0.332
W31	802.11n HT20	60	Tip Side	1+2	90	14.50	13.79	90.37	-0.05	0.294	0.134	0.383
W32	802.11n HT20	60	Horizontal Up	1+2	180	14.50	13.79	90.37	-0.04	0.964	0.322	1.257
W33	802.11n HT20	60	Horizontal Down	1+2	180	14.50	13.79	90.37	0.06	0.288	0.127	0.440
W34	802.11n HT20	60	Vertical Back	1+2	180	14.50	13.79	90.37	-0.11	0.265	0.129	0.404
W35	802.11n HT20	60	Vertical Front	1+2	180	14.50	13.79	90.37	0.02	0.243	0.117	0.371
W36	802.11n HT20	60	Tip Side	1+2	180	14.50	13.79	90.37	0.01	0.044	0.023	0.068
W37	802.11n HT20	52	Horizontal Up	1+2	180	13.50	12.78	90.37	0	0.815	0.274	1.246
W38	802.11n HT20	64	Horizontal Up	1+2	180	14.00	13.32	90.37	0.05	0.753	0.260	1.141

Test No.	Mode	Channel	Test Position	Ant	Ant Angle	Maximum Tune-up (dBm)	Conducted Power (dBm)	Duty Cycle (%)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W40	802.11n HT20	120	Horizontal Up	1+2	90	14.50	13.72	90.37	-0.09	0.063	0.0237	0.084
W41	802.11n HT20	120	Horizontal Down	1+2	90	14.50	13.72	90.37	0.06	0.0747	0.0237	0.099
W42	802.11n HT20	120	Vertical Back	1+2	90	14.50	13.72	90.37	-0.04	0.372	0.117	0.493
W43	802.11n HT20	120	Vertical Front	1+2	90	14.50	13.72	90.37	0.01	0.199	0.0732	0.264
W44	802.11n HT20	120	Tip Side	1+2	90	14.50	13.72	90.37	0.08	0.233	0.074	0.309
W45	802.11n HT20	120	Horizontal Up	1+2	180	14.50	13.72	90.37	-0.04	1.03	0.287	1.365
W46	802.11n HT20	120	Horizontal Down	1+2	180	14.50	13.72	90.37	-0.06	0.199	0.0722	0.264
W47	802.11n HT20	120	Vertical Back	1+2	180	14.50	13.72	90.37	0.01	0.398	0.132	0.528
W48	802.11n HT20	120	Vertical Front	1+2	180	14.50	13.72	90.37	0.06	0.137	0.0464	0.182
W49	802.11n HT20	120	Tip Side	1+2	180	14.50	13.72	90.37	0.08	0.0641	0.0237	0.085
W50	802.11n HT20	100	Horizontal Up	1+2	180	13.50	12.63	90.37	-0.06	0.99	0.262	1.338
W51	802.11n HT20	140	Horizontal Up	1+2	180	13.50	12.92	90.37	0.02	0.714	0.189	0.903
W53	802.11n HT20	149	Horizontal Up	1+2	90	15.00	14.46	90.37	-0.09	0.081	0.035	0.101
W54	802.11n HT20	149	Horizontal Down	1+2	90	15.00	14.46	90.37	0.06	0.055	0.027	0.069
W55	802.11n HT20	149	Vertical Back	1+2	90	15.00	14.46	90.37	0.07	0.370	0.163	0.464
W56	802.11n HT20	149	Vertical Front	1+2	90	15.00	14.46	90.37	-0.03	0.380	0.163	0.476
W57	802.11n HT20	149	Tip Side	1+2	90	15.00	14.46	90.37	0.01	0.394	0.152	0.494
W58	802.11n HT20	149	Horizontal Up	1+2	180	15.00	14.46	90.37	-0.08	1.040	0.338	1.303
W59	802.11n HT20	149	Horizontal Down	1+2	180	15.00	14.46	90.37	0.03	0.272	0.116	0.341
W60	802.11n HT20	149	Vertical Back	1+2	180	15.00	14.46	90.37	0.11	0.206	0.098	0.258
W61	802.11n HT20	149	Vertical Front	1+2	180	15.00	14.46	90.37	0.07	0.196	0.085	0.246
W62	802.11n HT20	149	Tip Side	1+2	180	15.00	14.46	90.37	-0.16	0.097	0.043	0.121
W63	802.11n HT20	157	Horizontal Up	1+2	180	14.50	13.90	90.37	0.03	0.966	0.304	1.227
W64	802.11n HT20	165	Horizontal Up	1+2	180	15.00	14.18	90.37	0.04	0.789	0.278	1.053

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

3. SAR test results of WiFi 6E

Test No.	Mode	Channel	Test Position	Ant	Ant Angle	Maximum Tune-up (dBm)	Conducted Power (dBm)	Duty Cycle (%)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W65	802.11ax HE20	45	Horizontal Up	2	90	7.50	7.32	89.42%	0.03	0.045	0.014	0.053
W66	802.11ax HE20	45	Horizontal Down	2	90	7.50	7.32	89.42%	-0.05	<0.001	<0.001	<0.001
W67	802.11ax HE20	45	Vertical Back	2	90	7.50	7.32	89.42%	0.04	0.157	0.059	0.183
W68	802.11ax HE20	45	Vertical Front	2	90	7.50	7.32	89.42%	0.06	0.150	0.054	0.175
W69	802.11ax HE20	45	Tip Side	2	90	7.50	7.32	89.42%	-0.05	0.237	0.075	0.276
W70	802.11ax HE20	45	Horizontal Up	2	180	7.50	7.32	89.42%	-0.04	0.231	0.074	0.269
W71	802.11ax HE20	45	Horizontal Down	2	180	7.50	7.32	89.42%	0.06	0.198	0.064	0.231
W72	802.11ax HE20	45	Vertical Back	2	180	7.50	7.32	89.42%	0.02	0.158	0.058	0.184
W73	802.11ax HE20	45	Vertical Front	2	180	7.50	7.32	89.42%	0.08	0.159	0.057	0.185
W74	802.11ax HE20	45	Tip Side	2	180	7.50	7.32	89.42%	0.04	0.042	0.010	0.049
W75	802.11ax HE20	105	Tip Side	2	90	7.50	7.12	89.42%	0.01	0.206	0.057	0.251
W76	802.11ax HE20	113	Tip Side	2	90	7.50	7.05	89.42%	-0.08	0.164	0.053	0.203
W77	802.11ax HE20	149	Tip Side	2	90	7.50	6.91	89.42%	0.07	0.147	0.046	0.188
W78	802.11ax HE20	209	Tip Side	2	90	7.50	6.57	89.42%	0.03	0.187	0.053	0.259
W80	802.11ax HE20	97	Horizontal Up	1	/	7.50	6.75	89.42%	0.05	0.068	0.014	0.090
W81	802.11ax HE20	97	Horizontal Down	1	/	7.50	6.75	89.42%	0.05	0.035	0.010	0.046
W82	802.11ax HE20	97	Vertical Back	1	/	7.50	6.75	89.42%	-0.07	0.023	0.007	0.031
W83	802.11ax HE20	97	Vertical Front	1	/	7.50	6.75	89.42%	0	<0.001	<0.001	<0.001
W84	802.11ax HE20	97	Tip Side	1	/	7.50	6.75	89.42%	0.05	0.005	<0.001	0.007
W85	802.11ax HE20	105	Horizontal Up	1	/	7.50	6.73	89.42%	-0.04	0.065	0.023	0.087
W86	802.11ax HE20	93	Horizontal Up	1	/	7.50	6.43	89.42%	0.02	0.069	0.018	0.099
W87	802.11ax HE20	181	Horizontal Up	1	/	7.50	6.51	89.42%	0	0.185	0.055	0.260
W88	802.11ax HE20	185	Horizontal Up	1	/	7.50	6.63	89.42%	0.03	0.182	0.055	0.249

Test No.	Mode	Channel	Test Position	Ant	Ant Angle	Maximum Tune-up (dBm)	Conducted Power (dBm)	Duty Cycle (%)	Power Drift (dB)	SAR 1g (W/kg)	SAR 10g (W/kg)	Reported 1g SAR (W/kg)
W90	802.11ax HE20	105	Horizontal Up	1+2	90	10.50	9.94	89.42%	-0.08	0.038	0.014	0.049
W91	802.11ax HE20	105	Horizontal Down	1+2	90	10.50	9.94	89.42%	0.03	0.060	0.020	0.076
W92	802.11ax HE20	105	Vertical Back	1+2	90	10.50	9.94	89.42%	0.04	0.102	0.044	0.130
W93	802.11ax HE20	105	Vertical Front	1+2	90	10.50	9.94	89.42%	-0.02	0.100	0.043	0.127
W94	802.11ax HE20	105	Tip Side	1+2	90	10.50	9.94	89.42%	0.02	0.188	0.052	0.239
W95	802.11ax HE20	105	Horizontal Up	1+2	180	10.50	9.94	89.42%	-0.09	0.211	0.057	0.268
W96	802.11ax HE20	105	Horizontal Down	1+2	180	10.50	9.94	89.42%	-0.11	0.176	0.065	0.224
W97	802.11ax HE20	105	Vertical Back	1+2	180	10.50	9.94	89.42%	0.02	0.101	0.048	0.129
W98	802.11ax HE20	105	Vertical Front	1+2	180	10.50	9.94	89.42%	0.08	0.113	0.045	0.144
W99	802.11ax HE20	105	Tip Side	1+2	180	10.50	9.94	89.42%	0.03	0.031	0.012	0.039
W100	802.11ax HE20	97	Horizontal Up	1+2	180	10.50	9.93	89.42%	-0.04	0.190	0.068	0.242
W100	802.11ax HE20	45	Horizontal Up	1+2	180	10.50	9.77	89.42%	0.02	0.184	0.073	0.243
W101	802.11ax HE20	181	Horizontal Up	1+2	180	10.50	9.68	89.42%	-0.06	0.253	0.081	0.341
W102	802.11ax HE20	185	Horizontal Up	1+2	180	10.50	9.59	89.42%	-0.07	0.227	0.074	0.313

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

4. SAR test results of Power Density

System&Position						DUT&Access				SAR						Power Density							
Test No.	Band	Mode	Channel	Test Position	Separation Distance (mm)	ANT	Ant Angle	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)	Grid Step (A)	Scaling Factor for Measurement Uncertainty	Averaging Area (cm²)	Power Drift (dB)	Normal PsPD (W/m²)	Scaling Normal PsPD (W/m²)	Total PsPD (W/m²)	Scaling Total PsPD (W/m²)
W69	UNII_5	802.11ax HE20	45	Tip Side	5	2	90	MCS0	89.42%	7.50	7.32	-0.05	0.237	0.075	0.276	0.0625	1.55	4	-0.15	2.29	4.137	3.74	6.76
W87	UNII_7	802.11ax HE20	181	Horizontal Up	5	1	/	MCS0	89.42%	7.50	6.51	0	0.185	0.055	0.260	0.0625	1.55	4	-0.08	2.04	4.442	3.53	7.69

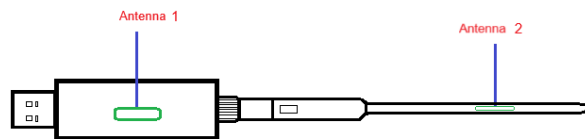
Note:

- 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.

8 MULTIPLE TRANSMITTER EVALUATION

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498 D04 Interim General RF Exposure Guidance v01.

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



Horizontal Up View

8.1 SIMULTANEOUS TRANSMISSION CONDITIONS

Per FCC KDB 447498 D01, 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-worn
1	WiFi 6G ANT 1+WiFi 6G ANT 2	Yes
2	WiFi 6G ANT 1+PD ANT 2	Yes
3	WiFi 6G ANT 2+PD ANT 1	Yes
4	WiFi 2.4G ANT 1+WiFi 2.4G ANT 2	Yes
5	WiFi 5G ANT 1+WiFi 5G ANT 2	Yes

Note: In the test data of Chapter 7.2, MIMO SAR (Ant 1+2) has already been tested, so there is no need to perform synchronous transmission calculation.

8.2 SAR SUMMATION SCENARIO

Position		Back of Keyboard (0mm)
Ant 2	WiFi 6E	0.276
Ant 1	WiFi 6E	0.260
MAX $\sum$ SAR _{10g}		0.536

Highest Simultaneous Transmission with Multiple transmitters	WIFI 6E		PD		Total Exposure Ratio
6E Ant 2+PD Ant 1	Ant 2	0.276	Ant 1	0.769	0.907
6E Ant 1+PD Ant 2	Ant 1	0.260	Ant 2	0.676	0.806
Max SAR & Power Density					0.907

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 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.

APPENDIX

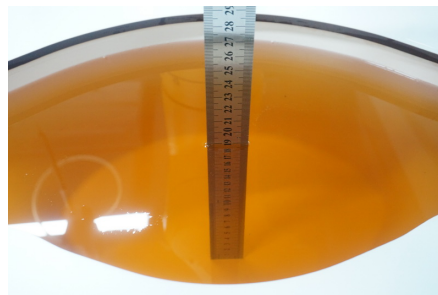
1. TEST LAYOUT

Specific Absorption Rate Test Layout

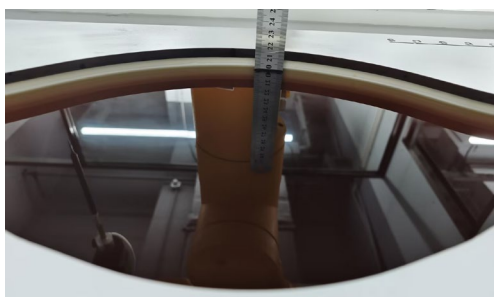


Liquid depth in the flat Phantom ($\geq 15\text{cm}$ depth)

HSL_2300MHz-2700MHz_Body_19.0cm HSL_5000MHz-6000MHz_Body_19cm



HSL_600MHz-10000MHz_Body_20.1cm



Appendix A. SAR Plots of System Verification

(Pls See BTL-FCC SAR-1-2505C215_Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See BTL-FCC SAR-1-2505C215_Appendix B.)

Appendix C. Calibration Certificate

(Pls See BTL-FCC SAR-1-2505C215_Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See BTL-FCC SAR-1-2505C215_Appendix D.)

End of Test Report