FCC SAR Test Report

FCC ID: RAS-MT7925B22M

Report No.	:	BTL-FCC SAR-1-2410C388C
Equipment	:	Notebook PC
Model Name	:	RZ09-0528
Brand Name	:	RAZER
Series Model		RZ09-0528M2
Applicant	:	Razer Inc.
Address	:	9 Pasteur, Irvine, CA 92618, USA.
Radio Function	:	Bluetooth, WLAN 2.4G, WLAN 5G, WLAN 6G
Standard(s)	:	**KDB447498 D04** Interim General RF Exposure Guidance v01 **KDB248227 D01** 802.11 Wi-Fi SAR v02r02 **KDB616217 D04** SAR for laptop and Tablets v01r02 **KDB865664 D01** SAR measurement 100 MHz to 6 GHz v01r04 **KDB865664 D02** SAR Reporting 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 **IEEE Std 1528:2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques **IEC/IEEE 62209-1528:2021** 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	:	Mar. 12, 2025
Date of Test	:	Jan. 6, 2025 ~ Mar. 13, 2025
Issued Date	:	Mar. 14, 2025

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

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Jerry Chuang

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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
R00	Original Issue.	2025/3/14

1. GENERAL INFORMATION

1.1. General Description Of EUT

<table>
<tr><td>Equipment</td><td colspan="3">Notebook PC</td></tr>
<tr><td>Model Name</td><td colspan="3">RZ09-0528</td></tr>
<tr><td>Brand Name</td><td colspan="3">RAZER</td></tr>
<tr><td>Series Model</td><td colspan="3">RZ09-0528M2</td></tr>
<tr><td>Model Difference</td><td colspan="3">The only difference in PCB layout between MB1 and MB2 motherboards is in the graphics card memory and graphics card power supply.</td></tr>
<tr><td>Power Rating</td><td colspan="3">MB1 SKU
Brand : RAZER
Model : ADP-280EB D
AC Input : 100-240V,50/60Hz 3.2A
DC Output : 20V/14A

MB2 SKU
Brand : RAZER
Model : ADP-200JB F
AC Input : 100-240V,50/60Hz 2.5A
DC Output: 20V/ 10A</td></tr>
<tr><td>Battery Information</td><td colspan="3">Brand Name : RAZER
Model Name : RC30-0528
Rated Capacity : 85.5Wh, 5494mAh</td></tr>
<tr><td>WIFI+BT Module</td><td colspan="3">Mediatek / MT7925B22M</td></tr>
<tr><td rowspan="14">Operation Frequency</td><td>Function</td><td>Band</td><td>Frequency (MHz)</td></tr>
<tr><td rowspan="10">WiFi</td><td>2.4G</td><td>TX : 2412 - 2472 MHz</td></tr>
<tr><td>5G_UNII 1</td><td>TX : 5180 - 5250 MHz</td></tr>
<tr><td>5G_UNII 2a</td><td>TX : 5250 - 5350 MHz</td></tr>
<tr><td>5G_UNII 2c</td><td>TX : 5500 - 5700 MHz</td></tr>
<tr><td>5G_UNII 3</td><td>TX : 5745 - 5825 MHz</td></tr>
<tr><td>5G_UNII 4</td><td>TX : 5850 - 5895 MHz</td></tr>
<tr><td>6G_UNII 5</td><td>TX : 5925 - 6425 MHz</td></tr>
<tr><td>6G_UNII 6</td><td>TX : 6425 - 6525 MHz</td></tr>
<tr><td>6G_UNII 7</td><td>TX : 6525 - 6875 MHz</td></tr>
<tr><td>6G_UNII 8</td><td>TX : 6875 - 7125 MHz</td></tr>
<tr><td rowspan="3">Bluetooth</td><td>Basic Rate (BR)</td><td>TX : 2402 - 2480 MHz</td></tr>
<tr><td>Enhance Data Rate</td><td>TX : 2402 - 2480 MHz</td></tr>
<tr><td>Bluetooth Low Energy</td><td>TX : 2402 - 2480 MHz</td></tr>
<tr><td>Sample Status</td><td colspan="3">Engineering Sample</td></tr>
<tr><td>EUT Modification(s)</td><td colspan="3">N/A</td></tr>
</table>

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 locations stated below are under the TAF Accreditation Number 0659.
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.
(FCC DN: TW0659)

☒SAR 01 ☐SAR 02 ☒SAR 03

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	5.5	Normal	1	1	1	± 5.5 %	± 5.5 %	∞
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	0.02	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
Probe Positioning	0.4	Rectangular	$\sqrt{3}$	1	1	± 0.2 %	± 0.2 %	∞
Max.SAR Evaluation	2	Rectangular	$\sqrt{3}$	1	1	± 1.2 %	± 1.2 %	∞
Test Sample Related								
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	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	± 3.5 %	± 3.5 %	∞
SAR correction	1.9	Rectangular	$\sqrt{3}$	1	0.84	± 1.1 %	± 0.9 %	
Liquid Conductivity (mea.)	2.5	Rectangular	$\sqrt{3}$	0.78	0.71	± 1.1 %	± 1.0 %	∞
Liquid Permittivity (mea.)	2.4	Rectangular	$\sqrt{3}$	0.26	0.26	± 0.4 %	± 0.4 %	∞
Temp. unc. - Conductivity	3.4	Rectangular	$\sqrt{3}$	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. unc. - Permittivity	0.4	Rectangular	$\sqrt{3}$	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Standard Uncertainty (K = 1)						± 10.78 %	± 10.73 %	361
Expanded Uncertainty (K = 2)						**± 21.55%**	**± 21.46 %**	

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	6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
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	0.04	Rectangular	$\sqrt{3}$	1	1	± 0.0 %	± 0.0 %	∞
Probe Positioning	0.8	Rectangular	$\sqrt{3}$	1	1	± 0.5 %	± 0.5 %	∞
Max.SAR Evaluation	4	Rectangular	$\sqrt{3}$	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	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	± 3.8 %	± 3.8 %	∞
SAR correction	1.9	Rectangular	$\sqrt{3}$	1	0.84	± 1.1 %	± 0.9 %	
Liquid Conductivity (mea.)	2.3	Rectangular	$\sqrt{3}$	0.78	0.71	± 1.0 %	± 0.9 %	∞
Liquid Permittivity (mea.)	2.4	Rectangular	$\sqrt{3}$	0.26	0.26	± 0.4 %	± 0.4 %	∞
Temp. unc. - Conductivity	3.4	Rectangular	$\sqrt{3}$	0.78	0.71	± 1.5 %	± 1.4 %	∞
Temp. unc. - Permittivity	0.4	Rectangular	$\sqrt{3}$	0.23	0.26	± 0.1 %	± 0.1 %	∞
Combined Standard Uncertainty (K = 1)						± 11.66 %	± 11.61 %	361
Expanded Uncertainty (K = 2)						**± 23.31 %**	**± 23.23 %**	

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 %	∞
Probe Isotropy	7.6	Rectangular	$\sqrt{3}$	1	1	± 4.4 %	± 4.4 %	∞
Other Probe+Electronic	2.4	Normal	1	1	1	± 2.4%	± 2.4%	∞
RF Ambient	1.8	Normal	1	1	1	± 1.8 %	± 1.8 %	∞
Probe Positioning	±0.005mm	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	± 1.1 %	± 1.0 %	∞
Conductivity(temp.)	2.6	Rectangular	$\sqrt{3}$	0.78	0.71	± 1.2 %	± 1.1 %	∞
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)						± 14.11%	± 14.05%	361
Expanded Uncertainty (K = 2)						**± 28.21 %**	**± 28.10 %**	

Uncertainty Budget for psSAR / psAPD Assessments

UncertaintyBudgetforpsSAR/psAPDAssessments

(Frequency band: 6 – 10 GHz range)

Symbol	Error Description	Uncert.	Prob. Dist.	Div.	ci (1g) / (1 cm2)	ci (8 g/10 g) / (4 cm2)	Std. Unc.0(1 g)/ (1 cm2)	Std. Unc. (8 g/10 g) / (4 cm2)
psSAR	Module SAR V16.4 (Table 6.3.3)	±14.11/14.05%	N	1	1	1	±14.11%	±14.05%
PDC	Power Density Conversion	±13.5%	R	$\sqrt{3}$	1	1	±7.8%	±7.8%
u(Δ SAR)	Combined Uncertainty						±15.6%	±15.5 %
U	**Expanded Uncertainty** in dB						±31.2% ±1.2 dB	±31.0% ±1.2 dB

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						
Probe Calibration	0.49	Normal	1	1	±0.49dB	∞
Probe correction	0	Rectangular	$\sqrt{3}$	1	±0dB	∞
Frequency response(BW≤1GHz)	0.20	Rectangular	$\sqrt{3}$	1	±0.12 dB	∞
Sensor cross coupling	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Isotropy	0.50	Rectangular	$\sqrt{3}$	1	±0.29 dB	∞
Linearity	0.20	Rectangular	$\sqrt{3}$	1	±0.12 dB	∞
Probe scattering	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Probe Positioning offset	0.30	Rectangular	$\sqrt{3}$	1	±0.17 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	$\sqrt{3}$	1	± 0.02 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	2.00	Rectangular	$\sqrt{3}$	1	±1.15 dB	∞
Forward transformation	0	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Power density scaling	-	Rectangular	$\sqrt{3}$	1	±0 dB	∞
Spatial averaging	0.10	Rectangular	$\sqrt{3}$	1	±0.06 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	$\sqrt{3}$	1	± 0.2 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	$\sqrt{3}$	1	± 0.1 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	$\sqrt{3}$	1	±0 dB	∞
Drift of the DUT	0.10	Rectangular	$\sqrt{3}$	1	±0.06 dB	∞
Combined Standard Uncertainty (K = 1)					± 1.34dB	∞
Expanded Uncertainty (K = 2)					**± 2.68dB**	

2.3. WLAN Antenna Information:

Ant.	Brand	Part Number	Type	Frequency Range (MHz)	Gain (dBi)
Main	Quectel	Y4RRW0MA2AA	PIFA	2400 - 2483.5	2.80
				5150 - 5250	3.62
				5250 - 5350	3.62
				5470 - 5725	3.81
				5725 - 5850	3.44
				5850 - 5895	3.44
				5925 - 6425	3.13
				6425 - 6525	3.13
				6525 - 6875	3.13
				6875 - 7125	3.13
Aux	Quectel	Y4RRW0MA2BA	PIFA	2400 - 2483.5	2.62
				5150 - 5250	3.47
				5250 - 5350	3.47
				5470 - 5725	3.43
				5725 - 5850	3.46
				5850 - 5895	3.46
				5925 - 6425	3.28
				6425 - 6525	3.28
				6525 - 6875	3.28
				6875 - 7125	3.28

Note:
The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.4. The Maximum SAR-1g & Power Density Values

Band	Mode	Highest Body Reported SAR-1g(W/kg)
GFSK	BT DH5	0.052
	BLE 1M	0.059
DTS	Wi-Fi 2.4G	1.113
UNII	5G UNII 1&2a	1.050
	5G UNII 2c	1.089
	5G UNII 3	1.064
	5G UNII 4	1.160
	6G UNII 5	0.296
	6G UNII 6	0.353
	6G UNII 7	0.251
	6G UNII 8	0.388

Band	Mode	Highest Reported 4cm^2 APD (W/m^2)
6G	6G UNII 8	2.54

Band	Mode	Highest Reported Power Density(W/m^2)
6G	6G UNII 8	9.494

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 IEEE Std 1528:2013.
2) The WLAN Test result we reference report no. BTL-FCC SAR-1 2410C388.

2.5. Laboratory Environment

Temperature	Min. = 18ºC, Max. = 25ºC
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 52.10.4.1535)	N/A	N/A	N/A
2	DASY8	Speag	cDASY8 Module SAR (Version 16.4.0.5005)	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	May. 16, 2024	1 Year
5	Data Acquisition Electronics	Speag	DAE4	1764	Jan. 19, 2024	1 Year
6	E-field Probe	Speag	EX3DV4	7369	Jun. 3, 2024	1 Year
7	E-field Probe	Speag	EX3DV4	7781	Jan. 24, 2024	1 Year
8	E-Field probe	Speag	EUmmWV4	9586	Jun. 6, 2024	1 Year
9	System Validation Dipole	Speag	D2450V2	973	Feb. 19, 2024	3 Year
10	System Validation Dipole	Speag	D5GHzV2	1221	Feb. 13, 2024	3 Year
11	System Validation Dipole	Speag	D6.5GHzV2	1041	Sep. 9, 2024	3 Year
12	5G Verification Source	Speag	5G Verification Source 10GHz	2011	Apr 19, 2024	1 Year
13	ELI4 Phantom	Speag	ELI4 Phantom V5.0	1240	N/A	N/A
14	ELI4 Phantom	Speag	ELI4 Phantom V8.0	2149	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. 9, 2024	1 Year
17	Signal Generator	R&S	SMR40	100502	Feb. 22, 2024	1 Year
18	MXG Vector Signal Generator	Agilent	N5182B	MY51350711	Feb. 21, 2025	1 Year
19	Frequency Extender	Keysight	N5182BX07	MY59360246	Feb. 21, 2025	1 Year
20	Spectrum Analyzer	R&S	FSV7	103032	Aug. 7, 2024	1 Year
21	Power Meter	Anritsu	ML2495A	1128008	May. 11, 2024	1 Year
22	Power Sensor	Anritsu	MA2411B	1126001	May. 11, 2024	1 Year
23	Dielectric Probe Kit	Agilent	85070E	2593	N/A	N/A
24	Low pass filter	Mini-Circuits	SLP-2950+	M108294	N/A	N/A
25	Power Amplifier	Mini-Circuits	ZVE-2W-272+	N650001538	N/A	N/A
26	Power Amplifier	Mini-Circuits	ZVE-8G+	N628801631	N/A	N/A
27	Power Amplifier	EMCI	EMC053035	980869	N/A	N/A
28	Thermometer	PA	TA298	h001	Mar. 14, 2024	1 Year
29	Directional Coupler	Woken	50W Coupler	DOM5CIW3E2	N/A	N/A
30	Attenuator	Woken	WATT-518FS-10	N/A	N/A	N/A

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

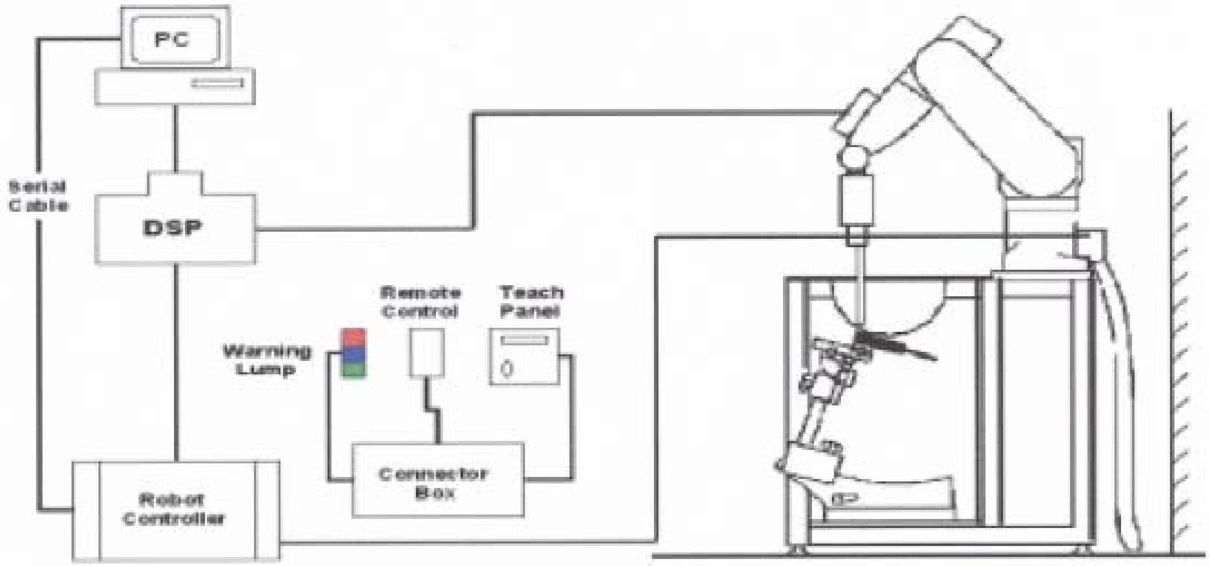
3. SAR MEASUREMENTS SYSTEM CONFIGURATION

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

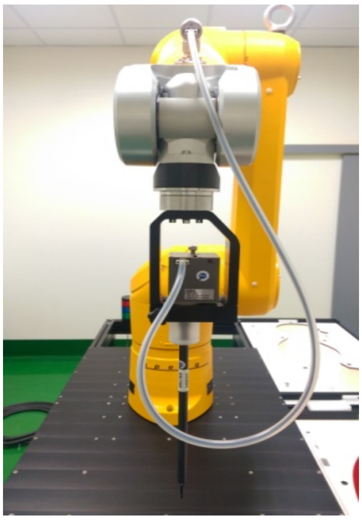


3.2. DASY5 E-field Probe System

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

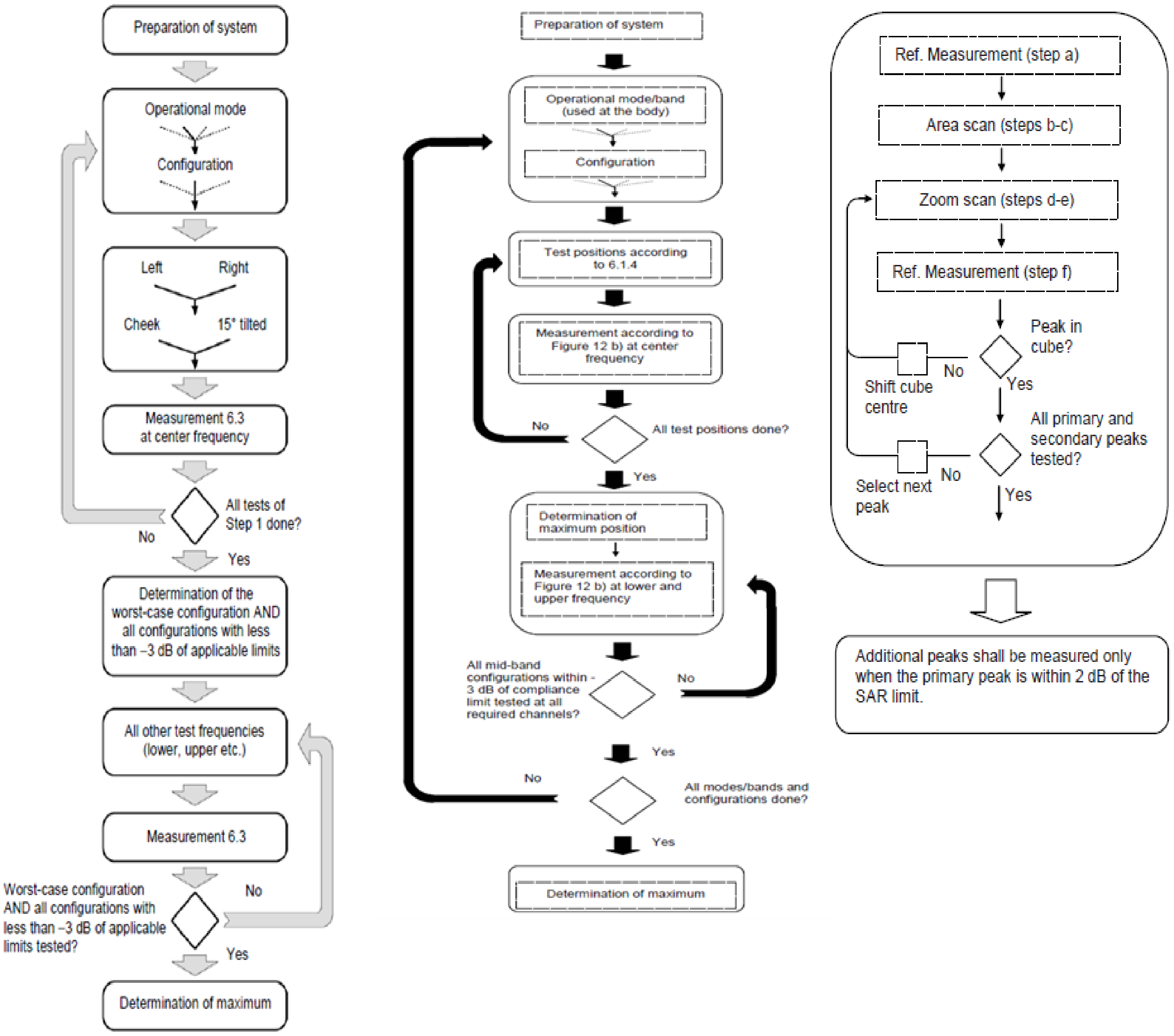
3.2.3.2. PHANTOM

Model	ELI4 Phantom
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
Shell Thickness	2±0.1 mm
Filling Volume	Approx. 30 liters
Dimensions	Length: 600 mm ; Width: 190mm Height: adjustable feet
Aailable	Special

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)
	dcpi = 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	Oxidized Mineral Oil
Head 2450	-	45.0	-	0.1	-	-	54.9	-	-
Head 5G	-	-	-	-	-	17.2	65.5	17.3	-
Head 6G	-	-	-	-	-	-	56.0	-	44.0

4.2. Tissue-equivalent Liquid Properties

Dielectric Performance of Tissue Simulating Liquid

Tissue Verification									
Date	Tissue Type	Frequency (MHz)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Limit (%) ±5
2025/1/6	Head	2402	1.73	38.44	1.76	39.29	-1.76	-2.17	±5
2025/1/6	Head	2412	1.74	38.03	1.77	39.27	-1.56	-3.16	±5
2025/1/6	Head	2437	1.77	37.96	1.79	39.22	-0.94	-3.22	±5
2025/3/13	Head	2437	1.86	39.20	1.79	39.22	4.14	-0.06	±5
2025/1/6	Head	2440	1.78	37.95	1.79	39.21	-0.95	-3.22	±5
2025/3/13	Head	2440	1.87	39.19	1.79	39.21	4.13	-0.05	±5
2025/1/6	Head	2441	1.78	37.95	1.79	39.21	-0.90	-3.21	±5
2025/1/6	Head	2450	1.79	37.94	1.80	39.20	-0.77	-3.22	±5
2025/3/13	Head	2450	1.88	39.18	1.80	39.20	4.33	-0.06	±5
2025/1/6	Head	2462	1.80	37.91	1.81	39.18	-0.74	-3.25	±5
2025/1/6	Head	2467	1.80	37.89	1.82	39.17	-0.81	-3.27	±5
2025/1/6	Head	2472	1.81	37.87	1.82	39.17	-0.83	-3.33	±5
2025/1/6	Head	2480	1.81	37.82	1.83	39.16	-0.95	-3.42	±5
2025/1/8	Head	5200	4.68	35.58	4.66	36.00	0.39	-1.18	±5
2025/3/13	Head	5200	4.75	35.79	4.66	36.00	1.87	-0.59	±5
2025/1/8	Head	5210	4.69	35.56	4.67	35.99	0.46	-1.20	±5
2025/1/8	Head	5280	4.78	35.39	4.74	35.92	0.74	-1.49	±5
2025/1/8	Head	5290	4.79	35.36	4.75	35.91	0.75	-1.53	±5
2025/1/8	Head	5300	4.80	35.32	4.76	35.90	0.74	-1.61	±5
2025/3/13	Head	5300	4.87	35.54	4.76	35.90	2.23	-1.01	±5
2025/1/8	Head	5530	5.06	34.76	4.99	35.57	1.34	-2.26	±5
2025/1/8	Head	5590	5.13	34.61	5.06	35.51	1.48	-2.54	±5
2025/1/8	Head	5600	5.14	34.85	5.07	35.50	1.47	-1.84	±5
2025/3/13	Head	5600	5.22	34.80	5.07	35.50	2.94	-1.98	±5
2025/1/8	Head	5775	5.35	34.16	5.25	35.32	2.09	-3.27	±5
2025/1/8	Head	5800	5.39	34.85	5.27	35.30	2.23	-1.29	±5
2025/3/13	Head	5800	5.46	34.33	5.27	35.30	3.68	-2.76	±5
2025/1/8	Head	5855	5.45	34.00	5.33	35.24	2.31	-3.52	±5
2025/3/13	Head	5855	5.53	34.21	5.33	35.24	3.77	-2.91	±5
2025/1/8	Head	5900	5.50	33.89	5.37	35.19	2.45	-3.68	±5
2025/1/10	Head	6000	5.58	35.10	5.48	35.07	1.82	0.09	±5
2025/3/13	Head	6000	5.37	34.80	5.48	35.07	-2.01	-0.77	±5
2025/1/10	Head	6050	5.64	35.00	5.54	35.01	1.81	-0.03	±5
2025/3/13	Head	6050	5.42	34.70	5.54	35.01	-2.17	-0.89	±5
2025/1/10	Head	6100	5.71	34.90	5.59	34.95	2.15	-0.14	±5
2025/3/13	Head	6100	5.49	34.60	5.59	34.95	-1.79	-1.00	±5
2025/1/10	Head	6150	5.77	34.90	5.65	34.89	2.12	0.03	±5
2025/3/13	Head	6150	5.55	34.50	5.65	34.89	-1.77	-1.12	±5
2025/1/10	Head	6200	5.83	34.70	5.71	34.83	2.10	-0.37	±5
2025/3/13	Head	6200	5.60	34.40	5.71	34.83	-1.93	-1.23	±5
2025/1/10	Head	6250	5.89	34.70	5.77	34.77	2.08	-0.20	±5
2025/3/13	Head	6250	5.67	34.30	5.77	34.77	-1.73	-1.35	±5
2025/1/10	Head	6300	5.95	34.60	5.83	34.70	2.06	-0.29	±5
2025/3/13	Head	6300	5.72	34.20	5.83	34.70	-1.89	-1.44	±5
2025/1/10	Head	6350	6.02	34.50	5.89	34.64	2.21	-0.40	±5
2025/3/13	Head	6350	5.79	34.20	5.89	34.64	-1.70	-1.27	±5
2025/1/10	Head	6400	6.06	34.40	5.95	34.58	1.85	-0.52	±5
2025/3/13	Head	6400	5.83	34.10	5.95	34.58	-2.02	-1.39	±5
2025/1/10	Head	6450	6.13	34.30	6.01	34.52	2.00	-0.64	±5
2025/3/13	Head	6450	5.89	34.00	6.01	34.52	-2.00	-1.51	±5
2025/1/10	Head	6500	6.18	34.30	6.07	34.46	1.81	-0.46	±5
2025/3/13	Head	6500	5.94	33.90	6.07	34.46	-2.14	-1.63	±5
2025/1/10	Head	6550	6.24	34.10	6.13	34.40	1.79	-0.87	±5
2025/3/13	Head	6550	6.01	33.80	6.13	34.40	-1.96	-1.74	±5

Tissue Verification									
Date	Tissue Type	Frequency (MHz)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Limit (%) ±5
2025/1/10	Head	6600	6.30	34.10	6.19	34.34	1.78	-0.70	±5
2025/3/13	Head	6600	6.06	33.70	6.19	34.34	-2.10	-1.86	±5
2025/1/10	Head	6650	6.36	34.00	6.25	34.29	1.76	-0.85	±5
2025/3/13	Head	6650	6.12	33.60	6.25	34.29	-2.08	-2.01	±5
2025/1/10	Head	6700	6.42	33.90	6.30	34.23	1.90	-0.96	±5
2025/3/13	Head	6700	6.18	33.60	6.30	34.23	-1.90	-1.84	±5
2025/1/10	Head	6750	6.48	33.80	6.36	34.17	1.89	-1.08	±5
2025/3/13	Head	6750	6.24	33.50	6.36	34.17	-1.89	-1.96	±5
2025/1/10	Head	6800	6.54	33.70	6.42	34.11	1.87	-1.20	±5
2025/3/13	Head	6800	6.30	33.40	6.42	34.11	-1.87	-2.08	±5
2025/1/10	Head	6850	6.60	33.70	6.48	34.05	1.85	-1.03	±5
2025/3/13	Head	6850	6.35	33.30	6.48	34.05	-2.01	-2.20	±5
2025/1/10	Head	6900	6.66	33.60	6.53	33.99	1.99	-1.15	±5
2025/3/13	Head	6900	6.41	33.30	6.53	33.99	-1.84	-2.03	±5
2025/1/10	Head	6950	6.71	33.50	6.59	33.94	1.82	-1.30	±5
2025/3/13	Head	6950	6.46	33.20	6.59	33.94	-1.97	-2.18	±5
2025/1/10	Head	7000	6.77	33.40	6.65	33.88	1.80	-1.42	±5
2025/3/13	Head	7000	6.52	33.10	6.65	33.88	-1.95	-2.30	±5

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

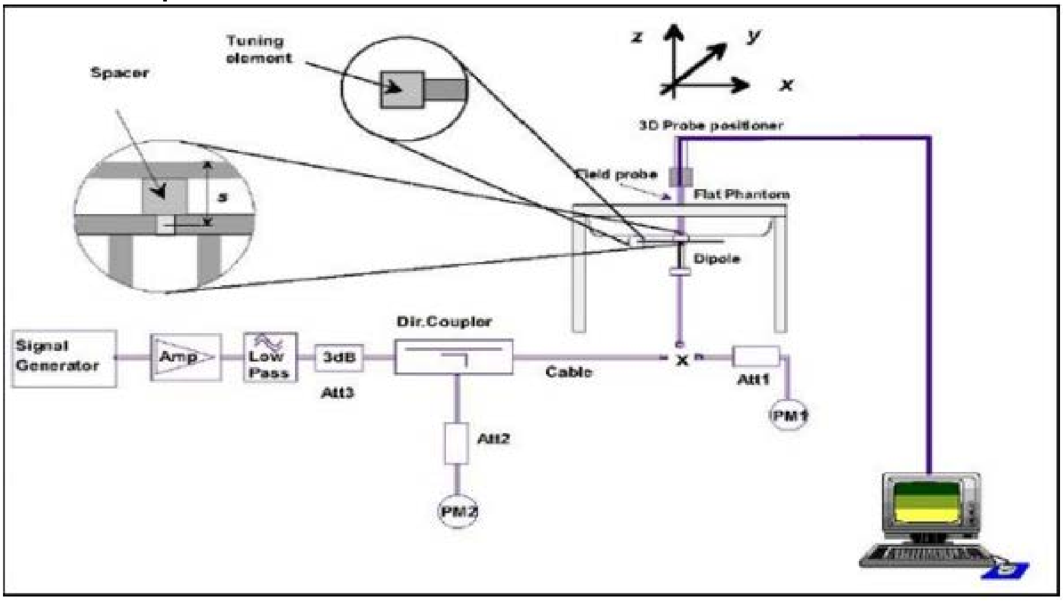
5.1. Description of System Check

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.

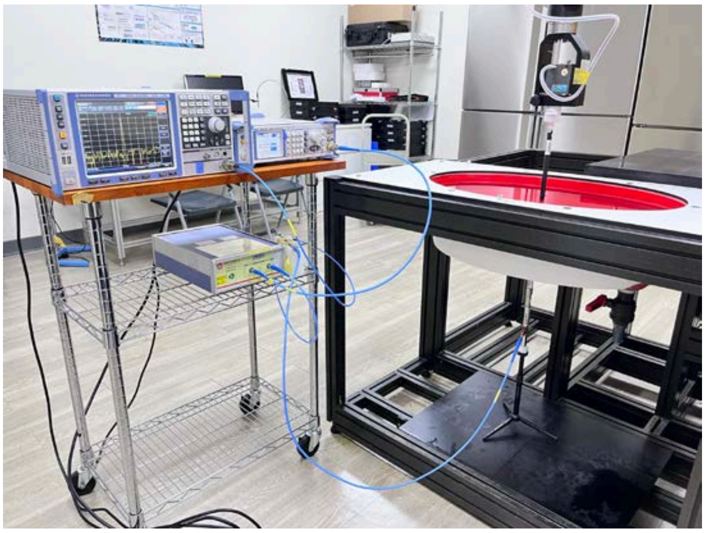
System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

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

System Check Set-up



System Check photo



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.

Date	System Dipole			Parameters	Target [W/kg]	Measured [W/kg]	Normalized to 1W [W/kg]	Deviation [%]	Limited [%]
	Type	Serial No.	Liquid						
2025/1/6	D2450V2	973	Head	1g SAR	52.9	13.40	53.6	1.32	± 10
2025/1/8	D5GHzV2 (5.2GHz)	1221	Head	1g SAR	78.1	7.71	77.1	-1.28	± 10
2025/1/8	D5GHzV2 (5.3GHz)	1221	Head	1g SAR	81.0	8.00	80.0	-1.23	± 10
2025/1/8	D5GHzV2 (5.6GHz)	1221	Head	1g SAR	82.8	8.44	84.4	1.93	± 10
2025/1/8	D5GHzV2 (5.8GHz)	1221	Head	1g SAR	80.5	7.91	79.1	-1.74	± 10
2025/1/10	D6.5GHzV2 (6.5GHz)	1041	Head	1g SAR	303.0	30.00	300.0	-0.99	± 10
2025/3/13	D2450V2	973	Head	1g SAR	52.9	13.60	54.4	2.84	± 10
2025/3/13	D5GHzV2 (5.2GHz)	1221	Head	1g SAR	78.1	7.92	79.2	1.41	± 10
2025/3/13	D5GHzV2 (5.3GHz)	1221	Head	1g SAR	81.0	8.55	85.5	5.56	± 10
2025/3/13	D5GHzV2 (5.6GHz)	1221	Head	1g SAR	82.8	8.24	82.4	-0.48	± 10
2025/3/13	D5GHzV2 (5.8GHz)	1221	Head	1g SAR	80.5	8.43	84.3	4.72	± 10
2025/3/13	D6.5GHzV2 (6.5GHz)	1041	Head	1g SAR	303.0	29.60	296.0	-2.31	± 10

Date	System Dipole			Target 4cm^2 APD [W/m^2]	Measured 4cm^2 APD [W/m^2]	Normalized to 1W 4cm^2 APD [W/m^2]	Deviation [%]	Limited [%]
	Type	Serial No.	Liquid					
2025/1/10	D6.5GHzV2 (6.5GHz)	1041	Head	1350	134	1340	-0.74	± 10
2025/3/13	D6.5GHzV2 (6.5GHz)	1041	Head	1350	128	1280	-5.19	± 10

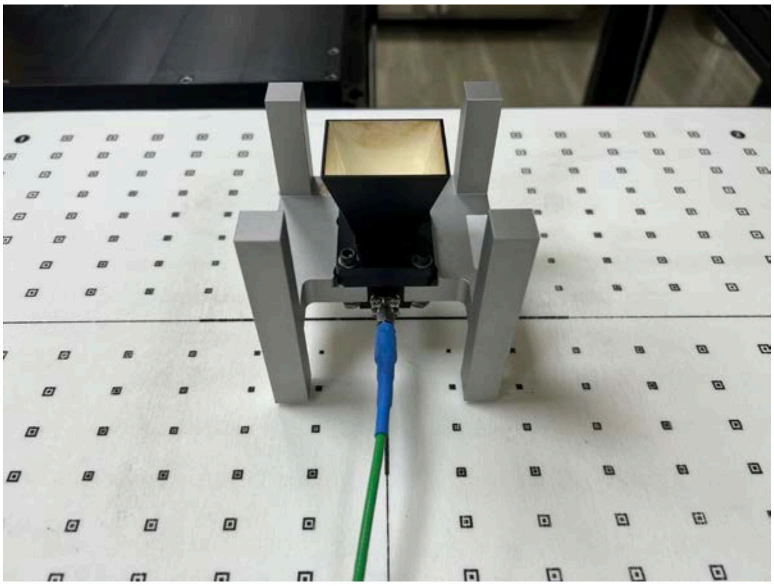
5.3 Power Density System Check

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 DASY6 specification in the user's manual and SPEAG's recommendation, the deviation threshold of ±0.66 dB represents the expanded standard uncertainty for system performance check.The system check is successful if the measured results are within±0.66 dB tolerancesto the target value shown in the calibration certificate of the verification source. The instrumentation and procedures usedfor system checkshould ensure the system is ready for performing compliance tests.

Power Density System Check Photo



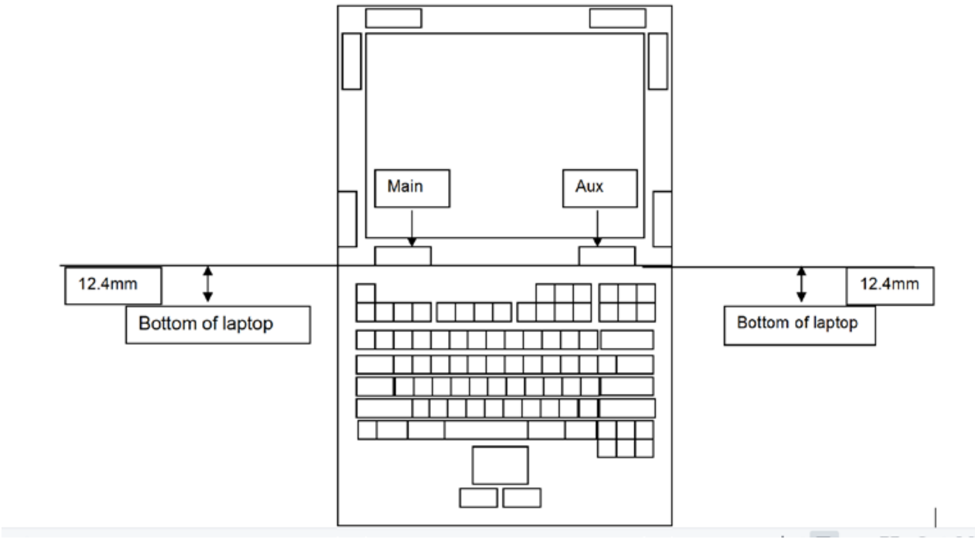
Date	5G Verification Souse			Parameters	Target [W/m^2]	Measured [W/m^2]	Deviation [dB]
	Type	Serial No.	Medium				
2025/1/15	10G	2011	Air	Avg Power Densuty 4cm^2	179.0	191.0	0.28

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



6.3. Test Position of Portable Devices

Minimum Separation Distance				
Mode	**Antenna**	**Position**	**Distance (mm)**	**Evaluation Test**
WiFi	Main	Bottom	12.4	Yes
	Aux	Bottom	12.4	Yes

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 9.

7.2. WIFI Test Configuration

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

Wi-Fi 2.4GHz Band

Mode						
	802.11b	802.11g	802.11 n20	802.11 n40	802.11 ac20	802.11 ac40
	802.11 ax20	802.11 ax40	802.11 be20	802.11 be40		
Duty cycle	100%					
Crest factor	1					

Wi-Fi 5GHz Band

Mode						
	802.11a	802.11 n20	802.11 n40	802.11 ac20	802.11 ac40	802.11 ac80
	802.11 ac160	802.11 ax20	802.11 ax40	802.11 ax80	802.11 ax160	802.11 be20
	802.11 be40	802.11 be80				
Duty cycle	100%					
Crest factor	1					

Wi-Fi 6GHz Band

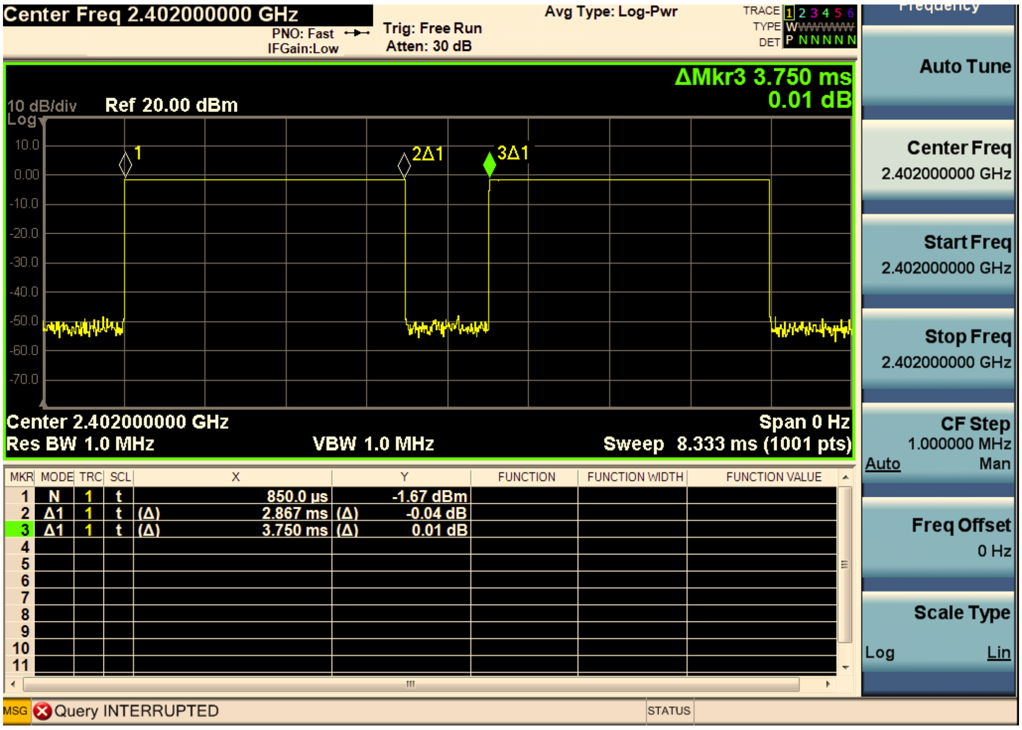
Mode						
	802.11a	802.11 ax20	802.11 ax40	802.11 ax80	802.11 ax160	802.11 be20
	802.11 be40	802.11 be80	802.11 be160			
Duty cycle	100%					
Crest factor	1					

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 RF signal utilized in SAR measurement has 100% duty cycle and its crest factor is 1. The test procedures in KDB 248227 D01 are applied.

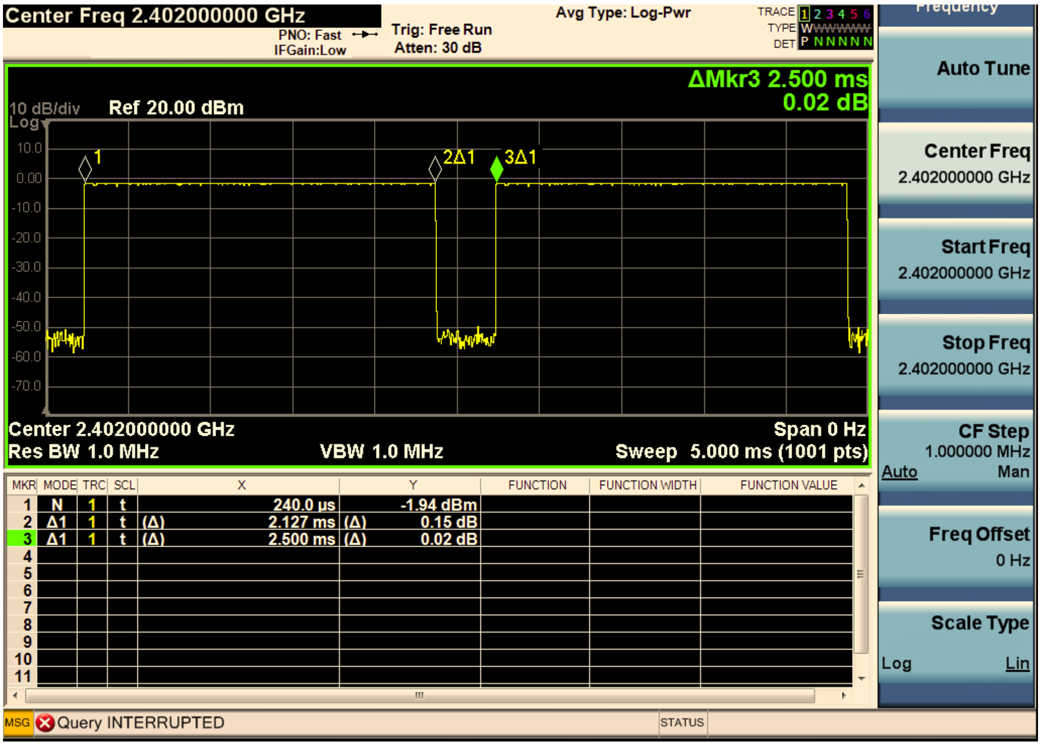
Bluetooth

Mode	Bluetooth BR	Bluetooth EDR	BLE 1M	BLE 2M	BLE 125K	BLE 500K
Duty cycle	76.45	76.67	85.08	57.17	97.09	90.87
Crest factor	1.31	1.30	1.18	1.95	1.03	1.10

Bluetooth_DH5



BLE_1M



7.3. 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.

7.4. 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.

7.5. 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.

7.6. 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.

8. CONDUCTED POWER RESULTS

8.1. Conducted power measurementS of Bluetooth

Band	Mode	Channel	Frequency (MHz)	Max Power (dBm)	AVG Power (dBm)
BR	DH5	0	2402	11.50	11.04
		39	2441	11.50	11.41
		78	2480	11.50	11.39
EDR	2DH5	0	2402	8.50	Not Require
		39	2441	8.50	
		78	2480	8.50	
	3DH5	0	2402	8.50	
		39	2441	8.50	
		78	2480	8.50	
BLE	1M	0	2402	11.50	10.91
		19	2440	11.50	11.38
		39	2480	11.50	11.48
	2M	0	2402	11.50	Not Require
		19	2440	11.50	
		39	2480	11.50	
	125K	0	2402	11.50	
		19	2440	11.50	
		39	2480	11.50	
	500K	0	2402	11.50	
		19	2440	11.50	
		39	2480	11.50	

8.2. Conducted power measurements of Wi-Fi 2.4GHz Band

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
2.4G	802.11 b	1	2412	1	23.50	23.28	
		6	2437	1	23.50	23.29	
		11	2462	1	23.50	23.08	
		12	2467	1	20.50	20.17	
		13	2472	1	16.00	16.00	
	802.11g	1-13	2412-2472	6	22.50		
	802.11 ac20	1-13	2412-2472	VHT	22.50		
	802.11 ac40	3-11	2422-2462	VHT	20.00		
	802.11 ax20	1-13	2412-2472	HE	22.50	Not Required	
	802.11 ax40	3-11	2422-2462	HE	20.00		
	802.11 be20	1-13	2412-2472	EHT	22.50		
	802.11 be40	3-11	2422-2462	EHT	20.50		
2.4G	802.11b	1	2412	1	22.50		22.41
		6	2437	1	22.50		22.42
		11	2462	1	22.50		22.36
		12	2467	1	20.50		20.40
		13	2472	1	16.00		15.71
	802.11g	1-13	2412-2472	6	22.50		
	802.11 ac20	1-13	2412-2472	VHT	22.50		
	802.11 ac40	3-11	2422-2462	VHT	20.00		
	802.11 ax20	1-13	2412-2472	HE	22.50	Not Required	
	802.11 ax40	3-11	2422-2462	HE	20.00		
	802.11 be20	1-13	2412-2472	EHT	22.50		
	802.11 be40	3-11	2422-2462	EHT	20.50		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
2.4G	802.11 be20	26-tone	1-13	2412-2472	EHT	22.50		
	802.11 be20	52-tone	1-13	2412-2472	EHT	22.50		
	802.11 be20	106-tone	1-13	2412-2472	EHT	22.50	Not Required	
	802.11 be20	52+26-tone MRU	1-13	2412-2472	EHT	22.50		
	802.11 be20	106+26-tone MRU	1-13	2412-2472	EHT	22.50		
2.4G	802.11 be20	26-tone	1-13	2412-2472	EHT	22.50		
	802.11 be20	52-tone	1-13	2412-2472	EHT	22.50		
	802.11 be20	106-tone	1-13	2412-2472	EHT	22.50	Not Required	
	802.11 be20	52+26-tone MRU	1-13	2412-2472	EHT	22.50		
	802.11 be20	106+26-tone MRU	1-13	2412-2472	EHT	22.50		

Note:

1. As per FCC OET KDB 248227 D01, conducted output power and SAR testing are not required for 802.11g/n20 channels 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 ≤ 1.2W/kg.

8.3. Conducted power measurements of 5G UNII_1

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
5.2G UNII_1	802.11a	36-48	5180-5240	6	17.50	Not Required	
	802.11 ac20	36-48	5180-5240	VHT	17.00		
	802.11 ac40	38-46	5190-5230	VHT	18.00		
	802.11 ac80	42	5210	VHT	18.00		
	802.11 ax20	36-48	5180-5240	HE	17.50		
	802.11 ax40	38-46	5190-5230	HE	18.00		
	802.11 ax80	42	5210	HE	18.00	17.83	
	802.11 be20	36-48	5180-5240	EHT	17.50	Not Required	
	802.11 be40	38-46	5190-5230	EHT	18.00		
	802.11 be80	42	5210	EHT	18.00		
5.2G UNII_1	802.11a	36-48	5180-5240	6	17.50	Not Required	
	802.11 ac20	36-48	5180-5240	VHT	17.00		
	802.11 ac40	38-46	5190-5230	VHT	18.00		
	802.11 ac80	42	5210	VHT	18.00		
	802.11 ax20	36-48	5180-5240	HE	17.50		
	802.11 ax40	38-46	5190-5230	HE	18.00		
	802.11 ax80	42	5210	HE	18.00		17.84
	802.11 be20	36-48	5180-5240	EHT	17.50	Not Required	
	802.11 be40	38-46	5190-5230	EHT	18.00		
	802.11 be80	42	5210	EHT	18.00		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
5.2G UNII_1	802.11 ax20	26-tone	36	5180	HE	10.50	Not Required	
	802.11 ax20	52-tone	36	5180	HE	13.00		
	802.11 ax20	106-tone	36	5180	HE	16.00		
	802.11 be20	26-tone	36	5180	EHT	10.50		
	802.11 be20	52-tone	36	5180	EHT	13.00		
	802.11 be20	106-tone	36	5180	EHT	16.00		
	802.11 be20	52+26-tone	36	5180	EHT	15.00		
	802.11 be20	106+26-tone	36	5180	EHT	16.00		
	802.11 be80	484+242-tone	42	5210	EHT	15.50		
5.2G UNII_1	802.11 ax20	26-tone	36	5180	HE	10.50	Not Required	
	802.11 ax20	52-tone	36	5180	HE	13.00		
	802.11 ax20	106-tone	36	5180	HE	16.00		
	802.11 be20	26-tone	36	5180	EHT	10.50		
	802.11 be20	52-tone	36	5180	EHT	13.00		
	802.11 be20	106-tone	36	5180	EHT	16.00		
	802.11 be20	52+26-tone	36	5180	EHT	15.00		
	802.11 be20	106+26-tone	36	5180	EHT	16.00		
	802.11 be80	484+242-tone	42	5210	EHT	15.50		

Note:
1. 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 (see §B.5.2 in this document).
2. The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple transmission modes (802.11a/g/n/ac/ax/be) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, lowest order 802.11 mode is selected (i.e. a, g, n, ac, ax, be).

8.4. CONDUCTED POWER MEASUREMENTS OF 5G UNII_2A

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
5.3G UNII_2a	802.11a	52-64	5260-5320	6	18.00	Not Required	
	802.11 ac20	52-64	5260-5320	VHT	18.00		
	802.11 ac40	54-62	5270-5310	VHT	18.00		
	802.11 ac80	58	5290	VHT	17.50		
	802.11 ac160	50	5250	VHT	12.50		
	802.11 ax20	52-64	5260-5320	HE	18.00		
	802.11 ax40	54-62	5270-5310	HE	18.00		
	802.11 ax80	58	5290	HE	18.00	17.89	
	802.11 ax160	50	5250	HE	12.50	Not Required	
5.3G UNII_2a	802.11a	52-64	5260-5320	6	18.00	Not Required	
	802.11 ac20	52-64	5260-5320	VHT	18.00		
	802.11 ac40	54	5270	VHT	18.00		
	802.11 ac40	62	5310	VHT	18.00		
	802.11 ac80	58	5290	VHT	17.50		
	802.11 ac160	50	5250	VHT	12.50		
	802.11 ax20	52-64	5260-5320	HE	18.00		
	802.11 ax40	54-62	5270-5310	HE	18.00		
	802.11 ax80	58	5290	HE	18.00		17.92
	802.11 ax160	50	5250	HE	12.50	Not Required	

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
5.3G UNII_2a	802.11 ax20	26-tone	64	5320	HE	15.50	Not Required	
	802.11 ax20	52-tone	64	5320	HE	18.00		
	802.11 ax20	106-tone	64	5320	HE	18.00		
5.3G UNII_2a	802.11 ax20	26-tone	64	5320	HE	15.50	Not Required	
	802.11 ax20	52-tone	64	5320	HE	18.00		
	802.11 ax20	106-tone	64	5320	HE	18.00		

Note:
1. 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 (see §B.5.2 in this document).
2. The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple transmission modes (802.11a/g/n/ac/ax/be) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, lowest order 802.11 mode is selected (i.e. a, g, n, ac, ax, be).
3. Largest channel bandwidth is worse than lowest order modulation.

8.5. CONDUCTED POWER MEASUREMENTS OF 5G UNII_2C

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
5.6G UNII_2c	802.11a	100-144	5500-5720	6	19.50	Not Required	
	802.11 ac20	100-144	5500-5720	VHT	19.50		
	802.11 ac40	102-142	5510-5710	VHT	19.50		
	802.11 ac80	106	5530	VHT	18.40	18.40	
	802.11 ac80	122	5610	VHT	19.50	19.38	
	802.11 ac80	138	5690	VHT	19.50	19.34	
	802.11 ac160	114	5570	VHT	17.00	Not Required	
	802.11 ax20	100-144	5500-5720	HE	19.50		
	802.11 ax40	102-142	5510-5710	HE	19.50		
	802.11 ax80	106-138	5530-5690	HE	19.50		
	802.11 ax160	114	5570	VHT	17.50		
5.6G UNII_2c	802.11a	100-144	5500-5720	6	20.50	Not Required	
	802.11 ac20	100-144	5500-5720	VHT	20.50		
	802.11 ac40	102-142	5510-5710	VHT	20.50		
	802.11 ac80	106	5530	VHT	18.50		18.34
	802.11 ac80	122	5610	VHT	20.50		20.39
	802.11 ac80	138	5690	VHT	20.50		20.41
	802.11 ac160	114	5570	VHT	17.00	Not Required	
	802.11 ax20	100-144	5500-5720	HE	20.50		
	802.11 ax40	102-142	5510-5710	HE	20.50		
	802.11 ax80	106-138	5530-5690	HE	20.50		
	802.11 ax160	114	5570	VHT	17.50		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
5.6G UNII_2c	802.11 ax20	26-tone	100-140	5500-5700	HE	15.50	Not Required	
	802.11 ax20	52-tone	100-140	5500-5700	HE	18.00		
	802.11 ax20	106-tone	100-140	5500-5700	HE	19.50		
5.6G UNII_2c	802.11 ax20	26-tone	100-140	5500-5700	HE	15.50	Not Required	
	802.11 ax20	52-tone	100-140	5500-5700	HE	18.00		
	802.11 ax20	106-tone	100-140	5500-5700	HE	20.50		

Note:
1. The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple transmission modes (802.11a/g/n/ac/ax/be) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, lowest order 802.11 mode is selected (i.e. a, g, n, ac, ax, be).
2. Largest channel bandwidth is worse than lowest order modulation.

8.6. CONDUCTED POWER MEASUREMENTS OF 5G UNII_3

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
5.8G UNII_3	802.11a	149-165	5745-5825	6	21.00	Not Required	
	802.11 ac20	149-165	5745-5825	VHT	21.00		
	802.11 ac40	151-159	5755-5795	VHT	21.00		
	802.11 ac80	155	5775	VHT	21.00	20.68	
	802.11 ax20	149-165	5745-5825	HE	21.00	Not Required	
	802.11 ax40	151-159	5755-5795	HE	21.00		
	802.11 ax80	155	5775	HE	21.00		
	802.11 be20	149-165	5745-5825	EHT	21.00		
	802.11 be40	151-159	5755-5795	EHT	21.00		
	802.11 be80	155	5775	EHT	21.00		
5.8G UNII_3	802.11a	149-165	5745-5825	6	21.00	Not Required	
	802.11 ac20	149-165	5745-5825	VHT	21.00		
	802.11 ac40	151-159	5755-5795	VHT	21.00		
	802.11 ac80	155	5775	VHT	21.00		20.70
	802.11 ax20	149-165	5745-5825	HE	21.00	Not Required	
	802.11 ax40	151-159	5755-5795	HE	21.00		
	802.11 ax80	155	5775	HE	21.00		
	802.11 be20	149-165	5745-5825	EHT	21.00		
	802.11 be40	151-159	5755-5795	EHT	21.00		
	802.11 be80	155	5775	EHT	21.00		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
5.8G UNII_3	802.11 ax20	26-tone	149-165	5745-5825	HE	21.00	Not Required	
	802.11 ax20	52-tone	149-165	5745-5825	HE	21.00		
	802.11 ax20	106-tone	149-165	5745-5825	HE	21.00		
	802.11 be20	26-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	52-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	106-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	52+26-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	106+26-tone	149-165	5745-5825	EHT	21.00		
	802.11 be80	484+242-tone	155	5775	EHT	19.00		
5.8G UNII_3	802.11 ax20	26-tone	149-165	5745-5825	HE	21.00	Not Required	
	802.11 ax20	52-tone	149-165	5745-5825	HE	21.00		
	802.11 ax20	106-tone	149-165	5745-5825	HE	21.00		
	802.11 be20	26-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	52-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	106-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	52+26-tone	149-165	5745-5825	EHT	21.00		
	802.11 be20	106+26-tone	149-165	5745-5825	EHT	21.00		
	802.11 be80	484+242-tone	155	5775	EHT	19.00		

Note:
1. The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance,
in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple transmission modes (802.11a/g/n/ac/ax/be) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, lowest order 802.11 mode is selected (i.e. a, g, n, ac, ax, be).
2. Largest channel bandwidth is worse than lowest order modulation.

8.7. CONDUCTED POWER MEASUREMENTS OF 5G UNII_4

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
5.9G UNII_4	802.11a	169-177	5845-5885	6	20.50	Not Required	
	802.11 ac20	169-177	5845-5885	VHT	20.00		
	802.11 ac40	167-175	5835-5875	VHT	20.50		
	802.11 ac80	171	5855	VHT	20.50	20.19	
	802.11 ac160	163	5815	VHT	18.50	Not Required	
	802.11 ax20	169-177	5845-5885	HE	20.00		
	802.11 ax40	167-175	5835-5875	HE	20.50		
	802.11 ax80	171	5855	HE	20.50		
	802.11 ax160	163	5815	VHT	18.50		
	802.11 be20	169-177	5845-5885	EHT	20.50		
	802.11 be40	167-175	5835-5875	EHT	20.50		
	802.11 be80	171	5855	EHT	20.50		
	802.11 be160	163	5815	EHT	19.00		
5.9G UNII_4	802.11a	169-177	5845-5885	6	21.00	Not Required	
	802.11 ac20	169-177	5845-5885	VHT	20.00		
	802.11 ac40	167-175	5835-5875	VHT	21.00		
	802.11 ac80	171	5855	VHT	21.00		20.83
	802.11 ac160	163	5815	VHT	18.50	Not Required	
	802.11 ax20	169-177	5845-5885	HE	20.00		
	802.11 ax40	167-175	5835-5875	HE	21.00		
	802.11 ax80	171	5855	HE	21.00		
	802.11 ax160	163	5815	VHT	18.50		
	802.11 be20	169-177	5845-5885	EHT	20.50		
	802.11 be40	167-175	5835-5875	EHT	21.00		
	802.11 be80	171	5855	EHT	21.00		
	802.11 be160	163	5815	EHT	19.00		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
5.9G UNII_4	802.11be20	26-tone	169-177	5845-5885	EHT	14.00	Not Required	
	802.11 be20	52-tone	169-177	5845-5885	EHT	16.00		
	802.11 be20	106-tone	169-177	5845-5885	EHT	19.50		
	802.11be20	52+26-tone	169-177	5845-5885	EHT	18.00		
	802.11be20	106+26-tone	169-177	5845-5885	EHT	19.00		
	802.11 be80	484+242-tone	171	5855	EHT	20.50		
	802.11 be160	996+484-tone	163	5815	EHT	17.50		
	802.11 be160	996+484+242 -tone	163	5815	EHT	18.00		
5.9G UNII_4	802.11be20	26-tone	169-177	5845-5885	EHT	14.00	Not Required	
	802.11 be20	52-tone	169-177	5845-5885	EHT	16.00		
	802.11 be20	106-tone	169-177	5845-5885	EHT	19.50		
	802.11be20	52+26-tone	169-177	5845-5885	EHT	18.00		
	802.11be20	106+26-tone	169-177	5845-5885	EHT	19.00		
	802.11 be80	484+242-tone	171	5855	EHT	21.00		
	802.11 be160	996+484-tone	163	5815	EHT	17.50		
	802.11 be160	996+484+242 -tone	163	5815	EHT	18.00		

Note:

1. The initial test configuration for 2.4 GHz and 5 GHz OFDM transmission modes is determined by the 802.11 configuration with the highest maximum output power specified for production units, including tune-up tolerance, in each standalone and aggregated frequency band. SAR for the initial test configuration is measured using the highest maximum output power channel determined by the default power measurement procedures. When multiple transmission modes (802.11a/g/n/ac/ax/be) have the same specified maximum output power, largest channel bandwidth, lowest order modulation and lowest data rate, lowest order 802.11 mode is selected (i.e. a, g, n, ac, ax, be).
2. Largest channel bandwidth is worse than lowest order modulation.

8.8. CONDUCTED POWER MEASUREMENTS OF 6G UNII_5

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
6.2G UNII_5	802.11 a	1-93	5955-6415	6	7.00	Not Required	
	802.11 ax20	1-93	5955-6415	HE	7.50		
	802.11 ax40	3-91	5965-6405	HE	9.50		
	802.11 ax80	7-87	5985-6385	HE	13.00		
	802.11 ax160	15	6025	HE	15.50	15.39	
	802.11 ax160	47	6185	HE	15.00	14.84	
	802.11 ax160	79	6345	HE	15.50	15.25	
	802.11 be20	1-93	5955-6415	EHT	7.50	Not Required	
	802.11 be40	3-91	5965-6405	EHT	10.00		
	802.11 be80	7-87	5985-6385	EHT	13.00		
	802.11 be160	15-79	6025-6345	EHT	15.50		
6.2G UNII_5	802.11 a	1-93	5955-6415	6	7.00	Not Required	
	802.11 ax20	1-93	5955-6415	HE	7.50		
	802.11 ax40	3-91	5965-6405	HE	9.50		
	802.11 ax80	7-87	5985-6385	HE	13.00		
	802.11 ax160	15	6025	HE	15.50		15.19
	802.11 ax160	47	6185	HE	15.00		14.88
	802.11 ax160	79	6345	HE	15.50		15.44
	802.11 be20	1-93	5955-6415	EHT	7.50	Not Required	
	802.11 be40	3-91	5965-6405	EHT	10.00		
	802.11 be80	7-87	5985-6385	EHT	13.00		
	802.11 be160	15-79	6025-6345	EHT	15.50		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
6.2G UNII_5	802.11be20	26-tone	1-93	5955-6415	EHT	-0.50	Not Required	
	802.11 be20	52-tone	1-93	5955-6415	EHT	2.50		
	802.11 be20	106-tone	1-93	5955-6415	EHT	5.00		
	802.11be20	52+26-tone	1-93	5955-6415	EHT	3.50		
	802.11be20	106+26-tone	1-93	5955-6415	EHT	5.00		
	802.11 be80	484+242-tone	7-87	5985-6385	EHT	11.50		
6.2G UNII_5	802.11be20	26-tone	1-93	5955-6415	EHT	-0.50	Not Required	
	802.11 be20	52-tone	1-93	5955-6415	EHT	2.50		
	802.11 be20	106-tone	1-93	5955-6415	EHT	5.00		
	802.11be20	52+26-tone	1-93	5955-6415	EHT	3.50		
	802.11be20	106+26-tone	1-93	5955-6415	EHT	5.00		
	802.11 be80	484+242-tone	7-87	5985-6385	EHT	11.50		

8.9. CONDUCTED POWER MEASUREMENTS OF 6G UNII_6

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
6.5G UNII_6	802.11 a	97-113	6435-6515	6	7.50	Not Required	
	802.11 ax20	97-113	6435-6515	HE	7.50		
	802.11 ax40	99-115	6445-6525	HE	10.50		
	802.11 ax80	103	6465	HE	13.00		
	802.11 ax160	111	6505	HE	16.00	15.61	
	802.11 be20	97-113	6435-6515	EHT	7.50	Not Required	
	802.11 be40	99-115	6445-6525	EHT	10.00		
	802.11 be80	103	6465	EHT	13.00		
	802.11 be160	111	6505	EHT	16.00		
6.5G UNII_6	802.11 a	97-113	6435-6515	6	7.50	Not Required	
	802.11 ax20	97-113	6435-6515	HE	7.50		
	802.11 ax40	99-115	6445-6525	HE	10.50		
	802.11 ax80	103	6465	HE	13.00		
	802.11 ax160	111	6505	HE	16.00		15.67
	802.11 be20	97-113	6435-6515	EHT	7.50	Not Required	
	802.11 be40	99-115	6445-6525	EHT	10.00		
	802.11 be80	103	6465	EHT	13.00		
	802.11 be160	111	6505	EHT	16.00		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
6.5G UNII_6	802.11be20	26-tone	97-113	6435-6515	EHT	-0.50	Not Required	
	802.11 be20	52-tone	97-113	6435-6515	EHT	2.50		
	802.11 be20	106-tone	97-113	6435-6515	EHT	5.50		
	802.11be20	52+26-tone	97-113	6435-6515	EHT	4.00		
	802.11be20	106+26-tone	97-113	6435-6515	EHT	5.00		
	802.11 be80	484+242-tone	103	6465	EHT	12.00		
	802.11 be160	996+484-tone	111	6505	EHT	15.00		
	802.11 be160	996+484+242 -tone	111	6505	EHT	15.50		
6.5G UNII_6	802.11be20	26-tone	97-113	6435-6515	EHT	-0.50	Not Required	
	802.11 be20	52-tone	97-113	6435-6515	EHT	2.50		
	802.11 be20	106-tone	97-113	6435-6515	EHT	5.50		
	802.11be20	52+26-tone	97-113	6435-6515	EHT	4.00		
	802.11be20	106+26-tone	97-113	6435-6515	EHT	5.00		
	802.11 be80	484+242-tone	103	6465	EHT	12.00		
	802.11 be160	996+484-tone	111	6505	EHT	15.00		
	802.11 be160	996+484+242 -tone	111	6505	EHT	15.50		

8.10. CONDUCTED POWER MEASUREMENTS OF 6G UNII_7

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
6.7G UNII_7	802.11 a	117-181	6535-6855	6	7.50	Not Required	
	802.11 ax20	117-181	6535-6855	HE	7.50		
	802.11 ax40	123-179	6565-6845	HE	10.00		
	802.11 ax80	119-183	6545-6865	HE	13.00		
	802.11 ax160	143	6665	HE	15.50	15.37	
	802.11 ax160	175	6825	HE	15.50	15.21	
	802.11 be20	117-181	6535-6855	EHT	7.50	Not Required	
	802.11 be40	123-179	6565-6845	EHT	10.00		
	802.11 be80	119-183	6545-6865	EHT	13.00		
	802.11 be160	143-175	6665-6825	EHT	15.50		
6.7G UNII_7	802.11 a	117-181	6535-6855	6	7.50	Not Required	
	802.11 ax20	117-181	6535-6855	HE	7.50		
	802.11 ax40	123-179	6565-6845	HE	10.00		
	802.11 ax80	119-183	6545-6865	HE	13.00		
	802.11 ax160	143	6665	HE	15.50		15.29
	802.11 ax160	175	6825	HE	15.50		15.02
	802.11 be20	117-181	6535-6855	EHT	7.50	Not Required	
	802.11 be40	123-179	6565-6845	EHT	10.00		
	802.11 be80	119-183	6545-6865	EHT	13.00		
	802.11 be160	143-175	6665-6825	EHT	15.50		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
6.7G UNII_7	802.11be20	26-tone	117	6535	EHT	-1.00	Not Required	
	802.11 be20	52-tone	117	6535	EHT	2.50		
	802.11 be20	106-tone	117	6535	EHT	5.50		
	802.11be20	52+26-tone	117	6535	EHT	3.50		
	802.11be20	106+26-tone	117	6535	EHT	4.50		
	802.11 be80	484+242-tone	119-183	6545-6865	EHT	12.00		
	802.11 be160	996+484-tone	143-175	6665-6825	EHT	15.00		
	802.11 be160	996+484+242 -tone	175	6825	EHT	15.00		
6.7G UNII_7	802.11be20	26-tone	117	6535	EHT	-1.00	Not Required	
	802.11 be20	52-tone	117	6535	EHT	2.50		
	802.11 be20	106-tone	117	6535	EHT	5.50		
	802.11be20	52+26-tone	117	6535	EHT	3.50		
	802.11be20	106+26-tone	117	6535	EHT	4.50		
	802.11 be80	484+242-tone	119-183	6545-6865	EHT	12.00		
	802.11 be160	996+484-tone	143-175	6665-6825	EHT	15.00		
	802.11 be160	996+484+242 -tone	175	6825	EHT	15.00		

8.11. CONDUCTED POWER MEASUREMENTS OF 6G UNII_8

Band	Mode	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
						Main	Aux
7.0G UNII_8	802.11 a	185-233	6875-7115	6	7.50	Not Required	
	802.11 ax20	185-233	6875-7115	HE	8.00		
	802.11 ax40	187-227	6885-7085	HE	10.50		
	802.11 ax80	199-215	6945-7025	HE	13.00		
	802.11 ax160	207	6985	HE	16.00	15.72	
	802.11 be20	185-233	6875-7115	EHT	8.00	Not Required	
	802.11 be40	187-227	6885-7085	EHT	10.50		
	802.11 be80	199-215	6945-7025	EHT	13.00		
	802.11 be160	207	6985	EHT	16.00		
7.0G UNII_8	802.11 a	185-233	6875-7115	6	7.50	Not Required	
	802.11 ax20	185-233	6875-7115	HE	8.00		
	802.11 ax40	187-227	6885-7085	HE	10.50		
	802.11 ax80	199-215	6945-7025	HE	13.00		
	802.11 ax160	207	6985	HE	16.00		15.96
	802.11 be20	185-233	6875-7115	EHT	8.00	Not Required	
	802.11 be40	187-227	6885-7085	EHT	10.50		
	802.11 be80	199-215	6945-7025	EHT	13.00		
	802.11 be160	207	6985	EHT	16.00		

RU tone

Band	Mode	RU tone	Channel	Frequency (MHz)	Data Rate	Max Tune-Up Power (dBm)	AVG Power (dBm)	
							Main	Aux
7.0G UNII_8	802.11be20	26-tone	185-233	6875-7115	EHT	-0.50	Not Required	
	802.11 be20	52-tone	185-233	6875-7115	EHT	3.00		
	802.11 be20	106-tone	185-233	6875-7115	EHT	6.00		
	802.11be20	52+26-tone	185-233	6875-7115	EHT	5.00		
	802.11be20	106+26-tone	185-233	6875-7115	EHT	5.50		
	802.11 be80	484+242-tone	199-215	6945-7025	EHT	12.00		
	802.11 be160	996+484-tone	207	6985	EHT	15.50		
	802.11 be160	996+484+242 -tone	207	6985	EHT	15.50		
7.0G UNII_8	802.11be20	26-tone	185-233	6875-7115	EHT	-0.50	Not Required	
	802.11 be20	52-tone	185-233	6875-7115	EHT	3.00		
	802.11 be20	106-tone	185-233	6875-7115	EHT	6.00		
	802.11be20	52+26-tone	185-233	6875-7115	EHT	5.00		
	802.11be20	106+26-tone	185-233	6875-7115	EHT	5.50		
	802.11 be80	484+242-tone	199-215	6945-7025	EHT	12.00		
	802.11 be160	996+484-tone	207	6985	EHT	15.50		
	802.11 be160	996+484+242 -tone	207	6985	EHT	15.50		

8.12. 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 > 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

Mode	Channel	Test Position	Distance (mm)	Ant	Max Tune-up (dBm)	AVG Power (dBm)	SAR 1g	Duty Cycel %	Duty Factor	Reported SAR 1g	Note
BT_DH5	0	Bottom	0	Main	11.50	11.04	0.036	76.45%	1.31	**0.052**	
	39	Bottom	0	Main	11.50	11.41	0.037	76.45%	1.31	0.049	
	78	Bottom	0	Main	11.50	11.39	0.026	76.45%	1.31	0.035	
	0	LCD Back	25	Main	11.50	11.04	<0.001	76.45%	1.31	<0.001	
BLE_1M	0	Bottom	0	Aux	11.50	10.91	0.041	85.08%	1.18	0.056	
	19	Bottom	0	Aux	11.50	11.38	0.049	85.08%	1.18	**0.059**	
	19	Bottom	0	Aux	11.50	11.38	0.043	85.08%	1.18	0.052	3
	39	Bottom	0	Aux	11.50	11.48	0.030	85.08%	1.18	0.035	
	19	LCD Back	25	Aux	11.50	11.38	<0.001	85.08%	1.18	<0.001	

SAR test results of 2.4G WiFi

Mode	Channel	Test Position	Distance (mm)	Ant	Max Tune-up (dBm)	AVG Power (dBm)	SAR 1g	Reported SAR 1g	Note
802.11b	1	Bottom	0	Main	23.50	23.28	0.910	0.957	1
	6	Bottom	0	Main	23.50	23.29	1.060	**1.113**	
	6	Bottom	0	Main	23.50	23.29	0.968	1.016	3
	11	Bottom	0	Main	23.50	23.08	0.920	1.013	1
	12	Bottom	0	Main	20.50	20.17	0.445	0.480	1
	13	Bottom	0	Main	16.00	16.00	0.155	0.155	1
	6	Bottom	0	Main	23.50	23.29	1.050	1.102	2
	6	LCD Back	25	Main	23.50	23.29	0.032	0.033	
802.11b	1	Bottom	0	Aux	22.50	22.41	0.973	0.993	1
	6	Bottom	0	Aux	22.50	22.42	1.060	**1.080**	
	11	Bottom	0	Aux	22.50	22.36	0.980	1.012	1
	12	Bottom	0	Aux	20.50	20.40	0.548	0.561	1
	13	Bottom	0	Aux	16.00	15.71	0.174	0.186	1
	6	LCD Back	25	Aux	22.50	22.42	0.038	0.038	

Note:

1. Highest reported SAR is > 0.8 W/kg. Added second highest power channel for this test position.
2. Repeated measurements are required only when the measured SAR is ≥0.80 W/kg. If the measured SAR values are < 1.45 W/kg with ≤20% variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns.
   Original SAR = 1.060 W/kg, therefore second times repeat SAR is required.
   Repeat SAR = 1.050 W/kg < 1.45 W/kg
   SAR variation= -0.94% < 20%
3. The WLAN result we reference report no. BTL-FCC SAR-1-2410C388, the PCB layout is different, so we select the worst case channel to spot check.

SAR test results of 5G WiFi

Band	Mode	Channel	Test Position	Distance (mm)	Ant	Max Tune-up (dBm)	AVG Power (dBm)	SAR 1g	Reported SAR 1g	Note
5G UNII 1&2a	802.11 ax80	42	Bottom	0	Main	18.00	17.83	1.010	**1.050**	
		58	Bottom	0	Main	18.00	17.89	0.783	0.803	1
		42	LCD Back	25	Main	18.00	17.83	0.022	0.023	
	802.11 ax80	42	Bottom	0	Aux	18.00	17.84	0.941	**0.976**	
		58	Bottom	0	Aux	18.00	17.92	0.553	0.563	1
		42	LCD Back	25	Aux	18.00	17.84	0.030	0.032	
5G UNII 2C	802.11 ac80	106	Bottom	0	Main	18.50	18.40	0.622	0.636	1
		122	Bottom	0	Main	19.50	19.38	1.040	1.069	
		138	Bottom	0	Main	19.50	19.34	1.050	**1.089**	1
		138	LCD Back	25	Main	19.50	19.34	0.029	0.030	
	802.11 ac80	106	Bottom	0	Aux	18.50	18.34	0.602	0.625	1
		122	Bottom	0	Aux	20.50	20.39	0.821	0.842	1
		138	Bottom	0	Aux	20.50	20.41	0.967	**0.987**	
		138	LCD Back	25	Aux	20.50	20.41	0.040	0.041	
5G UNII 3	802.11 ac80	155	Bottom	0	Main	21.00	20.68	0.982	**1.057**	
		155	LCD Back	25	Main	21.00	20.68	0.031	0.033	
	802.11 ac80	155	Bottom	0	Aux	21.00	20.70	0.993	**1.064**	
		155	LCD Back	25	Aux	21.00	20.70	0.039	0.041	
5G UNII 4	802.11 ac80	171	Bottom	0	Main	20.50	20.19	1.080	**1.160**	
		171	Bottom	0	Main	20.50	20.19	1.070	1.149	3
		171	LCD Back	25	Main	20.50	20.19	0.041	0.044	
	802.11 ac80	171	Bottom	0	Aux	21.00	20.83	1.100	**1.144**	
		171	Bottom	0	Aux	21.00	20.83	1.090	1.134	2
		171	LCD Back	25	Aux	21.00	20.83	0.037	0.038	

Note:
1. Highest reported SAR is > 0.8 W/kg. Added second highest power channel for this test position.
2. Repeated measurements are required only when the measured SAR is ≥0.80 W/kg. If the measured SAR values are < 1.45 W/kg with ≤20% variation, only one repeated measurement is required to reaffirm that the results are not expected to have substantial variations, which may introduce significant compliance concerns.
   Original SAR = 1.100 W/kg, therefore second times repeat SAR is required.
   Repeat SAR = 1.090 W/kg < 1.45 W/kg
   SAR variation= -0.91% < 20%
3. The WLAN result we reference report no. BTL-FCC SAR-1-2410C388, the PCB layout is different, so we select worse case channel to spot check.

SAR test results of 6G WiFi

Band	Mode	Channel	Test Position	Ant	Distance (mm)	Max une-up (dBm)	AVG Power (dBm)	SAR 1g	Reported SAR 1g	4cm^2 APD (W/m^2)	Reported 4cm^2 APD (W/m^2)	Note
6G UNII 5	802.11 ax160	79	Bottom	Main	0	15.50	15.25	0.169	0.179	1.12	1.19	
		15	Bottom	Main	0	15.50	15.39	0.113	0.116	0.73	0.75	
		47	Bottom	Main	0	15.00	14.84	0.285	**0.296**	1.92	**1.99**	
		47	LCD Back	Main	25	15.00	14.84	0.021	0.022	0.16	0.16	
		79	Bottom	Aux	0	15.50	15.44	0.278	**0.282**	1.99	**2.02**	
		15	Bottom	Aux	0	15.50	15.19	0.170	0.183	1.20	1.29	
		47	Bottom	Aux	0	15.00	14.88	0.210	0.216	1.46	1.50	
		79	LCD Back	Aux	25	15.50	15.44	0.029	0.029	0.26	0.26	
6G UNII 6	802.11 ax160	111	Bottom	Main	0	16.00	15.61	0.323	**0.353**	2.23	**2.44**	
		111	LCD Back	Main	25	16.00	15.61	0.019	0.021	0.14	0.16	
		111	Bottom	Aux	0	16.00	15.67	0.299	**0.323**	2.18	**2.35**	
		111	LCD Back	Aux	25	16.00	15.67	0.030	0.032	0.15	0.16	
6G UNII 7	802.11 ax160	175	Bottom	Main	0	15.50	15.21	0.235	**0.251**	1.53	**1.64**	
		143	Bottom	Main	0	15.50	15.37	0.221	0.228	1.51	1.56	
		175	LCD Back	Main	25	15.50	15.21	0.023	0.025	0.16	0.18	
		175	Bottom	Aux	0	15.50	15.02	0.181	0.202	1.32	1.47	
		143	Bottom	Aux	0	15.50	15.29	0.238	**0.250**	1.85	**1.94**	
		143	LCD Back	Aux	25	15.50	15.29	0.020	0.021	0.11	0.11	
6G UNII 8	802.11 ax160	207	Bottom	Main	0	16.00	15.72	0.364	**0.388**	2.38	**2.54**	
		207	Bottom	Main	0	16.00	15.72	0.266	0.284	2.21	2.36	1
		207	LCD Back	Main	25	16.00	15.72	0.024	0.026	0.16	0.17	
		207	Bottom	Aux	0	16.00	15.96	0.230	**0.232**	1.67	**1.69**	
		207	LCD Back	Aux	25	16.00	15.96	0.017	0.017	0.12	0.12	

1. The WLAN result we reference report no. BTL-FCC SAR-1-2410C388, the PCB layout is different, so we select worse case channel to spot check.

Power Density results 6G WiFi

Band	Mode	Channel	Test Position	Gap (mm)	Ant	Max une-up (dBm)	AVG Power (dBm)	Grid Step	Scaling Factor for Measurement Uncertainty	Averaging Area cm^2	Avg-Total Power Density W/m^2	Scaling Total Power Density	PD Limit W/m^2
6G UNII 8	802.11 ax160	207	Bottom	2mm	Main	16.00	15.72	0.125	1.5535	4.000	5.730	**9.494**	10
6G UNII 6	802.11 ax160	111	Bottom	2mm	Aux	16.00	15.67	0.125	1.5535	4.000	3.500	**5.867**	10

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.	Configuration
1	WLAN 2.4G(Aux) + BT(Main)
2	RLAN 5G(Aux) + BT(Main)
3	WLAN 6G(Aux) + BT(Main)
4	WLAN 2.4G(Main) + WLAN 2.4G(Aux)
5	RLAN 5G(Main) + RLAN 5G(Aux)
6	WLAN 6G(Main) + WLAN 6G(Aux)

10.2. SIMULTANEOUS TRANSMISSION CONDITIONS

KDB 447498 D04 General RF Exposure Guidance v01, introduces a new formula for calculating the SAR to Peak Location Ratio (SPLSR) between pairs of simultaneously transmitting antennas:

$SPLSR = (SAR_1 + SAR_2)^{1.5} / R_i$
Where:

SAR_1 is the highest Reported or estimated SAR for the first of a pair of simultaneous transmitting antennas, in a specific test operating mode and exposure condition

SAR_2 is the highest Reported or estimated SAR for the second of a pair of simultaneous transmitting antennas, in the same test operating mode and exposure condition as the first

R_i is the separation distance between the pair of simultaneous transmitting antennas. When the SAR is measured, for both antennas in the pair, it is determined by the actual x, y and z coordinates in the 1-g SAR for each SAR peak location, based on the extrapolated and interpolated result in the zoom scan measurement, using the formula of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$

A new threshold of 0.04 is also introduced in the KDB. Thus, in order for a pair of simultaneous transmitting antennas with the sum of 1-g SAR > 1.6 W/kg to qualify for exemption from Simultaneous Transmission SAR measurements, it has to satisfy the condition of:
$(SAR_1 + SAR_2)^{1.5} / R_i \leq 0.04$

10.3. About BT/WiFi

SAR1g(W/kg) \ Test Position	Bottom	LCD Back
WLAN 2.4G WiFi_Main	1.113	0.033
WLAN 2.4G WiFi_Aux	1.080	0.038
UNII_1 & 2a WiFi_Main	1.050	0.023
UNII_1 & 2a WiFi_Aux	0.976	0.032
UNII_2c WiFi_Main	1.089	0.030
UNII_2c WiFi_Aux	0.987	0.041
UNII_3 WiFi_Main	1.057	0.033
UNII_3 WiFi_Aux	1.064	0.041
UNII_4 WiFi_Main	1.160	0.044
UNII_4 WiFi_Aux	1.144	0.038
UNII_5 WiFi_Main	0.296	0.022
UNII_5 WiFi_Aux	0.282	0.029
UNII_6 WiFi_Main	0.353	0.021
UNII_6 WiFi_Aux	0.323	0.032
UNII_7 WiFi_Main	0.251	0.025
UNII_7 WiFi_Aux	0.250	0.021
UNII_8 WiFi_Main	0.388	0.026
UNII_8 WiFi_Aux	0.232	0.017
BT DH5	0.052	<0.001
BLE 1M	0.059	<0.001
WLAN_Main + WLAN_Aux MAX$\sum SAR_{1g}$	2.304	0.085
WLAN_Aux + BT_Main MAX$\sum SAR_{1g}$	1.196	0.041
WLAN_Aux + BLE_Main MAX$\sum SAR_{1g}$	1.203	0.041

Note:

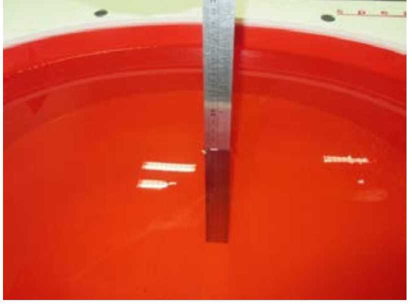
1. MAX. ΣSAR_{1g} = 2.304 W/Kg>1.6 W/Kg, so Peak location SAR are required.
2. Peak location SAR are 0.02 that refer Appendix E.

11. TEST LAYOUT

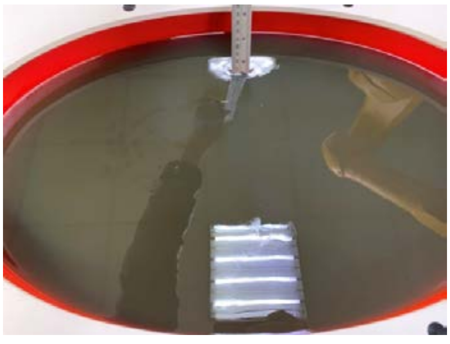
Specific Absorption Rate Test Layout

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

HSL(2450MHz) HSL(5GHz)



HSL(6.5GHz)



Appendix A. SAR Plots of System Verification

(Pls See BTL-FCC SAR-1-2410C388C_Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See BTL-FCC SAR-1-2410C388C_Appendix B.)

Appendix C. Calibration Certificate

(Pls See BTL-FCC SAR-1-2410C388C_Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See BTL-FCC SAR-1-2410C388C_Appendix D.)

Appendix E. SAR SPLSR

(Pls See BTL-FCC SAR-1-2410C388C_Appendix E.)

End of Test Report