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RF Exposure Part 1 Test Report

Applicant Name:
Microsoft Corporation
One Microsoft Way
Redmond, WA 98052 USA

Date of Testing:
01/07/2025 – 02/18/2025
Test Site/Location:
Element, Columbia, MD, USA
Document Serial No.:
1M2503050023-01.C3K (Rev2)

FCC ID: **C3K00002101**

APPLICANT: **MICROSOFT CORPORATION**

DUT Type:	Wireless Module
Application Type:	Class II Permissive Change
FCC Rule Part(s):	CFR §2.1093
Model(s):	HWB-Q93
Host Device Model Name:	2109
Host Device FCC ID:	C3K2109
Permissive Change(s):	FCC C2PC Cover Letter for 2109 and 2110

Equipment Class	Band & Mode	Tx Frequency	SAR (W/kg)	
			Power Mode 1	Power Mode 2
DTS	2.4 GHz WIFI	2412 - 2472 MHz	**<0.1**	**0.76**
NII	5 GHz WIFI	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz U-NII-4: 5845 - 5885 MHz	**<0.1**	**1.08**
6CD	6 GHz WIFI	U-NII-5: 5945 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz	**<0.1**	**0.86**
DSS	2.4 GHz Bluetooth	2402 - 2480 MHz	**<0.1**	**0.88**
Simultaneous SAR per KDB 690783 D01v01r03:			<0.1	**1.54**

Equipment Class	Band & Mode	Tx Frequency	APD (W/m^2)		Reported PD (W/m^2)
			Power Mode 1	Power Mode 2	
6CD	6 GHz WIFI	U-NII-5: 5935 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz	**<0.1**	**5.23**	7.144

Note: This revised test report supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

Only operations relevant to this permissive change were evaluated for compliance. The FCC C2PC Cover Letter for 2109 and 2110 includes a description of all changed items. Please see the compliance evaluation for the host model in RF Exposure Technical Report S/N 1M2501020002-01.C3K for complete evaluation of all other operating modes.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 2.8 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

RJ Ortanez
Executive Vice President

The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

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1 TEST LABORATORY INFORMATION

1.1 Introduction

This test report for device subject to testing at an accredited testing laboratory has been generated by the testing laboratory that tested the device. Detailed location and accredited information regarding the testing laboratories are provided below.

1.2 Test Laboratories Information

1.2.1 Testing Laboratory 1

Test Firm Name	ELEMENT MATERIALS TECHNOLOGY WASHINGTON DC LLC
Test Lab Location	7185 Oakland Mills Road, Columbia, MD 21046, United States Tel. +1.410.290.6652 / Fax +1.410.290.6654
Accreditation Info.	Lab Code. (ISED): 2451B
	CAB Identifier (NIST): US0110
	ISO/IEC 17025 (A2LA): CERT #2041.01
	ilac-MRA A2LA ACCREDITED CERT #2041.01
Measurement System No.	J, O, R, S, Q

2 DEVICE UNDER TEST

2.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
2.4 GHz WIFI	Data	2412 - 2472 MHz
5 GHz WIFI	Data	U-NII-1: 5180 - 5240 MHz U-NII-2A: 5260 - 5320 MHz U-NII-2C: 5500 - 5720 MHz U-NII-3: 5745 - 5825 MHz U-NII-4: 5845 - 5885 MHz
6 GHz WIFI	Data	U-NII-5: 5935 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz
2.4 GHz Bluetooth	Data	2402 - 2480 MHz

2.2 Time-Averaging Algorithm for RF Exposure Compliance

This Device is enabled with the Qualcomm® FastConnect TAS feature for WLAN technologies. This feature performs time averaging algorithm in real time to control and manage transmitting power and ensure the timeaveraged RF exposure is in compliance with FCC requirements all the time. Refer to Compliance Summary document for detailed description of Qualcomm® FastConnect TAS feature (report SN could be found in Section 2.10 – Bibliography).

Note that Bluetooth operations are not enabled with TAS.

The FastConnect TAS algorithm maintains the time-averaged transmit power, in turn, time-averaged RF exposure of SAR_design_target, below the predefined time-averaged power limit (i.e., *Plimit* for WLAN), for each characterized technology and band (see RF Exposure Part 0 Test Report, report SN found in Section 2.10 - Bibliography).

FastConnect TAS allows the device to transmit at higher power instantaneously, as high as *Pmax*, when needed, but enforces power limiting to maintain time-averaged transmit power to *Plimit*. Below table shows Final *Plimit* settings and maximum tune up output power *Pmax* configured for this DUT for various transmit conditions (Device State Index DSI for FastConnect.)

This device operates using two different DSIs, each corresponding to a different power level. Throughout this report, DSI=0 (Laptop and/or No Motion) will be defined as Power Mode 1 (high power test cases) and DSI=1 (Tablet and Motion) will be defined as Power Mode 2 (low power test cases).

Exposure Scenario			Maximum Tune-Up Output Power*	Power Mode 1	Power Mode 2
Averaging Volume				1g	1g
Spacing				25mm, 0mm	0mm
DSI				0	1
Technology/Band	Antenna	Antenna Group	P_{max}	P_{limit}	P_{limit}
2.4 GHz WIFI	R	AG0	22.0	34.3	16.25
2.4 GHz WIFI	L	AG1	22.0	33.7	16.25
5 GHz WIFI	R	AG0	20.5	29.8	16.0
5 GHz WIFI	L	AG1	20.5	27.4	16.0
6 GHz WIFI	R	AG0	18.0	30.3	14.0
6 GHz WIFI	L	AG1	18.0	29.3	14.0

Notes:
-All Plimit and maximum tune up output power Pmax levels entered in above Table correspond to average power levels after accounting for duty cycle in the case of OFDM modulation schemes (e.g. WLAN).

Per Qualcomm guidance, MIMO plimits are not included when the WLAN antennas are in separate antenna groups.

The purpose of this report (Part 1 test) is to demonstrate that the EUT meets FCC SAR limits when transmitting in static transmission scenario at maximum allowable time-averaged power levels.

2.3 Power Reduction for SAR

This device used an independent fixed level power reduction mechanism for Bluetooth when the device is used in Power Mode configurations defined below. Detailed descriptions of the power reduction mechanism are included in the operational description.

This device operates using three different Power Modes for Bluetooth. Throughout this report, Power Mode A will refer to the Bluetooth output power in Laptop Mode or Tablet Mode with no motion detected (high power test cases), Power Mode B will refer to the Bluetooth output power in Tablet Mode with WLAN inactive, and Power Mode C will refer to the Bluetooth output power in Tablet Mode with WLAN active.

2.4 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D04v01.

Note: Targets for 802.11ax/be RU operations can be found in 802.11ax/be RU SAR Exclusion Appendix.

2.4.1 2.4 GHz WLAN Output Power

The below table is applicable in the following conditions:

- Pmax, DSI=0 (Power Mode 1)

Mode	Bandwidth	IEEE 802.11 Modulated Output Power (in dBm)																									
		SISO/SISO in MIMO Antenna R														SISO/SISO in MIMO Antenna L											
		b		g		n		ac		ax (SU)		be (SU)		b		g		n		ac		ax (SU)		be (SU)			
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.		
2.4 GHz WLAN	20MHz	23.0	22.0	20.5	19.5	19.5	18.5	19.5	18.5	19.5	18.5	19.5	18.5	23.0	22.0	20.5	19.5	19.5	18.5	19.5	18.5	19.5	18.5	19.5	18.5		
				ch. 1: 16.0	15.0	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5			ch. 1: 16.0	15.0	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5		
				ch. 2: 18.0	17.0											ch. 2: 18.0	17.0										
				ch. 3: 19.0	18.0											ch. 3: 19.0	18.0										
				ch. 11: 15.5	14.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5			ch. 11: 15.5	14.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5		
		ch. 12: 16.5	15.5	ch. 12: 13.0	12.0	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 16.5	15.5	ch. 12: 13.0	12.0	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5		
		ch. 13: 9.0	8.0	ch. 13: -7.0	-8.5	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: 9.0	8.0	ch. 13: -7.0	-8.5	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0		

Mode	Bandwidth	IEEE 802.11 Modulated Output Power (in dBm)																									
		SISO/SISO in MIMO Antenna R														SISO/SISO in MIMO Antenna L											
		[redacted]				n		ac		ax (SU)		be (SU)		[redacted]				n		ac		ax (SU)		be (SU)			
Maximum / Nominal Power						Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.					Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.		
2.4 GHz WLAN	40 MHz					18.5	17.5	18.5	17.5	18.5	17.5	18.5	17.5					18.5	17.5	18.5	17.5	18.5	17.5	18.5	17.5		
						ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0					ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0		
						ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0					ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0		
						ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0					ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0		
						ch. 7: 17.5	16.5	ch. 7: 17.5	16.5	ch. 7: 17.5	16.5	ch. 7: 17.5	16.5					ch. 7: 17.5	16.5	ch. 7: 17.5	16.5	ch. 7: 17.5	16.5	ch. 7: 17.5	16.5		
						ch. 8: 17.5	16.5	ch. 8: 17.5	16.5	ch. 8: 17.5	16.5	ch. 8: 17.5	16.5					ch. 8: 17.5	16.5	ch. 8: 17.5	16.5	ch. 8: 17.5	16.5	ch. 8: 17.5	16.5		
						ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0					ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0		
						ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5					ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5		
						ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5					ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5		

The below table is applicable in the following conditions:

- DSI=1 (Power Mode 2)

Mode	Bandwidth	IEEE 802.11 Modulated Output Power (in dBm)																									
		SISO/SISO in MIMO Antenna R														SISO/SISO in MIMO Antenna L											
		b		g		n		ac		ax (SU)		be (SU)		b		g		n		ac		ax (SU)		be (SU)			
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.		
2.4 GHz WLAN	20MHz	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25		
				ch. 1: 16.0	15.0	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5			ch. 1: 16.0	15.0	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5	ch. 1: 16.5	15.5		
				ch. 11: 15.5	14.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5			ch. 11: 15.5	14.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5	ch. 11: 14.5	13.5		
		ch. 12: 16.5	15.5	ch. 12: 13.0	12.0	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 16.5	15.5	ch. 12: 13.0	12.0	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5	ch. 12: 12.5	11.5		
		ch. 13: 9.0	8.0	ch. 13: -7.0	-8.5	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: 9.0	8.0	ch. 13: -7.0	-8.5	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0	ch. 13: -8.5	-10.0		

Mode	Bandwidth	IEEE 802.11 Modulated Output Power (in dBm)																									
		SISO/SISO in MIMO Antenna R														SISO/SISO in MIMO Antenna L											
		[redacted]				n		ac		ax (SU)		be (SU)		[redacted]				n		ac		ax (SU)		be (SU)			
Maximum / Nominal Power						Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.					Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.		
2.4 GHz WLAN	40 MHz					17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25					17.25	16.25	17.25	16.25	17.25	16.25	17.25	16.25		
						ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0					ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0	ch. 3: 14.0	13.0		
						ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0					ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0	ch. 4: 16.0	15.0		
						ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0					ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0	ch. 5: 16.0	15.0		
						ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0					ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0	ch. 9: 14.0	13.0		
						ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5					ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5	ch. 10: 9.5	8.5		
						ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5					ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5	ch. 11: -8.0	-9.5		

2.4.2 5 GHz WLAN Output Power

The below table is applicable in the following conditions:

- Pmax, DSI=0 (Power Mode 1)

Mode	Band	IEEE 802.11 Modulated Output Power (in dBm)																			
		SISO/SISO in MIMO Antenna R										SISO/SISO in MIMO Antenna L									
		a		n		ac		ax (SU)		be (SU)		a		n		ac		ax (SU)		be (SU)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	UNII-1	17.0 ch. 36: 16.5	16.0 15.5	17.5 ch. 36: 16.0	16.5 15.0	17.5 ch. 36: 16.0	16.5 15.0	17.5 ch. 36: 16.0	16.5 15.0	17.5 ch. 36: 16.0	16.5 15.0	17.0 ch. 36: 16.5	16.0 15.5	17.5 ch. 36: 16.0	16.5 15.0	17.5 ch. 36: 16.0	16.5 15.0	17.5 ch. 36: 16.0	16.5 15.0	17.5 ch. 36: 16.0	16.5 15.0
	UNII-2A	17.5 ch. 64: 17.0	16.5 16.0	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 17.0	16.5 16.0	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 16.5	16.5 15.5	17.5 ch. 64: 16.5	16.5 15.5
	UNII-2C	17.5 ch. 140: 17.0	16.5 16.0	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 17.0	16.5 16.0	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 16.5	16.5 15.5	17.5 ch. 140: 16.5	16.5 15.5
	UNII-3	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0	21.5 ch. 149: 16.0	20.5 15.0
	UNII-4	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5
5 GHz WIFI (40MHz BW)	UNII-1			17.5 ch. 38: 15.0	16.5 14.0	17.5 ch. 38: 15.0	16.5 14.0	17.5 ch. 38: 15.0	16.5 14.0	17.5 ch. 38: 15.0	16.5 14.0			17.5 ch. 38: 15.0	16.5 14.0	17.5 ch. 38: 15.0	16.5 14.0	17.5 ch. 38: 15.0	16.5 14.0	17.5 ch. 38: 15.0	16.5 14.0
	UNII-2A			18.0 ch. 62: 14.5	17.0 13.5	18.0 ch. 62: 14.5	17.0 13.5	18.0 ch. 62: 14.5	17.0 13.5	18.0 ch. 62: 14.5	17.0 13.5			18.0 ch. 62: 14.5	17.0 13.5	18.0 ch. 62: 14.5	17.0 13.5	18.0 ch. 62: 14.5	17.0 13.5	18.0 ch. 62: 14.5	17.0 13.5
	UNII-2C			18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0	18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0	18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0	18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0			18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0	18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0	18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0	18.5 ch. 102: 16.0 ch. 134: 18.0 ch. 142: 16.0	17.5 15.0 17.0 15.0
	UNII-3			19.0	18.0	19.0	18.0	19.0	18.0	19.0	18.0			19.0	18.0	19.0	18.0	19.0	18.0	19.0	18.0
	UNII-4			19.0	18.0	19.0	18.0	19.0	18.0	19.0	18.0			19.0	18.0	19.0	18.0	19.0	18.0	19.0	18.0
5 GHz WIFI (80MHz BW)	UNII-1					14.0	13.0	14.0	13.0	14.0	13.0					14.0	13.0	14.0	13.0	14.0	13.0
	UNII-2A					15.0	14.0	15.0	14.0	15.0	14.0					15.0	14.0	15.0	14.0	15.0	14.0
	UNII-2C					19.0 ch. 106: 15.5 ch. 122: 18.0	18.0 14.5 17.0	19.0 ch. 106: 15.5 ch. 122: 18.0	18.0 14.5 17.0	19.0 ch. 106: 15.5 ch. 122: 18.0	18.0 14.5 17.0					19.0 ch. 106: 15.5 ch. 122: 18.0	18.0 14.5 17.0	19.0 ch. 106: 15.5 ch. 122: 18.0	18.0 14.5 17.0	19.0 ch. 106: 15.5 ch. 122: 18.0	18.0 14.5 17.0
	UNII-3					19.0	18.0	19.0	18.0	19.0	18.0					19.0	18.0	19.0	18.0	19.0	18.0
	UNII-4					19.0	18.0	19.0	18.0	19.0	18.0					19.0	18.0	19.0	18.0	19.0	18.0
5 GHz WIFI (160MHz BW)	UNII-1/2A					12.0	11.0	12.0	11.0	12.0	11.0					12.0	11.0	12.0	11.0	12.0	11.0
	UNII-2C					11.0	10.0	11.0	10.0	11.0	10.0					11.0	10.0	11.0	10.0	11.0	10.0
	UNII-3/4					13.0	12.0	13.0	12.0	13.0	12.0					13.0	12.0	13.0	12.0	13.0	12.0

The below table is applicable in the following conditions:

- DSI=1 (Power Mode 2)

Mode	Band	IEEE 802.11 Modulated Output Power (in dBm)																			
		SISO/SISO in MIMO Antenna R										SISO/SISO in MIMO Antenna L									
		a		n		ac		ax (SU)		be (SU)		a		n		ac		ax (SU)		be (SU)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
5 GHz WIFI (20MHz BW)	UNII-1	16.25	15.25	16.25 ch. 36: 16.0	15.25 15.0	16.25 ch. 36: 16.0	15.25 15.0	16.25 ch. 36: 16.0	15.25 15.0	16.25 ch. 36: 16.0	15.25 15.0	16.25	15.25	16.25 ch. 36: 16.0	15.25 15.0	16.25 ch. 36: 16.0	15.25 15.0	16.25 ch. 36: 16.0	15.25 15.0	16.25 ch. 36: 16.0	15.25 15.0
	UNII-2A	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5
	UNII-2C	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5	16.5	15.5
	UNII-3	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0	16.75 ch. 149: 16.0	15.75 15.0
	UNII-4	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5	16.0 ch. 173: 15.5 ch. 177: 15.5	15.0 14.5 14.5
5 GHz WIFI (40MHz BW)	UNII-1			16.25 ch. 38: 15.0	15.25 14.0	16.25 ch. 38: 15.0	15.25 14.0	16.25 ch. 38: 15.0	15.25 14.0	16.25 ch. 38: 15.0	15.25 14.0			16.25 ch. 38: 15.0	15.25 14.0	16.25 ch. 38: 15.0	15.25 14.0	16.25 ch. 38: 15.0	15.25 14.0	16.25 ch. 38: 15.0	15.25 14.0
	UNII-2A			16.5 ch. 62: 14.5	15.5 13.5	16.5 ch. 62: 14.5	15.5 13.5	16.5 ch. 62: 14.5	15.5 13.5	16.5 ch. 62: 14.5	15.5 13.5			16.5 ch. 62: 14.5	15.5 13.5	16.5 ch. 62: 14.5	15.5 13.5	16.5 ch. 62: 14.5	15.5 13.5	16.5 ch. 62: 14.5	15.5 13.5
	UNII-2C			16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0	16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0	16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0	16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0			16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0	16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0	16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0	16.5 ch. 102: 16.0 ch. 142: 16.0	15.5 15.0 15.0
	UNII-3			16.75	15.75	16.75	15.75	16.75	15.75	16.75	15.75			16.75	15.75	16.75	15.75	16.75	15.75	16.75	15.75
	UNII-4			17.0	16.0	17.0	16.0	17.0	16.0	17.0	16.0			17.0	16.0	17.0	16.0	17.0	16.0	17.0	16.0
5 GHz WIFI (80MHz BW)	UNII-1					14.0	13.0	14.0	13.0	14.0	13.0					14.0	13.0	14.0	13.0	14.0	13.0
	UNII-2A					15.0	14.0	15.0	14.0	15.0	14.0					15.0	14.0	15.0	14.0	15.0	14.0
	UNII-2C					16.5 ch. 106: 15.5	15.5 14.5	16.5 ch. 106: 15.5	15.5 14.5	16.5 ch. 106: 15.5	15.5 14.5					16.5 ch. 106: 15.5	15.5 14.5	16.5 ch. 106: 15.5	15.5 14.5	16.5 ch. 106: 15.5	15.5 14.5
	UNII-3					16.75	15.75	16.75	15.75	16.75	15.75					16.75	15.75	16.75	15.75	16.75	15.75
	UNII-4					17.0	16.0	17.0	16.0	17.0	16.0					17.0	16.0	17.0	16.0	17.0	16.0
5 GHz WIFI (160MHz BW)	UNII-1/2A					12.0	11.0	12.0	11.0	12.0	11.0					12.0	11.0	12.0	11.0	12.0	11.0
	UNII-2C					11.0	10.0	11.0	10.0	11.0	10.0					11.0	10.0	11.0	10.0	11.0	10.0
	UNII-3/4					13.0	12.0	13.0	12.0	13.0	12.0					13.0	12.0	13.0	12.0	13.0	12.0

2.4.3 6 GHz WLAN Output Power

The below table is applicable in the following conditions:

- Pmax, DSI=0 (Power Mode 1)

Mode	Band	IEEE 802.11 Modulated Output Power (in dBm)											
		SISO/SISO in MIMO Antenna R						SISO/SISO in MIMO Antenna L					
		a		ax (SU)		be (SU)		a		ax (SU)		be (SU)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
6 GHz WIFI (20MHz BW) - SP	UNII-5	17.5	16.5	17.5	16.5	17.5	16.5	17.5	16.5	17.5	16.5	17.5	16.5
	UNII-7	17.5 ch. 181: 14.5	16.5 13.5	17.5 ch. 181: 14.5	16.5 13.5	17.5 ch. 181: 14.5	16.5 13.5	17.5 ch. 181: 14.5	16.5 13.5	17.5 ch. 181: 14.5	16.5 13.5	17.5 ch. 181: 14.5	16.5 13.5
6 GHz WIFI (40MHz BW) - SP	UNII-5			18.0	17.0	18.0	17.0			18.0	17.0	18.0	17.0
	UNII-7			18.0	17.0	18.0	17.0			18.0	17.0	18.0	17.0
6 GHz WIFI (80MHz BW) - SP	UNII-5			18.0 ch. 7: 17.0 ch. 23: 17.0	17.0 16.0 16.0	18.0 ch. 7: 17.0 ch. 23: 17.0	17.0 16.0 16.0			18.0 ch. 7: 17.0 ch. 23: 17.0	17.0 16.0 16.0	18.0 ch. 7: 17.0 ch. 23: 17.0	17.0 16.0 16.0
	UNII-7			19.0 ch. 135: 17.5	18.0 16.5	19.0 ch. 135: 17.5	18.0 16.5			19.0 ch. 135: 17.5	18.0 16.5	19.0 ch. 135: 17.5	18.0 16.5
6 GHz WIFI (160MHz BW) - SP	UNII-5			19.0 ch. 15: 16.5 ch. 47: 16.5	18.0 15.5 15.5	19.0 ch. 15: 16.5 ch. 47: 16.5	18.0 15.5 15.5			19.0 ch. 15: 16.5 ch. 47: 16.5	18.0 15.5 15.5	19.0 ch. 15: 16.5 ch. 47: 16.5	18.0 15.5 15.5
	UNII-7			19.0	18.0	19.0	18.0			19.0	18.0	19.0	18.0
6 GHz WIFI (320MHz BW) - SP	UNII-5					19.0	18.0					19.0	18.0

The below table is applicable in the following conditions:

- DSI=1 (Power mode 2)

Mode	Band	IEEE 802.11 Modulated Output Power (in dBm)											
		SISO/SISO in MIMO Antenna R						SISO/SISO in MIMO Antenna L					
		a		ax (SU)		be (SU)		a		ax (SU)		be (SU)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
6 GHz WIFI (20MHz BW) - SP	UNII-5	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0
	UNII-7	14.5	13.5	14.5	13.5	14.5	13.5	14.5	13.5	14.5	13.5	14.5	13.5
6 GHz WIFI (40MHz BW) - SP	UNII-5			15.0	14.0	15.0	14.0			15.0	14.0	15.0	14.0
	UNII-7			14.5	13.5	14.5	13.5			14.5	13.5	14.5	13.5
6 GHz WIFI (80MHz BW) - SP	UNII-5			15.0	14.0	15.0	14.0			15.0	14.0	15.0	14.0
	UNII-7			14.5	13.5	14.5	13.5			14.5	13.5	14.5	13.5
6 GHz WIFI (160MHz BW) - SP	UNII-5			15.0	14.0	15.0	14.0			15.0	14.0	15.0	14.0
	UNII-7			14.5	13.5	14.5	13.5			14.5	13.5	14.5	13.5
6 GHz WIFI (320MHz BW) - SP	UNII-5					15.0	14.0					15.0	14.0

The below table is applicable in the following conditions:

- Pmax, DSI=0 (Power Mode 1)
- DSI=1 (Power Mode 2)

Mode	Band	IEEE 802.11 Modulated Output Power (in dBm)											
		SISO/SISO in MIMO Antenna R						SISO/SISO in MIMO Antenna L					
		a		ax (SU)		be (SU)		a		ax (SU)		be (SU)	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.	Max	Nom.
6 GHz WIFI (20MHz BW) - LPI	UNII-5	0.5	-1.0	1.5	0.0	1.5	0.0	0.5	-1.0	1.5	0.0	1.5	0.0
	UNII-6	0.5	-1.0	0.5	-1.0	0.5	-1.0	0.5	-1.0	0.5	-1.0	0.5	-1.0
	UNII-7	0.5	-1.0	0.5	-1.0	0.5	-1.0	0.0	-1.0	0.5	-1.0	0.5	-1.0
	UNII-8	0.5 ch. 233: -3.0	-1.0 -4.5	0.5 ch. 233: -3.0	-1.0 -4.5	0.5 ch. 233: -3.0	-1.0 -4.5	0.5 ch. 233: -3.0	-1.0 -4.5	0.5 ch. 233: -3.0	-1.0 -4.5	0.5 ch. 233: -3.0	-1.0 -4.5
6 GHz WIFI (40MHz BW) - LPI	UNII-5			4.0	2.5	4.0	2.5			4.0	2.5	4.0	2.5
	UNII-6			4.0	2.5	4.0	2.5			4.0	2.5	4.0	2.5
	UNII-7			4.0	2.5	4.0	2.5			4.0	2.5	4.0	2.5
	UNII-8			4.0	2.5	4.0	2.5			4.0	2.5	4.0	2.5
6 GHz WIFI (80MHz BW) - LPI	UNII-5			6.5	5.5	6.5	5.5			6.5	5.5	6.5	5.5
	UNII-6			6.5	5.5	6.5	5.5			6.5	5.5	6.5	5.5
	UNII-7			7.0 ch. 119: 6.0	6.0 5.0	7.0 ch. 119: 6.0	6.0 5.0			7.0 ch. 119: 6.0	6.0 5.0	7.0 ch. 119: 6.0	6.0 5.0
	UNII-8			7.0	6.0	7.0	6.0			7.0	6.0	7.0	6.0
6 GHz WIFI (160MHz BW) - LPI	UNII-5			9.0	8.0	9.0	8.0			9.0	8.0	9.0	8.0
	UNII-6			9.0	8.0	9.0	8.0			9.0	8.0	9.0	8.0
	UNII-7			9.5	8.5	9.5	8.5			9.5	8.5	9.5	8.5
	UNII-8			6.5	5.5	6.5	5.5			6.5	5.5	6.5	5.5
6 GHz WIFI (320MHz BW) - LPI	UNII-5					11.5	10.5					11.5	10.5
	UNII-6					11.5	10.5					11.5	10.5
	UNII-7					12.0	11.0					12.0	11.0
	UNII-8					12.0	11.0					12.0	11.0

2.4.4 2.4 GHz Maximum Bluetooth Output Power

The below table is applicable in the following conditions:

- Bluetooth Power Mode A

Mode	Data Rate	Modulated Output Power (in dBm)					
		Single Antenna				Each Chain in Beamforming	
		Antenna R		Antenna L		MIMO	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
Bluetooth	1Mbps	20.5	18.5	20.5	18.5	17.5	15.5
Bluetooth EDR	2Mbps	17.5	15.5	17.5	15.5	14.5	12.5
Bluetooth EDR	3Mbps	17.5	15.5	17.5	15.5	14.5	12.5
Bluetooth LE	1Mbps	19.5	17.5	19.5	17.5	16.5	14.5
Bluetooth LE	2Mbps	19.5	17.5	19.5	17.5	16.5	14.5
Bluetooth LE	125kbps	16.0	14.0	16.0	14.0	12.5	10.5
Bluetooth LE	500kbps	16.0	14.0	16.0	14.0	12.5	10.5

2.4.5 2.4 GHz Reduced Bluetooth Output Power

The below table is applicable in the following conditions:

- Bluetooth Power Mode B

Mode	Data Rate	Modulated Output Power (in dBm)					
		Single Antenna				Each Chain in Beamforming	
		Antenna R		Antenna L		MIMO	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
Bluetooth	1Mbps	17.25	15.25	17.25	15.25	15.5	13.5
Bluetooth EDR	2Mbps	17.25	15.25	16.50	14.50	14.5	12.5
Bluetooth EDR	3Mbps	17.25	15.25	16.50	14.50	14.5	12.5
Bluetooth LE	1Mbps	17.25	15.25	17.25	15.25	15.0	13.0
Bluetooth LE	2Mbps	17.25	15.25	17.25	15.25	15.0	13.0
Bluetooth LE	125kbps	16.0	14.0	16.0	14.0	12.5	10.5
Bluetooth LE	500kbps	16.0	14.0	16.0	14.0	12.5	10.5

The below table is applicable in the following conditions:

- Bluetooth Power Mode C

Mode	Data Rate	Modulated Output Power (in dBm)					
		Single Antenna				Each Chain in Beamforming	
		Antenna R		Antenna L		MIMO	
Maximum / Nominal Power		Max	Nom.	Max	Nom.	Max	Nom.
Bluetooth	1Mbps	12.0	10.0	12.0	10.0	11.0	9.0
Bluetooth EDR	2Mbps	12.0	10.0	12.0	10.0	11.0	9.0
Bluetooth EDR	3Mbps	12.0	10.0	12.0	10.0	11.0	9.0
Bluetooth LE	1Mbps	12.0	10.0	12.0	10.0	11.0	9.0
Bluetooth LE	2Mbps	12.0	10.0	12.0	10.0	11.0	9.0
Bluetooth LE	125kbps	12.0	10.0	12.0	10.0	11.0	9.0
Bluetooth LE	500kbps	12.0	10.0	12.0	10.0	11.0	9.0

2.5 DUT Antenna Locations

The overall dimensions of this device are > 200 mm. A diagram showing the location of the device antennas can be found in the DUT Antenna Diagram and SAR Test Setup Photographs Appendix. Exact dimensions and separation distances are shown in the Technical Descriptions in the FCC filings.

Table 2-1
Device Edges/Sides for SAR Testing Power Mode 1 Mode

Antenna	Back	Front	Top	Bottom	Right	Left
R	No	No	No	Yes	No	No
L	No	No	No	Yes	No	No

Table 2-2
Device Edges/Sides for SAR Testing Power Mode 2 Mode

Antenna	Back	Front	Top	Bottom	Right	Left
R	Yes	No	Yes	No	No	No
L	Yes	No	Yes	No	No	No

Note: Per FCC KDB Publication 616217 D04v01r01, particular edges were not required to be evaluated for SAR based on the SAR exclusion threshold in KDB 447498 D04v01. Additional edges may have been evaluated for simultaneous transmission analysis.

2.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D04v01, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D04v01 4.3.2 procedures.

Table 2-3
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Power Mode 1	Power Mode 2
1	2.4 GHz WLAN MIMO	Yes	Yes
2	5 GHz WLAN MIMO	Yes	Yes
3	6 GHz WLAN MIMO	Yes	Yes
4	2.4 GHz Bluetooth Beam Forming	Yes	Yes
5	2.4 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
6	2.4 GHz Bluetooth Ant R + 2.4 GHz WLAN Ant L	Yes	Yes
7	5 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
8	6 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
9	2.4 GHz Bluetooth Ant R + 5 GHz WLAN Ant L	Yes	Yes
10	2.4 GHz Bluetooth Ant R + 6 GHz WLAN Ant L	Yes	Yes
11	5 GHz WLAN MIMO + 2.4 GHz Bluetooth Ant R	Yes	Yes
12	6 GHz WLAN MIMO + 2.4 GHz Bluetooth Ant R	Yes	Yes
13	5 GHz WLAN MIMO + 2.4 GHz Bluetooth Ant L	Yes	Yes
14	6 GHz WLAN MIMO + 2.4 GHz Bluetooth Ant L	Yes	Yes
15	2.4 GHz WLAN MIMO + 5 GHz WLAN MIMO	Yes	Yes
16	2.4 GHz WLAN MIMO + 6 GHz WLAN MIMO	Yes	Yes
17	5 GHz WLAN MIMO + 2.4 GHz WLAN Ant R	Yes	Yes
18	6 GHz WLAN MIMO + 2.4 GHz WLAN Ant R	Yes	Yes
19	5 GHz WLAN MIMO + 2.4 GHz WLAN Ant L	Yes	Yes
20	6 GHz WLAN MIMO + 2.4 GHz WLAN Ant L	Yes	Yes
21	2.4 GHz Bluetooth Ant R + 2.4 GHz WLAN Ant L + 5 GHz WLAN Ant L	Yes	Yes
22	2.4 GHz Bluetooth Ant R + 2.4 GHz WLAN Ant L + 6 GHz WLAN Ant L	Yes	Yes
23	2.4 GHz WLAN Ant R + 5 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
24	2.4 GHz WLAN Ant R + 6 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
25	5 GHz WLAN MIMO + 2.4 GHz Bluetooth Ant R + 2.4 GHz WLAN Ant L	Yes	Yes
26	6 GHz WLAN MIMO + 2.4 GHz Bluetooth Ant R + 2.4 GHz WLAN Ant L	Yes	Yes
27	5 GHz WLAN MIMO + 2.4 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
28	6 GHz WLAN MIMO + 2.4 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant L	Yes	Yes
29	2.4 GHz WLAN Ant R + 5 GHz WLAN Ant L	Yes	Yes
30	2.4 GHz WLAN Ant R + 6 GHz WLAN Ant L	Yes	Yes
31	5 GHz WLAN Ant R + 2.4 GHz WLAN Ant L	Yes	Yes
32	6 GHz WLAN Ant R + 2.4 GHz WLAN Ant L	Yes	Yes
33	5 GHz WLAN Ant L + 2.4 GHz Bluetooth Ant L	Yes	Yes
34	6 GHz WLAN Ant L + 2.4 GHz Bluetooth Ant L	Yes	Yes
35	5 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant R	Yes	Yes
36	6 GHz WLAN Ant R + 2.4 GHz Bluetooth Ant R	Yes	Yes
37	2.4 GHz WLAN MIMO + 5 GHz WLAN Ant R	Yes	Yes
38	2.4 GHz WLAN MIMO + 6 GHz WLAN Ant R	Yes	Yes
39	2.4 GHz WLAN MIMO + 5 GHz WLAN Ant L	Yes	Yes
40	2.4 GHz WLAN MIMO + 6 GHz WLAN Ant L	Yes	Yes
41	2.4 GHz WLAN Ant L + 5 GHz WLAN Ant L	Yes	Yes
42	2.4 GHz WLAN Ant L + 6 GHz WLAN Ant L	Yes	Yes
43	2.4 GHz WLAN Ant R + 5 GHz WLAN Ant R	Yes	Yes
44	2.4 GHz WLAN Ant R + 6 GHz WLAN Ant R	Yes	Yes
45	5 GHz WLAN MIMO + 2.4 GHz Bluetooth Beam Forming	Yes	Yes
46	6 GHz WLAN MIMO + 2.4 GHz Bluetooth Beam Forming	Yes	Yes
47	2.4 GHz WLAN Ant R + NFC Reader and/or Wireless Charging NFC	Yes	Yes
48	2.4 GHz WLAN Ant L + NFC Reader and/or Wireless Charging NFC	Yes	Yes
49	2.4 GHz Bluetooth Ant R + NFC Reader and/or Wireless Charging NFC	Yes	Yes
50	2.4 GHz Bluetooth Ant L + NFC Reader and/or Wireless Charging NFC	Yes	Yes
51	5 GHz WLAN Ant R + NFC Reader and/or Wireless Charging NFC	Yes	Yes
52	5 GHz WLAN Ant L + NFC Reader and/or Wireless Charging NFC	Yes	Yes
53	6 GHz WLAN Ant R + NFC Reader and/or Wireless Charging NFC	Yes	Yes
54	6 GHz WLAN Ant L + NFC Reader and/or Wireless Charging NFC	Yes	Yes

1. 2.4 GHz WLAN Antenna R and 2.4 GHz Bluetooth Ant R share the same antenna path and cannot transmit simultaneously.

2. 2.4 GHz WLAN Antenna L and 2.4 GHz Bluetooth Ant L share the same antenna path and cannot transmit simultaneously.
3. 5 GHz WLAN and 6 GHz WLAN share the same antenna path and cannot transmit simultaneously.
4. This device supports 2x2 MIMO Tx for WLAN 802.11b/a/g/n/ac/ax/be. 802.11b/a/g/n/ac/ax/be supports CDD and STBC and 802.11n/ac/ax/be additionally supports SDM.
5. This device supports Bluetooth Tethering.
6. For simultaneous scenarios 1-46, these WLAN simultaneous TX modes can also transmit simultaneously with the NFC Reader and/or Wireless Charging NFC.

2.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

When U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02.

This device supports IEEE 802.11ac with the following features:
a) Up to 160 MHz Bandwidth only
b) No aggregate channel configurations
c) 2 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are supported

This device supports IEEE 802.11ax/be with the following features:
a) Up to 320 MHz Bandwidth only for 6 GHz
b) Up to 160 MHz Bandwidth only for 5 GHz
c) Up to 40 MHz Bandwidth only for 2.4 GHz
d) 2 Tx antenna output
e) Up to 1024 QAM is supported
f) TDWR and Band gap channels are supported for 5/6 GHz
g) MU-MIMO UL Operations are not supported

Per FCC Guidance, 802.11ax/be RU/MRU was considered a higher order 802.11 mode when compared to a/b/g/n/ac/be to apply KDB Publication 248227 D01v02r02 for OFDM mode selection. Therefore, SAR tests were not required for 802.11ax/be RU/MRU based on the maximum allowed output powers of OFDM modes and the reported SAR values. Per FCC Guidance, maximum conducted powers were performed for each RU/MRU size to demonstrate that the output powers would not be higher than the other OFDM 802.11 modes. Please see RU/MRU SAR Exclusion Appendix for 802.11ax/be RU/MRU output powers.

This device supports channel 1-13 for 2.4 GHz WLAN. However, because channel 12/13 targets are not higher than that of channels 1-11, channels 1, 6, and 11 were considered for SAR testing per FCC KDB 248227 D01V02r02.

Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors. FCC KDB 648474 and FCC KDB 248227 were followed for test positions, distances, and modes. Per TCB workshop October 2020 notes, channels were tested to cover the full range. Absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements. Incident power density is evaluated at 2mm ensuring that the resolution is sufficient such that integrated power density (iPD) between d=2mm and d=λ/5mm is ≥ -1dB per equipment manufacturer guidance. Power density results are scaled up for uncertainty above 30%.

2.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D04v01 (Interim General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 616217 D04v01r02
- FCC KDB 648474 D04 (Accessories)
- IEC/IEEE 63195-1:2022
- IEC 62479:2010
- November 2017, October 2018, April 2019, November 2019, October 2020 TCB Workshop Notes (IEEE 802.11ax/be)
- SPEAG DASY6 System Handbook
- SPEAG DASY6 Application Note (Interim Procedures for Devices Operating at 6-10 GHz) (Nov 2021)

2.9 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 10 and Section 11.

2.10 Bibliography

Report Type	Report Serial Number
RF Exposure Part 2 Test Report	1M2503050023-03.C3K
RF Exposure Compliance Summary Report	1M2503050023-04.C3K
RF Exposure Part 0 Test Report	1M2503050023-02.C3K

3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Device Under Test (DUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho dv}\right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

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

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

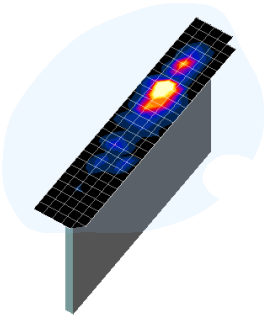

Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*Δz_{zoom}(n-1)	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*Δz_{zoom}(n-1)	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*Δz_{zoom}(n-1)	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*Δz_{zoom}(n-1)	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*Δz_{zoom}(n-1)	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

5 TEST CONFIGURATION POSITIONS

5.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

5.2 SAR Testing per KDB Publication 616217 D04v01r02

Per FCC KDB Publication 616217 D04v01r02, for devices containing a keyboard, SAR is required for the bottom surface and for devices with overall dimensions >200mm, the back surface and edges of the device should be tested for SAR compliance with the device touching the phantom. The SAR Exclusion Threshold in KDB 447498 D04v01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom. Please see the exact antenna locations shown in the Technical Descriptions document.

6 RF EXPOSURE LIMITS

6.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

6.3 RF Exposure Limits for Frequencies Below 6 GHz

Table 6-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

6.4 RF Exposure Limits for Frequencies Above 6 GHz

Per §1.1310 (d)(3), the MPE limits are applied for frequencies above 6 GHz. Power Density is expressed in units of W/m^2 or mW/cm^2.

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

Table 6-2
Human Exposure Limits Specified in FCC 47 CFR §1.1310

Human Exposure to Radiofrequency (RF) Radiation Limits		
Frequency Range [MHz]	**Power Density** [mW/cm^2]	**Average Time** [Minutes]
(A) Limits For Occupational / Controlled Environments		
1,500 – 100,000	5.0	6
(B) Limits For General Population / Uncontrolled Environments		
1,500 – 100,000	1.0	30

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

7 FCC MEASUREMENT PROCEDURES

7.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D04v01, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

7.2 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

7.2.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

7.2.2 U-NII-1 and U-NII-2A

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, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 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, SAR must be considered for these channels. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

7.2.4 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the 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 position 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 802.11 g/n/ax OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.5 OFDM Transmission Mode and SAR Test Channel Selection

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. Per April 2019 TCB Workshop guidance, 802.11ax was considered the highest order 802.11 mode. 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.

7.2.6 Initial Test Configuration Procedure

For OFDM, 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, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted 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 measurements (See Section 7.2.5). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.7 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR

(for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

7.2.8 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D04v01 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is <1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8 RF CONDUCTED POWERS

8.1 WLAN Conducted Powers

Table 8-1
2.4 GHz WLAN Measured PMax Average Power for DSI = 0 Power Mode 1 – Antenna R

2.4GHz WIFI (20MHz 802.11b SISO ANT R)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	22.47
2437	6		22.76
2462	11		22.71
2.4GHz WIFI (20MHz 802.11g SISO ANT R)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	15.73
2417	2		17.77
2422	3		18.98
2427	4		20.38
2437	6		20.42
2457	10		20.38
2462	11		15.34
2.4GHz WIFI (20MHz 802.11n SISO ANT R)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	15.78
2417	2		19.46
2437	6		19.05
2457	10		19.46
2462	11		14.33
2.4GHz WIFI (20MHz 802.11ac SISO ANT R)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.23
2417	2		19.48
2437	6		19.08
2457	10		19.47
2462	11		14.34
2.4GHz WIFI (20MHz 802.11ax SISO ANT R)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.38
2417	2		19.10
2437	6		19.17
2457	10		19.05
2462	11		14.42
2.4GHz WIFI (20MHz 802.11be SISO ANT R)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.38
2417	2		19.12
2437	6		19.17
2457	10		19.03
2462	11		14.40

Table 8-2
2.4 GHz WLAN Measured PMax Average Power for DSI = 0 Power Mode 1 – Antenna L

2.4GHz WIFI (20MHz 802.11b SISO ANT L)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	22.34
2437	6		22.59
2462	11		22.57
2.4GHz WIFI (20MHz 802.11g SISO ANT L)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	15.47
2417	2		17.68
2422	3		18.87
2427	4		19.70
2437	6		20.18
2457	10		19.55
2462	11		15.06
2.4GHz WIFI (20MHz 802.11n SISO ANT L)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.08
2417	2		19.23
2437	6		19.37
2457	10		19.23
2462	11		14.06
2.4GHz WIFI (20MHz 802.11ac SISO ANT L)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.07
2417	2		19.20
2437	6		19.36
2457	10		19.20
2462	11		14.11
2.4GHz WIFI (20MHz 802.11ax SISO ANT L)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.23
2417	2		19.34
2437	6		19.49
2457	10		19.32
2462	11		14.16
2.4GHz WIFI (20MHz 802.11be SISO ANT L)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.23
2417	2		19.34
2437	6		19.42
2457	10		19.34
2462	11		14.14

Table 8-3
2.4 GHz WLAN Measured Plimit Average Power for DSI = 1 Power Mode 2 – Antenna R

2.4GHz WIFI (20MHz 802.11b SISO ANTR)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.68
2437	6		16.83
2462	11		16.80
2.4GHz WIFI (20MHz 802.11g SISO ANTR)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	15.73
2417	2		16.75
2437	6		16.30
2457	10		16.86
2462	11		15.34
2.4GHz WIFI (20MHz 802.11n SISO ANTR)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	15.78
2417	2		16.93
2437	6		16.34
2457	10		17.08
2462	11		14.33
2.4GHz WIFI (20MHz 802.11ac SISO ANTR)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.23
2417	2		16.92
2437	6		16.32
2457	10		17.00
2462	11		14.34
2.4GHz WIFI (20MHz 802.11ax SISO ANTR)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.38
2417	2		17.04
2437	6		16.45
2457	10		17.11
2462	11		14.42
2.4GHz WIFI (20MHz 802.11be SISO ANTR)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.38
2417	2		17.04
2437	6		16.47
2457	10		17.11
2462	11		14.40

Table 8-4
2.4 GHz WLAN Measured Plimit Average Power for DSI = 1 Power Mode 2 – Antenna L

2.4GHz WIFI (20MHz 802.11b SISO ANTL)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.91
2437	6		16.56
2462	11		16.66
2.4GHz WIFI (20MHz 802.11g SISO ANTL)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	15.47
2417	2		16.74
2437	6		16.96
2457	10		16.51
2462	11		15.06
2.4GHz WIFI (20MHz 802.11n SISO ANTL)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.08
2417	2		16.77
2437	6		17.02
2457	10		16.53
2462	11		14.06
2.4GHz WIFI (20MHz 802.11ac SISO ANTL)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.07
2417	2		16.77
2437	6		17.04
2457	10		16.56
2462	11		14.11
2.4GHz WIFI (20MHz 802.11ax SISO ANTL)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.23
2417	2		16.88
2437	6		17.06
2457	10		16.66
2462	11		14.16
2.4GHz WIFI (20MHz 802.11be SISO ANTL)			
Freq. [MHz]	**Channel**	**Detector**	**Conducted Power [dBm]**
2412	1	Average	16.23
2417	2		16.88
2437	6		17.04
2457	10		16.64
2462	11		14.14

Table 8-5
5 GHz WLAN Measured PMax Average Power for DSI = 0 Power Mode 1 – Antenna R

5GHz WIFI (20MHz 802.11a SISO ANT R			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-3	5745	149	15.20
	5785	157	20.50
	5825	165	20.54
5GHz WIFI (20MHz 802.11n SISO ANT R			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	15.53
	5785	157	20.89
	5825	165	21.00
5GHz WIFI (20MHz 802.11ac SISO ANT R			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	15.49
	5785	157	20.81
	5825	165	20.99
5GHz WIFI (20MHz 802.11ax SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	15.46
	5785	157	20.94
	5825	165	21.04
5GHz WIFI (20MHz 802.11be SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	15.48
	5785	157	20.89
	5825	165	20.95

5GHz WIFI (40MHz 802.11n SISO ANT R)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.34
	5230	46	16.78
UNII-2A	5270	54	17.33
	5310	62	13.77
5GHz WIFI (40MHz 802.11ac SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.40
	5230	46	16.76
UNII-2A	5270	54	17.20
	5310	62	13.47
5GHz WIFI (40MHz 802.11ax SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.26
	5230	46	16.74
UNII-2A	5270	54	17.19
	5310	62	13.44
5GHz WIFI (40MHz 802.11be SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.24
	5230	46	16.78
UNII-2A	5270	54	17.22
	5310	62	13.45

5GHz WIFI (80MHz 802.11ac SISO ANT R)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	14.89
	5610	122	17.47
	5690	138	18.17
UNII-4	5885	171	18.03
5GHz WIFI (80MHz 802.11ax SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.74
	5610	122	17.23
	5690	138	18.15
UNII-4	5885	171	18.45
5GHz WIFI (80MHz 802.11be SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.68
	5610	122	17.23
	5690	138	18.29
UNII-4	5885	171	18.47

Table 8-6
5 GHz WLAN Measured PMax Average Power for DSI = 0 Power Mode 1 – Antenna L

5GHz WIFI (20MHz 802.11a SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	15.03
	5785	157	20.50
	5825	165	20.52

5GHz WIFI (20MHz 802.11n SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	14.80
	5785	157	20.13
	5825	165	20.14

5GHz WIFI (20MHz 802.11ac SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	14.82
	5785	157	20.16
	5825	165	20.21

5GHz WIFI (20MHz 802.11ax SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	14.65
	5785	157	20.10
	5825	165	20.09

5GHz WIFI (20MHz 802.11be SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-3	5745	149	14.61
	5785	157	20.07
	5825	165	20.12

5GHz WIFI (40MHz 802.11n SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.56
	5230	46	17.10
UNII-2A	5270	54	17.00
	5310	62	14.00

5GHz WIFI (40MHz 802.11ac SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.44
	5230	46	17.06
UNII-2A	5270	54	17.43
	5310	62	13.95

5GHz WIFI (40MHz 802.11ax SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.45
	5230	46	17.03
UNII-2A	5270	54	17.48
	5310	62	13.94

5GHz WIFI (40MHz 802.11be SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.44
	5230	46	16.94
UNII-2A	5270	54	17.43
	5310	62	13.91

5GHz WIFI (80MHz 802.11ac SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	15.07
	5610	122	17.53
	5690	138	18.33
UNII-4	5885	171	18.04

5GHz WIFI (80MHz 802.11ax SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.90
	5610	122	17.39
	5690	138	18.10
UNII-4	5885	171	17.70

5GHz WIFI (80MHz 802.11be SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.83
	5610	122	17.43
	5690	138	18.13
UNII-4	5885	171	17.71

Table 8-7
5 GHz WLAN Measured Plimit Average Power for DSI = 1 Power Mode 2 – Antenna R

5GHz WIFI (40MHz 802.11n SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.34
	5230	46	15.98
UNII-2A	5270	54	16.11
	5310	62	13.77
5GHz WIFI (40MHz 802.11ac SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.40
	5230	46	15.46
UNII-2A	5270	54	15.72
	5310	62	13.47
5GHz WIFI (40MHz 802.11ax SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.26
	5230	46	15.43
UNII-2A	5270	54	15.69
	5310	62	13.44
5GHz WIFI (40MHz 802.11be SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.24
	5230	46	15.43
UNII-2A	5270	54	15.70
	5310	62	13.45

5GHz WIFI (80MHz 802.11ac SISO ANTR)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.89
	5610	122	16.13
	5690	138	16.41
UNII-3	5775	155	16.41
UNII-4	5885	171	16.21
5GHz WIFI (80MHz 802.11ax SISO ANTR)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.74
	5610	122	16.36
	5690	138	16.49
UNII-3	5775	155	16.03
UNII-4	5885	171	16.55
5GHz WIFI (80MHz 802.11be SISO ANTR)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.68
	5610	122	16.42
	5690	138	16.50
UNII-3	5775	155	16.05
UNII-4	5885	171	16.53

Table 8-8
5 GHz WLAN Measured Plimit Average Power for DSI = 1 Power Mode 2 – Antenna L

5GHz WIFI (40MHz 802.11n SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.56
	5230	46	15.44
UNII-2A	5270	54	15.88
	5310	62	14.00

5GHz WIFI (40MHz 802.11ac SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.44
	5230	46	15.42
UNII-2A	5270	54	15.85
	5310	62	13.95

5GHz WIFI (40MHz 802.11ax SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.45
	5230	46	15.42
UNII-2A	5270	54	15.83
	5310	62	13.94

5GHz WIFI (40MHz 802.11be SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-1	5190	38	14.44
	5230	46	15.42
UNII-2A	5270	54	15.81
	5310	62	13.91

5GHz WIFI (80MHz 802.11ac SISO ANTL)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	15.07
	5610	122	16.38
	5690	138	15.95
UNII-3	5775	155	16.00
UNII-4	5885	171	16.20

5GHz WIFI (80MHz 802.11ax SISO ANTL)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.90
	5610	122	16.36
	5690	138	15.92
UNII-3	5775	155	15.76
UNII-4	5885	171	15.77

5GHz WIFI (80MHz 802.11be SISO ANTL)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-2C	5530	106	14.83
	5610	122	16.36
	5690	138	16.00
UNII-3	5775	155	15.84
UNII-4	5885	171	15.78

Table 8-9
6 GHz WLAN Measured PMax Average Power for DSI = 0 Power Mode 1– Antenna R

6GHz WIFI (320MHz 802.11be SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-5	6105	31	18.67
	6265	63	18.62
UNII-7	6585	127	10.51
UNII-8	6905	191	11.14

Table 8-10
6 GHz WLAN Measured PMax Average Power for DSI = 0 Power Mode 1 – Antenna L

6GHz WIFI (320MHz 802.11be SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-5	6105	31	18.31
	6265	63	18.29
UNII-7	6585	127	10.78
UNII-8	6905	191	11.30

Table 8-11
6 GHz WLAN Measured Plimit Average Power for DSI = 1 Power Mode 2 – Antenna R

6GHz WIFI (320MHz 802.11be SISO ANTR)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-5	6105	31	14.69
	6265	63	14.34
UNII-7	6585	127	10.51
UNII-8	6905	191	11.14

6GHz WIFI (160MHz 802.11ax SISO ANT R)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-7	6665	143	13.64

Table 8-12
6 GHz WLAN Measured Plimit Average Power for DSI = 1 Power Mode 2 – Antenna L

6GHz WIFI (320MHz 802.11be SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-5	6105	31	14.42
	6265	63	14.29
UNII-7	6585	127	10.78
UNII-8	6905	191	11.30

6GHz WIFI (160MHz 802.11ax SISO ANT L)			
Band	**Freq. [MHz]**	**Channel**	**Avg. Conducted Power [dBm]**
UNII-7	6665	143	13.77

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

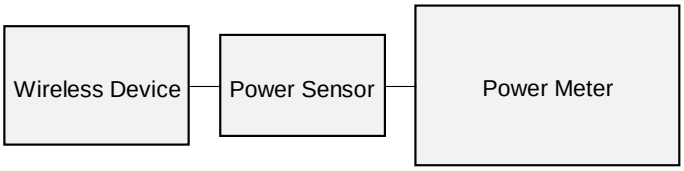

Figure 8-1
Power Measurement Setup

8.2 Bluetooth Conducted Powers

Table 8-13
Bluetooth Maximum Average RF Power for Power Mode A– Antenna R

Frequency [MHz]	Data Rate [Mbps]	Mod.	Power Scheme	Channel No.	Avg Conducted Power	
					[dBm]	[mW]
2402	1.0	GFSK	ePA	0	18.83	76.384
2441	1.0	GFSK	ePA	39	19.39	86.896
2480	1.0	GFSK	ePA	78	18.57	71.945

Table 8-14
Bluetooth Maximum Average RF Power for Power Mode A – Antenna L

Frequency [MHz]	Data Rate [Mbps]	Mod.	Power Scheme	Channel No.	Avg Conducted Power	
					[dBm]	[mW]
2402	1.0	GFSK	ePA	0	18.57	71.945
2441	1.0	GFSK	ePA	39	18.73	74.645
2480	1.0	GFSK	ePA	78	18.62	72.778

Table 8-15
Bluetooth Reduced Average RF Power for Power Mode B – Antenna R

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	1.0	GFSK	0	15.80	38.019
2441	1.0	GFSK	39	16.05	40.272
2480	1.0	GFSK	78	15.78	37.844

Table 8-16
Bluetooth Reduced Average RF Power for Power Mode B – Antenna L

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	1.0	GFSK	0	15.38	34.514
2441	1.0	GFSK	39	15.72	37.325
2480	1.0	GFSK	78	15.32	34.041

Table 8-17
Bluetooth Reduced Average RF Power for Power Mode C – Antenna R

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	1.0	GFSK	0	10.65	11.614
2441	1.0	GFSK	39	11.24	13.305
2480	1.0	GFSK	78	10.59	11.455

Table 8-18
Bluetooth Reduced Average RF Power for Power Mode C – Antenna L

Frequency [MHz]	Data Rate [Mbps]	Mod.	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	1.0	GFSK	0	10.04	10.093
2441	1.0	GFSK	39	10.38	10.914
2480	1.0	GFSK	78	10.31	10.740

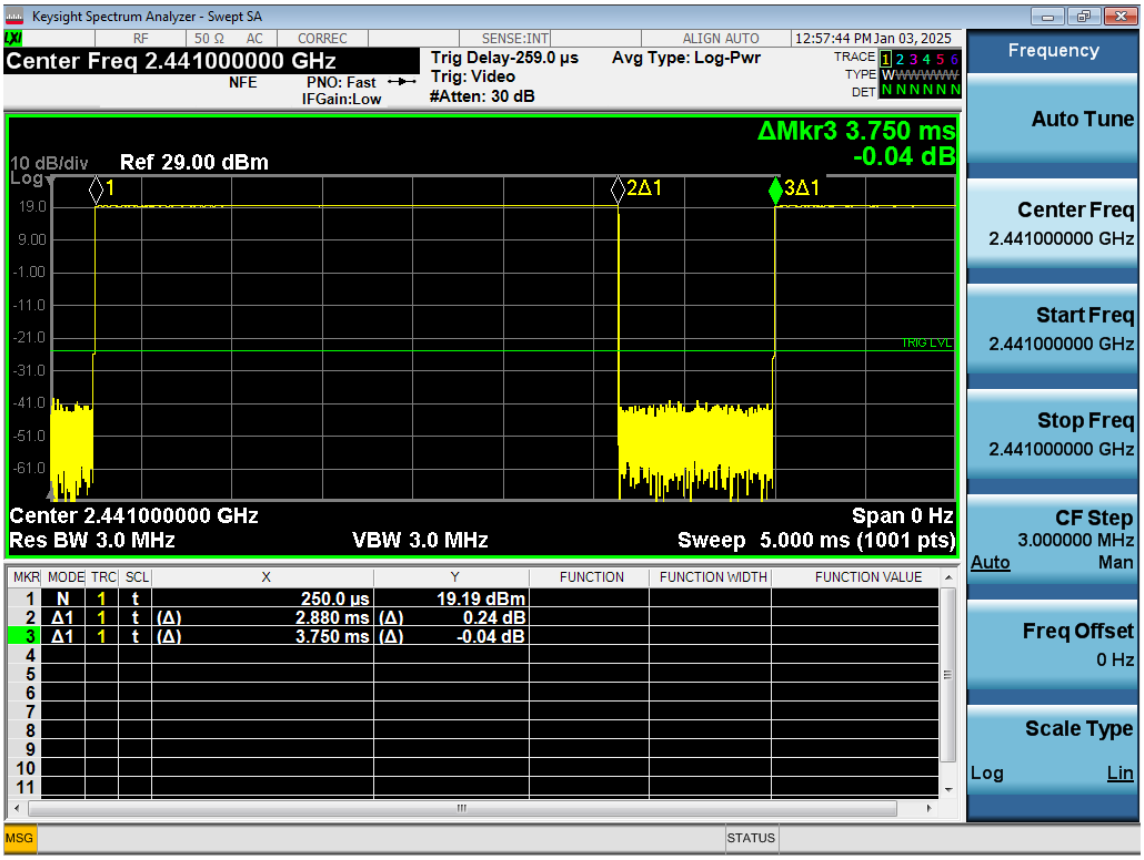

Figure 8-2
Bluetooth Transmission Plot – Antenna R

Equation 8-1
Bluetooth Antenna R Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.88ms}{3.75ms} * 100\% = 76.8\%$$

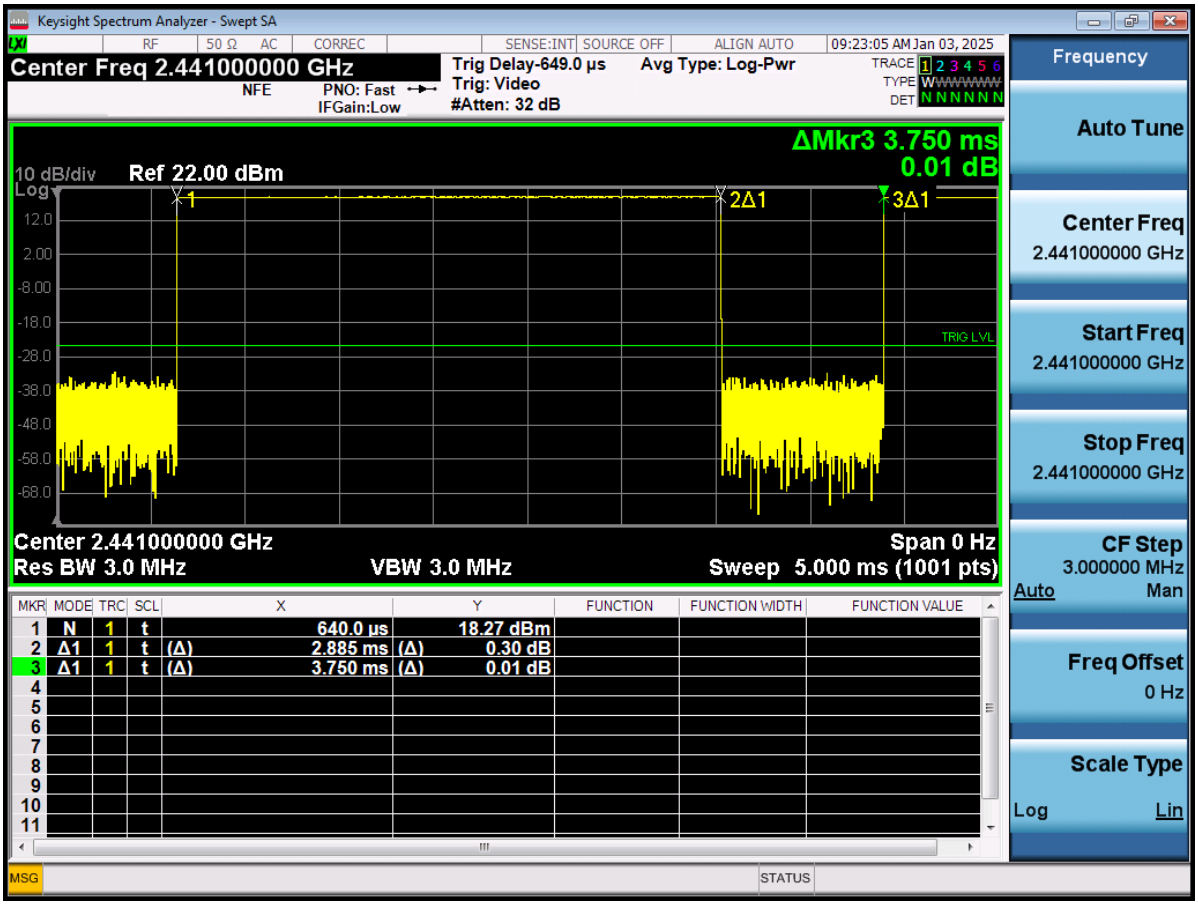

Figure 8-3
Bluetooth Transmission Plot – Antenna L

Equation 8-2
Bluetooth Antenna L Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.885ms}{3.75ms} * 100\% = 76.93\%$$

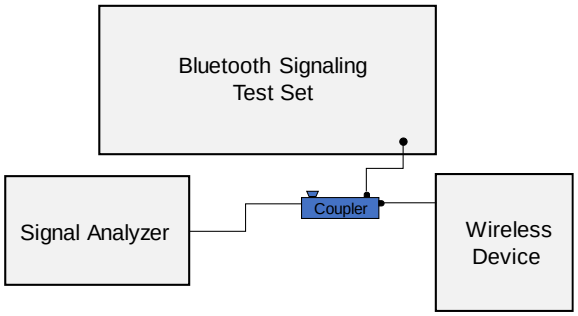

Figure 8-4
Power Measurement Setup

9 SYSTEM VERIFICATION

9.1 Tissue Verification

Table 9-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
01/08/2025	2450 Head	21.6	2300	1.713	39.169	1.670	39.500	2.57%	-0.84%
			2310	1.720	39.149	1.679	39.480	2.44%	-0.84%
			2320	1.727	39.127	1.687	39.460	2.37%	-0.84%
			2400	1.784	39.010	1.756	39.289	1.59%	-0.71%
			2450	1.822	38.917	1.800	39.200	1.22%	-0.72%
			2480	1.844	38.874	1.833	39.162	0.60%	-0.74%
			2500	1.858	38.837	1.855	39.136	0.16%	-0.76%
			2510	1.866	38.818	1.866	39.123	0.00%	-0.78%
			2535	1.885	38.776	1.893	39.092	-0.42%	-0.81%
			2550	1.897	38.760	1.909	39.073	-0.63%	-0.80%
			2560	1.905	38.751	1.920	39.060	-0.78%	-0.79%
			2600	1.935	38.689	1.964	39.009	-1.48%	-0.82%
			2650	1.975	38.596	2.018	38.945	-2.13%	-0.90%
			2680	1.998	38.565	2.051	38.907	-2.58%	-0.88%
			2700	2.013	38.530	2.073	38.882	-2.89%	-0.91%
01/20/2025	2450 Head	22.3	2300	1.722	38.901	1.670	39.500	3.11%	-1.52%
			2310	1.730	38.882	1.679	39.480	3.04%	-1.51%
			2320	1.737	38.864	1.687	39.460	2.96%	-1.51%
			2400	1.796	38.752	1.756	39.289	2.28%	-1.37%
			2450	1.836	38.663	1.800	39.200	2.00%	-1.37%
			2480	1.858	38.618	1.833	39.162	1.36%	-1.39%
			2500	1.871	38.572	1.855	39.136	0.86%	-1.44%
			2510	1.879	38.550	1.866	39.123	0.70%	-1.46%
			2535	1.899	38.505	1.893	39.092	0.32%	-1.50%
			2550	1.912	38.488	1.909	39.073	0.16%	-1.50%
			2560	1.920	38.478	1.920	39.060	0.00%	-1.49%
			2600	1.950	38.409	1.964	39.009	-0.71%	-1.54%
			2650	1.989	38.323	2.018	38.945	-1.44%	-1.60%
			2680	2.013	38.284	2.051	38.907	-1.85%	-1.60%
			2700	2.028	38.248	2.073	38.882	-2.17%	-1.63%
02/03/2025	2450 Head	20.4	2300	1.729	38.690	1.670	39.500	3.53%	-2.05%
			2310	1.737	38.668	1.679	39.480	3.45%	-2.06%
			2320	1.745	38.647	1.687	39.460	3.44%	-2.06%
			2400	1.807	38.509	1.756	39.289	2.90%	-1.99%
			2450	1.846	38.418	1.800	39.200	2.56%	-1.99%
			2480	1.870	38.359	1.833	39.162	2.02%	-2.05%
			2500	1.887	38.321	1.855	39.136	1.73%	-2.08%
			2510	1.895	38.303	1.866	39.123	1.55%	-2.10%
			2535	1.915	38.262	1.893	39.092	1.16%	-2.12%
			2550	1.928	38.237	1.909	39.073	1.00%	-2.14%
			2560	1.936	38.218	1.920	39.060	0.83%	-2.16%
			2600	1.968	38.149	1.964	39.009	0.20%	-2.20%
			2650	2.011	38.055	2.018	38.945	-0.35%	-2.29%
			2680	2.036	38.006	2.051	38.907	-0.73%	-2.32%
			2700	2.052	37.968	2.073	38.882	-1.01%	-2.35%
01/07/2025	5200-5800 Head	19.0	5150	4.457	37.614	4.608	36.050	-3.28%	4.34%
			5160	4.467	37.613	4.618	36.040	-3.27%	4.36%
			5170	4.476	37.600	4.629	36.030	-3.31%	4.36%
			5180	4.486	37.574	4.635	36.009	-3.21%	4.35%
			5190	4.497	37.543	4.645	35.998	-3.19%	4.29%
			5200	4.507	37.523	4.655	35.986	-3.18%	4.27%
			5210	4.520	37.498	4.666	35.975	-3.13%	4.23%
			5220	4.533	37.478	4.676	35.963	-3.06%	4.21%
			5240	4.560	37.445	4.696	35.940	-2.90%	4.19%
			5250	4.571	37.430	4.706	35.929	-2.87%	4.18%
			5260	4.579	37.417	4.717	35.917	-2.93%	4.18%
			5270	4.587	37.406	4.727	35.906	-2.96%	4.18%
			5280	4.596	37.397	4.737	35.894	-2.98%	4.19%
			5290	4.606	37.369	4.748	35.883	-2.99%	4.14%
			5300	4.618	37.341	4.758	35.871	-2.94%	4.10%
			5310	4.629	37.318	4.768	35.860	-2.92%	4.07%
			5320	4.643	37.298	4.778	35.849	-2.83%	4.04%
			5500	4.844	37.014	4.963	35.643	-2.40%	3.85%
			5510	4.857	36.980	4.973	35.632	-2.33%	3.78%
			5520	4.869	36.951	4.983	35.620	-2.29%	3.74%
			5530	4.883	36.930	4.994	35.609	-2.22%	3.71%
			5540	4.897	36.926	5.004	35.597	-2.14%	3.73%
			5550	4.912	36.923	5.014	35.586	-2.03%	3.76%
			5560	4.925	36.907	5.024	35.574	-1.97%	3.75%
			5580	4.938	36.873	5.045	35.551	-2.12%	3.72%
			5600	4.957	36.831	5.065	35.529	-2.13%	3.66%
			5610	4.972	36.799	5.076	35.518	-2.05%	3.61%
			5620	4.987	36.778	5.086	35.506	-1.95%	3.59%
			5640	5.015	36.756	5.106	35.483	-1.78%	3.59%
			5660	5.041	36.724	5.127	35.460	-1.68%	3.56%
			5670	5.051	36.720	5.137	35.449	-1.67%	3.59%
			5680	5.060	36.709	5.147	35.437	-1.69%	3.59%
			5690	5.069	36.683	5.158	35.426	-1.73%	3.55%
			5700	5.081	36.644	5.168	35.414	-1.68%	3.47%
			5710	5.095	36.614	5.178	35.403	-1.60%	3.42%
			5720	5.108	36.600	5.188	35.391	-1.54%	3.42%
			5745	5.141	36.576	5.214	35.363	-1.40%	3.43%
			5750	5.147	36.566	5.219	35.357	-1.38%	3.42%
			5755	5.152	36.559	5.224	35.351	-1.38%	3.42%
			5765	5.162	36.556	5.234	35.340	-1.38%	3.44%
			5775	5.171	36.546	5.245	35.329	-1.41%	3.44%
			5785	5.181	36.525	5.255	35.317	-1.41%	3.42%
			5795	5.192	36.501	5.265	35.305	-1.39%	3.39%
			5805	5.207	36.476	5.275	35.294	-1.29%	3.35%
			5825	5.235	36.449	5.296	35.271	-1.15%	3.34%
			5835	5.248	36.425	5.305	35.230	-1.07%	3.39%
			5845	5.258	36.411	5.315	35.210	-1.07%	3.41%
			5850	5.264	36.403	5.320	35.200	-1.05%	3.42%
			5855	5.269	36.395	5.325	35.197	-1.05%	3.40%
			5875	5.289	36.363	5.347	35.183	-1.08%	3.35%
			5885	5.300	36.340	5.357	35.177	-1.06%	3.31%
			5905	5.327	36.305	5.379	35.163	-0.97%	3.25%

Table 9-2
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
01/13/2025	5200-5800 Head	19.5	5150	4.446	35.902	4.608	36.050	-3.52%	-0.41%
			5160	4.459	35.892	4.618	36.040	-3.44%	-0.41%
			5170	4.469	35.889	4.629	36.030	-3.46%	-0.39%
			5180	4.477	35.883	4.635	36.009	-3.41%	-0.35%
			5190	4.484	35.866	4.645	35.998	-3.47%	-0.37%
			5200	4.492	35.834	4.655	35.986	-3.50%	-0.42%
			5210	4.503	35.813	4.666	35.975	-3.49%	-0.45%
			5220	4.519	35.788	4.676	35.963	-3.36%	-0.49%
			5240	4.554	35.739	4.696	35.940	-3.02%	-0.56%
			5250	4.570	35.721	4.706	35.929	-2.89%	-0.58%
			5260	4.577	35.715	4.717	35.917	-2.97%	-0.56%
			5270	4.579	35.707	4.727	35.906	-3.13%	-0.55%
			5280	4.583	35.699	4.737	35.894	-3.25%	-0.54%
			5290	4.593	35.689	4.748	35.883	-3.26%	-0.54%
			5300	4.607	35.663	4.758	35.871	-3.17%	-0.58%
			5310	4.620	35.629	4.768	35.860	-3.10%	-0.64%
			5320	4.633	35.591	4.778	35.849	-3.03%	-0.72%
			5500	4.831	35.260	4.963	35.643	-2.66%	-1.07%
			5510	4.845	35.238	4.973	35.632	-2.57%	-1.11%
			5520	4.859	35.224	4.983	35.620	-2.49%	-1.11%
			5530	4.873	35.222	4.994	35.609	-2.42%	-1.09%
			5540	4.884	35.217	5.004	35.597	-2.40%	-1.07%
			5550	4.894	35.202	5.014	35.586	-2.39%	-1.08%
			5560	4.903	35.179	5.024	35.574	-2.41%	-1.11%
			5580	4.927	35.118	5.045	35.551	-2.34%	-1.22%
			5600	4.952	35.066	5.065	35.529	-2.23%	-1.30%
			5610	4.965	35.054	5.076	35.518	-2.19%	-1.31%
			5620	4.979	35.039	5.086	35.506	-2.10%	-1.32%
			5640	5.006	35.028	5.106	35.483	-1.96%	-1.28%
			5660	5.018	34.988	5.127	35.460	-2.13%	-1.33%
			5670	5.028	34.954	5.137	35.449	-2.12%	-1.40%
			5680	5.043	34.931	5.147	35.437	-2.02%	-1.43%
			5690	5.058	34.914	5.158	35.426	-1.94%	-1.45%
			5700	5.074	34.894	5.168	35.414	-1.82%	-1.47%
			5710	5.086	34.877	5.178	35.403	-1.78%	-1.49%
			5720	5.100	34.864	5.188	35.391	-1.70%	-1.49%
			5745	5.120	34.843	5.214	35.363	-1.80%	-1.47%
			5750	5.124	34.829	5.219	35.357	-1.82%	-1.49%
			5755	5.128	34.816	5.224	35.351	-1.84%	-1.51%
			5765	5.139	34.790	5.234	35.340	-1.82%	-1.56%
			5775	5.154	34.760	5.245	35.329	-1.73%	-1.61%
			5785	5.167	34.735	5.255	35.317	-1.67%	-1.65%
			5795	5.182	34.717	5.265	35.305	-1.58%	-1.67%
			5805	5.196	34.703	5.275	35.294	-1.50%	-1.67%
			5825	5.215	34.693	5.296	35.271	-1.53%	-1.64%
			5835	5.221	34.680	5.305	35.230	-1.58%	-1.56%
			5845	5.231	34.657	5.315	35.210	-1.58%	-1.57%
			5850	5.236	34.647	5.320	35.200	-1.58%	-1.57%
			5855	5.241	34.631	5.325	35.197	-1.58%	-1.61%
			5875	5.266	34.579	5.347	35.183	-1.51%	-1.72%
			5885	5.278	34.565	5.357	35.177	-1.47%	-1.74%
			5905	5.309	34.533	5.379	35.163	-1.30%	-1.79%
01/13/2025	6000 Head	20.0	5935	5.191	35.967	5.411	35.143	-4.07%	2.34%
			5970	5.218	35.776	5.448	35.120	-4.22%	1.87%
			5985	5.258	35.734	5.464	35.110	-3.77%	1.78%
			6000	5.283	35.733	5.480	35.100	-3.59%	1.80%
			6025	5.257	35.633	5.510	35.070	-4.59%	1.61%
			6065	5.327	35.481	5.557	35.022	-4.14%	1.31%
			6075	5.357	35.471	5.569	35.010	-3.81%	1.32%
			6085	5.386	35.473	5.580	34.998	-3.48%	1.36%
			6185	5.507	35.388	5.698	34.878	-3.35%	1.46%
			6275	5.610	35.236	5.805	34.770	-3.36%	1.34%
			6285	5.622	35.248	5.816	34.758	-3.34%	1.41%
			6305	5.647	35.258	5.840	34.734	-3.30%	1.51%
			6345	5.674	35.134	5.887	34.686	-3.62%	1.29%
			6475	5.849	34.888	6.041	34.530	-3.18%	1.04%
			6485	5.862	34.887	6.052	34.518	-3.14%	1.07%
			6500	5.867	34.916	6.070	34.500	-3.34%	1.21%
			6505	5.872	34.919	6.076	34.494	-3.36%	1.23%
			6545	5.917	34.752	6.122	34.446	-3.35%	0.89%
			6665	6.095	34.529	6.265	34.302	-2.71%	0.66%
			6675	6.095	34.548	6.273	34.290	-2.84%	0.75%
			6685	6.100	34.595	6.285	34.278	-2.94%	0.92%
			6715	6.121	34.488	6.319	34.242	-3.13%	0.72%
			6785	6.214	34.458	6.400	34.158	-2.91%	0.88%
			6825	6.202	34.230	6.447	34.110	-3.80%	0.35%
			6985	6.427	33.990	6.633	33.918	-3.11%	0.21%
			6995	6.415	33.953	6.644	33.906	-3.45%	0.14%
			7000	6.400	33.920	6.650	33.900	-3.76%	0.06%
			7005	6.386	33.895	6.656	33.894	-4.06%	0.00%
			7025	6.394	33.805	6.680	33.870	-4.28%	-0.19%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2. The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

9.2 Test System Verification

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in the SAR System Validation Appendix.

Table 9-3
System Verification Results

System Verification TARGET & MEASURED																				
SAR System	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp. (C)	Liquid Temp. (C)	Input Power (W)	Source SN	Probe SN	DAE	Measured SAR 1g (W/kg)	1W Target SAR 1g (W/kg)	1W Normalized SAR 1g (W/kg)	Deviation 1g (%)	Measured SAR 10g (W/kg)	1W Target SAR 10g (W/kg)	1W Normalized SAR 10g (W/kg)	Deviation 10g (%)	Measured 4cm2 APD (W/m2)	1W Target 4cm2 APD (W/m2)	1W Normalized 4cm2 APD (W/m2)	Deviation 4cm2 APD (%)
J	2450	HEAD	01/08/2025	22.7	21.6	0.10	797	7406	1677	4.94	52.00	49.40	5.00%	2.33	24.40	23.30	-4.51%	N/A	N/A	N/A	N/A
J	2450	HEAD	01/20/2025	22.3	22.3	0.10	981	7406	1677	5.02	51.80	50.20	-3.09%	2.34	24.30	23.40	-3.70%	N/A	N/A	N/A	N/A
O	2450	HEAD	02/03/2025	21.1	19.5	0.10	719	3914	728	5.26	52.20	52.60	0.77%	2.44	24.60	24.40	-0.81%	N/A	N/A	N/A	N/A
S	5250	HEAD	01/07/2025	19.0	19.0	0.05	1191	7803	1583	3.72	78.90	74.40	-5.70%	1.07	22.70	21.40	-5.73%	N/A	N/A	N/A	N/A
S	5250	HEAD	01/13/2025	19.1	19.4	0.05	1191	7803	1583	3.73	78.90	74.60	-5.45%	1.08	22.70	21.60	-4.85%	N/A	N/A	N/A	N/A
S	5600	HEAD	01/07/2025	19.0	19.0	0.05	1191	7803	1583	3.87	83.00	77.40	-6.75%	1.11	23.90	22.20	-7.11%	N/A	N/A	N/A	N/A
S	5600	HEAD	01/13/2025	19.1	19.4	0.05	1191	7803	1583	4.04	83.00	80.80	-2.65%	1.17	23.90	23.40	-2.09%	N/A	N/A	N/A	N/A
S	5750	HEAD	01/07/2025	19.0	19.0	0.05	1191	7803	1583	3.67	78.90	73.40	-6.97%	1.07	22.40	21.40	-4.46%	N/A	N/A	N/A	N/A
S	5750	HEAD	01/13/2025	19.1	19.4	0.05	1191	7803	1583	3.93	78.90	78.60	-0.38%	1.14	22.40	22.80	1.79%	N/A	N/A	N/A	N/A
S	5850	HEAD	01/07/2025	19.0	19.0	0.05	1191	7803	1583	3.80	78.80	76.00	-3.55%	1.09	22.50	21.80	-3.11%	N/A	N/A	N/A	N/A
S	5850	HEAD	01/13/2025	19.1	19.4	0.05	1191	7803	1583	3.84	78.80	76.80	-2.54%	1.11	22.50	22.20	-1.33%	N/A	N/A	N/A	N/A
R	6500	HEAD	01/13/2025	19.0	19.0	0.03	1111	7527	1272	7.60	291.00	304.00	4.47%	1.40	53.50	56.00	4.67%	33.80	1300.00	1352.00	4.00%

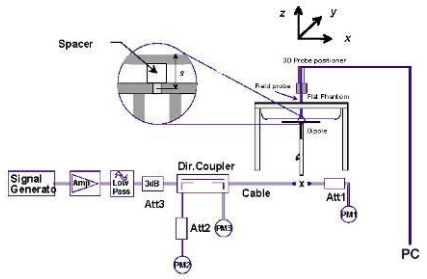

Figure 9-1
System Verification Setup Diagram

Figure 9-2
System Verification Setup Photo

9.3 Power Density Test System Verification

The system was verified to be within ±0.66 dB of the power density targets on the calibration certificate according to the test system specification in the user's manual and calibration facility recommendation. The 0.66 dB deviation threshold represents the expanded uncertainty for system performance checks using SPEAG's mmWave verification sources. The same spatial resolution and measurement region used in the source calibration was applied during the system check.

The measured power density distribution of verification source was also confirmed through visual inspection to have no noticeable differences, both spatially (shape) and numerically (level) from the distribution provided by the manufacturer, per November 2017 TCBC Workshop Notes.

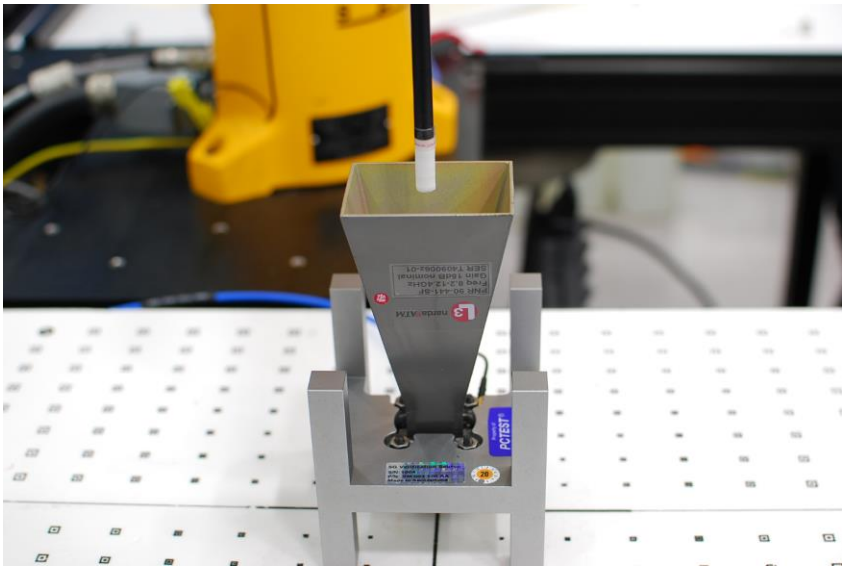

Figure 9-3
System Verification Setup Photo

Table 9-4
10 GHz Verifications

System	Frequency (GHz)	Date	Source S/N	Probe S/N	Prad (mW)	Normal psPD (W/m² over 4 cm²)		Deviation (dB)	Total psPD (W/m² over 4 cm²)		Deviation (dB)
						Measured	Target		Measured	Target	
Q	10	01/13/2025	1002	9622	93.3	58.20	54.60	0.28	58.40	54.90	0.27
Q	10	02/18/2025	1002	9622	93.3	52.50	54.60	-0.17	53.00	54.90	-0.15

Note: A **10 mm distance spacing** was used from the reference horn antenna aperture to the probe element.

10 SAR DATA SUMMARY

10.1 2.4 GHz WLAN SISO Standalone SAR

Table 10-1
2.4 GHz WLAN Antenna R - Power Mode 1

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	4CQ24	97.84	0.04	2437.00	6	1	23.0	22.76	Back	25	0.015	1.057	1.022	0.016	0.010		40.9	34.3
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	4CQ24	97.84	-0.04	2437.00	6	1	23.0	22.76	Top	25	0.068	1.057	1.022	0.073	0.046		34.3	
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	4CQ24	97.84	0.02	2437.00	6	1	23.0	22.76	Bottom	0	0.000	1.057	1.022	0.000	0.000		62.6	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 10-2
2.4 GHz WLAN Antenna L - Power Mode 1| Plot A1

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	L	4CQ24	97.91	0.08	2437.00	6	1	23.0	22.59	Back	25	0.014	1.099	1.021	0.016	0.010		41.0	33.7
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	L	4CQ24	97.91	-0.05	2437.00	6	1	23.0	22.59	Top	25	0.075	1.099	1.021	0.084	0.053		33.7	
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	L	4CQ24	97.91	0.01	2437.00	6	1	23.0	22.59	Bottom	0	0.012	1.099	1.021	0.013	0.008	Plot	41.7	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 10-3
2.4 GHz WLAN Antenna R - Power Mode 2| Plot A2

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	N/A	4CQ24	97.84	0.04	2437.00	6	1	17.25	16.83	Back	0	0.063	1.102	1.022	0.071	0.044		28.70	18.4
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	N/A	4CQ24	97.84	0.01	2412.00	1	1	17.25	16.68	Top	0	0.453	1.140	1.022	0.528	0.330		20.00	
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	N/A	4CQ24	97.84	0.02	2437.00	6	1	17.25	16.83	Top	0	0.561	1.102	1.022	0.632	0.395		19.20	
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	N/A	4CQ24	97.84	0.07	2462.00	11	1	17.25	16.80	Top	0	0.673	1.109	1.022	0.763	0.477	Plot	18.40	
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	R	Keyboard	4CQ24	97.84	0.06	2462.00	11	1	17.25	16.80	Top	0	0.628	1.109	1.022	0.712	0.445		18.70	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 10-4
2.4 GHz WLAN Antenna L - Power Mode 2

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	L	N/A	4CT24	97.91	0.03	2412.00	1	1	17.25	16.91	Back	0	0.061	1.081	1.021	0.067	0.042		28.9	18.7
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	L	N/A	4CT24	97.91	0.00	2412.00	1	1	17.25	16.91	Top	0	0.638	1.081	1.021	0.704	0.440		18.7	
Body	2.4 GHz WiFi/ IEEE 802.11b	22	DSSS	L	Keyboard	4CT24	97.91	-0.02	2412.00	1	1	17.25	16.91	Top	0	0.614	1.081	1.021	0.678	0.424		18.9	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

10.2 5 GHz WLAN Standalone SAR

Table 10-5
5 GHz WLAN Antenna R - Power Mode 1

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	U-NII band	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	5 GHz WiFi/ IEEE 802.11n	40	OFDM	R	4CQ24	99.41	0.03	5270.00	54	U-NII-2A	13.5	18.0	17.33	Back	25	0.024	1.167	1.006	0.028	0.018		33.5	29.8
Body	5 GHz WiFi/ IEEE 802.11ac	80	OFDM	R	4CQ24	99.12	0.04	5690.00	138	U-NII-2C	29.3	19.0	18.17	Back	25	0.022	1.211	1.009	0.027	0.017		34.7	
Body	5 GHz WiFi/ IEEE 802.11a	20	OFDM	R	4CQ24	99.15	0.04	5825.00	165	U-NII-3	6	21.5	20.54	Back	25	0.069	1.247	1.009	0.087	0.054		32.1	
Body	5 GHz WiFi/ IEEE 802.11ac	80	OFDM	R	4CQ24	99.12	0.04	5855.00	171	U-NII-4	29.3	19.0	18.03	Back	25	0.027	1.250	1.009	0.034	0.021		33.6	
Body	5 GHz WiFi/ IEEE 802.11n	40	OFDM	R	4CQ24	99.41	0.01	5270.00	54	U-NII-2A	13.5	18.0	17.33	Top	25	0.056	1.167	1.006	0.066	0.041		29.8	
Body	5 GHz WiFi/ IEEE 802.11ac	80	OFDM	R	4CQ24	99.12	0.09	5690.00	138	U-NII-2C	29.3	19.0	18.17	Top	25	0.043	1.211	1.009	0.053	0.033		31.7	
Body	5 GHz WiFi/ IEEE 802.11a	20	OFDM	R	4CQ24	99.15	0.07	5825.00	165	U-NII-3	6	21.5	20.54	Top	25	0.092	1.247	1.009	0.116	0.073		30.8	
Body	5 GHz WiFi/ IEEE 802.11ac	80	OFDM	R	4CQ24	99.12	0.01	5855.00	171	U-NII-4	29.3	19.0	18.03	Top	25	0.052	1.250	1.009	0.066	0.041		30.8	
Body	5 GHz WiFi/ IEEE 802.11n	40	OFDM	R	4CQ24	99.41	0.01	5270.00	54	U-NII-2A	13.5	18.0	17.33	Bottom	0	0.000	1.167	1.006	0.000	0.000		57.3	
Body	5 GHz WiFi/ IEEE 802.11ac	80	OFDM	R	4CQ24	99.12	0.06	5690.00	138	U-NII-2C	29.3	19.0	18.17	Bottom	0	0.000	1.211	1.009	0.000	0.000		58.1	
Body	5 GHz WiFi/ IEEE 802.11a	20	OFDM	R	4CQ24	99.15	0.02	5825.00	165	U-NII-3	6	21.5	20.54	Bottom	0	0.000	1.247	1.009	0.000	0.000		60.5	
Body	5 GHz WiFi/ IEEE 802.11ac	80	OFDM	R	4CQ24	99.12	0.07	5855.00	171	U-NII-4	29.3	19.0	18.03	Bottom	0	0.000	1.250	1.009	0.000	0.000		57.9	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 10-6
5 GHz WLAN Antenna L - Power Mode 1| Plot A3

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	U-NII band	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	L	4CQ24	99.48	0.06	5270.00	54	U-NII-2A	13.5	18.0	17.00	Back	25	0.015	1.259	1.005	0.019	0.012		35.2	27.4
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	4CQ24	99.04	0.01	5690.00	138	U-NII-2C	29.3	19.0	18.33	Back	25	0.025	1.167	1.010	0.029	0.018		34.3	
Body	5 GHz WIFI/ IEEE 802.11a	20	OFDM	L	4CQ24	98.96	0.04	5825.00	165	U-NII-3	6	21.5	20.52	Back	25	0.043	1.253	1.011	0.054	0.034		34.1	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	4CQ24	99.04	0.01	5855.00	171	U-NII-4	29.3	19.0	18.04	Back	25	0.027	1.247	1.010	0.034	0.021		33.6	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	L	4CQ24	99.48	-0.09	5270.00	54	U-NII-2A	13.5	18.0	17.00	Top	25	0.080	1.259	1.005	0.101	0.063		27.9	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	4CQ24	99.04	0.06	5690.00	138	U-NII-2C	29.3	19.0	18.33	Top	25	0.095	1.167	1.010	0.112	0.070		28.5	
Body	5 GHz WIFI/ IEEE 802.11a	20	OFDM	L	4CQ24	98.96	0.09	5825.00	165	U-NII-3	6	21.5	20.52	Top	25	0.202	1.253	1.011	0.256	0.160		27.4	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	4CQ24	99.04	0.02	5855.00	171	U-NII-4	29.3	19.0	18.04	Top	25	0.103	1.247	1.010	0.130	0.081		27.8	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	L	4CQ24	99.48	0.02	5270.00	54	U-NII-2A	13.5	18.0	17.00	Bottom	0	0.006	1.259	1.005	0.008	0.005		39.1	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	4CQ24	99.04	0.05	5690.00	138	U-NII-2C	29.3	19.0	18.33	Bottom	0	0.005	1.167	1.010	0.006	0.004		41.2	
Body	5 GHz WIFI/ IEEE 802.11a	20	OFDM	L	4CQ24	98.96	0.04	5825.00	165	U-NII-3	6	21.5	20.52	Bottom	0	0.015	1.253	1.011	0.019	0.012	Plot	38.7	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	4CQ24	99.04	0.06	5855.00	171	U-NII-4	29.3	19.0	18.04	Bottom	0	0.004	1.247	1.010	0.005	0.003		41.9	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 10-7
5 GHz WLAN Antenna R - Power Mode 2

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	U-NII band	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	R	N/A	4CQ24	99.41	-0.19	5270.00	54	U-NII-2A	13.5	16.5	16.11	Back	0	0.417	1.094	1.006	0.459	0.287		19.8	16.9
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	N/A	4CQ24	99.12	0.12	5690.00	138	U-NII-2C	29.3	16.5	16.41	Back	0	0.541	1.021	1.009	0.557	0.348		19.0	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	N/A	4CQ24	99.12	-0.02	5775.00	155	U-NII-3	29.3	16.75	16.41	Back	0	0.747	1.081	1.009	0.815	0.509		17.6	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	N/A	4CQ24	99.12	-0.06	5855.00	171	U-NII-4	29.3	17.0	16.21	Back	0	0.503	1.199	1.009	0.609	0.381		19.1	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	R	N/A	4CQ24	99.41	-0.05	5270.00	54	U-NII-2A	13.5	16.5	16.11	Top	0	0.698	1.094	1.006	0.768	0.480		17.6	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	N/A	4CQ24	99.12	0.20	5690.00	138	U-NII-2C	29.3	16.5	16.41	Top	0	0.668	1.021	1.009	0.688	0.430		18.1	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	N/A	4CQ24	99.12	0.07	5775.00	155	U-NII-3	29.3	16.75	16.41	Top	0	0.713	1.081	1.009	0.778	0.486		17.8	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	N/A	4CQ24	99.12	0.03	5855.00	171	U-NII-4	29.3	17.0	16.21	Top	0	0.820	1.199	1.009	0.992	0.620		17.0	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	R	Keyboard	4CW24	99.12	0.17	5855.00	171	U-NII-4	29.3	17.0	16.21	Top	0	0.836	1.199	1.009	1.011	0.632		16.9	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 10-8
5 GHz WLAN Antenna L - Power Mode 2| Plot A4

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	U-NII band	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	L	N/A	4CQ24	99.48	0.13	5270.00	54	U-NII-2A	13.5	16.5	15.88	Back	0	0.148	1.153	1.005	0.171	0.107		24.1	16.6
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	0.17	5610.00	122	U-NII-2C	29.3	16.5	16.38	Back	0	0.424	1.028	1.010	0.440	0.275		20.0	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	0.08	5775.00	155	U-NII-3	29.3	16.75	16.00	Back	0	0.420	1.189	1.010	0.504	0.315		19.7	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	-0.05	5855.00	171	U-NII-4	29.3	17.0	16.20	Back	0	0.486	1.202	1.010	0.590	0.369		19.2	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	L	N/A	4CQ24	99.48	-0.15	5270.00	54	U-NII-2A	13.5	16.5	15.88	Top	0	0.675	1.153	1.005	0.782	0.489		17.5	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	0.01	5610.00	122	U-NII-2C	29.3	16.5	16.38	Top	0	0.685	1.028	1.010	0.711	0.444		17.9	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	-0.15	5775.00	155	U-NII-3	29.3	16.75	16.00	Top	0	0.837	1.189	1.010	1.005	0.628		16.7	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	0.08	5775.00	155	U-NII-3	29.3	16.75	16.00	Top	0	0.877	1.189	1.010	0.927	0.567		17.3	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	0.03	5855.00	171	U-NII-4	29.3	17.0	16.20	Top	0	0.890	1.202	1.010	1.080	0.675	Plot	16.6	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	N/A	4CQ24	99.04	-0.02	5855.00	171	U-NII-4	29.3	17.0	16.20	Top	0	0.856	1.202	1.010	1.039	0.649		16.8	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	L	Keyboard	4CQ24	99.04	0.04	5855.00	171	U-NII-4	29.3	17.0	16.20	Top	0	0.831	1.202	1.010	1.009	0.631		16.9	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Note: Blue entry represents variability measurement

10.3 6 GHz Standalone SAR

Table 10-9
6 GHz WLAN Antenna R - Power Mode 1

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.05	6105.00	31	144.1	19.0	18.67	Back	25	0.029	1.079	1.022	0.032	0.020		33.9	30.3
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.03	6105.00	31	144.1	19.0	18.67	Top	25	0.067	1.079	1.022	0.074	0.046		30.3	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.05	6105.00	31	144.1	19.0	18.67	Bottom	0	0.000	1.079	1.022	0.000	0.000		58.5	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.03	6105.00	31	144.1	19.0	18.67	Right	25	0.040	1.079	1.022	0.044	0.028		32.5	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	WF324	97.84	0.03	6105.00	31	144.1	19.0	18.67	Left	0	0.007	1.079	1.022	0.008	0.005		40.1	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram									

Exposure	Band/ Mode	Bandwidth [MHz]	Service/ Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured APD [W/m² (4cm²)]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported APD [W/m² (4cm²)]	APD Exposure Ratio	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.05	6105.00	31	144.1	19.0	18.67	Back	25	0.271	1.079	1.022	0.299	0.015		35.2	31.7
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.03	6105.00	31	144.1	19.0	18.67	Top	25	0.605	1.079	1.022	0.667	0.033		31.7	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.05	6105.00	31	144.1	19.0	18.67	Bottom	0	0.003	1.079	1.022	0.003	0.000		54.8	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	4CP24	97.84	0.03	6105.00	31	144.1	19.0	18.67	Right	25	0.371	1.079	1.022	0.409	0.020		33.8	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	WF324	97.84	0.03	6105.00	31	144.1	19.0	18.67	Left	0	0.086	1.079	1.022	0.095	0.005		40.2	

Table 10-10
6 GHz WLAN Antenna L - Power Mode 1| Plot A5

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	4CP24	97.51	0.03	6105.00	31	144.1	19.0	18.31	Back	25	0.021	1.172	1.026	0.025	0.016		34.9	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	4CP24	97.51	0.08	6105.00	31	144.1	19.0	18.31	Top	25	0.077	1.172	1.026	0.093	0.058		29.3	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	4CP24	97.51	0.01	6105.00	31	144.1	19.0	18.31	Bottom	0	0.007	1.172	1.026	0.008	0.005	Plot	39.7	29.3
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	WF324	97.51	0.08	6105.00	31	144.1	19.0	18.31	Right	0	0.000	1.172	1.026	0.000	0.000		58.2	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	WF324	97.51	0.01	6105.00	31	144.1	19.0	18.31	Left	0	0.070	1.172	1.026	0.084	0.053		29.7	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram									

Exposure	Band/ Mode	Bandwidth [MHz]	Service/ Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured APD [W/m² (4cm²)]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported APD [W/m² (4cm²)]	APD Exposure Ratio	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	4CP24	97.51	0.03	6105.00	31	144.1	19.0	18.31	Back	25	0.179	1.172	1.026	0.215	0.011		36.6	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	4CP24	97.51	0.08	6105.00	31	144.1	19.0	18.31	Top	25	0.726	1.172	1.026	0.873	0.044		30.5	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	4CP24	97.51	0.01	6105.00	31	144.1	19.0	18.31	Bottom	0	0.046	1.172	1.026	0.055	0.003		42.5	30.5
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	WF324	97.51	0.08	6105.00	31	144.1	19.0	18.31	Right	0	0.000	1.172	1.026	0.000	0.000		69.2	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	WF324	97.51	0.01	6105.00	31	144.1	19.0	18.31	Left	0	0.613	1.172	1.026	0.737	0.037		31.3	

Table 10-11
6 GHz WLAN Antenna R - Power Mode 2| Plot A6

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.04	6105.00	31	144.1	15.0	14.69	Back	0	0.168	1.074	1.022	0.184	0.115		22.3	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	R	Keyboard	4CP24	99.46	-0.03	6665.00	143	72.1	14.5	13.64	Top	0	0.543	1.219	1.005	0.665	0.416		16.2	
Body	6 GHz WIFI/ IEEE 802.11be	160	OFDM	R	N/A	4CP24	99.46	0.04	6665.00	143	72.1	14.5	13.64	Top	0	0.703	1.219	1.005	0.861	0.538		15.1	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.09	6105.00	31	144.1	15.0	14.69	Top	0	0.714	1.074	1.022	0.784	0.490	Plot	16.0	14.4
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	-0.06	6265.00	63	144.1	15.0	14.34	Top	0	0.656	1.164	1.022	0.780	0.488		16.0	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.06	6585.00	127	144.1	11.5	10.51	Top	0	0.305	1.256	1.022	0.392	0.245		15.5	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.03	6905.00	191	144.1	12.0	11.14	Top	0	0.460	1.219	1.022	0.573	0.358		14.4	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	WF324	97.84	0.01	6105.00	31	144.1	19.0	18.67	Right	0	0.248	1.079	1.022	0.273	0.171		26.6	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Exposure	Band/ Mode	Bandwidth [MHz]	Service/ Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured APD [W/m² (4cm²)]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported APD [W/m² (4cm²)]	APD Exposure Ratio	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.04	6105.00	31	144.1	15.0	14.69	Back	0	0.843	1.074	1.022	0.925	0.046		26.3	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	R	Keyboard	4CP24	99.46	-0.03	6665.00	143	72.1	14.5	13.64	Top	0	3.450	1.219	1.005	4.227	0.211		19.2	
Body	6 GHz WIFI/ IEEE 802.11be	160	OFDM	R	N/A	4CP24	99.46	0.04	6665.00	143	72.1	14.5	13.64	Top	0	4.270	1.219	1.005	5.231	0.262		18.3	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.09	6105.00	31	144.1	15.0	14.69	Top	0	4.360	1.074	1.022	4.786	0.239		19.2	17.3
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	-0.06	6265.00	63	144.1	15.0	14.34	Top	0	4.040	1.164	1.022	4.806	0.240		19.1	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.06	6585.00	127	144.1	11.5	10.51	Top	0	1.890	1.256	1.022	2.426	0.121		18.6	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	4CP24	97.84	0.03	6905.00	191	144.1	12.0	11.14	Top	0	2.920	1.219	1.022	3.638	0.182		17.3	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	R	N/A	WF324	97.84	0.01	6105.00	31	136.1	19.0	18.67	Right	0	2.110	1.079	1.022	2.327	0.116		26.3	

Table 10-12
6 GHz WLAN Antenna L - Power Mode 2

Exposure	Band / Mode	Bandwidth [MHz]	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.05	6105.00	31	144.1	15.0	14.42	Back	0	0.265	1.143	1.026	0.311	0.194		20.0	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	L	N/A	4CP24	99.50	-0.14	6665.00	143	72.1	14.5	13.77	Top	0	0.546	1.183	1.005	0.649	0.406		16.3	
Body	6 GHz WIFI/ IEEE 802.11be	160	OFDM	L	Keyboard	4CP24	99.50	-0.21	6665.00	143	72.1	14.5	13.77	Top	0	0.501	1.183	1.005	0.596	0.373		16.7	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.08	6105.00	31	144.1	15.0	14.42	Top	0	0.373	1.143	1.026	0.437	0.273		18.5	15.9
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.03	6265.00	63	144.1	15.0	14.29	Top	0	0.340	1.178	1.026	0.411	0.257		18.8	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.01	6585.00	127	144.1	11.5	10.78	Top	0	0.194	1.180	1.026	0.235	0.147		17.7	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.06	6905.00	191	144.1	12.0	11.30	Top	0	0.336	1.175	1.026	0.405	0.253		15.9	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram									

Exposure	Band/ Mode	Bandwidth [MHz]	Service/ Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured APD [W/m² (4cm²)]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported APD [W/m² (4cm²)]	APD Exposure Ratio	Plot #	Plimit [dBm]	Overall Plimit [dBm]
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.05	6105.00	31	144.1	15.0	14.42	Back	0	1.470	1.143	1.026	1.724	0.086		23.6	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	L	N/A	4CP24	99.50	-0.14	6665.00	143	72.1	14.5	13.77	Top	0	3.120	1.183	1.005	3.709	0.185		19.8	
Body	6 GHz WIFI/ IEEE 802.11be	160	OFDM	L	Keyboard	4CP24	99.50	-0.21	6665.00	143	72.1	14.5	13.77	Top	0	2.980	1.183	1.005	3.543	0.177		20.0	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.08	6105.00	31	144.1	15.0	14.42	Top	0	2.380	1.143	1.026	2.791	0.140		21.5	19.1
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.03	6265.00	63	144.1	15.0	14.29	Top	0	1.930	1.178	1.026	2.333	0.117		22.3	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.01	6585.00	127	144.1	11.5	10.78	Top	0	1.060	1.180	1.026	1.283	0.064		21.4	
Body	6 GHz WIFI/ IEEE 802.11be	320	OFDM	L	N/A	4CP24	97.51	0.06	6905.00	191	136.1	12.0	11.30	Top	0	2.020	1.175	1.026	2.435	0.122		19.1	

10.4 Bluetooth SISO Standalone SAR

Table 10-13
Bluetooth Ant R - Power Mode A

Exposure	Band / Mode	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #
Body	2.4 GHz Bluetooth	FHSS	R	4CQ24	76.80	0.05	2441.00	39	1	20.5	19.39	Back	25	0.004	1.291	1.016	0.005	0.003	
Body	2.4 GHz Bluetooth	FHSS	R	4CQ24	76.80	0.11	2441.00	39	1	20.5	19.39	Top	25	0.022	1.291	1.016	0.029	0.018	
Body	2.4 GHz Bluetooth	FHSS	R	4CQ24	76.80	0.04	2441.00	39	1	20.5	19.39	Bottom	0	0.000	1.291	1.016	0.000	0.000	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-14
Bluetooth Antenna L - Power Mode A| Plot A7

Exposure	Band / Mode	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #
Body	2.4 GHz Bluetooth	FHSS	L	4CQ24	76.93	0.02	2441.00	39	1	20.5	18.73	Back	25	0.003	1.503	1.014	0.005	0.003	
Body	2.4 GHz Bluetooth	FHSS	L	4CQ24	76.93	0.02	2441.00	39	1	20.5	18.73	Top	25	0.024	1.503	1.014	0.037	0.023	
Body	2.4 GHz Bluetooth	FHSS	L	4CQ24	76.93	0.07	2441.00	39	1	20.5	18.73	Bottom	0	0.000	1.503	1.014	0.000	0.000	Plot
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-15
Bluetooth Reduced Antenna R - Power Mode C

Exposure	Band / Mode	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #
Body	2.4 GHz Bluetooth	FHSS	R	4CP24	76.80	0.05	2441.00	39	1	12.0	11.24	Back	0	0.011	1.191	1.016	0.013	0.008	
Body	2.4 GHz Bluetooth	FHSS	R	4CP24	76.80	0.04	2441.00	39	1	12.0	11.24	Top	0	0.122	1.191	1.016	0.148	0.093	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-16
Bluetooth Reduced Antenna L - Power Mode C

Exposure	Band / Mode	Service / Modulation	Ant.	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #
Body	2.4 GHz Bluetooth	FHSS	L	4CP24	76.93	0.02	2441.00	39	1	12.0	10.38	Back	0	0.010	1.452	1.014	0.015	0.009	
Body	2.4 GHz Bluetooth	FHSS	L	4CP24	76.93	0.01	2441.00	39	1	12.0	10.38	Top	0	0.125	1.452	1.014	0.184	0.115	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-17
Bluetooth Reduced Antenna R - Power Mode B

Exposure	Band / Mode	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #
Body	2.4 GHz Bluetooth	FHSS	R	N/A	4CP24	76.80	0.02	2441.00	39	1	17.25	16.05	Back	0	0.041	1.318	1.016	0.055	0.034	
Body	2.4 GHz Bluetooth	FHSS	R	N/A	4CP24	76.80	0.01	2441.00	39	1	17.25	16.05	Top	0	0.470	1.318	1.016	0.629	0.393	
Body	2.4 GHz Bluetooth	FHSS	R	Keyboard	4CP24	76.80	-0.13	2441.00	39	1	17.25	16.05	Top	0	0.492	1.318	1.016	0.659	0.412	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-18
Bluetooth Reduced Antenna L - Power Mode B| Plot A8

Exposure	Band / Mode	Service / Modulation	Ant.	Accessory	Serial Number	Duty Cycle [%]	Power Drift [dB]	Frequency [MHz]	Channel #	Data Rate [Mbps]	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Exposure Ratio (1g SAR)	Plot #
Body	2.4 GHz Bluetooth	FHSS	L	N/A	4CP24	76.93	0.11	2441.00	39	1	17.25	15.72	Back	0	0.049	1.422	1.014	0.071	0.044	
Body	2.4 GHz Bluetooth	FHSS	L	N/A	4CP24	76.93	-0.02	2402.00	0	1	17.25	15.38	Top	0	0.345	1.538	1.014	0.538	0.336	
Body	2.4 GHz Bluetooth	FHSS	L	N/A	4CP24	76.93	0.02	2441.00	39	1	17.25	15.72	Top	0	0.445	1.422	1.014	0.642	0.401	
Body	2.4 GHz Bluetooth	FHSS	L	N/A	4CP24	76.93	0.01	2480.00	78	1	17.25	15.32	Top	0	0.558	1.560	1.014	0.883	0.552	Plot
Body	2.4 GHz Bluetooth	FHSS	L	Keyboard	4CP24	76.93	0.07	2480.00	78	1	17.25	15.32	Top	0	0.450	1.560	1.014	0.712	0.445	
ANSI/IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population													Body 1.6 W/kg (mW/g) averaged over 1 gram							

10.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, FCC KDB Publication 447498 D04v01, and FCC KDB Publication 616217 D04v01r02.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D04v01.
6. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 12 for variability analysis.
7. This device uses Qualcomm FastConnect TAS for WLAN operations to control and manage transmitting power in real time to ensure RF Exposure compliance. Per FCC Guidance, compliance was assessed at the minimum of the time averaged power and the maximum output power for each band/mode/exposure condition (DSI).
8. Per October 2020 TCB Workshop notes, absorbed power density (APD) using a 4cm2 averaging area is reported based on SAR measurements.
9. FCC KDB Publication 616217 D04v01r02 Section 4.3, SAR tests are required for the back surface and edges of device with the device touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D04v01 was applied to determine SAR test exclusion for adjacent edge configurations.
10. Per FCC KDB 616217 D04, SAR is evaluated for the bottom surface of a keyboard when it is attached to the DUT in Power Mode 1 configuration.
11. Per FCC Guidance, SAR tests are required for the back surface and edges of the device with the device 25mm away from the phantom when the motion sensor is not active. The SAR Exclusion Threshold in FCC KDB 447498 D04v01 was applied to determine SAR test exclusion for adjacent edge configurations.
12. Per FCC KDB 648474 D04, highest reported SAR Power Mode 2 configuration for a transmission band on an antenna was additionally evaluated with keyboard accessory attached and folded back at 360°
13. The orange highlights throughout the report represent the highest scaled SAR per Equipment Class.

WLAN Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n/ax/be) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.2.4 for more information.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. 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 1.2 W/kg for 1g evaluations. See Section 7.2.5 for more information.
3. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D04v01 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see the Multi-Tx and Antenna SAR Considerations Appendix for complete analysis.
4. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance.

6. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors. Per October 2020 TCB Workshop notes, channels were tested to cover the entire range.
7. For some edges for 6 GHz SAR testing, testing was done at a more conservative distance and power level and no further evaluation is necessary

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 78% transmission duty factor for Bluetooth Antenna R and 78% transmission duty factor for Bluetooth Antenna L to determine compliance. See RF Conducted Power Section for the time domain plot and calculation for the duty factor of the device.

11 POWER DENSITY DATA SUMMARY

11.1 6 GHz WIFI Power Density Results

Table 11-1
6 GHz WLAN - Power Mode 1 | Plot A9

MEASUREMENT RESULTS																							
Frequency (MHz)	Channel	Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Power Drift (dB)	Spacing (mm)	Antenna Config.	DUT Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Grid Step (λ)	iPD (W/m²)	Scaling Factor for Measurement Uncertainty per IEC 62479	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Normal psPD (W/m²)	Scaled Normal psPD (W/m²)	Total psPD (W/m²)	Scaled Total psPD (W/m²)	Plot
6105.00	31	802.11be	OFDM	320	19.00	18.67	0.15	25	R	WF324	144.11	Back	97.84	0.125	-	1.554	1.079	1.022	0.441	0.756	0.453	0.776	
6105.00	31	802.11be	OFDM	320	19.00	18.67	0.09	25	R	WF324	144.11	Top	97.84	0.125	-	1.554	1.079	1.022	1.200	2.056	1.250	2.142	
6105.00	31	802.11be	OFDM	320	19.00	18.67	0.12	2	R	WF324	144.11	Bottom	97.84	0.125	-	1.554	1.079	1.022	0.213	0.365	0.234	0.401	
6105.00	31	802.11ax	OFDM	320	19.00	18.67	0.13	25	R	WF324	144.11	Right	97.84	0.125	-	1.554	1.079	1.022	2.920	5.004	2.950	5.055	Plot
6105.00	31	802.11be	OFDM	320	19.00	18.67	0.18	25	R	WF324	144.11	Left	97.84	0.125	-	1.554	1.079	1.022	1.330	2.279	1.350	2.313	
6105.00	31	802.11be	OFDM	320	19.00	18.31	-0.13	25	L	WF324	144.11	Back	97.51	0.125	-	1.554	1.172	1.026	0.351	0.656	0.395	0.738	
6105.00	31	802.11be	OFDM	320	19.00	18.31	0.12	25	L	WF324	144.11	Top	97.51	0.125	-	1.554	1.172	1.026	0.780	1.458	0.824	1.540	
6105.00	31	802.11be	OFDM	320	19.00	18.31	0.12	2	L	WF324	144.11	Bottom	97.51	0.125	-	1.554	1.172	1.026	0.082	0.153	0.090	0.168	
6105.00	31	802.11be	OFDM	320	19.00	18.67	-0.12	25	L	WF324	144.11	Right	97.51	0.125	-	1.554	1.079	1.026	2.270	3.905	2.350	4.043	
6105.00	31	802.11be	OFDM	320	19.00	18.67	0.13	25	L	WF324	144.11	Left	97.51	0.125	-	1.554	1.079	1.026	2.400	4.129	2.490	4.284	
47 CFR §1.1310 - SAFETY LIMIT Spatial Average Uncontrolled Exposure / General Population																	Power Density 10 W/m² averaged over 4 cm²						

Table 11-2
6 GHz WLAN - Power Mode 2 | Plot A10

MEASUREMENT RESULTS																							
Frequency (MHz)	Channel	Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Power Drift (dB)	Spacing (mm)	Antenna Config.	DUT Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Grid Step (λ)	iPD (W/m²)	Scaling Factor for Measurement Uncertainty per IEC 62479	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Normal psPD (W/m²)	Scaled Normal psPD (W/m²)	Total psPD (W/m²)	Scaled Total psPD (W/m²)	Plot #
6105.00	31	802.11be	OFDM	320	15.00	14.69	0.11	2	R	WF324	144.11	Back	97.84	0.125	-	1.554	1.074	1.022	0.785	1.339	0.993	1.694	
6105.00	31	802.11be	OFDM	320	15.00	14.69	-0.03	2	R	WF324	144.11	Top	97.84	0.125	-	1.554	1.074	1.022	3.160	5.390	4.080	6.959	Plot
6105.00	31	802.11be	OFDM	320	15.00	14.69	-0.05	2	R	WF324	144.11	Top	97.84	0.125	-	1.554	1.074	1.022	3.060	5.219	3.750	6.396	
6265.00	63	802.11be	OFDM	320	15.00	14.34	0.05	2	R	WF324	144.11	Top	97.84	0.125	-	1.554	1.164	1.022	2.300	4.252	2.960	5.472	
6585.00	127	802.11be	OFDM	320	11.50	10.51	-0.16	2	R	WF324	144.11	Top	97.84	0.125	-	1.554	1.256	1.022	1.470	2.932	1.650	3.291	
6665.00	143	802.11be	OFDM	160	14.50	13.64	-0.17	2	R	WF324	72.05	Top	99.50	0.125	-	1.554	1.219	1.005	2.170	4.131	2.600	4.950	
6905.00	191	802.11be	OFDM	320	12.00	11.14	-0.04	2	R	WF324	144.11	Top	97.84	0.125	-	1.554	1.219	1.022	1.500	2.904	1.930	3.736	
6105.00	31	802.11be	OFDM	320	15.00	14.69	0.16	2	R	WF324	144.11	Right	97.84	0.125	-	1.554	1.074	1.022	3.920	6.686	4.050	6.908	
6105.00	31	802.11be	OFDM	320	15.00	14.69	0.12	2	R	WF324	144.11	Left	97.84	0.125	-	1.554	1.074	1.022	1.470	2.507	1.500	2.559	
6105.00	31	802.11be	OFDM	320	15.00	14.42	0.13	2	L	WF324	144.11	Back	97.51	0.125	-	1.554	1.143	1.026	0.305	0.556	0.311	0.567	
6105.00	31	802.11be	OFDM	320	15.00	14.42	0.13	2	L	WF324	144.11	Top	97.51	0.125	-	1.554	1.143	1.026	3.350	6.105	3.870	7.053	
6105.00	31	802.11be	OFDM	320	15.00	14.42	-0.12	2	L	WF324	144.11	Top	97.51	0.125	-	1.554	1.143	1.026	3.830	6.980	3.920	7.144	
6265.00	63	802.11be	OFDM	320	15.00	14.29	0.12	2	L	WF324	144.11	Top	97.51	0.125	1.530	1.554	1.178	1.026	1.500	2.817	1.970	3.700	
6265.00	63	802.11be	OFDM	320	15.00	14.29	-0.15	9.57	L	WF324	144.11	Top	97.51	0.125	0.944	1.554	1.178	1.026	0.526	0.988	0.636	1.195	
6585.00	127	802.11be	OFDM	320	11.50	10.78	-0.13	2	L	WF324	144.11	Top	97.51	0.125	-	1.554	1.180	1.026	0.620	1.166	0.834	1.569	
6665.00	143	802.11be	OFDM	160	14.50	13.77	41.90	2	L	WF324	72.05	Top	99.46	0.125	-	1.554	1.183	1.005	1.640	3.030	1.930	3.566	
6905.00	191	802.11be	OFDM	320	12.00	11.30	-0.12	2	L	WF324	144.11	Top	97.51	0.125	-	1.554	1.175	1.026	0.601	1.126	0.992	1.858	
6905.00	191	802.11be	OFDM	320	15.00	14.42	0.14	2	L	WF324	144.11	Right	97.51	0.125	-	1.554	1.143	1.026	3.420	6.233	3.430	6.251	
6905.00	191	802.11be	OFDM	320	15.00	14.42	0.12	2	L	WF324	144.11	Left	97.51	0.125	-	1.554	1.143	1.026	2.020	3.681	2.060	3.754	
47 CFR §1.1310 - SAFETY LIMIT Spatial Average Uncontrolled Exposure / General Population																	Power Density 10 W/m² averaged over 4 cm²						

Power Density General Notes

1. The manufacturer has confirmed that the devices tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
2. Batteries are fully charged at the beginning of the measurements. The DUT was connected to a wall charger for some measurements due to the test duration. It was confirmed that the charger plugged into this DUT did not impact the near-field PD test results.
3. Power density was calculated by repeated E-field measurements on two measurement planes separated by λ/4.
4. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools.
5. Per FCC guidance and equipment manufacturer guidance, power density results were scaled according to IEC 62479:2010 for the portion of the measurement uncertainty > 30%. Total expanded uncertainty of 2.68 dB (85.4%) was used to determine the psPD measurement scaling factor.
6. Per equipment manufacturer guidance, power density was measured at d=2mm and d=λ/5mm using the same grid size and grid step size for some frequencies and surfaces. The integrated Power Density (iPD) was calculated based on these measurements. Since iPD ratio between the two distances is ≥ -1dB, the grid step was sufficient for determining compliance at d=2mm.
7. PTP-PR algorithm was used during psPD measurement and calculations.
8. PD results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D04.
9. Per October 2020 TCB Workshop notes, channels were tested to cover the entire range.

12 SAR MEASUREMENT VARIABILITY

12.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 12-1

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Side	Spacing	Antenna Config	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
5750	5775.00	155	5 GHz WIFI/IEEE 802.11ac, 80 MHz Bandwidth	OFDM	Top	0	L	0.837	0.732	1.14	N/A	N/A	N/A	N/A
5850	5855.00	171	5 GHz WIFI/IEEE 802.11ac, 80 MHz Bandwidth	OFDM	Top	0	L	0.890	0.856	1.04	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram						

12.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

13 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4404B	Spectrum Analyzer	N/A	N/A	N/A	MY45113242
Agilent	E4438C	ESG Vector Signal Generator	10/23/2024	Annual	10/23/2025	MY45093852
Agilent	E4438C	ESG Vector Signal Generator	3/25/2024	Annual	3/25/2025	MY47270002
Agilent	N5182A	MXG Vector Signal Generator	7/9/2024	Annual	7/9/2025	MY48180366
Agilent	N5182A	MXG Vector Signal Generator	3/7/2024	Annual	3/7/2025	MY47420603
Agilent	8753ES	S-Parameter Vector Network Analyzer	9/25/2024	Annual	9/25/2025	MY40003841
Agilent	8753ES	S-Parameter Vector Network Analyzer	9/25/2024	Annual	9/25/2025	US39170118
Agilent	E5515C	Wireless Communications Test Set	CBT	N/A	CBT	GB46310798
Agilent	E5515C	Wireless Communications Test Set	CBT	N/A	CBT	US41140256
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433973
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
Anritsu	ML2496A	Power Meter	7/15/2024	Annual	7/15/2025	1138001
Anritsu	ML2496A	Power Meter	6/24/2024	Annual	6/24/2025	1840005
Anritsu	MA2411B	Pulse Power Sensor	9/5/2024	Annual	9/5/2025	1726262
Anritsu	MA2411B	Pulse Power Sensor	10/21/2024	Annual	10/21/2025	1027293
Anritsu	MA24106A	USB Power Sensor	7/10/2024	Annual	7/10/2025	1827530
Anritsu	MA24106A	USB Power Sensor	4/15/2024	Annual	4/15/2025	1827528
Mini-Circuits	PWR-4GHS	USB Power Sensor	6/12/2024	Annual	6/12/2025	12001070013
Control Company	4052	Long Stem Thermometer	2/27/2024	Biennial	2/27/2026	240174346
Control Company	4052	Long Stem Thermometer	2/27/2024	Biennial	2/27/2026	240171096
Control Company	4052	Long Stem Thermometer	2/27/2024	Biennial	2/27/2026	240171059
Control Company	4040	Therm./ Clock/ Humidity Monitor	4/15/2024	Biennial	4/15/2026	240310280
Control Company	4040	Therm./ Clock/ Humidity Monitor	4/15/2024	Biennial	4/15/2026	240310282
Control Company	S66279	Therm./ Clock/ Humidity Monitor	2/16/2024	Biennial	2/16/2026	240140051
Mitutoyo	500-196-30	CD-6"ASX 6Inch Digital Caliper	2/16/2022	Triennial	2/16/2025	A20238413
Keysight Technologies	N9020A	MXA Signal Analyzer	7/8/2024	Annual	7/8/2025	MY48010233
Agilent	N9020A	MXA Signal Analyzer	6/14/2024	Annual	6/14/2025	MY56470202
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	7/10/2024	Annual	7/10/2025	31634
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	ZUDC10-83-S+	Directional Coupler	CBT	N/A	CBT	2050
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Seekonk	NC-100	Torque Wrench	CBT	N/A	CBT	22217
Seekonk	NC-100	Torque Wrench	4/2/2024	Biennial	4/2/2026	1262
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/5/2024	Annual	11/5/2025	1277
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/7/2024	Annual	8/7/2025	1041
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1237
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1331
SPEAG	MAIA	Modulation and Audio Interference Analyzer	N/A	N/A	N/A	1390
SPEAG	DAK-12	Dielectric Assessment Kit (4MHz - 3GHz)	3/11/2024	Annual	3/11/2025	1102
SPEAG	D2450V2	2450 MHz SAR Dipole	11/15/2022	Biennial	3/21/2025	797
SPEAG	D2450V2	2450 MHz SAR Dipole	11/7/2024	Annual	11/7/2025	981
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/17/2024	Annual	1/17/2025	1191
SPEAG	D6.5GHzV2	6 GHz SAR Dipole	2/22/2024	Annual	2/22/2025	1111
SPEAG	5G Verification Source 10GHz	10GHz System Verification Antenna	3/5/2024	Annual	3/5/2025	1002
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2024	Annual	5/8/2025	728
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/8/2024	Annual	7/8/2025	1677
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/12/2024	Annual	3/12/2025	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/8/2024	Annual	7/8/2025	1583
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/10/2024	Annual	9/10/2025	1449
SPEAG	EX3DV4	SAR Probe	5/10/2024	Annual	5/10/2025	3914
SPEAG	EX3DV4	SAR Probe	6/28/2024	Annual	6/28/2025	7803
SPEAG	EX3DV4	SAR Probe	7/5/2024	Annual	7/5/2025	7406
SPEAG	EX3DV4	SAR Probe	3/8/2024	Annual	3/8/2025	7527
SPEAG	EUmmWV4	EUmmWV4 Probe	2/2/2024	Annual	2/2/2025	9622

Note: 1) All equipment was used solely within its respective calibration period. 2) CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

14 MEASUREMENT UNCERTAINTIES

Applicable for SAR Measurements < 6 GHz:

				f(d,k)			c x f/e	c x g/e	
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c_i 1gm	c_i 10 gms	1gm u_i (± %)	10gms u_i (± %)	v_i
Measurement System									
Probe Calibration	E.2.1	7	N	1	1	1	7.0	7.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.73	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.73	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.73	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.73	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.73	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.73	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E.3.4	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)			RSS				12.2	12.0	191
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				24.4	24.0	

The above measurement uncertainties are according to IEEE Std. 1528-2013

Applicable for SAR Measurements > 6 GHz:

Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	f(d,k) Div.	c_i 1gm	c_i 10 gms	c x f/e 1gm u_i (± %)	c x g/e 10gms u_i (± %)	v_i
Measurement System									
Probe Calibration	E.2.1	9.3	N	1	1	1	9.3	9.3	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E.2.3	2	R	1.73	1	1	1.2	1.2	∞
Linearity	E.2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E.2.4	0.25	R	1.73	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.73	1	1	2.8	2.8	∞
Readout Electronics	E.2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	R	1.73	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.73	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.73	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.73	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.73	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E.4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E.2.9	5	R	1.73	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.73	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E.3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E.3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E.3.4	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E.3.4	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)			RSS				13.8	13.6	191
Expanded Uncertainty (95% CONFIDENCE LEVEL)			k=2				27.6	27.1	

The above measurement uncertainties are according to IEEE Std. 1528-2013

Applicable for Power Density Measurements:

a	b	c	d	e	f = c x f/e	g
Uncertainty Component	Unc. (± dB)	Prob. Dist.	Div.	c_i	u_i (± dB)	v_i
Measurement System						
Calibration	0.49	N	1	1	0.49	∞
Probe Correction	0.00	R	1.73	1	0.00	∞
Frequency Response	0.20	R	1.73	1	0.12	∞
Sensor Cross Coupling	0.00	R	1.73	1	0.00	∞
Isotropy	0.50	R	1.73	1	0.29	∞
Linearity	0.20	R	1.73	1	0.12	∞
Probe Scattering	0.00	R	1.73	1	0.00	∞
Probe Positioning offset	0.30	R	1.73	1	0.17	∞
Probe Positioning Repeatability	0.04	R	1.73	1	0.02	∞
Sensor MechanicalOffset	0.00	R	1.73	1	0.00	∞
Probe Spatial Resolution	0.00	R	1.73	1	0.00	∞
Field Impedence Dependance	0.00	R	1.73	1	0.00	∞
Amplitude and Phase Drift	0.00	R	1.73	1	0.00	∞
Amplitude and Phase Noise	0.04	R	1.73	1	0.02	∞
Measurement Area Truncation	0.00	R	1.73	1	0.00	∞
Data Acquisition	0.03	N	1	1	0.03	∞
Sampling	0.00	R	1.73	1	0.00	∞
Field Reconstruction	2.00	R	1.73	1	1.15	∞
Forward Transformation	0.00	R	1.73	1	0.00	∞
Power Density Scaling	0.00	R	1.73	1	0.00	∞
Spatial Averaging	0.10	R	1.73	1	0.06	∞
System Detection Limit	0.04	R	1.73	1	0.02	∞
Test Sample Related						
Probe Coupling with DUT	0.00	R	1.73	1	0.00	∞
Modulation Response	0.40	R	1.73	1	0.23	∞
Integration Time	0.00	R	1.73	1	0.00	∞
Response Time	0.00	R	1.73	1	0.00	∞
Device Holder Influence	0.10	R	1.73	1	0.06	∞
DUT alignment	0.00	R	1.73	1	0.00	∞
RF Ambient Conditions	0.04	R	1.73	1	0.02	∞
Ambient Reflections	0.04	R	1.73	1	0.02	∞
Immunity/Secondary Reception	0.00	R	1.73	1	0.00	∞
Drift of DUT	0.21	R	1.73	1	0.12	∞
Combined Standard Uncertainty (k=1)		RSS			1.34	∞
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				

15 CONCLUSION

15.1 Measurement Conclusion

The SAR evaluation indicates that the DUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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