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SAR EVALUATION REPORT

Applicant Name:
Apple Inc.
One Apple Park Way
Cupertino, CA 95014 USA

Date of Testing:
11/29/2023 – 02/26/2024
Test Report Issue Date:
03/27/2024
Test Site/Location:
Element, Morgan Hill, CA, USA
Document Serial No.:
1C2311270063-01.BCG (Rev 1)

FCC ID: **BCGA2902**

APPLICANT: **APPLE, INC.**

DUT Type: Tablet Device
Application Type: Certification
FCC Rule Part(s): CFR §2.1093
Models: A2902

Equipment Class	Band & Mode	Tx Frequency	SAR 1g Body (W/kg)
DTS	2.4 GHz WIFI	2412 - 2472 MHz	1.18
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	1.18
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	0.98
DSS/DTS	2.4 GHz Bluetooth	2402 - 2480 MHz	1.19
DTS	802.15.4	2405 - 2475 MHz	1.15
NII	NB U-NII 1	5162 - 5245 MHz	0.62
NII	NB U-NII 3	5733 - 5844 MHz	0.68
DXX	wPT	13.56 MHz	<0.1
Simultaneous SAR per KDB 690783 D01v01r03:			**1.52**
Equipment Class	Band & Mode	Tx Frequency	APD (W/m^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	6.78
Equipment Class	Band & Mode	Tx Frequency	Reported PD (W/m^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	7.08

Note: This revised Test Report supersedes and replaces the previously issued test report on the sane 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.

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 1.7 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

Prepared by: 009897

Reviewed by: 010082

ACCREDITED
CERT #2041.02

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 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
2.4 GHz WLAN	Voice/Data	2412 - 2472 MHz
5 GHz WIFI	Voice/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
6 GHz WIFI	Voice/Data	U-NII-5: 5955 - 6415 MHz U-NII-6: 6435 - 6515 MHz U-NII-7: 6535 - 6875 MHz U-NII-8: 6895 - 7115 MHz
Bluetooth	Data	2402 - 2480 MHz
802.15.4	Data	2405 - 2475 MHz
NB UNII-1	Data	5162 - 5245 MHz
NB UNII-3	Data	5733 - 5844 MHz
WPT	N/A	13.56 MHz

1.2 Power Reduction for SAR

This device additionally utilizes a power reduction mechanism for Bluetooth/802.15/NB UNII and WLAN operations. When Bluetooth/802.15.4/NB UNII is operating simultaneously with certain combinations of WLAN antennas, the output power is permanently reduced.

Additionally, this device uses an independent mechanism that limits WIFI powers to a time-averaged output power. For the purposes of this test report, all SAR measurements were performed with the algorithm disabled at the maximum time-averaged output power level. Verification data for this time-averaged SAR mechanism can be found in the WLAN Time-Averaged SAR Verification Appendix.

1.3 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.

The tolerances specified in the tables in this document refers to conducted tolerances.

1.3.1 Maximum WLAN Time-Averaged Output Power

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF8 Tolerance (+0/-3 dB)					
		SISO				MIMO	
		b	g	n	ax SU	g/n	ax SU
2.4 GHz WIFI 20 MHz Bandwidth	1	19.00	15.25	15.25	15.25	14.25	14.25
	2	19.00	19.00	19.00	19.00	18.25	18.00
	3	19.00	19.00	19.00	19.00	19.00	19.00
	4	19.00	19.00	19.00	19.00	19.00	19.00
	5	19.00	19.00	19.00	19.00	19.00	19.00
	6	19.00	19.00	19.00	19.00	19.00	19.00
	7	19.00	19.00	19.00	19.00	19.00	19.00
	8	19.00	19.00	19.00	19.00	19.00	19.00
	9	19.00	19.00	19.00	19.00	19.00	19.00
	10	19.00	19.00	19.00	18.50	19.00	18.00
	11	19.00	17.00	17.00	16.50	16.50	15.50
	12	19.00	14.00	14.00	14.00	13.50	13.50
	13	17.50	9.50	9.50	NS	9.00	NS

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF7b Tolerance (+0/-3 dB)					
		SISO				MIMO	
		b	g	n	ax SU	g/n	ax SU
2.4 GHz WIFI 20 MHz Bandwidth	1	20.00	15.25	15.25	15.25	14.25	14.25
	2	20.00	19.00	19.00	19.00	18.25	18.00
	3	20.00	20.00	20.00	20.00	19.50	19.50
	4	20.00	20.00	20.00	20.00	20.00	20.00
	5	20.00	20.00	20.00	20.00	20.00	20.00
	6	20.00	20.00	20.00	20.00	20.00	20.00
	7	20.00	20.00	20.00	20.00	20.00	20.00
	8	20.00	20.00	20.00	20.00	20.00	20.00
	9	20.00	20.00	20.00	20.00	19.50	19.50
	10	20.00	20.00	20.00	18.50	19.00	18.00
	11	20.00	17.00	17.00	16.50	16.50	15.50
	12	19.50	14.00	14.00	14.00	13.50	13.50
	13	17.50	9.50	9.50	NS	9.00	NS

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF8 Tolerance (+0/-3 dB)						
		SISO			MIMO CDD		MIMO SDM	
		a	n/ac	ax SU	a/n/ac	ax SU	n/ac	ax SU
5 GHz WIFI 20 MHz Bandwidth	36	18.00	18.00	17.00	16.50	15.50	16.50	15.50
	40	18.00	18.00	18.00	17.00	17.00	17.00	17.00
	44	18.00	18.00	18.00	17.00	17.00	17.00	17.00
	48	18.00	18.00	18.00	17.00	17.00	17.00	17.00
	52	18.00	18.00	18.00	17.00	17.00	17.00	17.00
	56	18.00	18.00	18.00	17.00	17.00	17.00	17.00
	60	18.00	18.00	18.00	17.00	17.00	17.00	17.00
	64	18.00	18.00	17.50	17.00	16.50	17.00	16.50
	100	16.25	16.25	16.25	16.25	16.00	16.25	16.00
	104	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	108	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	112	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	116	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	120	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	124	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	128	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	132	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	136	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	140	15.75	15.75	15.75	15.50	14.00	15.50	14.00
	144	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	149	17.00	17.00	17.00	17.00	17.00	17.00	17.00
	153	17.00	17.00	17.00	17.00	17.00	17.00	17.00
	157	17.00	17.00	17.00	17.00	17.00	17.00	17.00
	161	17.00	17.00	17.00	17.00	17.00	17.00	17.00
	165	17.00	17.00	17.00	17.00	17.00	17.00	17.00
5 GHz WIFI 40 MHz Bandwidth	38	[redacted]	16.00	14.50	14.50	13.50	14.50	13.50
	46		18.00	18.00	18.00	18.00	18.00	18.00
	54		18.00	18.00	18.00	18.00	18.00	18.00
	62		16.50	15.00	15.00	14.50	15.00	14.50
	102		15.50	15.00	14.50	13.50	14.50	13.50
	110		16.25	16.25	16.25	16.25	16.25	16.25
	118		16.25	16.25	16.25	16.25	16.25	16.25
	126		16.25	16.25	16.25	16.25	16.25	16.25
	134		16.25	16.25	16.25	16.25	16.25	16.25
	142		16.25	16.25	16.25	16.25	16.25	16.25
	151		17.00	17.00	17.00	17.00	17.00	17.00
	159		17.00	17.00	17.00	17.00	17.00	17.00
5 GHz WIFI 80 MHz Bandwidth	42		14.50	13.50	12.75	12.00	12.75	12.00
	58		15.50	15.00	14.50	14.50	14.50	14.50
	106		14.50	14.00	13.50	13.00	13.50	13.00
	122		16.25	16.25	16.25	16.25	16.25	16.25
	138		16.25	16.25	16.25	16.25	16.25	16.25
	155		17.00	17.00	17.00	17.00	17.00	17.00
5 GHz WIFI 160 MHz Bandwidth	50		13.00	13.00	11.00	11.00	11.00	11.00
	114		12.50	12.00	11.00	11.00	11.00	11.00

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above. 802.11a supports up to 20MHz, 802.11n supports up to 40MHz, 802.11ac/ax support up to 160MHz.

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF7a Tolerance (+0/-3 dB)						
		SISO			MIMO CDD		MIMO SDM	
		a	n/ac	ax SU	a/n/ac	ax SU	n/ac	ax SU
5 GHz WIFI 20 MHz Bandwidth	36	16.25	16.25	16.25	16.25	15.50	16.25	15.50
	40	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	44	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	48	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	52	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	56	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	60	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	64	16.25	16.25	16.25	16.25	16.25	16.25	16.25
	100	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	104	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	108	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	112	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	116	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	120	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	124	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	128	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	132	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	136	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	140	14.50	14.50	14.50	14.50	14.00	14.50	14.00
	144	14.50	14.50	14.50	14.50	14.50	14.50	14.50
	149	14.75	14.75	14.75	14.75	14.75	14.75	14.75
	153	14.75	14.75	14.75	14.75	14.75	14.75	14.75
	157	14.75	14.75	14.75	14.75	14.75	14.75	14.75
	161	14.75	14.75	14.75	14.75	14.75	14.75	14.75
	165	14.75	14.75	14.75	14.75	14.75	14.75	14.75
5 GHz WIFI 40 MHz Bandwidth	38	[redacted]	16.00	14.50	14.50	13.50	14.50	13.50
	46		16.25	16.25	16.25	16.25	16.25	16.25
	54		16.25	16.25	16.25	16.25	16.25	16.25
	62		16.25	15.00	15.00	14.50	15.00	14.50
	102		14.50	14.50	14.50	13.50	14.50	13.50
	110		14.50	14.50	14.50	14.50	14.50	14.50
	118		14.50	14.50	14.50	14.50	14.50	14.50
	126		14.50	14.50	14.50	14.50	14.50	14.50
	134		14.50	14.50	14.50	14.50	14.50	14.50
	142		14.50	14.50	14.50	14.50	14.50	14.50
	151		14.75	14.75	14.75	14.75	14.75	14.75
	159		14.75	14.75	14.75	14.75	14.75	14.75
5 GHz WIFI 80 MHz Bandwidth	42		14.50	13.50	12.75	12.00	12.75	12.00
	58		15.50	15.00	14.50	14.50	14.50	14.50
	106		14.50	14.00	13.50	13.00	13.50	13.00
	122		14.50	14.50	14.50	14.50	14.50	14.50
	138		14.50	14.50	14.50	14.50	14.50	14.50
	155		14.75	14.75	14.75	14.75	14.75	14.75
5 GHz WIFI 160 MHz Bandwidth	50		13.00	13.00	11.00	11.00	11.00	11.00
	114		12.50	12.00	11.00	11.00	11.00	11.00

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above. 802.11a supports up to 20MHz, 802.11n supports up to 40MHz, 802.11ac/ax support up to 160MHz.

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF8			
		Tolerance (+0/-3 dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW) (LP)	2	NS	NS	NS	NS
	1	3.50	3.50	-2.00	1.00
	5	3.50	3.50	-2.00	1.00
	9-29	3.50	3.50	-2.00	1.00
	33-61	4.25	4.25	-1.25	1.75
	65-85	5.00	5.00	-0.50	2.50
	89	5.00	5.00	-0.50	2.50
	93	5.00	5.00	-0.50	2.50
	97-113	4.75	4.75	-0.50	2.25
	117-181	5.25	5.25	-0.25	2.75
	185	5.25	5.25	-0.25	2.75
	189-225	6.75	6.75	0.75	3.75
	229	6.75	6.75	0.75	3.75
	233	6.75	6.75	0.75	3.75
6 GHz WIFI (40MHz BW) (LP)	3		6.50	1.00	4.00
	11		6.50	1.00	4.00
	19-27		6.50	1.00	4.00
	35-59		7.25	1.75	4.75
	67-75		8.00	2.50	5.50
	83		8.00	2.50	5.50
	91		8.00	2.50	5.50
	99-107		7.75	2.50	5.25
	115		7.75	2.50	5.25
	123-179		8.25	2.75	5.75
	187		8.25	2.75	5.75
	195-219		9.75	3.75	6.75
	227		9.75	3.75	6.75
6 GHz WIFI (80MHz BW) (LP)	7		9.50	4.00	7.00
	23		9.50	4.00	7.00
	39-55		10.25	4.75	7.75
	71		11.00	5.50	8.50
	87		11.00	5.50	8.50
	103		10.75	5.50	8.25
	119		10.75	5.50	8.25
	135-167		11.25	5.75	8.75
	183		11.25	5.75	8.75
	199		11.50	6.75	9.75
	215		11.50	6.75	9.75
6 GHz WIFI (160MHz BW) (LP)	15		12.00	6.50	9.50
	47		12.75	7.25	10.25
	79		13.50	8.00	11.00
	111		13.25	8.00	10.75
	143		13.75	8.25	11.25
	175		11.50	8.25	11.25
	207		11.50	9.25	11.50

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above. 802.11a supports up to 20MHz, 802.11ax supports up to 160MHz.

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF8			
		Tolerance (+0/-3 dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW) (SP)	2	NS	NS	NS	NS
	1	13.75	13.75	13.75	13.75
	5	13.75	13.75	13.75	13.75
	9-29	13.75	13.75	13.75	13.75
	33-61	13.75	13.75	13.75	13.75
	65-85	14.25	14.25	14.25	14.25
	89	14.25	14.25	14.25	14.25
	93	14.25	14.25	14.25	14.25
	97-113	NS	NS	NS	NS
	117-181	15.25	15.25	15.25	15.25
	185	NS	NS	NS	NS
	189-225	NS	NS	NS	NS
	229	NS	NS	NS	NS
	233	NS	NS	NS	NS
6 GHz WIFI (40MHz BW) (SP)	3	[redacted]	13.75	13.75	13.75
	11		13.75	13.75	13.75
	19-27		13.75	13.75	13.75
	35-59		13.75	13.75	13.75
	67-75		14.25	14.25	14.25
	83		14.25	14.25	14.25
	91		14.25	14.25	14.25
	99-107		NS	NS	NS
	115		NS	NS	NS
	123-179		16.00	16.00	16.00
	187		NS	NS	NS
	195-219		NS	NS	NS
	227		NS	NS	NS
6 GHz WIFI (80MHz BW) (SP)	7		13.75	13.75	13.75
	23		14.25	14.25	14.25
	39-55		13.75	13.75	13.75
	71		14.25	14.25	14.25
	87		14.25	14.25	14.25
	103		NS	NS	NS
	119		NS	NS	NS
	135-167		16.00	16.00	16.00
	183		NS	NS	NS
	199		NS	NS	NS
	215		NS	NS	NS
6 GHz WIFI (160MHz BW) (SP)	15		13.75	13.75	13.75
	47		13.75	13.75	13.75
	79		14.25	14.25	14.25
	111		NS	NS	NS
	143		16.00	16.00	16.00
	175		NS	NS	NS
	207		NS	NS	NS

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above. 802.11a supports up to 20MHz, 802.11ax supports up to 160MHz.

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

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF7a			
		Tolerance (+0/-3 dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW) (LP)	2	NS	NS	NS	NS
	1	3.50	3.50	-2.00	1.00
	5	3.50	3.50	-2.00	1.00
	9-29	3.50	3.50	-2.00	1.00
	33-61	4.25	4.25	-1.25	1.75
	65-85	5.00	5.00	-0.50	2.50
	89	5.00	5.00	-0.50	2.50
	93	5.00	5.00	-0.50	2.50
	97-113	4.75	4.75	-0.50	2.25
	117-181	5.25	5.25	-0.25	2.75
	185	5.25	5.25	-0.25	2.75
	189-225	6.75	6.75	0.75	3.75
	229	6.75	6.75	0.75	3.75
	233	6.75	6.75	0.75	3.75
6 GHz WIFI (40MHz BW) (LP)	3		6.50	1.00	4.00
	11		6.50	1.00	4.00
	19-27		6.50	1.00	4.00
	35-59		7.25	1.75	4.75
	67-75		8.00	2.50	5.50
	83		8.00	2.50	5.50
	91		8.00	2.50	5.50
	99-107		7.75	2.50	5.25
	115		7.75	2.50	5.25
	123-179		8.25	2.75	5.75
	187		8.25	2.75	5.75
	195-219		9.75	3.75	6.75
	227		9.75	3.75	6.75
6 GHz WIFI (80MHz BW) (LP)	7		9.50	4.00	7.00
	23		9.50	4.00	7.00
	39-55		10.25	4.75	7.75
	71		11.00	5.50	8.50
	87		11.00	5.50	8.50
	103		10.75	5.50	8.25
	119		10.75	5.50	8.25
	135-167		11.25	5.75	8.75
	183		11.25	5.75	8.75
	199		11.25	6.75	9.75
	215		11.25	6.75	9.75
6 GHz WIFI (160MHz BW) (LP)	15		12.00	6.50	9.50
	47		12.25	7.25	10.25
	79		12.25	8.00	11.00
	111		11.75	8.00	10.75
	143		11.25	8.25	11.25
	175		11.25	8.25	11.25
	207		11.25	9.25	11.25

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above. 802.11a supports up to 20MHz, 802.11ax supports up to 160MHz.

Mode	Channel	IEEE 802.11 (Maximum in dBm) - WF7a			
		Tolerance (+0/-3 dB)			
		SISO		MIMO	
		a	ax (SU)	ax (SU) CDD	ax (SU) SDM
6 GHz WIFI (20MHz BW) (SP)	2	NS	NS	NS	NS
	1	12.25	12.25	12.25	12.25
	5	12.25	12.25	12.25	12.25
	9-29	12.25	12.25	12.25	12.25
	33-61	12.25	12.25	12.25	12.25
	65-85	12.25	12.25	12.25	12.25
	89	12.25	12.25	12.25	12.25
	93	12.25	12.25	12.25	12.25
	97-113	NS	NS	NS	NS
	117-181	11.25	11.25	11.25	11.25
	185	NS	NS	NS	NS
	189-225	NS	NS	NS	NS
	229	NS	NS	NS	NS
	233	NS	NS	NS	NS
6 GHz WIFI (40MHz BW) (SP)	3	[redacted]	12.25	12.25	12.25
	11		12.25	12.25	12.25
	19-27		12.25	12.25	12.25
	35-59		12.25	12.25	12.25
	67-75		12.25	12.25	12.25
	83		12.25	12.25	12.25
	91		12.25	12.25	12.25
	99-107		NS	NS	NS
	115		NS	NS	NS
	123-179		11.25	11.25	11.25
	187		NS	NS	NS
	195-219		NS	NS	NS
	227		NS	NS	NS
6 GHz WIFI (80MHz BW) (SP)	7		12.25	12.25	12.25
	23		12.25	12.25	12.25
	39-55		12.25	12.25	12.25
	71		12.25	12.25	12.25
	87		12.25	12.25	12.25
	103		NS	NS	NS
	119		NS	NS	NS
	135-167		11.25	11.25	11.25
	183		NS	NS	NS
	199		NS	NS	NS
	215		NS	NS	NS
6 GHz WIFI (160MHz BW) (SP)	15		12.25	12.25	12.25
	47		12.25	12.25	12.25
	79		12.25	12.25	12.25
	111		NS	NS	NS
	143		11.25	11.25	11.25
	175		NS	NS	NS
	207		NS	NS	NS

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above. 802.11a supports up to 20MHz, 802.11ax supports up to 160MHz.

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

1.3.2 Bluetooth Maximum Output Power

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
Bluetooth BDR	Maximum	**20.00**	**11.50**
	Nominal	**18.50**	**10.00**
Bluetooth EDR	Maximum	**15.00**	**8.00**
	Nominal	**13.50**	**6.50**
Bluetooth LE	Maximum	**20.00**	**11.50**
	Nominal	**18.50**	**10.00**
Bluetooth HDR4	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**
Bluetooth HDR8	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF8	Modulated Average (iPA) TXBF (dBm) Antenna WF8
Bluetooth BDR	Maximum	**17.00**	**11.50**
	Nominal	**15.50**	**10.00**
Bluetooth EDR	Maximum	**13.50**	**8.00**
	Nominal	**12.00**	**6.50**
Bluetooth LE	Maximum	**20.00**	**11.50**
	Nominal	**18.50**	**10.00**
Bluetooth HDR4	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**
Bluetooth HDR8	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**

Note: In TxBF operations, each antenna transmits at allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7b	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7b
Bluetooth BDR	Maximum	**20.00**	**11.50**
	Nominal	**18.50**	**10.00**
Bluetooth EDR	Maximum	**15.00**	**8.00**
	Nominal	**13.50**	**6.50**
Bluetooth LE	Maximum	**20.00**	**11.50**
	Nominal	**18.50**	**10.00**
Bluetooth HDR4	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**
Bluetooth HDR8	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF7b	Modulated Average (iPA) TXBF (dBm) Antenna WF7b
Bluetooth BDR	Maximum	**17.00**	**11.50**
	Nominal	**15.50**	**10.00**
Bluetooth EDR	Maximum	**13.50**	**8.00**
	Nominal	**12.00**	**6.50**
Bluetooth LE	Maximum	**20.00**	**11.50**
	Nominal	**18.50**	**10.00**
Bluetooth HDR4	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**
Bluetooth HDR8	Maximum	**14.50**	**6.00**
	Nominal	**13.00**	**4.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

1.3.3 Bluetooth Reduced Output Power

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 5/6 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
Bluetooth BDR	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth EDR	Maximum	**13.00**	**8.00**
	Nominal	**11.50**	**6.50**
Bluetooth LE	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth HDR4	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**
Bluetooth HDR8	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 5/6 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF8	Modulated Average (iPA) TXBF (dBm) Antenna WF8
Bluetooth BDR	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth EDR	Maximum	**13.00**	**8.00**
	Nominal	**11.50**	**6.50**
Bluetooth LE	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth HDR4	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**
Bluetooth HDR8	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 5/6 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7b	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7b
Bluetooth BDR	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth EDR	Maximum	**13.00**	**8.00**
	Nominal	**11.50**	**6.50**
Bluetooth LE	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth HDR4	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**
Bluetooth HDR8	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 5/6 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF7b	Modulated Average (iPA) TXBF (dBm) Antenna WF7b
Bluetooth BDR	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth EDR	Maximum	**13.00**	**8.00**
	Nominal	**11.50**	**6.50**
Bluetooth LE	Maximum	**13.00**	**11.50**
	Nominal	**11.50**	**10.00**
Bluetooth HDR4	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**
Bluetooth HDR8	Maximum	**13.00**	**6.00**
	Nominal	**11.50**	**4.50**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

1.3.4 802.15.4 Max Output Power

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
802.15.4	Maximum	**21.00**	**11.50**
	Nominal	**19.50**	**10.00**

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7b	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7b
802.15.4	Maximum	**21.50**	**11.50**
	Nominal	**20.00**	**10.00**

1.3.5 802.15.4 Reduced Output Power

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 5/6 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
802.15.4	Maximum	**14.00**	**11.50**
	Nominal	**12.50**	**10.00**

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 5/6 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7b	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7b
802.15.4	Maximum	**14.50**	**11.50**
	Nominal	**13.00**	**10.00**

1.3.6 NB UNII Max Output Power

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
NB UNII-1 BDR	Maximum	**10.00**	**6.50**
	Nominal	**8.50**	**5.00**
NB UNII-1 HDR4	Maximum	**12.50**	**2.50**
	Nominal	**11.00**	**1.00**
NB UNII-1 HDR8	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF8	Modulated Average (iPA) TXBF (dBm) Antenna WF8
NB UNII-1 BDR	Maximum	**7.00**	**6.50**
	Nominal	**5.50**	**5.00**
NB UNII-1 HDR4	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**
NB UNII-1 HDR8	Maximum	**12.00**	**2.50**
	Nominal	**10.50**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7a	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7a
NB UNII-1 BDR	Maximum	**10.00**	**6.50**
	Nominal	**8.50**	**5.00**
NB UNII-1 HDR4	Maximum	**12.50**	**2.50**
	Nominal	**11.00**	**1.00**
NB UNII-1 HDR8	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF7a	Modulated Average (iPA) TXBF (dBm) Antenna WF7a
NB UNII-1 BDR	Maximum	**7.00**	**6.50**
	Nominal	**5.50**	**5.00**
NB UNII-1 HDR4	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**
NB UNII-1 HDR8	Maximum	**12.00**	**2.50**
	Nominal	**10.50**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
NB UNII-3 BDR	Maximum	**13.50**	**6.50**
	Nominal	**12.00**	**5.00**
NB UNII-3 HDR4	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**
NB UNII-3 HDR8	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF8	Modulated Average (iPA) TXBF (dBm) Antenna WF8
NB UNII-3 BDR	Maximum	**13.50**	**6.50**
	Nominal	**12.00**	**5.00**
NB UNII-3 HDR4	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**
NB UNII-3 HDR8	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7a	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7a
NB UNII-3 BDR	Maximum	**13.50**	**6.50**
	Nominal	**12.00**	**5.00**
NB UNII-3 HDR4	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**
NB UNII-3 HDR8	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF7a	Modulated Average (iPA) TXBF (dBm) Antenna WF7a
NB UNII-3 BDR	Maximum	**13.50**	**6.50**
	Nominal	**12.00**	**5.00**
NB UNII-3 HDR4	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**
NB UNII-3 HDR8	Maximum	**13.50**	**2.50**
	Nominal	**12.00**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

1.3.7 NB UNII Reduced Output Power

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
NB UNII-1 BDR	Maximum	**10.00**	**6.50**
	Nominal	**8.50**	**5.00**
NB UNII-1 HDR4	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**
NB UNII-1 HDR8	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**

-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF8	Modulated Average (iPA) TXBF (dBm) Antenna WF8
NB UNII-1 BDR	Maximum	**7.00**	**6.50**
	Nominal	**5.50**	**5.00**
NB UNII-1 HDR4	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**
NB UNII-1 HDR8	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7a	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7a
NB UNII-1 BDR	Maximum	**9.50**	**6.50**
	Nominal	**8.00**	**5.00**
NB UNII-1 HDR4	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**
NB UNII-1 HDR8	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF7a	Modulated Average (iPA) TXBF (dBm) Antenna WF7a
NB UNII-1 BDR	Maximum	**7.00**	**6.50**
	Nominal	**5.50**	**5.00**
NB UNII-1 HDR4	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**
NB UNII-1 HDR8	Maximum	**9.50**	**2.50**
	Nominal	**8.00**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF8	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF8
NB UNII-3 BDR	Maximum	**10.00**	**6.50**
	Nominal	**8.50**	**5.00**
NB UNII-3 HDR4	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**
NB UNII-3 HDR8	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF8	Modulated Average (iPA) TXBF (dBm) Antenna WF8
NB UNII-3 BDR	Maximum	**10.00**	**6.50**
	Nominal	**8.50**	**5.00**
NB UNII-3 HDR4	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**
NB UNII-3 HDR8	Maximum	**10.00**	**2.50**
	Nominal	**8.50**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) Single Tx Chain (dBm) Antenna WF7a	Modulated Average (iPA) Single Tx Chain (dBm) Antenna WF7a
NB UNII-3 BDR	Maximum	**8.50**	**6.50**
	Nominal	**7.00**	**5.00**
NB UNII-3 HDR4	Maximum	**8.50**	**2.50**
	Nominal	**7.00**	**1.00**
NB UNII-3 HDR8	Maximum	**8.50**	**2.50**
	Nominal	**7.00**	**1.00**

Note: Below table is applicable in the following conditions:
-Simultaneous conditions with 2.4 GHz WLAN and WPT active.

Mode / Band		Modulated Average (ePA) TXBF (dBm) Antenna WF7a	Modulated Average (iPA) TXBF (dBm) Antenna WF7a
NB UNII-3 BDR	Maximum	**8.50**	**6.50**
	Nominal	**7.00**	**5.00**
NB UNII-3 HDR4	Maximum	**8.50**	**2.50**
	Nominal	**7.00**	**1.00**
NB UNII-3 HDR8	Maximum	**8.50**	**2.50**
	Nominal	**7.00**	**1.00**

Note: In TxBF operations, each antenna transmits at maximum allowed powers as indicated above.

1.4 DUT Antenna Locations

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

Note: Per FCC KDB Publication 616217 D04v01r01, front side of the device is not required to be evaluated for SAR. All other edges were evaluated for simultaneous transmission analysis.

1.5 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 1-1
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Body
1	2.4 GHz WI-FI MIMO + WPT	Yes
2	5/6 GHz WI-FI MIMO + WPT	Yes
3	2.4 GHz Bluetooth (TXBF) + WPT	Yes
4	NB UNII (TXBF) + WPT	Yes
5	2.4 GHz Bluetooth Antenna WF7b + 2.4 GHz WI-FI Antenna WF8 + WPT	Yes
6	802.15.4 Antenna WF7b + 2.4 GHz WI-FI Antenna WF8 + WPT	Yes
7	2.4 GHz Bluetooth + 5/6 GHz WI-FI + WPT	Yes
8	802.15.4 + 5/6 GHz WI-FI + WPT	Yes
9	2.4 GHz Bluetooth + 5/6 GHz WI-FI MIMO + WPT	Yes
10	802.15.4 + 5/6 GHz WI-FI MIMO + WPT	Yes
11	2.4 GHz Bluetooth (TXBF) + 5/6 GHz WI-FI + WPT	Yes
12	2.4 GHz Bluetooth (TXBF) + 5/6 GHz WI-FI MIMO + WPT	Yes
13	NB UNII + 2.4 GHz WI-FI + WPT	Yes
14	NB UNII + 2.4 GHz WI-FI MIMO + WPT	Yes
15	NB UNII (TXBF) + 2.4 GHz WI-FI + WPT	Yes
16	NB UNII (TXBF) + 2.4 GHz WI-FI MIMO + WPT	Yes

1. 2.4GHz WIFI and 2.4 GHz Bluetooth/802.15.4 can transmit simultaneously on separate antennas, Specific 2.4 GHz WIFI Antenna that can only transmit simultaneously with 2.4 GHz Bluetooth/802.15.4 is listed in the above table. In this scenario, Wi-Fi max power will not exceed minimum of (13.5 dBm, SAR max cap, Reg max cap) power. Additionally, in disconnected mode, BT will be using iPA only.
2. 2.4 GHz WLAN and 5 GHz WLAN cannot transmit simultaneously.
3. This device supports 2x2 MIMO Tx for WLAN 802.11a/g/n/ac/ax. 802.11a/g/n/ac/ax supports CDD and STBC and 802.11n/ac/ax additionally supports SDM. Each WLAN antenna can transmit independently or together when operating with MIMO.
4. This device supports VoWIFI.

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Based on the maximum allowed power for the respective antennas, U-NII-2A was evaluated for Antenna WF8 and WF7a. Additional testing for U-NII-1 was not required since all reported SAR was less than 1.2 W/kg per FCC KDB Publication 248227 D01v02r02.

The WLAN/Bluetooth chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with identical mechanical structures to meet the same specifications and functions. Two device variants are referenced as Variant 1 and Variant 2 in this report. WLAN/Bluetooth SAR worst case configuration was spotchecked on Variant 1 and Variant 2. The Variant with the highest reported SAR value was evaluated for the remaining WLAN/Bluetooth configurations.

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.

This device supports IEEE 802.11ac with the following features:

a) Up to 160 MHz Bandwidth only for 5/6 GHz
b) 3 Tx antenna output
c) 256 QAM is supported
d) TDWR and Band gap channels are supported

This device supports IEEE 802.11ax with the following features:

a) Up to 160 MHz Bandwidth only for 5/6 GHz
b) Up to 20 MHz Bandwidth only for 2.4 GHz
c) No aggregate channel configurations
d) 3 Tx antenna output
e) Up to 1024 QAM is supported
f) TDWR and Band gap channels are supported for 5 GHz
g) MU-MIMO UL Operations are not supported

Per April 2019 TCB Workshop Notes, SAR testing was not required for 802.11ax when applying the initial test configuration procedures of KDB 248227, with 802.11ax considered a higher order 802.11 mode.

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, 5 channels were tested. 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%.

1.7 Guidance Applied

- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D04v01 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 616217 D04v01r02 (Tablet)
- November 2017, October 2018, April 2019, November 2019, October 2020 TCB Workshop Notes (IEEE 802.11ax)
- SPEAG DASY6 System Handbook
- SPEAG DASY6 Application Note (Interim Procedures for Devices Operating at 6-10 GHz) (Nov 2021)
- IEEE 1528-2013
- IEC TR 63170:2018
- IEC 62479:2010

1.8 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 9.

2 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 Equipment Under Test (EUT). 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.

2.1 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 2-1).

Equation 2-1
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]

3 DOSIMETRIC ASSESSMENT

3.1 Measurement Procedure

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

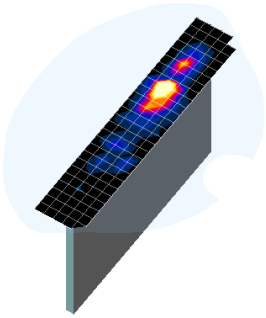


Figure 3-1
Sample SAR Area Scan

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 3-1) 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 3-1) 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 3-1. 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 3-1
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

4 TEST CONFIGURATION POSITIONS

4.1 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.

4.2 SAR Testing for Tablet per KDB Publication 616217 D04v01r02

Per FCC KDB Publication 616217 D04v01r02, the back surface and edges of the tablet should be tested for SAR compliance with the tablet 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 tablet 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.

5 RF EXPOSURE LIMITS

5.1 Uncontrolled Environment

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

5.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. 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.

5.3 RF Exposure Limits for Frequencies below 6 GHz

Table 5-1
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.

5.4 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/m2 or mW/cm2.

Peak Spatially Averaged Power Density was evaluated over a circular area of 4 cm2 per interim FCC Guidance for near-field power density evaluations per October 2018 TCB Workshop notes.

Table 5-2
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

6 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

6.1 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.

6.2 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.

6.2.1 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.

6.2.2 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.

6.2.3 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.

6.2.4 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.

6.2.5 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.

6.2.6 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 6.2.5). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

6.2.7 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.

6.2.8 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.

7 RF CONDUCTED POWERS

7.1 WLAN Maximum Time-Averaged Conducted Powers

Table 7-1
2.4 GHz WLAN Maximum Average RF Power – Antenna WF8, Variant 1

2.4GHz WIFI (20MHz 802.11b SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	17.54
2437	6		17.48
2462	11		17.57
2.4GHz WIFI (20MHz 802.11g SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.27
2437	6		17.91
2462	11		15.92
2.4GHz WIFI (20MHz 802.11n SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.26
2437	6		17.88
2462	11		15.91
2.4GHz WIFI (20MHz 802.11ax SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.13
2437	6		17.80
2462	11		15.55

Table 7-2
2.4 GHz WLAN Maximum Average RF Power – Antenna WF8, Variant 2

2.4GHz WIFI (20MHz 802.11b SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	17.41
2437	6		17.71
2462	11		17.68
2.4GHz WIFI (20MHz 802.11g SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.26
2437	6		18.02
2462	11		15.91

2.4GHz WIFI (20MHz 802.11n SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.23
2437	6		18.02
2462	11		15.93
2.4GHz WIFI (20MHz 802.11ax SISO ANT WF8)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.15
2437	6		17.95
2462	11		15.60

Table 7-3
2.4 GHz WLAN Maximum Average RF Power – Antenna WF7b, Variant 1

2.4GHz WIFI (20MHz 802.11b SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	19.03
2437	6		19.19
2462	11		19.28
2.4GHz WIFI (20MHz 802.11g SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.21
2437	6		19.02
2462	11		16.13
2.4GHz WIFI (20MHz 802.11n SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.22
2437	6		19.01
2462	11		16.12
2.4GHz WIFI (20MHz 802.11ax SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.29
2437	6		19.04
2462	11		15.56

Table 7-4
2.4 GHz WLAN Maximum Average RF Power – Antenna WF7b, Variant 2

2.4GHz WIFI (20MHz 802.11b SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	18.93
2437	6		19.07
2462	11		19.29

2.4GHz WIFI (20MHz 802.11g SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.31
2437	6		19.15
2462	11		16.17
2.4GHz WIFI (20MHz 802.11n SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.32
2437	6		19.15
2462	11		16.18
2.4GHz WIFI (20MHz 802.11ax SISO ANT WF7b)			
Freq. [MHz]	Channel	Detector	Conducted Power [dBm]
2412	1	Average	14.24
2437	6		19.19
2462	11		15.48

Table 7-5
5 GHz WLAN Maximum Average RF Power – Antenna WF8, Variant 1

5GHz WIFI (40MHz 802.11n SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.62
	5230	46	17.09
UNII-2A	5270	54	17.15
	5310	62	15.51
5GHz WIFI (40MHz 802.11ac SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.96
	5230	46	16.95
UNII-2A	5270	54	17.06
	5310	62	15.66
5GHz WIFI (40MHz 802.11ax SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	13.73
	5230	46	16.90
UNII-2A	5270	54	17.04
	5310	62	14.12
5GHz WIFI (80MHz 802.11ac SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.52
	5610	122	15.32
	5690	138	15.40
UNII-3	5775	155	15.57

5GHz WIFI (80MHz 802.11ax SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.12
	5610	122	15.38
	5690	138	15.31
UNII-3	5775	155	16.01

Table 7-6
5 GHz WLAN Maximum Average RF Power – Antenna WF8, Variant 2

5GHz WIFI (40MHz 802.11n SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.61
	5230	46	17.05
UNII-2A	5270	54	16.93
	5310	62	15.45
5GHz WIFI (40MHz 802.11ac SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	14.95
	5230	46	17.03
UNII-2A	5270	54	17.06
	5310	62	15.19
5GHz WIFI (40MHz 802.11ax SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	13.44
	5230	46	16.98
UNII-2A	5270	54	17.14
	5310	62	13.93
5GHz WIFI (80MHz 802.11ac SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.48
	5610	122	15.35
	5690	138	15.30
UNII-3	5775	155	15.85
5GHz WIFI (80MHz 802.11ax SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.09
	5610	122	15.32
	5690	138	15.13
UNII-3	5775	155	15.91

Table 7-7
5 GHz WLAN Maximum Average RF Power – Antenna WF7a, Variant 1

5GHz WIFI (40MHz 802.11n SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	15.09
	5230	46	15.21
UNII-2A	5270	54	15.18
	5310	62	15.30
5GHz WIFI (40MHz 802.11ac SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	15.04
	5230	46	15.17
UNII-2A	5270	54	15.22
	5310	62	15.14
5GHz WIFI (40MHz 802.11ax SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	13.44
	5230	46	15.17
UNII-2A	5270	54	15.18
	5310	62	13.93
5GHz WIFI (80MHz 802.11ac SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.24
	5610	122	13.79
	5690	138	13.12
UNII-3	5775	155	13.62
5GHz WIFI (80MHz 802.11ax SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.17
	5610	122	13.53
	5690	138	13.49
UNII-3	5775	155	13.73

Table 7-8
5 GHz WLAN Maximum Average RF Power – Antenna WF7a, Variant 2

5GHz WIFI (40MHz 802.11n SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	15.05
	5230	46	15.28
UNII-2A	5270	54	15.35
	5310	62	15.18

5GHz WIFI (40MHz 802.11ac SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	15.06
	5230	46	15.21
UNII-2A	5270	54	15.16
	5310	62	15.23
5GHz WIFI (40MHz 802.11ax SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-1	5190	38	13.34
	5230	46	15.21
UNII-2A	5270	54	15.17
	5310	62	14.03
5GHz WIFI (80MHz 802.11ac SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	13.75
	5610	122	13.99
	5690	138	13.35
UNII-3	5775	155	13.51
5GHz WIFI (80MHz 802.11ax SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-2C	5530	106	12.92
	5610	122	13.46
	5690	138	13.30
II-3	5775	155	13.61

Table 7-9
5 GHz WLAN Maximum Average RF Power – Antenna WF8 and WF7a MIMO, Variant 1

5GHz WIFI (40MHz 802.11n MIMO)					
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]		
			ANT WF8	ANT WF7a	MIMO
UNII-1	5190	38	13.52	13.56	16.55
	5230	46	16.91	15.32	19.20
UNII-2A	5270	54	17.11	15.27	19.30
	5310	62	13.81	13.95	16.89
5GHz WIFI (80MHz 802.11ac MIMO)					
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]		
			ANT WF8	ANT WF7a	MIMO
UNII-2C	5530	106	12.52	12.36	15.45
	5610	122	15.03	13.61	17.39
	5690	138	15.00	13.43	17.30
UNII-3	5775	155	16.11	13.51	18.01

Table 7-10
5 GHz WLAN Maximum Average RF Power – Antenna WF8 and WF7a MIMO, Variant 2

5GHz WIFI (40MHz 802.11n MIMO)					
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]		
			ANT WF8	ANT WF7A	MIMO
UNII-1	5190	38	13.48	13.41	16.46
	5230	46	16.90	15.18	19.13
UNII-2A	5270	54	17.09	15.20	19.26
	5310	62	13.94	13.98	16.97
5GHz WIFI (80MHz 802.11ac MIMO)					
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]		
			ANT WF8	ANT WF7A	MIMO
UNII-2C	5530	106	12.43	12.45	15.45
	5610	122	14.97	13.44	17.28
	5690	138	14.99	13.41	17.28
UNII-3	5775	155	15.90	13.74	17.96

Table 7-11
6 GHz WLAN Maximum Average RF Power – Antenna WF8, Variant 1

6GHz WIFI (160MHz 802.11ax SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-5	6025	15	12.49
	6345	79	13.16
UNII-6	6505	111	12.85
UNII-7	6665	143	14.49
UNII-8	6985	207	9.79

Table 7-12
6 GHz WLAN Maximum Average RF Power – Antenna WF8, Variant 2

6GHz WIFI (160MHz 802.11ax SISO ANT WF8)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-5	6025	15	12.26
	6345	79	12.31
UNII-6	6505	111	12.30
UNII-7	6665	143	14.01
UNII-8	6985	207	9.59

Table 7-13
6 GHz WLAN Maximum Average RF Power – Antenna WF7a, Variant 1

6GHz WIFI (160MHz 802.11ax SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-5	6025	15	11.65
	6345	79	11.39
UNII-6	6505	111	11.55
UNII-7	6665	143	10.68
UNII-8	6985	207	10.17

Table 7-14
6 GHz WLAN Maximum Average RF Power – Antenna WF7a, Variant 2

6GHz WIFI (160MHz 802.11ax SISO ANT WF7a)			
Band	Freq. [MHz]	Channel	Avg. Conducted Power [dBm]
UNII-5	6025	15	11.43
	6345	79	10.88
UNII-6	6505	111	10.85
UNII-7	6665	143	10.01
UNII-8	6985	207	9.63

7.2 Notes for WLAN

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.
- The WLAN chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with identical mechanical structures to meet the same specifications and functions.
- Two device variants are referenced as Variant 1 and Variant 2 in this report.
- WLAN SAR worst case configuration was spotchecked on Variant 1 and Variant 2.

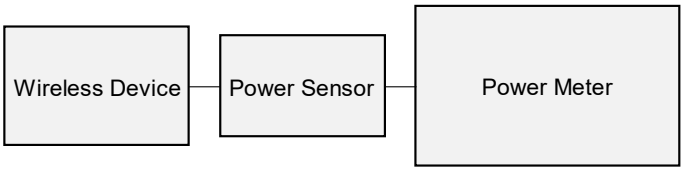


Figure 7-1
Power Measurement Setup

7.3 Bluetooth Maximum Conducted Powers

Table 7-16
Bluetooth Maximum Average RF Power – Antenna WF8, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	18.92	77.983
2441	GFSK	1.0	39	18.92	77.983
2480	GFSK	1.0	78	19.20	83.176

Table 7-17
Bluetooth Maximum Average RF Power – Antenna WF8, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	18.91	77.804
2441	GFSK	1.0	39	18.84	76.560
2480	GFSK	1.0	78	19.17	82.604

Table 7-18
Bluetooth Maximum Average RF Power – Antenna WF7b, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	19.70	93.325
2441	GFSK	1.0	39	19.73	93.972
2480	GFSK	1.0	78	19.76	94.624

Table 7-19
Bluetooth Maximum Average RF Power – Antenna WF7b, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	19.72	93.756
2441	GFSK	1.0	39	19.70	93.325
2480	GFSK	1.0	78	19.76	98.175

7.4 802.15.4 Maximum Conducted Powers

Table 7-20
802.15.4 Maximum Average RF Power – Antenna WF8, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	19.01	79.616
2440	O-QPSK	0.25	18	19.17	82.604
2475	O-QPSK	0.25	25	19.31	85.310

Table 7-21
802.15.4 Maximum Average RF Power – Antenna WF8, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	19.25	84.140
2440	O-QPSK	0.25	18	19.16	82.414
2475	O-QPSK	0.25	25	19.04	80.168

Table 7-22
802.15.4 Maximum Average RF Power – Antenna WF7b, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	19.58	90.782
2440	O-QPSK	0.25	18	19.85	96.605
2475	O-QPSK	0.25	25	19.65	92.257

Table 7-23
802.15.4 Maximum Average RF Power – Antenna WF7b, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	19.84	96.383
2440	O-QPSK	0.25	18	19.70	93.325
2475	O-QPSK	0.25	25	19.61	91.411

7.5 NB UNII Maximum Conducted Powers

Table 7-24
NB UNII-1 Maximum Average RF Power – Antenna WF8, Variant 1

Type	Band	Frequency	Channel	Average
HDR - 8	U-NII 1	5162	Low	12.98
		5204	Mid	13.16
		5245	High	13.15

Table 7-25
NB UNII-1 Maximum Average RF Power – Antenna WF8, Variant 2

Type	Band	Frequency	Channel	Average
HDR - 8	U-NII 1	5162	Low	13.15
		5204	Mid	13.10
		5245	High	13.13

Table 7-26
NB UNII-1 Maximum Average RF Power – Antenna WF7a, Variant 1

Type	Band	Frequency	Channel	Average
HDR-8	U-NII 1	5162	Low	12.69
		5204	Mid	12.68
		5245	High	12.63

Table 7-27
NB UNII-1 Maximum Average RF Power – Antenna WF7a, Variant 2

Type	Band	Frequency	Channel	Average
HDR-8	U-NII 1	5162	Low	12.42
		5204	Mid	12.58
		5245	High	12.41

Table 7-28
NB UNII-3 Maximum Average RF Power – Antenna WF8, Variant 1

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	11.97
		5789	Mid	12.09
		5844	High	12.00

Table 7-29
NB UNII-3 Maximum Average RF Power – Antenna WF8, Variant 2

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	12.35
		5789	Mid	12.24
		5844	High	12.30

Table 7-30
NB UNII-3 Maximum Average RF Power – Antenna WF7a, Variant 1

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	12.53
		5789	Mid	12.50
		5844	High	12.59

Table 7-31
NB UNII-3 Maximum Average RF Power – Antenna WF7a, Variant 2

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	12.49
		5789	Mid	12.47
		5844	High	12.46

7.6 Bluetooth Reduced Conducted Powers

Table 7-32
Bluetooth Reduced Average RF Power – Antenna WF8, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	12.13	16.331
2441	GFSK	1.0	39	12.15	16.406
2480	GFSK	1.0	78	11.81	15.171

Table 7-33
Bluetooth Reduced Average RF Power – Antenna WF8, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	12.40	77.804
2441	GFSK	1.0	39	12.23	76.560
2480	GFSK	1.0	78	11.88	82.604

Table 7-34
Bluetooth Reduced Average RF Power – Antenna WF7b, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	12.15	16.406
2441	GFSK	1.0	39	12.28	16.904
2480	GFSK	1.0	78	12.35	17.179

Table 7-35
Bluetooth Reduced Average RF Power – Antenna WF7b, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	12.34	17.140
2441	GFSK	1.0	39	12.44	17.539
2480	GFSK	1.0	78	12.48	17.701

7.7 802.15.4 Reduced Conducted Powers

Table 7-36
802.15.4 Reduced Average RF Power – Antenna WF8, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	12.80	19.055
2440	O-QPSK	0.25	18	12.83	19.187
2475	O-QPSK	0.25	25	12.87	19.364

Table 7-37
802.15.4 Reduced Average RF Power – Antenna WF8, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	12.82	19.143
2440	O-QPSK	0.25	18	12.86	19.320
2475	O-QPSK	0.25	25	12.83	19.187

Table 7-38
802.15.4 Reduced Average RF Power – Antenna WF7b, Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	13.79	23.933
2440	O-QPSK	0.25	18	13.70	23.442
2475	O-QPSK	0.25	25	13.52	22.491

Table 7-39
802.15.4 Reduced Average RF Power – Antenna WF7b, Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2405	O-QPSK	0.25	11	13.62	23.014
2440	O-QPSK	0.25	18	13.75	23.714
2475	O-QPSK	0.25	25	13.86	24.322

7.8 NB UNII Reduced Conducted Powers

Table 7-40
NB UNII-1 Reduced Average RF Power – Antenna WF8, Variant 1

Type	Band	Frequency	Channel	Average
BDR	U-NII 1	5162	Low	8.78
		5204	Mid	8.81
		5245	High	8.85

Table 7-41
NB UNII-1 Reduced Average RF Power – Antenna WF8, Variant 2

Type	Band	Frequency	Channel	Average
BDR	U-NII 1	5162	Low	9.15
		5204	Mid	9.06
		5245	High	9.12

Table 7-42
NB UNII-1 Reduced Average RF Power – Antenna WF7a, Variant 1

Type	Band	Frequency	Channel	Average
BDR	U-NII 1	5162	Low	8.86
		5204	Mid	8.95
		5245	High	8.74

Table 7-43
NB UNII-1 Reduced Average RF Power – Antenna WF7a, Variant 2

Type	Band	Frequency	Channel	Average
BDR	U-NII 1	5162	Low	8.72
		5204	Mid	8.59
		5245	High	8.54

Table 7-44
NB UNII-3 Reduced Average RF Power – Antenna WF8, Variant 1

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	8.79
		5789	Mid	8.92
		5844	High	9.09

Table 7-45
NB UNII-3 Reduced Average RF Power – Antenna WF8, Variant 2

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	9.41
		5789	Mid	9.26
		5844	High	9.26

Table 7-46
NB UNII-3 Reduced Average RF Power – Antenna WF7a, Variant 1

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	8.45
		5789	Mid	8.37
		5844	High	8.49

Table 7-47
NB UNII-3 Reduced Average RF Power – Antenna WF7a, Variant 2

Type	Band	Frequency	Channel	Average
BDR	U-NII 3	5733	Low	8.49
		5789	Mid	8.48
		5844	High	8.50

7.9 Bluetooth Duty Cycle Plots

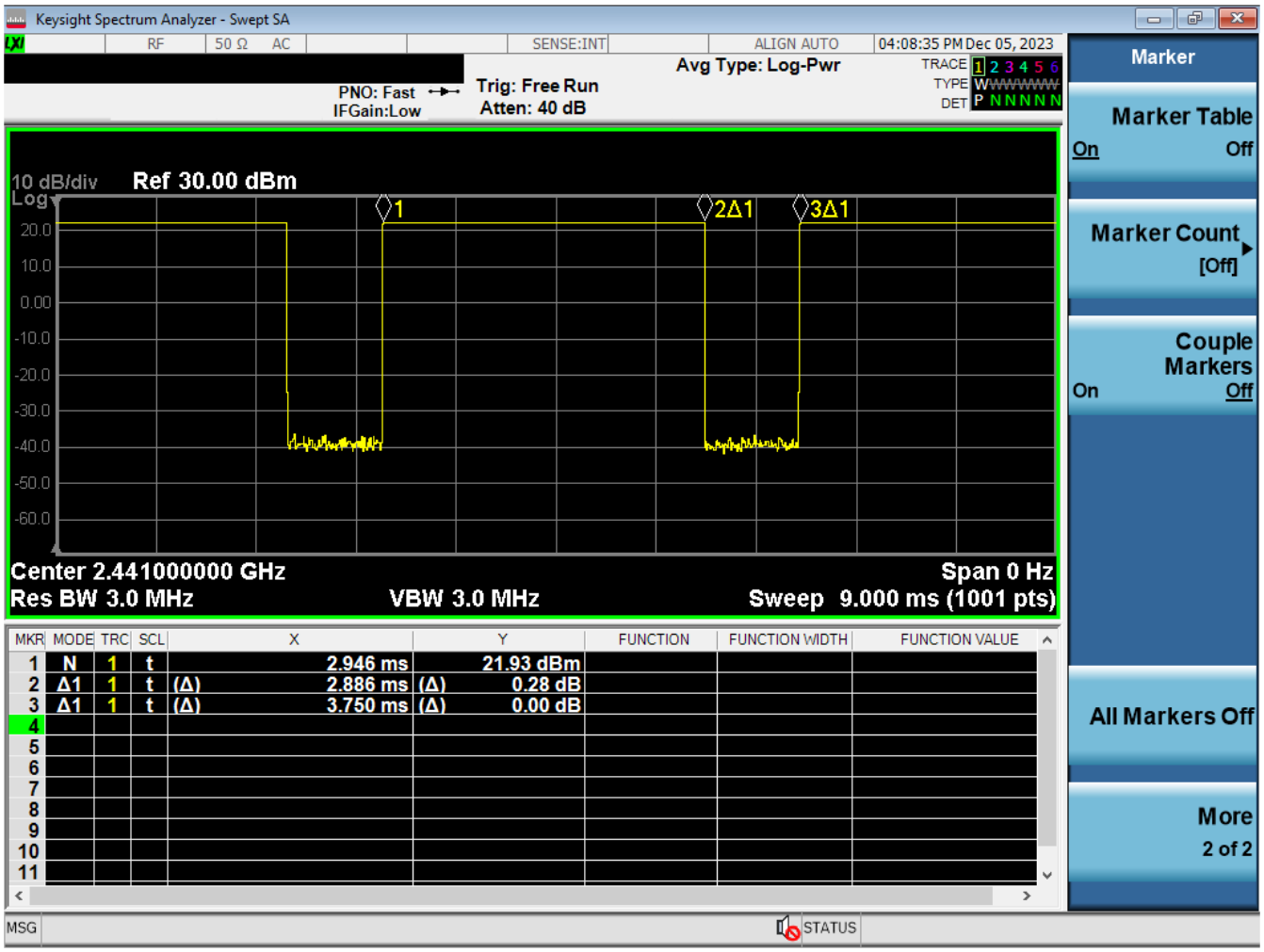


Figure 7-2
Bluetooth Transmission Plot – Antenna WF8, Variant 1

Equation 7-1
Bluetooth Duty Cycle Calculation – Antenna WF8, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.886\ ms}{3.750\ ms} * 100\% = 77.0\%$$

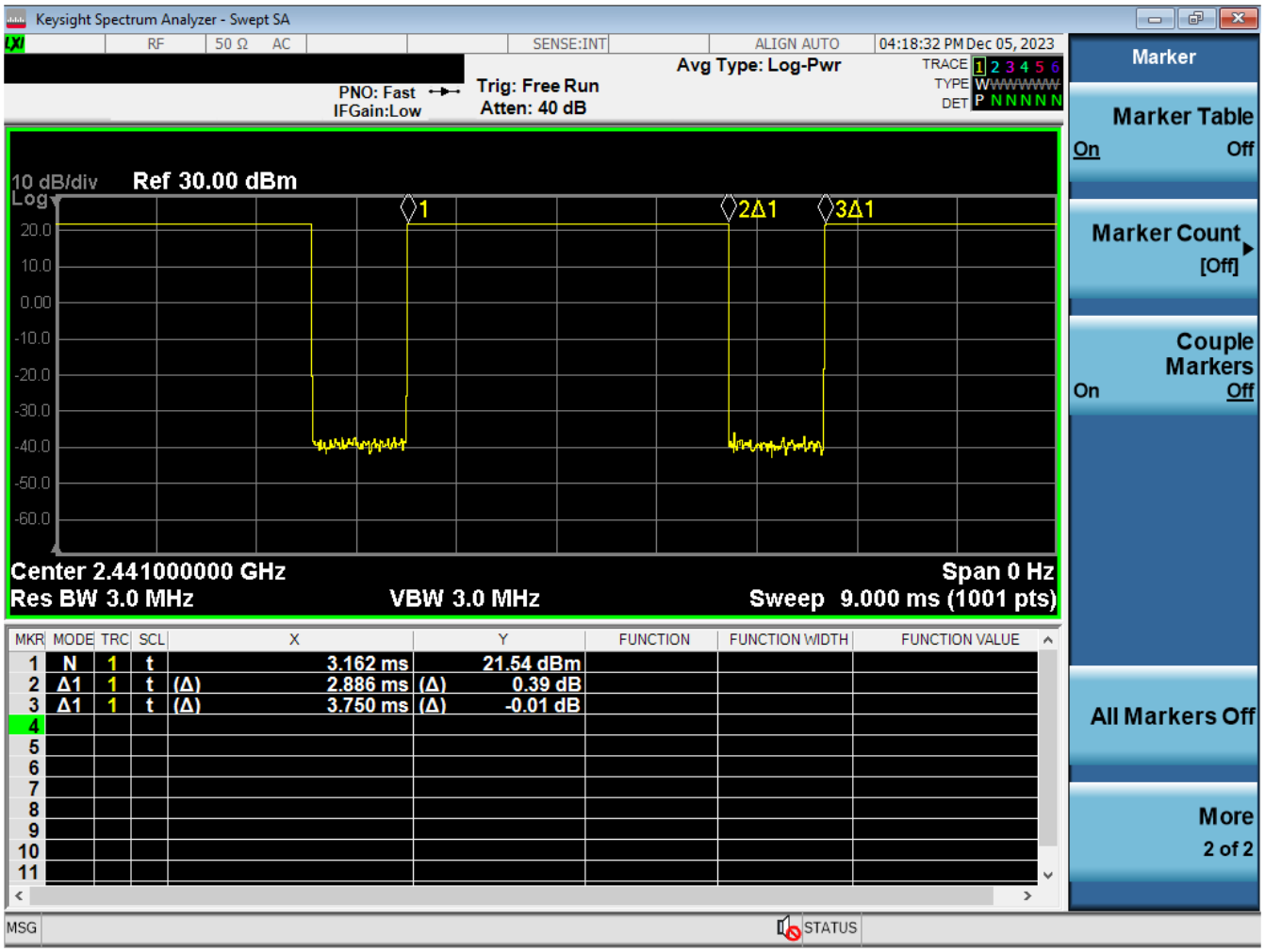


Figure 7-3
Bluetooth Transmission Plot – Antenna WF8, Variant 2

Equation 7-2
Bluetooth Duty Cycle Calculation – Antenna WF8, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.886\ ms}{3.750\ ms} * 100\% = 77.0\%$$

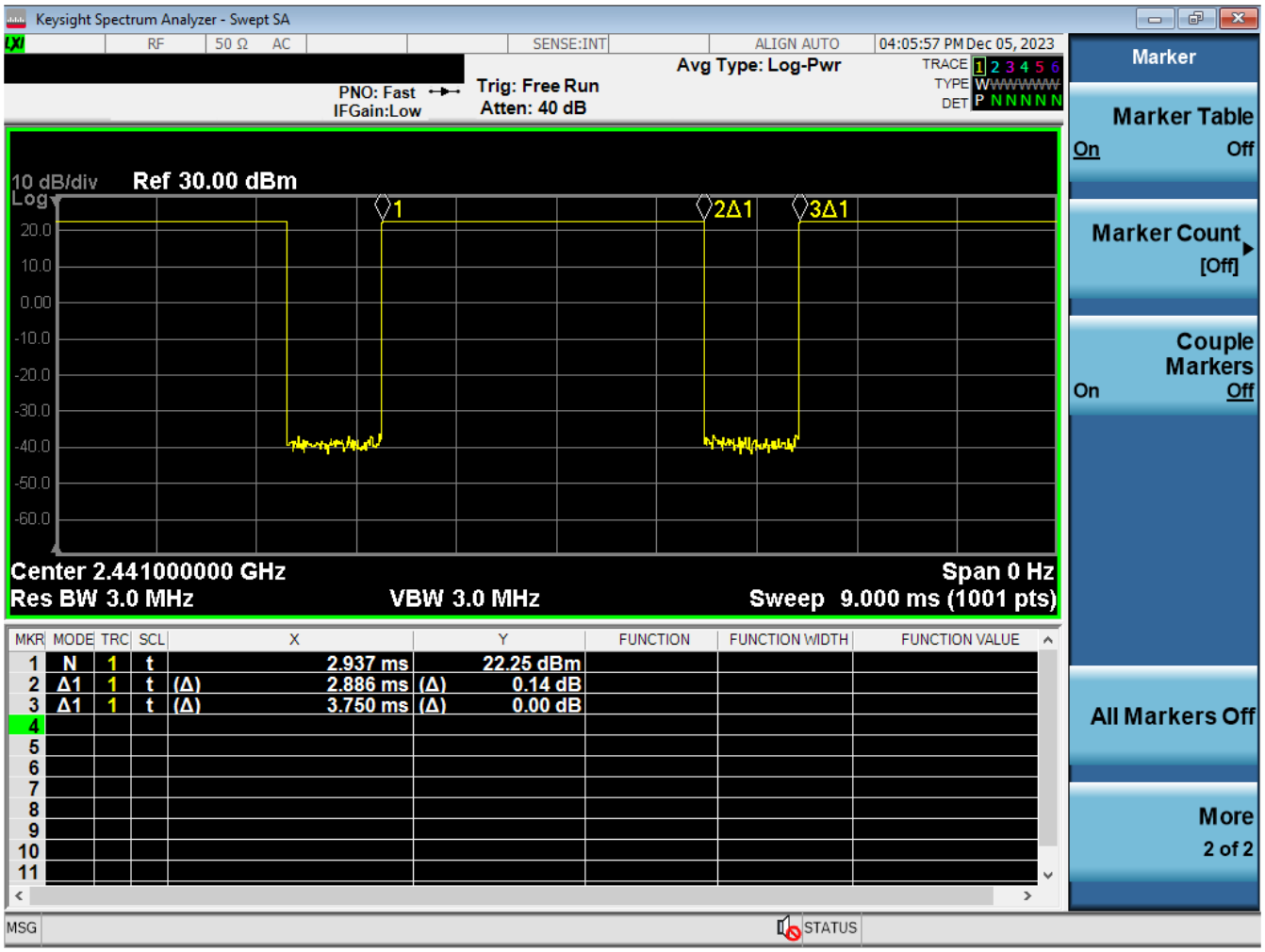


Figure 7-4
Bluetooth Transmission Plot – Antenna WF7b, Variant 1

Equation 7-3
Bluetooth Duty Cycle Calculation – Antenna WF7b, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.886\ ms}{3.750\ ms} * 100\% = 77.0\%$$

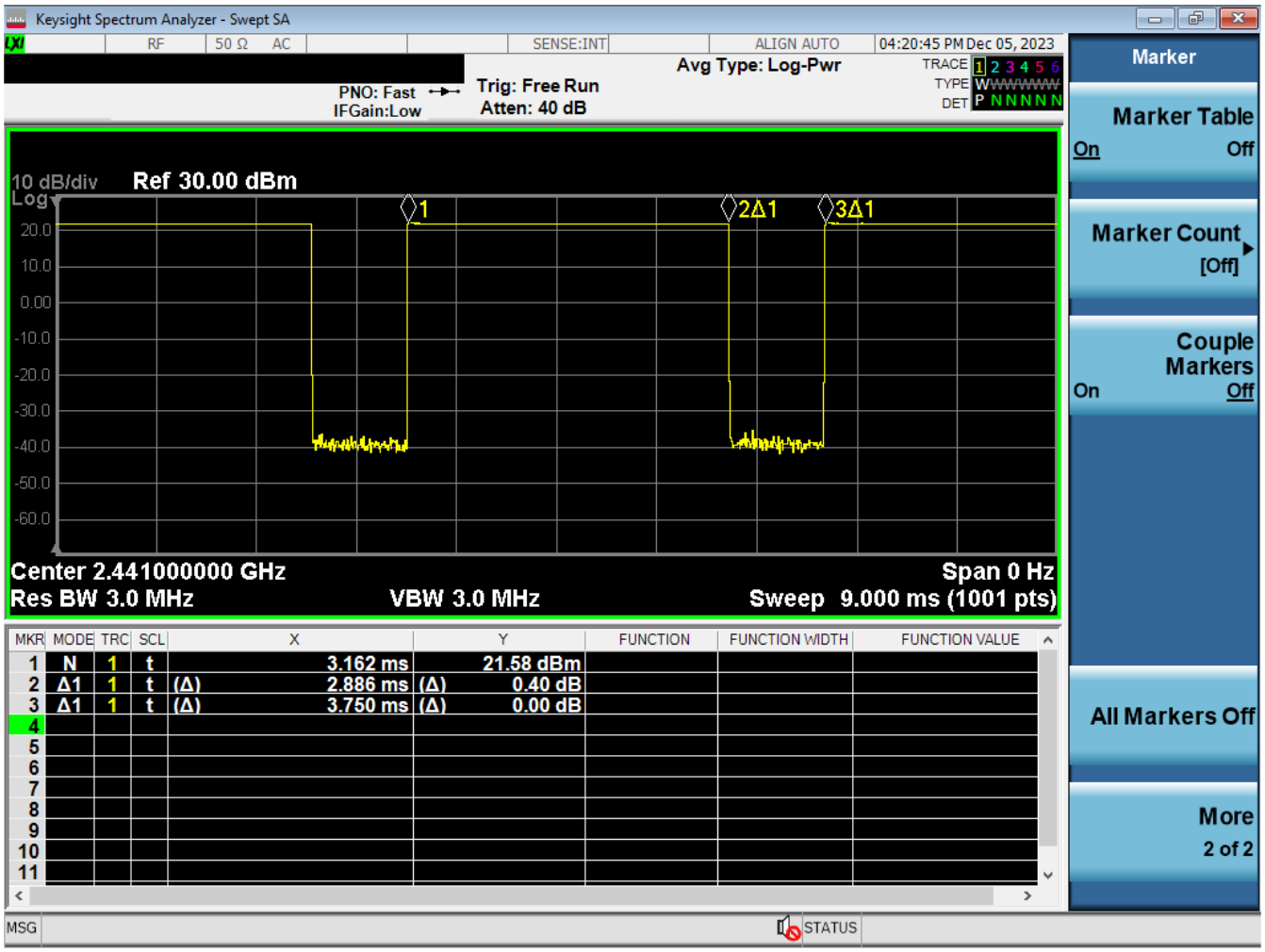
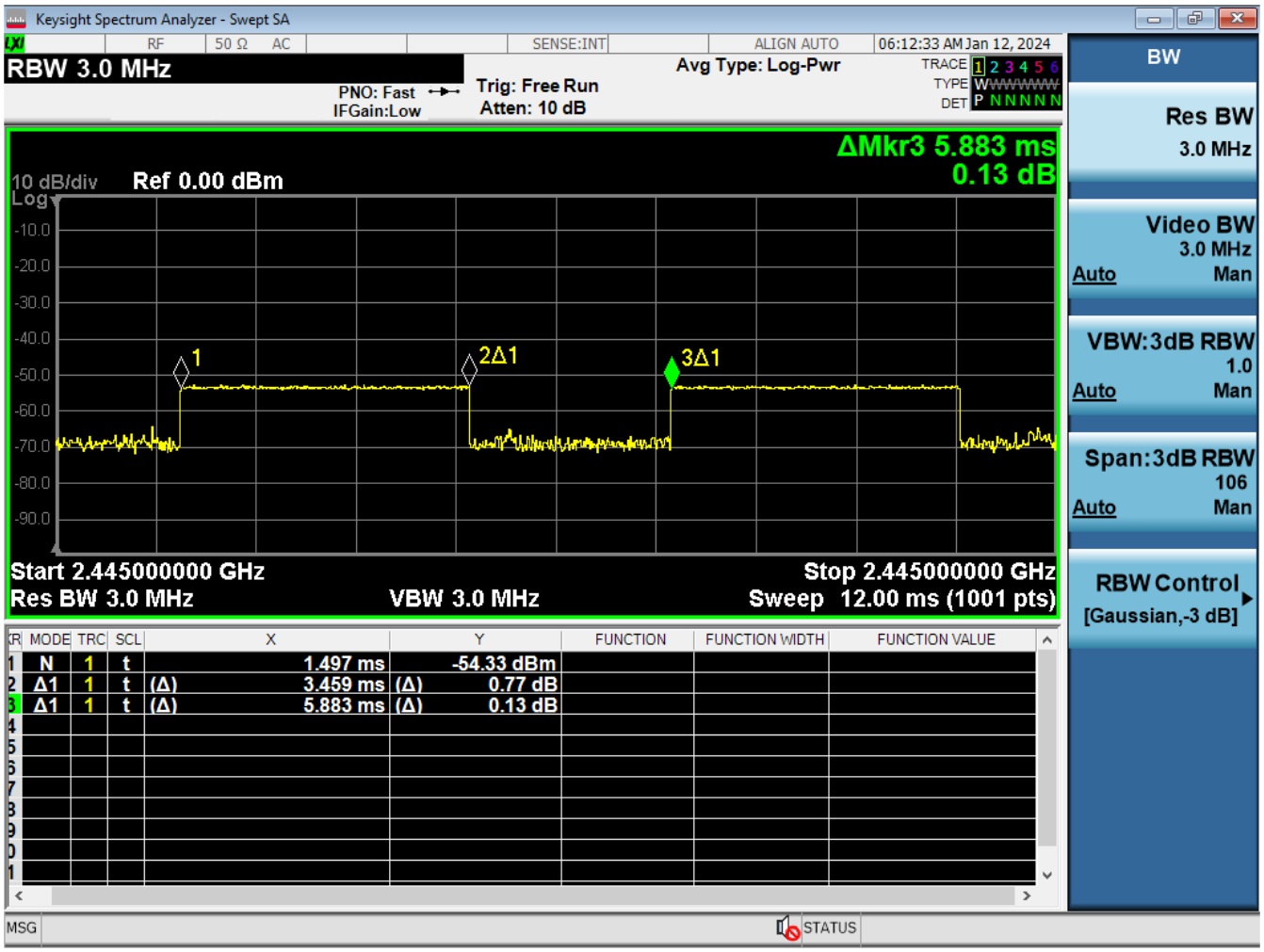


Figure 7-5
Bluetooth Transmission Plot – Antenna WF7b, Variant 2

Equation 7-4
Bluetooth Duty Cycle Calculation – Antenna WF7b, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.886\ ms}{3.750\ ms} * 100\% = 77.0\%$$

7.10 802.15.4 Duty Cycle Plots

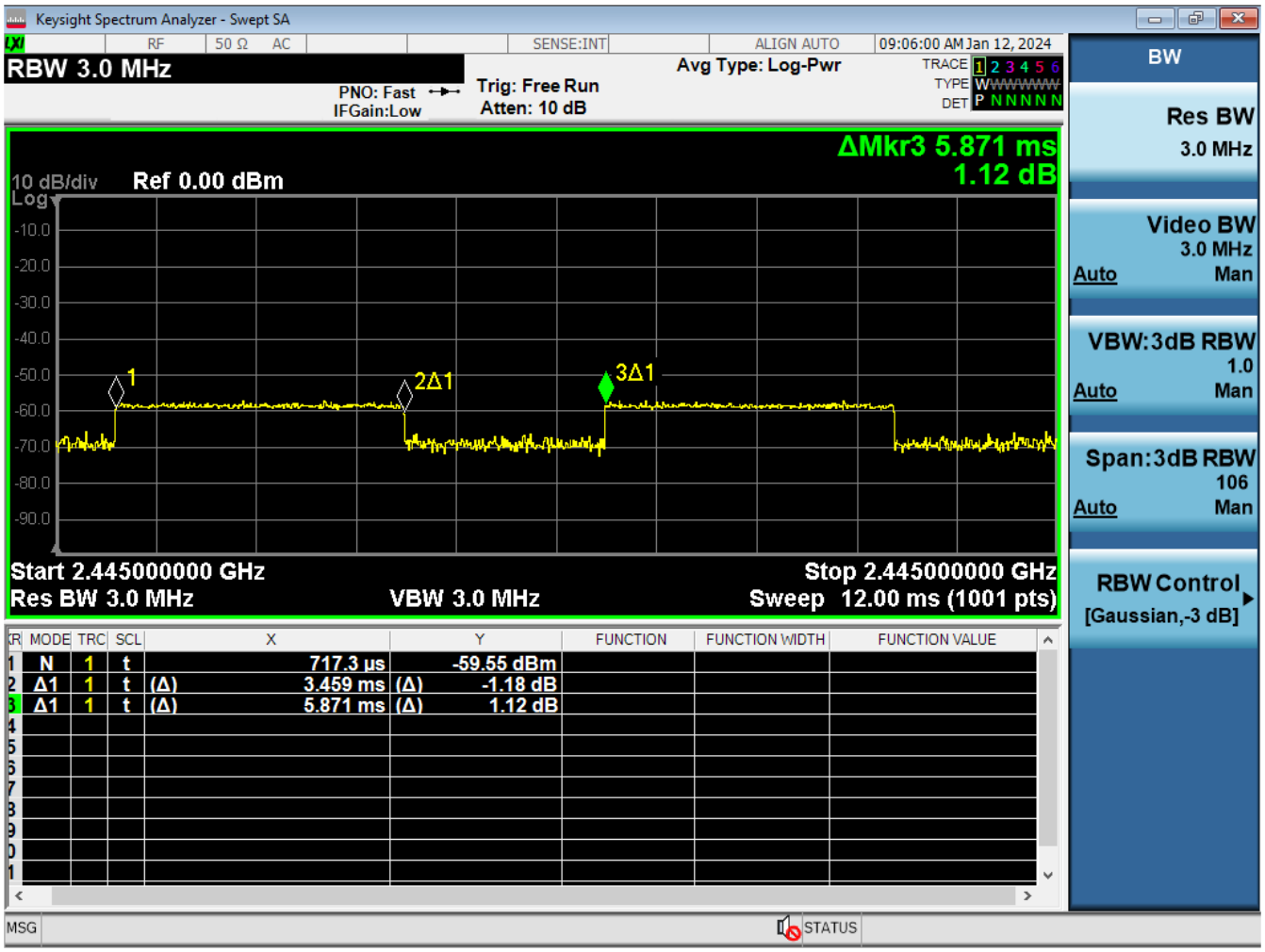


Note: Measured duty cycle as shown above is within the device maximum source-based duty cycle of 60%.

Figure 7-6
802.15.4 Transmission Plot – Variant 1

Equation 7-5
802.15.4 Duty Cycle Calculation – Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{3.459\ ms}{5.883\ ms} * 100\% = 58.80\%$$

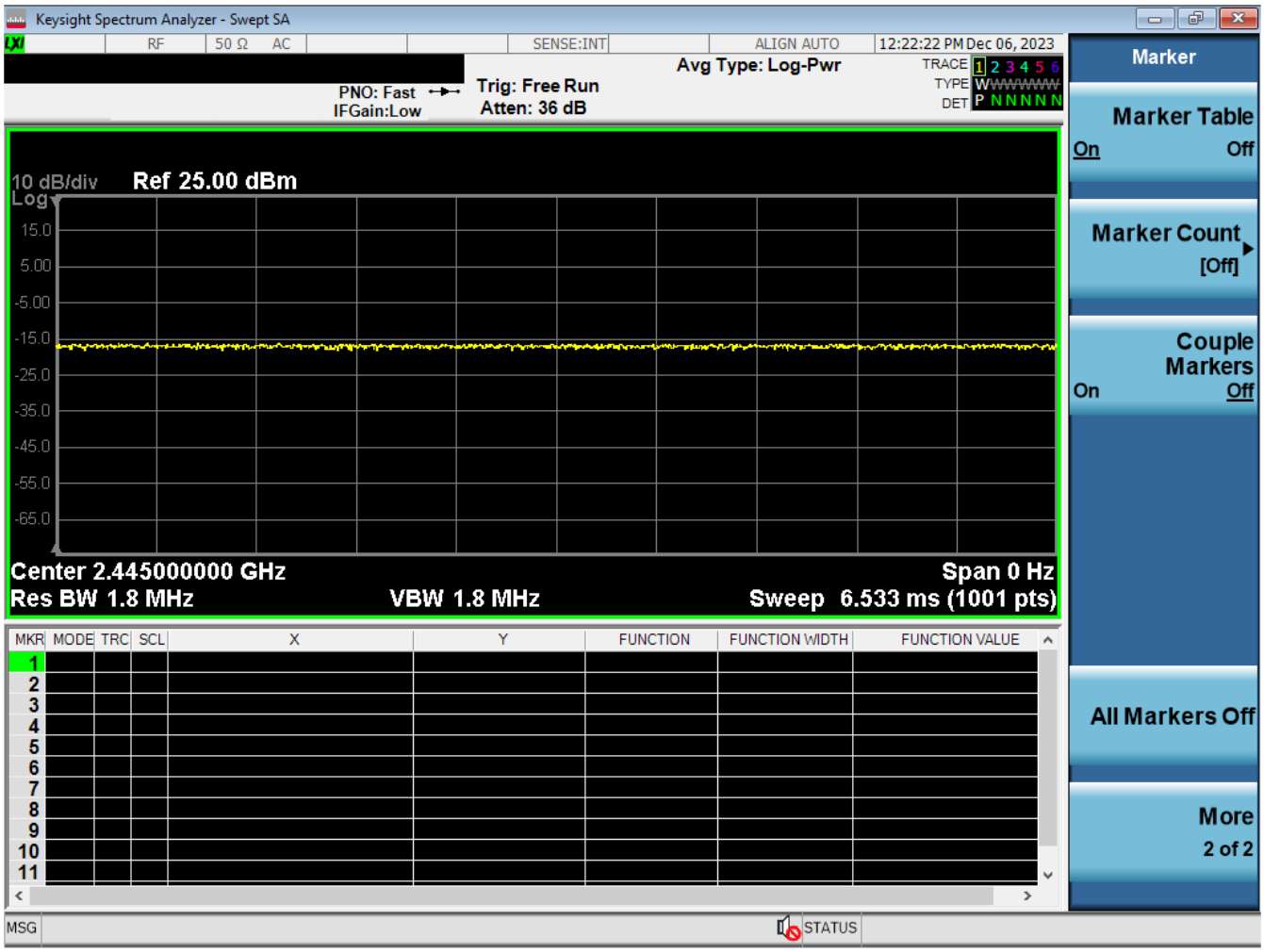


Note: Measured duty cycle as shown above is within the device maximum source-based duty cycle of 60%.

Figure 7-7
802.15.4 Transmission Plot – Variant 2

Equation 7-6
802.15.4 Duty Cycle Calculation – Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{3.459\ ms}{5.871\ ms} * 100\% = 59.92\%$$



Note: Test mode measured duty cycle for 802.15.4 during SAR measurement.

Figure 7-8
802.15.4 Transmission Plot – Antenna WF8 /WF7b, Variant 1 and 2

Equation 7-7
802.15.4 Duty Cycle Calculation – Antenna WF8 /WF7b, Variant 1 and 2

$$Duty\ Cycle = 100\%$$

7.11 NB UNII Duty Cycle Plots

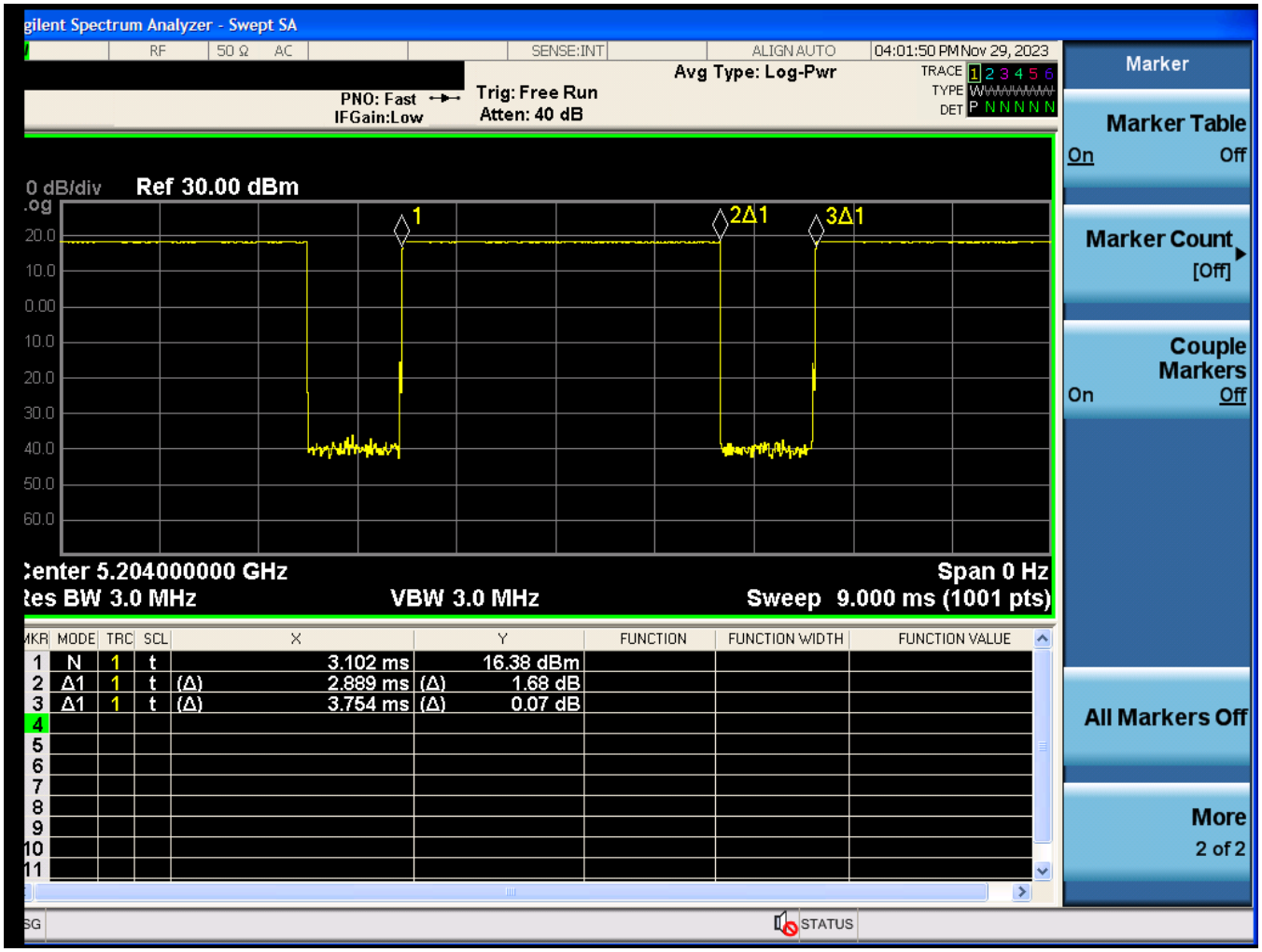


Figure 7-9
NB UNII 1 (HDR8) Transmission Plot – Antenna WF8, Variant 1

Equation 7-8
NB UNII 1 (HDR8) Duty Cycle Calculation – Antenna WF8, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889\ ms}{3.754\ ms} * 100\% = 77.0\%$$

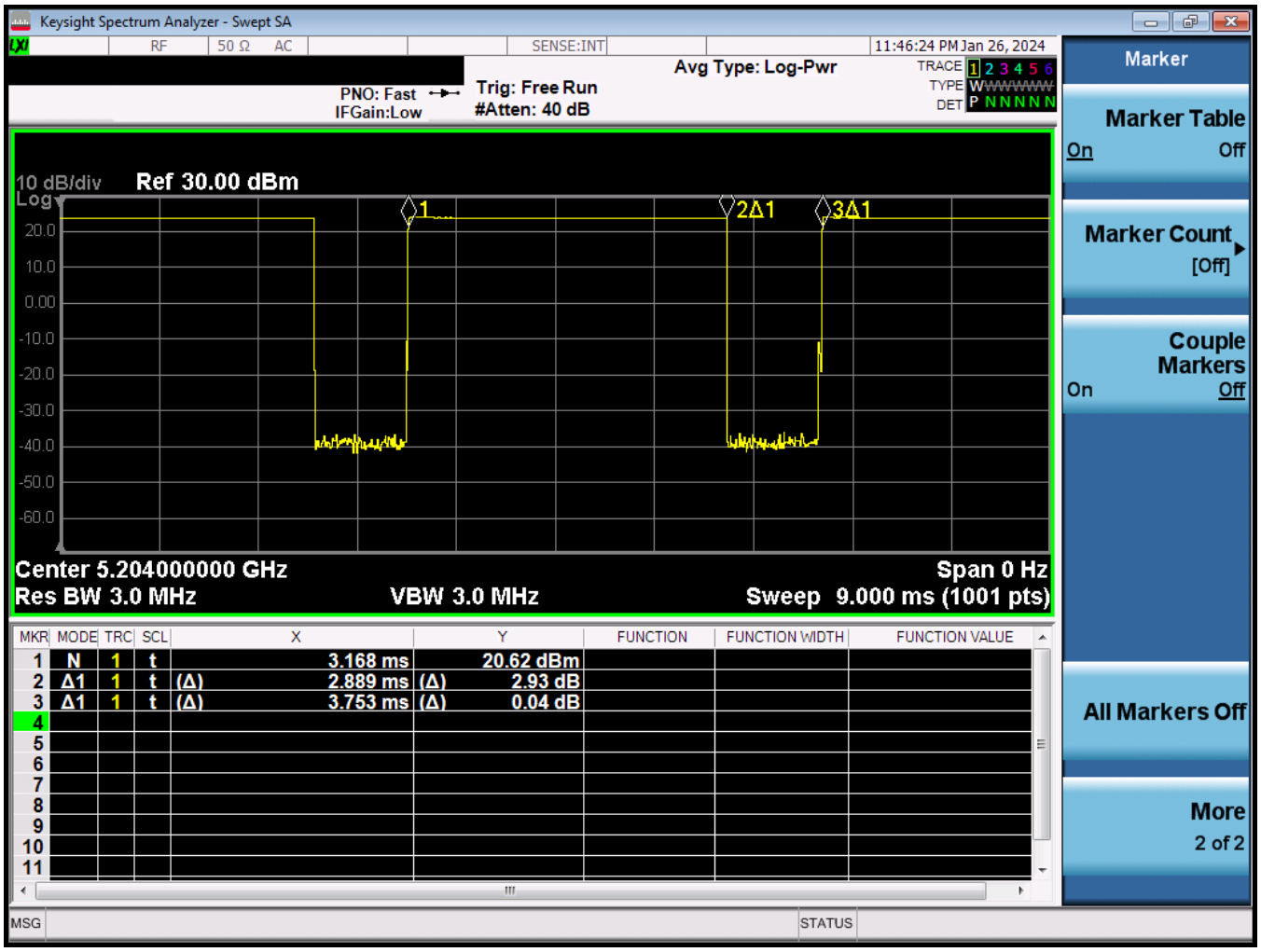


Figure 7-10
NB UNII 1 (BDR) Transmission Plot – Antenna WF8, Variant 1

Equation 7-9
NB UNII 1 (BDR) Duty Cycle Calculation – Antenna WF8, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889\ ms}{3.753\ ms} * 100\% = 77.0\%$$

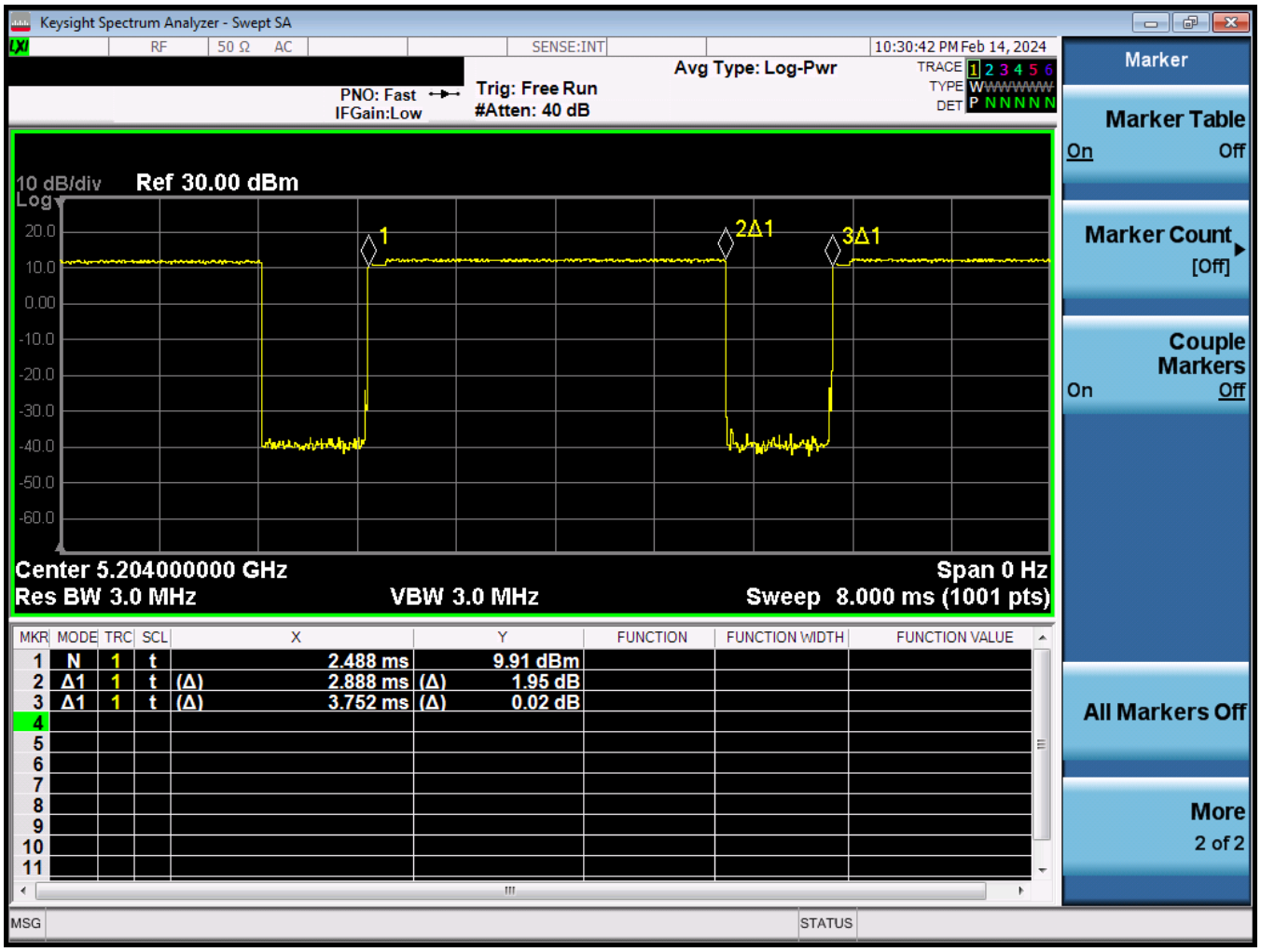


Figure 7-11
NB UNII 1 (HDR8) Transmission Plot – Antenna WF8, Variant 2

Equation 7-10
NB UNII 1 (HDR8) Duty Cycle Calculation – Antenna WF8, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.888\ ms}{3.752\ ms} * 100\% = 77.0\%$$

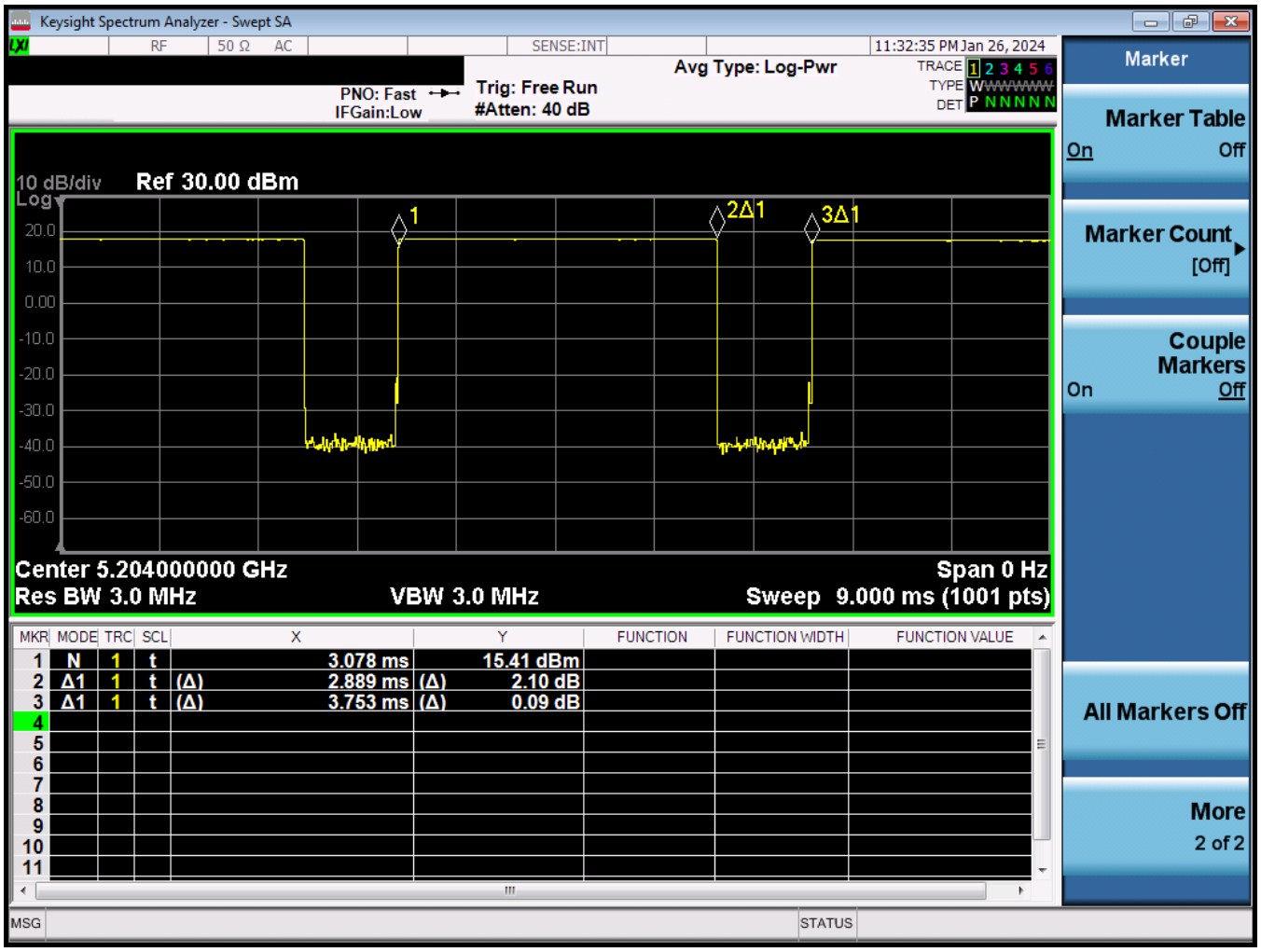


Figure 7-12
NB UNII 1 (BDR) Transmission Plot – Antenna WF8, Variant 2

Equation 7-11
NB UNII 1 (BDR) Duty Cycle Calculation – Antenna WF8, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889\ ms}{3.753\ ms} * 100\% = 77.0\%$$

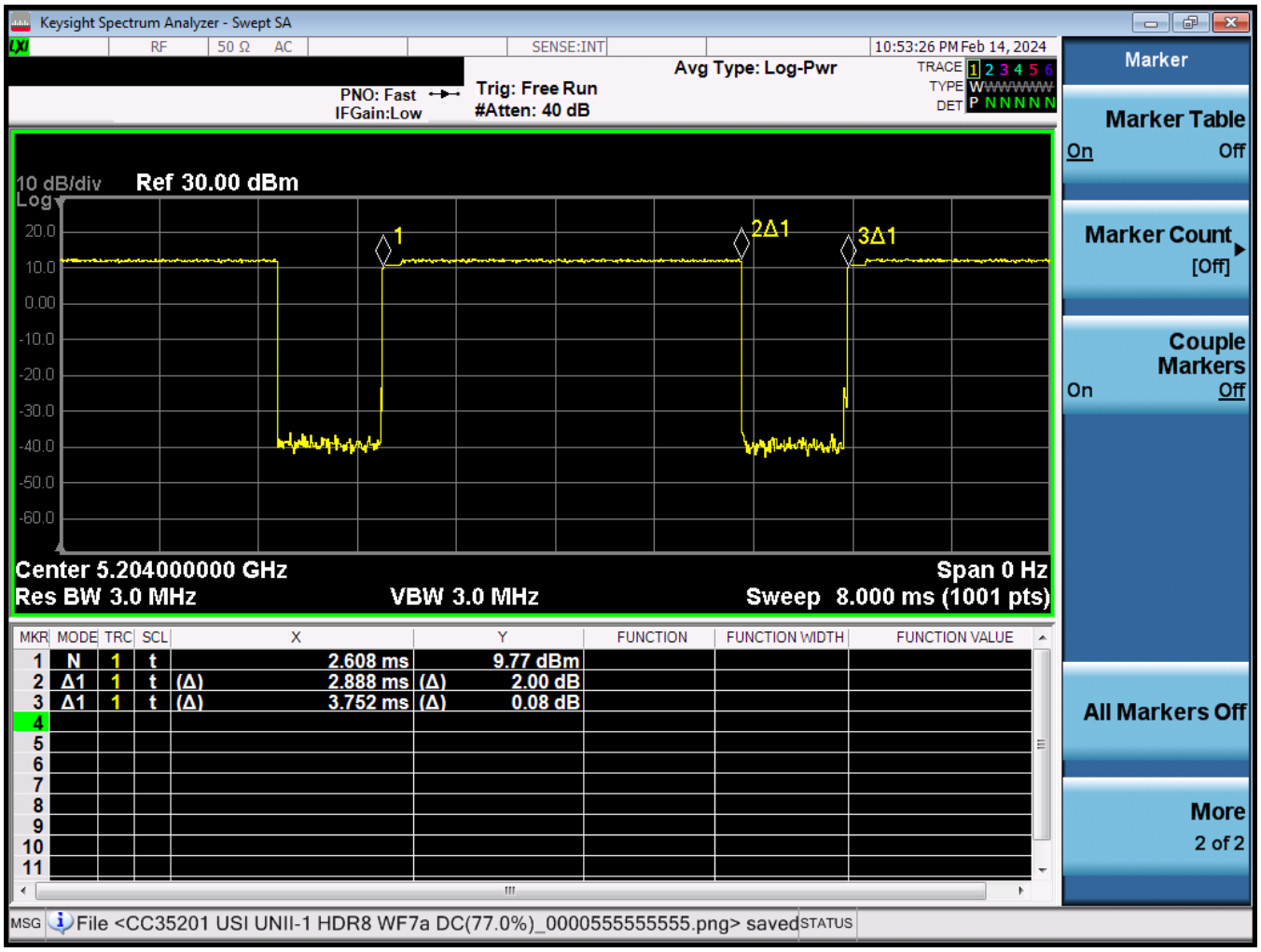


Figure 7-13
NB UNII 1 (HDR8) Transmission Plot – Antenna WF7a, Variant 1

Equation 7-12
NB UNII 1 (HDR8) Duty Cycle Calculation – Antenna WF7a, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.888\ ms}{3.752\ ms} * 100\% = 77.0\%$$

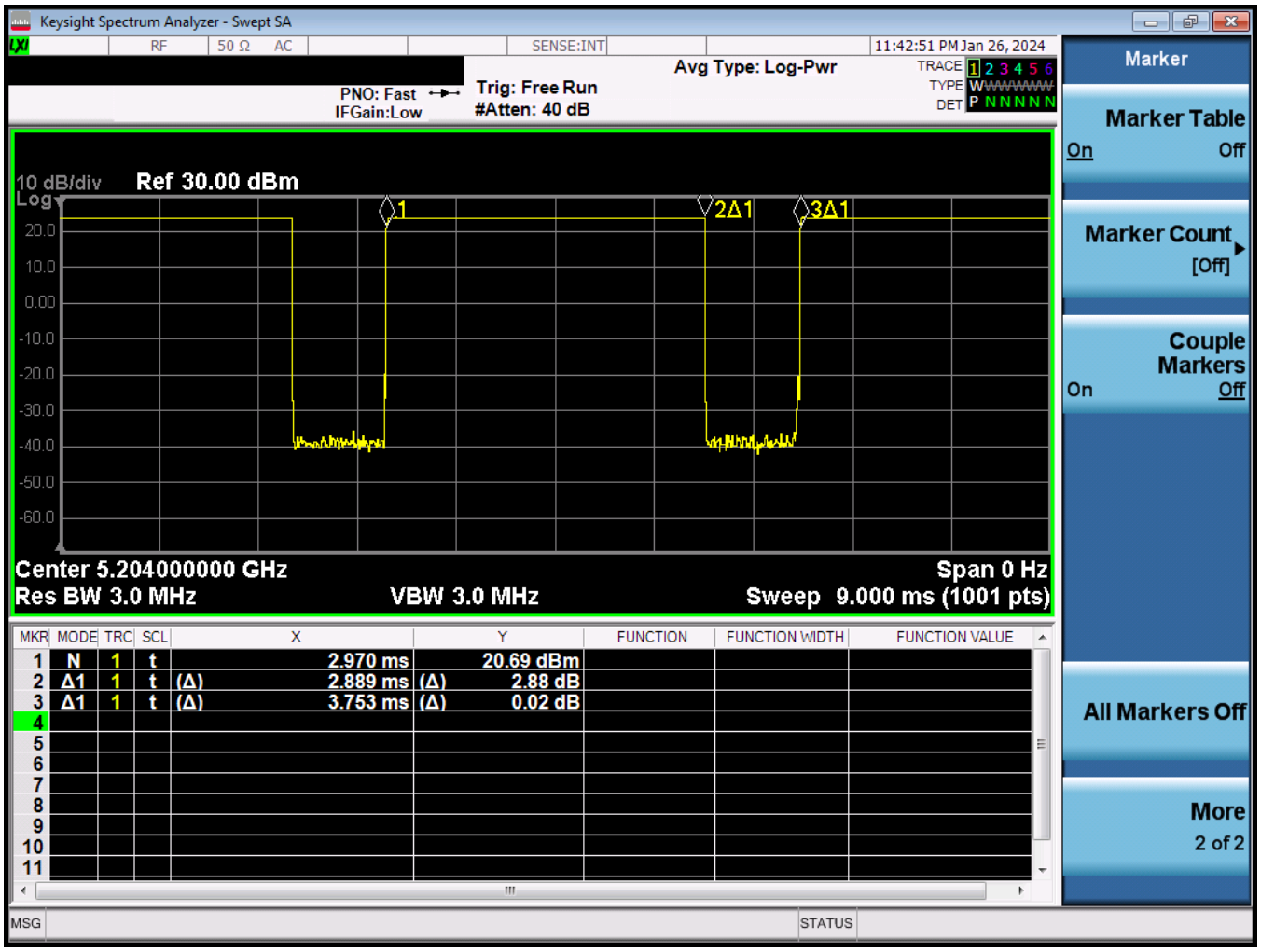


Figure 7-14
NB UNII 1 (BDR) Transmission Plot – Antenna WF7a, Variant 1

Equation 7-13
NB UNII 1 (BDR) Duty Cycle Calculation – Antenna WF7a, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889\ ms}{3.753\ ms} * 100\% = 77.0\%$$

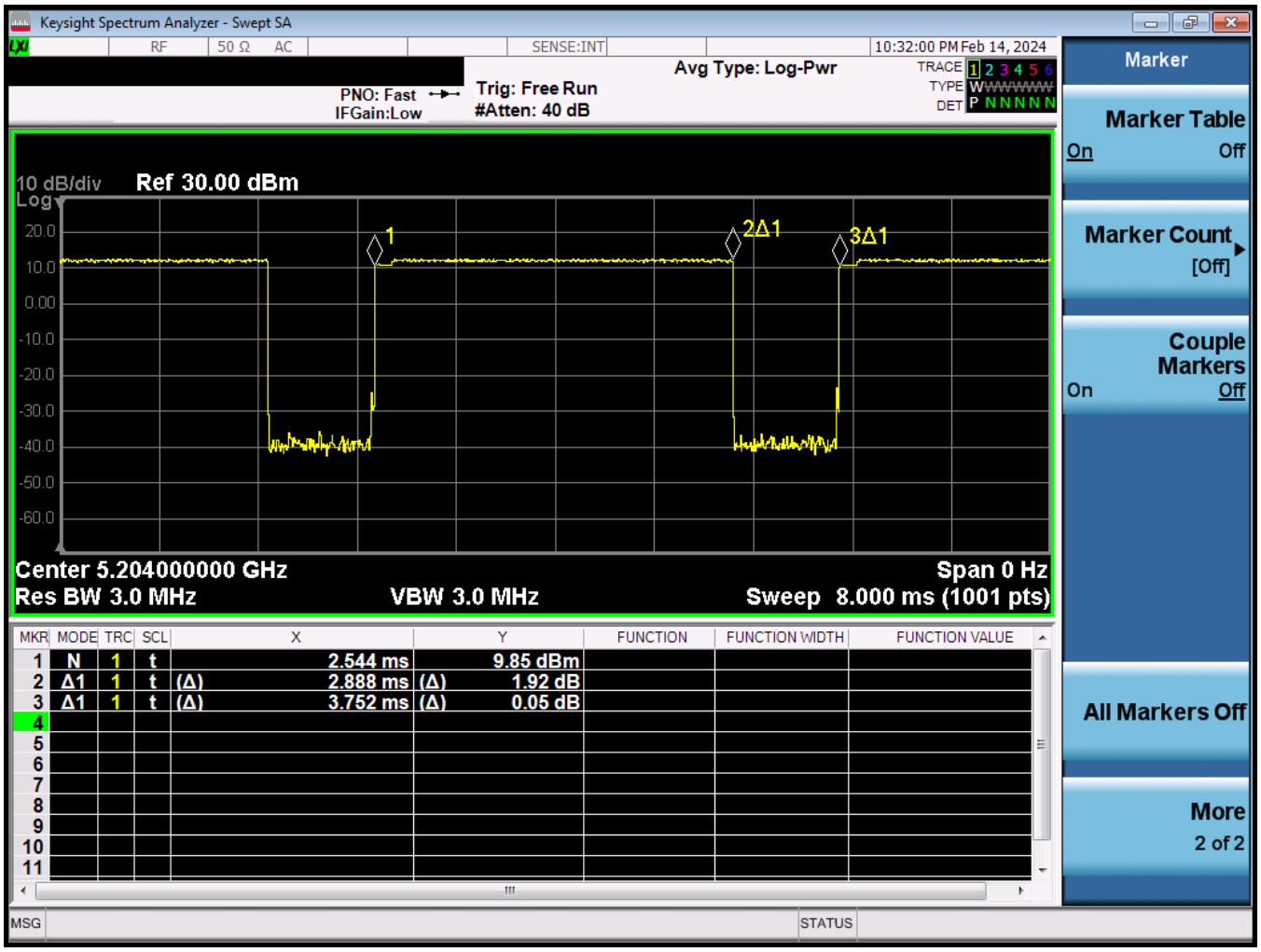


Figure 7-15
NB UNII 1 (HDR8) Transmission Plot – Antenna WF7a, Variant 2

Equation 7-14
NB UNII 1 (HDR8) Duty Cycle Calculation – Antenna WF7a, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.888\ ms}{3.752\ ms} * 100\% = 77.0\%$$

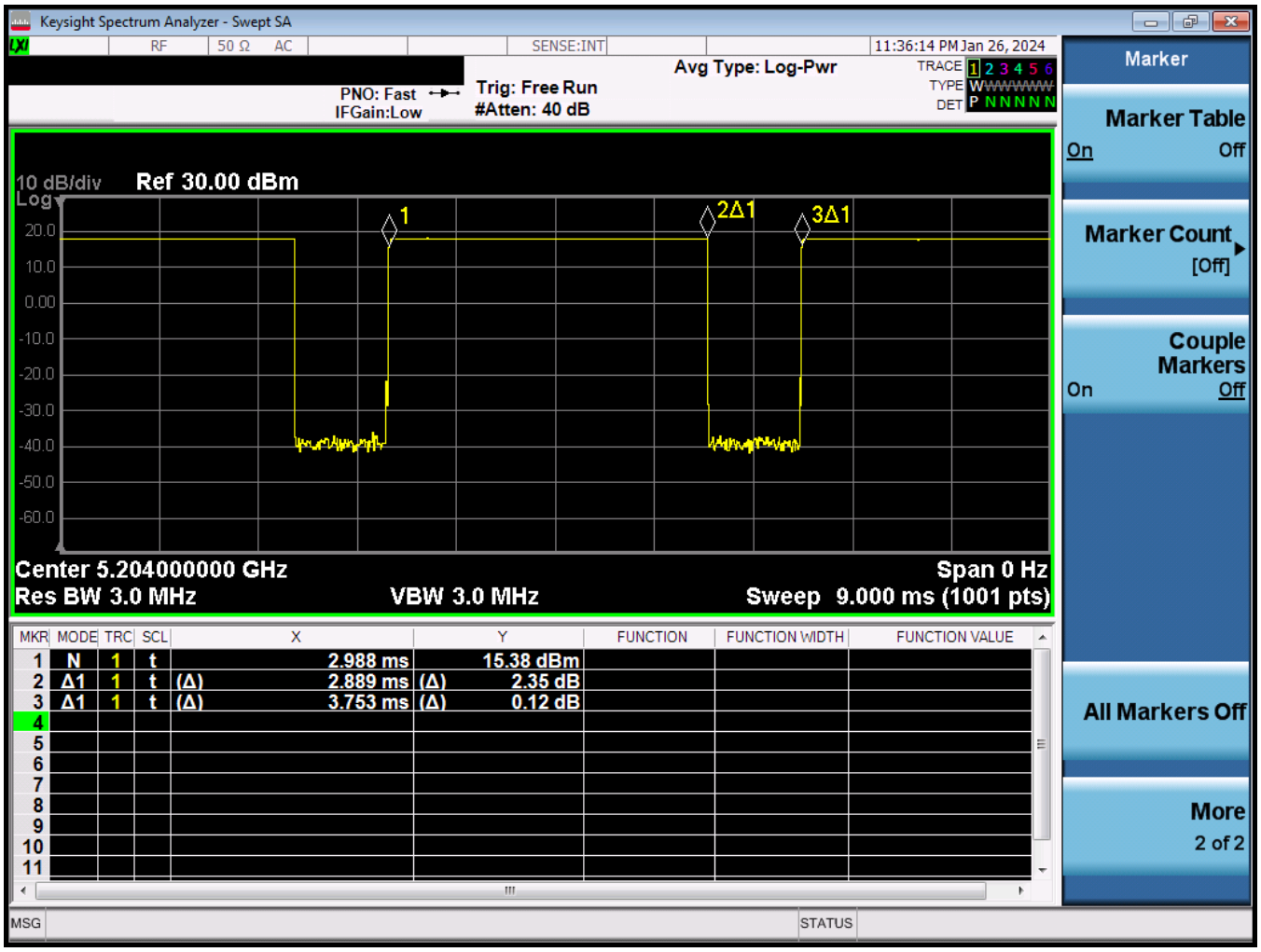


Figure 7-16
NB UNII 1 (BDR) Transmission Plot – Antenna WF7a, Variant 2

Equation 7-15
NB UNII 1 (BDR) Duty Cycle Calculation – Antenna WF7a, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889\ ms}{3.753\ ms} * 100\% = 77.0\%$$

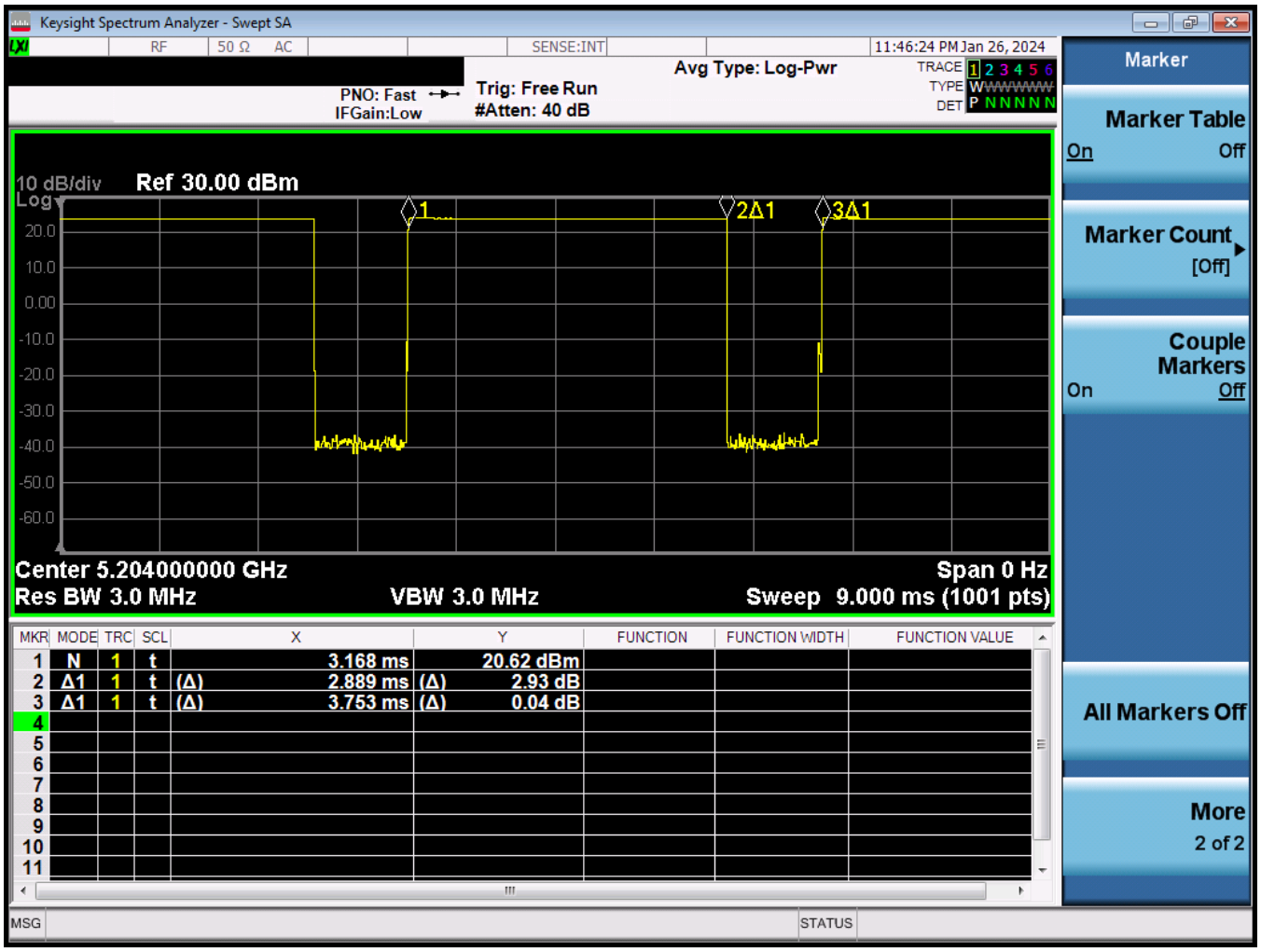


Figure 7-17
NB UNII 3 (BDR) Transmission Plot – Antenna WF8, Variant 1

Equation 7-16
NB UNII 3 (BDR) Duty Cycle Calculation – Antenna WF8, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.889\ ms}{3.753\ ms} * 100\% = 77.0\%$$

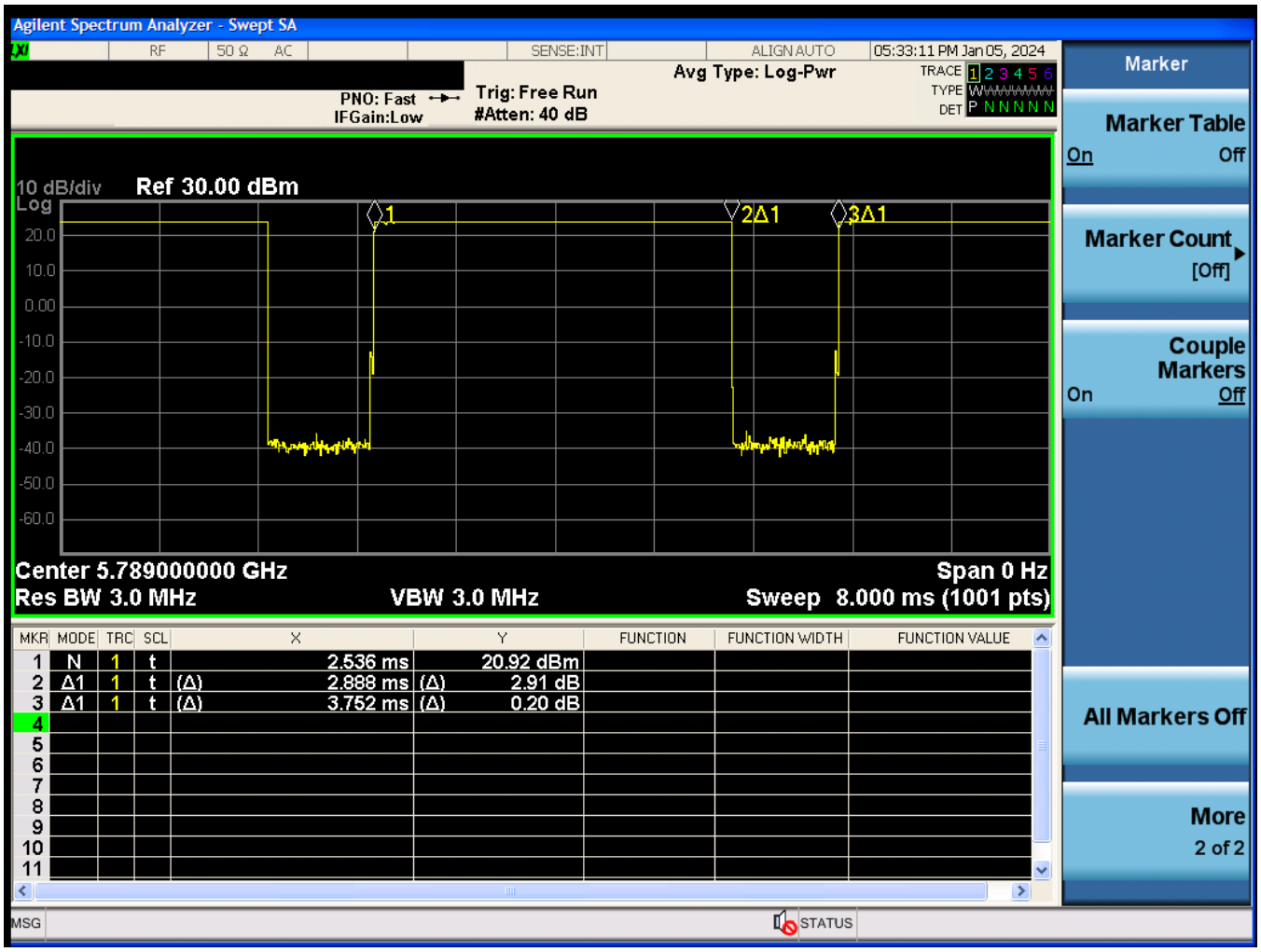


Figure 7-18
NB UNII 3 (BDR) Transmission Plot – Antenna WF8, Variant 2

Equation 7-17
NB UNII 3 (BDR) Duty Cycle Calculation – Antenna WF8, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.888\ ms}{3.752\ ms} * 100\% = 77.0\%$$

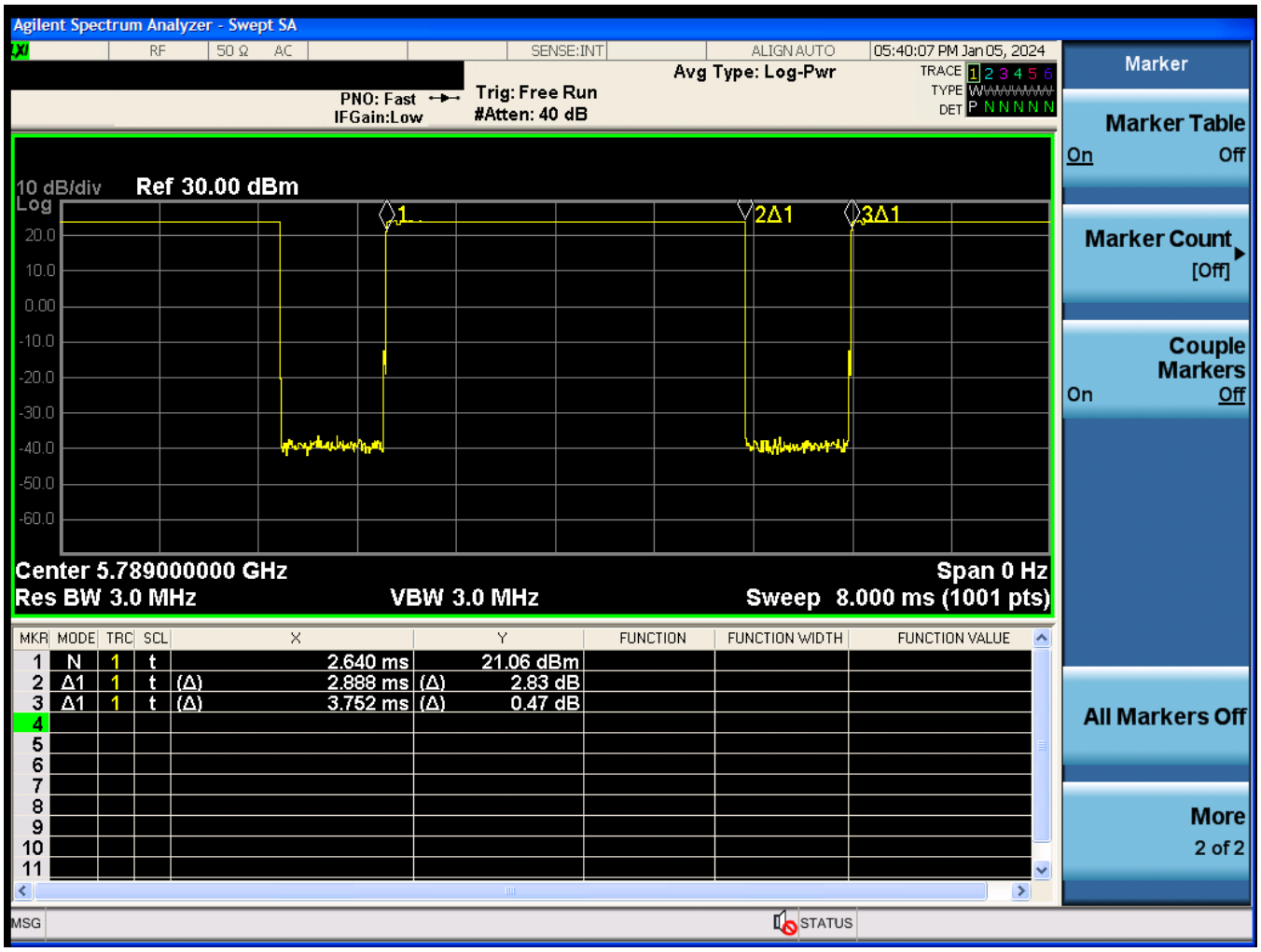


Figure 7-19
NB UNII 3 (BDR) Transmission Plot – Antenna WF7a, Variant 1

Equation 7-18
NB UNII 3 (BDR) Duty Cycle Calculation – Antenna WF7a, Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.888\ ms}{3.752\ ms} * 100\% = 77.0\%$$

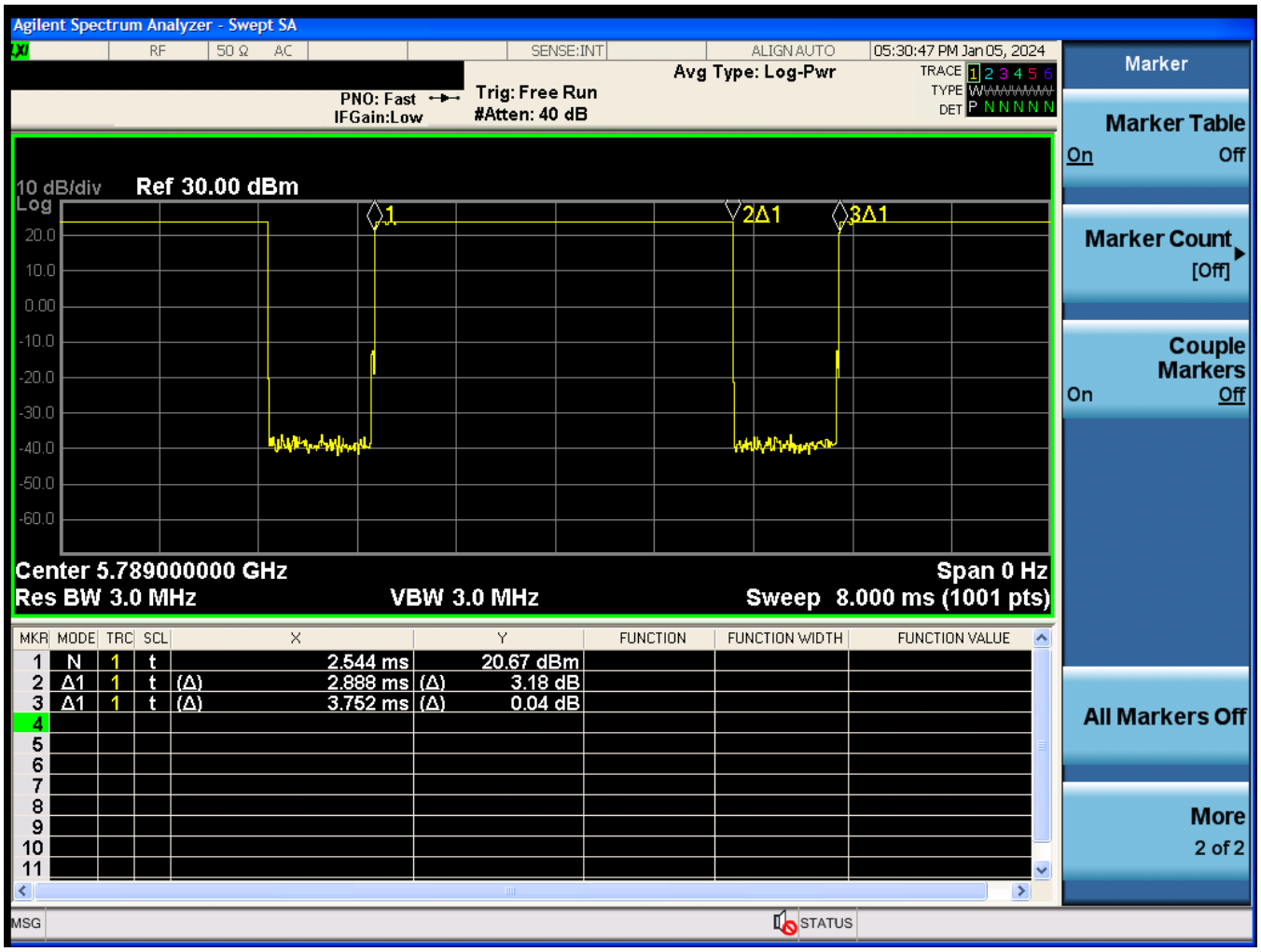


Figure 7-20
NB UNII 3 (BDR) Transmission Plot – Antenna WF7a, Variant 2

Equation 7-19
NB UNII 3 (BDR) Duty Cycle Calculation – Antenna WF7a, Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.888\ ms}{3.752\ ms} * 100\% = 77.0\%$$

7.12 Bluetooth/NB UNII Power Reduction Verification Summary

Table 7-48
Bluetooth Power Reduction Verification

Antenna	Mode/Band	Condition (s)	Maximum Scenario Maximum Allowed Tune Up Power [dBm]	Reduced Scenario Maximum Allowed Tune Up Power [dBm]	Maximum Measured Power [dBm]	Reduced Measured Power [dBm]	Verdict
Ant WF7b	2.4 GHz Bluetooth	5/6 GHz WLAN Ant WF7A ON	20.0	13.0	18.01	11.98	PASS
	2.4 GHz Bluetooth	5/6 GHz WLAN Ant WF8 ON	20.0	13.0	18.01	11.98	PASS
	802.15.4	5/6 GHz WLAN Ant WF7A + Ant WF8 ON	21.5	14.5	19.75	13.48	PASS
Ant WF8	802.15.4	5/6 GHz WLAN Ant WF7A ON	21.0	14.0	20.00	13.75	PASS
	802.15.4	5/6 GHz WLAN Ant WF8 ON	21.0	14.0	20.00	13.75	PASS
	2.4 GHz Bluetooth	5/6 GHz WLAN Ant WF7A + Ant WF8 ON	20.0	13.0	18.45	11.06	PASS

Maximum power will not exceed minimum of (SAR max cap, Reg max cap). Power reduction backoff for simultaneous transmission is applied to SAR max cap for each antenna. Reduced power level will not exceed minimum of (SAR max cap-power reduction backoff, Reg max cap).

Conducted powers were measured for each mode/band and applied condition. All conducted power measurements were verified to be below the maximum allowed.

Table 7-49
NB UNII Power Reduction Verification

Antenna	Mode/Band	Condition (s)	Maximum Scenario Maximum Allowed Tune Up Power [dBm]	Reduced Scenario Maximum Allowed Tune Up Power [dBm]	Maximum Measured Power [dBm]	Reduced Measured Power [dBm]	Verdict
Ant WF7a	NB UNII	2.4 GHz WLAN Ant WF7B ON	13.5	8.5	11.71	6.80	PASS
	NB UNII	2.4 GHz WLAN Ant WF8 ON	13.5	8.5	11.71	6.80	PASS
	NB UNII	2.4 GHz WLAN Ant WF7B + Ant WF8 ON	13.5	8.5	11.71	6.80	PASS
Ant WF8	NB UNII	2.4 GHz WLAN Ant WF7B ON	13.5	10.0	11.82	9.35	PASS
	NB UNII	2.4 GHz WLAN Ant WF8 ON	13.5	10.0	11.82	9.35	PASS
	NB UNII	2.4 GHz WLAN Ant WF7B + Ant WF8 ON	13.5	10.0	11.82	9.35	PASS

Maximum power will not exceed minimum of (SAR max cap, Reg max cap). Power reduction backoff for simultaneous transmission is applied to SAR max cap for each antenna. Reduced power level will not exceed minimum of (SAR max cap-power reduction backoff, Reg max cap).

Per manufacturer, 2.4 GHz Bluetooth and 802.15.4 share the same antenna path and reduces with the same power backoff when it transmits simultaneously with cellular and 5/6 GHz WLAN antennas. Therefore, conducted power measurements were measured for both mode/band as shown above and applied condition. All conducted power measurements were verified to be below the maximum allowed.

7.13 Notes for Bluetooth

- The Bluetooth chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with identical mechanical structures to meet the same specifications and functions. Two device variants are referenced as Variant 1 and Variant 2 in this report.
- Bluetooth SAR worst case configuration was spotchecked on Variant 1 and Variant 2.
- Full power measurements were performed for Variant 1 and Variant 2 per FCC KDB Procedures 248227.

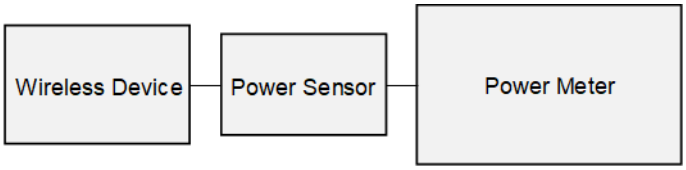


Figure 7-17
Power Measurement Setup

8 SYSTEM VERIFICATION

8.1 Tissue Verification

Table 8-1
Measured 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
01/02/2024	30 Head	22.6	12	0.725	53.346	0.750	55.000	-3.33%	-3.01%
			13	0.725	53.337	0.750	55.000	-3.33%	-3.02%
			14	0.725	53.291	0.750	55.000	-3.33%	-3.11%
			30	0.728	52.949	0.750	55.000	-2.93%	-3.73%
			60	0.733	52.109	0.753	54.325	-2.66%	-4.08%
			65	0.735	52.018	0.753	54.213	-2.39%	-4.05%
11/29/2023	2450 Head	19.0	2300	1.652	40.912	1.670	39.500	-1.08%	3.57%
			2310	1.659	40.909	1.679	39.480	-1.19%	3.62%
			2320	1.666	40.900	1.687	39.460	-1.24%	3.65%
			2400	1.729	40.760	1.756	39.289	-1.54%	3.74%
			2450	1.766	40.692	1.800	39.200	-1.89%	3.81%
			2480	1.789	40.638	1.833	39.162	-2.40%	3.77%
			2500	1.806	40.607	1.855	39.136	-2.64%	3.76%
			2510	1.816	40.592	1.866	39.123	-2.68%	3.75%
			2535	1.837	40.557	1.893	39.092	-2.96%	3.75%
			2550	1.848	40.535	1.909	39.073	-3.20%	3.74%
			2560	1.855	40.524	1.920	39.060	-3.39%	3.75%
			2600	1.888	40.457	1.964	39.009	-3.87%	3.71%
			2650	1.933	40.391	2.018	38.945	-4.21%	3.71%
			2680	1.956	40.344	2.051	38.907	-4.63%	3.69%
			2700	1.974	40.294	2.073	38.882	-4.78%	3.63%
11/29/2023	2450 Head	24.8	2300	1.694	38.619	1.670	39.500	1.44%	-2.23%
			2310	1.705	38.578	1.679	39.480	1.55%	-2.28%
			2320	1.717	38.537	1.687	39.460	1.78%	-2.34%
			2400	1.809	38.213	1.756	39.289	3.02%	-2.74%
			2450	1.869	38.018	1.800	39.200	3.83%	-3.02%
			2480	1.903	37.889	1.833	39.162	3.82%	-3.25%
			2500	1.925	37.796	1.855	39.136	3.77%	-3.42%
			2510	1.936	37.751	1.866	39.123	3.75%	-3.51%
			2535	1.965	37.654	1.893	39.092	3.80%	-3.68%
			2550	1.984	37.596	1.909	39.073	3.93%	-3.78%
			2560	1.995	37.554	1.920	39.060	3.91%	-3.86%
			2600	2.041	37.374	1.964	39.009	3.92%	-4.19%
			2650	2.099	37.176	2.018	38.945	4.01%	-4.54%
			2680	2.133	37.049	2.051	38.907	4.00%	-4.78%
			2700	2.156	36.965	2.073	38.882	4.00%	-4.93%
02/26/2024	2450 Head	19.0	2300	1.626	38.739	1.670	39.500	-2.63%	-1.93%
			2310	1.635	38.725	1.679	39.480	-2.62%	-1.91%
			2320	1.643	38.713	1.687	39.460	-2.61%	-1.89%
			2400	1.701	38.607	1.756	39.289	-3.13%	-1.74%
			2450	1.745	38.529	1.800	39.200	-3.06%	-1.71%
			2480	1.767	38.486	1.833	39.162	-3.60%	-1.73%
			2500	1.781	38.448	1.855	39.136	-3.99%	-1.76%
			2510	1.788	38.430	1.866	39.123	-4.18%	-1.77%
			2535	1.809	38.392	1.893	39.092	-4.44%	-1.79%
			2550	1.823	38.373	1.909	39.073	-4.50%	-1.79%
			2560	1.831	38.365	1.920	39.060	-4.64%	-1.78%

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
12/14/2023	5200-5800 Head	19.0	5180	4.423	35.050	4.635	36.009	-4.57%	-2.66%
			5190	4.440	35.034	4.645	35.998	-4.41%	-2.68%
			5200	4.453	35.029	4.655	35.986	-4.34%	-2.66%
			5210	4.461	35.023	4.666	35.975	-4.39%	-2.65%
			5220	4.465	35.007	4.676	35.963	-4.51%	-2.66%
			5240	4.487	34.962	4.696	35.940	-4.45%	-2.72%
			5250	4.497	34.960	4.706	35.929	-4.44%	-2.70%
			5260	4.507	34.936	4.717	35.917	-4.45%	-2.73%
			5270	4.523	34.907	4.727	35.906	-4.32%	-2.78%
			5280	4.538	34.872	4.737	35.894	-4.20%	-2.85%
			5290	4.550	34.853	4.748	35.883	-4.17%	-2.87%
			5300	4.560	34.847	4.758	35.871	-4.16%	-2.85%
			5320	4.586	34.837	4.778	35.849	-4.02%	-2.82%
			5500	4.782	34.494	4.963	35.643	-3.65%	-3.22%
			5510	4.789	34.474	4.973	35.632	-3.70%	-3.25%
			5520	4.795	34.457	4.983	35.620	-3.77%	-3.27%
			5530	4.805	34.449	4.994	35.609	-3.78%	-3.26%
			5540	4.820	34.436	5.004	35.597	-3.68%	-3.26%
			5550	4.830	34.427	5.014	35.586	-3.67%	-3.26%
			5560	4.836	34.413	5.024	35.574	-3.74%	-3.26%
			5580	4.852	34.367	5.045	35.551	-3.83%	-3.33%
			5600	4.887	34.292	5.065	35.529	-3.51%	-3.48%
			5610	4.902	34.282	5.076	35.518	-3.43%	-3.48%
			5620	4.915	34.273	5.086	35.506	-3.36%	-3.47%
			5640	4.938	34.243	5.106	35.483	-3.29%	-3.49%
			5660	4.954	34.217	5.127	35.460	-3.37%	-3.51%
			5670	4.960	34.197	5.137	35.449	-3.45%	-3.53%
			5680	4.968	34.168	5.147	35.437	-3.48%	-3.58%
			5690	4.980	34.134	5.158	35.426	-3.45%	-3.65%
			5700	4.998	34.103	5.168	35.414	-3.29%	-3.70%
			5710	5.014	34.082	5.178	35.403	-3.17%	-3.73%
			5720	5.029	34.076	5.188	35.391	-3.06%	-3.72%
			5745	5.054	34.049	5.214	35.363	-3.07%	-3.72%
			5750	5.061	34.041	5.219	35.357	-3.03%	-3.72%
			5755	5.064	34.033	5.224	35.351	-3.06%	-3.73%
			5765	5.072	34.012	5.234	35.340	-3.10%	-3.76%
			5775	5.076	34.000	5.245	35.329	-3.22%	-3.76%
			5785	5.082	33.977	5.255	35.317	-3.29%	-3.79%
			5795	5.092	33.939	5.265	35.305	-3.29%	-3.87%
			5800	5.099	33.921	5.270	35.300	-3.24%	-3.91%
			5800	5.099	33.921	5.270	35.300	-3.24%	-3.91%
			5805	5.108	33.906	5.275	35.294	-3.17%	-3.93%
			5825	5.138	33.874	5.296	35.271	-2.98%	-3.96%
			5835	5.155	33.866	5.305	35.230	-2.83%	-3.87%
			5845	5.166	33.857	5.315	35.210	-2.80%	-3.84%
			5855	5.174	33.845	5.325	35.197	-2.84%	-3.84%
			5865	5.180	33.829	5.336	35.190	-2.92%	-3.87%
			5865	5.180	33.829	5.336	35.190	-2.92%	-3.87%
			5865	5.180	33.829	5.336	35.190	-2.92%	-3.87%
			5865	5.180	33.829	5.336	35.190	-2.92%	-3.87%
			5875	5.190	33.806	5.347	35.183	-2.94%	-3.91%
			5885	5.201	33.786	5.357	35.177	-2.91%	-3.95%
			5905	5.225	33.722	5.379	35.163	-2.86%	-4.10%
12/26/2023	5200-5800 Head	19.8	5180	4.408	35.736	4.635	36.009	-4.90%	-0.76%
			5190	4.419	35.717	4.645	35.998	-4.87%	-0.78%
			5200	4.428	35.708	4.655	35.986	-4.88%	-0.77%
			5210	4.437	35.700	4.666	35.975	-4.91%	-0.76%
			5220	4.450	35.681	4.676	35.963	-4.83%	-0.78%
			5240	4.476	35.616	4.696	35.940	-4.68%	-0.90%
			5250	4.486	35.606	4.706	35.929	-4.67%	-0.90%
			5260	4.494	35.592	4.717	35.917	-4.73%	-0.90%
			5270	4.505	35.568	4.727	35.906	-4.70%	-0.94%
			5280	4.519	35.545	4.737	35.894	-4.60%	-0.97%
			5290	4.532	35.532	4.748	35.883	-4.55%	-0.98%
			5300	4.540	35.505	4.758	35.871	-4.58%	-1.02%
			5310	4.547	35.482	4.768	35.860	-4.64%	-1.05%
			5320	4.558	35.464	4.778	35.849	-4.60%	-1.07%
			5500	4.755	35.146	4.963	35.643	-4.19%	-1.39%
			5510	4.763	35.130	4.973	35.632	-4.22%	-1.41%
			5520	4.772	35.110	4.983	35.620	-4.23%	-1.43%
			5530	4.783	35.085	4.994	35.609	-4.23%	-1.47%
			5540	4.794	35.059	5.004	35.597	-4.20%	-1.51%
			5550	4.808	35.033	5.014	35.586	-4.11%	-1.55%
			5560	4.820	35.015	5.024	35.574	-4.06%	-1.57%
			5580	4.843	34.971	5.045	35.551	-4.00%	-1.63%
			5600	4.869	34.935	5.065	35.529	-3.87%	-1.67%
			5610	4.879	34.934	5.076	35.518	-3.88%	-1.64%
			5620	4.887	34.917	5.086	35.506	-3.91%	-1.66%
			5640	4.916	34.851	5.106	35.483	-3.72%	-1.78%
			5660	4.941	34.822	5.127	35.460	-3.63%	-1.80%
			5670	4.949	34.819	5.137	35.449	-3.66%	-1.78%
			5680	4.959	34.798	5.147	35.437	-3.65%	-1.80%
			5690	4.970	34.778	5.158	35.426	-3.64%	-1.83%

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
			5690	4.970	34.778	5.158	35.426	-3.64%	-1.83%
			5700	4.976	34.749	5.168	35.414	-3.72%	-1.88%
			5710	4.986	34.725	5.178	35.403	-3.71%	-1.92%
			5720	5.000	34.716	5.188	35.391	-3.62%	-1.91%
			5745	5.032	34.669	5.214	35.363	-3.49%	-1.96%
			5750	5.036	34.657	5.219	35.357	-3.51%	-1.98%
			5755	5.043	34.645	5.224	35.351	-3.46%	-2.00%
			5765	5.055	34.627	5.234	35.340	-3.42%	-2.02%
			5775	5.065	34.611	5.245	35.329	-3.43%	-2.03%
			5785	5.075	34.591	5.255	35.317	-3.43%	-2.06%
			5795	5.087	34.573	5.265	35.305	-3.38%	-2.07%
			5800	5.093	34.566	5.270	35.300	-3.36%	-2.08%
12/26/2023	5200-5800 Head	19.8	5800	5.093	34.566	5.270	35.300	-3.36%	-2.08%
			5805	5.098	34.554	5.275	35.294	-3.36%	-2.10%
			5825	5.118	34.521	5.296	35.271	-3.36%	-2.13%
			5835	5.128	34.515	5.305	35.230	-3.34%	-2.03%
			5845	5.139	34.501	5.315	35.210	-3.31%	-2.01%
			5855	5.152	34.484	5.325	35.197	-3.25%	-2.03%
			5865	5.162	34.454	5.336	35.190	-3.26%	-2.09%
			5865	5.162	34.454	5.336	35.190	-3.26%	-2.09%
			5865	5.162	34.454	5.336	35.190	-3.26%	-2.09%
			5865	5.162	34.454	5.336	35.190	-3.26%	-2.09%
			5875	5.174	34.430	5.347	35.183	-3.24%	-2.14%
			5885	5.183	34.407	5.357	35.177	-3.25%	-2.19%
			5905	5.204	34.371	5.379	35.163	-3.25%	-2.25%
			5935	5.378	35.093	5.411	35.143	-0.61%	-0.14%
			5970	5.410	35.013	5.448	35.120	-0.70%	-0.30%
			5985	5.433	34.973	5.464	35.110	-0.57%	-0.39%
			6000	5.458	34.947	5.480	35.100	-0.40%	-0.44%
			6025	5.491	34.925	5.510	35.070	-0.34%	-0.41%
			6065	5.532	34.848	5.557	35.022	-0.45%	-0.50%
			6075	5.547	34.826	5.569	35.010	-0.40%	-0.53%
			6085	5.562	34.804	5.580	34.998	-0.32%	-0.55%
			6185	5.693	34.618	5.698	34.878	-0.09%	-0.75%
			6275	5.800	34.453	5.805	34.770	-0.09%	-0.91%
			6285	5.815	34.439	5.816	34.758	-0.02%	-0.92%
			6305	5.842	34.419	5.840	34.734	0.03%	-0.91%
			6345	5.880	34.350	5.887	34.686	-0.12%	-0.97%
			6475	6.042	34.127	6.041	34.530	0.02%	-1.17%
12/03/2023	6000 Head	20.9	6485	6.054	34.122	6.052	34.518	0.03%	-1.15%
			6500	6.067	34.107	6.070	34.500	-0.05%	-1.14%
			6505	6.071	34.097	6.076	34.494	-0.08%	-1.15%
			6545	6.130	33.967	6.122	34.446	0.13%	-1.39%
			6665	6.290	33.747	6.265	34.302	0.40%	-1.62%
			6675	6.303	33.745	6.273	34.290	0.48%	-1.59%
			6715	6.322	33.730	6.319	34.242	0.05%	-1.50%
			6785	6.429	33.591	6.400	34.158	0.45%	-1.66%
			6825	6.453	33.533	6.447	34.110	0.09%	-1.69%
			6985	6.653	33.275	6.633	33.918	0.30%	-1.90%
			7005	6.654	33.263	6.656	33.894	-0.03%	-1.86%
			7025	6.686	33.186	6.680	33.870	0.09%	-2.02%
			7500	7.282	32.329	7.240	33.300	0.58%	-2.92%
			7980	7.860	31.516	7.816	32.724	0.56%	-3.69%
			8000	7.948	31.365	7.840	32.700	1.38%	-4.08%

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.

Note: Per April 2019 TCB Workshop Notes, single head-tissue simulating liquid specified in IEC 62209-1 is permitted to use for all SAR tests.

8.2 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 SAR System Validation Appendix.

Table 8-2
System Verification Results

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 ADP (W/m2)	1W Normalized 4cm2 ADP	Deviation 4cm2 ADP (%)
AM14	13	HEAD	01/02/2024	21.2	20.8	1.00	1004	7360	534	0.574	0.578	0.574	-0.69%	0.353	0.356	0.353	-0.84%				
AM12	2450	HEAD	11/29/2023	22.1	23.5	0.10	750	7546	1402	5.590	52.600	55.900	6.27%	2.550	24.500	25.500	4.08%				
AM8	2450	HEAD	11/29/2023	21.2	20.2	0.10	921	7421	604	5.110	54.200	51.100	-5.72%	2.420	25.500	24.200	-5.10%				
AM10	2450	HEAD	02/26/2024	20.3	19.8	0.10	750	7416	701	5.160	52.600	51.600	-1.90%	2.410	24.500	24.100	-1.63%				
AM9	5250	HEAD	12/14/2023	20.4	19.3	0.05	1123	3746	1237	3.740	80.500	74.800	-7.08%	1.070	22.900	21.400	-6.55%				
AM9	5250	HEAD	12/26/2023	20.1	19.0	0.05	1163	3746	1237	4.040	80.200	80.800	0.75%	1.160	23.100	23.200	0.43%				
AM9	5600	HEAD	12/14/2023	20.4	19.3	0.05	1123	3746	1237	3.940	83.700	78.800	-5.85%	1.110	23.700	22.200	-6.33%				
AM9	5600	HEAD	12/26/2023	20.1	19.0	0.05	1163	3746	1237	4.300	83.300	86.000	3.24%	1.210	23.800	24.200	1.68%				
AM9	5750	HEAD	12/14/2023	20.4	19.3	0.05	1123	3746	1237	3.950	80.500	79.000	-1.86%	1.120	22.700	22.400	-1.32%				
AM9	5750	HEAD	12/26/2023	20.1	19.0	0.05	1163	3746	1237	3.840	81.000	76.800	-5.19%	1.100	23.000	22.000	-4.35%				
AM9	5800	HEAD	12/14/2023	20.4	19.3	0.05	1123	3746	1237	3.810	80.500	76.200	-5.34%	1.080	22.500	21.600	-4.00%				
AM9	5800	HEAD	12/26/2023	20.1	19.0	0.05	1123	3746	1237	3.770	80.500	75.400	-6.34%	1.080	22.500	21.600	-4.00%				
AM2	6500	HEAD	12/03/2023	21.7	21.5	0.03	1020	7420	1333	7.670	296.000	306.800	3.65%	1.390	54.500	1.363	1.98%	33.9	1330	1356	1.95%

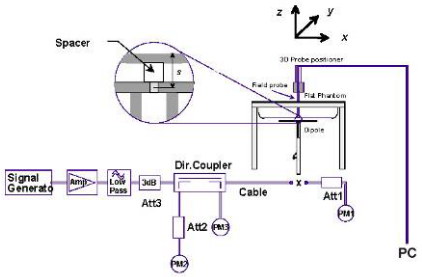


Figure 8-1
System Verification Setup Diagram

Figure 8-2
System Verification Setup Photo

8.3 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.

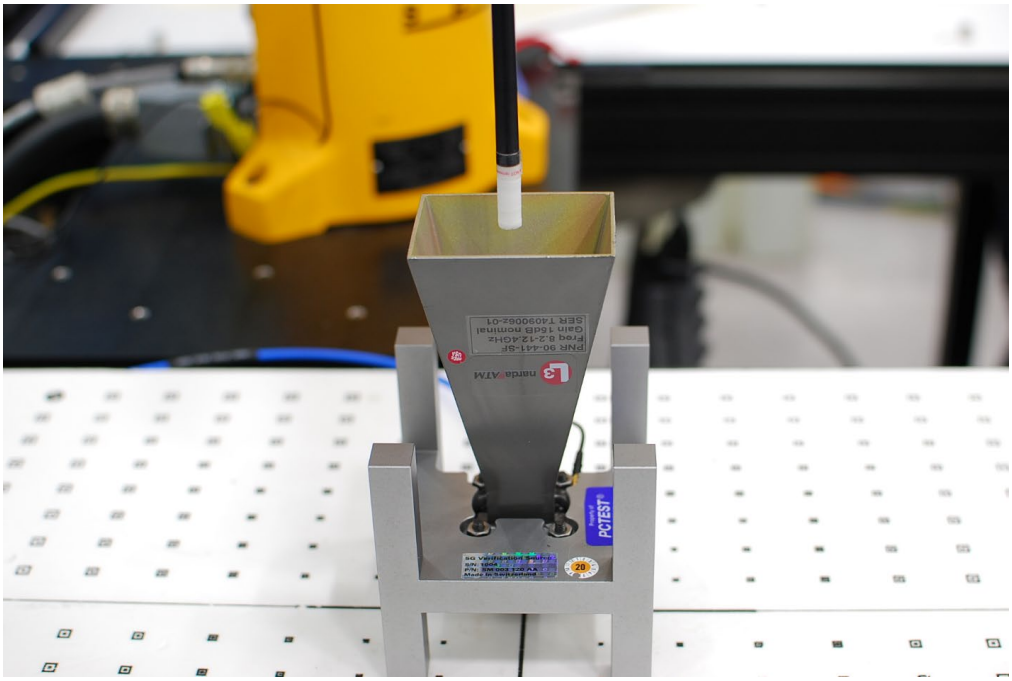


Figure 8-3
System Verification Setup Photo

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	
AM5	10	11/28/2023	1006	9523	93.3	54.20	58.50	-0.3316	54.30	58.90	-0.3532
AM5	10	11/30/2023	1006	9523	93.3	54.50	58.50	-0.3076	54.70	58.90	-0.3213

Table 8-3
10 GHz Verification Results

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

9 SAR DATA SUMMARY

9.1 Standalone SAR Data

Table 9-1
2.4 GHz WLAN Body SAR Data – Antenna WF8

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	0.13	2437	6	1	19.00	17.71	Back	0	V2	0.126	0.061	1.346	1.003	0.170	0.082	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	-0.04	2412	1	1	19.00	17.41	Top	0	V2	0.709	0.316	1.442	1.003	1.025	0.457	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	0.04	2437	6	1	19.00	17.71	Top	0	V2	0.827	0.365	1.346	1.003	1.116	0.493	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	-0.07	2462	11	1	19.00	17.68	Top	0	V2	0.866	0.378	1.355	1.003	1.177	0.514	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	3YN4Y	99.7	-0.12	2462	11	1	19.00	17.57	Top	0	V1	0.795	0.352	1.390	1.003	1.108	0.491	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	0.02	2437	6	1	19.00	17.71	Bottom	0	V2	0.009	0.004	1.346	1.003	0.012	0.005	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	0.06	2437	6	1	19.00	17.71	Right	0	V2	0.008	0.004	1.346	1.003	0.011	0.005	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF8	XD3J7	99.7	0.02	2437	6	1	19.00	17.71	Left	0	V2	0.001	0.000	1.346	1.003	0.001	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 9-2
2.4 GHz WLAN Body SAR Data – Antenna WF7b

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	0.04	2462	11	1	20.00	19.29	Back	0	V2	0.150	0.077	1.178	1.003	0.177	0.091	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	-0.21	2412	1	1	20.00	18.93	Top	0	V2	0.769	0.330	1.279	1.003	0.987	0.423	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	-0.21	2437	6	1	20.00	19.07	Top	0	V2	0.842	0.363	1.239	1.003	1.046	0.451	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	0.00	2462	11	1	20.00	19.29	Top	0	V2	1.000	0.427	1.178	1.003	1.182	0.505	A1
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	3YN4Y	99.7	0.01	2462	11	1	20.00	19.28	Top	0	V1	0.993	0.425	1.180	1.003	1.175	0.503	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	0.04	2462	11	1	20.00	19.29	Bottom	0	V2	0.013	0.005	1.178	1.003	0.015	0.006	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	0.18	2462	11	1	20.00	19.29	Right	0	V2	0.007	0.003	1.178	1.003	0.008	0.004	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	0.20	2412	1	1	20.00	18.93	Left	0	V2	0.490	0.225	1.279	1.003	0.629	0.289	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	0.01	2437	6	1	20.00	19.07	Left	0	V2	0.568	0.259	1.239	1.003	0.706	0.322	
Body	2.4 GHz WIFI/ IEEE 802.11b	22	DSSS	WF7b	QJQY2	99.7	-0.01	2462	11	1	20.00	19.29	Left	0	V2	0.753	0.328	1.178	1.003	0.890	0.388	
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 9-3
5 GHz WLAN Body SAR Data – Antenna WF8

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	-0.16	5270	54	U-NII-2A	13.5	18.00	17.15	Back	0	V1	0.115	0.040	1.216	1.024	0.143	0.050	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	XD3J7	97.7	0.01	5270	54	U-NII-2A	13.5	18.00	16.93	Top	0	V2	0.893	0.287	1.279	1.024	1.170	0.376	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	-0.21	5270	54	U-NII-2A	13.5	18.00	17.15	Top	0	V1	0.947	0.308	1.216	1.024	1.179	0.384	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	0.05	5270	54	U-NII-2A	13.5	18.00	17.15	Top	0	V1	0.938	0.304	1.216	1.024	1.168	0.379	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	0.14	5310	62	U-NII-2A	13.5	16.50	15.51	Top	0	V1	0.629	0.197	1.256	1.024	0.809	0.253	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	0.08	5270	54	U-NII-2A	13.5	18.00	17.15	Bottom	0	V1	0.006	0.000	1.216	1.024	0.007	0.000	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	0.06	5270	54	U-NII-2A	13.5	18.00	17.15	Right	0	V1	0.016	0.001	1.216	1.024	0.020	0.001	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	MJFXK	97.7	0.06	5270	54	U-NII-2A	13.5	18.00	17.15	Left	0	V1	0.000	0.000	1.216	1.024	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.05	5610	122	U-NII-2C	29.3	16.25	15.35	Back	0	V2	0.085	0.032	1.230	1.048	0.110	0.041	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	MJFXK	95.4	0.04	5530	106	U-NII-2C	29.3	14.50	13.52	Top	0	V1	0.588	0.179	1.253	1.048	0.772	0.235	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.00	5530	106	U-NII-2C	29.3	14.50	13.48	Top	0	V2	0.540	0.164	1.265	1.048	0.716	0.217	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	MJFXK	95.4	-0.14	5610	122	U-NII-2C	29.3	16.25	15.32	Top	0	V1	0.785	0.241	1.239	1.048	1.019	0.313	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	-0.11	5610	122	U-NII-2C	29.3	16.25	15.35	Top	0	V2	0.906	0.284	1.230	1.048	1.168	0.366	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	MJFXK	95.4	0.10	5690	138	U-NII-2C	29.3	16.25	15.40	Top	0	V1	0.639	0.194	1.216	1.048	0.814	0.247	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	-0.03	5690	138	U-NII-2C	29.3	16.25	15.30	Top	0	V2	0.736	0.224	1.245	1.048	0.960	0.292	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.07	5610	122	U-NII-2C	29.3	16.25	15.35	Bottom	0	V2	0.001	0.000	1.230	1.048	0.001	0.000	
Body	5 GHz WIFI/ IEEE 802. 11ac	80	OFDM	WF8	Q91YW	95.4	0.07	5610	122	U-NII-2C	29.3	16.25	15.35	Right	0	V2	0.000	0.000	1.230	1.048	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.03	5610	122	U-NII-2C	29.3	16.25	15.35	Left	0	V2	0.000	0.000	1.230	1.048	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.21	5775	155	U-NII-3	29.3	17.00	15.85	Back	0	V2	0.064	0.023	1.303	1.048	0.087	0.031	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.03	5775	155	U-NII-3	29.3	17.00	15.85	Top	0	V2	0.839	0.248	1.303	1.048	1.146	0.339	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	MJFXK	95.4	0.02	5775	155	U-NII-3	29.3	17.00	15.57	Top	0	V1	0.812	0.244	1.390	1.048	1.183	0.355	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.09	5775	155	U-NII-3	29.3	17.00	15.85	Bottom	0	V2	0.012	0.002	1.303	1.048	0.016	0.003	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.01	5775	155	U-NII-3	29.3	17.00	15.85	Right	0	V2	0.003	0.000	1.303	1.048	0.004	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	Q91YW	95.4	0.05	5775	155	U-NII-3	29.3	17.00	15.85	Left	0	V2	0.000	0.000	1.303	1.048	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									

Note: Blue entry represents variability measurement.

Table 9-4
5 GHz WLAN Body SAR Data – Antenna WF7a

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	QJQY2	97.7	0.05	5270	54	U-NII-2A	13.5	16.25	15.35	Back	0	V2	0.094	0.037	1.230	1.024	0.118	0.047	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	QJQY2	97.7	-0.01	5270	54	U-NII-2A	13.5	16.25	15.35	Top	0	V2	0.866	0.298	1.230	1.024	1.091	0.375	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	QJQY2	97.7	0.06	5310	62	U-NII-2A	13.5	16.25	15.18	Top	0	V2	0.860	0.292	1.279	1.024	1.126	0.382	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	W7W3T	97.7	-0.03	5310	62	U-NII-2A	13.5	16.25	15.30	Top	0	V1	0.794	0.268	1.245	1.024	1.012	0.342	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	XD3J7	97.7	0.05	5270	54	U-NII-2A	13.5	16.25	15.35	Bottom	0	V2	0.003	0.000	1.230	1.024	0.004	0.000	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	XD3J7	97.7	-0.01	5270	54	U-NII-2A	13.5	16.25	15.35	Right	0	V2	0.000	0.000	1.230	1.024	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF7a	QJQY2	97.7	0.09	5270	54	U-NII-2A	13.5	16.25	15.35	Left	0	V2	0.050	0.015	1.230	1.024	0.063	0.019	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	-0.15	5610	122	U-NII-2C	29.3	14.50	13.99	Back	0	V2	0.051	0.011	1.125	1.048	0.060	0.013	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	-0.05	5530	106	U-NII-2C	29.3	14.50	13.75	Top	0	V2	0.838	0.265	1.189	1.048	1.044	0.330	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	-0.02	5610	122	U-NII-2C	29.3	14.50	13.99	Top	0	V2	0.984	0.315	1.125	1.048	1.160	0.371	A2
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	0.02	5610	122	U-NII-2C	29.3	14.50	13.79	Top	0	V1	0.901	0.276	1.178	1.048	1.112	0.341	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	0.12	5610	122	U-NII-2C	29.3	14.50	13.99	Top	0	V2	0.911	0.285	1.125	1.048	1.074	0.336	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	-0.07	5690	138	U-NII-2C	29.3	14.50	13.35	Top	0	V2	0.835	0.262	1.303	1.048	1.140	0.358	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	0.06	5610	122	U-NII-2C	29.3	14.50	13.99	Bottom	0	V2	0.000	0.000	1.125	1.048	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	0.06	5610	122	U-NII-2C	29.3	14.50	13.99	Right	0	V2	0.000	0.000	1.125	1.048	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	-0.09	5610	122	U-NII-2C	29.3	14.50	13.99	Left	0	V2	0.000	0.000	1.125	1.048	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	-0.09	5775	155	U-NII-3	29.3	14.75	13.62	Back	0	V1	0.086	0.033	1.297	1.048	0.117	0.045	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	QJQY2	95.4	0.07	5775	155	U-NII-3	29.3	14.75	13.51	Top	0	V2	0.814	0.253	1.330	1.048	1.135	0.353	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	-0.11	5775	155	U-NII-3	29.3	14.75	13.62	Top	0	V1	0.870	0.272	1.297	1.048	1.183	0.370	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	0.03	5775	155	U-NII-3	29.3	14.75	13.62	Top	0	V1	0.821	0.254	1.297	1.048	1.116	0.345	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	0.07	5775	155	U-NII-3	29.3	14.75	13.62	Bottom	0	V1	0.002	0.000	1.297	1.048	0.003	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	0.05	5775	155	U-NII-3	29.3	14.75	13.62	Right	0	V1	0.000	0.000	1.297	1.048	0.000	0.000	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF7a	3YN4Y	95.4	0.06	5775	155	U-NII-3	29.3	14.75	13.62	Left	0	V1	0.048	0.016	1.297	1.048	0.065	0.022	

Note: Blue entry represents variability measurement.

Table 9-5
5 GHz WLAN Body SAR Data – MIMO

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	3YN4Y	97.7	-0.02	5270	54	U-NII-2A	13.5	18.00	17.11	Top	0	V1	0.902	0.306	1.276	1.024	1.133	0.384	
				WF7a			-0.01					16.25	15.27				0.745	0.251	1.253	1.024	0.956	0.322	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	QJQY2	97.7	0.01	5270	54	U-NII-2A	13.5	18.00	17.09	Top	0	V2	0.895	0.302	1.294	1.024	1.130	0.381	
				WF7a			-0.04					16.25	15.20				0.796	0.265	1.274	1.000	1.014	0.338	
Body	5 GHz WIFI/ IEEE 802.11n	40	OFDM	WF8	3YN4Y	97.7	0.13	5310	62	U-NII-2A	13.5	15.00	13.81	Top	0	V1	0.470	0.154	1.315	1.024	0.633	0.207	
				WF7a			0.08					15.00	13.95				0.556	0.184	1.274	1.024	0.725	0.240	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	3YN4Y	95.4	0.04	5530	106	U-NII-2C	29.3	13.50	12.52	Top	0	V1	0.456	0.149	1.259	1.048	0.599	0.196	
				WF7a			-0.08					13.50	12.36				0.526	0.174	1.300	1.048	0.717	0.237	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	3YN4Y	95.4	-0.03	5610	122	U-NII-2C	29.3	16.25	15.03	Top	0	V1	0.674	0.225	1.324	1.048	0.935	0.312	
				WF7a			0.02					14.50	13.61				0.912	0.295	1.227	1.048	1.173	0.379	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	QJQY2	95.4	0.01	5610	122	U-NII-2C	29.3	16.25	14.97	Top	0	V2	0.721	0.240	1.343	1.048	1.015	0.338	
				WF7a			-0.02					14.50	13.44				0.800	0.267	1.276	1.048	1.070	0.357	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	3YN4Y	95.4	0.01	5690	138	U-NII-2C	29.3	16.25	15.00	Top	0	V1	0.578	0.188	1.334	1.048	0.808	0.263	
				WF7a			0.12					14.50	13.43				0.784	0.248	1.279	1.048	1.051	0.332	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	3YN4Y	95.4	0.08	5775	155	U-NII-3	29.3	17.00	16.11	Top	0	V1	0.819	0.265	1.227	1.048	1.053	0.341	
				WF7a			-0.05					14.75	13.51				0.797	0.260	1.330	1.048	1.111	0.362	
Body	5 GHz WIFI/ IEEE 802.11ac	80	OFDM	WF8	QJQY2	95.4	0.06	5775	155	U-NII-3	29.3	17.00	15.90	Top	0	V2	0.682	0.227	1.288	1.048	0.921	0.306	
				WF7a			0.04					14.75	13.74				0.770	0.246	1.262	1.048	1.018	0.325	
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: Due to the spatial separation of Antenna WF7a and Antenna WF8, two measurement cubes were evaluated during MIMO SAR testing. Cubes 1 and 2 are located over the SAR distributions produced by Antenna WF8 and WF7a, respectively. Due to the spatial separation of the distributions, the conduct power of each antenna was individually considered for each measurement cube to determine the reported SAR.

Table 9-6
6 GHz WLAN Body SAR Data – Antenna WF8

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.09	6025	15	68.1	13.75	12.49	Back	0	V1	0.059	0.023	1.337	1.021	0.081	0.031	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.08	6665	143	68.1	16.00	14.49	Back	0	V1	0.055	0.019	1.416	1.021	0.080	0.027	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.02	6025	15	68.1	13.75	12.49	Top	0	V1	0.615	0.186	1.337	1.021	0.840	0.254	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.01	6345	79	68.1	14.25	13.16	Top	0	V1	0.334	0.103	1.285	1.021	0.438	0.135	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.12	6505	111	68.1	13.25	12.85	Top	0	V1	0.326	0.111	1.096	1.021	0.365	0.124	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	427P9	97.9	0.02	6665	143	68.1	16.00	14.01	Top	0	V2	0.507	0.172	1.581	1.021	0.818	0.278	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.09	6665	143	68.1	16.00	14.49	Top	0	V1	0.616	0.207	1.416	1.021	0.891	0.299	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.02	6985	207	68.1	11.50	9.79	Top	0	V1	0.288	0.087	1.483	1.021	0.436	0.132	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.01	6025	15	68.1	13.75	12.49	Bottom	0	V1	0.002	0.000	1.337	1.021	0.003	0.000	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.08	6665	143	68.1	16.00	14.49	Bottom	0	V1	0.009	0.003	1.416	1.021	0.013	0.004	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.08	6025	15	68.1	13.75	12.49	Right	0	V1	0.002	0.000	1.337	1.021	0.003	0.000	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.18	6665	143	68.1	16.00	14.49	Right	0	V1	0.068	0.027	1.416	1.021	0.098	0.039	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.04	6025	15	68.1	13.75	12.49	Left	0	V1	0.000	0.000	1.337	1.021	0.000	0.000	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.01	6665	143	68.1	16.00	14.49	Left	0	V1	0.002	0.000	1.416	1.021	0.003	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 9-7
6 GHz WLAN Body SAR Data – Antenna WF7a

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]	Add'l Info	Measured 1g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.15	6025	15	68.1	12.25	11.65	Back	0	V1	0.044	1.148	1.021	0.052	0.020	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.08	6025	15	68.1	12.25	11.65	Top	0	V1	0.632	1.148	1.021	0.741	0.231	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.12	6345	79	68.1	12.25	11.39	Top	0	V1	0.666	1.219	1.021	0.829	0.244	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	427P9	97.9	0.05	6505	111	68.1	11.75	10.85	Top	0	V2	0.778	1.230	1.021	0.977	0.279	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.03	6505	111	68.1	11.75	11.55	Top	0	V1	0.839	1.047	1.021	0.897	0.262	A3
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.00	6505	111	68.1	11.75	11.55	Top	0	V1	0.829	1.047	1.021	0.886	0.258	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.04	6665	143	68.1	11.25	10.68	Top	0	V1	0.617	1.140	1.021	0.718	0.203	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.01	6985	207	68.1	11.25	10.17	Top	0	V1	0.600	1.282	1.021	0.785	0.208	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.01	6025	15	68.1	12.25	11.65	Bottom	0	V1	0.002	1.148	1.021	0.002	0.000	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.01	6025	15	68.1	12.25	11.65	Right	0	V1	0.000	1.148	1.021	0.000	0.000	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.02	6025	15	68.1	12.25	11.65	Left	0	V1	0.001	1.148	1.021	0.001	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								

Note: Blue entry represents variability measurement.

Table 9-8
6 GHz WLAN Body Absorbed Power Density Data – Antenna WF8

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]	Add'l Info	Measured APD [W/m² (4cm²)]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported APD [W/m² (4cm²)]	Plot #
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.09	6025	15	68.1	13.75	12.49	Back	0	V1	0.52	1.337	1.021	0.70	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.08	6665	143	68.1	16.00	14.49	Back	0	V1	0.42	1.416	1.021	0.61	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.02	6025	15	68.1	13.75	12.49	Top	0	V1	4.27	1.337	1.021	5.83	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.01	6345	79	68.1	14.25	13.16	Top	0	V1	2.37	1.285	1.021	3.11	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.12	6505	111	68.1	13.25	12.85	Top	0	V1	2.53	1.096	1.021	2.83	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	427P9	97.9	0.02	6665	143	68.1	16.00	14.01	Top	0	V2	3.89	1.581	1.021	6.28	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.09	6665	143	68.1	16.00	14.49	Top	0	V1	4.69	1.416	1.021	6.78	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.02	6985	207	68.1	11.50	9.79	Top	0	V1	1.98	1.483	1.021	3.00	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.01	6025	15	68.1	13.75	12.49	Bottom	0	V1	0.00	1.337	1.021	0.00	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.08	6665	143	68.1	16.00	14.49	Bottom	0	V1	0.06	1.416	1.021	0.09	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.08	6025	15	68.1	13.75	12.49	Right	0	V1	0.01	1.337	1.021	0.01	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.18	6665	143	68.1	16.00	14.49	Right	0	V1	0.59	1.416	1.021	0.85	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	-0.04	6025	15	68.1	13.75	12.49	Left	0	V1	0.00	1.337	1.021	0.01	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF8	W7W3T	97.9	0.01	6665	143	68.1	16.00	14.49	Left	0	V1	0.02	1.416	1.021	0.03	

Table 9-9
6 GHz WLAN Body Absorbed Power Density Data – Antenna WF7a

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]	Add'l Info	Measured APD [W/m² (4cm²)]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported APD [W/m² (4cm²)]	Plot #
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.15	6025	15	68.1	12.25	11.65	Back	0	V1	0.38	1.148	1.021	0.45	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.08	6025	15	68.1	12.25	11.65	Top	0	V1	4.52	1.148	1.021	5.30	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.12	6345	79	68.1	12.25	11.39	Top	0	V1	4.54	1.219	1.021	5.65	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	427P9	97.9	0.05	6505	111	68.1	11.75	10.85	Top	0	V2	5.13	1.230	1.021	6.44	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.03	6505	111	68.1	11.75	11.55	Top	0	V1	5.62	1.047	1.021	6.01	A3
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.04	6665	143	68.1	11.25	10.68	Top	0	V1	4.04	1.140	1.021	4.70	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	-0.01	6985	207	68.1	11.25	10.17	Top	0	V1	3.71	1.282	1.021	4.86	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.01	6025	15	68.1	12.25	11.65	Bottom	0	V1	0.02	1.148	1.021	0.02	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.01	6025	15	68.1	12.25	11.65	Right	0	V1	0.00	1.148	1.021	0.00	
Body	6 GHz WIFI/ IEEE 802.11ax	160	OFDM	WF7a	W7W3T	97.9	0.02	6025	15	68.1	12.25	11.65	Left	0	V1	0.02	1.148	1.021	0.02	

Table 9-10
2.4 GHz Bluetooth Body SAR Data – Antenna WF8

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	0.06	2480	78	1	20.00	19.17	Back	0	V2	0.138	0.068	1.211	1.000	0.167	0.082	
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	-0.02	2402	0	1	20.00	18.91	Top	0	V2	0.731	0.320	1.285	1.000	0.939	0.411	
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	-0.07	2441	39	1	20.00	18.84	Top	0	V2	0.865	0.377	1.306	1.000	1.130	0.492	
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	0.10	2480	78	1	20.00	19.17	Top	0	V2	0.939	0.403	1.211	1.000	1.137	0.488	
Body	2.4 GHz Bluetooth	FHSS	WF8	MJFXK	77.0	0.00	2480	78	1	20.00	19.20	Top	0	V1	0.987	0.424	1.202	1.000	1.186	0.510	A4
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	0.06	2480	78	1	20.00	19.17	Bottom	0	V2	0.005	0.002	1.211	1.000	0.006	0.002	
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	0.04	2480	78	1	20.00	19.17	Right	0	V2	0.015	0.009	1.211	1.000	0.018	0.011	
Body	2.4 GHz Bluetooth	FHSS	WF8	XD3J7	77.0	0.01	2480	78	1	20.00	19.17	Left	0	V2	0.000	0.000	1.211	1.000	0.000	0.000	
Body	2.4 GHz Bluetooth	FHSS	WF8	3YN4Y	77.0	-0.11	2441	39	1	13.00	12.15	Back	0	V1	0.027	0.012	1.216	1.006	0.033	0.015	
Body	2.4 GHz Bluetooth	FHSS	WF8	3YN4Y	77.0	0.18	2441	39	1	13.00	12.15	Top	0	V1	0.149	0.060	1.216	1.006	0.182	0.073	
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: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per manufacturer.

Table 9-11
2.4 GHz Bluetooth Body SAR Data – Antenna WF7b

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	0.02	2480	78	1	20.00	19.76	Back	0	V2	0.116	0.059	1.057	1.006	0.123	0.063	
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	-0.02	2402	0	1	20.00	19.72	Top	0	V2	0.663	0.294	1.067	1.006	0.712	0.316	
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	-0.05	2441	39	1	20.00	19.70	Top	0	V2	0.795	0.347	1.072	1.006	0.858	0.374	
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	-0.01	2480	78	1	20.00	19.76	Top	0	V2	0.856	0.369	1.057	1.006	0.911	0.393	
Body	2.4 GHz Bluetooth	FHSS	WF7b	3YN4Y	77.0	-0.04	2480	78	1	20.00	19.76	Top	0	V1	0.898	0.377	1.057	1.006	0.955	0.401	
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	0.02	2480	78	1	20.00	19.76	Bottom	0	V2	0.012	0.005	1.057	1.006	0.013	0.005	
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	0.03	2480	78	1	20.00	19.76	Right	0	V2	0.012	0.005	1.057	1.006	0.013	0.005	
Body	2.4 GHz Bluetooth	FHSS	WF7b	Q91YW	77.0	0.07	2480	78	1	20.00	19.76	Left	0	V2	0.590	0.267	1.057	1.006	0.628	0.284	
Body	2.4 GHz Bluetooth	FHSS	WF7b	3YN4Y	77.0	-0.13	2480	78	1	13.00	12.35	Back	0	V1	0.023	0.010	1.161	1.006	0.027	0.012	
Body	2.4 GHz Bluetooth	FHSS	WF7b	3YN4Y	77.0	-0.01	2480	78	1	13.00	12.35	Top	0	V1	0.140	0.057	1.161	1.006	0.164	0.067	
Body	2.4 GHz Bluetooth	FHSS	WF7b	3YN4Y	77.0	-0.07	2480	78	1	13.00	12.35	Left	0	V1	0.086	0.037	1.161	1.006	0.100	0.043	
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: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per manufacturer.

Table 9-12
802.15.4 Body SAR Data – Antenna WF8

Exposure	Band / Mode	Ant.	Serial Number	Power Drift [dB]	Frequency [MHz]	Channel #	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	802.15.4	WF8	3YN4Y	0.03	2475	25	21.00	19.31	Back	0	V1	0.178	0.088	1.476	0.158	0.078	
Body	802.15.4	WF8	3YN4Y	0.00	2405	11	21.00	19.01	Top	0	V1	0.968	0.411	1.581	0.918	0.390	
Body	802.15.4	WF8	3YN4Y	-0.02	2440	18	21.00	19.17	Top	0	V1	1.140	0.473	1.524	1.042	0.433	
Body	802.15.4	WF8	Q91YW	0.00	2475	25	21.00	19.04	Top	0	V2	1.170	0.483	1.570	1.102	0.455	
Body	802.15.4	WF8	3YN4Y	0.01	2475	25	21.00	19.31	Top	0	V1	1.300	0.531	1.476	1.151	0.470	A5
Body	802.15.4	WF8	3YN4Y	-0.04	2475	25	21.00	19.31	Top	0	V1	1.280	0.527	1.476	1.134	0.467	
Body	802.15.4	WF8	3YN4Y	0.02	2475	25	21.00	19.31	Bottom	0	V1	0.014	0.006	1.476	0.012	0.005	
Body	802.15.4	WF8	3YN4Y	0.02	2475	25	21.00	19.31	Right	0	V1	0.023	0.012	1.476	0.020	0.011	
Body	802.15.4	WF8	3YN4Y	0.08	2475	25	21.00	19.31	Left	0	V1	0.001	0.000	1.476	0.001	0.000	
Body	802.15.4	WF8	3YN4Y	0.03	2475	25	14.00	12.87	Back	0	V1	0.037	0.017	1.297	0.029	0.013	
Body	802.15.4	WF8	3YN4Y	0.00	2475	25	14.00	12.87	Top	0	V1	0.269	0.108	1.297	0.209	0.084	
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: Manufacturer declared that maximum source-based duty cycle of 802.15.4 mode is permanently limited to 60%. SAR measurement for 802.15.4 is evaluated at higher duty cycle of 100% and scaled down to 60%.
Note: Blue entry represents variability measurement.

Table 9-13
802.15.4 Body SAR Data – Antenna WF7b

Exposure	Band / Mode	Ant.	Serial Number	Power Drift [dB]	Frequency [MHz]	Channel #	Max Allowed Power [dBm]	Conducted Power [dBm]	Test Position	Spacing [mm]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	802.15.4	WF7b	3YN4Y	0.01	2440	18	21.50	19.85	Back	0	V1	0.151	0.078	1.462	0.132	0.068	
Body	802.15.4	WF7b	3YN4Y	0.07	2405	11	21.50	19.58	Top	0	V1	0.733	0.329	1.556	0.684	0.307	
Body	802.15.4	WF7b	3YN4Y	0.08	2440	18	21.50	19.85	Top	0	V1	0.888	0.394	1.462	0.779	0.346	
Body	802.15.4	WF7b	3YN4Y	0.05	2475	25	21.50	19.65	Top	0	V1	0.998	0.438	1.531	0.917	0.402	
Body	802.15.4	WF7b	QJQY2	0.04	2475	25	21.50	19.61	Top	0	V2	0.955	0.421	1.545	0.885	0.390	
Body	802.15.4	WF7b	3YN4Y	-0.13	2440	18	21.50	19.85	Bottom	0	V1	0.010	0.003	1.462	0.009	0.003	
Body	802.15.4	WF7b	3YN4Y	0.07	2440	18	21.50	19.85	Right	0	V1	0.014	0.006	1.462	0.012	0.005	
Body	802.15.4	WF7b	3YN4Y	0.05	2440	18	21.50	19.85	Left	0	V1	0.621	0.288	1.462	0.545	0.253	
Body	802.15.4	WF7b	3YN4Y	-0.08	2405	11	14.50	13.79	Back	0	V1	0.022	0.010	1.178	0.016	0.007	
Body	802.15.4	WF7b	3YN4Y	-0.01	2405	11	14.50	13.79	Top	0	V1	0.168	0.073	1.178	0.119	0.052	
Body	802.15.4	WF7b	3YN4Y	-0.13	2405	11	14.50	13.79	Left	0	V1	0.112	0.049	1.178	0.079	0.035	
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: Manufacturer declared that maximum source-based duty cycle of 802.15.4 mode is permanently limited to 60%. SAR measurement for 802.15.4 is evaluated at higher duty cycle of 100% and scaled down to 60%.

Table 9-14
NB UNII 1 Body SAR Data – Antenna WF8

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	NB U-NII 1	FHSS	WF8	VWY0X	77.0	-0.02	5204	Mid	8	13.50	13.16	Back	0	V1	0.132	0.033	1.081	1.006	0.144	0.036	
Body	NB U-NII 1	FHSS	WF8	VWY0X	77.0	-0.10	5204	Mid	8	13.50	13.16	Top	0	V1	0.320	0.102	1.081	1.006	0.348	0.111	
Body	NB U-NII 1	FHSS	WF8	XD3J7	77.0	0.00	5204	Mid	8	13.50	13.10	Top	0	V2	0.335	0.103	1.096	1.006	0.370	0.114	
Body	NB U-NII 1	FHSS	WF8	VWY0X	77.0	0.09	5204	Mid	8	13.50	13.16	Bottom	0	V1	0.000	0.000	1.081	1.006	0.000	0.000	
Body	NB U-NII 1	FHSS	WF8	VWY0X	77.0	0.06	5204	Mid	8	13.50	13.16	Right	0	V1	0.003	0.000	1.081	1.006	0.003	0.000	
Body	NB U-NII 1	FHSS	WF8	VWY0X	77.0	0.07	5204	Mid	8	13.50	13.16	Left	0	V1	0.007	0.000	1.081	1.006	0.008	0.000	
Body	NB U-NII 1	FHSS	WF8	XD3J7	77.0	0.05	5162	Low	1	10.00	9.15	Back	0	V2	0.013	0.002	1.216	1.006	0.016	0.002	
Body	NB U-NII 1	FHSS	WF8	XD3J7	77.0	0.07	5162	Low	1	10.00	9.15	Top	0	V2	0.108	0.032	1.216	1.006	0.132	0.039	
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: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per manufacturer.

Table 9-15
NB UNII 3 Body SAR Data – Antenna WF8

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.01	5733	Low	1	13.50	12.35	Back	0	V2	0.029	0.008	1.303	1.006	0.038	0.010	
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.08	5733	Low	1	13.50	12.35	Top	0	V2	0.289	0.073	1.303	1.006	0.379	0.096	
Body	NB U-NII 3	FHSS	WF8	MJFXK	77.0	0.07	5733	Low	1	13.50	11.97	Top	0	V1	0.258	0.063	1.422	1.006	0.369	0.090	
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.02	5733	Low	1	13.50	12.35	Bottom	0	V2	0.002	0.000	1.303	1.006	0.003	0.000	
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.07	5733	Low	1	13.50	12.35	Right	0	V2	0.000	0.000	1.303	1.006	0.000	0.000	
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.01	5733	Low	1	13.50	12.35	Left	0	V2	0.000	0.000	1.303	1.006	0.000	0.000	
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.01	5733	Low	1	10.00	9.41	Back	0	V2	0.003	0.000	1.146	1.006	0.003	0.000	
Body	NB U-NII 3	FHSS	WF8	Q91YW	77.0	0.21	5733	Low	1	10.00	9.41	Top	0	V2	0.113	0.022	1.146	1.006	0.130	0.025	
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: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per manufacturer.

Table 9-16
NB UNII 1 Body SAR Data – Antenna WF7a

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	NB U-NII 1	FHSS	WF7a	QJQY2	77.0	0.02	5204	Mid	8	13.50	12.58	Back	0	V2	0.057	0.023	1.236	1.006	0.071	0.029	
Body	NB U-NII 1	FHSS	WF7a	QJQY2	77.0	0.12	5162	Low	8	13.50	12.42	Top	0	V2	0.480	0.166	1.282	1.006	0.619	0.214	
Body	NB U-NII 1	FHSS	WF7a	W7W3T	77.0	-0.12	5162	Low	8	13.50	12.69	Top	0	V1	0.447	0.152	1.205	1.006	0.542	0.184	
Body	NB U-NII 1	FHSS	WF7a	QJQY2	77.0	0.05	5204	Mid	8	13.50	12.58	Bottom	0	V2	0.000	0.000	1.236	1.006	0.000	0.000	
Body	NB U-NII 1	FHSS	WF7a	QJQY2	77.0	0.08	5204	Mid	8	13.50	12.58	Right	0	V2	0.000	0.000	1.236	1.006	0.000	0.000	
Body	NB U-NII 1	FHSS	WF7a	QJQY2	77.0	0.01	5204	Mid	8	13.50	12.58	Left	0	V2	0.006	0.000	1.236	1.006	0.007	0.000	
Body	NB U-NII 1	FHSS	WF7a	QJQY2	77.0	-0.16	5162	Low	1	9.50	8.72	Top	0	V2	0.143	0.046	1.197	1.006	0.172	0.055	
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: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per manufacturer.

Table 9-17
NB UNII 3 Body SAR Data – Antenna WF7a

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]	Add'l Info	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Power Scaling Factor	Duty Cycle Scaling Factor	Reported 1g SAR [W/kg]	Reported 10g SAR [W/kg]	Plot #
Body	NB U-NII 3	FHSS	WF7a	W7W3T	77.0	0.05	5844	High	1	13.50	12.59	Back	0	V1	0.091	0.023	1.233	1.006	0.113	0.029	
Body	NB U-NII 3	FHSS	WF7a	W7W3T	77.0	0.09	5844	High	1	13.50	12.59	Top	0	V1	0.547	0.156	1.233	1.006	0.679	0.194	A6
Body	NB U-NII 3	FHSS	WF7a	QJQY2	77.0	0.11	5844	High	1	13.50	12.46	Top	0	V2	0.534	0.152	1.271	1.006	0.683	0.194	
Body	NB U-NII 3	FHSS	WF7a	W7W3T	77.0	0.05	5844	High	1	13.50	12.59	Bottom	0	V1	0.002	0.000	1.233	1.006	0.002	0.000	
Body	NB U-NII 3	FHSS	WF7a	W7W3T	77.0	0.20	5844	High	1	13.50	12.59	Right	0	V1	0.000	0.000	1.233	1.006	0.000	0.000	
Body	NB U-NII 3	FHSS	WF7a	W7W3T	77.0	0.05	5844	High	1	13.50	12.59	Left	0	V1	0.000	0.000	1.233	1.006	0.000	0.000	
Body	NB U-NII 3	FHSS	WF7a	QJQY2	77.0	0.01	5844	High	1	8.50	8.50	Back	0	V2	0.010	0.002	1.000	1.006	0.010	0.002	
Body	NB U-NII 3	FHSS	WF7a	QJQY2	77.0	-0.01	5844	High	1	8.50	8.50	Top	0	V2	0.166	0.049	1.000	1.006	0.167	0.049	
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: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per manufacturer.

Table 9-18
WPT SAR Data

Exposure	Band / Mode	Service / Modulation	Serial Number	Power Drift [dB]	Frequency [MHz]	Test Position	Spacing [mm]	Measured 1g SAR [W/kg]	Measured 10g SAR [W/kg]	Plot #
Body	WPT	CW	HHF20	-0.15	13.56	Back	0	0.030	0.007	A7
Body	WPT	CW	HHF20	0.06	13.56	Top	0	0.000	0.000	
Body	WPT	CW	HHF20	0.01	13.56	Bottom	0	0.000	0.000	
Body	WPT	CW	HHF20	0.02	13.56	Right	0	0.002	0.000	
Body	WPT	CW	HHF20	0.03	13.56	Left	0	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				

9.2 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, and FCC KDB Publications 447 498 D04.
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 11 for variability analysis.
7. FCC KDB Publication 616217 D04v01r02 Section 4.3, SAR tests are required for the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D04v01 was applied to determine SAR test exclusion for adjacent edge configurations.
8. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.2. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.
9. The orange highlights throughout the report represent the highest scaled SAR per Equipment Class.
10. Per FCC guidance, SAR was performed using 6.5 GHz SAR probe calibration factors. Per October 2020 TCB Workshop notes, 5 channels were tested. Absorbed power density (APD) using a $4cm^2$ averaging area is reported based on SAR measurements.

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) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 6.2.4 for more information.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain 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 6.2.5 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 Section 11 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. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.
6. The time-averaged mechanism for WLAN operations was disabled for the above SAR measurements. The SAR was scaled to the maximum time-averaged output power.
7. For WIFI 6 GHz, the RF Exposure was evaluated at the maximum output power, therefore no evaluations for time-averaged were required.

Bluetooth/NB UNII Notes:

1. Bluetooth/NB-UNII SAR was evaluated with a test mode with hopping disabled with DH5 operation. The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is limited to 77.5% per manufacturer. See Section 7.9 and 7.11 for the time domain plot and calculation for the duty factor of the device.

802.15.4 Notes:

1. The manufacturer declared that the maximum source-based duty cycle of 802.15.4 mode is permanently limited to 60%. SAR measurement for 802.15.4 is evaluated at a higher duty cycle of 100% and scaled down to 60%. See Section 7.10 for the time domain plot for the duty factor of the device at the maximum source-based duty cycle of 60% and at the test mode during SAR measurement of 100%.

9.3 Power Density Data

MEASUREMENT RESULTS																								
Frequency (MHz)	Channel	Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift (dB)	Spacing (mm)	Antenna Config.	Variant	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 #
6025	15	802.11ax	OFDM	160	13.75	12.49	0.15	2	WF8	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	2.110	1.554	1.337	1.021	2.400	5.091	3.170	6.725	
6025	15	802.11ax	OFDM	160	13.75	12.26	0.00	2	WF8	V2	YW62T427P9	68.1	Top	97.9	0.25	-	1.554	1.409	1.021	2.070	4.628	2.340	5.231	
6345	79	802.11ax	OFDM	160	14.25	13.16	0.03	2	WF8	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.285	1.021	1.440	2.936	2.480	5.056	
6505	111	802.11ax	OFDM	160	13.25	12.85	-0.03	2	WF8	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.096	1.021	1.110	1.930	1.510	2.626	
6665	143	802.11ax	OFDM	160	16.00	14.49	0.03	2	WF8	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.416	1.021	2.570	5.774	2.840	6.381	
6985	207	802.11ax	OFDM	160	11.50	9.79	0.03	2	WF8	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.483	1.021	2.210	5.200	2.800	6.588	
6665	143	802.11ax	OFDM	160	16.00	14.49	-0.06	2	WF8	V1	LM6K6W7W3T	68.1	Right	97.9	0.25	-	1.554	1.416	1.021	0.231	0.519	0.241	0.541	
6665	143	802.11ax	OFDM	160	16.00	14.49	-0.09	2	WF8	V1	LM6K6W7W3T	68.1	Back	97.9	0.25	-	1.554	1.416	1.021	0.112	0.252	0.199	0.447	
6665	143	802.11ax	OFDM	160	16.00	14.49	-0.03	2	WF8	V1	LM6K6W7W3T	68.1	Left	97.9	0.25	-	1.554	1.416	1.021	0.249	0.559	0.392	0.881	
6665	143	802.11ax	OFDM	160	16.00	14.49	-0.16	2	WF8	V1	LM6K6W7W3T	68.1	Bottom	97.9	0.25	-	1.554	1.416	1.021	0.521	1.171	0.553	1.242	
6025	15	802.11ax	OFDM	160	13.75	12.49	0.08	9.95	WF8	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	1.940	1.554	1.337	1.021	0.713	1.513	1.130	2.397	
6025	15	802.11ax	OFDM	160	12.25	11.65	-0.01	2	WF7a	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.148	1.021	2.100	3.825	3.330	6.065	
6345	79	802.11ax	OFDM	160	12.25	11.39	0.17	2	WF7a	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.219	1.021	3.260	6.305	3.440	6.653	
6505	111	802.11ax	OFDM	160	11.75	11.55	-0.11	2	WF7a	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	3.130	1.554	1.047	1.021	3.990	6.628	4.260	**7.077**	A8
6505	111	802.11ax	OFDM	160	11.75	10.85	0.08	2	WF7a	V2	YW62T427P9	68.1	Top	97.9	0.25	-	1.554	1.230	1.021	3.340	6.518	3.520	6.869	
6665	143	802.11ax	OFDM	160	11.25	10.68	0.10	2	WF7a	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.140	1.021	3.670	6.638	3.900	7.054	
6985	207	802.11ax	OFDM	160	11.25	10.17	0.03	2	WF7a	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	-	1.554	1.282	1.021	3.140	6.387	3.460	7.038	
6025	15	802.11ax	OFDM	160	12.25	11.65	0.03	2	WF7a	V1	LM6K6W7W3T	68.1	Right	97.9	0.25	-	1.554	1.148	1.021	0.271	0.494	0.365	0.665	
6025	15	802.11ax	OFDM	160	12.25	11.65	-0.02	2	WF7a	V1	LM6K6W7W3T	68.1	Back	97.9	0.25	-	1.554	1.148	1.021	0.416	0.758	0.453	0.825	
6025	15	802.11ax	OFDM	160	12.25	11.65	-0.03	2	WF7a	V1	LM6K6W7W3T	68.1	Left	97.9	0.25	-	1.554	1.148	1.021	0.177	0.322	0.188	0.342	
6025	15	802.11ax	OFDM	160	12.25	11.65	0.05	2	WF7a	V1	LM6K6W7W3T	68.1	Bottom	97.9	0.25	-	1.554	1.148	1.021	0.112	0.204	0.116	0.211	
6505	111	802.11ax	OFDM	160	11.75	11.55	0.34	9.23	WF7a	V1	LM6K6W7W3T	68.1	Top	97.9	0.25	1.190	1.554	1.047	1.021	1.070	1.777	1.250	2.077	
47 CFR §1.1310 - SAFETY LIMIT Spatial Average Uncontrolled Exposure / General Population														Power Density 10 W/m² averaged over 4 cm²										

9.4 Power Density 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. PD results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01.
8. PTP-PR algorithm was used during psPD measurement and calculations.

10 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

10.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D04v01 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

10.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D04v01 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

Note:
SAR Summations for some scenarios when the output power levels are reduced, SAR values at the maximum output power level were used as the most conservative evaluation for simultaneous transmission analysis.

*The SAR distributions for at least one of the antennas are spatially separated from the other antennas per FCC KDB Publication 248227 Section 6.1 procedures. Therefore, simultaneous transmission were treated independently for this configuration. See section 11.4 for more information about the Spatial Separation Analysis.

In some cases where simultaneous transmission scenarios overlap with the same power level (for example, cellular band + 2.4 GHz WIFI SISO and cellular band + 2.4 GHz WIFI MIMO), the most conservative SAR summation scenario was evaluated.

10.3 Body SAR Simultaneous Transmission Analysis

Table 10-1

Simultaneous Transmission Scenario with 2.4 GHz Bluetooth and wPT

Simult Tx	Configuration	2.4 GHz Bluetooth Ant WF7b SAR (W/kg)	2.4 GHz Bluetooth Ant WF8 SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.123	0.167	0.030	0.320
	Top	0.955	1.186	0.000	1.186*
	Bottom	0.013	0.006	0.000	0.019
	Right	0.013	0.018	0.002	0.033
	Left	0.628	0.000	0.000	0.628

Table 10-2

Simultaneous Transmission Scenario with NB U-NII TXBF and wPT

Simult Tx	Configuration	NB U-NII Ant WF7a SAR (W/kg)	NB U-NII Ant WF8 SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.113	0.144	0.030	0.287
	Top	0.683	0.379	0.000	1.062
	Bottom	0.002	0.003	0.000	0.005
	Right	0.000	0.003	0.002	0.005
	Left	0.007	0.008	0.000	0.015

Table 10-3

Simultaneous Transmission Scenario with 2.4 GHz WIFI with 2.4 Bluetooth and wPT

Simult Tx	Configuration	2.4 GHz WIFI Ant WF8 SAR (W/kg)	2.4 GHz Bluetooth Ant WF7b SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.170	0.123	0.030	0.323
	Top	1.177	0.955	0.000	1.177*
	Bottom	0.012	0.013	0.000	0.025
	Right	0.011	0.013	0.002	0.026
	Left	0.001	0.628	0.000	0.629

Table 10-4

Simultaneous Transmission Scenario 2.4 GHz WIFI with 802.15.4 and wPT

Simult Tx	Configuration	2.4 GHz WIFI Ant WF8 SAR (W/kg)	802.15.4 Ant WF7b SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Back	0.170	0.132	0.030	0.332
	Top	1.177	0.917	0.000	1.177*
	Bottom	0.012	0.009	0.000	0.021
	Right	0.011	0.012	0.002	0.025
	Left	0.001	0.545	0.000	0.546

Table 10-5

Simultaneous Transmission Scenario 5 GHz WIFI MIMO with 2.4 GHz Bluetooth and wPT

Simult Tx	Configuration	5 GHz WIFI Ant WF7a SAR (W/kg)	5 GHz WIFI Ant WF8 SAR (W/kg)	2.4 GHz Bluetooth Ant WF7b at 13 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WF8 at 13 dBm SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Body SAR	Back	0.118	0.143	0.027	0.033	0.030	0.351
	Top	1.183	1.183	0.164	0.182	0.000	See Table Below
	Bottom	0.004	0.016	0.013	0.006	0.000	0.039
	Right	0.000	0.020	0.013	0.018	0.002	0.053
	Left	0.065	0.000	0.100	0.000	0.000	0.165

Simult Tx	Configuration	5 GHz WIFI MIMO SAR (W/kg)	2.4 GHz Bluetooth Ant WF7b at 13 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WF8 at 13 dBm SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body SAR	Top	1.173	0.164	0.182	0.000	1.519

Table 10-6

Simultaneous Transmission Scenario 6 GHz WIFI MIMO with 2.4 GHz Bluetooth TxBF and wPT

Simult Tx	Configuration	6 GHz WIFI Ant WF7a SAR (W/kg)	6 GHz WIFI Ant WF8 SAR (W/kg)	2.4 GHz Bluetooth Ant WF7b at 13 dBm SAR (W/kg)	2.4 GHz Bluetooth Ant WF8 at 13 dBm SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Body SAR	Back	0.052	0.080	0.027	0.033	0.030	0.222
	Top	0.977	0.891	0.164	0.182	0.000	1.141*
	Bottom	0.002	0.013	0.013	0.006	0.000	0.034
	Right	0.000	0.098	0.013	0.018	0.002	0.131
	Left	0.001	0.003	0.100	0.000	0.000	0.104

Table 10-7

Simultaneous Transmission Scenario 5 GHz WIFI MIMO with 802.15.4 and wPT

Simult Tx	Configuration	802.15.4 Ant WF7b at 14.5 dBm SAR (W/kg)	5 GHz WIFI Ant WF8 SAR (W/kg)	5 GHz WIFI Ant WF7a SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body SAR	Back	0.016	0.143	0.118	0.030	0.307
	Top	0.119	1.183	1.183	0.000	See Table Below
	Bottom	0.009	0.016	0.004	0.000	0.029
	Right	0.012	0.020	0.000	0.002	0.034
	Left	0.079	0.000	0.065	0.000	0.144

Simult Tx	Configuration	802.15.4 Ant WF7b at 14.5 dBm SAR (W/kg)	5 GHz WIFI MIMO SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Top	0.119	1.173	0.000	1.292

Table 10-8

Simultaneous Transmission Scenario 5 GHz WIFI MIMO with 802.15.4 and wPT

Simult Tx	Configuration	802.15.4 Ant WF8 at 14 dBm SAR (W/kg)	5 GHz WIFI Ant WF8 SAR (W/kg)	5 GHz WIFI Ant WF7a SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body SAR	Back	0.029	0.143	0.118	0.030	0.320
	Top	0.209	1.183	1.183	0.000	See Table Below
	Bottom	0.012	0.016	0.004	0.000	0.032
	Right	0.020	0.020	0.000	0.002	0.042
	Left	0.001	0.000	0.065	0.000	0.066

Simult Tx	Configuration	802.15.4 Ant WF8 at 14 dBm SAR (W/kg)	5 GHz WIFI MIMO SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	1+2+3
Body SAR	Top	0.209	1.173	0.000	1.382

Table 10-9

Simultaneous Transmission Scenario 6 GHz WIFI MIMO with 802.15.4 and wPT

Simult Tx	Configuration	802.15.4 Ant WF7b at 14.5 dBm SAR (W/kg)	6 GHz WIFI Ant WF8 SAR (W/kg)	6 GHz WIFI Ant WF7a SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body SAR	Back	0.016	0.080	0.052	0.030	0.178
	Top	0.119	0.891	0.977	0.000	1.096*
	Bottom	0.009	0.013	0.002	0.000	0.024
	Right	0.012	0.098	0.000	0.002	0.112
	Left	0.079	0.003	0.001	0.000	0.083

Table 10-10

Simultaneous Transmission Scenario 6 GHz WIFI MIMO with 802.15.4 and wPT

Simult Tx	Configuration	802.15.4 Ant WF8 at 14 dBm SAR (W/kg)	6 GHz WIFI Ant WF8 SAR (W/kg)	6 GHz WIFI Ant WF7a SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	1+2+3+4
Body SAR	Back	0.029	0.080	0.052	0.030	0.191
	Top	0.209	0.891	0.977	0.000	1.100*
	Bottom	0.012	0.013	0.002	0.000	0.027
	Right	0.020	0.098	0.000	0.002	0.120
	Left	0.001	0.003	0.001	0.000	0.005

Table 10-11

Simultaneous Transmission Scenario with 2.4 GHz WIFI MIMO and NB U-NII TXBF and wPT

Simult Tx	Configuration	2.4 GHz WIFI Ant WF7b SAR (W/kg)	2.4 GHz WIFI Ant WF8 SAR (W/kg)	NB U-NII Ant WF7a Reduced SAR (W/kg)	NB U-NII Ant WF8 Reduced SAR (W/kg)	wPT SAR (W/kg)	∑ SAR (W/kg)
		1	2	3	4	5	1+2+3+4+5
Body SAR	Back	0.177	0.170	0.071	0.016	0.030	0.464
	Top	1.182	1.177	0.172	0.132	0.000	1.354*
	Bottom	0.015	0.012	0.002	0.003	0.000	0.032
	Right	0.008	0.011	0.000	0.003	0.002	0.024
	Left	0.890	0.001	0.007	0.008	0.000	0.906

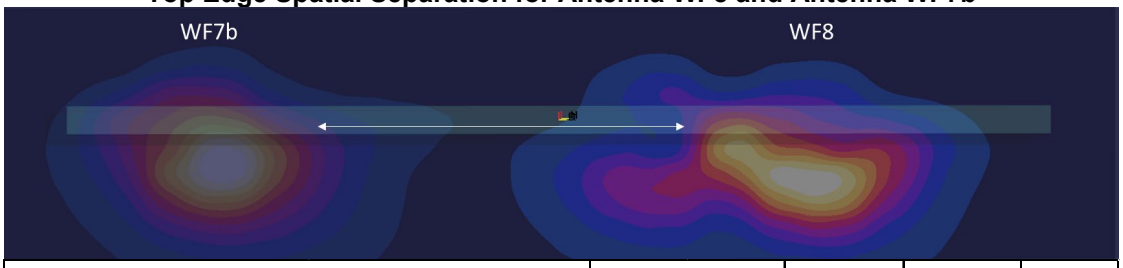
10.4 Spatial Separation Analysis

Per FCC KDB Publication 248227, antennas may be considered spatially separated when the aggregate SAR from multiple antennas at any location in the combined SAR distribution is either ≤ 1.2 W/kg where at least 90% of the SAR is attributed to a single SAR distribution or ≤ 0.4 W/kg where no more than one SAR distribution is contributing > 0.1 W/kg.

Spatial separation was determined by inspection of the area scan SAR distributions to confirm that at all locations, SAR was < 1.2 W/kg, where at least 90% of the SAR is attributed to a single SAR distribution. See below for illustrations of the spatial separated antennas considered.

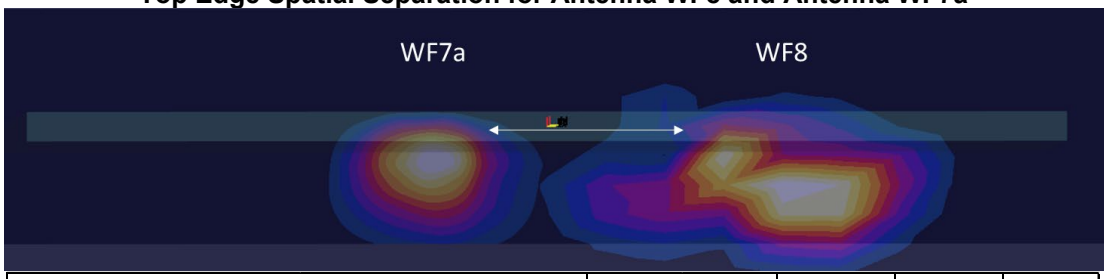
10.4.1 Top Edge Spatial Separation Analysis

Figure 10-1
Top Edge Spatial Separation for Antenna WF8 and Antenna WF7b



Antenna Pair		Standalone Values		Standalone Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio (SAR)	Exposure Ratio (SAR)			
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$
2.4 GHz Bluetooth/a Ant WF7b	2.4 GHz Bluetooth/a Ant WF8	0.955	1.186	2.141	96.03	0.03
2.4 GHz Bluetooth/a Ant WF7b	2.4 GHz WIFI/a Ant WF8	0.955	1.177	2.132	95.51	0.03
802.15.4/a Ant WF7b	2.4 GHz WIFI/a Ant WF8	0.917	1.177	2.094	93.63	0.03
2.4 GHz WIFI/a Ant WF7b	2.4 GHz WIFI/a Ant WF8	1.182	1.177	2.359	95.01	0.04

Figure 10-2
Top Edge Spatial Separation for Antenna WF8 and Antenna WF7a



Antenna Pair		Standalone Values		Standalone Sum	Peak Separation Distance (mm)	SPLS Ratio
		Exposure Ratio (SAR)	Exposure Ratio (SAR)			
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$
6 GHz WIFI/a Ant WF7a	6 GHz WIFI/a Ant WF8	0.977	0.891	1.868	81.69	0.03

10.5 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D04v01 and IEEE 1528-2013 Section 6.3.4.1.2.

11 SAR MEASUREMENT VARIABILITY

11.1 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.
5) When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Table 11-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS															
Band	FREQUENCY		Mode	Service	Ant	Data Rate (Mbps)	Side	Spacing	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)	
2450	2475.00	25	802.15.4	N/A	Ant WF8	0.25	Top	0 mm	1.300	1.280	1.016	N/A	N/A	N/A	N/A
5250	5270.00	54	5 GHz WIFI/ IEEE 802.11n, 40 MHz Bandwidth	OFDM	Ant WF8	13.50	Top	0 mm	0.947	0.938	1.010	N/A	N/A	N/A	N/A
5600	5610.00	122	5 GHz WIFI/ IEEE 802.11ac, 80 MHz Bandwidth	OFDM	Ant WF7a	29.30	Top	0 mm	0.984	0.911	1.080	N/A	N/A	N/A	N/A
5750	5775.00	155	5 GHz WIFI/ IEEE 802.11ac, 80 MHz Bandwidth	OFDM	Ant WF7a	29.30	Top	0 mm	0.870	0.821	1.060	N/A	N/A	N/A	N/A
6500	6505.00	111	6 GHz WIFI/ IEEE 802.11ax, 160 MHz Bandwidth	OFDM	Ant WF7a	68.10	Top	0 mm	0.839	0.829	1.012	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						

11.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g and <3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

12 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	11/14/2023	Annual	11/14/2024	MY45093852
Agilent	E4438C	ESG Vector Signal Generator	11/15/2023	Annual	11/15/2024	MY45092078
Agilent	N5182A	MXG Vector Signal Generator	10/12/2023	Annual	10/12/2024	MY47400015
Agilent	N5182A	MXG Vector Signal Generator	7/4/2023	Annual	7/4/2024	MY48180366
Agilent	8753ES	S-Parameter Vector Network Analyzer	7/21/2023	Annual	7/21/2024	US39170118
Agilent	8753ES	S-Parameter Vector Network Analyzer	6/2/2023	Annual	6/2/2024	MY40003841
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	MN8110B	I/O Adaptor	CBT	N/A	CBT	6261747881
Anritsu	ML2496A	Power Meter	6/15/2023	Annual	6/15/2024	1138001
Anritsu	ML2495A	Power Meter	6/13/2023	Annual	6/13/2024	1039008
Anritsu	MA2411B	Pulse Power Sensor	8/22/2023	Annual	8/22/2024	1726262
Anritsu	MA2411B	Pulse Power Sensor	6/15/2023	Annual	6/15/2024	1126066
Anritsu	MT8000A	Radio Communication Test Station	3/21/2023	Annual	3/21/2024	6261987983
Anritsu	MT8000A	Radio Communication Test Station	6/15/2023	Annual	6/15/2024	6261914237
Anritsu	MT8000A	Radio Communication Test Station	4/6/2023	Annual	4/6/2024	6272337439
Anritsu	MA24106A	USB Power Sensor	6/15/2023	Annual	6/15/2024	1827530
Control Company	4052	Long Stem Thermometer	2/17/2023	Biennial	2/17/2025	230111049
Control Company	4040	Therm/Clock/Humidity Monitor	5/11/2022	Biennial	5/11/2024	221514925
Mitutoyo	500-196-30	CD-6"ASX 6Inch Digital Caliper	2/16/2022	Triennial	2/16/2025	A20238413
Keysight Technologies	N6705B	DC Power Analyzer	5/5/2021	Triennial	5/5/2024	MY53004059
Keysight Technologies	N9020A	MXA Signal Analyzer	4/6/2023	Annual	4/6/2024	MY48010233
Agilent	N9020A	MXA Signal Analyzer	4/26/2022	Biennial	4/26/2024	MY56470202
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	VLF-6000+	Low Pass Filter DC to 6000 MHz	7/5/2023	Annual	7/5/2024	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	CBT	N/A	CBT	1262
SPEAG	DAK-3.5	Dielectric Assessment Kit	11/13/2023	Annual	11/13/2024	1277
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/14/2023	Annual	8/14/2024	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)	3/13/2023	Annual	3/13/2024	1102
SPEAG	CLA-13	Confined Loop Antenna	11/9/2023	Annual	11/9/2024	1004
SPEAG	D2450V2	2450 MHz SAR Dipole	11/9/2021	Triennial	11/9/2024	921
SPEAG	D2450V2	2450 MHz SAR Dipole	5/11/2022	Biennial	5/11/2024	750
SPEAG	D5GHzV2	5 GHz SAR Dipole	3/22/2022	Biennial	3/22/2024	1123
SPEAG	D5GHzV2	5 GHz SAR Dipole	6/9/2021	Triennial	6/9/2024	1163
SPEAG	D6.5GHzV2	6.5 GHz SAR Dipole	1/12/2023	Annual	1/12/2024	1020
SPEAG	10G Verification Source	10 GHz System Verification Antenna	10/13/2023	Annual	10/13/2024	1006
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2023	Annual	10/18/2024	1237
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/14/2023	Annual	4/14/2024	1402
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/15/2023	Annual	3/15/2024	604
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2023	Annual	10/18/2024	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2023	Annual	10/18/2024	793
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/15/2023	Annual	3/15/2024	534
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/11/2023	Annual	5/11/2024	701
SPEAG	EX3DV4	SAR Probe	10/16/2023	Annual	10/16/2024	3746
SPEAG	EX3DV4	SAR Probe	10/16/2023	Annual	10/16/2024	7420
SPEAG	EX3DV4	SAR Probe	3/16/2023	Annual	3/16/2024	7421
SPEAG	EX3DV4	SAR Probe	4/14/2023	Annual	4/14/2024	7546
SPEAG	EX3DV4	SAR Probe	3/16/2023	Annual	3/16/2024	7360
SPEAG	EX3DV4	SAR Probe	5/24/2023	Annual	5/24/202	7416
SPEAG	EU mmWV4	EU mm WV4 Probe	1/16/2023	Annual	1/16/2024	9523

Note: 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.

13 MEASUREMENT UNCERTAINTIES

Applicable for SAR measurements < 6 GHz:

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
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	1.732	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	1.732	1	1	0.1	0.1	∞
Modulation Response	E.2.5	4.8	R	1.732	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	1.732	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E.6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E.6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	4	R	1.732	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	1.732	1	1	2.9	2.9	∞
SAR Scaling	E.6.5	0	R	1.732	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	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E.3.4	0.6	R	1.732	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:

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
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	E2.1	9.3	N	1	1	1	9.3	9.3	∞
Axial Isotropy	E2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E2.2	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	E2.3	2	R	1.732	1	1	1.2	1.2	∞
Linearity	E2.4	0.3	N	1	1	1	0.3	0.3	∞
System Detection Limits	E2.4	0.25	R	1.732	1	1	0.1	0.1	∞
Modulation Response	E2.5	4.8	R	1.732	1	1	2.8	2.8	∞
Readout Electronics	E2.6	0.3	N	1	1	1	0.3	0.3	∞
Response Time	E2.7	0.8	R	1.732	1	1	0.5	0.5	∞
Integration Time	E2.8	2.6	R	1.732	1	1	1.5	1.5	∞
RF Ambient Conditions - Noise	E6.1	3	R	1.732	1	1	1.7	1.7	∞
RF Ambient Conditions - Reflections	E6.1	3	R	1.732	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E6.2	0.8	R	1.732	1	1	0.5	0.5	∞
Probe Positioning w/ respect to Phantom	E6.3	6.7	R	1.732	1	1	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E5	4	R	1.732	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E4.2	3.12	N	1	1	1	3.1	3.1	35
Device Holder Uncertainty	E4.1	1.67	N	1	1	1	1.7	1.7	5
Output Power Variation - SAR drift measurement	E2.9	5	R	1.732	1	1	2.9	2.9	∞
SAR Scaling	E6.5	0	R	1.732	1	1	0.0	0.0	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E3.1	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	E3.3	4.3	N	1	0.78	0.71	3.3	3.0	76
Liquid Permittivity - measurement uncertainty	E3.3	4.2	N	1	0.23	0.26	1.0	1.1	75
Liquid Conductivity - Temperature Uncertainty	E3.4	3.4	R	1.732	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	E3.4	0.6	R	1.732	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	E3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	E3.2	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			2.68	

14 CONCLUSION

14.1 Measurement Conclusion

The SAR evaluation indicates that the EUT 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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