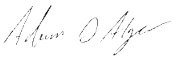
Test Report 3768-166-165 RFX

Equipment Under Test:	Module, SONA NX611 M.2 2230, 1 MHF / 2 MHF
Requirement(s):	FCC: 1.1307, 1.1310 ISED: RSS-102
Test Date(s):	8/1/2024
Prepared for:	Ezurio Attn: Brian Petted W66 N220 Commerce Ct. Cedarburg, WI 53012

Report Issued by: Dylan Rosenfeldt, EMC Engineer

Signature:  Date: 09/12/2024

Report Reviewed by: Adam Alger, Manager EMC Laboratory

Signature:  Date: 9/12/2024

Report Constructed by: Dylan Rosenfeldt, EMC Engineer

Signature:  Date: 9/10/2024

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Ezurio Test Services in Review

The Ezurio laboratory located at W66 N220 Commerce Court Cedarburg, Wisconsin, 53012 USA is recognized through the following organizations:

Certificate #1255.01

A2LA – American Association for Laboratory Accreditation

Accreditation based on ISO/IEC 17025:2017 with Electrical (EMC) Scope

A2LA Certificate Number: 1255.01

Scope of accreditation includes all test methods listed herein unless otherwise noted

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Federal Communications Commission (FCC) – USA

Accredited Test Firm Registration Number: 953492

Recognition of two 3 meter Semi-Anechoic Chambers

Government of Canada

Innovation, Science and Economic Development Canada

Accredited U.S. Identification Number: US0218

Recognition of two 3 meter Semi-Anechoic Chambers

1 TEST REPORT SUMMARY

During **7/31/2024** the Equipment Under Test (EUT), **Module, SONA NX611 M.2 2230, 1 MHF and 2 MHF,** as provided by **Ezurio** was tested to the following requirements:

Requirements	Description	Method	Compliant
FCC Part 1.1310, 2.1093	Radio Frequency Radiation Exposure Evaluation	KDB 447498 D01	Yes
ISED RSS-102	Radio Frequency Exposure Compliance of Radiocommunication Apparatus	RSS-102	Yes

Notice:

The results relate only to the item tested as configured and described in this report. Any additional configurations, modes of operation, or modifications made to the equipment under test after the specified test date(s) are at the decision of the client and may not apply to the data seen in this test report.

The decision rule for Pass / Fail assessment to the specification or standard listed in this test report has been agreed upon by the client and laboratory to be as follows:

Measurement Type	Rule
Emissions – Amplitude	1 dB below specified limit
Emissions – Frequency	1% less than the specification
Immunity	Tested at specified level

2 CLIENT INFORMATION

Company Name	Ezurio
Contact Person	Brian Petted
Address	W66 N220 Commerce Ct. Cedarburg, WI 53012

2.1 Equipment Under Test (EUT) Information

The following information has been supplied by the client

Product Name	Module, SONA NX611 M.2 2230, 1 MHF Module, SONA NX611 M.2 2230, 2 MHF
Part Number	453-00166, 453-00165
Serial Number	00047 | 00048
FCC ID	SQG-SONANX611M
IC ID	3147A-SONANX611M

2.2 Product Description

The NX611 is based upon NXP IW611 Wi-Fi 6 chipset. Feature-set includes 802.11 a/b/g/n/ac/ax Wi-Fi 6 and Dual-Mode Bluetooth v5.3 (BDR + EDR + BLE).

2.3 Modifications Incorporated for Compliance

None noted at time of test

2.4 Deviations and Exclusions from Test Specifications

None noted at time of test

2.5 EUT Information

Power Supply – INPUT:100-240VAC 50/60 Hz 0.3A

OUTPUT: 5VDC 2A

Firmware - sduart_nw61x_v1.bin.se

Sduart_nw61x_v1_mfg.bin.se

2.6 Ancillary Equipment

Equipment used for EUT programming (not part of the EUT)

Development Kit, SU60-SOMC 6.0

P/N: 463-00138-K1 Rev 1

Power Supply: INPUT: 100-240 VAC 50/60Hz 0.7A

OUTPUT: 12VDC 2A

HP Elitebook 840G1

Labtool Version: 1.0.0.45.6

2.7 Antenna Information

Manufacturer	Model	Part Number	Dimension	Type	Peak Gain (dBi)	
					2400-2500 MHz	4900-5925 MHz
Laird Connectivity	FlexMIMO 6E	EFD2471A3S-10MH4L	39.5mm X 39.5mm X 4.7mm	PIFA	2.2	3.8
Laird Connectivity	FlexPIFA 6E	EFB2471A3S-10MH4L	16mm X 36mm X 2.5mm	PIFA	2.2	3.9
Laird Connectivity	Mini NanoBlade Flex 6E	EMF2471A3S-10MH4L	36mm X 12mm X 0.3mm	PCB Dipole	2.4	4.4
Joymax Electronics	N/A	TWX-100BRS3B	137mm X 13mm	Dipole	2.0	4.0
Laird Connectivity	FlexPIFA	001-0021	38.5mm X 12.7mm X 2.5mm	PIFA	2.5	3.0

2.8 Test Channels 2.4 GHz WLAN

Channel	Frequency (MHz)	Bandwidth (MHz)	Data Rates
1	2402	20	802.11b – 1 and 11 Mbps 802.11g – 6 and 54 Mbps 802.11n – MCS0 and MCS7 802.11ax – MCS0 and MCS11
6	2437	20	
11	2462	20	
3	2422	40	
6	2437	40	
9	2452	40	

2.9 Test Channels 5 GHz WLAN

Channel	Frequency (MHz)	Bandwidth (MHz)	Data Rates
36	5180	20	802.11a – 6 and 54 Mbps 802.11n – MCS0 and MCS7 802.11ac – MCS0 and MCS9 802.11ax – MCS0 and MCS11
40	5200	20	
48	5240	20	
38	5190	40	
46	5230	40	
42	5210	80	
52	5260	20	
56	5280	20	
64	5320	20	
54	5270	40	
62	5310	40	
58	5290	80	
100	5500	20	
120	5600	20	
144	5700	20	
102	5510	40	
118	5590	40	
142	5710	40	
106	5530	80	
138	5610	80	
149	5745	20	
157	5785	20	
165	5825	20	
151	5755	40	
159	5795	40	
155	5775	80	

2.10 Test Channels BLE

Channel	Frequency (MHz)	Data Rates
0	2402	125k, 500k, 1M and 2M
19	2440	
39	2480	

2.11 Test Channels BT Classic

Channel	Frequency (MHz)	Data Rates
0	2402	DH5, 2DH5, and 3DH5
39	2441	
78	2480	

3 REFERENCES

Publication	Edition	Date	AMD 1	AMD 2
eCFR	-	2024	-	-
RSS-102	6	2023	-	-
KDB 447498	v06	2015	-	-
IEEE 95.3	-	2021	-	-

4 UNCERTAINTY SUMMARY

Using the guidance of the following publications the calculated measurement uncertainty represents an expanded uncertainty expressed at approximately the 95 % confidence level, using a coverage factor of k = 2.

References
CISPR 16-4-1
CISPR 16-4-2
CISPR 32
ANSI C63.23
A2LA P103
A2LA P103c
ETSI TR 100-028

Measurement Type	Configuration	Uncertainty ±
Radiated Emissions	Biconical Antenna	5.0 dB
Radiated Emissions	Log Periodic Antenna	5.3 dB
Radiated Emissions	Horn Antenna	4.7 dB
AC Line Conducted Emissions	Artificial Mains Network	3.4 dB
Telecom Conducted Emissions	Asymmetric Artificial Network	4.9 dB
Disturbance Power Emissions	Absorbing Clamp	4.1 dB
Radiated Immunity	3 Volts/meter	2.2 dB
Conducted Immunity	CDN/EM/BCI	2.4/3.5/3.4 dB
EFT Burst/Surge	Peak pulse voltage	164 volts
ESD Immunity	15 kV level	1377 Volts

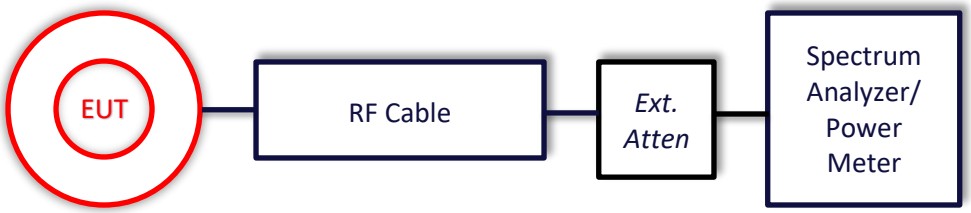
Parameter	ETSI U.C. ±	U.C. ±
Radio Frequency, from F0	$1x10^{-7}$	$0.55x10^{-7}$
Occupied Channel Bandwidth	5 %	2 %
RF conducted Power (Power Meter)	1.5 dB	1.2 dB
RF conducted emissions (Spectrum Analyzer)	3.0 dB	1.7 dB
All emissions, radiated	6.0 dB	5.3 dB
Temperature	1° C	0.65° C
Humidity	5 %	2.9 %
Supply voltages	3 %	1 %

5 TEST DATA

5.1 Antenna Port Conducted Emissions

Description of Measurement	The direct measurement of emissions at the antenna port of the EUT is achieved by use of a RF connection to a spectrum analyzer or power meter. The cable and attenuator factors are loaded into the analyzer or power meter allowing for direct measurement readings without the need for further corrections.
Example Calculations	Measurement (dBm) + Cable factor (dB) + External Attenuator (dB) = Corrected Reading (dBm) Margin (dB) = Limit (dBm) – Corrected Reading (dBm)

Block Diagram



5.1.1 Antenna Port Conducted Emissions – RF Output Power 2.4GHz WLAN (453-0166)

Nominal BW	Channel	Mode	MCS	Average Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	PWR Setting
20	1	802.11b	CCK-1	17.7		17.7	30.0	12.3	18
	6	802.11b	CCK-1	17.7		17.7	30.0	12.3	18
	11	802.11b	CCK-1	17.9		17.9	30.0	12.1	18
	1	802.11b	CCK-11	17.7		17.7	30.0	12.3	18
	6	802.11b	CCK-11	17.9		17.9	30.0	12.1	18
	11	802.11b	CCK-11	17.6		17.6	30.0	12.4	14
	1	802.11g	OFDM-6	12.9		12.9	30.0	17.1	14
	6	802.11g	OFDM-6	13.1		13.1	30.0	16.9	14
	11	802.11g	OFDM-6	13.0		13.0	30.0	17.0	14
	1	802.11g	OFDM-54	12.6	0.4	13.0	30.0	17.0	14
	6	802.11g	OFDM-54	12.7	0.4	13.1	30.0	16.9	14
	11	802.11g	OFDM-54	12.5	0.4	12.9	30.0	17.1	14
	1	802.11n	MCS0	12.8		12.8	30.0	17.2	14
	6	802.11n	MCS0	13.1		13.1	30.0	16.9	14
	11	802.11n	MCS0	13.0		13.0	30.0	17.0	14
	1	802.11n	MCS7	12.7	0.4	13.1	30.0	16.9	14
	6	802.11n	MCS7	12.7	0.4	13.1	30.0	16.9	14
	11	802.11n	MCS7	12.7	0.4	13.1	30.0	16.9	14
	1	802.11ax	MCS0	12.9		12.9	30.0	17.1	14
	6	802.11ax	MCS0	13.3		13.3	30.0	16.7	14
	11	802.11ax	MCS0	13.2		13.2	30.0	16.8	14
	1	802.11ax	MCS7	12.8	0.4	13.2	30.0	16.8	14
	6	802.11ax	MCS7	13.0	0.4	13.4	30.0	16.6	14
	11	802.11ax	MCS7	12.8	0.4	13.2	30.0	16.8	14
	1	802.11ax	MCS9	13.3	0.5	13.8	30.0	16.2	14
	6	802.11ax	MCS9	13.4	0.5	13.9	30.0	16.1	14
	11	802.11ax	MCS9	13.3	0.5	13.8	30.0	16.2	14
	1	802.11ax	MCS11	12.0	0.5	12.5	30.0	17.5	13
	6	802.11ax	MCS11	12.3	0.5	12.8	30.0	17.2	13
	11	802.11ax	MCS11	12.3	0.5	12.8	30.0	17.2	13
40	3	802.11n	MCS0	11.9	0.1	12.0	30.0	18.0	13
	6	802.11n	MCS0	12.0	0.1	12.1	30.0	17.9	13
	9	802.11n	MCS0	12.0	0.1	12.1	30.0	17.9	13
	3	802.11n	MCS7	12.4	0.6	13.0	30.0	17.0	14
	6	802.11n	MCS7	12.5	0.6	13.1	30.0	16.9	14
	9	802.11n	MCS7	12.6	0.6	13.2	30.0	16.8	14
	3	802.11ax	MCS0	12.2	0.1	12.3	30.0	17.7	13
	6	802.11ax	MCS0	12.3	0.1	12.4	30.0	17.6	13
	9	802.11ax	MCS0	12.2	0.1	12.3	30.0	17.7	13
	3	802.11ax	MCS7	11.8	0.6	12.4	30.0	17.6	13
	6	802.11ax	MCS7	11.9	0.6	12.5	30.0	17.5	13
	9	802.11ax	MCS7	11.9	0.6	12.5	30.0	17.5	13
	3	802.11ax	MCS9	11.7	0.6	12.3	30.0	17.7	13
	6	802.11ax	MCS9	11.8	0.6	12.4	30.0	17.6	13
	9	802.11ax	MCS9	11.7	0.6	12.3	30.0	17.7	13
	3	802.11ax	MCS11	11.0	0.7	11.7	30.0	18.3	12
	6	802.11ax	MCS11	11.0	0.7	11.7	30.0	18.3	12
	9	802.11ax	MCS11	11.0	0.7	11.7	30.0	18.3	12

Nominal BW	Channel	Mode	MCS	Average Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	PWR Setting
20	1	802.11ax	MCS0 RU26	12.6	0.2	12.8	30.0	17.2	13
	6			13.6	0.2	13.8	30.0	16.2	13
	11			12.4	0.2	12.6	30.0	17.4	13
	1		MCS0 RU52	12.7	0.2	12.9	30.0	17.1	13
	6			13.2	0.2	13.4	30.0	16.6	13
	11			12.5	0.2	12.7	30.0	17.3	13
	1		MCS0 RU106	12.8	0.2	13.0	30.0	17.0	13
	6			13.0	0.2	13.2	30.0	16.8	13
	11			12.8	0.2	13.0	30.0	17.0	13
40	3	802.11ax	MCS0 RU26	11.1	0.2	11.3	30.0	18.7	12
	6			12.3	0.2	12.5	30.0	17.5	12
	9			11.3	0.2	11.5	30.0	18.5	12
	3		MCS0 RU52	12.0	0.2	12.2	30.0	17.8	12
	6			12.5	0.2	12.7	30.0	17.3	12
	9			12.2	0.2	12.4	30.0	17.6	12
	3		MCS0 RU106	12.0	0.2	12.2	30.0	17.8	12
	6			12.7	0.2	12.9	30.0	17.1	12
	9			12.2	0.2	12.4	30.0	17.6	12
	3		MCS0 RU242	12.3	0.2	12.5	30.0	17.5	12
	6			12.5	0.2	12.7	30.0	17.3	12
	9			12.5	0.2	12.7	30.0	17.4	12

5.1.2 Antenna Port Conducted Emissions – RF Output Power 2.4GHz WLAN (453-0165)

Nominal BW	Channel	Mode	MCS	Avg Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	Power Setting
20	1	802.11b	CCK-1	17.4		17.4	30.0	12.6	18
	6	802.11b	CCK-1	17.6		17.6	30.0	12.4	18
	11	802.11b	CCK-1	17.6		17.6	30.0	12.4	18
	1	802.11b	CCK-11	17.2		17.2	30.0	12.8	18
	6	802.11b	CCK-11	17.5		17.5	30.0	12.5	18
	11	802.11b	CCK-11	17.4		17.4	30.0	12.6	18
	1	802.11g	OFDM-6	15.2		15.2	30.0	14.8	16
	6	802.11g	OFDM-6	15.4		15.4	30.0	14.6	16
	11	802.11g	OFDM-6	15.4		15.4	30.0	14.6	16
	1	802.11g	OFDM-54	14.9	0.4	15.3	30.0	14.7	16
	6	802.11g	OFDM-54	15.0	0.4	15.4	30.0	14.6	16
	11	802.11g	OFDM-54	14.9	0.4	15.3	30.0	14.7	16
	1	802.11n	MCS0	14.2		14.2	30.0	15.8	15
	6	802.11n	MCS0	14.4		14.4	30.0	15.6	15
	11	802.11n	MCS0	14.3		14.3	30.0	15.7	15
	1	802.11n	MCS7	13.9	0.4	14.3	30.0	15.7	15
	6	802.11n	MCS7	14.2	0.4	14.6	30.0	15.4	15
	11	802.11n	MCS7	13.9	0.4	14.3	30.0	15.7	15
	1	802.11ax	MCS0	14.4		14.4	30.0	15.6	15
	6	802.11ax	MCS0	14.7		14.7	30.0	15.3	15
	11	802.11ax	MCS0	14.5		14.5	30.0	15.5	15
	1	802.11ax	MCS7	12.9	0.4	13.3	30.0	16.7	14
	6	802.11ax	MCS7	13.0	0.4	13.4	30.0	16.6	14
	11	802.11ax	MCS7	12.9	0.4	13.3	30.0	16.7	14
	1	802.11ax	MCS9	13.0	0.5	13.5	30.0	16.5	14
	6	802.11ax	MCS9	13.2	0.5	13.7	30.0	16.3	14
	11	802.11ax	MCS9	13.0	0.5	13.5	30.0	16.5	14
	1	802.11ax	MCS11	11.9	0.5	12.4	30.0	17.6	13
	6	802.11ax	MCS11	12.1	0.5	12.6	30.0	17.4	13
	11	802.11ax	MCS11	12.1	0.5	12.6	30.0	17.4	13
40	1	802.11n	MCS0	13.0	0.1	13.1	30.0	16.9	14
	6	802.11n	MCS0	13.1	0.1	13.2	30.0	16.8	14
	11	802.11n	MCS0	13.1	0.1	13.2	30.0	16.8	14
	1	802.11n	MCS7	12.5	0.6	13.1	30.0	16.9	14
	6	802.11n	MCS7	12.6	0.6	13.2	30.0	16.8	14
	11	802.11n	MCS7	12.6	0.6	13.2	30.0	16.8	14
	1	802.11ax	MCS0	13.2	0.1	13.3	30.0	16.7	14
	6	802.11ax	MCS0	13.4	0.1	13.5	30.0	16.5	14
	11	802.11ax	MCS0	13.4	0.1	13.5	30.0	16.5	14
	1	802.11ax	MCS7	11.8	0.6	12.4	30.0	17.6	13
	6	802.11ax	MCS7	11.9	0.6	12.5	30.0	17.5	13
	11	802.11ax	MCS7	11.8	0.6	12.4	30.0	17.6	13
	3	802.11ax	MCS9	13.0	0.6	13.6	30.0	16.4	13
	6	802.11ax	MCS9	12.9	0.6	13.5	30.0	16.5	13
	9	802.11ax	MCS9	13.0	0.6	13.6	30.0	16.4	13
	3	802.11ax	MCS11	11.9	0.7	12.6	30.0	17.4	13
	6	802.11ax	MCS11	12.1	0.7	12.8	30.0	17.2	13
	9	802.11ax	MCS11	12.0	0.7	12.7	30.0	17.3	13

Nominal BW	Channel	Mode	MCS	Average Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	PWR Setting
20	1	802.11ax	MCS0 RU26	1.8	0.2	2.0	8.0	6.0	14
	6			2.3	0.2	2.5	8.0	5.5	14
	11			1.9	0.2	2.1	8.0	5.9	14
	1		MCS0 RU52	-1.3	0.2	-1.1	8.0	9.1	14
	6			-1.2	0.2	-1.0	8.0	9.0	14
	11			-1.2	0.2	-1.0	8.0	9.0	14
	1		MCS0 RU106	-3.5	0.2	-3.3	8.0	11.3	14
	6			-4.1	0.2	-3.9	8.0	11.9	14
	11			-3.8	0.2	-3.6	8.0	11.6	14
40	3	802.11ax	MCS0 RU26	-0.4	0.2	-0.2	8.0	8.2	13
	6			0.2	0.2	0.4	8.0	7.6	13
	9			0.2	0.2	0.4	8.0	7.6	13
	3		MCS0 RU52	-1.7	0.2	-1.5	8.0	9.5	13
	6			-2.3	0.2	-2.1	8.0	10.1	13
	9			-2.0	0.2	-1.8	8.0	9.8	13
	3		MCS0 RU106	-4.8	0.2	-4.6	8.0	12.6	13
	6			-4.9	0.2	-4.7	8.0	12.7	13
	9			-4.8	0.2	-4.6	8.0	12.6	13
	3		MCS0 RU242	-7.7	0.2	-7.5	8.0	15.5	13
	6			-8.5	0.2	-8.3	8.0	16.3	13
	9			-7.8	0.2	-7.6	8.0	15.6	13

5.1.3 Antenna Port Conducted Emissions – RF Output Power 5GHz WLAN (453-0166)

UNII 1									
Nominal BW	Channel	Mode	MCS	Avg Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	Power Setting
20	36	802.11a	OFDM-6	16.0		16.0	24.0	8.0	15
	40			16.0		16.0	24.0	8.0	
	48			15.9		15.9	24.0	8.1	
	36	802.11a	OFDM-54	15.7	0.4	16.1	24.0	7.9	15
	40			15.8	0.4	16.2	24.0	7.8	
	48			15.6	0.4	16.0	24.0	8.1	
	36	802.11n	MCS0	15.0		15.0	24.0	9.0	14
	40			15.1		15.1	24.0	8.9	
	48			14.9		14.9	24.0	9.1	
	36	802.11n	MCS7	14.7	0.4	15.1	24.0	8.9	14
	40			14.8	0.4	15.2	24.0	8.8	
	48			14.6	0.4	15.0	24.0	9.0	
	36	802.11ac	MCS0	14.9		14.9	24.0	9.1	14
	40			15.2		15.2	24.0	8.9	
	48			15.0		15.0	24.0	9.0	
	36	802.11ac	MCS7	14.7	0.4	15.1	24.0	8.9	14
	40			14.8	0.4	15.2	24.0	8.8	
	48			14.6	0.4	15.0	24.0	9.0	
	36	802.11ac	MCS8	14.6	0.4	15.0	24.0	9.1	14
	40			14.9	0.4	15.3	24.0	8.7	
	48			14.6	0.4	15.0	24.0	9.0	
	36	802.11ax	MCS0	15.2		15.2	24.0	8.8	14
	40			15.3		15.3	24.0	8.7	
	48			15.1		15.1	24.0	8.9	
	36	802.11ax	MCS7	14.7	0.4	15.1	24.0	8.9	14
	40			15.0	0.4	15.4	24.0	8.7	
	48			14.8	0.4	15.2	24.0	8.8	
	36	802.11ax	MCS9	12.7	0.5	13.2	24.0	10.8	12
	40			12.8	0.5	13.3	24.0	10.7	
	48			12.7	0.5	13.2	24.0	10.9	
	36	802.11ax	MCS11	10.7	0.5	11.2	24.0	12.8	10
	40			10.9	0.5	11.4	24.0	12.7	
	48			10.8	0.5	11.3	24.0	12.7	

40	38	802.11n	MCS0	12.9	0.1	13.0	24.0	11.0	12
	46			13.0	0.1	13.1	24.0	10.9	
	38	802.11n	MCS7	12.6	0.6	13.2	24.0	10.8	12
	46			12.4	0.6	13.0	24.0	11.0	
	38	802.11ac	MCS0	14.9	0.1	15.0	24.0	9.0	14
	46			14.9	0.1	15.0	24.0	9.0	
	38	802.11ac	MCS7	14.6	0.6	15.2	24.0	8.8	14
	46			14.5	0.6	15.1	24.0	8.9	
	38	802.11ac	MCS9	12.5	0.7	13.2	24.0	10.8	12
	46			12.3	0.7	13.0	24.0	11.0	
	38	802.11ax	MCS0	15.3	0.1	15.4	24.0	8.6	14
	46			15.2	0.1	15.3	24.0	8.7	
	38	802.11ax	MCS7	14.6	0.6	15.2	24.0	8.8	14
	46			14.7	0.6	15.3	24.0	8.7	
	38	802.11ax	MCS9	12.7	0.6	13.3	24.0	10.7	12
	46			12.6	0.6	13.2	24.0	10.8	
	38	802.11ax	MCS11	10.6	0.7	11.3	24.0	12.7	10
	46			10.7	0.7	11.4	24.0	12.6	
80	42	802.11ac	MCS0	12.8	0.2	13.0	24.0	11.0	12
	42	802.11ac	MCS7	12.1	0.9	13.0	24.0	11.0	12
	42	802.11ac	MCS9	11.0	1.0	12.0	24.0	12.0	11
	42	802.11ax	MCS0	12.1	0.2	12.3	24.0	11.7	11
	42	802.11ax	MCS7	11.6	0.8	12.4	24.0	11.6	11
	42	802.11ax	MCS9	12.6	0.8	13.4	24.0	10.7	12
	42	802.11ax	MCS11	10.4	0.8	11.2	24.0	12.8	10

UNII 2A									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	52	802.11a	OFDM-6	15.6		15.6	23.9	8.3	15
	56			15.6		15.6	23.9	8.3	
	64			15.3		15.3	23.9	8.6	
	52	802.11a	OFDM-54	15.4	0.4	15.8	23.9	8.2	15
	56			15.2	0.4	15.6	23.9	8.3	
	64			14.9	0.4	15.3	23.9	8.6	
	52	802.11n	MCS0	14.7		14.7	24.0	9.3	14
	56			14.6		14.6	24.0	9.4	
	64			14.3		14.3	24.0	9.7	
	52	802.11n	MCS7	14.4	0.4	14.8	24.0	9.2	14
	56			14.3	0.4	14.7	24.0	9.3	
	64			14.0	0.4	14.4	24.0	9.6	
	52	802.11ac	MCS0	14.8		14.8	24.0	9.2	14
	56			14.6		14.6	24.0	9.4	
	64			14.3		14.3	24.0	9.7	
	52	802.11ac	MCS7	14.4	0.4	14.8	24.0	9.2	14
	56			14.3	0.4	14.7	24.0	9.3	
	64			14.0	0.4	14.4	24.0	9.6	
	52	802.11ac	MCS8	14.4	0.4	14.8	24.0	9.2	14
	56			14.3	0.4	14.7	24.0	9.3	
	64			14.0	0.4	14.4	24.0	9.6	
	52	802.11ax	MCS0	14.9		14.9	24.0	9.1	14
	56			14.8		14.8	24.0	9.2	
	64			14.5		14.5	24.0	9.5	
	52	802.11ax	MCS7	14.6	0.4	15.0	24.0	9.0	14
	56			14.5	0.4	14.9	24.0	9.1	
	64			14.2	0.4	14.6	24.0	9.4	
	52	802.11ax	MCS9	12.4	0.5	12.9	24.0	11.1	12
	56			12.3	0.5	12.8	24.0	11.2	
	64			12.0	0.5	12.5	24.0	11.5	
	52	802.11ax	MCS11	10.3	0.5	10.8	24.0	13.2	10
	56			10.3	0.5	10.8	24.0	13.2	
	64			10.1	0.5	10.6	24.0	13.4	

40	54	802.11n	MCS0	12.6	0.1	12.7	24.0	11.3	12
	62			12.3	0.1	12.4	24.0	11.6	
	54	802.11n	MCS7	12.2	0.6	12.8	24.0	11.2	12
	62			11.9	0.6	12.5	24.0	11.5	
	54	802.11ac	MCS0	14.3	0.1	14.4	24.0	9.6	14
	62			14.2	0.1	14.3	24.0	9.7	
	54	802.11ac	MCS7	13.9	0.6	14.5	24.0	9.5	14
	62			13.9	0.6	14.5	24.0	9.5	
	54	802.11ac	MCS9	11.8	0.7	12.5	24.0	11.6	12
	62			11.7	0.7	12.4	24.0	11.6	
	54	802.11ax	MCS0	14.6	0.1	14.7	24.0	9.3	14
	62			14.6	0.1	14.7	24.0	9.3	
	54	802.11ax	MCS7	14.1	0.6	14.7	24.0	9.3	14
	62			14.1	0.6	14.7	24.0	9.3	
	54	802.11ax	MCS9	12.1	0.6	12.7	24.0	11.4	12
	62			12.1	0.6	12.7	24.0	11.3	
	54	802.11ax	MCS11	9.9	0.7	10.6	24.0	13.4	10
	62			10.0	0.7	10.7	24.0	13.3	
80	58	802.11ac	MCS0	12.4	0.2	12.6	24.0	11.4	12
	58	802.11ac	MCS7	11.8	0.9	12.7	24.0	11.3	12
	58	802.11ac	MCS9	10.7	1.0	11.7	24.0	12.3	11
	58	802.11ax	MCS0	11.7	0.2	11.9	24.0	12.1	11
	58	802.11ax	MCS7	11.2	0.8	12.0	24.0	12.0	11
	58	802.11ax	MCS9	12.2	0.8	13.0	24.0	11.0	12
	58	802.11ax	MCS11	10.0	0.8	10.8	24.0	13.2	10

UNII 2C									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	100	802.11a	OFDM-6	16.2		16.2	23.9	7.7	15
	120			16.7		16.7	23.9	7.2	
	144			16.2		16.2	23.9	7.7	
	100	802.11a	OFDM-54	16.0	0.4	16.4	23.9	7.5	15
	120			16.4	0.4	16.8	23.9	7.1	
	144			16.1	0.4	16.5	23.9	7.4	
	100	802.11n	MCS0	15.2		15.2	24.0	8.8	14
	120			15.7		15.7	24.0	8.3	
	144			15.4		15.4	24.0	8.6	
	100	802.11n	MCS7	15.0	0.4	15.4	24.0	8.6	14
	120			15.4	0.4	15.8	24.0	8.2	
	144			15.1	0.4	15.5	24.0	8.5	
	100	802.11ac	MCS0	15.4		15.4	24.0	8.6	14
	120			15.7		15.7	24.0	8.3	
	144			15.6		15.6	24.0	8.5	
	100	802.11ac	MCS7	15.1	0.4	15.5	24.0	8.6	14
	120			15.4	0.4	15.8	24.0	8.2	
	144			15.2	0.4	15.6	24.0	8.4	
	100	802.11ac	MCS8	14.9	0.4	15.3	24.0	8.7	14
	120			15.4	0.4	15.8	24.0	8.2	
	144			14.9	0.4	15.3	24.0	8.7	
	100	802.11ax	MCS0	15.6		15.6	24.0	8.4	14
	120			15.9		15.9	24.0	8.1	
	144			15.7		15.7	24.0	8.3	
	100	802.11ax	MCS7	15.2	0.4	15.6	24.0	8.4	14
	120			15.5	0.4	15.9	24.0	8.1	
	144			15.3	0.4	15.7	24.0	8.3	
	100	802.11ax	MCS9	13.0	0.5	13.5	24.0	10.5	12
	120			13.3	0.5	13.8	24.0	10.2	
	144			13.2	0.5	13.7	24.0	10.3	
	100	802.11ax	MCS11	10.8	0.5	11.3	24.0	12.7	10
	120			11.2	0.5	11.7	24.0	12.3	
	144			11.1	0.5	11.6	24.0	12.4	

40	102	802.11n	MCS0	13.4	0.1	13.5	24.0	10.5	14
	118			15.5	0.1	15.6	24.0	8.4	
	142			14.1	0.1	14.2	24.0	9.8	
	102	802.11n	MCS7	12.9	0.6	13.5	24.0	10.5	14
	118			15.1	0.6	15.7	24.0	8.3	
	142			13.5	0.6	14.1	24.0	9.9	
	102	802.11ac	MCS0	14.6	0.1	14.7	24.0	9.4	14
	118			15.5	0.1	15.6	24.0	8.4	
	142			16.0	0.1	16.1	24.0	7.9	
	102	802.11ac	MCS7	14.4	0.6	15.0	24.0	9.0	14
	118			15.1	0.6	15.7	24.0	8.3	
	142			15.7	0.6	16.3	24.0	7.7	
	102	802.11ac	MCS9	12.2	0.7	12.9	24.0	11.1	12
	118			12.9	0.7	13.6	24.0	10.4	
	142			13.6	0.7	14.3	24.0	9.7	
	102	802.11ax	MCS0	15.2	0.1	15.3	24.0	8.7	14
	118			15.9	0.1	16.0	24.0	8.0	
	142			16.4	0.1	16.5	24.0	7.5	
	102	802.11ax	MCS7	14.7	0.6	15.3	24.0	8.7	14
	118			15.5	0.6	16.1	24.0	7.9	
	142			16.0	0.6	16.6	24.0	7.4	
	102	802.11ax	MCS9	12.6	0.6	13.2	24.0	10.9	12
	118			13.2	0.6	13.8	24.0	10.2	
	142			13.9	0.6	14.5	24.0	9.5	
	102	802.11ax	MCS11	10.4	0.7	11.1	24.0	13.0	10
	118			11.0	0.7	11.7	24.0	12.3	
	142			11.8	0.7	12.5	24.0	11.5	

80	106	802.11ac	MCS0	13.1	0.2	13.3	24.0	10.7	12
	122			13.5	0.2	13.7	24.0	10.3	12
	138			14.6	0.2	14.8	24.0	9.2	12
	106		MCS7	12.5	0.9	13.4	24.0	10.6	12
	122			13.0	0.9	13.9	24.0	10.1	12
	138			13.9	0.9	14.8	24.0	9.2	12
	106		MCS9	11.3	1.0	12.3	24.0	11.7	11
	122			11.9	1.0	12.9	24.0	11.1	11
	138			12.9	1.0	13.9	24.0	10.1	11
	106	802.11ax	MCS0	12.4	0.2	12.6	24.0	11.4	11
	122			12.9	0.2	13.1	24.0	10.9	11
	138			13.8	0.2	14.0	24.0	10.0	11
	106		MCS7	11.8	0.8	12.6	24.0	11.4	11
	122			12.1	0.8	12.9	24.0	11.1	11
	138			13.2	0.8	14.0	24.0	10.0	11
	106		MCS9	12.7	0.8	13.5	24.0	10.5	12
	122			13.2	0.8	14.0	24.0	10.0	12
	138			14.3	0.8	15.1	24.0	8.9	12
	106		MCS11	10.5	0.8	11.3	24.0	12.7	10
	122			11.1	0.8	11.9	24.0	12.1	10
	138			12.2	0.8	13.0	24.0	11.1	10

UNII 2C (ISED)									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	116	802.11a	OFDM-6	16.4	0.0	16.4	23.9	7.5	15
			OFDM-54	16.1	0.4	16.5	23.9	7.4	15
		802.11n	MCS0	15.3	0.0	15.3	24	8.7	14
			MCS7	15.2	0.4	15.6	24	8.4	14
		802.11ac	MCS0	15.2	0.0	15.2	24	8.8	14
			MCS7	15	0.4	15.4	24	8.6	14
			MCS8	15	0.4	15.4	24	8.6	14
		802.11ax	MCS0	11.5	0.0	11.5	24	12.5	10
			MCS7	11.2	0.4	11.6	24	12.4	10
			MCS9	11.1	0.5	11.6	24	12.4	10
			MCS11	11	0.5	11.5	24	12.5	10
40	110	802.11n	MCS0	13	0.1	13.1	24	10.9	12
			MCS7	12.7	0.6	13.3	24	10.7	12
		802.11ac	MCS0	15.2	0.1	15.3	24	8.7	14
			MCS7	15	0.6	15.6	24	8.4	14
			MCS9	12.7	0.7	13.4	24	10.6	12
		802.11ax	MCS0	11.5	0.1	11.6	24	12.4	10
			MCS7	11	0.6	11.6	24	12.4	10
			MCS9	11	0.6	11.6	24	12.4	10
			MCS11	10.9	0.7	11.6	24	12.4	10

Mid channels used for ISED Canada

UNII 3									
Nominal BW	Channel	Mode	MCS	Avg Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	Power Setting
20	149	802.11a	OFDM-6	17.4		17.4	30.0	12.6	15
	157			17.3		17.3	30.0	12.7	
	165			17.4		17.4	30.0	12.6	
	149	802.11a	OFDM-54	17.1	0.4	17.5	30.0	12.5	15
	157			17.0	0.4	17.4	30.0	12.6	
	165			17.1	0.4	17.5	30.0	12.5	
	149	802.11n	MCS0	16.4		16.4	30.0	13.6	14
	157			16.3		16.3	30.0	13.7	
	165			16.4		16.4	30.0	13.6	
	149	802.11n	MCS7	16.1	0.4	16.5	30.0	13.5	14
	157			16.0	0.4	16.4	30.0	13.6	
	165			16.1	0.4	16.5	30.0	13.5	
	149	802.11ac	MCS0	16.5		16.5	30.0	13.5	14
	157			16.2		16.2	30.0	13.8	
	165			16.5		16.5	30.0	13.6	
	149	802.11ac	MCS7	16.1	0.4	16.5	30.0	13.5	14
	157			15.9	0.4	16.3	30.0	13.7	
	165			16.1	0.4	16.5	30.0	13.5	
	149	802.11ac	MCS8	16.1	0.4	16.5	30.0	13.5	14
	157			15.9	0.4	16.3	30.0	13.7	
	165			16.0	0.4	16.4	30.0	13.6	
	149	802.11ax	MCS0	16.7		16.7	30.0	13.3	14
	157			16.4		16.4	30.0	13.6	
	165			16.6		16.6	30.0	13.5	
	149	802.11ax	MCS7	16.4	0.4	16.8	30.0	13.2	14
	157			16.1	0.4	16.5	30.0	13.5	
	165			16.2	0.4	16.6	30.0	13.4	
	149	802.11ax	MCS9	14.3	0.5	14.8	30.0	15.2	12
	157			14.0	0.5	14.5	30.0	15.5	
	165			14.1	0.5	14.6	30.0	15.4	
	149	802.11ax	MCS11	12.1	0.5	12.6	30.0	17.4	10
	157			11.8	0.5	12.3	30.0	17.7	
	165			12.1	0.5	12.6	30.0	17.4	

40	151	802.11n	MCS0	14.3	0.1	14.4	30.0	15.6	12
	159			14.0	0.1	14.1	30.0	15.9	
	151	802.11n	MCS7	14.0	0.6	14.6	30.0	15.4	12
	159			13.9	0.6	14.5	30.0	15.5	
	151	802.11ac	MCS0	16.3	0.1	16.4	30.0	13.6	14
	159			16.4	0.1	16.5	30.0	13.6	
	151	802.11ac	MCS7	16.0	0.6	16.6	30.0	13.4	14
	159			15.9	0.6	16.5	30.0	13.5	
	151	802.11ac	MCS9	14.0	0.7	14.7	30.0	15.3	12
	159			14.0	0.7	14.7	30.0	15.4	
	151	802.11ax	MCS0	16.8	0.1	16.9	30.0	13.2	14
	159			16.7	0.1	16.8	30.0	13.2	
	151	802.11ax	MCS7	16.4	0.6	17.0	30.0	13.0	14
	159			16.2	0.6	16.8	30.0	13.2	
	151	802.11ax	MCS9	14.3	0.6	14.9	30.0	15.1	12
	159			14.1	0.6	14.7	30.0	15.3	
	151	802.11ax	MCS11	12.1	0.7	12.8	30.0	17.2	10
	159			11.9	0.7	12.6	30.0	17.4	
80	155	802.11ac	MCS0	14.9	0.2	15.1	30.0	15.0	12
	155	802.11ac	MCS7	14.3	0.9	15.2	30.0	14.8	12
	155	802.11ac	MCS9	13.2	1.0	14.2	30.0	15.8	11
	155	802.11ax	MCS0	14.2	0.2	14.4	30.0	15.6	11
	155	802.11ax	MCS7	13.7	0.8	14.5	30.0	15.5	11
	155	802.11ax	MCS9	14.6	0.8	15.4	30.0	14.6	12
	155	802.11ax	MCS11	12.5	0.8	13.3	30.0	16.7	10

UNII 1									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	36	802.11ax	MCS0 RU26	9.7	0.2	9.9	24.0	14.1	10
	40			10.2	0.2	10.4	24.0	13.6	
	48			10.2	0.2	10.4	24.0	13.6	
	36		MCS0 RU52	9.7	0.2	9.9	24.0	14.1	10
	40			10.2	0.2	10.4	24.0	13.7	
	48			10.3	0.2	10.5	24.0	13.5	
	36		MCS0 RU106	10.0	0.2	10.2	24.0	13.8	10
	40			10.3	0.2	10.5	24.0	13.5	
	48			10.4	0.2	10.6	24.0	13.4	
40	38		MCS0 RU26	8.7	0.2	8.9	24.0	15.1	10
	46			8.7	0.2	8.9	24.0	15.1	
	38		MCS0 RU52	9.4	0.2	9.6	24.0	14.4	10
	46			10.1	0.2	10.3	24.0	13.7	
	38		MCS0 RU106	9.5	0.2	9.7	24.0	14.3	10
	46			10.1	0.2	10.3	24.0	13.7	
	38		MCS0 RU242	9.7	0.2	9.9	24.0	14.1	10
	46			10.3	0.2	10.5	24.0	13.5	
80	42		MCS0 RU26	9.6	0.2	9.8	24.0	14.2	9
	42		MCS0 RU52	9.5	0.2	9.7	24.0	14.3	9
	42		MCS0 RU106	9.5	0.2	9.7	24.0	14.3	9
	42		MCS0 RU242	9.4	0.2	9.6	24.0	14.4	9
	42		MCS0 RU484	9.7	0.2	9.9	24.0	14.1	9

UNII 2A									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	52	802.11ax	MCS0 RU26	10.0	0.2	10.2	23.9	13.8	10
	56			10.1	0.2	10.3	23.9	13.6	
	64			10.1	0.2	10.3	23.9	13.6	
	52		MCS0 RU52	9.9	0.2	10.1	23.9	13.8	10
	56			10.0	0.2	10.2	23.9	13.7	
	64			10.2	0.2	10.4	23.9	13.6	
	52		MCS0 RU106	10.0	0.2	10.2	24.0	13.8	10
	56			10.1	0.2	10.3	24.0	13.7	
	64			10.2	0.2	10.4	24.0	13.6	
40	54	802.11ax	MCS0 RU26	8.9	0.2	9.1	24.0	14.9	10
	62			9.0	0.2	9.2	24.0	14.8	
	54		MCS0 RU52	9.8	0.2	10.0	24.0	14.0	10
	62			10.1	0.2	10.3	24.0	13.7	
	54		MCS0 RU106	9.8	0.2	10.0	24.0	14.0	10
	62			10.1	0.2	10.3	24.0	13.8	
	54		MCS0 RU242	10.0	0.2	10.2	24.0	13.8	10
	62			10.2	0.2	10.4	24.0	13.6	
80	58	802.11ax	MCS0 RU26	9.6	0.2	9.8	24.0	14.3	9
	58		MCS0 RU52	9.4	0.2	9.6	24.0	14.4	9
	58		MCS0 RU106	9.4	0.2	9.6	24.0	14.4	9
	58		MCS0 RU242	9.5	0.2	9.7	24.0	14.3	9
	58		MCS0 RU484	9.5	0.2	9.7	24.0	14.3	9

UNII 2C									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	100	802.11ax	MCS0 RU26	10.1	0.2	10.3	23.9	13.6	10
	120			11.1	0.2	11.3	23.9	12.6	
	144			11.3	0.2	11.5	23.9	12.4	
	100		MCS0 RU52	10.1	0.2	10.3	23.9	13.6	10
	120			11.2	0.2	11.4	23.9	12.5	
	144			11.3	0.2	11.5	23.9	12.4	
	100		MCS0 RU106	10.2	0.2	10.4	24.0	13.6	10
	120			11.3	0.2	11.5	24.0	12.5	
	144			11.4	0.2	11.6	24.0	12.4	
40	102	802.11ax	MCS0 RU26	9.3	0.2	9.5	23.9	14.4	10
	118			10.1	0.2	10.3	23.9	13.6	
	142			11.0	0.2	11.2	23.9	12.7	
	102		MCS0 RU52	10.1	0.2	10.3	23.9	13.6	10
	118			11.0	0.2	11.2	23.9	12.7	
	142			12.0	0.2	12.2	23.9	11.7	
	102		MCS0 RU106	10.2	0.2	10.4	24.0	13.6	10
	118			11.1	0.2	11.3	24.0	12.7	
	142			12.0	0.2	12.2	24.0	11.8	
	102		MCS0 RU242	10.4	0.2	10.6	24.0	13.4	10
	118			11.3	0.2	11.5	24.0	12.5	
	142			12.1	0.2	12.3	24.0	11.7	
80	106	802.11ax	MCS0 RU26	9.2	0.2	9.4	23.9	14.5	9
	122			10.7	0.2	10.9	23.9	13.0	
	138			11.9	0.2	12.1	23.9	11.8	
	106		MCS0 RU52	9.6	0.2	9.8	23.9	14.2	9
	122			10.9	0.2	11.1	23.9	12.8	
	138			11.9	0.2	12.1	23.9	11.8	
	106		MCS0 RU106	9.4	0.2	9.6	24.0	14.4	9
	122			10.7	0.2	10.9	24.0	13.1	
	138			11.5	0.2	11.7	24.0	12.3	
	106		MCS0 RU242	9.6	0.2	9.8	24.0	14.2	9
	122			10.7	0.2	10.9	24.0	13.1	
	138			11.7	0.2	11.9	24.0	12.1	
	106		MCS0 RU484	9.7	0.2	9.9	24.0	14.1	9
	122			10.8	0.2	11.0	24.0	13.0	
	138			11.7	0.2	11.9	24.0	12.2	

UNII 2C (ISED)									
Nominal BW	**Channel**	**Mode**	**MCS0**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	116	802.11ax	RU26	11.4	0.2	11.6	24	12.4	10
		802.11ax	RU52	11.6	0.2	11.8	24	12.2	10
		802.11ax	RU106	11.4	0.2	11.6	24	12.4	10
40	110	802.11ax	RU26	10.3	0.2	10.5	24	13.5	10
		802.11ax	RU52	11.4	0.2	11.6	24	12.4	10
		802.11ax	RU106	11.4	0.2	11.6	24	12.4	10
		802.11ax	RU242	11.6	0.2	11.8	24	12.2	10

Mid channels used for ISED Canada

UNII 3									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	149	802.11ax	MCS0 RU26	12.1	0.2	12.3	23.9	11.6	14
	157			12.1	0.2	12.3	23.9	11.6	
	165			12.5	0.2	12.7	23.9	11.2	
	149		MCS0 RU52	12.0	0.2	12.2	23.9	11.7	14
	157			12.0	0.2	12.2	23.9	11.7	
	165			12.5	0.2	12.7	23.9	11.2	
	149		MCS0 RU106	12.2	0.2	12.4	24.0	11.6	14
	157			12.2	0.2	12.4	24.0	11.6	
	165			12.6	0.2	12.8	24.0	11.2	
40	151	802.11ax	MCS0 RU26	11.1	0.2	11.3	24.0	12.7	14
	159			11.1	0.2	11.3	24.0	12.7	
	151		MCS0 RU52	12.1	0.2	12.3	24.0	11.7	14
	159			11.9	0.2	12.1	24.0	11.9	
	151		MCS0 RU106	12.1	0.2	12.3	24.0	11.7	14
	159			11.9	0.2	12.1	24.0	11.9	
	151		MCS0 RU242	12.2	0.2	12.4	24.0	11.6	14
	159			12.1	0.2	12.3	24.0	11.7	
80	155	802.11ax	MCS0 RU26	12.1	0.2	12.3	24.0	11.7	9
	155		MCS0 RU52	11.8	0.2	12.0	24.0	12.0	9
	155		MCS0 RU106	11.9	0.2	12.1	24.0	11.9	9
	155		MCS0 RU242	11.8	0.2	12.0	24.0	12.0	9
	155		MCS0 RU484	11.9	0.2	12.1	24.0	11.9	9

5.1.4 Antenna Port Conducted Emissions – RF Output Power 5GHz WLAN (453-0165)

UNII 1									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	36	802.11a	OFDM-6	15.2		15.2	24.0	8.8	15
	40			15.4		15.4	24.0	8.6	
	48			15.3		15.3	24.0	8.7	
	36	802.11a	OFDM-54	14.9	0.4	15.3	24.0	8.7	15
	40			15.1	0.4	15.5	24.0	8.5	
	48			15.0	0.4	15.4	24.0	8.6	
	36	802.11n	MCS0	14.1		14.1	24.0	9.9	14
	40			14.5		14.5	24.0	9.5	
	48			14.3		14.3	24.0	9.7	
	36	802.11n	MCS7	13.9	0.4	14.3	24.0	9.7	14
	40			14.1	0.4	14.5	24.0	9.5	
	48			14.0	0.4	14.4	24.0	9.6	
	36	802.11ac	MCS0	14.2		14.2	24.0	9.8	14
	40			14.5		14.5	24.0	9.5	
	48			14.3		14.3	24.0	9.7	
	36	802.11ac	MCS8	14.0	0.4	14.4	24.0	9.7	14
	40			14.1	0.4	14.5	24.0	9.5	
	48			14.0	0.4	14.4	24.0	9.6	
	36	802.11ax	MCS0	10.4		10.4	24.0	13.6	10
	40			10.6		10.6	24.0	13.4	
	48			10.6		10.6	24.0	13.4	
	36	802.11ax	MCS11	9.9	0.5	10.4	24.0	13.6	10
	40			10.1	0.5	10.6	24.0	13.4	
	48			10.0	0.5	10.5	24.0	13.5	

40	38	802.11n	MCS0	14.3	0.1	14.4	24.0	9.6	14
	46			14.3	0.1	14.4	24.0	9.6	
	38	802.11n	MCS7	13.6	0.6	14.2	24.0	9.8	14
	46			13.8	0.6	14.4	24.0	9.6	
	38	802.11ac	MCS0	14.2	0.1	14.3	24.0	9.7	14
	46			14.3	0.1	14.4	24.0	9.6	
	38	802.11ac	MCS9	11.7	0.7	12.4	24.0	11.6	12
	46			11.8	0.7	12.5	24.0	11.5	
	38	802.11ax	MCS0	10.4	0.1	10.5	24.0	13.5	14
	46			10.7	0.1	10.8	24.0	13.2	
	38	802.11ax	MCS11	9.8	0.7	10.5	24.0	13.5	10
	46			10.0	0.7	10.7	24.0	13.3	
80	42	802.11ac	MCS0	12.8	0.2	13.0	24.0	11.0	12
	42	802.11ac	MCS9	11.9	1.0	12.9	24.0	11.1	12
	42	802.11ax	MCS0	10.0	0.2	10.2	24.0	13.8	11
	42	802.11ax	MCS11	9.3	0.8	10.1	24.0	13.9	10

UNII 2A									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	52	802.11a	OFDM-6	14.9		14.9	23.9	9.0	15
	56			14.8		14.8	23.9	9.1	
	64			14.6		14.6	23.9	9.3	
	52	802.11a	OFDM-54	14.7	0.4	15.1	23.9	8.9	15
	56			14.6	0.4	15.0	23.9	8.9	
	64			14.3	0.4	14.7	23.9	9.2	
	52	802.11n	MCS0	14.0		14.0	24.0	10.0	14
	56			13.9		13.9	24.0	10.1	
	64			13.7		13.7	24.0	10.3	
	52	802.11n	MCS7	13.7	0.4	14.1	24.0	9.9	14
	56			13.7	0.4	14.1	24.0	9.9	
	64			13.4	0.4	13.8	24.0	10.2	
	52	802.11ac	MCS0	14.0		14.0	24.0	10.0	14
	56			14.0		14.0	24.0	10.0	
	64			13.7		13.7	24.0	10.3	
	52	802.11ac	MCS8	13.6	0.4	14.0	24.0	10.0	14
	56			13.6	0.4	14.0	24.0	10.0	
	64			13.3	0.4	13.7	24.0	10.3	
	52	802.11ax	MCS0	10.3		10.3	24.0	13.7	10
	56			10.3		10.3	24.0	13.7	
	64			10.1		10.1	24.0	13.9	
	52	802.11ax	MCS11	9.7	0.5	10.2	24.0	13.8	10
	56			9.8	0.5	10.3	24.0	13.7	
	64			9.6	0.5	10.1	24.0	13.9	

40	54	802.11n	MCS0	13.9	0.1	14.0	24.0	10.0	14
	62			13.8	0.1	13.9	24.0	10.1	
	54	802.11n	MCS7	13.5	0.6	14.1	24.0	9.9	14
	62			13.3	0.6	13.9	24.0	10.1	
	54	802.11ac	MCS0	13.8	0.1	13.9	24.0	10.1	14
	62			13.7	0.1	13.8	24.0	10.2	
	54	802.11ac	MCS9	11.4	0.7	12.1	24.0	11.9	12
	62			11.2	0.7	11.9	24.0	12.1	
	54	802.11ax	MCS0	10.2	0.1	10.3	24.0	13.7	14
	62			10.1	0.1	10.2	24.0	13.8	
	54	802.11ax	MCS11	9.7	0.7	10.4	24.0	13.6	10
	62			9.6	0.7	10.3	24.0	13.7	
80	58	802.11ac	MCS0	12.1	0.2	12.3	24.0	11.7	12
	58	802.11ac	MCS9	11.4	1.0	12.4	24.0	11.6	12
	58	802.11ax	MCS0	9.5	0.2	9.7	24.0	14.3	11
	58	802.11ax	MCS11	8.9	0.8	9.7	24.0	14.3	10

UNII 2C									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	100	802.11a	OFDM-6	15.1		15.1	23.9	8.8	16
	120			16.1		16.1	23.9	7.8	
	144			15.4		15.4	23.9	8.5	
	100	802.11a	OFDM-54	15.2	0.4	15.6	23.9	8.4	16
	120			15.8	0.4	16.2	23.9	7.7	
	144			15.3	0.4	15.7	23.9	8.2	
	100	802.11n	MCS0	14.5		14.5	24.0	9.5	14
	120			15.1		15.1	24.0	8.9	
	144			14.8		14.8	24.0	9.2	
	100	802.11n	MCS7	14.2	0.4	14.6	24.0	9.4	14
	120			14.8	0.4	15.2	24.0	8.8	
	144			14.5	0.4	14.9	24.0	9.1	
	100	802.11ac	MCS0	14.4		14.4	24.0	9.6	14
	120			15.1		15.1	24.0	8.9	
	144			14.7		14.7	24.0	9.3	
	100	802.11ac	MCS8	14.0	0.4	14.4	24.0	9.6	14
	120			14.7	0.4	15.1	24.0	8.9	
	144			14.4	0.4	14.8	24.0	9.2	
	100	802.11ax	MCS0	10.4		10.4	24.0	13.6	14
	120			11.1		11.1	24.0	12.9	
	144			10.9		10.9	24.0	13.1	
	100	802.11ax	MCS11	9.8	0.5	10.3	24.0	13.7	10
	120			10.6	0.5	11.1	24.0	12.9	
	144			10.5	0.5	11.0	24.0	13.0	

40	102	802.11n	MCS0	14.7	0.1	14.8	24.0	9.2	14
	118			15.0	0.1	15.1	11.0	-4.1	
	142			15.3	0.1	15.4	24.0	8.6	
	102	802.11n	MCS7	14.2	0.6	14.8	24.0	9.2	14
	118			14.6	0.6	15.2	11.0	-4.2	
	142			14.9	0.6	15.5	24.0	8.5	
	102	802.11ac	MCS0	14.4	0.1	14.5	24.0	9.5	14
	118			15.1	0.1	15.2	11.0	-4.2	
	142			15.3	0.1	15.4	24.0	8.6	
	102	802.11ac	MCS9	11.9	0.7	12.6	24.0	11.4	12
	118			12.5	0.7	13.2	11.0	-2.2	
	142			12.9	0.7	13.6	24.0	10.5	
	102	802.11ax	MCS0	10.8	0.1	10.9	24.0	13.1	14
	118			11.2	0.1	11.3	11.0	-0.3	
	142			11.5	0.1	11.6	24.0	12.4	
	102	802.11ax	MCS11	10.1	0.7	10.8	24.0	13.2	10
	118			10.6	0.7	11.3	11.0	-0.3	
	142			11.0	0.7	11.7	24.0	12.3	
80	106	802.11ac	MCS0	12.8	0.2	13.0	24.0	11.0	14
	122			13.4	0.2	13.6	24.0	10.4	14
	138			14.0	0.2	14.2	24.0	9.8	14
	106		MCS9	12.2	1.0	13.2	24.0	10.8	12
	122			12.7	1.0	13.7	24.0	10.3	12
	138			13.3	1.0	14.3	24.0	9.7	12
	106	802.11ax	MCS0	10.1	0.2	10.3	24.0	13.7	9
	122			10.7	0.2	10.9	24.0	13.1	9
	138			11.4	0.2	11.6	24.0	12.4	9
	106		MCS11	9.4	0.8	10.2	24.0	13.8	9
	122			10.0	0.8	10.8	24.0	13.2	9
	138			10.7	0.8	11.5	24.0	12.5	9

UNII 2C (ISED)									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	116	802.11a	OFDM-6	15.9	0.0	15.9	23.9	8.0	15
			OFDM-54	15.5	0.4	15.9	23.9	8.0	15
		802.11n	MCS0	14.9	0.0	14.9	24	9.1	14
			MCS7	14.6	0.4	15.0	24	9.0	14
		802.11ac	MCS0	14.9	0.0	14.9	24	9.1	14
			MCS7	14.7	0.4	15.1	24	8.9	14
			MCS8	14.5	0.4	14.9	24	9.1	14
		802.11ax	MCS0	11	0.0	11.0	24	13.0	10
			MCS7	10.6	0.4	11.0	24	13.0	10
			MCS9	10.6	0.5	11.1	24	12.9	10
			MCS11	10.4	0.5	10.9	24	13.1	10
40	110	802.11n	MCS0	14.5	0.1	14.6	24	9.4	14
			MCS7	14.4	0.6	15.0	24	9.0	14
		802.11ac	MCS0	14.8	0.1	14.9	24	9.1	14
			MCS7	14.3	0.6	14.9	24	9.1	14
			MCS9	12	0.7	12.7	24	11.3	12
		802.11ax	MCS0	10.8	0.1	10.9	24	13.1	10
			MCS7	10.3	0.6	10.9	24	13.1	10
			MCS9	10.3	0.6	10.9	24	13.1	10
			MCS11	10.1	0.7	10.8	24	13.2	10

Mid channels used for ISED Canada

UNII 3									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	149	802.11a	OFDM-6	16.6		16.6	30.0	13.4	15
	157			16.4		16.4	30.0	13.6	
	165			16.7		16.7	30.0	13.3	
	149	802.11a	OFDM-54	16.4	0.4	16.8	30.0	13.2	15
	157			16.0	0.4	16.4	30.0	13.6	
	165			16.2	0.4	16.6	30.0	13.4	
	149	802.11n	MCS0	15.7		15.7	30.0	14.3	14
	157			15.4		15.4	30.0	14.6	
	165			15.7		15.7	30.0	14.3	
	149	802.11n	MCS7	15.4	0.4	15.8	30.0	14.2	14
	157			15.1	0.4	15.5	30.0	14.5	
	165			15.2	0.4	15.6	30.0	14.4	
	149	802.11ac	MCS0	15.6		15.6	30.0	14.4	14
	157			15.4		15.4	30.0	14.6	
	165			15.8		15.8	30.0	14.2	
	149	802.11ac	MCS8	15.2	0.4	15.6	30.0	14.4	14
	157			15.1	0.4	15.5	30.0	14.5	
	165			15.3	0.4	15.7	30.0	14.3	
	149	802.11ax	MCS0	11.8		11.8	30.0	18.2	14
	157			11.7		11.7	30.0	18.3	
	165			12.0		12.0	30.0	18.1	
	149	802.11ax	MCS11	11.3	0.5	11.8	30.0	18.2	10
	157			11.2	0.5	11.7	30.0	18.3	
	165			11.4	0.5	11.9	30.0	18.1	

40	151	802.11n	MCS0	15.5	0.1	15.6	30.0	14.4	14
	159			15.4	0.1	15.5	30.0	14.5	
	151	802.11n	MCS7	15.0	0.6	15.6	30.0	14.4	14
	159			14.9	0.6	15.5	30.0	14.5	
	151	802.11ac	MCS0	15.4	0.1	15.5	30.0	14.5	14
	159			15.4	0.1	15.5	30.0	14.5	
	151	802.11ac	MCS9	13.1	0.7	13.8	30.0	16.2	12
	159			13.2	0.7	13.9	30.0	16.1	
	151	802.11ax	MCS0	11.9	0.1	12.0	30.0	18.0	14
	159			11.9	0.1	12.0	30.0	18.0	
	151	802.11ax	MCS11	11.4	0.7	12.1	30.0	18.0	10
	159			11.3	0.7	12.0	30.0	18.0	
80	155	802.11ac	MCS0	14.3	0.2	14.5	30.0	15.5	14
	155	802.11ac	MCS9	13.7	1.0	14.7	30.0	15.4	12
	155	802.11ax	MCS0	11.5	0.2	11.7	30.0	18.3	14
	155	802.11ax	MCS11	10.8	0.8	11.6	30.0	18.4	10

UNII 1									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	36	802.11ax	MCS0 RU26	10.1	0.2	10.3	24.0	13.7	14
	40			10.2	0.2	10.4	24.0	13.6	
	48			10.4	0.2	10.6	24.0	13.4	
	36		MCS0 RU52	9.9	0.2	10.1	24.0	13.9	14
	40			10.3	0.2	10.5	24.0	13.5	
	48			10.4	0.2	10.6	24.0	13.4	
	36		MCS0 RU106	10.1	0.2	10.3	24.0	13.7	14
	40			10.5	0.2	10.7	24.0	13.3	
	48			10.5	0.2	10.7	24.0	13.3	
40	38		MCS0 RU26	9.3	0.2	9.5	24.0	14.5	10
	46			9.6	0.2	9.8	24.0	14.2	
	38		MCS0 RU52	10.1	0.2	10.3	24.0	13.7	10
	46			10.5	0.2	10.7	24.0	13.4	
	38		MCS0 RU106	10.3	0.2	10.5	24.0	13.5	10
	46			10.5	0.2	10.7	24.0	13.3	
	38		MCS0 RU242	10.4	0.2	10.6	24.0	13.4	10
	46			10.6	0.2	10.8	24.0	13.2	
80	42		MCS0 RU26	11.2	0.2	11.4	24.0	12.6	10
	42		MCS0 RU52	11.1	0.2	11.3	24.0	12.7	10
	42		MCS0 RU106	11.1	0.2	11.3	24.0	12.7	10
	42		MCS0 RU242	10.9	0.2	11.1	24.0	12.9	10
	42		MCS0 RU484	11.2	0.2	11.4	24.0	12.6	10

UNII 2A									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	52	802.11ax	MCS0 RU26	9.9	0.2	10.1	23.9	13.8	14
	56			10.0	0.2	10.2	23.9	13.7	
	64			9.8	0.2	10.0	23.9	14.0	
	52		MCS0 RU52	9.9	0.2	10.1	23.9	13.8	14
	56			10.1	0.2	10.3	23.9	13.6	
	64			9.9	0.2	10.1	23.9	13.9	
	52		MCS0 RU106	10.1	0.2	10.3	24.0	13.7	14
	56			10.1	0.2	10.3	24.0	13.7	
	64			10.0	0.2	10.2	24.0	13.8	
40	54	802.11ax	MCS0 RU26	9.2	0.2	9.4	24.0	14.7	14
	62			9.3	0.2	9.5	24.0	14.6	
	54		MCS0 RU52	10.0	0.2	10.2	24.0	13.8	14
	62			10.1	0.2	10.3	24.0	13.7	
	54		MCS0 RU106	10.0	0.2	10.2	24.0	13.8	14
	62			10.1	0.2	10.3	24.0	13.7	
	54		MCS0 RU242	10.4	0.2	10.6	24.0	13.4	14
	62			10.3	0.2	10.5	24.0	13.5	
80	58	802.11ax	MCS0 RU26	10.9	0.2	11.1	24.0	13.0	9
	58		MCS0 RU52	10.9	0.2	11.1	24.0	12.9	9
	58		MCS0 RU106	10.6	0.2	10.8	24.0	13.2	9
	58		MCS0 RU242	10.5	0.2	10.7	24.0	13.3	9
	58		MCS0 RU484	10.5	0.2	10.7	24.0	13.3	9

UNII 2C									
Nominal BW	Channel	Mode	MCS	Avg Output Power (dBm)	Duty Cycle Correction (dB)	Corrected Output Value (dBm)	Limit (dBm)	Margin (dB)	Power Setting
20	100	802.11ax	MCS0 RU26	10.2	0.2	10.4	23.9	13.5	14
	120			11.0	0.2	11.2	23.9	12.8	
	144			11.1	0.2	11.3	23.9	12.6	
	100		MCS0 RU52	10.2	0.2	10.4	23.9	13.5	14
	120			11.1	0.2	11.3	23.9	12.6	
	144			11.1	0.2	11.3	23.9	12.6	
	100		MCS0 RU106	10.4	0.2	10.6	24.0	13.4	14
	120			11.0	0.2	11.2	24.0	12.8	
	144			11.0	0.2	11.2	24.0	12.8	
40	102	802.11ax	MCS0 RU26	9.5	0.2	9.7	23.9	14.3	14
	118			10.3	0.2	10.5	23.9	13.4	
	142			10.9	0.2	11.1	23.9	12.8	
	102		MCS0 RU52	10.6	0.2	10.8	23.9	13.1	14
	118			11.1	0.2	11.3	23.9	12.6	
	142			11.7	0.2	11.9	23.9	12.0	
	102		MCS0 RU106	10.6	0.2	10.8	24.0	13.2	14
	118			11.1	0.2	11.3	24.0	12.7	
	142			11.6	0.2	11.8	24.0	12.2	
	102		MCS0 RU242	10.8	0.2	11.0	24.0	13.0	14
	118			11.4	0.2	11.6	24.0	12.4	
	142			11.8	0.2	12.0	24.0	12.0	
80	106	802.11ax	MCS0 RU26	9.7	0.2	9.9	23.9	14.0	9
	122			10.6	0.2	10.8	23.9	13.1	
	138			11.7	0.2	11.9	23.9	12.0	
	106		MCS0 RU52	9.7	0.2	9.9	23.9	14.0	9
	122			10.7	0.2	10.9	23.9	13.0	
	138			11.6	0.2	11.8	23.9	12.1	
	106		MCS0 RU106	9.5	0.2	9.7	24.0	14.3	9
	122			10.5	0.2	10.7	24.0	13.3	
	138			11.4	0.2	11.6	24.0	12.4	
	106		MCS0 RU242	9.7	0.2	9.9	24.0	14.1	9
	122			10.6	0.2	10.8	24.0	13.2	
	138			11.2	0.2	11.4	24.0	12.6	
	106		MCS0 RU484	9.7	0.2	9.9	24.0	14.1	9
	122			10.7	0.2	10.9	24.0	13.1	
	138			11.4	0.2	11.6	24.0	12.4	

UNII 2C (ISED)									
Nominal BW	**Channel**	**Mode**	**MCS0**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	116	802.11ax	RU26	10.5	0.2	10.7	24	13.3	10
		802.11ax	RU52	10.6	0.2	10.8	24	13.2	10
		802.11ax	RU106	10.9	0.2	11.1	24	12.9	10
40	110	802.11ax	RU26	9.8	0.2	10.0	24	14.0	10
		802.11ax	RU52	10.3	0.2	10.5	24	13.5	10
		802.11ax	RU106	10.3	0.2	10.5	24	13.5	10
		802.11ax	RU242	10.8	0.2	11.0	24	13.0	10

Mid channels used for ISED Canada

UNII 3									
Nominal BW	**Channel**	**Mode**	**MCS**	**Avg Output Power (dBm)**	**Duty Cycle Correction (dB)**	**Corrected Output Value (dBm)**	**Limit (dBm)**	**Margin (dB)**	**Power Setting**
20	149	802.11ax	MCS0 RU26	11.8	0.2	12.0	23.9	11.9	14
	157			11.2	0.2	11.4	23.9	12.5	
	165			12.0	0.2	12.2	23.9	11.7	
	149		MCS0 RU52	11.8	0.2	12.0	23.9	11.9	14
	157			11.5	0.2	11.7	23.9	12.2	
	165			11.9	0.2	12.1	23.9	11.8	
	149		MCS0 RU106	11.9	0.2	12.1	24.0	11.9	14
	157			11.5	0.2	11.7	24.0	12.3	
	165			11.9	0.2	12.1	24.0	11.9	
40	151	802.11ax	MCS0 RU26	11.4	0.2	11.6	24.0	12.4	14
	159			11.0	0.2	11.2	24.0	12.8	
	151		MCS0 RU52	11.9	0.2	12.1	24.0	11.9	14
	159			11.8	0.2	12.0	24.0	12.0	
	151		MCS0 RU106	12.0	0.2	12.2	24.0	11.8	14
	159			11.7	0.2	11.9	24.0	12.1	
	151		MCS0 RU242	12.0	0.2	12.2	24.0	11.8	14
	159			11.7	0.2	11.9	24.0	12.1	
80	155	802.11ax	MCS0 RU26	11.7	0.2	11.9	24.0	12.1	9
	155		MCS0 RU52	11.9	0.2	12.1	24.0	11.9	9
	155		MCS0 RU106	11.6	0.2	11.8	24.0	12.2	9
	155		MCS0 RU242	11.6	0.2	11.8	24.0	12.3	9
	155		MCS0 RU484	11.5	0.2	11.7	24.0	12.3	9

5.1.5 Antenna Port Conducted Emissions – RF Output Power BLE (453-0166)

Channel	Mode	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
0	1M	6.6	30	23.4
19	1M	7.1	30	22.9
39	1M	7.1	30	22.9
0	2M	6.6	30	23.4
19	2M	7.1	30	22.9
39	2M	7.1	30	22.9
0	500k	6.7	30	23.3
19	500k	7.0	30	23.0
39	500k	7.0	30	23.0
0	125k	6.7	30	23.3
19	125k	7.0	30	23.0
39	125k	7.0	30	23.0

5.1.6 Antenna Port Conducted Emissions – RF Output Power BLE (453-0165)

Channel	Mode	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
0	1M	6.5	30	23.5
19	1M	6.4	30	23.6
39	1M	6.2	30	23.8
0	2M	6.5	30	23.5
19	2M	6.4	30	23.6
39	2M	6.2	30	23.8
0	500k	6.4	30	23.6
19	500k	6.4	30	23.6
39	500k	6.2	30	23.8
0	125k	6.5	30	23.5
19	125k	6.4	30	23.6
39	125k	6.2	30	23.8

5.1.7 Antenna Port Conducted Emissions – RF Output Power BT Classic (453-0166)

Channel	Mode	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
0	DH5	6.7	30	23.3
39	DH5	7.0	30	23
78	DH5	7.0	30	23
0	2DH5	5.0	30	25
39	2DH5	4.9	30	25.1
78	2DH5	4.7	30	25.3
0	3DH5	5.3	30	24.7
39	3DH5	5.1	30	24.9
78	3DH5	4.9	30	25.1

5.1.8 Antenna Port Conducted Emissions – RF Output Power BT Classic (453-0165)

Channel	Mode	Peak Output Power (dBm)	Limit (dBm)	Margin (dB)
0	DH5	7.4	30	22.6
39	DH5	7.3	30	22.7
78	DH5	7.1	30	22.9
0	2DH5	7.6	30	22.4
39	2DH5	7.7	30	22.3
78	2DH5	7.7	30	22.3
0	3DH5	7.8	30	22.2
39	3DH5	7.9	30	22.1
78	3DH5	7.9	30	22.1

6 FCC SAR EXCLUSION – 2.4GHZ WLAN

6.1 SAR Exclusion Limit

For separation distance of 50mm or less

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

- F(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The value 3.0 is referred to as numeric thresholds

For separation distance of greater than 50 mm

{[Power allowed at numeric threshold for 50 mm)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

KDB 447498 D01

6.2 Distance

≥55 mm

6.3 Power Calculation

Max Power of Channel = 17.9 dBm (802.11b, cck-1, channel 11)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 17.9 dBm + Tune-up Tolerance + Gain = 21.4 dBm = 138.0 mW

6.4 SAR Test Exclusion Calculation

$$\left[\frac{(XmW)}{(50mm)}\right] \times \sqrt{2.462} = 3.0$$

X = 95.6 mW

$$\{[95.6mW + [(55mm - 50mm) \times 10]\} = 145.6\ mW$$

6.5 Result

The EUT is excluded from SAR testing for WLAN in the 2.4GHz band at ≥65mm as 138.0 mW is less than the limit of 145.6 mW.

7 FCC SAR EXCLUSION – BLE

7.1 SAR Exclusion Limit

For separation distance of 50mm or less

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

- F(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The value 3.0 is referred to as numeric thresholds

For separation distance of greater than 50 mm

{[Power allowed at numeric threshold for 50 mm)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

KDB 447498 D01

7.2 Distance

≤7 mm

7.3 Power Calculation

Max Power of Channel = 7.1 dBm (1M, channel 19)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.1 dBm + Tune-up Tolerance + Gain = 10.6 dBm = 11.5 mW

7.4 SAR Test Exclusion Calculation

$$\left[\frac{(11.5mW)}{(7mm)}\right] \times \sqrt{2.440} = 2.6$$

2.6 ≤ 3.0

7.5 Result

The EUT is excluded from SAR testing for BLE in the 2.4GHz band at ≥7mm as 2.6 is less than 3.0.

8 FCC SAR EXCLUSION – BLUETOOTH CLASSIC

8.1 SAR Exclusion Limit

For separation distance of 50mm or less

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

- F(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The value 3.0 is referred to as numeric thresholds

For separation distance of greater than 50 mm

{[Power allowed at numeric threshold for 50 mm)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

KDB 447498 D01

8.2 Distance

≥8 mm

8.3 Power Calculation

Max Power of Channel = 7.9 dBm (3DH5, channel 39)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.9 dBm + Tune-up Tolerance + Gain = 11.4 dBm = 13.8 mW

8.4 SAR Test Exclusion Calculation

$$\left[\frac{(13.8mW)}{(8mm)}\right] \times \sqrt{2.441} = 2.7$$

2.7 ≤ 3.0

8.5 Result

The EUT is excluded from SAR testing at ≥8 mm for Bluetooth classic in the 2.4GHz band as 2.7 is less than 3.0.

9 FCC SAR EXCLUSION – 5GHZ WLAN

9.1 SAR Exclusion Limit

For separation distance of 50mm or less

[(max. power of channel, including tune-up tolerance, mW) / (min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR

- F(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison
- The value 3.0 is referred to as numeric thresholds

For separation distance of greater than 50 mm

{[Power allowed at numeric threshold for 50 mm)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

KDB 447498 D01

9.2 Distance

≥64 mm

9.3 Power Calculation

Max Power of Channel = 17.5 dBm (802.11a, OFDM-54, channel 149)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 17.5 dBm + Tune-up Tolerance + Gain = 22.9 dBm = 195.0 mW

9.4 SAR Test Exclusion Calculation

$$\left[\frac{(XmW)}{(50mm)}\right] \times \sqrt{5.745} = 3.0$$

X = 62.6 mW

$$\{[62.6mW + [(64mm - 50mm) \times 10] = 202.6\,mW$$

9.5 Result

The EUT is excluded from SAR testing for WLAN in the 5GHz band at ≥66mm as 195 mW is less than the limit of 202.6 mW.

10 ISED SAR EXEMPTION – 2.4GHZ WLAN

10.1 SAR Exemption Limit

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Power Limits for exemption from SAR evaluation RSS-102

10.2 Distance

45 mm

10.3 Power Calculation

Max Power of Channel = 17.9 dBm (802.11b, cck-1, channel 11)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 17.9 dBm + Tune-up Tolerance + Gain = 21.4 dBm = 138.0 mW

10.4 SAR Test Exemption

The exemption limit at 40 mm is 170 mW. The total power of the EUT is 138 mW.

138 mW ≤ 170 mW.

10.5 Result

The EUT is excluded from routine SAR testing at ≥40 mm as 138 mW is less than 170 mW.

11 ISED SAR EXEMPTION – BLE

11.1 SAR Exemption Limit

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Power Limits for exemption from SAR evaluation RSS-102

11.2 Distance

15 mm

11.3 Power Calculation

Max Power of Channel = 7.1 dBm (1M, channel 19)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.1 dBm + Tune-up Tolerance + Gain = 10.6 dBm = 11.5 mW

11.4 SAR Test Exemption

The exemption limit at 15 mm is 16 mW. The total power of the EUT is 11.5 mW.

11.5 mW ≤ 16 mW.

11.5 Result

The EUT is exempt from routine SAR testing at ≥15 mm as 11.5 mW is less than 16 mW.

12 ISED SAR EXEMPTION – BLUETOOTH CLASSIC

12.1 SAR Exemption Limit

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Power Limits for exemption from SAR evaluation RSS-102

12.2 Distance

15 mm

12.3 Power Calculation

Max Power of Channel = 7.9 dBm (3DH5, channel 39)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.9 dBm + Tune-up Tolerance + Gain = 11.4 dBm = 13.8 mW

12.4 SAR Test Exemption

The exemption limit at 15 mm is 16 mW. The total power of the EUT is 13.8 mW.

13.8 mW ≤ 16 mW.

12.5 Result

The EUT is excluded from routine SAR testing at ≥15 mm as 13.8 mW is less than 16 mW.

13 ISED MPE CALCULATION – 5GHZ WLAN

13.1 RF field strength and power density limits for devices used by the general public

Frequency range (MHz)	Electric field (V_{RMS}/m)	Magnetic field (A_{RMS}/m)	Power density (W/m^2)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142\ f^{0.3417}$	$0.008335\ f^{0.3417}$	$0.02619\ f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158\ f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000/f^{1.2}$

Note: f is frequency in MHz.

13.2 Determining power density for antenna (simple far-field model)

$$S_{FF} = \frac{G_{i(\theta,\phi)} P_{in}}{4\pi d^2}$$

IEEE Std C95.3-2021

where

S_{FF} is the far-field power density (W/m^2)

$G_i(\theta , \phi)$ is the far-field antenna gain in direction (θ,ϕ) spherical coordinates (power ratio with respect to isotropic).

P_{in} is the power into the antenna (W)

d is the distance to the antenna (m)

13.3 Distance

≥60 mm

13.4 Power Density Limit

The power density limit at 5745 MHz is 9.71 W/m^2.

13.5 Power Density Calculation

Max Power of Channel = 17.5 dBm (802.11a, OFDM-54, channel 149)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 17.5 dBm + Tune-up Tolerance + Gain = 22.9 dBm = 195.0 mW

$$S = \frac{0.195W}{4\pi(0.060)^2}$$

$$S = 1.37\ W/m^2$$

13.6 Result

The power density limit is 9.71 W/m^2, and the calculated power density at 60mm is 1.37 W/m^2.

The EUT meet the Power Density Requirement for devices used by the general public at a separation distance of 60 mm.

14 FCC MPE CALCULATION – SIMULTANEOUS TX (453-0166)

14.1 Information

The 1 MHF model of the SONA NX 611 M.2 2230 is capable of transmitting Bluetooth Classic and Bluetooth Low Energy Simultaneously with 5GHz WLAN.

14.2 MPE Limit

(ii) LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f^2)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

*f = frequency in MHz. * = Plane-wave equivalent power density.*

eCFR 1.1310

14.3 Determining power density for antenna (simple far-field model)

$$S_{FF} = \frac{G_{i(\theta,\phi)} P_{in}}{4\pi d^2}$$

IEEE Std C95.3-2021

where

S_{FF} is the far-field power density (W/m^2)

$G_i(\theta , \phi)$ is the far-field antenna gain in direction (θ,ϕ) spherical coordinates (power ratio with respect to isotropic).

P_{in} is the power into the antenna (W)

d is the distance to the antenna (m)

14.4 Distance

≥60 mm

14.5 Power Density Limit

The power density limit from 1,500 – 100,000 MHz is 1mw/cm^2.

14.6 Power Density Calculation 5GHz WLAN

Max Power of Channel = 17.5 dBm (802.11a, OFDM-54, channel 149)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 17.5 dBm + Tune-up Tolerance + Gain = 22.9 dBm = 195.0 mW

$$S = \frac{0.1950W}{4\pi(0.060)^2}$$

$$S = 4.31\ W/m^2 = 0.43\ mW/cm^2$$

14.7 Power Density Calculation BLE

Max Power of Channel = 7.1 dBm (1M, channel 19)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.1 dBm + Tune-up Tolerance + Gain = 10.6 dBm = 11.5 mW

$$S = \frac{0.0115W}{4\pi(0.060)^2}$$

$$S = 0.25\ W/m^2 = 0.03\ mW/cm^2$$

14.8 Power Density Calculation Bluetooth Classic

Max Power of Channel = 7.0 dBm (1DH5, channel 39)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.0 dBm + Tune-up Tolerance + Gain = 10.5 dBm = 11.2 mW

$$S = \frac{0.0112W}{4\pi(0.060)^2}$$

$$S = 0.25\ W/m^2 = 0.03\ mW/cm^2$$

14.9 MPE Ratio

MPE ratio = (calculated power density) / (power density limit)

5GHz WLAN = 0.43

BLE = 0.03

BT Classic = 0.03

The sum of the power density ratios must be less than 1 to be exempt from SAR testing.

5GHz WLAN + BLE = 0.46
5GHz WLAN + BT Classic = 0.46

14.10 Result

The EUT is exempt from routine SAR testing at ≥60 mm as the MPE ratio is ≤ 1.0

15 FCC MPE CALCULATION – SIMULTANEOUS TX (453-0165)

15.1 Information

The 2 MHF model of the SONA NX 611 M.2 2230 is capable of transmitting Bluetooth Classic, Bluetooth Low Energy, or 2.4GHz WLAN Simultaneously with 5GHz WLAN.

15.2 MPE Limit

(II) LIMITS FOR GENERAL POPULATION/UNCONTROLLED EXPOSURE

0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*(180/f^2)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

*f = frequency in MHz. * = Plane-wave equivalent power density.*

eCFR 1.1310

15.3 Determining power density for antenna (simple far-field model)

$$S_{FF} = \frac{G_{i(\theta,\phi)} P_{in}}{4\pi d^2}$$

IEEE Std C95.3-2021

where

S_{FF} is the far-field power density (W/m^2)

$G_i(\theta , \phi)$ is the far-field antenna gain in direction (θ,ϕ) spherical coordinates (power ratio with respect to isotropic).

P_{in} is the power into the antenna (W)

d is the distance to the antenna (m)

15.4 Distance

≥60 mm

15.5 Power Density Limit

The power density limit from 1,500 – 100,000 MHz is 1mw/cm^2.

15.6 Power Density Calculation 5GHz WLAN

Max Power of Channel = 16.8 dBm (802.11a, OFDM-54, channel 149)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 16.8 dBm + Tune-up Tolerance + Gain = 22.2 dBm = 166.0 mW

$$S = \frac{0.1660W}{4\pi(0.060)^2}$$

$$S = 3.67\ W/m^2 = 0.37\ mW/cm^2$$

15.7 Power Density Calculation 2.4GHz WLAN

Max Power of Channel = 17.6 dBm (802.11b, CCK-1, channel 6)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 17.6 dBm + Tune-up Tolerance + Gain = 23.0 dBm = 199.5 mW

$$S = \frac{0.1995W}{4\pi(0.060)^2}$$

$$S = 4.41\ W/m^2 = 0.44\ mW/cm^2$$

15.8 Power Density Calculation BLE

Max Power of Channel = 6.5 dBm (2M, channel 0)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 6.5 dBm + Tune-up Tolerance + Gain = 10.0 dBm = 10.0 mW

$$S = \frac{0.0100W}{4\pi(0.060)^2}$$

$$S = 0.22\ W/m^2 = 0.02\ mW/cm^2$$

15.9 Power Density Calculation Bluetooth Classic

Max Power of Channel = 7.9 dBm (3DH5, channel 39)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.9 dBm + Tune-up Tolerance + Gain = 11.4 dBm = 13.8 mW

$$S = \frac{0.0138W}{4\pi(0.060)^2}$$

$$S = 0.31\ W/m^2 = 0.03\ mW/cm^2$$

15.10 MPE Ratio

MPE ratio = (calculated power density) / (power density limit)

5GHz WLAN = 0.37

2GHz WLAN = 0.44

BLE = 0.02

BT Classic = 0.03

The sum of the power density ratios must be less than 1 to be exempt from SAR testing.

5GHz WLAN + 2.4GHz WLAN = 0.81
5GHz WLAN + BLE = 0.39
5GHz WLAN + BT Classic = 0.40

15.11 Result

The EUT is exempt from routine SAR testing at ≥60 mm as the MPE ratio is ≤ 1.0

16 ISED MPE CALCULATION – SIMULTANEOUS TX (453-0166)

16.1 Information

The 1 MHF model of the SONA NX 611 M.2 2230 is capable of transmitting Bluetooth Classic and Bluetooth Low Energy Simultaneously with 5GHz WLAN.

16.2 RF field strength and power density limits for devices used by the general public

Frequency range (MHz)	Electric field (V_{RMS}/m)	Magnetic field (A_{RMS}/m)	Power density (W/m^2)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142\ f^{0.3417}$	$0.008335\ f^{0.3417}$	$0.02619\ f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158\ f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000/f^{1.2}$

Note: f is frequency in MHz.

16.3 Determining power density for antenna (simple far-field model)

$$S_{FF} = \frac{G_{i(\theta,\phi)} P_{in}}{4\pi d^2}$$

IEEE Std C95.3-2021

where

S_{FF} is the far-field power density (W/m^2)

$G_i(\theta , \phi)$ is the far-field antenna gain in direction (θ,ϕ) spherical coordinates (power ratio with respect to isotropic).

P_{in} is the power into the antenna (W)

d is the distance to the antenna (m)

16.4 Distance

≥60 mm

16.5 Power Density Limit

The power density limit from 300 – 6000 MHz is $0.02619*f^{0.6834}$ where f is the frequency in MHz.

16.6 Power Density Calculation 5GHz WLAN

Max Power of Channel = 17.5 dBm (802.11a, OFDM-54, channel 149)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 17.5 dBm + Tune-up Tolerance + Gain = 22.9 dBm = 195.0 mW

$$S = \frac{0.1950W}{4\pi(0.060)^2}$$

$$S = 4.31\ W/m^2$$

$$Limit = 9.71\ W/m^2$$

$$Ratio = \frac{4.31}{9.71} = 0.44$$

16.7 Power Density Calculation BLE

Max Power of Channel = 7.1 dBm (1M, channel 19)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.1 dBm + Tune-up Tolerance + Gain = 10.6 dBm = 11.5 mW

$$S = \frac{0.0115W}{4\pi(0.060)^2}$$

$$S = 0.25\ W/m^2$$

$$Limit = 5.41\ W/m^2$$

$$Ratio = \frac{0.25}{5.41} = 0.05$$

16.8 Power Density Calculation Bluetooth Classic

Max Power of Channel = 7.0 dBm (1DH5, channel 39)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.0 dBm + Tune-up Tolerance + Gain = 10.5 dBm = 11.2 mW

$$S = \frac{0.0112W}{4\pi(0.060)^2}$$

$$S = 0.25\ W/m^2$$

$$Limit = 5.41\ W/m^2$$

$$Ratio = \frac{0.25}{5.41} = 0.05$$

16.9 MPE Ratio

MPE ratio = (calculated power density) / (power density limit)

5GHz WLAN = 0.44

BLE = 0.05

BT Classic = 0.05

The sum of the power density ratios must be less than 1 to comply with Power Density Exposure Limits.

5GHz WLAN + BLE = 0.49
5GHz WLAN + BT Classic = 0.49

16.10 Result

The EUT complies with Power Density Exposure Limits at ≥60 mm as the MPE ratio is ≤1.0

17 ISED MPE CALCULATION – SIMULTANEOUS TX (453-0165)

17.1 Information

The 2 MHF model of the SONA NX 611 M.2 2230 is capable of transmitting Bluetooth Classic, Bluetooth Low Energy, or 2.4GHz WLAN Simultaneously with 5GHz WLAN.

17.2 RF field strength and power density limits for devices used by the general public

Frequency range (MHz)	Electric field (V_{RMS}/m)	Magnetic field (A_{RMS}/m)	Power density (W/m^2)	Reference period (minutes)
10-20	27.46	0.0728	2	6
20-48	$58.07 / f^{0.25}$	$0.1540 / f^{0.25}$	$8.944 / f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142\ f^{0.3417}$	$0.008335\ f^{0.3417}$	$0.02619\ f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158\ f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000/f^{1.2}$

Note: f is frequency in MHz.

17.3 Determining power density for antenna (simple far-field model)

$$S_{FF} = \frac{G_{i(\theta,\phi)} P_{in}}{4\pi d^2}$$

IEEE Std C95.3-2021

where

S_{FF} is the far-field power density (W/m^2)

$G_i(\theta , \phi)$ is the far-field antenna gain in direction (θ,ϕ) spherical coordinates (power ratio with respect to isotropic).

P_{in} is the power into the antenna (W)

d is the distance to the antenna (m)

17.4 Distance

≥70 mm

17.5 Power Density Limit

The power density limit from 300 – 6000 MHz is $0.02619*f^{0.6834}$ where f is the frequency in MHz.

17.6 Power Density Calculation 5GHz WLAN

Max Power of Channel = 16.8 dBm (802.11a, OFDM-54, channel 149)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 16.8 dBm + Tune-up Tolerance + Gain = 22.2 dBm = 166.0 mW

$$S = \frac{0.1660W}{4\pi(0.070)^2}$$

$$S = 2.70\ W/m^2$$

$$Limit = 9.52\ W/m^2$$

$$Ratio = \frac{2.70}{9.71} = 0.28$$

17.7 Power Density Calculation 2.4GHz WLAN

Max Power of Channel = 17.6 dBm (802.11b, CCK-1, channel 6)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 4.4 dBi

Total Power = 17.6 dBm + Tune-up Tolerance + Gain = 23.0 dBm = 199.5 mW

$$S = \frac{0.1995W}{4\pi(0.070)^2}$$

$$S = 3.24\ W/m^2$$

$$Limit = 5.40\ W/m^2$$

$$Ratio = \frac{3.24}{5.40} = 0.60$$

17.8 Power Density Calculation BLE

Max Power of Channel = 6.5 dBm (2M, channel 0)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 6.5 dBm + Tune-up Tolerance + Gain = 10.0 dBm = 10.0 mW

$$S = \frac{0.0100W}{4\pi(0.070)^2}$$

$$S = 0.16\ W/m^2$$

$$Limit = 5.35\ W/m^2$$

$$Ratio = \frac{0.16}{5.35} = 0.03$$

17.9 Power Density Calculation Bluetooth Classic

Max Power of Channel = 7.9 dBm (3DH5, channel 39)

Tune-up Tolerance = 1.00 dB

Antenna Gain = 2.5 dBi

Total Power = 7.9 dBm + Tune-up Tolerance + Gain = 11.4 dBm = 13.8 mW

$$S = \frac{0.0138W}{4\pi(0.070)^2}$$

$$S = 0.22\ W/m^2$$

$$Limit = 5.41\ W/m^2$$

$$Ratio = \frac{0.22}{5.41} = 0.04$$

17.10 MPE Ratio

MPE ratio = (calculated power density) / (power density limit)

5GHz WLAN = 0.28

2GHz WLAN = 0.60

BLE = 0.03

BT Classic = 0.04

The sum of the power density ratios must be less than 1 to comply with Power Density Exposure Limits.

5GHz WLAN + 2.4GHz WLAN = 0.88
5GHz WLAN + BLE = 0.31
5GHz WLAN + BT Classic = 0.32

17.11 Result

The EUT complies with Power Density Exposure Limits at ≥70 mm as the MPE ratio is ≤ 1.0

18 REVISION HISTORY

Version	Date	Notes	Person
0	8/02/2024	Initial Draft	Dylan Rosenfeldt
1	8/06/2024	Added Serial number, Final Draft	Dylan Rosenfeldt
2	9/10/2024	Added Simultaneous TX, fixed power levels, and updated references	Dylan Rosenfeldt

END OF REPORT