

April 30, 2024

Intellian Technologies USA Inc
Christopher Goodman
2600 Tower Oaks Boulevard, Suite 400
Rockville, MD 20852

Dear Christopher Goodman,

Enclosed is the EMC Wireless test report for compliance testing of the Intellian Technologies USA Inc., CNX-WiFi with 450 Watt AC Adapter as tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.), Title 47 of the CFR, Part 15.407, Subpart E (UNII 3).

Thank you for using the services of Eurofins Electrical and Electronic Testing NA, Inc. If you have any questions regarding these results or if Eurofins Electrical and Electronic Testing NA, Inc. can be of further service to you, please feel free to contact me.

Sincerely yours,
EUROFINS ELECTRICAL AND ELECTRONIC TESTING NA, INC.

A handwritten signature in black ink that reads "Michelle Tawmging".

Michelle Tawmging

Reference: (Intellian Technologies USA Inc.\ WIR128375-FCC407 UNII 3 Rev. 3)



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Electromagnetic Compatibility Criteria Test Report

for the

**Intellian Technologies USA Inc.
Model CNX-WiFi with 450 Watt AC Adapter**

Tested under

The FCC Certification Rules
contained in
Title 47 of the CFR
15.407 Subpart E

Report: WIR128375-FCC407 UNII 3 Rev. 3

April 30, 2024

Prepared For:

**Intellian Technologies USA Inc.
20250 Century Blvd.
Germantown MD 20874**

Prepared By:

Eurofins Electrical and Electronic Testing NA, Inc.

914 W. Patapsco Avenue
Baltimore, MD 21230

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Donald Salguero
Wireless Laboratory Engineer

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of 15.407 of the FCC Rules under normal use and maintenance.



Michael Griffiths
Manager, Wireless Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
Ø	January 23, 2024	Initial Issue
1	February 22, 2024	Updated EUT name throughout; Updated Section A; Updated Section E.
2	April 3, 2024	Removed MPE section.
3	April 30, 2024	Updated Table 4; Updated Table 5.

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Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the Intellian Technologies USA Inc. CNX-WiFi with 450 Watt AC Adapter, with the requirements of Part 15, §15.407. All references are to the most current version of Title 47 of the Code of Federal Regulations in effect. In accordance with §2.1033, the following data is presented in support of the Certification of the CNX-WiFi with 450 Watt AC Adapter. Intellian Technologies USA Inc. should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the CNX-WiFi with 450 Watt AC Adapter, has been **permanently** discontinued.

B. Executive Summary

The following tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, §15.407, in accordance with Intellian Technologies USA Inc., purchase order number 4200001300. All tests were conducted using measurement procedure ANSI C63.10-2013.

FCC Reference	Description	Results
§15.203	Antenna Requirement	Compliant
N/A	Duty Cycle	Compliant
§15.407 (a)(3)	Maximum Conducted Output Power	Compliant
§15.407 (a)(3)	Maximum Power Spectral Density	Compliant
§15.407 (b)(4)& (9 - 10)	Undesirable Emissions	Compliant
§15.207	Conducted Emission	Compliant
§15.407(c)	Automatic Discontinue of Transmitter	Not Tested / Evaluated at Eurofins
§15.407(e)	6 dB Bandwidth	Compliant
§15.407(g)	Frequency Stability	Not Tested / Evaluated at Eurofins

Table 1. Executive Summary of EMC Part 15.407 Compliance Testing

Equipment Configuration

A. Overview

Eurofins Electrical and Electronic Testing NA, Inc. was contracted by Intellian Technologies USA Inc. to perform testing on the CNX-WiFi with 450 Watt AC Adapter, under Intellian Technologies USA Inc.'s purchase order number 4200001300.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Intellian Technologies USA Inc. CNX-WiFi with 450 Watt AC Adapter.

The results obtained relate only to the item(s) tested.

Model(s) Tested:	CNX-WiFi with 450 Watt AC Adapter	
Model(s) Covered:	CNX-WiFi with 450 Watt AC Adapter	
EUT Specifications:	Primary Power: 100-240 VAC	
	Type of Modulations:	BPSK,QPSK,DBPSK,DQPS
	Equipment Code:	NII
	Max. RF Output Power:	26.56 dBm; 0.453 W
	EUT Frequency Ranges:	5745 – 5825 MHz; 5755 – 5795 MHz; 5775 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35° C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Donald Salguero	
Report Date(s):	April 30, 2024	

Table 2. EUT Summary

B. References

CFR 47, Part 15, Subpart E	Unlicensed National Information Infrastructure Devices (UNII)
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2017	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices
KDB 789033 D02 v02r01	Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices Part 15, Subpart E

Table 3. References

C. Test Site

All testing was performed at Eurofins Electrical and Electronic Testing NA, Inc., 914 W. Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at Eurofins Electrical and Electronic Testing NA, Inc.

D. Measurement Uncertainty

Test Method	Typical Expanded Uncertainty	K	Confidence Level
Radiated Emissions, (30 MHz – 1 GHz)	±3.20	2	95%
Radiated Emissions, (1 GHz – 6 GHz)	±2.52	2	95%
Conducted Emission Voltage	±2.03	2	95%
RF Frequencies	±4.52 Hz	2	95%
RF Power Conducted Emissions	±2.32 dB	2	95%
RF Power Conducted Spurious Emissions	±2.25 dB	2	95%
RF Power Radiated Emissions	±3.01 dB	2	95%

Table 4. Uncertainty Calculations Summary

E. Equipment Overview and Test Configuration

Name of EUT/Model:	CNX-WiFi with 450 Watt AC Adapter
Description of EUT and Intended Use:	CNX (Customer Network Exchange) is an integral component of a OneWeb User Terminal (UT) that provides the network interface, WiFi and Ethernet, for connecting User Devices to the OneWeb Network. CNX also provides power to the OneWeb UT using a coax cable that multiplexes power and data.
Selected Operation Mode(s):	CNX Bridged Mode • CNX operates as a Layer-2 device • SSID: APN1 and SSID: APN_2 are disabled • Devices connected to LAN port MGNT obtain IP addresses via DHCP from the SSM • Devices connected to SSID: Intellian obtain IP addresses via DHCP from the SSM
Rational for the selection of the Operation Mode(s):	Intellian SSID/MGMT port for Management - data load testing between client and server
Susceptibility Criteria:	iPerf traffic loss for data load CNX-Wifi reboot due to excessive current draw by electronic load
Monitoring Method(s):	Performing as intended: • The CNX-WiFi functioning with an electronic load of 56VDC at 7.5A Failure conditions: • CNX reboot due to excessive current draw by electronic load
Emissions Class Declaration:	Class B
Configurations:	Please refer to Testing document.
Rated Power Input	
Input Voltage Range:	100-240 VAC
AC or DC:	AC
Voltage Frequency:	50-60 HZ
Number of Phases:	1
Current:	5.3 A Max
Uses an external AC/DC Adapter:	True
Manufacturer:	Adapter Technology Co Ltd

Model #:	ATM450A2-P560
Part #:	Not Applicable
Serial #:	Not Applicable
The EUT can be battery powered:	False
Power Input Under Test	
Input Voltage:	230 VAC
Frequency:	50 Hz
Physical Description	
EUT Arrangement:	Table Top
System with Multiple Chassis?	False
Size (HxWxD) inches:	8.3x6.8x3.1
Weight (lbs.):	1.5
Highest Internal Frequency (MHz):	5.95
Other Info	
EUT Software (Internal to EUT):	MoCA version 2.20.5
Support Software (used by support PC to exercise EUT):	iPerf Version 2.0.9, QDART, Windows 11
Firmware:	Version 13
Transmitter Parameters	
Description of your unit:	OFDM, OFDMA
Modulation Type:	BPSK,QPSK,DBPSK,DQPS
Number of Channels:	20
Frequency Range (MHz):	2412 – 2462; 5180 – 5240; 5260 – 5320; 5500 -5720; 5745 – 5825
Antenna Type:	MU-MIMO
Antenna Gain (dB):	2
PMN:	CNX-WiFi
HVIN:	V 04
FVIN:	420.204.1-009
HMN:	CNX-WiFi
Data Rates:	20 MHz -1xSS: MCS0 - MCS11 2xSS: MCS0 - MCS11 40MHZ -1xSS: MCS0 - MCS11 2xSS: MCS0 - MCS11
Expected Power Level:	23 dBm
Number of Antenna:	4

Number of Intentional Transmitters:	4
Number of Certified Intentional Transmitter Modules:	0
FCC ID:	XXZ-BL5008
IC ID:	26236-BL5008

Table 5. Equipment Details

Name/Description	Model Number	Part Number	Serial Number	Rev. #
CNX Wi-Fi	BL5008	N/A	5008232900005	V 0.4
450 Watt AC Adapter	ATM450A2-P560	N/A	N/A	N/A

Table 6. EUT List

Port Name on EUT	Cable Desc. or reason for none	3 Meters or Longer	Length as tested (m)	Max Length (m)	Shielded?	Termination Box ID & Port Name
MGMT	Ethernet Cable	Yes	3.048	100	No	Laptop
COAX	For Power and Ethernet	Yes	3.048	80	Yes	SSM
Power	Integrated Power Cable	No	1	1	No	450W PSU
LAN 3	Disabled	No	N/A	N/A	No	N/A
LAN 2	Not needed for testing	No	N/A	N/A	No	N/A
LAN 1	Not needed for testing	No	N/A	N/A	No	N/A

Table 7. Ports and Cabling

Name/Description	Manufacturer	Model Number	Serial Number	*Customer Supplied Calibration Data
Laptop	Dell	N/A	N/A	N/A
DC Load	BK Precision	8510B	N/A	N/A
Test Jig	Intellian	N.A.	N/A	N/A

Table 8. Support Equipment



Photograph 1. CNX-WiFi, Front Side



Photograph 2. CNX-WiFi, Right Side



Photograph 3. CNX-WiFi, Left Side



Photograph 4. CNX-WiFi, Rear Side



Photograph 5. CNX-WiFi, Top Side



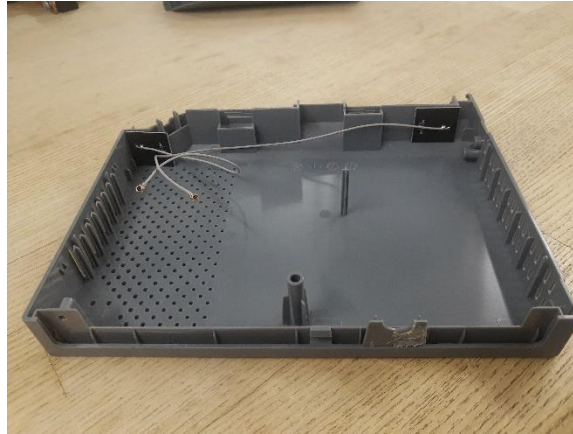
Photograph 6. CNX-WiFi, Bottom Side



Photograph 7. CNX-WiFi, Internal Board, Side 1



Photograph 8. CNX-WiFi, Internal Board, Side 2



Photograph 9. CNX-WiFi, Internal 2.4 GHz Antenna Position



Photograph 10. CNX-WiFi, Internal 5 GHz Antenna Position



Photograph 11. 450 Watt AC Adapter

F. Modifications**a) Modifications to EUT**

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

G. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Intellian Technologies USA Inc. upon completion of testing.

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.203 Antenna Requirement

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

- a.) Antenna must be permanently attached to the unit.
- b.) Antenna must use a unique type of connector to attach to the EUT.
- c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Test Results: The EUT was **compliant** with the requirements of this section. EUT uses internal antennas with U.FL connectors.

Ant0: 4.35dBi @ 5750MHz
Ant1: 5.3dBi @ 5750MHz

Test Engineer(s): Donald Salguero

Test Date(s): September 18, 2023

Electromagnetic Compatibility Criteria for Intentional Radiators

Duty Cycle

Test Procedure: The EUT was connected to a spectrum analyzer and was ran at the maximum achievable duty cycle for all modes. The duty cycle was measured in accordance with section 11.6 of ANSI C63.10-2013.

Test Results: The EUT was **compliant** with the requirements of this section.

Test Engineer(s): Donald Salguero

Test Date(s): September 18, 2023

Mode	On Time (mS)	Period (mS)	Duty Cycle (%)	DCCF	1/T (Hz)
802.11a	0.9833	1.333	73.77	1.32	750
802.11n HT20	5.400	5.700	94.74	0.23	175
802.11ac VHT20	5.400	5.725	94.32	0.25	175
802.11ax HE20	5.425	5.725	94.76	0.23	175
802.11n HT40	5.350	5.700	93.86	0.28	175
802.11ac VHT40	5.400	5.750	93.91	0.27	174
802.11ax HE40	5.400	5.750	93.91	0.27	174
802.11ac VHT80	5.375	5.700	94.30	0.25	175
802.11ax HE80	5.400	5.825	92.70	0.33	172

Table 9. UNII-3, Duty Cycle - Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§15. 407(a)(3) Maximum Conducted Output Power

Test Requirements: **§15.407(a)(3)(i):** For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.

Test Procedure: The EUT was connected to a spectrum analyzer through a cable and attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels. Its power was measured according to measurement method SA-2, as described in 789033 D02 General UNII Test Procedures v02r01.

MIMO directional gain, 2 antenna with unequal gain (correlated):
 $10\log[(10^{4.35/20} + 10^{5.3/20})^2/2] = 7.85\text{dBi}$

Test Results: The EUT was **compliant** with the requirements of this section.

Test Engineer(s): Donald Salguero

Test Date(s): September 18, 2023

Mode	Center Frequency (MHz)	Conducted Power (dBm)			Duty Cycle	Corrected OP (dBm)	Limit (dBm)	Margin (dB)
		Chain0	Chain1	Sum				
802.11a	5745	21.17	22.21	24.73	1.32	26.05	28.15	-2.10
	5785	20.88	22.99	25.07	1.32	26.39	28.15	-1.76
	5825	21.53	22.83	25.24	1.32	26.56	28.15	-1.59
802.11n HT20	5745	19.90	21.83	23.98	0.23	24.21	28.15	-3.94
	5785	19.72	21.64	23.80	0.23	24.03	28.15	-4.12
	5825	20.35	22.03	24.28	0.23	24.51	28.15	-3.64
802.11ac VHT20	5745	19.40	21.47	23.57	0.25	23.82	28.15	-4.33
	5785	20.34	22.92	24.83	0.25	25.08	28.15	-3.07
	5825	19.80	21.84	23.95	0.25	24.20	28.15	-3.95
802.11ax HE20	5745	21.66	24.02	26.01	0.23	26.24	28.15	-1.91
	5785	21.62	23.36	25.59	0.23	25.82	28.15	-2.33
	5825	21.87	23.06	25.52	0.23	25.75	28.15	-2.40
802.11n HT40	5755	21.86	24.09	26.13	0.28	26.41	28.15	-1.74
	5795	21.87	23.14	25.56	0.28	25.84	28.15	-2.31
802.11ac VHT40	5755	21.52	23.11	25.40	0.27	25.67	28.15	-2.48
	5795	21.43	23.16	25.39	0.27	25.66	28.15	-2.49
802.11ax HE40	5755	21.19	22.87	25.12	0.27	25.39	28.15	-2.76
	5795	21.72	23.29	25.59	0.27	25.86	28.15	-2.29
802.11 ac VHT80	5775	22.09	19.20	23.89	0.25	24.14	28.15	-4.01
802.11 ax HE80	5775	22.33	19.54	24.17	0.33	24.50	28.15	-3.65

Table 10. UNII-3, Conducted Output Power - Test Results

Mode	Center Frequency (MHz)	Corrected OP (dBm)	Directional Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)
802.11a	5745	26.05	7.85	33.90	36	-2.10
	5785	26.39	7.85	34.24	36	-1.76
	5825	26.56	7.85	34.41	36	-1.59
802.11n HT20	5745	24.21	7.85	32.06	36	-3.94
	5785	24.03	7.85	31.88	36	-4.12
	5825	24.51	7.85	32.36	36	-3.64
802.11ac VHT20	5745	23.82	7.85	31.67	36	-4.33
	5785	25.08	7.85	32.93	36	-3.07
	5825	24.20	7.85	32.05	36	-3.95
802.11ax HE20	5745	26.24	7.85	34.09	36	-1.91
	5785	25.82	7.85	33.67	36	-2.33
	5825	25.75	7.85	33.60	36	-2.40
802.11n HT40	5755	26.41	7.85	34.26	36	-1.74
	5795	25.84	7.85	33.69	36	-2.31
802.11ac VHT40	5755	25.67	7.85	33.52	36	-2.48
	5795	25.66	7.85	33.51	36	-2.49
802.11ax HE40	5755	25.39	7.85	33.24	36	-2.76
	5795	25.86	7.85	33.71	36	-2.29
802.11 ac VHT80	5775	24.14	7.85	31.99	36	-4.01
802.11 ax HE80	5775	24.50	7.85	32.35	36	-3.65

Table 11. UNII-3, EIRP - Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§15.407(a)(3) Maximum Power Spectral Density

Test Requirements:	§15.407(a)(3): In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power.
Test Procedure:	The EUT was connected to a spectrum analyzer through a cable and attenuator. Measurements were taken with the EUT set to transmit continuously on its low, mid, and high channels. Its power was measured according KDB 789033 D02 General UNII Test Procedures v02r01. A 510 kHz RBW was used during testing.
Test Results:	The EUT was compliant with the requirements of this section.
Test Engineer(s):	Donald Salguero
Test Date(s):	September 18, 2023

Mode	Center Frequency (MHz)	Conducted PSD (dBm)			Duty Cycle	Corrected OP (dBm)	Limit (dBm)	Margin (dB)
		Chain0	Chain1	Sum				
802.11a	5745	8.644	10.623	12.76	1.32	14.08	28.15	-14.07
	5785	9.674	10.614	13.18	1.32	14.50	28.15	-13.65
	5825	9.136	9.911	12.55	1.32	13.87	28.15	-14.28
802.11n HT20	5745	7.153	9.702	11.62	0.23	11.85	28.15	-16.30
	5785	7.467	9.626	11.69	0.23	11.92	28.15	-16.23
	5825	8.405	9.351	11.91	0.23	12.14	28.15	-16.01
802.11ac VHT20	5745	7.224	9.195	11.33	0.25	11.58	28.15	-16.57
	5785	8.072	10.454	12.43	0.25	12.68	28.15	-15.47
	5825	7.467	9.168	11.41	0.25	11.66	28.15	-16.49
802.11ax HE20	5745	8.738	11.540	13.37	0.23	13.60	28.15	-14.55
	5785	8.993	10.340	12.73	0.23	12.96	28.15	-15.19
	5825	9.503	10.461	13.02	0.23	13.25	28.15	-14.90
802.11n HT40	5755	6.671	8.418	10.64	0.28	10.92	28.15	-17.23
	5795	6.664	7.996	10.39	0.28	10.67	28.15	-17.48
802.11ac VHT40	5755	5.641	7.850	9.89	0.27	10.16	28.15	-17.99
	5795	6.139	8.244	10.33	0.27	10.60	28.15	-17.55
802.11ax HE40	5755	5.494	7.557	9.66	0.27	9.93	28.15	-18.22
	5795	6.224	7.757	10.07	0.27	10.34	28.15	-17.81
802.11 ac VHT80	5775	3.576	1.877	5.82	0.25	6.07	28.15	-22.08
802.11 ax HE80	5775	3.757	2.160	6.04	0.33	6.37	28.15	-21.78

Table 12. UNII-3, PSD - Test Results

Electromagnetic Compatibility Criteria for Intentional Radiators

§15.407(b)(4) & (9 – 10) Undesirable Emissions

Test Requirements: § 15.407(b)(4): For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of –27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

§ 15.407(b)(9): Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.

§ 15.407(b)(10): The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.

Test Procedure: Unwanted emissions measurements were performed at the antenna port as conducted measurements plus cabinet emissions measurements in a radiated setup. Guidance from section G in FCC KDB 789033 D02 General UNII Test Procedure New Rules v02r01 were followed.

For cabinet emissions measurements, the EUT was placed on a non-conducting stand on a turntable in a chamber. To find the maximum emission the EUT was set to transmit on low, mid, and high channels. Additionally, the turntable was rotated 360 degrees, the EUT was oriented through its three orthogonal axes, and the receive antenna height was varied in order to maximize emissions.

For frequencies from 30 MHz to 1 GHz, measurements were first made using a peak detector with a 100 kHz resolution bandwidth. Emissions which exceeded the limits were re-measured using a quasi-peak detector with a 120 kHz resolution bandwidth.

Above 1 GHz, measurements were made pursuant the method described in FCC KDB 789033 D02 General UNII Test Procedure New Rules v02r01. The equation, $EIRP = E + 20 \log D - 104.8$ was used to convert field strength to EIRP (E = field strength (dBμV/m) and D = Reference measurement distance).

For emissions above 1 GHz and in restricted bands, measurements of the field strength were made with a peak detector and an average detector and compared with the limits of 15.209.

Test Results: The EUT was **compliant** with the requirements of this section.

Test Engineer(s): Donald Salguero

Test Date(s): September 15 – September 18, 2023

Electromagnetic Compatibility Criteria for Intentional Radiators

§ 15.407(b)(6) Conducted Emissions

Test Requirement(s): § 15.407 (b)(6): Any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

§ 15.207 (a): For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 Σ line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dB μ V)	
	Quasi-Peak	Average
* 0.15- 0.45	66 – 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 13. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure: The EUT was placed on a non-metallic table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω /50 μ H Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.10-2013*. Scans were performed with the transmitter on.

Test Results: The EUT was **compliant** with the requirements of this section.

Test Engineer(s): Donald Salguero

Test Date(s): October 19, 2023

Conducted Emissions Datasheet						
METrak Number	128375			Test Specification	FCC Part 15, Subpart B, Section 15.107; ICES-003, Section 3.2.1	
Customer	Intellian Technologies USA Inc			Equipment Class	B	
EUT Name	CNX-WiFi			Engineer	Donald Salguero	
Model/Part Number	BL5008			Test Date(s)	10/19/2023	
Serial Number	5008232900005			Temperature	19.4°C	
Mode of Operation	Active			Relative Humidity	54%	
Notes:120V60Hz						
Start Frequency		150 kHz		Stop Frequency		30 MHz
Line Under Test		Line				
Frequency	Quasi-Peak Measurement	Correction Factor	Corrected Measurement	Quasi-Peak Limit	Margin	Result
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail
0.154	36.48	10.48	46.96	65.88	-18.92	PASS
0.63	36.6	10.03	46.63	56	-9.37	PASS
0.809	36.99	10.03	47.01	56	-8.99	PASS
0.989	36.75	10.02	46.77	56	-9.23	PASS
1.168	36.31	10.02	46.33	56	-9.67	PASS
1.351	35.79	10.02	45.81	56	-10.19	PASS
Frequency	Average Measurement	Correction Factor	Corrected Measurement	Average Limit	Margin	Result
MHz	dBµV	dB	dBµV	dBµV	dB	Pass/Fail
0.154	27.18	10.48	37.66	55.88	-18.22	PASS
0.2	23.53	10.26	33.79	54.57	-20.775	PASS
0.45	22.51	10.05	32.56	47.42	-14.858	PASS
0.63	23.95	10.03	33.98	46	-12.019	PASS
0.813	23.12	10.03	33.15	46	-12.85	PASS
18.243	22.1	10.23	32.33	50	-17.668	PASS

Table 14. CEV Data [Line, 120V60Hz]

Conducted Emissions Datasheet						
METrak Number	128375			Test Specification	FCC Part 15, Subpart B, Section 15.107; ICES-003, Section 3.2.1	
Customer	Intellian Technologies USA Inc			Equipment Class	B	
EUT Name	CNX-WiFi			Engineer	Donald Salguero	
Model/Part Number	BL5008			Test Date(s)	10/19/2023	
Serial Number	5008232900005			Temperature	19.4°C	
Mode of Operation	Active			Relative Humidity	54%	
Notes:120V60Hz						
Start Frequency		150 kHz		Stop Frequency		30 MHz
Line Under Test		Neutral				
Frequency	Quasi-Peak Measurement	Correction Factor	Corrected Measurement	Quasi-Peak Limit	Margin	Result
MHz	dBμV	dB	dBμV	dBμV	dB	Pass/Fail
0.634	37.18	10.07	47.25	56	-8.753	PASS
0.755	36.77	10.06	46.83	56	-9.173	PASS
0.813	37.67	10.06	47.72	56	-8.277	PASS
0.997	37.51	10.03	47.54	56	-8.46	PASS
1.176	37.23	10.04	47.27	56	-8.728	PASS
1.36	36.77	10.05	46.82	56	-9.184	PASS
Frequency	Average Measurement	Correction Factor	Corrected Measurement	Average Limit	Margin	Result
MHz	dBμV	dB	dBμV	dBμV	dB	Pass/Fail
0.154	29.7	10.51	40.21	55.88	-15.669	PASS
0.45	25.67	10.09	35.76	47.42	-11.663	PASS
0.588	24.88	10.08	34.95	46	-11.045	PASS
0.63	26.65	10.07	36.72	46	-9.275	PASS
0.813	26.28	10.06	36.34	46	-9.66	PASS
0.993	25.06	10.04	35.09	46	-10.906	PASS

Table 15. CEV Data [Neutral, 120V60Hz]

Electromagnetic Compatibility Criteria for Intentional Radiators**§ 15. 407(e); § 15.403 -6 dB / -26dB Bandwidth**

Test Requirements: **§ 15.407(e):** Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

§ 15.403: Emission bandwidth. For purposes of this subpart the emission bandwidth is determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier.

Test Procedure: The transmitter was set to low, mid, and high operating frequencies at the highest output power and connected to the spectrum analyzer through an attenuator.

The -6 dB bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW equal to 100 kHz, VBW = 3xRBW. The -6 dB Bandwidth was measured and recorded.

The emission bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately equal to 1-5% of the total emission bandwidth, VBW $\geq$ 3xRBW. The -26 dB Bandwidth was measured and recorded.

Test Results: The EUT was **compliant** with the requirements of this section.

Test Engineer(s): Donald Salguero

Test Date(s): September 7, 2023

Mode	Center Frequency (MHz)	-6dB Bandwidth (MHz)		-26dB Bandwidth (MHz)		99% Bandwidth (MHz)	
		Chain0	Chain1	Chain0	Chain1	Chain0	Chain1
802.11a	5745	15.210	15.212	19.001	19.365	16.6106	16.5600
	5785	15.178	15.208	19.395	19.331	16.5660	16.5657
	5825	15.435	15.178	19.335	19.381	16.5796	16.5408
802.11n HT20	5745	16.912	16.734	20.320	20.174	17.6860	17.6831
	5785	17.557	16.992	20.557	20.305	17.7000	17.6944
	5825	16.991	16.318	20.103	20.058	17.6516	17.6667
802.11ac VHT20	5745	17.328	17.452	20.074	20.376	17.7074	17.6559
	5785	16.944	17.614	19.945	19.951	17.6753	17.6057
	5825	17.251	17.666	20.000	20.370	17.6607	17.6664
802.11ax HE20	5745	15.355	15.149	21.076	20.968	18.9260	18.9429
	5785	15.495	15.859	21.318	21.310	18.9683	18.8934
	5825	15.455	15.951	21.159	21.192	18.8835	18.9817
802.11n HT40	5755	35.485	35.176	40.305	40.544	36.0029	35.9751
	5795	35.421	35.471	40.224	40.273	35.9900	36.0098
802.11ac VHT40	5755	34.048	35.231	40.251	40.446	35.9889	36.0116
	5795	34.559	35.934	40.655	40.183	35.9638	35.9553
802.11ax HE40	5755	37.217	36.083	41.579	41.346	37.8182	37.6138
	5795	34.090	34.892	41.173	41.067	37.6299	37.6286
802.11 ac VHT80	5775	73.790	73.729	81.831	82.266	74.9746	74.9021
802.11 ax HE80	5775	64.039	74.133	83.348	82.917	76.7694	76.5216

Table 16. UNII-3, OBW - Test Results

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Conducted Emissions Equipment List						
Asset Number	Description	Manufacturer	Model Number	Serial Number	Calibration Date	Calibration Due Date
1T9989	Thermometer/Hygrometer	Fisher Scientific	06-662-4, 11725843	210843361	10/1/2021	10/1/2023
1T9572	EMI Receiver	Gauss Instruments	TDEMI X40	1902001	10/13/2021	10/31/2023
1T8910	LISN	Com-Power	LI-150A	201123	10/17/2022	4/30/2024
1T4795	LISN	Com-Power	LI-150A	201065	10/17/2022	4/30/2024
1T7450	Transient Limiter	Com-Power	LIT-153A	22010020	FVR	FVR
1T8834	Conducted Comb Generator	Com-Power	CGC-255E	311358	5/1/2023	5/31/2024
4T7208	ELECTRIC SWITCH	LEVITRON	N/A	N/A	FVR	FVR
4T7311	Precision Resistive Circuit	MET	N/A	N/A	FVR	FVR

Table 17. CEV Test Equipment List

Asset Number	Description	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due Date
1T4751	Antenna - Blog	Sunol Sciences	JB6	A101910	6/1/2022	1/1/2024
1T4757	Antenna; Horn	ETS-Lindgren	3117	123516	7/24/2023	1/31/2025
1T4744	Antenna, Horn	ETS-Lindgren	3116	126519	12/16/2022	6/16/2024
1T8743	Preamplifier	A.H. Systems, Inc.	PAM-0118P	419	Func Verify	Func Verify
1T4752	Pre-Amplifier	Miteq	JS44-18004000-35-8P	1594792	Func Verify	Func Verify
1T4300	SEMI-ANECHOIC CHAMBER (NSA)	EMC TEST SYSTEMS	NONE	NONE	8/31/2023	8/31/2025
1T4771	PSA Spectrum Analyzer	Agilent Technologies	E4446A	MY51100015	11/2/2023	5/31/2025
1T8744	Spectrum Analyzer (PSA)	Agilent Technologies	E4440A	US40420612	5/2/2023	5/2/2024

Table 18. Test Equipment List

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

End of Report