TEST REPORT

Product Name: WIFI module

Trade Mark: GSD

Model No.: W7LM1110, W7LM1110A

HVIN: W7LM1110, W7LM1110A

Report Number: 171227007RFC-1

Test Standards: FCC 47 CFR Part 15 Subpart C

RSS-247 Issue 2 RSS-Gen Issue 4

FCC ID: 2AC23-W7LM1110

IC: 12290A-W7LM1110

Test Result: PASS

Date of Issue: May 7, 2018

Prepared for:

Hui Zhou Gaoshengda Technology Co.,LTD NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

Prepared by:

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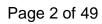
Team Leader

Vary 7, 2018

UnienTrust

Certified*

Shenzhen UnionTrust Quality and Technology Co., Ltd.





Version

Version No. Date		Description	
V1.0	May 7, 2018	Original	





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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant: Hui Zhou Gaoshengda Technology Co.,LTD	
Address of Applicant:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China
Manufacturer:	Hui Zhou Gaoshengda Technology Co.,LTD
Address of Manufacturer:	NO.75 Zhongkai Development Area, Huizhou, Guangdong, China

1.2 EUT INFORMATION

Product Name:	WIFI module		
Model No.:	W7LM1110, W7LM1110A		
Trade Mark:	GSD		
DUT Stage:	Identical Prototype		
EUT Supports Function:	2.4 GHz ISM Band: IEEE 802.11b/g/n		
Sample Received Date:	April 28, 2018		
Sample Tested Date:	April 28, 2018 to May 4, 2018		

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	2400 MHz to 2483	3.5 MHz			
Frequency Range:	2412 MHz to 2462 MHz				
Support Standards:	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20, IEEE 802.11n-HT40				
Type of Modulation: IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT20: OFDM(64-QAM, 16-QAM, QPSK, BPSK) IEEE 802.11n-HT40: OFDM(64-QAM, 16-QAM, QPSK, BPSK)					
Data Rate:	IEEE 802.11b: Up to 11 Mbps IEEE 802.11g: Up to 54 Mbps IEEE 802.11n-HT20: Up to MCS7 IEEE 802.11n-HT40: Up to MCS7				
Number of Channels:	IEEE 802.11b: 11 IEEE 802.11g: 11 IEEE 802.11n-HT2 IEEE 802.11n-HT2				
Channel Separation:	5 MHz				
Antenna Type:	PIFA Antenna				
Antonna Cain	W7LM1110	1.88 dBi			
Antenna Gain:	W7LM1110A	3 dBi			
Normal Test Voltage:	120V~60Hz or 240V~50Hz				

1.4 OTHER INFORMATION

Operation Frequency Each of Channel				
IEEE 802.11b, IEEE 802.11g, IEEE 802.11n-HT20	f = 2407 + 5k MHz, k = 1,,13			
IEEE 802.11n-HT40	f = 2407 + 5k MHz, k = 3,,11			
Note: f is the operating frequency (MHz); k is the operating channel.				



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1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	E450	SL10G10780	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust
2	USB Cable	USB	0.80 Meter	UnionTrust

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua

New District, Shenzhen, China 518109 Telephone: +86 (0) 755 2823 0888 Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1

The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS



None.

1.10OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB





2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart C Test Cases						
Test Item	Test Requirement	Test Method	Result			
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203/15.247 (c) RSS-Gen Issue 4, Section 8.3	ANSI C63.10-2013	PASS			
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207 RSS-Gen Issue 4, Section 8.8	ANSI C63.10-2013	PASS			
Conducted Peak Output Power	FCC 47 CFR Part 15 Subpart C Section 15.247 (b)(3) RSS-247 Issue 2, Section 5.4(d)	KDB 558074 D01 v04 Section 9.1.3	N/A ^(See Note 1, 2)			
6dB Bandwidth	FCC 47 CFR Part 15 Subpart C Section		N/A ^(See Note 1, 2)			
Occupied Bandwidth			N/A(See Note 1, 2)			
Power Spectral Density	FCC 47 CFR Part 15 Subpart C Section 15.247 (e) RSS-247 Issue 2, Section 5.2(b)	KDB 558074 D01 v04 Section 10.2	N/A ^(See Note 1, 2)			
Conducted Out of Band Emission	Conducted Out of FCC 47 CFR Part 15 Subpart C Section		N/A(See Note 1, 2)			
Radiated Spurious Emissions	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209 RSS-Gen Issue 4, Section 6.13/8.9/8.10	KDB 558074 D01 v04 Section 12.1	PASS			
Band Edge Measurements (Radiated)	FCC 47 CFR Part 15 Subpart C Section 15.205/15.209 RSS-247 Issue 2, Section 5.5	KDB 558074 D01 v04 Section 12.1	PASS			

Note:

- 1) N/A: In this whole report not application.
- 2) The EUT (FCC ID: 2AC23-W7LM1110, IC: 12290A-W7LM1110) this time and original model both WIFI module are identical in RF, about the difference between the both WIFI module, please refer to the difference statement. After assessment, all technical data is referred to previous FCC report no. EED32I00297001 dated Dec. 19, 2016 and IC report no. EED32I002971 dated Dec. 19, 2016 except AC Power Line Conducted Emission, Radiated Emissions and Band edge (Radiated).



3. EQUIPMENT LIST

	Radiated Emission Test Equipment List (3M Chamber)						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)	
>	3M Chamber & Accessory Equipment	ETS-LINDGREN	3M	N/A	Dec. 20, 2015	Dec. 19, 2018	
>	Receiver	R&S	ESIB26	100114	Dec. 10, 2017	Dec. 10, 2018	
>	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Dec.10, 2017	Dec. 10, 2018	
>	Loop Antenna	ETS-LINDGREN	6502	00202525	Dec. 17, 2017	Dec. 17, 2018	
>	Broadband Antenna	ETS-LINDGREN	3142E	00201566	Dec. 17, 2017	Dec. 17, 2018	
~	Preamplifier	HP	8447F	2805A02960	Dec. 10, 2017	Dec. 10, 2018	
•	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201874	Dec. 17, 2017	Dec. 17, 2018	
>	Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	Dec. 17, 2017	Dec. 17, 2018	
V	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A	
>	Test Software	Audix	e3	Software Version: 9.160323			

	Conducted Emission Test Equipment List						
Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm dd, yyyy)	Cal. Due date (mm dd, yyyy)	
>	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Dec. 10, 2017	Dec. 10, 2018	
>	Pulse Limiter	R&S	ESH3-Z2	0357.8810.54	Dec. 10, 2017	Dec. 10, 2018	
>	LISN	R&S	ESH2-Z5	860014/024	Dec. 10, 2017	Dec. 10, 2018	
~	Test Software	Audix	e3	Sof	tware Version: 9.16	0333	

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4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

Environment Parameter	Selected Values During Tests					
Test Condition						
rest Condition	Temperature (°C)	Voltage	Relative Humidity (%)			
NT/NV	+15 to +35	120V~60Hz or 240V~50Hz	20 to 75			
Remark: 1) NV: Normal Voltage; NT: Normal Temperature						

4.2TEST CHANNELS

Mode	Ty/Dy Eroquonov	Test RF Channel Lists				
iviode	Tx/Rx Frequency	Lowest(L)	Middle(M)	Highest(H)		
IEEE 902 11b	2412 MHz to 2462 MHz	Channel 1	Channel 7	Channel 11		
IEEE 802.11b	2412 WITZ to 2402 WITZ	2412 MHz	2437 MHz	2462 MHz		
IEEE 000 44 m	2412 MHz to 2462 MHz	Channel 1	Channel 7	Channel 11		
IEEE 802.11g		2412 MHz	2437 MHz	2462 MHz		
IEEE 802.11n-HT20	2412 MHz to 2462 MHz	Channel 1	Channel 7	Channel 11		
1EEE 002.1111-H120	2412 101112 10 2402 101112	2412 MHz	2437 MHz	2462 MHz		
IEEE 000 44 × 11740	2422 MHz to 2452 MHz	Channel 3	Channel 7	Channel 9		
IEEE 802.11n-HT40	2422 IVITIZ (0 2432 IVITIZ	2422 MHz	2437 MHz	2452 MHz		

4.3 EUT TEST STATUS

Mode	Tx/Rx Function	Description
IEEE 802.11b		
IEEE 802.11g	1Tx/1Rx	1. Keep the EUT in continuously transmitting or receiving with
IEEE 802.11n-HT20	11141111	modulation test single.
IEEE 802.11n-HT40		

4.4 PRE-SCAN

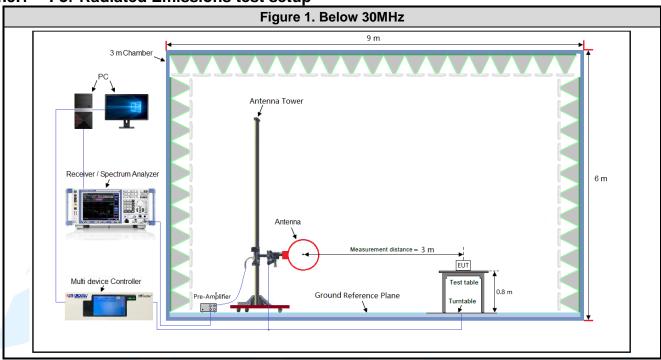
Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations and data rate. Following data rate was (were) selected for the final test as listed below.

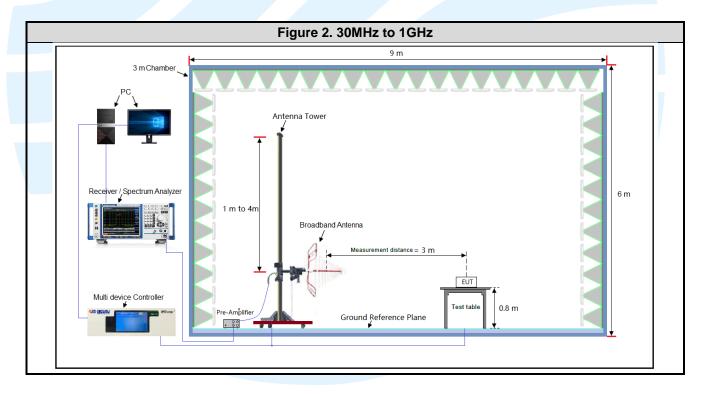
Mode	Worst-case data rates
IEEE 802.11b	1 Mbps
IEEE 802.11g	6 Mbps
IEEE 802.11n-HT20	MCS0
IEEE 802.11n-HT40	MCS0



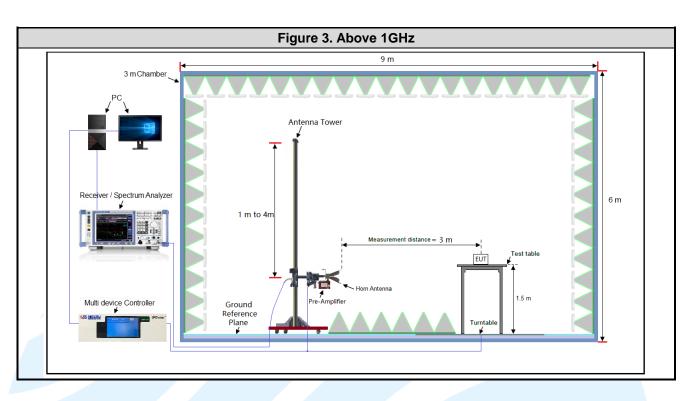
4.5 TEST SETUP

4.5.1 For Radiated Emissions test setup

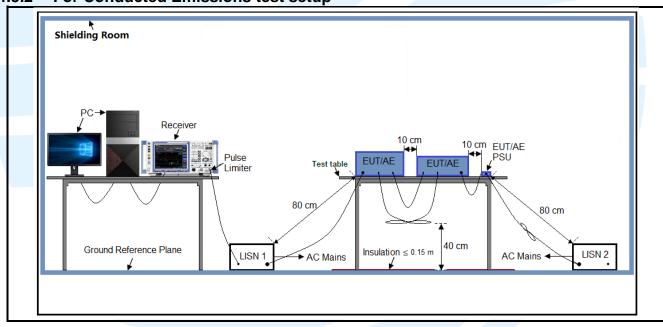






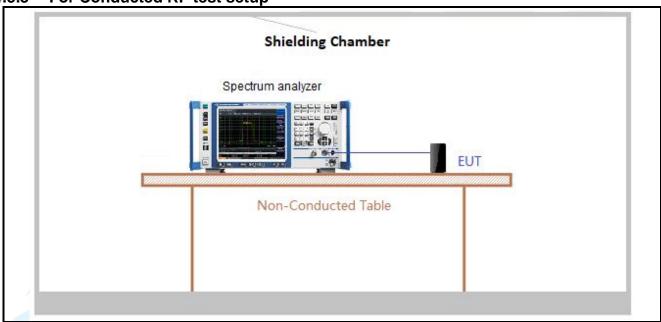


4.5.2 For Conducted Emissions test setup





4.5.3 For Conducted RF test setup



4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by 120V~60Hz or 240V~50Hz. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency	Mode	Antenna Port	Worst-case axis positioning
Above 1GHz	1TX	Chain 0	Y axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.



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5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION 5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	RSS-247 Issue 2	Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and Licence-Exempt Local Area Network (LE-LAN) Devices
4	RSS-Gen Issue 4	General Requirements for Compliance of Radio Apparatus
5	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
6	KDB 558074 D01 DTS Meas Guidance v04	Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247

5.2 ANTENNA REQUIREMENT

Standard Requirement

15.203 requirement:

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, 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.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

RSS-Gen Issue 4, Section 8.3 requirement:

According to RSS-Gen Issue 4, section 8.3, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns.

EUT Antenna:

Antenna in the interior of the equipment and no consideration of replacement. The gain of the antenna is 1.88 dBi.



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5.3 RADIATED SPURIOUS EMISSIONS

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

RSS-Gen Issue 4, Section 6.13/8.9/8.10 **Test Method:**KDB 558074 D01 v04, Section 12.1

Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

Spurious Emissions

Frequency	Field strength (microvolt/meter)	Limit (dBµV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	-	-	300
0.490 MHz-1.705 MHz	24000/F(kHz)			30
1.705 MHz-30 MHz	30			30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Remark:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

- 1. From 30 MHz to 1GHz test procedure as below:
- 1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- 2. Above 1GHz test procedure as below:



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- 1) Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 meter to 1.5 meter(Above 18GHz the distance is 1 meter and table is 1.5 meter).
- 2) Test the EUT in the lowest channel ,middle channel, the Highest channel
- 3) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y axis positioning which it is worse case.
- 4) Repeat above procedures until all frequencies measured was complete.

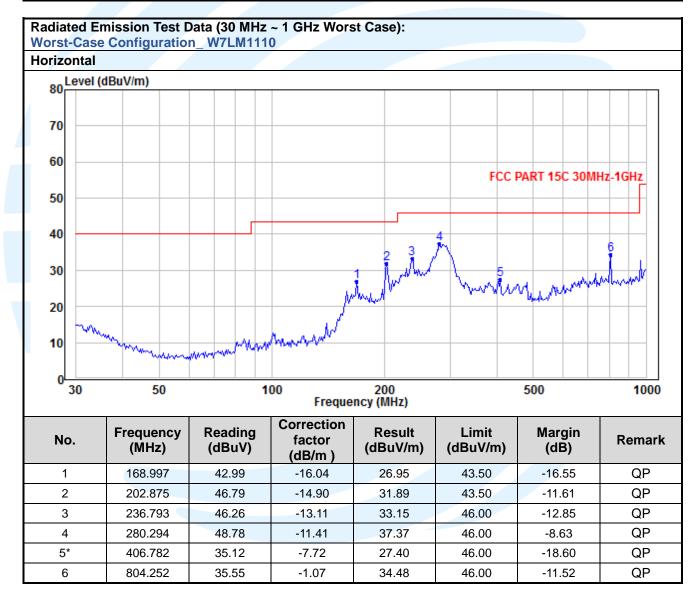
Equipment Used: Refer to section 3 for details.

Test Result: Pass

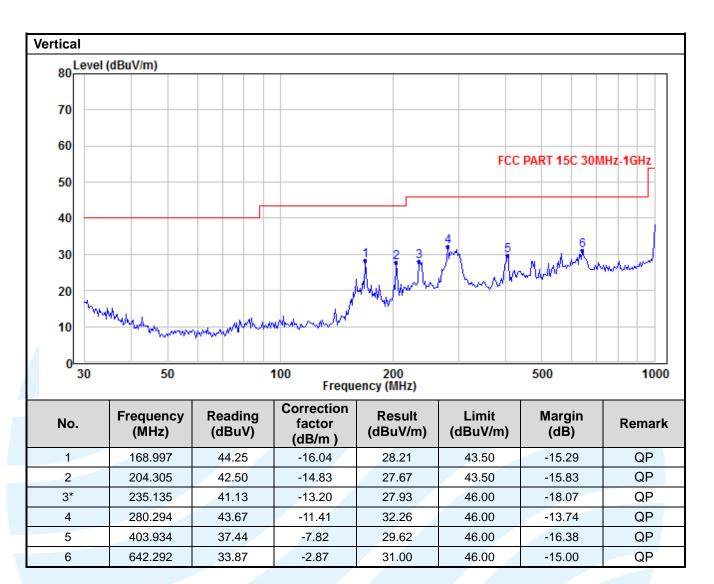
The measurement data as follows:

Radiated Emission Test Data (9 KHz ~ 30 MHz):

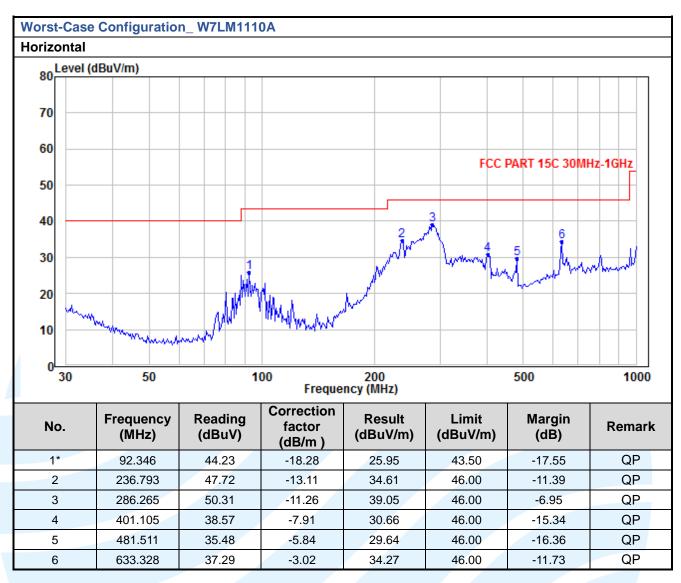
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.



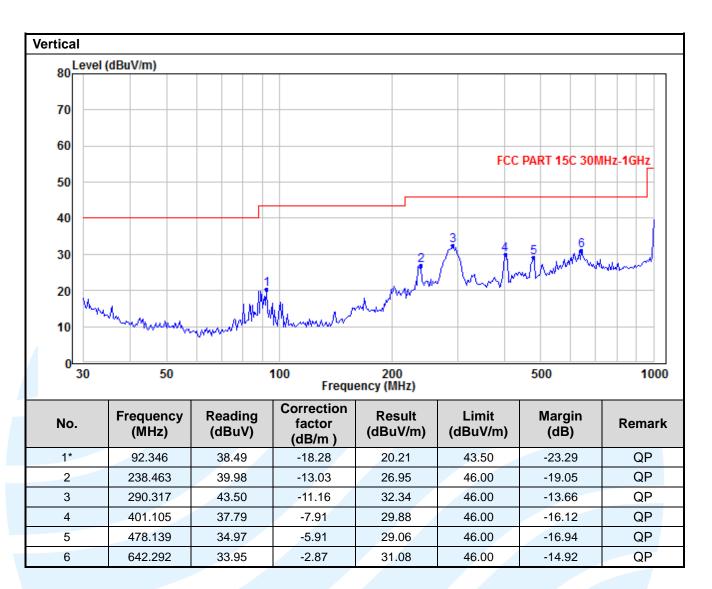












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Radiated Emission Test Data (Above 1GHz):

Model No.: W7LM1110

IEEE 802.11b	IEEE 802.11b_Lowest Channel:							
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis		
1	4824.00	69.88	74.00	-4.12	Peak	Horizontal		
2	4824.00	52.05	54.00	-1.95	Average	Horizontal		
3	7236.00	57.12	74.00	-16.88	Peak	Horizontal		
4	7236.00	41.13	54.00	-12.87	Average	Horizontal		
5	9648.00	60.97	74.00	-13.03	Peak	Horizontal		
6	9648.00	42.34	54.00	-11.66	Average	Horizontal		
7	4824.00	67.39	74.00	-6.61	Peak	Vertical		
8	4824.00	49.32	54.00	-4.68	Average	Vertical		
9	7236.00	52.96	74.00	-21.04	Peak	Vertical		
10	7236.00	39.00	54.00	-15.00	Average	Vertical		
11	9648.00	59.14	74.00	-14.86	Peak	Vertical		
12	9648.00	40.98	54.00	-13.02	Average	Vertical		

IEEE 802.11b	Middle Channe	el:				
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	50.14	74.00	-23.86	Peak	Horizontal
2	4874.00	50.12	54.00	-3.88	Average	Horizontal
3	7311.00	55.17	74.00	-18.83	Peak	Horizontal
4	7311.00	41.68	54.00	-12.32	Average	Horizontal
5	9748.00	60.07	74.00	-13.93	Peak	Horizontal
6	9748.00	41.41	54.00	-12.59	Average	Horizontal
7	4874.00	66.76	74.00	-7.24	Peak	Vertical
8	4874.00	48.88	54.00	-5.12	Average	Vertical
9	7311.00	53.81	74.00	-20.19	Peak	Vertical
10	7311.00	39.91	54.00	-14.09	Average	Vertical
11	9748.00	58.24	74.00	-15.76	Peak	Vertical
12	9748.00	39.94	54.00	-14.06	Average	Vertical

EEE 802.11b_Highest Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	64.35	74.00	-9.65	Peak	Horizonta
2	4924.00	46.78	54.00	-7.22	Average	Horizonta
3	7386.00	53.89	74.00	-20.11	Peak	Horizonta
4	7386.00	40.90	54.00	-13.10	Average	Horizonta
5	9848.00	60.13	74.00	-13.87	Peak	Horizonta
6	9848.00	41.26	54.00	-12.74	Average	Horizonta
7	4924.00	63.38	74.00	-10.62	Peak	Vertical
8	4924.00	45.45	54.00	-8.55	Average	Vertical
9	7386.00	51.79	74.00	-22.21	Peak	Vertical
10	7386.00	38.94	54.00	-15.06	Average	Vertical
11	9848.00	57.66	74.00	-16.34	Peak	Vertical
12	9848.00	39.72	54.00	-14.28	Average	Vertical



IEEE 802.11g	IEEE 802.11g_Lowest Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis	
1	4824.00	60.05	74.00	-13.95	Peak	Horizontal	
2	4824.00	46.54	54.00	-7.46	Average	Horizontal	
3	7236.00	50.22	74.00	-23.78	Peak	Horizontal	
4	7236.00	36.45	54.00	-17.55	Average	Horizontal	
5	9648.00	53.95	74.00	-20.05	Peak	Horizontal	
6	9648.00	37.79	54.00	-16.21	Average	Horizontal	
7	4824.00	57.94	74.00	-16.06	Peak	Vertical	
8	4824.00	44.15	54.00	-9.85	Average	Vertical	
9	7236.00	49.02	74.00	-24.98	Peak	Vertical	
10	7236.00	36.15	54.00	-17.85	Average	Vertical	
11	9648.00	50.90	74.00	-23.10	Peak	Vertical	
12	9648.00	36.89	54.00	-17.11	Average	Vertical	

IEEE 802.11g	_Middle Chann	el:				
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	60.53	74.00	-13.47	Peak	Horizontal
2	4874.00	46.73	54.00	-7.27	Average	Horizontal
3	7311.00	53.46	74.00	-20.54	Peak	Horizontal
4	7311.00	38.16	54.00	-15.84	Average	Horizontal
5	9748.00	52.54	74.00	-21.46	Peak	Horizontal
6	9748.00	37.29	54.00	-16.71	Average	Horizontal
7	4874.00	57.82	74.00	-16.18	Peak	Vertical
8	4874.00	43.21	54.00	-10.79	Average	Vertical
9	7311.00	50.17	74.00	-23.83	Peak	Vertical
10	7311.00	36.72	54.00	-17.28	Average	Vertical
11	9748.00	50.14	74.00	-23.86	Peak	Vertical
12	9748.00	35.77	54.00	-18.23	Average	Vertical

IEEE 802.11g	IEEE 802.11g_Highest Channel:								
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis			
1	4924.00	55.89	74.00	-18.11	Peak	Horizontal			
2	4924.00	42.74	54.00	-11.26	Average	Horizontal			
3	7386.00	50.61	74.00	-23.39	Peak	Horizontal			
4	7386.00	37.63	54.00	-16.37	Average	Horizontal			
5	9848.00	53.35	74.00	-20.65	Peak	Horizontal			
6	9848.00	37.38	54.00	-16.62	Average	Horizontal			
7	4924.00	55.15	74.00	-18.85	Peak	Vertical			
8	4924.00	40.76	54.00	-13.24	Average	Vertical			
9	7386.00	48.48	74.00	-25.52	Peak	Vertical			
10	7386.00	36.55	54.00	-17.45	Average	Vertical			
11	9848.00	51.07	74.00	-22.93	Peak	Vertical			
12	9848.00	36.89	54.00	-17.11	Average	Vertical			



IEEE 802.11n-	-HT20_Lowest (Channel:				
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4824.00	60.02	74.00	-13.98	Peak	Horizontal
2	4824.00	44.42	54.00	-9.58	Average	Horizontal
3	7236.00	48.42	74.00	-25.58	Peak	Horizontal
4	7236.00	36.00	54.00	-18.00	Average	Horizontal
5	9648.00	52.97	74.00	-21.03	Peak	Horizontal
6	9648.00	36.57	54.00	-17.43	Average	Horizontal
7	4824.00	55.89	74.00	-18.11	Peak	Vertical
8	4824.00	42.07	54.00	-11.93	Average	Vertical
9	7236.00	49.88	74.00	-24.12	Peak	Vertical
10	7236.00	36.00	54.00	-18.00	Average	Vertical
11	9648.00	50.75	74.00	-23.25	Peak	Vertical
12	9648.00	35.89	54.00	-18.11	Average	Vertical

No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	59.60	74.00	-14.40	Peak	Horizontal
2	4874.00	44.46	54.00	-9.54	Average	Horizontal
3	7311.00	49.87	74.00	-24.13	Peak	Horizontal
4	7311.00	36.86	54.00	-17.14	Average	Horizonta
5	9748.00	52.59	74.00	-21.41	Peak	Horizonta
6	9748.00	35.95	54.00	-18.05	Average	Horizonta
7	4874.00	58.96	74.00	-15.04	Peak	Vertical
8	4874.00	41.38	54.00	-12.62	Average	Vertical
9	7311.00	48.47	74.00	-25.53	Peak	Vertical
10	7311.00	36.43	54.00	-17.57	Average	Vertical
11	9748.00	49.41	74.00	-24.59	Peak	Vertical
12	9748.00	35.20	54.00	-18.80	Average	Vertical

IEEE 802.11n-	IEEE 802.11n-HT20_Highest Channel:								
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis			
1	4924.00	55.74	74.00	-18.26	Peak	Horizontal			
2	4924.00	40.64	54.00	-13.36	Average	Horizontal			
3	7386.00	50.08	74.00	-23.92	Peak	Horizontal			
4	7386.00	36.40	54.00	-17.60	Average	Horizontal			
5	9848.00	52.67	74.00	-21.33	Peak	Horizontal			
6	9848.00	36.55	54.00	-17.45	Average	Horizontal			
7	4924.00	54.69	74.00	-19.31	Peak	Vertical			
8	4924.00	39.47	54.00	-14.53	Average	Vertical			
9	7386.00	47.47	74.00	-26.53	Peak	Vertical			
10	7386.00	36.25	54.00	-17.75	Average	Vertical			
11	9848.00	48.80	74.00	-25.20	Peak	Vertical			
12	9848.00	36.19	54.00	-17.81	Average	Vertical			



IEEE 802.11n-	IEEE 802.11n-HT40_Lowest Channel:								
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis			
1	4844.00	55.77	74.00	-18.23	Peak	Horizontal			
2	4844.00	44.07	54.00	-9.93	Average	Horizontal			
3	7266.00	49.82	74.00	-24.18	Peak	Horizontal			
4	7266.00	36.30	54.00	-17.70	Average	Horizontal			
5	9688.00	50.16	74.00	-23.84	Peak	Horizontal			
6	9688.00	36.69	54.00	-17.31	Average	Horizontal			
7	4844.00	54.31	74.00	-19.69	Peak	Vertical			
8	4844.00	41.83	54.00	-12.17	Average	Vertical			
9	7266.00	48.49	74.00	-25.51	Peak	Vertical			
10	7266.00	36.30	54.00	-17.70	Average	Vertical			
11	9688.00	47.74	74.00	-26.26	Peak	Vertical			
12	9688.00	36.01	54.00	-17.99	Average	Vertical			

No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	57.10	74.00	-16.90	Peak	Horizontal
2	4874.00	44.00	54.00	-10.00	Average	Horizontal
3	7311.00	48.66	74.00	-25.34	Peak	Horizontal
4	7311.00	36.86	54.00	-17.14	Average	Horizontal
5	9748.00	48.93	74.00	-25.07	Peak	Horizontal
6	9748.00	35.95	54.00	-18.05	Average	Horizontal
7	4874.00	54.47	74.00	-19.53	Peak	Vertical
8	4874.00	41.00	54.00	-13.00	Average	Vertical
9	7311.00	47.79	74.00	-26.21	Peak	Vertical
10	7311.00	36.28	54.00	-17.72	Average	Vertical
11	9748.00	47.24	74.00	-26.76	Peak	Vertical
12	9748.00	35.20	54.00	-18,80	Average	Vertical

IEEE 802.11n-	HT40_Highest	Channel:				
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4904.00	53.91	74.00	-20.09	Peak	Horizontal
2	4904.00	41.92	54.00	-12.08	Average	Horizontal
3	7356.00	48.37	74.00	-25.63	Peak	Horizontal
4	7356.00	36.25	54.00	-17.75	Average	Horizontal
5	9808.00	50.05	74.00	-23.95	Peak	Horizontal
6	9808.00	36.77	54.00	-17.23	Average	Horizontal
7	4904.00	50.53	74.00	-23.47	Peak	Vertical
8	4904.00	39.44	54.00	-14.56	Average	Vertical
9	7356.00	48.26	74.00	-25.74	Peak	Vertical
10	7356.00	35.79	54.00	-18.21	Average	Vertical
11	9808.00	48.68	74.00	-25.32	Peak	Vertical
12	9808.00	36.07	54.00	-17.93	Average	Vertical



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IEEE 802.111	IEEE 802.11b_Lowest Channel:								
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis			
1	4824.00	67.94	74.00	-6.06	Peak	Horizontal			
2	4824.00	50.70	54.00	-3.30	Average	Horizontal			
3	7236.00	46.96	74.00	-27.04	Peak	Horizontal			
4	7236.00	35.52	54.00	-18.48	Average	Horizontal			
5	4824.00	65.96	74.00	-8.04	Peak	Vertical			
6	4824.00	48.67	54.00	-5.33	Average	Vertical			
7	7236.00	48.56	74.00	-25.44	Peak	Vertical			
8	7236.00	36.15	54.00	-17.85	Average	Vertical			

IEEE 802.11b	Middle Channe	el:				
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	69.81	74.00	-4.19	Peak	Horizontal
2	4874.00	52.23	54.00	-1.77	Average	Horizontal
3	7311.00	51.27	74.00	-22.73	Peak	Horizontal
4	7311.00	37.54	54.00	-16.46	Average	Horizontal
5	4874.00	69.55	74.00	-4.45	Peak	Vertical
6	4874.00	52.08	54.00	-1.92	Average	Vertical
7	7311.00	49.32	74.00	-24.68	Peak	Vertical
8	7311.00	37.14	54.00	-16.86	Average	Vertical

IEEE 802.11b	IEEE 802.11b_Highest Channel:								
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis			
1	4924.00	64.06	74.00	-9.94	Peak	Horizontal			
2	4924.00	46.52	54.00	-7.48	Average	Horizontal			
3	7386.00	47.47	74.00	-26.53	Peak	Horizontal			
4	7386.00	35.63	54.00	-18.37	Average	Horizontal			
5	4924.00	65.12	74.00	-8.88	Peak	Vertical			
6	4924.00	47.73	54.00	-6.27	Average	Vertical			
7	7386.00	47.05	74.00	-26.95	Peak	Vertical			
8	7386.00	35.63	54.00	-18.37	Average	Vertical			



IEEE 802.11g	IEEE 802.11g_Lowest Channel:								
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis			
1	4824.00	59.61	74.00	-14.39	Peak	Horizontal			
2	4824.00	44.72	54.00	-9.28	Average	Horizontal			
3	7236.00	47.10	74.00	-26.90	Peak	Horizontal			
4	7236.00	35.68	54.00	-18.32	Average	Horizontal			
5	4824.00	57.60	74.00	-16.40	Peak	Vertical			
6	4824.00	43.50	54.00	-10.50	Average	Vertical			
7	7236.00	47.64	74.00	-26.36	Peak	Vertical			
8	7236.00	35.52	54.00	-18.48	Average	Vertical			

IEEE 802.11g_Middle Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	64.01	74.00	-9.99	Peak	Horizontal
2	4874.00	48.27	54.00	-5.73	Average	Horizontal
3	7311.00	48.33	74.00	-25.67	Peak	Horizontal
4	7311.00	36.28	54.00	-17.72	Average	Horizontal
5	4874.00	62.73	74.00	-11.27	Peak	Vertical
6	4874.00	47.32	54.00	-6.68	Average	Vertical
7	7311.00	47.98	74.00	-26.02	Peak	Vertical
8	7311.00	35.98	54.00	-18.02	Average	Vertical

IEEE 802.11g	_Highest Chanr	nel:				
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	57.29	74.00	-16.71	Peak	Horizontal
2	4924.00	42.56	54.00	-11.44	Average	Horizontal
3	7386.00	47.59	74.00	-26.41	Peak	Horizontal
4	7386.00	35.79	54.00	-18.21	Average	Horizontal
5	4924.00	58.55	74.00	-15.45	Peak	Vertical
6	4924.00	41.93	54.00	-12.07	Average	Vertical
7	7386.00	48.26	74.00	-25.74	Peak	Vertical
8	7386.00	35.47	54.00	-18.53	Average	Vertical



IEEE 802.11n-HT20_Lowest Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4824.00	58.47	74.00	-15.53	Peak	Horizontal
2	4824.00	42.88	54.00	-11.12	Average	Horizontal
3	7236.00	48.49	74.00	-25.51	Peak	Horizontal
4	7236.00	35.68	54.00	-18.32	Average	Horizontal
5	4824.00	57.73	74.00	-16.27	Peak	Vertical
6	4824.00	41.50	54.00	-12.50	Average	Vertical
7	7236.00	47.56	74.00	-26.44	Peak	Vertical
8	7236.00	35.68	54.00	-18.32	Average	Vertical

IEEE 802.11n-HT20_Middle Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	61.27	74.00	-12.73	Peak	Horizontal
2	4874.00	44.54	54.00	-9.46	Average	Horizontal
3	7311.00	48.14	74.00	-25.86	Peak	Horizontal
4	7311.00	35.82	54.00	-18.18	Average	Horizontal
5	4874.00	59.42	74.00	-14.58	Peak	Vertical
6	4874.00	43.68	54.00	-10.32	Average	Vertical
7	7311.00	47.42	74.00	-26.58	Peak	Vertical
8	7311.00	35.82	54.00	-18.18	Average	Vertical

IEEE 802.11n-	IEEE 802.11n-HT20_Highest Channel:					
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4924.00	55.48	74.00	-18.52	Peak	Horizontal
2	4924.00	40.93	54.00	-13.07	Average	Horizontal
3	7386.00	47.55	74.00	-26.45	Peak	Horizontal
4	7386.00	35.63	54.00	-18.37	Average	Horizontal
5	4924.00	54.16	74.00	-19.84	Peak	Vertical
6	4924.00	39.53	54.00	-14.47	Average	Vertical
7	7386.00	47.67	74.00	-26.33	Peak	Vertical
8	7386.00	35.63	54.00	-18.37	Average	Vertical



IEEE 802.11n-HT40_Lowest Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4844.00	53.90	74.00	-20.10	Peak	Horizontal
2	4844.00	41.20	54.00	-12.80	Average	Horizontal
3	7266.00	47.84	74.00	-26.16	Peak	Horizontal
4	7266.00	35.84	54.00	-18.16	Average	Horizontal
5	4844.00	52.72	74.00	-21.28	Peak	Vertical
6	4844.00	41.36	54.00	-12.64	Average	Vertical
7	7266.00	48.08	74.00	-25.92	Peak	Vertical
8	7266.00	35.68	54.00	-18.32	Average	Vertical

IEEE 802.11n-HT40_Middle Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4874.00	59.07	74.00	-14.93	Peak	Horizontal
2	4874.00	45.08	54.00	-8.92	Average	Horizontal
3	7311.00	47.42	74.00	-26.58	Peak	Horizontal
4	7311.00	35.98	54.00	-18.02	Average	Horizontal
5	4874.00	56.18	74.00	-17.82	Peak	Vertical
6	4874.00	42.35	54.00	-11.65	Average	Vertical
7	7311.00	48.17	74.00	-25.83	Peak	Vertical
8	7311.00	35.82	54.00	-18.18	Average	Vertical

IEEE 802.11n-HT40_Highest Channel:						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Antenna Polaxis
1	4904.00	56.17	74.00	-17.83	Peak	Horizontal
2	4904.00	44.16	54.00	-9.84	Average	Horizontal
3	7356.00	47.67	74.00	-26.33	Peak	Horizontal
4	7356.00	35.63	54.00	-18.37	Average	Horizontal
5	4904.00	56.16	74.00	-17.84	Peak	Vertical
6	4904.00	42.41	54.00	-11.59	Average	Vertical
7	7356.00	47.71	74.00	-26.29	Peak	Vertical
8	7356.00	35.63	54.00	-18.37	Average	Vertical



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5.4 BAND EDGE MEASUREMENTS (RADIATED)

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.205/15.209

RSS-247 Issue 2, Section 5.5

Test Method: KDB 558074 D01 v04, Section 12.1

Limits:

Radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with

the radiated emission limits specified in section 15.209(a).

Frequency	Limit (dBµV/m @3m)	Remark
30 MHz-88 MHz	40.0	Quasi-peak Value
88 MHz-216 MHz	43.5	Quasi-peak Value
216 MHz-960 MHz	46.0	Quasi-peak Value
960 MHz-1 GHz	54.0	Quasi-peak Value
Above 1 CLIz	54.0	Average Value
Above 1 GHz	74.0	Peak Value

Test Setup: Refer to section 4.4.1 for details.

Test Procedures:

Radiated band edge measurements at 2390 MHz and 2483.5 MHz were made with the unit transmitting in the low end of the channel range and the high end closest to the restricted bands respectively. The emissions were made on the 966 Semi-Chamber. Use (resolution bandwidth (RBW) = 1 MHz, video bandwidth (VBW) = 3 MHz for peak levels and RBW = 1 MHz and VBW = 10 Hz or 1/T for average levels).

- 1. Use radiated spurious emission test procedure described in clause 5.10. The transmitter output (antenna port) was connected to the test receiver.
- 2. Set the PK and AV limit line.
- 3. Record the fundamental emission and emissions out of the band-edge.
- 4. Determine band-edge compliance as required.

Equipment Used: Refer to section 3 for details.

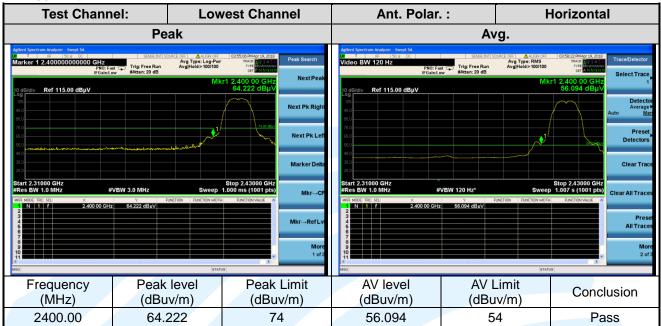
Test Result: Pass

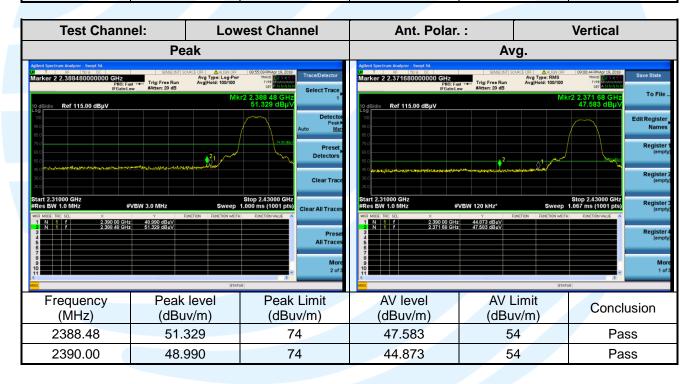
The measurement data as follows:



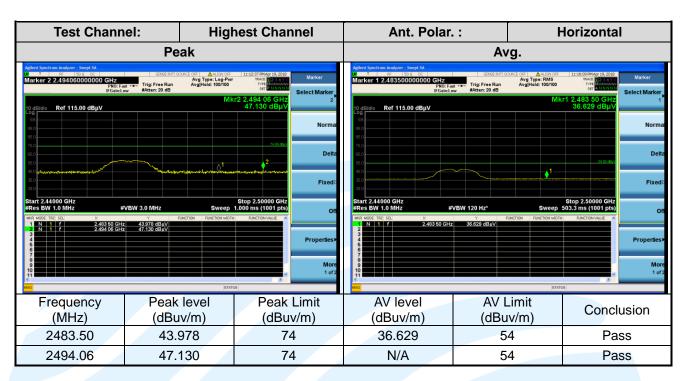
Model No.: W7LM1110

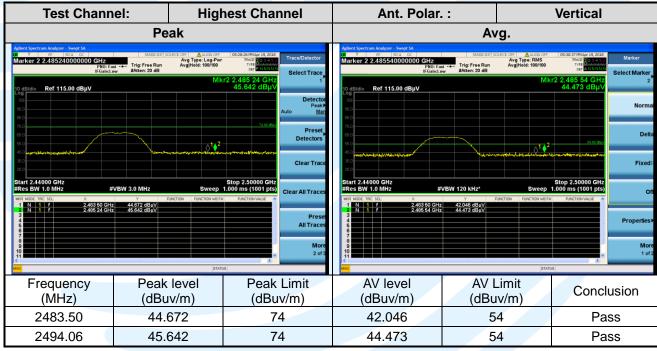
IEEE 802.11b













IEEE 802.11g

