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FCC RADIO TEST REPORT

FCC ID: 2AN8Z-SONNET

Product : Sonnet Trade Name : Sonnet Model Name : Sonnet Serial Model : N/A Report No. : UNIA2018081011-2FR-01

Prepared for

Sonnet Labs Inc.

8 The Green Suite #6290, Dover, DE 19901, United States

Prepared by

Shenzhen United Testing Technology Co., Ltd.

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

深圳市优耐检测技术有限公司 Shenzhen United Testing Technology Co., Ltd. United Testing Technology(Hong Kong) Limited

TEST RESULT CERTIFICATION

Applicant's name:	Sonnet Labs Inc.			
Address:	8 The Green Suite #6290, Dover, DE 19901, United States			
Manufacture's Name:	Sonnet Labs Inc.			
Address:	8 The Green Suite #6290, Dover, DE 19901, United States			
Product description				
Product name:	Sonnet			
Trade Mark:	Sonnet			
Model and/or type reference .:	Sonnet			
Standards	FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013			

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test:	
Date (s) of performance of tests:	
Date of Issue:	
Test Result:	

Aug. 10, 2018 ~ Sep. 04, 2018 Sep. 04, 2018 Pass

Prepared by:

Reviewer:

Approved & Authorized Signer:

ahn Yan

Kahn yang/Editor

Sherwin Qian/Supervisor

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1. TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST

CONDUCTED EMISSIONS TEST RADIATED EMISSION TEST **BAND EDGE** OCCUPIED BANDWIDTH MEASUREMENT POWER SPECTRAL DENSITY PEAK OUTPUT POWER OUT OF BAND EMISSIONS ANTENNA REQUIREMENT

RESULT COMPLIANT COMPLIANT COMPLIANT COMPLIANT COMPLIANT COMPLIANT COMPLIANT COMPLIANT

1.2 TEST FACILITY

Shenzhen United Testing Technology Co., Ltd. Test Firm 2

Address

2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

CNAS-LAB Code: L6494

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2017 General Requirements) for the Competence of testing Laboratories.

Designation Number: CN1227

Test Firm Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files.

1.3 MEASUREMENT UNCERTAINTY

Measurement Uncertainty		
Conducted Emission Expanded Uncertainty	= 2	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

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2F, Annex Bldg, Jiahuangyuan Tech Park, #365 Baotian 1 Rd, Tiegang Community, Xixiang Str, Bao'an District, Shenzhen, China 深圳市宝安区西乡街道铁岗社区宝田一路365号嘉皇源科技园附楼2楼 邮编:518102 Tel:+86-755-86180996 Fax:+86-755-86180156

LNi

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Sonnet Sonnet J/A J/A AN8Z-SONNET Internal Antenna				
Sonnet I/A I/A AN8Z-SONNET				
I/A I/A AN8Z-SONNET				
I/A AN8Z-SONNET				
AN8Z-SONNET				
nternal Antenna				
.5dBi				
02.11b/g/n20: 2412~2462 MHz				
02.11n40: 2422~2452MHz				
02.11b/g/n20: 11CH				
02.11n40: 7CH				
CK, OFDM, DBPSK, DAPSK				
DC 3.7V, 4200mAh				
OC 3.7V from Battery or DC 5V from adapter with				
AC 120(240)V/60Hz				
//N: PS06H050K1000UU				
nput: AC 100-240V, 50/60Hz, 0.25A				
Dutput: DC 5V, 1A				



2.2 Carrier Frequency of Channels

Channel List for 802.11b/g/n(20MHz)							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	04	2427	07	2442	10	2457
02	2417	05	2432	08	2447	11	2462
03	2422	06	2437	09	2452	-1	

	Channel List for 802.11n(40MHz)								
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)		
03	2422	06	2437	09	2452				
04	2427	07	2442	1					
05	2432	08	2447		1				

2.3 Operation of EUT during testing

Operating Mode The mode is used: Transmitting mode for 802.11b/g/n(20MHz) Low Channel: 2412MHz Middle Channel: 2437MHz High Channel: 2462MHz

> Transmitting mode for 802.11n(40MHz) Low Channel: 2422MHz Middle Channel: 2437MHz High Channel: 2452MHz

2.4 DESCRIPTION OF TEST SETUP

Operation of EUT during Conducted testing:



Operation of EUT during Radiation and Above1GHz Radiation testing:



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2.5 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
		CONDUCTED	EMISSIONS TEST	4	
1	AMN	Schwarzbeck	NNLK8121	8121370	2018.9.9
2	AMN	ETS	3810/2	00020199	2018.9.9
3	EMI TEST RECEIVER	Rohde&Schwarz	ESCI	101210	2018.9.9
4	AAN	TESEQ	T8-Cat6	38888	2018.9.9
	4,	RADIATED E	EMISSION TEST		
1	Horn Antenna	Sunol	DRH-118	A101415	2018.9.29
2	BicoNILog Antenna	Sunol	JB1 Antenna	A090215	2018.9.29
3	PREAMP	HP HP	8449B	3008A00160	2018.9.9
4	PREAMP	HP	8447D	2944A07999	2018.9.9
5	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2018.9.9
6	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2018.9.28
7	Signal Generator	Agilent	E4421B	MY4335105	2018.9.28
8	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2018.9.28
9	MXA Signal Analyzer	Agilent	N9020A	MY51110104	2018.9.9
10	ANT Tower&Turn table Controller	Champro	EM 1000	60764	2018.9.28
11	Anechoic Chamber	Taihe Maorui	9m*6m*6m	966A0001	2018.9.9
12	Shielding Room	Taihe Maorui	6.4m*4m*3m	643A0001	2018.9.9
13	RF Power sensor	DARE	RPR3006W	15100041SNO88	2019.3.14
14	RF Power sensor	DARE	RPR3006W	15100041SNO89	2019.3.14
15	RF power divider	Anritsu	K241B	992289	2018.9.28
16	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2018.9.28
17	Biconical antenna	Schwarzbeck	VHA 9103	91032360	2018.9.8
18	Biconical antenna	Schwarzbeck	VHA 9103	91032361	2018.9.8
19	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2018.9.8
20	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2019.1.12
21	Active Receive Loop Antenna	Schwarzbeck	FMZB 1919B	00023	2018.11.02
22	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170651	2019.03.14
23	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2018.10.24
24	Active Loop Antenna	Com-Power	AL-130R	10160009	2019.05.10
25	Power Meter	KEYSIGHT	N1911A	MY50520168	2019.05.10

3. CONDUCTED EMISSIONS TEST

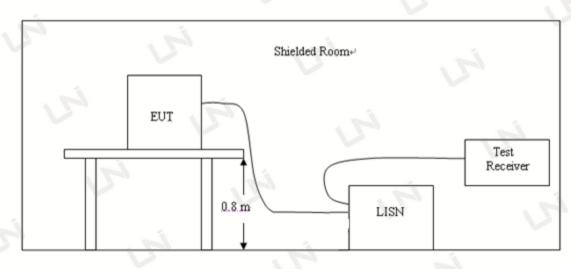
3.1 Conducted Power Line Emission Limit

For unintentional device, according to § 15.107(a) Line Conducted Emission Limits is as following

Frequency	Maximum RF Line Voltage(dBµV)					
	CLASS A		CLASS B			
(MHz)	Q.P.	Ave.	Q.P.	Ave.		
0.15~0.50	79	66	66~56*	56~46*		
0.50~5.00	73	60	56	46		
5.00~30.0	73	60	60	50		

* Decreasing linearly with the logarithm of the frequency For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 Test Setup



3.3 Test Procedure

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. A wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

3.4 Test Result

Pass

Remark:

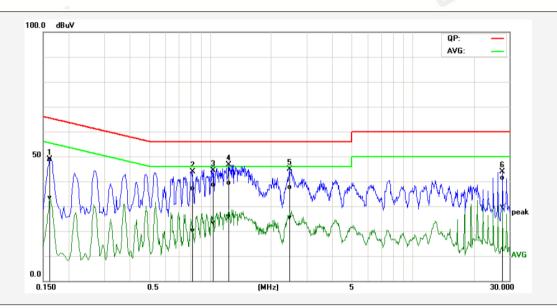
 All modes were tested at AC 120V and 240V, only the worst result of AC 120V was reported.
All modes were tested at Low, Middle, and High channel, only the worst result of 802.11n40 Middle Channel was reported as below:

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Report No.: UNIA2018081011-2FR-01

Temperature:	25℃	Relative Humidity:	58%		
Test Date:	Aug. 17, 2018	Pressure:	1030hPa		
Test Voltage:	AC 120V, 60Hz	Line			
Test Mode:	Transmitting mode of 802.11n40 2437MHz				



No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark	
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)		
1*	0.1620	40.44	24.85	8.49	48.93	33.34	65.36	55.36	-16.43	-22.02	Pass	
2P	0.8242	27.21	10.09	9.99	37.20	20.08	56.00	46.00	-18.80	-25.92	Pass	
3P	1.0439	28.68	13.39	10.03	38.71	23.42	56.00	46.00	-17.29	-22.58	Pass	
4P	1.2345	29.43	15.81	10.02	39.45	25.83	56.00	46.00	-16.55	-20.17	Pass	
5P	2.4844	27.62	15.39	10.09	37.71	25.48	56.00	46.00	-18.29	-20.52	Pass	
6P	27.7332	30.64	19.15	10.73	41.37	29.88	60.00	50.00	-18.63	-20.12	Pass	

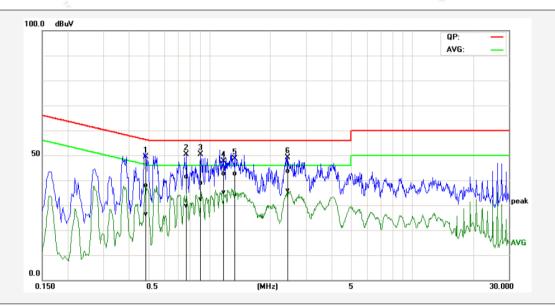
Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result - Limit.

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Report No.: UNIA2018081011-2FR-01

Temperature:	25℃	Relative Humidity:	58%
Test Date:	Aug. 17, 2018	Pressure:	1030hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Neutral
Test Mode:	Transmitting mode of 802.11n40 24	137MHz	, N



	No.	Frequency	QuasiPeak reading	Average reading	Correction factor	QuasiPeak result	Average result	QuasiPeak limit	Average limit	QuasiPeak margin	Average margin	Remark
ľ		(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
	1P	0.4907	27.98	16.45	9.95	37.93	26.40	56.16	46.16	-18.23	-19.76	Pass
	2P	0.7716	31.52	19.67	9.97	41.49	29.64	56.00	46.00	-14.51	-16.36	Pass
	3P	0.9103	28.80	22.26	10.00	38.80	32.26	56.00	46.00	-17.20	-13.74	Pass
	4P	1.1865	32.52	25.11	10.02	42.54	35.13	56.00	46.00	-13.46	-10.87	Pass
	5P	1.3235	32.51	23.91	10.05	42.56	33.96	56.00	46.00	-13.44	-12.04	Pass
	6*	2.4518	33.62	25.68	10.08	43.70	35.76	56.00	46.00	-12.30	-10.24	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result - Limit.

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4 RADIATED EMISSION TEST

4.1 Radiation Limit

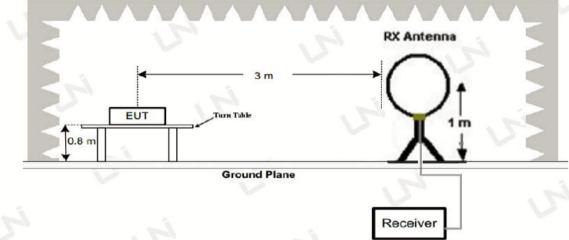
For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency (MHz)	Distance (Meters)	Radiated (dBµV/m)	Radiated (µV/m)
30-88	3	40	100
88-216	3	43.5	150
216-960	3	46	200
Above 960	3	54	500

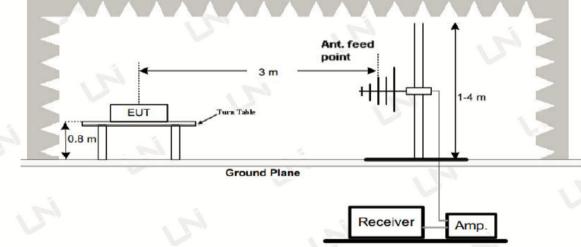
For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

4.2 Test Setup

1. Radiated Emission Test-Up Frequency Below 30MHz



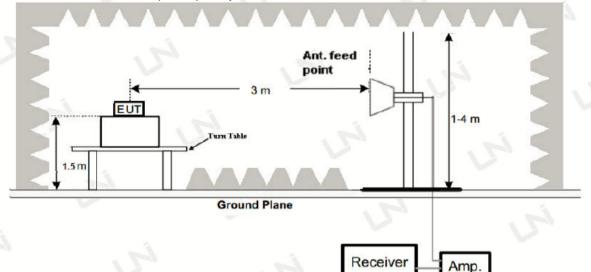
2. Radiated Emission Test-Up Frequency 30MHz~1GHz



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3. Radiated Emission Test-Up Frequency Above 1GHz



- 4.3 Test Procedure
 - 1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
 - 2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
 - 3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
 - 4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
 - 5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
 - 6. Repeat above procedures until the measurements for all frequencies are complete.
 - 7. The test frequency range from 9KHz to 25GHz per FCC PART 15.33(a).

Note:

For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 Test Result

PASS

Remark:

1. All modes of 802.11b/g/n20/n40 were test at Low, Middle, and High channel, only the worst result of 802.11g Middle Channel was reported for below 1GHz test.

2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "Z axis" position was the worst, and test data recorded in this report.

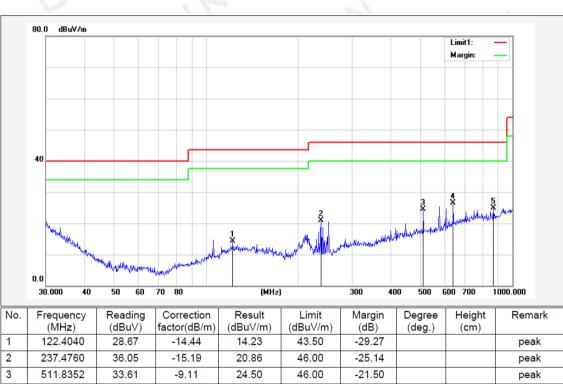
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peak

peak

Below 1GHz Test Results:

Temperature:	26℃	Relative Humidity:	53%			
Test Date:	Aug. 17, 2018	Pressure:	1030hPa			
Test Voltage:	DC 3.7V from Battery	Polarization:	Horizontal			
Test Mode:	Transmitting mode of 802.11n40 2437MHz					



Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit Factor = Ant. Factor + Cable Loss – Pre-amplifier

26.55

24.83

46.00

46.00

-19.45

-21.17

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4*

5

640.6110

866.0880

33.17

28.83

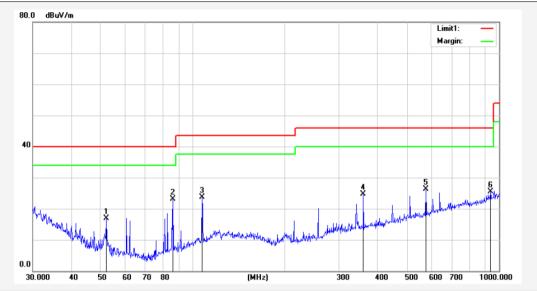
-6.62

-4.00

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Temperature:	26°C	Relative Humidity:	53%	5
Test Date:	Aug. 17, 2018	Pressure:	1030hPa	5
Test Voltage:	DC 3.7V from Battery	Polarization:	Vertical	
Test Mode:	Transmitting mode of 802.11	n40 2437MHz	in.	



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	52.2080	38.21	-21.32	16.89	40.00	-23.11			peak
2*	86.2001	42.53	-19.34	23.19	40.00	-16.81			peak
3	107.1337	40.18	-16.48	23.70	43.50	-19.80			peak
4	360.4476	36.24	-11.61	24.63	46.00	-21.37			peak
5	576.6443	34.60	-8.29	26.31	46.00	-19.69			peak
6	938.8326	27.88	-2.31	25.57	46.00	-20.43			peak

Remark: Absolute Level = Reading Level + Factor, Margin = Absolute Level – Limit Factor = Ant. Factor + Cable Loss – Pre-amplifier

Remark:

- (1) Measuring frequencies from 9 KHz to the 1 GHz, Radiated emission test from 9KHz to 30MHz was verified, and no any emission was found except system noise floor.
- (2) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
- (3) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz.

Above 1 GHz Test Results:

CH Low of 802.11b Mode (2412MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector				
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре				
4824	56.68	-3.64	53.04	74	-20.96	peak				
4824	47.37	-3.64	43.73	54	-10.27	AVG				
7236	59.42	-0.95	58.47	74	-15.53	peak				
7236	49.12	-0.95	48.17	54	-5.83	AVG				
Remark: Fact	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit									

Vertical:

Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
57.35	-3.64	53.71	74	-20.29	peak
48.01	-3.64	44.37	54	-9.63	AVG
59.44	-0.95	58.49	74	-15.51	peak
48.97	-0.95	48.02	54	-5.98	AVG
	(dBµV) 57.35 48.01 59.44	(dBµV) (dB) 57.35 -3.64 48.01 -3.64 59.44 -0.95	(dBµV) (dB) (dBµV/m) 57.35 -3.64 53.71 48.01 -3.64 44.37 59.44 -0.95 58.49	(dBµV) (dB) (dBµV/m) (dBµV/m) 57.35 -3.64 53.71 74 48.01 -3.64 44.37 54 59.44 -0.95 58.49 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 57.35 -3.64 53.71 74 -20.29 48.01 -3.64 44.37 54 -9.63 59.44 -0.95 58.49 74 -15.51

Remark: Factor = Antenna Factor + Cable Loss - Pre-amplifier. Margin = Absolute Level - Limit

CH Middle of 802.11b Mode (2437MHz)

Horizontal:

Reading Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
57.12	-3.51	53.61	74	-20.39	peak
46.96	-3.51	43.45	54	-10.55	AVG
59.37	-0.82	58.55	74	-15.45	peak
49.68	-0.82	48.86	54	-5.14	AVG
	(dBµV) 57.12 46.96 59.37	Result (dBµV) (dB) 57.12 -3.51 46.96 -3.51 59.37 -0.82	Result (dB) (dBµV/m) (dBµV) (dB) (dBµV/m) 57.12 -3.51 53.61 46.96 -3.51 43.45 59.37 -0.82 58.55	Result Image: Constraint of the constraint o	Itesuit Itesuit <t< td=""></t<>

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	56.43	-3.51	52.92	74	-21.08	peak
4874	46.89	-3.51	43.38	54	-10.62	AVG
7311	59.31	-0.82	58.49	74	-15.51	peak
7311	48.35	-0.82	47.53	54	-6.47	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

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CH High of 802.11b Mode (2462MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector				
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре				
4924	56.67	-3.43	53.24	74	-20.76	peak				
4924	46.64	-3.43	43.21	54	-10.79	AVG				
7386	58.93	-0.75	58.18	74	-15.82	peak				
7386	48.51	-0.75	47.76	54	-6.24	AVG				
Remark: Fact	Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit									

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	56.62	-3.43	53.19	74	-20.81	peak
4924	46.61	-3.43	43.18	54	-10.82	AVG
7386	58.35	-0.75	57.6	74	-16.4	peak
7386	48.77	-0.75	48.02	54	-5.98	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

Remark :

(1) Measuring frequencies from 1 GHz to the 25 GHz •

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Data of measurement within this frequency range shown "--- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

CH Low of 802.11g Mode (2412MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4824	57.83	-3.64	54.19	74	-19.81	peak
4824	47.52	-3.64	43.88	54	-10.12	AVG
7236	59.32	-0.95	58.37	74	-15.63	peak
7236	48.57	-0.95	47.62	54	-6.38	AVG
Remark: Fact	or = Antenna	Factor + Cabl	e Loss – Pre-ampli	fier. Margin =	Absolute Le	vel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4824	58.02	-3.64	54.38	74	-19.62	peak
4824	49.38	-3.64	45.74	54	-8.26	AVG
7236	60.73	-0.95	59.78	74	-14.22	peak
7236	48.77	-0.95	47.82	54	-6.18	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

CH Middle of 802.11g Mode (2437MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	58.42	-3.51	54.91	74	-19.09	peak
4874	48.37	-3.51	44.86	54	-9.14	AVG
7311	61.14	-0.82	60.32	74	-13.68	peak
7311	51.82	-0.82	51	54	-3.00	AVG
Remark: Fact	or = Antenna	Factor + Cabl	e Loss – Pre-ampli	fier. Margin =	Absolute Le	vel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	61.76	-3.51	58.25	74	-15.75	peak
4874	48.24	-3.51	44.73	54	-9.27	AVG
7311	61.28	-0.82	60.46	74	-13.54	peak
7311	51.42	-0.82	50.6	54	-3.4 0	AVG
	-	-	•	-		

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

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CH High of 802.11g Mode (2462MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	59.83	-3.43	56.4	74	-17.6	peak
4924	49.75	-3.43	46.32	54	-7.68	AVG
7386	61.14	-0.75	60.39	74	-13.61	peak
7386	50.95	-0.75	50.2	54	-3.8 0	AVG
Remark: Fact	tor = Antenna	Factor + Cabl	e Loss – Pre-ampli	ifier. Margin =	Absolute Le	evel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	59.79	-3.43	56.36	74	-17.64	peak
4924	49.83	-3.43	46.4	54	-7.6	AVG
7386	61.32	-0.75	60.57	74	-13.43	peak
7386	51.10	-0.75	50.35	54	-3.65	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

Remark :

(1) Measuring frequencies from 1 GHz to the 25 GHz •

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Data of measurement within this frequency range shown "----" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

CH Low of 802.11n/H20 Mode (2412MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4824	57.87	-3.64	54.23	74	-19.77	peak
4824	47.55	-3.64	43.91	54	-10.09	AVG
7236	61.11	-0.95	60.16	74	-13.84	peak
7236	50.88	-0.95	49.93	54	-4.07	AVG
Remark: Fact	or = Antenna	Factor + Cabl	e Loss – Pre-ampli	ifier. Margin =	Absolute Le	vel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4824	56.12	-3.64	52.48	74	-21.52	peak
4824	46.03	-3.64	42.39	54	-11.61	AVG
7236	58.41	-0.95	57.46	74	-16.54	peak
7236	49.45	-0.95	48.5	54	-5.5	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

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CH Middle of 802.11n/H20 Mode (2437MHz)

Horizontal:		1.00	
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Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	59.78	-3.51	56.27	74	-17.73	peak
4874	48.34	-3.51	44.83	54	-9.17	AVG
7311	62.39	-0.82	61.57	74	-12.43	peak
7311	51.97	-0.82	51.15	54	-2.85	AVG
Remark: Fact	tor = Antenna	Factor + Cabl	e Loss – Pre-ampli	fier. Margin =	Absolute Le	vel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	58.67	-3.51	55.16	74	-18.84	peak
4874	48.38	-3.51	44.87	54	-9.13	AVG
7311	61.82	-0.82	61.00	74	-13.00	peak
7311	51.57	-0.82	50.75	54	-3.25	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

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CH High of 802.11n/H20 Mode (2462MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	58.04	-3.43	54.61	74	-19.39	peak
4924	47.19	-3.43	43.76	54	-10.24	AVG
7386	60.62	-0.75	59.87	74	-14.13	peak
7386	50.43	-0.75	49.68	54	-4.32	AVG
Remark: Fact	or = Antenna	Factor + Cabl	e Loss – Pre-ampli	ifier. Margin =	Absolute Le	evel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4924	58.86	-3.43	55.43	74	-18.57	peak
4924	47.26	-3.43	43.83	54	-10.17	AVG
7386	61.64	-0.75	60.89	74	-13.11	peak
7386	51.34	-0.75	50.59	54	-3.41	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

Remark :

(1) Measuring frequencies from 1 GHz to the 25 GHz •

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Data of measurement within this frequency range shown "----" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.

CH Low of 802.11n/H40 Mode (2422MHz)

Horizontal:

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Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4844	58.57	-3.63	54.94	74	-19.06	peak
4844	47.21	-3.63	43.58	54	-10.42	AVG
7266	61.22	-0.94	60.28	74	-13.72	peak
7266	50.98	-0.94	50.04	54	-3.96	AVG
Remark: Fact	or = Antenna	Factor + Cabl	e Loss – Pre-ampli	fier. Margin =	Absolute Le	evel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4844	58.44	-3.63	54.81	74	-19.19	peak
4844	46.94	-3.63	43.31	54	-10.69	AVG
7266	61.34	-0.94	60.4	74	-13.6	peak
7266	51.03	-0.94	50.09	54	-3.91	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

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CH Middle of 802.11n/H40 Mode (2437MHz)

Horizontal:		1.00	
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Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	57.91	-3.51	54.4	74	-19.6	peak
4874	47.39	-3.51	43.88	54	-10.12	AVG
7311	60.72	-0.82	59.9	74	-14.1	peak
7311	51.20	-0.82	50.38	54	-3.62	AVG
Remark: Fact	tor = Antenna	Factor + Cabl	e Loss – Pre-ampli	fier. Margin =	Absolute Le	vel – Limit

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4874	58.23	-3.51	54.72	74	-19.28	peak
4874	47.51	-3.51	44	54	-10	AVG
7311	61.29	-0.82	60.47	74	-13.53	peak
7311	50.98	-0.82	50.16	54	-3.84	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

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CH High of 802.11n/H40 Mode (2452MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4904	58.65	-3.43	55.22	74	-18.78	peak
4904	47.83	-3.43	44.4	54	-9.60	AVG
7356	62.29	-0.75	61.54	74	-12.46	peak
7356	50.97	-0.75	50.22	54	-3.78	AVG
Remark: Fact	or = Antenna	Factor + Cabl	e Loss – Pre-ampli	fier. Margin =	Absolute Le	evel – Limit

Vertical:

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Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
4904	58.47	-3.43	55.04	74	-18.96	peak
4904	47.52	-3.43	44.09	54	-9.91	AVG
7356	61.52	-0.75	60.77	74	-13.23	peak
7356	50.87	-0.75	50.12	54	-3.88	AVG
Pomark: Fact	or – Antonna	Eactor I Cabl	o Loss - Bro ampli	fior Morgin -		vol Limit

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Margin = Absolute Level – Limit

Remark :

(1) Measuring frequencies from 1 GHz to the 25 GHz •

(2) "F" denotes fundamental frequency; "H" denotes spurious frequency. "E" denotes band edge frequency.

(3) * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

(4) Data of measurement within this frequency range shown "----" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(5) The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120KHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10KHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.

(6) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed. For example: Top Channel at Fundamental 73.16dBuV/m(PK Value) <93.98(AV Limit), at harmonic 53.20 dBuV/m(PK Value) <54 dBuV/m(AV Limit), the Average Detected not need to completed.



5 BAND EDGE

5.1 Limits

FCC PART 15.247 Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

5.2 Test Procedure

The band edge compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW to 100KHz and VBM to 300KHz to measure the peak field strength and set RBW to 1MHz and VBW to 10Hz to measure the average radiated field strength. The conducted RF band edge was measured by using a spectrum analyzer. Set span wide enough to capture the highest in-band emission and the emission at the band edge. Set RBW to 100 KHz and VBW to 300 KHz, to measure the conducted peak band edge.

5.3 Test Result

PASS

Operation Mode: 802.11b Mode TX CH Low (2412MHz)

Horizontal:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	56.32	-5.81	50.51	74	-23.49	peak
2310		-5.81	5	54	1	AVG
2390	62.37	-5.84	56.53	74	-17.47	peak
2390	51.03	-5.84	45.19	54	-8.81	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:

Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.25	-5.81	51.44	74	-22.56	peak
2310	15	-5.81	1	54	1	AVG
2390	61.38	-5.84	55.54	74	-18.46	peak
2390	52.42	-5.84	46.58	54	-7.42	AVG

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Operation Mode: 802.11b Mode TX CH High (2462MHz)

Reading Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
56.53	-5.65	50.88	74	-23.12	peak
1	-5.65	/	54	/	AVG
57.42	-5.72	51.7	74	-22.3	peak
4	-5.72		54	/	AVG
	(dBµV) 56.53 /	(dBµV) (dB) 56.53 -5.65 / -5.65 57.42 -5.72	(dBµV) (dB) (dBµV/m) 56.53 -5.65 50.88 / -5.65 / 57.42 -5.72 51.7	(dBμV) (dB) (dBμV/m) (dBμV/m) 56.53 -5.65 50.88 74 / -5.65 / 54 57.42 -5.72 51.7 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 56.53 -5.65 50.88 74 -23.12 / -5.65 / 54 / 57.42 -5.72 51.7 74 -22.3

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:				1	5	
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	∖ (dBµV/m)	(dB)	Туре
2483.5	57.03	-5.65	51.38	74	-22.62	peak
2483.5	V ,	-5.65	/	54	/	AVG
2500	56.82	-5.72	51.1	74	-22.9	peak
2500		-5.72		54	/	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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Operation Mode: 802.11g Mode TX CH Low (2412MHz)

Horizontal:						5
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	56.56	-5.81	50.75	74	-23.25	peak
2310	1	-5.81	/	54	/	AVG
2390	63.21	-5.84	57.37	74	-16.63	peak
2390	51.85	-5.84	46.01	54	-7.99	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:			U.		5	
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	56.77	-5.81	50.96	74	-23.04	peak
2310		-5.81	1	54	/	AVG
2390	63.49	-5.84	57.65	74	-16.35	peak
2390	52.17	-5.84	46.33	54	-7.67	AVG
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Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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Operation Mode: 802.11g Mode TX CH High (2462MHz)

Horizontal:	1				•	
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2483.5	56.33	-5.65	50.68	74	-23.32	peak
2483.5	1	-5.65	/	54	/	AVG
2500	56.42	-5.72	50.7	74	-23.3	peak
2500	Y	-5.72		54	/	AVG
8.					•	

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

			1	5	
Reading Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
56.45	-5.65	50.8	74	-23.2	peak
V ,	-5.65	/	54	/	AVG
56.61	-5.72	50.89	74	-23.11	peak
	-5.72		54	/	AVG
	(dBµV) 56.45 /	(dBµV) (dB) 56.45 -5.65 / -5.65 56.61 -5.72	(dBµV) (dB) (dBµV/m) 56.45 -5.65 50.8 / -5.65 / 56.61 -5.72 50.89	(dBµV) (dB) (dBµV/m) (dBµV/m) 56.45 -5.65 50.8 74 / -5.65 / 54 56.61 -5.72 50.89 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 56.45 -5.65 50.8 74 -23.2 / -5.65 / 54 / 56.61 -5.72 50.89 74 -23.11

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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Operation Mode: 802.11n/H20 Mode TX CH Low (2412MHz)

Horizontal:

TIONZOMai.						
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.42	-5.81	51.61	74	-22.39	peak
2310	/	-5.81	/	54	/	AVG
2390	62.81	-5.84	56.97	74	-17.03	peak
2390	52.34	-5.84	46.5	54	-7.5	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:			U		5	
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.13	-5.81	51.32	74	-22.68	peak
2310		-5.81	/	54	/	AVG
2390	62.47	-5.84	56.63	74	-17.37	peak
2390	52.71	-5.84	46.87	54	-7.13	AVG
Domark: East	tor - Antonno Footo		Dro omplifior	S		. +

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Operation Mode: 802.11n/H20 Mode TX CH High (2462MHz)

Horizontal:

rionzontai.						
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2483.5	57.84	-5.65	52.19	74	-21.81	peak
2483.5	1	-5.65	/	54	/	AVG
2500	57.03	-5.72	51.31	74	-22.69	peak
2500	1	-5.72		54	/	AVG
		.			•	5

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Reading Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
57.75	-5.65	52.1	74	-21.9	peak
	-5.65	/	54	/	AVG
56.89	-5.72	51.17	74	-22.83	peak
	-5.72		54	1	AVG
	(dBµV) 57.75 /	(dBµV) (dB) 57.75 -5.65 / -5.65 56.89 -5.72	(dBµV) (dB) (dBµV/m) 57.75 -5.65 52.1 / -5.65 / 56.89 -5.72 51.17	(dBµV) (dB) (dBµV/m) (dBµV/m) 57.75 -5.65 52.1 74 / -5.65 / 54 56.89 -5.72 51.17 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 57.75 -5.65 52.1 74 -21.9 / -5.65 / 54 / 56.89 -5.72 51.17 74 -22.83

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Operation Mode: 802.11n/H40 Mode TX CH Low (2422MHz)

Horizontal:

rionzontal.						
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.29	-5.81	51.48	74	-22.52	peak
2310	/	-5.81	/	54	/	AVG
2390	62.73	-5.84	56.89	74	-17.11	peak
2390	50.12	-5.84	44.28	54	-9.72	AVG

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Vertical:			V		5	
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2310	57.21	-5.81	51.4	74	-22.6	peak
2310		-5.81	/	54	/	AVG
2390	63.08	-5.84	57.24	74	-16.76	peak
2390	52.87	-5.84	47.03	54	-6.97	AVG
Pomork: Foo	tor - Antonno Eact		Pro amplifior	U U		. 1

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Operation Mode: 802.11n/H40 Mode TX CH High (2452MHz)

Horizontal:

Tionzontal.						
Frequency	Reading Result	Factor	Emission Level	Limits	Margin	Detector
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре
2483.5	56.78	-5.65	51.13	74	-22.87	peak
2483.5	1	-5.65	/	54	/	AVG
2500	56.91	-5.72	51.19	74	-22.81	peak
2500	4	-5.72		54	/	AVG
		.			•	0

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

			1	5	
Reading Result	Factor	Emission Level	Limits	Margin	Detector
(dBµV)	(dB)	(dBµV/m)	∖ (dBµV/m)	(dB)	Туре
56.82	-5.65	51.17	74	-22.83	peak
V ,	-5.65	/	54	/	AVG
56.99	-5.72	51.27	74	-22.73	peak
1	-5.72		54	/	AVG
	(dBµV) 56.82 /	(dBµV) (dB) 56.82 -5.65 / -5.65 56.99 -5.72	(dBµV) (dB) (dBµV/m) 56.82 -5.65 51.17 / -5.65 / 56.99 -5.72 51.27	(dBµV) (dB) (dBµV/m) (dBµV/m) 56.82 -5.65 51.17 74 / -5.65 / 54 56.99 -5.72 51.27 74	(dBµV) (dB) (dBµV/m) (dBµV/m) (dB) 56.82 -5.65 51.17 74 -22.83 / -5.65 / 54 / 56.99 -5.72 51.27 74 -22.73

Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.

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6 OCCUPIED BANDWIDTH MEASUREMENT

6.1 Test Limit

FCC Part15(15.247), Subpart C							
Section	Test Item	Limit	Frequency Range (MHz)	Result			
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS			

6.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.

2. Set EUT as normal operation.

3. Based on FCC Part15 C Section 15.247: RBW=100KHz, VBW=300KHz.

4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.

6.3 Measurement Equipment Used

Same as Radiated Emission Measurement

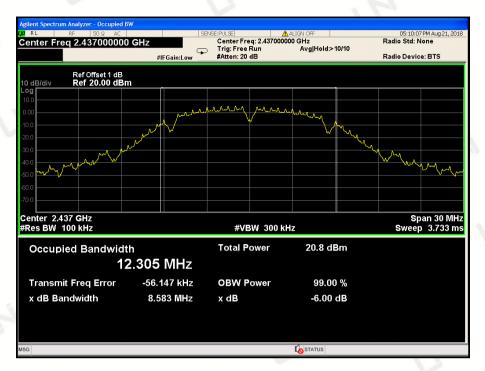
6.4 Test Result

PASS

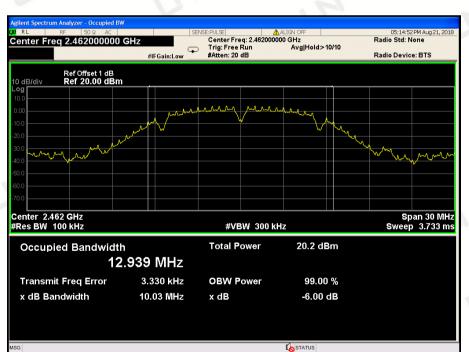
2	TX 802.11b Mode				
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result		
2412 MHz	9.571	>=500KHz	PASS		
2437 MHz	8.583	>=500KHz	PASS		
2462 MHz	10.03	>=500KHz	PASS		



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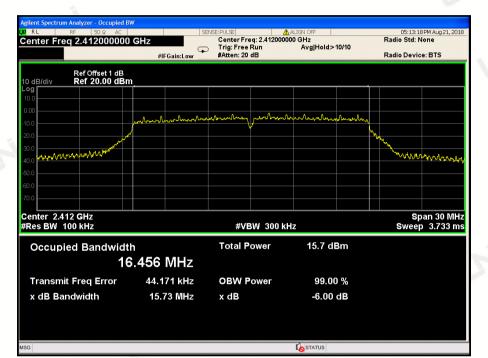


CH: 2462MHz



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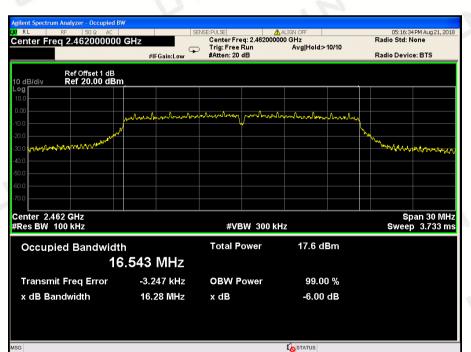
U.	TX 802.11	g Mode	
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2412 MHz	15.73	>=500KHz	PASS
2437 MHz	15.08	>=500KHz	PASS
2462 MHz	16.28	>=500KHz	PASS
			•



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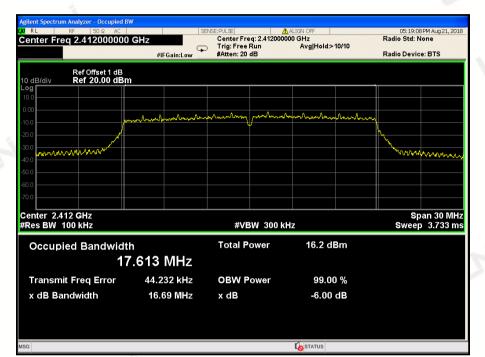
Agilent Spectrum Analyzer - Occupied B	3W			
LXU RL RF 50Ω AC			ALIGN OFF	05:16:02 PM Aug 21, 2018
Center Freq 2.43700000		Center Freq: 2.437000		Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 20 dB	Avg Hold:>10/10	Radio Device: BTS
	HI Galil.28W			
Ref Offset 1 dB 10 dB/div Ref 20.00 dBr	n			
Log				
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-10.0	A Martine P	¥	the way ward	h
-20.0	/			
-30.0				Manufactor & Bard Day 14
-30.0				man man man man
-50.0				
-60.0				
-70.0				
Center 2.437 GHz				Span 30 MHz
#Res BW 100 kHz		#VBW 300 k	Hz	Sweep 3.733 ms
Occupied Bandwidt	th	Total Power	18.1 dBm	
10	6.254 MHz			
Transmit Freq Error	-26.938 kHz	OBW Power	99.00 %	
x dB Bandwidth	15.08 MHz	x dB	-6.00 dB	
			1	
MSG			STATUS	

CH: 2462MHz



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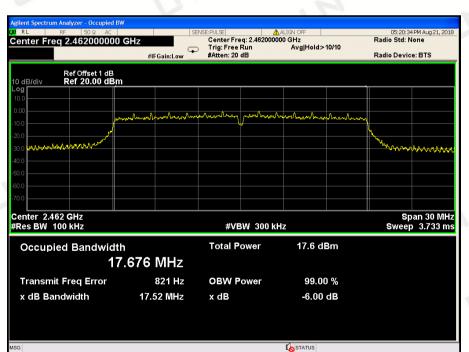
2	TX 802.11n/HT20 Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result	
2412 MHz	16.69	>=500KHz	PASS	
2437 MHz	15.09	>=500KHz	PASS	
2462 MHz	17.52	>=500KHz	PASS	
		5. C		



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Agilent Spectrum Analyzer - Occupied	BW			
04 RL RF 50 Q AC Center Freq 2.43700000	9	Center Freq: 2.437000	ALIGN OFF 000 GHz Avg Hold:>10/10	05:19:50 PM Aug 21, 2018 Radio Std: None Radio Device: BTS
Ref Offset 1 dB 10 dB/div Ref 20.00 dB	m			
Log 10.0				
-10.0	monterman	nertraumheren providencen	how have have have have have a second	m
-20.0 -30.0 -40.0				Martinetrophime
-50.0				
-60.0				
Center 2.437 GHz #Res BW 100 kHz		#VBW 300 k	Hz	Span 30 MHz Sweep 3.733 ms
Occupied Bandwid		Total Power	18.1 dBm	
1	7.399 MHz			
Transmit Freq Error	-34.969 kHz	OBW Power	99.00 %	
x dB Bandwidth	15.09 MHz	x dB	-6.00 dB	
MSG			STATUS	

CH: 2462MHz

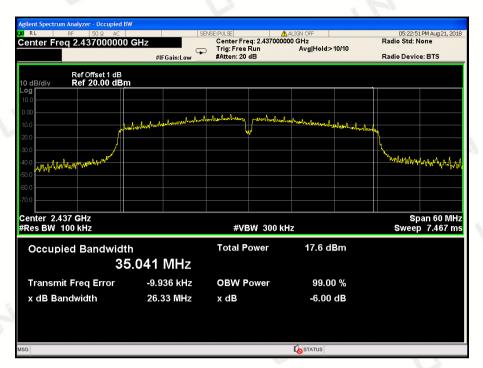


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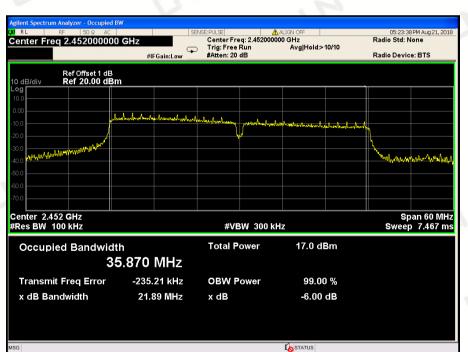
TX 802.11n/HT40 Mode			
Frequency	6dB Bandwidth (MHz)	Channel Separation (MHz)	Result
2422 MHz	21.34	>=500KHz	PASS
2437 MHz	26.33	>=500KHz	PASS
2452 MHz	21.89	>=500KHz	PASS
		6	



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CH: 2452MHz



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7 POWER SPECTRAL DENSITY TEST

7.1 Test Limit

	FCC	Part15(15.247), S	ubpart C	L-
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

7.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.

2. Set EUT as normal operation.

- 3. Based on FCC Part15 C Section 15.247: RBW=3KHz, VBW=10KHz.
- 4. The useful radiated emission from the EUT was detected by the spectrum analyzer with peak detector.
- 7.3 Measurement Equipment Used

Same as Radiated Emission Measurement

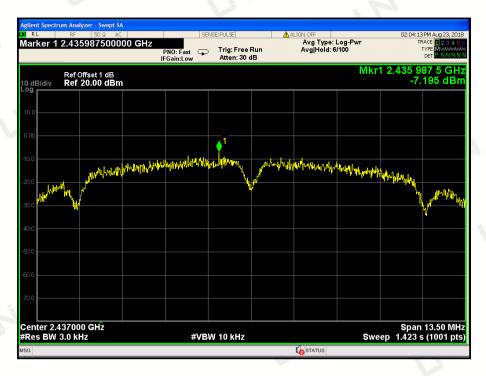
7.4 Test Result

PASS

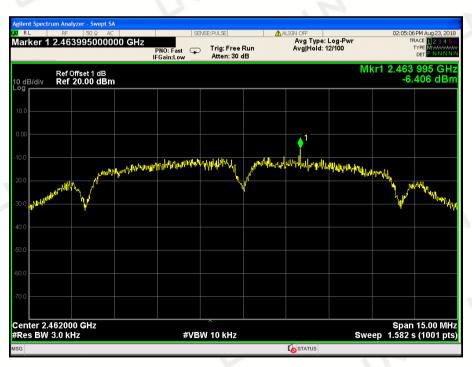
5	TX 802.11b Mode				
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result		
2412 MHz	-8.894	8	PASS		
2437 MHz	-7.195	8	PASS		
2462 MHz	-6.406	8	PASS		
		1			



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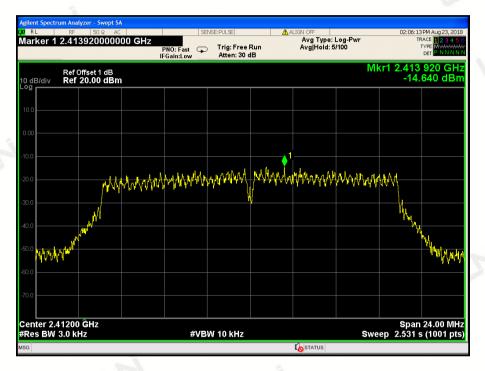


CH: 2462MHz



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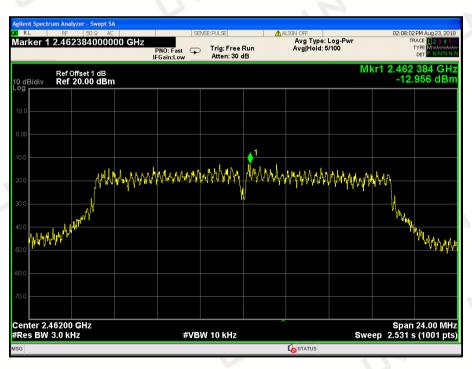
TX 802.11g Mode				
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result	
2412 MHz	-14.640	8	PASS	
2437 MHz	-11.048	8	PASS	
2462 MHz	-12.956	8	PASS	
		5		



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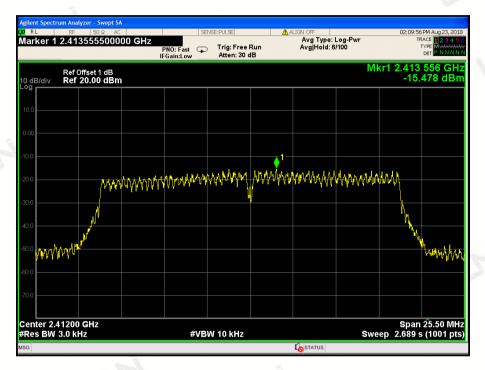


CH: 2462MHz

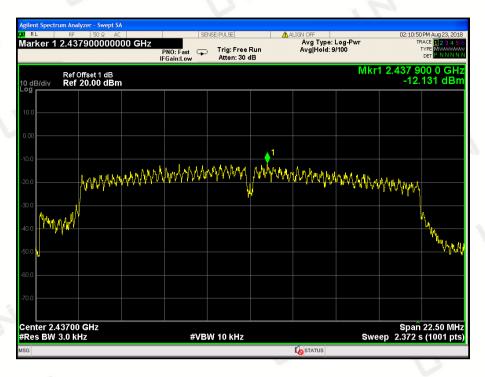


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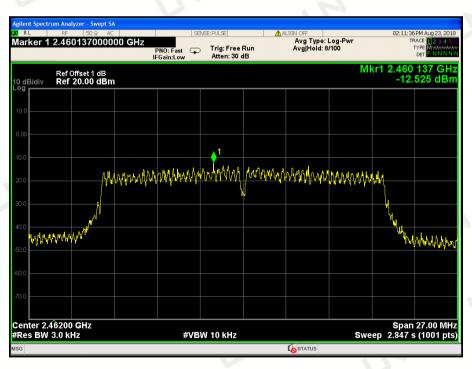
TX 802.11n/HT20 Mode				
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result	
2412 MHz	-15.478	8	PASS	
2437 MHz	-12.131	8	PASS	
2462 MHz	-12.525	8	PASS	
		1 A A		



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CH: 2462MHz



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TX 802.11n/HT40 Mode				
Frequency	Power Density (dBm/3KHz)	Limit (dBm/3KHz)	Result	
2422 MHz	-14.868	8	PASS	
2437 MHz	-14.435	8	PASS	
2452 MHz	-15.452	8	PASS	
		1 A A		

Agilent Spectrum Analyzer - Swept SA			
LX/RL RF 50Ω AC	SENSE:PULSE	ALIGN OFF	02:15:15 PM Aug 23, 2018
Marker 1 2.428560000000 GHz	PNO: Fast 🖵 Trig: Free Ru IFGain:Low Atten: 30 dB	Avg Type: Log-Pwr n Avg Hold: 5/100	TRACE 123456 TYPE MWWWWW DET PNNNNN
Ref Offset 1 dB 10 dB/div Ref 20.00 dBm Log		Μ	kr1 2.428 560 GHz -14.868 dBm
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Center 2.42200 GHz #Res BW 3.0 kHz	#VBW 10 kHz		Span 32.00 MHz eep 3.374 s (1001 pts)
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ilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC			
arker 1 2.435479000000 GHz	PNO: Fast IFGain:Low Trig: Free Atten: 30 of		02:14:10 PM Aug 23, 2016 TRACE 1 2 3 4 5 TYPE MWWWWW DET P N N N N
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enter 2.43700 GHz Res BW 3.0 kHz	#VBW 10 kHz	<u> </u>	Span 39.00 MH Sweep 4.112 s (1001 pt
G		STATUS	

CH: 2452MHz

RL	r <mark>um Analyzer - Swept S</mark> RF 50 Ω AG			SENSE:PULSE		🔥 ALIGN			02:16:	:44 PM Aug 23, 201
arker 1	2.4388330000		PNO: Fast IFGain:Low		ree Run 30 dB		vg Type: vg Hold: 4	/100		TRACE 12345 TYPE MWWWW DET PNNNN
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8 PEAK OUTPUT POWER TEST

8.1 Test Limit

	FCC	Part15(15.247), Se	ubpart C	À
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

8.2 Test Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.

- 2. The EUT was directly connected to the Power meter.
- 8.3 Measurement Equipment Used

Same as Radiated Emission Measurement

8.4 Test Result

PASS

All the test modes completed for test.

		TX 802.11b Mode	in,
Test	Frequency	Maximum Peak Conducted Output Power	LIMIT
Channel	(MHz)	(dBm)	(dBm)
CH01	2412	14.97	30
CH06	2437	15.55	30
CH11	2462	15.03	30
	S	TX 802.11g Mode	
CH01	2412	16.18	30
CH06	2437	17.32	30
CH11	2462	16.73	30
in .		TX 802.11n20 Mode	L.
CH01	2412	16.38	30
CH06	2437	17.72	30
CH11	2462	16.84	30
		TX 802.11n40 Mode	, M
CH03	2422	17.44	30
CH06	2437	18.29	30
CH09	2452	17.97	30

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9 OUT OF BAND EMISSIONS TEST

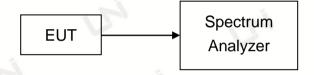
9.1 Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

9.2 Test Procedure

- 1. The EUT was placed on a turn table which is 0.8m above ground plane.
- 2. Set EUT as TX operation and connect directly to the spectrum analyzer.
- 3. Based on FCC Part15 C Section 15.247: RBW=100KHz, VBW=300KHz.
- 4. Set detected by the spectrum analyzer with peak detector.

9.3 Test Setup



9.4 Test Result

PASS

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TX 802.11b Mode CH: 2412MHz

LXI R	L		RF	l <mark>lyzer - Swep</mark> 50 Ω	AC			SENSE:PUL	.SE		<u>∧</u> A	LIGN OFF	. .		3 PM Aug 21, 2018
Mar	ker	32	.39	796000	0000	F	PNO: Fast Gain:Low		g:Free :en:30 d			Avg Typ Avg Hold	e: Log-Pwr ≫100/100	I	RACE 123456 TYPE MMMMMMM DET PNNNNN
10 d	B/div	,	Ref Ref	Offset 1 di 20.00 di	3 3m								Ν	/lkr3 2.39 -32.	7 96 GHz 885 dBm
Log 10.0															
0.00 -10.0													,	New Constraints	-14.75 dBm
-20.0 -30.0															Munda.
-40.0 -50.0												. J.m	N N		www.
-60.0 -70.0		erer er	Jupne	no public the second	marsh		nl	hagen lafter hater	-humber	**	nuaturant.	waren of			
Star								(7) (1) (2)						Stop 2	43000 GHz
#Re	S B			KHZ	X		#\	/BW 30		CTION	_ FUNC	UQUISIANTI		D 11.53 ms	s (1001 pts)
1 2 3	N N N	1 1 1	f f f		2.412 2.400	2 96 GHz) 00 GHz 7 96 GHz	5.2 -39.0	51 dBm 47 dBm 85 dBm	FUN	CHON	FUNCI	TION WIDTH	ł	UNCTION VALUE	
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CH: 2462MHz



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TX 802.11g Mode CH: 2412MHz

	RF	50 Ω A	AC	SE	NSE:PULSE		🔥 ALIG	N OFF		06:36:	41 PM Aug 21, 2
arker 3	2.399	9400000		PNO: Fast 🖵 FGain:Low	Trig: Fre Atten: 3	e Run 0 dB		Avg Type: Avg Hold:>			TRACE 1234 TYPE MWAAW DET PNNN
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art 2.31 les BW				#VB	W 300 kH	Iz			Swe	ep 11.53 m	2.43000 G Is (1001 p
R MODE T			×	Y		UNCTION	FUNCTION	WIDTH		FUNCTION VALUE	
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N 1			2.399 40 GHz	-31.824							
											1

CH: 2462MHz



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TX 802.11n/HT20 Mode CH: 2412MHz

2 300520								
-	0000000 GHz	PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Type Avg Hold:	:: Log-Pwr >100/100	TRACE 1234 TYPE MWWW DET PNNN		
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						-20.36		
					Adar Marine And	nor and		
n lapon or such	and the state of the	n		mananan personal and the				
						Stop 2.43000 G		
100 GH2		#VB	N 300 kHz		Sweep	11.53 ms (1001 p		
SCL	×	Y	FUNCTION	FUNCTION WIDTH	FUNC	FUNCTION VALUE		
			dBm					
f	2.399 52 GH	z -31.976						
	Ref 20.0	Ref Offset 1 dB Ref 20.00 dBm	IFGain:Low Ref Offset 1 dB Ref 20.00 dBm Image: colspan="2">Image: colspan="2">Image: colspan="2">Image: colspan="2">Image: colspan="2" Image: colspan="2">Image: colspan="2" Image: colspan="2">Image: colspan="2" Image: colspan="2	IFGainLow Atten: 30 dB Ref Offset 1 dB Image: Comparison of the second	IFGaint.ow Atten: 30 dB Ref Offset 1 dB Ref 20.00 dBm Image: Comparison of the second secon	IF GainLow Atten: 30 dB Ref Offset 1 dB Mk Ref 20.00 dBm Image: Comparison of the second seco		

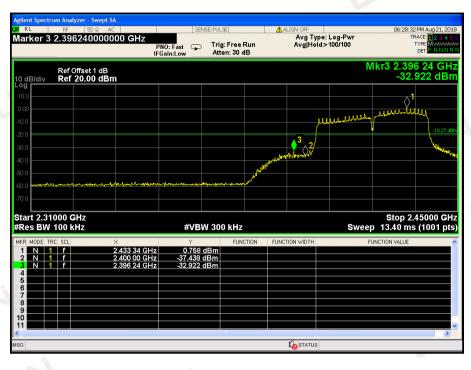
CH: 2462MHz



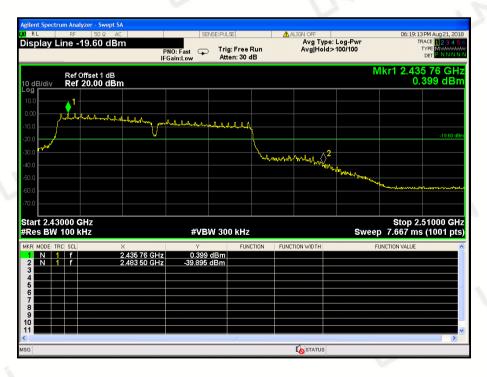
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TX 802.11n/HT40 Mode CH: 2422MHz



CH: 2452MHz



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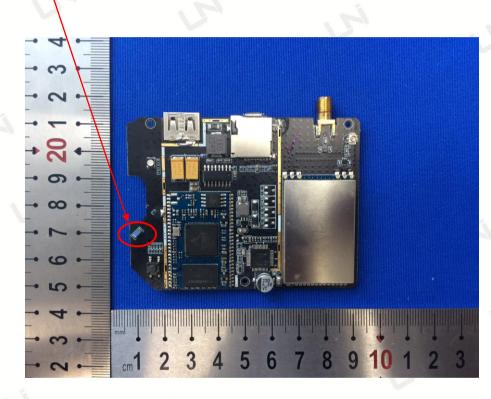
Standard Applicable:

For intentional device, according to FCC 47 CFR Section 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.

Antenna Connected Construction

The antenna used in this product is an Internal Antenna, the directional gains of antenna used for transmitting is 0.5dBi.

WIFI ANTENNA



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Report No.: UNIA2018081011-2FR-01

11 PHOTOGRAPH OF TEST

11.1 Radiated Emission





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End of Report

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