FCC Part 15E Test Report

FCC ID: Y2P-WR1200

Product Name:	WR1200
Trademark:	nEX
Model Name :	WR1200 Nex, nEX1200
Prepared For : Address :	Phonex Broadband Corporation dba ReadyNet 6952 High Tech Drive, Suite B, Midvale, Utah 84047, United States
Prepared By : Address :	Shenzhen BCTC Testing Co., Ltd. BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Test Date:	Sep. 25, 2019 – Nov. 14, 2019
Date of Report :	Nov. 14, 2019
Report No.:	BCTC-LH190901261-2E

TEST RESULT CERTIFICATION

Applicant's name	:	Phonex Broadband Corporation dba ReadyNet
Address	:	6952 High Tech Drive, Suite B, Midvale, Utah 84047, United States
Manufacture's Name	:	SHENZHEN MTN ELECTRONICS CO.,LTD
Address	:	MTN Industrial Park,No.9 South Futai Road, Pingxi Community, Pingdi Street, Longgang District, Shenzhen City, 518117, China
Product description		
Product name	:	WR1200
Trademark	:	nEX
Model and/or type reference	:	WR1200 nEX, nEX1200
Standards	:	FCC Part15 15.407 ANSI C63.10-2013 KDB 662911 D01 v02r01 KDB 789033 D02 v02r01

This device described above has been tested by BCTC, 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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Prepared by(Engineer):	Willem Wang	Willem Wang
Reviewer(Supervisor):	Eric Yang	
Approved(Manager):	Zero Zhou	

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Revision History

Report No.	Version	Description	Issued Date
BCTC-LH190901261-2E	Rev.01	Initial issue of report	Nov. 14, 2019

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(6)	Spurious Radiated Emissions	PASS	
15.207	Conducted Emission	PASS	
15.407 (a)(1) 15.407 (a)(3) 15.1049	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	Minimum 6 dB bandwidth	PASS	
15.407 (a)(1) 15.407 (a)(3)	Maximum Conducted Output Power	PASS	
2.1051, 15.407(b)(1) 15.407(b)(4)	Band Edge	PASS	
15.407 (a)(1) 15.407 (a)(3)	Power Spectral Density	PASS	
2.1051, 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

1.1 TEST FACILITY

Shenzhen BCTC Testing Co., Ltd.
Add. : BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
FCC Test Firm Registration Number: 712850
IC Registered No.: 23583

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U** , where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2** , providing a level of confidence of approximately **95** %。

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
3	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
4	Conducted Adjacent channel power	U=1.38dB
5	Conducted output power uncertainty Above 1G	U=1.576dB
6	Conducted output power uncertainty below 1G	U=1.28dB
7	humidity uncertainty	U=5.3%
8	Temperature uncertainty	U=0.59 ℃

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	WR1200	
Trade Name	nEX	
Model Name	WR1200 nEX, nEX1200	
Model Difference	N/A	
Product Description	IEEE 802.11 WLAN Mode Supported	☒802.11a/n/ac(20MHz channel bandwidth) ☒802.11n/ac(40MHz channel bandwidth) ☒802.11ac(80MHz channel bandwidth)
	Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80):NSS1, MCS0-MCS9
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
	Operating Frequency Range	☒5180-5240MHz for 802.11a/n(HT20)/ac20; 5190-5230MHz for 802.11n(HT40)/ac40; 5210MHz for 802.11 ac80; ☒5745-5825 MHz for 802.11a/n(HT20)/ac20; 5755-5795 MHz for 802.11a/n(HT40)/ac40; 5775MHz for 802.11 ac80;
	Number of Channels	☒4 channels for 802.11a/n20/ac20 in the 5180-5240MHz band ; 2 channels for 802.11 n40/ac40 in the 5190-5230MHz band ; 1 channels for 802.11 ac80 in the 5210MHz band ; ☒5 channels for 802.11a/n20/ac20 in the 5745-5825MHz band ; 2 channels for 802.11 n40/ac40 in the 5755-5795MHz band ; 1 channels for 802.11 ac80 in the 5775MHz band ;
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Type of device	Indoor AP	
Power Supply	Model: RD1202000-C55-80GB Input: 100-240V~50/60Hz 1.0A MAX. Output: 12V 2.0A	
hardware version	H1.0	
Software version	S1.0	
Connecting I/O Port(s)	Please refer to the User's Manual	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Frequency and Channel list for 802.11a/n/ac(20MHz) band I (5180-5240MHz):

802.11a/n/ac(20MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-

802.11n /ac(40MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

802.11ac (80MHz) Carrier Frequency Channel	
Channel	Frequency (MHz)
42	5210

Tx Antenna

Ant.	Brand	Model Name	Antenna Type	Gain (dBi)	NOTE
A	N/A	N/A	External antenna	5	
B	N/A	N/A	External antenna	5	

2.2 DESCRIPTION OF TEST MODES

Pretest Mode	Description
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42
Mode 4	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 5	Link Mode

Conducted Emission	
Final Test Mode	Description
Mode 5	Link Mode

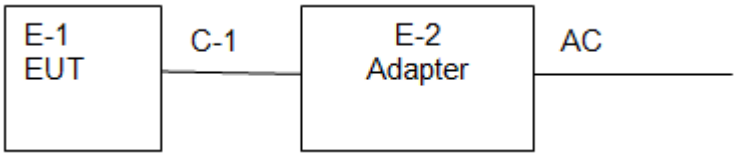
For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a / n/ ac 20 CH36/ CH40/ CH 48
Mode 2	802.11n/ ac40 CH38/ CH 46
Mode 3	802.11 ac80 CH 42
Mode 4	802.11a / n/ ac 20 CH36/ CH40/ CH 48

Note:

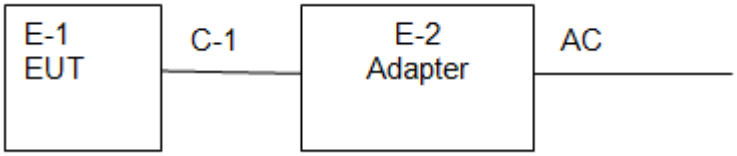
(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Conducted Emission Test



Radiated Spurious Emission



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Wireless Router	HNK	R6800U	N/A	EUT
E-2	Adapter	N/A	RD1202000-C55-80GB	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.5M	DC cableunshielded

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45109572	Jun. 13, 2019	Jun. 12, 2020
2	Test Receiver (9kHz-7GHz)	R&S	ESR7	101154	Jun. 13, 2019	Jun. 12, 2020
3	Bilog Antenna (30MHz-3GHz)	SCHWARZBECK	VULB9163	VULB9163-942	Jun. 22, 2019	Jun. 21, 2020
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1541	Jun. 22, 2019	Jun. 21, 2020
5	Horn Antenna (18GHz-40GHz)	SCHWARZBECK	BBHA9170	822	Jun. 22, 2019	Jun. 21, 2020
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	Jun. 25, 2019	Jun. 24, 2020
7	Amplifier (0.5GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	Jun. 25, 2019	Jun. 24, 2020
8	Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	Jun. 17, 2019	Jun. 16, 2020
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	014	Jul. 02, 2019	Jul. 01, 2020
10	RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	Jun. 25, 2019	Jun. 24, 2020
11	RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	Jun. 25, 2019	Jun. 24, 2020
12	RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	Jun. 25, 2019	Jun. 24, 2020
13	Power Metter	Keysight	E4419B	\	Jun. 17, 2019	Jun. 16, 2020
14	Power Sensor (AV)	Keysight	E9 300A	\	Jun. 17, 2019	Jun. 16, 2020
15	Signal Analyzer 20kHz-26.5GHz	KEYSIGHT	N9020A	MY49100060	Jun. 13, 2019	Jun. 12, 2020
16	Spectrum Analyzer 9kHz-40GHz	Aglient	FSP40	100363	Jun. 13, 2019	Jun. 12, 2020
17	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
18	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESR3	102075	Jun. 13, 2019	Jun. 12, 2020
2	LISN	SCHWARZBECK	NSLK8127	8127739	Jun. 13, 2019	Jun. 12, 2020
3	LISN	R&S	ENV216	101375	Jun. 13, 2019	Jun. 12, 2020
4	RF cables	Huber+Suhnar	9kHz-30MHz	B1702988-0008	Jun. 25, 2019	Jun. 24, 2020
5	Software	Frad	EZ-EMC	EMC-CON 3A1	\	\

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC/ RSS-247
0.50 -5.0	56.00	46.00	FCC/ RSS-247
5.0 -30.0	60.00	50.00	FCC/ RSS-247

Note:

(1) The tighter limit applies at the band edges.

(2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

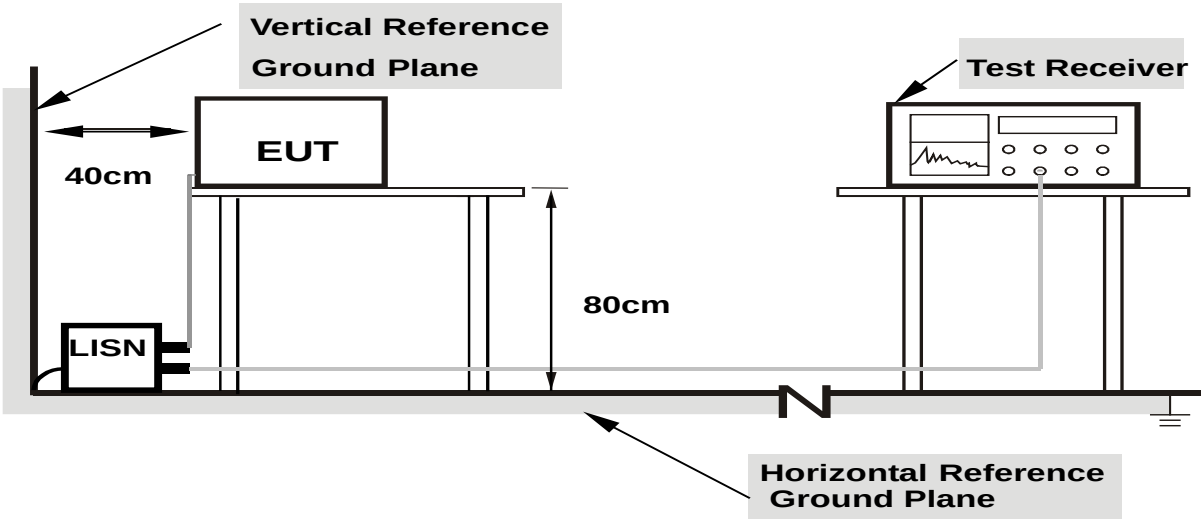
3.1.2 TEST PROCEDURE

a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



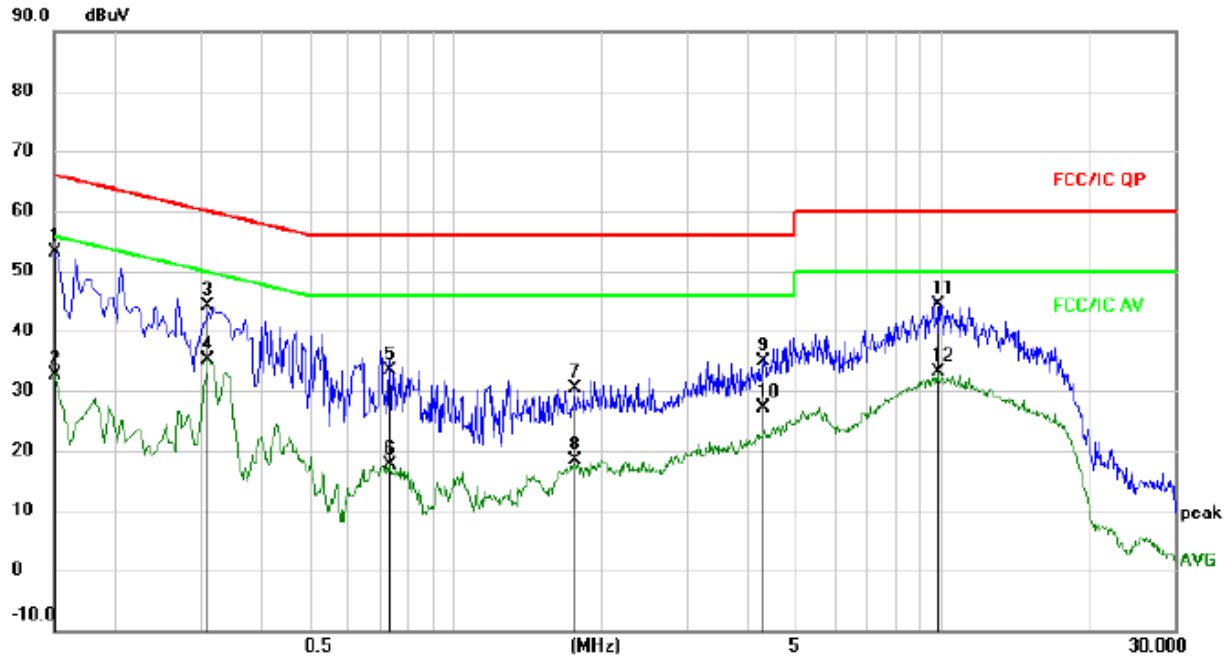
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

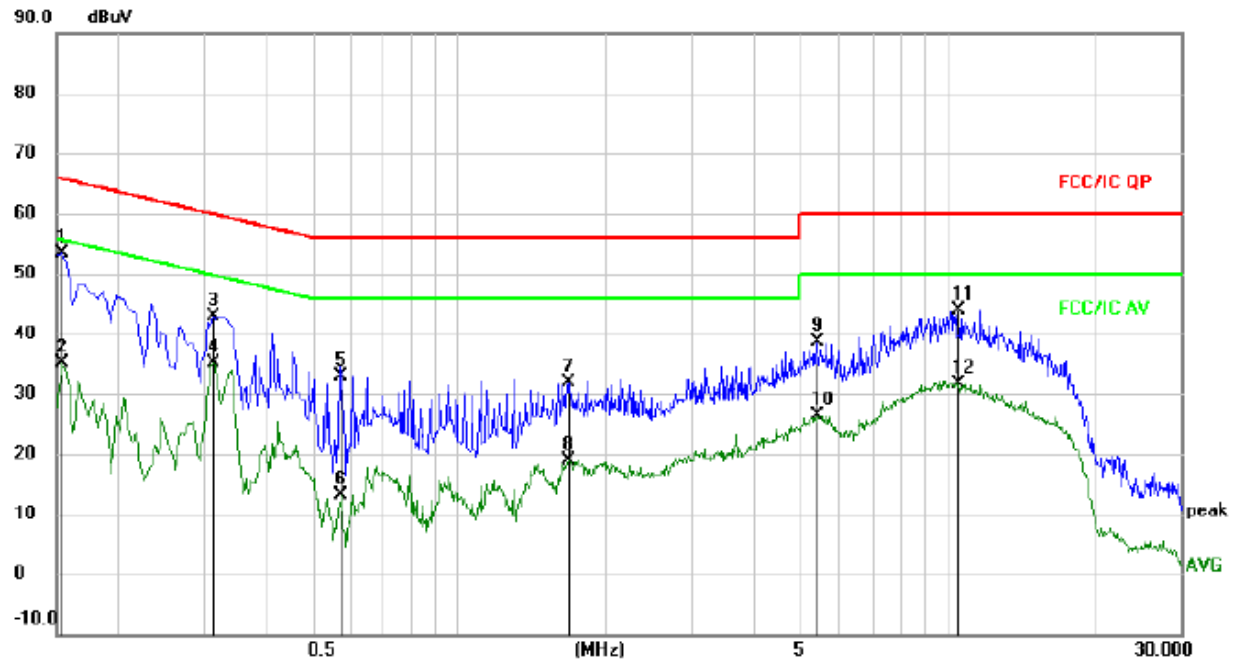
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	L
Test Voltage ：	AC120V 60Hz	Test Mode：	Mode 5



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV		dBuV	dBuV	dB	Detector	Comment
1	*	0.1500	43.57	9.52	53.09	66.00	-12.91	QP	
2		0.1500	23.22	9.52	32.74	56.00	-23.26	AVG	
3		0.3100	34.60	9.57	44.17	59.97	-15.80	QP	
4		0.3100	25.68	9.57	35.25	49.97	-14.72	AVG	
5		0.7340	23.79	9.64	33.43	56.00	-22.57	QP	
6		0.7340	7.93	9.64	17.57	46.00	-28.43	AVG	
7		1.7580	20.68	9.59	30.27	56.00	-25.73	QP	
8		1.7580	8.67	9.59	18.26	46.00	-27.74	AVG	
9		4.2900	25.23	9.75	34.98	56.00	-21.02	QP	
10		4.2900	17.27	9.75	27.02	46.00	-18.98	AVG	
11		9.7660	34.80	9.69	44.49	60.00	-15.51	QP	
12		9.7660	23.34	9.69	33.03	50.00	-16.97	AVG	

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	N
Test Voltage ：	AC120V 60Hz	Test Mode：	Mode 5



Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV		dBuV	dBuV	dB	Detector	Comment
1	*	0.1539	43.81	9.52	53.33	65.79	-12.46	QP	
2		0.1539	25.72	9.52	35.24	55.79	-20.55	AVG	
3		0.3140	33.39	9.57	42.96	59.86	-16.90	QP	
4		0.3140	25.59	9.57	35.16	49.86	-14.70	AVG	
5		0.5740	22.95	9.89	32.84	56.00	-23.16	QP	
6		0.5740	3.19	9.89	13.08	46.00	-32.92	AVG	
7		1.6740	22.22	9.58	31.80	56.00	-24.20	QP	
8		1.6740	9.30	9.58	18.88	46.00	-27.12	AVG	
9		5.4100	28.78	9.78	38.56	60.00	-21.44	QP	
10		5.4100	16.63	9.78	26.41	50.00	-23.59	AVG	
11		10.5180	34.14	9.69	43.83	60.00	-16.17	QP	
12		10.5180	21.93	9.69	31.62	50.00	-18.38	AVG	

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

3.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

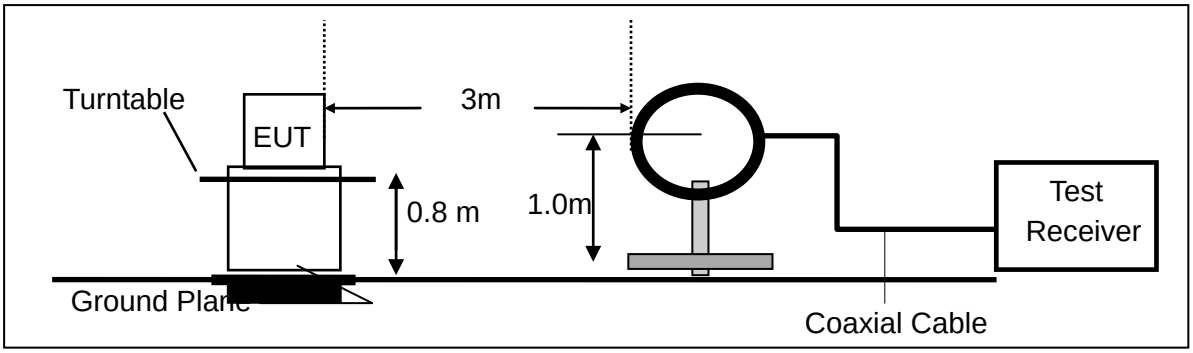
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

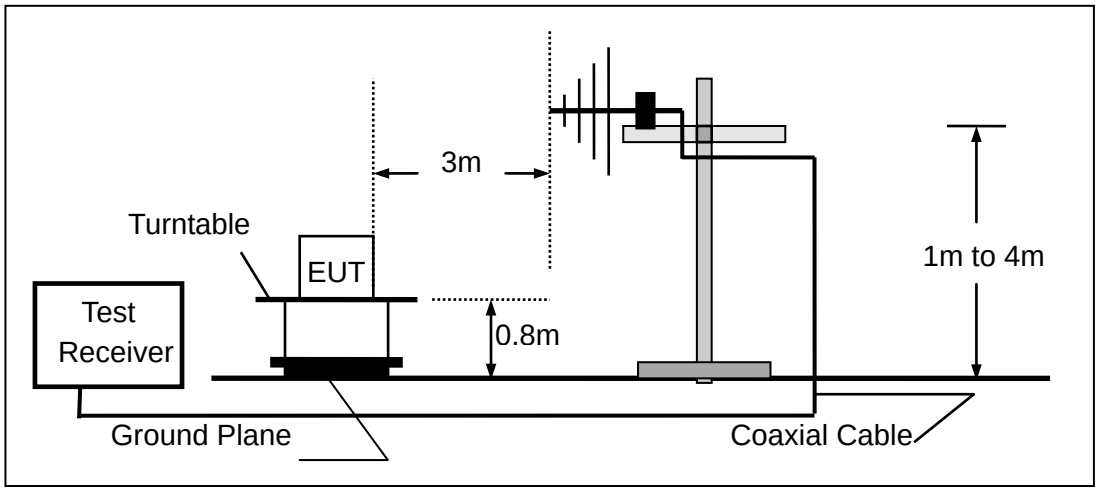
The Measuring equipment is listed in the section 6.3 of this test report.

3.2.4 TEST CONFIGURATION

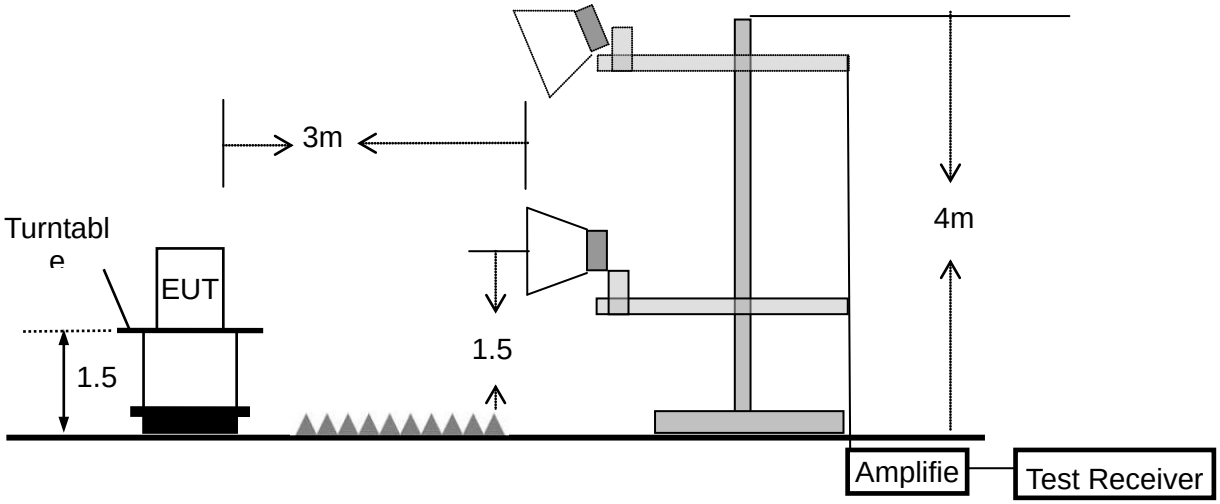
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

3.2.6 TEST RESULTS (9KHZ – 30 MHZ)

Temperature：	26℃	Relative Humidtity：	54%
Pressure：	101kPa	Test Voltage ：	AC 120V/60Hz
Test Mode ：	Mode 5	Polarization :	--

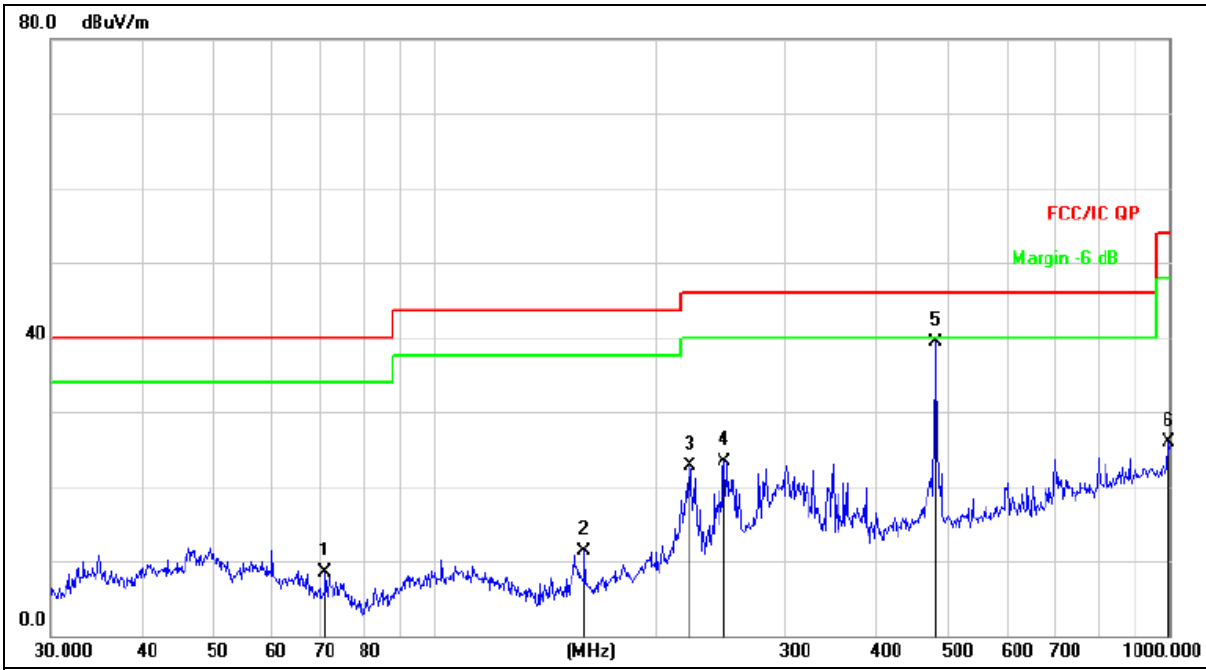
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (30MHZ – 1GHZ)

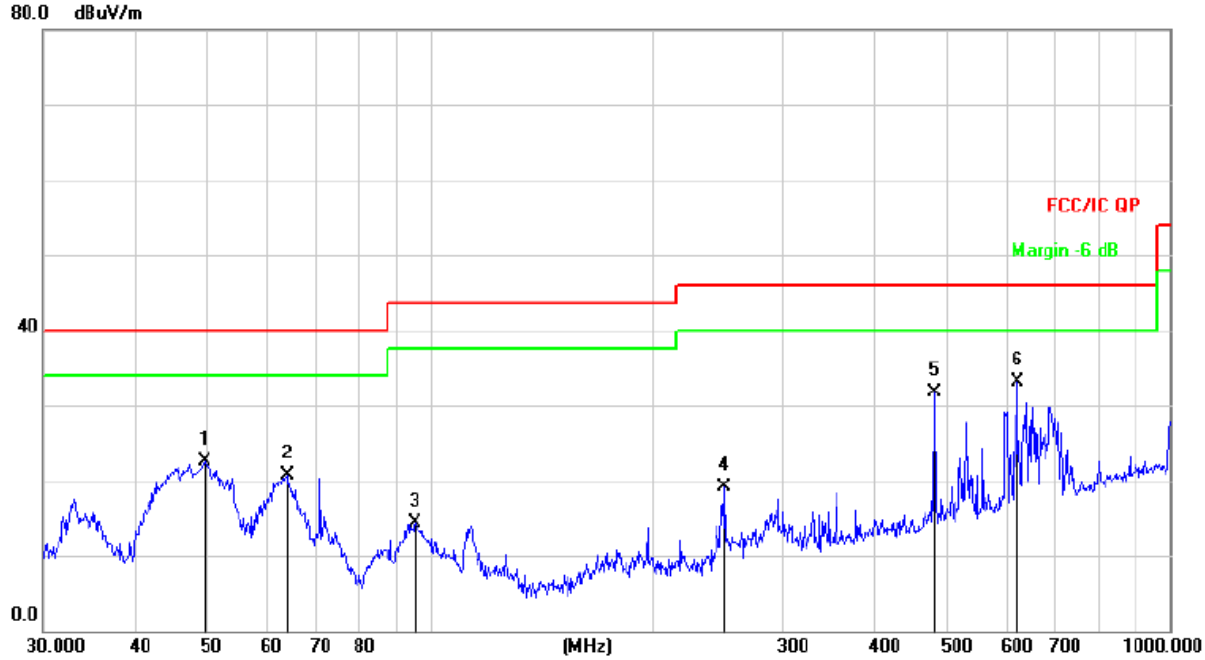
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101 kPa	Polarization：	Horizontal
Test Voltage ：	AC 120V/60Hz		
Test Mode ：	Mode 5		



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		70.8315	26.97	-18.37	8.60	40.00	-31.40	QP
2		159.7844	30.21	-18.87	11.34	43.50	-32.16	QP
3		222.1698	38.49	-15.79	22.70	46.00	-23.30	QP
4		247.6819	38.42	-15.20	23.22	46.00	-22.78	QP
5	*	480.5276	48.56	-9.34	39.22	46.00	-6.78	QP
6		996.4996	26.74	-0.83	25.91	54.00	-28.09	QP

Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Polarization：	Vertical
Test Voltage ：	AC 120V/60Hz		
Test Mode ：	Mode 5		



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		49.5328	37.38	-14.88	22.50	40.00	-17.50	QP
2		63.9828	37.55	-16.82	20.73	40.00	-19.27	QP
3		95.4270	31.32	-17.11	14.21	43.50	-29.29	QP
4		250.3012	34.16	-15.14	19.02	46.00	-26.98	QP
5		480.5276	41.04	-9.34	31.70	46.00	-14.30	QP
6	*	620.7096	39.68	-6.64	33.04	46.00	-12.96	QP

3.2.8 TEST RESULTS (1GHz-40GHz)

Test Mode :	TX(5.2G) - 802.11a

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	4434.157	62.24	5.94	35.40	44.00	59.58	74.00	-14.42	Pk
Vertical	4434.157	46.53	5.94	35.40	44.00	43.87	54.00	-10.13	AV
Vertical	10360.362	60.45	8.46	39.75	44.50	64.16	74.00	-9.84	Pk
Vertical	10360.362	42.96	8.46	39.75	44.50	46.67	54.00	-7.33	AV
Vertical	15540.196	61.44	10.12	38.80	44.10	66.26	74.00	-7.74	Pk
Vertical	15540.196	37.55	10.12	38.80	42.70	43.77	54.00	-10.23	AV
Horizontal	4434.521	66.57	5.94	35.18	44.00	63.69	74.00	-10.31	Pk
Horizontal	4434.521	44.13	5.94	35.18	44.00	41.25	54.00	-12.75	AV
Horizontal	10360.623	58.96	8.46	38.71	44.50	61.63	74.00	-12.37	Pk
Horizontal	10360.623	41.02	8.46	38.71	44.50	43.69	54.00	-10.31	AV
Horizontal	10540.865	56.94	10.12	38.38	44.10	61.34	74.00	-12.66	Pk
Horizontal	10540.865	38.82	10.12	38.38	44.10	43.22	54.00	-10.78	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	4592.093	60.25	6.48	36.35	44.05	59.03	74.00	-14.97	Pk
Vertical	4592.093	41.92	6.48	36.35	44.05	40.7	54.00	-13.3	AV
Vertical	10400.424	59.65	8.47	37.88	44.51	61.49	74.00	-12.51	Pk
Vertical	10400.424	42.73	8.47	37.88	44.51	44.57	54.00	-9.43	AV
Vertical	15600.218	56.56	10.12	38.8	44.10	61.38	74.00	-12.62	Pk
Vertical	15600.218	36.63	10.12	38.8	42.70	42.85	54.00	-11.15	AV
Horizontal	4592.691	59.85	6.48	36.37	44.05	58.65	74.00	-15.35	Pk
Horizontal	4592.691	43.12	6.48	36.37	44.05	41.92	54.00	-12.08	AV
Horizontal	10400.114	58.82	8.47	38.64	44.50	61.43	74.00	-12.57	Pk
Horizontal	10400.114	42.22	8.47	38.64	44.50	44.83	54.00	-9.17	AV
Horizontal	15600.187	59.85	10.12	38.38	44.10	64.25	74.00	-9.75	Pk
Horizontal	15600.187	38.72	10.12	38.38	44.10	43.12	54.00	-10.88	AV
High Channel (5240 MHz)-Above 1G									
Vertical	4739.246	61.24	7.10	37.24	43.50	62.08	74.00	-11.92	Pk
Vertical	4739.246	44.46	7.10	37.24	43.50	45.3	54.00	-8.7	AV
Vertical	10480.371	60.55	8.46	37.68	44.50	62.19	74.00	-11.81	Pk
Vertical	10480.371	40.33	8.46	37.68	44.50	41.97	54.00	-12.03	AV
Vertical	15720.359	61.75	10.12	38.8	44.10	66.57	74.00	-7.43	Pk
Vertical	15720.359	39.63	10.12	38.8	42.70	45.85	54.00	-8.15	AV
Horizontal	4739.352	62.26	7.10	37.24	43.50	63.1	74.00	-10.9	Pk
Horizontal	4739.352	43.23	7.10	37.24	43.50	44.07	54.00	-9.93	AV
Horizontal	10480.111	62.56	8.46	38.57	44.50	65.09	74.00	-8.91	Pk
Horizontal	10480.111	43.33	8.46	38.57	44.50	45.86	54.00	-8.14	AV
Horizontal	15720.357	60.78	10.12	38.38	44.10	65.18	74.00	-8.82	Pk
Horizontal	15720.357	42.23	10.12	38.38	44.10	46.63	54.00	-7.37	AV

Note:"The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.2G) - 802.11n-HT20

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	4434.157	62.25	5.94	35.40	44.00	59.59	74.00	-14.41	Pk
Vertical	4434.157	46.58	5.94	35.40	44.00	43.92	54.00	-10.08	AV
Vertical	10360.362	60.46	8.46	39.75	44.50	64.17	74.00	-9.83	Pk
Vertical	10360.362	42.92	8.46	39.75	44.50	46.63	54.00	-7.37	AV
Vertical	15540.196	61.41	10.12	38.80	44.10	66.23	74.00	-7.77	Pk
Vertical	15540.196	37.57	10.12	38.80	42.70	43.79	54.00	-10.21	AV
Horizontal	4434.521	66.54	5.94	35.18	44.00	63.66	74.00	-10.34	Pk
Horizontal	4434.521	44.18	5.94	35.18	44.00	41.3	54.00	-12.7	AV
Horizontal	10360.623	58.98	8.46	38.71	44.50	61.65	74.00	-12.35	Pk
Horizontal	10360.623	41.07	8.46	38.71	44.50	43.74	54.00	-10.26	AV
Horizontal	15540.865	56.92	10.12	38.38	44.10	61.32	74.00	-12.68	Pk
Horizontal	15540.865	38.83	10.12	38.38	44.10	43.23	54.00	-10.77	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	4592.093	60.27	6.48	36.35	44.05	59.05	74.00	-14.95	Pk
Vertical	4592.093	41.93	6.48	36.35	44.05	40.71	54.00	-13.29	AV
Vertical	10400.424	59.62	8.47	37.88	44.51	61.46	74.00	-12.54	Pk
Vertical	10400.424	42.76	8.47	37.88	44.51	44.6	54.00	-9.4	AV
Vertical	15600.218	56.54	10.12	38.8	44.10	61.36	74.00	-12.64	Pk
Vertical	15600.218	36.66	10.12	38.8	42.70	42.88	54.00	-11.12	AV
Horizontal	4592.691	59.82	6.48	36.37	44.05	58.62	74.00	-15.38	Pk
Horizontal	4592.691	43.13	6.48	36.37	44.05	41.93	54.00	-12.07	AV
Horizontal	10400.114	58.86	8.47	38.64	44.50	61.47	74.00	-12.53	Pk
Horizontal	10400.114	42.22	8.47	38.64	44.50	44.83	54.00	-9.17	AV
Horizontal	15600.187	59.82	10.12	38.38	44.10	64.22	74.00	-9.78	Pk
Horizontal	15600.187	38.77	10.12	38.38	44.10	43.17	54.00	-10.83	AV
High Channel (5240 MHz)-Above 1G									
Vertical	4739.246	61.29	7.10	37.24	43.50	62.13	74.00	-11.87	Pk
Vertical	4739.246	44.44	7.10	37.24	43.50	45.28	54.00	-8.72	AV
Vertical	10480.371	60.57	8.46	37.68	44.50	62.21	74.00	-11.79	Pk
Vertical	10480.371	40.34	8.46	37.68	44.50	41.98	54.00	-12.02	AV
Vertical	15720.359	61.78	10.12	38.8	44.10	66.6	74.00	-7.4	Pk
Vertical	15720.359	39.63	10.12	38.8	42.70	45.85	54.00	-8.15	AV
Horizontal	4739.352	62.23	7.10	37.24	43.50	63.07	74.00	-10.93	Pk
Horizontal	4739.352	43.25	7.10	37.24	43.50	44.09	54.00	-9.91	AV
Horizontal	10480.111	62.63	8.46	38.57	44.50	65.16	74.00	-8.84	Pk
Horizontal	10480.111	43.33	8.46	38.57	44.50	45.86	54.00	-8.14	AV
Horizontal	15720.357	60.76	10.12	38.38	44.10	65.16	74.00	-8.84	Pk
Horizontal	15720.357	42.31	10.12	38.38	44.10	46.71	54.00	-7.29	AV

Note: PK value is lower than the Average value limit, So average didn't record.

The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.2G) - 802.11n-HT40

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5190 MHz)-Above 1G									
Vertical	4434.157	62.25	5.94	35.40	44.00	59.59	74.00	-14.41	Pk
Vertical	4434.157	46.59	5.94	35.40	44.00	43.93	54.00	-10.07	AV
Vertical	10380.362	60.44	8.46	39.75	44.50	64.15	74.00	-9.85	Pk
Vertical	10380.362	42.98	8.46	39.75	44.50	46.69	54.00	-7.31	AV
Vertical	15570.196	61.43	10.12	38.80	44.10	66.25	74.00	-7.75	Pk
Vertical	15570.196	37.56	10.12	38.80	42.70	43.78	54.00	-10.22	AV
Horizontal	4434.521	66.52	5.94	35.18	44.00	63.64	74.00	-10.36	Pk
Horizontal	4434.521	44.23	5.94	35.18	44.00	41.35	54.00	-12.65	AV
Horizontal	10380.623	58.86	8.46	38.71	44.50	61.53	74.00	-12.47	Pk
Horizontal	10380.623	41.03	8.46	38.71	44.50	43.7	54.00	-10.3	AV
Horizontal	15570.865	56.98	10.12	38.38	44.10	61.38	74.00	-12.62	Pk
Horizontal	15570.865	38.83	10.12	38.38	44.10	43.23	54.00	-10.77	AV
High Channel (5230 MHz)-Above 1G									
Vertical	4739.246	61.38	7.10	37.24	43.50	62.22	74.00	-11.78	Pk
Vertical	4739.246	44.44	7.10	37.24	43.50	45.28	54.00	-8.72	AV
Vertical	10460.371	60.26	8.46	37.68	44.50	61.9	74.00	-12.1	Pk
Vertical	10460.371	40.44	8.46	37.68	44.50	42.08	54.00	-11.92	AV
Vertical	15690.359	61.68	10.12	38.8	44.10	66.5	74.00	-7.5	Pk
Vertical	15690.359	39.68	10.12	38.8	42.70	45.9	54.00	-8.1	AV
Horizontal	4739.352	62.23	7.10	37.24	43.50	63.07	74.00	-10.93	Pk
Horizontal	4739.352	43.15	7.10	37.24	43.50	43.99	54.00	-10.01	AV
Horizontal	10460.111	62.24	8.46	38.57	44.50	64.77	74.00	-9.23	Pk
Horizontal	10460.111	43.36	8.46	38.57	44.50	45.89	54.00	-8.11	AV
Horizontal	15690.357	60.71	10.12	38.38	44.10	65.11	74.00	-8.89	Pk
Horizontal	15690.357	42.28	10.12	38.38	44.10	46.68	54.00	-7.32	AV

Note: PK value is lower than the Average value limit, So average didn't record.

The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.2G) - 802.11ac-HT20

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	4434.157	62.29	5.94	35.40	44.00	59.63	74.00	-14.37	Pk
Vertical	4434.157	46.52	5.94	35.40	44.00	43.86	54.00	-10.14	AV
Vertical	10360.367	60.46	8.46	39.75	44.50	64.17	74.00	-9.83	Pk
Vertical	10360.367	42.95	8.46	39.75	44.50	46.66	54.00	-7.34	AV
Vertical	15540.195	61.49	10.12	38.80	44.10	66.31	74.00	-7.69	Pk
Vertical	15540.195	37.52	10.12	38.80	42.70	43.74	54.00	-10.26	AV
Horizontal	4434.524	66.59	5.94	35.18	44.00	63.71	74.00	-10.29	Pk
Horizontal	4434.524	44.12	5.94	35.18	44.00	41.24	54.00	-12.76	AV
Horizontal	10360.627	58.99	8.46	38.71	44.50	61.66	74.00	-12.34	Pk
Horizontal	10360.627	41.03	8.46	38.71	44.50	43.7	54.00	-10.3	AV
Horizontal	15540.865	56.98	10.12	38.38	44.10	61.38	74.00	-12.62	Pk
Horizontal	15540.865	38.82	10.12	38.38	44.10	43.22	54.00	-10.78	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	4592.098	60.31	6.48	36.35	44.05	59.09	74.00	-14.91	Pk
Vertical	4592.098	41.83	6.48	36.35	44.05	40.61	54.00	-13.39	AV
Vertical	10400.428	59.54	8.47	37.88	44.51	61.38	74.00	-12.62	Pk
Vertical	10400.428	42.72	8.47	37.88	44.51	44.56	54.00	-9.44	AV
Vertical	15600.214	56.52	10.12	38.8	44.10	61.34	74.00	-12.66	Pk
Vertical	15600.214	36.68	10.12	38.8	42.70	42.9	54.00	-11.1	AV
Horizontal	4592.699	59.84	6.48	36.37	44.05	58.64	74.00	-15.36	Pk
Horizontal	4592.699	43.18	6.48	36.37	44.05	41.98	54.00	-12.02	AV
Horizontal	10400.113	58.82	8.47	38.64	44.50	61.43	74.00	-12.57	Pk
Horizontal	10400.113	42.28	8.47	38.64	44.50	44.89	54.00	-9.11	AV
Horizontal	15600.187	59.83	10.12	38.38	44.10	64.23	74.00	-9.77	Pk
Horizontal	15600.187	38.78	10.12	38.38	44.10	43.18	54.00	-10.82	AV
High Channel (5240 MHz)-Above 1G									
Vertical	4739.249	61.23	7.10	37.24	43.50	62.07	74.00	-11.93	Pk
Vertical	4739.249	44.48	7.10	37.24	43.50	45.32	54.00	-8.68	AV
Vertical	10480.375	60.53	8.46	37.68	44.50	62.17	74.00	-11.83	Pk
Vertical	10480.375	40.39	8.46	37.68	44.50	42.03	54.00	-11.97	AV
Vertical	15720.358	61.74	10.12	38.8	44.10	66.56	74.00	-7.44	Pk
Vertical	15720.358	39.53	10.12	38.8	42.70	45.75	54.00	-8.25	AV
Horizontal	4739.354	62.28	7.10	37.24	43.50	63.12	74.00	-10.88	Pk
Horizontal	4739.354	43.35	7.10	37.24	43.50	44.19	54.00	-9.81	AV
Horizontal	10480.111	62.68	8.46	38.57	44.50	65.21	74.00	-8.79	Pk
Horizontal	10480.111	43.38	8.46	38.57	44.50	45.91	54.00	-8.09	AV
Horizontal	15720.356	60.65	10.12	38.38	44.10	65.05	74.00	-8.95	Pk
Horizontal	15720.353	42.39	10.12	38.38	44.10	46.79	54.00	-7.21	AV

Test Mode :	TX(5.2G) - 802.11ac-HT40

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5190 MHz)-Above 1G									
Vertical	4434.155	62.34	5.94	35.40	44.00	59.68	74.00	-14.32	Pk
Vertical	4434.155	46.52	5.94	35.40	44.00	43.86	54.00	-10.14	AV
Vertical	10380.367	60.48	8.46	39.75	44.50	64.19	74.00	-9.81	Pk
Vertical	10380.367	42.88	8.46	39.75	44.50	46.59	54.00	-7.41	AV
Vertical	15570.193	61.49	10.12	38.80	44.10	66.31	74.00	-7.69	Pk
Vertical	15570.193	37.54	10.12	38.80	42.70	43.76	54.00	-10.24	AV
Horizontal	4434.528	66.59	5.94	35.18	44.00	63.71	74.00	-10.29	Pk
Horizontal	4434.528	44.33	5.94	35.18	44.00	41.45	54.00	-12.55	AV
Horizontal	10380.623	58.89	8.46	38.71	44.50	61.56	74.00	-12.44	Pk
Horizontal	10380.623	41.04	8.46	38.71	44.50	43.71	54.00	-10.29	AV
Horizontal	15570.869	56.68	10.12	38.38	44.10	61.08	74.00	-12.92	Pk
Horizontal	15570.869	38.89	10.12	38.38	44.10	43.29	54.00	-10.71	AV
High Channel (5230 MHz)-Above 1G									
Vertical	4739.244	61.34	7.10	37.24	43.50	62.18	74.00	-11.82	Pk
Vertical	4739.244	44.48	7.10	37.24	43.50	45.32	54.00	-8.68	AV
Vertical	10460.377	60.23	8.46	37.68	44.50	61.87	74.00	-12.13	Pk
Vertical	10460.377	40.49	8.46	37.68	44.50	42.13	54.00	-11.87	AV
Vertical	15690.352	61.63	10.12	38.8	44.10	66.45	74.00	-7.55	Pk
Vertical	15690.356	39.64	10.12	38.8	42.70	45.86	54.00	-8.14	AV
Horizontal	4739.352	62.29	7.10	37.24	43.50	63.13	74.00	-10.87	Pk
Horizontal	4739.352	43.11	7.10	37.24	43.50	43.95	54.00	-10.05	AV
Horizontal	10460.115	62.28	8.46	38.57	44.50	64.81	74.00	-9.19	Pk
Horizontal	10460.115	43.26	8.46	38.57	44.50	45.79	54.00	-8.21	AV
Horizontal	15690.353	60.78	10.12	38.38	44.10	65.18	74.00	-8.82	Pk
Horizontal	15690.353	42.22	10.12	38.38	44.10	46.62	54.00	-7.38	AV

Note: PK value is lower than the Average value limit, So average didn't record.

The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Test Mode :	TX(5.2G) - 802.11ac-HT80

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
(5210 MHz)-Above 1G									
Vertical	4434.157	62.25	5.94	35.40	44.00	59.59	74.00	-14.41	Pk
Vertical	4434.157	46.59	5.94	35.40	44.00	43.93	54.00	-10.07	AV
Vertical	10420.361	60.44	8.46	39.75	44.50	64.15	74.00	-9.85	Pk
Vertical	10420.361	42.98	8.46	39.75	44.50	46.69	54.00	-7.31	AV
Vertical	15630.193	61.43	10.12	38.80	44.10	66.25	74.00	-7.75	Pk
Vertical	15630.193	37.56	10.12	38.80	42.70	43.78	54.00	-10.22	AV
Horizontal	4434.157	66.52	5.94	35.18	44.00	63.64	74.00	-10.36	Pk
Horizontal	4434.157	44.23	5.94	35.18	44.00	41.35	54.00	-12.65	AV
Horizontal	10420.366	58.86	8.46	38.71	44.50	61.53	74.00	-12.47	Pk
Horizontal	10420.366	41.03	8.46	38.71	44.50	43.7	54.00	-10.3	AV
Horizontal	15630.194	56.98	10.12	38.38	44.10	61.38	74.00	-12.62	Pk
Horizontal	15630.194	38.83	10.12	38.38	44.10	43.23	54.00	-10.77	AV

Note: PK value is lower than the Average value limit, So average didn't record.

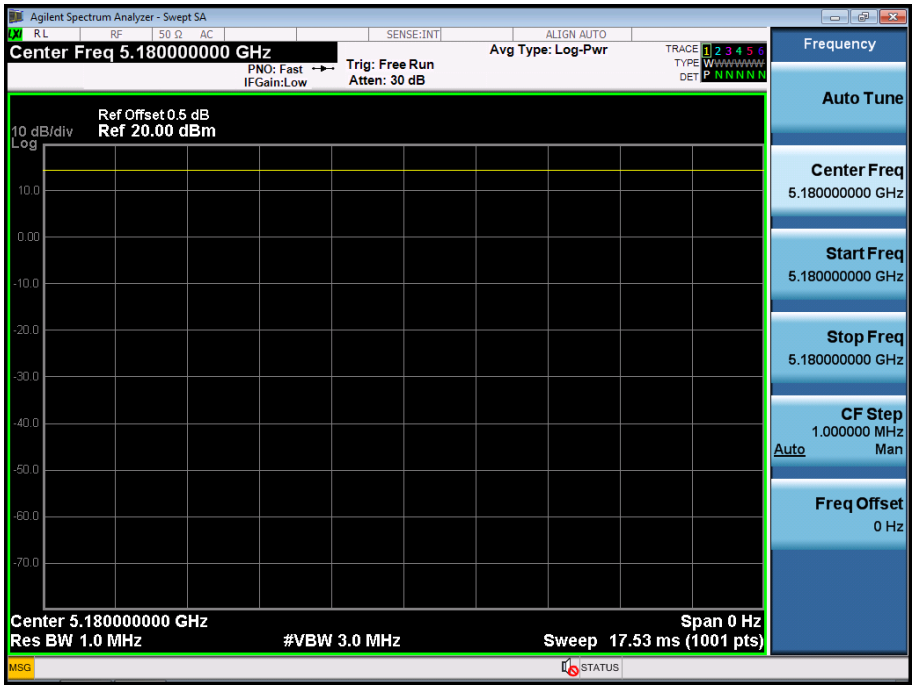
The 26.5-40G amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

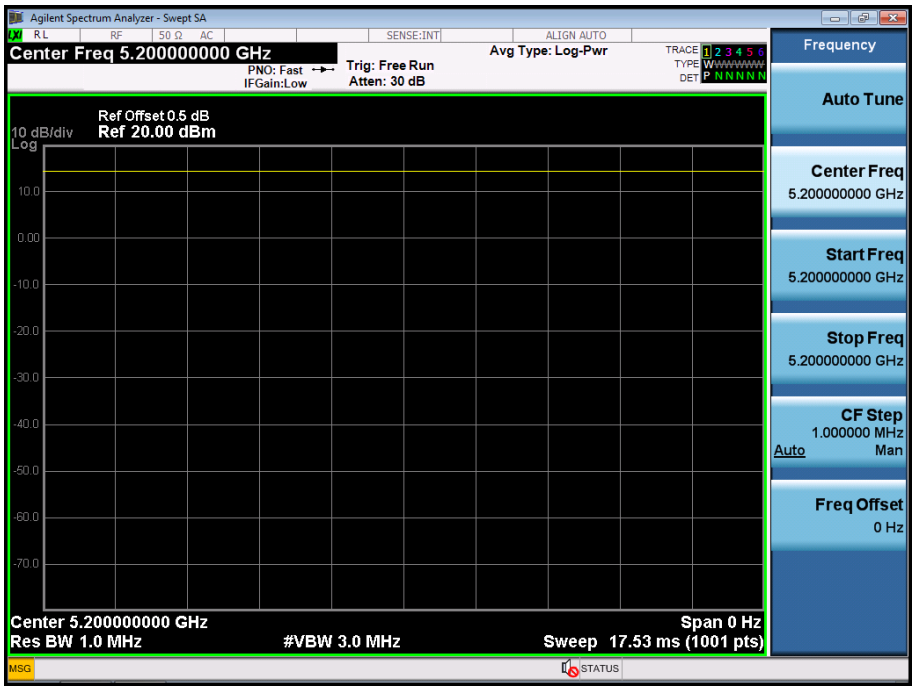
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Duty cycle

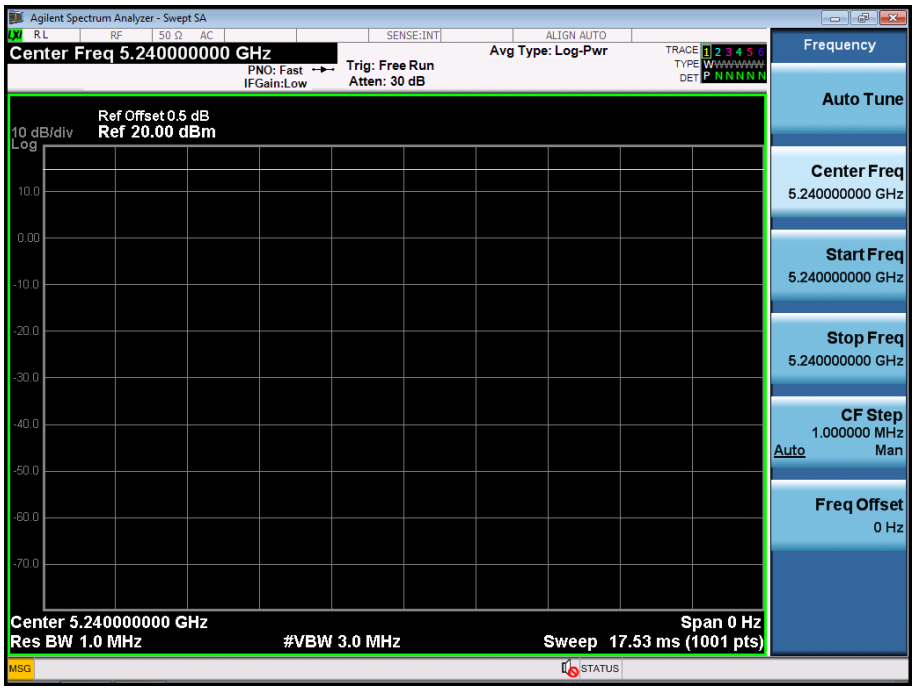
A20-5180MHz



A20-5200MHz



A20-5240MHz


Agilent Spectrum Analyzer - Swept SA
Center Freq 5.240000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 5.240000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 17.53 ms (1001 pts)
Frequency
Auto Tune
Center Freq
5.240000000 GHz
Start Freq
5.240000000 GHz
Stop Freq
5.240000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
MSG
STATUS

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(3)

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

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4.2 TEST PROCEDURE

For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, “provided that the measured power is integrated over the full reference bandwidth” to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

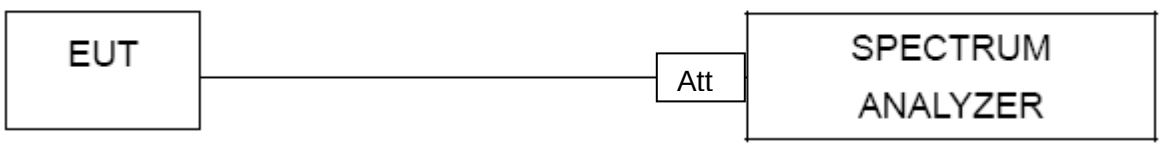
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

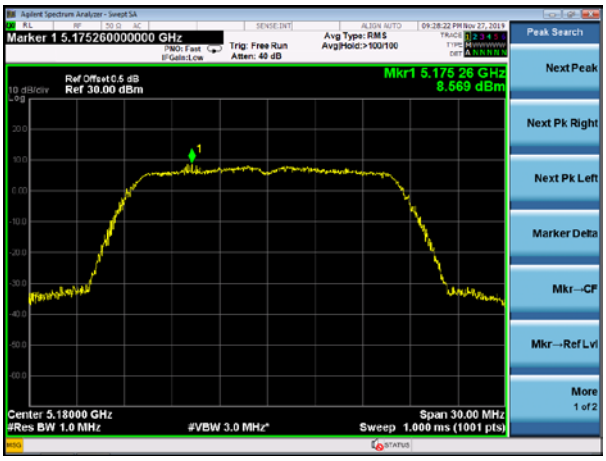
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	AC 120V/60Hz
Test Mode ：	TX Frequency U-NII-1 (5180-5240MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna B, only shown Antenna B Plot.

Note:Antenna A gain: 5dBi, Antenna B gain: 5dBi, Directional gain=[10log(GA+ G B)] dbi =8.01dbi, limit=17-(8.01-6)=14.99

Mode	Frequency	Measured Power Density (dBm/MHz)			Limit (dBm)	Result
		ANT A	ANT B	Total		
802.11 a	5180 MHz	8.347	8.569	/	17	PASS
	5200 MHz	8.436	8.480	/	17	PASS
	5240 MHz	7.667	8.270	/	17	PASS
802.11 n20	5180 MHz	6.535	6.896	9.730	14.99	PASS
	5200 MHz	8.218	7.605	10.933	14.99	PASS
	5240 MHz	6.947	6.859	9.914	14.99	PASS
802.11 n40	5190 MHz	6.180	6.236	9.218	14.99	PASS
	5230 MHz	6.299	6.173	9.247	14.99	PASS
802.11 AC20	5180 MHz	7.546	7.703	10.636	14.99	PASS
	5200 MHz	7.360	7.725	10.557	14.99	PASS
	5240 MHz	6.533	6.670	9.612	14.99	PASS
802.11 AC40	5190 MHz	7.459	7.403	10.441	14.99	PASS
	5230 MHz	6.317	6.345	9.341	14.99	PASS
802.11 AC80	5210 MHz	5.172	5.275	8.234	14.99	PASS

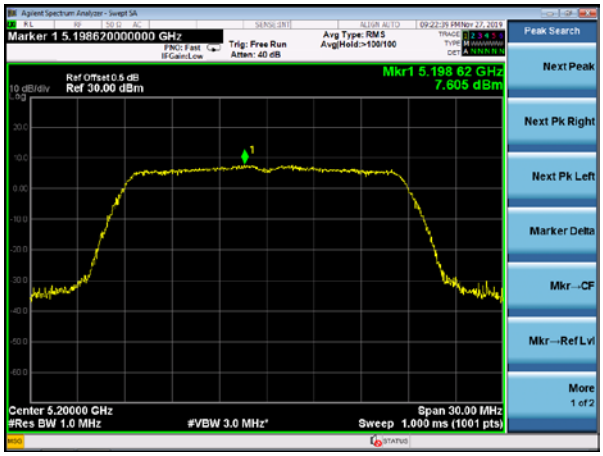
(802.11a) PSD plot on channel 36



(802.11n20) PSD plot on channel 36

(802.11a) PSD plot on channel 40

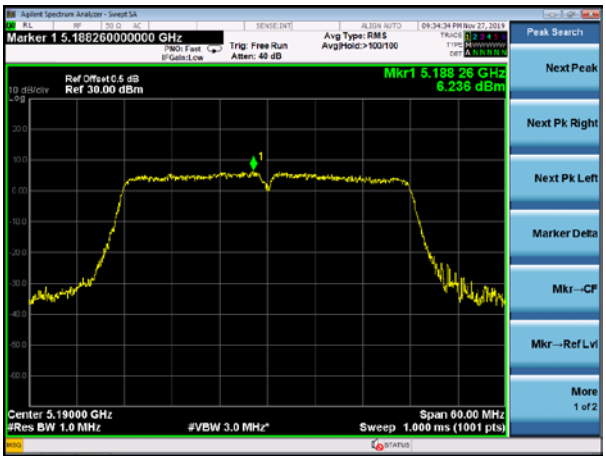
(802.11n20) PSD plot on channel 40



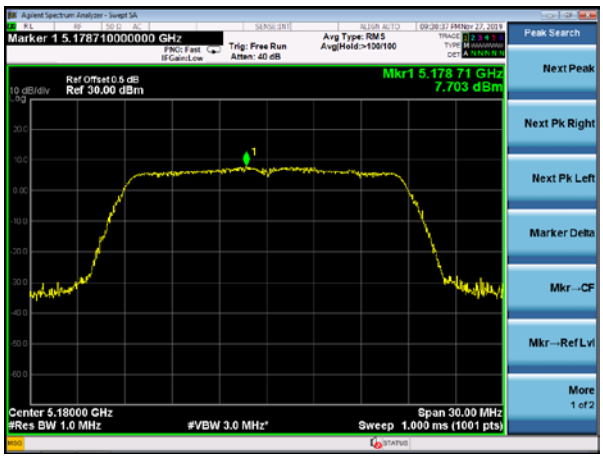
(802.11a) PSD plot on channel 48

(802.11n20) PSD plot on channel 48

(802.11n40) PSD plot on channel 38



(802.11ac20) PSD plot on channel 36

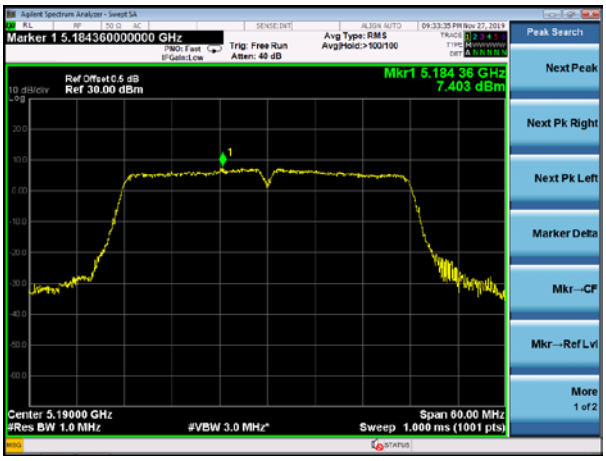


(802.11n40) PSD plot on channel 46

(802.11ac20) PSD plot on channel 40

(802.11ac20) PSD plot on channel 48

(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42

(802.11ac40) PSD plot on channel 46

5. 26DB & 6DB & 99% EMISSION BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

5.2 TEST PROCEDURE

a) Set RBW = approximately 1% of the emission bandwidth.

b) Set the VBW > RBW.

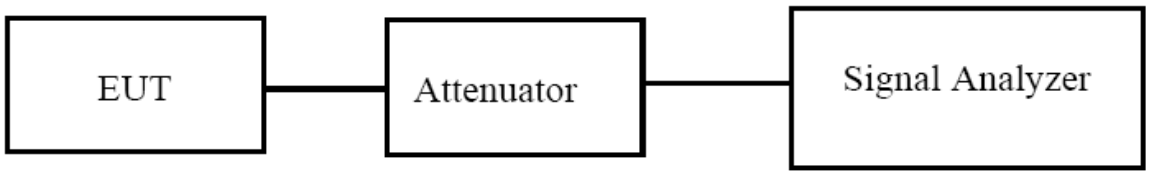
c) Detector = Peak.

d) Trace mode = max hold.

e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.



5.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 TEST RESULTS

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	101kPa	Test Voltage ：	AC 120V/60Hz
Test Mode ：	TX Frequency U-NII-1 (5180-5240MHz)		

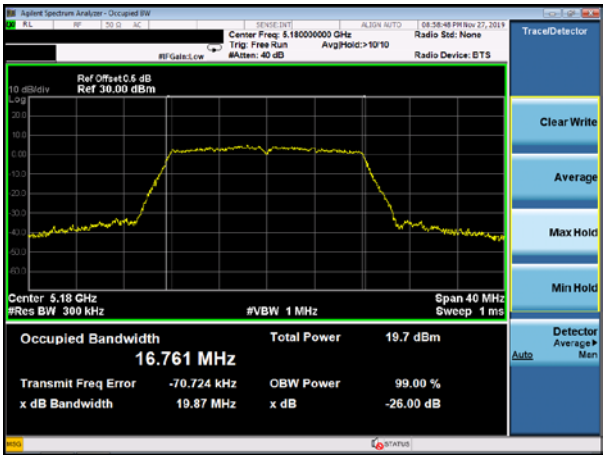
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	26dB bandwidth (MHz)	Limit MHz	Result
			ANT A	ANT A		
802.11a	CH36	5180	16.761	19.87	≥500	Pass
	CH40	5200	16.776	19.77	≥500	Pass
	CH48	5240	16.808	19.80	≥500	Pass
802.11 n20	CH36	5180	17.633	20.19	≥500	Pass
	CH40	5200	17.679	20.39	≥500	Pass
	CH48	5240	17.668	20.19	≥500	Pass
802.11 n40	CH 38	5190	36.238	41.69	≥500	Pass
	CH 46	5230	36.345	42.15	≥500	Pass
802.11 AC20	CH36	5180	17.666	20.38	≥500	Pass
	CH40	5200	17.664	20.40	≥500	Pass
	CH48	5240	17.693	20.33	≥500	Pass
802.11 AC40	CH 38	5190	36.248	40.98	≥500	Pass
	CH 46	5230	36.253	40.95	≥500	Pass
802.11 AC80	CH 42	5210	75.222	81.32	≥500	Pass

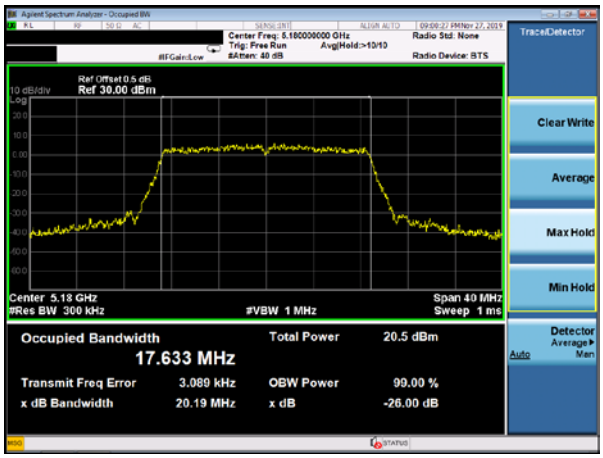
Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	26dB bandwidth (MHz)	Limit MHz	Result
			ANT B	ANT B		
802.11a	CH36	5180	16.806	19.84	≥500	Pass
	CH40	5200	16.713	19.77	≥500	Pass
	CH48	5240	16.731	19.88	≥500	Pass
802.11 n20	CH36	5180	17.666	20.24	≥500	Pass
	CH40	5200	17.659	20.33	≥500	Pass
	CH48	5240	17.636	20.16	≥500	Pass
802.11 n40	CH 38	5190	36.266	41.30	≥500	Pass
	CH 46	5230	36.330	41.38	≥500	Pass
802.11 AC20	CH36	5180	17.653	20.33	≥500	Pass
	CH40	5200	17.668	20.38	≥500	Pass
	CH48	5240	17.667	20.21	≥500	Pass
802.11 AC40	CH 38	5190	36.238	41.35	≥500	Pass
	CH 46	5230	36.260	41.71	≥500	Pass
802.11 AC80	CH 42	5210	75.158	81.51	≥500	Pass

Test plot

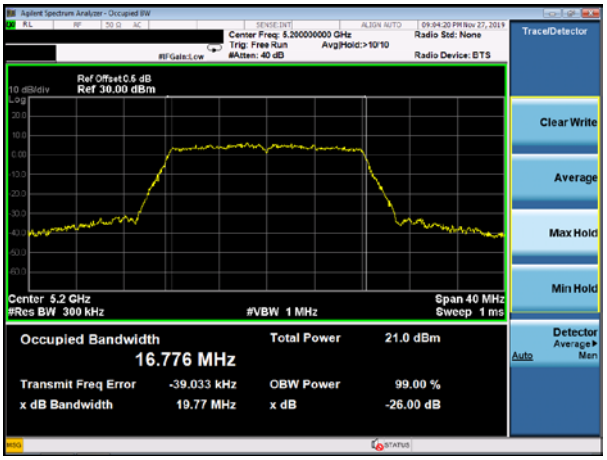
(802.11a) 26dB&99%Bandwidth plot on channel 36



(802.11 n20) 26dB&99%Bandwidth plot on channel 36



(802.11a) 26dB&99%Bandwidth plot on channel 40



(802.11 n20) 26dB&99%Bandwidth plot on channel 40

(802.11a) 26dB&99%Bandwidth plot on channel 48

(802.11 n20) 26dB&99%Bandwidth plot on channel 48