FCC TEST REPORT

FCC ID:2AP9Y-XM1000S

Product	:	Wireless Video Transmission System with intercom
Model Name	:	XM1000S
Brand	:	FORHOPE
Report No.	:	PTC20120303601E-FC02

Prepared for

Shenzhen Forhope Science Technology Co., Ltd.

Rm 601, 6/F., Baojie'an Economic Trading Center,Xinhu and Labor Road Cross, Xixiang, Bao'an District, Shenzhen, China P.C. 518102

Prepared by

Precise Testing & Certification Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China.

1 TEST RESULT CERTIFICATION

Applicant's name	:	Shenzhen Forhope Science Technology Co., Ltd.
Address	:	Rm 601, 6/F., Baojie'an Economic Trading Center,Xinhu and Labor Road Cross, Xixiang, Bao'an District, Shenzhen, China P.C. 518102
Manufacture's name	:	Shenzhen Forhope Science Technology Co., Ltd.
Address	:	Rm 601, 6/F., Baojie'an Economic Trading Center,Xinhu and Labor Road Cross, Xixiang, Bao'an District, Shenzhen, China P.C. 518102
Product name	:	Wireless Video Transmission System with intercom
Model name	:	XM1000S
Standards	:	FCC Part15 Subpart E , Paragraph 15.407
Test procedure	:	ANSI C63.10: 2013, KDB 789033 D02 General UNII Test Procedures New Rules v02r01 KDB662911 D01 Multiple Transmitter Output v02r01
Test Date	:	Dec 16, 2020 to Apr 12, 2021
Date of Issue	:	Apr 12, 2021
Test Result	:	Pass

This device described above has been tested by PTC, 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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Test Engineer:

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Leo Yang / Engineer

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2 Test Summary

Standard	Test Type	Result
15.207 & 15.407	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
15.407(b)	Band Edge	PASS
15.407(a)(5)&15.407(e)	Occupy Bandwidth	PASS
15.407(a)(3)	Maximum Conducted Output Power	PASS
15.407(a)(1)(3)	Peak Power Spectral Density	PASS
15.203	Antenna Requirement	PASS

2.1 Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Mode	Test channel	Frequency (MHz)
OFDM(802.11n20)	CH 149	5745MHz
	CH 157	5785MHz
	CH 165	5825MHz

Note:

1. The measurements are performed at the highest, middle, lowest available channels.
2. The EUT has been tested as an independent unit. And Continual Transmitting in maximum power.
3. For the relevant Conducted Measurement, the temporary antenna connector is used during the measurement. Antenna Connector Impedance: 50Ω, Cable Loss: 1.0 dB
4. The EUT was programmed to be in continuously transmitting mode and the transmit duty cycle is more than 98%

3 General Information

3.1 Antenna Infomation

Ant No	Brand	Model	AntennaType	Connector	Gain(dbi)
1	-	-	Columnar antenna	-	5
2	-	-	Columnar antenna	-	5

Note:

1. **The EUT has Two antennas, which can support IEEE802.11N20, and can support IEEE802.11N20 with the MIMO function**
2. **According to ANSI C63.10:2013 14.4.3.2.5 a):**

   Directional gain=5dbi+10xlog(2/1)db=8.01dBi＞6dBi

3.2 General Description of E.U.T.

Product Name	:	Wireless Video Transmission System with intercom
Model Name	:	XM1000S
Additional model		N/A
Operation Frequency	:	5745MHz~5825MHz
Number of Channel	:	5 Channels for 802.11n(HT20)
Type of Modulation	:	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM
Antenna installation	:	Columnar antenna
Antenna Gain	:	5dBi
The directional gain	:	8.01 dBi
Power supply	:	Input:DC 12V 0.65A
Hardware Version	:	5800-HI3520-T0forTransmitter 5800-AMN001-R0 for Receiver
Software Version	:	XM1000_TX_FCC&IC for Transmitter XM1000_RX_FCC&IC for Receiver

3.1 Channel List

802.11n20

Channel	Freq. (MHz)	Channel	Freq. (MHz)
149	5745	153	5765
157	5785	161	5805
165	5825		

3.2 Test Site

Precise Testing & Certification Co., Ltd.

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

4 Equipment During Test

4.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
MXG Signal Analyzer	Agilent	N9020A	SER MY5111038	10Hz-30GHz	Aug. 21, 2021
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	Aug. 21, 2021
Power Meter	Anritsu	ML2495A	0949003	300MHz-40GHz	Aug. 21, 2021
Power Sensor	Anritsu	MA2411B	0917017	300MHz-40GHz	Aug. 21, 2021

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Characteristics	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	9KHz-3GHz	Aug. 19, 2021
Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	Aug. 21, 2021
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	25MHz-2GHz	Aug. 21, 2021
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	1MHz-1GHz	Aug. 19, 2021
Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	Aug. 19, 2021
Spectrum Analyzer	Agilent	E4407B	MY45109572	9KHz-40GHz	Aug. 19, 2021
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	1GHz-18GHz	Aug. 21, 2021
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	Aug. 19, 2021
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	14GHz-40GHz	Aug. 21, 2021
Amplifier	SCHWARZBECK	BBV 9721	9721-205	18GHz-40GHz	Aug. 19, 2021
Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	Aug. 19, 2021
RF Cable	R&S	R204	R21X	1GHz-40GHz	Aug. 19, 2021

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Calibration Due
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Aug. 19, 2021
Artificial Mains Network	Rohde&Schwarz	ENV216	102453	Aug. 19, 2021
ISN	SCHWARZBECK	NTFM8131	00257	Aug. 19, 2021

4.2 Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

4.3 Description of Support Units

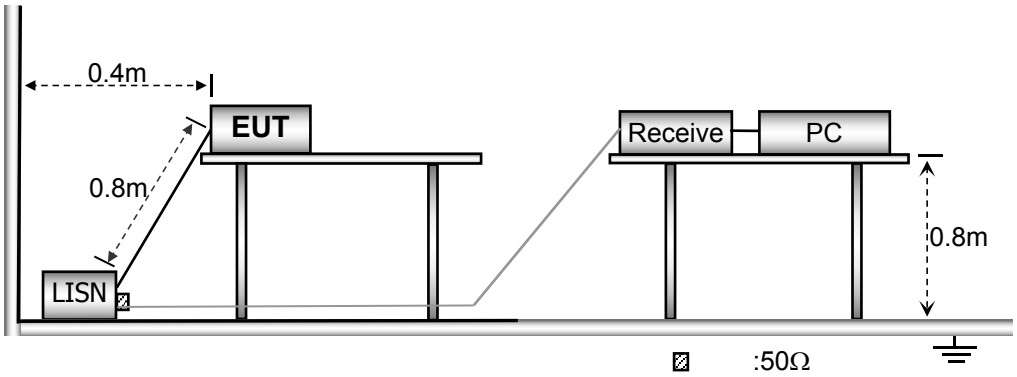
Equipment	Model No.	Series No.
N/A	Input:AC100-120V, Output ：DC12V 0.65A	N/A

5 Conducted Emission Test

5.1 Test Standard and Limit

Test Standard	FCC Part15 Section 15.207&15.407		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

5.2 Test Setup



5.3 Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

5.4 Test Data

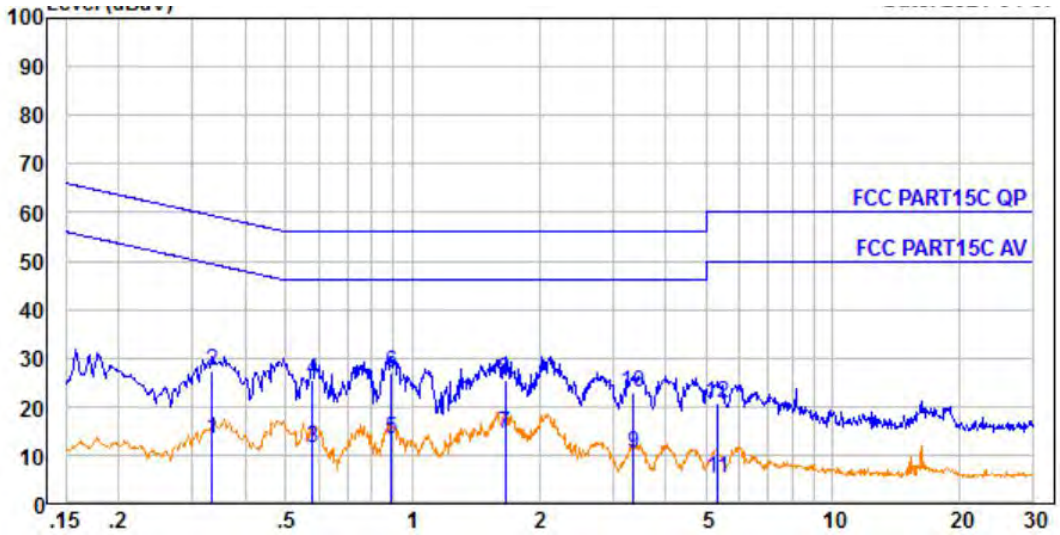
Note:TheDuring the test, pre-scan 120Vac/60Hz and 240Vac/60Hz of the Power supply, found 120Vac/60Hz was worse case mode, the report only reflects the worst mode.

Conducted Emission Test Data

Test Specification: AC 120V/60Hz

Comment: Live Line

Tem.: 23.5℃ Hum.: 55%



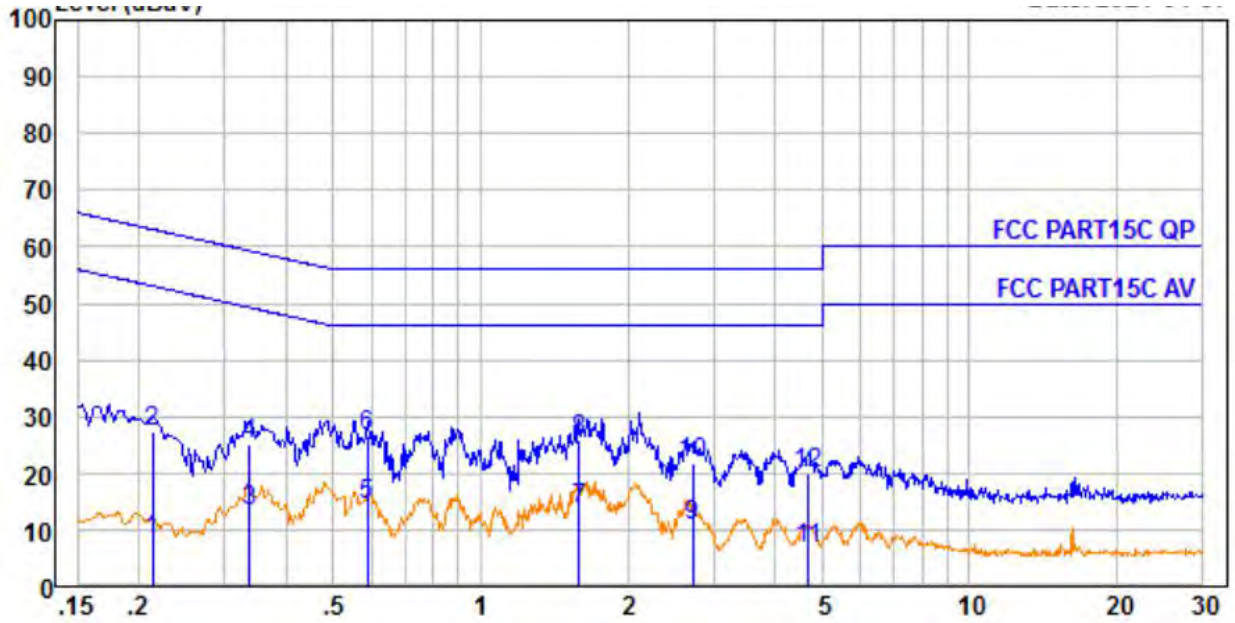
No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.334	0.38	9.60	3.33	13.31	49.35	-36.04	Average
2.	0.334	0.38	9.60	17.32	27.30	59.35	-32.05	QP
3.	0.579	0.43	9.61	1.42	11.46	46.00	-34.54	Average
4.	0.579	0.43	9.61	15.24	25.28	56.00	-30.72	QP
5.	0.890	0.45	9.61	3.11	13.17	46.00	-32.83	Average
6.	0.890	0.45	9.61	16.89	26.95	56.00	-29.05	QP
7.	1.662	0.47	9.61	4.21	14.29	46.00	-31.71	Average
8.	1.662	0.47	9.61	15.21	25.29	56.00	-30.71	QP
9.	3.364	0.47	9.64	0.09	10.20	46.00	-35.80	Average
10.	3.364	0.47	9.64	12.89	23.00	56.00	-33.00	QP
11.	5.333	0.51	9.69	-5.15	5.05	50.00	-44.95	Average
12.	5.333	0.51	9.69	10.46	20.66	60.00	-39.34	QP

Conducted Emission Test Data

Test Specification: AC 120V/60Hz

Comment: Neutral Line

Tem.: 23.5℃ Hum.: 55%



No.	Freq MHz	Cable Loss dB	AMN Factor dB	Receiver Reading dBμV	Emission Level dBμV	Limit dBμV	Over Limit dB	Remark
1.	0.214	0.29	9.61	-1.86	8.04	53.05	-45.01	Average
2.	0.214	0.29	9.61	17.33	27.23	63.05	-35.82	QP
3.	0.337	0.38	9.62	3.30	13.30	49.27	-35.97	Average
4.	0.337	0.38	9.62	15.02	25.02	59.27	-34.25	QP
5.	0.589	0.43	9.63	4.21	14.27	46.00	-31.73	Average
6.	0.589	0.43	9.63	16.45	26.51	56.00	-29.49	QP
7.	1.593	0.47	9.64	3.52	13.63	46.00	-32.37	Average
8.	1.593	0.47	9.64	15.62	25.73	56.00	-30.27	QP
9.	2.721	0.47	9.65	0.42	10.54	46.00	-35.46	Average
10.	2.721	0.47	9.65	11.66	21.78	56.00	-34.22	QP
11.	4.696	0.49	9.70	-3.59	6.60	46.00	-39.40	Average
12.	4.696	0.49	9.70	9.84	20.03	56.00	-35.97	QP

6 . Radiation Spurious Emission and Band Edge

6.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209, 15.205 and 15.407				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	68.2	Peak	3

Remark:

(1)The lower limit shall apply at the transition frequency.

(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

(3)Above 1GHz limit:E[dBμV/m] = EIRP[dBm] + 95.2=68.2 dBuV/m, for EIPR[dBm]=-27dBm.

6.2 Test Setup

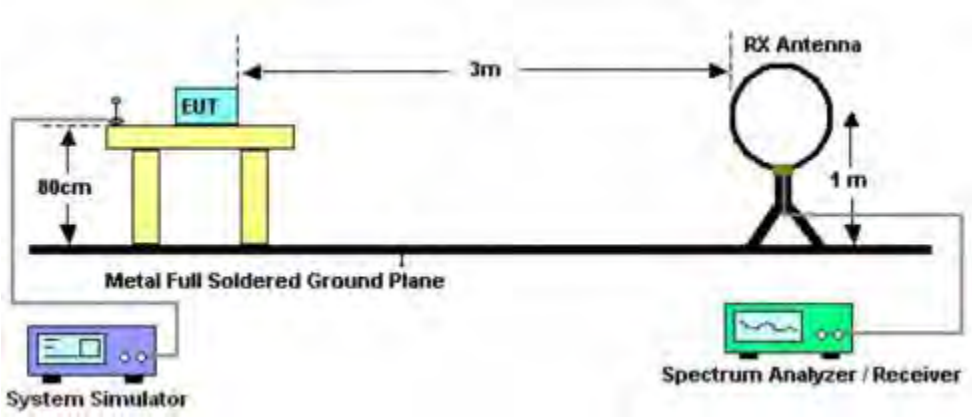


Figure 1. Below 30MHz

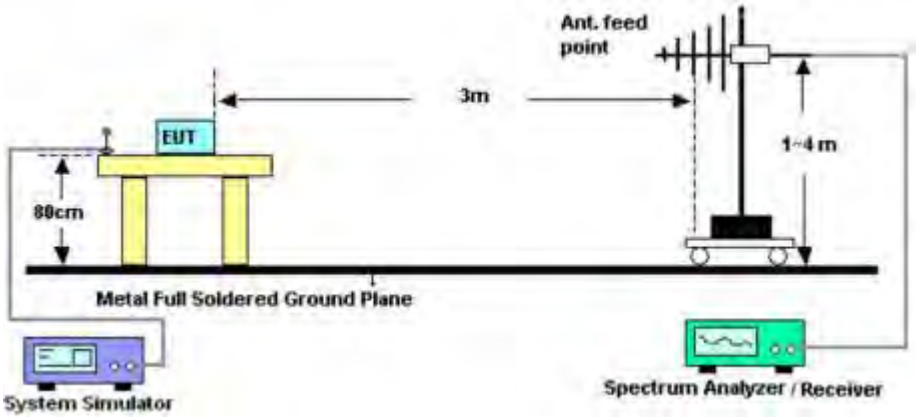


Figure 2. 30MHz to 1GHz

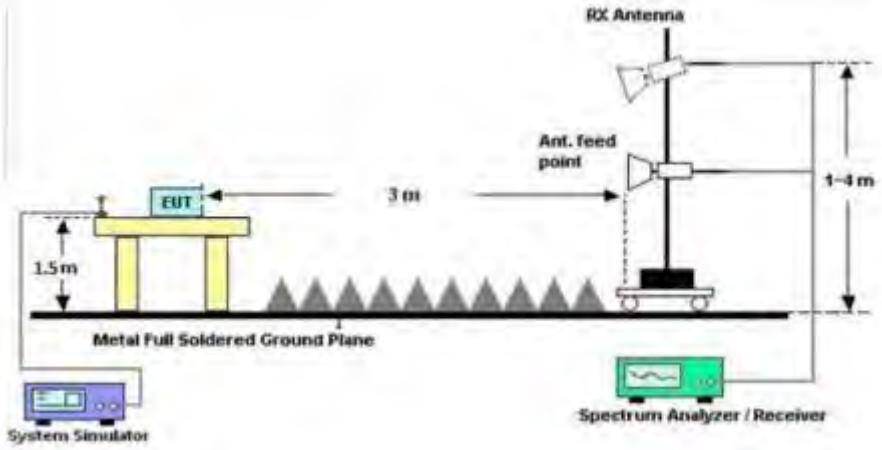


Figure 3. Above 1 GHz

6.3 Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.

For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.

The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

For 9kHz to 150kHz, Set the spectrum analyzer as:

RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:

RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:

RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For above 1GHz, Set the spectrum analyzer as:

RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.

RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

6.4 Test Data

PASS

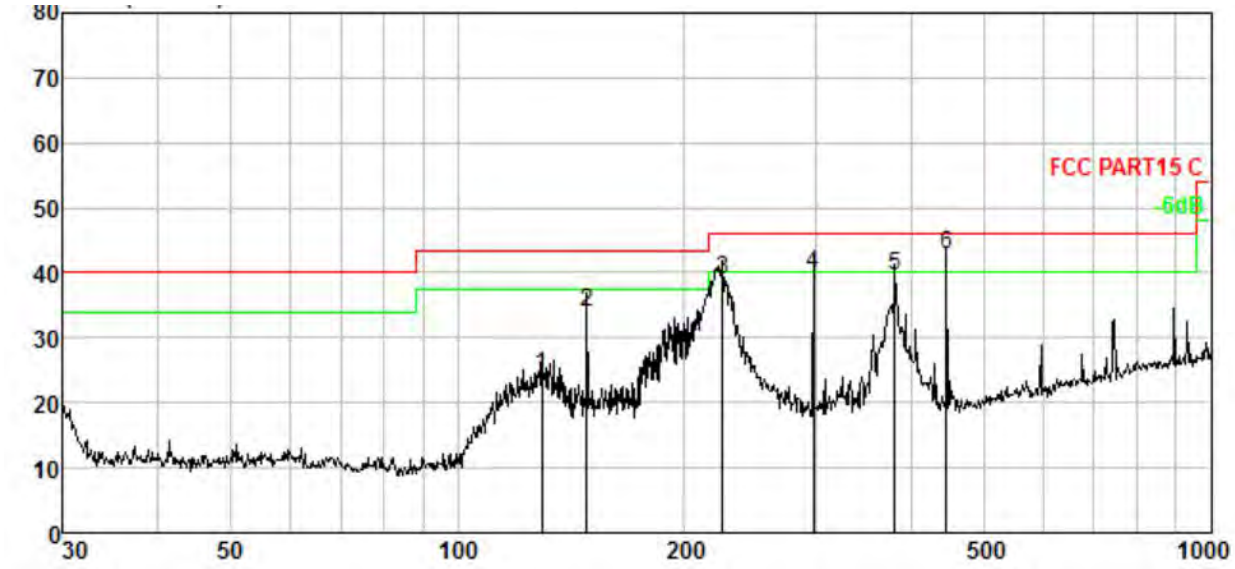
The test results of 9kHz-30MHz was attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all modes, and found MIMO mode is the worst case and only the worst case is recorded in the report.

Test Results (30~1000MHz)

Temp.(℃)/Hum.(%RH): 24.5℃/52%RH Test Mode: TX Mode

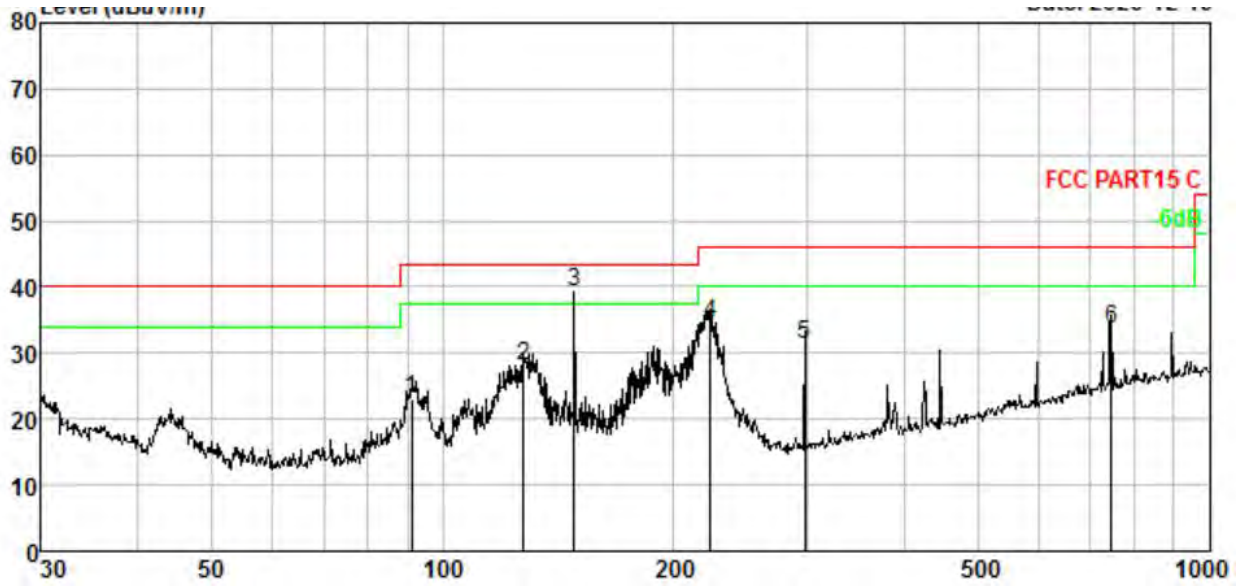
Power Source: DC 12V Polarization: Horizontal



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	129.468	3.72	12.64	37.97	30.01	24.32	43.50	-19.18	QP
2.	148.441	3.95	13.65	46.40	30.02	33.98	43.50	-9.52	QP
3.	225.308	4.67	11.80	52.54	30.12	38.89	46.00	-7.11	QP
4.	297.224	5.14	13.16	51.78	30.31	39.77	46.00	-6.23	QP
5.	381.249	5.58	14.66	49.83	30.64	39.43	46.00	-6.57	QP
6.	446.414	5.85	15.83	51.99	30.80	42.87	46.00	-3.13	QP

Test Results (30~1000MHz)

Temp.(℃)/Hum.(%RH):	24.5℃/52%RH	Test Mode:	TX Mode
Power Source:	DC 12V	Polarization:	Vertical



No.	Freq MHz	Cable Loss dB	ANT Factor dB/m	Receiver Reading dBuV	Preamp Factor dB	Emission Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark
1.	91.175	3.11	9.18	40.72	29.98	23.03	43.50	-20.47	QP
2.	127.665	3.69	12.52	41.80	30.01	28.00	43.50	-15.50	QP
3.	148.441	3.95	13.65	51.72	30.02	39.30	43.50	-4.20	QP
4.	223.733	4.65	11.75	48.30	30.12	34.58	46.00	-11.42	QP
5.	297.224	5.14	13.16	43.25	30.31	31.24	46.00	-14.76	QP
6.	744.866	6.73	20.64	37.35	31.12	33.60	46.00	-12.40	QP

Test Results (Above 1000MHz)

ANT A:

Test mode:	IEEE 802.11 N20	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	40.24	31.98	17.08	33.91	55.39	68.20	-12.81	V
17235.00	39.68	32.65	20.03	34.85	57.51	68.20	-10.69	V
11490.00	41.99	31.98	17.08	33.91	57.14	68.20	-11.06	H
17235.00	40.92	32.65	20.03	34.85	58.75	68.20	-9.45	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	28.92	31.98	17.08	33.91	44.07	54.00	-9.93	V
17235.00	28.73	32.65	20.03	34.85	46.56	54.00	-7.44	V
11490.00	29.16	31.98	17.08	33.91	44.31	54.00	-9.69	H
17235.00	27.72	32.65	20.03	34.85	45.55	54.00	-8.45	H

Test mode:	IEEE 802.11 N20	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	39.84	32.44	17.18	33.91	55.55	68.20	-12.65	V
17355.00	40.70	32.78	20.12	34.86	58.74	68.20	-9.46	V
11570.00	41.67	32.44	17.18	33.91	57.38	68.20	-10.82	H
17355.00	41.90	32.78	20.12	34.86	59.94	68.20	-8.26	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	27.38	32.44	17.18	33.91	43.09	54.00	-10.91	V
17355.00	27.87	32.78	20.12	34.86	45.91	54.00	-8.09	V
11570.00	27.13	32.44	17.18	33.91	42.84	54.00	-11.16	H
17355.00	27.30	32.78	20.12	34.86	45.34	54.00	-8.66	H

Test mode:	IEEE 802.11 N20	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	39.70	32.59	18.02	33.92	56.39	68.20	-11.81	V
17475.00	39.88	32.87	20.15	34.88	58.02	68.20	-10.18	V
11650.00	41.55	32.59	18.02	33.92	58.24	68.20	-9.96	H
17475.00	41.70	32.87	20.15	34.88	59.84	68.20	-8.36	H

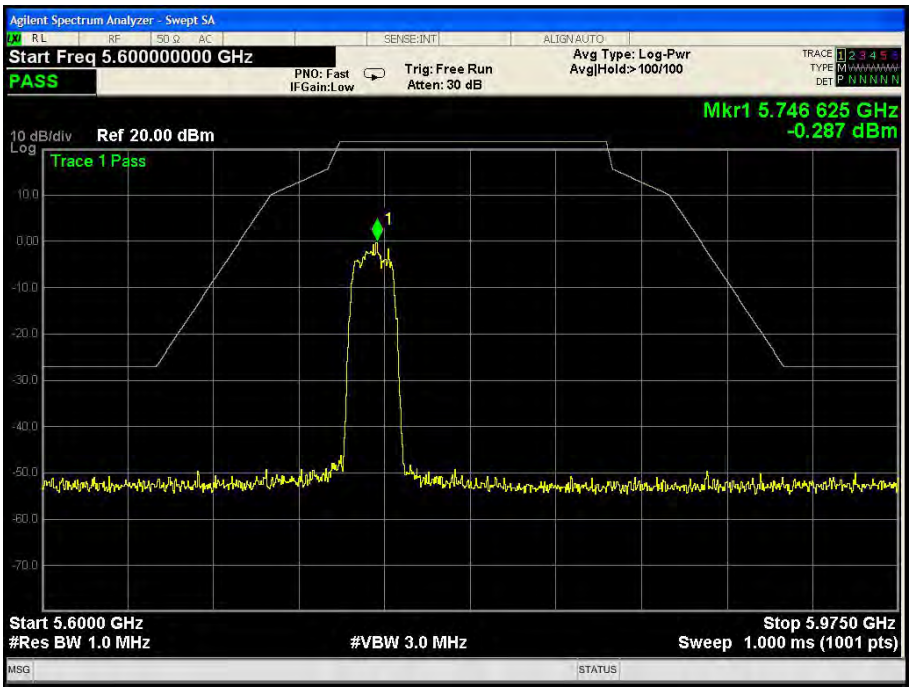
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	27.45	32.59	18.02	33.92	44.14	54.00	-9.86	V
17475.00	27.26	32.87	20.15	34.88	45.40	54.00	-8.60	V
11650.00	28.39	32.59	18.02	33.92	45.08	54.00	-8.92	H
17475.00	27.03	32.87	20.15	34.88	45.17	54.00	-8.83	H

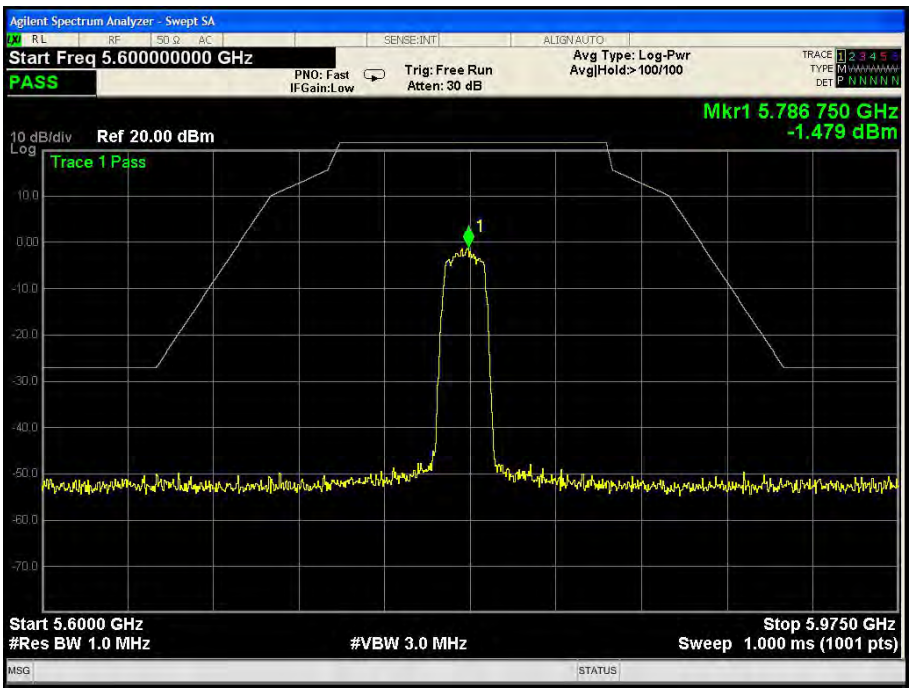
Note:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss–Preamplifier Factor
2. Product support 802.11 N (HT20) mode only, report only N20 test data
3. All other emissions moran 30dB below the limit

Band Edge test:



802.11n(20): Band Edge, Left Side



802.11n(20): Band Edge, Right Side

Test Results (Above 1000MHz)

ANT B:

Test mode:	IEEE 802.11 N20	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	41.93	31.98	17.08	33.91	57.08	68.20	-11.12	V
17235.00	40.88	32.65	20.03	34.85	58.71	68.20	-9.49	V
11490.00	41.64	31.98	17.08	33.91	56.79	68.20	-11.41	H
17235.00	39.70	32.65	20.03	34.85	57.53	68.20	-10.67	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	27.75	31.98	17.08	33.91	42.90	54.00	-11.10	V
17235.00	27.18	32.65	20.03	34.85	45.01	54.00	-8.99	V
11490.00	29.26	31.98	17.08	33.91	44.41	54.00	-9.59	H
17235.00	27.54	32.65	20.03	34.85	45.37	54.00	-8.63	H

Test mode:	IEEE 802.11 N20	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	41.57	32.44	17.18	33.91	57.28	68.20	-10.92	V
17355.00	39.59	32.78	20.12	34.86	57.63	68.20	-10.57	V
11570.00	41.60	32.44	17.18	33.91	57.31	68.20	-10.89	H
17355.00	41.37	32.78	20.12	34.86	59.41	68.20	-8.79	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	27.33	32.44	17.18	33.91	43.04	54.00	-10.96	V
17355.00	29.75	32.78	20.12	34.86	47.79	54.00	-6.21	V
11570.00	28.03	32.44	17.18	33.91	43.74	54.00	-10.26	H
17355.00	29.35	32.78	20.12	34.86	47.39	54.00	-6.61	H

Test mode:	IEEE 802.11 N20	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	39.71	32.59	18.02	33.92	56.40	68.20	-11.80	V
17475.00	41.44	32.87	20.15	34.88	59.58	68.20	-8.62	V
11650.00	41.58	32.59	18.02	33.92	58.27	68.20	-9.93	H
17475.00	40.95	32.87	20.15	34.88	59.09	68.20	-9.11	H

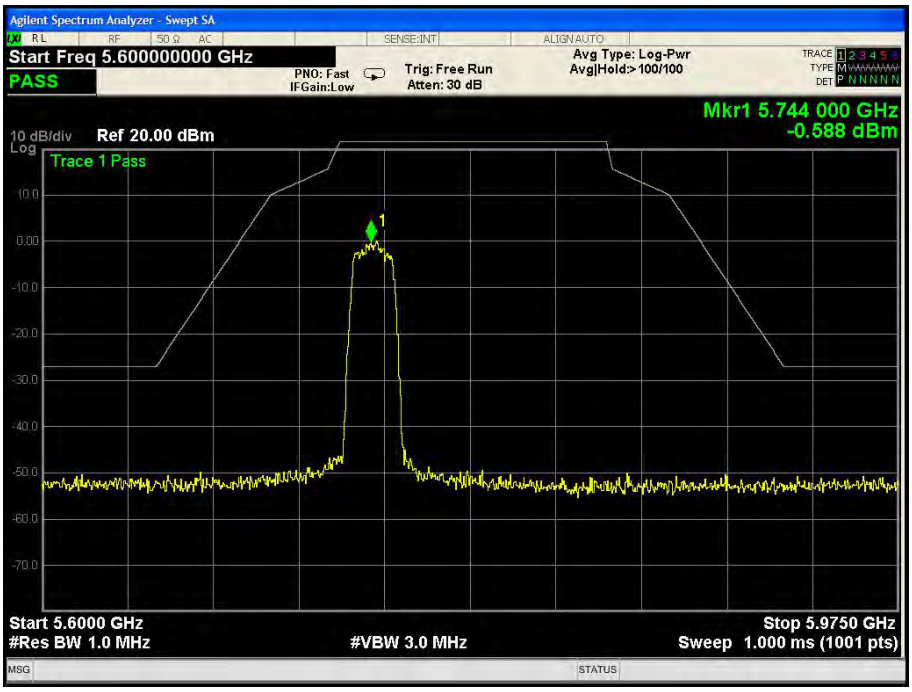
Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	27.40	32.59	18.02	33.92	44.09	54.00	-9.91	V
17475.00	28.87	32.87	20.15	34.88	47.01	54.00	-6.99	V
11650.00	29.59	32.59	18.02	33.92	46.28	54.00	-7.72	H
17475.00	29.91	32.87	20.15	34.88	48.05	54.00	-5.95	H

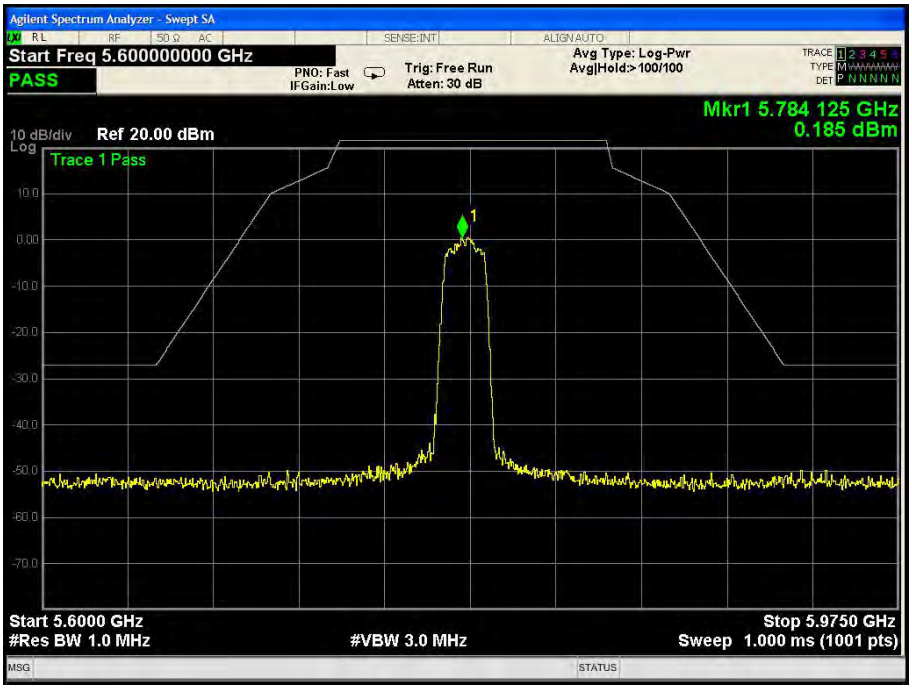
Note:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss–Preamplifier Factor
2. Product support 802.11 N (HT20) mode only, report only N20 test data
3. All other emissions moran 30dB below the limit

Band Edge test:



802.11n(20): Band Edge, Left Side



802.11n(20): Band Edge, Right Side

Test Results (Above 1000MHz)

ANT A+B

Test mode:	IEEE 802.11 N20	Test channel:	Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	42.18	31.98	17.08	33.91	57.33	68.20	-10.87	V
17235.00	41.75	32.65	20.03	34.85	59.58	68.20	-8.62	V
11490.00	42.18	31.98	17.08	33.91	57.33	68.20	-10.87	H
17235.00	41.49	32.65	20.03	34.85	59.32	68.20	-8.88	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11490.00	29.10	31.98	17.08	33.91	44.25	54.00	-9.75	V
17235.00	29.36	32.65	20.03	34.85	47.19	54.00	-6.81	V
11490.00	30.65	31.98	17.08	33.91	45.80	54.00	-8.20	H
17235.00	29.40	32.65	20.03	34.85	47.23	54.00	-6.77	H

Test mode:	IEEE 802.11 N20	Test channel:	Mid CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	40.45	32.44	17.18	33.91	56.16	68.20	-12.04	V
17355.00	42.91	32.78	20.12	34.86	60.95	68.20	-7.25	V
11570.00	40.78	32.44	17.18	33.91	56.49	68.20	-11.71	H
17355.00	42.72	32.78	20.12	34.86	60.76	68.20	-7.44	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11570.00	30.34	32.44	17.18	33.91	46.05	54.00	-7.95	V
17355.00	29.15	32.78	20.12	34.86	47.19	54.00	-6.81	V
11570.00	30.06	32.44	17.18	33.91	45.77	54.00	-8.23	H
17355.00	29.77	32.78	20.12	34.86	47.81	54.00	-6.19	H

Test mode:	IEEE 802.11 N20	Test channel:	High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	42.83	32.59	18.02	33.92	59.52	68.20	-8.68	V
17475.00	40.96	32.87	20.15	34.88	59.10	68.20	-9.10	V
11650.00	42.96	32.59	18.02	33.92	59.65	68.20	-8.55	H
17475.00	40.72	32.87	20.15	34.88	58.86	68.20	-9.34	H

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Pol.
11650.00	30.24	32.59	18.02	33.92	46.93	54.00	-7.07	V
17475.00	29.93	32.87	20.15	34.88	48.07	54.00	-5.93	V
11650.00	30.91	32.59	18.02	33.92	47.60	54.00	-6.40	H
17475.00	28.19	32.87	20.15	34.88	46.33	54.00	-7.67	H

Note:

1. Final Level =Receiver Read level + Antenna Factor + Cable Loss–Preamplifier Factor

2.Product support 802.11 N (HT20) mode only, report only N20 test data

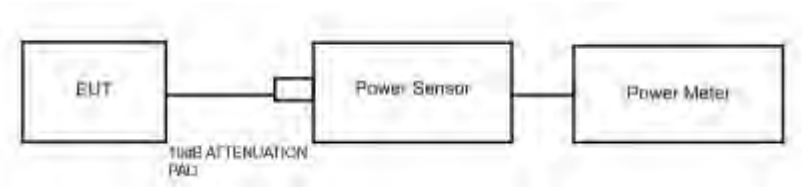
3.All other emissions moran 30dB below the limit

7 Maximum Peak Output Power Test

7.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407 (a) (3)
Test Limit	30dBm

7.2 Test Setup



7.3 Test Procedure

1. The Transmitter output (antenna port) was connected to the power meter.

2. Turn on the EUT and power meter and then record the power value.

3. Repeat above procedures on all channels needed to be tested.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

7.4 Test Data

Test Item	:	Max. peak output power	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 12V	Test Result	:	PASS

ANT A:

Mode	Channel Frequency (MHz)	Peak Power output (dBm)	Correctional Limit (dBm)	Results
802.11n20	5745	13.25	30	PASS
	5785	12.84	30	PASS
	5825	12.79	30	PASS

ANT B:

Mode	Channel Frequency (MHz)	Peak Power output (dBm)	Correctional Limit (dBm)	Results
802.11n20	5745	12.66	30	PASS
	5785	12.18	30	PASS
	5825	13.00	30	PASS

ANT A+B

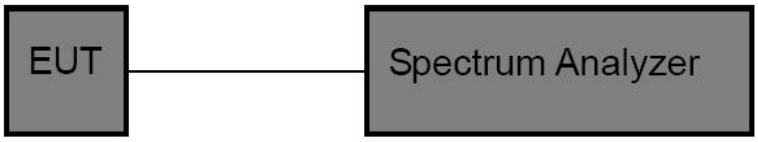
Mode	Channel Frequency (MHz)	Peak Power output (dBm)	Correctional Limit (dBm)	Results
802.11n20	5745	16.19	27.99	PASS
	5785	15.77	27.99	PASS
	5825	16.12	27.99	PASS

8 Occupy Bandwidth Test

8.1 Test Standard

Test Standard	FCC Part15 C Section 15.407 (a)(5)&15.407(e)

8.2 Test Setup



8.3 Test Procedure

1. Place the EUT on the table and set it in the transmitting mode.

2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

3. Set the spectrum analyzer as:

26 dB &99%bandwidth

RBW = approximately 1% of the emission bandwidth;

Set the VBW＞RBW;

Detector= Peak

Trace mode= Max hold.

Sweep- auto couple.

6 dB bandwidth

RBW = 100kHz;

Set the video bandwidth (VBW) ≥ 3 RBW;

Detector= Peak

Trace mode= Max hold.

Sweep- auto couple.

4. Measure the maximum width of the emission that is 26dB /6dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer

5. Repeat until all the rest channels are investigated.

8.4 Test Data

Test Item	:	6dB &26dB BW	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 12V	Test Result	:	PASS

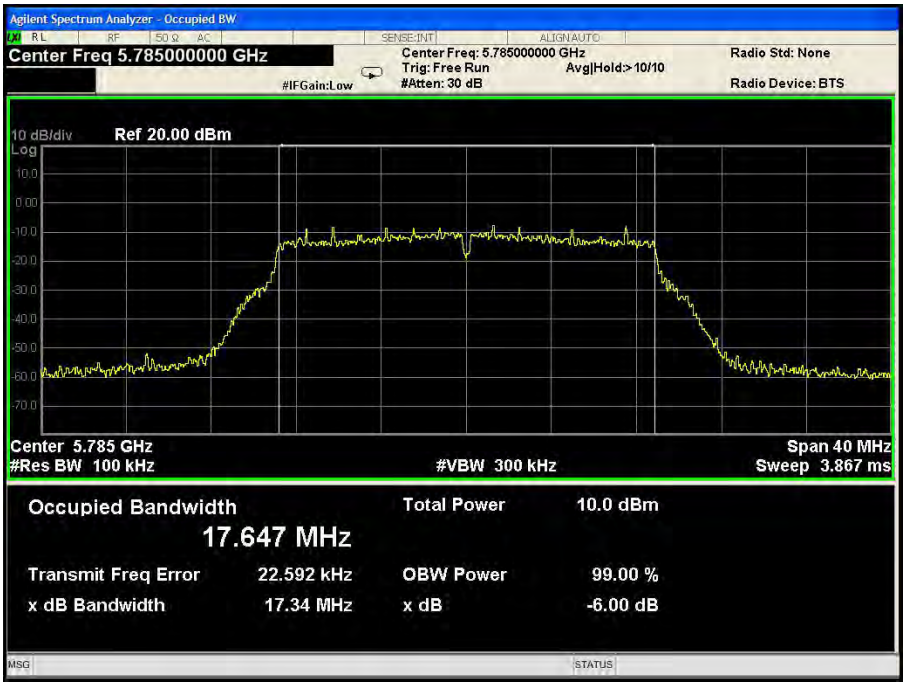
ANT A:

Mode	Channel Frequency (MHz)	6dB BW(MHz)	Limit	Results
802.11n20	5745	17.20	>0.5MHz	PASS
	5785	17.34		PASS
	5825	16.92		PASS

Mode	Channel Frequency (MHz)	26dB BW(MHz)	99% Bandwidth (MHz)
802.11n20	5745	21.38	17.785
	5785	21.35	17.806
	5825	21.20	17.759

6dB Bandwidth

Test Mode: 802.11n20---Low



Test Mode: 802.11n20---Middle

Test Mode: 802.11n20---High

26dB & 99% Bandwidth

Test Mode: 802.11N20--Low

Test Mode: 802.11N20---Middle

Test Mode: 802.11N20---High

ANT B:

Mode	Channel Frequency (MHz)	6dB BW(MHz)	Limit	Results
802.11n20	5745	17.57	>0.5MHz	PASS
	5785	17.58		PASS
	5825	17.07		PASS

Mode	Channel Frequency (MHz)	26dB BW(MHz)	99% Bandwidth (MHz)
802.11n20	5745	21.27	17.838
	5785	21.53	17.828
	5825	21.45	17.767

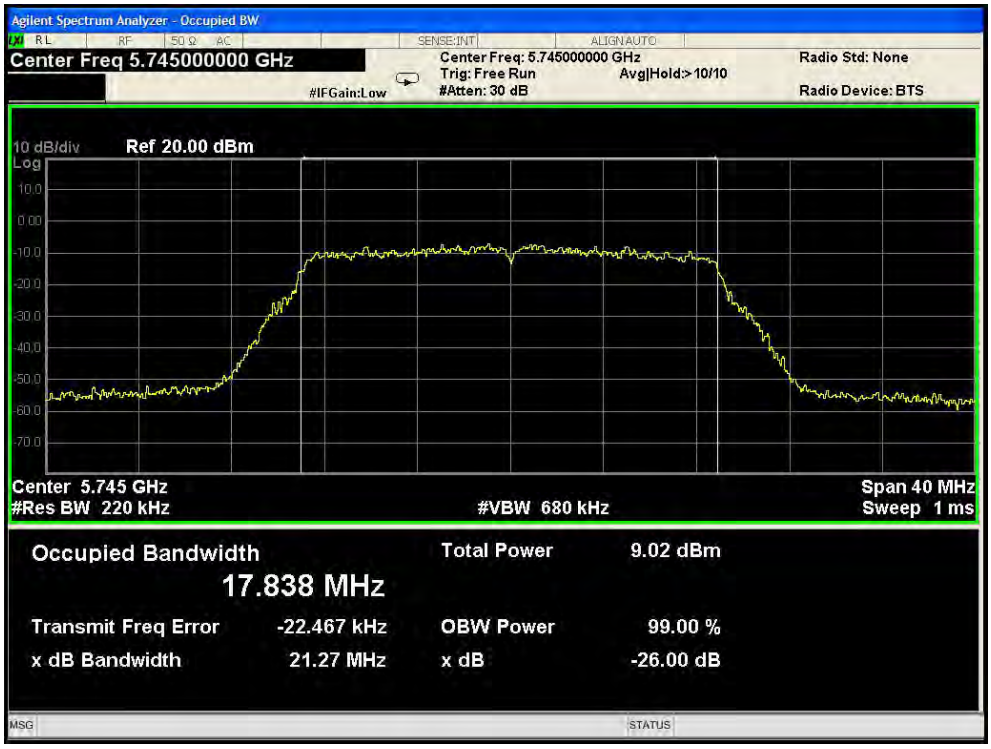
6dB Bandwidth

Test Mode: 802.11n20---Low

Test Mode: 802.11n20---Middle

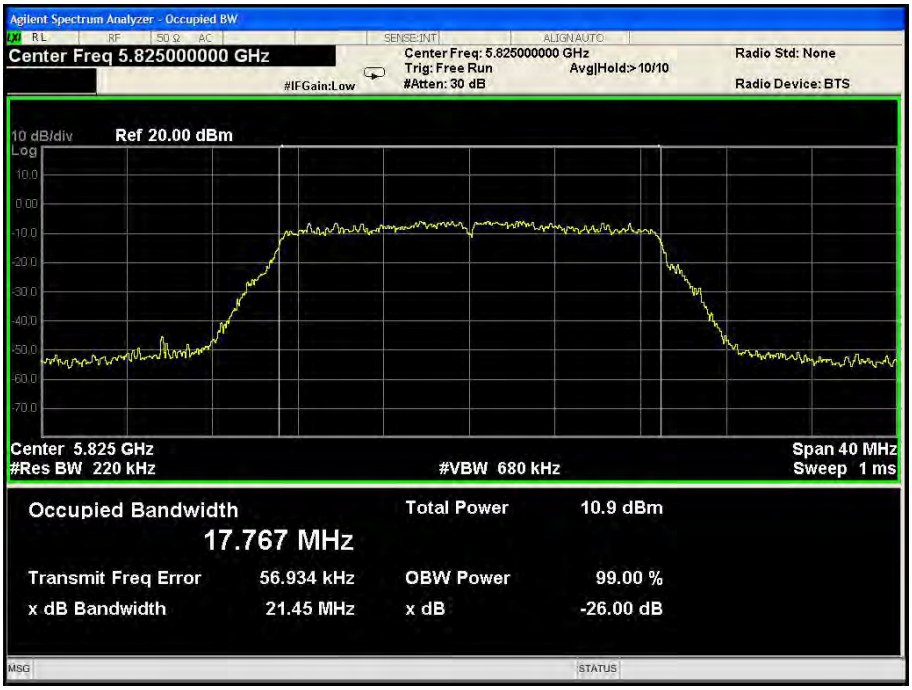
Test Mode: 802.11n20---High

26dB & 99% Bandwidth



Test Mode: 802.11n20---Low

Test Mode: 802.11n20---Middle



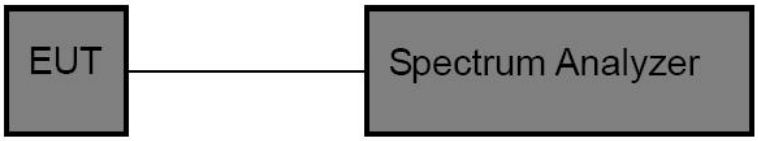
Test Mode: 802.11n20---High

9 Power Spectral Density Test

9.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.407 (a) (3)
Test Limit	30 dBm/500KHz

9.2 Test Setup



9.3 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).

1. The EUT is directly connected to the spectrum analyzer;

2. Set RBW =1MHz;

3. Set VBW ≥ 3 RBW=3MHz;

3. Set the span to encompass the entire emissions bandwidth (EBW) of the signal;

5. Detector=RMS;

6. Sweep time= auto couple;

7. Trace mode=max. hold;

9.4 Test Data

Test Item	:	Power Spectral Density	Test Mode	:	CH Low ~ CH High
Test Voltage	:	DC 12V	Test Result	:	PASS

ANT A:

Mode	Channel Frequency (MHz)	Test Power Spectral Density (dBm/510KHz)	Final Power Spectral Density (dBm/500KHz)	Limit	Results
802.11n20	5745	-2.163	-2.249	30	PASS
	5785	-1.630	-1.716	30	PASS
	5825	-1.667	-1.753	30	PASS

Remark: Final Power Spectral Density=Test Power Spectral Density+10log10(500/510)

ANT B:

Mode	Channel Frequency (MHz)	Test Power Spectral Density (dBm/510KHz)	Final Power Spectral Density (dBm/500KHz)	Limit	Results
802.11n20	5745	-1.863	-1.949	30	PASS
	5785	-2.581	-2.667	30	PASS
	5825	-2.724	-2.810	30	PASS

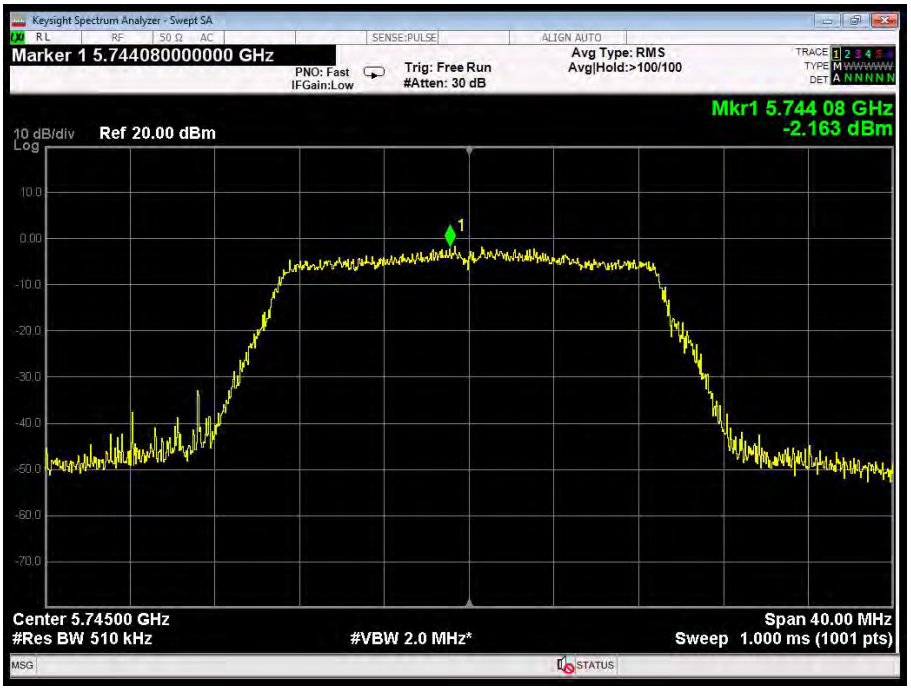
Remark: Final Power Spectral Density=Test Power Spectral Density+10log10(500/510)

ANT A+B

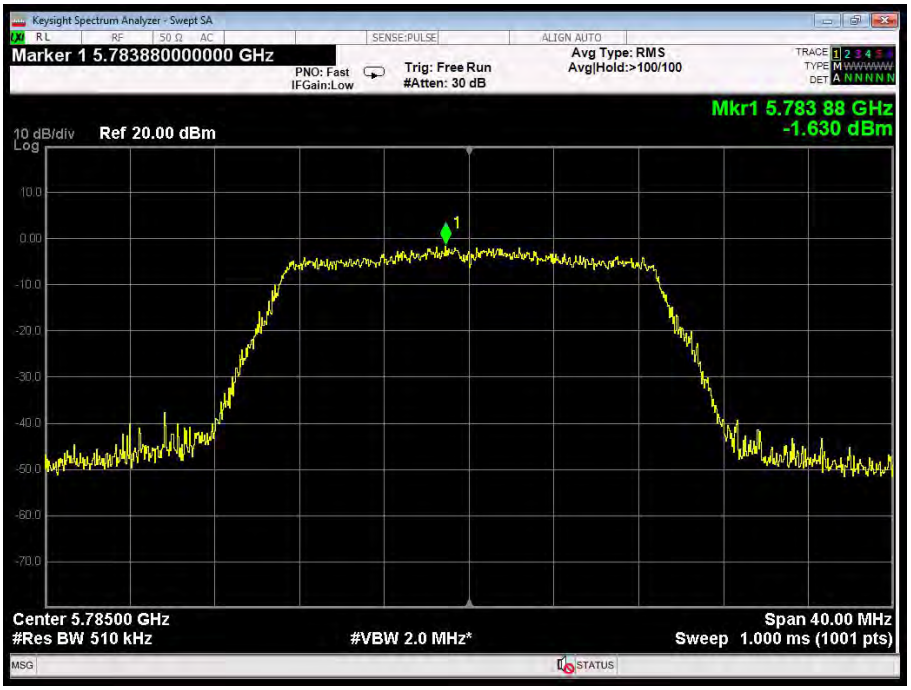
Mode	Channel Frequency (MHz)	Final Power Spectral Density (dBm/510KHz)	Final Power Spectral Density (dBm/500KHz)	Limit	Results
802.11n20	5745	3.35	3.264	27.99	PASS
	5785	3.05	2.964	27.99	PASS
	5825	2.69	2.604	27.99	PASS

Remark: Final Power Spectral Density=Test Power Spectral Density+10log10(500/510)

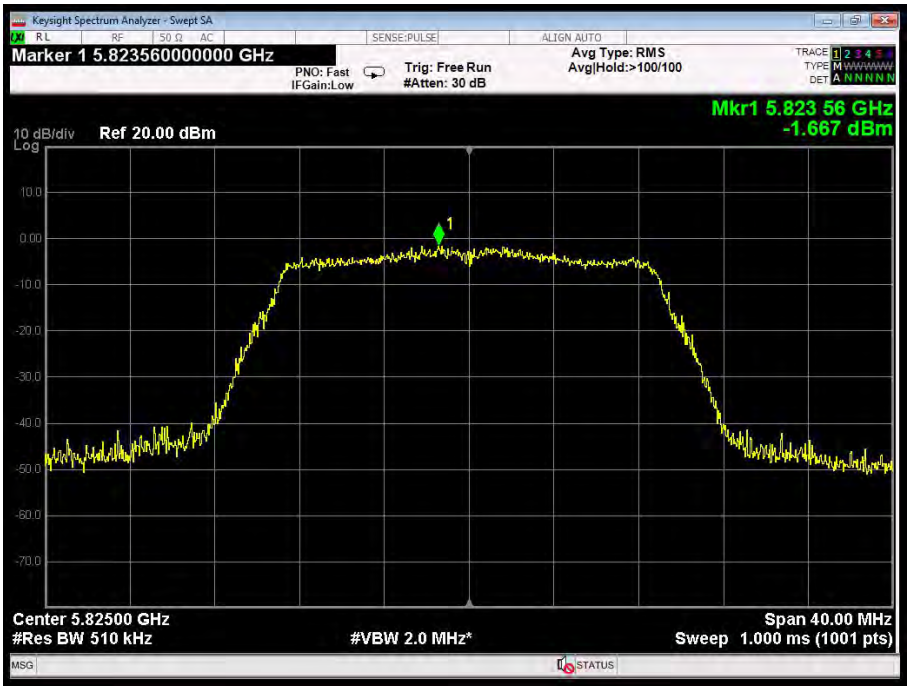
ANT A



Test Mode: 802.11n20---Low

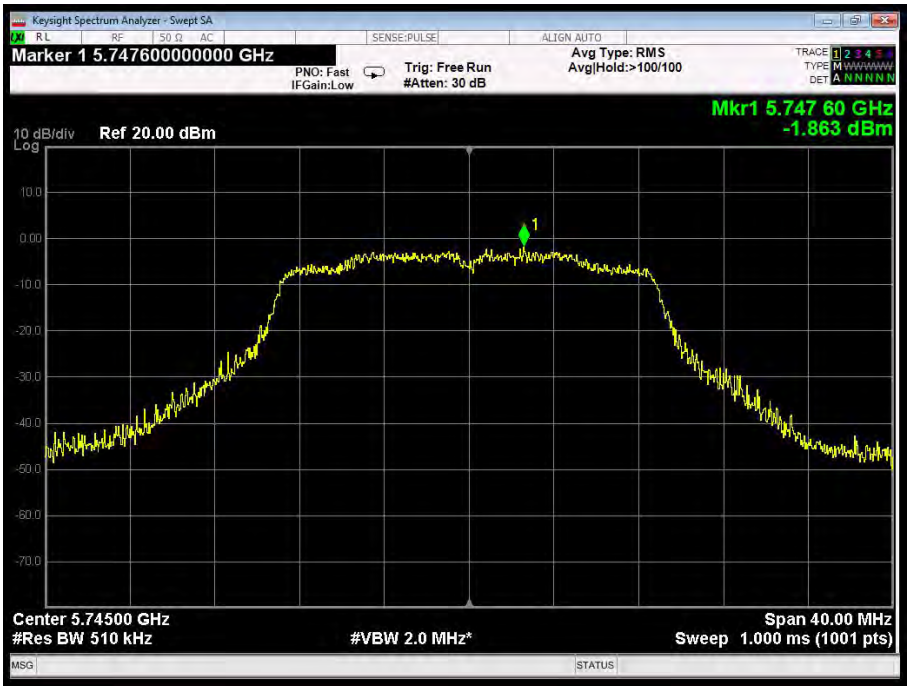


Test Mode: 802.11n20---Middle

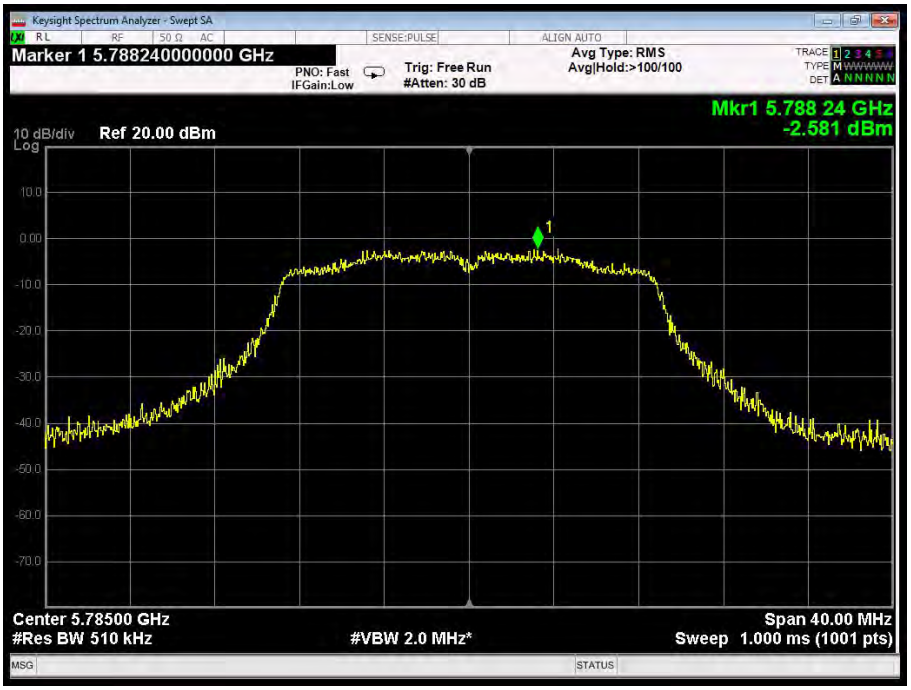


Test Mode: 802.11n20---High

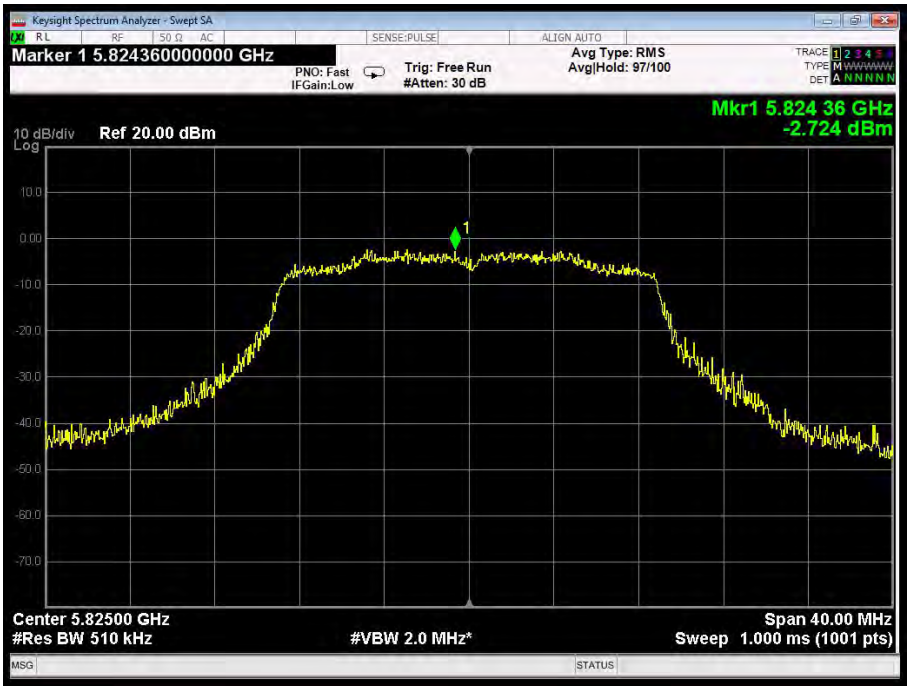
ANT B



Test Mode: 802.11n20---Low



Test Mode: 802.11n20---Middle



Test Mode: 802.11n20---High

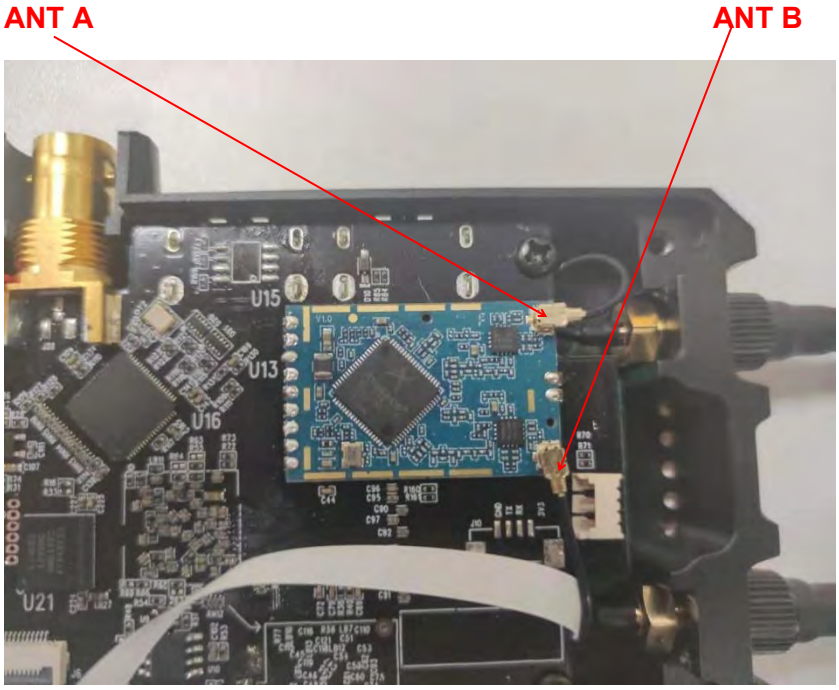
10 Antenna Requirement

10.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /15.407
Requirement	1) 15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 2) 15.407 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

10.2 Antenna Connected Construction

The antenna is a Columnar Antenna which permanently attached, and the best case gain of the antenna is 5 dBi. It complies with the standard requirement.



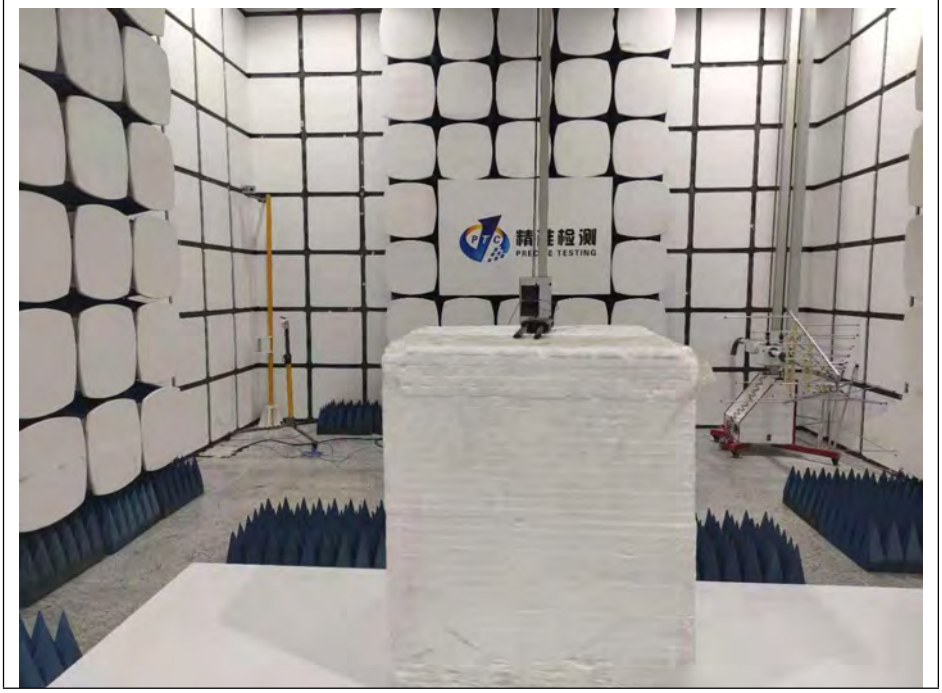
11 APPENDIX I -- PHOTOGRAPH

Conducted Emission

Radiated Emissions

From 30M-1GHz

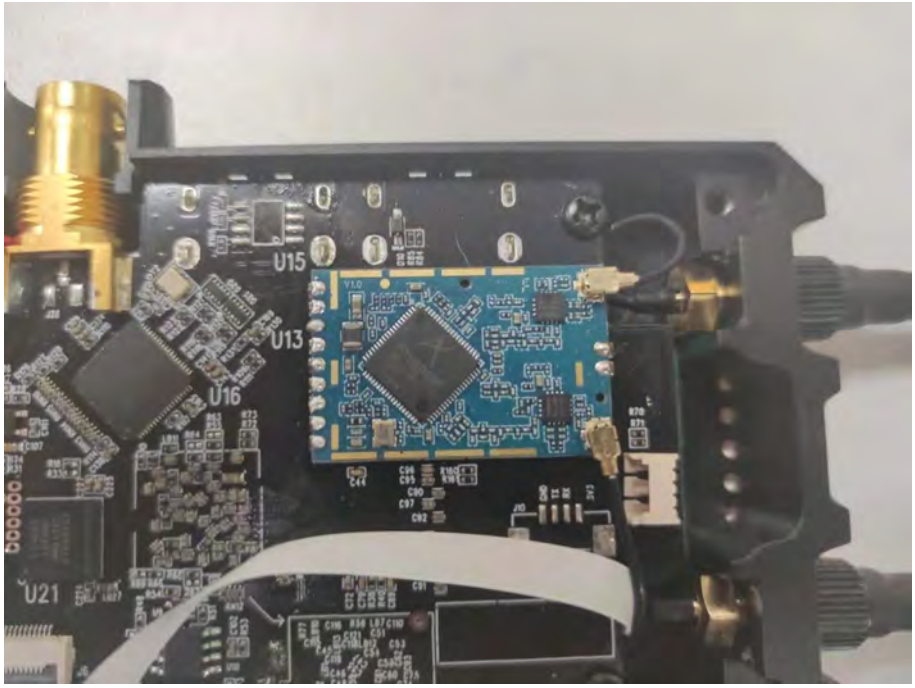
Radiated Emissions
Above 1GHz



12 APPENDIX I -- PHOTOGRAPH

FOXHOPE

FORHOPE
FORHOPE



---------- End of Report ----------