Test Report

FCC ID: YWT-5M02

Product Name:	WIFI Module
Trademark:	N/A
Model Name :	GWF-5M02
Prepared For :	Shenzhen Ogemray Technology Co.,Ltd
Address :	3F-4F,Plant 5,Dongwu Industrial Area,North of Donghuan 1st Road, Longhua office, Longhua New District, Shenzhen , Guangdong, China
Prepared By : Address :	Shenzhen BCTC Technology Co., Ltd. No.101,Yousong Road,Longhua New District, Shenzhen,China
Test Date:	Jun. 14– Jun. 23, 2017
Date of Report :	Jun. 23, 2017
Report No.:	BCTC-LH170803293-1E

VERIFICATION OF COMPLIANCE

Applicant's name.....	**Shenzhen Ogemray Technology Co.,Ltd**
Address	3F-4F,Plant 5,Dongwu Industrial Area,North of Donghuan 1st Road, Longhua office, Longhua New District, Shenzhen , Guangdong, China
Manufacture's Name	**Shenzhen Ogemray Technology Co.,Ltd**
Address	3F-4F,Plant 5,Dongwu Industrial Area,North of Donghuan 1st Road, Longhua office, Longhua New District, Shenzhen , Guangdong, China
Product description	
Product name.....	WIFI Module
Model Name:	GWF-5M02
	FCC Part15.407
Standards	ANSI C63.10-2013

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.

This report shall not be reproduced except in full, without the written approval of BCTC, this document may be altered or revised by BCTC, personal only, and shall be noted in the revision of the document.

Test Result **Pass**

Prepared by(Engineer):	Eric Yang
Reviewer(Supervisor):	Jade Yang
Approved(Manager):	Carson Zhang

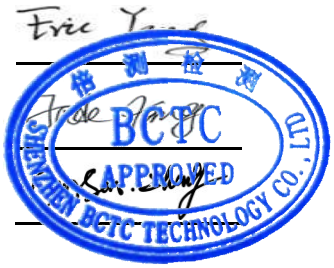


TABLE OF CONTENTS

Test Report Declaration Page

1. TEST SUMMARY 5
2. GENERAL PRODUCT INFORMATION 6
   - 2.1. Product Function 6
   - 2.2. Description of Device (EUT) 6
   - 2.3. Independent Operation Modes 8
   - 2.4. Test Sites 8
   - 2.5. List of Test and Measurement Instruments 9
3. TEST SET-UP AND OPERATION MODES 10
   - 3.1. Principle of Configuration Selection 10
   - 3.2. Block Diagram of Test Set-up 10
   - 3.3. Auxiliary Equipment 10
   - 3.4. Countermeasures to Achieve EMC Compliance 10
4. EMISSION TEST RESULTS 11
   - 4.1. Conducted Emission Measurement 11
   - 4.2. Radiated Emission Measurement 15
5. BAND EDGE COMPLIANCE TEST 47
   - 5.1. Limits 47
   - 5.2. TEST PROCEDURE 47
   - 5.3. Test Data 47
6. 26DB AND 99% BANDWIDTH TEST 53
   - 6.1. Applied procedures / limit 53
   - 6.2. TEST PROCEDURE 53
   - 6.3. Test result 54
7. MINIMUM 6 DB BANDWIDTH 61
   - 7.1. Applied procedures / limit 61
   - 7.2. TEST PROCEDURE 61
   - 7.3. Test result 61
8. OUTPUT POWER TEST 65
   - 8.1. Limits 65
   - 8.2. Test setup 65
   - 8.3. Test result 66
9. PEAK POWER SPECTRAL DENSITY TEST 67
   - 9.1. Limits 67
   - 9.2. Test setup 67
   - 9.3. Test data 68
10. DUTY CYCLE TEST SIGNAL 75
11. TRANSMISSION IN THE ABSENCE OF DATA 76
    - 11.1. Limits 76
    - 11.2. Test result 76
12. ANTENNA REQUIREMENT 77
    - 12.1. STANDARD REQUIREMENT 77
    - 12.2. EUT ANTENNA 77

13. PHOTOGRAPHS OF TEST SET-UP 78

14. EUT PHOTO 81

1.TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	RSS-GEN 15.207	PASS
Radiated Emissions	RSS-GEN 15.407(b), 15.209	PASS
26dB bandwidth and 99%dB Bandwidth	RSS-247 15.403(i) 15.407(e)	PASS
Minimum 6 dB bandwidth	15.407(e)	PASS
Power density	RSS-247 15.407 (a)	PASS
Maximum Peak Output Power	RSS-247 15.407 (a)	PASS
Emissions from out of band	RSS-247 15.407 (b)	PASS
Transmission in case of Absence of Information	RSS-247 15.407(c)	PASS
Frequency Stability	RSS-247 15.407(g)	PASS
Antenna Requirement	15.203	PASS

NOTE:

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

(2) For all test, the setup authorization of the prototype testing software comes from the customer. (including output power and other parameters)

2.GENERAL PRODUCT INFORMATION

2.1. Product Function

Refer to Technical Construction Form and User Manual.

2.2. Description of Device (EUT)

Product Name:	WIFI Module
Model No.:	GWF-5M02
Trade Name:	N/A
Operation Frequency:	5180-5240,5745-5825MHz(5G 802.11a/n/ac(HT20)) 5190-5230MHz(802.11n/ac(HT40)) 5210MHz(802.11ac(HT80))
Channel numbers:	See channel list
Modulation technology:	64QAM, 16QAM, QPSK, BPSK for OFDM
Data Rate	802.11 a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20):MCS0-MCS15; 802.11n(HT40):MCS0-MCS15; 802.11ac: NSS1,MCS0-MCS9,NSS2,MCS0-MCS9;
Antenna Type:	PCB antenna
Antenna gain:	1.0dBi
Power supply:	DC 5V

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

Channel List for 802.11a/n/ac(20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	161	5805
153	5765	165	5825
157	5785		

Channel List for 802.11n/ac(40)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

Channel List for 802.11ac(80)	
Channel	Frequency (MHz)
42	5210

2.3. Independent Operation Modes

The basic operation modes are:

These is Digital Transmission system (DTS) and have modulation OFDM, DSSS, DBPSK, DQPSK, CCK, 16QAM, 64QAM. According exploratory test, EUT will have maximum output power in those data rate (802.11a/n: MCS0), so those data rate were used for all test. The equipment enables high-speed access without wires to network assets. This adapter uses the IEEE 802.11 protocol to enable wireless communications between the host and Wireless rooter.

802.11a/n/ac(20)

Frequency	Band 1	Band 4
Low	5180MHz	5745MHz
Middle	5200MHz	5785MHz
High	5240MHz	5825MHz

802.11n/ac(40)

Frequency	Band 1	-
Low	5190MHz	-
Middle	-	-
High	5230MHz	-

802.11ac(80)

Frequency	Band 1	-
	5210MHz	-

2.4. Test Sites

2.4.1. Test Facilities

Lab Qualifications : FCC Registration No.:187086
IC Registered No.:12655A

2.5. List of Test and Measurement Instruments

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
2	Test Receiver (9kHz-7GHz)	R&S	ESPI	101318	2016.08.27	2017.08.26
3	Bilog Antenna (30MHz-1GHz)	R&S	VULB 9168	VULB91 68-438	2016.08.27	2017.08.26
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1201	2016.09.03	2017.09.03
5	Horn Antenna (14GHz-40GHz)	SCHWARZBECK	BBHA 9170	9170-181	2016.09.03	2017.09.03
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	2016.08.27	2017.08.26
7	Amplifier (1GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	2016.08.27	2017.08.26
8	Amplifier (18GHz-40GHz)	SCHWARZBECK	BBV 9721	9721-205	2016.08.27	2017.08.26
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	00014	2016.09.03	2017.09.03
10	RF cables1 (9kHz-1GHz)	R&S	R203	R20X	2016.08.27	2017.08.26
11	RF cables2 (1GHz-40GHz)	R&S	R204	R21X	2016.08.27	2017.08.26
12	Antenna connector	Florida RF Labs	N/A	RF 01#	2016.08.27	2017.08.26
13	Power Metter	ANRITSU	ML2487A	6K00001568	2016.08.27	2017.08.26
14	Power Sensor (AV)	ANRITSU	ML2491A	030989	2016.08.27	2017.08.26
15	Signal Analyzer 9kHz-26.5GHz	Agilent	N9010A	MY48030494	2016.08.27	2017.08.26
16	Test Receiver 20kHz-40GHz	R&S	ESU 40	100376	2016.08.27	2017.08.26
17	D.C. Power Supply	LongWei	PS-305D	010964729	2016.08.27	2017.08.26

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Test Receiver	R&S	ESCI	1166.5950K03-101165-ha	2016.08.27	2017.08.26
2	LISN	SCHWARZBECK	NSLK8127	8127739	2016.08.27	2017.08.26
3	LISN	R&S	NSLK8126	8126487	2016.08.27	2017.08.26
4	RF cables	R&S	R204	R20X	2016.08.27	2017.08.26
5	Attenuator	R&S	ESH3-Z2	143206	2016.08.27	2017.08.26

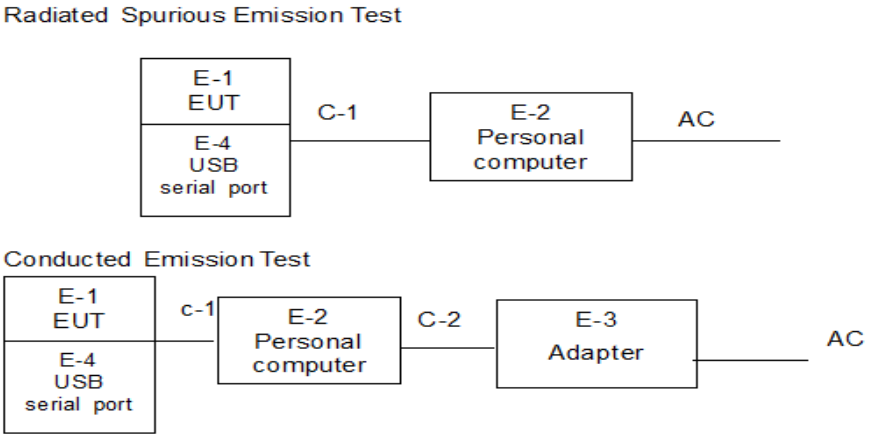
3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: WIFI Module)

3.3. Auxiliary Equipment

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	WIFI Module	N/A	GWF-5M02	N/A	EUT
E-2	Personal computer	Lenovo	S2	N/A	N/A
E-3	Adapter	Lenovo	SA10E75793	N/A	N/A
E-4	USB serial port	N/A	N/A	N/A	N/A

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	0.8M	USB cable unshielded
C-2	NO	NO	1.5M	DC cable unshielded

3.4. Countermeasures to Achieve EMC Compliance

None.

4. EMISSION TEST RESULTS

4.1. Conducted Emission Measurement

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

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

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

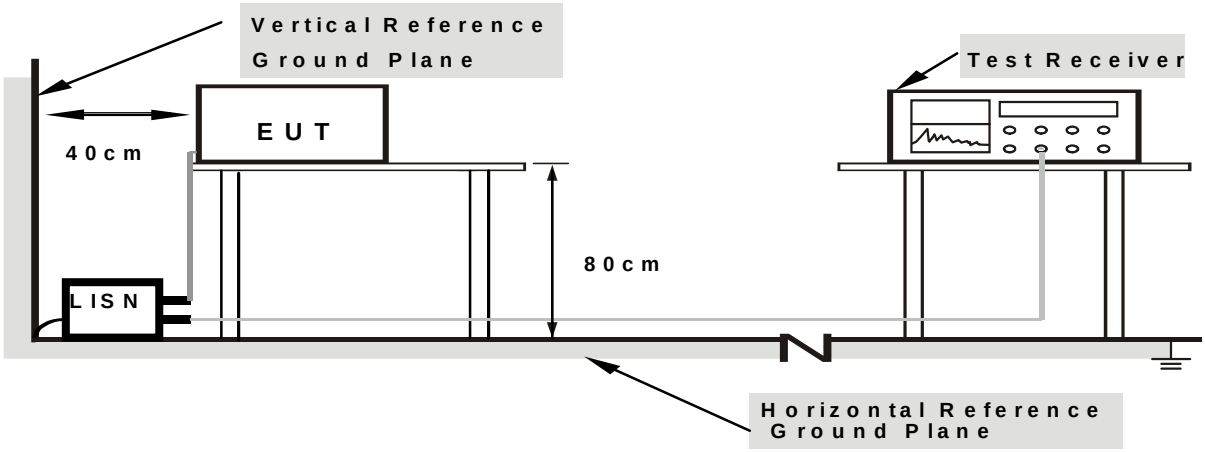
4.1.1. TEST PROCEDURE

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.

4.1.2. DEVIATION FROM TEST STANDARD

No deviation

4.1.3. TEST SETUP



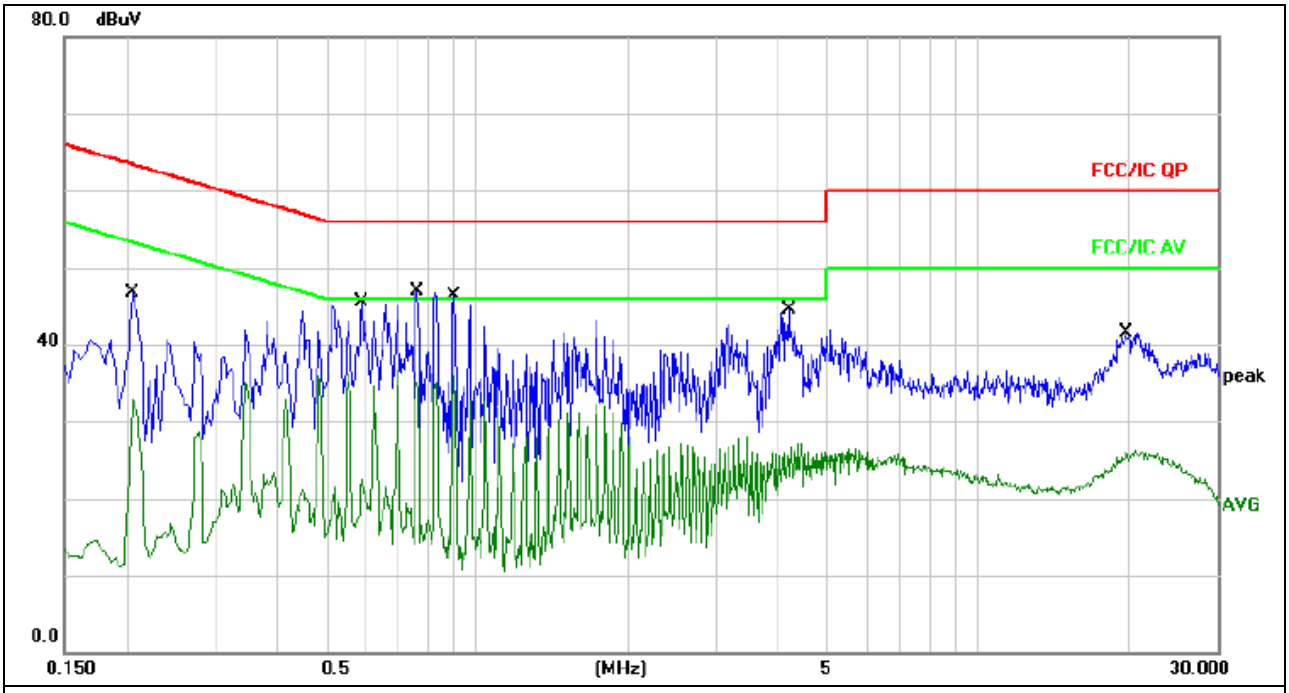
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

4.1.4. 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 all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.
The data only show the worst mode.
If peak level comply with Quasi-Peak limit, then the Quasi-Peak level is deemed to comply with Quasi-Peak limit.
We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.

4.1.5. TEST RESULTS

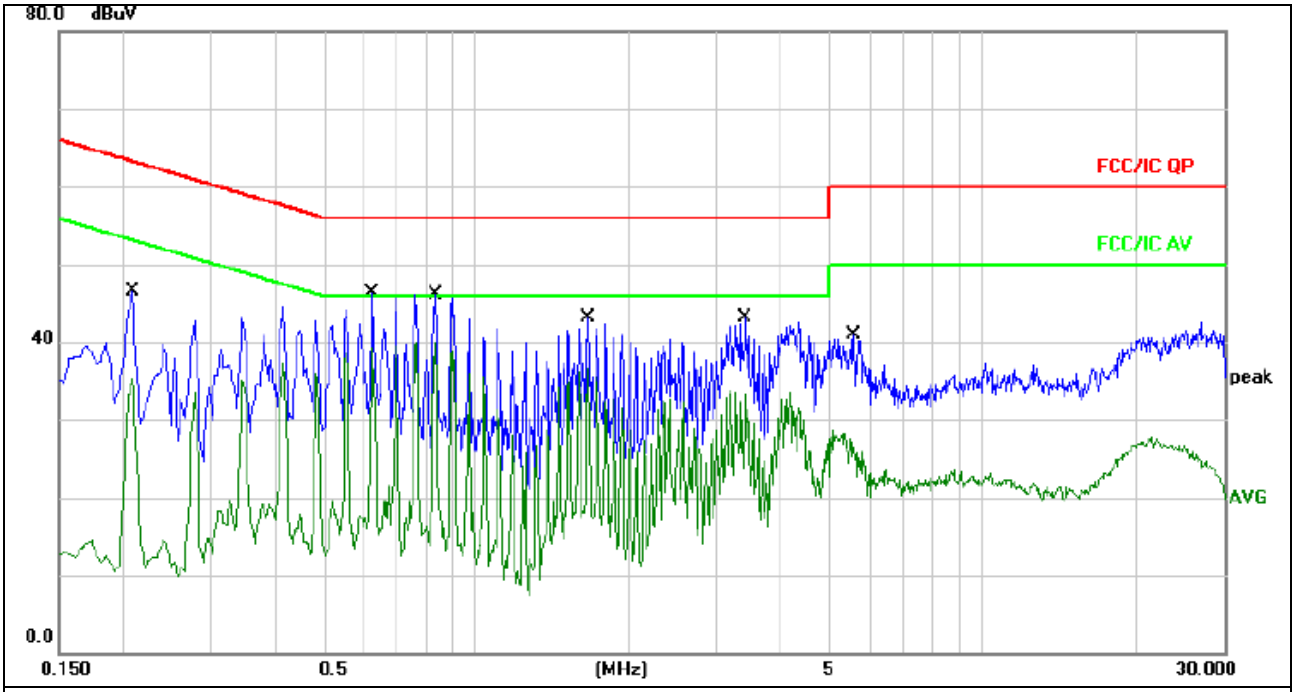
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 5V from PC	Test Mode:	Link Mode



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	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2072	36.99	9.65	46.64	63.31	-16.67	QP	
2		0.2072	22.72	9.65	32.37	53.31	-20.94	AVG	
3		0.5899	35.73	9.68	45.41	56.00	-10.59	QP	
4		0.5899	26.33	9.68	36.01	46.00	-9.99	AVG	
5	*	0.7620	37.20	9.68	46.88	56.00	-9.12	QP	
6		0.7620	27.05	9.68	36.73	46.00	-9.27	AVG	
7		0.9020	36.68	9.69	46.37	56.00	-9.63	QP	
8		0.9020	26.27	9.69	35.96	46.00	-10.04	AVG	
9		4.1979	34.78	9.73	44.51	56.00	-11.49	QP	
10		4.1979	17.36	9.73	27.09	46.00	-18.91	AVG	
11		19.6500	31.64	9.85	41.49	60.00	-18.51	QP	
12		19.6500	16.52	9.85	26.37	50.00	-23.63	AVG	

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 5V from PC	Test Mode:	Link Mode



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	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2100	36.87	9.65	46.52	63.20	-16.68	QP	
2		0.2100	25.57	9.65	35.22	53.20	-17.98	AVG	
3		0.6260	36.68	9.68	46.36	56.00	-9.64	QP	
4		0.6260	29.68	9.68	39.36	46.00	-6.64	AVG	
5		0.8340	36.39	9.69	46.08	56.00	-9.92	QP	
6	*	0.8340	30.18	9.69	39.87	46.00	-6.13	AVG	
7		1.6660	33.44	9.70	43.14	56.00	-12.86	QP	
8		1.6660	26.96	9.70	36.66	46.00	-9.34	AVG	
9		3.4020	33.28	9.73	43.01	56.00	-12.99	QP	
10		3.4020	24.00	9.73	33.73	46.00	-12.27	AVG	
11		5.5820	31.23	9.75	40.98	60.00	-19.02	QP	
12		5.5820	18.62	9.75	28.37	50.00	-21.63	AVG	

4.2. Radiated Emission Measurement

4.2.1. Radiated Emission Limits (Frequency Range 9kHz-1000MHz)

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.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

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

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

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

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

4.2.2. TEST PROCEDURE

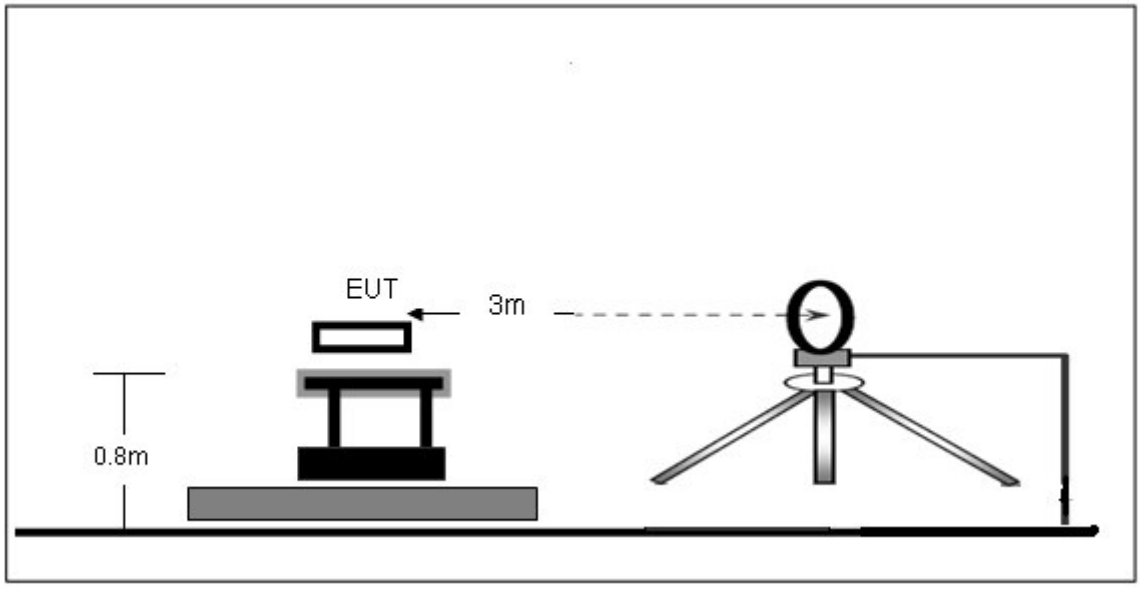
a. The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 1.5 m; 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.
g. 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.
Note:
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3. DEVIATION FROM TEST STANDARD

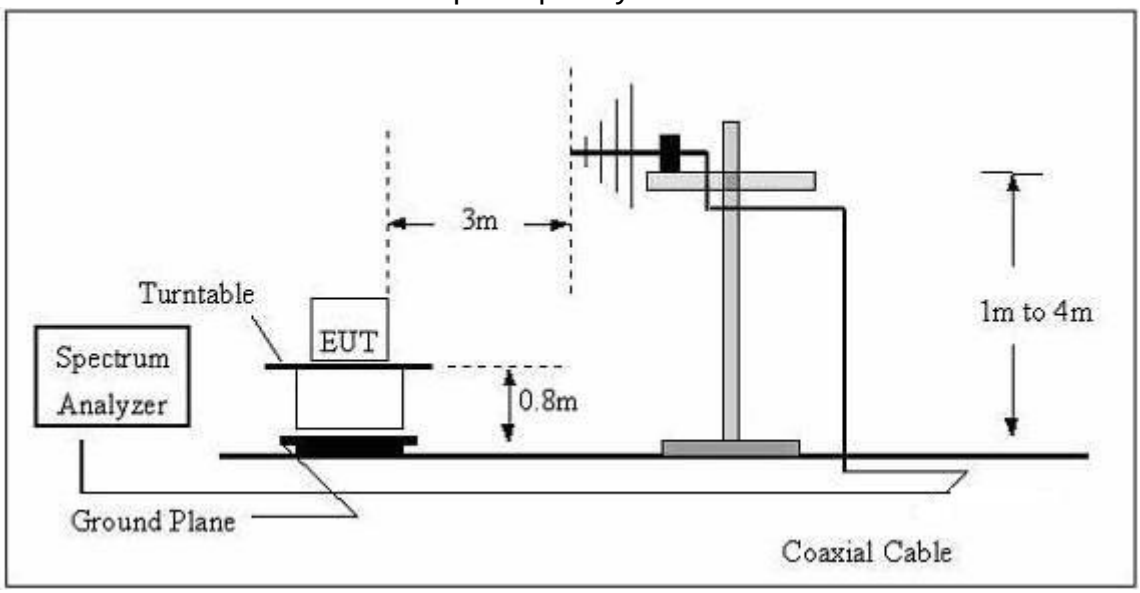
No deviation

4.2.4. TEST SETUP

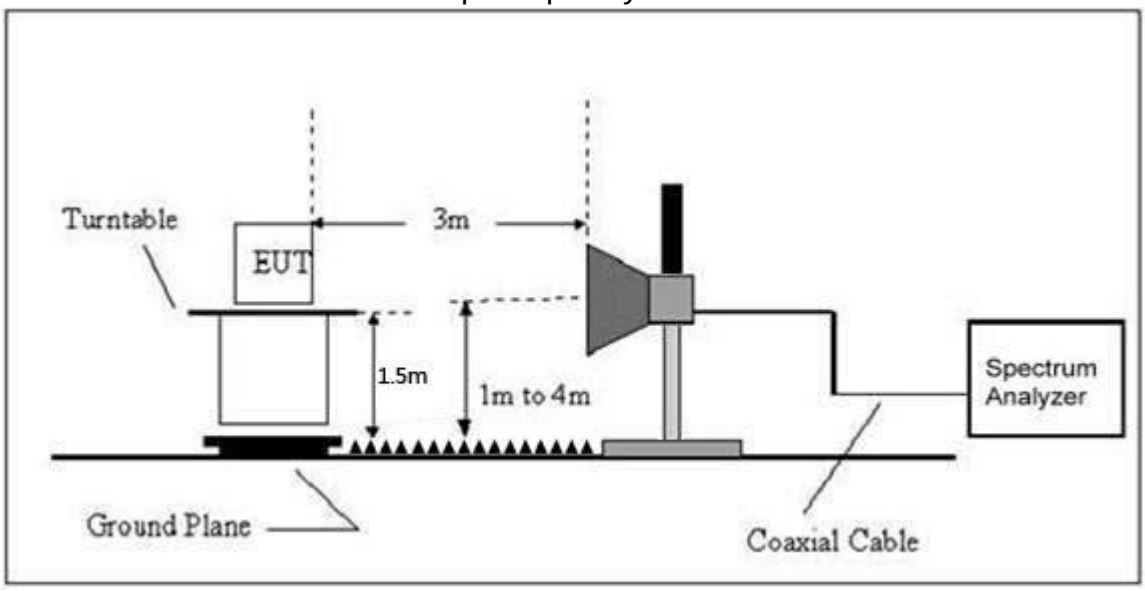
（A）Radiated Emission Test-Up Frequency Below 30MHz



（B）Radiated Emission Test-Up Frequency 30MHz~1GHz



（C）Radiated Emission Test-Up Frequency Above 1GHz



4.2.5. EUT OPERATING 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.

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

The data only show the worst mode.

Radiated Spurious Emission (Below 30MHz)

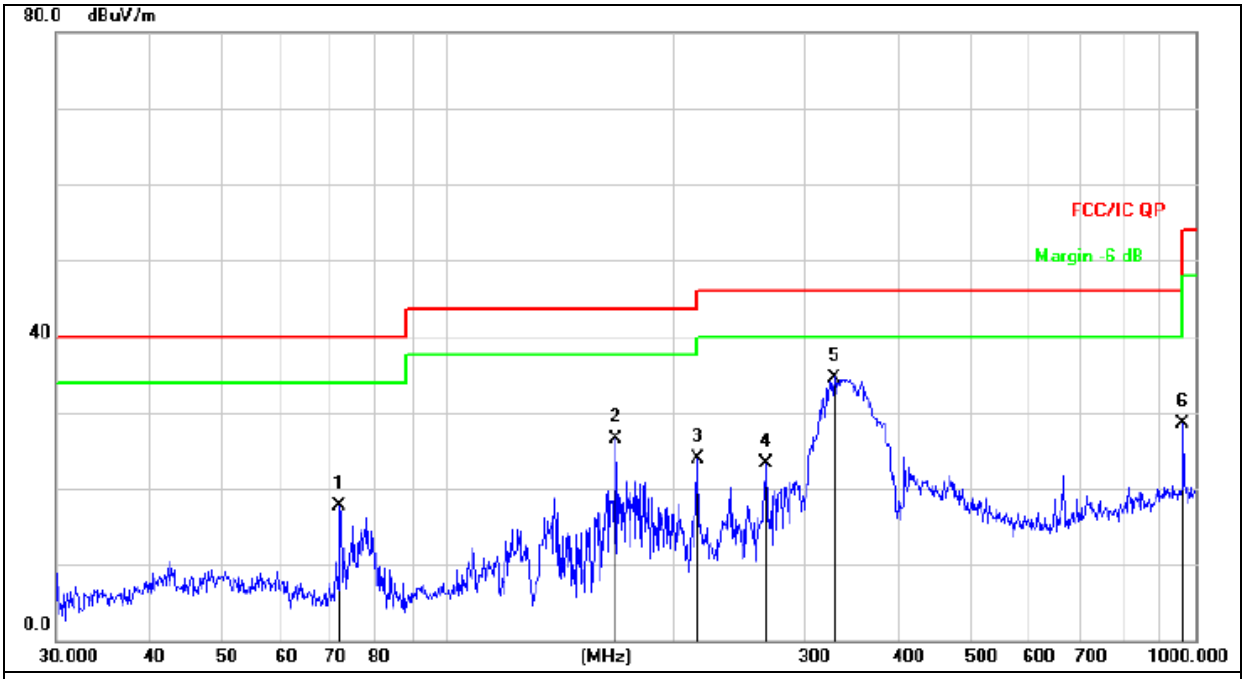
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Polarization :	---
Test Voltage ：	DC 5V from PC		
Test Mode ：	TX		

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

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.

Radiated Spurious Emission (Between 30MHz – 1GHz)

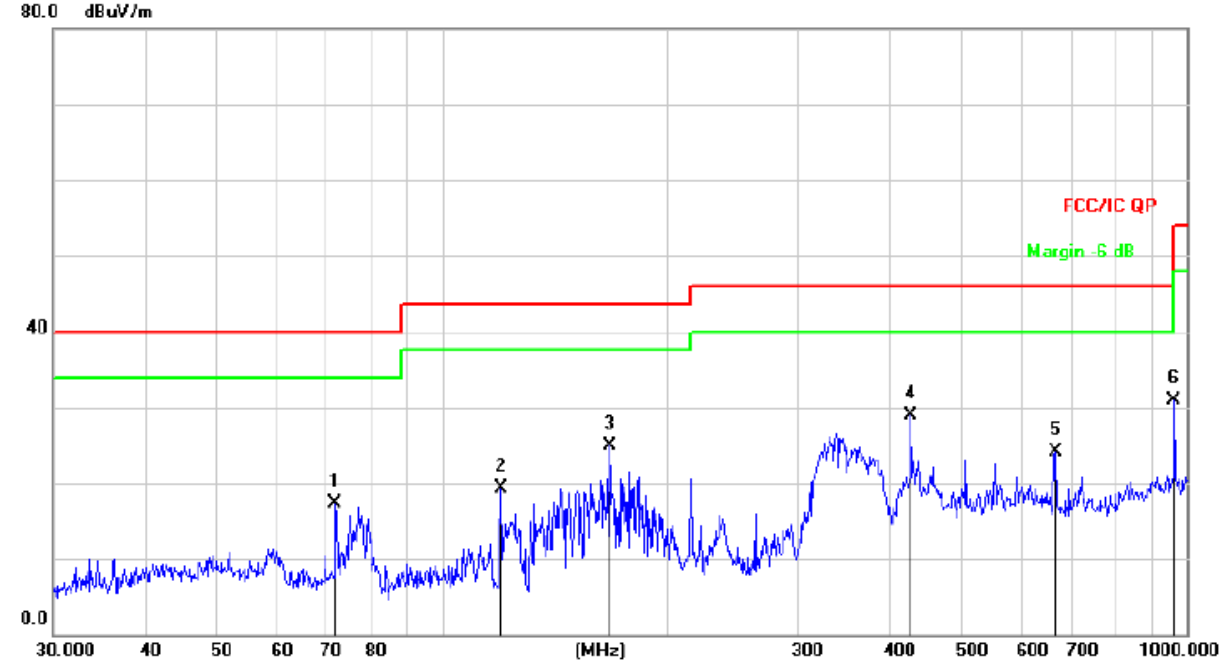
Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	Horizontal
Test Voltage ：	DC 5V from PC		
Test Mode ： (Worst)	Link Mode		



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		71.8320	35.67	-17.96	17.71	40.00	-22.29	QP
2		167.8243	45.10	-18.69	26.41	43.50	-17.09	QP
3		216.0240	40.08	-16.19	23.89	46.00	-22.11	QP
4		266.6089	38.19	-14.96	23.23	46.00	-22.77	QP
5	*	329.0390	48.02	-13.42	34.60	46.00	-11.40	QP
6		962.1623	30.54	-1.96	28.58	54.00	-25.42	QP

Temperature：	26 ℃	Relative Humidity：	54%
Pressure：	1010 hPa	Polarization：	Vertical
Test Voltage ：	DC 5V from PC		
Test Mode ： (Worst)	Link Mode		



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		71.8320	35.24	-17.96	17.28	40.00	-22.72	QP
2		119.8556	36.69	-17.43	19.26	43.50	-24.24	QP
3		167.8243	43.62	-18.69	24.93	43.50	-18.57	QP
4	*	426.5210	39.85	-10.92	28.93	46.00	-17.07	QP
5		665.8035	30.53	-6.41	24.12	46.00	-21.88	QP
6		962.1623	32.90	-1.96	30.94	54.00	-23.06	QP

Radiated Spurious Emission (Above 1GHz)
802.11a band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	10360.00	54.42	PK	H	36.36	10.20	27.10	55.36	74.00	Pass
	10360.00	42.73	Ave	H	36.36	10.20	27.10	43.67	54.00	Pass
	15540.00	51.24	PK	H	36.40	10.55	27.50	52.89	74.00	Pass
	15540.00	43.41	Ave	H	36.40	10.55	27.50	45.06	54.00	Pass
	10360.00	52.26	PK	V	36.63	10.20	27.10	52.93	74.00	Pass
	10360.00	42.65	Ave	V	36.63	10.20	27.10	43.32	54.00	Pass
	15540.00	52.47	PK	V	36.40	10.55	27.50	54.12	74.00	Pass
	15540.00	43.11	Ave	V	36.40	10.55	27.50	44.76	54.00	Pass
Middle Channel 5200MHz	10400.00	56.87	PK	H	36.38	10.20	27.10	57.79	74.00	Pass
	10400.00	45.63	Ave	H	36.38	10.20	27.10	46.55	54.00	Pass
	15600.00	58.22	PK	H	36.45	10.55	27.50	59.82	74.00	Pass
	15600.00	45.95	Ave	H	36.45	10.55	27.50	47.55	54.00	Pass
	10400.00	57.46	PK	V	36.68	10.20	27.10	58.08	74.00	Pass
	10400.00	47.75	Ave	V	36.68	10.20	27.10	48.37	54.00	Pass
	15600.00	58.69	PK	V	36.50	10.55	27.50	60.24	74.00	Pass
	15600.00	47.48	Ave	V	36.50	10.55	27.50	49.03	54.00	Pass
Upper Channel 5240MHz	10480.00	53.45	PK	H	36.65	10.35	27.34	54.49	74.00	Pass
	10480.00	43.28	Ave	H	36.65	10.35	27.34	44.32	54.00	Pass
	15720.00	52.35	PK	H	36.74	10.78	27.95	54.34	74.00	Pass
	15720.00	42.78	Ave	H	36.74	10.78	27.95	44.77	54.00	Pass
	10480.00	53.45	PK	V	36.65	10.35	27.34	54.49	74.00	Pass
	10480.00	42.87	Ave	V	36.65	10.35	27.34	43.91	54.00	Pass
	15720.00	53.02	PK	V	36.74	10.78	27.95	55.01	74.00	Pass
	15720.00	43.37	Ave	V	36.74	10.78	27.95	45.36	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11a band 4

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	11490.00	56.23	PK	H	37.15	10.55	28.12	57.75	74.00	Pass
	11490.00	46.87	Ave	H	37.15	10.55	28.12	48.39	54.00	Pass
	17235.00	57.24	PK	H	37.44	10.84	28.43	59.07	74.00	Pass
	17235.00	45.75	Ave	H	37.44	10.84	28.43	47.58	54.00	Pass
	11490.00	56.36	PK	V	37.15	10.55	28.12	57.88	74.00	Pass
	11490.00	44.35	Ave	V	37.15	10.55	28.12	45.87	54.00	Pass
	17235.00	55.42	PK	V	37.44	10.84	28.43	57.25	74.00	Pass
	17235.00	45.36	Ave	V	37.44	10.84	28.43	47.19	54.00	Pass
Middle Channel 5785MHz	11570.00	57.22	PK	H	37.15	10.89	28.35	59.31	74.00	Pass
	11570.00	47.05	Ave	H	37.15	10.89	28.35	49.14	54.00	Pass
	17355.00	58.12	PK	H	37.44	10.95	28.54	60.17	74.00	Pass
	17355.00	47.59	Ave	H	37.44	10.95	28.54	49.64	54.00	Pass
	11570.00	56.68	PK	V	37.15	10.89	28.35	58.77	74.00	Pass
	11570.00	47.83	Ave	V	37.15	10.89	28.35	49.92	54.00	Pass
	17355.00	58.01	PK	V	37.44	10.95	28.54	60.06	74.00	Pass
	17355.00	47.57	Ave	V	37.44	10.95	28.54	49.62	54.00	Pass
Upper Channel 5825MHz	11650.00	57.52	PK	H	37.29	10.96	28.56	59.75	74.00	Pass
	11650.00	46.23	Ave	H	37.29	10.96	28.56	48.46	54.00	Pass
	17475.00	59.61	PK	H	37.65	11.15	28.75	61.86	74.00	Pass
	17475.00	47.47	Ave	H	37.65	11.15	28.75	49.72	54.00	Pass
	11650.00	58.59	PK	V	37.29	10.96	28.56	60.82	74.00	Pass
	11650.00	47.36	Ave	V	37.29	10.96	28.56	49.59	54.00	Pass
	17475.00	59.42	PK	V	37.65	11.15	28.75	61.67	74.00	Pass
	17475.00	46.82	Ave	V	37.65	11.15	28.75	49.07	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11n20 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	10360.00	56.27	PK	H	36.36	10.20	27.10	57.21	74.00	Pass
	10360.00	47.78	Ave	H	36.36	10.20	27.10	48.72	54.00	Pass
	15540.00	58.11	PK	H	36.40	10.55	27.50	59.76	74.00	Pass
	15540.00	48.75	Ave	H	36.40	10.55	27.50	50.40	54.00	Pass
	10360.00	56.65	PK	V	36.63	10.20	27.10	57.32	74.00	Pass
	10360.00	48.05	Ave	V	36.63	10.20	27.10	48.72	54.00	Pass
	15540.00	57.34	PK	V	36.40	10.55	27.50	58.99	74.00	Pass
	15540.00	48.64	Ave	V	36.40	10.55	27.50	50.29	54.00	Pass
Middle Channel 5200MHz	10400.00	56.63	PK	H	36.38	10.20	27.10	57.55	74.00	Pass
	10400.00	47.27	Ave	H	36.38	10.20	27.10	48.19	54.00	Pass
	15600.00	58.21	PK	H	36.45	10.55	27.50	59.81	74.00	Pass
	15600.00	47.29	Ave	H	36.45	10.55	27.50	48.89	54.00	Pass
	10400.00	57.14	PK	V	36.68	10.20	27.10	57.76	74.00	Pass
	10400.00	47.58	Ave	V	36.68	10.20	27.10	48.2	54.00	Pass
	15600.00	58.24	PK	V	36.50	10.55	27.50	59.79	74.00	Pass
	15600.00	47.23	Ave	V	36.50	10.55	27.50	48.78	54.00	Pass
Upper Channel 5240MHz	10480.00	56.57	PK	H	36.65	10.35	27.34	57.61	74.00	Pass
	10480.00	46.24	Ave	H	36.65	10.35	27.34	47.28	54.00	Pass
	15720.00	58.32	PK	H	36.74	10.78	27.95	60.31	74.00	Pass
	15720.00	47.24	Ave	H	36.74	10.78	27.95	49.23	54.00	Pass
	10480.00	57.63	PK	V	36.65	10.35	27.34	58.67	74.00	Pass
	10480.00	45.85	Ave	V	36.65	10.35	27.34	46.89	54.00	Pass
	15720.00	58.12	PK	V	36.74	10.78	27.95	60.11	74.00	Pass
	15720.00	47.24	Ave	V	36.74	10.78	27.95	49.23	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11n20 band 4

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	11490.00	56.46	PK	H	37.15	10.55	28.12	57.98	74.00	Pass
	11490.00	47.71	Ave	H	37.15	10.55	28.12	49.23	54.00	Pass
	17235.00	58.50	PK	H	37.44	10.84	28.43	60.33	74.00	Pass
	17235.00	47.36	Ave	H	37.44	10.84	28.43	49.19	54.00	Pass
	11490.00	56.04	PK	V	37.15	10.55	28.12	57.56	74.00	Pass
	11490.00	46.13	Ave	V	37.15	10.55	28.12	47.65	54.00	Pass
	17235.00	59.21	PK	V	37.44	10.84	28.43	61.04	74.00	Pass
	17235.00	47.75	Ave	V	37.44	10.84	28.43	49.58	54.00	Pass
Middle Channel 5785MHz	11570.00	57.41	PK	H	37.15	10.89	28.35	59.5	74.00	Pass
	11570.00	47.32	Ave	H	37.15	10.89	28.35	49.41	54.00	Pass
	17355.00	58.19	PK	H	37.44	10.95	28.54	60.24	74.00	Pass
	17355.00	48.24	Ave	H	37.44	10.95	28.54	50.29	54.00	Pass
	11570.00	56.99	PK	V	37.15	10.89	28.35	59.08	74.00	Pass
	11570.00	47.24	Ave	V	37.15	10.89	28.35	49.33	54.00	Pass
	17355.00	59.62	PK	V	37.44	10.95	28.54	61.67	74.00	Pass
	17355.00	47.36	Ave	V	37.44	10.95	28.54	49.41	54.00	Pass
Upper Channel 5825MHz	11650.00	57.79	PK	H	37.29	10.96	28.56	60.02	74.00	Pass
	11650.00	47.14	Ave	H	37.29	10.96	28.56	49.37	54.00	Pass
	17475.00	59.73	PK	H	37.65	11.15	28.75	61.98	74.00	Pass
	17475.00	47.65	Ave	H	37.65	11.15	28.75	49.90	54.00	Pass
	11650.00	57.95	PK	V	37.29	10.96	28.56	60.18	74.00	Pass
	11650.00	46.82	Ave	V	37.29	10.96	28.56	49.05	54.00	Pass
	17475.00	59.36	PK	V	37.65	11.15	28.75	61.61	74.00	Pass
	17475.00	48.05	Ave	V	37.65	11.15	28.75	50.30	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	10360.00	58.29	PK	H	36.36	10.20	27.10	59.23	74.00	Pass
	10360.00	48.54	Ave	H	36.36	10.20	27.10	49.48	54.00	Pass
	15540.00	59.13	PK	H	36.40	10.55	27.50	60.78	74.00	Pass
	15540.00	47.86	Ave	H	36.40	10.55	27.50	49.51	54.00	Pass
	10360.00	56.75	PK	V	36.63	10.20	27.10	57.42	74.00	Pass
	10360.00	48.67	Ave	V	36.63	10.20	27.10	49.34	54.00	Pass
	15540.00	58.49	PK	V	36.40	10.55	27.50	60.14	74.00	Pass
	15540.00	46.65	Ave	V	36.40	10.55	27.50	48.30	54.00	Pass
Middle Channel 5200MHz	10400.00	56.45	PK	H	36.38	10.20	27.10	57.37	74.00	Pass
	10400.00	45.79	Ave	H	36.38	10.20	27.10	46.71	54.00	Pass
	15600.00	58.05	PK	H	36.45	10.55	27.50	59.65	74.00	Pass
	15600.00	45.43	Ave	H	36.45	10.55	27.50	47.03	54.00	Pass
	10400.00	56.85	PK	V	36.68	10.20	27.10	57.47	74.00	Pass
	10400.00	47.31	Ave	V	36.68	10.20	27.10	47.93	54.00	Pass
	15600.00	58.58	PK	V	36.50	10.55	27.50	60.13	74.00	Pass
	15600.00	47.64	Ave	V	36.50	10.55	27.50	49.19	54.00	Pass
Upper Channel 5240MHz	10480.00	55.93	PK	H	36.65	10.35	27.34	56.97	74.00	Pass
	10480.00	46.52	Ave	H	36.65	10.35	27.34	47.56	54.00	Pass
	15720.00	58.16	PK	H	36.74	10.78	27.95	60.15	74.00	Pass
	15720.00	47.25	Ave	H	36.74	10.78	27.95	49.24	54.00	Pass
	10480.00	56.67	PK	V	36.65	10.35	27.34	57.71	74.00	Pass
	10480.00	45.21	Ave	V	36.65	10.35	27.34	46.25	54.00	Pass
	15720.00	59.84	PK	V	36.74	10.78	27.95	61.83	74.00	Pass
	15720.00	47.53	Ave	V	36.74	10.78	27.95	49.52	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac band 4

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	11490.00	56.48	PK	H	37.15	10.55	28.12	58.00	74.00	Pass
	11490.00	47.48	Ave	H	37.15	10.55	28.12	49.00	54.00	Pass
	17235.00	57.86	PK	H	37.44	10.84	28.43	59.69	74.00	Pass
	17235.00	46.34	Ave	H	37.44	10.84	28.43	48.17	54.00	Pass
	11490.00	56.81	PK	V	37.15	10.55	28.12	58.33	74.00	Pass
	11490.00	46.10	Ave	V	37.15	10.55	28.12	47.62	54.00	Pass
	17235.00	56.76	PK	V	37.44	10.84	28.43	58.59	74.00	Pass
	17235.00	46.35	Ave	V	37.44	10.84	28.43	48.18	54.00	Pass
Middle Channel 5785MHz	11570.00	57.46	PK	H	37.15	10.89	28.35	59.55	74.00	Pass
	11570.00	47.95	Ave	H	37.15	10.89	28.35	50.04	54.00	Pass
	17355.00	58.37	PK	H	37.44	10.95	28.54	60.42	74.00	Pass
	17355.00	48.12	Ave	H	37.44	10.95	28.54	50.17	54.00	Pass
	11570.00	57.74	PK	V	37.15	10.89	28.35	59.83	74.00	Pass
	11570.00	47.83	Ave	V	37.15	10.89	28.35	49.92	54.00	Pass
	17355.00	59.94	PK	V	37.44	10.95	28.54	61.99	74.00	Pass
	17355.00	47.28	Ave	V	37.44	10.95	28.54	49.33	54.00	Pass
Upper Channel 5825MHz	11650.00	57.83	PK	H	37.29	10.96	28.56	60.06	74.00	Pass
	11650.00	46.15	Ave	H	37.29	10.96	28.56	48.38	54.00	Pass
	17475.00	59.75	PK	H	37.65	11.15	28.75	62.00	74.00	Pass
	17475.00	46.35	Ave	H	37.65	11.15	28.75	48.60	54.00	Pass
	11650.00	59.24	PK	V	37.29	10.96	28.56	61.47	74.00	Pass
	11650.00	47.17	Ave	V	37.29	10.96	28.56	49.40	54.00	Pass
	17475.00	59.46	PK	V	37.65	11.15	28.75	61.71	74.00	Pass
	17475.00	46.73	Ave	V	37.65	11.15	28.75	48.98	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11n40 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5190MHz	10380.00	57.86	PK	H	36.36	10.20	27.10	58.80	74.00	Pass
	10380.00	48.54	Ave	H	36.36	10.20	27.10	49.48	54.00	Pass
	15570.00	58.76	PK	H	36.40	10.55	27.50	60.41	74.00	Pass
	15570.00	47.74	Ave	H	36.40	10.55	27.50	49.39	54.00	Pass
	10380.00	57.52	PK	V	36.63	10.20	27.10	58.19	74.00	Pass
	10380.00	48.38	Ave	V	36.63	10.20	27.10	49.05	54.00	Pass
	15570.00	58.27	PK	V	36.40	10.55	27.50	59.92	74.00	Pass
	15570.00	47.65	Ave	V	36.40	10.55	27.50	49.30	54.00	Pass
Upper Channel 5230MHz	10460.00	55.58	PK	H	36.65	10.35	27.34	56.62	74.00	Pass
	10460.00	46.64	Ave	H	36.65	10.35	27.34	47.68	54.00	Pass
	15690.00	57.99	PK	H	36.74	10.78	27.95	59.98	74.00	Pass
	15690.00	47.57	Ave	H	36.74	10.78	27.95	49.56	54.00	Pass
	10460.00	56.88	PK	V	36.65	10.35	27.34	57.92	74.00	Pass
	10460.00	44.69	Ave	V	36.65	10.35	27.34	45.73	54.00	Pass
	15690.00	58.53	PK	V	36.74	10.78	27.95	60.52	74.00	Pass
	15690.00	47.04	Ave	V	36.74	10.78	27.95	49.03	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac40 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	10380.00	57.46	PK	H	36.36	10.20	27.10	58.40	74.00	Pass
	10380.00	48.54	Ave	H	36.36	10.20	27.10	49.48	54.00	Pass
	15570.00	58.45	PK	H	36.40	10.55	27.50	60.10	74.00	Pass
	15570.00	47.86	Ave	H	36.40	10.55	27.50	49.51	54.00	Pass
	10380.00	56.75	PK	V	36.63	10.20	27.10	57.42	74.00	Pass
	10380.00	48.48	Ave	V	36.63	10.20	27.10	49.15	54.00	Pass
	15570.00	58.76	PK	V	36.40	10.55	27.50	60.41	74.00	Pass
	15570.00	46.53	Ave	V	36.40	10.55	27.50	48.18	54.00	Pass
Upper Channel 5240MHz	10460.00	56.53	PK	H	36.65	10.35	27.34	57.57	74.00	Pass
	10460.00	47.41	Ave	H	36.65	10.35	27.34	48.45	54.00	Pass
	15690.00	57.82	PK	H	36.74	10.78	27.95	59.81	74.00	Pass
	15690.00	47.38	Ave	H	36.74	10.78	27.95	49.37	54.00	Pass
	10460.00	56.87	PK	V	36.65	10.35	27.34	57.91	74.00	Pass
	10460.00	44.24	Ave	V	36.65	10.35	27.34	45.28	54.00	Pass
	15690.00	59.05	PK	V	36.74	10.78	27.95	61.04	74.00	Pass
	15690.00	48.24	Ave	V	36.74	10.78	27.95	50.23	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac80 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Channel 5210MHz	10420.00	58.14	PK	H	36.38	10.20	27.10	59.06	74.00	Pass
	10420.00	48.20	Ave	H	36.38	10.20	27.10	49.12	54.00	Pass
	15630.00	59.29	PK	H	36.45	10.55	27.50	60.89	74.00	Pass
	15630.00	47.50	Ave	H	36.45	10.55	27.50	49.10	54.00	Pass
	10420.00	56.26	PK	V	36.68	10.20	27.10	56.88	74.00	Pass
	10420.00	48.04	Ave	V	36.68	10.20	27.10	48.66	54.00	Pass
	15630.00	59.02	PK	V	36.50	10.55	27.50	60.57	74.00	Pass
	15630.00	47.37	Ave	V	36.50	10.55	27.50	48.92	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

18G~40GHz

802.11a band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	20720.00	44.53	PK	H	37.15	10.55	28.12	46.05	74.00	Pass
	25900.00	43.24	PK	H	37.15	10.82	28.42	45.33	74.00	Pass
	31080.00	42.86	PK	H	37.68	11.18	28.78	45.14	74.00	Pass
	20720.00	42.37	PK	V	37.15	10.55	28.12	43.89	74.00	Pass
	25900.00	43.34	PK	V	37.15	10.82	28.42	45.43	74.00	Pass
	31080.00	43.58	PK	V	37.68	11.18	28.78	45.86	74.00	Pass
Middle Channel 5200MHz	20800.00	43.46	PK	H	37.15	10.55	28.12	44.98	74.00	Pass
	26000.00	42.23	PK	H	37.15	10.82	28.42	44.32	74.00	Pass
	31200.00	42.27	PK	H	37.68	11.18	28.78	44.55	74.00	Pass
	20800.00	42.36	PK	V	37.15	10.55	28.12	43.88	74.00	Pass
	26000.00	42.51	PK	V	37.15	10.82	28.42	44.60	74.00	Pass
	31200.00	42.17	PK	V	37.68	11.18	28.78	44.45	74.00	Pass
Upper Channel 5240MHz	20960.00	42.56	PK	H	37.15	10.55	28.12	44.08	74.00	Pass
	26200.00	42.74	PK	H	37.15	10.82	28.42	44.83	74.00	Pass
	31440.00	42.26	PK	H	37.68	11.18	28.78	44.54	74.00	Pass
	20960.00	43.41	PK	V	37.15	10.55	28.12	44.93	74.00	Pass
	26200.00	41.69	PK	V	37.15	10.82	28.42	43.78	74.00	Pass
	31440.00	42.23	PK	V	37.68	11.18	28.78	44.51	74.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.
If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

802.11a band 4

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	22980.00	43.48	PK	H	37.15	10.55	28.12	45.00	74.00	Pass
	28725.00	42.63	PK	H	37.15	10.82	28.42	44.72	74.00	Pass
	34470.00	41.64	PK	H	37.68	11.18	28.78	43.92	74.00	Pass
	22980.00	43.44	PK	V	37.15	10.55	28.12	44.96	74.00	Pass
	28725.00	42.6	PK	V	37.15	10.82	28.42	44.69	74.00	Pass
	34470.00	42.32	PK	V	37.68	11.18	28.78	44.60	74.00	Pass
Middle Channel 5785MHz	23140.00	43.55	PK	H	37.15	10.55	28.12	45.07	74.00	Pass
	28925.00	42.67	PK	H	37.15	10.82	28.42	44.76	74.00	Pass
	34710.00	42.87	PK	H	37.68	11.18	28.78	45.15	74.00	Pass
	23140.00	42.5	PK	V	37.15	10.55	28.12	44.02	74.00	Pass
	28925.00	42.94	PK	V	37.15	10.82	28.42	45.03	74.00	Pass
	34710.00	42.51	PK	V	37.68	11.18	28.78	44.79	74.00	Pass
Upper Channel 5825MHz	23300.00	42.99	PK	H	37.15	10.55	28.12	44.51	74.00	Pass
	29125.00	42.79	PK	H	37.15	10.82	28.42	44.88	74.00	Pass
	34950.00	42.74	PK	H	37.68	11.18	28.78	45.02	74.00	Pass
	23300.00	43.63	PK	V	37.15	10.55	28.12	45.15	74.00	Pass
	29125.00	42.51	PK	V	37.15	10.82	28.42	44.60	74.00	Pass
	34950.00	42.49	PK	V	37.68	11.18	28.78	44.77	74.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.
If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

802.11n20 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	20720.00	42.42	PK	H	37.15	10.55	28.12	43.94	74.00	Pass
	25900.00	42.61	PK	H	37.15	10.82	28.42	44.70	74.00	Pass
	31080.00	42.38	PK	H	37.68	11.18	28.78	44.66	74.00	Pass
	20720.00	43.46	PK	V	37.15	10.55	28.12	44.98	74.00	Pass
	25900.00	43.51	PK	V	37.15	10.82	28.42	45.60	74.00	Pass
	31080.00	42.54	PK	V	37.68	11.18	28.78	44.82	74.00	Pass
Middle Channel 5200MHz	20800.00	43.05	PK	H	37.15	10.55	28.12	44.57	74.00	Pass
	26000.00	43.33	PK	H	37.15	10.82	28.42	45.42	74.00	Pass
	31200.00	42.62	PK	H	37.68	11.18	28.78	44.90	74.00	Pass
	20800.00	42.74	PK	V	37.15	10.55	28.12	44.26	74.00	Pass
	26000.00	43.28	PK	V	37.15	10.82	28.42	45.37	74.00	Pass
	31200.00	43.09	PK	V	37.68	11.18	28.78	45.37	74.00	Pass
Upper Channel 5240MHz	20960.00	43.32	PK	H	37.15	10.55	28.12	44.84	74.00	Pass
	26200.00	43.15	PK	H	37.15	10.82	28.42	45.24	74.00	Pass
	31440.00	42.53	PK	H	37.68	11.18	28.78	44.81	74.00	Pass
	20960.00	43.87	PK	V	37.15	10.55	28.12	45.39	74.00	Pass
	26200.00	41.62	PK	V	37.15	10.82	28.42	43.71	74.00	Pass
	31440.00	42.45	PK	V	37.68	11.18	28.78	44.73	74.00	Pass

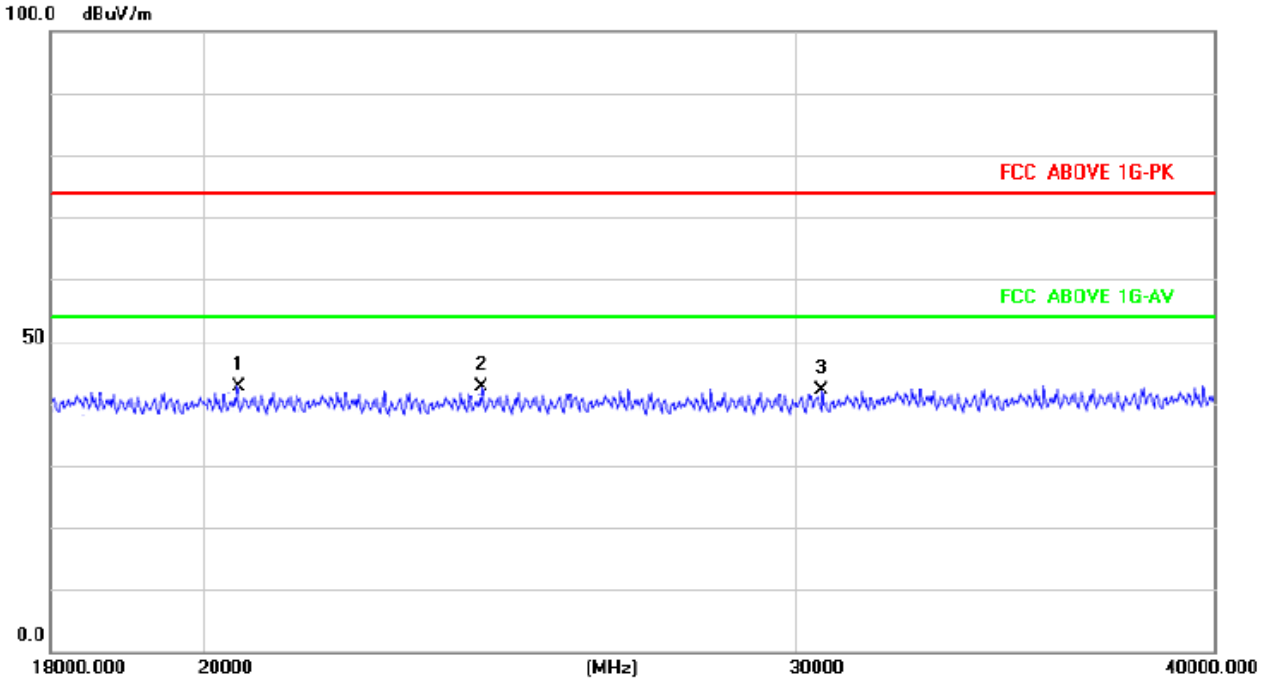
Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.
If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

802.11n20 band 4

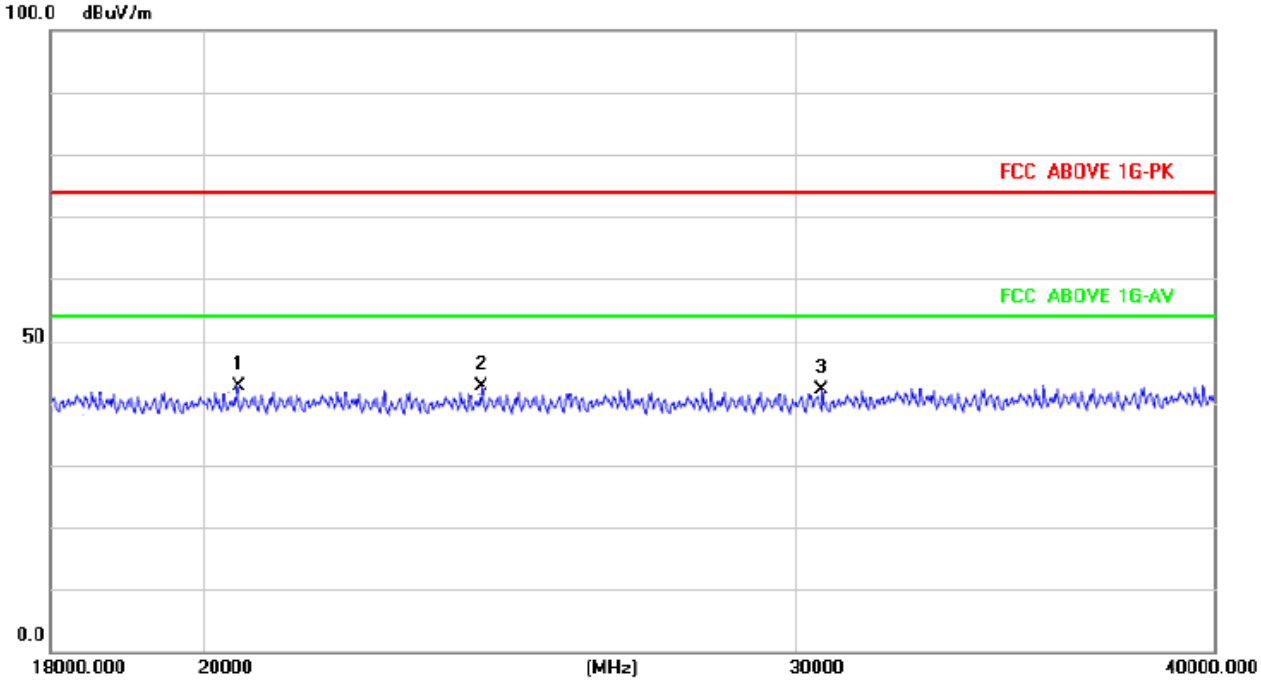
	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	22980.00	42.63	PK	H	37.15	10.55	28.12	44.15	74.00	Pass
	28725.00	42.86	PK	H	37.15	10.82	28.42	44.95	74.00	Pass
	34470.00	42.32	PK	H	37.68	11.18	28.78	44.60	74.00	Pass
	22980.00	43.47	PK	V	37.15	10.55	28.12	44.99	74.00	Pass
	28725.00	43.52	PK	V	37.15	10.82	28.42	45.61	74.00	Pass
	34470.00	42.47	PK	V	37.68	11.18	28.78	44.75	74.00	Pass
Middle Channel 5785MHz	23140.00	43.19	PK	H	37.15	10.55	28.12	44.71	74.00	Pass
	28925.00	43.54	PK	H	37.15	10.82	28.42	45.63	74.00	Pass
	34710.00	43.27	PK	H	37.68	11.18	28.78	45.55	74.00	Pass
	23140.00	43.24	PK	V	37.15	10.55	28.12	44.76	74.00	Pass
	28925.00	43.63	PK	V	37.15	10.82	28.42	45.72	74.00	Pass
	34710.00	43.27	PK	V	37.68	11.18	28.78	45.55	74.00	Pass
Upper Channel 5825MHz	23300.00	43.52	PK	H	37.15	10.55	28.12	45.04	74.00	Pass
	29125.00	43.17	PK	H	37.15	10.82	28.42	45.26	74.00	Pass
	34950.00	42.53	PK	H	37.68	11.18	28.78	44.81	74.00	Pass
	23300.00	43.25	PK	V	37.15	10.55	28.12	44.77	74.00	Pass
	29125.00	43.78	PK	V	37.15	10.82	28.42	45.87	74.00	Pass
	34950.00	43.61	PK	V	37.68	11.18	28.78	45.89	74.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.
If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

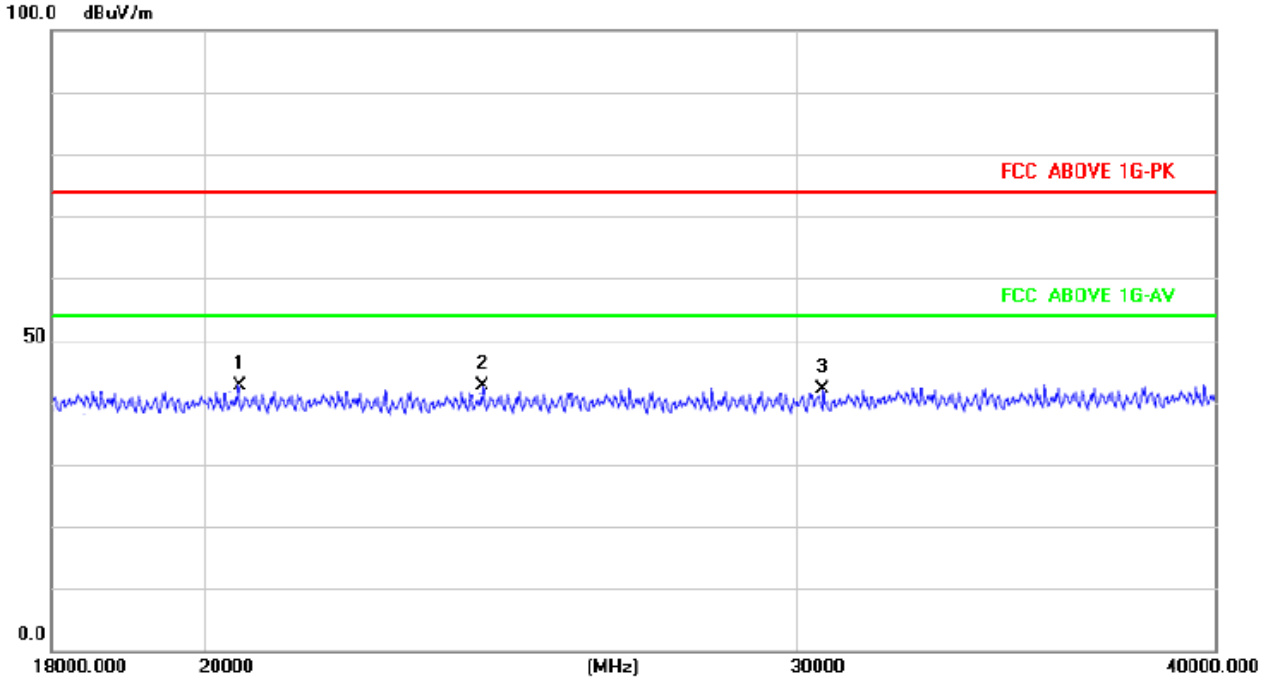
802.11a band 1
5180MHz Horizontal



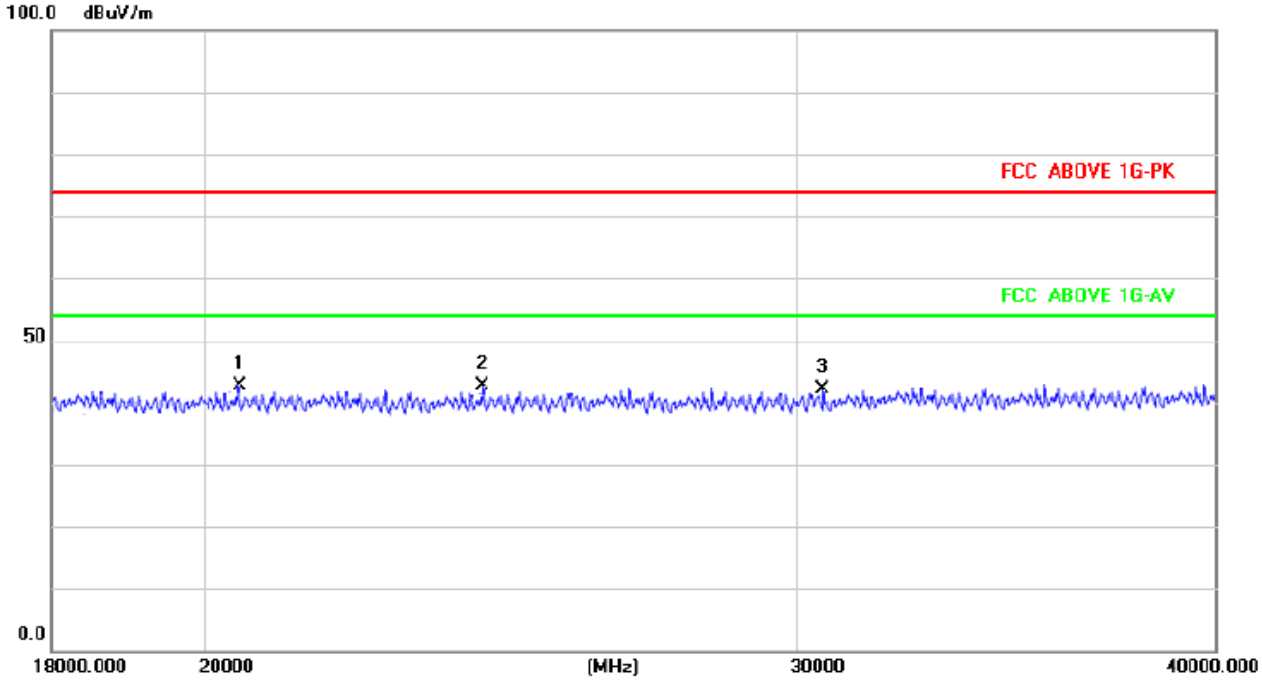
5180MHz Vertical



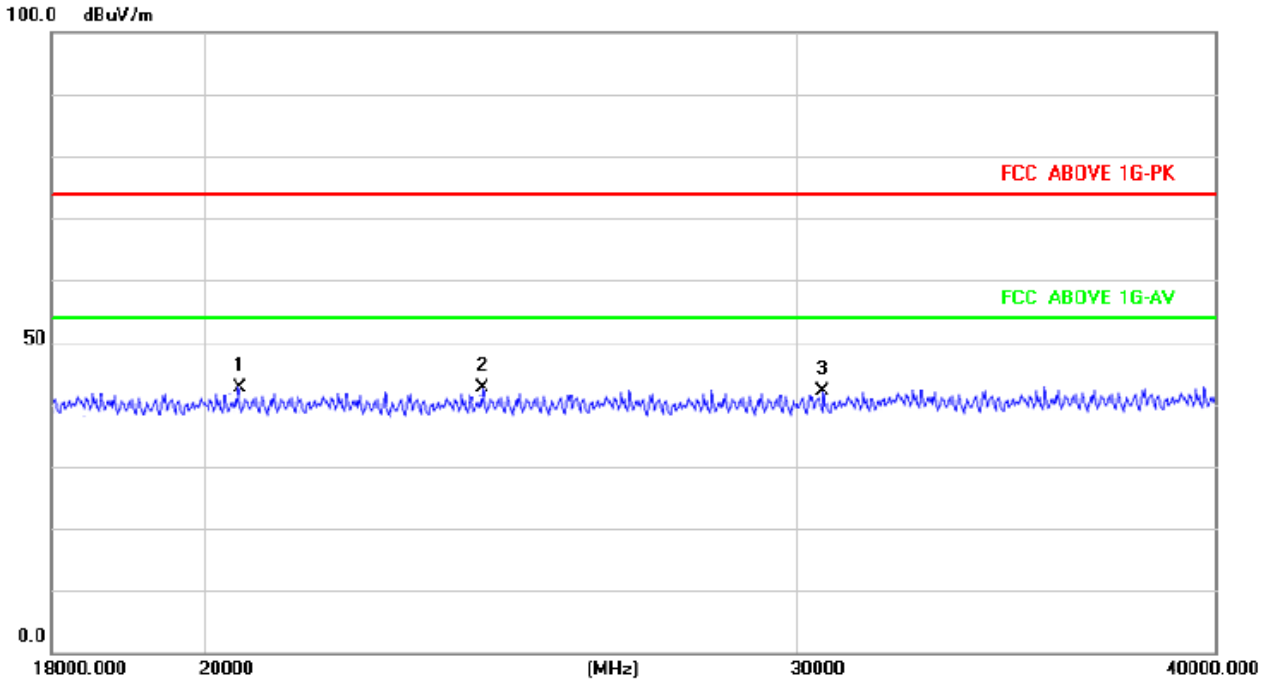
5200MHz Horizontal



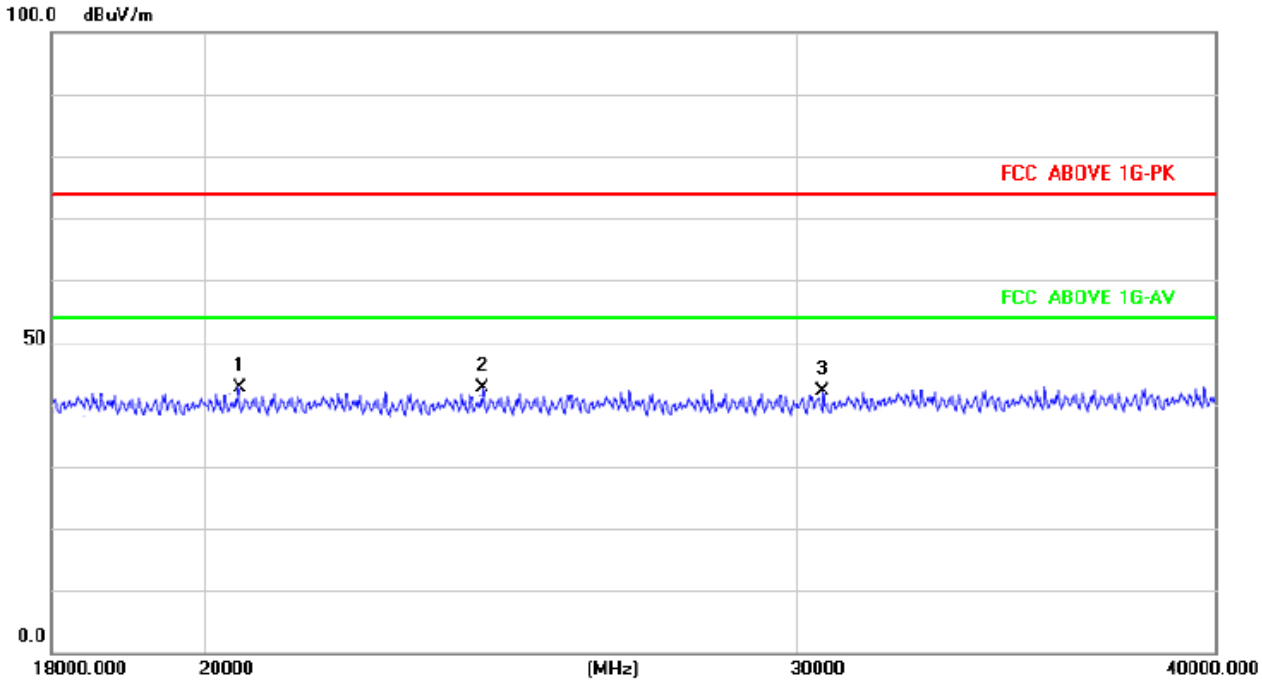
5200MHz Vertical



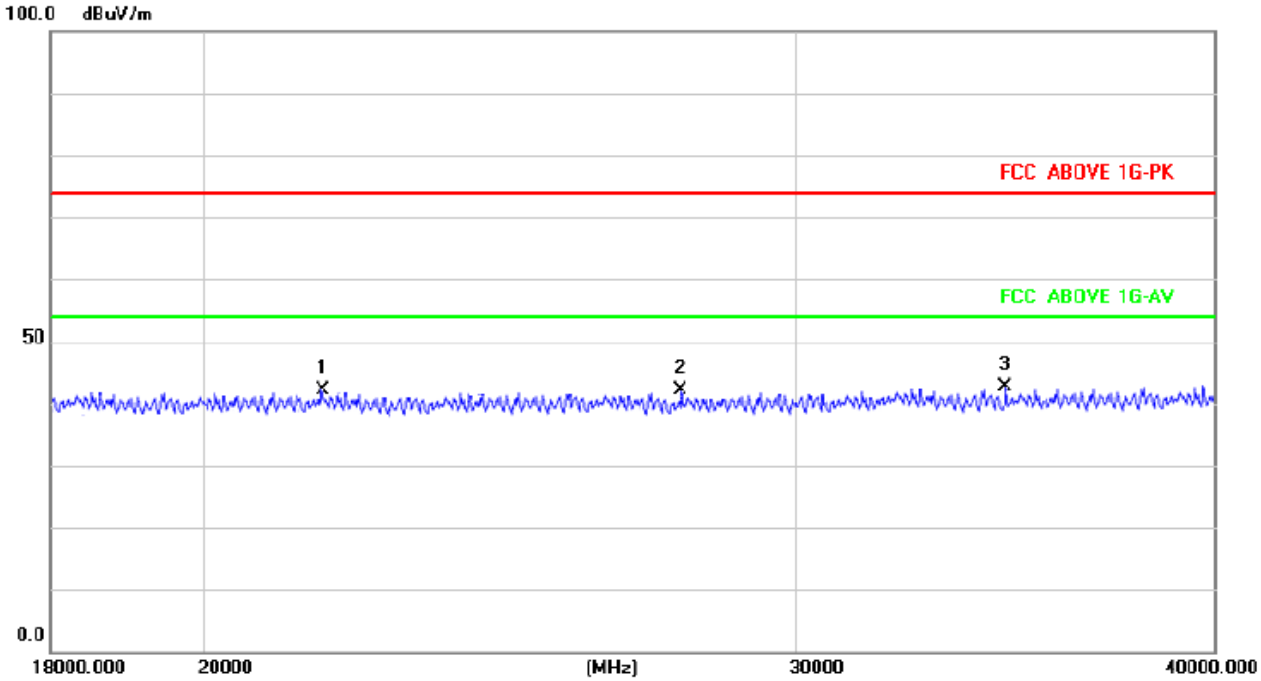
5240MHz Horizontal



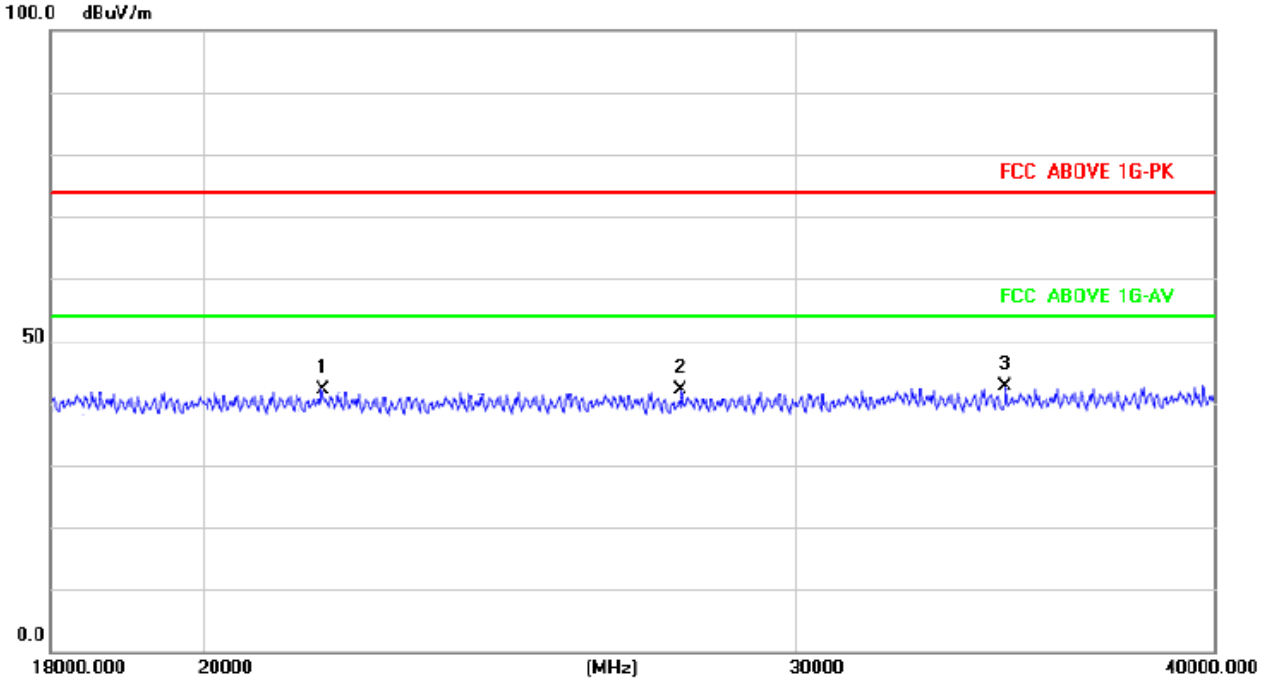
5240MHz Vertical



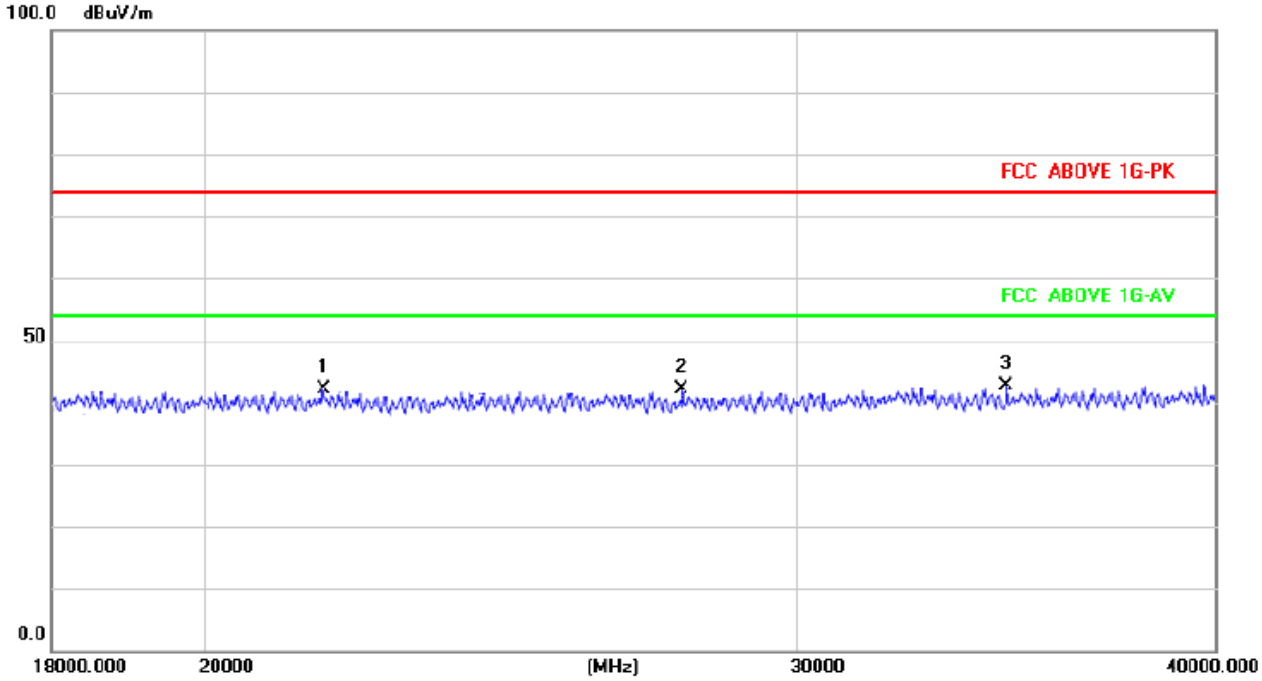
802.11n20 band 4
5745MHz Horizontal



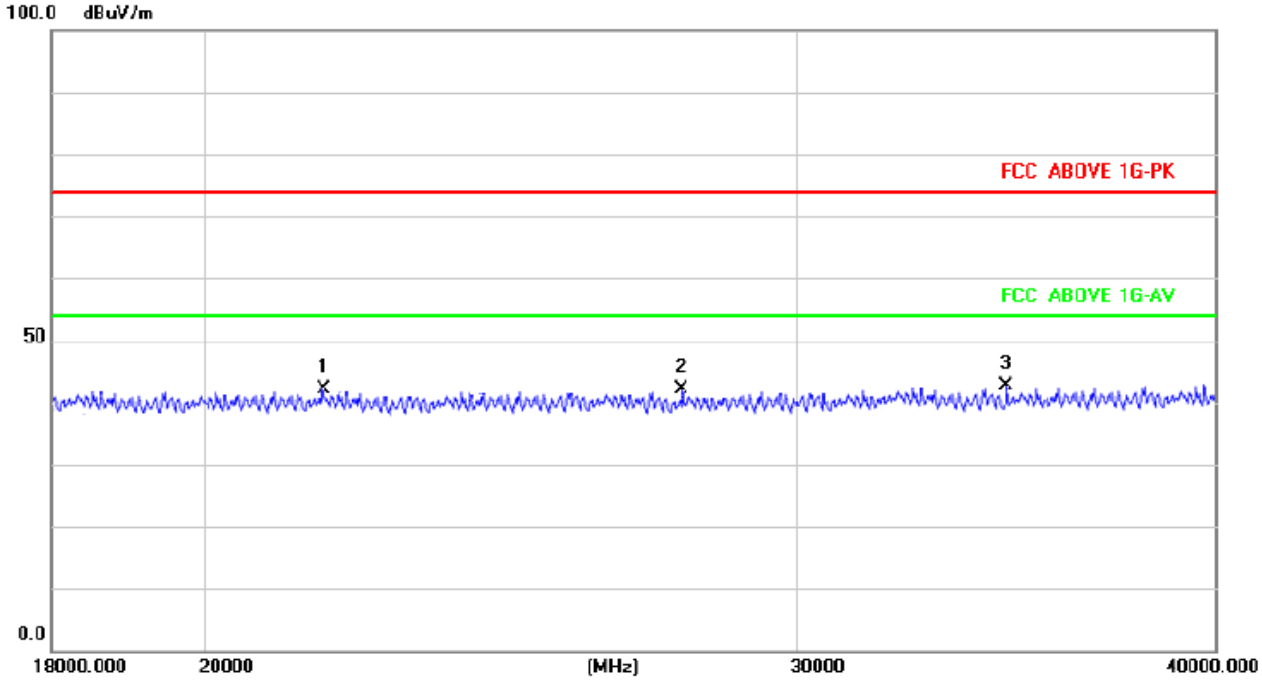
5745MHz Vertical



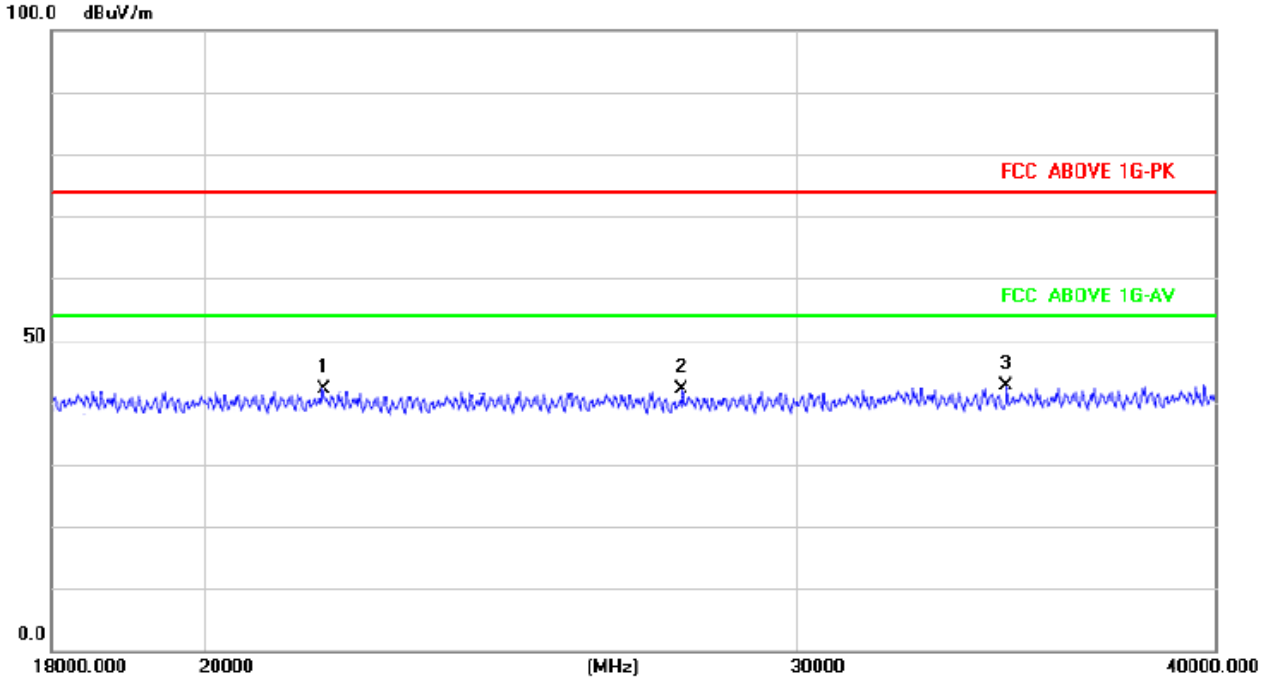
5785MHz Horizontal



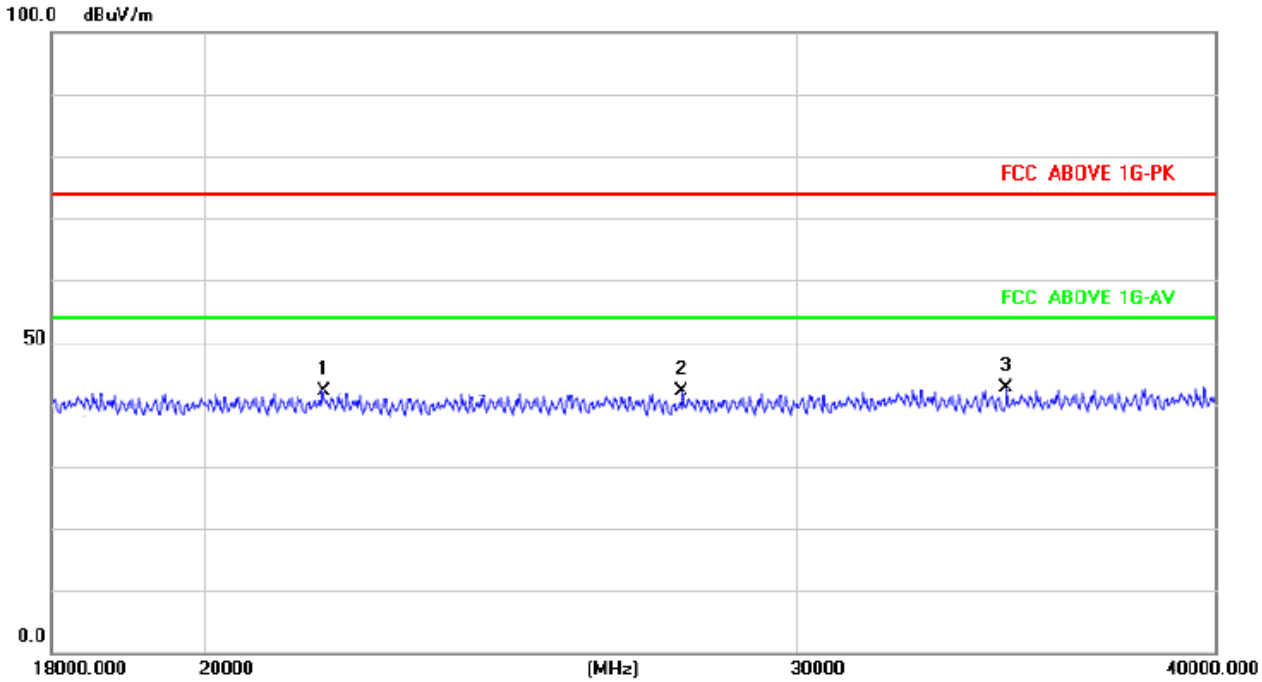
5785MHz Vertical



5825MHz Horizontal



5825MHz Vertical



NOTE: We pretest All the modulation modes, the worst data recording in the report.

Radiation in restricted band

802.11a band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	4500.00	56.57	PK	H	34.65	6.86	25.32	54.10	74.00	Pass
	4500.00	46.24	Ave	H	34.65	6.86	25.32	43.77	54.00	Pass
	5150.00	58.32	PK	H	35.54	7.02	26.04	55.84	74.00	Pass
	5150.00	47.24	Ave	H	35.54	7.02	26.04	44.76	54.00	Pass
	4500.00	57.63	PK	V	34.65	6.86	25.32	55.16	74.00	Pass
	4500.00	45.85	Ave	V	34.65	6.86	25.32	43.38	54.00	Pass
	5150.00	58.12	PK	V	35.54	7.02	26.04	55.64	74.00	Pass
	5150.00	47.24	Ave	V	35.54	7.02	26.04	44.76	54.00	Pass
Upper Channel 5240MHz	5350.00	56.42	PK	H	34.97	7.05	25.76	54.26	74.00	Pass
	5350.00	46.61	Ave	H	34.97	7.05	25.76	44.45	54.00	Pass
	5460.00	58.74	PK	H	35.86	7.34	26.77	56.99	74.00	Pass
	5460.00	47.13	Ave	H	35.86	7.34	26.77	45.38	54.00	Pass
	5350.00	57.59	PK	V	34.97	7.05	25.76	55.43	74.00	Pass
	5350.00	45.74	Ave	V	34.97	7.05	25.76	43.58	54.00	Pass
	5460.00	58.45	PK	V	35.86	7.34	26.77	56.70	74.00	Pass
	5460.00	47.46	Ave	V	35.86	7.34	26.77	45.71	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11n20 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	4500.00	57.53	PK	H	34.65	6.86	25.32	55.06	74.00	Pass
	4500.00	46.25	Ave	H	34.65	6.86	25.32	43.78	54.00	Pass
	5150.00	58.78	PK	H	35.54	7.02	26.04	56.30	74.00	Pass
	5150.00	47.48	Ave	H	35.54	7.02	26.04	45.00	54.00	Pass
	4500.00	57.36	PK	V	34.65	6.86	25.32	54.89	74.00	Pass
	4500.00	45.25	Ave	V	34.65	6.86	25.32	42.78	54.00	Pass
	5150.00	57.39	PK	V	35.54	7.02	26.04	54.91	74.00	Pass
	5150.00	48.42	Ave	V	35.54	7.02	26.04	45.94	54.00	Pass
Upper Channel 5240MHz	5350.00	57.35	PK	H	34.97	7.05	25.76	55.19	74.00	Pass
	5350.00	46.72	Ave	H	34.97	7.05	25.76	44.56	54.00	Pass
	5460.00	58.05	PK	H	35.86	7.34	26.77	56.30	74.00	Pass
	5460.00	47.46	Ave	H	35.86	7.34	26.77	45.71	54.00	Pass
	5350.00	57.71	PK	V	34.97	7.05	25.76	55.55	74.00	Pass
	5350.00	45.93	Ave	V	34.97	7.05	25.76	43.77	54.00	Pass
	5460.00	58.01	PK	V	35.86	7.34	26.77	56.26	74.00	Pass
	5460.00	47.66	Ave	V	35.86	7.34	26.77	45.91	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5180MHz	4500.00	56.89	PK	H	34.65	6.86	25.32	54.42	74.00	Pass
	4500.00	46.42	Ave	H	34.65	6.86	25.32	43.95	54.00	Pass
	5150.00	58.63	PK	H	35.54	7.02	26.04	56.15	74.00	Pass
	5150.00	47.47	Ave	H	35.54	7.02	26.04	44.99	54.00	Pass
	4500.00	57.58	PK	V	34.65	6.86	25.32	55.11	74.00	Pass
	4500.00	45.12	Ave	V	34.65	6.86	25.32	42.65	54.00	Pass
	5150.00	57.84	PK	V	35.54	7.02	26.04	55.36	74.00	Pass
	5150.00	48.05	Ave	V	35.54	7.02	26.04	45.57	54.00	Pass
Upper Channel 5240MHz	5350.00	57.35	PK	H	34.97	7.05	25.76	55.19	74.00	Pass
	5350.00	47.15	Ave	H	34.97	7.05	25.76	44.99	54.00	Pass
	5460.00	58.06	PK	H	35.86	7.34	26.77	56.31	74.00	Pass
	5460.00	47.49	Ave	H	35.86	7.34	26.77	45.74	54.00	Pass
	5350.00	57.47	PK	V	34.97	7.05	25.76	55.31	74.00	Pass
	5350.00	45.16	Ave	V	34.97	7.05	25.76	43.00	54.00	Pass
	5460.00	57.52	PK	V	35.86	7.34	26.77	55.77	74.00	Pass
	5460.00	47.64	Ave	V	35.86	7.34	26.77	45.89	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11n40 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5190MHz	4500.00	57.69	PK	H	34.65	6.86	25.32	55.22	74.00	Pass
	4500.00	47.23	Ave	H	34.65	6.86	25.32	44.76	54.00	Pass
	5150.00	58.04	PK	H	35.54	7.02	26.04	55.56	74.00	Pass
	5150.00	47.58	Ave	H	35.54	7.02	26.04	45.10	54.00	Pass
	4500.00	57.16	PK	V	34.65	6.86	25.32	54.69	74.00	Pass
	4500.00	45.79	Ave	V	34.65	6.86	25.32	43.32	54.00	Pass
	5150.00	57.47	PK	V	35.54	7.02	26.04	54.99	74.00	Pass
	5150.00	47.16	Ave	V	35.54	7.02	26.04	44.68	54.00	Pass
Upper Channel 5230MHz	5350.00	57.25	PK	H	34.97	7.05	25.76	55.09	74.00	Pass
	5350.00	46.49	Ave	H	34.97	7.05	25.76	44.33	54.00	Pass
	5460.00	58.48	PK	H	35.86	7.34	26.77	56.73	74.00	Pass
	5460.00	47.72	Ave	H	35.86	7.34	26.77	45.97	54.00	Pass
	5350.00	57.41	PK	V	34.97	7.05	25.76	55.25	74.00	Pass
	5350.00	45.96	Ave	V	34.97	7.05	25.76	43.80	54.00	Pass
	5460.00	58.35	PK	V	35.86	7.34	26.77	56.60	74.00	Pass
	5460.00	47.87	Ave	V	35.86	7.34	26.77	46.12	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac40 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5190MHz	4500.00	56.95	PK	H	34.65	6.86	25.32	54.48	74.00	Pass
	4500.00	46.71	Ave	H	34.65	6.86	25.32	44.24	54.00	Pass
	5150.00	58.23	PK	H	35.54	7.02	26.04	55.75	74.00	Pass
	5150.00	47.45	Ave	H	35.54	7.02	26.04	44.97	54.00	Pass
	4500.00	57.76	PK	V	34.65	6.86	25.32	55.29	74.00	Pass
	4500.00	45.97	Ave	V	34.65	6.86	25.32	43.50	54.00	Pass
	5150.00	58.10	PK	V	35.54	7.02	26.04	55.62	74.00	Pass
	5150.00	47.43	Ave	V	35.54	7.02	26.04	44.95	54.00	Pass
Upper Channel 5230MHz	5350.00	56.89	PK	H	34.97	7.05	25.76	54.73	74.00	Pass
	5350.00	46.45	Ave	H	34.97	7.05	25.76	44.29	54.00	Pass
	5460.00	58.12	PK	H	35.86	7.34	26.77	56.37	74.00	Pass
	5460.00	47.85	Ave	H	35.86	7.34	26.77	46.10	54.00	Pass
	5350.00	57.76	PK	V	34.97	7.05	25.76	55.60	74.00	Pass
	5350.00	45.99	Ave	V	34.97	7.05	25.76	43.83	54.00	Pass
	5460.00	57.67	PK	V	35.86	7.34	26.77	55.92	74.00	Pass
	5460.00	47.16	Ave	V	35.86	7.34	26.77	45.41	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

802.11ac80 band 1

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Channel 5210MHz	5350.00	57.54	PK	H	34.97	7.05	25.76	55.38	74.00	Pass
	5350.00	46.48	Ave	H	34.97	7.05	25.76	44.32	54.00	Pass
	5460.00	58.09	PK	H	35.86	7.34	26.77	56.34	74.00	Pass
	5460.00	47.52	Ave	H	35.86	7.34	26.77	45.77	54.00	Pass
	5350.00	57.84	PK	V	34.97	7.05	25.76	55.68	74.00	Pass
	5350.00	45.97	Ave	V	34.97	7.05	25.76	43.81	54.00	Pass
	5460.00	57.76	PK	V	35.86	7.34	26.77	56.01	74.00	Pass
	5460.00	47.62	Ave	V	35.86	7.34	26.77	45.87	54.00	Pass

Remark:
Emission Level = Receiver Reading + Antenna Factor + Cable Loss – Pre-amplifier.
Margin = Emission Level - Limit
Other harmonics emissions are lower than 20dB below the allowable limit.

5. BAND EDGE COMPLIANCE TEST

5.1. Limits

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

5.2. TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

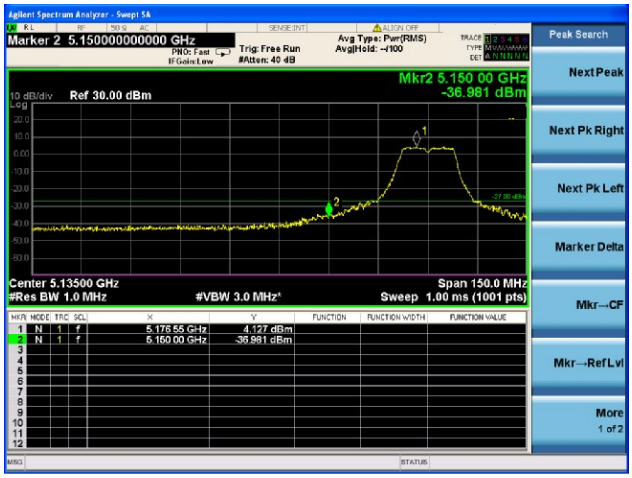
5.3. Test Data

Please see data as below:

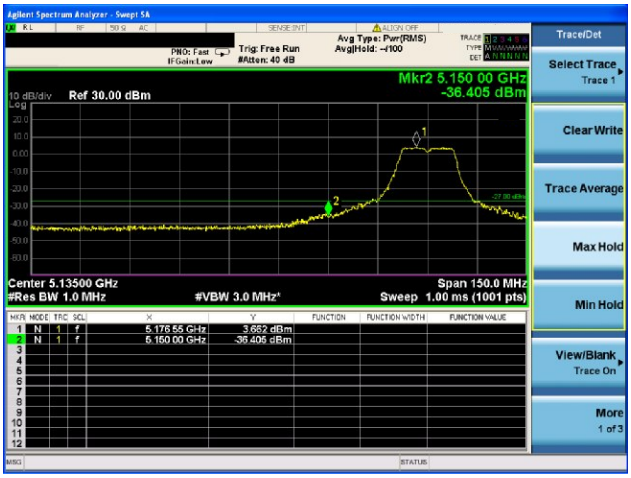
NOTE: Represent the value of antenna 1 and 2, The worst data is Antenna 1, only shown Antenna 1 Plot.

5.15~5.25 GHz

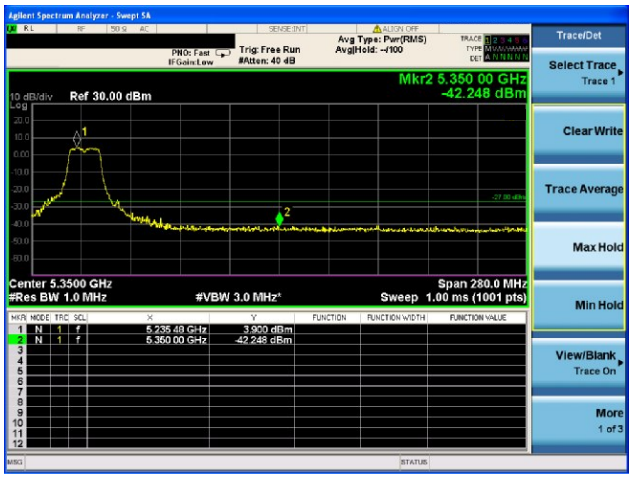
(802.11a) Band Edge, Left Side



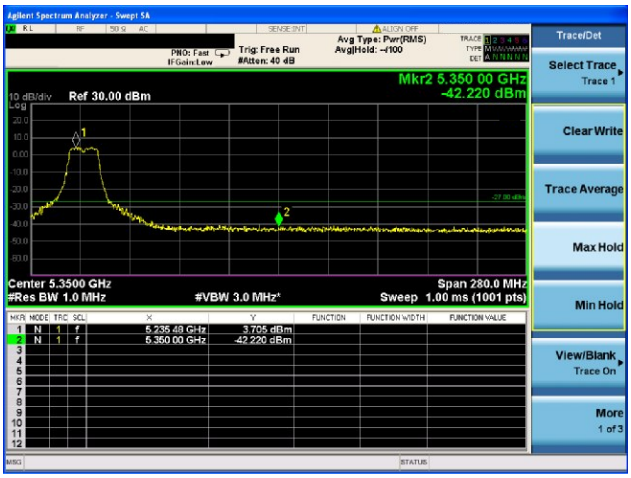
(802.11n20) Band Edge, Left Side



(802.11a) Band Edge, Right Side

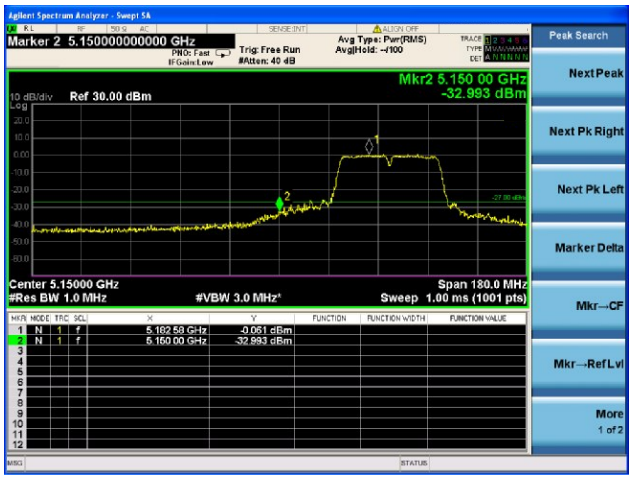


(802.11n20) Band Edge, Right Side

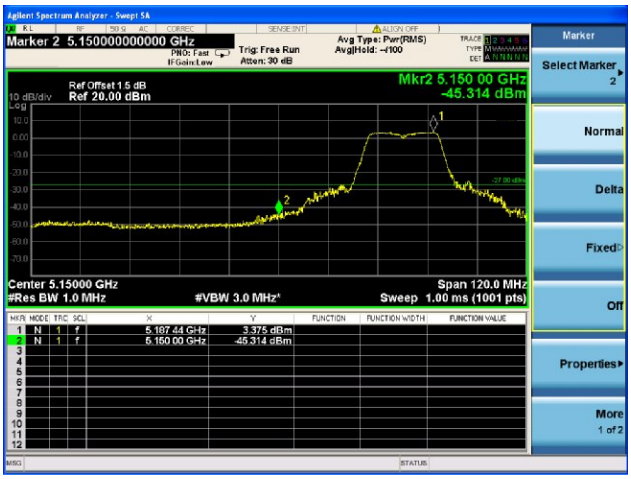


5.15~5.25 GHz

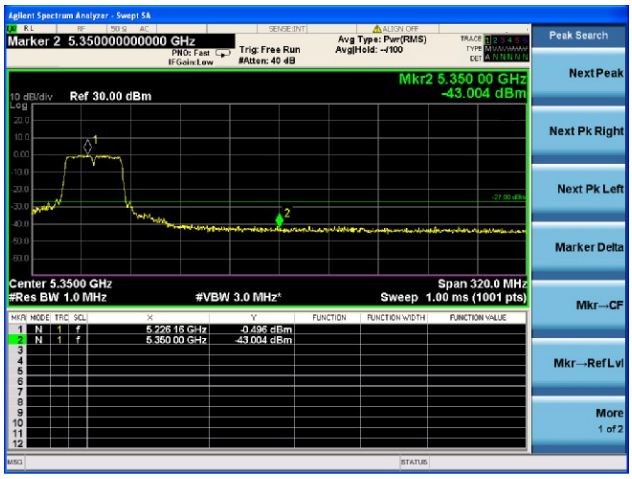
(802.11n40) Band Edge, Left Side



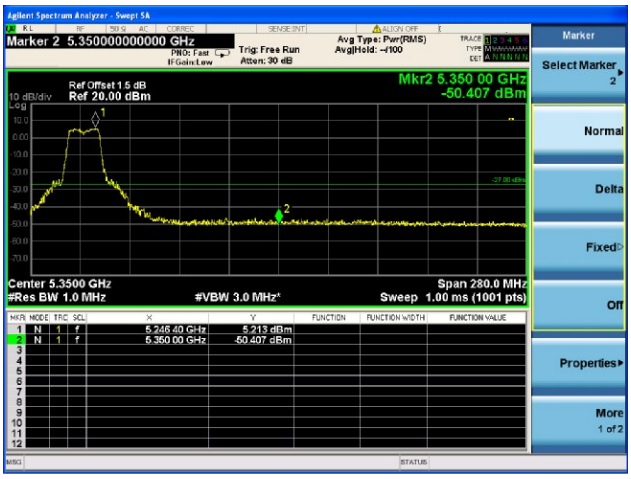
(802.11ac20) Band Edge, Left Side



(802.11n40) Band Edge, Right Side

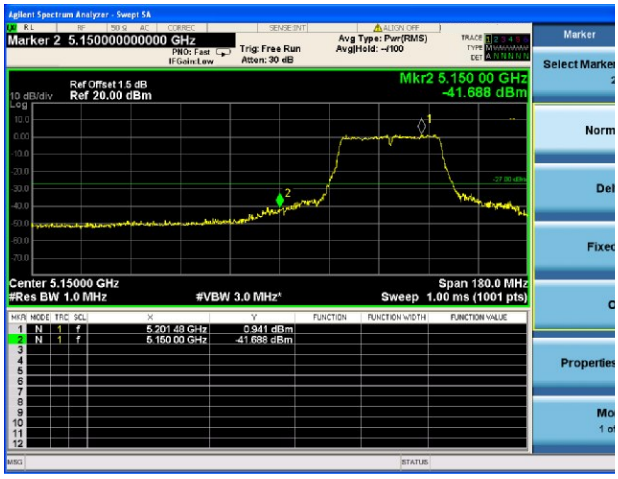


(802.11ac20) Band Edge, Right Side

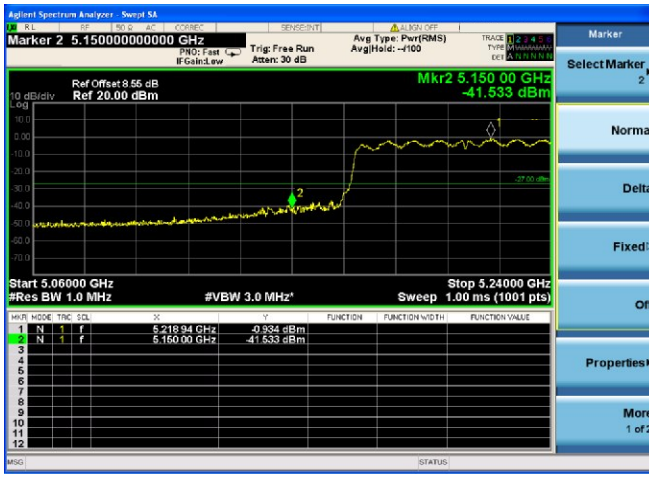


5.15~5.25 GHz

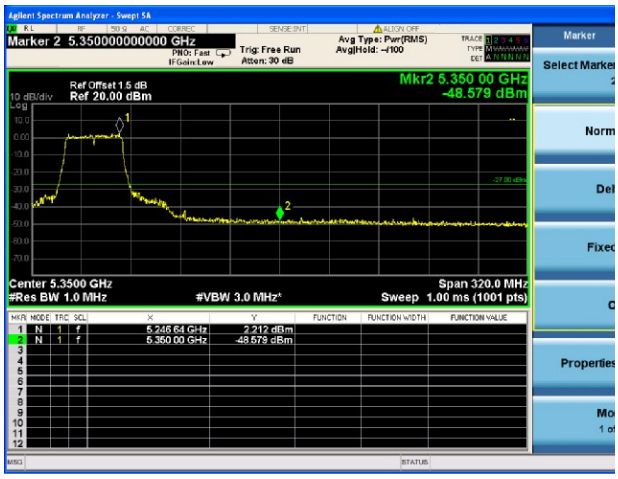
(802.11ac40) Band Edge, Left Side



(802.11ac80) Band Edge, Left Side



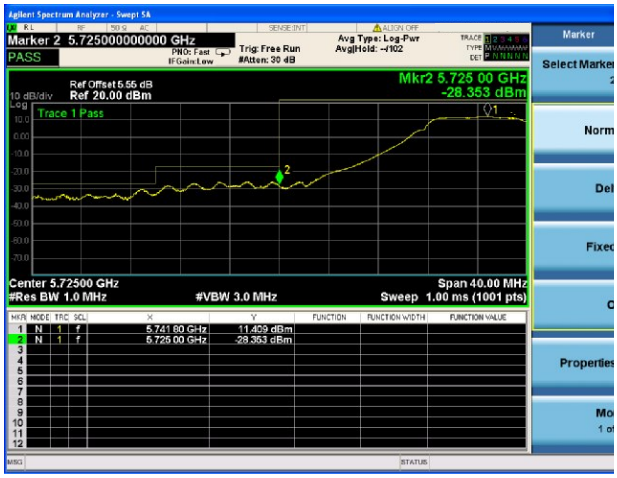
(802.11ac40) Band Edge, Right Side



(802.11ac80) Band Edge, Right Side

5.725-5.85 GHz

(802.11a) Band Edge, Left Side



(802.11n20) Band Edge, Left Side

(802.11a) Band Edge, Right Side

(802.11n20) Band Edge, Right Side

5.725-5.85 GHz

(802.11n40) Band Edge, Left Side

(802.11ac20) Band Edge, Left Side

(802.11n40) Band Edge, Right Side

(802.11ac20) Band Edge, Right Side

6. 26DB AND 99% BANDWIDTH TEST

6.1. 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.

6.2. 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:

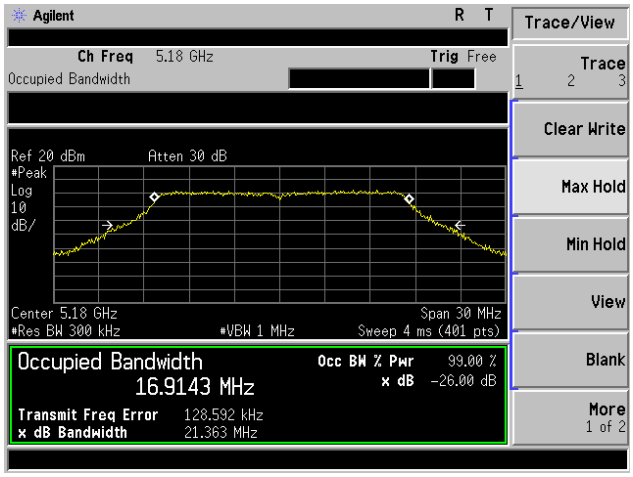
1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW $\geq 3 \cdot$ RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, 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.

6.3. Test result

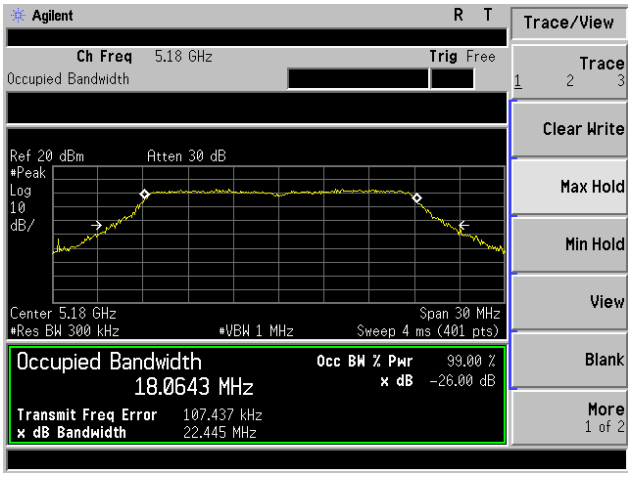
26dB bandwith

Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	26dB bandwidth (MHz)	Result
802.11a	CH36	5180	16.914	21.363	Pass
	CH40	5200	16.949	20.947	Pass
	CH48	5240	16.928	21.230	Pass
802.11 n20	CH36	5180	18.064	22.445	Pass
	CH40	5200	17.936	22.660	Pass
	CH48	5240	18.045	22.431	Pass
802.11 n40	CH 38	5190	36.293	42.754	Pass
	CH 46	5230	36.270	43.399	Pass
802.11 AC20	CH36	5180	17.945	22.011	Pass
	CH40	5200	17.985	22.555	Pass
	CH48	5240	17.977	22.399	Pass
802.11 AC40	CH 38	5190	36.284	43.445	Pass
	CH 46	5230	36.318	43.278	Pass
802.11 AC80	CH 42	5210	75.005	83.092	Pass

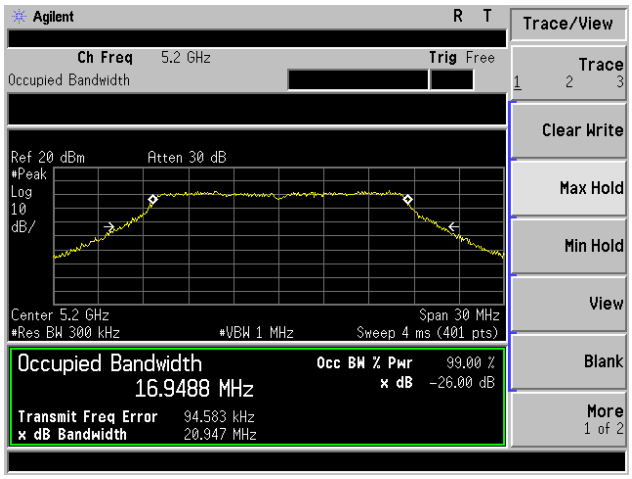
(802.11a) -26dB&99% Bandwidth plot on channel 36



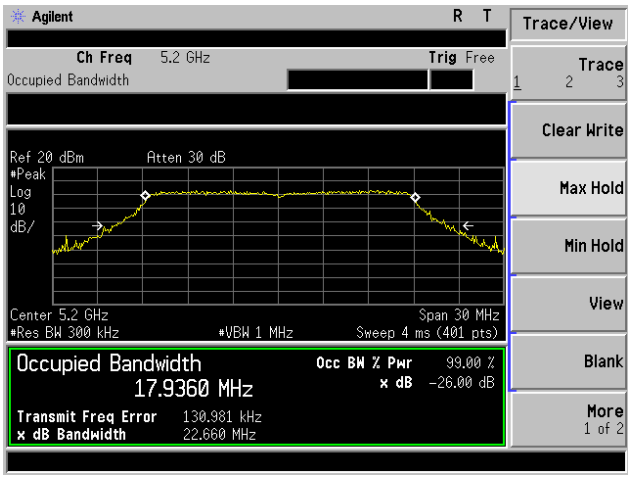
(802.11n20) -26dB&99% Bandwidth plot on channel 36



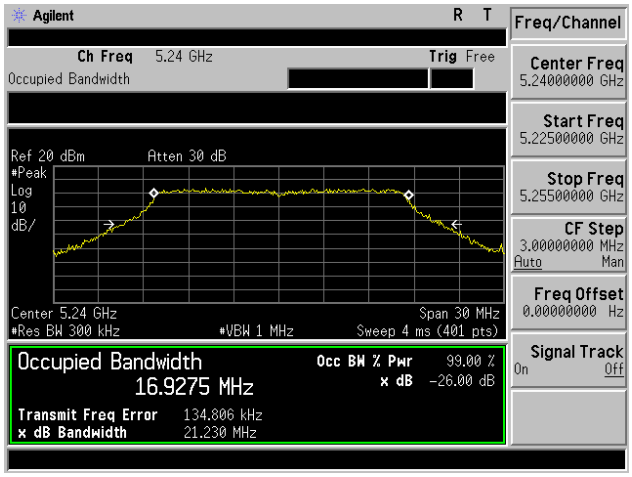
(802.11a) -26dB&99% Bandwidth plot on channel 40



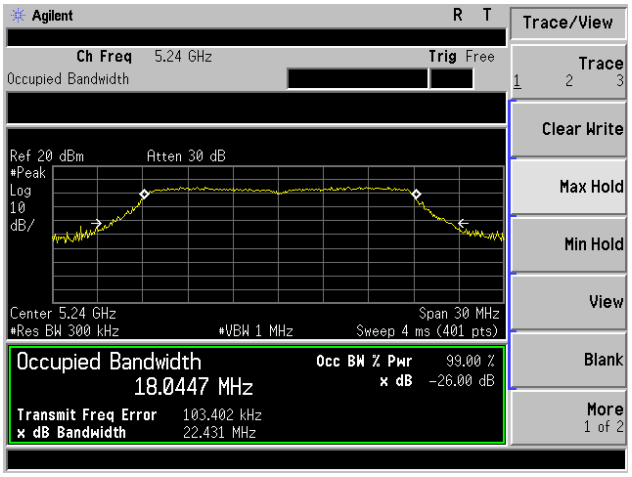
(802.11n20) -26dB&99% Bandwidth plot on channel 40



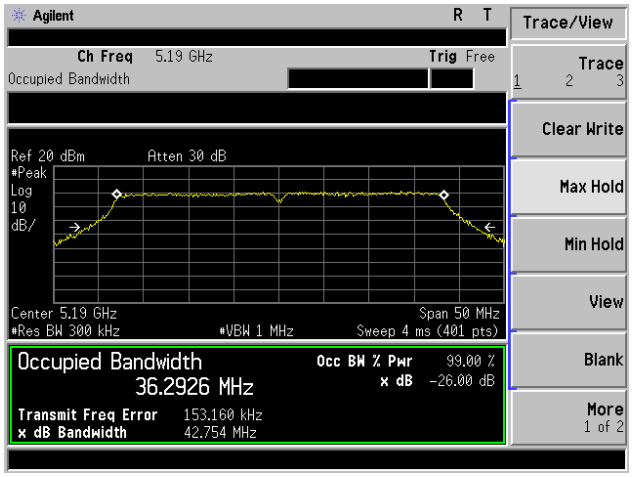
(802.11a) -26dB&99% Bandwidth plot on channel 48



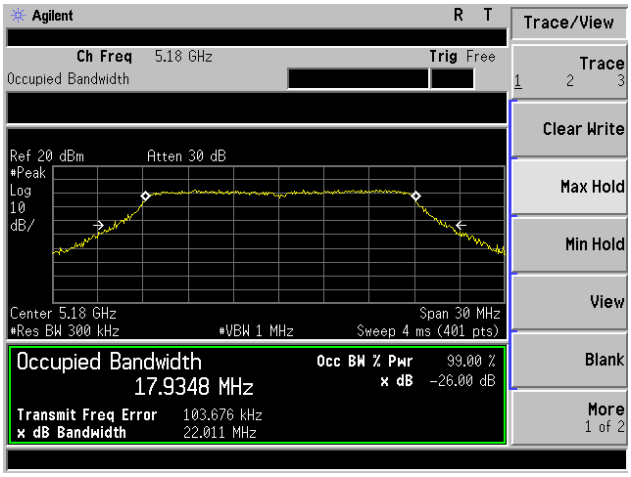
(802.11n20) -26dB&99% Bandwidth plot on channel 48



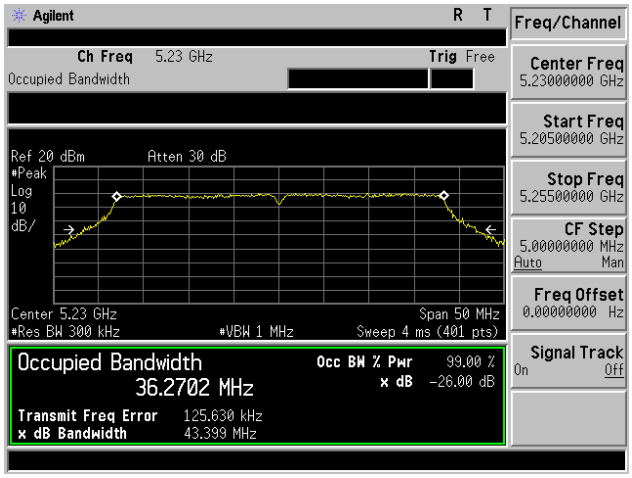
(802.11n40) -26dB&99% Bandwidth plot on channel 38



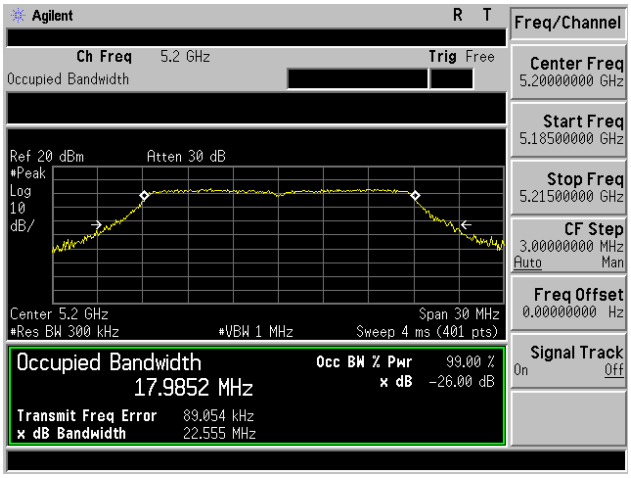
(802.11ac20) -26dB&99% Bandwidth plot on channel 36



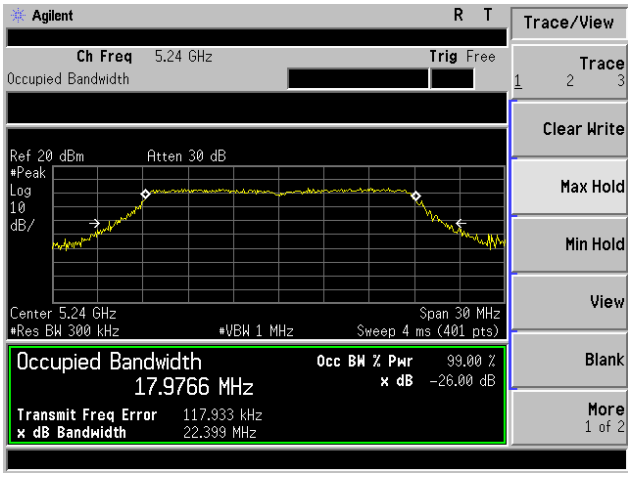
(802.11n40) -26dB&99% Bandwidth plot on channel 46



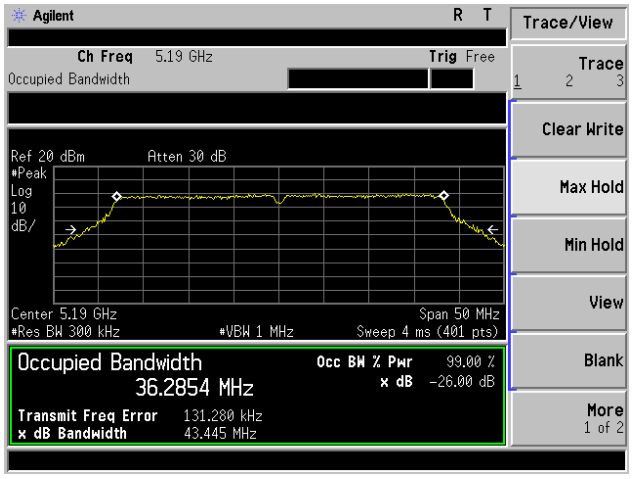
(802.11ac20) -26dB&99% Bandwidth plot on channel 40



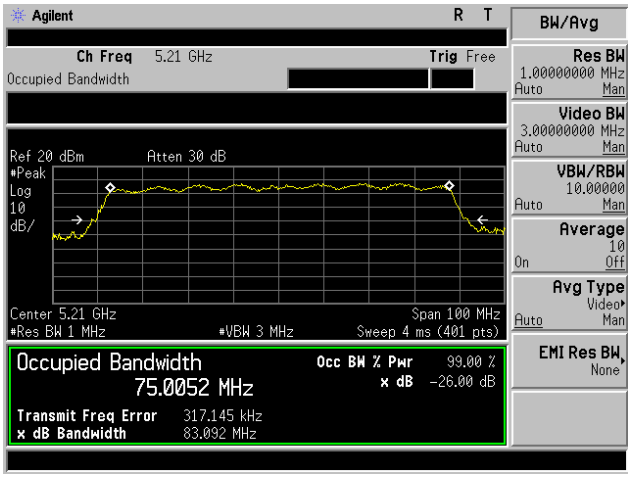
(802.11ac20) -26dB&99% Bandwidth plot on channel 48



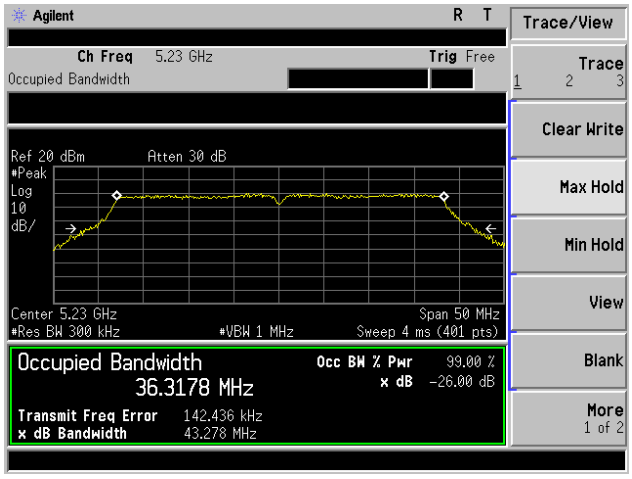
(802.11ac40) -26dB&99% Bandwidth plot on channel 38



(802.11ac80) -26dB&99% Bandwidth plot on channel 42

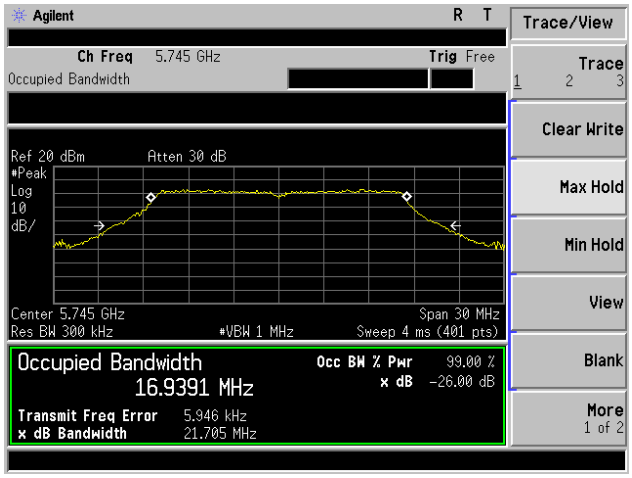


(802.11ac40) -26dB&99% Bandwidth plot on channel 46

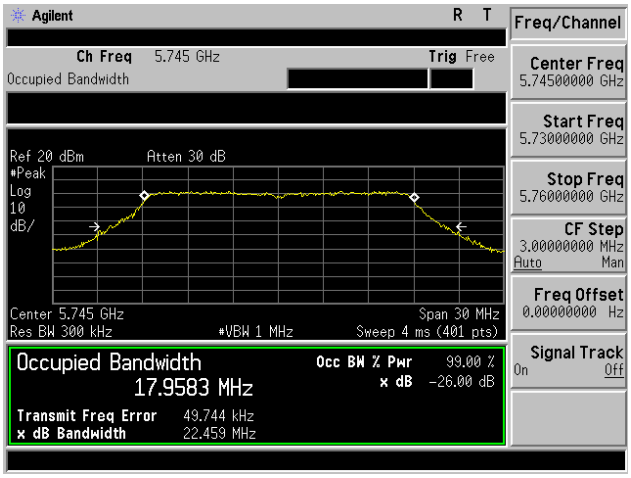


Mode	Channel	Frequency (MHz)	99% bandwidth(MHz)	26dB bandwidth (MHz)	Result
802.11a	CH149	5745	16.939	21.705	Pass
	CH157	5785	16.931	21.683	Pass
	CH165	5825	17.032	21.464	Pass
802.11 n20	CH149	5745	17.958	22.459	Pass
	CH157	5785	17.970	22.277	Pass
	CH165	5825	18.000	22.404	Pass
802.11 AC20	CH149	5745	17.933	22.107	Pass
	CH157	5785	17.948	22.375	Pass
	CH165	5825	17.943	22.004	Pass

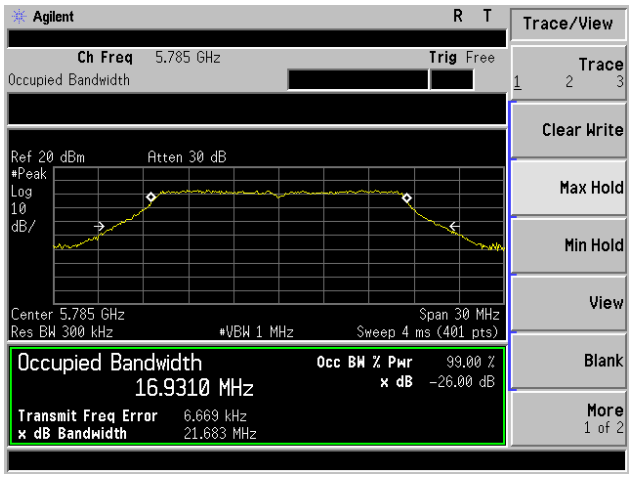
(802.11a) -26dB&99% Bandwidth plot on channel 149



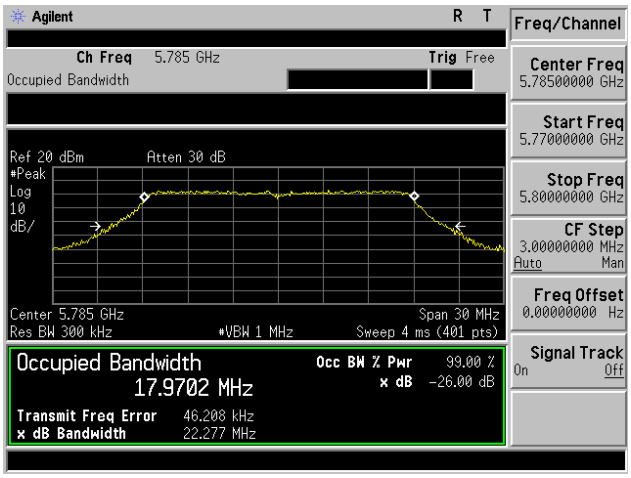
(802.11n20) -26dB&99% Bandwidth plot on channel 149



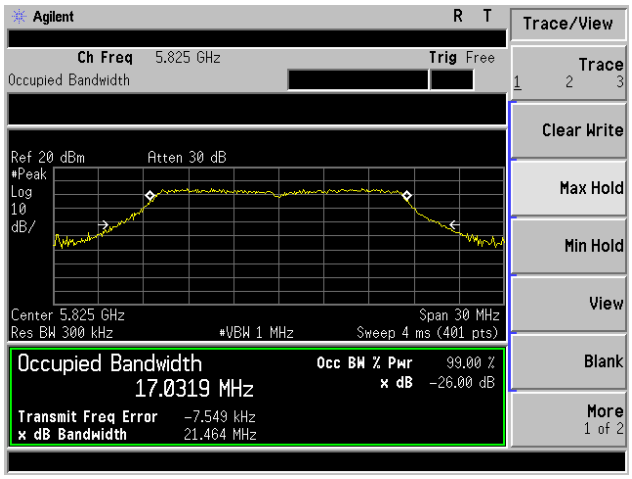
(802.11a) -26dB&99% Bandwidth plot on channel 157



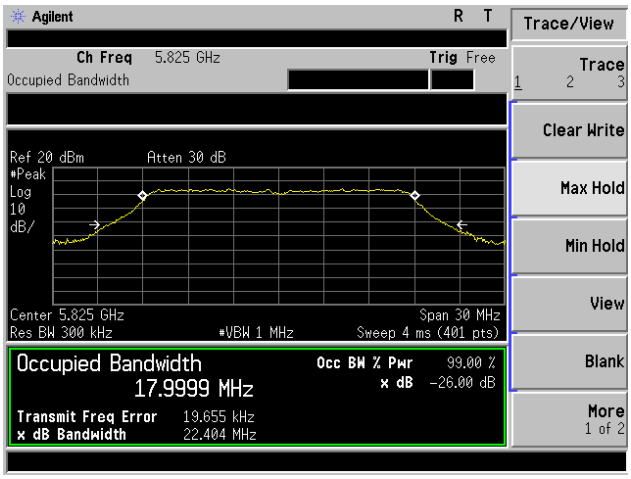
(802.11n20) -26dB&99% Bandwidth plot on channel 157



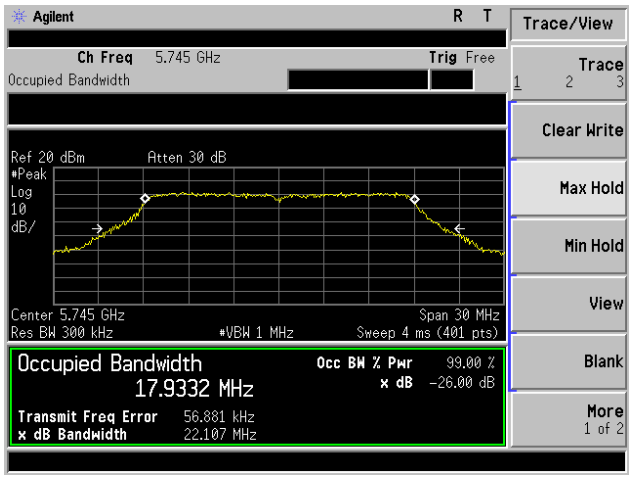
(802.11a) -26dB&99% Bandwidth plot on channel 165



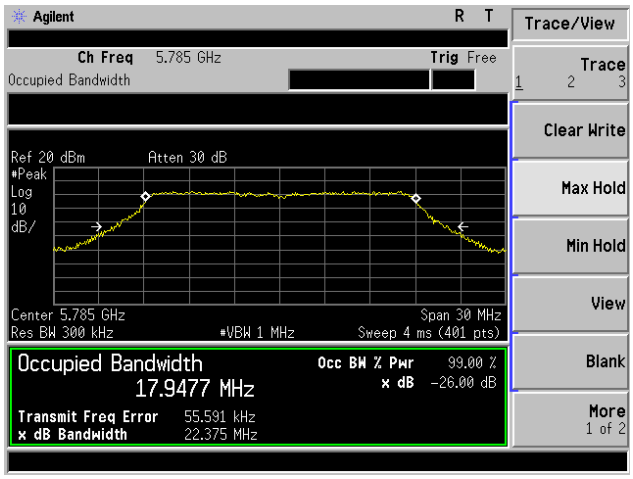
(802.11n20) -26dB&99% Bandwidth plot on channel 165



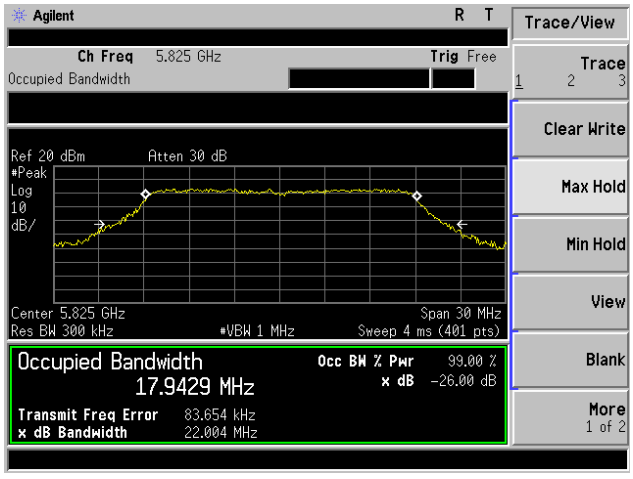
(802.11ac20) -26dB&99% Bandwidth plot on channel 149



(802.11ac20) -26dB&99% Bandwidth plot on channel 157



(802.11ac20) -26dB&99% Bandwidth plot on channel 165



7. MINIMUM 6 DB BANDWIDTH

7.1. Applied procedures / limit

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

7.2. TEST PROCEDURE

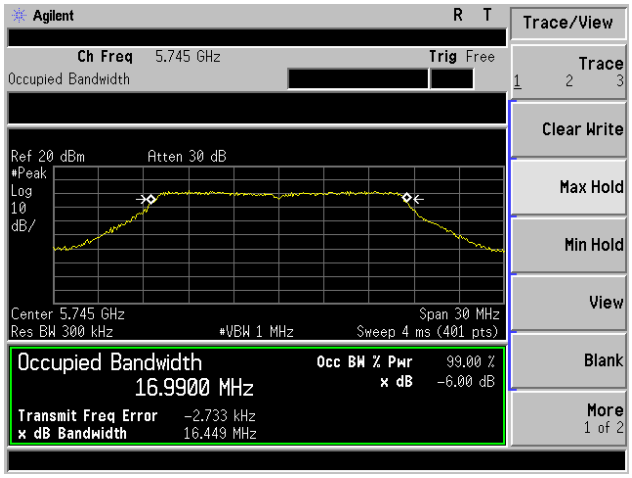
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 × RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.3. Test result

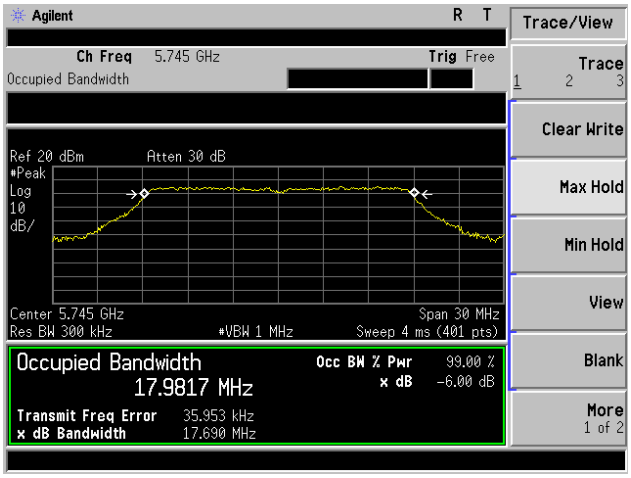
6dB bandwith

Mode	Channel	Frequency (MHz)	-6dB bandwidth (MHz)	Limit (KHz)	Result
802.11a	149	5745	16.449	500	Pass
	157	5785	16.468	500	Pass
	165	5825	16.495	500	Pass
802.11 n20	149	5745	17.690	500	Pass
	157	5785	17.768	500	Pass
	165	5825	17.707	500	Pass
802.11 AC20	149	5745	17.691	500	Pass
	157	5785	17.652	500	Pass
	165	5825	17.696	500	Pass

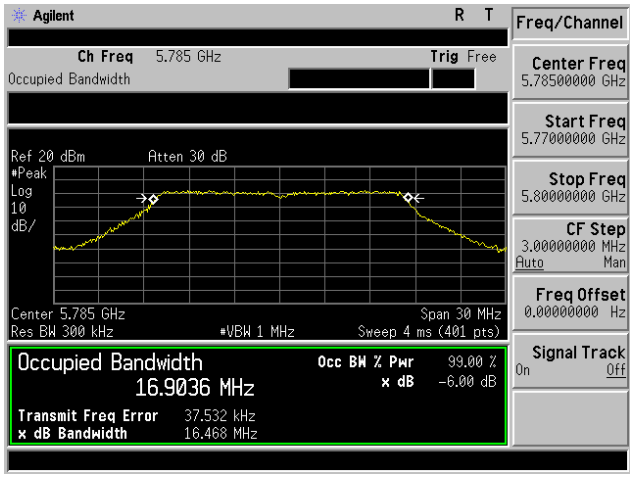
(802.11a) -6dB Bandwidth plot on channel 149



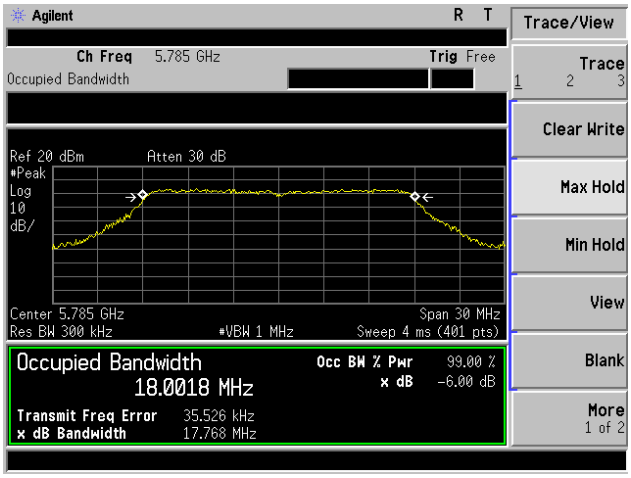
(802.11n20) -6dB Bandwidth plot on channel 149



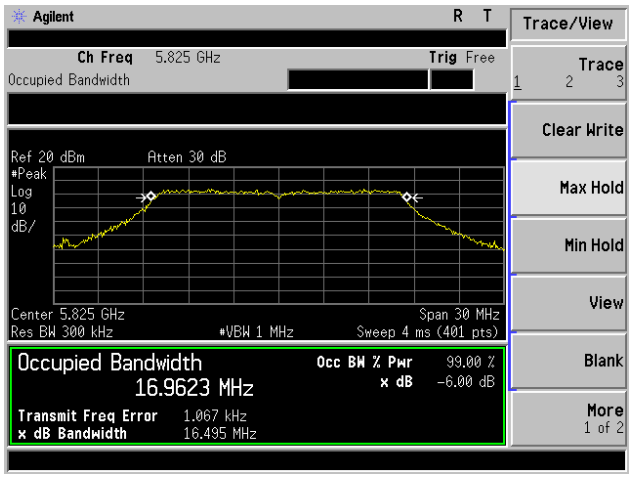
(802.11a) -6dB Bandwidth plot on channel 157



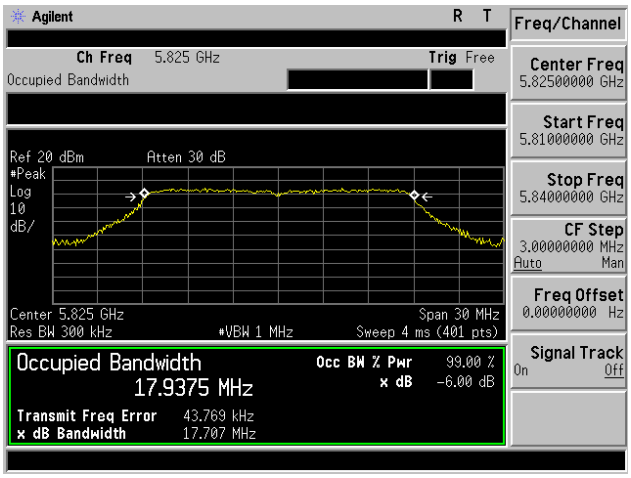
(802.11n20) -6dB Bandwidth plot on channel 157



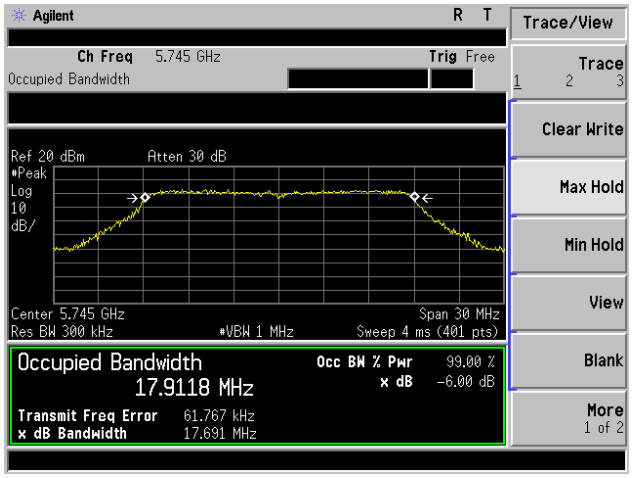
(802.11a) -6dB Bandwidth plot on channel 165



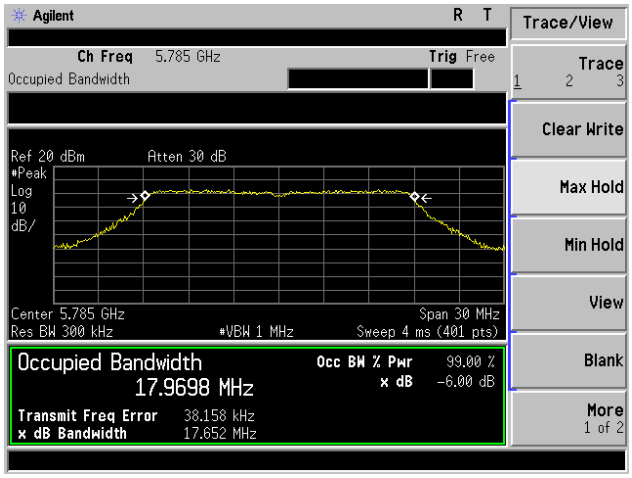
(802.11n20) -6dB Bandwidth plot on channel 165



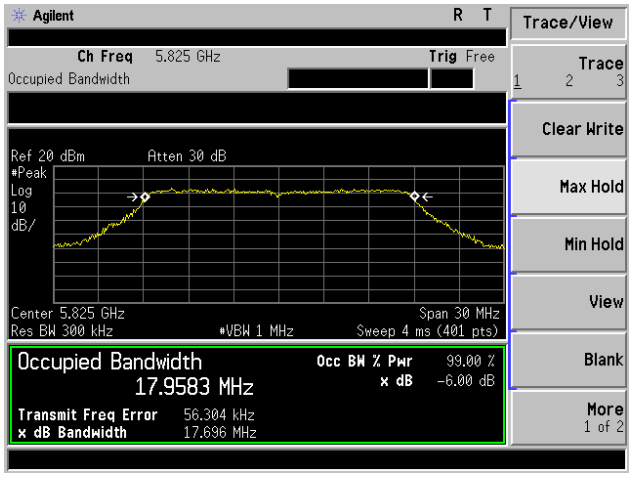
(802.11ac20) -6dB Bandwidth plot on channel 149



(802.11ac20) -6dB Bandwidth plot on channel 157



(802.11ac20) -6dB Bandwidth plot on channel 165



8. OUTPUT POWER TEST

8.1. Limits

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

8.2. Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

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

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

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

8.3. Test result

Test Channel	Frequency (MHz)	Maximum output (PK) (dBm)	LIMIT dBm	Result
TX 802.11a Mode				
CH36	5180	16.68	23.98	Pass
CH40	5200	16.74	23.98	Pass
CH48	5240	16.57	23.98	Pass
TX 802.11 n20M Mode				
CH36	5180	14.710	23.98	Pass
CH40	5200	14.760	23.98	Pass
CH48	5240	14.080	23.98	Pass
TX 802.11 n40M Mode				
CH38	5190	13.870	23.98	Pass
CH46	5230	13.570	23.98	Pass
TX 802.11 AC20M Mode				
CH36	5180	14.84	23.98	Pass
CH40	5200	14.54	23.98	Pass
CH48	5240	14.25	23.98	Pass
TX 802.11 AC40M Mode				
CH38	5190	13.14	23.98	Pass
CH46	5230	13.11	23.98	Pass
TX 802.11 AC80M Mode				
CH42	5210	11.250	23.98	Pass

Test Channel	Frequency (MHz)	Maximum output (PK) (dBm)	LIMIT dBm	Result
TX 802.11a Mode				
CH 149	5745	15.51	30	Pass
CH 157	5785	15.29	30	Pass
CH 165	5825	15.38	30	Pass
TX 802.11 n20M Mode				
CH 149	5745	14.31	30	Pass
CH 157	5785	14.37	30	Pass
CH 165	5825	14.22	30	Pass
TX 802.11 AC20M Mode				
CH 149	5745	14.14	30	Pass
CH 157	5785	14.21	30	Pass
CH 165	5825	14.22	30	Pass

9. PEAK POWER SPECTRAL DENSITY TEST

9.1. Limits

In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band.

9.2. Test setup

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to

Spectrum.

4. For U-NII1, U-NII-2A, U-NII-2C Band:

Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

For U-NII-3 Band:

Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)

5. User the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).

9.3. Test data

Test data as below

Frequency	Frequency	Power Density (dBm)	Limit (dBm)	Result
802.11a	5180 MHz	2.464	11	PASS
	5200 MHz	0.771	11	PASS
	5240 MHz	2.318	11	PASS
802.11n20	5180 MHz	2.710	11	PASS
	5200 MHz	1.787	11	PASS
	5240 MHz	3.662	11	PASS
802.11n40	5190 MHz	-0.692	11	PASS
	5230 MHz	-1.782	11	PASS
802.11ac20	5180 MHz	2.259	11	PASS
	5200 MHz	2.097	11	PASS
	5240 MHz	3.970	11	PASS
802.11ac40	5190 MHz	-0.196	11	PASS
	5230 MHz	-1.825	11	PASS
802.11ac80	5210 MHz	-4.545	11	PASS

(802.11a) PSD plot on channel 36

(802.11n20) PSD plot on channel 36

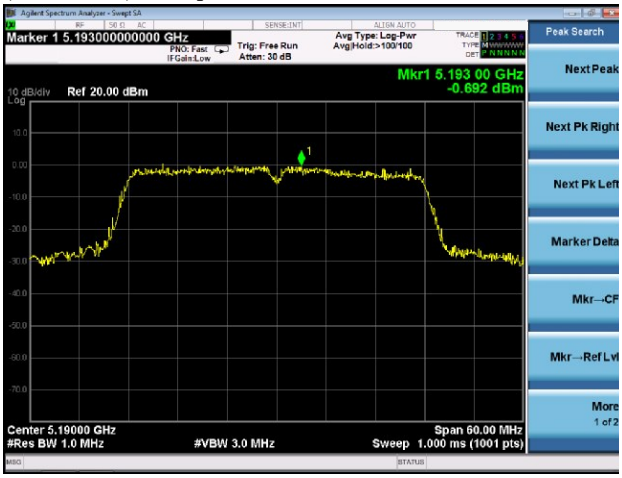
(802.11a) PSD plot on channel 40

(802.11n20) PSD plot on channel 40

(802.11a) PSD plot on channel 48

(802.11n20) PSD plot on channel 48

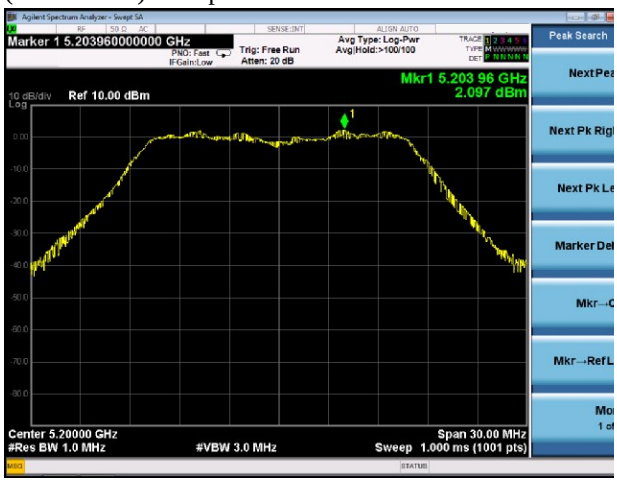
(802.11n40) PSD plot on channel 38



(802.11ac20) PSD plot on channel 36

(802.11n40) PSD plot on channel 46

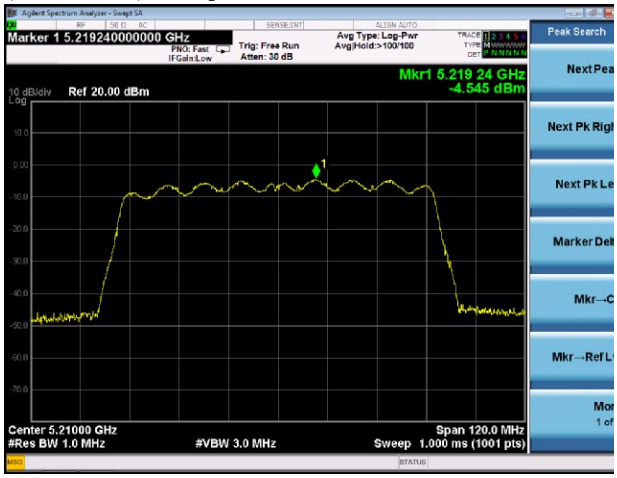
(802.11ac20) PSD plot on channel 40



(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

Frequency	Frequency	Power Density (dBm)	Limit (dBm)	Result
802.11a	5745 MHz	3.794	30	PASS
	5785 MHz	0.748	30	PASS
	5825 MHz	-0.586	30	PASS
802.11n20	5745 MHz	2.849	30	PASS
	5785 MHz	2.411	30	PASS
	5825 MHz	0.831	30	PASS
802.11ac20	5745 MHz	3.205	30	PASS
	5785 MHz	2.897	30	PASS
	5825 MHz	0.370	30	PASS

(802.11a) PSD plot on channel 149

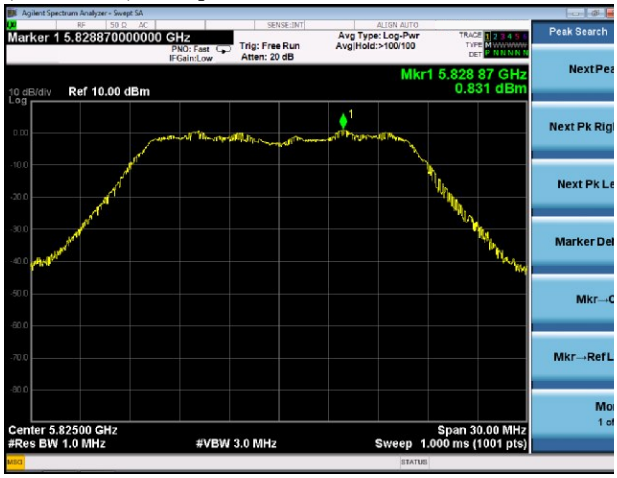
(802.11n20) PSD plot on channel 149

(802.11a) PSD plot on channel 157

(802.11n20) PSD plot on channel 157

(802.11a) PSD plot on channel 165

(802.11n20) PSD plot on channel 165



(802.11ac20) PSD plot on channel 149

(802.11ac20) PSD plot on channel 157

(802.11ac20) PSD plot on channel 165

10. DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

Operation Mode	Duty Cycle	Duty Fator (dB) 10 * log (1/ Duty cycle)
802.11a	100%	0
802.11n(HT20)	100%	0
802.11ac	100%	0
802.11n(HT40)	100%	0
802.11ac(HT40)	100%	0
802.11ac(HT80)	100%	0

11. TRANSMISSION IN THE ABSENCE OF DATA

11.1. Limits

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

11.2. Test result

No non-compliance noted:

Refer to the theory of operation.

12. ANTENNA REQUIREMENT

12.1. STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

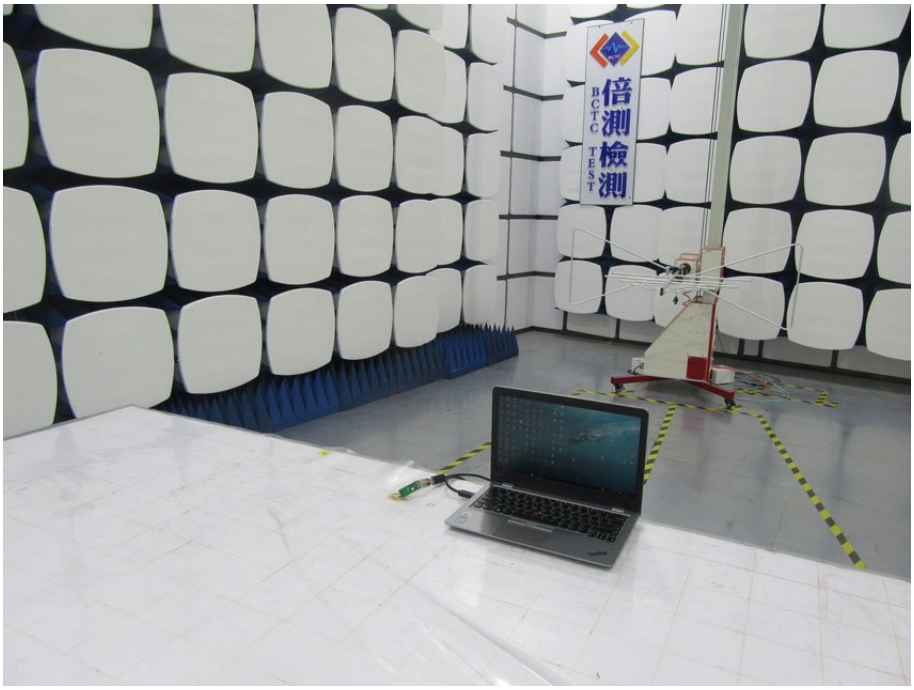
12.2. EUT ANTENNA

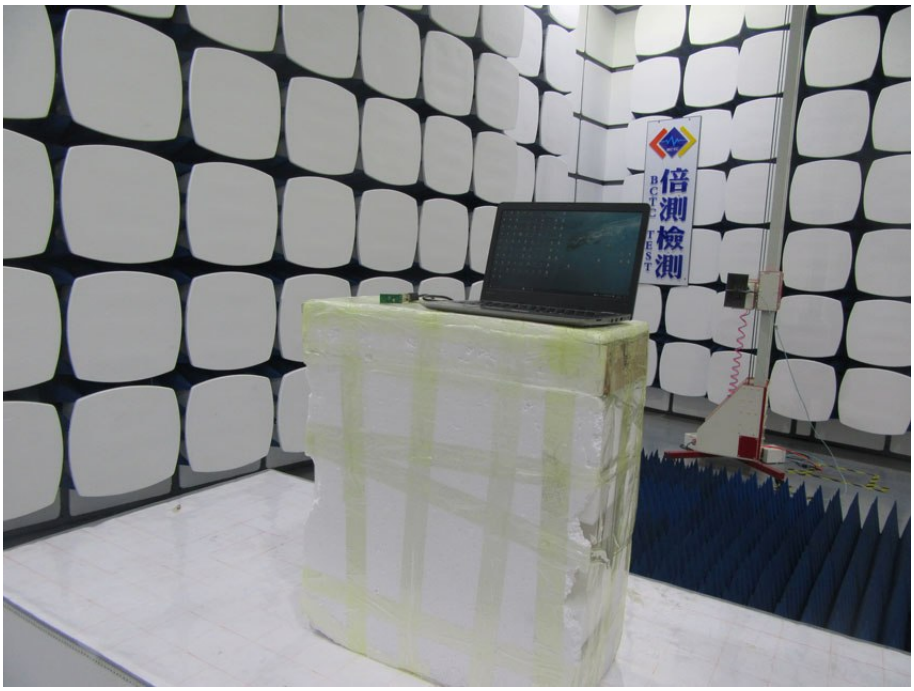
The EUT antenna is PCB antenna, It comply with the standard requirement.

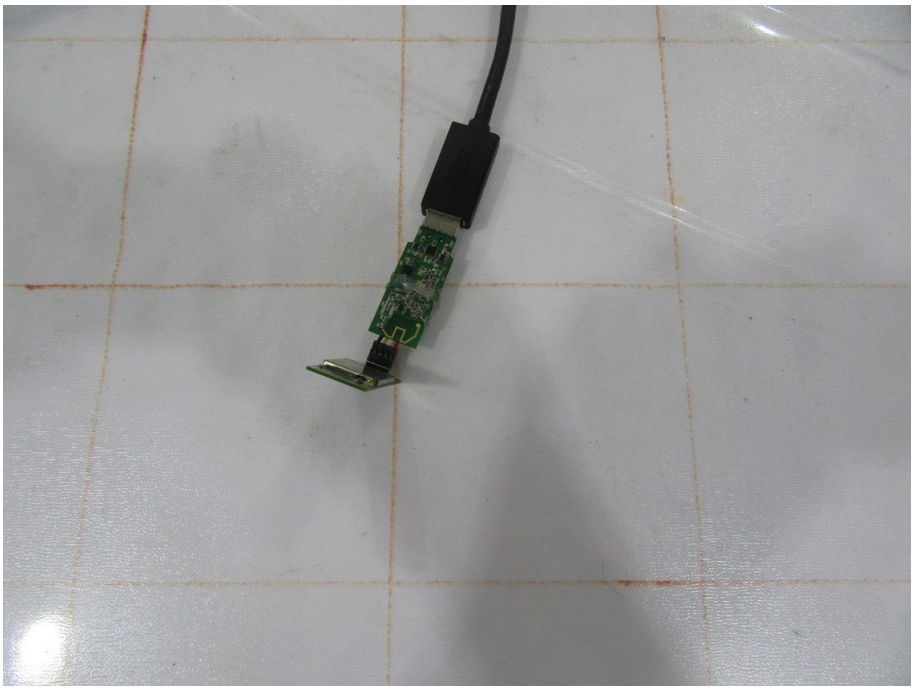
13. PHOTOGRAPHS OF TEST SET-UP

Conducted Emission

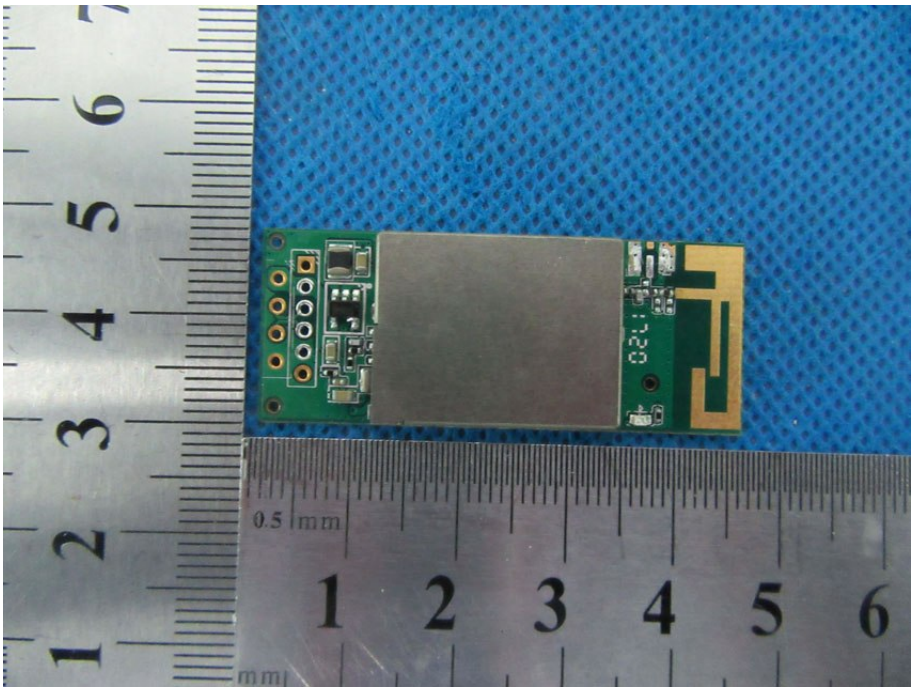
Radiated Emission Test

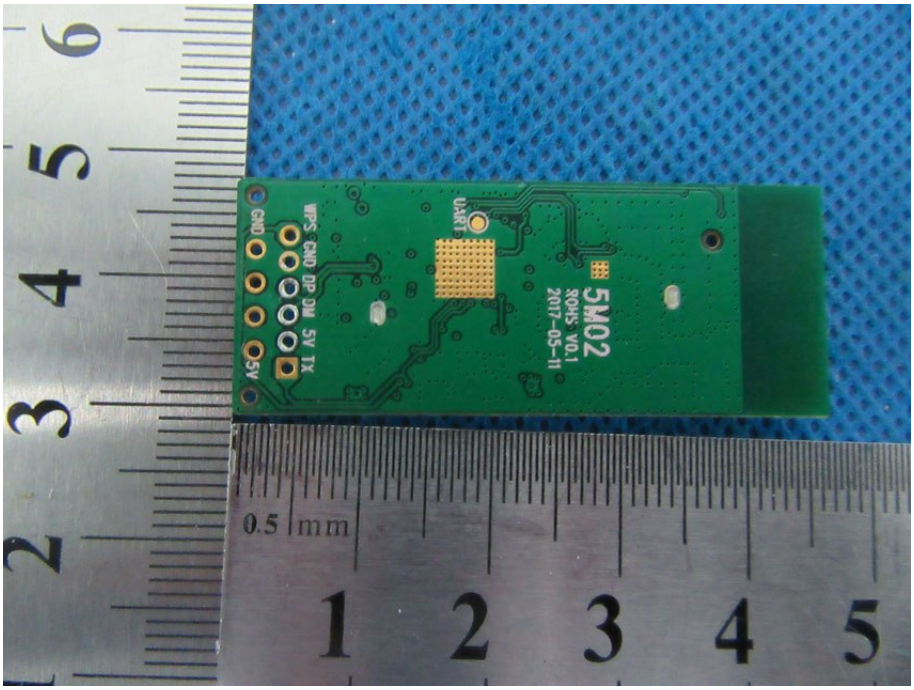






14. EUT PHOTO





------END------