Report No.: GTSL202105000104F02

TEST REPORT

Applicant:	Sinocan International Technologies Co., Ltd
Address of Applicant:	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China
Manufacturer:	Sinocan International Technologies Co., Ltd
Address of Manufacturer:	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China
Factory:	Sinocan International Technologies Co., Ltd
Address of Factory:	4F,Building B,Peking University Founder Science Park, SongBai Road North , Longteng Community, Shiyan Street , Baoan District, Shenzhen, China

Equipment Under Test (EUT)

Product Name:	Integrated Video Conference Terminal
Model No.:	S5VB1, S5VS1、S5MS10、S5VB2、S5VB5、S5VB8
Trade Mark:	
FCC ID:	2AT6L- S5VB1
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	Apr.12, 2021
Date of Test:	Apr.13, 2021-May. 06, 2021
Date of report issue:	May. 12, 2021
Test Result :	PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Luo
Laboratory Manager

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

2 Version

Version No.	Date	Description
00	*May. 12, 2021*	*Original*

Prepared By: ***Date:*** May. 11, 2021

Project Engineer

Check By: ***Date:*** May. 11, 2021

Reviewer

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4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	PASS
Emission Bandwidth and 99% Occupied Bandwidth	15.407(a)(5)	PASS
AC Power Line Conducted Emission	15.207	PASS
Peak Transmit Power	15.407(a)(1)	PASS
Power Spectral Density	15.407(a)(1)	PASS
Undesirable Emission	15.407(b), 15.205/15.209	PASS
Radiated Emission	15.205/15.209	PASS
Band Edge	15.407(b)(1)	PASS
Frequency Stability	15.407(g)	PASS

Remark:

Pass: The EUT complies with the essenial requirements in the standard.

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	Integrated Video Conference Terminal
Model No.:	S5VB1, S5VS1、S5MS10、S5VB2、S5VB5、S5VB8
Test Model No:	S5VB1
Remark: All models differences are only naming method, which represents different customer codes and sales markets, and others are the same	
Serial No.:	N/A
Hardware Version:	T.RK3399.75B
Software Version:	MS10B_Monitor_GENERAL_MS10B_maintain_3399_SRRC_V2_20210224 1617_5.0.3.01
Test sample(s) ID:	GTSL202105000104-1
Sample(s) Status:	Engineer sample
Operation Frequency:	

Band	Mode	Frequency Range(MHz)	Number of channels
U-NII Band I	IEEE 802.11a	5180-5240	4
	IEEE 802.11n/ac 20MHz	5180-5240	4
	IEEE 802.11n/ac 40MHz	5190-5230	2
	IEEE 802.11ac 80MHz	5210	1

Modulation technology:	IEEE 802.11a: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n: OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11ac: OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)
Antenna Type:	Integral Antenna
Antenna gain:	Antenna 1: 3.5dBi (Max) Antenna 2: 3.5dBi(Max)
Power supply:	DC 12V From adapter with ac 100-240V

Channel list for 802.11a/n(HT20)/ac(HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180MHz	40	5200MHz	44	5220MHz	48	5240MHz

Channel list for 802.11n(HT40)/ac(HT40)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz	/	/	/	/

Channel list for 802.11ac(HT80)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210MHz	/	/	/	/	/	/

Selected Test Channel for 802.11a/n(HT20)/ac(HT20)		
Band	Channel	Frequency
U-NII Band I	The lowest channel (CH36)	5180MHz
	The middle channel (CH40)	5200MHz
	The highest channel (CH48)	5240MHz

Selected Test Channel for 802.11n(HT40)/ac(HT40)		
Band	Channel	Frequency
U-NII Band I	The lowest channel (CH38)	5190MHz
	The highest channel (CH46)	5230MHz

Selected Test Channel for 802.11ac(HT80)		
Band	Channel	Frequency
U-NII Band I	One channel (CH42)	5210MHz

5.2 Test mode

Transmitting mode	Keep the EUT in transmitting with modulation. EUT was test with 100% duty cycle at its maximum power control level.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

Mode	Data rate
802.11a	6 Mbps
802.11n(HT20)	6.5 Mbps
802.11n(HT40)	13.5 Mbps
802.11ac(HT20)	6.5 Mbps
802.11ac(HT40)	13.5 Mbps
802.11ac(HT80)	29.3 Mbps

5.3 Test Facility

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

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.4 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
Address: No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, sBaoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.5 Description of Support Units

None.

5.6 Deviation from Standards

None.

5.7 Abnormalities from Standard Conditions

None.

5.8 Other Information Requested by the Customer

None.

5.9 Additional Instructions

EUT Software Settings:

Mode	Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.		
Test Software Name	RtkWiFiTest-release.apk		
Mode	Channel	Frequency (MHz)	Soft Set
OFDM	CH36	5180	TX level : default
	CH38	5190	
	CH40	5200	
	CH42	5210	
	CH46	5230	
	CH48	5240	

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 02 2020	July. 01 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 25 2020	June. 24 2021
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 25 2020	June. 24 2021
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 25 2020	June. 24 2021
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 25 2020	June. 24 2021
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 25 2020	June. 24 2021
9	Coaxial Cable	GTS	N/A	GTS211	June. 25 2020	June. 24 2021
10	Coaxial cable	GTS	N/A	GTS210	June. 25 2020	June. 24 2021
11	Coaxial Cable	GTS	N/A	GTS212	June. 25 2020	June. 24 2021
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 25 2020	June. 24 2021
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 25 2020	June. 24 2021
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 25 2020	June. 24 2021
15	Band filter	Amindeon	82346	GTS219	June. 25 2020	June. 24 2021
16	Power Meter	Anritsu	ML2495A	GTS540	June. 25 2020	June. 24 2021
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 25 2020	June. 24 2021
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 25 2020	June. 24 2021
19	Splitter	Agilent	11636B	GTS237	June. 25 2020	June. 24 2021
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 25 2020	June. 24 2021
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 18 2020	Oct. 17 2021
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 18 2020	Oct. 17 2021
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 18 2020	Oct. 17 2021
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 25 2020	June. 24 2021

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 25 2020	June. 24 2021
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 25 2020	June. 24 2021
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 25 2020	June. 24 2021
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 25 2020	June. 24 2021
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	June. 25 2020	June. 24 2021

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 25 2020	June. 24 2021
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 25 2020	June. 24 2021
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 25 2020	June. 24 2021
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 25 2020	June. 24 2021
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 25 2020	June. 24 2021
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 25 2020	June. 24 2021
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 25 2020	June. 24 2021
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 25 2020	June. 24 2021

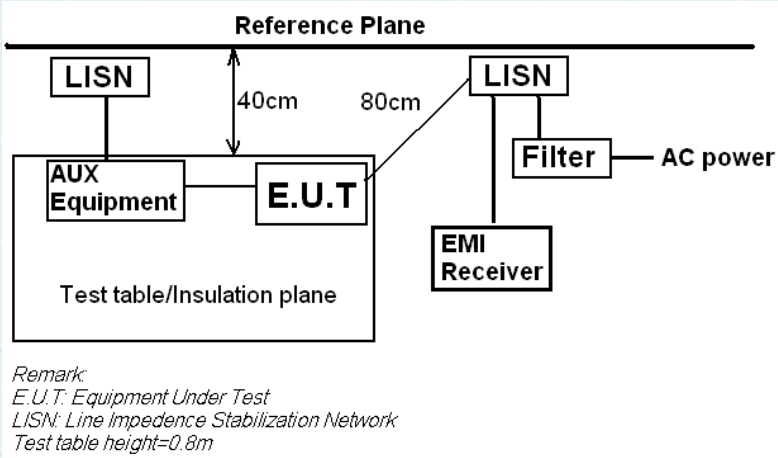
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 25 2020	June. 24 2021
2	Barometer	ChangChun	DYM3	GTS255	June. 25 2020	June. 24 2021

7 Test results and Measurement Data

7.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
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.	
E.U.T Antenna:	
The antennas are integral antenna, the best case gain of the antenna is 3.5dBi. Two antennas simultaneously transmitting, the Directional Gain is 6.5dBi，reference to the appendix II for details.	

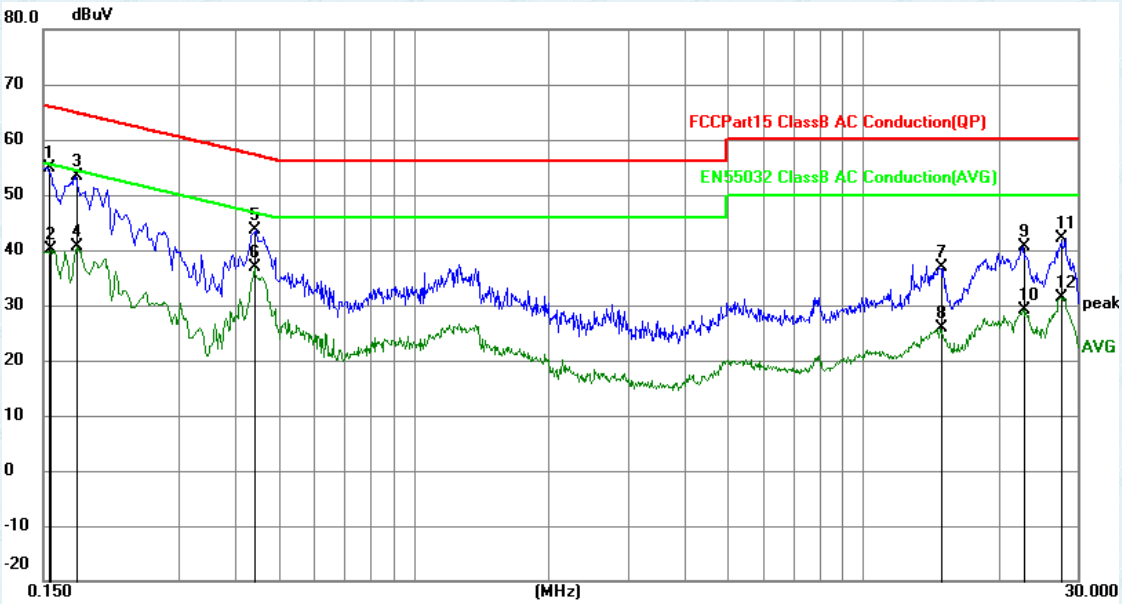
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test procedure	The E.U.T and simulators are connected to the main power through a line impedance stabilization network(L.I.S.N.). The provide a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.
Test setup:	
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C; Humid.: 52%; Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

Measurement Data

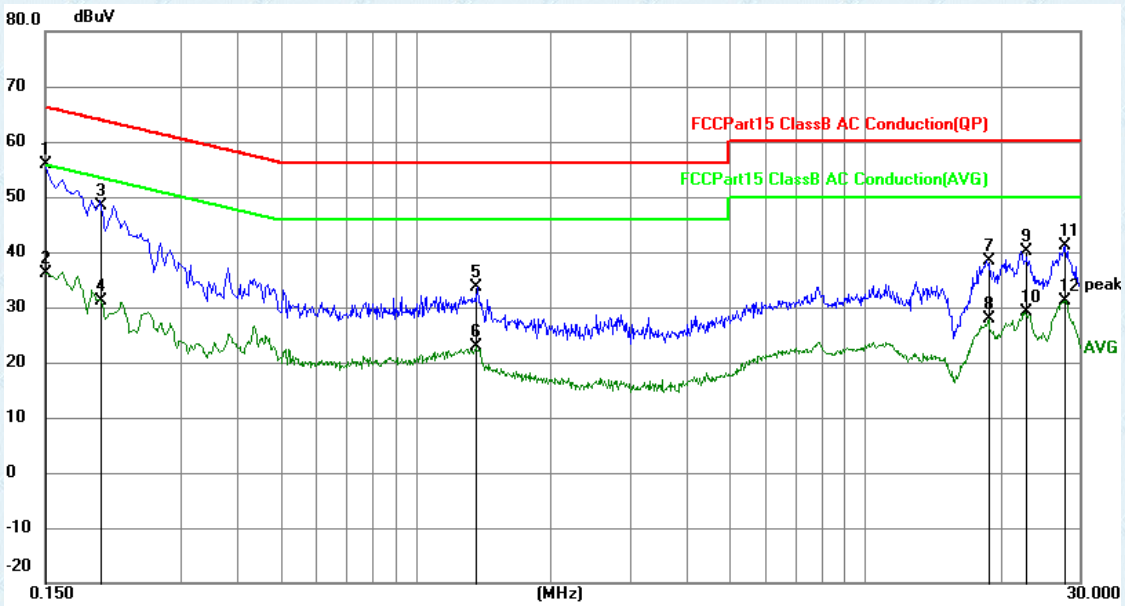
An initial pre-scan was performed on the line and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Line:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1544	44.33	10.49	54.82	65.76	-10.94	QP
2	0.1554	29.60	10.49	40.09	55.71	-15.62	AVG
3	0.1785	42.97	10.47	53.44	64.56	-11.12	QP
4	0.1785	30.13	10.47	40.60	54.56	-13.96	AVG
5	0.4425	33.18	10.37	43.55	57.01	-13.46	QP
6	0.4425	26.46	10.37	36.83	47.01	-10.18	AVG
7	14.8559	26.43	10.42	36.85	60.00	-23.15	QP
8	14.8559	15.41	10.42	25.83	50.00	-24.17	AVG
9	22.8431	30.04	10.60	40.64	60.00	-19.36	QP
10	22.8431	18.64	10.60	29.24	50.00	-20.76	AVG
11	27.6810	31.37	10.67	42.04	60.00	-17.96	QP
12	27.6810	20.75	10.67	31.42	50.00	-18.58	AVG

Neutral:

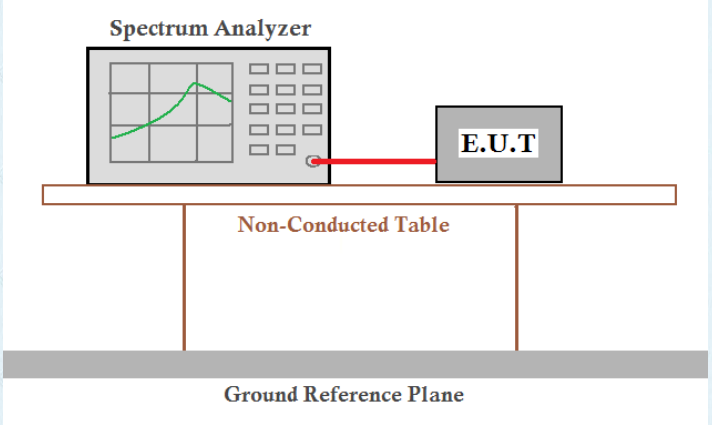


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1500	45.35	10.49	55.84	66.00	-10.16	QP
2	0.1500	25.72	10.49	36.21	56.00	-19.79	AVG
3	0.1995	37.94	10.46	48.40	63.63	-15.23	QP
4	0.1995	20.71	10.46	31.17	53.63	-22.46	AVG
5	1.3649	23.35	10.29	33.64	56.00	-22.36	QP
6	1.3649	12.67	10.29	22.96	46.00	-23.04	AVG
7	18.8338	27.91	10.53	38.44	60.00	-21.56	QP
8	18.8338	17.26	10.53	27.79	50.00	-22.21	AVG
9	22.7130	29.43	10.60	40.03	60.00	-19.97	QP
10	22.7130	18.43	10.60	29.03	50.00	-20.97	AVG
11	27.7935	30.46	10.67	41.13	60.00	-18.87	QP
12	27.7935	20.56	10.67	31.23	50.00	-18.77	AVG

Notes:

1. *An initial pre-scan was performed on the line and neutral lines with peak detector.*
2. *Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.*
3. *Final Level =Receiver Read level + LISN Factor + Cable Loss*

7.3 Emission Bandwidth and 99% Occupied Bandwidth

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	N/A
Test setup:	
Test procedure:	According to KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data:

ANT 1(Module RTL8821CU):

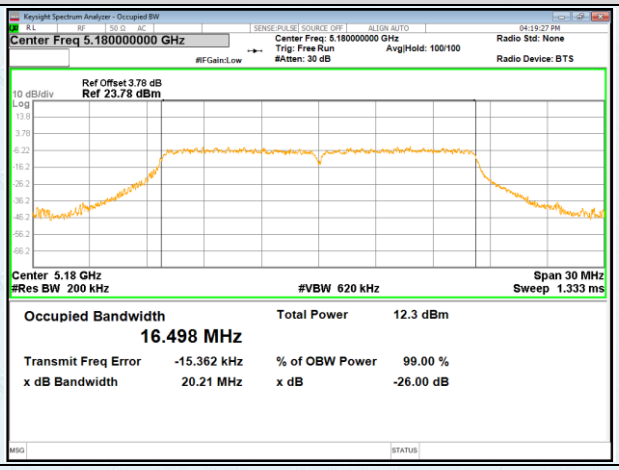
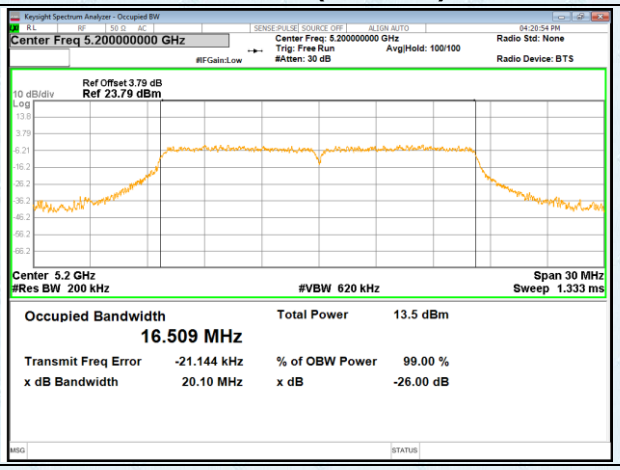
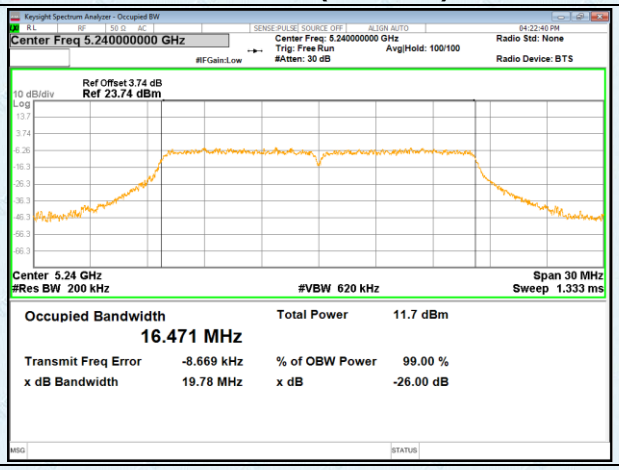
U-NII Band I							
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT20)	802.11ac(HT20)	802.11a	802.11n(HT20)	802.11ac(HT20)
36	5180.00	16.498	17.623	17.629	20.21	20.94	21.11
40	5200.00	16.509	17.620	17.626	20.10	21.27	20.90
48	5240.00	16.471	17.621	17.621	19.78	21.02	20.74
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11n(HT40)	802.11ac(HT40)		802.11n(HT40)	802.11ac(HT40)	
38	5190.00	36.075	36.031		41.19	41.17	
46	5230.00	36.063	36.076		41.54	40.88	
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11ac(HT80)			802.11ac(HT80)		
42	5210.00	75.106			80.68		

ANT 2(Module RTL8822CU):

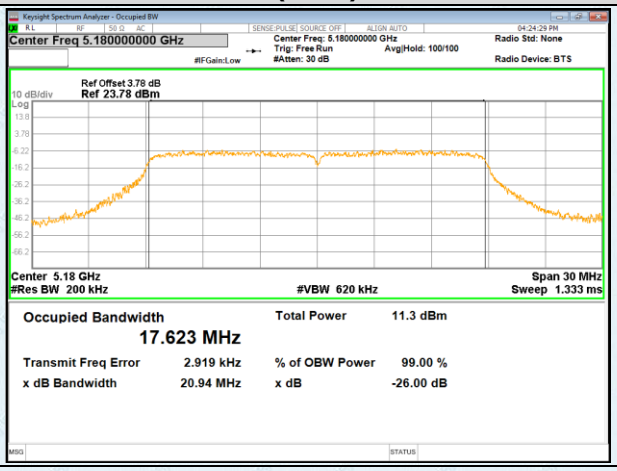
U-NII Band I							
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11a	802.11n(HT20)	802.11ac(HT20)	802.11a	802.11n(HT20)	802.11ac(HT20)
36	5180.00	16.346	17.517	17.534	18.43	19.19	19.13
40	5200.00	16.327	17.533	17.531	18.50	19.18	19.31
48	5240.00	16.343	17.531	17.525	18.39	19.21	19.32
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11n(HT40)	802.11ac(HT40)		802.11n(HT40)	802.11ac(HT40)	
38	5190.00	36.052	36.081		40.61	41.52	
46	5230.00	36.066	36.042		41.24	40.56	
CH. No.	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26dB Occupied Bandwidth (MHz)		
		802.11ac(HT80)			802.11ac(HT80)		
42	5210.00	74.605			80.58		

Test plots as followed:

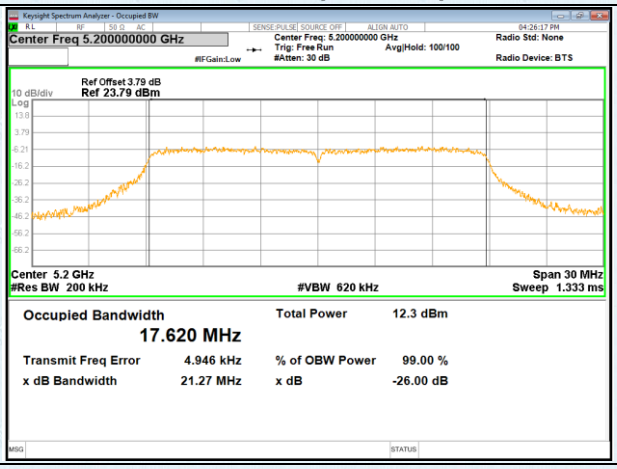
ANT 1(Module RTL8821CU):

802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

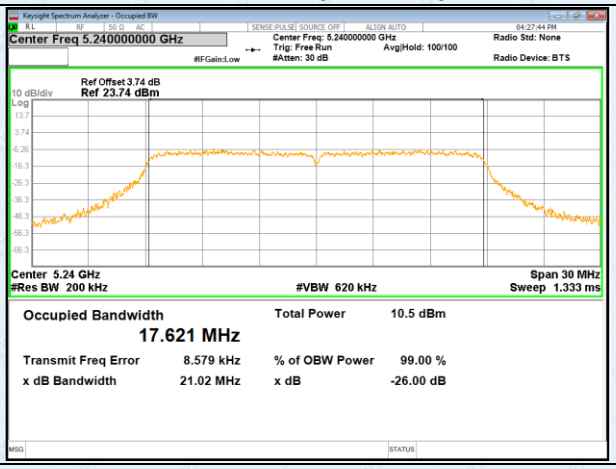
802.11n(HT20) mode



Channel 36 (5180MHz)

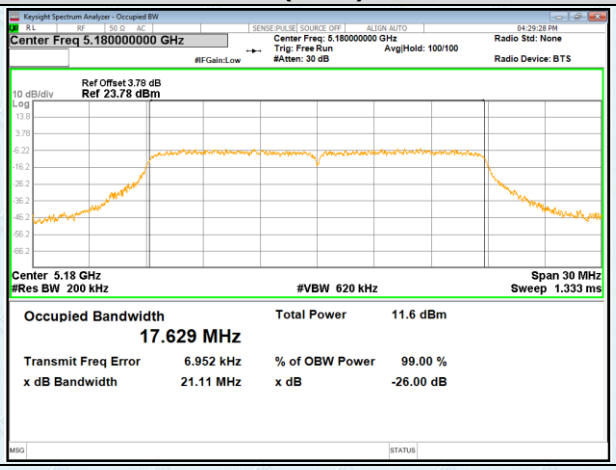


Channel 40 (5200MHz)

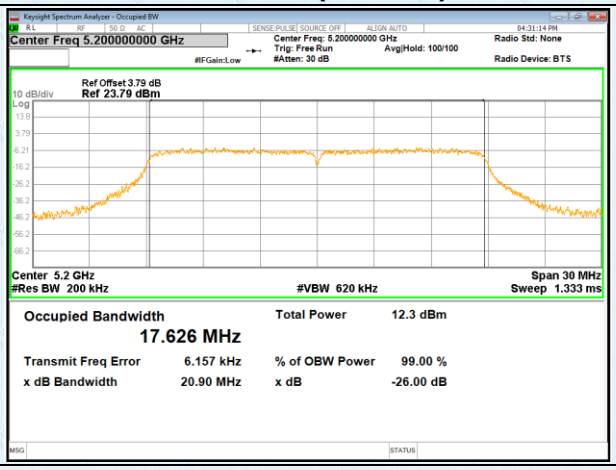


Channel 48 (5240MHz)

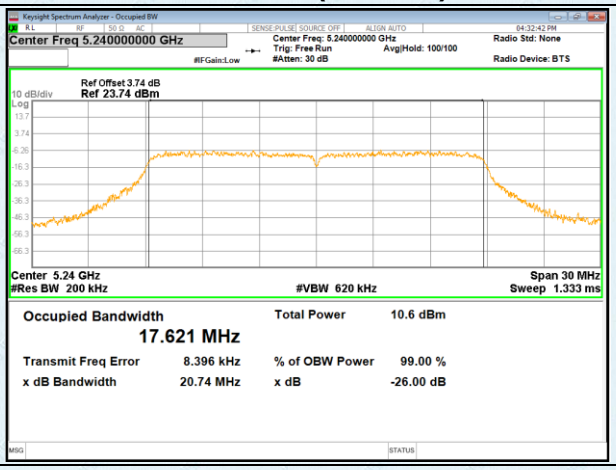
802.11ac(HT20) mode



Channel 36 (5180MHz)

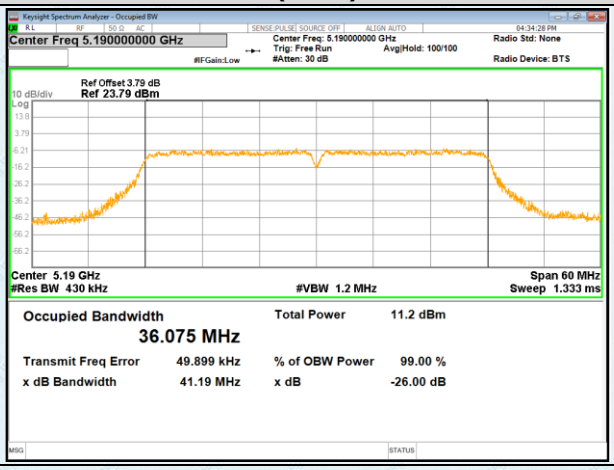


Channel 40 (5200MHz)

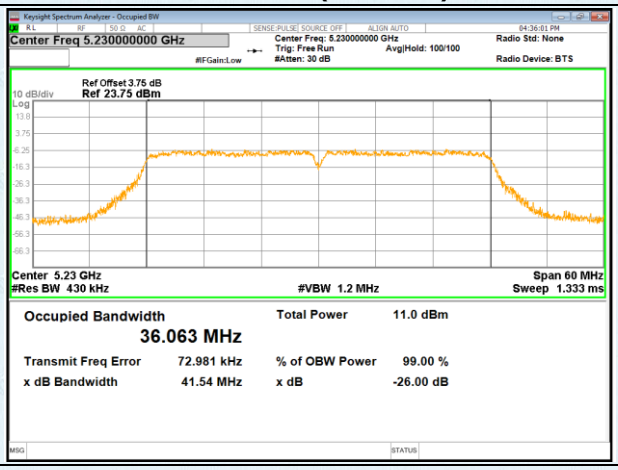


Channel 48 (5240MHz)

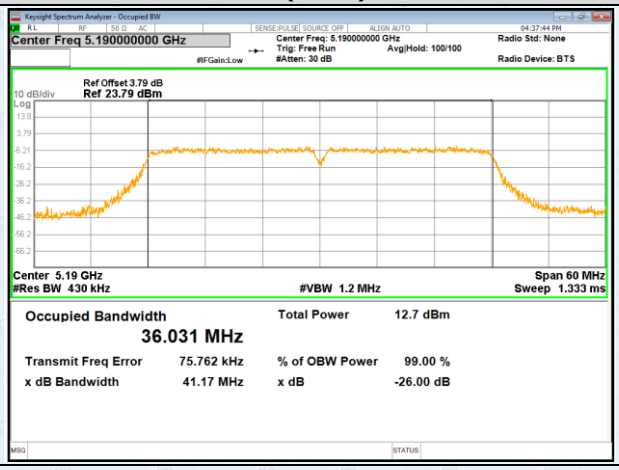
802.11n(HT40) mode



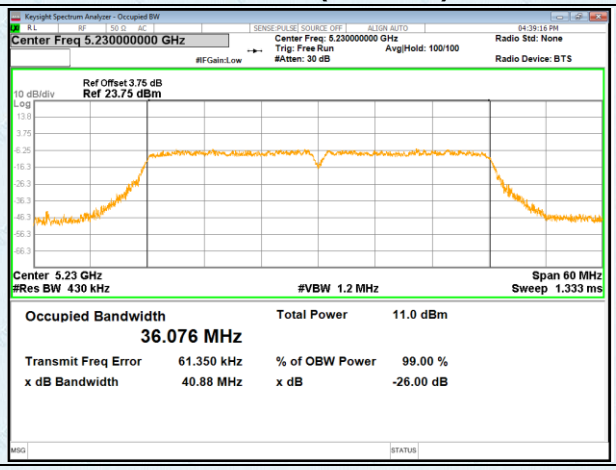
Channel 38 (5190MHz)



802.11ac(HT40) mode

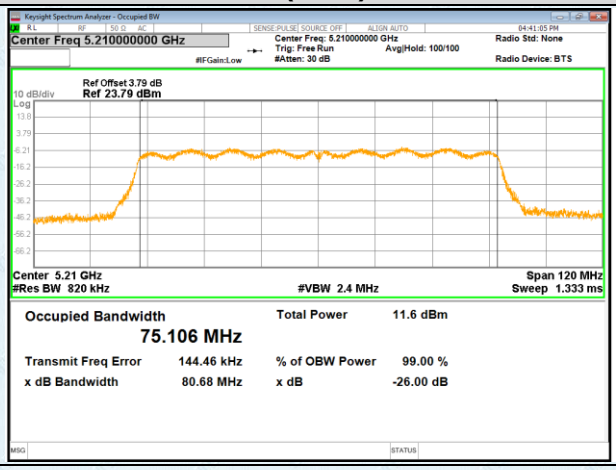


Channel 38 (5190MHz)



Channel 46 (5230MHz)

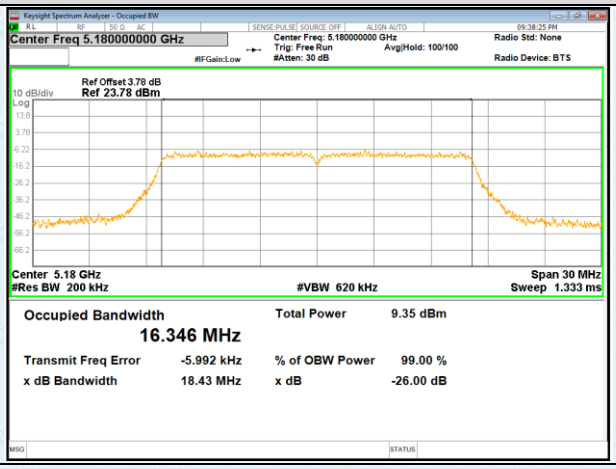
802.11ac(HT80) mode



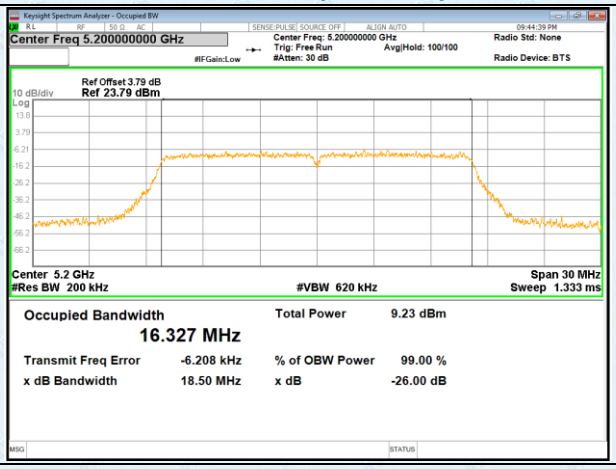
Channel 42 (5210MHz)

ANT 2(Module RTL8822CU):

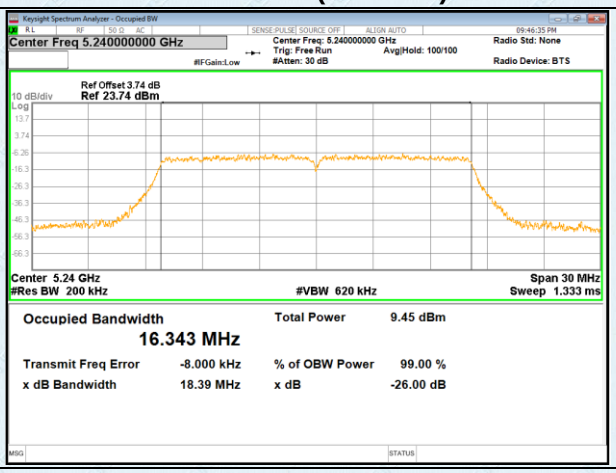
802.11a mode



Channel 36 (5180MHz)

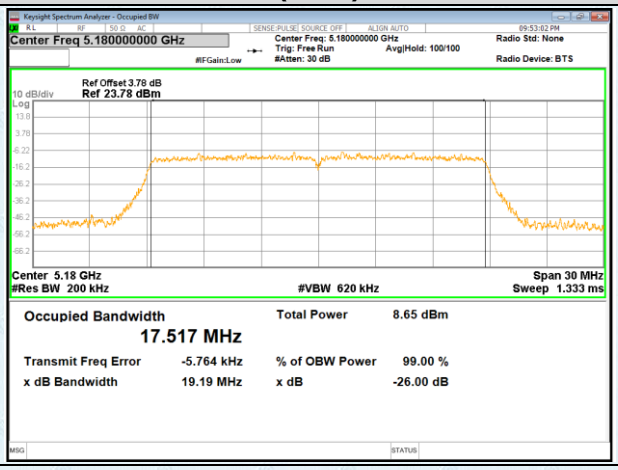


Channel 40 (5200MHz)

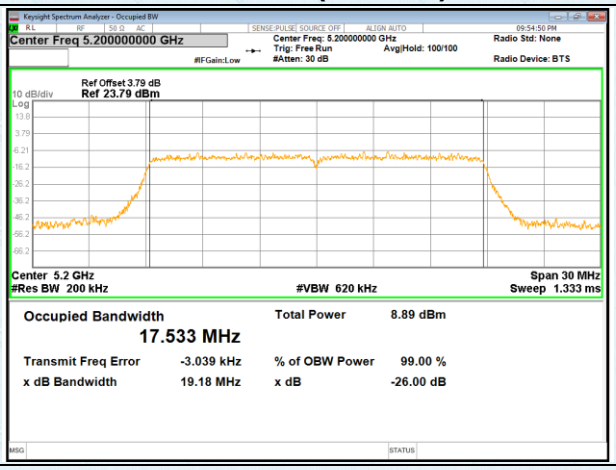


Channel 48 (5240MHz)

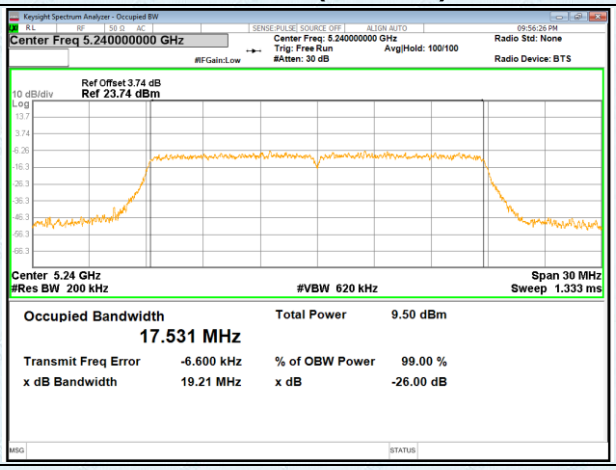
802.11n(HT20) mode



Channel 36 (5180MHz)

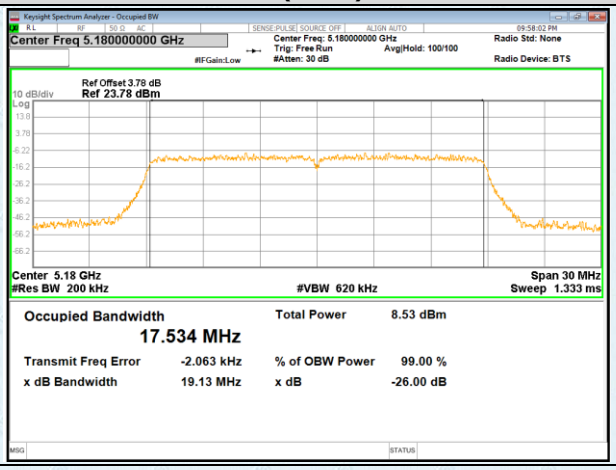


Channel 40 (5200MHz)

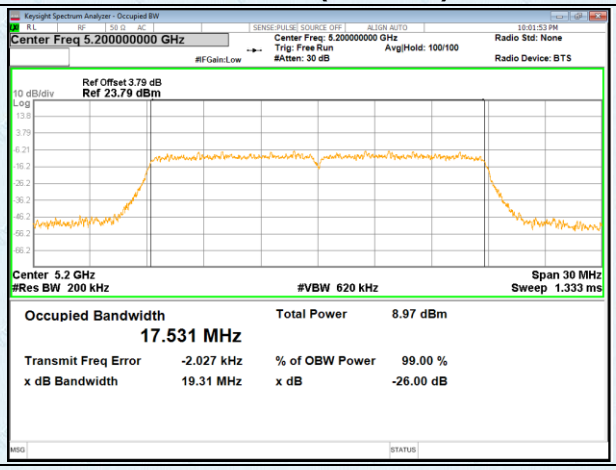


Channel 48 (5240MHz)

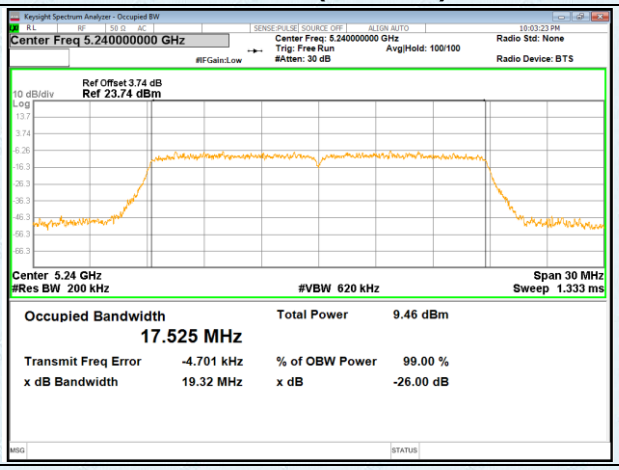
802.11ac(HT20) mode



Channel 36 (5180MHz)

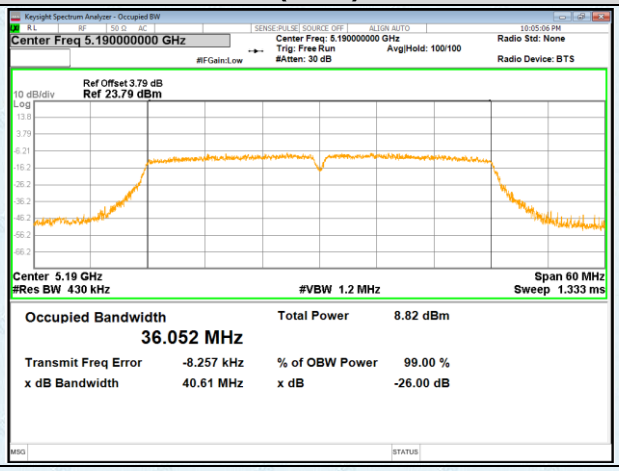


Channel 40 (5200MHz)

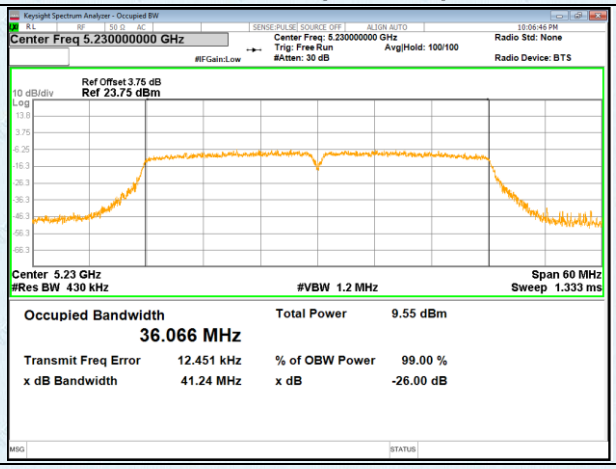


Channel 48 (5240MHz)

802.11n(HT40) mode

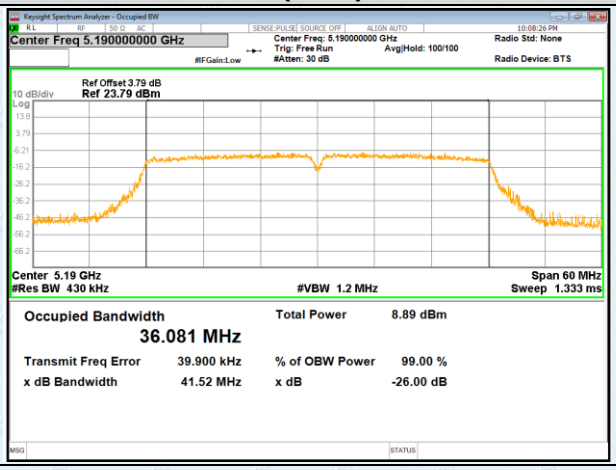


Channel 38 (5190MHz)

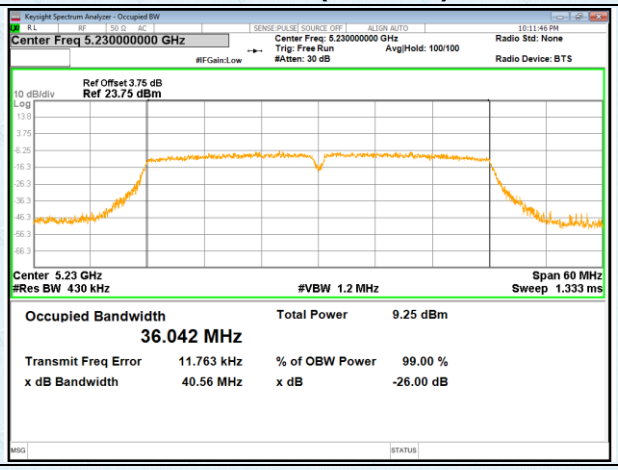


Channel 46 (5230MHz)

802.11ac(HT40) mode

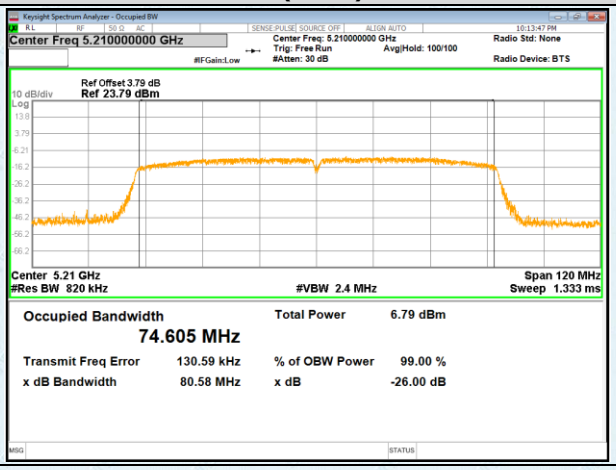


Channel 38 (5190MHz)



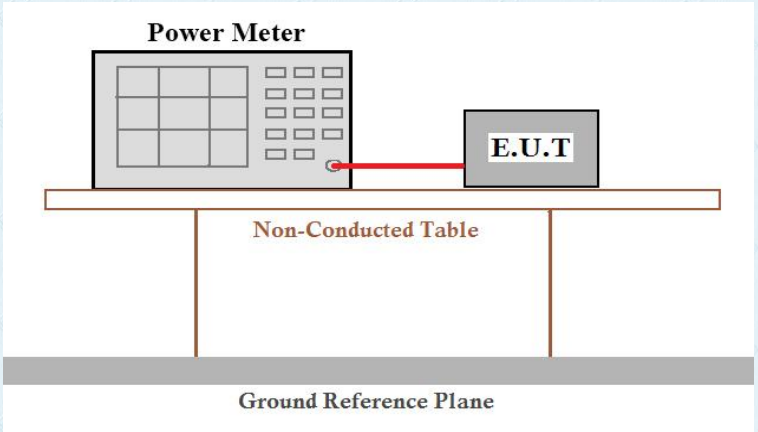
Channel 46 (5230MHz)

802.11ac(HT80) mode



Channel 42 (5210MHz)

7.4 Duty Cycle

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	/
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

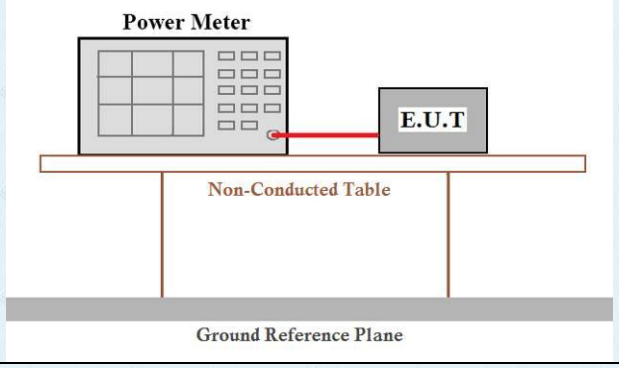
ANT 1(Module RTL8821CU):

Modulation	Duty cycle	Duty Factor
802.11a	100%	0
802.11n(HT20)	100%	0
802.11n(HT40)	100%	0
802.11ac(HT20)	100%	0
802.11ac(HT40)	100%	0
802.11ac(HT80)	100%	0

ANT 2(Module RTL8822CU):

Modulation	Duty cycle	Duty Factor
802.11a	100%	0
802.11n(HT20)	100%	0
802.11n(HT40)	100%	0
802.11ac(HT20)	100%	0
802.11ac(HT40)	100%	0
802.11ac(HT80)	100%	0

7.5 Peak Transmit Power

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	<table><tr><th>Frequency band (MHz)</th><th>Limit</th></tr><tr><td rowspan="2">5150-5250</td><td>≤1W(30dBm) for master device</td></tr><tr><td>≤250mW(23.98dBm) for client device</td></tr><tr><td>5250-5350</td><td>≤250mW(23.98dBm) for client device or 11dBm+10logB*</td></tr><tr><td>5470-5725</td><td>≤250mW(23.98dBm) for client device or 11dBm+10logB*</td></tr><tr><td colspan="2">Remark: *Where B is the 26dB emission bandwidth in MHz. The maximum conducted output power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage.</td></tr></table>
Test setup:	
Test procedure:	**Measurement using an RF average power meter** (i) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the conditions listed below are satisfied a) The EUT is configured to transmit continuously or to transmit with a constant duty cycle. b) At all times when the EUT is transmitting, it must be transmitting at its maximum power control level. c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five. (ii) If the transmitter does not transmit continuously, measure the duty cycle, x, of the transmitter output signal as described in section B). (iii) Measure the average power of the transmitter. This measurement is an average over both the on and off periods of the transmitter. (iv) Adjust the measurement in dBm by adding 10 log(1/x) where x is the duty cycle (e.g., 10log(1/0.25) if the duty cycle is 25 percent).
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

ANT 1(Module RTL8821CU):

U-NII Band I

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	11.34	0	11.34	23.98	Pass
40	5200.00	12.63	0	12.63	23.98	Pass
48	5240.00	10.74	0	10.74	23.98	Pass
802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	10.68	0	10.68	23.98	Pass
40	5200.00	11.71	0	11.71	23.98	Pass
48	5240.00	9.98	0	9.98	23.98	Pass
802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	9.98	0	9.98	23.98	Pass
40	5200.00	11.73	0	11.73	23.98	Pass
48	5240.00	10.04	0	10.04	23.98	Pass
802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	10.04	0	10.04	23.98	Pass
46	5230.00	10.01	0	10.01	23.98	Pass
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	11.58	0	11.58	23.98	Pass
46	5230.00	9.98	0	9.98	23.98	Pass
802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210.00	9.76	0	9.76	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

ANT 2(Module RTL8822CU):

U-NII Band I

802.11a mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	8.39	0	8.39	23.98	Pass
40	5200.00	8.19	0	8.19	23.98	Pass
48	5240.00	8.68	0	8.68	23.98	Pass
802.11n(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	7.51	0	7.51	23.98	Pass
40	5200.00	7.92	0	7.92	23.98	Pass
48	5240.00	8.46	0	8.46	23.98	Pass
802.11ac(HT20) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
36	5180.00	7.56	0	7.56	23.98	Pass
40	5200.00	7.81	0	7.81	23.98	Pass
48	5240.00	8.49	0	8.49	23.98	Pass
802.11n(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	7.86	0	7.86	23.98	Pass
46	5230.00	8.45	0	8.45	23.98	Pass
802.11 ac(HT40) mode						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
38	5190.00	7.84	0	7.84	23.98	Pass
46	5230.00	8.33	0	8.33	23.98	Pass
802.11 ac(HT80)						
CH No.	Frequency (MHz)	Measured Power (dBm)	Duty Factor	Output Power (dBm)	Limit (dBm)	Result
42	5210.00	5.07	0	5.07	23.98	Pass

Note: Output Power = Measured Power + Duty Factor

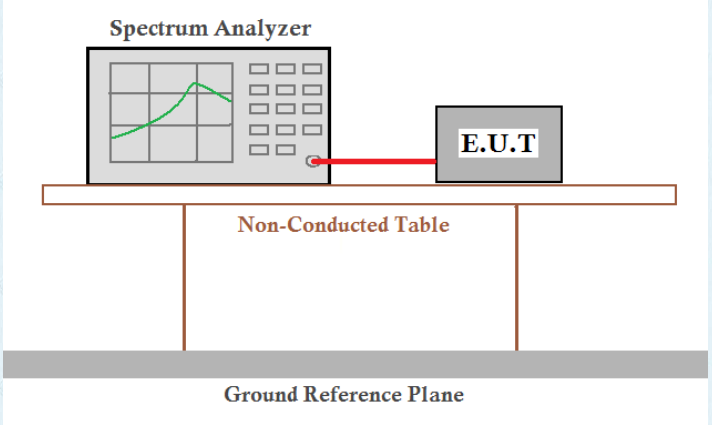
Duty Factor = 10 log (1/Duty Cycle)

ANT1+ANT2:

Modulation	Test CH	Peak Output Power (dBm)		Sum Output Power (dBm)	Limit (dBm)	Result
802.11a	36	ANT 1	11.34	13.12	23.48	Pass
		ANT 2	8.39			
	40	ANT 1	12.63	13.96		
		ANT 2	8.19			
	48	ANT 1	10.74	12.84		
		ANT 2	8.68			
802.11n(HT20)	36	ANT 1	10.68	12.39	23.48	Pass
		ANT 2	7.51			
	40	ANT 1	11.71	13.23		
		ANT 2	7.92			
	48	ANT 1	9.98	12.30		
		ANT 2	8.46			
802.11ac(HT20)	36	ANT 1	9.98	11.95	23.48	Pass
		ANT 2	7.56			
	40	ANT 1	11.73	13.21		
		ANT 2	7.81			
	48	ANT 1	10.04	12.34		
		ANT 2	8.49			
802.11n(HT40)	38	ANT 1	10.04	12.10	23.48	Pass
		ANT 2	7.86			
	46	ANT 1	10.01	12.31		
		ANT 2	8.45			
802.11ac(HT40)	38	ANT 1	11.58	13.11	23.48	Pass
		ANT 2	7.84			
	46	ANT 1	9.98	12.24		
		ANT 2	8.33			
802.11ac(HT80)	42	ANT 1	9.76	11.03	23.48	Pass
		ANT 2	5.07			

Note: GANT =3.5dBi, Array Gain=10log(NANT/NSS)=3.0dBi, Directional Gain=GANT + Array Gain=6.5dBi, limit=23.98-(6.5-6)=23.48dBm

7.6 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	<table><tr><th>Frequency band (MHz)</th><th>Limit</th></tr><tr><td rowspan="2">5150-5250</td><td>≤17dBm in 1MHz for master device</td></tr><tr><td>≤11dBm in 1MHz for client device</td></tr><tr><td>5250-5350</td><td>≤11dBm in 1MHz for client device</td></tr><tr><td>5470-5725</td><td>≤11dBm in 1MHz for client device</td></tr><tr><td colspan="2">Remark: The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test.</td></tr></table>
Test setup:	
Test procedure:	1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. 2) Use the peak search function on the instrument to find the peak of the spectrum. 3) Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step E)2)g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4) The result is the PSD.
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

ANT 1(Module RTL8821CU):

U-NII Band I

802.11a mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	3.187	0	3.187	11.00	Pass
40	5200.00	4.719	0	4.719	11.00	Pass
48	5240.00	2.749	0	2.749	11.00	Pass
802.11n(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	2.352	0	2.352	11.00	Pass
40	5200.00	3.420	0	3.420	11.00	Pass
48	5240.00	1.616	0	1.616	11.00	Pass
802.11ac(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	2.771	0	2.771	11.00	Pass
40	5200.00	3.404	0	3.404	11.00	Pass
48	5240.00	1.698	0	1.698	11.00	Pass
802.11n(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-0.808	0	-0.808	11.00	Pass
46	5230.00	-1.245	0	-1.245	11.00	Pass
802.11ac(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	0.255	0	0.255	11.00	Pass
46	5230.00	-1.310	0	-1.310	11.00	Pass
802.11ac(HT80) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5210.00	-3.069	0	-3.069	11.00	Pass

Note: Total PSD = Measured PSD + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

ANT 2(Module RTL8822CU):

U-NII Band I

802.11a mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	1.192	0	1.192	11.00	Pass
40	5200.00	0.858	0	0.858	11.00	Pass
48	5240.00	0.631	0	0.631	11.00	Pass
802.11n(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	-0.191	0	-0.191	11.00	Pass
40	5200.00	-0.392	0	-0.392	11.00	Pass
48	5240.00	0.194	0	0.194	11.00	Pass
802.11ac(HT20) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
36	5180.00	-0.181	0	-0.181	11.00	Pass
40	5200.00	0.101	0	0.101	11.00	Pass
48	5240.00	0.462	0	0.462	11.00	Pass
802.11n(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-2.928	0	-2.928	11.00	Pass
46	5230.00	-2.425	0	-2.425	11.00	Pass
802.11ac(HT40) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5190.00	-2.935	0	-2.935	11.00	Pass
46	5230.00	-2.612	0	-2.612	11.00	Pass
802.11ac(HT80) mode						
Channel No.	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Result
38	5210.00	-8.552	0	-8.552	11.00	Pass

Note: Total PSD = Measured PSD + Duty Factor

Duty Factor = 10 log (1/Duty Cycle)

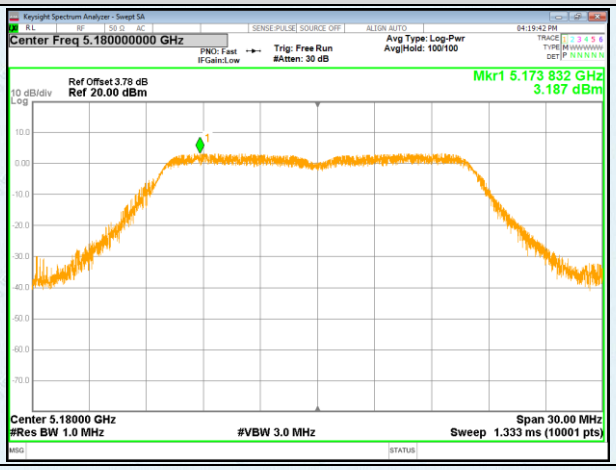
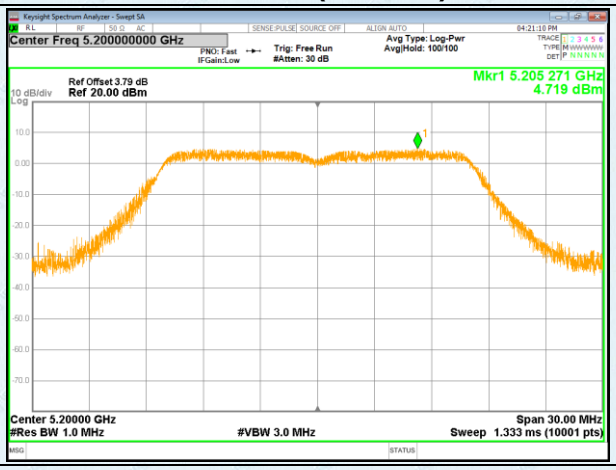
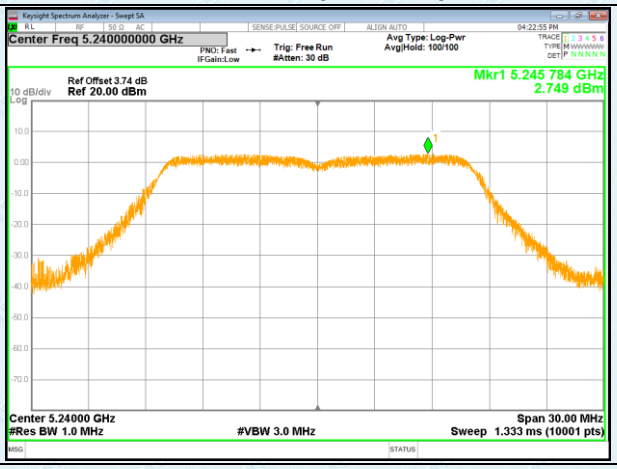
ANT1+ANT2

Modulation	Test CH	Power Spectral Density (dBm/MHz)		Sum Output Power(dBm)	Limit (dBm/MHz)	Result
802.11a	36	ANT 1	3.187	5.313	10.5	Pass
		ANT 2	1.192			
	40	ANT 1	4.719	6.214		
		ANT 2	0.858			
	48	ANT 1	2.749	4.828		
		ANT 2	0.631			
802.11n(HT20)	36	ANT 1	2.352	4.274	10.5	Pass
		ANT 2	-0.191			
	40	ANT 1	3.420	4.930		
		ANT 2	-0.392			
	48	ANT 1	1.616	3.973		
		ANT 2	0.194			
802.11ac(HT20)	36	ANT 1	2.771	4.551	10.5	Pass
		ANT 2	-0.181			
	40	ANT 1	3.404	5.070		
		ANT 2	0.101			
	48	ANT 1	1.698	4.134		
		ANT 2	0.462			
802.11n(HT40)	38	ANT 1	-0.808	1.270	10.5	Pass
		ANT 2	-2.928			
	46	ANT 1	-1.245	1.215		
		ANT 2	-2.425			
802.11ac(HT40)	38	ANT 1	0.255	1.959	10.5	Pass
		ANT 2	-2.935			
	46	ANT 1	-1.310	1.098		
		ANT 2	-2.612			
802.11ac(HT80)	42	ANT 1	-3.069	-1.987	10.5	Pass
		ANT 2	-8.552			

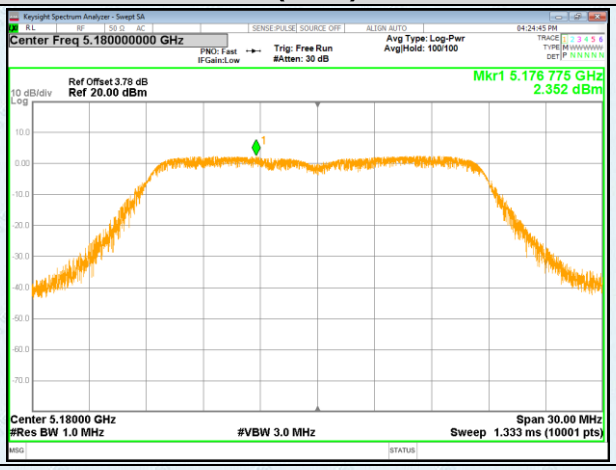
Note: GANT =3.5dBi, Array Gain=10log(NANT/NSS)=3.0dBi, Directional Gain=GANT + Array Gain=6.5dBi, Limit =11-(6.5-6) =10.5dBm

Test plots as followed:

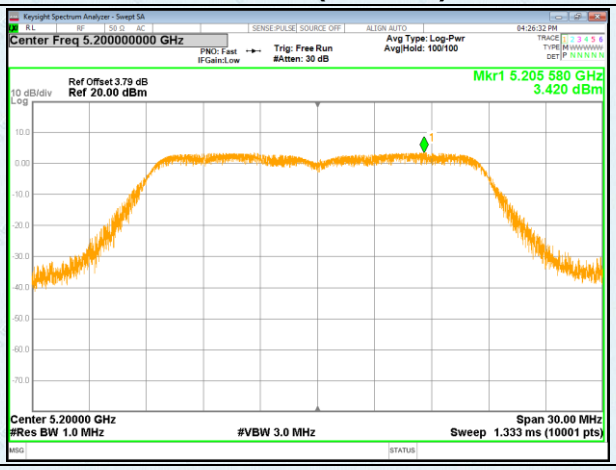
ANT 1(Module RTL8821CU):

802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

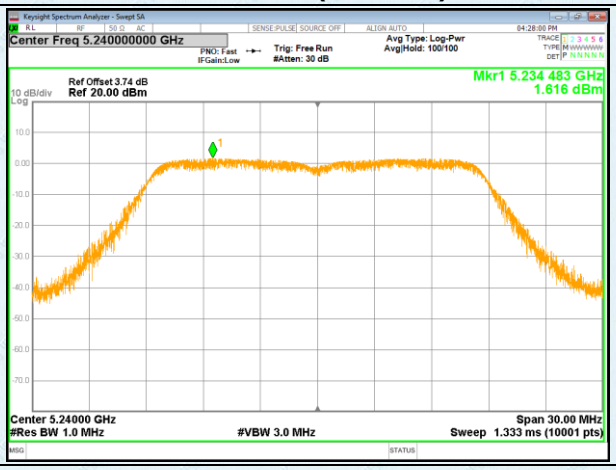
802.11n(HT20) mode



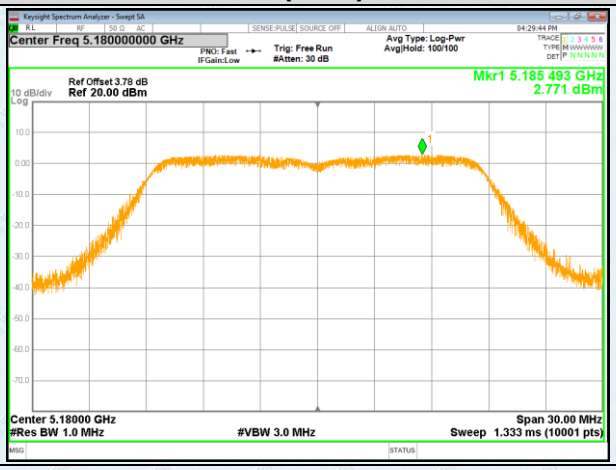
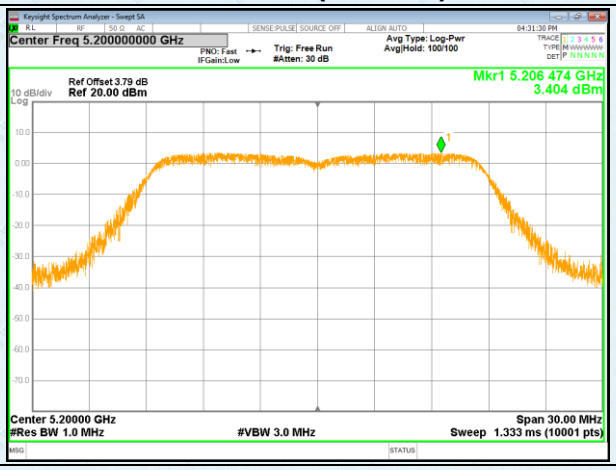
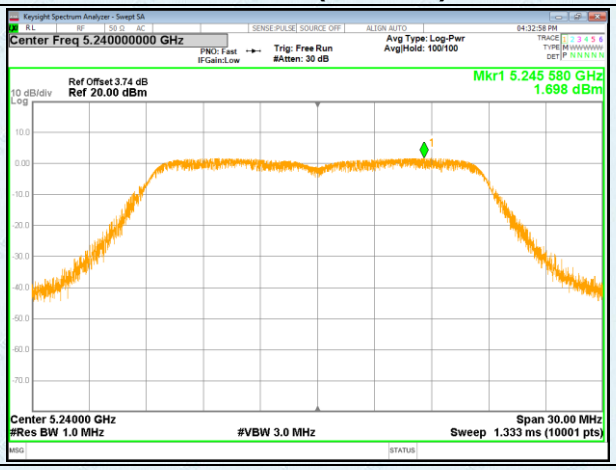
Channel 36 (5180MHz)

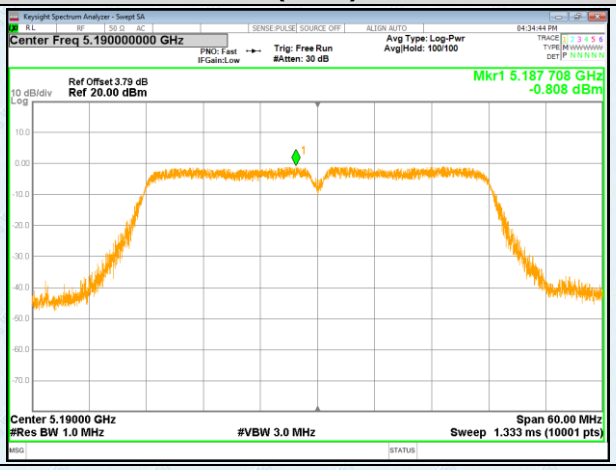
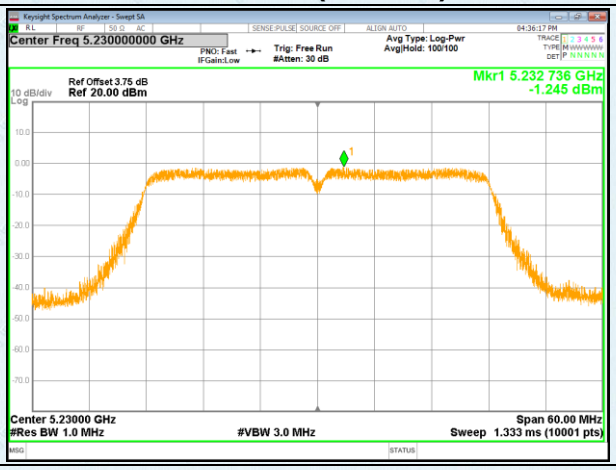


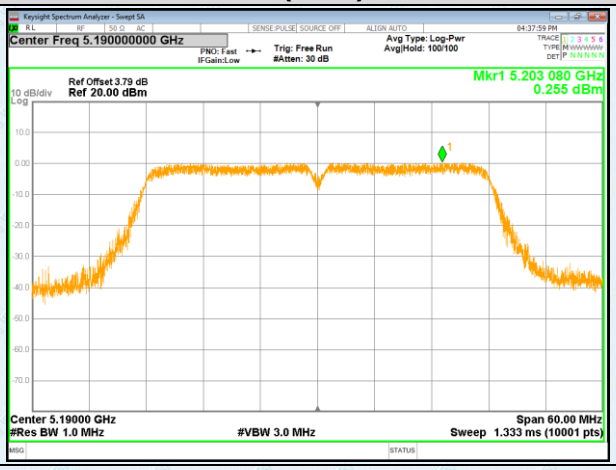
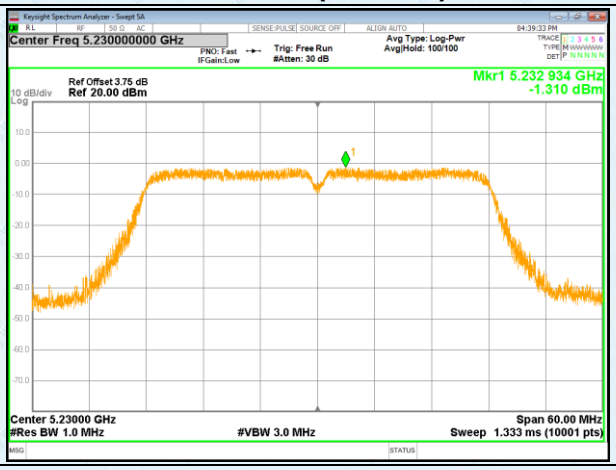
Channel 40 (5200MHz)

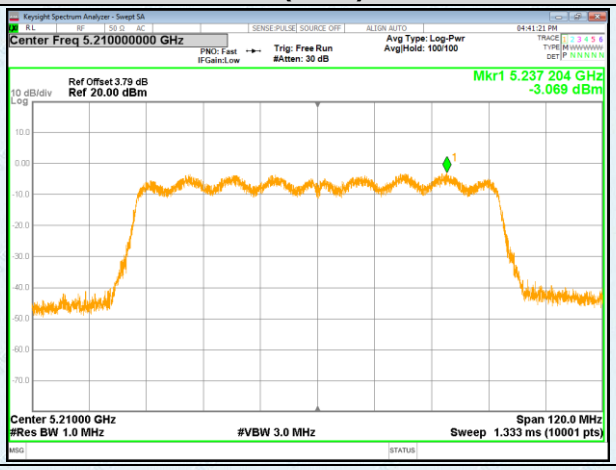


Channel 48 (5240MHz)

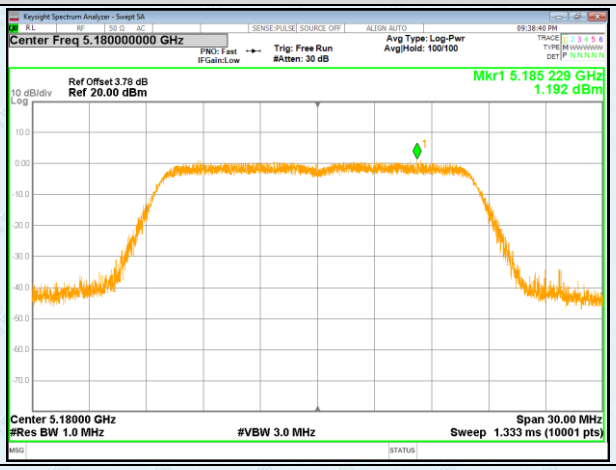
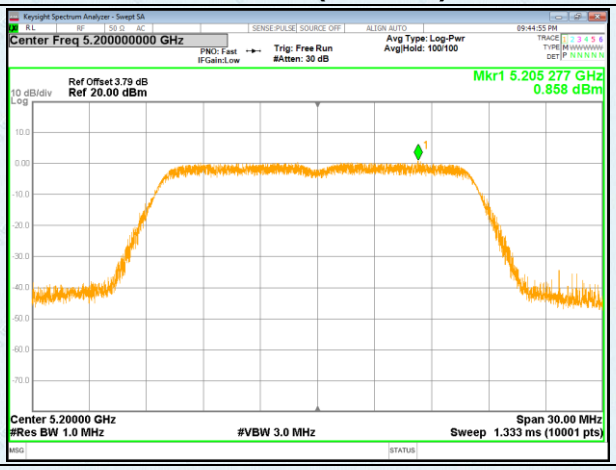
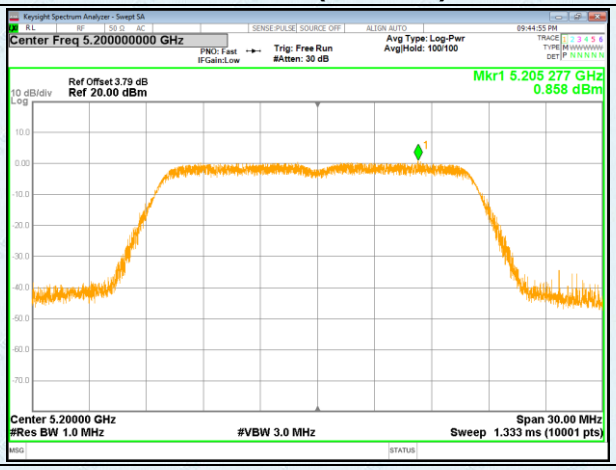
802.11ac(HT20) mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

802.11n(HT40) mode

Channel 38 (5190MHz)


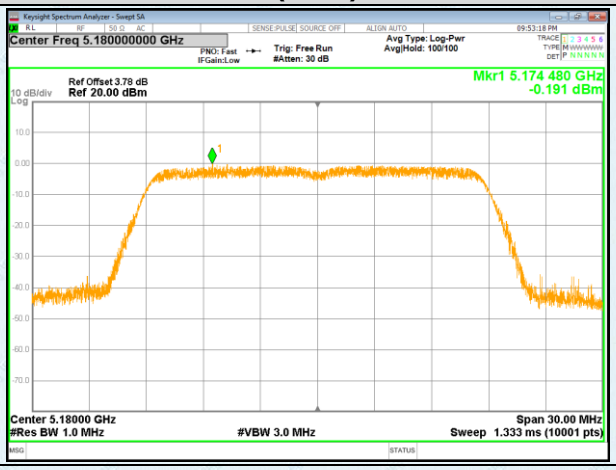
802.11ac(HT40) mode

Channel 38 (5190MHz)

Channel 46 (5230MHz)

802.11ac(HT80) mode

Channel 40 (5210MHz)

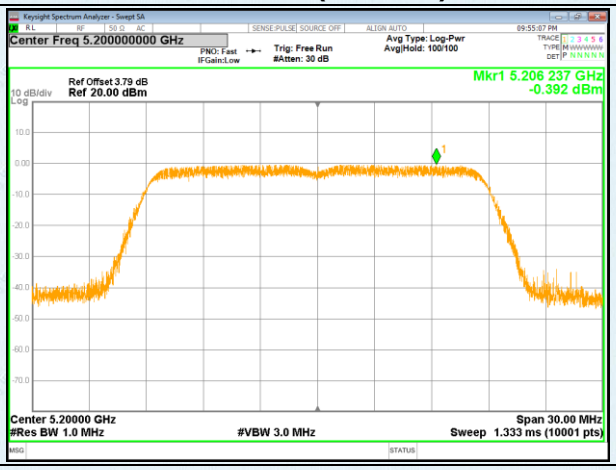
ANT 2(Module RTL8822CU):

802.11a mode

Channel 36 (5180MHz)

Channel 40 (5200MHz)

Channel 48 (5240MHz)

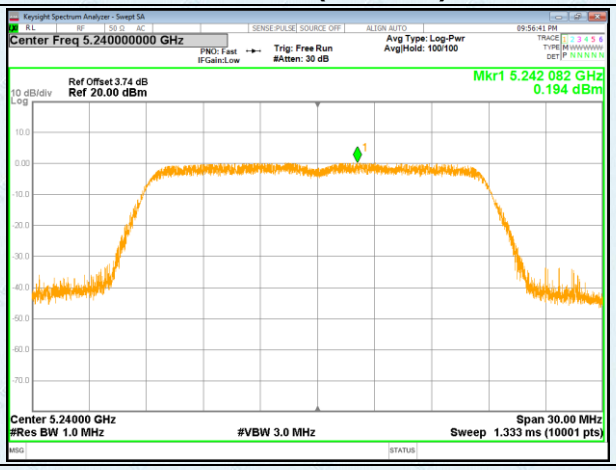
802.11n(HT20) mode



Channel 36 (5180MHz)

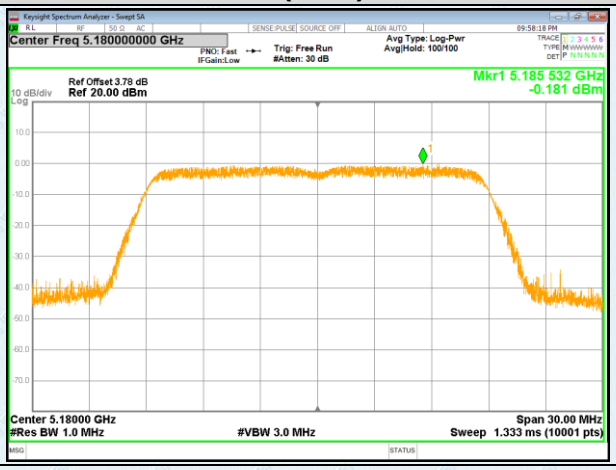


Channel 40 (5200MHz)

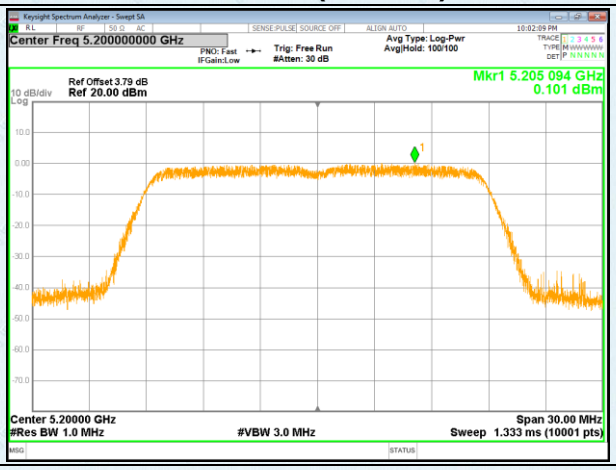


Channel 48 (5240MHz)

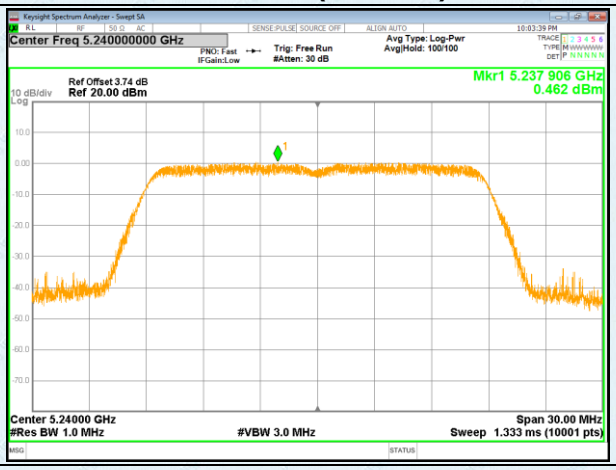
802.11ac(HT20) mode



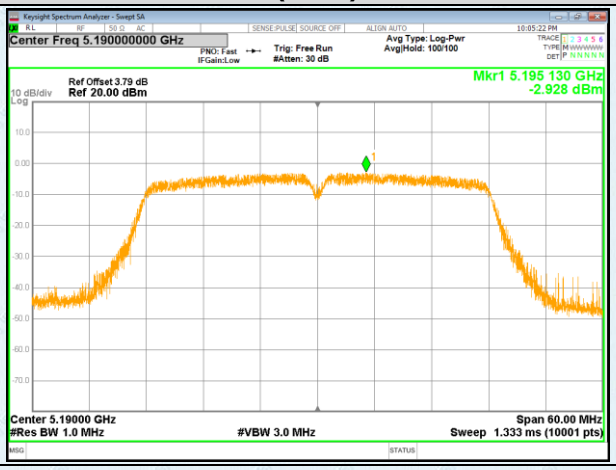
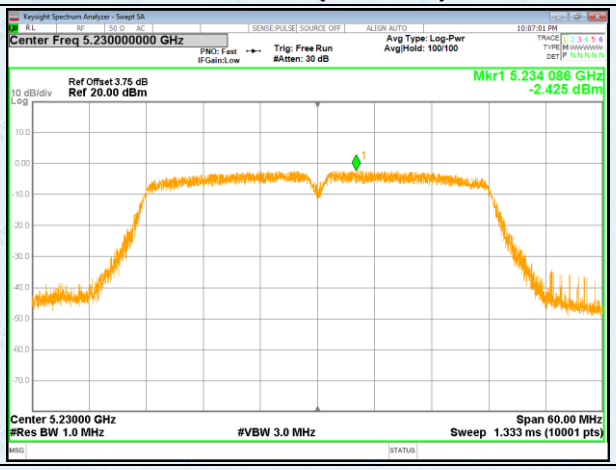
Channel 36 (5180MHz)

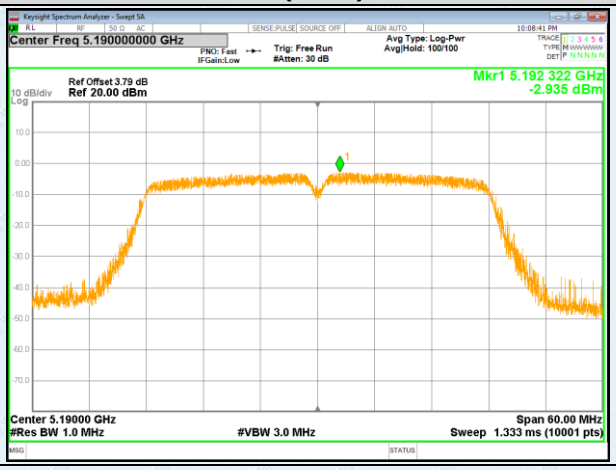
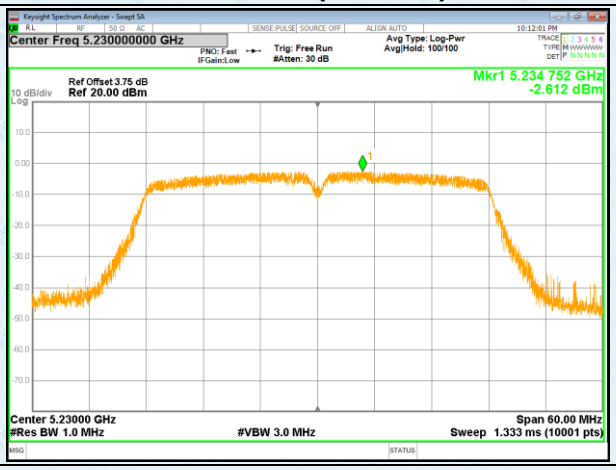


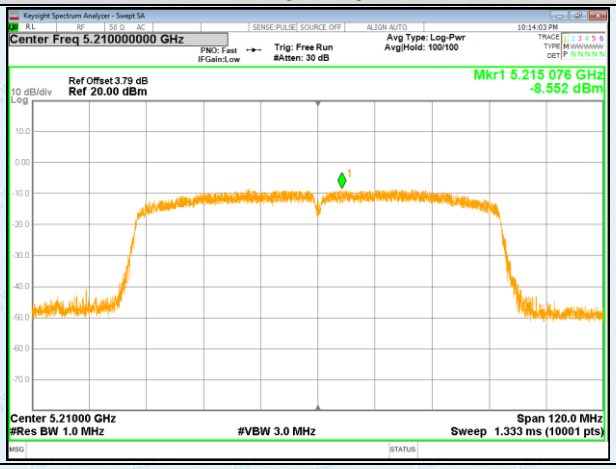
Channel 40 (5200MHz)



Channel 48 (5240MHz)

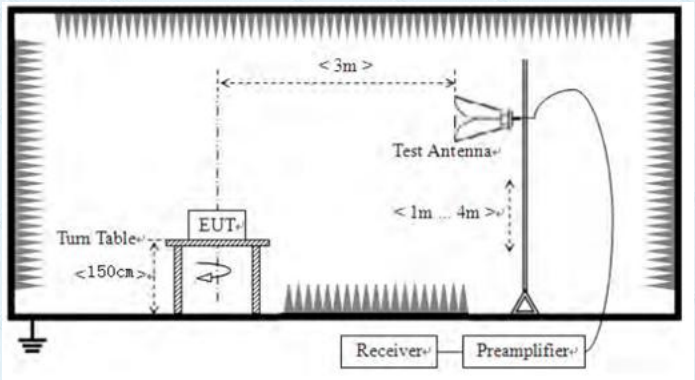
802.11n(HT40) mode

Channel 38 (5190MHz)

Channel 46 (5230MHz)

802.11ac(HT40) mode

Channel 38 (5190MHz)


802.11ac(HT80) mode

Channel 40 (5210MHz)

7.7 Band Edge

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 E Section 15.407 and 5.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m (Semi-Anechoic Chamber)</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr>
<tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr>
<tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr>
<tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr>
<tr><td>68.2</td><td>Peak Value</td></tr>
</table>
Undesirable emission 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 EIRP of -27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.
(3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of −27 dBm/MHz.
</td></tr>
<tr><td>Test Procedure:</td><td>
a. The EUT was placed on the top of a rotating table 1.5 m above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data
</td></tr>
</table>

	sheet.
Test setup:	Above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

1. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
3. *Two antennas are tested, only the worst case's ANT 1+ANT2 data was showed.*
4. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
5. *According to KDB 789033 D02v02r01 section G) 1) d),for measurements above 1000 MHz @3m distance, the limit of field strength is computed as follows:*

   E[dBuV/m] = EIRP[dBm] + 95.2;

   For example, if EIRP = -27dBm

   E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.

Measurement Data:

Band I

IEEE 802.11a								
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)	Polarization
5150.00	49.05	32.07	8.99	37.49	52.62	74.00	-21.38	Horizontal
5350.00	46.74	31.75	9.29	37.20	50.58	74.00	-23.42	Horizontal
5150.00	49.79	32.07	8.99	37.49	53.36	74.00	-20.64	Vertical
5350.00	50.67	31.75	9.29	37.20	54.51	74.00	-19.49	Vertical

IEEE 802.11a								
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)	Polarization
5150.00	41.04	32.07	8.99	37.49	44.61	54.00	-9.39	Horizontal
5350.00	36.51	31.75	9.29	37.20	40.35	54.00	-13.65	Horizontal
5150.00	38.64	32.07	8.99	37.49	42.21	54.00	-11.79	Vertical
5350.00	36.85	31.75	9.29	37.20	40.69	54.00	-13.31	Vertical

IEEE 802.11n HT20								
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)	Polarization
5150.00	50.39	32.07	8.99	37.49	53.96	74.00	-20.04	Horizontal
5350.00	47.98	31.75	9.29	37.20	51.82	74.00	-22.18	Horizontal
5150.00	52.34	32.07	8.99	37.49	55.91	74.00	-18.09	Vertical
5350.00	50.55	31.75	9.29	37.20	54.39	74.00	-19.61	Vertical

IEEE 802.11n HT20								
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)	Polarization
5150.00	38.90	32.07	8.99	37.49	42.47	54.00	-11.53	Horizontal
5350.00	37.70	31.75	9.29	37.20	41.54	54.00	-12.46	Horizontal
5150.00	37.71	32.07	8.99	37.49	41.28	54.00	-12.72	Vertical
5350.00	35.57	31.75	9.29	37.20	39.41	54.00	-14.59	Vertical

IEEE 802.11ac HT20								
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)	Polarization
5150.00	51.71	32.07	8.99	37.49	55.28	74.00	-18.72	Horizontal
5350.00	50.09	31.75	9.29	37.20	53.93	74.00	-20.07	Horizontal
5150.00	52.16	32.07	8.99	37.49	55.73	74.00	-18.27	Vertical
5350.00	51.08	31.75	9.29	37.20	54.92	74.00	-19.08	Vertical

IEEE 802.11ac HT20								
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)	Polarization
5150.00	39.89	32.07	8.99	37.49	43.46	54.00	-10.54	Horizontal
5350.00	38.88	31.75	9.29	37.20	42.72	54.00	-11.28	Horizontal
5150.00	38.32	32.07	8.99	37.49	41.89	54.00	-12.11	Vertical
5350.00	37.51	31.75	9.29	37.20	41.35	54.00	-12.65	Vertical

IEEE 802.11n HT40								
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)	Polarization
5150.00	54.55	32.07	8.99	37.49	58.12	74.00	-15.88	Horizontal
5350.00	50.30	31.75	9.29	37.20	54.14	74.00	-19.86	Horizontal
5150.00	48.02	32.07	8.99	37.49	51.59	74.00	-22.41	Vertical
5350.00	52.45	31.75	9.29	37.20	56.29	74.00	-17.71	Vertical

IEEE 802.11n HT40								
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)	Polarization
5150.00	36.81	32.07	8.99	37.49	40.38	54.00	-13.62	Horizontal
5350.00	37.65	31.75	9.29	37.20	41.49	54.00	-12.51	Horizontal
5150.00	36.75	32.07	8.99	37.49	40.32	54.00	-13.68	Vertical
5350.00	38.79	31.75	9.29	37.20	42.63	54.00	-11.37	Vertical

IEEE 802.11ac HT40								
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)	Polarization
5150.00	48.61	32.07	8.99	37.49	52.18	74.00	-21.82	Horizontal
5350.00	49.65	31.75	9.29	37.20	53.49	74.00	-20.51	Horizontal
5150.00	48.42	32.07	8.99	37.49	51.99	74.00	-22.01	Vertical
5350.00	47.72	31.75	9.29	37.20	51.56	74.00	-22.44	Vertical

IEEE 802.11ac HT40								
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)	Polarization
5150.00	38.81	32.07	8.99	37.49	42.38	54.00	-11.62	Horizontal
5350.00	38.08	31.75	9.29	37.20	41.92	54.00	-12.08	Horizontal
5150.00	39.47	32.07	8.99	37.49	43.04	54.00	-10.96	Vertical
5350.00	39.98	31.75	9.29	37.20	43.82	54.00	-10.18	Vertical

IEEE 802.11ac HT80								
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)	Polarization
5150.00	49.86	32.07	8.99	37.49	53.43	74.00	-20.57	Horizontal
5350.00	48.97	31.75	9.29	37.20	52.81	74.00	-21.19	Horizontal
5150.00	48.27	32.07	8.99	37.49	51.84	74.00	-22.16	Vertical
5350.00	48.25	31.75	9.29	37.20	52.09	74.00	-21.91	Vertical

IEEE 802.11ac HT80								
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)	Polarization
5150.00	38.67	32.07	8.99	37.49	42.24	54.00	-11.76	Horizontal
5350.00	38.10	31.75	9.29	37.20	41.94	54.00	-12.06	Horizontal
5150.00	35.58	32.07	8.99	37.49	39.15	54.00	-14.85	Vertical
5350.00	37.05	31.75	9.29	37.20	40.89	54.00	-13.11	Vertical

7.8 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10:2013
Test Frequency Range:	9kHz to 40GHz
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)
Receiver setup:	

Frequency	Detector	RBW	VBW	Value
9kHz-150KHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value
150kHz-30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

Limit:

Frequency	Limit (uV/m)	Value	Measurement Distance
0.009MHz-0.490MHz	2400/F(KHz)	QP	300m
0.490MHz-1.705MHz	24000/F(KHz)	QP	300m
1.705MHz-30MHz	30	QP	30m
30MHz-88MHz	100	QP	3m
88MHz-216MHz	150	QP	
216MHz-960MHz	200	QP	
960MHz-1GHz	500	QP	
Above 1GHz	500	Average	
	5000	Peak	

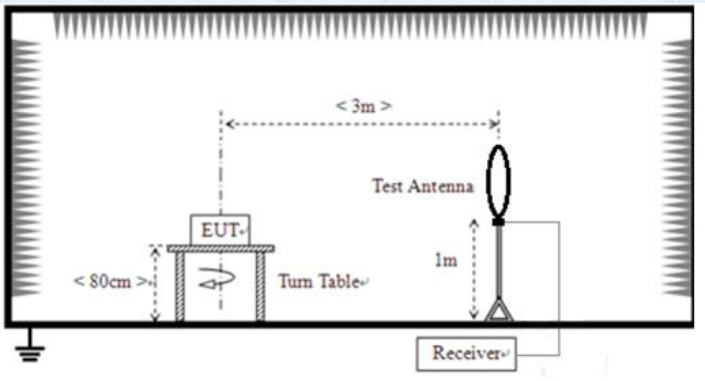
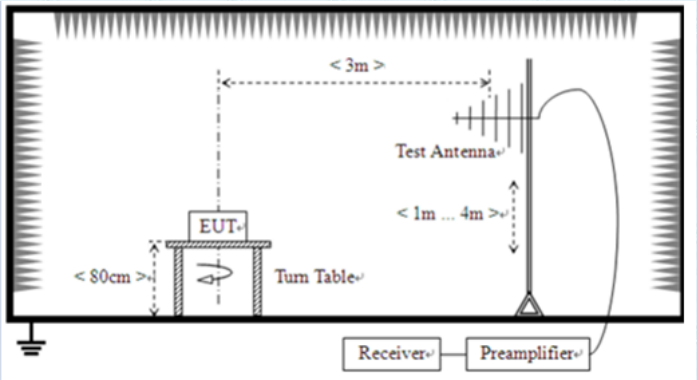
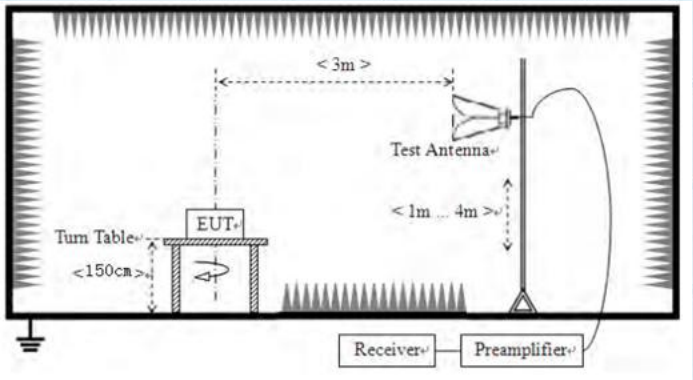
Test Procedure:

Substitution method was performed to determine the actual ERP emission levels of the EUT.
The following test procedure as below:

1>.Below 1GHz test procedure:

1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than

	the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. 2>.Above 1GHz test procedure: 1. On the test site as test setup graph above,the EUT shall be placed at the 0.8m support on the turntable and in the position closest to normal use as declared by the provider. 2. The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter.The output of the test antenna shall be connected to the measuring receiver. 3. The transmitter shall be switched on, if possible, without modulation and the measuring receiver shall be tuned to the frequency of the transmitter under test. 4. The test antenna shall be raised and lowered from 1m to 4m until a maximum signal level is detected by the measuring receiver. Then the turntable should be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver. 5. Repeat step 4 for test frequency with the test antenna polarized horizontally. 6. Remove the transmitter and replace it with a substitution antenna 7. Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a nonradiating cable. With the antennas at both ends vertically polarized, and with the signal generator tuned to a particular test frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output. 8. Repeat step 7 with both antennas horizontally polarized for each test frequency. 9. Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps 7 and 8 by the power loss in the cable between the generator and the antenna, and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna by the following formula: EIRP(dBm) = Pg(dBm) – cable loss (dB) + antenna gain (dBi) where: Pg is the generator output power into the substitution antenna.

Test setup:	Below 30MHz  Below 1GHz  Above 1GHz 
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark:

Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.

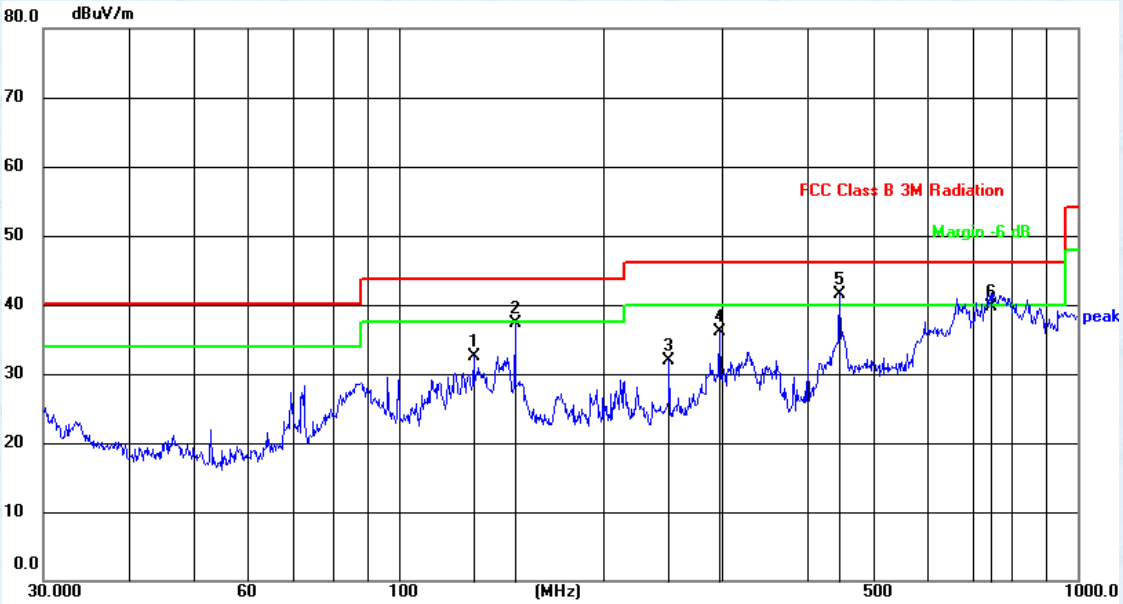
Measurement Data:

9 kHz ~ 30 MHz

The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB lower than the limit line per 15.31(o) was not reported.

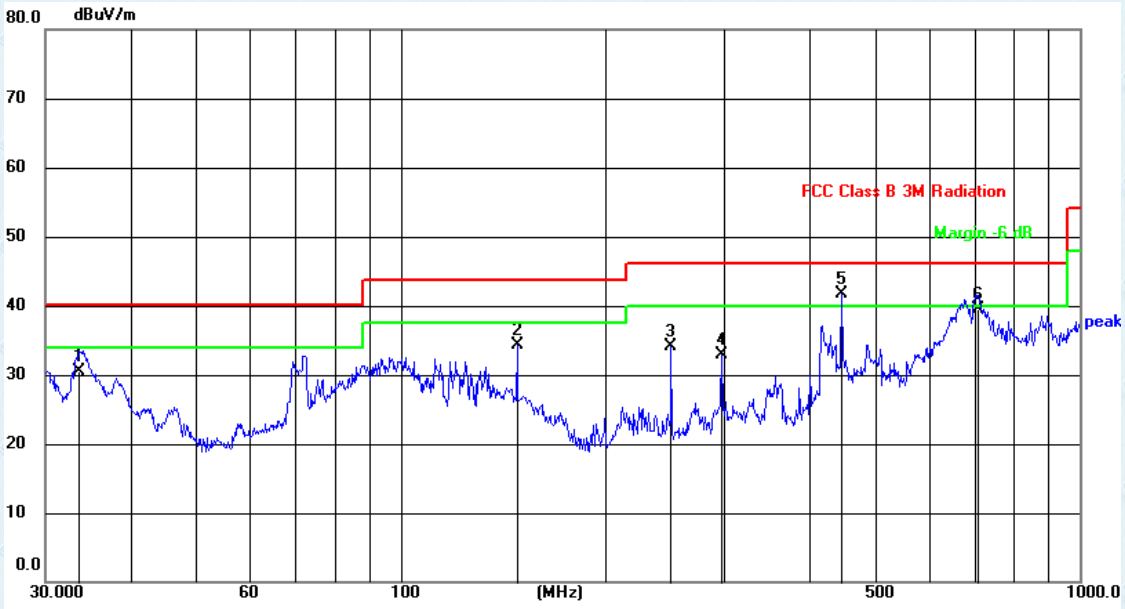
Below 1GHz

Horizontal:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	129.0142	51.40	-18.98	32.42	43.50	-11.08	QP
2	148.4410	55.98	-18.67	37.31	43.50	-6.19	QP
3	250.3009	50.11	-18.20	31.91	46.00	-14.09	QP
4	297.2238	54.58	-18.50	36.08	46.00	-9.92	QP
5	446.4139	56.32	-14.87	41.45	46.00	-4.55	QP
6	744.8659	47.88	-8.26	39.62	46.00	-6.38	QP

Vertical:



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	33.6802	51.92	-21.35	30.57	40.00	-9.43	QP
2	148.4410	53.16	-18.95	34.21	43.50	-9.29	QP
3	250.3009	52.25	-18.20	34.05	46.00	-11.95	QP
4	297.2238	50.91	-17.99	32.92	46.00	-13.08	QP
5	446.4139	56.52	-14.88	41.64	46.00	-4.36	QP
6	709.1820	48.35	-8.81	39.54	46.00	-6.46	QP

Above 1GHz:

All antennas was tested and the Worse case *ANT 1+ANT2 data Show Report*

802.11a 5180MHz

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)	polarization
10360.00	38.52	39.67	14.62	32.65	60.16	68.20	-8.04	Vertical
15540.00	37.57	38.60	17.66	34.46	59.37	74.00	-14.63	Vertical
10360.00	40.74	39.67	14.62	32.65	62.38	68.20	-5.82	Horizontal
15540.00	38.62	38.60	17.66	34.46	60.42	74.00	-13.58	Horizontal

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)	polarization
10360.00	27.92	39.67	14.62	32.65	49.56	54.00	-4.44	Vertical
15540.00	25.83	38.60	17.66	34.46	47.63	54.00	-6.37	Vertical
10360.00	26.89	39.67	14.62	32.65	48.53	54.00	-5.47	Horizontal
15540.00	24.92	38.60	17.66	34.46	46.72	54.00	-7.28	Horizontal

802.11a 5200MHz

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)	polarization
10400.00	38.69	39.75	14.63	32.71	60.36	68.20	-7.84	Vertical
15600.00	37.64	38.33	17.67	34.17	59.47	74.00	-14.53	Vertical
10400.00	39.76	39.75	14.63	32.71	61.43	68.20	-6.77	Horizontal
15600.00	39.08	38.33	17.67	34.17	60.91	74.00	-13.09	Horizontal

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)	polarization
10400.00	23.49	39.75	14.63	32.71	45.16	54.00	-8.84	Vertical
15600.00	25.49	38.33	17.67	34.17	47.32	54.00	-6.68	Vertical
10400.00	24.80	39.75	14.63	32.71	46.47	54.00	-7.53	Horizontal
15600.00	26.26	38.33	17.67	34.17	48.09	54.00	-5.91	Horizontal

802.11a 5240MHz

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)	polarization
10480.00	38.60	39.82	14.68	32.86	60.24	68.20	-7.96	Vertical
15720.00	40.26	38.09	17.73	33.66	62.42	74.00	-11.58	Vertical
10480.00	41.12	39.82	14.68	32.86	62.76	68.20	-5.44	Horizontal
15720.00	40.93	38.09	17.73	33.66	63.09	74.00	-10.91	Horizontal

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)	polarization
10480.00	23.49	39.82	14.68	32.86	45.13	54.00	-8.87	Vertical
15720.00	25.38	38.09	17.73	33.66	47.54	54.00	-6.46	Vertical
10480.00	24.34	39.82	14.68	32.86	45.98	54.00	-8.02	Horizontal
15720.00	24.32	38.09	17.73	33.66	46.48	54.00	-7.52	Horizontal

802.11n(HT20) 5180MHz

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)	polarization
10360.00	39.68	39.67	14.62	32.65	61.32	68.20	-6.88	Vertical
15540.00	37.84	38.60	17.66	34.46	59.64	74.00	-14.36	Vertical
10360.00	36.89	39.67	14.62	32.65	58.53	68.20	-9.67	Horizontal
15540.00	34.89	38.60	17.66	34.46	56.69	74.00	-17.31	Horizontal

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)	polarization
10360.00	25.07	39.67	14.62	32.65	46.71	54.00	-7.29	Vertical
15540.00	26.15	38.60	17.66	34.46	47.95	54.00	-6.05	Vertical
10360.00	26.52	39.67	14.62	32.65	48.16	54.00	-5.84	Horizontal
15540.00	24.13	38.60	17.66	34.46	45.93	54.00	-8.07	Horizontal

802.11n(HT20) 5200MHz

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)	polarization
10400.00	40.87	39.75	14.63	32.71	62.54	68.20	-5.66	Vertical
15600.00	37.80	38.33	17.67	34.17	59.63	74.00	-14.37	Vertical
10400.00	37.57	39.75	14.63	32.71	59.24	68.20	-8.96	Horizontal
15600.00	36.06	38.33	17.67	34.17	57.89	74.00	-16.11	Horizontal

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)	polarization
10400.00	23.65	39.75	14.63	32.71	45.32	54.00	-8.68	Vertical
15600.00	25.32	38.33	17.67	34.17	47.15	54.00	-6.85	Vertical
10400.00	24.21	39.75	14.63	32.71	45.88	54.00	-8.12	Horizontal
15600.00	22.66	38.33	17.67	34.17	44.49	54.00	-9.51	Horizontal

802.11n(HT20) 5240MHz

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)	polarization
10480.00	39.62	39.82	14.68	32.86	61.26	68.20	-6.94	Vertical
15720.00	41.29	38.09	17.73	33.66	63.45	74.00	-10.55	Vertical
10480.00	34.62	39.82	14.68	32.86	56.26	68.20	-11.94	Horizontal
15720.00	35.47	38.09	17.73	33.66	57.63	74.00	-16.37	Horizontal

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)	polarization
10480.00	23.45	39.82	14.68	32.86	45.09	54.00	-8.91	Vertical
15720.00	23.96	38.09	17.73	33.66	46.12	54.00	-7.88	Vertical
10480.00	23.05	39.82	14.68	32.86	44.69	54.00	-9.31	Horizontal
15720.00	24.79	38.09	17.73	33.66	46.95	54.00	-7.05	Horizontal

802.11ac(HT20) 5180MHz

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)	polarization
10360.00	38.53	39.67	14.62	32.65	60.17	68.20	-8.03	Vertical
15540.00	37.63	38.60	17.66	34.46	59.43	74.00	-14.57	Vertical
10360.00	36.45	39.67	14.62	32.65	58.09	68.20	-10.11	Horizontal
15540.00	33.85	38.60	17.66	34.46	55.65	74.00	-18.35	Horizontal

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)	polarization
10360.00	24.71	39.67	14.62	32.65	46.35	54.00	-7.65	Vertical
15540.00	25.06	38.60	17.66	34.46	46.86	54.00	-7.14	Vertical
10360.00	24.21	39.67	14.62	32.65	45.85	54.00	-8.15	Horizontal
15540.00	22.73	38.60	17.66	34.46	44.53	54.00	-9.47	Horizontal

802.11ac(HT20) 5200MHz

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)	polarization
10400.00	36.46	39.75	14.63	32.71	58.13	68.20	-10.07	Vertical
15600.00	35.59	38.33	17.67	34.17	57.42	74.00	-16.58	Vertical
15600.00	34.56	38.33	17.67	34.17	56.39	68.20	-11.81	Horizontal
10400.00	35.38	39.75	14.63	32.71	57.05	74.00	-16.95	Horizontal

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)	polarization
10400.00	24.72	39.75	14.63	32.71	46.39	54.00	-7.61	Vertical
15600.00	23.58	38.33	17.67	34.17	45.41	54.00	-8.59	Vertical
10400.00	26.81	39.75	14.63	32.71	48.48	54.00	-5.52	Horizontal
15600.00	24.56	38.33	17.67	34.17	46.39	54.00	-7.61	Horizontal

802.11ac(HT20) 5240MHz

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)	polarization
10480.00	36.03	39.82	14.68	32.86	57.67	68.20	-10.53	Vertical
15720.00	39.26	38.09	17.73	33.66	61.42	74.00	-12.58	Vertical
10480.00	36.79	39.82	14.68	32.86	58.43	68.20	-9.77	Horizontal
15720.00	37.02	38.09	17.73	33.66	59.18	74.00	-14.82	Horizontal

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)	polarization
10480.00	24.75	39.82	14.68	32.86	46.39	54.00	-7.61	Vertical
15720.00	22.88	38.09	17.73	33.66	45.04	54.00	-8.96	Vertical
10480.00	21.74	39.82	14.68	32.86	43.38	54.00	-10.62	Horizontal
15720.00	23.49	38.09	17.73	33.66	45.65	54.00	-8.35	Horizontal

802.11n(HT40) 5190MHz

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)	polarization
10380.00	33.71	39.71	14.63	32.68	55.37	68.20	-12.83	Vertical
15570.00	35.62	38.46	17.67	34.32	57.43	74.00	-16.57	Vertical
10380.00	33.01	39.71	14.63	32.68	54.67	68.20	-13.53	Horizontal
15570.00	35.21	38.46	17.67	34.32	57.02	74.00	-16.98	Horizontal

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)	polarization
10380.00	22.72	39.71	14.63	32.68	44.38	54.00	-9.62	Vertical
15570.00	24.73	38.46	17.67	34.32	46.54	54.00	-7.46	Vertical
10380.00	22.26	39.71	14.63	32.68	43.92	54.00	-10.08	Horizontal
15570.00	20.07	38.46	17.67	34.32	41.88	54.00	-12.12	Horizontal

802.11n(HT40) 5230MHz

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)	polarization
10460.00	32.71	39.75	14.65	32.74	54.37	68.20	-13.83	Vertical
15690.00	33.70	38.33	17.69	34.03	55.69	74.00	-18.31	Vertical
10460.00	36.65	39.75	14.65	32.74	58.31	68.20	-9.89	Horizontal
15690.00	38.28	38.33	17.69	34.03	60.27	74.00	-13.73	Horizontal

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)	polarization
10460.00	22.48	39.75	14.65	32.74	44.14	54.00	-9.86	Vertical
15690.00	23.59	38.33	17.69	34.03	45.58	54.00	-8.42	Vertical
10460.00	24.75	39.75	14.65	32.74	46.41	54.00	-7.59	Horizontal
15690.00	21.19	38.33	17.69	34.03	43.18	54.00	-10.82	Horizontal

802.11ac(HT40) 5190MHz

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)	polarization
10380.00	34.88	39.71	14.63	32.68	56.54	68.20	-11.66	Vertical
15570.00	36.58	38.46	17.67	34.32	58.39	74.00	-15.61	Vertical
10380.00	31.98	39.71	14.63	32.68	53.64	68.20	-14.56	Horizontal
15570.00	35.87	38.46	17.67	34.32	57.68	74.00	-16.32	Horizontal

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)	polarization
10380.00	22.03	39.71	14.63	32.68	43.69	54.00	-10.31	Vertical
15570.00	23.40	38.46	17.67	34.32	45.21	54.00	-8.79	Vertical
10380.00	21.52	39.71	14.63	32.68	43.18	54.00	-10.82	Horizontal
15570.00	22.02	38.46	17.67	34.32	43.83	54.00	-10.17	Horizontal

802.11ac(HT40) 5230MHz

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)	polarization
10460.00	35.66	39.75	14.65	32.74	57.32	68.20	-10.88	Vertical
15690.00	36.14	38.33	17.69	34.03	58.13	74.00	-15.87	Vertical
10460.00	34.73	39.75	14.65	32.74	56.39	68.20	-11.81	Horizontal
15690.00	35.99	38.33	17.69	34.03	57.98	74.00	-16.02	Horizontal

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)	polarization
10460.00	22.73	39.75	14.65	32.74	44.39	54.00	-9.61	Vertical
15690.00	21.69	38.33	17.69	34.03	43.68	54.00	-10.32	Vertical
10460.00	21.87	39.75	14.65	32.74	43.53	54.00	-10.47	Horizontal
15690.00	23.17	38.33	17.69	34.03	45.16	54.00	-8.84	Horizontal

802.11ac(HT80) 5210MHz

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)	polarization
10420.00	35.26	39.73	14.64	32.71	56.92	68.20	-11.28	Vertical
15630.00	32.25	38.80	17.68	34.18	54.55	74.00	-19.45	Vertical
10420.00	31.55	39.73	14.64	32.71	53.21	68.20	-14.99	Horizontal
15630.00	32.17	38.80	17.68	34.18	54.47	74.00	-19.53	Horizontal

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)	polarization
10420.00	20.53	39.73	14.64	32.71	42.19	54.00	-11.81	Vertical
15630.00	21.28	38.80	17.68	34.18	43.58	54.00	-10.42	Vertical
10420.00	21.60	39.73	14.64	32.71	43.26	54.00	-10.74	Horizontal
15630.00	22.17	38.80	17.68	34.18	44.47	54.00	-9.53	Horizontal

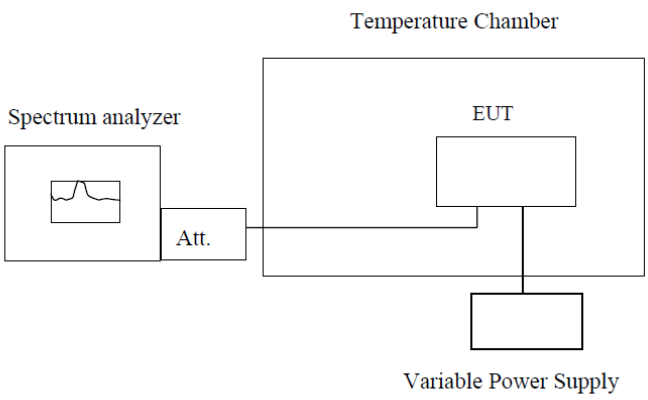
Note:

1. Level = Read Level + Antenna Factor+ Cable loss- Preamp Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

7.9 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minute s. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remark: Set the EUT transmits at un-modulation mode to test frequency stability.

Measurement data:

802.11a									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5179.98	Pass	5180.00	Pass	5179.98	Pass	5179.98	Pass
-20	120	5179.99	Pass	5179.99	Pass	5179.97	Pass	5179.99	Pass
-10	120	5179.98	Pass	5179.98	Pass	5179.99	Pass	5179.99	Pass
0	120	5179.99	Pass	5179.98	Pass	5179.99	Pass	5179.99	Pass
10	120	5179.99	Pass	5179.98	Pass	5180.00	Pass	5179.98	Pass
20	120	5179.97	Pass	5179.99	Pass	5179.97	Pass	5179.97	Pass
30	120	5179.98	Pass	5180.00	Pass	5179.99	Pass	5179.99	Pass
40	120	5179.99	Pass	5179.99	Pass	5179.98	Pass	5179.97	Pass
50	120	5180.00	Pass	5179.98	Pass	5179.99	Pass	5179.97	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	102	5180.00	Pass	5179.97	Pass	5179.99	Pass	5179.99	Pass
25	120	5179.98	Pass	5179.98	Pass	5179.98	Pass	5180.00	Pass
25	138	5179.99	Pass	5179.99	Pass	5179.99	Pass	5179.99	Pass

802.11n(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5179.96	Pass	5179.99	Pass	5179.99	Pass	5179.99	Pass
-20	120	5179.99	Pass	5179.99	Pass	5180.00	Pass	5179.98	Pass
-10	120	5179.99	Pass	5179.98	Pass	5179.98	Pass	5179.99	Pass
0	120	5180.00	Pass	5179.98	Pass	5179.99	Pass	5180.00	Pass
10	120	5179.98	Pass	5179.99	Pass	5179.97	Pass	5179.99	Pass
20	120	5179.99	Pass	5180.00	Pass	5179.99	Pass	5179.99	Pass
30	120	5179.98	Pass	5179.99	Pass	5179.98	Pass	5179.99	Pass
40	120	5179.99	Pass	5179.98	Pass	5180.00	Pass	5179.98	Pass
50	120	5180.00	Pass	5179.97	Pass	5179.99	Pass	5179.99	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	102	5179.99	Pass	5179.98	Pass	5179.98	Pass	5179.98	Pass
25	120	5179.99	Pass	5179.99	Pass	5179.99	Pass	5179.99	Pass
25	138	5179.99	Pass	5179.99	Pass	5179.98	Pass	5179.99	Pass

802.11ac(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5179.99	Pass	5179.99	Pass	5179.99	Pass	5180.00	Pass
-20	120	5179.96	Pass	5179.97	Pass	5179.98	Pass	5179.98	Pass
-10	120	5179.99	Pass	5179.96	Pass	5179.99	Pass	5180.01	Pass
0	120	5179.97	Pass	5179.99	Pass	5179.99	Pass	5179.99	Pass
10	120	5179.99	Pass	5179.98	Pass	5179.99	Pass	5179.01	Pass
20	120	5179.99	Pass	5179.96	Pass	5179.98	Pass	5179.98	Pass
30	120	5179.98	Pass	5179.99	Pass	5179.99	Pass	5179.99	Pass
40	120	5179.99	Pass	5180.00	Pass	5179.98	Pass	5179.98	Pass
50	120	5179.98	Pass	5179.98	Pass	5179.96	Pass	5179.99	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5180MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	102	5179.97	Pass	5179.98	Pass	5179.98	Pass	5179.99	Pass
25	120	5179.99	Pass	5179.97	Pass	5179.98	Pass	5179.98	Pass
25	138	5180.00	Pass	5180.00	Pass	5179.98	Pass	5179.99	Pass

802.11n(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5189.99	Pass	5189.96	Pass	5189.98	Pass	5189.98	Pass
-20	120	5190.00	Pass	5189.98	Pass	5189.99	Pass	5189.99	Pass
-10	120	5189.99	Pass	5189.98	Pass	5189.99	Pass	5189.99	Pass
0	120	5189.98	Pass	5189.99	Pass	5190.00	Pass	5189.98	Pass
10	120	5189.99	Pass	5189.99	Pass	5189.99	Pass	5189.99	Pass
20	120	5189.99	Pass	5189.98	Pass	5189.98	Pass	5189.98	Pass
30	120	5189.98	Pass	5189.99	Pass	5189.99	Pass	5189.98	Pass
40	120	5189.97	Pass	5189.97	Pass	5189.97	Pass	5189.98	Pass
50	120	5189.99	Pass	5189.99	Pass	5189.98	Pass	5189.98	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	102	5189.99	Pass	5189.99	Pass	5189.99	Pass	5189.98	Pass
25	120	5190.00	Pass	5189.98	Pass	5189.99	Pass	5189.98	Pass
25	138	5189.99	Pass	5189.99	Pass	5189.97	Pass	5189.99	Pass

802.11ac(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5189.99	Pass	5189.9	Pass	5189.99	Pass	5189.99	Pass
-20	120	5189.99	Pass	5190.00	Pass	5189.99	Pass	5189.98	Pass
-10	120	5189.99	Pass	5190.00	Pass	5189.99	Pass	5189.99	Pass
0	120	5189.98	Pass	5189.99	Pass	5189.98	Pass	5189.99	Pass
10	120	5189.99	Pass	5189.98	Pass	5190.00	Pass	5189.99	Pass
20	120	5189.97	Pass	5189.98	Pass	5190.00	Pass	5190.00	Pass
30	120	5189.97	Pass	5190.00	Pass	5189.98	Pass	5190.00	Pass
40	120	5189.96	Pass	5189.98	Pass	5189.99	Pass	5189.99	Pass
50	120	5189.99	Pass	5189.98	Pass	5189.99	Pass	5189.99	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5190MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	102	5189.98	Pass	5190.00	Pass	5189.99	Pass	5189.99	Pass
25	120	5189.98	Pass	5189.99	Pass	5189.98	Pass	5190.00	Pass
25	138	5189.98	Pass	5189.99	Pass	5189.98	Pass	5190.00	Pass

802.11ac(HT80)									
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	120	5209.99	Pass	5209.99	Pass	5209.99	Pass	5209.99	Pass
-20	120	5210.00	Pass	5209.99	Pass	5209.99	Pass	5210.00	Pass
-10	120	5209.99	Pass	5209.98	Pass	5209.98	Pass	5209.99	Pass
0	120	5209.98	Pass	5209.99	Pass	5209.98	Pass	5209.99	Pass
10	120	5209.99	Pass	5209.99	Pass	5209.98	Pass	5209.99	Pass
20	120	5209.97	Pass	5209.99	Pass	5209.99	Pass	5209.98	Pass
30	120	5209.97	Pass	5209.97	Pass	5209.99	Pass	5209.97	Pass
40	120	5209.99	Pass	5209.98	Pass	5209.99	Pass	5209.99	Pass
50	120	5209.99	Pass	5209.99	Pass	5209.98	Pass	5209.99	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency：5210MHz									
Temp. (°C)	Power Supply (V_{AC})	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
25	102	5209.99	Pass	5210.00	Pass	5209.99	Pass	5209.99	Pass
25	120	5209.99	Pass	5209.98	Pass	5209.98	Pass	5209.98	Pass
25	138	5209.99	Pass	5209.98	Pass	5209.99	Pass	5209.98	Pass

8 Test Setup Photo

Reference to the **appendix I** for details.

9 EUT Constructional Details

Reference to the **appendix II** for details.

---END---