TEST REPORT

Applicant:	Everex Electronics Ltd.
Address of Applicant:	Unit 01,19F .,Block A,Kailey Industrial Centre,12 Fung Yip Street,Chai Wan ,HONGKONG, China
Manufacturer/Factory:	Everex Electronics Ltd.
Address of Manufacturer/Factory:	Unit 01,19F .,Block A,Kailey Industrial Centre,12 Fung Yip Street,Chai Wan ,HONGKONG, China

Equipment Under Test (EUT)

Product Name:	IOEX BOX
Model No.:	iHH2001, iHH2002, iHH2003, iHH2004, iHH2005, iHH2006, iHH2007, iHH2008, iHH2009
Trade Mark:	iOEX
FCC ID:	2ABWOHH2001
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	April 17, 2020
Date of Test:	April 17- April 26, 2020
Date of report issued:	April 26, 2020
Test Result :	PASS *

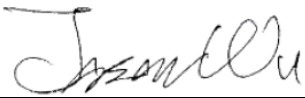
* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

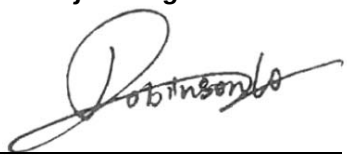
Robinson Lo
Laboratory Manager

2 Version

Version No.	Date	Description
00	*April 26, 2020*	*Original*

Prepared By:  ***Date:*** ***April 26, 2020***

Project Engineer

Check By:  ***Date:*** ***April 26, 2020***

Reviewer

3 Contents

4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.407(a)(3)	Pass
Channel Bandwidth	15.407(e)	Pass
Power Spectral Density	15.407(a)(3)	Pass
Band Edge	15.407(b)(4)	Pass
Spurious Emission	15.205/15.209/15.407(b)(4)	Pass
Frequency Stability	15.407(g)	Pass

Remarks：

1. *Pass: The EUT complies with the essential requirements in the standard.*
2. *Test according to ANSI C63.10:2013.*

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:	IOEX BOX
Model No.:	iHH2001, iHH2002, iHH2003, iHH2004, iHH2005, iHH2006, iHH2007, iHH2008, iHH2009
Test model:	iHH2001
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The differences are system version, product appearance and model name for commercial purpose.	
Serial No.:	H2258FAC
Hardware Version:	HV1.0
Software Version:	SV1.0
Test sample(s) ID:	GTS202004000149-1
Sample(s) Status:	Engineer sample
Operation Frequency:	802.11a/802.11n(HT20)/802.11ac(HT20): 5745MHz ~ 5825MHz 802.11n(HT40)/ 802.11ac(HT40): 5755MHz ~ 5795MHz 802.11ac(HT80): 5775MHz
Channel numbers:	802.11a/802.11n(HT20)/802.11ac(HT20): 5 802.11n(HT40)/ 802.11ac(HT40): 2 802.11ac(HT80): 1
Channel bandwidth:	802.11a/802.11n(HT20)/802.11ac(HT20) : 20MHz 802.11n(HT40)/802.11ac(HT40) : 40MHz 802.11ac(HT80): 80MHz
Modulation technology:	802.11a/802.11n(H20)/802.11n(H40)/802.11ac(HT20)/802.11ac(HT40) /802.11ac(HT80): Orthogonal Frequency Division Multiplexing (OFDM) MIMO: 802.11n/ac SISO: 802.11a
Antenna Type:	FPCB antenna
Antenna gain:	1.0dBi
Power supply:	AC120V / 60Hz

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	153	5765MHz	155	5775MHz
157	5785MHz	159	5795MHz	161	5805MHz	163	5815MHz
165	5825MHz						

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency (MHz)		
	802.11 a/n/ac(HT20)	802.11 n/ac(HT40)	802.11ac(HT80)
Lowest channel	5745	5755	
Middle channel	5785		5775
Highest channel	5825	5795	

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode
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:

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

Mode	Data rate
802.11a	6Mbps
802.11n(HT20)	6.5Mbps
802.11n(HT40)	13Mbps
802.11ac(HT20)	6.5Mbps
802.11ac(HT40)	13.5Mbps
802.11ac(HT80)	29.3Mbps

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 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

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone,

Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102

Tel: 0755-27798480

Fax: 0755-27798960

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. 03 2015	July. 02 2020
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. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 19 2019	Oct. 18 2020
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 19 2019	Oct. 18 2020
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 19 2019	Oct. 18 2020
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

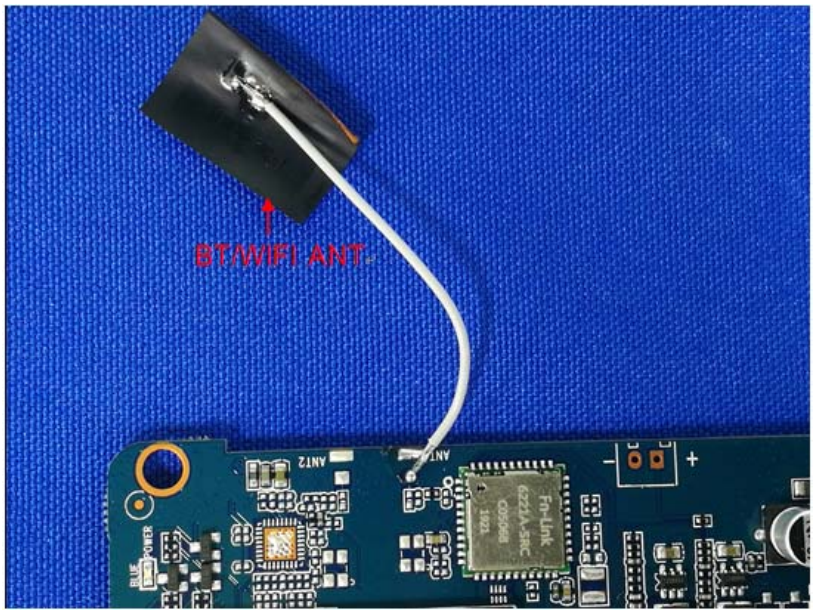
Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	June. 26 2019	June. 25 2020
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. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

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. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

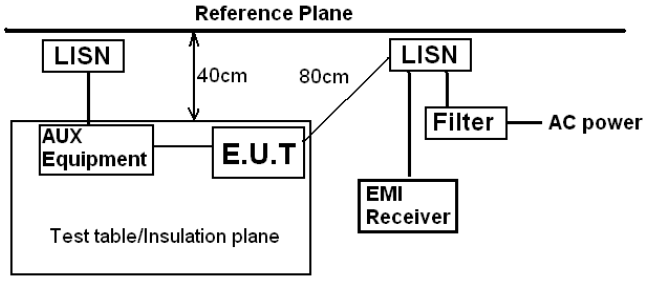
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

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 FPCBantenna, the best case gain of the antennas are 1.0dBi. 	

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, Sweep time=auto
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 setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. 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 Instruments:	Refer to section 6.0 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

Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

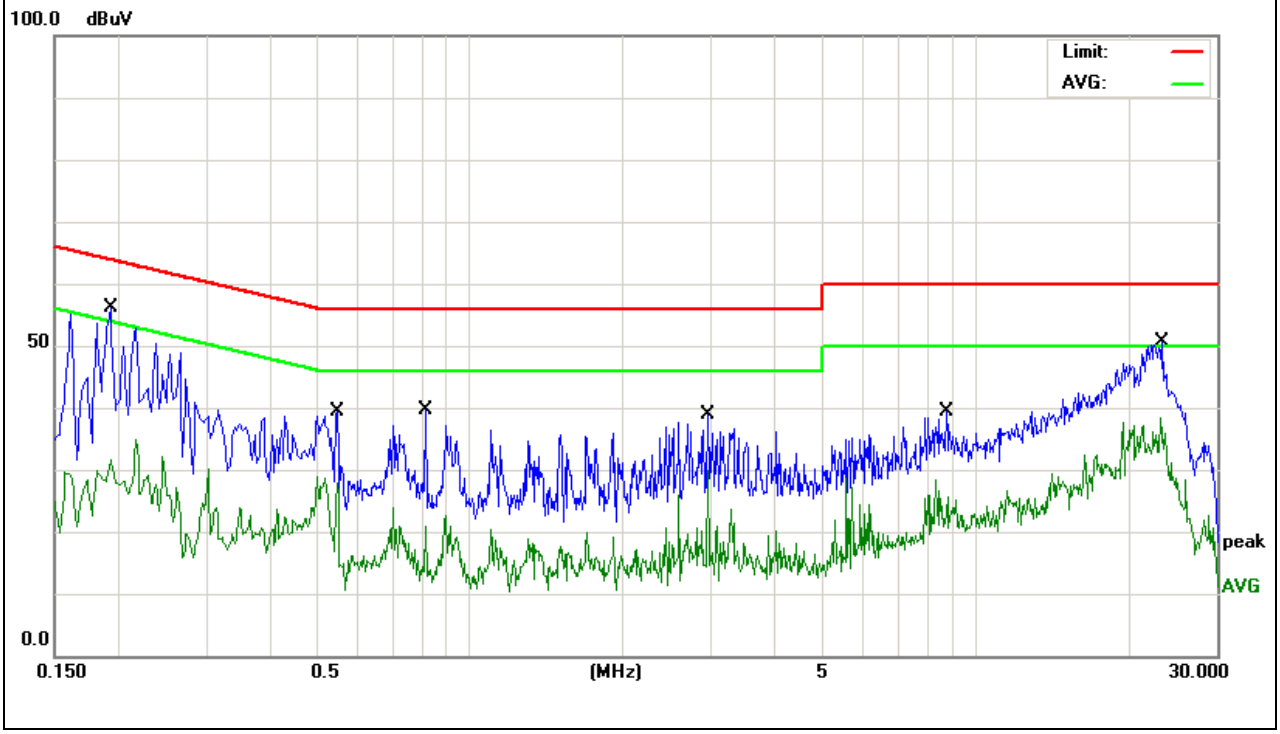
Measurement data

Line:

Frequency	Factor	Meter Reading (dBµV)		Emission Level (dBµV)		Limits (dBµV)		Margin (dB)	
(MHz)	(dB)	QP	Average	QP	Average	QP	Average	QP	Average
0.1940	11.21	44.82	20.51	56.03	31.72	63.86	53.86	-7.83	-22.14
0.5460	9.97	29.41	17.85	39.38	27.82	56.00	46.00	-16.62	-18.18
0.8139	9.92	29.67	10.84	39.59	20.76	56.00	46.00	-16.41	-25.24
2.9500	9.98	28.92	19.89	38.90	29.87	56.00	46.00	-17.10	-16.13
8.7418	10.13	29.15	15.58	39.28	25.71	60.00	50.00	-20.72	-24.29
23.2060	2.03	48.53	36.31	50.56	38.34	60.00	50.00	-9.44	-11.66

Remark:

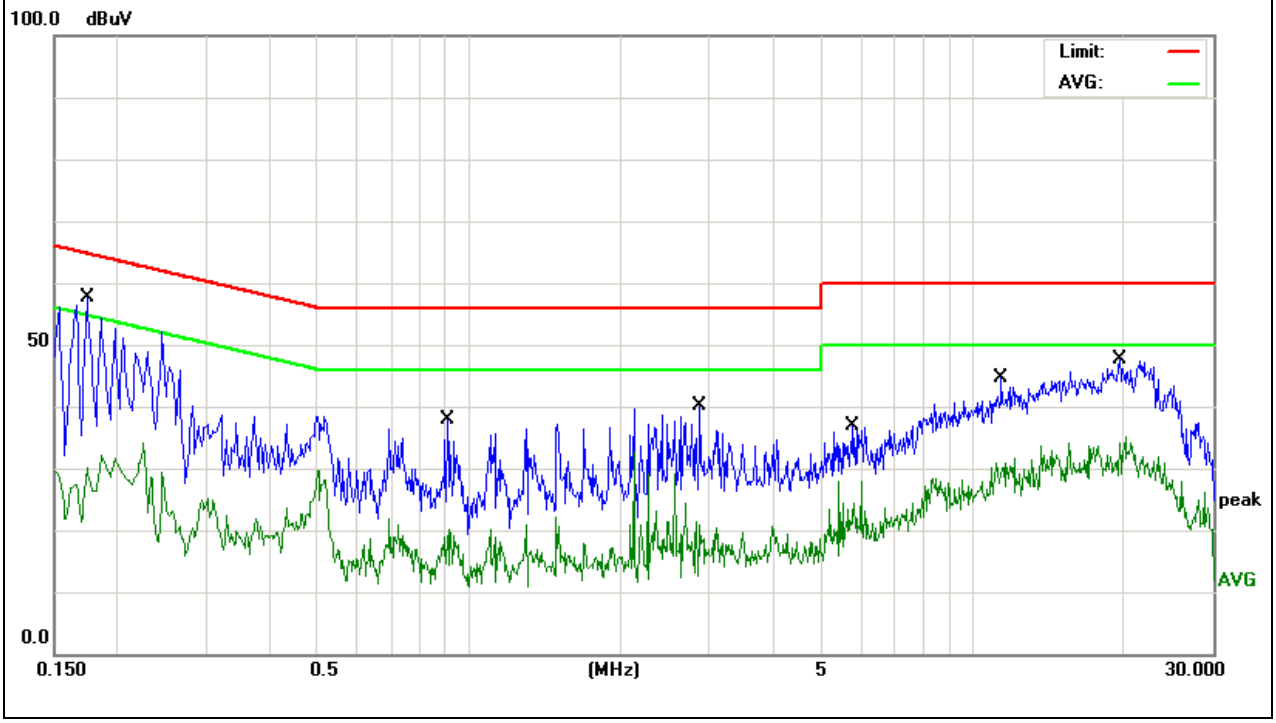
1. All readings are Quasi-Peak and Average values.
2. Factor = LISN factor + Cable Loss + Pulse limiter.



Neutral:

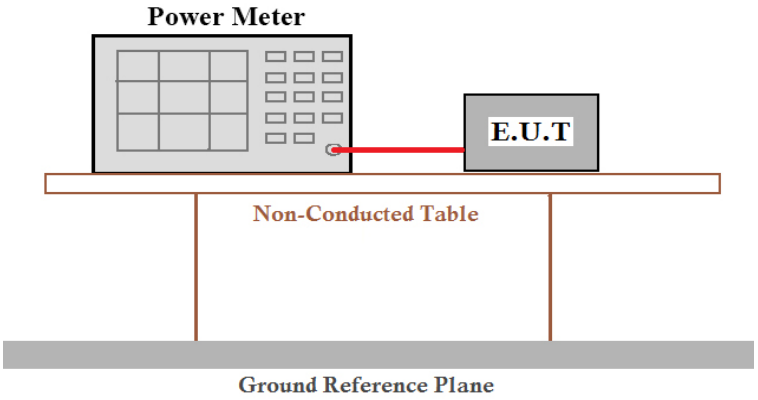
Frequency	Factor	Meter Reading (dBµV)		Emission Level (dBµV)		Limits (dBµV)		Margin (dB)	
(MHz)	(dB)	QP	Average	QP	Average	QP	Average	QP	Average
0.1740	11.48	46.11	18.60	57.59	30.08	64.76	54.76	-7.17	-24.68
0.9060	9.90	27.87	10.19	37.77	20.09	56.00	46.00	-18.23	-25.91
2.8780	9.99	30.10	11.28	40.09	21.27	56.00	46.00	-15.91	-24.73
5.7979	10.05	26.77	14.29	36.82	24.34	60.00	50.00	-23.18	-25.66
11.3979	10.21	34.37	20.69	44.58	30.90	60.00	50.00	-15.42	-19.10
19.5579	1.64	45.97	33.44	47.61	35.08	60.00	50.00	-12.39	-14.92

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = LISN factor + Cable Loss + Pulse limiter.



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
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both *limits and measurement with the average detector receiver is unnecessary.*

7.3 Conducted Peak Output Power

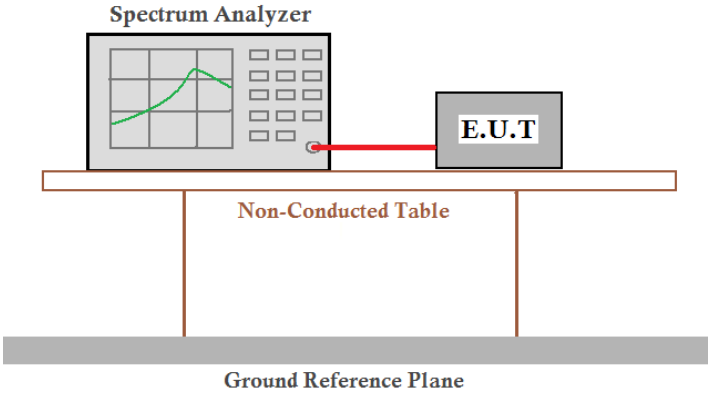
Test Requirement:	FCC Part15 E Section 15.407(a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	30dBm
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Test CH	Peak Output Power (dBm)						Limit(dBm)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	20.44	19.04	12.67	19.67	11.91	---	30.00	Pass
Middle	20.51	18.69	12.41	---	---	8.57		
Highest	20.77	18.66	12.48	18.96	11.84	---		

Remark: "---"is not applicable

7.4 Channel Bandwidth

Test Requirement:	FCC Part15 E Section 15.407(e)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	>500KHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

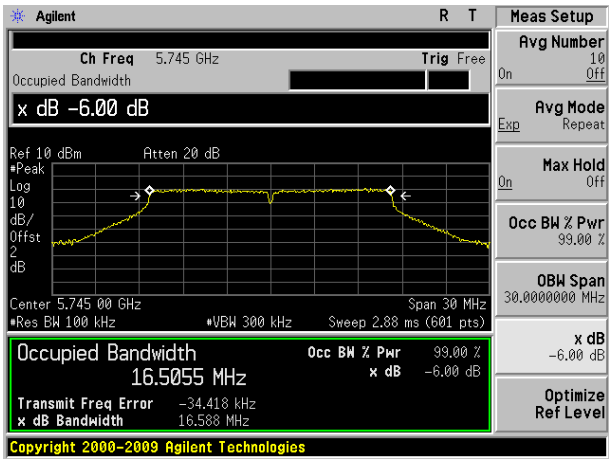
Measurement Data

Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	16.588	17.855	17.793	36.541	36.521	---	>500	Pass
Middle	16.564	17.845	17.773	---	---	76.026		
Highest	16.573	17.802	17.787	36.142	36.54	---		

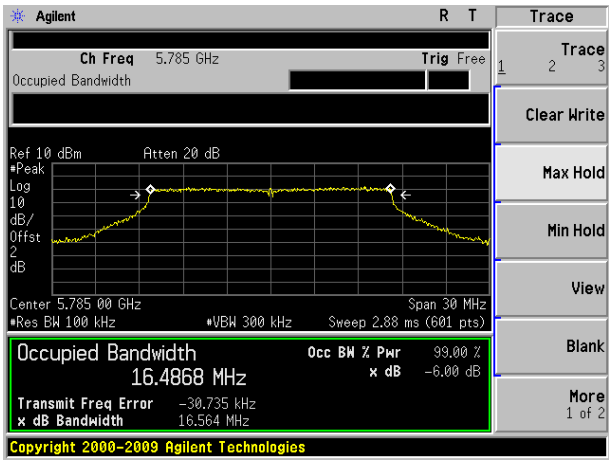
Remark: “---“is not applicable

Test plot as follows:

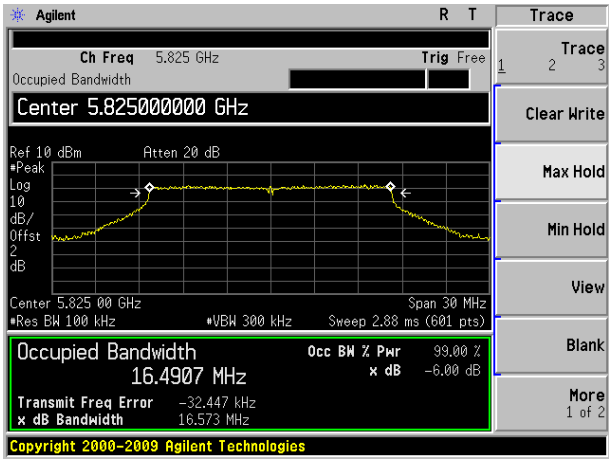
Test mode: 802.11a



Lowest channel

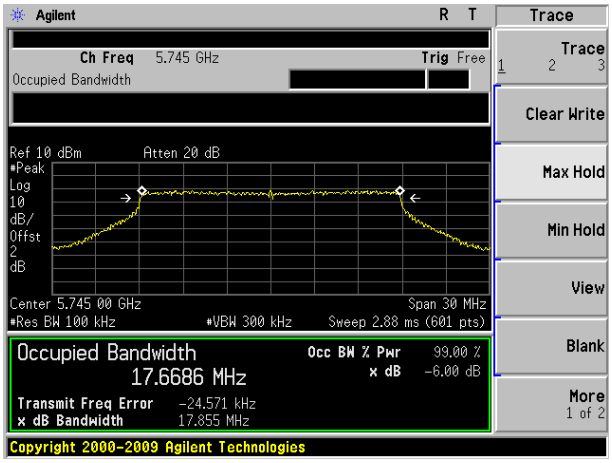


Middle channel

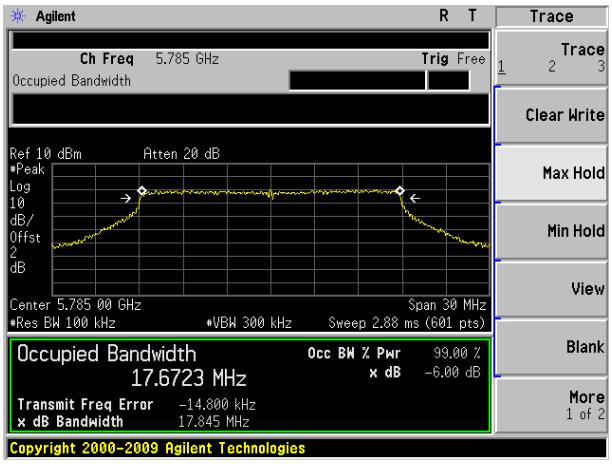


Highest channel

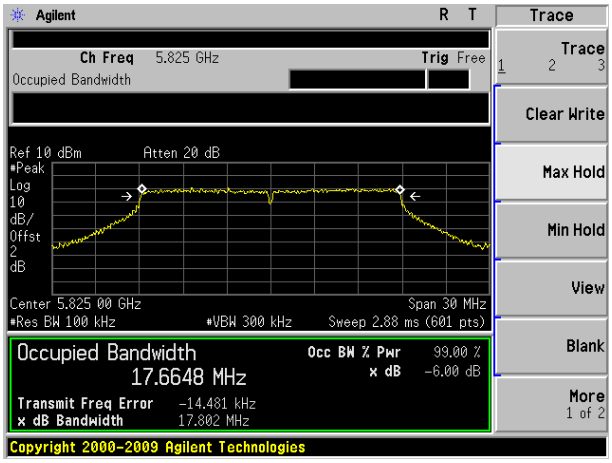
Test mode: 802.11n(HT20)



Lowest channel

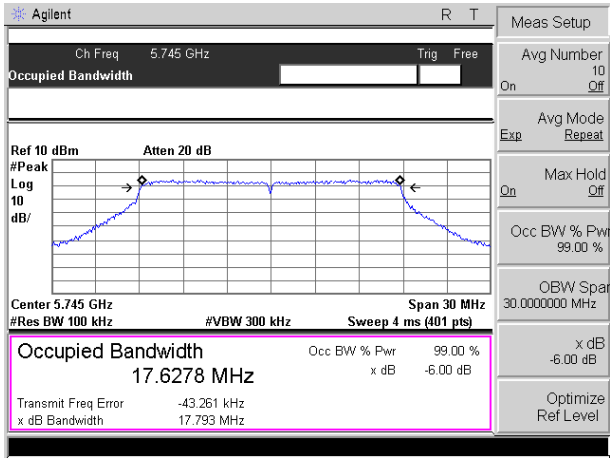


Middle channel

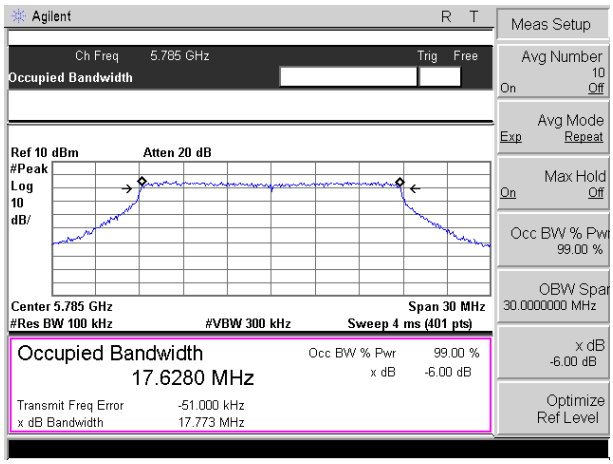


Highest channel

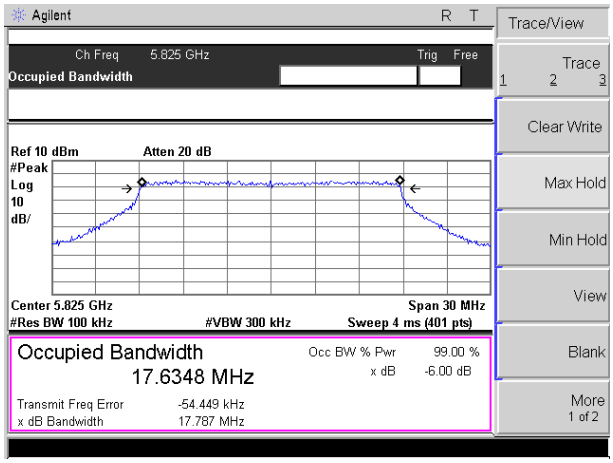
Test mode: 802.11ac(HT20)



Lowest channel

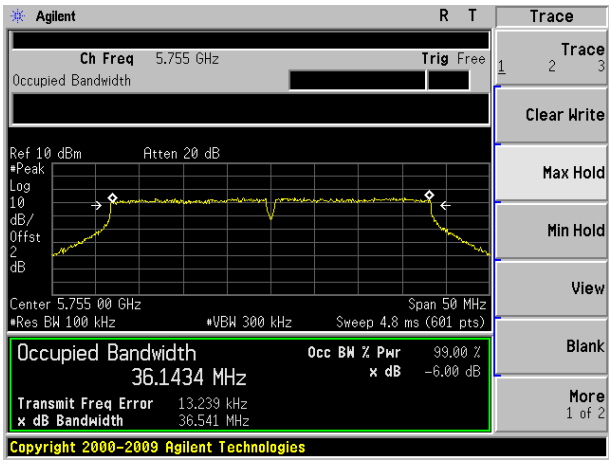


Middle channel

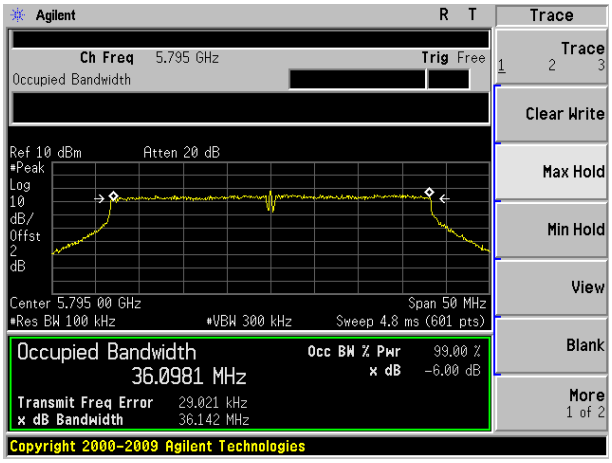


Highest channel

Test mode: 802.11n(HT40)

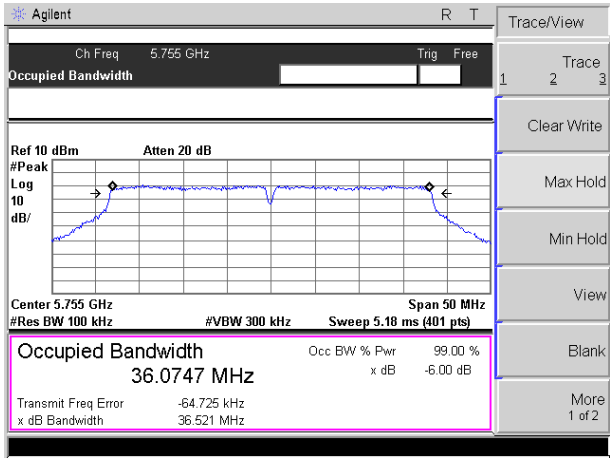


Lowest channel

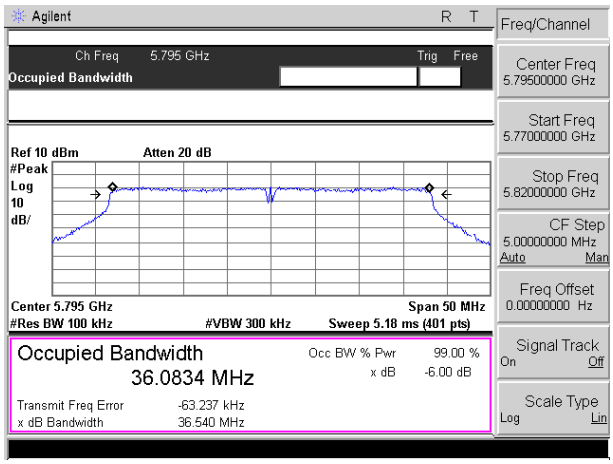


Highest channel

Test mode: 802.11ac(HT40)

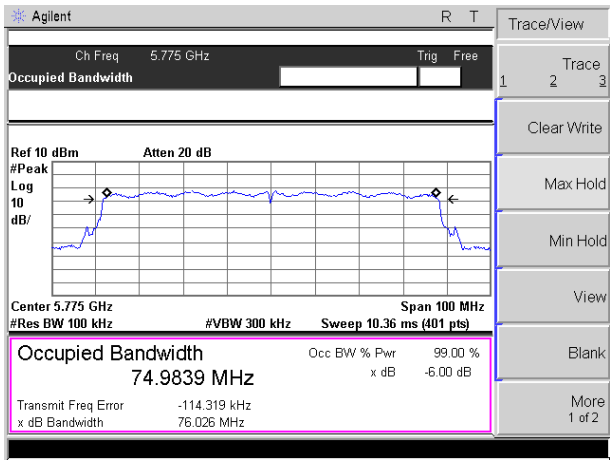


Lowest channel

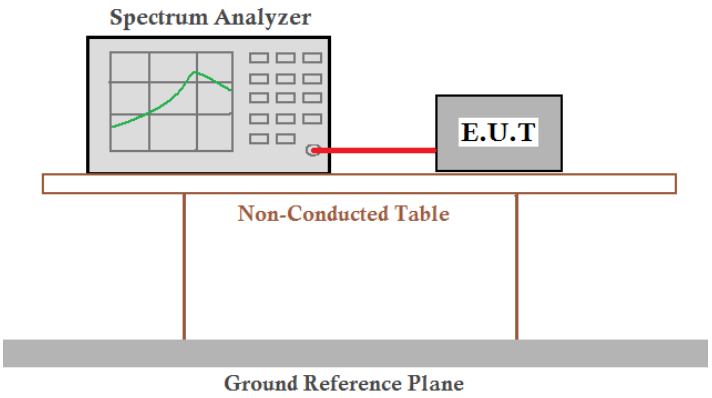


Highest channel

Test mode: 802.11ac(HT80)



7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407(a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	30dBm/500kHz
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

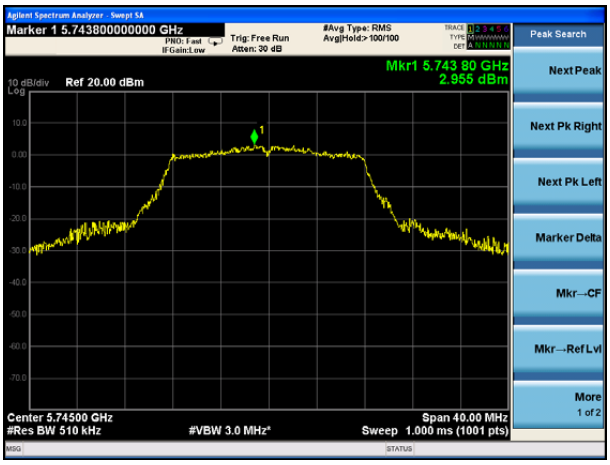
Measurement Data

Test CH	Power Spectral Density (dBm)						Limit (dBm/500kHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	2.955	3.030	2.959	0.054	0.055	---	30.00	Pass
Middle	2.515	2.683	2.512	---	---	-4.050		
Highest	2.254	2.649	2.252	-0.629	-0.622	---		

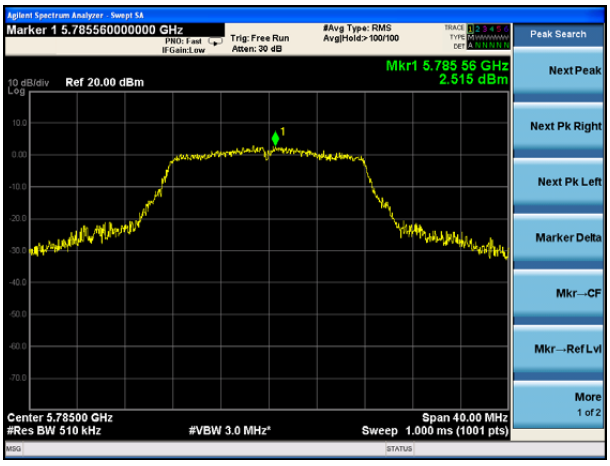
Remark: “---“is not applicable

Test plot as follows:

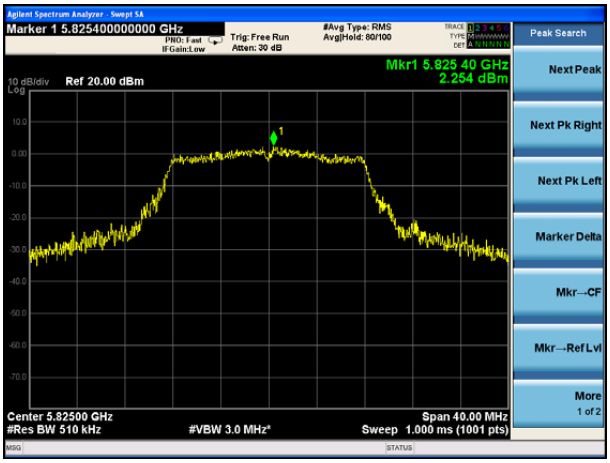
Test mode: 802.11a



Lowest channel

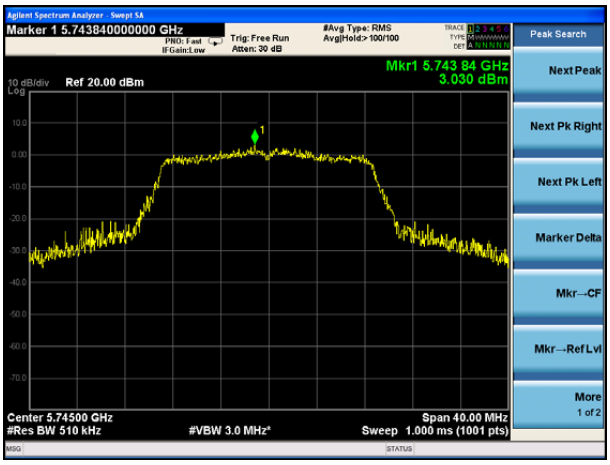


Middle channel

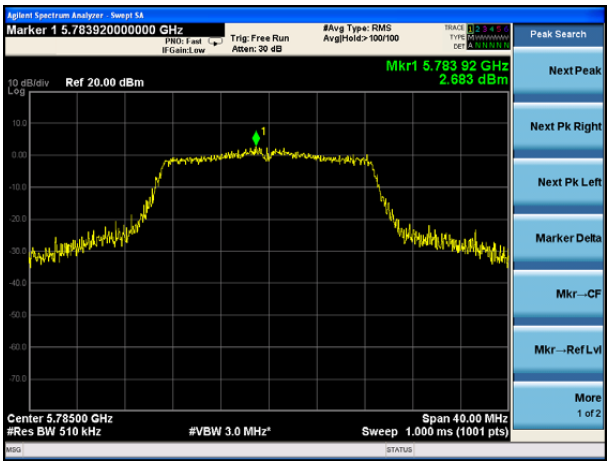


Highest channel

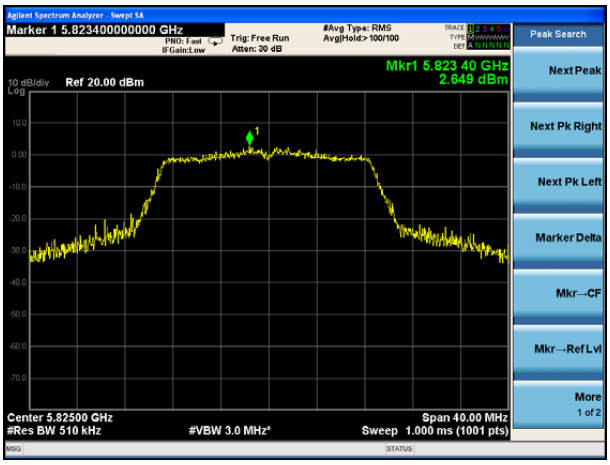
Test mode: 802.11n(HT20)



Lowest channel

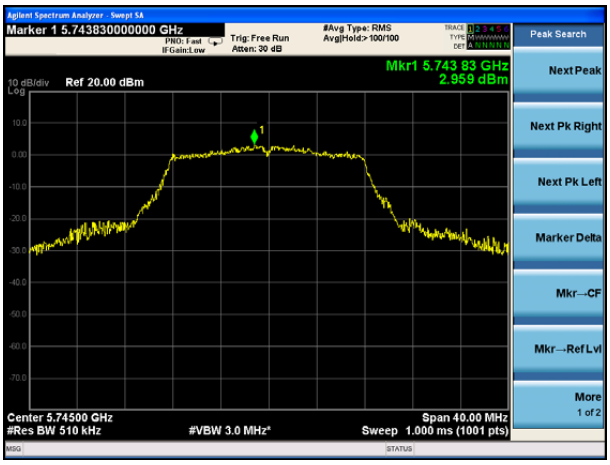


Middle channel

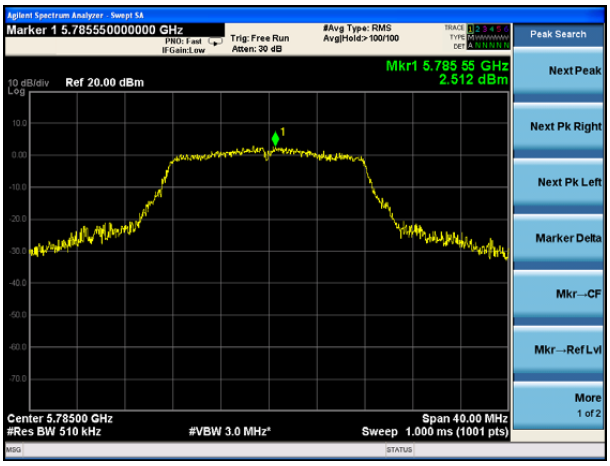


Highest channel

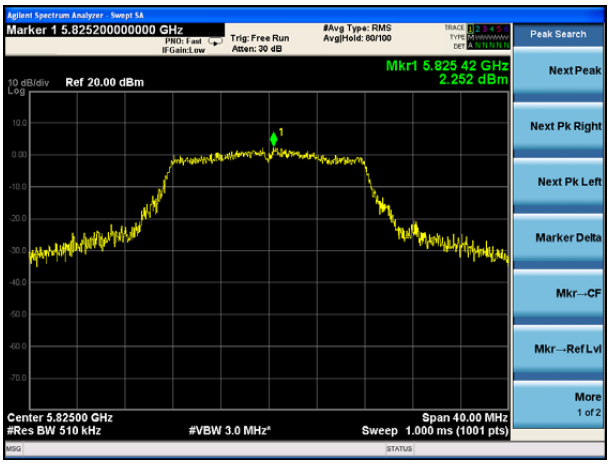
Test mode: 802.11ac(HT20)



Lowest channel

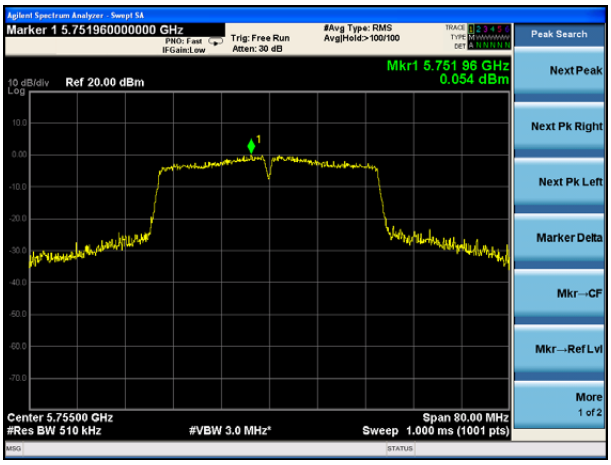


Middle channel



Highest channel

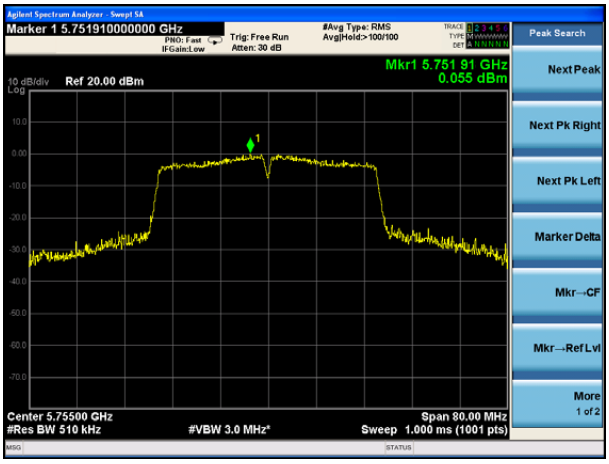
Test mode: 802.11n(HT40)



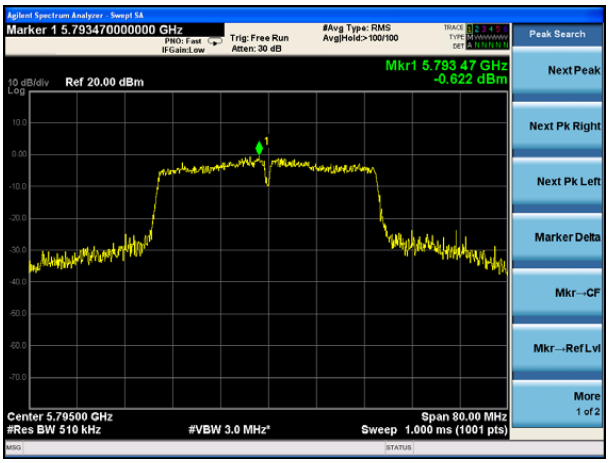
Lowest channel

Highest channel

Test mode: 802.11ac(HT40)

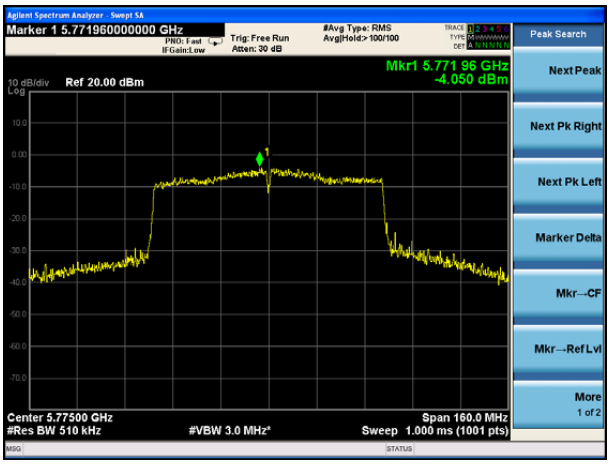


Lowest channel



Highest channel

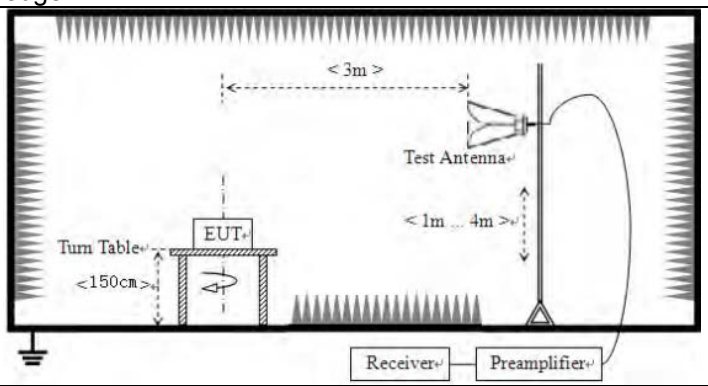
Test mode: 802.11ac(HT80)



Middle channel

7.6 Band edge

7.6.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209 and 15.205
Test Method:	ANSI C63.10: 2013
Test Frequency Range:	9kHz to 40GHz, only worse case is reported
Test site:	Measurement Distance: 3m
Receiver setup:	Frequency / Detector / RBW / VBW / Value Above 1GHz / Peak / 1MHz / 3MHz / Peak Above 1GHz / RMS / 1MHz / 3MHz / RMS
Limit:	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.
Test setup:	
Test Procedure:	1. The EUT was placed on the top of a rotating table 1.5 meters 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 rota 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. 7. The radiation measurements are performed in X, Y, Z axis positioning.

	And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remarks:

1. *Only the worst case Main Antenna test data..*
2. *Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*
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;
   E[dBuV/m] = -27 + 95.2 = 68.2dBuV/m.
   E[dBuV/m] = 10 + 95.2 = 105.2dBuV/m.
   E[dBuV/m] = 15.6 + 95.2 = 110.8dBuV/m.
   E[dBuV/m] = 27 + 95.2 = 122.2dBuV/m

Measurement data:

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
5,650.00	30.64	32.36	9.72	23.83	48.89	68.2	-19.31	Horizontal
5,700.00	28.17	32.5	9.79	23.84	46.62	105.2	-58.58	Horizontal
5,720.00	31.25	32.53	9.81	23.85	49.74	110.8	-61.06	Horizontal
5,725.00	32.29	32.53	9.83	23.86	50.79	122.2	-71.41	Horizontal
5,850.00	32.28	32.7	9.99	23.87	51.1	122.2	-71.1	Horizontal
5,855.00	33.10	32.72	9.99	23.88	51.93	110.8	-58.87	Horizontal
5,875.00	31.38	32.74	10.04	23.89	50.27	105.2	-54.93	Horizontal
5,925.00	32.25	32.8	10.11	23.9	51.26	68.2	-16.94	Horizontal
5,650.00	28.58	32.36	9.72	23.83	46.83	68.2	-21.37	Vertical
5,700.00	31.72	32.5	9.79	23.84	50.17	105.2	-55.03	Vertical
5,720.00	30.78	32.53	9.81	23.85	49.27	110.8	-61.53	Vertical
5,725.00	29.09	32.53	9.83	23.86	47.59	122.2	-74.61	Vertical
5,850.00	30.18	32.7	9.99	23.87	49	122.2	-73.2	Vertical
5,855.00	27.79	32.72	9.99	23.88	46.62	110.8	-64.18	Vertical
5,875.00	28.44	32.74	10.04	23.89	47.33	105.2	-57.87	Vertical
5,925.00	28.96	32.8	10.11	23.9	47.97	68.2	-20.23	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
5,650.00	29.22	32.36	9.72	23.83	47.47	68.2	-20.73	Horizontal
5,700.00	26.75	32.5	9.79	23.84	45.2	105.2	-60	Horizontal
5,720.00	29.83	32.53	9.81	23.85	48.32	110.8	-62.48	Horizontal
5,725.00	30.87	32.53	9.83	23.86	49.37	122.2	-72.83	Horizontal
5,850.00	30.86	32.7	9.99	23.87	49.68	122.2	-72.52	Horizontal
5,855.00	31.68	32.72	9.99	23.88	50.51	110.8	-60.29	Horizontal
5,875.00	29.96	32.74	10.04	23.89	48.85	105.2	-56.35	Horizontal
5,925.00	30.83	32.8	10.11	23.9	49.84	68.2	-18.36	Horizontal
5,650.00	27.16	32.36	9.72	23.83	45.41	68.2	-22.79	Vertical
5,700.00	30.30	32.5	9.79	23.84	48.75	105.2	-56.45	Vertical
5,720.00	29.36	32.53	9.81	23.85	47.85	110.8	-62.95	Vertical
5,725.00	27.67	32.53	9.83	23.86	46.17	122.2	-76.03	Vertical
5,850.00	28.76	32.7	9.99	23.87	47.58	122.2	-74.62	Vertical
5,855.00	26.37	32.72	9.99	23.88	45.2	110.8	-65.6	Vertical
5,875.00	27.02	32.74	10.04	23.89	45.91	105.2	-59.29	Vertical
5,925.00	27.54	32.8	10.11	23.9	46.55	68.2	-21.65	Vertical

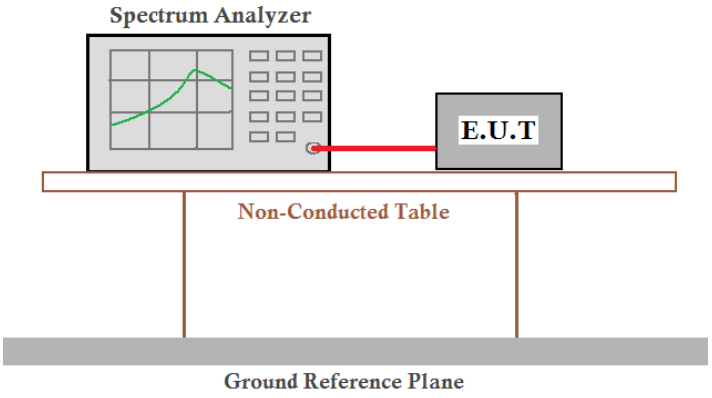
IEEE 802.11ac HT20								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5,650.00	30.93	32.36	9.72	23.83	49.18	68.2	-19.02	Horizontal
5,700.00	28.46	32.5	9.79	23.84	46.91	105.2	-58.29	Horizontal
5,720.00	31.54	32.53	9.81	23.85	50.03	110.8	-60.77	Horizontal
5,725.00	32.58	32.53	9.83	23.86	51.08	122.2	-71.12	Horizontal
5,850.00	32.57	32.7	9.99	23.87	51.39	122.2	-70.81	Horizontal
5,855.00	33.39	32.72	9.99	23.88	52.22	110.8	-58.58	Horizontal
5,875.00	31.67	32.74	10.04	23.89	50.56	105.2	-54.64	Horizontal
5,925.00	32.54	32.8	10.11	23.9	51.55	68.2	-16.65	Horizontal
5,650.00	28.87	32.36	9.72	23.83	47.12	68.2	-21.08	Vertical
5,700.00	32.01	32.5	9.79	23.84	50.46	105.2	-54.74	Vertical
5,720.00	31.07	32.53	9.81	23.85	49.56	110.8	-61.24	Vertical
5,725.00	29.38	32.53	9.83	23.86	47.88	122.2	-74.32	Vertical
5,850.00	30.47	32.7	9.99	23.87	49.29	122.2	-72.91	Vertical
5,855.00	28.08	32.72	9.99	23.88	46.91	110.8	-63.89	Vertical
5,875.00	28.73	32.74	10.04	23.89	47.62	105.2	-57.58	Vertical
5,925.00	29.25	32.8	10.11	23.9	48.26	68.2	-19.94	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
5,650.00	30.53	32.36	9.72	23.83	48.78	68.2	-19.42	Horizontal
5,700.00	28.06	32.5	9.79	23.84	46.51	105.2	-58.69	Horizontal
5,720.00	31.14	32.53	9.81	23.85	49.63	110.8	-61.17	Horizontal
5,725.00	32.18	32.53	9.83	23.86	50.68	122.2	-71.52	Horizontal
5,850.00	32.17	32.7	9.99	23.87	50.99	122.2	-71.21	Horizontal
5,855.00	32.99	32.72	9.99	23.88	51.82	110.8	-58.98	Horizontal
5,875.00	31.27	32.74	10.04	23.89	50.16	105.2	-55.04	Horizontal
5,925.00	32.14	32.8	10.11	23.9	51.15	68.2	-17.05	Horizontal
5,650.00	28.47	32.36	9.72	23.83	46.72	68.2	-21.48	Vertical
5,700.00	31.61	32.5	9.79	23.84	50.06	105.2	-55.14	Vertical
5,720.00	30.67	32.53	9.81	23.85	49.16	110.8	-61.64	Vertical
5,725.00	28.98	32.53	9.83	23.86	47.48	122.2	-74.72	Vertical
5,850.00	30.07	32.7	9.99	23.87	48.89	122.2	-73.31	Vertical
5,855.00	27.68	32.72	9.99	23.88	46.51	110.8	-64.29	Vertical
5,875.00	28.33	32.74	10.04	23.89	47.22	105.2	-57.98	Vertical
5,925.00	28.85	32.8	10.11	23.9	47.86	68.2	-20.34	Vertical

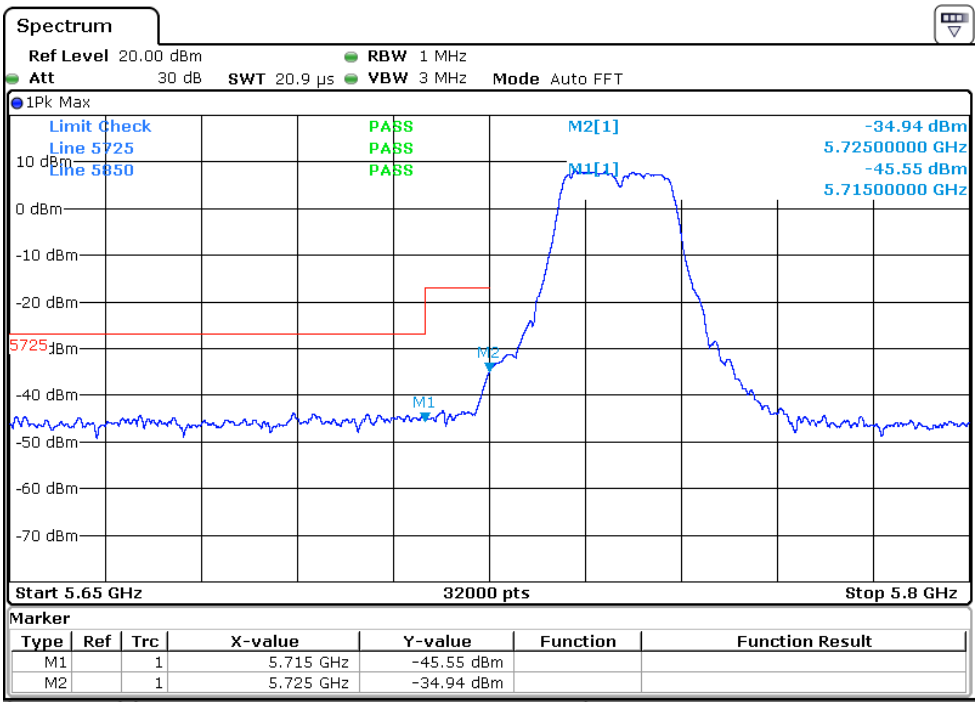
IEEE 802.11ac HT40								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5,650.00	32.06	32.36	9.72	23.83	50.31	68.2	-17.89	Horizontal
5,700.00	29.59	32.5	9.79	23.84	48.04	105.2	-57.16	Horizontal
5,720.00	32.67	32.53	9.81	23.85	51.16	110.8	-59.64	Horizontal
5,725.00	33.71	32.53	9.83	23.86	52.21	122.2	-69.99	Horizontal
5,850.00	33.70	32.7	9.99	23.87	52.52	122.2	-69.68	Horizontal
5,855.00	34.52	32.72	9.99	23.88	53.35	110.8	-57.45	Horizontal
5,875.00	32.80	32.74	10.04	23.89	51.69	105.2	-53.51	Horizontal
5,925.00	33.67	32.8	10.11	23.9	52.68	68.2	-15.52	Horizontal
5,650.00	30.00	32.36	9.72	23.83	48.25	68.2	-19.95	Vertical
5,700.00	33.14	32.5	9.79	23.84	51.59	105.2	-53.61	Vertical
5,720.00	32.20	32.53	9.81	23.85	50.69	110.8	-60.11	Vertical
5,725.00	30.51	32.53	9.83	23.86	49.01	122.2	-73.19	Vertical
5,850.00	31.60	32.7	9.99	23.87	50.42	122.2	-71.78	Vertical
5,855.00	29.21	32.72	9.99	23.88	48.04	110.8	-62.76	Vertical
5,875.00	29.86	32.74	10.04	23.89	48.75	105.2	-56.45	Vertical
5,925.00	30.38	32.8	10.11	23.9	49.39	68.2	-18.81	Vertical

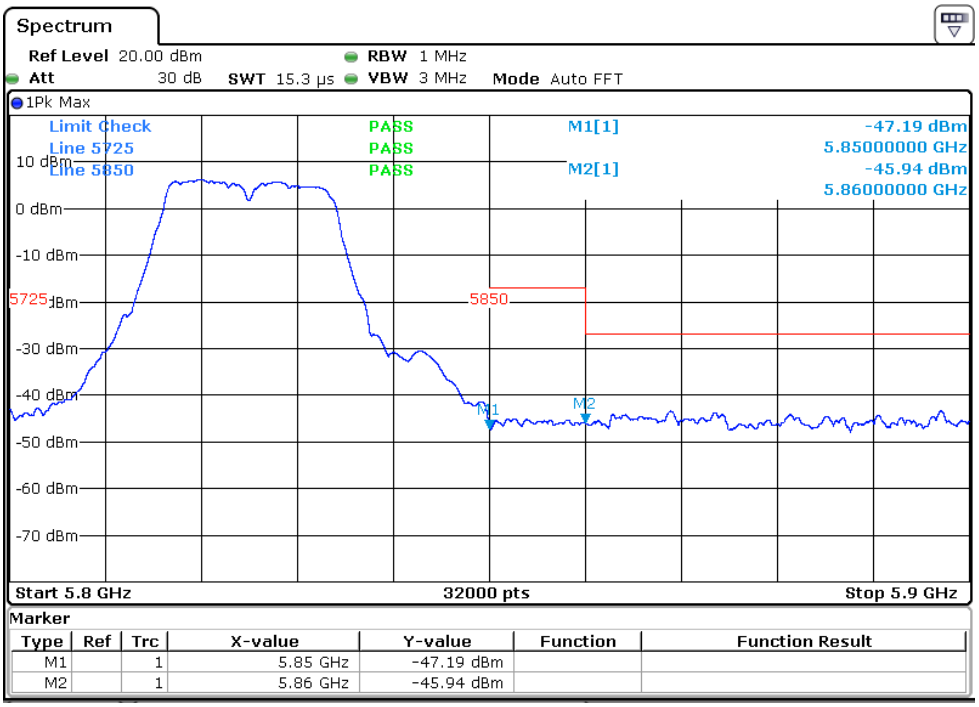
IEEE 802.11ac HT80								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5,650.00	30.59	32.36	9.72	23.83	48.84	68.2	-19.36	Horizontal
5,700.00	28.12	32.5	9.79	23.84	46.57	105.2	-58.63	Horizontal
5,720.00	31.20	32.53	9.81	23.85	49.69	110.8	-61.11	Horizontal
5,725.00	32.24	32.53	9.83	23.86	50.74	122.2	-71.46	Horizontal
5,850.00	32.23	32.7	9.99	23.87	51.05	122.2	-71.15	Horizontal
5,855.00	33.05	32.72	9.99	23.88	51.88	110.8	-58.92	Horizontal
5,875.00	31.33	32.74	10.04	23.89	50.22	105.2	-54.98	Horizontal
5,925.00	32.20	32.8	10.11	23.9	51.21	68.2	-16.99	Horizontal
5,650.00	28.53	32.36	9.72	23.83	46.78	68.2	-21.42	Vertical
5,700.00	31.67	32.5	9.79	23.84	50.12	105.2	-55.08	Vertical
5,720.00	30.73	32.53	9.81	23.85	49.22	110.8	-61.58	Vertical
5,725.00	29.04	32.53	9.83	23.86	47.54	122.2	-74.66	Vertical
5,850.00	30.13	32.7	9.99	23.87	48.95	122.2	-73.25	Vertical
5,855.00	27.74	32.72	9.99	23.88	46.57	110.8	-64.23	Vertical
5,875.00	28.39	32.74	10.04	23.89	47.28	105.2	-57.92	Vertical
5,925.00	28.91	32.8	10.11	23.9	47.92	68.2	-20.28	Vertical

7.7 Band edge(Conducted Emission Method)

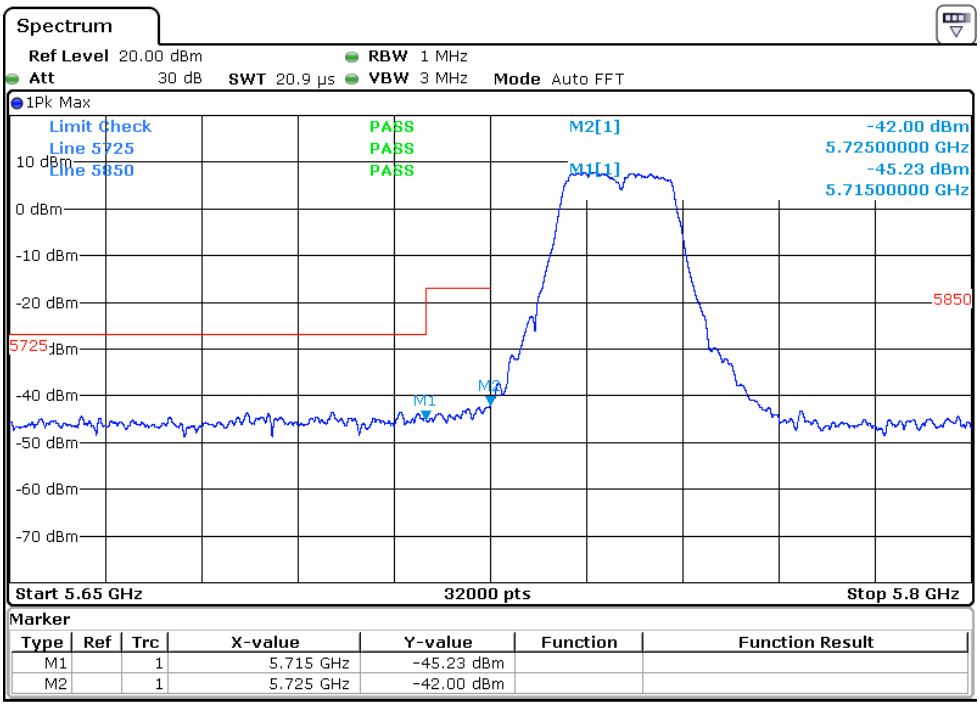
Test Requirement:	FCC Part15 C Section 15.407 (b)
Test Method:	Clause 8.7 of KDB558074 D01 DTS Meas Guidance V05r02 and subclause 11.13 of ANSI C63.10
Limit:	For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below 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.
Test setup:	
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.*
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

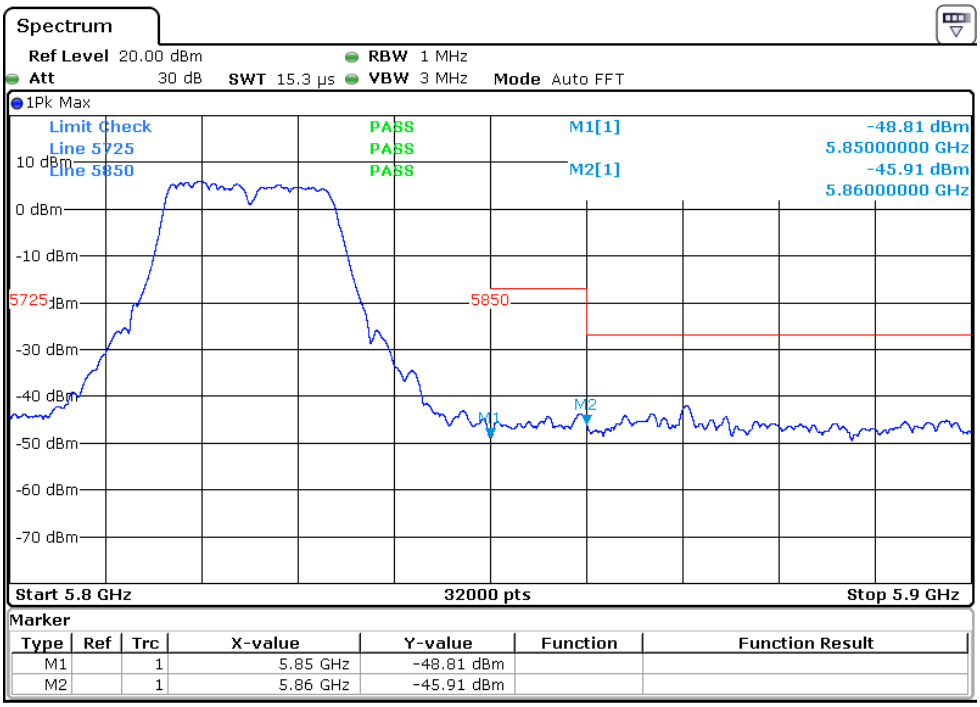
802.11 a


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 20.9 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M2[1] -34.94 dBm
5.72500000 GHz
M1[1] -45.55 dBm
5.71500000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
5725 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
M2
Start 5.65 GHz
32000 pts
Stop 5.8 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.715 GHz -45.55 dBm
M2 1 5.725 GHz -34.94 dBm

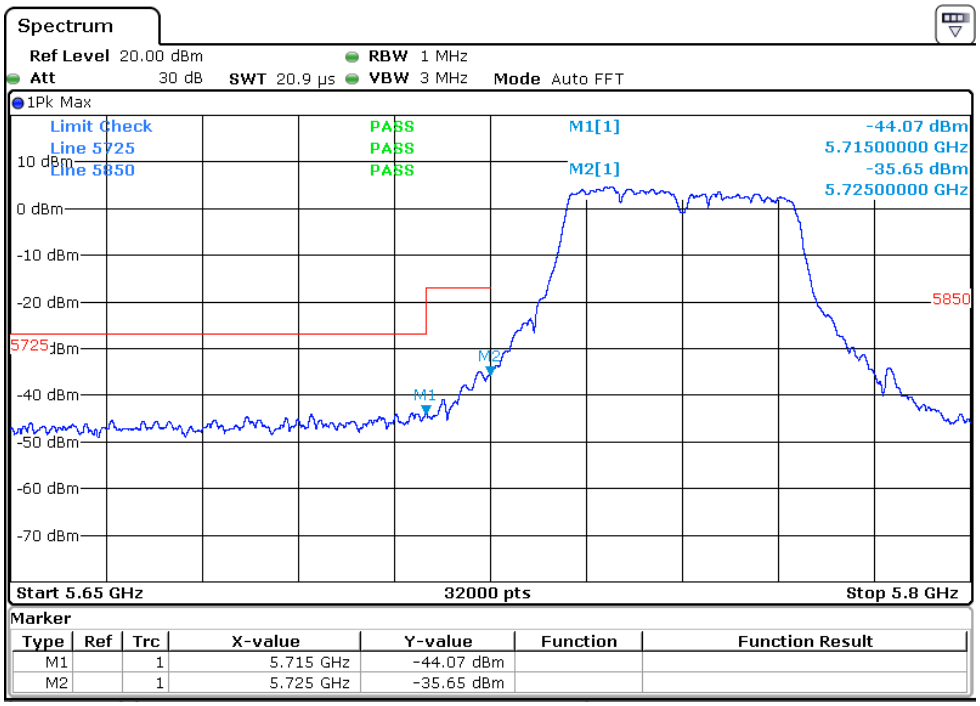

Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 15.3 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M1[1] -47.19 dBm
5.85000000 GHz
M2[1] -45.94 dBm
5.86000000 GHz
10 dBm
0 dBm
-10 dBm
5725 dBm
5850
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
M2
Start 5.8 GHz
32000 pts
Stop 5.9 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.85 GHz -47.19 dBm
M2 1 5.86 GHz -45.94 dBm

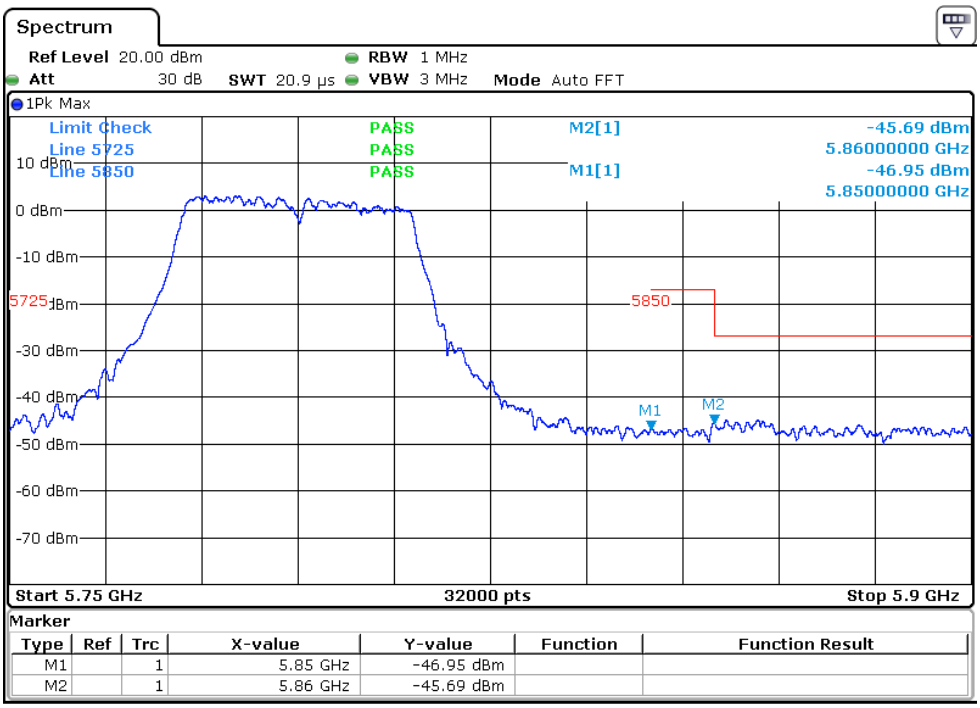
802.11 n20


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 20.9 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M2[1] -42.00 dBm
5.72500000 GHz
M1[1] -45.23 dBm
5.71500000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
5725
5850
M1
M2
Start 5.65 GHz
32000 pts
Stop 5.8 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.715 GHz -45.23 dBm
M2 1 5.725 GHz -42.00 dBm

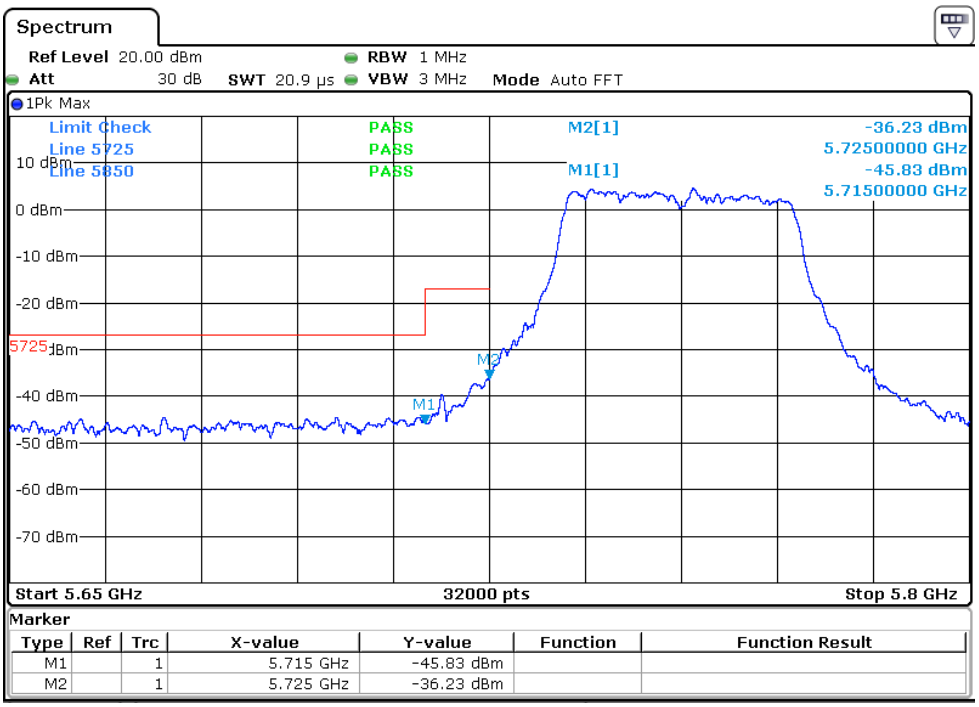

Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 15.3 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M1[1] -48.81 dBm
5.85000000 GHz
M2[1] -45.91 dBm
5.86000000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
5725
5850
M1
M2
Start 5.8 GHz
32000 pts
Stop 5.9 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.85 GHz -48.81 dBm
M2 1 5.86 GHz -45.91 dBm

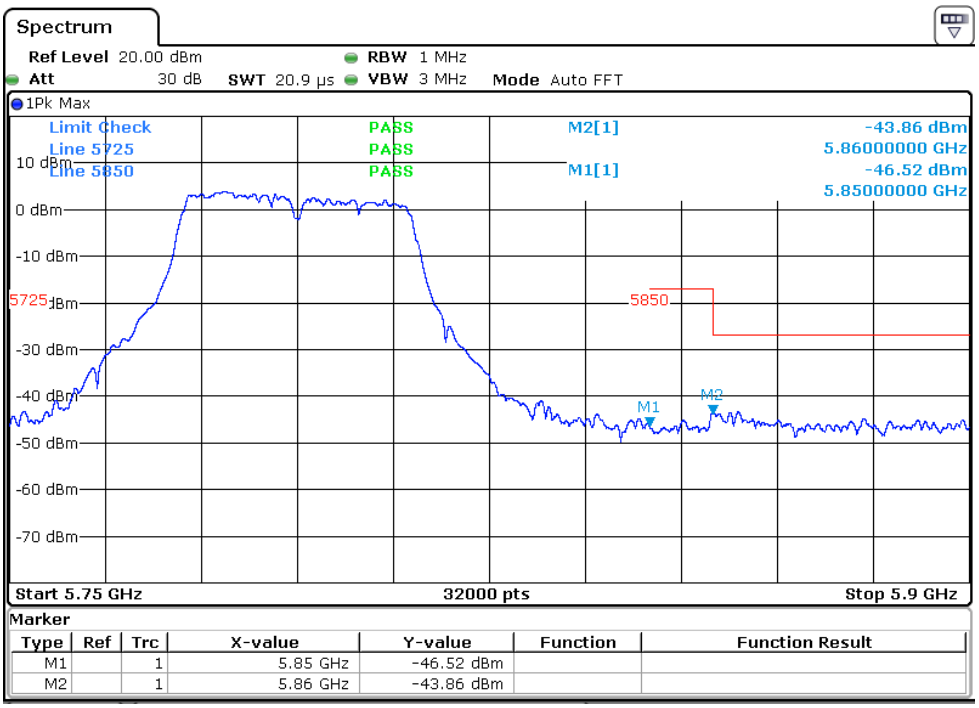
802.11 n40


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 20.9 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M1[1] -44.07 dBm
5.71500000 GHz
M2[1] -35.65 dBm
5.72500000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
5725
5850
M1
M2
Start 5.65 GHz
32000 pts
Stop 5.8 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.715 GHz -44.07 dBm
M2 1 5.725 GHz -35.65 dBm

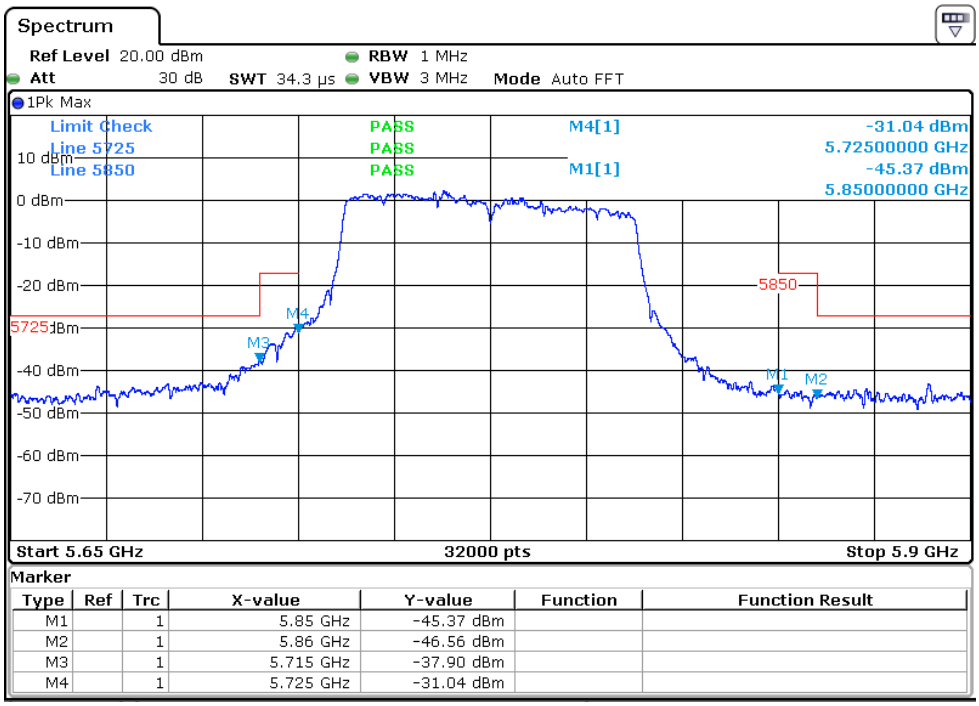

Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 20.9 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M2[1] -45.69 dBm
5.86000000 GHz
M1[1] -46.95 dBm
5.85000000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
5725
5850
M1
M2
Start 5.75 GHz
32000 pts
Stop 5.9 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.85 GHz -46.95 dBm
M2 1 5.86 GHz -45.69 dBm

802.11 ac40


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 20.9 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M2[1] -36.23 dBm
5.72500000 GHz
M1[1] -45.83 dBm
5.71500000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
5725
-40 dBm
-50 dBm
-60 dBm
-70 dBm
Start 5.65 GHz
32000 pts
Stop 5.8 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.715 GHz -45.83 dBm
M2 1 5.725 GHz -36.23 dBm


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 20.9 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
Limit Check PASS
Line 5725 PASS
Line 5850 PASS
M2[1] -43.86 dBm
5.86000000 GHz
M1[1] -46.52 dBm
5.85000000 GHz
10 dBm
0 dBm
-10 dBm
5725
5850
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
Start 5.75 GHz
32000 pts
Stop 5.9 GHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.85 GHz -46.52 dBm
M2 1 5.86 GHz -43.86 dBm

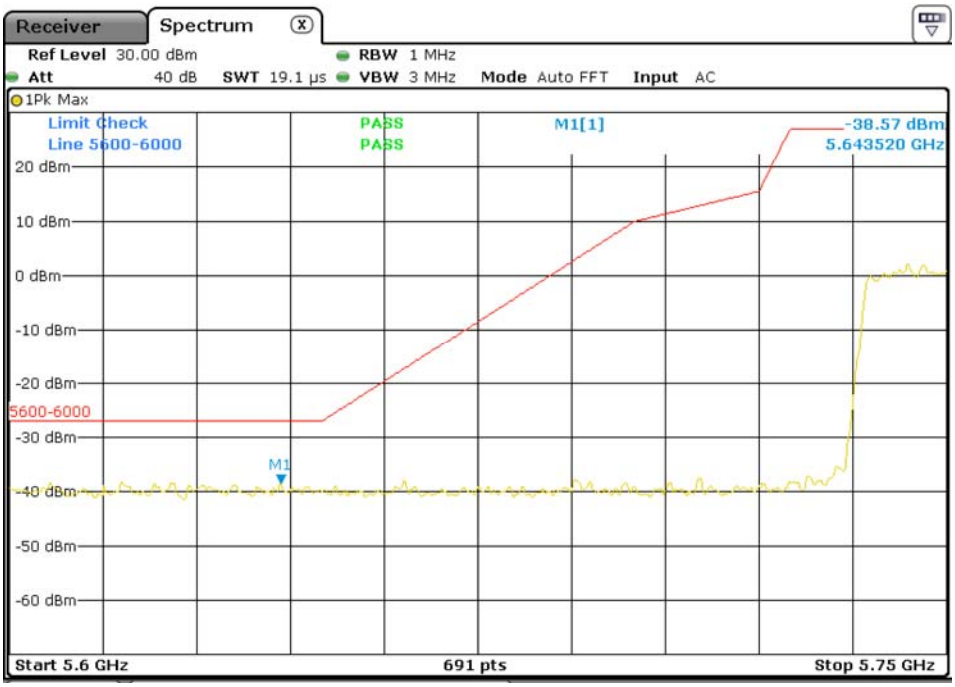
802.11 ac80

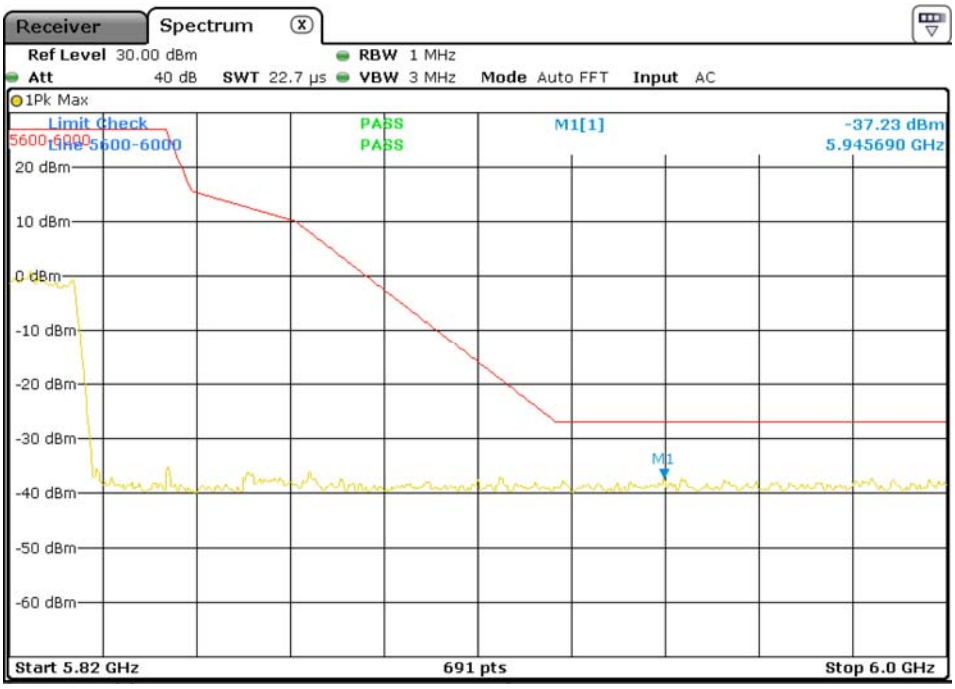


Marker

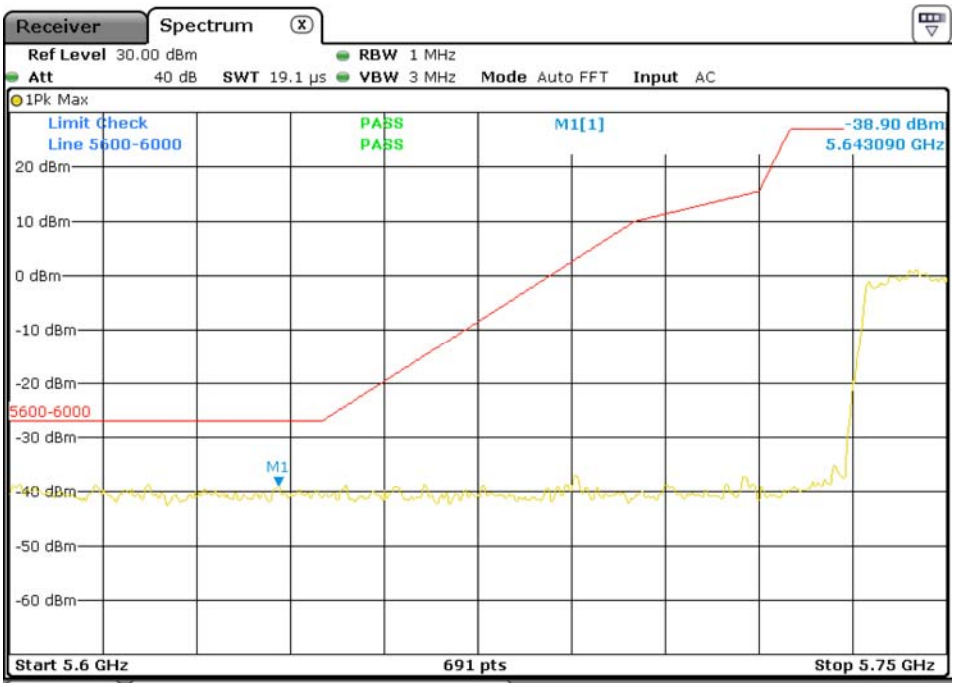
Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	5.85 GHz	-45.37 dBm		
M2		1	5.86 GHz	-46.56 dBm		
M3		1	5.715 GHz	-37.90 dBm		
M4		1	5.725 GHz	-31.04 dBm		

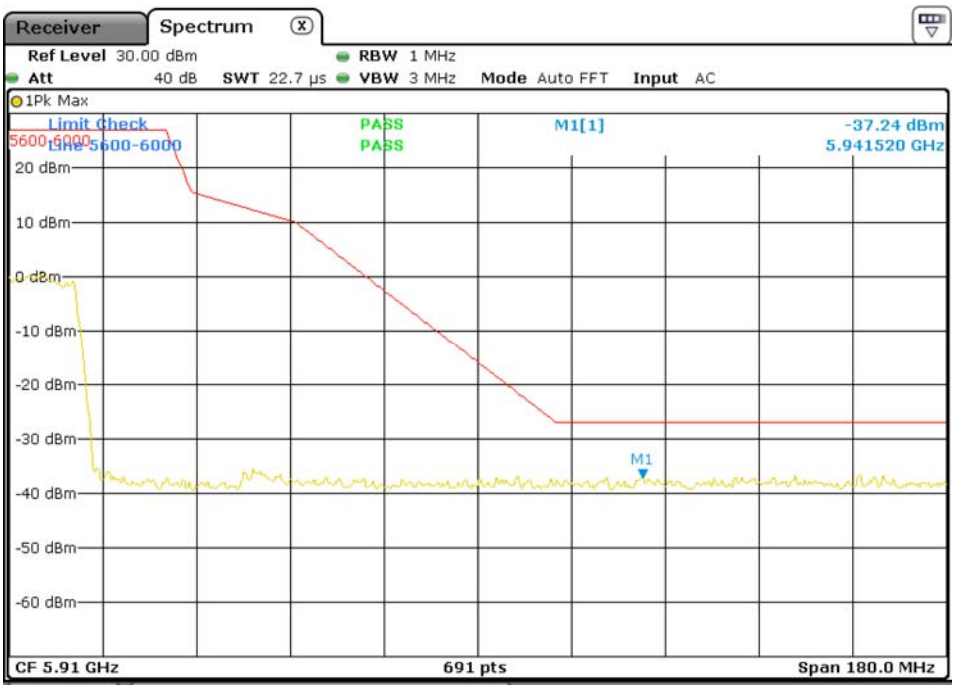
802.11 a


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 19.1 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
Line 5600-6000 PASS
M1[1]
-38.57 dBm
5.643520 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
5600-6000
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.6 GHz
691 pts
Stop 5.75 GHz


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 22.7 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
5600-6000
Line 5600-6000 PASS
M1[1]
-37.23 dBm
5.945690 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.82 GHz
691 pts
Stop 6.0 GHz

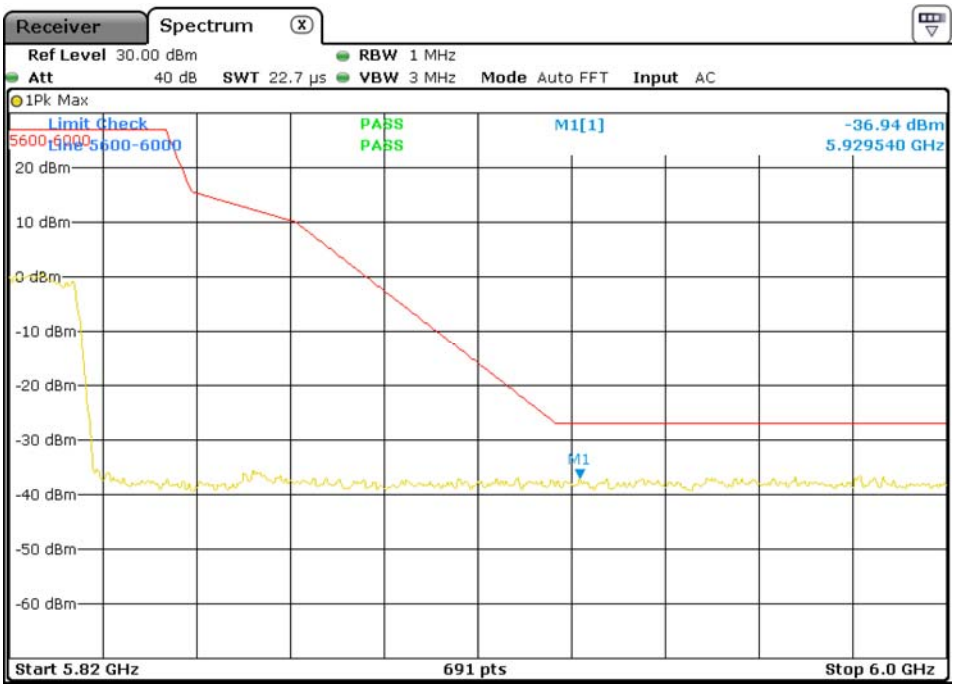
802.11n20


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 19.1 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
Line 5600-6000 PASS
M1[1]
-38.90 dBm
5.643090 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
5600-6000
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.6 GHz
691 pts
Stop 5.75 GHz


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 22.7 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
5600-6000
Line 5600-6000 PASS
M1[1]
-37.24 dBm
5.941520 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
CF 5.91 GHz
691 pts
Span 180.0 MHz

802.11 n40


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 19.1 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
Line 5600-6000 PASS
M1[1]
-38.68 dBm
5.642870 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
5600-6000
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.6 GHz
691 pts
Stop 5.75 GHz


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 22.7 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
5600-6000
Line 5600-6000 PASS
M1[1]
-36.94 dBm
5.929540 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.82 GHz
691 pts
Stop 6.0 GHz

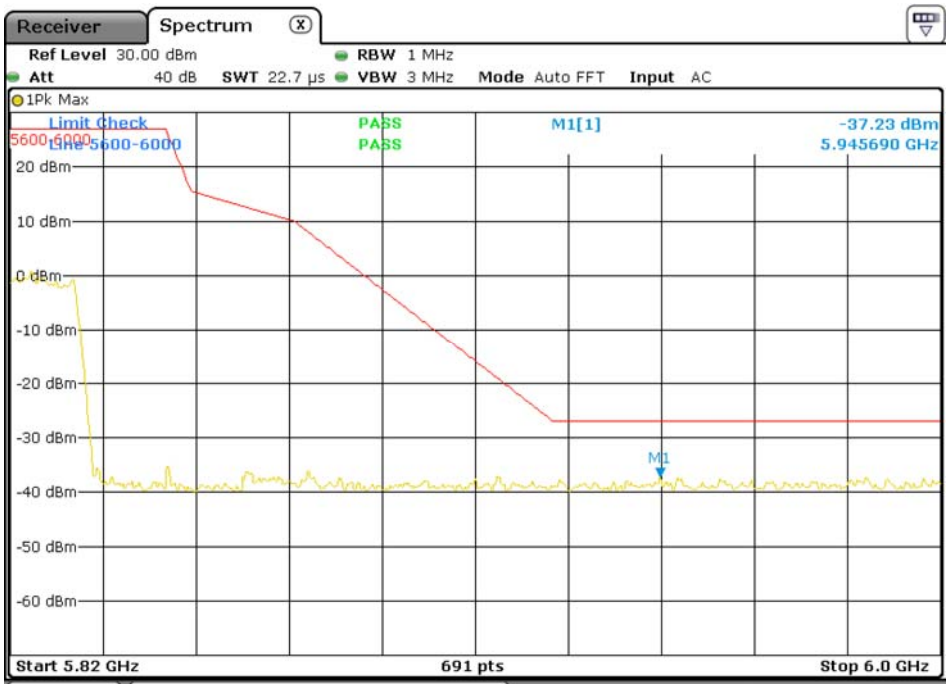
802.11 ac40


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 19.1 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
Line 5600-6000 PASS
M1[1]
-38.32 dBm
5.613780 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
5600-6000
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.6 GHz
691 pts
Stop 5.75 GHz

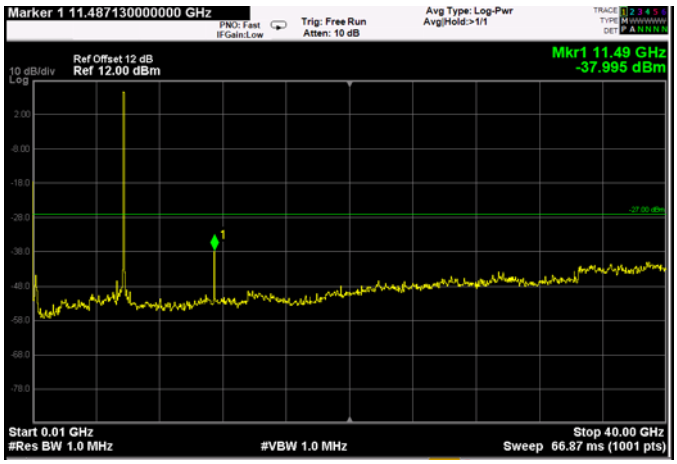

Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 22.7 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
Line 5600-6000 PASS
M1[1]
-35.72 dBm
5.985800 GHz
5600-6000
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.82 GHz
691 pts
Stop 6.0 GHz

802.11 ac80

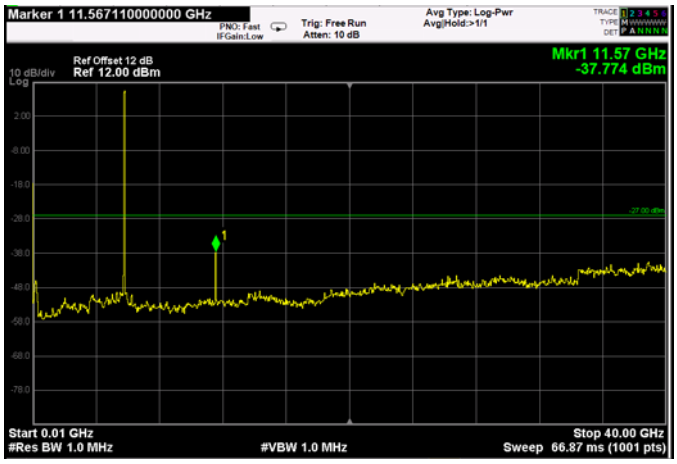

Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 19.1 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
Line 5600-6000 PASS
M1[1]
-38.68 dBm
5.642870 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
5600-6000
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.6 GHz
691 pts
Stop 5.75 GHz


Receiver
Spectrum
Ref Level 30.00 dBm
RBW 1 MHz
Att 40 dB
SWT 22.7 µs
VBW 3 MHz
Mode Auto FFT
Input AC
1Pk Max
Limit Check PASS
5600-6000
Line 5600-6000 PASS
M1[1]
-37.23 dBm
5.945690 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
M1
-40 dBm
-50 dBm
-60 dBm
Start 5.82 GHz
691 pts
Stop 6.0 GHz

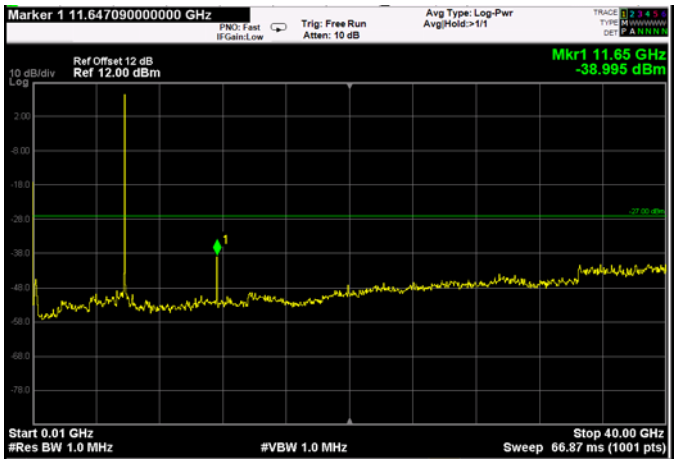
a CH 149



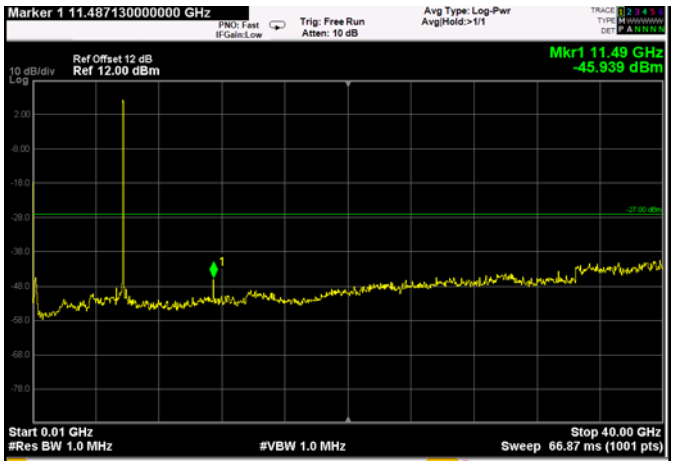
a CH 157



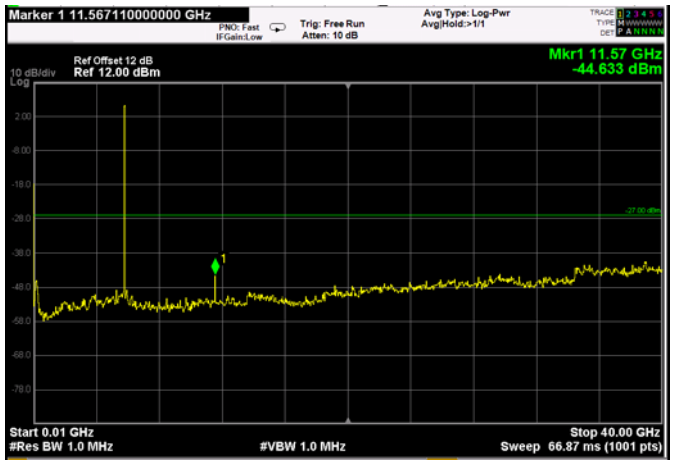
a CH 165



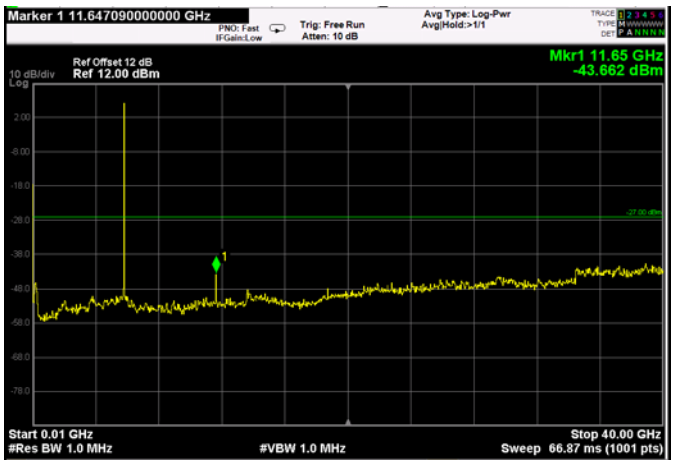
N20 CH 149



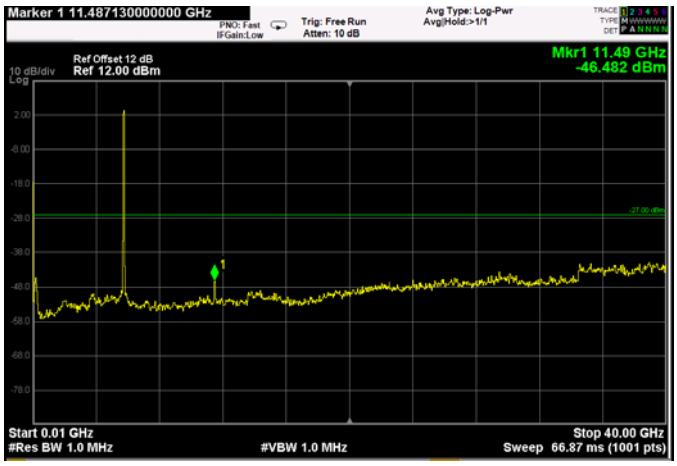
N20 CH 157



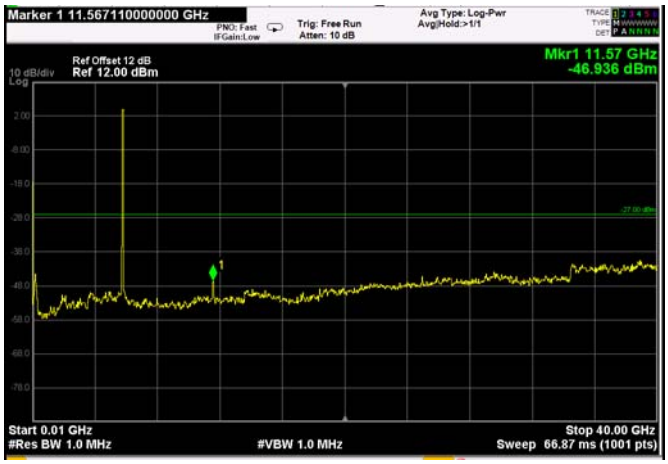
N20 CH 165



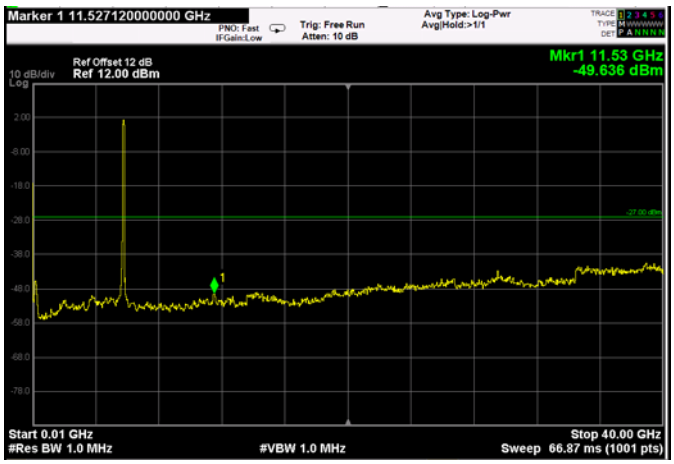
N40 CH 151



N40 CH 159

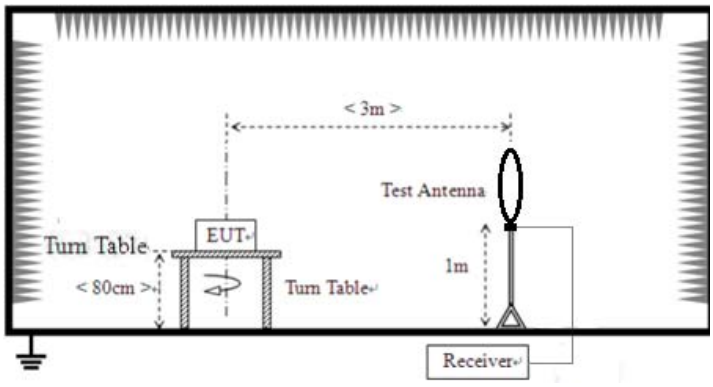


ac 80 CH 155

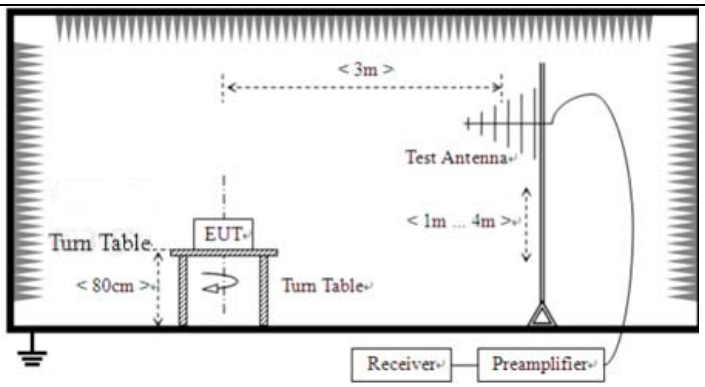


7.8 Spurious Emission

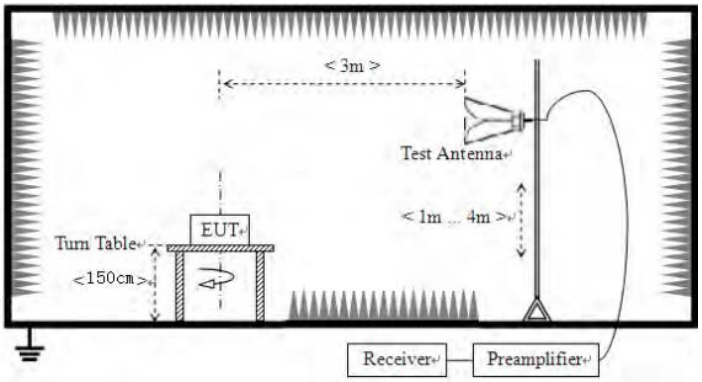
7.8.1 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9kHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</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><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="4">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
</table>
<table>
<tr><th>Frequency</th><th>Limit (dBm/MHz)</th><th>Remark</th></tr>
<tr><td>Above 1GHz</td><td>-27.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 

For radiated emissions from 30MHz to1GHz</td></tr>
</table>



For radiated emissions above 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 rota 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. 7. The radiation measurements are performed in X, Y, Z axis positioning.

	And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.					
Test Instruments:	Refer to section 6.0 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					

Remarks:

1. *Only the worst case Main Antenna test data.*
2. *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.

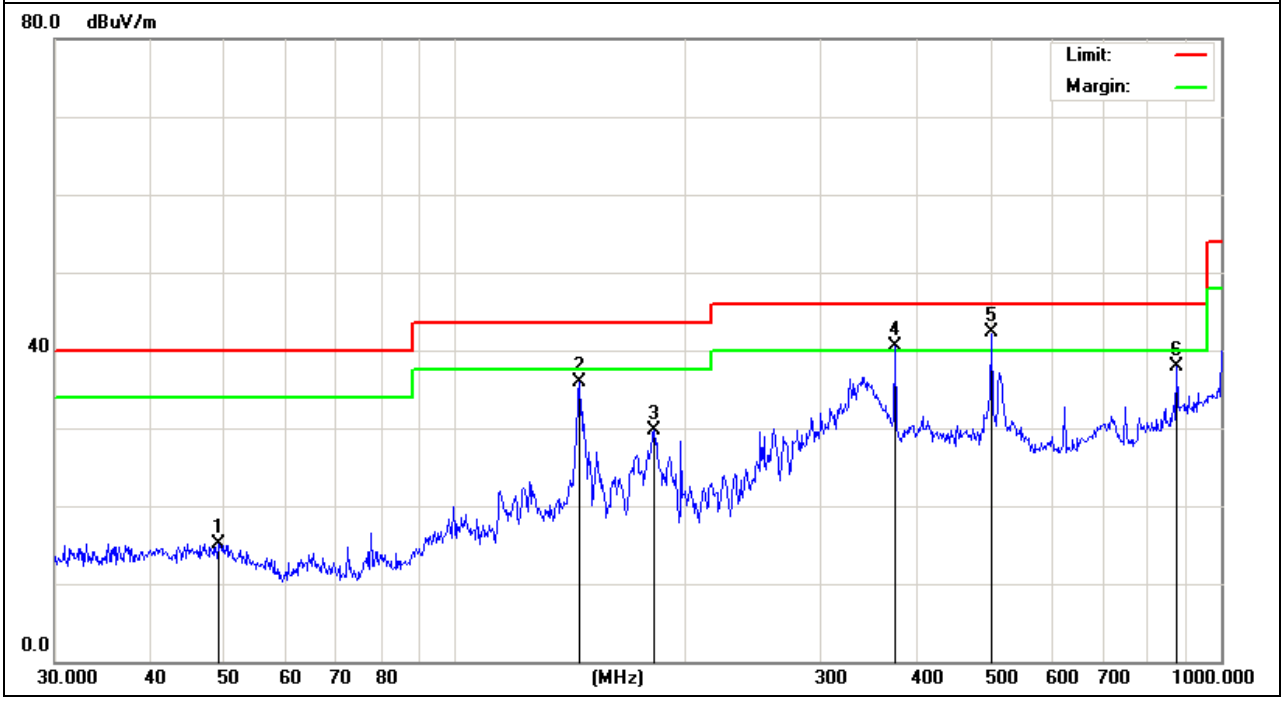
Below 1GHz

Pre-scan all test modes, found worst case at 802.11ac(HT80), and so only show the test result of 802.11ac(HT80)

Horizontal:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
49.0145	29.28	-14.21	15.07	40.00	-24.93	Quasi-Peak
145.3506	51.16	-15.28	35.88	43.50	-7.62	Quasi-Peak
181.9202	41.24	-11.58	29.66	43.50	-13.84	Quasi-Peak
375.9385	48.00	-7.54	40.46	46.00	-5.54	Quasi-Peak
501.1789	47.83	-5.61	42.22	46.00	-3.78	Quasi-Peak
875.2470	35.75	2.21	37.96	46.00	-8.04	Quasi-Peak

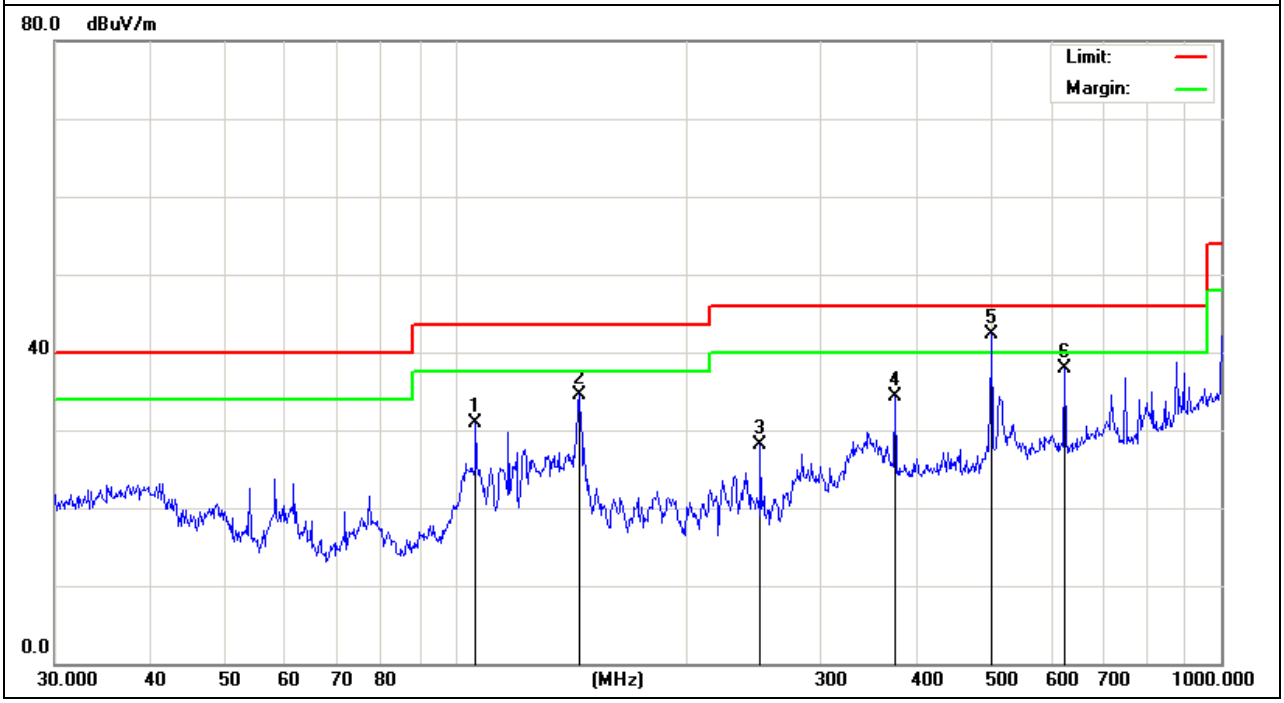
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier.



Vertical:

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)	
106.3850	44.35	-13.50	30.85	43.50	-12.65	Quasi-Peak
145.3506	50.56	-16.09	34.47	43.50	-9.03	Quasi-Peak
250.3012	41.75	-13.57	28.18	46.00	-17.82	Quasi-Peak
375.9385	41.82	-7.54	34.28	46.00	-11.72	Quasi-Peak
501.1789	48.01	-5.61	42.40	46.00	-3.60	Quasi-Peak
625.0780	39.90	-1.97	37.93	46.00	-8.07	Quasi-Peak

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



Above 1GHz:

802.11a,11n(HT20),11ac(HT20),11n(HT40),11ac(HT40),11ac(HT80) all have been tested,
Only the data of worst case at each channel plan (nominal bandwidth =20MHz, 40MHz, 80MHz) is reported.

Test mode:		802.11a		Test channel:		lowest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11490	31.92	15.77	47.69	74.00	-26.31	PK
V	17235	32.57	16.16	48.73	74.00	-25.27	PK
H	11490	31.48	15.77	47.25	74.00	-26.75	PK
H	17235	32.26	16.16	48.42	74.00	-25.58	PK

Test mode:		802.11a		Test channel:		Middle	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11570	31.33	15.91	47.24	74.00	-26.76	PK
V	17355	33.08	17.02	50.10	74.00	-23.90	PK
H	11570	30.49	15.91	46.40	74.00	-27.60	PK
H	17355	32.88	17.02	49.90	74.00	-24.10	PK

Test mode:		802.11a		Test channel:		Highest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11650	30.76	15.91	46.67	74.00	-27.33	PK
V	17475	32.29	17.02	49.31	74.00	-24.69	PK
H	11650	31.40	15.91	47.31	74.00	-26.69	PK
H	17475	33.36	17.02	50.38	74.00	-23.62	PK

Test mode:		802.11ac(HT40)		Test channel:		Lowest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11510	32.26	15.81	48.07	74.00	-25.93	PK
V	17265	31.93	16.25	48.18	74.00	-25.82	PK
H	11510	32.08	15.81	47.89	74.00	-26.11	PK
H	17265	33.37	16.25	49.62	74.00	-24.38	PK

Test mode:		802.11ac(HT40)		Test channel:		Highest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11590	31.19	15.81	47.00	74.00	-27.00	PK
V	17385	32.08	16.25	48.33	74.00	-25.67	PK
H	11590	30.27	15.81	46.08	74.00	-27.92	PK
H	17385	32.46	16.25	48.71	74.00	-25.29	PK

Test mode:		802.11ac(HT80)		Test channel:		Middle	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11550	31.16	15.85	47.01	74.00	-26.99	PK
V	17325	32.53	16.30	48.83	74.00	-25.17	PK
H	11550	30.77	15.85	46.62	74.00	-27.38	PK
H	17325	33.54	16.30	49.84	74.00	-24.16	PK

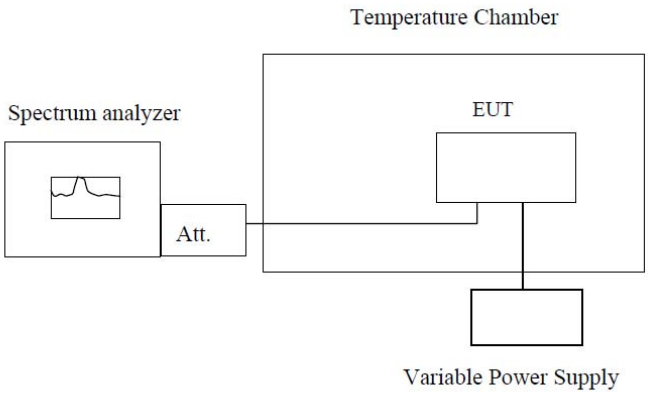
Notes:

1. Measure Level = Reading Level + 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:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
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

Measurement data:

HT 20MHz					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
-20	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
-10	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
0	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
10	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
20	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
30	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
40	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
50	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
108	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
120	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025
132	5745	5745.0015	5745.0015	5745.0015	5745.0015
	5785	5785.0008	5785.0008	5785.0008	5785.0008
	5825	5825.0025	5825.0025	5825.0025	5825.0025

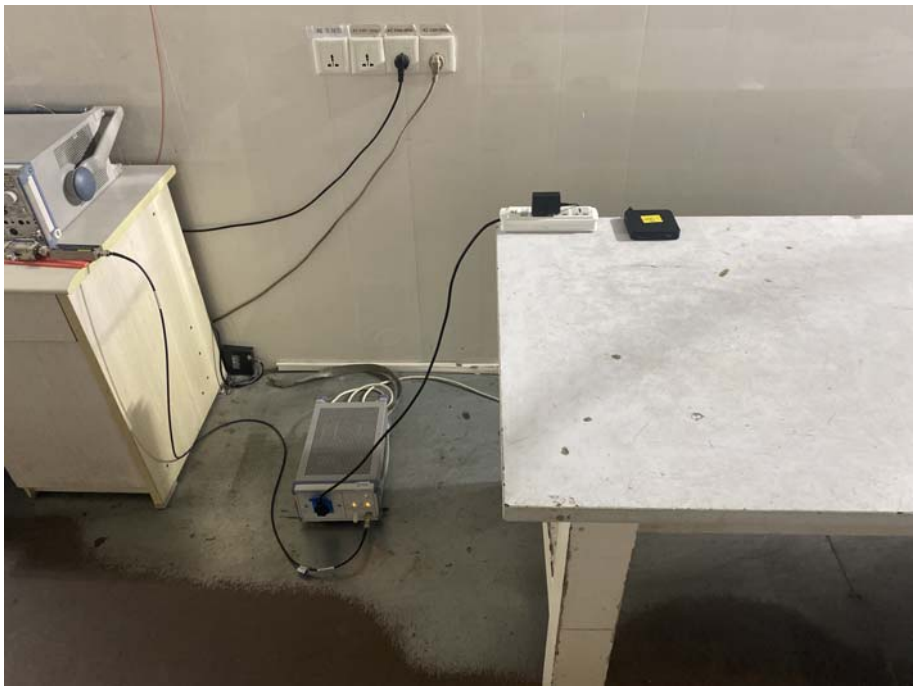
HT40 MHz					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
-20	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
-10	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
0	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
10	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
20	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
30	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
40	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
50	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005

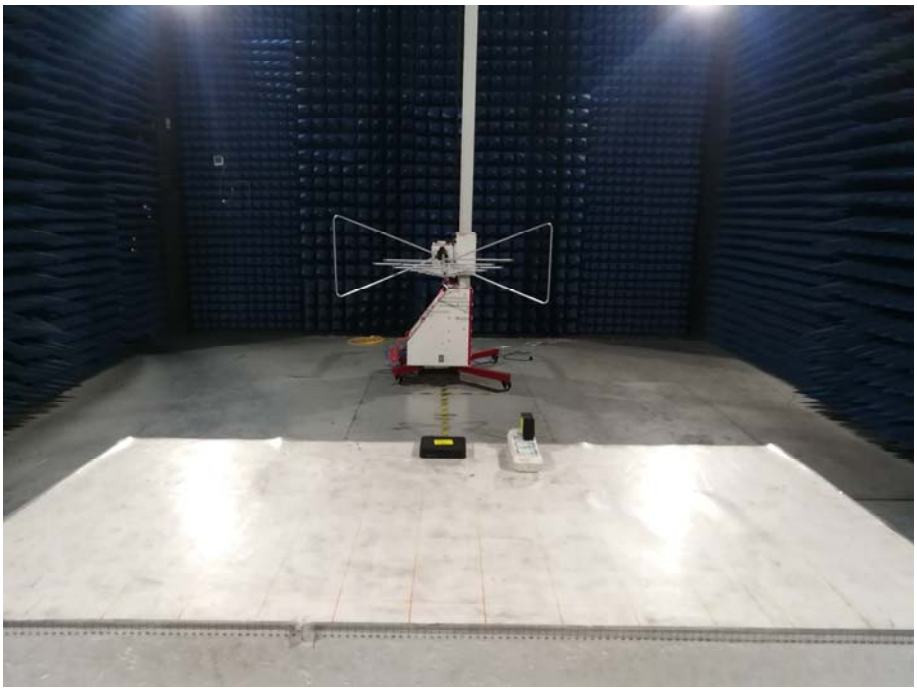
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
108	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
120	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005
132	5755	5755.0010	5755.0010	5755.0010	5755.0010
	5795	5795.0005	5795.0005	5795.0005	5795.0005

HT80 MHz					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5775	5775.0012	5775.0012	5775.0012	5775.0012
-20	5775	5775.0012	5775.0012	5775.0012	5775.0012
-10	5775	5775.0012	5775.0012	5775.0012	5775.0012
0	5775	5775.0012	5775.0012	5775.0012	5775.0012
10	5775	5775.0012	5775.0012	5775.0012	5775.0012
20	5775	5775.0012	5775.0012	5775.0012	5775.0012
30	5775	5775.0012	5775.0012	5775.0012	5775.0012
40	5775	5775.0012	5775.0012	5775.0012	5775.0012
50	5775	5775.0012	5775.0012	5775.0012	5775.0012

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
108	5775	5775.0012	5775.0012	5775.0012	5775.0012
120	5775	5775.0012	5775.0012	5775.0012	5775.0012
132	5775	5775.0012	5775.0012	5775.0012	5775.0012

8 Test Setup Photo





9 EUT Constructional Details

Reference to the report No.GTS202004000149F01.

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