

# FCC REPORT

**Applicant:** Shenzhen Arashi Vision Company Limited

**Address of Applicant:** 6/F, Building A, Logan Century Center Haixiu Road, Bao an District, Shenzhen, Guangdong 518000, China

**Manufacturer/Factory:** Shenzhen Arashi Vision Company Limited

**Address of Manufacturer/Factory:** 6/F, Building A, Logan Century Center Haixiu Road, Bao an District, Shenzhen, Guangdong 518000, China

**Equipment Under Test (EUT)**

Product Name: Insta360 Titan

Model No.: TINTITA/A, TINTITA

Trade Mark: Insta360

**FCC ID:** 2AFSH-TINTITA-A

**Applicable standards:** FCC CFR Title 47 Part 15 Subpart E Section 15.407

**Date of sample receipt:** April 10, 2019

**Date of Test:** April 11-24, 2019

**Date of report issued:** April 25, 2019

**Test Result :** PASS \*

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

Authorized Signature:



**Robinson Lo**

**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	April 25, 2019	Original

Prepared By:

*Bill. Yuan*  
Project Engineer

Date:

April 25, 2019

Check By:

*Robinson*  
Reviewer

Date:

April 25, 2019

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## 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

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

Remark: Test according to ANSI C63.10:2013.

### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 4.54\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 5.34\text{dB}$	(1)
Radiated Emission	1GHz ~ 40GHz	$\pm 5.34\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.44\text{dB}$	(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:	Insta360 Titan
Model No.:	TINTITA/A, TINTITA
Test Model No:	TINTITA/A
<i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.</i>	
Serial No.:	ITGWWYYNXXXXXX
Hardware Version:	Titan_MB_V0.7
Software Version:	V: X.X.X
Test Sample(s) ID:	GTS201904000074-1
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)
Antenna Type:	External Antenna
Antenna Gain:	2.00dBi(declare by applicant)
Power Supply:	Adapter Model: HKA18019095-7A Input: AC 100-240V, 50/60Hz, 3A Max Output: DC 19V, 9.47A Or Battery: DC 14.4V

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
<i>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.</i>	

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 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.

- **Industry Canada (IC) —Registration No.: 9079A-2**

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-2.

- **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

## 5.5 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 301-309, 3/F., Jinyuan Business Building, No.2, Laodong Industrial Zone,

Xixiang Road, Baoan District, Shenzhen, Guangdong, China

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. 27 2018	June. 26 2019
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 27 2018	June. 26 2019
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 27 2018	June. 26 2019
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 27 2018	June. 26 2019
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 27 2018	June. 26 2019
9	Coaxial Cable	GTS	N/A	GTS211	June. 27 2018	June. 26 2019
10	Coaxial cable	GTS	N/A	GTS210	June. 27 2018	June. 26 2019
11	Coaxial Cable	GTS	N/A	GTS212	June. 27 2018	June. 26 2019
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 27 2018	June. 26 2019
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 27 2018	June. 26 2019
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 27 2018	June. 26 2019
15	Band filter	Amindeon	82346	GTS219	June. 27 2018	June. 26 2019
16	Power Meter	Anritsu	ML2495A	GTS540	June. 27 2018	June. 26 2019
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 27 2018	June. 26 2019
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 27 2018	June. 26 2019
19	Splitter	Agilent	11636B	GTS237	June. 27 2018	June. 26 2019
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 27 2018	June. 26 2019
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 27 2018	June. 26 2019



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.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 27 2018	June. 26 2019
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 27 2018	June. 26 2019
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. 27 2018	June. 26 2019
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 27 2018	June. 26 2019

Conducted:						
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. 27 2018	June. 26 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 27 2018	June. 26 2019
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 27 2018	June. 26 2019
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 27 2018	June. 26 2019
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 27 2018	June. 26 2019
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 27 2018	June. 26 2019
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 27 2018	June. 26 2019

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. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

## 7 Test results and Measurement Data

### 7.1 Antenna requirement

<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<i>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.</i>	
<b>E.U.T Antenna:</b>	
<i>The antenna is external antenna, the best case gain of the antenna is 2.0dBi, reference to the appendix I for details.</i>	

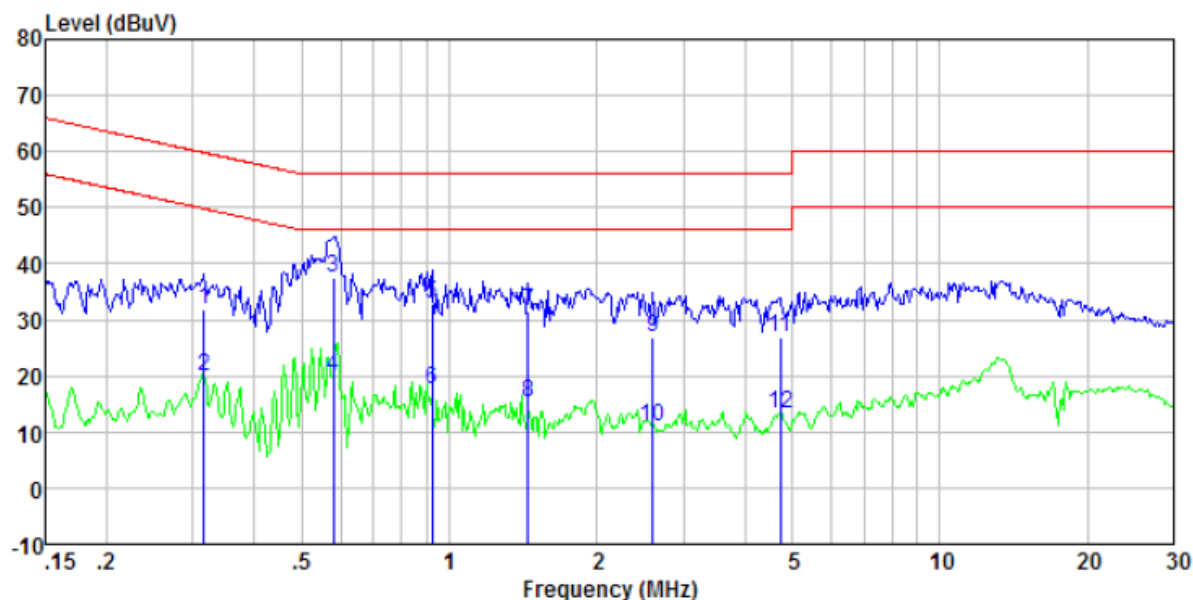
## 7.2 Conducted Emissions

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:	<div><p>Reference Plane</p><p>Test table/Insulation plane</p></div>		
	<p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>		
Test procedure:	<div><ol style="list-style-type: none"><li>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.</li><li>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).</li><li>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.</li></ol></div>		
Test Instruments:	Refer to section 6.0 for details		
Test mode:	Refer to section 5.2 for details		
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.

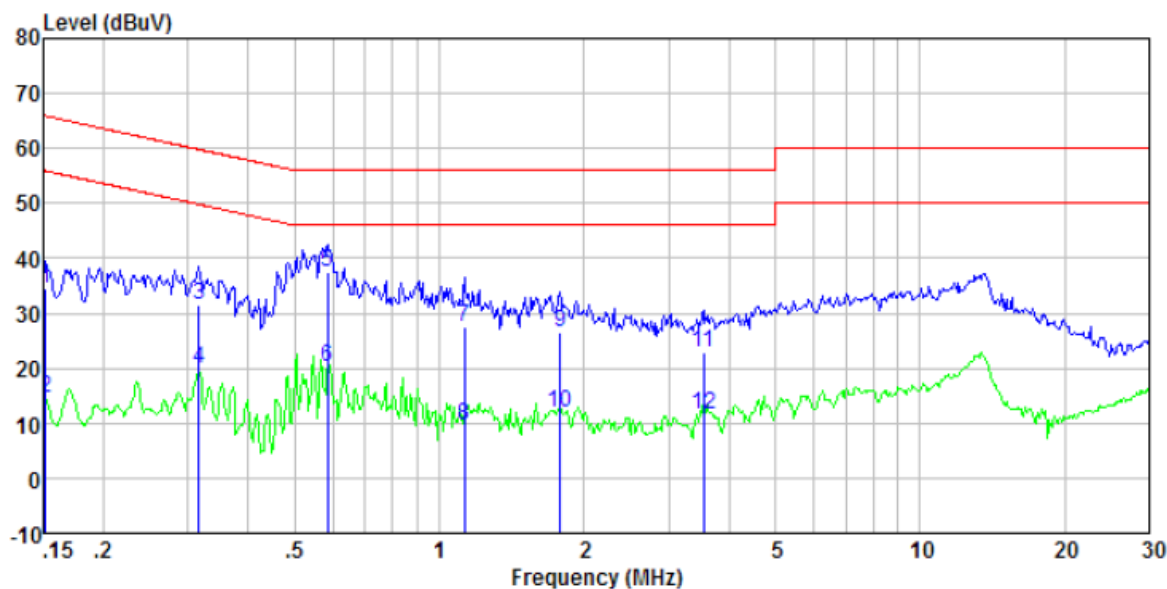
## Measurement data

Mode:	Transmitting mode	Test by:	Bill
Temp./Hum.(%RH):	26°C/56%RH	Probe:	Line



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.32	31.43	0.39	0.10	31.92	59.80	-27.88	QP
0.32	19.45	0.39	0.10	19.94	49.80	-29.86	Average
0.58	37.25	0.29	0.12	37.66	56.00	-18.34	QP
0.58	19.40	0.29	0.12	19.81	46.00	-26.19	Average
0.92	32.64	0.21	0.15	33.00	56.00	-23.00	QP
0.92	17.18	0.21	0.15	17.54	46.00	-28.46	Average
1.45	31.20	0.20	0.16	31.56	56.00	-24.44	QP
1.45	14.89	0.20	0.16	15.25	46.00	-30.75	Average
2.59	26.36	0.20	0.18	26.74	56.00	-29.26	QP
2.59	10.47	0.20	0.18	10.85	46.00	-35.15	Average
4.72	26.52	0.20	0.17	26.89	56.00	-29.11	QP
4.72	12.90	0.20	0.17	13.27	46.00	-32.73	Average

<b>Mode:</b>	<b>Transmitting mode</b>	<b>Test by:</b>	<b>Bill</b>
<b>Temp./Hum.(%RH):</b>	<b>26°C/56%RH</b>	<b>Probe:</b>	<b>Neutral</b>

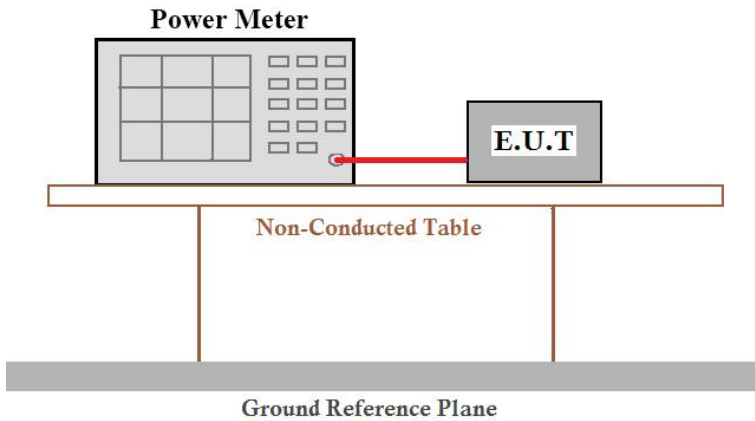


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	34.10	0.40	0.07	34.57	65.91	-31.34	QP
0.15	14.26	0.40	0.07	14.73	55.91	-41.18	Average
0.32	31.07	0.39	0.10	31.56	59.80	-28.24	QP
0.32	19.47	0.39	0.10	19.96	49.80	-29.84	Average
0.59	37.06	0.29	0.12	37.47	56.00	-18.53	QP
0.59	19.84	0.29	0.12	20.25	46.00	-25.75	Average
1.13	27.20	0.20	0.15	27.55	56.00	-28.45	QP
1.13	9.41	0.20	0.15	9.76	46.00	-36.24	Average
1.78	26.03	0.20	0.17	26.40	56.00	-29.60	QP
1.78	11.39	0.20	0.17	11.76	46.00	-34.24	Average
3.55	22.33	0.20	0.18	22.71	56.00	-33.29	QP
3.55	11.05	0.20	0.18	11.43	46.00	-34.57	Average

## 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

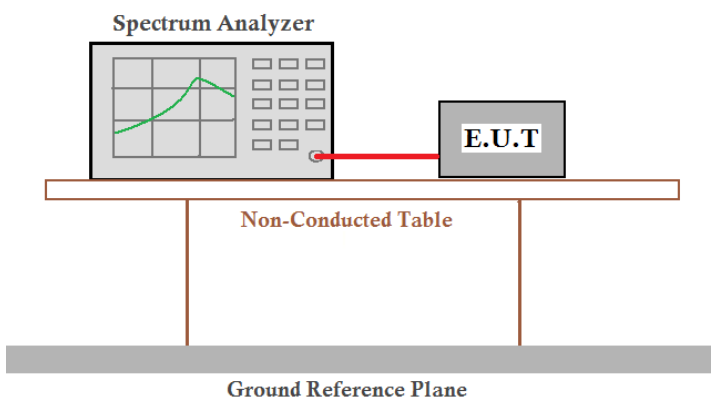
Test Requirement:	FCC Part15 E Section 15.407(a)(3)
Test Method:	ANSI C63.10:2013 and KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	30dBm
Test setup:	 <p>The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
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	10.65	10.59	10.13	8.36	8.19	---	30.00	Pass
Middle	10.77	10.52	10.25	---	---	7.65		
Highest	10.71	10.23	10.29	8.86	8.15	---		

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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

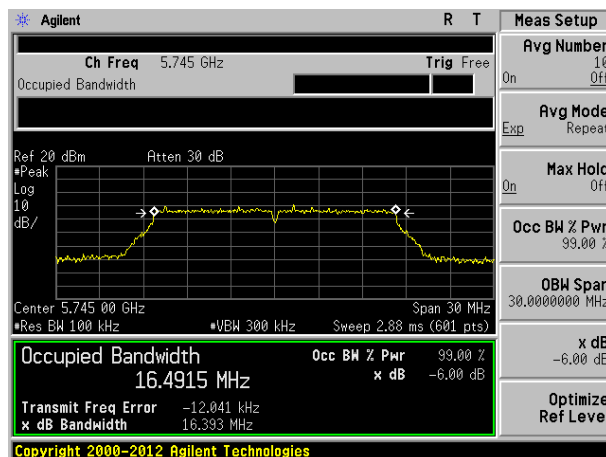
## Measurement Data

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	16.393	17.644	17.635	36.392	36.060	---	>500	Pass
Middle	16.394	17.634	17.679	---	---	75.417		
Highest	16.392	17.654	17.635	36.385	36.470	---		

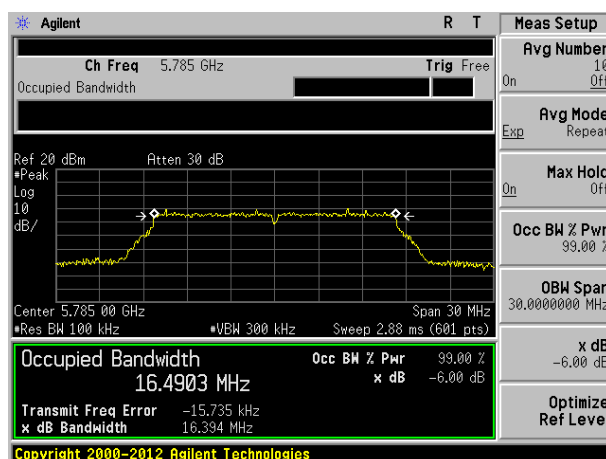
Remark: “---” is not applicable

Test plot as follows:

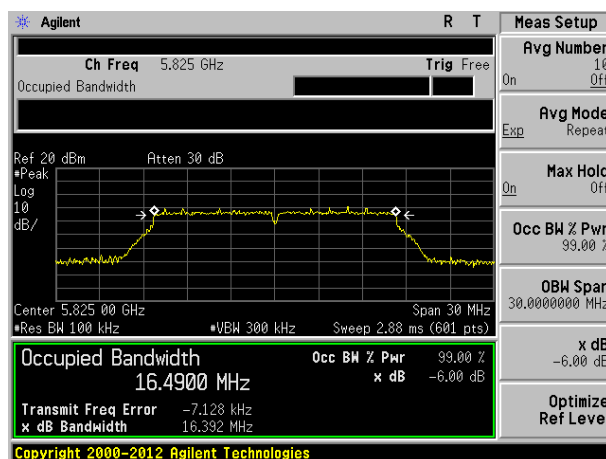
Test mode: 802.11a



Lowest channel



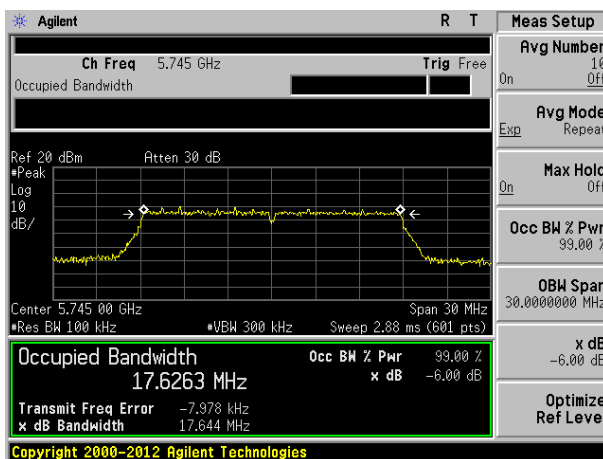
Middle channel



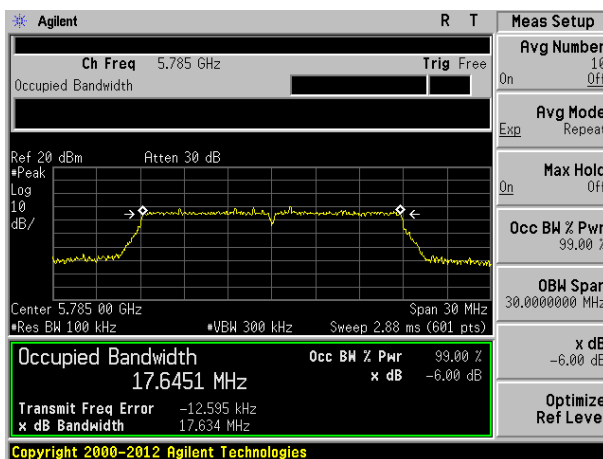
Highest channel



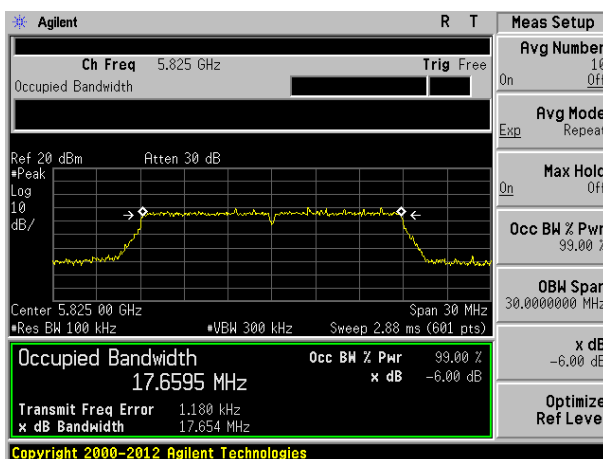
Test mode: 802.11n(HT20)



Lowest channel

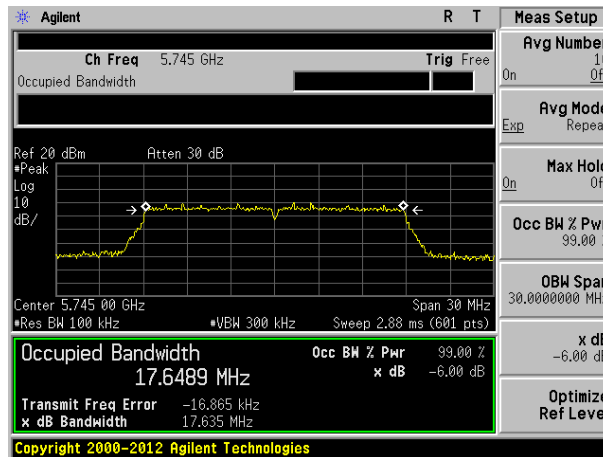


Middle channel

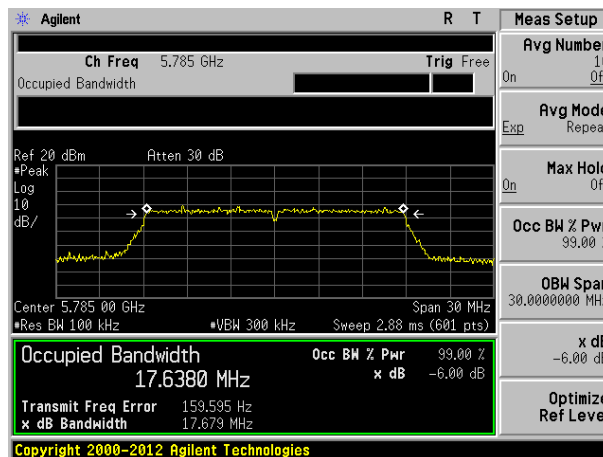


Highest channel

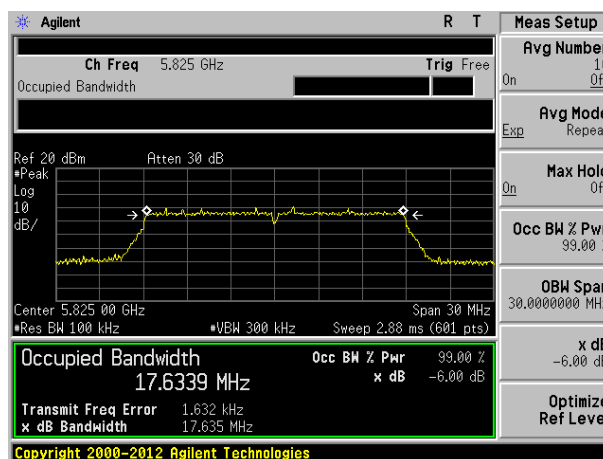
Test mode: 802.11ac(HT20)



Lowest channel

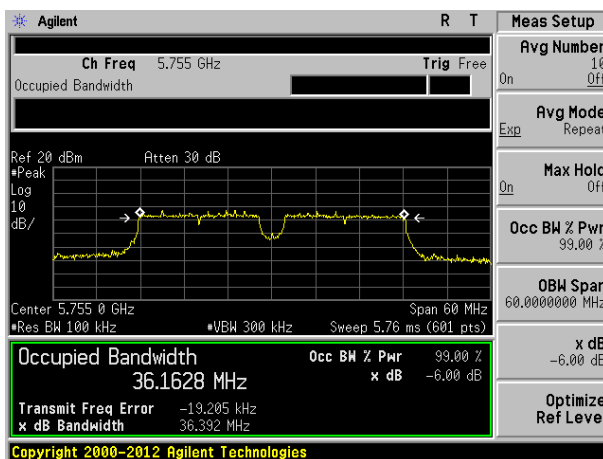


Middle channel

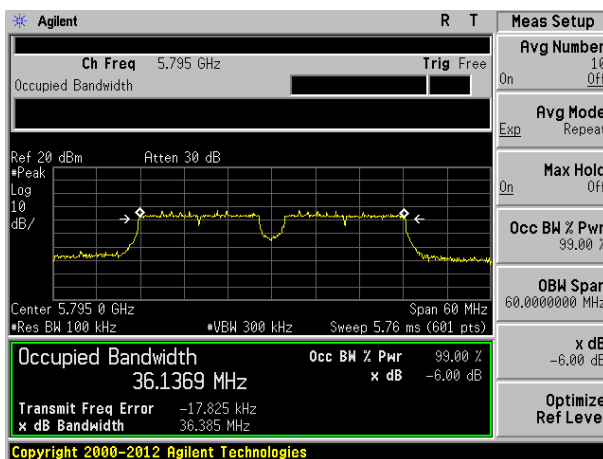


Highest channel

Test mode: 802.11n(HT40)

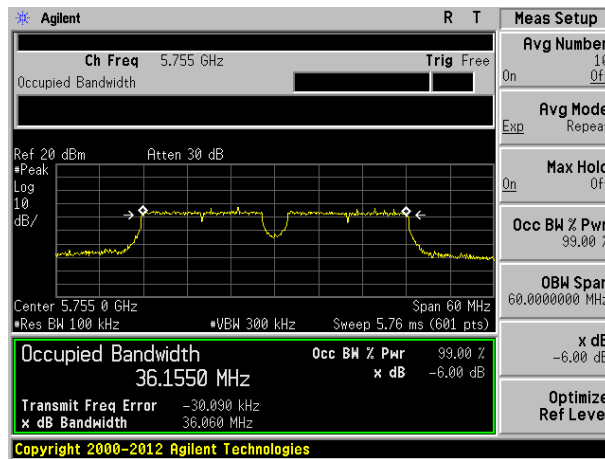


Lowest channel

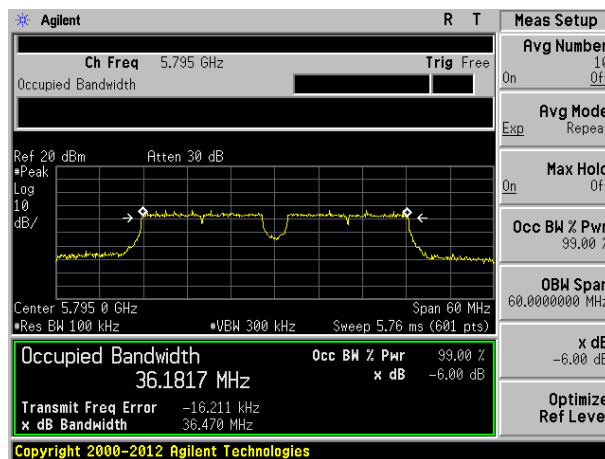


Highest channel

Test mode:802.11ac(HT40)

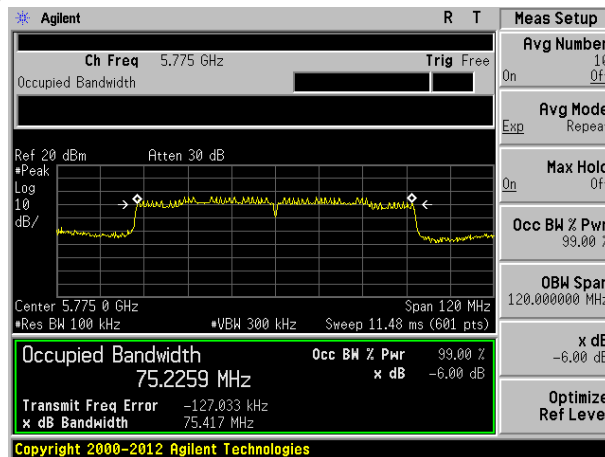


Lowest channel

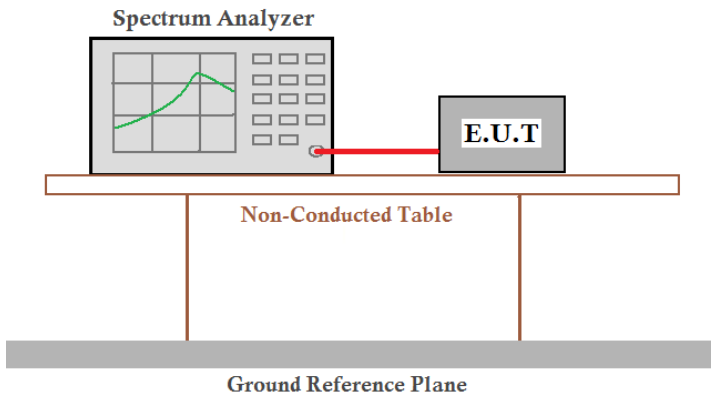


Highest channel

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:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Spectrum Analyzer and the E.U.T. are placed on a Non-Conducted Table. The table is supported by a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

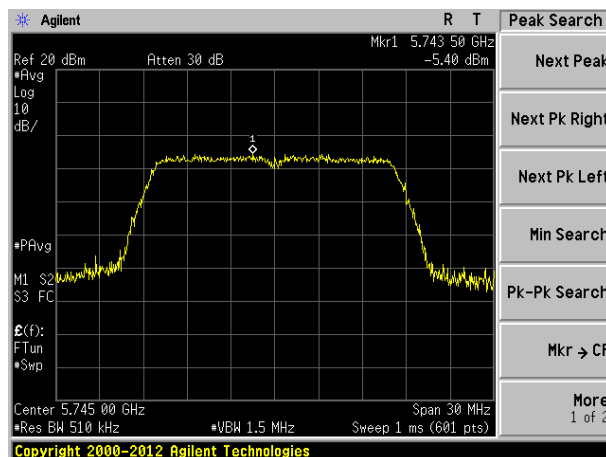
### Measurement Data

Test CH	Power Spectral Density (dBm)						Limit (dBm/500k Hz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	-5.40	-5.26	-5.59	-8.40	-7.45	---	30.00	Pass
Middle	-5.07	-5.69	-5.53	---	---	-12.16		
Highest	-4.96	-5.22	-5.25	-8.77	-8.08	---		

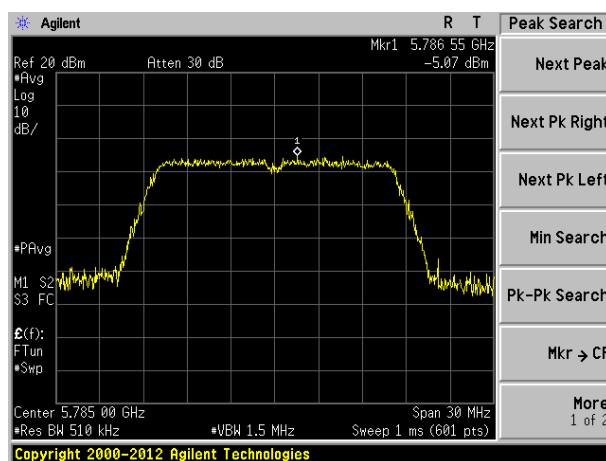
Remark: "---" is not applicable

## Test plot as follows:

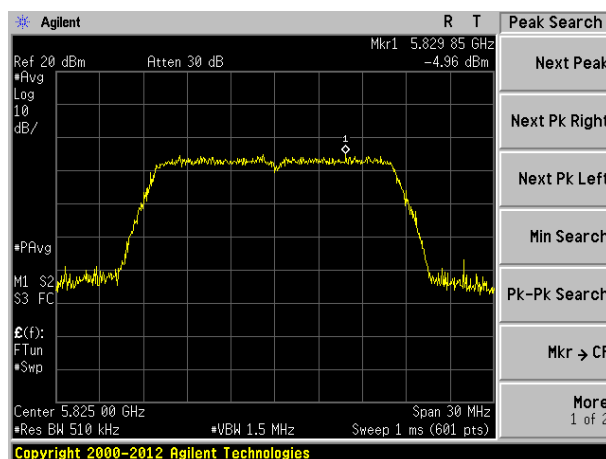
Test mode: 802.11a



Lowest channel

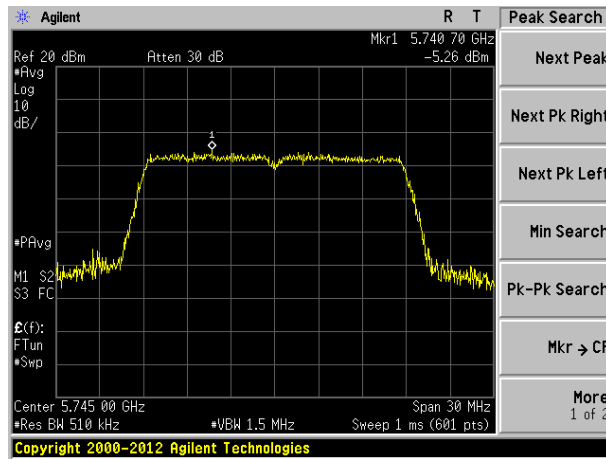


Middle channel

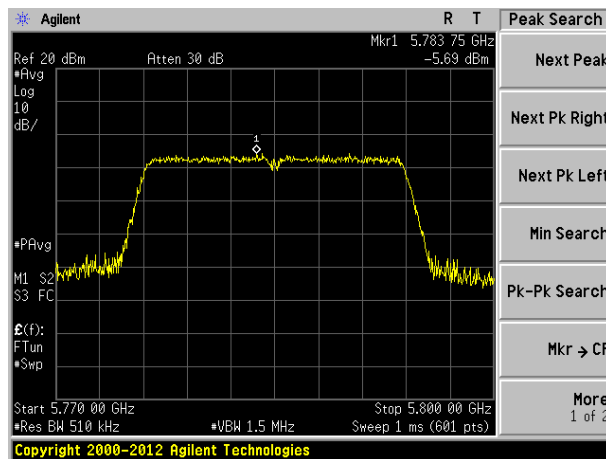


Highest channel

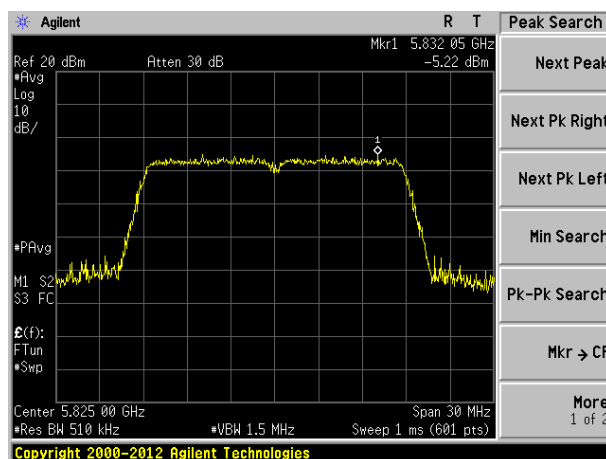
Test mode: 802.11n(HT20) @ 5.8G Band



Lowest channel

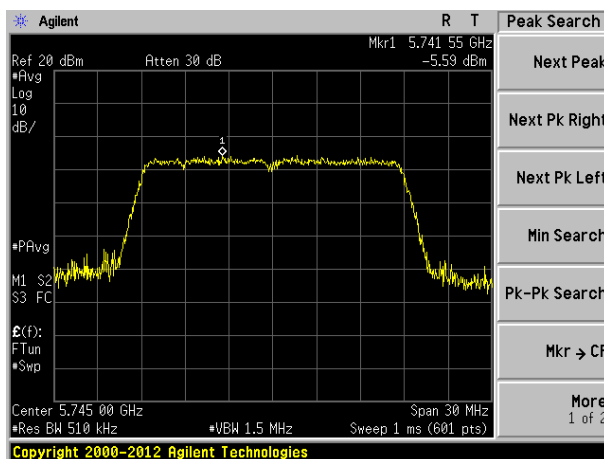


Middle channel

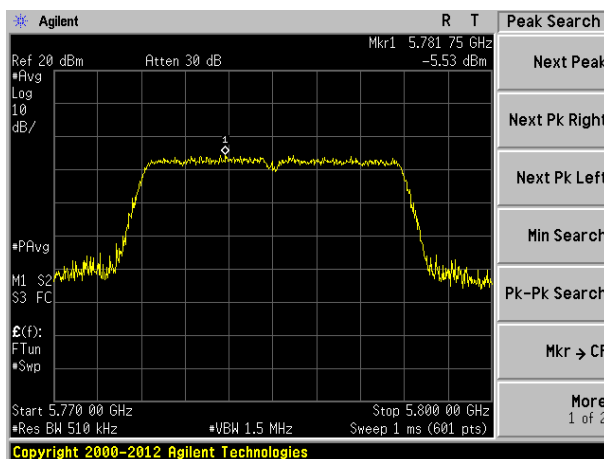


Highest channel

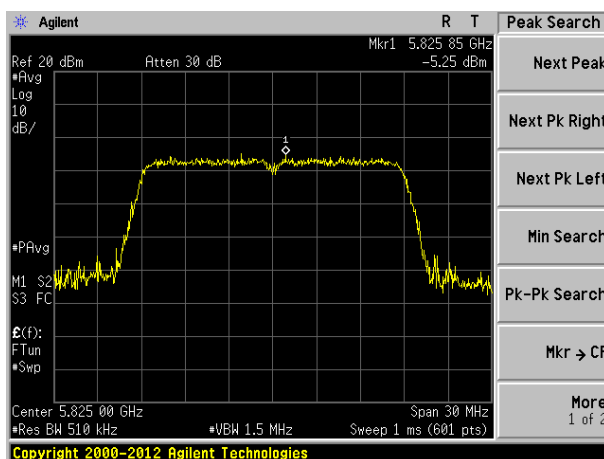
Test mode: 802.11ac(HT20)



Lowest channel



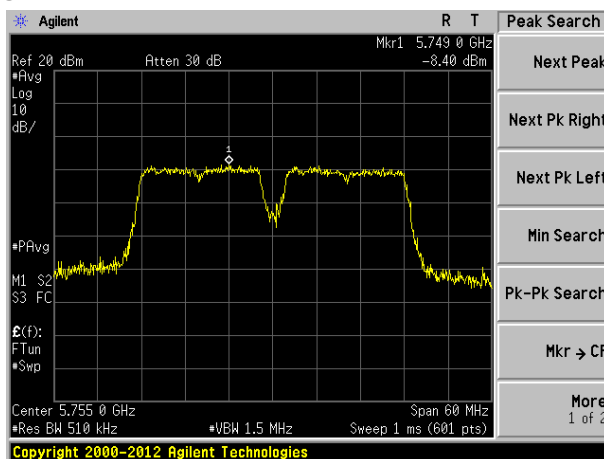
Middle channel



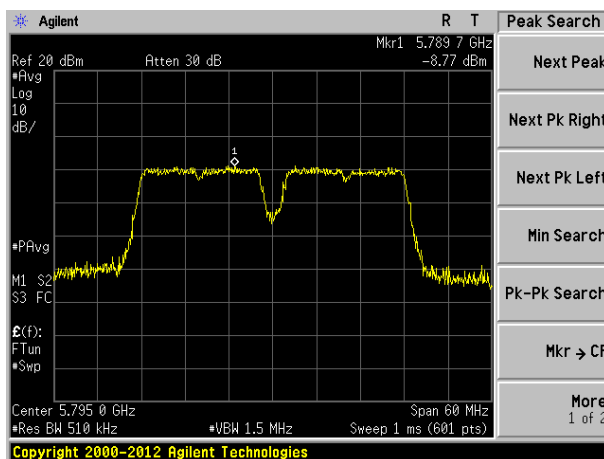
Highest channel



Test mode: 802.11n(HT40) @ 5.8G Band

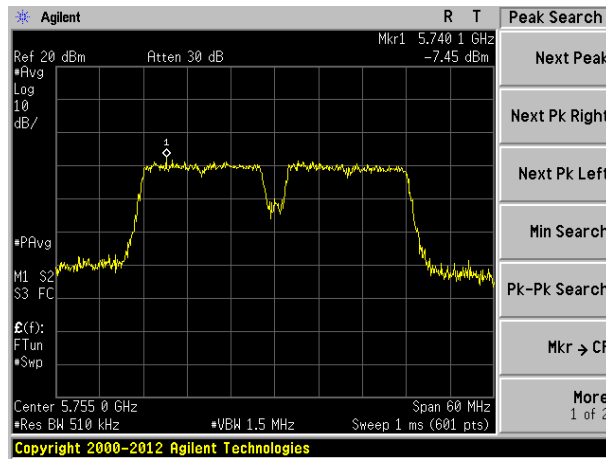


Lowest channel

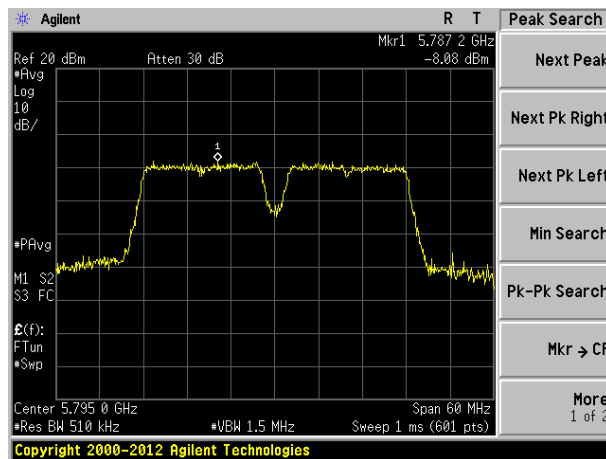


Highest channel

Test mode: 802.11ac(HT40)

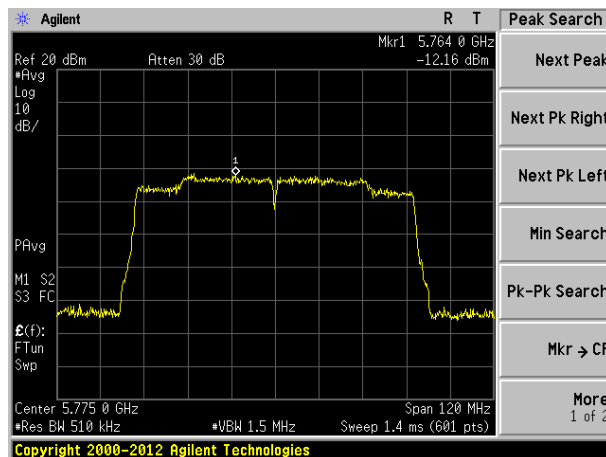


Lowest channel



Highest channel

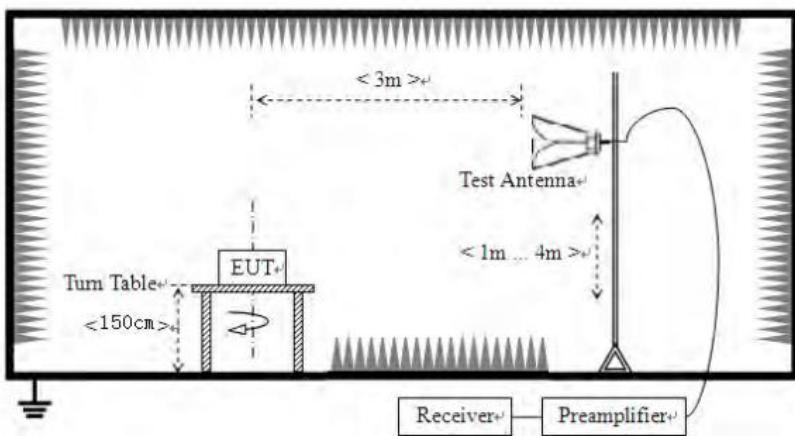
Test mode: 802.11ac(HT80)



Middle channel

## 7.6 Band edges

### 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
		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:	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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</li> </ol>				

	<p>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.</p> <p>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.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test voltage:	AC 120V, 60Hz
Test results:	Pass

## Remarks:

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. *The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.*
4. *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:*

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$$

$$E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$$

$$E[\text{dBuV/m}] = 10 + 95.2 = 105.2\text{dBuV/m}.$$

$$E[\text{dBuV/m}] = 15.6 + 95.2 = 110.8\text{dBuV/m}.$$

$$E[\text{dBuV/m}] = 27 + 95.2 = 122.2\text{dBuV/m}$$

## Measurement data:

Remark: The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.

IEEE 802.11a								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.01	32.36	9.72	23.83	55.26	68.20	-12.94	Horizontal
5700.00	37.41	32.50	9.79	23.84	55.86	105.20	-49.34	Horizontal
5720.00	37.58	32.53	9.81	23.85	56.07	110.80	-54.73	Horizontal
5725.00	41.65	32.53	9.83	23.86	60.15	122.20	-62.05	Horizontal
5850.00	37.86	32.70	9.99	23.87	56.68	122.20	-65.52	Horizontal
5855.00	35.82	32.72	9.99	23.88	54.65	110.80	-56.15	Horizontal
5875.00	37.11	32.74	10.04	23.89	56.00	105.20	-49.20	Horizontal
5925.00	37.18	32.80	10.11	23.90	56.19	68.20	-12.01	Horizontal
5650.00	37.31	32.36	9.72	23.83	55.56	68.20	-12.64	Vertical
5700.00	35.88	32.50	9.79	23.84	54.33	105.20	-50.87	Vertical
5720.00	37.23	32.53	9.81	23.85	55.72	110.80	-55.08	Vertical
5725.00	40.24	32.53	9.83	23.86	58.74	122.20	-63.46	Vertical
5850.00	39.57	32.70	9.99	23.87	58.39	122.20	-63.81	Vertical
5855.00	36.03	32.72	9.99	23.88	54.86	110.80	-55.94	Vertical
5875.00	36.88	32.74	10.04	23.89	55.77	105.20	-49.43	Vertical
5925.00	37.41	32.80	10.11	23.90	56.42	68.20	-11.78	Vertical

IEEE 802.11a								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	24.87	32.36	9.72	23.83	43.12	54.00	-10.88	Horizontal
5700.00	25.06	32.50	9.79	23.84	43.51	54.00	-10.49	Horizontal
5720.00	24.18	32.53	9.81	23.85	42.67	54.00	-11.33	Horizontal
5725.00	28.83	32.53	9.83	23.86	47.33	54.00	-6.67	Horizontal
5850.00	28.14	32.70	9.99	23.87	46.96	54.00	-7.04	Horizontal
5855.00	25.45	32.72	9.99	23.88	44.28	54.00	-9.72	Horizontal
5875.00	24.73	32.74	10.04	23.89	43.62	54.00	-10.38	Horizontal
5925.00	25.12	32.80	10.11	23.90	44.13	54.00	-9.87	Horizontal
5650.00	24.91	32.36	9.72	23.83	43.16	54.00	-10.84	Vertical
5700.00	25.19	32.50	9.79	23.84	43.64	54.00	-10.36	Vertical
5720.00	25.21	32.53	9.81	23.85	43.70	54.00	-10.30	Vertical
5725.00	28.84	32.53	9.83	23.86	47.34	54.00	-6.66	Vertical
5850.00	28.23	32.70	9.99	23.87	47.05	54.00	-6.95	Vertical
5855.00	24.64	32.72	9.99	23.88	43.47	54.00	-10.53	Vertical
5875.00	24.82	32.74	10.04	23.89	43.71	54.00	-10.29	Vertical
5925.00	25.14	32.80	10.11	23.90	44.15	54.00	-9.85	Vertical

IEEE 802.11n(HT20)								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	36.52	32.36	9.72	23.83	54.77	68.20	-13.43	Horizontal
5700.00	37.30	32.50	9.79	23.84	55.75	105.20	-49.45	Horizontal
5720.00	37.46	32.53	9.81	23.85	55.95	110.80	-54.85	Horizontal
5725.00	41.40	32.53	9.83	23.86	59.90	122.20	-62.30	Horizontal
5850.00	39.12	32.70	9.99	23.87	57.94	122.20	-64.26	Horizontal
5855.00	37.09	32.72	9.99	23.88	55.92	110.80	-54.88	Horizontal
5875.00	36.58	32.74	10.04	23.89	55.47	105.20	-49.73	Horizontal
5925.00	36.49	32.80	10.11	23.90	55.50	68.20	-12.70	Horizontal
5650.00	37.22	32.36	9.72	23.83	55.47	68.20	-12.73	Vertical
5700.00	37.26	32.50	9.79	23.84	55.71	105.20	-49.49	Vertical
5720.00	36.13	32.53	9.81	23.85	54.62	110.80	-56.18	Vertical
5725.00	39.86	32.53	9.83	23.86	58.36	122.20	-63.84	Vertical
5850.00	39.02	32.70	9.99	23.87	57.84	122.20	-64.36	Vertical
5855.00	36.52	32.72	9.99	23.88	55.35	110.80	-55.45	Vertical
5875.00	36.89	32.74	10.04	23.89	55.78	105.20	-49.42	Vertical
5925.00	36.38	32.80	10.11	23.90	55.39	68.20	-12.81	Vertical

IEEE 802.11n(HT20)								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	25.61	32.36	9.72	23.83	43.86	54.00	-10.14	Horizontal
5700.00	25.64	32.50	9.79	23.84	44.09	54.00	-9.91	Horizontal
5720.00	25.67	32.53	9.81	23.85	44.16	54.00	-9.84	Horizontal
5725.00	30.13	32.53	9.83	23.86	48.63	54.00	-5.37	Horizontal
5850.00	28.39	32.70	9.99	23.87	47.21	54.00	-6.79	Horizontal
5855.00	25.89	32.72	9.99	23.88	44.72	54.00	-9.28	Horizontal
5875.00	25.43	32.74	10.04	23.89	44.32	54.00	-9.68	Horizontal
5925.00	25.55	32.80	10.11	23.90	44.56	54.00	-9.44	Horizontal
5650.00	25.34	32.36	9.72	23.83	43.59	54.00	-10.41	Vertical
5700.00	25.69	32.50	9.79	23.84	44.14	54.00	-9.86	Vertical
5720.00	25.64	32.53	9.81	23.85	44.13	54.00	-9.87	Vertical
5725.00	29.66	32.53	9.83	23.86	48.16	54.00	-5.84	Vertical
5850.00	28.31	32.70	9.99	23.87	47.13	54.00	-6.87	Vertical
5855.00	25.61	32.72	9.99	23.88	44.44	54.00	-9.56	Vertical
5875.00	25.36	32.74	10.04	23.89	44.25	54.00	-9.75	Vertical
5925.00	25.61	32.80	10.11	23.90	44.62	54.00	-9.38	Vertical



IEEE 802.11ac(HT20)								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	36.84	32.36	9.72	23.83	55.09	68.20	-13.11	Horizontal
5700.00	36.77	32.50	9.79	23.84	55.22	105.20	-49.98	Horizontal
5720.00	36.59	32.53	9.81	23.85	55.08	110.80	-55.72	Horizontal
5725.00	40.48	32.53	9.83	23.86	58.98	122.20	-63.22	Horizontal
5850.00	39.17	32.70	9.99	23.87	57.99	122.20	-64.21	Horizontal
5855.00	37.03	32.72	9.99	23.88	55.86	110.80	-54.94	Horizontal
5875.00	36.49	32.74	10.04	23.89	55.38	105.20	-49.82	Horizontal
5925.00	36.50	32.80	10.11	23.90	55.51	68.20	-12.69	Horizontal
5650.00	36.64	32.36	9.72	23.83	54.89	68.20	-13.31	Vertical
5700.00	36.86	32.50	9.79	23.84	55.31	105.20	-49.89	Vertical
5720.00	37.10	32.53	9.81	23.85	55.59	110.80	-55.21	Vertical
5725.00	39.96	32.53	9.83	23.86	58.46	122.20	-63.74	Vertical
5850.00	39.19	32.70	9.99	23.87	58.01	122.20	-64.19	Vertical
5855.00	36.70	32.72	9.99	23.88	55.53	110.80	-55.27	Vertical
5875.00	36.67	32.74	10.04	23.89	55.56	105.20	-49.64	Vertical
5925.00	36.82	32.80	10.11	23.90	55.83	68.20	-12.37	Vertical

IEEE 802.11ac(HT20)								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	26.20	32.36	9.72	23.83	44.45	54.00	-9.55	Horizontal
5700.00	26.86	32.50	9.79	23.84	45.31	54.00	-8.69	Horizontal
5720.00	25.64	32.53	9.81	23.85	44.13	54.00	-9.87	Horizontal
5725.00	29.89	32.53	9.83	23.86	48.39	54.00	-5.61	Horizontal
5850.00	29.02	32.70	9.99	23.87	47.84	54.00	-6.16	Horizontal
5855.00	26.11	32.72	9.99	23.88	44.94	54.00	-9.06	Horizontal
5875.00	25.61	32.74	10.04	23.89	44.50	54.00	-9.50	Horizontal
5925.00	25.88	32.80	10.11	23.90	44.89	54.00	-9.11	Horizontal
5650.00	25.59	32.36	9.72	23.83	43.84	54.00	-10.16	Vertical
5700.00	26.40	32.50	9.79	23.84	44.85	54.00	-9.15	Vertical
5720.00	25.93	32.53	9.81	23.85	44.42	54.00	-9.58	Vertical
5725.00	29.65	32.53	9.83	23.86	48.15	54.00	-5.85	Vertical
5850.00	29.09	32.70	9.99	23.87	47.91	54.00	-6.09	Vertical
5855.00	25.63	32.72	9.99	23.88	44.46	54.00	-9.54	Vertical
5875.00	25.88	32.74	10.04	23.89	44.77	54.00	-9.23	Vertical
5925.00	26.12	32.80	10.11	23.90	45.13	54.00	-8.87	Vertical

IEEE 802.11n(HT40)								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.09	32.36	9.72	23.83	55.34	68.20	-12.86	Horizontal
5700.00	37.28	32.50	9.79	23.84	55.73	105.20	-49.47	Horizontal
5720.00	37.31	32.53	9.81	23.85	55.80	110.80	-55.00	Horizontal
5725.00	40.19	32.53	9.83	23.86	58.69	122.20	-63.51	Horizontal
5850.00	39.61	32.70	9.99	23.87	58.43	122.20	-63.77	Horizontal
5855.00	37.08	32.72	9.99	23.88	55.91	110.80	-54.89	Horizontal
5875.00	36.89	32.74	10.04	23.89	55.78	105.20	-49.42	Horizontal
5925.00	37.56	32.80	10.11	23.90	56.57	68.20	-11.63	Horizontal
5650.00	37.21	32.36	9.72	23.83	55.46	68.20	-12.74	Vertical
5700.00	36.84	32.50	9.79	23.84	55.29	105.20	-49.91	Vertical
5720.00	37.60	32.53	9.81	23.85	56.09	110.80	-54.71	Vertical
5725.00	40.55	32.53	9.83	23.86	59.05	122.20	-63.15	Vertical
5850.00	39.31	32.70	9.99	23.87	58.13	122.20	-64.07	Vertical
5855.00	37.30	32.72	9.99	23.88	56.13	110.80	-54.67	Vertical
5875.00	37.44	32.74	10.04	23.89	56.33	105.20	-48.87	Vertical
5925.00	36.83	32.80	10.11	23.90	55.84	68.20	-12.36	Vertical

IEEE 802.11n(HT40)								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	26.27	32.36	9.72	23.83	44.52	54.00	-9.49	Horizontal
5700.00	27.65	32.50	9.79	23.84	46.10	54.00	-7.90	Horizontal
5720.00	26.07	32.53	9.81	23.85	44.56	54.00	-9.44	Horizontal
5725.00	30.77	32.53	9.83	23.86	49.27	54.00	-4.73	Horizontal
5850.00	29.48	32.70	9.99	23.87	48.30	54.00	-5.70	Horizontal
5855.00	26.43	32.72	9.99	23.88	45.26	54.00	-8.74	Horizontal
5875.00	25.79	32.74	10.04	23.89	44.68	54.00	-9.32	Horizontal
5925.00	26.51	32.80	10.11	23.90	45.52	54.00	-8.48	Horizontal
5650.00	26.01	32.36	9.72	23.83	44.26	54.00	-9.74	Vertical
5700.00	25.93	32.50	9.79	23.84	44.38	54.00	-9.62	Vertical
5720.00	25.84	32.53	9.81	23.85	44.33	54.00	-9.67	Vertical
5725.00	30.66	32.53	9.83	23.86	49.16	54.00	-4.84	Vertical
5850.00	29.46	32.70	9.99	23.87	48.28	54.00	-5.72	Vertical
5855.00	26.47	32.72	9.99	23.88	45.30	54.00	-8.70	Vertical
5875.00	25.80	32.74	10.04	23.89	44.69	54.00	-9.31	Vertical
5925.00	26.57	32.80	10.11	23.90	45.58	54.00	-8.42	Vertical

IEEE 802.11ac(HT40)								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	36.84	32.36	9.72	23.83	55.09	68.20	-13.11	Horizontal
5700.00	36.49	32.50	9.79	23.84	54.94	105.20	-50.26	Horizontal
5720.00	36.55	32.53	9.81	23.85	55.04	110.80	-55.76	Horizontal
5725.00	41.24	32.53	9.83	23.86	59.74	122.20	-62.46	Horizontal
5850.00	39.58	32.70	9.99	23.87	58.40	122.20	-63.80	Horizontal
5855.00	36.68	32.72	9.99	23.88	55.51	110.80	-55.29	Horizontal
5875.00	36.51	32.74	10.04	23.89	55.40	105.20	-49.80	Horizontal
5925.00	36.77	32.80	10.11	23.90	55.78	68.20	-12.42	Horizontal
5650.00	36.86	32.36	9.72	23.83	55.11	68.20	-13.09	Vertical
5700.00	36.71	32.50	9.79	23.84	55.16	105.20	-50.04	Vertical
5720.00	37.23	32.53	9.81	23.85	55.72	110.80	-55.08	Vertical
5725.00	39.98	32.53	9.83	23.86	58.48	122.20	-63.72	Vertical
5850.00	39.23	32.70	9.99	23.87	58.05	122.20	-64.15	Vertical
5855.00	37.33	32.72	9.99	23.88	56.16	110.80	-54.64	Vertical
5875.00	36.54	32.74	10.04	23.89	55.43	105.20	-49.77	Vertical
5925.00	37.22	32.80	10.11	23.90	56.23	68.20	-11.97	Vertical

IEEE 802.11ac(HT40)								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	26.04	32.36	9.72	23.83	44.29	54.00	-9.71	Horizontal
5700.00	26.86	32.50	9.79	23.84	45.31	54.00	-8.69	Horizontal
5720.00	25.93	32.53	9.81	23.85	44.42	54.00	-9.58	Horizontal
5725.00	30.14	32.53	9.83	23.86	48.64	54.00	-5.36	Horizontal
5850.00	29.24	32.70	9.99	23.87	48.06	54.00	-5.94	Horizontal
5855.00	25.95	32.72	9.99	23.88	44.78	54.00	-9.22	Horizontal
5875.00	26.02	32.74	10.04	23.89	44.91	54.00	-9.09	Horizontal
5925.00	26.31	32.80	10.11	23.90	45.32	54.00	-8.68	Horizontal
5650.00	25.65	32.36	9.72	23.83	43.90	54.00	-10.10	Vertical
5700.00	26.14	32.50	9.79	23.84	44.59	54.00	-9.41	Vertical
5720.00	26.11	32.53	9.81	23.85	44.60	54.00	-9.40	Vertical
5725.00	30.07	32.53	9.83	23.86	48.57	54.00	-5.43	Vertical
5850.00	29.29	32.70	9.99	23.87	48.11	54.00	-5.89	Vertical
5855.00	25.95	32.72	9.99	23.88	44.78	54.00	-9.22	Vertical
5875.00	25.87	32.74	10.04	23.89	44.76	54.00	-9.24	Vertical
5925.00	26.30	32.80	10.11	23.90	45.31	54.00	-8.69	Vertical

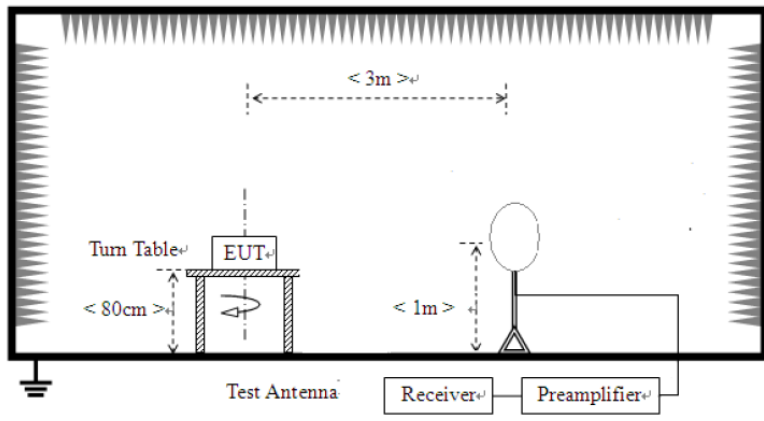
IEEE 802.11ac(HT80)								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.27	32.36	9.72	23.83	55.52	68.20	-12.68	Horizontal
5700.00	36.61	32.50	9.79	23.84	55.06	105.20	-50.14	Horizontal
5720.00	36.51	32.53	9.81	23.85	55.00	110.80	-55.80	Horizontal
5725.00	41.45	32.53	9.83	23.86	59.95	122.20	-62.25	Horizontal
5850.00	40.01	32.70	9.99	23.87	58.83	122.20	-63.37	Horizontal
5855.00	36.61	32.72	9.99	23.88	55.44	110.80	-55.36	Horizontal
5875.00	36.60	32.74	10.04	23.89	55.49	105.20	-49.71	Horizontal
5925.00	36.84	32.80	10.11	23.90	55.85	68.20	-12.35	Horizontal
5650.00	37.06	32.36	9.72	23.83	55.31	68.20	-12.89	Vertical
5700.00	37.32	32.50	9.79	23.84	55.77	105.20	-49.43	Vertical
5720.00	37.18	32.53	9.81	23.85	55.67	110.80	-55.13	Vertical
5725.00	39.99	32.53	9.83	23.86	58.49	122.20	-63.71	Vertical
5850.00	39.48	32.70	9.99	23.87	58.30	122.20	-63.90	Vertical
5855.00	37.20	32.72	9.99	23.88	56.03	110.80	-54.77	Vertical
5875.00	36.42	32.74	10.04	23.89	55.31	105.20	-49.89	Vertical
5925.00	37.25	32.80	10.11	23.90	56.26	68.20	-11.94	Vertical

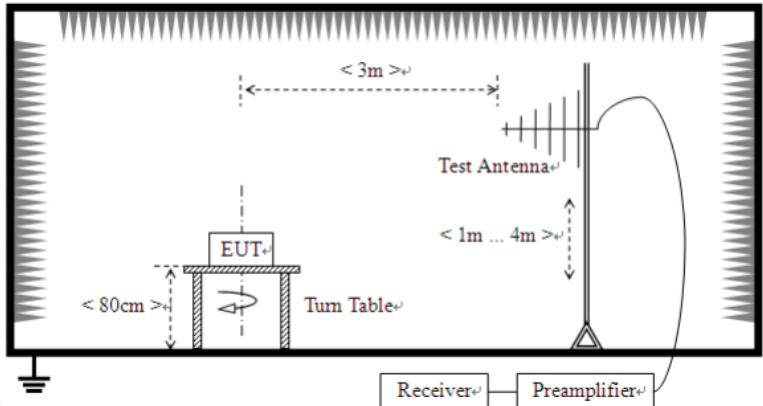
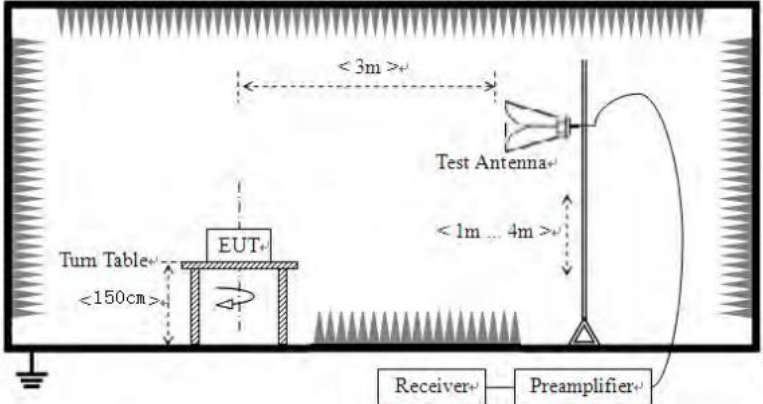
IEEE 802.11ac(HT80)								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	24.92	32.36	9.72	23.83	43.17	54.00	-10.83	Horizontal
5700.00	25.82	32.50	9.79	23.84	44.27	54.00	-9.73	Horizontal
5720.00	25.11	32.53	9.81	23.85	43.60	54.00	-10.40	Horizontal
5725.00	29.47	32.53	9.83	23.86	47.97	54.00	-6.03	Horizontal
5850.00	28.02	32.70	9.99	23.87	46.84	54.00	-7.16	Horizontal
5855.00	24.90	32.72	9.99	23.88	43.73	54.00	-10.27	Horizontal
5875.00	25.23	32.74	10.04	23.89	44.12	54.00	-9.88	Horizontal
5925.00	25.12	32.80	10.11	23.90	44.13	54.00	-9.87	Horizontal
5650.00	25.24	32.36	9.72	23.83	43.49	54.00	-10.51	Vertical
5700.00	25.41	32.50	9.79	23.84	43.86	54.00	-10.14	Vertical
5720.00	25.08	32.53	9.81	23.85	43.57	54.00	-10.43	Vertical
5725.00	28.29	32.53	9.83	23.86	46.79	54.00	-7.21	Vertical
5850.00	28.06	32.70	9.99	23.87	46.88	54.00	-7.12	Vertical
5855.00	25.41	32.72	9.99	23.88	44.24	54.00	-9.76	Vertical
5875.00	25.01	32.74	10.04	23.89	43.90	54.00	-10.10	Vertical
5925.00	25.04	32.80	10.11	23.90	44.05	54.00	-9.95	Vertical



## 7.7 Spurious Emission

### 7.7.1 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 40GHz				
Test site:	Measurement Distance: 3m				
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	120KHz	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		
	Frequency	Limit (dBm/MHz)	Remark		
	Above 1GHz	-27.0	Peak Value		
Test setup:	For radiated emissions from 9kHz to 30MHz				
	<div></div>				
	For radiated emissions from 30MHz to1GHz				

	 <p>For radiated emissions above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>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.</li> <li>7. The radiation measurements are performed in X, Y, Z axis positioning.</li> </ol>

	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 voltage:	AC 120V, 60Hz
Test results:	Pass

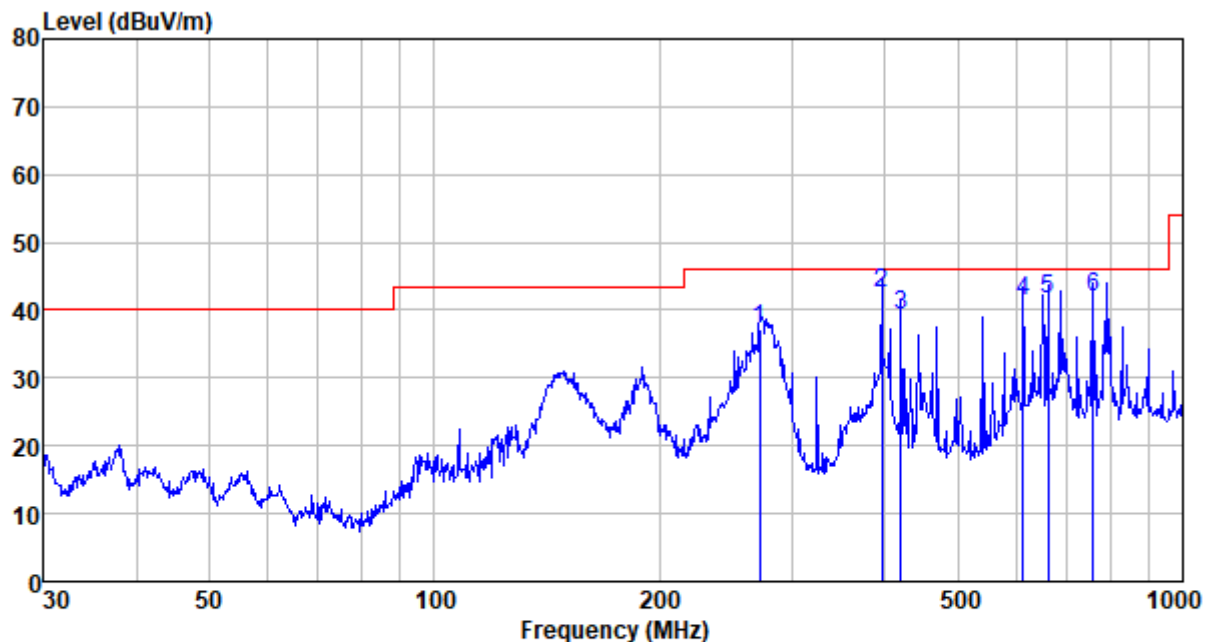
## Measurement Data:

### 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.

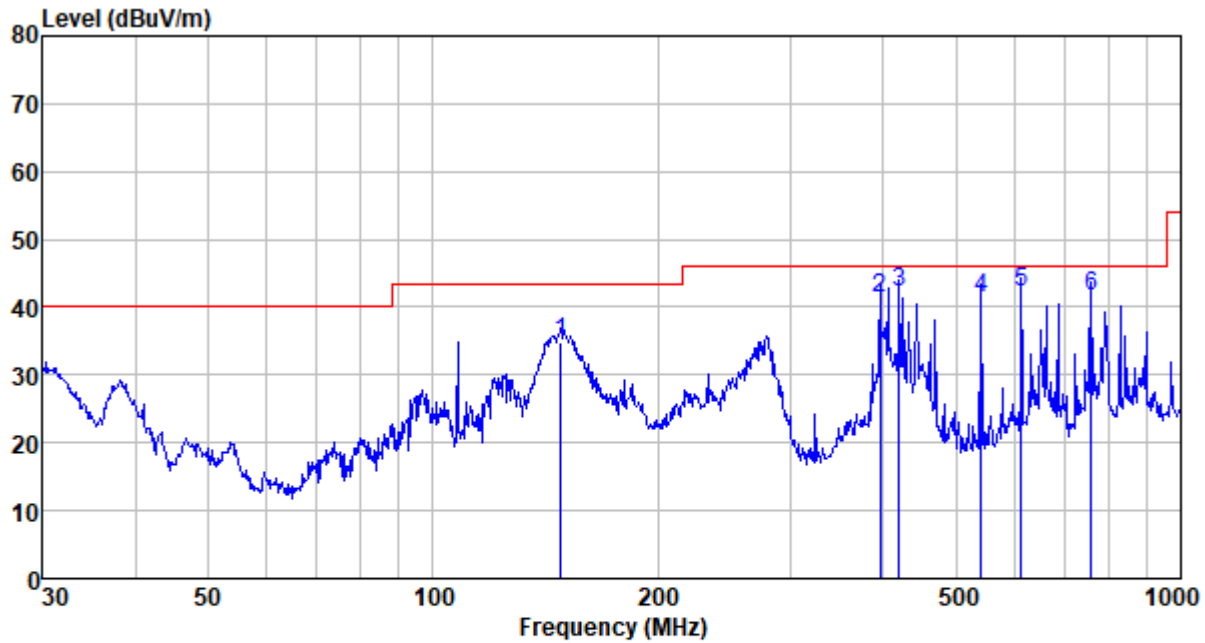
### Below 1GHz

Mode:	Transmitting mode	Test by:	Bill
Temp./Hum.(%RH):	26°C/56%RH	Polarization:	Horizontal



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
272.278	59.60	12.84	2.24	37.40	37.28	46.00	-8.72	QP
396.242	61.95	15.25	2.83	37.52	42.51	46.00	-3.49	QP
420.580	58.08	15.75	2.95	37.52	39.26	46.00	-6.74	QP
612.064	55.53	19.51	3.76	37.55	41.25	46.00	-4.75	QP
661.151	55.85	19.56	3.95	37.60	41.76	46.00	-4.24	QP
758.041	54.54	20.66	4.31	37.62	41.89	46.00	-4.11	QP

Mode:	Transmitting mode	Test by:	Bill
Temp./Hum.(%RH):	26°C/56%RH	Polarization:	Vertical



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
148.441	62.79	7.57	1.56	37.07	34.85	43.50	-8.65	QP
396.242	60.86	15.25	2.83	37.52	41.42	46.00	-4.58	QP
420.580	60.91	15.75	2.95	37.52	42.09	46.00	-3.91	QP
541.373	57.05	18.23	3.49	37.52	41.25	46.00	-4.75	QP
612.064	56.45	19.51	3.76	37.55	42.17	46.00	-3.83	QP
758.041	54.31	20.66	4.31	37.62	41.66	46.00	-4.34	QP

## 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	21.54	21.64	43.18	54(Note3)	-10.82	PK
V	17235	22.07	21.80	43.87	54(Note3)	-10.13	PK
H	11490	22.71	21.83	44.54	54(Note3)	-9.46	PK
H	17235	21.18	21.67	42.85	54(Note3)	-11.15	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	20.27	21.64	41.91	54(Note3)	-12.09	PK
V	17355	20.77	21.80	42.57	54(Note3)	-11.43	PK
H	11570	21.06	21.83	42.89	54(Note3)	-11.11	PK
H	17355	22.21	21.67	43.88	54(Note3)	-10.12	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	21.96	21.64	43.60	54(Note3)	-10.40	PK
V	17475	21.54	21.80	43.34	54(Note3)	-10.66	PK
H	11650	20.77	21.83	42.60	54(Note3)	-11.40	PK
H	17475	21.15	21.67	42.82	54(Note3)	-11.18	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	22.58	21.67	44.25	54(Note3)	-9.75	PK
V	17265	21.66	21.83	43.49	54(Note3)	-10.51	PK
H	11510	21.17	21.67	42.84	54(Note3)	-11.16	PK
H	17265	22.29	21.83	44.12	54(Note3)	-9.88	PK

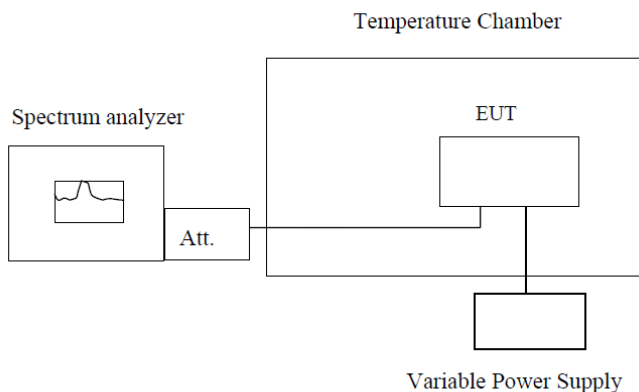
Test mode:		802.11ac(HT40)		Test channel:		Highest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11590	22.21	21.67	43.88	54(Note3)	-10.12	PK
V	17385	22.05	21.83	43.88	54(Note3)	-10.12	PK
H	11590	22.69	21.67	44.36	54(Note3)	-9.64	PK
H	17385	22.55	21.83	44.38	54(Note3)	-9.62	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	20.77	21.65	42.42	54(Note3)	-11.58	PK
V	17325	20.63	21.81	42.44	54(Note3)	-11.56	PK
H	11550	20.99	21.65	42.64	54(Note3)	-11.36	PK
H	17325	22.10	21.81	43.91	54(Note3)	-10.09	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.

## 7.8 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:	 <p><b>Note :</b> Measurement setup for testing on Antenna connector</p>
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: 5785MHz									
Temp. (°C)	Power Supply (Vdc)	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	14.40	5784.5626	Pass	5785.9652	Pass	5785.1921	Pass	5784.3953	Pass
-20	14.40	5784.4664	Pass	5785.5889	Pass	5785.3516	Pass	5784.1702	Pass
-10	14.40	5784.8155	Pass	5785.8658	Pass	5785.8477	Pass	5784.6091	Pass
0	14.40	5784.6449	Pass	5785.6408	Pass	5785.5110	Pass	5784.9403	Pass
10	14.40	5784.7650	Pass	5785.7029	Pass	5785.7412	Pass	5784.1765	Pass
20	14.40	5784.8503	Pass	5785.4976	Pass	5785.5421	Pass	5784.7017	Pass
30	14.40	5784.2033	Pass	5785.0490	Pass	5785.3680	Pass	5784.4185	Pass
40	14.40	5784.8304	Pass	5785.1868	Pass	5785.5044	Pass	5784.9556	Pass
50	14.40	5784.3912	Pass	5785.0952	Pass	5785.8545	Pass	5784.8606	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5785MHz									
Temp. (°C)	Power Supply (Vdc)	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	12.24	5785.7926	Pass	5785.7554	Pass	5784.3819	Pass	5785.0232	Pass
25	14.40	5786.0393	Pass	5785.7571	Pass	5784.1234	Pass	5784.4628	Pass
25	16.56	5785.0970	Pass	5785.6041	Pass	5784.4780	Pass	5784.6669	Pass



802.11n(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5785MHz									
Temp. (°C)	Power Supply (Vdc)	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	14.40	5784.3976	Pass	5785.6160	Pass	5785.4566	Pass	5784.9601	Pass
-20	14.40	5784.9052	Pass	5785.6304	Pass	5785.7985	Pass	5784.9878	Pass
-10	14.40	5784.5317	Pass	5785.1562	Pass	5785.9579	Pass	5784.8370	Pass
0	14.40	5784.6153	Pass	5785.1322	Pass	5785.3599	Pass	5784.6353	Pass
10	14.40	5784.1462	Pass	5785.0693	Pass	5785.9524	Pass	5784.3213	Pass
20	14.40	5784.9767	Pass	5785.7088	Pass	5785.3995	Pass	5784.2573	Pass
30	14.40	5784.4493	Pass	5785.3292	Pass	5785.2355	Pass	5784.0749	Pass
40	14.40	5784.8416	Pass	5785.1938	Pass	5785.4591	Pass	5785.0353	Pass
50	14.40	5784.7364	Pass	5785.7989	Pass	5785.7031	Pass	5784.3381	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5785MHz									
Temp. (°C)	Power Supply (Vdc)	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	12.24	5785.7060	Pass	5785.1711	Pass	5784.8111	Pass	5784.3208	Pass
25	14.40	5785.6921	Pass	5785.4351	Pass	5784.5119	Pass	5784.7207	Pass
25	16.56	5785.4709	Pass	5785.2493	Pass	5784.1620	Pass	5784.1121	Pass

802.11ac(HT20)									
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5785MHz									
Temp. (°C)	Power Supply (Vdc)	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	14.40	5784.2058	Pass	5785.6200	Pass	5785.6575	Pass	5784.1084	Pass
-20	14.40	5784.5525	Pass	5785.4650	Pass	5785.1555	Pass	5784.3380	Pass
-10	14.40	5784.6997	Pass	5785.1519	Pass	5785.9808	Pass	5784.1497	Pass
0	14.40	5784.7045	Pass	5785.8927	Pass	5785.4066	Pass	5784.1414	Pass
10	14.40	5784.3925	Pass	5785.8636	Pass	5785.4998	Pass	5784.5116	Pass
20	14.40	5784.9666	Pass	5785.5796	Pass	5785.6092	Pass	5784.9116	Pass
30	14.40	5784.6289	Pass	5785.6941	Pass	5785.4009	Pass	5784.2764	Pass
40	14.40	5784.7294	Pass	5785.4742	Pass	5786.0170	Pass	5784.9950	Pass
50	14.40	5784.7621	Pass	5785.8736	Pass	5785.5020	Pass	5784.7949	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5785MHz									
Temp. (°C)	Power Supply (Vdc)	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	12.24	5785.6580	Pass	5785.5563	Pass	5784.0583	Pass	5784.7823	Pass
25	14.40	5785.4530	Pass	5785.0644	Pass	5784.1638	Pass	5784.8119	Pass
25	16.56	5785.6917	Pass	5785.5016	Pass	5784.4245	Pass	5784.8608	Pass

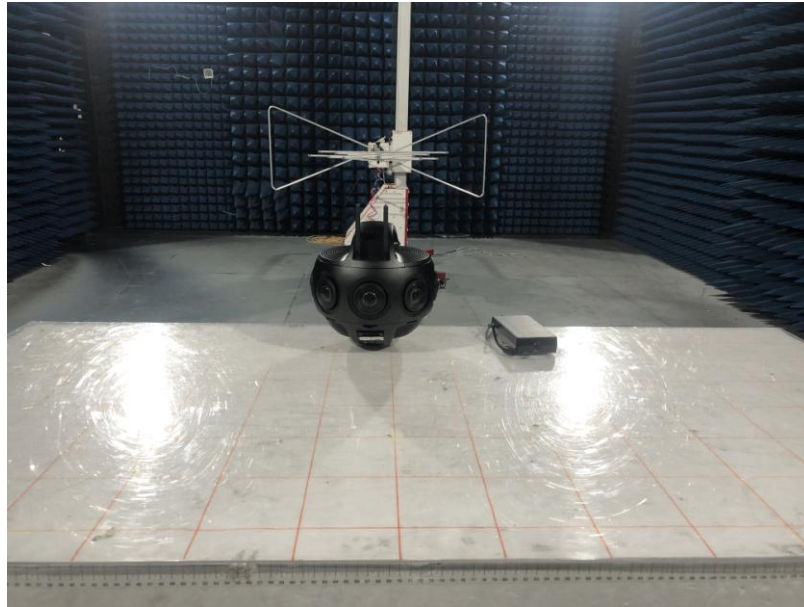
802.11n(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5755MHz									
Temp. (°C)	Power Supply (Vdc)	0 minute		2 minute		5 minute		10 minute	
		Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail	Measured Frequency (MHz)	Pass /Fail
-30	14.40	5754.0964	Pass	5755.3213	Pass	5755.8998	Pass	5754.6947	Pass
-20	14.40	5754.7975	Pass	5755.5312	Pass	5755.3575	Pass	5754.5379	Pass
-10	14.40	5754.3243	Pass	5755.2616	Pass	5755.2985	Pass	5754.4553	Pass
0	14.40	5754.1402	Pass	5755.9758	Pass	5755.5536	Pass	5754.4697	Pass
10	14.40	5754.8284	Pass	5755.1658	Pass	5756.0074	Pass	5754.7451	Pass
20	14.40	5754.0789	Pass	5755.6077	Pass	5755.9306	Pass	5754.1030	Pass
30	14.40	5754.1349	Pass	5755.2208	Pass	5755.2542	Pass	5754.4274	Pass
40	14.40	5754.1773	Pass	5755.3178	Pass	5755.7604	Pass	5754.6113	Pass
50	14.40	5754.9087	Pass	5755.3098	Pass	5755.6346	Pass	5754.9394	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5755MHz									
Temp. (°C)	Power Supply (Vdc)	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	12.24	5755.4497	Pass	5755.3495	Pass	5754.2068	Pass	5754.0584	Pass
25	14.40	5755.6317	Pass	5755.9422	Pass	5754.8424	Pass	5755.0140	Pass
25	16.56	5755.2359	Pass	5755.5914	Pass	5754.0436	Pass	5754.8186	Pass

802.11ac(HT40)									
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5755MHz									
Temp. (°C)	Power Supply (Vdc)	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	14.40	5754.2207	Pass	5755.4409	Pass	5755.8639	Pass	5754.4784	Pass
-20	14.40	5754.7627	Pass	5755.4746	Pass	5755.5876	Pass	5754.0745	Pass
-10	14.40	5754.8599	Pass	5755.6806	Pass	5755.0252	Pass	5754.4569	Pass
0	14.40	5754.8656	Pass	5755.5690	Pass	5755.4177	Pass	5754.3009	Pass
10	14.40	5754.5508	Pass	5755.5881	Pass	5755.2032	Pass	5754.4686	Pass
20	14.40	5754.3019	Pass	5755.7613	Pass	5755.5403	Pass	5754.0955	Pass
30	14.40	5754.5476	Pass	5755.5236	Pass	5755.2095	Pass	5754.9993	Pass
40	14.40	5754.5485	Pass	5755.6017	Pass	5755.8407	Pass	5754.3213	Pass
50	14.40	5754.1815	Pass	5755.0356	Pass	5755.6481	Pass	5754.2366	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5755MHz									
Temp. (°C)	Power Supply (Vdc)	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	12.24	5755.8798	Pass	5755.1956	Pass	5754.6490	Pass	5754.6494	Pass
25	14.40	5755.8476	Pass	5755.3589	Pass	5754.5929	Pass	5754.4379	Pass
25	16.56	5755.9328	Pass	5755.0957	Pass	5754.5028	Pass	5754.8379	Pass

802.11ac(HT80)									
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5775MHz									
Temp. (°C)	Power Supply (Vdc)	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	14.40	5775.5984	Pass	5775.9164	Pass	5774.4142	Pass	5775.7420	Pass
-20	14.40	5775.3150	Pass	5775.1140	Pass	5774.8350	Pass	5775.9799	Pass
-10	14.40	5775.9880	Pass	5775.0663	Pass	5774.2264	Pass	5775.0639	Pass
0	14.40	5775.0473	Pass	5775.1509	Pass	5774.2246	Pass	5775.3249	Pass
10	14.40	5775.1934	Pass	5775.5879	Pass	5774.2294	Pass	5775.9618	Pass
20	14.40	5775.0449	Pass	5775.8073	Pass	5774.8979	Pass	5774.8603	Pass
30	14.40	5775.5575	Pass	5775.9192	Pass	5774.4615	Pass	5774.7255	Pass
40	14.40	5775.5624	Pass	5775.0469	Pass	5774.7178	Pass	5774.6990	Pass
50	14.40	5775.6624	Pass	5775.9706	Pass	5774.9905	Pass	5774.7040	Pass
Frequency stability versus Temp.									
Worse Case Operating Frequency: 5775MHz									
Temp. (°C)	Power Supply (Vdc)	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	12.24	5775.2566	Pass	5775.1996	Pass	5775.0519	Pass	5775.7079	Pass
25	14.40	5775.8949	Pass	5775.1157	Pass	5775.6124	Pass	5775.7514	Pass
25	16.56	5775.8450	Pass	5775.8526	Pass	5775.6092	Pass	5775.3182	Pass

## 8 Test Setup Photo

Radiated Emission



## Conducted Emission



## 9 EUT Constructional Details

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

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