

FCC REPORT

Applicant: Wuhan Ipason Technology Co., Ltd

Address of Applicant: Room 1801, 18/F, Block D1, Hankou North E-Commerce Building, No. 88, Hankou North Avenue, Huangpi District, Wuhan, China

Manufacturer: Wuhan Ipason Technology Co., Ltd

Address of Manufacturer: Room 1801, 18/F, Block D1, Hankou North E-Commerce Building, No. 88, Hankou North Avenue, Huangpi District, Wuhan, China

Factory: Wuhan Ipason Technology Co., Ltd

Address of Factory: IPASON Science Park, Special #1, Qing Wu Road, Huangpi District, Wuhan City, Hubei Province.China

Equipment Under Test (EUT)

Product Name: Microcomputer

Model No.: OB18501, OB18101, OB15401, OB12201, OB12401, OB12001, OB***** (* represent 0-9, a-z, A-Z, or blank, only used to tell different market area and for client internal serial number, will not affect product Safety and EMC performance.)

Trade Mark: IPASON

FCC ID: 2ATY8-OB18501

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

Date of sample receipt: July 04, 2019

Date of Test: July 04-12, 2019

Date of report issued: July 12, 2019

Test Result : PASS *

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

Authorized Signature:

A circular blue stamp with the text "GLOBAL UNITED TECHNOLOGY SERVICES" around the perimeter and "GTS" in the center. Overlaid on the stamp is a handwritten signature in black ink.

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	July 12, 2019	Original

Prepared By:

Bill. Yuan

Date:

July 12, 2019

Project Engineer

Check By:

Robinson

Date:

July 12, 2019

Reviewer

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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

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

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	9kHz ~ 30MHz	$\pm 3.8039\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 3.9679\text{dB}$	(1)
Radiated Emission	1GHz ~ 40GHz	$\pm 4.29\text{dB}$	(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:	Microcomputer
Model No.:	OB18501, OB18101, OB15401, OB12201, OB12401, OB12001, OB***** (* represent 0-9, a-z, A-Z, or blank, only used to tell different market area and for client internal serial number, will not affect product Safety and EMC performance.)
Test Model No:	OB18501, OB12201
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.	
Serial No.:	PS00094219230089
Test sample(s) ID:	GTS201907000062-1
Sample(s) Status	Engineer sample
Operation Frequency:	802.11a/802.11n(HT20)/802.11ac(HT20) @5.8G Band: 5745MHz ~ 5825MHz 802.11n(HT40)/ 802.11ac(HT40) @ 5.8G Band: 5755MHz ~ 5795MHz 802.11ac(HT80): 5775MHz
Channel numbers:	802.11a/802.11n(HT20)/802.11ac(HT20) @5.8G Band: 5 802.11n(HT40)/ 802.11ac(HT40) @ 5.8G Band: 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:	Integral antenna
Antenna gain:	Main Antenna: 1.20dBi (Max) Aux Antenna: 1.20dBi(Max) Two antennas can not synchronous transmission.
Power supply:	Adapter Model: ADP-90MD H Input: AC 100-240V, 50/60Hz Output: DC 19V, 4.74A

Operation Frequency each of channel @ 5.8G Band							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
149	5745MHz	151	5755MHz	153	5765MHz	155	5775MHz
157	5785MHz	159	5795MHz	161	5805MHz	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)		
	5.8G Band		
	802.11a 802.11n(HT20) 802.11ac(HT20)	802.11n(HT40) 802.11ac(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, the duty cycle>98%, 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

5.6 Additional Instructions

EUT Software Settings:

Mode	Special software is used. The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.		
Test Software Name	DRTU Version 1.7.7-02972		
Mode	Channel	Frequency (MHz)	Soft Set
OFDM	CH149	5745	TX level : default
	CH151	5755	
	CH155	5775	
	CH157	5785	
	CH159	5795	
	CH165	5825	

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. 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. 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	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	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

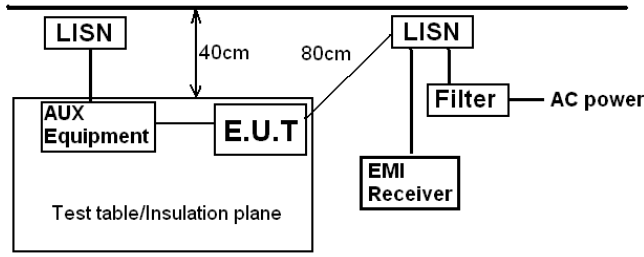
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

7.1 Antenna requirement

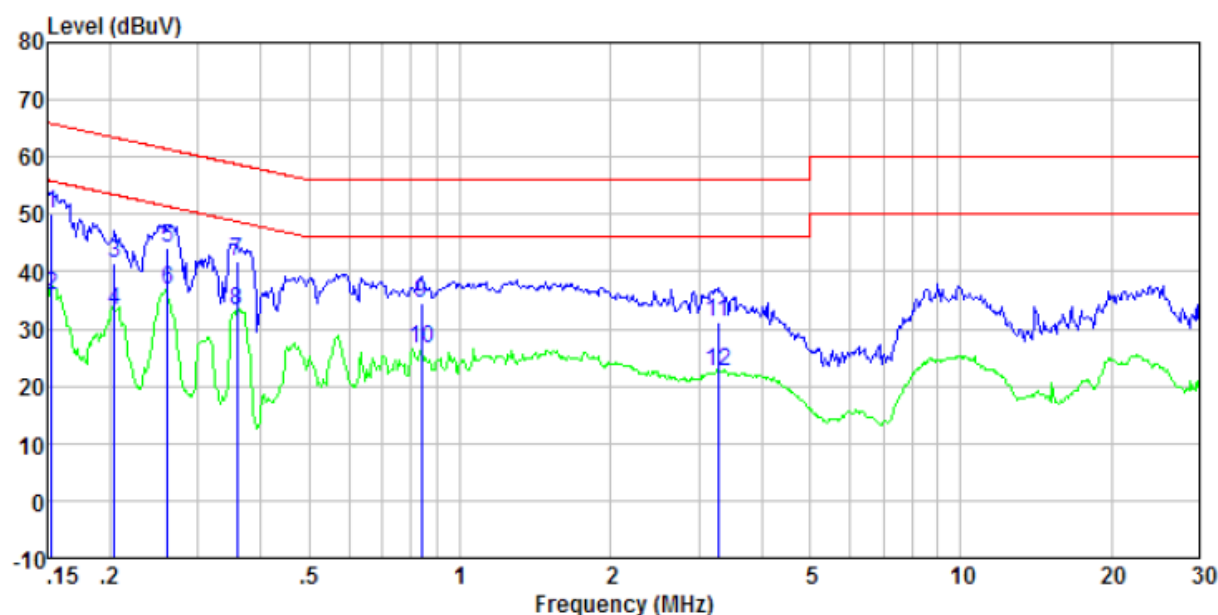
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling 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 Main and Aux antenna is integral antenna, the best case gain of the antenna is 1.20dBi. Two antennas can not synchronous transmission, reference to the appendix II for details.	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207																				
Test Method:	ANSI C63.10:2013																				
Test Frequency Range:	150KHz to 30MHz																				
Class / Severity:	Class B																				
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto																				
Limit:	<table><tr><th rowspan="2">Frequency range (MHz)</th><th colspan="2">Limit (dBuV)</th></tr><tr><th>Quasi-peak</th><th>Average</th></tr><tr><td>0.15-0.5</td><td>66 to 56*</td><td>56 to 46*</td></tr><tr><td>0.5-5</td><td>56</td><td>46</td></tr><tr><td>5-30</td><td>60</td><td>50</td></tr></table> * Decreases with the logarithm of the frequency.							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
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																			
Test setup:	Reference Plane  Remark: E.U.T: Equipment Under Test LISN: Line Impedance 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																				

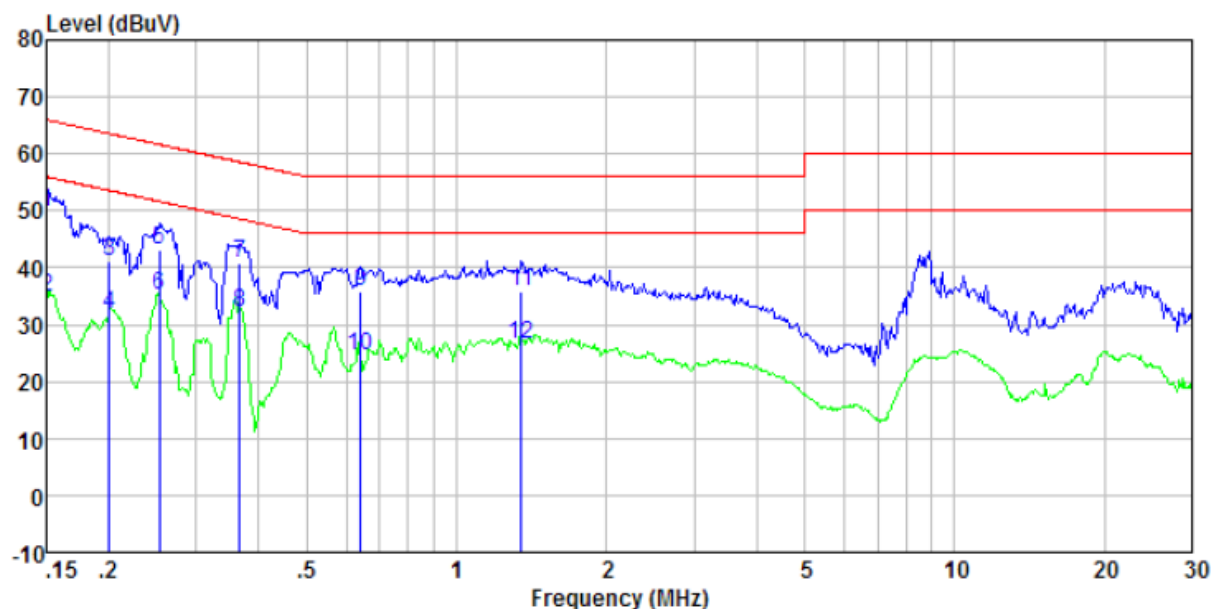
Measurement data

Line:



Freq MHz	Reading level dBUV	LIISN/ISN factor dB	Cable loss dB	level dBUV	Limit level dBUV	Over limit dB	Remark
0.153	49.69	0.40	0.07	50.16	65.82	-15.66	QP
0.153	35.53	0.40	0.07	36.00	55.82	-19.82	Average
0.204	41.11	0.40	0.11	41.62	63.45	-21.83	QP
0.204	32.64	0.40	0.11	33.15	53.45	-20.30	Average
0.260	43.73	0.40	0.10	44.23	61.42	-17.19	QP
0.260	36.36	0.40	0.10	36.86	51.42	-14.56	Average
0.360	41.44	0.37	0.10	41.91	58.74	-16.83	QP
0.360	32.79	0.37	0.10	33.26	48.74	-15.48	Average
0.839	34.12	0.23	0.14	34.49	56.00	-21.51	QP
0.839	26.31	0.23	0.14	26.68	46.00	-19.32	Average
3.276	30.84	0.20	0.19	31.23	56.00	-24.77	QP
3.276	22.13	0.20	0.19	22.52	46.00	-23.48	Average

Neutral:

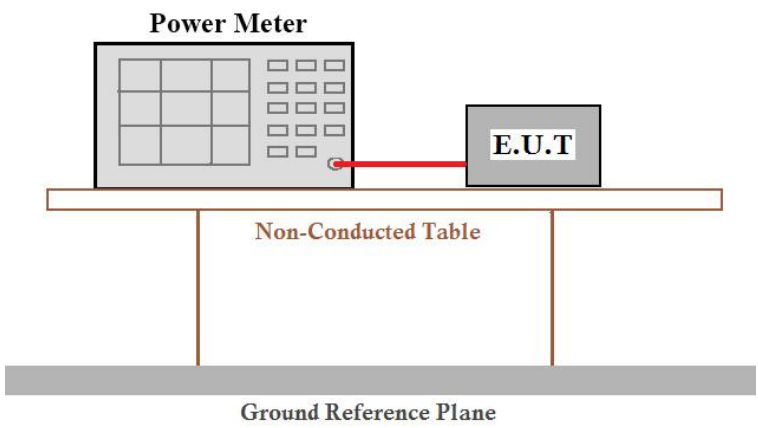


Freq MHz	Reading level dBuV	LISN/ISN factor dB	Cable loss dB	level dBuV	Limit level dBuV	Over limit dB	Remark
0.150	49.30	0.40	0.07	49.77	66.00	-16.23	QP
0.150	34.42	0.40	0.07	34.89	56.00	-21.11	Average
0.201	40.59	0.40	0.11	41.10	63.58	-22.48	QP
0.201	31.38	0.40	0.11	31.89	53.58	-21.69	Average
0.253	42.57	0.40	0.10	43.07	61.64	-18.57	QP
0.253	34.57	0.40	0.10	35.07	51.64	-16.57	Average
0.367	40.43	0.37	0.10	40.90	58.56	-17.66	QP
0.367	31.65	0.37	0.10	32.12	48.56	-16.44	Average
0.641	35.30	0.27	0.12	35.69	56.00	-20.31	QP
0.641	24.15	0.27	0.12	24.54	46.00	-21.46	Average
1.352	35.56	0.20	0.16	35.92	56.00	-20.08	QP
1.352	26.06	0.20	0.16	26.42	46.00	-19.58	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:	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

Main Antenna:

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	15.73	15.58	16.70	15.57	15.35	---	30.00	Pass
Middle	15.74	15.58	16.56	---	---	17.12		
Highest	14.24	15.58	15.83	15.39	16.00	---		

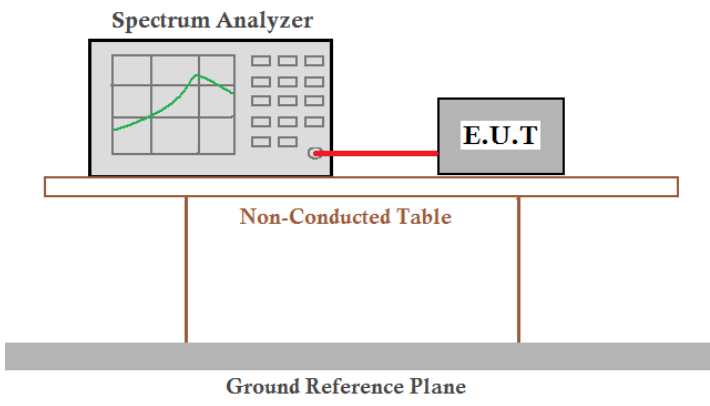
Remark: "---" is not applicable

Aux Antenna:

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	16.78	16.30	16.05	16.33	16.18	---	30.00	Pass
Middle	16.25	16.83	16.05	---	---	16.22		
Highest	16.60	16.00	16.06	16.06	16.53	---		

Remark: "---" is not applicable

7.4 Channel Bandwidth

Test Requirement:	FCC Part15 E Section 15.407(e)
Test Method:	KDB 789033 D02 General U-NII Test Procedures New Rules v02r01
Limit:	>500KHz
Test setup:	 The diagram illustrates the test setup. A Spectrum Analyzer, shown with a grid and a green curve, is connected to an E.U.T. (Equipment Under Test) by a red cable. Both the Spectrum Analyzer and the E.U.T. are positioned on a Non-Conducted Table, which is supported by two vertical legs. Below the table is a Ground Reference Plane, represented by a thick grey bar.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

Main Antenna:

5.8G Band								
Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n(H T20)	802.11ac(HT20)	802.11n(H T40)	802.11ac(HT40)	802.11ac(HT80)		
Lowest	15.378	15.071	14.812	35.137	35.137	---	>500	Pass
Middle	15.528	14.885	15.670	---	---	74.047		
Highest	15.153	15.335	16.268	33.978	35.190	---		

Remark: "---" is not applicable

Aux Antenna:

5.8G Band								
Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n(H T20)	802.11ac(HT20)	802.11n(H T40)	802.11ac(HT40)	802.11ac(HT80)		
Lowest	14.750	15.005	12.925	32.726	32.380	---	>500	Pass
Middle	15.817	13.258	15.130	---	---	72.765		
Highest	13.870	15.152	16.922	35.182	35.187	---		

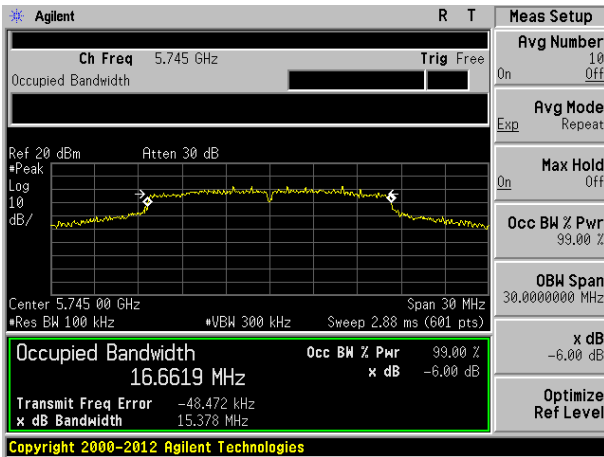
Remark: "---" is not applicable

Test plot as follows:

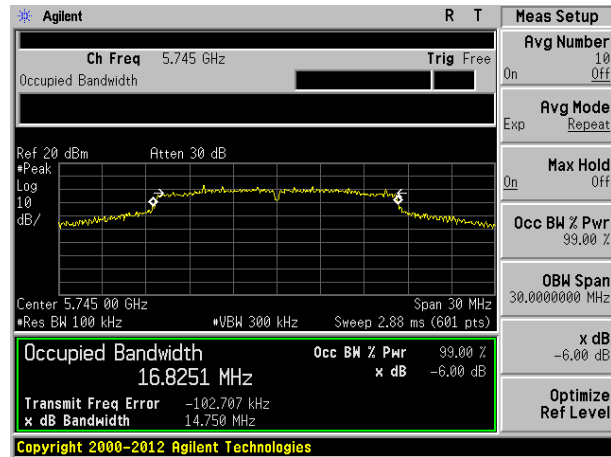
Test mode: 802.11a

Main Antenna:

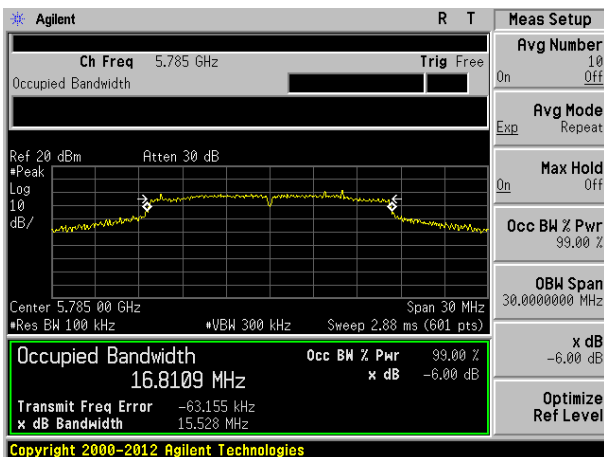
Aux Antenna:



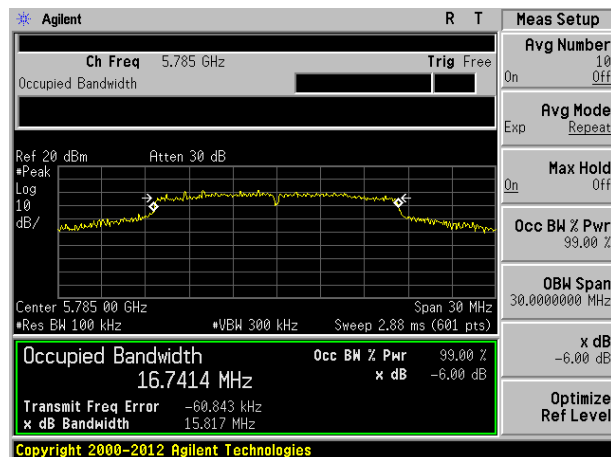
Lowest channel



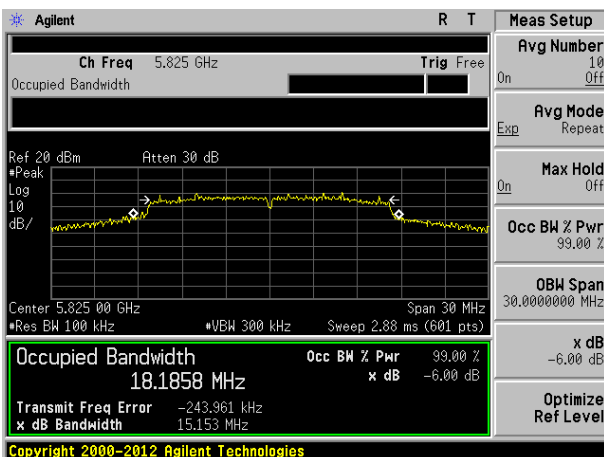
Lowest channel



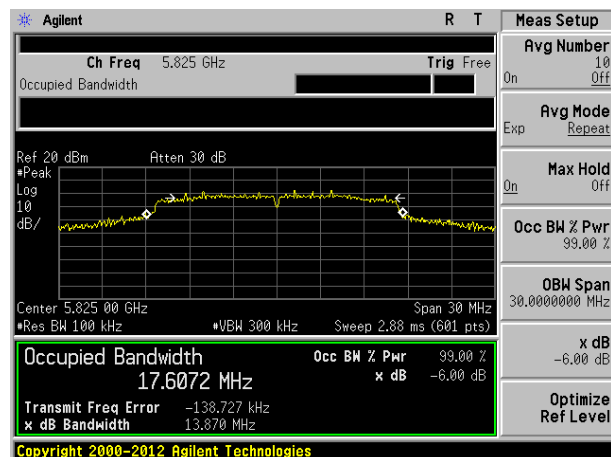
Middle channel



Middle channel



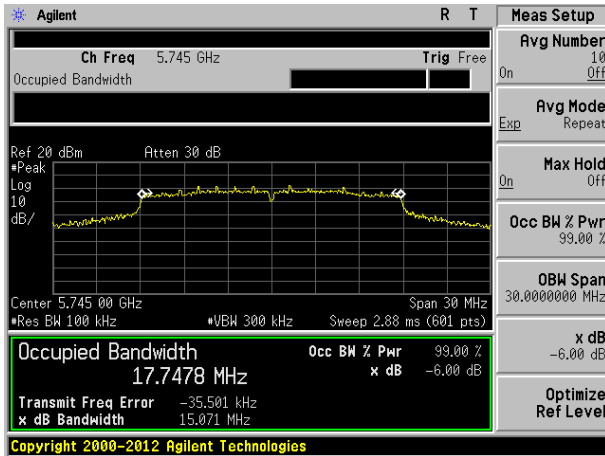
Highest channel



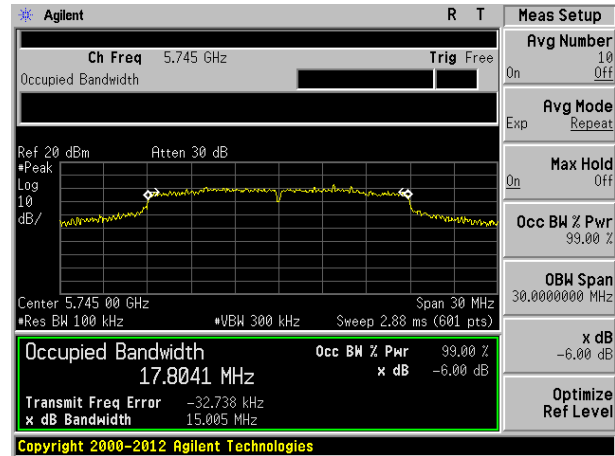
Highest channel

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

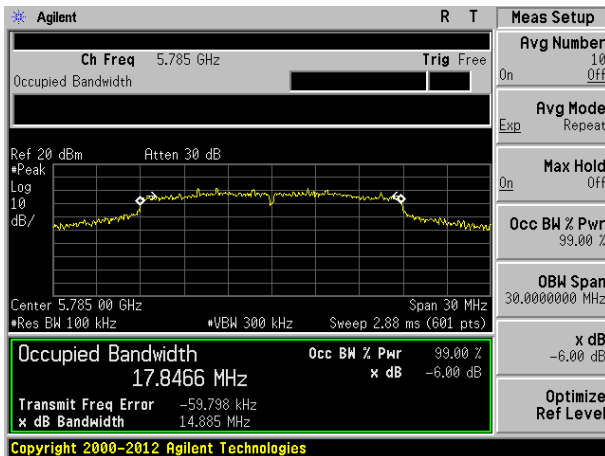
Main Antenna:	Aux Antenna:
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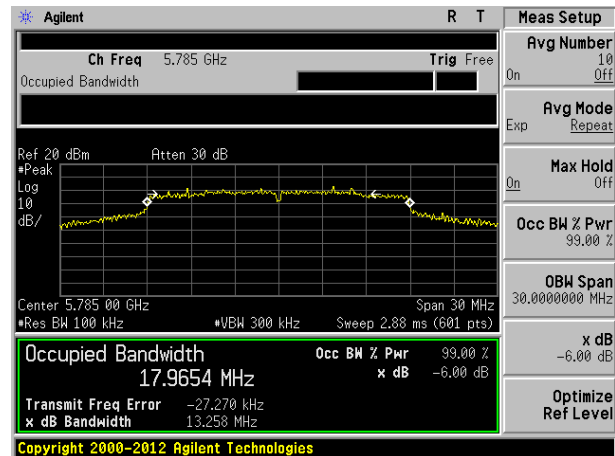
Lowest channel



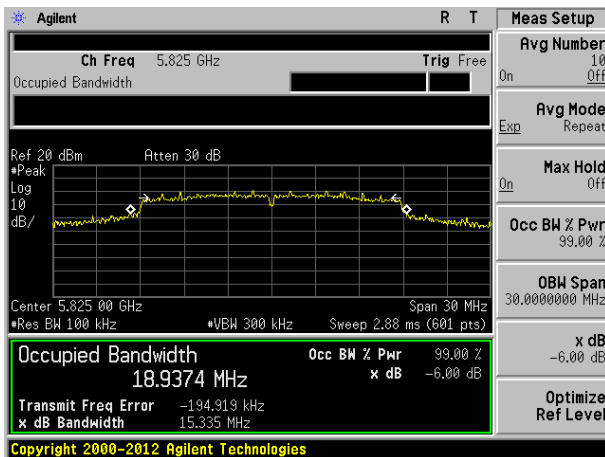
Lowest channel



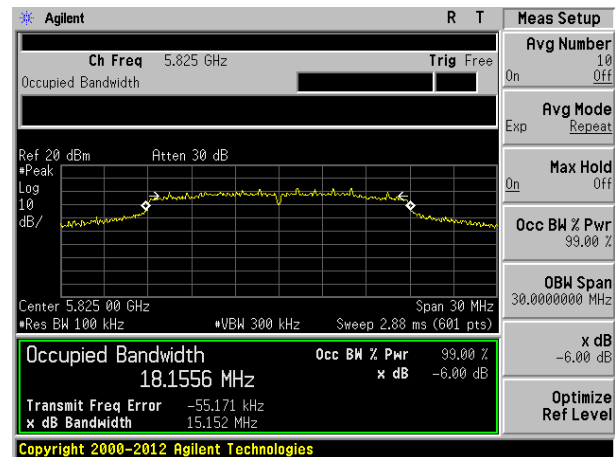
Middle channel



Middle channel



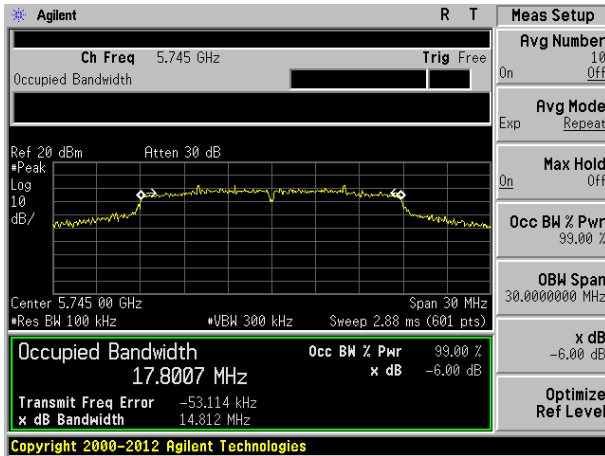
Highest channel



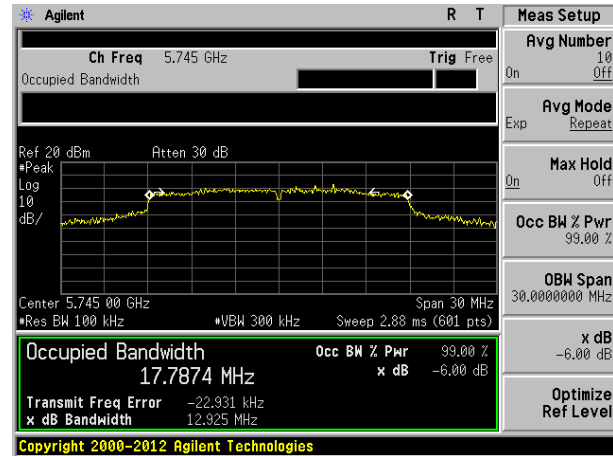
Highest channel

Test mode: 802.11ac(HT20)

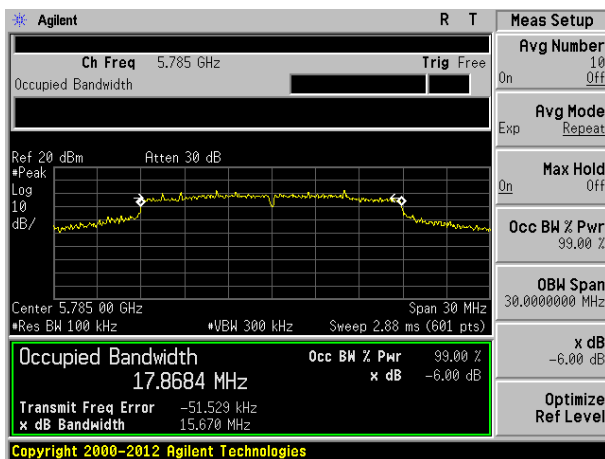
Main Antenna:	Aux Antenna:
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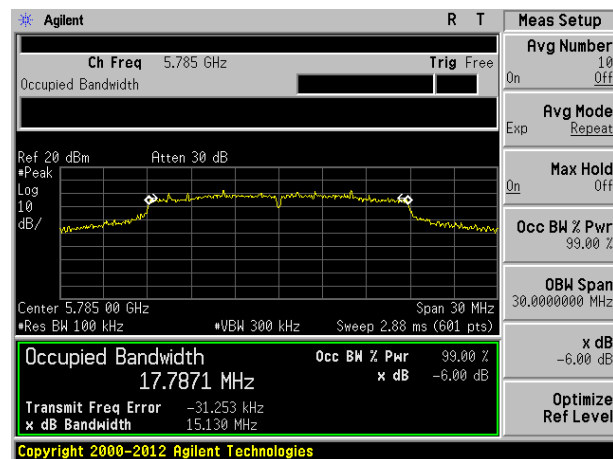
Lowest channel



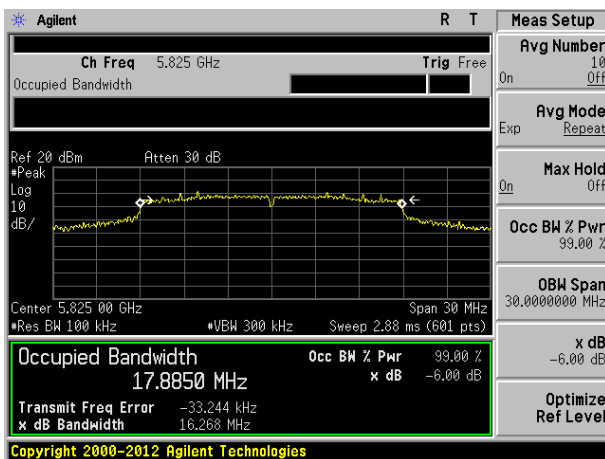
Lowest channel



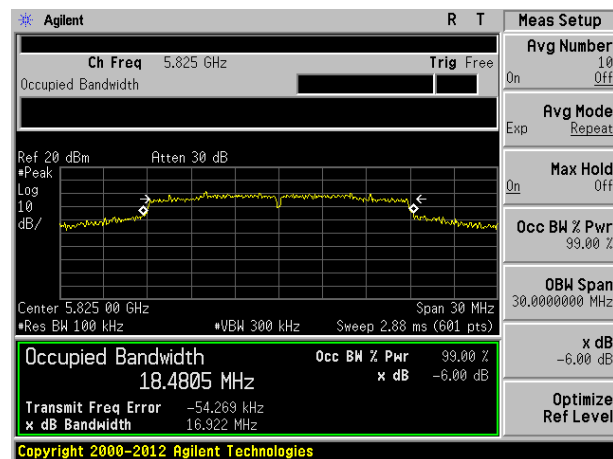
Middle channel



Middle channel



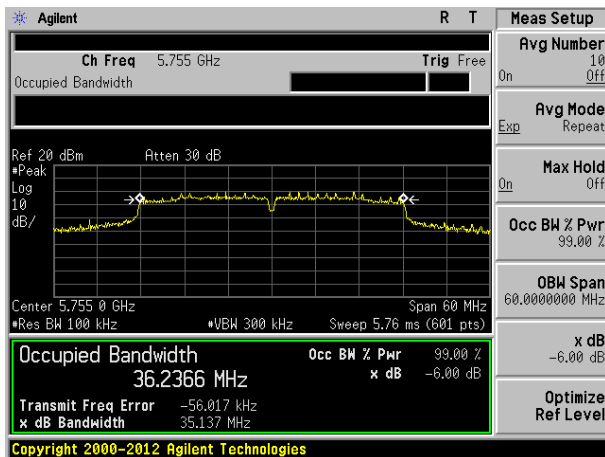
Highest channel



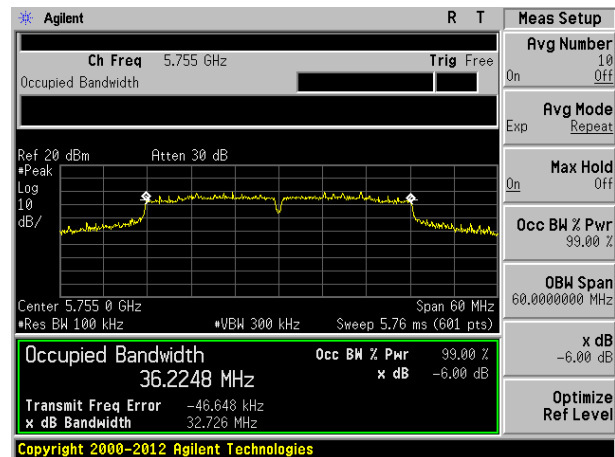
Highest channel

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

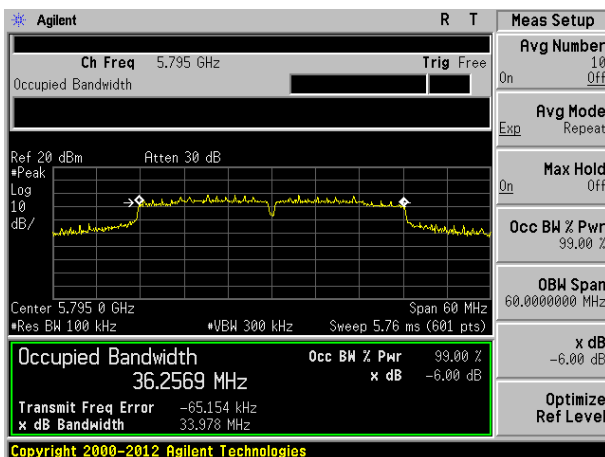
Main Antenna:	Aux Antenna:
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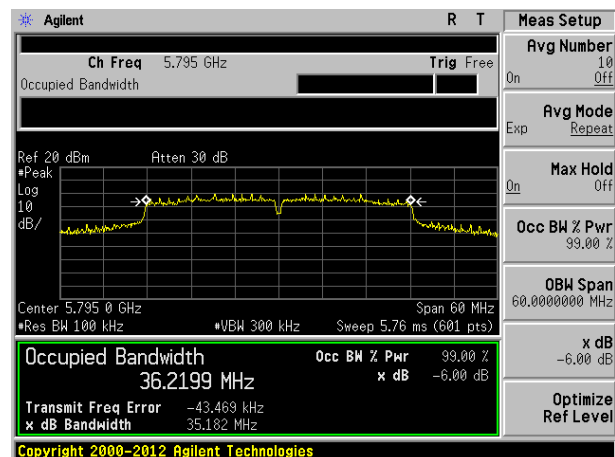
Lowest channel



Lowest channel



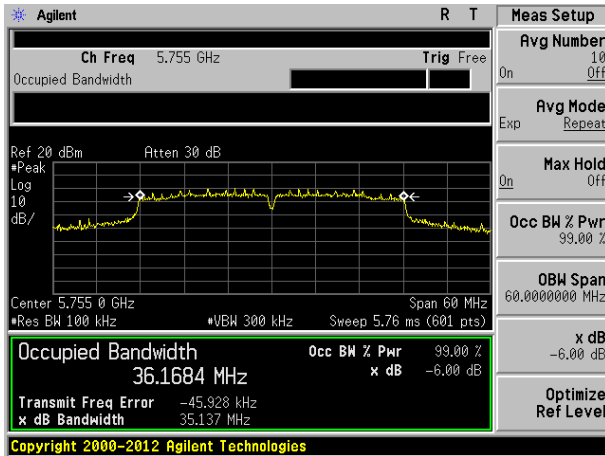
Highest channel



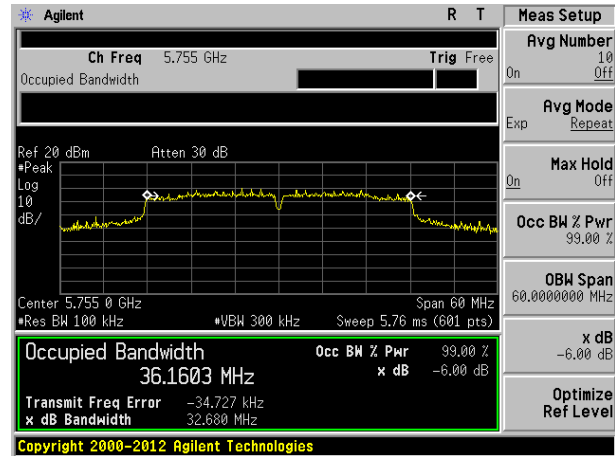
Highest channel

Test mode: 802.11ac(HT40)

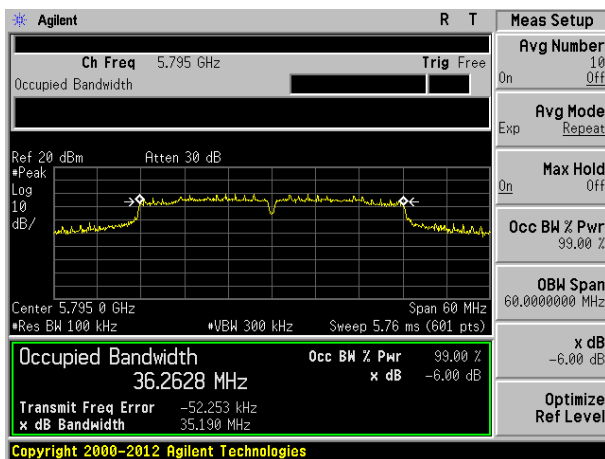
Main Antenna:	Aux Antenna:
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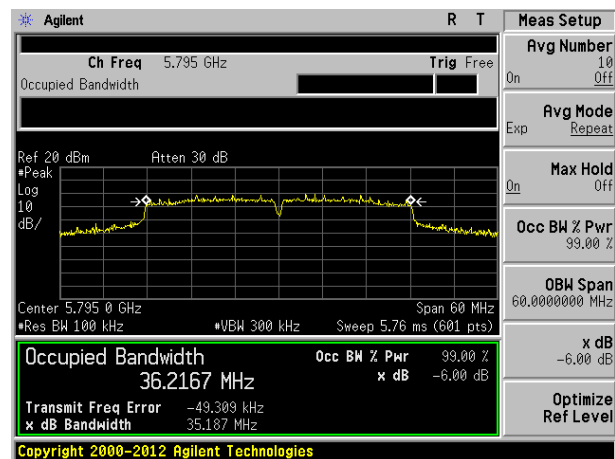
Lowest channel



Lowest channel



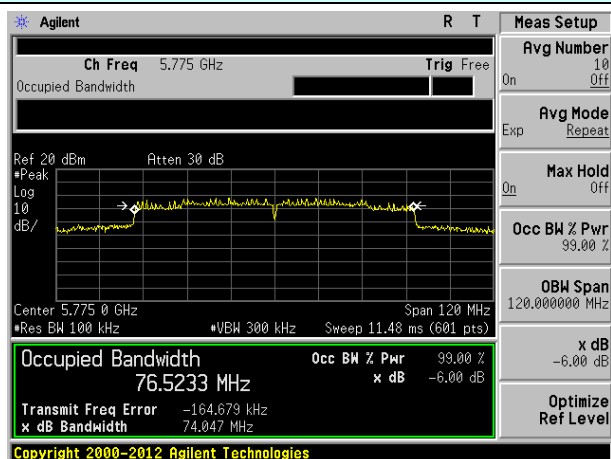
Highest channel



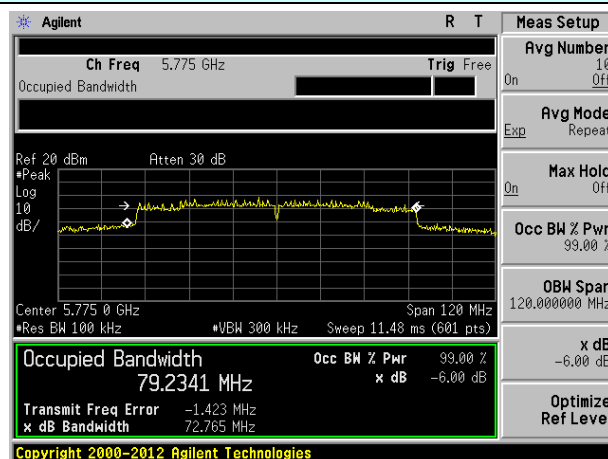
Highest channel

Test mode: 802.11ac(HT80)

Main Antenna:	Aux Antenna:
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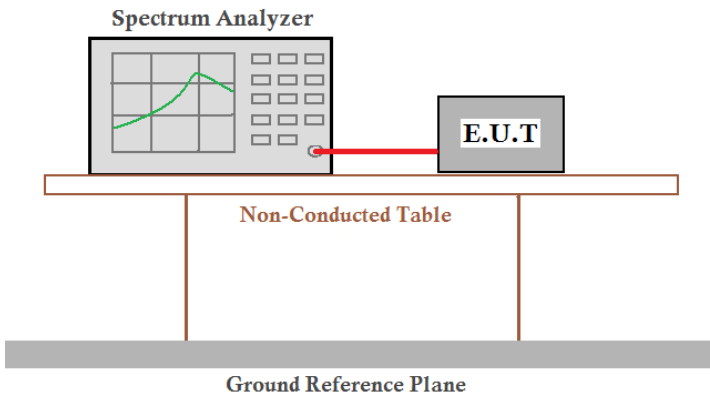


Middle channel



Middle channel

7.5 Power Spectral Density

Test Requirement:	FCC Part15 E Section 15.407(a)(3)
Test Method:	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

Main Antenna:

5.8G Band								
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	6.63	5.53	6.24	3.45	2.92	---	30.00	Pass
Middle	5.96	6.33	6.67	---	---	0.02		
Highest	4.84	4.55	5.97	2.41	3.24	---		

Aux Antenna:

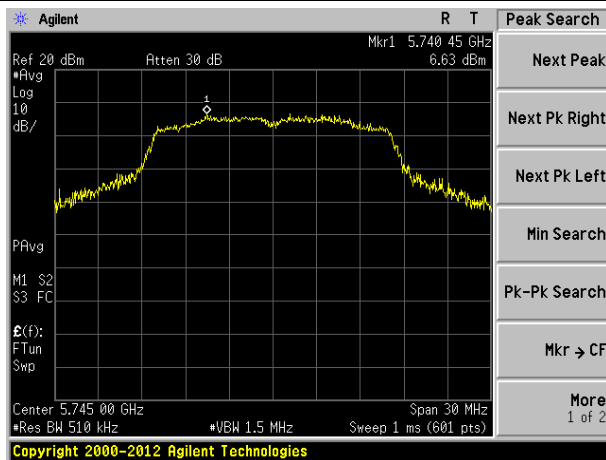
5.8G Band								
Test CH	Power Spectral Density (dBm)						Limit (dBm/500kHz)	Result
	802.11a	802.11n (HT20)	802.11ac (HT20)	802.11n (HT40)	802.11ac (HT40)	802.11ac (HT80)		
Lowest	6.72	6.91	6.87	3.27	3.57	---	30.00	Pass
Middle	6.20	6.84	6.38	---	---	-0.89		
Highest	6.23	6.01	6.08	3.08	3.18	---		

Remark: “---” is not applicable

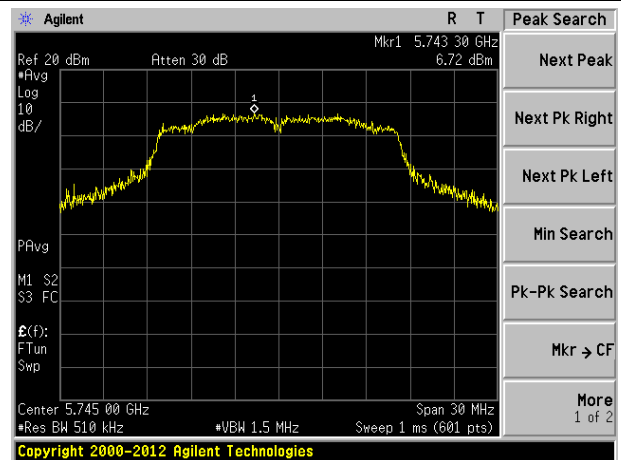
Test plot as follows:

Test mode: 802.11a

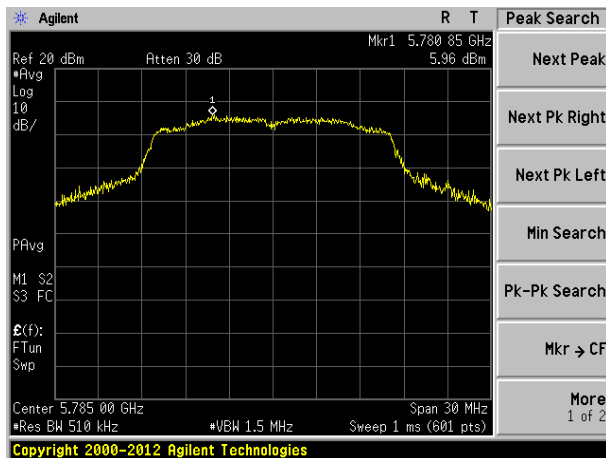
Main Antenna:



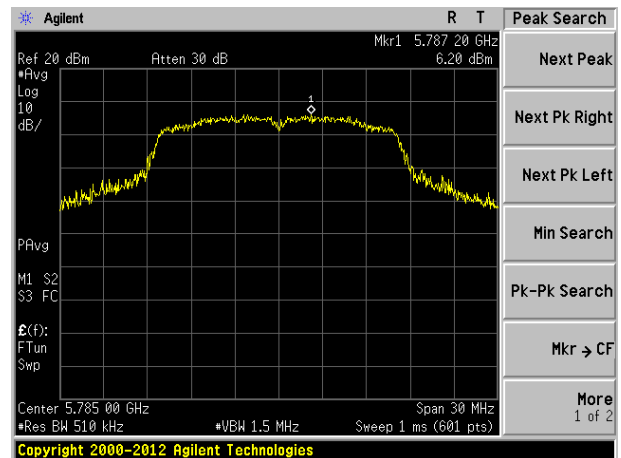
Aux Antenna:



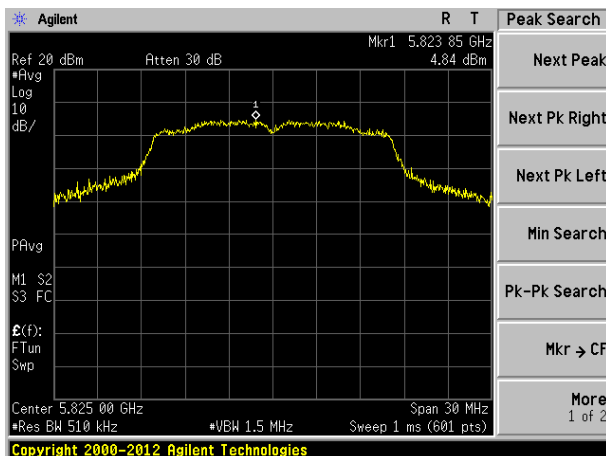
Lowest channel



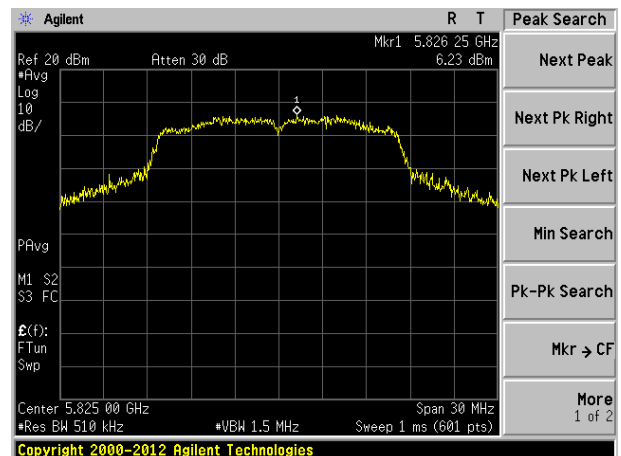
Lowest channel



Middle channel



Middle channel

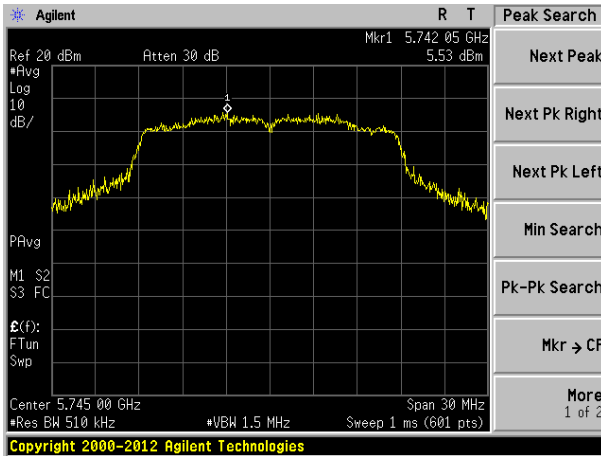


Highest channel

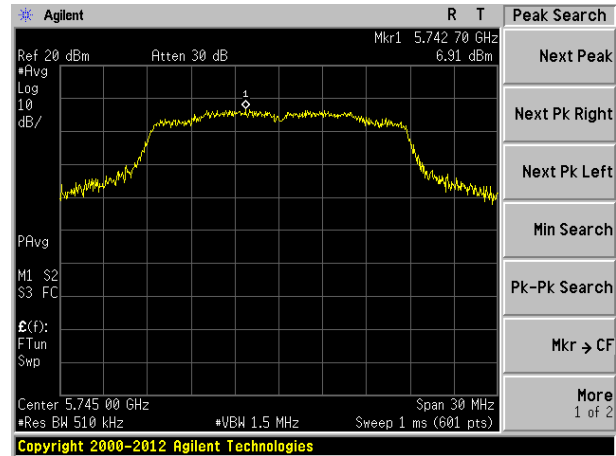
Highest channel

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

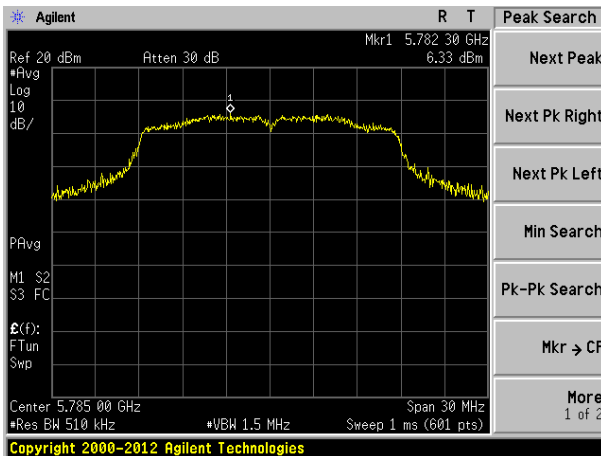
Main Antenna: Aux Antenna:



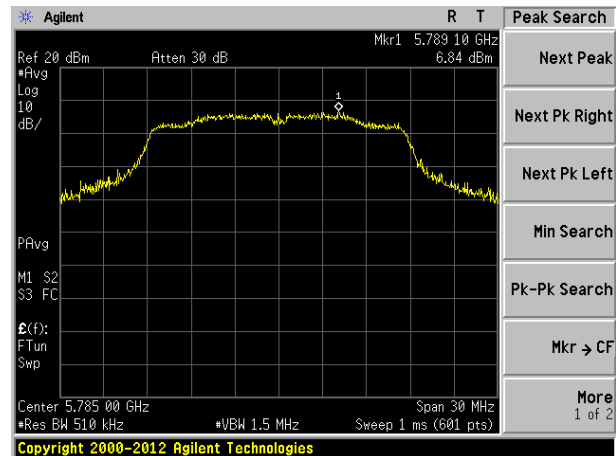
Lowest channel



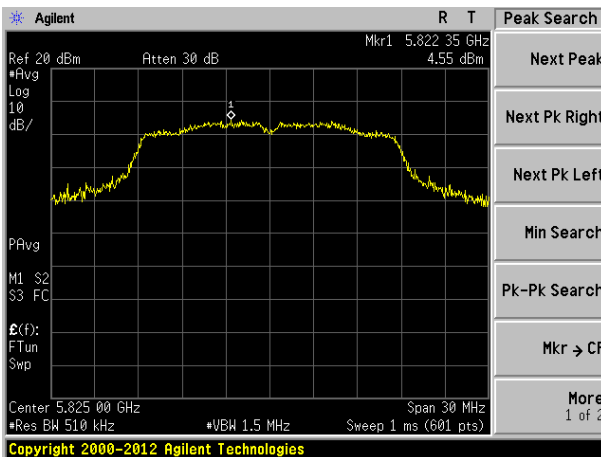
Lowest channel



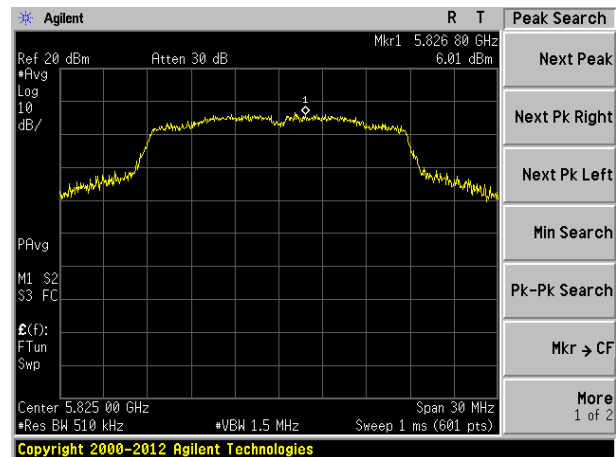
Middle channel



Middle channel



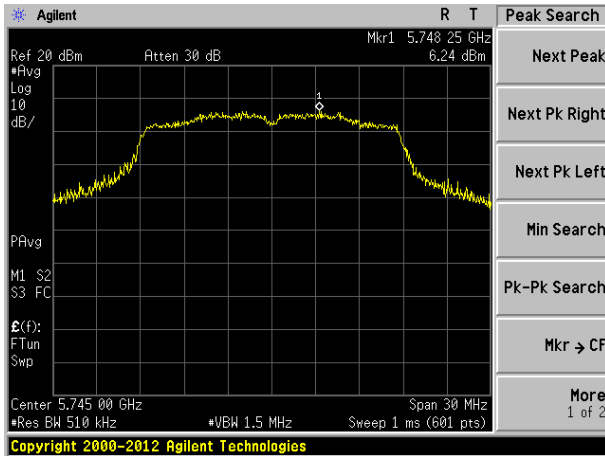
Highest channel



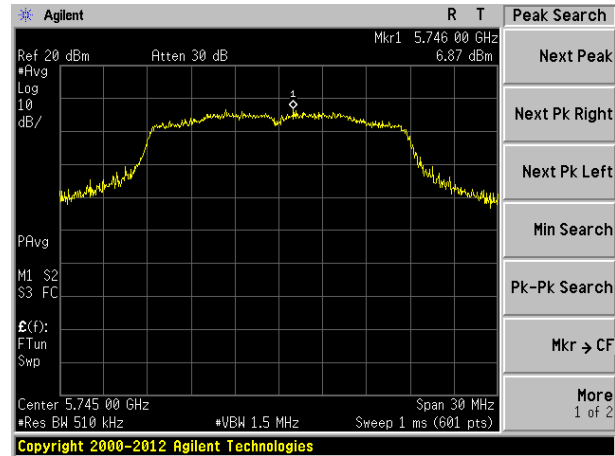
Highest channel

Test mode: 802.11ac(HT20)

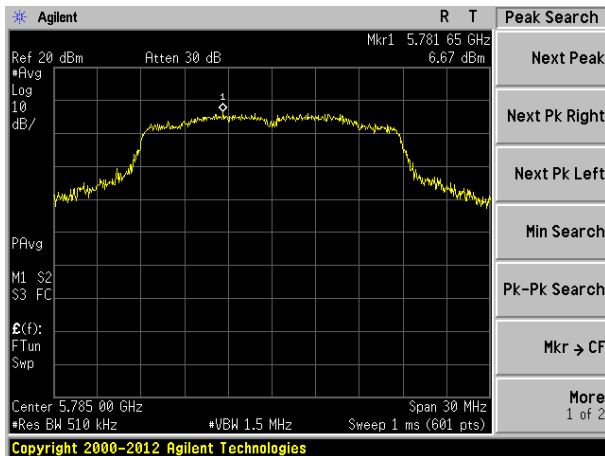
Main Antenna:	Aux Antenna::
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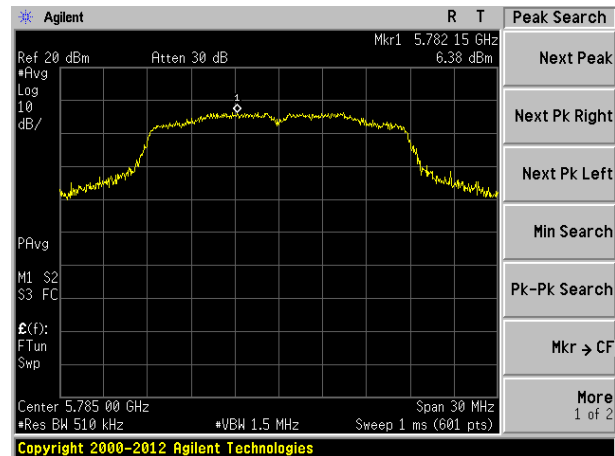
Lowest channel



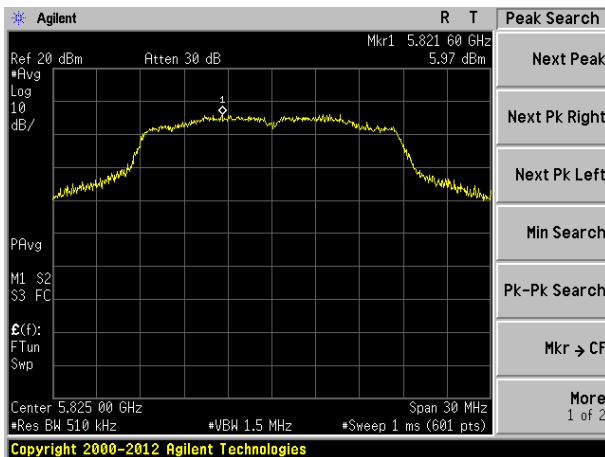
Lowest channel



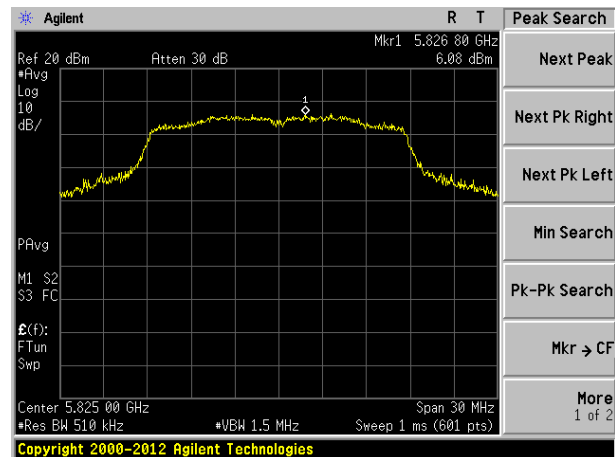
Middle channel



Middle channel



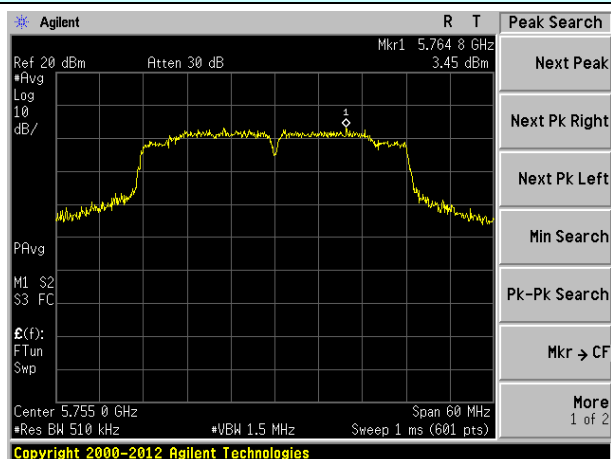
Highest channel



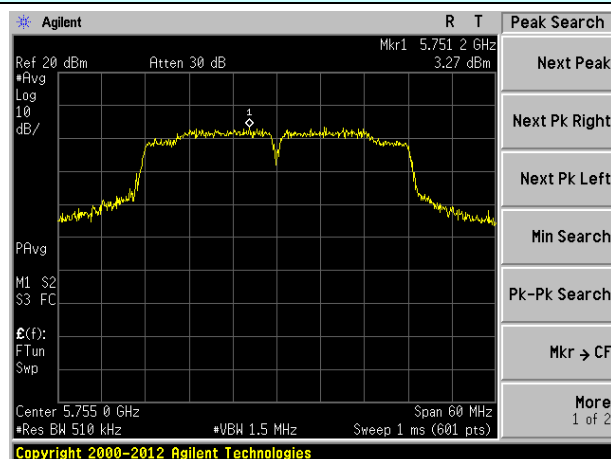
Highest channel

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

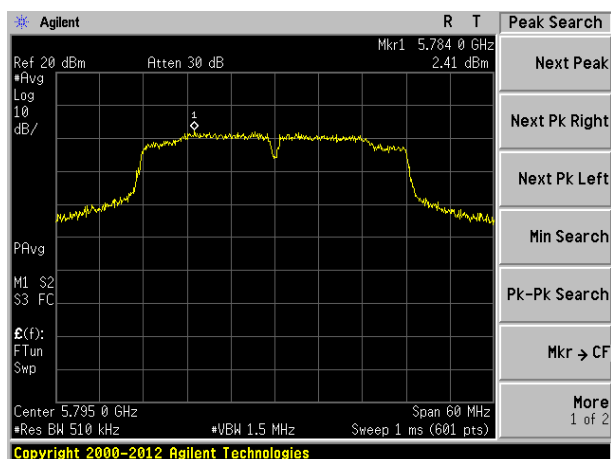
Main Antenna:	Aux Antenna:
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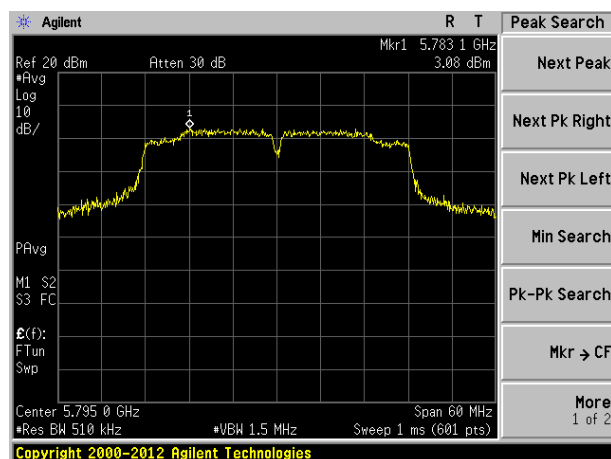
Lowest channel



Lowest channel



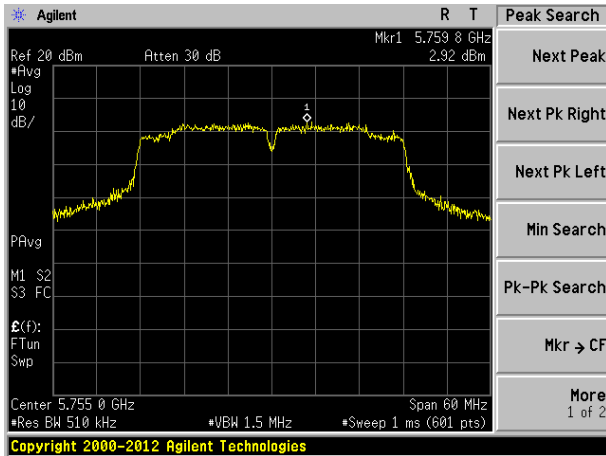
Highest channel



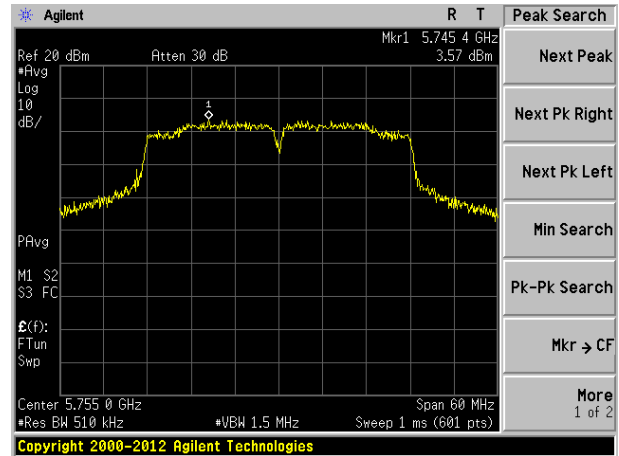
Highest channel

Test mode: 802.11ac(HT40)

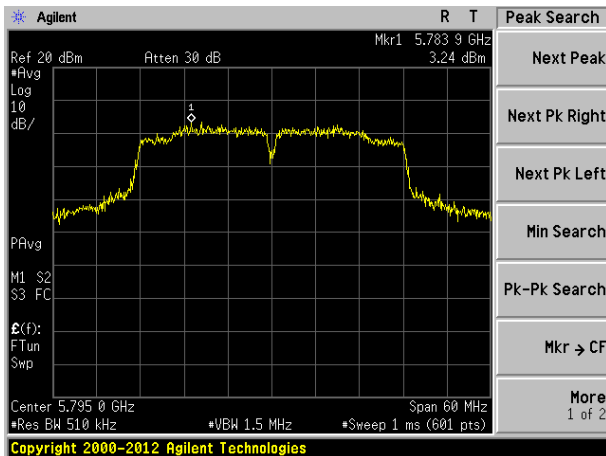
Main Antenna: Aux Antenna:



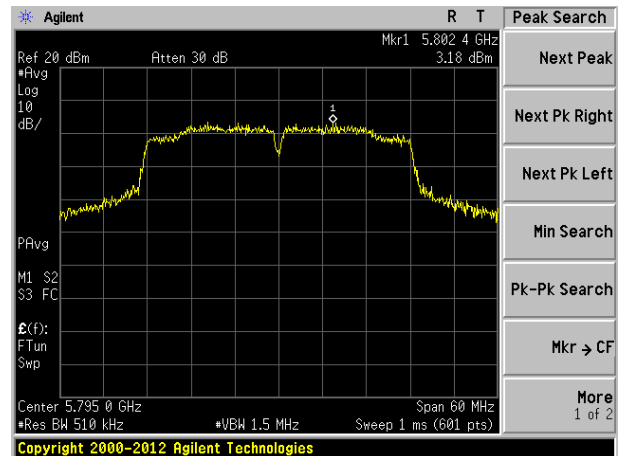
Lowest channel



Lowest channel



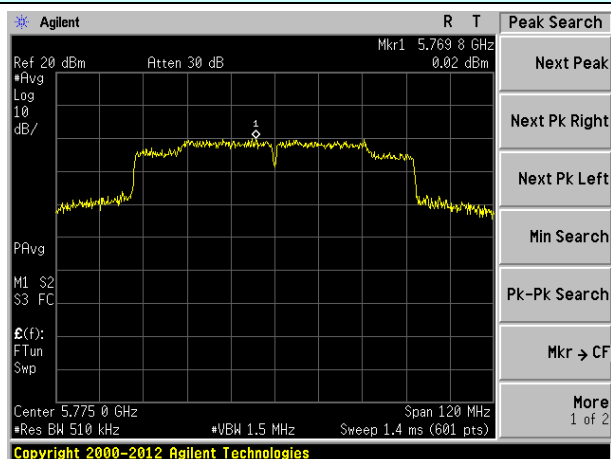
Highest channel



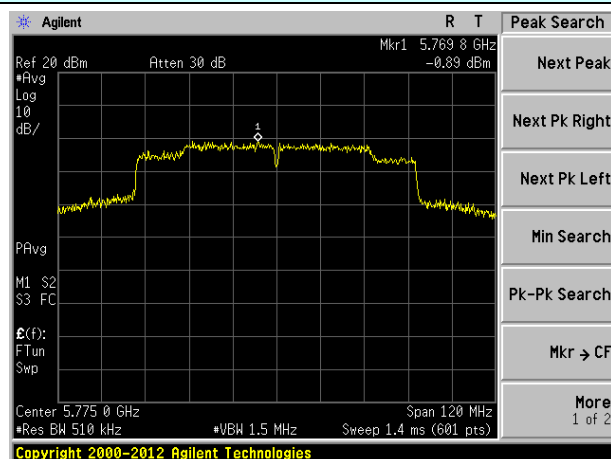
Highest channel

Test mode: 802.11ac(HT80)

Main Antenna:	Aux Antenna:
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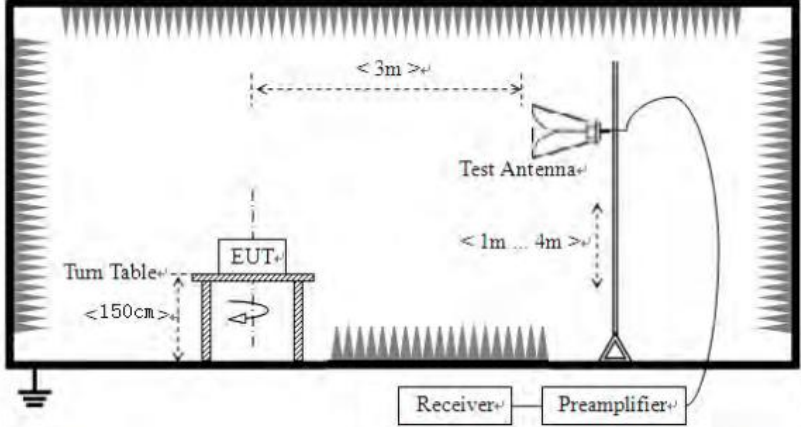
Middle channel



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:	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

Remark:

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

$$E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$$
For example, if EIRP = -27dBm

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

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

$$E[\text{dBuV/m}] = 15.6 + 95.2 = 111.1\text{dBuV/m}.$$

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

Measurement data:

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
5725.00	48.84	32.53	9.83	35.86	55.34	122.20	-66.86	Horizontal
5850.00	46.25	32.70	9.99	36.05	52.89	122.20	-69.31	Horizontal
5855.00	44.32	32.72	9.99	36.07	50.96	111.10	-60.14	Horizontal
5875.00	45.55	32.74	10.04	36.09	52.24	105.20	-52.96	Horizontal
5925.00	45.66	32.80	10.11	36.18	52.39	68.20	-15.81	Horizontal
5725.00	48.73	32.53	9.83	35.86	55.23	122.20	-66.97	Vertical
5850.00	48.14	32.70	9.99	36.05	54.78	122.20	-67.42	Vertical
5855.00	44.80	32.72	9.99	36.07	51.44	111.10	-59.66	Vertical
5875.00	45.65	32.74	10.04	36.09	52.34	105.20	-52.86	Vertical
5925.00	46.20	32.80	10.11	36.18	52.93	68.20	-15.27	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
5725.00	39.29	32.53	9.83	35.86	45.79	54.00	-8.21	Horizontal
5850.00	38.61	32.70	9.99	36.05	45.25	54.00	-8.75	Horizontal
5855.00	35.92	32.72	9.99	36.07	42.56	54.00	-11.44	Horizontal
5875.00	35.19	32.74	10.04	36.09	41.88	54.00	-12.12	Horizontal
5925.00	35.62	32.80	10.11	36.18	42.35	54.00	-11.65	Horizontal
5725.00	39.54	32.53	9.83	35.86	46.04	54.00	-7.96	Vertical
5850.00	38.97	32.70	9.99	36.05	45.61	54.00	-8.39	Vertical
5855.00	35.38	32.72	9.99	36.07	42.02	54.00	-11.98	Vertical
5875.00	35.60	32.74	10.04	36.09	42.29	54.00	-11.71	Vertical
5925.00	35.96	32.80	10.11	36.18	42.69	54.00	-11.31	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
5725.00	49.98	32.53	9.83	35.86	56.48	122.20	-65.72	Horizontal
5850.00	47.81	32.70	9.99	36.05	54.45	122.20	-67.75	Horizontal
5855.00	45.87	32.72	9.99	36.07	52.51	111.10	-58.59	Horizontal
5875.00	45.38	32.74	10.04	36.09	52.07	105.20	-53.13	Horizontal
5925.00	45.34	32.80	10.11	36.18	52.07	68.20	-16.13	Horizontal
5725.00	48.74	32.53	9.83	35.86	55.24	122.20	-66.96	Vertical
5850.00	47.97	32.70	9.99	36.05	54.61	122.20	-67.59	Vertical
5855.00	45.61	32.72	9.99	36.07	52.25	111.10	-58.85	Vertical
5875.00	46.00	32.74	10.04	36.09	52.69	105.20	-52.51	Vertical
5925.00	45.55	32.80	10.11	36.18	52.28	68.20	-15.92	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
5725.00	35.12	32.53	9.83	35.86	41.62	54.00	-12.38	Horizontal
5850.00	36.30	32.70	9.99	36.05	42.94	54.00	-11.06	Horizontal
5855.00	35.84	32.72	9.99	36.07	42.48	54.00	-11.52	Horizontal
5875.00	35.39	32.74	10.04	36.09	42.08	54.00	-11.92	Horizontal
5925.00	35.55	32.80	10.11	36.18	42.28	54.00	-11.72	Horizontal
5725.00	39.78	32.53	9.83	35.86	46.28	54.00	-7.72	Vertical
5850.00	36.48	32.70	9.99	36.05	43.12	54.00	-10.88	Vertical
5855.00	35.85	32.72	9.99	36.07	42.49	54.00	-11.51	Vertical
5875.00	35.64	32.74	10.04	36.09	42.33	54.00	-11.67	Vertical
5925.00	35.93	32.80	10.11	36.18	42.66	54.00	-11.34	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
5725.00	48.12	32.53	9.83	35.86	54.62	122.20	-67.58	Horizontal
5850.00	47.25	32.70	9.99	36.05	53.89	122.20	-68.31	Horizontal
5855.00	45.12	32.72	9.99	36.07	51.76	111.10	-59.34	Horizontal
5875.00	45.43	32.74	10.04	36.09	52.12	105.20	-53.08	Horizontal
5925.00	45.25	32.80	10.11	36.18	51.98	68.20	-16.22	Horizontal
5725.00	48.12	32.53	9.83	35.86	54.62	122.20	-67.58	Vertical
5850.00	48.43	32.70	9.99	36.05	55.07	122.20	-67.13	Vertical
5855.00	45.78	32.72	9.99	36.07	52.42	111.10	-58.68	Vertical
5875.00	45.79	32.74	10.04	36.09	52.48	105.20	-52.72	Vertical
5925.00	45.97	32.80	10.11	36.18	52.70	68.20	-15.50	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
5725.00	39.47	32.53	9.83	35.86	45.97	54.00	-8.03	Horizontal
5850.00	38.64	32.70	9.99	36.05	45.28	54.00	-8.72	Horizontal
5855.00	35.81	32.72	9.99	36.07	42.45	54.00	-11.55	Horizontal
5875.00	35.32	32.74	10.04	36.09	42.01	54.00	-11.99	Horizontal
5925.00	35.62	32.80	10.11	36.18	42.35	54.00	-11.65	Horizontal
5725.00	39.48	32.53	9.83	35.86	45.98	54.00	-8.02	Vertical
5850.00	38.97	32.70	9.99	36.05	45.61	54.00	-8.39	Vertical
5855.00	35.62	32.72	9.99	36.07	42.26	54.00	-11.74	Vertical
5875.00	35.90	32.74	10.04	36.09	42.59	54.00	-11.41	Vertical
5925.00	36.18	32.80	10.11	36.18	42.91	54.00	-11.09	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
5725.00	48.45	32.53	9.83	35.86	54.95	122.20	-67.25	Horizontal
5850.00	47.91	32.70	9.99	36.05	54.55	122.20	-67.65	Horizontal
5855.00	45.52	32.72	9.99	36.07	52.16	111.10	-58.94	Horizontal
5875.00	45.34	32.74	10.04	36.09	52.03	105.20	-53.17	Horizontal
5925.00	46.02	32.80	10.11	36.18	52.75	68.20	-15.45	Horizontal
5725.00	49.03	32.53	9.83	35.86	55.53	122.20	-66.67	Vertical
5850.00	47.89	32.70	9.99	36.05	54.53	122.20	-67.67	Vertical
5855.00	46.01	32.72	9.99	36.07	52.65	111.10	-58.45	Vertical
5875.00	46.19	32.74	10.04	36.09	52.88	105.20	-52.32	Vertical
5925.00	46.65	32.80	10.11	36.18	53.38	68.20	-14.82	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
5725.00	35.04	32.53	9.83	35.86	41.54	54.00	-12.46	Horizontal
5850.00	38.81	32.70	9.99	36.05	45.45	54.00	-8.55	Horizontal
5855.00	35.87	32.72	9.99	36.07	42.51	54.00	-11.49	Horizontal
5875.00	35.25	32.74	10.04	36.09	41.94	54.00	-12.06	Horizontal
5925.00	35.99	32.80	10.11	36.18	42.72	54.00	-11.28	Horizontal
5725.00	37.18	32.53	9.83	35.86	43.68	54.00	-10.32	Vertical
5850.00	39.05	32.70	9.99	36.05	45.69	54.00	-8.31	Vertical
5855.00	36.19	32.72	9.99	36.07	42.83	54.00	-11.17	Vertical
5875.00	35.58	32.74	10.04	36.09	42.27	54.00	-11.73	Vertical
5925.00	36.37	32.80	10.11	36.18	43.10	54.00	-10.90	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
5725.00	48.81	32.53	9.83	35.86	55.31	122.20	-66.89	Horizontal
5850.00	48.25	32.70	9.99	36.05	54.89	122.20	-67.31	Horizontal
5855.00	45.48	32.72	9.99	36.07	52.12	111.10	-58.98	Horizontal
5875.00	45.32	32.74	10.04	36.09	52.01	105.20	-53.19	Horizontal
5925.00	45.61	32.80	10.11	36.18	52.34	68.20	-15.86	Horizontal
5725.00	48.85	32.53	9.83	35.86	55.35	122.20	-66.85	Vertical
5850.00	48.17	32.70	9.99	36.05	54.81	122.20	-67.39	Vertical
5855.00	46.38	32.72	9.99	36.07	53.02	111.10	-58.08	Vertical
5875.00	45.66	32.74	10.04	36.09	52.35	105.20	-52.85	Vertical
5925.00	46.36	32.80	10.11	36.18	53.09	68.20	-15.11	Vertical

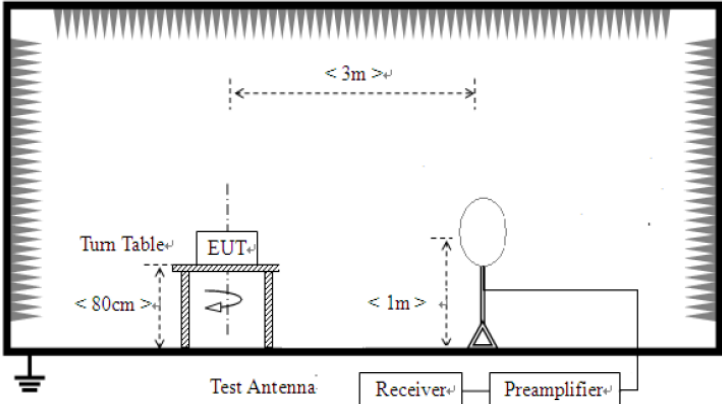
IEEE 802.11ac HT40								
Average value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	37.70	32.53	9.83	35.86	44.20	54.00	-9.80	Horizontal
5850.00	38.86	32.70	9.99	36.05	45.50	54.00	-8.50	Horizontal
5855.00	36.65	32.72	9.99	36.07	43.29	54.00	-10.71	Horizontal
5875.00	35.72	32.74	10.04	36.09	42.41	54.00	-11.59	Horizontal
5925.00	36.04	32.80	10.11	36.18	42.77	54.00	-11.23	Horizontal
5725.00	37.89	32.53	9.83	35.86	44.39	54.00	-9.61	Vertical
5850.00	39.17	32.70	9.99	36.05	45.81	54.00	-8.19	Vertical
5855.00	35.93	32.72	9.99	36.07	42.57	54.00	-11.43	Vertical
5875.00	35.89	32.74	10.04	36.09	42.58	54.00	-11.42	Vertical
5925.00	38.35	32.80	10.11	36.18	45.08	54.00	-8.92	Vertical

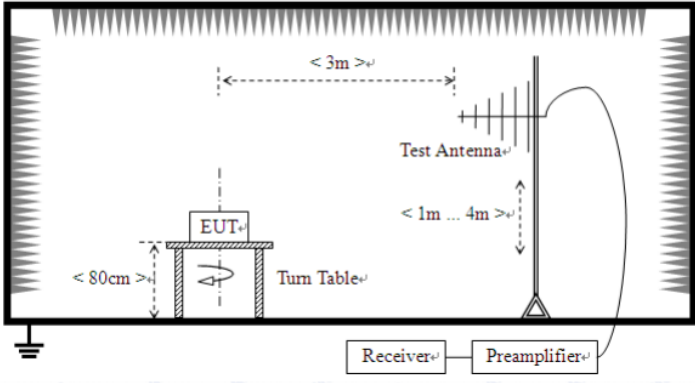
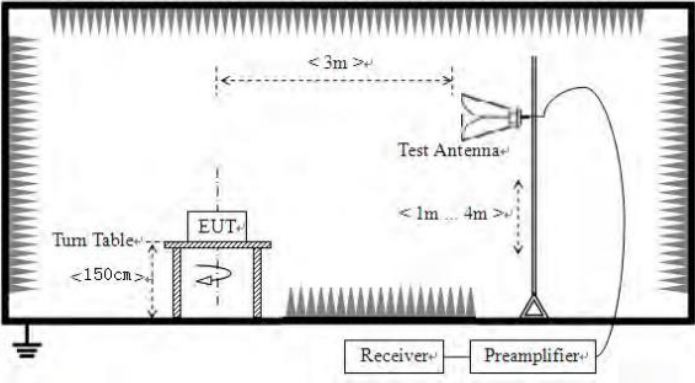
IEEE 802.11ac HT80								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	47.03	32.53	9.83	35.86	53.53	122.20	-68.67	Horizontal
5850.00	48.66	32.70	9.99	36.05	55.30	122.20	-66.90	Horizontal
5855.00	45.41	32.72	9.99	36.07	52.05	111.10	-59.05	Horizontal
5875.00	45.40	32.74	10.04	36.09	52.09	105.20	-53.11	Horizontal
5925.00	45.67	32.80	10.11	36.18	52.40	68.20	-15.80	Horizontal
5725.00	48.86	32.53	9.83	35.86	55.36	122.20	-66.84	Vertical
5850.00	48.41	32.70	9.99	36.05	55.05	122.20	-67.15	Vertical
5855.00	46.26	32.72	9.99	36.07	52.90	111.10	-58.20	Vertical
5875.00	45.55	32.74	10.04	36.09	52.24	105.20	-52.96	Vertical
5925.00	46.39	32.80	10.11	36.18	53.12	68.20	-15.08	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
5725.00	39.98	32.53	9.83	35.86	46.48	54.00	-7.52	Horizontal
5850.00	38.47	32.70	9.99	36.05	45.11	54.00	-8.89	Horizontal
5855.00	35.37	32.72	9.99	36.07	42.01	54.00	-11.99	Horizontal
5875.00	37.61	32.74	10.04	36.09	44.30	54.00	-9.70	Horizontal
5925.00	35.65	32.80	10.11	36.18	42.38	54.00	-11.62	Horizontal
5725.00	38.93	32.53	9.83	35.86	45.43	54.00	-8.57	Vertical
5850.00	38.71	32.70	9.99	36.05	45.35	54.00	-8.65	Vertical
5855.00	36.86	32.72	9.99	36.07	43.50	54.00	-10.50	Vertical
5875.00	35.79	32.74	10.04	36.09	42.48	54.00	-11.52	Vertical
5925.00	36.86	32.80	10.11	36.18	43.59	54.00	-10.41	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
	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		Peak	1MHz	3MHz	RMS 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:	Below 30MHz			
					
Test setup:	Below 1GHz				

	 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 results:	Pass

Two antennas are tested, only the worst case's (Main Antenna) data was showed.

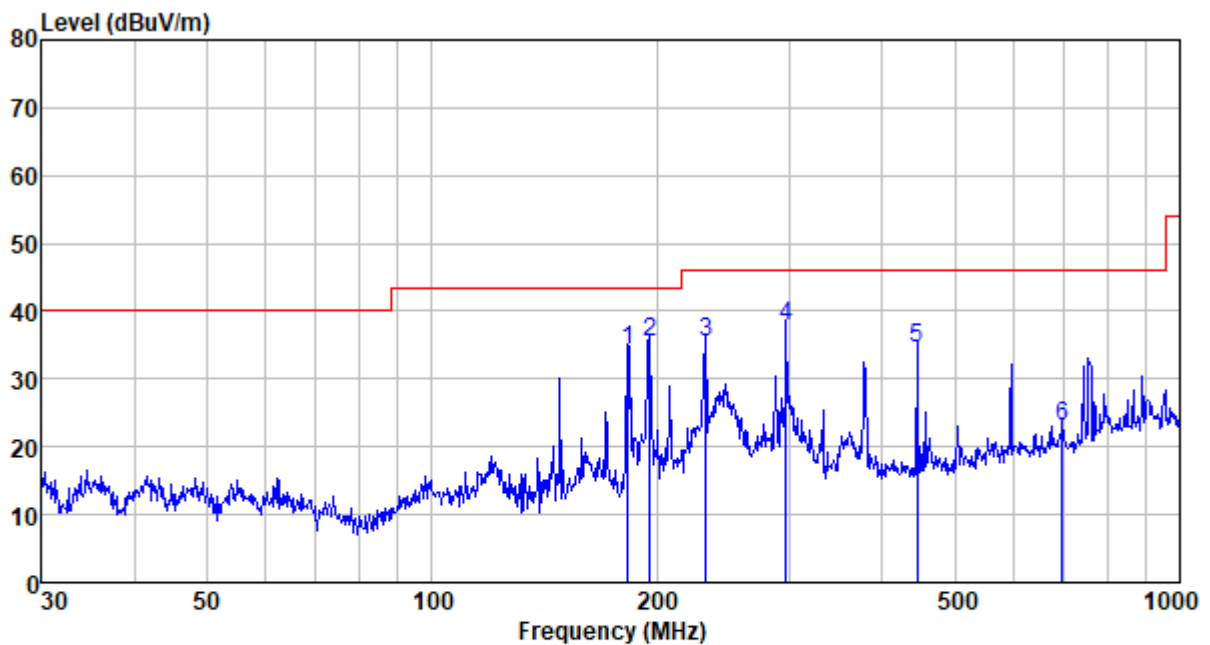
Measurement Data

■ 9kHz~30MHz

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

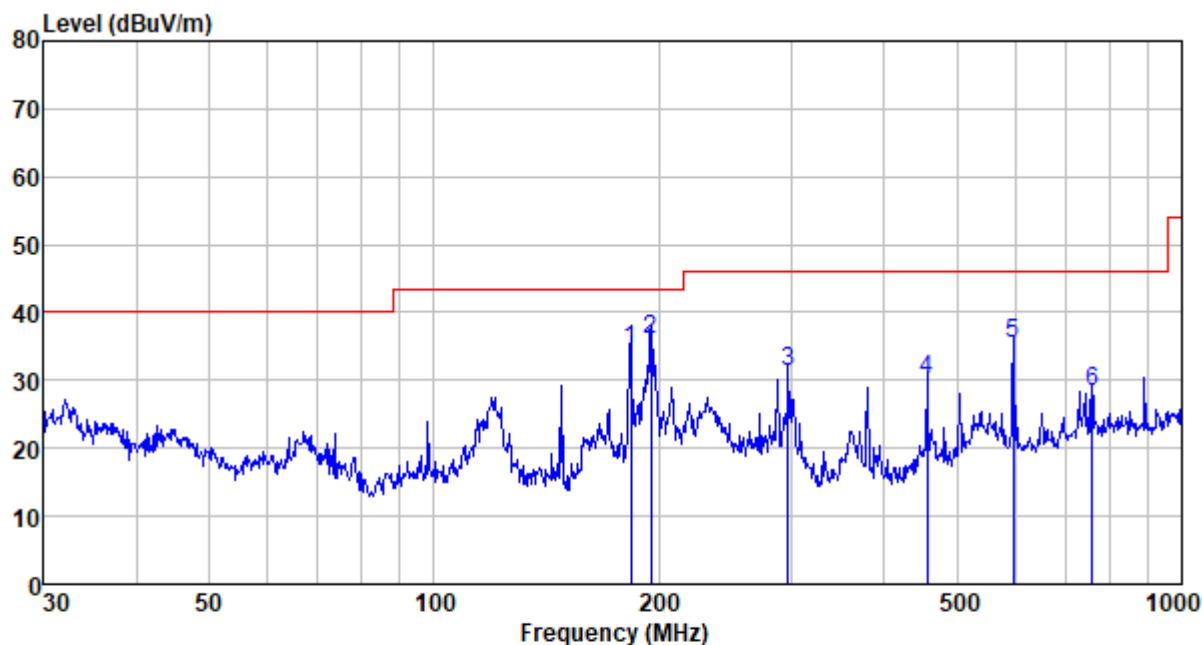
■ Below 1GHz

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamplifier factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
182.559	60.58	9.15	1.75	37.25	34.23	43.50	-9.27	QP
195.822	60.71	10.17	1.82	37.31	35.39	43.50	-8.11	QP
232.532	59.06	11.60	2.03	37.36	35.33	46.00	-10.67	QP
297.224	59.26	13.53	2.35	37.42	37.72	46.00	-8.28	QP
444.851	52.66	16.28	3.07	37.52	34.49	46.00	-11.51	QP
696.857	36.88	19.60	4.08	37.63	22.93	46.00	-23.07	QP

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
183.201	60.77	9.23	1.75	37.25	34.50	43.50	-9.00	QP
195.137	61.35	10.17	1.81	37.31	36.02	43.50	-7.48	QP
297.224	52.88	13.53	2.35	37.42	31.34	46.00	-14.66	QP
455.906	48.13	16.48	3.11	37.51	30.21	46.00	-15.79	QP
595.133	49.97	19.39	3.70	37.54	35.52	46.00	-10.48	QP
758.041	41.01	20.66	4.31	37.62	28.36	46.00	-17.64	QP

■ Above 1GHz

Main Antenna:

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	22.53	21.64	44.17	54(Note3)	-9.83	PK
V	17235	23.16	21.80	44.96	54(Note3)	-9.04	PK
H	11490	23.54	21.83	45.37	54(Note3)	-8.63	PK
H	17235	22.41	21.67	44.08	54(Note3)	-9.92	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	21.07	21.64	42.71	54(Note3)	-11.29	PK
V	17355	21.67	21.80	43.47	54(Note3)	-10.53	PK
H	11570	21.70	21.83	43.53	54(Note3)	-10.47	PK
H	17355	23.21	21.67	44.88	54(Note3)	-9.12	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	22.73	21.64	44.37	54(Note3)	-9.63	PK
V	17475	22.43	21.80	44.23	54(Note3)	-9.77	PK
H	11650	21.41	21.83	43.24	54(Note3)	-10.76	PK
H	17475	22.18	21.67	43.85	54(Note3)	-10.15	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	23.56	21.64	45.20	54(Note3)	-8.80	PK
V	17265	22.76	21.80	44.56	54(Note3)	-9.44	PK
H	11510	22.01	21.83	43.84	54(Note3)	-10.16	PK
H	17265	23.51	21.67	45.18	54(Note3)	-8.82	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	22.68	21.64	44.32	54(Note3)	-9.68	PK
V	17385	22.52	21.80	44.32	54(Note3)	-9.68	PK
H	11590	23.28	21.83	45.11	54(Note3)	-8.89	PK
H	17385	23.03	21.67	44.70	54(Note3)	-9.30	PK

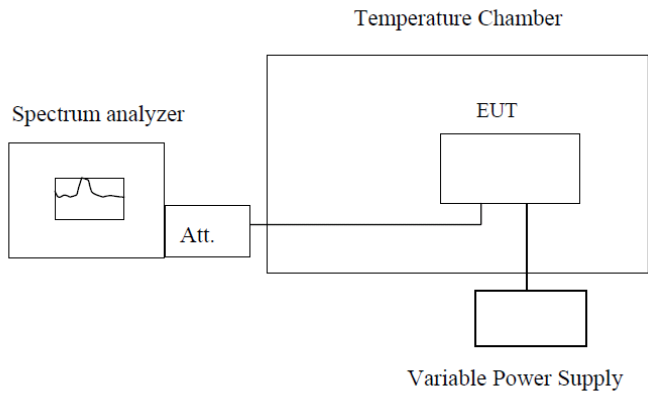
Test mode:		802.11ac(HT80)		Test channel:		Middle	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Detector
V	11550.00	21.48	21.64	43.12	54(Note3)	-10.88	PK
V	17325.00	21.34	21.80	43.14	54(Note3)	-10.86	PK
H	11550.00	21.83	21.83	43.66	54(Note3)	-10.34	PK
H	17325.00	22.81	21.67	44.48	54(Note3)	-9.52	PK

Note:

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.

Note: All low mid high channels have been tested, only worse case is reported.

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:	a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage. b. Turn the EUT on and couple its output to a spectrum analyzer. c. Turn the EUT off and set the chamber to the highest temperature specified. d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes. e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minute s. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
Test setup:	 Note : Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

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

Measurement data:

802.11a					
Frequency stability versus Temp.					
Power Supply: DC AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5745	5744.2102	5744.1730	5743.3087	5743.4002
	5785	5784.9743	5783.6937	5784.7982	5783.0373
	5825	5824.6468	5824.9649	5824.6895	5823.0550
-20	5745	5744.4561	5743.0056	5744.5526	5744.1013
	5785	5784.5442	5784.4955	5784.4459	5784.4746
	5825	5824.0011	5824.7894	5824.5831	5824.9399
-10	5745	5743.6941	5743.1047	5744.2731	5744.5999
	5785	5783.8920	5783.9958	5784.6764	5784.5800
	5825	5824.9065	5824.2440	5824.2491	5824.4049
0	5745	5743.2674	5743.2975	5744.6592	5744.4675
	5785	5784.1520	5784.1345	5784.6207	5784.9884
	5825	5824.5554	5823.8273	5824.0706	5824.1136
10	5745	5743.8950	5743.4670	5744.8751	5744.6784
	5785	5783.2603	5783.8371	5784.4425	5784.3664
	5825	5823.0713	5824.7840	5824.7994	5824.4838
20	5745	5744.8723	5743.6615	5744.0774	5744.8218
	5785	5783.4175	5784.4520	5784.2573	5783.6982
	5825	5824.1242	5823.4919	5823.5346	5824.6201
30	5745	5743.0074	5744.5384	5744.8058	5744.7415
	5785	5784.6897	5784.1376	5784.3448	5783.0274
	5825	5824.8449	5824.8875	5824.6606	5824.3186
40	5745	5744.2856	5743.2241	5744.4432	5744.1488
	5785	5783.8166	5783.6084	5783.1993	5783.3519
	5825	5823.2140	5824.5027	5823.8720	5823.7175
50	5745	5743.5943	5744.3493	5743.9204	5743.5404
	5785	5784.9685	5784.5514	5784.9822	5784.8557
	5825	5824.8216	5823.7106	5823.0095	5823.6858
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
102	5745	5744.6107	5744.8793	5743.0051	5744.2912
	5785	5783.5077	5783.3618	5783.1411	5783.4553
	5825	5824.9950	5824.7075	5824.2380	5824.5271
120	5745	5743.5590	5744.0210	5744.9286	5744.8162
	5785	5783.9135	5783.3627	5784.0877	5783.6476
	5825	5824.0472	5824.0699	5824.4606	5823.3868
138	5745	5744.6168	5744.1895	5743.6353	5743.9060
	5785	5783.9081	5784.5187	5783.6492	5783.4545
	5825	5824.9699	5824.4083	5825.9982	5823.6247

Note: The worst case is FL=5743.0051MHz, FH=5825.9982MHz

802.11n(HT20)					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5745	5745.6538	5744.3160	5743.7168	5746.5341
	5785	5785.6607	5784.9600	5783.8469	5786.8073
	5825	5825.9773	5824.5218	5824.4080	5826.4048
-20	5745	5745.7531	5744.5145	5744.9214	5745.2977
	5785	5785.1995	5784.1963	5784.6512	5785.2233
	5825	5825.0265	5824.4787	5824.4096	5825.5989
-10	5745	5745.8704	5744.3406	5744.1488	5745.0093
	5785	5785.5795	5784.8482	5784.1677	5785.0350
	5825	5825.2303	5824.8473	5824.8897	5825.3610
0	5745	5745.8401	5744.1141	5744.3924	5745.3976
	5785	5785.6039	5784.5099	5784.0147	5785.7953
	5825	5825.6170	5824.7408	5824.1077	5825.6570
10	5745	5745.1479	5744.4535	5744.0200	5745.9454
	5785	5785.5687	5784.4080	5784.8117	5785.6900
	5825	5825.2025	5824.3605	5824.8960	5825.9865
20	5745	5745.9964	5744.8568	5744.7207	5745.6635
	5785	5785.8777	5784.0377	5784.7956	5785.2393
	5825	5825.7554	5824.4695	5824.3006	5825.5138
30	5745	5745.9275	5744.9651	5744.7801	5745.0002
	5785	5785.5984	5784.5961	5784.8302	5785.0422
	5825	5825.8679	5824.5777	5824.8455	5825.8145
40	5745	5745.2094	5744.2900	5744.1550	5745.2296
	5785	5785.8806	5784.7796	5784.1971	5785.5303
	5825	5825.5370	5824.3899	5824.9461	5825.3970
50	5745	5745.2365	5744.3604	5744.4755	5745.5349
	5785	5785.8530	5784.6293	5784.3875	5785.1547
	5825	5825.9845	5824.8057	5824.9550	5825.1682
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
102	5745	5746.9862	5745.5808	5744.2017	5743.0046
	5785	5785.3100	5785.8762	5784.3342	5783.4142
	5825	5825.7110	5825.0311	5824.2828	5823.0249
120	5745	5745.7433	5745.2353	5744.9383	5743.7021
	5785	5785.7955	5785.1432	5784.4246	5784.4550
	5825	5825.0710	5825.5954	5824.6440	5824.1964
138	5745	5745.9985	5745.4882	5744.0242	5744.9607
	5785	5785.3446	5785.5707	5784.1771	5784.9933
	5825	5825.5188	5825.2195	5824.6928	5824.1439

Note: The worst case is FL=5743.0046MHz, FH=5825.9985MHz

802.11ac(HT20)					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5745	5743.8950	5743.4481	5743.7560	5744.9805
	5785	5783.1719	5783.7883	5784.5028	5784.6532
	5825	5823.4981	5823.0645	5824.2334	5824.5823
-20	5745	5743.4254	5743.9095	5744.8010	5744.3740
	5785	5783.4678	5784.3553	5784.9642	5784.7599
	5825	5824.6564	5824.9472	5824.2577	5824.3766
-10	5745	5744.9100	5744.4744	5744.4837	5744.7658
	5785	5784.4359	5784.2457	5784.9300	5784.8068
	5825	5824.7216	5824.6379	5824.5443	5824.1809
0	5745	5744.2750	5744.3616	5744.6084	5744.5619
	5785	5784.4541	5784.9432	5784.1815	5784.5773
	5825	5824.3058	5824.5503	5824.0205	5824.6015
10	5745	5744.0463	5744.2591	5744.4608	5744.0985
	5785	5784.4709	5784.1693	5784.0435	5784.6630
	5825	5824.2235	5824.6250	5824.3844	5824.1821
20	5745	5744.7545	5744.5870	5744.2171	5744.6469
	5785	5784.7653	5784.1527	5784.2489	5784.0463
	5825	5824.9682	5824.7658	5824.9531	5824.0515
30	5745	5744.0960	5744.7204	5744.3355	5744.6980
	5785	5784.5335	5784.5590	5784.3801	5784.4099
	5825	5824.1579	5824.9285	5824.9512	5824.9853
40	5745	5744.7576	5744.0608	5744.8919	5744.0890
	5785	5784.4681	5784.2405	5784.0871	5784.2692
	5825	5824.6917	5824.0508	5824.1573	5824.7785
50	5745	5744.1751	5744.3683	5744.2156	5744.1090
	5785	5784.9757	5784.4071	5784.7604	5784.0501
	5825	5824.4222	5824.9646	5824.4794	5824.3508
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
102	5745	5745.2006	5743.1164	5744.6947	5744.8261
	5785	5785.8253	5785.8825	5784.2901	5784.6720
	5825	5825.2825	5825.0362	5824.9130	5824.5437
120	5745	5745.6077	5745.0350	5744.9599	5744.4020
	5785	5785.3176	5785.8770	5784.7386	5784.0056
	5825	5825.2067	5825.1195	5824.0130	5824.0493
138	5745	5745.4011	5745.1608	5744.4304	5744.3241
	5785	5785.6992	5785.3145	5784.9883	5784.8086
	5825	5826.9784	5825.9545	5824.0409	5824.2783

Note: The worst case is FL=5743.1164MHz, FH=5826.9784MHz

802.11n(HT40)					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5755	5755.2049	5753.1230	5753.5858	5756.7117
	5795	5795.1927	5794.4915	5793.3547	5796.7846
-20	5755	5755.5382	5754.7554	5754.4287	5756.6832
	5795	5795.7337	5794.7436	5794.2281	5796.0063
-10	5755	5755.5919	5754.0883	5754.7261	5755.5390
	5795	5795.7734	5794.5489	5794.9428	5795.2519
0	5755	5755.0379	5754.3896	5754.4520	5755.8655
	5795	5795.4061	5794.1163	5794.9851	5795.0476
10	5755	5755.8281	5754.0860	5754.3998	5755.4068
	5795	5795.4306	5794.9440	5794.7436	5795.7682
20	5755	5755.8861	5754.0849	5754.5278	5755.3734
	5795	5795.6221	5794.4203	5794.8388	5795.3147
30	5755	5755.4460	5754.7727	5754.6723	5755.3715
	5795	5795.1204	5794.5612	5794.3539	5795.5774
40	5755	5755.8332	5754.7989	5754.8831	5755.7765
	5795	5795.9927	5794.3897	5794.4479	5795.0045
50	5755	5755.3122	5754.8779	5754.9039	5755.9167
	5795	5795.9877	5794.0503	5794.6613	5795.4268
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
102	5755	5755.9482	5753.0006	5756.1145	5753.0192
	5795	5795.5129	5793.2690	5796.6813	5794.0564
120	5755	5755.2562	5754.5516	5755.2827	5754.9911
	5795	5796.9196	5794.3075	5795.1904	5794.5419
138	5755	5755.0860	5754.9008	5755.4912	5754.7274
	5795	5795.5890	5794.3615	5795.1389	5794.7089

Note: The worst case is FL=5753.0192MHz, FH=5796.9196MHz

802.11ac(HT40)					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5755	5755.4919	5754.8838	5756.9547	5754.8763
	5795	5795.4061	5794.8974	5795.0023	5794.4393
-20	5755	5755.9164	5754.4060	5755.2175	5754.6223
	5795	5795.1812	5794.6947	5795.3400	5794.1314
-10	5755	5755.0407	5754.3983	5755.5280	5754.9930
	5795	5795.9851	5794.2700	5795.4396	5794.9954
0	5755	5755.3472	5754.0551	5755.1412	5754.0152
	5795	5795.8028	5794.0213	5795.9645	5794.7866
10	5755	5755.8531	5754.6660	5755.0314	5754.0438
	5795	5795.5892	5794.9769	5795.8649	5794.0817
20	5755	5755.8002	5754.6976	5755.3368	5754.2224
	5795	5795.5389	5794.3911	5795.4846	5794.4312
30	5755	5755.9111	5754.2755	5755.1723	5754.4545
	5795	5795.2144	5794.0879	5795.5563	5794.2421
40	5755	5755.4970	5754.5025	5755.7182	5754.8823
	5795	5795.3513	5794.4935	5795.3501	5794.5756
50	5755	5755.2887	5754.8363	5755.9757	5754.3740
	5795	5795.0441	5794.0925	5795.4675	5794.2077
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
102	5755	5756.6588	5754.0621	5756.5906	5753.6351
	5795	5795.1353	5794.8155	5796.7517	5794.0210
120	5755	5755.9786	5754.0177	5755.8628	5754.7309
	5795	5795.5983	5794.7388	5795.7625	5794.7080
138	5755	5755.9570	5754.6718	5755.5845	5754.2170
	5795	5795.9946	5794.1815	5795.4275	5794.8567

Note: The worst case is FL=5754.0210MHz, FH=5795.9946MHz

802.11ac(HT80)					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
-30	5775	5775.2960	5775.2044	5774.9613	5774.4760
-20	5775	5775.5096	5775.6951	5774.6756	5774.6527
-10	5775	5775.3670	5775.2713	5774.8657	5774.7073
0	5775	5775.5809	5775.5244	5774.4049	5774.9832
10	5775	5775.3906	5775.8858	5774.2004	5774.4875
20	5775	5775.2940	5775.1041	5774.5732	5774.3688
30	5775	5775.3446	5775.2031	5774.3945	5774.6836
40	5775	5775.0234	5775.3893	5774.4958	5774.4392
50	5775	5775.6041	5775.0712	5774.9905	5774.6651
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute Measured Frequency (MHz)	2 minute Measured Frequency (MHz)	5 minute Measured Frequency (MHz)	10 minute Measured Frequency (MHz)
102	5775	5774.4378	5775.3280	5776.7750	5775.0426
120	5775	5774.7513	5776.3430	5776.4720	5775.7647
138	5775	5774.0028	5775.6519	5775.5240	5776.9986

Note: The worst case is FL=5774.0028MHz, FH=5776.9986MHz

8 Test Setup Photo

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

9 EUT Constructional Details

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

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