FCC REPORT

Applicant:	Quantum Creations LLC.
Address of Applicant:	15705 NW 13th Ave, Miami Gardens, Miami Beach, Florida 33169, United States
Manufacturer/Factory:	MELE TECHNOLOGIES(SHENZHEN) CO.,LTD
Address of Manufacturer/Factory:	1F, Bldg#2, 28 Cuijing Road, Pingshan District, Shenzhen, PR China.

Equipment Under Test (EUT)

Product Name:	Access 3
Model No.:	A-1198-AA3, A-1198-AA3-1, A-1198-AA3-2, A-1198-AA3-3, A-1198-AA3-4, A-1198-AA3-5, A-1198-AA3-6, A-1198-AA3-7, A-1198-AA3-8, A-1198-AA3-9
Trade Mark:	AZULLE
FCC ID:	2AFJI20181198
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	August 28, 2018
Date of Test:	August 28-September 07, 2018
Date of report issued:	September 07, 2018
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	*September 07, 2018*	*Original*

Prepared By:	Tiger. Chen	***Date:***	*September 07, 2018*
	Project Engineer		
Check By:	Robinson Lo	***Date:***	*September 07, 2018*
	Reviewer		

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 TEST SUMMARY 4

4.1 MEASUREMENT UNCERTAINTY 4

5 GENERAL INFORMATION 5

5.1 GENERAL DESCRIPTION OF EUT 5
5.2 TEST MODE 7
5.3 DESCRIPTION OF SUPPORT UNITS 7
5.4 TEST FACILITY 7
5.5 TEST LOCATION 7
5.6 ADDITIONAL INSTRUCTIONS 8

6 TEST INSTRUMENTS LIST 9

7 TEST RESULTS AND MEASUREMENT DATA 11

7.1 ANTENNA REQUIREMENT 11
7.2 CONDUCTED EMISSIONS 12
7.3 CONDUCTED PEAK OUTPUT POWER 15
7.4 CHANNEL BANDWIDTH 17
7.5 POWER SPECTRAL DENSITY 24
7.6 BAND EDGES 32
7.6.1 Radiated Emission Method 32
7.7 SPURIOUS EMISSION 40
7.7.1 Radiated Emission Method 40
7.8 FREQUENCY STABILITY 49

8 TEST SETUP PHOTO 55

9 EUT CONSTRUCTIONAL DETAILS 56

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	± 4.34dB	(1)
Radiated Emission	30MHz ~ 1000MHz	± 4.24dB	(1)
Radiated Emission	1GHz ~ 40GHz	± 4.68dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	± 3.45dB	(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:	Access 3
Model No.:	A-1198-AA3, A-1198-AA3-1, A-1198-AA3-2, A-1198-AA3-3, A-1198-AA3-4, A-1198-AA3-5, A-1198-AA3-6, A-1198-AA3-7, A-1198-AA3-8, A-1198-AA3-9
Test Model No:	A-1198-AA3
Serial No.:	000001
Test sample(s) ID:	GTS201808000194-1
Sample(s) Status:	Engineer sample
Hardware Version:	V1.1
Software Version:	V1.1
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): 6 802.11n(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:	Orthogonal Frequency Division Multiplexing (OFDM)
Antenna Type:	Integral Antenna
Antenna gain:	2dBi (declare by manufacturer)
Power supply:	SWITCHING ADAPTOR Model No.: FJ-SW0503000N Input: AC 100-240V, 50/60Hz, 0.6A Max Output: DC 5V, 3000mA

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	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)**		
	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 EUT was test with max duty cycle at its maximum power control level.

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

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

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, January 08, 2018.

● **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, August 15, 2016.

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 Fixed Frequency Settings:

Special test software was pre-built-in by manufacturer.			
Mode	Channel	Frequency (MHz)	Level 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. 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

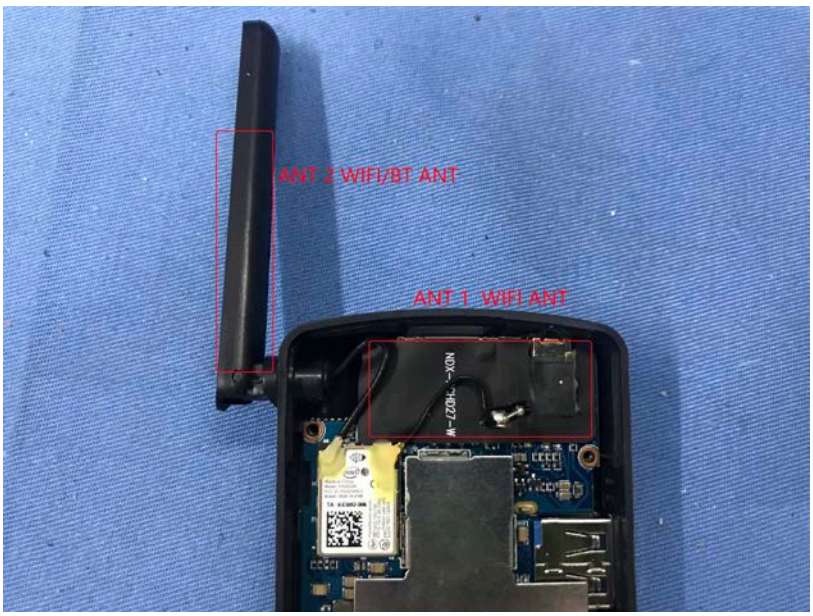
Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
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	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
9	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

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 antenna is integral antenna, the best case gain of the main antenna is 2dBi  	

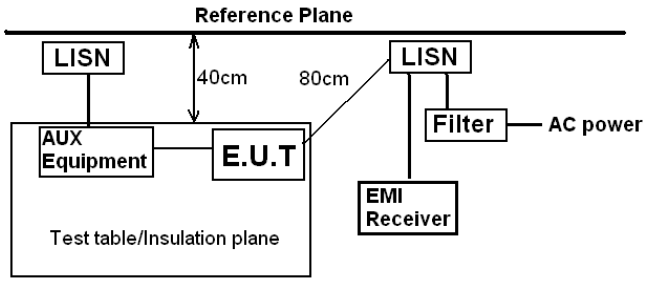
7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test setup:



Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m

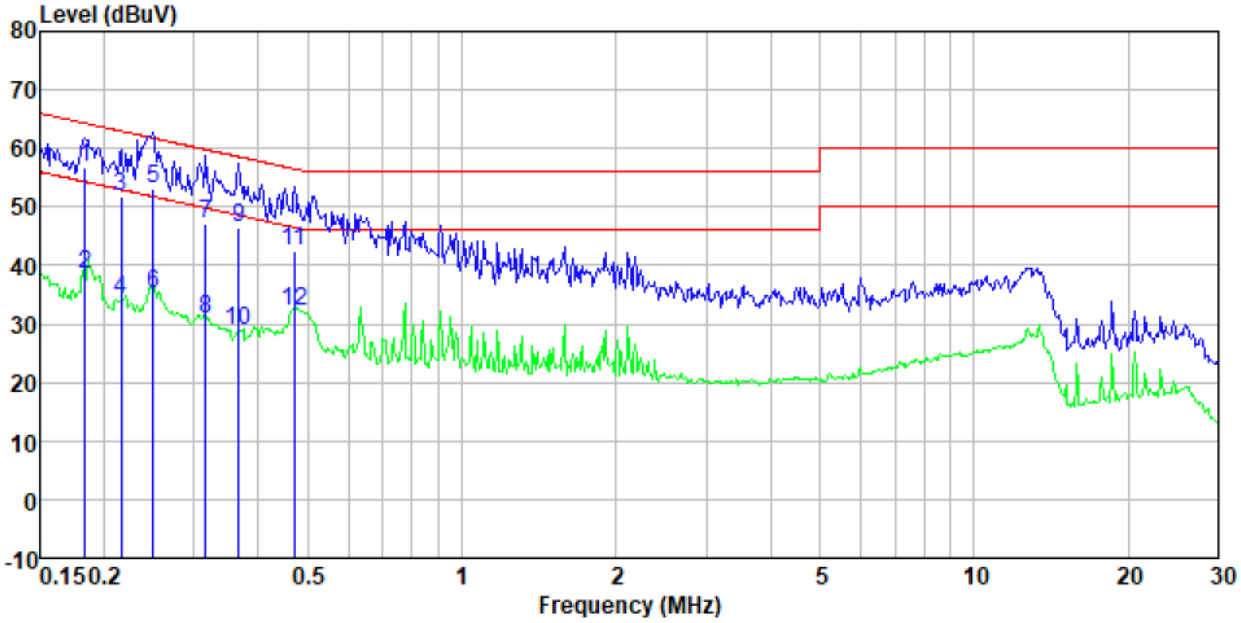
Test procedure:

1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.
2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).
3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.

Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test voltage:	AC120V 60Hz					
Test results:	Pass					

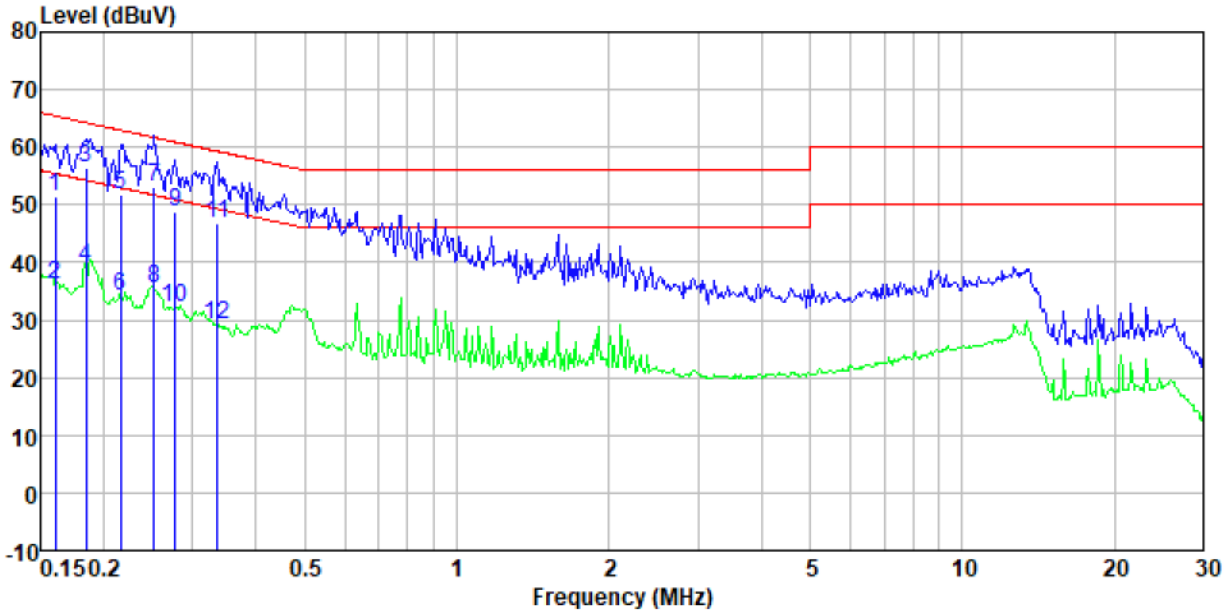
Measurement data

Test mode:	WiFi mode	Probe:	Line



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.18	56.10	0.40	0.10	56.60	64.33	-7.73	QP
0.18	37.93	0.40	0.10	38.43	54.33	-15.90	Average
0.22	51.11	0.40	0.11	51.62	62.96	-11.34	QP
0.22	33.58	0.40	0.11	34.09	52.96	-18.87	Average
0.25	52.74	0.40	0.10	53.24	61.78	-8.54	QP
0.25	34.80	0.40	0.10	35.30	51.78	-16.48	Average
0.32	46.79	0.39	0.10	47.28	59.80	-12.52	QP
0.32	30.42	0.39	0.10	30.91	49.80	-18.89	Average
0.37	46.15	0.37	0.10	46.62	58.56	-11.94	QP
0.37	28.24	0.37	0.10	28.71	48.56	-19.85	Average
0.47	42.14	0.32	0.11	42.57	56.49	-13.92	QP
0.47	31.61	0.32	0.11	32.04	46.49	-14.45	Average

Test mode:	WiFi mode	Probe:	Neutral

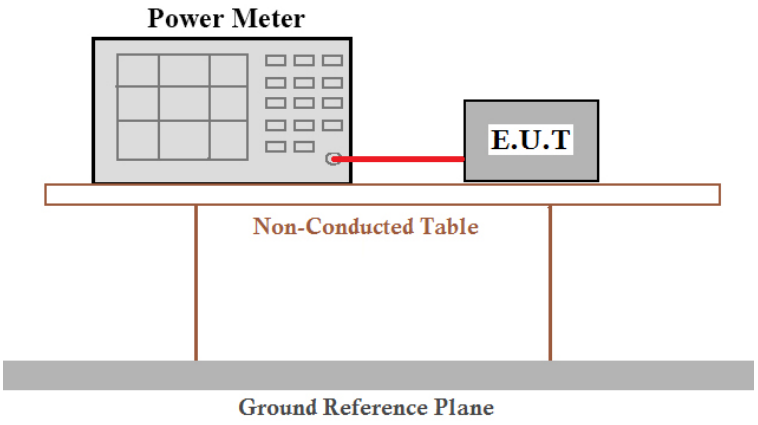


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	51.00	0.40	0.08	51.48	65.43	-13.95	QP
0.16	35.81	0.40	0.08	36.29	55.43	-19.14	Average
0.18	55.80	0.40	0.10	56.30	64.28	-7.98	QP
0.18	38.56	0.40	0.10	39.06	54.28	-15.22	Average
0.22	51.23	0.40	0.11	51.74	62.96	-11.22	QP
0.22	33.68	0.40	0.11	34.19	52.96	-18.77	Average
0.25	52.45	0.40	0.10	52.95	61.69	-8.74	QP
0.25	35.03	0.40	0.10	35.53	51.69	-16.16	Average
0.28	48.26	0.40	0.10	48.76	60.90	-12.14	QP
0.28	31.83	0.40	0.10	32.33	50.90	-18.57	Average
0.34	46.15	0.38	0.10	46.63	59.31	-12.68	QP
0.34	28.79	0.38	0.10	29.27	49.31	-20.04	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:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

ANT: 1

Test CH	Peak Output Power (dBm)	Limit(dBm)	Result
	802.11a (SISO)		
Lowest	6.97	30	Pass
Middle	5.98		
Highest	5.86		

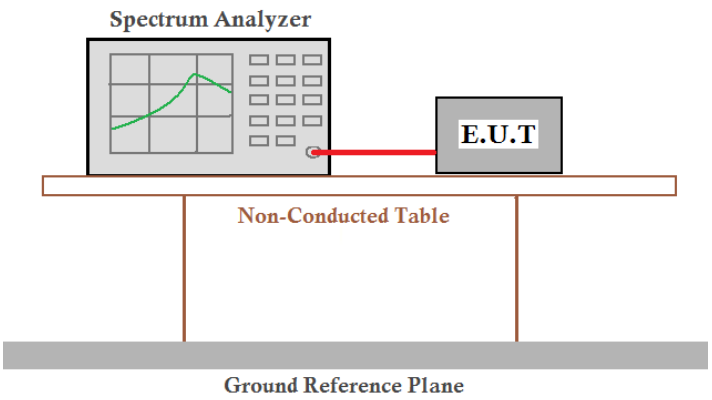
ANT: 2

Test CH	Peak Output Power (dBm)	Limit(dBm)	Result
	802.11a (SISO)		
Lowest	7.02	30	Pass
Middle	5.88		
Highest	5.77		

ANT1 + ANT2:

Test mode	Channel	Read Level (dBm)		Read Level (mW)	Total Peak Output Power (mW)	Total Peak Output Power (dBm)	Limit (dBm)	Result
802.11n (HT20) (MIMO)	Lowest	ANT1	5.13	3.26	6.44	8.09	30	Pass
		ANT2	5.02	3.18				
	Middle	ANT1	4.82	3.03	6.36	8.03		
		ANT2	5.22	3.33				
	Highest	ANT1	6.62	4.59	8.88	9.48		
		ANT2	6.32	4.29				
802.11ac(HT20) (MIMO)	Lowest	ANT1	5.97	3.95	7.90	8.98		
		ANT2	5.97	3.95				
	Middle	ANT1	6.55	4.52	8.29	9.18		
		ANT2	5.76	3.77				
	Highest	ANT1	4.31	2.69	5.41	7.33		
		ANT2	4.33	2.71				
802.11n (HT40) (MIMO)	Lowest	ANT1	5.67	3.69	6.82	8.34		
		ANT2	4.96	3.13				
	Highest	ANT1	5.24	3.34	7.62	8.82		
		ANT2	6.31	4.28				
802.11ac(HT40) (MIMO)	Lowest	ANT1	5.91	3.90	7.79	8.91		
		ANT2	5.90	3.89				
	Highest	ANT1	5.81	3.81	8.62	9.35		
		ANT2	6.82	4.81				
802.11ac(HT80) (MIMO)	Middle	ANT1	4.53	2.84	6.36	8.04		
		ANT2	5.47	3.52				

7.4 Channel Bandwidth

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

Measurement Data

Antenna 1:

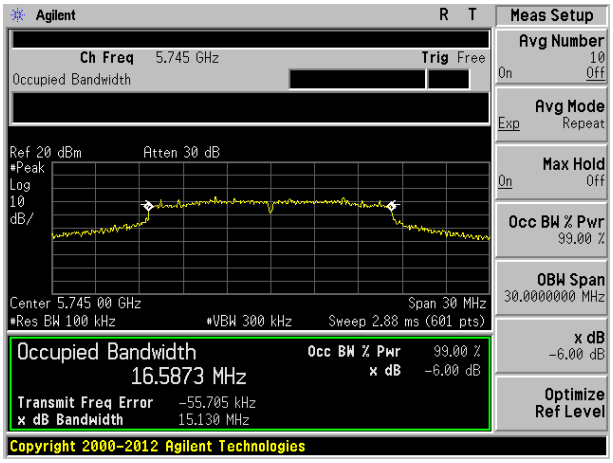
5.8G Band								
Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n(HT20)	802.11ac(HT20)	802.11n(HT40)	802.11ac(HT40)	802.11ac(HT80)		
Lowest	15.130	13.926	16.089	35.134	28.840	N/A	>500	Pass
Middle	13.860	13.908	14.156	N/A	N/A	72.650		
Highest	15.560	15.156	17.198	32.319	35.060	N/A		

Antenna 2:

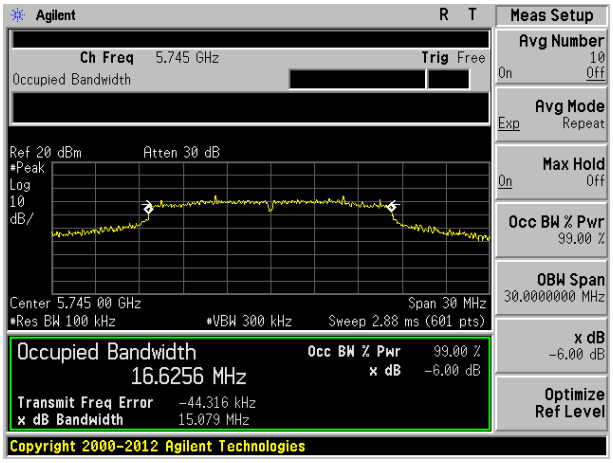
5.8G Band								
Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n(HT20)	802.11ac(HT20)	802.11n(HT40)	802.11ac(HT40)	802.11ac(HT80)		
Lowest	15.079	13.868	14.731	35.081	35.176	N/A	>500	Pass
Middle	13.776	13.249	15.117	N/A	N/A	63.902		
Highest	15.121	15.032	15.266	33.850	33.914	N/A		

Test plot as follows: Test mode: 802.11a

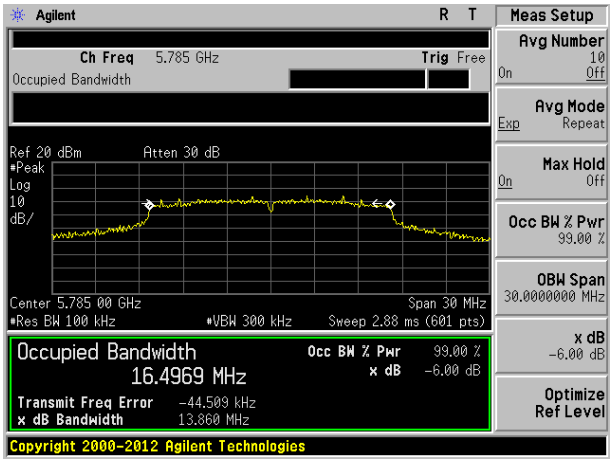
Antenna 1:	Antenna 2:



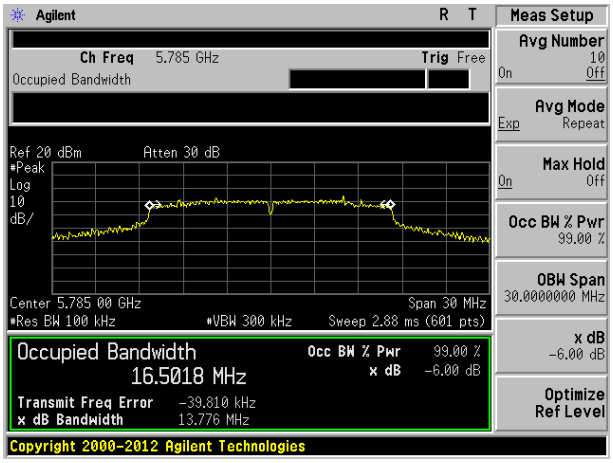
Lowest channel



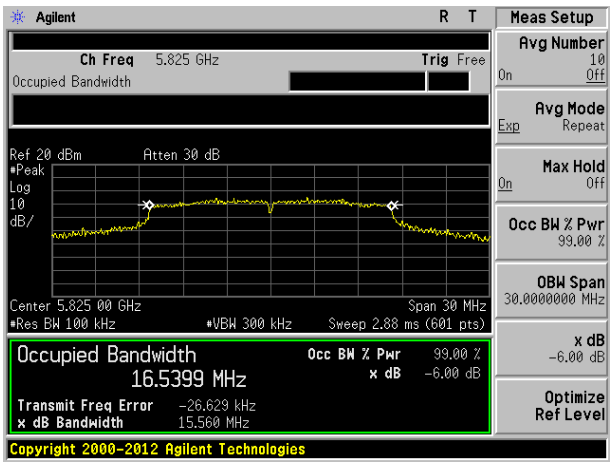
Lowest channel



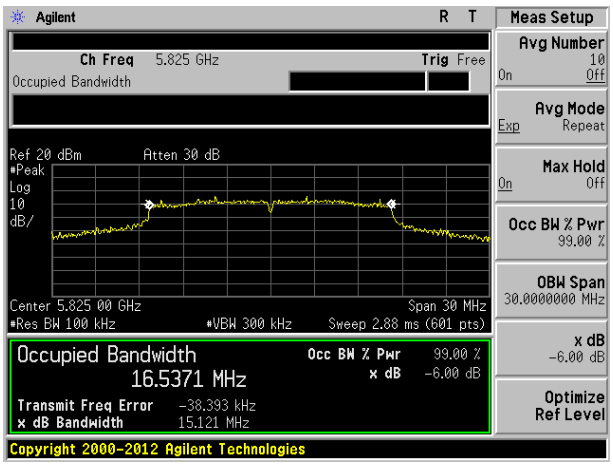
Middle channel



Middle channel



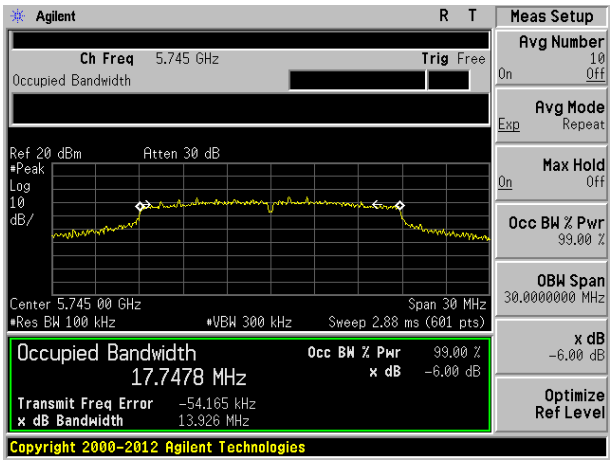
Highest channel



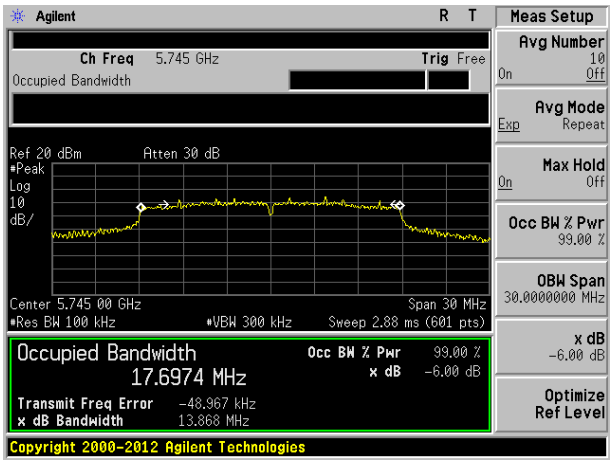
Highest channel

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

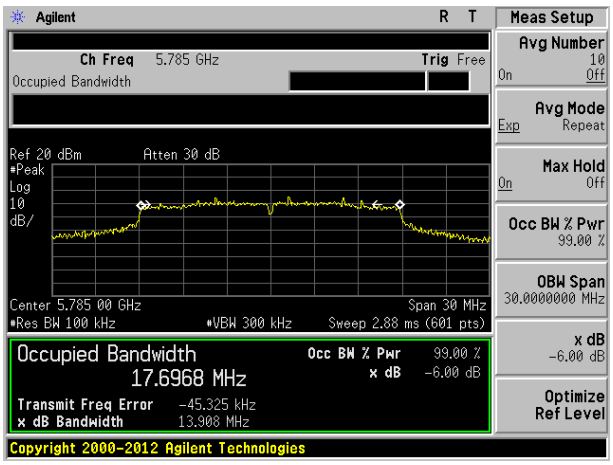
Antenna 1:	Antenna 2:



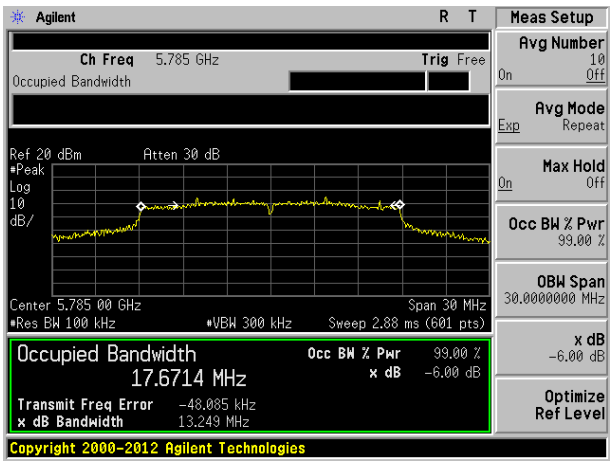
Lowest channel



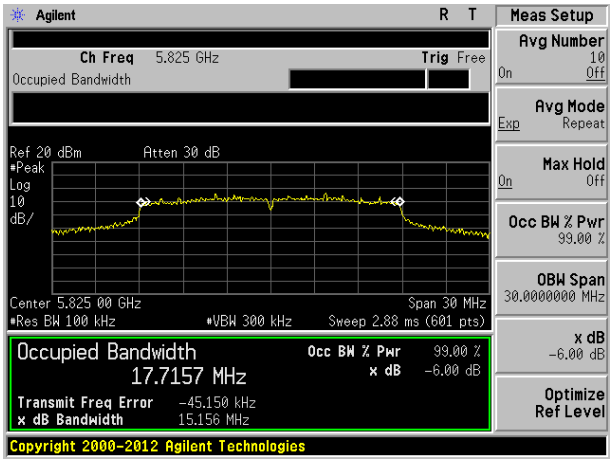
Lowest channel



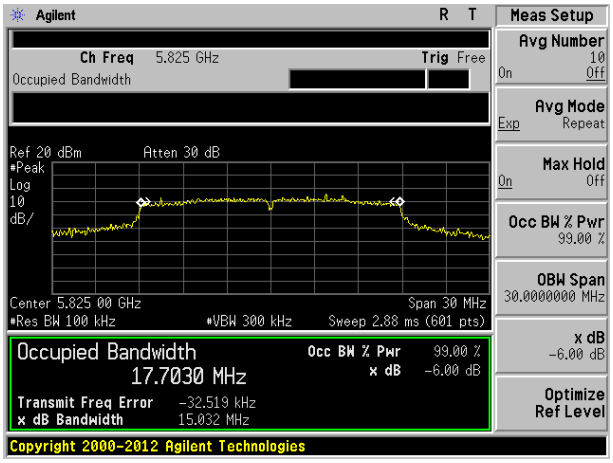
Middle channel



Middle channel



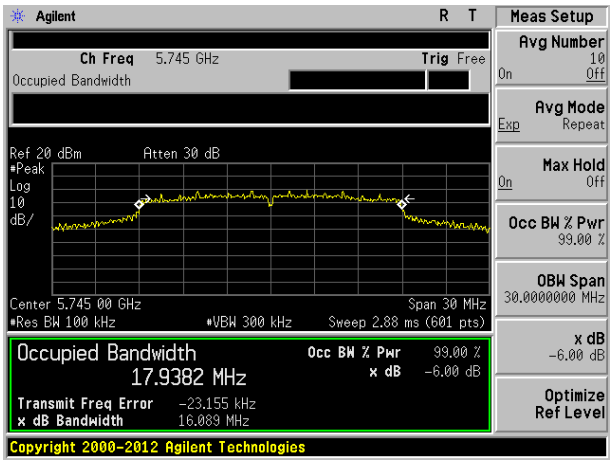
Highest channel



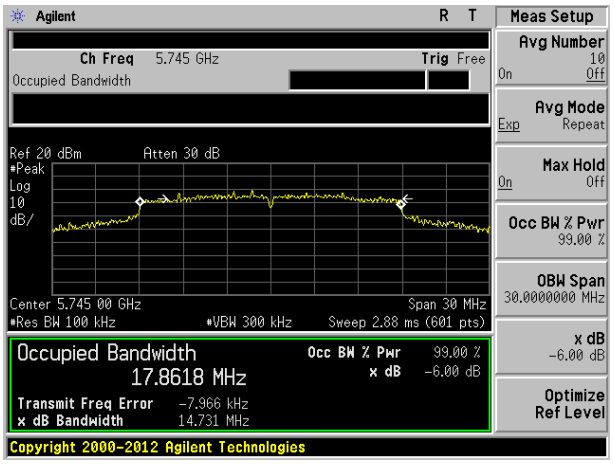
Highest channel

Test mode: 802.11ac(HT20)

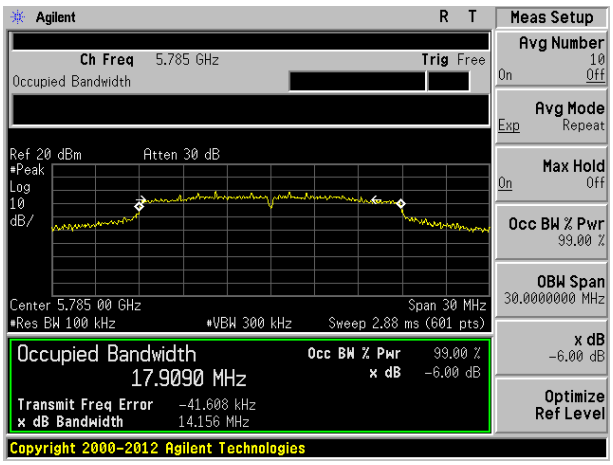
Antenna 1:	Antenna 2:



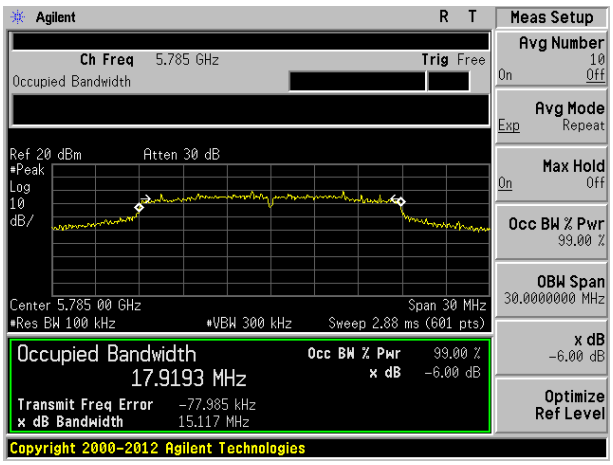
Lowest channel



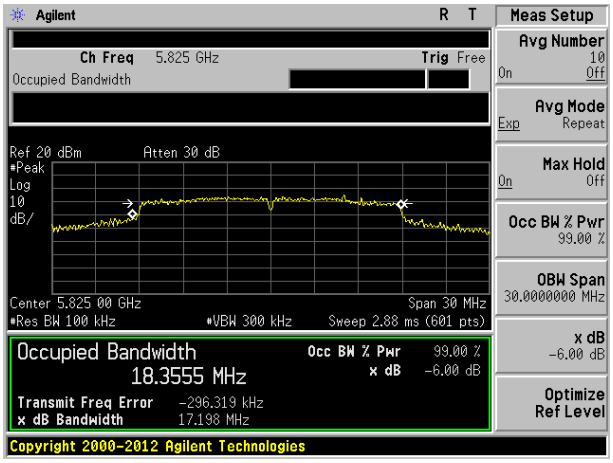
Lowest channel



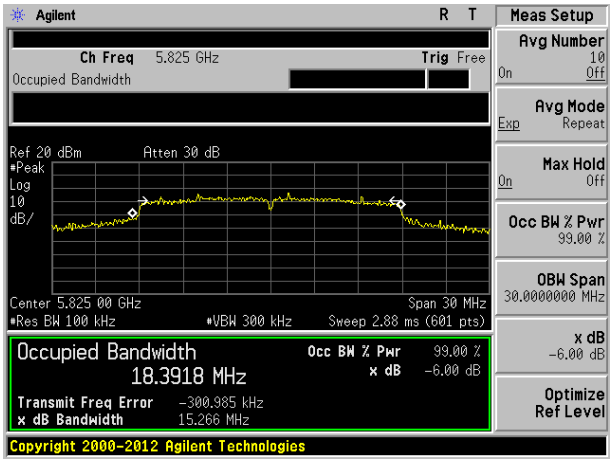
Middle channel



Middle channel



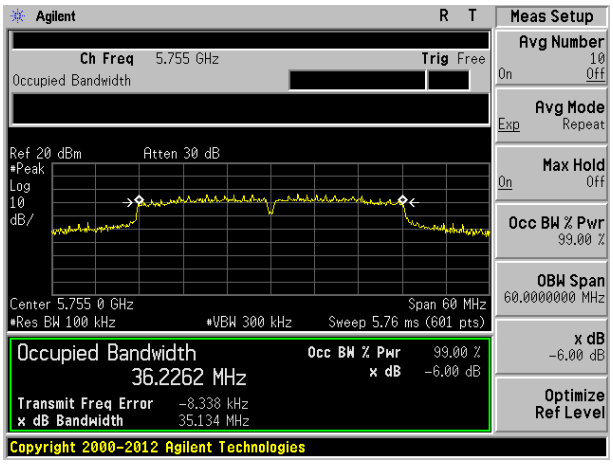
Highest channel



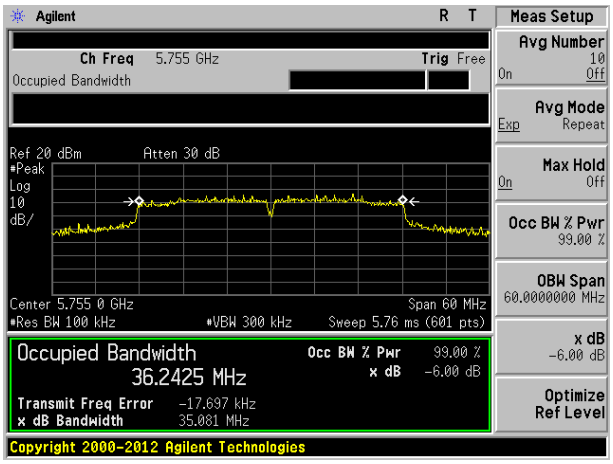
Highest channel

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

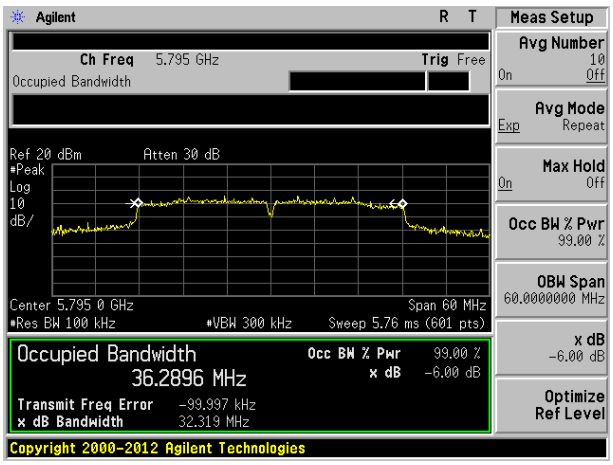
Antenna 1:	Antenna 2:



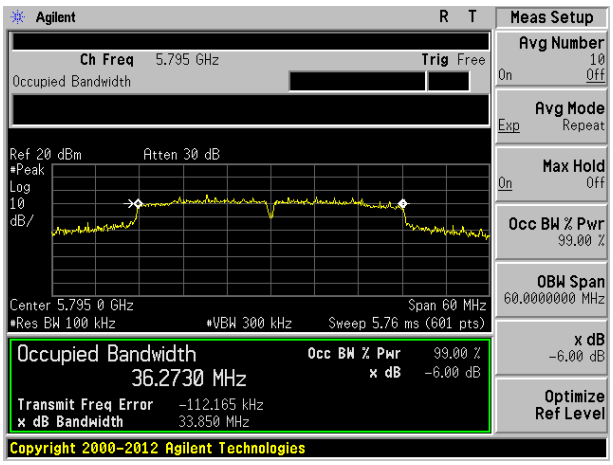
Lowest channel



Lowest channel



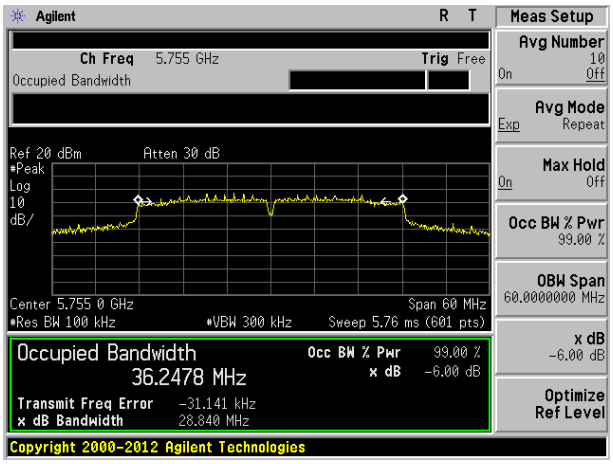
Highest channel



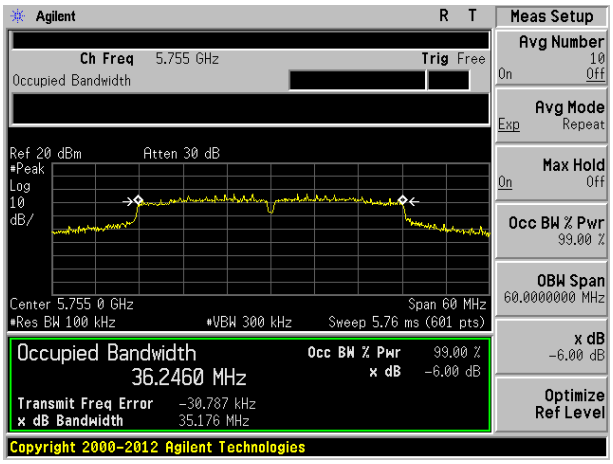
Highest channel

Test mode: 802.11ac(HT40)

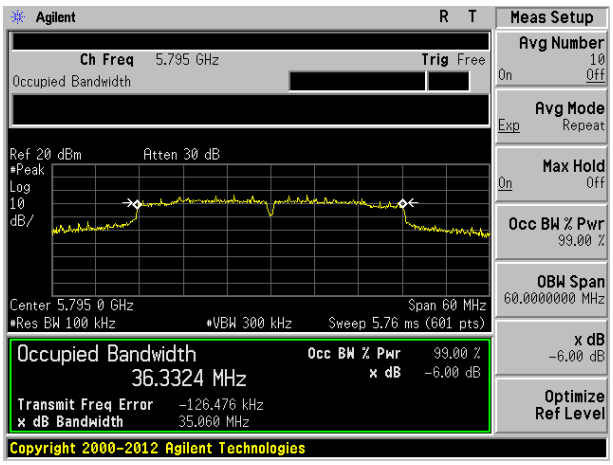
Antenna 1:	Antenna 2:



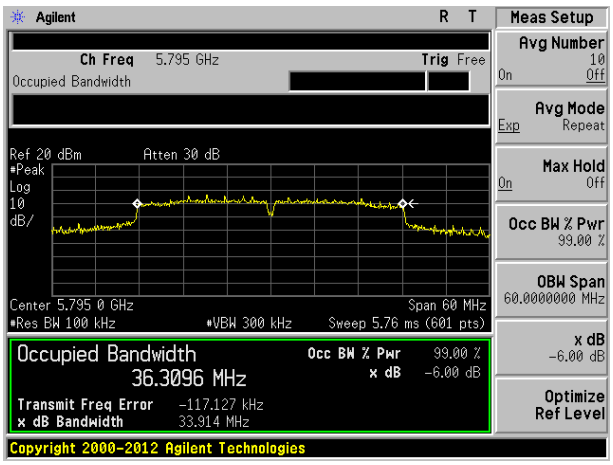
Lowest channel



Lowest channel

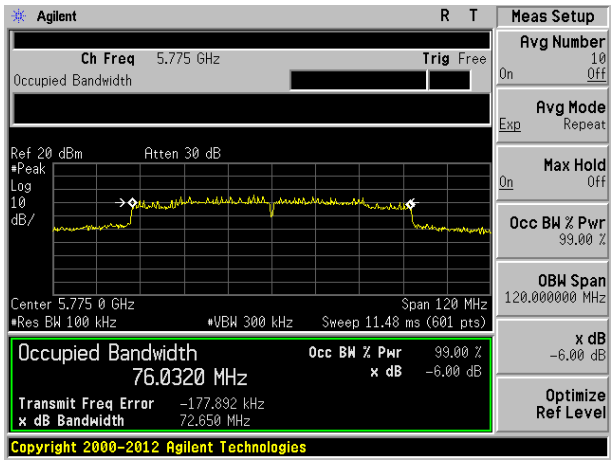
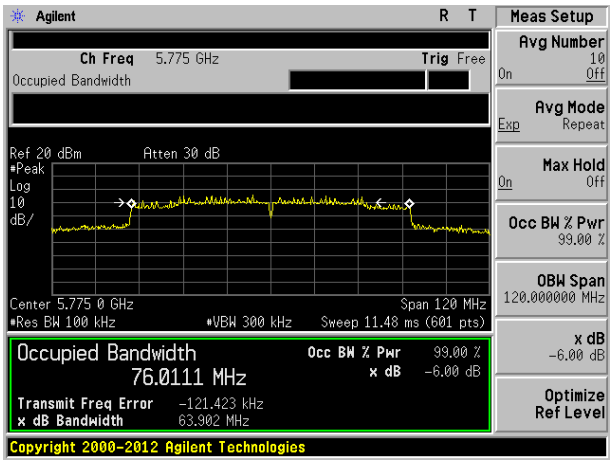


Highest channel

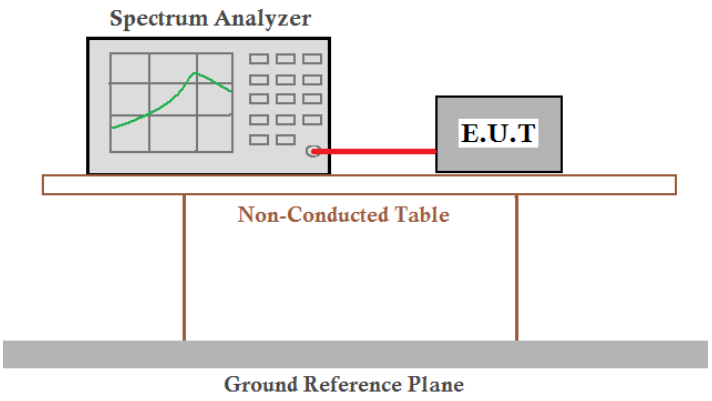


Highest channel

Test mode: 802.11ac(HT80)

Antenna 1:	Antenna 2:
	
Middle channel	Middle channel

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
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

5.8G Band				
Test CH	Power Spectral Density (dBm)			
	802.11a(SISO)(dBm)		Limit (dBm)	Result
Lowest	ANT 1	0.90	30	Pass
	ANT 2	1.30		
Middle	ANT 1	0.81		
	ANT 2	1.23		
Highest	ANT 1	0.43		
	ANT 2	0.45		

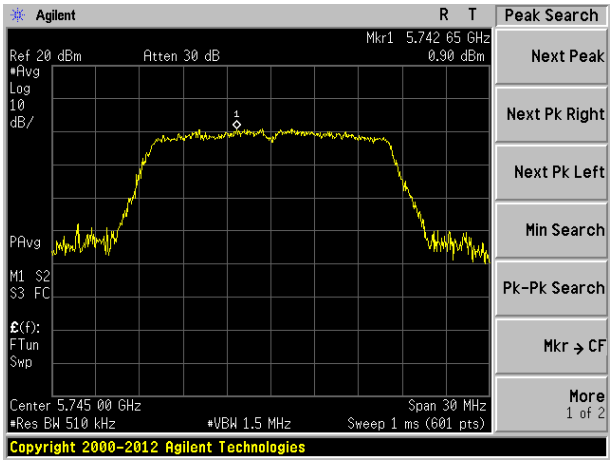
Antenna 1+Antenna 2：

5.8G Band							
Test mode	Channel	Read Level (dBm)		Read Level (mW)	Total PSD (dBm)	Limit (dBm)	Result
802.11n (HT20) (MIMO)	Lowest	ANT1	-0.19	0.96	2.96	30	Pass
		ANT2	-0.09	1.02			
	Middle	ANT1	0.18	1.04	2.90		
		ANT2	-0.42	0.91			
	Highest	ANT1	-0.31	0.93	2.75		
		ANT2	-0.49	0.95			
802.11ac(HT20) (MIMO)	Lowest	ANT1	-0.21	0.95	2.65		
		ANT2	-0.51	0.89			
	Middle	ANT1	0.08	1.02	2.93		
		ANT2	-0.25	0.94			
	Highest	ANT1	-0.59	0.87	2.58		
		ANT2	-0.27	0.94			
802.11n (HT40) (MIMO)	Lowest	ANT1	-3.39	0.46	-0.11		
		ANT2	-2.86	0.52			
	Highest	ANT1	-3.38	0.46	-0.21		
		ANT2	-3.07	0.49			
802.11ac(HT40) (MIMO)	Lowest	ANT1	-3.06	0.49	-0.05		
		ANT2	-3.07	0.49			
	Highest	ANT1	-2.79	0.53	0.14		
		ANT2	-2.95	0.51			
802.11ac(HT80) (MIMO)	Middle	ANT1	-7.43	0.18	-4.05		
		ANT2	-6.72	0.21			

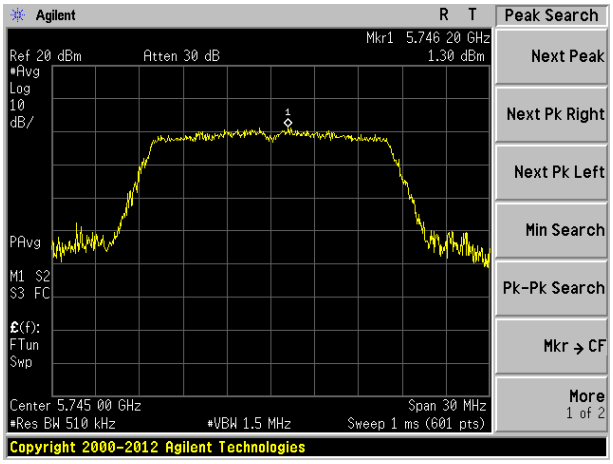
Test plot as follows:

Test mode: 802.11a

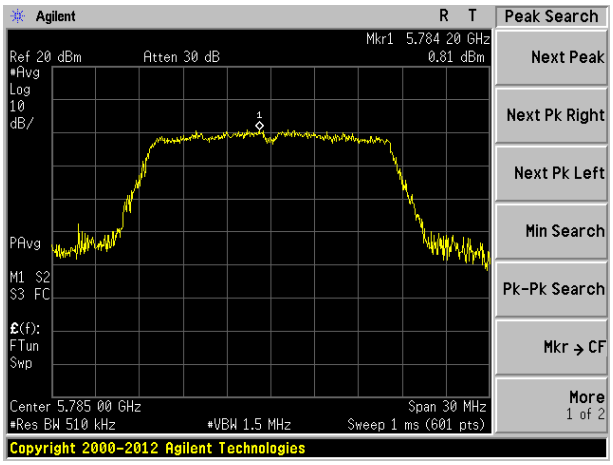
Antenna 1:	Antenna 2:



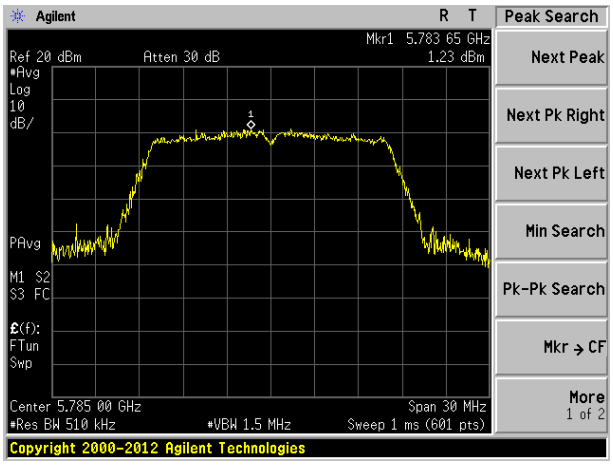
Lowest channel



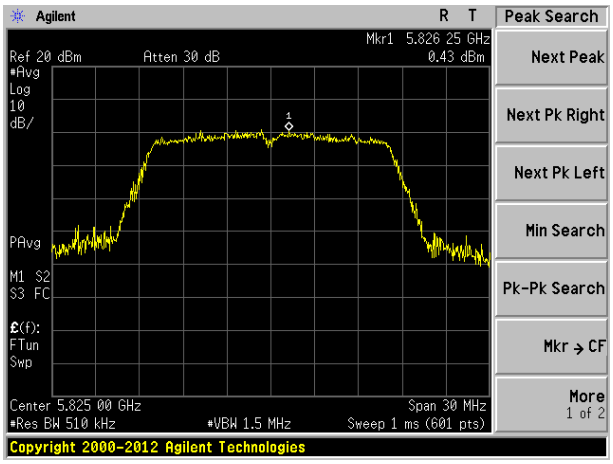
Lowest channel



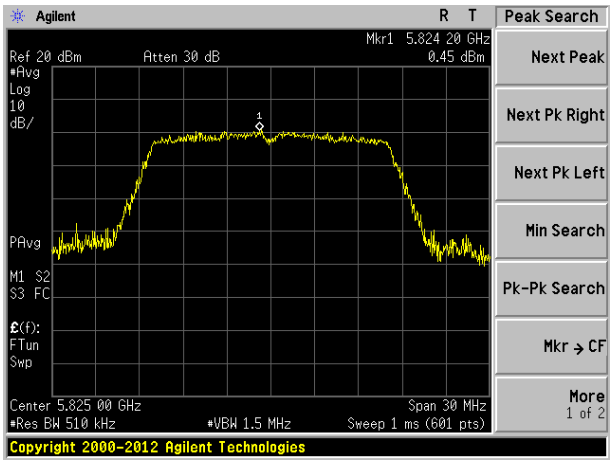
Middle channel



Middle channel



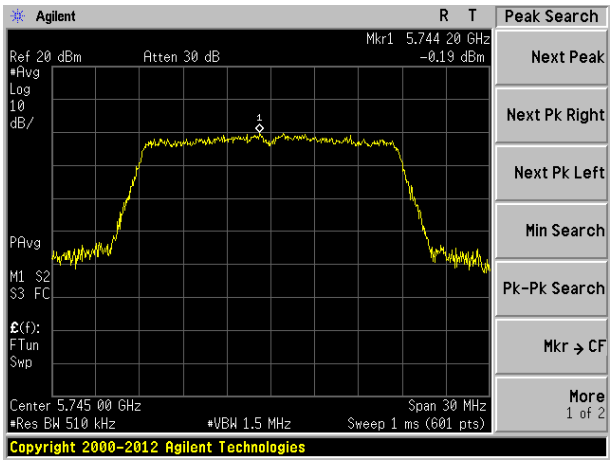
Highest channel



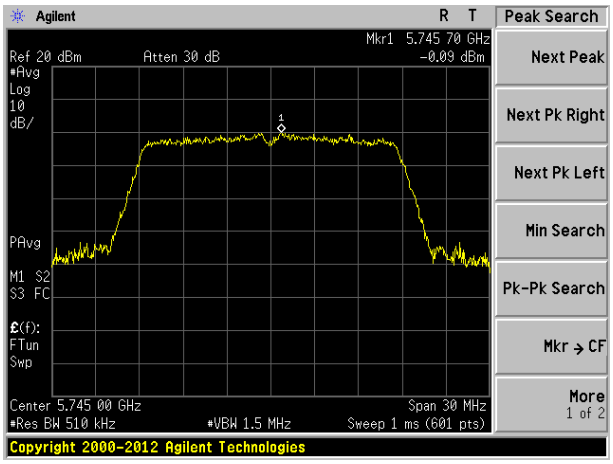
Highest channel

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

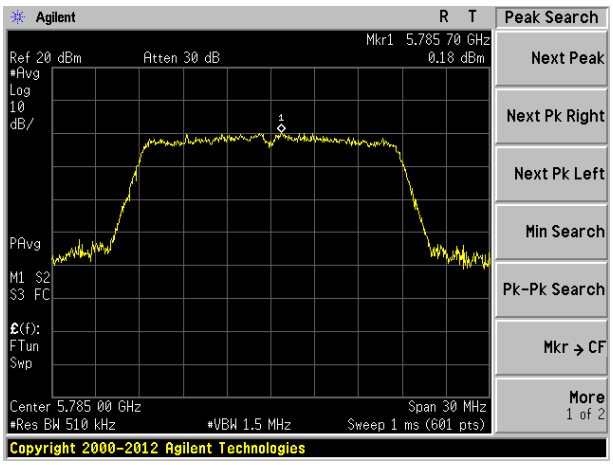
Antenna 1:	Antenna 2:



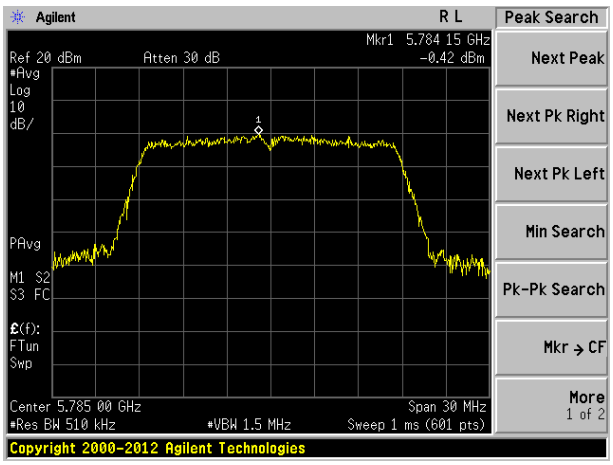
Lowest channel



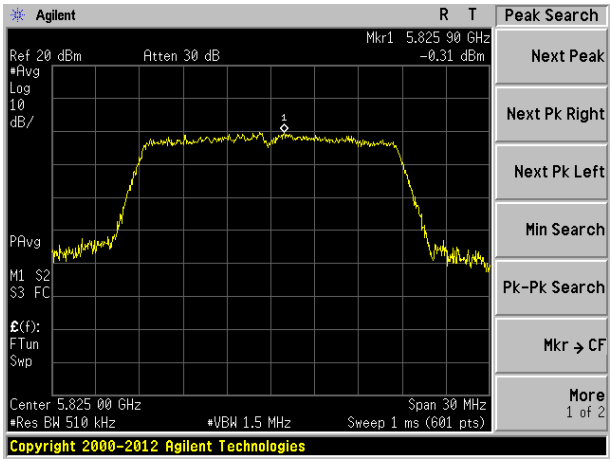
Lowest channel



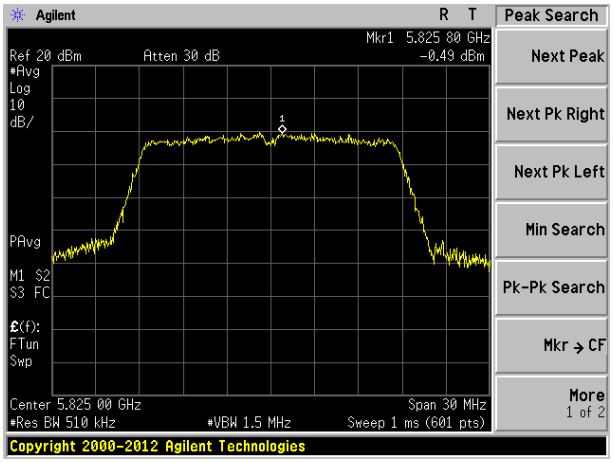
Middle channel



Middle channel



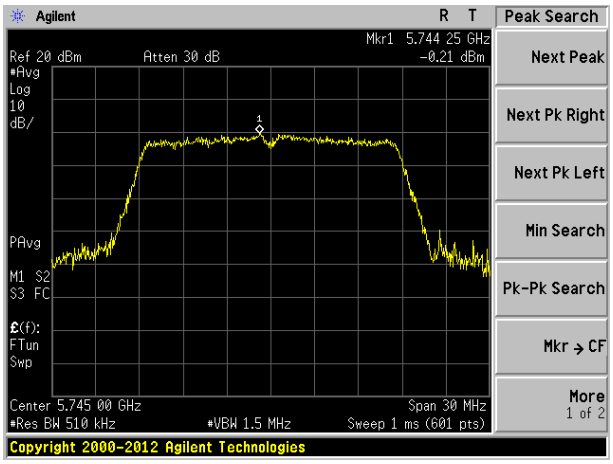
Highest channel



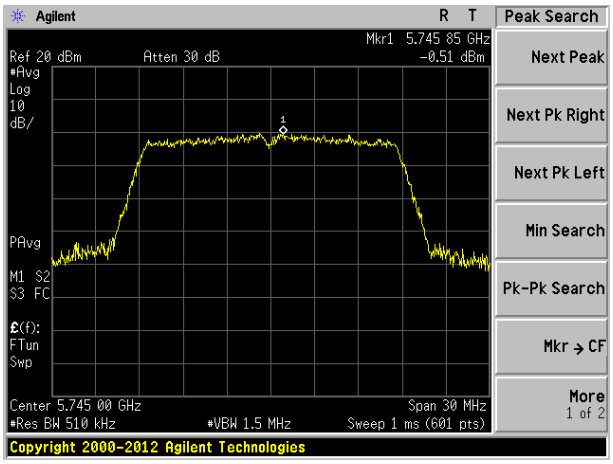
Highest channel

Test mode: 802.11ac(HT20)

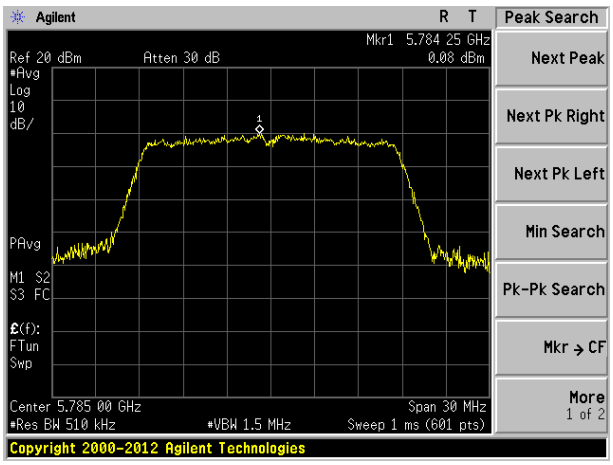
Antenna 1:	Antenna 2:



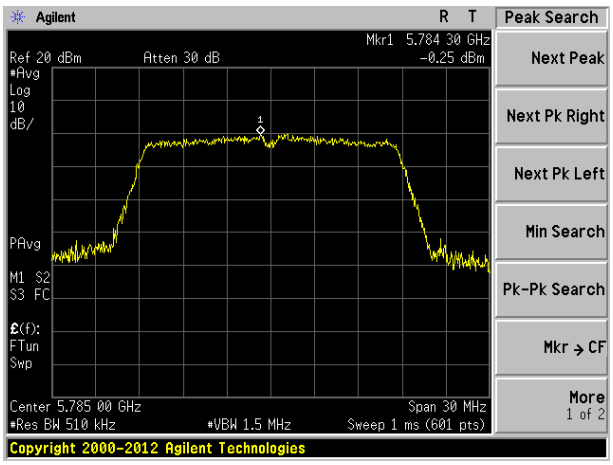
Lowest channel



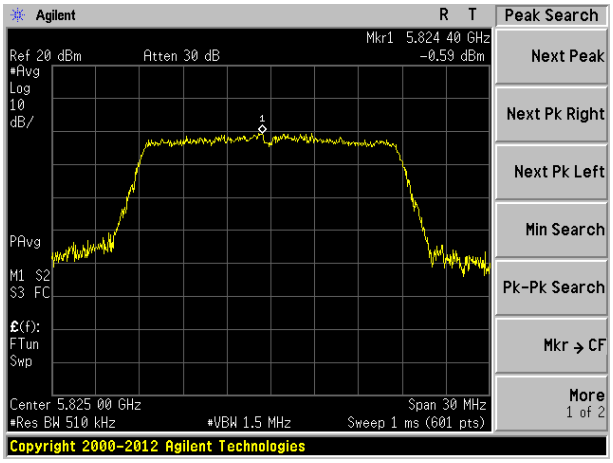
Lowest channel



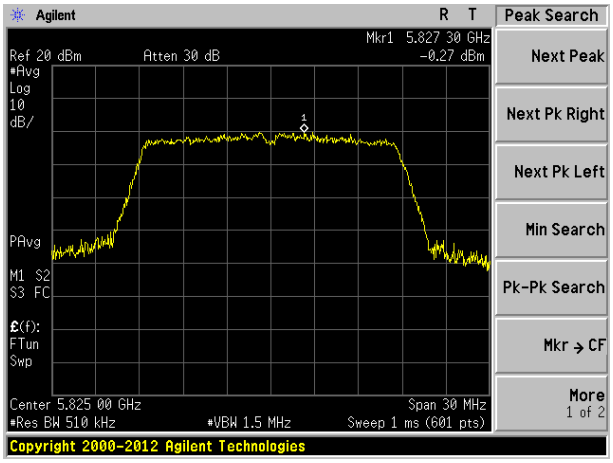
Middle channel



Middle channel



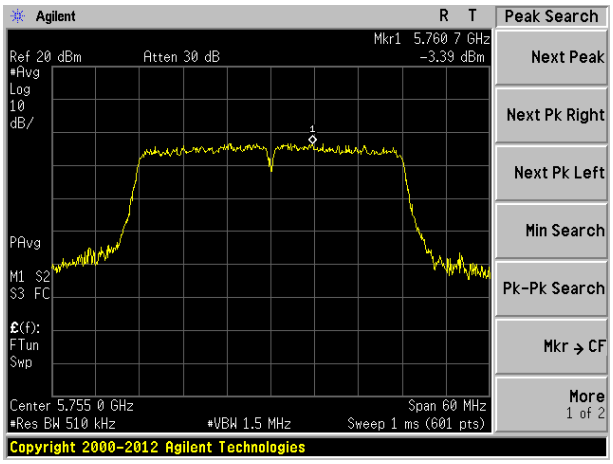
Highest channel



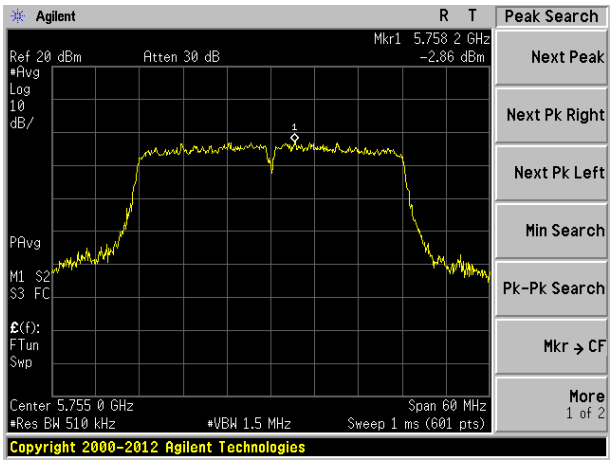
Highest channel

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

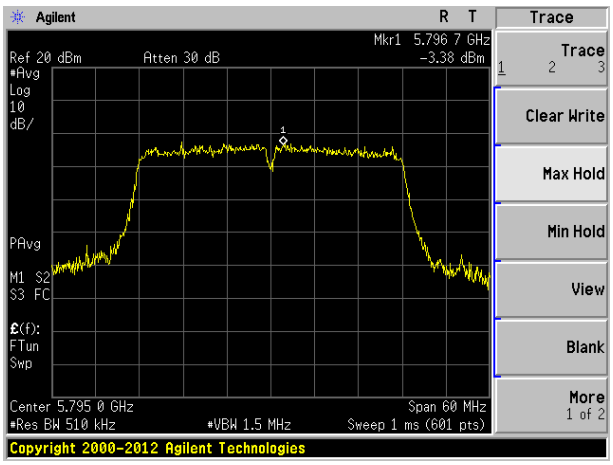
Antenna 1:	Antenna 2:



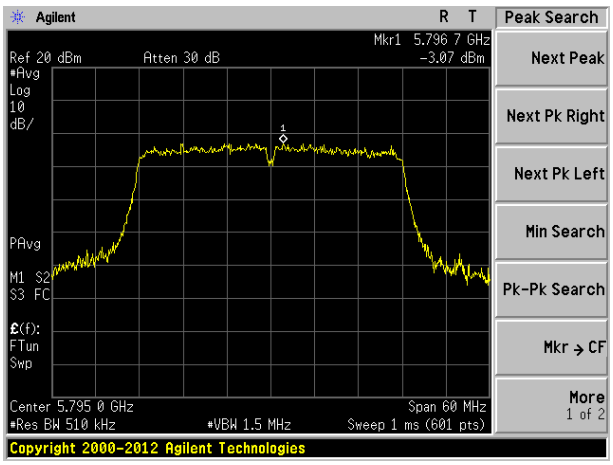
Lowest channel



Lowest channel

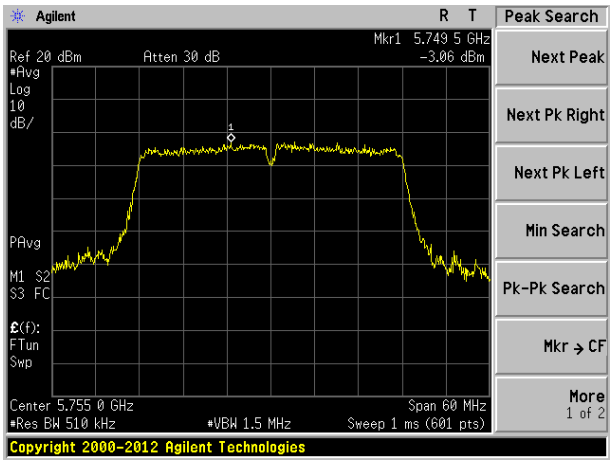
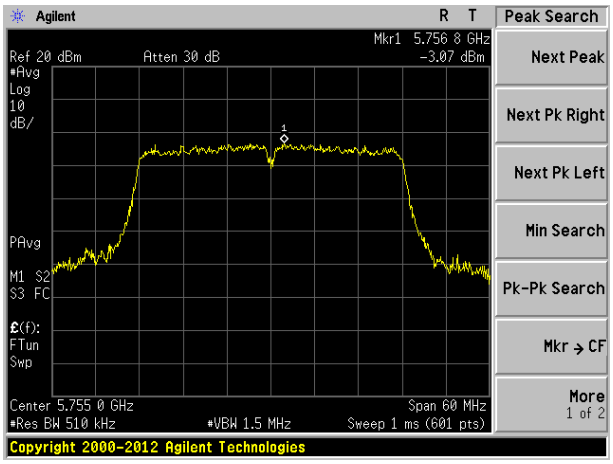
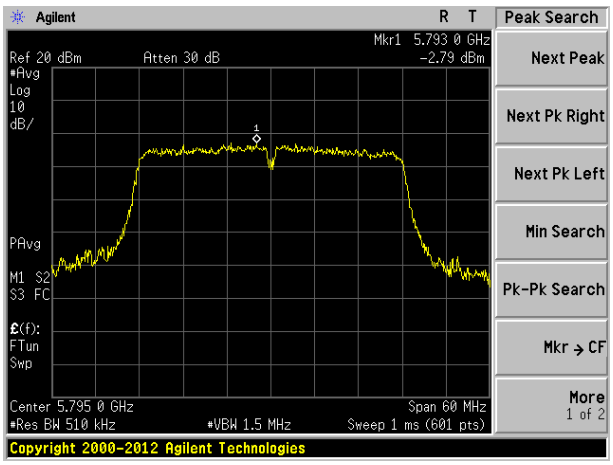
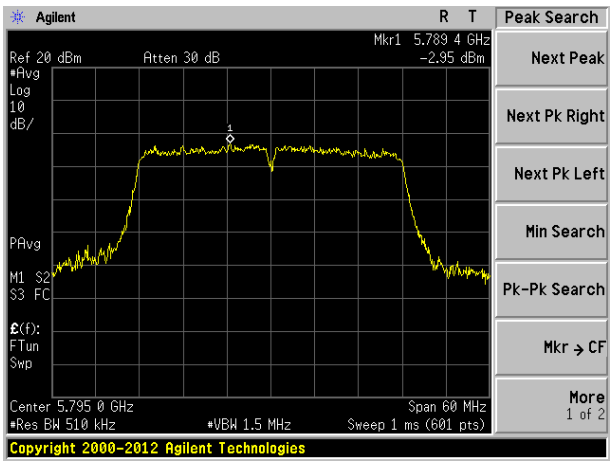


Highest channel

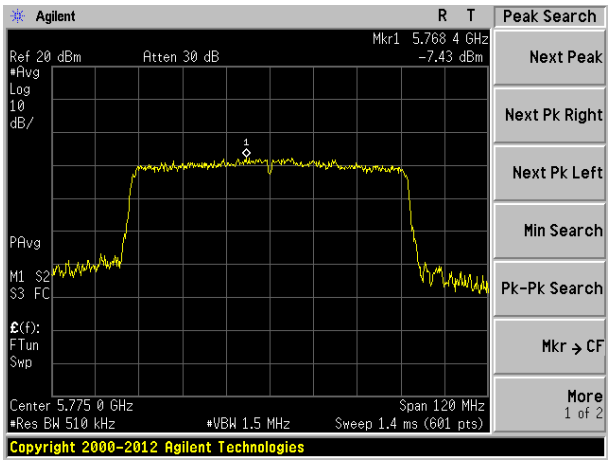
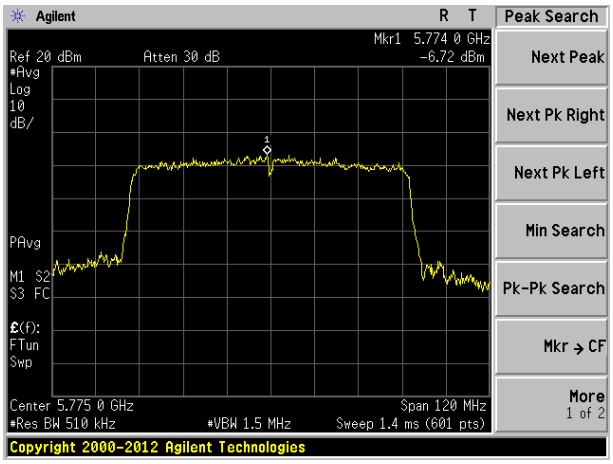


Highest channel

Test mode: 802.11ac(HT40)

Antenna 1:	Antenna 2:
	
Lowest channel	Lowest channel
	
Highest channel	Highest channel

Test mode: 802.11ac(HT80)

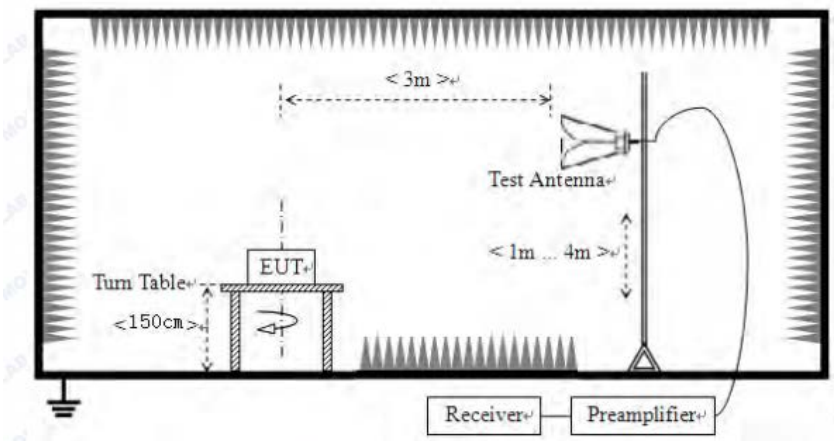
Antenna 1:	Antenna 2:
	
Middle channel	Middle channel

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 environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
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. *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[dBuV/m] = EIRP[dBm] + 95.2;

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

   E[dBuV/m] = 10 + 95.2 = 105.2dBuV/m.

   E[dBuV/m] = 15.6 + 95.2 = 110.8dBuV/m.

   E[dBuV/m] = 27 + 95.2 = 122.2dBuV/m

Measurement data:

All antennas have been test and only the worst case antenna 2 was report

Test mode:	802.11a(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	35.96	32.12	9.83	36.76	41.15	68.20	-27.05	Horizontal
5725.00	33.59	32.12	9.83	36.76	38.78	68.20	-29.42	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	29.26	32.12	9.83	36.76	34.45	54.00	-19.55	Horizontal
5725.00	29.23	32.12	9.83	36.76	34.42	54.00	-19.58	Vertical

Test mode:	802.11a(HT20)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	34.50	32.33	9.99	36.60	40.22	68.20	-27.98	Horizontal
5850.00	32.84	32.33	9.99	36.60	38.56	68.20	-29.64	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	30.55	32.33	9.99	36.60	36.27	54.00	-17.73	Horizontal
5850.00	29.32	32.33	9.99	36.60	35.04	54.00	-18.96	Vertical

MIMO:

Test mode:	802.11n(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	35.89	32.12	9.83	36.76	41.08	68.20	-27.12	Horizontal
5725.00	33.54	32.12	9.83	36.76	38.73	68.20	-29.47	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	29.24	32.12	9.83	36.76	34.43	54.00	-19.57	Horizontal
5725.00	29.13	32.12	9.83	36.76	34.32	54.00	-19.68	Vertical

Test mode:	802.11n(HT20)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	34.46	32.33	9.99	36.60	40.18	68.20	-28.02	Horizontal
5850.00	32.77	32.33	9.99	36.60	38.49	68.20	-29.71	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	30.43	32.33	9.99	36.60	36.15	54.00	-17.85	Horizontal
5850.00	29.21	32.33	9.99	36.60	34.93	54.00	-19.07	Vertical

Test mode:	802.11ac(HT20)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	34.54	32.12	9.83	36.76	39.73	68.20	-28.47	Horizontal
5725.00	35.30	32.12	9.83	36.76	40.49	68.20	-27.71	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	29.54	32.12	9.83	36.76	34.73	54.00	-19.27	Horizontal
5725.00	29.13	32.12	9.83	36.76	34.32	54.00	-19.68	Vertical

Test mode:	802.11ac(HT20)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	32.26	32.33	9.99	36.60	37.98	68.20	-30.22	Horizontal
5850.00	33.77	32.33	9.99	36.60	39.49	68.20	-28.71	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	28.34	32.33	9.99	36.60	34.06	54.00	-19.94	Horizontal
5850.00	26.89	32.33	9.99	36.60	32.61	54.00	-21.39	Vertical

Test mode:	802.11n(HT40)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	36.39	32.12	9.83	36.76	41.58	68.20	-26.62	Horizontal
5725.00	34.66	32.12	9.83	36.76	39.85	68.20	-28.35	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	28.96	32.12	9.83	36.76	34.15	54.00	-19.85	Horizontal
5725.00	28.23	32.12	9.83	36.76	33.42	54.00	-20.58	Vertical

Test mode:	802.11n(HT40)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	37.32	32.33	9.99	36.60	43.04	68.20	-25.16	Horizontal
5850.00	35.34	32.33	9.99	36.60	41.06	68.20	-27.14	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	26.84	32.33	9.99	36.60	32.56	54.00	-21.44	Horizontal
5850.00	28.77	32.33	9.99	36.60	34.49	54.00	-19.51	Vertical

Test mode:	802.11ac(HT40)	Test channel:	Lowest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	36.28	32.12	9.83	36.76	41.47	68.20	-26.73	Horizontal
5725.00	34.61	32.12	9.83	36.76	39.80	68.20	-28.40	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	28.89	32.12	9.83	36.76	34.08	54.00	-19.92	Horizontal
5725.00	28.13	32.12	9.83	36.76	33.32	54.00	-20.68	Vertical

Test mode:	802.11ac(HT40)	Test channel:	Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	37.21	32.33	9.99	36.60	42.93	68.20	-25.27	Horizontal
5850.00	35.31	32.33	9.99	36.60	41.03	68.20	-27.17	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5850.00	26.77	32.33	9.99	36.60	32.49	54.00	-21.51	Horizontal
5850.00	28.71	32.33	9.99	36.60	34.43	54.00	-19.57	Vertical

Test mode:	802.11ac(HT80)	Test channel:	Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	34.59	32.12	9.83	36.76	39.78	68.20	-28.42	Horizontal
5725.00	35.32	32.12	9.83	36.76	40.51	68.20	-27.69	Vertical
5850.00	32.30	32.33	9.99	36.60	38.02	68.20	-30.18	Horizontal
5850.00	33.84	32.33	9.99	36.60	39.56	68.20	-28.64	Vertical

RMS value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5725.00	29.67	32.12	9.83	36.76	34.86	54.00	-19.14	Horizontal
5725.00	29.23	32.12	9.83	36.76	34.42	54.00	-19.58	Vertical
5850.00	28.42	32.33	9.99	36.60	34.14	54.00	-19.86	Horizontal
5850.00	26.96	32.33	9.99	36.60	32.68	54.00	-21.32	Vertical

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.*

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	100KHz	300KHz	Quasi-peak Value
Above 1GHz	Peak	1MHz	3MHz	Peak Value
	AV	1MHz	3MHz	Average Value

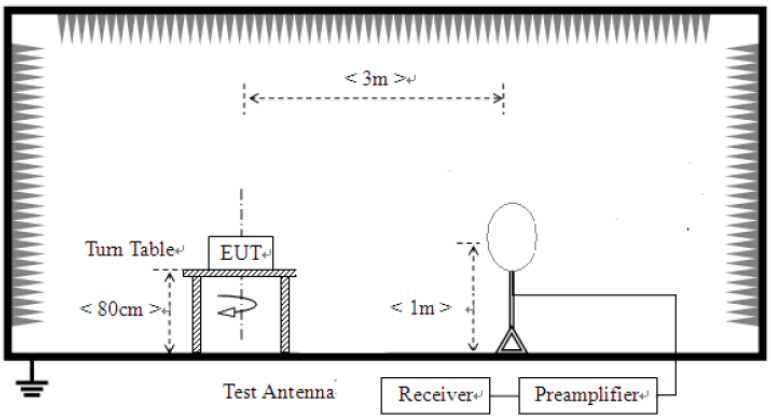
Limit:

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

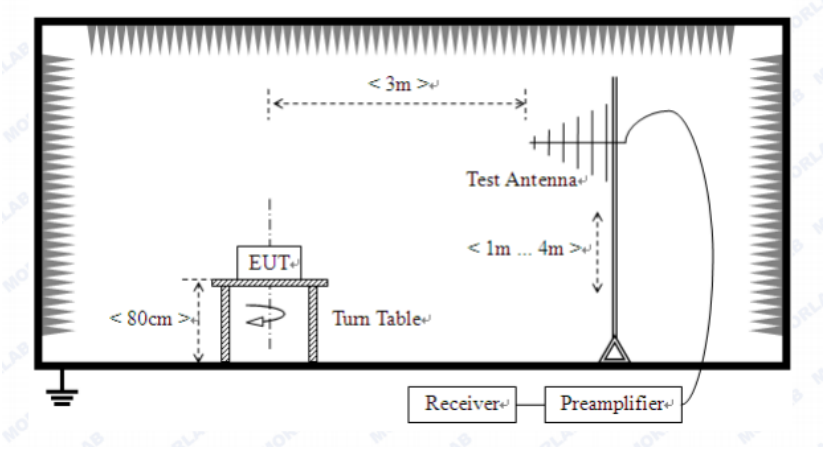
Frequency	Limit (dBm/MHz)	Remark
Above 1GHz	-27.0	Peak Value

Test setup:

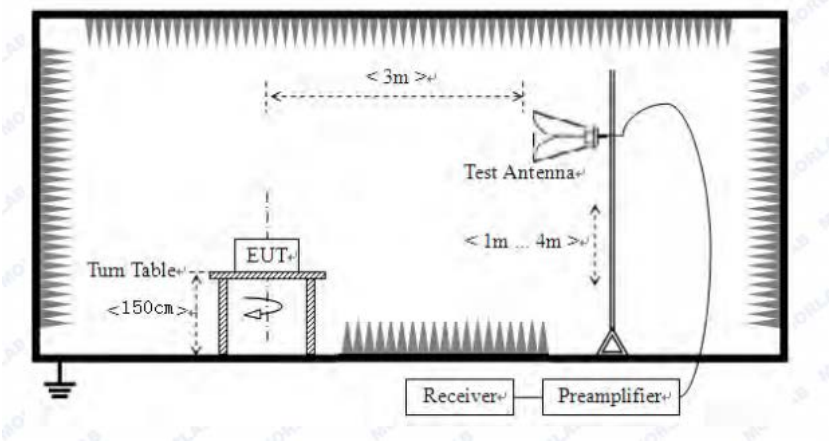
For radiated emissions from 9kHz to 30MHz



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



Test Procedure:

1. The EUT was placed on the top of a rotating table (0.8m for below 1GHz and 1.5 meters for above 1GHz) above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or

	average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1 012mbar
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test voltage:	AC120V 60Hz					
Test results:	Pass					

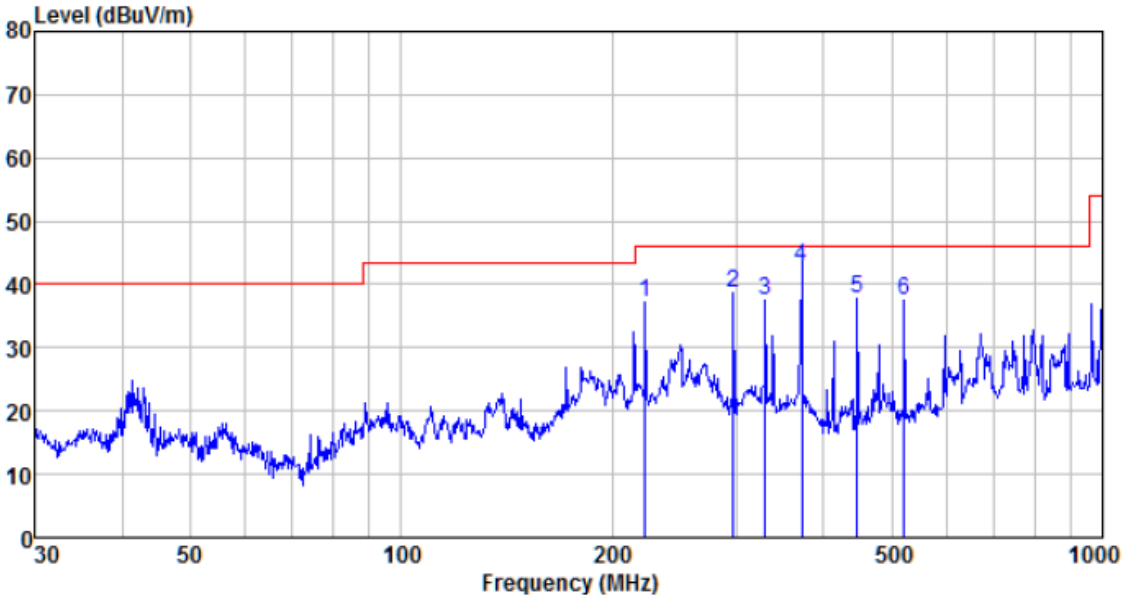
Measurement Data:

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.

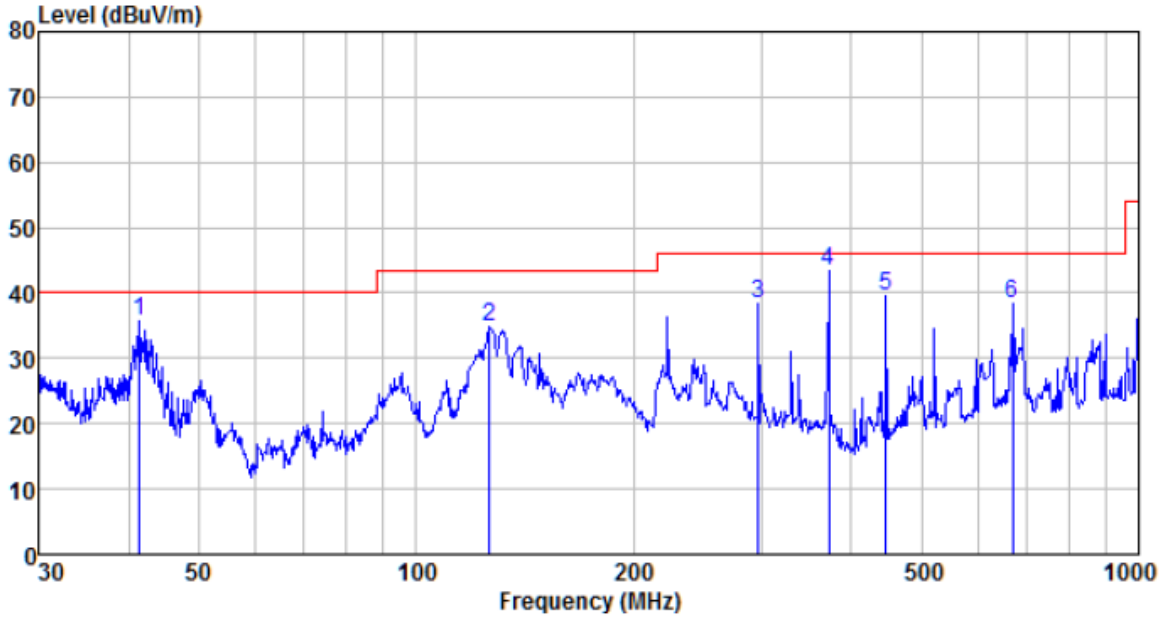
Below 1GHz

Test mode:	WiFi mode	Probe:	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
222.950	61.29	11.27	1.98	37.35	37.19	46.00	-8.81	QP
297.224	60.17	13.53	2.35	37.42	38.63	46.00	-7.37	QP
330.195	58.21	14.18	2.52	37.45	37.46	46.00	-8.54	QP
372.005	62.60	14.89	2.72	37.49	42.72	46.00	-3.28	QP
446.414	56.04	16.28	3.07	37.52	37.87	46.00	-8.13	QP
520.888	53.86	17.80	3.39	37.52	37.53	46.00	-8.47	QP

Test mode:	WiFi mode	Probe:	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
41.422	58.52	12.22	0.68	35.75	35.67	40.00	-4.33	QP
126.329	61.61	8.66	1.41	36.93	34.75	43.50	-8.75	QP
297.224	59.92	13.53	2.35	37.42	38.38	46.00	-7.62	QP
372.005	63.24	14.89	2.72	37.49	43.36	46.00	-2.64	QP
446.414	57.60	16.28	3.07	37.52	39.43	46.00	-6.57	QP
668.142	52.53	19.57	3.97	37.60	38.47	46.00	-7.53	QP

Above 1GHz:

All antennas have been test and only the worst case antenna 2 was report

802.11a(HT20) 5745MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	29.66	39.40	14.98	36.30	47.74	74.00	-26.26	Vertical
17235.00	28.60	41.00	18.98	36.28	52.30	74.00	-21.70	Vertical
11490.00	29.27	39.40	14.98	36.30	47.35	74.00	-26.65	Horizontal
17235.00	30.33	41.00	18.98	36.28	54.03	74.00	-19.97	Horizontal
11490.00	22.14	39.40	14.98	36.30	40.22	54.00	-13.78	Vertical
17235.00	21.82	41.00	18.98	36.28	45.52	54.00	-8.48	Vertical
11490.00	22.23	39.40	14.98	36.30	40.31	54.00	-13.69	Horizontal
17235.00	21.39	41.00	18.98	36.28	45.09	54.00	-8.91	Horizontal

802.11a(HT20) 5785MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	30.85	39.28	14.99	36.29	48.83	74.00	-25.17	Vertical
17355.00	30.47	41.52	18.98	36.26	54.71	74.00	-19.29	Vertical
11570.00	29.95	39.28	14.99	36.29	47.93	74.00	-26.07	Horizontal
17355.00	30.36	41.52	18.98	36.26	54.60	74.00	-19.40	Horizontal
11570.00	21.42	39.28	14.99	36.29	39.40	54.00	-14.60	Vertical
17355.00	20.35	41.52	18.98	36.26	44.59	54.00	-9.41	Vertical
11570.00	20.95	39.28	14.99	36.29	38.93	54.00	-15.07	Horizontal
17355.00	21.18	41.52	18.98	36.26	45.42	54.00	-8.58	Horizontal

802.11a(HT20) 5825MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	29.66	39.16	14.99	36.27	47.54	74.00	-26.46	Vertical
17475.00	30.85	42.30	18.97	36.25	55.87	74.00	-18.13	Vertical
11650.00	29.29	39.16	14.99	36.27	47.17	74.00	-26.83	Horizontal
17475.00	30.23	42.30	18.97	36.25	55.25	74.00	-18.75	Horizontal
11650.00	21.39	39.16	14.99	36.27	39.27	54.00	-14.73	Vertical
17475.00	21.27	42.30	18.97	36.25	46.29	54.00	-7.71	Vertical
11650.00	22.30	39.16	14.99	36.27	40.18	54.00	-13.82	Horizontal
17475.00	21.33	42.30	18.97	36.25	46.35	54.00	-7.65	Horizontal

MIMO:

802.11n(HT20) 5745MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11490.00	29.58	39.40	14.98	36.30	47.66	74.00	-26.34	Vertical
17235.00	28.49	41.00	18.98	36.28	52.19	74.00	-21.81	Vertical
11490.00	29.12	39.40	14.98	36.30	47.20	74.00	-26.80	Horizontal
17235.00	30.17	41.00	18.98	36.28	53.87	74.00	-20.13	Horizontal
11490.00	21.88	39.40	14.98	36.30	39.96	54.00	-14.04	Vertical
17235.00	21.60	41.00	18.98	36.28	45.30	54.00	-8.70	Vertical
11490.00	21.96	39.40	14.98	36.30	40.04	54.00	-13.96	Horizontal
17235.00	21.22	41.00	18.98	36.28	44.92	54.00	-9.08	Horizontal

802.11n(HT20) 5785MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11570.00	30.63	39.28	14.99	36.29	48.61	74.00	-25.39	Vertical
17355.00	30.30	41.52	18.98	36.26	54.54	74.00	-19.46	Vertical
11570.00	29.84	39.28	14.99	36.29	47.82	74.00	-26.18	Horizontal
17355.00	30.19	41.52	18.98	36.26	54.43	74.00	-19.57	Horizontal
11570.00	21.36	39.28	14.99	36.29	39.34	54.00	-14.66	Vertical
17355.00	20.30	41.52	18.98	36.26	44.54	54.00	-9.46	Vertical
11570.00	20.84	39.28	14.99	36.29	38.82	54.00	-15.18	Horizontal
17355.00	21.04	41.52	18.98	36.26	45.28	54.00	-8.72	Horizontal

802.11n(HT20) 5825MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11650.00	29.58	39.16	14.99	36.27	47.46	74.00	-26.54	Vertical
17475.00	30.63	42.30	18.97	36.25	55.65	74.00	-18.35	Vertical
11650.00	29.25	39.16	14.99	36.27	47.13	74.00	-26.87	Horizontal
17475.00	29.96	42.30	18.97	36.25	54.98	74.00	-19.02	Horizontal
11650.00	21.15	39.16	14.99	36.27	39.03	54.00	-14.97	Vertical
17475.00	21.12	42.30	18.97	36.25	46.14	54.00	-7.86	Vertical
11650.00	22.14	39.16	14.99	36.27	40.02	54.00	-13.98	Horizontal
17475.00	21.17	42.30	18.97	36.25	46.19	54.00	-7.81	Horizontal

802.11n(HT40) 5755MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	30.20	39.40	14.98	36.30	48.28	74.00	-25.72	Vertical
17265.00	31.51	41.26	18.98	36.27	55.48	74.00	-18.52	Vertical
11510.00	30.04	39.40	14.98	36.30	48.12	74.00	-25.88	Horizontal
17265.00	31.28	41.26	18.98	36.27	55.25	74.00	-18.75	Horizontal
11510.00	20.40	39.40	14.98	36.30	38.48	54.00	-15.52	Vertical
17265.00	20.95	41.26	18.98	36.27	44.92	54.00	-9.08	Vertical
11510.00	21.56	39.40	14.98	36.30	39.64	54.00	-14.36	Horizontal
17265.00	21.42	41.26	18.98	36.27	45.39	54.00	-8.61	Horizontal

802.11n(HT40) 5795MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	31.57	39.22	14.99	36.28	49.50	74.00	-24.50	Vertical
17385.00	30.80	41.78	18.98	36.26	55.30	74.00	-18.70	Vertical
11590.00	30.04	39.22	14.99	36.28	47.97	74.00	-26.03	Horizontal
17385.00	30.27	41.78	18.98	36.26	54.77	74.00	-19.23	Horizontal
11590.00	20.40	39.22	14.99	36.28	38.33	54.00	-15.67	Vertical
17385.00	21.24	41.78	18.98	36.26	45.74	54.00	-8.26	Vertical
11590.00	21.90	39.22	14.99	36.28	39.83	54.00	-14.17	Horizontal
17385.00	20.61	41.78	18.98	36.26	45.11	54.00	-8.89	Horizontal

802.11ac(HT40) 5755MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11510.00	30.16	39.40	14.98	36.30	48.24	74.00	-25.76	Vertical
17265.00	31.21	41.26	18.98	36.27	55.18	74.00	-18.82	Vertical
11510.00	29.91	39.40	14.98	36.30	47.99	74.00	-26.01	Horizontal
17265.00	31.01	41.26	18.98	36.27	54.98	74.00	-19.02	Horizontal
11510.00	20.36	39.40	14.98	36.30	38.44	54.00	-15.56	Vertical
17265.00	20.84	41.26	18.98	36.27	44.81	54.00	-9.19	Vertical
11510.00	21.37	39.40	14.98	36.30	39.45	54.00	-14.55	Horizontal
17265.00	21.24	41.26	18.98	36.27	45.21	54.00	-8.79	Horizontal

802.11ac(HT40) 5795MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11590.00	31.26	39.22	14.99	36.28	49.19	74.00	-24.81	Vertical
17385.00	30.46	41.78	18.98	36.26	54.96	74.00	-19.04	Vertical
11590.00	29.91	39.22	14.99	36.28	47.84	74.00	-26.16	Horizontal
17385.00	30.12	41.78	18.98	36.26	54.62	74.00	-19.38	Horizontal
11590.00	20.36	39.22	14.99	36.28	38.29	54.00	-15.71	Vertical
17385.00	21.09	41.78	18.98	36.26	45.59	54.00	-8.41	Vertical
11590.00	21.79	39.22	14.99	36.28	39.72	54.00	-14.28	Horizontal
17385.00	20.51	41.78	18.98	36.26	45.01	54.00	-8.99	Horizontal

802.11ac(HT80) 5775MHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
11550.00	31.51	39.34	14.98	36.29	49.54	74.00	-24.46	Vertical
17325.00	30.59	41.52	18.98	36.26	54.83	74.00	-19.17	Vertical
11550.00	30.68	39.34	14.98	36.29	48.71	74.00	-25.29	Horizontal
17325.00	30.39	41.52	18.98	36.26	54.63	74.00	-19.37	Horizontal
11550.00	21.18	39.34	14.98	36.29	39.21	54.00	-14.79	Vertical
17325.00	21.13	41.52	18.98	36.26	45.37	54.00	-8.63	Vertical
11550.00	21.27	39.34	14.98	36.29	39.30	54.00	-14.70	Horizontal
17325.00	21.38	41.52	18.98	36.26	45.62	54.00	-8.38	Horizontal

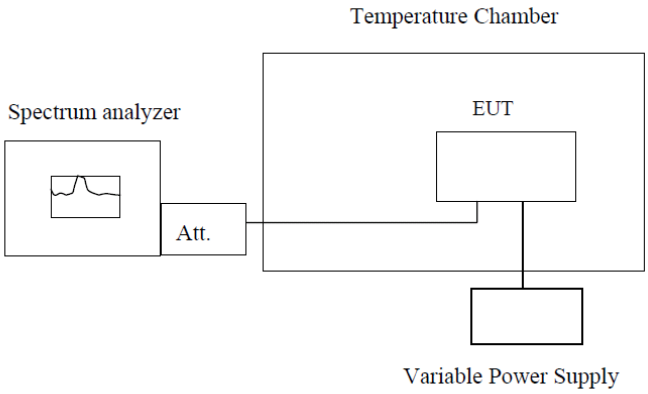
Note:

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.

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:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 6.0for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5745	5743.8318	5744.3531	5741.7389	5743.5388
	5785	5783.6029	5782.7220	5782.4867	5783.8293
	5825	5822.6967	5821.2348	5824.8414	5823.1438
-20	5745	5742.5234	5743.3403	5744.9316	5744.0949
	5785	5784.9199	5782.4148	5784.4803	5784.6468
	5825	5823.3533	5823.9791	5824.8734	5824.1109
-10	5745	5743.8596	5741.7166	5744.1032	5744.8046
	5785	5782.5906	5781.3505	5784.3286	5784.3055
	5825	5824.1470	5821.4779	5824.9460	5824.1067
0	5745	5744.3504	5743.6458	5744.7419	5744.5636
	5785	5784.4731	5782.9593	5783.0247	5783.2463
	5825	5822.4833	5823.5963	5824.9390	5824.3477
10	5745	5744.0846	5742.8412	5742.6233	5744.0601
	5785	5782.4940	5782.5655	5782.9200	5784.6451
	5825	5824.6194	5823.7811	5824.6730	5824.4316
20	5745	5741.6632	5744.0099	5744.8962	5743.3219
	5785	5784.8326	5781.9454	5784.5551	5784.2602
	5825	5822.9328	5822.7598	5822.5716	5822.7609
30	5745	5744.7858	5743.0077	5744.9816	5744.6115
	5785	5782.5915	5781.4691	5784.4282	5784.1903
	5825	5823.6022	5824.8679	5824.4114	5824.4928
40	5745	5744.6321	5743.2798	5743.6538	5742.3862
	5785	5783.0204	5781.0680	5784.9609	5784.7580
	5825	5823.3424	5821.7964	5823.8215	5824.8661
50	5745	5743.6212	5742.3795	5744.1566	5744.4834
	5785	5782.3128	5783.3268	5783.7422	5782.7443
	5825	5824.6274	5823.0377	5824.6826	5824.9489

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5745	5742.9697	5742.9407	5744.2563	5744.2511
	5785	5782.6152	5782.0072	5783.6949	5782.0761
	5825	5824.7549	5821.9438	5821.6516	5824.9287
3.7	5745	5741.6469	5742.4645	5741.0701	5743.8568
	5785	5782.7327	5782.3473	5783.1023	5783.0011
	5825	5823.3101	5823.5824	5824.7955	5823.3828
4.1	5745	5742.8067	5743.8142	5742.5775	5742.0507
	5785	5782.3728	5784.8863	5781.2999	5783.3656
	5825	5822.6525	5824.2399	5821.4558	5824.5270

Note: The worst case is FL=5743.0333MHz, FH=5824.9493MHz

Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5755	5755.1329	5752.4902	5752.5891	5756.6263
	5795	5795.2137	5793.7152	5793.5203	5795.3105
-20	5755	5755.6319	5754.8676	5753.2213	5755.0104
	5795	5795.7663	5794.6590	5794.8174	5795.7312
-10	5755	5755.6278	5754.9203	5754.2304	5755.5256
	5795	5795.7221	5794.6044	5794.3056	5795.8709
0	5755	5755.5288	5754.6872	5754.4579	5755.3716
	5795	5795.7172	5794.9227	5794.7460	5795.9256
10	5755	5755.5756	5754.2690	5754.2862	5755.1002
	5795	5795.7922	5794.3509	5794.5067	5795.9406
20	5755	5755.1327	5754.1988	5754.7427	5755.5750
	5795	5795.0588	5794.7198	5794.5410	5795.2590
30	5755	5755.8855	5754.1674	5754.6243	5755.2351
	5795	5795.5299	5794.6309	5794.8600	5795.4906
40	5755	5755.2026	5754.1414	5754.9928	5755.2602
	5795	5795.5569	5794.6045	5794.2624	5795.4861
50	5755	5755.0579	5754.3564	5754.4280	5755.2255
	5795	5795.5597	5794.6965	5794.9078	5795.2017

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5755	5757.5518	5753.4138	5755.7250	5754.0061
	5795	5797.8966	5794.2689	5795.1343	5794.0550
3.7	5755	5757.1491	5754.8147	5755.9939	5754.1053
	5795	5796.3155	5794.1233	5795.8679	5794.2409
4.1	5755	5755.3833	5754.5111	5755.6131	5754.7150
	5795	5795.0137	5794.6585	5795.2969	5794.4971

Note: The worst case is FL=5752.4902MHz, FH=5797.8966MHz

802.11n(HT40) (MIMO)					
Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5755	5755.1329	5752.4902	5752.5891	5756.6263
	5795	5795.2137	5793.7152	5793.5203	5795.3105
-20	5755	5755.6319	5754.8676	5753.2213	5755.0104
	5795	5795.7663	5794.6590	5794.8174	5795.7312
-10	5755	5755.6278	5754.9203	5754.2304	5755.5256
	5795	5795.7221	5794.6044	5794.3056	5795.8709
0	5755	5755.5288	5754.6872	5754.4579	5755.3716
	5795	5795.7172	5794.9227	5794.7460	5795.9256
10	5755	5755.5756	5754.2690	5754.2862	5755.1002
	5795	5795.7922	5794.3509	5794.5067	5795.9406
20	5755	5755.1327	5754.1988	5754.7427	5755.5750
	5795	5795.0588	5794.7198	5794.5410	5795.2590
30	5755	5755.8855	5754.1674	5754.6243	5755.2351
	5795	5795.5299	5794.6309	5794.8600	5795.4906
40	5755	5755.2026	5754.1414	5754.9928	5755.2602
	5795	5795.5569	5794.6045	5794.2624	5795.4861
50	5755	5755.0579	5754.3564	5754.4280	5755.2255
	5795	5795.5597	5794.6965	5794.9078	5795.2017

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5755	5757.5518	5753.4138	5755.7250	5754.0061
	5795	5797.8966	5794.2689	5795.1343	5794.0550
3.7	5755	5757.1491	5754.8147	5755.9939	5754.1053
	5795	5796.3155	5794.1233	5795.8679	5794.2409
4.1	5755	5755.3833	5754.5111	5755.6131	5754.7150
	5795	5795.0137	5794.6585	5795.2969	5794.4971

Note: The worst case is FL=5752.4902MHz, FH=5797.8966MHz

802.11ac(HT40) (MIMO)					
Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5755	5755.8349	5751.6473	5758.5574	5753.4836
	5795	5795.5347	5793.0890	5795.6690	5793.3605
-20	5755	5755.6680	5753.6200	5755.4987	5753.5711
	5795	5795.5068	5793.0886	5795.7035	5793.5378
-10	5755	5755.5407	5754.9062	5755.7480	5753.9599
	5795	5795.1827	5794.1149	5795.1446	5793.5342
0	5755	5755.5104	5754.8318	5755.3808	5754.3556
	5795	5795.8322	5794.1442	5795.2876	5794.5773
10	5755	5755.4745	5754.3358	5755.7851	5754.1145
	5795	5795.3717	5794.0619	5795.3578	5794.6024
20	5755	5755.4541	5754.0238	5755.1236	5754.1189
	5795	5795.2591	5794.1993	5795.6608	5794.4294
30	5755	5755.9969	5754.6412	5755.1247	5754.5095
	5795	5795.7041	5794.2844	5795.5743	5794.3812
40	5755	5755.0764	5754.3284	5755.6754	5754.9975
	5795	5795.1497	5794.1612	5795.3569	5794.4402
50	5755	5755.9844	5754.9079	5755.4161	5754.6002
	5795	5795.4029	5794.1904	5795.7690	5794.2796

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5755	5758.3231	5753.7816	5755.0412	5754.2210
	5795	5798.0449	5794.0905	5795.9225	5794.2844
3.7	5755	5756.1800	5754.7707	5755.8338	5754.0172
	5795	5796.7801	5794.2397	5795.2943	5794.8680
4.1	5755	5755.7047	5754.9055	5755.2082	5754.8597
	5795	5795.9566	5794.8443	5795.4541	5794.7483

Note: The worst case in MIMO mode is FL=5751.6473MHz, FH=5798.0449MHz

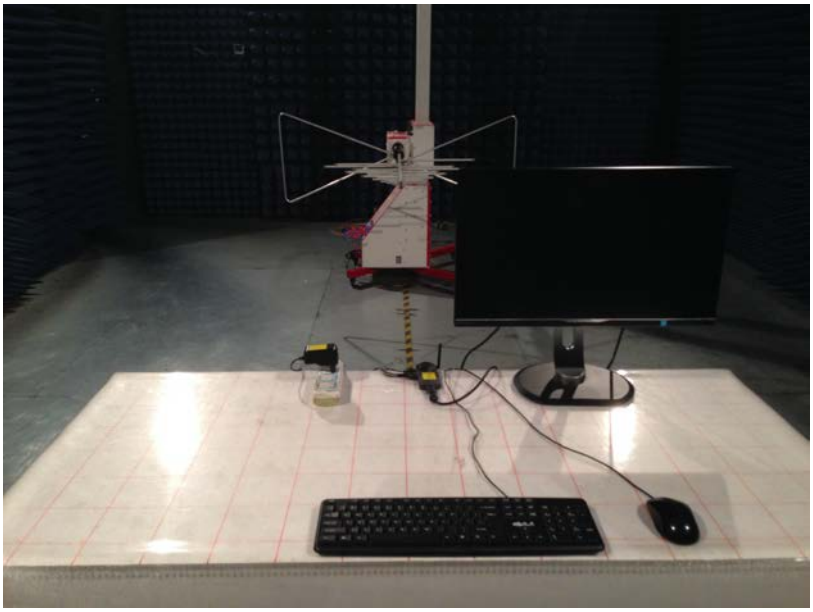
Frequency stability versus Temp.					
Power Supply: DC 3.7V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5775	5775.3812	5775.1222	5774.2688	5773.9088
-20	5775	5775.4995	5775.8239	5774.3282	5773.5163
-10	5775	5775.5498	5775.6940	5774.8174	5773.6424
0	5775	5775.5294	5775.9793	5774.8590	5774.9031
10	5775	5775.7769	5775.1818	5774.5575	5774.5177
20	5775	5775.6325	5775.5574	5774.3269	5774.2614
30	5775	5775.2301	5775.8757	5774.0359	5774.1085
40	5775	5775.2755	5775.6289	5774.4655	5774.7608
50	5775	5775.2553	5775.0939	5774.9905	5774.4925

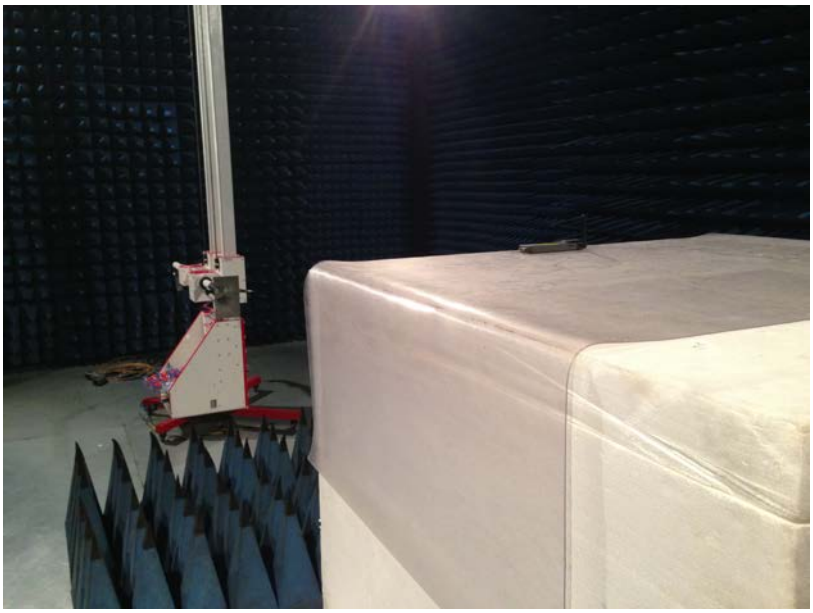
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VDC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
3.3	5775	5773.6848	5777.5108	5777.7646	5776.1990
3.7	5775	5773.7014	5777.8090	5777.8193	5775.4322
4.1	5775	5773.1627	5775.3726	5777.6555	5776.5021

Note: The worst case in MIMO mode is FL=5777.8193MHz, FH=5773.1627MHz

8 Test Setup Photo

Radiated Emission





Conducted Emission

9 EUT Constructional Details

Reference to the test report No. GTS201808000194F01

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