

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: 3FW, Mele Building, No.28 Cuijing Road, Pingshan District, Shenzhen (518118) P.R.China

Equipment Under Test (EUT)

Product Name: Access3

Model No.: A-1164-AA3, A-1164-AA3-1, A-1164-AA3-2, A-1164-AA3-3, A-1164-AA3-4, A-1164-AA3-5, A-1164-AA3-6, A-1164-AA3-7, A-1164-AA3-8, A-1164-AA3-9, A-1164-AA3-10, A-1164-AA3-11, A-1164-AA3-12, A-1164-AA3-13, A-1164-AA3-14, A-1164-AA3-15, A-1164-AA3-16, A-1164-AA3-17, A-1164-AA3-18

Trade Mark: AZULLE

FCC ID: 2AFJI20171164

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

Date of sample receipt: July 03, 2018

Date of Test: July 04-16, 2018

Date of report issued: July 16, 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	July 16, 2018	Original

Prepared By:

Bill. Yuan

Project Engineer

Date:

July 16, 2018

Check By:

Robinson
Reviewer

Date:

July 16, 2018

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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	$\pm 4.34\text{dB}$	(1)
Radiated Emission	30MHz ~ 1000MHz	$\pm 4.24\text{dB}$	(1)
Radiated Emission	1GHz ~ 40GHz	$\pm 4.68\text{dB}$	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	$\pm 3.45\text{dB}$	(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:	Access3
Model No.:	A-1164-AA3, A-1164-AA3-1, A-1164-AA3-2, A-1164-AA3-3, A-1164-AA3-4, A-1164-AA3-5, A-1164-AA3-6, A-1164-AA3-7, A-1164-AA3-8, A-1164-AA3-9, A-1164-AA3-10, A-1164-AA3-11, A-1164-AA3-12, A-1164-AA3-13, A-1164-AA3-14, A-1164-AA3-15, A-1164-AA3-16, A-1164-AA3-17, A-1164-AA3-18
Test Model No:	A-1164-AA3
<i>Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The difference should be the CPU, RAM, storage and/or operating system for commercial purpose.</i>	
Serial No.:	3305120784137
Test sample(s) ID:	GTS201807000026-1
Sample(s) Status	Engineer sample
Hardware version:	PCHD27-APL3-272-V1.10
Software version:	win10
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:	ANT 1: Integral Antenna ANT 2: FPCB Antenna
Antenna gain:	ANT 1: 3.7dBi ANT 2: 0.5dBi
Power supply:	SWITCHING ADAPTER: Model No.:FJ-SW0503000N Input: AC 100~240V~50/60Hz 0.6A Max Output: DC 5V 3A

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, 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

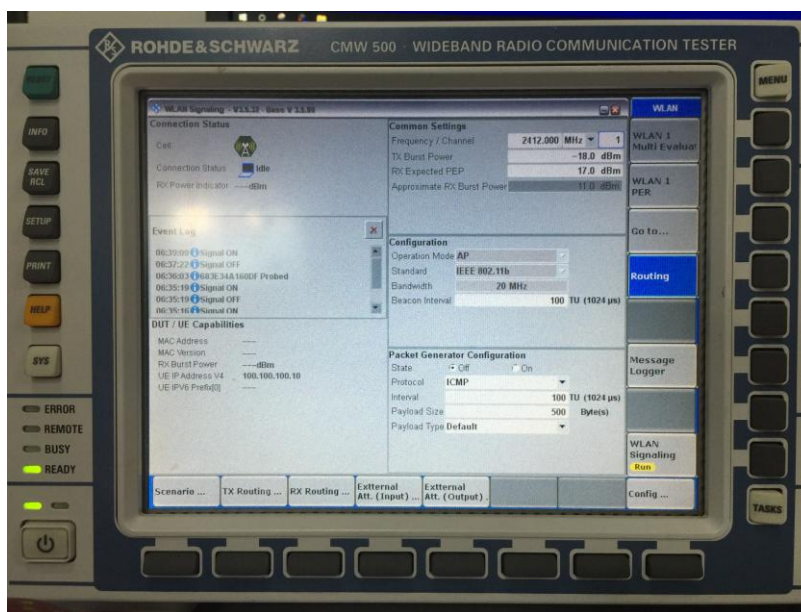
Tel: 0755-27798480

Fax: 0755-27798960

5.6 Additional Instructions

EUT Fixed Frequency Settings:

Power level setup			
Support Units	Description	Manufacturer	Model
	Wideband Radio Communication Tester	Rohde & Schwarz	CMW 500
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

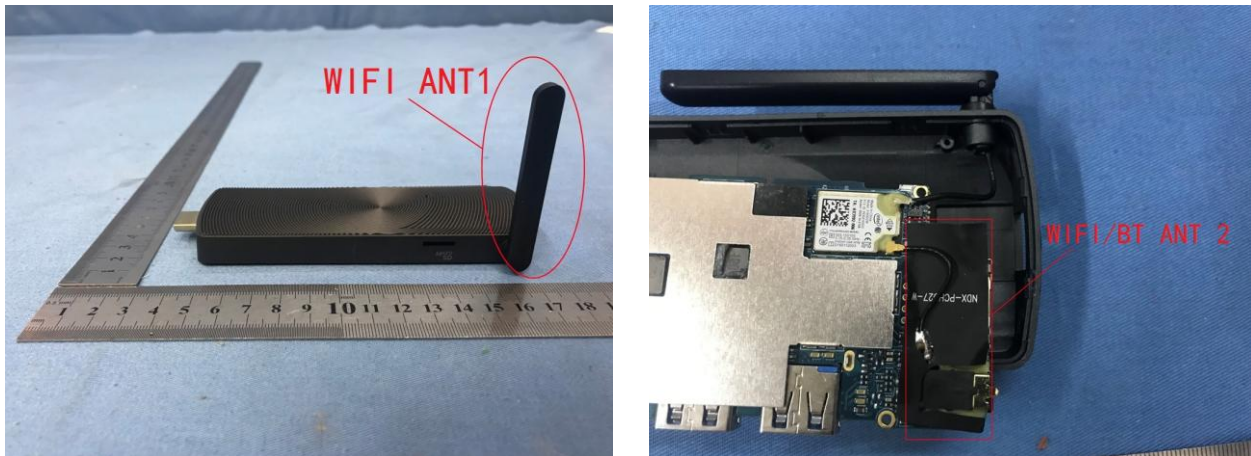
Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.16 2014	May.15 2019
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 27 2018	June. 26 2019
3	Coaxial Switch	ANRITSU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

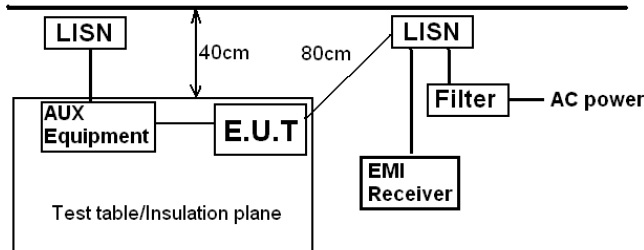
General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 27 2018	June. 26 2019
2	Barometer	ChangChun	DYM3	GTS255	June. 27 2018	June. 26 2019

7 Test results and Measurement Data

7.1 Antenna requirement

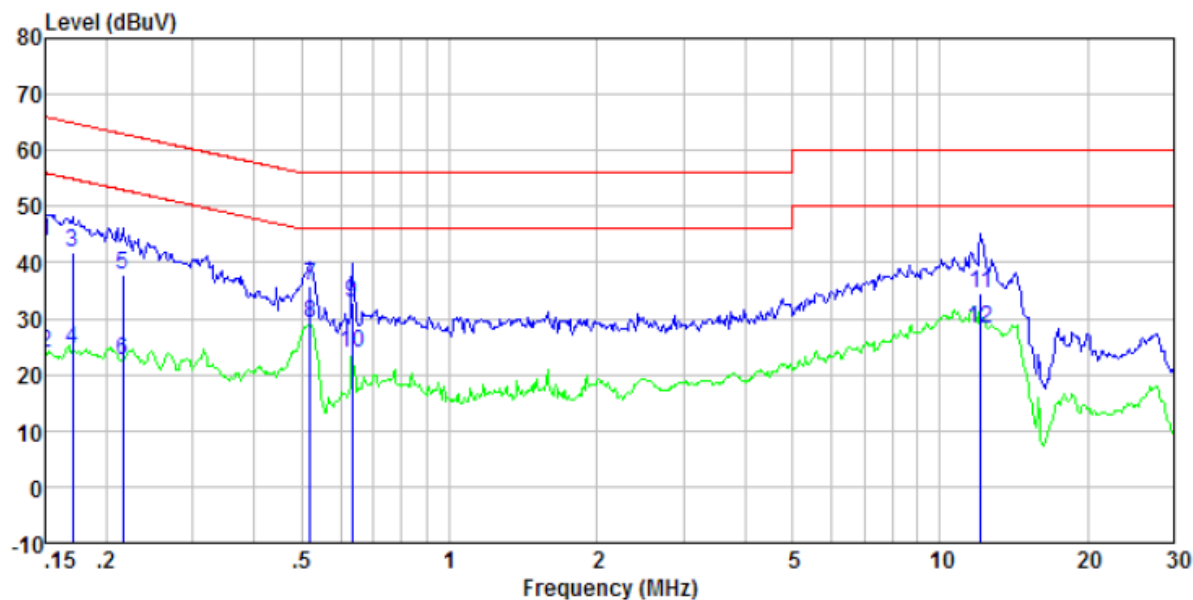
Standard requirement:	FCC Part15 C Section 15.203
<p>15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique 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.</p>	
E.U.T Antenna:	
<p><i>The antenna 1 is Integral antenna. The best case gain of the antenna is 3.7dBi.</i> <i>The antenna 2 is FPCB antenna. The best case gain of the antenna is 0.5dBi.</i> <i>Directional Gain Calculations is below:</i> <i>The Directional Gain = GANT + 10log(2) dBi = 3.7 + 3.01 dBi = 6.71dBi.</i></p>	
	

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> <p>* Decreases with the logarithm of the frequency.</p>	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:	<div><p style="text-align: center;">Reference Plane</p><p>Remark: E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p></div>														
Test procedure:	<div><div>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.</div><div>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).</div><div>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.</div></div>														
Test Instruments:	Refer to section 6.0 for details														
Test mode:	Refer to section 5.2 for details														
Test results:	Pass														

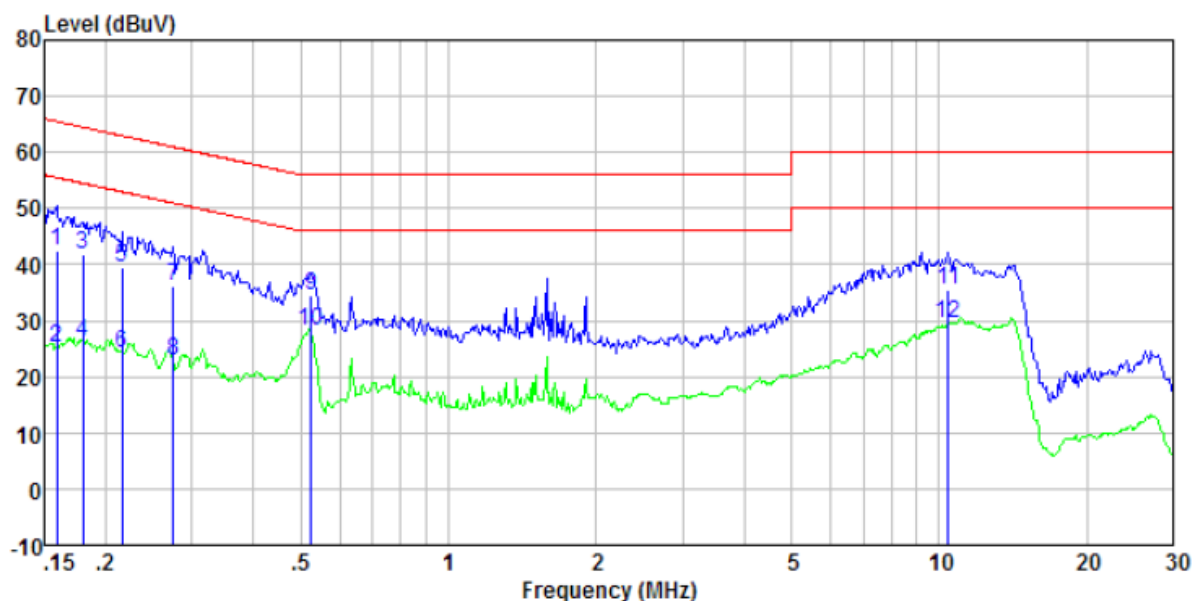
Measurement data

Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	43.33	0.40	0.07	43.80	66.00	-22.20	QP
0.15	23.53	0.40	0.07	24.00	56.00	-32.00	Average
0.17	41.32	0.40	0.09	41.81	64.94	-23.13	QP
0.17	23.93	0.40	0.09	24.42	54.94	-30.52	Average
0.22	37.18	0.40	0.11	37.69	62.96	-25.27	QP
0.22	22.02	0.40	0.11	22.53	52.96	-30.43	Average
0.52	35.53	0.31	0.11	35.95	56.00	-20.05	QP
0.52	28.92	0.31	0.11	29.34	46.00	-16.66	Average
0.63	32.41	0.28	0.12	32.81	56.00	-23.19	QP
0.63	23.60	0.28	0.12	24.00	46.00	-22.00	Average
12.12	34.20	0.20	0.20	34.60	60.00	-25.40	QP
12.12	27.94	0.20	0.20	28.34	50.00	-21.66	Average

Neutral:

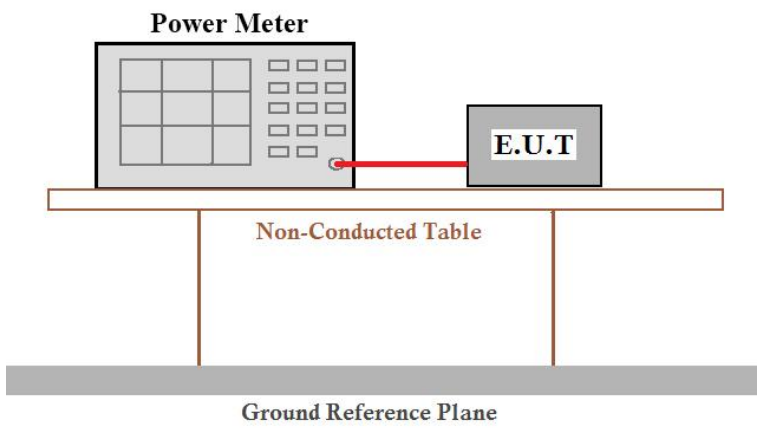


Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	41.89	0.40	0.08	42.37	65.52	-23.15	QP
0.16	24.76	0.40	0.08	25.24	55.52	-30.28	Average
0.18	41.25	0.40	0.10	41.75	64.50	-22.75	QP
0.18	25.80	0.40	0.10	26.30	54.50	-28.20	Average
0.22	38.87	0.40	0.11	39.38	62.96	-23.58	QP
0.22	23.70	0.40	0.11	24.21	52.96	-28.75	Average
0.27	35.69	0.40	0.10	36.19	60.98	-24.79	QP
0.27	22.35	0.40	0.10	22.85	50.98	-28.13	Average
0.52	33.96	0.31	0.11	34.38	56.00	-21.62	QP
0.52	27.65	0.31	0.11	28.07	46.00	-17.93	Average
10.45	35.18	0.20	0.20	35.58	60.00	-24.42	QP
10.45	29.00	0.20	0.20	29.40	50.00	-20.60	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:	 <p>The diagram illustrates the test setup. A Power Meter is connected to an E.U.T. (Equipment Under Test) via a red cable. Both the Power Meter and the E.U.T. are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement Data

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		

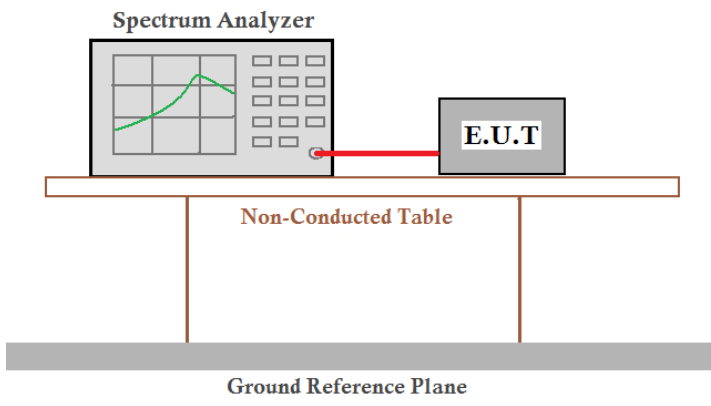
ANT: 2

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				
802.11a c(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				
802.11a c(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				
802.11a c(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:	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(H T20)	802.11ac(HT20)	802.11n(H T40)	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		

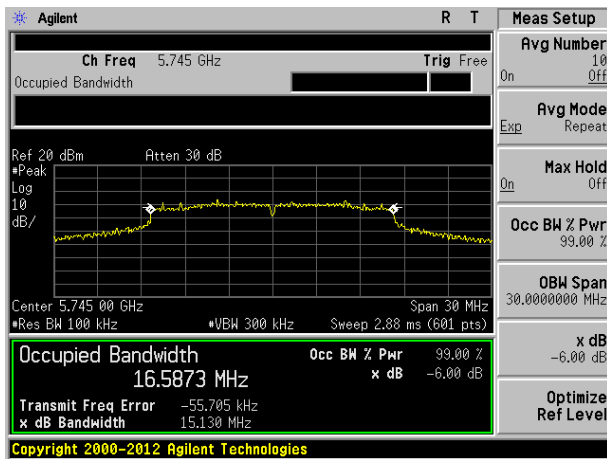
Antenna 2:

5.8G Band								
Test CH	Channel Bandwidth (MHz)						Limit (KHz)	Result
	802.11a	802.11n(H T20)	802.11ac(HT20)	802.11n(H T40)	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:

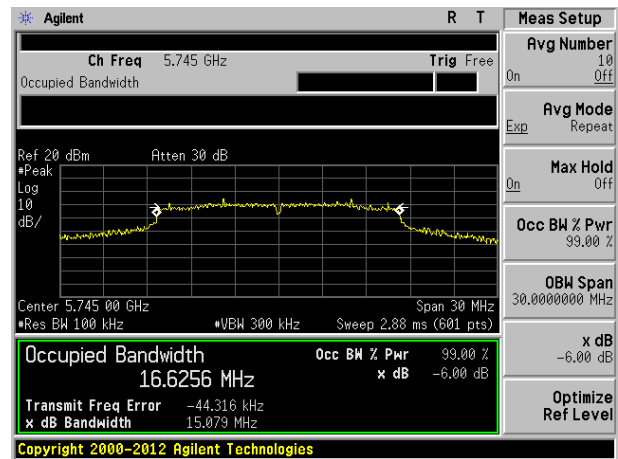
Test mode: 802.11a

Antenna 1:

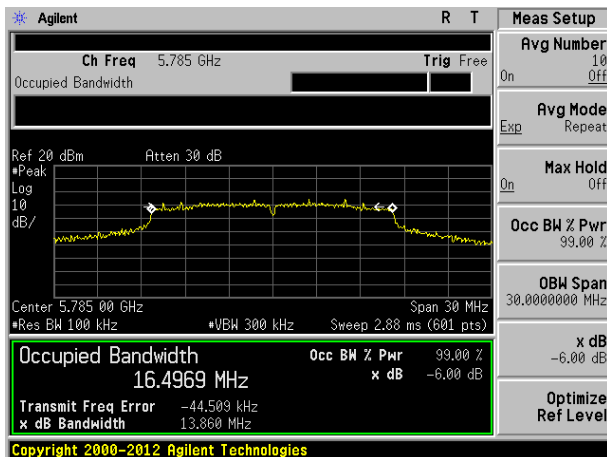


Lowest channel

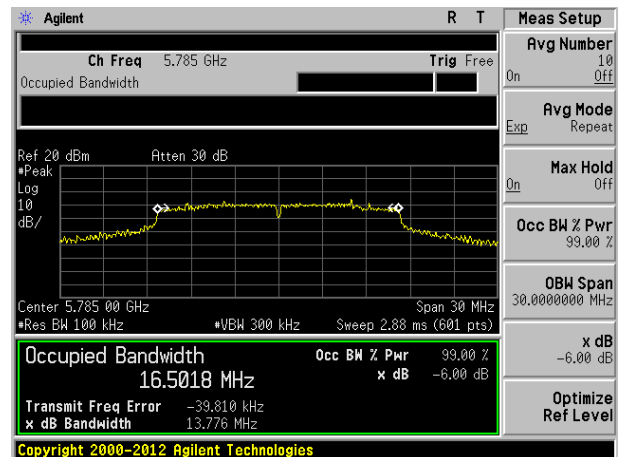
Antenna 2:



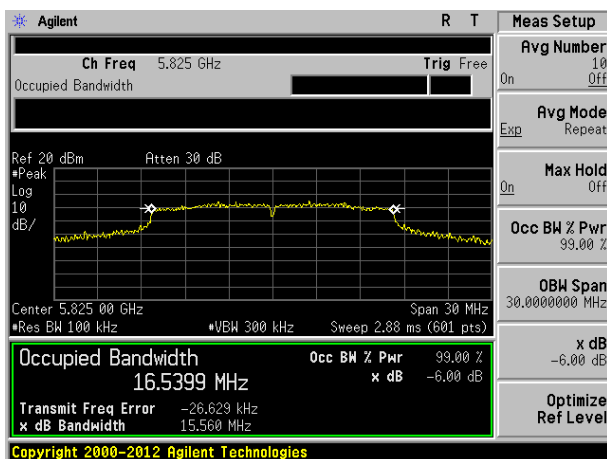
Lowest channel



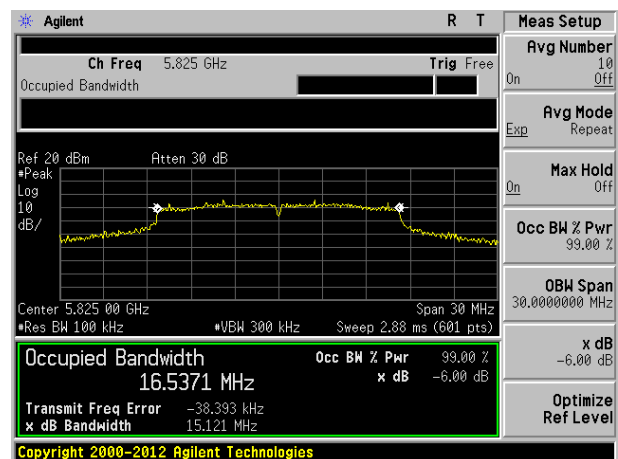
Middle channel



Middle channel



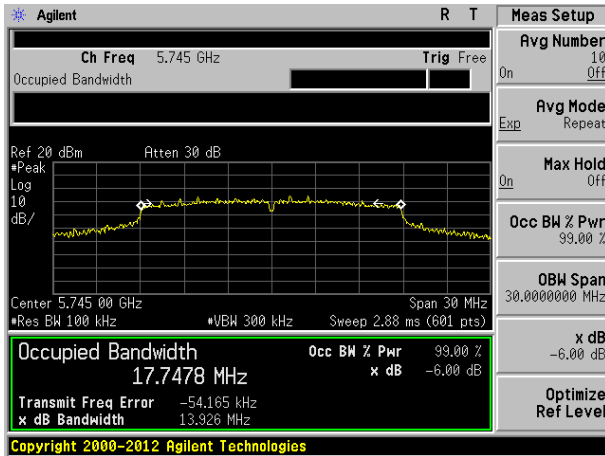
Highest channel



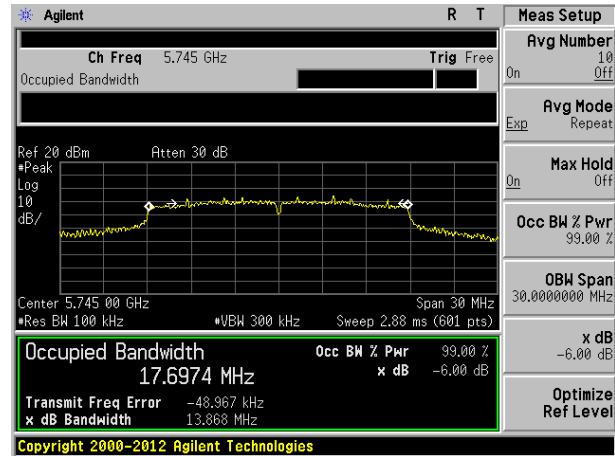
Highest channel

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

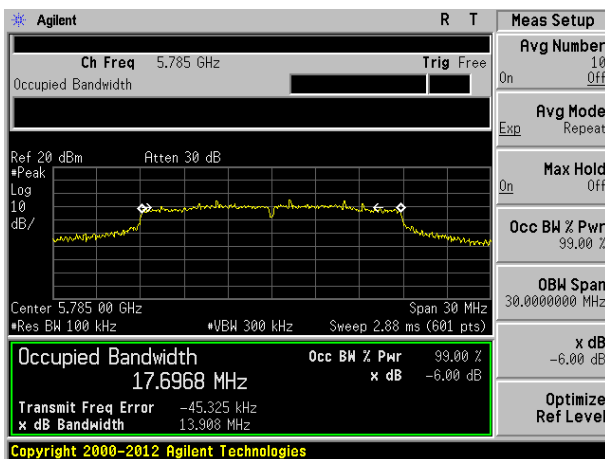
Antenna 1: Antenna 2:



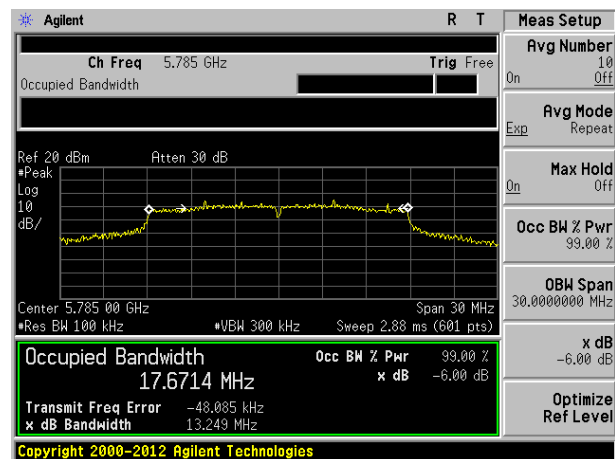
Lowest channel



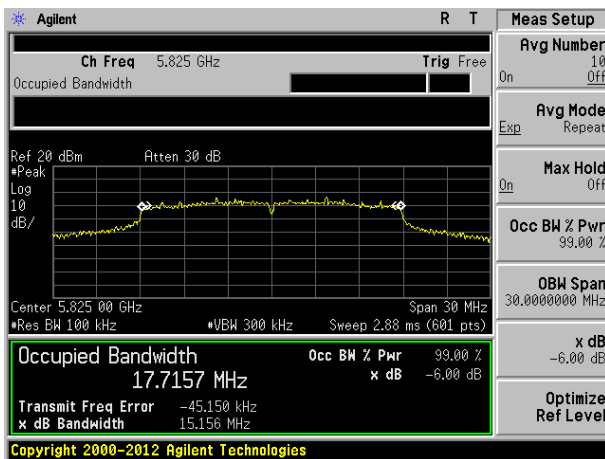
Lowest channel



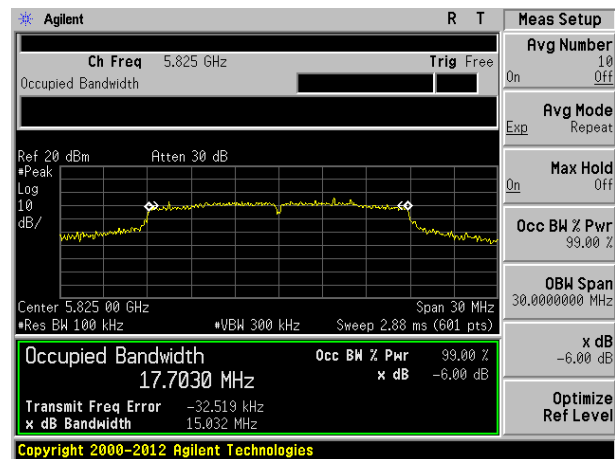
Middle channel



Middle channel



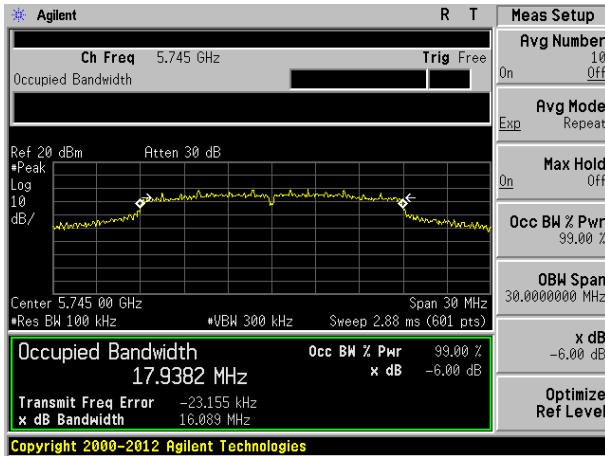
Highest channel



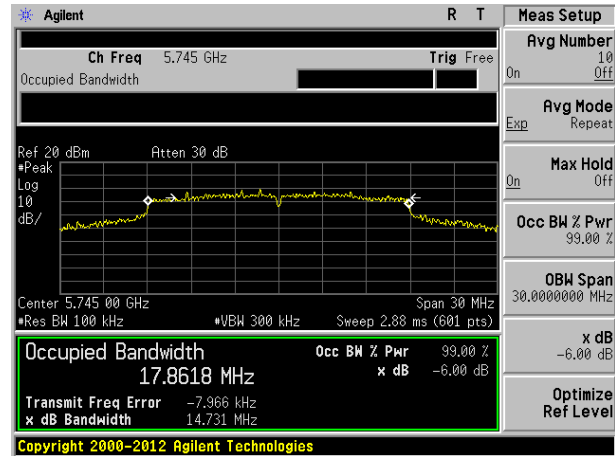
Highest channel

Test mode: 802.11ac(HT20)

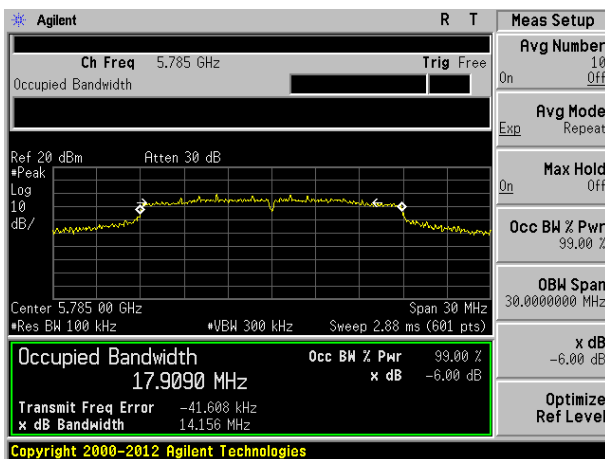
Antenna 1:	Antenna 2:
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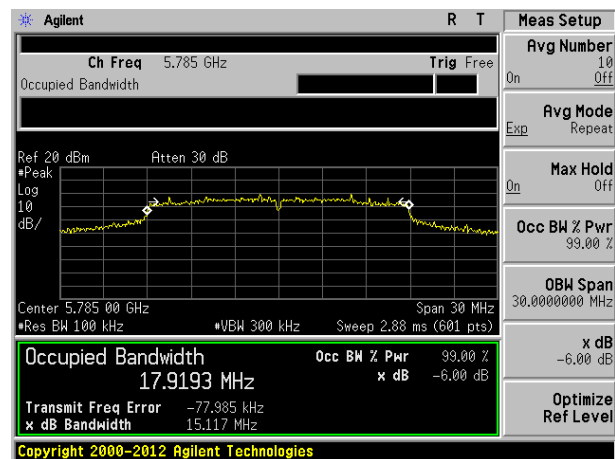
Lowest channel



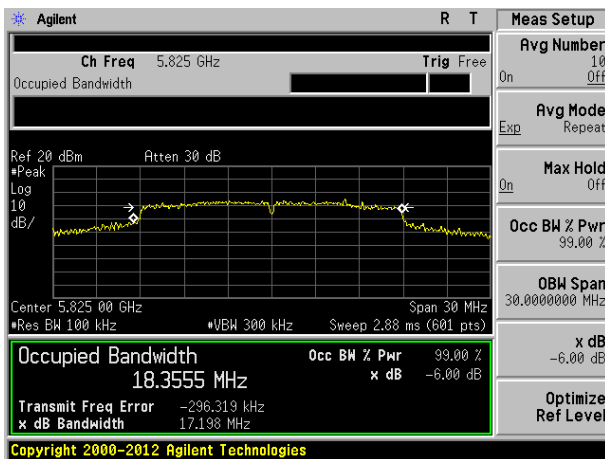
Lowest channel



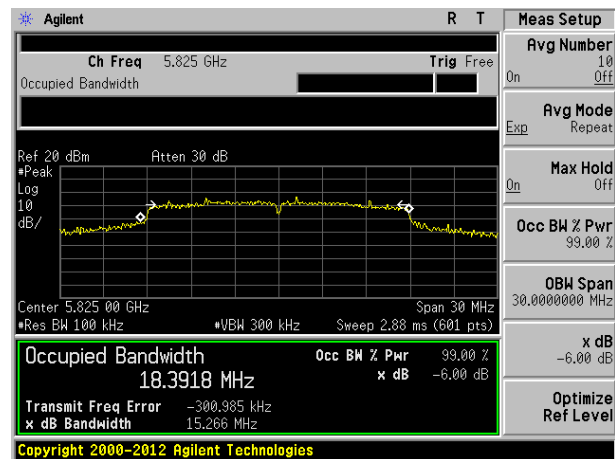
Middle channel



Middle channel



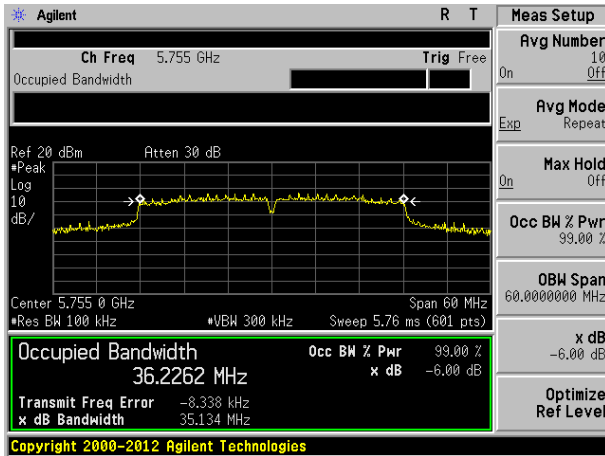
Highest channel



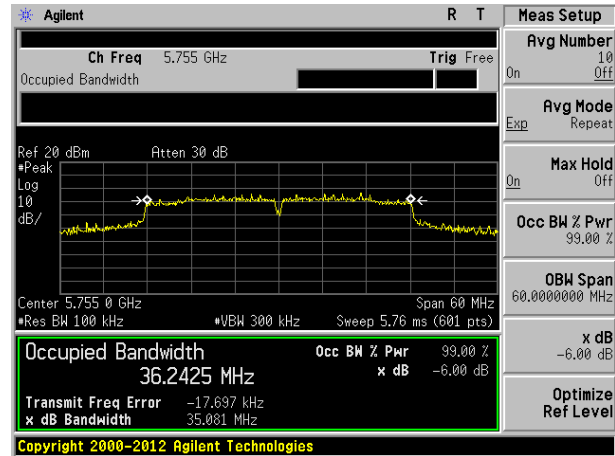
Highest channel

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

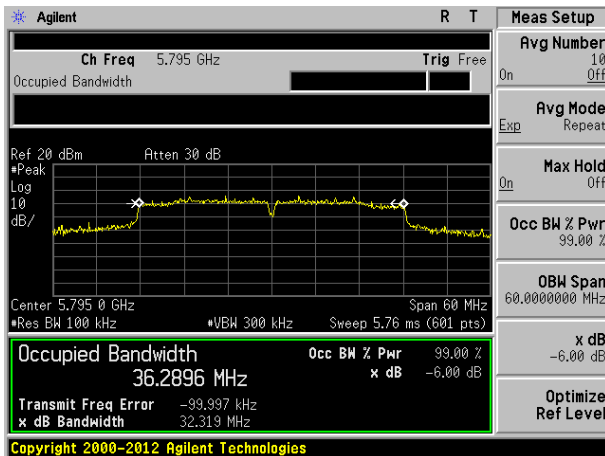
Antenna 1:	Antenna 2:
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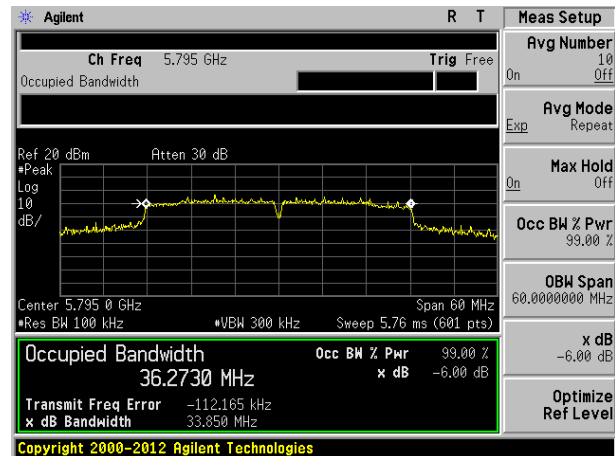
Lowest channel



Lowest channel



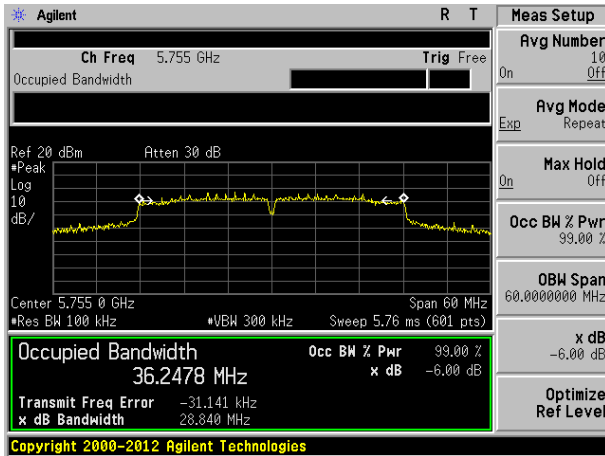
Highest channel



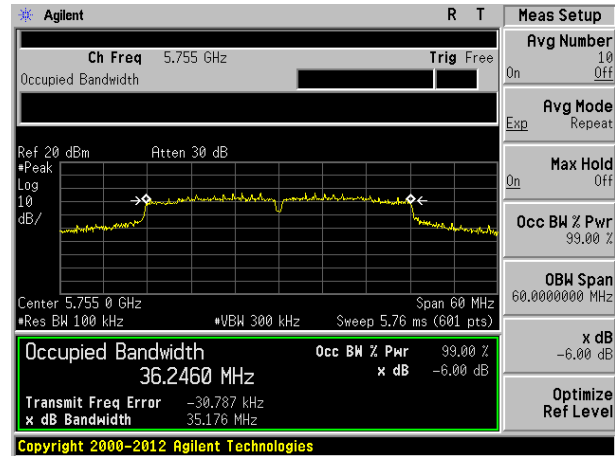
Highest channel

Test mode: 802.11ac(HT40)

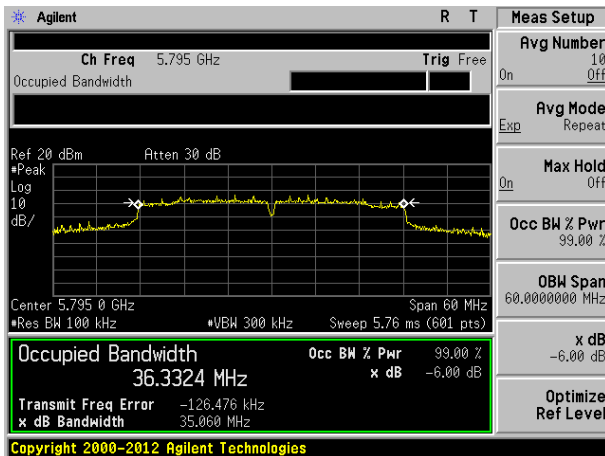
Antenna 1:	Antenna 2:
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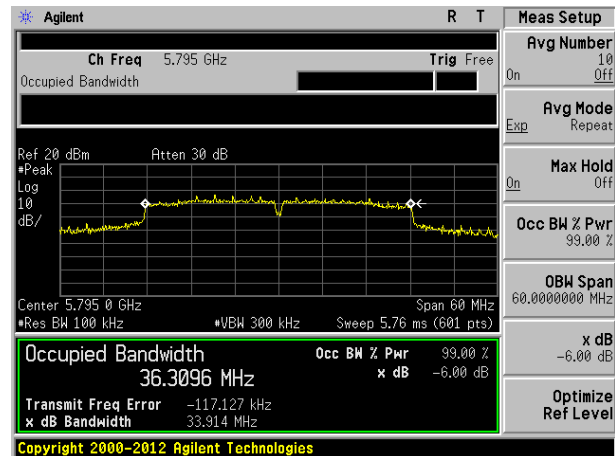
Lowest channel



Lowest channel



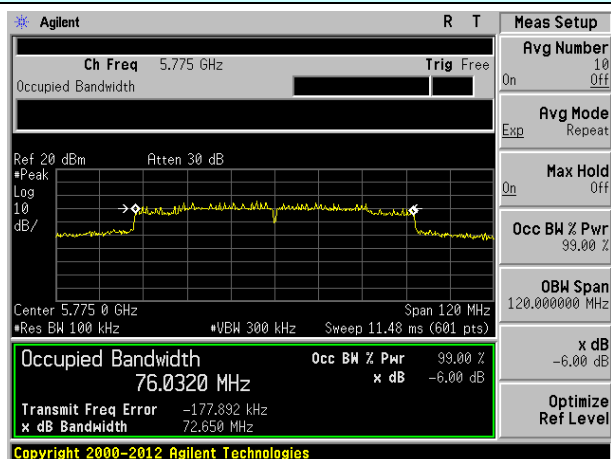
Highest channel



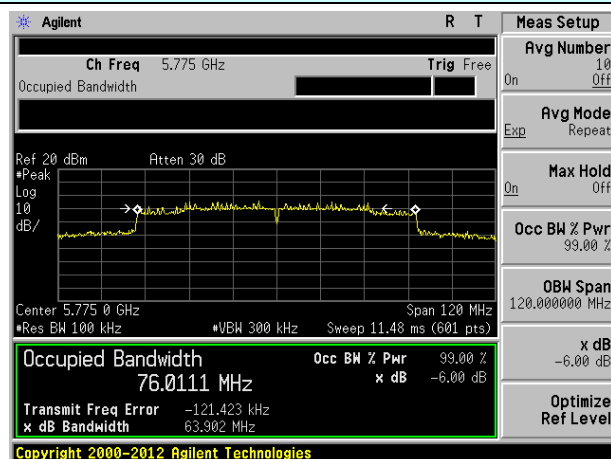
Highest channel

Test mode: 802.11ac(HT80)

Antenna 1:	Antenna 2:
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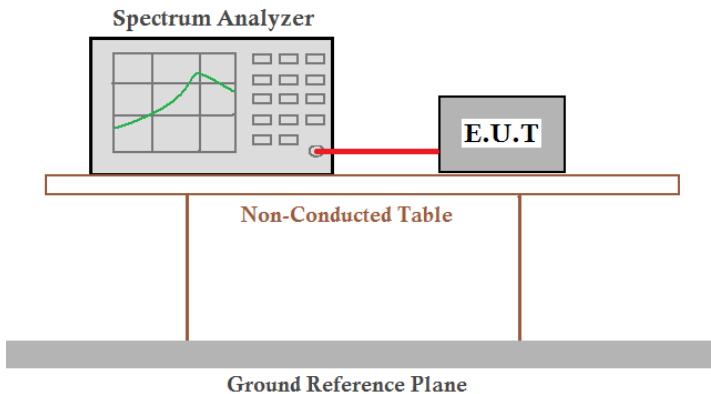


Middle channel



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

Measurement Data

5.8G Band				
Test CH	Power Spectral Density (dBm)			
	802.11a(SISO)(dBm)		Limit (dBm)	Result
Lowest	ANT 1	0.90	30.00	Pass
	ANT 2	1.30		
Middle	ANT 1	0.81		
	ANT 2	1.23		
Highest	ANT 1	0.43		
	ANT 2	0.45		

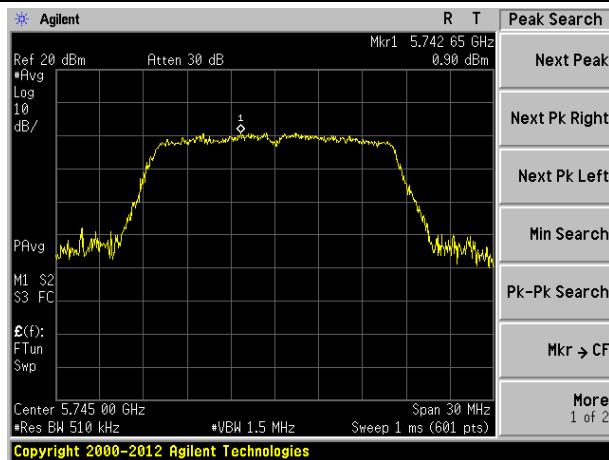
Antenna 1+Antenna 2:

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	30.00	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			
802.11a c(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			
802.11a c(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			
802.11a c(HT80) (MIMO)	Middle	ANT1	-7.43	0.18	-4.05		
		ANT2	-6.72	0.21			

Test plot as follows:

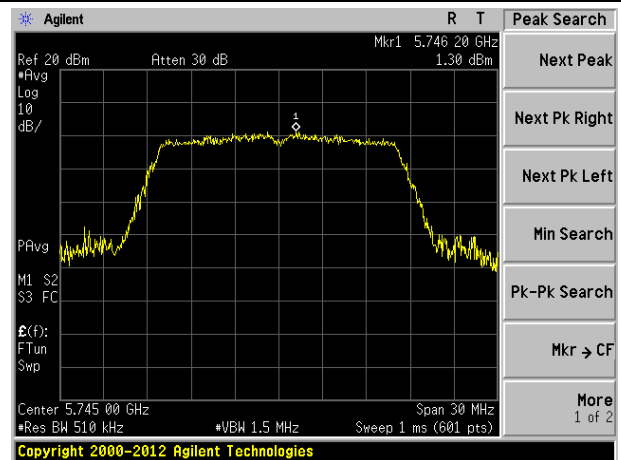
Test mode: 802.11a

Antenna 1:

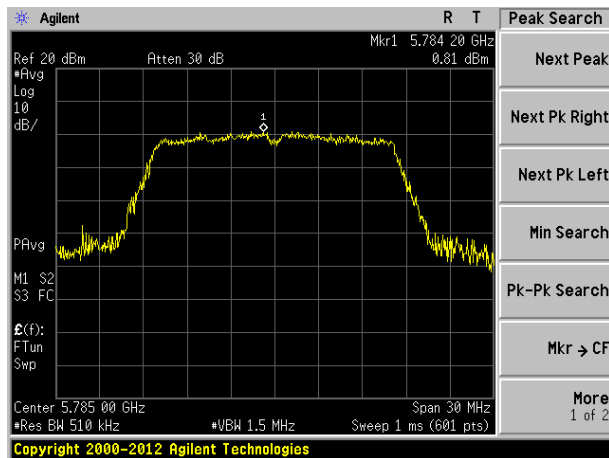


Lowest channel

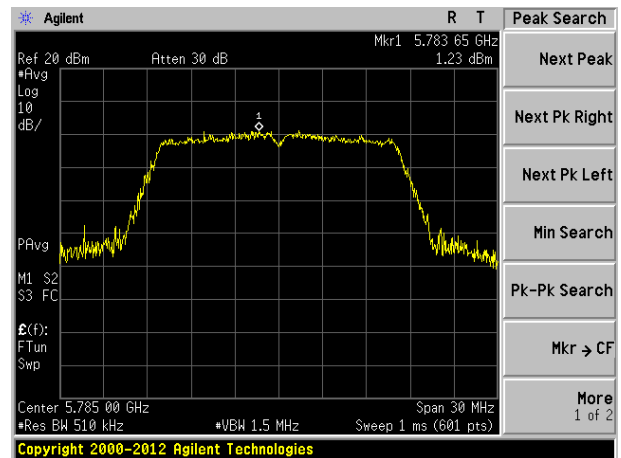
Antenna 2:



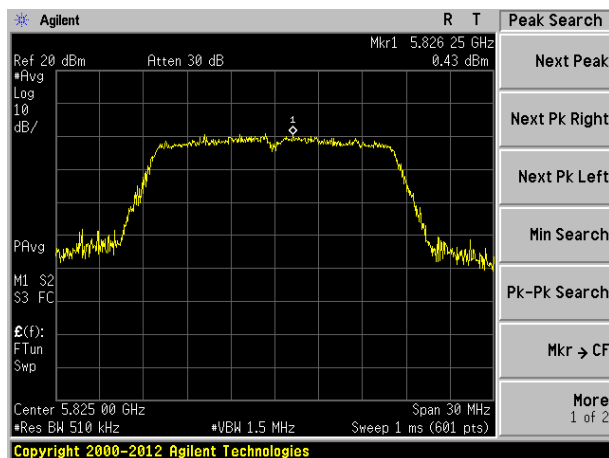
Lowest channel



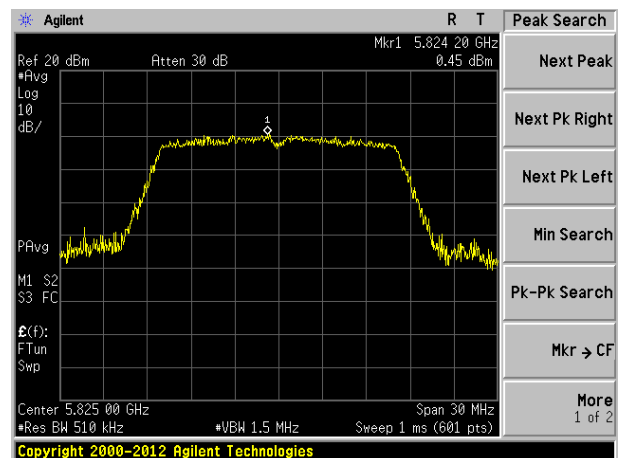
Middle channel



Middle channel



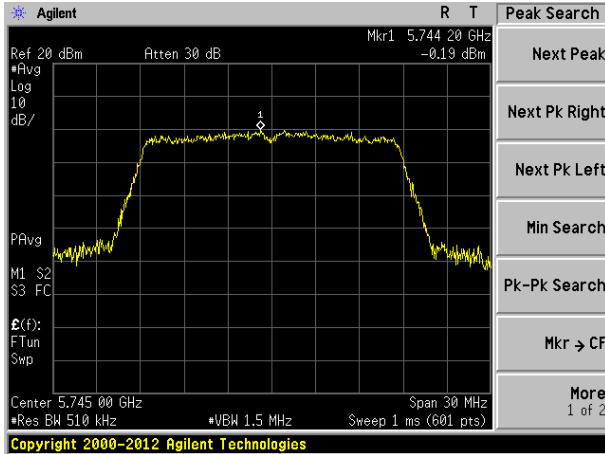
Highest channel



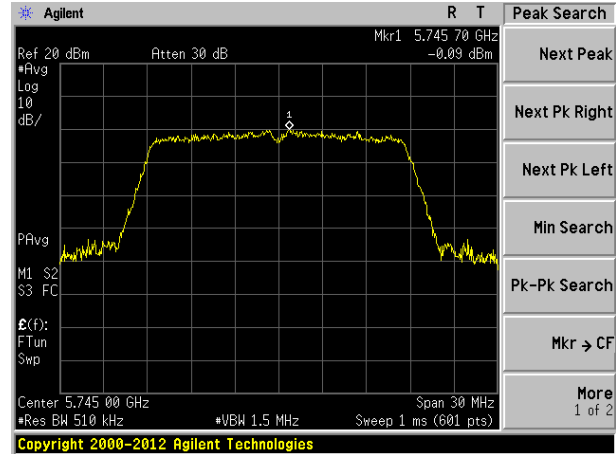
Highest channel

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

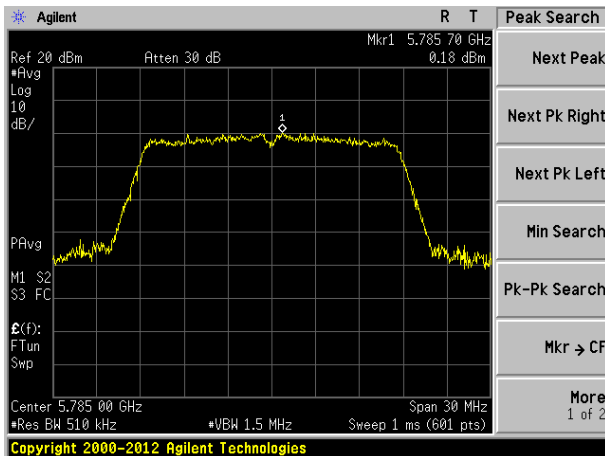
Antenna 1:	Antenna 2:
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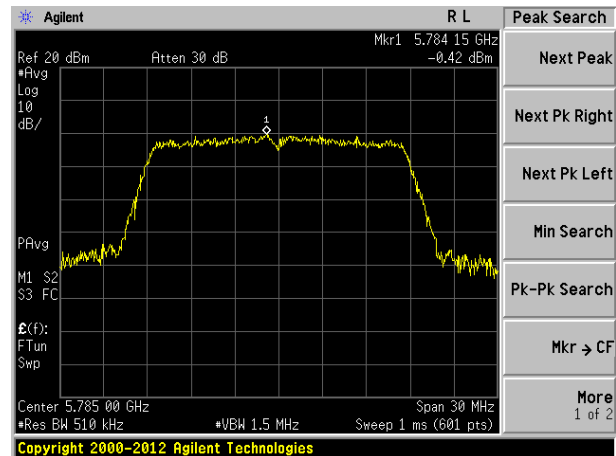
Lowest channel



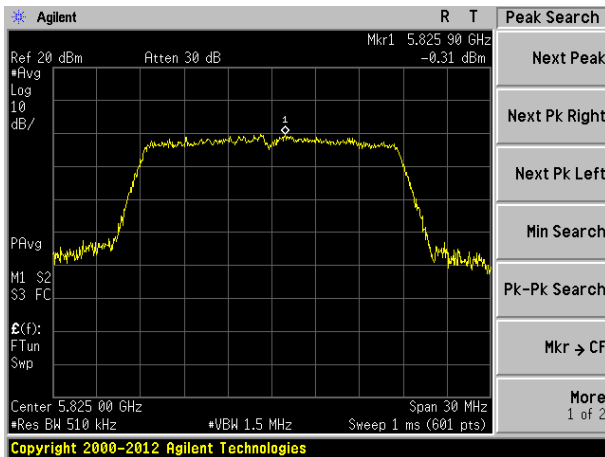
Lowest channel



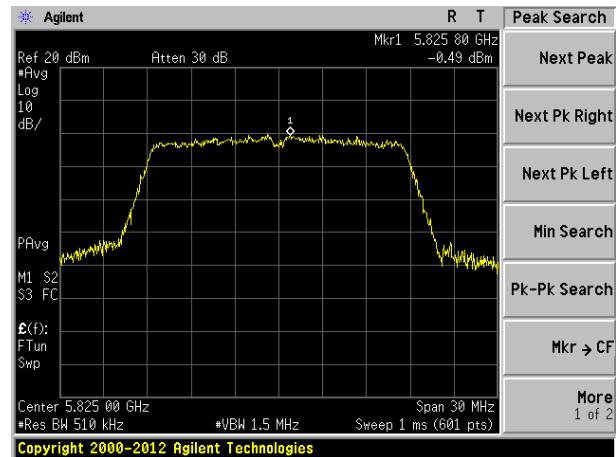
Middle channel



Middle channel



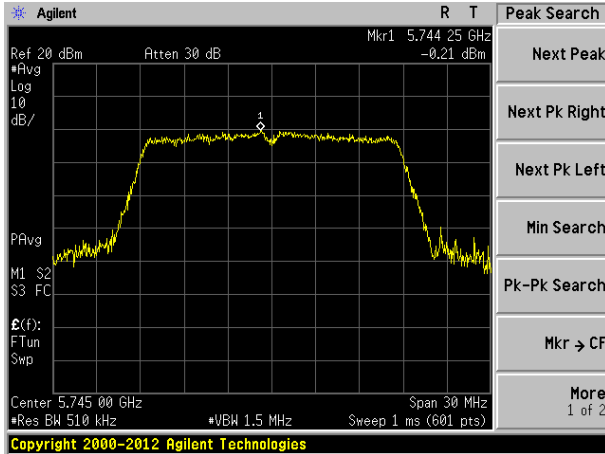
Highest channel



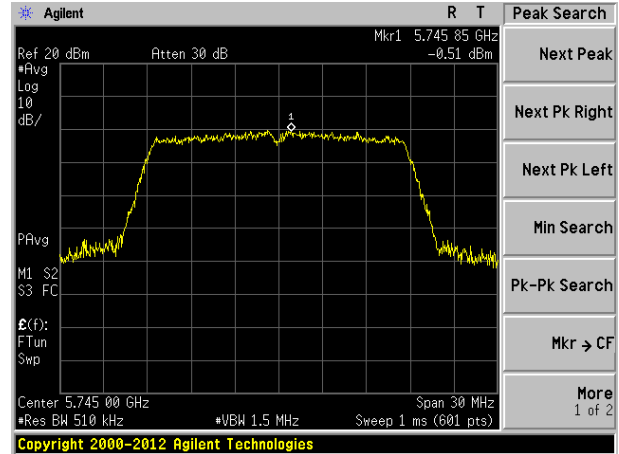
Highest channel

Test mode: 802.11ac(HT20)

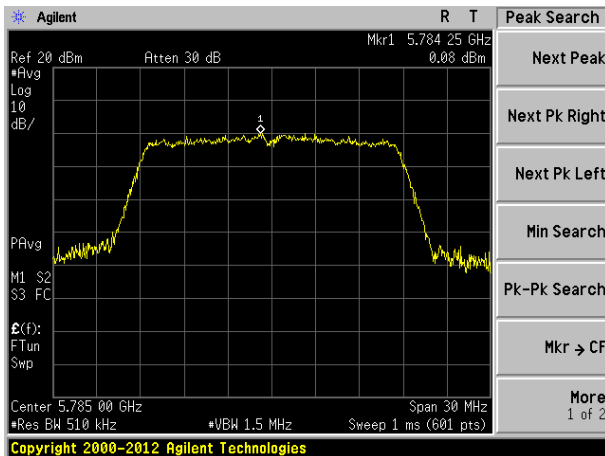
Antenna 1:	Antenna 2:
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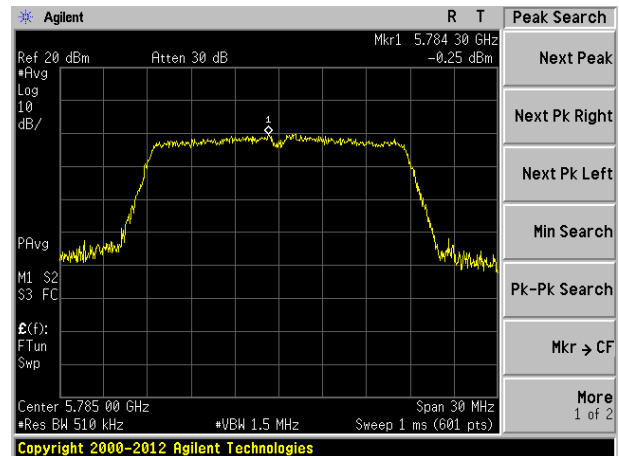
Lowest channel



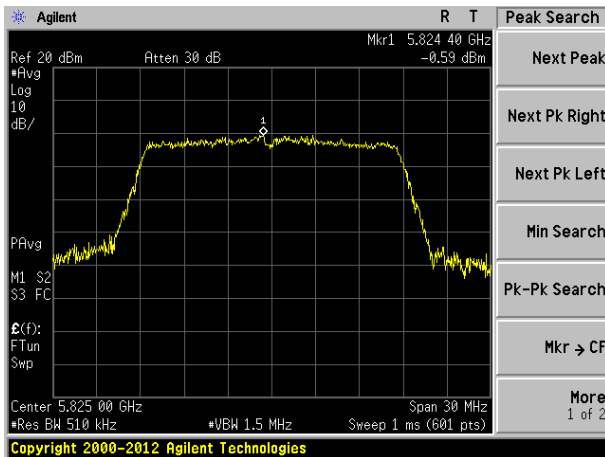
Lowest channel



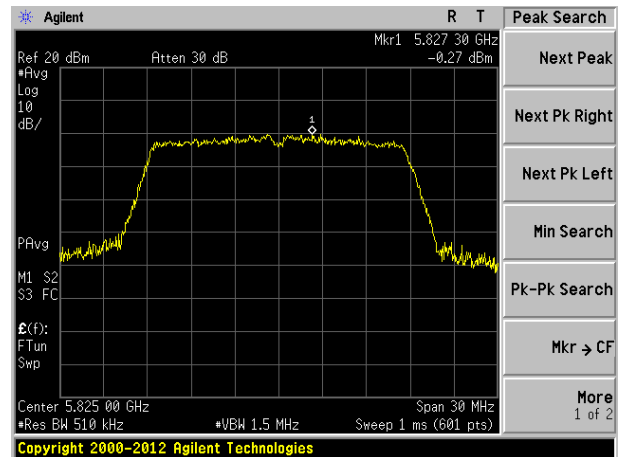
Middle channel



Middle channel



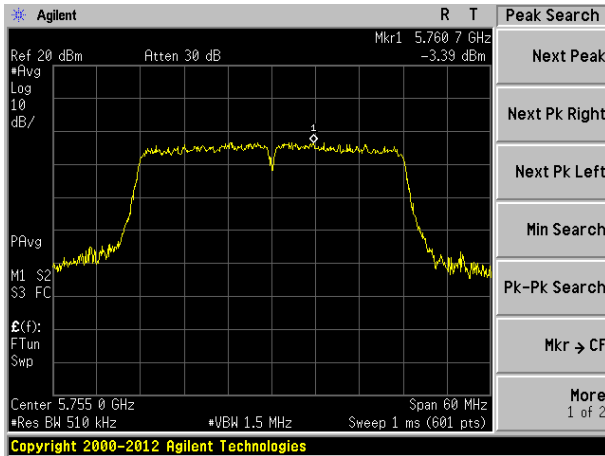
Highest channel



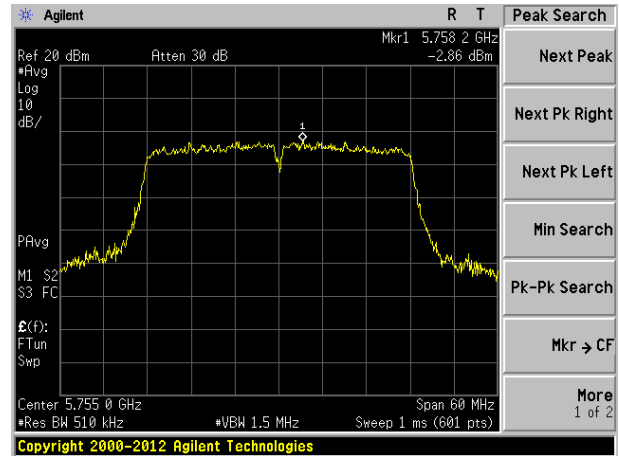
Highest channel

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

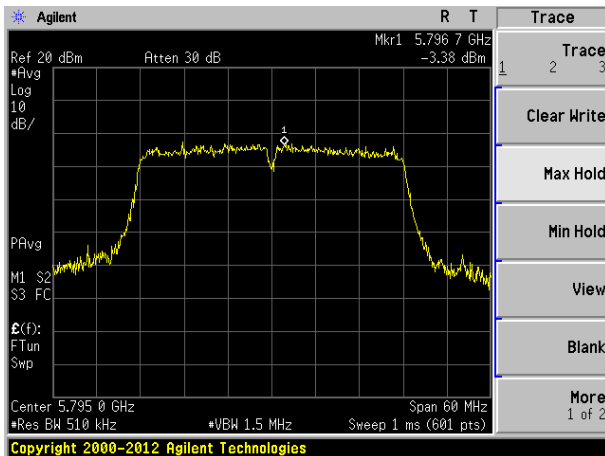
Antenna 1: Antenna 2:



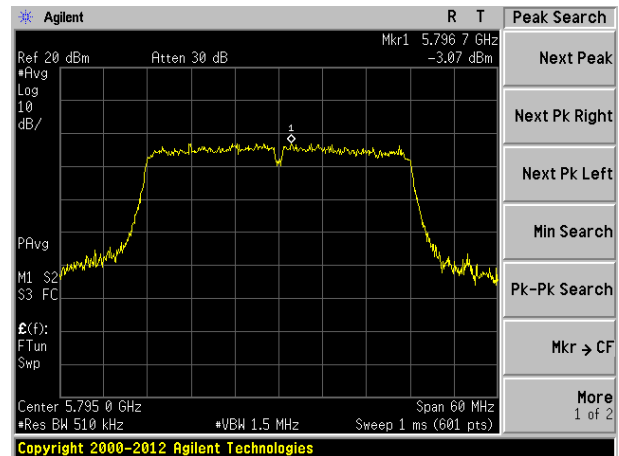
Lowest channel



Lowest channel



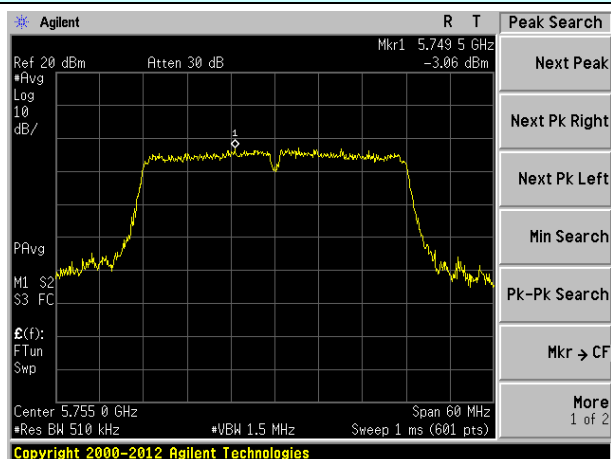
Highest channel



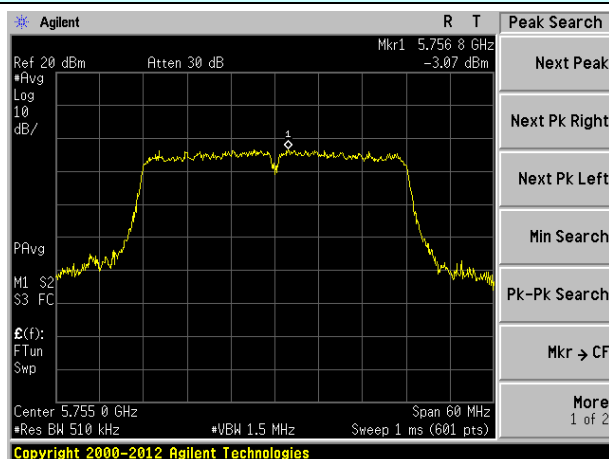
Highest channel

Test mode: 802.11ac(HT40)

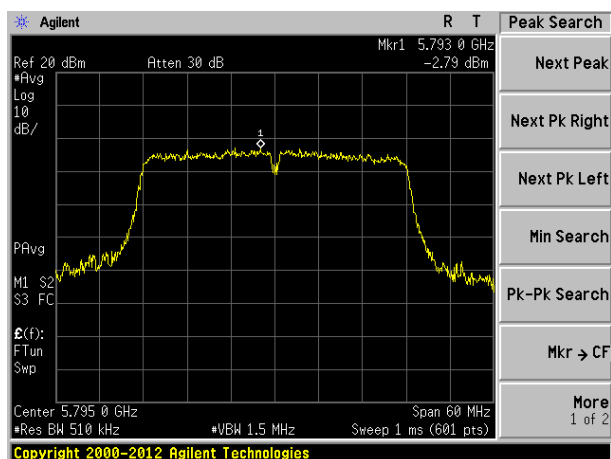
Antenna 1:	Antenna 2:
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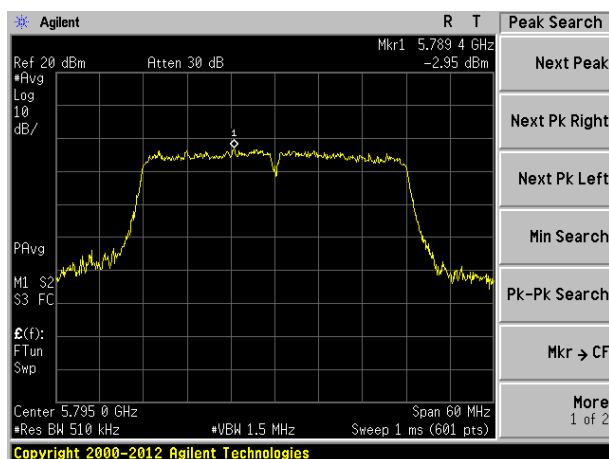
Lowest channel



Lowest channel



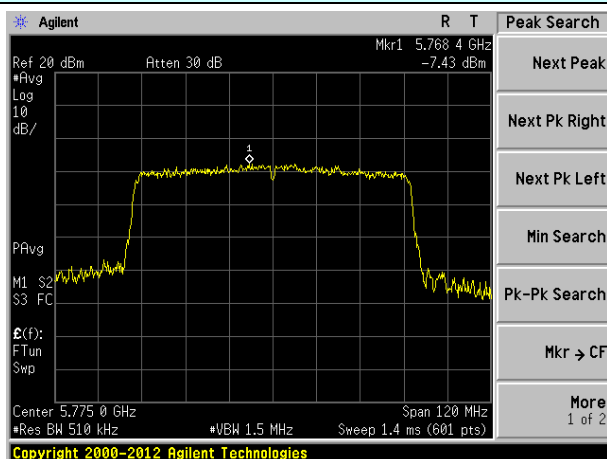
Highest channel



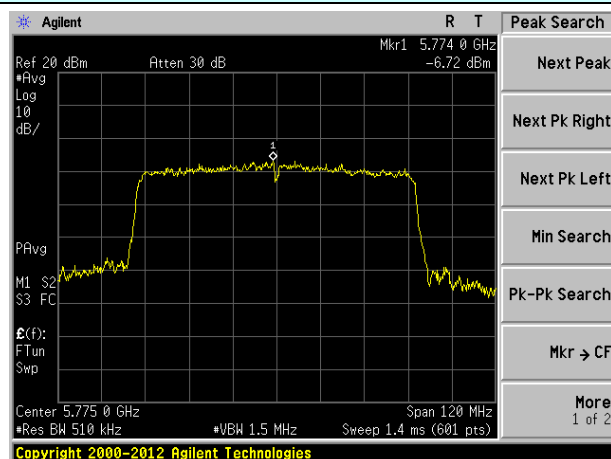
Highest channel

Test mode: 802.11ac(HT80)

Antenna 1:	Antenna 2:
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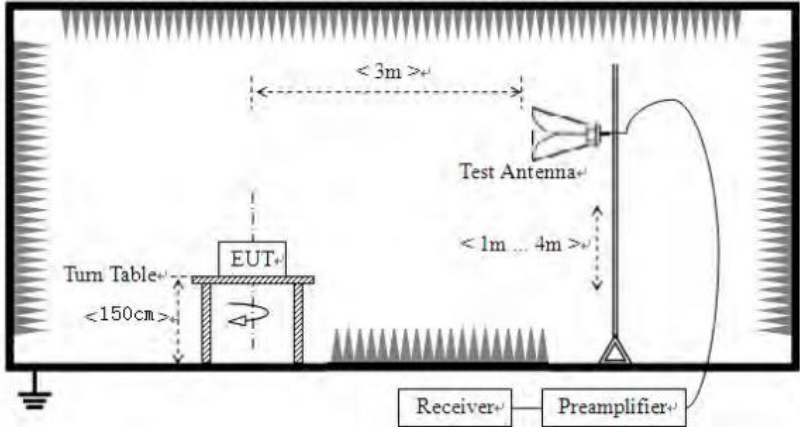
Middle channel



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:	<ol style="list-style-type: none"> 1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. 2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. 4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi- 				

	peak or average method as specified and then reported in a data sheet. 7. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Remarks:

1. Only the worst case Main Antenna test data..
2. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. The pre-test were performed on lowest, middle and highest frequencies, only the worst case's (lowest and highest frequencies) data was showed.
5. According to KDB 789033 D02v02r01 section G) 1) d),for measurements above 1000 MHz @3m distance, the limit of field strength is computed as follows:
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2;$
 $E[\text{dBuV/m}] = -27 + 95.2 = 68.2\text{dBuV/m}.$
 $E[\text{dBuV/m}] = 10 + 95.2 = 105.2\text{dBuV/m}.$
 $E[\text{dBuV/m}] = 15.6 + 95.2 = 110.8\text{dBuV/m}.$
 $E[\text{dBuV/m}] = 27 + 95.2 = 122.2\text{dBuV/m}$

Measurement data:

<i>IEEE 802.11a</i>								
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
5650.00	38.13	32.36	9.72	23.83	56.38	68.20	-11.82	Horizontal
5700.00	38.54	32.50	9.79	23.84	56.99	105.20	-48.21	Horizontal
5720.00	38.71	32.53	9.81	23.85	57.20	110.80	-53.60	Horizontal
5725.00	46.40	32.53	9.83	23.86	64.90	122.20	-57.30	Horizontal
5850.00	43.17	32.70	9.99	23.87	61.99	122.20	-60.21	Horizontal
5855.00	36.18	32.72	9.99	23.88	55.01	110.80	-55.79	Horizontal
5875.00	38.97	32.74	10.04	23.89	57.86	105.20	-47.34	Horizontal
5925.00	38.30	32.80	10.11	23.90	57.31	68.20	-10.89	Horizontal
5650.00	37.70	32.36	9.72	23.83	55.95	68.20	-12.25	Vertical
5700.00	36.96	32.50	9.79	23.84	55.41	105.20	-49.79	Vertical
5720.00	37.62	32.53	9.81	23.85	56.11	110.80	-54.69	Vertical
5725.00	45.18	32.53	9.83	23.86	63.68	122.20	-58.52	Vertical
5850.00	42.63	32.70	9.99	23.87	61.45	122.20	-60.75	Vertical
5855.00	36.40	32.72	9.99	23.88	55.23	110.80	-55.57	Vertical
5875.00	37.26	32.74	10.04	23.89	56.15	105.20	-49.05	Vertical
5925.00	37.80	32.80	10.11	23.90	56.81	68.20	-11.39	Vertical

IEEE 802.11n HT20								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.26	32.36	9.72	23.83	55.51	68.20	-12.69	Horizontal
5700.00	38.06	32.50	9.79	23.84	56.51	105.20	-48.69	Horizontal
5720.00	38.21	32.53	9.81	23.85	56.70	110.80	-54.10	Horizontal
5725.00	45.93	32.53	9.83	23.86	64.43	122.20	-57.77	Horizontal
5850.00	42.72	32.70	9.99	23.87	61.54	122.20	-60.66	Horizontal
5855.00	37.83	32.72	9.99	23.88	56.66	110.80	-54.14	Horizontal
5875.00	37.32	32.74	10.04	23.89	56.21	105.20	-48.99	Horizontal
5925.00	37.22	32.80	10.11	23.90	56.23	68.20	-11.97	Horizontal
5650.00	37.97	32.36	9.72	23.83	56.22	68.20	-11.98	Vertical
5700.00	38.01	32.50	9.79	23.84	56.46	105.20	-48.74	Vertical
5720.00	36.85	32.53	9.81	23.85	55.34	110.80	-55.46	Vertical
5725.00	45.39	32.53	9.83	23.86	63.89	122.20	-58.31	Vertical
5850.00	42.45	32.70	9.99	23.87	61.27	122.20	-60.93	Vertical
5855.00	37.26	32.72	9.99	23.88	56.09	110.80	-54.71	Vertical
5875.00	37.63	32.74	10.04	23.89	56.52	105.20	-48.68	Vertical
5925.00	37.11	32.80	10.11	23.90	56.12	68.20	-12.08	Vertical

IEEE 802.11ac HT20								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.57	32.36	9.72	23.83	55.82	68.20	-12.38	Horizontal
5700.00	37.51	32.50	9.79	23.84	55.96	105.20	-49.24	Horizontal
5720.00	37.33	32.53	9.81	23.85	55.82	110.80	-54.98	Horizontal
5725.00	45.30	32.53	9.83	23.86	63.80	122.20	-58.40	Horizontal
5850.00	42.08	32.70	9.99	23.87	60.90	122.20	-61.30	Horizontal
5855.00	37.78	32.72	9.99	23.88	56.61	110.80	-54.19	Horizontal
5875.00	37.22	32.74	10.04	23.89	56.11	105.20	-49.09	Horizontal
5925.00	37.23	32.80	10.11	23.90	56.24	68.20	-11.96	Horizontal
5650.00	37.38	32.36	9.72	23.83	55.63	68.20	-12.57	Vertical
5700.00	37.60	32.50	9.79	23.84	56.05	105.20	-49.16	Vertical
5720.00	37.84	32.53	9.81	23.85	56.33	110.80	-54.47	Vertical
5725.00	46.22	32.53	9.83	23.86	64.72	122.20	-57.48	Vertical
5850.00	43.01	32.70	9.99	23.87	61.83	122.20	-60.37	Vertical
5855.00	37.44	32.72	9.99	23.88	56.27	110.80	-54.53	Vertical
5875.00	37.41	32.74	10.04	23.89	56.30	105.20	-48.90	Vertical
5925.00	37.55	32.80	10.11	23.90	56.56	68.20	-11.64	Vertical

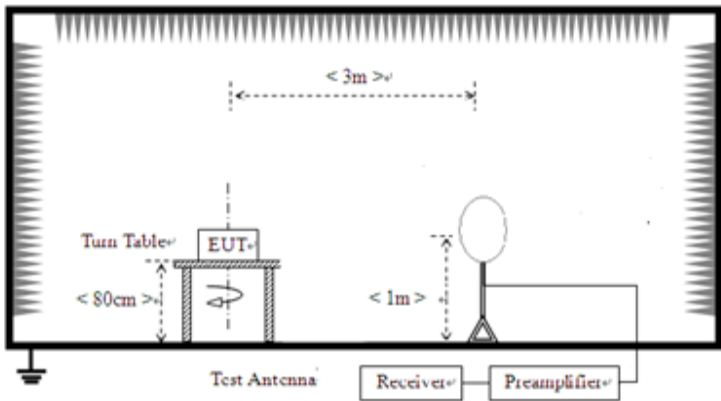
IEEE 802.11n HT40								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	36.75	32.36	9.72	23.83	55.00	68.20	-13.20	Horizontal
5700.00	36.93	32.50	9.79	23.84	55.38	105.20	-49.82	Horizontal
5720.00	36.96	32.53	9.81	23.85	55.45	110.80	-55.35	Horizontal
5725.00	39.83	32.53	9.83	23.86	58.33	122.20	-63.87	Horizontal
5850.00	39.24	32.70	9.99	23.87	58.06	122.20	-64.14	Horizontal
5855.00	36.74	32.72	9.99	23.88	55.57	110.80	-55.23	Horizontal
5875.00	36.55	32.74	10.04	23.89	55.44	105.20	-49.76	Horizontal
5925.00	37.22	32.80	10.11	23.90	56.23	68.20	-11.97	Horizontal
5650.00	36.87	32.36	9.72	23.83	55.12	68.20	-13.08	Vertical
5700.00	36.51	32.50	9.79	23.84	54.96	105.20	-50.24	Vertical
5720.00	37.26	32.53	9.81	23.85	55.75	110.80	-55.05	Vertical
5725.00	45.04	32.53	9.83	23.86	63.54	122.20	-58.66	Vertical
5850.00	41.61	32.70	9.99	23.87	60.43	122.20	-61.77	Vertical
5855.00	36.95	32.72	9.99	23.88	55.78	110.80	-55.02	Vertical
5875.00	37.10	32.74	10.04	23.89	55.99	105.20	-49.21	Vertical
5925.00	36.50	32.80	10.11	23.90	55.51	68.20	-12.69	Vertical

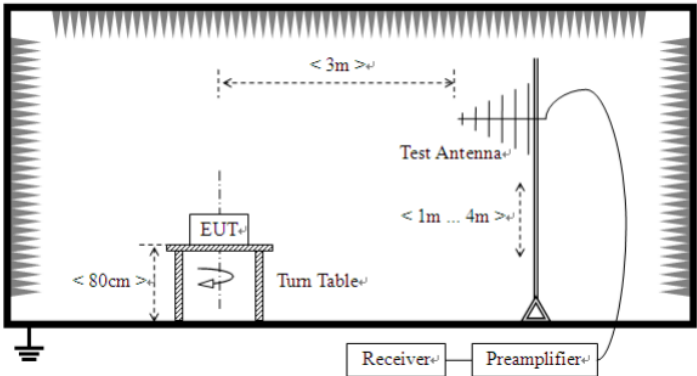
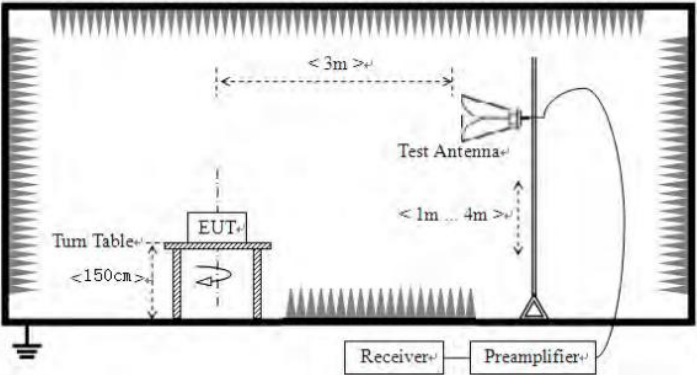
IEEE 802.11ac HT40								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.57	32.36	9.72	23.83	55.82	68.20	-12.38	Horizontal
5700.00	37.22	32.50	9.79	23.84	55.67	105.20	-49.53	Horizontal
5720.00	37.28	32.53	9.81	23.85	55.77	110.80	-55.03	Horizontal
5725.00	45.81	32.53	9.83	23.86	64.31	122.20	-57.89	Horizontal
5850.00	42.55	32.70	9.99	23.87	61.37	122.20	-60.83	Horizontal
5855.00	37.42	32.72	9.99	23.88	56.25	110.80	-54.55	Horizontal
5875.00	37.24	32.74	10.04	23.89	56.13	105.20	-49.07	Horizontal
5925.00	37.51	32.80	10.11	23.90	56.52	68.20	-11.68	Horizontal
5650.00	37.60	32.36	9.72	23.83	55.85	68.20	-12.36	Vertical
5700.00	37.45	32.50	9.79	23.84	55.90	105.20	-49.30	Vertical
5720.00	37.98	32.53	9.81	23.85	56.47	110.80	-54.33	Vertical
5725.00	45.59	32.53	9.83	23.86	64.09	122.20	-58.11	Vertical
5850.00	42.30	32.70	9.99	23.87	61.12	122.20	-61.08	Vertical
5855.00	38.08	32.72	9.99	23.88	56.91	110.80	-53.89	Vertical
5875.00	37.27	32.74	10.04	23.89	56.16	105.20	-49.04	Vertical
5925.00	37.97	32.80	10.11	23.90	56.98	68.20	-11.22	Vertical

IEEE 802.11ac HT80								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	37.29	32.36	9.72	23.83	55.54	68.20	-12.66	Horizontal
5700.00	36.62	32.50	9.79	23.84	55.07	105.20	-50.13	Horizontal
5720.00	36.53	32.53	9.81	23.85	55.02	110.80	-55.78	Horizontal
5725.00	45.51	32.53	9.83	23.86	64.01	122.20	-58.19	Horizontal
5850.00	42.04	32.70	9.99	23.87	60.86	122.20	-61.34	Horizontal
5855.00	36.62	32.72	9.99	23.88	55.45	110.80	-55.35	Horizontal
5875.00	36.61	32.74	10.04	23.89	55.50	105.20	-49.70	Horizontal
5925.00	36.85	32.80	10.11	23.90	55.86	68.20	-12.34	Horizontal
5650.00	37.07	32.36	9.72	23.83	55.32	68.20	-12.88	Vertical
5700.00	37.33	32.50	9.79	23.84	55.78	105.20	-49.42	Vertical
5720.00	37.20	32.53	9.81	23.85	55.69	110.80	-55.11	Vertical
5725.00	44.85	32.53	9.83	23.86	63.35	122.20	-58.85	Vertical
5850.00	41.84	32.70	9.99	23.87	60.66	122.20	-61.54	Vertical
5855.00	37.22	32.72	9.99	23.88	56.05	110.80	-54.75	Vertical
5875.00	36.43	32.74	10.04	23.89	55.32	105.20	-49.88	Vertical
5925.00	37.27	32.80	10.11	23.90	56.28	68.20	-11.92	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				
	<div></div>				
Test setup:	Below 1GHz				

	 <p>Above 1GHz</p> 
<p>Test Procedure:</p>	<ol style="list-style-type: none"> 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.

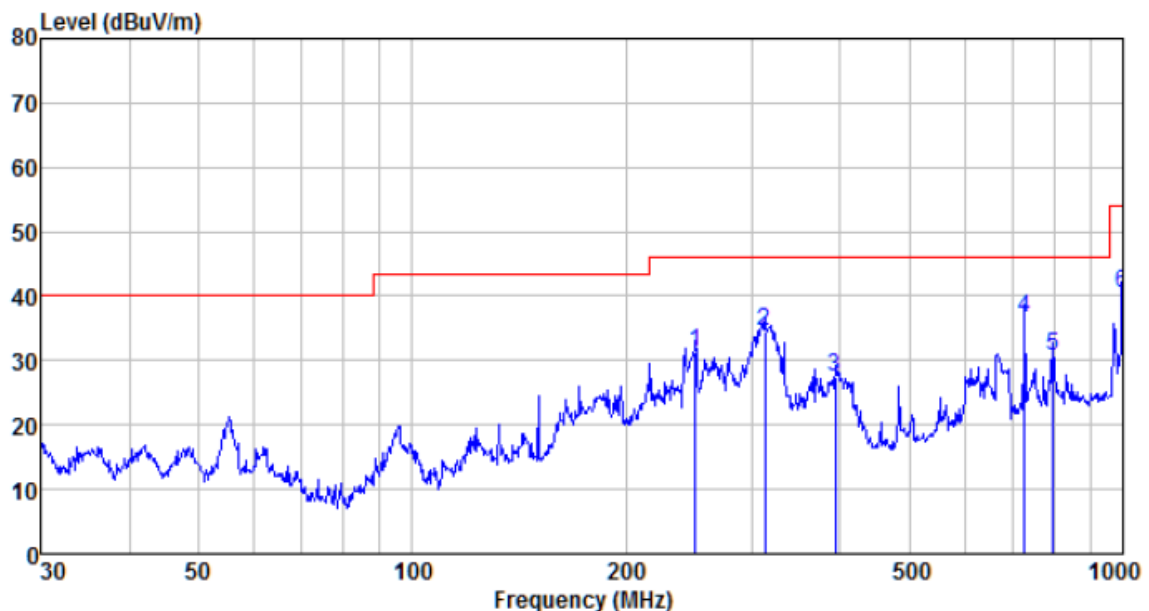
Measurement Data

■ 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.

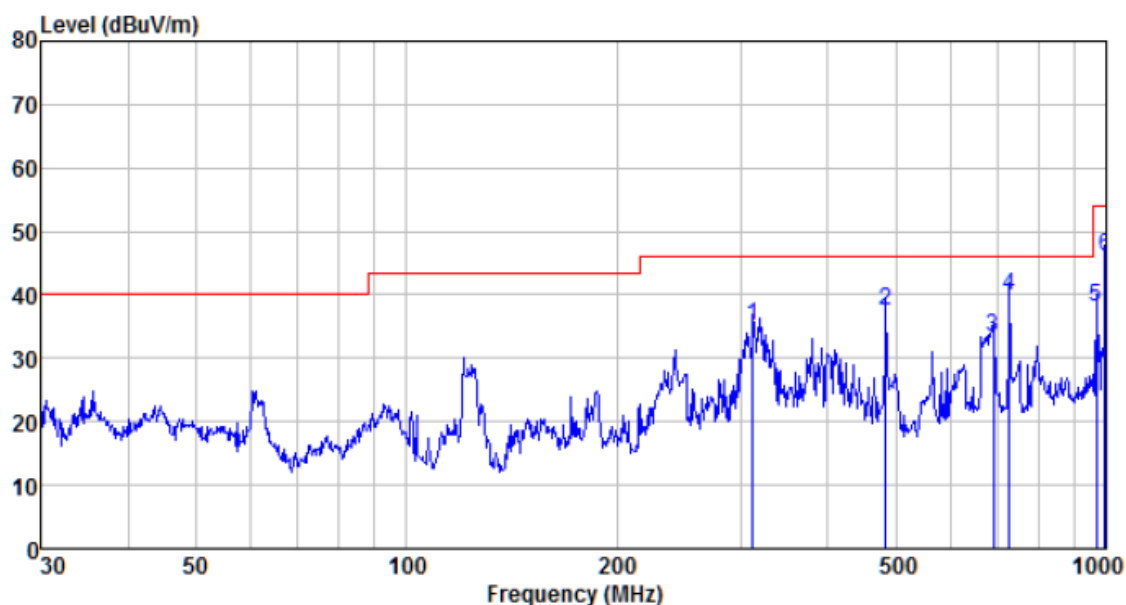
■ Below 1GHz

Horizontal:



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV	Limit level dBuV/m	Over limit dB	Remark
250.301	54.26	12.18	2.12	37.38	31.18	46.00	-14.82	QP
313.276	55.62	13.85	2.43	37.44	34.46	46.00	-11.54	QP
393.472	46.83	15.22	2.82	37.51	27.36	46.00	-18.64	QP
726.805	50.00	20.10	4.19	37.63	36.66	46.00	-9.34	QP
796.183	42.47	21.34	4.45	37.62	30.64	46.00	-15.36	QP
1000.000	50.10	22.70	5.22	37.51	40.51	54.00	-13.49	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
312.179	56.19	13.85	2.42	37.43	35.03	46.00	-10.97	QP
483.910	54.70	17.01	3.23	37.51	37.43	46.00	-8.57	QP
689.565	47.43	19.59	4.05	37.62	33.45	46.00	-12.55	QP
726.805	53.22	20.10	4.19	37.63	39.88	46.00	-6.12	QP
968.934	47.84	22.59	5.11	37.54	38.00	54.00	-16.00	QP
996.500	55.52	22.70	5.20	37.51	45.91	54.00	-8.09	QP

■ Above 1GHz

ANT 1:

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	11510	29.06	21.64	50.70	54(Note3)	-3.30	PK
V	17265	26.79	21.8	48.59	54(Note3)	-5.41	PK
H	11510	26.86	21.83	48.69	54(Note3)	-5.31	PK
H	17265	25.66	21.67	47.33	54(Note3)	-6.67	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	26.89	21.64	48.53	54(Note3)	-5.47	PK
V	17355	25.58	21.8	47.38	54(Note3)	-6.62	PK
H	11570	23.24	21.83	45.07	54(Note3)	-8.93	PK
H	17355	23.90	21.67	45.57	54(Note3)	-8.43	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	27.06	21.64	48.70	54(Note3)	-5.30	PK
V	17475	24.67	21.8	46.47	54(Note3)	-7.53	PK
H	11650	24.90	21.83	46.73	54(Note3)	-7.27	PK
H	17475	22.96	21.67	44.63	54(Note3)	-9.37	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	28.45	21.67	50.12	54(Note3)	-3.88	PK
V	17265	27.06	21.83	48.89	54(Note3)	-5.11	PK
H	11510	27.59	21.67	49.26	54(Note3)	-4.74	PK
H	17265	26.86	21.83	48.69	54(Note3)	-5.31	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	29.15	21.67	50.82	54(Note3)	-3.18	PK
V	17385	27.28	21.83	49.11	54(Note3)	-4.89	PK
H	11590	28.31	21.67	49.98	54(Note3)	-4.02	PK
H	17385	28.88	21.83	50.71	54(Note3)	-3.29	PK

Test mode:		802.11ac(HT80)		Test channel:		Middle	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Detector
V	11550	26.25	21.65	47.90	54(Note3)	-6.10	PK
V	17325	24.38	21.81	46.19	54(Note3)	-7.81	PK
H	11550	23.72	21.65	45.37	54(Note3)	-8.63	PK
H	17325	23.18	21.81	44.99	54(Note3)	-9.01	PK

ANT 2:.

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	11510	28.87	21.64	50.51	54(Note3)	-3.49	PK
V	17265	26.60	21.8	48.40	54(Note3)	-5.60	PK
H	11510	26.67	21.83	48.50	54(Note3)	-5.50	PK
H	17265	25.47	21.67	47.14	54(Note3)	-6.86	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	26.70	21.64	48.34	54(Note3)	-5.66	PK
V	17355	25.39	21.8	47.19	54(Note3)	-6.81	PK
H	11570	23.05	21.83	44.88	54(Note3)	-9.12	PK
H	17355	23.71	21.67	45.38	54(Note3)	-8.62	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	26.87	21.64	48.51	54(Note3)	-5.49	PK
V	17475	24.48	21.8	46.28	54(Note3)	-7.72	PK
H	11650	24.71	21.83	46.54	54(Note3)	-7.46	PK
H	17475	22.77	21.67	44.44	54(Note3)	-9.56	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	28.26	21.67	49.93	54(Note3)	-4.07	PK
V	17265	26.87	21.83	48.70	54(Note3)	-5.30	PK
H	11510	27.40	21.67	49.07	54(Note3)	-4.93	PK
H	17265	26.67	21.83	48.50	54(Note3)	-5.50	PK

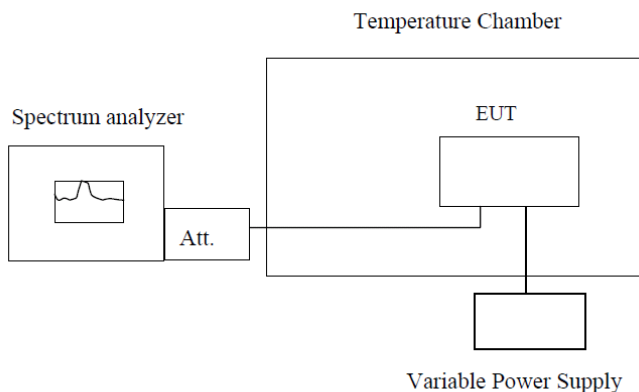
Test mode:		802.11ac(HT40)		Test channel:		Highest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit (dB)	Detector
V	11590	28.96	21.67	50.63	54(Note3)	-3.37	PK
V	17385	27.09	21.83	48.92	54(Note3)	-5.08	PK
H	11590	28.12	21.67	49.79	54(Note3)	-4.21	PK
H	17385	28.69	21.83	50.52	54(Note3)	-3.48	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	26.25	21.65	47.90	54(Note3)	-6.10	PK
V	17325	24.38	21.81	46.19	54(Note3)	-7.81	PK
H	11550	23.72	21.65	45.37	54(Note3)	-8.63	PK
H	17325	23.18	21.81	44.99	54(Note3)	-9.01	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.

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:	<p>a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.</p> <p>b. Turn the EUT on and couple its output to a spectrum analyzer.</p> <p>c. Turn the EUT off and set the chamber to the highest temperature specified.</p> <p>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.</p> <p>e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.</p> <p>f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minute</p> <p>s. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.</p>
Test setup:	 <p>Note : Measurement setup for testing on Antenna connector</p>
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

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

Measurement data:

802.11a					
Frequency stability versus Temp.					
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	5744.3274	5743.7761	5744.2730	5743.7385
	5785	5783.3450	5783.7046	5783.6769	5784.9857
	5825	5823.3093	5824.0740	5822.1217	5821.1940
-20	5745	5743.2046	5743.8801	5744.8263	5744.3827
	5785	5783.1997	5783.4043	5784.1063	5784.8108
	5825	5824.2193	5823.2227	5824.9760	5824.2650
-10	5745	5744.1893	5744.9864	5744.9462	5744.1070
	5785	5783.2592	5783.8768	5784.6495	5784.4075
	5825	5823.4313	5823.3236	5824.8217	5824.4484
0	5745	5743.6351	5743.9628	5744.8639	5744.3051
	5785	5783.9976	5784.3474	5784.2042	5784.0015
	5825	5824.3763	5824.2119	5824.4563	5823.1768
10	5745	5744.3230	5744.6060	5743.9963	5744.3536
	5785	5783.0413	5784.3446	5784.0667	5784.0793
	5825	5823.6193	5823.2873	5823.2302	5823.9883
20	5745	5744.7453	5744.3525	5744.9126	5744.2896
	5785	5783.1393	5783.5857	5784.2335	5784.2814
	5825	5824.9792	5824.4859	5823.6263	5824.4421
30	5745	5743.2664	5743.8363	5743.2393	5744.6168
	5785	5783.0821	5784.1688	5783.0840	5784.1531
	5825	5823.2774	5823.5386	5824.5996	5823.9830
40	5745	5743.5410	5743.3353	5744.2453	5744.4750
	5785	5783.8785	5783.8067	5784.8213	5784.4708
	5825	5824.2855	5823.4734	5823.6764	5823.4370
50	5745	5744.2972	5744.6410	5744.0375	5743.9310
	5785	5784.1175	5784.6197	5784.9190	5784.4334
	5825	5823.2776	5823.4698	5823.0151	5824.4159
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	5744.3156	5744.0955	5743.2083	5743.2680
	5785	5783.2930	5783.3974	5783.1407	5784.5461
	5825	5824.9551	5824.8848	5823.0010	5824.6149
120	5745	5743.4360	5744.4234	5743.5912	5743.4197
	5785	5783.4541	5783.2977	5783.1990	5784.8249
	5825	5824.4800	5823.3782	5823.4660	5823.8377
138	5745	5743.0634	5744.2396	5743.9116	5743.5638
	5785	5784.4720	5784.1247	5784.9658	5783.8357
	5825	5824.7770	5824.9115	5824.4711	5823.2252

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	5747.4584	5743.3235	5743.0007	5747.6960
	5785	5786.3640	5784.5895	5784.6967	5785.5274
	5825	5825.9668	5824.9294	5824.5987	5825.9142
-20	5745	5745.4124	5744.9030	5744.5470	5745.0291
	5785	5785.2835	5784.4482	5784.4787	5785.0474
	5825	5825.3046	5824.1528	5824.6132	5825.7543
-10	5745	5745.6518	5744.9658	5744.2733	5745.9911
	5785	5785.1470	5784.0389	5784.5219	5785.3065
	5825	5825.2593	5824.5105	5824.5055	5825.0036
0	5745	5745.0343	5744.8499	5744.5620	5745.0113
	5785	5785.2595	5784.4958	5784.5837	5785.2426
	5825	5825.4670	5824.8031	5824.9473	5825.8363
10	5745	5745.0616	5744.9571	5744.5948	5745.9467
	5785	5785.2408	5784.6794	5784.9896	5785.4856
	5825	5825.0579	5824.0512	5824.5986	5825.7133
20	5745	5745.1027	5744.9109	5744.4051	5745.7684
	5785	5785.1142	5784.2583	5784.8026	5785.4660
	5825	5825.4378	5824.8468	5824.4214	5825.5400
30	5745	5745.5389	5744.8642	5744.6072	5745.2323
	5785	5785.8800	5784.9441	5784.9868	5785.1304
	5825	5825.5812	5824.5160	5824.5838	5825.1619
40	5745	5745.7587	5744.1634	5744.8943	5745.3496
	5785	5785.1617	5784.0012	5784.7387	5785.9846
	5825	5825.0017	5824.9372	5824.1111	5825.4316
50	5745	5745.7490	5744.9843	5744.2197	5745.3469
	5785	5785.8661	5784.4730	5784.4652	5785.2763
	5825	5825.7279	5824.1717	5824.4087	5825.3719
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	5746.1544	5747.8827	5744.7802	5743.2929
	5785	5785.3811	5787.5291	5784.9678	5784.2933
	5825	5825.3522	5826.6570	5824.1398	5824.5510
120	5745	5745.4607	5745.9835	5744.1166	5744.1666
	5785	5785.4077	5785.2020	5784.5679	5784.1993
	5825	5825.0971	5825.0359	5824.6906	5824.9384
138	5745	5745.5859	5745.5028	5744.9771	5744.5892
	5785	5785.6618	5785.7376	5784.4150	5784.3062
	5825	5825.6850	5825.7167	5824.1221	5824.1715

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	5755	5742.3029	5743.4232	5744.5844	5741.8414
	5795	5782.4878	5783.4391	5784.6192	5782.6049
	5755	5822.6985	5824.6005	5824.2278	5824.2538
-20	5795	5744.9537	5744.0443	5744.0399	5744.6938
	5755	5784.7641	5784.6341	5784.0451	5784.1863
	5795	5824.0805	5824.2947	5824.8552	5824.9915
-10	5755	5744.8675	5744.1607	5744.1271	5744.0025
	5795	5784.8983	5784.6461	5784.3551	5784.0949
	5755	5824.2423	5824.6271	5824.0775	5824.3799
0	5795	5744.4832	5744.3477	5744.8891	5744.0819
	5755	5784.3137	5784.6811	5784.8023	5784.9070
	5795	5824.9856	5824.5463	5824.7325	5824.5854
10	5755	5744.0431	5744.2398	5744.4580	5744.6958
	5795	5784.7033	5784.0525	5784.7533	5784.2999
	5755	5824.3196	5824.6950	5824.4612	5824.2490
20	5795	5744.9316	5744.0645	5744.6016	5744.5760
	5755	5784.5649	5784.0749	5784.9408	5784.4475
	5795	5824.7650	5824.2490	5824.9928	5824.1911
30	5755	5744.3711	5744.5333	5744.1176	5744.3594
	5795	5784.4769	5784.2266	5784.3200	5784.2419
	5755	5824.8160	5824.0236	5824.3011	5824.0928
40	5795	5744.9369	5744.0489	5744.6046	5744.2586
	5755	5784.3983	5784.5518	5784.8309	5784.2584
	5795	5824.0054	5824.1500	5824.6635	5824.1702
50	5755	5744.5794	5744.3719	5744.1779	5744.7348
	5795	5784.4230	5784.2958	5784.8449	5784.1696
	5755	5824.3688	5824.7567	5824.9860	5824.4067
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	5742.0649	5743.0506	5745.7539	5747.1092
	5785	5784.6235	5784.5323	5785.3885	5787.1693
	5825	5824.6407	5824.7014	5825.6293	5827.1064
120	5745	5744.2129	5744.0180	5745.3807	5745.9562
	5785	5784.6145	5784.6099	5785.5960	5785.0070
	5825	5824.3913	5824.9486	5825.0369	5825.1955
138	5745	5744.6327	5744.1464	5745.2453	5745.4137
	5785	5784.9682	5784.5252	5785.4697	5785.3300
	5825	5824.7066	5824.0364	5825.5959	5825.3935

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	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5755	5755.3909	5752.6607	5753.8496	5757.7175
	5795	5795.1389	5793.1360	5793.7288	5797.2226
-20	5755	5755.1563	5754.6466	5754.1370	5756.9623
	5795	5795.8918	5794.5462	5794.4780	5796.8483
-10	5755	5755.7611	5754.2780	5754.0447	5755.5418
	5795	5795.3013	5794.2865	5794.7123	5795.8360
0	5755	5755.7394	5754.3674	5754.3595	5755.0033
	5795	5795.3911	5794.2867	5794.5413	5795.5064
10	5755	5755.4685	5754.1894	5754.3653	5755.4659
	5795	5795.9492	5794.6291	5794.6770	5795.7269
20	5755	5755.8347	5754.2501	5754.7951	5755.7015
	5795	5795.8452	5794.1796	5794.2099	5795.4754
30	5755	5755.8857	5754.5432	5754.0233	5755.3041
	5795	5795.8105	5794.0079	5794.7676	5795.9528
40	5755	5755.1099	5754.8211	5754.9009	5755.6328
	5795	5795.8355	5794.0008	5794.5290	5795.9306
50	5755	5755.6569	5754.4440	5754.1435	5755.7408
	5795	5795.5782	5794.1510	5794.3402	5795.3159
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
102	5755	5756.9024	5753.2530	5755.5323	5754.0472
	5795	5795.9468	5793.5383	5795.5580	5794.1282
120	5755	5755.7707	5753.3233	5755.1337	5754.8054
	5795	5795.1950	5794.4497	5795.5291	5794.5182
138	5755	5755.7702	5754.1697	5755.1487	5754.8128
	5795	5795.6305	5794.1290	5795.1891	5794.2132

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	5755.4562	5752.8146	5756.0730	5751.6324
	5795	5795.4299	5794.6868	5795.6054	5791.7317
-20	5755	5755.3611	5754.2168	5755.3822	5752.1218
	5795	5795.6051	5794.6554	5795.7183	5793.1222
-10	5755	5755.1946	5754.7274	5755.8049	5753.2006
	5795	5795.9795	5794.0872	5795.8654	5794.1104
0	5755	5755.6173	5754.7191	5755.8355	5754.0107
	5795	5795.6656	5794.4773	5795.0719	5794.7806
10	5755	5755.1311	5754.7133	5755.8831	5754.3847
	5795	5795.0832	5794.4691	5795.4597	5794.6854
20	5755	5755.6597	5754.4141	5755.7623	5754.0111
	5795	5795.8465	5794.7630	5795.9515	5794.6480
30	5755	5755.1450	5754.3417	5755.8099	5754.7054
	5795	5795.0732	5794.3286	5795.9138	5794.0762
40	5755	5755.1710	5754.2317	5755.1237	5754.3347
	5795	5795.4798	5794.6667	5795.7822	5794.0702
50	5755	5755.8999	5754.7977	5755.1157	5754.3244
	5795	5795.4662	5794.6313	5795.0372	5794.4186
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (Vdc)	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	5757.6868	5751.8336	5757.1692	5753.6960
	5795	5796.9747	5791.5355	5795.0460	5794.7567
120	5755	5756.3898	5753.4316	5755.3361	5754.7780
	5795	5795.6932	5793.1035	5795.8769	5794.8626
138	5755	5755.3818	5754.5793	5755.4696	5754.6367
	5795	5795.1221	5794.0480	5795.2976	5794.3053

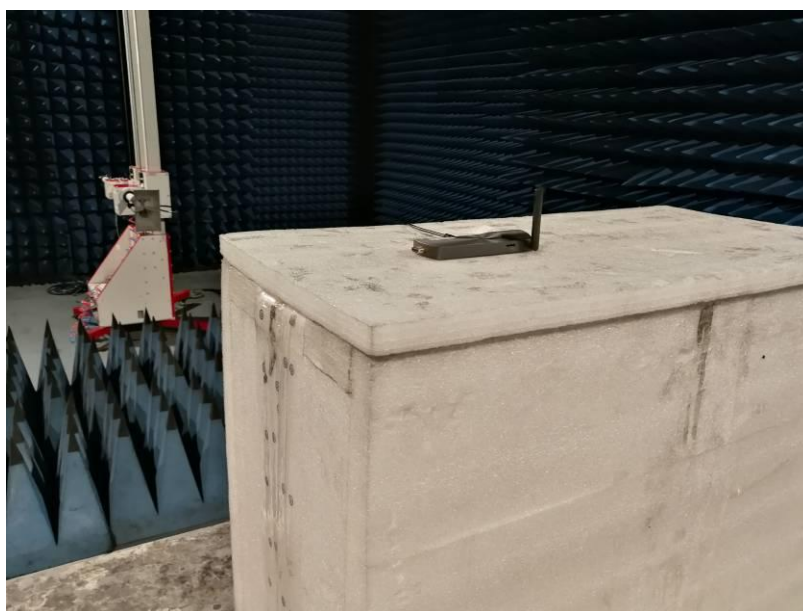
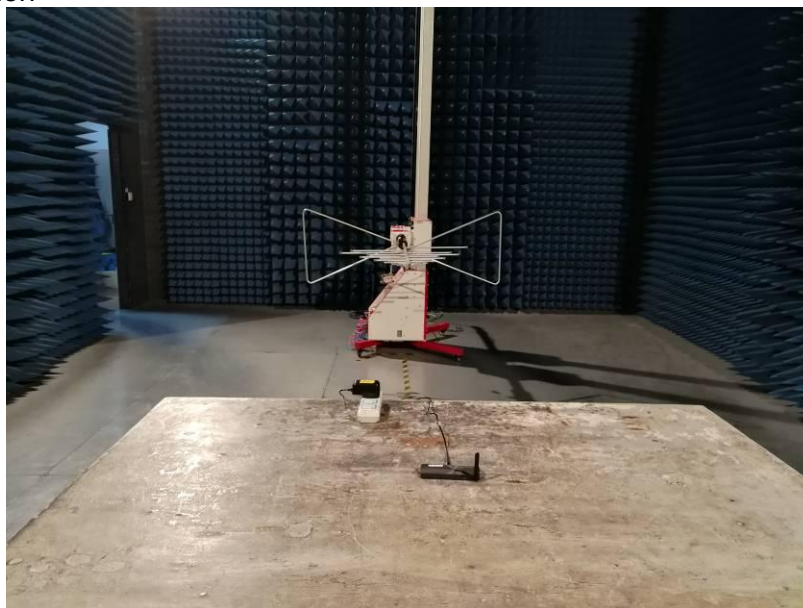
Note: The worst case is FL=5754.0210MHz, FH=5795.9946MHz

802.11ac(HT80)					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5775	5777.2191	5777.6572	5774.7916	5773.4616
-20	5775	5777.2416	5776.6434	5774.4887	5774.0258
-10	5775	5775.1858	5775.5867	5774.6373	5774.3190
0	5775	5775.2406	5775.7467	5774.0600	5774.7027
10	5775	5775.6324	5775.2121	5774.9188	5774.4906
20	5775	5775.2939	5775.4764	5774.2430	5774.9849
30	5775	5775.9702	5775.0979	5774.1842	5774.0141
40	5775	5775.9557	5775.7342	5774.0344	5774.9214
50	5775	5775.3258	5775.7668	5774.9905	5774.7081
Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (V _{AC})	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
102	5775	5774.0805	5777.2337	5777.7019	5775.7879
120	5775	5774.7970	5775.9508	5775.0437	5775.9125
138	5775	5772.3015	5775.7464	5776.0789	5776.1420

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

8 Test Setup Photo

Radiated Emission



Conducted Emission



9 EUT Constructional Details

Reference to the test report No. GTS201807000026F01

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