FCC REPORT

Applicant:	Autel Intelligent Tech. Corp., Ltd.
Address of Applicant:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd. Xili, Nanshan, Shenzhen 518055, China
Manufacturer:	Autel Intelligent Tech. Corp., Ltd.
Address of Manufacturer:	7th-8th, 10th Floor, Bldg. B1, Zhiyuan, Xueyuan Rd. Xili, Nanshan, Shenzhen 518055, China
Factory 1:	Autel Intelligent Technology Corp.,Ltd.
Address of Factory 1:	6th Floor,Building 1,Yanxiang Zhigu,NO.11 Gaoxin West Rd,Guangming New District, Shenzhen City, Guangdong Province,China.
Factory 2:	AUTEL VIETNAM COMPANY LIMITED
Address of Factory 2:	4th Floor, Factory#6, Land#CN1, An Duong Industrial Zone, Hong Phong Township, An Duong County, Hai Phong, Viet Nam

Equipment Under Test (EUT)

Product Name:	MaxiFlash VCMI
Model No.:	MaxiFlash VCMI
Trade Mark:	Autel
FCC ID:	WQ8VCMI1911
Applicable standards:	FCC CFR Title 47 Part 15 Subpart E Section 15.407
Date of sample receipt:	September 25, 2019
Date of Test:	September 25-29, 2019
Date of report issued:	September 29, 2019
Test Result :	PASS *

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

Authorized Signature:

Robinson Lo

Laboratory Manager

2 Version

Version No.	Date	Description
00	*September 29, 2019*	*Original*

Prepared By:  ***Date:*** *September 29, 2019*

Project Engineer

Check By:  ***Date:*** *September 29, 2019*

Reviewer

3 Contents

4 Test Summary

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

Remarks：

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

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

4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
Radiated Emission	1GHz-18GHz	4.29dB	(1)
Radiated Emission	18GHz-40GHz	3.30dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.			

5 General Information

5.1 General Description of EUT

Product Name:	MaxiFlash VCMI
Model No.:	MaxiFlash VCMI
Serial No.:	123456789101112
Hardware Version:	V6
Software Version:	V1.00.10
Test sample(s) ID:	GTS201909000203-1
Sample(s) Status:	Engineer sample
Operation Frequency:	802.11a/802.11n(HT20): 5745MHz ~ 5825MHz 802.11n(HT40): 5755MHz ~ 5795MHz
Channel numbers:	802.11a/802.11n(HT20): 5 802.11n(HT40): 2
Channel bandwidth:	802.11a/802.11n(HT20): 20MHz 802.11n(HT40) : 40MHz
Modulation technology:	Orthogonal Frequency Division Multiplexing (OFDM) MIMO: 802.11n SISO: 802.11a
Antenna Type:	Integral Antenna
Antenna gain:	ANT1: 2.6dBi ANT2: 2.6dBi
Power supply:	Adapter Model: A361-1203000DI Input: AC 100-240V, 50/60Hz, 1.5A Output: DC 12V, 3000mA Rechargeable battery: DC3.8V 3750mAh 14.25Wh

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

Note:

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

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

5.2 Test mode

Transmitting mode	Keep the EUT in continuously transmitting mode

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

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

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

Mode	Data rate
802.11a	6Mbps
802.11n(HT20)	6.5Mbps
802.11n(HT40)	13Mbps

5.3 Description of Support Units

None.

5.4 Deviation from Standards

None.

5.5 Abnormalities from Standard Conditions

None.

5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **IC —Registration No.: 9079A**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0

5.7 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.
No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone,
Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102
Tel: 0755-27798480
Fax: 0755-27798960

5.8 Additional Instructions

Test Software	Special test command provided by manufacturer
Power level setup	Default

6 Test Instruments list

Radiated Emission:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July. 03 2015	July. 02 2020
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	June. 26 2019	June. 25 2020
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS214	June. 26 2019	June. 25 2020
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June. 26 2019	June. 25 2020
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June. 26 2019	June. 25 2020
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	June. 26 2019	June. 25 2020
9	Coaxial Cable	GTS	N/A	GTS211	June. 26 2019	June. 25 2020
10	Coaxial cable	GTS	N/A	GTS210	June. 26 2019	June. 25 2020
11	Coaxial Cable	GTS	N/A	GTS212	June. 26 2019	June. 25 2020
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	June. 26 2019	June. 25 2020
13	Amplifier(2GHz-20GHz)	HP	84722A	GTS206	June. 26 2019	June. 25 2020
14	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June. 26 2019	June. 25 2020
15	Band filter	Amindeon	82346	GTS219	June. 26 2019	June. 25 2020
16	Power Meter	Anritsu	ML2495A	GTS540	June. 26 2019	June. 25 2020
17	Power Sensor	Anritsu	MA2411B	GTS541	June. 26 2019	June. 25 2020
18	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	June. 26 2019	June. 25 2020
19	Splitter	Agilent	11636B	GTS237	June. 26 2019	June. 25 2020
20	Loop Antenna	ZHINAN	ZN30900A	GTS534	June. 26 2019	June. 25 2020
21	Breitband hornantenne	SCHWARZBECK	BBHA 9170	GTS579	Oct. 20 2018	Oct. 19 2019
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 20 2018	Oct. 19 2019
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 20 2018	Oct. 19 2019
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June. 26 2019	June. 25 2020

Conducted Emission						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May.15 2019	May.14 2022
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June. 26 2019	June. 25 2020
4	Artificial Mains Network	SCHWARZBECK MESS	NSLK8127	GTS226	June. 26 2019	June. 25 2020
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	KTJ	TA328	GTS233	June. 26 2019	June. 25 2020
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	June. 26 2019	June. 25 2020
9	ISN	SCHWARZBECK	NTFM 8158	GTD565	June. 26 2019	June. 25 2020

RF Conducted Test:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	June. 26 2019	June. 25 2020
2	EMI Test Receiver	R&S	ESCI 7	GTS552	June. 26 2019	June. 25 2020
3	Spectrum Analyzer	Agilent	E4440A	GTS533	June. 26 2019	June. 25 2020
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	June. 26 2019	June. 25 2020
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	June. 26 2019	June. 25 2020
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	June. 26 2019	June. 25 2020
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	June. 26 2019	June. 25 2020
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	June. 26 2019	June. 25 2020

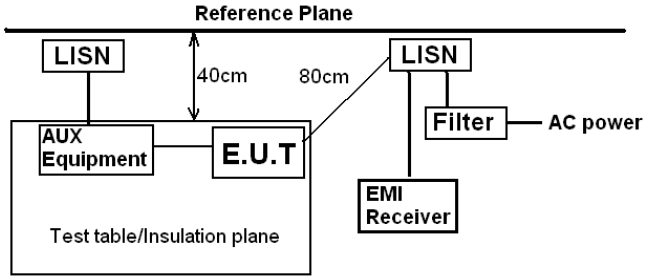
General used equipment:						
Item	**Test Equipment**	**Manufacturer**	**Model No.**	**Inventory No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	June. 26 2019	June. 25 2020
2	Barometer	ChangChun	DYM3	GTS255	June. 26 2019	June. 25 2020

7 Test results and Measurement Data

7.1 Antenna requirement

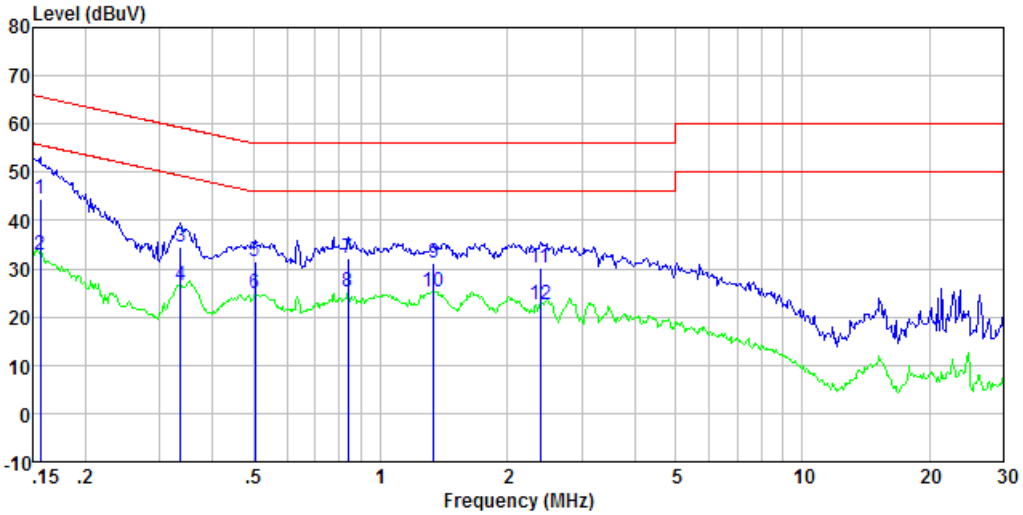
Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: *An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.*	
E.U.T Antenna:	
The antennas are integral antenna, the best case gain of the antennas are 2.6dBi, reference to the appendix II for details	

7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Class / Severity:	Class B
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto
Limit:	Frequency range (MHz) / Limit (dBuV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 * Decreases with the logarithm of the frequency.
Test setup:	 *Remark:* *E.U.T: Equipment Under Test* *LISN: Line Impedence Stabilization Network* *Test table height=0.8m*
Test procedure:	1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2013 on conducted measurement.
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test environment:	Temp.: 25 °C / Humid.: 52% / Press.: 1012mbar
Test voltage:	AC 120V, 60Hz
Test results:	Pass

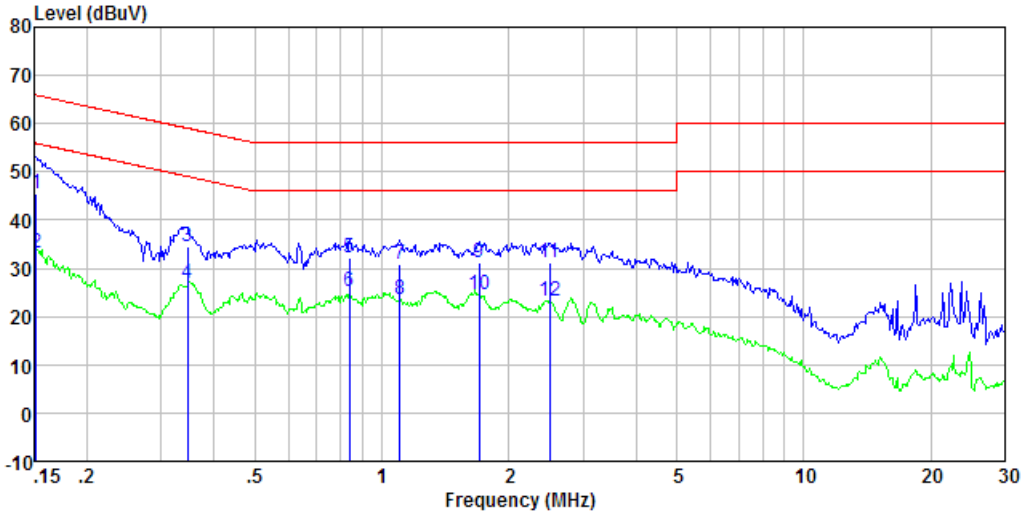
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data
Line:



Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.16	44.15	0.40	0.08	44.63	65.65	-21.02	QP
0.16	32.52	0.40	0.08	33.00	55.65	-22.65	Average
0.34	34.00	0.38	0.10	34.48	59.31	-24.83	QP
0.34	26.00	0.38	0.10	26.48	49.31	-22.83	Average
0.50	31.17	0.31	0.11	31.59	56.00	-24.41	QP
0.50	24.34	0.31	0.11	24.76	46.00	-21.24	Average
0.84	31.65	0.23	0.14	32.02	56.00	-23.98	QP
0.84	24.78	0.23	0.14	25.15	46.00	-20.85	Average
1.34	30.69	0.20	0.16	31.05	56.00	-24.95	QP
1.34	24.76	0.20	0.16	25.12	46.00	-20.88	Average
2.40	29.79	0.20	0.18	30.17	56.00	-25.83	QP
2.40	22.09	0.20	0.18	22.47	46.00	-23.53	Average

Neutral:



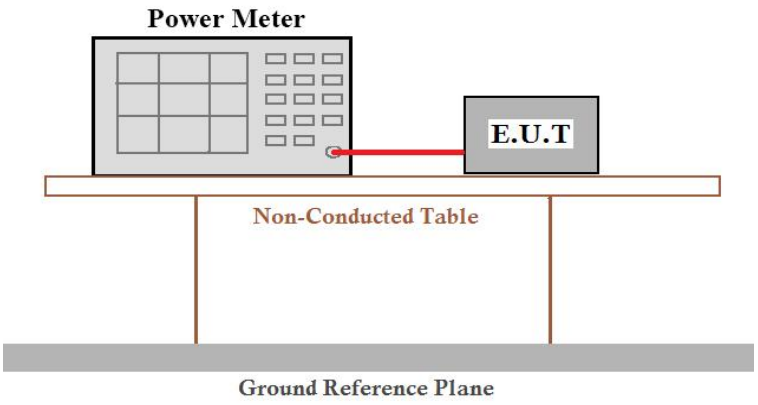
Freq MHz	Reading level dBuV	LISN/ISN factor dB/m	Cable loss dB	Level dBuV	Limit level dBuV	Over limit dB	Remark
0.15	45.04	0.40	0.07	45.51	65.91	-20.40	QP
0.15	32.74	0.40	0.07	33.21	55.91	-22.70	Average
0.35	34.01	0.38	0.10	34.49	59.05	-24.56	QP
0.35	26.48	0.38	0.10	26.96	49.05	-22.09	Average
0.84	31.81	0.23	0.14	32.18	56.00	-23.82	QP
0.84	24.77	0.23	0.14	25.14	46.00	-20.86	Average
1.11	30.61	0.20	0.15	30.96	56.00	-25.04	QP
1.11	23.07	0.20	0.15	23.42	46.00	-22.58	Average
1.70	30.67	0.20	0.17	31.04	56.00	-24.96	QP
1.70	24.23	0.20	0.17	24.60	46.00	-21.40	Average
2.50	30.66	0.20	0.18	31.04	56.00	-24.96	QP
2.50	22.72	0.20	0.18	23.10	46.00	-22.90	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

ANT1:

Test CH	Peak Output Power (dBm)			Limit(dBm)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)		
Lowest	13.27	12.89	13.08	30.00	Pass
Middle	13.32	13.29	---		
Highest	14.55	14.09	13.41		

ANT2:

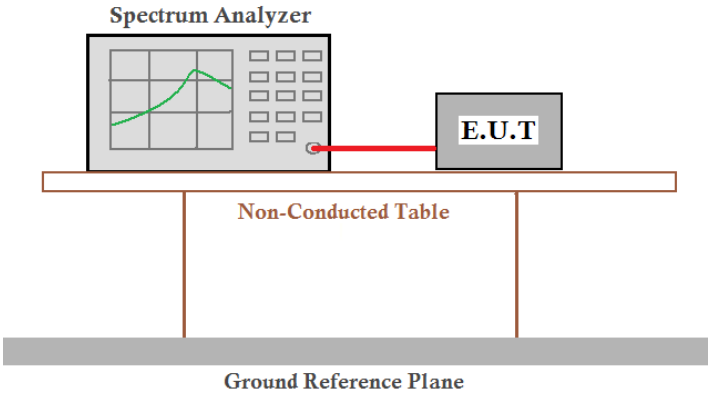
Test CH	Peak Output Power (dBm)			Limit(dBm)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)		
Lowest	13.15	12.81	12.96	30.00	Pass
Middle	13.25	13.10	---		
Highest	13.78	13.75	13.37		

Remark: “---“is not applicable

MIMO without beam forming:

Test mode	Frequency (MHz)	ANT 1 power (dBm)	ANT 2 power (dBm)	MIMO power (dBm)	Limit (dBm)	Result
802.11n(HT20)	5180	12.89	12.81	15.86	23.98	Pass
	5200	13.29	13.10	16.21		
	5240	14.09	13.75	16.93		
802.11n(HT40)	5190	13.08	12.96	16.03		
	5230	13.41	13.37	16.40		

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

ANT 1:

Test CH	Channel Bandwidth (MHz)			Limit (KHz)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)		
Lowest	16.539	17.807	36.532	>500	Pass
Middle	16.565	17.763	---		
Highest	16.574	17.718	36.577		

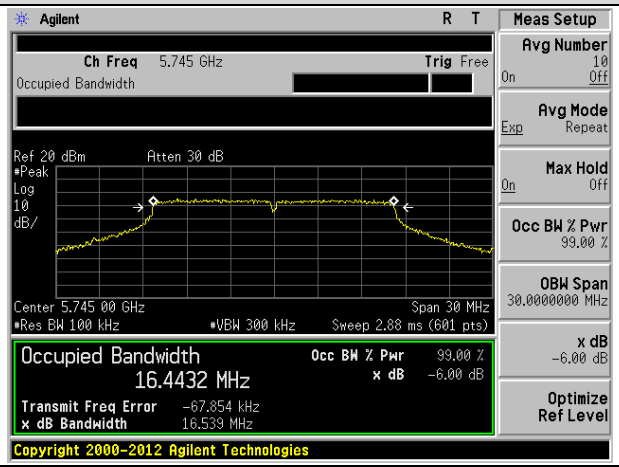
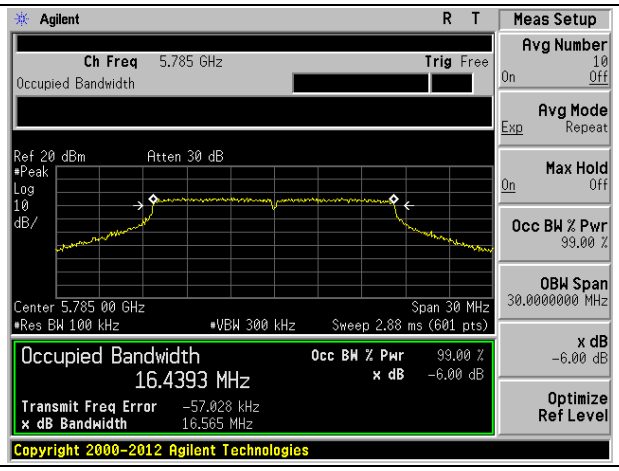
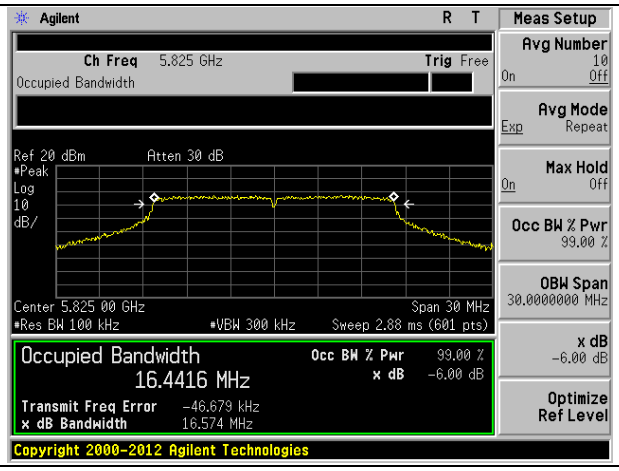
ANT 2:

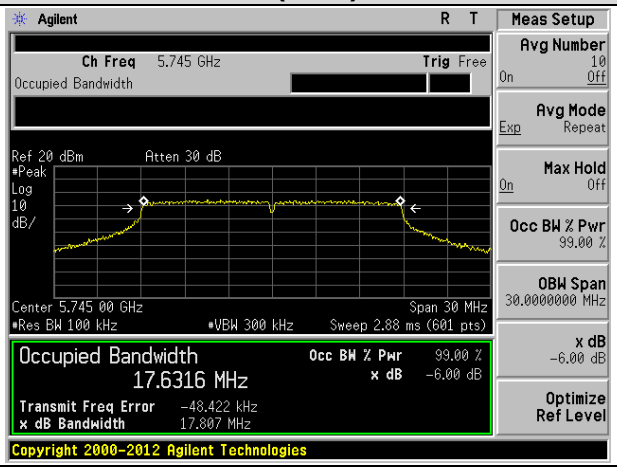
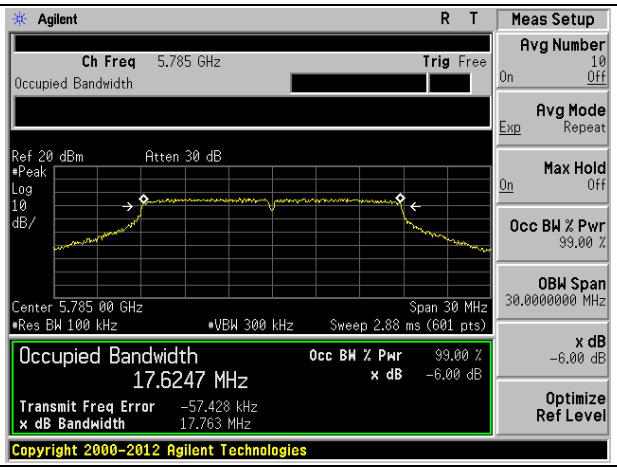
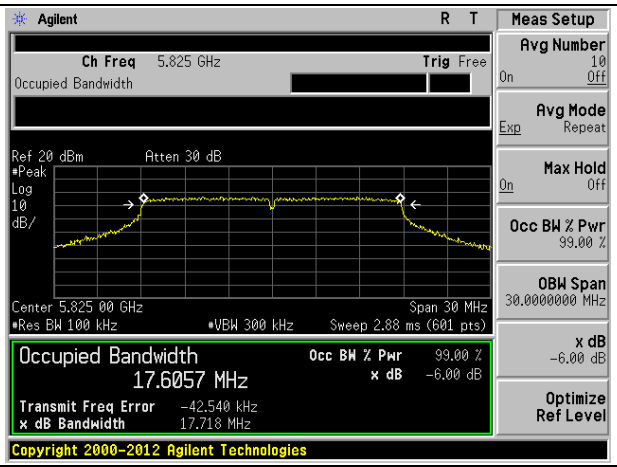
Test CH	Channel Bandwidth (MHz)			Limit (KHz)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)		
Lowest	16.531	17.723	36.561	>500	Pass
Middle	16.506	17.709	---		
Highest	16.563	17.763	36.571		

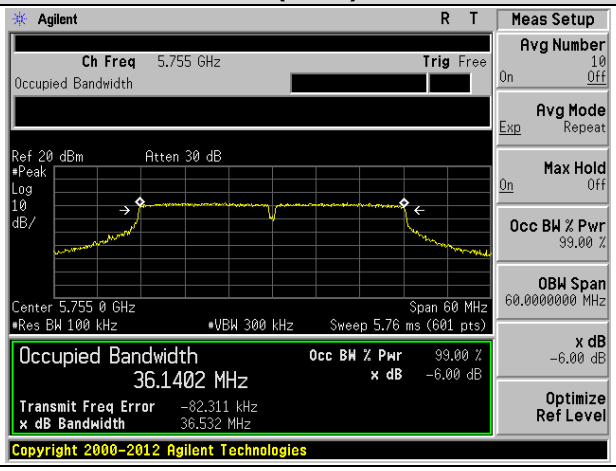
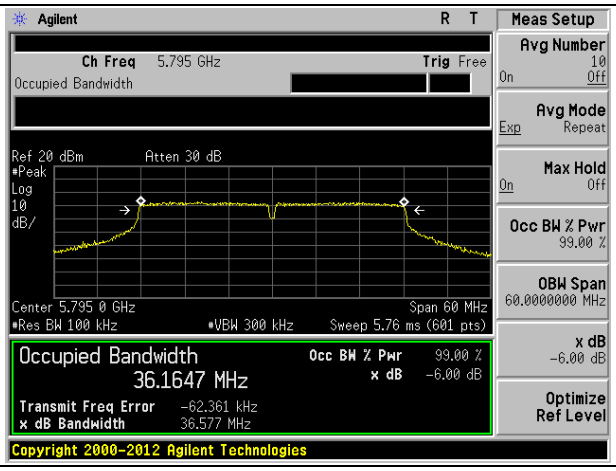
Remark: “---“is not applicable

Test plot as follows:

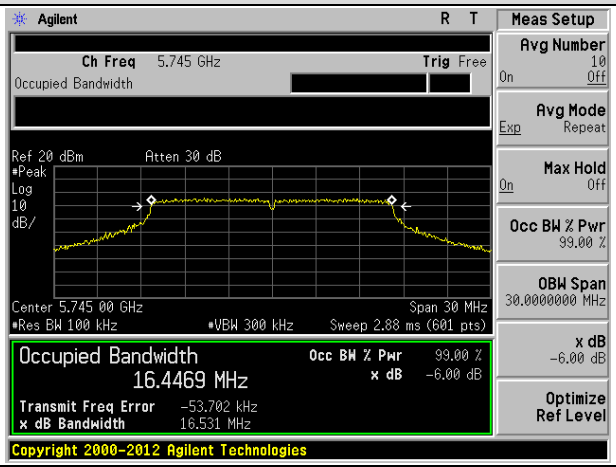
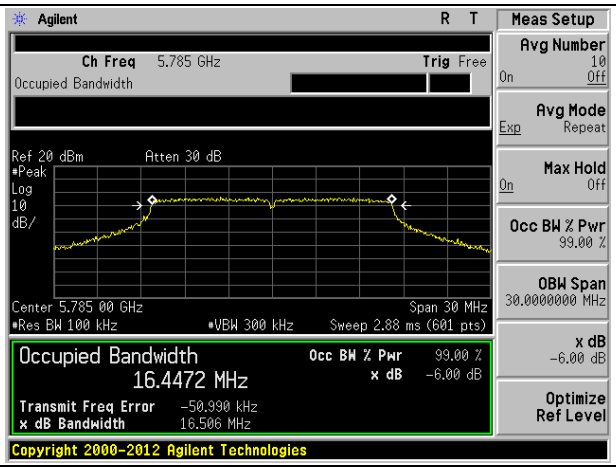
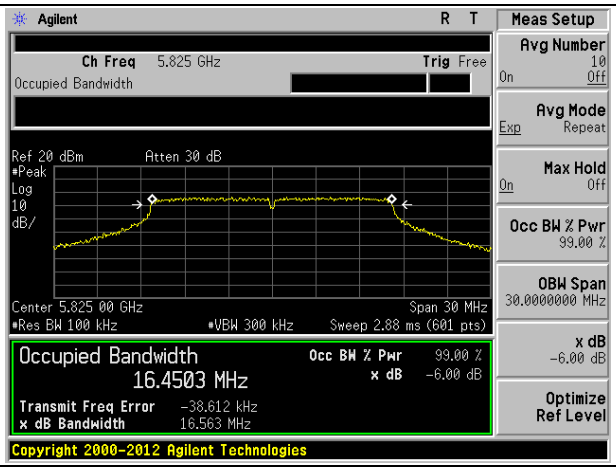
ANT1:

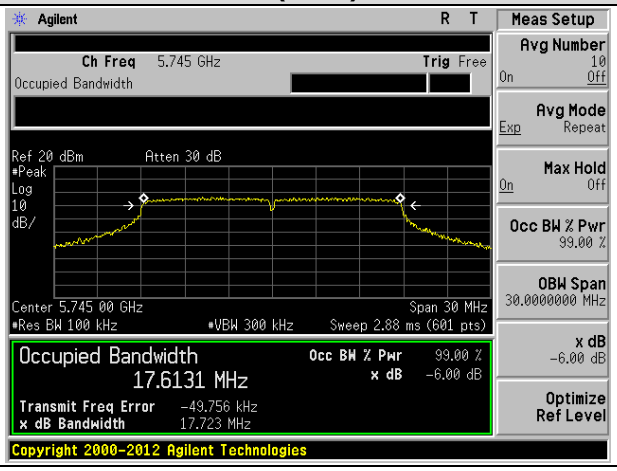
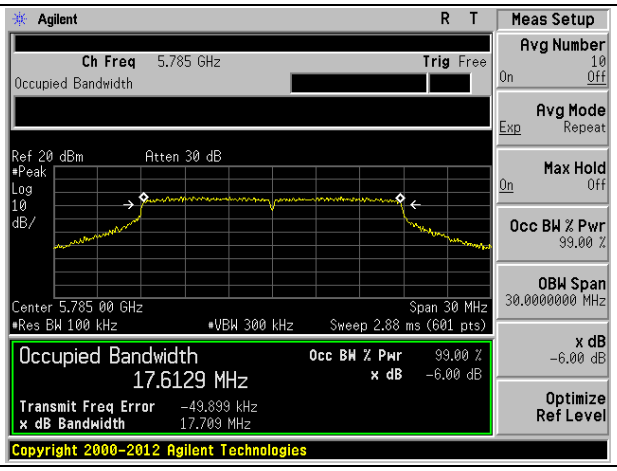
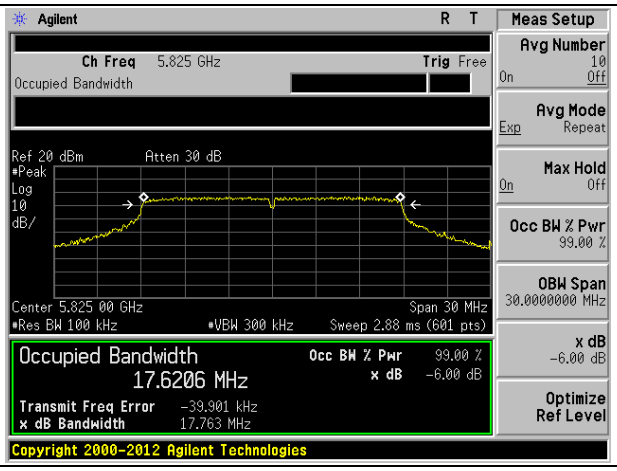
802.11a mode

Lowest channel

Middle channel

Highest channel

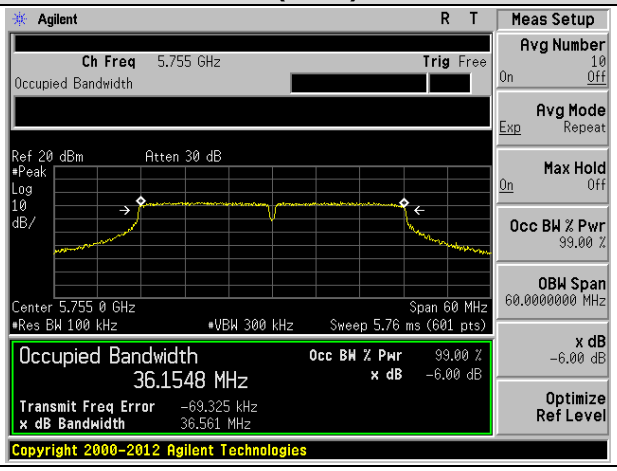
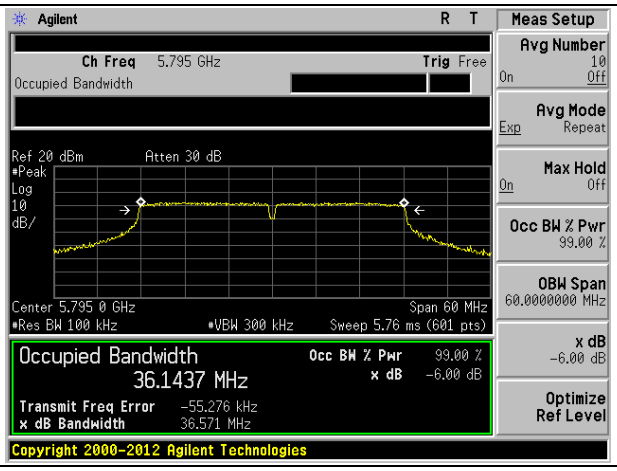
802.11n(HT20) mode

Lowest channel

Middle channel

Highest channel

802.11n(HT40) mode

Lowest channel

Highest channel

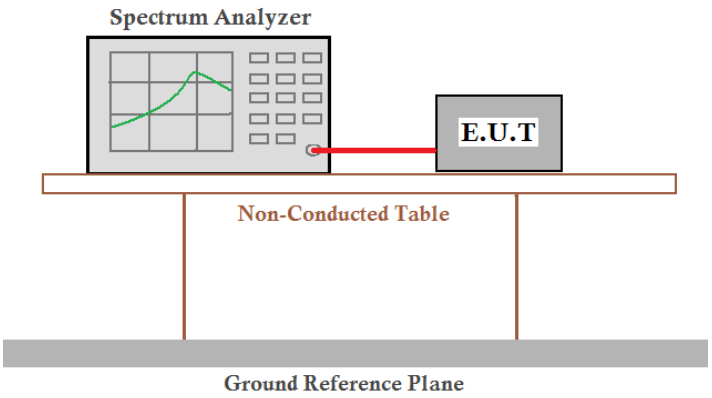
ANT2:

802.11a mode

Lowest channel

Middle channel

Highest channel

802.11n(HT20) mode

Lowest channel

Middle channel

Highest channel

802.11n(HT40) mode

Lowest channel

Highest 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/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

ANT1:

Test CH	Power Spectral Density (dBm/500kHz)			Limit (dBm/500kHz)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)		
Lowest	4.99	3.43	1.70	30.00	Pass
Middle	5.51	4.18	---		
Highest	6.82	5.18	2.58		

ANT2:

Test CH	Power Spectral Density (dBm/500kHz)			Limit (dBm/500kHz)	Result
	802.11a	802.11n(HT20)	802.11n(HT40)		
Lowest	3.36	3.32	1.63	30.00	Pass
Middle	4.08	4.28	---		
Highest	5.93	5.32	1.75		

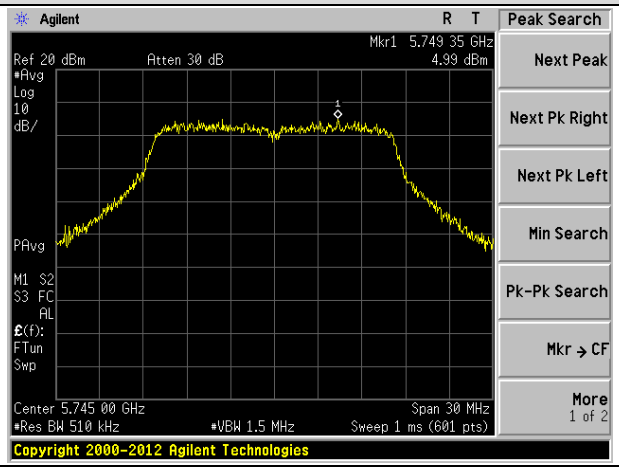
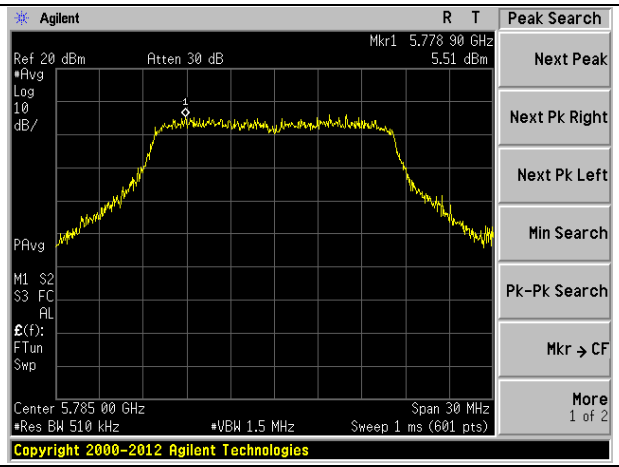
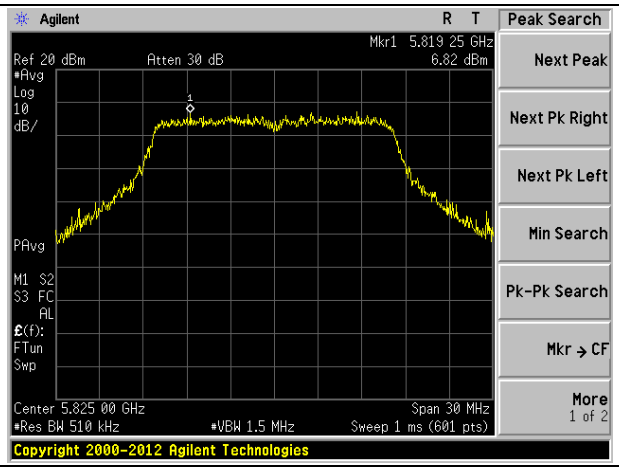
Remark: "---"is not applicable

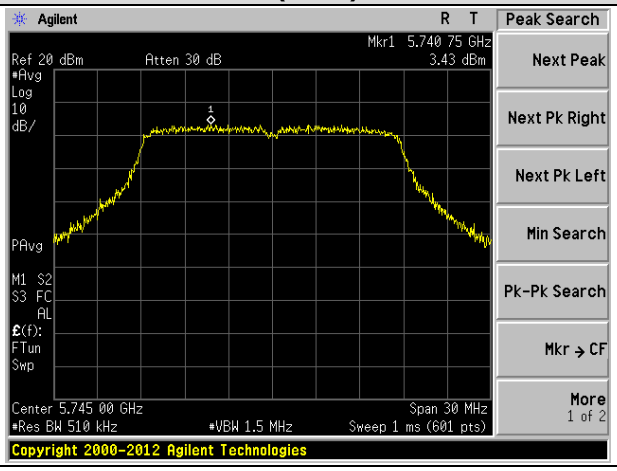
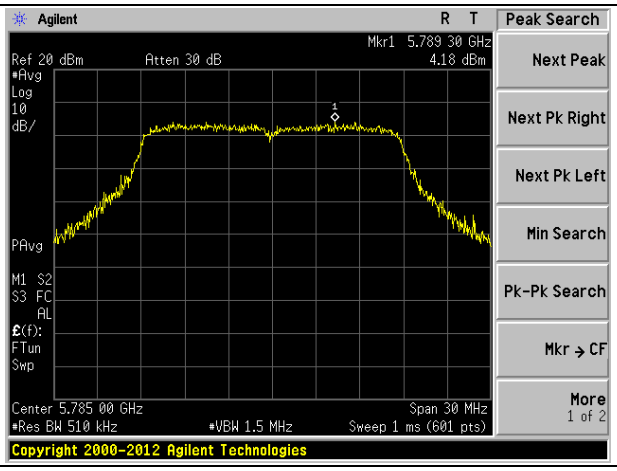
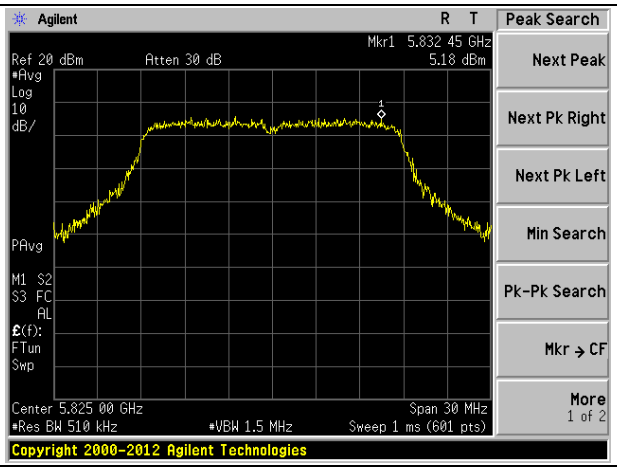
MIMO without beam forming:

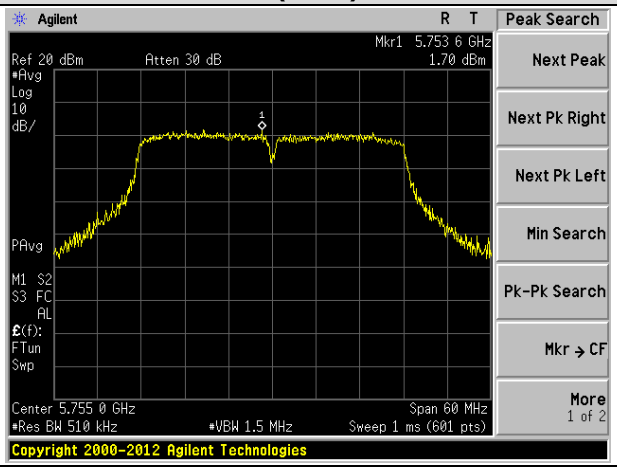
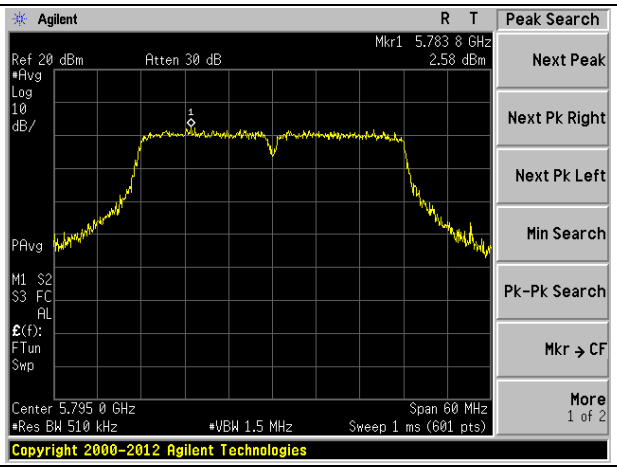
Test mode	Frequency (MHz)	ANT 1 PSD (dBm/MHz)	ANT 2 PSD (dBm/MHz)	MIMO (dBm/MHz)	Limit	Result
802.11n(HT20)	5180	3.43	3.32	6.39	30 dBm/MHz	Pass
	5200	4.18	4.28	7.24		
	5240	5.18	5.32	8.26		
802.11n(HT40)	5190	1.70	1.63	4.67		
	5230	2.58	1.75	5.19		

Test plot as follows:

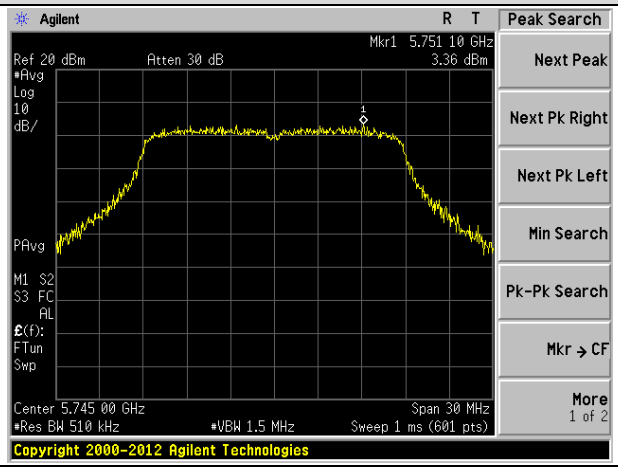
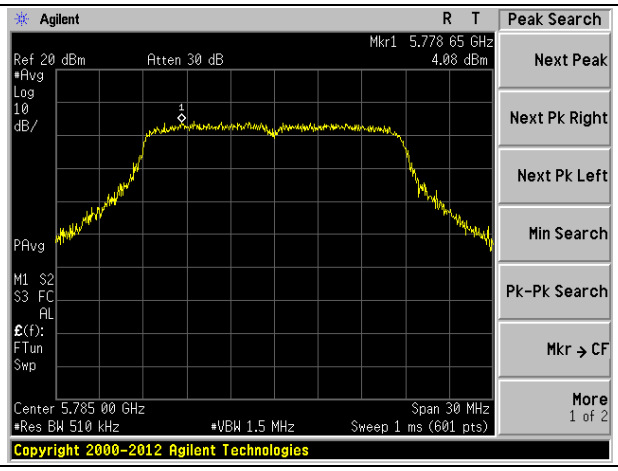
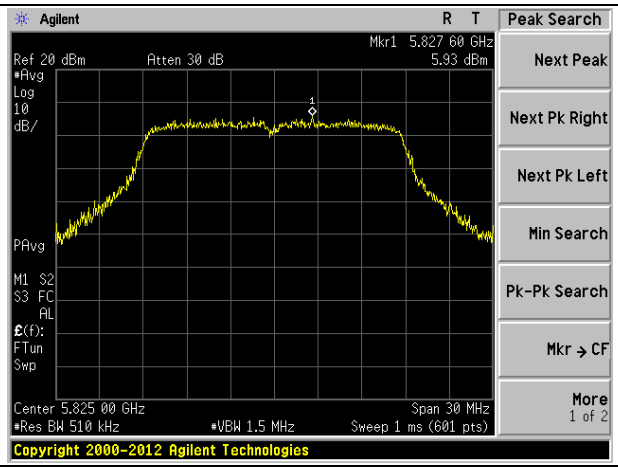
ANT1:

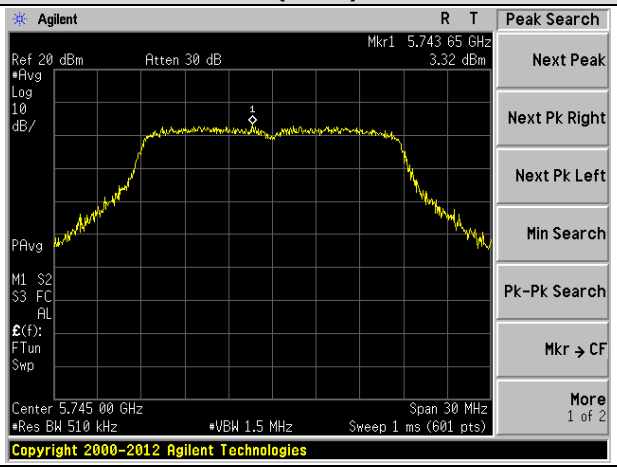
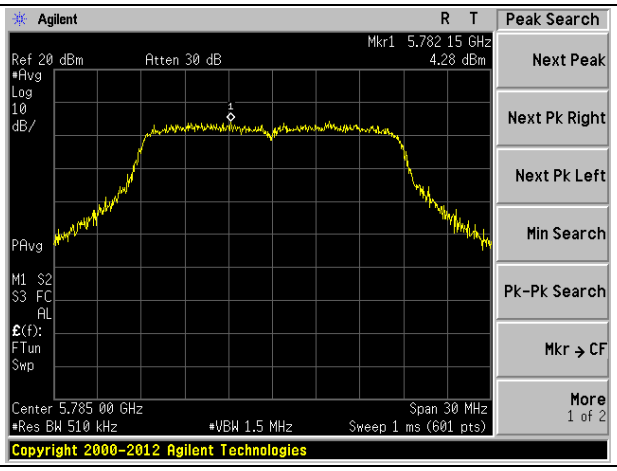
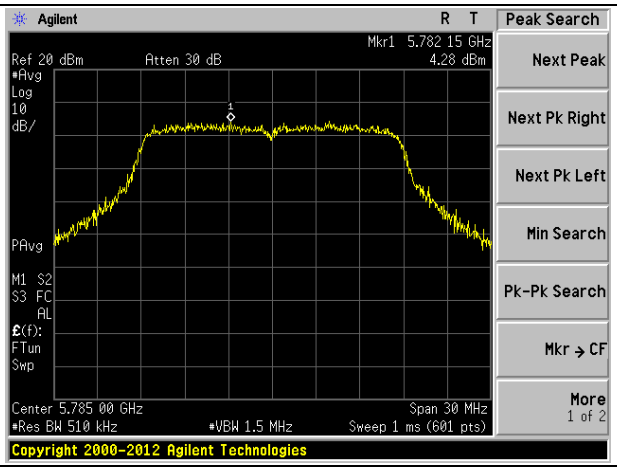
802.11a mode

Lowest channel

Middle channel

Highest channel

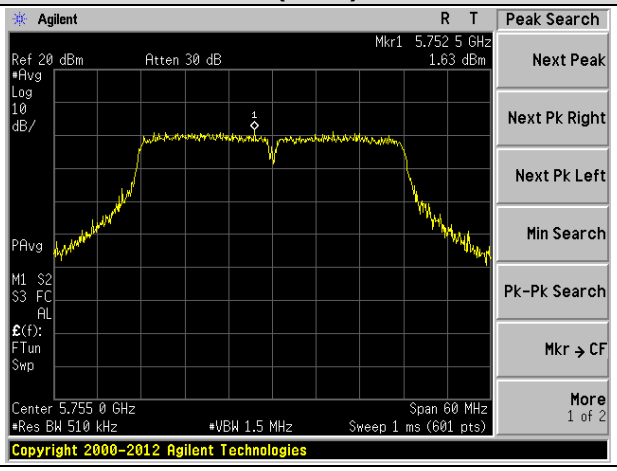
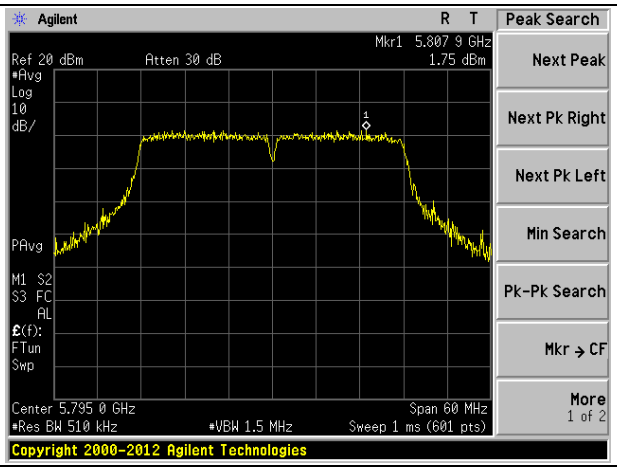
802.11n(HT20) mode

Lowest channel

Middle channel

Highest channel

802.11n(HT40) mode

Lowest channel

Highest channel

ANT2:

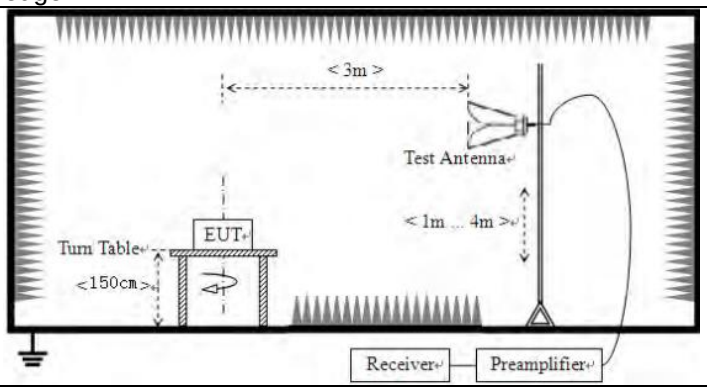
802.11a mode

Lowest channel

Middle channel

Highest channel

802.11n(HT20) mode

Lowest channel

Middle channel

Highest channel

802.11n(HT40) mode

Lowest channel

Highest channel

7.6 Band edge

7.6.1 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10: 2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 40GHz, only worse case is reported</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>RMS</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>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.</td></tr>
<tr><td>Test setup:</td><td> 
</td></tr>
<tr><td>Test Procedure:</td><td>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.</td></tr>
</table>

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

Measurement data:

IEEE 802.11a								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	29.17	32.36	9.72	23.83	47.42	68.20	-20.78	Horizontal
5700.00	28.87	32.50	9.79	23.84	47.32	105.20	-57.88	Horizontal
5720.00	30.43	32.53	9.81	23.85	48.92	110.80	-61.88	Horizontal
5725.00	31.56	32.53	9.83	23.86	50.06	122.20	-72.14	Horizontal
5850.00	31.14	32.70	9.99	23.87	49.96	122.20	-72.24	Horizontal
5855.00	29.83	32.72	9.99	23.88	48.66	110.80	-62.14	Horizontal
5875.00	32.00	32.74	10.04	23.89	50.89	105.20	-54.31	Horizontal
5925.00	30.49	32.80	10.11	23.90	49.50	68.20	-18.70	Horizontal
5650.00	28.91	32.36	9.72	23.83	47.16	68.20	-21.04	Vertical
5700.00	33.58	32.50	9.79	23.84	52.03	105.20	-53.17	Vertical
5720.00	28.87	32.53	9.81	23.85	47.36	110.80	-63.44	Vertical
5725.00	28.72	32.53	9.83	23.86	47.22	122.20	-74.98	Vertical
5850.00	32.32	32.70	9.99	23.87	51.14	122.20	-71.06	Vertical
5855.00	30.85	32.72	9.99	23.88	49.68	110.80	-61.12	Vertical
5875.00	32.94	32.74	10.04	23.89	51.83	105.20	-53.37	Vertical
5925.00	29.43	32.80	10.11	23.90	48.44	68.20	-19.76	Vertical

IEEE 802.11n HT20								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	29.22	32.36	9.72	23.83	47.47	68.20	-20.73	Horizontal
5700.00	28.92	32.50	9.79	23.84	47.37	105.20	-57.83	Horizontal
5720.00	30.49	32.53	9.81	23.85	48.98	110.80	-61.82	Horizontal
5725.00	31.65	32.53	9.83	23.86	50.15	122.20	-72.05	Horizontal
5850.00	31.23	32.70	9.99	23.87	50.05	122.20	-72.15	Horizontal
5855.00	29.88	32.72	9.99	23.88	48.71	110.80	-62.09	Horizontal
5875.00	32.12	32.74	10.04	23.89	51.01	105.20	-54.19	Horizontal
5925.00	30.55	32.80	10.11	23.90	49.56	68.20	-18.64	Horizontal
5650.00	29.00	32.36	9.72	23.83	47.25	68.20	-20.95	Vertical
5700.00	33.64	32.50	9.79	23.84	52.09	105.20	-53.11	Vertical
5720.00	28.92	32.53	9.81	23.85	47.41	110.80	-63.39	Vertical
5725.00	28.81	32.53	9.83	23.86	47.31	122.20	-74.89	Vertical
5850.00	32.44	32.70	9.99	23.87	51.26	122.20	-70.94	Vertical
5855.00	30.99	32.72	9.99	23.88	49.82	110.80	-60.98	Vertical
5875.00	33.03	32.74	10.04	23.89	51.92	105.20	-53.28	Vertical
5925.00	29.49	32.80	10.11	23.90	48.50	68.20	-19.70	Vertical

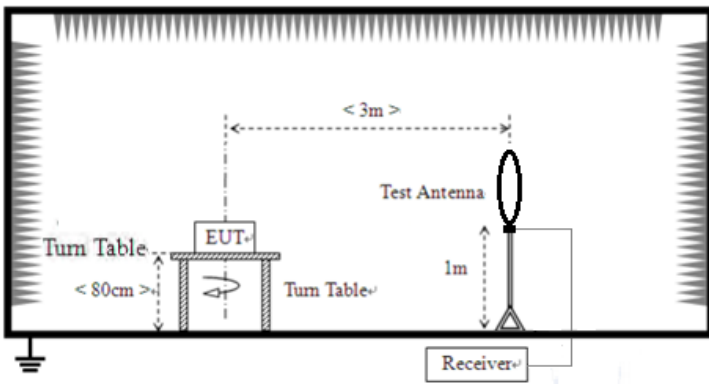
IEEE 802.11n HT40								
Peak value:								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
5650.00	30.83	32.36	9.72	23.83	49.08	68.20	-19.12	Horizontal
5700.00	28.36	32.50	9.79	23.84	46.81	105.20	-58.39	Horizontal
5720.00	31.50	32.53	9.81	23.85	49.99	110.80	-60.81	Horizontal
5725.00	32.51	32.53	9.83	23.86	51.01	122.20	-71.19	Horizontal
5850.00	32.50	32.70	9.99	23.87	51.32	122.20	-70.88	Horizontal
5855.00	33.28	32.72	9.99	23.88	52.11	110.80	-58.69	Horizontal
5875.00	31.60	32.74	10.04	23.89	50.49	105.20	-54.71	Horizontal
5925.00	32.43	32.80	10.11	23.90	51.44	68.20	-16.76	Horizontal
5650.00	28.76	32.36	9.72	23.83	47.01	68.20	-21.19	Vertical
5700.00	31.91	32.50	9.79	23.84	50.36	105.20	-54.84	Vertical
5720.00	31.00	32.53	9.81	23.85	49.49	110.80	-61.31	Vertical
5725.00	29.31	32.53	9.83	23.86	47.81	122.20	-74.39	Vertical
5850.00	30.36	32.70	9.99	23.87	49.18	122.20	-73.02	Vertical
5855.00	28.04	32.72	9.99	23.88	46.87	110.80	-63.93	Vertical
5875.00	28.63	32.74	10.04	23.89	47.52	105.20	-57.68	Vertical
5925.00	29.18	32.80	10.11	23.90	48.19	68.20	-20.01	Vertical

Remark:

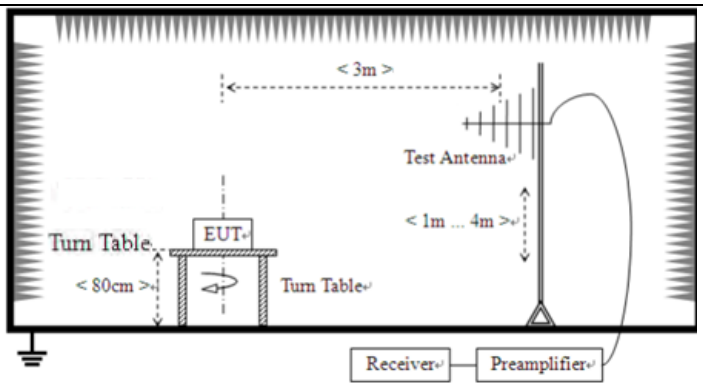
1. Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

7.7 Spurious Emission

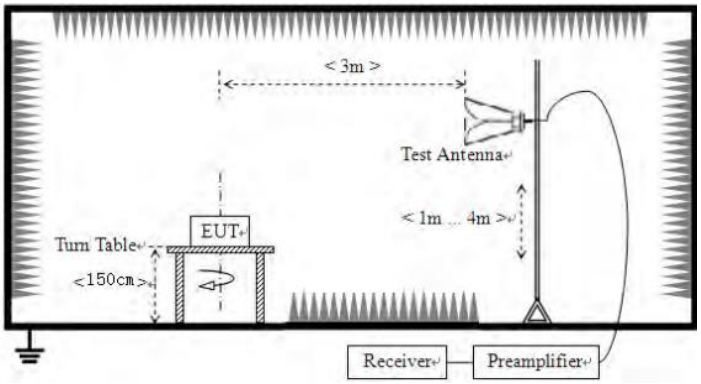
7.7.1 Radiated Emission Method

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209, Part 15E Section 15.407(b)(4)</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10:2013</td></tr>
<tr><td>Test Frequency Range:</td><td>9kHz to 40GHz</td></tr>
<tr><td>Test site:</td><td>Measurement Distance: 3m</td></tr>
<tr><td>Receiver setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Value</th></tr>
<tr><td>9kHz-150KHz</td><td>Quasi-peak</td><td>200Hz</td><td>1kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>150kHz-30MHz</td><td>Quasi-peak</td><td>9kHz</td><td>30kHz</td><td>Quasi-peak Value</td></tr>
<tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>AV</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
</table>
</td></tr>
<tr><td>Limit:</td><td>
<table>
<tr><th>Frequency</th><th>Limit (uV/m)</th><th>Value</th><th>Measurement Distance</th></tr>
<tr><td>0.009MHz-0.490MHz</td><td>2400/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>0.490MHz-1.705MHz</td><td>24000/F(KHz)</td><td>QP</td><td>300m</td></tr>
<tr><td>1.705MHz-30MHz</td><td>30</td><td>QP</td><td>30m</td></tr>
<tr><td>30MHz-88MHz</td><td>100</td><td>QP</td><td rowspan="4">3m</td></tr>
<tr><td>88MHz-216MHz</td><td>150</td><td>QP</td></tr>
<tr><td>216MHz-960MHz</td><td>200</td><td>QP</td></tr>
<tr><td>960MHz-1GHz</td><td>500</td><td>QP</td></tr>
</table>
<table>
<tr><th>Frequency</th><th>Limit (dBm/MHz)</th><th>Remark</th></tr>
<tr><td>Above 1GHz</td><td>-27.0</td><td>Peak Value</td></tr>
</table>
</td></tr>
<tr><td>Test setup:</td><td>For radiated emissions from 9kHz to 30MHz
 

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



For radiated emissions above 1GHz



Test Procedure:

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

	And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report.					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

Remarks:

1. *Only show the worst case ant 1 test data.*
2. *Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.*

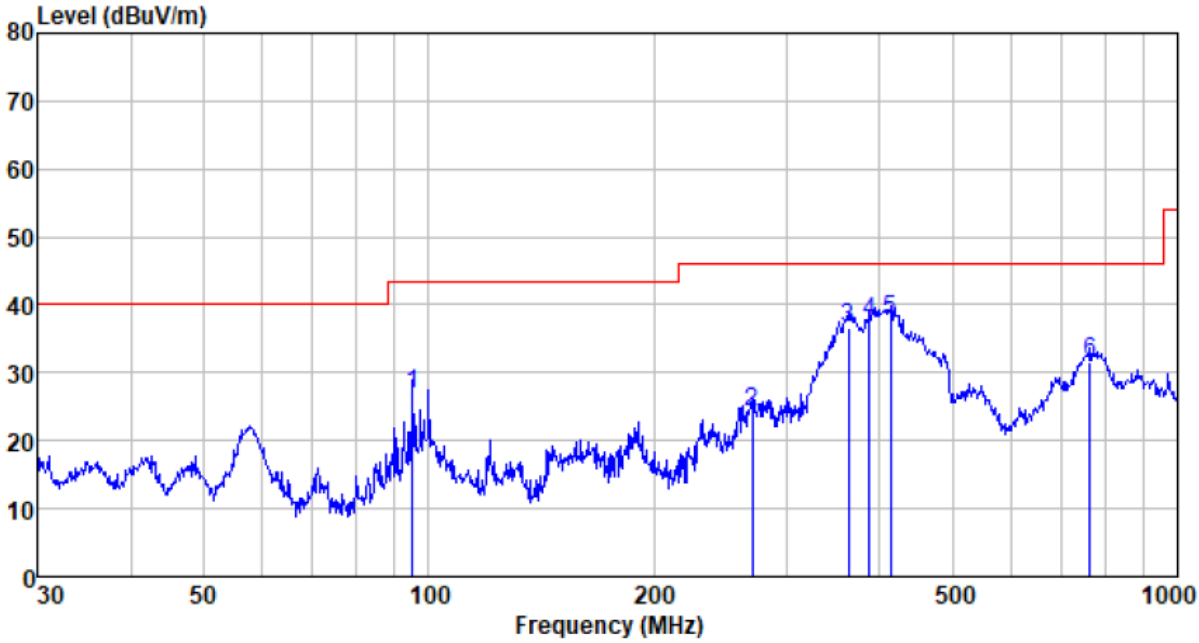
Measurement Data:

9 kHz ~ 30 MHz

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

Below 1GHz

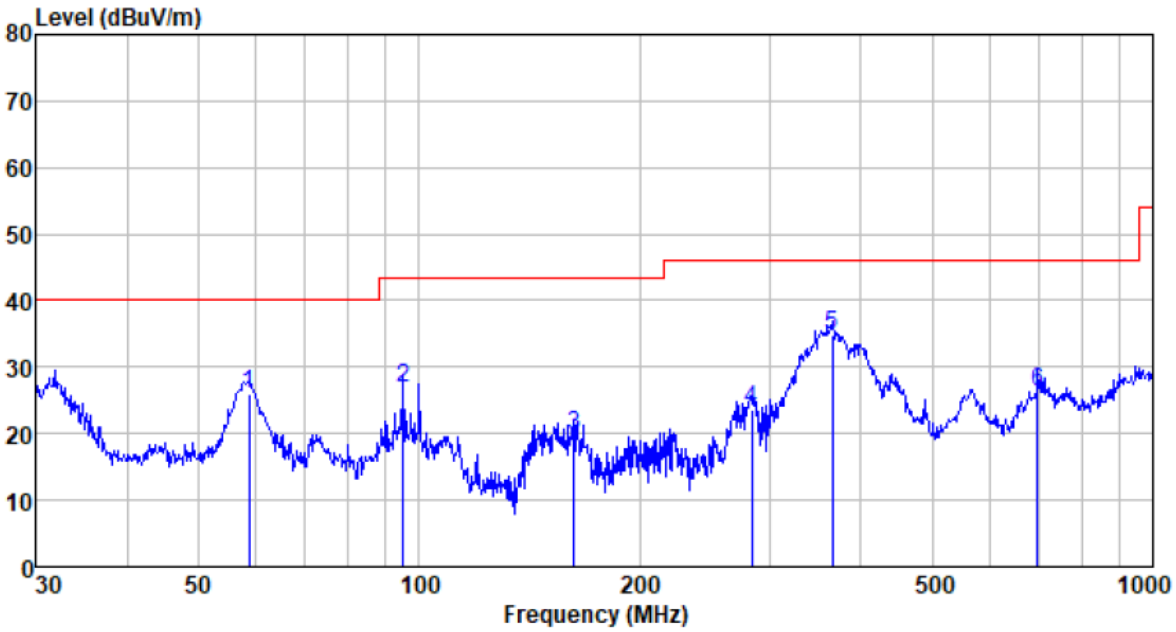
Horizontal:



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
95.093	50.88	11.52	1.15	36.68	26.87	43.50	-16.63	QP
270.375	46.66	12.76	2.22	37.40	24.24	46.00	-21.76	QP
362.985	56.81	14.72	2.68	37.49	36.72	46.00	-9.28	QP
387.992	56.98	15.14	2.79	37.51	37.40	46.00	-8.60	QP
413.271	56.80	15.63	2.92	37.52	37.83	46.00	-8.17	QP
763.376	44.16	20.78	4.32	37.62	31.64	46.00	-14.36	QP

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

Vertical:



Freq	Reading level	Antenna factor	Cable loss	Preamp factor	level	Limit level	Over limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV	dBuV/m	dB	
58.613	50.01	11.45	0.85	36.30	26.01	40.00	-13.99	Peak
95.093	50.79	11.52	1.15	36.68	26.78	43.50	-16.72	Peak
162.611	47.05	8.36	1.65	37.15	19.91	43.50	-23.59	Peak
283.979	45.56	13.16	2.29	37.41	23.60	46.00	-22.40	Peak
365.539	54.84	14.78	2.69	37.49	34.82	46.00	-11.18	Peak
696.857	40.35	19.60	4.08	37.63	26.40	46.00	-19.60	Peak

Remarks: level = Reading level + Antenna factor + Cable loss - Preamp Factor

Above 1GHz:

802.11a,11n(HT20),11n(HT40), all have been tested,
Only the data of worst case at each channel plan reporteded.

Test mode:		802.11a		Test channel:		lowest	
Antenna Pol.	Frequency (MHz)	Reading Level (dBuV/m)	Factor (dBuV/m)	Measure Level (dBuV/m)	Limit (dBuV/m)	Over limit(dB)	Detector
V	11490.00	21.11	21.64	42.75	54(Note3)	-11.25	PK
V	17235.00	20.63	21.80	42.43	54(Note3)	-11.57	PK
H	11490.00	21.85	21.83	43.68	54(Note3)	-10.32	PK
H	17235.00	19.66	21.67	41.33	54(Note3)	-12.67	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	11570.00	22.17	21.64	43.81	54(Note3)	-10.19	PK
V	17355.00	23.06	21.80	44.86	54(Note3)	-9.14	PK
H	11570.00	24.19	21.83	46.02	54(Note3)	-7.98	PK
H	17355.00	25.06	21.67	46.73	54(Note3)	-7.27	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	11650.00	21.24	21.64	42.88	54(Note3)	-11.12	PK
V	17475.00	21.55	21.80	43.35	54(Note3)	-10.65	PK
H	11650.00	20.33	21.83	42.16	54(Note3)	-11.84	PK
H	17475.00	19.21	21.67	40.88	54(Note3)	-13.12	PK

Test mode:		802.11n(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	11510.00	21.85	21.67	43.52	54(Note3)	-10.48	PK
V	17265.00	22.34	21.83	44.17	54(Note3)	-9.83	PK
H	11510.00	20.33	21.67	42.00	54(Note3)	-12.00	PK
H	17265.00	22.31	21.83	44.14	54(Note3)	-9.86	PK

Test mode:		802.11n(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	11590.00	21.62	21.67	43.29	54(Note3)	-10.71	PK
V	17385.00	25.01	21.83	46.84	54(Note3)	-7.16	PK
H	11590.00	24.04	21.67	45.71	54(Note3)	-8.29	PK
H	17385.00	23.17	21.83	45.00	54(Note3)	-9.00	PK

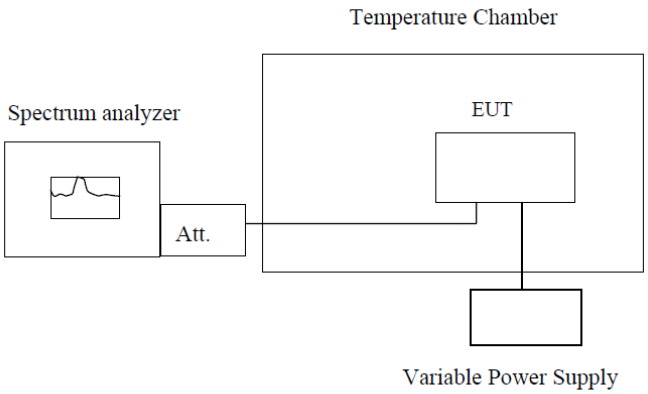
Notes:

1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 18GHz~40GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

7.8 Frequency stability

Test Requirement:	FCC Part15 C Section 15.407(g)
Test Method:	ANSI C63.10:2013, FCC Part 2.1055
Limit:	Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified
Test Procedure:	The EUT was setup to ANSI C63.4, 2003; tested to 2.1055 for compliance to FCC Part 15.407(g) requirements.
Test setup:	 **Note :** Measurement setup for testing on Antenna connector
Test Instruments:	Refer to section 5.10 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

Measurement data:

HT 20MHz					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5745	5746.7121	5744.9584	5744.5449	5746.6874
	5785	5786.1342	5784.0074	5784.8004	5786.3506
	5825	5825.3612	5824.8954	5824.5113	5826.9002
-20	5745	5745.1487	5744.5415	5744.7089	5746.0342
	5785	5785.9148	5784.0918	5784.0773	5785.9147
	5825	5825.4069	5824.4683	5824.3189	5825.4525
-10	5745	5745.2768	5744.1520	5744.1176	5745.0326
	5785	5785.9493	5784.2090	5784.9533	5785.9453
	5825	5825.3892	5824.8216	5824.3038	5825.5557
0	5745	5745.7760	5744.9293	5744.9441	5745.2705
	5785	5785.5141	5784.5262	5784.8229	5785.1040
	5825	5825.6259	5824.1541	5824.3438	5825.1267
10	5745	5745.4788	5744.0080	5744.2583	5745.5275
	5785	5785.6313	5784.3003	5784.4062	5785.1702
	5825	5825.7824	5824.9900	5824.2706	5825.8321
20	5745	5745.4151	5744.3563	5744.7996	5745.4205
	5785	5785.8055	5784.5829	5784.6263	5785.4933
	5825	5825.5799	5824.9945	5824.3275	5825.5868
30	5745	5745.5267	5744.6325	5744.4138	5745.7146
	5785	5785.3958	5784.6278	5784.9315	5785.9604
	5825	5825.9566	5824.4404	5824.8326	5825.6395
40	5745	5745.2072	5744.4105	5744.0954	5745.1247
	5785	5785.5031	5784.0582	5784.0931	5785.4493
	5825	5825.5370	5824.3329	5824.1103	5825.1434
50	5745	5745.4306	5744.8582	5744.3140	5745.8707
	5785	5785.6980	5784.4462	5784.8536	5785.9060
	5825	5825.9758	5824.5049	5824.3186	5825.8734

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
108	5745	5745.6734	5746.5805	5743.4983	5743.1200
	5785	5785.1786	5785.4081	5784.3305	5783.4749
	5825	5825.8082	5825.6210	5824.1592	5824.1212
120	5745	5745.9730	5745.0170	5744.4950	5744.6683
	5785	5785.2615	5785.7406	5784.2273	5784.6041
	5825	5825.5739	5825.2313	5824.0818	5824.8609
132	5745	5745.2595	5745.3467	5744.0606	5744.4630
	5785	5785.2399	5785.7454	5784.3182	5784.7607
	5825	5825.4895	5825.6275	5824.0012	5824.0858

HT40 MHz					
Frequency stability versus Temp.					
Power Supply: AC 120V					
Temp. (°C)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
-30	5755	5755.2456	5753.6877	5754.7757	5755.3340
	5795	5795.6298	5793.6601	5794.8612	5795.1102
-20	5755	5755.1382	5753.0323	5754.6857	5755.0687
	5795	5795.1580	5793.6755	5794.4074	5795.9845
-10	5755	5755.5916	5753.1017	5754.1231	5755.4900
	5795	5795.7245	5793.4623	5794.5404	5795.4990
0	5755	5755.9792	5754.0876	5754.8368	5755.6685
	5795	5795.1572	5794.1209	5794.0696	5795.9412
10	5755	5755.0256	5754.8624	5754.4512	5755.7078
	5795	5795.5665	5794.3726	5794.8420	5795.5857
20	5755	5755.6784	5754.4050	5754.7126	5755.0948
	5795	5795.2630	5794.5570	5794.6351	5795.7392
30	5755	5755.3194	5754.0780	5754.2991	5755.2138
	5795	5795.1126	5794.0089	5794.8234	5795.5365
40	5755	5755.6925	5754.1379	5754.3978	5755.3714
	5795	5795.7652	5794.1489	5794.6385	5795.4212
50	5755	5755.0274	5754.7023	5754.8110	5755.6740
	5795	5795.8451	5794.8207	5794.6518	5795.2661

Frequency stability versus Voltage					
Temperature: 25°C					
Power Supply (VAC)	Operating Frequency (MHz)	0 minute	2 minute	5 minute	10 minute
		Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)	Measured Frequency (MHz)
108	5755	5755.8646	5754.7854	5755.9810	5754.6364
	5795	5795.4880	5794.1361	5795.6514	5794.9970
120	5755	5755.7672	5754.0054	5755.4848	5754.9853
	5795	5795.0435	5794.6179	5795.3875	5794.3441
132	5755	5755.0762	5754.3251	5755.0095	5754.1056
	5795	5795.8268	5794.6781	5795.4729	5794.8049

8 Test Setup Photo

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

9 EUT Constructional Details

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

------END------