FCC TEST REPORT

Product Name:	Mobile Phone
Trade Mark:	MI
Model No.:	MDG2
Report Number:	170615001RFC-4
Test Standards:	FCC 47 CFR Part 15 Subpart E
FCC ID:	2AFZZ-XMSG2
Test Result:	PASS
Date of Issue:	July 12, 2017

Prepared for:

Xiaomi Communications Co., Ltd.
The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

Prepared by:

Shenzhen UnionTrust Quality and Technology Co., Ltd.
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Tiny You
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Approved by:
Billy Li
Technical Director

Date: July 12, 2017

Version

Version No.	Date	Description
V1.0	July 12, 2017	Original

CONTENTS

1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	Xiaomi Communications Co., Ltd.
Address of Applicant:	The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China
Manufacturer:	Xiaomi Communications Co., Ltd.
Address of Manufacturer:	The Rainbow City of China Resources, NO.68, Qinghe Middle Street, Haidian District, Beijing, China

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Mobile Phone		
Model No.:	MDG2		
Add. Model No.:	NA		
Trade Mark:	MI		
DUT Stage:	Production Unit		
EUT Supports Function:	GSM Bands:	GSM850/1900	
	UTRA Bands:	Band II/ Band V	
	E-UTRA Bands:	FDD Band 4/ Band 5/ Band 7	
		TDD Band 38	
	2.4 GHz ISM Band:	IEEE 802.11b/g/n	
		Bluetooth: V3.0+HS & V4.0 LE	
	5 GHz U-NII Bands:	5 150 MHz to 5 250 MHz	IEEE 802.11a/n/ac
		5 250 MHz to 5 350 MHz	IEEE 802.11a/n/ac
		5 470 MHz to 5 725 MHz	IEEE 802.11a/n/ac
		5 725 MHz to 5 850 MHz	IEEE 802.11a/n/ac
		1559 MHz to 1610 MHz	GPS/GLONASS
	BSR:	VHF Band II	FM
Software Version:	QL1515-tissot		
Hardware Version:	P3A		
IMEI Code:	865181030010724, 865181030010732		
Sample Received Date:	June 10, 2017		
Sample Tested Date:	June 11, 2017 to July 10, 2017		

1.2.2 Description of Accessories

Adapter(1)	
Trade Mark:	MI
Model No.:	MDY-08-EZ
Input:	100-240 V~50/60 Hz 0.35 A Max
Output:	5.0 V ⎓ 2.0 A
AC Cable:	N/A
DC Cable:	1.0 Meter, Shielded without ferrite
Manufacturer:	Dongguan Aohai Power Technology Co., Ltd.

Adapter(2)	
Trade Mark:	MI
Model No.:	MDY-08-EZ
Input:	100-240 V~50/60 Hz 0.35 A Max
Output:	5.0 V ⎓ 2.0 A
AC Cable:	N/A
DC Cable:	1.0 Meter, Shielded without ferrite
Manufacturer:	Jangsu Chenyang Electron Co., Ltd.

Battery	
Trade Mark:	MI
Model No.:	BN31
Battery Type:	Lithium-ion Polymer Rechargeable Battery
Rated Voltage:	3.85 Vdc
Limited Charge Voltage:	4.4 Vdc
Rated Capacity:	3000 mAh
Manufacturer:	Zhuhai Coslight Battery Co., Ltd.

Cable(1)	
Trade Mark:	MI
Model No.:	L6BU2013-CS-H
Description:	USB Type-C Plug Cable
Cable Type:	Shielded without ferrite
Length:	1.0 Meter

Cable(2)	
Trade Mark:	MI
Model No.:	KLC-2588
Description:	USB Type-C Plug Cable
Cable Type:	Shielded without ferrite
Length:	1.0 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Range:	5150 MHz to 5250 MHz				
	5250 MHz to 5350 MHz				
	5470 MHz to 5725 MHz				
	5 725 MHz to 5 850 MHz				
Support Standards:	IEEE 802.11a/n/ac				
TPC Function:	Not Support				
DFS Operational mode:	Slave without radar Interference detection function				
Type of Modulation:	IEEE 802.11a: OFDM(64QAM, 16QAM, QPSK, BPSK)				
	IEEE 802.11n: OFDM(64QAM, 16QAM, QPSK, BPSK)				
	IEEE 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)				
Channel Spacing:	IEEE 802.11a/n-HT20/ac-VHT20: 20 MHz				
	IEEE 802.11n-HT40/ac-VHT40: 40 MHz				
	IEEE 802.11ac-VHT80/: 80 MHz				
Data Rate:	IEEE 802.11a: Up to 54 Mbps				
	IEEE 802.11n-HT20: Up to MCS7				
	IEEE 802.11n-HT40: Up to MCS7				
	IEEE 802.11ac-VHT20: Up to MCS8				
	IEEE 802.11ac-VHT40: Up to MCS9				
	IEEE 802.11ac-VHT80: Up to MCS9				
Number of Channels:	5150 MHz to 5250 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80				
	5250 MHz to 5350 MHz: 4 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40)/ac-VHT40 1 for IEEE 802.11acVHT80				
	5470 MHz to 5725 MHz: 11 for IEEE 802.11a/n-HT20/ac-VHT20 5 for IEEE 802.11n-HT40/ac-VHT40 2 for IEEE 802.11ac-VHT80				
	5725 MHz to 5850 MHz: 5 for IEEE 802.11a/n-HT20/ac-VHT20 2 for IEEE 802.11n-HT40/ac-VHT40 1 for IEEE 802.11ac-VHT80				
Antenna Type:	PIFA Antenna				
Antenna Gain:	5150 MHz to 5250 MHz	2.8 dBi			
	5250 MHz to 5350 MHz	4.0 dBi			
	5470 MHz to 5725 MHz	3.2 dBi			
	5725 MHz to 5850 MHz	3.9 dBi			
Maximum Output Power (dBm):	**Mode**	**U-NII-1**	**U-NII-2A**	**U-NII-2C**	**U-NII-3**
	IEEE 802.11a	12.70	12.77	13.19	10.23
	IEEE 802.11n-HT20	11.67	11.74	12.34	10.24
	IEEE 802.11n-HT40	11.54	11.55	12.10	10.83
	IEEE 802.11ac-VHT80	10.67	10.72	13.04	11.69
Normal Test Voltage:	3.85 Vdc				
Extreme Test Voltage:	3.4 to 4.4 Vdc				

Extreme Test Temperature:	-20 °C to 50 °C

1.4 OTHER INFORMATION

Operation Frequency Each of Channel							
Channel	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**
For IEEE 802.11a/n-HT20/ac-VHT20 operation in the 5150 MHz to 5350 MHz band							
36	5180 MHz	44	5220 MHz	52	5260 MHz	60	5300 MHz
40	5200 MHz	48	5240 MHz	56	5280 MHz	64	5320 MHz
For IEEE 802.11a/n-HT20/ac-VHT20 operation in the 5470 MHz to 5725 MHz band							
100	5500 MHz	112	5560 MHz	124	5620 MHz	136	5680 MHz
104	5520 MHz	116	5580 MHz	128	5640 MHz	140	5700 MHz
108	5540 MHz	120	5600 MHz	132	5660 MHz	--	--
For IEEE 802.11a/n-HT20/ac-VHT20 operation in the 5725 MHz to 5850 MHz band							
149	5745 MHz	153	5765 MHz	157	5785 MHz	161	5805 MHz
165	5825 MHz	--	--	--	--	--	--
For IEEE 802.11n-HT40/ac-VHT40 operation in the 5150 MHz to 5350 MHz band							
38	5190 MHz	46	5230 MHz	54	5270 MHz	62	5310 MHz
For IEEE 802.11n-HT40/ac-VHT40 operation in the 5470 MHz to 5725 MHz band							
102	5510 MHz	110	5550 MHz	118	5590 MHz	126	5630 MHz
134	5670 MHz	--	--	--	--	--	--
For IEEE 802.11n-HT40/ac-VHT40 operation in the 5725 MHz to 5850 MHz band							
151	5755 MHz	159	5795 MHz	--	--	--	--
For IEEE 802.11ac-VHT80 operation in the 5150 MHz to 5350 MHz band							
42	5210 MHz	58	5290 MHz	--	--	--	--
For IEEE 802.11ac-VHT80 operation in the 5470 MHz to 5725 MHz band							
106	5530 MHz	122	5610 MHz	--	--	--	--
For IEEE 802.11ac-VHT80 operation in the 5725 MHz to 5850 MHz band							
155	5775 MHz	--	--	--	--	--	--

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Notebook	Lenovo	E450	SL10G10780	UnionTrust
Wireless AP	Alcatel-Lucent	G-240W-B	2ADZRG240WB	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.30 Meter	UnionTrust

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6, Baoneng Science and Technology Park, Qingxiang Road No.1, Longhua

New District, Shenzhen, China 518109
Telephone: +86 (0) 755 2823 0888
Fax: +86 (0) 755 2823 0886

Tests were sub-contracted. (FCC 47 CFR Part 15.207, FCC 47 CFR Part 15.209)
Compliance Certification Services (Shenzhen) Inc.

Address: No.10-1 Mingkeda Logistics Park, No.18 Huanguan South RD. Guan lan Town, Baoan Distr, Shenzhen, Guangdong, China.
Telephone: +86 (0) 755 28055000 Fax: +86 (0) 755 29055221

1.7 TEST FACILITY

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

CNAS-Lab Code: L9069
The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC/EN 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

IC-Registration No.: 21600-1
The 3m Semi-anechoic chamber of Shenzhen UnionTrust Quality and Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 21600-1.

A2LA-Lab Certificate No.: 4312.01
Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Compliance Certification Services (Shenzhen) Inc.

FCC Registration Number is 441872.

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-30MHz	±3.2878 dB
2	Radiated emission 30MHz-200MHz	±3.8928 dB
3	Radiated emission 200MHz-1GHz	±3.8753 dB
4	Radiated emission 1GHz-8GHz	±5.3112 dB
5	Radiated emission 8GHz-18GHz	±5.3493 dB

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart E Test Cases			
Test Item	**Test Requirement**	**Test Method**	**Result**
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203 FCC 47 CFR Part 15 Subpart C Section 15.407(a)(1) (2)	ANSI C63.10-2013	PASS
26 dB emission bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(2)(5)	KDB 789033 D02 v01r04 Section C.1	PASS
6 dB bandwidth	FCC 47 CFR Part 15 Subpart E Section 15.407 (e)	KDB 789033 D02 v01r04 Section C.2	PASS
Maximum conducted output power	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v01r04 Section E.3.a(Method PM)	PASS
Peak Power Spectral Density	FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)	KDB 789033 D02 v01r04 Section F	PASS
Frequency stability	FCC 47 CFR Part 15 Subpart E Section 15.407 (g)	ANSI C63.10-2013	PASS
Radiated Emissions and Band Edge Measurement	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6) FCC 47 CFR Part 15 Subpart C Section 15.209/205	KDB 789033 D02 v01r04 Section G.3, G.4, G.5, and G.6	PASS*
Dynamic Frequency Selection	FCC 47 CFR Part 15 Subpart E Section 15.407 (h)	KDB 905462 D03 Client Without DFS New Rules v01r02	PASS*
AC Power Line Conducted Emission	FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(6) FCC 47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10-2013	PASS*
Note: 1) N/A: In this whole report not application. 2) "*": In this whole report "*" means tests were sub-contracted Item.			

For Dynamic Frequency Selection

Test Case	Result
Channel Availability Check Time	N/A[1]
U-NII Detection Bandwidth	N/A[1]
Channel Closing Transmission Time	PASS
Channel Move Time	PASS
DFS Detection Threshold	N/A[1]
Non- Occupancy Period	N/A[1]
Note: 1) The EUT is slave, NA In this whole report not application.	

3. EQUIPMENT LIST

Radiated Emission Test Equipment List Chamber 1						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☑	PSA Series Spectrum Analyzer	Agilent	E4446A	US44300399	Feb. 17, 2017	Feb. 16, 2018
☑	High Noise Amplifier	Agilent	8449B	3008A01838	Feb. 11, 2017	Feb. 10, 2018
☑	Horn Antenna	SCHWARZBECK	BBHA9120	D286	Feb. 12, 2017	Feb. 11, 2018
☑	Bilog Antenna	SCHAFFNER	CBL6143	5082	02-12-2017	02-11-2018
☑	Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	Feb. 11, 2017	Feb. 10, 2018
☑	Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
☑	Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
☑	Controller	CT	N/A	N/A	N.C.R	N.C.R
☑	Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
☑	Temp. / Humidity Meter	Anymetre	JR913	N/A	Feb. 15, 2017	Feb. 14, 2018
☑	Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

Conducted Emission Test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☑	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	Feb. 11, 2017	Feb. 10, 2018
☑	LISN(EUT)	ROHDE&SCHWARZ	ENV216	101543-WX	Feb. 11, 2017	Feb. 10, 2018
☑	LISN	EMCO	3825/2	8901-1459	Feb. 12, 2017	Feb. 11, 2018
☑	Temp. / Humidity Meter	VICTOR	HTC-1	N/A	Feb. 15, 2017	Feb. 14, 2018
☑	Test S/W	FARAD	EZ-EMC/ CCS-3A1-CE			

Conducted RF test Equipment List						
Used	**Equipment**	**Manufacturer**	**Model No.**	**Serial Number**	**Cal. date (mm dd, yyyy)**	**Cal. Due date (mm dd, yyyy)**
☑	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	Dec. 22, 2016	Dec. 22, 2017
☐	Receiver	R&S	ESR7	1316.3003K07 -101181-K3	Dec. 22, 2016	Dec. 22, 2017
☑	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	Dec. 22, 2016	Dec. 22, 2017
☐	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430023	Dec. 22, 2016	Dec. 22, 2017
☑	EXG-B RF Analog Signal Generator	KEYSIGHT	N5171B	MY53051777	Jan. 09, 2016	Jan. 08, 2018
☑	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	MY51350267	Jan. 08, 2016	Jan. 07, 2018
☑	DC Source	KIKUSUI	PWR400L	LK003024	Sep. 21, 2016	Sep. 20, 2017
☑	Temp & Humidity chamber	Votisch	VT4002	58566133290020	Jun. 19, 2017	Jun. 18, 2018

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Test Environment	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (V)	Relative Humidity (%)
TN/VN	+15 to +35	3.85	20 to 75
TL/VL	-20	3.4	20 to 75
TH/VL	50	3.4	20 to 75
TL/VH	-20	4.4	20 to 75
TH/VH	50	4.4	20 to 75

Remark:

1) The EUT just work in such extreme temperature of -20 °C to 50 °C and the extreme voltage of 3.4 V to 4.4 V, so here the EUT is tested in the temperature of -20 °C to 50 °C and the voltage of 3.4 V to 4.4 V.
2) VN: Normal Voltage; TN: Normal Temperature;
TL: Low Extreme Test Temperature; TH: High Extreme Test Temperature;
VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage.

4.1.2 Record of Normal Environment

Test Item	Temperature (°C)	Relative Humidity (%)	Pressure (Kpa)	Tested by
AC Power Line Conducted Emission	24.3	56	101.8	Tiny You
26 dB emission bandwidth	24.3	56	101.8	Tiny You
Maximum conducted output power	24.3	56	101.8	Tiny You
Peak Power Spectral Density	24.3	56	101.8	Tiny You
6 dB bandwidth	24.3	56	101.8	Tiny You
Frequency stability	24.3	56	101.8	Tiny You
Dynamic Frequency Selection	24.3	56	101.8	Tiny You
Radiated Emissions and Band Edge Measurement	24.3	56	101.8	Tiny You

4.2 TEST CHANNELS

Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
IEEE 802.11a IEEE 802.11n-HT20 IEEE 802.11ac-VHT20	5150 MHz to 5250 MHz	Channel 36	Channel 44	Channel 48
		5180 MHz	5220 MHz	5240 MHz
	5250 MHz to 5350 MHz	Channel 52	Channel 60	Channel 64
		5260 MHz	5300 MHz	5320 MHz
	5470 MHz to 5725 MHz	Channel 100	Channel 116	Channel 140
		5500 MHz	5580 MHz	5700 MHz
	5725 MHz to 5850 MHz	Channel 149	Channel 157	Channel 165
		5745 MHz	5785 MHz	5825 MHz
IEEE 802.11n-HT40 IEEE 802.11ac-VHT40	5150 MHz to 5250 MHz	Channel 38	--	Channel 46
		5190 MHz	--	5230 MHz
	5250 MHz to 5350 MHz	Channel 54	--	Channel 62
		5270 MHz	--	5310 MHz
	5470 MHz to 5725 MHz	Channel 102	Channel 110	Channel 134
		5510 MHz	5550 MHz	5670 MHz
	5725 MHz to 5850 MHz	Channel 151	--	Channel 159
		5755 MHz	--	5795 MHz
IEEE 802.11ac-VHT80	5150 MHz to 5250 MHz	--	Channel 42	--
		--	5210 MHz	--
	5250 MHz to 5350 MHz	--	Channel 58	--
		--	5290 MHz	--
	5470 MHz to 5725 MHz	Channel 106	--	Channel 122
		5530 MHz	--	5610 MHz
	5725 MHz to 5850 MHz	--	Channel 155	--
		--	5775 MHz	--

4.3 EUT TEST STATUS

Mode	Tx/Rx Function	Description
IEEE 802.11a/n/ac	1Tx/1Rx	1. Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

4.4 PRE-SCAN

4.4.1 Pre-scan under all rates

Mode and Frequency	Maximum Conducted Average Power (dBm) for Data Rates (Mbps)							
IEEE 802.11a 5180 MHz	6	9	12	18	24	36	48	54
	11.95	11.64	11.43	10.97	10.49	9.47	9.26	9.02
IEEE 802.11n-HT20 5180 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	10.67	10.15	9.89	9.56	8.63	8.13	7.86	7.56
IEEE 802.11n-HT40 5190 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	10.03	9.03	8.36	7.76	6.57	6.47	6.65	6.21
IEEE 802.11ac-VHT20 5180 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	10.75	10.54	9.65	9.11	7.86	7.56	7.67	7.53
	MCS8							
	7.16							
IEEE 802.11ac-VHT40 5190 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	10.01	9.06	8.38	7.74	7.02	6.76	6.34	6.15
	MCS8	MCS9						
	5.91	5.55						
IEEE 802.11ac-VHT80 5210 MHz	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
	8.11	6.84	6.17	5.62	4.95	4.64	4.36	4.41
	MCS8	MCS9						
	4.18	3.98						

4.4.2 Worst-case data rates

Mode	Worst-case data rates
IEEE 802.11a	6 Mbps
IEEE 802.11n-HT20	MCS0
IEEE 802.11n-HT40	MCS0
IEEE 802.11ac-VHT20	MCS0
IEEE 802.11ac-VHT40	MCS0
IEEE 802.11ac-VHT80	MCS0

4.5 TEST SETUP

4.5.1 For Radiated Emissions test setup

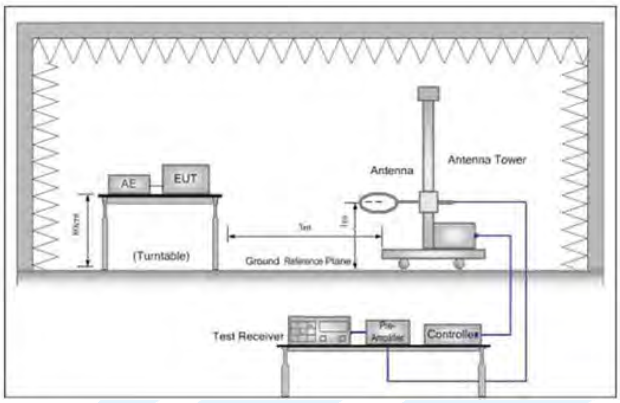


Figure 1. Below 30MHz

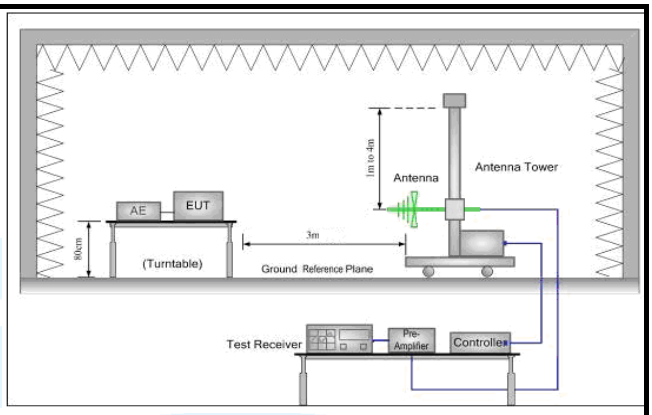


Figure 2. 30MHz to 1GHz

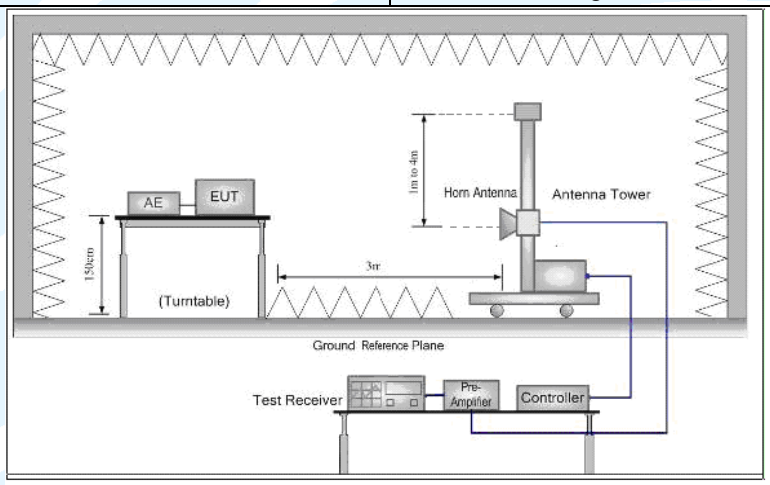
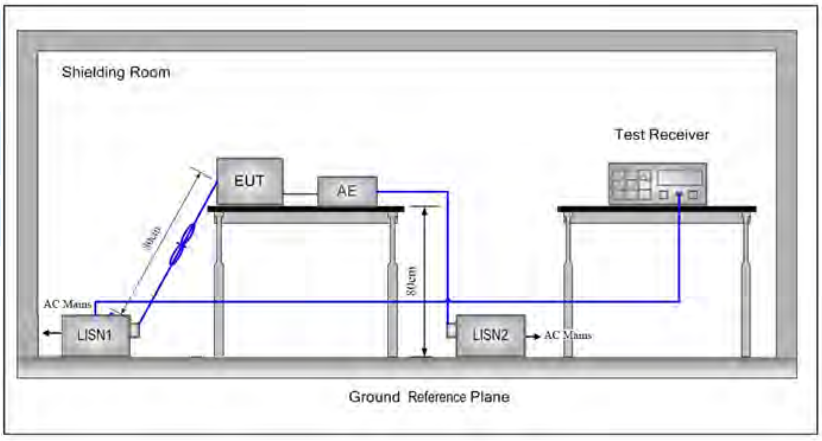


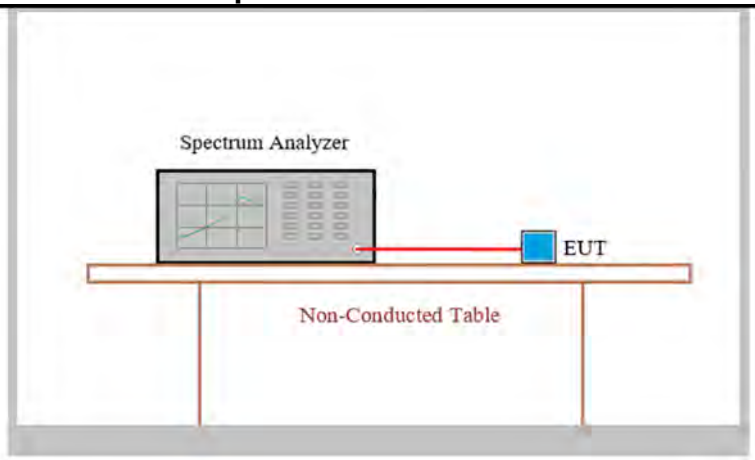
Figure 3. Above 1GHz

4.5.2 For Conducted Emissions test setup

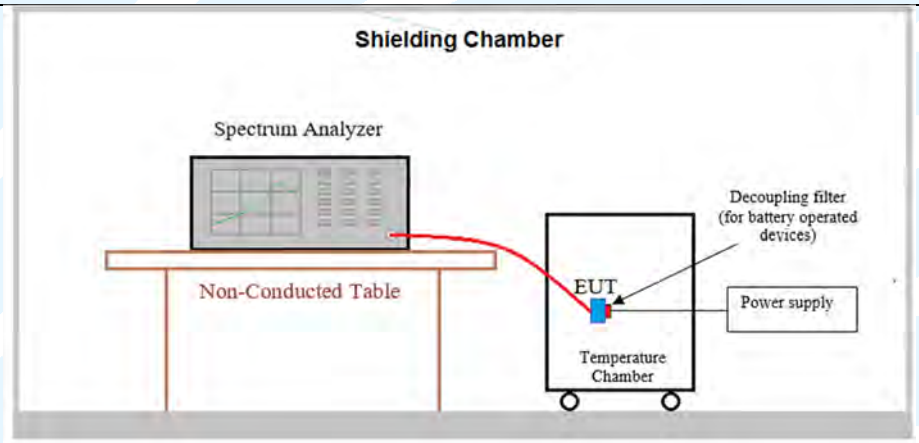
Figure 3. Conducted Emissions setup



4.5.3 For Conducted RF test setup



Normal Environment



Extreme Environment

4.6 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3.85Vdc rechargeable Li-on battery. Only the worst case data were recorded in this test report.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters. Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. Therefore, all final radiated testing was performed with the EUT in (see table below) orientation.

Frequency	Mode	Antenna Port	Worst-case axis positioning
Above 1GHz	1TX	Chain 0	X axis

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

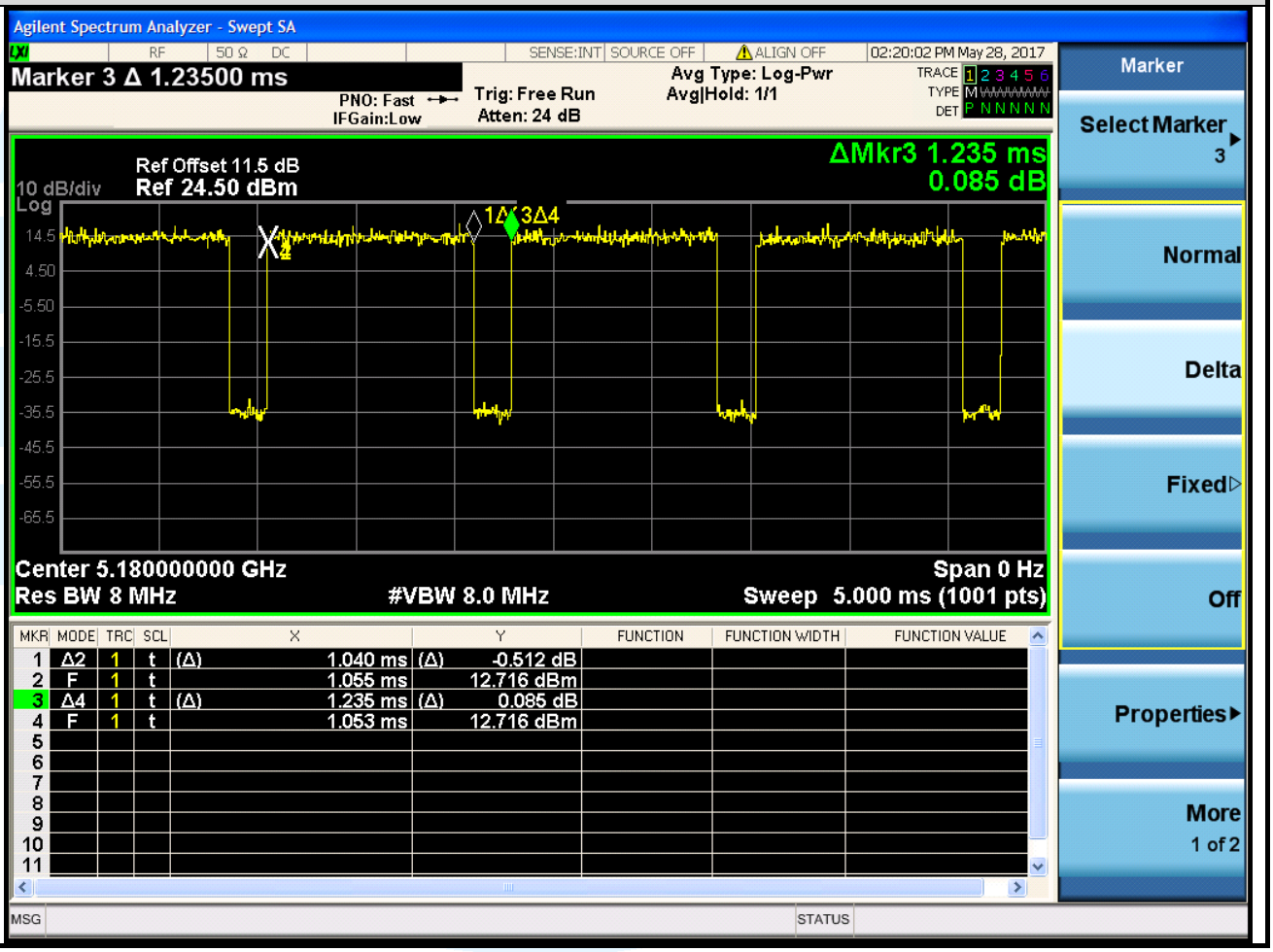
4.7 DUTY CYCLE

Mode	Data rates (Mbps)	On Time (msec)	Period (msec)	Duty Cycle (linear)	Duty Cycle (%)	Duty Cycle Factor (dB)	1/ T Minimum VBW (kHz)	Average Factor (dB)
IEEE 802.11a	6	1.04	1.235	0.84	84.21	0.75	0.96	-1.49
IEEE 802.11n-HT20	MCS0	0.98	1.175	0.83	83.40	0.79	1.02	-1.58
IEEE 802.11n-HT40	MCS0	0.489	0.687	0.71	71.18	1.48	2.04	-2.95
IEEE 802.11ac-VHT80	MCS0	0.246	0.444	0.55	55.41	2.56	4.07	-5.13

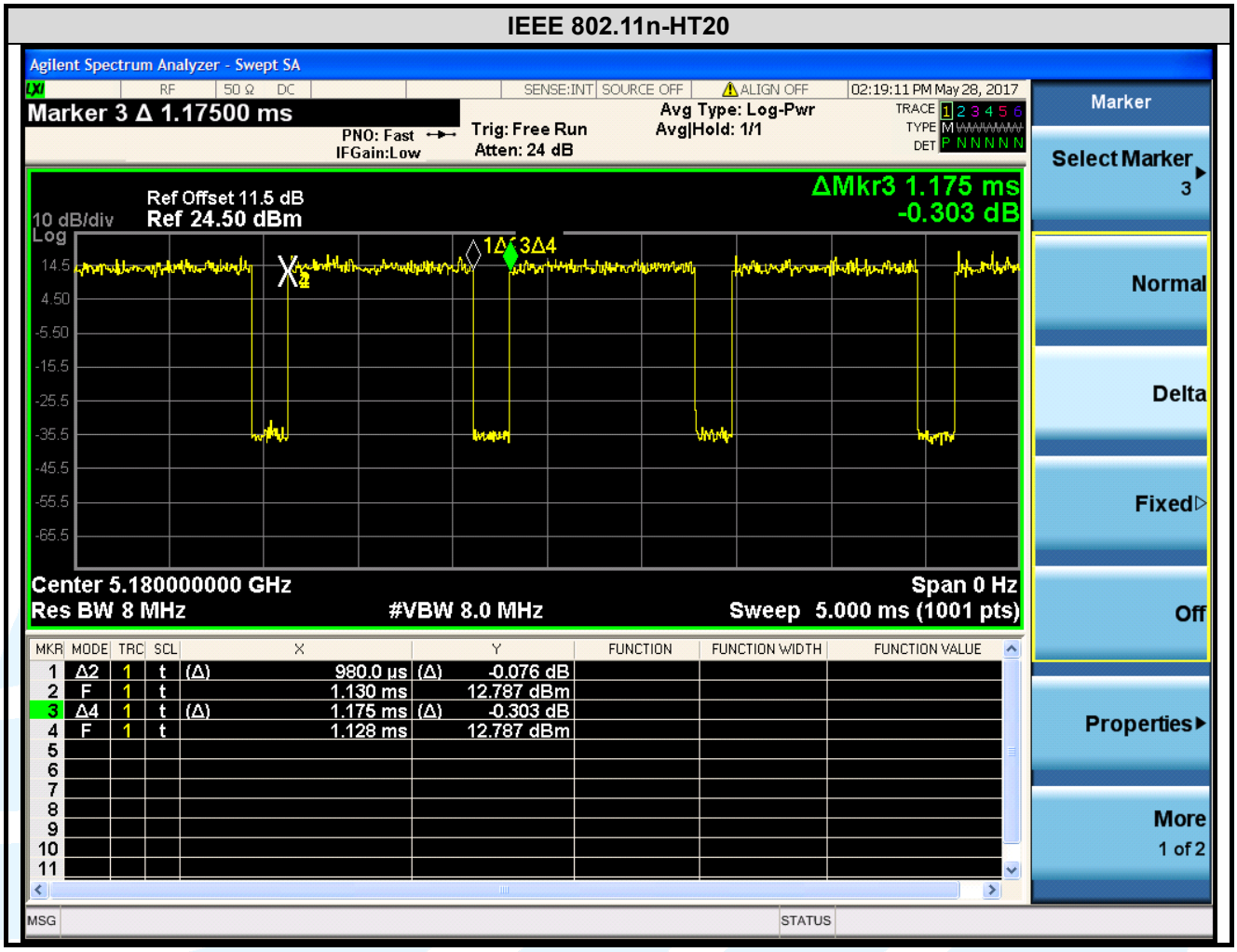
Remark:
1) Duty cycle= On Time/ Period;
2) Duty Cycle factor = 10 * log(1/ Duty cycle);
3) Average factor = 20 $\log_{10}$ Duty Cycle.

The test plot as follows

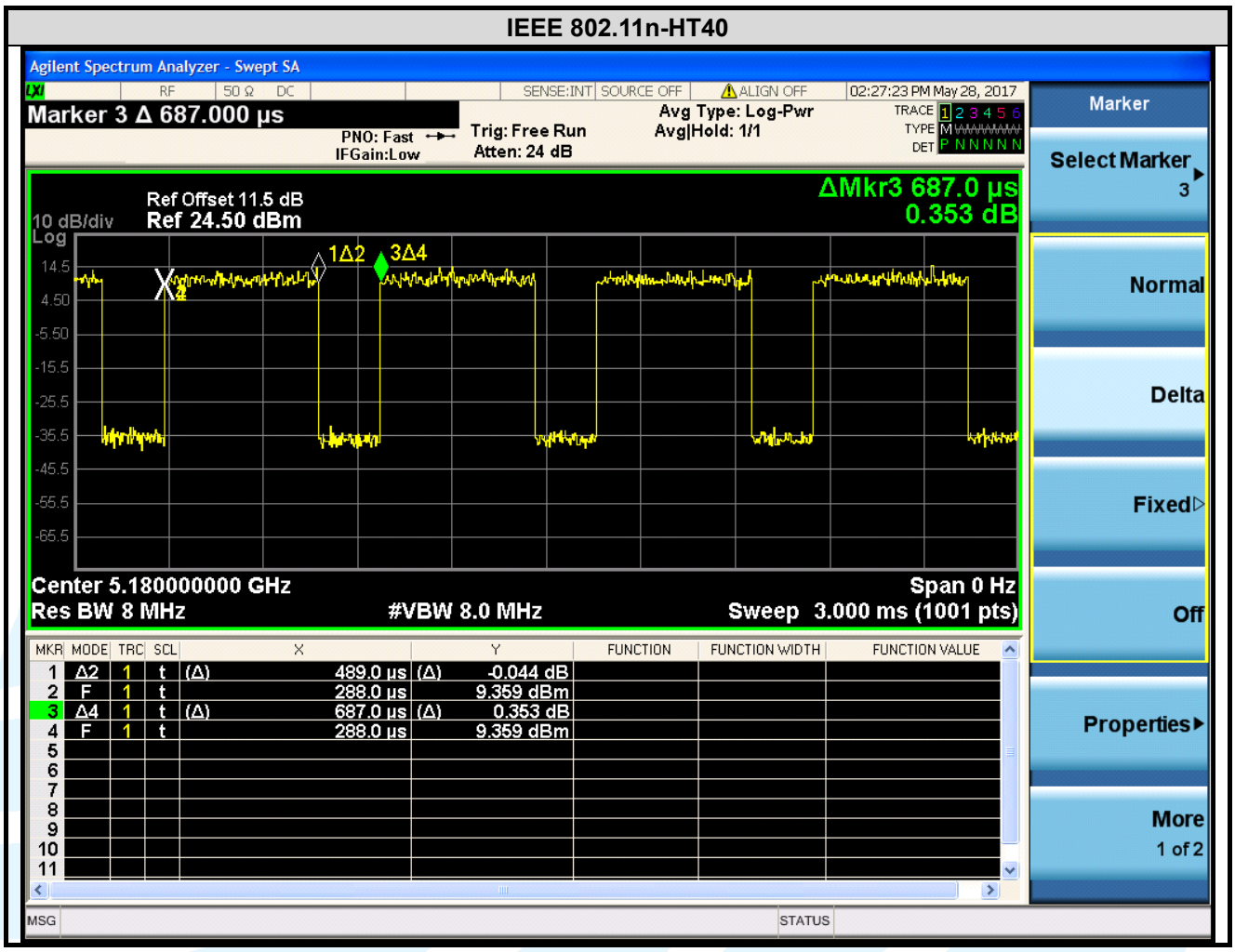
IEEE 802.11a



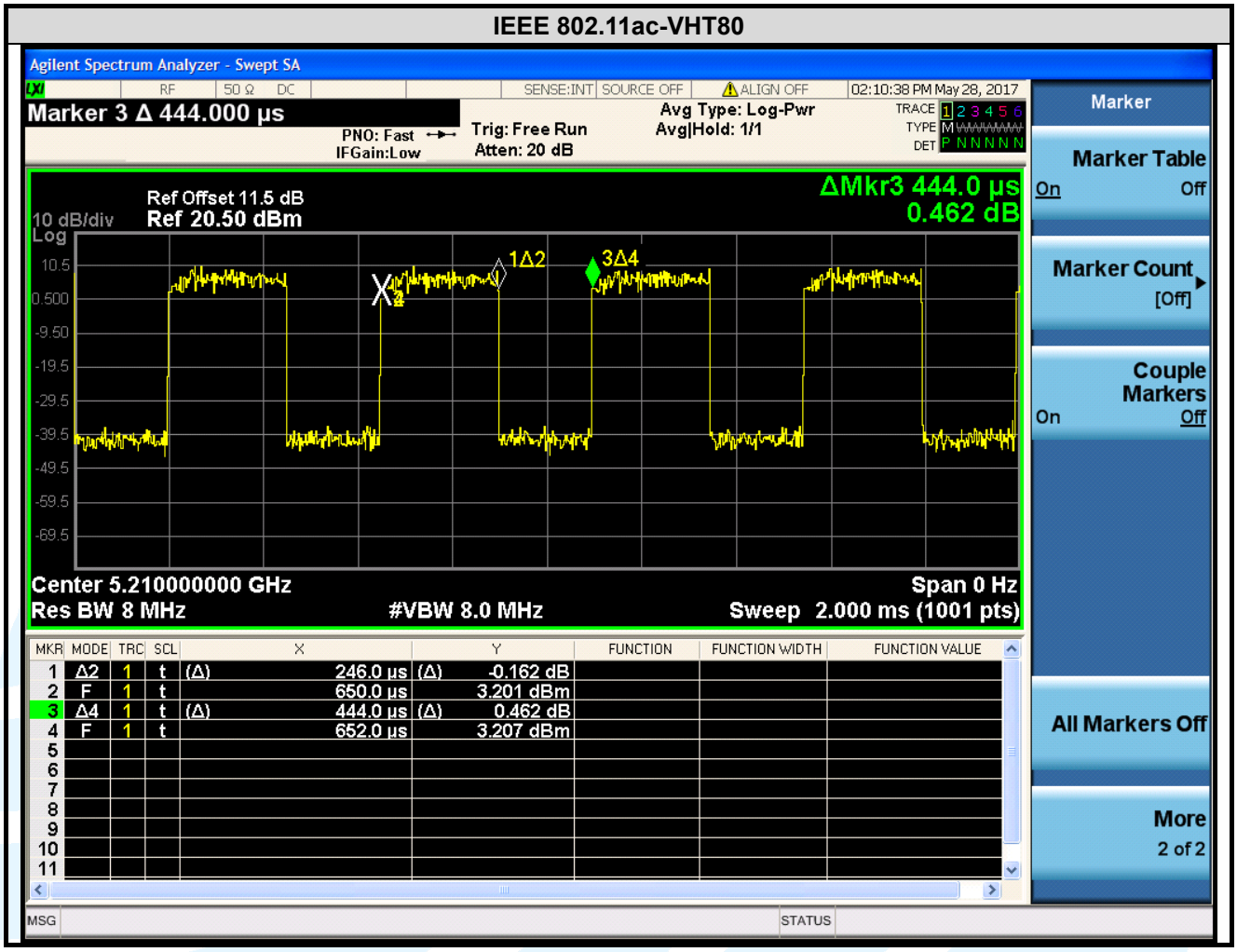
IEEE 802.11n-HT20



IEEE 802.11n-HT40



IEEE 802.11ac-VHT80



5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title
1	FCC 47 CFR Part 2	Frequency allocations and radio treaty matters; general rules and regulations
2	FCC 47 CFR Part 15	Radio Frequency Devices
3	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices
4	KDB 789033 D02 General UNII Test Procedures New Rules v01r04	Guidelines for compliance testing of unlicensed national information infrastructure (U-NII) device part 15 subpart E
5	905462 D06 802.11 Channel Plans New Rules v02	Operation in U-NII bands -802.11 channel PLAN(§15.407)
6	KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02	Compliance measurement procedures for Unlicensed –National Information Infrastructure devices operates in the frequency bands 5250 MHz to 5350 MHz and 5470 MHz to 5725 MHz bands incorporating dynamic frequency selection
7	KDB 905462 D03 Client Without DFS New Rules v01r02	U-NII client devices without radar detection capability

5.2 ANTENNA REQUIREMENT

Standard Requirement
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. **15.407(a)(1) (2) requirement:** The conducted output power limit specified in paragraph (a) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (a) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power and the peak power spectral density shall be reduced by the by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
EUT Antenna:
Antenna in the interior of the equipment and no consideration of replacement. the highest case directional gain of the antenna is 4.0 dBi.

5.3 26 DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a) (2)(5)

Test Method: KDB 789033 D02 v01r04 Section C.1

Limit: None; for reporting purposes only.

Test Procedure:

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum analyzer.

Spectrum analyzer according to the following Settings:
a) Set RBW = approximately 1 % of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

Mode	Channel	26 dB Bandwidth (MHz)	99% Bandwidth (MHz)
IEEE 802.11a	36 (5180)	21.74	17.047
	44 (5220)	21.51	17.009
	48 (5240)	21.70	16.976
	52 (5260)	21.80	17.001
	60 (5300)	21.50	16.946
	64 (5320)	21.60	16.996
	100 (5500)	21.52	16.958
	116 (5580)	21.53	16.955
	140 (5700)	22.40	16.999
IEEE 802.11n-HT20	36 (5180)	21.67	16.969
	44 (5220)	22.08	18.035
	48 (5240)	22.03	17.976
	52 (5260)	21.53	18.015
	60 (5300)	22.50	17.942
	64 (5320)	22.08	17.982
	100 (5500)	22.26	17.994
	116 (5580)	21.18	17.936
	140 (5700)	21.88	18.013
IEEE 802.11n-HT40	38 (5190)	43.15	36.276
	46 (5230)	42.29	35.987
	54 (5270)	41.77	36.197
	62 (5310)	39.98	35.947
	102 (5510)	42.76	36.108
	110 (5550)	40.77	36.016
	134 (5670)	40.55	36.205

IEEE 802.11ac-VHT80	42 (5230)	84.39	74.902
	58 (5290)	83.48	74.630
	106 (5530)	82.90	74.905
	122 (5610)	82.82	74.808

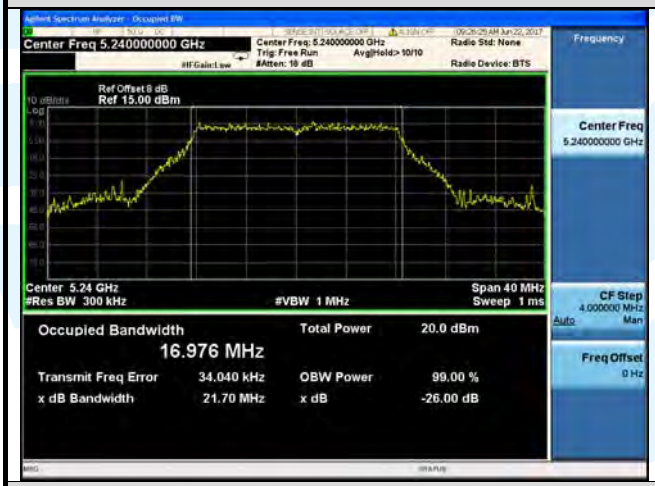
The test plot as follows:

IEEE 802.11a

Channel 36

Channel 44

Channel 48



Channel 52

Channel 60

Channel 64

Channel 100	Channel 116
	

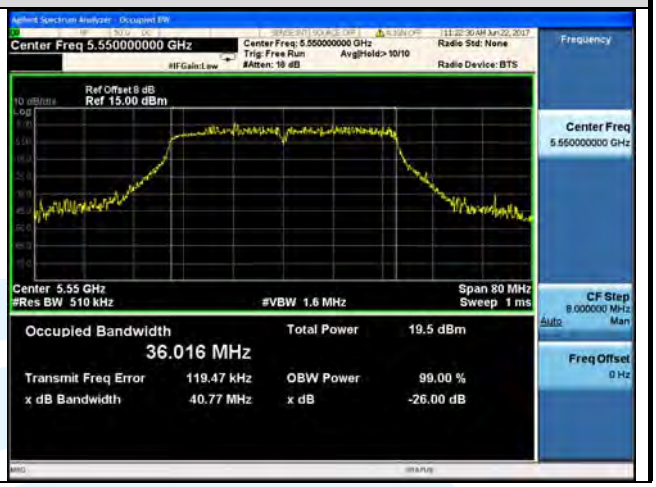
Channel 140

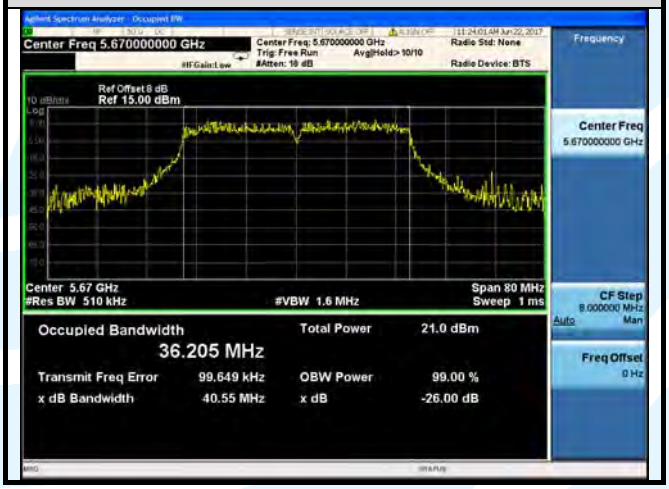

IEEE 802.11n-HT20	
Channel 36	Channel 44
	

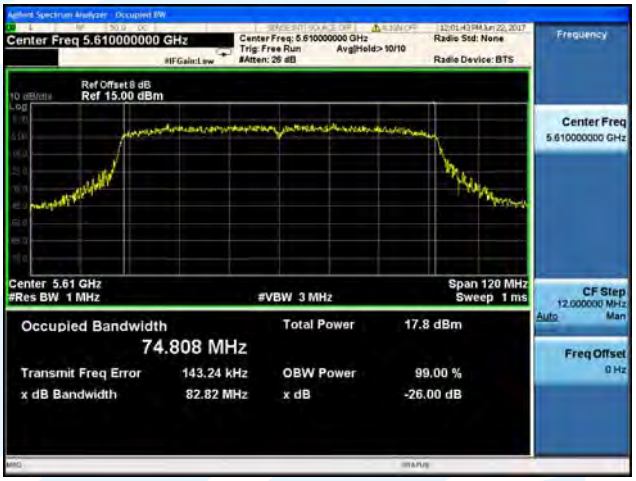
Channel 48	Channel 52
	
Channel 60	**Channel 64**
	
Channel 100	**Channel 116**
	

Channel 140


IEEE 802.11n-HT40	
Channel 38	Channel 46
	
Channel 54	Channel 62
	

Channel 102	Channel 110
	

Channel 134


IEEE 802.11ac-VHT80	
Channel 42	Channel 58
	
Channel 106	
	

5.46 DB BANDWIDTH

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.407 (e)

Test Method: KDB 789033 D02 v01r04Section C.2

Limit: Within the 5.725-5.85 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

Test Procedure:

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyzer according to the following Settings:
a) Set RBW = 100 kHz.
b) Set the video bandwidth (VBW) ≥ 3 * RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Sweep = auto couple.
f) Allow the trace to stabilize.
g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

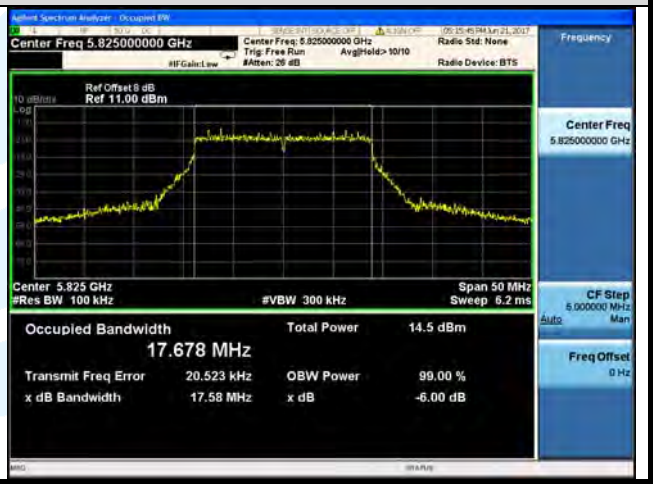
Test Mode: Transmitter mode

Test Results: Pass

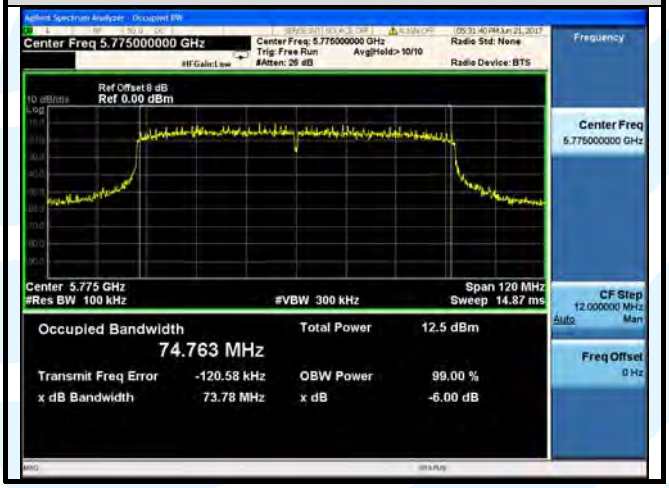
Test Data:

Mode	Channel/ Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	6 dB Bandwidth Limit	Pass / Fail
IEEE 802.11a	149 (5745)	16.41	16.504	> 500 kHz	Pass
	157 (5785)	17.60	17.686	> 500 kHz	Pass
	165 (5825)	16.45	16.509	> 500 kHz	Pass
IEEE 802.11n-HT20	149 (5745)	17.61	17.694	> 500 kHz	Pass
	157 (5785)	16.40	16.484	> 500 kHz	Pass
	165 (5825)	17.58	17.678	> 500 kHz	Pass
IEEE 802.11n-HT40	151 (5755)	35.17	35.934	> 500 kHz	Pass
	159 (5795)	35.56	35.944	> 500 kHz	Pass
IEEE 802.11ac-VHT80	155 (5775)	73.78	74.763	> 500 kHz	Pass

The test plot as follows:

IEEE 802.11a	IEEE 802.11n-HT20
Channel 149	
	
Channel 157	
	
Channel 165	
	

IEEE 802.11n-HT40	
Channel 151	Channel 159
	

IEEE 802.11ac-VHT80
Channel 155


5.5 MAXIMUM CONDUCTED OUTPUT POWER

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)

Test Method: KDB 789033 D02 v01r04 Section E.3.a(Method PM)

Limits:

1. For the band 5.15-5.25 GHz.
   (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

   (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

   (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

   (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure:

1. Connected the EUT's antenna port to measure device by 10dB attenuator.
2. Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of Tx on burst.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

Antenna gain and the maximum output power limit.

Frequency Band	Antenna Gain (dBi))	Peak Power Limits (dBm)
U-NII-1	2.80	24.00
U-NII-2A	4.00	24.00
U-NII-2C	3.20	24.00
U-NII-3	3.90	30.00

For U-NII-1 Band:

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
		Meas Power	Corr'd Power		
IEEE 802.11a	36 (5180)	11.95	12.70	24	Pass
	44 (5220)	11.69	12.44	24	Pass
	48 (5240)	11.92	12.67	24	Pass
IEEE 802.11n-HT20	36 (5180)	10.67	11.46	24	Pass
	44 (5220)	10.72	11.51	24	Pass
	48 (5240)	10.88	11.67	24	Pass
IEEE 802.11n-HT40	38 (5190)	10.03	11.51	24	Pass
	46 (5230)	9.96	11.44	24	Pass
IEEE 802.11ac-VHT80	42 (5210)	8.11	10.67	24	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor

For U-NII-2A Band:

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
		Meas Power	Corr'd Power		
IEEE 802.11a	52 (5260)	12.02	12.77	24	Pass
	60 (5300)	11.82	12.57	24	Pass
	64 (5320)	11.89	12.64	24	Pass
IEEE 802.11n-HT20	52 (5260)	10.81	11.60	24	Pass
	60 (5300)	10.83	11.62	24	Pass
	64 (5320)	10.95	11.74	24	Pass
IEEE 802.11n-HT40	54 (5270)	10.05	11.53	24	Pass
	62 (5310)	10.07	11.55	24	Pass
IEEE 802.11ac-VHT80	58 (5290)	8.16	10.72	24	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor
2. The max conducted output power limit is 24dBm (250mW) or 11dBm+10logB, whichever is lower (B=26-Db emission BW)

   For IEEE 802.11a/an/ac, the minimum 26dB emission bandwidth is 21.5 MHz

   11 dBm + $10\log_{10}(16.946)$ = 24.3 dBm > 24 dBm (250mW), So the power limit is 24dBm.

For U-NII-2C Band:

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
		Meas Power	Corr'd Power		
IEEE 802.11a	100 (5500)	12.44	13.19	24	Pass
	116 (5580)	12.34	13.09	24	Pass
	140 (5700)	12.12	12.87	24	Pass
IEEE 802.11n-HT20	100 (5500)	11.52	12.31	24	Pass
	116 (5580)	11.55	12.34	24	Pass
	140 (5700)	11.48	12.27	24	Pass
IEEE 802.11n-HT40	102 (5510)	10.08	11.56	24	Pass
	134 (5670)	10.62	12.10	24	Pass
IEEE 802.11ac-VHT80	106 (5530)	10.48	13.04	24	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor
2. The max conducted output power limit is 24dBm (250mW) or 11dBm+10logB, whichever is lower (B=26-Db emission BW)

   For IEEE 802.11a/an/ac, the minimum 26dB emission bandwidth is 21.18 MHz

   11 dBm + $10\log_{10}(16.946)$ = 24.3 dBm > 24 dBm (250mW), So the power limit is 24dBm.

For U-NII-3 Band:

Mode	Channel/ Frequency (MHz)	Maximum conducted output power (dBm)		Limit (dBm)	Pass / Fail
		Meas Power	Corr'd Power		
IEEE 802.11a	149 (5745)	9.48	10.23	30	Pass
	157 (5785)	9.39	10.14	30	Pass
	165 (5825)	9.32	10.07	30	Pass
IEEE 802.11n-HT20	149 (5745)	9.45	10.24	30	Pass
	157 (5785)	9.35	10.14	30	Pass
	165 (5825)	9.29	10.08	30	Pass
IEEE 802.11n-HT40	151 (5755)	9.35	10.83	30	Pass
	159 (5795)	9.31	10.79	30	Pass
IEEE 802.11ac-VHT80	155 (5775)	9.13	11.69	30	Pass

Remark:

1. Corr'd Power = Meas Power + Duty Cycle Factor

5.6 PEAK POWER SPECTRAL DENSITY

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (a)(1)(2)(3)

Test Method: KDB 789033 D02 v01r04 Section F

Limits:

1. For the band 5.15-5.25 GHz.
   (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

   (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

   (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

   (iv) For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
3. For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

Test Procedure:
The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyzer according to the following Settings:
1. For U-NII-1, U-NII-2A, U-NII-2C band:
Using method SA-2
a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
b) Set RBW = 1 MHz, Set VBW ≥ 3 RBW, Detector = RMS
c) Sweep time = auto, trigger set to “free run”.
d) Trace average at least 100 traces in power averaging mode.
e) Record the max value and add 10 log (1/duty cycle)
2. For U-NII-3 band:
a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
b) Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS
c) Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
d) Sweep time = auto, trigger set to “free run”.
e) Trace average at least 100 traces in power averaging mode.
f) Record the max value and add 10 log (1/duty cycle)

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.
Test Setup: Refer to section 4.5.3 for details.
Instruments Used: Refer to section 3 for details
Test Mode: Transmitter mode
Test Results: Pass
Test Data:

Antenna gain and the maximum output power limit.

Frequency Band	Antenna Gain (dBi))	PSD Limits (dBm/MHz or dBm/500kHz)
U-NII-1	2.80	11.00
U-NII-2A	4.00	11.00
U-NII-2C	3.20	11.00
U-NII-3	3.90	30.00

For U-NII-1 Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Limit (dBm/MHz)	Pass / Fail
		Meas PSD	Corr’d PSD		
IEEE 802.11a	36 (5180)	0.802	1.552	11	Pass
	44 (5220)	1.372	2.122	11	Pass
	48 (5240)	1.476	2.226	11	Pass
IEEE 802.11n-HT20	36 (5180)	0.604	1.394	11	Pass
	44 (5220)	1.109	1.899	11	Pass
	48 (5240)	0.081	0.871	11	Pass
IEEE 802.11n-HT40	38 (5190)	-3.14	-1.660	11	Pass
	46 (5230)	-3.40	-1.920	11	Pass
IEEE 802.11ac-VHT80	42 (5210)	-7.968	-5.408	11	Pass

Remark:
1. Corr’d PSD = Meas PSD + Duty Cycle Factor

For U-NII-2A Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Limit (dBm/MHz)	Pass / Fail
		Meas PSD	Meas PSD		
IEEE 802.11a	52 (5260)	1.546	2.296	11	Pass
	60 (5300)	0.748	1.498	11	Pass
	64 (5320)	0.762	1.512	11	Pass
IEEE 802.11n-HT20	52 (5260)	0.305	1.095	11	Pass
	60 (5300)	-0.292	0.498	11	Pass
	64 (5320)	-0.229	0.561	11	Pass
IEEE 802.11n-HT40	54 (5270)	-3.442	-1.962	11	Pass
	62 (5310)	-3.336	-1.856	11	Pass
IEEE 802.11ac-VHT80	58 (5290)	-8.006	-5.446	11	Pass

Remark:

1. Corr'd PSD = Meas PSD + Duty Cycle Factor

For U-NII-2C Band:

Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/MHz)		Limit (dBm/MHz)	Pass / Fail
		Meas PSD	Meas PSD		
IEEE 802.11a	100 (5500)	-0.089	0.661	11	Pass
	116 (5580)	-4.067	-3.317	11	Pass
	140 (5700)	1.582	2.332	11	Pass
IEEE 802.11n-HT20	100 (5500)	-1.894	-1.104	11	Pass
	116 (5580)	-1.381	-0.591	11	Pass
	140 (5700)	-1.787	-0.997	11	Pass
IEEE 802.11n-HT40	102 (5510)	-4.255	-2.775	11	Pass
	134 (5670)	-2.954	-1.474	11	Pass
IEEE 802.11ac-VHT80	106 (5530)	-8.683	-6.123	11	Pass

Remark:

1. Corr'd PSD = Meas PSD + Duty Cycle Factor

For U-NII-3 Band:

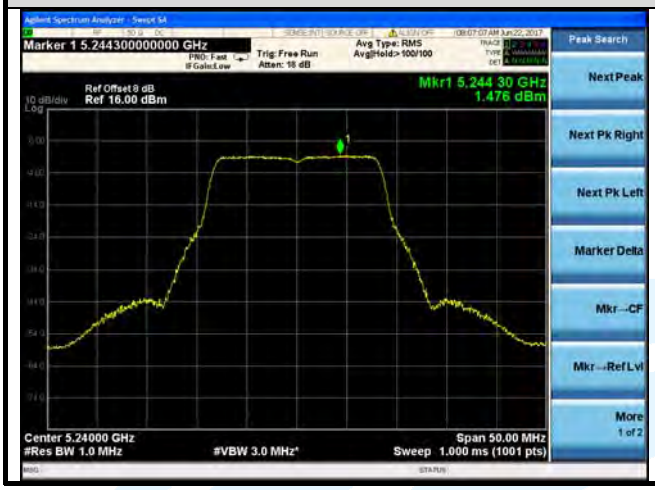
Mode	Channel/ Frequency (MHz)	Power spectral density (dBm/500KHz)		Limit (dBm/500KHz)	Pass / Fail
		Meas PSD	Meas PSD		
IEEE 802.11a	149 (5745)	-0.717	0.033	30	Pass
	157 (5785)	-0.321	0.429	30	Pass
	165 (5825)	-0.871	-0.121	30	Pass
IEEE 802.11n-HT20	149 (5745)	-1.894	-1.104	30	Pass
	157 (5785)	-1.381	-0.591	30	Pass
	165 (5825)	-1.787	-0.997	30	Pass
IEEE 802.11n-HT40	151 (5755)	-5.265	-3.785	30	Pass
	159 (5795)	-5.132	-3.652	30	Pass
IEEE 802.11ac-VHT80	155 (5775)	-8.460	-5.900	30	Pass

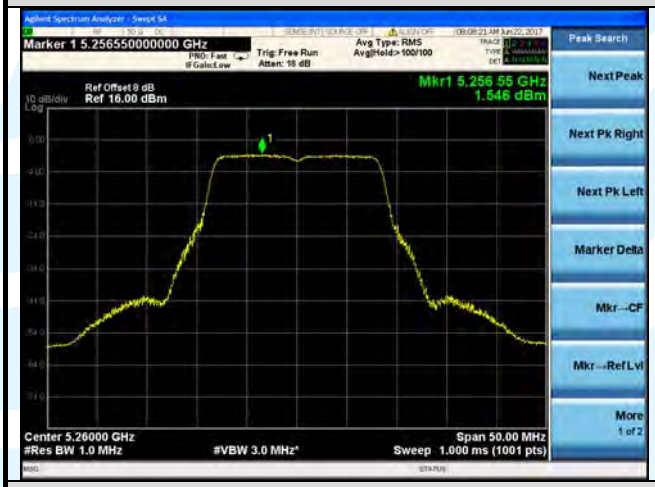
Remark:

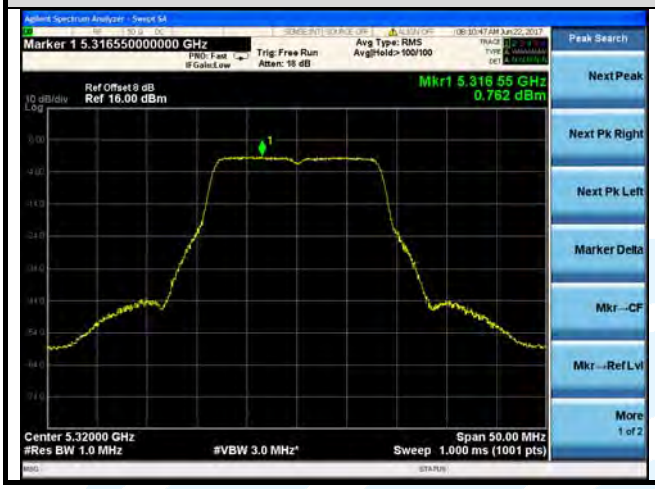
1. Corr'd PSD = Meas PSD + Duty Cycle Factor

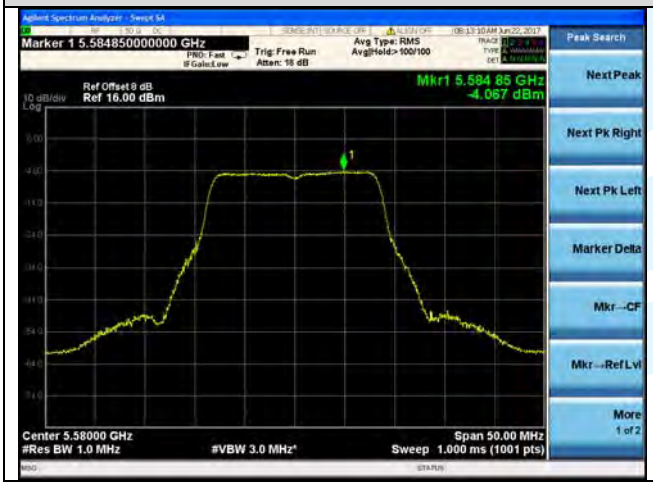
The test plot as follows:

IEEE 802.11a	IEEE 802.11n-HT20
Channel 36	
	
Channel 44	
	

Channel 48	
	

IEEE 802.11a	IEEE 802.11n-HT20
Channel 52	
	
Channel 60	
	

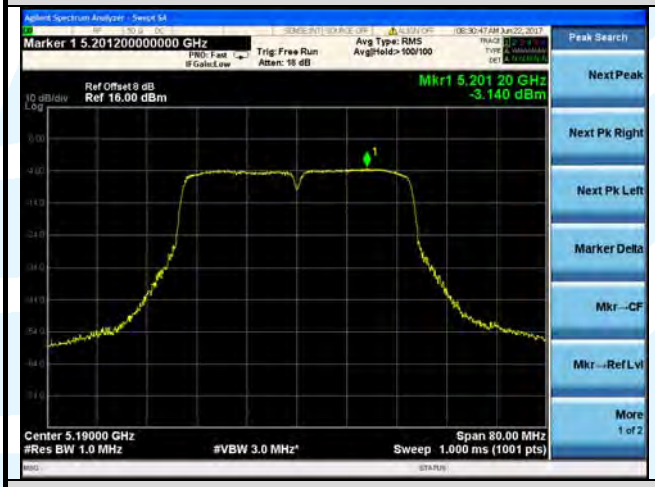
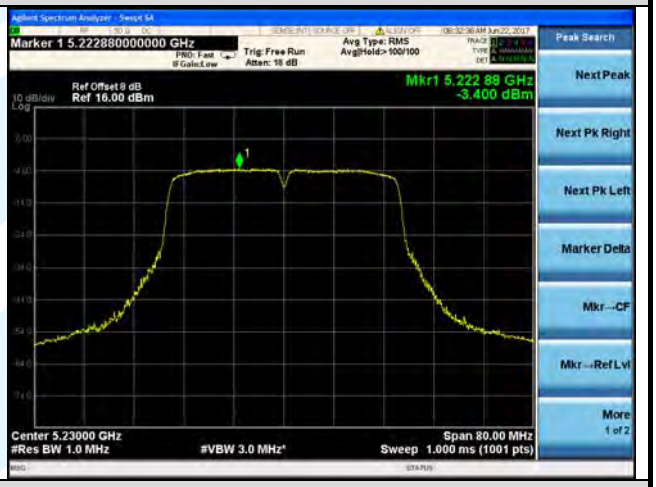
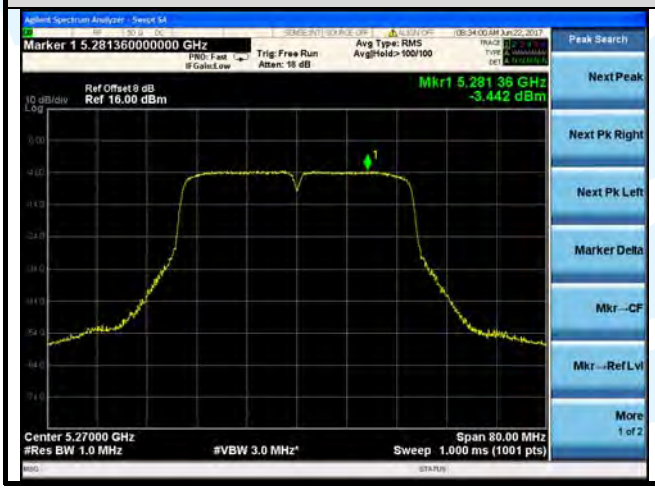
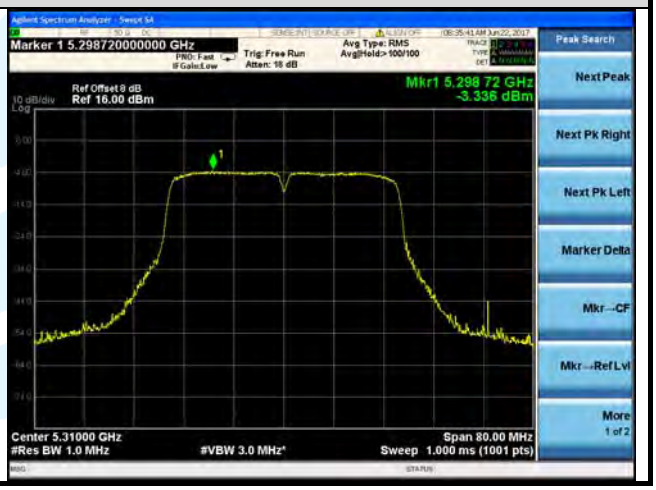
Channel 64	
	

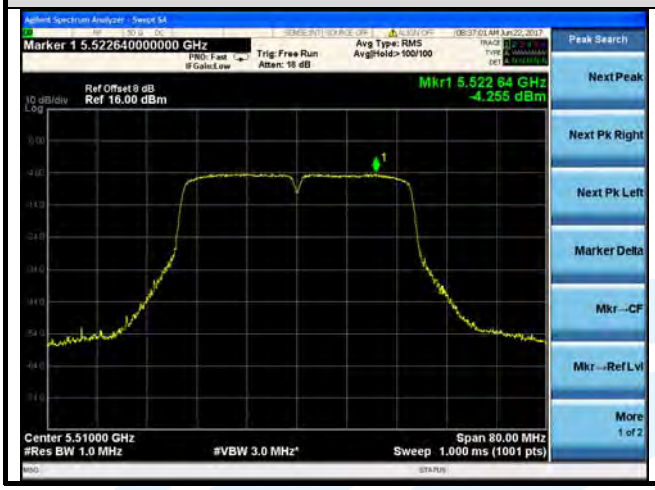
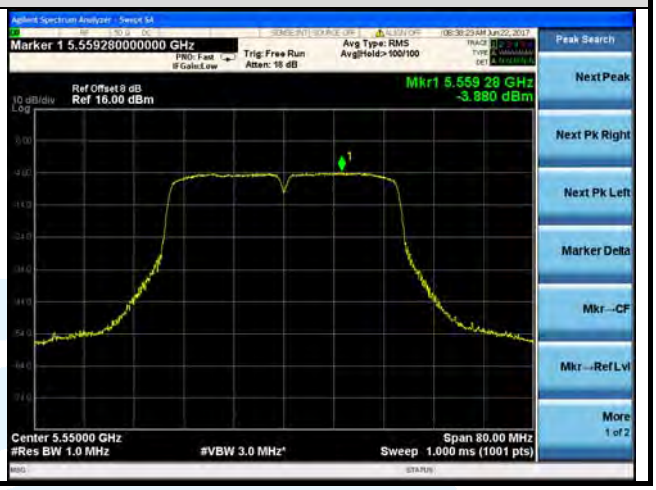
IEEE 802.11a	IEEE 802.11n-HT20
Channel 100	
	
Channel 116	
	

Channel 140	
	

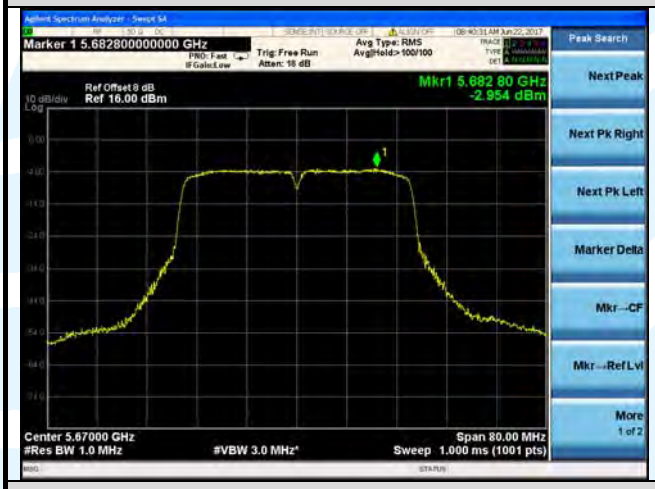
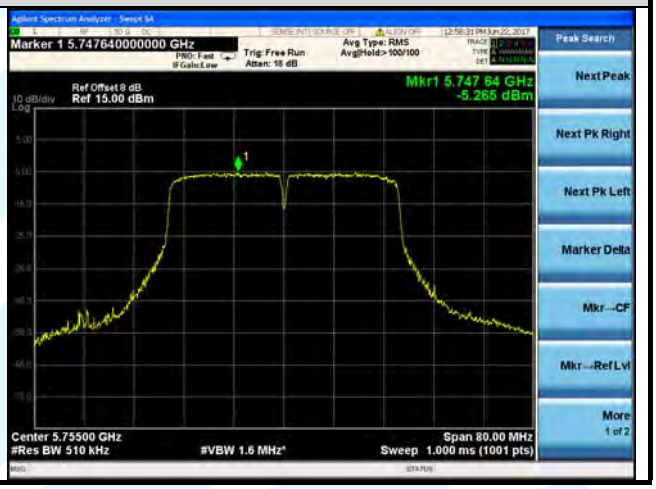
IEEE 802.11a	IEEE 802.11n-HT20
Channel 149	
	
Channel 157	
	

Channel 165
 

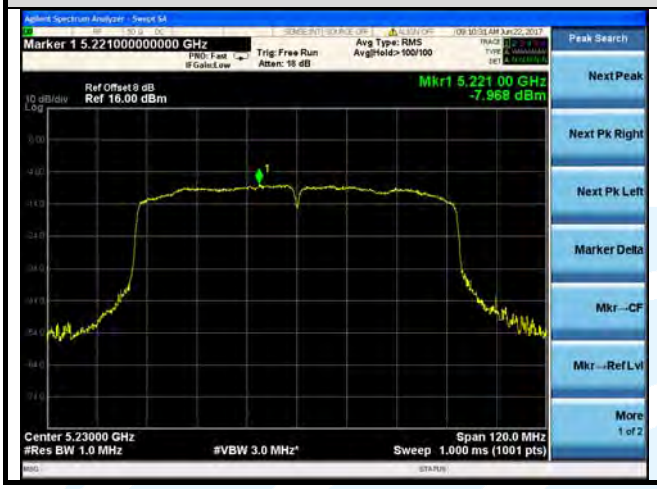
IEEE 802.11n-HT40	
Channel 38	**Channel 46**
	
Channel 54	**Channel 62**
	

Channel 102	Channel 110
	

IEEE 802.11n-HT40

Channel 134	Channel 151
	

Channel 159


IEEE 802.11ac-VHT80	
Channel 42	Channel 58
	

IEEE 802.11ac-VHT80	
Channel 106	Channel 122
	
Channel 155	
	

5.7 FREQUENCY STABILITY

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (g)

Test Method: ANSI C63.10-2013

Limit: The frequency of the carrier signal shall be maintained within band of operation.

Test Procedure:

a) To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.

b) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.

c) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

EUT Operation Condition:

☑ Keep the EUT transmit at un-modulation mode to frequency stability

☐ Keep the EUT in transmitting mode with all kind of modulation and all kind of data rate.

Test Setup: Refer to section 4.5.3 for details.

Instruments Used: Refer to section 3 for details

Test Mode: Transmitter mode

Test Results: Pass

Test Data:

Frequency Stability Versus Temp.			
Operation Frequency: 5320 MHz			
Temp. (°C)	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
50	VN	5319.986	-2.631579
40		5319.986	-2.631579
30		5319.988	-2.255639
20		5319.988	-2.255639
10		5319.988	-2.255639
0		5319.987	-2.443609
-10		5319.984	-3.007519
-20		5319.976	-4.511278

Operation Frequency: 5320 MHz			
Temp.	Voltage	Measured Frequency (MHz)	Frequency Drift (ppm)
TN	VL	5319.985000	-2.819549
	VN	5319.988000	-2.255639
	VH	5319.987000	-2.443609

5.8 RADIATED EMISSIONS AND BAND EDGE MEASUREMENT

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (b)(1)(2)(3)(4)(6)
FCC 47 CFR Part 15 Subpart C Section 15.209/205

Test Method: KDB 789033 D02 v01r04 Section G.3, G.4, G.5, and G.6

Receiver Setup:

Frequency	Detector	RBW	VBW	Remark
0.009 MHz-0.090 MHz	Peak	10 kHz	30 KHz	Peak
0.009 MHz-0.090 MHz	Average	10 kHz	30 KHz	Average
0.090 MHz-0.110 MHz	Quasi-peak	10 kHz	30 KHz	Quasi-peak
0.110 MHz-0.490 MHz	Peak	10 kHz	30 KHz	Peak
0.110 MHz-0.490 MHz	Average	10 kHz	30 KHz	Average
0.490 MHz -30 MHz	Quasi-peak	10 kHz	30 kHz	Quasi-peak
30 MHz-1 GHz	Quasi-peak	100 kHz	300 KHz	Quasi-peak
Above 1 GHz	Peak	1 MHz	3 MHz	Peak
	Peak	1 MHz	10 Hz	Average

Limits:

1. Limits of Radiated Emission and Band edge Measurement

Radiated emissions that fall in the restricted bands must comply with the general emissions limits in 15.209(a) as below table. Other emissions shall be at least 20 dB below the highest level of the desired power.

Frequency	Field strength (microvolt/meter)	Limit (dBμV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)	--	--	300
0.490 MHz-1.705 MHz	24000/F(kHz)	--	--	30
1.705 MHz-30 MHz	30	--	--	30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

Remark:

a. The lower limit shall apply at the transition frequencies.
b. Emission level (dBuV/m) = 20 log Emission level (uV/m).
c. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

2. Limits of Unwanted Emission Out of the Restricted Bands

Applicable To	Limit	
789033 D02 General U-NII Test Procedures New Rules v01r04	Field Strength at 3 m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
FCC 47 CFR Part 15 Subpart E Section 6.2.1.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.2.2	PK: -27 (dBm/MHz)	PK: 74 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.3.2	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
FCC 47 CFR Part 15 Subpart E Section 6.2.4.2	27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges;	PK: 68.2 (dBμV/m)
	15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;	
	10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges;	
	-27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.	

Test Setup: Refer to section 4.5.1 for details.

Test Procedures:

1. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. 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 height of antenna 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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
6. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Remark:

a) The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
b) The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
c) The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
d) The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) or ≥ 1/T(duty cycle is < 98%) for Average detection (AV) at frequency above 1 GHz.
e) All modes of operation were investigated and the worst-case emissions are reported.

Equipment Used: Refer to section 3 for details.

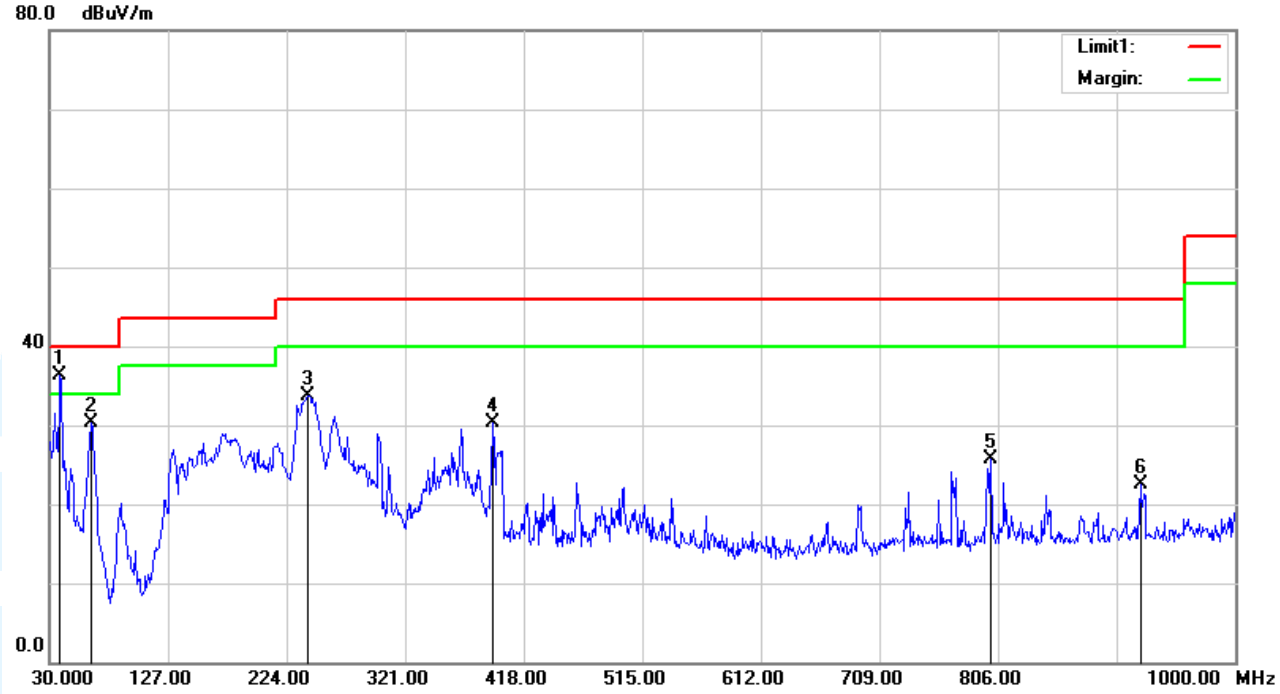
Test Result: Pass

The measurement data as follows:

Radiated Emission Test Data (9 KHz ~ 30 MHz):
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

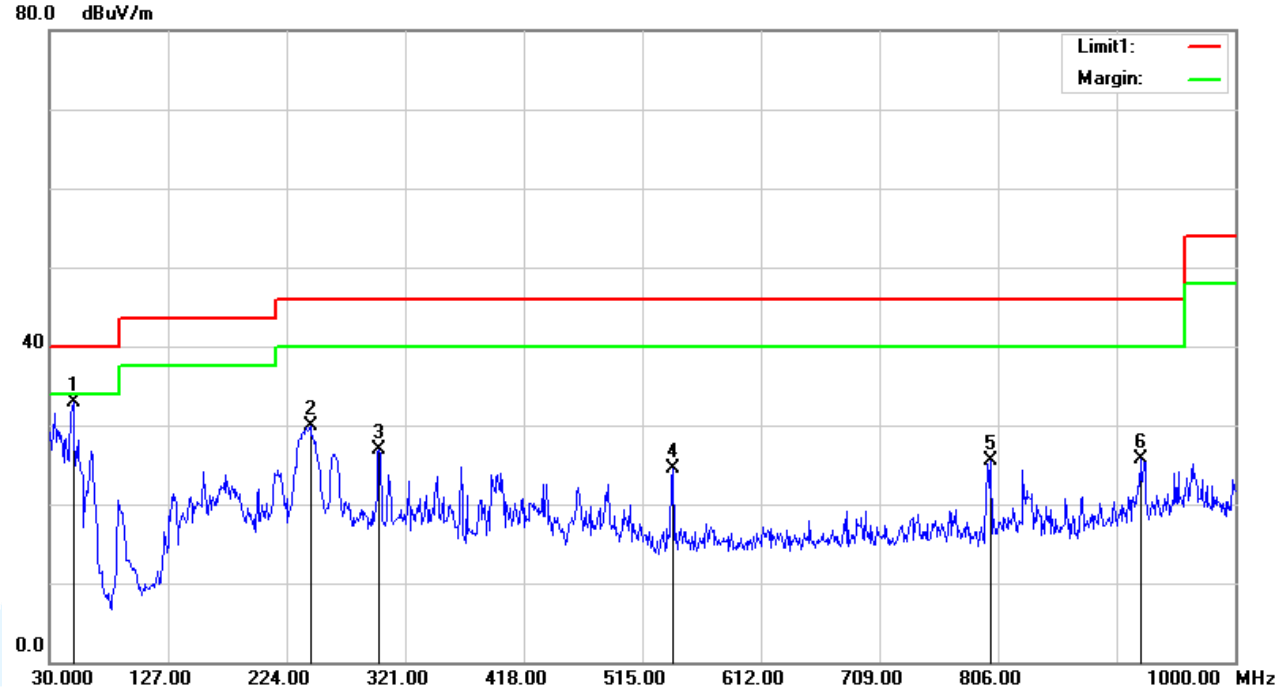
Radiated Emission Test Worst Data (30 MHz ~ 1 GHz Worst Case):
IEEE 802.11a_Channel 100

Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	38.7300	52.01	-15.79	36.22	40.00	-3.78	QP
2	63.9500	55.04	-24.65	30.39	40.00	-9.61	QP
3	241.4600	55.09	-21.44	33.65	46.00	-12.35	QP
4	392.7800	46.57	-16.34	30.23	46.00	-15.77	QP
5	800.1800	36.79	-11.11	25.68	46.00	-20.32	QP
6	922.4000	31.90	-9.42	22.48	46.00	-23.52	QP

Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	49.4000	53.76	-20.83	32.93	40.00	-7.07	QP
2	243.4000	51.34	-21.36	29.98	46.00	-16.02	QP
3	299.6600	46.50	-19.60	26.90	46.00	-19.10	QP
4	540.2200	37.86	-13.28	24.58	46.00	-21.42	QP
5	800.1800	36.52	-11.11	25.41	46.00	-20.59	QP
6	922.4000	35.13	-9.42	25.71	46.00	-20.29	QP

Radiated Emission Test Data (1GHz ~ 40GHz):						
IEEE 802.11a_Channel 36						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10360.00	43.75	74.00	-30.25	Peak	Horizontal
2	15540.00	53.79	74.00	-20.21	Peak	Horizontal
3	10360.00	42.34	74.00	-31.66	Peak	Vertical
4	15540.00	51.54	74.00	-22.46	Peak	Vertical

IEEE 802.11a_Channel 44						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10440.00	43.56	74.00	-30.44	Peak	Horizontal
2	15660.00	53.44	74.00	-20.56	Peak	Horizontal
3	10440.00	42.72	74.00	-31.28	Peak	Vertical
4	15660.00	52.08	74.00	-21.92	Peak	Vertical

IEEE 802.11a_Channel 48						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10480.00	44.23	74.00	-29.77	Peak	Horizontal
2	15720.00	53.85	74.00	-20.15	Peak	Horizontal
3	10480.00	42.67	74.00	-31.33	Peak	Vertical
4	15720.00	53.22	74.00	-20.78	Peak	Vertical

IEEE 802.11a_Channel 52						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10520.00	44.56	74.00	-29.44	Peak	Horizontal
2	15780.00	52.91	74.00	-21.09	Peak	Horizontal
3	10520.00	43.12	74.00	-30.88	Peak	Vertical
4	15780.00	53.02	74.00	-20.98	Peak	Vertical

IEEE 802.11a_Channel 60						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10600.00	44.67	74.00	-29.33	Peak	Horizontal
2	15900.00	53.27	74.00	-20.73	Peak	Horizontal
3	10600.00	44.22	74.00	-29.78	Peak	Vertical
4	15900.00	51.64	74.00	-22.36	Peak	Vertical

IEEE 802.11a_Channel 64						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10640.00	44.56	74.00	-29.44	Peak	Horizontal
2	15960.00	52.89	74.00	-21.11	Peak	Horizontal
3	10640.00	43.87	74.00	-30.13	Peak	Vertical
4	15960.00	53.52	74.00	-20.48	Peak	Vertical

IEEE 802.11a_Channel 100						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11000.00	45.32	74.00	-28.68	Peak	Horizontal
2	16500.00	53.78	74.00	-20.22	Peak	Horizontal
3	11000.00	43.67	74.00	-30.33	Peak	Vertical
4	16500.00	52.78	74.00	-21.22	Peak	Vertical

IEEE 802.11a_Channel 116						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11160.00	44.67	74.00	-29.33	Peak	Horizontal
2	16740.00	53.70	74.00	-20.30	Peak	Horizontal
3	11160.00	43.33	74.00	-30.67	Peak	Vertical
4	16740.00	52.86	74.00	-21.14	Peak	Vertical

IEEE 802.11a_Channel 140						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11400.00	44.51	74.00	-29.49	Peak	Horizontal
2	17100.00	53.69	74.00	-20.31	Peak	Horizontal
3	11400.00	43.67	74.00	-30.33	Peak	Vertical
4	17100.00	53.77	74.00	-20.23	Peak	Vertical

IEEE 802.11a_Channel 149						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11490.00	43.77	74.00	-30.23	Peak	Horizontal
2	17235.00	52.45	74.00	-21.55	Peak	Horizontal
3	11490.00	43.34	74.00	-30.66	Peak	Vertical
4	17235.00	53.12	74.00	-20.88	Peak	Vertical

IEEE 802.11a_Channel 157						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11570.00	44.54	74.00	-29.46	Peak	Horizontal
2	17355.00	53.27	74.00	-20.73	Peak	Horizontal
3	11570.00	43.46	74.00	-30.54	Peak	Vertical
4	17355.00	52.76	74.00	-21.24	Peak	Vertical

IEEE 802.11a_Channel 165						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11650.00	44.68	74.00	-29.32	Peak	Horizontal
2	17475.00	53.76	74.00	-20.24	Peak	Horizontal
3	11650.00	42.65	74.00	-31.35	Peak	Vertical
4	17475.00	53.55	74.00	-20.45	Peak	Vertical

IEEE 802.11n-HT40_Channel 38						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10380.00	44.32	74.00	-29.68	Peak	Horizontal
2	15570.00	53.65	74.00	-20.35	Peak	Horizontal
3	10380.00	43.12	74.00	-30.88	Peak	Vertical
4	15570.00	53.07	74.00	-20.93	Peak	Vertical

IEEE 802.11n-HT40_Channel 46						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10460.00	44.76	74.00	-29.24	Peak	Horizontal
2	15690.00	53.88	74.00	-20.12	Peak	Horizontal
3	10460.00	43.69	74.00	-30.31	Peak	Vertical
4	15690.00	52.66	74.00	-21.34	Peak	Vertical

IEEE 802.11n-HT40_Channel 54						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10540.00	44.46	74.00	-29.54	Peak	Horizontal
2	15810.00	53.54	74.00	-20.46	Peak	Horizontal
3	10540.00	43.87	74.00	-30.13	Peak	Vertical
4	15810.00	53.78	74.00	-20.22	Peak	Vertical

IEEE 802.11n-HT40_Channel 62						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10620.00	44.68	74.00	-29.32	Peak	Horizontal
2	15930.00	53.54	74.00	-20.46	Peak	Horizontal
3	10620.00	43.55	74.00	-30.45	Peak	Vertical
4	15930.00	52.78	74.00	-21.22	Peak	Vertical

IEEE 802.11n-HT40_Channel 102						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11020.00	43.89	74.00	-30.11	Peak	Horizontal
2	16530.00	53.78	74.00	-20.22	Peak	Horizontal
3	11020.00	44.12	74.00	-29.88	Peak	Vertical
4	16530.00	53.65	74.00	-20.35	Peak	Vertical

IEEE 802.11n-HT40_Channel 110						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11100.00	44.54	74.00	-29.46	Peak	Horizontal
2	16650.00	55.34	74.00	-18.66	Peak	Horizontal
3	11100.00	43.21	74.00	-30.79	Peak	Vertical
4	16650.00	53.87	74.00	-20.13	Peak	Vertical

IEEE 802.11n-HT40_Channel 134						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11340.00	43.32	74.00	-30.68	Peak	Horizontal
2	17010.00	53.87	74.00	-20.13	Peak	Horizontal
3	11340.00	42.89	74.00	-31.11	Peak	Vertical
4	17010.00	53.44	74.00	-20.56	Peak	Vertical

IEEE 802.11n-HT40_Channel 151						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11510.00	44.54	74.00	-29.46	Peak	Horizontal
2	17265.00	53.67	74.00	-20.33	Peak	Horizontal
3	11510.00	42.89	74.00	-31.11	Peak	Vertical
4	17625.00	53.24	74.00	-20.76	Peak	Vertical

IEEE 802.11n-HT40_Channel 159						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11590.00	44.65	74.00	-29.35	Peak	Horizontal
2	17385.00	53.45	74.00	-20.55	Peak	Horizontal
3	11590.00	43.43	74.00	-30.57	Peak	Vertical
4	17385.00	53.42	74.00	-20.58	Peak	Vertical

IEEE 802.11ac-VHT80_Channel 42						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10460.00	45.32	74.00	-28.68	Peak	Horizontal
2	15690.00	43.54	74.00	-30.46	Peak	Horizontal
3	10460.00	44.23	74.00	-29.77	Peak	Vertical
4	15690.00	44.67	74.00	-29.33	Peak	Vertical

IEEE 802.11ac-VHT80_Channel 58						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	10580.00	44.66	74.00	-29.34	Peak	Horizontal
2	15870.00	53.78	74.00	-20.22	Peak	Horizontal
3	10580.00	43.21	74.00	-30.79	Peak	Vertical
4	15870.00	52.84	74.00	-21.16	Peak	Vertical

IEEE 802.11ac-VHT80_Channel 106						
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11060.00	44.34	74.00	-29.66	Peak	Horizontal
2	16590.00	53.89	74.00	-20.11	Peak	Horizontal
3	11060.00	42.87	74.00	-31.13	Peak	Vertical
4	16590.00	52.29	74.00	-21.71	Peak	Vertical

IEEE 802.11ac-VHT80_Channel 122

No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11220.00	45.32	74.00	-28.68	Peak	Horizontal
2	16830.00	52.45	74.00	-21.55	Peak	Horizontal
3	11220.00	44.33	74.00	-29.67	Peak	Vertical
4	16830.00	53.06	74.00	-20.94	Peak	Vertical

IEEE 802.11ac-VHT80_Channel 155

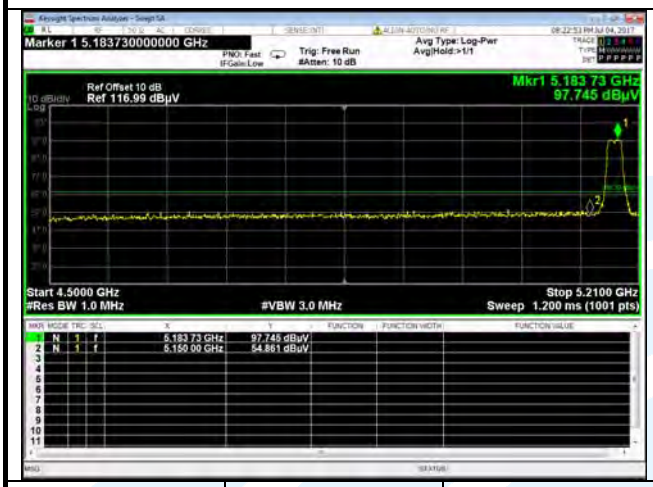
No.	Frequency (MHz)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Polaxis	Remark
1	11550.00	45.22	74.00	-28.78	Peak	Horizontal
2	17325.00	52.84	74.00	-21.16	Peak	Horizontal
3	11550.00	44.43	74.00	-29.57	Peak	Vertical
4	17325.00	53.66	74.00	-20.34	Peak	Vertical

Remark: The peak measured value does not exceed the Average limit, so the Average does not measured.

Band Edge Measurements (Radiated)

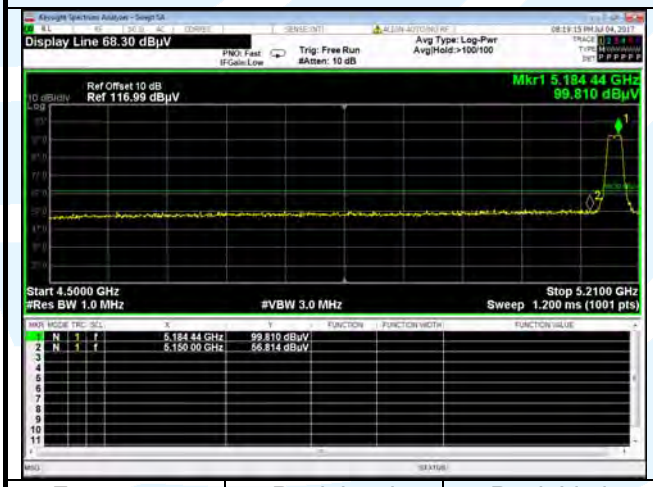
IEEE 802.11a

Test Channel:	36	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	



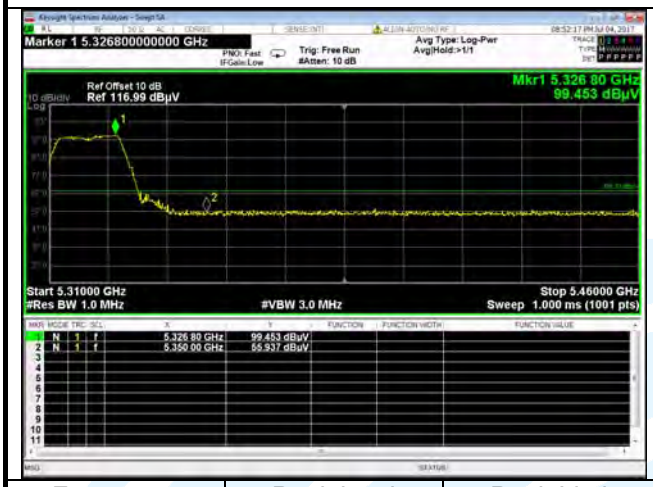
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	54.861	74	45.225	54	Pass

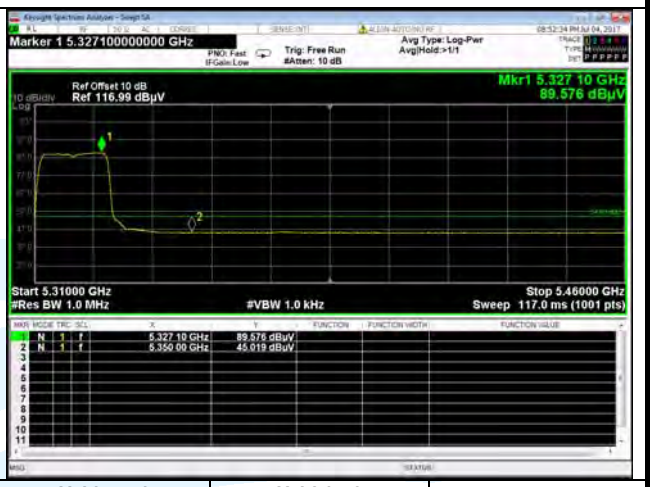
Test Channel:	36	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	56.814	74	45.466	54	Pass

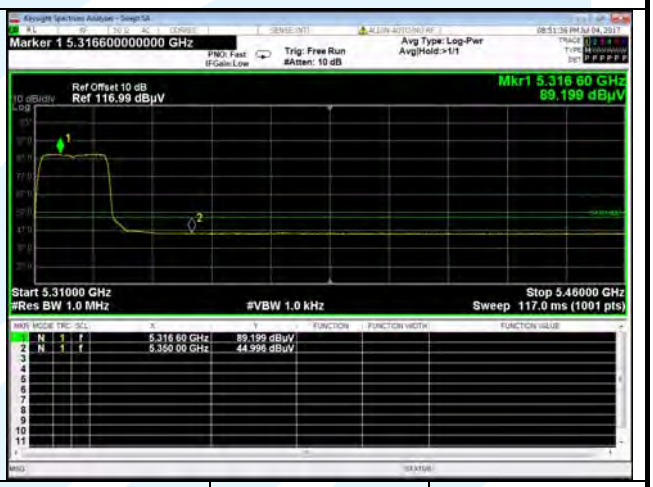
Test Channel:	64	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	





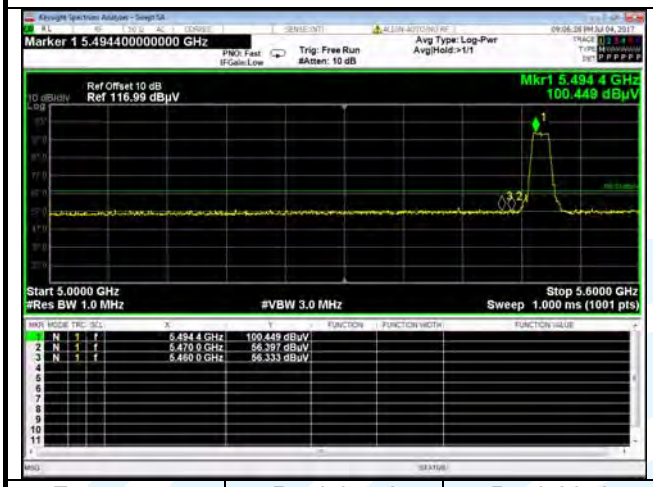
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	55.937	74	45.019	54	Pass

Test Channel:	64	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	



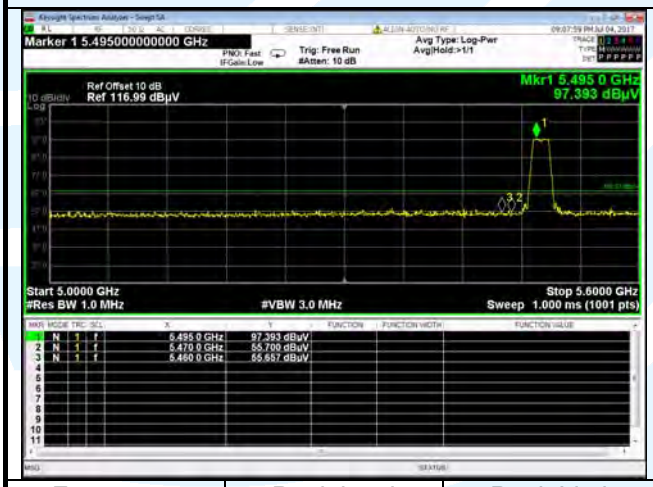
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	56.196	74	44.996	54	Pass

Test Channel:	100	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	



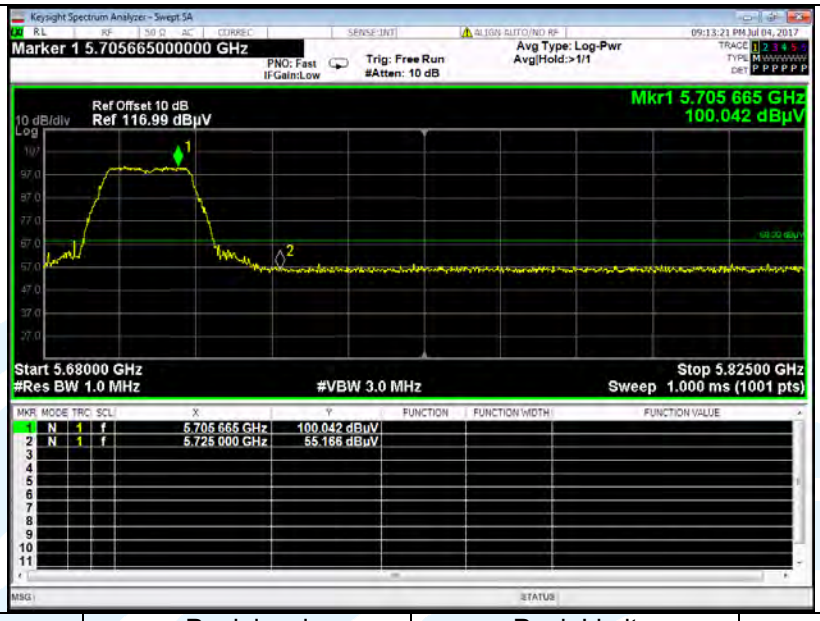
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5470.00	56.397	68.3	45.384	/	Pass
5460.00	56.333	74	45.331	54	Pass

Test Channel:	100	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	



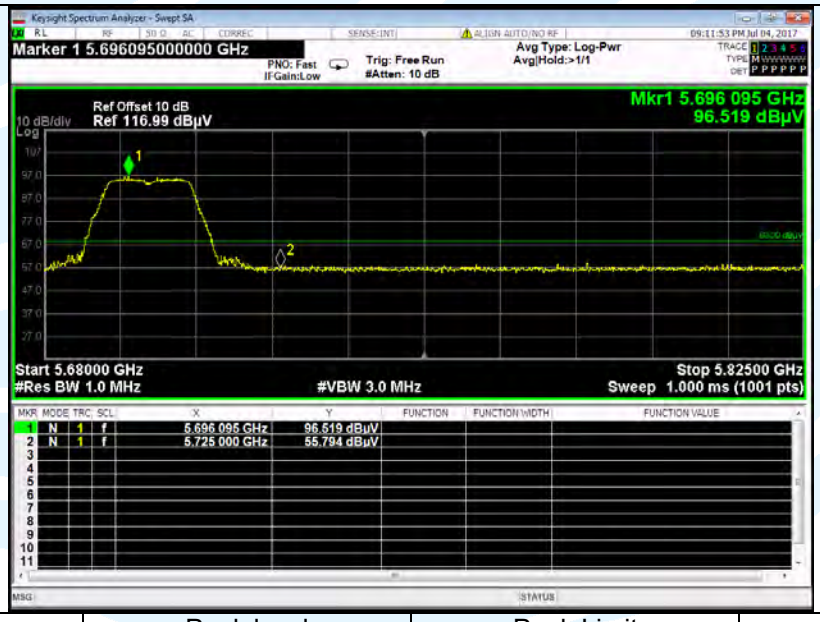
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5470.00	55.700	68.3	45.121	/	Pass
5460.00	55.657	74	45.251	54	Pass

Test Channel:	140	Ant. Polar. :	Horizontal
Detector: Peak			



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Conclusion
5725.00	55.166	68.3	Pass

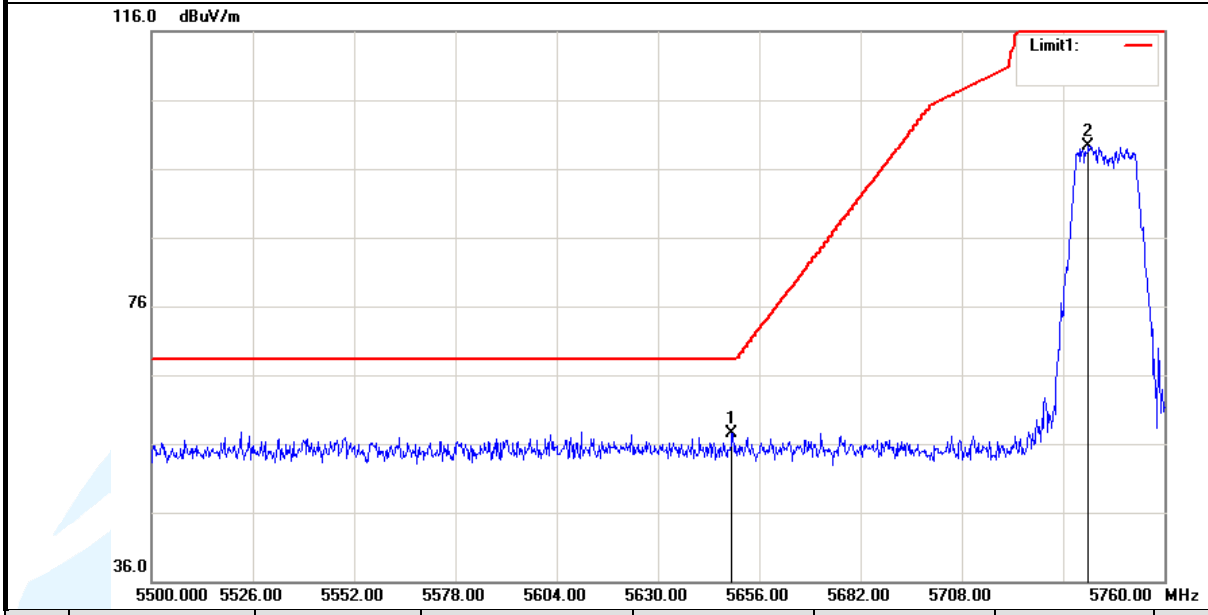
Test Channel:	140	Ant. Polar. :	Vertical
Detector: Peak			



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Conclusion
5725.00	55.794	68.3	Pass

Test Channel:	149	Ant. Polar. :	Horizontal

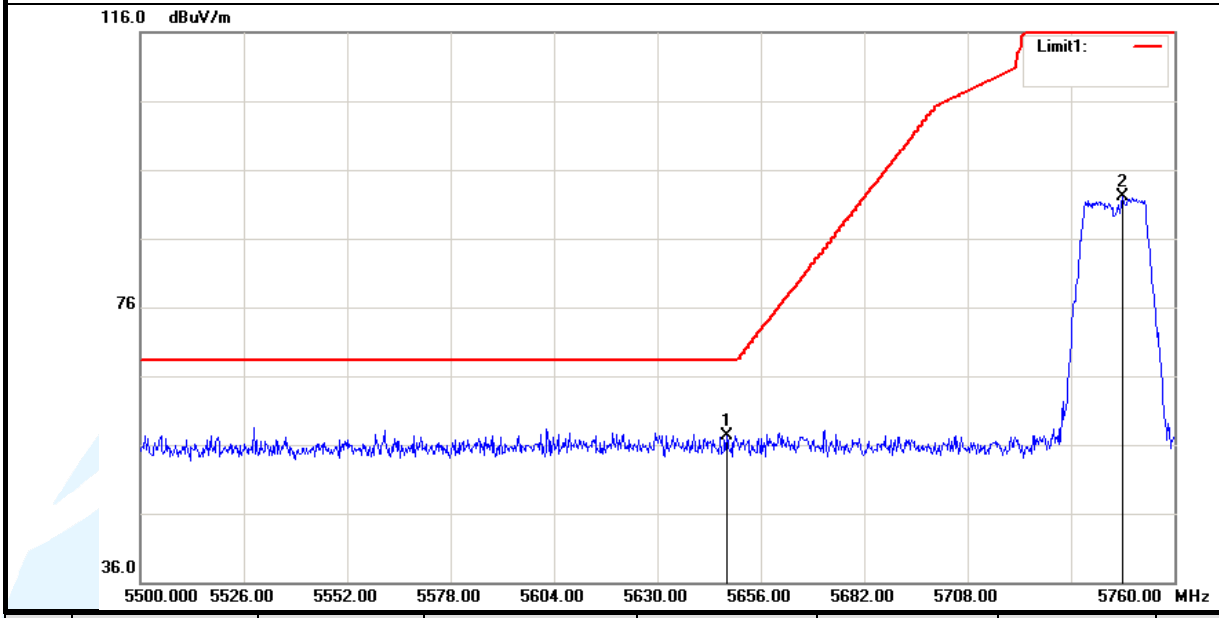
Detector: Peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1*	5648.980	51.52	5.93	57.45	68.20	-10.75	peak
2	5740.500	93.27	5.97	99.24	122.20	-22.96	peak

Test Channel:	149	Ant. Polar. :	Vertical

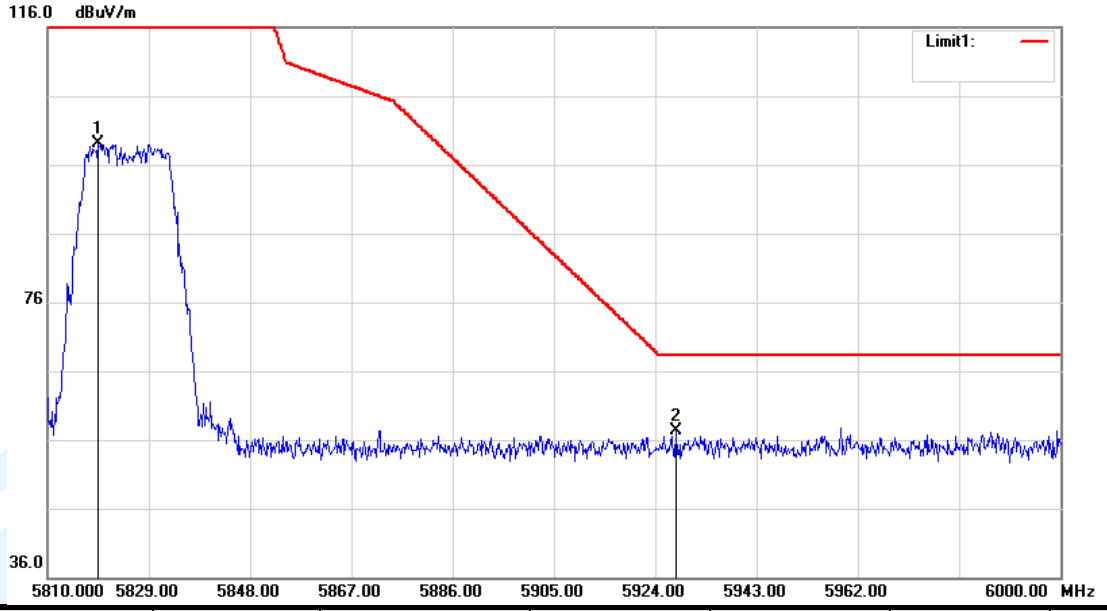
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	5647.420	51.43	5.93	57.36	68.20	-10.84	peak
2	5747.000	86.17	5.97	92.14	122.20	-30.06	peak

Test Channel:	165	Ant. Polar. :	Horizontal

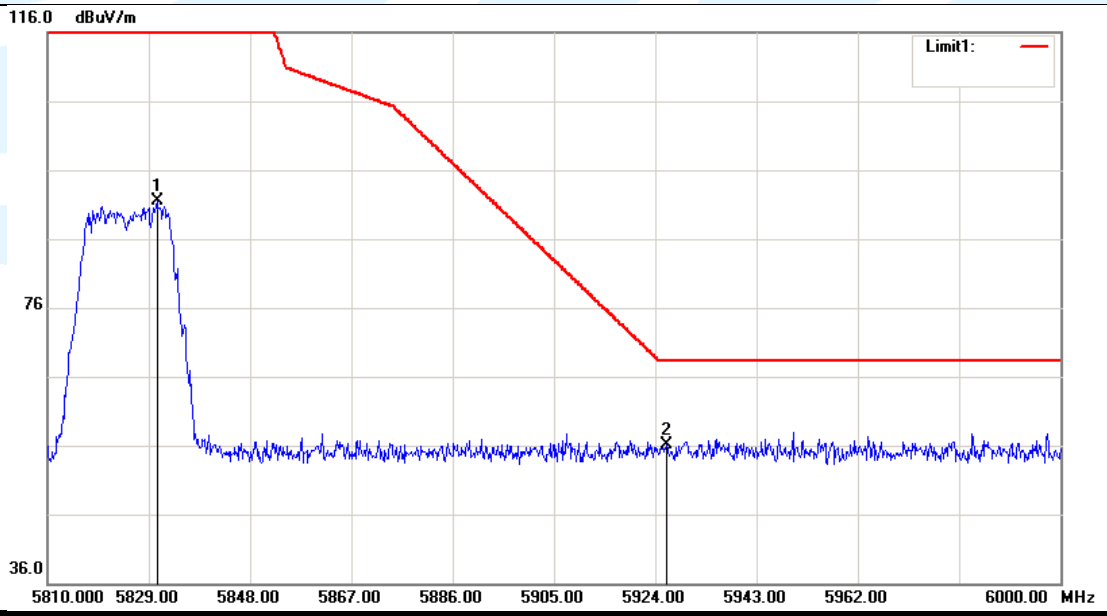
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5819.500	93.12	6.00	99.12	122.20	-23.08	peak
2*	5927.800	51.22	6.05	57.27	68.20	-10.93	peak

Test Channel:	165	Ant. Polar. :	Vertical

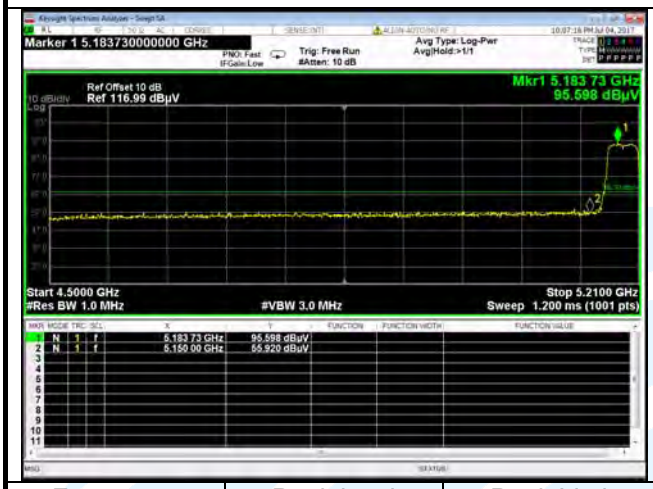
Detector: Peak

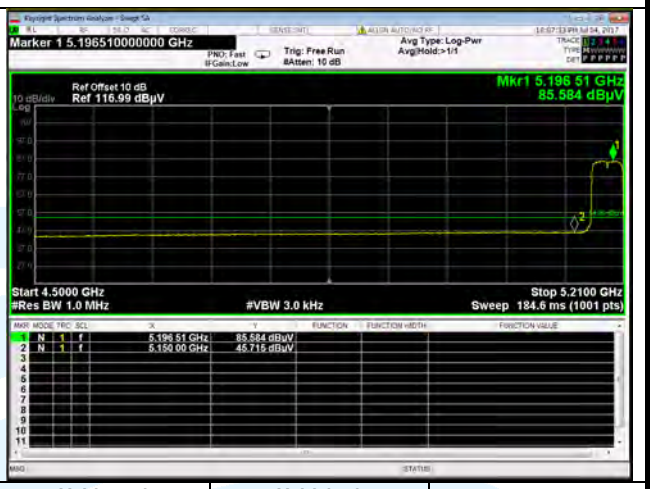


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5830.520	85.42	6.01	91.43	122.20	-30.77	peak
2*	5926.090	49.97	6.05	56.02	68.20	-12.18	peak

IEEE 802.11n-HT40

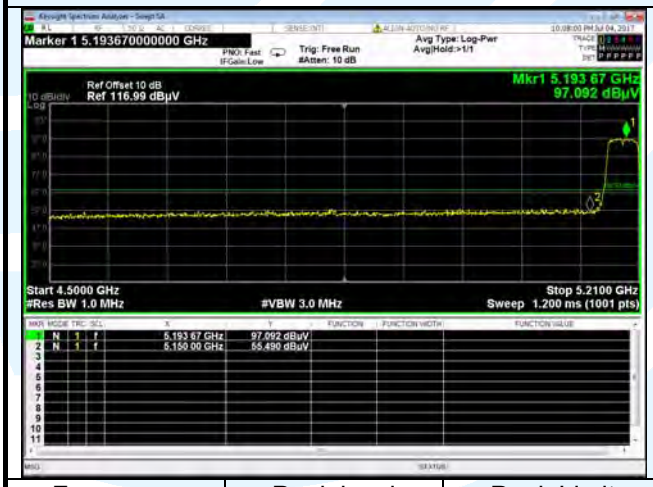
Test Channel:	38	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	

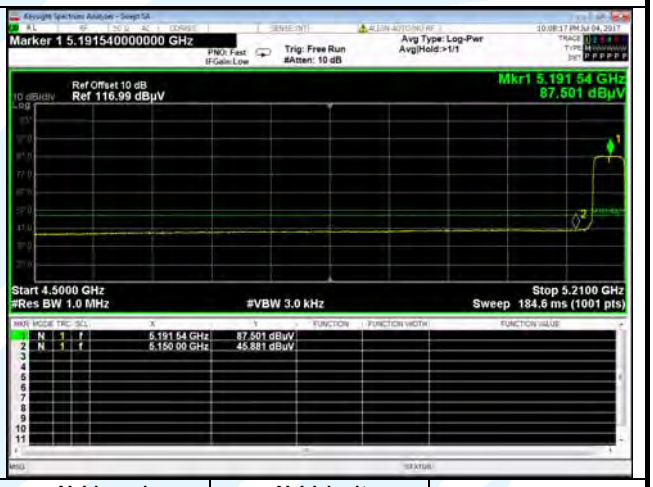




Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	55.92	74	45.715	54	Pass

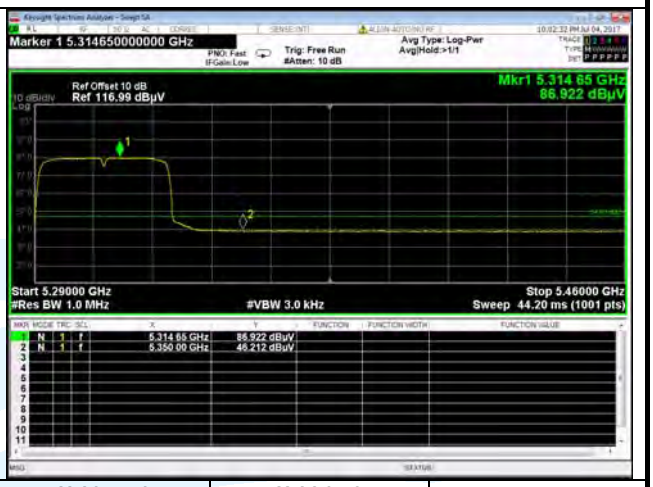
Test Channel:	38	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	





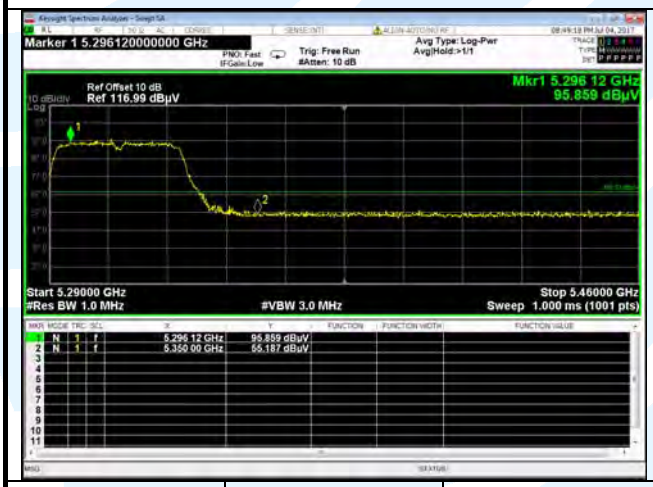
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	55.49	74	45.881	54	Pass

Test Channel:	62	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	



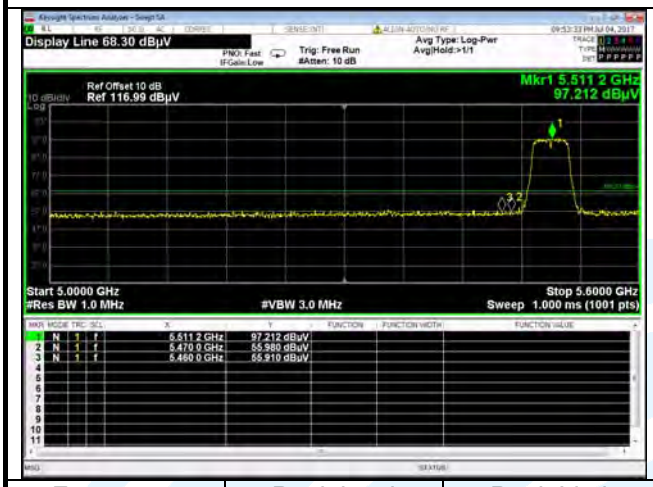
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	55.69	74	45.212	54	Pass

Test Channel:	62	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	



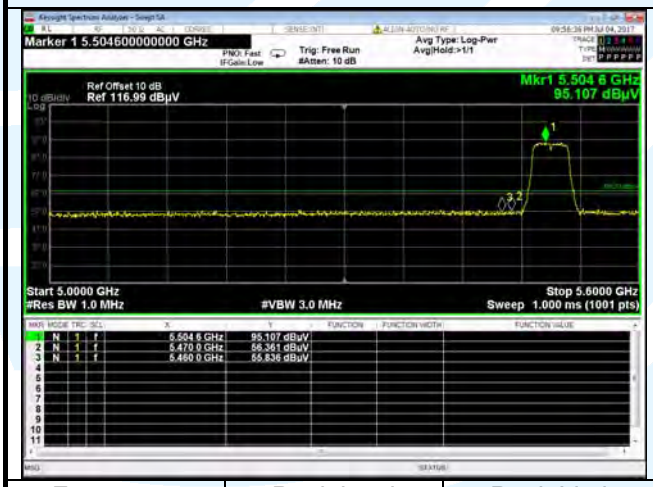
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	55.187	74	45.914	54	Pass

Test Channel:	102	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	



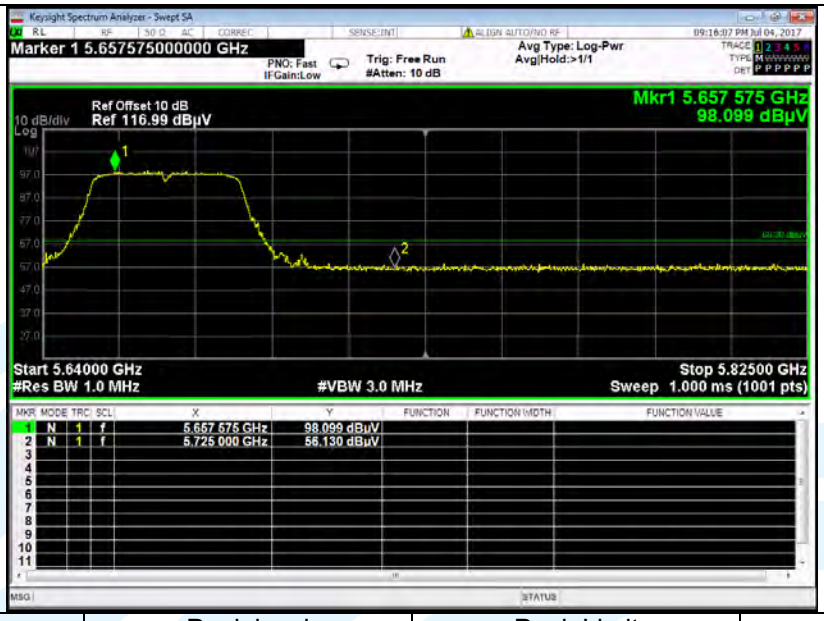
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5470.00	55.98	68.3	46.22	/	Pass
5460.00	55.910	74	45.793	54	Pass

Test Channel:	102	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	



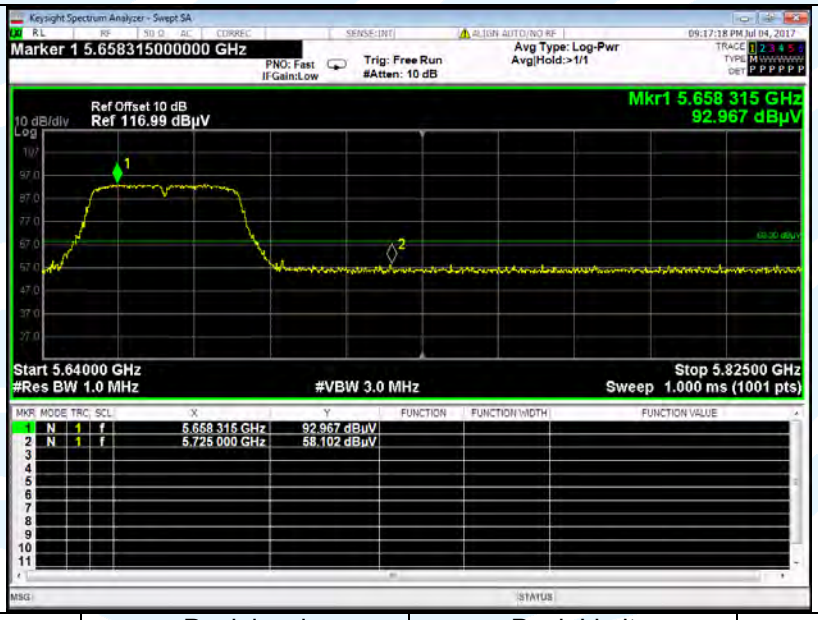
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5470.00	56.36	68.3	45.91	/	Pass
5460.00	55.835	74	45.738	54	Pass

Test Channel:	134	Ant. Polar. :	Horizontal
Detector: Peak			



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Conclusion
5725.00	56.13	68.3	Pass

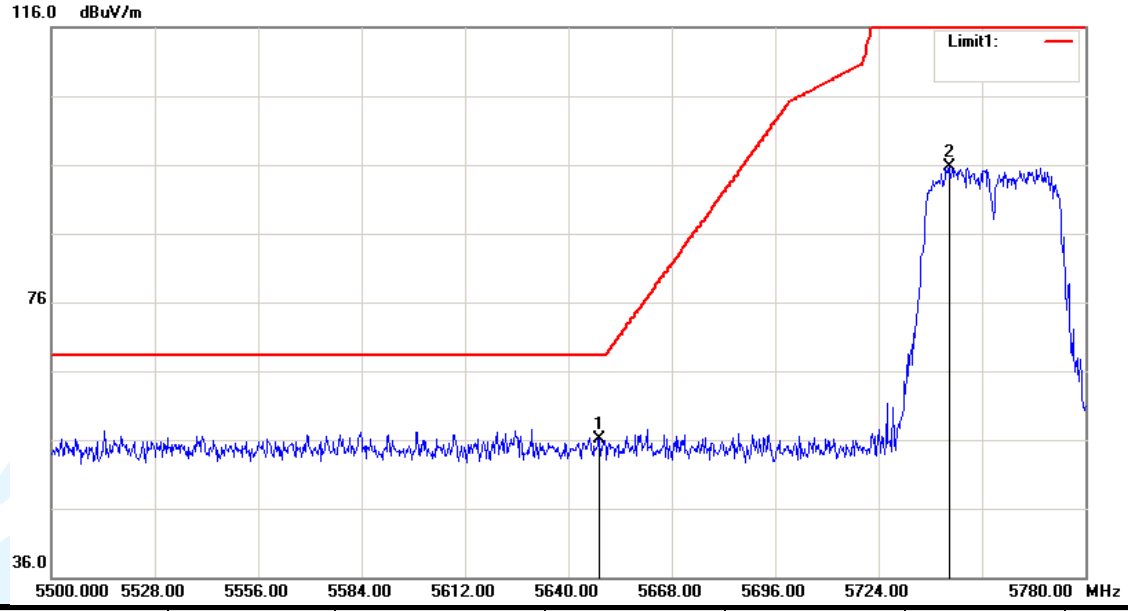
Test Channel:	134	Ant. Polar. :	Vertical
Detector: Peak			



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Conclusion
5725.00	58.102	68.3	Pass

Test Channel:	151	Ant. Polar. :	Horizontal

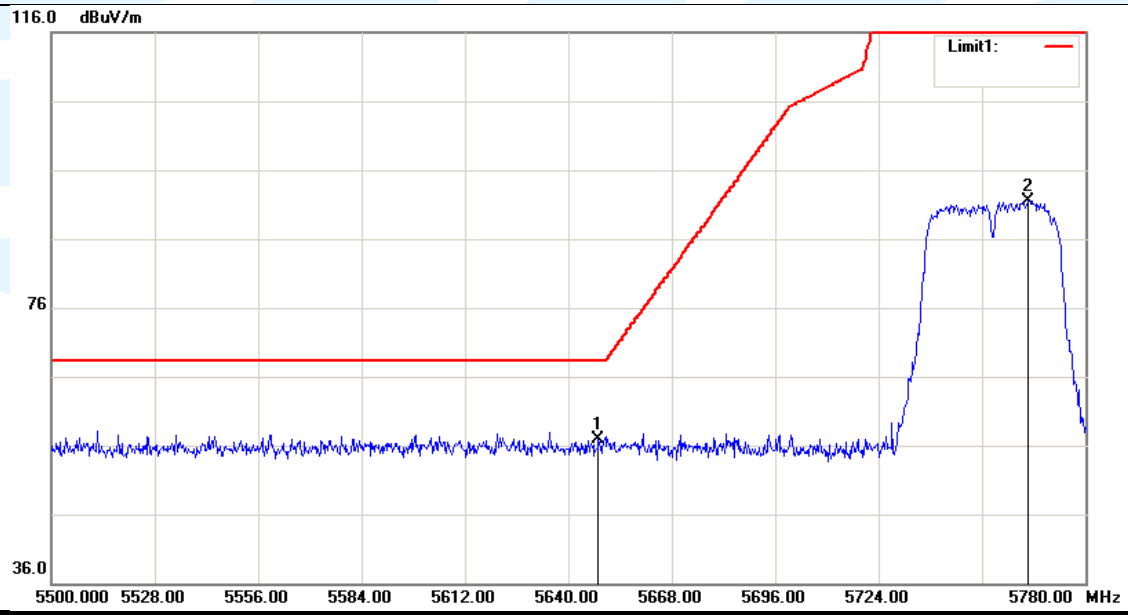
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	5648.400	50.26	5.93	56.19	68.20	-12.01	peak
2	5743.320	89.82	5.97	95.79	122.20	-26.41	peak

Test Channel:	151	Ant. Polar. :	Vertical

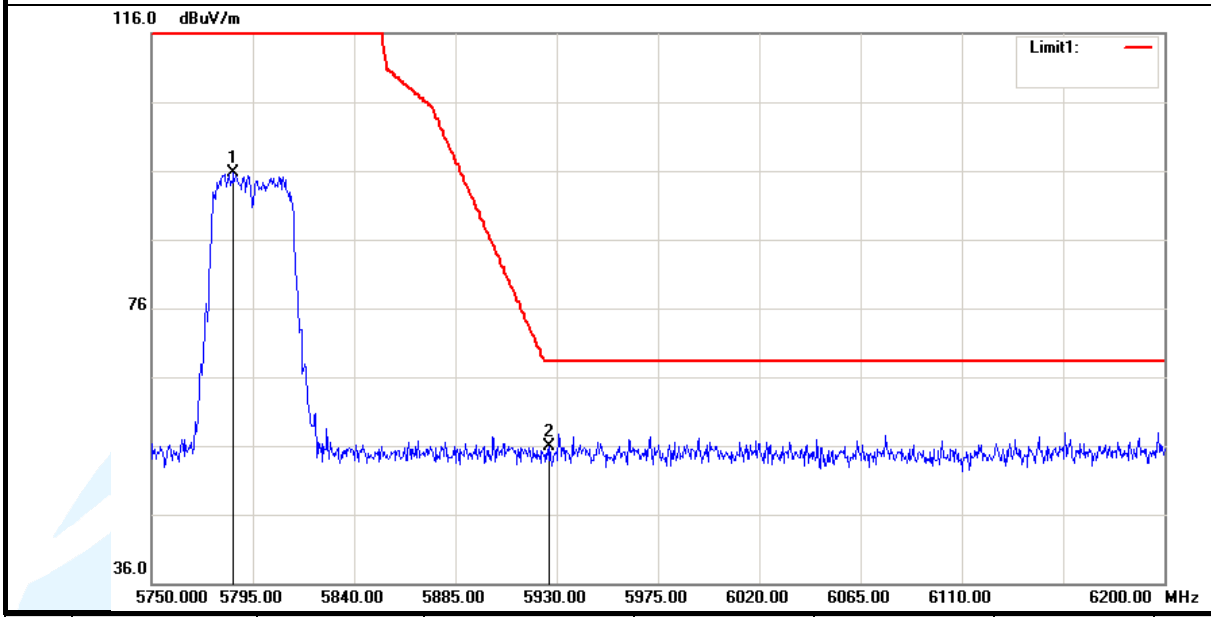
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	5648.120	51.06	5.93	56.99	68.20	-11.21	peak
2	5764.600	85.48	5.98	91.46	122.20	-30.74	peak

Test Channel:	159	Ant. Polar. :	Horizontal

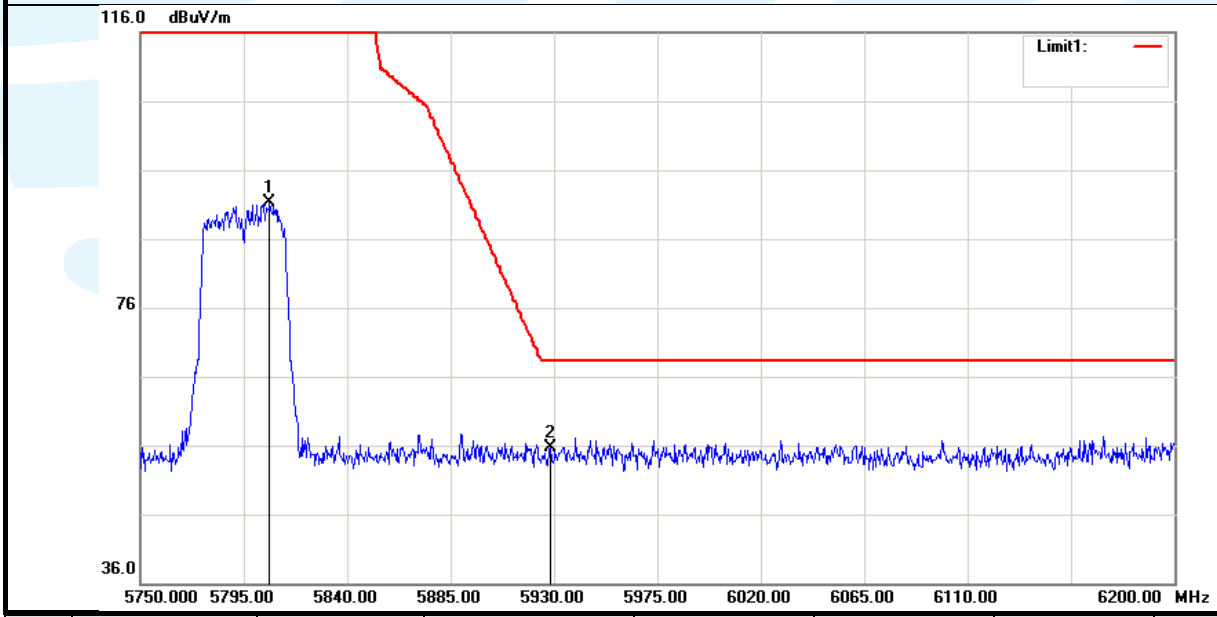
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5786.450	89.72	5.99	95.71	122.20	-26.49	peak
2*	5926.850	49.89	6.05	55.94	68.20	-12.26	peak

Test Channel:	159	Ant. Polar. :	Vertical

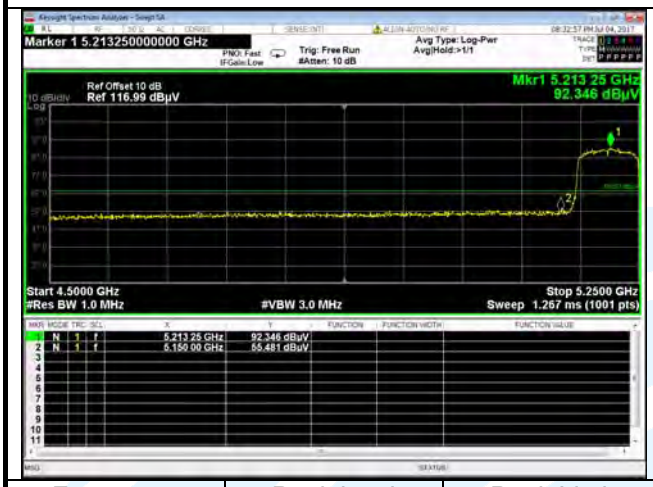
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5806.250	85.22	6.00	91.22	122.20	-30.98	peak
2*	5928.200	49.74	6.05	55.79	68.20	-12.41	peak

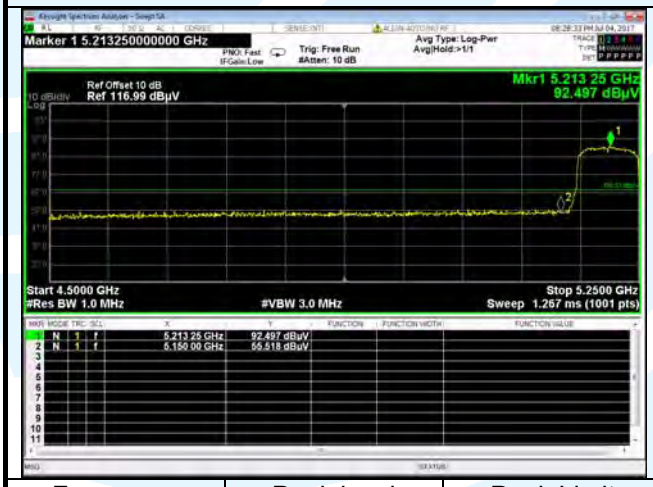
IEEE 802.11ac-VHT80

Test Channel:	42	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	55.481	74	46.597	54	Pass

Test Channel:	42	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5150.00	55.618	74	46.688	54	Pass

Test Channel:	58	Ant. Polar. :	Horizontal
Detector: Peak		Detector: AV	

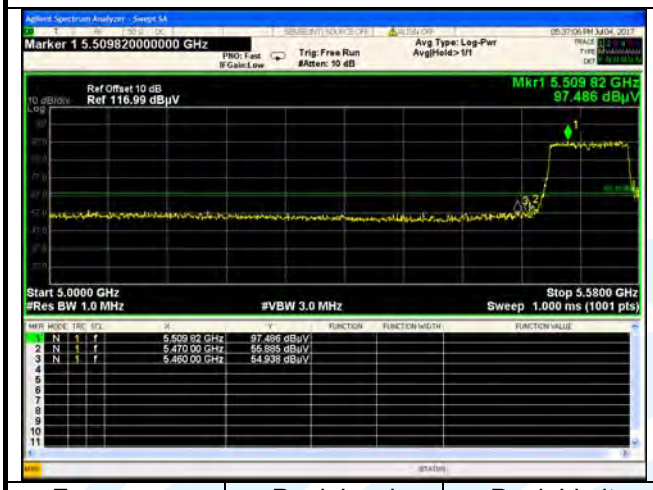
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	56.191	74	46.394	54	Pass

Test Channel:	58	Ant. Polar. :	Vertical
Detector: Peak		Detector: AV	

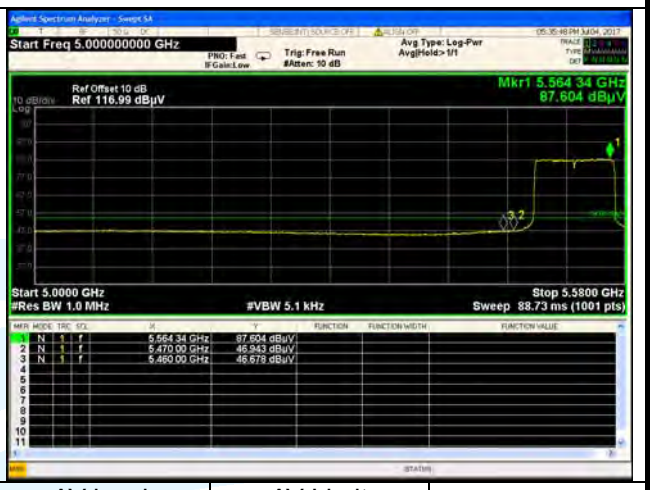
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5350.00	57.109	74	46.920	54	Pass

Test Channel:	106	Ant. Polar. :	Horizontal

Detector: Peak



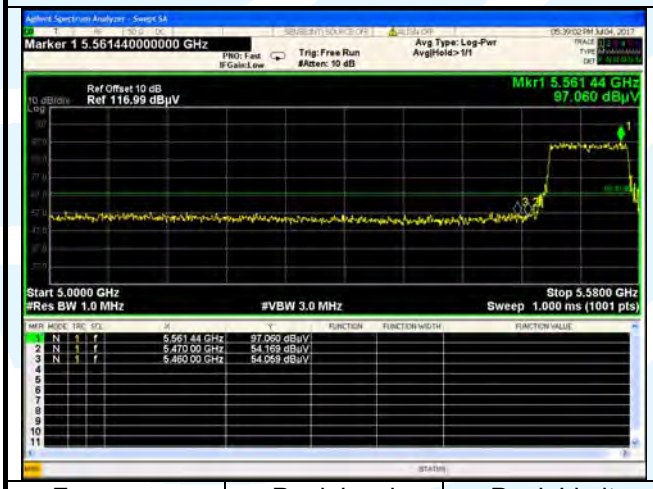
Detector: AV



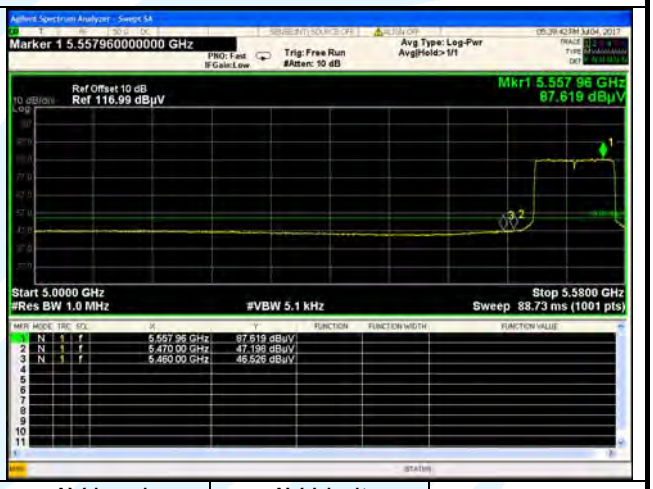
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5470.00	55.885	68.3	46.943	/	Pass
5460.00	54.938	74	46.678	54	Pass

Test Channel:	106	Ant. Polar. :	Vertical

Detector: Peak

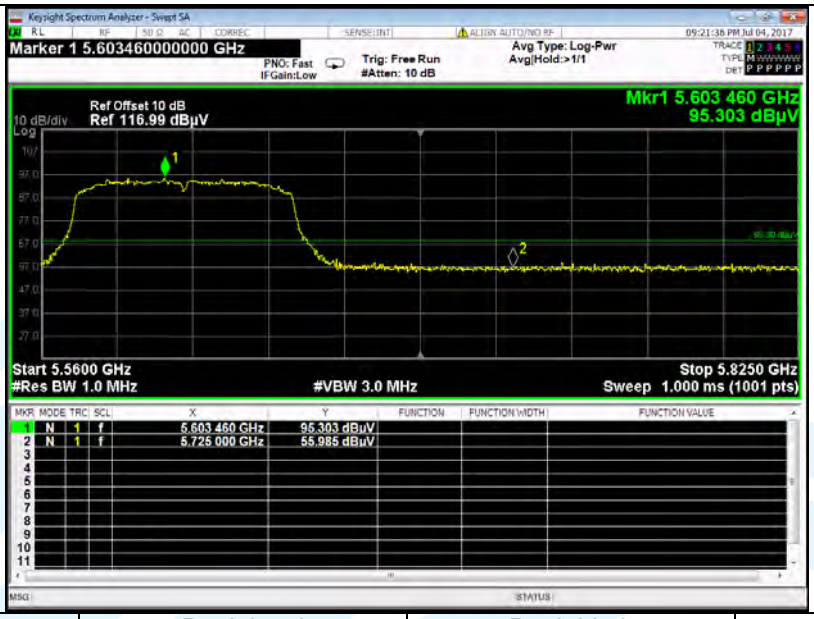


Detector: AV



Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	AV level (dBuv/m)	AV Limit (dBuv/m)	Conclusion
5470.00	54.169	68.3	47.198	/	Pass
5460.00	54.069	74	46.526	54	Pass

Test Channel:	122	Ant. Polar. :	Horizontal
Detector: Peak			



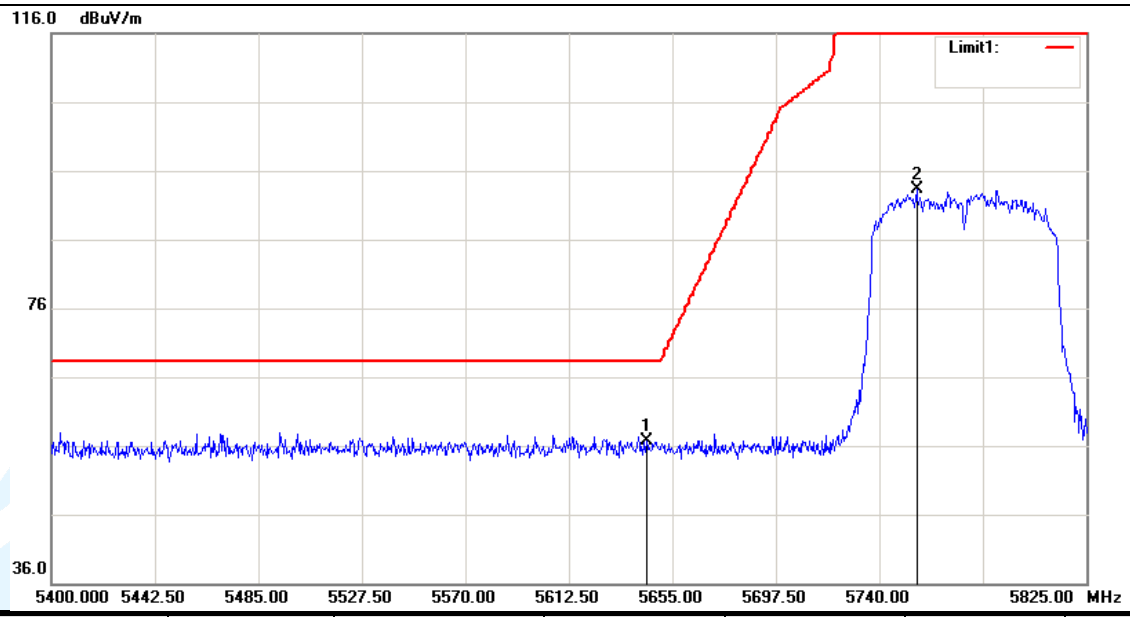
Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Conclusion
5725.00	55.985	68.3	Pass

Test Channel:	122	Ant. Polar. :	Vertical
Detector: Peak			

Frequency (MHz)	Peak level (dBuv/m)	Peak Limit (dBuv/m)	Conclusion
5725.00	56.339	68.3	Pass

Test Channel:	155	Ant. Polar. :	Horizontal

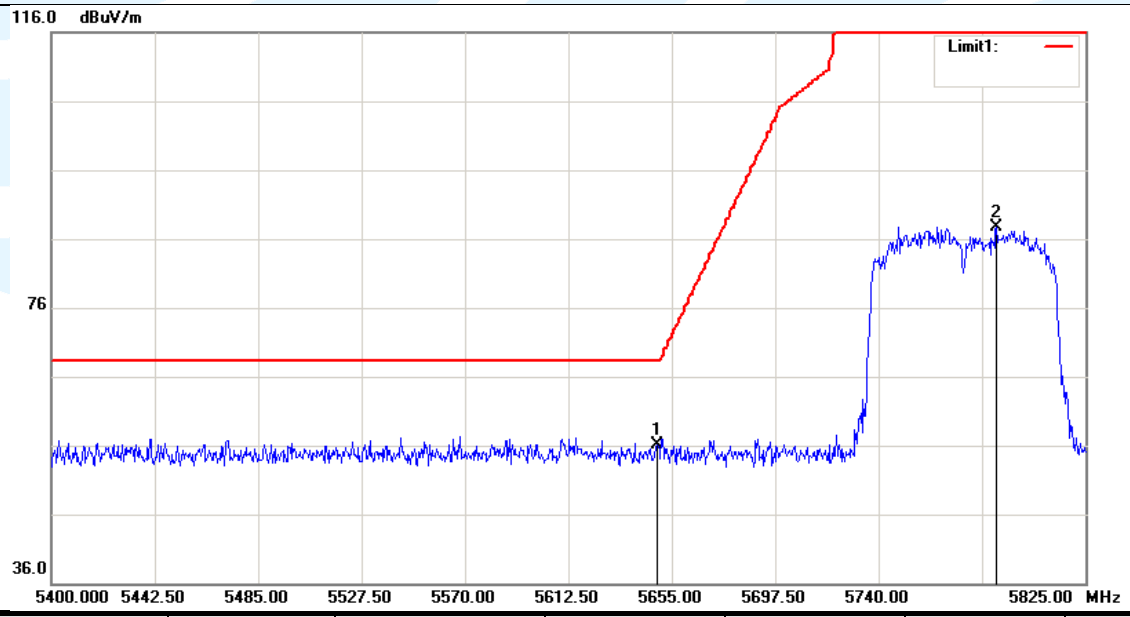
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5644.375	50.81	5.93	56.74	68.20	-11.46	peak
2*	5755.300	87.31	5.98	93.29	122.20	-28.91	peak

Test Channel:	155	Ant. Polar. :	Vertical

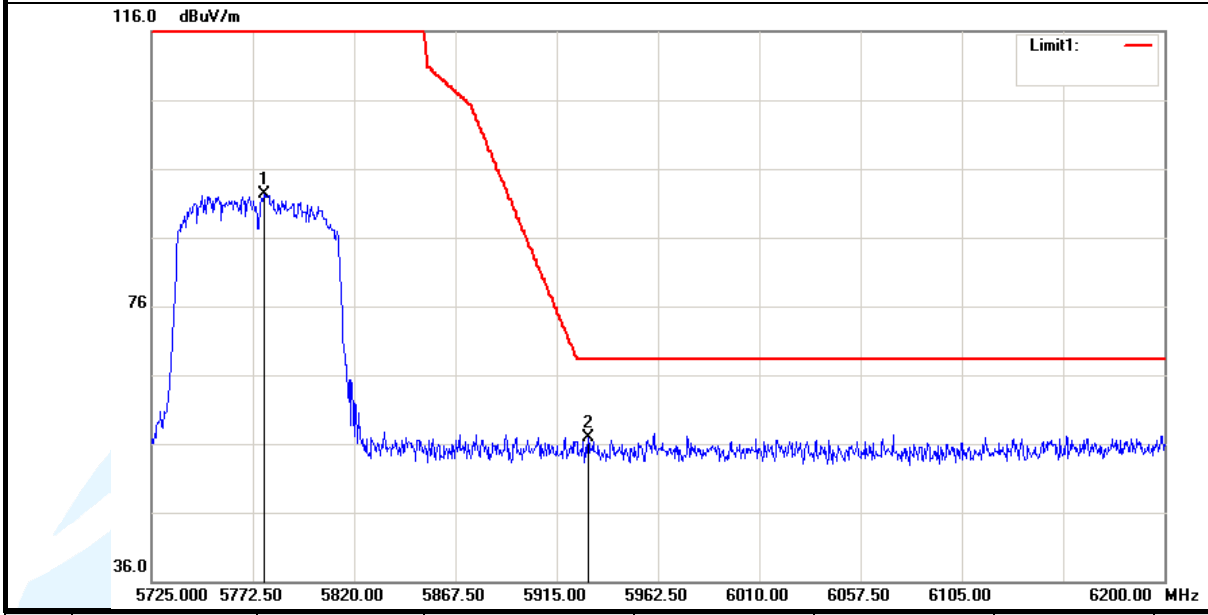
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1*	5649.050	50.09	5.93	56.02	68.20	-12.18	peak
2	5788.450	81.72	5.99	87.71	122.20	-34.49	peak

Test Channel:	155	Ant. Polar. :	Horizontal

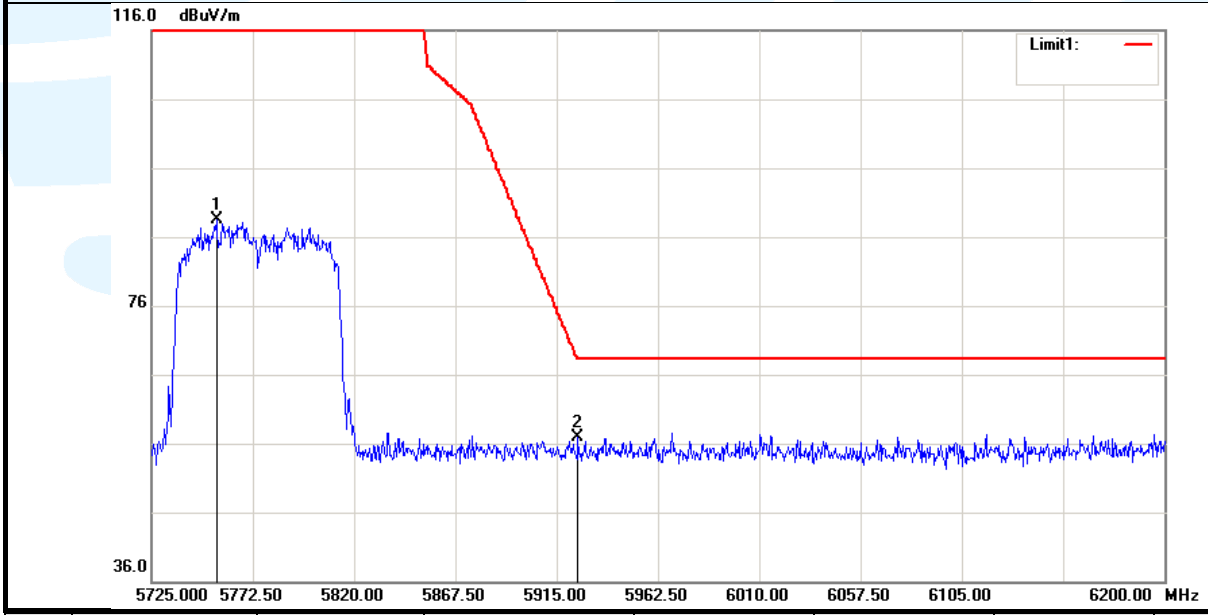
Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5777.725	86.37	5.99	92.36	122.20	-29.84	peak
2*	5929.725	50.93	6.05	56.98	68.20	-11.22	peak

Test Channel:	155	Ant. Polar. :	Vertical

Detector: Peak



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5755.400	82.61	5.98	88.59	122.20	-33.61	peak
2*	5924.975	50.78	6.05	56.83	68.22	-11.39	peak

5.9 DYNAMIC FREQUENCY SELECTION

Test Requirement: FCC 47 CFR Part 15 Subpart E Section 15.407 (h)

Test Method: KDB 905462 D03 Client Without DFS New Rules v01r02

EUT Operating Mode:

DFS Operational mode	Operating Frequency Range	
	5250 MHz to 5350 MHz	5470 MHz to 5725 MHz
Slave without radar Interference detection function	✓	✓

Applicability:

The following table from KDB905462 and the lists of the applicable requirements for the DFS testing.

Applicability of DFS Requirements Prior to Use of a Channel:

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	✓	Not required	Yes
DFS Detection Threshold	✓	Not required	Yes
Channel Availability Check Time	✓	Not required	Not required
U-NII Detection Bandwidth	✓	Not required	Yes

Applicability of DFS requirements during normal operation:

Requirement	Operational Mode	
	Master Device or Client with Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required
Additional requirements for devices with multiple bandwidth modes	**Master Device or Client with Radar Detection**	**Client Without Radar Detection**
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest BW mode available for the link
All other tests	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

DFS Detection Thresholds for Master Devices and Client Devices with Radar Detection:

Maximum Transmit Power	Value (See Notes 1, 2, and 3)
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64dBm

Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna.
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
Note3: EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.

DFS Radar Signal Parameter Values:

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1.)
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. (See Notes 1 and 2.)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth. (See Note 3.)

Note 1: Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
Note 2: The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
Note 3: During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

DFS Radar Signal Parameter:

Radar Type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time

Table 1-Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1.	See Note 1.
1	1	Test A Test B	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu sec}}\right)\right\}$	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note 1: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a
Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A
A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms.
If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4

Table 2-Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 3-Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

In-Service Monitoring: Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

Limit of In-Service Monitoring:

Reference to DFS Radar Signal Parameter Values.

Test Procedures:

a) One frequency will be chosen from the Operating Channels of the EUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

b) In case the EUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the EUT (Master). For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

c) The TCP protocol unicast data stream was generated by the iperf software command line with at least 17% activity ratio over any 100ms period.

d) Timing plots are reported with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time).

e) At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at DFS Detection Threshold levels on the Operating Channel. An additional 1 dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

f) Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

g) When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T2 to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.

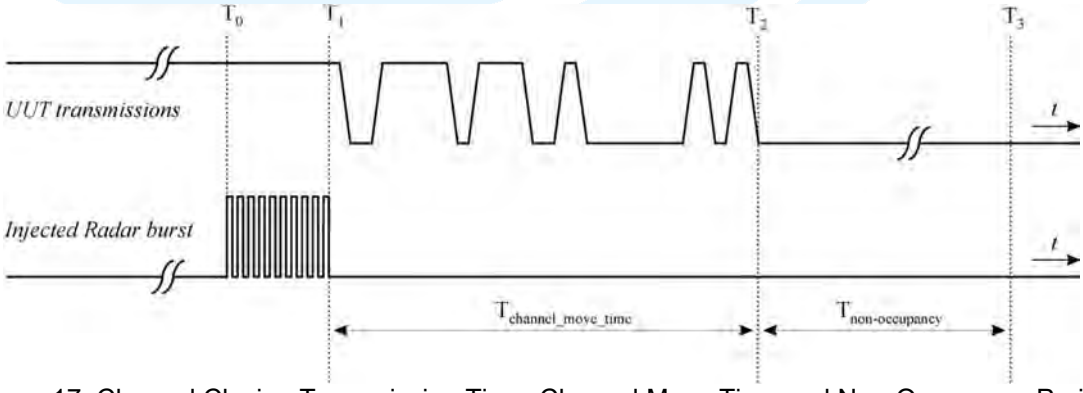
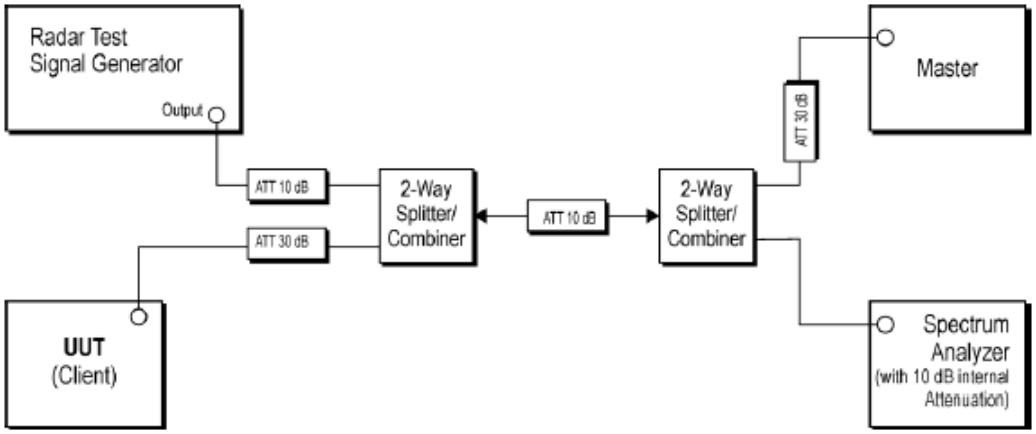


Figure 17: Channel Closing Transmission Time, Channel Move Time and Non-Occupancy Period

Conducted test setup



Setup for Client with injection at the Master

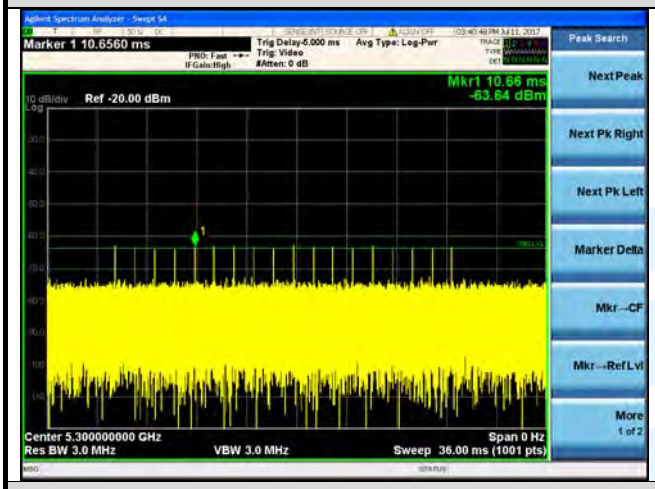
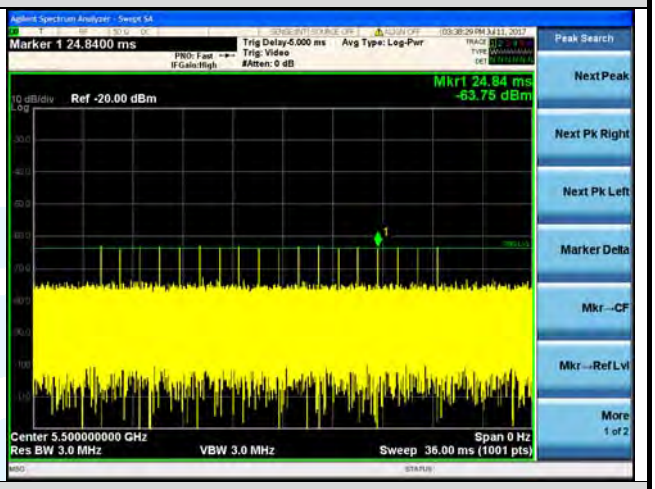
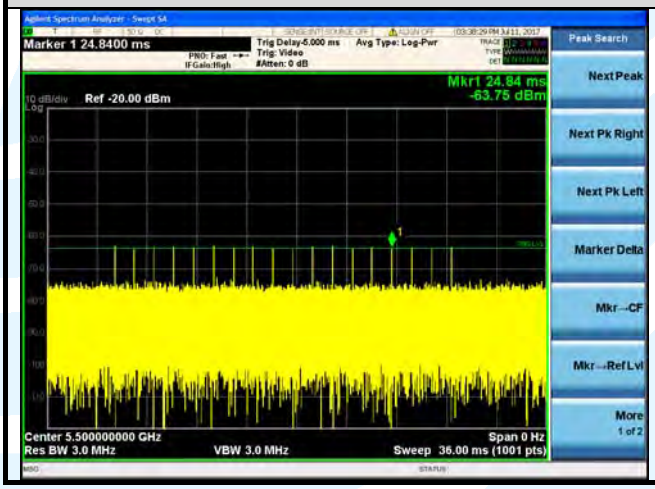
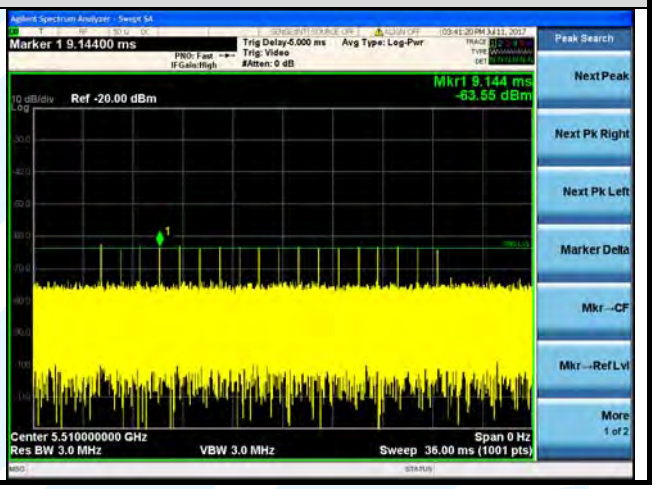
Equipment Used: Refer to section 3 for details.

Test Result: Result of Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period for Client Beacon Tes

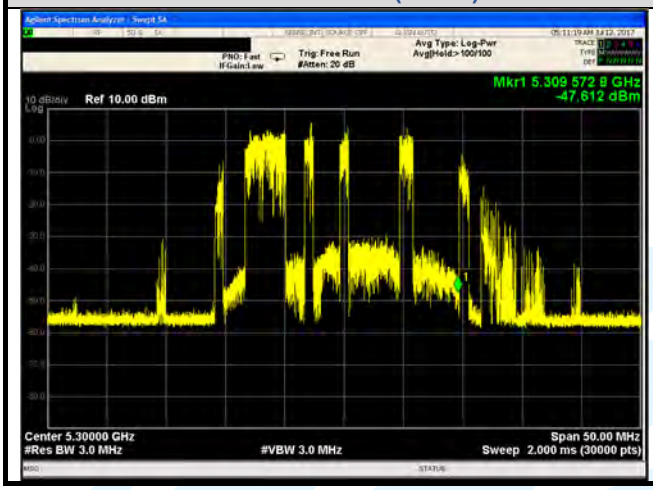
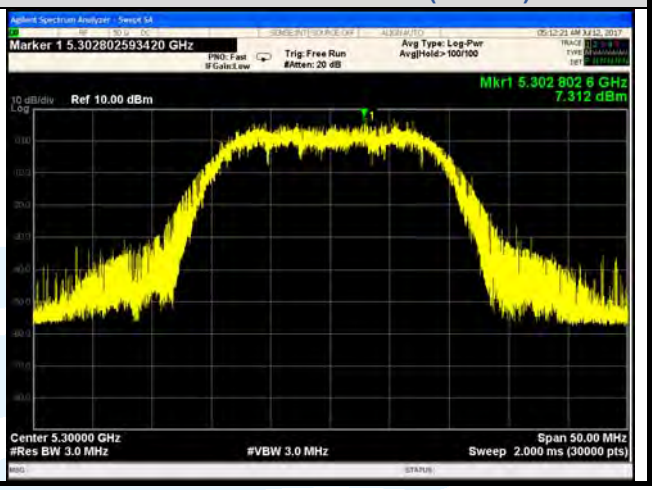
The measurement data as follows:

BW / Channel	Test Item	Test Result	Limit	Pass/Fail
20 MHz / 5300 MHz	Channel Move Time	0.529 s	< 10s	Pass
	Channel Closing Transmission Time	1.6 ms	< 200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass
20 MHz / 5500 MHz	Channel Move Time	0.598 s	< 10s	Pass
	Channel Closing Transmission Time	1.2 ms	< 200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass
40 MHz / 5500 MHz	Channel Move Time	0.575 s	< 10s	Pass
	Channel Closing Transmission Time	2.4 ms	< 200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass
40 MHz / 5510 MHz	Channel Move Time	0.529 s	< 10s	Pass
	Channel Closing Transmission Time	2.8 ms	< 200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass

Radar Waveform calibration Plot

Reference DFS test signal	
5300 MHz	5500 MHz
	
5500 MHz	5510 MHz
	

Data Traffic Plot

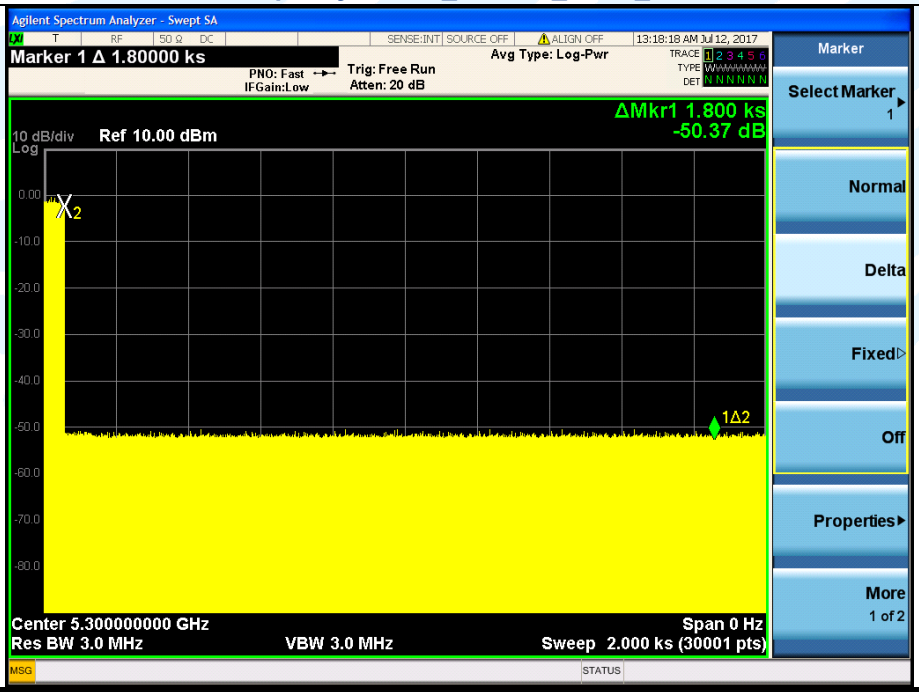
EUT data traffic (Slave)	Access Point data traffic (Master)
	

Channel Move Time & Channel Closing Transmission Time
802.11a_5300 MHz

Note:

1) Mark1Time:948ms, Mark2Time:1277ms, OntimePoints:4, TotalPoint:822, DutyCycle:0.487%,Sum of OnTime:1.6ms
2) Dwell = S/B = 12000ms/30001 = 0.4 ms, C = N x Dwell = 4 x 0.4 = 1.6ms
3) CMT = 1.277 s – 0.748 s = 0.529 s

Non-Occupancy Period_802.11a_CH60_5300 MHz

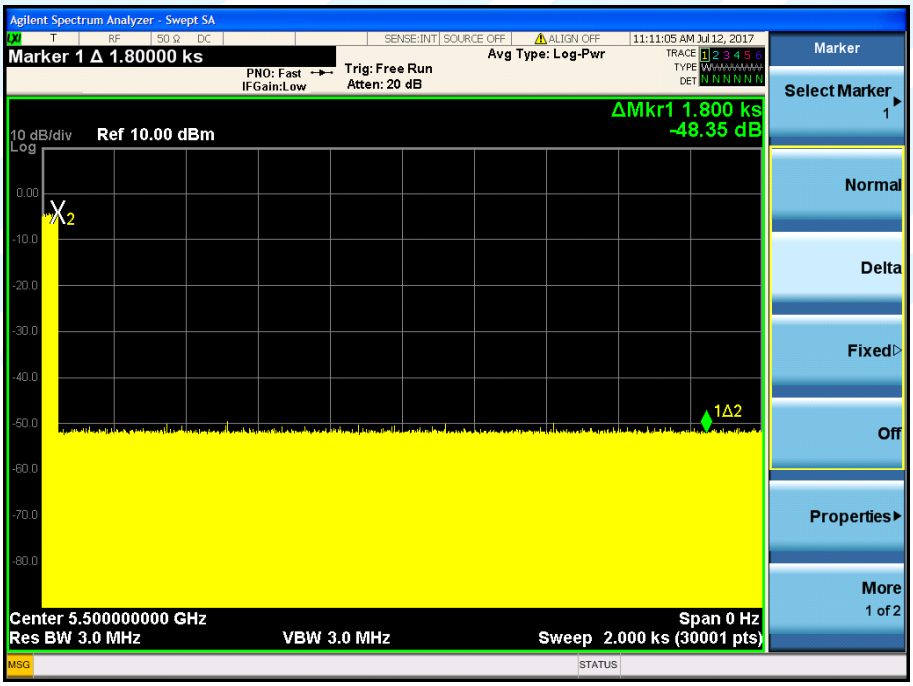


Channel Move Time & Channel Closing Transmission Time
802.11a_5500 MHz

Note:

1) Mark1 Time: Mark1Time:744ms, Mark2Time:1142ms, OntimePoints:3, TotalPoint:995, DutyCycle:0.302%,Sum of OnTime:1.2ms
2) Dwell = S/B = 12000ms/30001 = 0.4 ms, C = N x Dwell = 3 x 0.4 = 1.2ms
3) CMT = 1.142 s – 0.544 s = 0.598s

Non-Occupancy Period_802.11a_CH100_5500 MHz

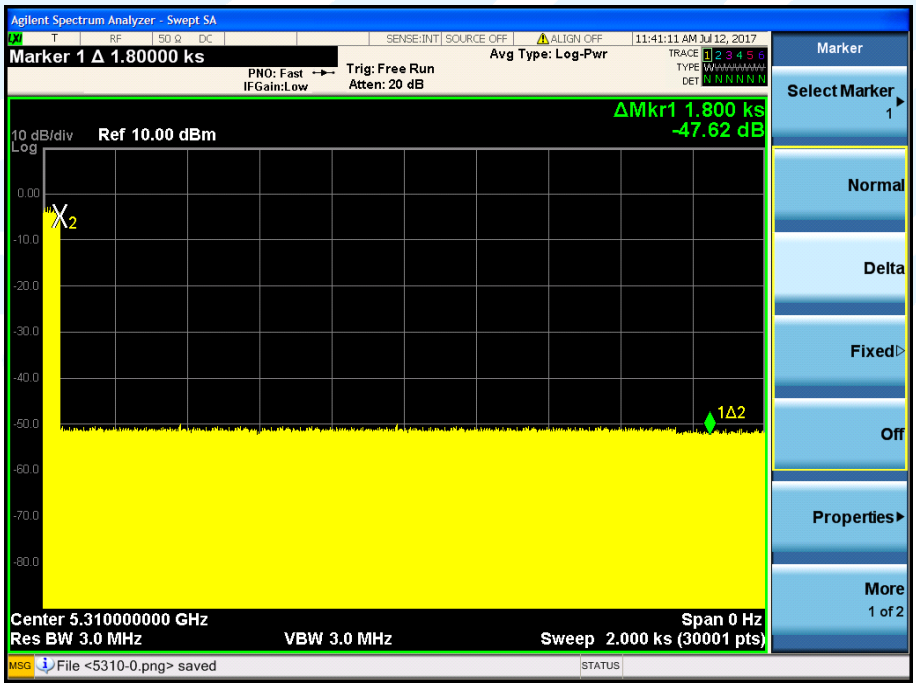


Channel Move Time & Channel Closing Transmission Time
802.11ac_5310 MHz

Note:

1) Mark1Time:916.8ms, Mark2Time:1291ms, OntimePoints:6, TotalPoint:935, DutyCycle:0.642%,Sum of OnTime:2.4ms
2) Dwell = S/B = 12000ms/30001 = 0.4 ms, C = N x Dwell = 6 x 0.4 = 2.4ms
3) CMT = 1.291s – 0.716s = 0.575s

Non-Occupancy Period_802.11ac_CH58_5310 MHz

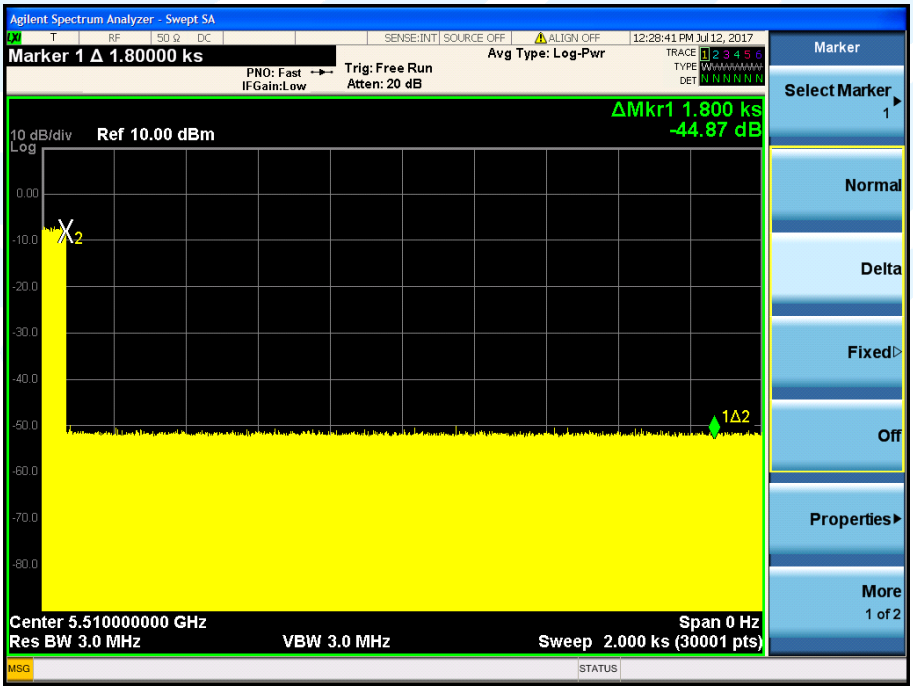


Channel Move Time & Channel Closing Transmission Time
802.11ac_5510 MHz

Note:

1) Mark1Time:646.4ms, Mark2Time:975.2ms, OntimePoints:7, TotalPoint:822, DutyCycle:0.852%,Sum of OnTime:2.8ms
2) Dwell = S/B = 12000ms/30001 = 0.4 ms, C = N x Dwell = 7 x 0.4 = 2.8ms
3) CMT = 0.975 s – 0.446 s = 0.529s

Non-Occupancy Period_802.11ac_CH102_5510 MHz



5.10 AC POWER LINE CONDUCTED EMISSION

Test Requirement: FCC 47 CFR Part 15 Subpart C Section 15.207

Test Method: ANSI C63.10-2013

Limits:

Frequency range (MHz)	Limits (dB(μV))	
	Quasi-peak	Average
0,15 to 0,50	66 to 56	56 to 46
0,50 to 5	56	46
5 to 30	60	50

Remark:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 to 0.50 MHz.

Test Setup: Refer to section 4.4.2 for details.

Test Procedures:

Test frequency range :150KHz-30MHz

1) The mains terminal disturbance voltage test was conducted in a shielded room.
2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
5) 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 on conducted measurement.

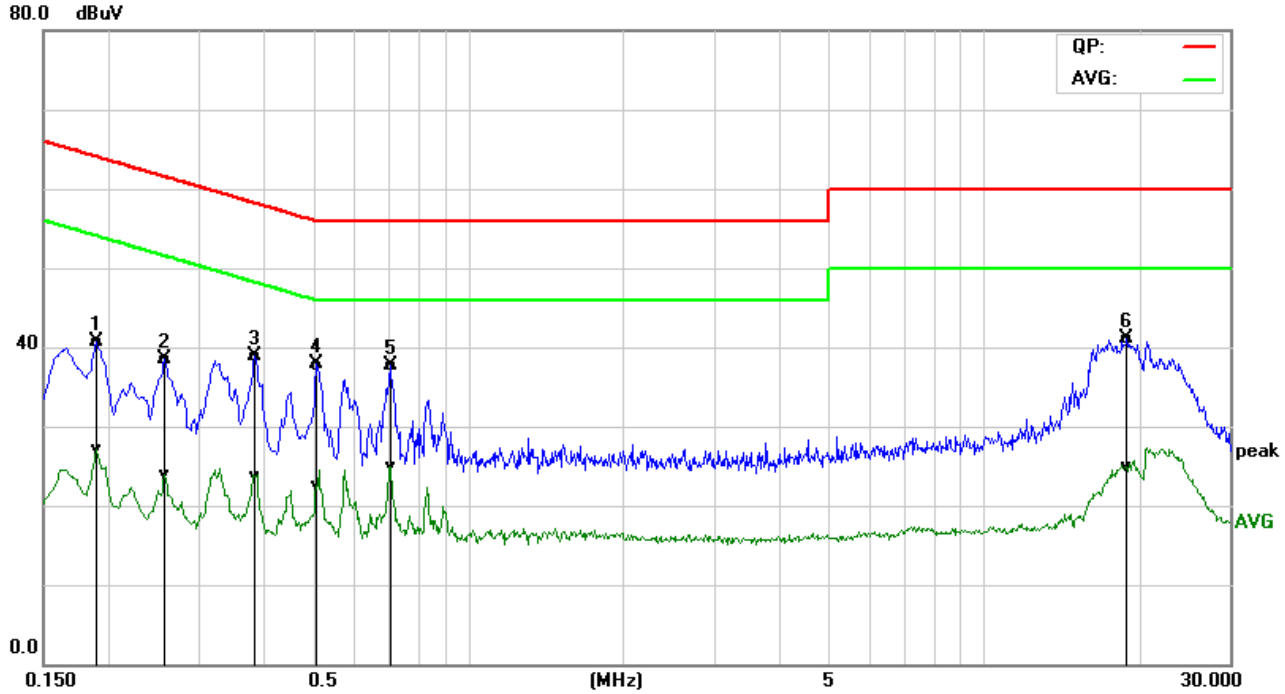
Equipment Used: Refer to section 3 for details.

Test Result: Pass

Test Mode: WIFI Link

The measurement worst data as follows:

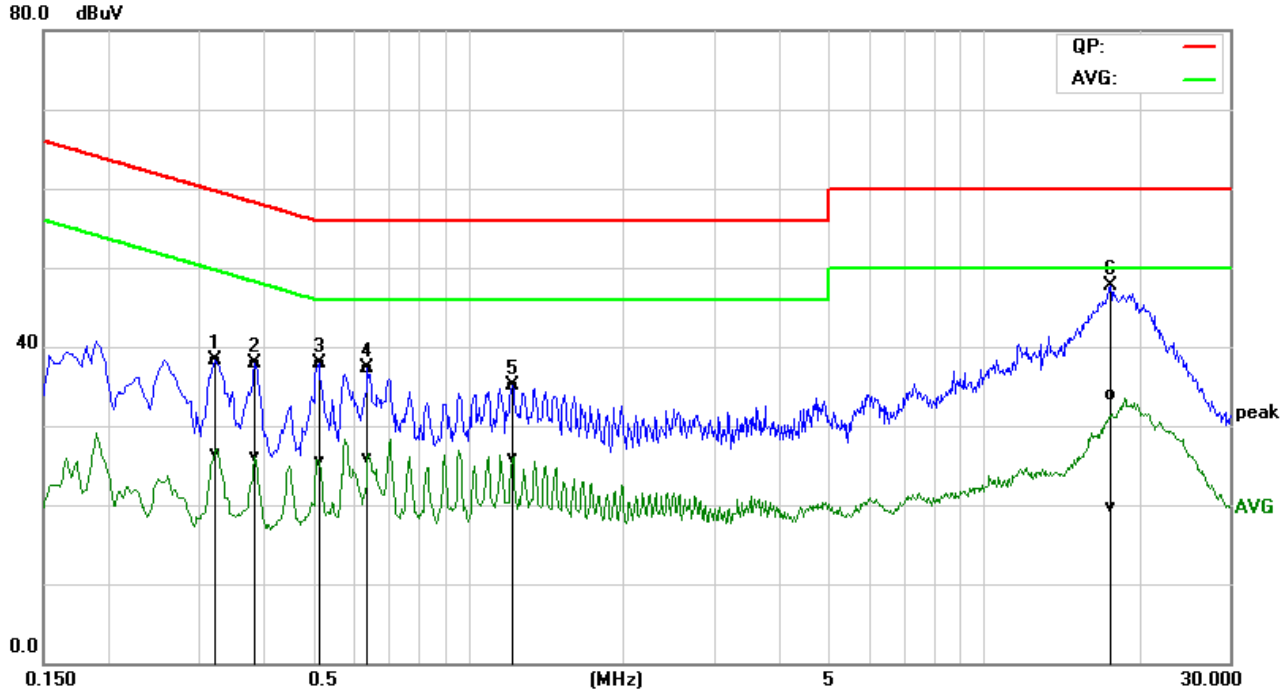
Quasi Peak:
Live Line



No.	Freq. (MHz)	QP reading (dBuV)	Avg reading (dBuV)	Correction factor (dB)	QP result (dBuV)	Avg result (dBuV)	QP limit (dBuV)	Avg limit (dBuV)	QP margin (dB)	Avg margin (dB)	Remark
1P	0.1900	21.21	7.64	19.54	40.75	27.18	64.03	54.04	-23.28	-26.86	Pass
2P	0.2580	18.88	4.41	19.54	38.42	23.95	61.49	51.50	-23.07	-27.55	Pass
3P	0.3860	19.36	4.25	19.53	38.89	23.78	58.15	48.15	-19.26	-24.37	Pass
4*	0.5100	18.27	2.95	19.53	37.80	22.48	56.00	46.00	-18.20	-23.52	Pass
5P	0.7060	18.11	5.24	19.61	37.72	24.85	56.00	46.00	-18.28	-21.15	Pass
6P	19.0020	20.84	4.82	20.18	41.02	25.00	60.00	50.00	-18.98	-25.00	Pass

The measurement data as follows:

Quasi Peak:
Neutral Line



No.	Freq.	QP reading	Avg reading	Correction factor	QP result	Avg result	QP limit	Avg limit	QP margin	Avg margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1P	0.3220	18.73	6.93	19.60	38.33	26.53	59.65	49.66	-21.32	-23.13	Pass
2P	0.3860	18.24	6.54	19.57	37.81	26.11	58.15	48.15	-20.34	-22.04	Pass
3P	0.5140	18.33	5.97	19.54	37.87	25.51	56.00	46.00	-18.13	-20.49	Pass
4*	0.6380	17.67	6.35	19.59	37.26	25.94	56.00	46.00	-18.74	-20.06	Pass
5P	1.2220	15.48	6.30	19.59	35.07	25.89	56.00	46.00	-20.93	-20.11	Pass
6P	17.5820	13.72	-0.47	20.17	33.89	19.70	60.00	50.00	-26.11	-30.30	Pass

Remark:
1. An initial pre-scan was performed on the Phase and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

APPENDIX 1 PHOTOGRAPHS OF TEST SETUP

See test photographs attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOGRAPHS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photographs.

*** End of Report ***