FCC Part 15E
Measurement and Test Report

For

Vizualogic LLC

1493 Bentley Drive, Corona, California 92879, United States

FCC ID: 2AUH9-Q83

FCC Rule(s):	FCC Part 15.407
Product Description:	Q83 Omni8 Tablet PC
Tested Model:	Q83
Report No.:	WTX19X08056345W-1
Sample Receipt Date:	2019-08-14
Tested Date:	2019-08-14 to 2019-08-22
Issued Date:	2019-08-22
Tested By:	Mike Shi / Engineer
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Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen SEM Test Technology Co., Ltd.

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Report version

Version No.	Date of issue	Description
Rev.00	2019-08-22	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: Vizualogic LLC
Address of applicant: 1493 Bentley Drive, Corona, California 92879, United States

Manufacturer: Vizualogic LLC
Address of manufacturer: 1493 Bentley Drive, Corona, California 92879, United States

General Description of EUT	
Product Name:	Q83 Omni8 Tablet PC
Brand Name:	Vizualogic
Model No.:	Q83
Adding Model(s):	/
Rated Voltage:	External Power Supply :DC12V; Battery:DC3.8V
Battery Capacity:	4200mAh
Power Adapter:	/
Software Version:	/
Hardware Version:	/
The EUT is only support slave without radar Detection function,and does not support TPC mode.	
Note: The test data is gathered from a production sample, provided by the manufacturer.	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VH80
Frequency Range:	5250-5350MHz, 5470-5725MHz
RF Output Power:	12.67dBm (Conducted)
Type of Modulation:	BPSK, QPSK,16QAM,64QAM, 256QAM
Data Rate:	6-54Mbps, up to 200Mbps
Quantity of Channels:	15
Type of Antenna:	FPCB Antenna
Antenna Gain:	5250-5350MHz:0.52dBi 5470-5725MHz:1.11dBi

1.2 Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.407: General technical requirements.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
KDB789033 D02 v02r01: GUIDELINES FOR COMPLIANCE TESTING OF UNLICENSED NATIONAL INFORMATION INFRASTRUCTURE (U-NII) DEVICES PART 15, SUBPART E

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product, which result in lowering the emission, should be checked to ensure compliance has been maintained.

1.3 Test Methodology

All measurements contained in this report were conducted with ANSI C63.10-2013, KDB789033 D02 v02r01
The equipment under test (EUT) was configured to measure its highest possible emission level. The test modes were adapted accordingly in reference to the Operating Instructions.

1.4 Table for parameters of Test Software setting

Enter "Ampak RFTestTool,VER5.4 into the calculator to enter the engineer mode, you can start to test. During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Mode	Test Frequency (MHz)												
	NCB: 20MHz												
	5180	5200	5240	5260	5300	5320	5500	5580	5700	5720	5745	5785	5825
802.11a 6Mbps	/	/	/	*	*	*	*	/	*	*	/	/	/
802.11n-HT20 MCS0	/	/	/	*	*	*	*	/	*	*	/	/	/

Mode	NCB: 40MHz									
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795
802.11n-HT40 MCS0	/	/	*	*	*	*	*	*	/	/

Mode	NCB: 80MHz					
	5210	5290	5530	5610	5690	5775
802.11ac-VH80 MCS0/Nss2	/	*	*	*	*	/

*Means' the software does not have the power value show function.

1.5 EUT Operating during test

EUT was programmed to be in continuously transmitting mode. During the test, EUT operation to normal function and programs under Android were executed.

1.6 Test Facility

FCC – Registration No.: 125990

Shenzhen SEM Test Technology Co., Ltd. Laboratory has been recognized to perform compliance testing on equipment subject to the Commissions Declaration Of Conformity (DOC). The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Shenzhen SEM Test Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 11464A.

1.7 EUT Setup and Test Mode

The EUT was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements. All testing shall be performed under maximum output power condition, with a duty cycle equal to 100%, and to measure its highest possible emissions level, more detailed description as follows:

Test Mode List		
Test Mode	Description	Remark
TM1	802.11a	5260MHz,5280MHz,5320MHz,5500MHz,5600MHz,5700MHz,
TM2	802.11n-HT20	5260MHz,5280MHz,5320MHz,5500MHz,5600MHz,5700MHz
TM3	802.11n-HT40	5270MHz,5310MHz,5510MHz,5590MHz,5670MHz
TM4	802.11ac-VH80	5290MHz,5610 MHz,5690 MHz

Test Conditions	
Temperature:	22~25 °C
Relative Humidity:	50~55 %.
ATM Pressure:	1019 mbar

EUT Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Special Cable List and Details			
Cable Description	Length (m)	Shielded/Unshielded	With / Without Ferrite
/	/	/	/

Auxiliary Equipment List and Details			
Description	Manufacturer	Model	Serial Number
/	/	/	/

1.8 Measurement Uncertainty

Measurement uncertainty		
Parameter	Conditions	Uncertainty
RF Output Power	Conducted	±0.42dB
Occupied Bandwidth	Conducted	±1.5%
Power Spectral Density	Conducted	±1.8dB
Conducted Spurious Emission	Conducted	±2.17dB
Conducted Emissions	Conducted	9-150kHz ±3.74dB
		0.15-30MHz ±3.34dB
Transmitter Spurious Emissions	Radiated	30-200MHz ±4.52dB
		0.2-1GHz ±5.56dB
		1-6GHz ±3.84dB
		6-18GHz ±3.92dB

1.9 Test Equipment List and Details

No.	Description	Manufacturer	Model	Serial No.	Cal Date	Due Date
SEMT-1072	Spectrum Analyzer	Agilent	E4407B	MY41440400	2019-04-30	2020-04-29
SEMT-1031	Spectrum Analyzer	Rohde & Schwarz	FSP30	836079/035	2019-04-30	2020-04-29
SEMT-1007	EMI Test Receiver	Rohde & Schwarz	ESVB	825471/005	2019-04-30	2020-04-29
SEMT-1008	Amplifier	Agilent	8447F	3113A06717	2019-04-30	2020-04-29
SEMT-1043	Amplifier	C&D	PAP-1G18	2002	2019-04-30	2020-04-29
SEMT-1011	Broadband Antenna	Schwarz beck	VULB9163	9163-333	2019-05-05	2021-05-04
SEMT-1042	Horn Antenna	ETS	3117	00086197	2019-05-05	2021-05-04
SEMT-1121	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170582	2019-05-05	2021-05-04
SEMT-1069	Loop Antenna	Schwarz beck	FMZB 1516	9773	2019-05-05	2021-05-04
SEMT-1001	EMI Test Receiver	Rohde & Schwarz	ESPI	101611	2019-04-30	2020-04-29
SEMT-1003	L.I.S.N	Schwarz beck	NSLK8126	8126-224	2019-04-30	2020-04-29
SEMT-1002	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100911	2019-04-30	2020-04-29
SEMT-1168	Pre-amplifier	Direction Systems Inc.	PAP-0126	14141-12838	2019-04-30	2020-04-29
SEMT-1169	Pre-amplifier	Direction Systems Inc.	PAP-2640	14145-14153	2019-04-30	2020-04-29
SEMT-1163	Spectrum Analyzer	Rohde & Schwarz	FSP40	100612	2019-04-30	2020-04-29
SEMT-1170	DRG Horn Antenna	A.H. SYSTEMS	SAS-574	571	2019-05-05	2021-05-04
SEMT-1166	Power Limiter	Agilent	N9356B	MY45450376	2019-04-30	2020-04-29
SEMT-1048	RF Limiter	ATTEN	AT-BSF-2400~2500	/	2019-04-30	2020-04-29
SEMT-1076	RF Switcher	Top Precision	RCS03-A2	/	2019-04-30	2020-04-29
SEMT-C001	Cable	Zheng DI	LL142-07-07-10M(A)	/	2019-03-18	2020-03-17
SEMT-C002	Cable	Zheng DI	ZT40-2.92J-2.92J-6M	/	2019-03-18	2020-03-17
SEMT-C003	Cable	Zheng DI	ZT40-2.92J-2.92J-2.5M	/	2019-03-18	2020-03-17
SEMT-C004	Cable	Zheng DI	2M0RFC	/	2019-03-18	2020-03-17
SEMT-C005	Cable	Zheng DI	1M0RFC	/	2019-03-18	2020-03-17
SEMT-C006	Cable	Zheng DI	1M0RFC	/	2019-03-18	2020-03-17

Software List			
Description	**Manufacturer**	**Model**	**Version**
EMI Test Software (Radiated Emission)*	Farad	EZ-EMC	RA-03A1
EMI Test Software (Conducted Emission)*	Farad	EZ-EMC	RA-03A1

*Remark: indicates software version used in the compliance certification testing

2. SUMMARY OF TEST RESULTS

FCC Rules	Description of Test Item	Result
§15.203; §15.405	Antenna Requirement	Compliant
§15.207; §15.407(b)(6)	Conducted Emission	N/A
§15.407(a)(1),(2)	Power Spectral Density	Compliant
§15.407(e)	Emission Bandwidth and Occupied Bandwidth	Compliant
§15.407(a)(1),(2)	Maximum Conducted Output Power	Compliant
§15.407(b)(1),(2),(3),(4)	Undesirable emission	Compliant
§15.205; §15.407(b)(1),(2),(3)	Radiated Emission	Compliant
§15.407(g)	Frequency Stability	Compliant
§15.407(h)	Dynamic Frequency Selection (DFS)	Compliant

N/A: not applicable

3. RF Exposure

3.1 Standard Applicable

According to §1.1307 and §2.1093, the portable transmitter must comply the RF exposure requirements.

3.2 Test Result

This product complied with the requirement of the RF exposure, please see the MPE Report.

4. Antenna Requirement

4.1 Standard Applicable

According to FCC Part 15.203, 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 shall be considered sufficient to comply with the provisions of this section.

4.2 Evaluation Information

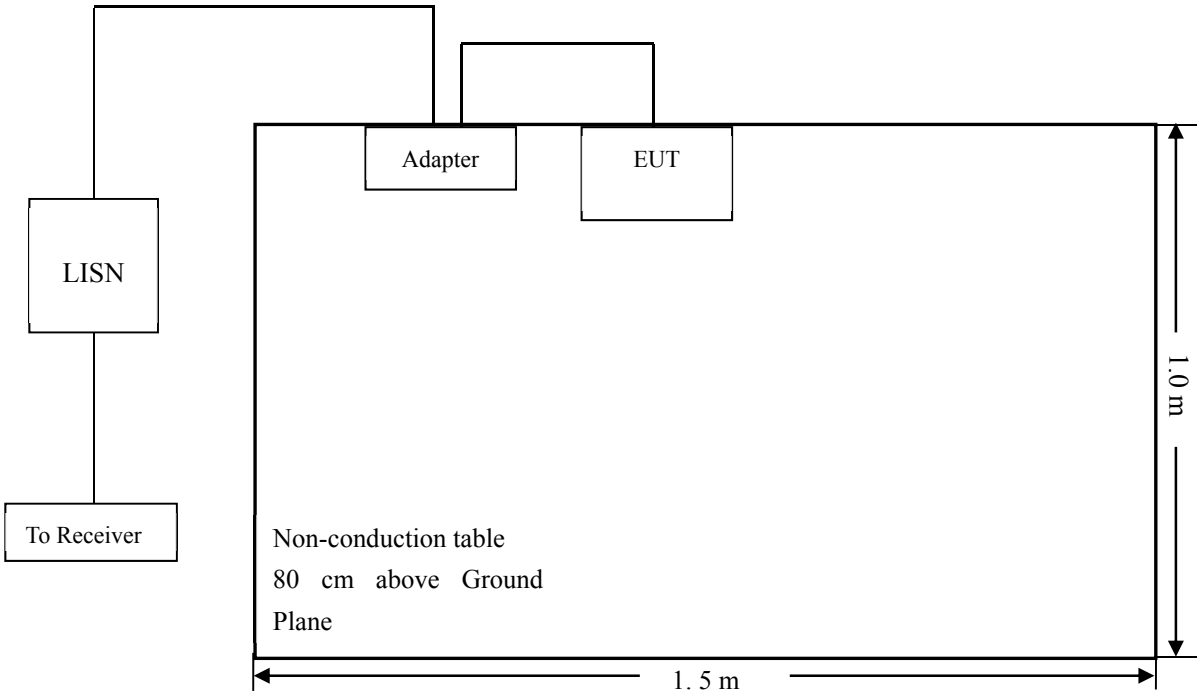
This product has an FPCB Antenna fulfill the requirement of this section.

5. Conducted Emissions

5.1 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 Limit.
The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.
The spacing between the peripherals was 10 cm.

5.2 Basic Test Setup Block Diagram



5.3 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency ..... 150 kHz
Stop Frequency ..... 30 MHz
Sweep Speed ..... Auto
IF Bandwidth..... 10 kHz
Quasi-Peak Adapter Bandwidth ..... 9 kHz
Quasi-Peak Adapter Mode ..... Normal

5.4 Summary of Test Results/Plots

Not applicable

6. Power Spectral Density

6.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25 GHz.
(iv) For mobile and portable 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.

6.2 Test Procedure

According to 789033 D02 v02r01 General UNII Test Procedures New Rules v02, the following is the measurement procedure.
For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500kHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW ≥ 1/T, where T is defined in section II.B.l.a).
b) Set VBW ≥ 3 RBW.
c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 kHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

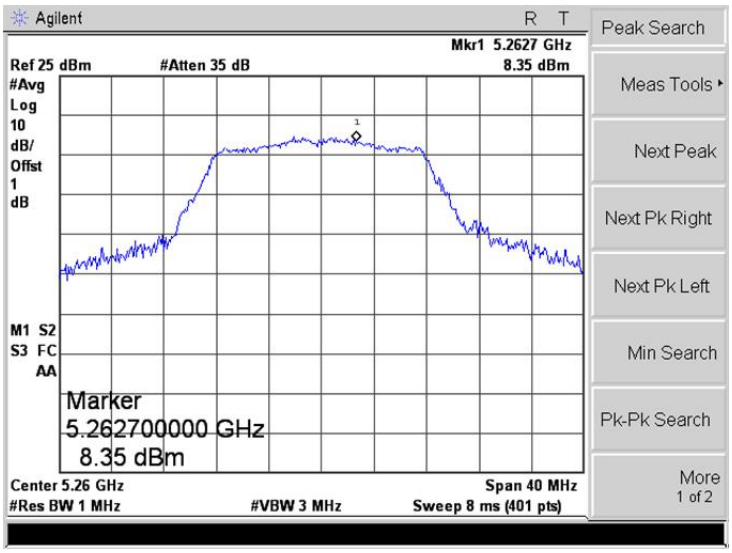
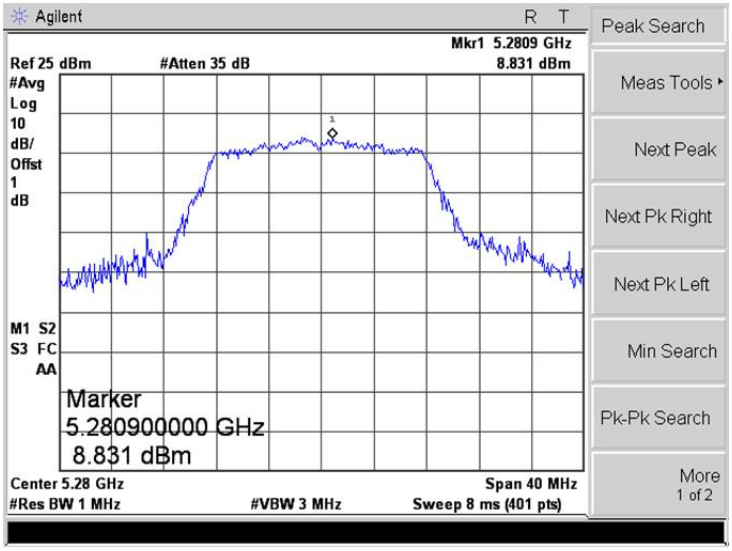
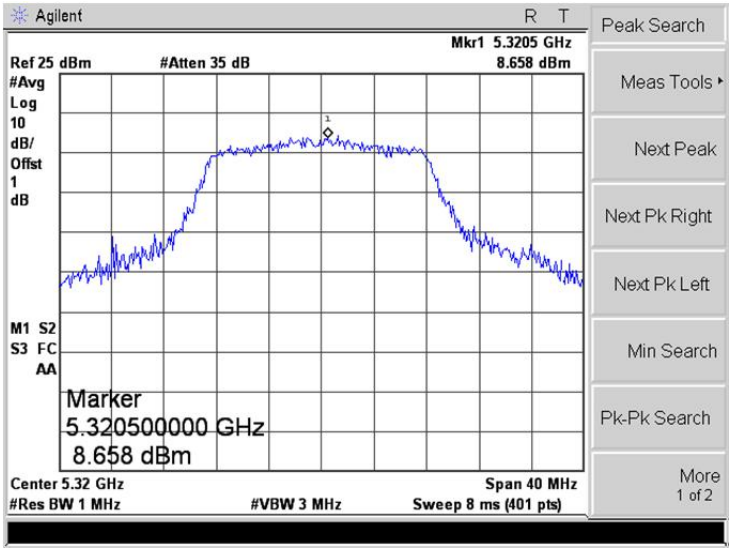
Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since RBW=100 kHZ is available on nearly all spectrum analyzers.

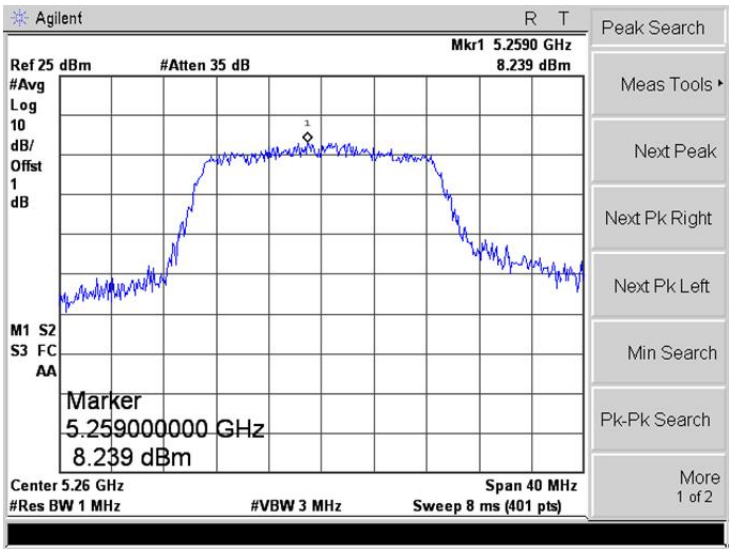
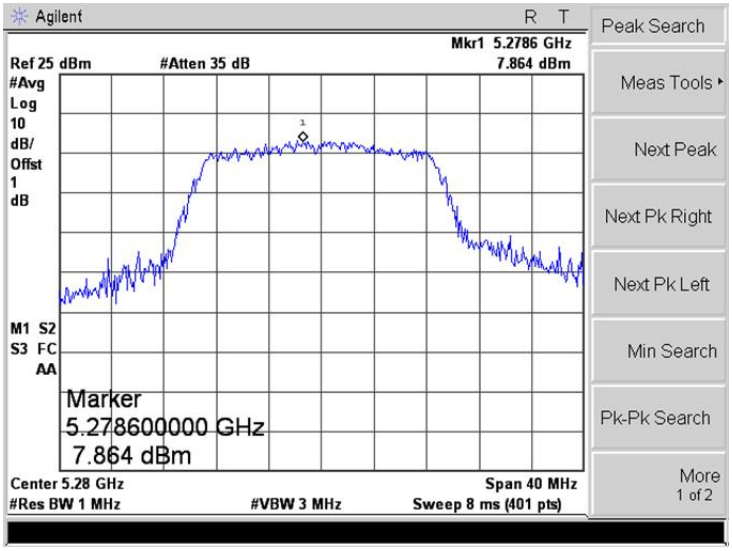
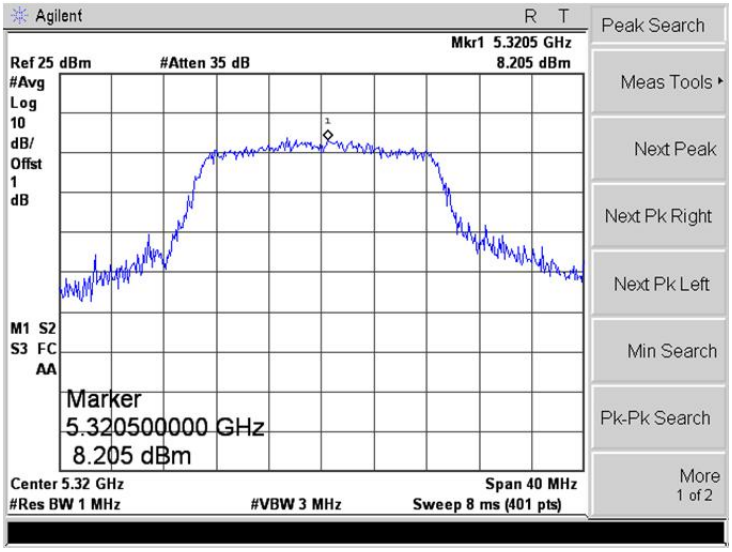
6.3 Summary of Test Results/Plots

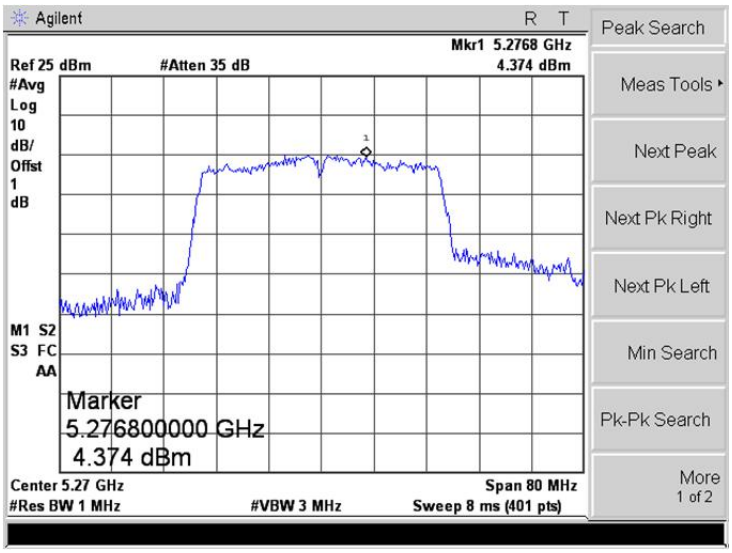
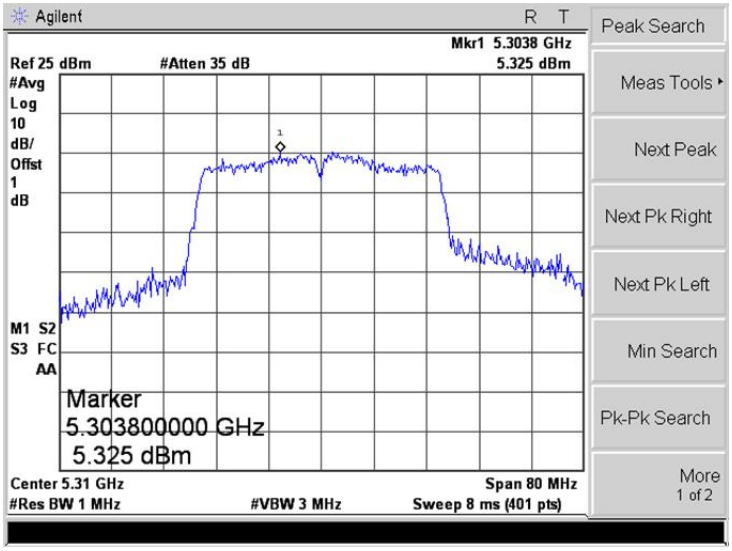
U-NII-2A: 5250-5350MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5260	8.35	11
	5280	8.83	11
	5320	8.66	11
802.11n-HT20	5260	8.24	11
	5280	7.86	11
	5320	8.21	11
802.11n-HT40	5270	4.37	11
	5310	5.33	11
802.11ac-HT80	5290	2.15	11

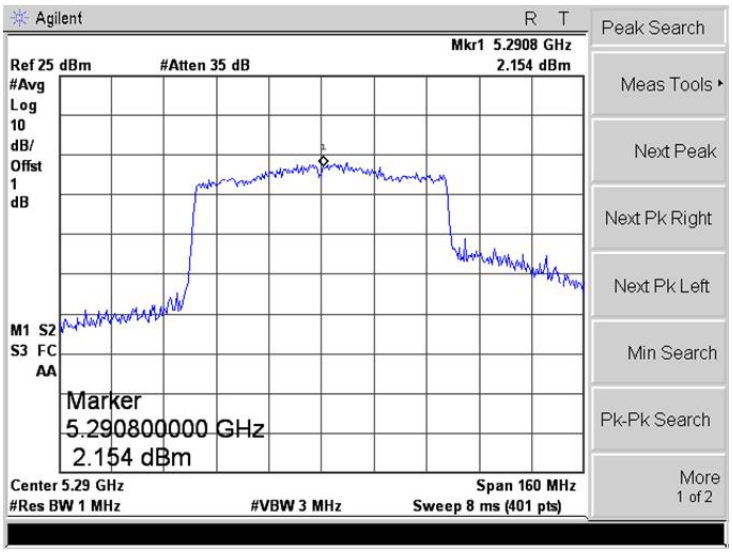
U-NII-2C: 5470-5725MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5500	8.82	11
	5600	4.41	11
	5700	3.18	11
802.11n-HT20	5500	7.20	11
	5600	3.90	11
	5700	2.74	11
802.11n-HT40	5510	4.92	11
	5590	0.59	11
	5670	-0.26	11
802.11ac-HT80	5530	0.92	11
	5610	-1.43	11

➢ 5250-5350MHz

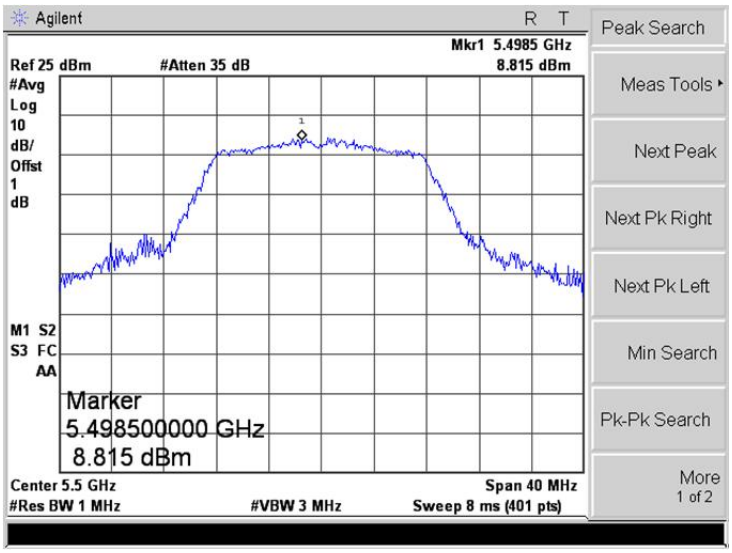
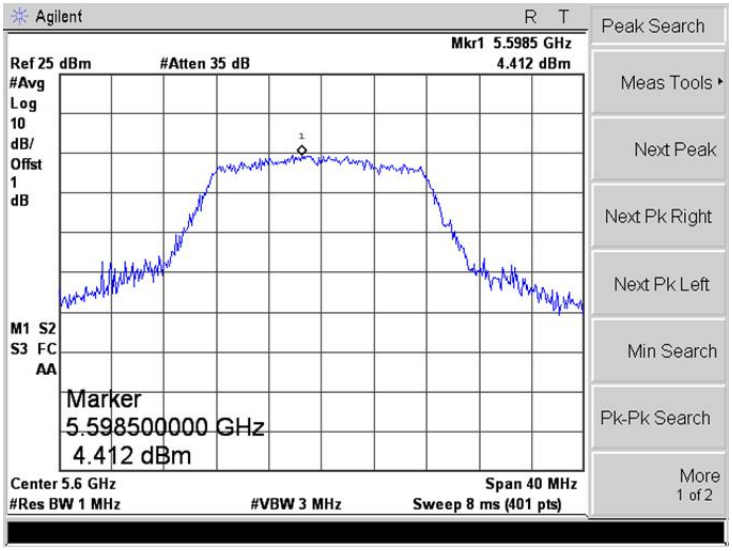
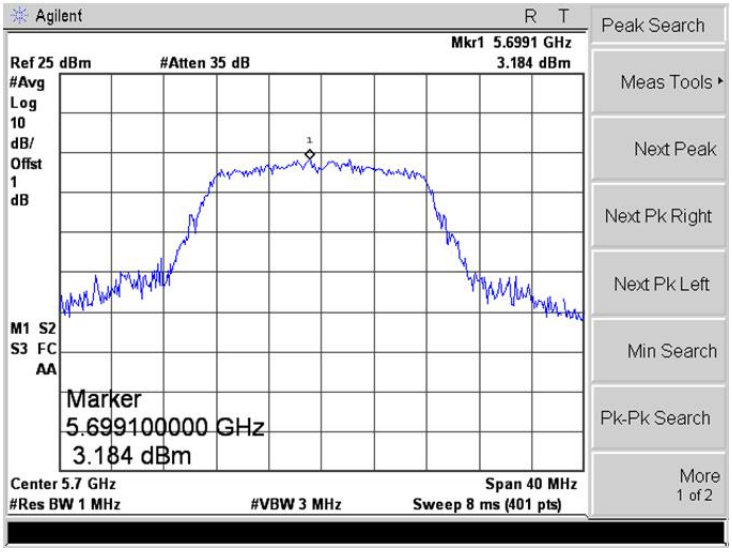
Mode:	802.11a
5260MHz	
5280MHz	
5320MHz	

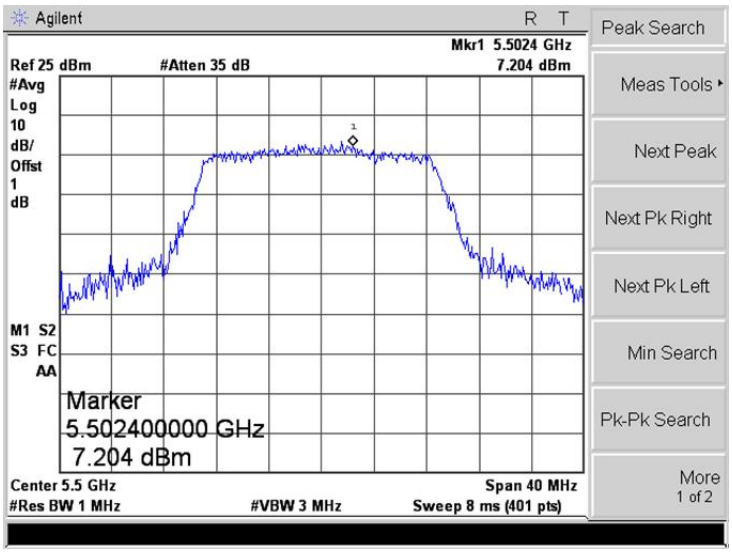
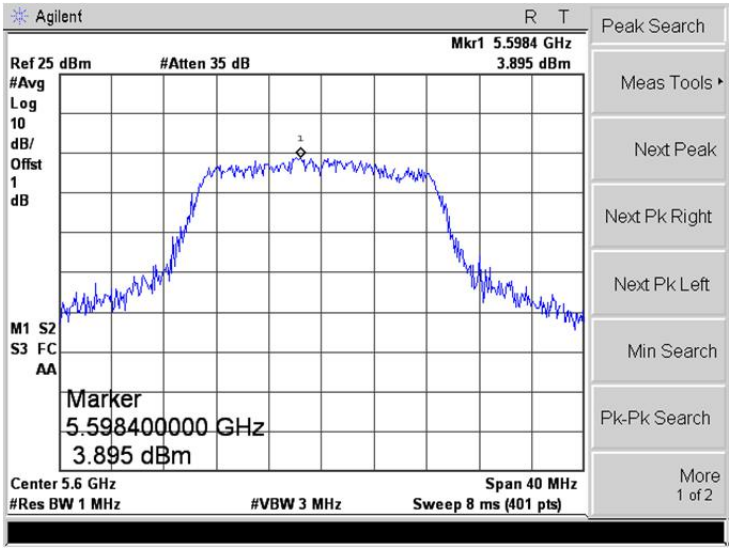
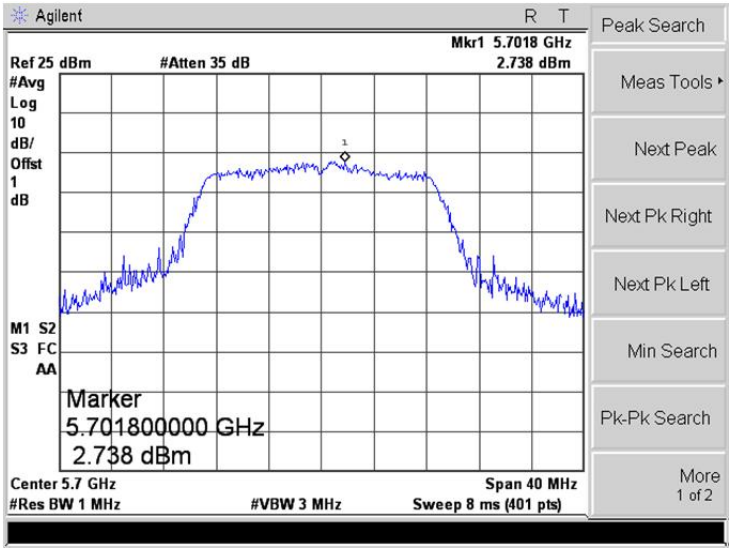
Mode:	802.11n-HT20
5260MHz	
5280MHz	
5320MHz	

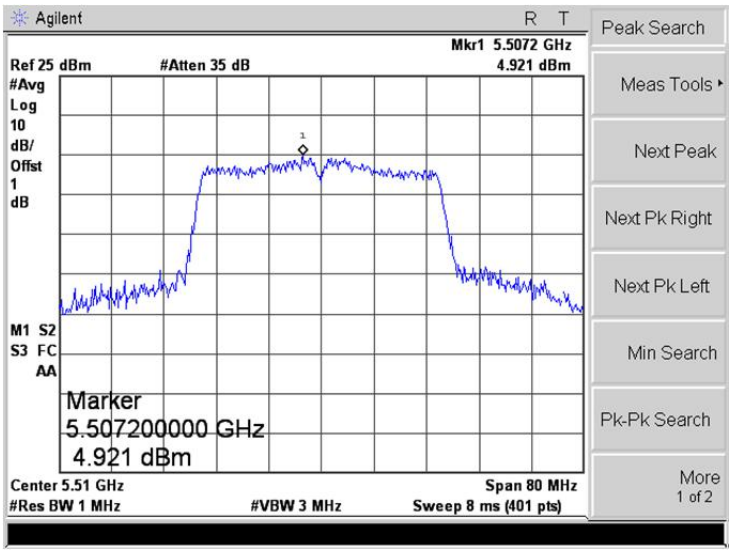
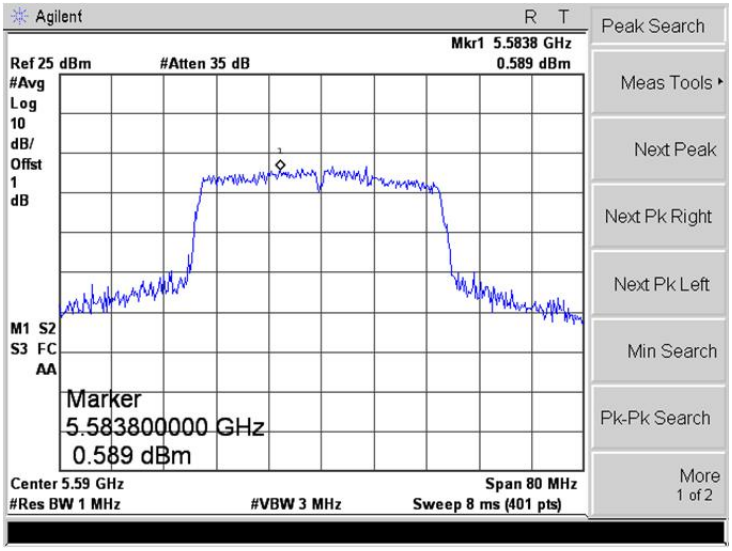
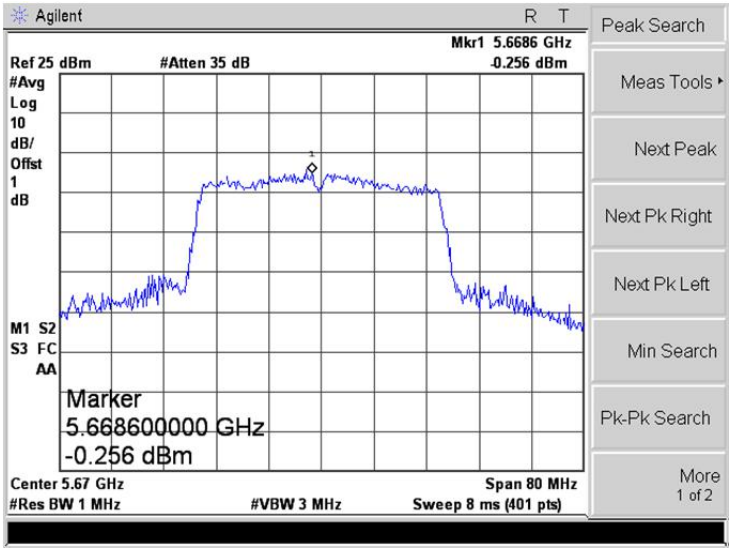
Mode:	802.11n-HT40
5270MHz	
5310MHz	

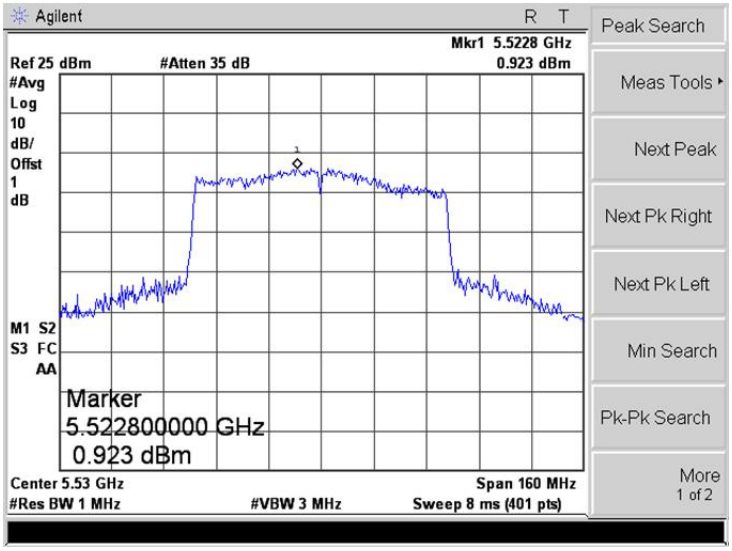
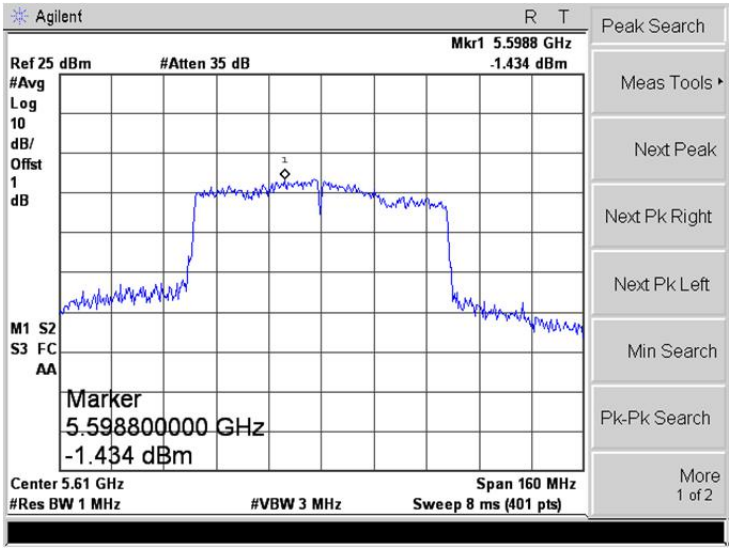
Mode:	802.11ac VH80
5290MHz	

➢ 5470-5725MHz

Mode:	**802.11a**
5500MHz	
5600MHz	
5700MHz	

Mode:	802.11n-HT20
5500MHz	
5600MHz	
5700MHz	

Mode:	802.11n-HT40
5510MHz	
5590MHz	
5670MHz	

Mode:	802.11ac VH80
5530MHz	
5610MHz	

7. Emission Bandwidth and Occupied Bandwidth

7.1 Standard Applicable

According to 15.407(a) and (e):

(1) For the band 5.15-5.25 GHz.
(iv) For mobile and portable 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.

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

7.2 Test Procedure

According to 789033 D02 v02r0r section C&D, the following is the measurement procedure.

1. Emission Bandwidth (EBW)
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 maximum 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%.

2. Minimum Emission Bandwidth for the band 5.725-5.85 GHz
Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.715-5.85 GHz. The following procedure shall be used for measuring this bandwidth:
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 automatic bandwidth measurement capability of a spectrum analyzer or EMI receiver may be employed if it implements the functionality described above.

D. 99 Percent Occupied Bandwidth
The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to 789033 D02 v02r01 General UNII Test Procedures New Rules v01 define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

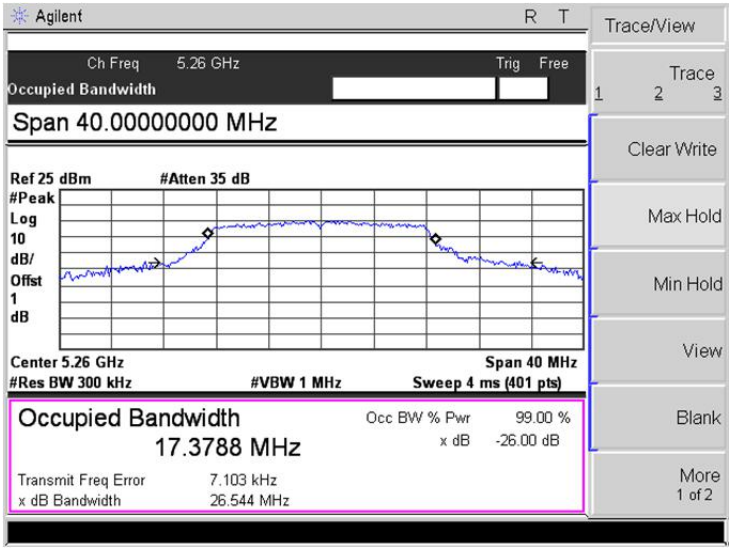
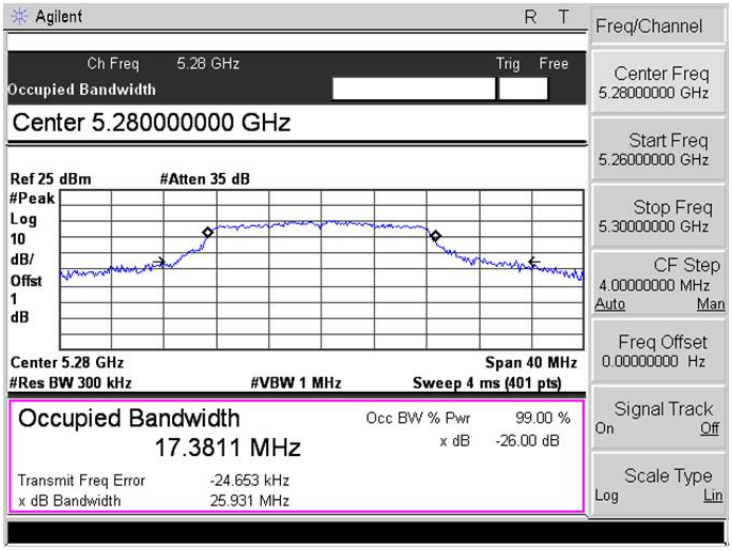
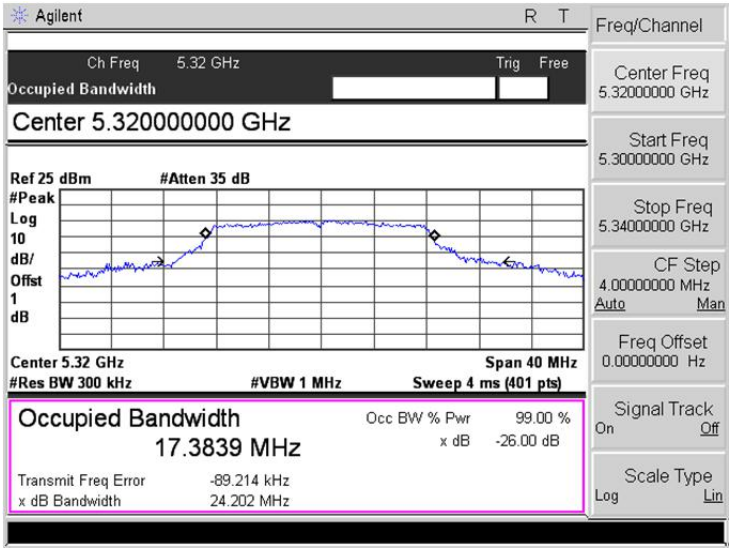
The following procedure shall be used for measuring (99 %) power bandwidth:
1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 * RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

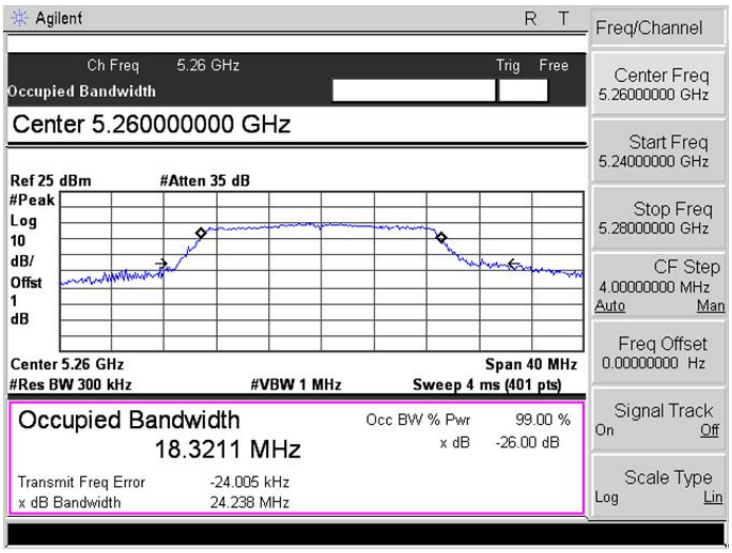
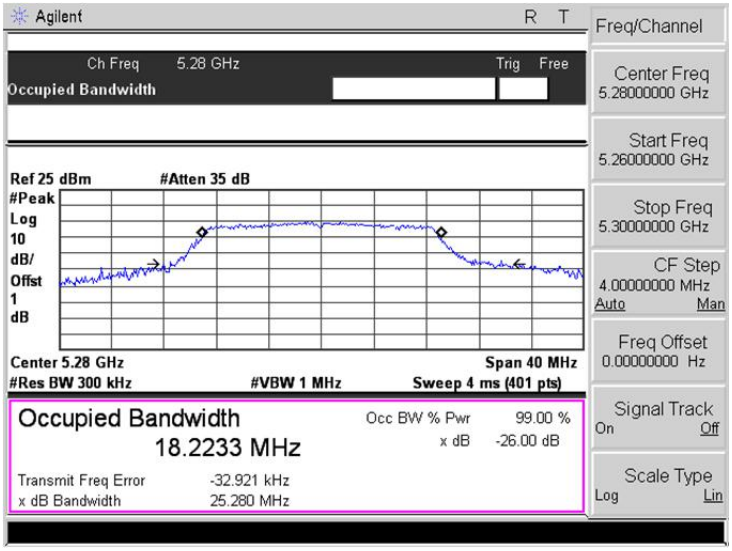
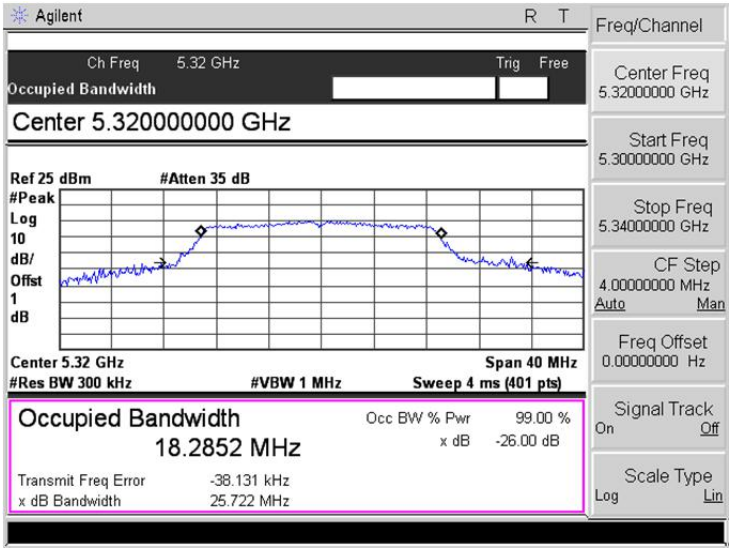
7.3 Summary of Test Results/Plots

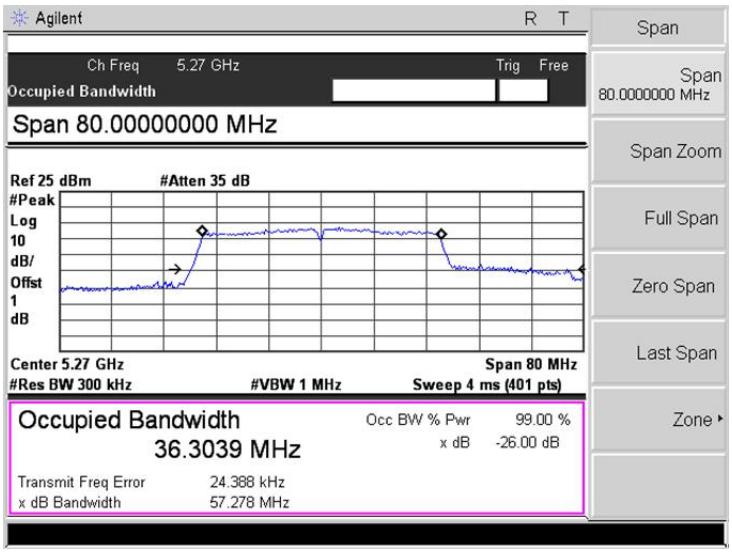
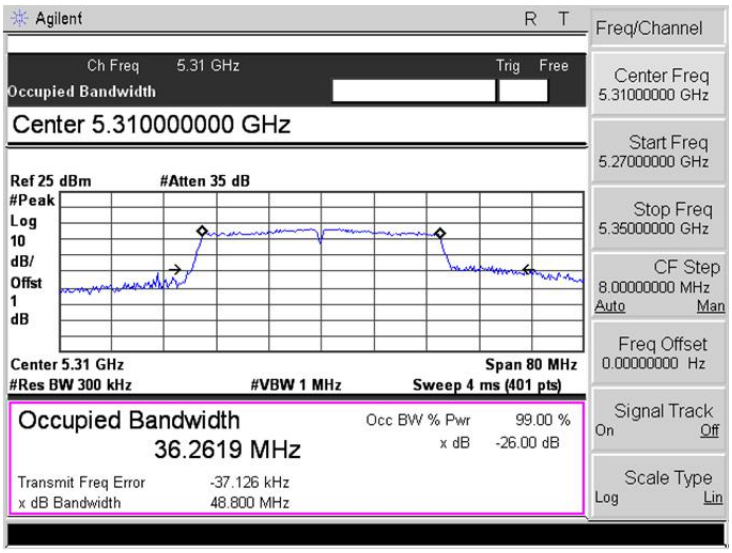
U-NII-2A: 5250-5350MHz				
Test Mode	**Test Channel MHz**	**26 dB Bandwidth MHz**	**99% Bandwidth MHz**	**Limit MHz**
802.11a	5260	26.544	17.3788	Pass
	5280	25.931	17.3811	Pass
	5320	24.202	17.3839	Pass
802.11n-HT20	5260	24.238	18.3211	Pass
	5280	25.280	18.2233	Pass
	5320	25.722	18.2852	Pass
802.11n-HT40	5270	57.278	36.3039	Pass
	5310	48.800	36.2619	Pass
802.11ac-HT80	5290	108.599	75.7427	Pass

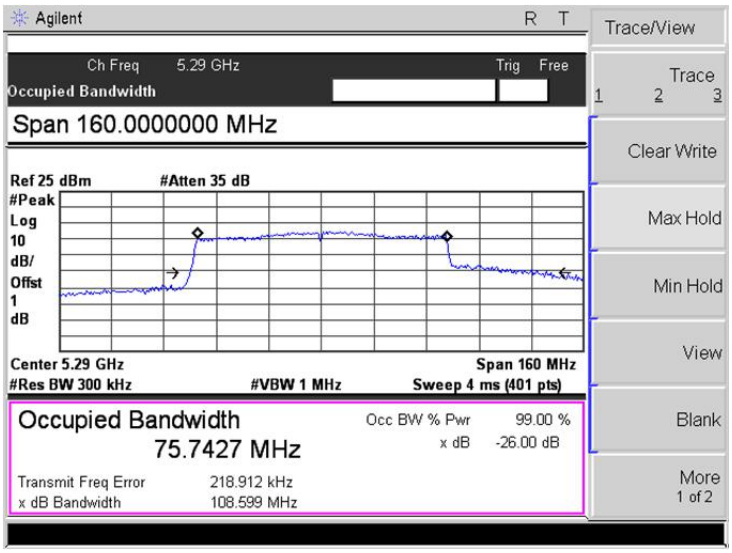
U-NII-2C: 5470-5725MHz				
Test Mode	**Test Channel MHz**	**26 dB Bandwidth MHz**	**99% Bandwidth MHz**	**Limit MHz**
802.11a	5500	23.696	17.2340	Pass
	5600	22.016	17.1582	Pass
	5700	25.504	17.2313	Pass
802.11n-HT20	5500	23.138	18.0851	Pass
	5600	26.106	18.2004	Pass
	5700	23.277	18.1554	Pass
802.11n-HT40	5510	44.625	36.1706	Pass
	5590	40.623	36.2106	Pass
	5670	42.723	36.1804	Pass
802.11ac-HT80	5530	84.438	75.4370	Pass
	5610	88.838	75.6114	Pass

➢ 5250-5350MHz

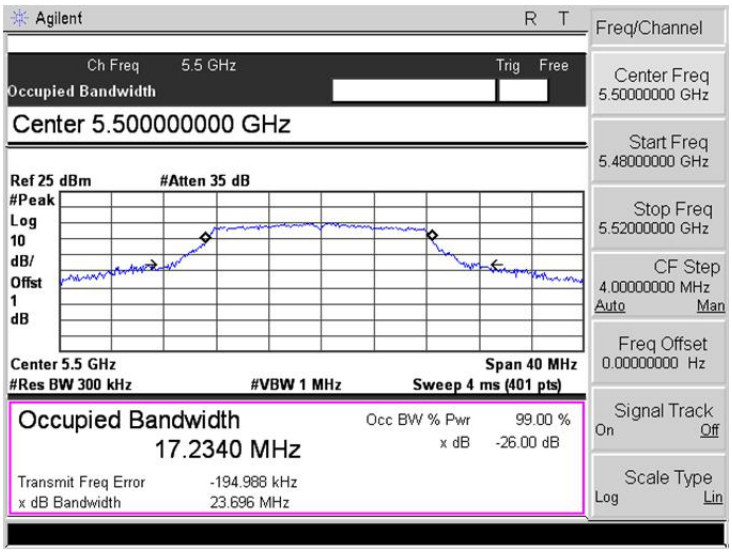
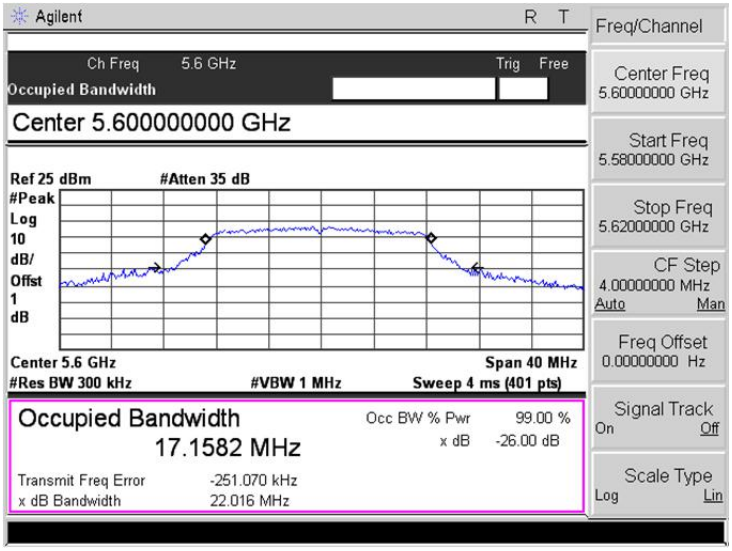
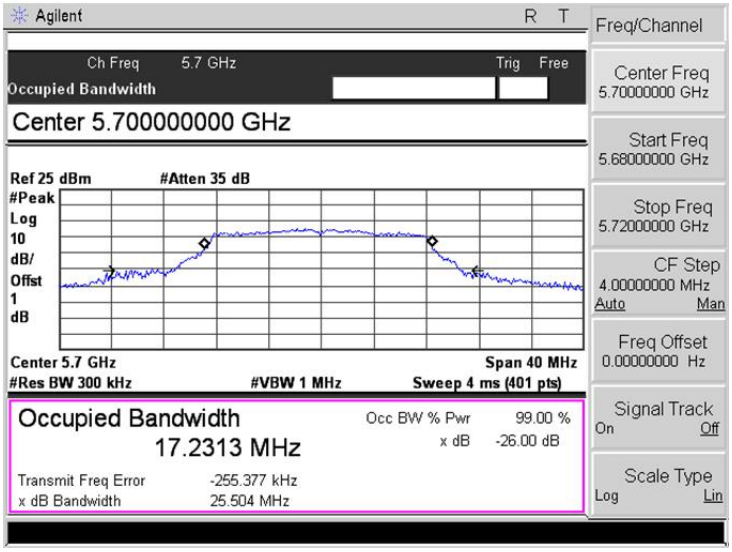
Mode:	802.11a
5260MHz	
5280MHz	
5320MHz	

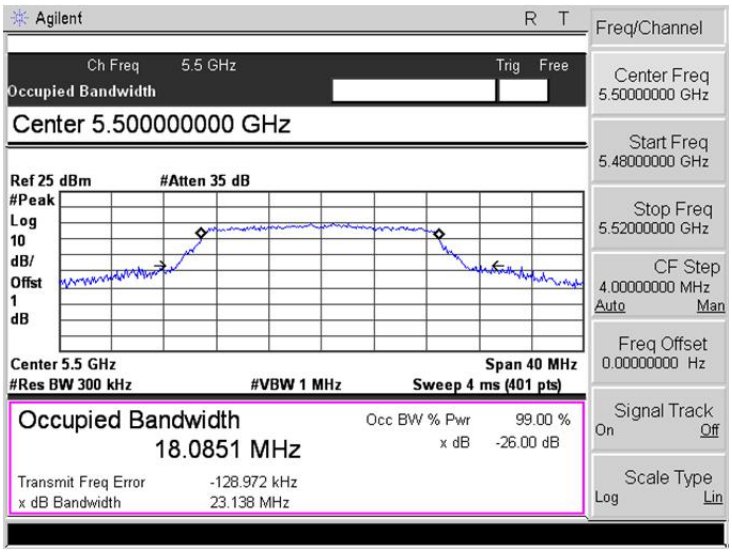
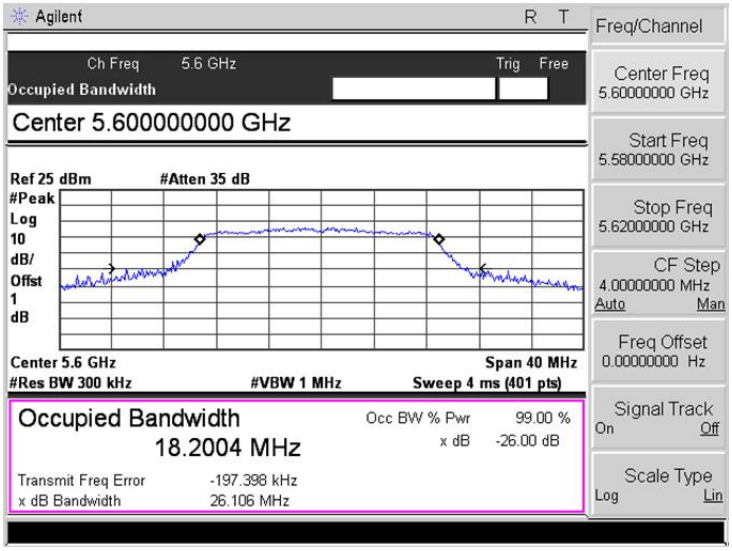
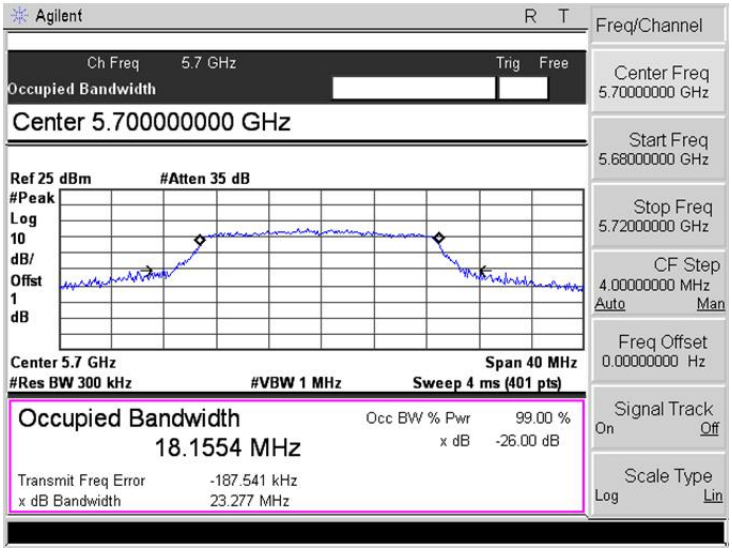
Mode:	802.11n-HT20
5260MHz	
5280MHz	
5320MHz	

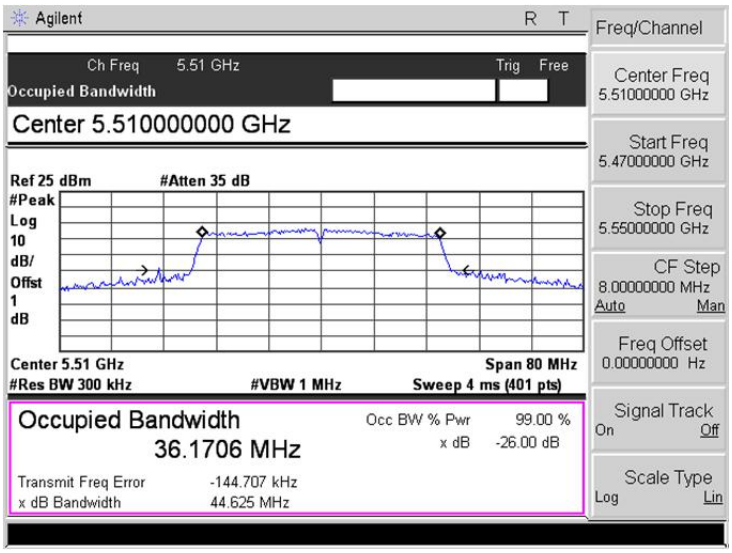
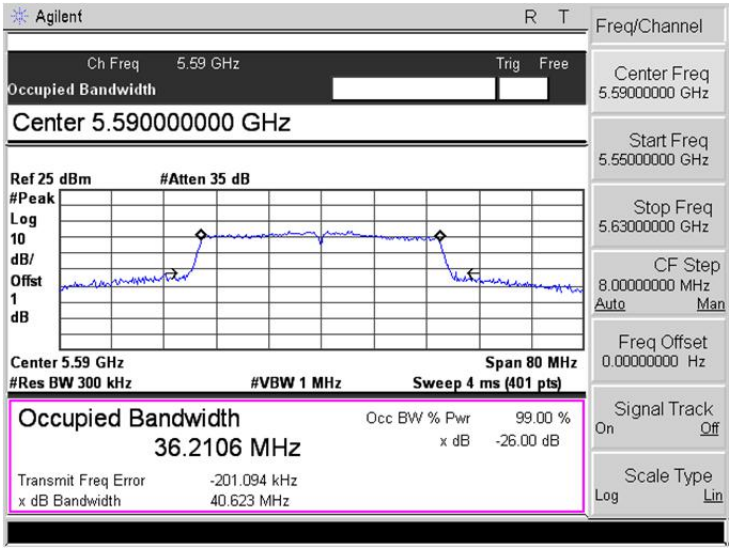
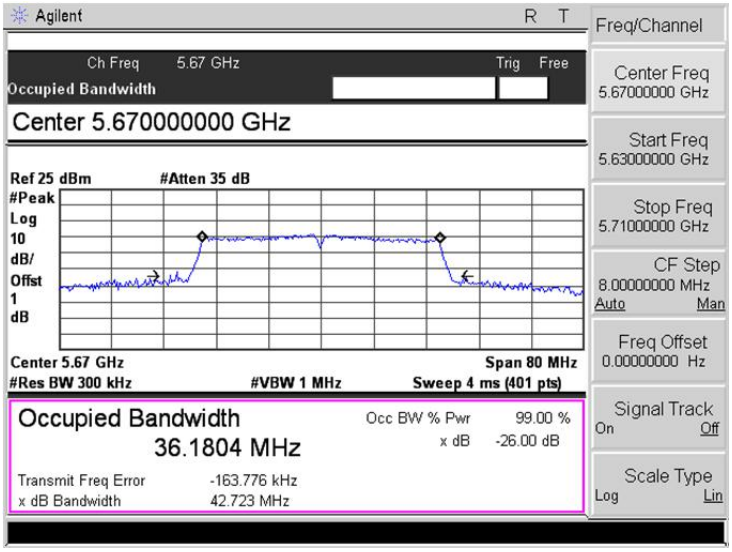
Mode:	802.11n-HT40
5270MHz	
5310MHz	

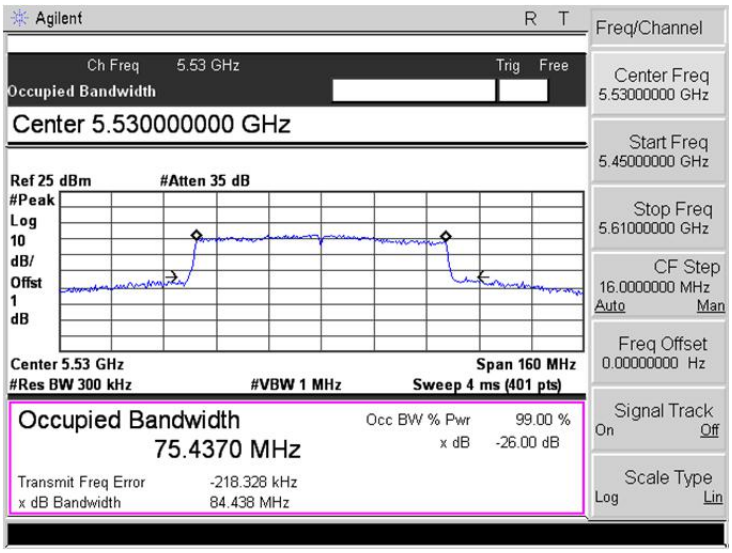
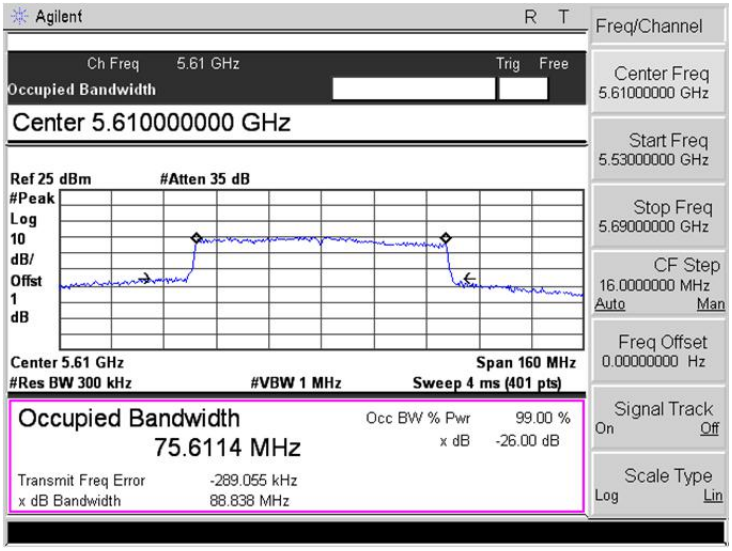
Mode:	802.11ac VH80
5290MHz	

➢ 5470-5725MHz

Mode:	**802.11a**
5500MHz	
5600MHz	
5700MHz	

Mode:	802.11n-HT20
5500MHz	
5600MHz	
5700MHz	

Mode:	802.11n-HT40
5510MHz	
5590MHz	
5670MHz	

Mode:	802.11ac VH80
5530MHz	
5610MHz	

8. Maximum Conducted Output Power

8.1 Standard Applicable

Section 15.407(a) Power limits:

(1) For the band 5.15-5.25 GHz.
(iv) For mobile and portable 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.

8.2 Test Procedure

According to KDB789033 D02 v02r01 section E, the following is the measurement procedure.

(i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.

(vii) If transmit duty cycle < 98 percent, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle ≥ 98 percent, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run".

(viii) Trace average at least 100 traces in power averaging (i.e., RMS) mode.

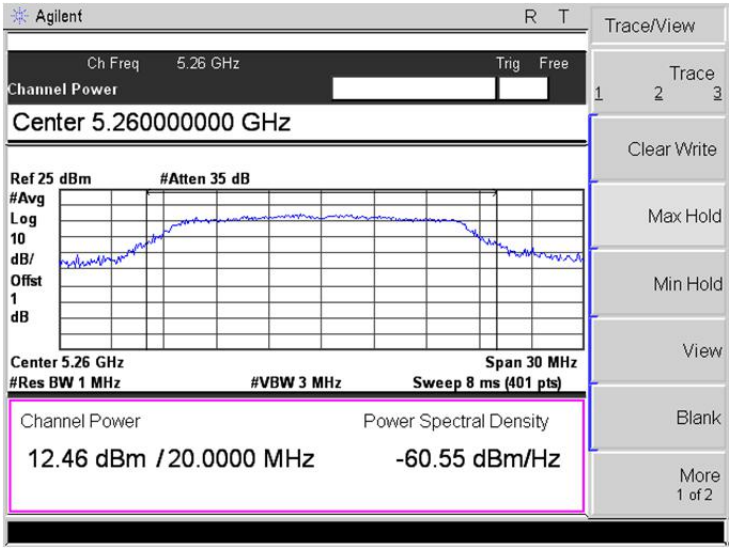
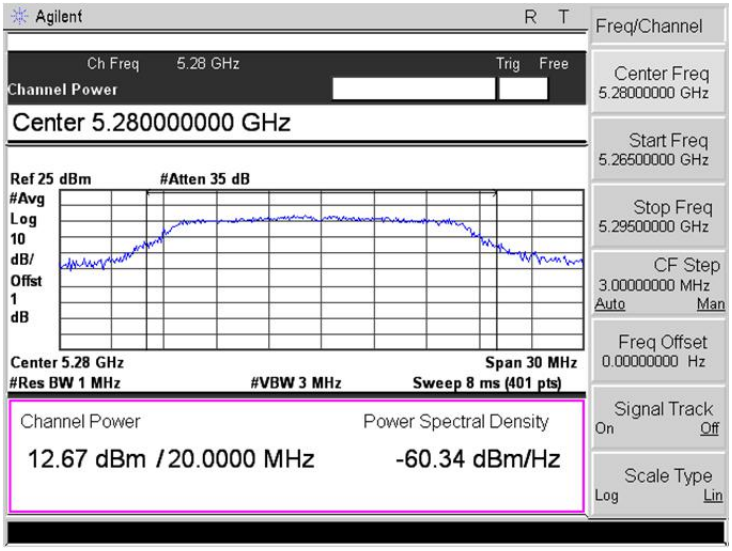
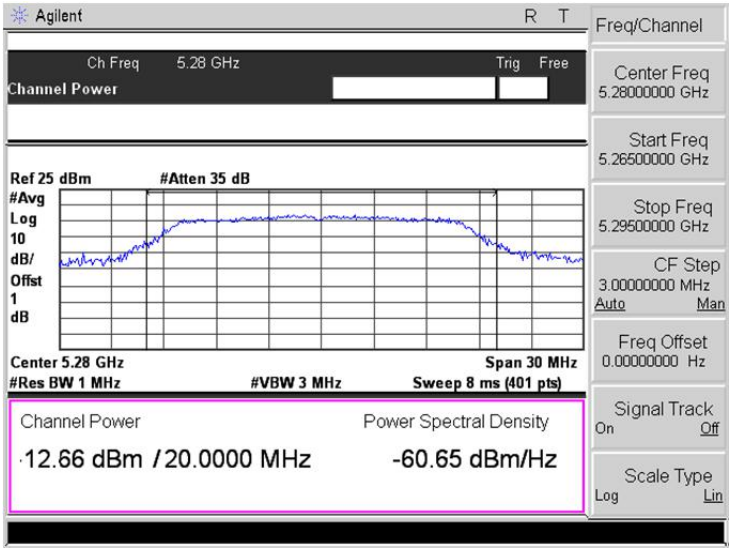
(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

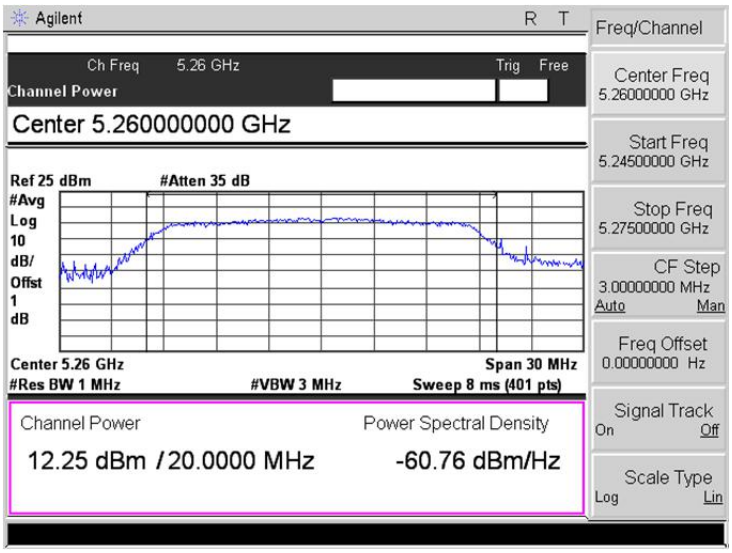
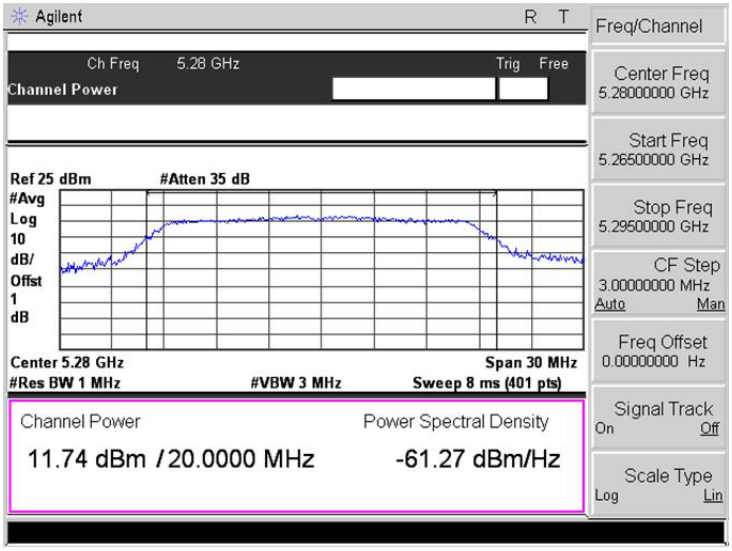
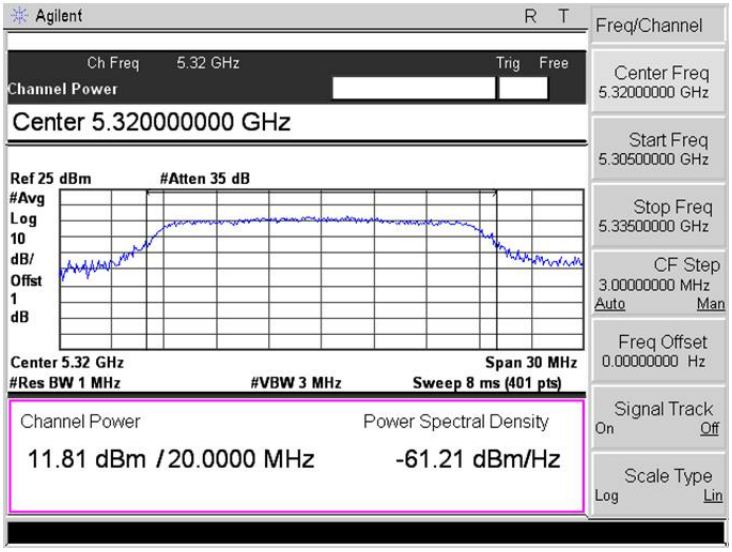
8.3 Summary of Test Results/Plots

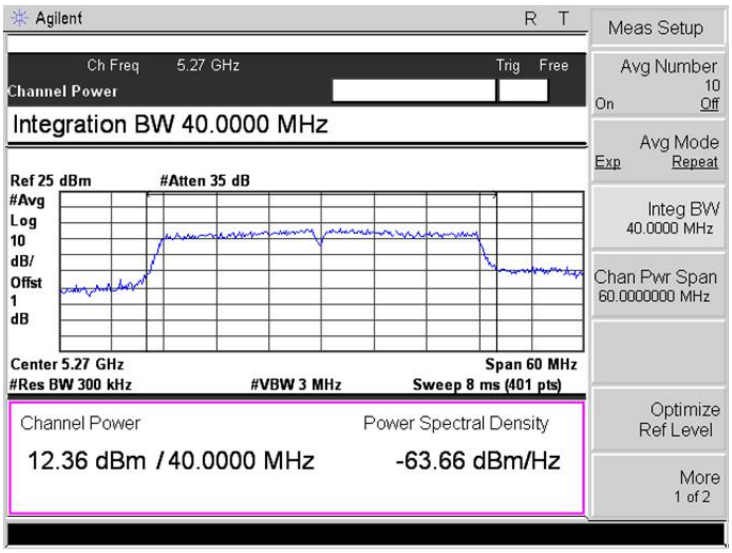
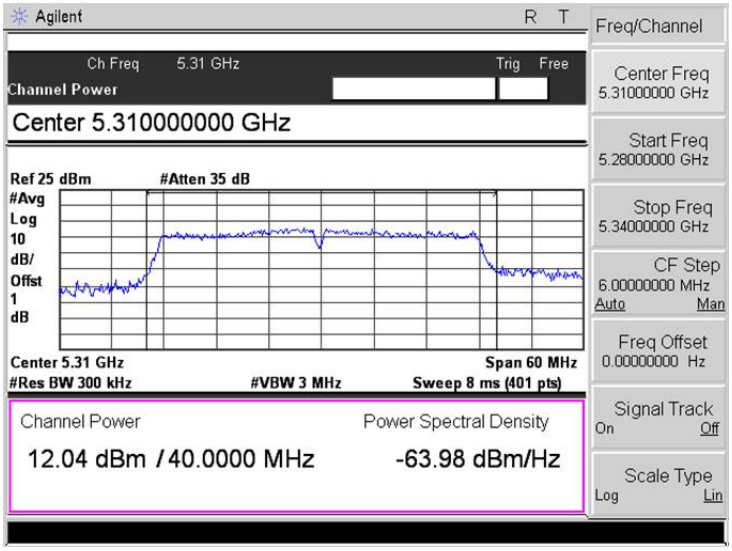
U-NII-2A: 5250-5350MHz				
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5260	12.46	17.62	250
	5280	12.67	18.49	250
	5320	12.66	18.45	250
802.11n-HT20	5260	12.25	16.79	250
	5280	11.74	14.93	250
	5320	11.81	15.17	250
802.11n-HT40	5270	12.36	17.22	250
	5310	12.04	16.00	250
802.11ac VH80	5290	11.92	15.56	250

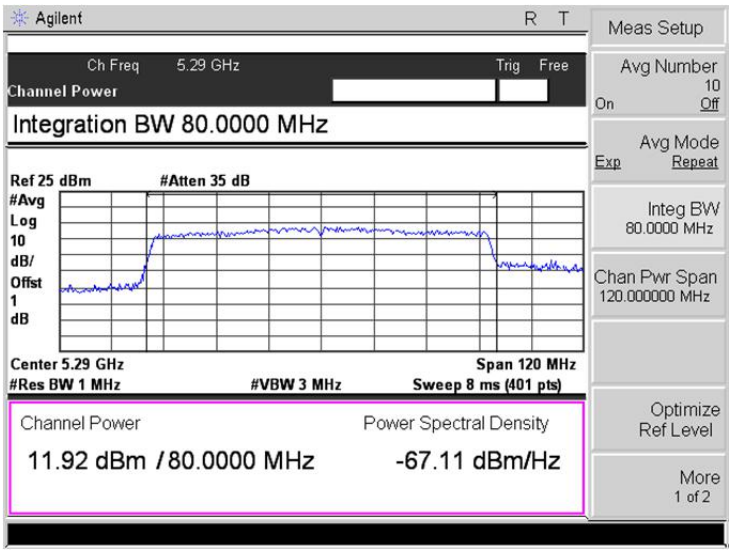
U-NII-2C: 5470-5725MHz				
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5500	12.45	17.58	250
	5600	8.99	7.93	250
	5700	7.39	5.48	250
802.11n-HT20	5500	11.83	15.24	250
	5600	8.00	6.31	250
	5700	6.55	4.52	250
802.11n-HT40	5510	12.15	16.41	250
	5590	9.43	8.77	250
	5670	7.61	5.77	250
802.11ac VH80	5530	10.30	10.72	250
	5610	8.04	6.37	250

➢ 5250-5350MHz

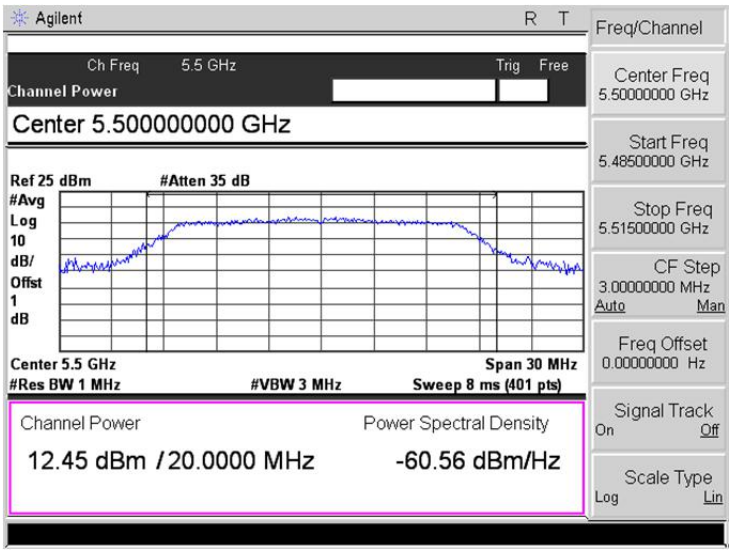
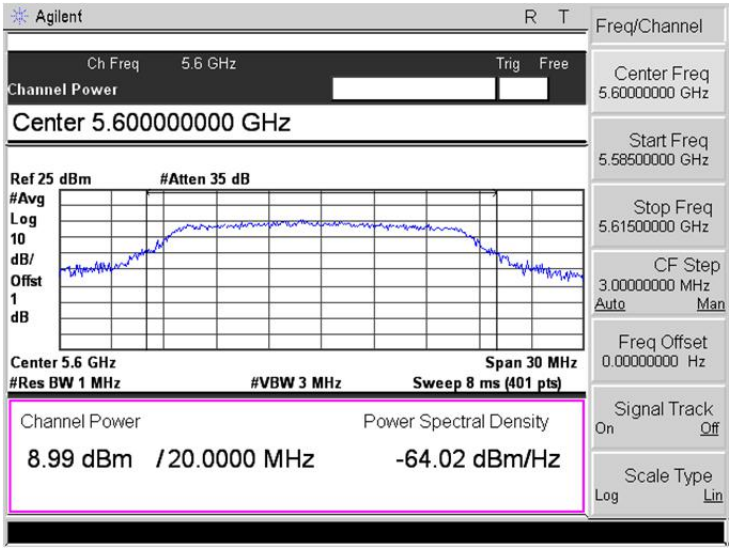
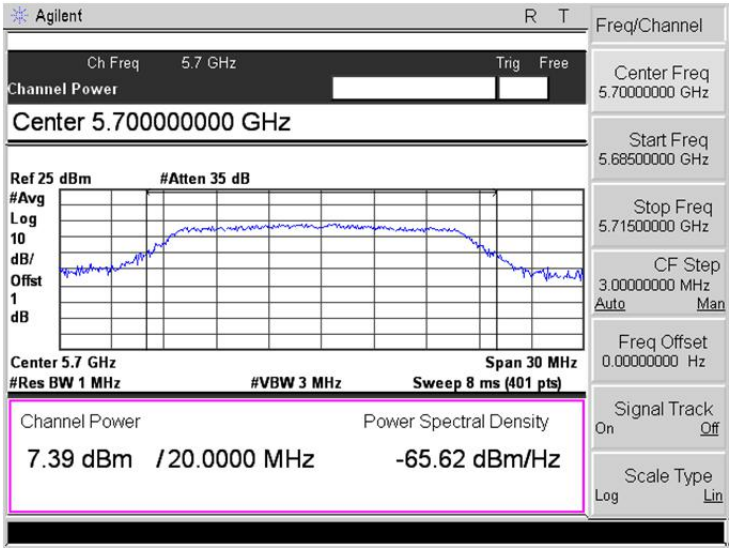
Mode:	802.11a
5260MHz	
5280MHz	
5320MHz	

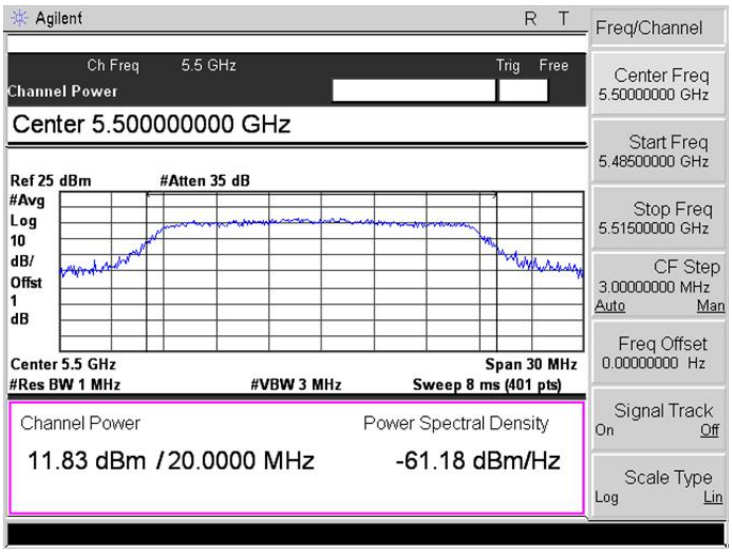
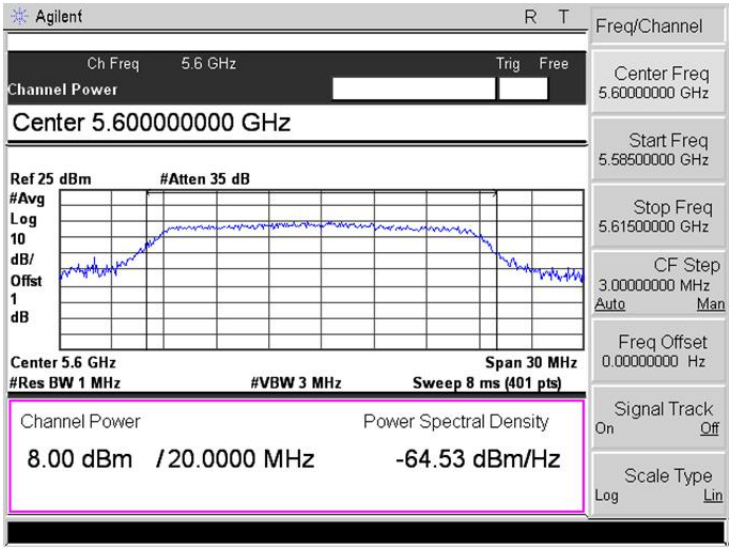
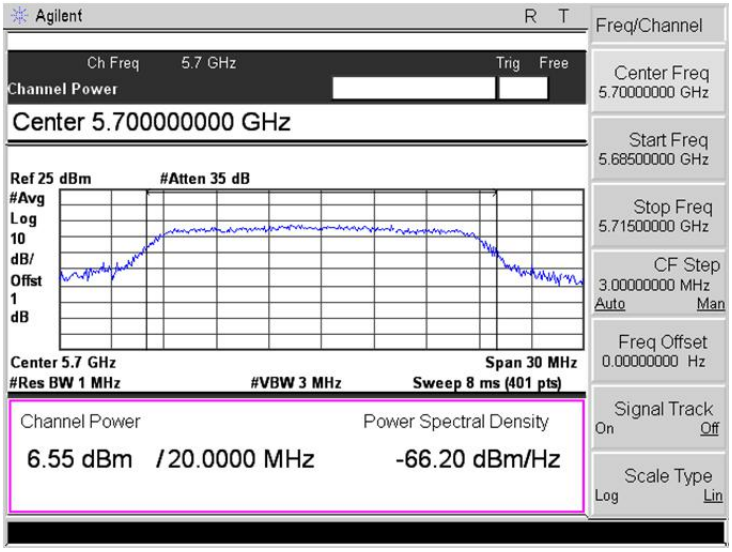
Mode:	802.11n-HT20
5260MHz	
5280MHz	
5320MHz	

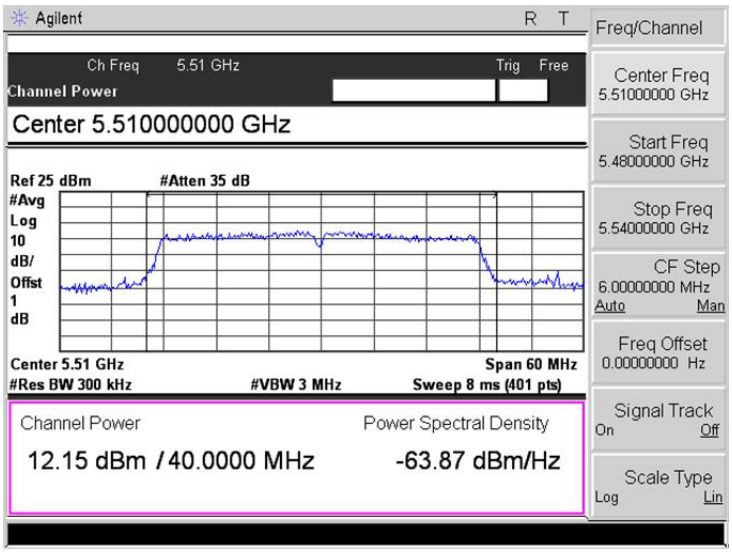
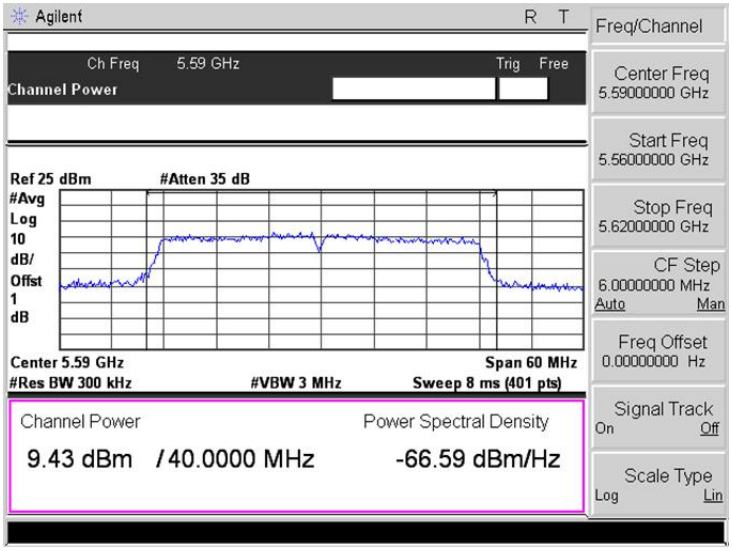
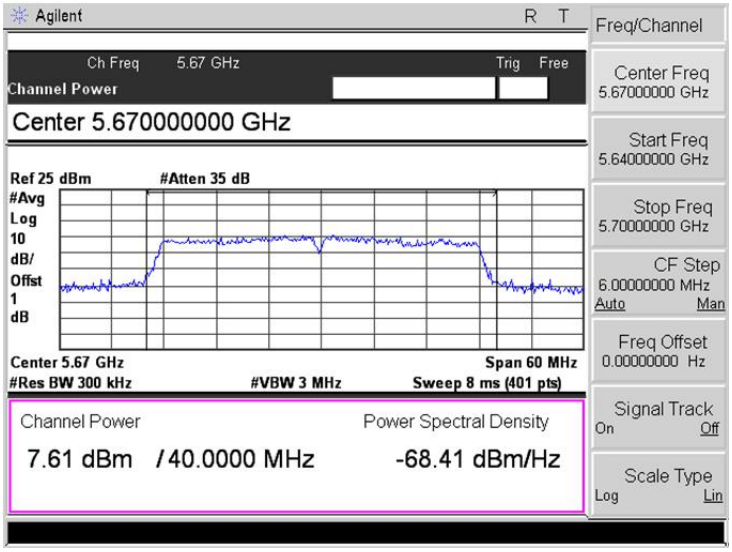
Mode:	802.11n-HT40
5270MHz	
5310MHz	

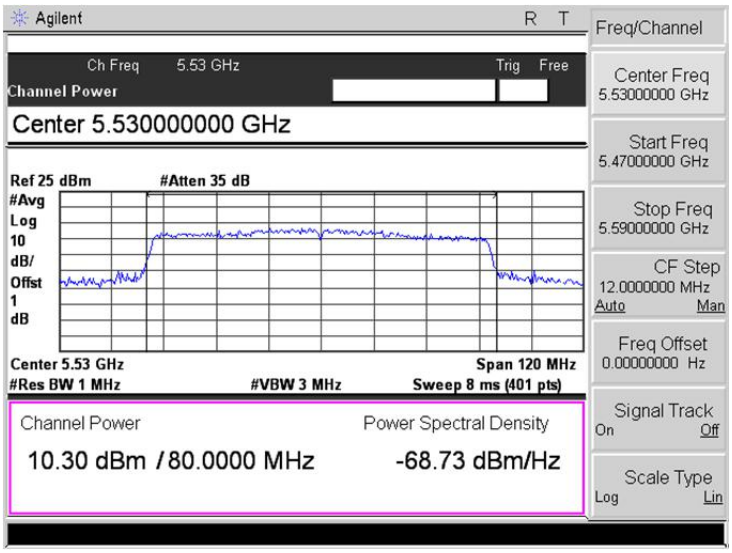
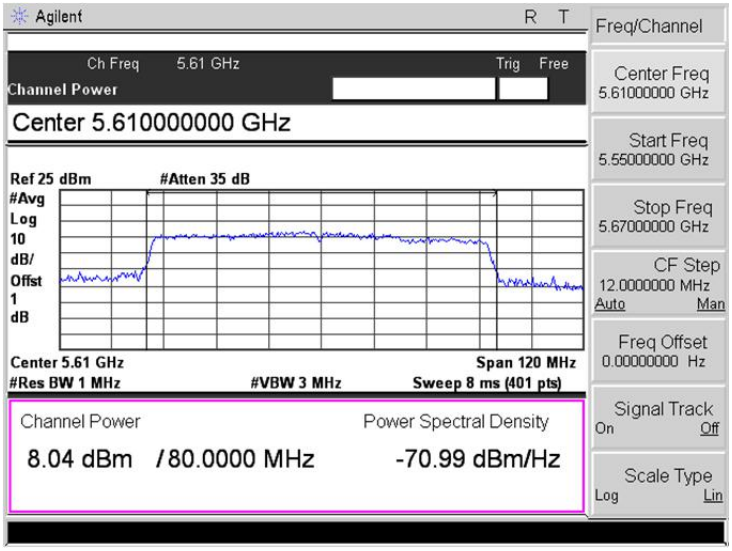
Mode:	802.11ac VH80
5290MHz	

➢ 5470-5725MHz

Mode:	**802.11a**
5500MHz	
5600MHz	
5700MHz	

Mode:	802.11n-HT20
5500MHz	
5600MHz	
5700MHz	

Mode:	802.11n-HT40
5510MHz	
5590MHz	
5670MHz	

Mode:	802.11ac VH80
5530MHz	
5610MHz	

9. Radiated Spurious Emissions

9.1 Standard Applicable

According to §15.407(b), undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

According to §15.407(b)(6), Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

According to §15.407(b)(7), The provisions of §15.205 apply to intentional radiators operating under this section.

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If radiated measurements are performed, field strength is then converted to EIRP as follows:

EIRP = ((E*d)^2) / 30

where:

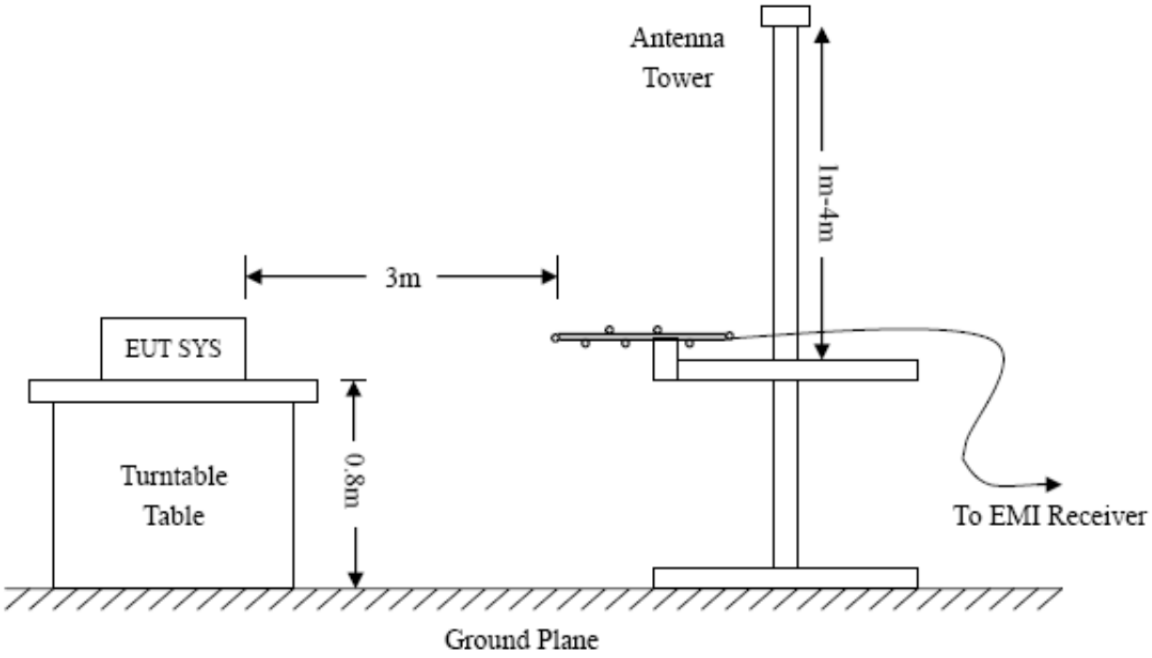
- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

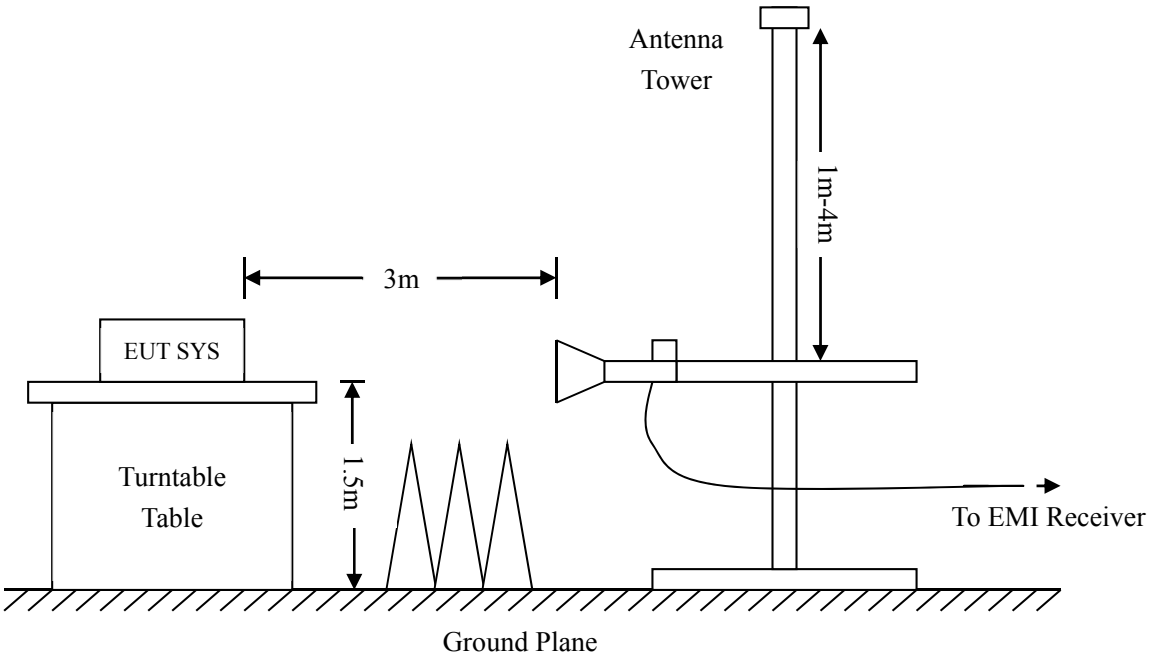
9.2 Test Procedure

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.205 15.407(b)(6) and FCC Part 15.209 Limit..

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.


Antenna
Tower
1m-4m
3m
EUT SYS
Turntable
Table
0.8m
To EMI Receiver
Ground Plane


Antenna
Tower
1m-4m
3m
EUT SYS
Turntable
Table
1.5m
To EMI Receiver
Ground Plane

9.3 Test Receiver Setup

During the radiated emission test for above 1GHz, the test receiver was set with the following configurations:

For peak detector:
RBW = 1000kHz, VBW = 3000kHz, Sweep Time = Auto

For average detector:
RBW = 1000kHz, VBW = 10Hz, Sweep Time = Auto

9.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated adding the Antenna Factor and the Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Ant. Factor + Cable Loss – Ampl. Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -6dBμV means the emission is 6dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – FCC Part 15 Limit

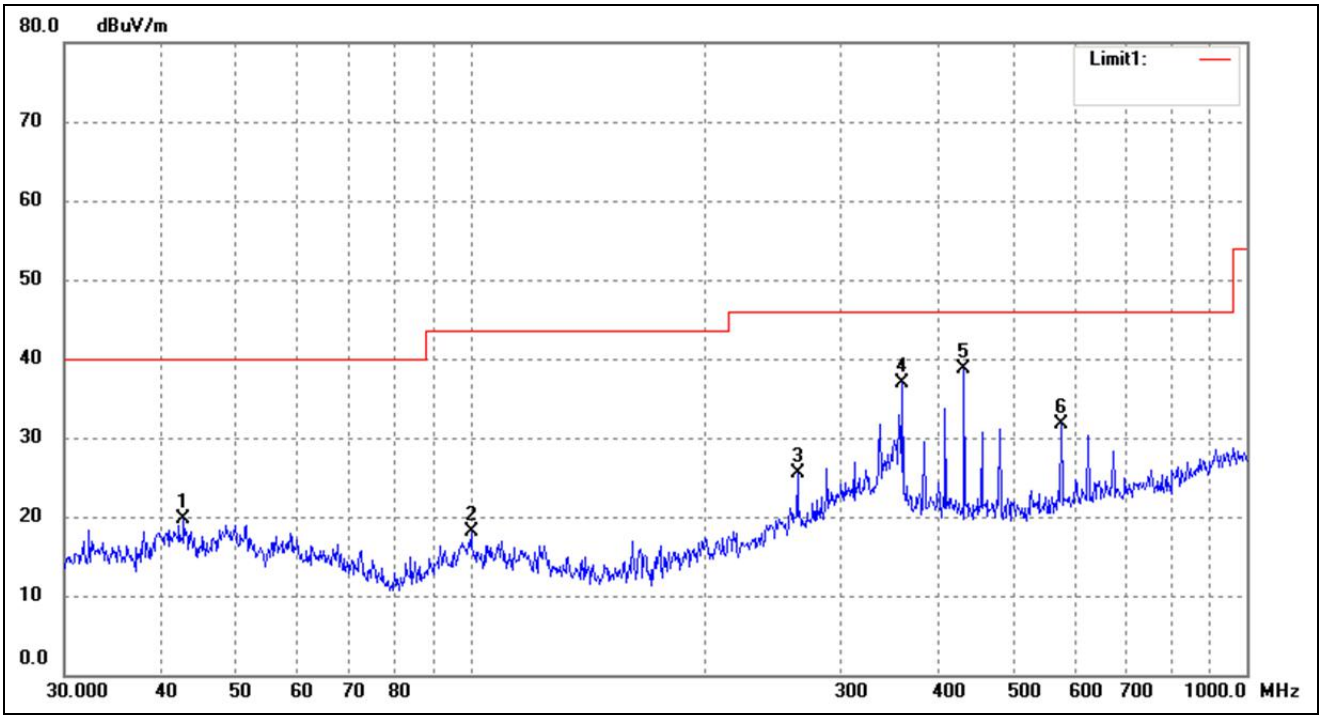
9.5 Summary of Test Results/Plots

Note: *this EUT was tested in 3 orthogonal positions and the worst case position data was reported.*

- Spurious Emission From 30 MHz to 1 GHz

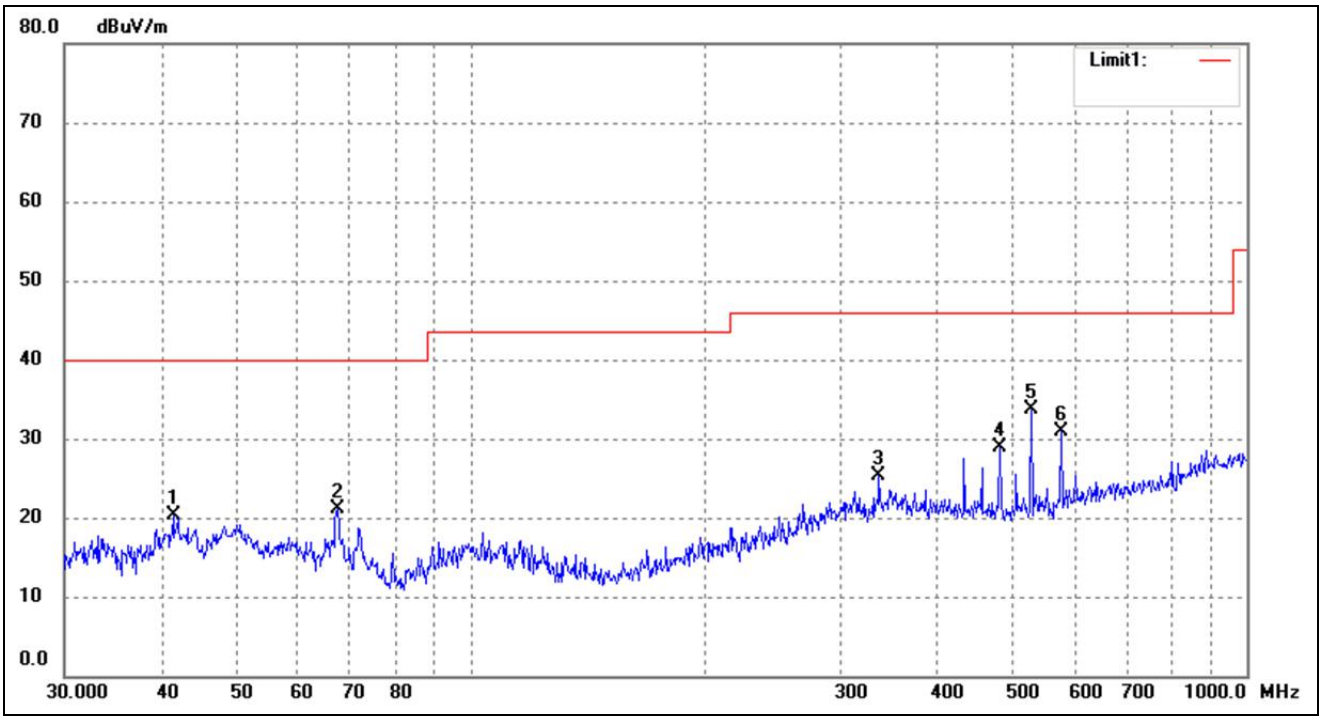
- 5250-5350MHzs

802.11a(Worst case)			
Test Channel	5260MHz	Polarity:	Horizontal



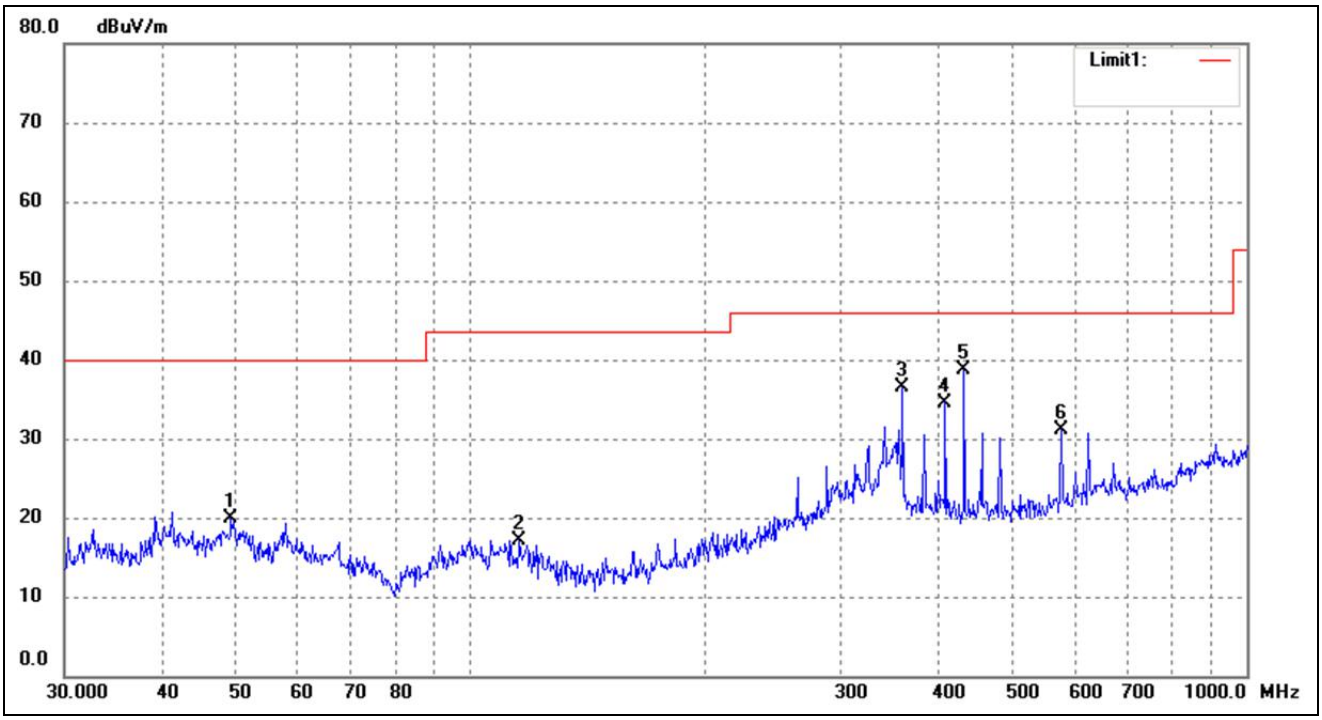
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	42.7496	33.71	-14.04	19.67	40.00	-20.33	331	100	peak
2	100.2286	32.95	-14.92	18.03	43.50	-25.47	98	100	peak
3	263.8190	35.78	-10.21	25.57	46.00	-20.43	342	100	peak
4	360.4477	44.61	-7.75	36.86	46.00	-9.14	95	100	peak
5	432.5457	46.71	-8.01	38.70	46.00	-7.30	201	100	peak
6	576.6443	38.02	-6.25	31.77	46.00	-14.23	313	100	peak

802.11a(Worst case)			
Test Channel	5260MHz	Polarity:	Vertical



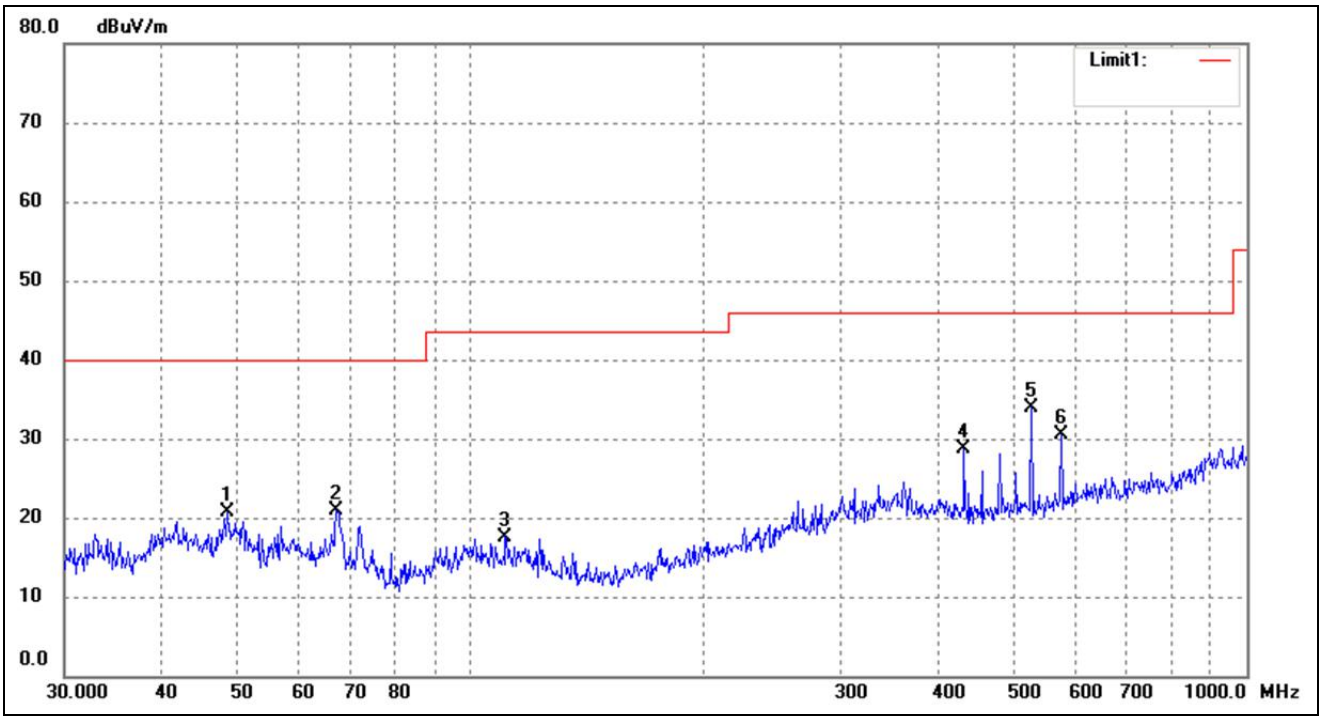
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	41.4215	34.33	-14.09	20.24	40.00	-19.76	356	100	peak
2	67.4382	37.55	-16.49	21.06	40.00	-18.94	130	100	peak
3	336.0352	33.30	-8.08	25.22	46.00	-20.78	137	100	peak
4	480.5276	37.04	-8.05	28.99	46.00	-17.01	130	100	peak
5	528.2458	41.69	-7.96	33.73	46.00	-12.27	304	100	peak
6	576.6443	37.15	-6.25	30.90	46.00	-15.10	320	100	peak

802.11a(Worst case)			
Test Channel	5280MHz	Polarity:	Horizontal



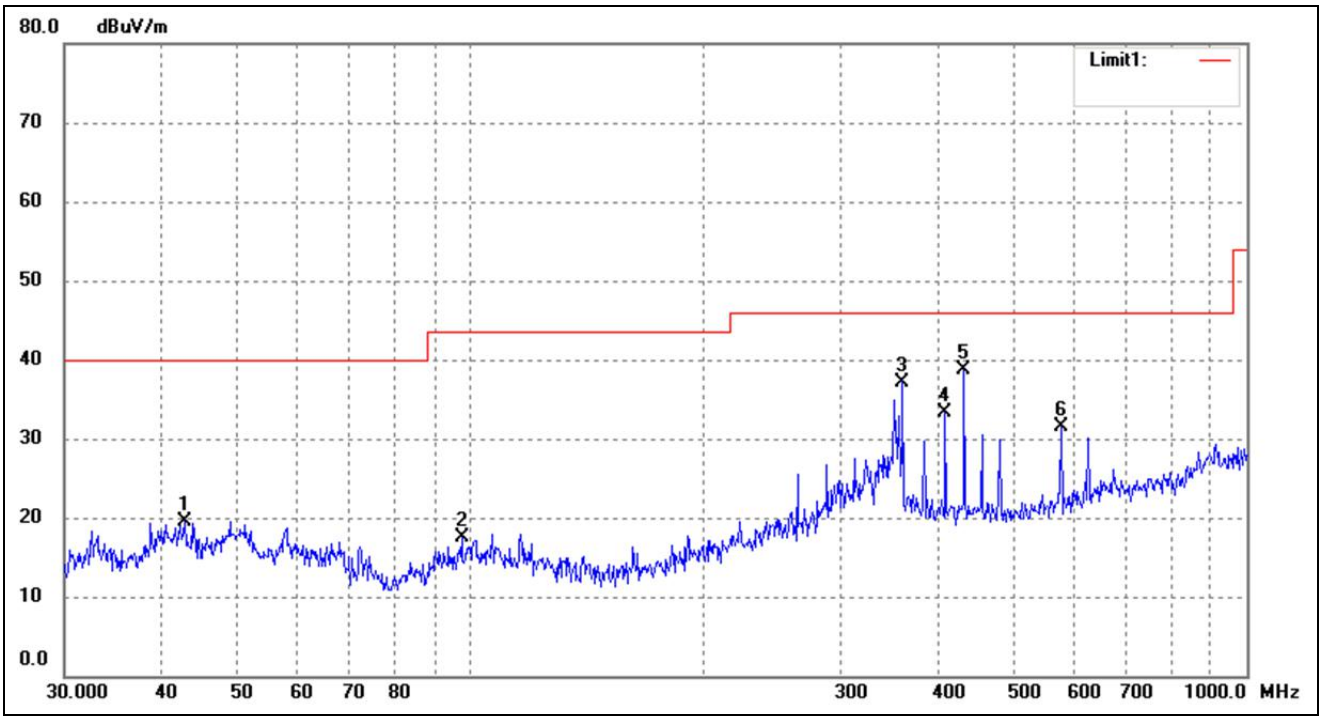
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	49.1866	33.64	-13.68	19.96	40.00	-20.04	190	100	peak
2	115.7256	32.45	-15.27	17.18	43.50	-26.32	222	100	peak
3	360.4477	44.18	-7.75	36.43	46.00	-9.57	62	100	peak
4	408.9460	42.48	-7.88	34.60	46.00	-11.40	199	100	peak
5	432.5457	46.73	-8.01	38.72	46.00	-7.28	114	100	peak
6	576.6443	37.32	-6.25	31.07	46.00	-14.93	281	100	peak

802.11a(Worst case)			
Test Channel	5280MHz	Polarity:	Vertical



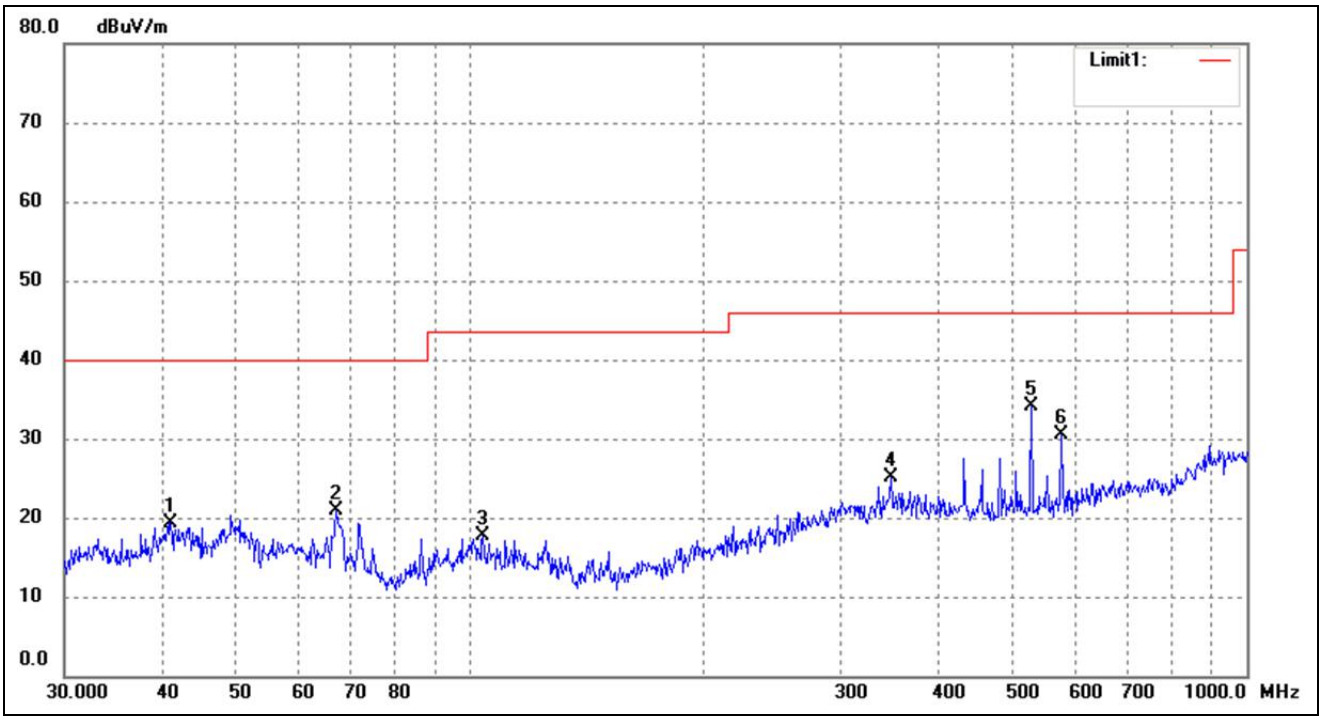
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	48.6719	34.32	-13.71	20.61	40.00	-19.39	345	100	peak
2	67.2022	37.31	-16.45	20.86	40.00	-19.14	90	100	peak
3	110.9571	32.46	-14.86	17.60	43.50	-25.90	79	100	peak
4	432.5457	36.68	-8.01	28.67	46.00	-17.33	113	100	peak
5	528.2458	41.94	-7.96	33.98	46.00	-12.02	80	100	peak
6	576.6443	36.77	-6.25	30.52	46.00	-15.48	164	100	peak

802.11a(Worst case)			
Test Channel	5320MHz	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	42.8998	33.57	-14.03	19.54	40.00	-20.46	191	100	peak
2	97.4560	33.03	-15.44	17.59	43.50	-25.91	157	100	peak
3	360.4477	44.95	-7.75	37.20	46.00	-8.80	58	100	peak
4	408.9460	41.28	-7.88	33.40	46.00	-12.60	112	100	peak
5	432.5457	46.81	-8.01	38.80	46.00	-7.20	196	100	peak
6	576.6443	37.77	-6.25	31.52	46.00	-14.48	174	100	peak

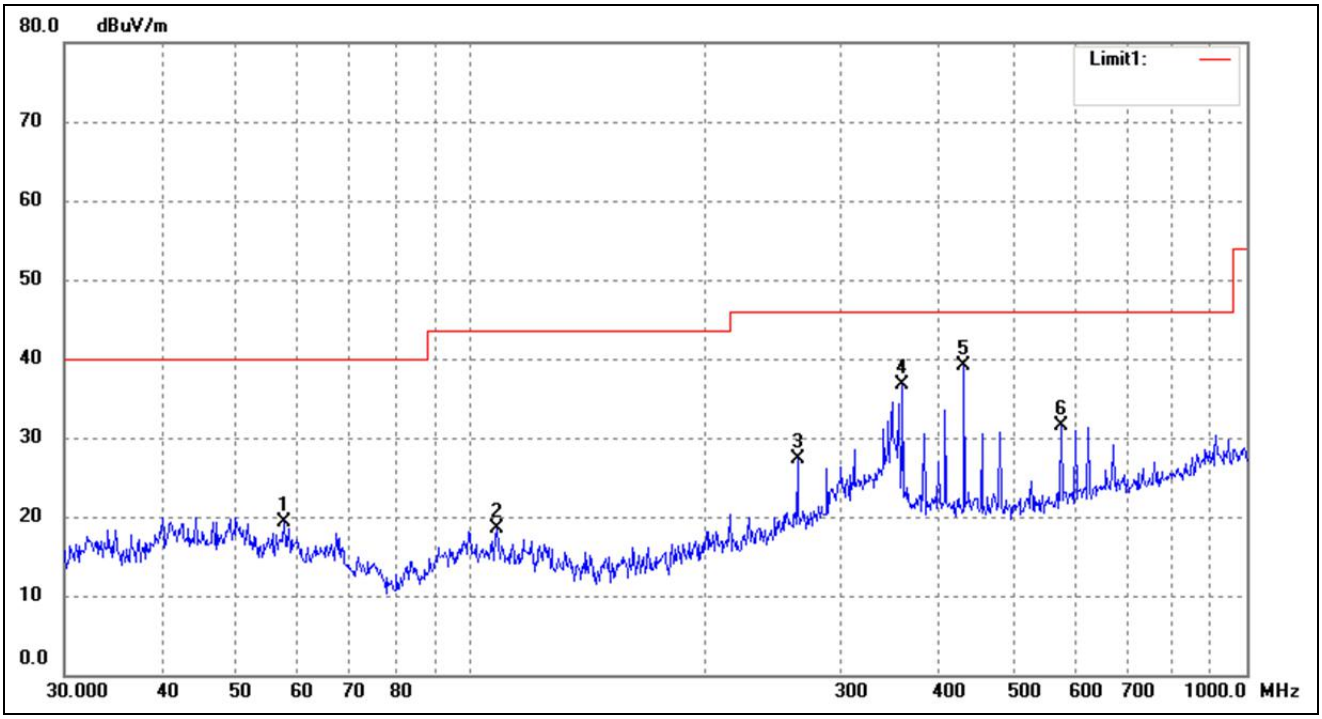
802.11a(Worst case)			
Test Channel	5320MHz	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	41.1320	33.40	-14.10	19.30	40.00	-20.70	262	100	peak
2	67.2022	37.27	-16.45	20.82	40.00	-19.18	91	100	peak
3	103.8055	32.50	-14.86	17.64	43.50	-25.86	80	100	peak
4	348.0274	32.85	-7.65	25.20	46.00	-20.80	100	100	peak
5	528.2458	42.12	-7.96	34.16	46.00	-11.84	95	100	peak
6	576.6443	36.75	-6.25	30.50	46.00	-15.50	139	100	peak

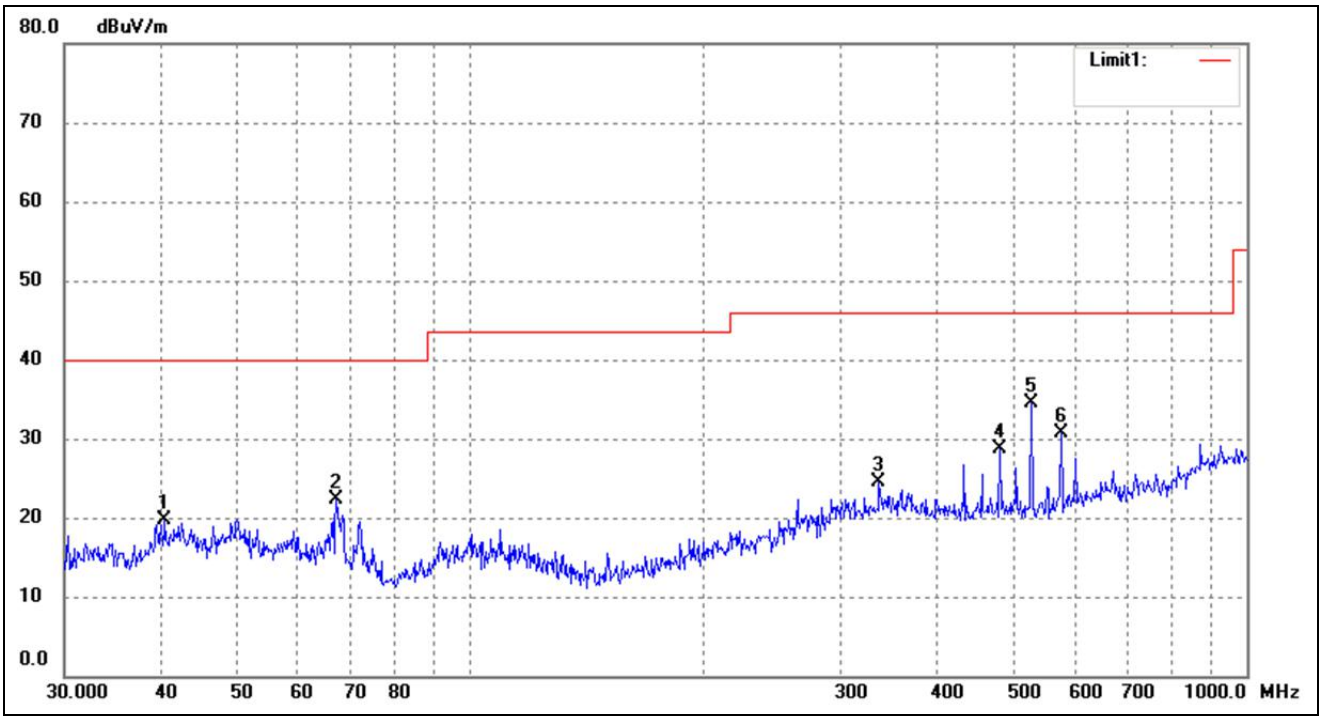
➢ 5470-5725MHz

802.11a(worst case)			
Test Channel	5500MHz	Polarity:	Horizontal



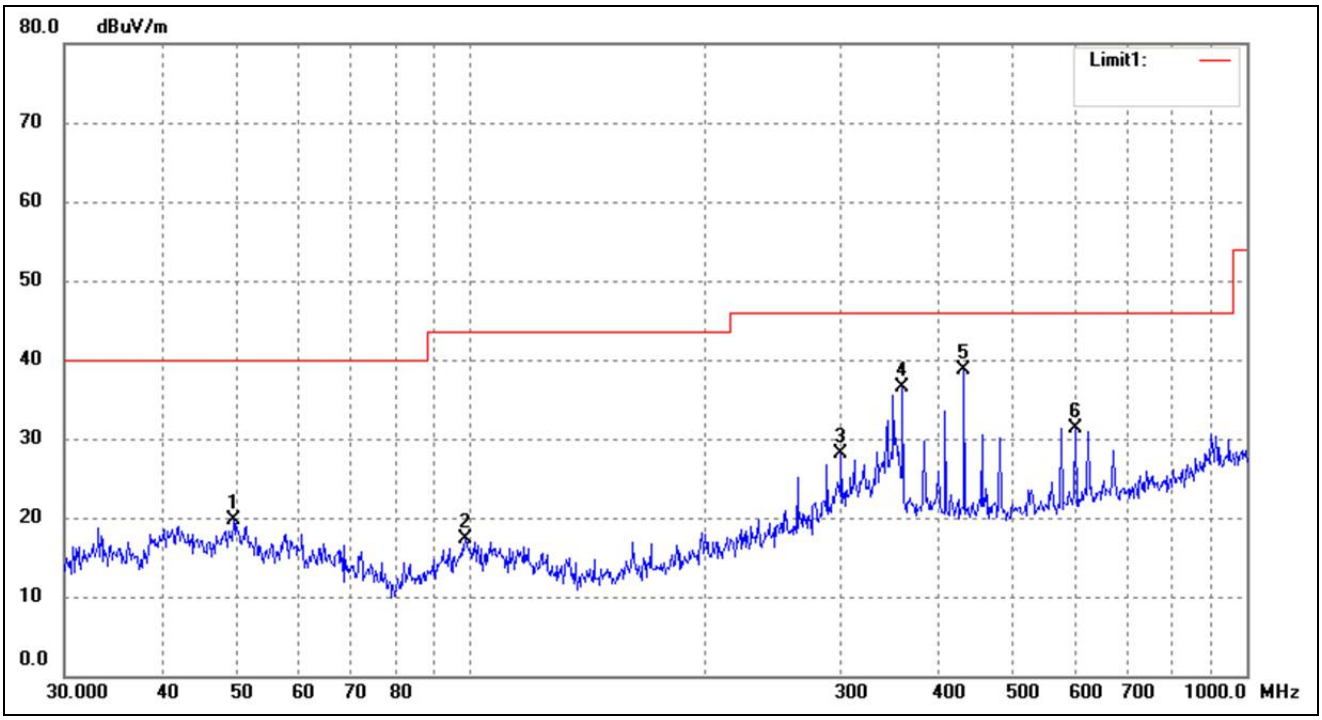
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	57.5939	34.44	-15.13	19.31	40.00	-20.69	187	100	peak
2	108.2667	33.34	-14.79	18.55	43.50	-24.95	215	100	peak
3	263.8190	37.50	-10.21	27.29	46.00	-18.71	65	100	peak
4	360.4477	44.53	-7.75	36.78	46.00	-9.22	183	100	peak
5	432.5457	47.04	-8.01	39.03	46.00	-6.97	139	100	peak
6	576.6443	37.66	-6.25	31.41	46.00	-14.59	216	100	peak

802.11a(worst case)			
Test Channel	5500MHz	Polarity:	Vertical



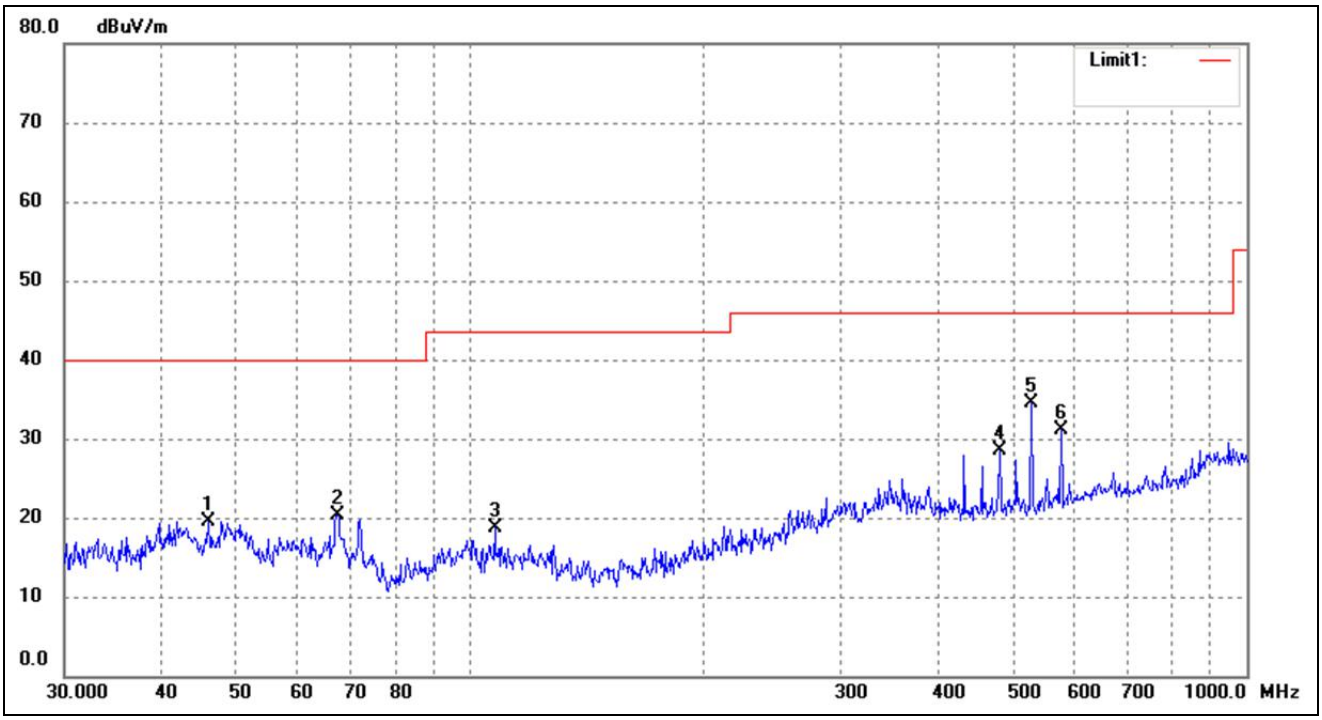
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	40.4172	33.84	-14.14	19.70	40.00	-20.30	290	100	peak
2	67.2022	38.73	-16.45	22.28	40.00	-17.72	198	100	peak
3	336.0352	32.62	-8.08	24.54	46.00	-21.46	83	100	peak
4	480.5276	36.83	-8.05	28.78	46.00	-17.22	240	100	peak
5	528.2458	42.49	-7.96	34.53	46.00	-11.47	94	100	peak
6	576.6443	36.97	-6.25	30.72	46.00	-15.28	124	100	peak

802.11a(worst case)			
Test Channel	5600MHz	Polarity:	Horizontal



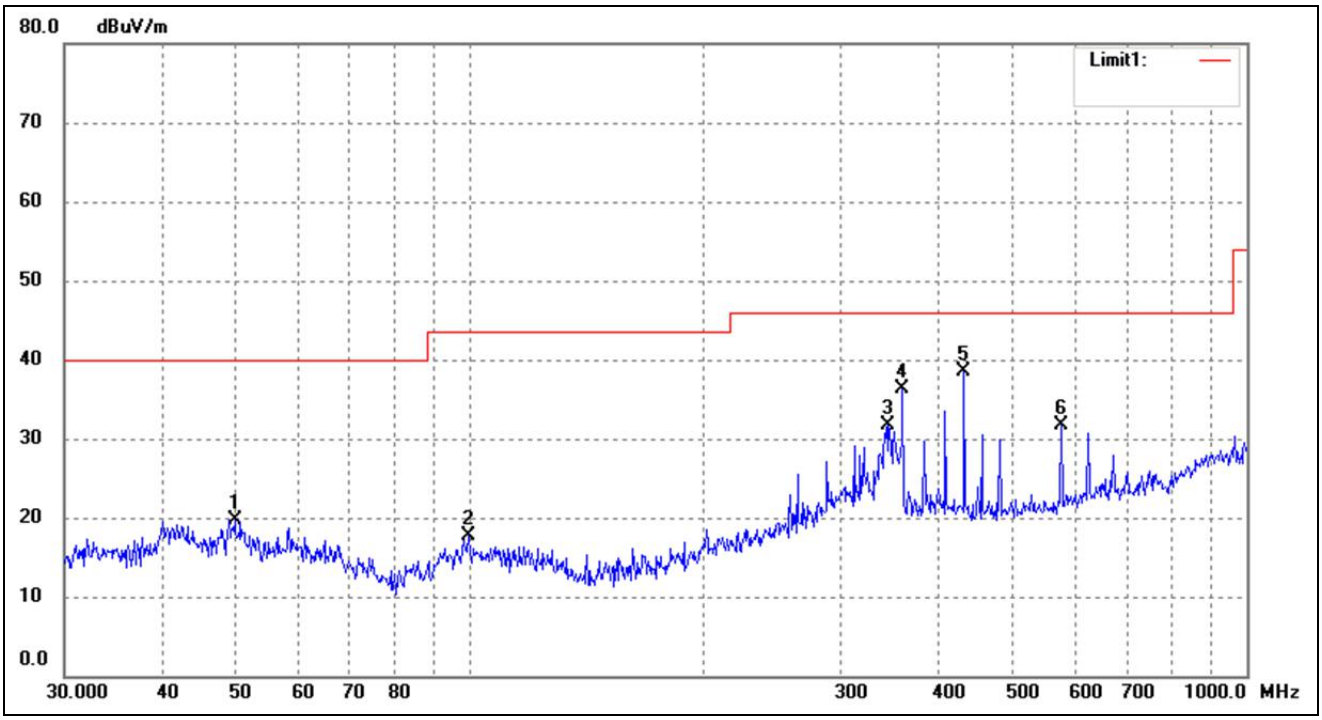
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	49.5328	33.30	-13.66	19.64	40.00	-20.36	277	100	peak
2	98.4866	32.53	-15.22	17.31	43.50	-26.19	99	100	peak
3	300.3673	35.94	-7.83	28.11	46.00	-17.89	280	100	peak
4	360.4477	44.34	-7.75	36.59	46.00	-9.41	95	100	peak
5	432.5457	46.69	-8.01	38.68	46.00	-7.32	82	100	peak
6	601.4265	36.94	-5.60	31.34	46.00	-14.66	116	100	peak

802.11a(worst case)			
Test Channel	5600MHz	Polarity:	Vertical



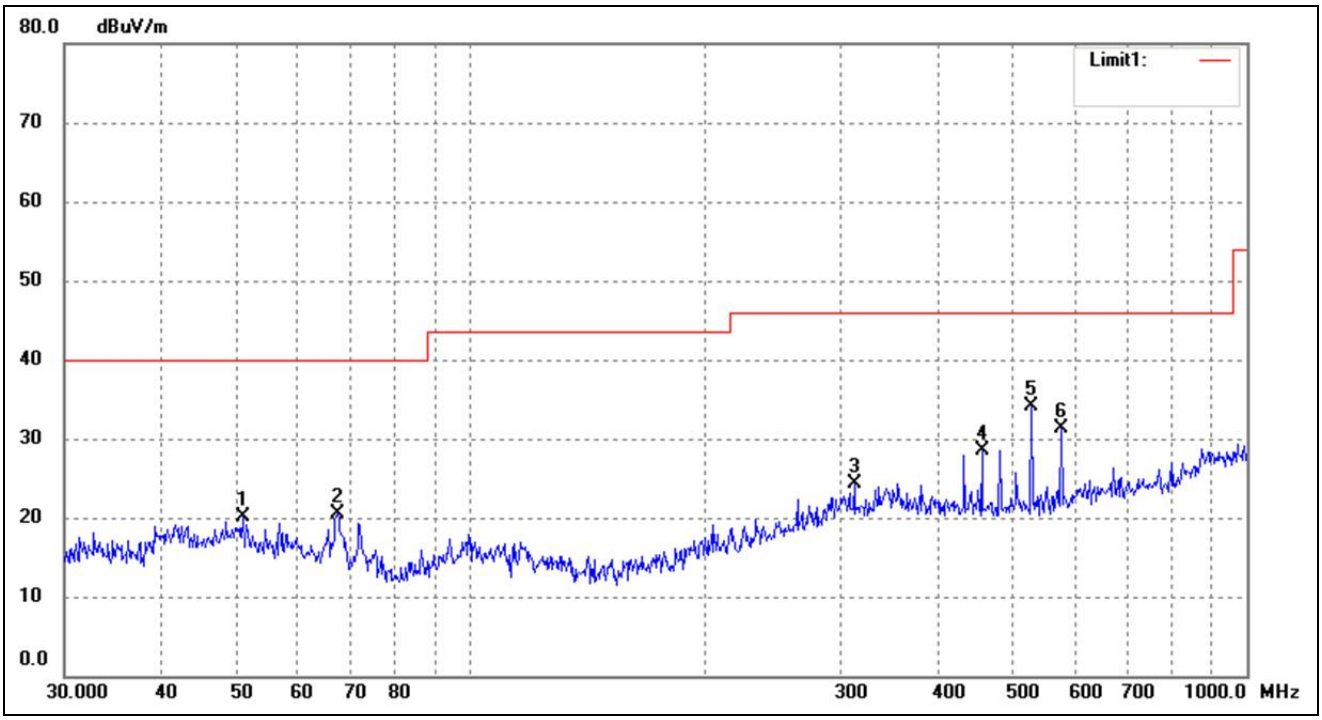
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	46.0164	33.43	-13.87	19.56	40.00	-20.44	206	100	peak
2	67.4382	36.75	-16.49	20.26	40.00	-19.74	188	100	peak
3	107.5101	33.61	-14.82	18.79	43.50	-24.71	60	100	peak
4	480.5276	36.48	-8.05	28.43	46.00	-17.57	145	100	peak
5	528.2458	42.53	-7.96	34.57	46.00	-11.43	254	100	peak
6	576.6443	37.41	-6.25	31.16	46.00	-14.84	150	100	peak

802.11a(worst case)			
Test Channel	5700MHz	Polarity:	Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	49.7068	33.34	-13.65	19.69	40.00	-20.31	279	100	peak
2	99.5281	32.68	-15.01	17.67	43.50	-25.83	98	100	peak
3	345.5952	39.43	-7.74	31.69	46.00	-14.31	324	100	peak
4	360.4477	44.06	-7.75	36.31	46.00	-9.69	99	100	peak
5	432.5457	46.52	-8.01	38.51	46.00	-7.49	187	100	peak
6	576.6443	38.03	-6.25	31.78	46.00	-14.22	113	100	peak

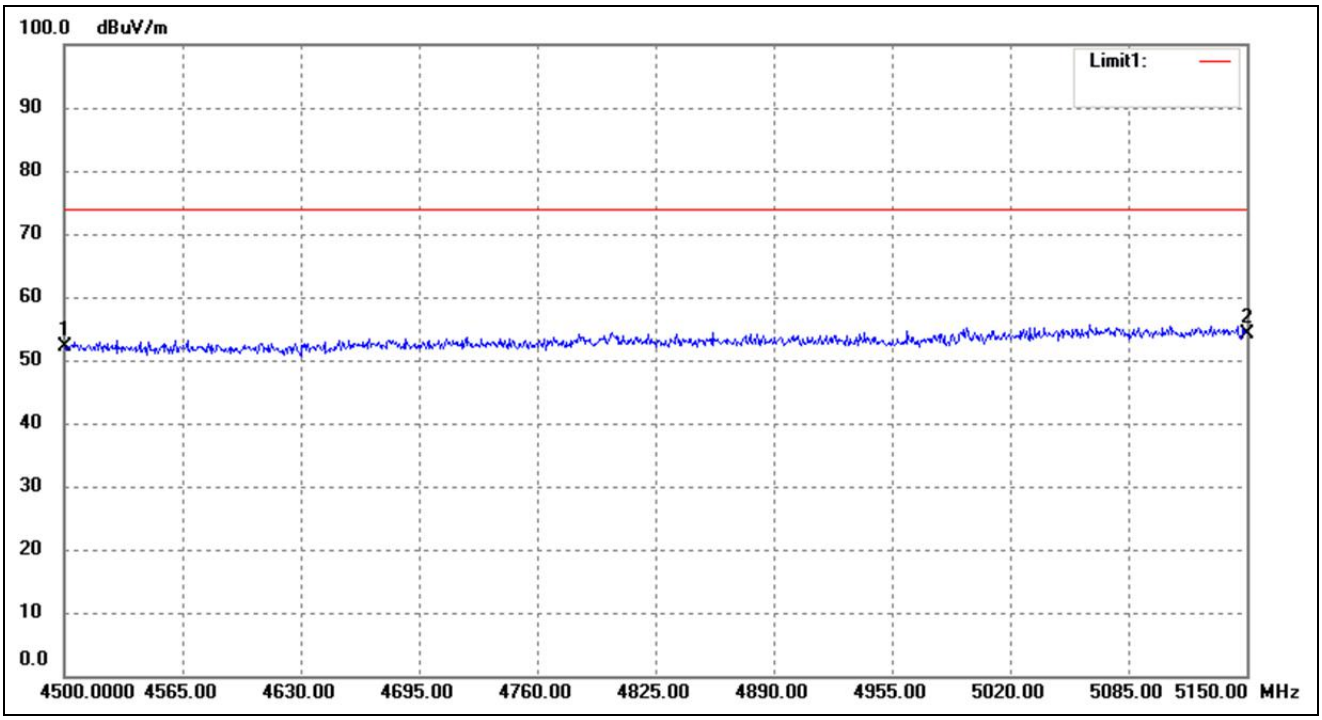
802.11a(worst case)			
Test Channel	5700MHz	Polarity:	Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	50.9420	33.99	-13.90	20.09	40.00	-19.91	131	100	peak
2	67.4382	37.04	-16.49	20.55	40.00	-19.45	333	100	peak
3	312.1794	32.45	-8.15	24.30	46.00	-21.70	57	100	peak
4	455.9058	36.65	-8.21	28.44	46.00	-17.56	232	100	peak
5	528.2458	42.11	-7.96	34.15	46.00	-11.85	151	100	peak
6	576.6443	37.63	-6.25	31.38	46.00	-14.62	257	100	peak

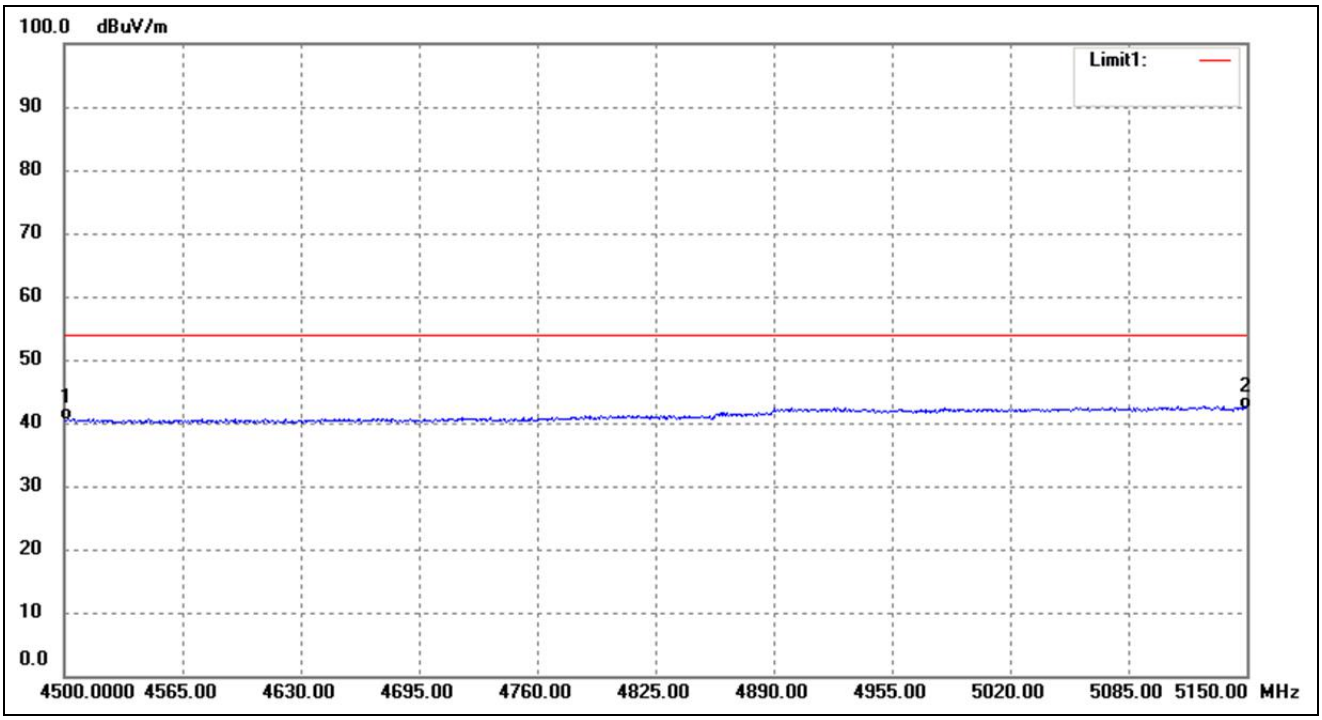
➢ Spurious Emission above 1GHz

802.11a- Restricted Bandedge			
Test Channel	band 4.5-5.15GHz	Polarity:	Vertical(worst case)



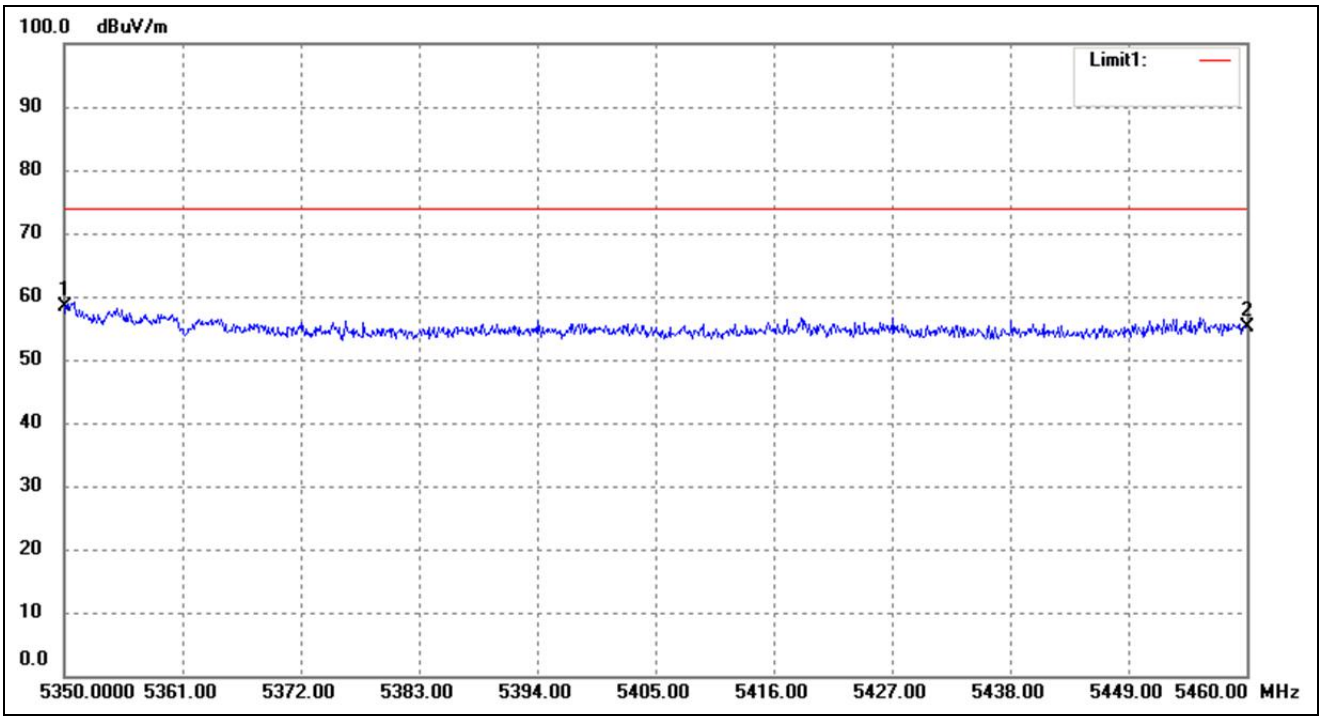
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4500.000	52.89	-0.65	52.24	74.00	-21.76	88	100	peak
2	5150.000	53.51	0.69	54.20	74.00	-19.80	182	100	peak

802.11a- Restricted Bandedge			
Test Channel	band 5.35-5.46GHz	Polarity:	Vertical(worst case)



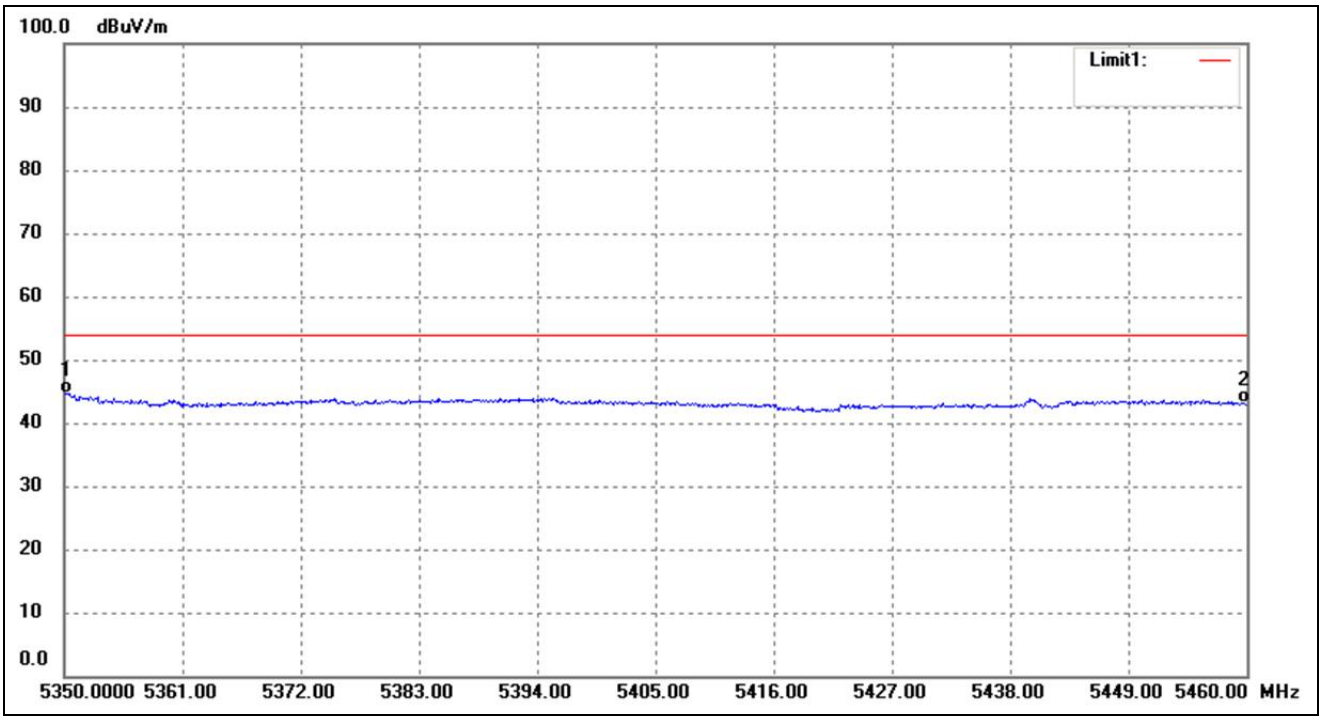
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	4500.000	41.13	-0.65	40.48	54.00	-13.52	318	100	AVG
2	5150.000	41.51	0.69	42.20	54.00	-11.80	179	100	AVG

802.11a- Restricted Bandedge			
Test Channel	band 5.35-5.46GHz	Polarity:	Vertical(worst case)



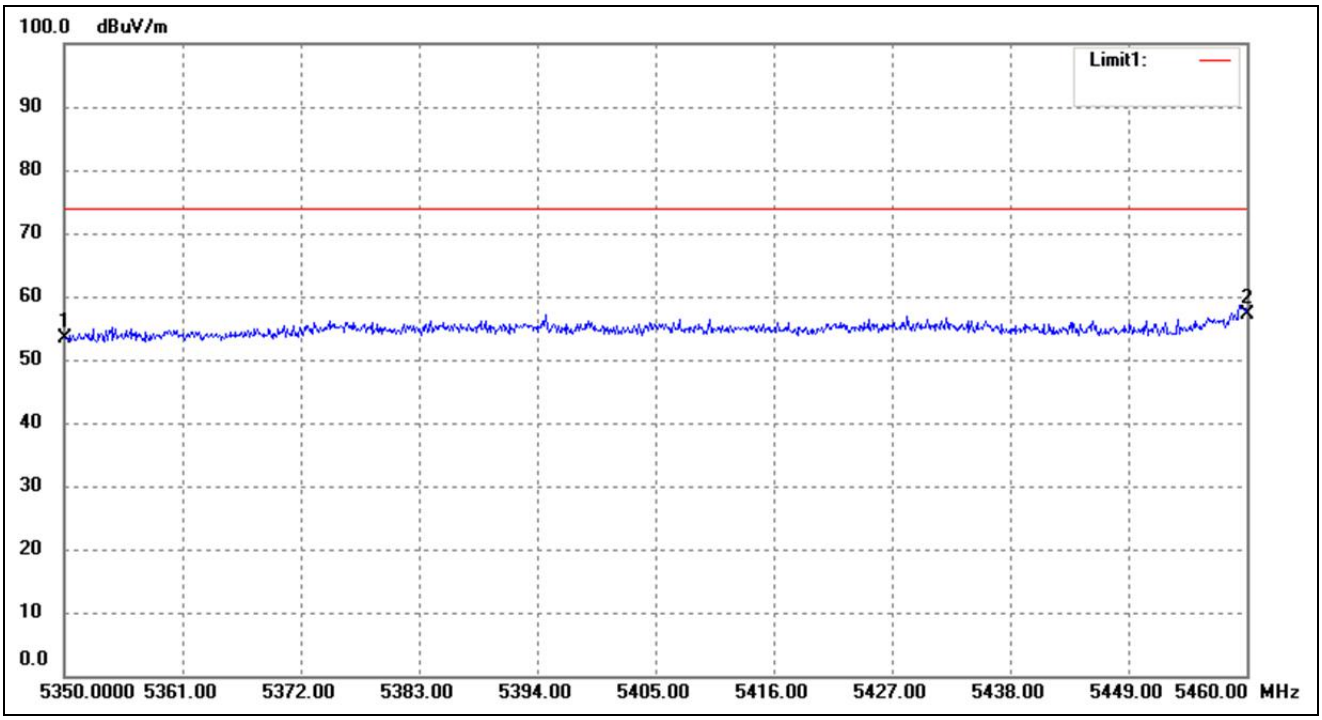
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	57.21	1.19	58.40	74.00	-15.60	135	100	peak
2	5460.000	53.69	1.47	55.16	74.00	-18.84	79	100	

802.11a-Restricted Bandedge			
Test Channel	band 5.15-5.25GHz	Polarity:	Vertical(worst case)



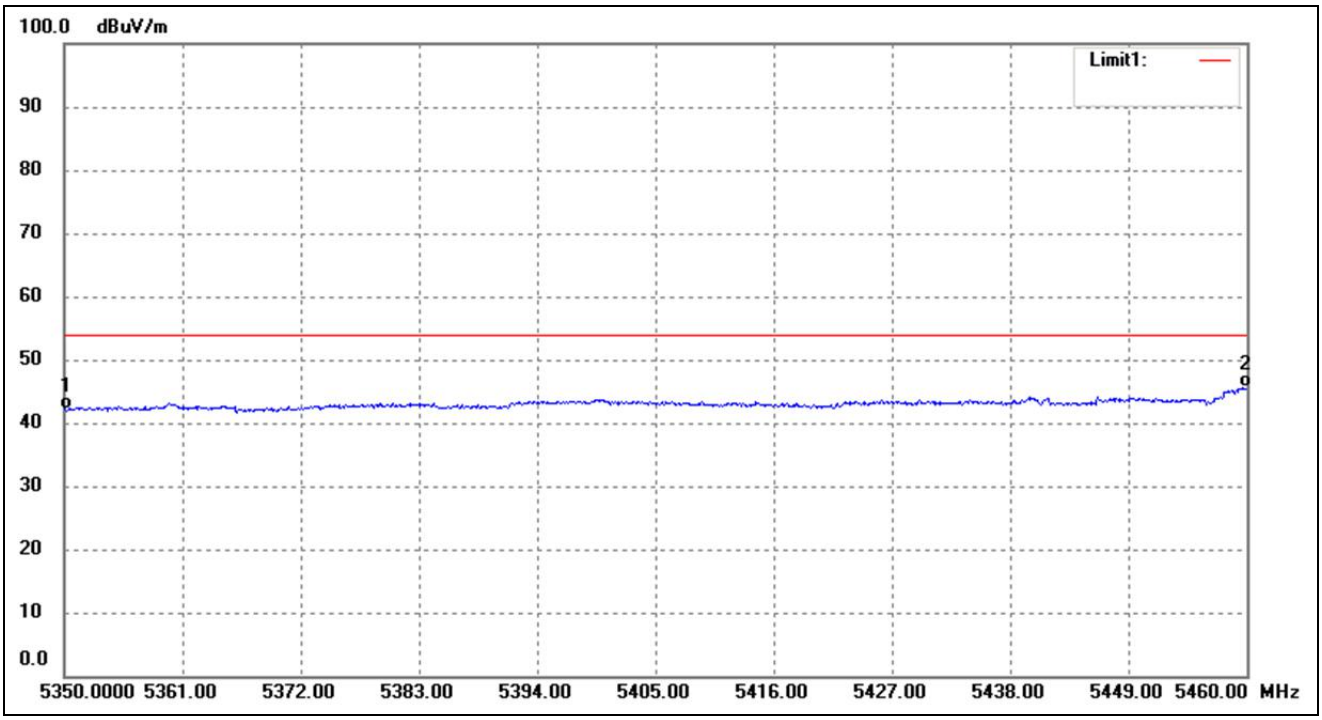
No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	43.48	1.19	44.67	54.00	-9.33	327	100	AVG
2	5460.000	41.66	1.47	43.13	54.00	-10.87	98	100	AVG

802.11a-Restricted Bandedge			
Test Channel	band 5.35-5.46GHz	Polarity:	Vertical(worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	52.12	1.19	53.31	74.00	-20.69	348	100	peak
2	5460.000	55.55	1.47	57.02	74.00	-16.98	116	100	peak

802.11a-Restricted Bandedge			
Test Channel	band 5.35-5.46GHz	Polarity:	Vertical(worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Degree	Height	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	( )	(cm)	
1	5350.000	40.82	1.19	42.01	54.00	-11.99	339	100	AVG
2	5460.000	44.04	1.47	45.51	54.00	-8.49	87	100	AVG

Note: The Restricted Bandedge was tested in Horizontal /Vertical and the worst case position data was reported.

- For the frequency band 5.250-5.350GHz, 5.470-5.725GHz (802.11a)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5260MHz)							
10520	48.84	7.12	55.96	74	-18.04	H	PK
10520	33.43	7.12	40.55	54	-13.45	H	AV
10520	52.24	7.12	59.36	74	-14.64	H	PK
10520	35.34	7.12	42.46	54	-11.54	H	AV
High Channel (5320MHz)							
10640	50.50	7.24	57.74	74	-16.26	H	PK
10640	30.83	7.24	38.07	54	-15.93	H	AV
10640	51.92	7.24	59.16	74	-14.84	H	PK
10640	29.54	7.24	36.78	54	-17.22	H	AV

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5500MHz)							
11000	51.51	7.57	59.08	74	-14.92	H	PK
11000	34.34	7.57	41.91	54	-12.09	H	AV
11000	48.81	7.57	56.38	74	-17.62	H	PK
11000	34.14	7.57	41.71	54	-12.29	H	AV
High Channel (5700MHz)							
11400	49.13	8.75	57.88	74	-16.12	H	PK
11400	33.01	8.75	41.76	54	-12.24	H	AV
11400	48.48	8.75	57.23	74	-16.77	H	PK
11400	33.20	8.75	41.95	54	-12.05	H	AV

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-33.75	-27
Highest	Above 5350	-36.03	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-36.54	-27
Highest	Above 5725	-39.18	-27
Note: the data just list the worst cases			

- For the frequency band 5.250-5.350GHz, 5.470-5.725GHz (802.11n HT20)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5260MHz)							
10520	51.63	7.12	58.75	74	-15.25	H	PK
10520	34.93	7.12	42.05	54	-11.95	H	AV
10520	49.98	7.12	57.10	74	-16.90	H	PK
10520	36.59	7.12	43.71	54	-10.29	H	AV
High Channel (5320MHz)							
10640	51.60	7.24	58.84	74	-15.16	H	PK
10640	34.38	7.24	41.62	54	-12.38	H	AV
10640	51.85	7.24	59.09	74	-14.91	H	PK
10640	35.89	7.24	43.13	54	-10.87	H	AV

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5500MHz)							
11000	51.74	7.57	59.31	74	-14.69	H	PK
11000	33.14	7.57	40.71	54	-13.29	H	AV
11000	50.10	7.57	57.67	74	-16.33	H	PK
11000	34.27	7.57	41.84	54	-12.16	H	AV
High Channel (5700MHz)							
11400	50.66	8.75	59.41	74	-14.59	H	PK
11400	32.29	8.75	41.04	54	-12.96	H	AV
11400	51.38	8.75	60.13	74	-13.87	H	PK
11400	35.21	8.75	43.96	54	-10.04	H	AV

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.40	-27
Highest	Above 5350	-35.16	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-36.65	-27
Highest	Above 5725	-39.02	-27
Note: the data just list the worst cases			

Note: this EUT was tested in the low, high channel and the worst case position data was reported.

- For the frequency band 5.250-5.350GHz, 5.470-5.725GHz (802.11n HT40)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5270MHz)							
10540	50.30	7.15	57.45	74	-16.55	H	PK
10540	35.40	7.15	42.55	54	-11.45	H	AV
10540	49.11	7.15	56.26	74	-17.74	H	PK
10540	33.82	7.15	40.97	54	-13.03	H	AV
High Channel (5310MHz)							
10620	52.95	7.22	60.17	74	-13.83	H	PK
10620	34.27	7.22	41.49	54	-12.51	H	AV
10620	50.15	7.22	57.37	74	-16.63	H	PK
10620	34.08	7.22	41.30	54	-12.70	H	AV

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5510MHz)							
11020	51.64	7.63	59.27	74	-14.73	H	PK
11020	33.54	7.63	41.17	54	-12.83	H	AV
11020	52.18	7.63	59.81	74	-14.19	H	PK
11020	33.77	7.63	41.40	54	-12.60	H	AV
High Channel (5670MHz)							
11340	50.25	8.58	58.83	74	-15.17	H	PK
11340	35.59	8.58	44.17	54	-9.83	H	AV
11340	50.16	8.58	58.74	74	-15.26	H	PK
11340	35.89	8.58	44.47	54	-9.53	H	AV

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.98	-27
Highest	Above 5350	-35.97	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-37.76	-27
Highest	Above 5725	-38.62	-27
Note: the data just list the worst cases			

- For the frequency band 5.250-5.350GHz, 5.470-5.725GHz (802.11ac VH80)
- Harmonics And Spurious Emissions

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
5290MHz							
10580	52.56	7.18	59.74	74	-14.26	H	PK
10580	34.88	7.18	42.06	54	-11.94	H	AV
10580	49.67	7.18	56.85	74	-17.15	H	PK
10580	33.96	7.18	41.14	54	-12.86	H	AV

Frequency (MHz)	Reading (dBuV/m)	Correct dB	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Polar H/V	Detector
Low Channel (5530MHz)							
11060	51.89	7.95	59.84	74	-14.16	H	PK
11060	33.79	7.95	41.74	54	-12.26	H	AV
11060	53.35	7.95	61.30	74	-12.70	H	PK
11060	35.57	7.95	43.52	54	-10.48	H	AV
High Channel (5610MHz)							
11220	52.17	8.21	60.38	74	-13.62	H	PK
11220	33.24	8.21	41.45	54	-12.55	H	AV
11220	52.36	8.21	60.57	74	-13.43	H	PK
11220	33.76	8.21	41.97	54	-12.03	H	AV

- Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.77	-27
Highest	Above 5350	-36.24	-27
Note: the data just list the worst cases			

- Out of Band edge for 5470-5725MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5470	-36.99	-27
Highest	Above 5725	-39.89	-27
Note: the data just list the worst cases			

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, other than listed in the table above are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

10. Frequency Stability

10.1 Standard Applicable

According to §15.407(g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the users manual.

10.2 Test Procedure

According to §2.1055, the following test procedure was performed.
The Frequency Stability is measured directly with a Frequency Domain Analyzer. Frequency Deviation in ppm is calculated from the measured peak to peak value.
The Carrier Frequency Stability over Power Supply Voltage and over Temperature is measured with a Frequency Domain Analyzer in histogram mode.

10.3 Summary of Test Results/Plots

U-NII-1: 5250-5350MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	3.8	-30	162	0.0306
100%		-20	179	0.0338
100%		-10	162	0.0306
100%		0	134	0.0254
100%		+10	181	0.0343
100%		+20	133	0.0252
100%		+30	130	0.0245
100%		+40	169	0.0319
100%		+50	123	0.0233
Low Battery power	3.5	+20	132	0.0250
High Battery power	4.35	+20	184	0.0347

U-NII-1: 5470-5725MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	3.8	-30	159	0.0284
100%		-20	181	0.0324
100%		-10	157	0.0281
100%		0	127	0.0227
100%		+10	182	0.0326
100%		+20	138	0.0247
100%		+30	135	0.0242
100%		+40	167	0.0299
100%		+50	121	0.0217
Low Battery power	3.5	+20	136	0.0244
High Battery power	4.35	+20	135	0.0242

******* END OF REPORT *******