



FCC Part 15E Measurement and Test Report

For

ShenZhen HaiLingKe Electronic co.,Ltd

3F Caiyue Mansion, No.24 Liuxian blvd, LongHua District,

Shenzhen, Guangdong, China

FCC ID: 2AD56HLK-RM58S

FCC Rule(s): FCC Part 15.407

Product Description: WIFI module

Tested Model: HLK-RM58S

Report No.: WTX19X10074455W-1

Sample Receipt Date: 2019-10-29

Tested Date: 2019-10-29 to 2019-12-16

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Report version

Version No.	Date of issue	Description
Rev.00	2019-12-16	Original
/	/	/

1. GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: ShenZhen HaiLingKe Electronic co.,Ltd
 Address of applicant: 3F Caiyue Mansion, No.24 Liuxian blvd, LongHua District, Shenzhen, Guangdong, China

Manufacturer: ShenZhen HaiLingKe Electronic co.,Ltd
 Address of manufacturer: 3F Caiyue Mansion, No.24 Liuxian blvd, LongHua District, Shenzhen, Guangdong, China

General Description of EUT	
Product Name:	WIFI module
Brand Name:	HI-LINK
Model No.:	HLK-RM58S
Adding Model(s):	/
Rated Voltage:	DC 5V
Battery Capacity:	/
Power Adapter:	/
Software Version:	HLK-RM58S(b.1.00.120190513111358)
Hardware Version:	V2.0
<i>Note: The test data is gathered from a production sample, provided by the manufacturer.</i>	

Technical Characteristics of EUT	
Support Standards:	802.11a, 802.11n(HT20) , 802.11n-HT40, 802.11ac-VH80
Frequency Range:	5150-5250MHz, 5250-5350MHz, 5470-5725MHz, 5725-5850MHz
RF Output Power:	13.04dBm (Conducted)
Type of Modulation:	BPSK, QPSK, 16QAM, 64QAM, 256QAM
Data Rate:	6-54Mbps, up to 200Mbps
Type of Antenna:	Integral Antenna
Antenna Gain:	3.73dBi



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

Install “QATool” and follow the instructions given by the manufacturer, 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	20	1D	1C	1B	1B	1B	1C	1C	1C	/	18	1C	1C
802.11n-HT20 MCS0	1B	1D	1C	1C	1C	1C	19	1C	1D	/	1C	1D	1D
Mode	NCB: 40MHz												
	5190	5230	5270	5310	5510	5550	5670	5710	5755	5795			
802.11n-HT40 MCS0	1C	1C	0F	0F	19	1F	1F	/	1F	1F			
Mode	NCB: 80MHz												
	5210		5290		5530		5610		5690		5775		
802.11ac-VH80 MCS0/Nss2	12		12		12		12		/		15		

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

Address of the test laboratory

Laboratory: Waltek Testing Group (Shenzhen) Co., Ltd.

Address: 1/F., Room 101, Building 1, Hongwei Industrial Park, Liuxian 2nd Road, Block 70 Bao'an District, Shenzhen, Guangdong, China

FCC – Registration No.: 125990

Waltek Testing Group (Shenzhen) Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the FCC (Federal Communications Commission). The acceptance letter from the FCC is maintained in our files. The Designation Number is CN5010, and Test Firm Registration Number is 125990.

Industry Canada (IC) Registration No.: 11464A

The 3m Semi-anechoic chamber of Waltek Testing Group (Shenzhen) 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	5180MHz,5200MHz,5240MHz,5260MHz,5280MHz,5320MHz,5500MHz,5600MHz,5700MHz,5745MHz, 5785MHz,5825MHz
TM2	802.11n-HT20	5180MHz,5200MHz,5240MHz,5260MHz,5280MHz,5320MHz,5500MHz,5600MHz,5700MHz,5745MHz, 5785MHz,5825MHz
TM3	802.11n-HT40	5190MHz,5230MHz,5270MHz,5310MHz,5510MHz,5590MHz,5670MHz,5755MHz,5795MHz
TM4	802.11ac-VH80	5210MHz,5290MHz,5530 MHz,5610 MHz,5775 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
USB Cable	1.0	Unshielded	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	$\pm 0.42\text{dB}$
Occupied Bandwidth	Conducted	$\pm 1.5\%$
Power Spectral Density	Conducted	$\pm 1.8\text{dB}$
Conducted Spurious Emission	Conducted	$\pm 2.17\text{dB}$
Conducted Emissions	Conducted	9-150kHz $\pm 3.74\text{dB}$
		0.15-30MHz $\pm 3.34\text{dB}$
Transmitter Spurious Emissions	Radiated	30-200MHz $\pm 4.52\text{dB}$
		0.2-1GHz $\pm 5.56\text{dB}$
		1-6GHz $\pm 3.84\text{dB}$
		6-18GHz $\pm 3.92\text{dB}$

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	Compliant
§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 §2.1091, the mobile fixed 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 integral antenna, fulfill the requirement of this section.

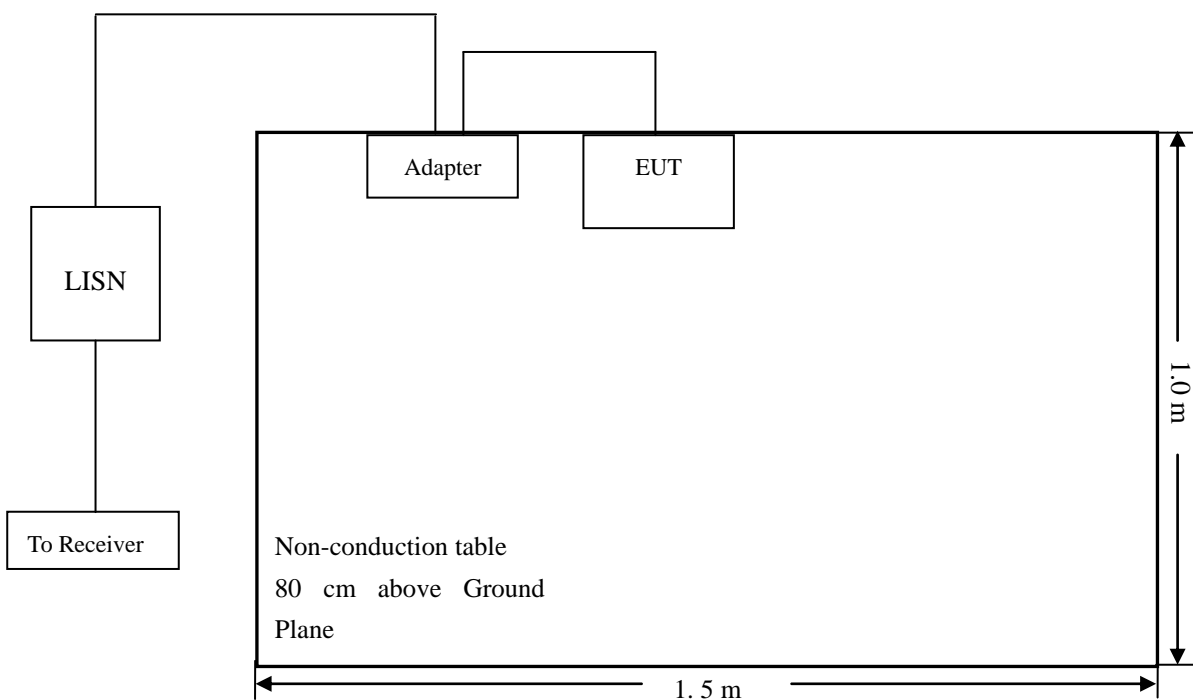
5. Conducted Emissions

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

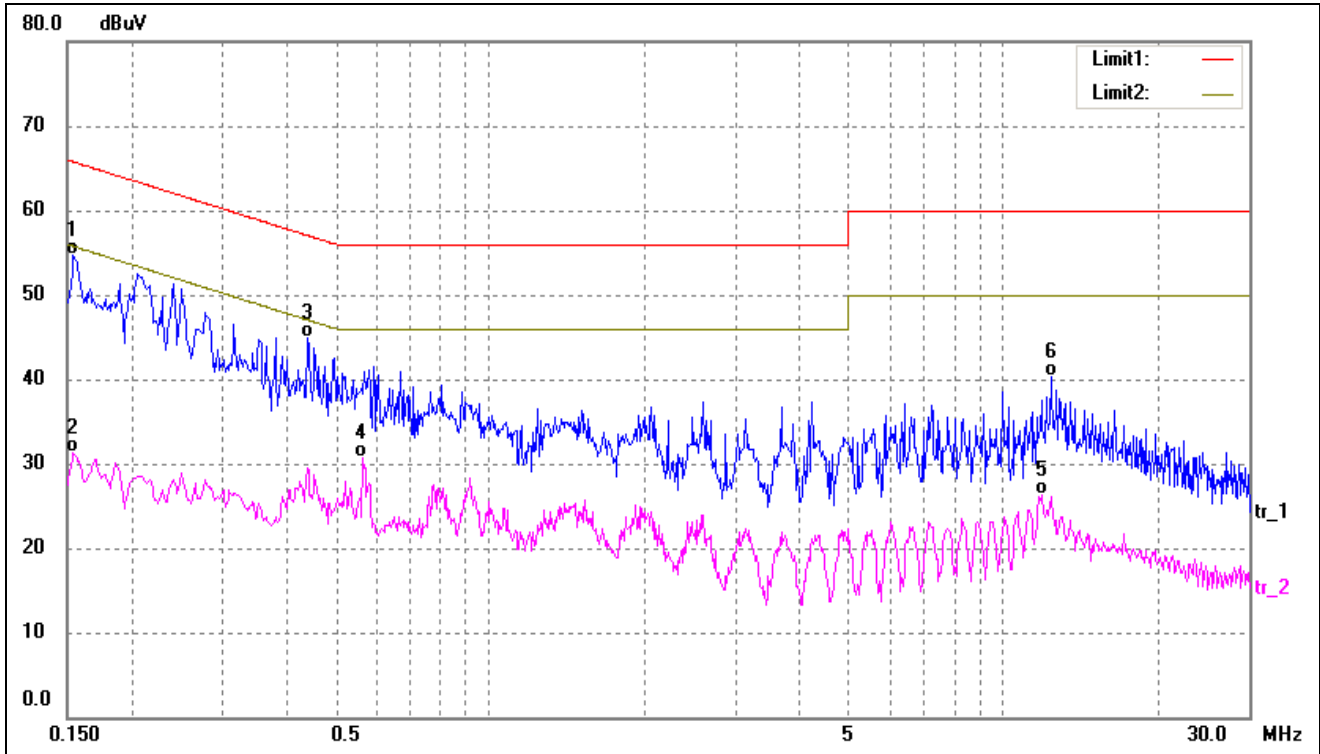
During the conducted emission test, the test receiver was set with the following configurations:

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



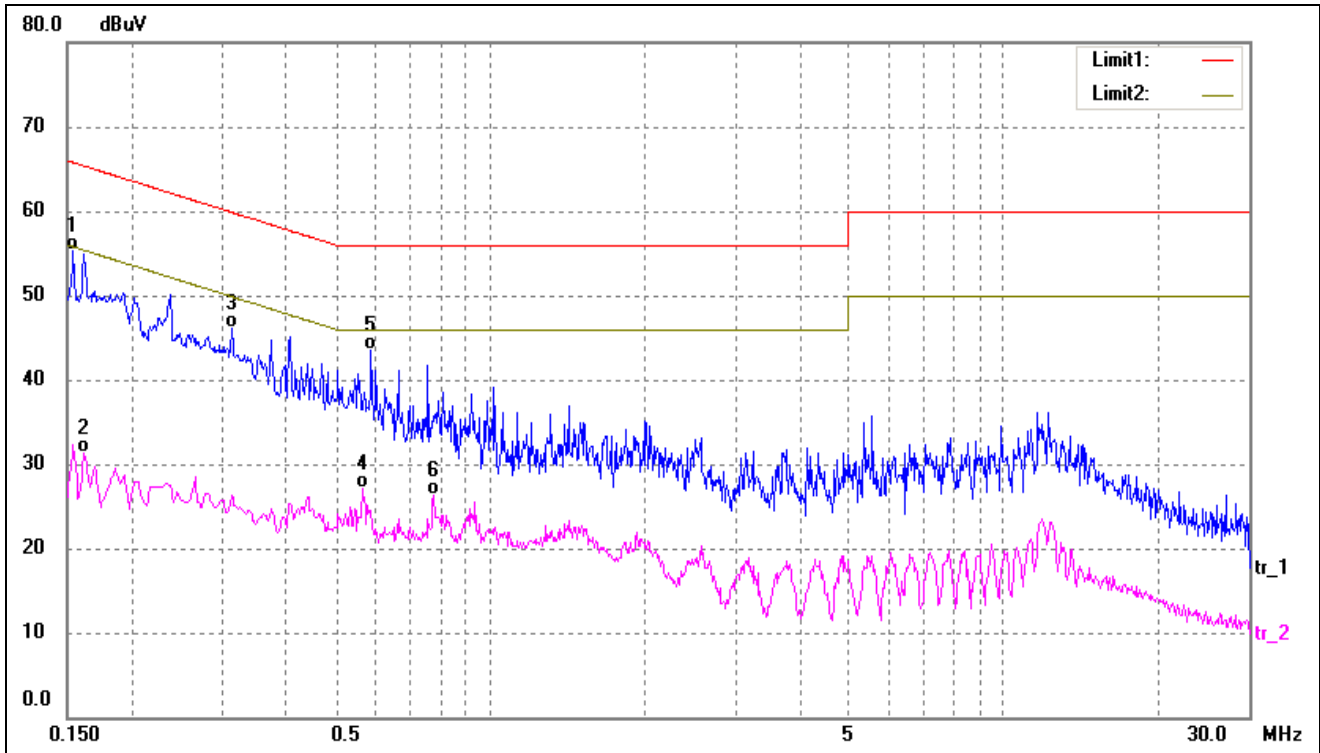
Test Mode	Communication	AC120V 60Hz	Polarity:	Neutral
-----------	---------------	-------------	-----------	---------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1540	44.80	9.95	54.75	65.78	-11.03	QP
2	0.1540	21.35	9.95	31.30	55.78	-24.48	AVG
3	0.4420	34.85	10.01	44.86	57.02	-12.16	QP
4	0.5660	20.60	10.04	30.64	46.00	-15.36	AVG
5	11.8980	15.64	10.60	26.24	50.00	-23.76	AVG
6	12.3460	29.79	10.61	40.40	60.00	-19.60	QP



Test Mode	Communication	AC120V 60Hz	Polarity:	Line
-----------	---------------	-------------	-----------	------



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1*	0.1540	45.40	9.95	55.35	65.78	-10.43	QP
2	0.1620	21.32	9.95	31.27	55.36	-24.09	AVG
3	0.3140	36.13	10.01	46.14	59.86	-13.72	QP
4	0.5660	17.05	10.04	27.09	46.00	-18.91	AVG
5	0.5860	33.44	10.05	43.49	56.00	-12.51	QP
6	0.7780	16.13	10.15	26.28	46.00	-19.72	AVG

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 $11 \text{ dBm} + 10 \log B$, 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 $\geq 1/T$, where T is defined in section II.B.1.a).
- b) Set VBW ≥ 3 RBW.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/\text{RBW})$ 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 $10\log(1\text{MHz}/\text{RBW})$ 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-1:5150-5250MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5180	9.65	11
	5200	9.39	11
	5240	9.90	11
802.11n-HT20	5180	9.18	11
	5200	8.72	11
	5240	9.35	11
802.11n-HT40	5190	5.02	11
	5230	5.39	11
802.11ac-HT80	5210	2.55	11

U-NII-2A: 5250-5350MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5260	8.35	11
	5280	8.58	11
	5320	9.27	11
802.11n-HT20	5260	8.60	11
	5280	9.36	11
	5320	8.80	11
802.11n-HT40	5270	4.98	11
	5310	1.63	11
802.11ac-HT80	5290	1.08	11



U-NII-2C: 5470-5725MHz			
Operating mode	Test Channel	Power Spectral Density dBm/MHz	Limit (dBm/MHz)
802.11a	5500	9.12	11
	5600	7.57	11
	5700	7.77	11
802.11n-HT20	5500	7.38	11
	5600	8.57	11
	5700	7.70	11
802.11n-HT40	5510	4.52	11
	5590	5.34	11
	5670	5.06	11
802.11ac-HT80	5530	0.77	11
	5610	0.73	11

U-NII-3: 5725-5850MHz					
Operating mode	Test Channel	Power Spectral Density dBm/300kHz	Factor	Power Spectral Density* dBm/500kHz	Limit dBm/500kHz
802.11a	5745	3.98	2.22	6.20	30
	5785	3.67	2.22	5.89	30
	5825	3.40	2.22	5.62	30
802.11n-HT20	5745	3.38	2.22	5.60	30
	5785	2.92	2.22	5.14	30
	5825	4.01	2.22	6.23	30
802.11n HT40	5755	1.58	2.22	3.80	30
	5795	1.01	2.22	3.23	30
802.11ac VH80	5775	-1.89	2.22	0.33	30

*Note: Maximum PSD=PSD(dBm/300kHz)+10log(500kHz/300kHz)=2.22



➤ 5150-5250MHz

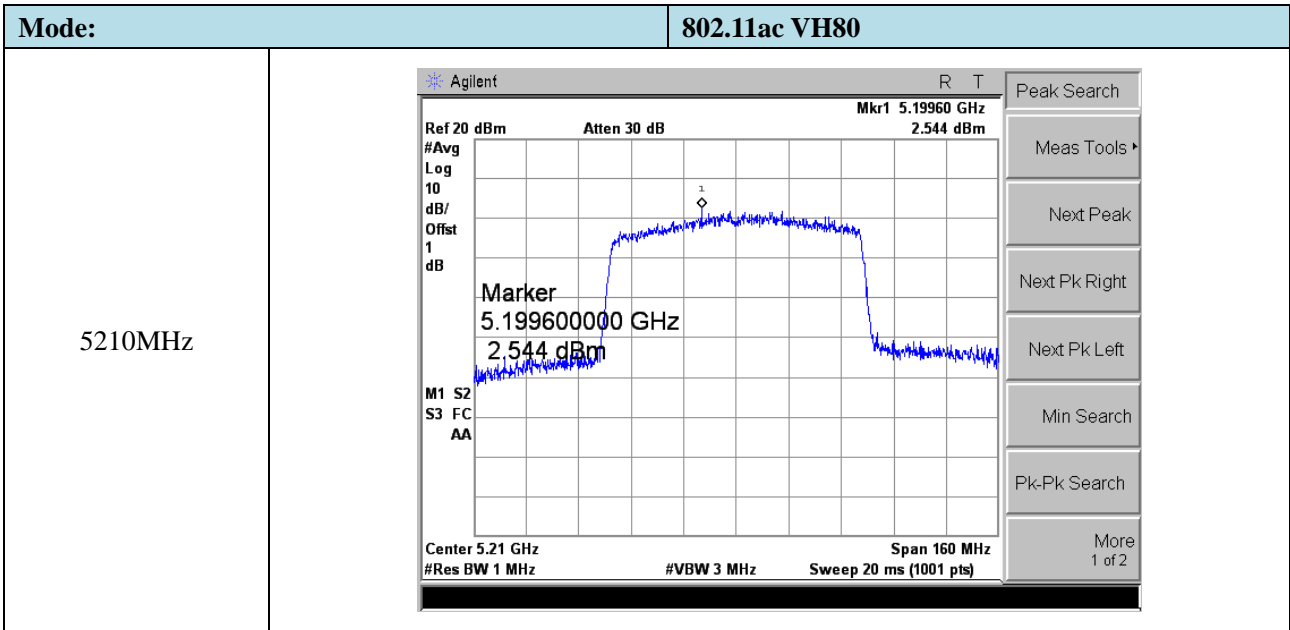
Mode:		802.11a
5180MHz		
5200MHz		
5240MHz		



Mode:	802.11n-HT20
5180MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.18132 GHz 9.181 dBm #Avg 10 Log dB/Offset 1 dB Marker 5.181320000 GHz 9.181 dBm M1 S2 S3 FC AA Center 5.18 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>
5200MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.20124 GHz 8.722 dBm #Avg 10 Log dB/Offset 1 dB Marker 5.201240000 GHz 8.722 dBm M1 S2 S3 FC AA Center 5.2 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>
5240MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.24032 GHz 9.348 dBm #Avg 10 Log dB/Offset 1 dB Marker 5.240320000 GHz 9.348 dBm M1 S2 S3 FC AA Center 5.24 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>



Mode:	802.11n-HT40
5190 MHz	
5230 MHz	





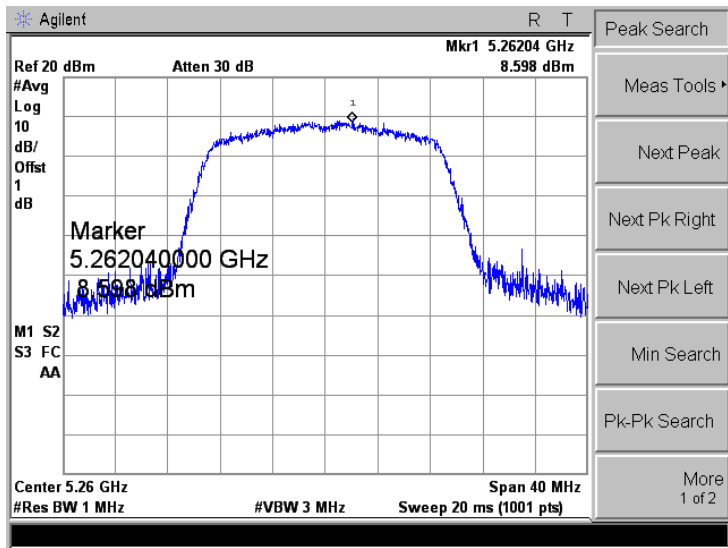
➤ 5250-5350MHz

Mode:		802.11a
5260MHz		
5280MHz		
5320MHz		

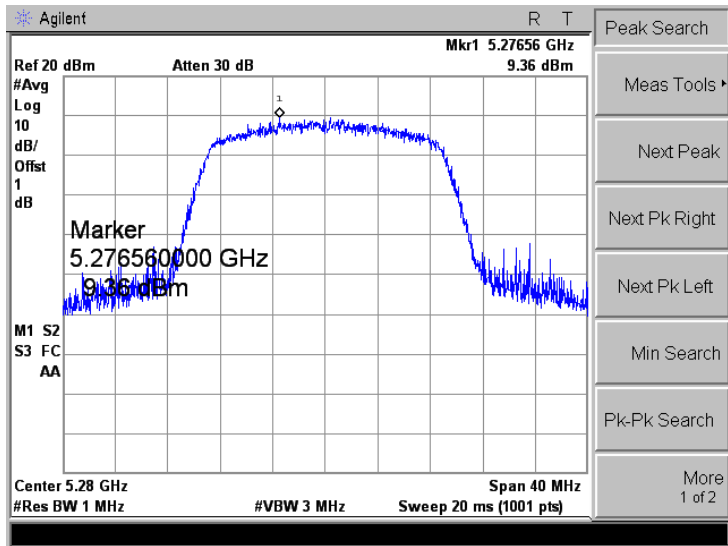


Mode: 802.11n-HT20

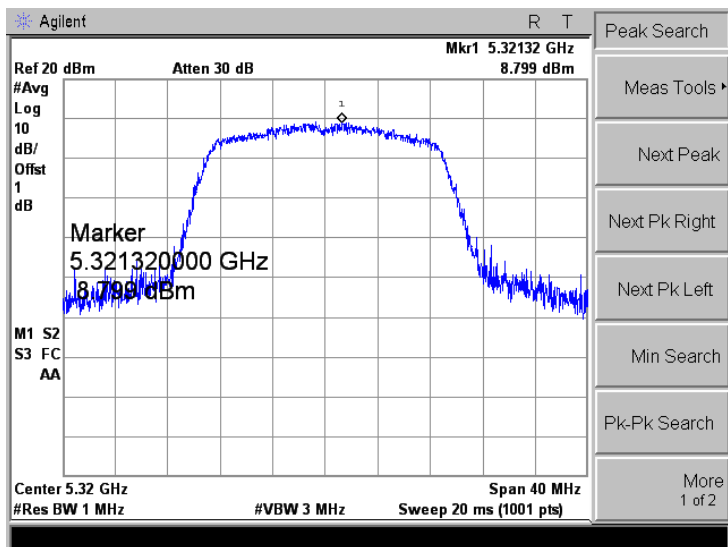
5260MHz



5280MHz

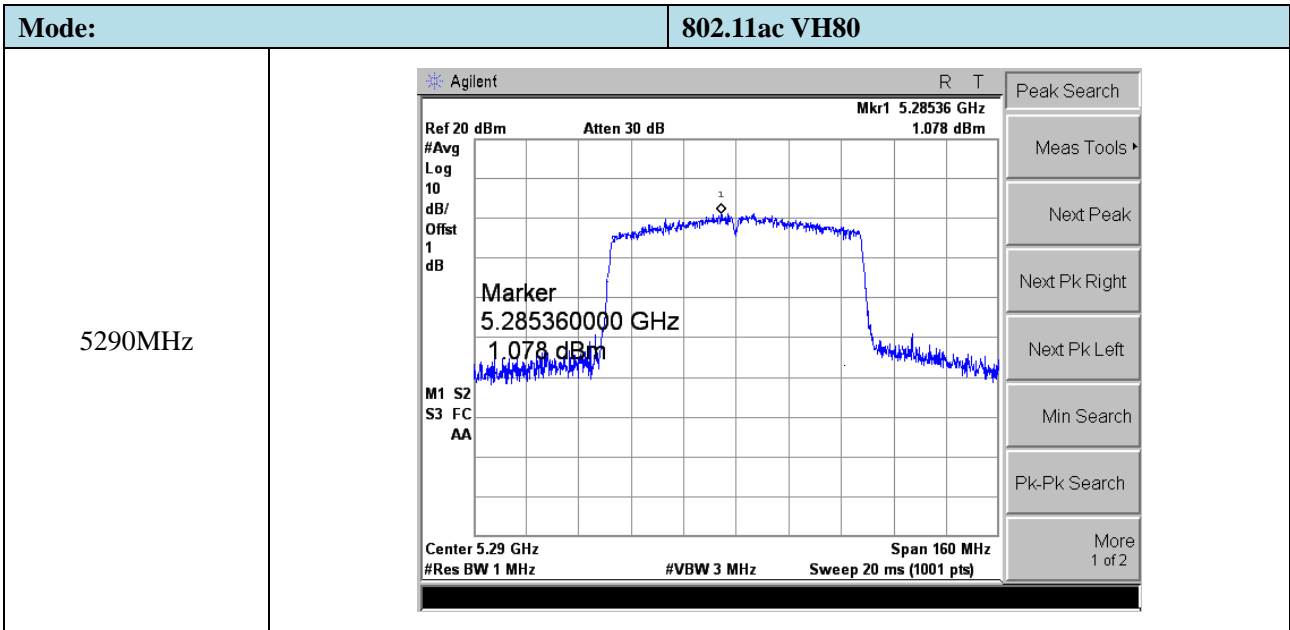


5320MHz





Mode:	802.11n-HT40
5270MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.27208 GHz 4.981 dBm #Avg Log 10 dB/Offset 1 dB Marker 5.27208000 GHz 4.981 dBm M1 S2 S3 FC AA Center 5.27 GHz Span 80 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>
5310MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.29272 GHz 1.631 dBm #Avg Log 10 dB/Offset 1 dB Marker 5.29272000 GHz 1.631 dBm M1 S2 S3 FC AA Center 5.29 GHz Span 160 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>





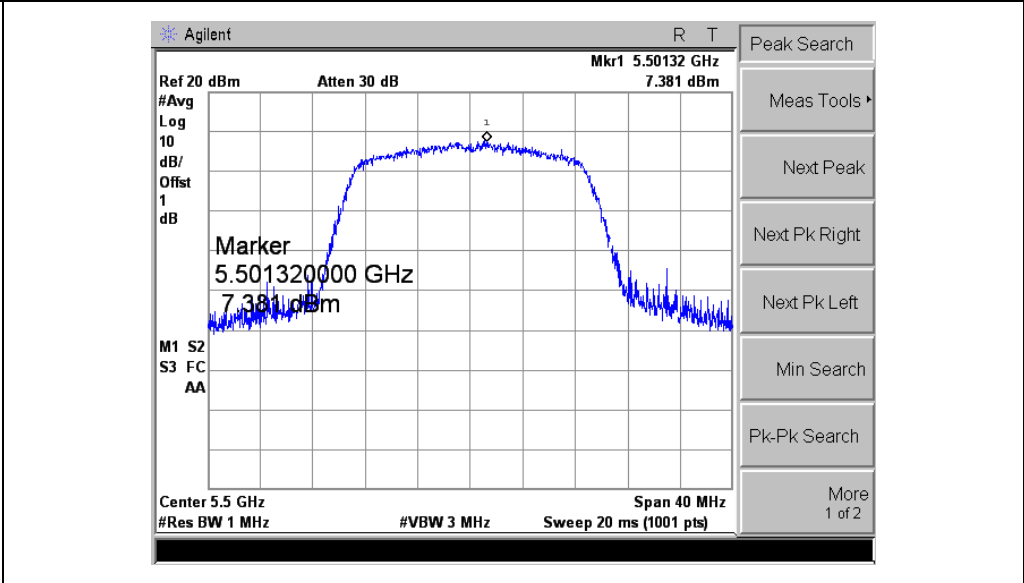
➤ 5470-5725MHz

Mode:		802.11a
5500MHz		
5600MHz		
5700MHz		

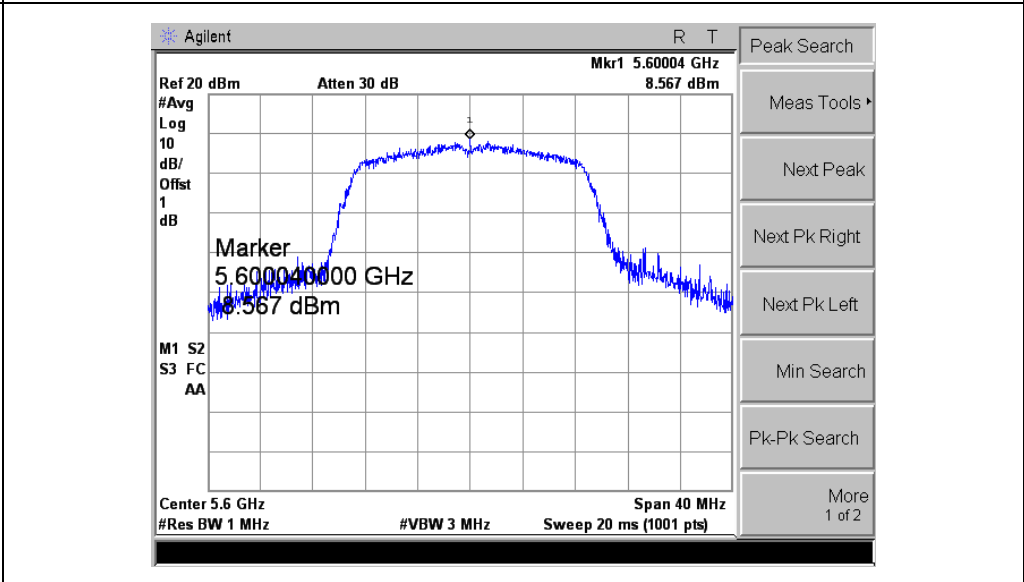


Mode: 802.11n-HT20

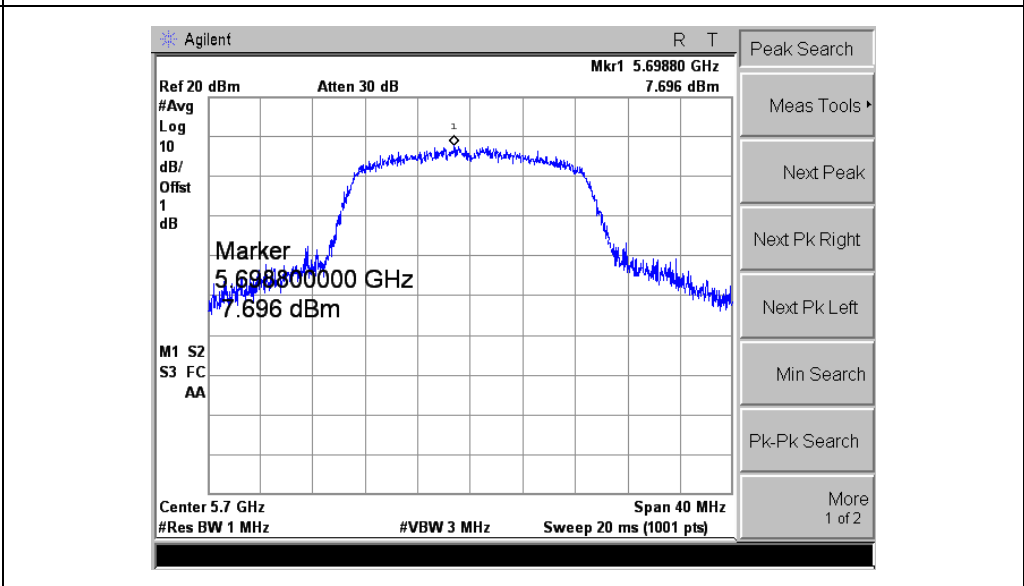
5500MHz



5600MHz



5700MHz





Mode:	802.11n-HT40
5510MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.51152 GHz 4.524 dBm #Avg Log 10 dB/ Offst 1 dB Marker 5.511520000 GHz 4.524 dBm M1 S2 S3 FC AA Center 5.51 GHz #Res BW 1 MHz #VBW 3 MHz Span 80 MHz Sweep 20 ms (1001 pts)</p>
5590MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.59504 GHz 5.338 dBm #Avg Log 10 dB/ Offst 1 dB Marker 5.595040000 GHz 5.338 dBm M1 S2 S3 FC AA Center 5.59 GHz #Res BW 1 MHz #VBW 3 MHz Span 80 MHz Sweep 20 ms (1001 pts)</p>
5670MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.67192 GHz 5.058 dBm #Avg Log 10 dB/ Offst 1 dB Marker 5.671920000 GHz 5.058 dBm M1 S2 S3 FC AA Center 5.67 GHz #Res BW 1 MHz #VBW 3 MHz Span 80 MHz Sweep 20 ms (1001 pts)</p>



Mode:		802.11ac VH80
5530MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.53144 GHz 0.767 dBm #Avg Log 10 dB/Offset 1 dB Marker 5.531440000 GHz 0.767 dBm M1 S2 S3 FC AA Center 5.53 GHz Span 160 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>	
5610MHz	<p>Agilent R T Ref 20 dBm Atten 30 dB Mkr1 5.61448 GHz 0.727 dBm #Avg Log 10 dB/Offset 1 dB Marker 5.614480000 GHz 0.727 dBm M1 S2 S3 FC AA Center 5.61 GHz Span 160 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p>	



➤ 5725-5850MHz

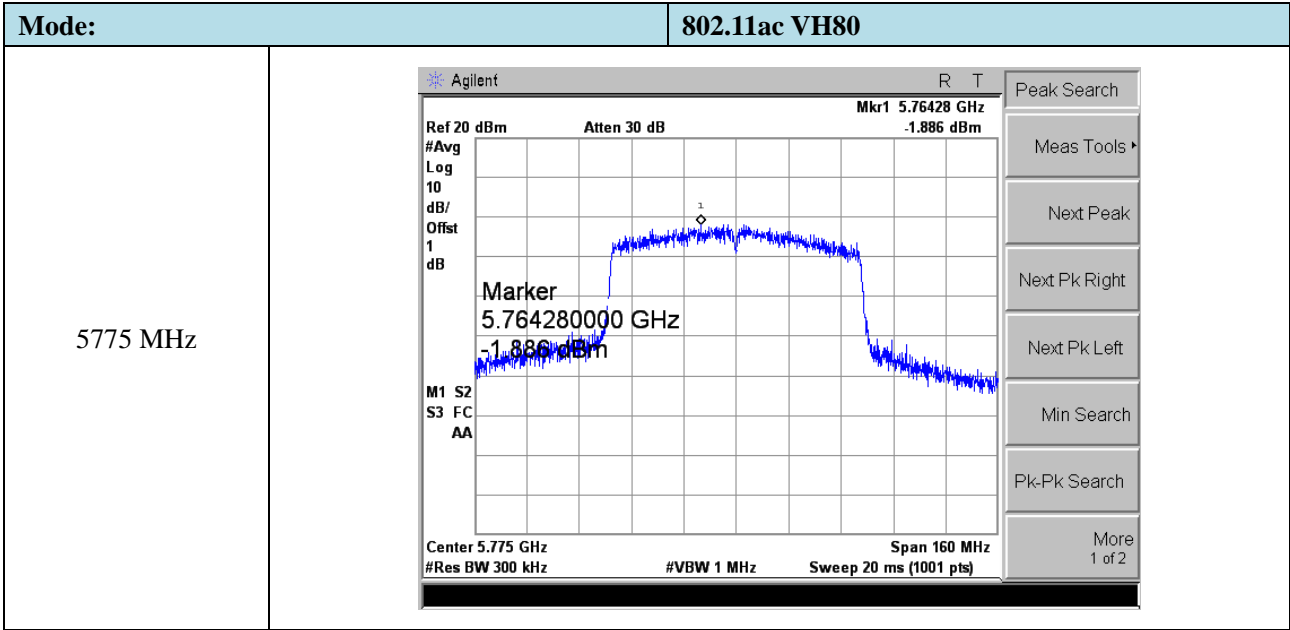
Mode:		802.11a
5745MHz		
5785MHz		
5825MHz		



Mode:		802.11n-HT20
5745MHz		
5785MHz		
5825MHz		



Mode:		802.11n-HT40
5755 MHz		
5795 MHz		



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 $11 \text{ dBm} + 10 \log B$, 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) $\geq 3 \times$ 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 $\geq 3 * RBW$
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-1:5150-5250MHz				
Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5180	20.412	16.6597	Pass
	5200	20.083	16.6454	Pass
	5240	20.071	16.5510	Pass
802.11n-HT20	5180	20.329	17.6530	Pass
	5200	20.385	17.6212	Pass
	5240	20.416	17.6895	Pass
802.11n-HT40	5190	41.384	36.2195	Pass
	5230	41.471	36.1669	Pass
802.11ac-HT80	5210	80.745	75.0009	Pass

U-NII-2A: 5250-5350MHz				
Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5260	20.321	16.7422	Pass
	5280	20.061	16.6180	Pass
	5320	20.045	16.5471	Pass
802.11n-HT20	5260	20.467	17.6891	Pass
	5280	20.271	17.6114	Pass
	5320	20.473	17.6507	Pass
802.11n-HT40	5270	41.608	36.1361	Pass
	5310	41.186	36.1826	Pass
802.11ac-HT80	5290	80.222	74.8991	Pass

U-NII-2C: 5470-5725MHz				
Test Mode	Test Channel MHz	26 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5500	20.030	16.6117	Pass
	5600	20.040	16.6596	Pass
	5700	22.339	16.7752	Pass
802.11n-HT20	5500	20.109	17.6252	Pass
	5600	20.429	17.6648	Pass
	5700	21.078	17.6843	Pass
802.11n-HT40	5510	41.332	36.1534	Pass
	5590	41.620	36.3696	Pass
	5670	50.944	36.5031	Pass
802.11ac-HT80	5530	80.298	74.9829	Pass
	5610	80.699	75.1013	Pass



U-NII-3: 5725-5850MHz				
Test Mode	Test Channel MHz	6 dB Bandwidth MHz	99% Bandwidth MHz	Limit MHz
802.11a	5745	16.335	16.4246	≥500
	5785	16.334	16.3282	≥500
	5825	16.022	16.3513	≥500
802.11n-HT20	5745	17.180	17.5447	≥500
	5785	17.322	17.5164	≥500
	5825	17.535	17.5300	≥500
802.11n-HT40	5755	36.004	35.8436	≥500
	5795	32.845	35.8642	≥500
802.11ac VH80	5775	71.908	74.8569	≥500



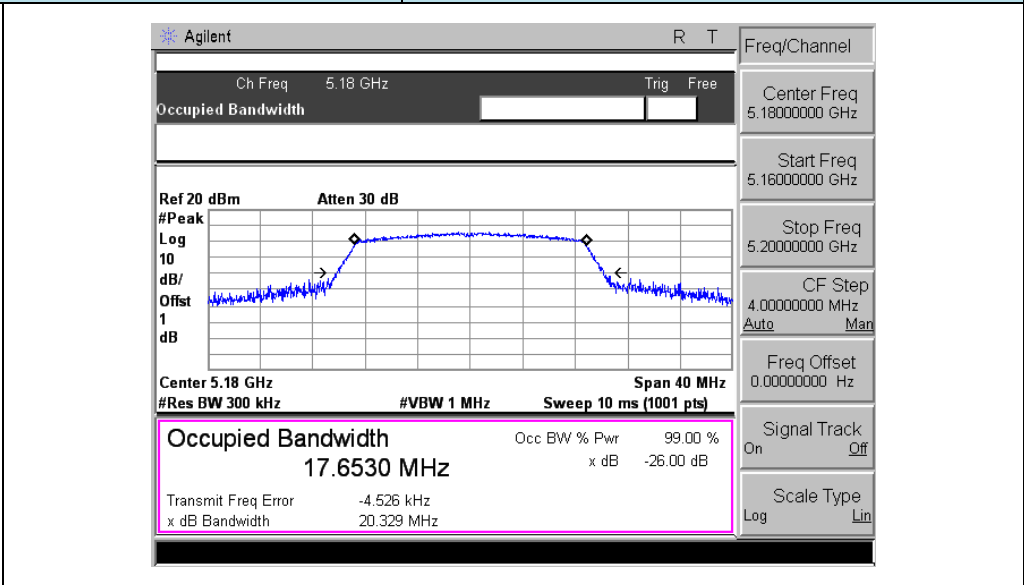
➤ 5150-5250MHz

Mode:		802.11a
5180MHz		
5200MHz		
5240MHz		

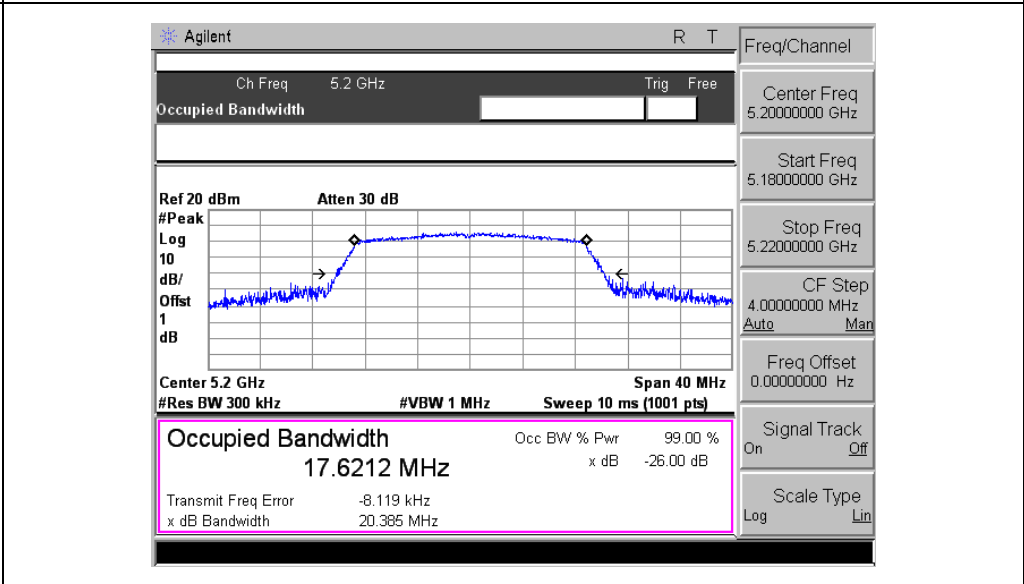


Mode: 802.11n-HT20

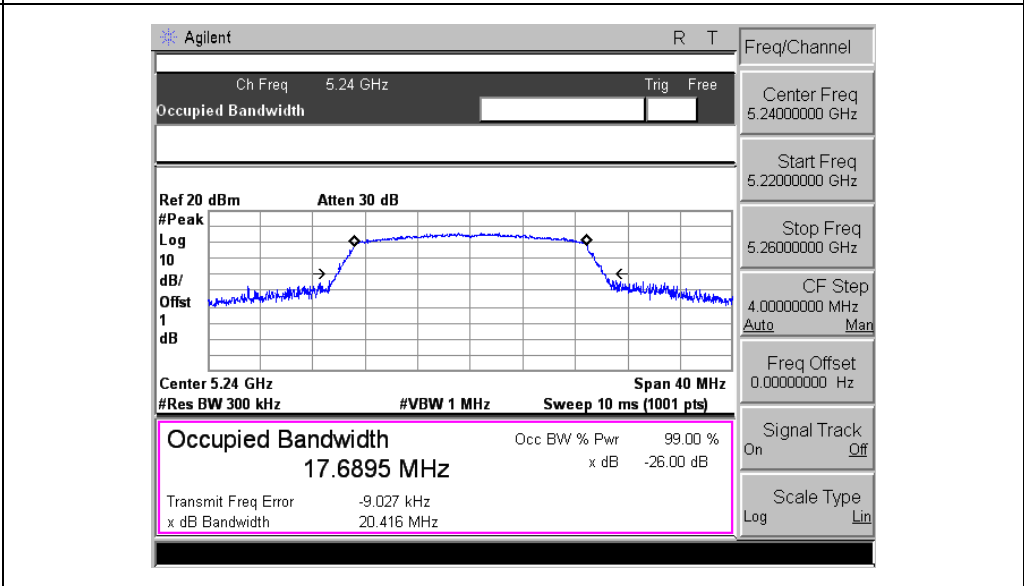
5180MHz



5200MHz



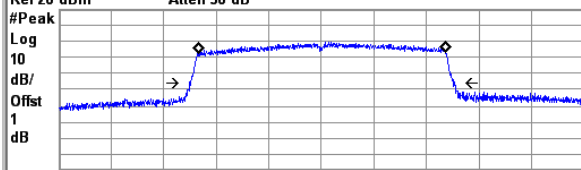
5240MHz





Mode:	802.11n-HT40
5190 MHz	<p>Agilent R T</p> <p>Ch Freq 5.19 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 5.19 GHz Span 80 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 10 ms (1001 pts)</p> <p>Occupied Bandwidth 36.2195 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 93.332 kHz x dB Bandwidth 41.384 MHz</p> <p>Freq/Channel</p> <p>Center Freq 5.19000000 GHz</p> <p>Start Freq 5.15000000 GHz</p> <p>Stop Freq 5.23000000 GHz</p> <p>CF Step 8.00000000 MHz Auto Man</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>
5230 MHz	<p>Agilent R T</p> <p>Ch Freq 5.23 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 5.23 GHz Span 80 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 10 ms (1001 pts)</p> <p>Occupied Bandwidth 36.1669 MHz Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 89.429 kHz x dB Bandwidth 41.471 MHz</p> <p>Freq/Channel</p> <p>Center Freq 5.23000000 GHz</p> <p>Start Freq 5.19000000 GHz</p> <p>Stop Freq 5.27000000 GHz</p> <p>CF Step 8.00000000 MHz Auto Man</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>



Mode:	802.11ac VH80
5210MHz	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black;"> Agilent R T </div> <div style="border-bottom: 1px solid black; padding: 2px;"> <p style="margin: 0;">Ch Freq 5.21 GHz Trig Free</p> </div> <div style="border-bottom: 1px solid black; padding: 2px;"> <p style="margin: 0;">Occupied Bandwidth</p> </div> <div style="padding: 5px;"> <p style="margin: 0;">Ref 20 dBm Atten 30 dB</p>  <p style="margin: 0;">#Peak Log dB/ dB/</p> </div> <div style="border-bottom: 1px solid black; padding: 2px;"> <p style="margin: 0;">Center 5.21 GHz Span 160 MHz</p> </div> <div style="border-bottom: 1px solid black; padding: 2px;"> <p style="margin: 0;">#Res BW 300 kHz #VBW 1 MHz Sweep 10 ms (1001 pts)</p> </div> <div style="border: 2px solid magenta; padding: 5px;"> <p style="margin: 0;">Occupied Bandwidth Occ BW % Pwr 99.00 %</p> <p style="margin: 0; text-align: center;">75.0009 MHz x dB -26.00 dB</p> </div> <div style="padding: 2px;"> <p style="margin: 0;">Transmit Freq Error 145.984 kHz</p> <p style="margin: 0;">x dB Bandwidth 80.745 MHz</p> </div> </div> <div style="border: 1px solid gray; padding: 2px; margin-top: 5px;"> <p style="margin: 0;">Freq/Channel</p> <p style="margin: 0;">Center Freq 5.21000000 GHz</p> <p style="margin: 0;">Start Freq 5.13000000 GHz</p> <p style="margin: 0;">Stop Freq 5.29000000 GHz</p> <p style="margin: 0;">CF Step 16.00000000 MHz</p> <p style="margin: 0;">Auto Man</p> <p style="margin: 0;">Freq Offset 0.00000000 Hz</p> <p style="margin: 0;">Signal Track On Off</p> <p style="margin: 0;">Scale Type Log Lin</p> </div>



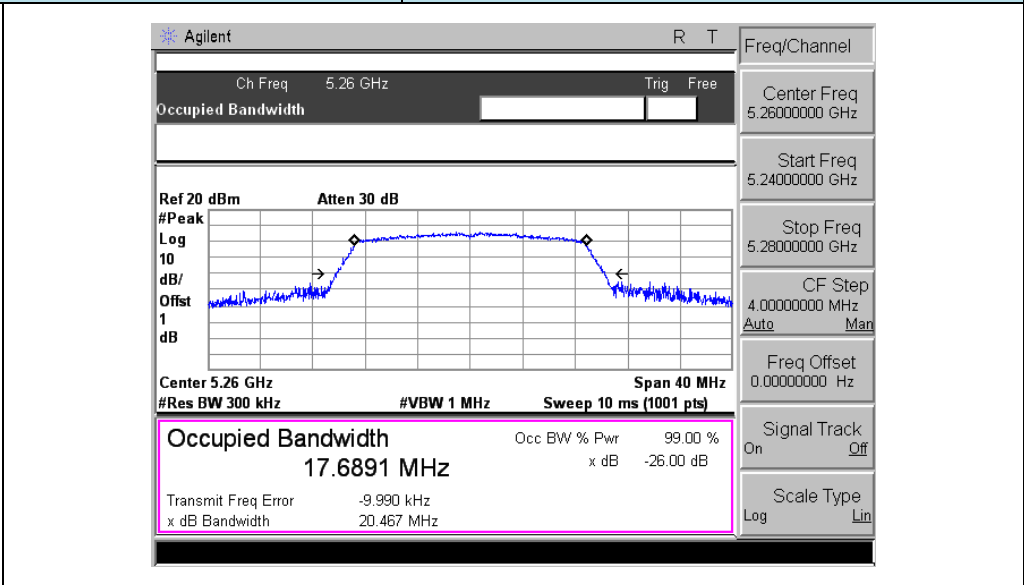
➤ 5250-5350MHz

Mode:	802.11a
5260MHz	
5280MHz	
5320MHz	

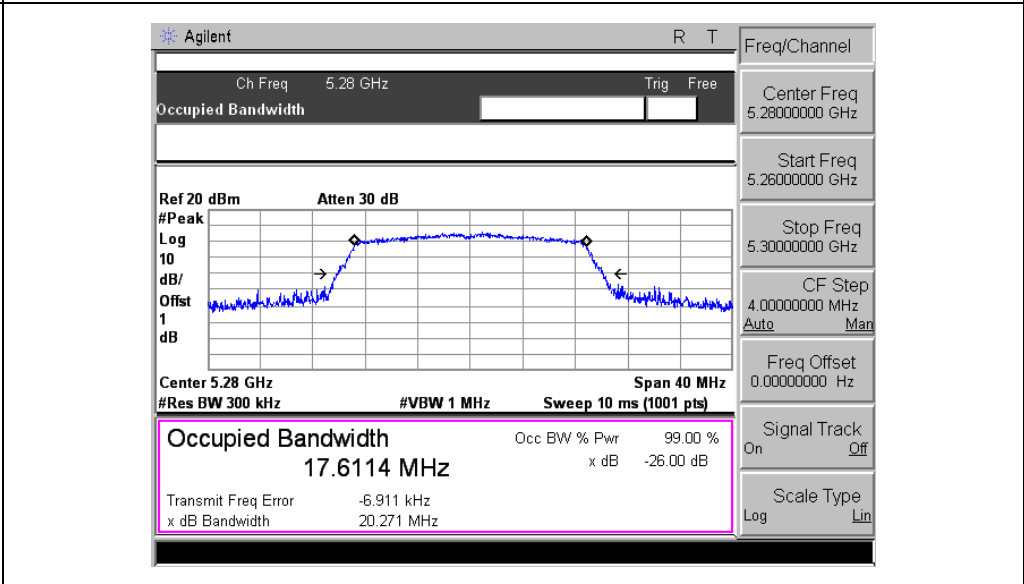


Mode: 802.11n-HT20

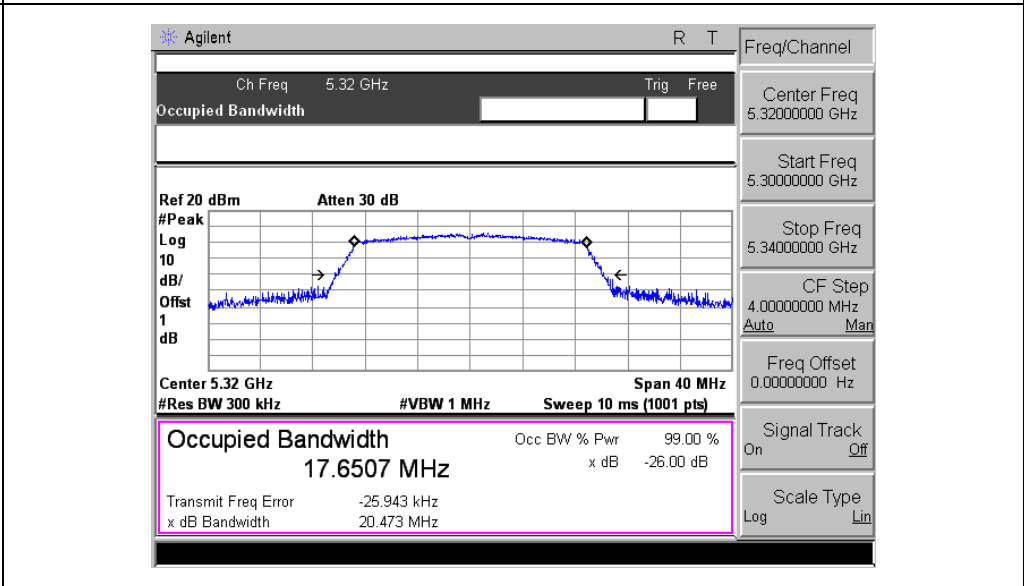
5260MHz



5280MHz



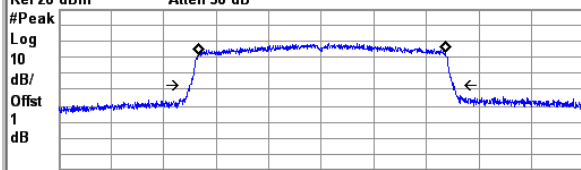
5320MHz





Mode:	802.11n-HT40
5270MHz	<p>Agilent R T</p> <p>Ch Freq 5.27 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 5.27 GHz Span 80 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 10 ms (1001 pts)</p> <p>Occupied Bandwidth 36.1361 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 72.858 kHz x dB Bandwidth 41.608 MHz</p> <p>Freq/Channel</p> <p>Center Freq 5.2700000 GHz</p> <p>Start Freq 5.2300000 GHz</p> <p>Stop Freq 5.3100000 GHz</p> <p>CF Step 8.0000000 MHz Auto Man</p> <p>Freq Offset 0.0000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>
5310MHz	<p>Agilent R T</p> <p>Ch Freq 5.31 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Peak Log 10 dB/ Offst 1 dB</p> <p>Center 5.31 GHz Span 80 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 10 ms (1001 pts)</p> <p>Occupied Bandwidth 36.1826 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -26.00 dB</p> <p>Transmit Freq Error 34.369 kHz x dB Bandwidth 41.186 MHz</p> <p>Freq/Channel</p> <p>Center Freq 5.3100000 GHz</p> <p>Start Freq 5.2700000 GHz</p> <p>Stop Freq 5.3500000 GHz</p> <p>CF Step 8.0000000 MHz Auto Man</p> <p>Freq Offset 0.0000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>



Mode:	802.11ac VH80																		
5290MHz	<div style="border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid black;"> Agilent R T </div> <div style="border-bottom: 1px solid black; padding: 2px;"> <p style="margin: 0;">Ch Freq 5.29 GHz Trig Free</p> </div> <div style="border-bottom: 1px solid black; padding: 2px;"> <p style="margin: 0;">Occupied Bandwidth</p> </div> <div style="padding: 5px;"> <p style="margin: 0;">Ref 20 dBm Atten 30 dB</p>  <p style="margin: 0; font-size: small;">Center 5.29 GHz Span 160 MHz #Res BW 300 kHz #VBW 1 MHz Sweep 10 ms (1001 pts)</p> <div style="border: 2px solid magenta; padding: 2px; margin: 5px 0;"> <p style="margin: 0;">Occupied Bandwidth Occ BW % Pwr 99.00 % 74.8991 MHz x dB -26.00 dB</p> </div> <p style="margin: 0; font-size: x-small;">Transmit Freq Error 103.973 kHz x dB Bandwidth 80.222 MHz</p> </div> <div style="border: 1px solid black; padding: 2px; font-size: x-small;"> <table style="width: 100%; border-collapse: collapse;"> <tr><td colspan="2">Freq/Channel</td></tr> <tr><td>Center Freq</td><td>5.29000000 GHz</td></tr> <tr><td>Start Freq</td><td>5.21000000 GHz</td></tr> <tr><td>Stop Freq</td><td>5.37000000 GHz</td></tr> <tr><td>CF Step</td><td>16.00000000 MHz</td></tr> <tr><td>Auto</td><td>Man</td></tr> <tr><td>Freq Offset</td><td>0.00000000 Hz</td></tr> <tr><td>Signal Track</td><td>On Off</td></tr> <tr><td>Scale Type</td><td>Log Lin</td></tr> </table> </div> </div>	Freq/Channel		Center Freq	5.29000000 GHz	Start Freq	5.21000000 GHz	Stop Freq	5.37000000 GHz	CF Step	16.00000000 MHz	Auto	Man	Freq Offset	0.00000000 Hz	Signal Track	On Off	Scale Type	Log Lin
Freq/Channel																			
Center Freq	5.29000000 GHz																		
Start Freq	5.21000000 GHz																		
Stop Freq	5.37000000 GHz																		
CF Step	16.00000000 MHz																		
Auto	Man																		
Freq Offset	0.00000000 Hz																		
Signal Track	On Off																		
Scale Type	Log Lin																		



➤ 5470-5725MHz

Mode:		802.11a
5500MHz		
5600MHz		
5700MHz		



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



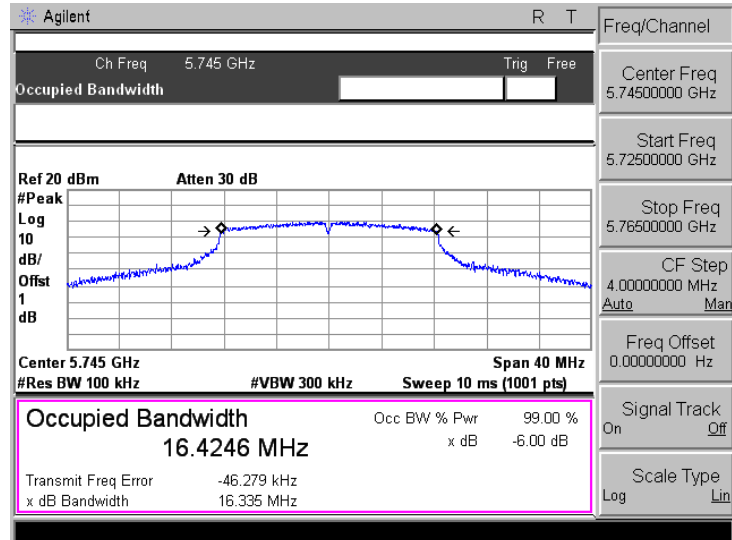
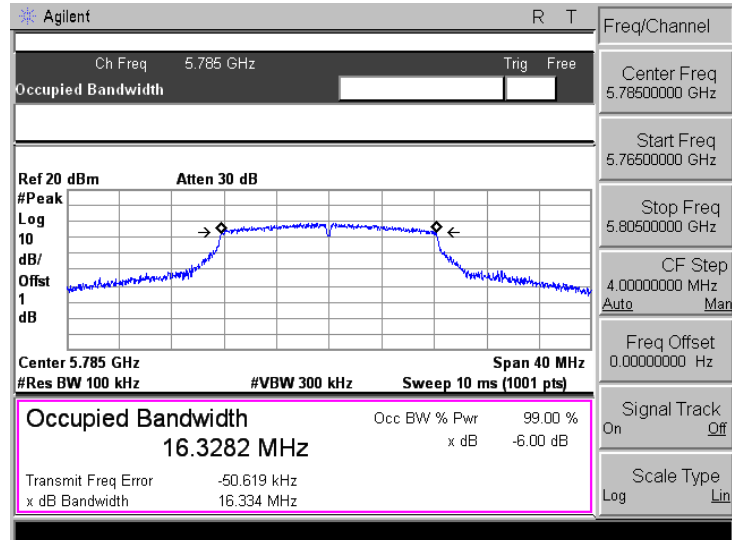
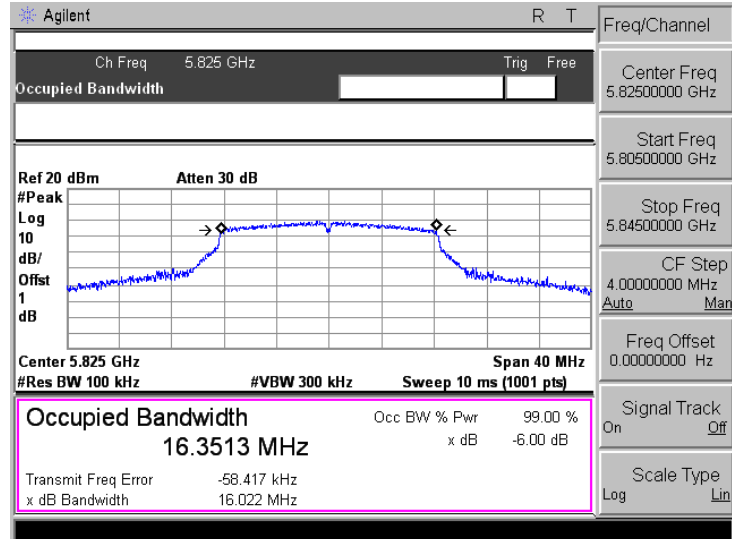
Mode:	802.11n-HT40
5510MHz	
5590MHz	
5670MHz	



Mode:		802.11ac VH80
5530MHz	<p>Occupied Bandwidth 74.9829 MHz</p> <p>Transmit Freq Error: 91.756 kHz x dB Bandwidth: 80.298 MHz</p>	
5610MHz	<p>Occupied Bandwidth 75.1013 MHz</p> <p>Transmit Freq Error: 207.455 kHz x dB Bandwidth: 80.699 MHz</p>	



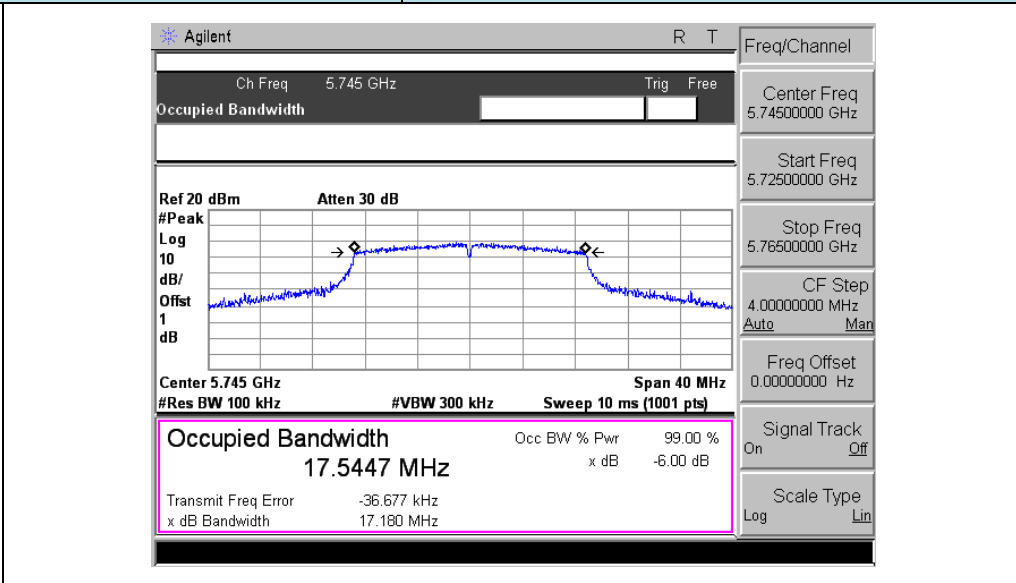
➤ 5725-5850MHz

Mode:	802.11a
5745MHz	
5785MHz	
5825MHz	

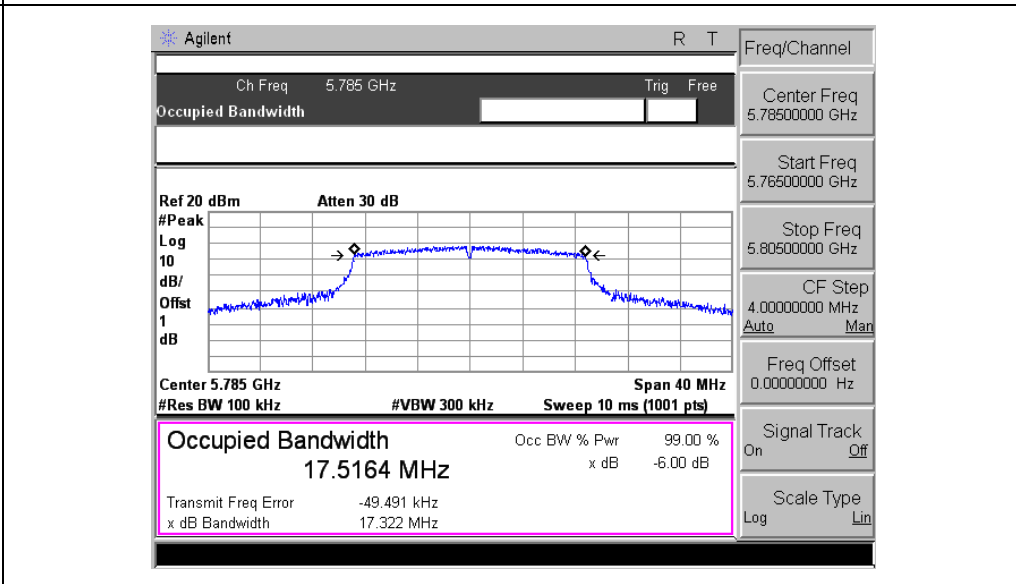


Mode: **802.11n-HT20**

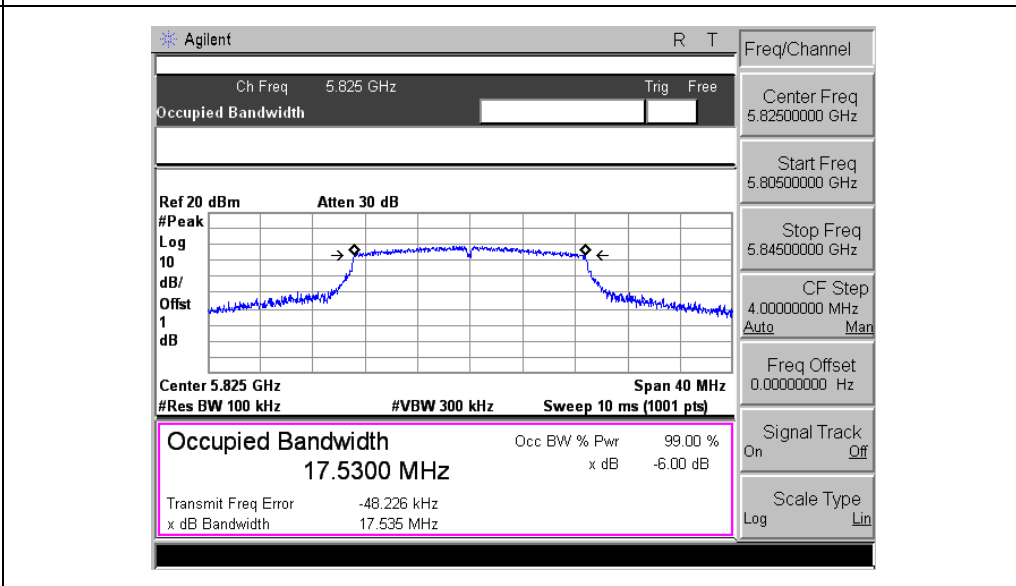
5745MHz



5785MHz



5825MHz





Mode:		802.11n-HT40
5755 MHz	<p>Agilent R T</p> <p>Ch Freq 5.755 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Peak Log 10 dB/Offst 1 dB</p> <p>Center 5.755 GHz Span 80 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts)</p> <p>Occupied Bandwidth 35.8436 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -6.00 dB</p> <p>Transmit Freq Error -75.409 kHz x dB Bandwidth 36.004 MHz</p> <p>Freq/Channel</p> <p>Center Freq 5.75500000 GHz</p> <p>Start Freq 5.71500000 GHz</p> <p>Stop Freq 5.79500000 GHz</p> <p>CF Step 8.00000000 MHz Auto Man</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>	
5795 MHz	<p>Agilent R T</p> <p>Ch Freq 5.795 GHz Trig Free</p> <p>Occupied Bandwidth</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Peak Log 10 dB/Offst 1 dB</p> <p>Center 5.795 GHz Span 80 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 10 ms (1001 pts)</p> <p>Occupied Bandwidth 35.8642 MHz</p> <p>Occ BW % Pwr 99.00 % x dB -6.00 dB</p> <p>Transmit Freq Error -106.296 kHz x dB Bandwidth 32.845 MHz</p> <p>Freq/Channel</p> <p>Center Freq 5.79500000 GHz</p> <p>Start Freq 5.75500000 GHz</p> <p>Stop Freq 5.83500000 GHz</p> <p>CF Step 8.00000000 MHz Auto Man</p> <p>Freq Offset 0.00000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p>	



Mode:	802.11ac VH80
5775 MHz	<div style="border: 1px solid #ccc; padding: 5px;"> <p style="font-size: small; margin: 0;">Agilent R T</p> <hr/> <p style="font-size: x-small; margin: 0;">Ch Freq 5.775 GHz Trig Free</p> <p style="font-size: x-small; margin: 0;">Occupied Bandwidth []</p> <hr/> <div style="display: flex; justify-content: space-between; font-size: x-small;"> Ref 20 dBm Atten 30 dB </div> <div style="font-size: x-small; margin-top: 5px;"> <p>Center 5.775 GHz Span 160 MHz</p> <p>#Res BW 100 kHz #VBW 300 kHz Sweep 16.58 ms (1001 pts)</p> </div> <div style="border: 2px solid magenta; padding: 2px; margin-top: 5px; font-size: small;"> <p style="margin: 0;">Occupied Bandwidth Occ BW % Pwr 99.00 %</p> <p style="margin: 0; text-align: center;">74.8569 MHz x dB -6.00 dB</p> <p style="font-size: x-small; margin: 0;">Transmit Freq Error -171.344 kHz</p> <p style="font-size: x-small; margin: 0;">x dB Bandwidth 71.908 MHz</p> </div> </div>

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 $11 \text{ dBm} + 10 \log B$, 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 \geq 3 MHz.
- (iv) Number of points in sweep \geq 2 Span / RBW. (This ensures that bin-to-bin spacing is \leq 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 \geq 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-1:5150-5250MHz				
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5180	12.18	16.52	250
	5200	12.64	18.37	250
	5240	13.04	20.14	250
802.11n-HT20	5180	12.82	19.14	250
	5200	12.51	17.82	250
	5240	12.45	17.58	250
802.11n-HT40	5190	11.44	13.93	250
	5230	12.26	16.83	250
802.11ac VH80	5210	11.17	13.09	250

U-NII-2A: 5250-5350MHz				
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5260	12.01	15.89	250
	5280	12.18	16.52	250
	5320	12.79	19.01	250
802.11n-HT20	5260	12.38	17.30	250
	5280	12.49	17.74	250
	5320	12.54	17.95	250
802.11n-HT40	5270	12.03	15.96	250
	5310	11.83	15.24	250
802.11ac VH80	5290	11.10	12.88	250



U-NII-2C: 5470-5725MHz				
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5500	11.26	13.37	250
	5600	11.24	13.30	250
	5700	11.02	12.65	250
802.11n-HT20	5500	11.18	13.12	250
	5600	11.18	13.12	250
	5700	10.96	12.47	250
802.11n-HT40	5510	11.03	12.68	250
	5590	11.57	14.35	250
	5670	11.50	14.13	250
802.11ac VH80	5530	10.63	11.56	250
	5610	10.20	10.47	250

U-NII-3: 5725-5850MHz				
Test mode	Frequency MHz	Output Power dBm	Output Power mW	Limit mW
802.11a	5745	11.50	14.13	1000
	5785	10.76	11.91	1000
	5825	11.15	13.03	1000
802.11n-HT20	5745	11.10	12.88	1000
	5785	10.96	12.47	1000
	5825	11.45	13.96	1000
802.11n-HT40	5755	11.05	12.74	1000
	5795	11.44	13.93	1000
802.11ac VH80	5775	11.38	13.74	1000



➤ 5150-5250MHz

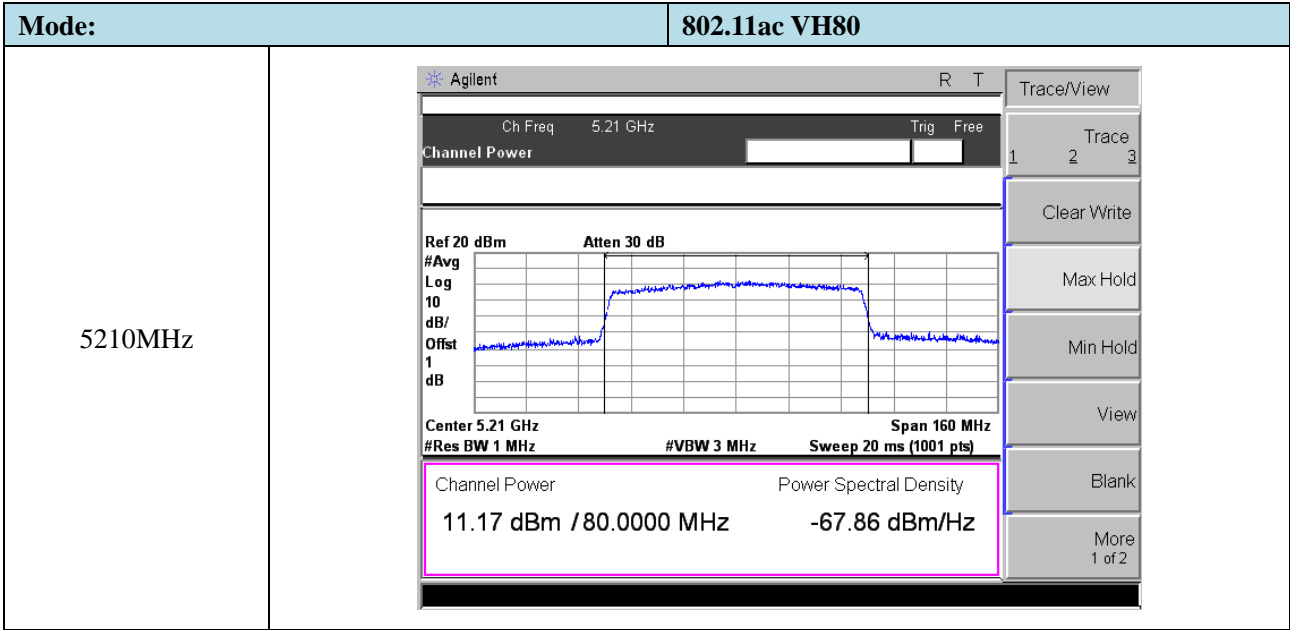
Mode:		802.11a
5180MHz	<p>Agilent R T Trace/View Ch Freq 5.18 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.18 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 12.18 dBm / 20.0000 MHz -60.83 dBm/Hz</p>	
5200MHz	<p>Agilent R T Trace/View Ch Freq 5.2 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.2 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 12.64 dBm / 20.0000 MHz -60.37 dBm/Hz</p>	
5240MHz	<p>Agilent R T Trace/View Ch Freq 5.24 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.24 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 13.04 dBm / 20.0000 MHz -59.97 dBm/Hz</p>	



Mode:		802.11n-HT20
5180MHz		
5200MHz		
5240MHz		



<p>Mode:</p>	<p>802.11n-HT40</p>
<p>5190 MHz</p>	
<p>5230 MHz</p>	





➤ 5250-5350MHz

Mode:		802.11a
5260MHz		
5280MHz		
5320MHz		



Mode:		802.11n-HT20
5260MHz	<p>Agilent R T Trace/View Ch Freq 5.26 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.26 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 12.38 dBm / 20.0000 MHz -60.63 dBm/Hz</p>	
5280MHz	<p>Agilent R T Trace/View Ch Freq 5.28 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.28 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 12.49 dBm / 20.0000 MHz -60.52 dBm/Hz</p>	
5320MHz	<p>Agilent R T Trace/View Ch Freq 5.32 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.32 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 12.54 dBm / 20.0000 MHz -60.47 dBm/Hz</p>	



Mode:	802.11n-HT40
5270MHz	<p>Agilent R T</p> <p>Ch Freq 5.27 GHz Trig Free</p> <p>Channel Power</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Avg Log 10 dB/ Offst 1 dB</p> <p>Center 5.27 GHz Span 80 MHz</p> <p>#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p> <p>Channel Power Power Spectral Density</p> <p>12.03 dBm / 40.0000 MHz -63.99 dBm/Hz</p>
5310MHz	<p>Agilent R T</p> <p>Ch Freq 5.31 GHz Trig Free</p> <p>Channel Power</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Avg Log 10 dB/ Offst 1 dB</p> <p>Center 5.31 GHz Span 80 MHz</p> <p>#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p> <p>Channel Power Power Spectral Density</p> <p>11.83 dBm / 40.0000 MHz -64.19 dBm/Hz</p>



Mode:	802.11ac VH80				
5290MHz	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid #ccc; margin-bottom: 5px;"> Agilent R T </div> <div style="border-bottom: 1px solid #ccc; margin-bottom: 5px;"> <p style="font-size: small;">Ch Freq 5.29 GHz Trig Free</p> </div> <div style="border-bottom: 1px solid #ccc; margin-bottom: 5px;"> <p style="font-size: small;">Channel Power</p> </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-bottom: 5px;"> Ref 20 dBm Atten 30 dB </div> <div style="font-size: x-small; margin-bottom: 5px;"> <p>#Avg Log dB/Ofst dB</p> </div> <div style="text-align: center; margin-bottom: 5px;"> </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-bottom: 5px;"> Center 5.29 GHz Span 160 MHz </div> <div style="display: flex; justify-content: space-between; font-size: x-small; margin-bottom: 5px;"> #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) </div> <div style="border: 2px solid #ff00ff; padding: 5px; margin-bottom: 5px;"> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; font-size: x-small;">Channel Power</td> <td style="width: 50%; font-size: x-small;">Power Spectral Density</td> </tr> <tr> <td style="text-align: center;">11.10 dBm / 80.0000 MHz</td> <td style="text-align: center;">-67.93 dBm/Hz</td> </tr> </table> </div> </div> <div style="font-size: x-small; margin-bottom: 5px;"> <p>Freq/Channel</p> <p>Center Freq 5.2900000 GHz</p> <p>Start Freq 5.2100000 GHz</p> <p>Stop Freq 5.3700000 GHz</p> <p>CF Step 16.0000000 MHz</p> <p>Auto Man</p> <p>Freq Offset 0.0000000 Hz</p> <p>Signal Track On Off</p> <p>Scale Type Log Lin</p> </div>	Channel Power	Power Spectral Density	11.10 dBm / 80.0000 MHz	-67.93 dBm/Hz
Channel Power	Power Spectral Density				
11.10 dBm / 80.0000 MHz	-67.93 dBm/Hz				



➤ 5470-5725MHz

Mode:		802.11a
5500MHz		
5600MHz		
5700MHz		



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



Mode:	802.11n-HT40
5510MHz	<p>Agilent R T Trace/View</p> <p>Ch Freq 5.51 GHz Trig Free</p> <p>Channel Power</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Avg Log 10 dB/ Offst 1 dB</p> <p>Center 5.51 GHz Span 80 MHz</p> <p>#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p> <p>Channel Power Power Spectral Density</p> <p>11.03 dBm / 40.0000 MHz -64.99 dBm/Hz</p>
5590MHz	<p>Agilent R T Trace/View</p> <p>Ch Freq 5.59 GHz Trig Free</p> <p>Channel Power</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Avg Log 10 dB/ Offst 1 dB</p> <p>Center 5.59 GHz Span 80 MHz</p> <p>#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p> <p>Channel Power Power Spectral Density</p> <p>11.57 dBm / 40.0000 MHz -64.46 dBm/Hz</p>
5670MHz	<p>Agilent R T Trace/View</p> <p>Ch Freq 5.67 GHz Trig Free</p> <p>Channel Power</p> <p>Ref 20 dBm Atten 30 dB</p> <p>#Avg Log 10 dB/ Offst 1 dB</p> <p>Center 5.67 GHz Span 80 MHz</p> <p>#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p> <p>Channel Power Power Spectral Density</p> <p>11.50 dBm / 40.0000 MHz -64.52 dBm/Hz</p>



Mode:		802.11ac VH80
5530MHz		
5610MHz		



➤ 5725-5850MHz

Mode:		802.11a
5745MHz	<p>Agilent R T Trace/View Ch Freq 5.745 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.745 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 11.50 dBm / 20.0000 MHz -61.51 dBm/Hz</p>	
5785MHz	<p>Agilent R T Trace/View Ch Freq 5.785 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.785 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 10.76 dBm / 20.0000 MHz -62.25 dBm/Hz</p>	
5825MHz	<p>Agilent R T Trace/View Ch Freq 5.825 GHz Trig Free Channel Power Ref 20 dBm Atten 30 dB #Avg Log 10 dB/ Offst 1 dB Center 5.825 GHz Span 40 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density 11.15 dBm / 20.0000 MHz -61.87 dBm/Hz</p>	



Mode:		802.11n-HT20
5745MHz		
5785MHz		
5825MHz		



Mode:		802.11n-HT40
5755 MHz		
5795 MHz		



Mode:	802.11ac VH80																																
5775 MHz	<div style="border: 1px solid #ccc; padding: 5px;"> <div style="display: flex; justify-content: space-between; border-bottom: 1px solid #ccc;"> Agilent R T </div> <div style="border-bottom: 1px solid #ccc; padding: 2px;"> <p style="font-size: small;">Ch Freq 5.775 GHz Trig Free</p> <p style="font-size: small;">Channel Power</p> </div> <div style="border-bottom: 1px solid #ccc; padding: 5px;"> <p style="font-size: x-small;">Ref 20 dBm Atten 30 dB</p> <p style="font-size: x-small;">#Avg 10 Log dB/Ofst 1 dB</p> <p style="font-size: x-small;">Center 5.775 GHz Span 160 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts)</p> </div> <div style="border: 2px solid #ff00ff; padding: 2px;"> <table style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td style="width: 50%;">Channel Power</td> <td style="width: 50%;">Power Spectral Density</td> </tr> <tr> <td style="text-align: center;">11.38 dBm / 80.0000 MHz</td> <td style="text-align: center;">-67.47 dBm/Hz</td> </tr> </table> </div> <div style="border-top: 1px solid #ccc; padding: 2px;"> <table style="width: 100%; border-collapse: collapse; font-size: x-small;"> <tr> <td style="width: 100px;">Trace/View</td> <td>1</td> <td>Trace 2</td> <td>3</td> </tr> <tr> <td>Clear Write</td> <td colspan="3"></td> </tr> <tr> <td>Max Hold</td> <td colspan="3"></td> </tr> <tr> <td>Min Hold</td> <td colspan="3"></td> </tr> <tr> <td>View</td> <td colspan="3"></td> </tr> <tr> <td>Blank</td> <td colspan="3"></td> </tr> <tr> <td>More</td> <td colspan="3">1 of 2</td> </tr> </table> </div> </div>	Channel Power	Power Spectral Density	11.38 dBm / 80.0000 MHz	-67.47 dBm/Hz	Trace/View	1	Trace 2	3	Clear Write				Max Hold				Min Hold				View				Blank				More	1 of 2		
Channel Power	Power Spectral Density																																
11.38 dBm / 80.0000 MHz	-67.47 dBm/Hz																																
Trace/View	1	Trace 2	3																														
Clear Write																																	
Max Hold																																	
Min Hold																																	
View																																	
Blank																																	
More	1 of 2																																

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. 789033 D02 v02r01 General UNII Test Procedures New Rules v01

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

$$\text{EIRP} = ((E*d)^2) / 30$$

where:

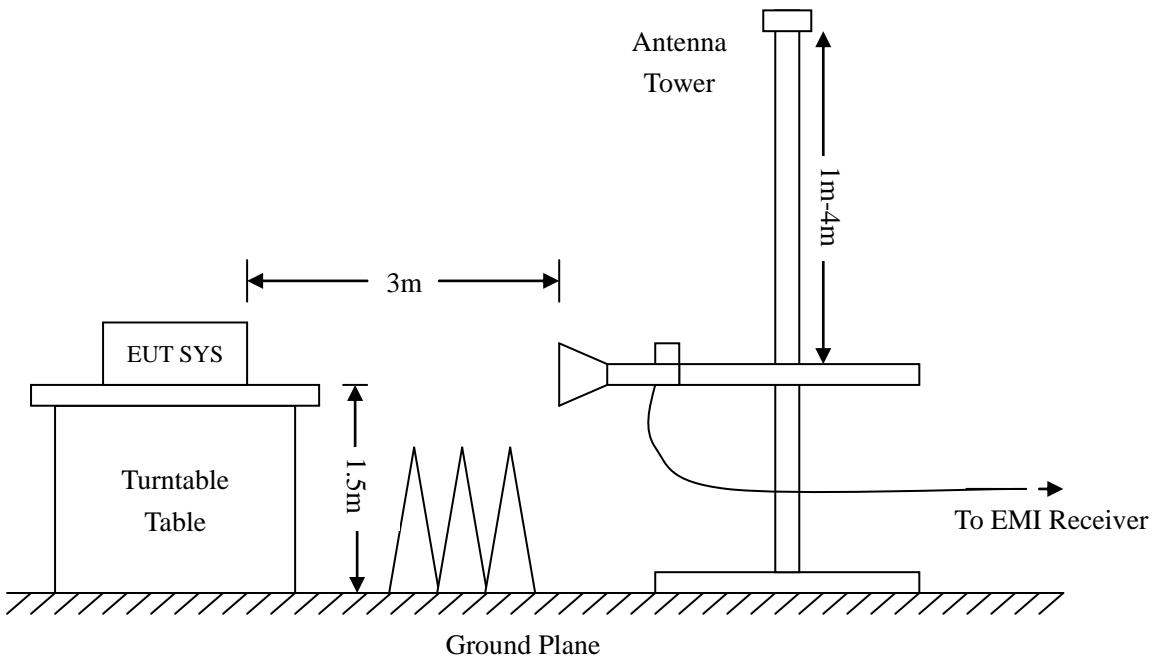
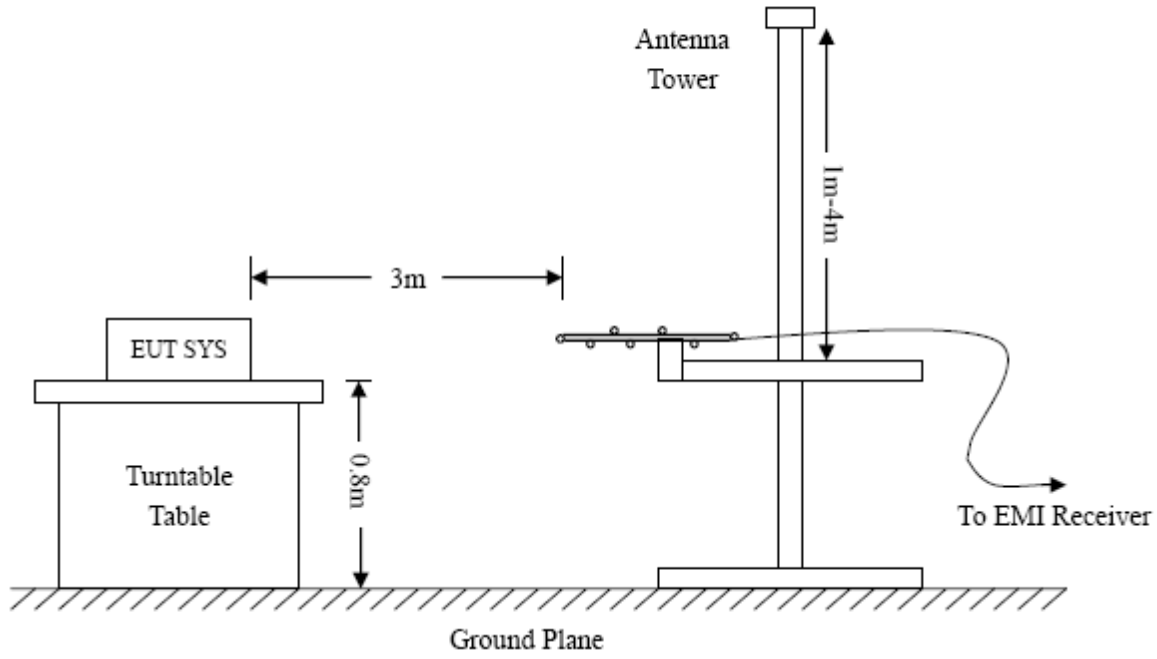
- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotropically radiated power in watts.

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.





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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Ant. Factor} + \text{Cable Loss} - \text{Ampl. Gain}$$

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

$$\text{Margin} = \text{Corr. Ampl.} - \text{FCC Part 15 Limit}$$

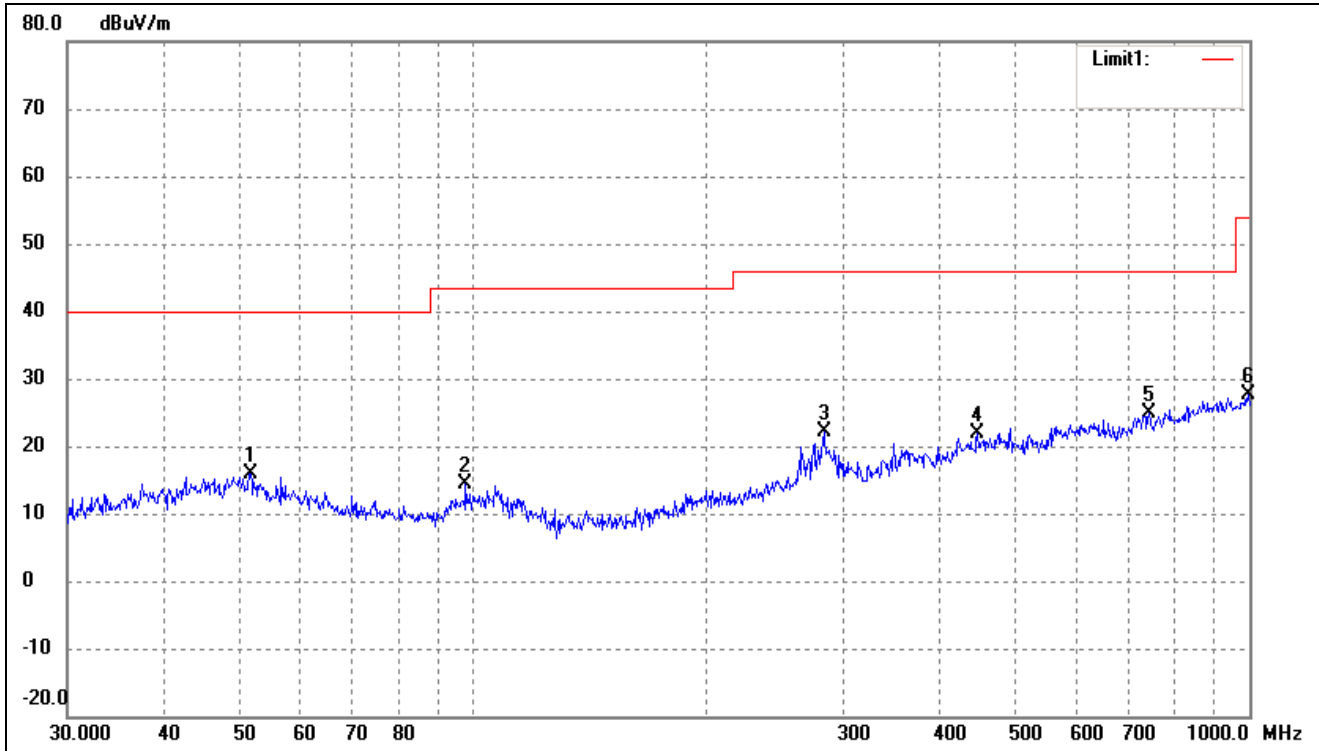
9.5 Summary of Test Results/Plots

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
- 5150-5250MHz

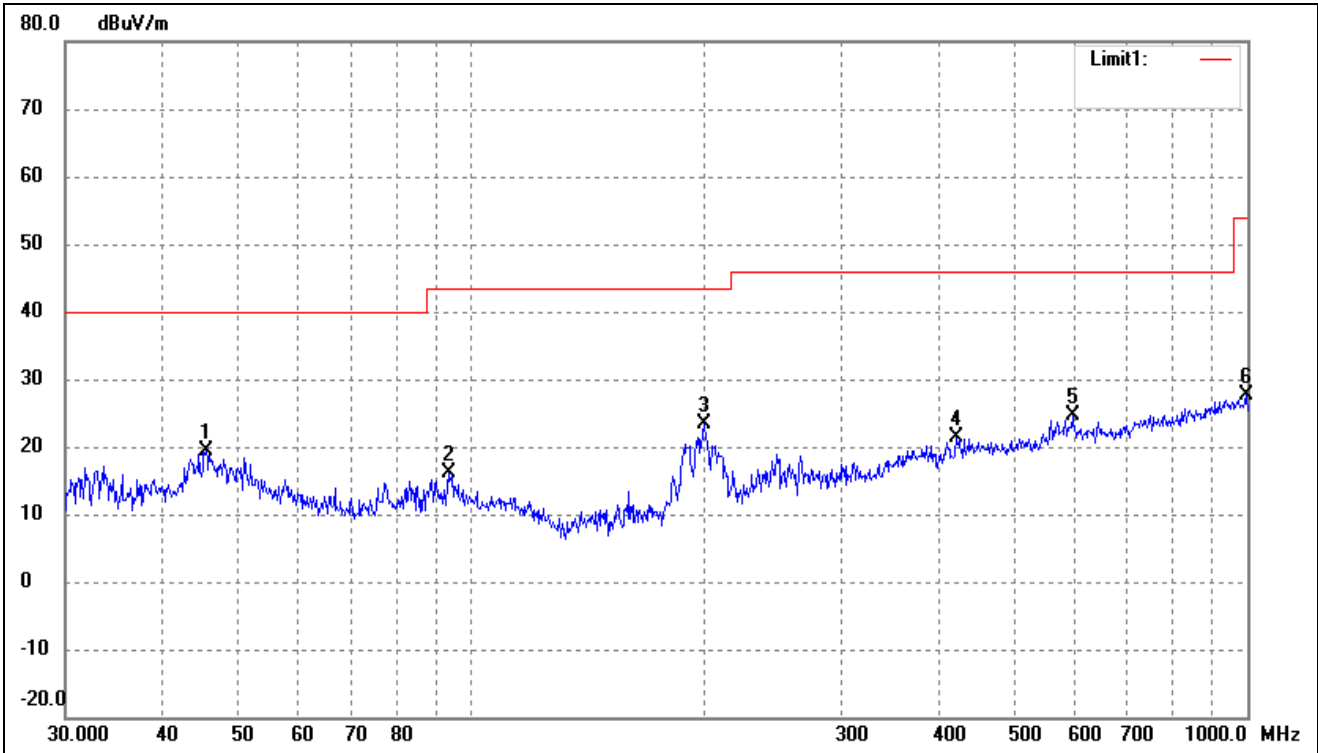
802.11a(Worst case)			
Test Channel	5180MHz(Worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	51.6616	27.24	-11.38	15.86	40.00	-24.14	146	100	peak
2	97.7983	28.04	-13.68	14.36	43.50	-29.14	156	100	peak
3	282.9852	32.19	-10.13	22.06	46.00	-23.94	89	100	peak
4	446.4141	28.10	-6.31	21.79	46.00	-24.21	162	100	peak
5	742.2587	27.71	-2.76	24.95	46.00	-21.05	185	100	peak
6	996.4996	27.03	0.55	27.58	54.00	-26.42	194	100	peak



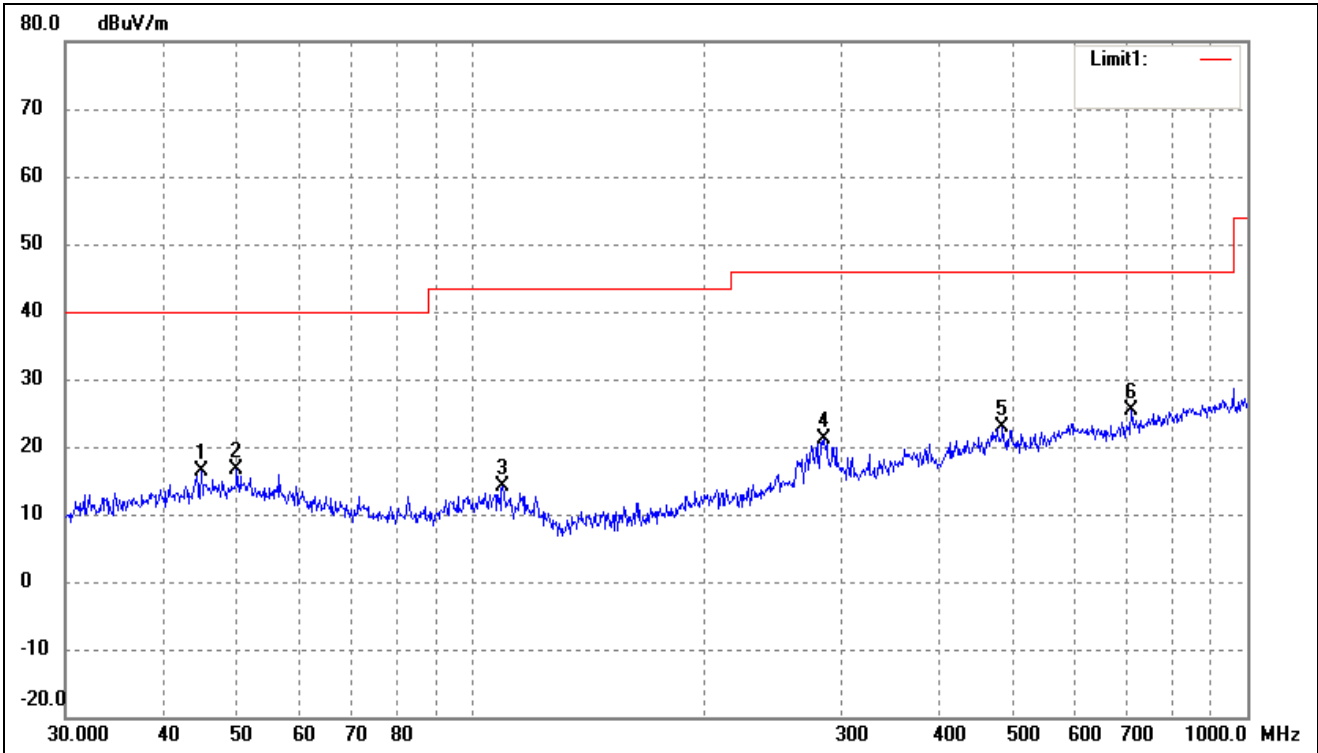
802.11a(Worst case)			
Test Channel	5180MHz(Worst case)	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	45.5348	30.57	-11.30	19.27	40.00	-20.73	73	100	peak
2	93.4402	30.75	-14.72	16.03	43.50	-27.47	173	100	peak
3	199.2855	36.23	-12.75	23.48	43.50	-20.02	76	100	peak
4	422.0577	27.57	-6.29	21.28	46.00	-24.72	141	100	peak
5	595.1329	28.68	-4.06	24.62	46.00	-21.38	136	100	peak
6	996.4996	27.10	0.55	27.65	54.00	-26.35	235	100	peak



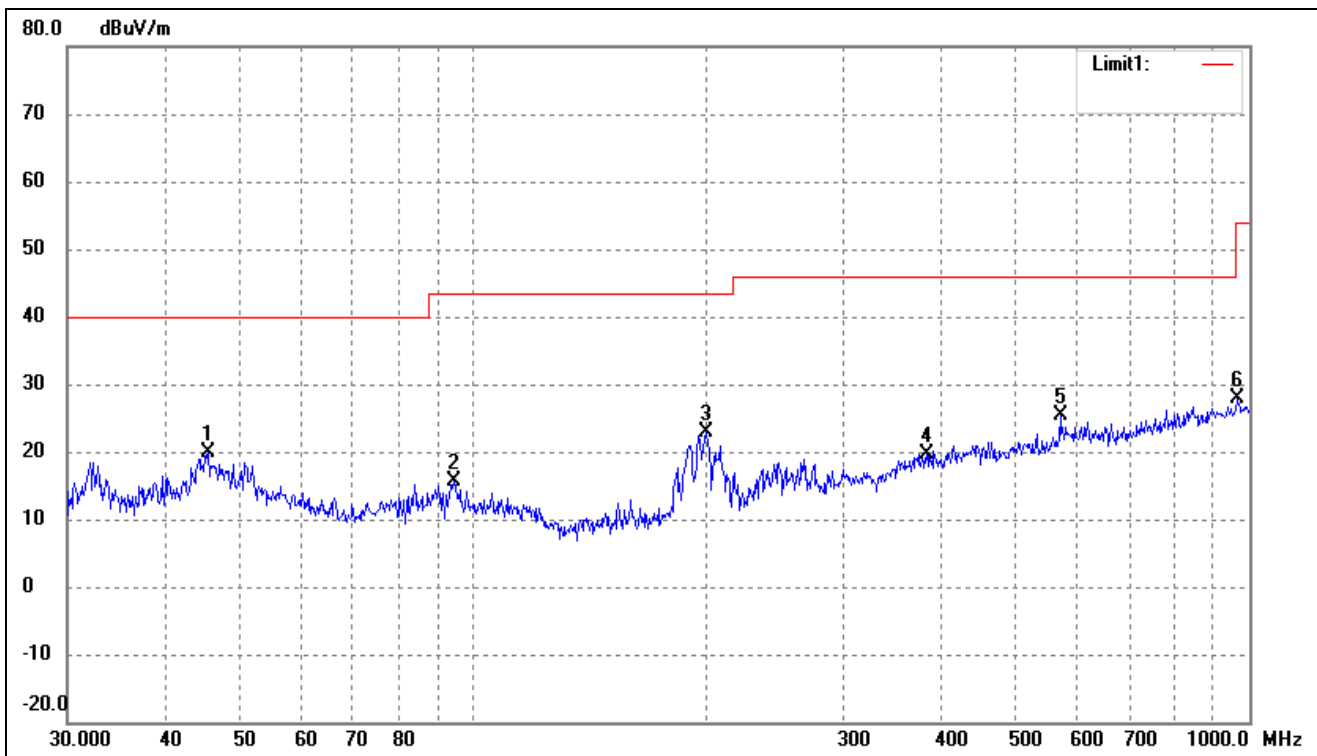
802.11a(Worst case)			
Test Channel	5240MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.9006	27.80	-11.36	16.44	40.00	-23.56	134	100	peak
2	49.8814	27.61	-11.00	16.61	40.00	-23.39	102	100	peak
3	109.7960	27.17	-13.02	14.15	43.50	-29.35	66	100	peak
4	284.9767	31.05	-10.03	21.02	46.00	-24.98	344	100	peak
5	483.9094	29.22	-6.40	22.82	46.00	-23.18	98	100	peak
6	709.1823	29.04	-3.57	25.47	46.00	-20.53	177	100	peak



802.11a(Worst case)			
Test Channel	5240MHz(worst case)	Polarity:	Vertical

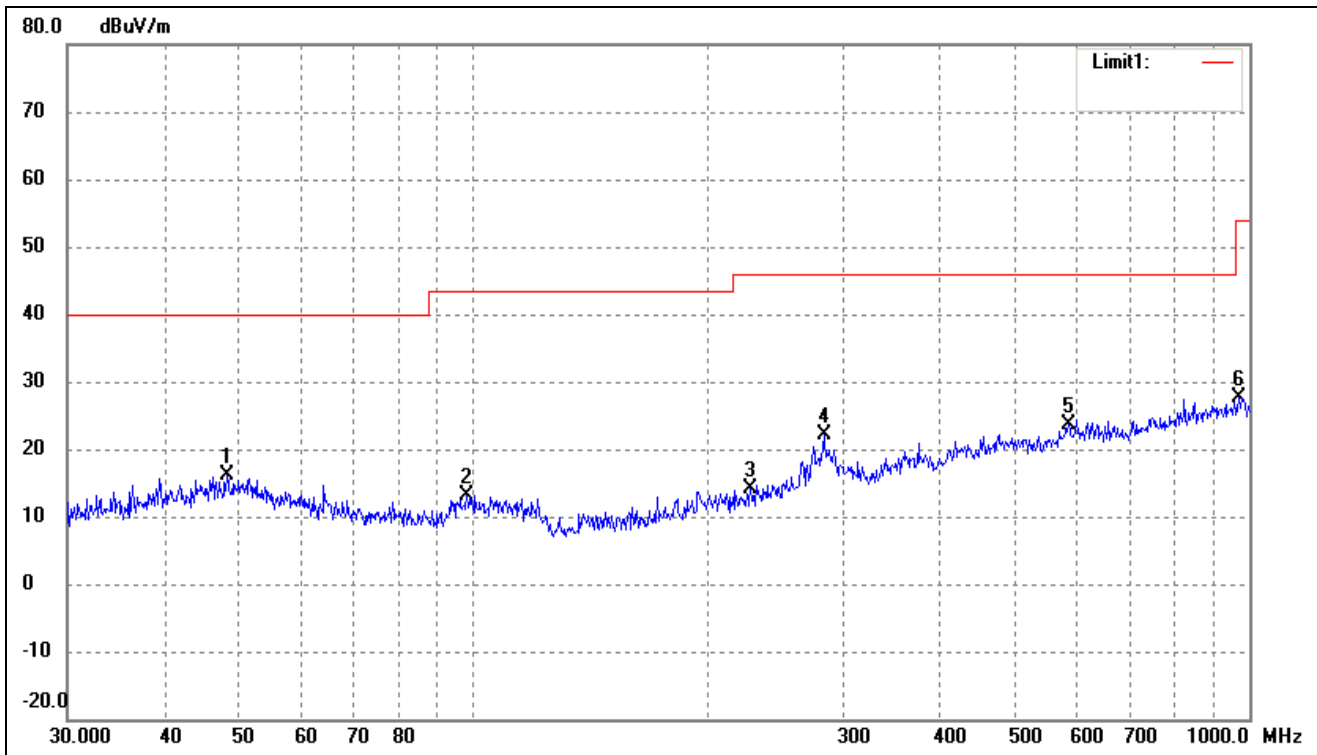


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	45.5348	31.25	-11.30	19.95	40.00	-20.05	66	100	peak
2	94.4284	30.08	-14.46	15.62	43.50	-27.88	153	100	peak
3	199.9856	35.63	-12.70	22.93	43.50	-20.57	143	100	peak
4	383.9318	27.22	-7.59	19.63	46.00	-26.37	134	100	peak
5	570.6100	29.76	-4.49	25.27	46.00	-20.73	98	100	peak
6	965.5421	27.64	0.22	27.86	54.00	-26.14	119	100	peak



➤ 5250-5350MHz

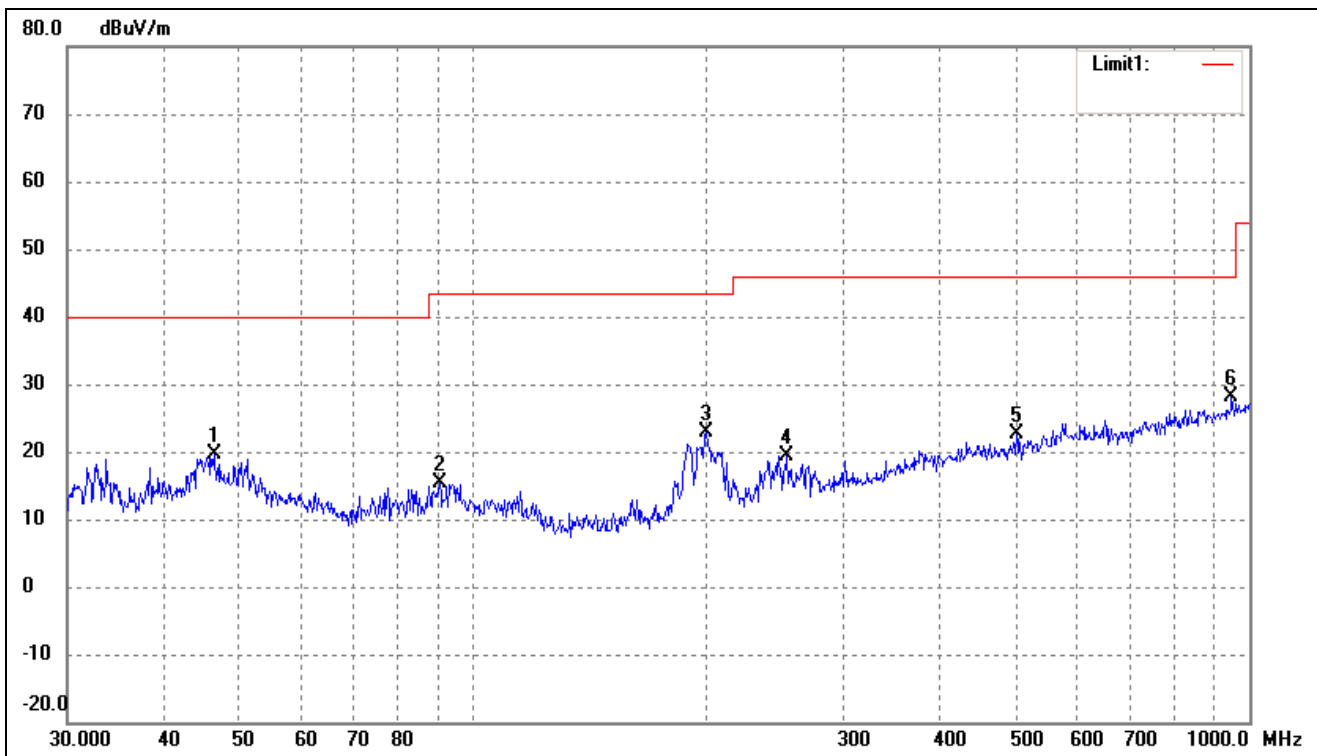
802.11a(Worst case)			
Test Channel	5260MHz (worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	48.1626	27.14	-11.12	16.02	40.00	-23.98	275	100	peak
2	98.1419	26.78	-13.61	13.17	43.50	-30.33	298	100	peak
3	227.6906	26.35	-12.17	14.18	46.00	-31.82	83	100	peak
4	282.9852	32.20	-10.13	22.07	46.00	-23.93	226	100	peak
5	584.7895	27.70	-4.17	23.53	46.00	-22.47	171	100	peak
6	968.9338	27.45	0.25	27.70	54.00	-26.30	240	100	peak



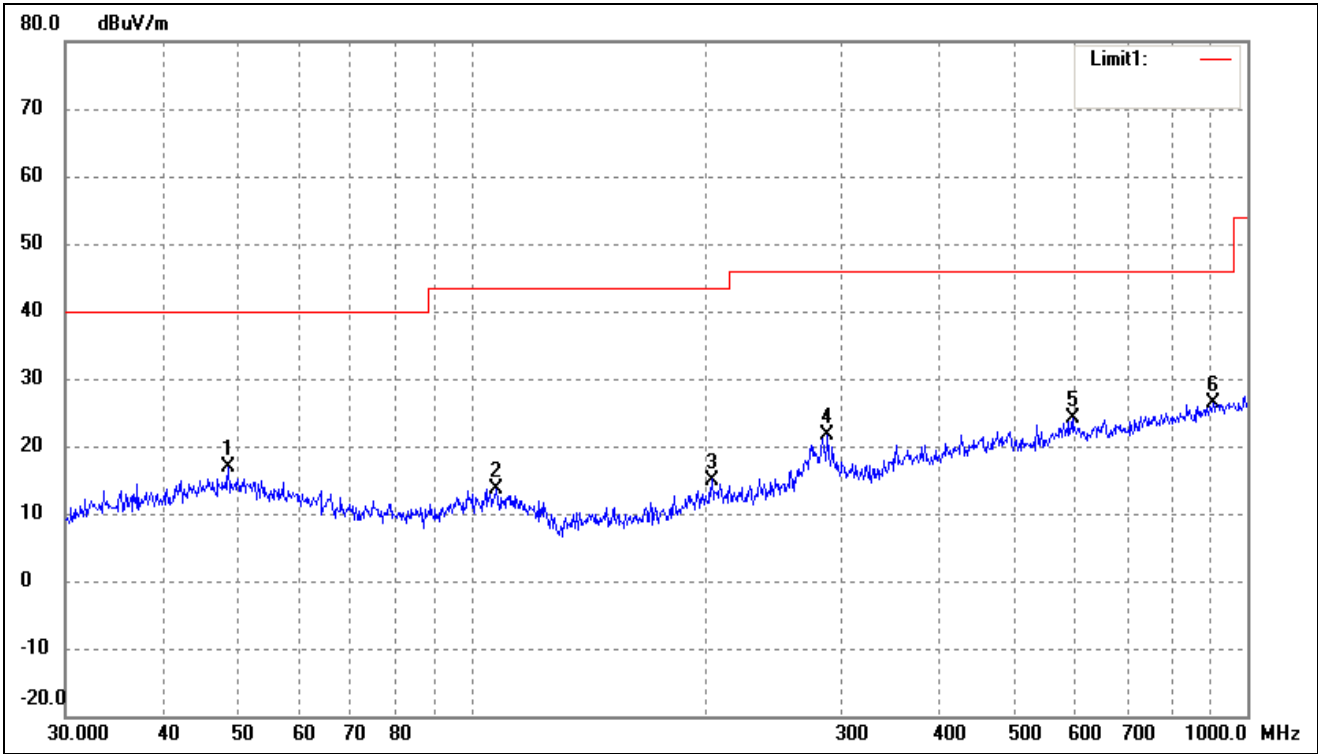
802.11a(Worst case)			
Test Channel	5260MHz(worst case)	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	46.3402	30.84	-11.25	19.59	40.00	-20.41	172	100	peak
2	90.5374	30.85	-15.48	15.37	43.50	-28.13	94	100	peak
3	199.9856	35.61	-12.70	22.91	43.50	-20.59	62	100	peak
4	253.8367	30.31	-10.93	19.38	46.00	-26.62	163	100	peak
5	501.1790	28.74	-6.17	22.57	46.00	-23.43	177	100	peak
6	948.7610	27.99	0.08	28.07	46.00	-17.93	173	100	peak



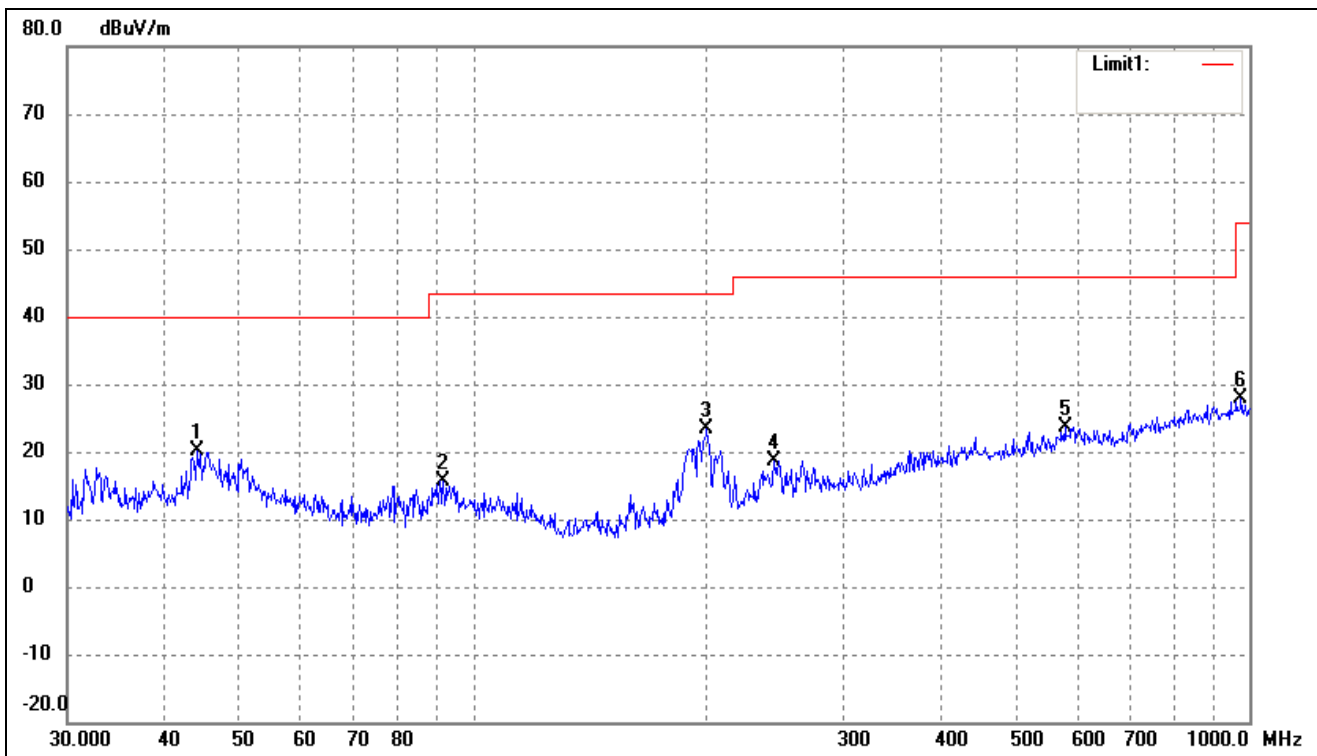
802.11a(Worst case)			
Test Channel	5320MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	48.6719	27.93	-11.08	16.85	40.00	-23.15	89	100	peak
2	107.5101	26.60	-13.05	13.55	43.50	-29.95	174	100	peak
3	204.2377	27.64	-12.64	15.00	43.50	-28.50	148	100	peak
4	287.9904	31.47	-9.87	21.60	46.00	-24.40	118	100	peak
5	595.1329	28.11	-4.06	24.05	46.00	-21.95	202	100	peak
6	903.3094	26.79	-0.52	26.27	46.00	-19.73	292	100	peak



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



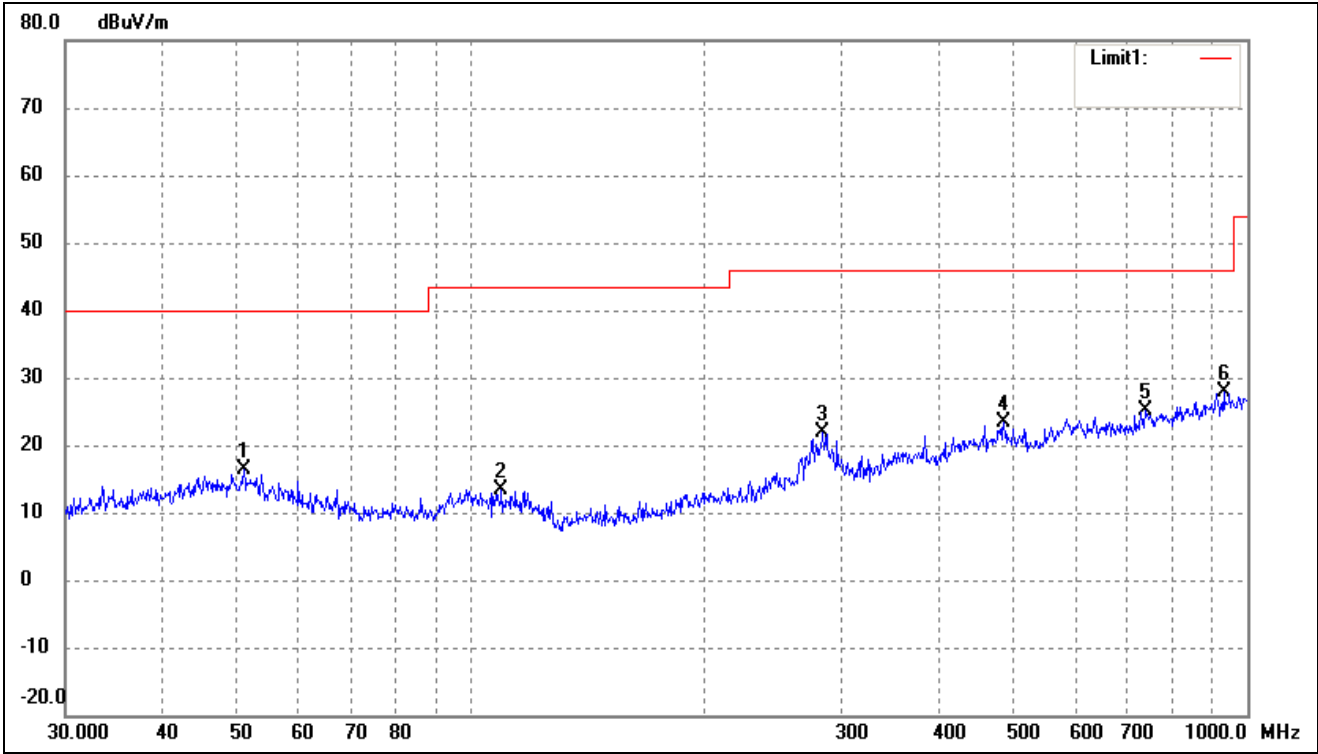
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.1202	31.77	-11.54	20.23	40.00	-19.77	293	100	peak
2	91.4949	30.92	-15.22	15.70	43.50	-27.80	91	100	peak
3	199.9856	36.17	-12.70	23.47	43.50	-20.03	196	100	peak
4	244.2321	30.05	-11.30	18.75	46.00	-27.25	100	100	peak
5	578.6699	27.91	-4.23	23.68	46.00	-22.32	161	100	peak
6	975.7529	27.64	0.31	27.95	54.00	-26.05	224	100	peak



➤ 5470-5725MHz

802.11a(Worst case)

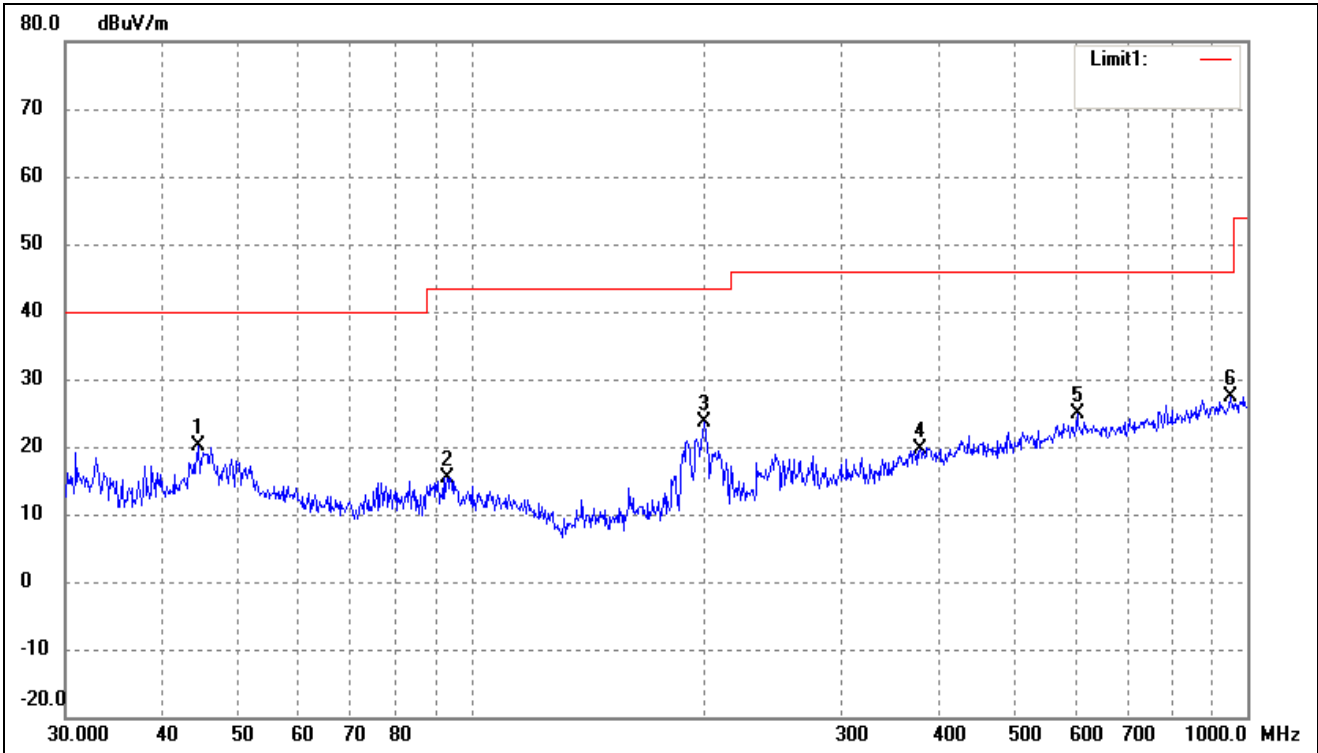
Test Channel	5500MHz(worst case)	Polarity:	Horizontal
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No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	50.9420	27.61	-11.21	16.40	40.00	-23.60	271	100	peak
2	109.4116	26.29	-13.03	13.26	43.50	-30.24	141	100	peak
3	283.9792	32.04	-10.08	21.96	46.00	-24.04	104	100	peak
4	485.6093	29.76	-6.38	23.38	46.00	-22.62	141	100	peak
5	739.6605	27.96	-2.79	25.17	46.00	-20.83	178	100	peak
6	932.2715	27.92	-0.10	27.82	46.00	-18.18	225	100	peak



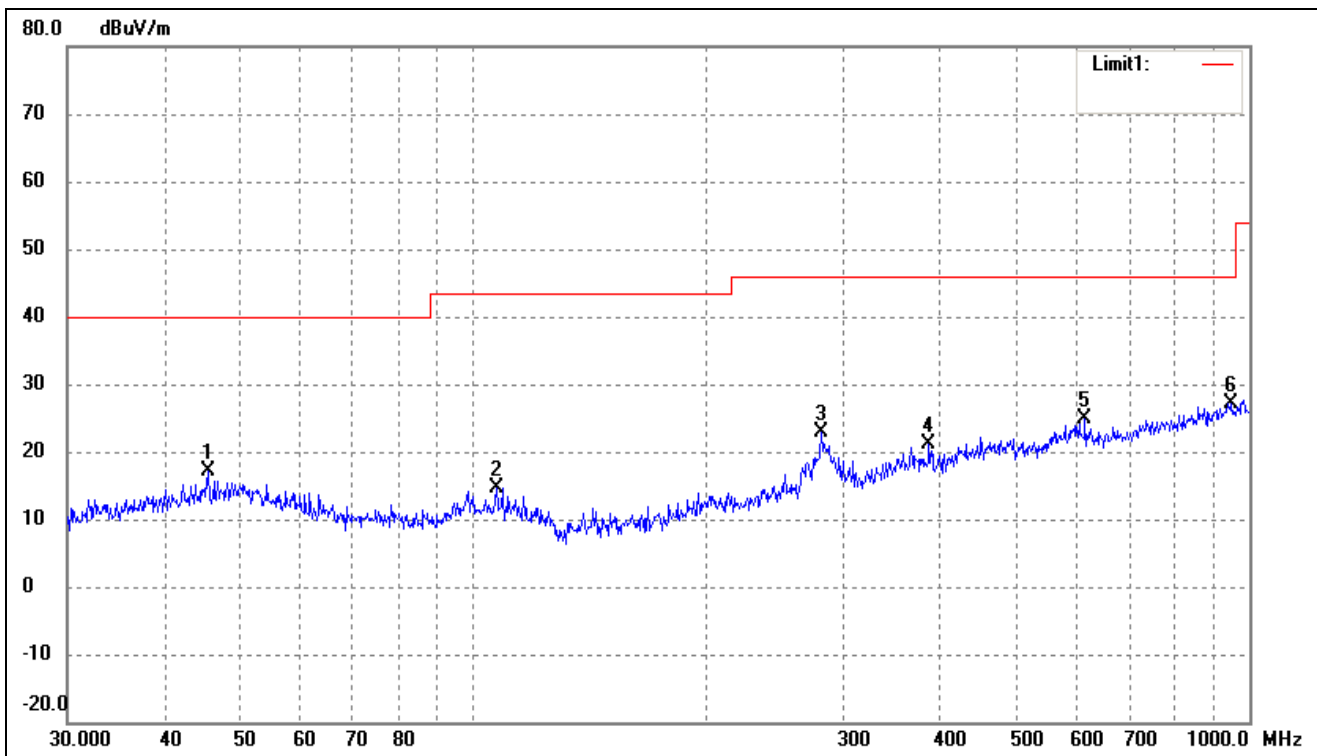
802.11a(Worst case)			
Test Channel	5500MHz(worst case)	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.5868	31.52	-11.43	20.09	40.00	-19.91	207	100	peak
2	93.1132	30.28	-14.80	15.48	43.50	-28.02	151	100	peak
3	199.2855	36.31	-12.75	23.56	43.50	-19.94	88	100	peak
4	378.5843	27.19	-7.56	19.63	46.00	-26.37	261	100	peak
5	603.5392	28.87	-4.03	24.84	46.00	-21.16	63	100	peak
6	952.0937	27.24	0.12	27.36	46.00	-18.64	314	100	peak



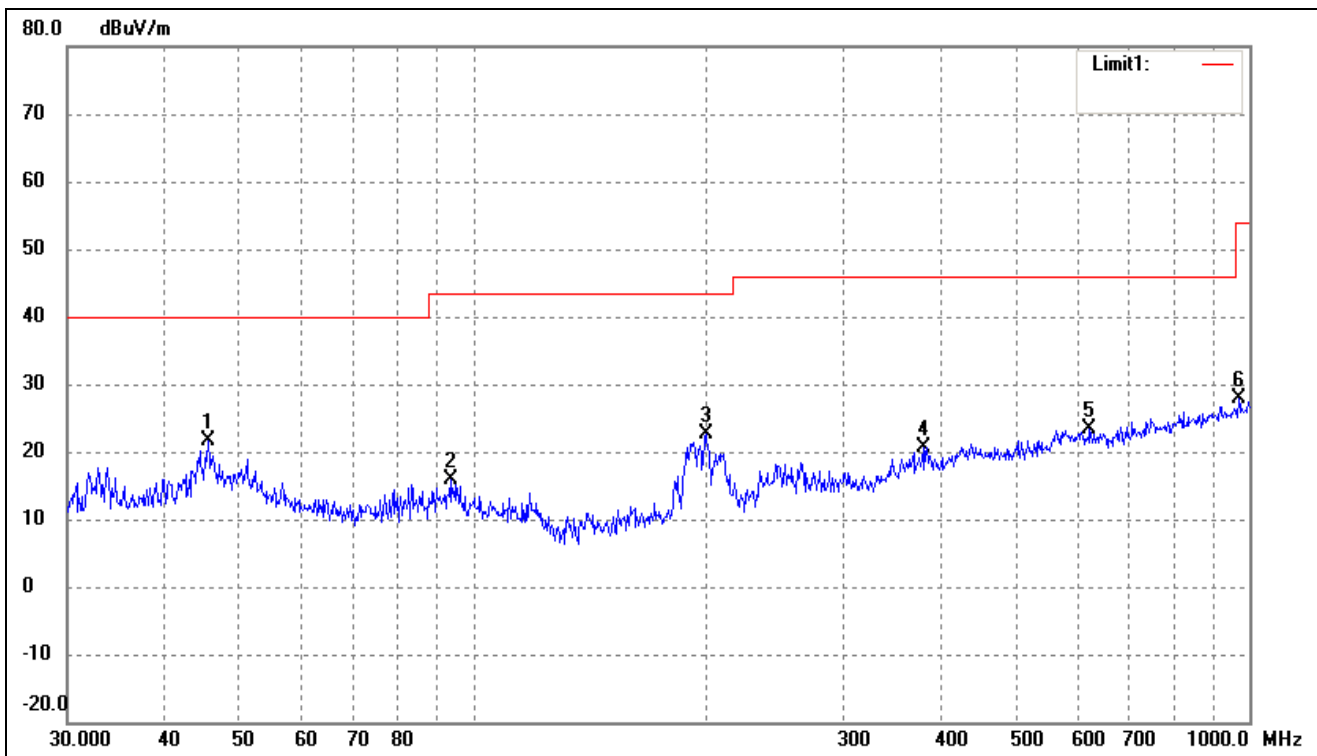
802.11a(Worst case)			
Test Channel	5700MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	45.5348	28.43	-11.30	17.13	40.00	-22.87	305	100	peak
2	107.1337	27.72	-13.07	14.65	43.50	-28.85	270	100	peak
3	281.0075	33.11	-10.24	22.87	46.00	-23.13	60	100	peak
4	386.6338	28.77	-7.61	21.16	46.00	-24.84	244	100	peak
5	614.2142	28.84	-4.08	24.76	46.00	-21.24	50	100	peak
6	948.7610	27.08	0.08	27.16	46.00	-18.84	182	100	peak



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

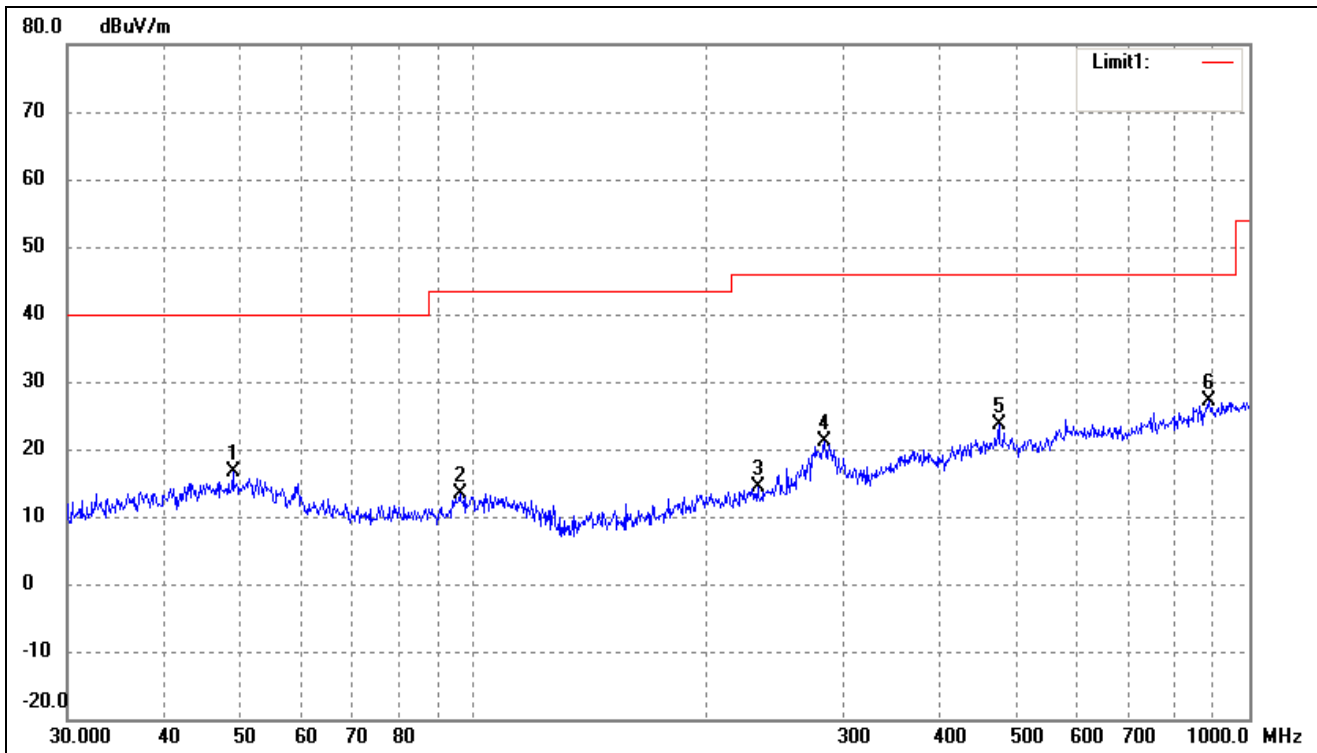


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	45.5348	32.86	-11.30	21.56	40.00	-18.44	224	100	peak
2	93.4402	30.71	-14.72	15.99	43.50	-27.51	100	100	peak
3	199.2855	35.26	-12.75	22.51	43.50	-20.99	358	100	peak
4	379.9141	28.30	-7.56	20.74	46.00	-25.26	119	100	peak
5	622.8900	27.57	-4.12	23.45	46.00	-22.55	311	100	peak
6	968.9338	27.64	0.25	27.89	54.00	-26.11	337	100	peak



➤ 5725-5850MHz

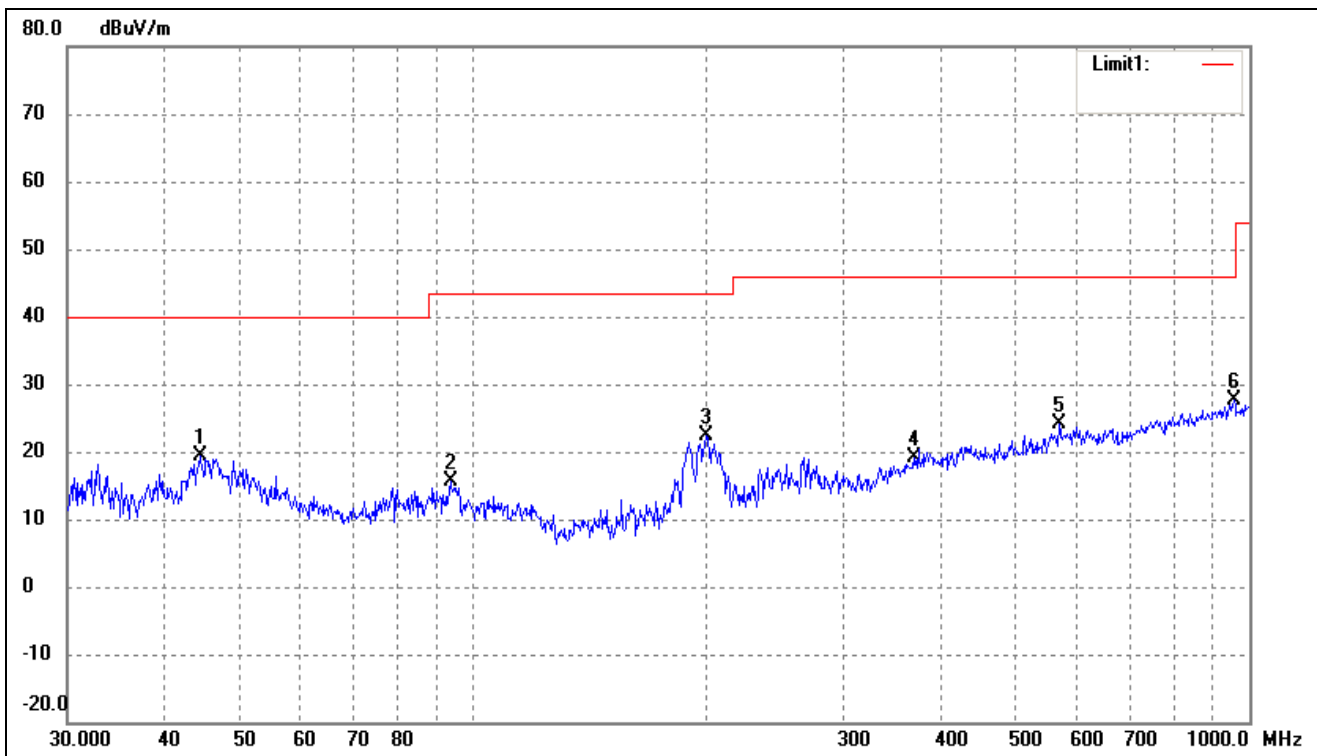
802.11a(Worst case)			
Test Channel	5745MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	49.0145	27.60	-11.06	16.54	40.00	-23.46	108	100	peak
2	96.0986	27.35	-14.07	13.28	43.50	-30.22	165	100	peak
3	232.5318	26.31	-11.92	14.39	46.00	-31.61	96	100	peak
4	283.9792	31.16	-10.08	21.08	46.00	-24.92	188	100	peak
5	475.4991	30.14	-6.59	23.55	46.00	-22.45	146	100	peak
6	887.6099	27.83	-0.78	27.05	46.00	-18.95	106	100	peak



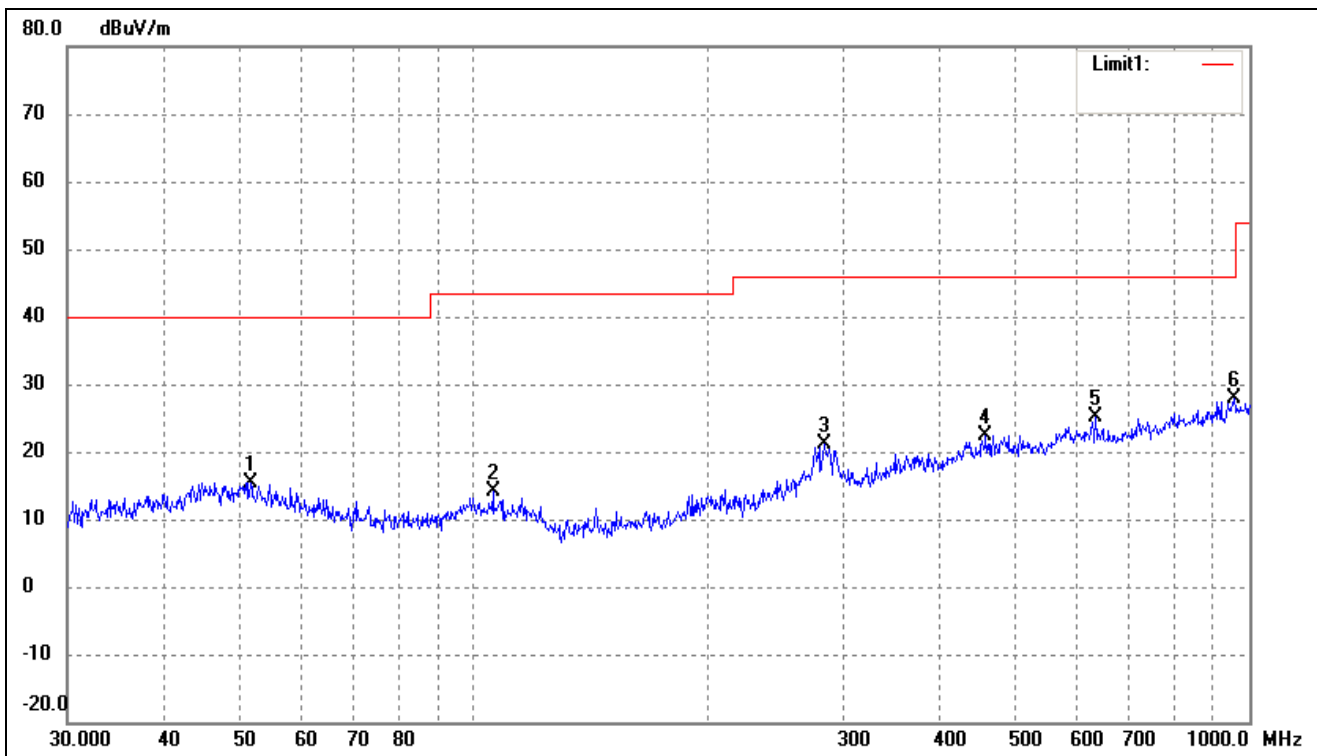
802.11a(Worst case)			
Test Channel	5745MHz(worst case)	Polarity:	Vertical



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	44.4308	30.88	-11.48	19.40	40.00	-20.60	256	100	peak
2	93.4402	30.29	-14.72	15.57	43.50	-27.93	192	100	peak
3	199.2855	35.20	-12.75	22.45	43.50	-21.05	84	100	peak
4	369.4047	26.75	-7.68	19.07	46.00	-26.93	117	100	peak
5	568.6127	28.71	-4.59	24.12	46.00	-21.88	308	100	peak
6	955.4381	27.55	0.13	27.68	46.00	-18.32	297	100	peak



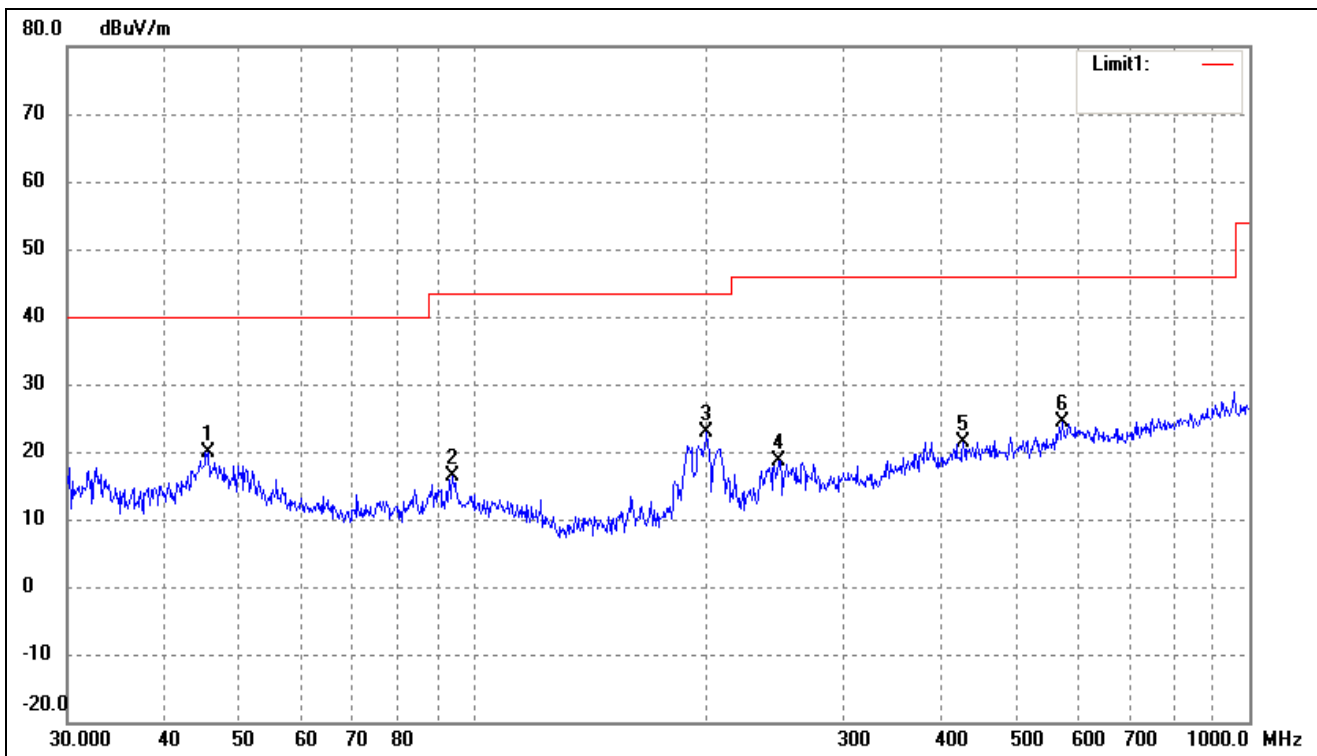
802.11a(Worst case)			
Test Channel	5825MHz(worst case)	Polarity:	Horizontal



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	51.6616	26.77	-11.38	15.39	40.00	-24.61	d	100	peak
2	106.0126	27.21	-13.08	14.13	43.50	-29.37	158	100	peak
3	283.9792	31.11	-10.08	21.03	46.00	-24.97	76	100	peak
4	457.5073	28.97	-6.54	22.43	46.00	-23.57	129	100	peak
5	633.9073	29.18	-4.16	25.02	46.00	-20.98	288	100	peak
6	955.4381	27.65	0.13	27.78	46.00	-18.22	312	100	peak



802.11a(Worst case)			
Test Channel	5825MHz(worst case)	Polarity:	Vertical

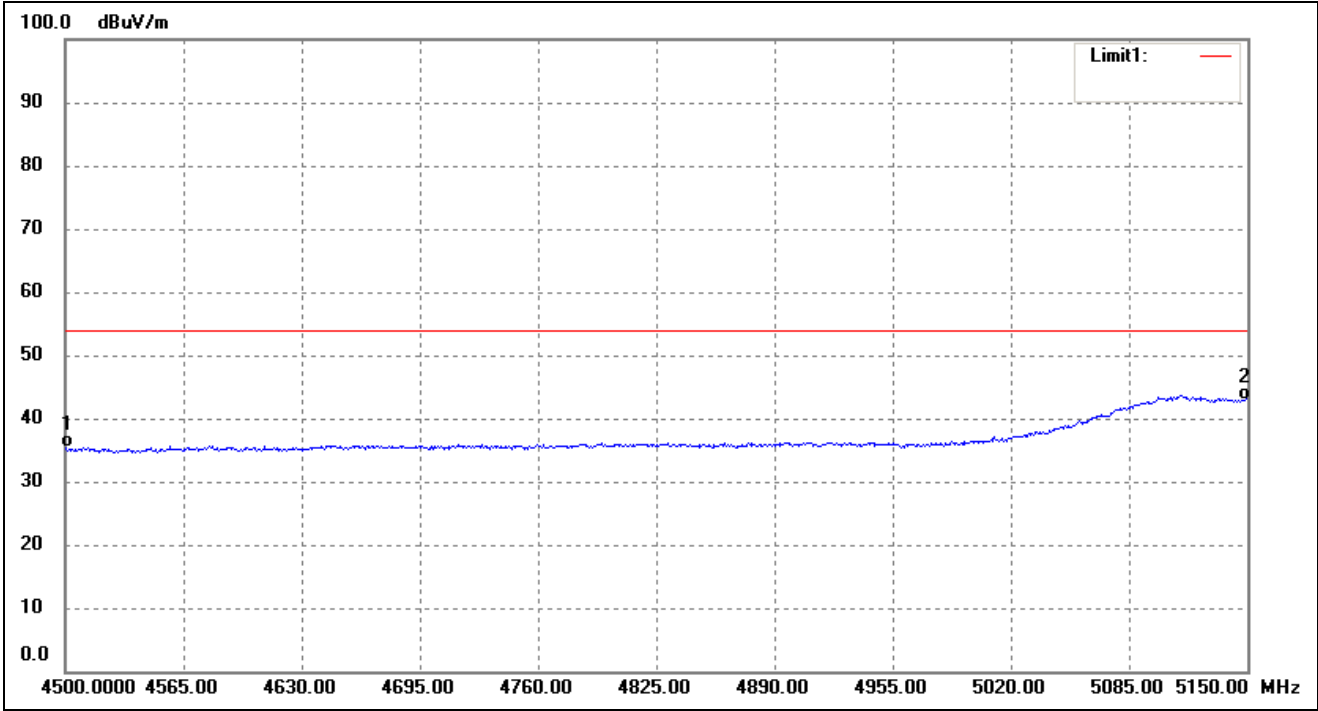


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	45.5348	31.21	-11.30	19.91	40.00	-20.09	266	100	peak
2	94.0979	30.84	-14.55	16.29	43.50	-27.21	100	100	peak
3	199.9856	35.50	-12.70	22.80	43.50	-20.70	238	100	peak
4	247.6819	29.85	-11.12	18.73	46.00	-27.27	100	100	peak
5	428.0193	27.62	-6.19	21.43	46.00	-24.57	176	100	peak
6	574.6258	28.59	-4.29	24.30	46.00	-21.70	298	100	peak



➤ Spurious Emission above 1GHz

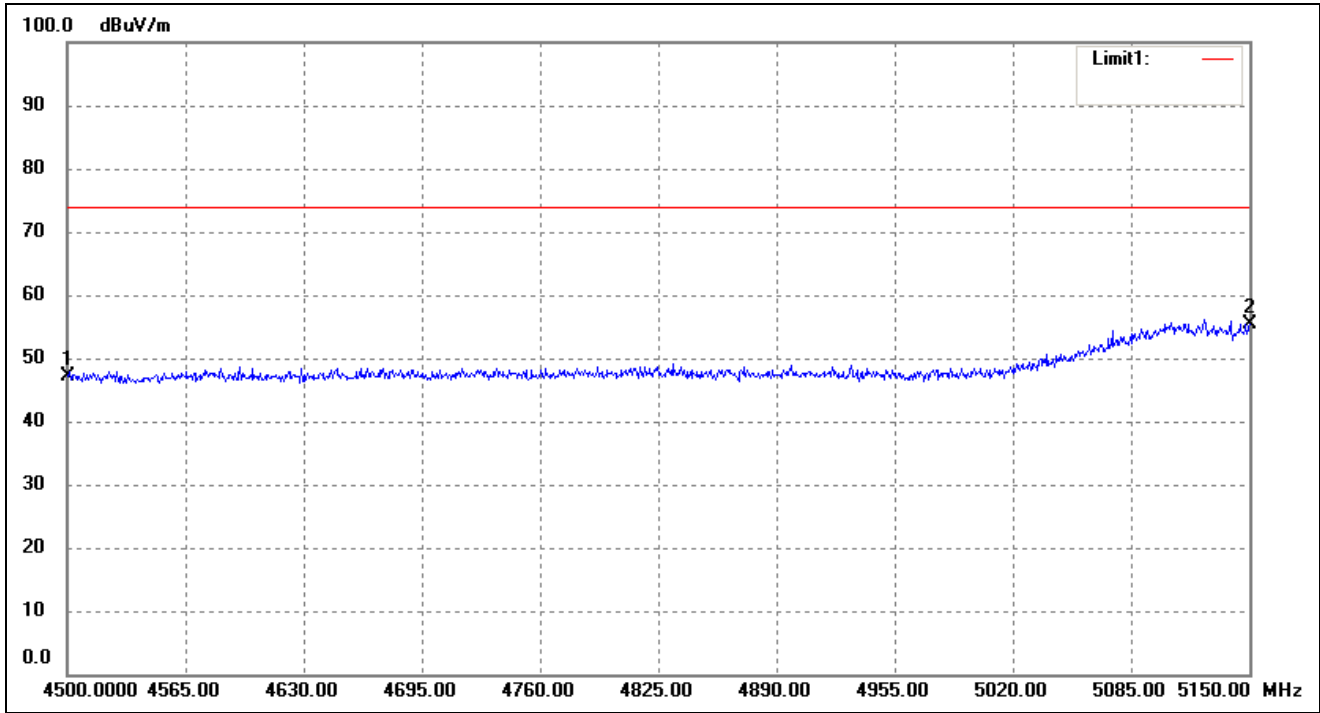
802.11a- Restricted Bandedge (Worst case)			
Test Channel	band 4.5-5.15GHz	Polarity:	Horizontal worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	4500.000	40.01	-4.71	35.30	54.00	-18.70	299	100	AVG
2	5150.000	47.26	-4.32	42.94	54.00	-11.06	347	100	AVG



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

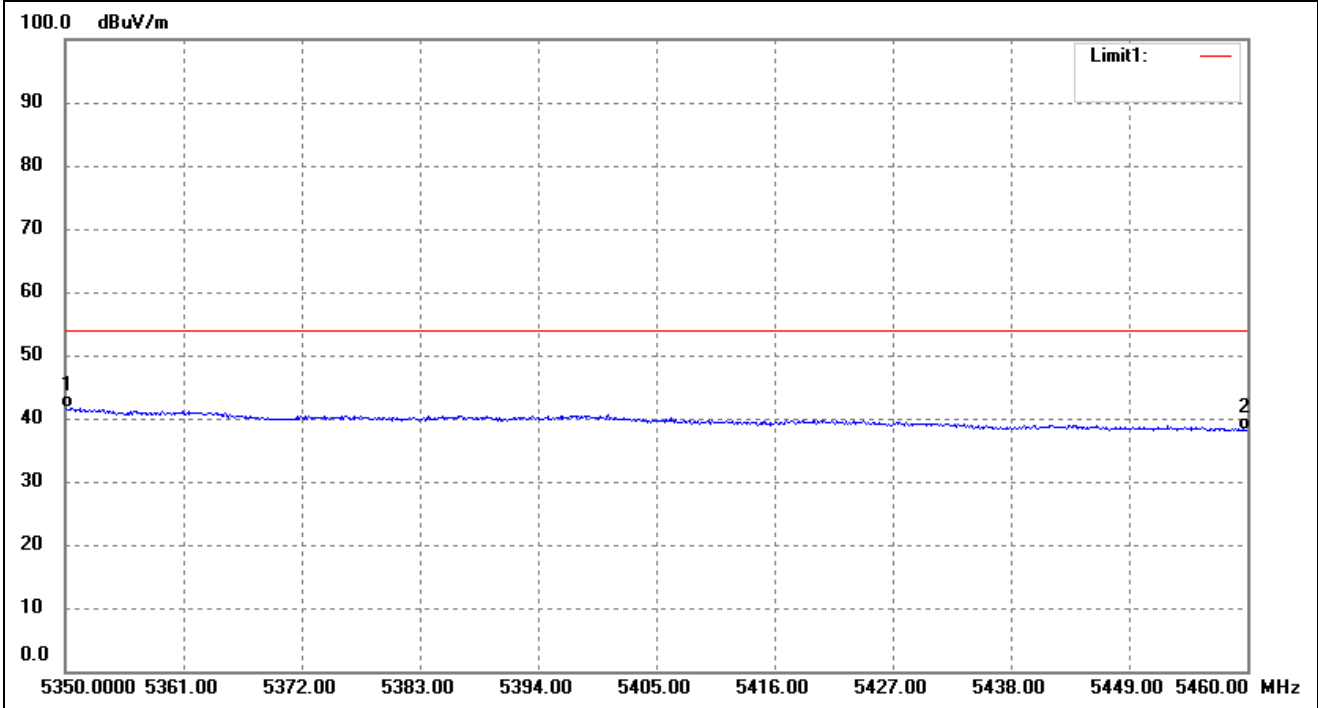


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	4500.000	51.72	-4.71	47.01	74.00	-26.99	85	100	peak
2	5150.000	59.82	-4.32	55.50	74.00	-18.50	129	100	peak



Band 2

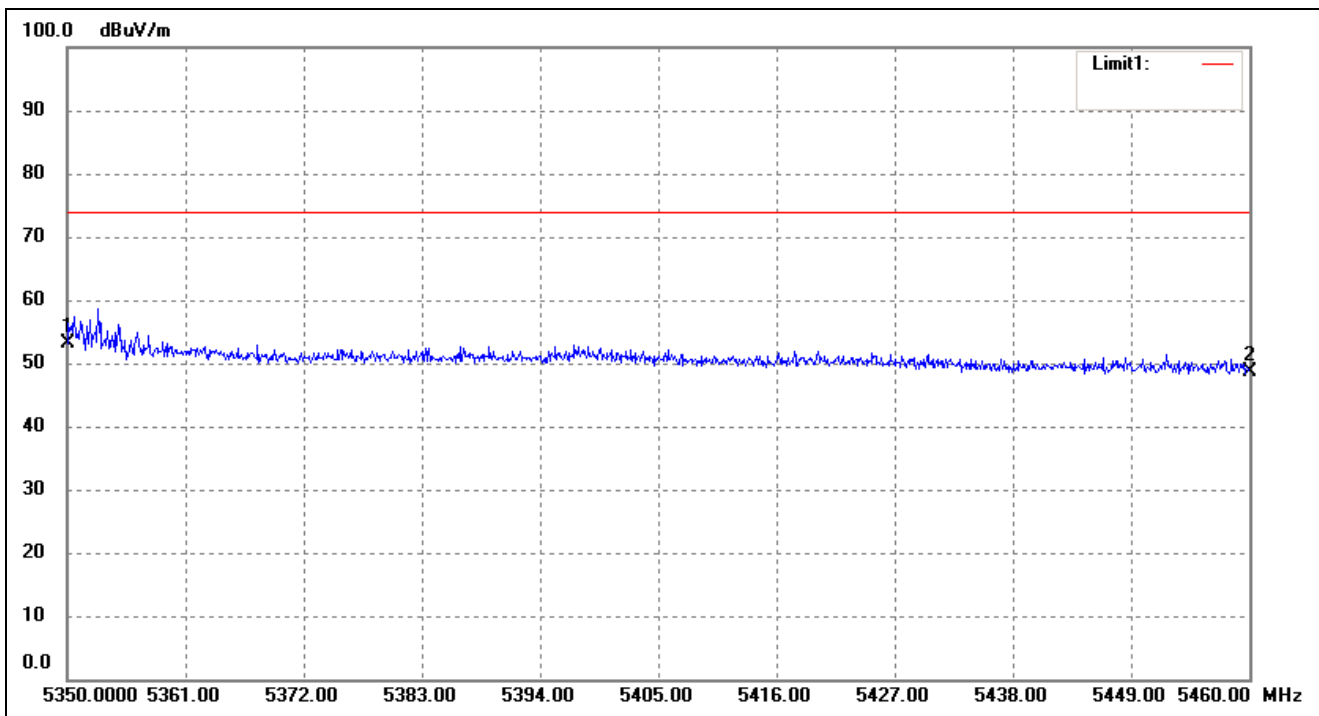
802.11a- Restricted Bandedge			
Test Channel	band 5.35-5.47GHz	Polarity:	Vertical(worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5350.000	45.87	-4.21	41.66	54.00	-12.34	152	100	AVG
2	5460.000	42.36	-4.16	38.20	54.00	-15.80	122	100	AVG



802.11a- Restricted Bandedge (Worst case)			
Test Channel	band 5.35-5.47GHz	Polarity:	Vertical(worst case)

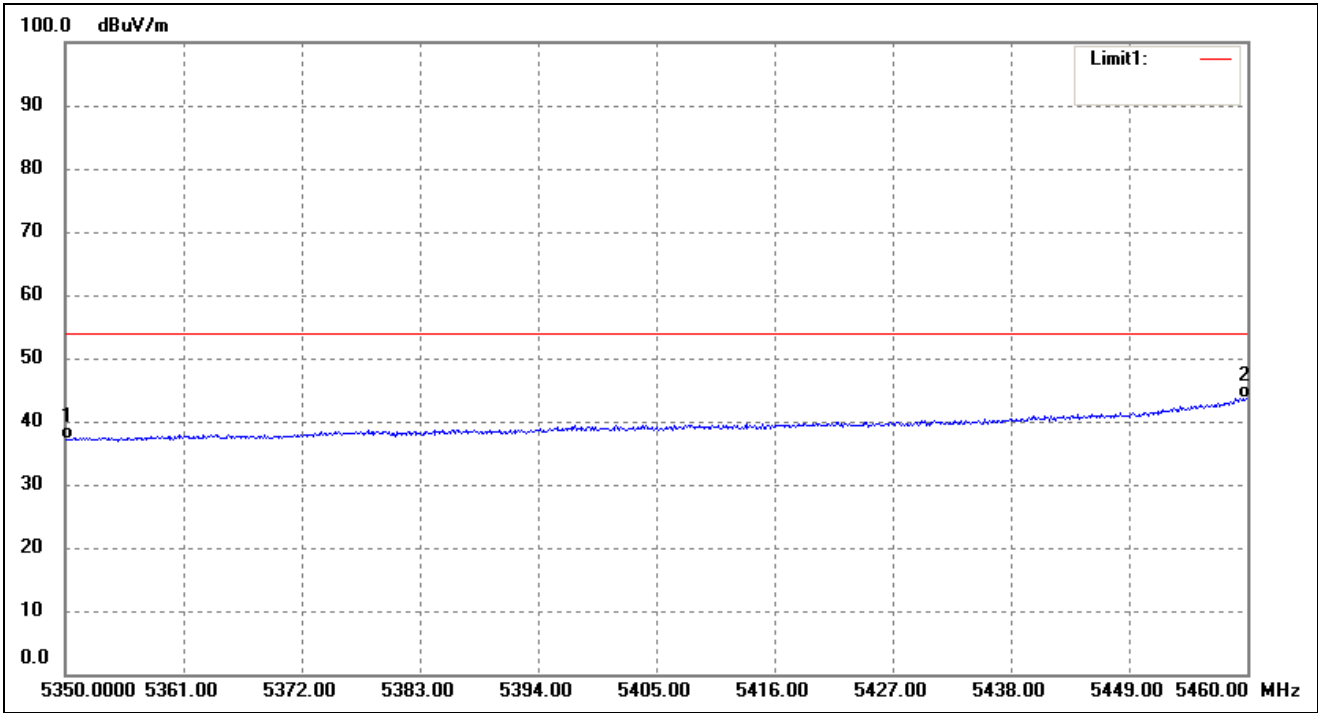


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5350.000	57.45	-4.21	53.24	74.00	-20.76	155	100	peak
2	5460.000	52.68	-4.16	48.52	74.00	-25.48	161	100	peak



Band 3

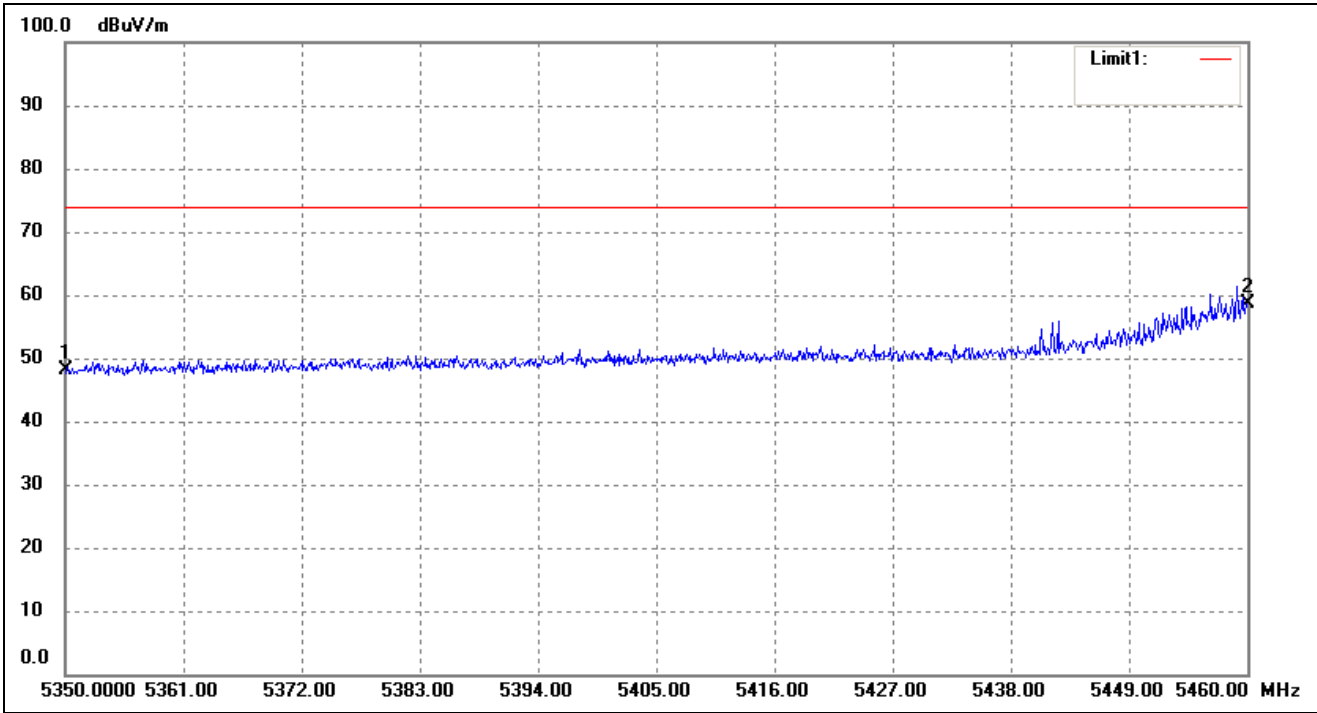
802.11a- Restricted Bandedge (Worst case)			
Test Channel	band 5.35-5.47GHz	Polarity:	Vertical(worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5350.000	41.42	-4.21	37.21	54.00	-16.79	100	100	AVG
2	5460.000	47.80	-4.16	43.64	54.00	-10.36	61	100	AVG



802.11a- Restricted Bandedge (Worst case)			
Test Channel	band 5.35-5.47GHz	Polarity:	Vertical(worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree ()	Height (cm)	Remark
1	5350.000	52.30	-4.21	48.09	74.00	-25.91	177	100	peak
2	5460.000	62.69	-4.16	58.53	74.00	-15.47	149	100	peak

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



- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 5.725-5.850GHz (802.11a)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	58.98	7.11	66.09	74	-7.91	H	PK
15540	37.64	8.22	45.86	54	-8.14	H	AV
10360	59.42	7.11	66.53	74	-7.47	V	PK
15540	39.50	8.22	47.72	54	-6.28	V	AV
Middle Channel (5200MHz)							
10400	57.43	7.22	64.65	74	-9.35	H	PK
15600	34.28	8.67	42.95	54	-11.05	H	AV
10400	57.09	7.22	64.31	74	-9.69	V	PK
15600	36.32	8.67	44.99	54	-9.01	V	AV
High Channel (5240MHz)							
10480	56.73	7.69	64.42	74	-9.58	H	PK
15720	38.59	8.93	47.52	54	-6.48	H	AV
10480	60.80	7.69	68.49	74	-5.51	V	PK
15720	38.49	8.93	47.42	54	-6.58	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5260MHz)							
10520	56.31	7.96	64.27	74	-9.73	H	PK
15780	35.57	9.02	44.59	54	-9.41	H	AV
10520	58.93	7.96	66.89	74	-7.11	V	PK
15780	37.47	9.02	46.49	54	-7.51	V	AV
Middle Channel (5280MHz)							
10560	58.83	8.02	66.85	74	-7.15	H	PK
15840	38.57	9.42	47.99	54	-6.01	H	AV
10560	57.09	8.02	65.11	74	-8.89	V	PK
15840	36.84	9.42	46.26	54	-7.74	V	AV
High Channel (5320MHz)							
10640	57.57	8.35	65.92	74	-8.08	H	PK
15960	35.78	9.63	45.41	54	-8.59	H	AV
10640	57.20	8.35	65.55	74	-8.45	V	PK
15960	34.10	9.63	43.73	54	-10.27	V	AV



Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5500MHz)							
11000	57.18	8.82	66.00	74	-8.00	H	PK
16500	38.70	9.88	48.58	54	-5.42	H	AV
11000	59.31	8.82	68.13	74	-5.87	V	PK
16500	34.69	9.88	44.57	54	-9.43	V	AV
Middle Channel (5600MHz)							
11200	58.80	8.92	67.72	74	-6.28	H	PK
16800	37.61	10.03	47.64	54	-6.36	H	AV
11200	57.16	8.92	66.08	74	-7.92	V	PK
16800	37.53	10.03	47.56	54	-6.44	V	AV
High Channel (5700MHz)							
11400	54.95	9.36	64.31	74	-9.69	H	PK
17100	35.39	10.25	45.64	54	-8.36	H	AV
11400	55.12	9.36	64.48	74	-9.52	V	PK
17100	35.66	10.25	45.91	54	-8.09	V	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	56.06	9.45	65.51	74	-8.49	H	PK
17235	35.85	10.36	46.21	54	-7.79	H	AV
11490	56.06	9.45	65.51	74	-8.49	V	PK
17235	34.76	10.36	45.12	54	-8.88	V	AV
Middle Channel (5785MHz)							
11570	56.24	9.62	65.86	74	-8.14	H	PK
17355	36.94	10.67	47.61	54	-6.39	H	AV
11570	55.60	9.62	65.22	74	-8.78	V	PK
17355	35.73	10.67	46.40	54	-7.60	V	AV
High Channel (5825MHz)							
11650	57.07	9.84	66.91	74	-7.09	H	PK
17475	33.50	10.95	44.45	54	-9.55	H	AV
11650	55.19	9.84	65.03	74	-8.97	V	PK
17475	37.01	10.95	47.96	54	-6.04	V	AV



➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.93	-27
Highest	Above 5350	-43.50	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-35.33	-27
Highest	Above 5350	-41.94	-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	-36.01	-27
Highest	Above 5725	-43.81	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-37.32	-27
	5715 to 5725	-39.22	-17
Highest	5850 to 5860	-40.36	-17
	Above 5860	-43.18	-27

Note: the data just list the worst cases



- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 5.725-5.850GHz (802.11n HT20)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5180MHz)							
10360	58.29	7.11	65.40	74	-8.60	H	PK
15540	39.23	8.22	47.45	54	-6.55	H	AV
10360	60.68	7.11	67.79	74	-6.21	H	PK
15540	38.16	8.22	46.38	54	-7.62	H	AV
Middle Channel (5200MHz)							
10400	58.24	7.22	65.46	74	-8.54	H	PK
15600	34.68	8.67	43.35	54	-10.65	H	AV
10400	57.91	7.22	65.13	74	-8.87	H	PK
15600	38.10	8.67	46.77	54	-7.23	H	AV
High Channel (5240MHz)							
10480	56.76	7.69	64.45	74	-9.55	H	PK
15720	37.48	8.93	46.41	54	-7.59	H	AV
10480	59.84	7.69	67.53	74	-6.47	H	PK
15720	39.29	8.93	48.22	54	-5.78	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5260MHz)							
10520	56.60	7.96	64.56	74	-9.44	H	PK
15780	35.49	9.02	44.51	54	-9.49	H	AV
10520	59.26	7.96	67.22	74	-6.78	H	PK
15780	39.60	9.02	48.62	54	-5.38	H	AV
Middle Channel (5280MHz)							
10560	57.46	8.02	65.48	74	-8.52	H	PK
15840	38.89	9.42	48.31	54	-5.69	H	AV
10560	58.36	8.02	66.38	74	-7.62	H	PK
15840	37.36	9.42	46.78	54	-7.22	H	AV
High Channel (5320MHz)							
10640	59.15	8.35	67.50	74	-6.50	H	PK
15960	37.33	9.63	46.96	54	-7.04	H	AV
10640	56.60	8.35	64.95	74	-9.05	H	PK
15960	33.62	9.63	43.25	54	-10.75	H	AV



Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5500MHz)							
11000	57.32	8.82	66.14	74	-7.86	H	PK
16500	37.16	9.88	47.04	54	-6.96	H	AV
11000	57.90	8.82	66.72	74	-7.28	H	PK
16500	33.14	9.88	43.02	54	-10.98	H	AV
Middle Channel (5600MHz)							
11200	58.05	8.92	66.97	74	-7.03	H	PK
16800	37.63	10.03	47.66	54	-6.34	H	AV
11200	55.10	8.92	64.02	74	-9.98	H	PK
16800	40.51	10.03	50.54	54	-3.46	H	AV
High Channel (5700MHz)							
11400	57.12	9.36	66.48	74	-7.52	H	PK
17100	35.70	10.25	45.95	54	-8.05	H	AV
11400	57.12	9.36	66.48	74	-7.52	H	PK
17100	35.28	10.25	45.53	54	-8.47	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5745MHz)							
11490	57.65	9.45	67.10	74	-6.90	H	PK
17235	35.82	10.36	46.18	54	-7.82	H	AV
11490	55.55	9.45	65.00	74	-9.00	H	PK
17235	37.12	10.36	47.48	54	-6.52	H	AV
Middle Channel (5785MHz)							
11570	58.81	9.62	68.43	74	-5.57	H	PK
17355	38.13	10.67	48.80	54	-5.20	H	AV
11570	58.10	9.62	67.72	74	-6.28	H	PK
17355	37.40	10.67	48.07	54	-5.93	H	AV
High Channel (5825MHz)							
11650	56.63	9.84	66.47	74	-7.53	H	PK
17475	34.38	10.95	45.33	54	-8.67	H	AV
11650	55.17	9.84	65.01	74	-8.99	H	PK
17475	37.03	10.95	47.98	54	-6.02	H	AV



➤ Out of Band edge 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-37.91	-27
Highest	Above 5350	-38.82	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.74	-27
Highest	Above 5350	-37.35	-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	-38.44	-27
Highest	Above 5725	-36.39	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-45.61	-27
	5715 to 5725	-34.20	-17
Highest	5850 to 5860	-34.53	-17
	Above 5860	-42.08	-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 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 5.725-5.850GHz (802.11n HT40)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5190MHz)							
10380	58.59	7.25	65.84	74	-8.16	H	PK
15570	37.47	8.33	45.80	54	-8.20	H	AV
10380	60.79	7.25	68.04	74	-5.96	H	PK
15570	38.97	8.33	47.30	54	-6.70	H	AV
High Channel (5230MHz)							
10460	57.41	7.54	64.95	74	-9.05	H	PK
15690	38.29	8.86	47.15	54	-6.85	H	AV
10460	60.10	7.54	67.64	74	-6.36	H	PK
15690	37.46	8.86	46.32	54	-7.68	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5270MHz)							
10540	56.40	8.12	64.52	74	-9.48	H	PK
15810	35.90	9.24	45.14	54	-8.86	H	AV
10540	57.05	8.12	65.17	74	-8.83	H	PK
15810	34.69	9.24	43.93	54	-10.07	H	AV
High Channel (5310MHz)							
10620	57.25	8.30	65.55	74	-8.45	H	PK
15930	37.40	9.45	46.85	54	-7.15	H	AV
10620	56.41	8.30	64.71	74	-9.29	H	PK
15930	33.97	9.45	43.42	54	-10.58	H	AV



Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5510MHz)							
11020	55.22	8.95	64.17	74	-9.83	H	PK
16530	37.17	9.99	47.16	54	-6.84	H	AV
11020	57.95	8.95	66.90	74	-7.10	H	PK
16530	33.95	9.99	43.94	54	-10.06	H	AV
Middle Channel (5590MHz)							
11180	58.41	9.12	67.53	74	-6.47	H	PK
16770	36.39	10.12	46.51	54	-7.49	H	AV
11180	55.41	9.12	64.53	74	-9.47	H	PK
16770	36.47	10.12	46.59	54	-7.41	H	AV
High Channel (5670MHz)							
11340	54.23	9.39	63.62	74	-10.38	H	PK
17010	34.64	10.22	44.86	54	-9.14	H	AV
11340	57.14	9.39	66.53	74	-7.47	H	PK
17010	34.51	10.22	44.73	54	-9.27	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5755MHz)							
11510	55.04	9.65	64.69	74	-9.31	H	PK
17265	36.21	10.87	47.08	54	-6.92	H	AV
11510	56.00	9.65	65.65	74	-8.35	H	PK
17265	36.12	10.87	46.99	54	-7.01	H	AV
High Channel (5795MHz)							
11590	57.64	9.81	67.45	74	-6.55	H	PK
17385	32.49	10.89	43.38	54	-10.62	H	AV
11590	56.37	9.81	66.18	74	-7.82	H	PK
17385	34.11	10.89	45.00	54	-9.00	H	AV



➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-37.32	-27
Highest	Above 5350	-41.35	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-36.89	-27
Highest	Above 5350	-39.29	-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	-38.07	-27
Highest	Above 5725	-40.03	-27

Note: the data just list the worst cases

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-42.52	-27
	5715 to 5725	-41.30	-17
Highest	5850 to 5860	-43.50	-17
	Above 5860	-40.07	-27

Note: the data just list the worst cases



- For the frequency band 5.15-5.25GHz, 5.250-5.350GHz, 5.470-5.725GHz, 5.725-5.850GHz (802.11ac VH80)
- Harmonics And Spurious Emissions

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5210MHz							
10420	58.07	7.33	65.40	74	-8.60	H	PK
15630	35.77	8.75	44.52	54	-9.48	H	AV
10420	59.49	7.33	66.82	74	-7.18	H	PK
15630	38.15	8.75	46.90	54	-7.10	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5290MHz							
10580	55.92	8.15	64.07	74	-9.93	H	PK
15870	36.28	9.49	45.77	54	-8.23	H	AV
10580	57.68	8.15	65.83	74	-8.17	H	PK
15870	36.76	9.49	46.25	54	-7.75	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel (5530MHz)							
11060	55.28	8.96	64.24	74	-9.76	H	PK
16590	37.18	10.03	47.21	54	-6.79	H	AV
11060	57.89	8.96	66.85	74	-7.15	H	PK
16590	33.22	10.03	43.25	54	-10.75	H	AV
High Channel (5610MHz)							
11220	60.63	9.04	69.67	74	-4.33	H	PK
16830	37.84	10.35	48.19	54	-5.81	H	AV
11220	55.73	9.04	64.77	74	-9.23	H	PK
16830	40.17	10.35	50.52	54	-3.48	H	AV

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB	(dBuV/m)	(dBuV/m)	(dB)	H/V	
5775MHz							
11550	56.48	9.54	66.02	74	-7.98	H	PK
17325	35.19	10.59	45.78	54	-8.22	H	AV
11550	58.24	9.54	67.78	74	-6.22	H	PK
17325	34.25	10.59	44.84	54	-9.16	H	AV



➤ Out of Band edge for 5150-5250MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-33.93	-27
Highest	Above 5350	-31.67	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5250-5350MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5150	-37.22	-27
Highest	Above 5350	-35.05	-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	-40.89	-27
Highest	Above 5725	-36.94	-27
Note: the data just list the worst cases			

➤ Out of Band edge for 5725-5850MHz

Test CH.	Test Segment	Result	Limit
	MHz	dBm/MHz	dBm/MHz
Lowest	Below 5715	-42.48	-27
	5715 to 5725	-29.49	-17
Highest	5850 to 5860	-31.63	-17
	Above 5860	-40.56	-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-1:5150-5250MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	5	-30	162	0.0312
100%		-20	168	0.0323
100%		-10	161	0.0310
100%		0	121	0.0233
100%		+10	172	0.0331
100%		+20	131	0.0253
100%		+30	137	0.0263
100%		+40	165	0.0317
100%		+50	121	0.0233
Low Battery power		4.5	+20	162
High Battery power	5.5	+20	168	0.0323



U-NII-1: 5250-5350MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	5	-30	159	0.0301
100%		-20	173	0.0328
100%		-10	162	0.0307
100%		0	125	0.0237
100%		+10	181	0.0343
100%		+20	137	0.0259
100%		+30	131	0.0248
100%		+40	158	0.0299
100%		+50	126	0.0239
Low Battery power		4.5	+20	159
High Battery power	5.5	+20	173	0.0328

U-NII-1: 5470-5725MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	5	-30	155	0.0277
100%		-20	177	0.0316
100%		-10	162	0.0289
100%		0	128	0.0229
100%		+10	174	0.0311
100%		+20	130	0.0232
100%		+30	129	0.0230
100%		+40	166	0.0296
100%		+50	120	0.0214
Low Battery power		4.5	+20	155
High Battery power	5.5	+20	177	0.0316



U-NII-1:5725-5850MHz worst case at 802.11a middle channel				
Voltage(%)	Power(VDC)	TEMP(°C)	Freq.Dev(Hz)	Deviation
100%	5	-30	161	0.0278
100%		-20	168	0.0290
100%		-10	161	0.0278
100%		0	130	0.0225
100%		+10	175	0.0303
100%		+20	133	0.0230
100%		+30	133	0.0230
100%		+40	161	0.0278
100%		+50	127	0.0220
Low Battery power		4.5	+20	161
High Battery power	5.5	+20	168	0.0290

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