FCC/ISED RF TEST REPORT

Vista Labs
TEST • CERTIFY • COMPLY

Test Report Number……	**WAP-19052921-LC-FCC-IC-UNII**
Applicant……	**Mikrotik**
Applicant Address……	**Brivibas gatve 214i, Riga, LV-1039 LATVIA**
Product Name……	hAP ac²
Model Number……	RBD52G-5HacD2HnD-TC-US
Family Product/Model……	N/A
FCC ID……	TV7RBD52-5ACD2ND
ISED ID……	7442A-D52AC
Date of EUT received……	09/04/2019
Date of Test……	09/04/2019 – 10/11/2019
Report Issue Date……	10/22/2019
Test Standards……	**47CFR Part 15.407** **RSS-247 Issue 2.0: Feb 2017**
Test Result……	Pass

Issued By:

Vista Laboratories

1261 Puerta Del Sol, San Clemente, CA 92673 USA

www.vista-compliance.com

Tested by:	**Approved By:**
Bruce Li	
Bruce Li/Test Engineer	**David Zhang/Technical Manager**

Laboratory Introduction

Vista Labs is an A2LA accredited 17025 compliant regulatory compliance testing laboratories (Cert. number: 4848-01) strategically located in Orange County, providing services in the electrical and telecommunication industries. Vista labs is also recognized testing facility for Australia (ACMA), Chinese Taipei (BSMI), Chinese Taipei (NCC), Hong Kong (OFCA), Israel (MOC), Korea (RRA), Singapore (IMDA), Vietnam (MIC), etc.

Our comprehensive testing services include safety testing, EMC emission and susceptibility testing, RF and wireless testing (including DFS).
As your partner, Vista investigates appropriate test standards, develops test plans, performs troubleshooting & failure analysis, reviews documentation, and provides test reports for a complete compliance testing and certification package.

Accredited Laboratory

A2LA has accredited

VISTA LABORATORIES, INC.

San Clemente, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 21st day of June 2018.

President and CEO
For the Accreditation Council
Certificate Number 4848.01
Valid to July 31, 2020

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

17025 Product Testing Accreditation Certificate

Accredited Product Certification Body

A2LA has accredited

VISTA LABORATORIES, INC.

San Clemente, CA

This product certification body is accredited in accordance with the recognized International Standard ISO/IEC 17065:2012 *Requirements for bodies certifying products, processes and services*. This product certification body also meets the A2LA R308 – Specific Requirements – ISO-IEC 17065 – Telecommunication Certification Body Accreditation Program and R322 – Specific Requirements – Notified Body Accreditation Requirements. This accreditation demonstrates technical competence for a defined scope and the operation of a management system.

Presented this 1st day of October 2018.

President and CEO
For the Accreditation Council
Certificate Number 4848.02
Valid to July 31, 2020

For the product certification schemes to which this accreditation applies, please refer to the organization's Product Certification Scope of Accreditation.

17065 Product Certification Accreditation Certificate

TABLE OF CONTENTS

REVISION HISTORY

Revision	Issue Date	Description	Note
Original	10/22/2019	Original release	N/A

1 General Information

1.1 Applicant

Applicant:	Mikrotik
Applicant address:	Brivibas gatve 214i, Riga, LV-1039 LATVIA
Manufacturer:	Mikrotik
Manufacturer Address:	Brivibas gatve 214i, Riga, LV-1039 LATVIA

1.2 Product information

Product Name	hAP ac²
Model Number	RBD52G-5HacD2HnD-TC-US
Family Model Number	N/A
HVIN	RBD52G-5HacD2HnD-TC-US
FVIN	V6.45
Serial Number	B4A00A63E3D2/914/r2(Conducted) B4A00A9C54C9/913/r2 (Radiated)
Frequency Band	**For United states:** 802.11b/g/n-20MHz: 2412-2462MHz 802.11n-40MHz: 2422-2452MHz 802.11a/n-20MHz: 5180-5320MHz, 5500-5720MHz, 5725-5825MHz 802.11n-40MHz: 5190-5310MHz, 5510-5710MHz, 5755-5795MHz 802.11ac: 5210-5290MHz, 5530-5690MHz, 5775MHz **For Canada (5600-5650MHz blocked):** 802.11b/g/n-20MHz: 2412-2462MHz 802.11n-40MHz: 2422-2452MHz 802.11a/n-20MHz: 5180-5320MHz, 5500-5580MHz, 5660-5720MHz, 5725-5825MHz 802.11n-40MHz: 5190-5310MHz, 5510-5550MHz, 5630-5710MHz, 5755-5795MHz 802.11ac: 5210-5290MHz, 5530, 5690MHz, 5775MHz
Type of modulation	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g: OFDM-CCK (BPSK, QPSK, 16QAM, 64QAM) 802.11a/n/ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Equipment Class/ Category	DTS, UNII
Maximum output power	See test result
Antenna Information	2 x Integral antenna, 2.5 dBi gain Directional Gain: WiFi1 & WiFi2 Antenna: 5.5 dBi
Clock Frequencies	N/A
Port/Connectors	DC In, PoE, Ethernet
Input Power	DC 12-28V
Power Adapter Manu/Model	FullPower / SAW30-240-0800U
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	N/A
Additional Info	EUT is DFS master device.

1.3 Test standard and method

Test standard	RSS-247 Issue 2.0: Feb 2017
Test method	ANSI C63.10: 2013 789033 D02 General UNII Test Procedures New Rules v02r01 RSS-Gen Issue 5: Mar 2019

1.4 Test Purpose and statement

The purpose of this test report is intended to demonstrate the compliance of product listed in section 1.2, received from company listed in section 1.1, to the requirements of standard and method listed in section 1.3. Based on our test results, we conclude that the product tested complies with the requirements of the standards indicated.

2 Test site information

Lab performing tests	**Vista Laboratories**
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www. Vista-compliance.com

Test condition	Test Engineer	Test Environment	Test Date
RF conducted	Bruce Li	23.5°C / 58.2%/996 mbar	09/04/2019 – 10/11/2019
Radiated	Bruce Li	23.5°C / 58.2%/996 mbar	09/04/2019 – 10/11/2019

3 Modification of EUT

The EUT is a normal operational sample loaded with test firmware to set the EUT into continusous transmission mode under different modulation and data rate.

4 Test configuration and operation

4.1 EUT test configuration

EUT is powered by external DC power supply for testing purpose. EUT's RF antenna port is connected to spectrum analyzer through RF test cable for measurement. The test software is used to set EUT to different transmission mode in terms of radio mode (11a/n/ac), test channel, data rate, etc.

4.2 EUT test channel

Radio	Channel	Radio	Channel
802.11-a	5500	802.11-a	5720
802.11-a	5580	802.11-n-20	5720
802.11-a	5700	802.11-n-40	5710
802.11-n-20	5500	802.11-ac-80	5690
802.11-n-20	5580		
802.11-n-20	5700		
802.11-n-40	5510		
802.11-n-40	5550		
802.11-n-40	5670		
802.11-ac-80	5530		

4.3 Supporting Equipment

Index	Description	Model	S/N	Brand	Remark
1	Notebook	W540	427638U	Lenovo	DFS client
2	AC/DC Adapter	SAW30-240-0800U	N/A	FullPower	-
3	AC/DC Adapter	HA45NM140	00285K	DELL	-
4	Laptop	Inspiron 15	245S2F2	DELL	-

4.4 EUT setup diagram

4.5 EUT operation

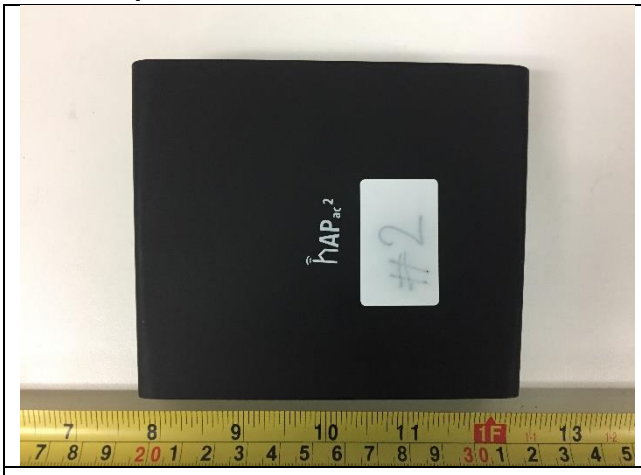
The test software is used to set EUT to different transmission mode in terms of radio mode (11a/n/ac), test channel, data rate, etc.

4.6 Test software

Index	Description	Remark
1	EMISoft Vasona 6.0049	EMC/Spurious emission test software used during testing

5 EUT and test setup pictures

5.1 EUT pictures



EUT Top View

EUT Bottom View

EUT Front View

EUT Rear View

EUT Left View

EUT Right View

6 Test Summary

FCC Rules	ISED Rules	Test Item	Section	Verdict
§15.203	-	Antenna Requirement	8.1	Pass
§15.407(a)	-	26 dB Bandwidth	8.2	Pass
-	RSS-Gen §6.7	99% Occupied Bandwidth	8.3	Pass
§15.407(a)	RSS-247 §6.2	Conducted Maximum Output Power & E.I.R.P	8.4	Pass
§15.407(a)	RSS-247 §6.2	Power Spectral Density& E.I.R.Psd	8.5	Pass
§15.407(c)	RSS-247 §6.4 (a)	Automatically Discontinue Transmission	8.6	Pass
§15.205, §15.209, §15.407(b)	RSS-247 §6.2	Radiated Emissions & Unwanted Emissions into Restricted Frequency Bands	8.7	Pass
§15.207 (a)	RSS-Gen §8.8	AC Power Line Conducted Emissions	8.8	Pass
-	RSS-Gen §7.3	Receiver Spurious Emission	N/A	N/A 1)

Note

1) Testing covered the receive mode, and receiver spurious emissions are considered to be the same as transmitter.

7 Uncertainly of Measurement

Test item	Measurement Uncertainty (dB)
RF Output Power (Conducted)	±1.2 dB
Power Spectral Density	±0.9 dB
Unwanted Emission (conducted)	±2.6 dB
Occupied Channel Bandwidth	±5 %
Radiated Emission (9KHz-30MHz)	±3.5 dB
Radiated Emission (30MHz-1GHz)	±4.6 dB
Radiated Emission (1-18GHz)	±4.9 dB
Radiated Emission (18-40GHz)	±3.5 dB

8 Test summary and result

8.1 Antenna Requirement

8.1.1 Requirement

Per § 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. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

8.1.2 Result

Analysis:

- EUT uses internal PIFA antenna. No standard RF connector or coupling is used.

Conclusion:

EUT complies with antenna requirement in § 15.203.

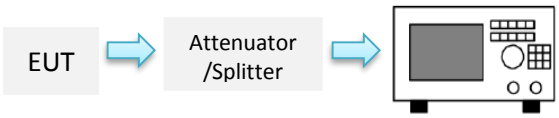
8.2 26 d Bandwidth

8.2.1 Requirement

§ 15.407 (a)

This section is for reporting purpose only. There are no restriction limits for bandwidth.

8.2.2 Test setup



8.2.3 Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01, Section C) Emission bandwidth.

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 26 dB, if the functionality described above (i.e., RBW , VBW ≥ 3 × RBW, peak detector with maximum hold) is implemented by the instrumentation function.

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Use automatic bandwidth measurement capability on instrument to obtain BW result.

8.2.4 Test Result

For U-NII-2A band

Mode/ Bandwidth	Channel	Frequency (MHz)	Data rate	Measured 26 dB Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
11a	52	5260	6Mbps	19400	N/A	N/A
11a	60	5300	6Mbps	19190	N/A	N/A
11a	64	5320	6Mbps	19440	N/A	N/A
11n-20M	52	5260	MCS0	20170	N/A	N/A
11n-20M	60	5300	MCS0	20080	N/A	N/A
11n-20M	64	5320	MCS0	20310	N/A	N/A
11n-40M	54	5270	MCS0	39540	N/A	N/A
11n-40M	62	5310	MCS0	39270	N/A	N/A
11ac-80M	58	5290	VHC-MCS0	82010	N/A	N/A

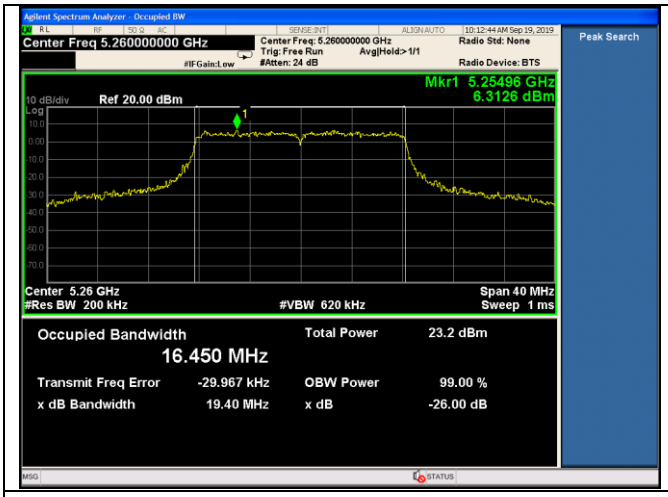
For U-NII-2C band

Mode/ Bandwidth	Channel	Frequency (MHz)	Data rate	Measured 26 dB Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
11a	100	5500	6Mbps	21070	N/A	N/A
11a	116	5580	6Mbps	31340	N/A	N/A
11a	140	5700	6Mbps	38600	N/A	N/A
11n-20M	100	5500	MCS0	21230	N/A	N/A
11n-20M	116	5580	MCS0	36150	N/A	N/A
11n-20M	140	5700	MCS0	39930	N/A	N/A
11n-40M	102	5510	MCS0	40460	N/A	N/A
11n-40M	110	5550	MCS0	51470	N/A	N/A
11n-40M	134	5670	MCS0	79540	N/A	N/A
11ac-80M	106	5530	VHC-MCS0	80820	N/A	N/A

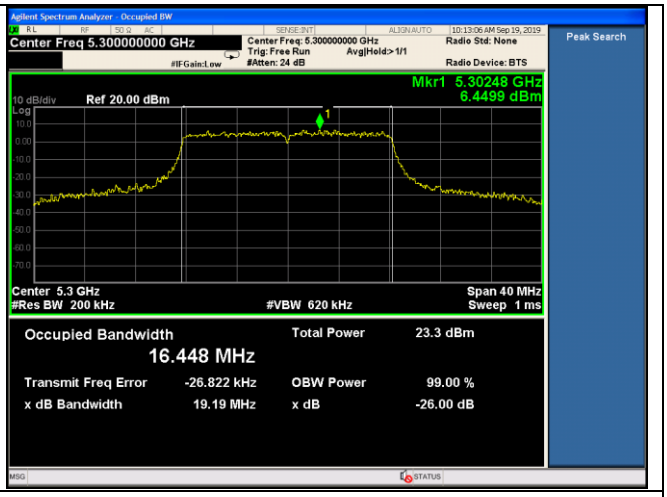
For U-NII-2C band Cross-band channel

Mode/ Bandwidth	Channel	Frequency (MHz)	Data rate	Measured 26 dB Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
11a	144	5720	6Mbps	39880	N/A	N/A
11n	144	5720	MCS0	39990	N/A	N/A
11n-40M	144	5710	MCS0	80000	N/A	N/A
11ac-80M	136	5690	VHC-MCS0	149000	N/A	N/A

8.2.5 Test Plots



26dB BW -802.11a 5260MHz



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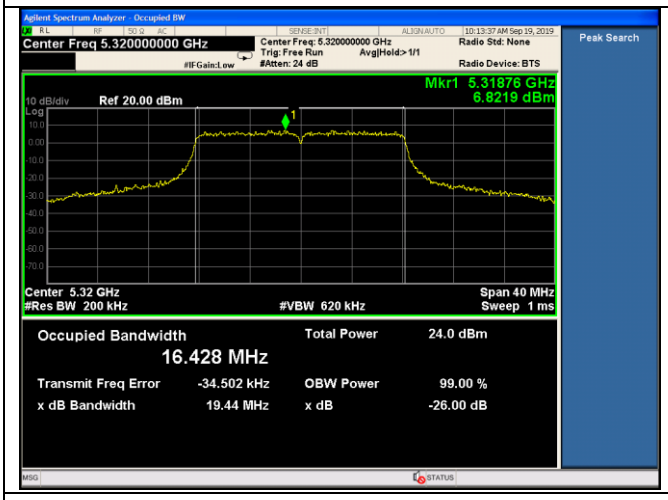
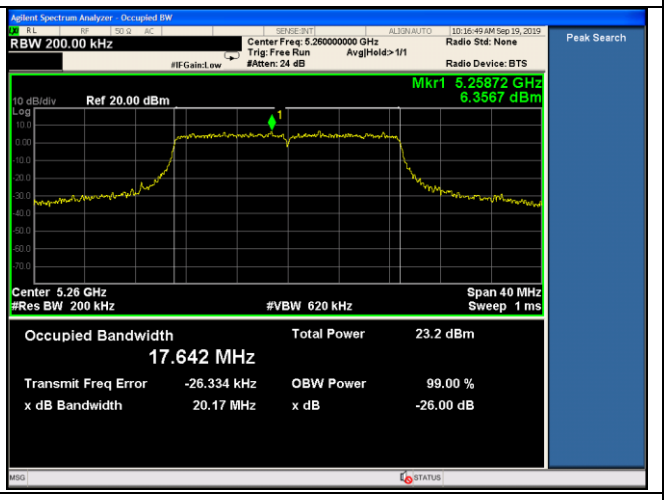
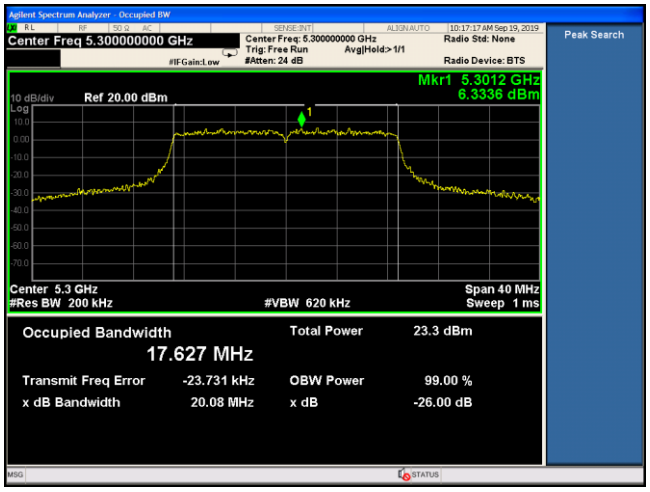


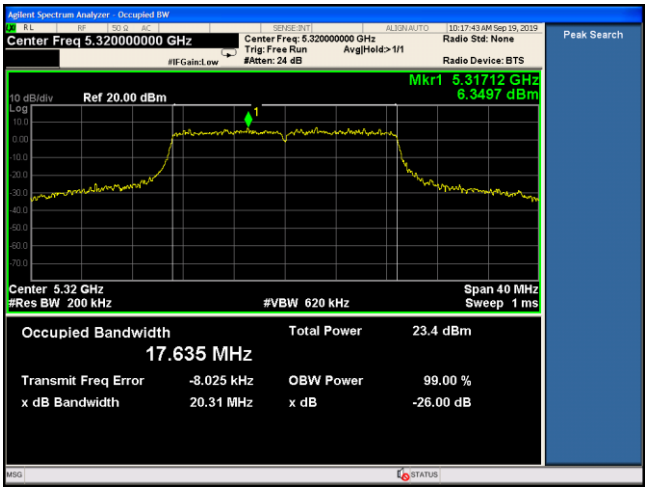
26dB BW -802.11a 5320MHz



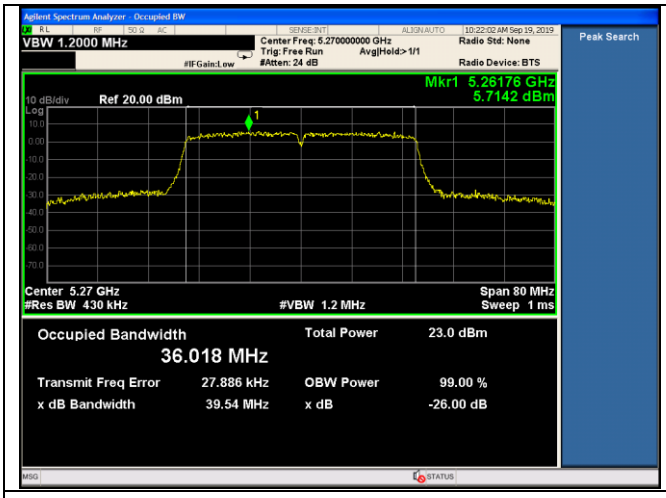
26dB BW -802.11n-20M 5260MHz



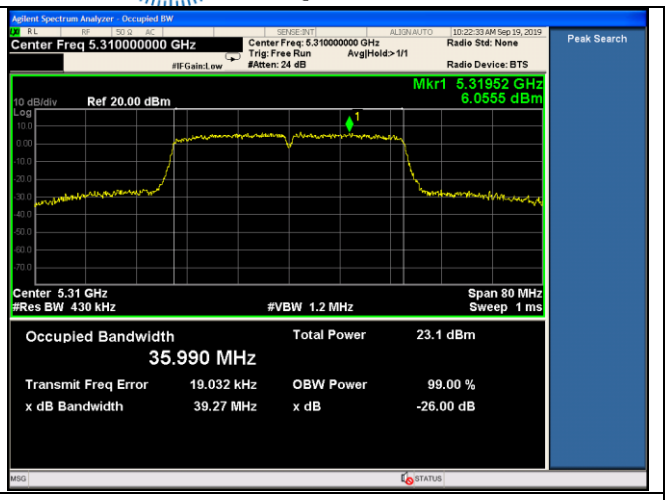
26dB BW -802.11n-20M 5300MHz



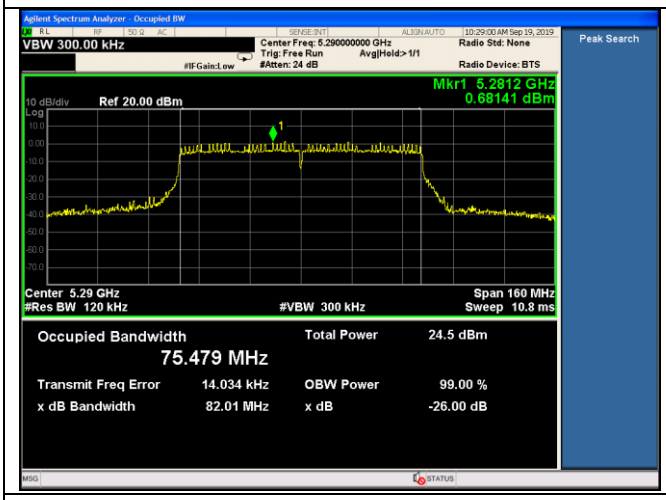
26dB BW -802.11n-20M 5320MHz



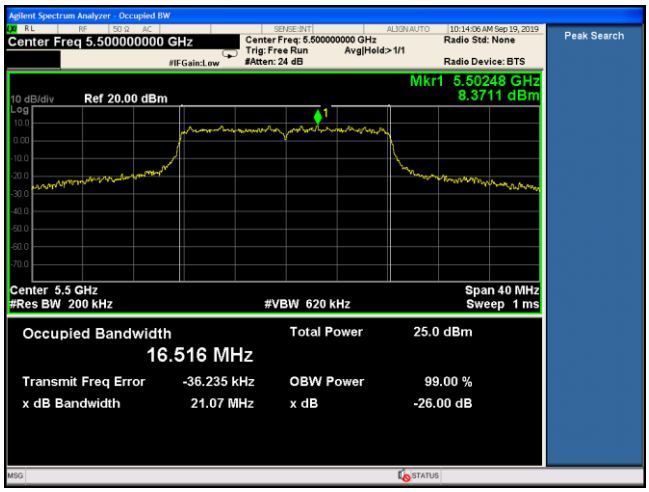
26dB BW -802.11n-40M 5270MHz



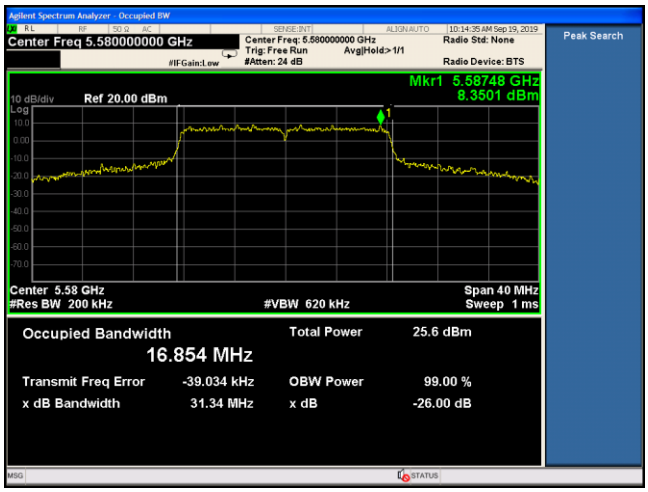
26dB BW -802.11n-40M 5310MHz



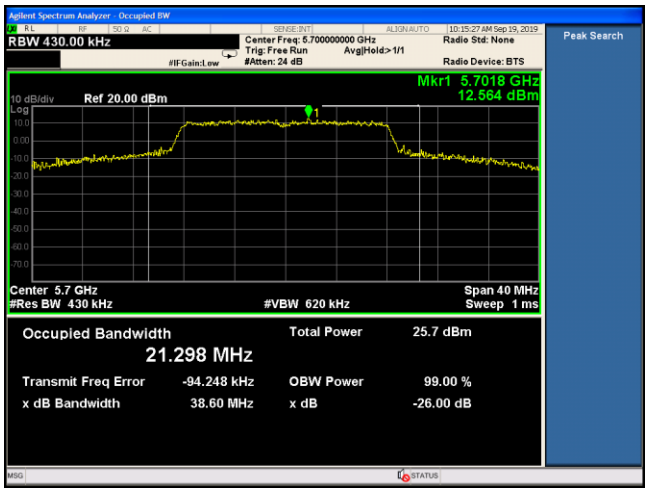
26dB BW -802.11ac-80M 5290MHz



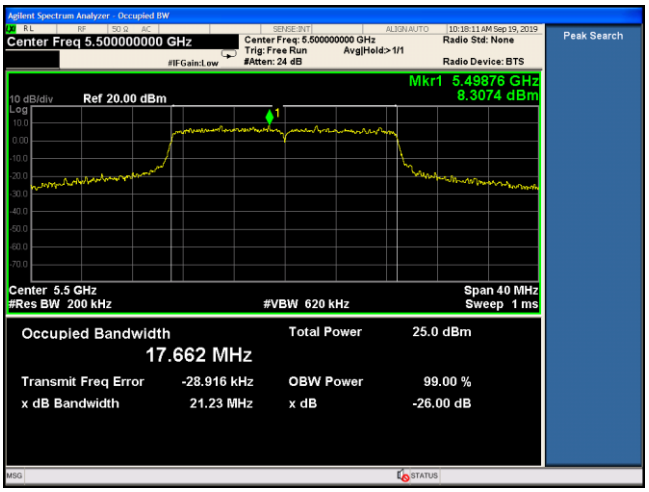
26dB BW -802.11a 5500MHz



26dB BW -802.11a 5580MHz



26dB BW -802.11a 5700MHz



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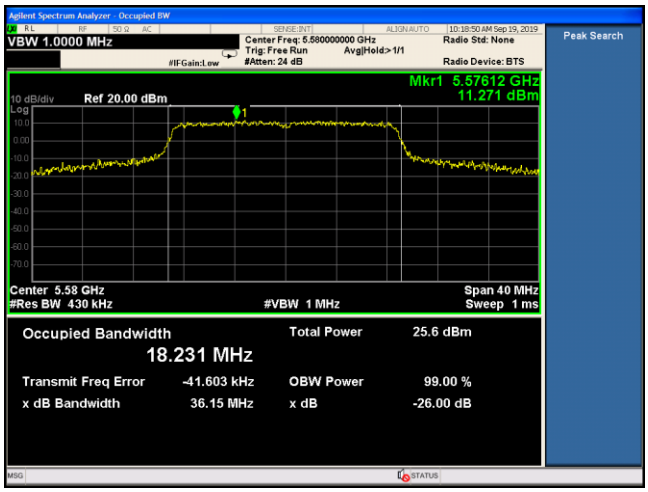
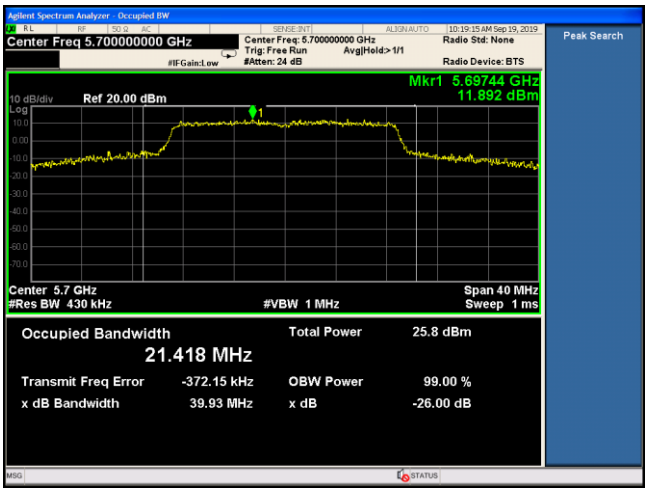
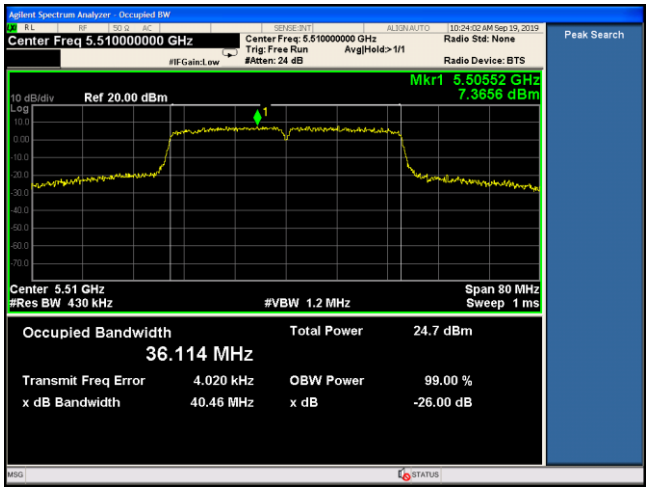


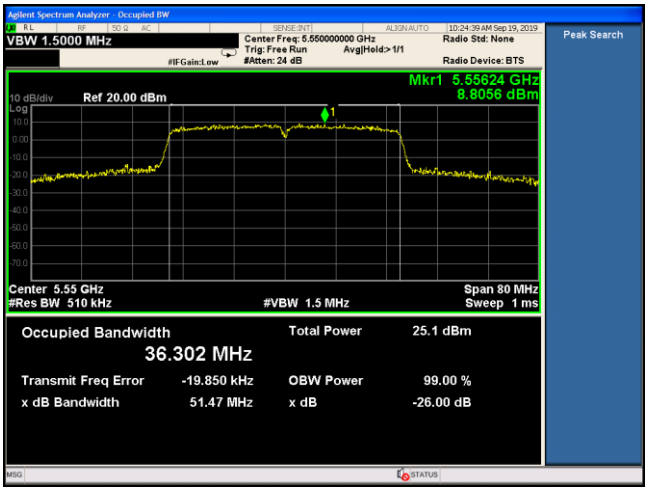
26dB BW -802.11n-20M 5580MHz



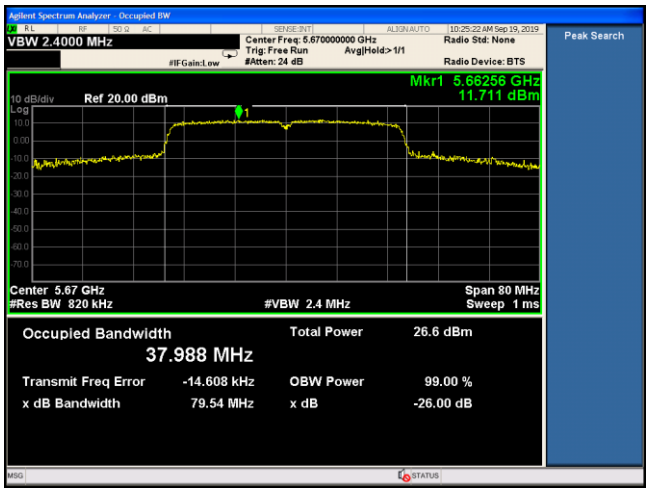
26dB BW -802.11n-20M 5700MHz



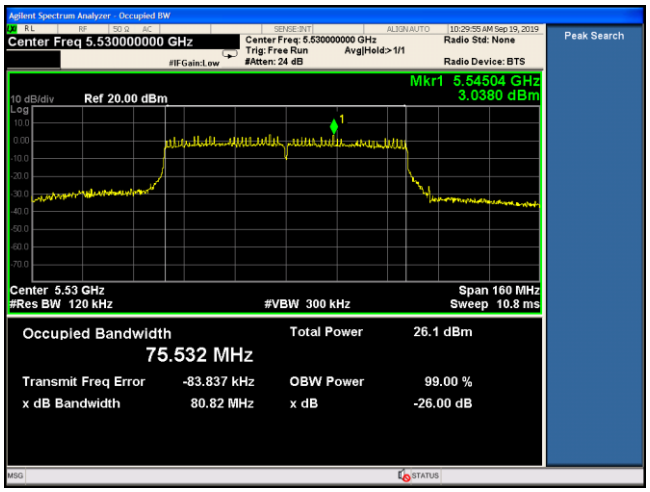
26dB BW -802.11n-40M 5510MHz



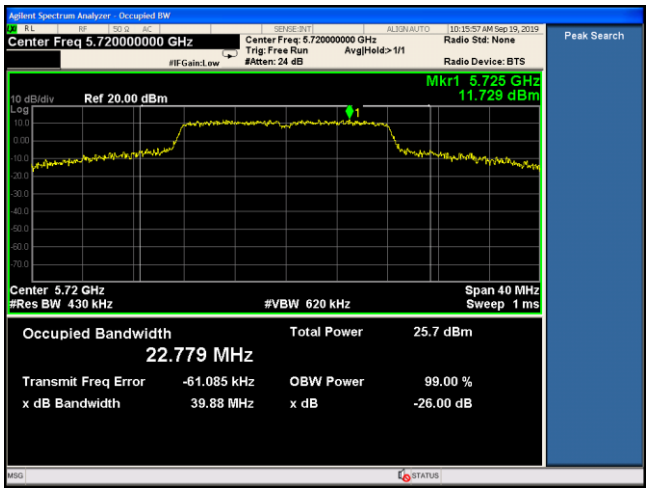
26dB BW -802.11n-40M 5550MHz



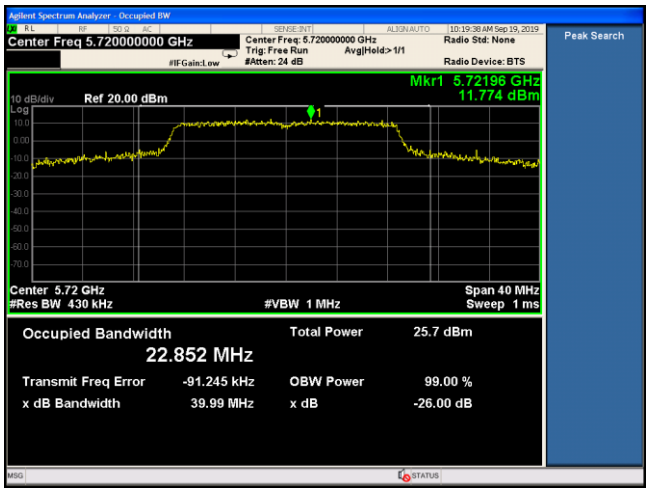
26dB BW -802.11n-40M 5670MHz



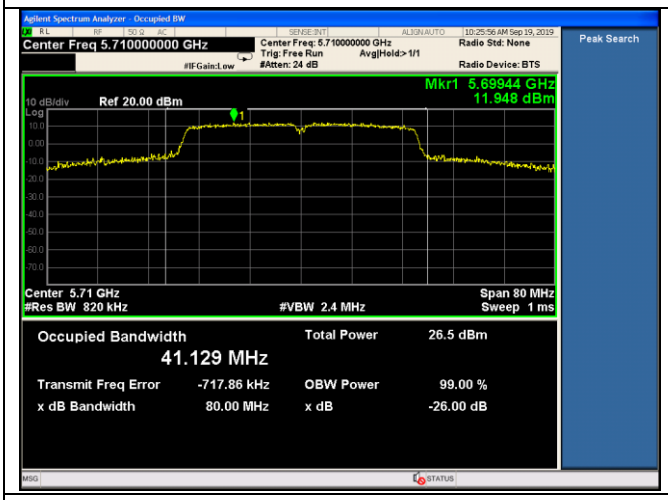
26dB BW -802.11ac-80M 5530MHz



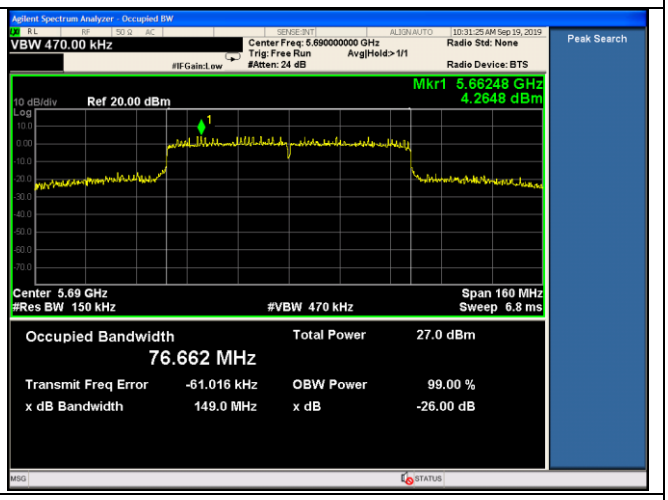
26dB BW -802.11a-20M 5720MHz



26dB BW -802.11n-20M 5720MHz



26dB BW -802.11n-40M 5710MHz



26dB BW -802.11ac-80M 5690MHz

8.3 Occupied Bandwidth (99%)

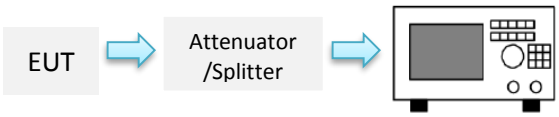
8.3.1 Requirement

RSS-Gen §6.7

This section is for reporting purpose only. There are no restriction limits for bandwidth.

The occupied bandwidth or the "99% emission bandwidth" is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

8.3.2 Test setup



8.3.3 Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01, Section C) Emission bandwidth.

The automatic bandwidth measurement capability of an instrument is used for this measurement.

1. Set RBW = 1% to 5% of the actual occupied BW.
2. Set the video bandwidth (VBW) ≥ 3 x RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Span = 1.5 times to 5.0 times the OBW
7. Allow the trace to stabilize.
8. Use automatic bandwidth measurement capability on instrument to obtain BW result.

8.3.4 Test Result

For U-NII-2A band

Mode/ Bandwidth	Channel	Frequency (MHz)	Data rate	Measured 99% Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
11a	52	5260	6Mbps	16450	N/A	N/A
11a	60	5300	6Mbps	16448	N/A	N/A
11a	64	5320	6Mbps	16428	N/A	N/A
11n-20M	52	5260	MCS0	17642	N/A	N/A
11n-20M	60	5300	MCS0	17627	N/A	N/A
11n-20M	64	5320	MCS0	17635	N/A	N/A
11n-40M	54	5270	MCS0	36018	N/A	N/A
11n-40M	62	5310	MCS0	35990	N/A	N/A
11ac-80M	58	5290	VHC-MCS0	75479	N/A	N/A

For U-NII-2C band

Mode/ Bandwidth	Channel	Frequency (MHz)	Data rate	Measured 99% Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
11a	100	5500	6Mbps	16516	N/A	N/A
11a	120	5580	6Mbps	16854	N/A	N/A
11a	140	5700	6Mbps	21298	N/A	N/A
11n-20M	100	5500	MCS0	17662	N/A	N/A
11n-20M	120	5580	MCS0	18231	N/A	N/A
11n-20M	140	5700	MCS0	21418	N/A	N/A
11n-40M	102	5510	MCS0	36114	N/A	N/A
11n-40M	110	5550	MCS0	36302	N/A	N/A
11n-40M	134	5670	MCS0	37988	N/A	N/A
11ac-80M	106	5530	VHC-MCS0	75532	N/A	N/A

For U-NII-2C band Cross-band channel

Mode/ Bandwidth	Channel	Frequency (MHz)	Data rate	Measured 99% Bandwidth (KHz)	Minimum Bandwidth (KHz)	Result
11a	144	5720	6Mbps	22779	N/A	N/A
11n	144	5720	MCS0	22852	N/A	N/A
11n-40M	144	5710	MCS0	41129	N/A	N/A
11ac-80M	136	5690	VHC-MCS0	76662	N/A	N/A

8.4 Maximum Output Power

8.4.1 Requirement

Per § 15.407 (a),

For the 5.25–5.725 GHz bands:
The maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm+10 log B, where B is the 26 dB emission bandwidth in megahertz.

For Straddle Channel, according to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, if the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
Note that U-NII-2 band, devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

Per RSS-247 §6.2

For the 5.25–5.350 GHz bands:
For OEM devices installed in vehicles, the maximum e.i.r.p. shall not exceed 30 mW or 1.76 + 10 log10B, dBm, whichever is less. Devices shall implement TPC in order to have the capability to operate at least 3 dB below the maximum permitted e.i.r.p. of 30 mW.

Devices, other than devices installed in vehicles, shall comply with the following:

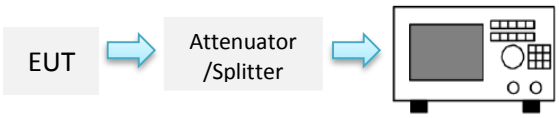
a) The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

For the 5.47–5.600GHz and 5.65-5.725GHz bands:
The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order

8.4.2 Test setup



8.4.3 Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v01, Section E) Maximum conducted output power, 2, b), method SA-1

1. Set span to encompass the entireemission bandwidth (EBW)(or, alternatively, the entire 99% occupied bandwidth)of the signal.
2. Set RBW=1MHz
3. Set VBW ≥ 3 X RBW
4. Number of points in sweep ≥ 2 × span/ RBW. (This ensures that bin-to-bin spacing is ≤RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto couple.
6. Detector = Power averaging (RMS)
7. Trace average at least 100 traces in power averaging(rms)mode.
8. 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.

8.4.4 Test Result

For U-NII-2A band

Mode/ Bandwidth	Frequency (MHz)	Data rate	TX1 power (dBm)	TX2 power (dBm)	Highest or Total power (dBm)	Max Output Power (dBm)	Result
11a	5260	6Mbps	16.92	15.92	16.92	23.88	Pass
11a	5300	6Mbps	18.55	15.58	18.55	23.83	Pass
11a	5320	6Mbps	18.30	15.60	18.30	23.89	Pass
11n-20M	5260	MCS0	18.08	15.73	20.07	23.98	Pass
11n-20M	5300	MCS0	17.77	15.46	19.78	23.98	Pass
11n-20M	5320	MCS0	17.69	15.37	19.69	23.98	Pass
11n-40M	5270	MCS0	16.48	14.03	18.44	23.98	Pass
11n-40M	5310	MCS0	15.97	13.91	18.07	23.98	Pass
11ac-80M	5290	VHC-MCS0	14.61	12.38	16.65	23.98	Pass

For U-NII-2C band

Mode/ Bandwidth	Frequency (MHz)	Data rate	TX1 power (dBm)	TX2 power (dBm)	Highest or Total power (dBm)	Max Output Power (dBm)	Result
11a	5500	6Mbps	18.94	17.28	18.94	23.98	Pass
11a	5580	6Mbps	19.22	18.21	19.22	23.98	Pass
11a	5700	6Mbps	18.17	17.63	18.17	23.98	Pass
11n-20M	5500	MCS0	18.55	17.11	20.90	23.98	Pass
11n-20M	5580	MCS0	18.78	18.05	21.44	23.98	Pass
11n-20M	5700	MCS0	17.93	17.57	20.76	23.98	Pass
11n-40M	5510	MCS0	16.96	15.69	19.38	23.98	Pass
11n-40M	5550	MCS0	17.08	16.13	19.64	23.98	Pass
11n-40M	5670	MCS0	16.80	16.42	19.62	23.98	Pass
11ac-80M	5530	VHC-MCS0	15.20	14.42	17.84	23.98	Pass

For U-NII-2C band Cross-band channel

Mode/ Bandwidth	Frequency (MHz)	Data rate	TX1 power (dBm)	TX2 power (dBm)	Highest or Total power (dBm)	Max Output Power (dBm)	Result
11a	5720	6Mbps	17.87	17.55	17.87	23.98	Pass
11n	5720	MCS0	17.76	17.37	20.58	23.98	Pass
11n-40M	5710	MCS0	16.27	16.13	19.21	23.98	Pass
11ac-80M	5690	VHC-MCS0	14.77	14.75	17.77	23.98	Pass

Note:

1) For 802.11a, the highest output power is recorded.
2) For 5GHz non-11a mode, it's under 2x2 MIMO mode, the output power is combined together to compare to limit.

8.4.5 Test Result for e.i.r.p

For U-NII-2A band

Mode/ Bandwidth	Frequency (MHz)	Data rate	Highest or Total power (dBm)	Directional Ant Gain (dBi)	Highest or Total E.I.R.P (dBm)	Max E.I.R.P (dBm)	Result
11a	5260	6Mbps	16.92	2.5	19.42	29.88	Pass
11a	5300	6Mbps	18.55	2.5	21.05	29.83	Pass
11a	5320	6Mbps	18.30	2.5	20.80	29.89	Pass
11n-20M	5260	MCS0	20.07	5.5	25.57	30.00	Pass
11n-20M	5300	MCS0	19.78	5.5	25.28	30.00	Pass
11n-20M	5320	MCS0	19.69	5.5	25.19	30.00	Pass
11n-40M	5270	MCS0	18.44	5.5	23.94	30.00	Pass
11n-40M	5310	MCS0	18.07	5.5	23.57	30.00	Pass
11ac-80M	5290	VHC-MCS0	16.65	5.5	22.15	30.00	Pass

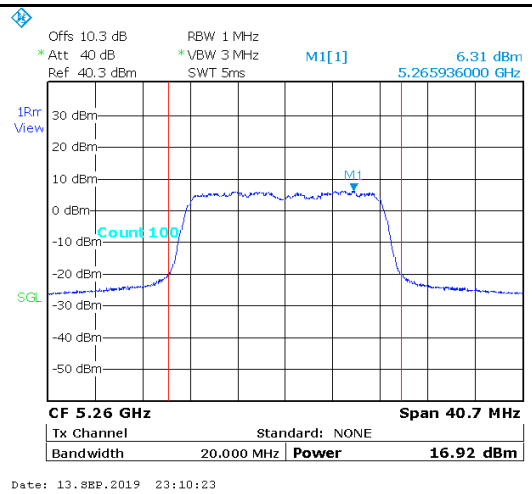
For U-NII-2C band

Mode/ Bandwidth	Frequency (MHz)	Data rate	Highest or Total power (dBm)	Directional Ant Gain (dBi)	Highest or Total E.I.R.P (dBm)	Max E.I.R.P (dBm)	Result
11a	5500	6Mbps	18.94	2.5	21.44	30.00	Pass
11a	5580	6Mbps	19.22	2.5	21.72	30.00	Pass
11a	5700	6Mbps	18.17	2.5	20.67	30.00	Pass
11n-20M	5500	MCS0	20.90	5.5	26.40	30.00	Pass
11n-20M	5580	MCS0	21.44	5.5	26.94	30.00	Pass
11n-20M	5700	MCS0	20.76	5.5	26.26	30.00	Pass
11n-40M	5510	MCS0	19.38	5.5	24.88	30.00	Pass
11n-40M	5550	MCS0	19.64	5.5	25.14	30.00	Pass
11n-40M	5670	MCS0	19.62	5.5	25.12	30.00	Pass
11ac-80M	5530	VHC-MCS0	17.84	5.5	23.34	30.00	Pass

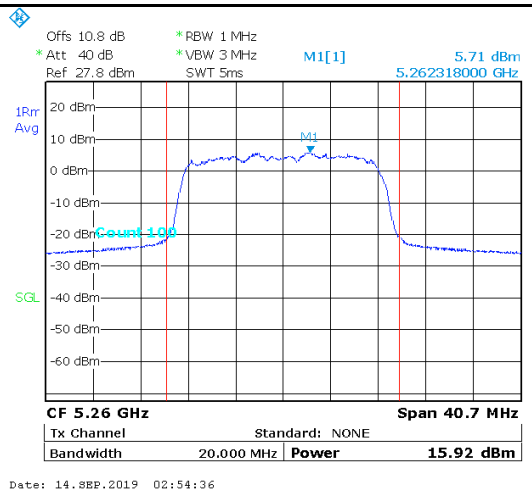
For U-NII-2C band Cross-band channel

Mode/ Bandwidth	Frequency (MHz)	Data rate	Highest or Total power (dBm)	Directional Ant Gain (dBi)	Highest or Total E.I.R.P (dBm)	Max E.I.R.P (dBm)	Result
11a	5720	6Mbps	17.87	2.5	20.37	30.00	Pass
11n	5720	MCS0	20.58	5.5	26.08	30.00	Pass
11n-40M	5710	MCS0	19.21	5.5	24.71	30.00	Pass
11ac-80M	5690	VHC-MCS0	17.77	5.5	23.27	30.00	Pass

8.4.6 Test Plots



802.11a 5260MHz-PWR-TX1



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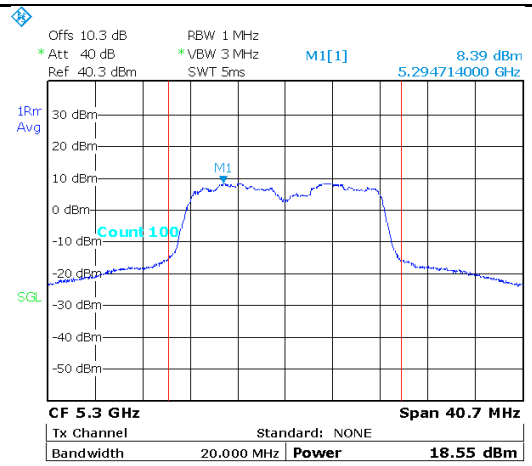

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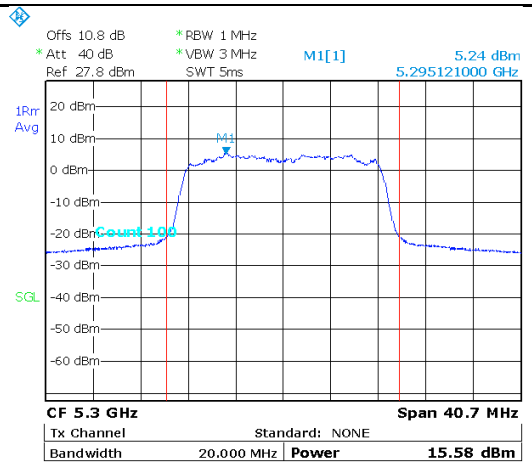

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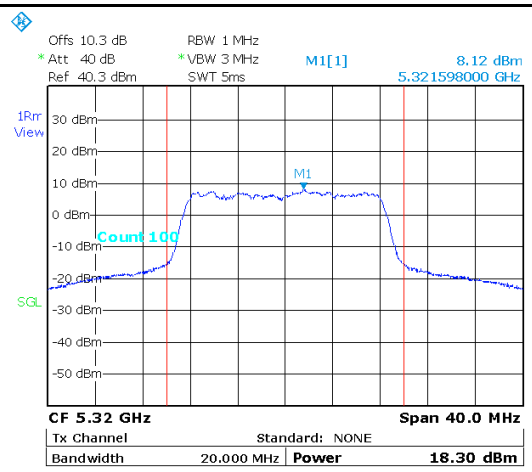
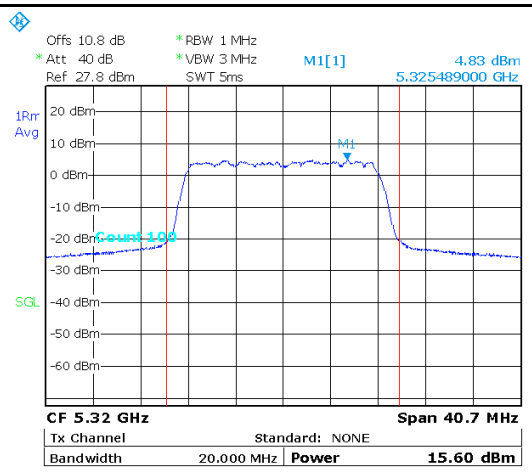


802.11a 5320MHz-PWR-TX1



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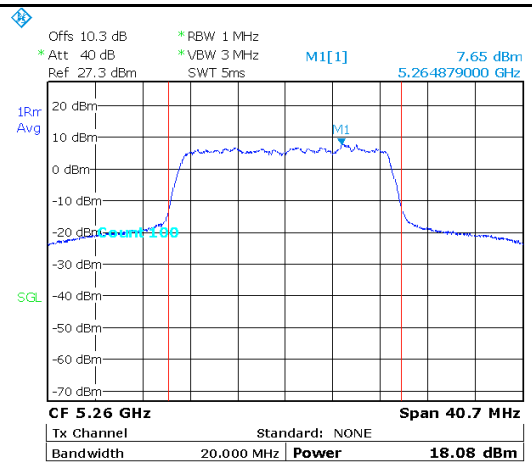
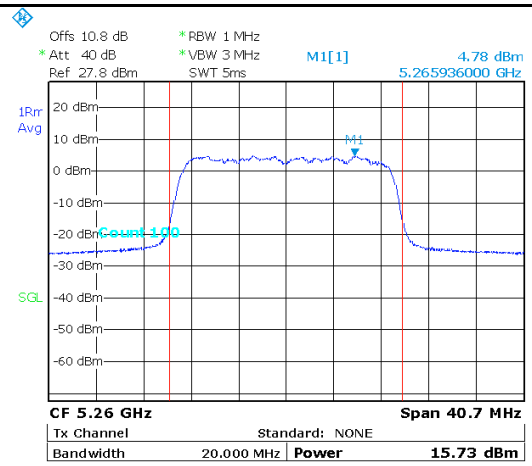


802.11n-20MHz- 5260MHz-PWR-TX1



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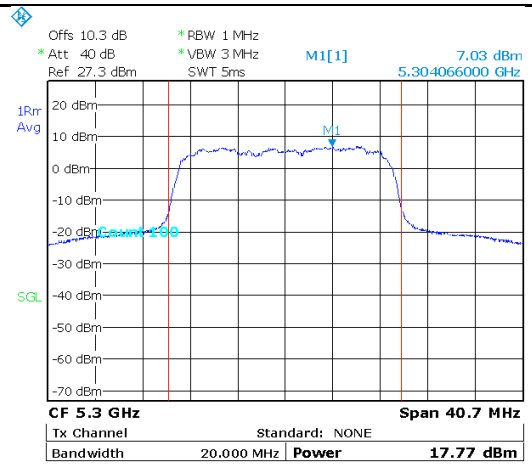

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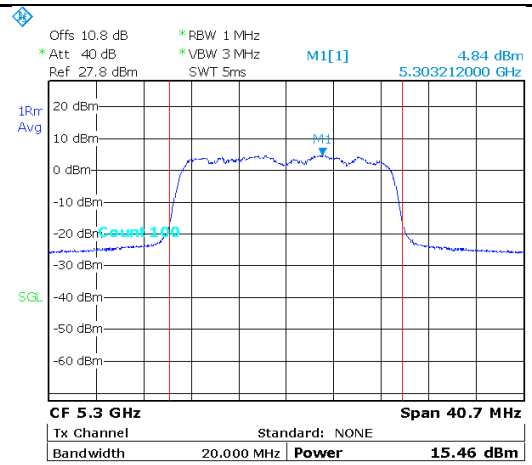

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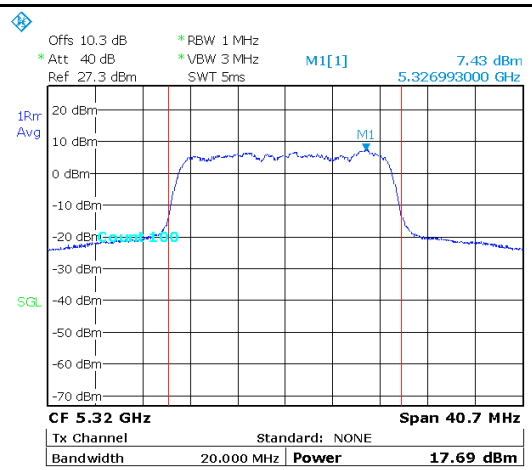

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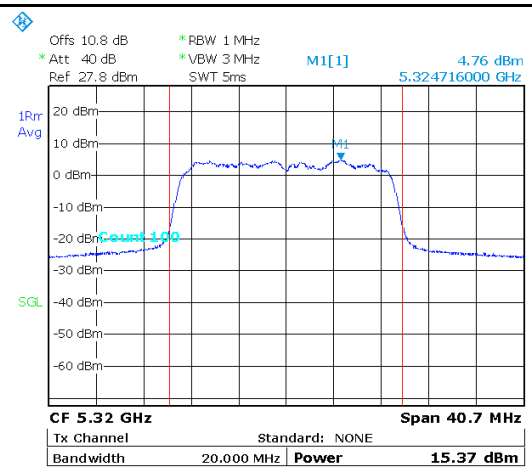

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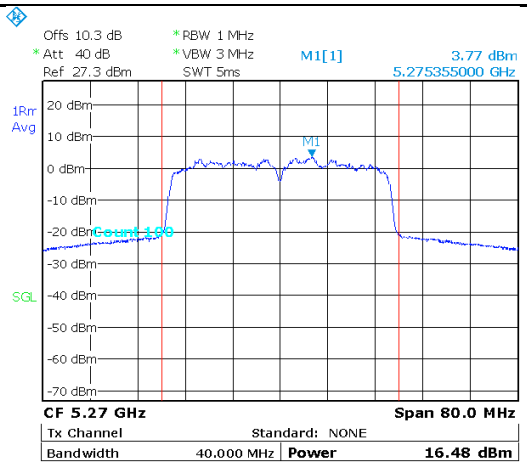

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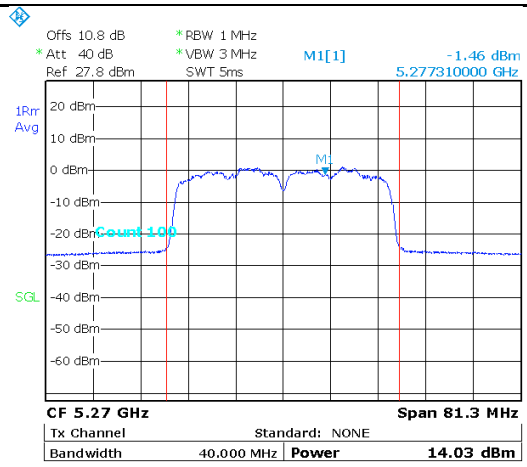

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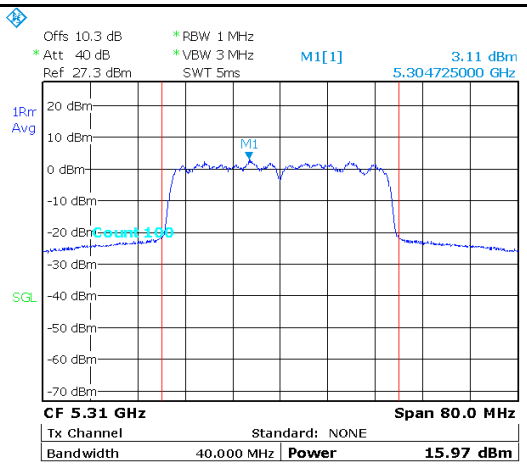

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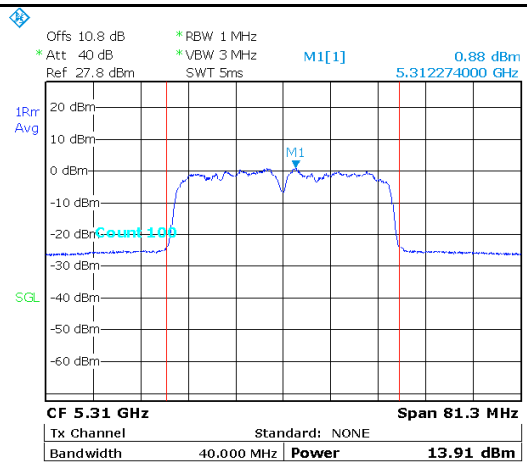

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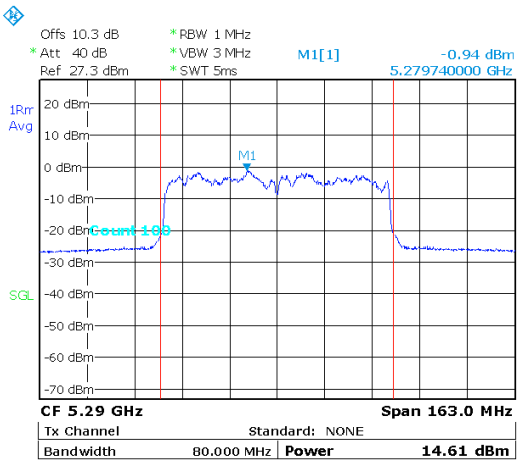

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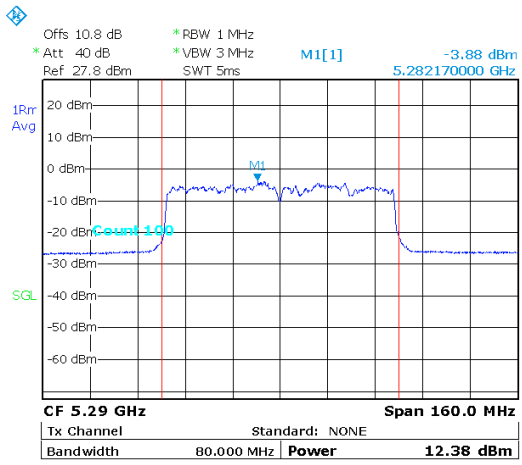

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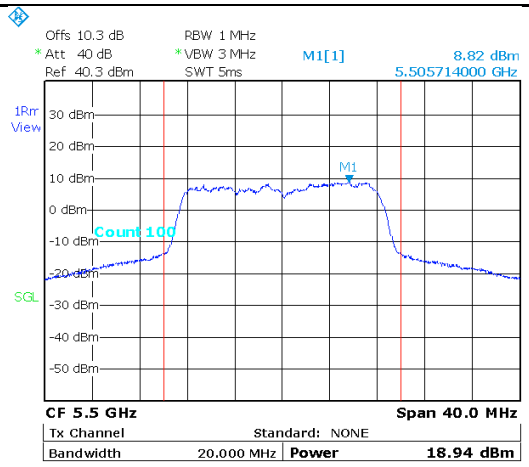
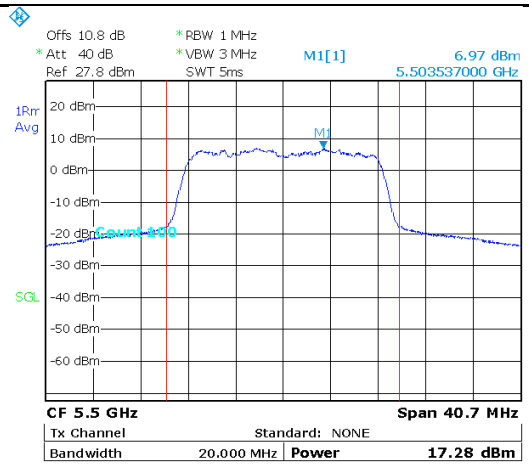
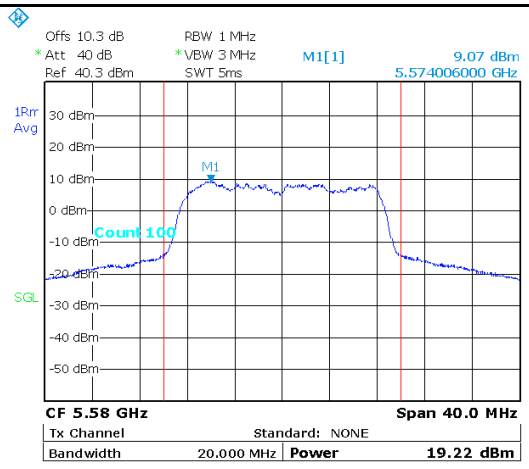


802.11a 5500MHz-PWR-TX1



802.11a 5500MHz-PWR-TX2



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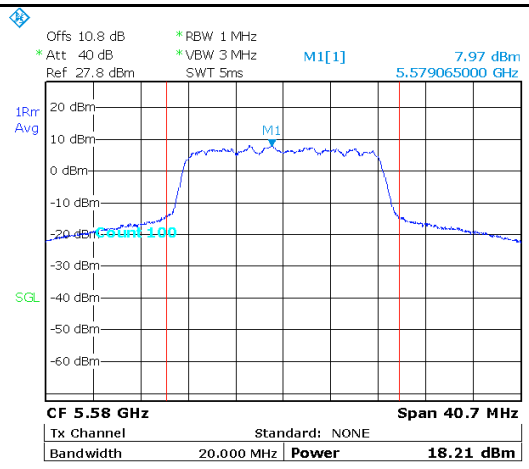
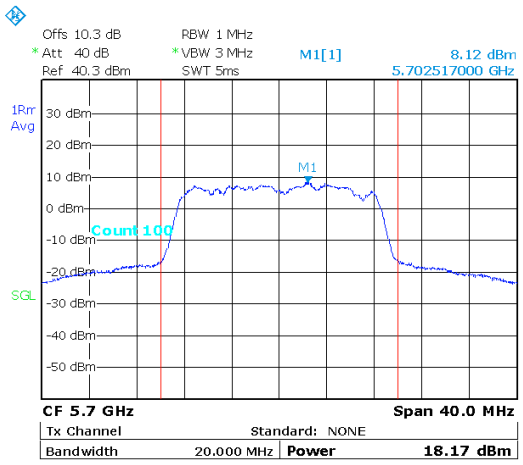
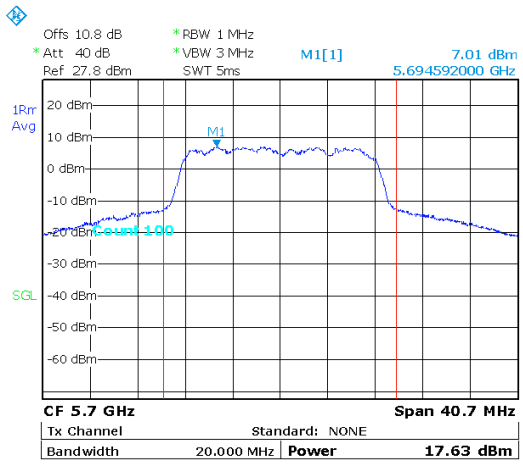


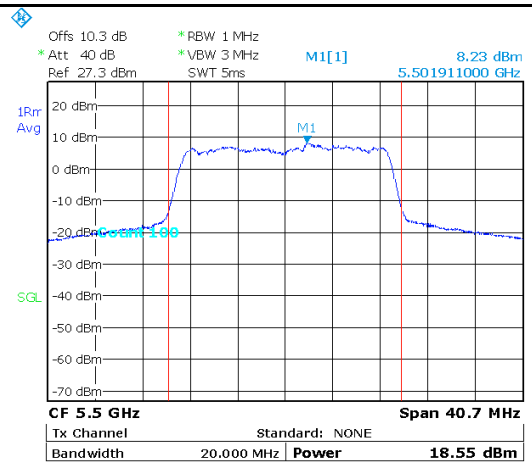
802.11a 5580MHz-PWR-TX2



802.11a 5700MHz-PWR-TX1



802.11a 5700MHz-PWR-TX2



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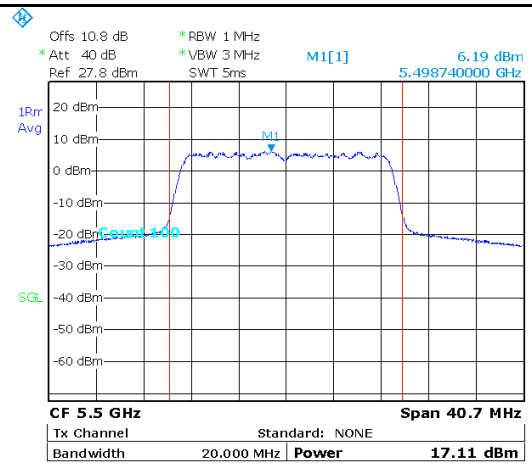
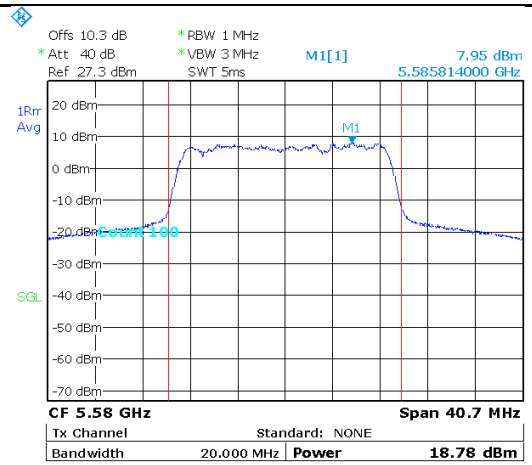
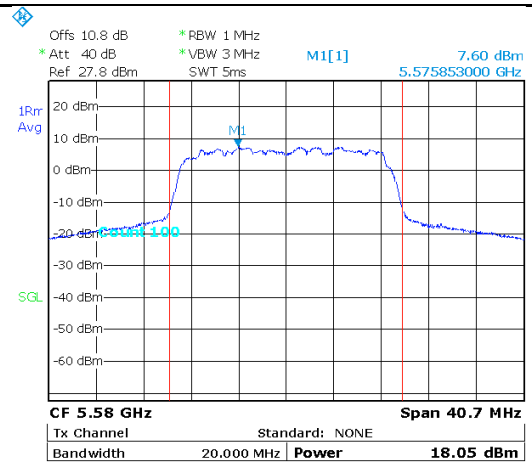


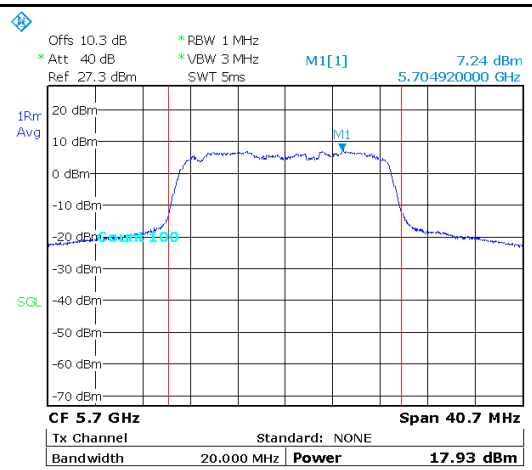
802.11n-20MHz- 5500MHz-PWR-TX2



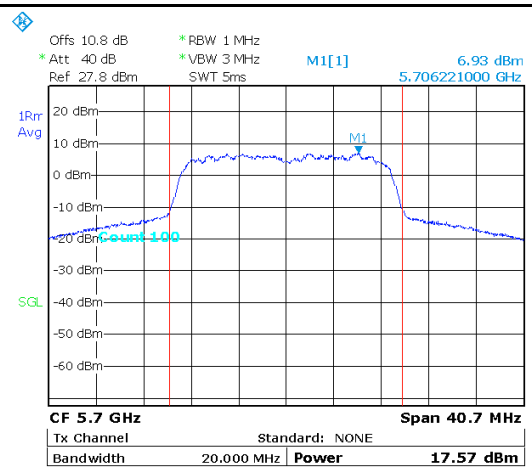
802.11n-20MHz- 5580MHz-PWR-TX1



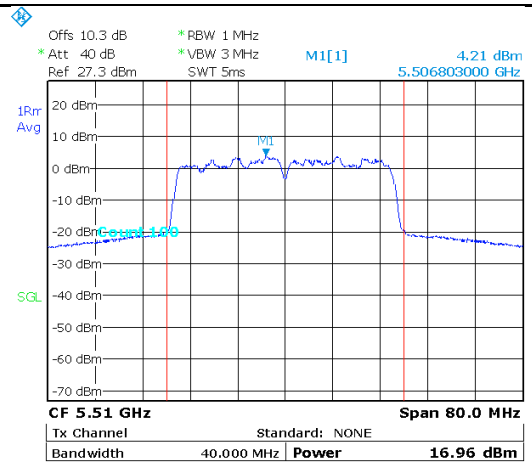
802.11n-20MHz- 5580MHz-PWR-TX2



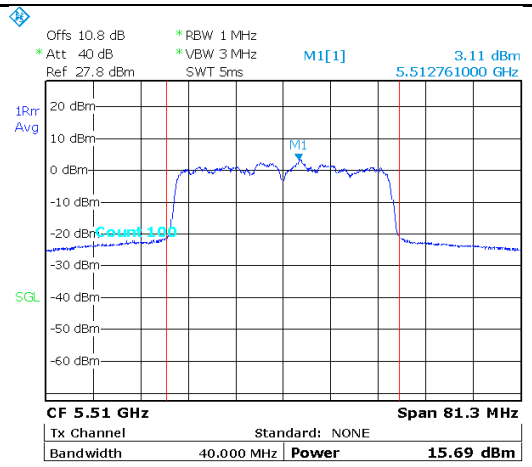
802.11n-20MHz- 5700MHz-PWR-TX1



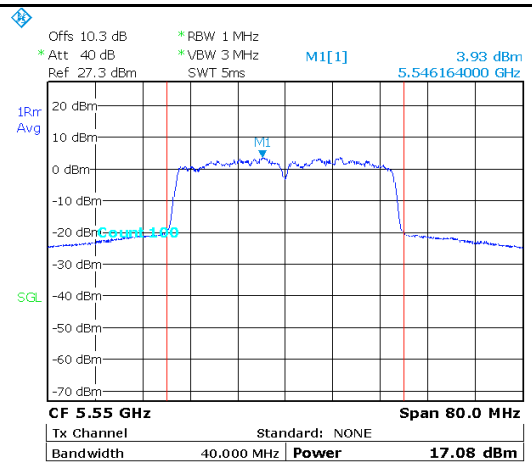
802.11n-20MHz- 5700MHz-PWR-TX2



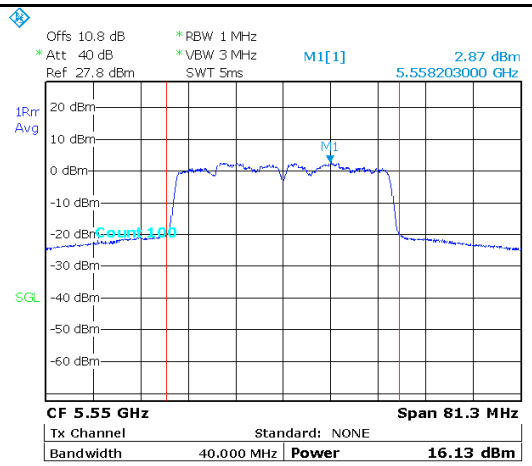
802.11n-40MHz- 5510MHz-PWR-TX1



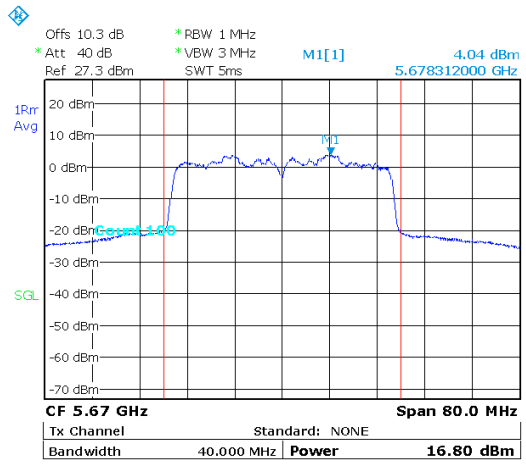
802.11n-40MHz- 5510MHz-PWR-TX2



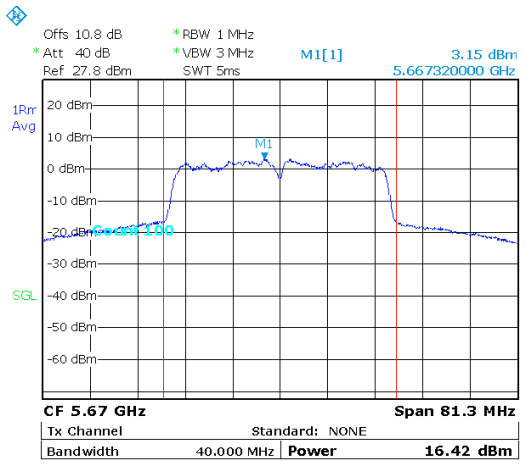
802.11n-40MHz- 5550MHz-PWR-TX1



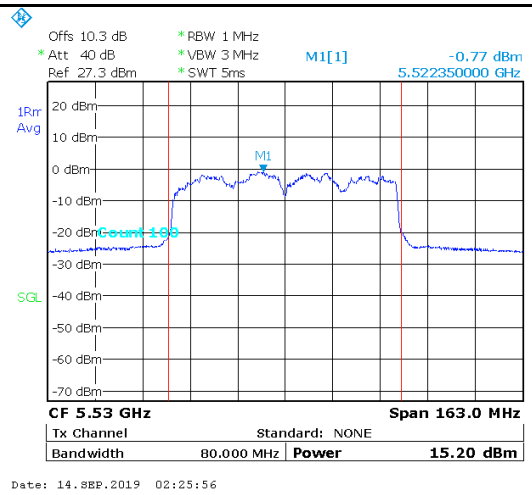
802.11n-40MHz- 5550MHz-PWR-TX2



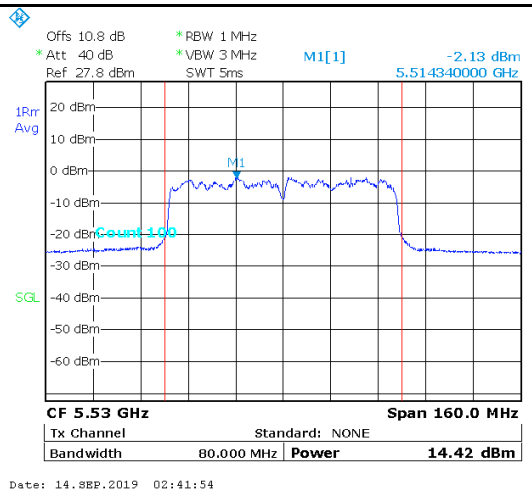
802.11n-40MHz- 5670MHz-PWR-TX1



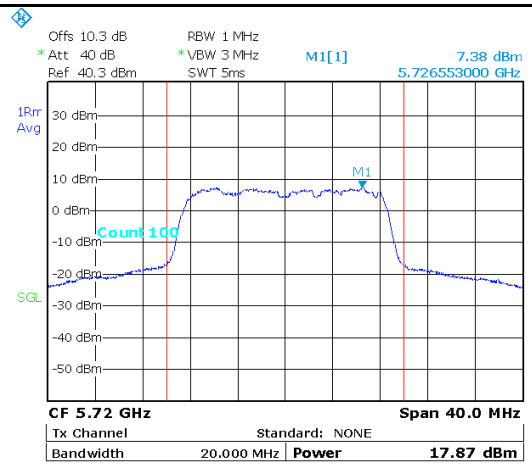
802.11n-40MHz- 5670MHz-PWR-TX2



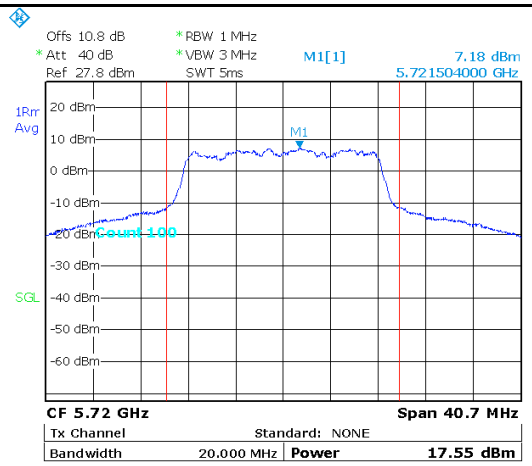
802.11ac-80MHz- 5530MHz-PWR-TX1



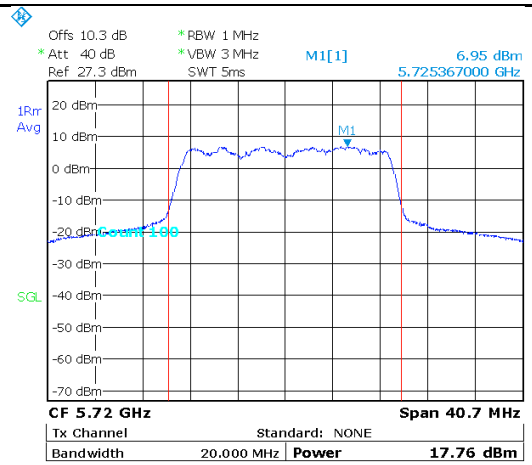
802.11ac-80MHz - 5530MHz-PWR-TX2



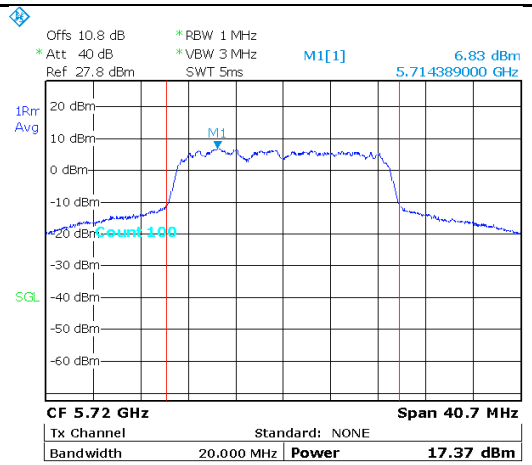
802.11a-20MHz- 5720MHz-PWR-TX1



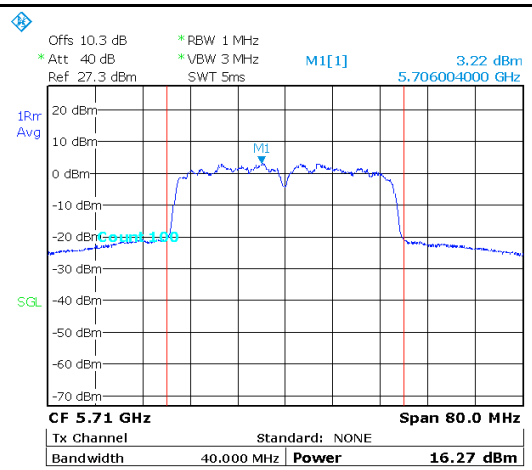
802.11a-20MHz- 5720MHz-PWR-TX2



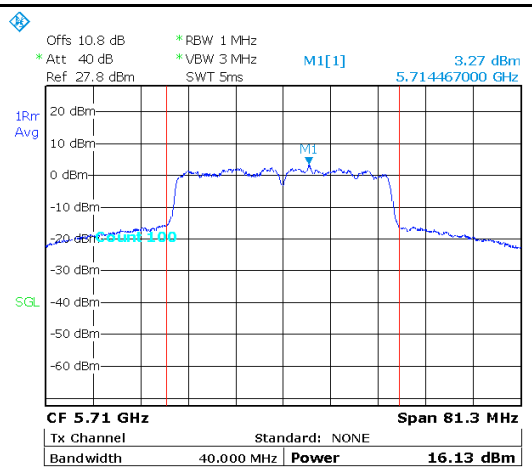
802.11n-20MHz- 5720MHz-PWR-TX1



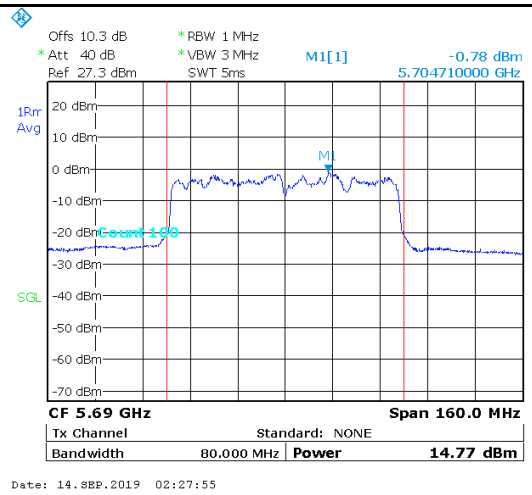
802.11n-20MHz- 5720MHz-PWR-TX2



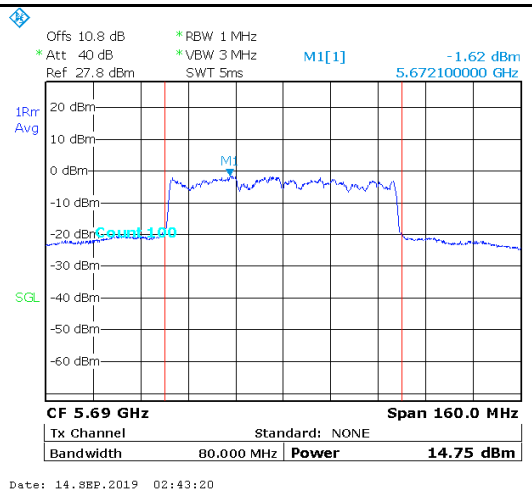
802.11n-40MHz- 5710MHz-PWR-TX1



802.11n-40MHz- 5710MHz-PWR-TX2



802.11ac-80MHz- 5690MHz-PWR-TX1



802.11ac-80MHz- 5690MHz-PWR-TX2

8.5 Power Spectral Density

8.5.1 Requirement

Per § 15.407 (a),

For the 5.25–5.725 GHz bands, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

For Straddle Channel, According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, If the power and PSD of the devices are uniform and comply with the lower limits specified for the U-NII-2 bands, a single measurement over the entire emission bandwidth can be performed to show compliance.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Per RSS-247 §6.2

For the 5.25–5.350 GHz bands:
Devices, other than devices installed in vehicles, shall comply with the following:

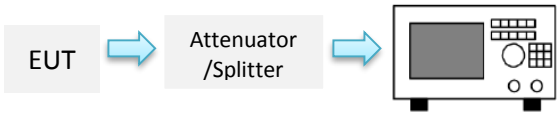
a) The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

b) The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order to have the capability to operate at least 6 dB below the maximum permitted e.i.r.p. of 1 W.

For the 5.47–5.600GHz and 5.65-5.725GHz bands:
The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. The power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz. Note that devices with a maximum e.i.r.p. greater than 500 mW shall implement TPC in order

8.5.2 Test setup



8.5.3 Test Procedure

According to KDB 789033 D02 General UNII Test Procedures New Rules v02r01, section F) Maximum power spectral density. Method SA-1

1. Set span to encompass the entireemission bandwidth (EBW)(or, alternatively, the entire 99% occupied bandwidth)of the signal.
2. Set RBW=1MHz
3. Set VBW ≥ 3 X RBW
4. Number of points in sweep ≥ 2 × span/ RBW. (This ensures that bin-to-bin spacing is ≤RBW/2, so that narrowband signals are not lost between frequency bins.)
5. Sweep time = auto couple.
6. Detector = Power averaging (RMS)
7. Trace average at least 100 traces in power averaging(rms)mode.
8. Use the peak marker function to determine the maximum amplitude level within the RBW.

8.5.4 Test Result

For U-NII-2A band

Mode/ Bandwidth	Frequency (MHz)	Data rate	TX1 PSD (dBm/MHz)	TX2 PSD (dBm/MHz)	Highest or Total PSD (dBm/MHz)	Max PSD (dBm/MHz)	Result
11a	5260	6Mbps	6.31	5.71	6.31	11	Pass
11a	5300	6Mbps	8.39	5.24	8.39	11	Pass
11a	5320	6Mbps	8.12	4.83	8.12	11	Pass
11n-20M	5260	MCS0	7.65	4.78	9.46	11	Pass
11n-20M	5300	MCS0	7.03	4.84	9.08	11	Pass
11n-20M	5320	MCS0	7.43	4.76	9.31	11	Pass
11n-40M	5270	MCS0	3.77	-1.46	4.91	11	Pass
11n-40M	5310	MCS0	3.11	0.88	5.15	11	Pass
11ac-80M	5290	VHC-MCS0	-0.94	-3.88	0.84	11	Pass

For U-NII-2C band

Mode/ Bandwidth	Frequency (MHz)	Data rate	TX1 PSD (dBm/MHz)	TX2 PSD (dBm/MHz)	Highest or Total PSD (dBm/MHz)	Max PSD (dBm/MHz)	Result
11a	5500	6Mbps	8.82	6.97	8.82	11	Pass
11a	5580	6Mbps	9.07	7.97	9.07	11	Pass
11a	5700	6Mbps	8.12	7.01	8.12	11	Pass
11n-20M	5500	MCS0	8.23	6.19	10.34	11	Pass
11n-20M	5580	MCS0	7.95	7.60	10.79	11	Pass
11n-20M	5700	MCS0	7.24	6.93	10.10	11	Pass
11n-40M	5510	MCS0	4.21	3.11	6.71	11	Pass
11n-40M	5550	MCS0	3.93	2.87	6.44	11	Pass
11n-40M	5670	MCS0	4.04	3.15	6.63	11	Pass
11ac-80M	5530	VHC-MCS0	-0.77	-2.13	1.61	11	Pass

For U-NII-2C band Cross-band channel

Mode/ Bandwidth	Frequency (MHz)	Data rate	TX1 PSD (dBm/MHz)	TX2 PSD (dBm/MHz)	Highest or Total PSD (dBm/MHz)	Max PSD (dBm/MHz)	Result
11a	5720	6Mbps	7.38	7.18	7.38	11	Pass
11n	5720	MCS0	6.95	6.83	9.90	11	Pass
11n-40M	5710	MCS0	3.22	3.27	6.26	11	Pass
11ac-80M	5690	VHC-MCS0	-0.78	-1.62	1.83	11	Pass

Note:

1) For 802.11a, the highest PSD is recorded.
2) For 5GHz non-11a mode, it's under 2x2 MIMO mode, the PSD is combined together to compare to limit.

8.5.5 Test Plots

Refer to test plots in conducted peak output power

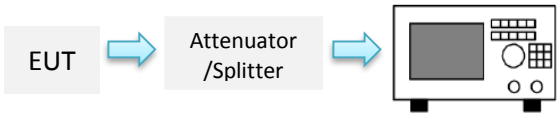
8.6 Automatically Discontinue Transmission

8.6.1 Requirement

§ 15.407 (c), RSS-247 §6 (a)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signalling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

8.6.2 Test setup



8.6.3 Test Result

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

8.7 Radiated Spurious Emissions into Restricted Frequency Bands

8.7.1 Requirement

§ 15.205, 15.209, 15.407(b), RSS-Gen §8.10, RSS-247

(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 EIRP 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 EIRP of -27 dBm/MHz. Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

(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 EIRP of −27 dBm/MHz.

(4) For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz.

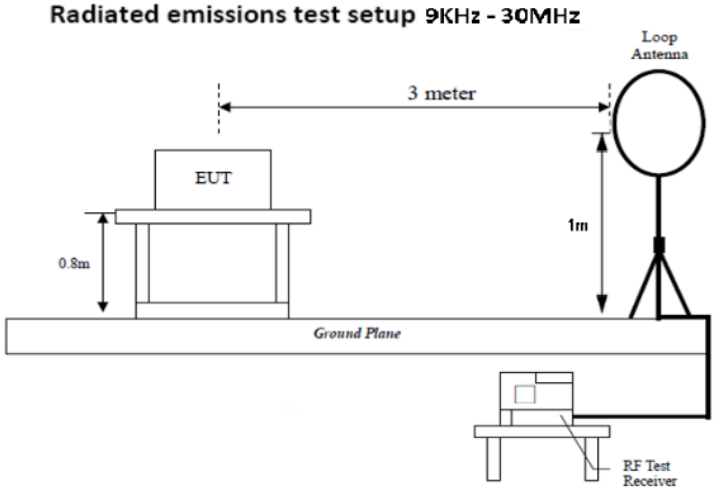
(5) Restricted band, emission must also comply with the radiated emission limits specified in 15.209

Attenuation below the general limits specified in §15.209(a) and RSS-Gen is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

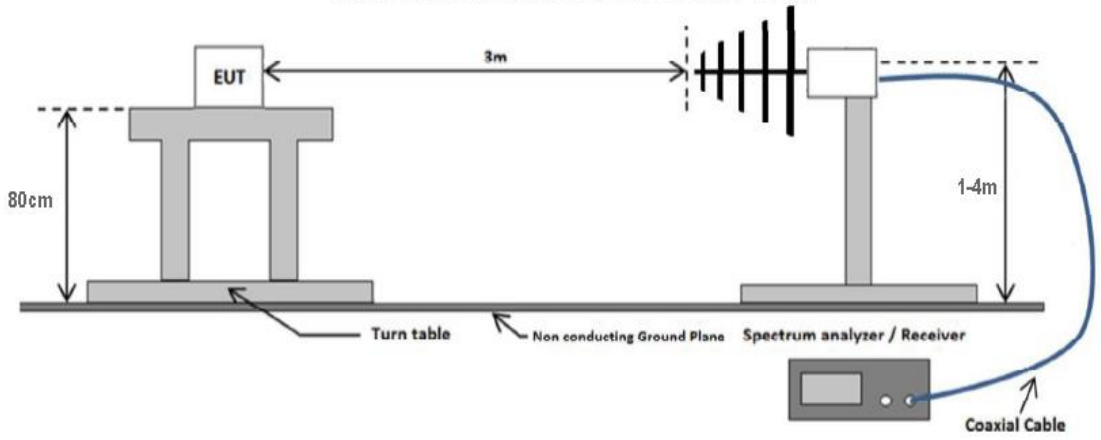
Frequency range (MHz)	Field Strength (µV/m)
0.009~0.490	2400/F(KHz)
0.490~1.705	24000/F(KHz)
1.705~30.0	30
30 – 88	100
88 – 216	150
216 960	200
Above 960	500

8.7.2 Test setup

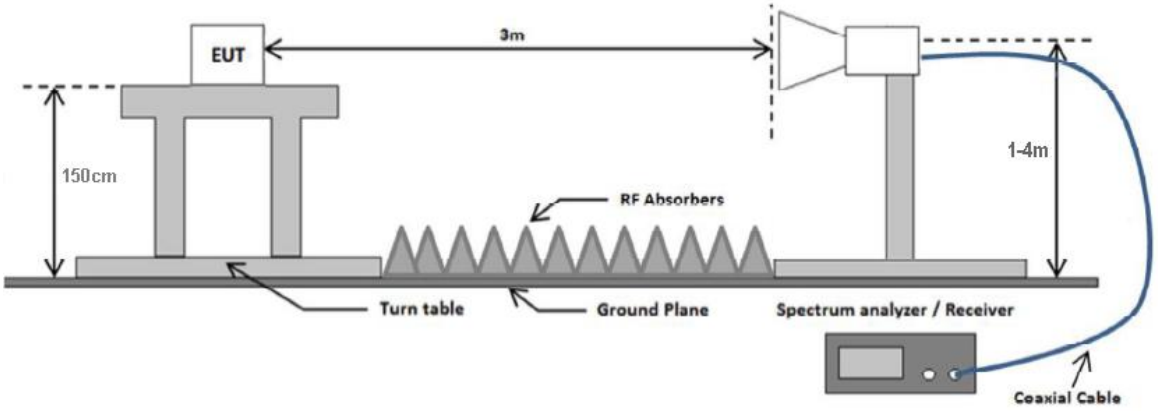
Radiated emissions test setup 9KHz - 30MHz



Radiated emissions test setup 30 MHz - 1 GHz



Radiated emissions test setup above 1 GHz



8.7.3 Test Procedure

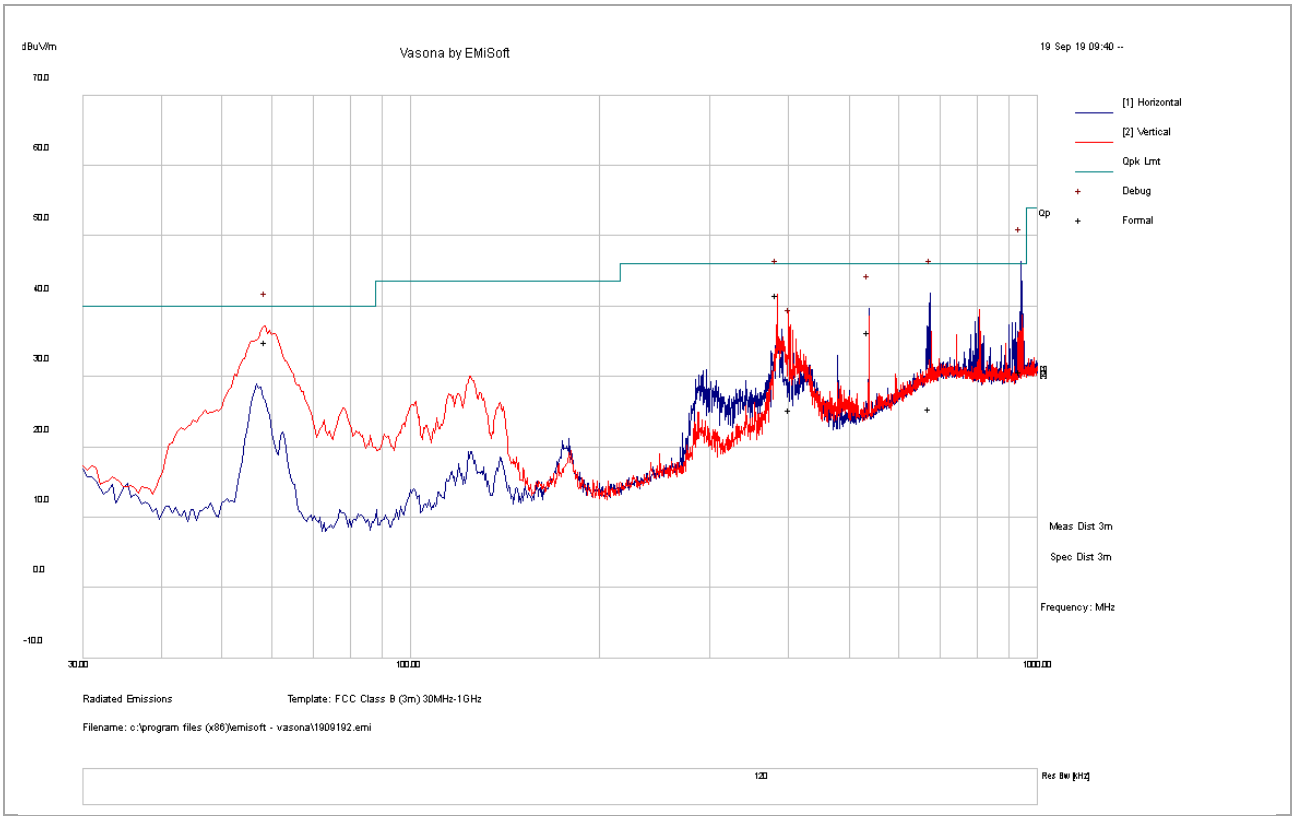
According to FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01. Section G) Unwanted emissions measurement. And subclause 12.7 Radiated spurious emission measurements in ANSI C62.10-2013 as well as the procedures for maximizing and measuring radiated emissions that are described in ANSI C63.10 was followed. Boresight antenna mast was used during the scanning to point to EUT to maximize the emission. The process will be repeated in 3 EUT orientations.

1. The EUT was switched on and allowed to warm up to its normal operating condition.
2. The test was carried out at the selected frequency points obtained from the EUT characterization. Maximization of the emissions, was carried out by rotating the EUT, changing the antenna polarization, and adjusting the antenna height in the following manner:
   a. Vertical or horizontal polarization (whichever gave the higher emission level over a full rotation of the EUT) was chosen.
   b. The EUT was then rotated to the direction that gave the maximum emission.
   c. Finally, the antenna height was adjusted to the height that gave the maximum emission.
3. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 300 Hz for frequency below 150KHz.
4. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 10 kHz for frequency between 150KHz – 30MHz.
5. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-Peak detection at frequency between 30MHz - 1GHz.
6. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz with Peak detection for Peak and average measurement at frequency above 1GHz.
7. Steps 2 and 3 were repeated for the next frequency point, until all selected frequency points were measured.

8.7.4 Test Result

30-1000MHz test result

Test Standard:	**RSS-247**	**Mode:**	**11a-5500MHz**
Frequency Range:	**30-1000MHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Bi-Log/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



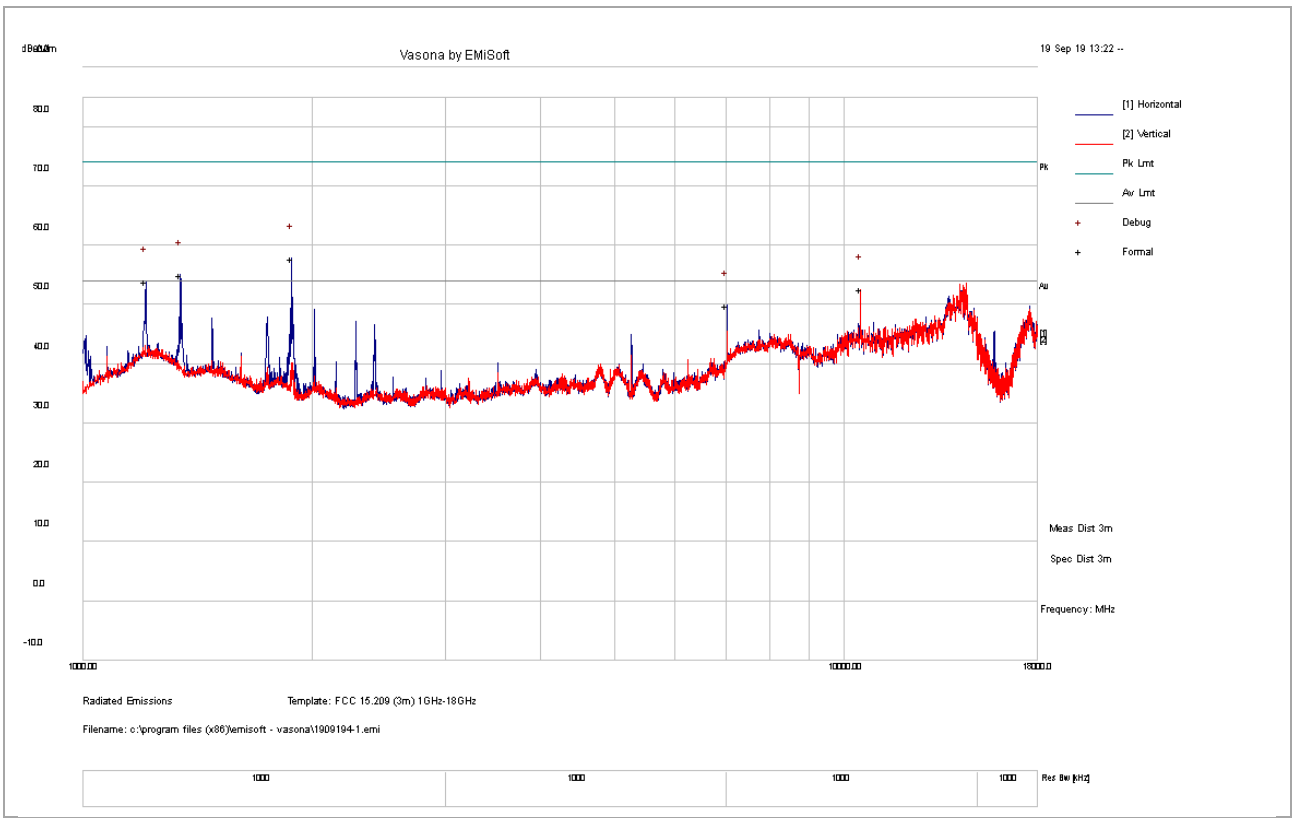
Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
938.38	29.86	7.76	-6.81	30.80	QP	H	187	0	46.00	-15.20
58.59	56.69	2.97	-24.69	34.96	QP	V	100	102	40.00	-5.04
673.48	25.56	7.28	-7.30	25.53	QP	H	188	309	46.00	-20.47
384.00	49.58	6.27	-14.25	41.60	QP	V	169	208	46.00	-4.40
537.57	41.53	6.51	-11.60	36.44	QP	H	163	188	46.00	-9.56
401.68	32.43	6.36	-13.45	25.34	QP	H	382	54	46.00	-20.66

Note:

1) For below 1GHz, all different channel and modes were verified but only the worst case result is shown here.

1GHz – 18GHz test result

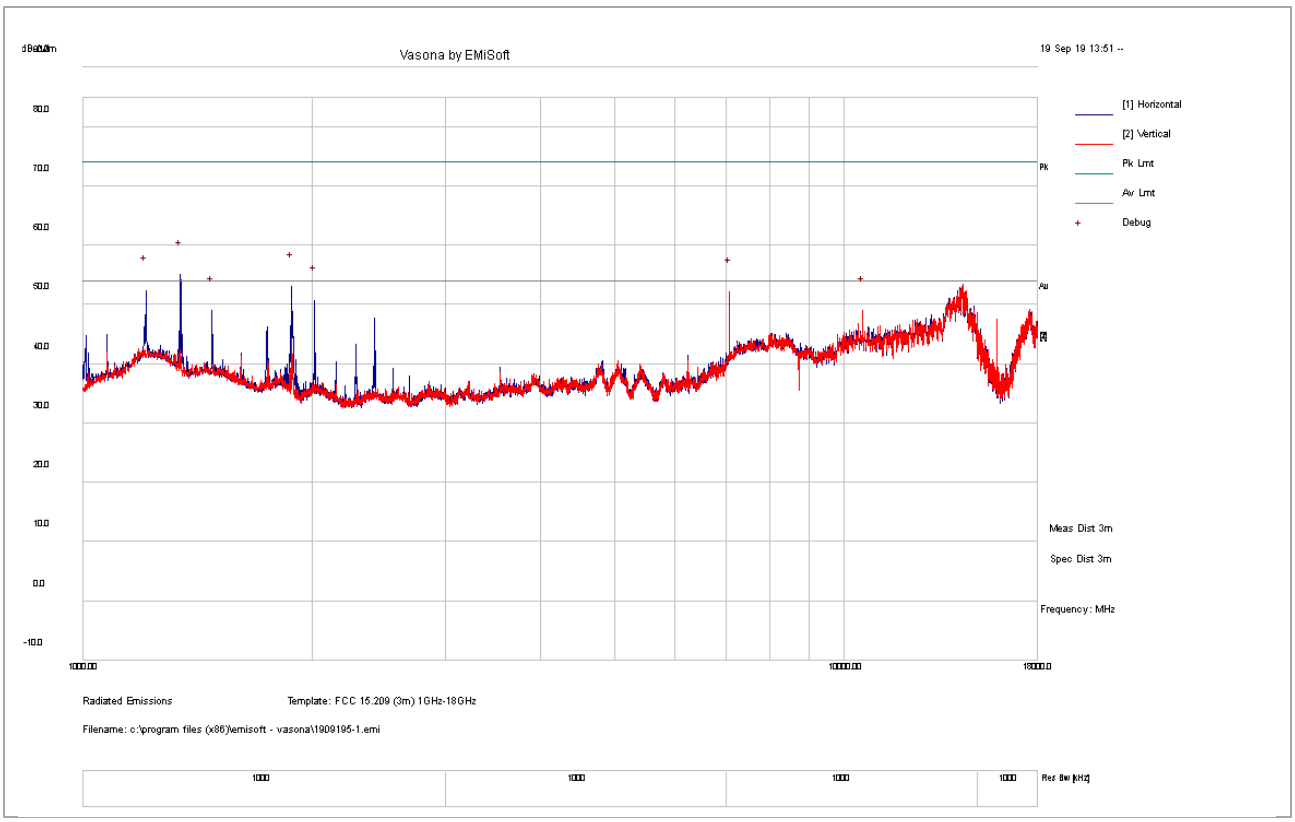
Test Standard:	**RSS-247**	**Mode:**	**11a-5260MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.25	57.34	14.38	-21.54	50.18	AV	H	339	71	54.00	-3.82
1343.75	55.32	14.59	-20.41	49.50	AV	V	400	29	54.00	-4.50
1210.00	52.83	14.32	-19.28	47.87	AV	V	100	95	54.00	-6.13
1881.25	64.99	14.38	-21.54	57.83	PK	H	339	71	74.00	-16.17
1343.75	60.82	14.59	-20.41	55.00	PK	V	400	29	74.00	-19.00
1210.00	58.89	14.32	-19.28	53.94	PK	V	100	95	74.00	-20.06
10520.00	32.80	23.20	-3.50	52.54	PK	H	178	276	54.00	-1.50
7025.00	39.26	20.10	-9.42	49.94	PK	V	343	312	54.00	-4.06

1GHz – 18GHz test result

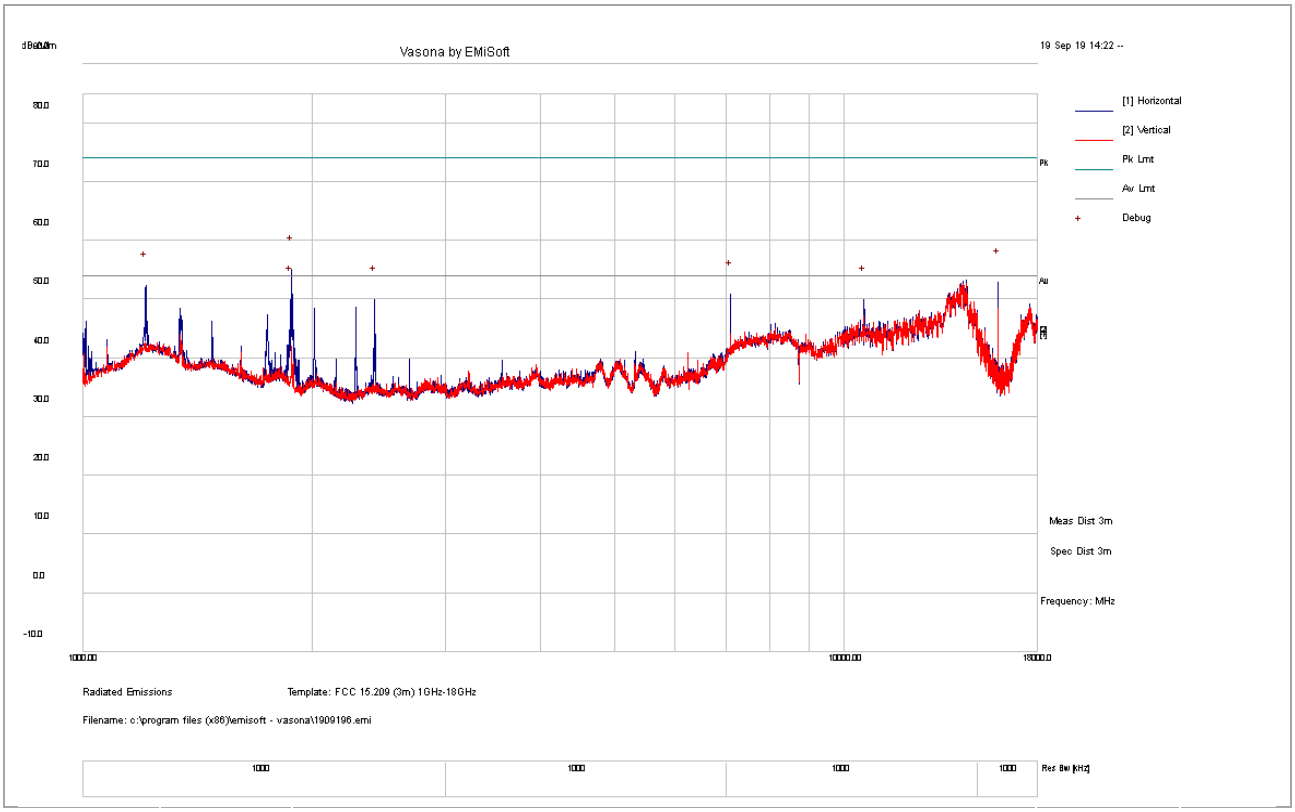
Test Standard:	**RSS-247**	**Mode:**	**11a-5300MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**09/19/2019**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1343.75	51.92	14.59	-20.41	46.10	AV	H	146	57	54.00	-7.90
1881.25	48.88	14.38	-21.54	41.72	AV	H	209	258	54.00	-12.28
1343.75	60.87	14.59	-20.41	55.04	PK	H	146	57	74.00	-18.96
1881.25	60.22	14.38	-21.54	53.07	PK	H	209	258	74.00	-20.93
1210.00	57.32	14.32	-19.28	52.37	PK	H	400	361	54.00	-1.64
7080.00	40.97	20.21	-9.08	52.10	PK	V	295	56	54.00	-1.90
2016.25	58.59	14.27	-22.16	50.70	PK	H	102	172	54.00	-3.30
1478.75	55.79	14.83	-21.65	48.97	PK	H	226	229	54.00	-5.03
10595.00	29.24	23.27	-3.55	48.97	PK	V	67	113	54.00	-5.03

1GHz – 18GHz test result

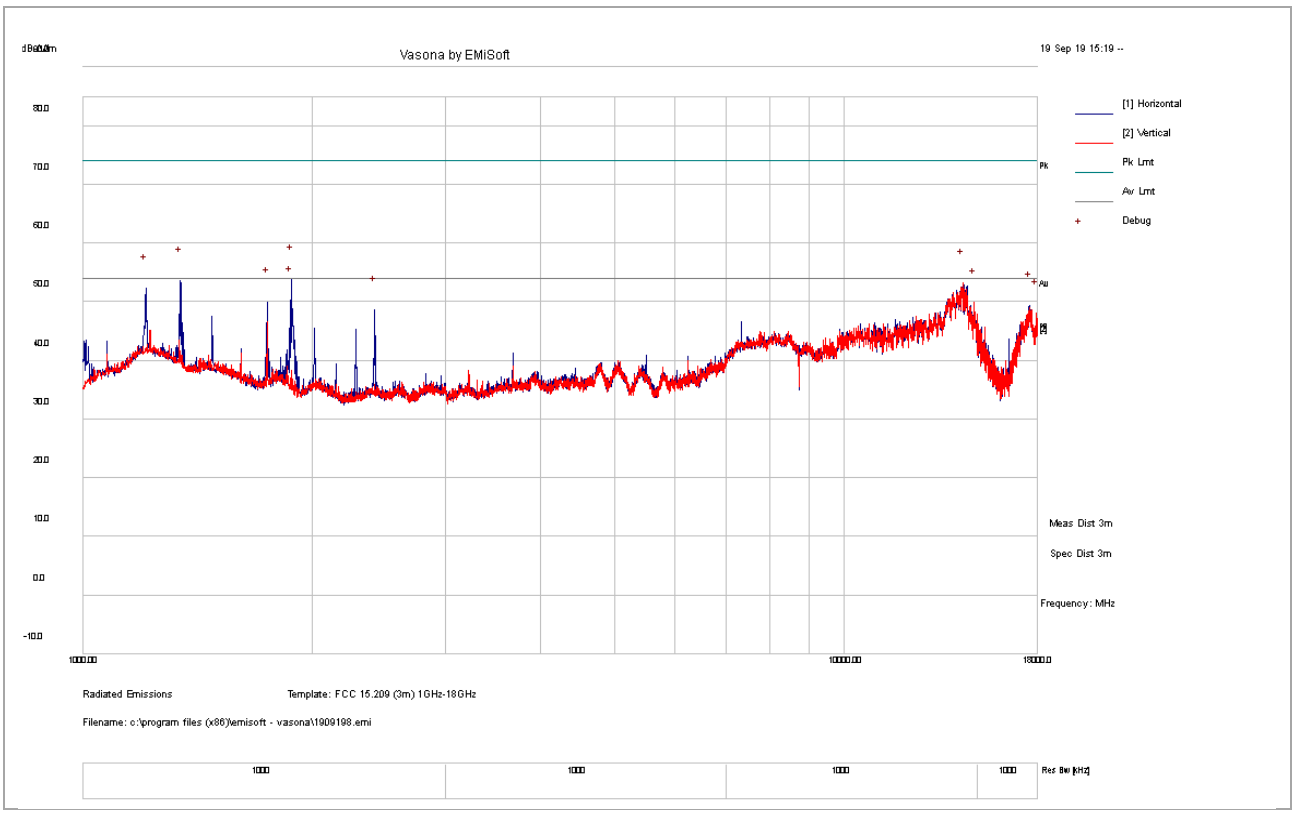
Test Standard:	**RSS-247**	**Mode:**	**11a-5320MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.25	54.92	14.38	-21.54	47.76	AV	V	101	110	54.00	-6.24
1881.25	62.11	14.38	-21.54	54.96	PK	V	101	110	74.00	-19.04
15971.25	29.81	27.81	-4.76	52.86	PK	H	172	192	54.00	-1.14
1210.00	57.19	14.32	-19.28	52.24	PK	H	156	322	54.00	-1.76
7105.00	39.42	20.26	-8.94	50.74	PK	V	162	88	54.00	-3.26
1875.00	57.03	14.39	-21.50	49.92	PK	H	182	19	54.00	-4.08
10635.00	30.11	23.33	-3.55	49.90	PK	V	122	12	54.00	-4.11

1GHz – 18GHz test result

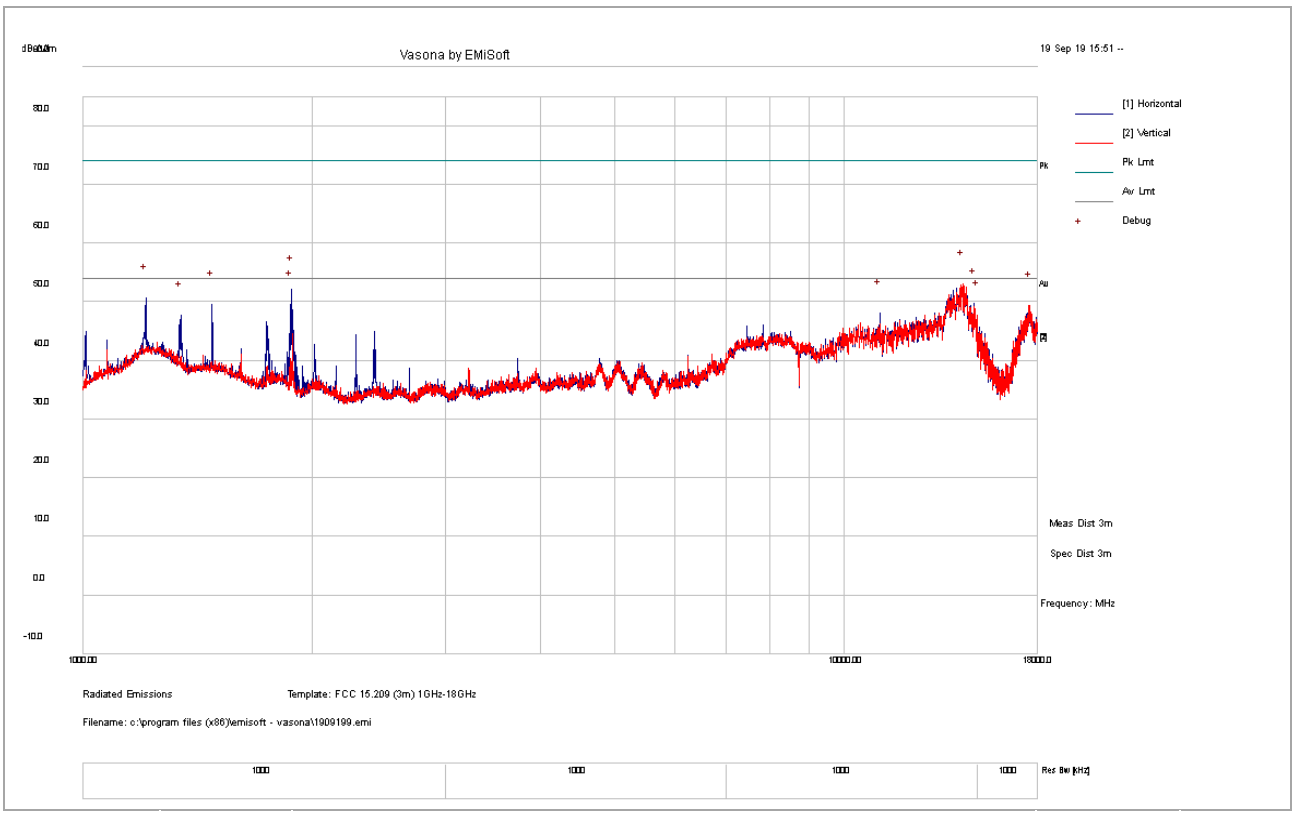
Test Standard:	**RSS-247**	**Mode:**	**11a-5500MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.25	53.74	14.38	-21.54	46.58	AV	H	281	310	54.00	-7.42
1343.75	50.13	14.59	-20.41	44.31	AV	H	217	301	54.00	-9.69
14340	15.33	26.55	2.45	44.33	AV	V	100	95	54.00	-9.67
1881.25	61.00	14.38	-21.54	53.84	PK	H	281	310	74.00	-20.16
1343.75	59.33	14.59	-20.41	53.51	PK	H	217	301	74.00	-20.49
14340.00	24.26	26.55	2.45	53.27	PK	V	131	98	74.00	-20.73
1210.00	57.26	14.32	-19.28	52.30	PK	V	119	228	54.00	-1.70
1875.00	57.43	14.39	-21.50	50.32	PK	V	172	19	54.00	-3.68
1747.50	57.75	14.54	-22.32	49.97	PK	V	192	113	54.00	-4.03

1GHz – 18GHz test result

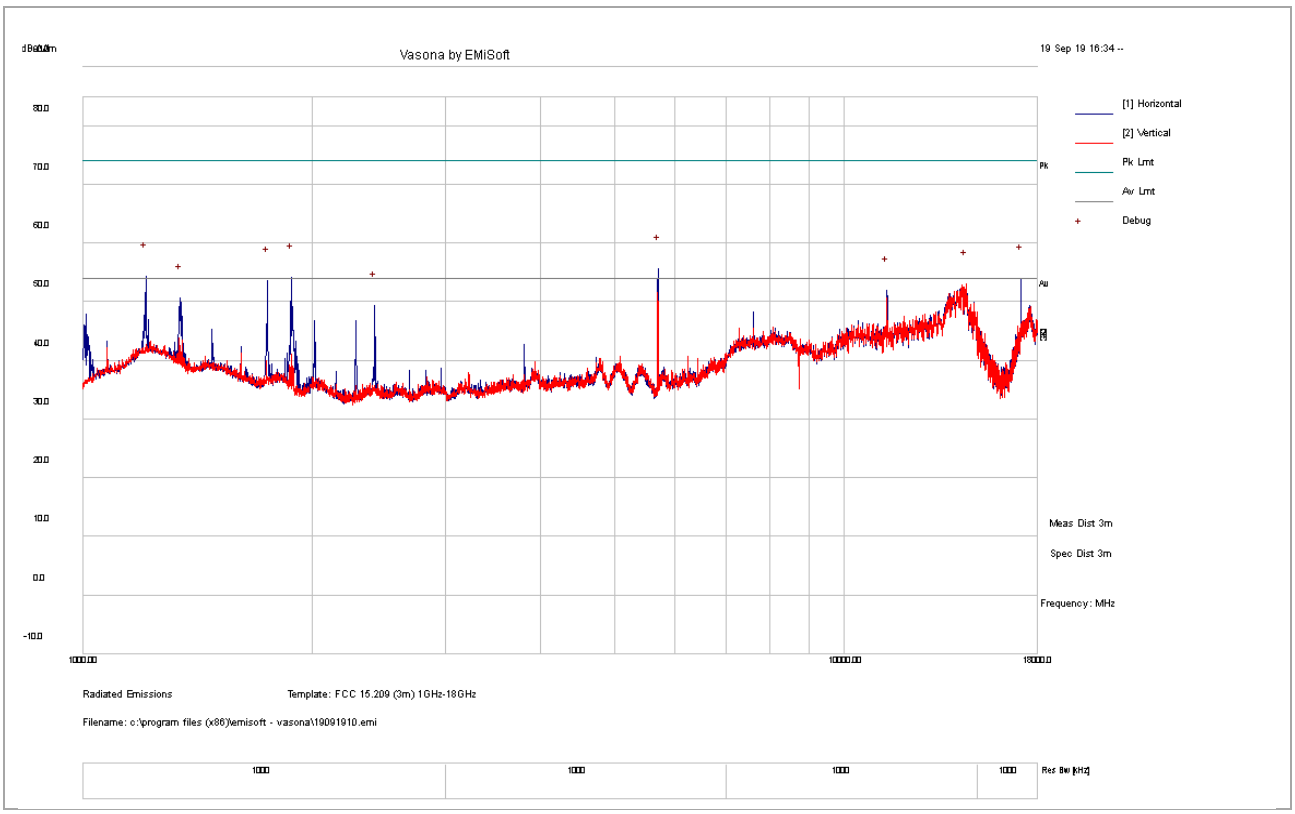
Test Standard:	**RSS-247**	**Mode:**	**11a-5580MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
14340.00	23.95	26.55	2.45	52.96	PK	H	109	72	54.00	-1.04
1882.50	59.23	14.38	-21.55	52.06	PK	V	121	45	54.00	-1.94
1210.00	55.53	14.32	-19.28	50.57	PK	V	187	192	54.00	-3.43
14840.00	22.69	28.04	-0.94	49.78	PK	V	113	148	54.00	-4.22
1875.00	56.70	14.39	-21.50	49.59	PK	V	162	195	54.00	-4.41
1478.75	56.29	14.83	-21.65	49.47	PK	V	143	132	54.00	-4.53

1GHz – 18GHz test result

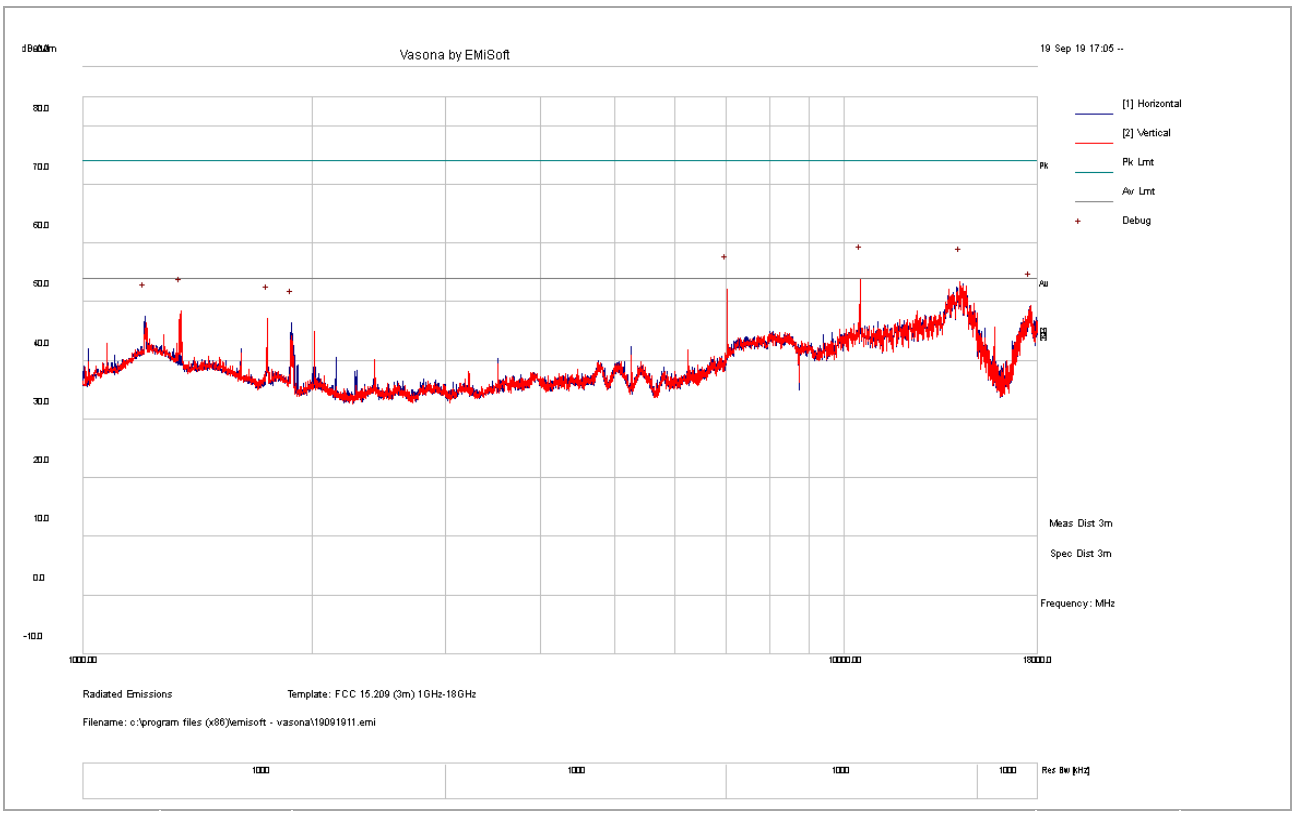
Test Standard:	**RSS-247**	**Mode:**	**11a-5700MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1210.00	51.83	14.32	-19.28	46.87	AV	H	137	164	54.00	-7.13
1881.25	49.34	14.38	-21.54	42.18	AV	H	171	178	54.00	-11.82
1210.00	59.23	14.32	-19.28	54.28	PK	H	137	164	74.00	-19.72
1881.25	61.35	14.38	-21.54	54.20	PK	H	171	178	74.00	-19.80
11405.00	30.32	24.58	-3.01	51.90	PK	V	102	113	54.00	-2.10
1343.75	56.38	14.59	-20.41	50.55	PK	V	189	109	54.00	-3.45
2420.00	56.74	14.73	-22.13	49.34	PK	V	118	62	54.00	-4.66

1GHz – 18GHz test result

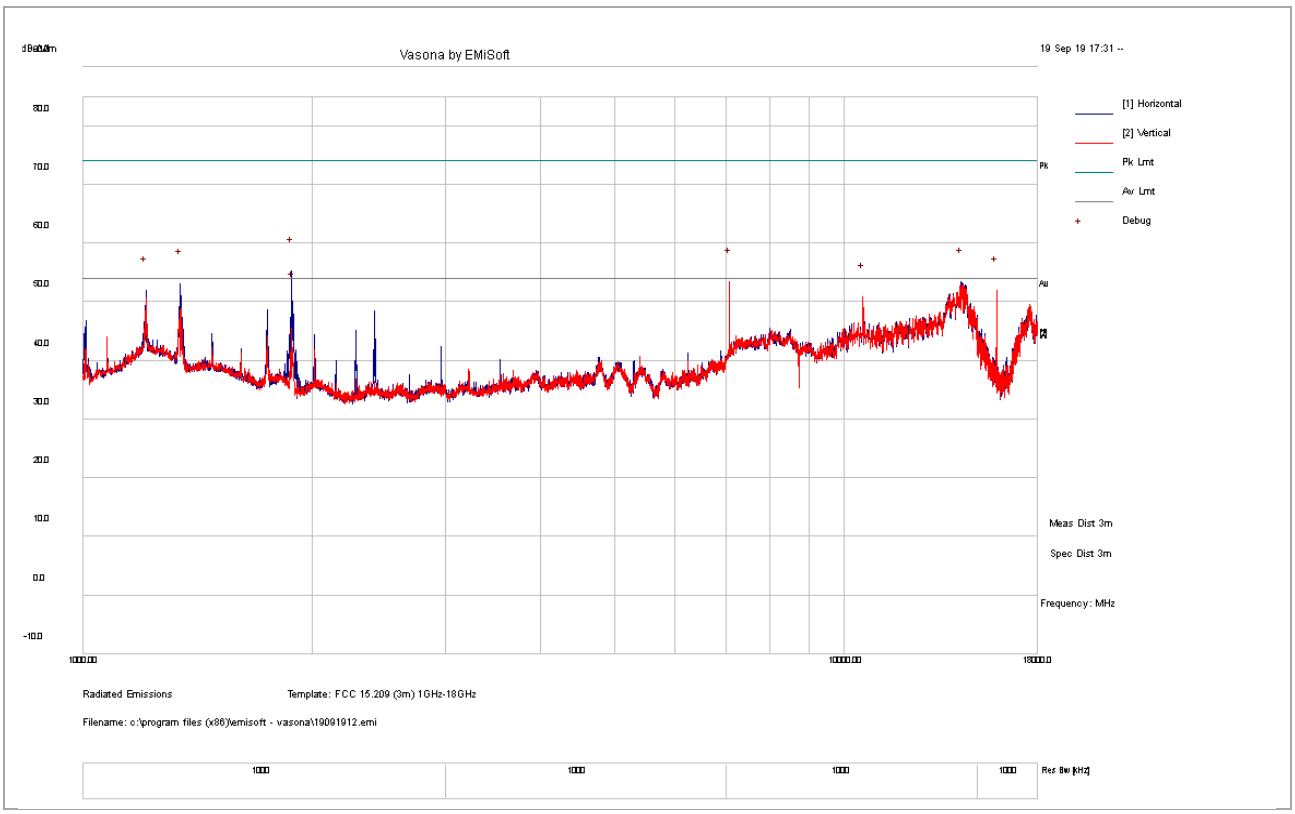
Test Standard:	**RSS-247**	**Mode:**	**11n-5260MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
10520.00	32.24	23.16	-3.47	51.94	PK	V	171	180	54.00	-2.06
14210.00	23.11	26.16	2.20	51.47	PK	V	132	75	54.00	-2.53
7025.00	41.50	20.10	-9.42	52.17	PK	H	109	46	54.00	-1.83
17596.88	15.28	29.28	4.78	49.34	PK	V	325	113	54.00	-4.66
1345.00	54.16	14.59	-20.43	48.32	PK	H	126	222	54.00	-5.68
1206.25	52.49	14.32	-19.25	47.56	PK	H	223	0	54.00	-6.45

1GHz – 18GHz test result

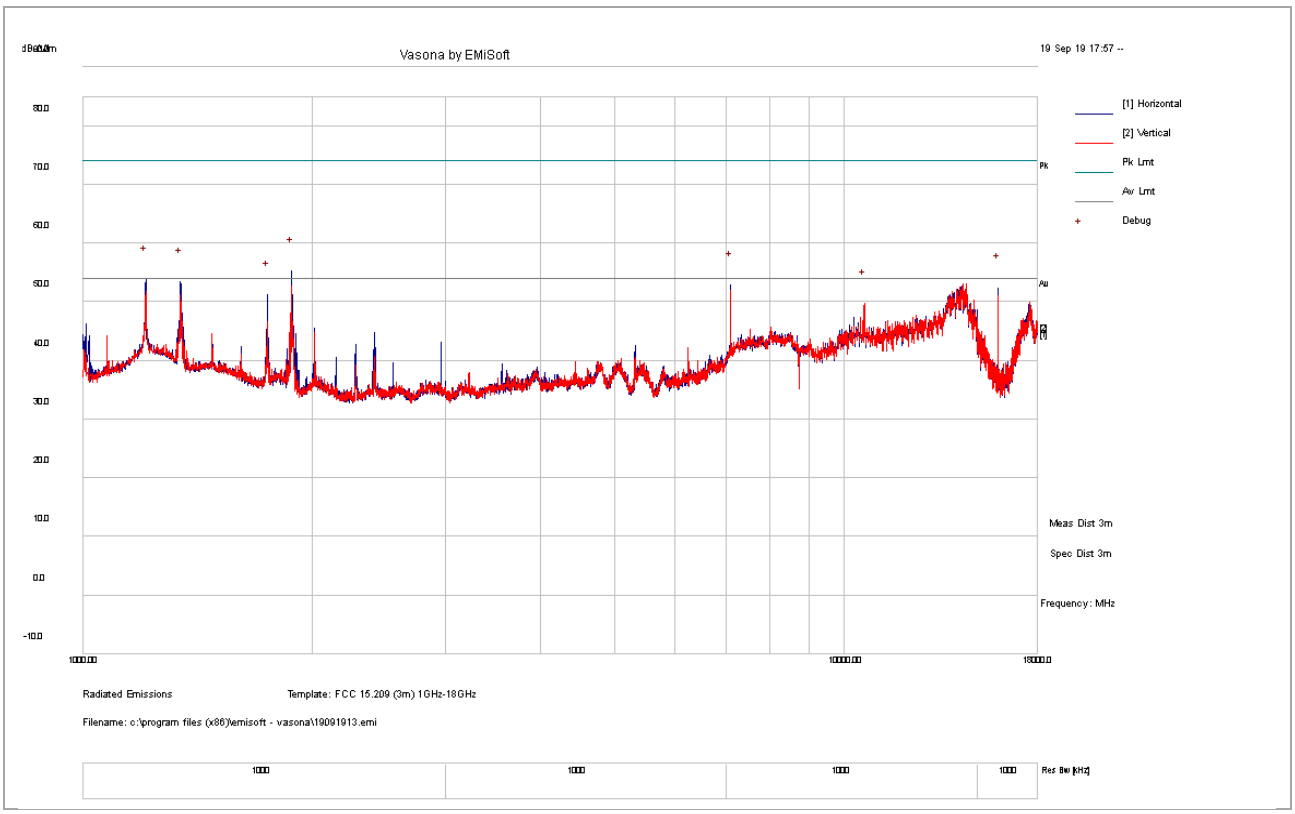
Test Standard:	**RSS-247**	**Mode:**	**11n-5300MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.25	49.55	14.38	-21.54	42.39	AV	H	103	260	54.00	-11.61
1881.25	62.31	14.38	-21.54	55.15	PK	H	103	260	74.00	-18.85
7080.00	41.32	20.21	-9.08	52.45	PK	H	308	265	54.00	-1.55
14285.00	23.56	26.39	2.38	52.33	PK	V	235	102	54.00	-1.67
1343.75	58.93	14.59	-20.41	53.10	PK	V	291	119	54.00	-0.90
15892.50	28.82	27.86	-4.79	51.90	PK	V	183	91	54.00	-2.10

1GHz – 18GHz test result

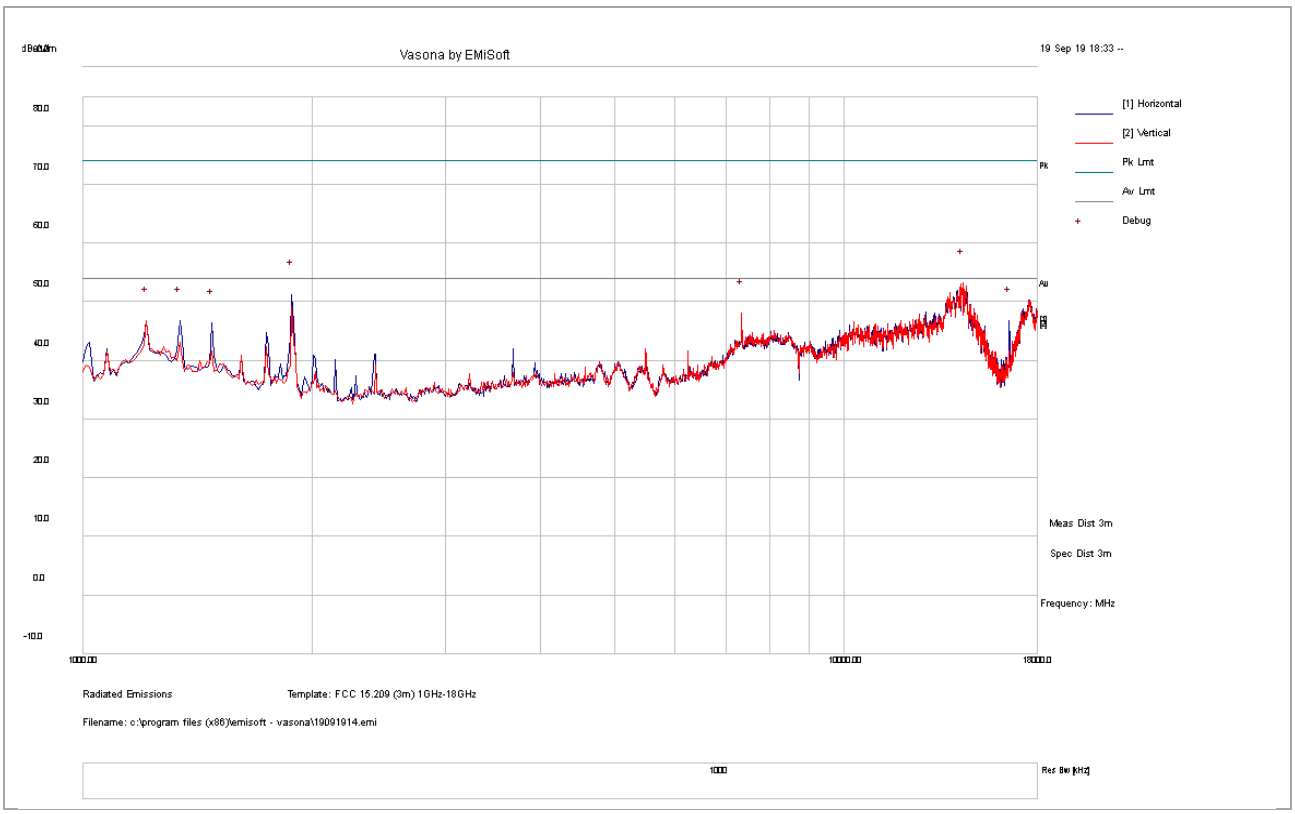
Test Standard:	**RSS-247**	**Mode:**	**11n-5320MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.25	52.44	14.38	-21.54	45.28	AV	H	226	357	54.00	-8.72
1881.25	62.29	14.38	-21.54	55.13	PK	H	226	357	74.00	-18.87
1210.00	56.63	14.32	-19.28	51.67	PK	V	189	110	54.00	-2.33
1343.75	57.12	14.59	-20.41	51.30	PK	V	318	227	54.00	-2.70
7105.00	41.49	20.26	-8.94	52.81	PK	V	226	357	54.00	-1.19
15963.75	29.31	27.82	-4.77	52.36	PK	V	189	110	54.00	-1.64

1GHz – 18GHz test result

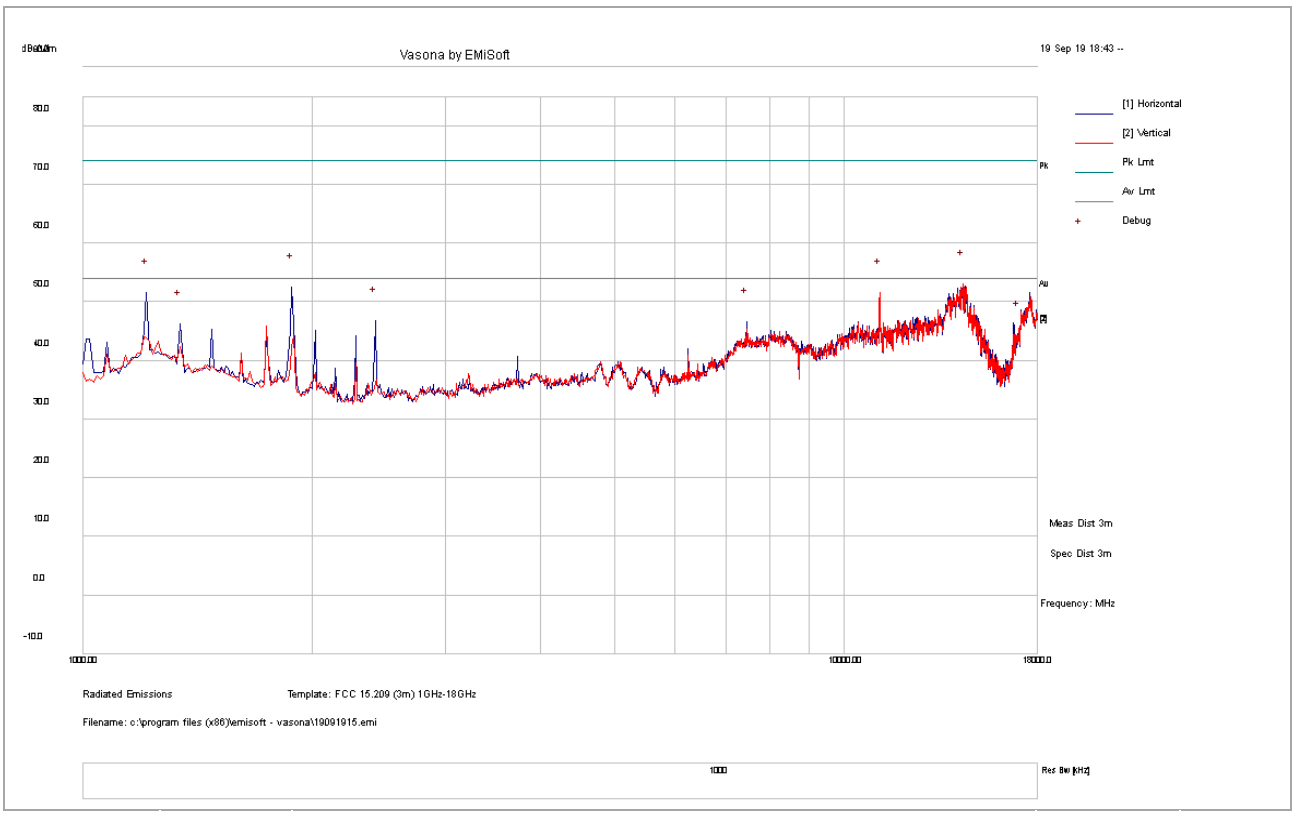
Test Standard:	**RSS-247**	**Mode:**	**11n-5500MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
14345.00	23.20	26.57	2.46	52.23	PK	V	208	17	54.00	-1.77
1881.88	58.42	14.38	-21.54	51.26	PK	H	221	109	54.00	-2.74
7343.13	35.07	20.72	-7.81	47.97	PK	H	184	92	54.00	-6.03
16512.50	21.42	28.15	-2.76	46.81	PK	H	112	98	54.00	-7.19
1212.50	51.71	14.33	-19.30	46.75	PK	V	183	19	54.00	-7.25

1GHz – 18GHz test result

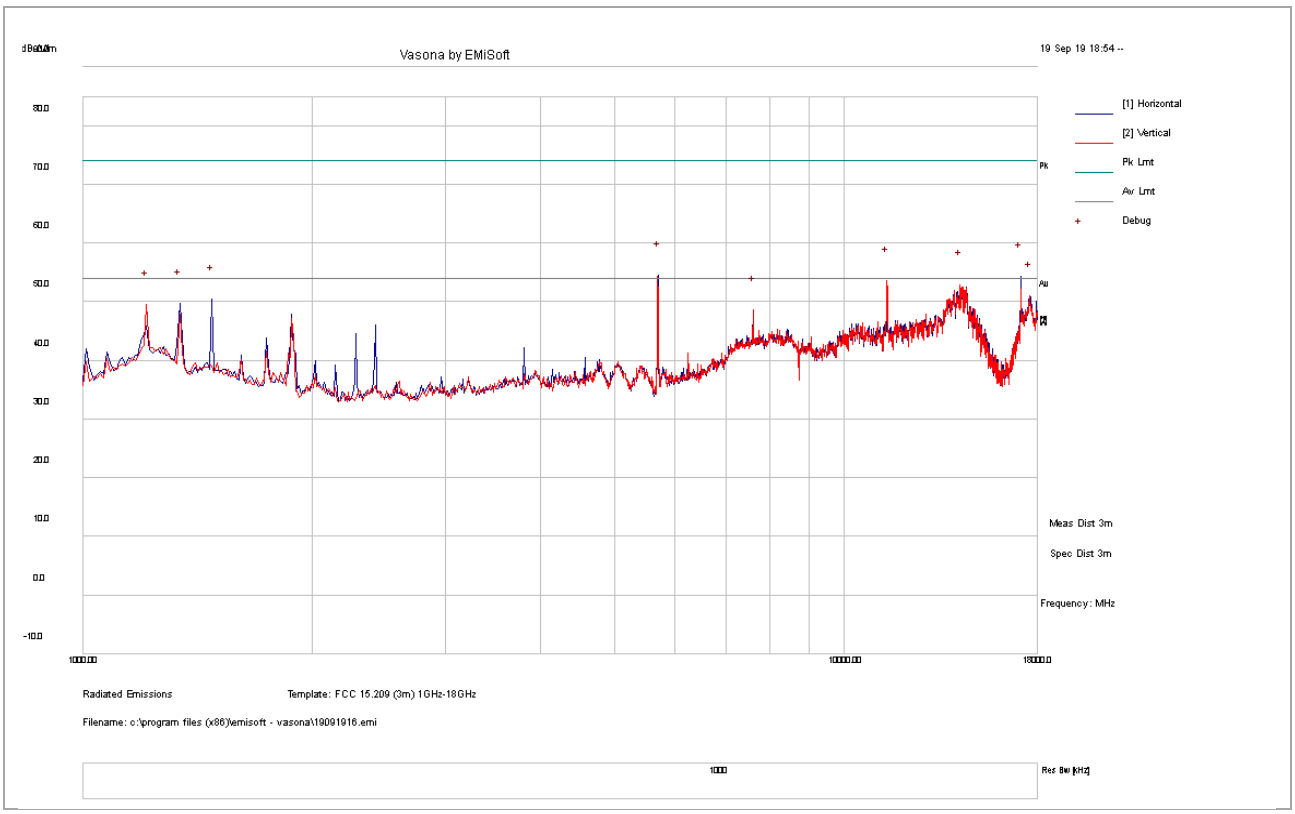
Test Standard:	**RSS-247**	**Mode:**	**11n-5580MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
14345.00	24.02	26.57	2.46	53.05	PK	V	192	261	54.00	-0.95
1881.88	59.55	14.38	-21.54	52.39	PK	H	227	74	54.00	-1.61
11157.50	30.24	24.14	-2.82	51.56	PK	H	181	118	54.00	-2.44
1212.50	56.46	14.33	-19.30	51.49	PK	V	147	108	54.00	-2.51
2423.75	54.10	14.74	-22.13	46.71	PK	H	306	360	54.00	-7.29

1GHz – 18GHz test result

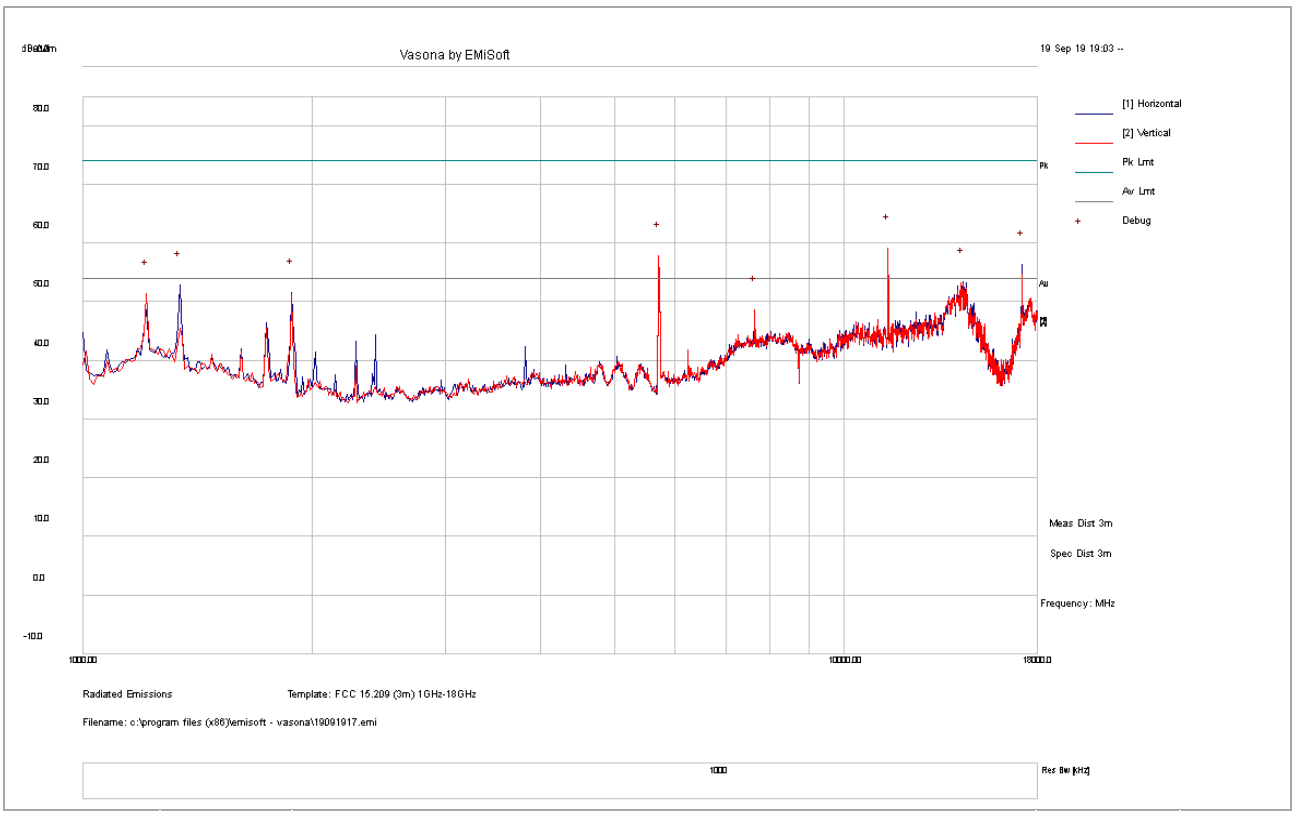
Test Standard:	**RSS-247**	**Mode:**	**11n-5700MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1212.50	54.54	14.33	-19.30	49.57	PK	H	181	118	54.00	-4.43
1340.00	55.40	14.58	-20.37	49.62	PK	H	147	108	54.00	-4.38
1478.13	57.18	14.83	-21.64	50.37	PK	V	306	360	54.00	-3.63
7608.75	35.05	21.07	-7.47	48.65	PK	V	178	98	54.00	-5.35
11401.88	32.08	24.58	-3.01	53.64	PK	V	209	96	54.00	-0.36

1GHz – 18GHz test result

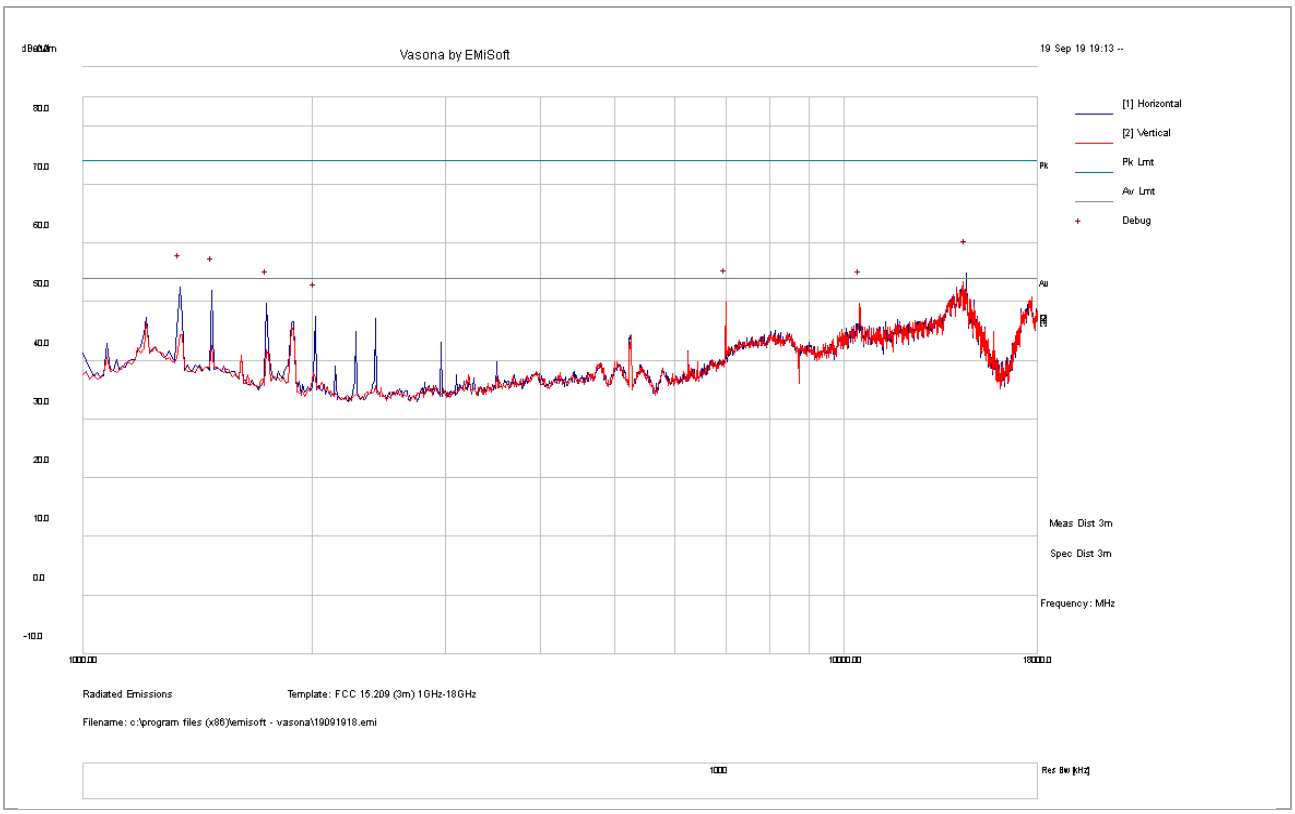
Test Standard:	**RSS-247**	**Mode:**	**11n20-5720MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
11433.75	28.53	24.63	-2.99	50.17	AV	H	196	303	54.00	-3.83
17160.63	19.43	28.69	2.27	50.39	AV	H	276	233	54.00	-3.61
11433.75	37.45	24.63	-2.99	59.09	PK	H	196	303	74.00	-14.91
17160.63	25.44	28.69	2.27	56.41	PK	H	276	233	74.00	-17.59
14345.00	24.31	26.57	2.46	53.34	PK	V	291	358	54.00	-0.66
1340.00	58.69	14.58	-20.37	52.91	PK	V	365	284	54.00	-1.10
1881.88	58.74	14.38	-21.54	51.58	PK	V	100	108	54.00	-2.42

1GHz – 18GHz test result

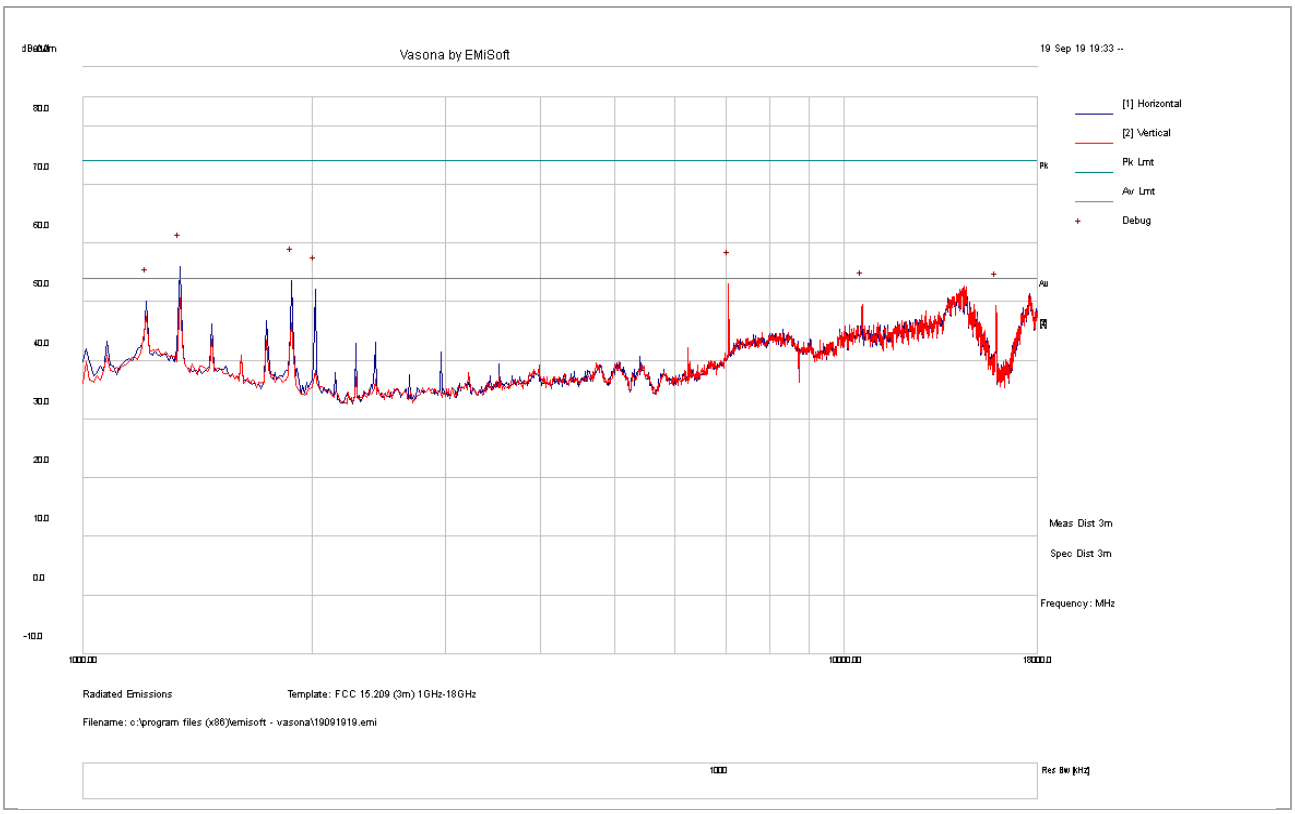
Test Standard:	**RSS-247**	**Mode:**	**11n40-5270MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
14493.75	17.22	27.02	1.47	45.71	AV	H	196	303	54.00	-8.29
14493.75	26.34	27.02	1.47	54.83	PK	H	196	303	74.00	-19.17
1340.00	58.23	14.58	-20.37	52.44	PK	H	276	233	54.00	-1.56
1478.13	58.64	14.83	-21.64	51.82	PK	H	196	303	54.00	-2.18
7003.13	39.44	20.06	-9.59	49.91	PK	H	276	233	54.00	-4.09
1743.75	57.44	14.54	-22.34	49.64	PK	V	291	358	54.00	-4.36

1GHz – 18GHz test result

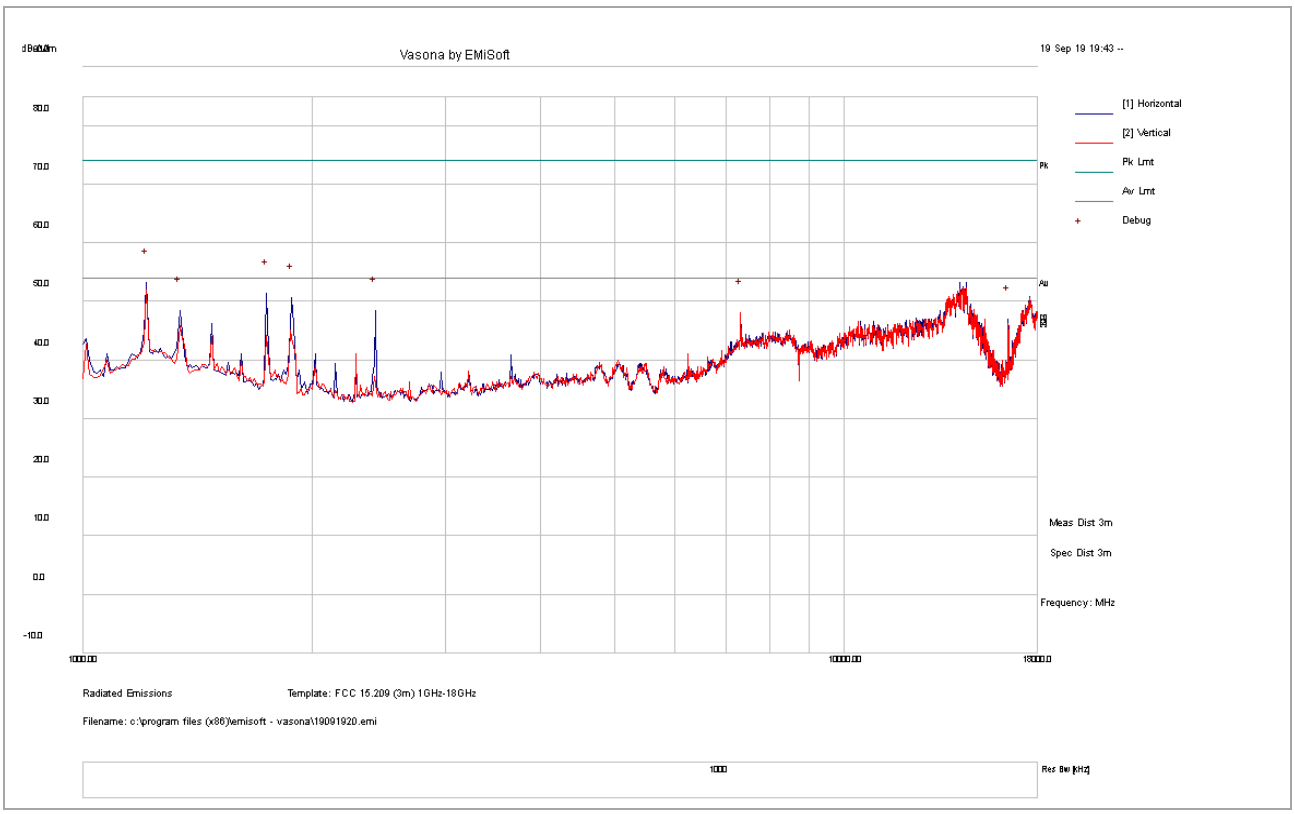
Test Standard:	**RSS-247**	**Mode:**	**11n40-5310MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1340.00	52.81	14.58	-20.37	47.02	AV	H	162	35	54.00	-6.98
1340.00	61.75	14.58	-20.37	55.96	PK	H	162	35	74.00	-18.04
1881.88	60.67	14.38	-21.54	53.51	PK	V	102	27	54.00	-0.49
7056.25	41.97	20.16	-9.20	52.93	PK	V	261	109	54.00	-1.07
2020.00	60.01	14.28	-22.18	52.11	PK	V	182	38	54.00	-1.89
1212.50	55.01	14.33	-19.30	50.04	PK	V	214	25	54.00	-3.96

1GHz – 18GHz test result

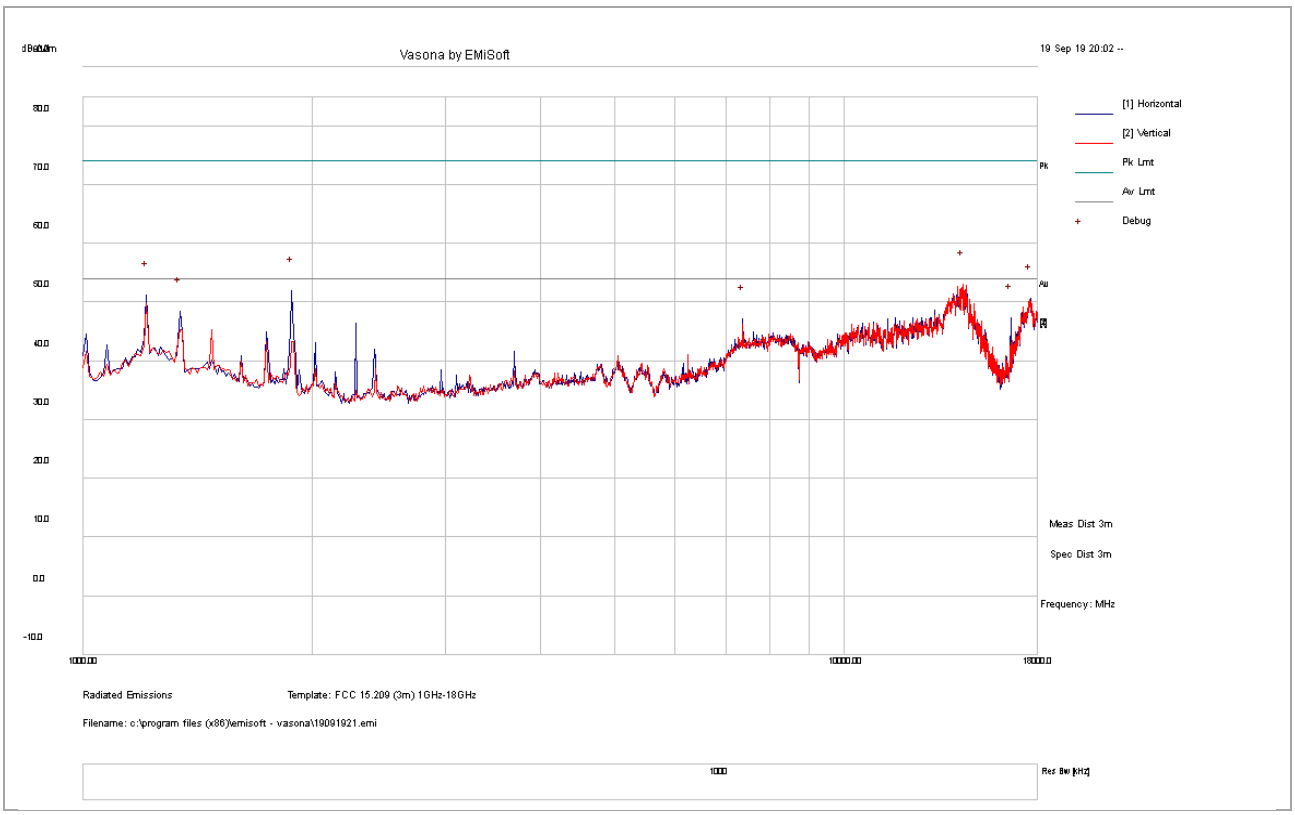
Test Standard:	**RSS-247**	**Mode:**	**11n40-5510MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1212.50	58.22	14.33	-19.30	53.26	PK	H	399	286	54.00	-0.74
1743.75	59.15	14.54	-22.34	51.36	PK	V	384	57	54.00	-2.65
1881.88	57.80	14.38	-21.54	50.64	PK	V	119	62	54.00	-3.36
1340.00	54.25	14.58	-20.37	48.46	PK	V	150	354	54.00	-5.54
2423.75	55.80	14.74	-22.13	48.41	PK	H	224	44	54.00	-5.59

1GHz – 18GHz test result

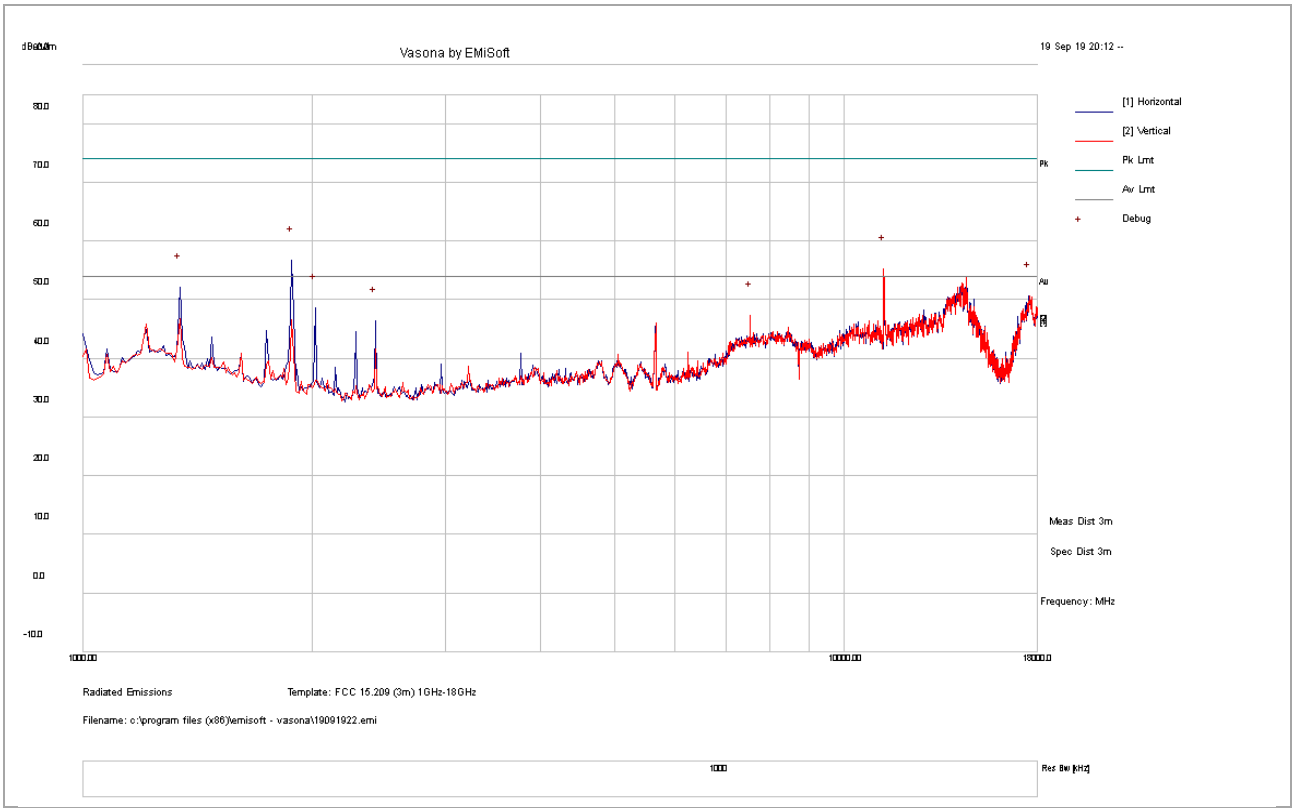
Test Standard:	**RSS-247**	**Mode:**	**11n40-5550MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
14345.00	23.90	26.57	2.46	52.93	PK	V	188	170	54.00	-1.07
1881.88	59.14	14.38	-21.54	51.98	PK	V	115	26	54.00	-2.02
1212.50	56.20	14.33	-19.30	51.24	PK	V	152	356	54.00	-2.77
17596.25	16.52	29.28	4.78	50.57	PK	H	280	136	54.00	-3.43
1340.00	54.15	14.58	-20.37	48.37	PK	V	314	317	54.00	-5.63

1GHz – 18GHz test result

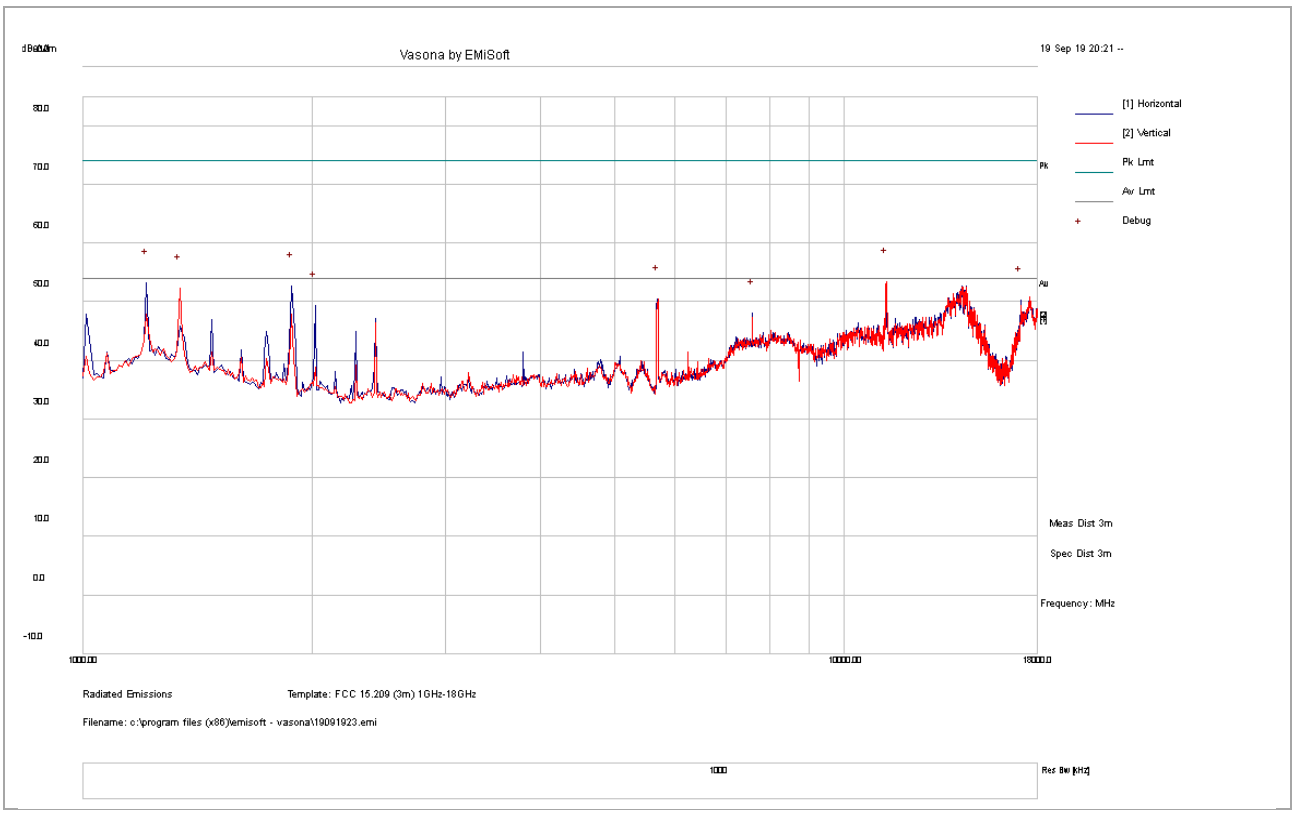
Test Standard:	**RSS-247**	**Mode:**	**11n40-5670MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**09/19/2019**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.88	50.82	14.38	-21.54	43.66	AV	H	257	192	54.00	-10.34
11295.63	21.80	24.39	-2.92	43.27	AV	V	350	0	54.00	-10.73
1881.88	63.78	14.38	-21.54	56.62	PK	H	257	192	74.00	-17.38
11295.63	33.76	24.39	-2.92	55.23	PK	V	350	0	74.00	-18.77
1340.00	57.95	14.58	-20.37	52.17	PK	V	129	101	54.00	-1.83
17532.50	17.36	29.20	4.08	50.64	PK	V	228	86	54.00	-3.36
2020.00	56.43	14.28	-22.18	48.53	PK	V	149	70	54.00	-5.47

1GHz – 18GHz test result

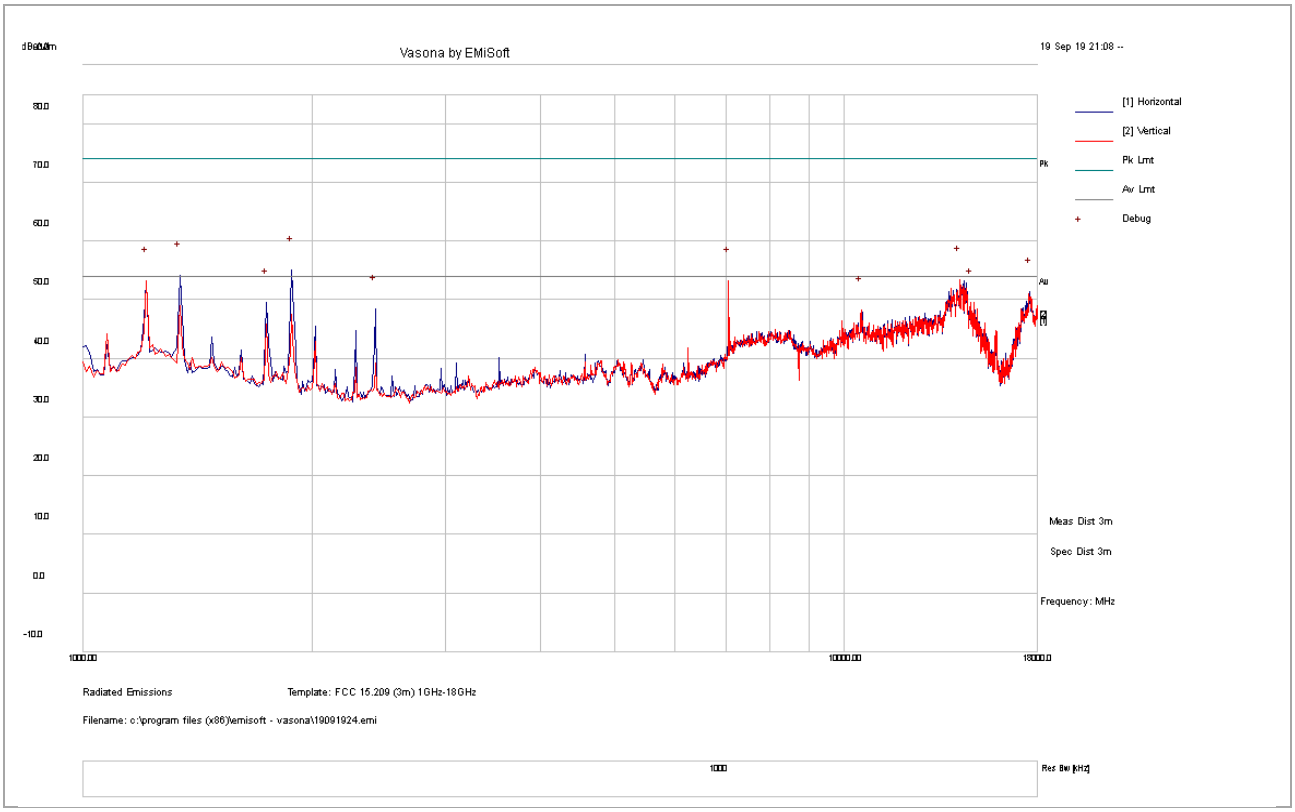
Test Standard:	**RSS-247**	**Mode:**	**11n40-5710MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
11380.63	31.84	24.54	-3.01	53.37	PK	H	325	339	54.00	-0.63
1212.50	58.10	14.33	-19.30	53.13	PK	V	217	322	54.00	-0.87
1881.88	59.77	14.38	-21.54	52.61	PK	V	100	68	54.00	-1.40
1340.00	57.98	14.58	-20.37	52.19	PK	V	212	342	54.00	-1.81

1GHz – 18GHz test result

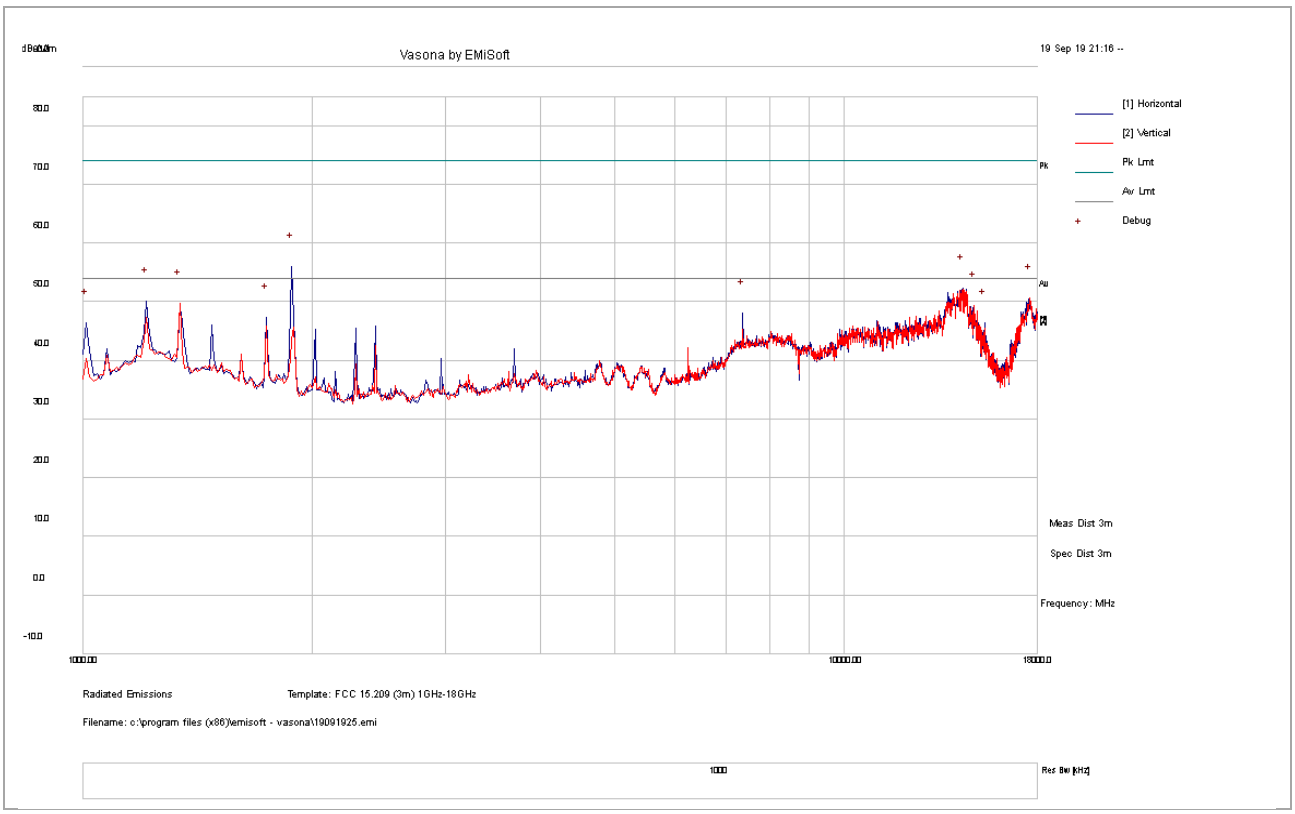
Test Standard:	**RSS-247**	**Mode:**	**11ac80-5290MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.88	55.72	14.38	-21.54	48.56	AV	H	325	339	54.00	-5.44
1340.00	49.24	14.58	-20.37	43.45	AV	V	217	322	54.00	-10.55
1881.88	62.15	14.38	-21.54	54.99	PK	H	325	339	74.00	-19.01
1340.00	59.87	14.58	-20.37	54.09	PK	V	217	322	74.00	-19.91
14206.88	23.04	26.15	2.19	51.38	PK	V	100	68	54.00	-2.62
7056.25	40.26	20.16	-9.20	51.22	PK	V	212	342	54.00	-2.78

1GHz – 18GHz test result

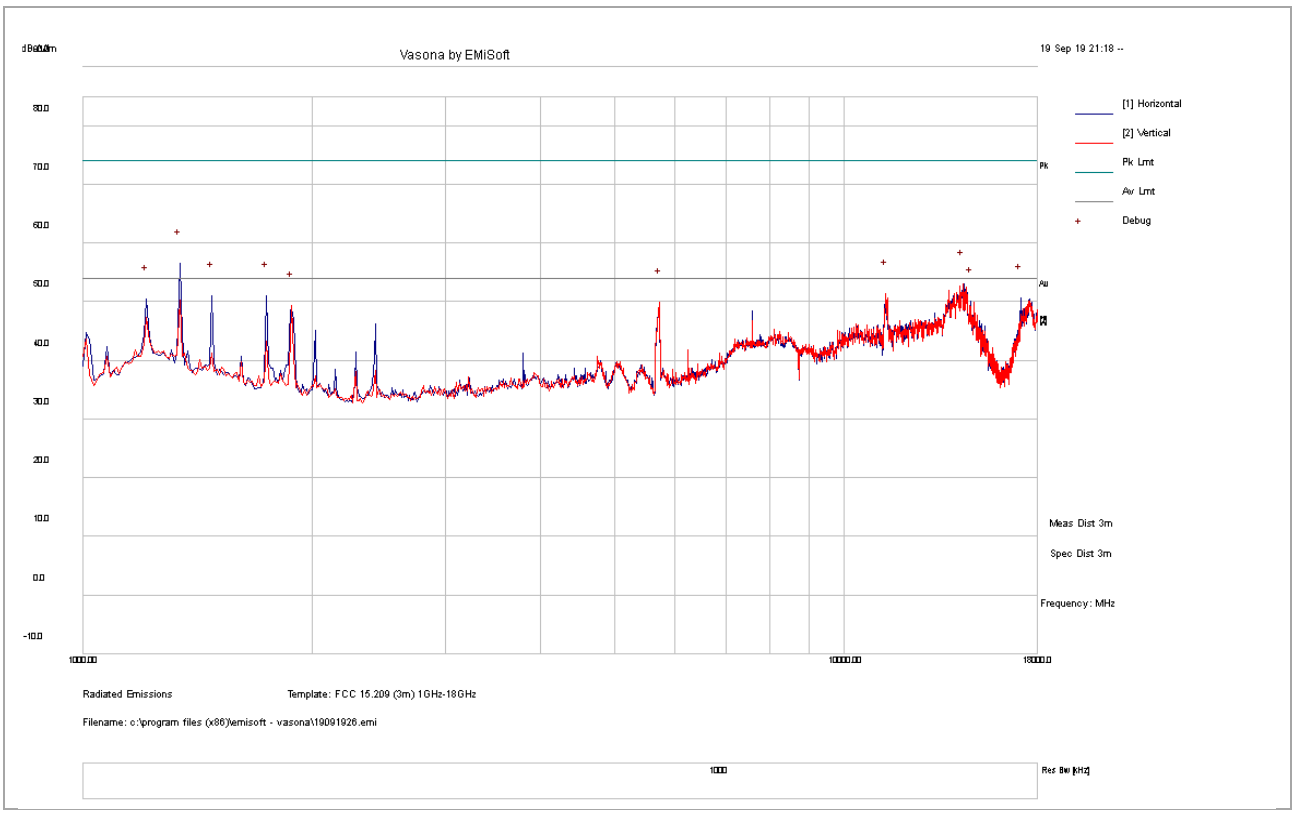
Test Standard:	**RSS-247**	**Mode:**	**11ac80-5530MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**



Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1881.88	52.34	14.38	-21.54	45.18	AV	H	183	113	54.00	-8.82
1881.88	63.16	14.38	-21.54	56.00	PK	H	183	113	74.00	-18.00
14334.38	23.20	26.54	2.45	52.18	PK	H	100	86	54.00	-1.82
17564.38	16.95	29.24	4.34	50.53	PK	V	345	163	54.00	-3.47
1212.50	54.95	14.33	-19.30	49.98	PK	V	128	348	54.00	-4.02
1340.00	55.44	14.58	-20.37	49.66	PK	V	100	78	54.00	-4.34

1GHz – 18GHz test result

Test Standard:	**RSS-247**	**Mode:**	**11ac80-5690MHz**
Frequency Range:	**1GHz-18GHz**	**Test Date:**	**09/19/2019**
Antenna Type/Polarity:	**Horn/Hor & Ver**	**Test Personnel:**	**Bruce Li**
Remark:	**N/A**	**Test Result:**	**Pass**

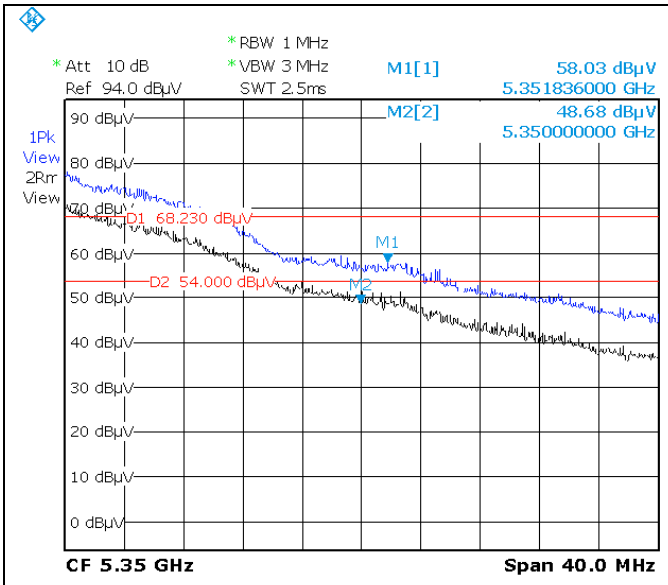


Frequency MHz	Raw dB	Cable dB	AF dB	Level dBuV/m	Det	Pol deg	Height cm	Table deg	Limit dBuV/m	Margin dB
1340.00	51.83	14.58	-20.37	46.04	AV	H	183	113	54.00	-7.96
1340.00	62.37	14.58	-20.37	56.58	PK	H	183	113	74.00	-17.42
14345.00	24.02	26.57	2.46	53.05	PK	H	183	113	54.00	-0.95
11359.38	29.86	24.50	-3.01	51.35	PK	H	100	86	54.00	-2.65
1478.13	57.78	14.83	-21.64	50.97	PK	V	345	163	54.00	-3.03
1743.75	58.73	14.54	-22.34	50.93	PK	V	128	348	54.00	-3.07

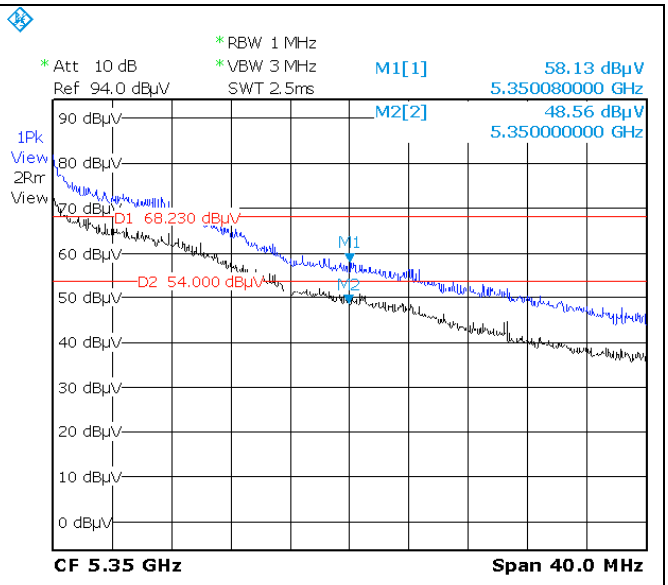
18GHz – 40GHz test result

Note: no substantial emission is found other than the noise floor.

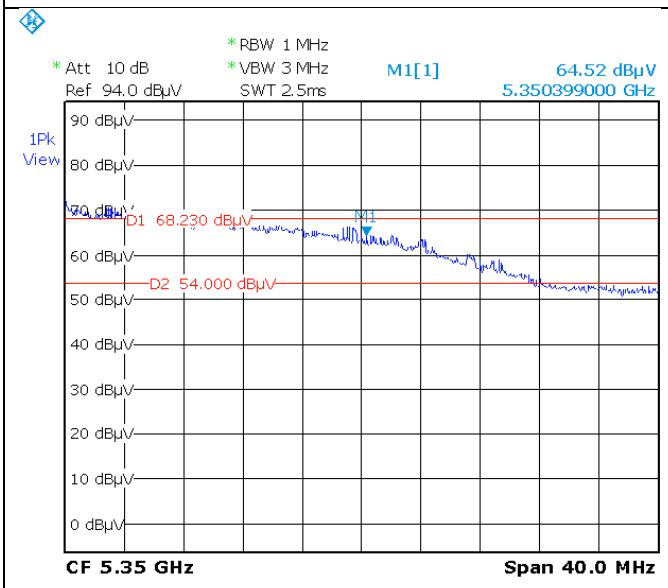
Radiated Band Edge measurement result



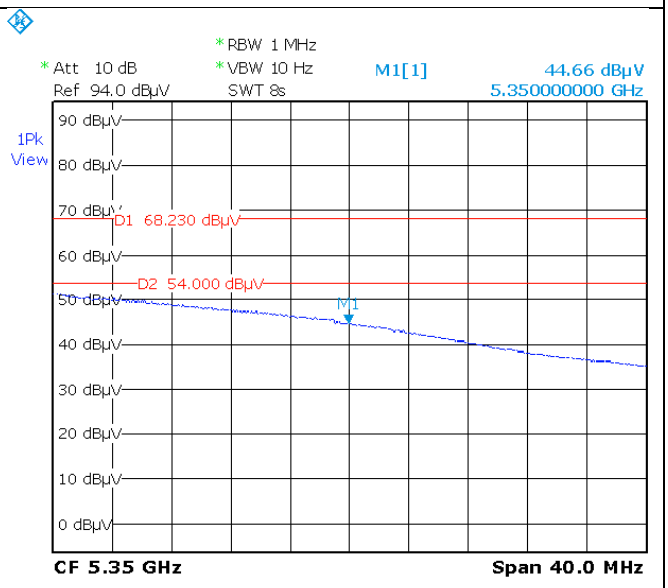
802.11a 5320M– Edge 5350MHz



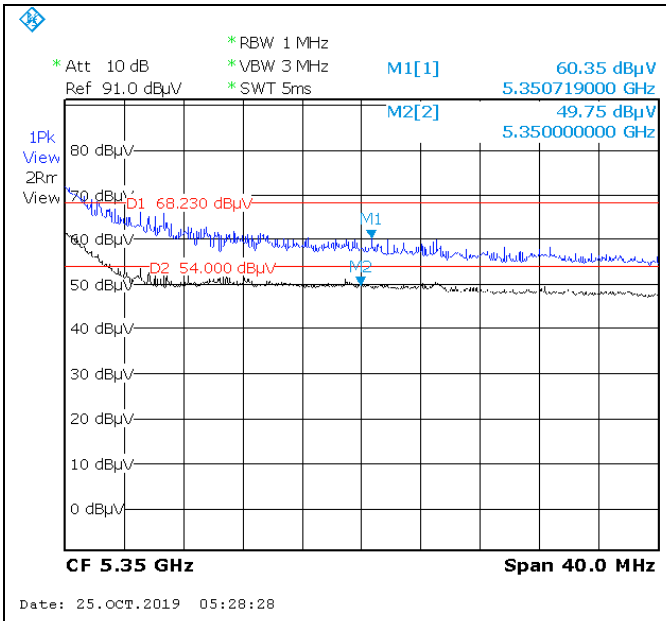
802.11n 5320M– Edge 5350MHz



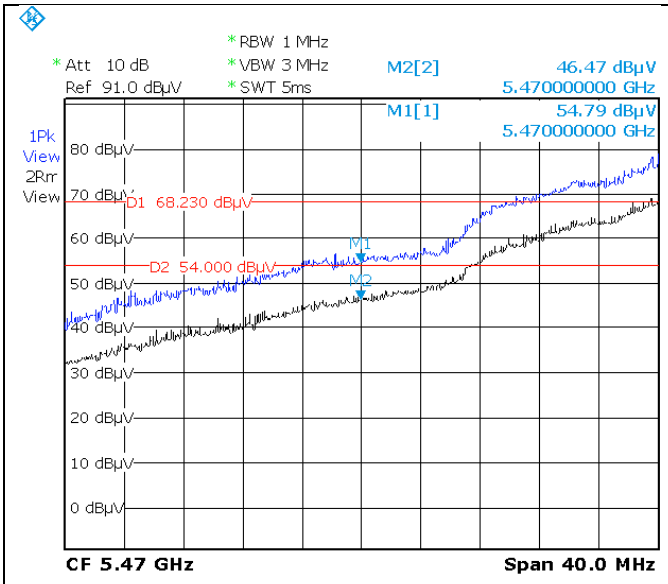
802.11n40MHz 5310M– Edge 5350MHz (Peak)



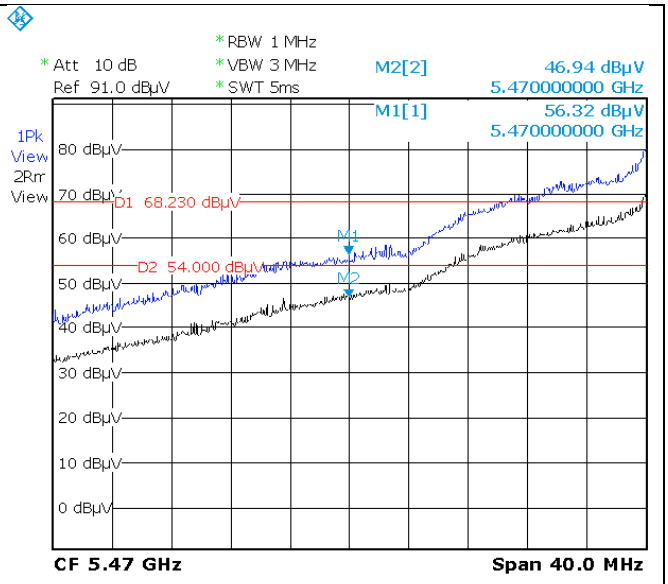
802.11n40MHz 5310M– Edge 5350MHz (Average)



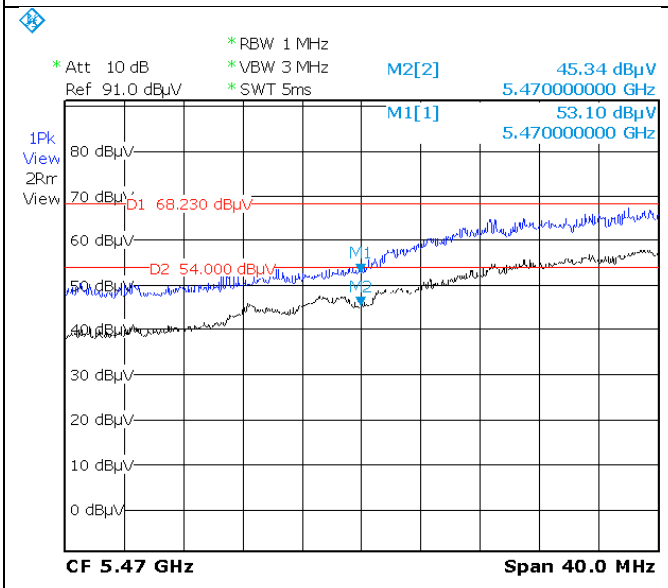
802.11ac80MHz 5290M– Edge 5350MHz



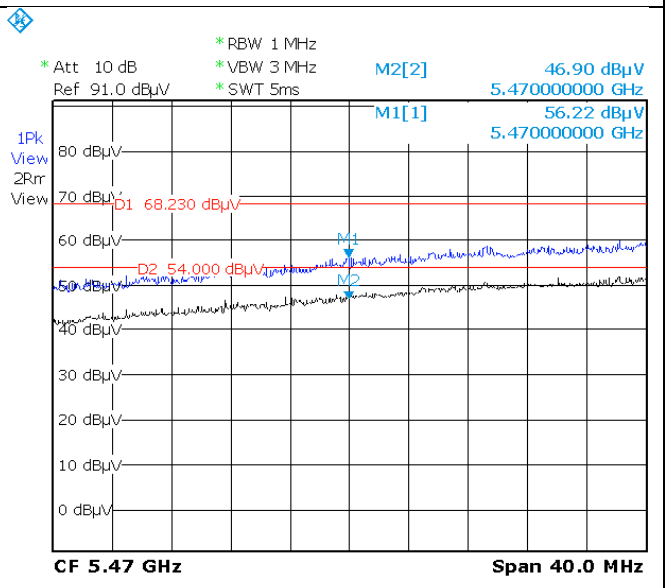
802.11a 5500M– Edge 5470MHz



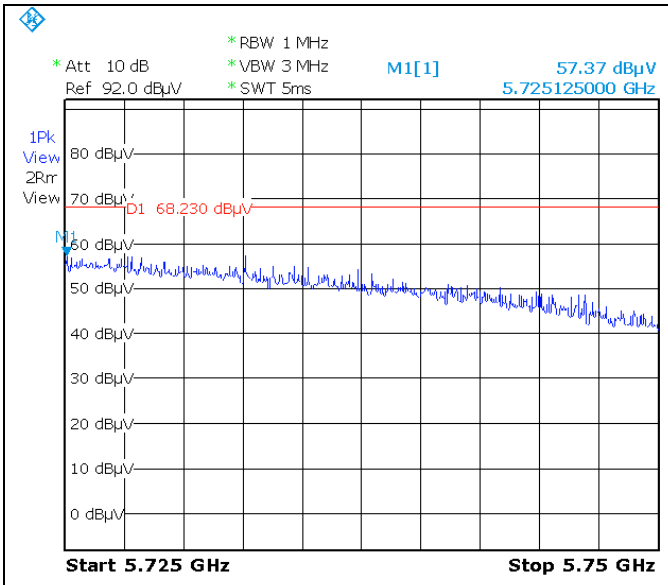
802.11n 5500M– Edge 5470MHz



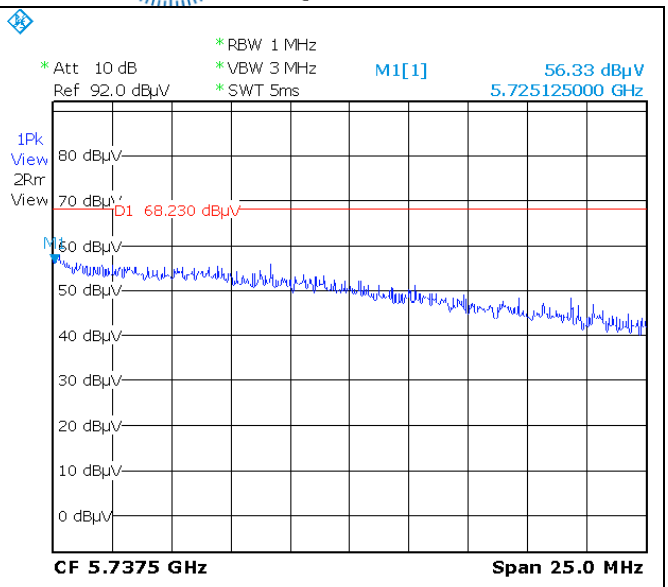
802.11n40MHz 5510M– Edge 5470MHz



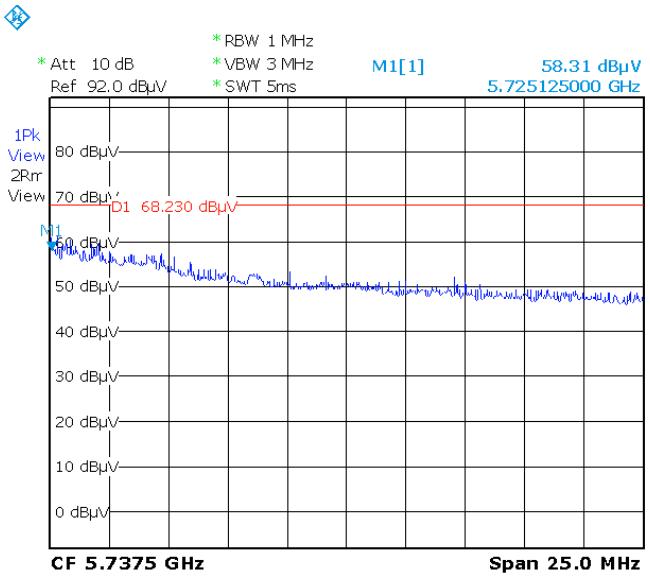
802.11ac80MHz 5530M– Edge 5470MHz



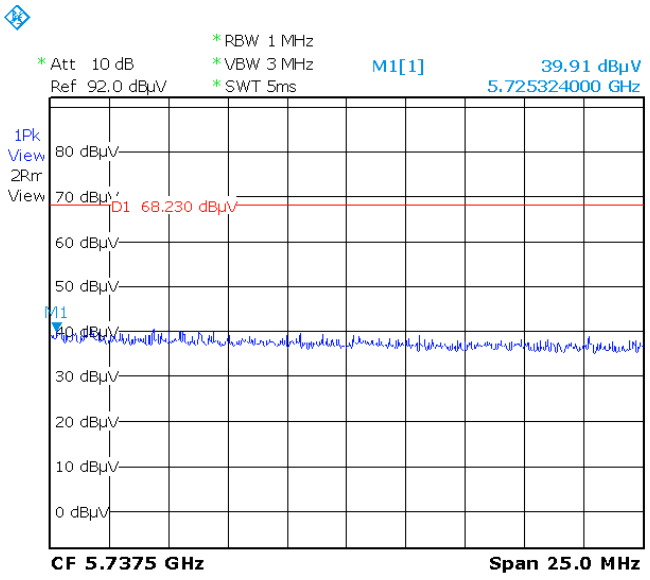
802.11a 5700M– Edge 5725MHz



802.11n 5700M– Edge 5725MHz



802.11n40MHz 5670M– Edge 5725MHz



802.11ac80MHz 5530M– Edge 5725MHz

8.8 Conducted Emissions

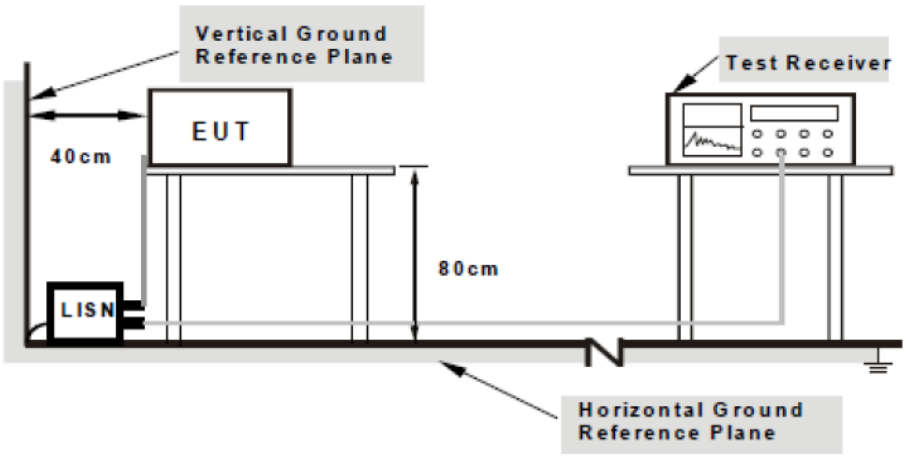
8.8.1 Requirement

Per § 15.207 (a), an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Limits for Conducted Emissions at the Mains Ports

Section	Frequency ranges (MHz)	Limit (dBuV)	
		QP	Average
Class B devices	0.15 – 0.5	66 – 56	56 – 46
	0.5 – 5	56	46
	5 - 30	60	50
NOTE 1 The lower limit shall apply at the transition frequencies.			

8.8.2 Test setup



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80cm from EUT and at least 80cm from other units and other metal planes support units.

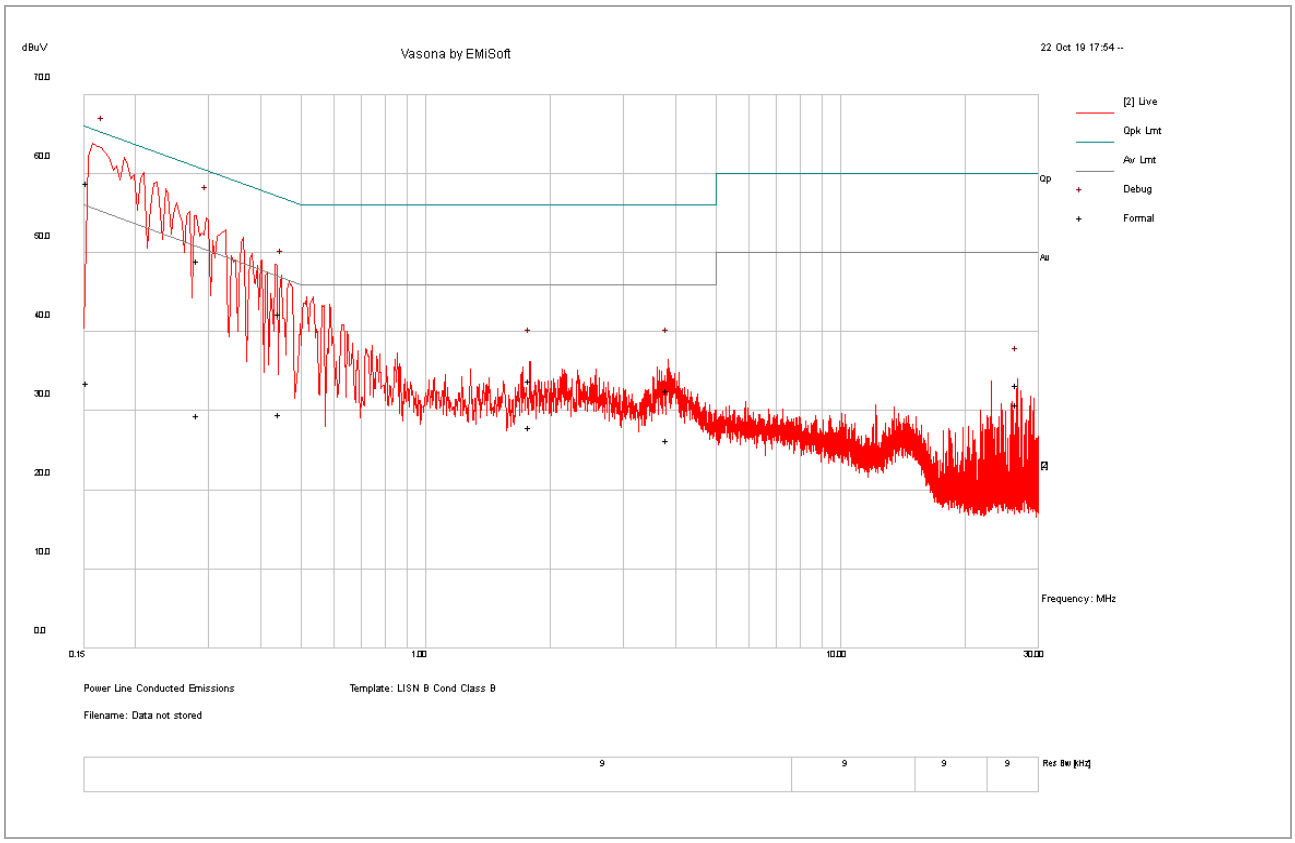
8.8.3 Test Procedure

1. The EUT and supporting equipment were set up in accordance with the requirements of the standard on top of a 1.5m x 1m x 0.8m high, non-metallic table.
2. The power supply for the EUT was fed through a 50Ω/50µH EUT LISN, connected to filtered mains.
3. The RF OUT of the EUT LISN was connected to the EMI test receiver via a low-loss coaxial cable.
4. All other supporting equipment was powered separately from another main supply.
5. The EUT was switched on and allowed to warm up to its normal operating condition.
6. A scan was made on the NEUTRAL line (for AC mains) or Earth line (for DC power) over the required frequency range using an EMI test receiver.
7. High peaks, relative to the limit line, were then selected.
8. The EMI test receiver was then tuned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10 kHz. For FCC tests, only Quasi-peak measurements were made; while for CISPR/EN tests, both Quasi-peak and Average measurements were made
9. All possible modes of operation were investigated. Only the worst case emissions were measured and reported. All other emissions were relatively insignificant.

8.8.4 Test Result

Live Line

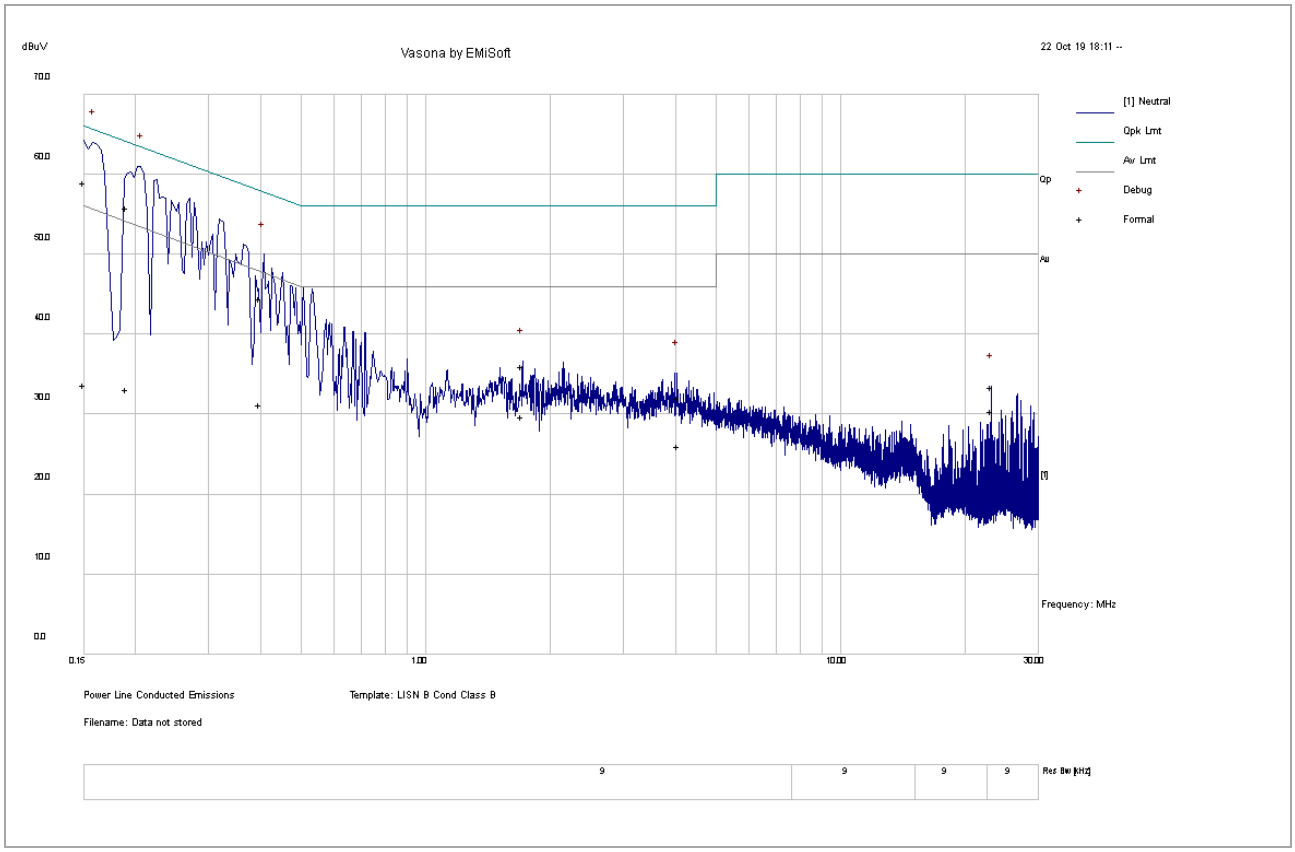
Test Standard:	**47CFR 15.207**	**Mode:**	**Line**
Frequency Range:	**0.15-30MHz**	**Test Date:**	**09/27/2019**
Antenna Type/Polarity:	**N/A**	**Test Personnel:**	**Bruce Li**
Remark:	**120VAC, 60Hz**	**Test Result:**	**Pass**



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV/m)	Meas. Type	Line	Limit (dBuV/m)	Margin (dB)	Pass /Fail
0.44	32.20	10.10	0.12	42.42	QP	Live	56.97	-14.55	Pass
0.15	48.57	10.07	0.24	58.89	QP	Live	65.81	-6.92	Pass
0.28	38.79	10.08	0.14	49.01	QP	Live	60.74	-11.73	Pass
3.82	22.15	10.32	0.12	32.60	QP	Live	56.00	-23.40	Pass
1.78	23.57	10.21	0.10	33.88	QP	Live	56.00	-22.12	Pass
26.61	21.69	10.87	0.77	33.34	QP	Live	60.00	-26.66	Pass
0.44	19.48	10.10	0.12	29.70	AV	Live	46.97	-17.27	Pass
0.15	23.30	10.07	0.24	33.62	AV	Live	55.81	-22.19	Pass
0.28	19.23	10.08	0.14	29.45	AV	Live	50.74	-21.29	Pass
3.82	15.92	10.32	0.12	26.37	AV	Live	46.00	-19.63	Pass
1.78	17.62	10.21	0.10	27.93	AV	Live	46.00	-18.07	Pass
26.61	19.29	10.87	0.77	30.93	AV	Live	50.00	-19.07	Pass

Neutral Line

Test Standard:	**47CFR 15.207**	**Mode:**	**Neutral**
Frequency Range:	**0.15-30MHz**	**Test Date:**	**09/27/2019**
Antenna Type/Polarity:	**N/A**	**Test Personnel:**	**Bruce Li**
Remark:	**120VAC, 60Hz**	**Test Result:**	**Pass**



Frequency (MHz)	Raw (dBuV)	Cable Loss (dB)	Factors (dB)	Level (dBuV/m)	Meas. Type	Line	Limit (dBuV/m)	Margin (dB)	Pass /Fail
0.15	48.74	10.07	0.24	59.06	QP	Neutral	66.00	-6.94	Pass
0.19	45.64	10.07	0.19	55.90	QP	Neutral	64.02	-8.12	Pass
0.40	34.31	10.10	0.11	44.52	QP	Neutral	57.88	-13.36	Pass
1.71	25.71	10.21	0.10	36.02	QP	Neutral	56.00	-19.98	Pass
4.05	21.65	10.34	0.13	32.13	QP	Neutral	56.00	-23.87	Pass
23.13	21.99	10.81	0.61	33.41	QP	Neutral	60.00	-26.59	Pass
0.15	23.49	10.07	0.24	33.80	AV	Neutral	56.00	-22.20	Pass
0.19	22.88	10.07	0.19	33.15	AV	Neutral	54.02	-20.87	Pass
0.40	21.02	10.10	0.11	31.23	AV	Neutral	47.88	-16.65	Pass
1.71	19.41	10.21	0.10	29.72	AV	Neutral	46.00	-16.28	Pass
4.05	15.61	10.34	0.13	26.08	AV	Neutral	46.00	-19.92	Pass
23.13	19.01	10.81	0.61	30.43	AV	Neutral	50.00	-19.57	Pass

9 Test instrument list

Equipment	Manufacturer	Model	Serial Number	Cal. Date	Cal. Due
Semi-Anechoic Chamber	ETS-Lindgren	10M	VL001	5/11/2019	5/11/2020
Shielding Control Room	ETS-Lindgren	Series 81	VL006	N/A	N/A
Spectrum Analyzer	Keysight	N9020A	MY50110074	5/4/2019	5/4/2020
EMC Test Receiver	R&S	ESL6	100230	5/7/2019	5/7/2020
LISN (9KHz – 30MHz)	EMCO	3816/2	9705-1066	5/4/2019	5/4/2020
Bi-Log Antenna	ETS-Lindgren	3142E	217921	11/15/2018	11/15/2019
Horn Antenna (1-18GHz)	Electro-Metrics	EM-6961	6292	5/2/2019	5/2/2020
Horn Antenna (18-40GHz)	Com-Power	AH-840	101109	5/2/2019	5/2/2020
Preamplifier	RF Bay, Inc.	LPA-10-20	11180621	5/10/2019	5/10/2020
True RMS Multi-meter	UNI-T	UT181A	C173014829	5/10/2019	5/10/2020
Temp / Humidity / Pressure Meter	PCE Instruments	PCE-THB 40	R062028	5/9/2019	5/9/2020
RF Attenuator	Pasternack	PE7005-3	VL061	5/10/2019	5/10/2020
Preamplifier 100KHz - 40GHz	Aeroflex	33711-392-77150-11	064	5/10/2019	5/10/2020
EM Center Control	ETS-Lindgren	7006-001	160136	N/A	N/A
Turn Table	ETS-Lindgren	2181-3.03	VL002	N/A	N/A
Boresight Antenna Tower	ETS-Lindgren	2171B	VL003	N/A	N/A
Loop Antenna (9k-30MHz)	Com-Power	AL-130	121012	5/9/2019	5/9/2020
RE test cable(below 6GHz)	Vista	RE-6GHz-01	RE-6GHz-01	5/10/2019	5/10/2020
RE test cable (1-18GHz)	PhaseTrack	II-240	RE-18GHz-01	5/10/2019	5/10/2020
RE test cable (>18GHz)	Sucoflex	104	344903/4	5/10/2019	5/10/2020
Pulse limiter	Com-Power	LIT-930A	531727	5/15/2019	5/15/2020
CE test cable #1	FIRST RF	FRF-C-1002-001	CE-6GHz-01	5/10/2019	5/10/2020
CE test cable#2	FIRST RF	FRF-C-1002-001	CE-6GHz-02	5/9/2019	5/9/2020
Wideband Communication	R&S	CMW500	147508	5/8/2019	5/8/2020