MEASUREMENT REPORT
EN 301 893 V2.1.1 WLAN 802.11a/n/ac

Applicant: Compex Systems Pte Ltd

Address: No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

Product: 802.11ac Dual Band Module

Model No.: WLE600VX, WLE600VX-I

Brand Name: COMPEX

Standards: ETSI EN 301 893 V2.1.1 (2017-05)

Result: Complies

Test Date: June 20 ~ July 11, 2017

Reviewed By : (Jame Yuan)

Approved By : (Marlin Chen)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

Revision History

Report No.	Version	Description	Issue Date	Note
1706RSU02403	Rev. 01	Initial report	07-11-2017	Valid

Note: This test report was based on MRT report number 1612RSU02402 and updated the standard EN 301893 version from v1.8.1 to v2.1.1. Besides adaptivity & the receiver blocking items, there is no any other updated item.

CONTENTS

1. General Information

1.1. Applicant

Compex Systems Pte Ltd
No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

1.2. Manufacturer

Compex Systems Pte Ltd
No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

1.3. Testing Facility

Test Site

MRT Technology (Suzhou) Co., Ltd

Test Site Location

D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**


Accredited Laboratory

A2LA has accredited

MRT TECHNOLOGY (SUZHOU) CO., LTD.

Suzhou, Jiangsu, People's Republic of China

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 8 January 2009).

Presented this 6th day of September 2016.

Senior Director of Quality and Communications
For the Accreditation Council
Certificate Number 3628.01
Valid to August 31, 2018

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

1.4. Feature of Equipment under Test

Product Name:	802.11ac Dual Band Module
Serial Model:	WLE600VX, WLE600VX-I
Brand Name:	COMPEX
Wi-Fi Specification:	802.11a/b/g/n/ac

Note: Differences between all models are for different marketing requirement.

1.5. Product Specification Subjective

Frequency Range	For 802.11a/n-HT20 5180~5240 MHz, 5260~5320 MHz, 5500~5700 MHz For 802.11n-HT40 5190~5230 MHz, 5270~5310 MHz, 5510~5670 MHz 802.11ac-VHT80: 5210 MHz, 5290 MHz, 5530 MHz, 5610 MHz;
Channel Number	802.11a/n-HT20/ac-VHT20: 19 802.11n-HT40/ac-VHT40: 9 802.11ac-VHT80: 4
Type of Modulation	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps

Note: For other features of this EUT, test report will be issued separately.

1.6. Operation Frequency / Channel List

802.11a/n-HT20/ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	--	--	--	--

802.11n-HT40/ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz

802.11ac-VHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	N/A	N/A	N/A	N/A

1.7. Description of Available Antennas

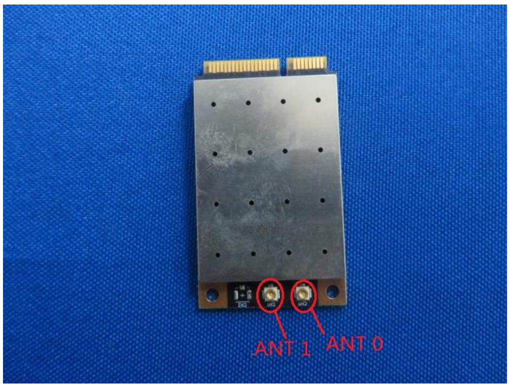
Antenna Type	Manufacturer	Tx Paths	Max Directional Gain (dBi)
Dipole Antenna 1#	Kunshan Wavelink Electronic Co., Ltd.	2	2.4GHz: 2.0, 5GHz: 2.0
Dipole Antenna 2#	Smart Ant Inc	2	2.4GHz: 4.5, 5GHz: 7.0
PCB Antenna 3#	TAOGLAS Inc	2	2.4GHz: 4.5, 5GHz: 6.7
PCB Antenna 4#	Compex Systems Pte Ltd	2	2.4GHz: 5.0, 5GHz: 5.0
PCB Antenna 5#	Compex Systems Pte Ltd	2	2.4GHz: 5.0, 5GHz: 5.0

Note: We selected the dipole antenna 2# and PCB antenna 3# for all radiated emission testing.

1.8. Description of Antenna RF Port

--	2.4/5GHz Antenna RF Port	
	2.4/5GHz	2.4/5GHz
Software Control Port	Ant 0	Ant 1

Antenna RF Port Plot



1.9. Standards Applicable for Testing

The EUT complies with the requirements of ETSI EN 301 893 V2.1.1.

1.10. Application Form for Testing

Device Type			
☒	Stand-alone equipment		
☐	Combined (or host) equipment		
☐	Plug-in radio device		
☐	Test Jig		
Operating Conditions			
☒	AC Mains State AC Voltage:100 - 240V	☐	DC State DC Voltage: DC 48V
Type of DC Source	☐ Internal power supply		
	☐ External power supply or AC/DC adapter		
	☐ Battery		
☒	Temperature Range: -20 ~ 70°C		
Antenna Category			
☒	Integral antenna (antenna permanently attached)		
	☒ Permanently RF connector provided (Specific Antenna Connectors)		
	☐ No temporary RF connector provided		
Adaptivity (Channel Access Mechanism)			
☐ Frame Based Equipment			
☒ Load Based Equipment			
With Regards to Adaptivity for Frame Based Equipment			
☐ The Frame Based Equipment equipment operates as an Innitiating Device			
☐ The Frame Based Equipment equipment operates as an Responding Device			
☐ The Frame Based Equipment equipment can operate as an Innitiating Device and as a Responding Device			
With Regards to Adaptivity for Load Based Equipment			
☐ The Load Based Equipment equipment operates as a Supervising Device			
☐ The Load Based Equipment equipment operates as a Supervised Device			
☒ The Load Based Equipment can operate as a Supervising and as a Supervised Device			
☐ The Load Based Equipment equipment makes use of note 1 in table 7 or note 1 in table 8 of ETSI EN 301 893 V2.1.1			
☐ The Load Based Equipment equipment, when operating as a Supervising Device, makes use of note 2 in table 8 of ETSI EN 301 893 V2.1.1			
☐ The Load Based Equipment equipment operates as an Innitiating Device			
☐ The Load Based Equipment equipment operates as an Responding Device			

☒ The Load Based Equipment equipment can operate as an Innitiating Device and as a Responding Device The Priority Classes implemented by the Load Based Equipment ● When operating as a Supervising Device ☐ Priority Class 4 (Highest priority) ☐ Priority Class 3 ☐ Priority Class 2 ☒ Priority Class 1 (Lowest priority) ● When operating as a Supervised Device ☐ Priority Class 4 (Highest priority) ☐ Priority Class 3 ☐ Priority Class 2 ☒ Priority Class 1 (Lowest priority)	
With regard to Energy Detection Threshold, the Load Based Equipment has implemented either option 1 of clause 4.2.7.3.2.5 of ETSI EN 301 893 V2.1.1 or option 2 of clause 4.2.7.3.2.5 of ETSI EN 301 893 V2.1.1:	
☒ Option 1	☐ Option 2
Geo-location capability supported by the equipment	
☐	Yes ☐The geographical location determined by the equipment is not accessible to the user.
☒	No

2. Test Summary

Clause EN301893	Test Parameter	Result (Pass/Fail)	Remark
4.2.7	Adaptivity (Channel Access Mechaism)	Pass	--
4.2.8	Receiver Blocking	Pass	--

3. Adaptivity (Channel Access Mechanism)

3.1. Limit

This device define to Load Based Equipment.

Priority Class dependent Channel Access parameters for Supervised Devices				
Class #	p_0	CW_{min}	CW_{max}	Maximum Channel Occupancy Time (COT)
4	2	3	7	2ms
3	2	7	15	4ms
2	3	15	1023	6ms (note 1)
1	7	15	1023	6ms (note 1)

Note 1: The maximum Channel Occupancy Time (COT) of 6ms may be increased to 8ms by inserting one or more pauses. The minimum duration of a pause shall be 100µs. The maximum duration (Channel Occupancy) before including any such pause shall be 6ms. Pause duration is not included in the channel occupancy time.

Note 2: The values for p0, CW_{min}, CW_{max} are minimum values. Greater values are allowed.

Priority Class dependent Channel Access parameters for Supervising Devices				
Class #	p_0	CW_{min}	CW_{max}	Maximum Channel Occupancy Time (COT)
4	1	3	7	2ms
3	1	7	15	4ms
2	3	15	1023	6ms (note 1)
1	7	15	1023	6ms (note 1)

Note 1: The maximum Channel Occupancy Time (COT) of 6 ms may be increased to 8 ms by inserting one or more pauses. The minimum duration of a pause shall be 100 µs. The maximum duration (Channel Occupancy) before including any such pause shall be 6ms. Pause duration is not included in the channel occupancy time.

Note 2: The maximum Channel Occupancy Time (COT) of 6 ms may be increased to 10 ms by extending CW to CW × 2 + 1 when selecting the random number q for any backoff(s) that precede the Channel Occupancy that may exceed 6 ms or which follow the Channel Occupancy that exceeded 6ms. The choice between preceding or following a Channel Occupancy shall remain unchanged during the operation time of the device.

Note 3: The values for p_0, CW_{min}, CW_{max} are minimum values. Greater values are allowed.

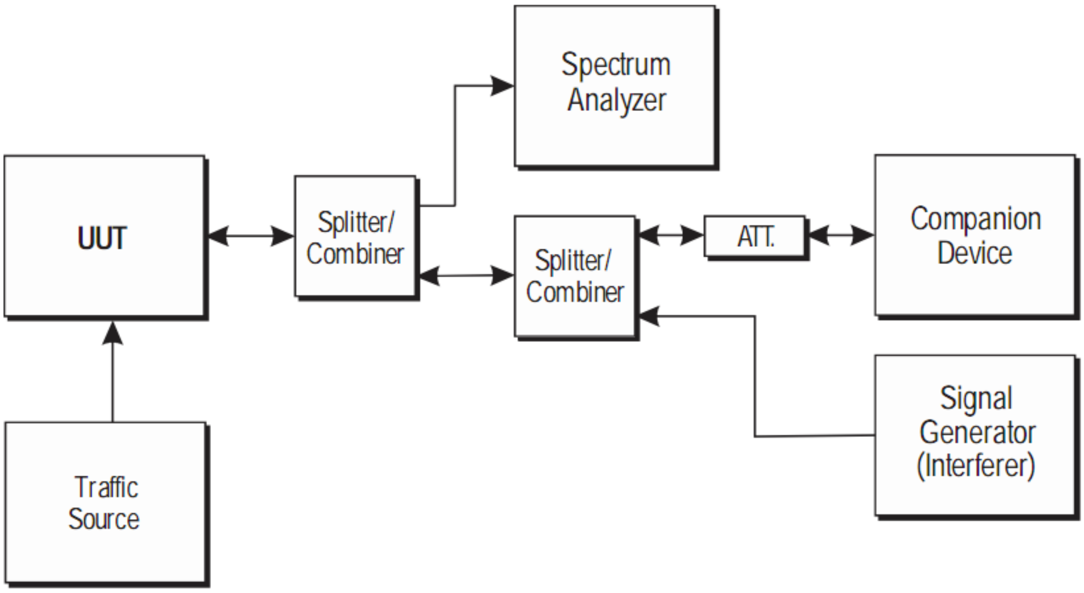
For equipment that for its operation in the 5 GHz bands is conforming to IEEE 802.11™ac-2013 [10], clause 22, or to IEEE 802.11™-2012 [9], clause 18 or clause 20, or any combination of these clauses, the Energy Detect Threshold (ED Threshold) is independent of the equipment's maximum transmit power (PH). The Energy Detect Threshold (ED Threshold) shall be: TL = -75 dBm/MHz

Short Control Signalling Transmissions Limit

The use of Short Control Signalling Transmissions is constrained as follows:

- within an observation period of 50 ms, the number of Short Control Signalling Transmissions by the equipment shall be equal to or less than 50; and
- the total duration of the equipment's Short Control Signalling Transmissions shall be less than 2 500 µs within said observation period.

3.2. Test Setup



3.3. Test Procedure

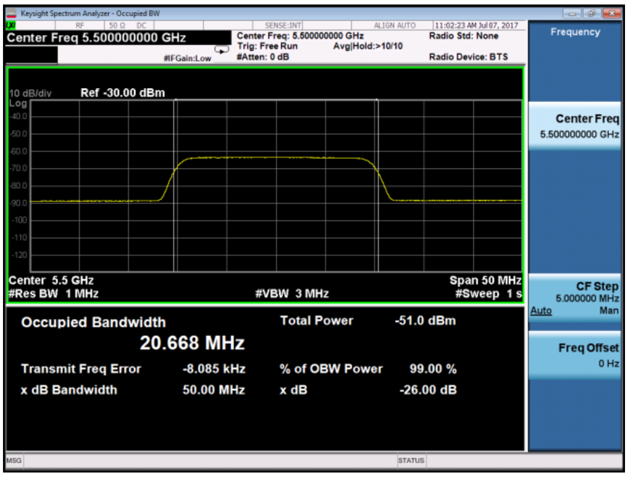
Refer to Draft ETSI EN 301 893 V2.1.1 (2017-05) Clause 5.4.9.3.2.3.2

3.4. Test Result

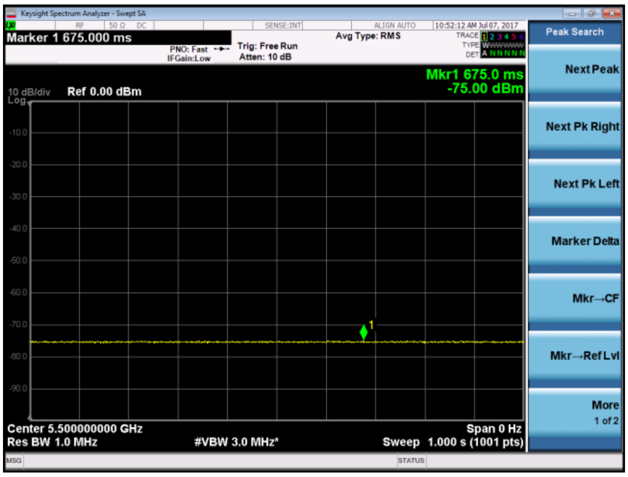
Product	802.11ac Dual Band Module	Temperature	26°C
Test Engineer	Andy Zhu	Relative Humidity	54%
Test Site	TR4	Test Date	2017/07/07

AWGN Interference Signal Calibration - 5500MHz

Step 1 - Occupied Channel bandwidth

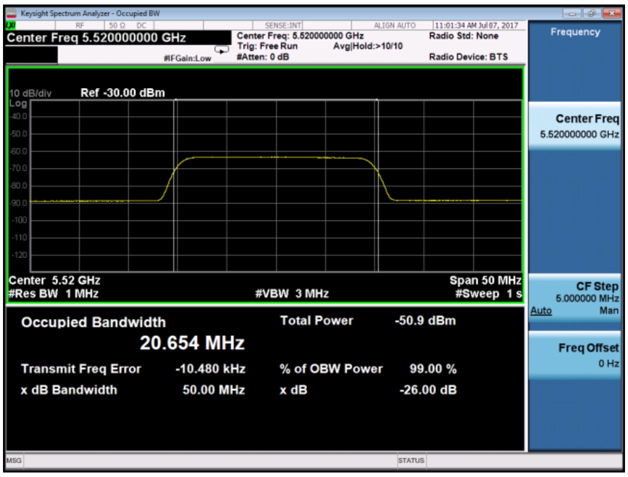


Step 2 - Interference Signal Level

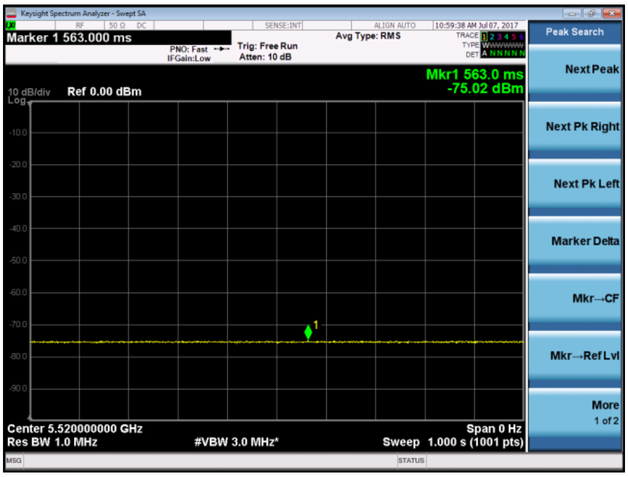


AWGN Interference Signal Calibration - 5520MHz

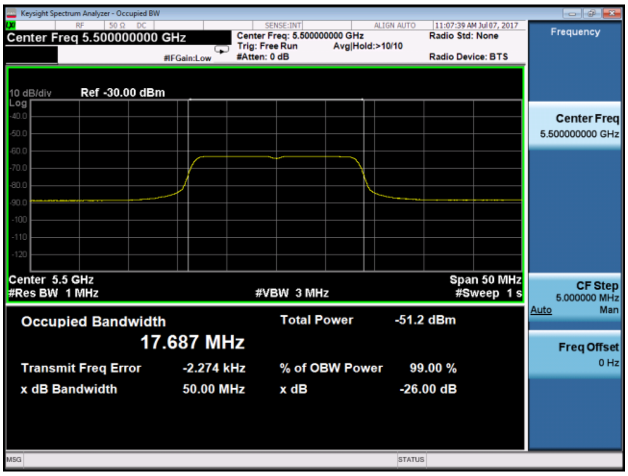
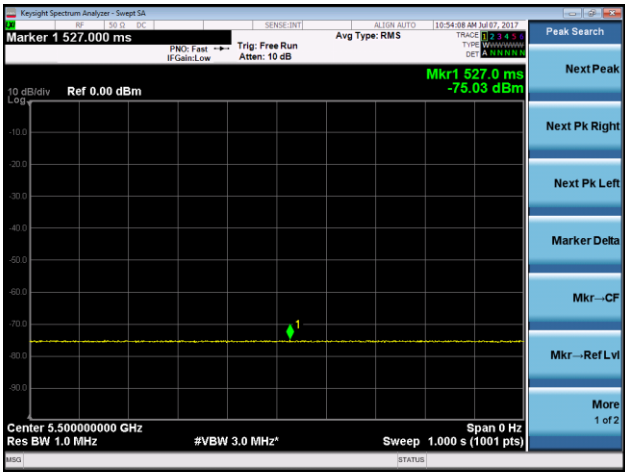
Step 1 - Occupied Channel bandwidth



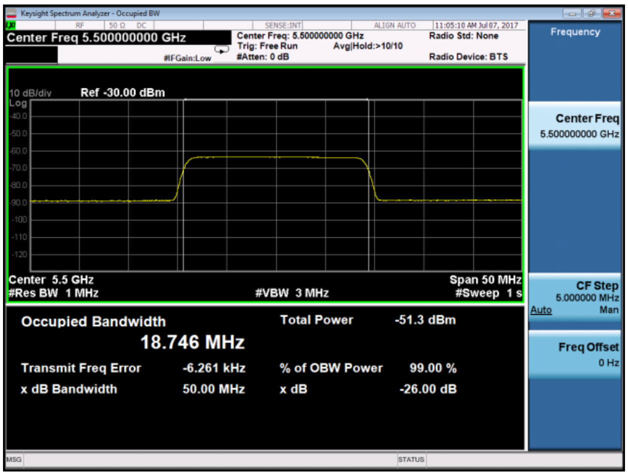
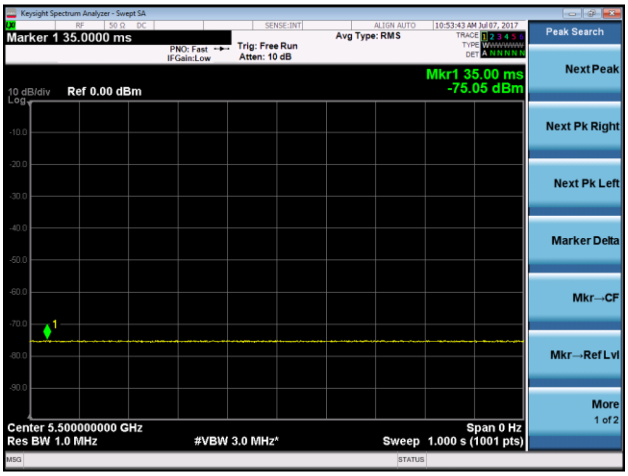
Step 2 - Interference Signal Level

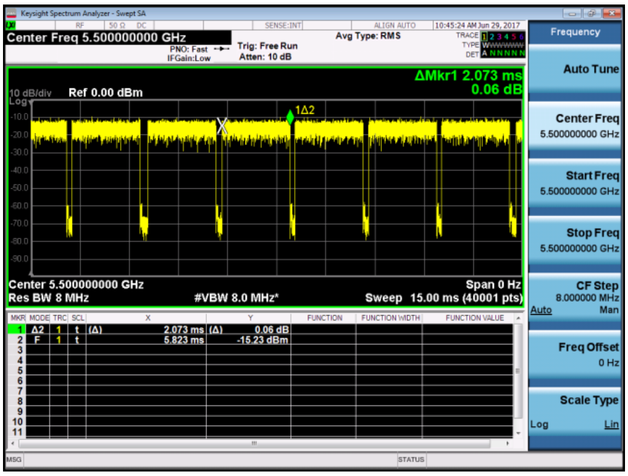
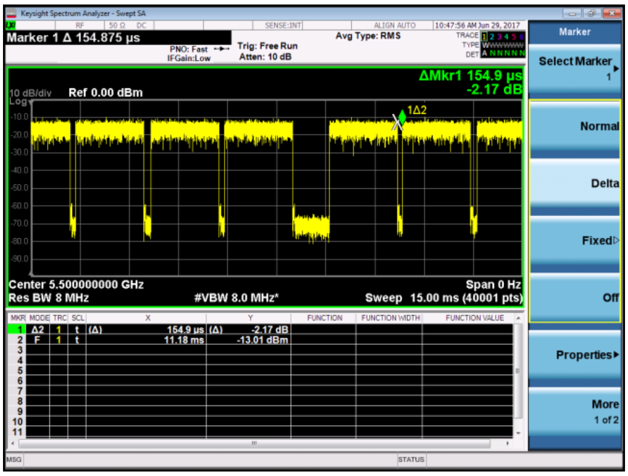
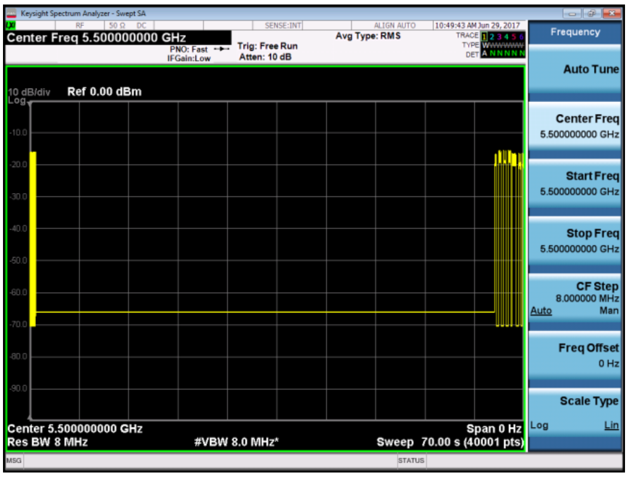
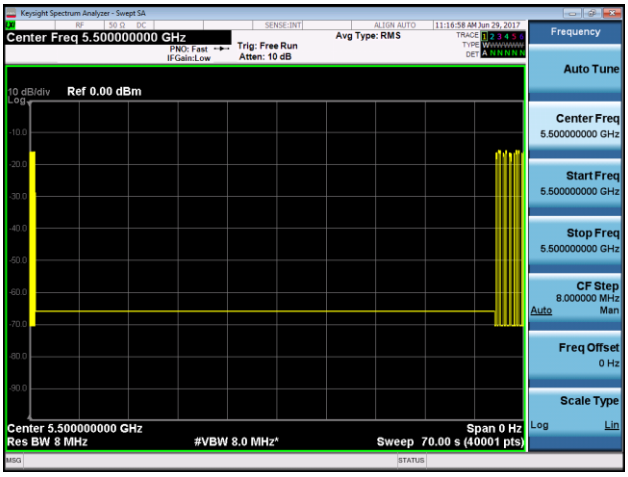


OFDM Interference Signal Calibration

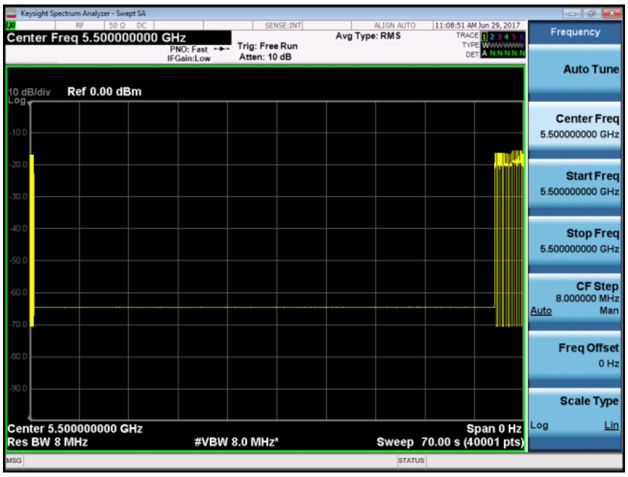
Step 1 - Occupied Channel bandwidth	Step 2 - Interference Signal Level
	

LTE Interference Signal Calibration

Step 1 - Occupied Channel bandwidth	Step 2 - Interference Signal Level
	

802.1a - 5500MHz	
Maximum Channel Occupancy Time = 2.073ms	**Minimum Idle Period = 154.9us**
	
Transmission stopped after AWGN interference added	**Transmission stopped after OFDM interference added**
	

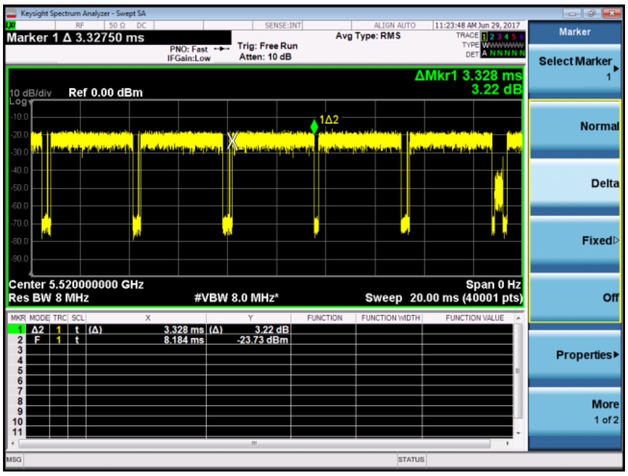
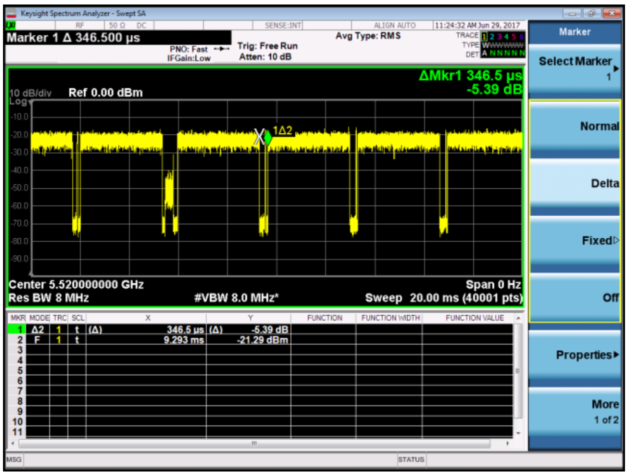
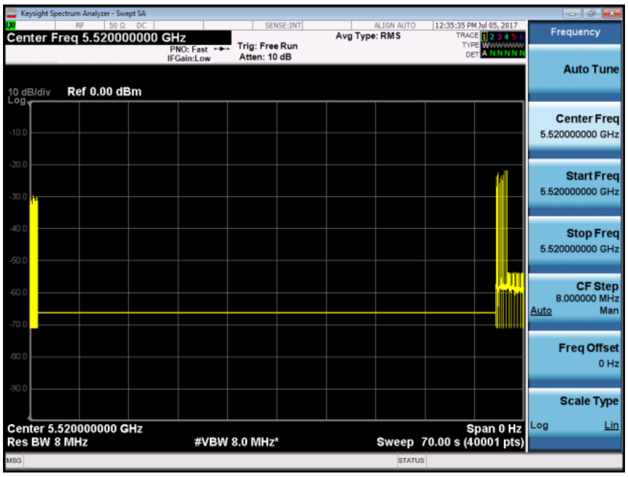
Transmission stopped after LTE interference added	



Note 1: Detection Level = -75 dBm/MHz.

Note 2: The manufacturer is allowed to declare compliance with the Medium Access Mechanism requirements contained in EN 301 893 V2.1.0 clause 4.2.7.3.2.6 and clause 4.2.7.3.2.7

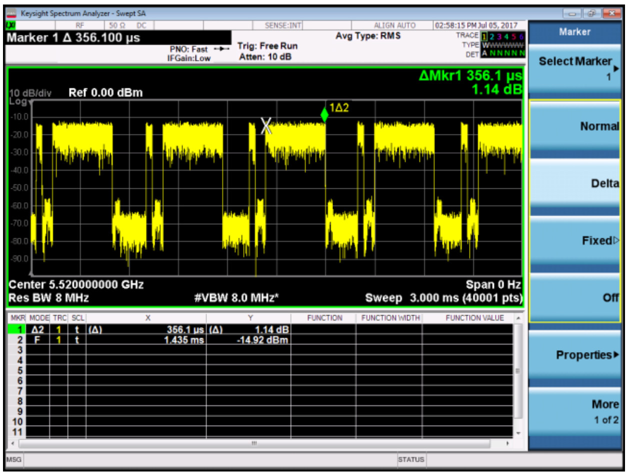
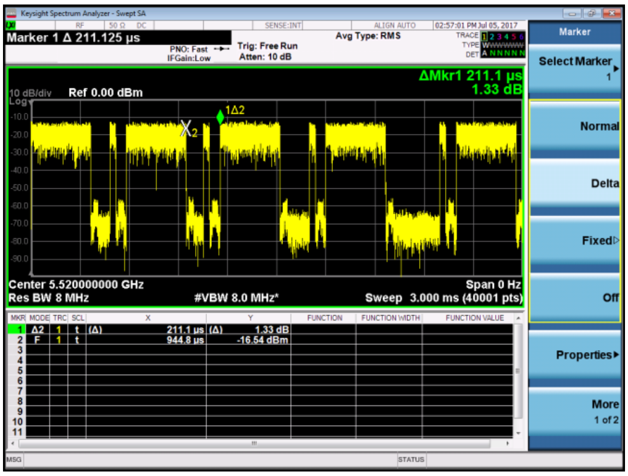
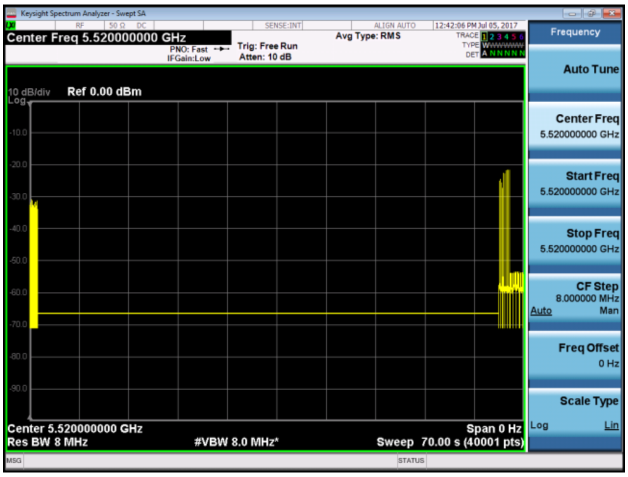
Test Result:	Pass

<table>
<tr><th colspan="2">802.11n-HT40 - 5510MHz (Non-Primary Operating Channel)</th></tr>
<tr><td>Maximum Channel Occupancy Time =3.328ms</td><td>Minimum Idle Period = 346.5us</td></tr>
<tr><td>
</td><td>
</td></tr>
<tr><td>Transmission stopped after AWGN interference added</td><td>The total short control signaling less than 2.5ms within observation period</td></tr>
<tr><td>
</td><td></td></tr>
</table>

Note 1: Detection Level = -75 dBm/MHz.

Note 2: The manufacturer is allowed to declare compliance with the Medium Access Mechanism requirements contained in EN 301 893 V2.1.0 clause 4.2.7.3.2.6 and clause 4.2.7.3.2.7

Test Result:	Pass

802.11ac-VHT40 - 5510MHz (Non-Primary Operating Channel)	
Maximum Channel Occupancy Time = 356.1us	**Minimum Idle Period =211.1us**
	
Transmission stopped after AWGN interference added	**The total short control signaling less than 2.5ms within observation period**
	

Note 1: Detection Level = -75 dBm/MHz.

Note 2: The manufacturer is allowed to declare compliance with the Medium Access Mechanism requirements contained in EN 301 893 V2.1.0 clause 4.2.7.3.2.6 and clause 4.2.7.3.2.7

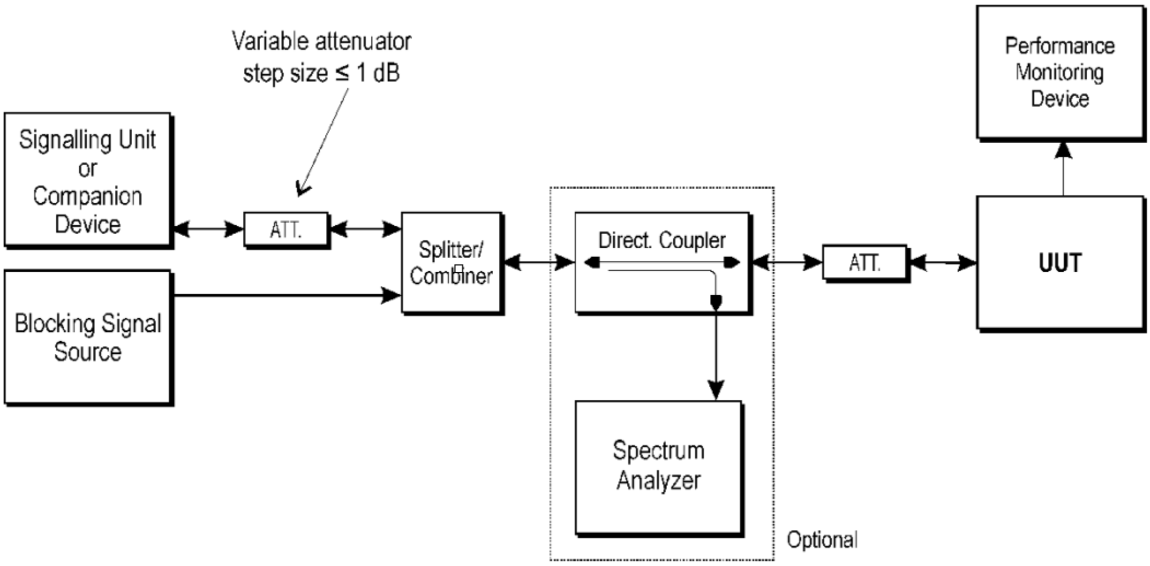
Test Result:	Pass

4. Receiver Blocking

4.1. Limit

The minimum performance criterion shall be a PER less than or equal to 10 %. The manufacturer may declare alternative performance criteria as long as that is appropriate for the intended use of the equipment.

4.2. Test Setup



Test Set-up for receiver blocking

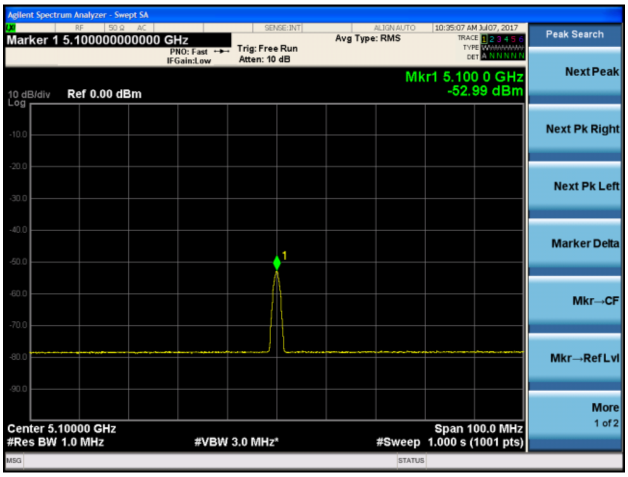
4.3. Test Procedure

Refer to ETSI EN 301 893 V2.1.1 (2017-03) Clause 5.4.10.2.1

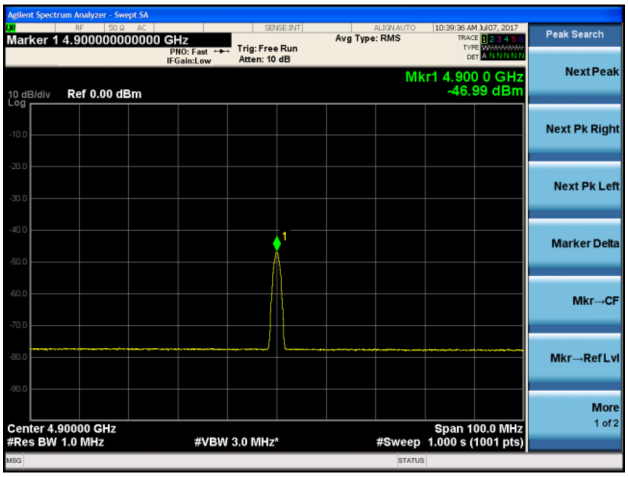
4.4. Test Result

Blocking Signal Calibration Plots

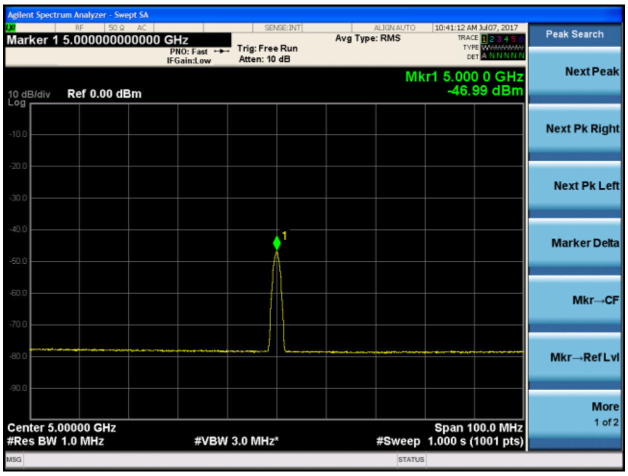
5100MHz



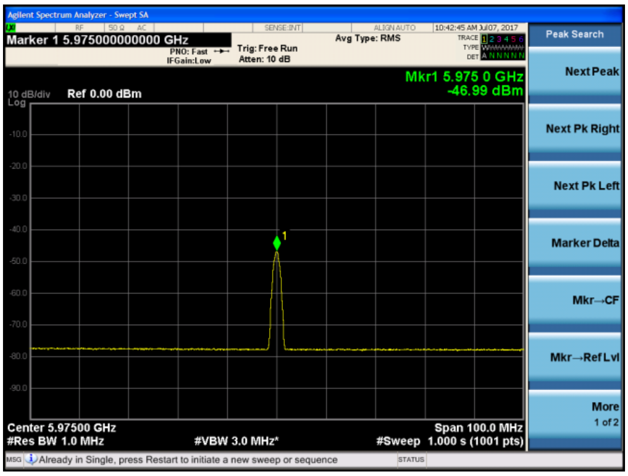
4900MHz



5000MHz



5975MHz



Product	WIRELESS ACCESS POINT	Temperature	26°C
Test Engineer	Andy Zhu	Relative Humidity	54%
Test Site	TR4	Test Data	2017/07/07
Test Mode	802.11a		

Channel	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	PER Test Result	Limit (PER)	Test Result
64	P_{min} + 6 dB	4900	-47	CW	0.6	< 10%	Pass
		5000	-47		0.9		Pass
		5100	-53		0.5		Pass
		5975	-47		1.0		Pass
Note 1: the P_{min} of channel 64 is -87dBm.							
100	P_{min} + 6 dB	4900	-47	CW	0.5	< 10%	Pass
		5000	-47		0.8		Pass
		5100	-53		0.4		Pass
		5975	-47		0.5		Pass
Note 2: the P_{min} of channel 100 is -87dBm.							

Product	WIRELESS ACCESS POINT	Temperature	26°C
Test Engineer	Andy Zhu	Relative Humidity	54%
Test Site	TR4	Test Data	2017/07/07
Test Mode	802.11n-HT20		

Channel	Wanted Signal Mean Power from Companion Device (dBm)	Blocking Signal Frequency (MHz)	Blocking Signal Power (dBm)	Type of Blocking Signal	PER Test Result	Limit (PER)	Test Result
64	P_{min} + 6 dB	4900	-47	CW	0.4	< 10%	Pass
		5000	-47		1.1		Pass
		5100	-53		0.7		Pass
		5975	-47		1.2		Pass
Note 1: the P_{min} of channel 64 is -88dBm.							
100	P_{min} + 6 dB	4900	-47	CW	0.8	< 10%	Pass
		5000	-47		0.4		Pass
		5100	-53		0.5		Pass
		5975	-47		0.2		Pass
Note 2: the P_{min} of channel 100 is -89dBm.							

5. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±10 ppm
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3 dB
Spurious Emissions, radiated	±6 dB
Temperature	±2 °C
Humidity	±5 %
Time	±10 %

6. List of Measuring Instrument

Adaptivity (Channel Access Mechanism) - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Vector Signal Generator	Agilent	E4438C	MRTSUE06026	1 year	2017/12/08
Directional Coupler	Narda	4216-20	MRTSUE06065	1 year	2018/03/28
Power Splitter	Mini-Circuits	ZFRSC-123-S+	MRTSUE06122	N/A	N/A
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Receiver Blocking - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Vector Signal Generator	Agilent	E4438C	MRTSUE06026	1 year	2017/12/06
4 Ch. Simultaneous Sampling 14	Agilent	U2531A	MRTSUE06247	N/A	N/A
4 Ch. Simultaneous Sampling 14	Agilent	U2531A	MRTSUE06248	N/A	N/A
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06108	1 year	2017/11/10
Directional Coupler	Narda	4216-20	MRTSUE06065	1 year	2018/03/28
Power Splitter	Mini-Circuits	ZFRSC-123-S+	MRTSUE06122	N/A	N/A
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Software	Version	Function
e3	V8.3.5	EMI Test Software

The End

7. Appendix - Original Report

MEASUREMENT REPORT

EN 301 893 V1.8.1 WLAN 802.11a/n

Applicant:	Compex Systems Pte Ltd
Address:	No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651
Product:	802.11ac Dual Band Module
Model No.:	WLE600VX, WLE600VX-I
Brand Name:	COMPEX
Standards:	ETSI EN 301 893 V1.8.1 (2015-03)
Result:	Complies
Test Date:	December 28, 2016 ~ January 10, 2017

Reviewed By : (Robin Wu)

Approved By : (Marlin Chen)

ilac-MRA

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1612RSU02402	Rev. 01	Initial report	01-14-2017	Valid

CONTENTS

Description Page

1. General Information

1.1. Applicant

Compex Systems Pte Ltd

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

1.2. Manufacturer

Compex Systems Pte Ltd

No:9 Harrison Road, Harrison Industrial Building, #05-01, Singapore 369651

1.3. Testing Facility

Test Site

MRT Technology (Suzhou) Co., Ltd

Test Site Location

D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.**

Accredited Laboratory

A2LA has accredited

MRT TECHNOLOGY (SUZHOU) CO., LTD.

Suzhou, Jiangsu, People's Republic of China

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 8 January 2009).

Presented this 6th day of September 2016.

Senior Director of Quality and Communications
For the Accreditation Council
Certificate Number 3628.01
Valid to August 31, 2018

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

1.4. Feature of Equipment under Test

Product Name:	802.11ac Dual Band Module
Model No.:	WLE600VX, WLE600VX-I
Brand Name:	COMPEX
Wi-Fi Specification:	802.11a/b/g/n/ac

Note: Differences between all models are for different marketing requirement.

1.5. Product Specification Subjective to this Report

Frequency Range	802.11a /n-HT20/ac-VHT20: 5180~5240 MHz, 5260~5320 MHz, 5500~5700 MHz; 802.11n-HT40/ac-VHT40: 5190~5230 MHz, 5270~5310 MHz, 5510~5670 MHz; 802.11ac-VHT80: 5210 MHz, 5290 MHz, 5530 MHz, 5610 MHz;
Channel Number	802.11a/n-HT20/ac-VHT20: 19 802.11n-HT40/ac-VHT40: 9 802.11ac-VHT80: 4
Type of Modulation	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.6Mbps

Note: For other features of this EUT, test report will be issued separately.

1.6. Operation Frequency / Channel List

802.11a/n-HT20/ac-VHT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	52	5260 MHz	56	5280 MHz
60	5300 MHz	64	5320 MHz	100	5500 MHz
104	5520 MHz	108	5540 MHz	112	5560 MHz
116	5580 MHz	120	5600 MHz	124	5620 MHz
128	5640 MHz	132	5660 MHz	136	5680 MHz
140	5700 MHz	--	--	--	--

802.11n-HT40/ac-VHT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	54	5270 MHz
62	5310 MHz	102	5510 MHz	110	5550 MHz
118	5590 MHz	126	5630 MHz	134	5670 MHz

802.11ac-VHT80

Channel	Frequency	Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 MHz	106	5530 MHz
122	5610 MHz	N/A	N/A	N/A	N/A

1.7. Description of Available Antennas

Antenna Type	Manufacturer	Tx Paths	Max Directional Gain (dBi)
Dipole Antenna 1#	Kunshan Wavelink Electronic Co., Ltd.	3	2.4GHz: 2.0, 5GHz: 2.0
Dipole Antenna 2#	Smart Ant Inc	3	2.4GHz: 4.5, 5GHz: 7.0
PCB Antenna 3#	TAOGLAS Inc	3	2.4GHz: 4.5, 5GHz: 6.7
PCB Antenna 4#	Compex Systems Pte Ltd	3	2.4GHz: 5.0, 5GHz: 5.0
PCB Antenna 5#	Compex Systems Pte Ltd	3	2.4GHz: 5.0, 5GHz: 5.0

Note: We selected the dipole antenna 2# and PCB antenna 3# for all radiated emission testing.

1.8. Standards Applicable for Testing

The EUT complies with the requirements of ETSI EN 301 893 V1.8.1.

2. Test Configuration of Equipment under Test

2.1. Description of Test Mode

Test Mode	Mode 1: Transmit by 802.11a
	Mode 2: Transmit by 802.11n-HT20
	Mode 3: Transmit by 802.11n-HT40
	Mode 4: Transmit by 802.11ac-VHT20
	Mode 5: Transmit by 802.11ac-VHT40
	Mode 6: Transmit by 802.11ac-VHT80
	Mode 7: Receive by 802.11a
	Mode 8: Receive by 802.11n-HT20
	Mode 9: Receive by 802.11n-HT40
	Mode 10: Receive by 802.11ac-VHT20
	Mode 11: Receive by 802.11ac-VHT40
	Mode 12: Receive by 802.11ac-VHT80

Test Mode	Duty Cycle
11a	96.96%
11n-HT20	94.44%
11n-HT40	85.85%
11ac-VHT20	95.06%
11ac-VHT40	93.54%
11ac-VHT80	80.08%

2.2. Description of Test Software

The test utility software used during testing was “ART2-GUI Version: 2.3” and “CART Version: 4.9”.

Final Power Parameter Value of the test software

Test Mode	Test Frequency	Power Parameter Value		
		Ant 0	Ant 1	Ant 0 + 1
802.11a	5180	14.0	14.5	Not Support
	5320	13.5	14.0	
	5500	20.0	18.5	
	5700	20.0	20.0	
802.11n-HT20	5180	14.0	14.5	11.5
	5320	14.0	14.5	11.5
	5500	20.0	19.0	18.0
	5700	21.0	20.0	20.0
802.11n-HT40	5190	14.5	14.5	13.0
	5310	14.0	15.0	12.5
	5510	20.0	19.0	20.0
	5670	20.0	20.0	20.0
802.11ac-VHT20	5180	14.0	14.5	11.5
	5320	14.0	14.5	11.0
	5500	20.0	19.0	16.0
	5700	20.0	20.0	17.0
802.11ac-VHT40	5190	15.5	15.0	13.0
	5310	15.0	15.5	12.5
	5510	20.0	20.0	20.0
	5670	20.0	20.0	20.0
802.11ac-VHT80	5210	16.0	14.5	13.5
	5290	15.5	15.0	13.0
	5530	20.0	20.0	20.0
	5610	20.0	20.0	20.00

3. Test Summary

Clause EN301893	Test Parameter	Result (Pass/Fail)	Remark
4.2	Carrier Frequencies	Pass	--
4.3	Occupied Channel Bandwidth	Pass	--
4.4	RF Output Power, Transmit Power Control (TPC) and Power Density	Pass	--
4.5.1	Transmitter Unwanted Emissions Outside the 5GHz RLAN Bands	Pass	--
4.5.2	Transmitter Unwanted Emissions Within the 5GHz RLAN Bands	Pass	--
4.6	Receiver Spurious Emissions	Pass	--
4.7	Dynamic Frequency Selection (DFS)	Pass	Refer to DFS report
4.8	Adaptivity	Pass	--
4.9	User Access Restrictions	Pass	--
4.10	Geo-location Capability	N/A	--

Note 1: For Radiated spurious emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions (Z axis), and the test setup showed in test setup photo.
Note 2: This device doesn't have Geo-location Capability which is declared by the manufacturer.
Note 3: We executed all test items at high data rates, since all modes of operation and data rates have been investigated.

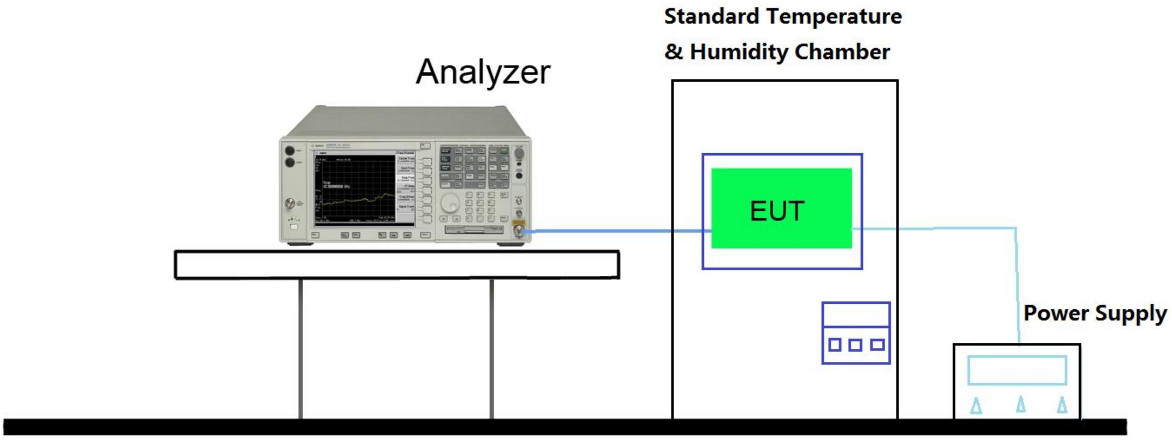
4. Carrier Frequencies

4.1. Limit

The actual centre frequency for any given channel declared by the manufacturer shall be maintained within the range fc ± 20ppm.

4.2. Test Setup

For Conducted Measurement



4.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.2.2.1.

4.4. Test Result

Product	802.11ac Dual Band Module	Temperature	-20 ~ 70°C
Test Engineer	Amy Zhang	Relative Humidity	48 ~ 57%
Test Site	TR3	Test Date	2016/12/29

Test Conditions		Declared Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)	Result
T_{NOM} (25°C)	V_{NOM} (AC 230V)	5320	5319.989845	-1.91	-20 ~ +20	Pass
		5500	5499.988546	-2.08	-20 ~ +20	Pass
T_{MIN} (-20°C)	V_{MIN} (AC 207V)	5320	5319.986945	-2.45	-20 ~ +20	Pass
		5500	5499.988475	-2.10	-20 ~ +20	Pass
	V_{MAX} (AC 253V)	5320	5319.986925	-2.46	-20 ~ +20	Pass
		5500	5499.984857	-2.75	-20 ~ +20	Pass
T_{MAX} (70°C)	V_{MAX} (AC 207V)	5320	5319.988369	-2.19	-20 ~ +20	Pass
		5500	5499.984528	-2.81	-20 ~ +20	Pass
	V_{MAX} (AC 253V)	5320	5319.985691	-2.69	-20 ~ +20	Pass
		5500	5499.986915	-2.38	-20 ~ +20	Pass

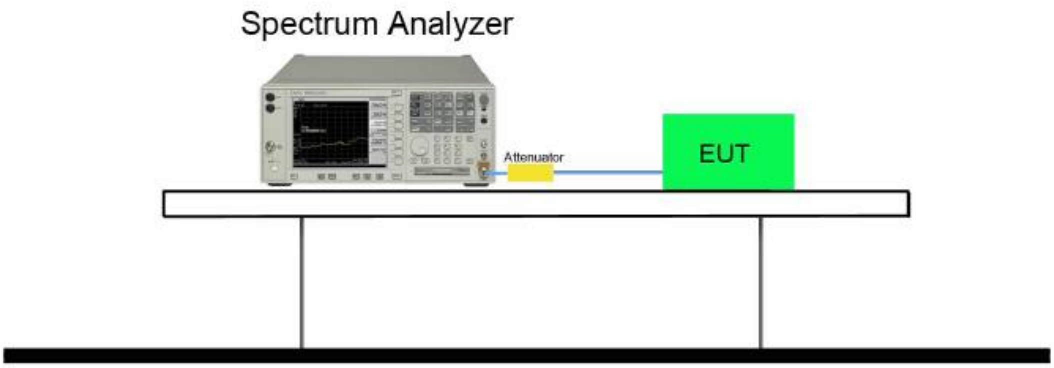
Note: Tolerance (ppm) = {Measured Frequency (MHz) - Declared Frequency (MHz)} / Declared Frequency (MHz) * 10^6 (ppm)

5. Occupied Channel Bandwidth

5.1. Limit

The Nominal Channel Bandwidth shall be at least 5 MHz at all times.
The Occupied Channel Bandwidth shall be between 80 % and 100 % of the declared Nominal Channel Bandwidth. In case of smart antenna systems (devices with multiple transmit Ants) each of the transmit Ants shall meet this requirement.
During an established communication, a device is allowed to operate temporarily with an Occupied Channel Bandwidth below 80 % of its Nominal Channel Bandwidth with a minimum of 4 MHz.

5.2. Test Setup



5.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.3.2.1.

5.4. Test Result

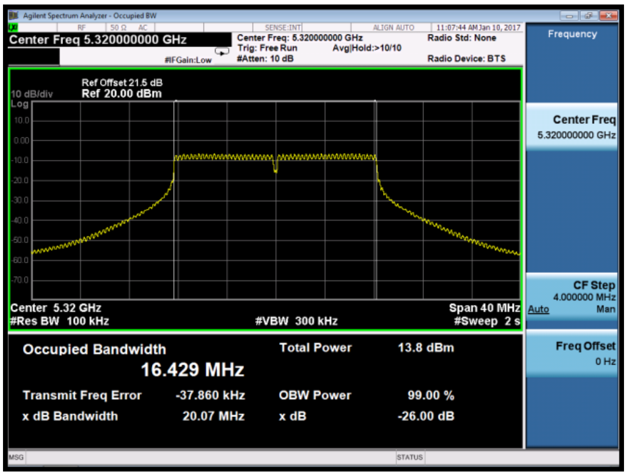
Product	802.11ac Dual Band Module	Temperature	24°C
Test Engineer	Amy Zhang	Relative Humidity	54%
Test Site	TR3	Test Date	2017/01/10

Test Mode	Channel No.	Frequency (MHz)	99% Bandwidth (MHz)	Declared Nominal Channel Bandwidth (MHz)	Occupied Bandwidth (%)	Limit (%)	Result
1Tx							
11a	64	5320	16.43	20	82.15	80 - 100	Pass
11a	100	5500	16.45	20	82.25	80 - 100	Pass
11nHT20	64	5320	17.65	20	88.25	80 - 100	Pass
11n-HT20	100	5500	17.67	20	88.35	80 - 100	Pass
11ac-VHT20	64	5320	17.65	20	88.25	80 - 100	Pass
11ac-VHT20	100	5500	17.66	20	88.30	80 - 100	Pass
11n-HT40	62	5310	36.22	40	90.55	80 - 100	Pass
11n-HT40	102	5510	36.28	40	90.70	80 - 100	Pass
11ac-VHT40	62	5310	36.22	40	90.55	80 - 100	Pass
11ac-VHT40	102	5510	36.28	40	90.70	80 - 100	Pass
11ac-VHT80	42	5210	75.75	80	94.69	80 - 100	Pass
11ac-VHT80	58	5290	75.75	80	94.69	80 - 100	Pass
2Tx							
11nHT20	64	5320	17.65	20	88.25	80 - 100	Pass
11n-HT20	100	5500	17.79	20	88.95	80 - 100	Pass
11ac-VHT20	64	5320	17.65	20	88.25	80 - 100	Pass
11ac-VHT20	100	5500	17.66	20	88.30	80 - 100	Pass
11n-HT40	62	5310	36.22	40	90.55	80 - 100	Pass
11n-HT40	102	5510	36.43	40	91.08	80 - 100	Pass
11ac-VHT40	62	5310	36.23	40	90.58	80 - 100	Pass
11ac-VHT40	102	5510	36.44	40	91.10	80 - 100	Pass
11ac-VHT80	42	5210	75.76	80	94.70	80 - 100	Pass
11ac-VHT80	58	5290	75.99	80	94.99	80 - 100	Pass

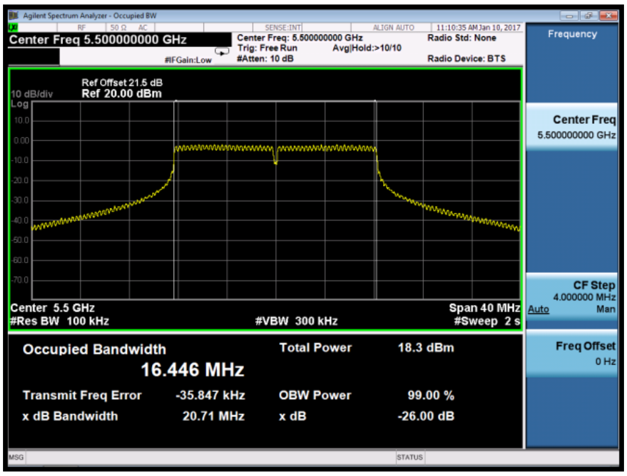
Occupied Channel Bandwidth – 1Tx

802.11a

Channel 64 (5320MHz)

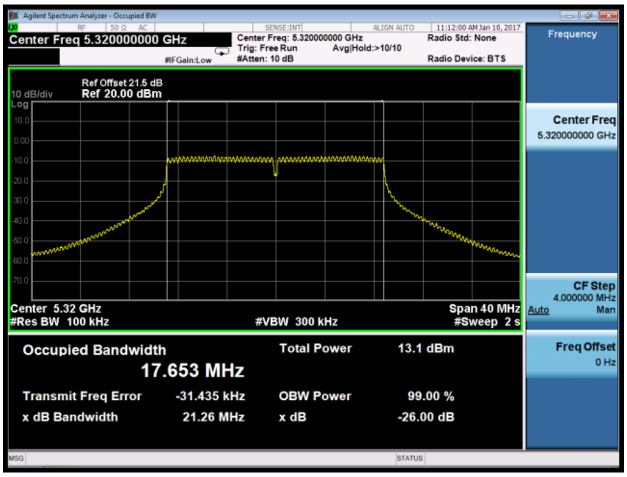


Channel 100 (5500MHz)

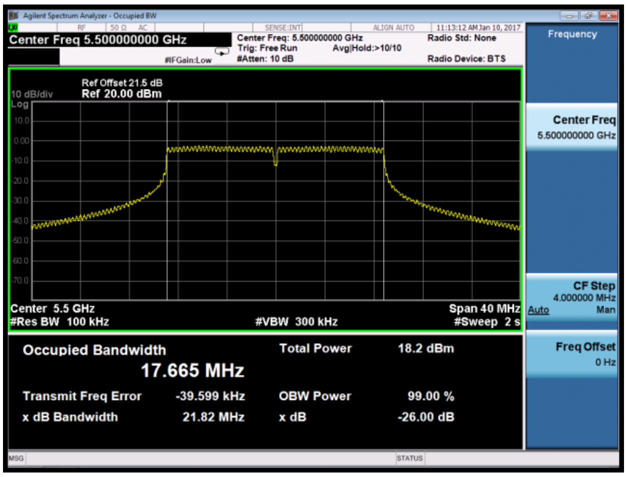


802.11n-HT20

Channel 64 (5320MHz)

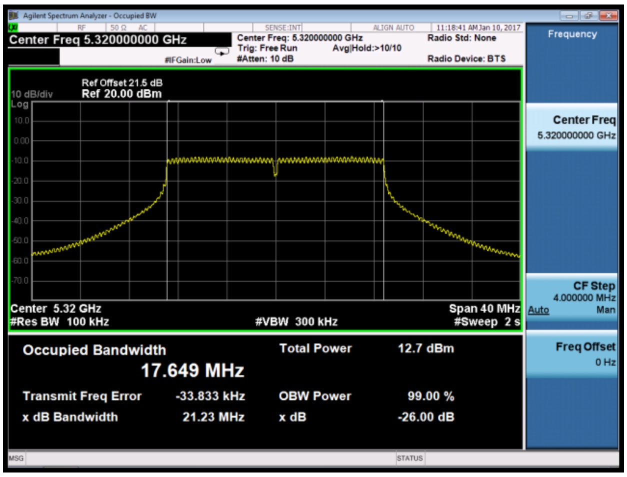


Channel 100 (5500MHz)

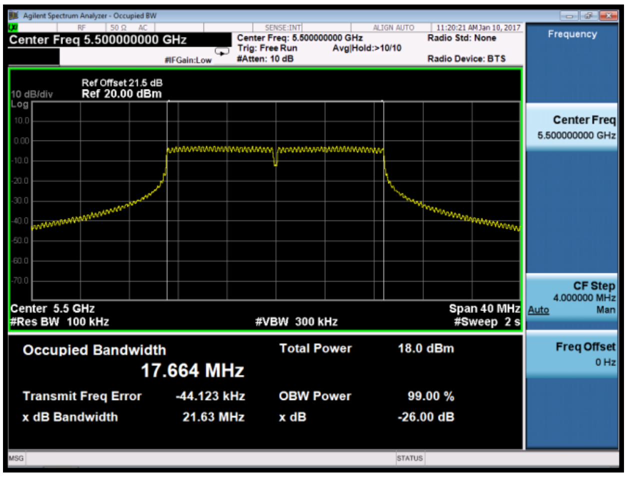


802.11ac-VHT20

Channel 64 (5320MHz)

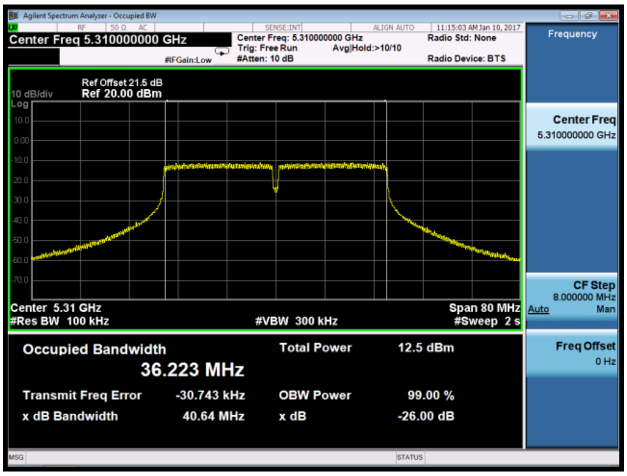


Channel 100 (5500MHz)

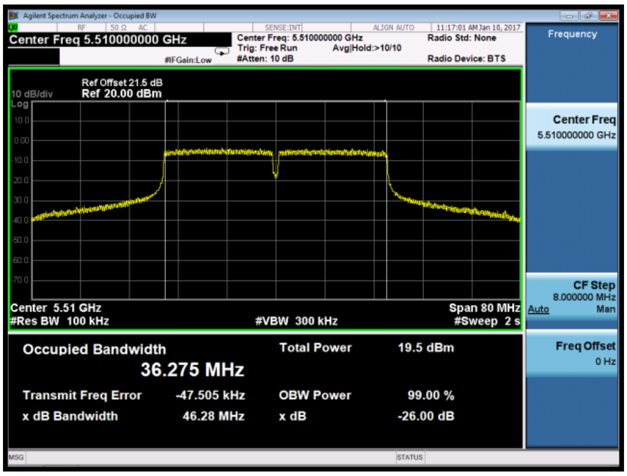


802.11n-HT40

Channel 62 (5310MHz)

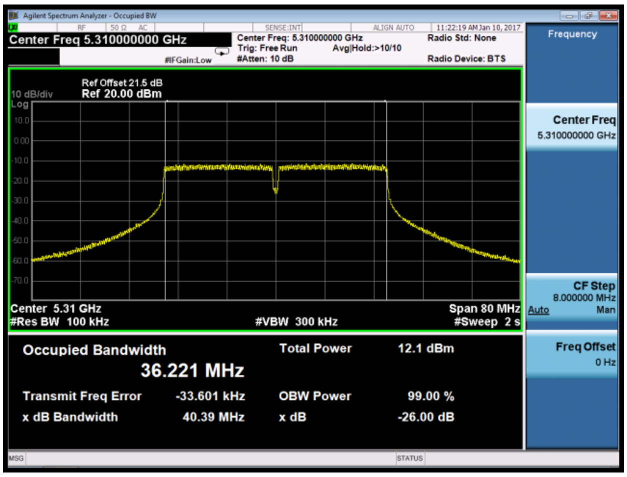


Channel 102 (5510MHz)

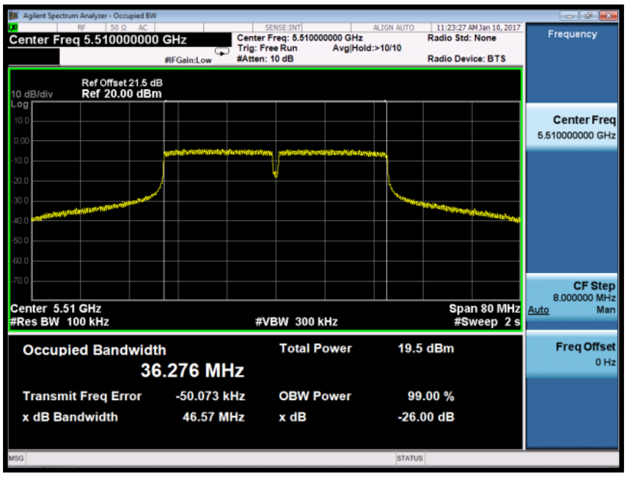


802.11ac-VHT40

Channel 62 (5310MHz)

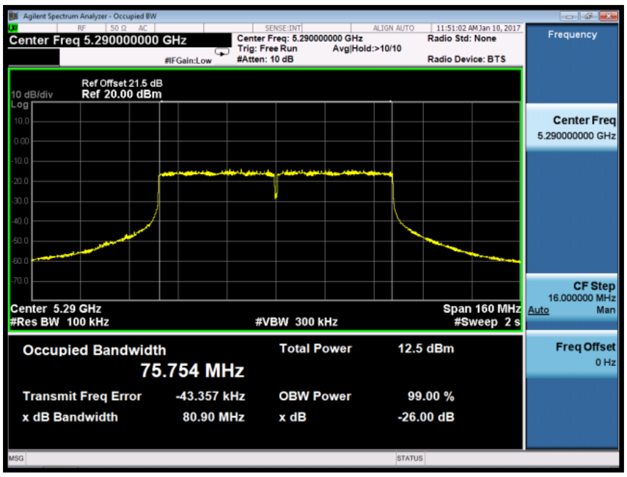


Channel 102 (5510MHz)

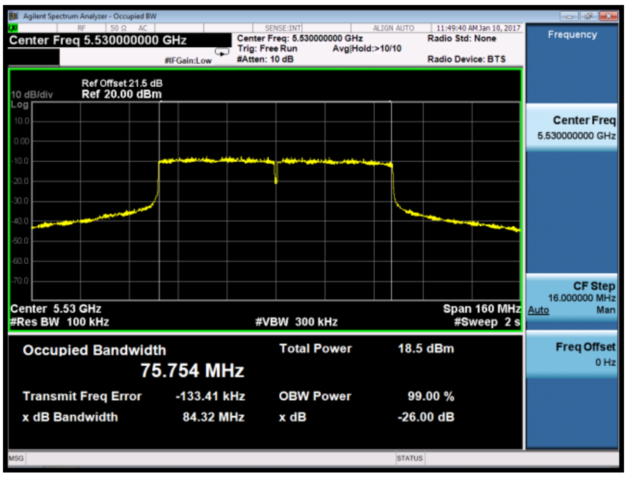


802.11ac-VHT80

Channel 58 (5290MHz)



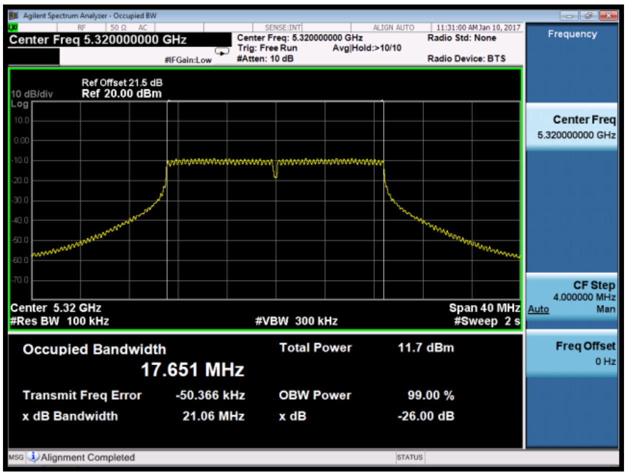
Channel 106 (5530MHz)



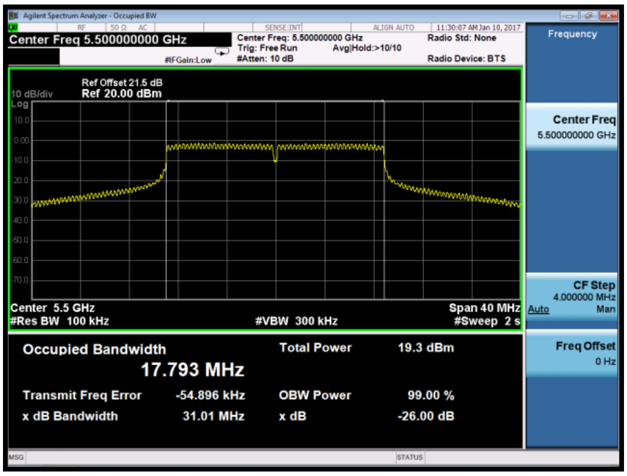
Occupied Channel Bandwidth – 2Tx

802.11n-HT20

Channel 64 (5320MHz)

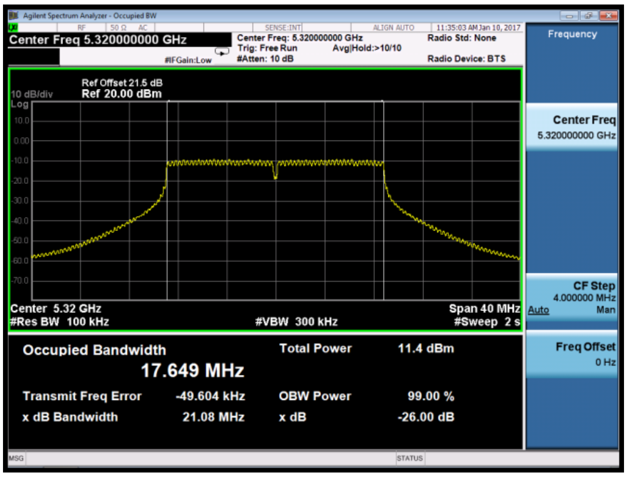


Channel 100 (5500MHz)

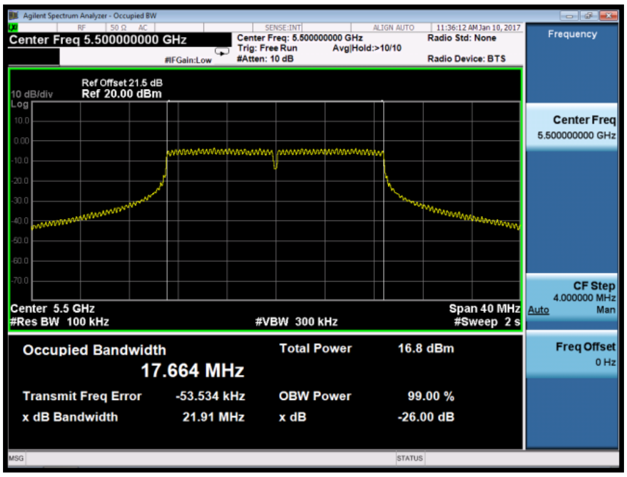


802.11ac-VHT20

Channel 64 (5320MHz)

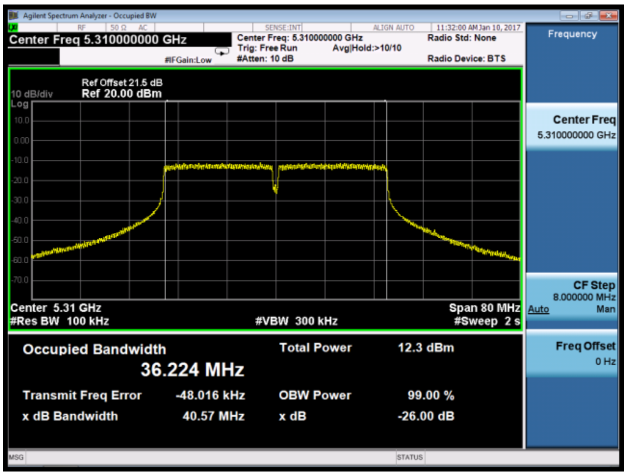


Channel 100 (5500MHz)

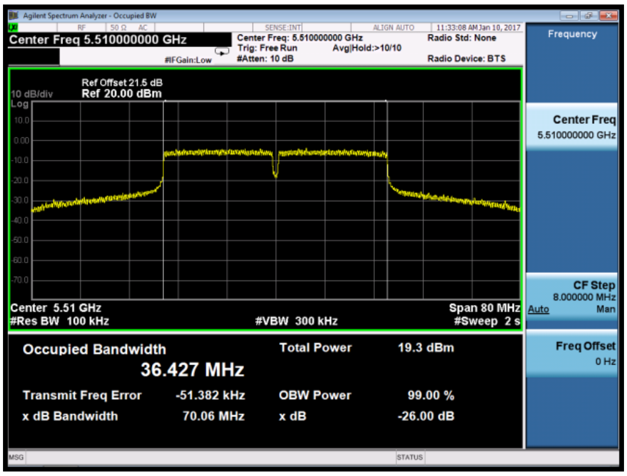


802.11n-HT40

Channel 62 (5310MHz)

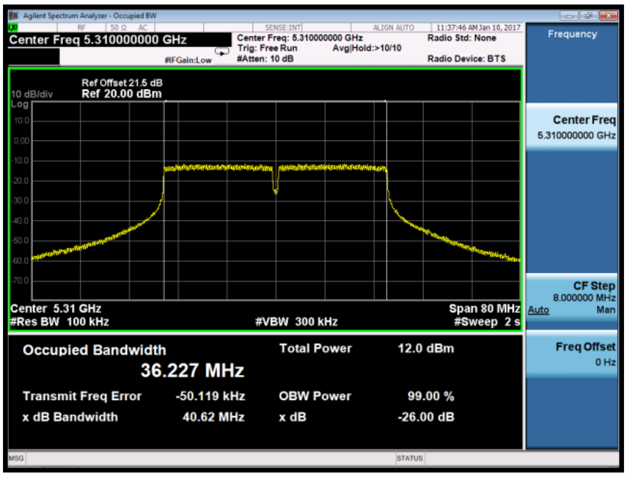


Channel 102 (5510MHz)

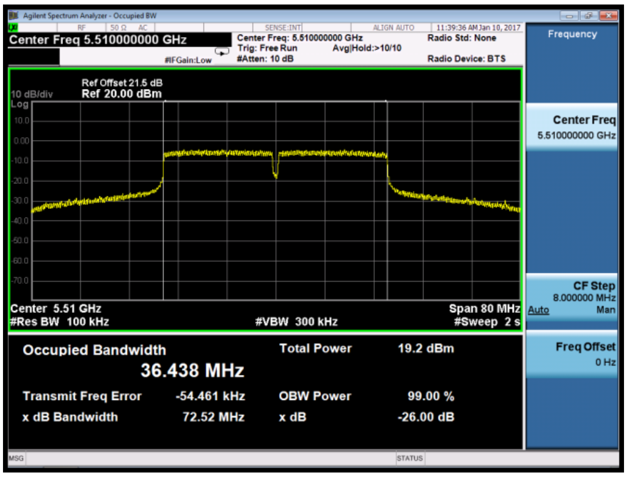


802.11ac-VHT40

Channel 62 (5310MHz)

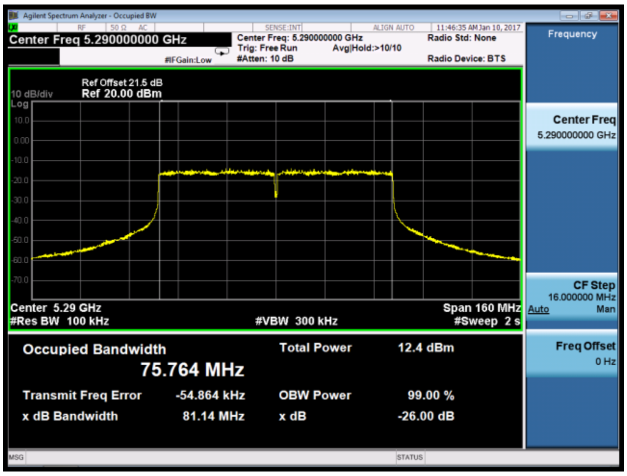


Channel 102 (5510MHz)

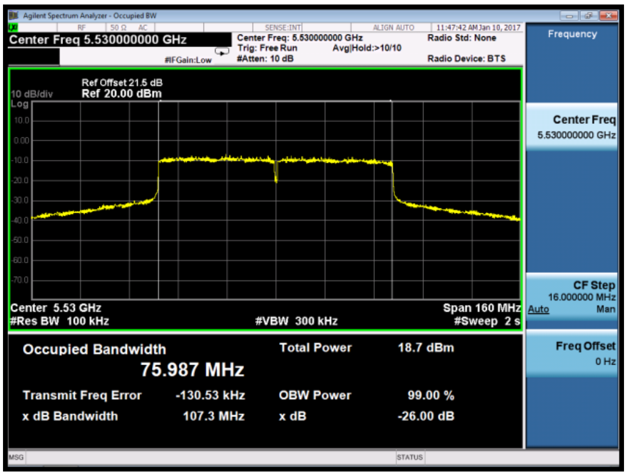


802.11ac-VHT80

Channel 58 (5290MHz)



Channel 106 (5530MHz)



6. RF Output Power, Transmit Power Control (TPC) and Power Density

6.1. Limit

RF Output Power and Power Density at the Highest Power Level

TPC is not required for channels whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz.

For devices with TPC, the RF output power and the power density when configured to operate at the highest stated power level of the TPC range shall not exceed the levels given in following table.

Devices are allowed to operate without TPC. See table for applicable limits in this case.

Mean EIRP limits for RF Output Power and Power Density at the Highest Power Level				
Frequency Range	Mean EIRP Limit [dBm]		Mean EIRP Density Limit [dBm/MHz]	
	with TPC	without TPC	with TPC	without TPC
5150 MHz to 5350 MHz	23	20/23 (see note 1)	10	7/10 (see note 2)
5470 MHz to 5725 MHz	30 (see note 3)	27 (see note 3)	17 (see note 3)	14 (see note 3)

NOTE 1: The applicable limit is 20 dBm, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 23 dBm.

NOTE 2: The applicable limit is 7 dBm/MHz, except for transmissions whose nominal bandwidth falls completely within the band 5150 MHz to 5250 MHz, in which case the applicable limit is 10 dBm/MHz.

NOTE 3: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.

RF Output Power at the Lowest Power Level of the TPC Range

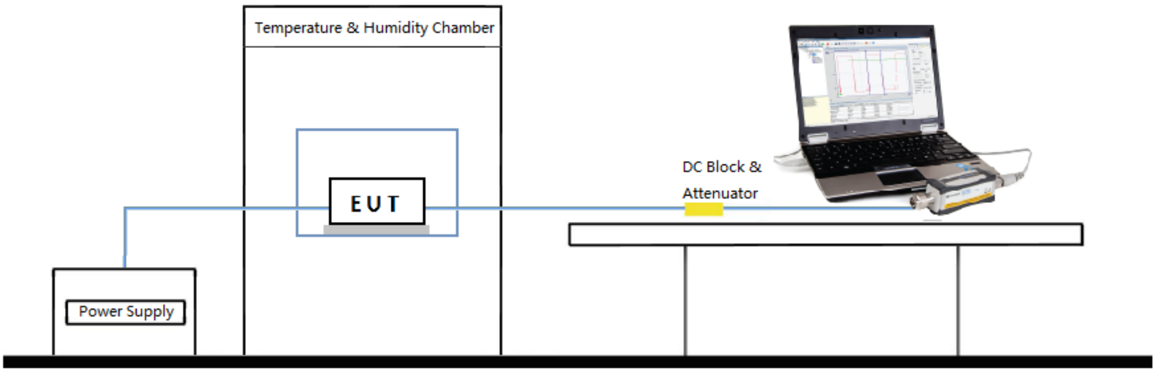
For devices using TPC, the RF output power during a transmission burst when configured to operate at the lowest stated power level of the TPC range shall not exceed the levels given in following table.

For devices without TPC, the limits in table do not apply.

Mean EIRP Limits for RF Output Power at the Lowest Power Level of the TPC Range	
Frequency Range	Mean EIRP [dBm]
5250 MHz to 5350 MHz	17
5470 MHz to 5725 MHz	24 (see note)

Note: Slave devices without a Radar Interference Detection function shall comply with the limits for the band 5250 MHz to 5350 MHz.

6.2. Test Setup



6.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.4.2.1.

6.4. Test Result

Product	802.11ac Dual Band Module	Temperature	-20 ~ 70°C
Test Engineer	Amy Zhang	Relative Humidity	50 ~ 58%
Test Site	TR3	Test Date	2017/01/02
Test Item	RF Output Power		

Normal Conditions (Temperature 25°C)

1Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Max EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11a	36	5180	14.62	14.03	21.75	23	Pass
11a	64	5320	14.42	14.11	21.55	23	Pass
11a	100	5500	18.62	18.61	25.75	30	Pass
11a	140	5700	18.44	18.52	25.65	30	Pass
11n-HT20	36	5180	14.62	14.15	21.87	23	Pass
11n-HT20	64	5320	14.29	14.71	21.96	23	Pass
11n-HT20	100	5500	18.62	18.76	26.01	30	Pass
11n-HT20	140	5700	17.82	18.42	25.67	30	Pass
11ac-VHT20	36	5180	14.53	14.03	22.19	23	Pass
11ac-VHT20	64	5320	14.62	14.25	22.28	23	Pass
11ac-VHT20	100	5500	18.42	18.69	26.35	30	Pass
11ac-VHT20	140	5700	18.62	18.41	26.28	30	Pass
11n-HT40	38	5190	14.36	14.03	21.58	23	Pass
11n-HT40	62	5310	14.36	14.29	21.58	23	Pass
11n-HT40	102	5510	18.52	18.76	25.98	30	Pass
11n-HT40	134	5670	18.62	18.54	25.84	30	Pass
11ac-VHT40	38	5190	14.62	13.36	21.91	23	Pass
11ac-VHT40	62	5310	14.69	14.52	21.98	23	Pass
11ac-VHT40	102	5510	18.62	18.46	25.91	30	Pass
11ac-VHT40	134	5670	18.52	18.41	25.81	30	Pass
11ac-VHT80	42	5210	14.62	14.32	22.58	23	Pass
11ac-VHT80	58	5290	14.29	13.62	22.25	23	Pass
11ac-VHT80	106	5530	18.63	18.46	26.59	30	Pass
11ac-VHT80	122	5610	18.49	18.84	26.80	30	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi) + 10*Log(1/Duty Cycle).

2Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	36	5180	11.36	11.25	21.56	23	Pass
11n-HT20	64	5320	11.54	11.35	21.70	23	Pass
11n-HT20	100	5500	18.24	18.78	28.78	30	Pass
11n-HT20	140	5700	18.66	18.81	28.99	30	Pass
11ac-VHT20	36	5180	12.15	11.64	22.58	23	Pass
11ac-VHT20	64	5320	11.86	11.74	22.47	23	Pass
11ac-VHT20	100	5500	18.26	18.68	29.15	30	Pass
11ac-VHT20	140	5700	18.26	18.26	28.93	30	Pass
11n-HT40	38	5190	11.26	11.63	21.68	23	Pass
11n-HT40	62	5310	11.64	11.42	21.76	23	Pass
11n-HT40	102	5510	18.64	18.59	28.85	30	Pass
11n-HT40	134	5670	18.49	18.48	28.72	30	Pass
11ac-VHT40	38	5190	12.03	11.56	22.10	23	Pass
11ac-VHT40	62	5310	11.84	11.54	21.99	23	Pass
11ac-VHT40	102	5510	18.68	18.24	28.77	30	Pass
11ac-VHT40	134	5670	18.42	18.56	28.79	30	Pass
11ac-VHT80	42	5210	11.92	11.63	22.75	23	Pass
11ac-VHT80	58	5290	11.46	11.2	22.31	23	Pass
11ac-VHT80	106	5530	18.46	18.39	29.40	30	Pass
11ac-VHT80	122	5610	18.55	18.49	29.50	30	Pass

Note: Total EIRP Power(dBm) = 10*log{$10^{(\text{Ant 0 RF Output Power /10})}$+$10^{(\text{Ant 1 RF Output Power /10})}$} + Antenna Gain(dBi) + 10*Log(1/Duty Cycle).

Extreme Conditions (Temperature -20°C / AC 207V)

1Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Max EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11a	36	5180	13.54	12.88	20.67	23	Pass
11a	64	5320	13.41	13.24	20.54	23	Pass
11a	100	5500	17.64	17.35	24.77	30	Pass
11a	140	5700	17.29	17.41	24.54	30	Pass
11n-HT20	36	5180	13.46	13.29	20.71	23	Pass
11n-HT20	64	5320	13.29	13.28	20.54	23	Pass
11n-HT20	100	5500	18.22	17.66	25.47	30	Pass
11n-HT20	140	5700	17.74	17.41	24.99	30	Pass
11ac-VHT20	36	5180	13.46	13.82	21.48	23	Pass
11ac-VHT20	64	5320	13.66	14.94	22.60	23	Pass
11ac-VHT20	100	5500	16.82	17.49	25.15	30	Pass
11ac-VHT20	140	5700	17.55	18.03	25.69	30	Pass
11n-HT40	38	5190	13.44	14.62	21.84	23	Pass
11n-HT40	62	5310	13.55	13.21	20.77	23	Pass
11n-HT40	102	5510	17.68	17.42	24.90	30	Pass
11n-HT40	134	5670	17.48	17.86	25.08	30	Pass
11ac-VHT40	38	5190	13.55	13.29	20.84	23	Pass
11ac-VHT40	62	5310	13.49	12.66	20.78	23	Pass
11ac-VHT40	102	5510	17.52	17.68	24.97	30	Pass
11ac-VHT40	134	5670	17.29	17.69	24.98	30	Pass
11ac-VHT80	42	5210	13.55	13.46	21.51	23	Pass
11ac-VHT80	58	5290	13.49	13.21	21.45	23	Pass
11ac-VHT80	106	5530	17.61	17.49	25.57	30	Pass
11ac-VHT80	122	5610	17.58	17.49	25.54	30	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi) + 10*Log(1/Duty Cycle).

2Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	36	5180	10.42	10.31	20.62	23	Pass
11n-HT20	64	5320	10.66	10.25	20.72	23	Pass
11n-HT20	100	5500	17.24	17.85	27.81	30	Pass
11n-HT20	140	5700	17.49	17.59	27.80	30	Pass
11ac-VHT20	36	5180	10.99	10.64	21.49	23	Pass
11ac-VHT20	64	5320	10.84	10.51	21.35	23	Pass
11ac-VHT20	100	5500	17.19	17.69	28.12	30	Pass
11ac-VHT20	140	5700	17.46	17.58	28.19	30	Pass
11n-HT40	38	5190	10.25	10.68	20.70	23	Pass
11n-HT40	62	5310	10.69	10.49	20.82	23	Pass
11n-HT40	102	5510	17.64	17.55	27.83	30	Pass
11n-HT40	134	5670	17.49	17.63	27.79	30	Pass
11ac-VHT40	38	5190	11.24	10.62	21.24	23	Pass
11ac-VHT40	62	5310	10.49	10.53	20.81	23	Pass
11ac-VHT40	102	5510	17.69	17.33	27.81	30	Pass
11ac-VHT40	134	5670	17.36	17.91	27.94	30	Pass
11ac-VHT80	42	5210	10.94	10.66	21.78	23	Pass
11ac-VHT80	58	5290	10.69	10.24	21.45	23	Pass
11ac-VHT80	106	5530	17.81	17.48	28.62	30	Pass
11ac-VHT80	122	5610	17.59	17.68	28.61	30	Pass

Note: Total EIRP Power(dBm) = $10*\log\{10^{(\text{Ant 0 RF Output Power}/10)}+10^{(\text{Ant 1 RF Output Power}/10)}\}$ + Antenna Gain(dBi) + 10*Log(1/Duty Cycle).

Extreme Conditions (Temperature -20°C / AC 253V)

1Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Max EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11a	36	5180	13.48	12.91	20.61	23	Pass
11a	64	5320	13.29	13.25	20.42	23	Pass
11a	100	5500	17.59	17.24	24.72	30	Pass
11a	140	5700	17.19	17.34	24.47	30	Pass
11n-HT20	36	5180	13.52	13.27	20.77	23	Pass
11n-HT20	64	5320	13.51	13.42	20.76	23	Pass
11n-HT20	100	5500	18.11	17.49	25.36	30	Pass
11n-HT20	140	5700	17.81	17.62	25.06	30	Pass
11ac-VHT20	36	5180	13.52	13.95	21.61	23	Pass
11ac-VHT20	64	5320	13.78	14.68	22.34	23	Pass
11ac-VHT20	100	5500	16.59	17.81	25.47	30	Pass
11ac-VHT20	140	5700	17.49	17.86	25.52	30	Pass
11n-HT40	38	5190	13.64	14.59	21.81	23	Pass
11n-HT40	62	5310	13.69	13.48	20.91	23	Pass
11n-HT40	102	5510	17.81	17.29	25.03	30	Pass
11n-HT40	134	5670	17.59	17.88	25.10	30	Pass
11ac-VHT40	38	5190	13.69	13.51	20.98	23	Pass
11ac-VHT40	62	5310	13.59	12.94	20.88	23	Pass
11ac-VHT40	102	5510	17.49	17.48	24.78	30	Pass
11ac-VHT40	134	5670	17.49	17.59	24.88	30	Pass
11ac-VHT80	42	5210	13.36	13.55	21.51	23	Pass
11ac-VHT80	58	5290	13.29	13.42	21.38	23	Pass
11ac-VHT80	106	5530	17.49	17.23	25.45	30	Pass
11ac-VHT80	122	5610	17.78	17.68	25.74	30	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi) + 10*Log(1/Duty Cycle).

2Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	36	5180	10.55	10.39	20.73	23	Pass
11n-HT20	64	5320	10.58	10.42	20.76	23	Pass
11n-HT20	100	5500	17.55	17.49	27.78	30	Pass
11n-HT20	140	5700	17.69	17.48	27.85	30	Pass
11ac-VHT20	36	5180	11.24	10.84	21.72	23	Pass
11ac-VHT20	64	5320	10.94	10.66	21.48	23	Pass
11ac-VHT20	100	5500	17.28	17.71	28.17	30	Pass
11ac-VHT20	140	5700	17.68	17.49	28.26	30	Pass
11n-HT40	38	5190	10.39	10.59	20.72	23	Pass
11n-HT40	62	5310	10.72	10.61	20.90	23	Pass
11n-HT40	102	5510	17.59	17.42	27.74	30	Pass
11n-HT40	134	5670	17.24	17.35	27.53	30	Pass
11ac-VHT40	38	5190	11.39	10.82	21.41	23	Pass
11ac-VHT40	62	5310	10.62	10.73	20.98	23	Pass
11ac-VHT40	102	5510	17.81	17.29	27.86	30	Pass
11ac-VHT40	134	5670	17.42	17.81	27.92	30	Pass
11ac-VHT80	42	5210	10.99	10.53	21.74	23	Pass
11ac-VHT80	58	5290	10.71	10.35	21.51	23	Pass
11ac-VHT80	106	5530	17.91	17.51	28.69	30	Pass
11ac-VHT80	122	5610	17.91	17.66	28.76	30	Pass

Note: Total EIRP Power(dBm) = 10*log{$10^{(\text{Ant 0 RF Output Power }/10)}$+$10^{(\text{Ant 1 RF Output Power }/10)}$} + Antenna Gain(dBi) + 10*Log(1/Duty Cycle).

Extreme Conditions (Temperature 70°C / AC 207V)

1Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Max EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11a	36	5180	15.61	14.82	22.74	23	Pass
11a	64	5320	15.68	15.48	22.81	23	Pass
11a	100	5500	19.28	19.58	26.71	30	Pass
11a	140	5700	19.42	19.62	26.75	30	Pass
11n-HT20	36	5180	15.48	15.29	22.73	23	Pass
11n-HT20	64	5320	15.39	15.49	22.74	23	Pass
11n-HT20	100	5500	19.52	19.49	26.77	30	Pass
11n-HT20	140	5700	19.55	19.61	26.86	30	Pass
11ac-VHT20	36	5180	14.84	14.29	22.50	23	Pass
11ac-VHT20	64	5320	14.42	15.24	22.90	23	Pass
11ac-VHT20	100	5500	19.26	19.46	27.12	30	Pass
11ac-VHT20	140	5700	19.46	19.24	27.12	30	Pass
11n-HT40	38	5190	15.32	14.33	22.54	23	Pass
11n-HT40	62	5310	15.35	15.35	22.57	23	Pass
11n-HT40	102	5510	19.26	19.74	26.96	30	Pass
11n-HT40	134	5670	19.68	19.46	26.90	30	Pass
11ac-VHT40	38	5190	15.59	14.64	22.88	23	Pass
11ac-VHT40	62	5310	15.62	15.48	22.91	23	Pass
11ac-VHT40	102	5510	19.48	19.28	26.77	30	Pass
11ac-VHT40	134	5670	19.24	19.20	26.53	30	Pass
11ac-VHT80	42	5210	14.41	14.86	22.82	23	Pass
11ac-VHT80	58	5290	14.26	13.85	22.22	23	Pass
11ac-VHT80	106	5530	19.24	19.34	27.30	30	Pass
11ac-VHT80	122	5610	19.22	19.24	27.20	30	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi) + 10*Log(1/Duty Cycle).

2Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	36	5180	12.34	12.06	22.46	23	Pass
11n-HT20	64	5320	12.19	12.24	22.47	23	Pass
11n-HT20	100	5500	19.52	19.61	29.82	30	Pass
11n-HT20	140	5700	19.46	19.49	29.73	30	Pass
11ac-VHT20	36	5180	11.64	11.58	22.28	23	Pass
11ac-VHT20	64	5320	11.91	11.55	22.41	23	Pass
11ac-VHT20	100	5500	19.24	19.03	29.81	30	Pass
11ac-VHT20	140	5700	19.11	19.24	29.85	30	Pass
11n-HT40	38	5190	12.62	11.86	22.49	23	Pass
11n-HT40	62	5310	12.35	12.22	22.52	23	Pass
11n-HT40	102	5510	19.33	19.24	29.52	30	Pass
11n-HT40	134	5670	19.28	19.26	29.50	30	Pass
11ac-VHT40	38	5190	12.77	12.19	22.79	23	Pass
11ac-VHT40	62	5310	12.51	12.26	22.69	23	Pass
11ac-VHT40	102	5510	19.29	19.24	29.57	30	Pass
11ac-VHT40	134	5670	19.24	19.55	29.70	30	Pass
11ac-VHT80	42	5210	11.81	11.29	22.53	23	Pass
11ac-VHT80	58	5290	11.59	11.77	22.66	23	Pass
11ac-VHT80	106	5530	18.62	18.49	29.53	30	Pass
11ac-VHT80	122	5610	18.42	18.61	29.49	30	Pass

Note: Total EIRP Power(dBm) = 10*log{$10^{(\text{Ant 0 RF Output Power}/10)}$+$10^{(\text{Ant 1 RF Output Power}/10)}$} + Antenna Gain(dBi) + 10*Log(1/Duty Cycle).

Extreme Conditions (Temperature 70°C / AC 253V)

1Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Max EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11a	36	5180	15.48	14.77	22.61	23	Pass
11a	64	5320	15.49	15.39	22.62	23	Pass
11a	100	5500	19.33	19.46	26.59	30	Pass
11a	140	5700	19.46	19.55	26.68	30	Pass
11n-HT20	36	5180	15.35	15.36	22.61	23	Pass
11n-HT20	64	5320	15.59	15.41	22.84	23	Pass
11n-HT20	100	5500	19.36	19.29	26.61	30	Pass
11n-HT20	140	5700	19.46	19.54	26.79	30	Pass
11ac-VHT20	36	5180	14.75	14.39	22.41	23	Pass
11ac-VHT20	64	5320	14.29	15.24	22.90	23	Pass
11ac-VHT20	100	5500	19.22	19.61	27.27	30	Pass
11ac-VHT20	140	5700	19.55	19.35	27.21	30	Pass
11n-HT40	38	5190	15.29	14.85	22.51	23	Pass
11n-HT40	62	5310	15.64	15.46	22.86	23	Pass
11n-HT40	102	5510	19.33	19.64	26.86	30	Pass
11n-HT40	134	5670	19.28	19.44	26.66	30	Pass
11ac-VHT40	38	5190	15.36	14.55	22.65	23	Pass
11ac-VHT40	62	5310	15.29	15.28	22.58	23	Pass
11ac-VHT40	102	5510	19.26	19.66	26.95	30	Pass
11ac-VHT40	134	5670	19.33	19.24	26.62	30	Pass
11ac-VHT80	42	5210	14.22	14.81	22.77	23	Pass
11ac-VHT80	58	5290	14.14	13.77	22.10	23	Pass
11ac-VHT80	106	5530	19.06	19.13	27.09	30	Pass
11ac-VHT80	122	5610	19.03	19.61	27.57	30	Pass

Note: EIRP Power (dBm) = RF Output Power (dBm) + Antenna Gain (dBi) + 10*Log(1/Duty Cycle).

2Tx

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	36	5180	12.24	11.95	22.36	23	Pass
11n-HT20	64	5320	12.03	12.21	22.38	23	Pass
11n-HT20	100	5500	19.32	19.48	29.66	30	Pass
11n-HT20	140	5700	19.42	19.64	29.79	30	Pass
11ac-VHT20	36	5180	11.84	11.63	22.41	23	Pass
11ac-VHT20	64	5320	11.82	11.64	22.40	23	Pass
11ac-VHT20	100	5500	19.33	19.14	29.91	30	Pass
11ac-VHT20	140	5700	19.03	19.33	29.86	30	Pass
11n-HT40	38	5190	12.42	11.66	22.29	23	Pass
11n-HT40	62	5310	12.21	12.03	22.35	23	Pass
11n-HT40	102	5510	19.28	19.35	29.55	30	Pass
11n-HT40	134	5670	19.31	19.36	29.57	30	Pass
11ac-VHT40	38	5190	12.55	12.31	22.73	23	Pass
11ac-VHT40	62	5310	12.49	12.48	22.79	23	Pass
11ac-VHT40	102	5510	19.05	19.34	29.50	30	Pass
11ac-VHT40	134	5670	19.03	19.48	29.56	30	Pass
11ac-VHT80	42	5210	11.74	11.05	22.38	23	Pass
11ac-VHT80	58	5290	11.42	11.64	22.51	23	Pass
11ac-VHT80	106	5530	18.43	18.35	29.37	30	Pass
11ac-VHT80	122	5610	18.36	18.43	29.37	30	Pass

Note: Total EIRP Power(dBm) = 10*log{$10^{(\text{Ant 0 RF Output Power /10})}$+$10^{(\text{Ant 1 RF Output Power /10})}$} + Antenna Gain(dBi) + 10*Log(1/Duty Cycle).

Product	802.11ac Dual Band Module	Temperature	-20 ~ 70°C
Test Engineer	Amy Zhang	Relative Humidity	50 ~ 58%
Test Site	TR3	Test Date	2017/01/02
Test Item	Transmit Power Control (TPC)		

Normal Conditions (Temperature 25°C)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	64	5320	2.11	1.65	12.14	17	Pass
11n-HT20	100	5500	10.84	11.26	21.31	24	Pass
11n-HT20	140	5700	10.21	10.35	20.54	24	Pass
11ac-VHT20	64	5320	3.03	2.64	13.51	17	Pass
11ac-VHT20	100	5500	10.84	11.25	21.72	24	Pass
11ac-VHT20	140	5700	9.85	10.68	20.96	24	Pass
11n-HT40	62	5310	2.68	2.69	12.92	17	Pass
11n-HT40	102	5510	10.81	10.59	20.93	24	Pass
11n-HT40	134	5670	10.68	10.59	20.87	24	Pass
11ac-VHT40	62	5310	2.81	2.61	13.01	17	Pass
11ac-VHT40	102	5510	11.16	10.69	21.23	24	Pass
11ac-VHT40	134	5670	9.76	9.82	20.09	24	Pass
11ac-VHT80	58	5290	2.64	2.21	13.41	17	Pass
11ac-VHT80	106	5530	10.58	10.66	21.60	24	Pass
11ac-VHT80	122	5610	10.15	10.36	21.23	24	Pass

Note: Total EIRP Power(dBm) = $10*\log\{10^{(\text{Ant 0 RF Output Power}/10)}+10^{(\text{Ant 1 RF Output Power}/10)}+10^{(\text{Ant 2 RF Output Power}/10)}\}$ + Antenna Gain(dBi) + 10*Log(1/Duty Cycle)

Extreme Conditions (Temperature -20°C / AC 207V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	64	5320	1.15	0.84	11.26	17	Pass
11n-HT20	100	5500	9.69	10.36	20.30	24	Pass
11n-HT20	140	5700	8.99	9.38	19.45	24	Pass
11ac-VHT20	64	5320	1.88	1.49	12.36	17	Pass
11ac-VHT20	100	5500	9.64	9.86	20.42	24	Pass
11ac-VHT20	140	5700	8.74	9.48	19.80	24	Pass
11n-HT40	62	5310	1.66	1.81	11.97	17	Pass
11n-HT40	102	5510	9.46	9.48	19.70	24	Pass
11n-HT40	134	5670	9.64	9.44	19.77	24	Pass
11ac-VHT40	62	5310	1.87	1.85	12.16	17	Pass
11ac-VHT40	102	5510	9.76	9.46	19.91	24	Pass
11ac-VHT40	134	5670	8.61	8.47	18.84	24	Pass
11ac-VHT80	58	5290	1.66	1.24	12.43	17	Pass
11ac-VHT80	106	5530	9.48	9.78	20.61	24	Pass
11ac-VHT80	122	5610	9.25	9.36	20.28	24	Pass

Note: Total EIRP Power(dBm) = $10*\log\{10^{(\text{Ant 0 RF Output Power}/10)}+10^{(\text{Ant 1 RF Output Power}/10)}+10^{(\text{Ant 2 RF Output Power}/10)}\}$ + Antenna Gain(dBi) + 10*Log(1/Duty Cycle)

Extreme Conditions (Temperature -20°C / AC 253V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	64	5320	1.26	0.99	11.39	17	Pass
11n-HT20	100	5500	9.85	10.54	20.47	24	Pass
11n-HT20	140	5700	8.79	9.41	19.37	24	Pass
11ac-VHT20	64	5320	1.92	1.52	12.40	17	Pass
11ac-VHT20	100	5500	9.84	10.11	20.65	24	Pass
11ac-VHT20	140	5700	8.89	9.69	19.98	24	Pass
11n-HT40	62	5310	1.55	1.63	11.82	17	Pass
11n-HT40	102	5510	9.28	9.35	19.55	24	Pass
11n-HT40	134	5670	9.81	9.46	19.87	24	Pass
11ac-VHT40	62	5310	1.64	1.92	12.08	17	Pass
11ac-VHT40	102	5510	9.86	9.68	20.07	24	Pass
11ac-VHT40	134	5670	8.82	8.59	19.01	24	Pass
11ac-VHT80	58	5290	1.76	1.43	12.57	17	Pass
11ac-VHT80	106	5530	9.58	9.82	20.68	24	Pass
11ac-VHT80	122	5610	9.38	9.47	20.40	24	Pass

Note: Total EIRP Power(dBm) = 10*log{$10^{(\text{Ant 0 RF Output Power }/10)}+10^{(\text{Ant 1 RF Output Power }/10)}+10^{(\text{Ant 2 RF Output Power }/10)}$} + Antenna Gain(dBi) + 10*Log(1/Duty Cycle)

Extreme Conditions (Temperature 70°C / AC 207V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	64	5320	3.91	3.58	14.01	17	Pass
11n-HT20	100	5500	11.48	12.51	22.28	24	Pass
11n-HT20	140	5700	10.91	11.24	21.34	24	Pass
11ac-VHT20	64	5320	3.55	3.61	14.25	17	Pass
11ac-VHT20	100	5500	11.24	11.52	22.06	24	Pass
11ac-VHT20	140	5700	11.06	11.26	21.83	24	Pass
11n-HT40	62	5310	3.61	3.29	13.68	17	Pass
11n-HT40	102	5510	11.82	11.52	21.90	24	Pass
11n-HT40	134	5670	11.68	11.62	21.88	24	Pass
11ac-VHT40	62	5310	3.42	3.52	13.77	17	Pass
11ac-VHT40	102	5510	11.69	11.36	21.83	24	Pass
11ac-VHT40	134	5670	10.42	10.55	20.79	24	Pass
11ac-VHT80	58	5290	3.26	2.75	13.99	17	Pass
11ac-VHT80	106	5530	10.39	10.45	21.40	24	Pass
11ac-VHT80	122	5610	10.24	10.14	21.17	24	Pass

Note: Total EIRP Power(dBm) = $10*\log\{10^{(\text{Ant 0 RF Output Power}/10)}+10^{(\text{Ant 1 RF Output Power}/10)}+10^{(\text{Ant 2 RF Output Power}/10)}\}$ + Antenna Gain(dBi) + 10*Log(1/Duty Cycle)

Extreme Conditions (Temperature 70°C / AC 253V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)		Total EIRP Power (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1			
11n-HT20	64	5320	3.86	3.66	14.02	17	Pass
11n-HT20	100	5500	11.59	12.48	22.32	24	Pass
11n-HT20	140	5700	10.86	11.43	21.41	24	Pass
11ac-VHT20	64	5320	3.64	3.85	14.42	17	Pass
11ac-VHT20	100	5500	11.39	11.81	22.28	24	Pass
11ac-VHT20	140	5700	11.36	11.42	22.06	24	Pass
11n-HT40	62	5310	3.82	3.46	13.87	17	Pass
11n-HT40	102	5510	11.64	11.35	21.73	24	Pass
11n-HT40	134	5670	11.58	11.42	21.73	24	Pass
11ac-VHT40	62	5310	3.29	3.42	13.66	17	Pass
11ac-VHT40	102	5510	11.46	11.24	21.65	24	Pass
11ac-VHT40	134	5670	10.36	10.35	20.66	24	Pass
11ac-VHT80	58	5290	3.03	2.84	13.91	17	Pass
11ac-VHT80	106	5530	10.16	10.24	21.18	24	Pass
11ac-VHT80	122	5610	10.16	10.35	21.23	24	Pass

Note: Total EIRP Power(dBm) = 10*log{$10^{(\text{Ant 0 RF Output Power /10})}$+$10^{(\text{Ant 1 RF Output Power /10})}$ +$10^{(\text{Ant 2 RF Output Power /10})}$} + Antenna Gain(dBi) + 10*Log(1/Duty Cycle)

Product	802.11ac Dual Band Module	Temperature	24°C
Test Engineer	Amy Zhang	Relative Humidity	54%
Test Site	TR3	Test Date	2017/01/05
Test Item	Power Density		

1Tx

Mode	Ch. No.	Freq. (MHz)	Power Density (dBm/MHz)		Max Power Density (dBm/MHz)	Limit (dBm/MHz)	Result
			Ant 0	Ant 1			
11a	36	5180	2.78	2.68	9.91	10	Pass
11a	64	5320	2.29	2.49	9.62	10	Pass
11a	100	5500	7.26	8.16	15.29	17	Pass
11a	140	5700	7.59	7.55	14.72	17	Pass
11n-HT20	36	5180	2.43	2.49	9.74	10	Pass
11n-HT20	64	5320	2.69	2.55	9.94	10	Pass
11n-HT20	100	5500	6.82	7.81	15.06	17	Pass
11n-HT20	140	5700	8.11	7.35	15.36	17	Pass
11ac-VHT20	36	5180	2.29	2.24	9.95	10	Pass
11ac-VHT20	64	5320	2.15	2.18	9.84	10	Pass
11ac-VHT20	100	5500	6.83	8.19	15.85	17	Pass
11ac-VHT20	140	5700	7.69	7.24	15.35	17	Pass
11n-HT40	38	5190	-1.35	-1.62	5.87	10	Pass
11n-HT40	62	5310	-1.41	-1.34	5.88	10	Pass
11n-HT40	102	5510	3.25	3.42	10.64	17	Pass
11n-HT40	134	5670	3.29	3.19	10.51	17	Pass
11ac-VHT40	38	5190	0.62	-0.38	7.91	10	Pass
11ac-VHT40	62	5310	-0.25	0.41	7.70	10	Pass
11ac-VHT40	102	5510	4.26	4.75	12.04	17	Pass
11ac-VHT40	134	5670	3.64	3.76	11.05	17	Pass
11ac-VHT80	42	5210	-3.25	-3.29	4.71	10	Pass
11ac-VHT80	58	5290	-3.19	-3.31	4.77	10	Pass
11ac-VHT80	106	5530	0.55	0.47	8.51	17	Pass
11ac-VHT80	122	5610	0.29	0.66	8.62	17	Pass

Note: Max Power Density (dBm/MHz) = Power Density + Antenna Gain + 10*Log(1/Duty Cycle).

2Tx

Mode	Ch. No.	Freq. (MHz)	Power Density (dBm/MHz)		Total Power Density (dBm/MHz)	Limit (dBm/MHz)	Result
			Ant 0	Ant 1			
11n-HT20	36	5180	-0.24	-0.91	9.70	10	Pass
11n-HT20	64	5320	-0.68	-0.84	9.50	10	Pass
11n-HT20	100	5500	5.75	6.85	16.59	17	Pass
11n-HT20	140	5700	6.48	6.03	16.52	17	Pass
11ac-VHT20	36	5180	-0.88	-1.25	9.61	10	Pass
11ac-VHT20	64	5320	-1.03	-1.54	9.40	10	Pass
11ac-VHT20	100	5500	5.44	6.57	16.71	17	Pass
11ac-VHT20	140	5700	6.26	5.88	16.75	17	Pass
11n-HT40	38	5190	-2.85	-2.94	7.34	10	Pass
11n-HT40	62	5310	-2.74	-2.88	7.42	10	Pass
11n-HT40	102	5510	4.24	3.84	14.27	17	Pass
11n-HT40	134	5670	5.14	4.58	15.10	17	Pass
11ac-VHT40	38	5190	-2.33	-2.47	7.90	10	Pass
11ac-VHT40	62	5310	-2.47	-2.58	7.78	10	Pass
11ac-VHT40	102	5510	3.36	4.03	14.01	17	Pass
11ac-VHT40	134	5670	4.91	4.58	15.05	17	Pass
11ac-VHT80	42	5210	-5.46	-5.14	5.68	10	Pass
11ac-VHT80	58	5290	-5.36	-5.03	5.78	10	Pass
11ac-VHT80	106	5530	-2.03	-1.77	9.08	17	Pass
11ac-VHT80	122	5610	-1.94	-1.85	9.08	17	Pass

Note: Total Power Density(dBm/MHz) = $10*\log\{10^{(\text{Ant 0 Power Density}/10)}+10^{(\text{Ant 1 Power Density}/10)}\}$ + Antenna Gain(dBi) + 10*Log(1/Duty Cycle).

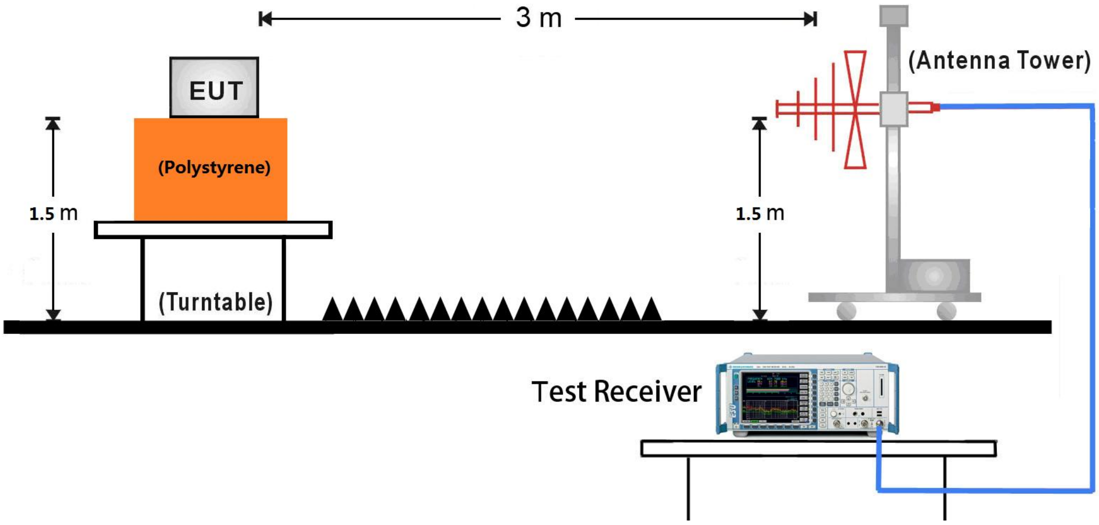
7. Transmitter Unwanted Emissions Outside the 5GHz RLAN Bands

7.1. Limit

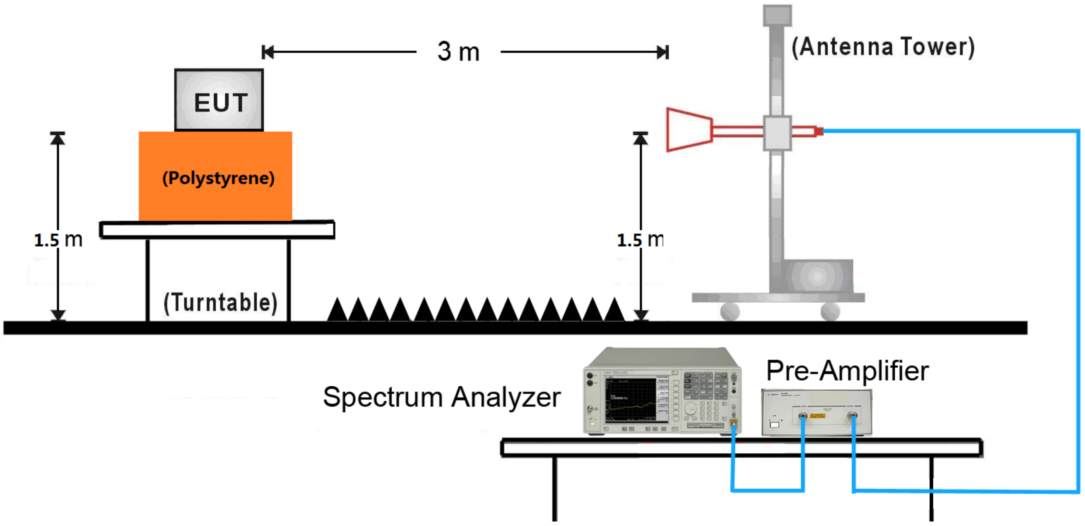
Frequency Range	Maximum Power	Bandwidth
30 MHz to 47 MHz	-36dBm	100 kHz
47 MHz to 74 MHz	-54dBm	100 kHz
74 MHz to 87.5 MHz	-36dBm	100 kHz
87.5 MHz to 118 MHz	-54dBm	100 kHz
118 MHz to 174 MHz	-36dBm	100 kHz
174 MHz to 230 MHz	-54dBm	100 kHz
230 MHz to 470 MHz	-36dBm	100 kHz
470 MHz to 862 MHz	-54dBm	100 kHz
862 MHz to 1 GHz	-36dBm	100 kHz
1 GHz to 5.15 GHz	-30dBm	1 MHz
5.35 GHz to 5.47 GHz	-30dBm	1 MHz
5.725 GHz to 26.5 GHz	-30dBm	1 MHz

7.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



7.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.5.2.2.

7.4. Test Result

Test with ANT 2#

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11a - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	62.0	-84.6	22.9	-61.7	-54.0	-7.7	PK	Horizontal
	97.4	-77.6	14.7	-62.9	-54.0	-8.9	PK	Horizontal
	72.7	-89.4	25.9	-63.5	-54.0	-9.5	PK	Vertical
	750.2	-98.6	35.3	-63.3	-54.0	-9.3	PK	Vertical
	7596.0	-64.6	21.5	-43.1	-30.0	-13.1	PK	Horizontal
	14744.5	-74.9	29.8	-45.1	-30.0	-15.1	PK	Horizontal
	7596.0	-69.4	21.9	-47.5	-30.0	-17.5	PK	Vertical
	14702.0	-75.4	31.2	-44.2	-30.0	-14.2	PK	Vertical
100	62.5	-87.6	22.9	-64.7	-54.0	-10.7	PK	Horizontal
	190.1	-85.4	23.8	-61.6	-54.0	-7.6	PK	Horizontal
	57.2	-85.4	22.0	-63.4	-54.0	-9.4	PK	Vertical
	200.2	-86.9	22.5	-64.4	-54.0	-10.4	PK	Vertical
	7596.0	-67.9	21.5	-46.4	-30.0	-16.4	PK	Horizontal
	10826.0	-76.4	29.6	-46.8	-30.0	-16.8	PK	Horizontal
	7596.0	-71.2	21.9	-49.3	-30.0	-19.3	PK	Vertical
	14583.0	-72.9	30.8	-42.1	-30.0	-12.1	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT20 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	63.0	-86.0	22.8	-63.2	-54.0	-9.2	PK	Horizontal
	190.1	-86.8	23.8	-63.0	-54.0	-9.0	PK	Horizontal
	55.2	-84.2	21.8	-62.4	-54.0	-8.4	PK	Vertical
	197.8	-87.0	22.4	-64.6	-54.0	-10.6	PK	Vertical
	7094.5	-57.6	21.6	-36.0	-30.0	-6.0	PK	Horizontal
	11506.0	-73.0	28.8	-44.2	-30.0	-14.2	PK	Horizontal
	7093.3	-54.4	21.9	-32.5	-30.0	-2.5	RMS	Vertical
	14353.5	-74.0	31.0	-43.0	-30.0	-13.0	PK	Vertical
100	62.5	-85.1	22.9	-62.2	-54.0	-8.2	PK	Horizontal
	675.1	-97.3	32.7	-64.6	-54.0	-10.6	PK	Horizontal
	66.9	-85.7	24.7	-61.0	-54.0	-7.0	PK	Vertical
	750.2	-96.3	35.3	-61.0	-54.0	-7.0	PK	Vertical
	7332.5	-64.1	22.1	-42.0	-30.0	-12.0	PK	Horizontal
	10919.5	-73.9	29.8	-44.1	-30.0	-14.1	PK	Horizontal
	7332.5	-65.5	22.1	-43.4	-30.0	-13.4	PK	Vertical
	10979.0	-73.9	29.4	-44.5	-30.0	-14.5	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT40 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	62.5	-84.5	22.9	-61.6	-54.0	-7.6	PK	Horizontal
	750.2	-95.5	35.6	-59.9	-54.0	-5.9	RMS	Horizontal
	66.9	-85.5	24.7	-60.8	-54.0	-6.8	PK	Vertical
	750.2	-96.2	35.3	-60.9	-54.0	-6.9	PK	Vertical
	7094.5	-57.0	21.6	-35.4	-30.0	-5.4	RMS	Horizontal
	10919.5	-74.2	29.8	-44.4	-30.0	-14.4	PK	Horizontal
	7093.3	-54.2	21.9	-32.3	-30.0	-2.3	RMS	Vertical
	13724.5	-72.3	30.1	-42.2	-30.0	-12.2	PK	Vertical
102	61.5	-85.1	22.7	-62.4	-54.0	-8.4	PK	Horizontal
	749.7	-95.2	35.6	-59.6	-54.0	-5.6	RMS	Horizontal
	66.9	-85.7	24.7	-61.0	-54.0	-7.0	PK	Vertical
	750.2	-98.4	35.3	-63.1	-54.0	-9.1	PK	Vertical
	7358.0	-63.3	22.1	-41.2	-30.0	-11.2	PK	Horizontal
	10877.0	-74.0	29.7	-44.3	-30.0	-14.3	PK	Horizontal
	7358.0	-63.8	22.3	-41.5	-30.0	-11.5	PK	Vertical
	11038.5	-72.6	29.2	-43.4	-30.0	-13.4	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT20 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	62.0	-85.0	22.9	-62.1	-54.0	-8.1	PK	Horizontal
	190.1	-84.7	23.8	-60.9	-54.0	-6.9	PK	Horizontal
	66.4	-86.1	24.7	-61.4	-54.0	-7.4	PK	Vertical
	750.2	-96.4	35.3	-61.1	-54.0	-7.1	PK	Vertical
	7094.5	-58.6	21.6	-37.0	-30.0	-7.0	PK	Horizontal
	10868.5	-73.8	29.5	-44.3	-30.0	-14.3	PK	Horizontal
	7093.2	-54.6	21.9	-32.7	-30.0	-2.7	RMS	Vertical
	14158.0	-73.6	31.0	-42.6	-30.0	-12.6	PK	Vertical
100	90.6	-78.4	15.7	-62.7	-54.0	-8.7	PK	Horizontal
	750.2	-95.4	35.6	-59.8	-54.0	-5.8	RMS	Horizontal
	66.9	-85.1	24.7	-60.4	-54.0	-6.4	PK	Vertical
	500.0	-90.9	29.8	-61.1	-54.0	-7.1	PK	Vertical
	7332.5	-66.7	22.1	-44.6	-30.0	-14.6	PK	Horizontal
	10911.0	-74.9	30.1	-44.8	-30.0	-14.8	PK	Horizontal
	7332.5	-66.0	22.1	-43.9	-30.0	-13.9	PK	Vertical
	10894.0	-73.8	29.8	-44.0	-30.0	-14.0	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT40 - Ant 0 + 1 + 2	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	62.5	-85.4	22.9	-62.5	-54.0	-8.5	PK	Horizontal
	190.1	-85.1	23.8	-61.3	-54.0	-7.3	PK	Horizontal
	66.9	-85.9	24.7	-61.2	-54.0	-7.2	PK	Vertical
	500.0	-91.2	29.8	-61.4	-54.0	-7.4	PK	Vertical
	7077.5	-64.6	21.5	-43.1	-30.0	-13.1	PK	Horizontal
	11030.0	-74.2	29.3	-44.9	-30.0	-14.9	PK	Horizontal
	7077.5	-58.6	21.6	-37.0	-30.0	-7.0	PK	Vertical
	11064.0	-74.8	29.2	-45.6	-30.0	-15.6	PK	Vertical
102	62.0	-85.2	22.9	-62.3	-54.0	-8.3	PK	Horizontal
	625.1	-92.7	32.6	-60.1	-54.0	-6.1	PK	Horizontal
	66.9	-85.8	24.7	-61.1	-54.0	-7.1	PK	Vertical
	201.2	-84.9	22.4	-62.5	-54.0	-8.5	PK	Vertical
	7349.5	-66.7	22.0	-44.7	-30.0	-14.7	PK	Horizontal
	10902.5	-74.3	29.8	-44.5	-30.0	-14.5	PK	Horizontal
	7349.5	-67.4	22.4	-45.0	-30.0	-15.0	PK	Vertical
	10885.5	-75.2	29.7	-45.5	-30.0	-15.5	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT80 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	61.5	-85.3	22.7	-62.6	-54.0	-8.6	PK	Horizontal
	750.2	-96.0	35.6	-60.4	-54.0	-6.4	PK	Horizontal
	66.9	-86.2	24.7	-61.5	-54.0	-7.5	PK	Vertical
	201.7	-85.5	22.3	-63.2	-54.0	-9.2	PK	Vertical
	7043.5	-62.0	21.1	-40.9	-30.0	-10.9	PK	Horizontal
	10902.5	-74.3	29.8	-44.5	-30.0	-14.5	PK	Horizontal
	7040.0	-54.9	21.5	-33.4	-30.0	-3.4	RMS	Vertical
	10919.5	-75.6	29.7	-45.9	-30.0	-15.9	PK	Vertical
102	61.5	-84.9	22.7	-62.2	-54.0	-8.2	PK	Horizontal
	749.7	-97.2	35.6	-61.6	-54.0	-7.6	PK	Horizontal
	66.4	-85.8	24.7	-61.1	-54.0	-7.1	PK	Vertical
	750.2	-96.7	35.3	-61.4	-54.0	-7.4	PK	Vertical
	7358.0	-67.2	22.1	-45.1	-30.0	-15.1	PK	Horizontal
	13877.5	-73.9	29.8	-44.1	-30.0	-14.1	PK	Horizontal
	7358.0	-68.4	22.3	-46.1	-30.0	-16.1	PK	Vertical
	14676.5	-74.8	31.4	-43.4	-30.0	-13.4	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test with ANT 3#

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11a - Ant 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	559.4	-91.6	31.5	-60.1	-54	-6.1	PK	Horizontal
	579.3	-95.7	31.2	-64.5	-54	-10.5	PK	Horizontal
	559.4	-91.8	30.2	-61.6	-54	-7.6	PK	Vertical
	850.9	-95.1	35.9	-59.2	-54	-5.2	PK	Vertical
	9346.3	-73.7	27.1	-46.6	-30	-16.6	PK	Horizontal
	12992.8	-74.6	31.5	-43.1	-30	-13.1	PK	Horizontal
	9312.3	-72.6	28.6	-44.0	-30	-14.0	PK	Vertical
	12992.8	-74.9	32.2	-42.7	-30	-12.7	PK	Vertical
100	66.6	-88.2	20.2	-68.0	-54	-14.0	PK	Horizontal
	559.4	-92.0	31.5	-60.5	-54	-6.5	PK	Horizontal
	64.2	-89.4	22.3	-67.1	-54	-13.1	PK	Vertical
	559.4	-92.0	30.2	-61.8	-54	-7.8	PK	Vertical
	9023.3	-72.7	26.1	-46.6	-30	-16.6	PK	Horizontal
	14803.3	-74.6	34.1	-40.5	-30	-10.5	PK	Horizontal
	9669.3	-72.9	28.7	-44.2	-30	-14.2	PK	Vertical
	13672.8	-73.5	31.8	-41.7	-30	-11.7	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT20 - Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	64.7	-89.7	20.5	-69.2	-54	-15.2	PK	Horizontal
	559.4	-92.1	31.5	-60.6	-54	-6.6	PK	Horizontal
	64.7	-89.1	22.1	-67.0	-54	-13.0	PK	Vertical
	559.4	-92.1	30.2	-61.9	-54	-7.9	PK	Vertical
	11624.3	-74.5	31.1	-43.4	-30	-13.4	PK	Horizontal
	14820.3	-74.3	34.1	-40.2	-30	-10.2	PK	Horizontal
	8691.8	-72.6	27.0	-45.6	-30	-15.6	PK	Vertical
	13791.8	-74.7	32.4	-42.3	-30	-12.3	PK	Vertical
100	559.4	-93.6	31.5	-62.1	-54	-8.1	PK	Horizontal
	839.3	-96.1	35.0	-61.1	-54	-7.1	PK	Horizontal
	65.2	-87.1	21.9	-65.2	-54	-11.2	PK	Vertical
	559.4	-91.7	30.2	-61.5	-54	-7.5	PK	Vertical
	9720.3	-72.2	27.3	-44.9	-30	-14.9	PK	Horizontal
	14794.8	-74.3	34.2	-40.1	-30	-10.1	PK	Horizontal
	7450.8	-72.2	25.4	-46.8	-30	-16.8	PK	Vertical
	10944.3	-74.1	30.5	-43.6	-30	-13.6	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT40 - Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	64.7	-90.5	20.5	-70.0	-54	-16.0	PK	Horizontal
	559.4	-93.3	31.5	-61.8	-54	-7.8	PK	Horizontal
	58.4	-89.7	21.8	-67.9	-54	-13.9	PK	Vertical
	559.4	-91.9	30.2	-61.7	-54	-7.7	PK	Vertical
	11624.3	-74.5	31.1	-43.4	-30	-13.4	PK	Horizontal
	14803.3	-74.6	34.1	-40.5	-30	-10.5	PK	Horizontal
	9414.3	-73.2	29.4	-43.8	-30	-13.8	PK	Vertical
	13366.8	-75.3	32.8	-42.5	-30	-12.5	PK	Vertical
102	64.2	-89.3	20.7	-68.6	-54	-14.6	PK	Horizontal
	559.4	-91.4	31.5	-59.9	-54	-5.9	PK	Horizontal
	68.6	-87.5	21.9	-65.6	-54	-11.6	PK	Vertical
	559.4	-91.7	30.2	-61.5	-54	-7.5	PK	Vertical
	11505.3	-74.6	30.4	-44.2	-30	-14.2	PK	Horizontal
	15270.8	-72.9	33.1	-39.8	-30	-9.8	PK	Horizontal
	10969.8	-74.1	30.5	-43.6	-30	-13.6	PK	Vertical
	12984.3	-74.0	32.2	-41.8	-30	-11.8	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT20 - Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	64.2	-90.0	20.7	-69.3	-54	-15.3	PK	Horizontal
	559.4	-91.9	31.5	-60.4	-54	-6.4	PK	Horizontal
	68.6	-88.5	21.9	-66.6	-54	-12.6	PK	Vertical
	559.4	-92.3	30.2	-62.1	-54	-8.1	PK	Vertical
	10935.8	-74.1	29.5	-44.6	-30	-14.6	PK	Horizontal
	15364.3	-73.1	32.8	-40.3	-30	-10.3	PK	Horizontal
	10570.3	-73.1	29.4	-43.7	-30	-13.7	PK	Vertical
	13630.3	-74.9	32.6	-42.3	-30	-12.3	PK	Vertical
100	64.2	-89.6	20.7	-68.9	-54	-14.9	PK	Horizontal
	559.4	-92.0	31.5	-60.5	-54	-6.5	PK	Horizontal
	65.2	-88.5	21.9	-66.6	-54	-12.6	PK	Vertical
	559.4	-92.1	30.2	-61.9	-54	-7.9	PK	Vertical
	11615.8	-74.8	30.8	-44.0	-30	-14.0	PK	Horizontal
	16494.8	-67.4	31.4	-36.0	-30	-6.0	PK	Horizontal
	7986.3	-72.1	25.2	-46.9	-30	-16.9	PK	Vertical
	16494.8	-68.8	33.3	-35.5	-30	-5.5	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT40 - Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	65.2	-88.7	20.4	-68.3	-54	-14.3	PK	Horizontal
	559.4	-91.7	31.5	-60.2	-54	-6.2	PK	Horizontal
	65.7	-88.7	21.8	-66.9	-54	-12.9	PK	Vertical
	559.4	-92.0	30.2	-61.8	-54	-7.8	PK	Vertical
	7476.3	-72.1	23.6	-48.5	-30	-18.5	PK	Horizontal
	15177.3	-73.1	33.3	-39.8	-30	-9.8	PK	Horizontal
	11590.3	-74.2	31.4	-42.8	-30	-12.8	PK	Vertical
	15185.8	-73.5	33.1	-40.4	-30	-10.4	PK	Vertical
102	559.4	-92.2	31.5	-60.7	-54	-6.7	PK	Horizontal
	579.3	-96.0	31.2	-64.8	-54	-10.8	PK	Horizontal
	64.2	-89.2	22.3	-66.9	-54	-12.9	PK	Vertical
	559.4	-91.7	30.2	-61.5	-54	-7.5	PK	Vertical
	11590.3	-74.8	31.1	-43.7	-30	-13.7	PK	Horizontal
	14361.3	-73.8	33.0	-40.8	-30	-10.8	PK	Horizontal
	11641.3	-74.5	31.5	-43.0	-30	-13.0	PK	Vertical
	15185.8	-73.3	33.1	-40.2	-30	-10.2	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT80 - Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
58	69.1	-88.8	19.7	-69.1	-54	-15.1	PK	Horizontal
	559.4	-91.9	31.5	-60.4	-54	-6.4	PK	Horizontal
	94.3	-100.7	33.6	-67.1	-54	-13.1	PK	Vertical
	559.4	-91.6	30.2	-61.4	-54	-7.4	PK	Vertical
	10383.3	-73.5	27.8	-45.7	-30	-15.7	PK	Horizontal
	14531.3	-73.7	32.7	-41.0	-30	-11.0	PK	Horizontal
	10935.8	-72.2	30.6	-41.6	-30	-11.6	PK	Vertical
	15542.8	-73.8	33.4	-40.4	-30	-10.4	PK	Vertical
106	64.2	-89.1	20.7	-68.4	-54	-14.4	PK	Horizontal
	559.4	-91.8	31.5	-60.3	-54	-6.3	PK	Horizontal
	64.7	-87.9	22.1	-65.8	-54	-11.8	PK	Vertical
	559.4	-92.2	30.2	-62.0	-54	-8.0	PK	Vertical
	11556.3	-74.4	30.5	-43.9	-30	-13.9	PK	Horizontal
	15151.8	-73.7	33.4	-40.3	-30	-10.3	PK	Horizontal
	9303.8	-73.9	28.8	-45.1	-30	-15.1	PK	Vertical
	13800.3	-74.6	32.7	-41.9	-30	-11.9	PK	Vertical

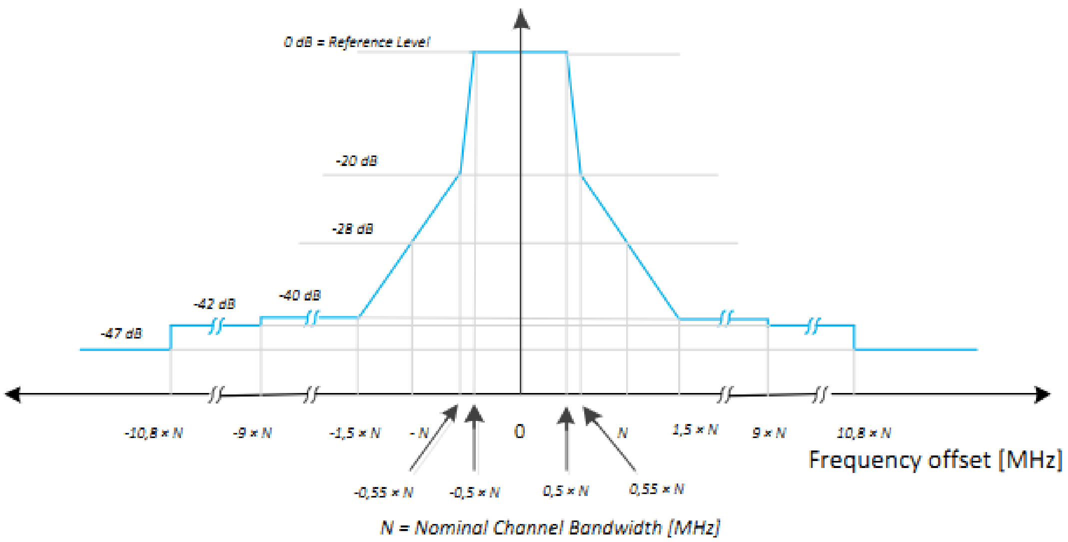
Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

8. Transmitter Unwanted Emissions Within the 5GHz RLAN Bands

8.1. Limit

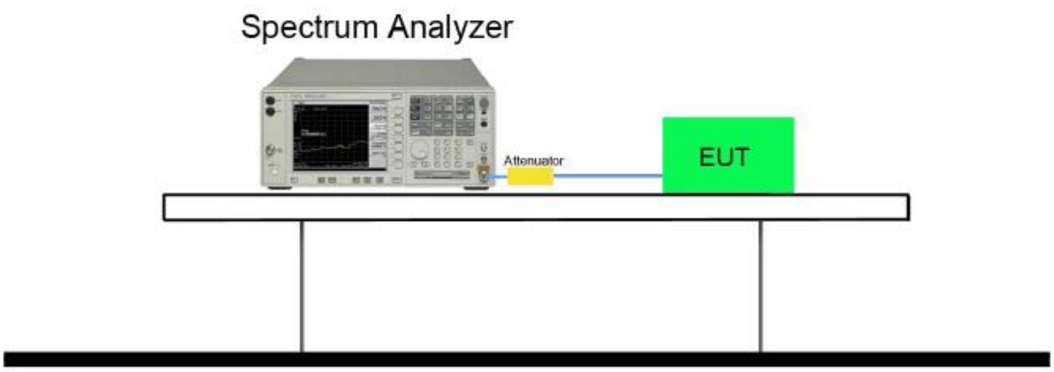


NOTE: dBc is the spectral density relative to the maximum spectral power density of the transmitted signal.

Figure : Transmit spectral power mask

8.2. Test Setup

Conducted measurements



8.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.6.2.1.

8.4. Test Result

Product	802.11ac Dual Band Module	Temperature	20°C
Test Engineer	Amy Zhang	Relative Humidity	50%
Test Site	TR3	Test Date	2015/06/12

1Tx

Test Mode	Channel No.	Frequency (MHz)	Result
11a	36	5180	Pass
11a	64	5320	Pass
11a	100	5500	Pass
11a	140	5700	Pass
11n-HT20	36	5180	Pass
11n-HT20	64	5320	Pass
11n-HT20	100	5500	Pass
11n-HT20	140	5700	Pass
11n-HT40	38	5190	Pass
11n-HT40	62	5310	Pass
11n-HT40	102	5510	Pass
11n-HT40	134	5670	Pass
802.11ac-VHT20	36	5180	Pass
802.11ac-VHT20	64	5320	Pass
802.11ac-VHT20	100	5500	Pass
802.11ac-VHT20	140	5700	Pass
802.11ac-VHT40	38	5190	Pass
802.11ac-VHT40	62	5310	Pass
802.11ac-VHT40	102	5510	Pass
802.11ac-VHT40	134	5670	Pass
802.11ac-VHT80	42	5210	Pass
802.11ac-VHT80	58	5290	Pass
802.11ac-VHT80	106	5530	Pass
802.11ac-VHT80	122	5610	Pass

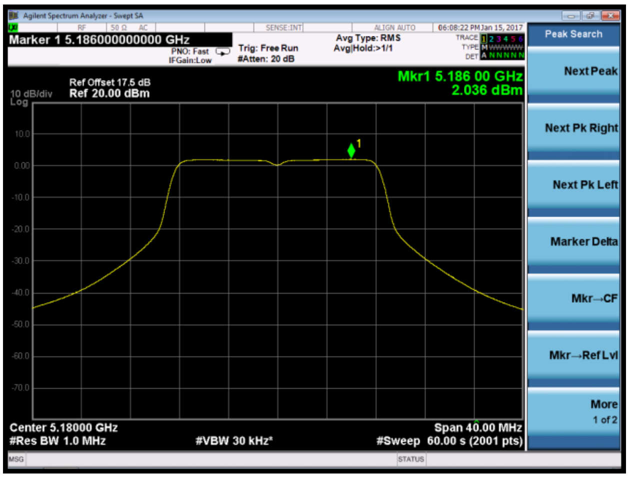
2Tx

Test Mode	Channel No.	Frequency (MHz)	Result
802.11n-HT20	36	5180	Pass
802.11n-HT20	64	5320	Pass
802.11n-HT20	100	5500	Pass
802.11n-HT20	140	5700	Pass
802.11n-HT40	38	5190	Pass
802.11n-HT40	62	5310	Pass
802.11n-HT40	102	5510	Pass
802.11n-HT40	134	5670	Pass
802.11ac-VHT20	36	5180	Pass
802.11ac-VHT20	64	5320	Pass
802.11ac-VHT20	100	5500	Pass
802.11ac-VHT20	140	5700	Pass
802.11ac-VHT40	38	5190	Pass
802.11ac-VHT40	62	5310	Pass
802.11ac-VHT40	102	5510	Pass
802.11ac-VHT40	134	5670	Pass
802.11ac-VHT80	42	5210	Pass
802.11ac-VHT80	58	5290	Pass
802.11ac-VHT80	106	5530	Pass
802.11ac-VHT80	122	5610	Pass

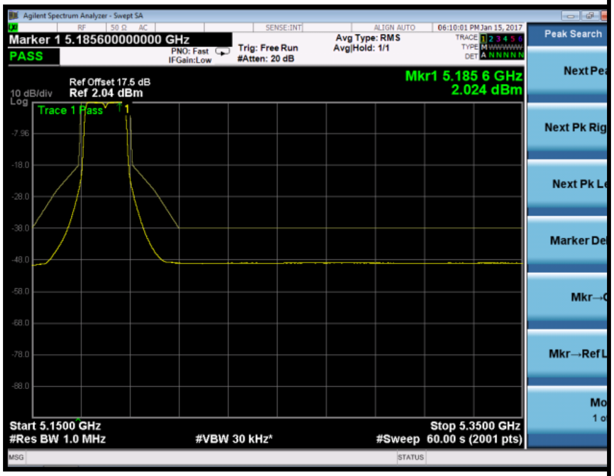
802.11a Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 1Tx

Channel 36 (5180MHz)

The Reference Level

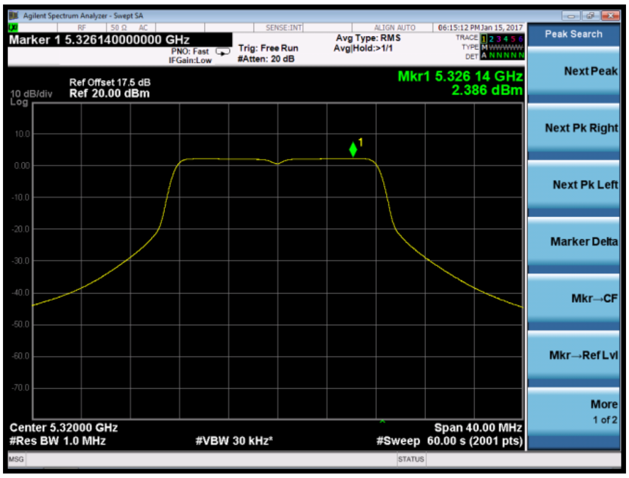


The Mask Data

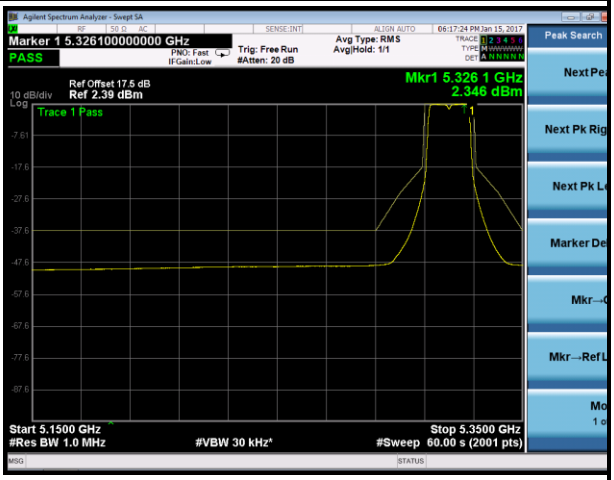


Channel 64 (5320MHz)

The Reference Level

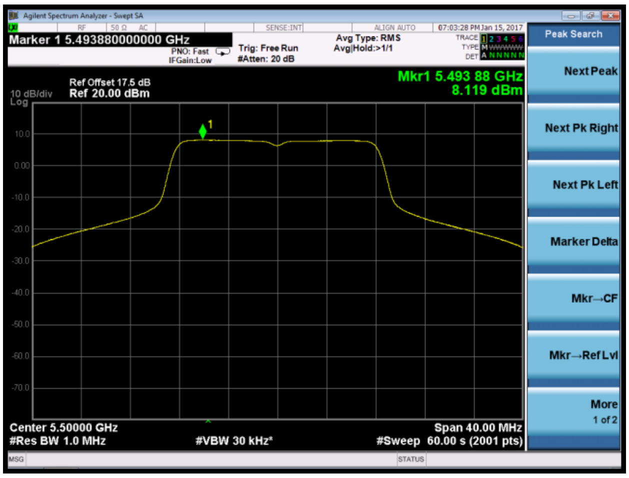


The Mask Data



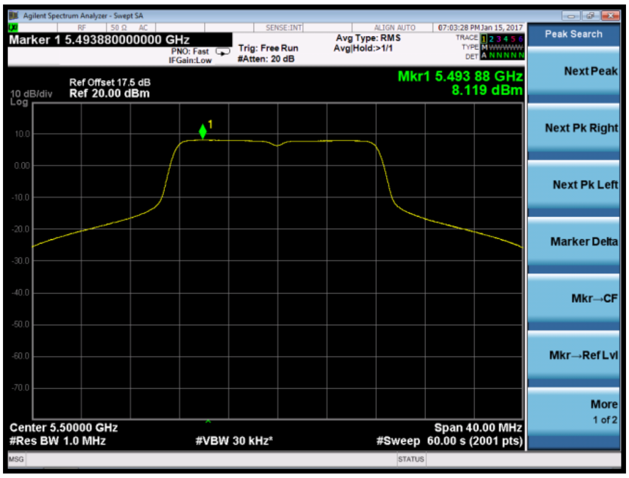
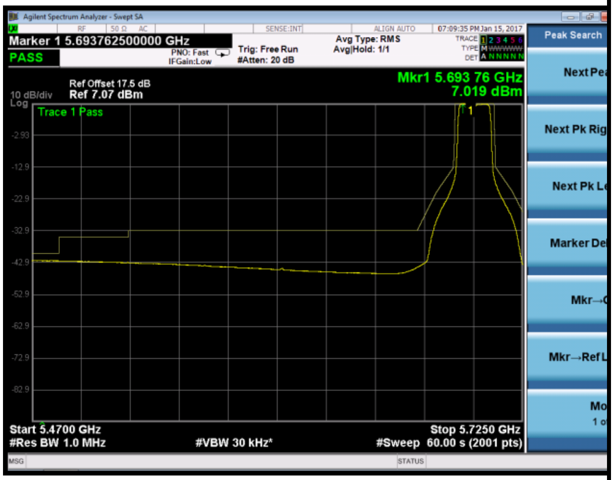
Channel 100 (5500MHz)

The Reference Level



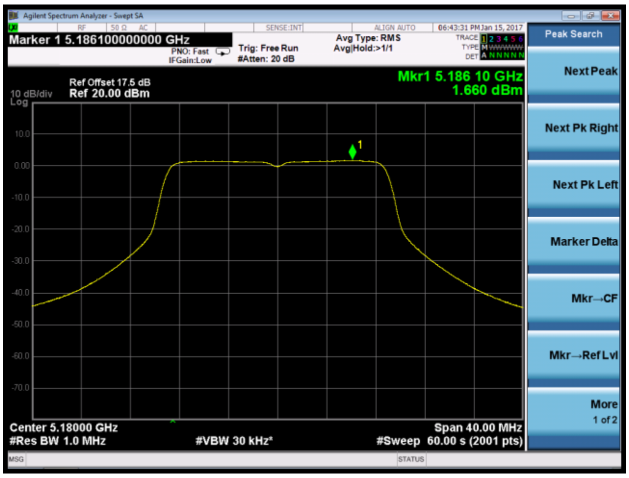
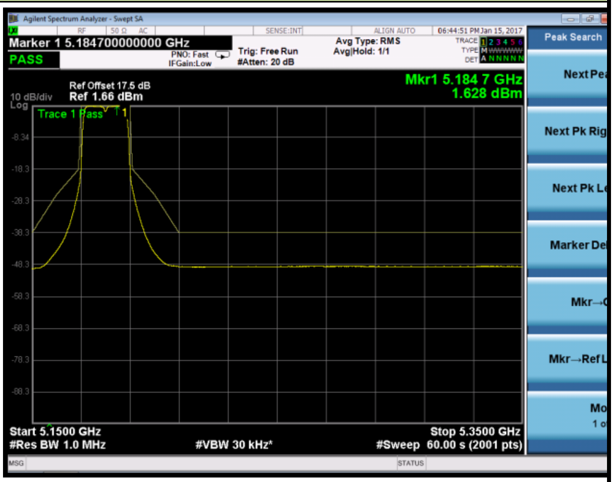
The Mask Data

Channel 140 (5700MHz)

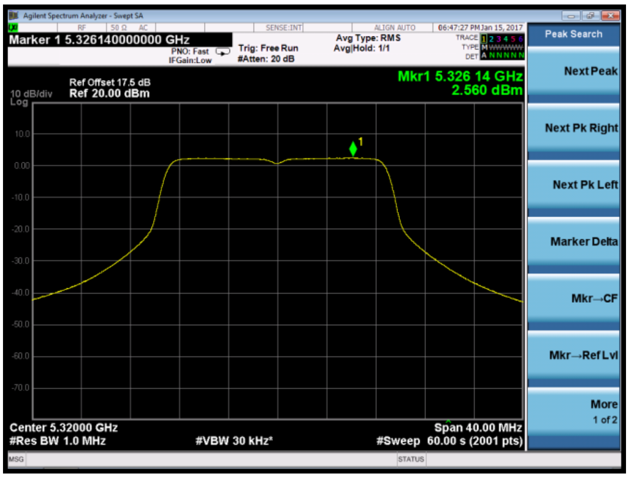
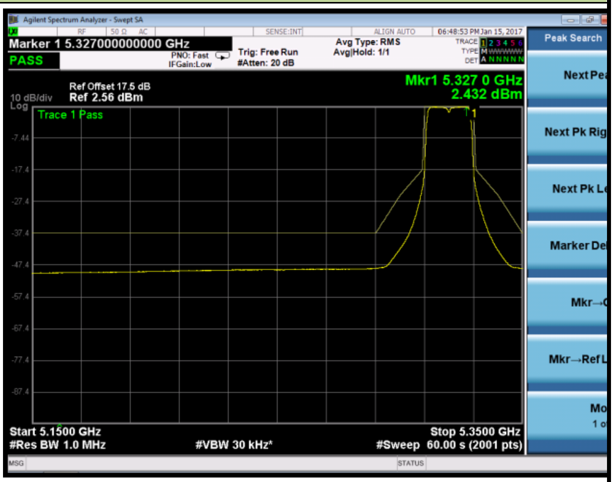
The Reference Level	The Mask Data
	

802.11n-HT20 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 1Tx

Channel 36 (5180MHz)

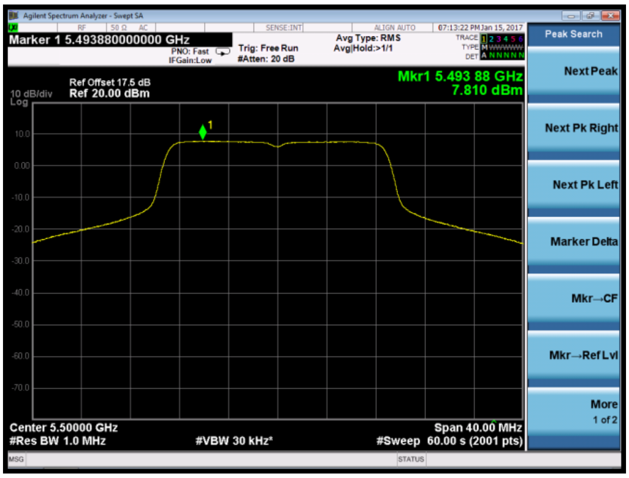
The Reference Level	The Mask Data
	

Channel 64 (5320MHz)

The Reference Level	The Mask Data
	

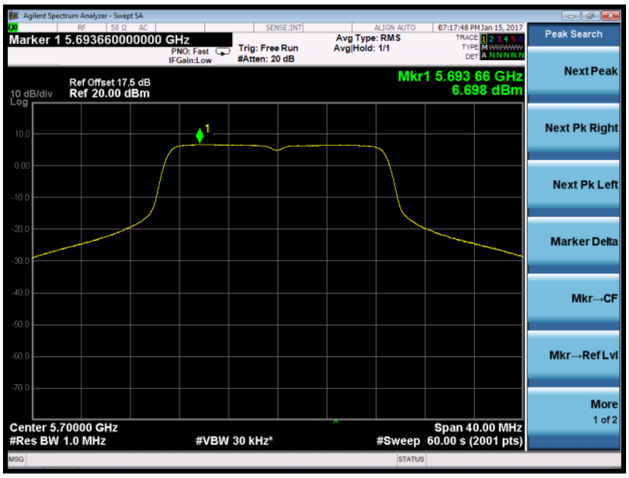
Channel 100 (5500MHz)

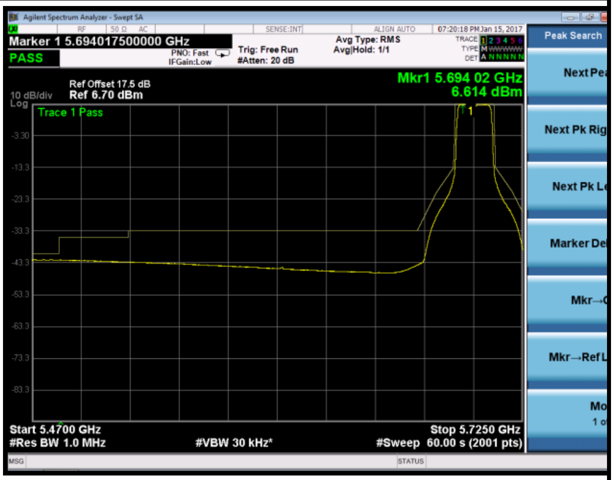
The Reference Level / **The Mask Data**



Channel 140 (5700MHz)

The Reference Level / **The Mask Data**

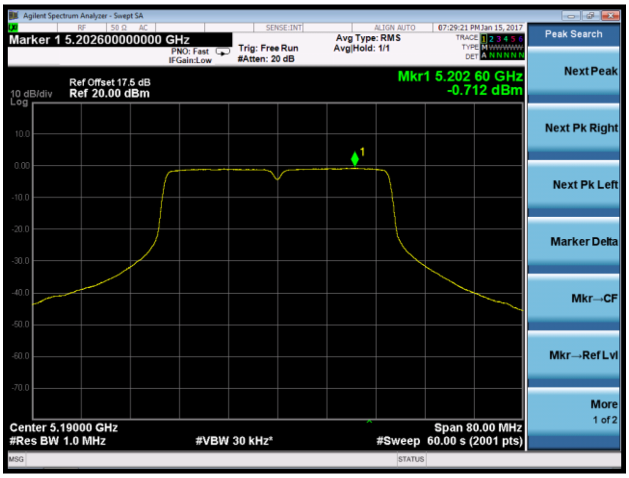


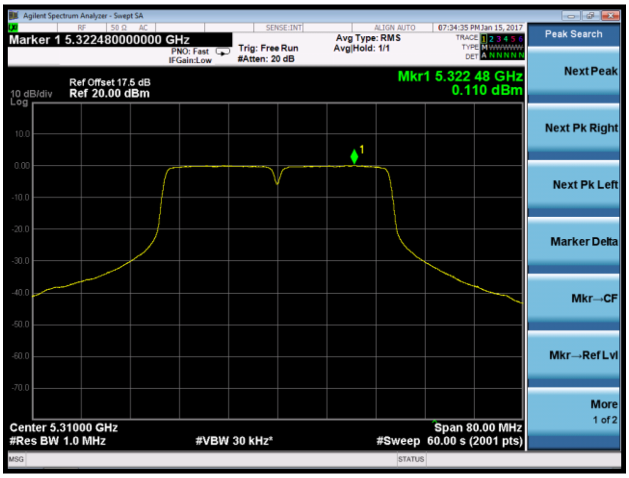
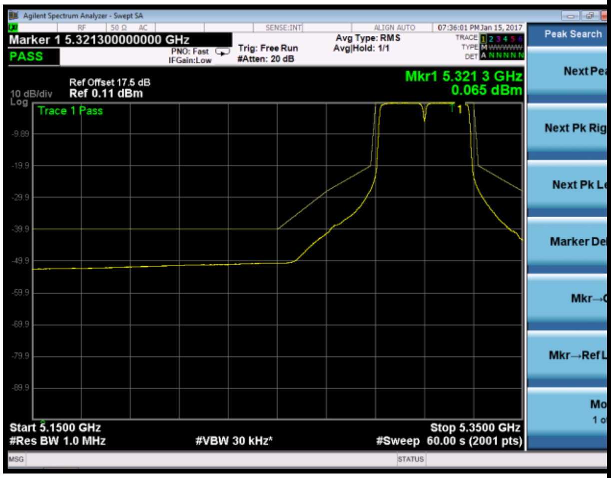
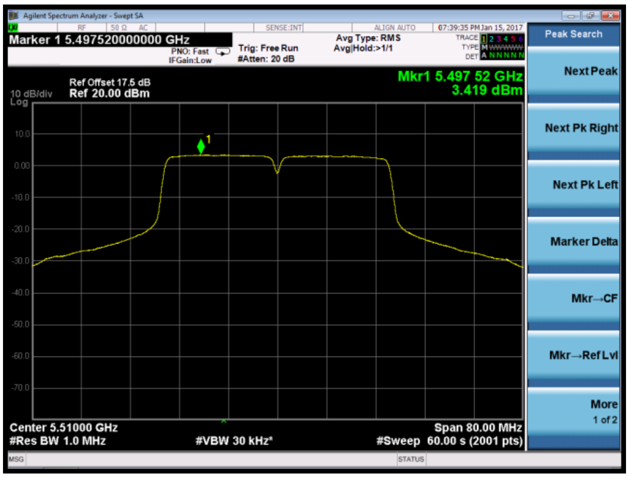
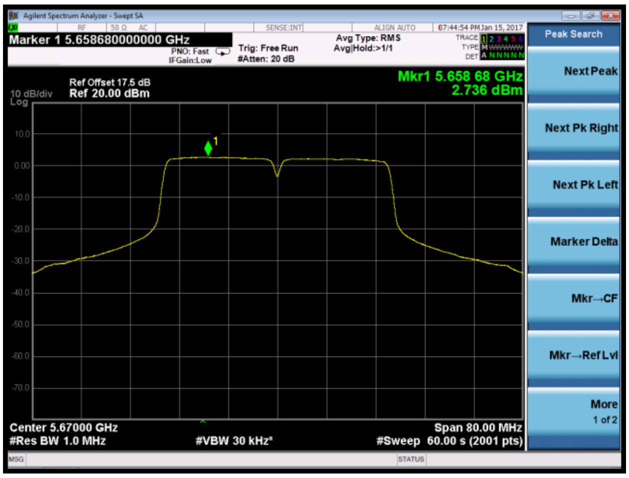
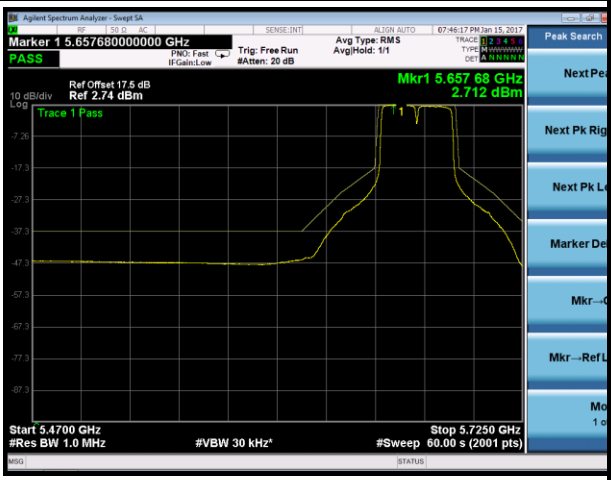


802.11n-HT40 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 1Tx

Channel 38 (5190MHz)

The Reference Level / **The Mask Data**

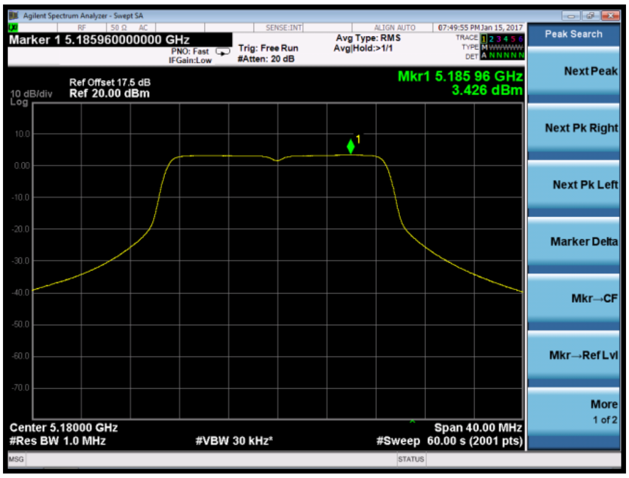


Channel 62 (5310MHz)	
The Reference Level	**The Mask Data**
	
Channel 102 (5510MHz)	
The Reference Level	**The Mask Data**
	
Channel 134 (5670MHz)	
The Reference Level	**The Mask Data**
	

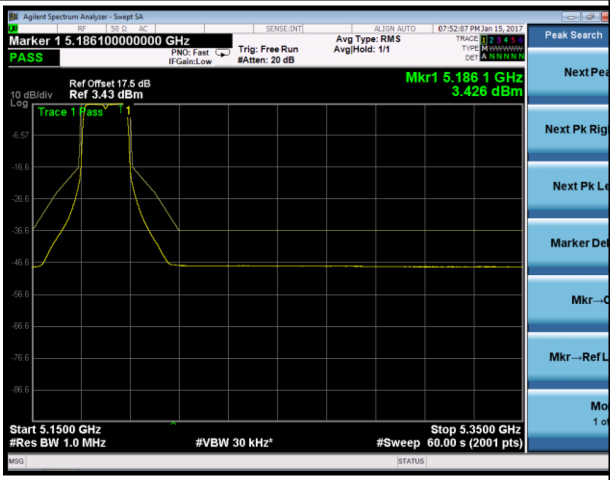
802.11ac-VHT20 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 1Tx

Channel 36 (5180MHz)

The Reference Level

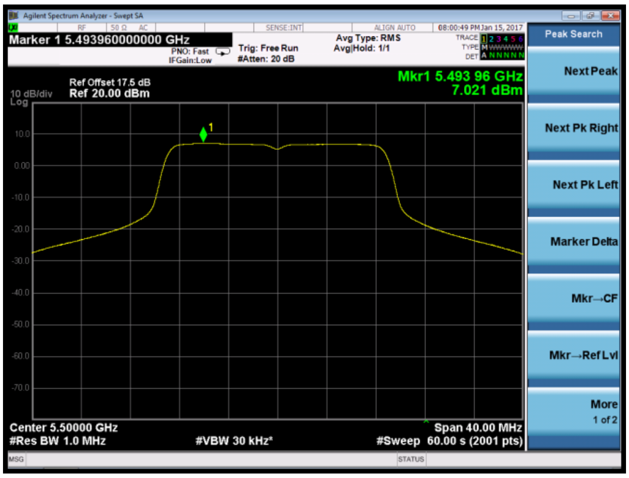


The Mask Data

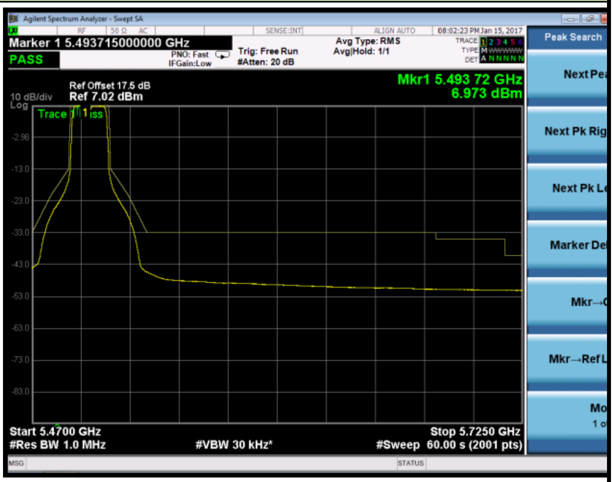


Channel 64 (5320MHz)

The Reference Level

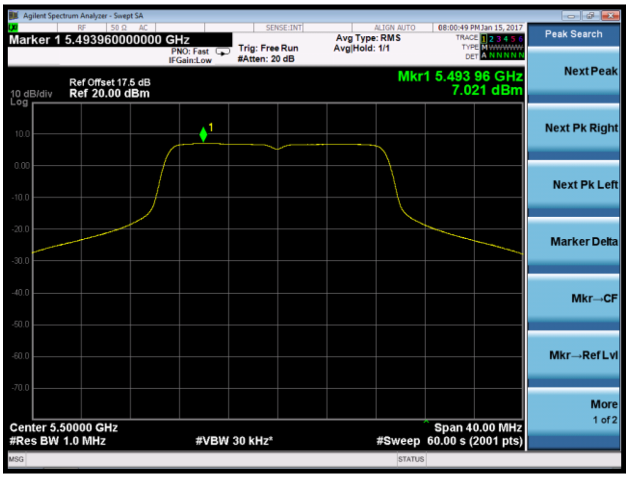


The Mask Data

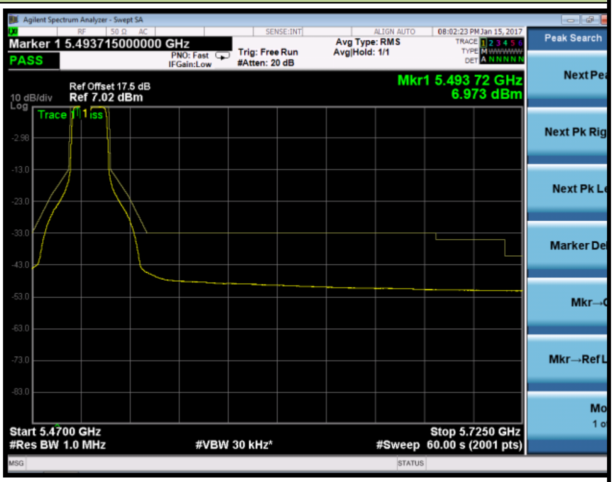


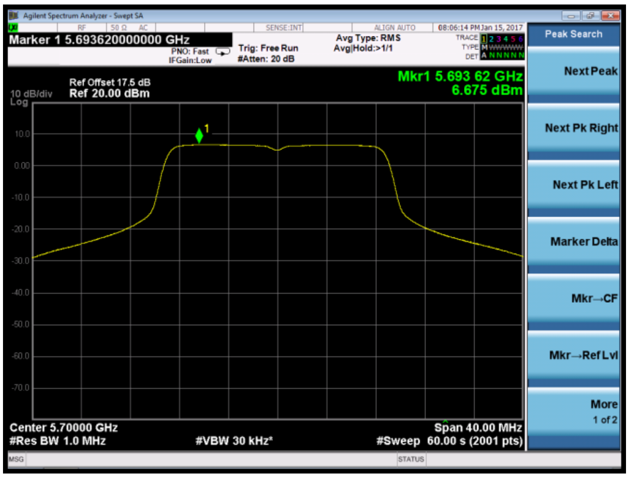
Channel 100 (5500MHz)

The Reference Level

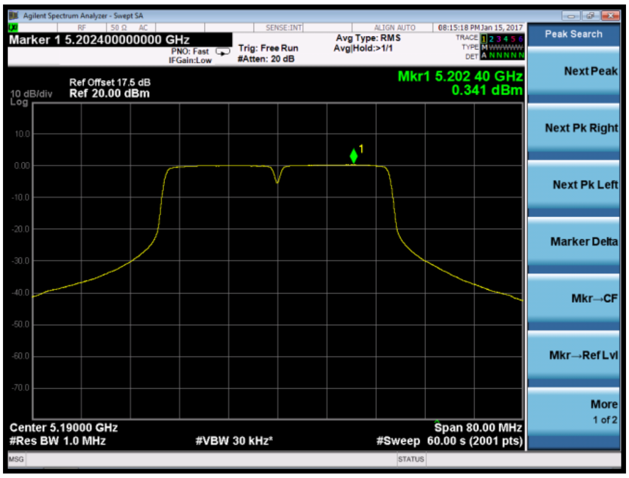
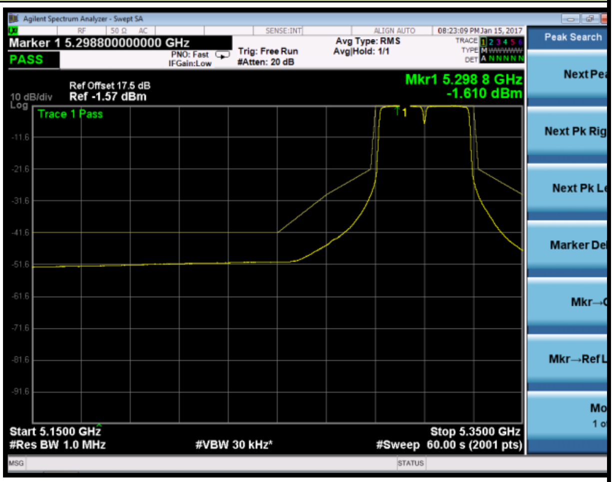


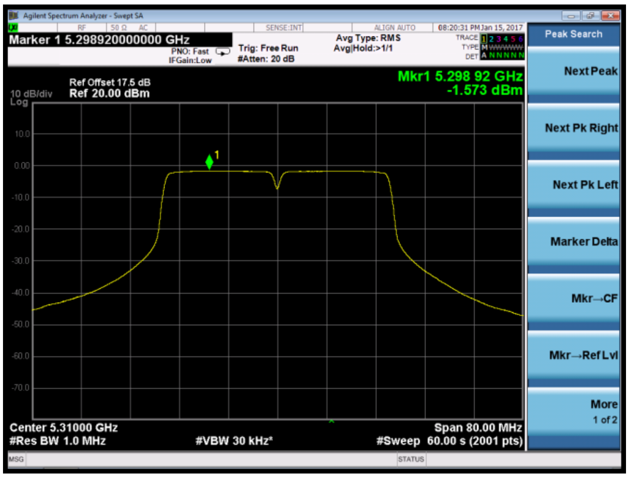
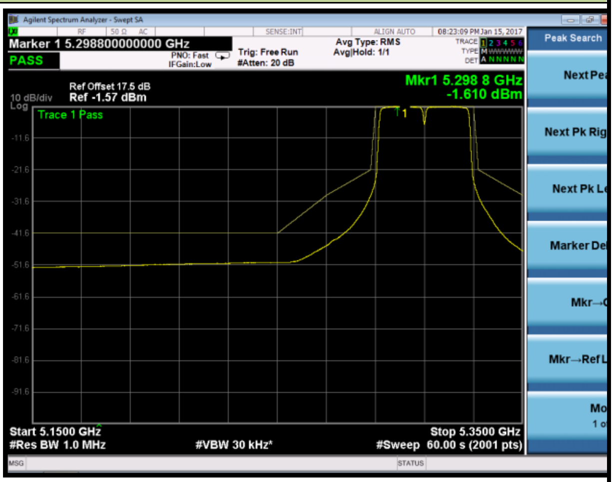
The Mask Data



Channel 140 (5700MHz)	
The Reference Level	The Mask Data
	

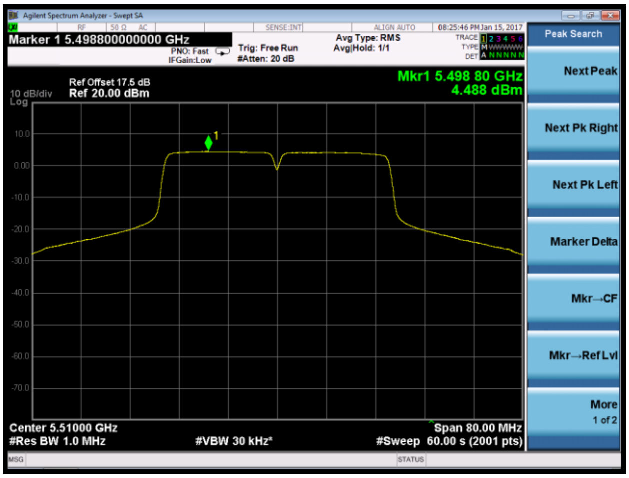
802.11ac-VHT40 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 1Tx

Channel 38 (5190MHz)	
The Reference Level	The Mask Data
	

Channel 62 (5310MHz)	
The Reference Level	The Mask Data
	

Channel 102 (5510MHz)

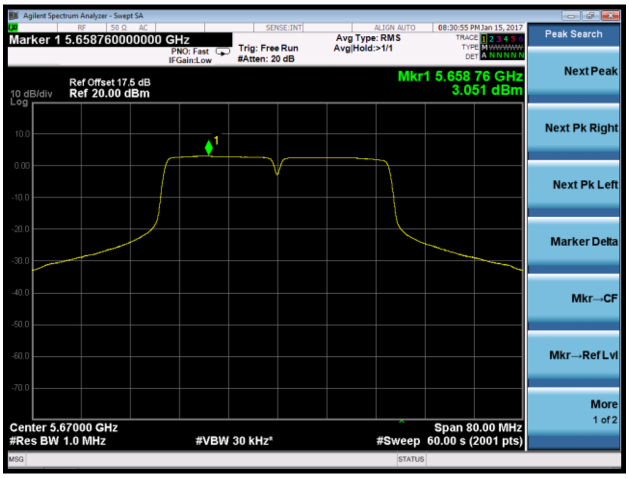
The Reference Level



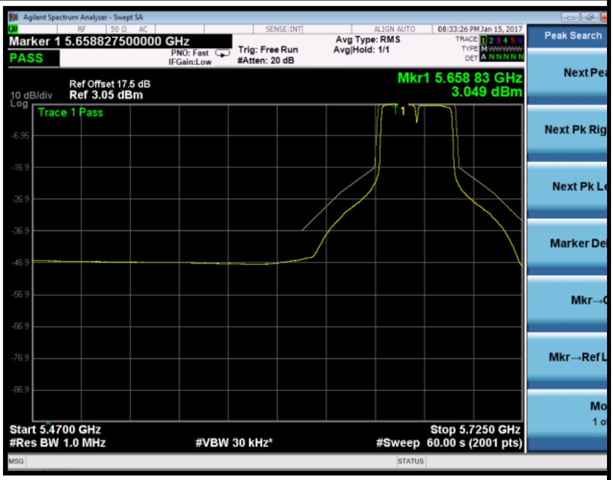
The Mask Data

Channel 134 (5670MHz)

The Reference Level



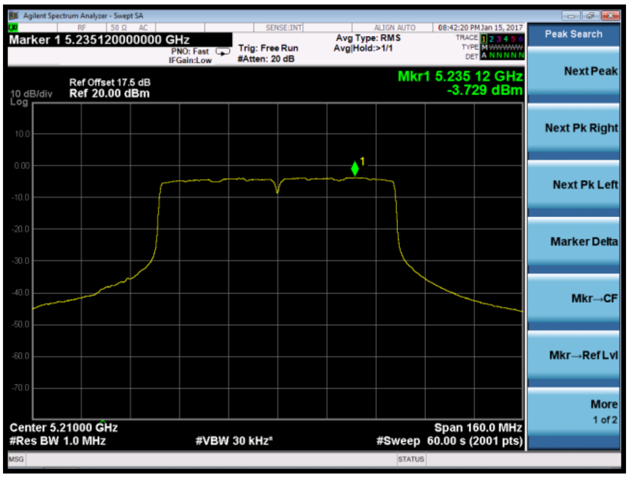
The Mask Data



802.11ac-VHT80 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 1Tx

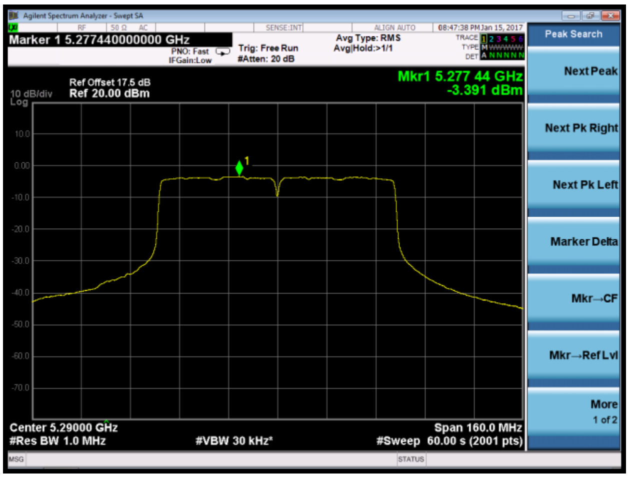
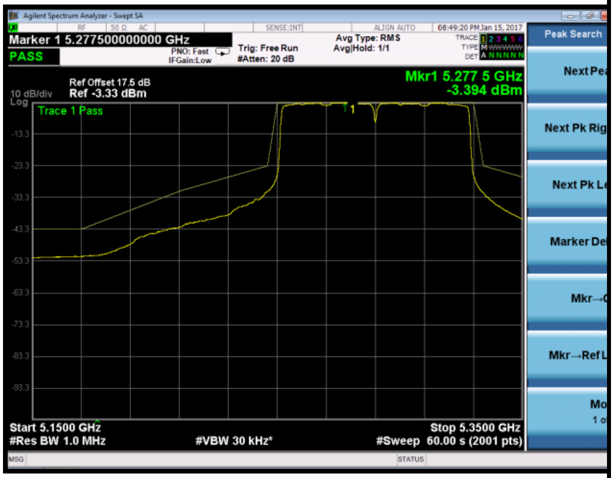
Channel 42 (5210MHz)

The Reference Level

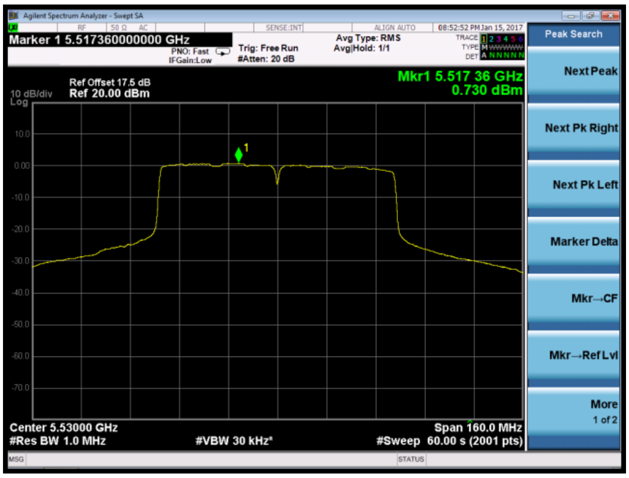


The Mask Data

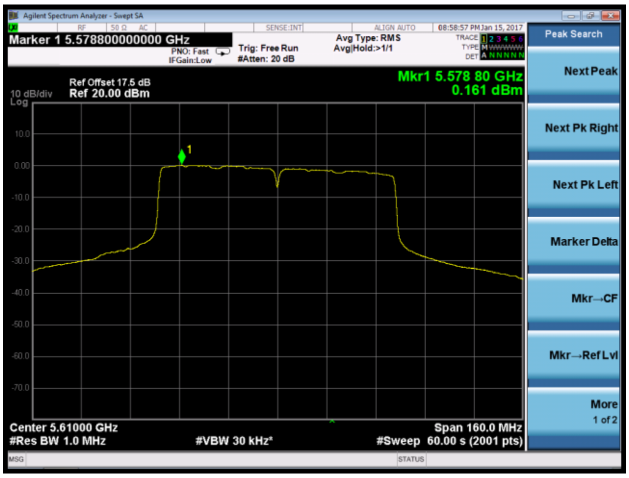
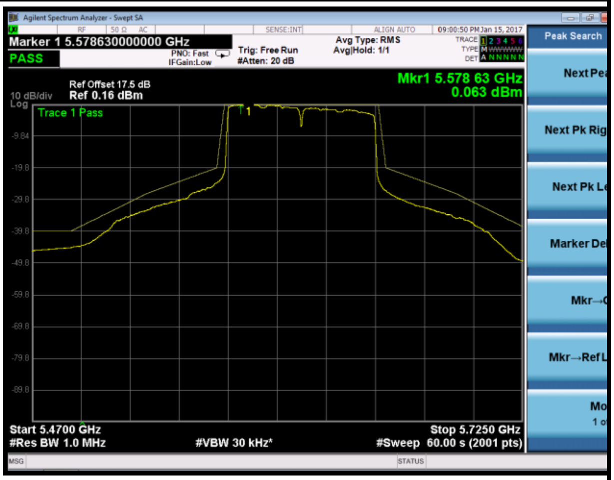
Channel 58 (5290MHz)

The Reference Level	The Mask Data
	

Channel 106 (5530MHz)

The Reference Level	The Mask Data
	

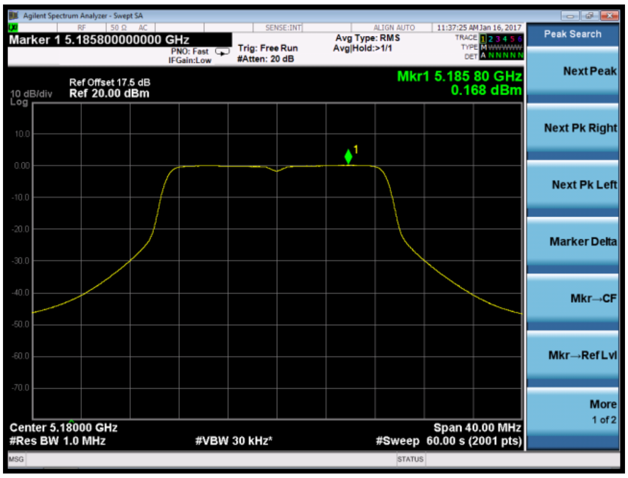
Channel 122 (5610MHz)

The Reference Level	The Mask Data
	

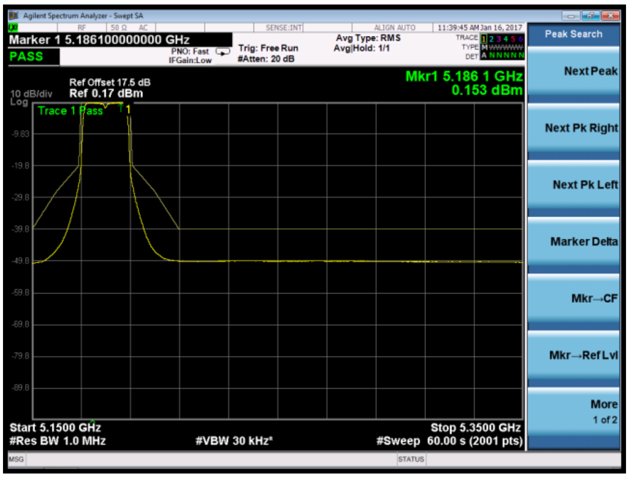
802.11n-HT20 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 2Tx

Channel 36 (5180MHz)

The Reference Level

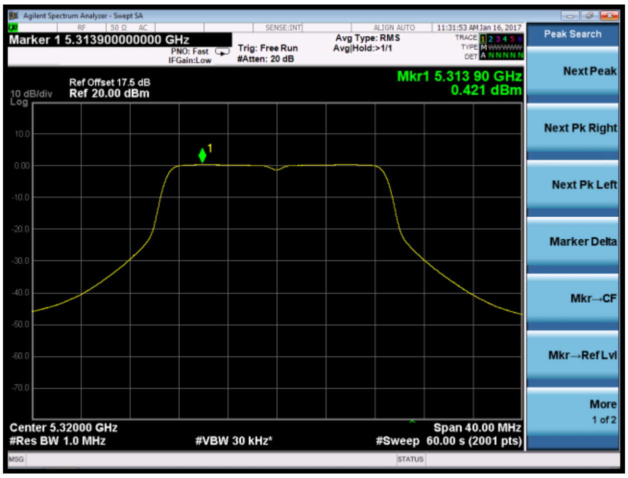


The Mask Data

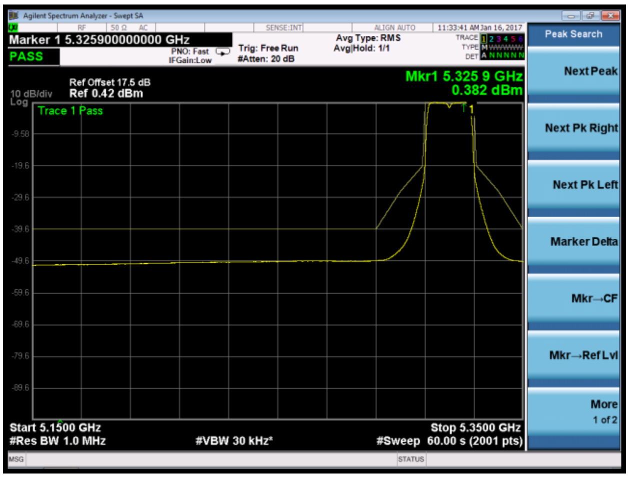


Channel 64 (5320MHz)

The Reference Level

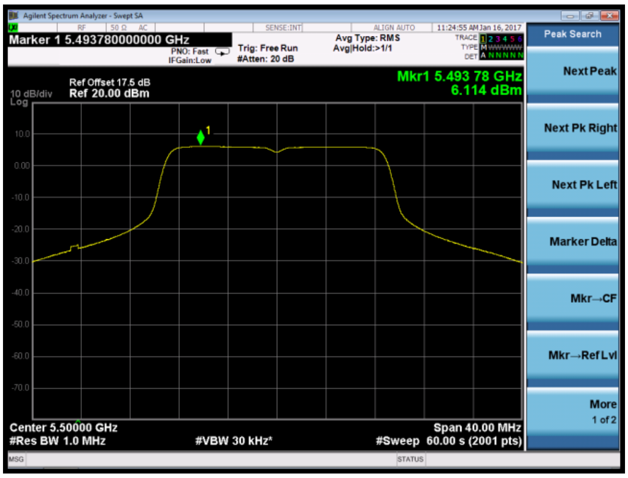


The Mask Data



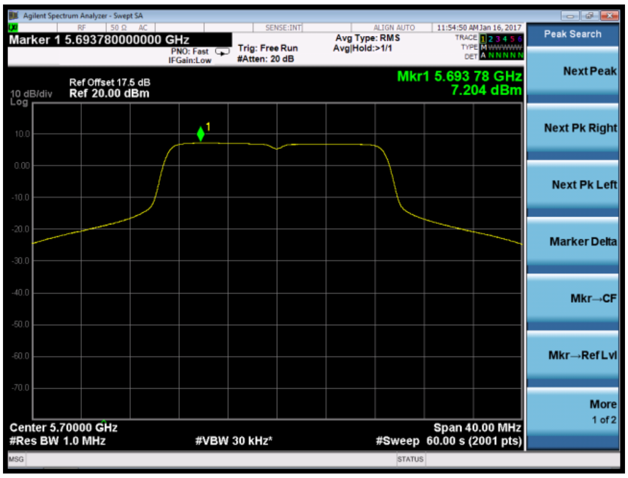
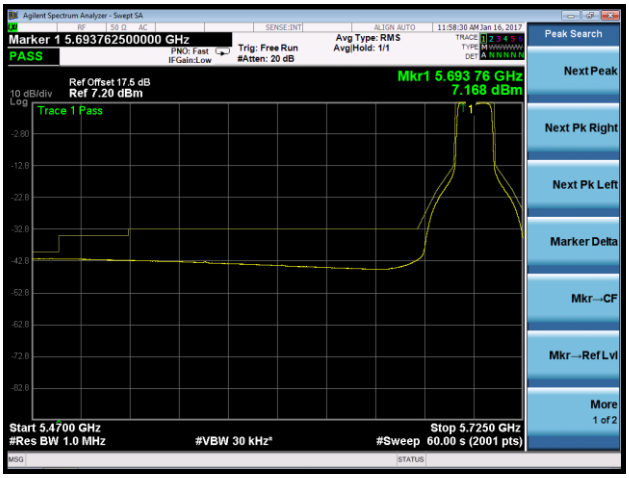
Channel 100 (5500MHz)

The Reference Level



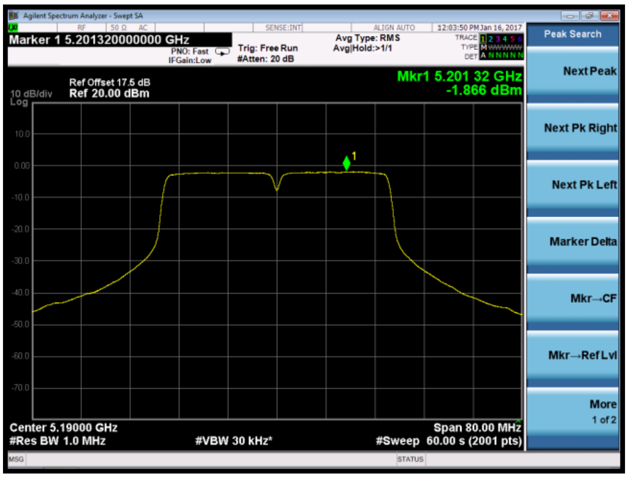
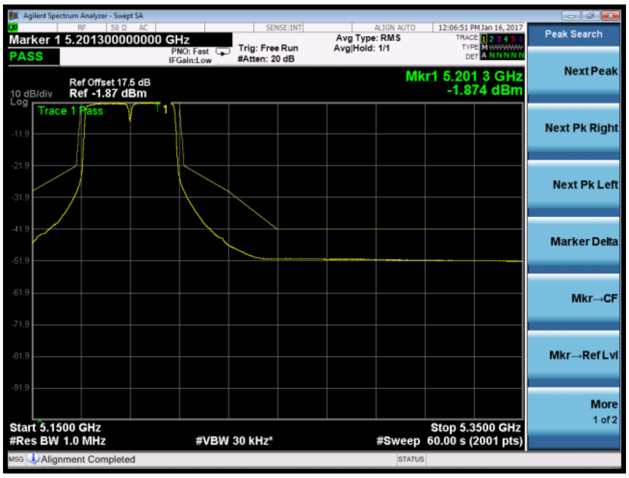
The Mask Data

Channel 140 (5700MHz)

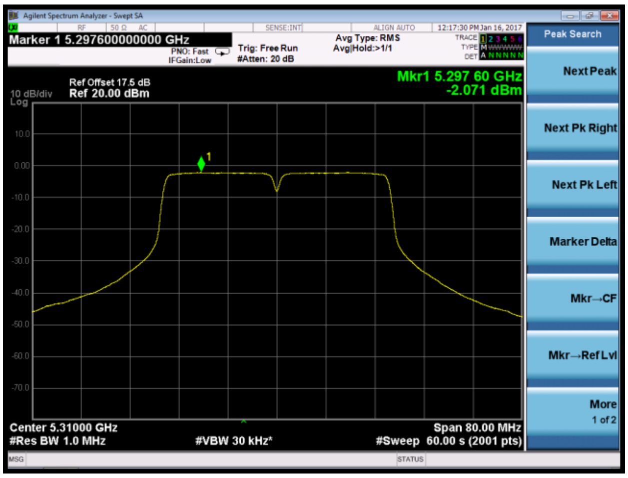
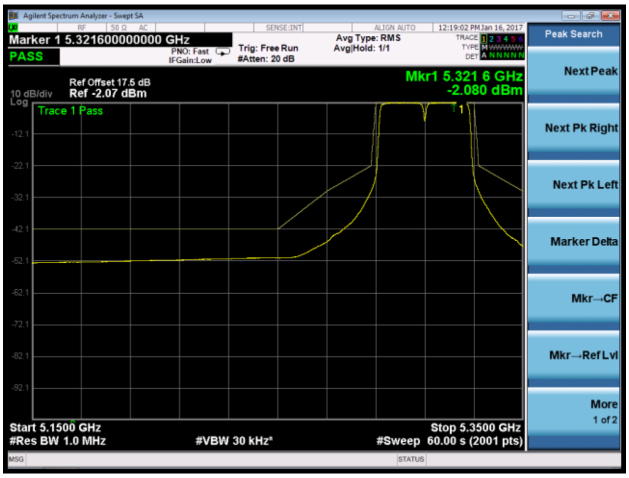
The Reference Level	The Mask Data
	

802.11n-HT40 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 2Tx

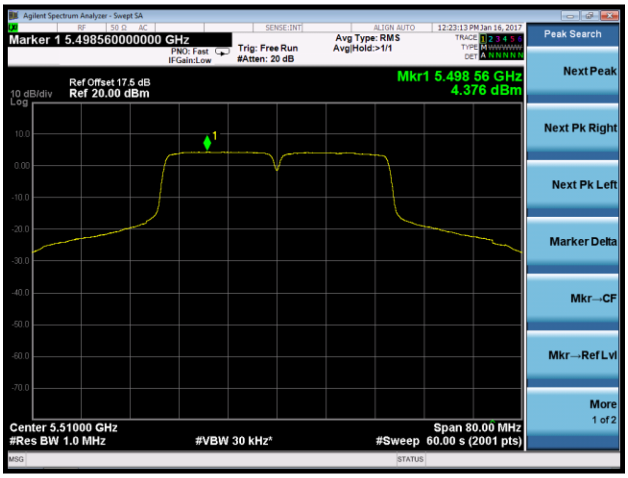
Channel 38 (5190MHz)

The Reference Level	The Mask Data
	

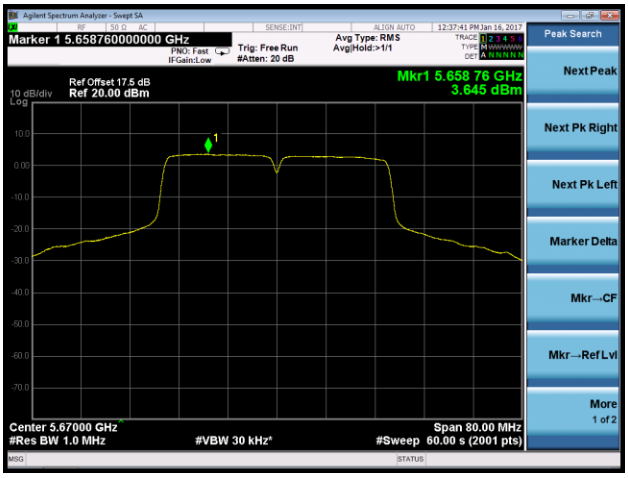
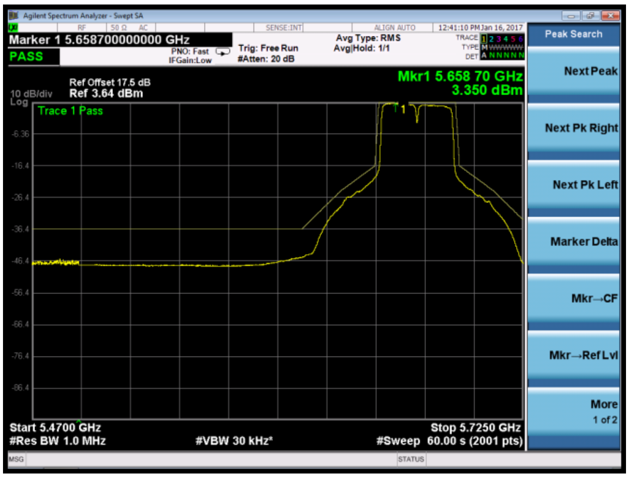
Channel 62 (5310MHz)

The Reference Level	The Mask Data
	

Channel 102 (5510MHz)

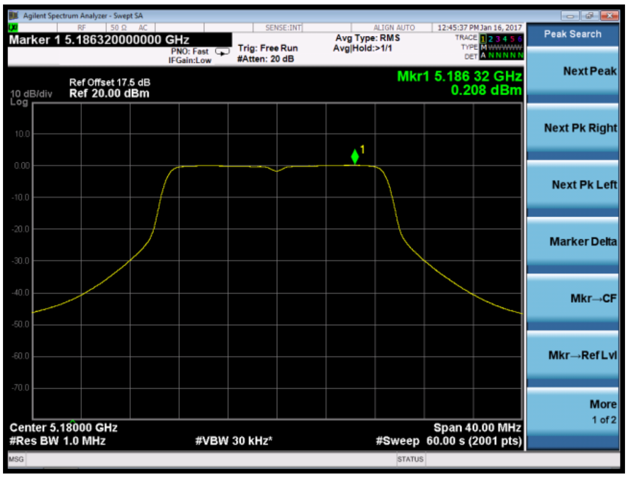
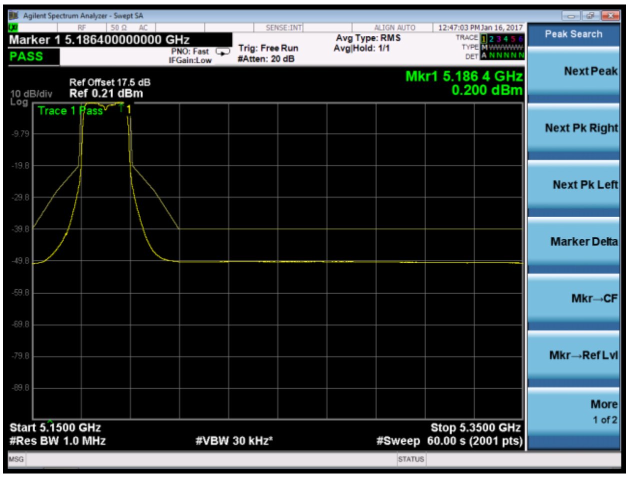
The Reference Level	The Mask Data
	

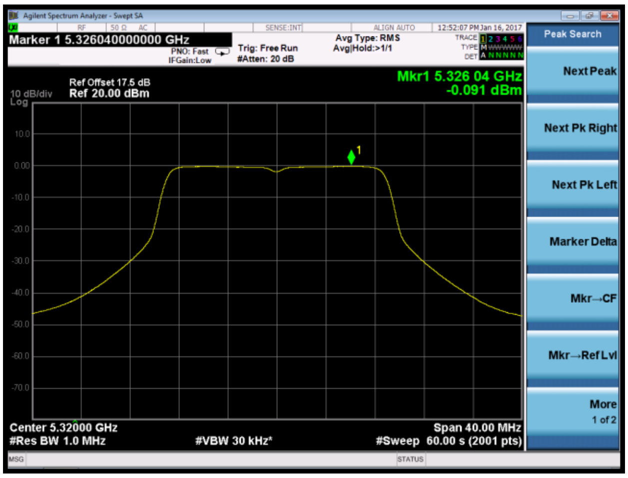
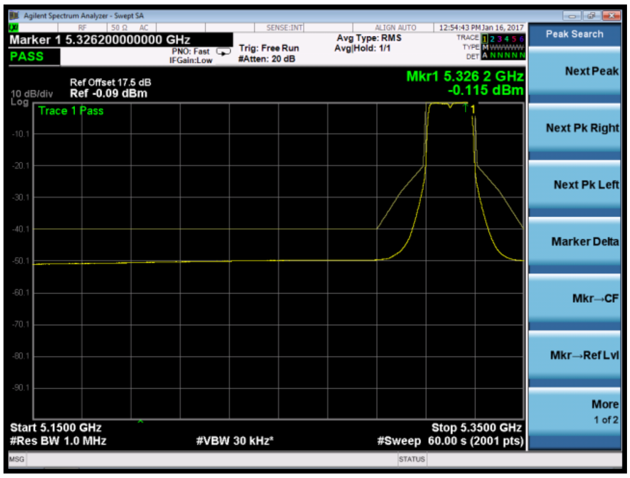
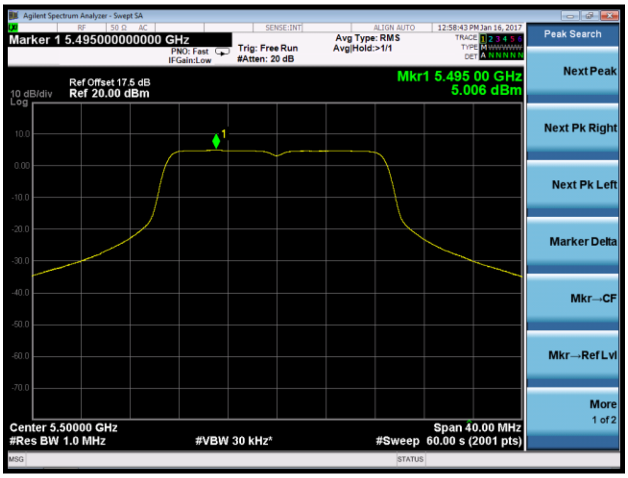
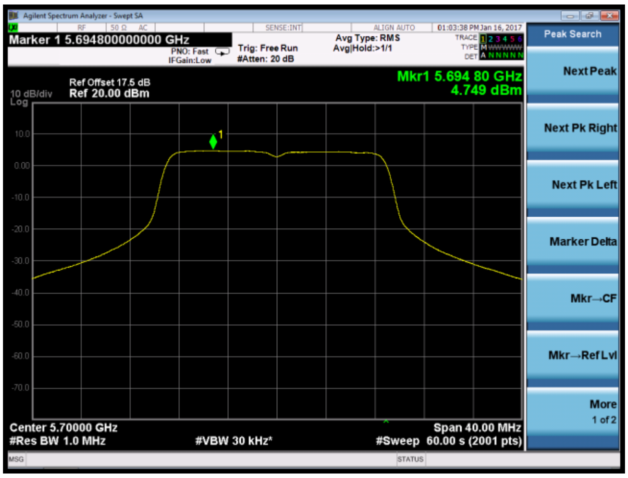
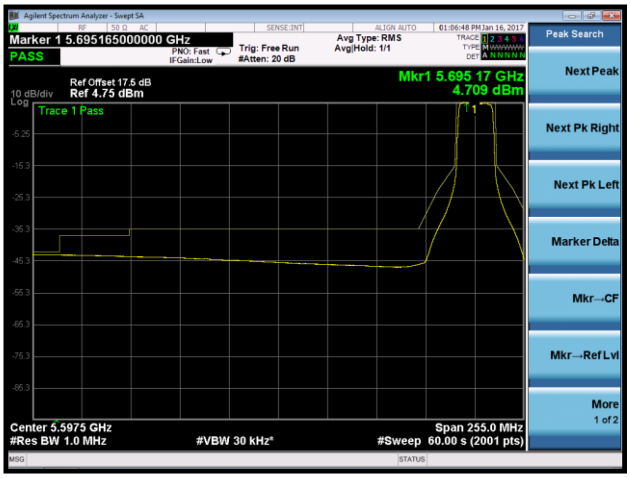
Channel 134 (5670MHz)

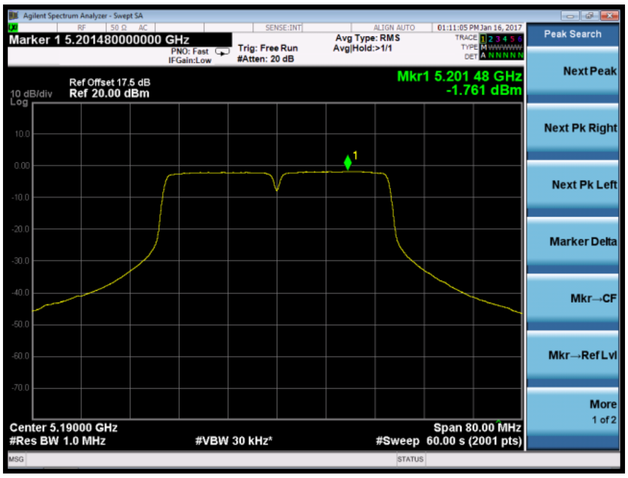
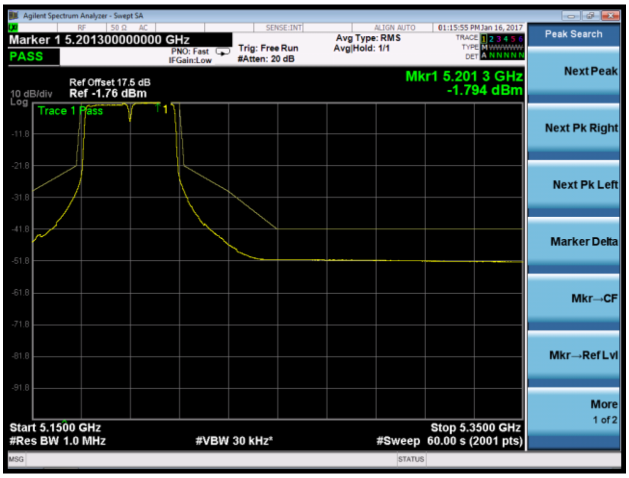
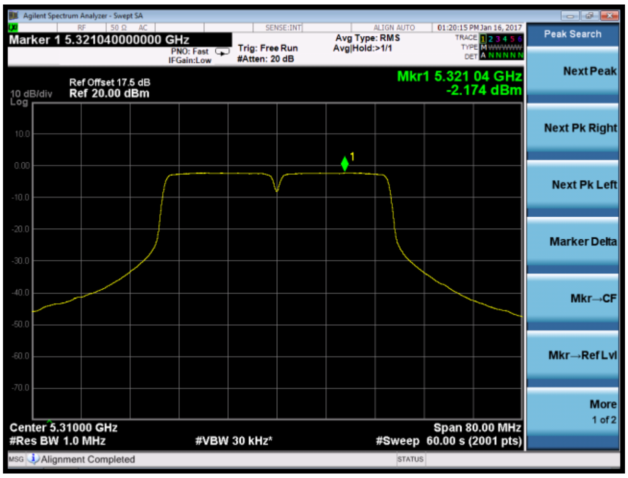
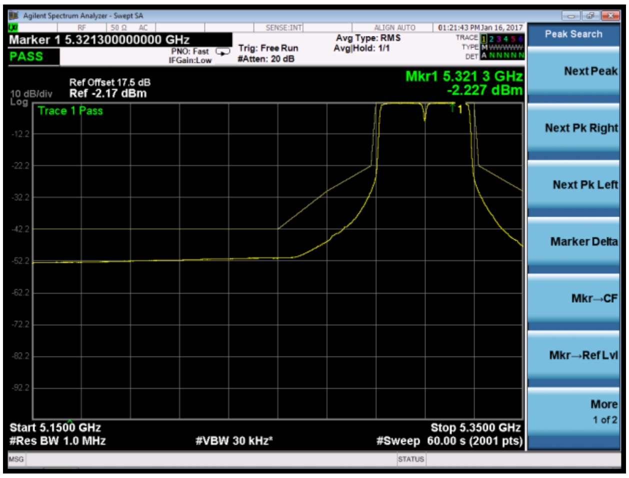
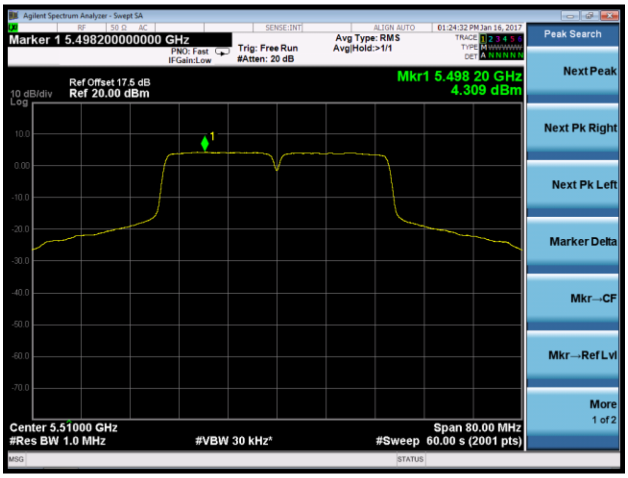
The Reference Level	The Mask Data
	

802.11ac-VHT20 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 2Tx

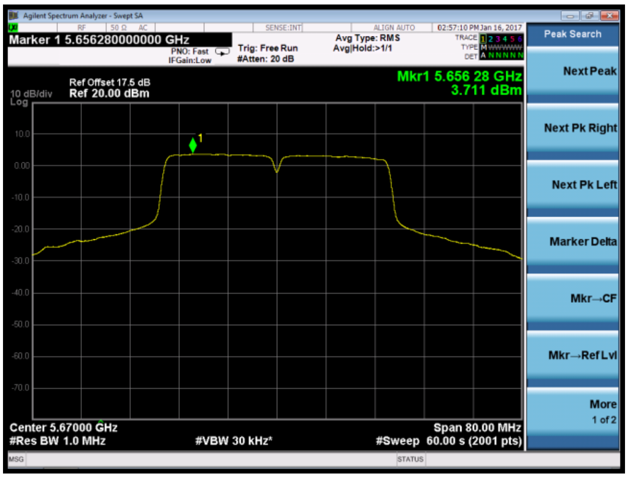
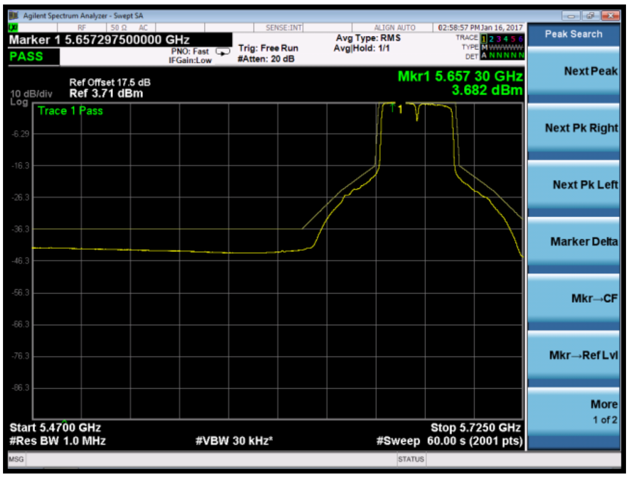
Channel 36 (5180MHz)

The Reference Level	The Mask Data
	

<table>
<tr><th colspan="2">Channel 64 (5320MHz)</th></tr>
<tr><th>The Reference Level</th><th>The Mask Data</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><th colspan="2">Channel 100 (5500MHz)</th></tr>
<tr><th>The Reference Level</th><th>The Mask Data</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><th colspan="2">Channel 140 (5700MHz)</th></tr>
<tr><th>The Reference Level</th><th>The Mask Data</th></tr>
<tr><td>
</td><td>
</td></tr>
</table>

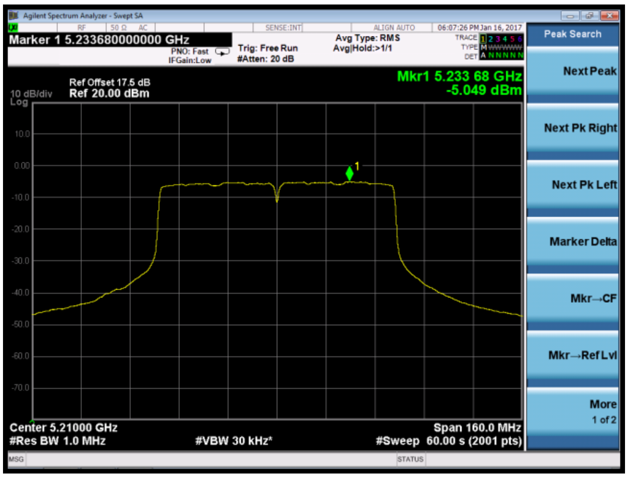
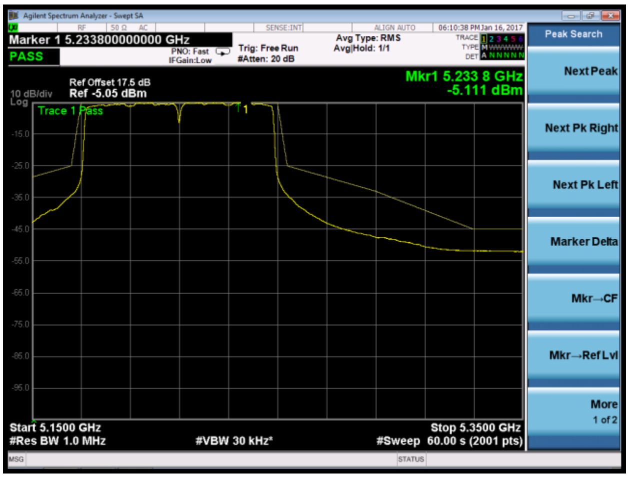
802.11ac-VHT40 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 2Tx	
Channel 38 (5190MHz)	
The Reference Level	The Mask Data
	
Channel 62 (5310MHz)	
The Reference Level	The Mask Data
	
Channel 102 (5510MHz)	
The Reference Level	The Mask Data
	

Channel 134 (5670MHz)

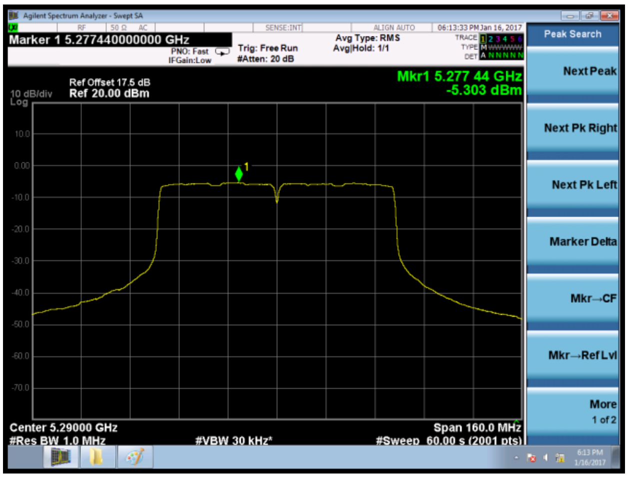
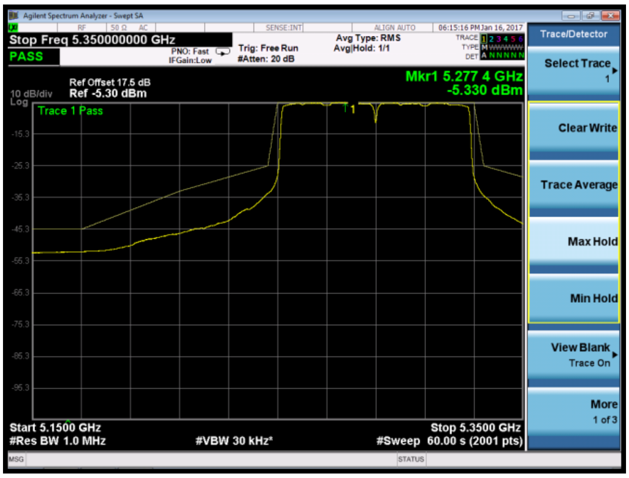
The Reference Level	The Mask Data
	

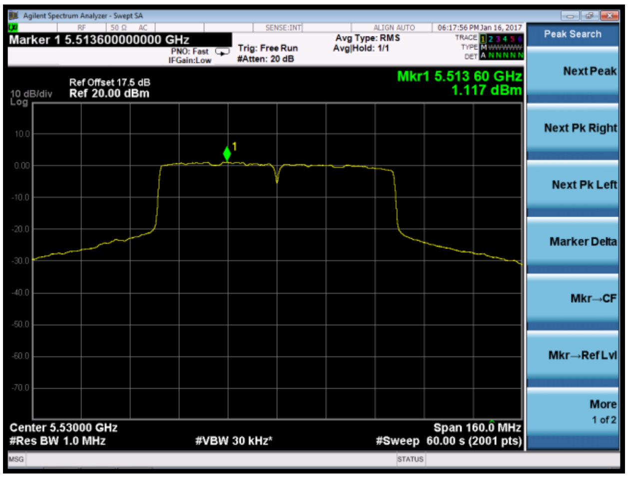
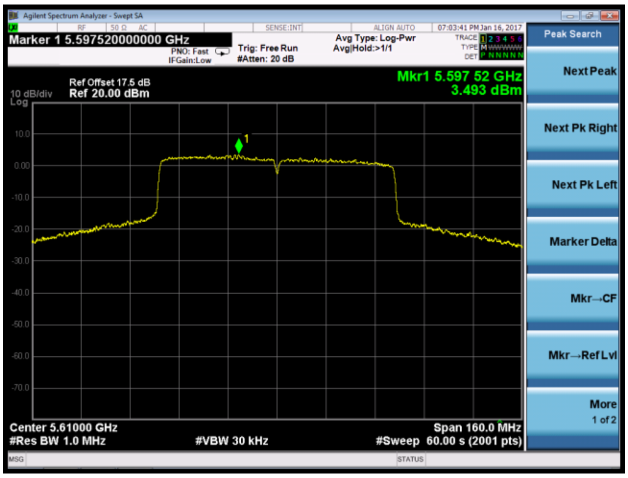
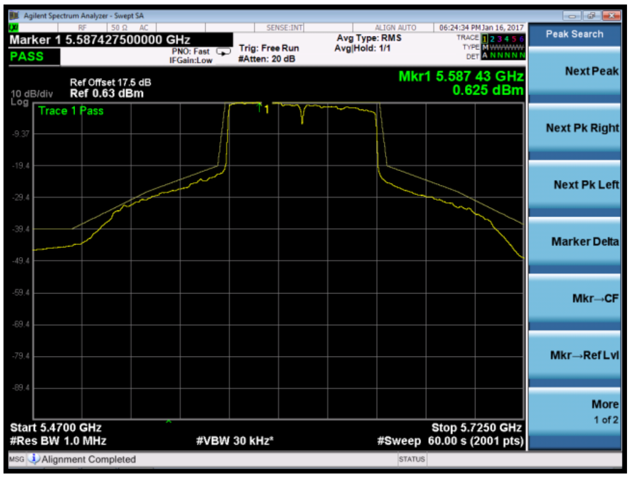
802.11ac-VHT80 Transmitter Unwanted Emissions Within the 5GHz RLAN Bands – 2Tx

Channel 42 (5210MHz)

The Reference Level	The Mask Data
	

Channel 58 (5290MHz)

The Reference Level	The Mask Data
	

<table>
<tr><th colspan="2">Channel 106 (5530MHz)</th></tr>
<tr><th>The Reference Level</th><th>The Mask Data</th></tr>
<tr><td>
</td>
<td>
</td></tr>
<tr><th colspan="2">Channel 122 (5610MHz)</th></tr>
<tr><th>The Reference Level</th><th>The Mask Data</th></tr>
<tr><td>
</td>
<td>
</td></tr>
</table>

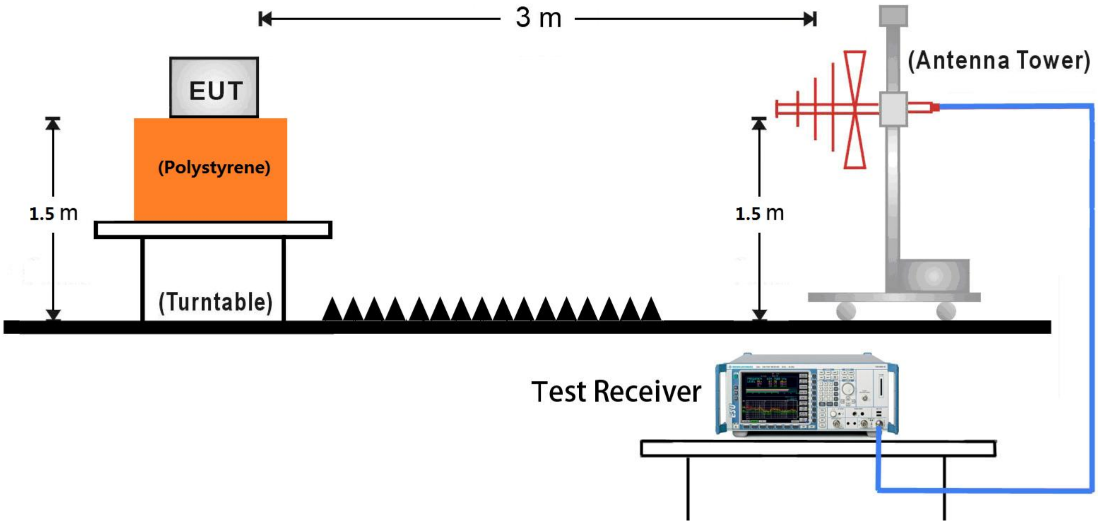
9. Receiver Spurious Emissions

9.1. Limit

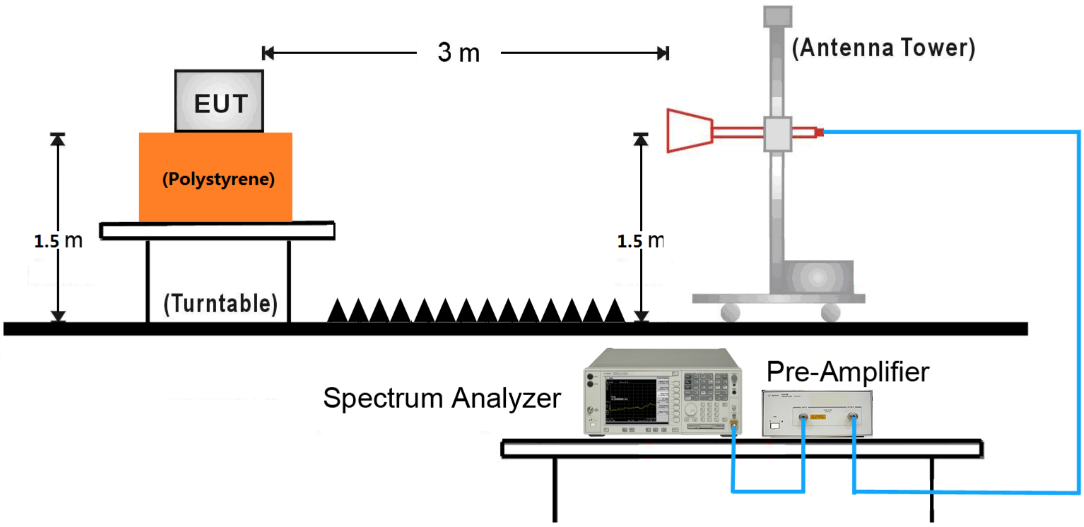
Frequency Range	Maximum Power	Bandwidth
30 MHz to 1GHz	-57dBm	100 kHz
1 GHz to 26 GHz	-47dBm	1 MHz

9.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



9.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.7.2.2.

9.4. Test Result

Test with ANT 2#

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11a - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	54.3	-89.6	23.4	-66.2	-57.0	-9.2	PK	Horizontal
	251.6	-93.6	24.9	-68.7	-57.0	-11.7	PK	Horizontal
	47.0	-91.4	21.2	-70.2	-57.0	-13.2	PK	Vertical
	115.8	-96.6	28.0	-68.6	-57.0	-11.6	PK	Vertical
	1127.5	-57.8	2.1	-55.7	-47.0	-8.7	PK	Horizontal
	2249.5	-68.6	9.5	-59.1	-47.0	-12.1	PK	Horizontal
	1348.5	-62.4	4.6	-57.8	-47.0	-10.8	PK	Vertical
	1875.5	-63.2	6.0	-57.2	-47.0	-10.2	PK	Vertical
100	59.1	-89.4	22.5	-66.9	-57.0	-9.9	PK	Horizontal
	265.2	-91.2	25.5	-65.7	-57.0	-8.7	PK	Horizontal
	53.8	-86.6	21.9	-64.7	-57.0	-7.7	PK	Vertical
	250.2	-87.4	22.1	-65.3	-57.0	-8.3	PK	Vertical
	1127.5	-56.6	2.1	-54.5	-47.0	-7.5	PK	Horizontal
	2249.5	-68.9	9.5	-59.4	-47.0	-12.4	PK	Horizontal
	1348.5	-60.6	4.6	-56.0	-47.0	-9.0	PK	Vertical
	2249.5	-67.1	9.0	-58.1	-47.0	-11.1	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT20 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	38.7	-95.8	29.8	-66.0	-57.0	-9.0	PK	Horizontal
	300.1	-89.7	23.4	-66.3	-57.0	-9.3	PK	Horizontal
	47.9	-87.6	21.1	-66.5	-57.0	-9.5	PK	Vertical
	250.2	-86.0	22.1	-63.9	-57.0	-6.9	PK	Vertical
	1127.5	-55.8	2.1	-53.7	-47.0	-6.7	PK	Horizontal
	2249.5	-67.4	9.5	-57.9	-47.0	-10.9	PK	Horizontal
	1875.5	-62.8	6.0	-56.8	-47.0	-9.8	PK	Vertical
	3805.0	-72.0	13.8	-58.2	-47.0	-11.2	PK	Vertical
100	64.9	-86.9	22.8	-64.1	-57.0	-7.1	PK	Horizontal
	93.5	-80.1	15.1	-65.0	-57.0	-8.0	PK	Horizontal
	39.2	-87.9	19.2	-68.7	-57.0	-11.7	PK	Vertical
	205.1	-87.0	21.7	-65.3	-57.0	-8.3	PK	Vertical
	1127.5	-55.5	2.1	-53.4	-47.0	-6.4	PK	Horizontal
	2249.5	-68.2	9.5	-58.7	-47.0	-11.7	PK	Horizontal
	1348.5	-59.9	4.6	-55.3	-47.0	-8.3	PK	Vertical
	2249.5	-65.7	9.0	-56.7	-47.0	-9.7	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT40 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	58.1	-87.5	22.7	-64.8	-57.0	-7.8	PK	Horizontal
	102.3	-80.9	14.9	-66.0	-57.0	-9.0	PK	Horizontal
	59.6	-86.0	22.3	-63.7	-57.0	-6.7	PK	Vertical
	125.1	-91.2	25.2	-66.0	-57.0	-9.0	PK	Vertical
	1127.5	-58.1	2.1	-56.0	-47.0	-9.0	PK	Horizontal
	2249.5	-68.3	9.5	-58.8	-47.0	-11.8	PK	Horizontal
	1348.5	-59.7	4.6	-55.1	-47.0	-8.1	PK	Vertical
	2249.5	-65.8	9.0	-56.8	-47.0	-9.8	PK	Vertical
102	58.1	-87.1	22.7	-64.4	-57.0	-7.4	PK	Horizontal
	91.6	-82.6	15.5	-67.1	-57.0	-10.1	PK	Horizontal
	59.1	-88.7	22.3	-66.4	-57.0	-9.4	PK	Vertical
	90.1	-92.0	24.9	-67.1	-57.0	-10.1	PK	Vertical
	1127.5	-55.3	2.1	-53.2	-47.0	-6.2	PK	Horizontal
	2249.5	-66.9	9.5	-57.4	-47.0	-10.4	PK	Horizontal
	1348.5	-59.2	4.6	-54.6	-47.0	-7.6	PK	Vertical
	1875.5	-62.9	6.0	-56.9	-47.0	-9.9	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT20 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	58.6	-89.6	22.6	-67.0	-57.0	-10.0	PK	Horizontal
	97.4	-80.0	14.7	-65.3	-57.0	-8.3	PK	Horizontal
	53.8	-87.1	21.9	-65.2	-57.0	-8.2	PK	Vertical
	125.1	-88.4	25.2	-63.2	-57.0	-6.2	PK	Vertical
	1127.5	-55.4	2.1	-53.3	-47.0	-6.3	PK	Horizontal
	2249.5	-68.6	9.5	-59.1	-47.0	-12.1	PK	Horizontal
	1348.5	-59.2	4.6	-54.6	-47.0	-7.6	PK	Vertical
	1875.5	-62.7	6.0	-56.7	-47.0	-9.7	PK	Vertical
100	59.1	-88.4	22.5	-65.9	-57.0	-8.9	PK	Horizontal
	89.2	-79.7	16.0	-63.7	-57.0	-6.7	PK	Horizontal
	73.7	-92.1	26.5	-65.6	-57.0	-8.6	PK	Vertical
	140.1	-90.1	24.2	-65.9	-57.0	-8.9	PK	Vertical
	1127.5	-55.3	2.1	-53.2	-47.0	-6.2	PK	Horizontal
	2249.5	-68.1	9.5	-58.6	-47.0	-11.6	PK	Horizontal
	1348.5	-59.2	4.6	-54.6	-47.0	-7.6	PK	Vertical
	1875.5	-62.8	6.0	-56.8	-47.0	-9.8	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT40 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	64.4	-88.7	22.7	-66.0	-57.0	-9.0	PK	Horizontal
	89.2	-79.8	16.0	-63.8	-57.0	-6.8	PK	Horizontal
	39.2	-86.6	19.2	-67.4	-57.0	-10.4	PK	Vertical
	64.9	-89.2	24.2	-65.0	-57.0	-8.0	PK	Vertical
	1127.5	-57.5	2.1	-55.4	-47.0	-8.4	PK	Horizontal
	2249.5	-69.9	9.5	-60.4	-47.0	-13.4	PK	Horizontal
	1348.5	-59.1	4.6	-54.5	-47.0	-7.5	PK	Vertical
	2249.5	-66.5	9.0	-57.5	-47.0	-10.5	PK	Vertical
102	39.2	-96.4	29.4	-67.0	-57.0	-10.0	PK	Horizontal
	74.6	-86.2	20.0	-66.2	-57.0	-9.2	PK	Horizontal
	59.1	-87.2	22.3	-64.9	-57.0	-7.9	PK	Vertical
	125.1	-89.0	25.2	-63.8	-57.0	-6.8	PK	Vertical
	1127.5	-59.6	2.1	-57.5	-47.0	-10.5	PK	Horizontal
	2249.5	-68.2	9.5	-58.7	-47.0	-11.7	PK	Horizontal
	1374.0	-61.8	5.7	-56.1	-47.0	-9.1	PK	Vertical
	1629.0	-62.7	4.7	-58.0	-47.0	-11.0	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT80 - Ant 0 + 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
62	62.0	-89.2	22.9	-66.3	-57.0	-9.3	PK	Horizontal
	225.0	-92.0	26.4	-65.6	-57.0	-8.6	PK	Horizontal
	53.8	-85.4	21.9	-63.5	-57.0	-6.5	PK	Vertical
	264.7	-88.5	24.3	-64.2	-57.0	-7.2	PK	Vertical
	1127.5	-59.1	2.1	-57.0	-47.0	-10.0	PK	Horizontal
	2249.5	-69.9	9.5	-60.4	-47.0	-13.4	PK	Horizontal
	1348.5	-61.1	4.6	-56.5	-47.0	-9.5	PK	Vertical
	1875.5	-62.8	6.0	-56.8	-47.0	-9.8	PK	Vertical
102	59.1	-86.1	22.5	-63.6	-57.0	-6.6	PK	Horizontal
	100.3	-80.1	14.7	-65.4	-57.0	-8.4	PK	Horizontal
	58.6	-87.2	22.3	-64.9	-57.0	-7.9	PK	Vertical
	96.4	-88.1	23.8	-64.3	-57.0	-7.3	PK	Vertical
	1127.5	-59.5	2.1	-57.4	-47.0	-10.4	PK	Horizontal
	2249.5	-67.3	9.5	-57.8	-47.0	-10.8	PK	Horizontal
	1348.5	-60.0	4.6	-55.4	-47.0	-8.4	PK	Vertical
	1875.5	-62.6	6.0	-56.6	-47.0	-9.6	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test with ANT 2#

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11a Ant 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	64.7	-90.4	20.5	-69.9	-57	-12.9	PK	Horizontal
	339.2	-90.0	25.9	-64.1	-57	-7.1	PK	Horizontal
	339.2	-95.0	25.8	-69.2	-57	-12.2	PK	Vertical
	499.3	-98.2	29.3	-68.9	-57	-11.9	PK	Vertical
	3753.3	-62.3	11.9	-50.4	-47	-3.4	PK	Horizontal
	5121.8	-69.2	16.0	-53.2	-47	-6.2	PK	Horizontal
	2240.3	-66.2	10.0	-56.2	-47	-9.2	PK	Vertical
	3753.3	-66.1	12.6	-53.5	-47	-6.5	PK	Vertical
100	65.2	-90.9	20.4	-70.5	-57	-13.5	PK	Horizontal
	339.2	-90.0	25.9	-64.1	-57	-7.1	PK	Horizontal
	88.5	-97.2	30.5	-66.7	-57	-9.7	PK	Vertical
	339.2	-95.4	25.8	-69.6	-57	-12.6	PK	Vertical
	3753.3	-61.8	11.9	-49.9	-47	-2.9	PK	Horizontal
	4433.3	-68.1	14.1	-54.0	-47	-7.0	PK	Horizontal
	3753.3	-65.3	12.6	-52.7	-47	-5.7	PK	Vertical
	5002.8	-68.1	16.5	-51.6	-47	-4.6	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT20 – Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	64.7	-88.8	20.5	-68.3	-57	-11.3	PK	Horizontal
	339.2	-88.6	25.9	-62.7	-57	-5.7	PK	Horizontal
	66.6	-88.3	21.9	-66.4	-57	-9.4	PK	Vertical
	339.2	-95.0	25.8	-69.2	-57	-12.2	PK	Vertical
	2240.3	-66.6	9.8	-56.8	-47	-9.8	PK	Horizontal
	3753.3	-61.8	11.9	-49.9	-47	-2.9	PK	Horizontal
	1679.3	-65.8	6.3	-59.5	-47	-12.5	PK	Vertical
	3753.3	-67.0	12.6	-54.4	-47	-7.4	PK	Vertical
100	68.6	-91.0	19.9	-71.1	-57	-14.1	PK	Horizontal
	339.2	-89.9	25.9	-64.0	-57	-7.0	PK	Horizontal
	93.3	-100.0	33.2	-66.8	-57	-9.8	PK	Vertical
	339.2	-97.1	25.8	-71.3	-57	-14.3	PK	Vertical
	2240.3	-66.8	9.8	-57.0	-47	-10.0	PK	Horizontal
	3753.3	-62.3	11.9	-50.4	-47	-3.4	PK	Horizontal
	2240.3	-67.2	10.0	-57.2	-47	-10.2	PK	Vertical
	3753.3	-66.6	12.6	-54.0	-47	-7.0	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11n-HT40 – Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
60	339.2	-90.2	25.9	-64.3	-57	-7.3	PK	Horizontal
	579.3	-95.8	31.2	-64.6	-57	-7.6	PK	Horizontal
	63.7	-90.0	22.5	-67.5	-57	-10.5	PK	Vertical
	339.2	-96.5	25.8	-70.7	-57	-13.7	PK	Vertical
	1245.8	-66.2	8.1	-58.1	-47	-11.1	PK	Horizontal
	3753.3	-61.7	11.9	-49.8	-47	-2.8	PK	Horizontal
	1245.8	-64.9	7.9	-57.0	-47	-10.0	PK	Vertical
	2240.3	-66.9	10.0	-56.9	-47	-9.9	PK	Vertical
100	65.2	-90.6	20.4	-70.2	-57	-13.2	PK	Horizontal
	579.3	-95.3	31.2	-64.1	-57	-7.1	PK	Horizontal
	68.1	-89.2	22.0	-67.2	-57	-10.2	PK	Vertical
	579.3	-96.9	30.9	-66.0	-57	-9.0	PK	Vertical
	2240.3	-66.5	9.8	-56.7	-47	-9.7	PK	Horizontal
	3753.3	-62.2	11.9	-50.3	-47	-3.3	PK	Horizontal
	1245.8	-64.6	7.9	-56.7	-47	-9.7	PK	Vertical
	3753.3	-66.8	12.6	-54.2	-47	-7.2	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT20 – Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	69.1	-90.9	19.7	-71.2	-57	-14.2	PK	Horizontal
	339.2	-90.7	25.9	-64.8	-57	-7.8	PK	Horizontal
	90.9	-97.0	30.7	-66.3	-57	-9.3	PK	Vertical
	339.2	-95.7	25.8	-69.9	-57	-12.9	PK	Vertical
	1398.8	-62.7	7.1	-55.6	-47	-8.6	PK	Horizontal
	3753.3	-61.7	11.9	-49.8	-47	-2.8	PK	Horizontal
	2240.3	-67.2	10.0	-57.2	-47	-10.2	PK	Vertical
	3753.3	-66.4	12.6	-53.8	-47	-6.8	PK	Vertical
100	66.6	-90.0	20.2	-69.8	-57	-12.8	PK	Horizontal
	339.2	-90.0	25.9	-64.1	-57	-7.1	PK	Horizontal
	90.4	-97.9	30.6	-67.3	-57	-10.3	PK	Vertical
	339.2	-94.9	25.8	-69.1	-57	-12.1	PK	Vertical
	1398.8	-61.4	7.1	-54.3	-47	-7.3	PK	Horizontal
	3753.3	-61.9	11.9	-50.0	-47	-3.0	PK	Horizontal
	2240.3	-67.0	10.0	-57.0	-47	-10.0	PK	Vertical
	3753.3	-66.8	12.6	-54.2	-47	-7.2	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT40 – Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
64	68.1	-89.9	20.0	-69.9	-57	-12.9	PK	Horizontal
	339.2	-90.2	25.9	-64.3	-57	-7.3	PK	Horizontal
	90.9	-97.5	30.7	-66.8	-57	-9.8	PK	Vertical
	499.3	-97.3	29.3	-68.0	-57	-11.0	PK	Vertical
	2240.3	-66.7	9.8	-56.9	-47	-9.9	PK	Horizontal
	3753.3	-62.3	11.9	-50.4	-47	-3.4	PK	Horizontal
	2240.3	-67.1	10.0	-57.1	-47	-10.1	PK	Vertical
	3753.3	-66.0	12.6	-53.4	-47	-6.4	PK	Vertical
100	64.7	-89.5	20.5	-69.0	-57	-12.0	PK	Horizontal
	339.2	-90.6	25.9	-64.7	-57	-7.7	PK	Horizontal
	87.0	-97.0	30.3	-66.7	-57	-9.7	PK	Vertical
	339.2	-96.5	25.8	-70.7	-57	-13.7	PK	Vertical
	2240.3	-66.0	9.8	-56.2	-47	-9.2	PK	Horizontal
	3753.3	-62.0	11.9	-50.1	-47	-3.1	PK	Horizontal
	2240.3	-66.1	10.0	-56.1	-47	-9.1	PK	Vertical
	3753.3	-67.0	12.6	-54.4	-47	-7.4	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

Test Engineer	Lewis Huang	Temperature	24°C
Test Time	2016/12/24	Relative Humidity	52%
Test Mode	802.11ac-VHT80 – Ant 0 + 1	Test Site	AC2

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
60	339.2	-91.0	25.9	-65.1	-57	-8.1	PK	Horizontal
	579.3	-95.2	31.2	-64.0	-57	-7.0	PK	Horizontal
	64.2	-89.9	22.3	-67.6	-57	-10.6	PK	Vertical
	89.9	-97.6	30.5	-67.1	-57	-10.1	PK	Vertical
	1398.8	-62.8	7.1	-55.7	-47	-8.7	PK	Horizontal
	3753.3	-63.9	11.9	-52.0	-47	-5.0	PK	Horizontal
	2240.3	-67.3	10.0	-57.3	-47	-10.3	PK	Vertical
	3753.3	-66.3	12.6	-53.7	-47	-6.7	PK	Vertical
100	66.2	-89.9	20.3	-69.6	-57	-12.6	PK	Horizontal
	339.2	-90.0	25.9	-64.1	-57	-7.1	PK	Horizontal
	65.2	-89.0	21.9	-67.1	-57	-10.1	PK	Vertical
	579.3	-97.8	30.9	-66.9	-57	-9.9	PK	Vertical
	2240.3	-67.3	9.8	-57.5	-47	-10.5	PK	Horizontal
	3753.3	-61.8	11.9	-49.9	-47	-2.9	PK	Horizontal
	1679.3	-65.5	6.3	-59.2	-47	-12.2	PK	Vertical
	3753.3	-67.3	12.6	-54.7	-47	-7.7	PK	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Note 3: Other frequency was base noise within 18-26.5GHz, there is not show in the report.

10. Adaptivity (Channel Access Mechanism)

10.1. Limit

LBT based Detect and Avoid (Load based Equipment may implement an LBT based spectrum sharing mechanism as described in IEEE 802.11-2012, clauses 9, clauses 10, clauses 18 and 20 or as described in IEEE 802.11ac-2013, clauses 8, clauses 9, clause 10 and 22)

Adaptivity Limit (Option B)

The CCA observation time shall be not less than 20 us, and the CCA time used by the equipment shall be declared by the manufacturer.

The Channel Occupancy Time shall be less than (13 / 32) * q ms, q = [4~32].

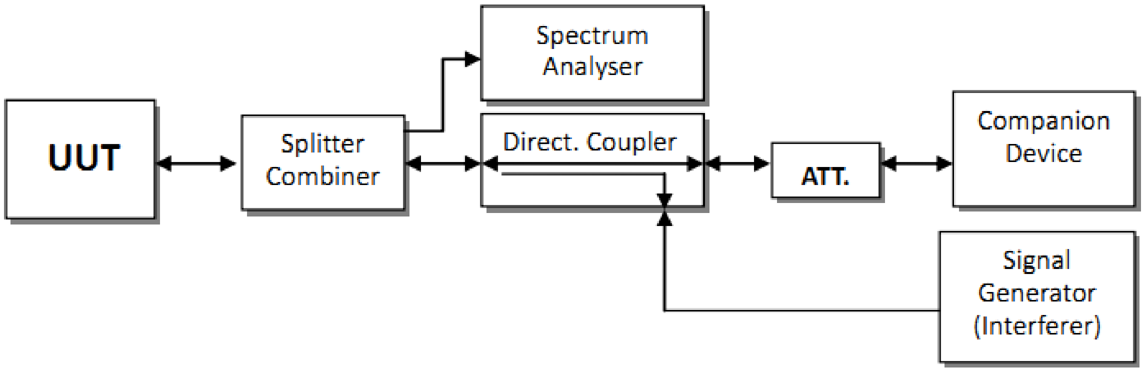
The minimum idle period varied between CCA and q*CCA.

When adding the interference signal, the EUT shall stop transmissions on the current operating channel.

Short Control Signalling Transmissions Limit

Short Control Signalling Transmissions shall have a maximum duty cycle of 5% within an observation period of 50ms.

10.2. Test Setup



10.3. Test Procedure

Refer to ETSI EN 301 893 V1.8.1 (2015-03) Clause 5.3.9.2.1.

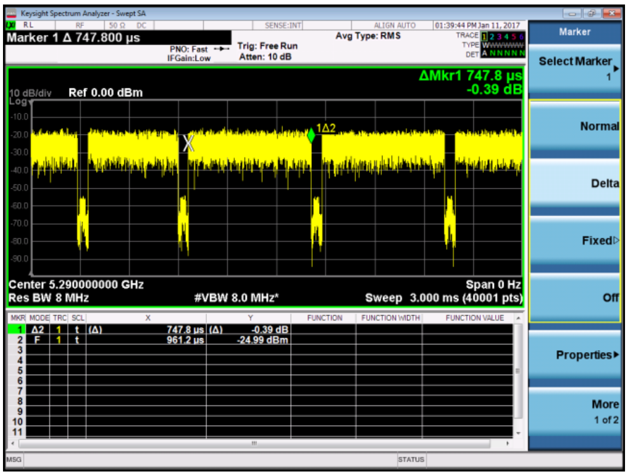
10.4. Test Result

Product	802.11ac Dual Band Module	Temperature	24°C
Test Engineer	Andy Zhu	Relative Humidity	54%
Test Site	TR3	Test Date	2017/01/10

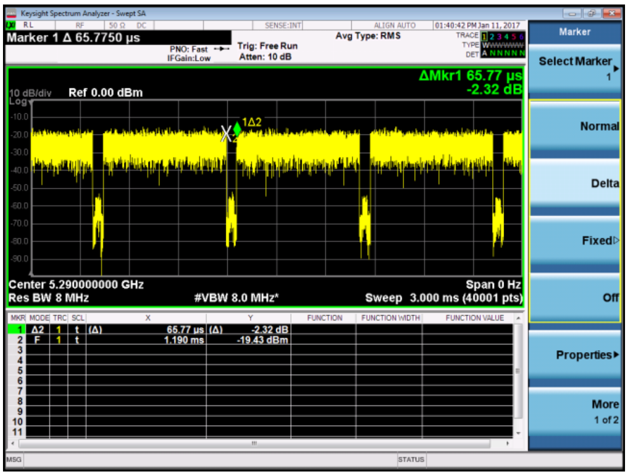
The CCA observation time was 25 us, and the maximum factor of q = 24 which were declared by the supplier. So the idle period varied between 25 us and 600 us and the channel occupancy time shall less than (13 / 32) * 24 = 9.75 ms.

802.11ac-VHT80 – 5290MHz

Maximum Channel Occupancy Time = 747.8us

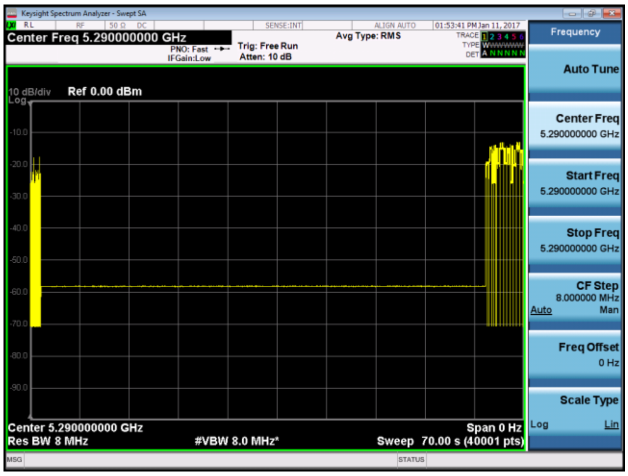


Minimum Idle Period = 65.77us



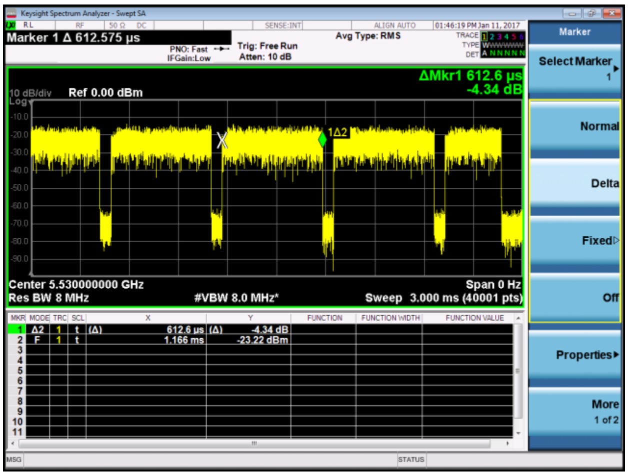
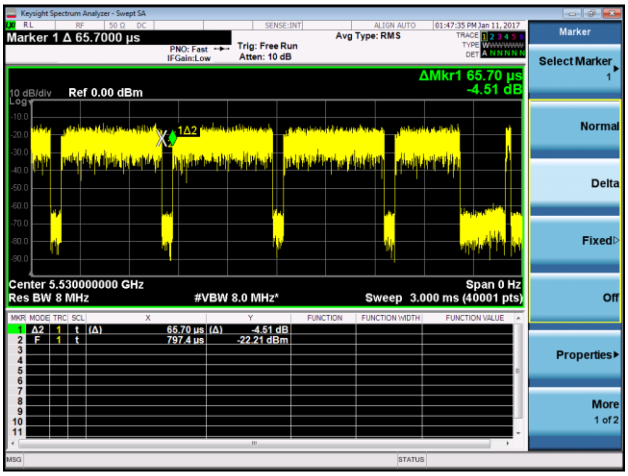
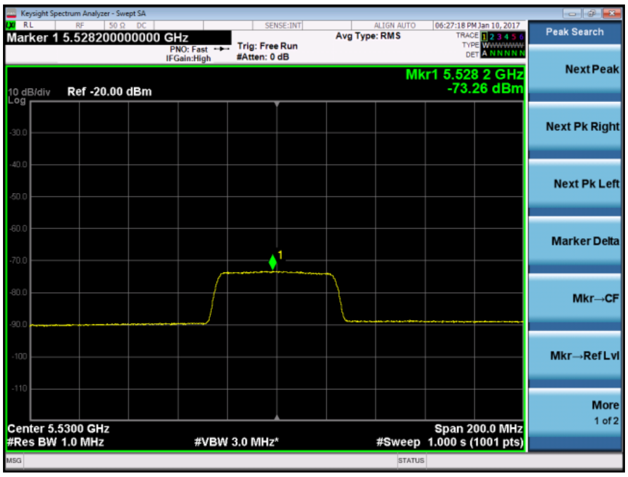
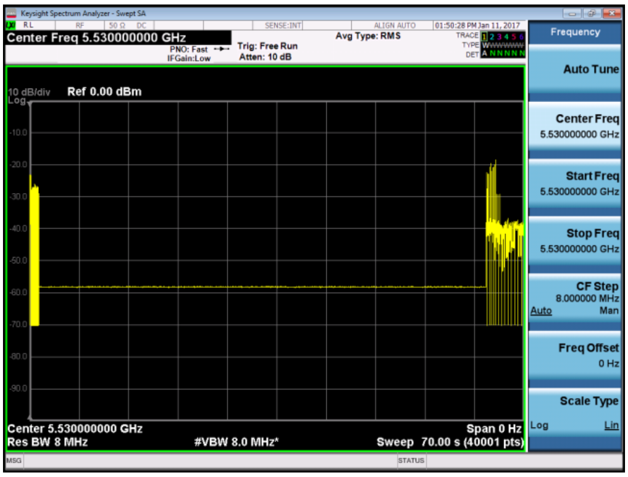
Interference Signal Calibration

Transmission stopped after interference added and the short control signaling less than 5ms.



Note: Detection Level = -73 dBm/MHz + (23 dBm - the max conducted power (dBm))/MHz ≥ -73 dBm/MHz We used the worst-case detection level (-73dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

<table>
<tr><th colspan="2">802.11ac-VHT80 – 5530MHz</th></tr>
<tr><th>Maximum Channel Occupancy Time = 612.6us</th><th>Minimum Idle Period = 65.70us</th></tr>
<tr><td>
</td><td>
</td></tr>
<tr><th>Interference Signal Calibration</th><th>Transmission stopped after interference added and the short control signaling less than 5ms.</th></tr>
<tr><td>
</td><td>
</td></tr>
</table>

Note: Detection Level = -73 dBm/MHz + (23 dBm - the max conducted power (dBm))/MHz ≥ -73 dBm/MHz We used the worst-case detection level (-73dBm/MHz) to perform adaptivity testing.

Test Result:	Pass

11. User Access Restrictions

11.1. Requirement

DFS controls (hardware or software) related to radar detection shall not be accessible to the user so that the DFS requirements described in clauses 4.7.2.1 to 4.7.2.6 can neither be disabled nor altered.

11.2. Test Result

In the hardware, there is no switch or button to modify the DFS function or parameter for the user.
In the software, there is no options to modify the DFS function or parameter for the user.
The user access restrictions mechanism shall be implemented by the equipment which was declared by the manufacturer.

12. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
RF Power Conducted	±1.5dB
RF Power Radiated	±6dB
Spurious Emissions, Conducted	±3dB
Spurious Emissions, Radiated	±6dB
Humidity	±5%
Temperature	±1℃
Time	±10%

13. List of Measuring Instrument

Carrier Frequencies - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	1309W043	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2017/12/20

Occupied Channel Bandwidth - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2017/12/20

RF Output Power, Transmit Power Control (TPC) and Power Density - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Power Meter	Agilent	U2021XA	MY53410005	1 year	2017/12/06
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	1309W043	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2017/12/20

Transmitter Unwanted Emissions Within the 5GHz RLAN Bands - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2017/12/20

Transmitter Spurious Emissions and Receiver Spurious Emissions - AC2

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cal. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	302	1 year	2017/12/10
Preamplifier	Schwarzbeck	BBV 9721	9721-008	1 year	2017/04/16
TRILOG Antenna	Schwarzbeck	VULB9162	9162-047	1 year	2017/10/22
Broad-Band Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1167	1 year	2017/11/19
Broadband Horn Antenna	Schwarzbeck	BBHA9170	BBHA9170549	1 year	2017/01/05
Digital Thermometer & Hygrometer	Minggao	ETH529	N/A	1 year	2017/11/30
Anechoic Chamber	RIKEN	Chamber-AC2	N/A	1 year	2017/05/10

Adaptivity (Channel Access Mechanism) - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MY52090106	1 year	2017/05/08
Vector Signal Generator	Agilent	E4438C	MY49872484	1 year	2017/12/06
Directional Coupler	Narda	4216-20	1395	1 year	2017/03/29
Power Splitter	Mini-Circuits	ZFRSC-123-S+	N/A	N/A	N/A
Temperature/Humidity Meter	Yuhuaze	HTC-2	N/A	1 year	2017/12/20

Software	Version	Function
e3	V8.3.5	EMI Test Software

The End