

MEASUREMENT REPORT

EN 302 502 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: 4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module

Model No.: WLE1216V5-20, WLE1216V5-20-I

Brand Name: COMPEX

Standards: ETSI EN 302 502 V2.1.1 (2017-03)

Result: Complies

Test Date: October 25 ~ November 22, 2017

Reviewed By : Jame Yuan
(Jame Yuan)

Approved By : Marlin Chen
(Marlin Chen)



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
1710RSU02006	Rev. 01	Initial Report	11-25-2017	Valid

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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. 893164) 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.



1.4. Feature of Equipment under Test

Product Name:	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module
Model No.:	WLE1216V5-20, WLE1216V5-20-I
Brand Name:	COMPEX
Wi-Fi Specification:	802.11a/n/ac
Operating Temperature:	-20 ~ 70 ° C

1.5. Product Specification Subjective to this Report

Frequency Range	802.11a /n-HT20/ac-VHT20: 5745~5825 MHz
Channel Number	802.11a/n-HT20/ac-VHT20: 5
Type of Modulation	802.11a/n/ac: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 288.8Mbps 802.11ac: up to 346.8Mbps

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
149	5745 MHz	153	5765 MHz	157	5785 MHz
161	5805 MHz	165	5825 MHz	--	--

1.7. Description of Available Antennas

No.	Antenna	Manufacturer	Frequency Band (MHz)	Max Peak Gain (dBi)
Wi-Fi External Antenna List (5GHz 4*4 MIMO)				
1#	Omni Directional	Exceltek Electronics Technology Co., Ltd.	2400 ~ 2500	3.0
			5150 ~ 5850	5.0
2#	Omni Directional	Laird Smart Technology Co., Ltd.	2400 ~ 2500	2.2
			5150 ~ 5850	3.5
3#	Omni Directional	Linx Technologies	2400 ~ 2500	2.5
			5150 ~ 5850	4.6
4#	Omni Directional	Kenbotong Technology Co., Ltd.	5150 ~ 5850	10.0

Note 1: The device didn't support beam-forming technology and Cyclic Delay Diversity (CDD) technology, and the transmit signals are uncorrected.

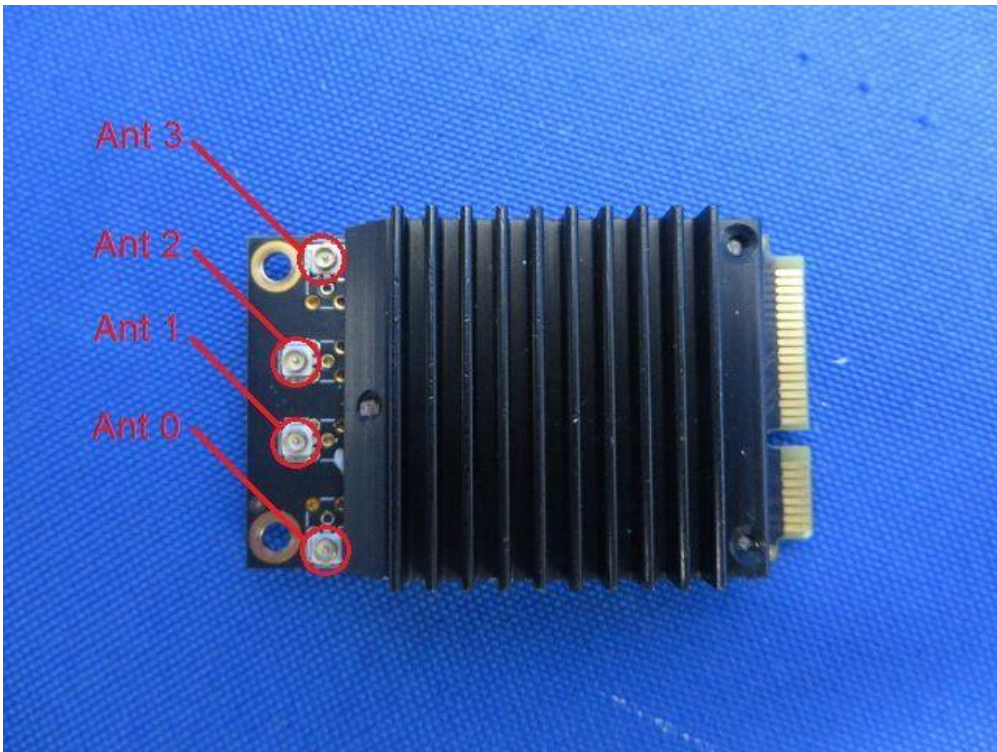
Note 2: We selected the max peak gain antenna 4# to perform all RF testing.

1.8. Description of Support Units

The EUT has been tested with associated equipment below:

Description	Manufacturer	Model No.
PCB Board	Compex Systems Pte Ltd	WPQ864HV

1.9. Description of Antenna RF Port

Antenna RF Port				
--	5GHz RF Port			
Software Control Port	Ant 0	Ant 1	Ant 2	Ant 3
				

1.10. Standards Applicable for Testing

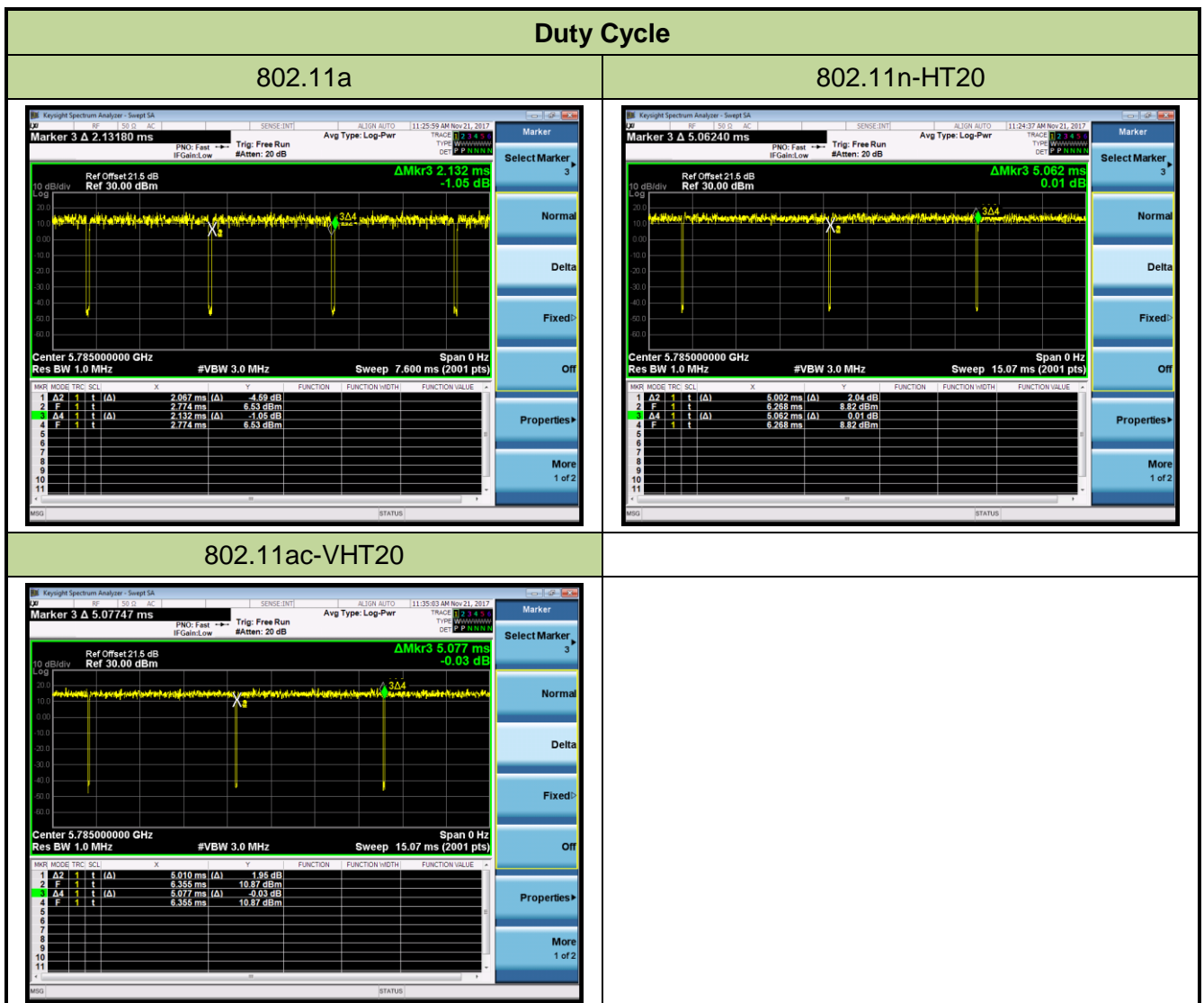
The EUT complies with the requirements of ETSI EN 302 502 V2.1.1.

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 802.11ac-VHT20
	Mode 4: Receive by 802.11a
	Mode 5: Receive by 802.11n-HT20
	Mode 6: Receive by 802.11ac-VHT20

Test Mode	Duty Cycle
802.11a	96.95%
802.11n-HT20	98.81%
802.11ac-VHT20	98.68%



2.2. Description of Test Data Rate

Pre-Test RF Output Power at various data rates for Ant 1

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate (Mbps)	RF Output Power (dBm)
11a	20	157	5785	6Mbps	21.29
				24Mbps	21.03
				54Mbps	20.84
11n	20	157	5785	MCS0	20.39
				MCS3	20.06
				MCS7	19.84
11ac	20	157	5785	MCS0	21.68
				MCS3	21.42
				MCS7	21.23

Note: All modes of operation and data rates were investigated, so all RF test requirements shall be executed at low data rates.

2.3. Description of Test Software

The test utility software used during testing was “QCARCT”, and the version was “v3.0.174.0”.

Power Parameter Value for 1TX:

Test Mode	Channel No.	Test Frequency (MHz)	Power Parameter Value			
			Ant 0	Ant 1	Ant 2	Ant 3
802.11a	149	5745	20.0	19.00	20.00	20.00
	157	5785	20.0	19.00	20.00	20.00
	165	5825	20.0	19.00	20.00	20.00
802.11n-HT20	149	5745	--	19.5	--	--
	157	5785	--	19.5	--	--
	165	5825	--	19.0	--	--
802.11ac-VHT20	149	5745	--	19.5	--	--
	157	5785	--	19.5	--	--
	165	5825	--	19.0	--	--

Power Parameter Value for 4TX:

Test Mode	Channel No.	Test Frequency (MHz)	Ant 0 + 1 + 2 + 3 Power Parameter Value
802.11n-HT20	149	5745	18.0
	157	5785	18.0
	165	5825	18.5
802.11ac-VHT20	149	5745	18.0
	157	5785	18.0
	165	5825	18.5

3. Test Summary

Clause EN 302 502	Test Parameter	Result (Pass/Fail)	Remark
4.2.1	Frequency Error	Pass	--
4.2.2 & 4.2.4	Transmitter RF Output Power, EIRP, EIRP Spectral Density and Transmitter Power Control (TPC)	Pass	--
4.2.3	Transmitter Unwanted Emissions	Pass	--
4.2.5	Receiver Spurious Emissions	Pass	--
4.2.6	Dynamic Frequency Selection (DFS)	Pass	Refer to DFS report
4.2.7	Receiver Blocking	Pass	--
4.2.8	User Access Restrictions	Pass	--
Note: For Occupied Channel Bandwidth and Transmitter Unwanted Emissions Within the 5GHz RLAN Bands test, only the worst port was performed in the report.			

4. Frequency Error

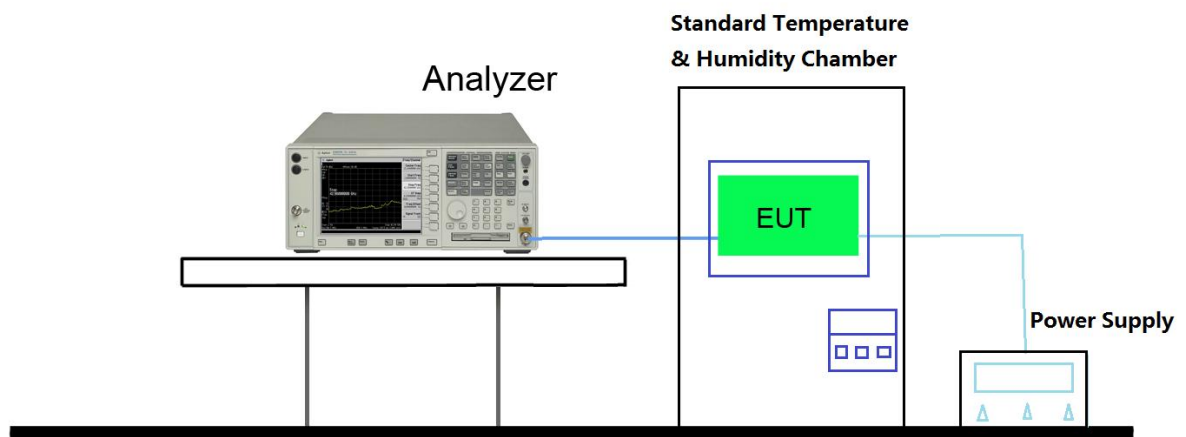
4.1. Limit

The manufacturer shall declare the centre frequencies on which the equipment can operate. The equipment shall only operate in channels centred on any of those frequencies identified in clause 4.1.1 of standard.

The actual carrier centre frequency shall be maintained within the range $f_c \pm 20$ ppm of the nominal channel centre frequency.

4.2. Test Setup

For Conducted Measurement



4.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.2.

4.4. Test Result

Product	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module	Temperature	-20 ~ 70°C
Test Engineer	Lewis Huang	Relative Humidity	58%
Test Site	TR3	Test Date	2017/11/21

Test Conditions		Centre Frequency (MHz)	Measured Frequency (MHz)	Tolerance (ppm)	Limit (ppm)	Result
T _{NOM} (25°C)	V _{NOM} (DC 3.3V)	5745	5744.9921	-1.38	-20 ~ +20	Pass
		5825	5824.9916	-1.44	-20 ~ +20	Pass
T _{MIN} (-20°C)	V _{MIN} (DC 2.8V)	5745	5744.9934	-1.15	-20 ~ +20	Pass
		5825	5824.9927	-1.25	-20 ~ +20	Pass
	V _{MAX} (DC 3.6V)	5745	5744.9936	-1.11	-20 ~ +20	Pass
		5825	5824.9925	-1.29	-20 ~ +20	Pass
T _{MAX} (70°C)	V _{MIN} (DC 2.8V)	5745	5744.9946	-0.94	-20 ~ +20	Pass
		5825	5824.9954	-0.79	-20 ~ +20	Pass
	V _{MAX} (DC 3.6V)	5745	5744.9954	-0.80	-20 ~ +20	Pass
		5825	5824.9955	-0.77	-20 ~ +20	Pass

Note: Tolerance (ppm) = {Measured Frequency (MHz) - Centre Frequency (MHz)} / Centre Frequency (MHz) * 10⁶ (ppm)

5. Transmitter RF Output Power, EIRP, TPC and EIRP Spectral Density

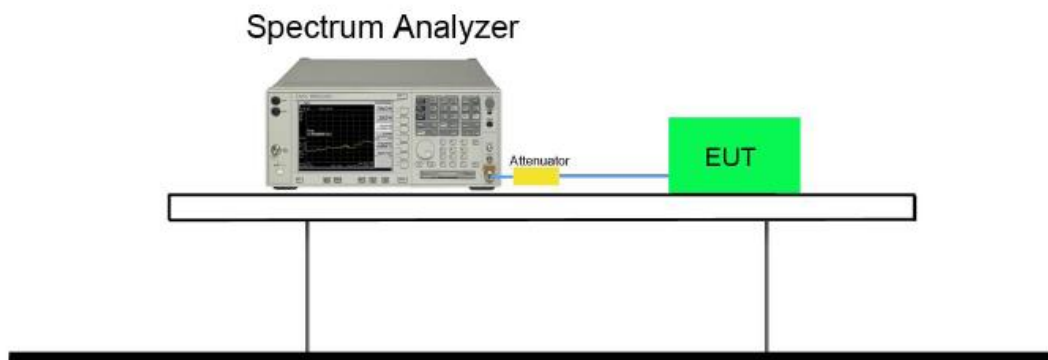
5.1. Limit

The mean EIRP, RF power and EIRP spectral density when configured to operate at the highest stated power level (P_{cond_1}) shall not exceed the limit in following table.

Mean RF output power, EIRP and power density limits at the highest power level			
Channel Width (MHz) ChS	Mean RF power into antenna (dBm)	Mean EIRP (dBm)	Mean EIRP spectral density (dBm/MHz)
10	27	33	23
20	30	36	23

The FWA device shall have the capability to reduce the operating mean EIRP level to level not exceeding 24 dBm for ChS = 20 MHz and 21 dBm for ChS = 10 MHz.

5.2. Test Setup



5.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.3.

5.4. Test Result

Product	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module	Temperature	-20 ~ 70° C
Test Engineer	Hunk Li	Relative Humidity	54%
Test Site	TR3	Test Date	2017/10/27
Test Item	RF Output Power		

Normal Conditions (Temperature 25°C and Voltage DC 3.3V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)				Max RF Output Power (dBm)	Power Limit (dBm)	Max EIRP (dBm)	EIRP Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
11a	149	5745	20.60	21.19	20.91	20.55	21.19	≤ 30	31.19	≤ 36	Pass
11a	157	5785	19.94	21.29	20.86	20.57	21.29	≤ 30	31.29	≤ 36	Pass
11a	165	5825	19.54	21.24	20.98	20.66	21.24	≤ 30	31.24	≤ 36	Pass

Note 1: Max RF Output Power (dBm) = Max (Ant 0 RF Output Power: Ant 1 RF Output Power: Ant 2 RF Output Power: Ant 3 RF Output Power).

Note 2: Max EIRP (dBm) = Max RF Output Power (dBm) + Antenna Gain (dBi).

Note 3: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	Ant 1 RF Output Power (dBm)	Power Limit (dBm)	Ant 1 EIRP (dBm)	EIRP Limit (dBm)	Result
11n-HT20	149	5745	21.71	≤ 30	31.71	≤ 36	Pass
11n-HT20	157	5785	20.39	≤ 30	30.39	≤ 36	Pass
11n-HT20	165	5825	20.11	≤ 30	30.11	≤ 36	Pass
11ac-VHT20	149	5745	21.59	≤ 30	31.59	≤ 36	Pass
11ac-VHT20	157	5785	21.68	≤ 30	31.68	≤ 36	Pass
11ac-VHT20	165	5825	21.21	≤ 30	31.21	≤ 36	Pass

Note 1: Ant 1 EIRP (dBm) = Ant 1 RF Output Power (dBm) + Antenna Gain (dBi).

Note 2: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)				Total Output Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
11n-HT20	149	5745	18.69	19.65	19.45	19.72	25.42	≤ 30	35.42	≤ 36	Pass
11n-HT20	157	5785	18.94	19.73	19.40	19.72	25.48	≤ 30	35.48	≤ 36	Pass
11n-HT20	165	5825	19.26	20.16	20.15	19.85	25.89	≤ 30	35.89	≤ 36	Pass
11ac-VHT20	149	5745	18.69	19.58	19.43	19.69	25.39	≤ 30	35.39	≤ 36	Pass
11ac-VHT20	157	5785	18.98	19.90	19.57	19.74	25.58	≤ 30	35.58	≤ 36	Pass
11ac-VHT20	165	5825	19.27	20.34	20.13	19.88	25.94	≤ 30	35.94	≤ 36	Pass

Note 1: EIRP Power (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 RF Output Power})/10} + 10^{(\text{Ant 1 RF Output Power})/10} + 10^{(\text{Ant 2 RF Output Power})/10} + 10^{(\text{Ant 3 RF Output Power})/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + $10 \cdot \log(1/\text{Duty Cycle})$.

Extreme Conditions (Temperature -20°C and Voltage DC 2.8V & DC 3.6V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)				Max RF Output Power (dBm)	Power Limit (dBm)	Max EIRP (dBm)	EIRP Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
11a	149	5745	20.33	21.77	21.42	21.13	21.77	≤ 30	31.77	≤ 36	Pass
11a	157	5785	19.90	21.90	21.33	21.32	21.90	≤ 30	31.90	≤ 36	Pass
11a	165	5825	20.42	21.88	21.60	21.31	21.88	≤ 30	31.88	≤ 36	Pass

Note 1: Max RF Output Power (dBm) = Max (Ant 0 RF Output Power: Ant 1 RF Output Power: Ant 2 RF Output Power: Ant 3 RF Output Power).

Note 2: Max EIRP (dBm) = Max RF Output Power (dBm) + Antenna Gain (dBi).

Note 3: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	Ant 1 RF Output Power (dBm)	Power Limit (dBm)	Ant 1 EIRP (dBm)	EIRP Limit (dBm)	Result
11n-HT20	149	5745	22.27	≤ 30	32.27	≤ 36	Pass
11n-HT20	157	5785	22.39	≤ 30	32.39	≤ 36	Pass
11n-HT20	165	5825	21.90	≤ 30	31.90	≤ 36	Pass
11ac-VHT20	149	5745	22.23	≤ 30	32.23	≤ 36	Pass
11ac-VHT20	157	5785	22.39	≤ 30	32.39	≤ 36	Pass
11ac-VHT20	165	5825	21.88	≤ 30	31.88	≤ 36	Pass

Note 1: Ant 1 EIRP (dBm) = Ant 1 RF Output Power (dBm) + Antenna Gain (dBi).

Note 2: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MzHz)	RF Output Power (dBm)				Total Output Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
11n-HT20	149	5745	18.82	20.12	19.50	19.98	25.65	≤ 30	35.65	≤ 36	Pass
11n-HT20	157	5785	19.12	20.37	18.98	19.84	25.63	≤ 30	35.63	≤ 36	Pass
11n-HT20	165	5825	18.91	20.26	19.75	20.31	25.86	≤ 30	35.86	≤ 36	Pass
11ac-VHT20	149	5745	18.55	19.88	19.77	19.91	25.58	≤ 30	35.58	≤ 36	Pass
11ac-VHT20	157	5785	18.78	19.95	19.24	20.04	25.55	≤ 30	35.55	≤ 36	Pass
11ac-VHT20	165	5825	19.11	20.22	19.80	20.25	25.89	≤ 30	35.89	≤ 36	Pass

Note 1: EIRP Power (dBm) = $10 \cdot \log\{10^{(Ant\ 0\ RF\ Output\ Power)/10} + 10^{(Ant\ 1\ RF\ Output\ Power)/10} + 10^{(Ant\ 2\ RF\ Output\ Power)/10} + 10^{(Ant\ 3\ RF\ Output\ Power)/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Extreme Conditions (Temperature 70°C and Voltage DC 2.8V & DC 3.6V)

Mode	Ch. No.	Freq. (MHz)	RF Output Power (dBm)				Max RF Output Power (dBm)	Power Limit (dBm)	Max EIRP (dBm)	EIRP Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
11a	149	5745	21.22	20.75	20.44	20.39	21.22	≤ 30	31.22	≤ 36	Pass
11a	157	5785	20.44	20.78	20.48	20.36	20.78	≤ 30	30.78	≤ 36	Pass
11a	165	5825	19.92	20.78	20.60	20.29	20.78	≤ 30	30.78	≤ 36	Pass

Note 1: Max RF Output Power (dBm) = Max (Ant 0 RF Output Power: Ant 1 RF Output Power: Ant 2 RF Output Power: Ant 3 RF Output Power).

Note 2: Max EIRP (dBm) = Max RF Output Power (dBm) + Antenna Gain (dBi).

Note 3: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	Ant 1 RF Output Power (dBm)	Power Limit (dBm)	Ant 1 EIRP (dBm)	EIRP Limit (dBm)	Result
11n-HT20	149	5745	20.33	≤ 30	30.33	≤ 36	Pass
11n-HT20	157	5785	20.53	≤ 30	30.53	≤ 36	Pass
11n-HT20	165	5825	20.03	≤ 30	30.03	≤ 36	Pass
11ac-VHT20	149	5745	21.22	≤ 30	31.22	≤ 36	Pass
11ac-VHT20	157	5785	21.26	≤ 30	31.26	≤ 36	Pass
11ac-VHT20	165	5825	20.73	≤ 30	30.73	≤ 36	Pass

Note 1: Ant 1 EIRP (dBm) = Ant 1 RF Output Power (dBm) + Antenna Gain (dBi).

Note 2: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MzHz)	RF Output Power (dBm)				Total Output Power (dBm)	Power Limit (dBm)	EIRP (dBm)	EIRP Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3					
11n-HT20	149	5745	18.55	19.48	19.63	19.48	25.33	≤ 30	35.33	≤ 36	Pass
11n-HT20	157	5785	18.13	19.95	19.72	19.39	25.37	≤ 30	35.37	≤ 36	Pass
11n-HT20	165	5825	18.83	20.36	19.72	18.79	25.50	≤ 30	35.50	≤ 36	Pass
11ac-VHT20	149	5745	18.55	19.64	19.62	19.48	25.37	≤ 30	35.37	≤ 36	Pass
11ac-VHT20	157	5785	18.19	19.95	20.14	19.85	25.62	≤ 30	35.62	≤ 36	Pass
11ac-VHT20	165	5825	19.01	20.38	20.23	19.52	25.84	≤ 30	35.84	≤ 36	Pass

Note 1: EIRP Power (dBm) = $10 \cdot \log\{10^{(Ant\ 0\ RF\ Output\ Power)/10} + 10^{(Ant\ 1\ RF\ Output\ Power)/10} + 10^{(Ant\ 2\ RF\ Output\ Power)/10} + 10^{(Ant\ 3\ RF\ Output\ Power)/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: Each RF Output Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Product	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module	Temperature	-20 ~ 70° C
Test Engineer	Hunk Li	Relative Humidity	54%
Test Site	TR3	Test Date	2017/10/27
Test Item	Transmit Power Control (TPC)		

Normal Conditions (Temperature 25°C and Voltage DC 3.3V)

Mode	Ch. No.	Freq. (MHz)	TPC Power (dBm)				Max TPC Power (dBm)	Max EIRP of TPC (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11a	149	5745	12.32	13.02	12.89	12.25	13.02	23.02	≤ 24	Pass
11a	157	5785	11.78	13.07	12.71	12.44	13.07	23.07	≤ 24	Pass
11a	165	5825	11.37	13.02	12.80	12.48	13.02	23.02	≤ 24	Pass

Note 1: Max TPC Power (dBm) = Max (Ant 0 TPC Power: Ant 1 TPC Power: Ant 2 TPC Power: Ant 3 TPC Power).

Note 2: Max EIRP of TPC (dBm) = Max TPC Power (dBm) + Antenna Gain (dBi).

Note 3: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	Ant 1 TPC Power (dBm)	Ant 1 EIRP of TPC (dBm)	Limit (dBm)	Result
11n-HT20	149	5745	12.56	22.56	≤ 24	Pass
11n-HT20	157	5785	11.22	21.22	≤ 24	Pass
11n-HT20	165	5825	11.03	21.03	≤ 24	Pass
11ac-VHT20	149	5745	12.42	22.42	≤ 24	Pass
11ac-VHT20	157	5785	12.56	22.56	≤ 24	Pass
11ac-VHT20	165	5825	11.87	21.87	≤ 24	Pass

Note 1: Ant 1 EIRP of TPC (dBm) = Ant 1 TPC Power (dBm) + Antenna Gain (dBi).

Note 2: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MzHz)	TPC Power (dBm)				Total TPC Power (dBm)	EIRP of TPC (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11n-HT20	149	5745	6.56	7.42	7.44	7.67	13.31	23.31	≤ 24	Pass
11n-HT20	157	5785	6.68	7.68	7.29	7.32	13.28	23.28	≤ 24	Pass
11n-HT20	165	5825	7.02	7.83	7.74	7.47	13.55	23.55	≤ 24	Pass
11ac-VHT20	149	5745	6.61	7.23	7.26	7.45	13.17	23.17	≤ 24	Pass
11ac-VHT20	157	5785	6.85	7.49	7.26	7.69	13.35	23.35	≤ 24	Pass
11ac-VHT20	165	5825	7.21	8.13	7.88	7.88	13.81	23.81	≤ 24	Pass

Note 1: EIRP of TPC (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 TPC Power})/10} + 10^{(\text{Ant 1 TPC Power})/10} + 10^{(\text{Ant 2 TPC Power})/10} + 10^{(\text{Ant 3 TPC Power})/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + $10 \cdot \log(1/\text{Duty Cycle})$.

Extreme Conditions (Temperature -20°C and Voltage DC 2.8V & DC 3.6V)

Mode	Ch. No.	Freq. (MHz)	TPC Power (dBm)				Max TPC Power (dBm)	Max EIRP of TPC (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11a	149	5745	12.07	13.50	13.26	12.86	13.50	23.50	≤ 24	Pass
11a	157	5785	11.84	13.72	13.14	13.16	13.72	23.72	≤ 24	Pass
11a	165	5825	12.31	13.63	13.32	13.29	13.63	23.63	≤ 24	Pass

Note 1: Max TPC Power (dBm) = Max (Ant 0 TPC Power: Ant 1 TPC Power: Ant 2 TPC Power: Ant 3 TPC Power).

Note 2: Max EIRP of TPC (dBm) = Max TPC Power (dBm) + Antenna Gain (dBi).

Note 3: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	Ant 1 TPC Power (dBm)	Ant 1 EIRP of TPC (dBm)	Limit (dBm)	Result
11n-HT20	149	5745	13.25	23.25	≤ 24	Pass
11n-HT20	157	5785	13.09	23.09	≤ 24	Pass
11n-HT20	165	5825	12.62	22.62	≤ 24	Pass
11ac-VHT20	149	5745	12.89	22.89	≤ 24	Pass
11ac-VHT20	157	5785	13.20	23.20	≤ 24	Pass
11ac-VHT20	165	5825	12.74	22.74	≤ 24	Pass

Note 1: Ant 1 EIRP of TPC (dBm) = Ant 1 TPC Power (dBm) + Antenna Gain (dBi).

Note 2: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MzHz)	TPC Power (dBm)				Total TPC Power (dBm)	EIRP of TPC (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11n-HT20	149	5745	6.48	7.76	7.16	7.88	13.38	23.38	≤ 24	Pass
11n-HT20	157	5785	7.04	8.35	6.86	7.73	13.56	23.56	≤ 24	Pass
11n-HT20	165	5825	6.53	8.24	7.58	8.16	13.70	23.70	≤ 24	Pass
11ac-VHT20	149	5745	6.44	7.48	7.42	7.91	13.37	23.37	≤ 24	Pass
11ac-VHT20	157	5785	6.73	7.65	6.95	7.76	13.32	23.32	≤ 24	Pass
11ac-VHT20	165	5825	7.03	8.04	7.44	8.18	13.72	23.72	≤ 24	Pass

Note 1: EIRP of TPC (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 TPC Power})/10} + 10^{(\text{Ant 1 TPC Power})/10} + 10^{(\text{Ant 2 TPC Power})/10} + 10^{(\text{Ant 3 TPC Power})/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Extreme Conditions (Temperature 70°C and Voltage DC 2.8V & DC 3.6V)

Mode	Ch. No.	Freq. (MHz)	TPC Power (dBm)				Max TPC Power (dBm)	Max EIRP of TPC (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11a	149	5745	13.14	12.51	12.34	12.21	13.14	23.14	≤ 24	Pass
11a	157	5785	12.17	12.51	12.41	12.14	12.51	22.51	≤ 24	Pass
11a	165	5825	11.84	12.69	12.47	12.28	12.69	22.69	≤ 24	Pass

Note 1: Max TPC Power (dBm) = Max (Ant 0 TPC Power: Ant 1 TPC Power: Ant 2 TPC Power: Ant 3 TPC Power).

Note 2: Max EIRP of TPC (dBm) = Max TPC Power (dBm) + Antenna Gain (dBi).

Note 3: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MHz)	Ant 1 TPC Power (dBm)	Ant 1 EIRP of TPC (dBm)	Limit (dBm)	Result
11n-HT20	149	5745	11.20	21.20	≤ 24	Pass
11n-HT20	157	5785	11.51	21.51	≤ 24	Pass
11n-HT20	165	5825	10.66	20.66	≤ 24	Pass
11ac-VHT20	149	5745	11.97	21.97	≤ 24	Pass
11ac-VHT20	157	5785	11.99	21.99	≤ 24	Pass
11ac-VHT20	165	5825	11.62	21.62	≤ 24	Pass

Note 1: Ant 1 EIRP of TPC (dBm) = Ant 1 TPC Power (dBm) + Antenna Gain (dBi).

Note 2: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Mode	Ch. No.	Freq. (MzHz)	TPC Power (dBm)				Total TPC Power (dBm)	EIRP of TPC (dBm)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11n-HT20	149	5745	6.35	7.28	7.55	7.23	13.15	23.15	≤ 24	Pass
11n-HT20	157	5785	5.90	7.73	7.61	7.21	13.19	23.19	≤ 24	Pass
11n-HT20	165	5825	6.59	8.01	7.63	6.37	13.23	23.23	≤ 24	Pass
11ac-VHT20	149	5745	6.49	7.29	7.24	7.19	13.09	23.09	≤ 24	Pass
11ac-VHT20	157	5785	5.83	7.87	7.80	7.74	13.41	23.41	≤ 24	Pass
11ac-VHT20	165	5825	6.86	8.27	8.03	7.14	13.64	23.64	≤ 24	Pass

Note 1: EIRP of TPC (dBm) = $10 \cdot \log\{10^{(\text{Ant 0 TPC Power})/10} + 10^{(\text{Ant 1 TPC Power})/10} + 10^{(\text{Ant 2 TPC Power})/10} + 10^{(\text{Ant 3 TPC Power})/10}\}$ (dBm) + Antenna Gain (dBi).

Note 2: Each TPC Power (dBm) = Power Meter Reading Level (dBm) + 10*Log(1/Duty Cycle).

Product	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module	Temperature	25°C
Test Date	2017/08/08	Relative Humidity	52%
Test Site	TR3	Test Item	Power Density

Mode	Ch. No.	Freq. (MHz)	Power Density (dBm/MHz)				Duty Cycle (%)	Max Power Density (dBm/MHz)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11a	149	5745	10.87	12.76	12.43	12.23	96.95	22.89	≤ 23	Pass
11a	157	5785	10.44	12.61	12.31	12.27	96.95	22.74	≤ 23	Pass
11a	165	5825	11.35	12.48	12.29	12.17	96.95	22.61	≤ 23	Pass

Note: Max Power Density (dBm/MHz) = Max (Ant 0 Power Density: Ant 1 Power Density: Ant 2 Power Density: Ant 3 Power Density) + 10*Log(1/Duty Cycle) + Antenna Gain (dBi).

Mode	Ch. No.	Freq. (MHz)	Ant 1 Power Density (dBm/MHz)	Duty Cycle (%)	Ant 1 Final Power Density (dBm/MHz)	Limit (dBm)	Result
11n-HT20	149	5745	12.39	98.81	22.44	≤ 23	Pass
11n-HT20	157	5785	12.27	98.81	22.32	≤ 23	Pass
11n-HT20	165	5825	12.15	98.81	22.20	≤ 23	Pass
11ac-VHT20	149	5745	12.30	98.68	22.36	≤ 23	Pass
11ac-VHT20	157	5785	12.22	98.68	22.28	≤ 23	Pass
11ac-VHT20	165	5825	12.17	98.68	22.23	≤ 23	Pass

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

Mode	Ch. No.	Freq. (MzHz)	Power Density (dBm/MHz)				Duty Cycle (%)	Total Power Density (dBm/MHz)	Limit (dBm)	Result
			Ant 0	Ant 1	Ant 2	Ant 3				
11n-HT20	149	5745	6.11	6.80	6.38	6.87	98.81	22.62	≤ 23	Pass
11n-HT20	157	5785	5.94	7.13	7.29	6.55	98.81	22.83	≤ 23	Pass
11n-HT20	165	5825	6.14	7.18	7.02	6.32	98.81	22.76	≤ 23	Pass
11ac-VHT20	149	5745	6.03	6.80	6.49	7.09	98.68	22.70	≤ 23	Pass
11ac-VHT20	157	5785	5.96	7.02	6.56	6.69	98.68	22.65	≤ 23	Pass
11ac-VHT20	165	5825	5.56	7.11	7.02	5.89	98.68	22.53	≤ 23	Pass

Note: Total Power Density (dBm/MHz) = $10^{\text{Ant 0 Power Density} / 10} + 10^{\text{Ant 1 Power Density} / 10} + 10^{\text{Ant 2 Power Density} / 10} + 10^{\text{Ant 3 Power Density} / 10}$ (dBm/MHz) + 10*Log(1/Duty Cycle) + Antenna Gain (dBi).

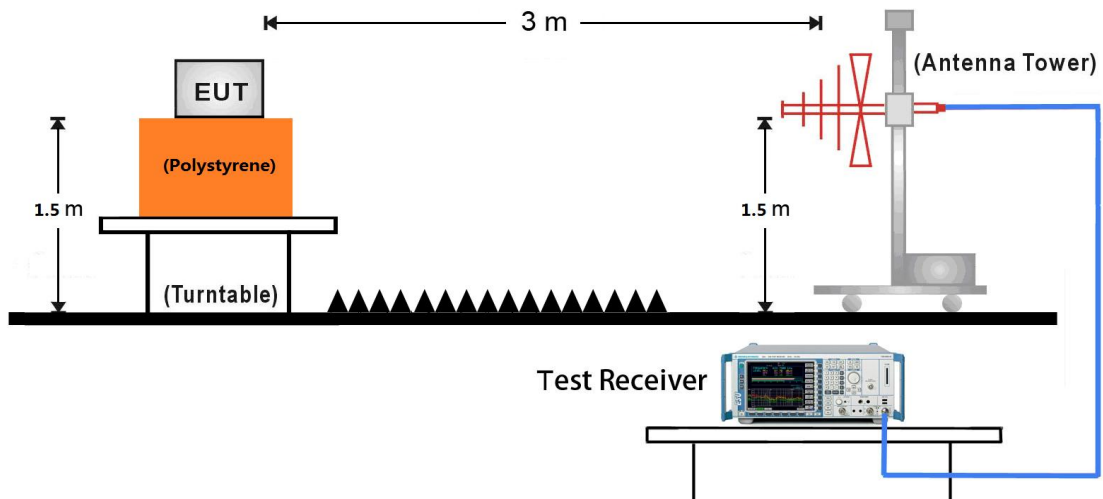
6. Transmitter Unwanted Emissions Outside the 5725 MHz to 5875 MHz Band

6.1. Limit

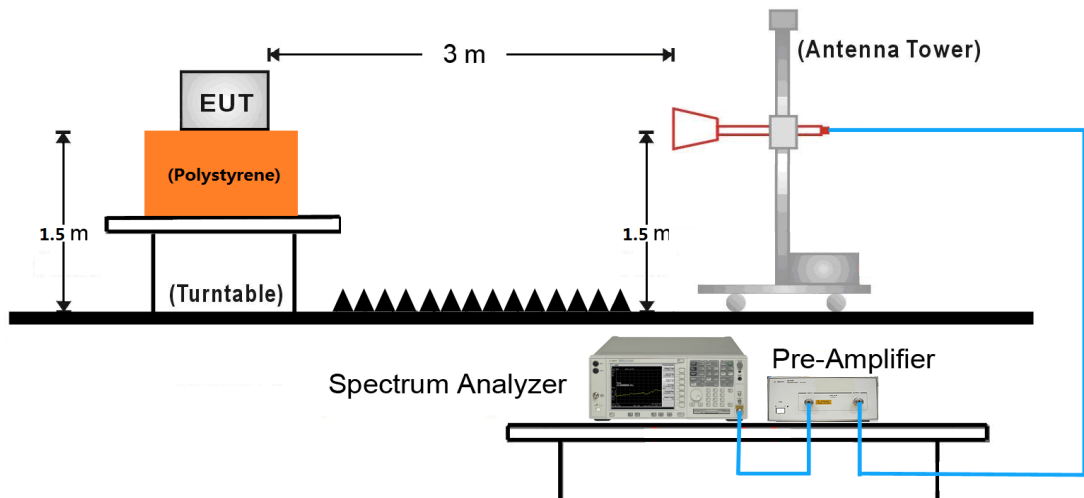
Frequency Range (MHz)	Limit (dBm)	Bandwidth (kHz) (see note)
30 to 1000	-36	100
1000 to 5725	-30	1000
5875 to 26500	-30	1000

6.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.4.1.

6.4. Test Result

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11a - Ant 0	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	30.49	-91.87	29.98	-61.89	-36.00	-25.89	Peak	Horizontal
	875.36	-96.53	35.44	-61.09	-36.00	-25.09	Peak	Horizontal
	423.82	-85.31	27.73	-57.58	-36.00	-21.58	Peak	Vertical
	875.36	-94.33	36.39	-57.94	-36.00	-21.94	Peak	Vertical
	10885.50	-72.25	31.82	-40.43	-30.00	-10.43	Peak	Horizontal
	17235.00	-65.16	31.29	-33.87	-30.00	-3.87	RMS	Horizontal
	10775.00	-71.42	31.55	-39.87	-30.00	-9.87	Peak	Vertical
	17235.00	-62.57	32.16	-30.41	-30.00	-0.41	RMS	Vertical
165	30.49	-91.92	29.98	-61.94	-36.00	-25.94	Peak	Horizontal
	875.36	-96.96	35.44	-61.52	-36.00	-25.52	Peak	Horizontal
	423.82	-84.30	27.73	-56.57	-36.00	-20.57	Peak	Vertical
	875.36	-94.06	36.39	-57.67	-36.00	-21.67	Peak	Vertical
	10800.50	-71.18	31.51	-39.67	-30.00	-9.67	Peak	Horizontal
	15203.50	-71.92	32.91	-39.01	-30.00	-9.01	Peak	Horizontal
	11650.50	-69.39	30.92	-38.47	-30.00	-8.47	Peak	Vertical
	14277.00	-71.05	33.23	-37.82	-30.00	-7.82	Peak	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
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
149	30.49	-91.64	29.98	-61.66	-36.00	-25.66	Peak	Horizontal
	875.36	-96.87	35.44	-61.43	-36.00	-25.43	Peak	Horizontal
	425.76	-87.05	27.80	-59.25	-36.00	-23.25	Peak	Vertical
	875.36	-94.09	36.39	-57.70	-36.00	-21.70	Peak	Vertical
	10834.50	-71.94	31.78	-40.16	-30.00	-10.16	Peak	Horizontal
	17235.00	-67.71	31.29	-36.42	-30.00	-6.42	RMS	Horizontal
	11489.00	-69.24	31.21	-38.03	-30.00	-8.03	Peak	Vertical
	17226.50	-63.60	31.86	-31.74	-30.00	-1.74	RMS	Vertical
165	30.49	-91.36	29.98	-61.38	-36.00	-25.38	Peak	Horizontal
	875.36	-96.71	35.44	-61.27	-36.00	-25.27	Peak	Horizontal
	423.82	-86.92	27.73	-59.19	-36.00	-23.19	Peak	Vertical
	875.36	-94.76	36.39	-58.37	-36.00	-22.37	Peak	Vertical
	10800.50	-71.11	31.51	-39.60	-30.00	-9.60	Peak	Horizontal
	15161.00	-71.19	32.86	-38.33	-30.00	-8.33	Peak	Horizontal
	11650.50	-67.80	30.92	-36.88	-30.00	-6.88	Peak	Vertical
	17473.00	-67.20	33.68	-33.52	-30.00	-3.52	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11a - Ant 2	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	30.49	-91.58	29.98	-61.60	-36.00	-25.60	Peak	Horizontal
	875.36	-96.26	35.44	-60.82	-36.00	-24.82	Peak	Horizontal
	422.85	-86.58	27.71	-58.87	-36.00	-22.87	Peak	Vertical
	875.36	-94.37	36.39	-57.98	-36.00	-21.98	Peak	Vertical
	10826.00	-71.09	31.75	-39.34	-30.00	-9.34	Peak	Horizontal
	13597.00	-71.14	32.61	-38.53	-30.00	-8.53	Peak	Horizontal
	10885.50	-71.18	31.86	-39.32	-30.00	-9.32	Peak	Vertical
	17235.00	-68.23	32.16	-36.07	-30.00	-6.07	RMS	Vertical
165	30.49	-91.69	29.98	-61.71	-36.00	-25.71	Peak	Horizontal
	875.36	-96.85	35.44	-61.41	-36.00	-25.41	Peak	Horizontal
	424.31	-84.77	27.75	-57.02	-36.00	-21.02	Peak	Vertical
	875.36	-95.40	36.39	-59.01	-36.00	-23.01	Peak	Vertical
	11472.00	-70.85	31.59	-39.26	-30.00	-9.26	Peak	Horizontal
	13716.00	-70.53	32.13	-38.40	-30.00	-8.40	Peak	Horizontal
	11650.50	-63.49	30.92	-32.57	-30.00	-2.57	RMS	Vertical
	14447.00	-71.08	32.92	-38.16	-30.00	-8.16	Peak	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11a - Ant 3	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	625.10	-95.87	32.62	-63.25	-36.00	-27.25	Peak	Horizontal
	875.36	-96.77	35.44	-61.33	-36.00	-25.33	Peak	Horizontal
	423.82	-87.19	27.73	-59.46	-36.00	-23.46	Peak	Vertical
	875.36	-94.16	36.39	-57.77	-36.00	-21.77	Peak	Vertical
	10877.00	-70.89	31.81	-39.08	-30.00	-9.08	Peak	Horizontal
	14200.50	-71.08	33.11	-37.97	-30.00	-7.97	Peak	Horizontal
	8029.50	-71.40	25.53	-45.87	-30.00	-15.87	Peak	Vertical
	10894.00	-71.72	31.92	-39.80	-30.00	-9.80	Peak	Vertical
165	30.49	-91.44	29.98	-61.46	-36.00	-25.46	Peak	Horizontal
	875.36	-97.20	35.44	-61.76	-36.00	-25.76	Peak	Horizontal
	424.31	-85.81	27.75	-58.06	-36.00	-22.06	Peak	Vertical
	875.36	-95.29	36.39	-58.90	-36.00	-22.90	Peak	Vertical
	7222.00	-70.28	24.10	-46.18	-30.00	-16.18	Peak	Horizontal
	11038.50	-71.50	31.46	-40.04	-30.00	-10.04	Peak	Horizontal
	8055.00	-71.33	26.00	-45.33	-30.00	-15.33	Peak	Vertical
	10894.00	-72.13	31.92	-40.21	-30.00	-10.21	Peak	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	30.49	-91.62	29.98	-61.64	-36.00	-25.64	Peak	Horizontal
	875.36	-96.48	35.44	-61.04	-36.00	-25.04	Peak	Horizontal
	424.79	-86.84	27.77	-59.07	-36.00	-23.07	Peak	Vertical
	875.36	-94.70	36.39	-58.31	-36.00	-22.31	Peak	Vertical
	8038.00	-71.06	25.95	-45.11	-30.00	-15.11	Peak	Horizontal
	10826.00	-71.37	31.75	-39.62	-30.00	-9.62	Peak	Horizontal
	10809.00	-71.93	31.56	-40.37	-30.00	-10.37	Peak	Vertical
	17226.50	-69.28	31.86	-37.42	-30.00	-7.42	Peak	Vertical
165	30.49	-91.66	29.98	-61.68	-36.00	-25.68	Peak	Horizontal
	875.36	-97.05	35.44	-61.61	-36.00	-25.61	Peak	Horizontal
	424.31	-87.12	27.75	-59.37	-36.00	-23.37	Peak	Vertical
	875.36	-94.22	36.39	-57.83	-36.00	-21.83	Peak	Vertical
	10902.50	-72.55	32.00	-40.55	-30.00	-10.55	Peak	Horizontal
	15229.00	-72.00	33.13	-38.87	-30.00	-8.87	Peak	Horizontal
	10877.00	-72.59	31.81	-40.78	-30.00	-10.78	Peak	Vertical
	14710.50	-71.73	33.31	-38.42	-30.00	-8.42	Peak	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11ac-VHT20 - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	30.00	-91.60	29.99	-61.61	-36.00	-25.61	Peak	Horizontal
	875.36	-96.93	35.44	-61.49	-36.00	-25.49	Peak	Horizontal
	424.79	-87.02	27.77	-59.25	-36.00	-23.25	Peak	Vertical
	875.36	-94.42	36.39	-58.03	-36.00	-22.03	Peak	Vertical
	10902.50	-71.93	32.00	-39.93	-30.00	-9.93	Peak	Horizontal
	14991.00	-71.91	32.42	-39.49	-30.00	-9.49	Peak	Horizontal
	10868.50	-70.80	31.73	-39.07	-30.00	-9.07	Peak	Vertical
	17226.50	-68.44	31.86	-36.58	-30.00	-6.58	Peak	Vertical
165	30.49	-91.57	29.98	-61.59	-36.00	-25.59	Peak	Horizontal
	875.36	-96.46	35.44	-61.02	-36.00	-25.02	Peak	Horizontal
	423.82	-86.77	27.73	-59.04	-36.00	-23.04	Peak	Vertical
	875.36	-94.33	36.39	-57.94	-36.00	-21.94	Peak	Vertical
	10783.50	-71.28	31.26	-40.02	-30.00	-10.02	Peak	Horizontal
	13673.50	-71.50	32.01	-39.49	-30.00	-9.49	Peak	Horizontal
	10783.50	-72.23	31.41	-40.82	-30.00	-10.82	Peak	Vertical
	13818.00	-72.73	33.09	-39.64	-30.00	-9.64	Peak	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0 + 1 + 2 + 3	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	30.49	-91.85	29.98	-61.87	-36.00	-25.87	Peak	Horizontal
	875.36	-97.47	35.44	-62.03	-36.00	-26.03	Peak	Horizontal
	425.28	-86.68	27.78	-58.90	-36.00	-22.90	Peak	Vertical
	875.36	-95.17	36.39	-58.78	-36.00	-22.78	Peak	Vertical
	9253.50	-71.44	29.59	-41.85	-30.00	-11.85	Peak	Horizontal
	14064.50	-70.74	31.60	-39.14	-30.00	-9.14	Peak	Horizontal
	10894.00	-72.47	31.92	-40.55	-30.00	-10.55	Peak	Vertical
	14209.00	-71.43	33.25	-38.18	-30.00	-8.18	Peak	Vertical
165	30.49	-91.69	29.98	-61.71	-36.00	-25.71	Peak	Horizontal
	875.36	-96.51	35.44	-61.07	-36.00	-25.07	Peak	Horizontal
	423.82	-86.57	27.73	-58.84	-36.00	-22.84	Peak	Vertical
	875.36	-94.41	36.39	-58.02	-36.00	-22.02	Peak	Vertical
	10962.00	-71.92	31.36	-40.56	-30.00	-10.56	Peak	Horizontal
	13597.00	-72.24	32.61	-39.63	-30.00	-9.63	Peak	Horizontal
	11514.50	-71.63	31.42	-40.21	-30.00	-10.21	Peak	Vertical
	14625.50	-71.58	33.45	-38.13	-30.00	-8.13	Peak	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11ac-VHT20 - Ant 0 + 1 + 2 + 3	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	30.49	-91.86	29.98	-61.88	-36.00	-25.88	Peak	Horizontal
	875.36	-96.93	35.44	-61.49	-36.00	-25.49	Peak	Horizontal
	424.31	-86.13	27.75	-58.38	-36.00	-22.38	Peak	Vertical
	875.36	-95.01	36.39	-58.62	-36.00	-22.62	Peak	Vertical
	10885.50	-72.48	31.82	-40.66	-30.00	-10.66	Peak	Horizontal
	15152.50	-73.00	32.74	-40.26	-30.00	-10.26	Peak	Horizontal
	10911.00	-72.31	31.73	-40.58	-30.00	-10.58	Peak	Vertical
	14617.00	-71.86	33.43	-38.43	-30.00	-8.43	Peak	Vertical
165	30.49	-91.77	29.98	-61.79	-36.00	-25.79	Peak	Horizontal
	875.36	-96.85	35.44	-61.41	-36.00	-25.41	Peak	Horizontal
	425.76	-86.34	27.80	-58.54	-36.00	-22.54	Peak	Vertical
	875.36	-94.79	36.39	-58.40	-36.00	-22.40	Peak	Vertical
	10851.50	-72.37	31.65	-40.72	-30.00	-10.72	Peak	Horizontal
	15042.00	-71.59	32.73	-38.86	-30.00	-8.86	Peak	Horizontal
	10911.00	-70.27	31.73	-38.54	-30.00	-8.54	Peak	Vertical
	17464.50	-71.06	33.32	-37.74	-30.00	-7.74	Peak	Vertical

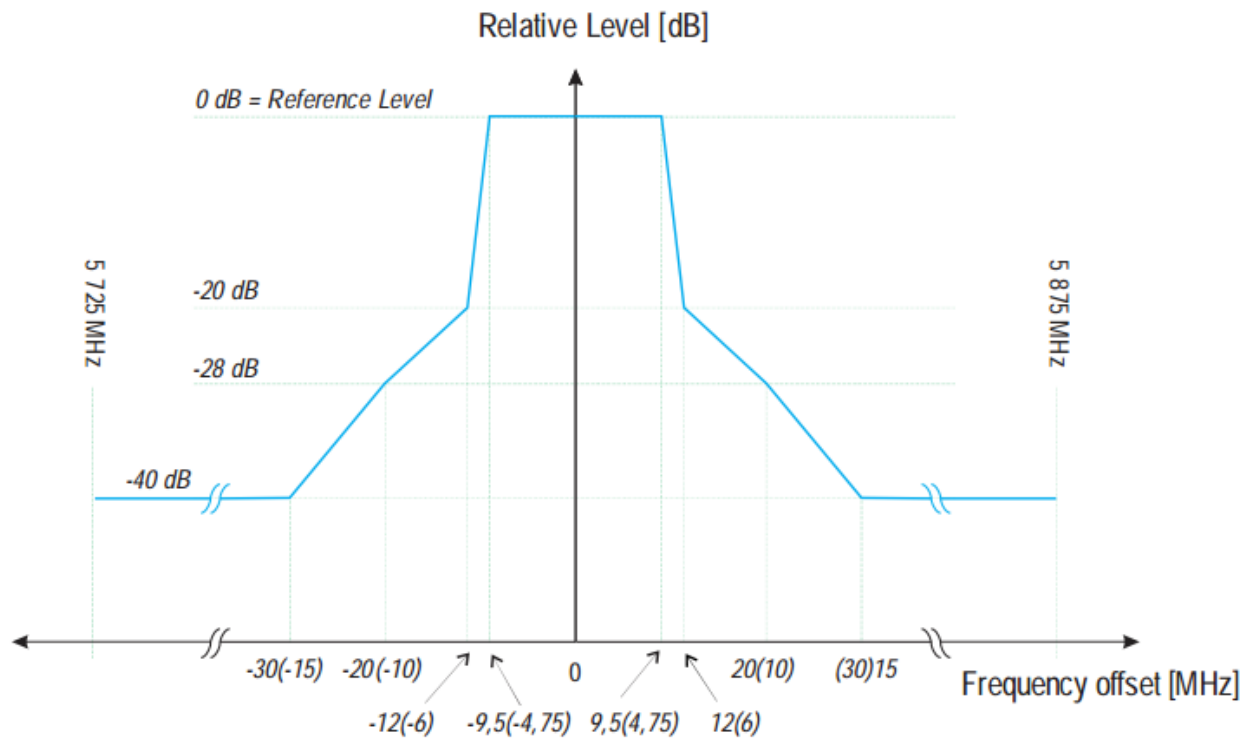
Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

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

7. Transmitter Unwanted Emissions Within the 5725 MHz to 5875 MHz Band

7.1. Limit

The average level of the transmitted spectrum based on the declared Ch_S shall not exceed the limits given in figure 1 when operating under highest output power conditions.

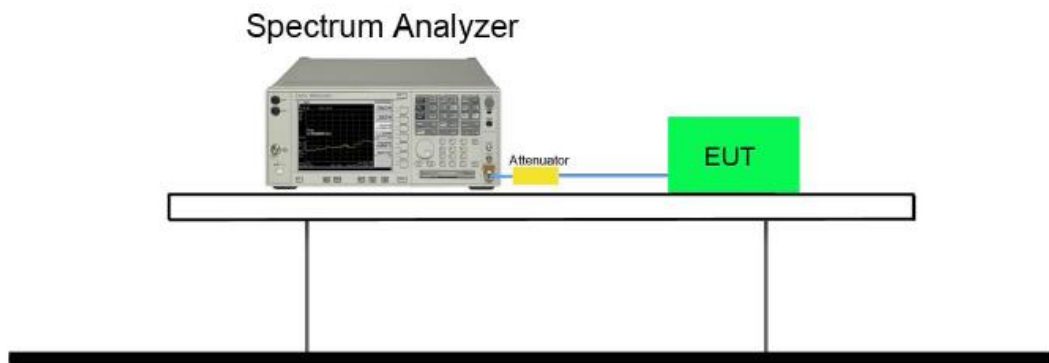


Note 1: 0 dB Reference Level is the spectral density relative to the maximum spectral power density of the transmitted signal.

Note 2: On the Frequency Offset axis, the figures apply to $Ch_S = 20$ MHz whereas the figures in parentheses apply to $Ch_S = 10$ MHz.

Note 3: Emissions that fall outside the lower and upper band frequency limits of 5725 MHz and 5875 MHz respectively shall instead meet the unwanted emission limits of clause 4.2.3.1.

7.2. Test Setup



7.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.4.2.

7.4. Test Result

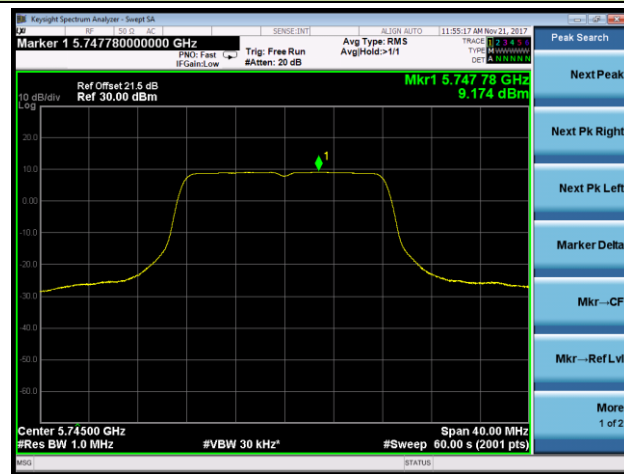
Product	4x4 Wave-2 802.11ac/a/n Mini PCIe WiFi Module	Temperature	24°C
Test Engineer	Milo Li	Relative Humidity	53%
Test Site	TR3	Test Date	2017/11/21

Test Mode	Channel No.	Frequency (MHz)	Result
1TX_Ant 1			
802.11a	149	5745	Pass
802.11a	165	5825	Pass
802.11n-HT20	149	5745	Pass
802.11n-HT20	165	5825	Pass
802.11ac-VHT20	149	5745	Pass
802.11ac-VHT20	165	5825	Pass
4TX_Ant 1 / Ant 0 + 1 + 2 + 3			
802.11n-HT20	149	5745	Pass
802.11n-HT20	165	5825	Pass
802.11ac-VHT20	149	5745	Pass
802.11ac-VHT20	165	5825	Pass

802.11a - Ant 1

Channel 149 (5745MHz)

The Reference Level

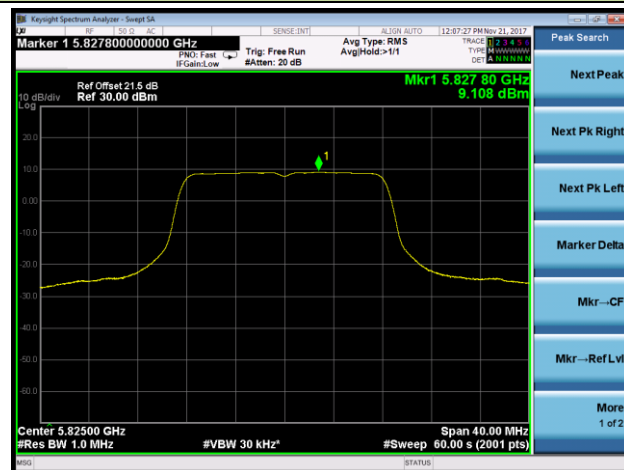


The Mask Data



Channel 165 (5825MHz)

The Reference Level



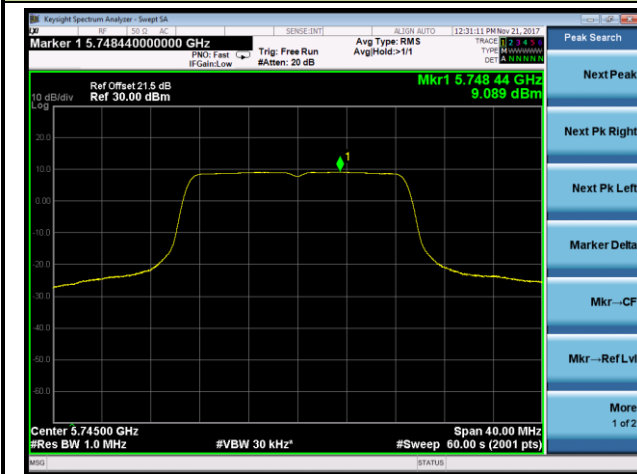
The Mask Data



802.11n-HT20 - Ant 1

Channel 149 (5745MHz)

The Reference Level

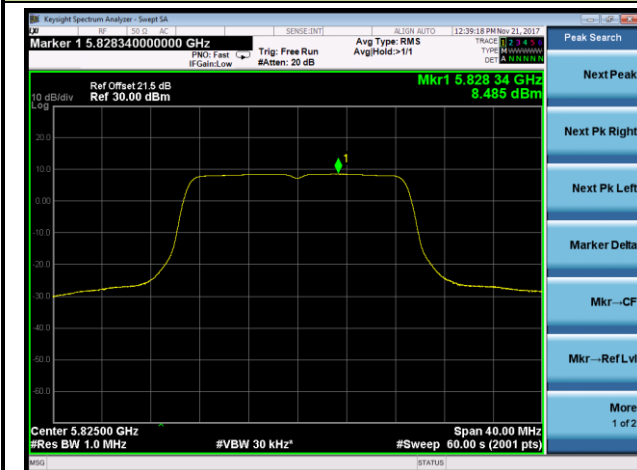


The Mask Data



Channel 165 (5825MHz)

The Reference Level



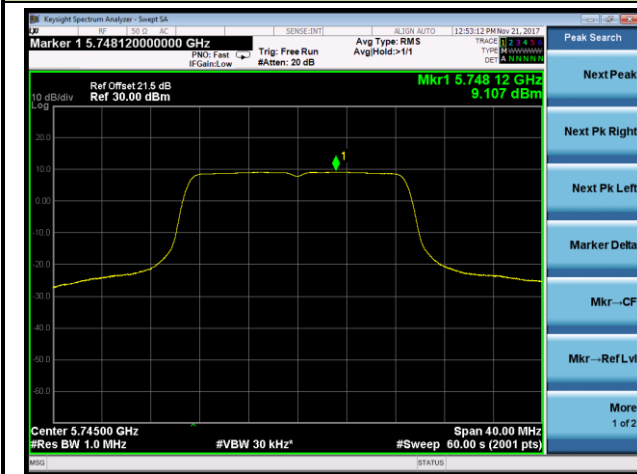
The Mask Data



802.11ac-VHT20 - Ant 1

Channel 149 (5745MHz)

The Reference Level

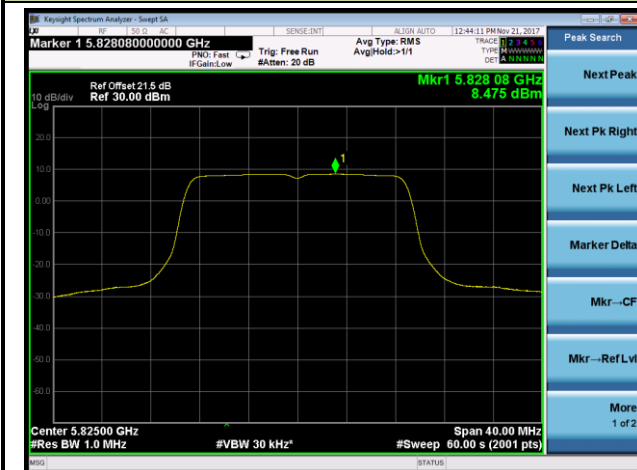


The Mask Data



Channel 165 (5825MHz)

The Reference Level



The Mask Data



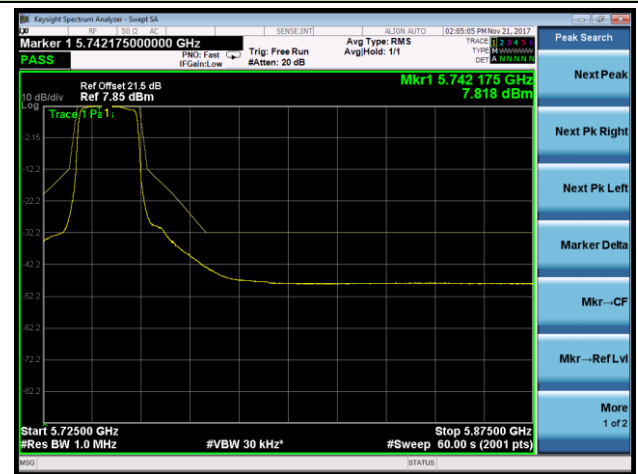
802.11n-HT20 - Ant 1 / Ant 0 + 1 + 2 + 3

Channel 149 (5745MHz)

The Reference Level

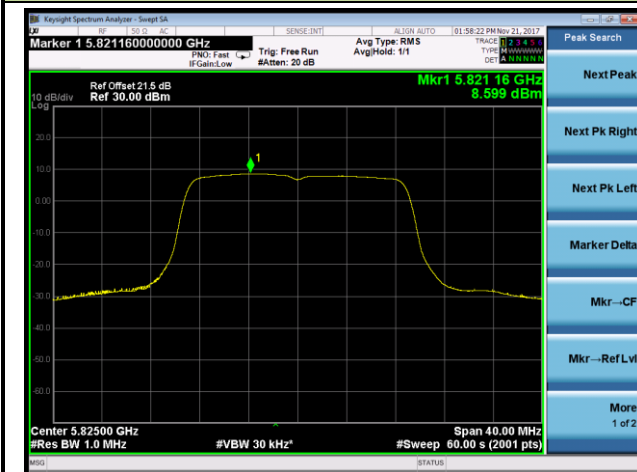


The Mask Data



Channel 165 (5825MHz)

The Reference Level



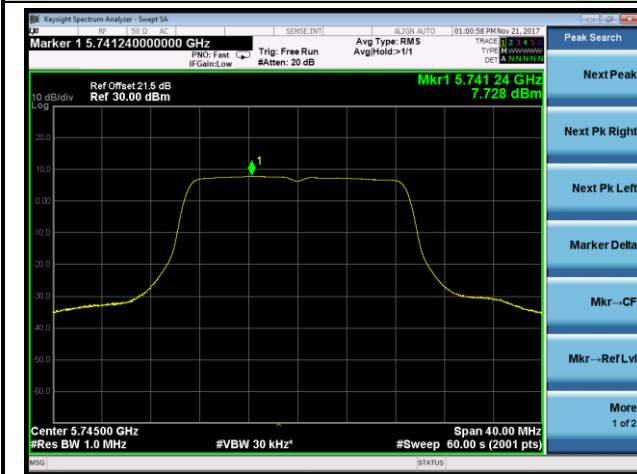
The Mask Data



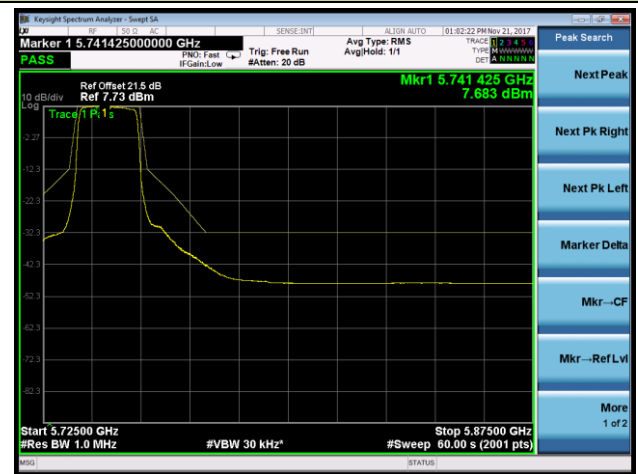
802.11ac-VHT20 - Ant 1 / Ant 0 + 1 + 2 + 3

Channel 149 (5745MHz)

The Reference Level

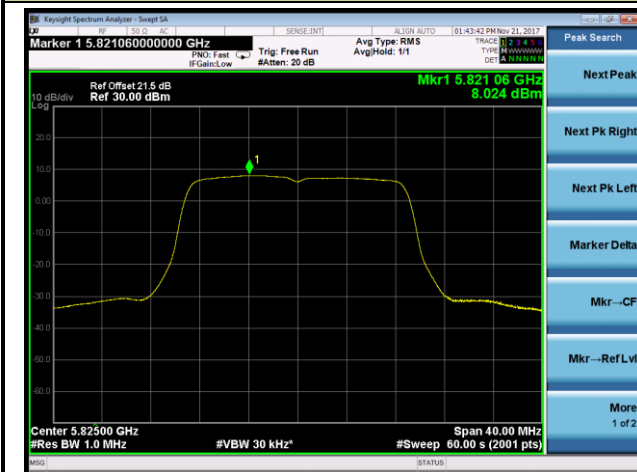


The Mask Data



Channel 165 (5825MHz)

The Reference Level



The Mask Data



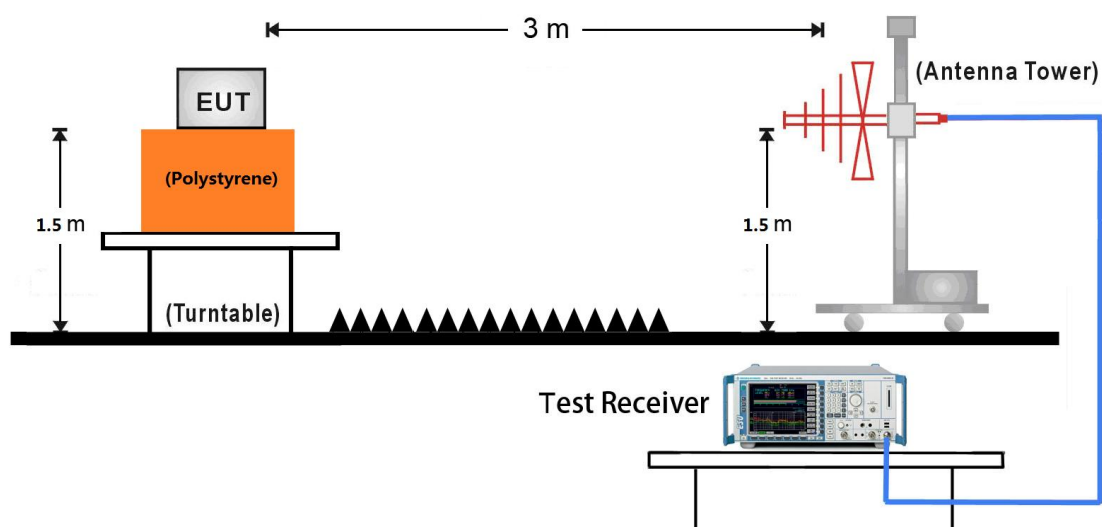
8. Receiver Spurious Emissions

8.1. Limit

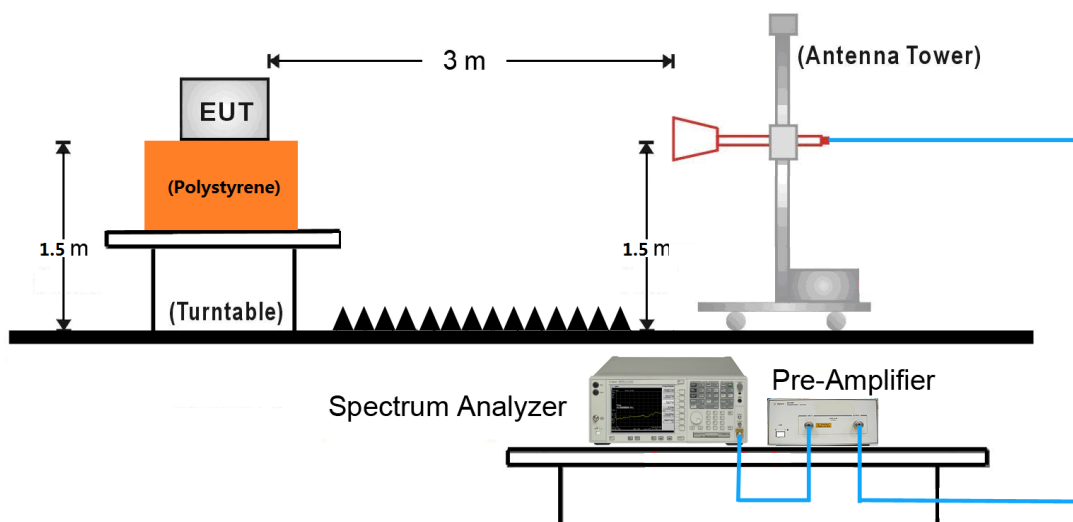
Frequency Range	Maximum Power, ERP	Measurement Bandwidth
30 MHz to 1GHz	-57 dBm	100 kHz
1 GHz to 26.5 GHz	-47 dBm	1 MHz

8.2. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



8.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.5.

8.4. Test Result

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
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
149	30.49	-91.71	29.98	-61.73	-57.00	-4.73	RMS	Horizontal
	423.82	-93.75	28.63	-65.12	-57.00	-8.12	Peak	Horizontal
	125.06	-92.91	25.21	-67.70	-57.00	-10.70	Peak	Vertical
	424.31	-87.94	27.75	-60.19	-57.00	-3.19	RMS	Vertical
	1374.00	-64.66	7.68	-56.98	-47.00	-9.98	Peak	Horizontal
	3473.50	-69.64	14.22	-55.42	-47.00	-8.42	Peak	Horizontal
	1875.50	-61.05	8.15	-52.90	-47.00	-5.90	RMS	Vertical
	3473.50	-64.65	14.56	-50.09	-47.00	-3.09	RMS	Vertical
165	246.31	-95.74	25.82	-69.92	-57.00	-12.92	Peak	Horizontal
	424.31	-95.12	28.67	-66.45	-57.00	-9.45	Peak	Horizontal
	76.56	-93.65	27.43	-66.22	-57.00	-9.22	Peak	Vertical
	425.28	-86.49	27.78	-58.71	-57.00	-1.71	RMS	Vertical
	3881.50	-67.90	16.00	-51.90	-47.00	-4.90	RMS	Horizontal
	4952.50	-70.98	18.19	-52.79	-47.00	-5.79	RMS	Horizontal
	2504.50	-66.63	11.00	-55.63	-47.00	-8.63	Peak	Vertical
	3881.50	-63.53	16.21	-47.32	-47.00	-0.32	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
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
149	87.23	-83.63	16.30	-67.33	-57.00	-10.33	Peak	Horizontal
	423.82	-95.65	28.63	-67.02	-57.00	-10.02	Peak	Horizontal
	125.06	-92.61	25.21	-67.40	-57.00	-10.40	Peak	Vertical
	419.46	-88.02	27.63	-60.39	-57.00	-3.39	RMS	Vertical
	1391.00	-64.08	7.27	-56.81	-47.00	-9.81	Peak	Horizontal
	3473.50	-68.42	14.22	-54.20	-47.00	-7.20	Peak	Horizontal
	1875.50	-61.44	8.15	-53.29	-47.00	-6.29	Peak	Vertical
	3473.50	-64.44	14.56	-49.88	-47.00	-2.88	RMS	Vertical
165	246.31	-95.11	25.82	-69.29	-57.00	-12.29	Peak	Horizontal
	424.31	-94.80	28.67	-66.13	-57.00	-9.13	Peak	Horizontal
	125.06	-92.74	25.21	-67.53	-57.00	-10.53	Peak	Vertical
	423.82	-87.43	27.73	-59.70	-57.00	-2.70	RMS	Vertical
	1374.00	-64.09	7.68	-56.41	-47.00	-9.41	Peak	Horizontal
	5131.00	-72.01	18.74	-53.27	-47.00	-6.27	Peak	Horizontal
	1875.50	-61.08	8.15	-52.93	-47.00	-5.93	RMS	Vertical
	3473.50	-64.74	14.56	-50.18	-47.00	-3.18	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11a - Ant 2	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	87.23	-84.71	16.30	-68.41	-57.00	-11.41	Peak	Horizontal
	424.31	-93.78	28.67	-65.11	-57.00	-8.11	Peak	Horizontal
	125.06	-92.91	25.21	-67.70	-57.00	-10.70	Peak	Vertical
	423.34	-87.19	27.72	-59.47	-57.00	-2.47	RMS	Vertical
	3771.00	-70.34	15.80	-54.54	-47.00	-7.54	Peak	Horizontal
	5751.50	-71.08	19.61	-51.47	-47.00	-4.47	RMS	Horizontal
	1875.50	-60.58	8.15	-52.43	-47.00	-5.43	RMS	Vertical
	3473.50	-65.04	14.56	-50.48	-47.00	-3.48	RMS	Vertical
165	87.72	-84.66	16.22	-68.44	-57.00	-11.44	Peak	Horizontal
	423.82	-95.17	28.63	-66.54	-57.00	-9.54	Peak	Horizontal
	125.06	-92.68	25.21	-67.47	-57.00	-10.47	Peak	Vertical
	422.37	-88.64	27.71	-60.93	-57.00	-3.93	RMS	Vertical
	1255.00	-63.76	6.45	-57.31	-47.00	-10.31	Peak	Horizontal
	3473.50	-68.98	14.22	-54.76	-47.00	-7.76	Peak	Horizontal
	1875.50	-61.84	8.15	-53.69	-47.00	-6.69	Peak	Vertical
	3473.50	-64.93	14.56	-50.37	-47.00	-3.37	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11a - Ant 3	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	87.23	-84.48	16.30	-68.18	-57.00	-11.18	Peak	Horizontal
	424.31	-94.88	28.67	-66.21	-57.00	-9.21	Peak	Horizontal
	124.58	-91.44	25.28	-66.16	-57.00	-9.16	Peak	Vertical
	422.85	-87.51	27.71	-59.80	-57.00	-2.80	RMS	Vertical
	1272.00	-63.38	6.03	-57.35	-47.00	-10.35	Peak	Horizontal
	3473.50	-68.82	14.22	-54.60	-47.00	-7.60	Peak	Horizontal
	1875.50	-61.72	8.15	-53.57	-47.00	-6.57	Peak	Vertical
	3473.50	-65.32	14.56	-50.76	-47.00	-3.76	RMS	Vertical
165	87.72	-82.85	16.22	-66.63	-57.00	-9.63	Peak	Horizontal
	425.28	-93.23	28.73	-64.50	-57.00	-7.50	Peak	Horizontal
	125.06	-93.36	25.21	-68.15	-57.00	-11.15	Peak	Vertical
	424.79	-86.86	27.77	-59.09	-57.00	-2.09	RMS	Vertical
	1374.00	-65.20	7.68	-57.52	-47.00	-10.52	Peak	Horizontal
	5080.00	-72.08	18.65	-53.43	-47.00	-6.43	Peak	Horizontal
	1875.50	-61.43	8.15	-53.28	-47.00	-6.28	Peak	Vertical
	3473.50	-65.87	14.56	-51.31	-47.00	-4.31	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	87.72	-85.23	16.22	-69.01	-57.00	-12.01	Peak	Horizontal
	423.34	-94.24	28.60	-65.64	-57.00	-8.64	Peak	Horizontal
	125.06	-92.38	25.21	-67.17	-57.00	-10.17	Peak	Vertical
	423.34	-86.83	27.72	-59.11	-57.00	-2.11	RMS	Vertical
	1178.50	-63.36	5.69	-57.67	-47.00	-10.67	Peak	Horizontal
	4629.50	-71.44	17.61	-53.83	-47.00	-6.83	Peak	Horizontal
	1875.50	-61.10	8.15	-52.95	-47.00	-5.95	RMS	Vertical
	3473.50	-65.50	14.56	-50.94	-47.00	-3.94	RMS	Vertical
165	88.20	-85.54	16.13	-69.41	-57.00	-12.41	Peak	Horizontal
	424.31	-94.73	28.67	-66.06	-57.00	-9.06	Peak	Horizontal
	87.72	-93.31	26.02	-67.29	-57.00	-10.29	Peak	Vertical
	423.82	-86.52	27.73	-58.79	-57.00	-1.79	RMS	Vertical
	1357.00	-64.87	7.77	-57.10	-47.00	-10.10	Peak	Horizontal
	3762.50	-70.48	15.73	-54.75	-47.00	-7.75	Peak	Horizontal
	1875.50	-61.24	8.15	-53.09	-47.00	-6.09	RMS	Vertical
	3473.50	-65.50	14.56	-50.94	-47.00	-3.94	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11ac-VHT20 - Ant 1	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	88.20	-85.53	16.13	-69.40	-57.00	-12.40	Peak	Horizontal
	424.31	-94.08	28.67	-65.41	-57.00	-8.41	Peak	Horizontal
	125.06	-92.36	25.21	-67.15	-57.00	-10.15	Peak	Vertical
	423.82	-88.07	27.73	-60.34	-57.00	-3.34	RMS	Vertical
	1357.00	-65.32	7.77	-57.55	-47.00	-10.55	Peak	Horizontal
	3822.00	-70.93	15.85	-55.08	-47.00	-8.08	Peak	Horizontal
	1875.50	-61.86	8.15	-53.71	-47.00	-6.71	Peak	Vertical
	3473.50	-65.75	14.56	-51.19	-47.00	-4.19	RMS	Vertical
165	87.72	-86.89	16.22	-70.67	-57.00	-13.67	Peak	Horizontal
	424.31	-93.08	28.67	-64.41	-57.00	-7.41	Peak	Horizontal
	124.58	-92.07	25.28	-66.79	-57.00	-9.79	Peak	Vertical
	423.82	-87.59	27.73	-59.86	-57.00	-2.86	RMS	Vertical
	1178.50	-64.13	5.69	-58.44	-47.00	-11.44	Peak	Horizontal
	3473.50	-69.20	14.22	-54.98	-47.00	-7.98	Peak	Horizontal
	1875.50	-62.29	8.15	-54.14	-47.00	-7.14	Peak	Vertical
	3473.50	-65.38	14.56	-50.82	-47.00	-3.82	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11n-HT20 - Ant 0 + 1 + 2 + 3	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	87.23	-86.16	16.30	-69.86	-57.00	-12.86	Peak	Horizontal
	423.34	-93.00	28.60	-64.40	-57.00	-7.40	Peak	Horizontal
	125.06	-92.44	25.21	-67.23	-57.00	-10.23	Peak	Vertical
	425.28	-86.65	27.78	-58.87	-57.00	-1.87	RMS	Vertical
	1323.00	-66.52	7.56	-58.96	-47.00	-11.96	Peak	Horizontal
	3473.50	-70.09	14.22	-55.87	-47.00	-8.87	Peak	Horizontal
	1875.50	-61.85	8.15	-53.70	-47.00	-6.70	Peak	Vertical
	3473.50	-65.47	14.56	-50.91	-47.00	-3.91	RMS	Vertical
165	87.23	-83.62	16.30	-67.32	-57.00	-10.32	Peak	Horizontal
	425.28	-93.44	28.73	-64.71	-57.00	-7.71	Peak	Horizontal
	125.06	-92.32	25.21	-67.11	-57.00	-10.11	Peak	Vertical
	424.31	-87.52	27.75	-59.77	-57.00	-2.77	RMS	Vertical
	1442.00	-65.61	6.91	-58.70	-47.00	-11.70	Peak	Horizontal
	3754.00	-70.99	15.66	-55.33	-47.00	-8.33	Peak	Horizontal
	1875.50	-62.82	8.15	-54.67	-47.00	-7.67	Peak	Vertical
	3473.50	-65.14	14.56	-50.58	-47.00	-3.58	RMS	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)

Test Engineer	Alex Ma	Temperature	25°C
Test Time	2017/11/06	Relative Humidity	54%
Test Mode	802.11ac-VHT20 - Ant 0 + 1 + 2 + 3	Test Site	AC1

Channel	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
149	87.23	-83.42	16.30	-67.12	-57.00	-10.12	Peak	Horizontal
	425.28	-93.93	28.73	-65.20	-57.00	-8.20	Peak	Horizontal
	125.06	-92.25	25.21	-67.04	-57.00	-10.04	Peak	Vertical
	423.82	-85.03	27.73	-57.30	-57.00	-0.30	RMS	Vertical
	1127.50	-62.39	4.20	-58.19	-47.00	-11.19	Peak	Horizontal
	3813.50	-70.23	15.90	-54.33	-47.00	-7.33	Peak	Horizontal
	1875.50	-61.70	8.15	-53.55	-47.00	-6.55	Peak	Vertical
	3473.50	-65.59	14.56	-51.03	-47.00	-4.03	RMS	Vertical
165	87.23	-83.85	16.30	-67.55	-57.00	-10.55	Peak	Horizontal
	421.40	-94.00	28.50	-65.50	-57.00	-8.50	Peak	Horizontal
	125.06	-92.80	25.21	-67.59	-57.00	-10.59	Peak	Vertical
	424.79	-87.30	27.77	-59.53	-57.00	-2.53	RMS	Vertical
	2249.50	-69.65	11.63	-58.02	-47.00	-11.02	Peak	Horizontal
	5522.00	-72.58	19.32	-53.26	-47.00	-6.26	Peak	Horizontal
	1875.50	-61.97	8.15	-53.82	-47.00	-6.82	Peak	Vertical
	3473.50	-65.46	14.56	-50.90	-47.00	-3.90	RMS	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)

9. Receiver Blocking

9.1. Limit

While maintaining the minimum performance criteria as defined in clause 4.2.7.3, the blocking levels at specified frequency offsets shall be equal to or greater than the limits defined in table 4.

Table 4: Receiver Blocking parameters			
Wanted signal mean power from companion device (dBm)	Blocking signal frequency (MHz)	Blocking signal power (dBm)	Type of blocking signal
$P_{\text{MIN}} + 6 \text{ dB}$	5 420 5 925	-42	CW
$P_{\text{MIN}} + 6 \text{ dB}$	5 320 6 025 6 125		CW

Note 1: P_{MIN} is the minimum level of the wanted signal (in dBm) required to meet the minimum performance criteria as defined in clause 4.2.7.3 in the absence of any blocking signal.

Note 2: The levels specified are levels in front of the UUT antenna. In case of conducted measurements, the same levels should be used at the antenna connector irrespective of antenna gain.

9.2. Test Setup

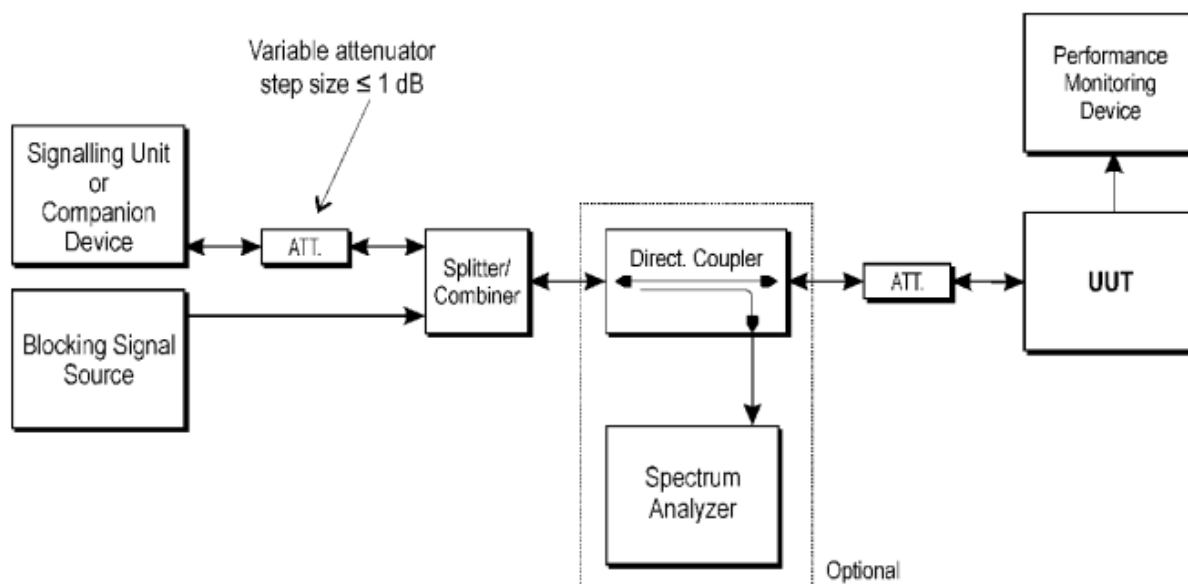


Figure 9: Test Set-up for receiver blocking

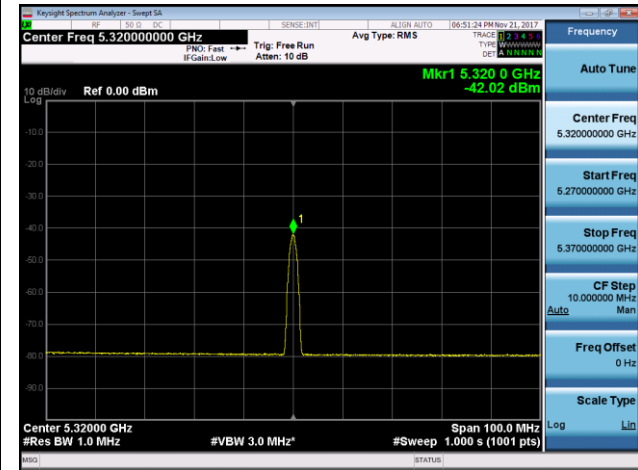
9.3. Test Procedure

Refer to ETSI EN 302 502 V2.1.1 (2017-03) Clause 5.4.7.2.1

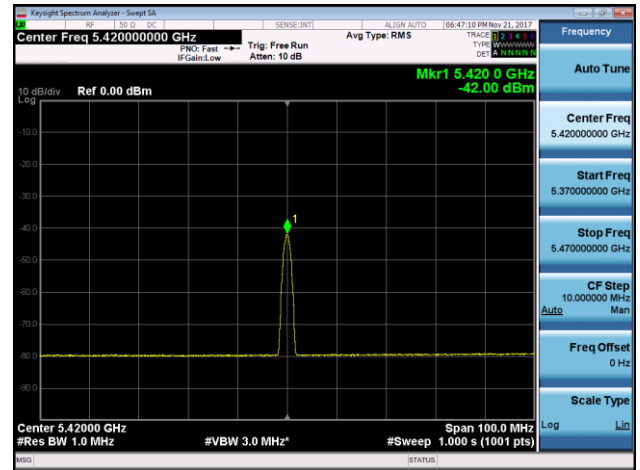
9.4. Test Result

Blocking Signal Calibration Plots

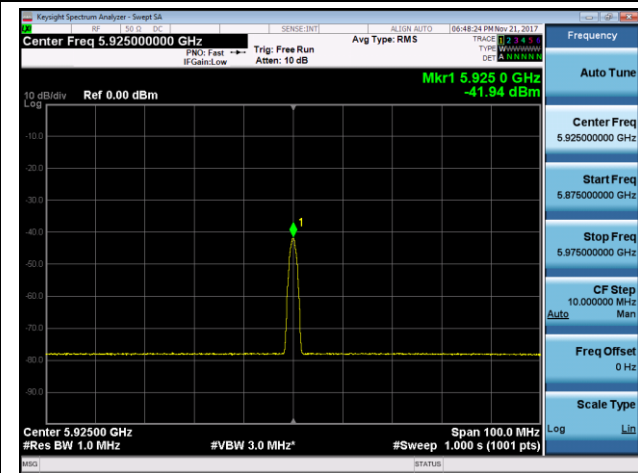
5320MHz



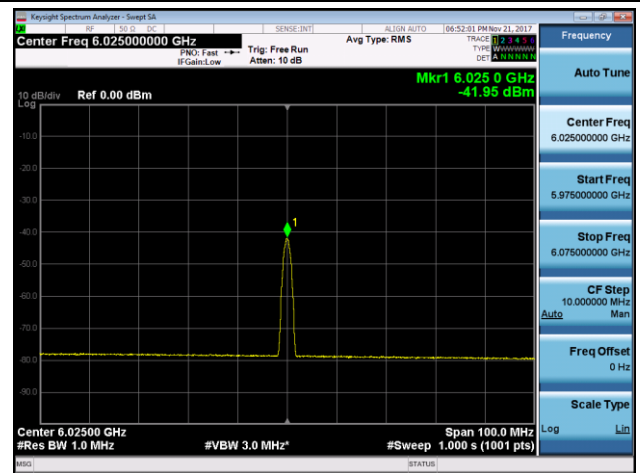
5420MHz



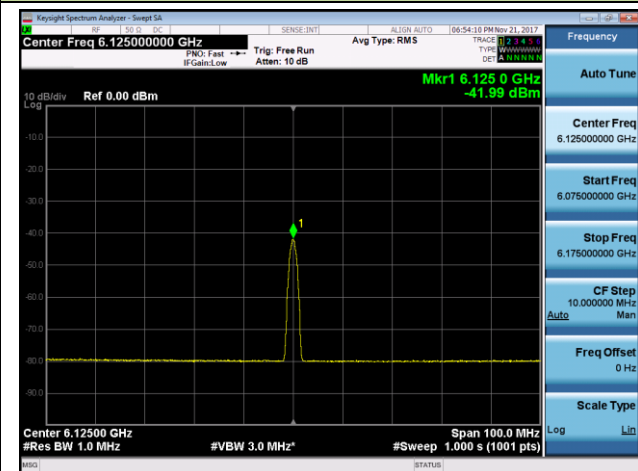
5925MHz



6025MHz



6125MHz



Test Engineer	Andy Zhu	Temperature	25°C
Test Data	2017/11/21	Relative Humidity	54%
Test Mode	802.11a	Test Site	TR4

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
149	$P_{\text{MIN}} + 6 \text{ dB}$	5420	-42	CW	0.3	< 10%	Pass
		5925			0.2		Pass
		5320			0.2		Pass
		6025			0.5		Pass
		6125			0.0		Pass

Note 1: the P_{MIN} of channel 1 is -78dBm.

10. User Access Restrictions

10.1. Requirement

The equipment shall be so constructed that settings (hardware and/or software) related to DFS shall not be accessible to the user if changing those settings result in the equipment no longer being compliant with the DFS requirements.

10.2. Test Result

The user can not change the country code of operation which is locked by the manufacturer. All RF parameters are limited by the country code.

So the equipment can satisfy the user access restrictions requirement.

11. 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 %

12. List of Measuring Instrument

Carrier Frequencies - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	MRTSUE06051	1 year	2017/12/06
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/22

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

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Power Meter	Agilent	U2021XA	MRTSUE06030	1 year	2017/12/08
Programmable Temperature & Humidity Chamber	BAOYT	BYH-1500L	MRTSUE06051	1 year	2017/12/08
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/20

Transmitter Unwanted Emissions Within the 5GHz RLAN Bands - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06180	1 year	2017/12/22

Transmitter Spurious Emissions and Receiver Spurious Emissions - AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cal. Due Date
Spectrum Analyzer	Agilent	N9010A	MRTSUE06195	1 year	2018/04/22
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2018/04/25
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2018/03/28
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2018/11/19
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2018/10/21
Temperature/Humidity Meter	Yuhuaze	HTC-2	MRTSUE06183	1 year	2017/12/22
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2018/05/10

Receiver Blocking - TR3

Instrument	Manufacturer	Type No.	Serial No.	Cali. Interval	Cali. Due Date
Vector Signal Generator	Agilent	E4438C	MY49872484	1 year	2017/12/06
Wideband Radio Communication Tester	R&S	CMW 500	MRTSUE06243	1 year	2018/02/14
Directional Coupler	Narda	4216-20	MRTSUE06065	1 year	2018/03/29
Power divider	Marvelous Microwave Inc.	ZFRSC-123-S +	MVE8577	1 year	2018/03/20
Thermohygrometer	Testo	608-H1	MRTSUE06222	1 year	2017/12/19

Software	Version	Function
e3	V8.3.5	EMI Test Software

_____ The End _____