



Test report No. : 4789482589-US-R1-V0
Page : 1 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

RADIO TEST REPORT

Product : 802.11ac/b/g/n WiFi + Bluetooth M.2 Card
Model Name : WNFT-237ACN(BT)
FCC ID : RYK-WNFT237ACNBT
Test Regulation : FCC 47 CFR Part 15 Subpart E (Section 15.407)
Received Date : May 13, 2020
Test Date : May 18, 2020 ~ Jul. 16, 2020
Issued Date : Jul. 16, 2020

Applicant : SparkLAN Communications, Inc.
8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City
11493, Taiwan (R.O.C.)

Issued By : Underwriters Laboratories Taiwan Co., Ltd.
Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd.,
Zhudong Township, Hsinchu County, Taiwan



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Doc No: 17-EM-F0878 / 5.0

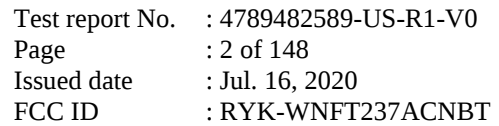




Table Of Contents

1. Attestation of Test Results	4
2. Summary of Test Results	5
3. Test Methodology and Reference Procedures.....	6
4. Facilities and Accreditation	6
5. Measurement Uncertainty	7
6. Equipment under Test	8
6.1. Description of EUT	8
6.2. Channel List	10
6.3. Test Condition	12
6.4. Description Of Available Antennas	12
6.5. Test Mode Applicability and Tested Channel Detail	13
6.6. Duty cycle	15
7. Test Equipment.....	16
8. Description of Test Setup	18
9. Test Results	19
9.1. 6dB Bandwidth	19
9.2. 26dB Bandwidth	23
9.3. Occupied Bandwidth.....	27
9.4. Conducted output power	35
9.5. Power Spectral Density	41
9.6. Frequency Stability	53
9.7. Radiated Spurious Emission	55
9.8. AC Power Line Conducted Emission	106
Appendix I Radiated Band Edge and OOB Measurement.....	112
Appendix II Radiated Spurious Emission Measurement	133



Test report No. : 4789482589-US-R1-V0
Page : 4 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

1. Attestation of Test Results

APPLICANT: SparkLAN Communications, Inc.
8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493,
Taiwan (R.O.C.)

MANUFACTURER SparkLAN Communications, Inc.
8F., No.257, Sec. 2, Tiding Blvd., Neihu District, Taipei City 11493,
Taiwan (R.O.C.)

EUT DESCRIPTION: 802.11ac/b/g/n WiFi + Bluetooth M.2 Card

MODEL: WNFT-237ACN(BT)

SAMPLE STAGE: Identical Prototype

DATE of TESTED: May 18, 2020 ~ Jul. 16, 2020

APPLICABLE STANDARDS	
STANDARD	Test Results
FCC 47 CFR PART 15 Subpart E (Section 15.407)	PASS

Underwriters Laboratories Taiwan Co., Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by Underwriters Laboratories Taiwan Co., Ltd. based on interpretations and/or observations of test results. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Underwriters Laboratories Taiwan Co., Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Underwriters Laboratories Taiwan Co., Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Prepared By:

Cindy Hsin
Project Handler

Date : Jul. 16, 2020

Approved and Authorized By:

Howard Kao Date : Jul. 16, 2020
Project Engineer

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2. Summary of Test Results

Summary of Test Results		
FCC Clause	Test Items	Result
15.407(e)	6dB Bandwidth	PASS
15.403(i)	26dB Bandwidth	PASS
2.1049	Occupied Bandwidth	See Note2
15.407(a)(1/2/3)	Conducted Output Power	PASS
15.407(a)(1/2/3)	Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions and Band Edge Measurement	PASS
15.407(b)(6)	AC Power Conducted Emission	PASS
15.203	Antenna Requirement	PASS
15.407(h)	Dynamic Frequency Selection	See Note3

Note:

1. For the Radiated Band Edge and OOB test plots were recorded in Appendix I, the Radiated Emissions test plots were recorded in Appendix II.
2. The Occupied Bandwidth was reference only.
3. The “Dynamic Frequency Selection measurement” was recorded in Report No.: 4789482589-US-R2-V0.

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3. Test Methodology and Reference Procedures

The tests documented in this report were performed in accordance with 47 CFR FCC Part 2, KDB 789033 D02 General UNII Test Procedure New Rules v02r01, KDB414788 D01 Radiated Test Site v01r01, ANSI C63.10-2013 and KDB 662911 D01 Multiple Transmitter Output v02r01.

4. Facilities and Accreditation

Test Location	Underwriters Laboratories Taiwan Co., Ltd.
Address	Building B and Building E, No. 372-7, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County, Taiwan
Accreditation Certificate	Underwriters Laboratories Taiwan Co., Ltd. is accredited by TAF, Laboratory Code 3398. The full scope of accreditation can be viewed at http://accreditation.taftw.org.tw/taf/public/basic/viewApplyItems.action?unitNo=3398

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5. Measurement Uncertainty

For statement of conformity, accuracy method (Section 8.2.4 and 8.2.5 of ISO Guide 98-4) was applied as decision rule for measurement in this test report.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.

Test Item	Measurement Frequency Range	K	U(dB)
Conducted disturbance at mains terminals ports	0.15MHz ~ 30MHz	2	1.7
RF Conducted	9 kHz - 40GHz	2	1.0
Radiated disturbance below 30MHz	9 kHz - 30 MHz	2	2.2
Radiated disturbance below 1 GHz	30MHz ~ 1GHz	2	5.3
Radiated disturbance above 1GHz	1GHz ~ 40GHz	2	4.8

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6. Equipment under Test

6.1. Description of EUT

Product	802.11ac/b/g/n WiFi + Bluetooth M.2 Card	
Model Name	WNFT-237ACN(BT)	
Operating Frequency	5180 ~ 5240 MHz, 5260 ~ 5320 MHz, 5500 ~ 5720 MHz, 5745 ~ 5825 MHz	
Modulation	256QAM, 64QAM, 16QAM, QPSK, BPSK	
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to MCS15 802.11ac: up to MCS9	
Number of Channel	5180 ~ 5240 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11 ac (VHT40)
		1 for 802.11ac (VHT80)
	5260 ~ 5320 MHz	4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11 ac (VHT40)
		1 for 802.11ac (VHT80)
	5500 ~ 5720 MHz	12 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		6 for 802.11n (HT40), 802.11 ac (VHT40)
		3 for 802.11ac (VHT80)
	5745 ~ 5825 MHz	5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)
		2 for 802.11n (HT40), 802.11 ac (VHT40)
		1 for 802.11ac (VHT80)
Maximum Output Power	5180 ~ 5240 MHz: 22.96 dBm 5260 ~ 5320 MHz: 23.09 dBm 5500 ~ 5720 MHz: 23.33 dBm 5745 ~ 5825 MHz: 24.86 dBm	
Normal Voltage	3.3 Vdc	
S/N	19662E2008976	
Hardware Version	WNFT-237ACN(BT)	
Software Version	N/A	

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Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	Tx,Rx Function
802.11a	2TX,2RX
802.11n (HT20)	2TX,2RX
802.11n (HT40)	2TX,2RX
802.11ac (VHT20)	2TX,2RX
802.11ac (VHT40)	2TX,2RX
802.11ac (VHT80)	2TX,2RX

* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report.

2. The EUT contains following accessory devices

Product	Brand	Model	Description
Antenna	Nissei Limited	FML2.4W45A-160-MHF4L	N/A

3. The above EUT information is declared by manufacturer and for more detailed features description, please refer the manufacturer's or user's manual.

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6.2. Channel List

FOR 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

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FOR 5500 ~ 5720MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz	144	5720 MHz

6 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	138	5690MHz
122	5610MHz	-	-

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

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6.3. Test Condition

Test Item	Test Site No.	Environmental Condition	Input Power	Test Date	Tested by
Antenna Port Conducted Measurement	SR4	23~26°C / 63~68%RH	120Vac / 60 Hz	May 18, 2020 ~ Jul. 16, 2020	Patrick Kuan
Radiated Spurious Emission	966-2	22~26°C / 62~68%RH	120Vac / 60 Hz	May 19, 2020 ~ Jun. 10, 2020	Mike Cai
AC power Line Conducted Emission	SR1	23~25°C / 63~68%RH	120Vac / 60 Hz	Jun. 10, 2020	Mike Cai

FCC Test Firm Registration Number: 498077

6.4. Description Of Available Antennas

Antenna	Brand Name	Model Name	Antenna Type	Frequency Band (MHz)	Antenna Gain(dBi)
Ant 0	Nissei Limited	FML2.4W45A-160-MHF4L	PCB	5180 ~ 5240	-0.52
				5260 ~ 5320	0.26
				5500 ~ 5720	4.94
				5745 ~ 5825	4.45
Ant 1	Nissei Limited	FML2.4W45A-160-MHF4L	PCB	5180 ~ 5240	-0.52
				5260 ~ 5320	0.26
				5500 ~ 5720	4.94
				5745 ~ 5825	4.45

Note: The above antenna information was provided from customer and for more detailed features description, please refer the manufacturer's specification or user's manual.

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6.5. Test Mode Applicability and Tested Channel Detail

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- For below 1 GHz radiated emission and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
- For Antenna Port Conducted Measurement, this item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- The fundamental of the EUT was investigated in three orthogonal axes X/Y/Z, it was determined that Z axis was worst-case. Therefore, all final radiated testing was performed with the EUT in Z axis.
- For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.
- For AC power line conducted emissions, the pre-scan has been determined by AC power 120Vac/60Hz (worst case)

Test item	Mode	Frequency Band (MHz)	Modulation Technology	Available Channel	Test Channel	Data Rate
Radiated Emissions (Above 1GHz)	802.11a	5180-5240	OFDM	36 to 48	36, 44, 48	6.0
	802.11ac (VHT20)		OFDM	36 to 48	36, 44, 48	MCS0
	802.11ac (VHT40)		OFDM	38 to 46	38, 46	MCS0
	802.11ac (VHT80)		OFDM	42	42	MCS0
	802.11a	5260-5320	OFDM	52 to 64	52, 60, 64	6.0
	802.11ac (VHT20)		OFDM	52 to 64	52, 60, 64	MCS0
	802.11ac (VHT40)		OFDM	54 to 62	54, 62	MCS0
	802.11ac (VHT80)		OFDM	58	58	MCS0
	802.11a	5500-5720	OFDM	100 to 144	100, 116, 140, 144	6.0
	802.11ac (VHT20)		OFDM	100 to 144	100, 116, 140, 144	MCS0
	802.11ac (VHT40)		OFDM	102 to 142	102, 110, 134, 142	MCS0
	802.11ac (VHT80)		OFDM	106, 122, 138	106, 122, 138	MCS0
	802.11a	5745-5825	OFDM	149 to 165	149, 157, 165	6.0
	802.11ac (VHT20)		OFDM	149 to 165	149, 157, 165	MCS0
	802.11ac (VHT40)		OFDM	151 to 159	151, 159	MCS0
	802.11ac (VHT80)		OFDM	155	155	MCS0
Radiated Emissions (Below 1GHz)	802.11ac (VHT20)	5180-5240	OFDM	36 to 48	48	MCS0
AC Power Line Conducted Emission	802.11ac (VHT20)	5180-5240	OFDM	36 to 48	48	MCS0

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 14 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

Test item	Mode	Frequency Band (MHz)	Modulation Technology	Available Channel	Test Channel	Data Rate
Antenna Port Conducted Measurement	802.11a	5180-5240	OFDM	36 to 48	36, 44, 48	6.0
	802.11ac (VHT20)		OFDM	36 to 48	36, 44, 48	MCS0
	802.11ac (VHT40)		OFDM	38 to 46	38, 46	MCS0
	802.11ac (VHT80)		OFDM	42	42	MCS0
	802.11a	5260-5320	OFDM	52 to 64	52, 60, 64	6.0
	802.11ac (VHT20)		OFDM	52 to 64	52, 60, 64	MCS0
	802.11ac (VHT40)		OFDM	54 to 62	54, 62	MCS0
	802.11ac (VHT80)		OFDM	58	58	MCS0
	802.11a	5500-5720	OFDM	100 to 144	100, 116, 140, 144	6.0
	802.11ac (VHT20)		OFDM	100 to 144	100, 116, 140, 144	MCS0
	802.11ac (VHT40)		OFDM	102 to 142	102, 110, 134, 142	MCS0
	802.11ac (VHT80)		OFDM	106, 122, 138	106, 122, 138	MCS0
	802.11a	5745-5825	OFDM	149 to 165	149, 157, 165	6.0
	802.11ac (VHT20)		OFDM	149 to 165	149, 157, 165	MCS0
	802.11ac (VHT40)		OFDM	151 to 159	151, 159	MCS0
	802.11ac (VHT80)		OFDM	155	155	MCS0

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6.6. Duty cycle

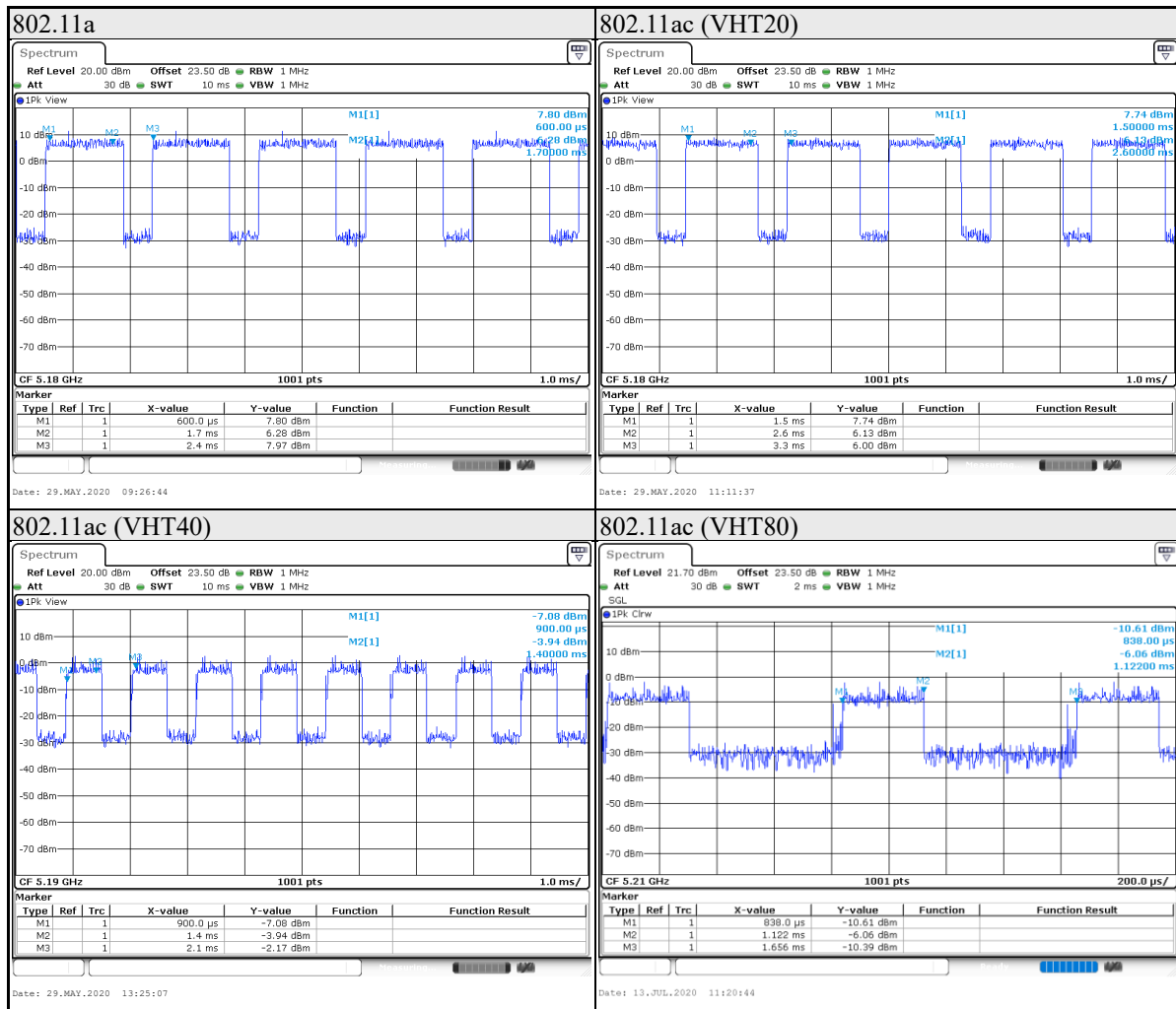
Duty cycle of test signal is < 98 %, duty factor is required.

802.11a: Duty cycle = $1.1/1.8 = 0.611$, Duty factor = $10 * \log(1/0.611) = 2.14$

802.11ac (VHT20): Duty cycle = $1.1/1.8 = 0.611$, Duty factor = $10 * \log(1/0.611) = 2.14$

802.11ac (VHT40): Duty cycle = $0.5/1.2 = 0.417$, Duty factor = $10 * \log(1/0.417) = 3.8$

802.11ac (VHT80): Duty cycle = $0.28/0.818 = 0.347$, Duty factor = $10 * \log(1/0.347) = 4.59$



Note: $T_{on} = \text{Mark2} - \text{Mark1}$, $T_{on} + T_{off} = \text{Mark3} - \text{Mark1}$.



7. Test Equipment

Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Radiated Spurious Emission					
Spectrum Analyzer	Keysight	N9010A	MY56070827	Nov. 13, 2019	1 year
EMI Test Receiver	Rohde & Schwarz	ESR7	101754	Dec. 17, 2019	1 year
Loop Antenna	ETS lindgren	6502	00213440	Dec. 19, 2019	1 year
Trilog-Broadband Antenna with 5dB Attenuator	Schwarzbeck & EMCI	VULB 9168 & N-6-05	774 & AT-N0538	Jan. 3, 2020	1 year
Horn Antenna (1-18 GHz)	Schwarzbeck	BBHA 9120 D	01690	Jan. 3, 2020	1 year
Horn Antenna (18-40 GHz)	Schwarzbeck	BBHA 9170	781	Dec. 27, 2019	1 year
Preamplifier (30-1000 MHz)	EMCI	EMC330E	980405	Feb. 4, 2020	1 year
Preamplifier (1-18 GHz)	EMCI	EMC051835BE	980406	Feb. 4, 2020	1 year
Preamplifier (18-40GHz)	EMCI	EMC184040SEE	980426	May 19, 2020	1 year
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-4 & 170425-2	Jan. 8, 2020	1 year
Cables	Hanyitek	K1K50-UP0264-K1K50-2500	170214-1 & 170214-2	Jan. 8, 2020	1 year

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Test report No. : 4789482589-US-R1-V0
Page : 17 of 148
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Test Equipment List					
Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
Antenna Port Conducted Measurement					
Spectrum Analyzer	Keysight	N9010A	MY56070834	Nov. 6, 2019	1 year
FSV40 Signal Analyzer	Rohde & Schwarz	FSV40	101490	Sep. 24, 2019	1 year
Pulse Power Sensor	Anrisu	MA2411B	1531202	Dec. 23, 2019	1 year
Power Meter	Anrisu	ML2495A	1645002	Dec. 23, 2019	1 year
Temperature & Humidity Test Chamber	GIANT FORCE	GTH-150-40-CP-AR	MAA1701-010	Mar. 23, 2020	1 year
AC power Line Conducted Emission					
EMI Test Receiver	Rohde & Schwarz	ESR7	101753	Nov. 19, 2019	1 year
Two-Line V-Network	Rohde & Schwarz	ENV216	102136	Aug. 8, 2019	1 year
Impuls-Begrenzer Pulse Limiter	Rohde & Schwarz	ESH3-Z2	102219-Qt	Aug. 6, 2019	1 year
Cables	HARBOUR INDUSTRIES	LL142	170205-5000-1	Feb. 5, 2020	1 year

UL Software		
Description	Name	Version
Radiated measurement	E3	6.0
AC power Line Conducted Emission	EZ EMC	1.1.4.2

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8. Description of Test Setup

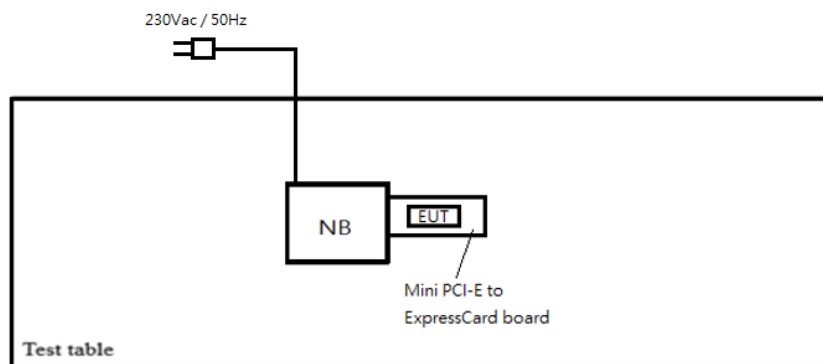
Support Equipment

Equipment	Brand Name	Model Name	S/N	Remark
Notebook	Lenovo	T430	PBE38AK	N/A
Mini PCI-E to ExpressCard board	N/A	N/A	N/A	N/A

Test Setup

Controlled using a bespoke application (MPTool.Ink 1.2.0.5) on a test Notebook. The application was used to enable a continuous transmission mode and to select the test channels, data rates, modulation schemes and power setting as required.

Setup Diagram for Test



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9. Test Results

9.1. 6dB Bandwidth

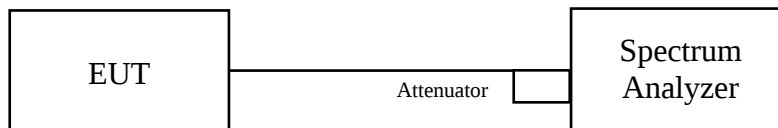
Requirements

The minimum 6 dB bandwidth shall be at least 500 kHz.

Test procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (U-NII-3 Band)	5720	3.07	2.79	0.5	Pass
149	5745	16.30	15.94	0.5	Pass
157	5785	16.34	15.94	0.5	Pass
165	5825	16.30	16.26	0.5	Pass

802.11ac (VHT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (U-NII-3 Band)	5720	3.31	3.67	0.5	Pass
149	5745	17.54	16.94	0.5	Pass
157	5785	17.54	16.90	0.5	Pass
165	5825	17.54	17.18	0.5	Pass

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802.11ac (VHT40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
142 (U-NII-3 Band)	5710	2.50	2.42	0.5	Pass
151	5755	35.48	29.49	0.5	Pass
159	5795	35.16	35.08	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
138 (U-NII-3 Band)	5690	2.24	1.84	0.5	Pass
155	5775	74.97	72.57	0.5	Pass

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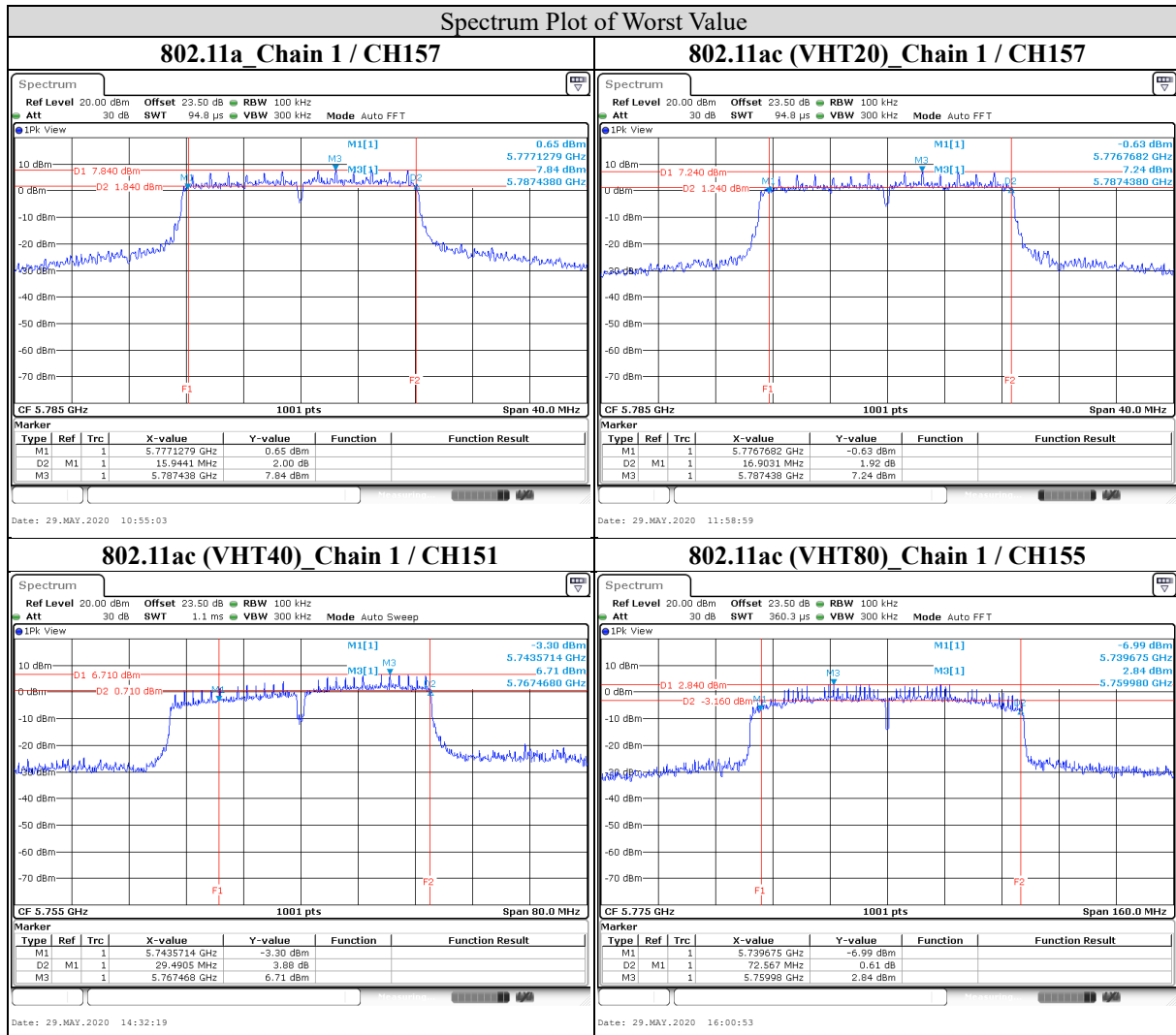
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Test report No. : 4789482589-US-R1-V0
Page : 22 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



Note: The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

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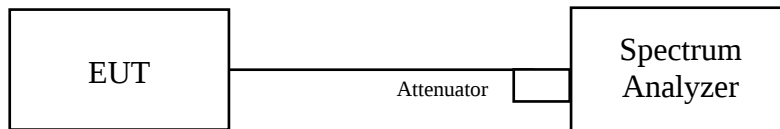


9.2. 26dB Bandwidth

Test procedure

- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Doc No: 17-EM-F0878 / 5.0



Test Data

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	18.62	18.74	PASS
44	5220	18.50	18.82	PASS
48	5240	18.54	18.58	PASS
52	5260	18.66	18.82	PASS
60	5300	18.66	18.54	PASS
64	5320	18.82	18.54	PASS
100	5500	18.70	18.78	PASS
116	5580	18.62	30.49	PASS
140	5700	18.70	18.78	PASS
144 (U-NII-2c Band)	5720	14.47	17.07	PASS

802.11ac (VHT20)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	19.54	19.62	PASS
44	5220	19.66	19.62	PASS
48	5240	19.86	19.62	PASS
52	5260	19.82	19.86	PASS
60	5300	19.70	19.46	PASS
64	5320	19.78	19.62	PASS
100	5500	19.82	19.78	PASS
116	5580	19.66	32.61	PASS
140	5700	19.54	19.86	PASS
144 (U-NII-2c Band)	5720	14.99	14.95	PASS

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802.11ac (VHT40)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	43.56	43.00	PASS
46	5230	42.60	43.80	PASS
54	5270	61.62	43.32	PASS
62	5310	42.92	44.12	PASS
102	5510	45.23	43.72	PASS
110	5550	43.16	75.29	PASS
134	5670	43.32	55.54	PASS
142 (U-NII-2c Band)	5710	37.06	54.08	PASS

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	26 dB Bandwidth (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	81.36	81.52	PASS
58	5290	82.80	82.64	PASS
106	5530	81.52	82.32	PASS
122	5610	91.75	132.35	PASS
138 (U-NII-2c Band)	5690	89.82	87.91	PASS

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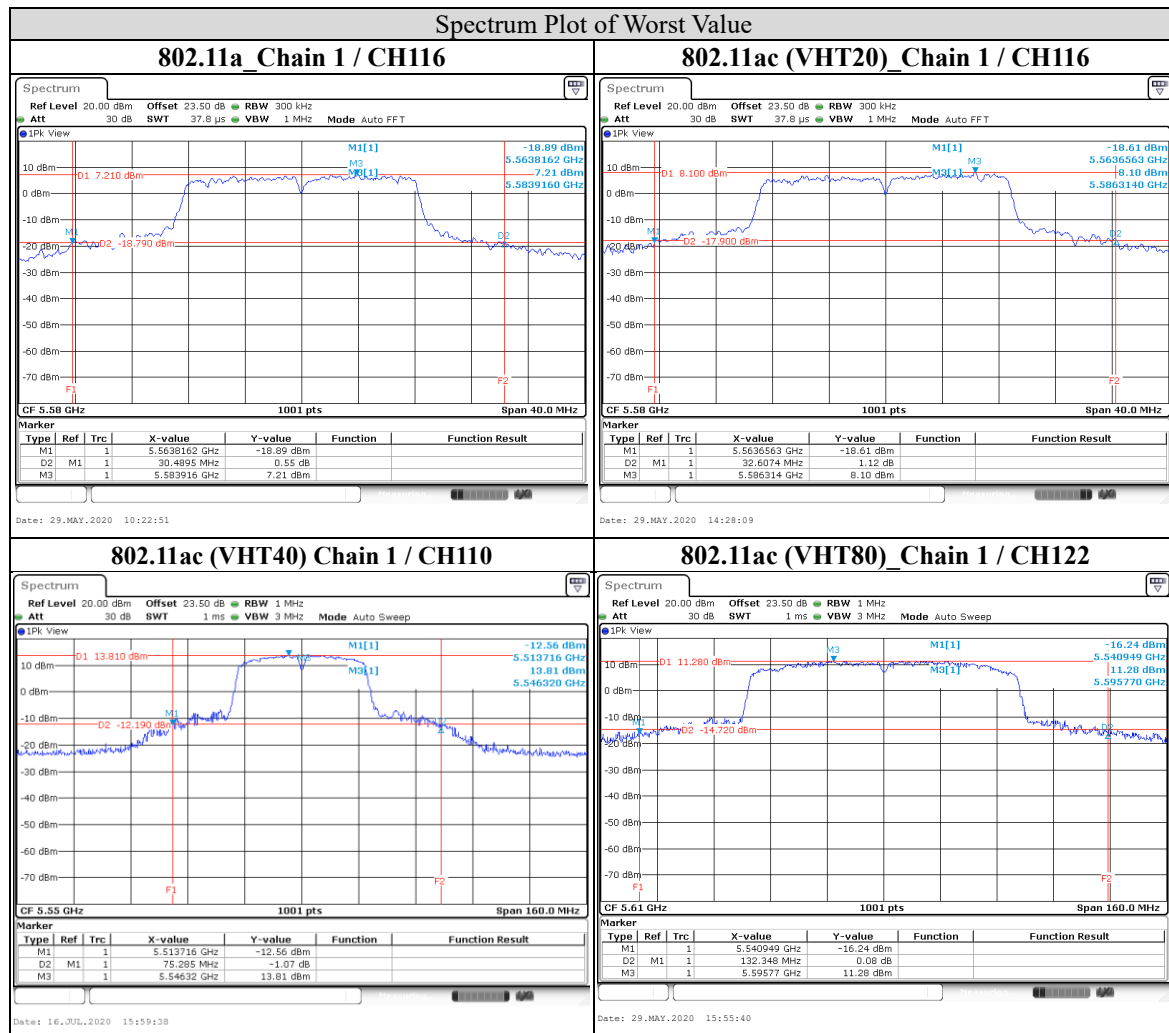
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Test report No. : 4789482589-US-R1-V0
Page : 26 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



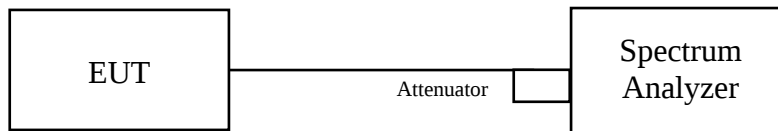


9.3. Occupied Bandwidth

Test procedure

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

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Doc No: 17-EM-F0878 / 5.0



Test Data

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	16.42	16.46
44	5220	16.42	16.38
48	5240	16.42	16.42
52	5260	16.42	16.42
60	5300	16.42	16.42
64	5320	16.42	16.42
100	5500	16.42	16.38
116	5580	16.42	16.94
140	5700	16.46	16.42
144 (U-NII-2c Band)	5720	13.23	13.39
144 (U-NII-3 Band)	5720	3.23	3.26
149	5745	16.42	17.66
157	5785	16.42	16.46
165	5825	16.42	16.74

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Doc No: 17-EM-F0878 / 5.0



802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	17.58	17.54
44	5220	17.62	17.58
48	5240	17.58	17.58
52	5260	17.58	17.66
60	5300	17.66	17.54
64	5320	17.58	17.54
100	5500	17.62	17.62
116	5580	17.58	18.06
140	5700	17.62	17.62
144 (U-NII-2c Band)	5720	13.81	13.81
144 (U-NII-3 Band)	5720	3.81	3.81
149	5745	17.58	17.86
157	5785	17.62	17.58
165	5825	17.58	17.70

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 30 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

802.11ac (VHT40)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
38	5190	36.76	36.52
46	5230	36.52	36.76
54	5270	36.48	36.68
62	5310	36.60	36.76
102	5510	36.84	36.68
110	5550	36.60	36.64
134	5670	36.76	36.84
142 (U-NII-2c Band)	5710	33.38	33.38
142 (U-NII-3 Band)	5710	3.38	3.51
151	5755	36.76	37.64
159	5795	36.76	36.60

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Test report No. : 4789482589-US-R1-V0
Page : 31 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

802.11ac (VHT80)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
42	5210	74.81	74.81
58	5290	74.97	74.97
106	5530	74.97	74.81
122	5610	74.81	75.45
138 (U-NII-2c Band)	5690	72.56	72.56
138 (U-NII-3 Band)	5690	2.56	2.56
155	5775	74.97	75.13

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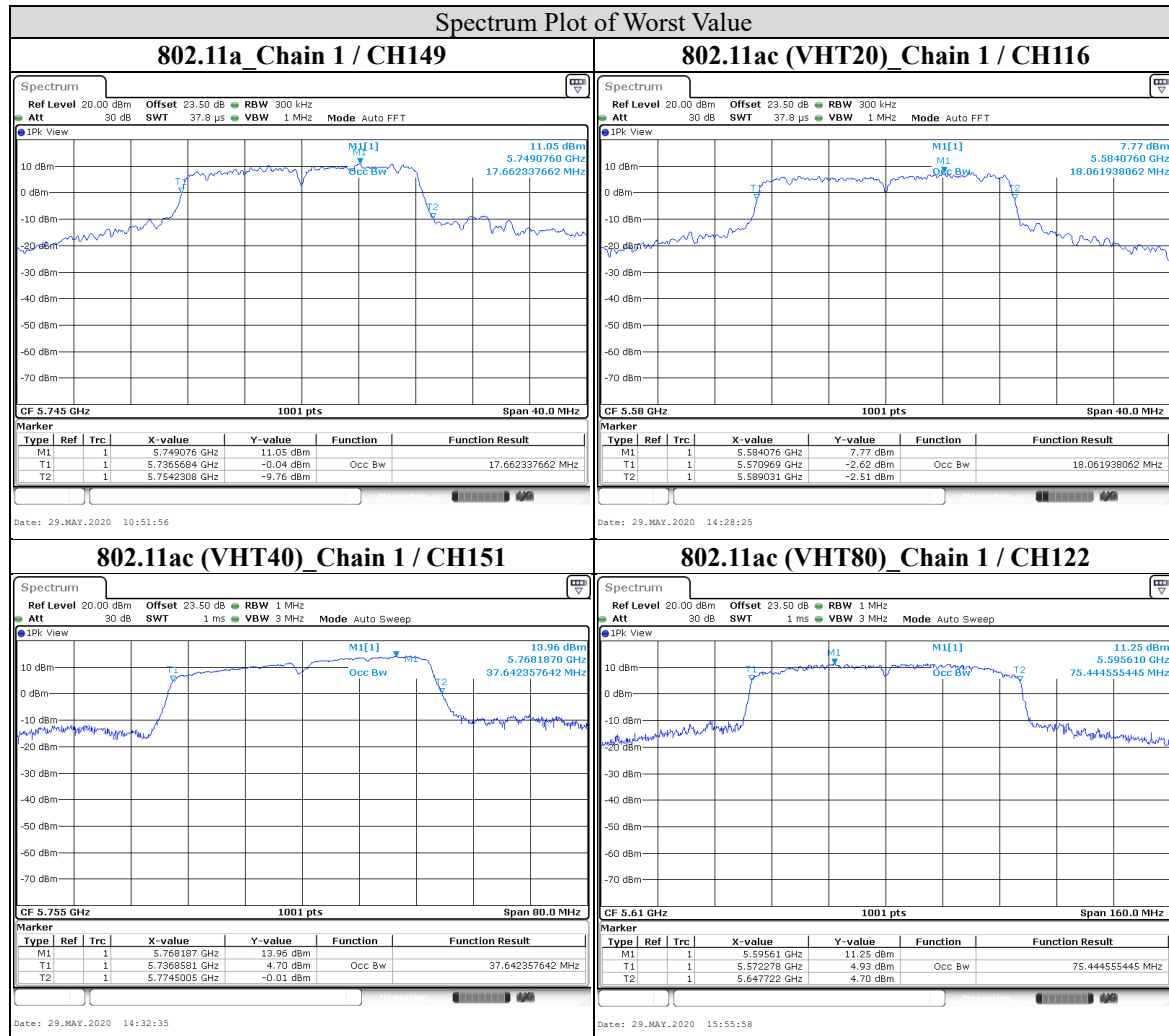
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Page : 32 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



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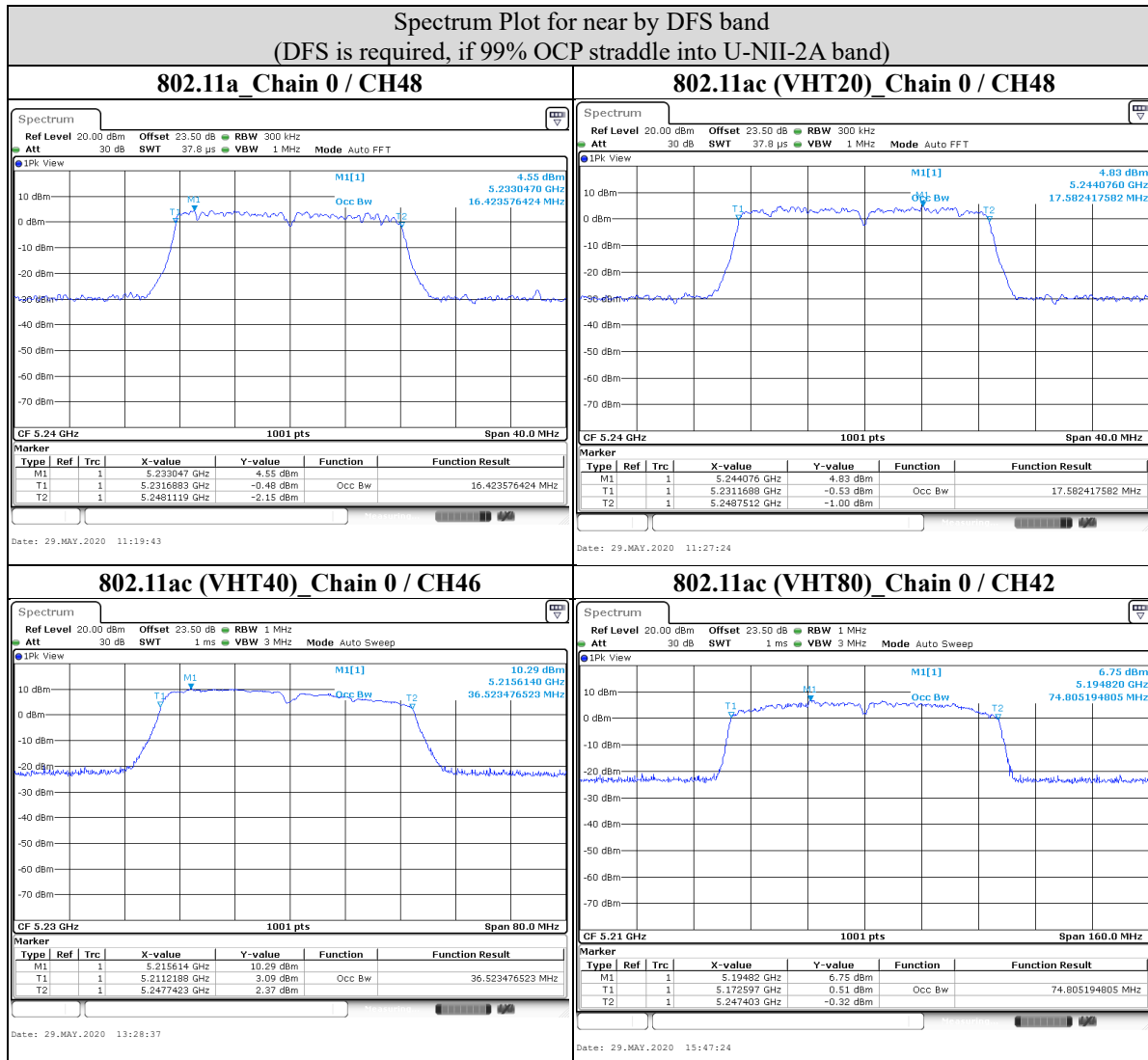
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Test report No. : 4789482589-US-R1-V0
Page : 33 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



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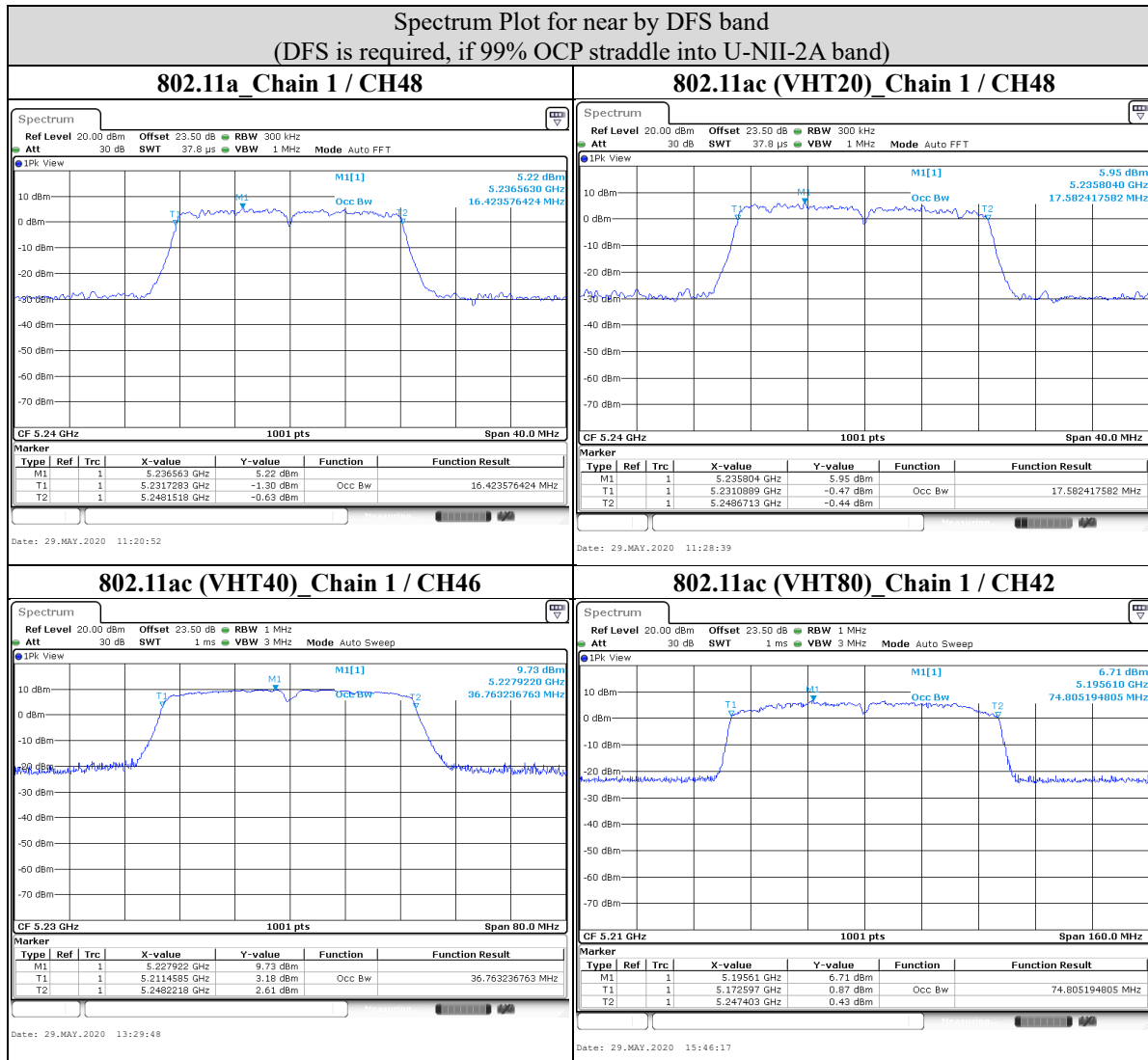
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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 34 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



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9.4. Conducted output power

Requirements

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) Max. e.i.r.p $\leq$ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
		Fixed point-to-point Access Point	1 Watt (30 dBm) If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$
		Indoor Access Point	1 Watt (30 dBm) If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$
	V	Client device	250mW (24 dBm) If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$
U-NII-2A	---		250mW (24 dBm) or 11 dBm+10 log B* If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$
U-NII-2C	---		250mW (24 dBm) or 11 dBm+10 log B* If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$
U-NII-3	---		For Point-to-multipoint systems (P2M): 1 Watt (30 dBm). If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ For Point-to-point systems (P2P): 1 Watt (30 dBm)

Note:

- P_{Out} = maximum conducted output power in dBm,
- G_{TX} = the maximum transmitting antenna directional gain in dBi.
- Directional Gain = $G_{ant} + 10 \log (N_{ant})$ dBi.

N_{ant} : Number of Transmit Antennas

$G_1, G_2, \dots, G_n$: Gain of Individual Antennas (Same for Each Antenna)

- B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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Test Procedure

For Average Power Measurement

Test method PM-G

For 802.11a, 802.11ac (VHT20), 802.11ac (VHT40)

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst and set the detector to AVERAGE. Duty factor is not added to measured value.

Test method SA-1

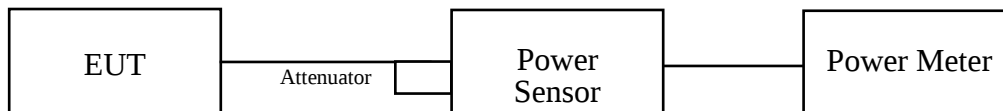
For 802.11ac (VHT80), Channel Straddling (802.11a, 802.11ac (VHT20/ VHT40/ VHT80))

- Set span to encompass the entire EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
- Set RBW = 1 MHz.
- Set VBW $\geq$ 3 MHz
- Number of points in sweep $\geq$ 2 Span / RBW.
- Sweep time = auto.
- Detector = RMS.
- Trace average at least 100 traces in power averaging mode.
- Compute power by integrating the spectrum across the EBW of the signal.

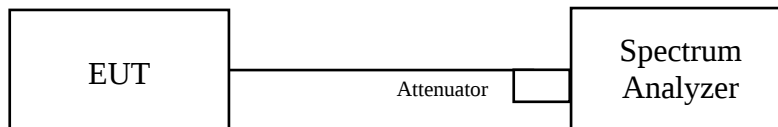
* If transmit duty cycle < 98%, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle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

Test Setup

For Average Power Measurement



The loss between RF output port of the EUT and the input port of the Power Meter has been taken into consideration.



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Doc No: 17-EM-F0878 / 5.0



Test Data

802.11a

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		chain 0	chain 1				
36	5180	18.74	18.74	149.63	21.75	24	PASS
44	5220	18.76	18.69	149.12	21.74	24	PASS
48	5240	18.75	18.79	150.67	21.78	24	PASS
52	5260	18.66	18.63	146.40	21.66	23.7	PASS
60	5300	18.51	18.54	142.41	21.54	23.68	PASS
64	5320	18.52	18.68	144.91	21.61	23.68	PASS
100	5500	17.81	17.65	118.61	20.74	23.71	PASS
116	5580	18.75	18.74	149.81	21.76	23.7	PASS
140	5700	17.62	17.71	116.83	20.68	23.71	PASS
144 (U-NII-2c Band)	5720	14.32	14.33	54.15	17.34	22.6	PASS
144 (U-NII-3 Band)	5720	3.50	3.55	4.50	6.54	30	PASS
149	5745	21.7	21.83	300.32	24.78	30	PASS
157	5785	21.69	21.81	299.28	24.76	30	PASS
165	5825	21.83	21.72	301.00	24.79	30	PASS

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		chain 0	chain 1		
144	5720	17.82	17.83	121.21	20.84

Note: The total power was calculated through formula and record the value for reference only.

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802.11ac (VHT20)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		chain 0	chain 1				
36	5180	18.61	18.35	141.00	21.49	24	PASS
44	5220	18.84	18.61	149.17	21.74	24	PASS
48	5240	18.75	18.72	149.46	21.75	24	PASS
52	5260	18.67	18.77	148.96	21.73	23.97	PASS
60	5300	17.98	17.84	123.62	20.92	23.89	PASS
64	5320	18.74	18.7	148.95	21.73	23.92	PASS
100	5500	16.59	16.56	90.89	19.59	23.96	PASS
116	5580	18.68	18.72	148.26	21.71	23.93	PASS
140	5700	16.59	16.67	92.06	19.64	23.9	PASS
144 (U-NII-2c Band)	5720	14.01	13.96	50.07	17.00	22.74	PASS
144 (U-NII-3 Band)	5720	3.87	3.85	4.86	6.87	30	PASS
149	5745	21.84	21.85	305.87	24.86	30	PASS
157	5785	21.61	21.78	295.54	24.71	30	PASS
165	5825	21.78	21.74	299.94	24.77	30	PASS

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		chain 0	chain 1		
144	5720	17.88	17.81	121.77	20.86

Note: The total power was calculated through formula and record the value for reference only.

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802.11ac (VHT40)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		chain 0	chain 1				
38	5190	13.91	13.52	47.10	16.73	24	PASS
46	5230	20.02	19.87	197.51	22.96	24	PASS
54	5270	20.17	19.98	203.53	23.09	24	PASS
62	5310	15.09	14.93	63.40	18.02	24	PASS
102	5510	14.90	14.89	61.74	17.91	24	PASS
110	5550	20.31	20.33	215.29	23.33	24	PASS
134	5670	18.94	18.86	155.26	21.91	24	PASS
142 (U-NII-2c Band)	5710	18.09	17.62	122.26	20.87	24	PASS
142 (U-NII-3 Band)	5710	1.83	2.08	3.14	4.97	30	PASS
151	5755	20.14	20.29	210.18	23.23	30	PASS
159	5795	20.24	20.20	210.40	23.23	30	PASS

For Reference only – Power meter value

The power value was measured by power meter with average sensor.

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		chain 0	chain 1		
142	5710	19.92	19.41	185.47	22.68

Note: The total power was calculated through formula and record the value for reference only.

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802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		chain 0	chain 1				
42	5210	13.01	12.78	38.97	15.91	24	PASS
58	5290	14.91	14.88	61.74	17.91	24	PASS
106	5530	14.01	14.15	51.18	17.09	24	PASS
122	5610	18.17	18.24	132.30	21.22	24	PASS
138 (U-NII-2c Band)	5690	18.59	19.04	152.46	21.83	24	PASS
138 (U-NII-3 Band)	5690	0.66	0.67	2.33	3.67	30	PASS
155	5775	17.21	17.39	107.43	20.31	30	PASS

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)
		chain 0	chain 1		
138	5690	19.25	19.71	177.68	22.5

Note: The total power was calculated through formula and record the value for reference only.

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9.5. Power Spectral Density

Requirements

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 17 - (G_{TX} - 6)$
		Fixed point-to-point Access Point	17dBm/ MHz If $G_{TX} > 23$ dBi, then $PSD = 17 - (G_{TX} - 23)$
		Indoor Access Point	17dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 17 - (G_{TX} - 6)$
	√	Client device	11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-2A	---		11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-2C	---		11dBm/ MHz If $G_{TX} > 6$ dBi, then $PSD = 11 - (G_{TX} - 6)$
U-NII-3	---		For Point-to-multipoint systems (P2M): 30dBm/ 500kHz. If $G_{TX} > 6$ dBi, then $PSD = 30 - (G_{TX} - 6)$ For Point-to-point systems (P2P): 30dBm/ 500kHz

Note:

- PSD = power spectral density that the same method as used to determine the conducted output power shall be used to determine the power spectral density. And power spectral density in dBm/MHz
- G_{TX} = the maximum transmitting antenna directional gain in dBi.
- Directional Gain = $G_{ant} + 10 \log(N_{ant})$ dBi.

N_{ant} : Number of Transmit Antennas

$G_1, G_2, \dots, G_n$: Gain of Individual Antennas (Same for Each Antenna)

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Test procedure

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2_with Duty cycle <98 %

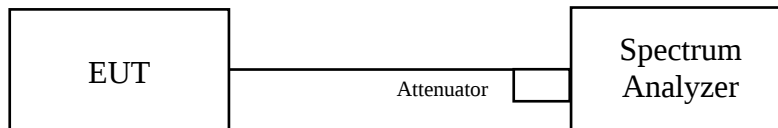
- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW $\geq$ 3 RBW, Detector = RMS
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

with Duty cycle <98 %

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 500 kHz, Set VBW $\geq$ 3 RBW, Detector = RMS
- Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
- Sweep time = auto, trigger set to “free run”.
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

Test Setup



The loss between RF output port of the EUT and the input port of the Spectrum Analyzer has been taken into consideration.

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Test Data

For U-NII-1, U-NII-2A, U-NII-2C band

802.11a

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD with duty factor (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	3.61	3.52	8.71	11	PASS
44	5220	3.60	3.48	8.69	11	PASS
48	5240	3.93	3.68	8.96	11	PASS
52	5260	3.56	3.41	8.64	11	PASS
60	5300	3.90	3.84	9.02	11	PASS
64	5320	3.50	3.64	8.72	11	PASS
100	5500	2.90	2.59	7.90	9.05	PASS
116	5580	3.79	3.73	8.91	9.05	PASS
140	5700	2.70	2.93	7.97	9.05	PASS
144 (U-NII-2c Band)	5720	2.40	2.65	7.68	9.05	PASS

Note:

1. Method a) of power density measurement of KDB 662911 is using for calculating total power density.
Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1 band: Directional gain = 2.49 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2A band: Directional gain = 3.27 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2C band: Directional gain = 7.95 dBi > 6 dBi , so the limit shall be reduced.
3. Refer to section 6.6 for duty cycle spectrum plot.

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802.11ac (VHT20)

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD with duty factor (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	3.66	3.64	8.80	11	PASS
44	5220	3.70	3.85	8.93	11	PASS
48	5240	3.49	3.57	8.68	11	PASS
52	5260	3.69	3.48	8.74	11	PASS
60	5300	2.46	2.40	7.58	11	PASS
64	5320	3.60	3.84	8.87	11	PASS
100	5500	2.05	2.13	7.24	9.05	PASS
116	5580	3.89	3.74	8.97	9.05	PASS
140	5700	2.03	2.22	7.28	9.05	PASS
144 (U-NII-2c Band)	5720	2.46	2.28	7.52	9.05	PASS

Note:

1. Method a) of power density measurement of KDB 662911 is using for calculating total power density.
Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1 band: Directional gain = 2.49 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2A band: Directional gain = 3.27 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2C band: Directional gain = 7.95 dBi > 6 dBi , so the limit shall be reduced.
3. Refer to section 6.6 for duty cycle spectrum plot.

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802.11ac (VHT40)

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD with duty factor (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
38	5190	-4.52	-4.98	2.07	11	PASS
46	5230	2.21	2.30	9.06	11	PASS
54	5270	2.12	2.49	9.12	11	PASS
62	5310	-3.28	-3.23	3.55	11	PASS
102	5510	-2.01	-1.72	4.95	9.05	PASS
110	5550	2.49	1.93	9.03	9.05	PASS
134	5670	0.75	1.07	7.72	9.05	PASS
142 (U-NII-2c Band)	5710	1.24	1.14	8.00	9.05	PASS

Note:

1. Method a) of power density measurement of KDB 662911 is using for calculating total power density.
Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. For U-NII-1 band: Directional gain = 2.49 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2A band: Directional gain = 3.27 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2C band: Directional gain = 7.95 dBi > 6 dBi , so the limit shall be reduced.
3. Refer to section 6.6 for duty cycle spectrum plot.

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802.11ac (VHT80)

CHAN.	FREQ. (MHz)	PSD (dBm)		TOTAL PSD with duty factor (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
42	5210	-8.42	-8.20	-0.70	11	PASS
58	5290	-6.61	-6.95	0.83	11	PASS
106	5530	-7.24	-7.26	0.36	9.05	PASS
122	5610	-2.97	-3.11	4.57	9.05	PASS
138 (U-NII-2c Band)	5690	-2.89	-2.73	4.80	9.05	PASS

Note:

- Method a) of power density measurement of KDB 662911 is using for calculating total power density.
Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- For U-NII-1 band: Directional gain = 2.49 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2A band: Directional gain = 3.27 dBi < 6 dBi , so the limit does not need to reduced.
For U-NII-2C band: Directional gain = 7.95 dBi > 6 dBi , so the limit shall be reduced.
- Refer to section 6.6 for duty cycle spectrum plot.

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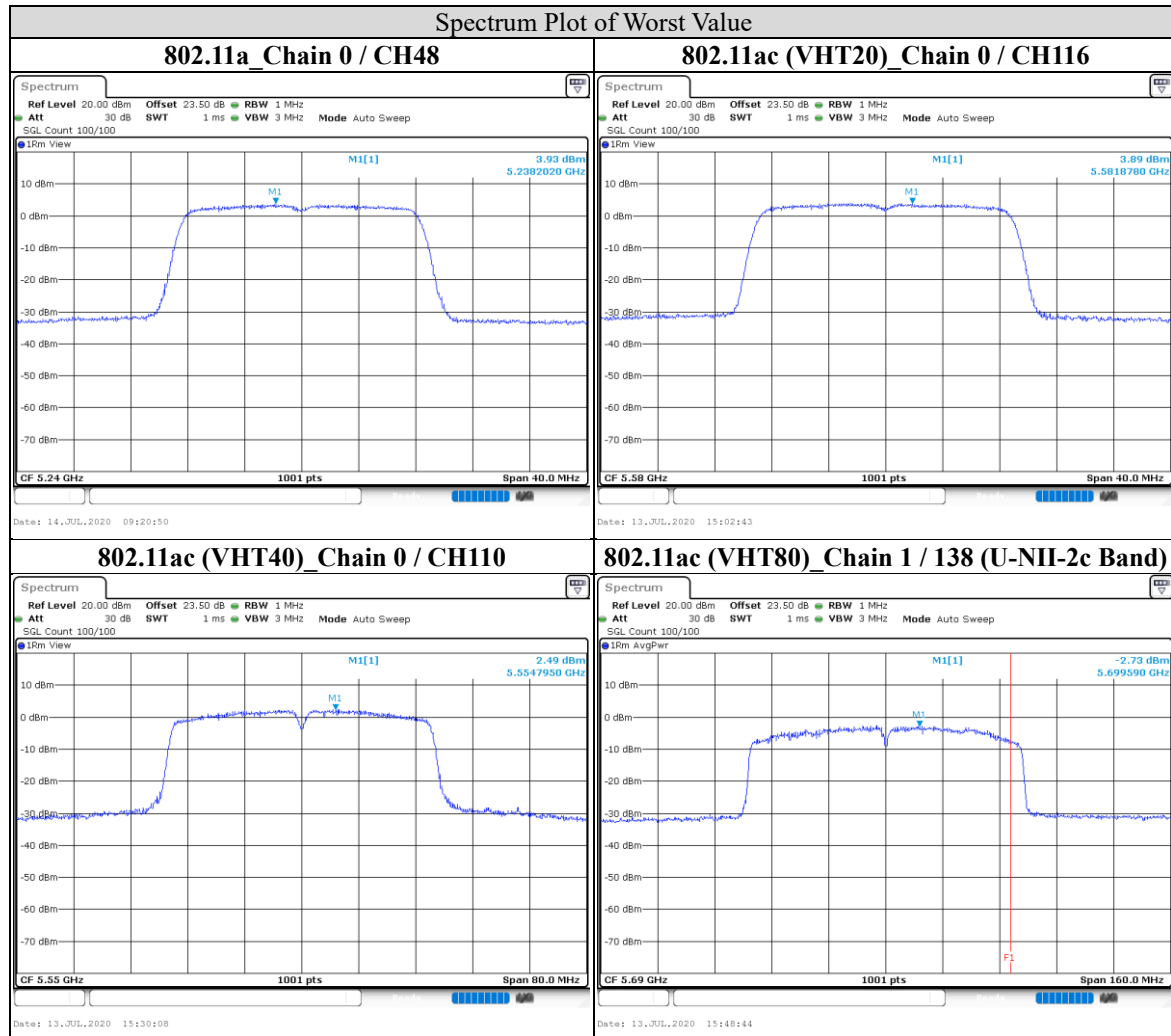
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Test report No. : 4789482589-US-R1-V0
Page : 47 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



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Doc No: 17-EM-F0878 / 5.0



For U-NII-3 band

802.11a

TX Chain	Channel	Frequency (MHz)	PSD w/o duty factor (dBm/500 kHz)	10 log (N=2) dB	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	144 (U-NII-3 Band)	5720	0.48	3.01	5.63	28.54	Pass
	149	5745	6.53	3.01	11.68	28.54	Pass
	157	5785	6.72	3.01	11.87	28.54	Pass
	165	5825	6.41	3.01	11.56	28.54	Pass
1	144 (U-NII-3 Band)	5720	-0.01	3.01	5.14	28.54	Pass
	149	5745	6.41	3.01	11.56	28.54	Pass
	157	5785	6.09	3.01	11.24	28.54	Pass
	165	5825	6.26	3.01	11.41	28.54	Pass

Note:

1. Directional gain = 7.46 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.

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802.11ac (VHT20)

TX Chain	Channel	Frequency (MHz)	PSD w/o duty factor (dBm/500 kHz)	10 log (N=2) dB	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	144 (U-NII-3 Band)	5720	-0.42	3.01	4.73	28.54	Pass
	149	5745	6.21	3.01	11.36	28.54	Pass
	157	5785	6.12	3.01	11.27	28.54	Pass
	165	5825	6.21	3.01	11.36	28.54	Pass
1	144 (U-NII-3 Band)	5720	-0.07	3.01	5.08	28.54	Pass
	149	5745	6.26	3.01	11.41	28.54	Pass
	157	5785	6.18	3.01	11.33	28.54	Pass
	165	5825	5.72	3.01	10.87	28.54	Pass

Note:

1. Directional gain = 7.46 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.

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802.11ac (VHT40)

TX Chain	Channel	Frequency (MHz)	PSD w/o duty factor (dBm/500 kHz)	10 log (N=2) dB	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	142 (U-NII-3 Band)	5710	-4.81	3.01	2.00	28.54	Pass
	151	5755	0.58	3.01	7.39	28.54	Pass
	159	5795	0.76	3.01	7.57	28.54	Pass
1	142 (U-NII-3 Band)	5710	-4.83	3.01	1.98	28.54	Pass
	151	5755	0.72	3.01	7.53	28.54	Pass
	159	5795	0.33	3.01	7.14	28.54	Pass

Note:

1. Directional gain = 7.46 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.



802.11ac (VHT80)

TX Chain	Channel	Frequency (MHz)	PSD w/o duty factor (dBm/500 kHz)	10 log (N=2) dB	Total PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	138 (U-NII-3 Band)	5690	-9.66	3.01	-2.06	28.54	Pass
	155	5775	-7.93	3.01	-0.33	28.54	Pass
1	138 (U-NII-3 Band)	5690	-9.97	3.01	-2.37	28.54	Pass
	155	5775	-8.06	3.01	-0.46	28.54	Pass

Note:

1. Directional gain = 7.46 dBi > 6 dBi , so the limit shall be reduced.
2. Refer to section 6.6 for duty cycle spectrum plot.

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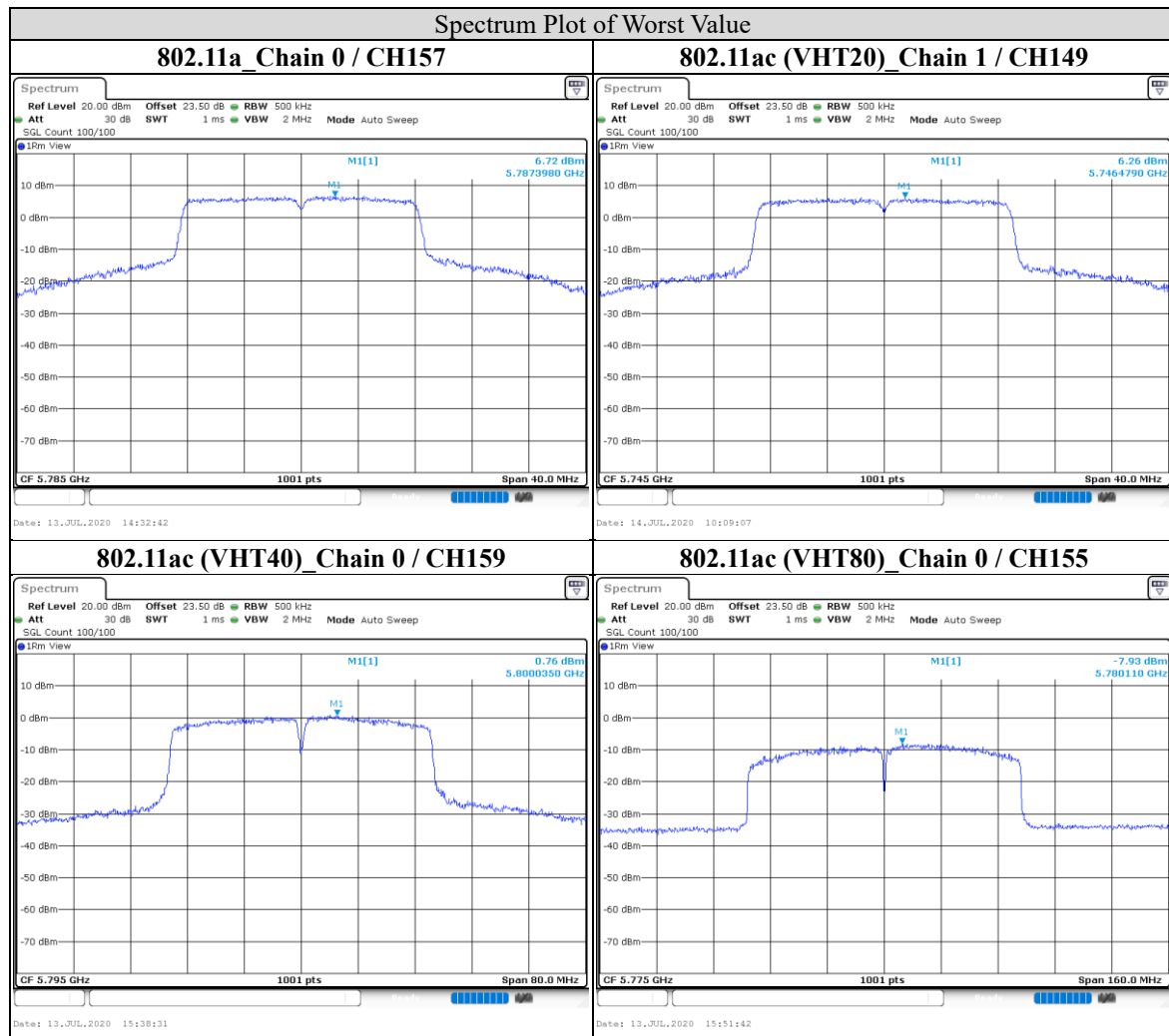
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Test report No. : 4789482589-US-R1-V0
Page : 52 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT



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9.6. Frequency Stability

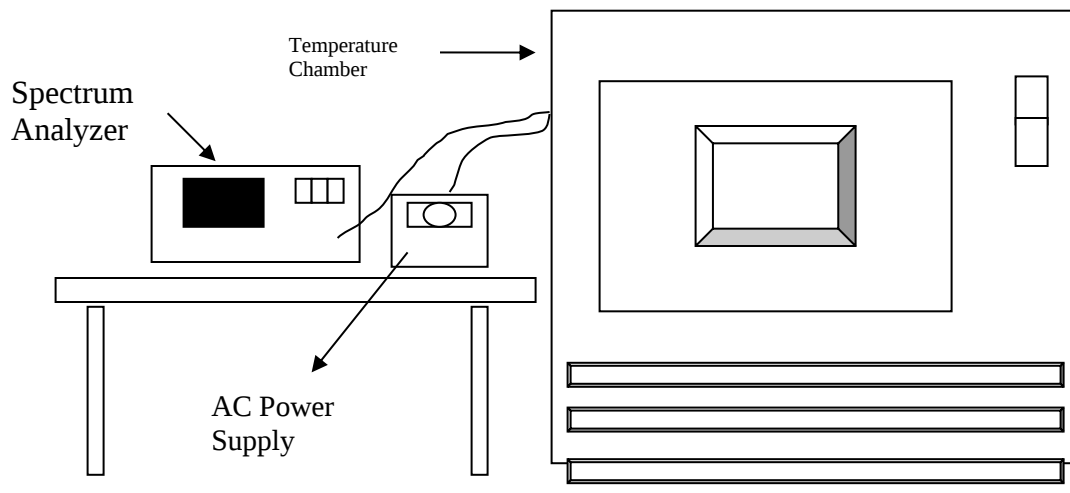
Requirements

The frequency of the carrier signal shall be maintained within band of operation.

Test procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

Test Setup



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Test Data

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)
70	120	5180.0667	12.87	5179.9793	-4.00	5179.9593	-7.85	5180.0671	12.95
60	120	5179.9732	-5.17	5179.9438	-10.85	5179.9295	-13.62	5179.9345	-12.64
50	120	5179.9426	-11.07	5179.9223	-15.01	5180.0268	5.18	5179.9570	-8.29
40	120	5180.0371	7.16	5180.0016	0.31	5179.9896	-2.00	5180.0527	10.17
30	120	5180.0611	11.79	5179.9716	-5.49	5180.0527	10.17	5180.0172	3.31
20	120	5179.9777	-4.30	5179.9509	-9.47	5180.0499	9.63	5179.9683	-6.13
10	120	5180.0120	2.31	5179.9255	-14.38	5179.9847	-2.96	5180.0122	2.36
0	120	5180.0075	1.44	5179.9844	-3.01	5180.0619	11.95	5179.9910	-1.74
-10	120	5180.0667	12.88	5180.0027	0.52	5179.9477	-10.10	5180.0614	11.85
-20	120	5180.0601	11.59	5180.0259	4.99	5180.0314	6.07	5179.9947	-1.02
-30	120	5179.9338	-12.78	5179.9499	-9.68	5180.0035	0.68	5180.0313	6.05
TEMP. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)	Measured Frequency (MHz)	Freq. Drift (ppm)
20	102	5179.9241	-14.65	5180.0736	14.21	5180.0532	10.27	5180.0349	6.73
20	138	5180.0642	12.39	5180.0093	1.79	5179.9768	-4.47	5180.0002	0.03

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9.7. Radiated Spurious Emission

Requirements

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequency(MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

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Limits of unwanted emission out of the restricted bands

Applicable To		Limit	
789033 D02 General UNII Test Procedure New Rules v02r01		Field Strength at 3m	
		PK:74 (dBμV/m)	AV:54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3m
5150~5250 MHz	15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2(dBμV/m) ^{*1} PK:105.2 (dBμV/m) ^{*2} PK: 110.8(dBμV/m) ^{*3} PK:122.2 (dBμV/m) ^{*4}
*1 beyond 75 MHz or more above of the band edge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.			

Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

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Doc No: 17-EM-F0878 / 5.0



Test Procedures

[For 9 kHz ~ 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 30MHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

[For above 30 MHz]

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

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Doc No: 17-EM-F0878 / 5.0



Note:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1GHz.

Configuration	Average	
	RBW	VBW
802.11a	1MHz	1 kHz
802.11ac (VHT20)		1 kHz
802.11ac (VHT40)		3 kHz
802.11ac (VHT80)		4 kHz

Note: Refer to section 6.6 for duty cycle.

- All modes of operation were investigated (includes all external accessories) and the worst-case emissions are reported.

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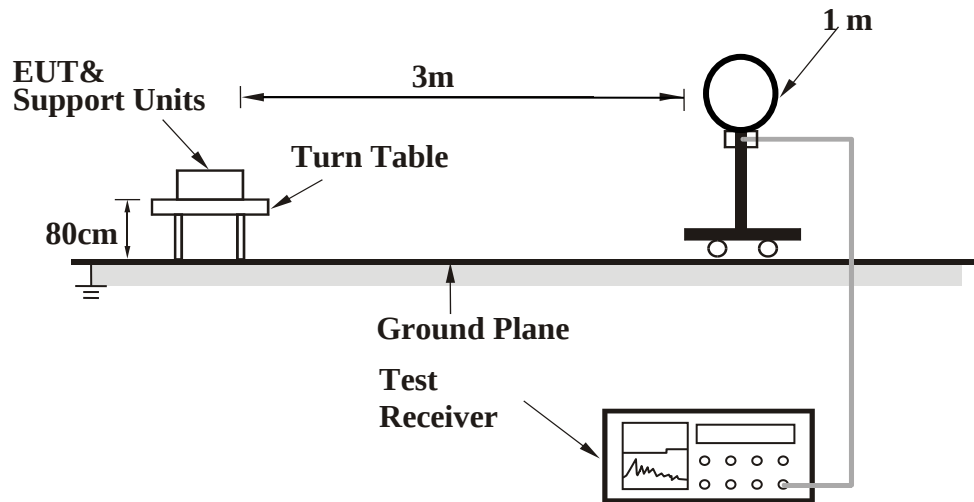
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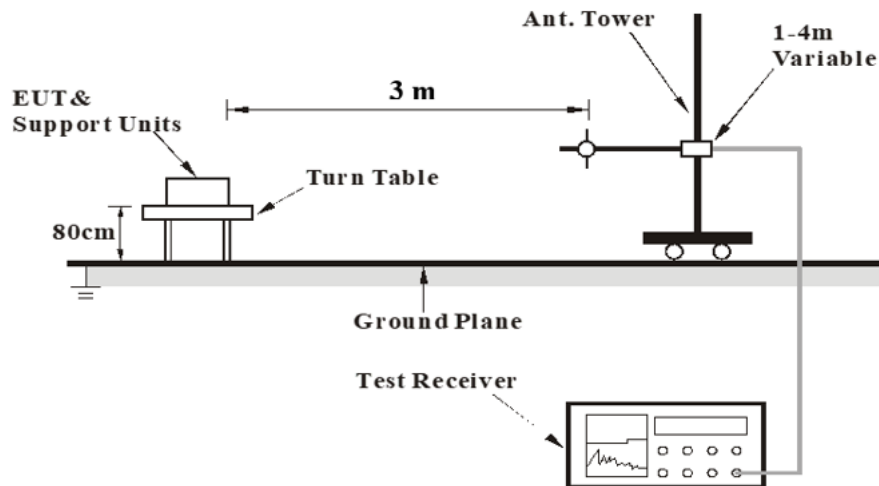
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Test Setup

<Frequency Range 9 kHz ~ 30 MHz>



<Frequency Range 30 MHz ~ 1 GHz >



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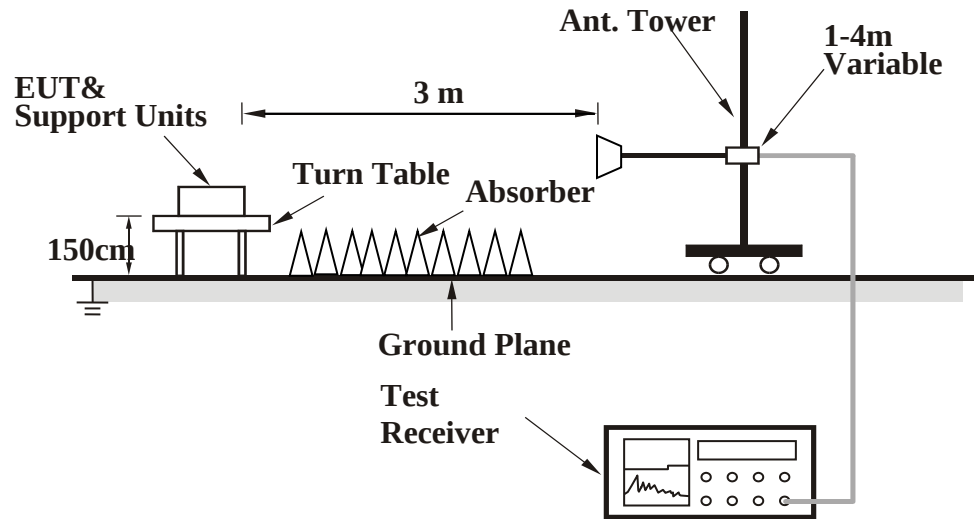
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<Frequency Range above 1 GHz>



For the actual test configuration, please refer to the Setup Configurations.

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Doc No: 17-EM-F0878 / 5.0



Test Data

Above 1GHz Data

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 36	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5069.6	44.24	9.91	54.15	74	-19.85	Peak
@	5180	91.8	10.11	101.91	-	-	Peak
-	5148.2	32.25	10.16	42.41	54	-11.59	Average
@	5180	85.46	10.11	95.57	-	-	Average
#	10360	38.95	12.16	51.11	68.2	-17.09	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5150	54.11	10.16	64.27	74	-9.73	Peak
@	5180	103.24	10.11	113.35	-	-	Peak
-	5150	40.35	10.16	50.51	54	-3.49	Average
@	5180	94.72	10.11	104.83	-	-	Average
#	10360	40.58	12.16	52.74	68.2	-15.46	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 62 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 44	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5131.4	43.86	10.12	53.98	74	-20.02	Peak
@	5220	93.03	9.9	102.93	-	-	Peak
-	5133.2	31.63	10.13	41.76	54	-12.24	Average
@	5220	81.98	9.9	91.88	-	-	Average
#	10440	36.51	12.46	48.97	68.2	-19.23	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5145.5	45.04	10.15	55.19	74	-18.81	Peak
@	5220	102.29	9.9	112.19	-	-	Peak
-	5136.5	33.03	10.13	43.16	54	-10.84	Average
@	5220	92.94	9.9	102.84	-	-	Average
#	10440	40.78	12.46	53.24	68.2	-14.96	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 63 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5143.1	43.74	10.15	53.89	74	-20.11	Peak
@	5240	90.65	9.7	100.35	-	-	Peak
-	5121.5	31.98	10.09	42.07	54	-11.93	Average
@	5240	83.27	9.7	92.97	-	-	Average
#	10480	36.96	12.6	49.56	68.2	-18.64	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5058.5	44.38	9.85	54.23	74	-19.77	Peak
@	5240	100.89	9.7	110.59	-	-	Peak
-	5122.4	34.24	10.09	44.33	54	-9.67	Average
@	5240	93.71	9.7	103.41	-	-	Average
#	10480	41.32	12.6	53.92	68.2	-14.28	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 64 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 52	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5260	91.68	9.6	101.28	-	-	Peak
-	5380.5	41.7	9.85	51.55	74	-22.45	Peak
@	5260	82.94	9.6	92.54	-	-	Average
-	5454	30.3	10.11	40.41	54	-13.59	Average
#	10520	37.22	12.66	49.88	68.2	-18.32	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5260	100.45	9.6	110.05	-	-	Peak
-	5403.9	42.52	9.99	52.51	74	-21.49	Peak
@	5260	93.1	9.6	102.7	-	-	Average
-	5382	31.72	9.86	41.58	54	-12.42	Average
#	10520	41.67	12.66	54.33	68.2	-13.87	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 65 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5300	89.4	9.53	98.93	-	-	Peak
-	5413.5	41.9	10.02	51.92	74	-22.08	Peak
@	5300	82.41	9.53	91.94	-	-	Average
-	5456.4	30.35	10.11	40.46	54	-13.54	Average
*	10600	37.02	12.55	49.57	74	-18.63	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5300	100.62	9.53	110.15	-	-	Peak
-	5440.5	42.03	10.08	52.11	74	-21.89	Peak
@	5300	91.39	9.53	100.92	-	-	Average
-	5382.6	31.15	9.87	41.02	54	-12.98	Average
*	10600	40.42	12.55	52.97	74	-15.23	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 66 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5320	91.19	9.58	100.77	-	-	Peak
-	5454	42.05	10.11	52.16	74	-21.84	Peak
@	5320	81.95	9.58	91.53	-	-	Average
-	5453.4	30.24	10.11	40.35	54	-13.65	Average
*	10640	36.48	12.61	49.09	74	-24.91	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5320	99.57	9.58	109.15	-	-	Peak
-	5351.4	45.68	9.67	55.35	74	-18.65	Peak
@	5320	89.89	9.58	99.47	-	-	Average
-	5350.2	31.69	9.66	41.35	54	-12.65	Average
*	10640	36.98	12.61	49.59	74	-24.41	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 67 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5427.65	29.23	10.05	39.28	54	-14.72	Average
-	5427.65	42.04	10.05	52.09	74	-21.91	Peak
#	5465.1	43.84	10.13	53.97	68.2	-14.23	Peak
@	5500	85.32	10.22	95.54	-	-	Average
@	5500	96.12	10.22	106.34	-	-	Peak
*	11000	36.64	13.08	49.72	74	-24.28	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5457.75	29.98	10.12	40.1	54	-13.9	Average
-	5457.75	42.56	10.12	52.68	74	-21.32	Peak
#	5465.1	47.03	10.13	57.16	68.2	-11.04	Peak
@	5500	90.31	10.22	100.53	-	-	Average
@	5500	100.25	10.22	110.47	-	-	Peak
*	11000	37.12	13.08	50.2	74	-23.8	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 68 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5426.6	29.88	10.04	39.92	54	-14.08	Average
-	5426.6	42.36	10.04	52.4	74	-21.6	Peak
#	5467.2	41.51	10.14	51.65	68.2	-16.55	Peak
@	5580	86.63	10.3	96.93	-	-	Average
@	5580	97.64	10.3	107.94	-	-	Peak
#	5733.2	42.86	10.63	53.49	68.2	-14.71	Peak
*	11160	37.33	13.02	50.35	74	-23.65	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5458.45	29.34	10.12	39.46	54	-14.54	Average
-	5458.45	42.68	10.12	52.8	74	-21.2	Peak
#	5461.6	42.68	10.12	52.8	68.2	-15.4	Peak
@	5580	90.16	10.3	100.46	-	-	Average
@	5580	100.56	10.3	110.86	-	-	Peak
#	5731.45	42.91	10.62	53.53	68.2	-14.67	Peak
*	11160	37.02	13.02	50.04	74	-23.96	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 69 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5700	84.96	10.4	95.36	-	-	Average
@	5700	95.83	10.4	106.23	-	-	Peak
#	5727.6	48.67	10.6	59.27	68.2	-8.93	Peak
*	11400	35.8	13.3	49.1	74	-24.9	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5700	90.28	10.4	100.68	-	-	Average
@	5700	100.52	10.4	110.92	-	-	Peak
#	5725.5	51.43	10.57	62	68.2	-6.2	Peak
*	11400	35.56	13.3	48.86	74	-25.14	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 70 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 144	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11440	35.63	13.4	49.03	74	-24.97	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11440	35.75	13.4	49.15	74	-24.85	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 71 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5627.5	43	10.34	53.34	68.2	-14.86	Peak
-	5721.5	56.31	10.55	66.86	114.22	-47.36	Peak
@	5745	86.41	10.72	97.13	-	-	Average
@	5745	97.99	10.72	108.71	-	-	Peak
*	11490	36.89	13.54	50.43	74	-23.57	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5580	44.68	10.3	54.98	68.2	-13.22	Peak
#	5725	69.43	10.57	80	122.2	-42.2	Peak
@	5745	94.37	10.72	105.09	-	-	Average
@	5745	105.05	10.72	115.77	-	-	Peak
*	11490	38.82	13.54	52.36	74	-21.64	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 72 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5586.5	42.97	10.3	53.27	68.2	-14.93	Peak
-	5715.5	42.31	10.5	52.81	109.54	-56.73	Peak
@	5785	88.81	10.78	99.59	-	-	Average
@	5785	99.62	10.78	110.4	-	-	Peak
-	5925	43.12	11.39	54.51	68.2	-13.69	Peak
#	5925.5	43.25	11.39	54.64	68.2	-13.56	Peak
*	11570	38.07	13.33	51.4	74	-22.6	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5577.5	43.38	10.3	53.68	68.2	-14.52	Peak
-	5712	44.5	10.48	54.98	108.56	-53.58	Peak
@	5785	92.82	10.78	103.6	-	-	Average
@	5785	103.24	10.78	114.02	-	-	Peak
-	5859.5	44.1	11.11	55.21	109.54	-54.33	Peak
#	5949	43.29	11.42	54.71	68.2	-13.49	Peak
*	11570	38.03	13.33	51.36	74	-22.64	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 73 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5825	88.79	10.91	99.7	-	-	Average
@	5825	99.12	10.91	110.03	-	-	Peak
-	5859.5	52.36	11.11	63.47	109.54	-46.07	Peak
#	5931	42.44	11.4	53.84	68.2	-14.36	Peak
*	11650	36.8	13.09	49.89	74	-24.11	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5825	92.64	10.91	103.55	-	-	Average
@	5825	103.28	10.91	114.19	-	-	Peak
-	5856	60.08	11.08	71.16	110.52	-39.36	Peak
#	5981	42.82	11.38	54.2	68.2	-14	Peak
*	11650	40.87	13.09	53.96	74	-20.04	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 74 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

802.11ac (VHT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 36	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5146.4	44.89	10.15	55.04	74	-18.96	Peak
@	5180	89.37	10.11	99.48	-	-	Peak
-	5149.7	31.88	10.16	42.04	54	-11.96	Average
@	5180	82.77	10.11	92.88	-	-	Average
#	10360	38.47	12.16	50.63	68.2	-17.57	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5148.8	56.88	10.16	67.04	74	-6.96	Peak
@	5180	101.36	10.11	111.47	-	-	Peak
-	5150	40.41	10.16	50.57	54	-3.43	Average
@	5180	92.05	10.11	102.16	-	-	Average
#	10360	40.99	12.16	53.15	68.2	-15.05	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 75 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 44	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5087	43.58	9.98	53.56	74	-20.44	Peak
@	5220	93.07	9.9	102.97	-	-	Peak
-	5125.4	31.78	10.1	41.88	54	-12.12	Average
@	5220	82.98	9.9	92.88	-	-	Average
#	10440	39.48	12.46	51.94	68.2	-16.26	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5148.5	44.27	10.16	54.43	74	-19.57	Peak
@	5220	101.58	9.9	111.48	-	-	Peak
-	5144.6	34.61	10.15	44.76	54	-9.24	Average
@	5220	93.12	9.9	103.02	-	-	Average
#	10440	41.11	12.46	53.57	68.2	-14.63	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 76 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5133.8	43.76	10.13	53.89	74	-20.11	Peak
@	5240	92.13	9.7	101.83	-	-	Peak
-	5143.7	32.02	10.15	42.17	54	-11.83	Average
@	5240	82.95	9.7	92.65	-	-	Average
#	10480	39.61	12.6	52.21	68.2	-15.99	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5140.7	45.23	10.13	55.36	74	-18.64	Peak
@	5240	100.9	9.7	110.6	-	-	Peak
-	5122.7	33.48	10.1	43.58	54	-10.42	Average
@	5240	92.39	9.7	102.09	-	-	Average
#	10480	41.99	12.6	54.59	68.2	-13.61	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 77 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 52	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5260	91.27	9.6	100.87	-	-	Peak
-	5392.2	41.83	9.92	51.75	74	-22.25	Peak
@	5260	82.44	9.6	92.04	-	-	Average
-	5378.4	30.44	9.84	40.28	54	-13.72	Average
#	10520	37.71	12.66	50.37	68.2	-17.83	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5260	101.78	9.6	111.38	-	-	Peak
-	5459.7	43.07	10.12	53.19	74	-20.81	Peak
@	5260	91.84	9.6	101.44	-	-	Average
-	5379.3	31.32	9.85	41.17	54	-12.83	Average
#	10520	39.85	12.66	52.51	68.2	-15.69	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 78 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5300	87.28	9.53	96.81	-	-	Peak
-	5436.9	42	10.06	52.06	74	-21.94	Peak
@	5300	80.81	9.53	90.34	-	-	Average
-	5456.7	30.16	10.11	40.27	54	-13.73	Average
*	10600	36.71	12.55	49.26	68.2	-18.94	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5300	101.19	9.53	110.72	-	-	Peak
-	5382	43.45	9.86	53.31	74	-20.69	Peak
@	5300	89.49	9.53	99.02	-	-	Average
-	5372.7	31.85	9.8	41.65	54	-12.35	Average
*	10600	38.9	12.55	51.45	68.2	-16.75	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 79 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5320	89.29	9.58	98.87	-	-	Peak
-	5433.3	42.07	10.06	52.13	74	-21.87	Peak
@	5320	81.37	9.58	90.95	-	-	Average
-	5459.7	30.18	10.12	40.3	54	-13.7	Average
*	10640	36.63	12.61	49.24	74	-24.76	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5320	101.57	9.58	111.15	-	-	Peak
-	5352.9	54.08	9.68	63.76	74	-10.24	Peak
@	5320	88.87	9.58	98.45	-	-	Average
-	5350.5	34.46	9.66	44.12	54	-9.88	Average
*	10640	36.49	12.61	49.1	74	-24.9	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 80 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5458.8	29.57	10.12	39.69	54	-14.31	Average
-	5458.8	41.67	10.12	51.79	74	-22.21	Peak
#	5464.05	41.51	10.13	51.64	68.2	-16.56	Peak
@	5500	82.68	10.22	92.9	-	-	Average
@	5500	94.88	10.22	105.1	-	-	Peak
*	11000	35.87	13.08	48.95	74	-25.05	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5428.35	29.31	10.05	39.36	54	-14.64	Average
-	5428.35	42.57	10.05	52.62	74	-21.38	Peak
#	5469.65	45.15	10.15	55.3	68.2	-12.9	Peak
@	5500	86.25	10.22	96.47	-	-	Average
@	5500	97.47	10.22	107.69	-	-	Peak
*	11000	36.38	13.08	49.46	74	-24.54	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 81 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5450.05	29.46	10.1	39.56	54	-14.44	Average
-	5450.05	41.94	10.1	52.04	74	-21.96	Peak
#	5464.4	41	10.13	51.13	68.2	-17.07	Peak
@	5580	83.92	10.3	94.22	-	-	Average
@	5580	95	10.3	105.3	-	-	Peak
#	5739.5	42.81	10.68	53.49	68.2	-14.71	Peak
*	11160	38.24	13.02	51.26	74	-22.74	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5442.35	30.12	10.08	40.2	54	-13.8	Average
-	5442.35	42.35	10.08	52.43	74	-21.57	Peak
#	5463.7	42.48	10.13	52.61	68.2	-15.59	Peak
@	5580	92.12	10.3	102.42	-	-	Average
@	5580	101.04	10.3	111.34	-	-	Peak
#	5734.95	42.66	10.64	53.3	68.2	-14.9	Peak
*	11160	37.43	13.02	50.45	74	-23.55	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 82 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5700	82.82	10.4	93.22	-	-	Average
@	5700	93.41	10.4	103.81	-	-	Peak
-	5725.5	46.77	10.57	57.34	68.2	-10.86	Peak
*	11400	35.58	13.3	48.88	74	-25.12	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5700	88.98	10.4	99.38	-	-	Average
@	5700	99.78	10.4	110.18	-	-	Peak
#	5727.95	50.16	10.6	60.76	68.2	-7.44	Peak
*	11400	36.28	13.3	49.58	74	-24.42	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 83 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 144	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11440	35.23	13.4	48.63	74	-25.37	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11440	35.13	13.4	48.53	74	-25.47	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 84 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 149	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5641	42.81	10.34	53.15	68.2	-15.05	Peak
-	5724	56.79	10.56	67.35	119.92	-52.57	Peak
@	5745	84.49	10.72	95.21	-	-	Average
@	5745	95.81	10.72	106.53	-	-	Peak
*	11490	37.54	13.54	51.08	74	-22.92	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5538.5	42.43	10.25	52.68	68.2	-15.52	Peak
-	5724.5	69.47	10.57	80.04	121.06	-41.02	Peak
@	5745	92.1	10.72	102.82	-	-	Average
@	5745	101.89	10.72	112.61	-	-	Peak
*	11490	39.32	13.54	52.86	74	-21.14	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 85 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 157	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5591.5	42.94	10.3	53.24	68.2	-14.96	Peak
-	5724	42.32	10.56	52.88	119.92	-67.04	Peak
@	5785	84.96	10.78	95.74	-	-	Average
@	5785	95.37	10.78	106.15	-	-	Peak
-	5866	43.04	11.14	54.18	107.72	-53.54	Peak
#	5949	42.45	11.42	53.87	68.2	-14.33	Peak
*	11570	37.52	13.33	50.85	74	-23.15	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5541.5	42.33	10.26	52.59	68.2	-15.61	Peak
-	5705.5	43.9	10.43	54.33	106.74	-52.41	Peak
@	5785	93.71	10.78	104.49	-	-	Average
@	5785	103.32	10.78	114.1	-	-	Peak
-	5873	44.38	11.19	55.57	105.76	-50.19	Peak
#	5942	43.1	11.41	54.51	68.2	-13.69	Peak
*	11570	38.18	13.33	51.51	74	-22.49	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 86 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 165	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5825	88.73	10.91	99.64	-	-	Average
@	5825	99.55	10.91	110.46	-	-	Peak
-	5853	53.06	11.06	64.12	115.36	-51.24	Peak
#	5935.5	42.46	11.4	53.86	68.2	-14.34	Peak
*	11650	37.74	13.09	50.83	74	-23.17	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5825	93.17	10.91	104.08	-	-	Average
@	5825	102.68	10.91	113.59	-	-	Peak
-	5851	59.09	11.05	70.14	119.92	-49.78	Peak
#	5950.5	42.3	11.42	53.72	68.2	-14.48	Peak
*	11650	38.95	13.09	52.04	74	-21.96	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 87 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

802.11ac (VHT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5147.3	47.49	10.15	57.64	74	-16.36	Peak
@	5190	83.5	10.1	93.6	-	-	Peak
-	5149.4	32.78	10.16	42.94	54	-11.06	Average
@	5190	75.52	10.1	85.62	-	-	Average
#	10380	36.86	12.24	49.1	68.2	-19.1	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5146.4	56.48	10.15	66.63	74	-7.37	Peak
@	5190	95.92	10.1	106.02	-	-	Peak
-	5149.7	40.81	10.16	50.97	54	-3.03	Average
@	5190	87.58	10.1	97.68	-	-	Average
#	10380	37	12.24	49.24	68.2	-18.96	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 88 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 46	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5060.6	43.39	9.86	53.25	74	-20.75	Peak
@	5230	87.9	9.8	97.7	-	-	Peak
-	5106.5	32.23	10.06	42.29	54	-11.71	Average
@	5230	80.77	9.8	90.57	-	-	Average
#	10460	36.64	12.53	49.17	68.2	-19.03	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5147.6	49.55	10.16	59.71	74	-14.29	Peak
@	5230	98.7	9.8	108.5	-	-	Peak
-	5149.7	36.28	10.16	46.44	54	-7.56	Average
@	5230	90.8	9.8	100.6	-	-	Average
#	10460	41.08	12.53	53.61	68.2	-14.59	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 89 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 54	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5270	88.69	9.58	98.27	-	-	Peak
-	5407.5	42.55	9.99	52.54	74	-21.46	Peak
@	5270	79.66	9.58	89.24	-	-	Average
-	5458.5	30.45	10.12	40.57	54	-13.43	Average
#	10540	37.93	12.62	50.55	68.2	-17.65	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5270	99.07	9.58	108.65	-	-	Peak
-	5362.5	46.06	9.74	55.8	74	-18.2	Peak
@	5270	90.86	9.58	100.44	-	-	Average
-	5353.2	33.79	9.68	43.47	54	-10.53	Average
#	10540	41.35	12.62	53.97	68.2	-14.23	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 90 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 62	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5310	79.69	9.56	89.25	-	-	Peak
-	5451.3	41.68	10.1	51.78	74	-22.22	Peak
@	5310	77.03	9.56	86.59	-	-	Average
-	5350.2	33.5	9.66	43.16	54	-10.84	Average
*	10620	35.89	12.57	48.46	74	-25.54	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5310	96.43	9.56	105.99	-	-	Peak
-	5351.7	54.7	9.67	64.37	74	-9.63	Peak
@	5310	87.37	9.56	96.93	-	-	Average
-	5350.5	41.32	9.66	50.98	54	-3.02	Average
*	10620	36.78	12.57	49.35	74	-24.65	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 91 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 102	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5459.85	29.32	10.12	39.44	54	-14.56	Average
-	5459.85	41.35	10.12	51.47	74	-22.53	Peak
#	5469.65	43.17	10.15	53.32	68.2	-14.88	Peak
@	5510	75.99	10.23	86.22	-	-	Average
@	5510	87.9	10.23	98.13	-	-	Peak
*	11020	35.4	13.09	48.49	74	-25.51	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5459.5	31.29	10.12	41.41	54	-12.59	Average
-	5459.5	44.06	10.12	54.18	74	-19.82	Peak
#	5466.85	50.59	10.14	60.73	68.2	-7.47	Peak
@	5510	82.1	10.23	92.33	-	-	Average
@	5510	93.28	10.23	103.51	-	-	Peak
*	11020	35.39	13.09	48.48	74	-25.52	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 92 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 110	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5430.1	28.72	10.05	38.77	54	-15.23	Average
-	5430.1	42.11	10.05	52.16	74	-21.84	Peak
#	5463.35	45.98	10.13	56.11	68.2	-12.09	Peak
@	5550	83.33	10.27	93.6	-	-	Average
@	5550	94.7	10.27	104.97	-	-	Peak
#	5730.4	41.3	10.61	51.91	68.2	-16.29	Peak
*	11100	36.4	13.16	49.56	74	-24.44	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5456.35	31.13	10.11	41.24	54	-12.76	Average
-	5456.35	45.65	10.11	55.76	74	-18.24	Peak
#	5465.8	50.18	10.13	60.31	68.2	-7.89	Peak
@	5550	87.62	10.27	97.89	-	-	Average
@	5550	98.51	10.27	108.78	-	-	Peak
#	5725.15	41.88	10.57	52.45	68.2	-15.75	Peak
*	11100	36.65	13.16	49.81	74	-24.19	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 93 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 134	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5670	82.27	10.38	92.65	-	-	Average
@	5670	93.84	10.38	104.22	-	-	Peak
#	5735.65	47.84	10.65	58.49	68.2	-9.71	Peak
*	11340	35.6	13.13	48.73	74	-25.27	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5670	87.01	10.38	97.39	-	-	Average
@	5670	97.07	10.38	107.45	-	-	Peak
#	5737.05	53.71	10.66	64.37	68.2	-3.83	Peak
*	11340	36.16	13.13	49.29	74	-24.71	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 94 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 142	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11420	35.92	13.35	49.27	74	-24.73	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11420	35.81	13.35	49.16	74	-24.84	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 95 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 151	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5625.5	44.19	10.34	54.53	68.2	-13.67	Peak
-	5720.5	60.42	10.54	70.96	111.94	-40.98	Peak
@	5755	82.01	10.75	92.76	-	-	Average
@	5755	93.93	10.75	104.68	-	-	Peak
*	11510	36.39	13.54	49.93	74	-24.07	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5645	46.18	10.35	56.53	68.2	-11.67	Peak
-	5714	67.4	10.49	77.89	109.12	-31.23	Peak
@	5755	88.09	10.75	98.84	-	-	Average
@	5755	98.93	10.75	109.68	-	-	Peak
*	11510	35.82	13.54	49.36	74	-24.64	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 96 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 159	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5620	42.54	10.33	52.87	68.2	-15.33	Peak
-	5706	43.64	10.44	54.08	106.88	-52.8	Peak
@	5795	83.82	10.79	94.61	-	-	Average
@	5795	94.61	10.79	105.4	-	-	Peak
-	5851	52.08	11.05	63.13	119.92	-56.79	Peak
#	5930	42.31	11.4	53.71	68.2	-14.49	Peak
*	11590	36.26	13.25	49.51	74	-24.49	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5643.5	43.45	10.35	53.8	68.2	-14.4	Peak
-	5723.5	50.04	10.56	60.6	118.78	-58.18	Peak
@	5795	86.35	10.79	97.14	-	-	Average
@	5795	97.89	10.79	108.68	-	-	Peak
-	5851	51.75	11.05	62.8	119.92	-57.12	Peak
#	5975.5	43.04	11.39	54.43	68.2	-13.77	Peak
*	11590	35.37	13.25	48.62	74	-25.38	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 97 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5126	43.02	10.1	53.12	74	-20.88	Peak
@	5210	80.57	9.99	90.56	-	-	Peak
-	5147.9	32.2	10.16	42.36	54	-11.64	Average
@	5210	69.4	9.99	79.39	-	-	Average
#	10420	36.27	12.39	48.66	68.2	-19.54	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5144.9	50.1	10.15	60.25	74	-13.75	Peak
@	5210	89.77	9.99	99.76	-	-	Peak
-	5148.2	40.62	10.16	50.78	54	-3.22	Average
@	5210	80.86	9.99	90.85	-	-	Average
#	10420	36.71	12.39	49.1	68.2	-19.1	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 98 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 58	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5290	78	9.55	87.55	-	-	Peak
-	5446.2	41.71	10.09	51.8	74	-22.2	Peak
@	5290	73.09	9.55	82.64	-	-	Average
-	5358	31.9	9.71	41.61	54	-12.39	Average
#	10580	36.47	12.57	49.04	68.2	-19.16	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
@	5290	91.04	9.55	100.59	-	-	Peak
-	5355	48.17	9.69	57.86	74	-16.14	Peak
@	5290	80.23	9.55	89.78	-	-	Average
-	5353.8	37.01	9.68	46.69	54	-7.31	Average
#	10580	36.15	12.57	48.72	68.2	-19.48	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 99 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 106	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5444.1	29.63	10.09	39.72	54	-14.28	Average
-	5444.1	44.06	10.09	54.15	74	-19.85	Peak
#	5466.15	48.03	10.13	58.16	68.2	-10.04	Peak
@	5530	75.82	10.24	86.06	-	-	Average
@	5530	86.91	10.24	97.15	-	-	Peak
*	11060	35.44	13.13	48.57	74	-25.43	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5459.15	32.21	10.12	42.33	54	-11.67	Average
-	5459.15	49.53	10.12	59.65	74	-14.35	Peak
#	5463.35	48.82	10.13	58.95	68.2	-9.25	Peak
@	5530	79.96	10.24	90.2	-	-	Average
@	5530	90.86	10.24	101.1	-	-	Peak
*	11060	36.59	13.13	49.72	74	-24.28	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 100 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 122	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5454.95	29.18	10.11	39.29	54	-14.71	Average
-	5454.95	42.54	10.11	52.65	74	-21.35	Peak
#	5468.25	42.36	10.15	52.51	68.2	-15.69	Peak
@	5610	79.82	10.32	90.14	-	-	Average
@	5610	90.28	10.32	100.6	-	-	Peak
#	5726.2	45.83	10.59	56.42	68.2	-11.78	Peak
*	11220	36.09	12.95	49.04	74	-24.96	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	5452.85	29.63	10.11	39.74	54	-14.26	Average
-	5452.85	43.51	10.11	53.62	74	-20.38	Peak
#	5468.6	46.54	10.15	56.69	68.2	-11.51	Peak
@	5610	82.89	10.32	93.21	-	-	Average
@	5610	94.38	10.32	104.7	-	-	Peak
#	5735.3	51.53	10.65	62.18	68.2	-6.02	Peak
*	11220	36.14	12.95	49.09	74	-24.91	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 101 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 138	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11380	35.45	13.23	48.68	74	-25.32	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
*	11380	35.78	13.23	49.01	74	-24.99	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. " * ": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

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Test report No. : 4789482589-US-R1-V0
Page : 102 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

EUT Test Condition		Measurement Detail	
Channel	Channel 155	Frequency Range	1 GHz ~ 40 GHz

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5644	45.21	10.35	55.56	68.2	-12.64	Peak
-	5686.5	54.67	10.39	65.06	95.24	-30.18	Peak
@	5775	78.62	10.77	89.39	-	-	Average
@	5775	89.59	10.77	100.36	-	-	Peak
-	5851	53.5	11.05	64.55	119.92	-55.37	Peak
#	5996.5	41.99	11.37	53.36	68.2	-14.84	Peak
*	11550	35.91	13.39	49.3	74	-24.7	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
#	5649	47.67	10.35	58.02	68.2	-10.18	Peak
-	5717.5	61.93	10.52	72.45	110.1	-37.65	Peak
@	5775	83.24	10.77	94.01	-	-	Average
@	5775	94.57	10.77	105.34	-	-	Peak
-	5856.5	57.42	11.08	68.5	110.38	-41.88	Peak
#	5928.5	43.2	11.4	54.6	68.2	-13.6	Peak
*	11550	35.92	13.39	49.31	74	-24.69	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. "@": Fundamental Frequency.
5. "#": The radiated frequency is out of the restricted band.
6. "*": The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
7. The other emission levels were very low against the limit.

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9 kHz ~ 30 MHz Data

For 9 kHz to 30 MHz radiated emission have performed all modes of operation were investigated. The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

No non-compliance noted:

KDB 414788 D01 OATS and Chamber Correlation Justification

- Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

- OATs and chamber correlation testing had been performed and chamber measured test results is the worst case test result.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30m open area test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

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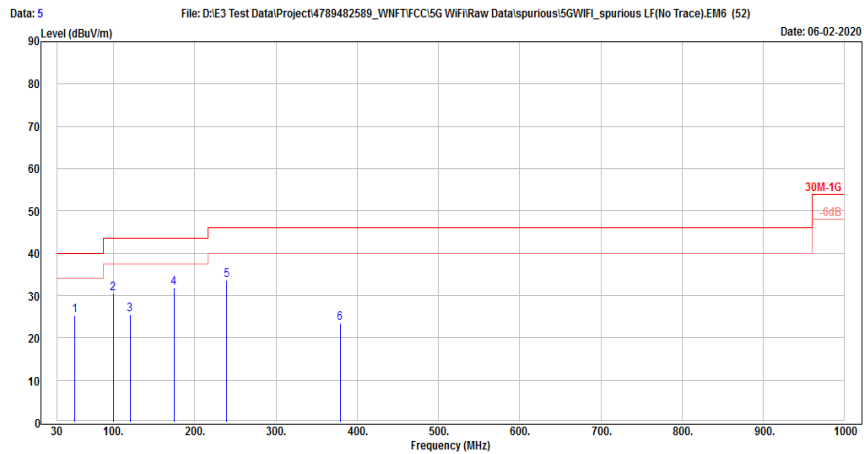


30 MHz ~ 1 GHz Data

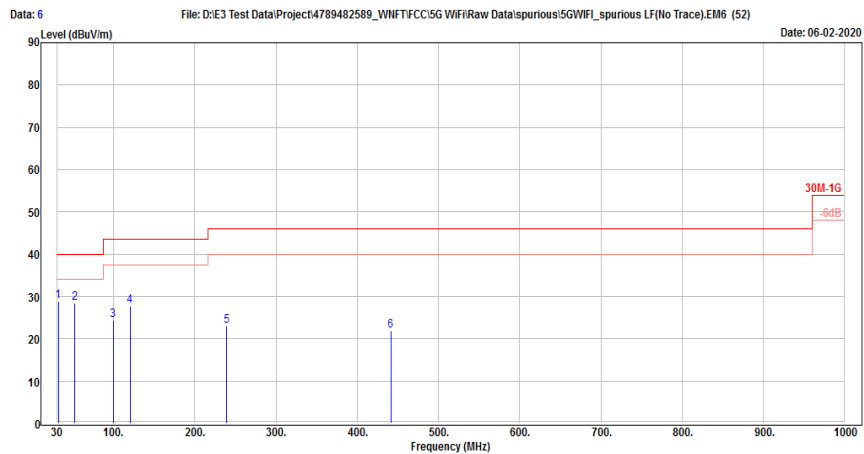
802.11ac (VHT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	30 MHz ~ 1 GHz

Horizontal



Vertical



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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 105 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

Antenna Polarity & Test Distance: Horizontal at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	52.31	40.3	-15.02	25.28	40	-14.72	Peak
-	99.84	50.34	-19.78	30.56	43.5	-12.94	Peak
-	120.21	42.86	-17.47	25.39	43.5	-18.11	Peak
-	174.53	46.91	-15.18	31.73	43.5	-11.77	Peak
-	239.52	49.38	-15.81	33.57	46	-12.43	Peak
-	379.2	35.24	-11.68	23.56	46	-22.44	Peak
Antenna Polarity & Test Distance: Vertical at 3 m							
Notation	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
-	31.94	44.99	-16.04	28.95	40	-11.05	Peak
-	52.31	43.44	-15.02	28.42	40	-11.58	Peak
-	99.84	44.15	-19.78	24.37	43.5	-19.13	Peak
-	120.21	45.18	-17.47	27.71	43.5	-15.79	Peak
-	239.52	38.75	-15.81	22.94	46	-23.06	Peak
-	441.28	31.87	-10.09	21.78	46	-24.22	Peak

Remarks:

1. Result value (dBuV/m) = Reading value (dBuV/m) + Correction Factor (dB/m).
2. Margin(dB) = Result value (dBuV/m) - Limit value (dBuV/m).
3. Correction Factor (dB/m) = Antenna Factor (dBuV/m) + Cable Loss (dB) - Preamp Factor (dB).
4. The peak result complies with QP limit, QP result is deemed to comply with QP limit.
5. The other emission levels were very low against the limit.

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Doc No: 17-EM-F0878 / 5.0



9.8. AC Power Line Conducted Emission

Requirements

Frequency (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

Test Procedures

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

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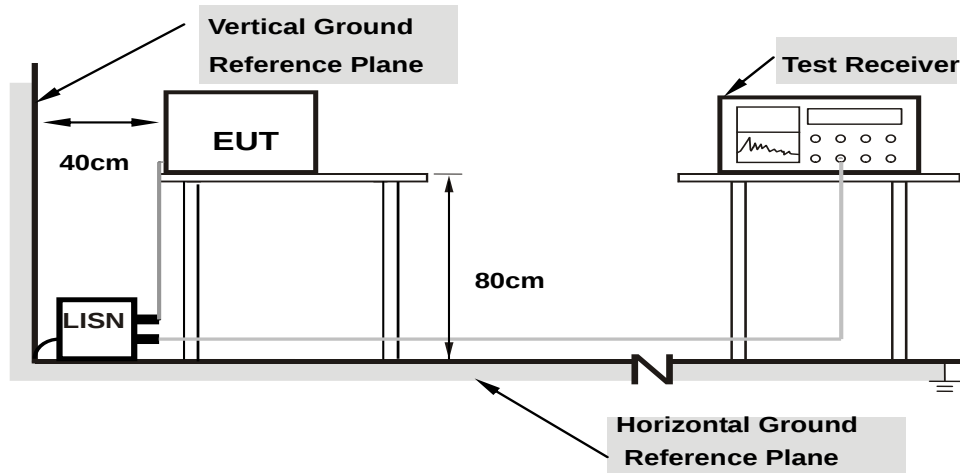
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Doc No: 17-EM-F0878 / 5.0



Test Setup



Note: 1.Support units were connected to second LISN.

For the actual test configuration, please refer to the Setup Configurations.

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Doc No: 17-EM-F0878 / 5.0

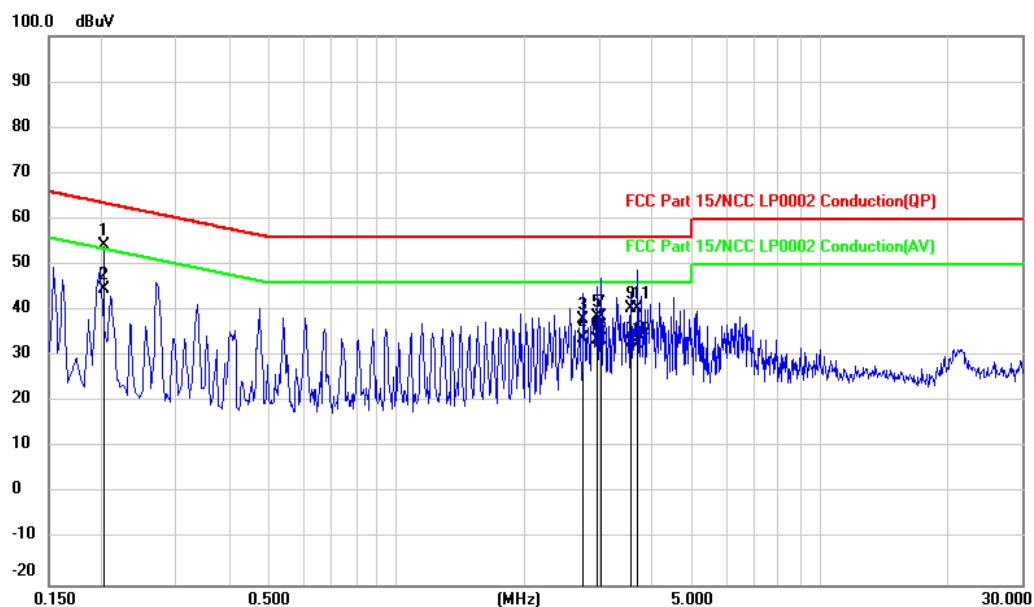


Test Data

802.11ac (VHT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 48	Frequency Range	150 kHz ~ 30 MHz

Phase of Power : Line (L)



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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 109 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.2025	34.87	19.47	54.34	63.51	-9.17	QP
2	0.2025	25.26	19.47	44.73	53.51	-8.78	AVG
3	2.7644	18.47	19.55	38.02	56.00	-17.98	QP
4	2.7644	14.23	19.55	33.78	46.00	-12.22	AVG
5	2.9670	19.21	19.55	38.76	56.00	-17.24	QP
6	2.9670	14.02	19.55	33.57	46.00	-12.43	AVG
7	3.0348	19.21	19.55	38.76	56.00	-17.24	QP
8	3.0348	13.92	19.55	33.47	46.00	-12.53	AVG
9	3.5749	21.00	19.58	40.58	56.00	-15.42	QP
10	3.5749	13.24	19.58	32.82	46.00	-13.18	AVG
11	3.7102	20.96	19.58	40.54	56.00	-15.46	QP
12	3.7102	13.10	19.58	32.68	46.00	-13.32	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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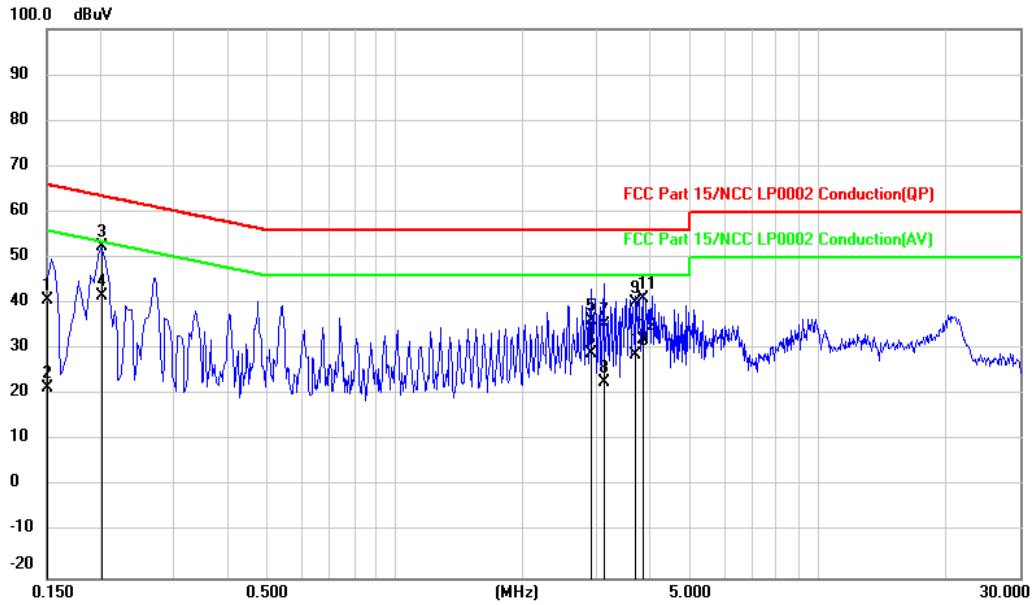
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Phase of Power : Neutral (N)



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Doc No: 17-EM-F0878 / 5.0



Test report No. : 4789482589-US-R1-V0
Page : 111 of 148
Issued date : Jul. 16, 2020
FCC ID : RYK-WNFT237ACNBT

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	dB	(dBuV)	(dBuV)	(dB)	
1	0.1505	21.17	19.47	40.64	65.97	-25.33	QP
2	0.1505	2.00	19.47	21.47	55.97	-34.50	AVG
3	0.2031	32.84	19.48	52.32	63.48	-11.16	QP
4	0.2031	22.29	19.48	41.77	53.48	-11.71	AVG
5	2.9044	16.57	19.56	36.13	56.00	-19.87	QP
6	2.9044	9.62	19.56	29.18	46.00	-16.82	AVG
7	3.1073	15.93	19.57	35.50	56.00	-20.50	QP
8	3.1073	3.13	19.57	22.70	46.00	-23.30	AVG
9	3.7153	20.63	19.59	40.22	56.00	-15.78	QP
10	3.7153	9.10	19.59	28.69	46.00	-17.31	AVG
11	3.8508	21.43	19.59	41.02	56.00	-14.98	QP
12	3.8508	12.33	19.59	31.92	46.00	-14.08	AVG

Remarks:

1. Result value (dBuV) = Reading value (dBuV) + Correction Factor (dB)
2. Margin(dB) = Result value (dBuV) - Limit value (dBuV)
3. Correction Factor(dB) = Insertion loss(dB) + Cable loss(dB)
4. The other emission levels were very low against the limit.

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