Audix Technology Corp.
No. 491, Zhongfu Rd., Linkou Dist.,
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Tel: +886 2 26099301
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FCC 15.407 NII
5GHz Test Report

for

AAEON Technology Inc.

5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien Dist, New Taipei City, 231, Taiwan, R.O.C.

Product Name	**:**	**IOTAS Connect 3**
Model Name	**:**	**(1)ITS-GW01-A10-C001** **(2)ITS-GW01-A10-C002**
Brand		**IOTAS**
FCC ID	**:**	**OHB-A010001**

Prepared by:	**:**	**AUDIX Technology Corporation,** **EMC Department**

Testing Laboratory
1724

TESTING
NVLAP LAB CODE 200077-0

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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TEST REPORT

Applicant	:	AAEON Technology Inc.
Manufacturer	:	AAEON Technology Inc.
EUT Description		
(1) Product	:	IOTAS Connect 3
(2) Model	:	(1)ITS-GW01-A10-C001 (2)ITS-GW01-A10-C002
(3) Brand	:	IOTAS
(4) Power Supply	:	DC 5V, 3A

Applicable Standards:

47CFRFCC Part 15 Subpart E
ANSI C63.10:2013

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.
Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2021. 04. 09

Reviewed by: Annie Yu (Annie Yu/Administrator)

Approved by: Johnny Hsueh (Johnny Hsueh/Section Manager)

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1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2021. 04. 09	Original Report	EM-F210208

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**PASS**
15.205/15.209	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.407(a)(5)/15.407(e)	26dB/6dBBandwidth	**PASS**
15.407(a)	Maximum Output Power	**PASS**
15.407(b)	Conducted Band Edges	**PASS**
15.407(a)	Power Spectral Density	**PASS**
15.407	Frequency Stability	**PASS**
15.203	Antenna Requirement	**Compliance**
Note: The uncertainties value is not used in determining the result.		

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3. GENERAL INFORMATION

3.1. Description of Application

<table>
<tr><td>Applicant</td><td>AAEON Technology Inc.
5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien Dist, New Taipei City, 231, Taiwan, R.O.C.</td></tr>
<tr><td>Manufacturer</td><td>AAEON Technology Inc.
5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien Dist, New Taipei City, 231, Taiwan, R.O.C.</td></tr>
<tr><td>Product</td><td>IOTAS Connect 3</td></tr>
<tr><td>Brand</td><td>IOTAS</td></tr>
<tr><td>Model</td><td>(1)ITS-GW01-A10-C001 (2)ITS-GW01-A10-C002
The difference between models is as following, and the difference has no influence on RF function. The model ITS-GW01-A10-C002 was tested in this report.
<table>
<tr><th>Model / Difference</th><th>ITS-GW01-A10-C001</th><th>ITS-GW01-A10-C002</th></tr>
<tr><td>LTE Module</td><td>Without</td><td>With</td></tr>
</table></td></tr>
</table>

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3.2. Description of EUT

Test Model	ITS-GW01-A10-C002
Serial Number	N/A
Power Rating	DC 5V, 3A
RF Features	WLAN:802.11 a/b/g/n/ac Bluetooth: BT and BLE ZigBee Z-Wave
Transmit Type	WLAN: 1T1R Bluetooth: 1T1R ZigBee: 1T1R Z-Wave: 1T1R
Device Category	☐Outdoor Access Point ☐Fixed point-to-point Access Point ☐Indoor Access Point ■Mobile and Portable client device
Test Sample	Sample No. / Test Item / Firmware: 02 / AC Conduction, RSE, Conducted / N/A
Sample Status	Mass production
Date of Receipt	2021. 03. 09
Date of Test	2021. 03. 23 ~ 29
Interface Ports of EUT	• One LAN Port • One USB Port • One DC Input Port
Accessories Supplied	• AC Adapter

3.3. Reference Test Guidance

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

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3.4. Antenna Information

WLAN/ZigBee/BT Antenna				
Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain(dBi)
RFA-DB1-AP609-70-100	Aristotle	PIFA	2400-2500	2.39
			5150-5875	4.06

Z-Wave Antenna				
Antenna Part Number	Manufacture	Antenna Type	Frequency (MHz)	Max Gain(dBi)
RFA-ZW-AP856-100-R2	Aristotle	PIFA	868-928	0.3

3.5. EUT Specifications Assessed in Current Report

Mode	U-NII Band	Fundamental Range (MHz)	Channel Number
802.11a	I	5180-5240	4
	III	5745-5825	5
802.11n-HT20/ 802.11ac-VHT20	I	5180-5240	4
	III	5745-5825	5
802.11n-HT40/ 802.11ac-VHT40	I	5190-5230	2
	III	5755-5795	2
802.11ac-VHT80	I	5210	1
	III	5775	1

Mode	Modulation	Data Rate (Mbps)
802.11a	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 54
802.11n-HT20	OFDM (BPSK/QPSK/16QAM/64QAM)	Up to 72.2
802.11n-HT40		Up to 150
802.11ac-VHT20	OFDM (BPSK/QPSK/16QAM/64QAM/256QAM)	Up to 86.7
802.11ac-VHT40		Up to 200
802.11ac-VHT80		Up to 433.3

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Channel List					
802.11a/802.11n-HT20/802.11ac-VHT20					
U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)
I	36	5180	III	149	5745
	40	5200		153	5765
	44	5220		157	5785
	48	5240		161	5805
				165	5825

Channel List					
802.11n-HT40/802.11ac-VHT40					
U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)
I	38	5190	III	151	5755
	46	5230		159	5795

Channel List					
802.11ac-VHT80					
U-NII Band	Channel Number	Frequency (MHz)	U-NII Band	Channel Number	Frequency (MHz)
I	42	5210	III	155	5775

Note: Test modes are presented at section 3.7.

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3.6. Description of Key Components

Item	Supplier	Model / Type	Character
CPU (Socket: BGA1170)	Intel	N2807	1.58GHz
Storage (SSD)	Kingston	EMMC16G-TB28	eMMC flash 16GB
Memory (RAM)	NANYA	NT5CC256M16EP-EK	4GB DDR3
WLAN/BT Combo Card	AMPAK	AP6255	---
Antenna	Aristotle	RFA-DB1-AP609-70-100	Wi-Fi/BT/ZigBee/antenna
Z-Wave Chip	Silicon Labs	ZGM130S	---
Antenna	Aristotle	RFA-ZW-AP856-100-R2	Z-Wave antenna
ZigBee Chip	Silicon Labs	EFR32MG1B232	---
Antenna	Aristotle	RFA-DB1-AP609-70-100	Wi-Fi/BT/ZigBee/antenna
LTE Module (Option)	Quectel	EC25-AFX	FCC ID: XMR201909EC25AFX IC: 10224A-2019EC25AFX
Antenna	Aristotle	RFA-LTE-T42-U-M62-1	LTE antenna
AC Adapter (Wall-mount, 2C)	SUNNY COMPUTER TECHNOLOGY CO., LTD	SYS1639-1505-W2 (P/N: G401163915009)	I/P: 100-240Vac, 50-60Hz, 1.0A O/P: 5Vdc, 3A 15W MAX
	DC Cable: Unshielded, Detachable, 1.4m		

Remark: For more detailed features description, please refer to the manufacturer's specifications or the user manual.

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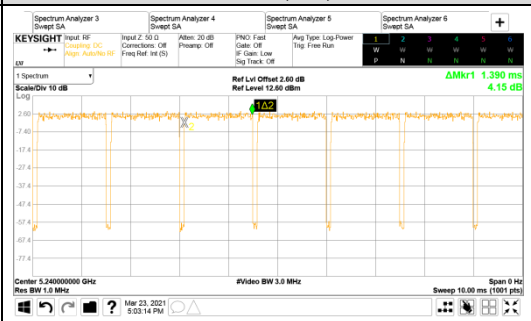
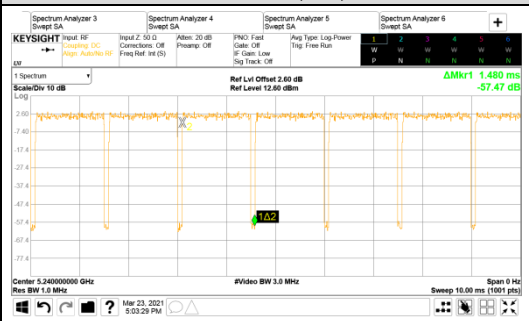
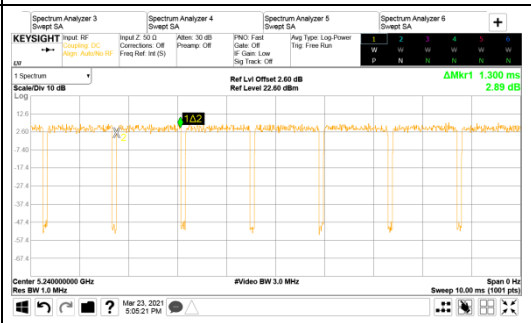
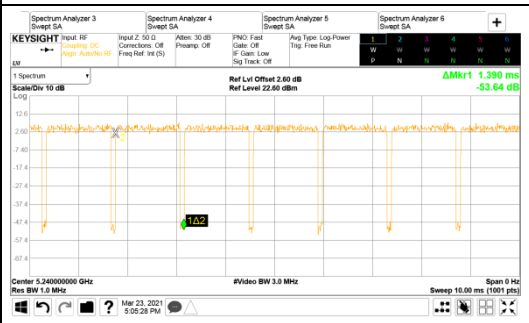
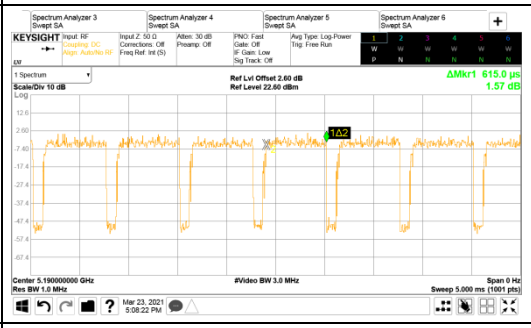
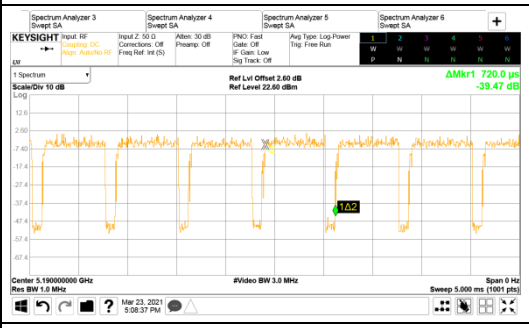
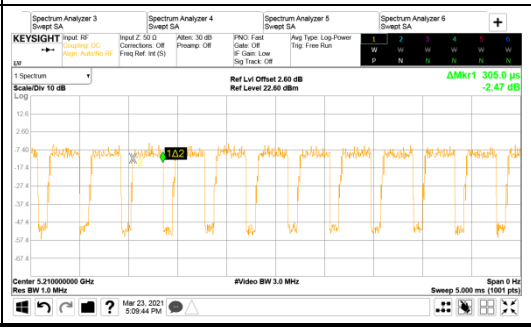
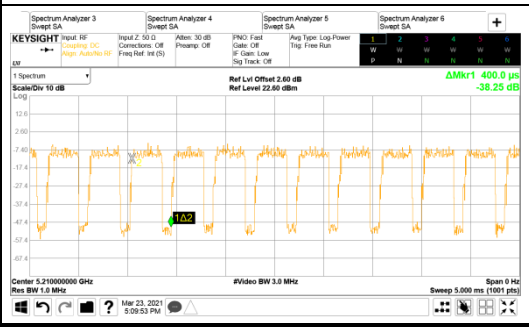
3.7. Test Configuration

Mode	TX_{on} (ms)	1/ TX_{on} (kHz)	Duty Cycle (x)	Duty Cycle Factor [10log(1/x)] (dB)
802.11a	1.390	0.719	0.939	0.27
802.11n-HT20	1.300	0.769	0.935	0.29
802.11n-HT40	0.615	1.626	0.854	0.68
802.11ac-VHT80	0.305	3.279	0.763	1.18

Note: When duty cycle is less than 98% (0.98) that duty cycle factor 10log(1/x) is needed to add in conducted test items measured in average detector.

Mode	TX_{on} (ms)	$T_{on}+T_{off}$(ms)
802.11a		
802.11n-HT20		
802.11n-HT40		
802.11ac-VHT80		

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AC Conduction	
Test Case	Normal operation

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	802.11a	6 Mbps	36/149/165
		802.11n-HT20	MCS0	36/149/165
		802.11n-HT40	MCS0	38/151/159
		802.11ac-VHT80	MCS0	42/155
	Radiated Spurious Emission Note1& 2	802.11a	6 Mbps	48/149
		802.11n-HT20	MCS0	48/165
		802.11n-HT40	MCS0	46/151
		802.11ac-VHT80	MCS0	42/155

Item		Mode	Data Rate	Test Channel
Conducted Test Case	26dB/6dBBandwidth	802.11a	6 Mbps	36/40/48/149/157/165
		802.11n-HT20	MCS0	36/40/48/149/157/165
		802.11n-HT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155
	Maximum output power	802.11a	6 Mbps	36/40/48/149/157/165
		802.11n-HT20	MCS0	36/40/48/149/157/165
		802.11n-HT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155
	Power spectral density	802.11a	6 Mbps	36/40/48/149/157/165
		802.11n-HT20	MCS0	36/40/48/149/157/165
		802.11n-HT40	MCS0	38/46/151/159
		802.11ac-VHT80	MCS0	42/155

Note 1: ■Mobile Device
□Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: □Lie□Side □Stand

Note 2: Low, mid, and high channels were measured, only the worst channel of each modulation was presented in this report.

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3.8. Output Power Setting

Mode	U-NII Band	Centre Frequency (MHz)	Power Setting	Mode	U-NII Band	Centre Frequency (MHz)	Power Setting
802.11a	I	5180	9	802.11n-HT20	I	5180	10
		5200	9			5200	10
		5240	9			5240	10
	III	5745	12		III	5745	13
		5785	12			5785	13
		5825	12			5825	13

Mode	U-NII Band	Centre Frequency (MHz)	Power Setting	U-NII Band	Band	Centre Frequency (MHz)	Power Setting
802.11n-HT40	I	5190	8	802.11 ac-VHT80	I	5210	6
		5230	8		III	5775	9
	III	5755	11				
		5795	11				

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3.9. Tested Supporting System List

3.9.1. Support Peripheral Unit

No.	Product	Brand	Model No.	Serial No.	Approval
1.	Notebook Computer	hp	TPN-Q189	5CD8175992	Contains FCC ID: PD93168NG Contains IC: 1000M-3168NG

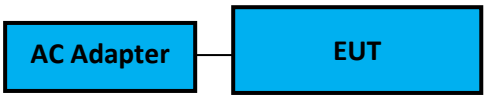
3.9.2. Cable Lists

No.	Cable Description Of The Above Support Units
1.	LAN Cable: Unshielded, Detachable, 1.0m Adapter: hp, M/N PPP-012C-S DC Cord：Shielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord：Unshielded, Detachable, 1.0m

3.10. Setup Configuration

3.10.1. EUT Configuration for Power Line & Radiated Emission

3.10.2. EUT Configuration for RF Conducted Test Items



3.11. Operating Condition of EUT

Test program “putty” is used for enabling EUT WLAN function under continues transmitting and choosing data rate/ channel.

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3.12.Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2017 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724 (1) No.8 Shielded Room (2) No.1 3m Semi Anechoic Chamber (3) Fully Anechoic Chamber

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3.13.Measurement Uncertainty

Test Items/Facilities			Frequency Range	Uncertainty
Conduction Test			9kHz-150kHz	±3.7dB
			150kHz-30MHz	±3.4dB
Radiation Test	☒	No.1 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.8dB
			200MHz-1000MHz, 3m, Horizontal	±4.1dB
			30MHz-200MHz, 3m, Vertical	±4.5dB
			200MHz-1000MHz, 3m, Vertical	±4.5dB
			1GHz-6GHz, 3m	±4.7dB
			6GHz-18GHz, 3m	±4.1dB
	☐	No.3 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±3.9dB
			200MHz-1000MHz, 3m, Horizontal	±4.2dB
			30MHz-200MHz, 3m, Vertical	±4.3dB
			200MHz-1000MHz, 3m, Vertical	±4.5dB
	☐	No.4 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.1dB
			200MHz-1000MHz, 3m, Horizontal	±4.5dB
			30MHz-200MHz, 3m, Vertical	±4.4dB
			200MHz-1000MHz, 3m, Vertical	±4.8dB
			1GHz-6GHz, 3m	±5.0dB
			6GHz-18GHz, 3m	±4.7dB
	☐	No.5 3m Semi Anechoic Chamber	30MHz-200MHz, 3m, Horizontal	±4.2dB
			200MHz-1000MHz, 3m, Horizontal	±4.3dB
			30MHz-200MHz, 3m, Vertical	±4.3dB
			200MHz-1000MHz, 3m, Vertical	±4.7dB
			1GHz-6GHz, 3m	±4.8dB
			6GHz-18GHz, 3m	±4.5dB
	☒	Fully Anechoic Chamber	30MHz~1000MHz	±4.6dB
			1GHz~18GHz	±5.4dB
			18GHz~40GHz	±3.52dB
			40GHz~260GHz	±3.56dB

Remark：Uncertainty = $ku_c(y)$

Test Items	Uncertainty
Emission Bandwidth	± 0.2kHz
Maximum output power	± 0.33dB
Power spectral density	± 0.13dB

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4. MEASUREMENT EQUIPMENTLIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2021. 02. 02	1 Year
2.	A.M.N.	R&S	ENV432	101567	2020. 04. 20	1 Year
3.	L.I.S.N.	Kyoritsu	KNW-407	8-855-9	2020. 12. 10	1 Year
4.	Pulse Limiter	R&S	ESH3-Z2	100354	2021. 01. 04	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.8 S/R	2020. 04. 17	1 Year
6.	Coaxial Cable	Yeida	RG/58AU	CE-08	2020. 09. 19	1 Year
7.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.

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4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9010B-544	MY55460198	2020. 04. 29	1 Year
2.	Spectrum Analyzer	Agilent	N9030A-526	MY53310269	2021. 01. 14	1 Year
3.	Test Receiver	R&S	ESCS30	100039	2020. 06. 05	1 Year
4.	Amplifier	HP	8447D	2944A07178	2020. 04. 29	1 Year
5.	Microwave Amplifier	Keysight	83051A	MY53010042	2020. 08. 05	1 Year
6.	Microwave Amplifier	Agilent	8449B	3008A02678	2021. 02. 27	1 Year
7.	Loop Antenna	R&S	HFH2-Z2	891847/27	2019. 12. 26	2 Years
8.	Bilog Antenna	TESEQ	CBL6112D	33821	2021. 01. 15	1 Year
9.	Horn Antenna	ETS-Lindgren	3117	00135902	2021. 03. 19	1 Year
10.	Horn Antenna	COM-POWER	AH-840	101092	2020 .05. 08	1 Year
11.	5G Notch Filter	Microware Circuits	N0452502	459775	2020. 05. 06	1 Year
12.	5G Notch Filter	Microware Circuits	N0257881	459776	2020. 08. 15	1 Year
13.	Coaxial Cable	MIYAZAKI	5D2W	CLAMP-01	2020. 09. 19	1 Year
14.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2021. 01. 29	1 Year
15.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 104	RE-29	2020. 09. 19	1 Year
16.	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	RE-30	2020. 09. 19	1 Year
17.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.1 3m A/C	2020. 04. 17	1 Year
18.	Digital Thermo-Hygro Meter	EVERY DAY	E-512	RF-02	2020. 04. 17	1 Year
19.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.
20.	Test Software	Audix	e3	V6.110601	N.C.R.	N.C.R.

4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9020B-544	MY57120357	2021. 01. 06	1 Year
2.	Power Meter	Anritsu	ML2487A	6K00005406	2020. 04. 29	1 Year
3.	Power Sensor	Anritsu	MA2491A	030873	2020. 04. 29	1 Year
4.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2020. 04. 17	1 Year

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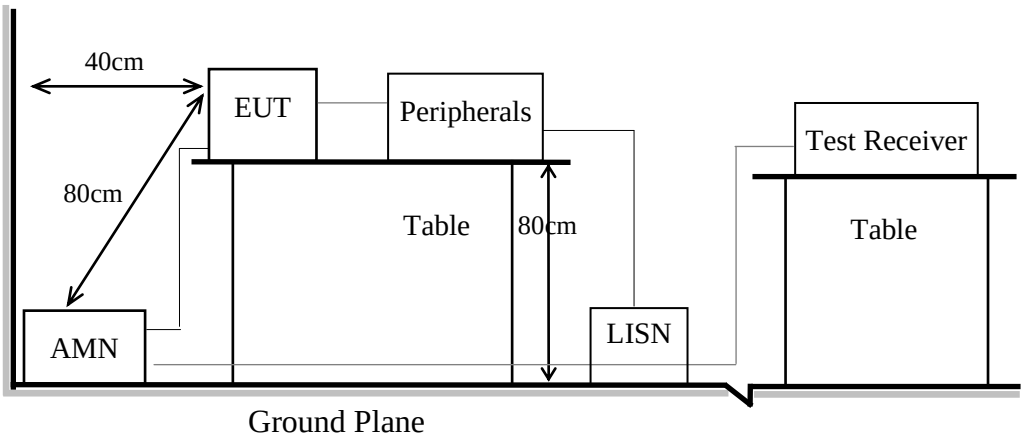
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.9

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dBμV	56 ~ 46 dBμV
500kHz ~ 5MHz	56 dBμV	46 dBμV
5MHz ~ 30MHz	60 dBμV	50 dBμV

Remark1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.

2.: The lower limit applies to the band edges.

5.3. Test Procedure

5.3.1. To set up the EUT as indicated in ANSI C63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.

5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).

5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)

5.3.4. Checking frequency range from 150kHz to 30 MHz and record the emission which does not have 20 dB below limit.

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5.4. Test Results

Please refer to Appendix A.

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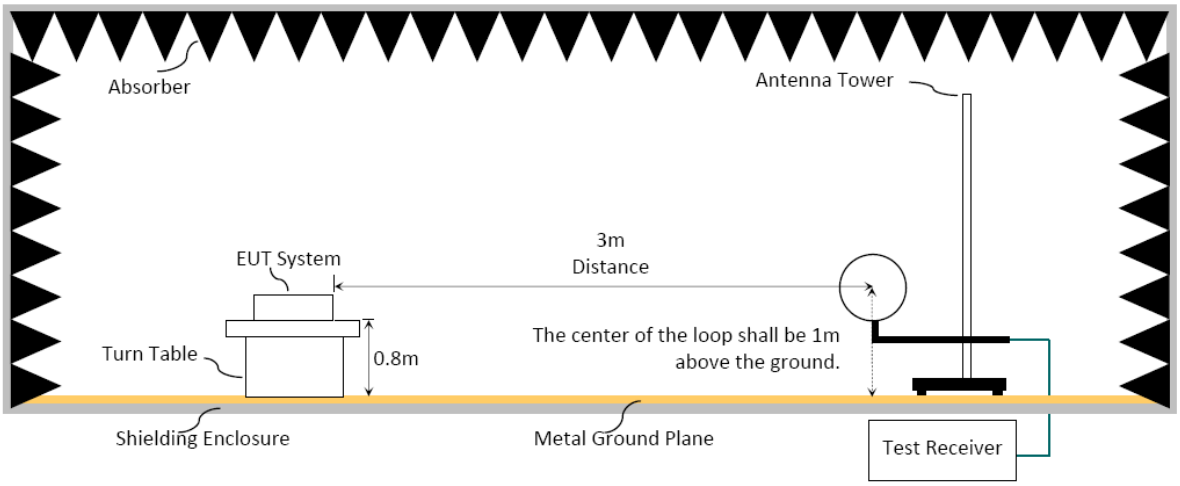
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

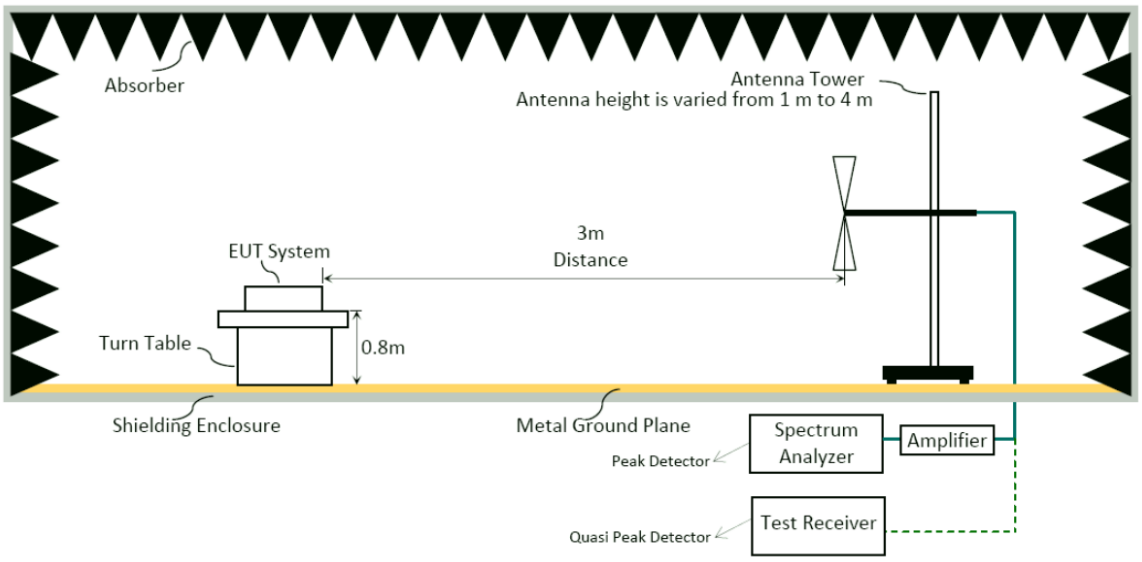
6.1.1. Block Diagram of EUT

Indicated as section 3.9

6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000MHz



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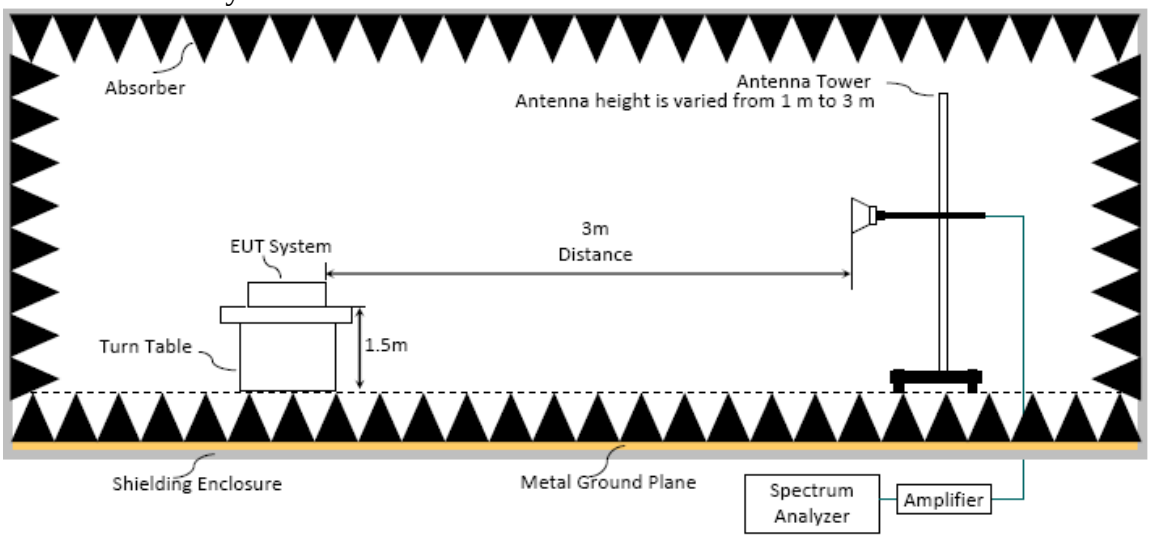
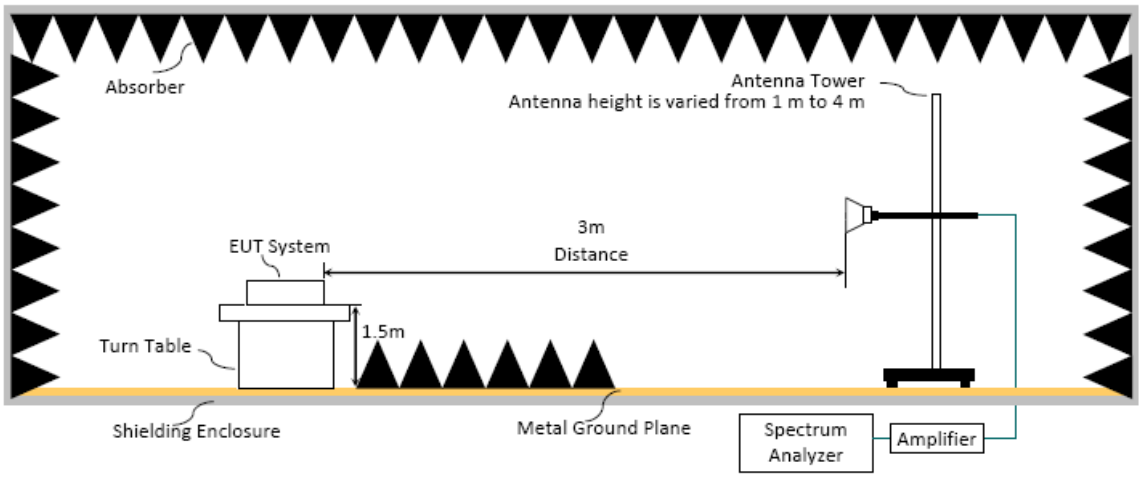
6.1.4. Setup Diagram for above 1GHz

Fully Anechoic Chamber



Semi Anechoic Chamber



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6.2. Radiated Emission Limits

Radiated emissions fall in restricted bands, as defined in Section 15.205 must be in compliance with the radiated emission limits specified in 15.209 as below.

6.2.1. General Limit

Frequency (MHz)	Distance(m)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/m)

(2) The tighter limit applies to the edge between two frequency bands.

(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

(4) Fundamental and emission fall within operation band are exempted from this section.

(5) Pursuant to ANSI C63.10: 6.6.4.3,if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

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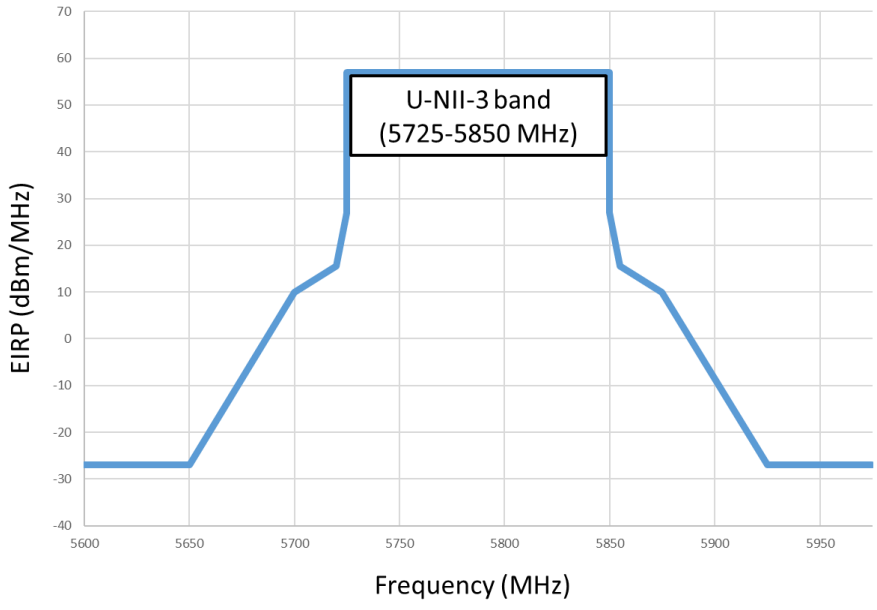
6.2.2. Limit for non-restricted frequency above 1 GHz

Frequency Band (MHz)	E.I.R.P. Limit	Field Strength Limit at 3 m
5150 to 5250	-27 dBm	68.2 dBμV/m
5250 to 5350		68.2 dBμV/m
5470 to 5725		68.2 dBμV/m

Note: Field Strength at 3 m= E.I.R.P. + 95.2 dB

Frequency Band (MHz)	Field Strength Limit at 3 m	
5725 to 5850	☒	15.407(b)(4)(i) All emissions shall be limited to a level of 68.2 dBμV/mat 75 MHz or more above or below the band edge increasing linearly to 105.2dBμV/m at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 110.8 dBμV/m at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 68.2 dBμV/m at the band edge.
	☐	15.407(b)(4)(ii) ,compliance with the emission limits in § 15.247(d) Shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,. Attenuation below the general limits specified in §15.209(a) is not required. In addition,radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))



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6.3. Test Procedure

Frequency Range 9kHz~30MHz:
The EUT setup on the turntable which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level.
In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

(1) RBW = 9kHz with peak and average detector.

(2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz-30MHz)

Frequency Range 30MHz ~ 40GHz:
The EUT setup on the turn table which has 80cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m (for 30-1000MHz) and from 1m to 3m (for above 1GHz at fully Anechoic Chamber)or from 1 m to 4 m (for above 1GHz at Semi Anechoic Chamber) to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

Frequency below 1GHz:
Spectrum Analyzer is used for pre-testing with following setting:

(1)RBW = 120KHz

(2)VBW ≥ 3 x RBW.

(3)Detector = Peak.

(4)Sweep time = auto.

(5)Trace mode = max hold.

(6)Allow sweeps to continue until the trace stabilizes.

Note 1: When peak-detected value is lower than limit that the measurement using theQ.P. detector is not required, otherwise using Q.P. for final measurement.

Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Frequency above 1GHz to 10th harmonic(up to 40 GHz):
Peak Detector:

(1)RBW = 1MHz

(2)VBW ≥ 3 x RBW.

(3)Detector = Peak.

(4)Sweep time = auto.

(5)Trace mode = max hold.

(6)Allow sweeps to continue until the trace stabilizes.

Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

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Average Detector:

■**Option 1:**

(1)RBW = 1MHz

(2)VBW ≥ 1/ T.

Modulation Type	T (ms)	1/ T (kHz)	VBW Setting(kHz)
802.11a	1.390	0.719	750Hz
802.11n-HT20	1.300	0.769	820Hz
802.11n-HT40	0.615	1.626	1.8Hz
802.11ac-VHT80	0.305	3.279	3.3Hz

N/A: 1/ T is not implemented when duty cycle presented in section 3.7 is ≥98%.

(1)Detector = Peak.

(2)Sweep time = auto.

(3)Trace mode = max hold.

(4)Allow sweeps to continue until the trace stabilizes.

□**Option 2:**

Average Emission Level= Peak Emission Level+ D.C.C.F.

6.4. Measurement Result Explanation

■Peak Emission Level=Antenna Factor + Cable Loss + Meter Reading (including Preamp factor if test used)

■Average Emission Level l=Antenna Factor + Cable Loss + Meter Reading (including Preamp factor if test used)

□Average Emission Level= Peak Emission Level+ DCCF

Duty Cycle Correction Factor (DCCF)= 20log(TX_{on}/TX_{on+off}) presented in section 3.6.

□ERP= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

Please refer to Appendix A.

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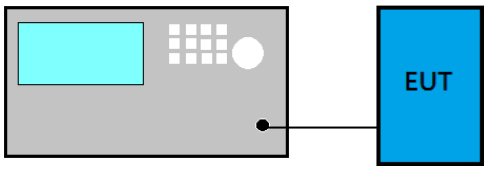
7. 26dB/6dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

Frequency Band (MHz)	Limit
5150 to 5250	Reference only
5250 to 5350	
5470 to 5725	
5725 to 5850	≥ 500kHz

7.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■ Applicable to all bands except to 5725 MHz- 5850 MHz

(1) Set RBW= 1% of the emission bandwidth
(2) Set VBW > RBW
(3) Detector = Peak
(4) Trace mode = max hold
(5) Setting channel bandwidth function x dB to -26 dB to record the final bandwidth.

■ 5725 MHz- 5850 MHz

(1) Set RBW = 100 kHz.
(2) Set the video bandwidth (VBW) ≥ 3 × RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

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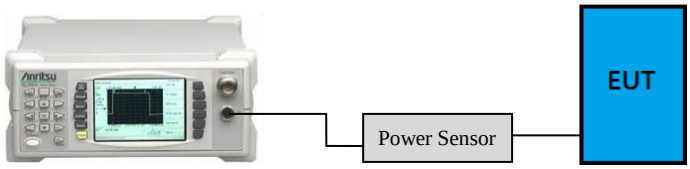
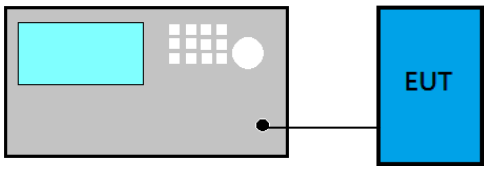
8. MAXIMUM OUTPUT POWER

8.1. Block Diagram of Test Setup



- **For 802.11ac-VHT80/160, 802.11ax-HE80/160 modes only**



8.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	1 W(30 dBm)/ Max e.i.r.p. ≤125 mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon
	Fixed point-to-point Access Point	1 W(30 dBm)
	Indoor Access Point	1 W(30 dBm)
	Mobile and Portable client device	250 mW(24 dBm)
5250 to 5350	N/A	250 mW or 11 dBm + 10 log B[Note1]
5470 to 5725		250 mW or 11 dBm + 10 log B [Note1]
5725 to 5850		1 W(30 dBm)

Note 1: B is the 26 dB emission bandwidth, which presented in section 7 and appendix A.1.

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8.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■Method AVGPM (Measurement using an RF average power meter):

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

■Method AVGSA-2 (Spectrum channel power) for 802.11ac-VHT80/160, 802.11ax-HE80/160 modes only

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 MHz
(3) Set the video bandwidth (VBW) ≥ 3 MHz.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
(8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

8.4. Test Results

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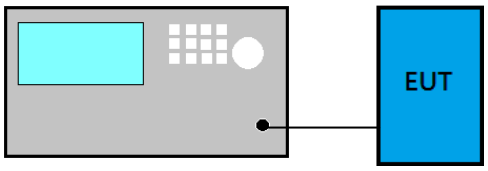
9. POWER SPECTRAL DENSITY

9.1. Block Diagram of Test Setup



9.2. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	17dBm/MHz
	Fixed point-to-point Access Point	
	Indoor Access Point	
	Mobile and Portable client device	11 dBm/MHz
5250 to 5350	N/A	11 dBm/MHz
5470 to 5725		11 dBm/MHz
5725 to 5850		30dBm/500 kHz

9.3. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■Method AVGSA-2 (Spectrum channel power)

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 MHz
(3) Set the video bandwidth (VBW) ≥ 3 MHz.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) Use peak search function to find out the maximum power density.
(8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

9.4. Test Results

Please refer to Appendix A

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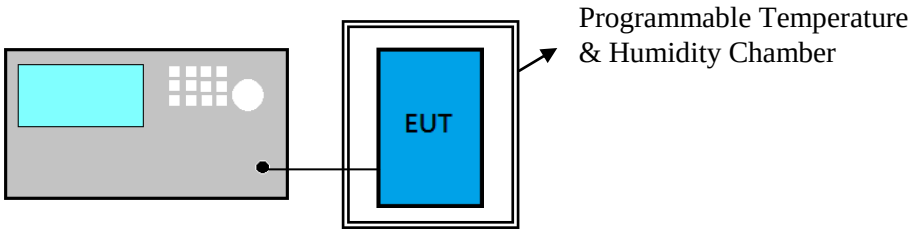
10. FREQUENCY STABILITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

NONE

10.3. Test Procedure

(1) Frequency: Test frequency.
(2) Span: enough to cover the complete power envelope
(3) RBW: 1MHz(modulation ON) ; 10KHz(CW)
(4) VBW: 1MHz(modulation ON) ; 10KHz(CW)
(5) Detector Mode: Positive Peak
(6) Indication mode: Max hold
(7) Find the peak frequency and take calculate by the formula:
(Measurement Value-declaration frequency)/ declaration frequency)

10.4. Test Results

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11. DEVIATION TO TEST SPECIFICATIONS

【NONE】

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APPDNDIX A

TEST DATA AND PLOTS

(Model: (1)ITS-GW01-A10-C001 (2)ITS-GW01-A10-C002)

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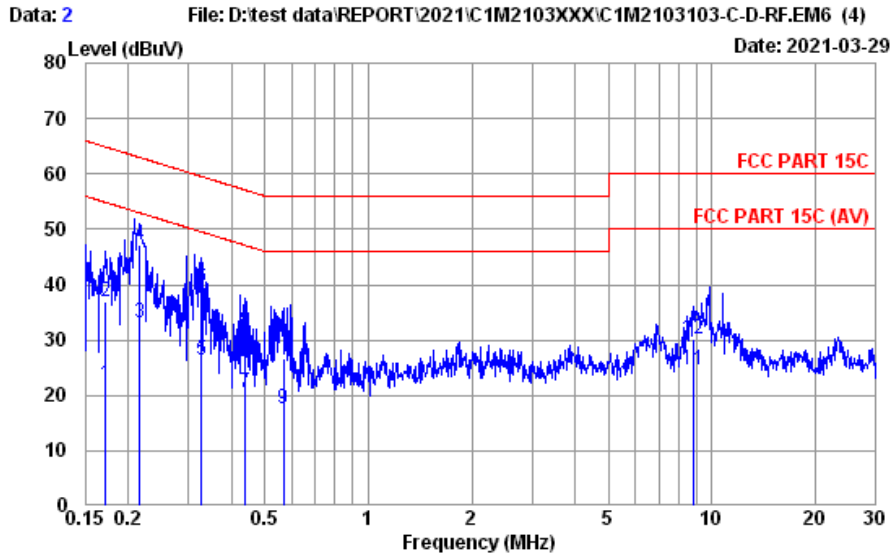
A.1 CONDUCTED EMISSION

Test Date	2021/03/29	Temp./Hum.	24℃/74%
Test Voltage	AC 120V 60Hz (Via AC Adapter)	Tested By	Chucky Chiu



Site No. : No.8 Shielded Room
Instrument 1 : Receiver ESR3(774)
Instrument 2 : ENV432 (567)(A)|CE-08|ESH3-Z2 (354)
Limit : FCC PART 15C
Environment : 24°C / 74%
EUT Model : ITS-GW01-A10-C002
Test Mode : Operating

Data No. : 2
Phase : NEUTRAL
Engineer : Chucky Chiu
Test Rating : 120Vac/60Hz

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBµV)	Emission Level (dBµV)	Limits (dBµV)	Margin (dB)	Remark
1	0.172	10.20	0.03	9.85	1.81	21.89	54.86	32.97	Average
2	0.172	10.20	0.03	9.85	16.84	36.92	64.86	27.94	QP
3	0.216	10.20	0.03	9.85	13.11	33.19	52.96	19.77	Average
4	0.216	10.20	0.03	9.85	27.20	47.28	62.96	15.68	QP
5	0.327	10.20	0.03	9.85	6.28	26.36	49.53	23.17	Average
6	0.327	10.20	0.03	9.85	19.56	39.64	59.53	19.89	QP
7	0.440	10.20	0.03	9.85	0.43	20.51	47.07	26.56	Average
8	0.440	10.20	0.03	9.85	11.70	31.78	57.07	25.29	QP
9	0.567	10.20	0.03	9.85	-2.48	17.60	46.00	28.40	Average
10	0.567	10.20	0.03	9.85	6.68	26.76	56.00	29.24	QP
11	8.822	10.46	0.13	9.88	4.15	24.62	50.00	25.38	Average
12	8.822	10.46	0.13	9.88	9.84	30.31	60.00	29.69	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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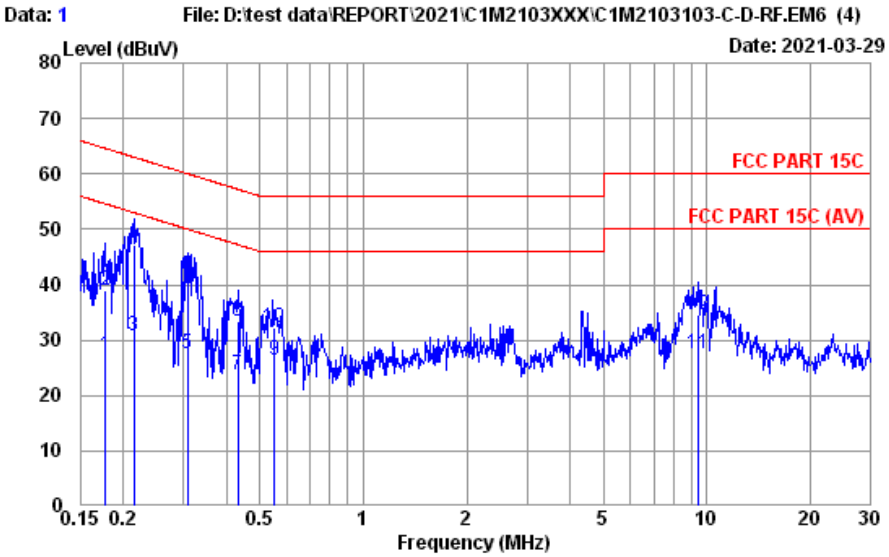
Test Date	2021/03/29	Temp./Hum.	24℃/74%
Test Voltage	AC 120V 60Hz (Via AC Adapter)	Tested By	Chucky Chiu



Site No. : No.8 Shielded Room Data No. : 1
Instrument 1 : Receiver ESR3(774)
Instrument 2 : EMV432 (567)(A)|CE-08|ESH3-Z2 (354)
Limit : FCC PART 15C Phase : LINE
Environment : 24°C / 74% Engineer : Chucky Chiu
EUT Model : ITS-GW01-A10-C002 Test Rating : 120Vac/60Hz
Test Mode : Operating

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.178	10.20	0.03	9.85	7.19	27.27	54.59	27.32	Average
2	0.178	10.20	0.03	9.85	18.78	38.86	64.59	25.73	QP
3	0.215	10.20	0.03	9.85	10.73	30.81	53.01	22.20	Average
4	0.215	10.20	0.03	9.85	27.23	47.31	63.01	15.70	QP
5	0.308	10.20	0.03	9.85	7.35	27.43	50.02	22.59	Average
6	0.308	10.20	0.03	9.85	21.44	41.52	60.02	18.50	QP
7	0.431	10.20	0.03	9.85	3.70	23.78	47.24	23.46	Average
8	0.431	10.20	0.03	9.85	13.19	33.27	57.24	23.97	QP
9	0.552	10.20	0.03	9.85	6.36	26.44	46.00	19.56	Average
10	0.552	10.20	0.03	9.85	12.11	32.19	56.00	23.81	QP
11	9.451	10.38	0.14	9.88	7.12	27.52	50.00	22.48	Average
12	9.451	10.38	0.14	9.88	14.29	34.69	60.00	25.31	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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A.2 RADIATED EMISSION

Test Date	2021/03/26 ~ 29	Temp./Hum.	21 ~ 25°C/69 ~ 70%
Test Voltage	AC 120V 60Hz (Via AC Adapter)	Tested By	Sean Wang

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.1.2 Frequency Below 1GHz

Mode	802.11n-HT20	U-NII Band	III
		Frequency	TX 5825MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
34.850	16.29	1.35	28.13	35.34	24.85	40.00	15.15	Peak
101.780	11.40	2.45	28.04	40.31	26.12	43.50	17.38	Peak
384.050	15.14	5.79	28.31	39.31	31.93	46.00	14.07	Peak
500.450	17.28	6.93	29.21	39.90	34.90	46.00	11.10	Peak
900.090	20.39	8.72	28.86	39.64	39.89	46.00	6.11	Peak
988.360	21.23	9.11	28.61	34.70	36.43	54.00	17.57	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
37.760	14.73	1.43	28.13	47.29	35.32	40.00	4.68	Peak
152.220	10.45	3.08	27.82	44.94	30.65	43.50	12.85	Peak
378.230	15.02	5.71	28.29	37.54	29.98	46.00	16.02	Peak
500.450	17.28	6.93	29.21	43.23	38.23	46.00	7.77	Peak
700.270	18.84	7.62	29.33	39.97	37.10	46.00	8.90	Peak
974.780	21.10	9.05	28.64	34.67	36.18	54.00	17.82	Peak

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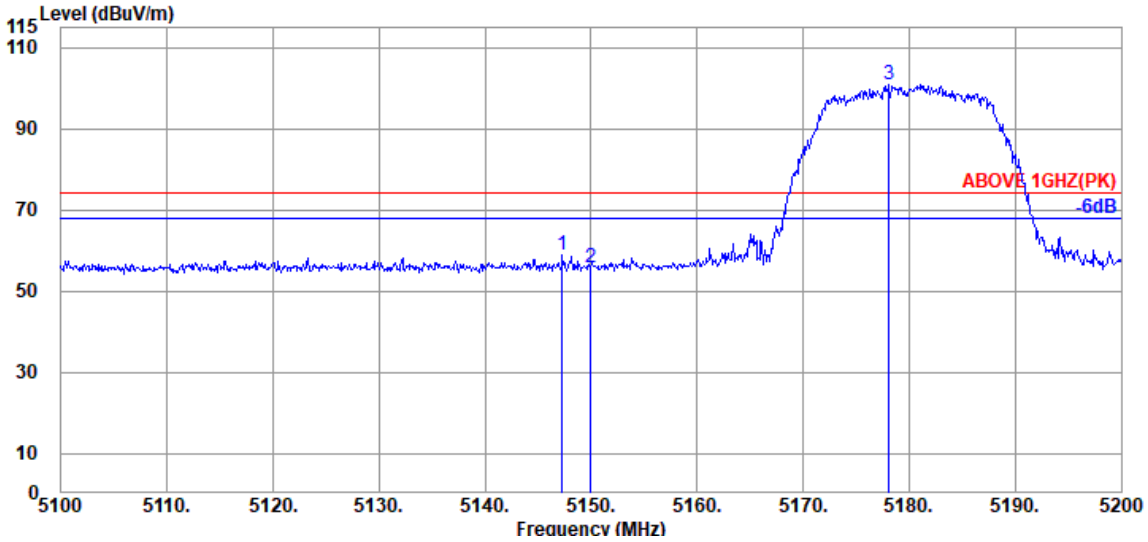
A.2.1.3 Frequency Above 1 GHz to 10th harmonics

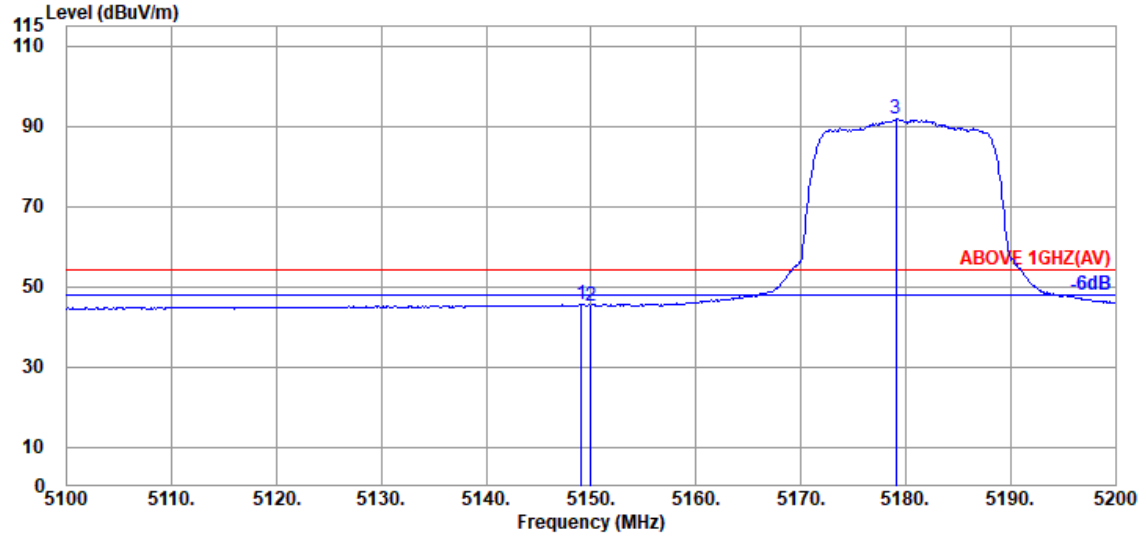
Band Edge:

Mode	802.11a	U-NII Band	I
		Frequency	TX 5180MHz



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5147.300	34.40	10.70	34.35	48.04	58.79	74.00	15.21	Peak
	5150.000	34.40	10.70	34.35	44.89	55.64	74.00	18.36	Peak
@	5178.100	34.47	10.72	34.34	90.16	101.01	---	---	Peak



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5149.100	34.40	10.70	34.35	34.71	45.46	54.00	8.54	Average
	5150.000	34.40	10.70	34.35	34.45	45.20	54.00	8.80	Average
@	5179.100	34.47	10.72	34.34	80.88	91.73	---	---	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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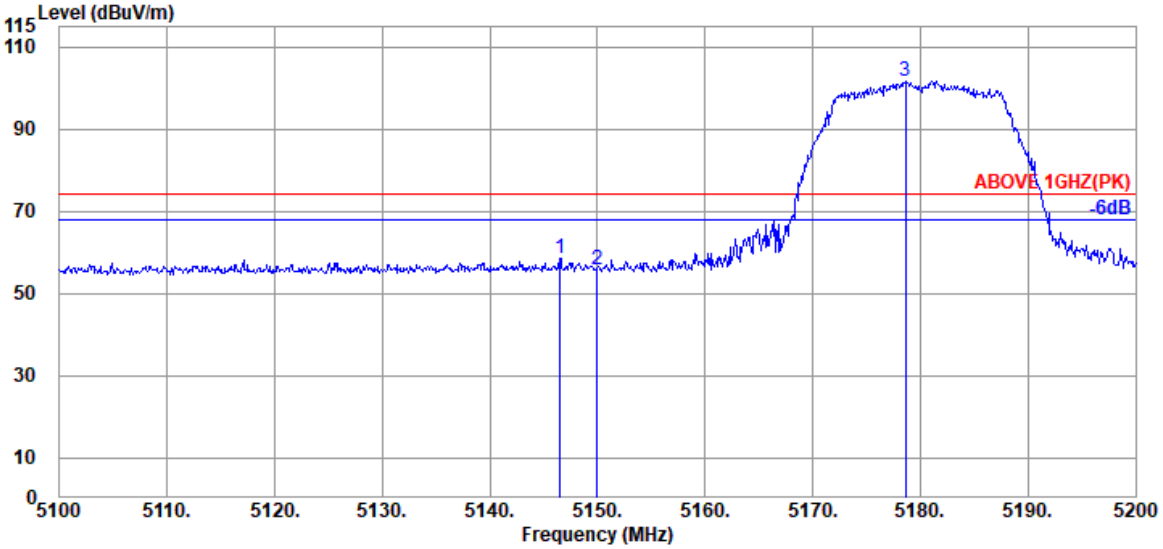
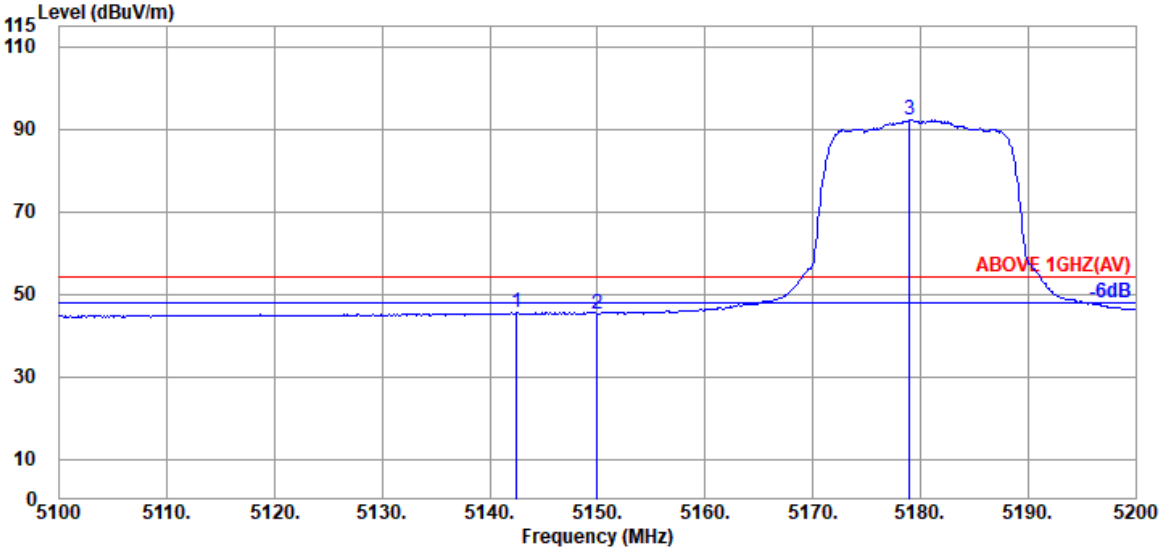
Mode	802.11a	U-NII Band	I
		Frequency	TX 5180MHz



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5146.500	34.40	10.70	34.35	47.89	58.64	74.00	15.36	Peak
	5150.000	34.40	10.70	34.35	45.13	55.88	74.00	18.12	Peak
@	5178.600	34.47	10.72	34.34	90.85	101.70	---	---	Peak



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5142.500	34.40	10.70	34.36	34.83	45.57	54.00	8.43	Average
	5150.000	34.40	10.70	34.35	34.47	45.22	54.00	8.78	Average
@	5179.000	34.47	10.72	34.34	81.38	92.23	---	---	Average

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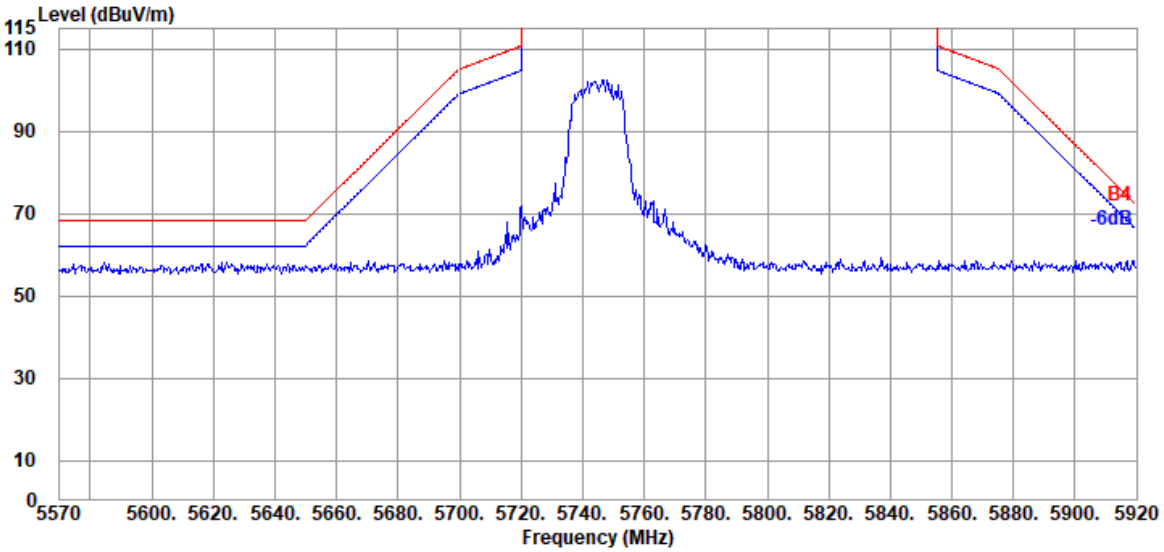
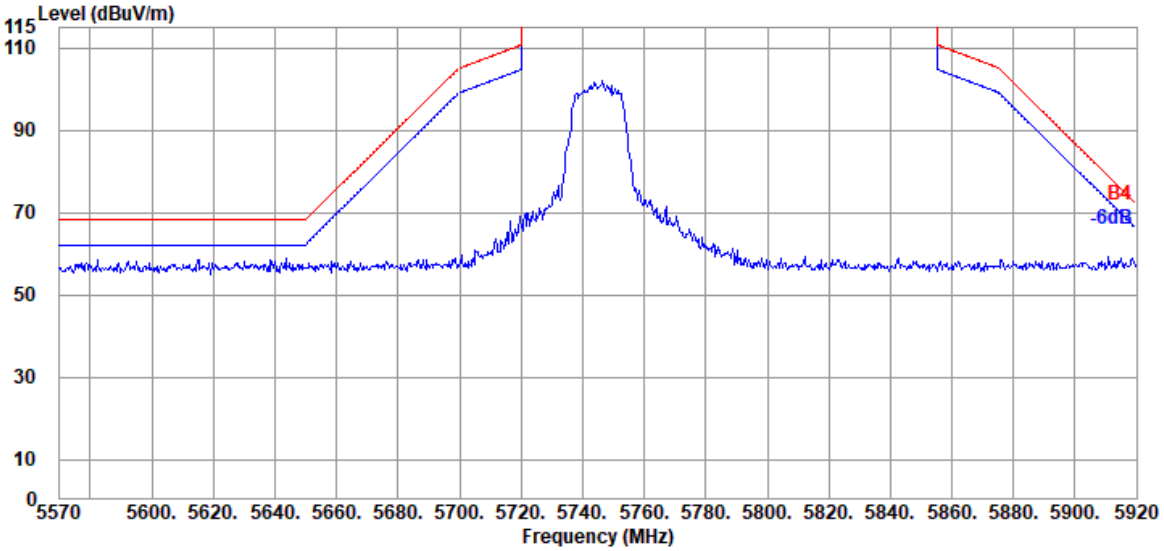
Mode	802.11a	U-NII Band	III
		Frequency	TX 5745MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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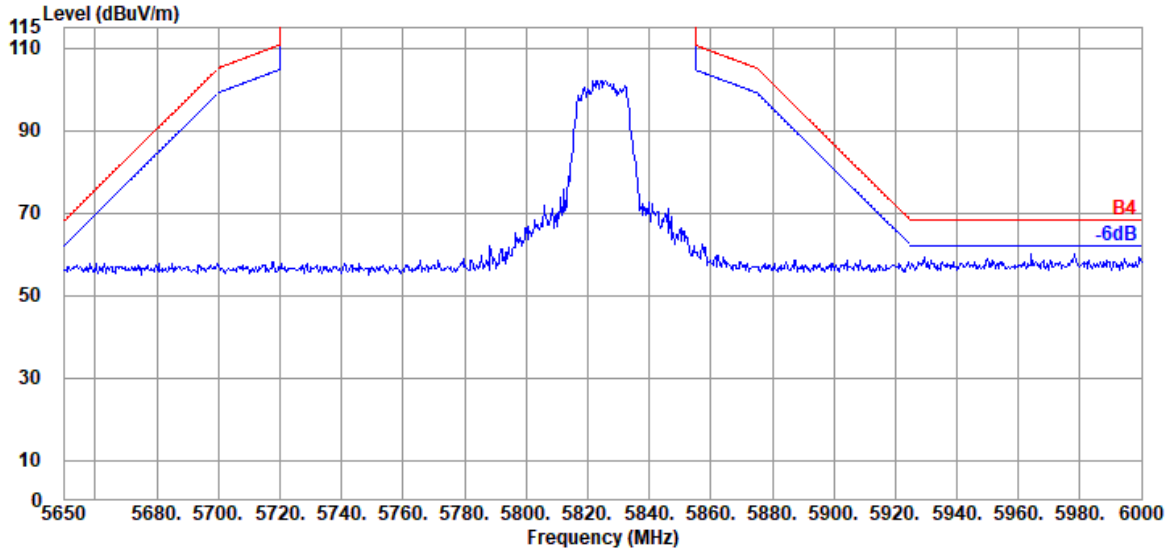
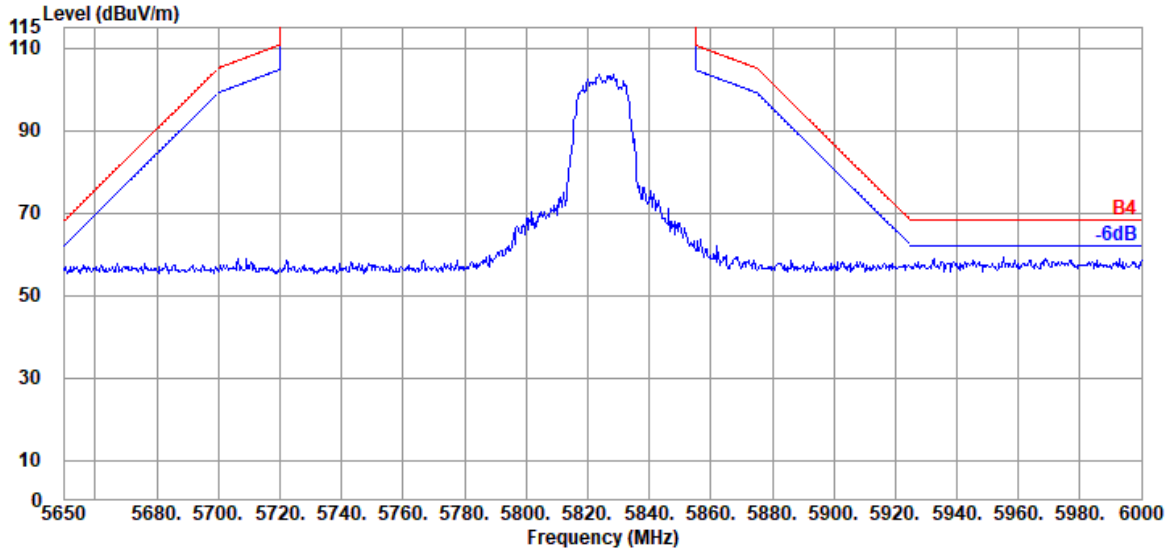
Mode	802.11a	U-NII Band	III
		Frequency	TX 5825MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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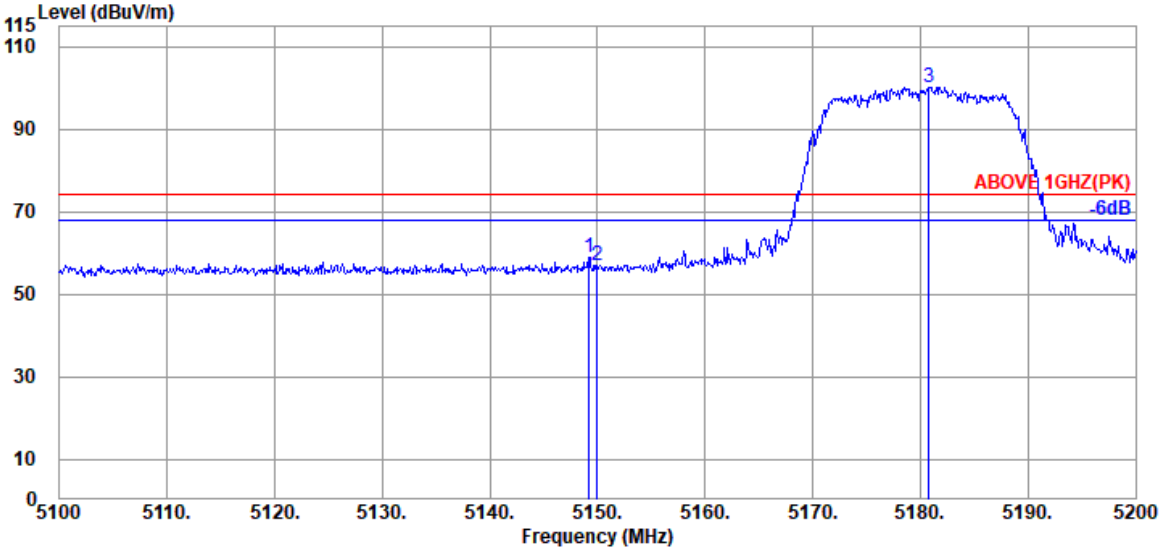
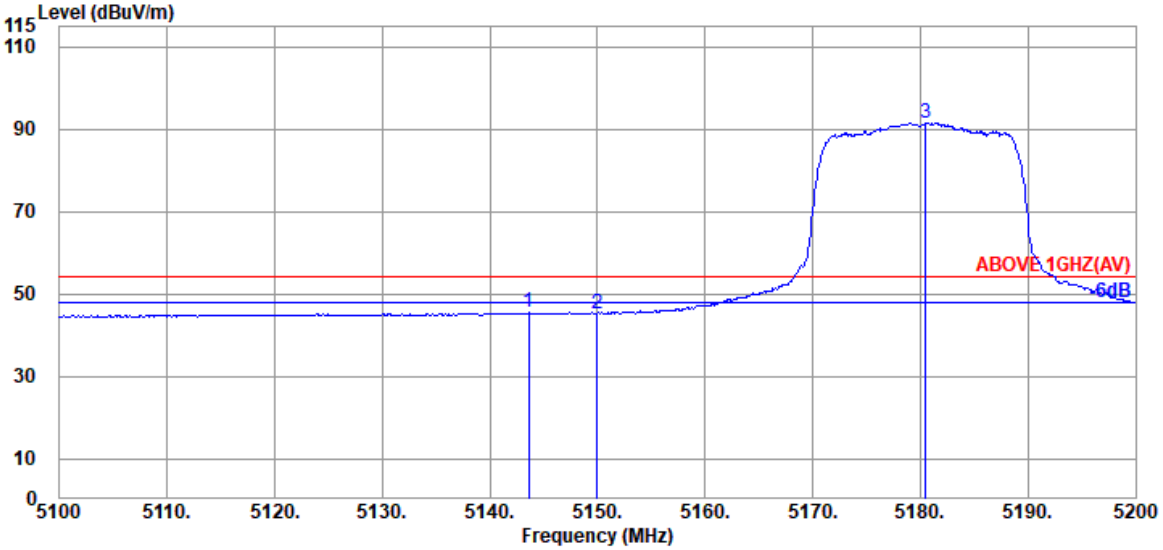
Mode	802.11n-HT20	U-NII Band	I
		Frequency	TX 5180MHz



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5149.200	34.40	10.70	34.35	48.09	58.84	74.00	15.16	Peak
	5150.000	34.40	10.70	34.35	46.26	57.01	74.00	16.99	Peak
@	5180.800	34.47	10.72	34.34	89.37	100.22	---	---	Peak



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5143.600	34.40	10.70	34.36	34.64	45.38	54.00	8.62	Average
	5150.000	34.40	10.70	34.35	34.49	45.24	54.00	8.76	Average
@	5180.500	34.47	10.72	34.34	80.76	91.61	---	---	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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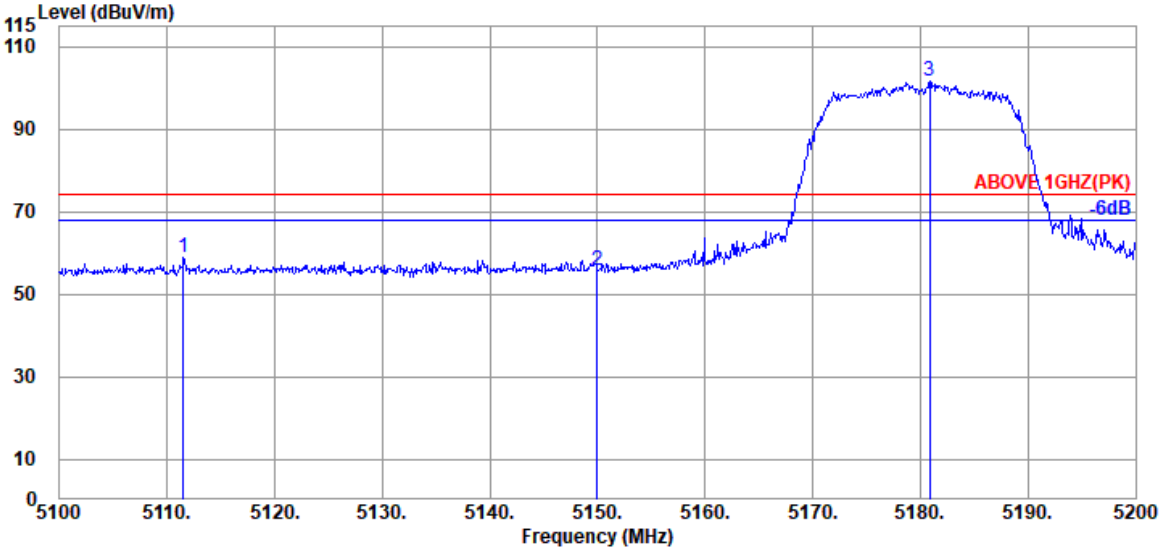
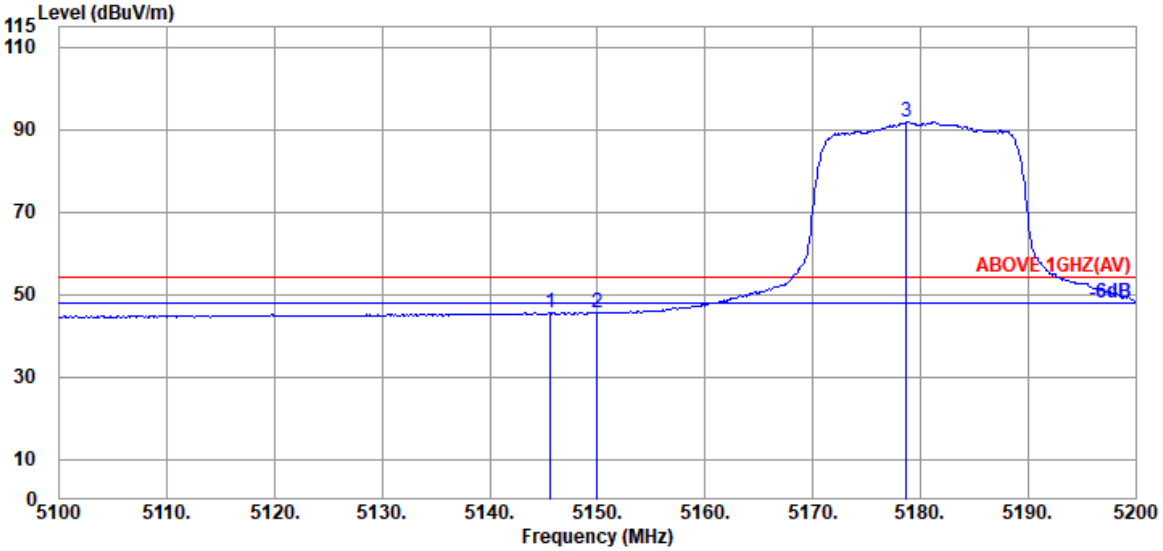
Mode	802.11n-HT20	U-NII Band	I
		Frequency	TX 5180MHz



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5111.500	34.30	10.68	34.36	48.17	58.79	74.00	15.21	Peak
	5150.000	34.40	10.70	34.35	44.84	55.59	74.00	18.41	Peak
@	5180.900	34.47	10.72	34.34	90.68	101.53	---	---	Peak



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5145.600	34.40	10.70	34.35	34.75	45.50	54.00	8.50	Average
	5150.000	34.40	10.70	34.35	34.72	45.47	54.00	8.53	Average
@	5178.700	34.47	10.72	34.34	81.13	91.98	---	---	Average

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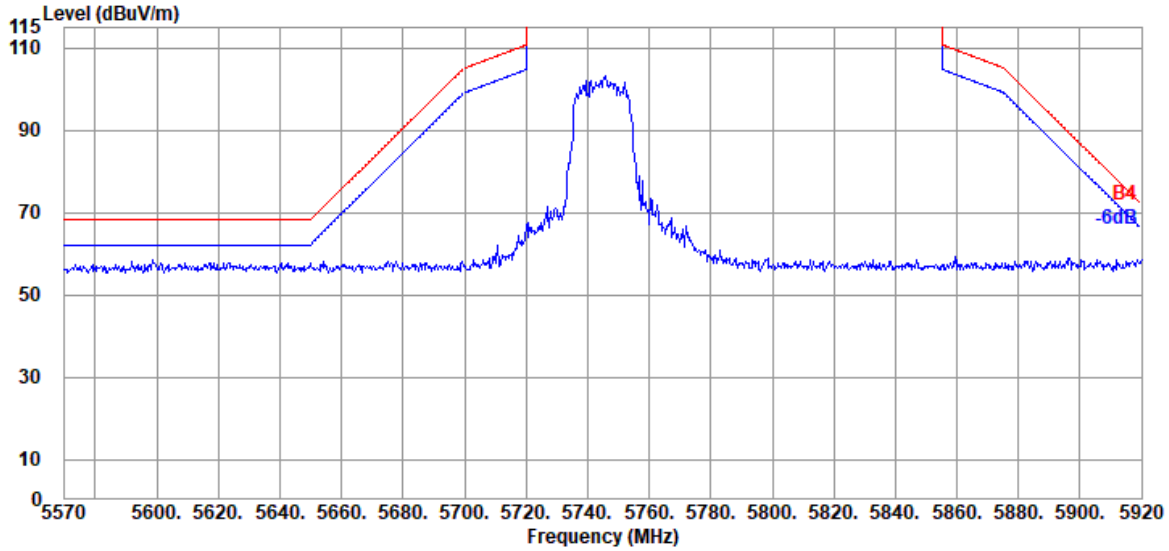
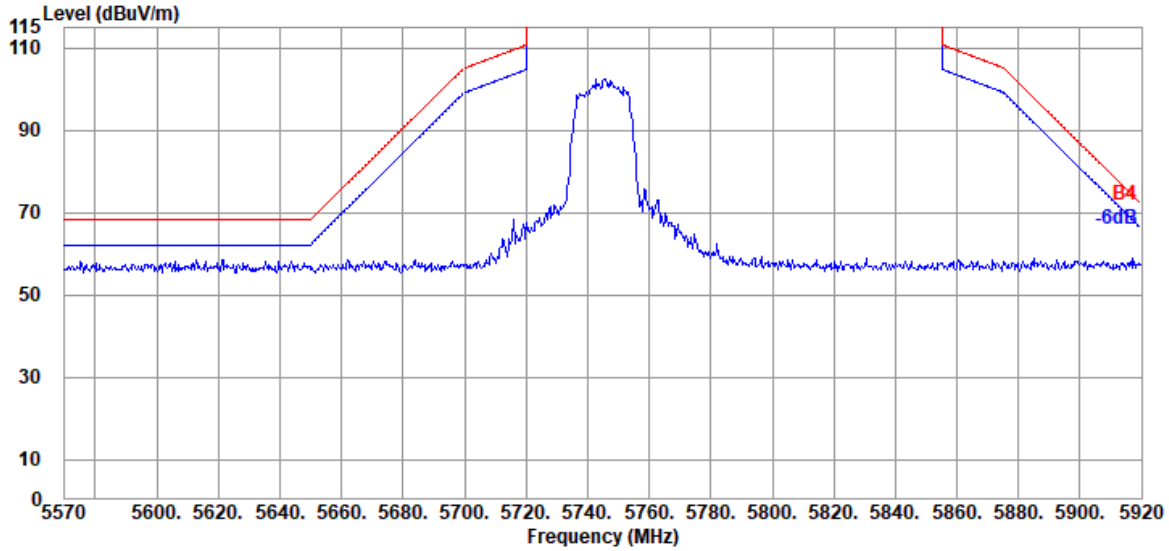
Mode	802.11n-HT20	U-NII Band	III
		Frequency	TX 5745MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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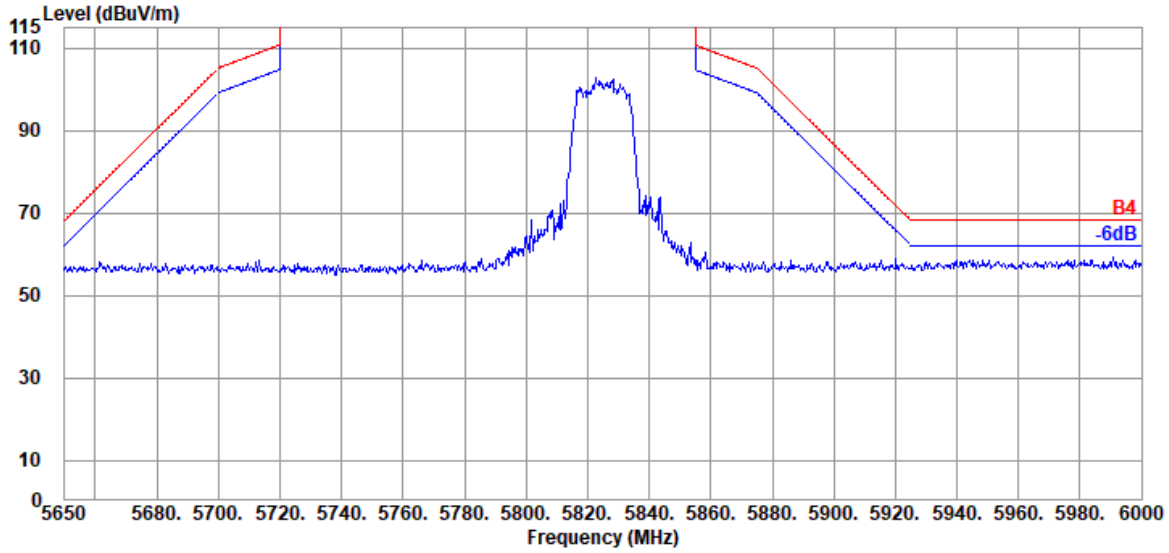
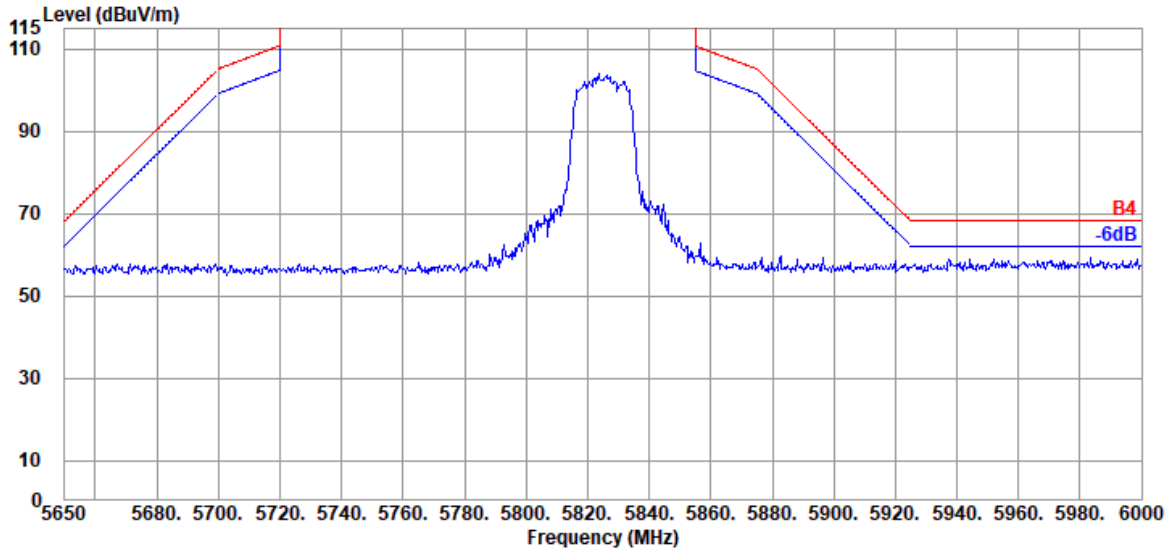
Mode	802.11n-HT20	U-NII Band	III
		Frequency	TX 5825MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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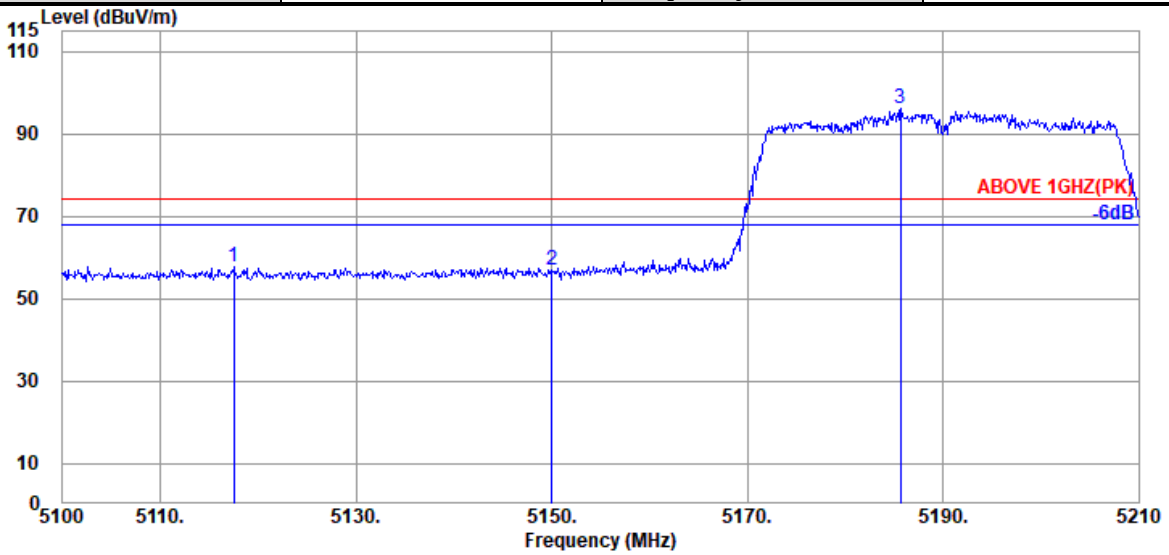
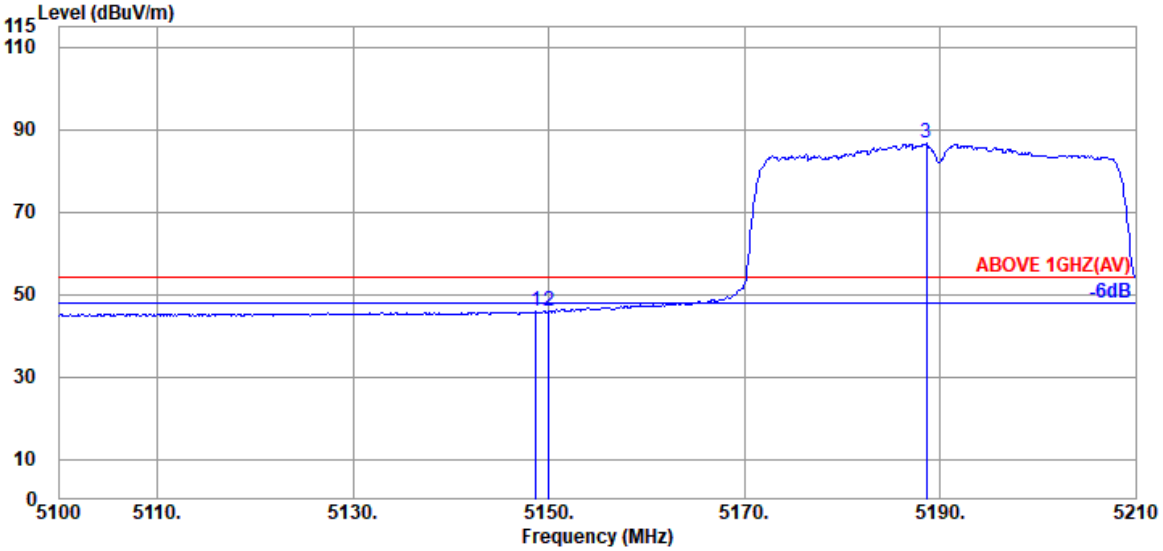
Mode	802.11n-HT40	U-NII Band	I
		Frequency	TX 5190MHz



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5117.490	34.33	10.68	34.36	47.19	57.84	74.00	16.16	Peak
	5150.050	34.40	10.70	34.35	46.14	56.89	74.00	17.11	Peak
@	5185.690	34.47	10.72	34.34	85.27	96.12	---	---	Peak



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5148.730	34.40	10.70	34.35	35.05	45.80	54.00	8.20	Average
	5150.050	34.40	10.70	34.35	35.17	45.92	54.00	8.08	Average
@	5188.660	34.50	10.74	34.34	75.84	86.74	---	---	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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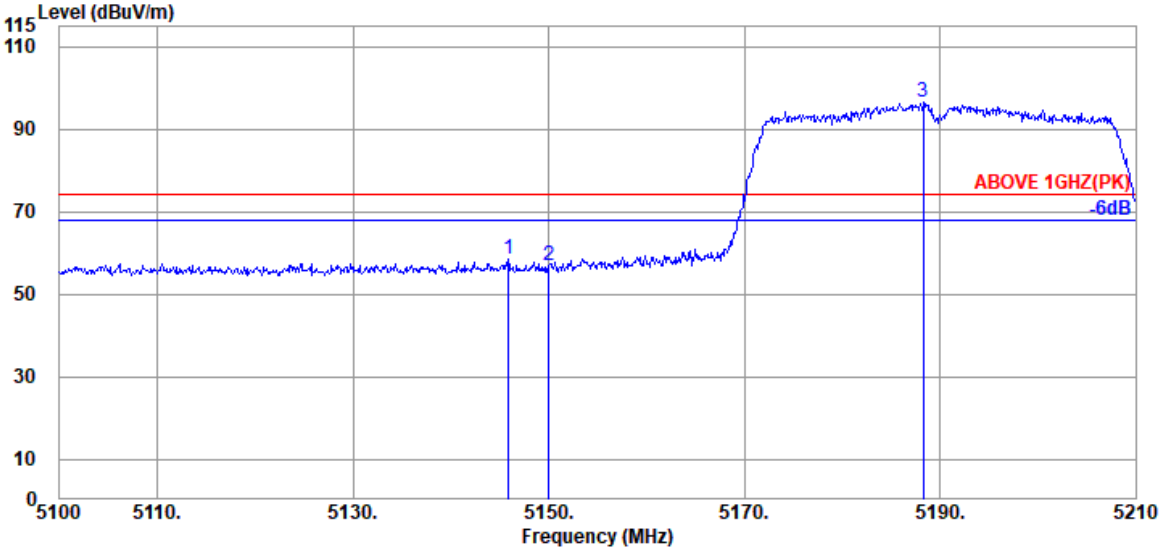
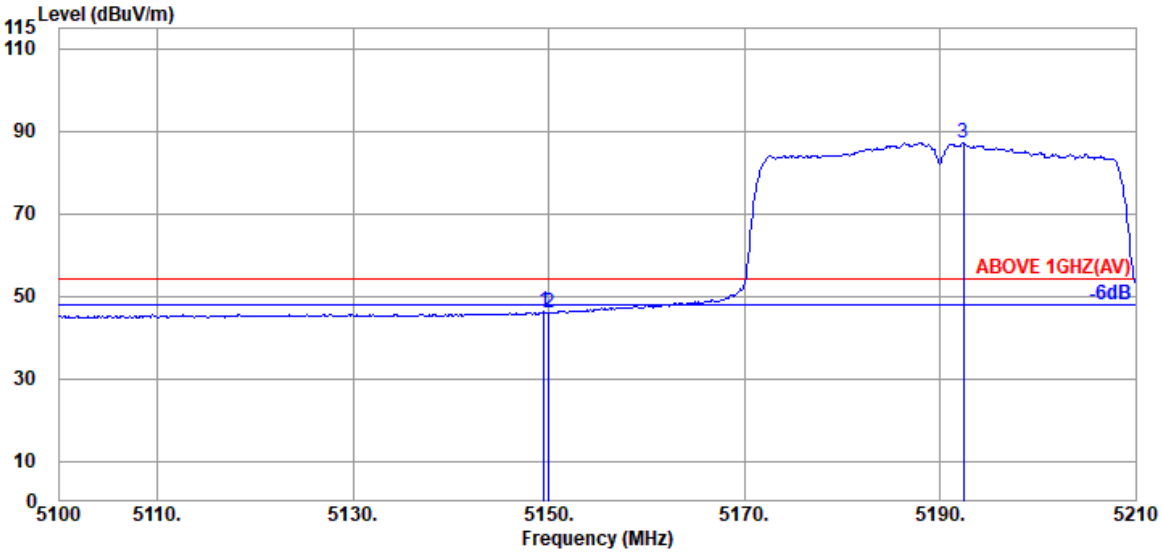
Mode	802.11n-HT40	U-NII Band	I
		Frequency	TX 5190MHz



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5145.870	34.40	10.70	34.35	47.67	58.42	74.00	15.58	Peak
	5150.050	34.40	10.70	34.35	46.08	56.83	74.00	17.17	Peak
@	5188.330	34.50	10.74	34.34	85.52	96.42	---	---	Peak



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5149.500	34.40	10.70	34.35	35.46	46.21	54.00	7.79	Average
	5150.050	34.40	10.70	34.35	35.12	45.87	54.00	8.13	Average
@	5192.400	34.50	10.74	34.34	76.34	87.24	---	---	Average

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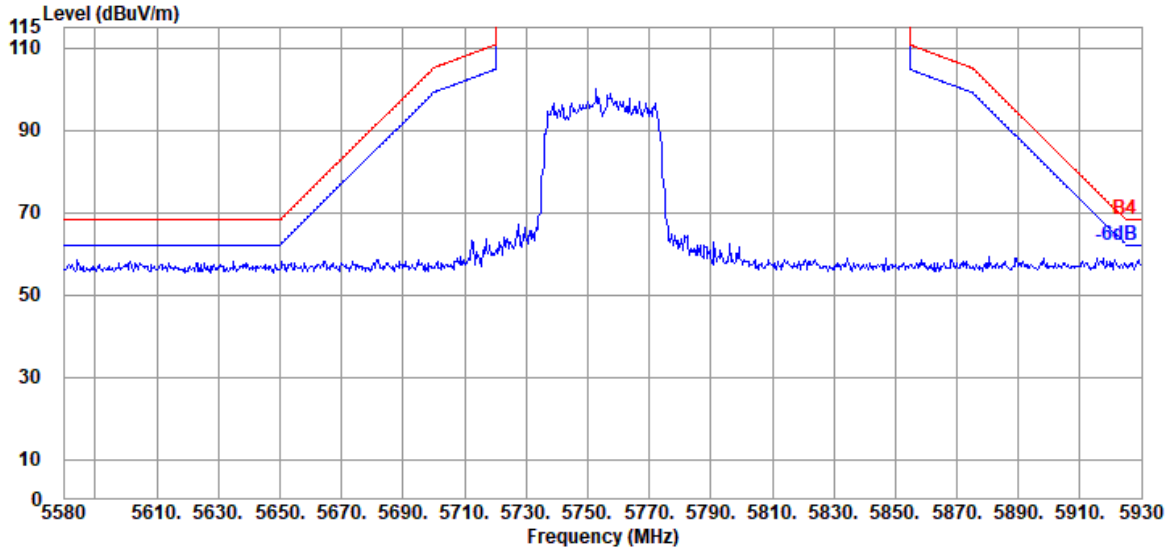
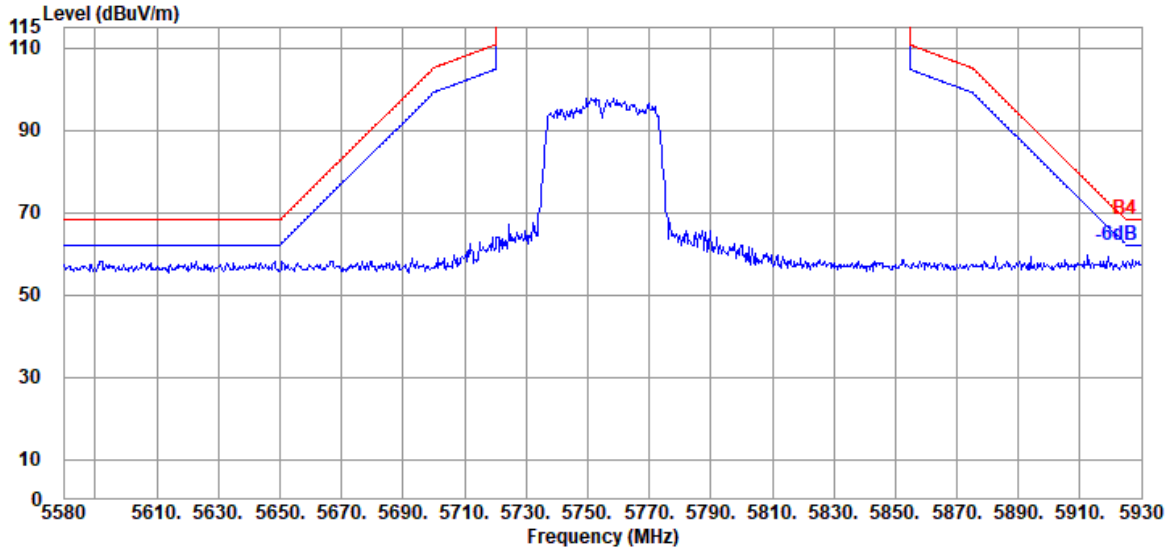
Mode	802.11n-HT40	U-NII Band	III
		Frequency	TX 5755MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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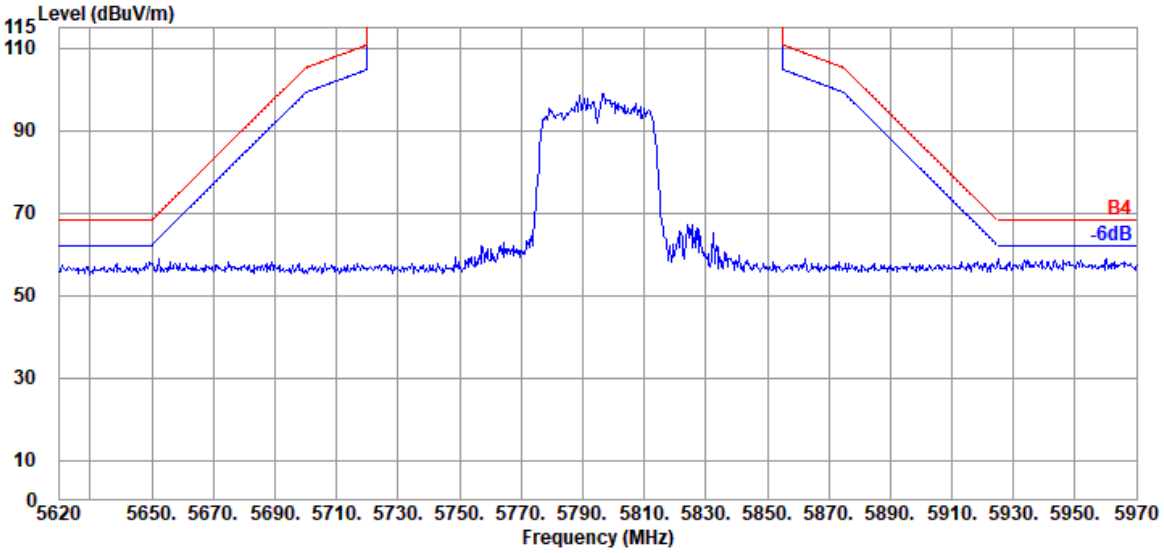
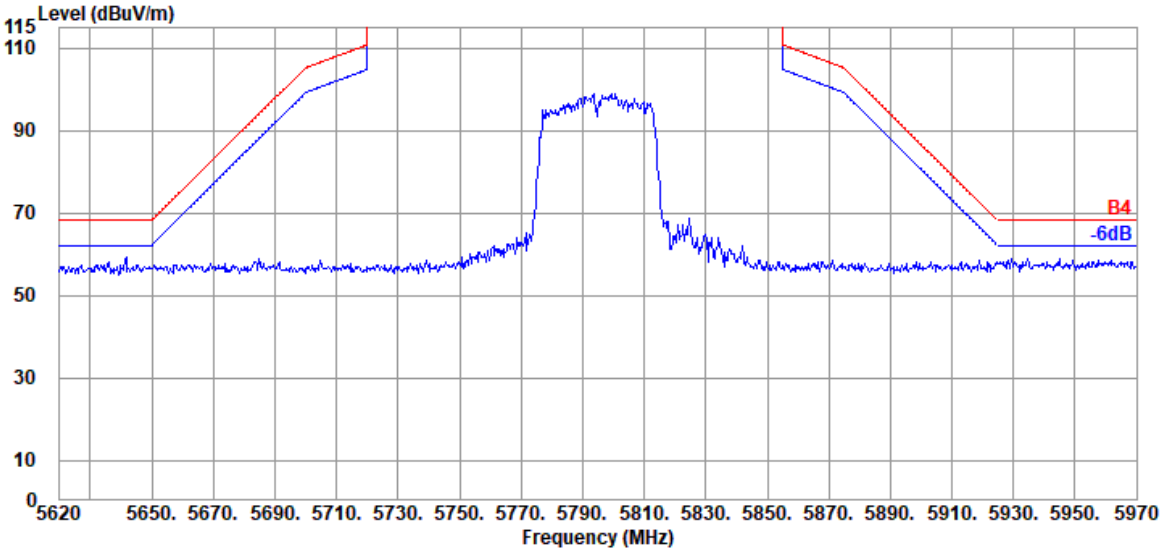
Mode	802.11n-HT40	U-NII Band	III
		Frequency	TX 5795MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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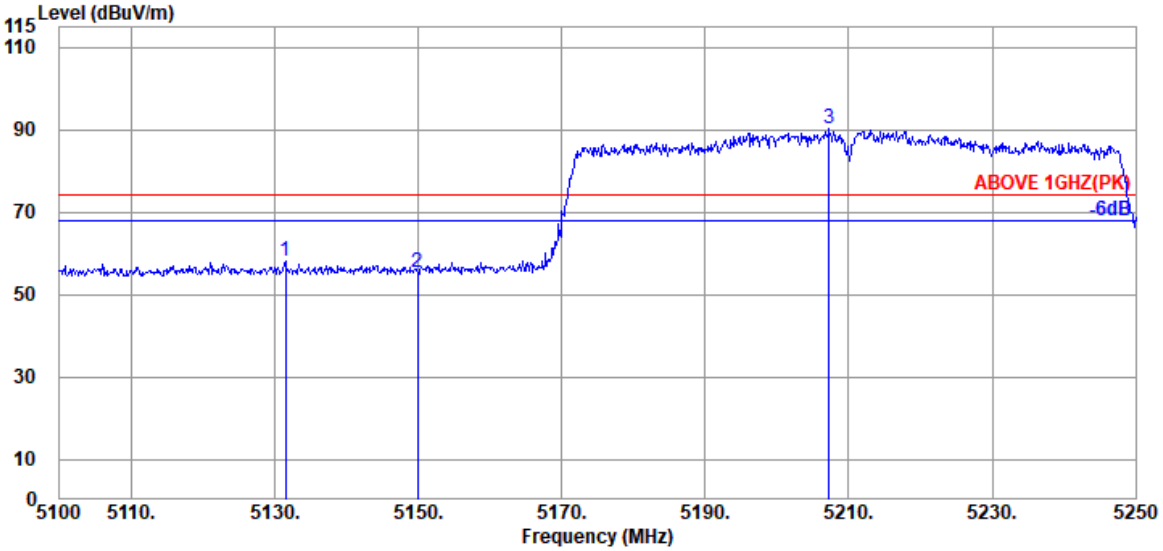
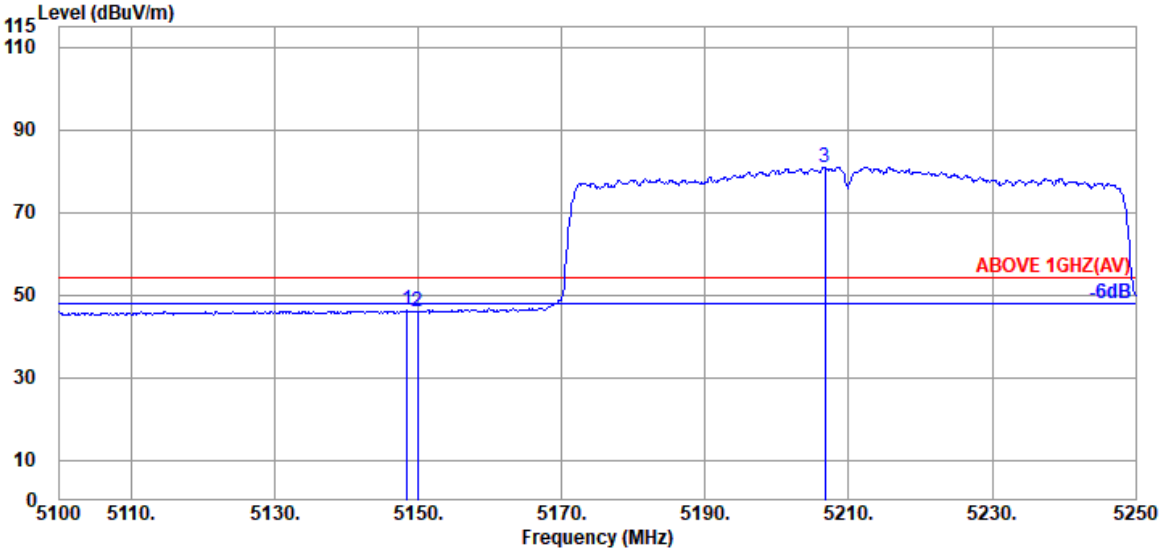
Mode	802.11ac-VHT80	U-NII Band	I
		Frequency	TX 5210MHz



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5131.500	34.37	10.70	34.36	47.23	57.94	74.00	16.06	Peak
	5149.950	34.40	10.70	34.35	44.66	55.41	74.00	18.59	Peak
@	5207.250	34.50	10.74	34.33	79.17	90.08	---	---	Peak



Antenna at Horizontal Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5148.450	34.40	10.70	34.35	35.38	46.13	54.00	7.87	Average
	5149.950	34.40	10.70	34.35	35.14	45.89	54.00	8.11	Average
@	5206.650	34.50	10.74	34.33	70.05	80.96	---	---	Average

Remark: The "@" means fundamental frequency, it is ignored in this section.

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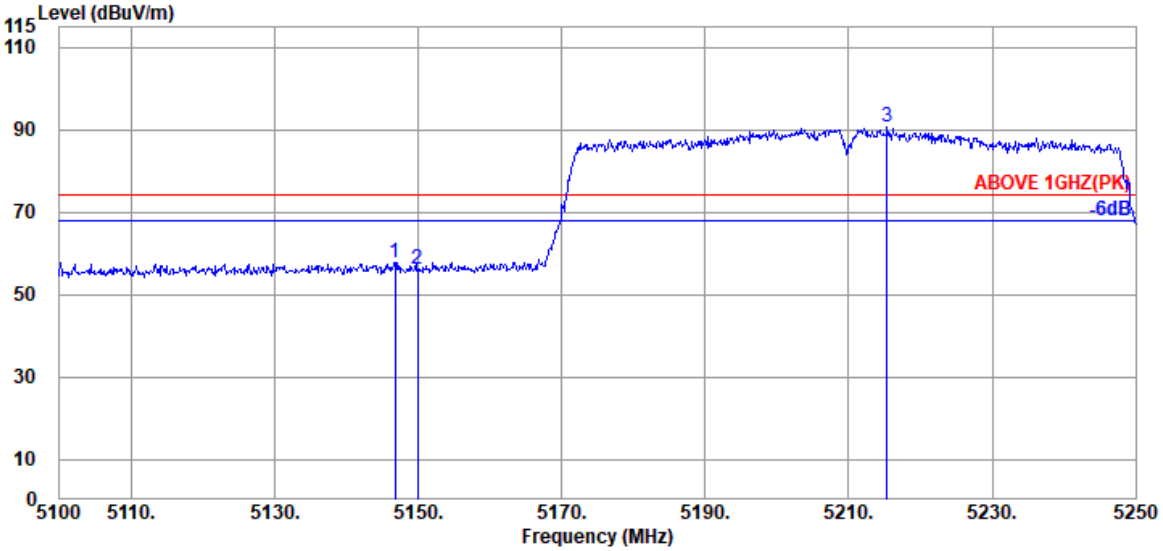
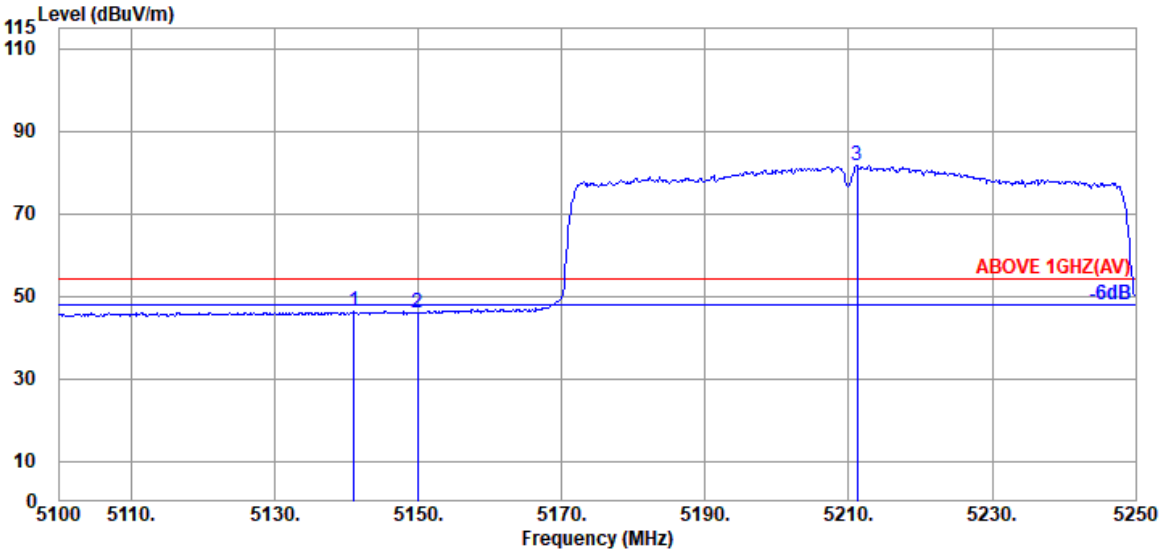
Mode	802.11ac-VHT80	U-NII Band	I
		Frequency	TX 5210MHz



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5146.800	34.40	10.70	34.35	47.14	57.89	74.00	16.11	Peak
	5149.950	34.40	10.70	34.35	45.28	56.03	74.00	17.97	Peak
@	5215.350	34.50	10.74	34.33	79.61	90.52	---	---	Peak



Antenna at Vertical Polarization

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
	5141.100	34.37	10.70	34.36	35.66	46.37	54.00	7.63	Average
	5149.950	34.40	10.70	34.35	35.32	46.07	54.00	7.93	Average
@	5211.150	34.50	10.74	34.33	70.71	81.62	---	---	Average

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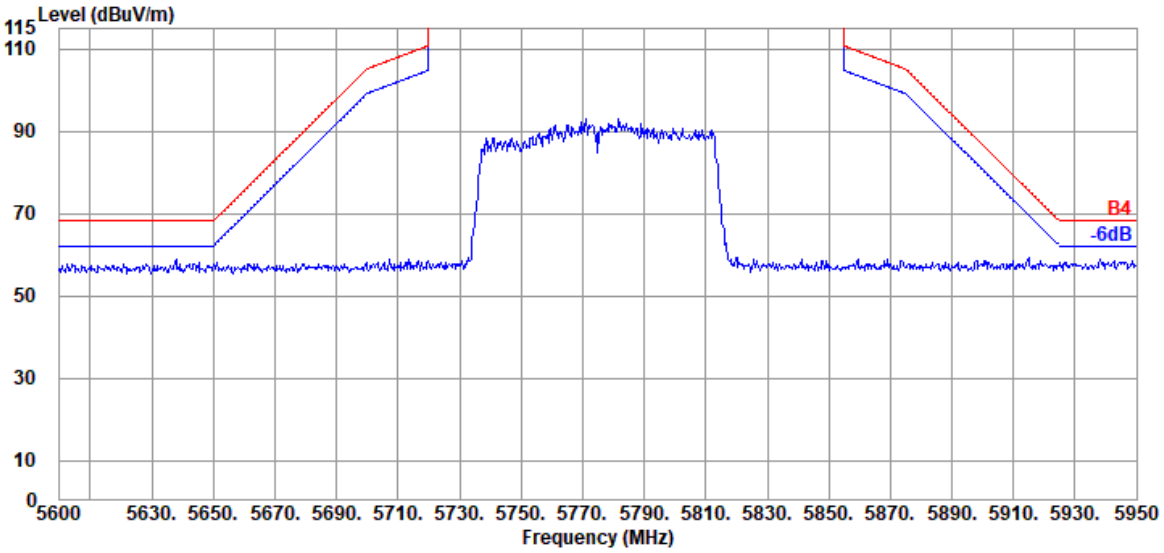
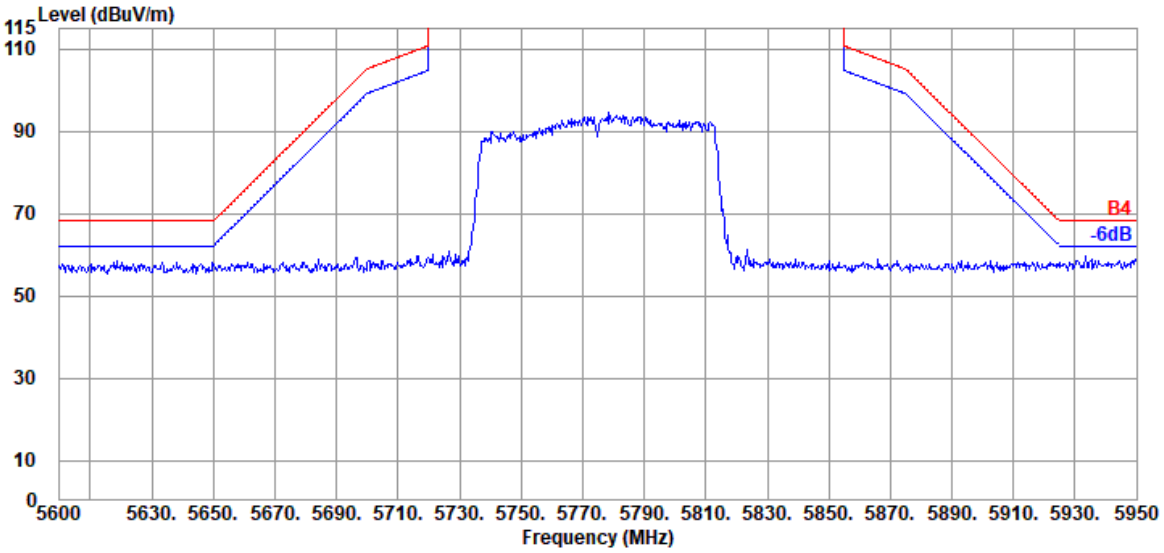
Mode	802.11ac-VHT80	U-NII Band	III
		Frequency	TX 5775MHz

Antenna at Horizontal Polarization



Antenna at Vertical Polarization



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A.2.2 Emissions outside the frequency band

The emissions (up to 40GHz) not reported for there is no emission be found.

Mode	802.11a	U-NII Band	NII-I
		Frequency	TX 5180MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10360.000	37.63	14.90	34.83	29.71	47.41	54.00	6.59	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10360.000	37.63	14.90	34.83	29.31	47.01	54.00	6.99	Peak

Mode	802.11a	U-NII Band	III
		Frequency	TX 5825MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.40	15.77	34.62	28.40	47.95	54.00	6.05	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.40	15.77	34.62	28.95	48.50	54.00	5.50	Peak

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Mode	802.11n-HT20	U-NII Band	I
		Frequency	TX 5200MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10400.000	37.70	14.90	34.78	30.06	47.88	54.00	6.12	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10400.000	37.70	14.90	34.78	29.33	47.15	54.00	6.85	Peak

Mode	802.11n-HT20	U-NII Band	III
		Frequency	TX 5825MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.40	15.77	34.62	28.60	48.15	54.00	5.85	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11650.000	38.40	15.77	34.62	27.99	47.54	54.00	6.46	Peak

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Mode	802.11n-HT40	U-NII Band	I
		Frequency	TX 5190MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10380.000	37.70	14.90	34.81	28.54	46.33	54.00	7.67	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10380.000	37.70	14.90	34.81	29.84	47.63	54.00	6.37	Peak

Mode	802.11n-HT40	U-NII Band	III
		Frequency	TX 5795MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11590.000	38.40	15.71	34.61	28.84	48.34	54.00	5.66	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11590.000	38.40	15.71	34.61	28.74	48.24	54.00	5.76	Peak

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Mode	802.11ac-VHT80	U-NII Band	I
		Frequency	TX 5210MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10420.000	37.70	14.94	34.78	29.48	47.34	54.00	6.66	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
10420.000	37.70	14.94	34.78	28.95	46.81	54.00	7.19	Peak

Mode	802.11ac-VHT80	U-NII Band	III
		Frequency	TX 5775MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.000	38.33	15.71	34.60	28.23	47.67	54.00	6.33	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
11550.000	38.33	15.71	34.60	28.72	48.16	54.00	5.84	Peak

A.2.3 Emissions in Non-restricted Frequency Bands

Pursuant to KDB 789033 D02 General UNII Test Procedures New Rules v02r01 that emission levels below the 15.209 general radiated emissions limits is not required.

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A.3 26dB/6dB BANDWIDTH

Test Date	2021/03/23	Temp./Hum.	17℃/63%
Cable Loss	2.60dB	Tested By	Sean Wang
Test Voltage	AC 120V 60Hz (Via AC Adapter)		

A.3.1 26dB/6dB Bandwidth Result

- For 26dB Bandwidth

Mode	U-NII Band	Centre Frequency (MHz)	26dB Bandwidth (MHz)	Occupied (99%) Bandwidth (MHz) (Reference only)	Limit
802.11a	I	5180	20.87	16.551	Reference only
		5200	21.12	16.559	
		5240	20.84	16.564	
802.11n-HT20	I	5180	21.09	17.718	Reference only
		5200	21.06	17.715	
		5240	21.13	17.734	
802.11n-HT40	I	5190	39.35	36.173	Reference only
		5230	39.29	36.118	
802.11ac-VHT80	I	5210	81.11	75.454	Reference only

- For 6dB Bandwidth

Mode	U-NII Band	Centre Frequency (MHz)	6dB Bandwidth (MHz)	Occupied (99%) Bandwidth (MHz) (Reference only)	Limit
802.11a	III	5745	16.32	16.532	≥ 500kHz
		5785	16.35	16.498	
		5825	16.32	16.464	
802.11n-HT20	III	5745	17.21	17.674	
		5785	17.58	17.649	
		5825	17.14	17.632	
802.11n-HT40	III	5755	35.78	36.139	
		5795	35.99	36.083	
802.11ac-VHT80	III	5775	75.84	75.396	

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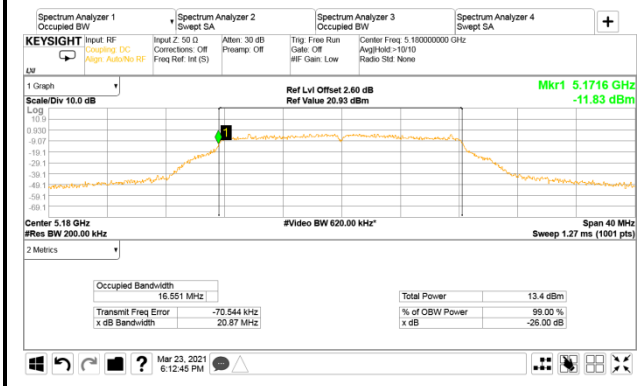
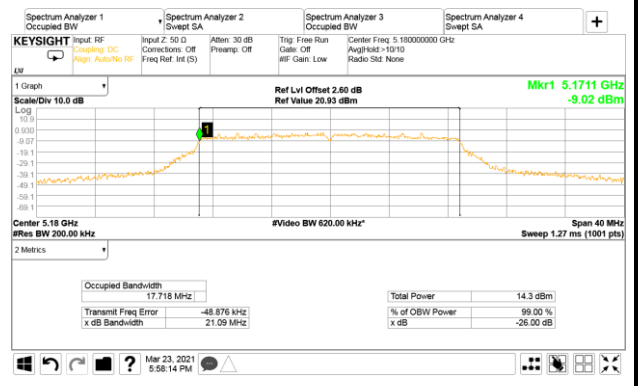
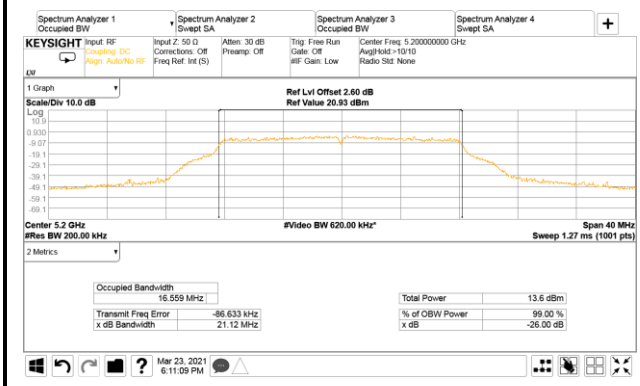
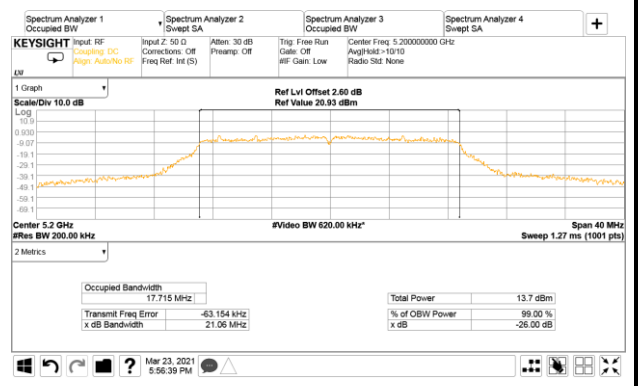
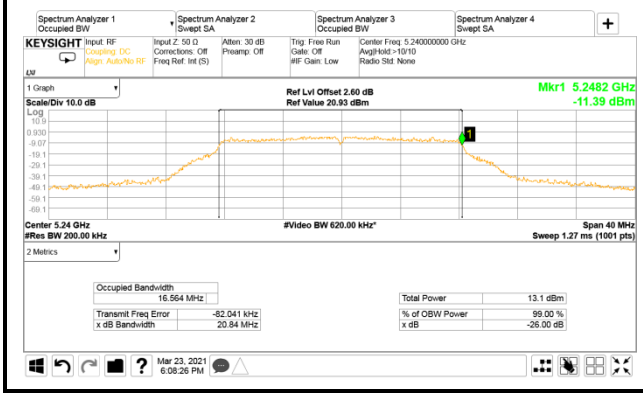
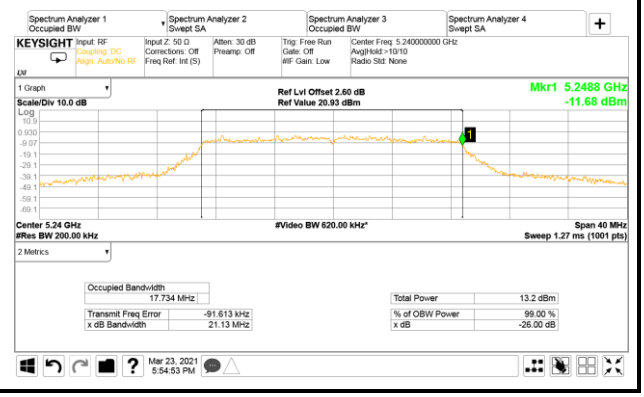
A.3.2 Measurement Plots

- For 26dB Bandwidth

Mode: 802.11a	802.11n-HT20
U-NII Band I	U-NII Band I
	
	
	

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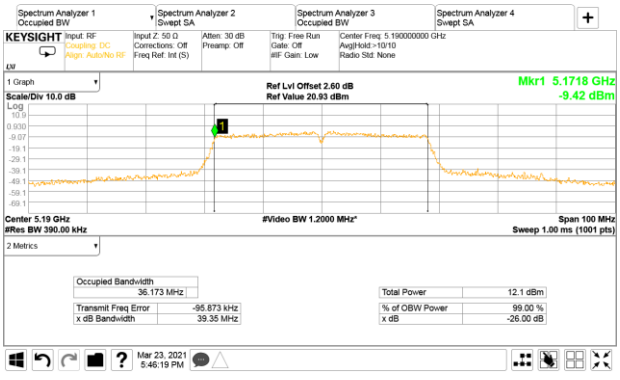
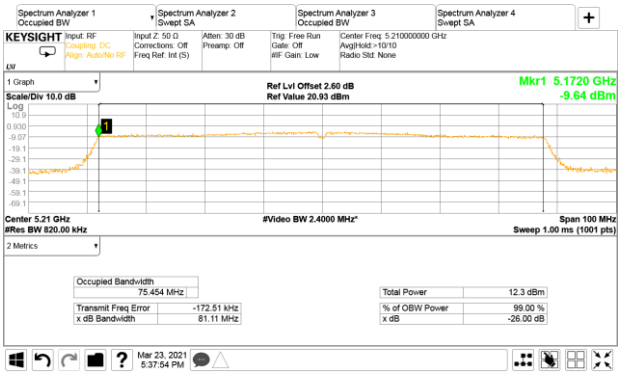
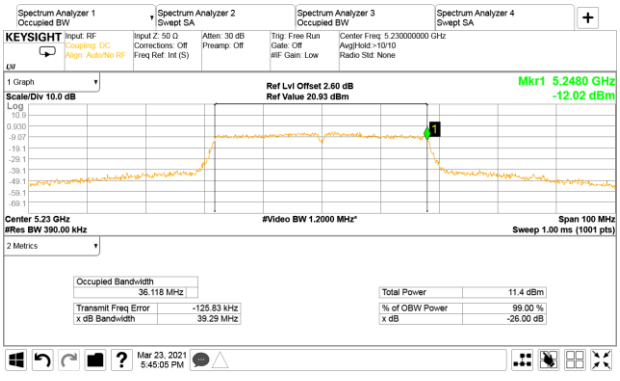
Mode: 802.11n-HT40	802.11ac-VHT80
U-NII Band I	U-NII Band I
	
	

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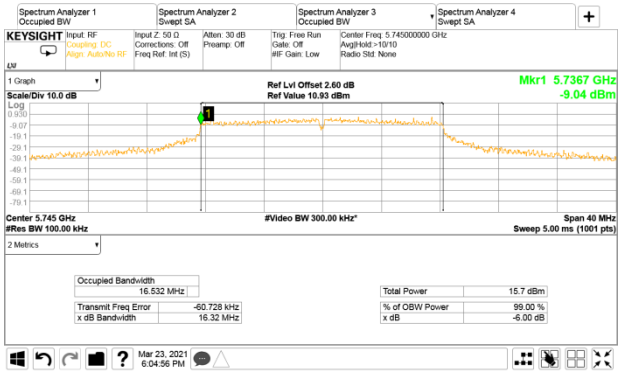
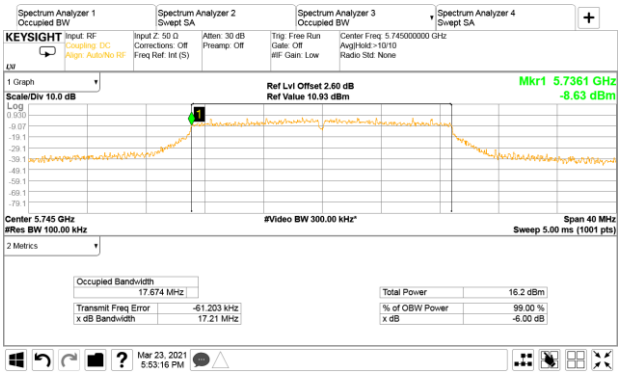
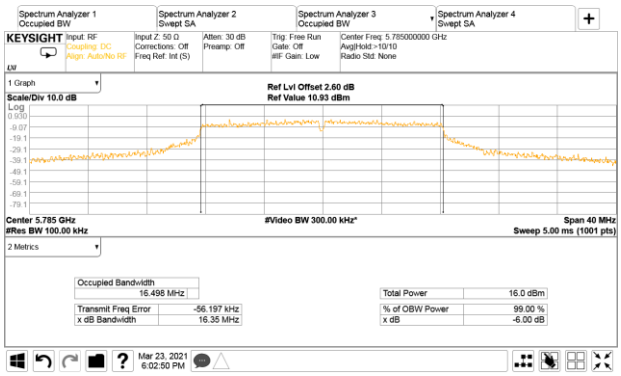
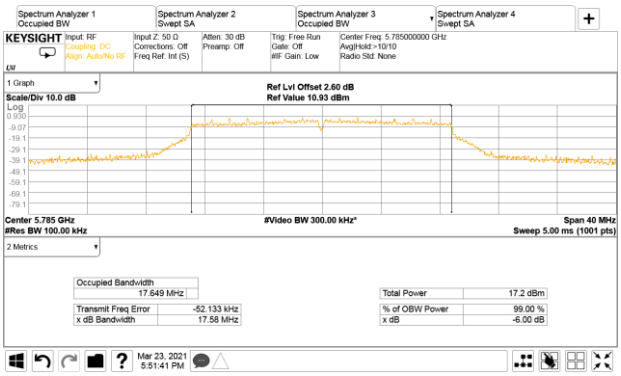
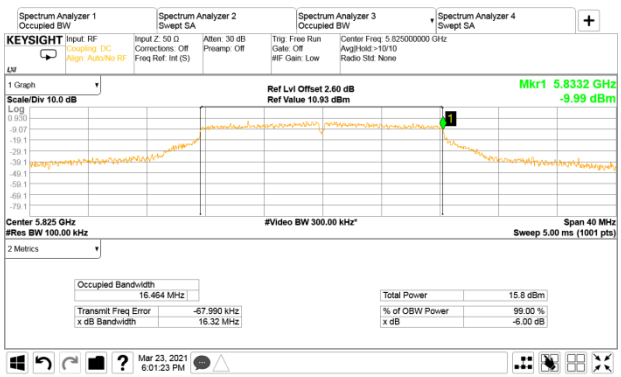
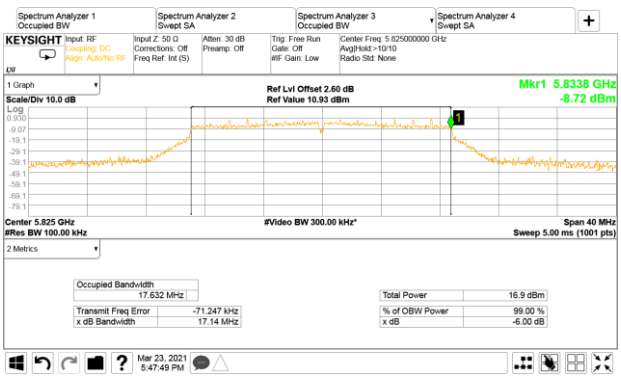
- For 6dB Bandwidth

Mode: 802.11a	Mode: 802.11n-HT20
U-NII Band III	U-NII Band III
	
	
	

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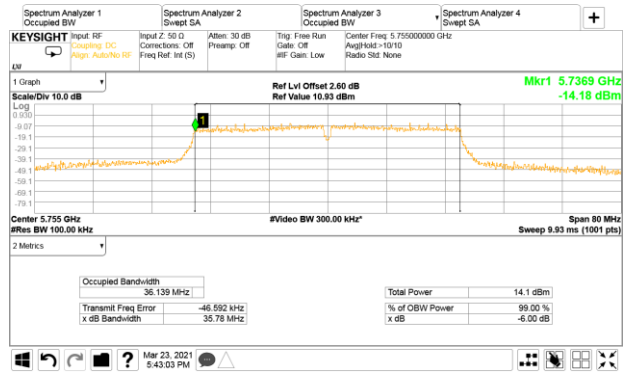
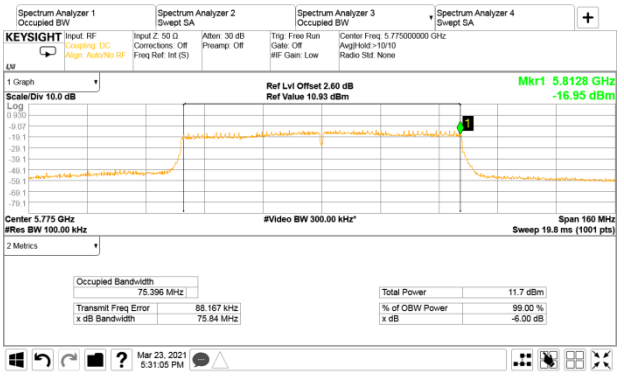
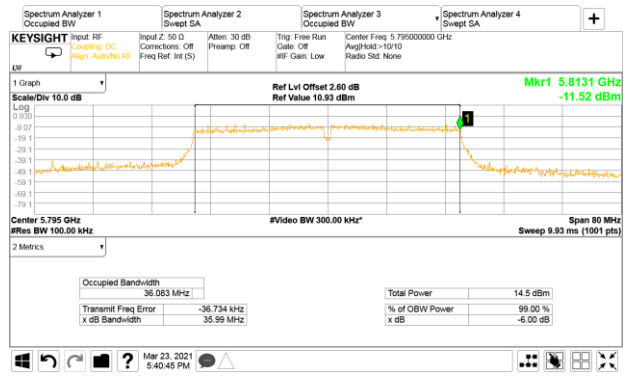
Mode: 802.11n-HT40	Mode: 802.11ac-VHT80
U-NII Band III	U-NII Band III
	
	

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A.4 MAXIMUM OUTPUT POWER

Test Date	2021/03/23	Temp./Hum.	17℃/63%
Cable Loss	2.60dB	Tested By	Sean Wang
Test Voltage	AC 120V 60Hz (Via AC Adapter)		

A.4.1 Average Output Power

Mode	U-NII Band	Centre Frequency (MHz)	Average Output Power(dBm)	10log (1/X)	Max Average Output Power		Limit
					(dBm)	(W)	
802.11a	I	5180	9.42	0.27	9.69	0.009	< 250 mW (24 dBm)
		5200	9.16		9.43	0.009	
		5240	9.03		9.30	0.009	
	III	5745	11.77		12.04	0.016	< 1 W (30 dBm)
		5785	11.84		12.11	0.016	
		5825	11.98		12.25	0.017	
802.11n-HT20	I	5180	9.65	0.29	9.94	0.010	< 250 mW (24 dBm)
		5200	9.71		10.00	0.010	
		5240	9.22		9.51	0.009	
	III	5745	12.14		12.43	0.017	< 1 W (30 dBm)
		5785	12.17		12.46	0.018	
		5825	12.31		12.60	0.018	
802.11n-HT40	I	5190	7.54	0.68	8.22	0.007	< 250 mW (24 dBm)
		5230	7.34		8.02	0.006	
	III	5755	10.16		10.84	0.012	< 1 W (30 dBm)
		5795	10.33		11.01	0.013	
802.11ac-VHT80	I	5210	3.39	1.18	4.57	0.003	< 250 mW (24 dBm)
	III	5775	6.66		7.84	0.006	< 1 W (30 dBm)

Note: The results have been included cable loss.

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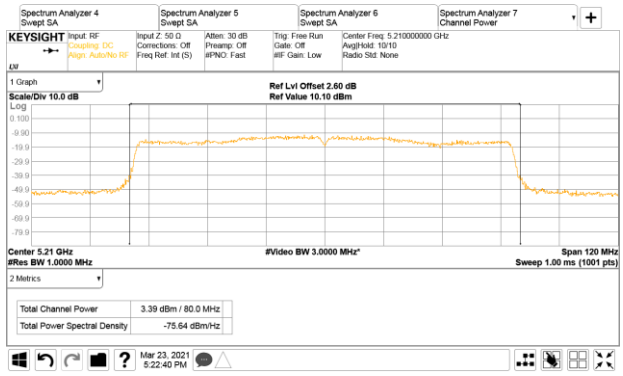
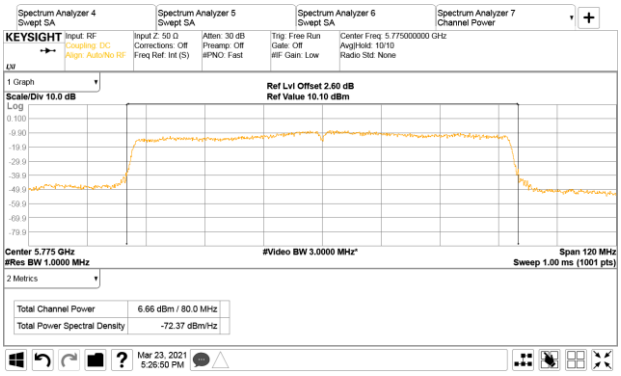
A.4.2 Measurement Plots

802.11ac-VHT80	
U-NII Band I	U-NII Band III
	

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A.5 POWER SPECTRAL DENSITY

Test Date	2021/03/23	Temp./Hum.	17℃/63%
Cable Loss	2.60dB	Tested By	Sean Wang
Test Voltage	AC 120V 60Hz (Via AC Adapter)		
Simultaneous Factor 10 log(n)(Note: "n" is antenna number)	0		

A.5.1 Power Spectral Density Result

Mode	U-NII Band	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
802.11a	I	5180	-1.641	11 dBm/MHz
		5200	-1.985	
		5240	-2.261	
	III[Note2]	5745	-1.023	30dBm/500 kHz
		5785	-0.669	
		5825	-0.922	
802.11n-HT20	I	5180	-1.342	11 dBm/MHz
		5200	-1.561	
		5240	-1.775	
	III[Note2]	5745	-0.732	30dBm/500 kHz
		5785	-0.498	
		5825	-0.640	
802.11n-HT40	I	5190	-6.255	11 dBm/MHz
		5230	-6.111	
	III[Note2]	5755	-5.928	30dBm/500 kHz
		5795	-5.237	
802.11ac-VHT80	I	5210	-11.314	11 dBm/MHz
	III [Note2]	5775	-10.624	30dBm/500 kHz

Note 1: All results have been included cable loss and Simultaneous Factor.

Note 2: BWCF 6.99dB (100kHz converted to 500kHz) has been included in the test result.

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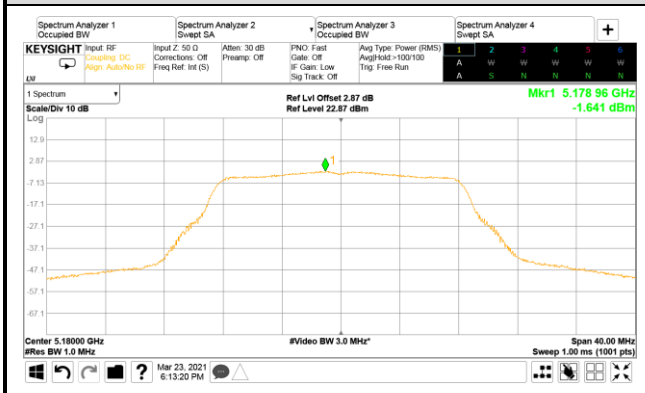
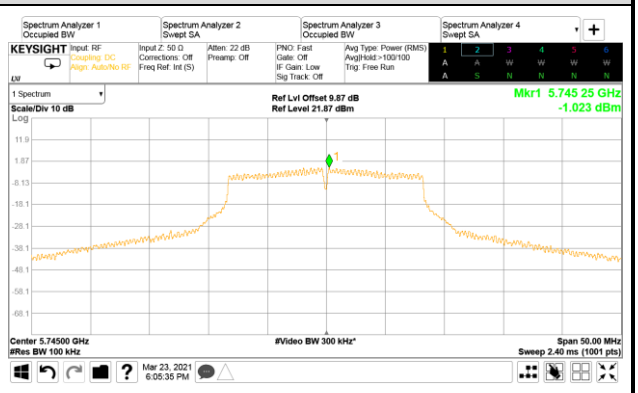
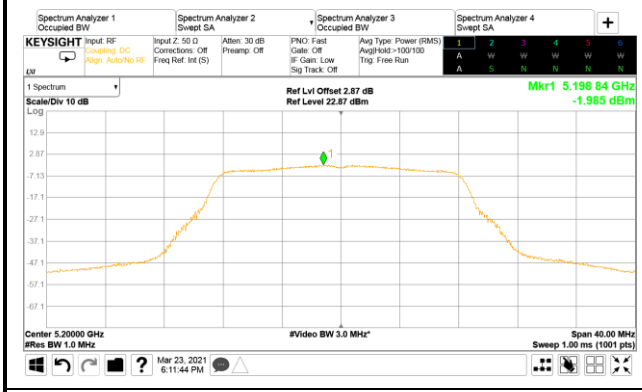
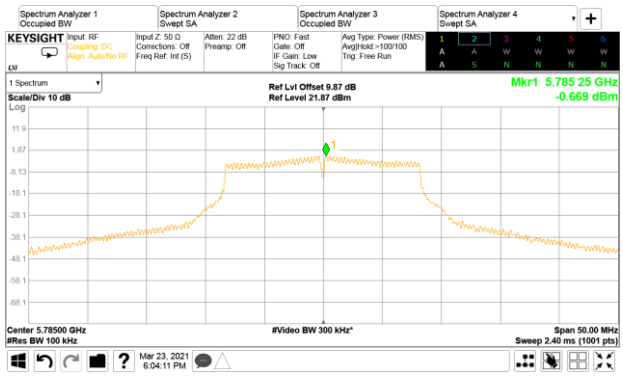
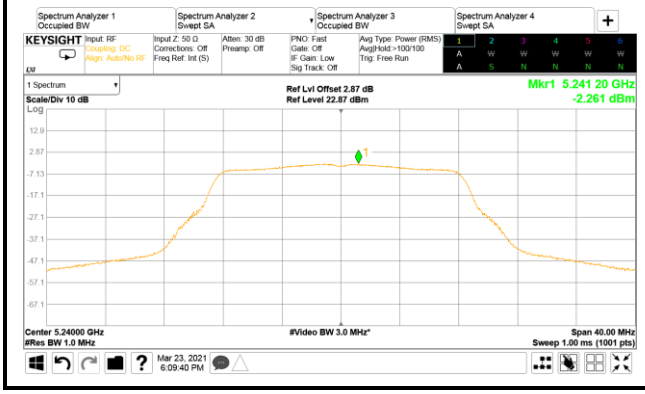
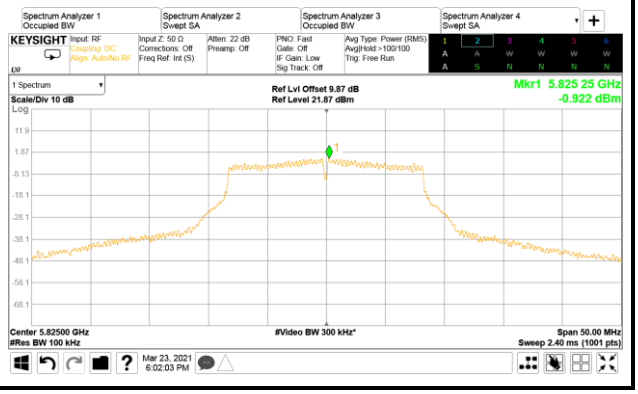
A.5.2 Measurement Plots

Mode: 802.11a	
U-NII Band I	U-NII Band III
	
	
	

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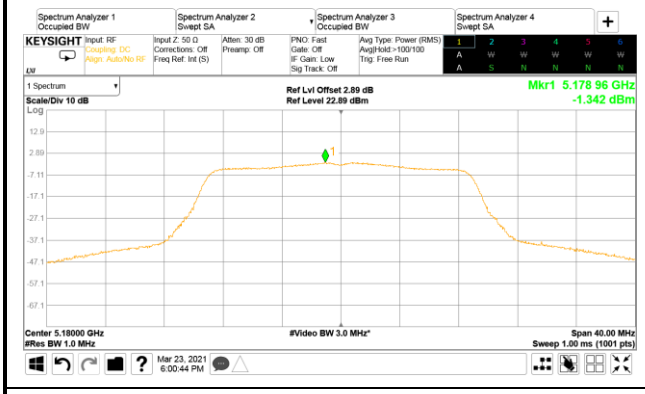
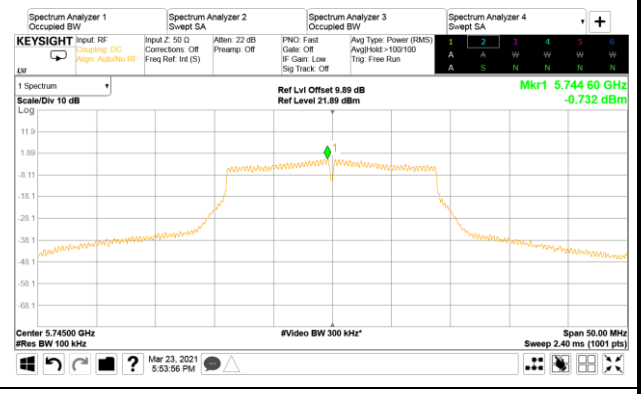
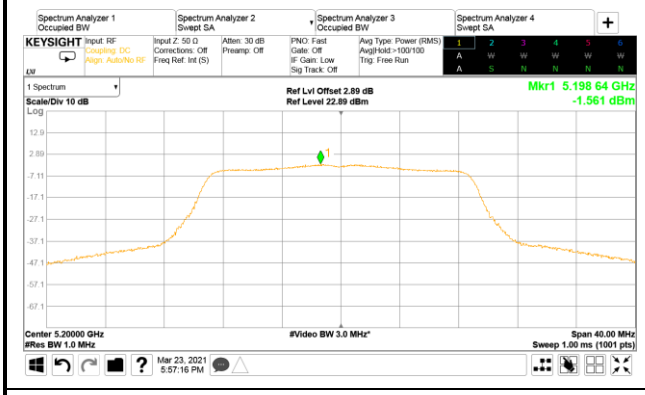
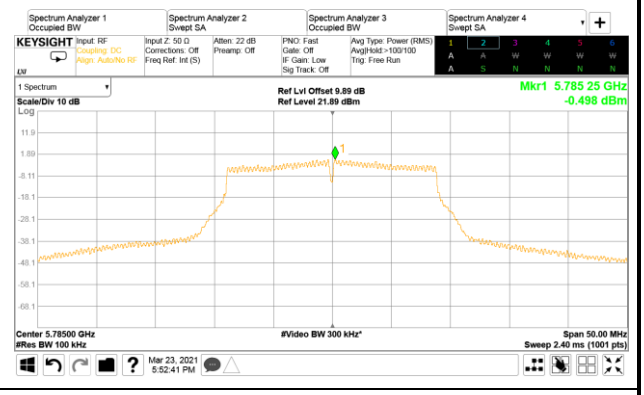
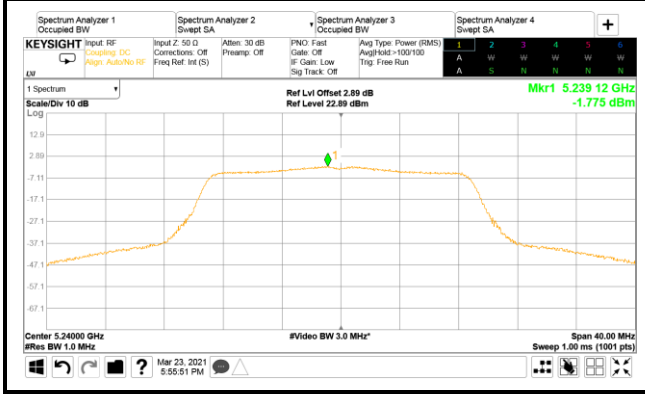
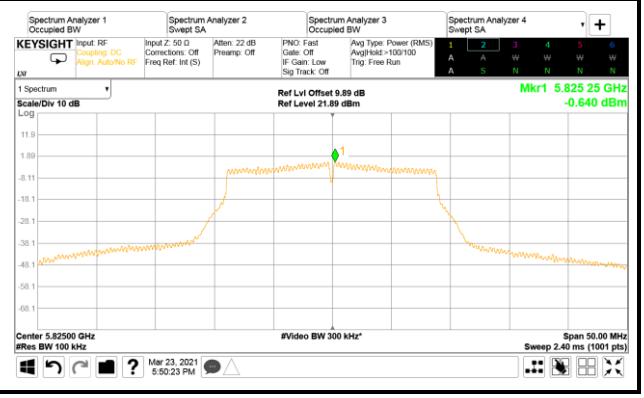
Mode: 802.11n-HT20	
U-NII Band I	U-NII Band III
	
	
	

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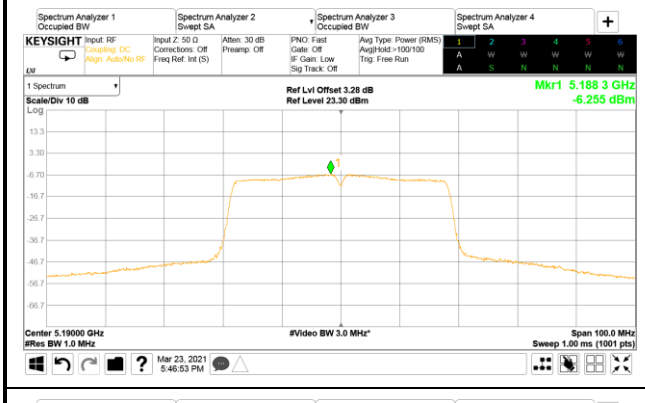
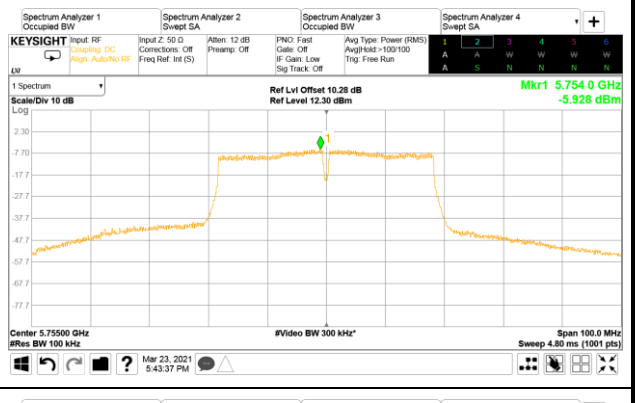
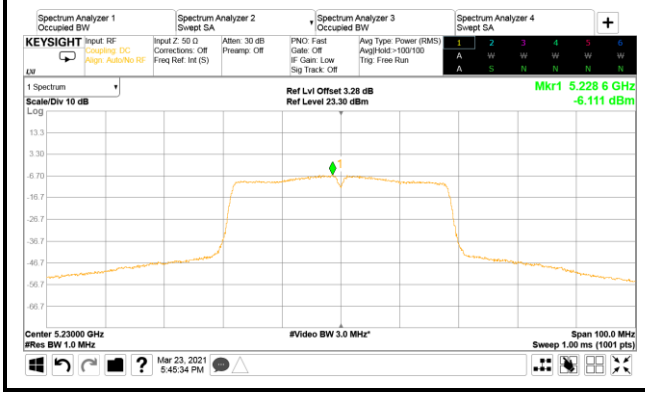
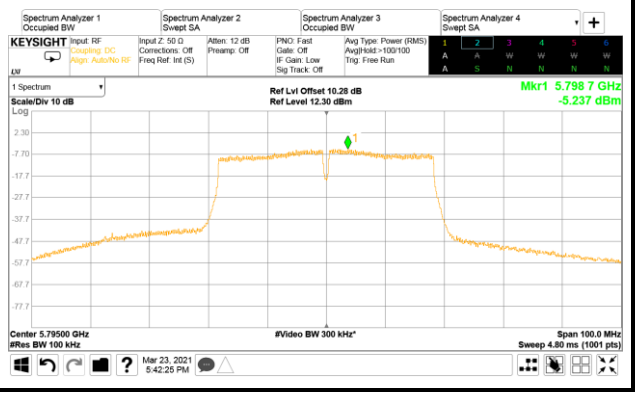
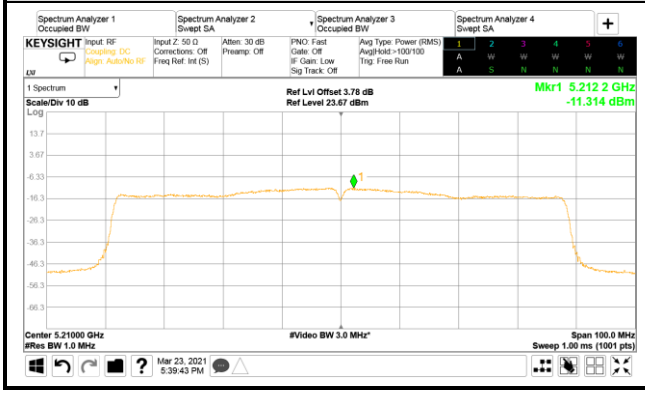
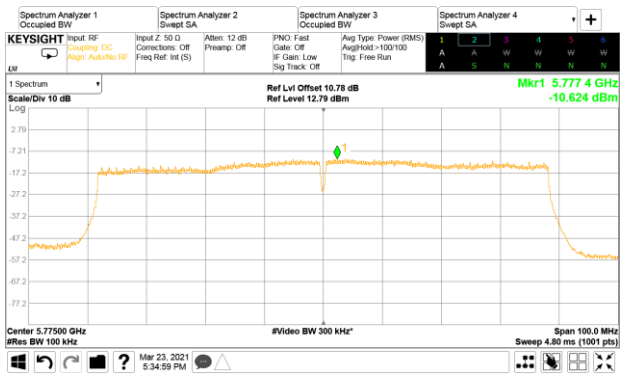
Mode: 802.11n-HT40	
U-NII Band I	U-NII Band III
	
	

Mode: 802.11ac-VHT80	
U-NII Band I	U-NII Band III
	

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A.6 FREQUENCY STABILITY

Test Date	2021/03/23	Temp./Hum.	17℃/63%
Cable Loss	---	Tested By	Sean Wang
Test Voltage	AC 120V 60Hz (Via AC Adapter)		

A.6.1 Frequency stability Result

Temperature (℃)	Voltage (Vac)	Centre Frequency (MHz)	Measurement Value (MHz)	Frequency Stability (ppm)
25	120	5180	5180.013	2.510
-30	102		5179.991	-1.737
	138		5179.995	-0.965
-20	102		5180.014	2.703
	138		5179.994	-1.158
-10	102		5179.989	-2.124
	138		5180.015	2.896
0	102		5180.011	2.124
	138		5180.003	0.579
10	102		5180.016	3.089
	138		5180.021	4.054
20	102		5179.989	-2.124
	138		5180.014	2.703
30	102		5179.996	-0.772
	138		5180.006	1.158
40	102		5180.014	2.703
	138		5180.002	0.386
50	102		5179.995	-0.965
	138		5180.014	2.703

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APPDNDIX B

TEST PHOTOGRAPHS

(Model: (1)ITS-GW01-A10-C001 (2)ITS-GW01-A10-C002)

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