TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart E (Section 15.407)**
Report No.:	RFBERD-WTW-P22090179-6
FCC ID:	TVE-391CBE0291
Product:	Secured Wireless Access Point
Brand:	FORTINET
Test Model:	FAP-U231G
Series Model:	FortiAP U231Gxxxxxx, FAP-U231Gxxxxxx, FORTIAP-U231Gxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)
Received Date:	2022/9/6
Test Date:	2022/9/23 ~ 2023/2/14
Issued Date:	2023/3/21
Applicant:	Fortinet, Inc.
Address:	899 Kifer Road, Sunnyvale, CA 94086, USA
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
Test Location (2):	B2F., No. 215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan
FCC Registration / Designation Number(1):	788550 / TW0003
FCC Registration / Designation Number(2):	427177 / TW0011

Approved by: Jeremy Lin , **Date:** 2023/3/21

Jeremy Lin / Project Engineer

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Prepared by : Pettie Chen / Senior Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBERD-WTW-P22090179-6	Original release.	2023/3/21

1 Certificate

Product:	Secured Wireless Access Point
Brand:	FORTINET
Test Model:	FAP-U231G
Series Model:	FortiAP U231Gxxxxxx, FAP-U231Gxxxxxx, FORTIAP-U231Gxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)
Sample Status:	Engineering sample
Applicant:	Fortinet, Inc.
Test Date:	2022/9/23 ~ 2023/2/14
Standard:	47 CFR FCC Part 15, Subpart E (Section 15.407)
Measurement procedure:	ANSI C63.10-2013 KDB 789033 D02 General UNII Test Procedure New Rules v02r01 KDB 662911 D01 Multiple Transmitter Output v02r01

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(a)(2)	26 dB Bandwidth	Pass	For U-NII-2A U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	RF Output Power	Pass	Meet the requirement of limit.
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Power Spectral Density	Pass	Meet the requirement of limit.
---	Occupied Bandwidth	-	Reference only.
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.407(b)(9)	AC Power Conducted Emissions	Pass	Minimum passing margin is -10.21 dB at 0.35800 MHz
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -3.0 dB at 530.90 MHz
15.407(b) (1/10) 15.407(b) (2/10) 15.407(b) (3/10) 15.407(b) (4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -1.0 dB at 5470.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is IPEX not a standard connector.

Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Parameter	Specification	Expanded Uncertainty (k=2) (±)
Occupied Bandwidth	-	491.896 Hz
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.99 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	2.44 dB
	30 MHz ~ 1 GHz	2.02 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	1.01 dB
	18 GHz ~ 40 GHz	1.15 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Secured Wireless Access Point
Brand	FORTINET
Test Model	FAP-U231G
Series Model	FortiAP U231Gxxxxxx, FAP-U231Gxxxxxx, FORTIAP-U231Gxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)
Status of EUT	Engineering sample
Power Supply Rating	12Vdc from adapter 56Vdc from POE
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20/40): up to 300Mbps VHT20/40/80/160: up to 1733.3Mbps 802.11ax: up to 2401.9Mbps
Operating Frequency	**Radio 1:** 5.5 GHz ~ 5.72 GHz **Radio 2:** 5.26 GHz ~ 5.32 GHz, 5.5 GHz ~ 5.72 GHz **Radio 3:** 5.25 GHz ~ 5.32 GHz, 5.5 GHz ~ 5.72 GHz
Number of Channel	Radio 1: 5500 ~ 5720MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 12 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 6 802.11ac (VHT80), 802.11ax (HE80): 3 Radio 2: 5260 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5500 ~ 5720MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 12 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 6 802.11ac (VHT80), 802.11ax (HE80): 3 Radio 3: 5250 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 802.11ac (VHT160), 802.11ax (HE160): 1 5500 ~ 5720MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 12 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 6 802.11ac (VHT80), 802.11ax (HE80): 3 802.11ac (VHT160), 802.11ax (HE160): 1

Output Power	**Radio 1:** 5500 ~ 5720MHz: CDD: 229.648 mW (23.61 dBm) Beamforming: 136.308 mW (21.35 dBm) **Radio 2:** 5260 ~ 5320MHz: CDD: 207.821 mW (23.18 dBm) Beamforming: 163.393 mW (22.13 dBm) 5500 ~ 5720MHz: CDD: 234.611 mW (23.70 dBm) Beamforming: 139.015 mW (21.43 dBm) **Radio 3:** 5250 ~ 5320MHz: CDD: 221.605 mW (23.46 dBm) Beamforming: 159.614 mW (22.03 dBm) 5500 ~ 5720MHz: CDD: 240.18 mW (23.81 dBm) Beamforming: 130.962 mW (21.17 dBm)
EUT Category	Indoor Access Point

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of BV CPS report no.: RFBERD-WTW-P22090179-3. Difference compared with the original report is adding 5250~5320MHz and 5500~5720MHz band. Therefore, the EUT was tested and presented in the test report.
2. The following models are provided to this EUT. The model FAP-U231G was chosen for final test.

Brand	Model	Description
FORTINET	FAP-U231G	Series model for marketing purpose
	FortiAP U231Gxxxxxx, FAP-U231Gxxxxxx, FORTIAP-U231Gxxxxxx (Where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)	

3. The EUT consumes power from the following POE and adapter. (Support unit only)

POE (Support unit only)	
Brand	Engenius
Model	PNA90BGS-54
Input Power	100-240V ~1.5A, 50-60Hz
Output Power	56V, 1.7A

AC Adapter 1 (Support unit only)	
Brand	Asian Power Devices Inc.
Model	WA-30J12R
Input Power	100-240Vac ~50-60Hz, 0.9A Max
Output Power	12Vdc, 2.5A
DC Output Cable	1.48m non-shielded cable without core

AC Adapter 2 (Support unit only)	
Brand	Asian Power Devices Inc.
Model	WA-48A12R
Input Power	100-240Vac ~50-60Hz, 1.5A Max
Output Power	12Vdc, 4.0A
DC Output Cable	1.46m non-shielded cable without core

4. The simultaneous operation mode was determined by client.

No	Mode
1	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + BLE
2	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + Zigbee
3	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 5GHz radio (Radio 3) + BLE
4	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 5GHz radio (Radio 3) + Zigbee
5	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 6GHz radio (Radio 3) + BLE
6	2.4GHz radio (Radio 1) + 5GHz radio (Radio 2) + 6GHz radio (Radio 3) + Zigbee
7	5GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + BLE
8	5GHz radio (Radio 1) + 5GHz radio (Radio 2) + 2.4GHz radio (Radio 3) + Zigbee

* 5GHz radio (Radio 2) and 5GHz radio (Radio 3) cannot transmit in the same band at same time.
* Zigbee and BT technologies cannot transmit at same time.
* The emission of the simultaneous operation has been evaluated and no non-compliance was found.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna Type	PIFA
Connector Type	IPEX

Antenna NO.	RF Chain NO.	Brand	Model	Antenna Net Gain (dBi)	Frequency range
ANT0(D1)	Radio 1 2G (Chain 0) Radio 1 5G (Chain 0)	INPAQ	46-500534-01	3.89	2.4~2.4835GHz
				4.76	5.15~5.25GHz
				4.96	5.25~5.35GHz
				5.75	5.47~5.725GHz
				5.78	5.725~5.85GHz
ANT1(D2)	Radio 1 2G (Chain 1) Radio 1 5G (Chain 1)	INPAQ	46-500534-01	3.83	2.4~2.4835GHz
				4.50	5.15~5.25GHz
				4.72	5.25~5.35GHz
				5.46	5.47~5.725GHz
				5.54	5.725~5.85GHz
ANT2(D3)	Radio 3 2G (Chain 0) Radio 3 5G (Chain 0)	INPAQ	46-500534-01	3.78	2.4~2.4835GHz
				5.47	5.15~5.25GHz
				5.28	5.25~5.35GHz
				5.78	5.47~5.725GHz
				5.42	5.725~5.85GHz
ANT3(D4)	Radio 3 2G (Chain 1) Radio 3 5G (Chain 1)	INPAQ	46-500534-01	3.75	2.4~2.4835GHz
				4.00	5.15~5.25GHz
				4.55	5.25~5.35GHz
				5.77	5.47~5.725GHz
				5.32	5.725~5.85GHz
ANT5(5G1)	Radio 2 5G (Chain 0)	INPAQ	46-500534-01	4.66	5.15~5.25GHz
				4.75	5.25~5.35GHz
				5.56	5.47~5.725GHz
				5.59	5.725~5.85GHz
ANT6(5G2)	Radio 2 5G (Chain 1)	INPAQ	46-500534-01	5.19	5.15~5.25GHz
				4.93	5.25~5.35GHz
				5.53	5.47~5.725GHz
				5.24	5.725~5.85GHz

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

2. The EUT incorporates a MIMO function:

Radio 1, Radio 2		
5 GHz Band		
Modulation Mode	TX & RX Configuration	
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
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11a modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), 802.11ac mode for 20 MHz (40 MHz, 80 MHz) and 802.11ax mode for 20 MHz (40 MHz, 80 MHz), therefore the manufacturer will control the power for 802.11n/ac mode is the same as the 802.11ax or more lower than it and investigated worst case to representative mode in test report.
4. The device didn't support Partial RU (Tone RU) with OFDMA Mode.

Radio 3		
5 GHz Band		
Modulation Mode	TX & RX Configuration	
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
802.11ac (VHT160)	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX
802.11ax (HE160)	2TX	2RX

Note:
1. All of modulation mode support beamforming function except 802.11a modulation mode.
2. The EUT support Beamforming and CDD mode, therefore both mode were investigated and the worst case scenario was identified. The worst case data were presented in test report.
3. The modulation and bandwidth are similar for 802.11n mode for 20 MHz (40 MHz), 802.11ac mode for 20 MHz (40 MHz, 80 MHz, 160 MHz) and 802.11ax mode for 20 MHz (40 MHz, 80 MHz, 160 MHz), therefore the manufacturer will control the power for 802.11n/ac mode is the same as the 802.11ax or more lower than it and investigated worst case to representative mode in test report.
4. The device didn't support Partial RU (Tone RU) with OFDMA Mode.

3.3 Channel List

FOR 5250 ~ 5320 MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
58	5290 MHz

1 straddle channel is provided for 802.11ac (VHT160), 802.11ax (HE160):

Channel	Frequency
50	5250 MHz

FOR 5500 ~ 5720 MHz

12 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

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), 802.11ax (HE80):

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

1 straddle channel is provided for 802.11ac (VHT160), 802.11ax (HE160):

Channel	Frequency
114	5570 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. The EUT has 2 power modes: AC adapter/PoE. Pre-scan these modes and find the worst case as a representative test condition.
Worst Case:	1. X-axis/ Y-axis/ Z-axis Worst Condition: X-axis 2. Worst Condition: Adapter 1 & PoE

Following channel(s) was (were) selected for the final test as listed below:

Test Item	EUT Configure Mode	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
26 dB Bandwidth	A	802.11a	CDD	100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	106, 122, 138	BPSK	MCS0
	C	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	58, 106, 122, 138	BPSK	MCS0
	E	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	58, 106, 122, 138	BPSK	MCS0
		802.11ax (HE160)	CDD	50, 114	BPSK	MCS0

Test Item	EUT Configure Mode	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
RF Output Power	A	802.11a	CDD	100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD & Beamforming	100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD & Beamforming	102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD & Beamforming	106, 122, 138	BPSK	MCS0
	C	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD & Beamforming	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD & Beamforming	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD & Beamforming	58, 106, 122, 138	BPSK	MCS0
	E	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD & Beamforming	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD & Beamforming	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD & Beamforming	58, 106, 122, 138	BPSK	MCS0
		802.11ax (HE160)	CDD & Beamforming	50, 114	BPSK	MCS0
Power Spectral Density / Occupied Bandwidth	A	802.11a	CDD	100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	106, 122, 138	BPSK	MCS0
	C	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	58, 106, 122, 138	BPSK	MCS0
	E	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	58, 106, 122, 138	BPSK	MCS0
		802.11ax (HE160)	CDD	50, 114	BPSK	MCS0

Test Item	EUT Configure Mode	Mode	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
Frequency Stability	A	802.11a	CDD	100	un-modulation	-
	C	802.11a	CDD	100	un-modulation	-
	E	802.11a	CDD	100	un-modulation	-
AC Power Conducted Emissions	A, B	802.11ax (HE40)	CDD	110	BPSK	MCS0
	C, D	802.11ax (HE40)	CDD	54	BPSK	MCS0
	E, F	802.11ax (HE40)	CDD	110	BPSK	MCS0
Unwanted Emissions below 1 GHz	A, B	802.11ax (HE40)	CDD	110	BPSK	MCS0
	C, D	802.11ax (HE40)	CDD	54	BPSK	MCS0
	E, F	802.11ax (HE40)	CDD	110	BPSK	MCS0
Unwanted Emissions above 1 GHz	A	802.11a	CDD	100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	106, 122, 138	BPSK	MCS0
	C	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	58, 106, 122, 138	BPSK	MCS0
	E	802.11a	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s
		802.11ax (HE20)	CDD	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0
		802.11ax (HE40)	CDD	54, 62, 102, 110, 134, 142	BPSK	MCS0
		802.11ax (HE80)	CDD	58, 106, 122, 138	BPSK	MCS0
		802.11ax (HE160)	CDD	50, 114	BPSK	MCS0

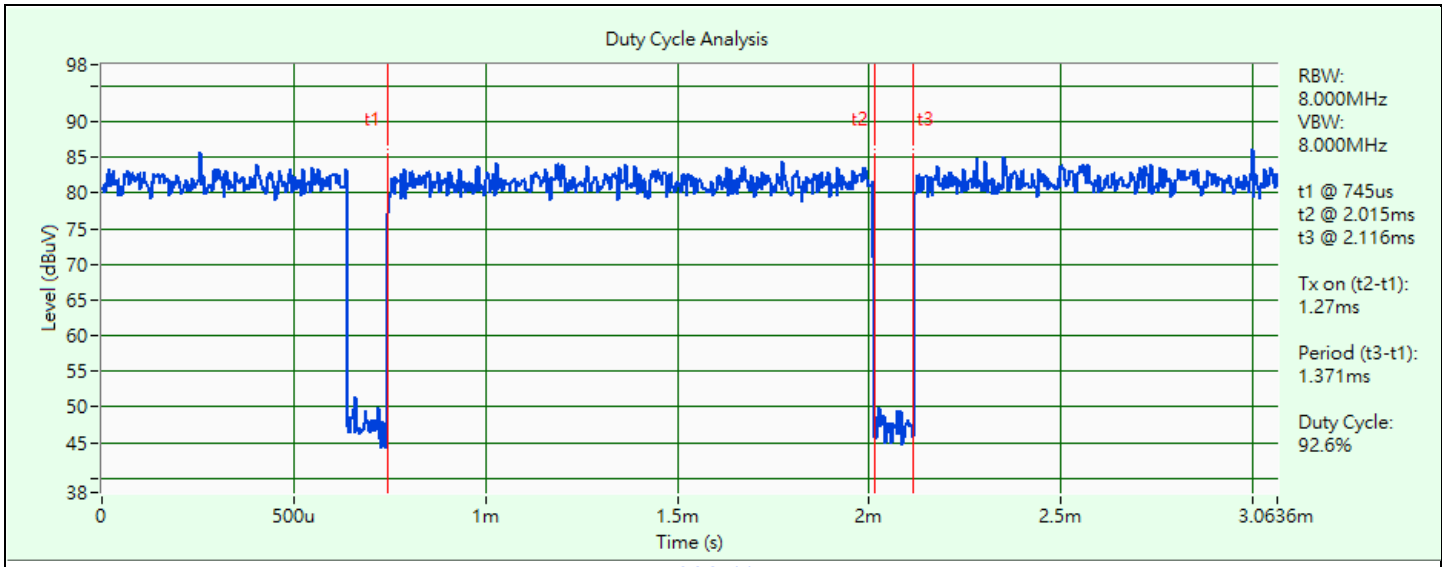
EUT Configure Mode	Mode	Radio	Power
	A	1	Powered by adapter 1
	B	1	Powered by POE
	C	2	Powered by adapter 1
	D	2	Powered by POE
	E	3	Powered by adapter 1
	F	3	Powered by POE

3.5 Duty Cycle of Test Signal

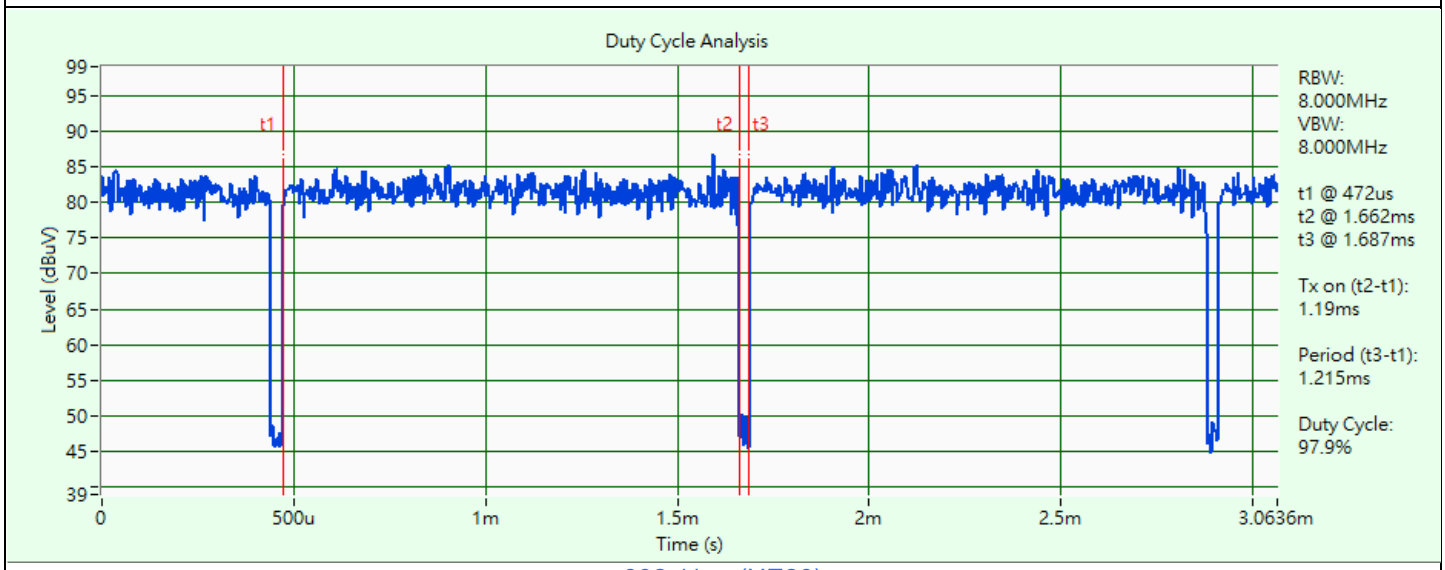
Test Mode A

Radio 1

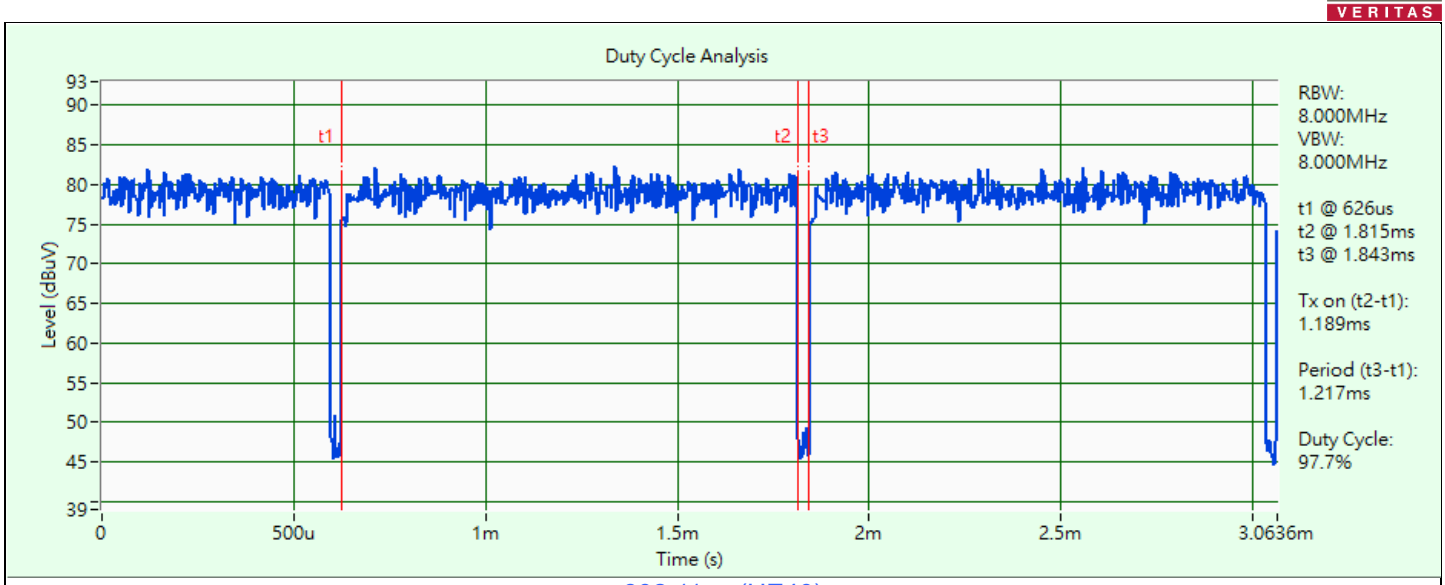
802.11a: Duty cycle = 1.27 ms / 1.371 ms x 100% = 92.6%, duty factor = 10 * log (1/Duty cycle) = 0.33 dB
802.11ax (HE20): Duty cycle = 1.19 ms / 1.215 ms x 100% = 97.9%, duty factor = 10 * log (1/Duty cycle) = 0.09 dB
802.11ax (HE40): Duty cycle = 1.189 ms / 1.217 ms x 100% = 97.7%, duty factor = 10 * log (1/Duty cycle) = 0.10 dB
802.11ax (HE80): Duty cycle = 1.178 ms / 1.202 ms x 100% = 98.0%



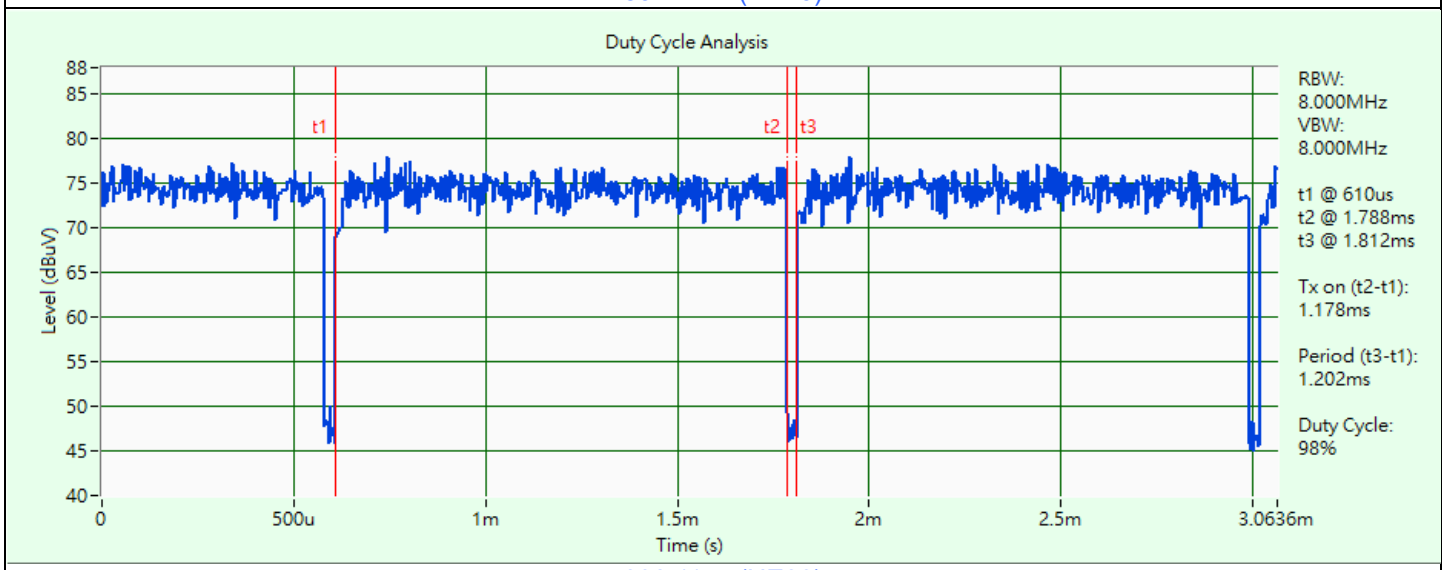
802.11a



802.11ax (HE20)



802.11ax (HE40)

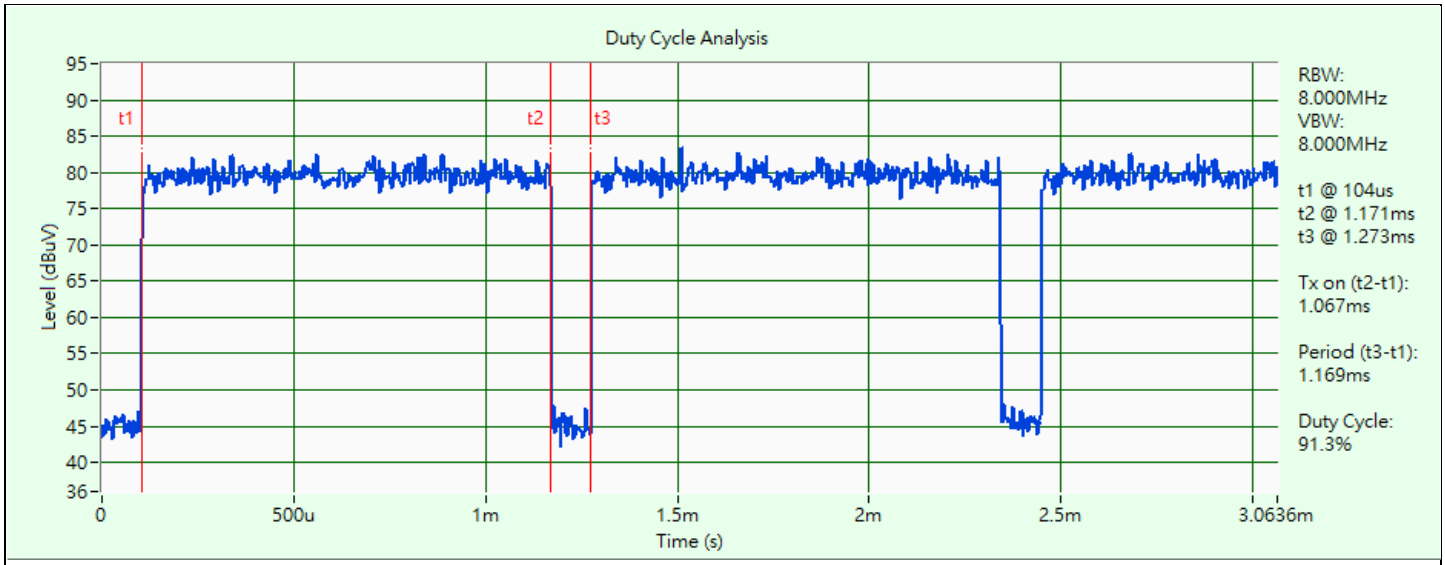


802.11ax (HE80)

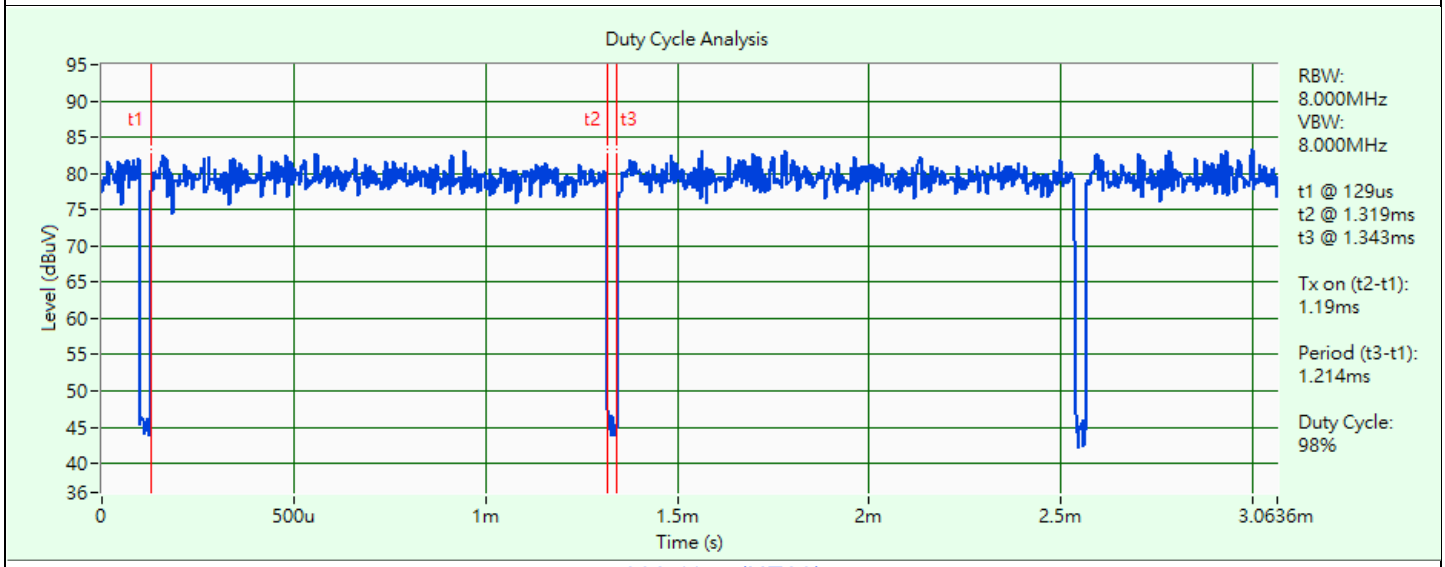
Test Mode C

Radio 2

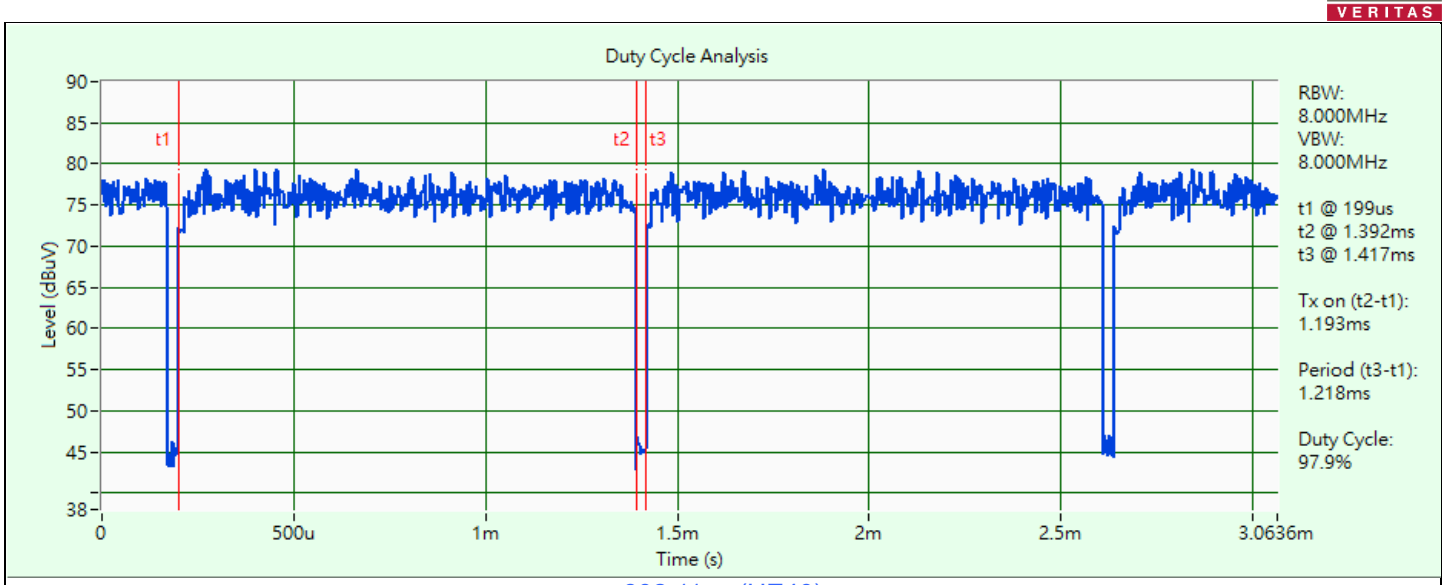
802.11a: Duty cycle = 1.067 ms / 1.169 ms x 100% = 91.3%, duty factor = 10 * log (1/Duty cycle) = 0.40 dB
802.11ax (HE20): Duty cycle = 1.19 ms / 1.214 ms x 100% = 98.0%
802.11ax (HE40): Duty cycle = 1.193 ms / 1.218 ms x 100% = 97.9%, duty factor = 10 * log (1/Duty cycle) = 0.09 dB
802.11ax (HE80): Duty cycle = 1.11 ms / 1.134 ms x 100% = 97.9%, duty factor = 10 * log (1/Duty cycle) = 0.09 dB



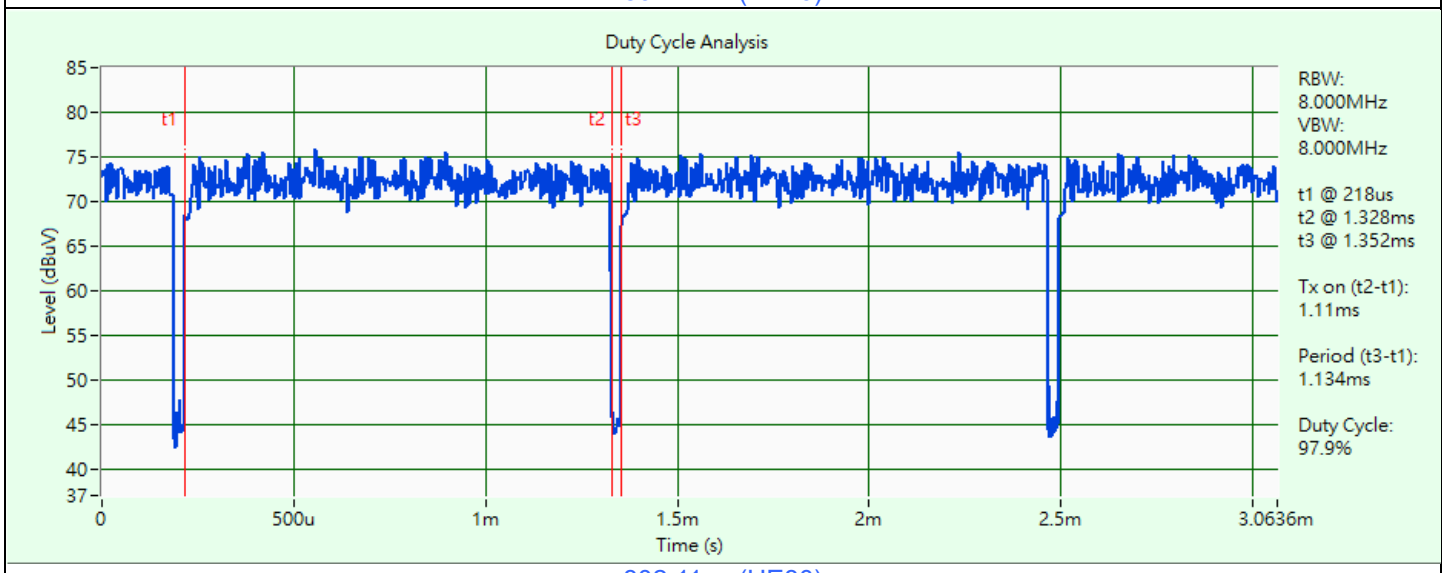
802.11a



802.11ax (HE20)



802.11ax (HE40)

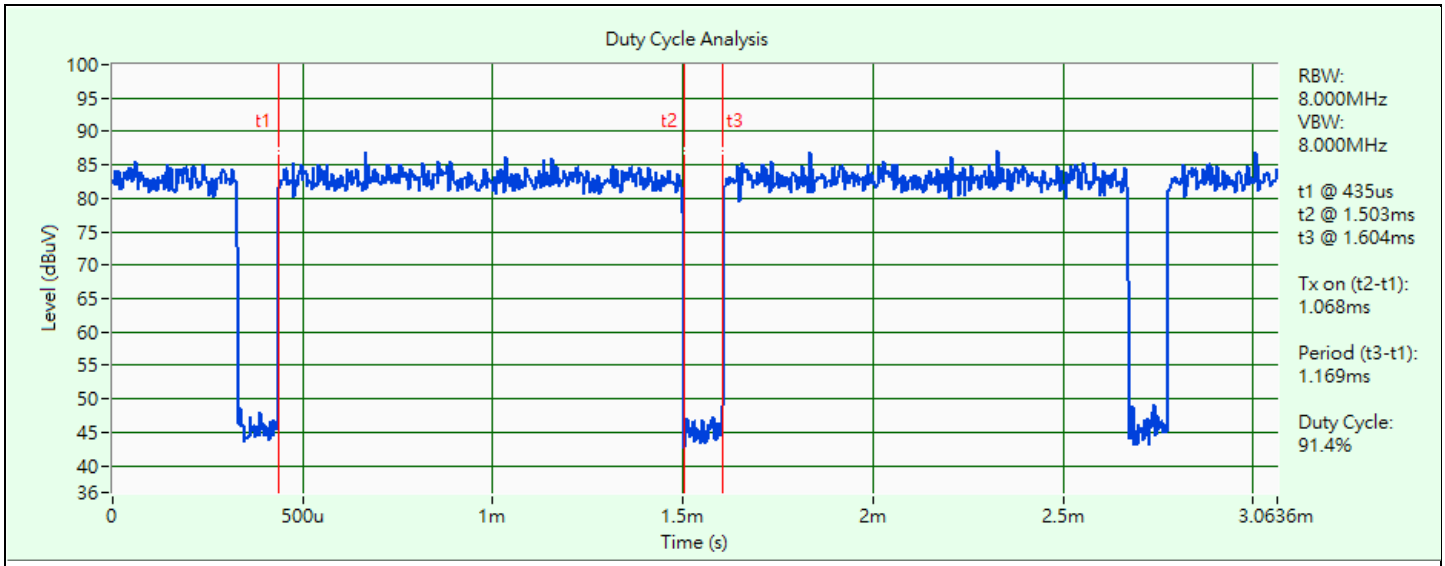


802.11ax (HE80)

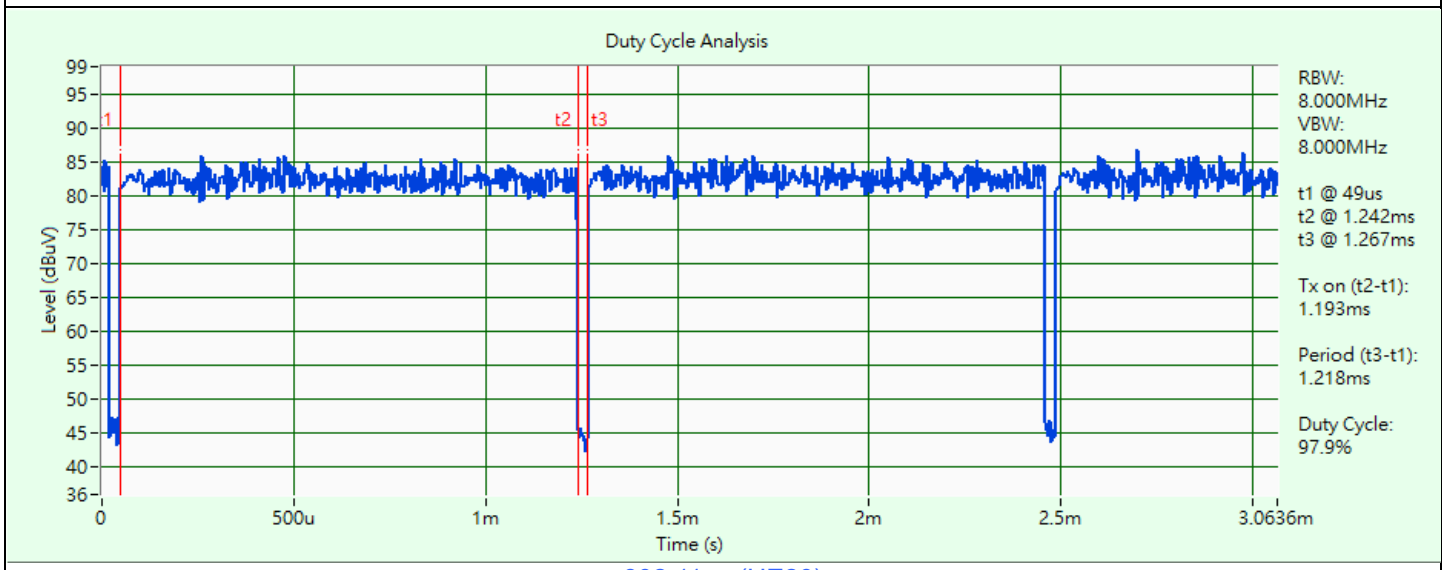
Test Mode E

Radio 3

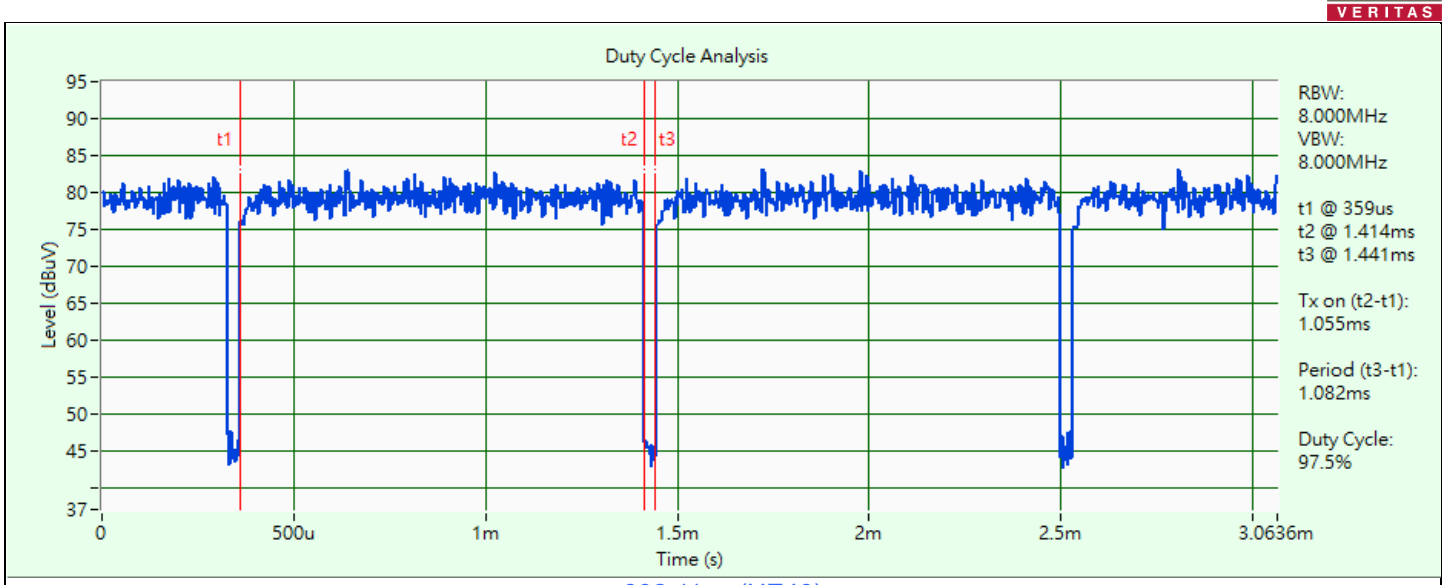
802.11a: Duty cycle = 1.068 ms / 1.169 ms x 100% = 91.4%, duty factor = 10 * log (1/Duty cycle) = 0.39 dB
802.11ax (HE20): Duty cycle = 1.193 ms / 1.218 ms x 100% = 97.9%, duty factor = 10 * log (1/Duty cycle) = 0.09 dB
802.11ax (HE40): Duty cycle = 1.055 ms / 1.082 ms x 100% = 97.5%, duty factor = 10 * log (1/Duty cycle) = 0.11 dB
802.11ax (HE80): Duty cycle = 1.04 ms / 1.067 ms x 100% = 97.5%, duty factor = 10 * log (1/Duty cycle) = 0.11 dB
802.11ax (HE160): Duty cycle = 1.04 ms / 1.064 ms x 100% = 97.7%, duty factor = 10 * log (1/Duty cycle) = 0.10 dB



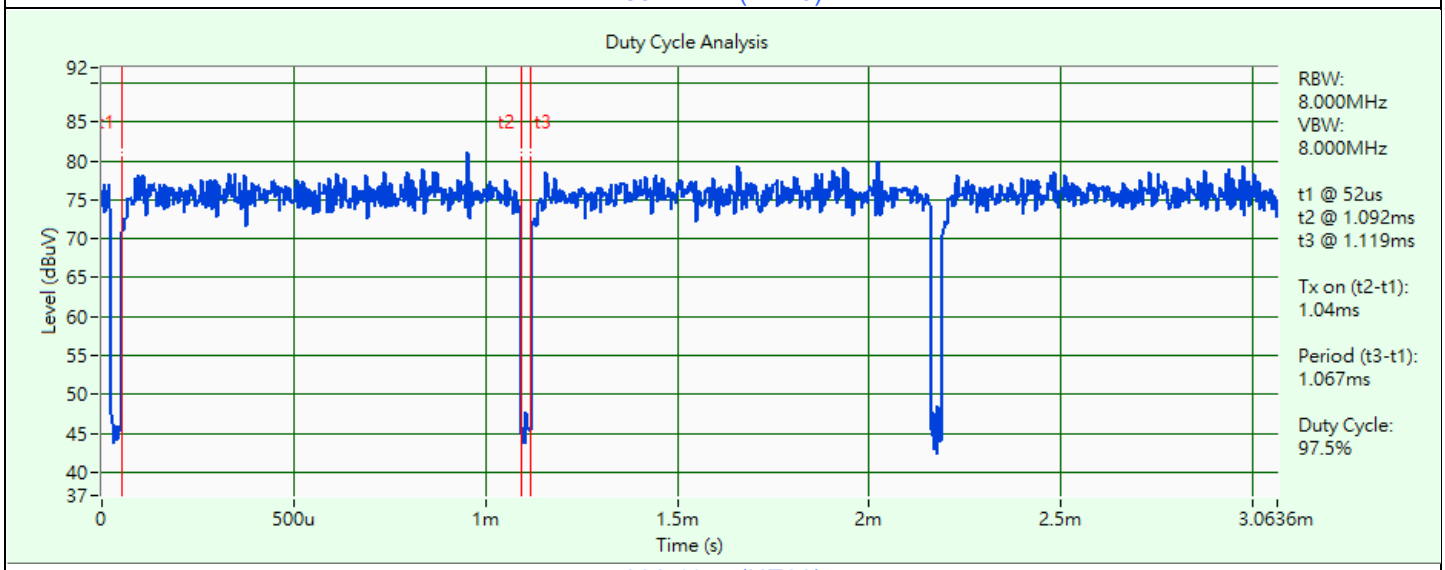
802.11a



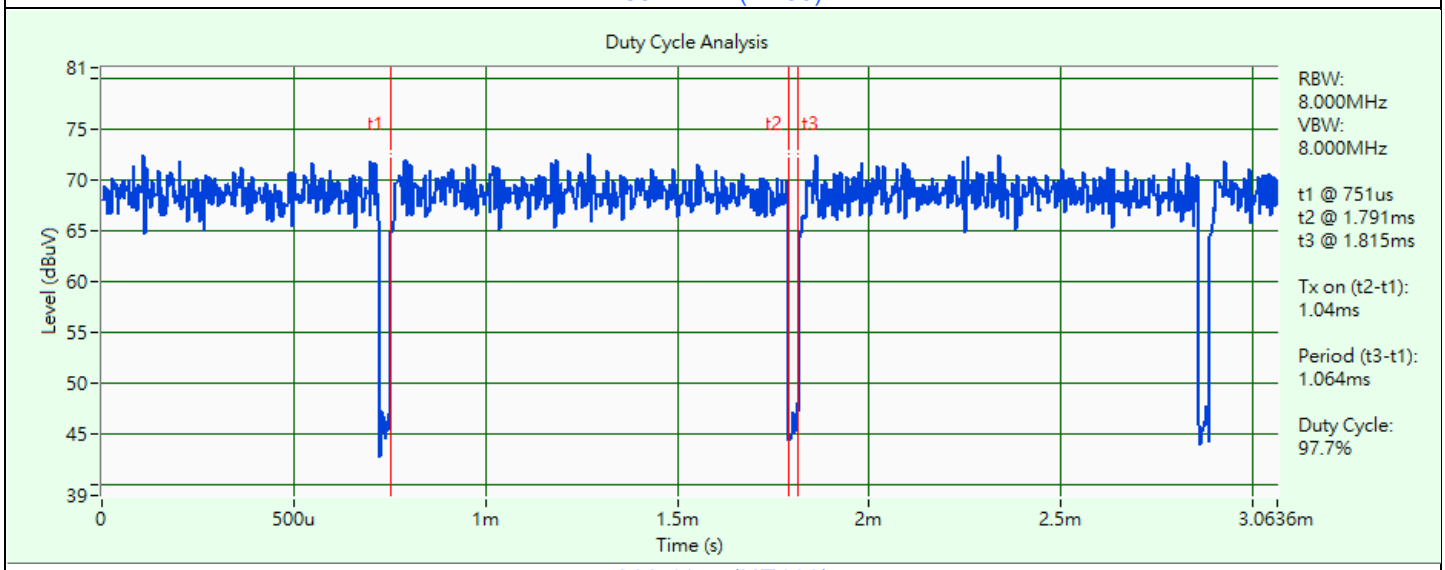
802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)



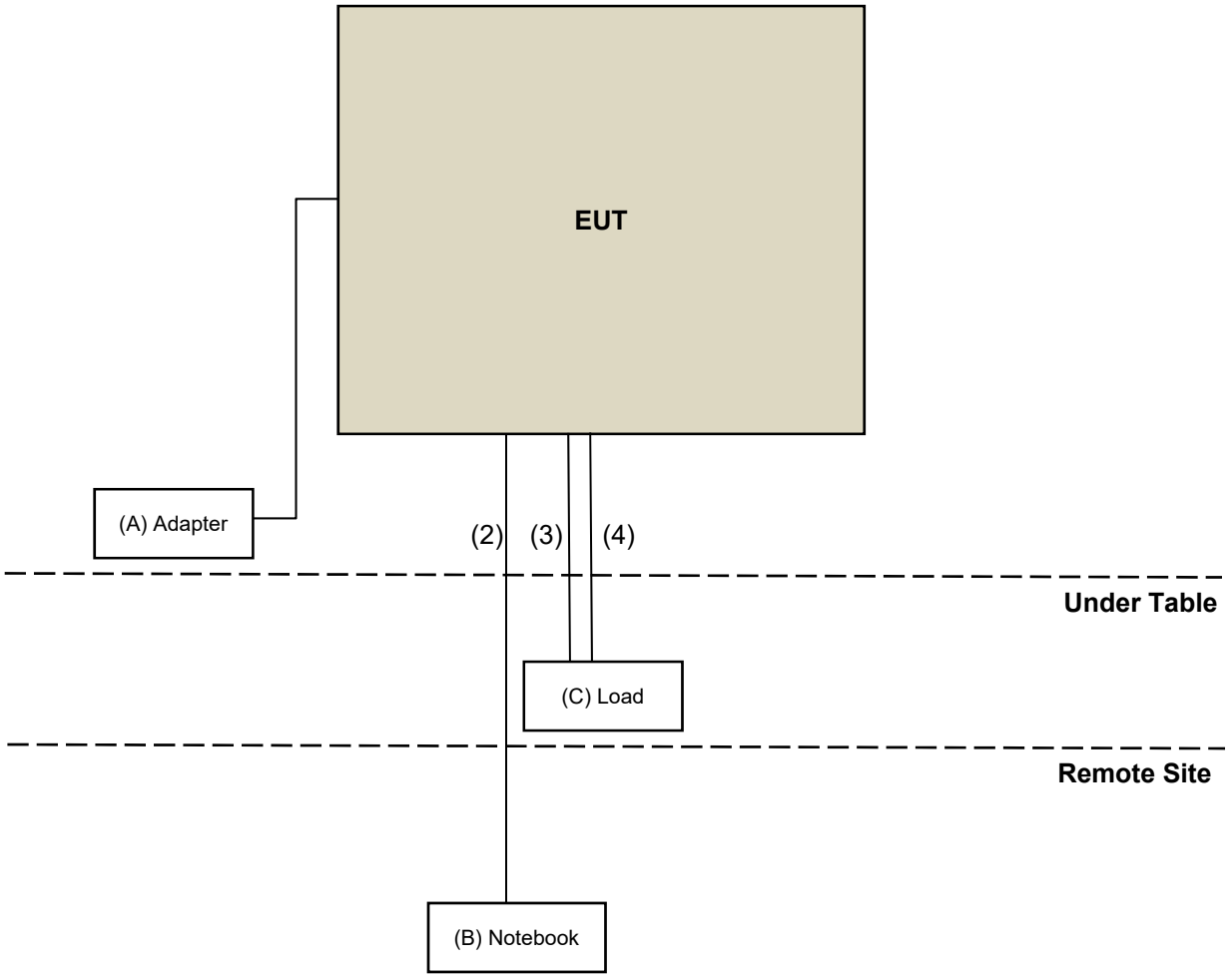
802.11ax (HE160)

3.6 Test Program Used and Operation Descriptions

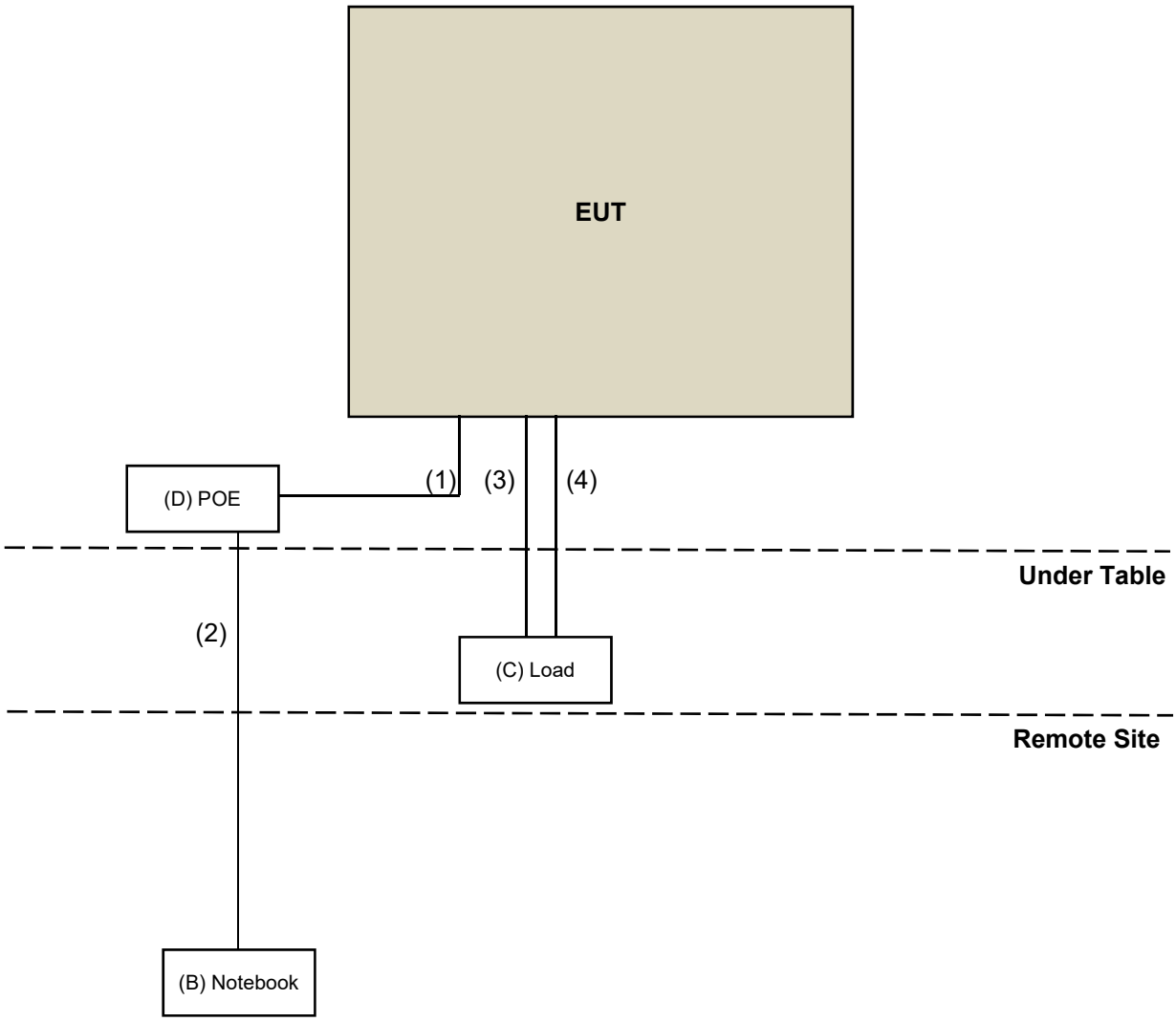
Controlling software (Access Manual Tool 3.2.1.5) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

Mode A, C, E



Mode B, D, F



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Adapter	Asian Power Devices Inc.	WA-30J12R	NA	NA	Provided by client
B.	Notebook	Dell	E5430	BPJVKV1	FCC DoC Approved	-
C.	Load	NA	NA	NA	NA	-
D.	PoE	Engenius	PNA90BGS-54	NA	NA	Provided by client

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	LAN cable	1	1.5	N	0	RJ45, Cat5e
2.	LAN cable	1	10	N	0	RJ45, Cat5e
3.	LAN cable	1	1.5	N	0	RJ45, Cat5e
4.	LAN cable	1	1.5	N	0	RJ45, Cat5e

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 26 dB Bandwidth

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/11/2 ~ 2023/2/13

4.2 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24
Wideband Power Sensor KEYSIGHT	N1923A	MY58020002	2023/1/18	2024/1/17
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	2023/1/19	2024/1/18

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2023/2/13 ~ 2023/2/14

4.3 Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/11/2 ~ 2023/2/14

4.4 Occupied Bandwidth

Refer to section 4.1 to get information of the instruments.

4.5 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
AC Power Source ExTech	CFW-105	E000603	N/A	N/A
AC power supply JIN YIH Technology	6905S	1720444	N/A	N/A
Digital Multimeter Fluke	87-III	70360742	2022/6/23	2023/6/22
Software BV	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer R&S	FSV40	100979	2022/3/25	2023/3/24
Temperature & Humidity Chamber TERCHY	HRM-120RF	931022	2022/1/3	2023/1/2

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2022/11/2 ~ 2022/11/18

4.6 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
LISN R&S	ESH3-Z5	100311	2022/09/12	2023/09/11
LISN ROHDE & SCHWARZ	ENV216	101826	2022/03/14	2023/03/13
RF Coaxial Cable WOKEN	5D-FB	Cable-cond1-01	2022/01/15	2023/01/14
Software BVADT	BVADT_Cond_ V7.3.7.4	N/A	N/A	N/A
Test Receiver Rohde&Schwarz	ESCI	100613	2021/12/03	2022/12/02
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2022/08/31	2023/08/30

Notes:

1. The test was performed in HY - Conduction 1.
2. Tested Date: 2022/11/29

4.7 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	UNAT_5+	PAD-CH6-01	N/A	N/A
Antenna Tower Controller Max-Full	MF-7802	N/A	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB9168	9168-616	2021/10/27 2022/10/26	2022/10/26 2023/10/25
Loop Antenna EMCI	EM-6879	269	2022/09/19	2023/09/18
Loop Antenna TESEQ	HLA 6121	45745	2022/07/27	2023/07/26
Pre-amplifier EMCI	EMC001340	980201	2022/09/23	2023/09/22
Preamplifier Agilent	310N	187226	2022/06/14	2023/06/13
RF Coaxial Cable EMCI	5D-NM-BM	140903+140902	2022/01/15 2023/01/07	2023/01/14 2024/01/06
RF Coaxial Cable ETS-Lindgren	EMC104-SM-SM-10000	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-4	2022/06/14	2023/06/13
	RFC-SMS-100-SMS-24-IN	Cable-CH1-02(RFC-SMS-100-SMS-24)	2022/06/14	2023/06/13
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Test Receiver Agilent	N9038A	MY52260177	2022/09/19	2023/09/18
Turn Table Max-Full	TT-1510	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802	N/A	N/A	N/A

Notes:

1. The test was performed in XD - 966 chamber 6.
2. Tested Date: 2022/10/20 ~ 2023/2/11

4.8 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower Max-Full	UNAT_5+	PAD-CH6-01	N/A	N/A
Antenna Tower Controller Max-Full	MF-7802	N/A	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	8	N/A	N/A
Horn Antenna ETS-Lindgren	3117	00143293	2021/11/14	2022/11/13
Horn Antenna Schwarzbeck	BBHA 9170	BBHA9170241	2021/10/26	2022/10/25
Pre-Ammlifier EMCI	EMC 184045	980116	2021/10/05	2022/10/04
Preamplifier Agilent	83017A	MY39501373	2022/06/14	2023/06/13
RF Coaxial Cable ETS-Lindgren	EMC104-SM-SM-10000	Cable-CH1-01(RFC-SMS-100-SMS-120+RFC-SMS-100-SMS-4	2022/06/14	2023/06/13
	RFC-SMS-100-SMS-24-IN	Cable-CH1-02(RFC-SMS-100-SMS-24)	2022/06/14	2023/06/13
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	2022/01/15	2023/01/14
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104& EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	2022/01/15	2023/01/14
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Test Receiver Agilent	N9038A	MY52260177	2022/09/19	2023/09/18
Turn Table Max-Full	TT-1510	N/A	N/A	N/A
Turn Table Controller Max-Full	MF-7802	N/A	N/A	N/A

Notes:

1. The test was performed in XD - 966 chamber 6.
2. Tested Date: 2022/9/23 ~ 2022/10/3

5 Limits of Test Items

5.1 26 dB Bandwidth

The results are for reference only.

5.2 RF Output Power

Operation Band	EUT Category	Limit
U-NII-1	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
	Fixed point-to-point Access Point	1 Watt (30 dBm)
	Indoor Access Point	1 Watt (30 dBm)
	Mobile and Portable client device	250mW (24 dBm)

Operation Band	Limit
U-NII-2A	250 mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	250 mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 D01 Multiple Transmitter Output 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.

5.3 Power Spectral Density

Operation Band	EUT Category	Limit
U-NII-1	Outdoor Access Point	17 dBm/MHz
	Fixed point-to-point Access Point	
	Indoor Access Point	
	Mobile and Portable client device	11 dBm/MHz

Operation Band	Limit
U-NII-2A	11 dBm/MHz
U-NII-2C	11 dBm/MHz
U-NII-3	30 dBm/500 kHz

5.4 Occupied Bandwidth

The results are for reference only.

5.5 Frequency Stability

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

5.6 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

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 0.50 MHz.

5.7 Unwanted Emissions below 1 GHz

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

Frequencies (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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.8 Unwanted Emissions above 1 GHz

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

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Notes:

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 1000 MHz, 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 20 dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

Applicable To	Limit	
789033 D02 General UNII Test Procedure New Rules v02r01	Field Strength at 3 m	
	PK: 74 (dBµV/m)	AV: 54 (dBµV/m)

For transmitters operating in the 5.15-5.25 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)

For transmitters operating in the 5.25-5.35 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(2)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)

For transmitters operating in the 5.47-5.725 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(3)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)

For transmitters operating in the 5.725-5.850 GHz band:

Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
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.		

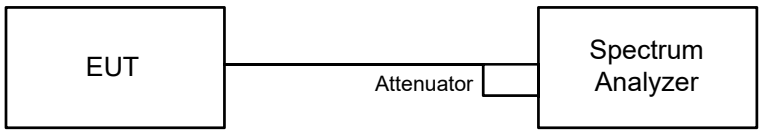
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 26 dB Bandwidth

6.1.1 Test Setup



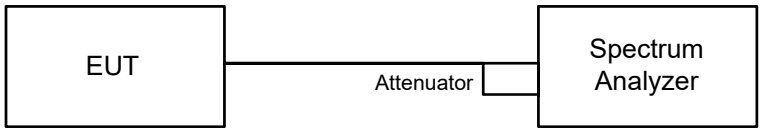
6.1.2 Test Procedure

a. Set RBW = approximately 1% of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. 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%.

6.2 RF Output Power

6.2.1 Test Setup

For channel straddling:



6.2.2 Test Procedure

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.

For channel straddling:

Method SA-1

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
d. Sweep time = auto, trigger set to “free run”.
e. Trace average at least 100 traces in power averaging mode.
f. Record the max value

Note: When measuring straddle channel power, use compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

For channel straddling:

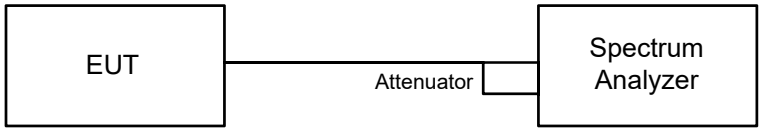
Method SA-2A

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
d. Manually set sweep time ≥ 10 × (number of points in sweep) × (total on/off period of the transmitted signal).
e. Perform a single sweep.
f. Record the max value and add 10 log (1/duty cycle).

Note: When measuring straddle channel power, use compute power by integrating the spectrum across the 26 dB EBW or 99% OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the EBW or OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in power units) at 1 MHz intervals extending across the 26 dB EBW or 99% OBW of the spectrum.

6.3 Power Spectral Density

6.3.1 Test Setup



6.3.2 Test Procedure

For specified measurement bandwidth 1 MHz:
Method SA-1

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
d. Sweep time = auto, trigger set to “free run”.
e. Trace average at least 100 traces in power averaging mode.
f. Record the max value

For specified measurement bandwidth 1 MHz:
Method SA-2

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz, Detector = RMS
c. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
d. Sweep time = auto, trigger set to “free run”.
e. Trace average at least 100 traces in power averaging mode.
f. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
g. Record the max value and add 10 log (1/duty cycle).

For specified measurement bandwidth 500 kHz:
Method SA-1

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
c. Scale the observed power level to an equivalent value in 500 kHz by adjusting (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300 kHz)
d. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
e. Sweep time = auto, trigger set to “free run”.
f. Trace average at least 100 traces in power averaging mode.
g. Record the max value

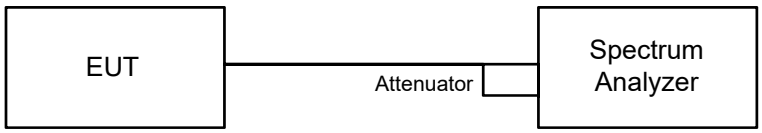
For specified measurement bandwidth 500 kHz:
Method SA-2

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
c. Scale the observed power level to an equivalent value in 500 kHz by adjusting (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz/300 kHz)
d. Sweep points ≥ [2 × span / RBW]. (This gives bin-to-bin spacing ≤ RBW / 2, so that narrowband signals are not lost between frequency bins.)
e. Sweep time = auto, trigger set to “free run”.

f. Trace average at least 100 traces in power averaging mode.
g. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
h. Record the max value and add 10 log (1/duty cycle).

6.4 Occupied Bandwidth

6.4.1 Test Setup

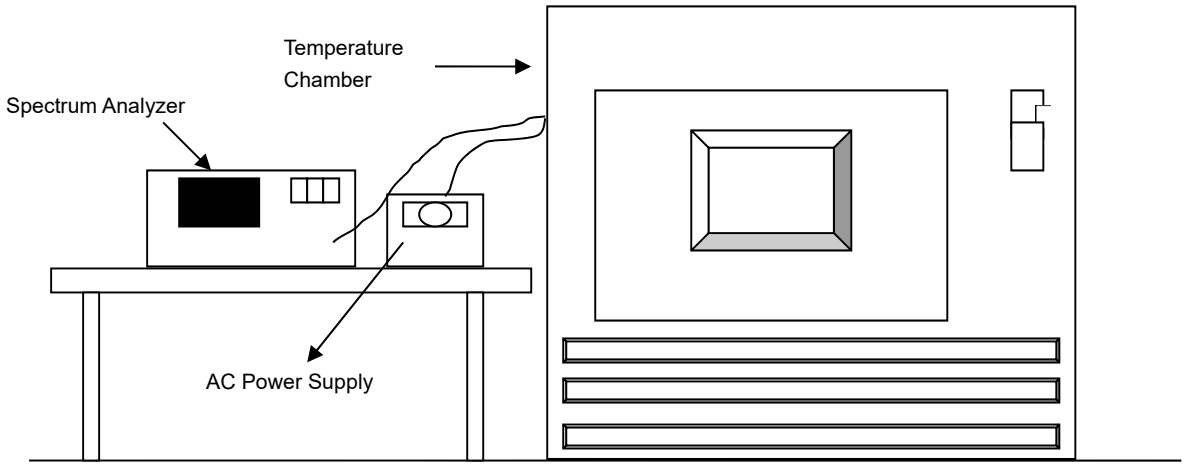


6.4.2 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to Sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean power of a given emission.

6.5 Frequency Stability

6.5.1 Test Setup

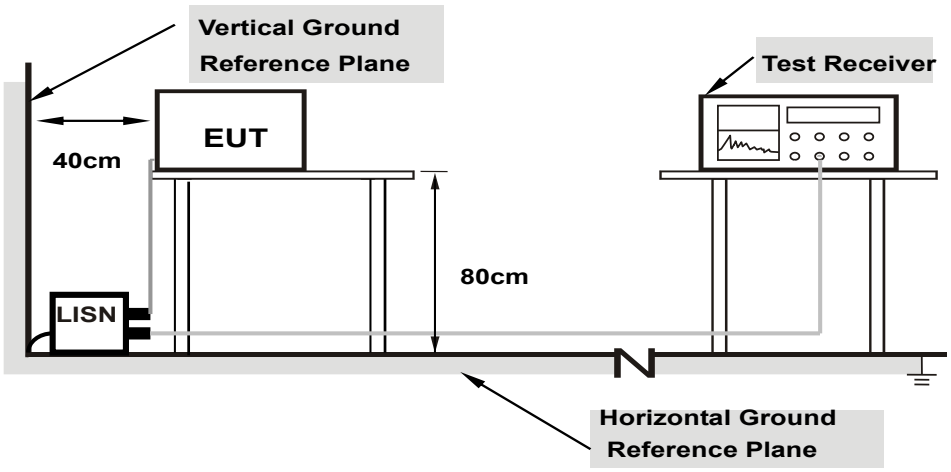


6.5.2 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. 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.
e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
f. 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.

6.6 AC Power Conducted Emissions

6.6.1 Test Setup



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.6.2 Test Procedure

a. The EUT was placed on a 0.8 meter to the top of table and 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/ 50 uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

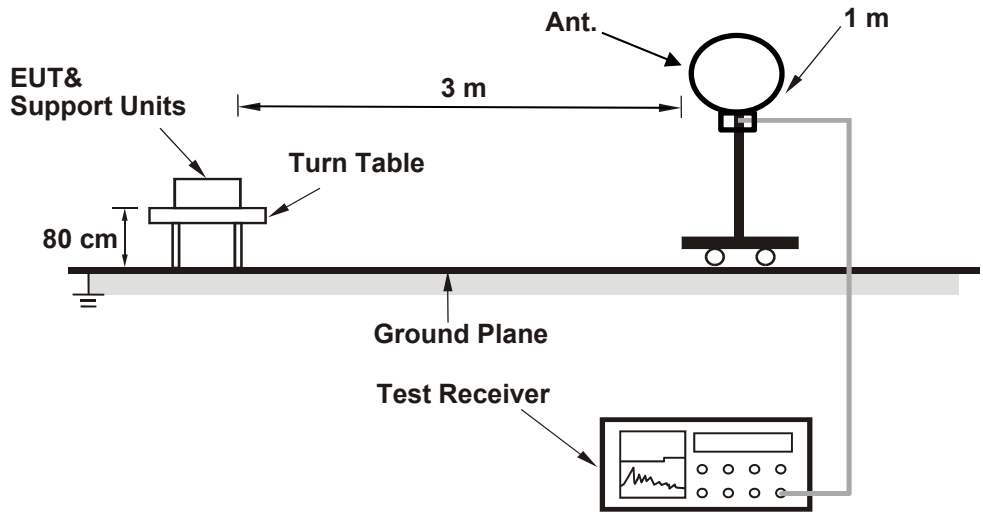
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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

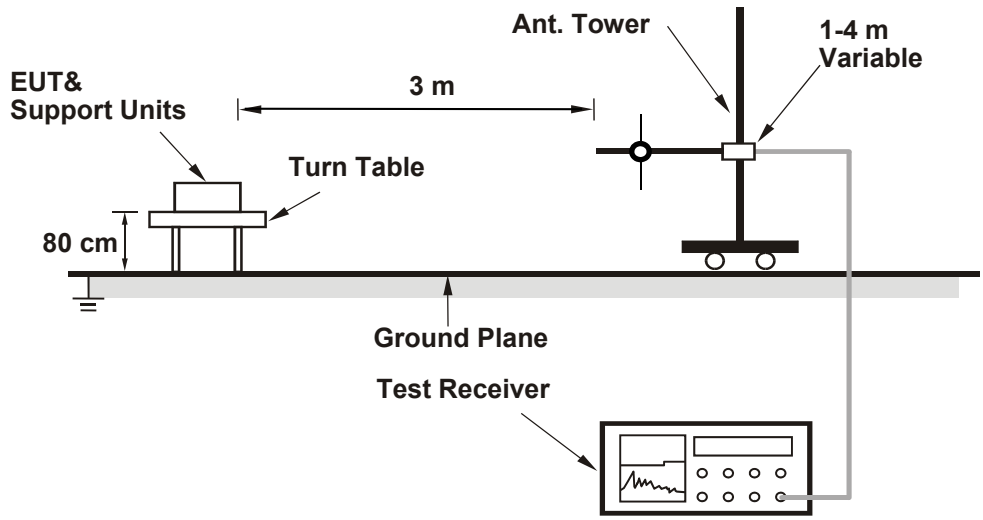
6.7 Unwanted Emissions below 1 GHz

6.7.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.7.2 Test Procedure

For Radiated emission below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters 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. 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. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters 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.

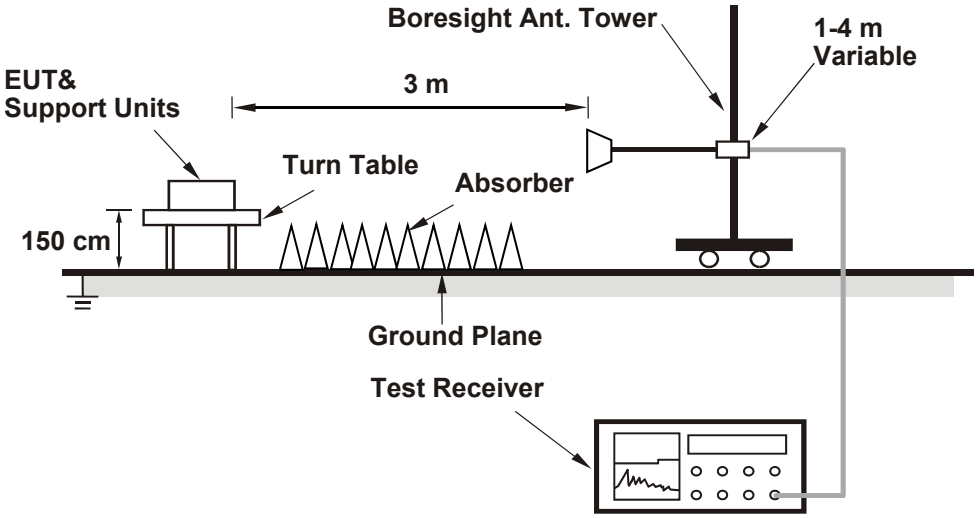
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

6.8 Unwanted Emissions above 1 GHz

6.8.1 Test Setup



For the actual test configuration, please refer to the attached file (Test Setup Photo).

6.8.2 Test Procedure

a. The EUT was placed on the top of a rotating table 1.5 meters 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. 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.

Notes:

1. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
2. For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10 Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 26 dB Bandwidth

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Wayne Lin

Test Mode A

Radio 1

802.11a

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
100	5500	22.72	21.99
116	5580	21.95	22.01
140	5700	21.91	21.59
144 (U-NII-2C)	5720	15.96	15.96

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
100	5500	21.99	24.42	>	24
116	5580	21.95	24.41	>	24
140	5700	21.59	24.34	>	24
144 (U-NII-2C)	5720	15.96	23.03	<	24

Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE20)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
100	5500	21.92	21.85
116	5580	21.83	21.75
140	5700	21.87	21.83
144 (U-NII-2C)	5720	15.96	15.91

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
100	5500	21.85	24.39	>	24
116	5580	21.75	24.37	>	24
140	5700	21.83	24.39	>	24
144 (U-NII-2C)	5720	15.91	23.01	<	24

Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE40)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
102	5510	41.37	41.53
110	5550	44.91	42.45
134	5670	41.67	41.37
142 (U-NII-2C)	5710	37.58	39.91

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
102	5510	41.37	27.16	>	24
110	5550	42.45	27.27	>	24
134	5670	41.37	27.16	>	24
142 (U-NII-2C)	5710	37.58	26.74	>	24

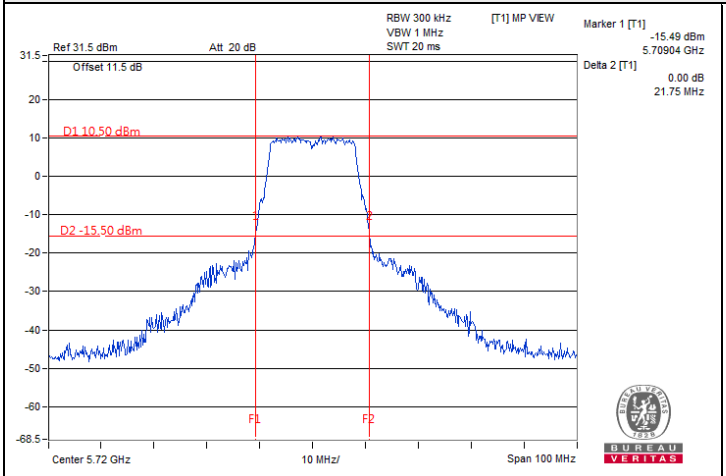
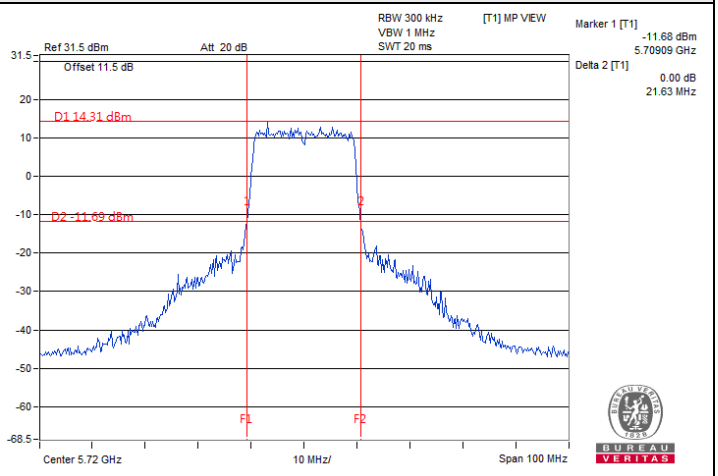
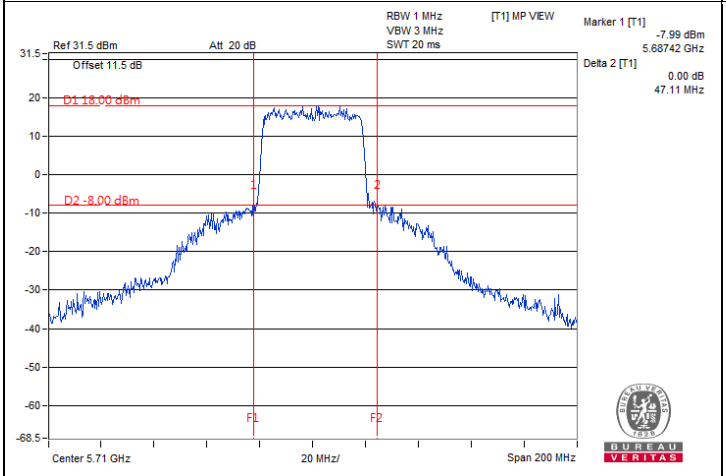
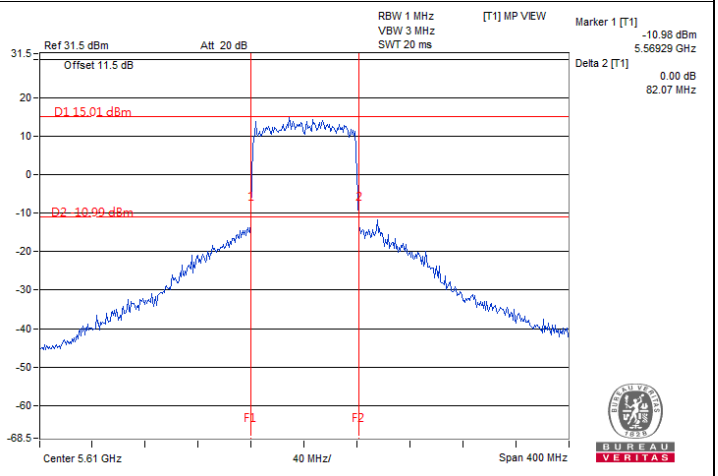
Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE80)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
106	5530	82.14	82.47
122	5610	82.07	93.65
138 (U-NII-2C)	5690	83.93	88.89

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
106	5530	82.14	30.14	>	24
122	5610	82.07	30.14	>	24
138 (U-NII-2C)	5690	83.93	30.23	>	24

Note: For U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

Spectrum Plot of Minimum Value	
	
802.11a / Chain 0 : CH 144 (U-NII-2C)	802.11ax (HE20) / Chain 1 : CH 144 (U-NII-2C)
	
802.11ax (HE40) / Chain 0 : CH 142 (U-NII-2C)	802.11ax (HE80) / Chain 0 : CH 122

Notes:

1. For U-NII-2C straddle channel = 5725 MHz - Marker 1

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Wayne Lin

Test Mode C

Radio 2

802.11a

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.85	21.83
60	5300	22.49	22.03
64	5320	22.95	21.88
100	5500	22.09	21.65
116	5580	22.09	22.14
140	5700	22.53	21.83
144 (U-NII-2C)	5720	16.02	15.85

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	21.83	24.39	>	24
60	5300	22.03	24.43	>	24
64	5320	21.88	24.4	>	24
100	5500	21.65	24.35	>	24
116	5580	22.09	24.44	>	24
140	5700	21.83	24.39	>	24
144 (U-NII-2C)	5720	15.85	23	<	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE20)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	23.05	21.83
60	5300	22.00	22.00
64	5320	21.95	21.82
100	5500	21.87	21.74
116	5580	21.99	21.90
140	5700	21.86	21.73
144 (U-NII-2C)	5720	15.86	16.23

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	21.83	24.39	>	24
60	5300	22.00	24.42	>	24
64	5320	21.82	24.38	>	24
100	5500	21.74	24.37	>	24
116	5580	21.90	24.4	>	24
140	5700	21.73	24.37	>	24
144 (U-NII-2C)	5720	15.86	23	<	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE40)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	47.11	47.71
62	5310	41.86	41.44
102	5510	41.59	41.46
110	5550	41.46	45.97
134	5670	41.59	41.44
142 (U-NII-2C)	5710	46.14	48.28

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
54	5270	47.11	27.73	>	24
62	5310	41.44	27.17	>	24
102	5510	41.46	27.17	>	24
110	5550	41.46	27.17	>	24
134	5670	41.44	27.17	>	24
142 (U-NII-2C)	5710	46.14	27.64	>	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

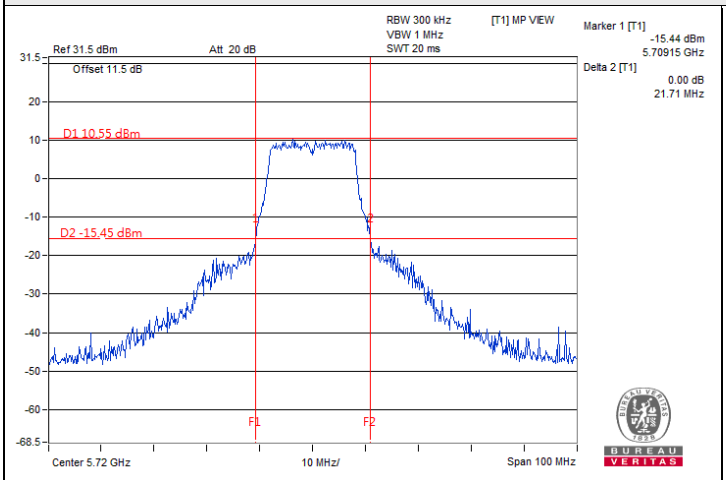
802.11ax (HE80)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	82.88	82.33
106	5530	82.82	82.53
122	5610	82.73	82.48
138 (U-NII-2C)	5690	111.32	106.68

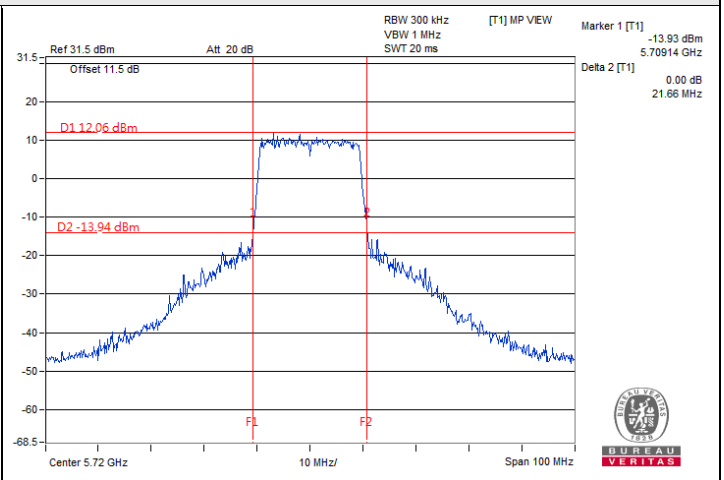
Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
58	5290	82.33	30.15	>	24
106	5530	82.53	30.16	>	24
122	5610	82.48	30.16	>	24
138 (U-NII-2C)	5690	106.68	31.28	>	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

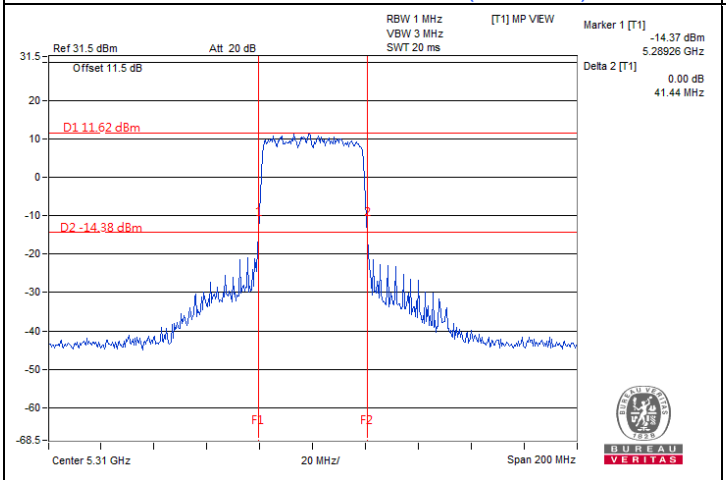
Spectrum Plot of Minimum Value



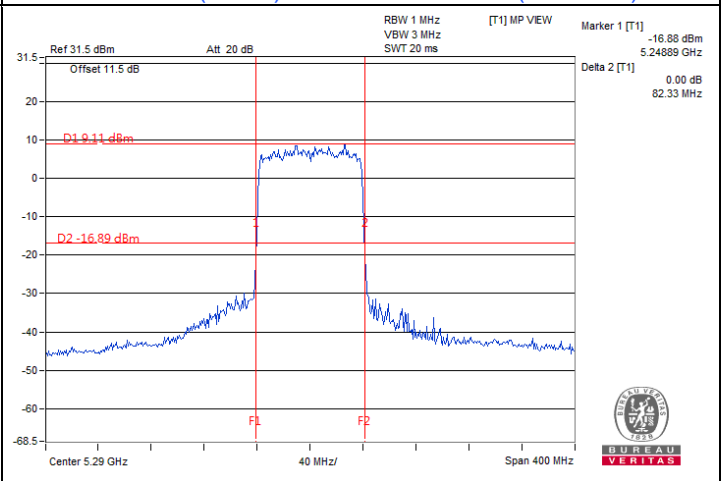
802.11a / Chain 1 : CH 144 (U-NII-2C)



802.11ax (HE20) / Chain 0 : CH 144 (U-NII-2C)



802.11ax (HE40) / Chain 1 : CH 62



802.11ax (HE80) / Chain 1 : CH 58

Notes:

1. For U-NII-2C straddle channel = 5725 MHz - Marker 1

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Alan Wu/Wayne Lin

Test Mode E

Radio 3

802.11a

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.61	21.96
60	5300	21.84	21.90
64	5320	21.87	22.27
100	5500	21.97	22.19
116	5580	21.92	21.93
140	5700	22.21	22.57
144 (U-NII-2C)	5720	18.02	16.11

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	21.61	24.34	>	24
60	5300	21.84	24.39	>	24
64	5320	21.87	24.39	>	24
100	5500	21.97	24.41	>	24
116	5580	21.92	24.4	>	24
140	5700	22.21	24.46	>	24
144 (U-NII-2C)	5720	16.11	23.07	<	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE20)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	21.79	21.91
60	5300	21.84	22.06
64	5320	21.84	21.86
100	5500	23.24	21.99
116	5580	22.30	21.77
140	5700	21.87	21.86
144 (U-NII-2C)	5720	15.83	15.86

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	21.79	24.38	>	24
60	5300	21.84	24.39	>	24
64	5320	21.84	24.39	>	24
100	5500	21.99	24.42	>	24
116	5580	21.77	24.37	>	24
140	5700	21.86	24.39	>	24
144 (U-NII-2C)	5720	15.83	22.99	<	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE40)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	52.97	50.40
62	5310	41.58	41.25
102	5510	41.50	41.51
110	5550	83.18	77.35
134	5670	56.20	48.23
142 (U-NII-2C)	5710	51.92	54.19

Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
54	5270	50.40	28.02 > 24
62	5310	41.25	27.15 > 24
102	5510	41.50	27.18 > 24
110	5550	77.35	29.88 > 24
134	5670	48.23	27.83 > 24
142 (U-NII-2C)	5710	51.92	28.15 > 24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

802.11ax (HE80)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	82.40	82.55
106	5530	82.45	82.94
122	5610	83.38	86.36
138 (U-NII-2C)	5690	96.70	97.41

Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
58	5290	82.40	30.15 > 24
106	5530	82.45	30.16 > 24
122	5610	83.38	30.21 > 24
138 (U-NII-2C)	5690	96.70	30.85 > 24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

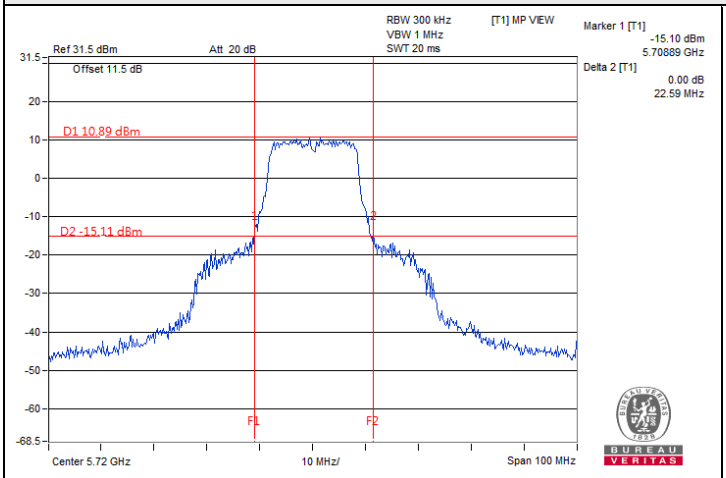
802.11ax (HE160)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
50 (U-NII-2A)	5250	84.34	83.79
114	5570	168.71	167.12

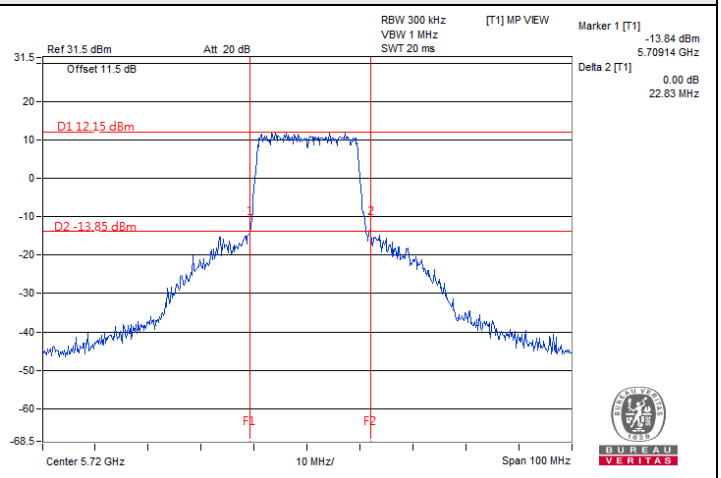
Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
50 (U-NII-2A)	5250	83.79	30.23	>	24
114	5570	167.12	33.23	>	24

Note: For U-NII-2A, U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.

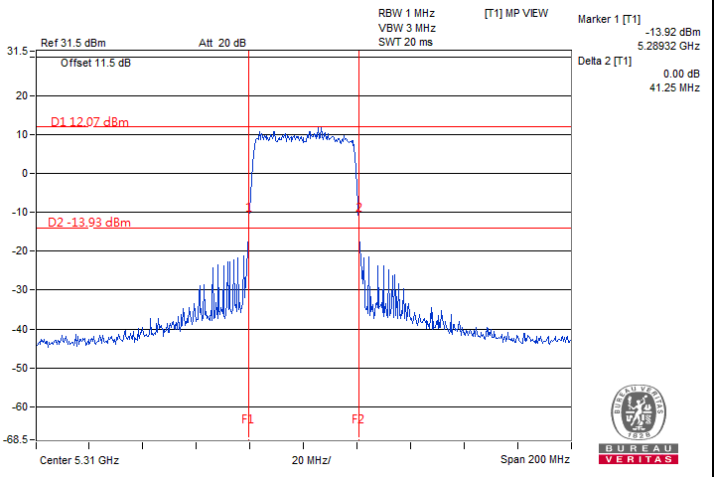
Spectrum Plot of Minimum Value



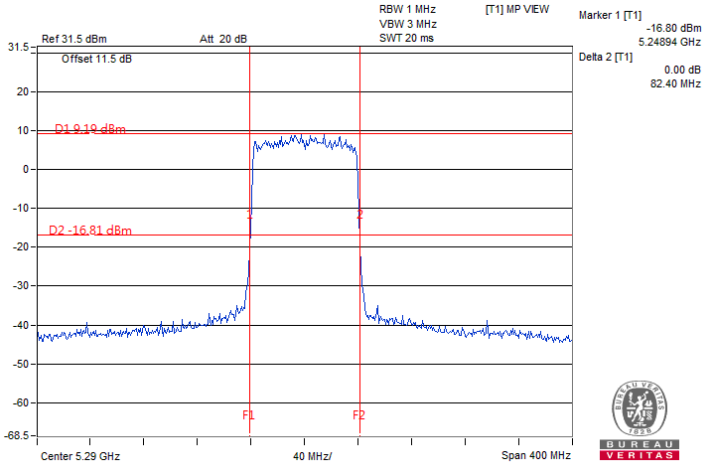
802.11a / Chain 1 : CH 144 (U-NII-2C)



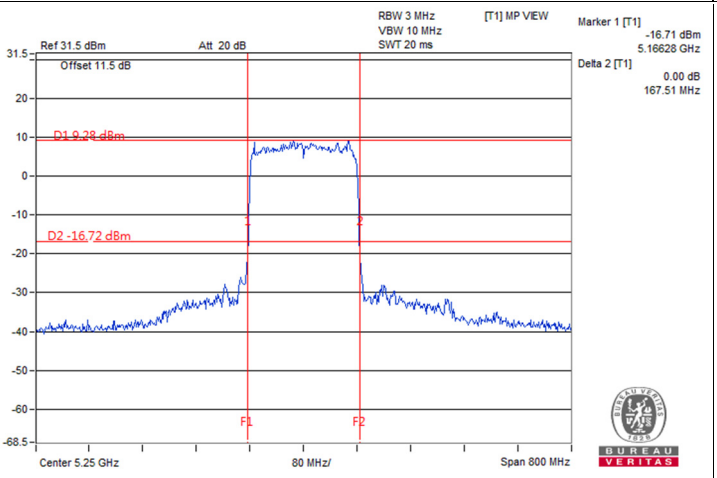
802.11ax (HE20) / Chain 0 : CH 144 (U-NII-2C)



802.11ax (HE40) / Chain 1 : CH 62



802.11ax (HE80) / Chain 0 : CH 58



802.11ax (HE160) / Chain 1 : CH 50 (U-NII-2A)

Notes: For U-NII-2C straddle channel = 5725 MHz - Marker 1

7.2 RF Output Power

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Wayne Lin

Test Mode A

Radio 1

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
100	5500	16.34	17.26	96.263	19.83	24	Pass
116	5580	18.02	18.39	132.411	21.22	24	Pass
140	5700	17.31	17.56	110.843	20.45	24	Pass
*144 (U-NII-2C)	5720	16.78	16.96	105.041	20.21	23.03	Pass
*144 (U-NII-3)	5720	10.51	10.89	25.391	14.05	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2C, the maximum gain is 5.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-3, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
100	5500	17.51	17.76	116.067	20.65	24	Pass
116	5580	18.12	18.20	130.933	21.17	24	Pass
140	5700	14.25	14.18	52.789	17.23	24	Pass
*144 (U-NII-2C)	5720	16.94	17.37	106.192	20.26	23.01	Pass
*144 (U-NII-3)	5720	11.56	12.05	30.992	14.91	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2C, the maximum gain is 5.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-3, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
102	5510	13.93	14.63	53.757	17.30	24	Pass
110	5550	19.66	20.40	202.118	23.06	24	Pass
134	5670	18.03	18.24	130.214	21.15	24	Pass
*142 (U-NII-2C)	5710	20.13	20.79	228.24	23.58	24	Pass
*142 (U-NII-3)	5710	10.19	11.03	23.668	13.74	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2C, the maximum gain is 5.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-3, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
106	5530	13.04	13.87	44.515	16.49	24	Pass
122	5610	20.22	20.95	**229.648**	23.61	24	Pass
*138 (U-NII-2C)	5690	19.90	20.99	223.327	23.49	24	Pass
*138 (U-NII-3)	5690	6.66	7.86	10.744	10.31	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2C, the maximum gain is 5.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-3, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
100	5500	17.51	17.76	116.067	20.65	21.38	Pass
116	5580	18.12	18.20	130.933	21.17	21.38	Pass
140	5700	14.25	14.18	52.789	17.23	21.38	Pass
*144 (U-NII-2C)	5720	16.94	17.37	106.192	20.26	20.39	Pass
*144 (U-NII-3)	5720	11.56	12.05	30.992	14.91	27.33	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. For U-NII-2C, the directional gain is 8.62 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.62-6)].
4. For U-NII-3, the directional gain is 8.67 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.67-6) = 27.33 dBm.

802.11ax (HE40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
102	5510	13.93	14.63	53.757	17.30	21.38	Pass
110	5550	17.92	18.63	134.89	21.30	21.38	Pass
134	5670	18.03	18.24	130.214	21.15	21.38	Pass
*142 (U-NII-2C)	5710	17.45	18.01	121.63	20.85	21.38	Pass
*142 (U-NII-3)	5710	7.51	8.09	12.362	10.92	27.33	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. For U-NII-2C, the directional gain is 8.62 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.62-6)].
4. For U-NII-3, the directional gain is 8.67 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.67-6) = 27.33 dBm.

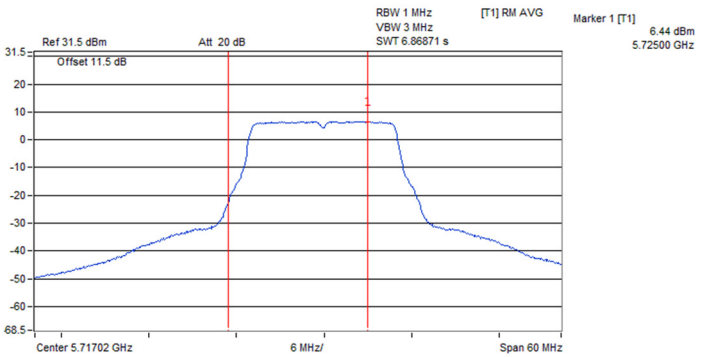
802.11ax (HE80) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
106	5530	13.04	13.87	44.515	16.49	21.38	Pass
122	5610	17.96	18.68	**136.308**	21.35	21.38	Pass
*138 (U-NII-2C)	5690	17.23	18.24	119.525	20.77	21.38	Pass
*138 (U-NII-3)	5690	4.01	5.12	5.769	7.61	27.33	Pass

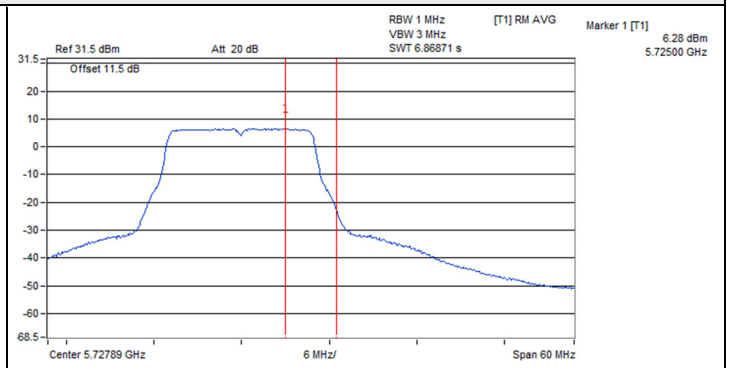
Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2]
3. For U-NII-2C, the directional gain is 8.62 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.62-6)].
4. For U-NII-3, the directional gain is 8.67 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.67-6) = 27.33 dBm.

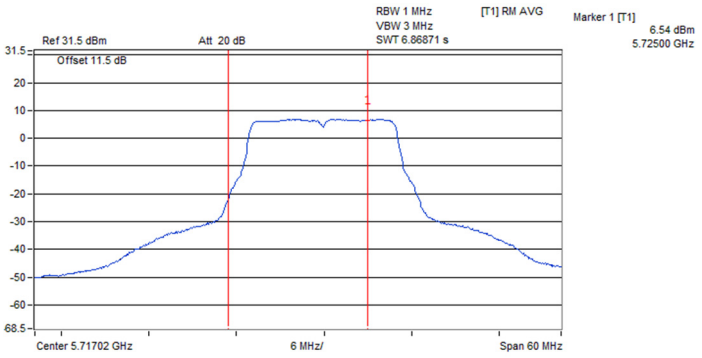
Spectrum Plot for channel straddling



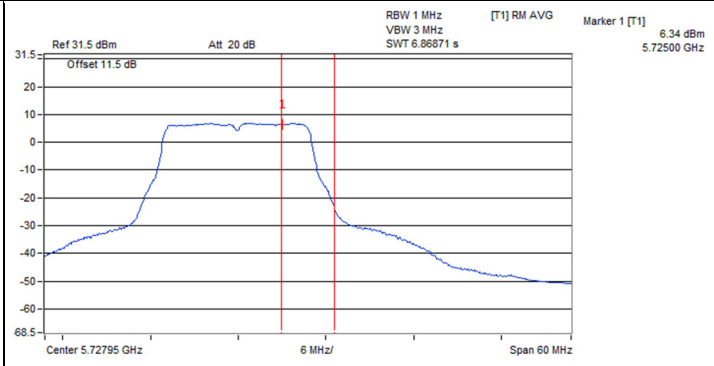
802.11a / Chain 0 : CH 144 (U-NII-2C)



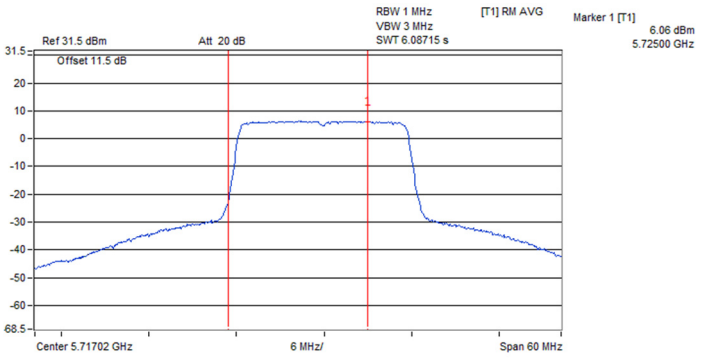
802.11a / Chain 0 : CH 144 (U-NII-3)



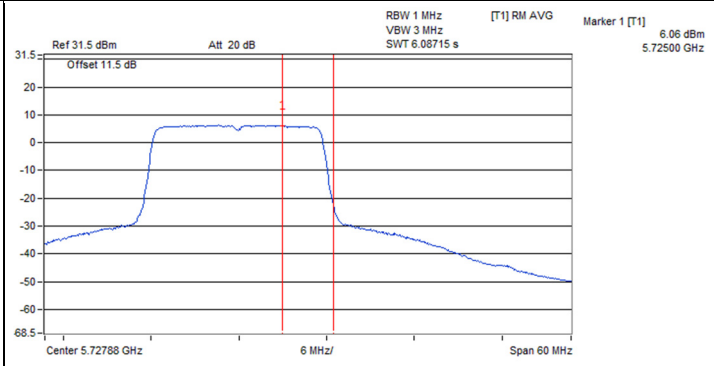
802.11a / Chain 1 : CH 144 (U-NII-2C)



802.11a / Chain 1 : CH 144 (U-NII-3)

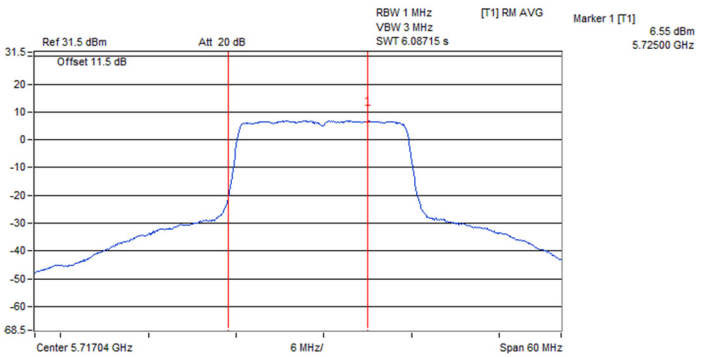


802.11ax (HE20) / Chain 0 : CH 144 (U-NII-2C)

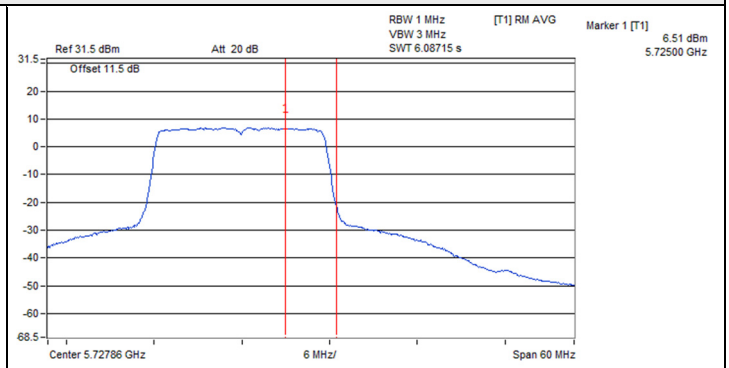


802.11ax (HE20) / Chain 0 : CH 144 (U-NII-3)

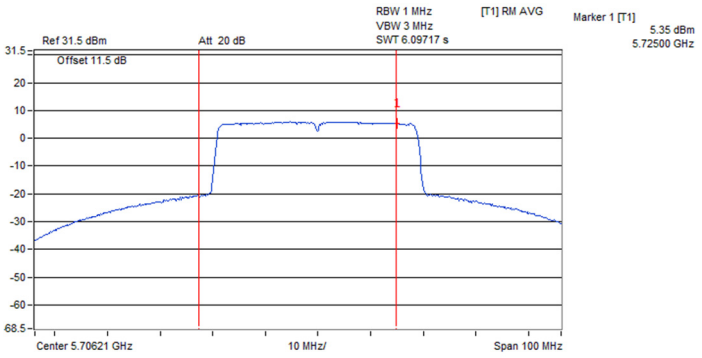
Spectrum Plot for channel straddling



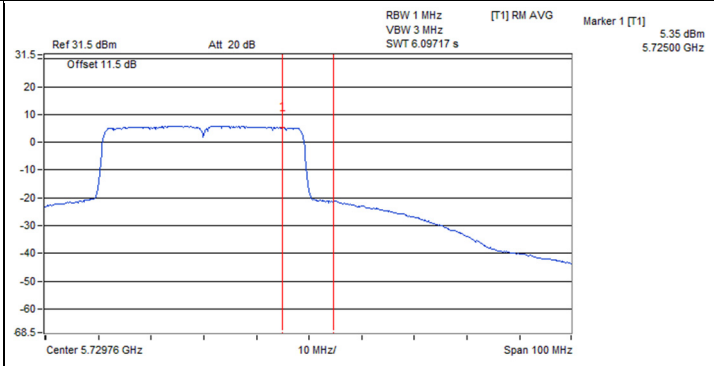
802.11ax (HE20) / Chain 1 : CH 144 (U-NII-2C)



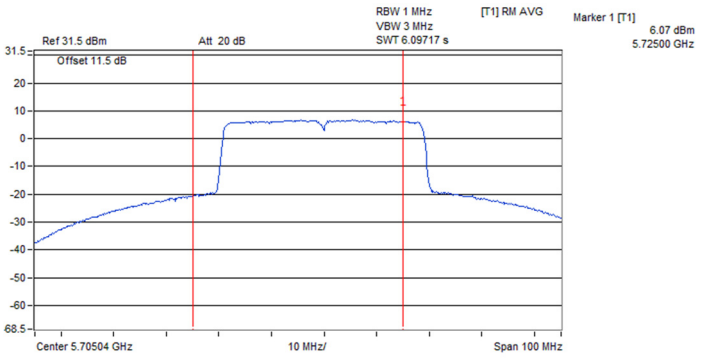
802.11ax (HE20) / Chain 1 : CH 144 (U-NII-3)



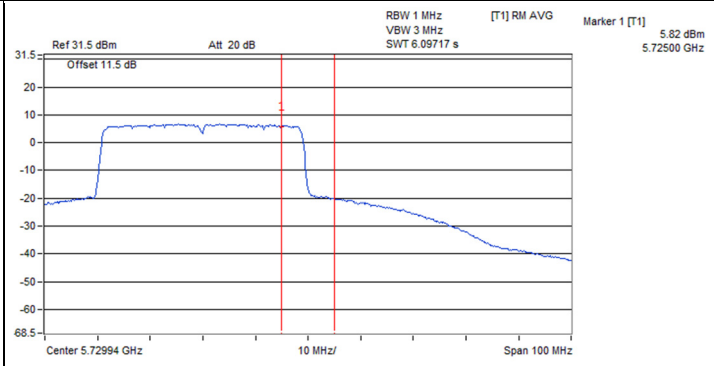
802.11ax (HE40) / Chain 0 : CH 142 (U-NII-2C)



802.11ax (HE40) / Chain 0 : CH 142 (U-NII-3)

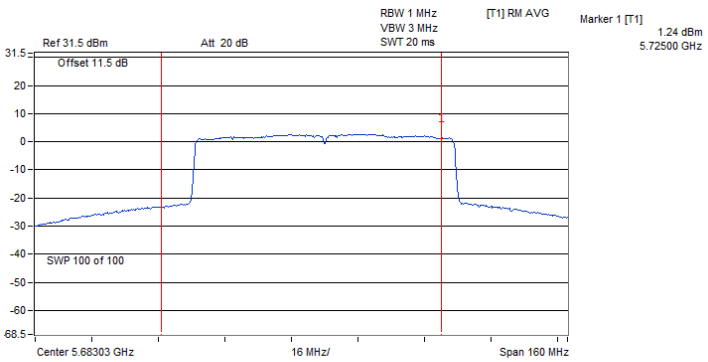


802.11ax (HE40) / Chain 1 : CH 142 (U-NII-2C)

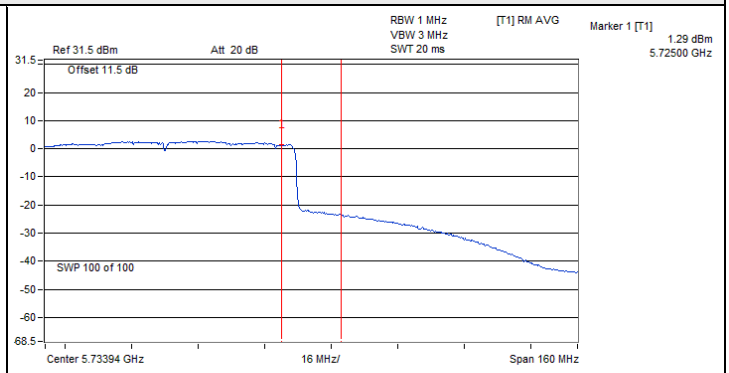


802.11ax (HE40) / Chain 1 : CH 142 (U-NII-3)

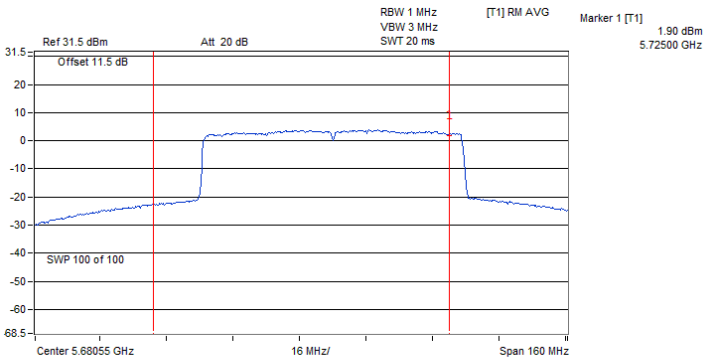
Spectrum Plot for channel straddling



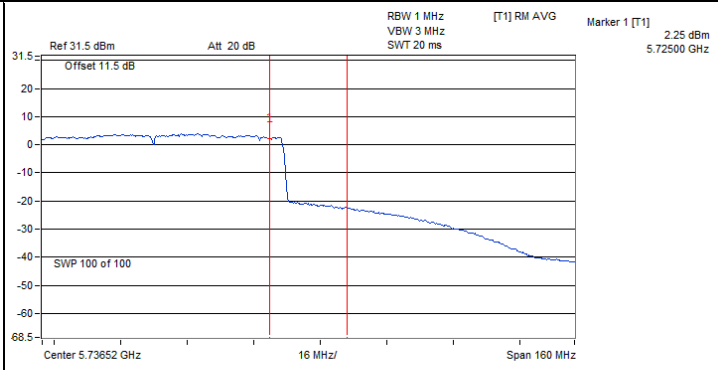
802.11ax (HE80) / Chain 0 : CH 138 (U-NII-2C)



802.11ax (HE80) / Chain 0 : CH 138 (U-NII-3)



802.11ax (HE80) / Chain 1 : CH 138 (U-NII-2C)



802.11ax (HE80) / Chain 1 : CH 138 (U-NII-3)

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Wayne Lin

Test Mode C

Radio 2

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
52	5260	19.16	18.66	155.865	21.93	24	Pass
60	5300	19.30	18.47	155.421	21.92	24	Pass
64	5320	19.38	18.44	156.519	21.95	24	Pass
100	5500	17.27	17.73	112.626	20.52	24	Pass
116	5580	18.07	18.23	130.648	21.16	24	Pass
140	5700	17.16	17.14	103.76	20.16	24	Pass
*144 (U-NII-2C)	5720	17.47	16.59	111.149	20.46	23	Pass
*144 (U-NII-3)	5720	11.10	10.32	25.908	14.13	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 4.93 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.56 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.59 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
52	5260	19.36	18.72	160.771	22.06	24	Pass
60	5300	19.46	18.63	161.254	22.08	24	Pass
64	5320	18.92	17.85	138.937	21.43	24	Pass
100	5500	16.30	16.52	87.532	19.42	24	Pass
116	5580	18.15	18.54	136.763	21.36	24	Pass
140	5700	16.20	15.57	77.745	18.91	24	Pass
*144 (U-NII-2C)	5720	17.14	16.87	100.401	20.02	23	Pass
*144 (U-NII-3)	5720	11.79	11.61	29.589	14.71	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 4.93 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.56 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.59 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
54	5270	20.53	19.77	**207.821**	23.18	24	Pass
62	5310	16.70	15.98	86.401	19.37	24	Pass
102	5510	13.86	14.62	53.295	17.27	24	Pass
110	5550	18.20	18.63	139.015	21.43	24	Pass
134	5670	18.42	18.04	133.182	21.24	24	Pass
*142 (U-NII-2C)	5710	20.61	20.06	221.007	23.44	24	Pass
*142 (U-NII-3)	5710	10.74	10.77	24.296	13.86	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 4.93 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.56 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.59 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
58	5290	15.92	15.41	73.838	18.68	24	Pass
106	5530	13.81	14.32	51.083	17.08	24	Pass
122	5610	18.15	18.23	131.84	21.20	24	Pass
*138 (U-NII-2C)	5690	20.55	20.65	**234.611**	23.70	24	Pass
*138 (U-NII-3)	5690	7.53	7.44	11.451	10.59	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 4.93 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.56 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.59 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
52	5260	19.36	18.72	160.771	22.06	22.15	Pass
60	5300	19.46	18.63	161.254	22.08	22.15	Pass
64	5320	18.92	17.85	138.937	21.43	22.15	Pass
100	5500	16.30	16.52	87.532	19.42	21.44	Pass
116	5580	18.15	18.54	136.763	21.36	21.44	Pass
140	5700	16.20	15.57	77.745	18.91	21.44	Pass
*144 (U-NII-2C)	5720	17.14	16.87	100.401	20.02	20.44	Pass
*144 (U-NII-3)	5720	11.79	11.61	29.589	14.71	27.57	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2]
3. For U-NII-2A, the directional gain is 7.85 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.85-6)].
4. For U-NII-2C, the directional gain is 8.56 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.56-6)].
5. For U-NII-3, the directional gain is 8.43 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.43-6) = 27.57 dBm.

802.11ax (HE40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
54	5270	19.49	18.72	**163.393**	22.13	22.15	Pass
62	5310	16.70	15.98	86.401	19.37	22.15	Pass
102	5510	13.86	14.62	53.295	17.27	21.44	Pass
110	5550	18.20	18.63	**139.015**	21.43	21.44	Pass
134	5670	18.42	18.04	133.182	21.24	21.44	Pass
*142 (U-NII-2C)	5710	17.86	17.31	117.329	20.69	21.44	Pass
*142 (U-NII-3)	5710	7.99	8.02	12.899	11.11	27.57	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2]
3. For U-NII-2A, the directional gain is 7.85 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.85-6)].
4. For U-NII-2C, the directional gain is 8.56 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.56-6)].
5. For U-NII-3, the directional gain is 8.43 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.43-6) = 27.57 dBm.

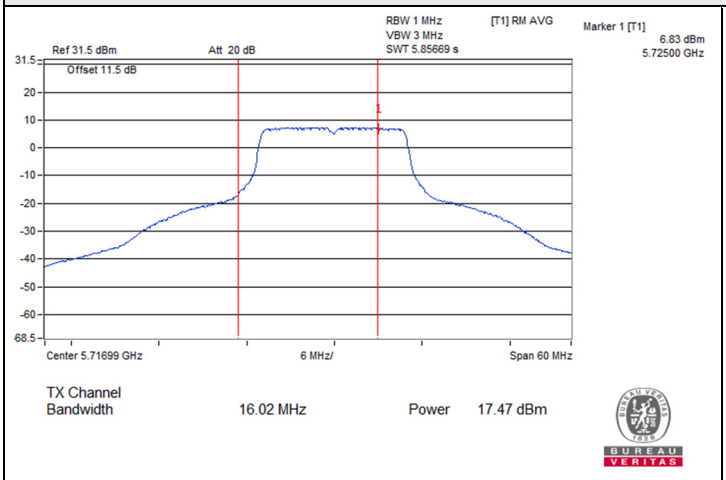
802.11ax (HE80) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
58	5290	15.92	15.41	73.838	18.68	22.15	Pass
106	5530	13.81	14.32	51.083	17.08	21.44	Pass
122	5610	18.17	18.22	131.826	21.20	21.44	Pass
*138 (U-NII-2C)	5690	18.05	18.15	131.932	21.20	21.44	Pass
*138 (U-NII-3)	5690	5.03	4.94	6.439	8.09	27.57	Pass

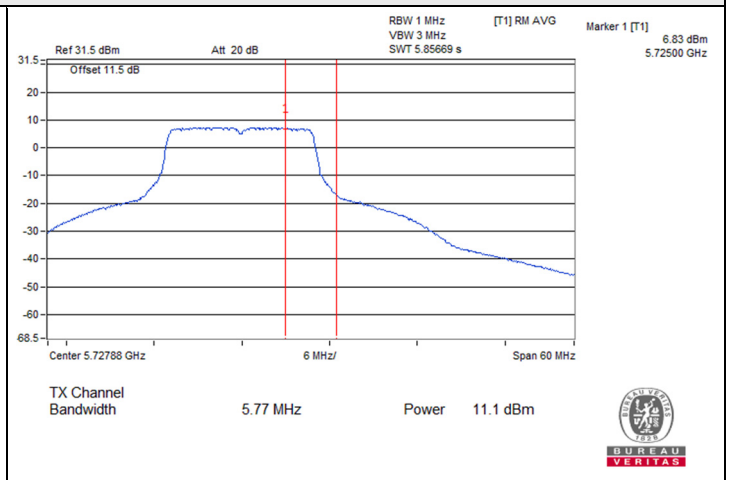
Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[(10$^{Chain0/20}$ + 10$^{Chain1/20}$)^2 / 2]
3. For U-NII-2A, the directional gain is 7.85 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.85-6)].
4. For U-NII-2C, the directional gain is 8.56 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.56-6)].
5. For U-NII-3, the directional gain is 8.43 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.43-6) = 27.57 dBm.

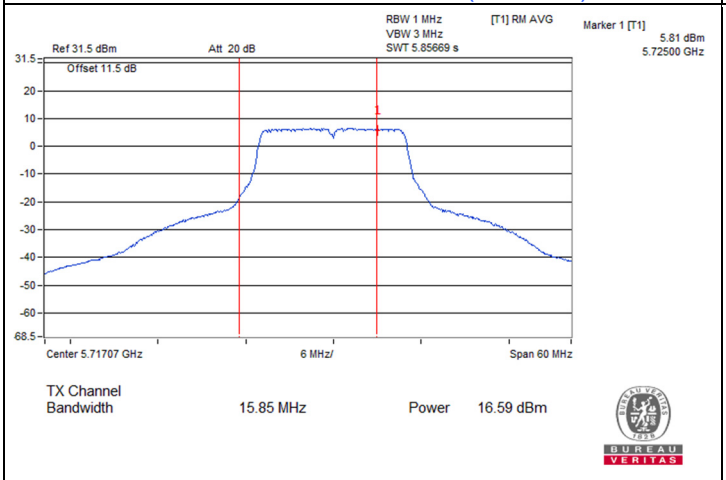
Spectrum Plot for channel straddling



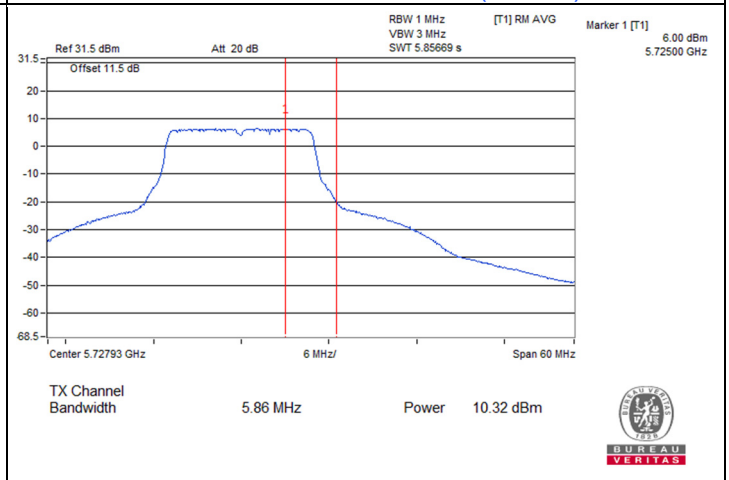
802.11a / Chain 0 : CH 144 (U-NII-2C)



802.11a / Chain 0 : CH 144 (U-NII-3)

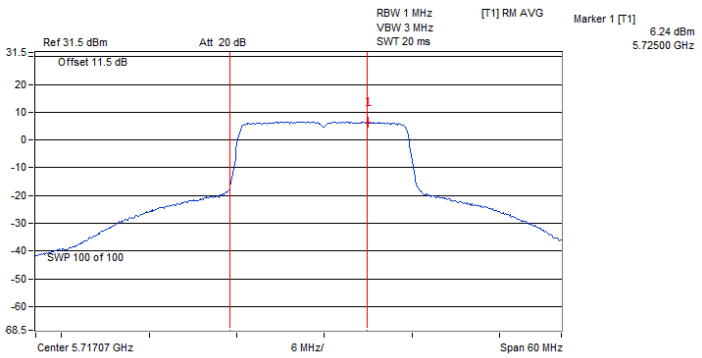


802.11a / Chain 1 : CH 144 (U-NII-2C)



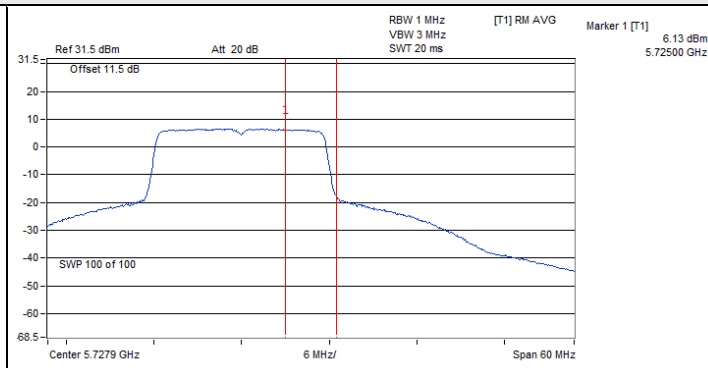
802.11a / Chain 1 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



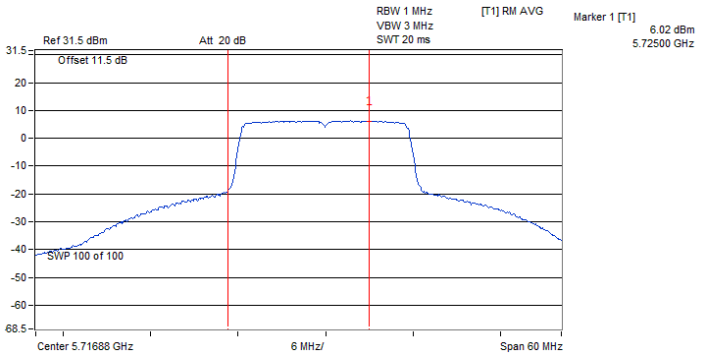
TX Channel Bandwidth 15.86 MHz Power 17.14 dBm

802.11ax (HE20) / Chain 0 : CH 144 (U-NII-2C)



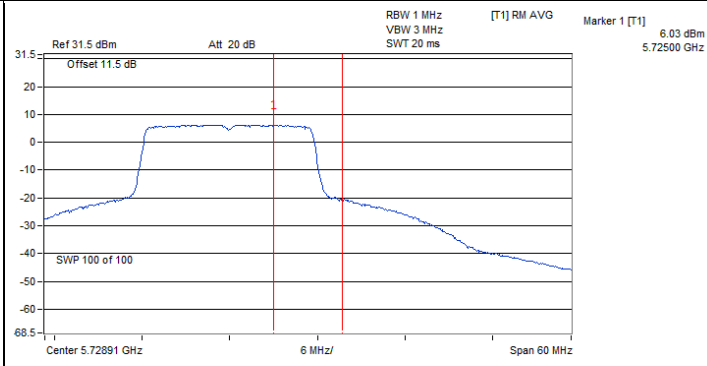
TX Channel Bandwidth 5.8 MHz Power 11.79 dBm

802.11ax (HE20) / Chain 0 : CH 144 (U-NII-3)



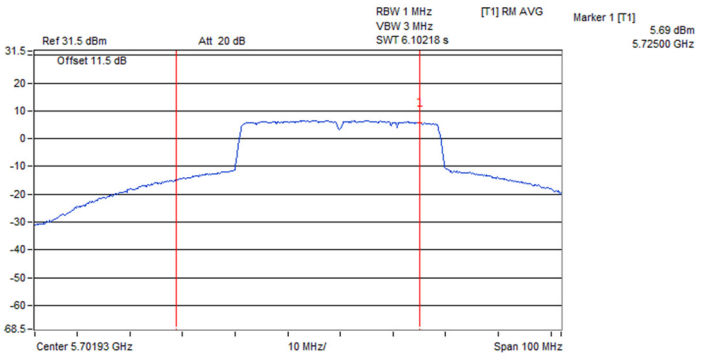
TX Channel Bandwidth 16.23 MHz Power 16.87 dBm

802.11ax (HE20) / Chain 1 : CH 144 (U-NII-2C)



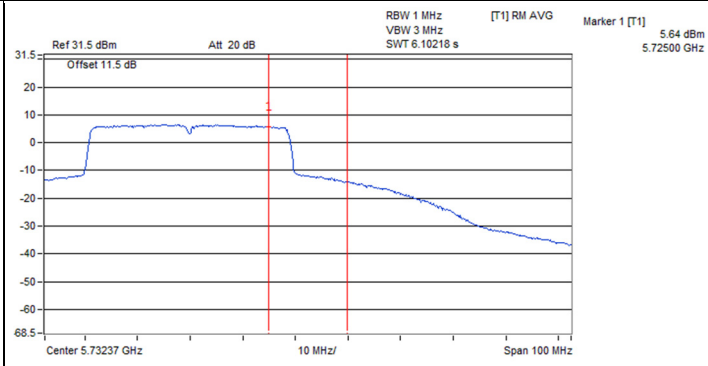
TX Channel Bandwidth 7.82 MHz Power 11.61 dBm

802.11ax (HE20) / Chain 1 : CH 144 (U-NII-3)



TX Channel Bandwidth 46.14 MHz Power 20.61 dBm

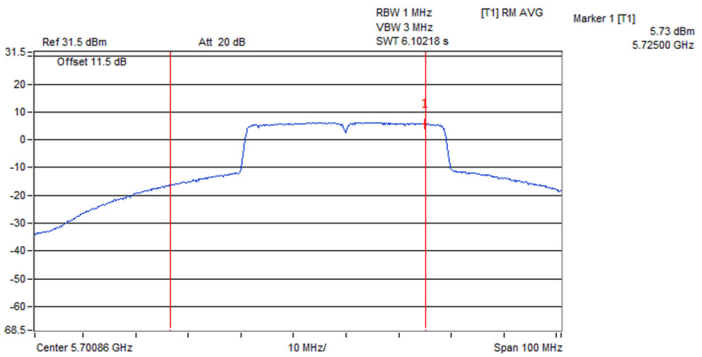
802.11ax (HE40) / Chain 0 : CH 142 (U-NII-2C)



TX Channel Bandwidth 14.74 MHz Power 10.74 dBm

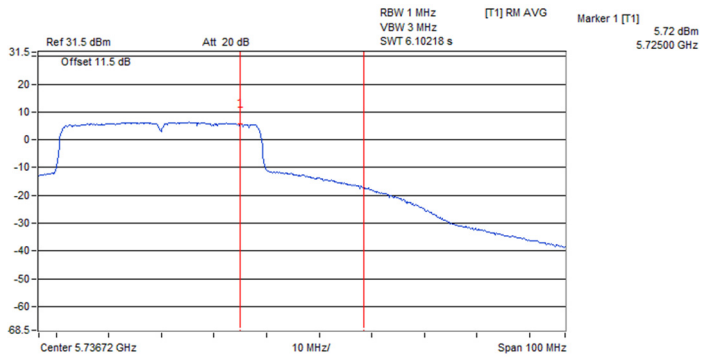
802.11ax (HE40) / Chain 0 : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



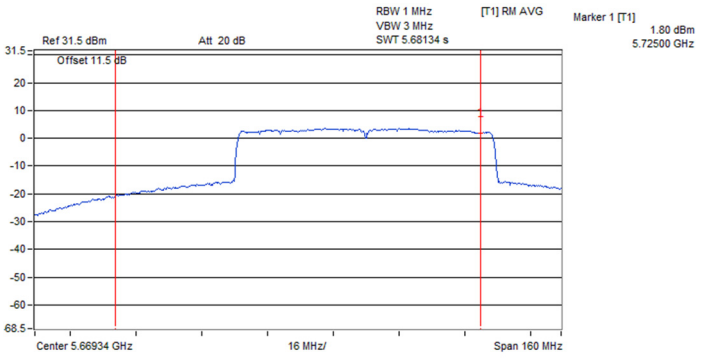
TX Channel Bandwidth 48.28 MHz Power 20.06 dBm

802.11ax (HE40) / Chain 1 : CH 142 (U-NII-2C)



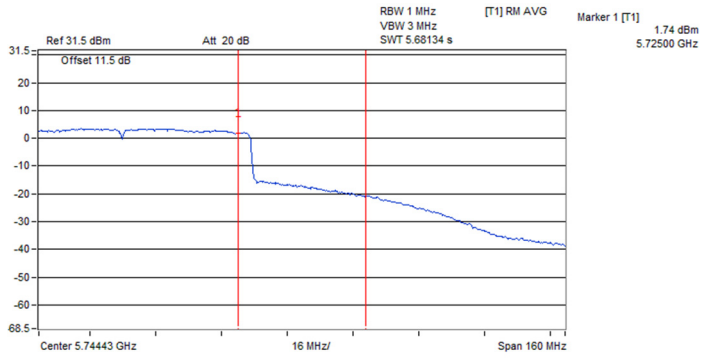
TX Channel Bandwidth 23.44 MHz Power 10.77 dBm

802.11ax (HE40) / Chain 1 : CH 142 (U-NII-3)



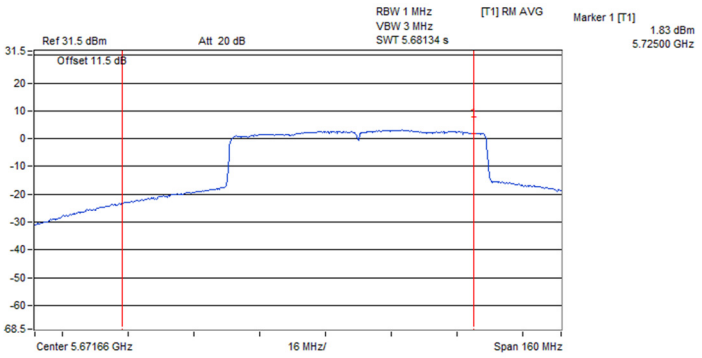
TX Channel Bandwidth 111.32 MHz Power 20.55 dBm

802.11ax (HE80) / Chain 0 : CH 138 (U-NII-2C)



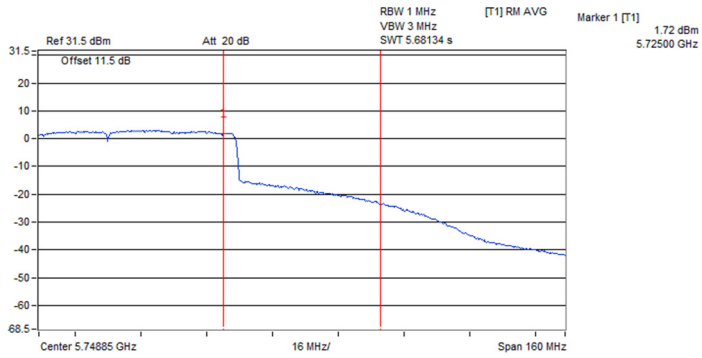
TX Channel Bandwidth 38.87 MHz Power 7.53 dBm

802.11ax (HE80) / Chain 0 : CH 138 (U-NII-3)



TX Channel Bandwidth 106.68 MHz Power 20.65 dBm

802.11ax (HE80) / Chain 1 : CH 138 (U-NII-2C)



TX Channel Bandwidth 47.71 MHz Power 7.44 dBm

802.11ax (HE80) / Chain 1 : CH 138 (U-NII-3)

Input Power:	120 Vac, 60 Hz	Environmental Conditions:	25°C, 60% RH	Tested By:	Alan Wu/Wayne Lin

Test Mode E

Radio 3

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
52	5260	18.69	18.95	152.484	21.83	24	Pass
60	5300	18.89	19.09	158.542	22.00	24	Pass
64	5320	19.16	19.27	166.942	22.23	24	Pass
100	5500	16.70	16.99	96.777	19.86	24	Pass
116	5580	17.21	17.43	107.937	20.33	24	Pass
140	5700	17.24	17.54	109.721	20.40	24	Pass
*144 (U-NII-2C)	5720	16.02	16.27	90.147	19.55	23.07	Pass
*144 (U-NII-3)	5720	10.09	10.28	22.85	13.59	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 5.28 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.42 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
52	5260	19.23	19.35	169.852	22.30	24	Pass
60	5300	19.42	19.66	179.968	22.55	24	Pass
64	5320	18.81	19.09	157.129	21.96	24	Pass
100	5500	17.54	17.68	115.368	20.62	24	Pass
116	5580	17.69	17.75	118.315	20.73	24	Pass
140	5700	16.22	16.34	84.932	19.29	24	Pass
*144 (U-NII-2C)	5720	16.67	16.93	97.776	19.90	22.99	Pass
*144 (U-NII-3)	5720	11.61	11.85	30.423	14.83	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 5.28 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.42 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
54	5270	20.38	20.51	**221.605**	23.46	24	Pass
62	5310	16.13	16.30	83.678	19.23	24	Pass
102	5510	15.63	15.86	75.107	18.76	24	Pass
110	5550	20.77	20.82	**240.18**	23.81	24	Pass
134	5670	19.09	19.29	166.014	22.20	24	Pass
*142 (U-NII-2C)	5710	19.99	20.28	211.713	23.26	24	Pass
*142 (U-NII-3)	5710	10.48	10.77	23.7	13.75	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 5.28 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.42 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
58	5290	15.74	16.01	77.4	18.89	24	Pass
106	5530	15.39	15.52	70.239	18.47	24	Pass
122	5610	18.92	19.11	159.453	22.03	24	Pass
*138 (U-NII-2C)	5690	20.21	20.40	220.173	23.43	24	Pass
*138 (U-NII-3)	5690	7.36	7.60	11.49	10.60	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-2A, the maximum gain is 5.28 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the maximum gain is 5.42 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
*50 (U-NII-1)	5250	10.39	11.19	24.648	13.92	30	Pass
*50 (U-NII-2A)	5250	10.63	11.41	25.983	14.15	24	Pass
114	5570	14.81	14.95	61.53	17.89	24	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain is the maximum gain of antennas.
3. For U-NII-1, the maximum gain is 5.47 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.28 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.78 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
52	5260	18.96	19.08	**159.614**	22.03	22.07	Pass
60	5300	18.90	19.13	159.471	22.03	22.07	Pass
64	5320	18.81	19.09	157.129	21.96	22.07	Pass
100	5500	17.54	17.68	115.368	20.62	21.21	Pass
116	5580	17.69	17.75	118.315	20.73	21.21	Pass
140	5700	16.22	16.34	84.932	19.29	21.21	Pass
*144 (U-NII-2C)	5720	16.40	16.65	91.773	19.63	20.2	Pass
*144 (U-NII-3)	5720	11.33	11.59	28.591	14.56	27.62	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. For U-NII-2A, the directional gain is 7.93 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.93-6)].
4. For U-NII-2C, the directional gain is 8.79 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.79-6)].
5. For U-NII-3, the directional gain is 8.38 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.38-6) = 27.62 dBm.

802.11ax (HE40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
54	5270	18.86	19.03	156.896	21.96	22.07	Pass
62	5310	16.13	16.30	83.678	19.23	22.07	Pass
102	5510	15.63	15.86	75.107	18.76	21.21	Pass
110	5550	18.00	18.05	126.922	21.04	21.21	Pass
134	5670	18.06	18.26	**130.962**	21.17	21.21	Pass
*142 (U-NII-2C)	5710	17.22	17.50	111.746	20.48	21.21	Pass
*142 (U-NII-3)	5710	7.74	8.00	12.566	10.99	27.62	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. For U-NII-2A, the directional gain is 7.93 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.93-6)].
4. For U-NII-2C, the directional gain is 8.79 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.79-6)].
5. For U-NII-3, the directional gain is 8.38 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.38-6) = 27.62 dBm.

802.11ax (HE80) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
58	5290	15.74	16.01	77.4	18.89	22.07	Pass
106	5530	15.39	15.52	70.239	18.47	21.21	Pass
122	5610	17.89	18.05	125.344	20.98	21.21	Pass
*138 (U-NII-2C)	5690	17.63	17.82	121.553	20.85	21.21	Pass
*138 (U-NII-3)	5690	4.79	5.02	6.351	8.03	27.62	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[$(10^{Chain0/20} + 10^{Chain1/20})^2$ / 2]
3. For U-NII-2A, the directional gain is 7.93 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.93-6)].
4. For U-NII-2C, the directional gain is 8.79 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.79-6)].
5. For U-NII-3, the directional gain is 8.38 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.38-6) = 27.62 dBm.

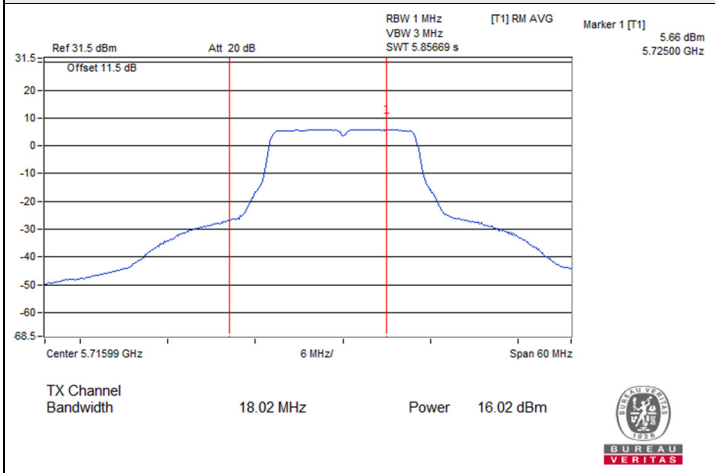
802.11ax (HE160) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
*50 (U-NII-1)	5250	10.39	11.19	24.648	13.92	28.22	Pass
*50 (U-NII-2A)	5250	10.63	11.41	25.983	14.15	22.07	Pass
114	5570	14.81	14.95	61.53	17.89	21.21	Pass

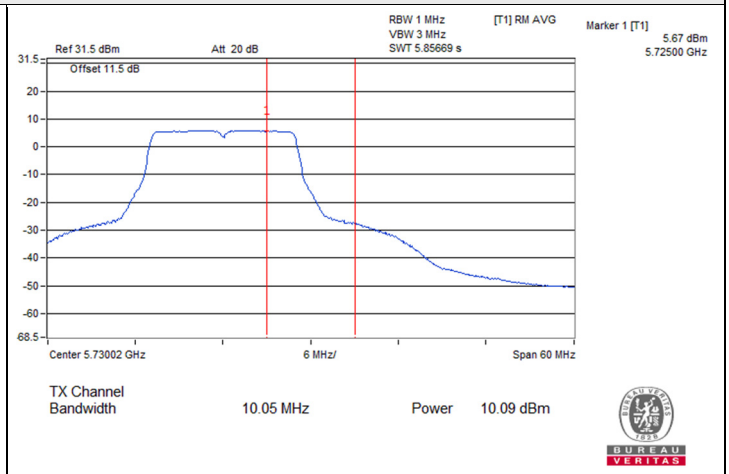
Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = 10 log[($10^{Chain0/20}$ + $10^{Chain1/20}$)^2 / 2]
3. For U-NII-1, the directional gain is 7.78 dBi > 6 dBi, so the output power limit shall be reduced to 30-(7.78-6) = 28.22 dBm.
4. For U-NII-2A, the directional gain is 7.93 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(7.93-6)].
5. For U-NII-2C, the directional gain is 8.79 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.79-6)].

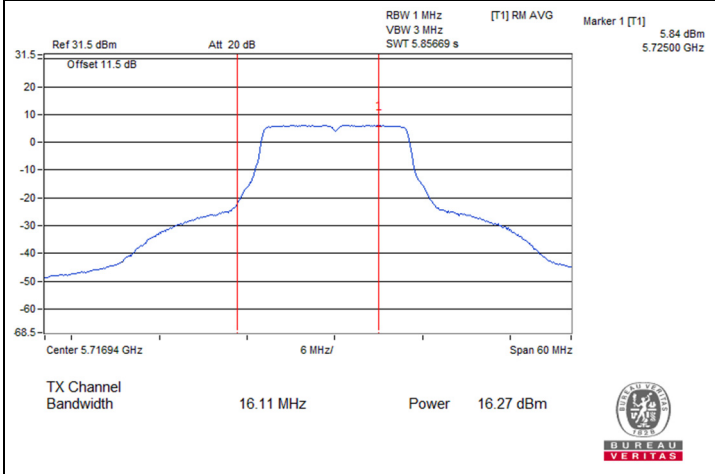
Spectrum Plot for channel straddling



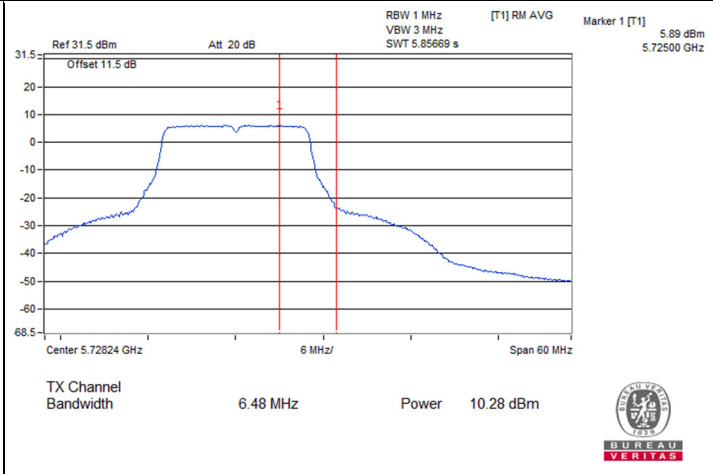
802.11a / Chain 0 : CH 144 (U-NII-2C)



802.11a / Chain 0 : CH 144 (U-NII-3)

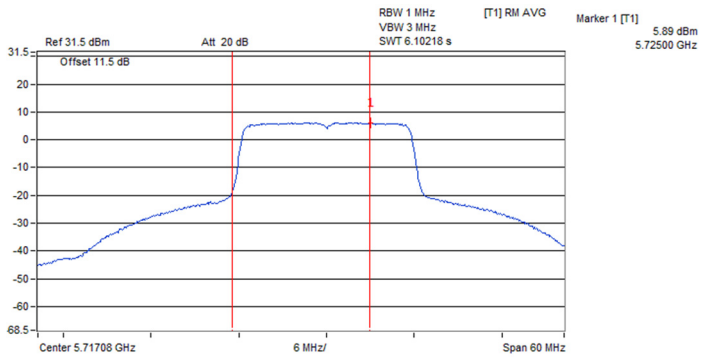


802.11a / Chain 1 : CH 144 (U-NII-2C)



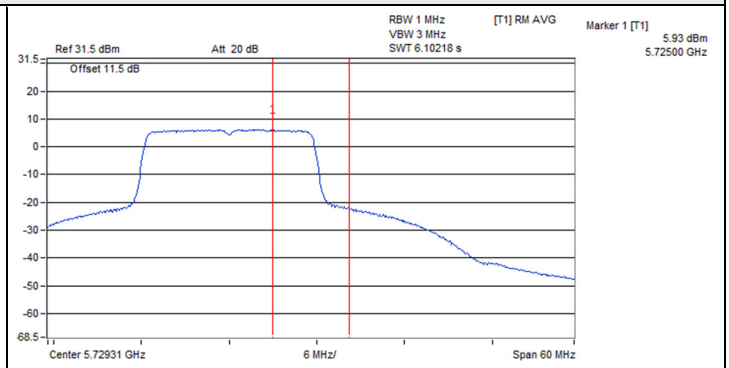
802.11a / Chain 1 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



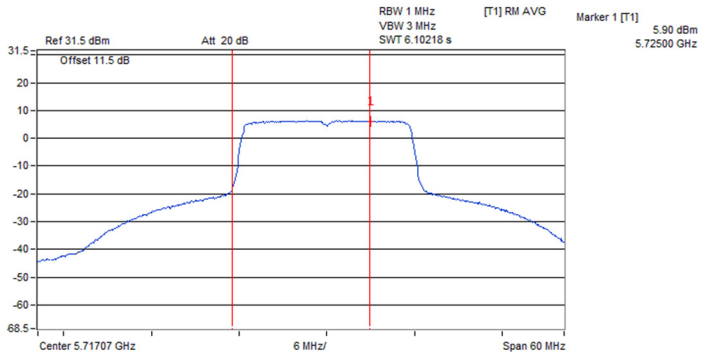
TX Channel Bandwidth 15.83 MHz Power 16.67 dBm

802.11ax (HE20) / Chain 0 : CH 144 (U-NII-2C)



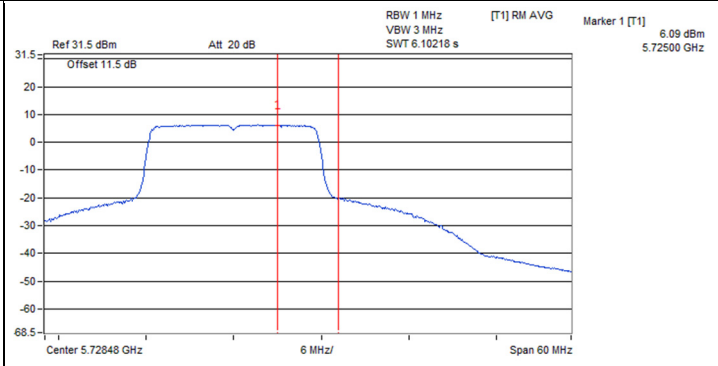
TX Channel Bandwidth 8.63 MHz Power 11.61 dBm

802.11ax (HE20) / Chain 0 : CH 144 (U-NII-3)



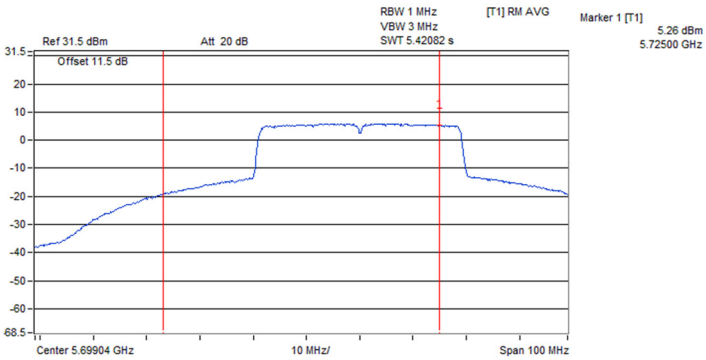
TX Channel Bandwidth 15.86 MHz Power 16.93 dBm

802.11ax (HE20) / Chain 1 : CH 144 (U-NII-2C)



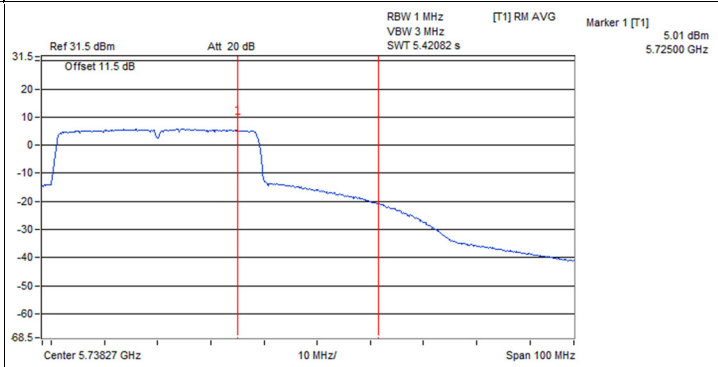
TX Channel Bandwidth 6.97 MHz Power 11.85 dBm

802.11ax (HE20) / Chain 1 : CH 144 (U-NII-3)



TX Channel Bandwidth 51.92 MHz Power 19.99 dBm

802.11ax (HE40) / Chain 0 : CH 142 (U-NII-2C)



TX Channel Bandwidth 26.54 MHz Power 10.48 dBm

802.11ax (HE40) / Chain 0 : CH 142 (U-NII-3)