TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart E (Section 15.407)**
Report No.:	RFBDUM-WTW-P22090716-1 R1
FCC ID:	UXX-S5A246A
Product:	Semi-Ruggedized Router
Brand:	cradlepoint
Model No.:	S5A245A
Series Model:	S5A246A
Received Date:	2022/10/11
Test Date:	2022/10/14 ~ 2022/11/25
Issued Date:	2023/3/23
Applicant:	CRADLEPOINT, INC.
Address:	1111 W. Jefferson Street Suite 400, Boise ID 83702 United States Of America
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** **2023/3/23**

May Chen / Manager

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Prepared by : Vito Lung / Specialist

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Table of Contents

Release Control Record **4**

1 Certificate **5**

2 Summary of Test Results **6**

2.1 Measurement Uncertainty 6
2.2 Supplementary Information 6

3 General Information **7**

3.1 General Description of EUT 7
3.2 Antenna Description of EUT 9
3.3 Channel List 10
3.4 Test Mode Applicability and Tested Channel Detail 12
3.5 Duty Cycle of Test Signal 17
3.6 Test Program Used and Operation Descriptions 19
3.7 Connection Diagram of EUT and Peripheral Devices 19
3.8 Configuration of Peripheral Devices and Cable Connections 21

4 Test Instruments **22**

4.1 26 dB Bandwidth 22
4.2 RF Output Power 22
4.3 Power Spectral Density 22
4.4 6 dB Bandwidth 22
4.5 Occupied Bandwidth 22
4.6 Frequency Stability 23
4.7 AC Power Conducted Emissions 23
4.8 Unwanted Emissions below 1 GHz 24
4.9 Unwanted Emissions above 1 GHz 25

5 Limits of Test Items **26**

5.1 26 dB Bandwidth 26
5.2 RF Output Power 26
5.3 Power Spectral Density 26
5.4 6 dB Bandwidth 26
5.5 Occupied Bandwidth 27
5.6 Frequency Stability 27
5.7 AC Power Conducted Emissions 27
5.8 Unwanted Emissions below 1 GHz 27
5.9 Unwanted Emissions above 1 GHz 28

6 Test Arrangements **29**

6.1 26 dB Bandwidth 29
6.1.1 Test Setup 29
6.1.2 Test Procedure 29
6.2 RF Output Power 30
6.2.1 Test Setup 30
6.2.2 Test Procedure 30
6.3 Power Spectral Density 31
6.3.1 Test Setup 31
6.3.2 Test Procedure 31
6.4 6 dB Bandwidth 31
6.4.1 Test Setup 31
6.4.2 Test Procedure 31
6.5 Occupied Bandwidth 32
6.5.1 Test Setup 32
6.5.2 Test Procedure 32
6.6 Frequency Stability 32
6.6.1 Test Setup 32
6.6.2 Test Procedure 32
6.7 AC Power Conducted Emissions 33

6.7.1 Test Setup 33
6.7.2 Test Procedure 33
6.8 Unwanted Emissions below 1 GHz 34
6.8.1 Test Setup 34
6.8.2 Test Procedure 35
6.9 Unwanted Emissions above 1 GHz 36
6.9.1 Test Setup 36
6.9.2 Test Procedure 36

7 Test Results of Test Item 37

7.1 26 dB Bandwidth 37
7.2 RF Output Power 41
7.3 Power Spectral Density 61
7.4 6 dB Bandwidth 67
7.5 Occupied Bandwidth 69
7.6 Frequency Stability 75
7.7 AC Power Conducted Emissions 76
7.8 Unwanted Emissions below 1 GHz 78
7.9 Unwanted Emissions above 1 GHz 82

8 Pictures of Test Arrangements 270

9 Information of the Testing Laboratories 271

Release Control Record

Issue No.	Description	Date Issued
RFBDUM-WTW-P22090716-1	Original release.	2022/12/14
RFBDUM-WTW-P22090716-1 R1	Modified the antenna list and the section 7.2 & 7.3	2023/3/23

1 Certificate

Product:	Semi-Ruggedized Router
Brand:	cradlepoint
Test Model:	S5A245A
Series Model:	S5A246A
Sample Status:	Engineering sample
Applicant:	CRADLEPOINT, INC.
Test Date:	2022/10/14 ~ 2022/11/25
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	N/A	For U-NII-2A U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.
15.407(a)(1/2/3)	RF Output Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
---	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 -7.66 dB at 0.15781 MHz
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -6.4 dB at 41.40 MHz
15.407(b) (1/2/3/4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.1 dB at 5149.08, 5150.00, 5350.00, 5352.31, 5460.00, 5470.00, 5613.96, 5649.96, 5725.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is R-SMA 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:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.4 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.0 dB
	18 GHz ~ 40 GHz	5.3 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	Semi-Ruggedized Router
Brand	cradlepoint
Test Model	S5A245A
Series Model	S5A246A
Status of EUT	Engineering sample
Power Supply Rating	9 ~ 33 Vdc
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax HE mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps 802.11ax: up to 1201.0Mbps
Operating Frequency	5.18 GHz ~ 5.24 GHz 5.26 GHz ~ 5.32 GHz 5.5 GHz ~ 5.72 GHz 5.745 GHz ~ 5.825 GHz
Number of Channel	802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 25 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 12 802.11ac (VHT80), 802.11ax (HE80): 6
Output Power	**CDD Mode:** 5.18 GHz ~ 5.24 GHz : **(Master):** 125.62 mW (20.99 dBm) 5.18 GHz ~ 5.24 GHz : **(Client):** 125.62 mW (20.99 dBm) 5.26 GHz ~ 5.32 GHz : 93.93 mW (19.73 dBm) 5.5 GHz ~ 5.72 GHz : 90.086 mW (19.55 dBm) 5.745 GHz ~ 5.825 GHz : 115.378 mW (20.62 dBm) **Beamforming Mode:** 5.18 GHz ~ 5.24 GHz : **(Master):** 123.756 mW (20.93 dBm) 5.18 GHz ~ 5.24 GHz : **(Client):** 123.756 mW (20.93 dBm) 5.26 GHz ~ 5.32 GHz : 91.997 mW (19.64 dBm) 5.5 GHz ~ 5.72 GHz : 90.086 mW (19.55 dBm) 5.745 GHz ~ 5.825 GHz : 98.992 mW (19.96 dBm)
EUT Category	Indoor Access Point Client device

Note:

1. The EUT has below model names which are identical to each other in all aspects except for the following table:

Product name	Brand	Product marketing name (PMN)	Model	Wi-Fi Function	Embedded radio (WWAN module)	Contains FCC ID
Polaris	cradlepoint	S700-C4E	S5A245A	Yes	Quectel, EG25-G	XMR201903EG25G
		S700-C4D	S5A246A	Yes	Quectel, EC25-AF	XMR201808EC25AF
Note: From the above models, model: **S5A245A** was selected as representative model for the test and its data was recorded in this report.						

2. There are WWAN and WLAN (2.4 GHz & 5 GHz) technology used for the EUT.
3. The EUT has three radios as following table:

Radio 1	Radio 2	Radio 3
WLAN (2.4GHz + 5GHz)	WWAN (LTE + WCDMA+ GSM)	GPS

4. Simultaneously transmission condition.

Condition	Technology		
1	WWAN	WLAN (5GHz)	WLAN (2.4GHz)
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.			

5. The EUT uses following accessories.

GPIO Cable For DC Power		
Brand	Model	Specification
U-MEDIA	0573-1200090001	With DC Power supply Voltage Range : 9V-33V, 3A Cable : Unshielded, 2m
AC Adapter 1		
Brand	Model	Specification
APD	WA-36N12R	AC Input : 100-240V, 0.9A, 50-60Hz DC Output : 12V, 3A DC Output Cable : Unshielded, 1.5m
AC Adapter 2		
Brand	Model	Specification
Ktec	KSA-36W-120300D5	AC Input : 100-240V, 1A, 50-60Hz DC Output : 12V, 3A DC Output Cable : Unshielded, 1.5m

6. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

For WLAN							
Ant. Set	RF Chain NO.	Brand	Model	Ant. Net Gain (dBi)	Frequency Range (GHz)	Ant. Type	Connector Type
1	Chain 0	M.gear	C732-510013-A	3.5	2.4~2.4835	Dipole	R-SMA
				4.5	5.15~5.85		
	Chain 1	M.gear	C732-510013-A	3.5	2.4~2.4835	Dipole	R-SMA
				4.5	5.15~5.85		
2	Chain 0	JOYMAX	TWX-151ARSXX-711	3.86	2.4~2.4835	Dipole	R-SMA
				3.58	5.15~5.85		
	Chain 1	JOYMAX	TWX-151ARSXX-711	3.86	2.4~2.4835	Dipole	R-SMA
				3.58	5.15~5.85		
3	Chain 0	WNC	08.22100.011	2.47	2.4~2.4835	Dipole	R-SMA
				2.47	5.15~5.85		
	Chain 1	WNC	08.22100.011	2.47	2.4~2.4835	Dipole	R-SMA
				2.47	5.15~5.85		
4	Chain 0	Cradlepoint	CP01	5.74	2.4~2.4835	Monopole	R-SMA
				5.60	5.15~5.85		
	Chain 1	Cradlepoint	CP01	5.74	2.4~2.4835	Monopole	R-SMA
				5.60	5.15~5.85		
5	Chain 0	TAOGLAS	MA1505.AK.001	1.4	2.4~2.4835	Monopole	R-SMA
				2.33	5.15~5.85		
	Chain 1	TAOGLAS	MA1505.AK.001	1.37	2.4~2.4835	Monopole	R-SMA
				2.55	5.15~5.85		

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

2. The EUT incorporates a MIMO function:

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.

3.3 Channel List

FOR 5180 ~ 5320 MHz

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

Channel	Frequency	Channel	Frequency
36	5180 MHz	52	5260 MHz
40	5200 MHz	56	5280 MHz
44	5220 MHz	60	5300 MHz
48	5240 MHz	64	5320 MHz

4 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	54	5270 MHz
46	5230 MHz	62	5310 MHz

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

Channel	Frequency	Channel	Frequency
42	5210 MHz	58	5290 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		

FOR 5745 ~ 5825 MHz

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

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. The power Cable for DC Power, has the following models: 0573-1200090001. The AC Adapter has the following models: KSA-36W-120300D5 / WA-36N12R. Pre-scan these models and find the worst case as a representative test condition. 2. EUT can be used in the following ways for Dipole antenna: X-axis/ Y-axis/ Z-axis and also with the Monopole antenna has placed in the X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition.
Worst Case:	1. Power source Worst Condition: WA-36N12R 2. EUT with Dipole antenna and Monopole antenna Pre-scan X-axis/ Y-axis/ Z-axis Worst condidtion: X-axis 3. Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

Note: Partial RU(resource unit) Configuration not supported.

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

Test Item	EUT Configure Mode	Mode	Device Type :	Signal Mode	Tested Channel	Modulation	Data Rate Parameter
26 dB Bandwidth	C	802.11a	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	6Mb/s
		802.11ax (HE20)	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0

Power Spectral Density	C	802.11a	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	6Mb/s
		802.11ac (VHT20)	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ac (VHT40)	Master	CDD	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ac (VHT80)	Master	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0
		802.11ax (HE20)	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0

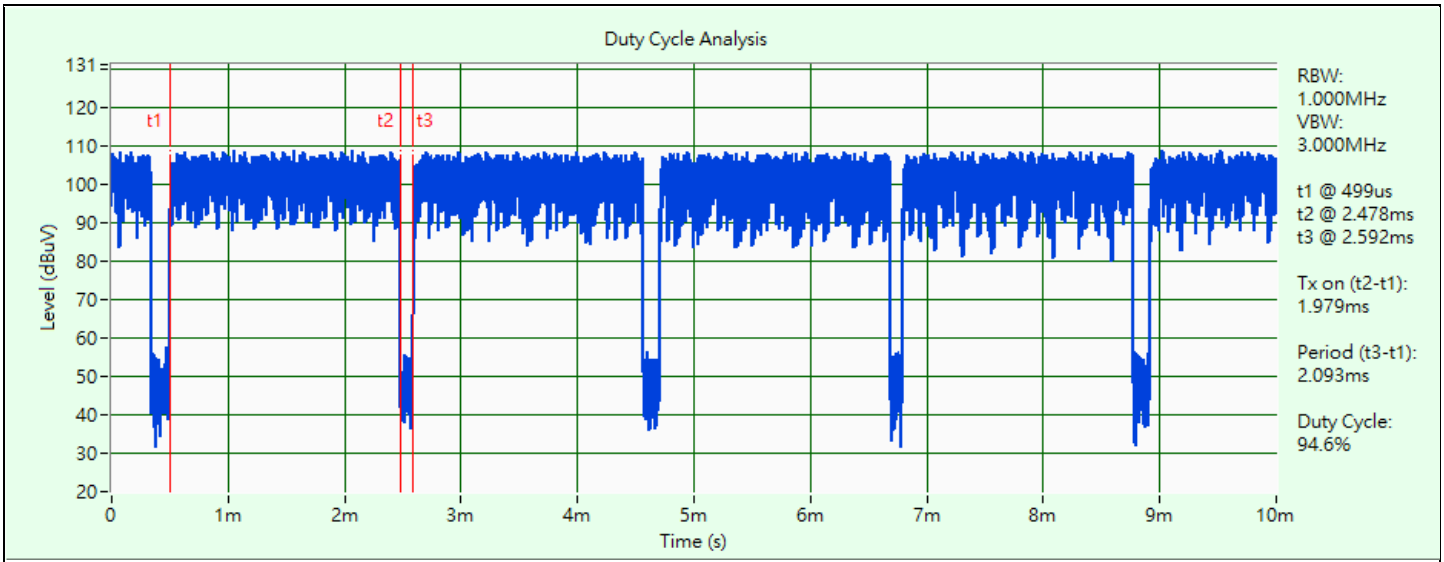
RF Output Power	C	802.11a	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	6Mb/s
		802.11ac (VHT20)	Master	CDD & Beamforming	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ac (VHT40)	Master	CDD & Beamforming	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ac (VHT80)	Master	CDD & Beamforming	42, 58, 106, 122, 138, 155	BPSK	MCS0
		802.11ax (HE20)	Master	CDD & Beamforming	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD & Beamforming	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD & Beamforming	42, 58, 106, 122, 138, 155	BPSK	MCS0
	D	802.11a	Client	CDD	36, 40, 48	BPSK	6Mb/s
		802.11ac (VHT20)	Client	CDD & Beamforming	36, 40, 48	BPSK	MCS0
		802.11ac (VHT40)	Client	CDD & Beamforming	38, 46	BPSK	MCS0
		802.11ac (VHT80)	Client	CDD & Beamforming	42	BPSK	MCS0
		802.11ax (HE20)	Client	CDD & Beamforming	36, 40, 48	BPSK	MCS0
		802.11ax (HE40)	Client	CDD & Beamforming	38, 46	BPSK	MCS0
		802.11ax (HE80)	Client	CDD & Beamforming	42	BPSK	MCS0
6 dB Bandwidth	C	802.11a	Master	CDD	149, 157, 165	BPSK	6Mb/s
		802.11ax (HE20)	Master	CDD	149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD	151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD	155	BPSK	MCS0

Occupied Bandwidth	C	802.11a	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	6Mb/s
		802.11ax (HE20)	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0
Frequency Stability	C	802.11a	Master	CW	36	un-modulation	-
AC Power Conducted Emissions	B	802.11ax (HE20)	Master	CDD	40	BPSK	MCS0
Unwanted Emissions below 1 GHz	A	802.11ax (HE20)	Master	CDD	40	BPSK	MCS0
	B	802.11ax (HE20)	Master	CDD	40	BPSK	MCS0
Unwanted Emissions above 1 GHz	A	802.11a	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	6Mb/s
		802.11ax (HE20)	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0

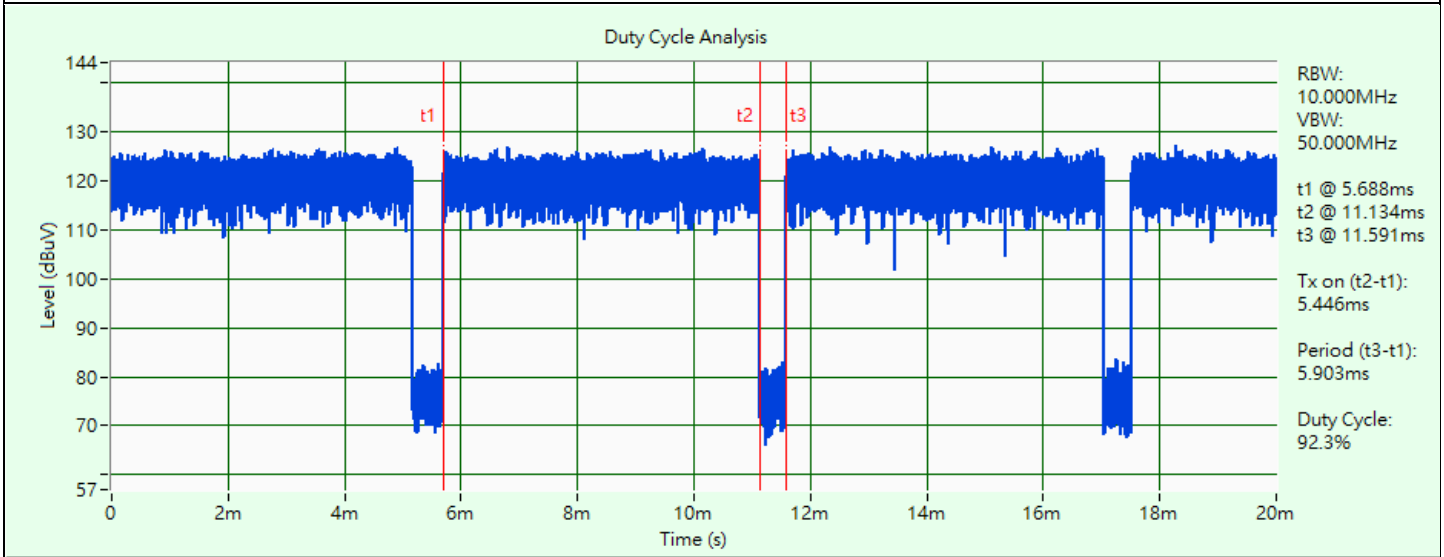
	B	802.11a	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	6Mb/s
		802.11ax (HE20)	Master	CDD	36, 40, 48, 52, 60, 64, 100, 116, 140, 149, 157, 165	BPSK	MCS0
		802.11ax (HE40)	Master	CDD	38, 46, 54, 62, 102, 110, 134, 151, 159	BPSK	MCS0
		802.11ax (HE80)	Master	CDD	42, 58, 106, 122, 138, 155	BPSK	MCS0
EUT Configure Mode:	A	Antenna Type : Dipole (Antenna Set 1)					
	B	Antenna Type : Monopole (Antenna Set 4)					
	C	Antenna Port : Master					
	D	Antenna Port : Client					

3.5 Duty Cycle of Test Signal

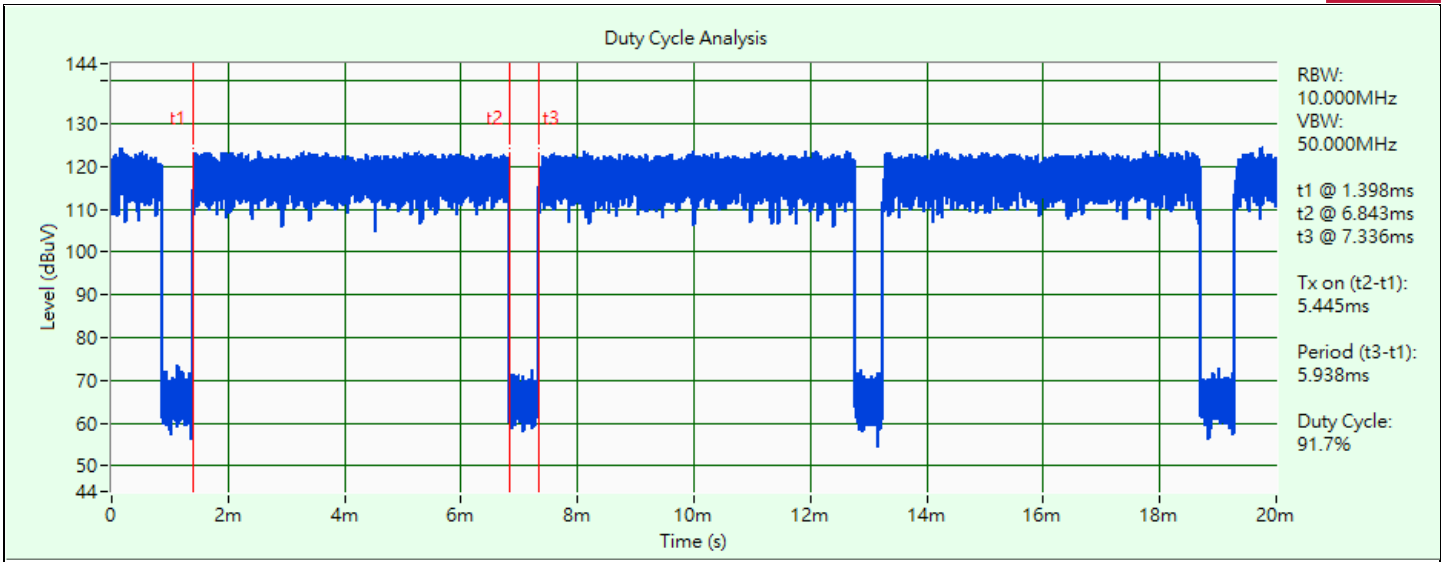
802.11a: Duty cycle = 1.979 ms / 2.093 ms x 100% = 94.6%, duty factor = 10 * log (1/Duty cycle) = 0.24 dB
802.11ax (HE20): Duty cycle = 5.446 ms / 5.903 ms x 100% = 92.3%, duty factor = 10 * log (1/Duty cycle) = 0.35 dB
802.11ax (HE40): Duty cycle = 5.445 ms / 5.938 ms x 100% = 91.7%, duty factor = 10 * log (1/Duty cycle) = 0.38 dB
802.11ax (HE80): Duty cycle = 5.445 ms / 5.964 ms x 100% = 91.3%, duty factor = 10 * log (1/Duty cycle) = 0.40 dB



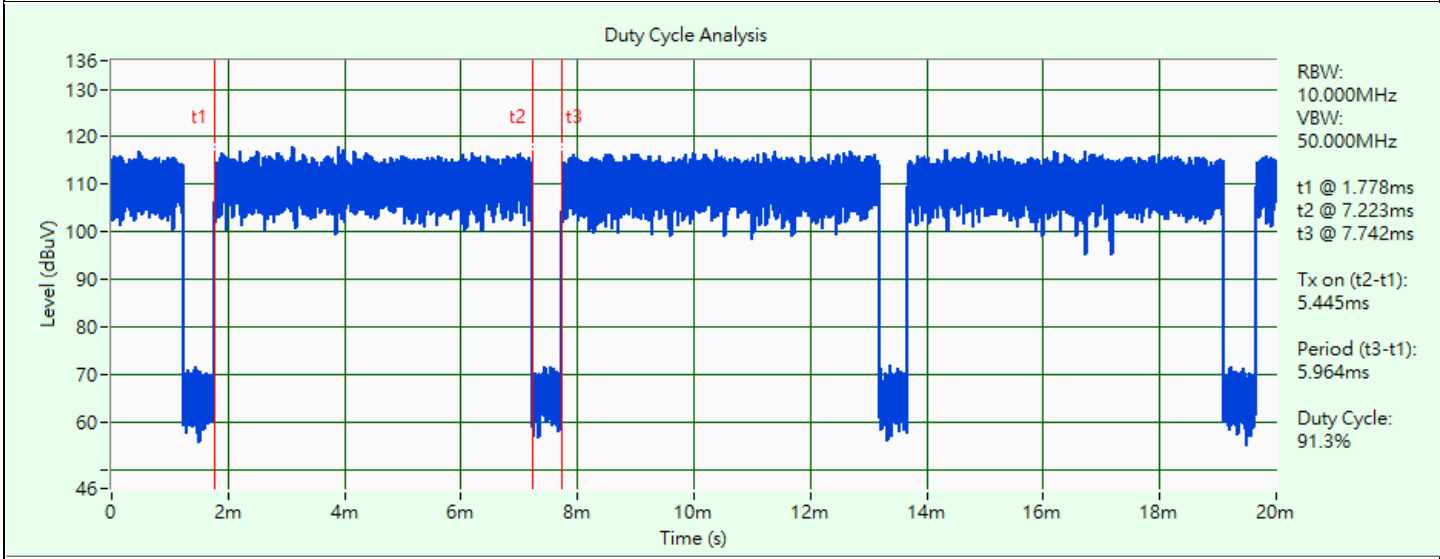
802.11a



802.11ax (HE20)



802.11ax (HE40)



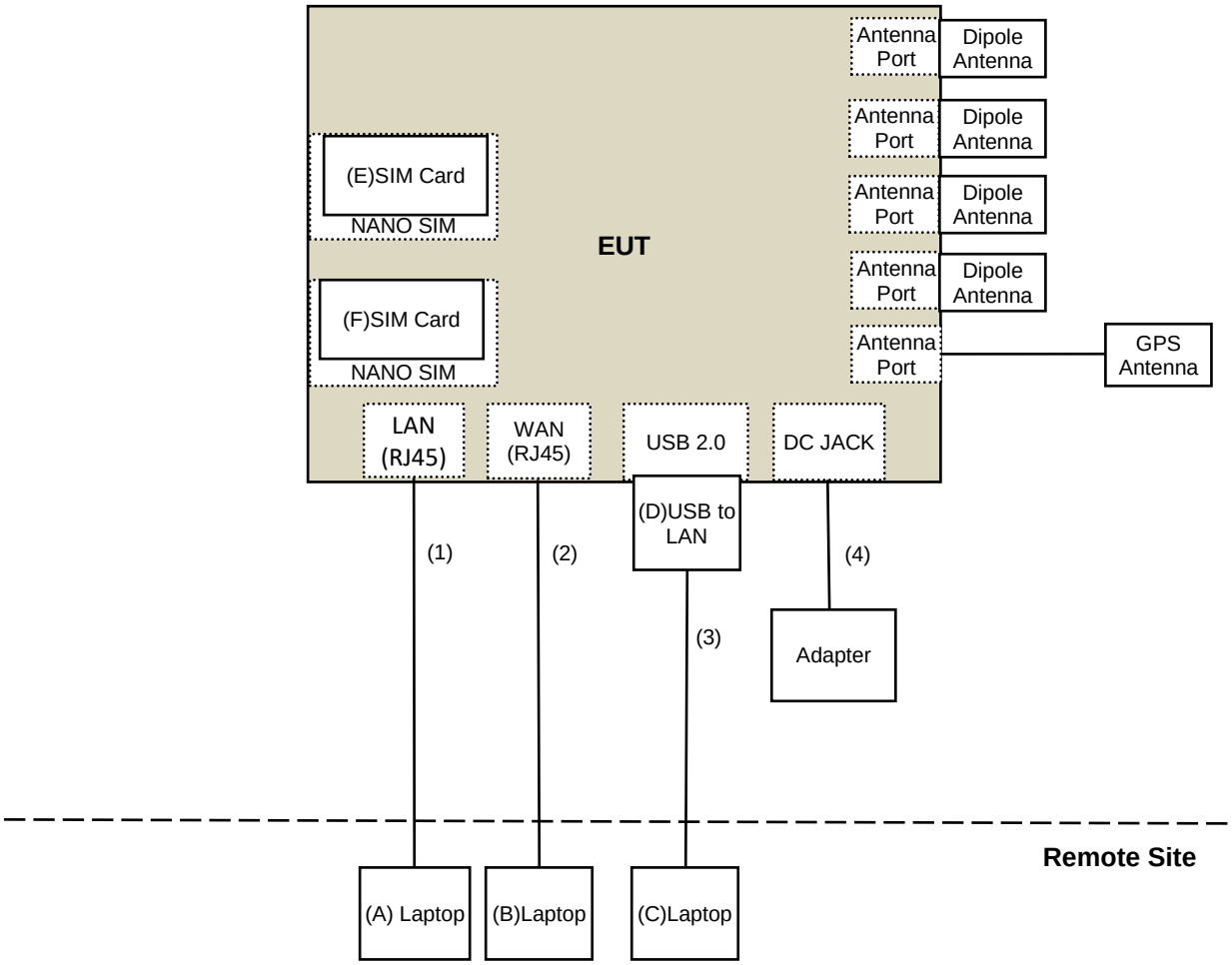
802.11ax (HE80)

3.6 Test Program Used and Operation Descriptions

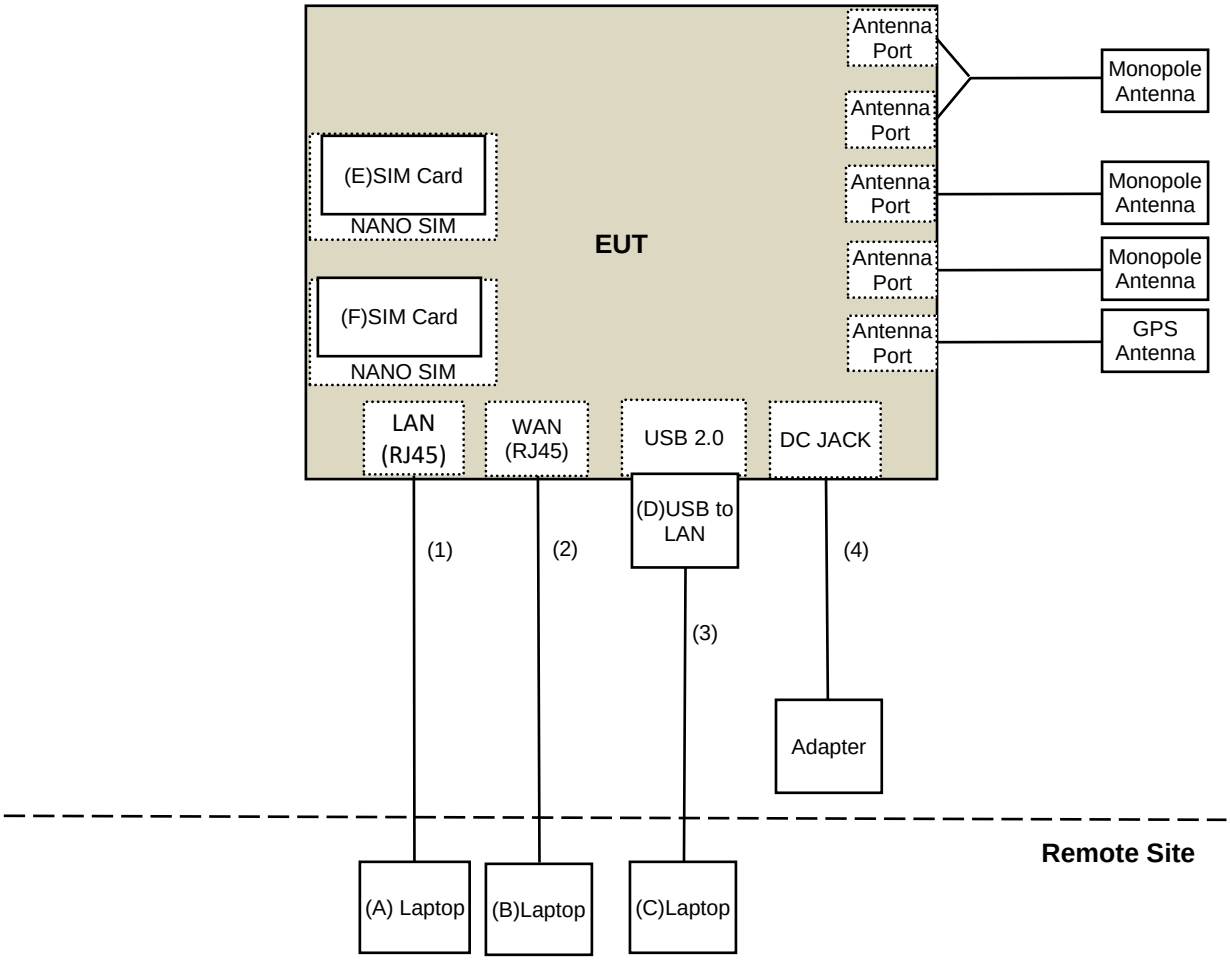
Controlling software (qdart_conn.win.1.0_installer_00089.1) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

For Mode A



For Mode B


Antenna Port
Antenna Port
Antenna Port
Antenna Port
Antenna Port
Monopole Antenna
Monopole Antenna
Monopole Antenna
GPS Antenna
(E)SIM Card
NANO SIM
(F)SIM Card
NANO SIM
EUT
LAN (RJ45)
WAN (RJ45)
USB 2.0
DC JACK
(D)USB to LAN
(1)
(2)
(3)
(4)
Adapter
Remote Site
(A) Laptop
(B)Laptop
(C)Laptop

3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	DELL	E6440	85HJXZ1	N/A	Provided by Lab
B	Laptop	Lenovo	81A4	YD02YN76	PD93165NGU	Provided by Lab
C	Laptop	Dell	Latitude 7430	8C19NN3	N/A	Provided by Lab
D	USB to LAN	i-gota	LAN-USBRJ45	N/A	N/A	Supplied by applicant
E	SIM Card	KeysSight	E7515-10910	N/A	N/A	Provided by Lab
F	SIM Card	R&S	CRT-Z3	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	RJ-45	1	10	No	0	Provided by Lab
2	RJ-45	1	10	No	0	Provided by Lab
3	RJ-45	1	10	No	0	Provided by Lab
4	DC Cable	1	1.5	No	0	Supplied by applicant

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
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112409	2022/3/11	2023/3/10

Notes:

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

4.2 RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Power Meter Anritsu	ML2495A	1529002	2022/6/22	2023/6/21
Pulse Power Sensor Anritsu	MA2411B	1726434	2022/6/22	2023/6/21
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112409	2022/3/11	2023/3/10

Notes:

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

4.3 Power Spectral Density

Refer to section 4.1 to get information of the instruments.

4.4 6 dB Bandwidth

Refer to section 4.1 to get information of the instruments.

4.5 Occupied Bandwidth

Refer to section 4.1 to get information of the instruments.

4.6 Frequency Stability

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
AC Power Source GOOD WILL	6905S	1991551	N/A	N/A
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112409	2022/3/11	2023/3/10
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	2022/1/14	2023/1/13
True RMS Clamp Meter Fluke	325	31130711WS	2022/6/9	2023/6/8

Notes:

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

4.7 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohms Terminator	50	3	2021/10/27	2022/10/26
Fixed attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2022/8/24	2023/8/23
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A
TEST RECEIVER R&S	ESCS 30	847124/029	2022/10/14	2023/10/13

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2022/10/25

4.8 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	N/A	N/A
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	2022/9/14	2023/9/13
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
Pre_Amplifier Agilent	8447D	2944A10636	2022/3/19	2023/3/18
Pre_Amplifier Mini-Circuits	ZFL-1000VH2	QA0838008	2022/10/4	2023/10/3
RF Coaxial Cable COMMATE/PEWC	8D	966-3-2	2022/2/26	2023/2/25
		966-3-3	2022/2/26	2023/2/25
		966-4-1	2022/3/8	2023/3/7
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
		LOOPCAB-002	2022/1/6	2023/1/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-361	2022/10/21	2023/10/20

Notes:

1. The test was performed in 966 Chamber No. 3.
2. Tested Date: 2022/10/23

4.9 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	N/A	N/A
Fix tool for Boresight antenna tower BV	FBA-01	FBA_SIP01	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9170	9170-739	2022/11/13	2023/11/12
	BBHA9120-D	9120D-406	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980384	2022/1/10	2023/1/9
	EMC184045SE	980387	2022/1/10	2023/1/9
RF Cable EMCI	EMC104-SM-SM-6000	210201	2022/5/10	2023/5/9
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-1500	180504	2022/4/25	2023/4/24
	EMC104-SM-SM-2000	180601	2022/6/6	2023/6/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Test Receiver KEYSIGHT	N9038A	MY59050100	2022/6/20	2023/6/19

Notes:

1. The test was performed in 966 Chamber No. 3.
2. Tested Date: 2022/10/14 ~ 2022/11/25

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	250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	250mW (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 6 dB Bandwidth

Within the 5.725-5.850 GHz band, the minimum 6 dB bandwidth of U-NII devices shall be at least 500 kHz.

5.5 Occupied Bandwidth

The results are for reference only.

5.6 Frequency Stability

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

5.7 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.

5.8 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).

5.9 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)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	15.407(b)(4)(i)	PK: -27 (dBm/MHz) *1 PK: 10 (dBm/MHz) *2 PK: 15.6 (dBm/MHz) *3 PK: 27 (dBm/MHz) *4	PK: 68.2 (dBµV/m) *1 PK: 105.2 (dBµV/m) *2 PK: 110.8 (dBµV/m) *3 PK: 122.2 (dBµV/m) *4
*1 beyond 75 MHz or more above of the band edge. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.		*2 below the band edge increasing linearly to 10 dBm/MHz at 25 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.	

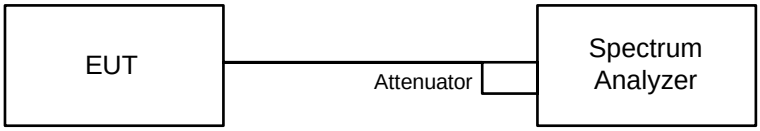
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 26 dB Bandwidth

6.1.1 Test Setup

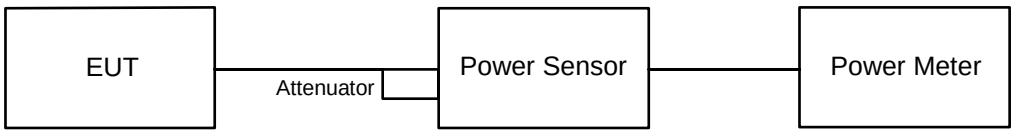


6.1.2 Test Procedure

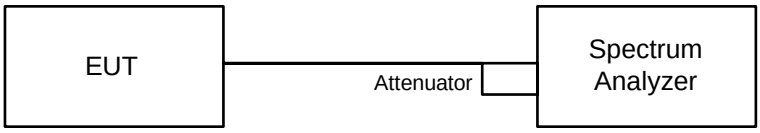
a. Set RBW = approximately 1% of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement 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:

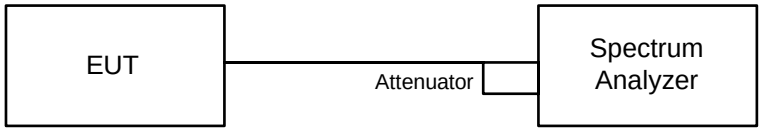
Method SA-2

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.)Sweep time = auto, trigger set to “free run”.
d. Trace average at least 100 traces in power averaging mode.
e. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
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-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).

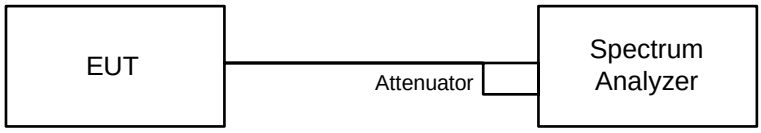
For specified measurement bandwidth 500 kHz:

Method SA-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 6 dB Bandwidth

6.4.1 Test Setup

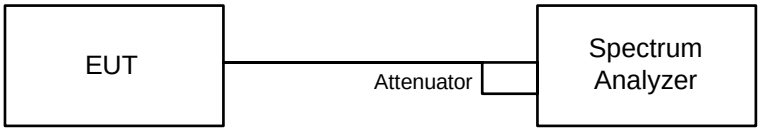


6.4.2 Test Procedure

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

6.5 Occupied Bandwidth

6.5.1 Test Setup

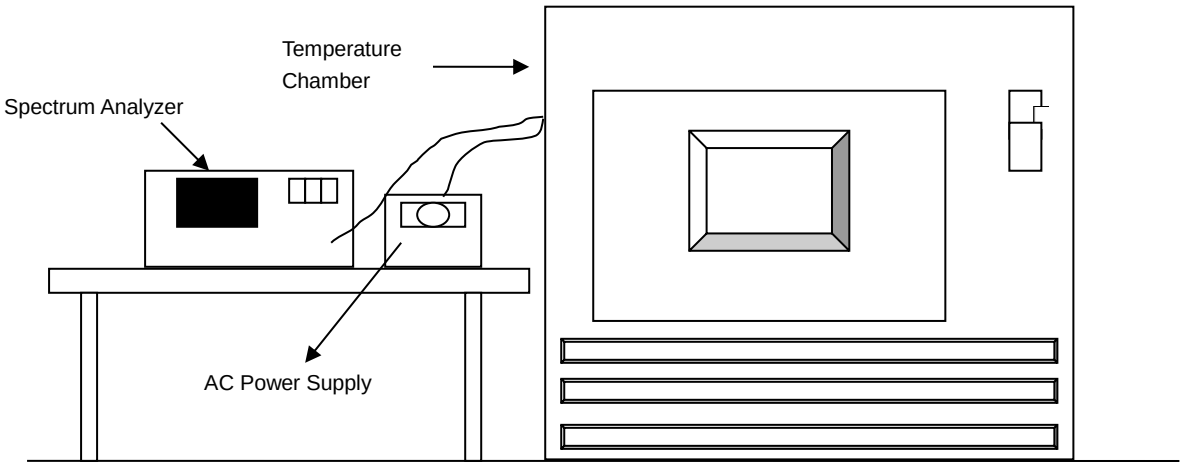


6.5.2 Test Procedure

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.

6.6 Frequency Stability

6.6.1 Test Setup

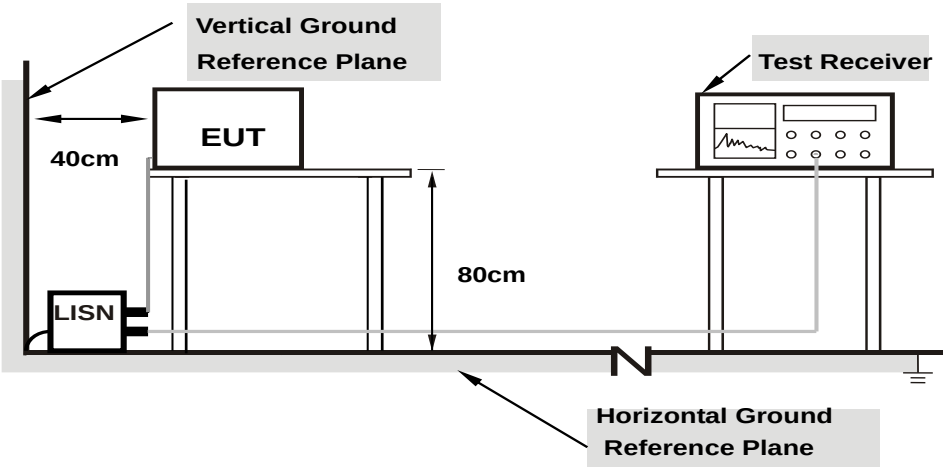


6.6.2 Test Procedure

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.

6.7 AC Power Conducted Emissions

6.7.1 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).

6.7.2 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.

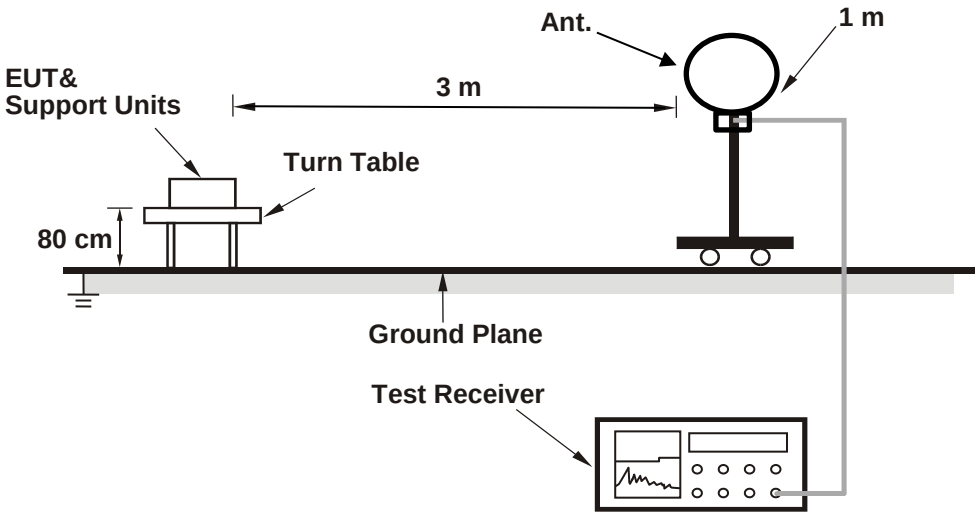
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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.

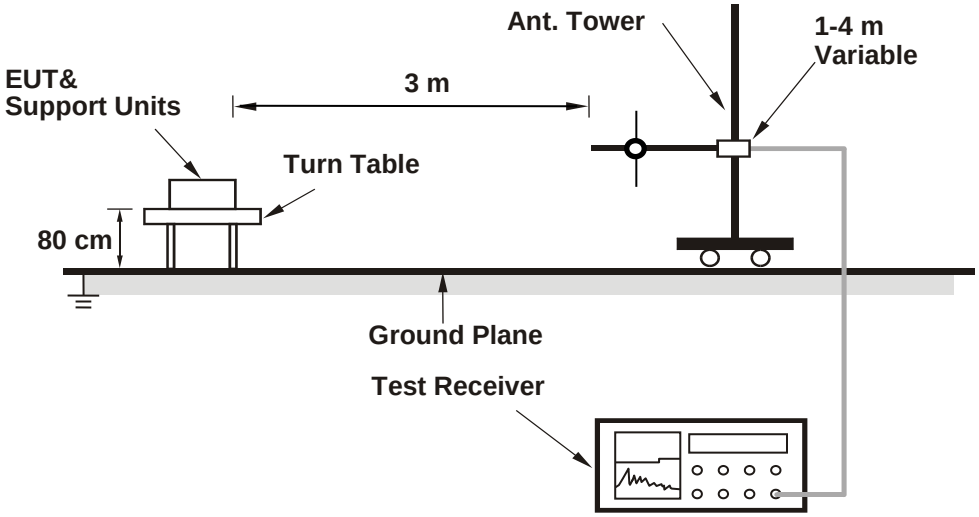
6.8 Unwanted Emissions below 1 GHz

6.8.1 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).

6.8.2 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.

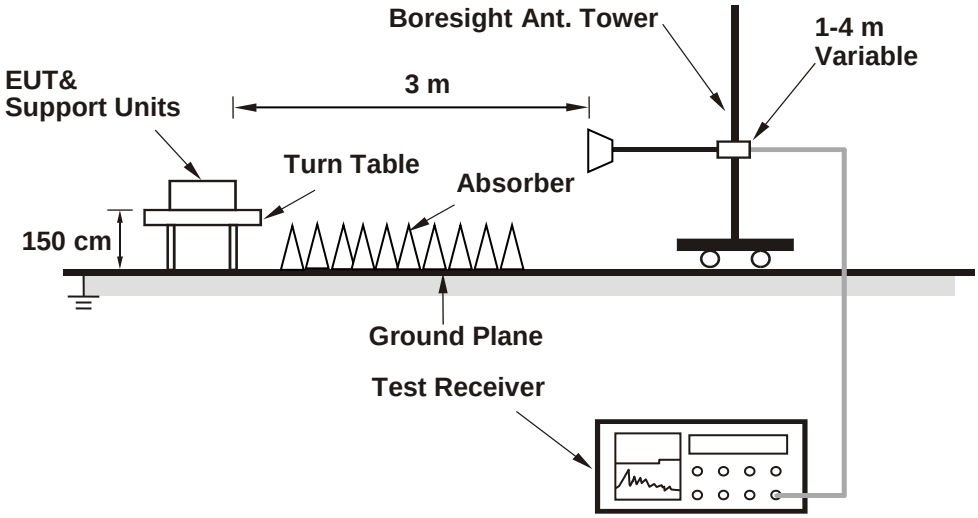
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

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.

6.9 Unwanted Emissions above 1 GHz

6.9.1 Test Setup



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

6.9.2 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

Mode C

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

802.11a

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	23.26	29.70
60	5300	25.31	35.32
64	5320	23.69	25.55
100	5500	19.41	22.17
116	5580	23.49	25.50
140	5700	26.86	32.19
144 (U-NII-2C)	5720	20.31	19.68
144 (U-NII-3)	5720	9.22	8.69

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	23.26	24.66	>	24
60	5300	25.31	25.03	>	24
64	5320	23.69	24.74	>	24
100	5500	19.41	23.88	=	24
116	5580	23.49	24.7	>	24
140	5700	26.86	25.29	>	24
144 (U-NII-2C)	5720	19.68	23.94	=	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	23.64	26.75
60	5300	27.58	31.60
64	5320	25.21	25.15
100	5500	20.94	21.39
116	5580	26.79	25.10
140	5700	30.52	29.12
144 (U-NII-2C)	5720	15.16	18.64
144 (U-NII-3)	5720	5.44	9.60

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	23.64	24.73	>	24
60	5300	27.58	25.4	>	24
64	5320	25.15	25	>	24
100	5500	20.94	24.2	>	24
116	5580	25.10	24.99	>	24
140	5700	29.12	25.64	>	24
144 (U-NII-2C)	5720	15.16	22.8	=	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	63.93	82.10
62	5310	40.85	41.19
102	5510	41.04	40.91
110	5550	59.29	72.54
134	5670	69.08	76.37
142 (U-NII-2C)	5710	49.48	57.86
142 (U-NII-3)	5710	21.60	27.21

Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
54	5270	63.93	29.05 > 24
62	5310	40.85	27.11 > 24
102	5510	40.91	27.11 > 24
110	5550	59.29	28.72 > 24
134	5670	69.08	29.39 > 24
142 (U-NII-2C)	5710	49.48	27.94 > 24

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

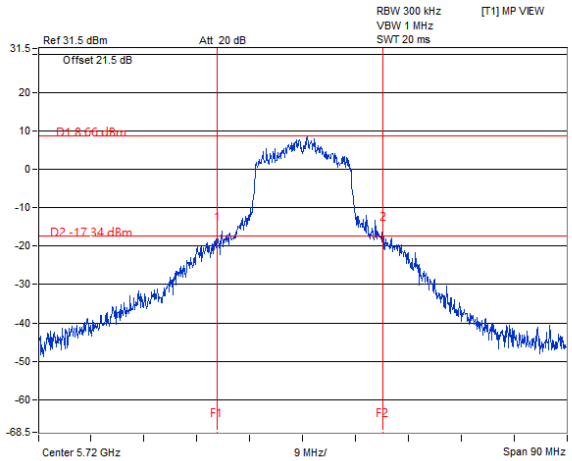
802.11ax (HE80)

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	81.37	81.79
106	5530	81.24	81.36
122	5610	125.73	123.28
138 (U-NII-2C)	5690	76.90	76.85
138 (U-NII-3)	5690	7.00	7.28

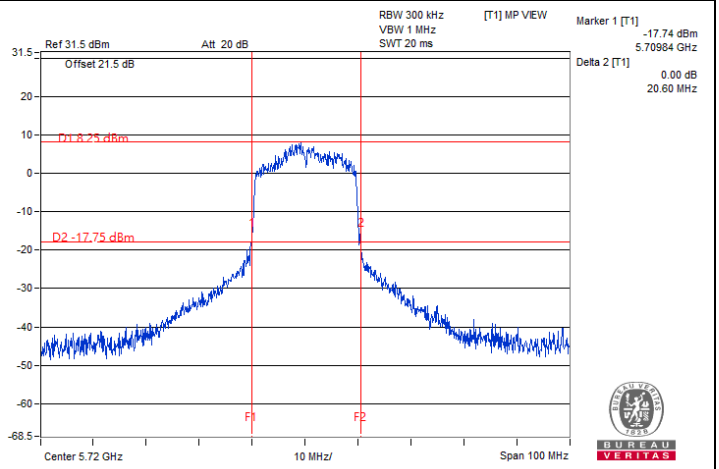
Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
58	5290	81.37	30.1 > 24
106	5530	81.24	30.09 > 24
122	5610	123.28	31.9 > 24
138 (U-NII-2C)	5690	76.85	29.85 > 24

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

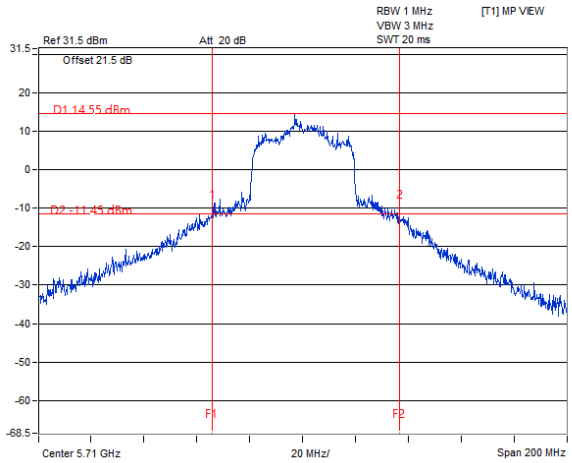
Spectrum Plot of Minimum Value



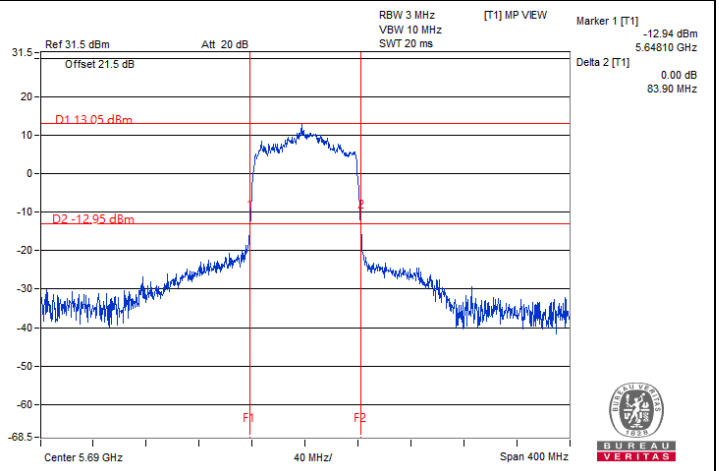
802.11a / Chain 1 : CH 144 (U-NII-3)



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



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



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

Notes:

1. For U-NII-2C straddle channel = 5725 MHz - Marker 1
2. For U-NII-3 straddle channel = Marker 1 + Delta 2 - 5725 MHz

7.2 RF Output Power

Mode C

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

802.11a CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	16.08	16.18	82.046	19.14	30	Pass
40	5200	17.93	18.03	125.62	20.99	30	Pass
48	5240	15.87	16.22	80.516	19.06	30	Pass
52	5260	15.92	16.36	82.335	19.16	24	Pass
60	5300	16.56	16.87	93.93	19.73	24	Pass
64	5320	15.07	15.43	67.051	18.26	24	Pass
100	5500	15.63	15.36	70.915	18.51	23.88	Pass
116	5580	16.29	16.67	89.011	19.49	24	Pass
140	5700	14.52	14.93	59.431	17.74	24	Pass
*144 (U-NII-2C)	5720	12.92	15.13	55.177	17.42	23.94	Pass
*144 (U-NII-3)	5720	4.73	6.69	8.078	9.07	30	Pass
149	5745	16.73	17.29	100.677	20.03	30	Pass
157	5785	16.89	17.38	103.567	20.15	30	Pass
165	5825	17.11	18.06	115.378	20.62	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT20) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	15.67	15.88	75.624	18.79	30	Pass
40	5200	17.62	17.73	117.102	20.69	30	Pass
48	5240	15.40	15.86	73.222	18.65	30	Pass
52	5260	15.68	16.05	77.255	18.88	24	Pass
60	5300	16.22	16.51	86.651	19.38	24	Pass
64	5320	14.46	14.67	57.234	17.58	24	Pass
100	5500	15.07	14.92	63.182	18.01	24	Pass
116	5580	15.82	16.23	80.17	19.04	24	Pass
140	5700	14.09	14.58	54.353	17.35	24	Pass
*144 (U-NII-2C)	5720	13.22	14.73	54.961	17.40	22.8	Pass
*144 (U-NII-3)	5720	6.08	7.18	10.058	10.03	30	Pass
149	5745	15.11	16.67	78.885	18.97	30	Pass
157	5785	16.37	16.98	93.24	19.70	30	Pass
165	5825	15.97	17.01	89.771	19.53	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT40) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
38	5190	13.43	13.55	44.676	16.50	30	Pass
46	5230	15.85	15.98	78.087	18.93	30	Pass
54	5270	15.97	16.09	80.181	19.04	24	Pass
62	5310	11.30	12.03	29.448	14.69	24	Pass
102	5510	14.08	13.99	50.647	17.05	24	Pass
110	5550	15.98	15.74	77.125	18.87	24	Pass
134	5670	15.25	15.31	67.459	18.29	24	Pass
*142 (U-NII-2C)	5710	15.65	15.72	80.758	19.07	24	Pass
*142 (U-NII-3)	5710	2.81	3.92	4.772	6.79	30	Pass
151	5755	14.92	15.84	69.416	18.41	30	Pass
159	5795	15.71	17.03	87.705	19.43	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT80) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	8.93	9.29	16.308	12.12	30	Pass
58	5290	9.18	9.55	17.295	12.38	24	Pass
106	5530	12.46	12.47	35.28	15.48	24	Pass
122	5610	16.39	16.18	85.047	19.30	24	Pass
*138 (U-NII-2C)	5690	14.16	14.25	57.689	17.61	24	Pass
*138 (U-NII-3)	5690	-1.52	-1.46	1.5545	1.92	30	Pass
155	5775	12.77	13.89	43.414	16.38	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	15.93	16.14	80.289	19.05	30	Pass
40	5200	17.86	17.97	123.756	20.93	30	Pass
48	5240	15.66	16.13	77.833	18.91	30	Pass
52	5260	15.94	16.33	82.218	19.15	24	Pass
60	5300	16.48	16.77	91.997	19.64	24	Pass
64	5320	14.72	14.93	60.765	17.84	24	Pass
100	5500	15.31	15.19	66.999	18.26	24	Pass
116	5580	16.08	16.47	84.912	19.29	24	Pass
140	5700	14.32	14.83	57.448	17.59	24	Pass
*144 (U-NII-2C)	5720	13.22	14.73	54.961	17.40	22.8	Pass
*144 (U-NII-3)	5720	6.08	7.18	10.058	10.03	30	Pass
149	5745	15.38	16.92	83.718	19.23	30	Pass
157	5785	16.63	17.24	98.992	19.96	30	Pass
165	5825	16.24	17.27	95.406	19.80	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
38	5190	13.68	13.79	47.268	16.75	30	Pass
46	5230	16.10	16.22	82.617	19.17	30	Pass
54	5270	16.21	16.32	84.638	19.28	24	Pass
62	5310	11.56	12.27	31.187	14.94	24	Pass
102	5510	14.32	14.25	53.647	17.30	24	Pass
110	5550	16.22	16	81.599	19.12	24	Pass
134	5670	15.53	15.56	71.702	18.56	24	Pass
*142 (U-NII-2C)	5710	15.65	15.72	80.758	19.07	24	Pass
*142 (U-NII-3)	5710	2.81	3.92	4.772	6.79	30	Pass
151	5755	15.16	16.08	73.36	18.65	30	Pass
159	5795	15.97	17.27	92.87	19.68	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	9.17	9.56	17.297	12.38	30	Pass
58	5290	9.44	9.79	18.318	12.63	24	Pass
106	5530	12.72	12.73	37.457	15.74	24	Pass
122	5610	16.64	16.43	90.086	19.55	24	Pass
*138 (U-NII-2C)	5690	14.16	14.25	57.689	17.61	24	Pass
*138 (U-NII-3)	5690	-1.52	-1.46	1.5545	1.92	30	Pass
155	5775	13.03	14.12	45.914	16.62	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 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 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2A, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-2C, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.
6. For U-NII-3, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	15.67	15.88	75.624	18.79	27.39	Pass
40	5200	17.62	17.73	117.102	20.69	27.39	Pass
48	5240	15.40	15.86	73.222	18.65	27.39	Pass
52	5260	15.68	16.05	77.255	18.88	21.39	Pass
60	5300	16.22	16.51	86.651	19.38	21.39	Pass
64	5320	14.46	14.67	57.234	17.58	21.39	Pass
100	5500	15.07	14.92	63.182	18.01	21.39	Pass
116	5580	15.82	16.23	80.17	19.04	21.39	Pass
140	5700	14.09	14.58	54.353	17.35	21.39	Pass
*144 (U-NII-2C)	5720	13.22	14.73	54.961	17.40	20.19	Pass
*144 (U-NII-3)	5720	6.08	7.18	10.058	10.03	27.39	Pass
149	5745	15.11	16.67	78.885	18.97	27.39	Pass
157	5785	16.37	16.98	93.24	19.70	27.39	Pass
165	5825	15.97	17.01	89.771	19.53	27.39	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
6. For U-NII-3, the directional gain is 8.61 dBi> 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.

802.11ac (VHT40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
38	5190	13.43	13.55	44.676	16.50	27.39	Pass
46	5230	15.85	15.98	78.087	18.93	27.39	Pass
54	5270	15.97	16.09	80.181	19.04	21.39	Pass
62	5310	11.30	12.03	29.448	14.69	21.39	Pass
102	5510	14.08	13.99	50.647	17.05	21.39	Pass
110	5550	15.98	15.74	77.125	18.87	21.39	Pass
134	5670	15.25	15.31	67.459	18.29	21.39	Pass
*142 (U-NII-2C)	5710	15.65	15.72	80.758	19.07	21.39	Pass
*142 (U-NII-3)	5710	2.81	3.92	4.772	6.79	27.39	Pass
151	5755	14.92	15.84	69.416	18.41	27.39	Pass
159	5795	15.71	17.03	87.705	19.43	27.39	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
6. For U-NII-3, the directional gain is 8.61 dBi> 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.

802.11ac (VHT80) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	8.93	9.29	16.308	12.12	27.39	Pass
58	5290	9.18	9.55	17.295	12.38	21.39	Pass
106	5530	12.46	12.47	35.28	15.48	21.39	Pass
122	5610	16.39	16.18	85.047	19.30	21.39	Pass
*138 (U-NII-2C)	5690	14.16	14.25	57.689	17.61	21.39	Pass
*138 (U-NII-3)	5690	-1.52	-1.46	1.5545	1.92	27.39	Pass
155	5775	12.77	13.89	43.414	16.38	27.39	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
6. For U-NII-3, the directional gain is 8.61 dBi> 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.

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				
36	5180	15.93	16.14	80.289	19.05	27.39	Pass
40	5200	17.86	17.97	123.756	20.93	27.39	Pass
48	5240	15.66	16.13	77.833	18.91	27.39	Pass
52	5260	15.94	16.33	82.218	19.15	21.39	Pass
60	5300	16.48	16.77	91.997	19.64	21.39	Pass
64	5320	14.72	14.93	60.765	17.84	21.39	Pass
100	5500	15.31	15.19	66.999	18.26	21.39	Pass
116	5580	16.08	16.47	84.912	19.29	21.39	Pass
140	5700	14.32	14.83	57.448	17.59	21.39	Pass
*144 (U-NII-2C)	5720	13.22	14.73	54.961	17.40	20.19	Pass
*144 (U-NII-3)	5720	6.08	7.18	10.058	10.03	27.39	Pass
149	5745	15.38	16.92	83.718	19.23	27.39	Pass
157	5785	16.63	17.24	98.992	19.96	27.39	Pass
165	5825	16.24	17.27	95.406	19.80	27.39	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
6. For U-NII-3, the directional gain is 8.61 dBi> 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 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				
38	5190	13.68	13.79	47.268	16.75	27.39	Pass
46	5230	16.10	16.22	82.617	19.17	27.39	Pass
54	5270	16.21	16.32	84.638	19.28	21.39	Pass
62	5310	11.56	12.27	31.187	14.94	21.39	Pass
102	5510	14.32	14.25	53.647	17.30	21.39	Pass
110	5550	16.22	15.99	81.599	19.12	21.39	Pass
134	5670	15.53	15.56	71.702	18.56	21.39	Pass
*142 (U-NII-2C)	5710	15.65	15.72	80.758	19.07	21.39	Pass
*142 (U-NII-3)	5710	2.81	3.92	4.772	6.79	27.39	Pass
151	5755	15.16	16.08	73.36	18.65	27.39	Pass
159	5795	15.97	17.27	92.87	19.68	27.39	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
6. For U-NII-3, the directional gain is 8.61 dBi> 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.

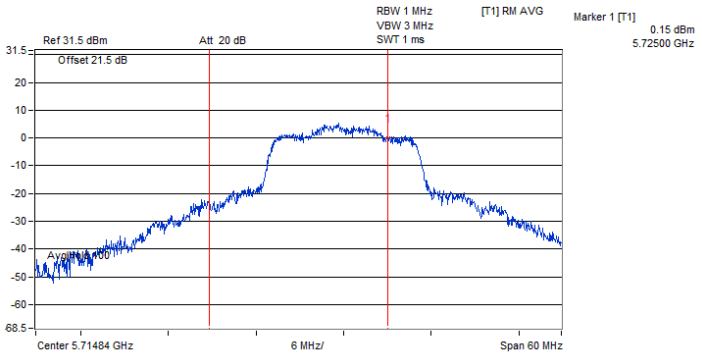
802.11ax (HE80) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	9.17	9.56	17.297	12.38	27.39	Pass
58	5290	9.44	9.79	18.318	12.63	21.39	Pass
106	5530	12.72	12.73	37.457	15.74	21.39	Pass
122	5610	16.64	16.43	90.086	19.55	21.39	Pass
*138 (U-NII-2C)	5690	14.16	14.25	57.689	17.61	21.39	Pass
*138 (U-NII-3)	5690	-1.52	-1.46	1.5545	1.92	27.39	Pass
155	5775	13.03	14.12	45.914	16.62	27.39	Pass

Notes:

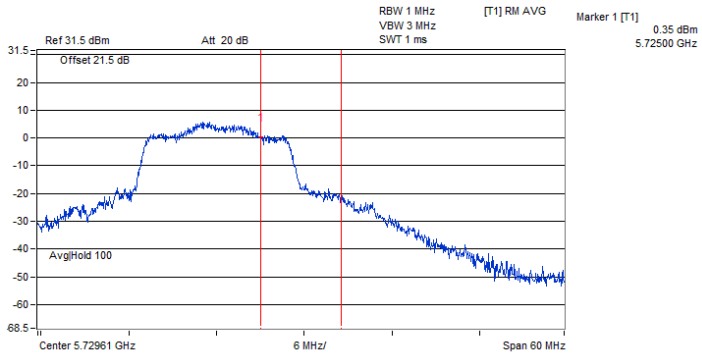
1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2 and use spectrum analyzer test , the duty factor was included in the total power.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to [Determined Conducted Power Limit-(8.61-6)].
6. For U-NII-3, the directional gain is 8.61 dBi> 6 dBi, so the output power limit shall be reduced to 30-(8.61-6) = 27.39 dBm.

Spectrum Plot for channel straddling



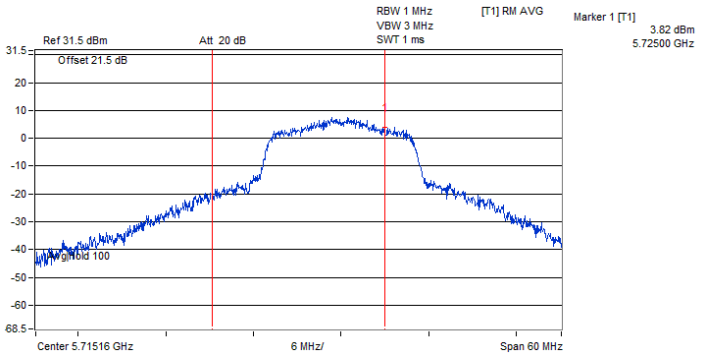
TX Channel Bandwidth 20.31 MHz Power 12.92 dBm

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



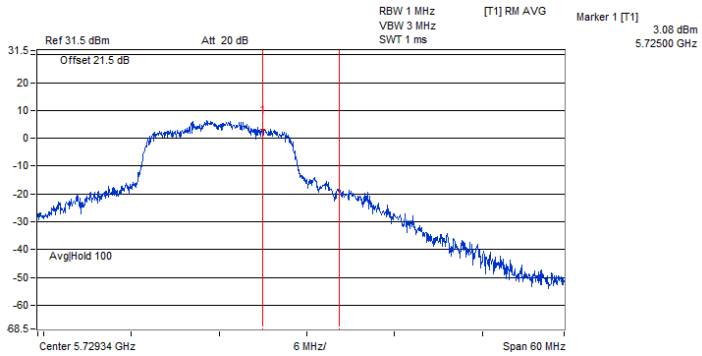
TX Channel Bandwidth 9.22 MHz Power 4.73 dBm

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



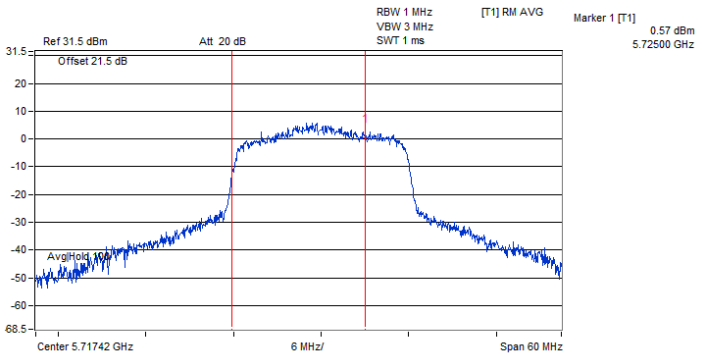
TX Channel Bandwidth 19.68 MHz Power 15.13 dBm

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



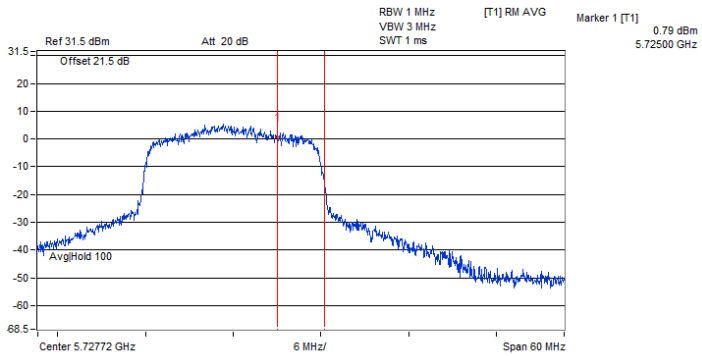
TX Channel Bandwidth 8.69 MHz Power 6.69 dBm

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



TX Channel Bandwidth 15.16 MHz Power 13.22 dBm

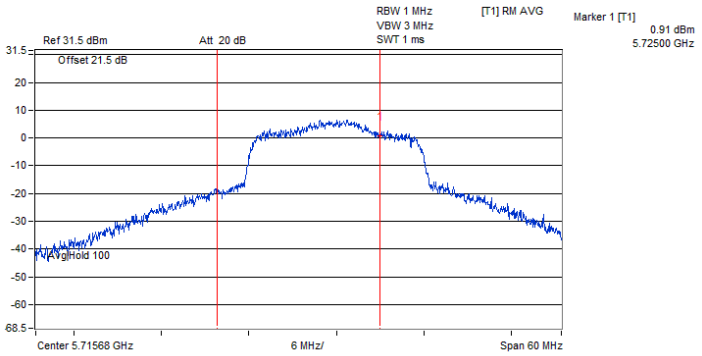
802.11ac (VHT20) CDD / Chain 0 : CH 144 (U-NII-2C)



TX Channel Bandwidth 5.44 MHz Power 6.08 dBm

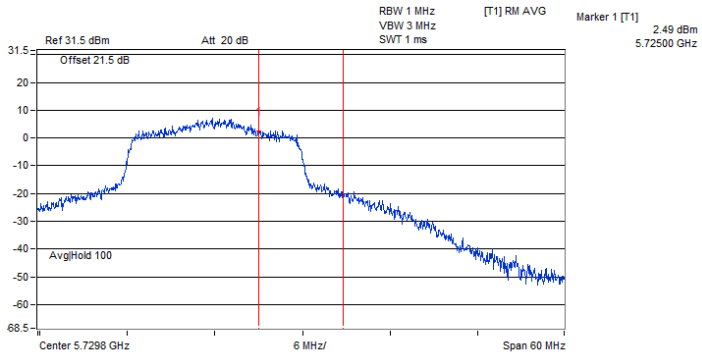
802.11ac (VHT20) CDD / Chain 0 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



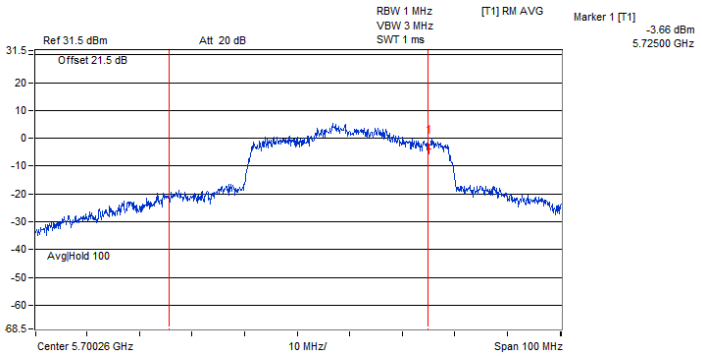
TX Channel Bandwidth 18.64 MHz Power 14.73 dBm

802.11ac (VHT20) CDD / Chain 1 : CH 144 (U-NII-2C)



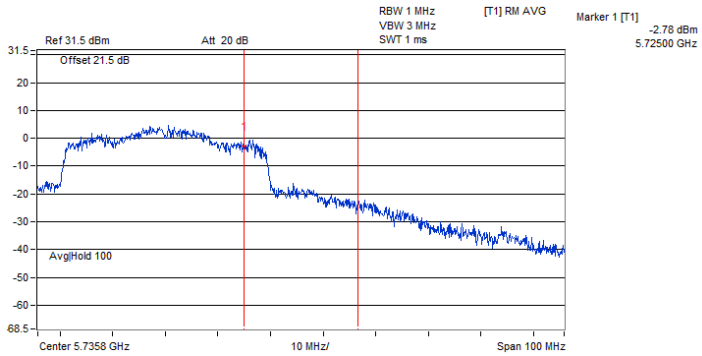
TX Channel Bandwidth 9.6 MHz Power 7.18 dBm

802.11ac (VHT20) CDD / Chain 1 : CH 144 (U-NII-3)



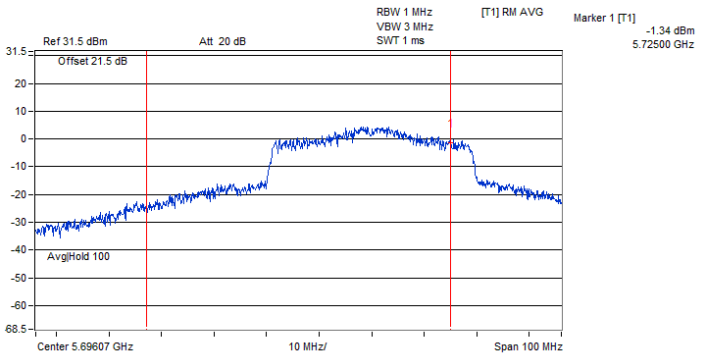
TX Channel Bandwidth 49.48 MHz Power 15.65 dBm

802.11ac (VHT40) CDD / Chain 0 : CH 142 (U-NII-2C)



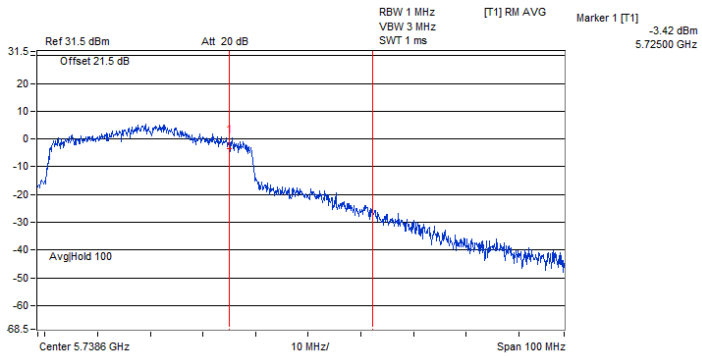
TX Channel Bandwidth 21.6 MHz Power 2.81 dBm

802.11ac (VHT40) CDD / Chain 0 : CH 142 (U-NII-3)



TX Channel Bandwidth 57.86 MHz Power 15.72 dBm

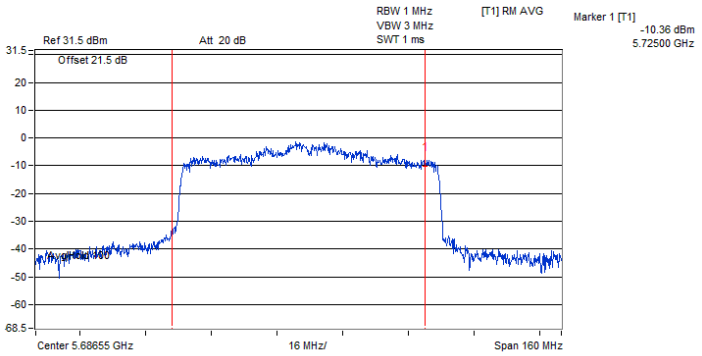
802.11ac (VHT40) CDD / Chain 1 : CH 142 (U-NII-2C)



TX Channel Bandwidth 27.21 MHz Power 3.92 dBm

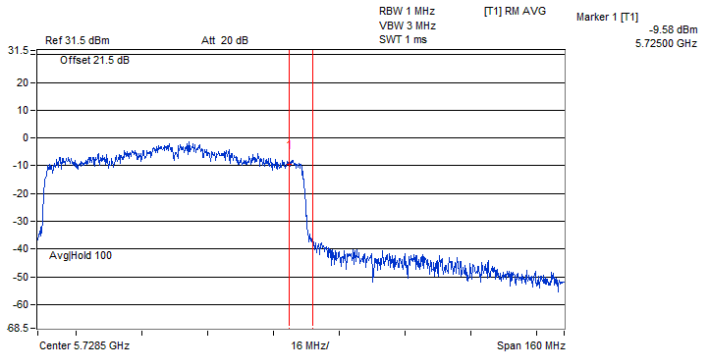
802.11ac (VHT40) CDD / Chain 1 : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



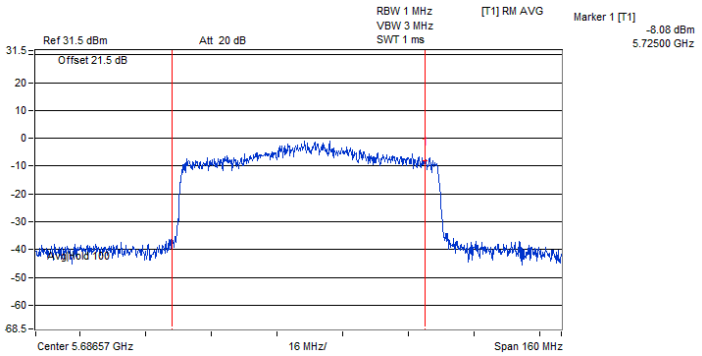
TX Channel Bandwidth 76.9 MHz Power 14.16 dBm

802.11ac (VHT80) CDD / Chain 0 : CH 138 (U-NII-2C)



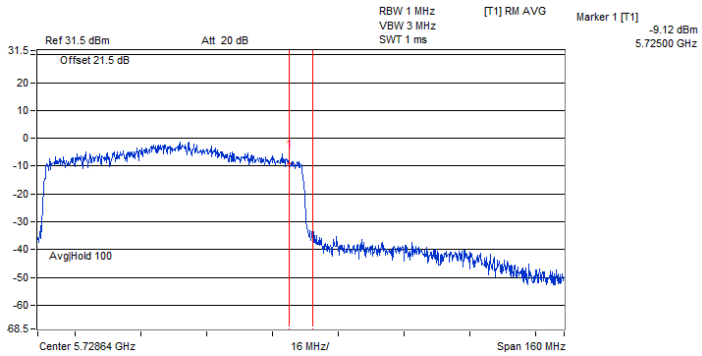
TX Channel Bandwidth 7 MHz Power -1.52 dBm

802.11ac (VHT80) CDD / Chain 0 : CH 138 (U-NII-3)



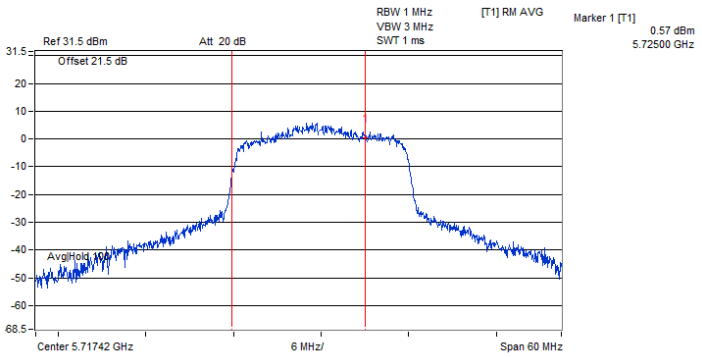
TX Channel Bandwidth 76.85 MHz Power 14.25 dBm

802.11ac (VHT80) CDD / Chain 1 : CH 138 (U-NII-2C)



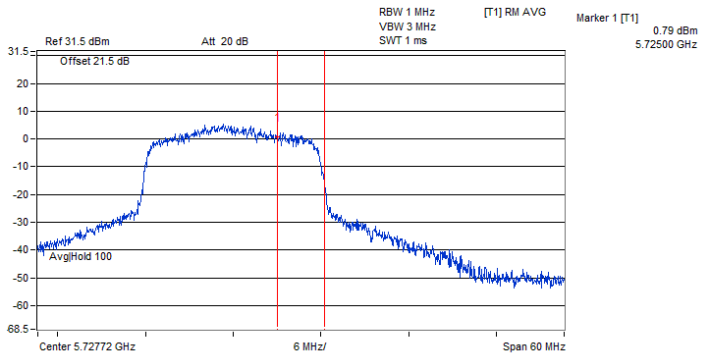
TX Channel Bandwidth 7.28 MHz Power -1.46 dBm

802.11ac (VHT80) CDD / Chain 1 : CH 138 (U-NII-3)



TX Channel Bandwidth 15.16 MHz Power 13.22 dBm

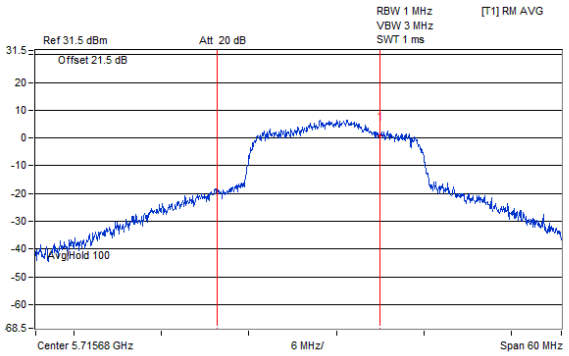
802.11ax (HE20) CDD / Chain 0 : CH 144 (U-NII-2C)



TX Channel Bandwidth 5.44 MHz Power 6.08 dBm

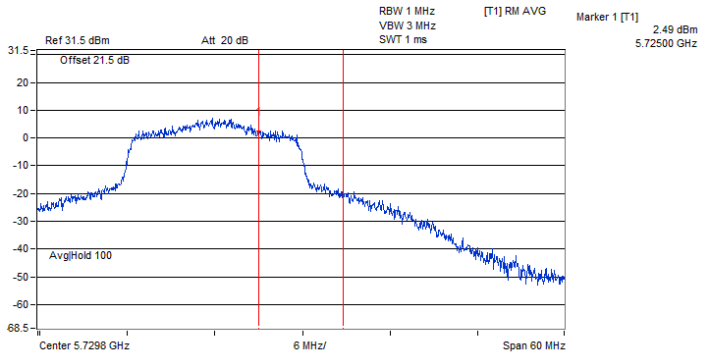
802.11ax (HE20) CDD / Chain 0 : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



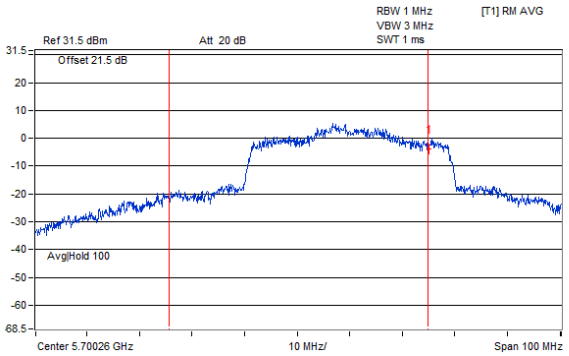
TX Channel Bandwidth 18.64 MHz Power 14.73 dBm

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



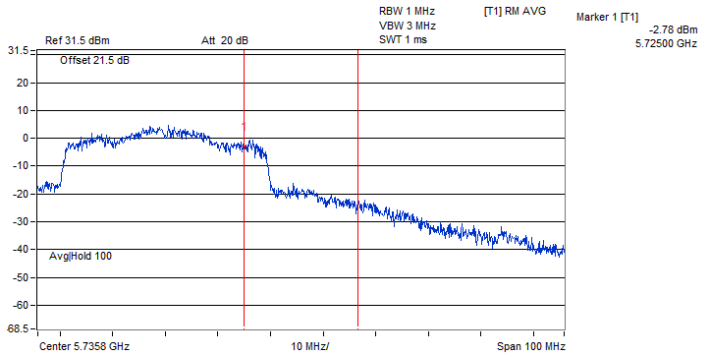
TX Channel Bandwidth 9.6 MHz Power 7.18 dBm

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



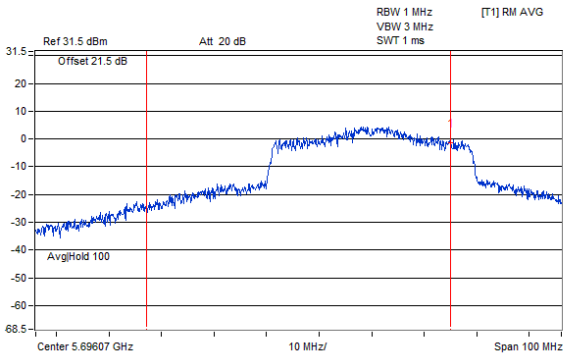
TX Channel Bandwidth 49.48 MHz Power 15.65 dBm

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



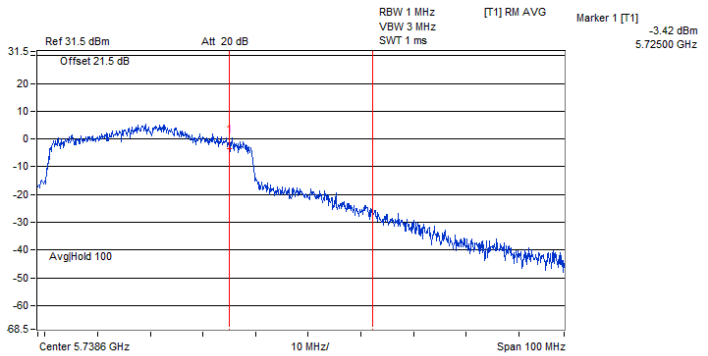
TX Channel Bandwidth 21.6 MHz Power 2.81 dBm

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



TX Channel Bandwidth 57.86 MHz Power 15.72 dBm

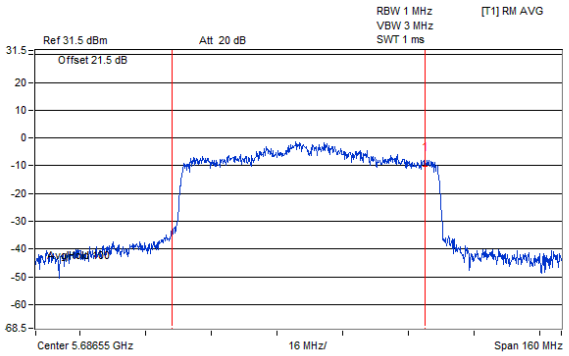
802.11ax (HE40) CDD / Chain 1 : CH 142 (U-NII-2C)



TX Channel Bandwidth 27.21 MHz Power 3.92 dBm

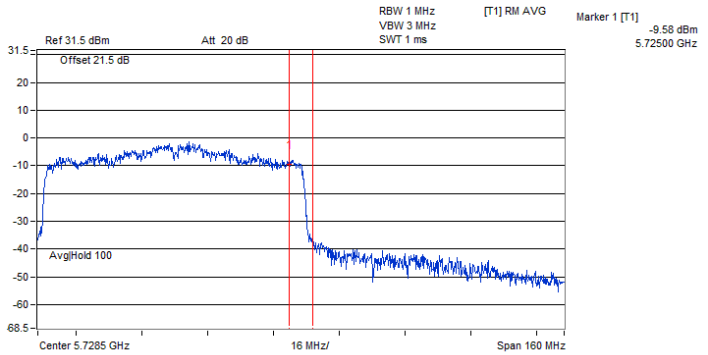
802.11ax (HE40) CDD / Chain 1 : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



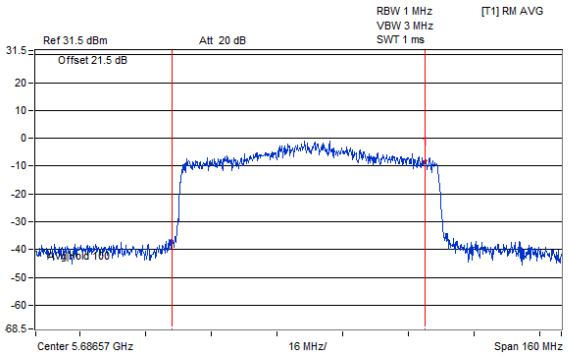
TX Channel Bandwidth 76.9 MHz Power 14.16 dBm

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



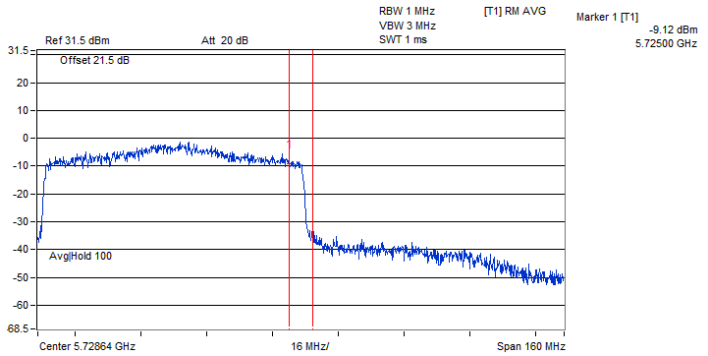
TX Channel Bandwidth 7 MHz Power -1.52 dBm

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



TX Channel Bandwidth 76.85 MHz Power 14.25 dBm

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



TX Channel Bandwidth 7.28 MHz Power -1.46 dBm

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

Mode D

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

802.11a CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	16.08	16.18	82.046	19.14	24	Pass
40	5200	17.93	18.03	125.62	20.99	24	Pass
48	5240	15.87	16.22	80.516	19.06	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT20) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	15.67	15.88	75.624	18.79	24	Pass
40	5200	17.62	17.73	117.102	20.69	24	Pass
48	5240	15.40	15.86	73.222	18.65	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT40) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
38	5190	13.43	13.55	44.676	16.50	24	Pass
46	5230	15.85	15.98	78.087	18.93	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT80) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	8.93	9.29	16.308	12.12	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	15.93	16.14	80.289	19.05	24	Pass
40	5200	17.86	17.97	123.756	20.93	24	Pass
48	5240	15.66	16.13	77.833	18.91	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
38	5190	13.68	13.79	47.268	16.75	24	Pass
46	5230	16.10	16.22	82.617	19.17	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80) CDD

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	9.17	9.56	17.297	12.38	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-1, the maximum gain is 5.6 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT20) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
36	5180	15.67	15.88	75.624	18.79	21.39	Pass
40	5200	17.62	17.73	117.102	20.69	21.39	Pass
48	5240	15.40	15.86	73.222	18.65	21.39	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 24-(8.61-6) = 21.39 dBm.

802.11ac (VHT40) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
38	5190	13.43	13.55	44.676	16.50	21.39	Pass
46	5230	15.85	15.98	78.087	18.93	21.39	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 24-(8.61-6) = 21.39 dBm.

802.11ac (VHT80) Beamforming

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Test Result
		Chain 0	Chain 1				
42	5210	8.93	9.29	16.308	12.12	21.39	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 24-(8.61-6) = 21.39 dBm.

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				
36	5180	15.93	16.14	80.289	19.05	21.39	Pass
40	5200	17.86	17.97	123.756	20.93	21.39	Pass
48	5240	15.66	16.13	77.833	18.91	21.39	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 24-(8.61-6) = 21.39 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				
38	5190	13.68	13.79	47.268	16.75	21.39	Pass
46	5230	16.10	16.22	82.617	19.17	21.39	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 24-(8.61-6) = 21.39 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				
42	5210	9.17	9.56	17.297	12.38	21.39	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-1, the directional gain is 8.61 dBi > 6 dBi, so the output power limit shall be reduced to 24-(8.61-6) = 21.39 dBm.

7.3 Power Spectral Density

Mode C

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

802.11a

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1				
36	5180	3.66	4.58	0.24	7.39	14.39	Pass
40	5200	5.50	6.45	0.24	9.25	14.39	Pass
48	5240	3.24	4.62	0.24	7.23	14.39	Pass
52	5260	2.94	4.99	0.24	7.34	8.39	Pass
60	5300	3.60	5.55	0.24	7.93	8.39	Pass
64	5320	2.28	4.04	0.24	6.50	8.39	Pass
100	5500	3.31	4.14	0.24	7.00	8.39	Pass
116	5580	3.46	4.79	0.24	7.43	8.39	Pass
140	5700	2.96	4.58	0.24	7.10	8.39	Pass
144 (U-NII-2C)	5720	3.10	4.94	0.24	7.37	8.39	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(8.61-6) = 14.39 dBm/MHz.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1				
36	5180	3.58	3.69	0.35	7.00	14.39	Pass
40	5200	4.88	6.05	0.35	8.86	14.39	Pass
48	5240	2.34	4.03	0.35	6.63	14.39	Pass
52	5260	2.43	3.99	0.35	6.64	8.39	Pass
60	5300	2.52	4.84	0.35	7.19	8.39	Pass
64	5320	1.40	3.38	0.35	5.86	8.39	Pass
100	5500	1.82	3.44	0.35	6.07	8.39	Pass
116	5580	2.65	3.76	0.35	6.60	8.39	Pass
140	5700	2.13	3.51	0.35	6.23	8.39	Pass
144 (U-NII-2C)	5720	2.80	3.89	0.35	6.74	8.39	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(8.61-6) = 14.39 dBm/MHz.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1				
38	5190	-1.58	-0.61	0.38	2.32	14.39	Pass
46	5230	1.84	2.14	0.38	5.38	14.39	Pass
54	5270	1.07	3.35	0.38	5.75	8.39	Pass
62	5310	-4.19	-2.26	0.38	0.27	8.39	Pass
102	5510	-1.43	-0.40	0.38	2.51	8.39	Pass
110	5550	1.42	2.80	0.38	5.55	8.39	Pass
134	5670	0.61	1.75	0.38	4.61	8.39	Pass
142 (U-NII-2C)	5710	2.09	2.44	0.38	5.66	8.39	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(8.61-6) = 14.39 dBm/MHz.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1				
42	5210	-9.32	-8.35	0.40	-5.40	14.39	Pass
58	5290	-9.44	-8.35	0.40	-5.45	8.39	Pass
106	5530	-5.49	-4.92	0.40	-1.79	8.39	Pass
122	5610	-1.63	-1.49	0.40	1.85	8.39	Pass
138 (U-NII-2C)	5690	-4.03	-4.19	0.40	-0.70	8.39	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-1, the directional gain is 8.61 dBi > 6dBi, so the power density limit shall be reduced to 17-(8.61-6) = 14.39 dBm/MHz.
4. For U-NII-2A, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.
5. For U-NII-2C, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 11-(8.61-6) = 8.39 dBm/MHz.

802.11a

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Total PSD w/o Duty Factor (dBm/300kHz)	Duty Factor (dB)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
		Chain 0	Chain 1					
144 (U-NII-3)	5720	-6.43	-3.92	-1.99	0.24	0.47	27.39	Pass
149	5745	-0.65	1.00	3.26	0.24	5.72	27.39	Pass
157	5785	-0.40	1.48	3.65	0.24	6.11	27.39	Pass
165	5825	-0.62	1.46	3.55	0.24	6.01	27.39	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 30-(8.61-6) = 27.39 dBm/500kHz.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Total PSD w/o Duty Factor (dBm/300kHz)	Duty Factor (dB)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
		Chain 0	Chain 1					
144 (U-NII-3)	5720	-5.70	-5.46	-2.57	0.35	0.00	27.39	Pass
149	5745	-1.94	-0.21	2.02	0.35	4.59	27.39	Pass
157	5785	-1.15	0.27	2.63	0.35	5.20	27.39	Pass
165	5825	-1.69	0.29	2.42	0.35	4.99	27.39	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 30-(8.61-6) = 27.39 dBm/500kHz.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Total PSD w/o Duty Factor (dBm/300kHz)	Duty Factor (dB)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
		Chain 0	Chain 1					
142 (U-NII-3)	5710	-8.41	-8.30	-5.34	0.38	-2.74	27.39	Pass
151	5755	-5.26	-3.52	-1.29	0.38	1.31	27.39	Pass
159	5795	-4.17	-2.47	-0.23	0.38	2.37	27.39	Pass

Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 30-(8.61-6) = 27.39 dBm/500kHz.

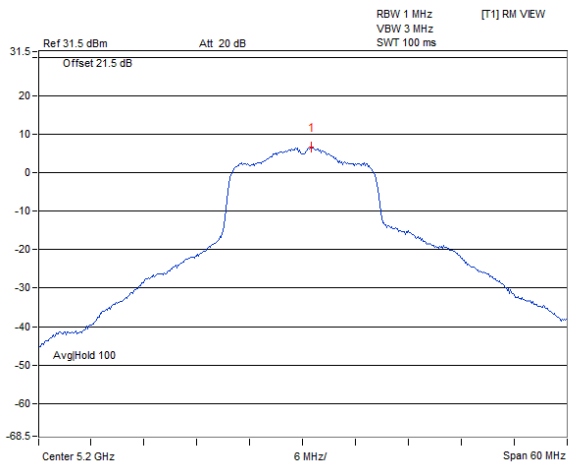
802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)		Total PSD w/o Duty Factor (dBm/300kHz)	Duty Factor (dB)	Total PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
		Chain 0	Chain 1					
138 (U-NII-3)	5690	-15.32	-14.84	-12.06	0.4	-9.44	27.39	Pass
155	5775	-9.70	-8.24	-5.9	0.4	-3.28	27.39	Pass

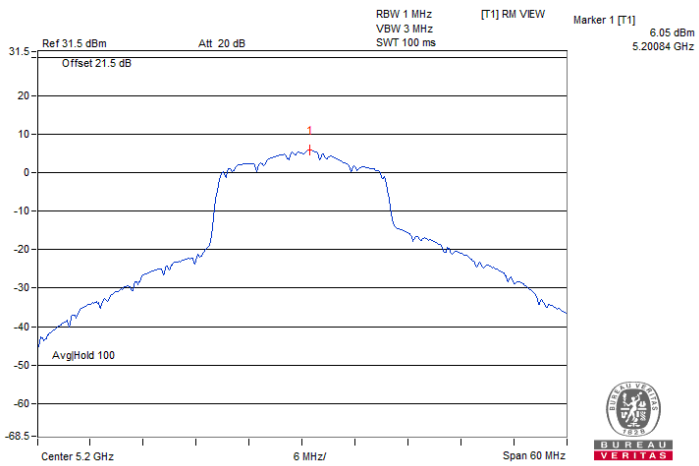
Notes:

1. Method E) 2) b) Measure and sum spectral maxima across the outputs of KDB 662911 is using for calculating total power density.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-3, the directional gain is 8.61 dBi > 6 dBi, so the power density limit shall be reduced to 30-(8.61-6) = 27.39 dBm/500kHz.

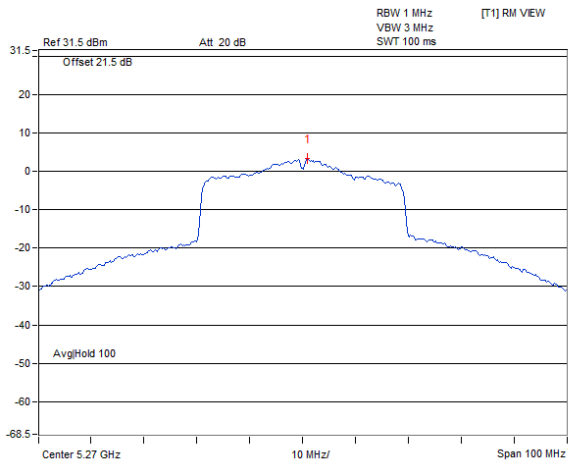
Spectrum Plot of Maximum Value



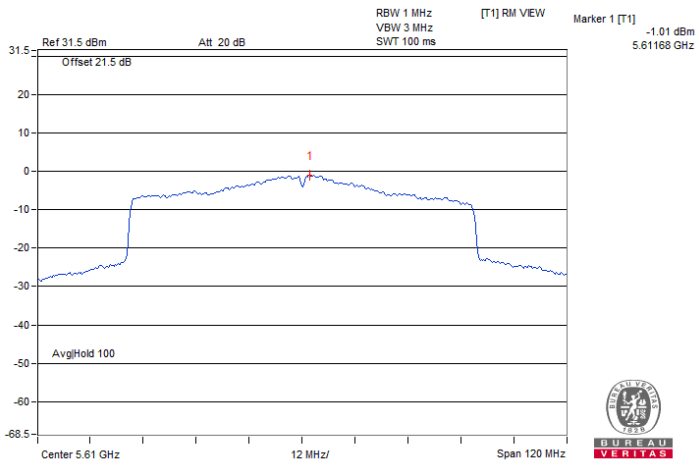
802.11a / Chain 1 : CH 40



802.11ax (HE20) / Chain 1 : CH 40

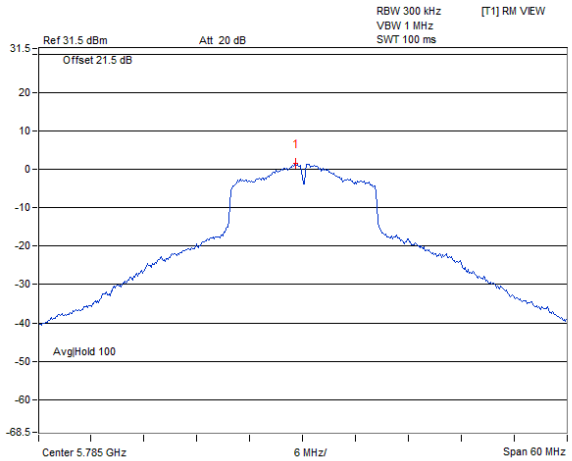


802.11ax (HE40) / Chain 1 : CH 54

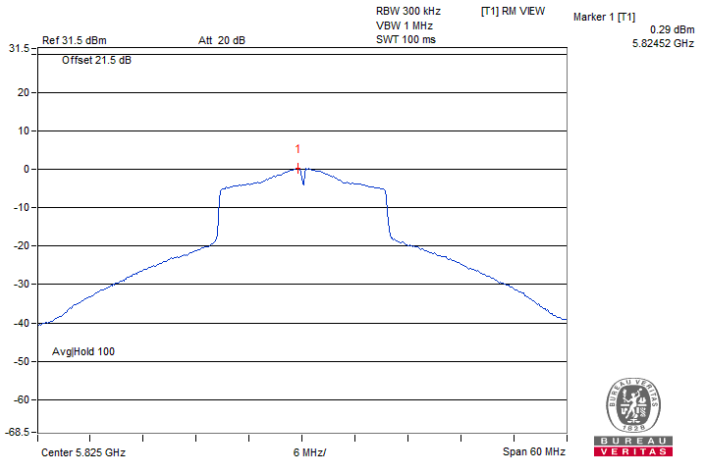


802.11ax (HE80) / Chain 1 : CH 122

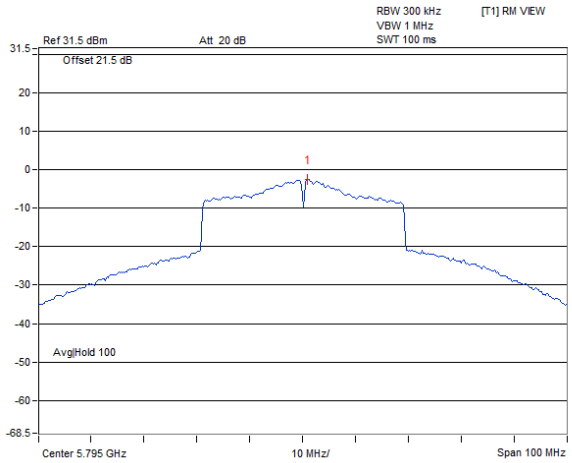
Spectrum Plot of Maximum Value



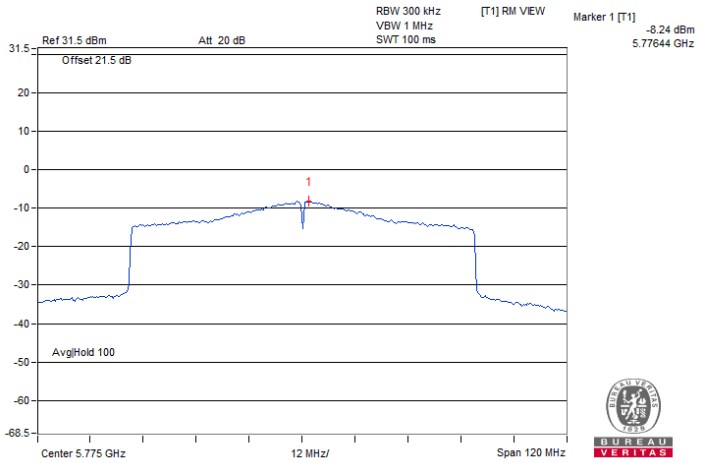
802.11a / Chain 1 : CH 157



802.11ax (HE20) / Chain 1 : CH 165



802.11ax (HE40) / Chain 1 : CH 159



802.11ax (HE80) / Chain 1 : CH 155

7.4 6 dB Bandwidth

Mode C

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

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
144 (U-NII-3)	5720	1.30	2.56	0.5	Pass
149	5745	15.70	14.99	0.5	Pass
157	5785	15.09	14.44	0.5	Pass
165	5825	15.34	14.42	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
144 (U-NII-3)	5720	1.25	2.51	0.5	Pass
149	5745	13.84	15.41	0.5	Pass
157	5785	10.33	12.45	0.5	Pass
165	5825	13.16	17.76	0.5	Pass

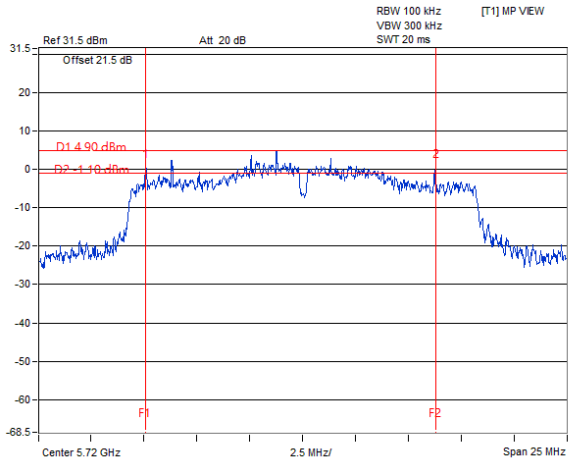
802.11ax (HE40)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
142 (U-NII-3)	5710	2.62	4.01	0.5	Pass
151	5755	35.38	24.89	0.5	Pass
159	5795	30.06	35.84	0.5	Pass

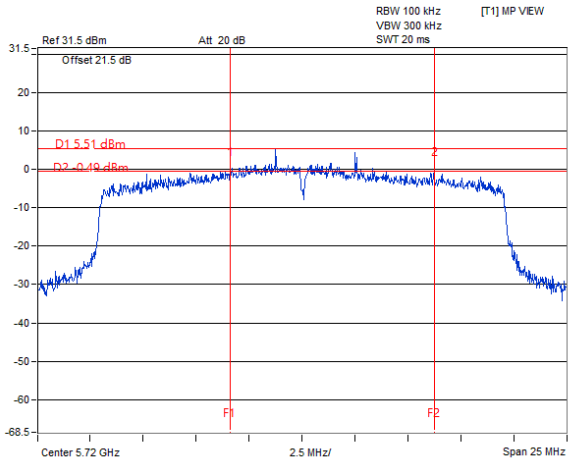
802.11ax (HE80)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)		Minimum Limit (MHz)	Test Result
		Chain 0	Chain 1		
138 (U-NII-3)	5690	2.42	1.81	0.5	Pass
155	5775	54.51	54.15	0.5	Pass

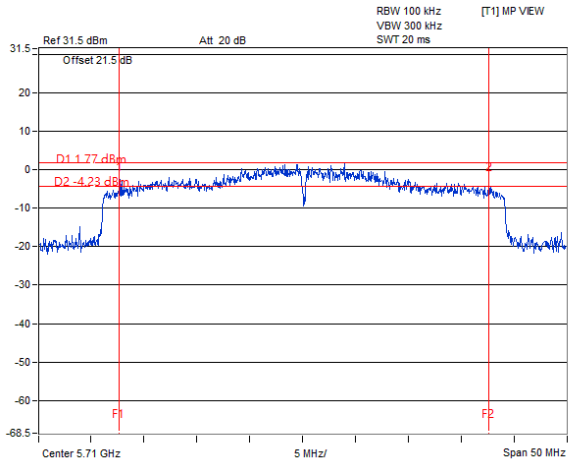
Spectrum Plot of Minimum Value



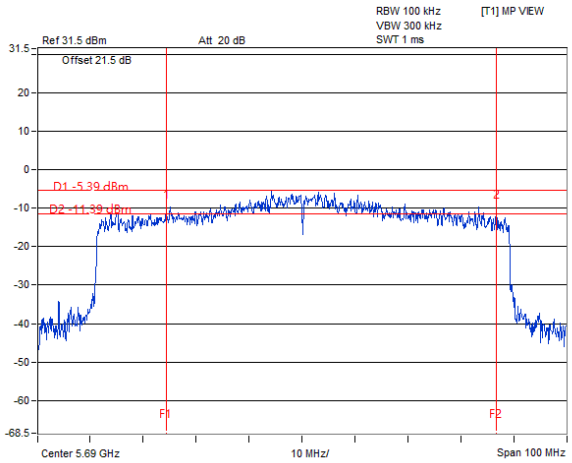
802.11a / Chain 0 : CH 144 (U-NII-3)



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



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



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

Notes:

1. For U-NII-3 straddle channel = Marker 1 + Delta 2 - 5725 MHz

7.5 Occupied Bandwidth

Mode C

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

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.98	16.38
40	5200	18.60	18.48
48	5240	16.44	16.74
52	5260	16.44	17.04
60	5300	16.80	17.52
64	5320	16.50	16.56
100	5500	16.32	16.38
116	5580	16.44	16.56
140	5700	16.68	16.80
144 (U-NII-2C)	5720	13.34	14.24
144 (U-NII-3)	5720	3.52	4.00
149	5745	20.88	26.22
157	5785	20.34	25.02
165	5825	19.08	22.32

802.11ax (HE20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	19.26	18.84
40	5200	20.58	19.92
48	5240	18.84	18.96
52	5260	18.90	19.02
60	5300	19.02	19.20
64	5320	18.84	18.96
100	5500	18.78	18.78
116	5580	18.84	18.96
140	5700	19.02	19.08
144 (U-NII-2C)	5720	14.36	14.54
144 (U-NII-3)	5720	4.42	4.60
149	5745	21.48	26.88
157	5785	21.84	26.94
165	5825	20.10	22.50

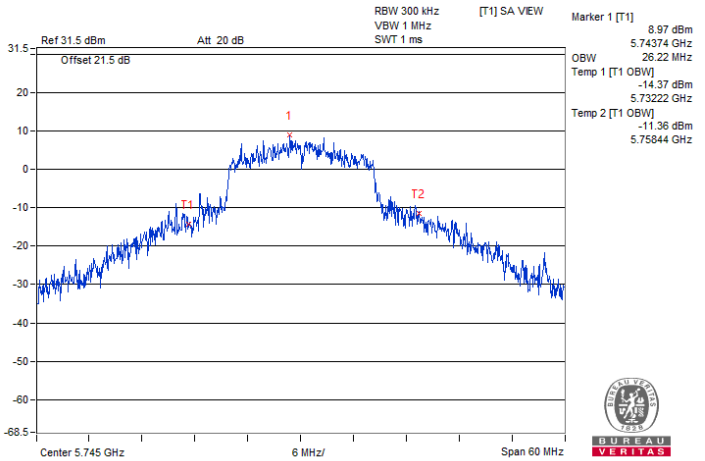
802.11ax (HE40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	37.68	37.56
46	5230	38.64	38.40
54	5270	38.76	42.60
62	5310	37.32	37.44
102	5510	37.56	37.56
110	5550	38.04	40.08
134	5670	38.52	38.76
142 (U-NII-2C)	5710	34.14	34.62
142 (U-NII-3)	5710	4.50	4.32
151	5755	40.56	46.68
159	5795	46.20	53.40

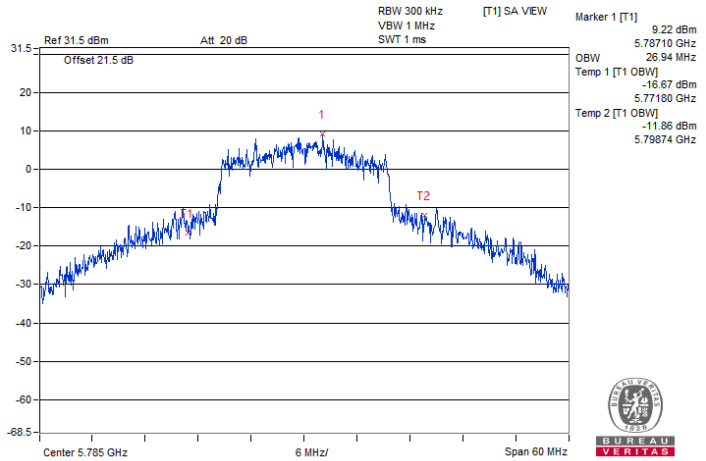
802.11ax (HE80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.80	76.32
58	5290	76.56	76.80
106	5530	76.80	76.80
122	5610	77.28	78.00
138 (U-NII-2C)	5690	73.16	72.92
138 (U-NII-3)	5690	3.16	3.16
155	5775	77.28	77.76

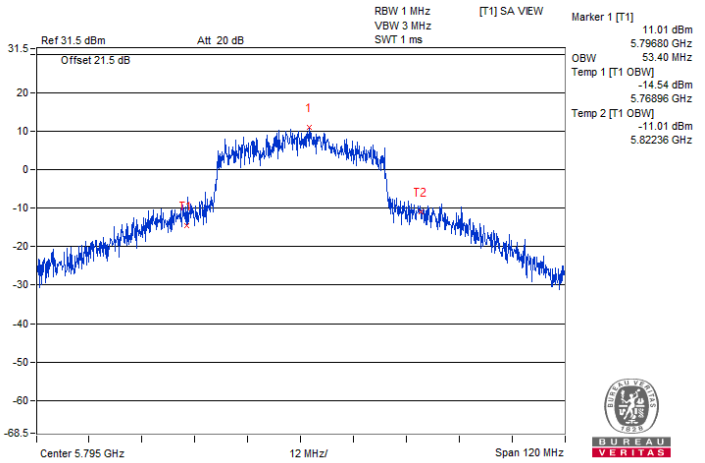
Spectrum Plot of Maximum Value



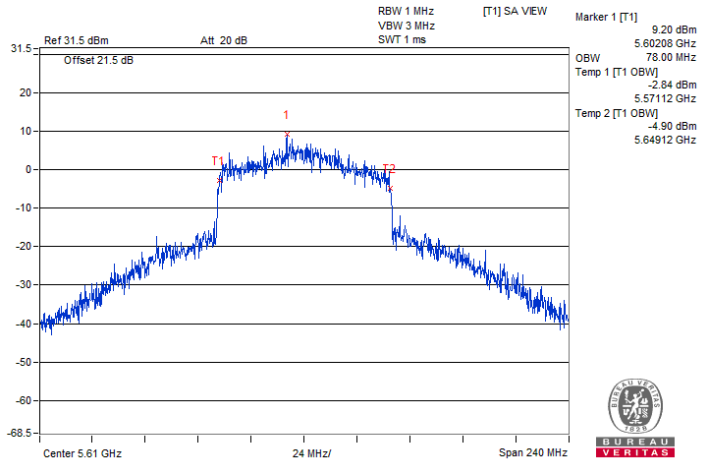
802.11a / Chain 1 : CH 149



802.11ax (HE20) / Chain 1 : CH 157

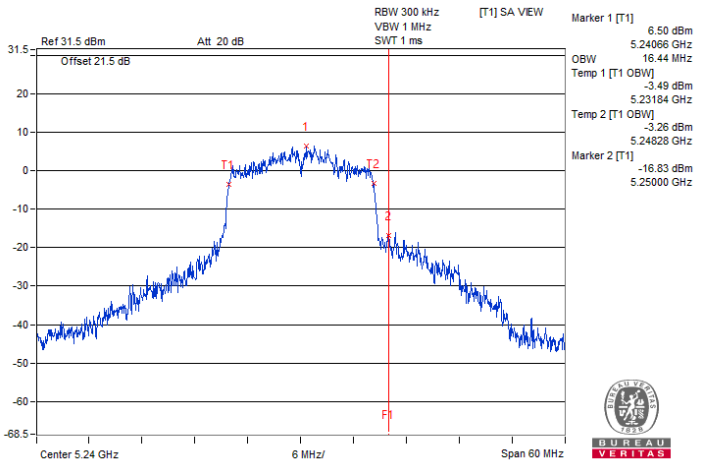


802.11ax (HE40) / Chain 1 : CH 159

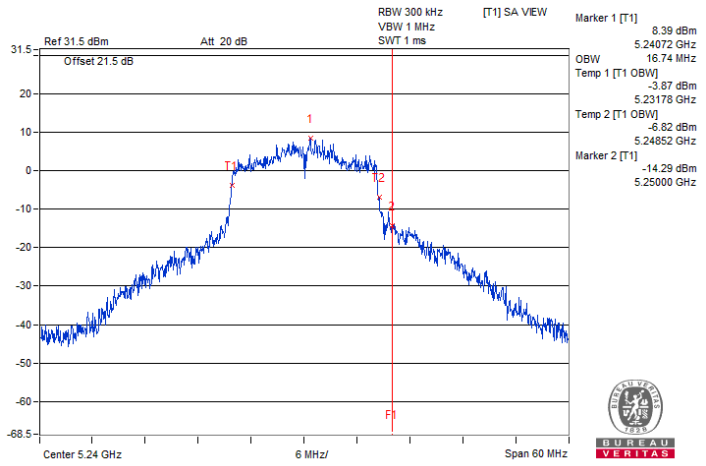


802.11ax (HE80) / Chain 1 : CH 122

Spectrum Plot for nearby DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A)

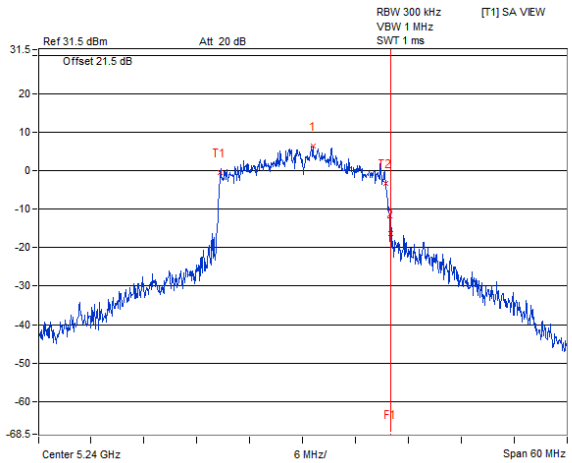


802.11a / Chain 0 : CH 48

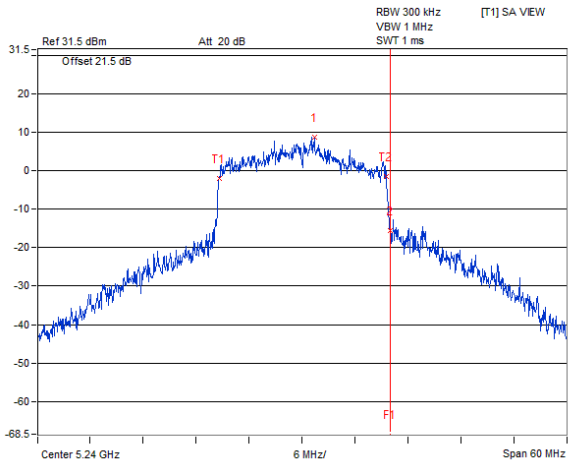


802.11a / Chain 1 : CH 48

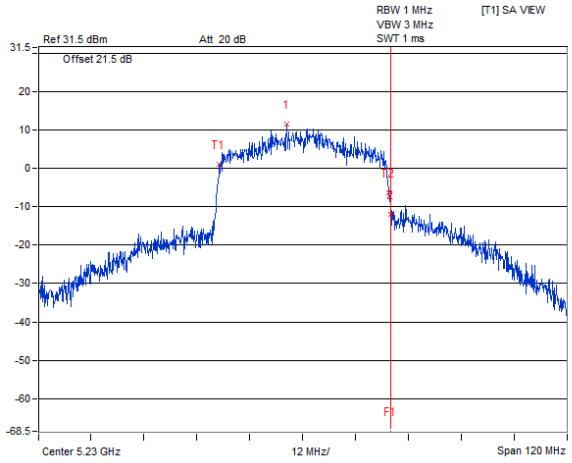
Spectrum Plot for nearby DFS band
(DFS is required, if 99% OCP straddle into U-NII-2A)



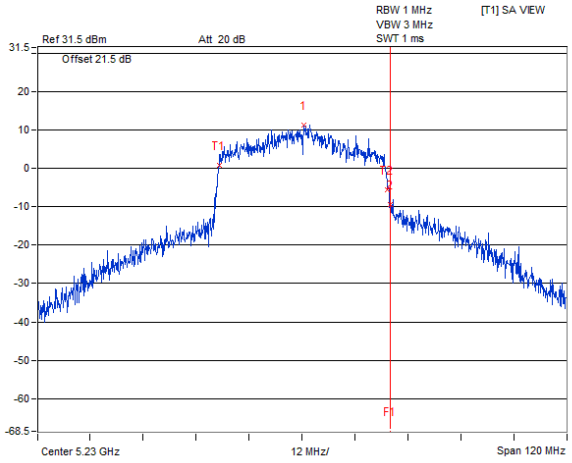
802.11ax (HE20) / Chain 0 : CH 48



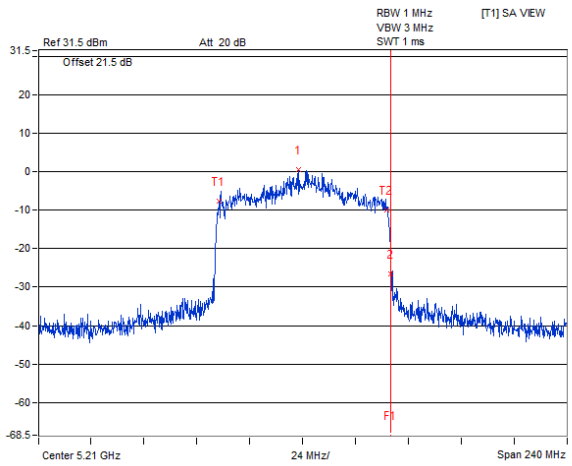
802.11ax (HE20) / Chain 1 : CH 48



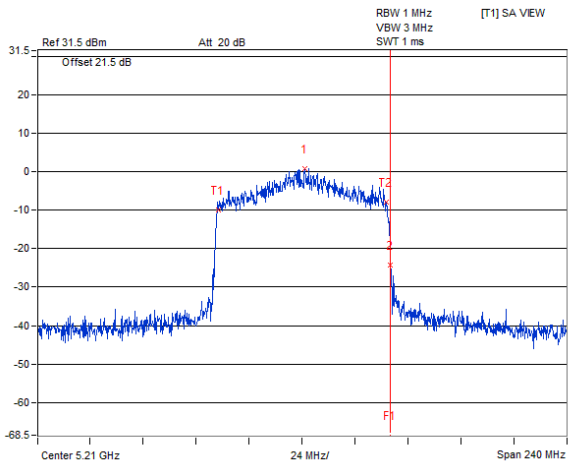
802.11ax (HE40) / Chain 0 : CH 46



802.11ax (HE40) / Chain 1 : CH 46



802.11ax (HE80) / Chain 0 : CH 42



802.11ax (HE80) / Chain 1 : CH 42