TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart E (Section 15.407)**
Report No.:	RFBHVI-WTW-P22120237-1
FCC ID:	N6C-SDMAX
Product:	Wireless Embedded Module
Brand:	Silex Technology
Model No.:	SX-SDMAX
Received Date:	2022/12/7
Test Date:	2023/1/3 ~ 2023/2/13
Issued Date:	2023/4/20
Applicant:	Silex Technology, Inc.
Address:	2-3-1 Hikaridai, Seika-cho, Soraku-gun, Kyoto 619-0237, Japan
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:** 2023/4/20

May Chen / Manager

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Prepared by : Claire Kuan / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBHVI-WTW-P22120237-1	Original release.	2023/4/20

1 Certificate

Product:	Wireless Embedded Module
Brand:	Silex Technology
Test Model:	SX-SDMAX
Sample Status:	Engineering sample
Applicant:	Silex Technology, Inc.
Test Date:	2023/1/3 ~ 2023/2/13
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

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

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(a)(2)	26 dB Bandwidth	Pass	For U-NII-2A U-NII-2C Band output power limitation is determined based on 26dBc bandwidth.
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	RF Output Power	Pass	Meet the requirement of limit.
15.407(a)(1) 15.407(a)(2) 15.407(a)(3)	Power Spectral Density	Pass	Meet the requirement of limit.
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 -12.52 dB at 27.96484 MHz
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -9.1 dB at 62.62 MHz
15.407(b) (1/10) 15.407(b) (2/10) 15.407(b) (3/10) 15.407(b) (4(i)/10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -17.7 dB at 11570.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is ipex(MHF) 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	5.5 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 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	Wireless Embedded Module
Brand	Silex Technology
Test Model	SX-SDMAX
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode 1024QAM for OFDMA in 11ax mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: up to 54 Mbps 802.11n: up to 150 Mbps 802.11ac: up to 433.3 Mbps 802.11ax: up to 600.4 Mbps
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	5.18 GHz ~ 5.24 GHz : 43.853 mW (16.42 dBm) 5.26 GHz ~ 5.32 GHz : 44.361 mW (16.47 dBm) 5.5 GHz ~ 5.72 GHz : 43.752 mW (16.41 dBm) 5.745 GHz ~ 5.825 GHz : 44.259 mW (16.46 dBm)
EUT Category	Client device

Note:

1. There are Bluetooth and WLAN (2.4 GHz & 5 GHz) technology used for the EUT.
2. Simultaneously transmission condition.

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

3. The EUT support OFDMA and Partial RU mode, therefore partial RU combination were investigated and the worst case scenario was identified. (The worst case data were presented in section 3.4)
4. 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.

Antenna NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
1	Molex	1461530050	3.18	2.4~2.4835GHz	Dipole	ipex(MHF)	50mm
			3.15	5.15~5.25GHz			
			2.75	5.25~5.35GHz			
			4.25	5.47~5.725GHz			
			3.85	5.725~5.85GHz			

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

2. The EUT incorporates a SISO function:

5 GHz Band		
Modulation Mode	**TX & RX Configuration**	
802.11a	1TX	1RX
802.11n (HT20)	1TX	1RX
802.11n (HT40)	1TX	1RX
802.11ac (VHT20)	1TX	1RX
802.11ac (VHT40)	1TX	1RX
802.11ac (VHT80)	1TX	1RX
802.11ax (HE20)	1TX	1RX
802.11ax (HE40)	1TX	1RX
802.11ax (HE80)	1TX	1RX
802.11ax (RU26/52/106/242/484/996)	1TX	1RX

Note:

1. 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.For Partial RU modes of 20MHz,40MHz and 80MHz bandwidth needs to be pre-worst. 2.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).
Worst Case:	1.The worst case occurs in 20 MHz bandwidth(partial RU 26/52/106)

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

Test Item	EUT Configure Mode	Mode	Tested Channel	Modulation	Data Rate Parameter	RU Configuration
26 dB Bandwidth	A	802.11a	52, 60, 64, 100, 116, 140, 144	BPSK	6Mb/s	-
		802.11ax (HE20)	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0	-
		802.11ax (HE40)	54, 62, 102, 110, 134, 142	BPSK	MCS0	-
		802.11ax (HE80)	58, 106, 122, 138	BPSK	MCS0	-
		20 MHz Preamble 802.11ax (RU26)	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0	26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/8
		20 MHz Preamble 802.11ax (RU52)	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0	52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/40
		20 MHz Preamble 802.11ax (RU106)	52, 60, 64, 100, 116, 140, 144	BPSK	MCS0	106/53, 106/54, 106/54, 106/53, 106/53, 106/54, 106/54
RF Output Power	A	802.11a	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	6Mb/s	-
		802.11ac (VHT20)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	-
		802.11ac (VHT40)	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0	-
		802.11ac (VHT80)	42, 58, 106, 122, 138, 155	BPSK	MCS0	-
		802.11ax (HE20)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	-

Test Item	EUT Configure Mode	Mode	Tested Channel	Modulation	Data Rate Parameter	RU Configuration
		802.11ax (HE40)	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0	-
		802.11ax (HE80)	42, 58, 106, 122, 138, 155	BPSK	MCS0	-
		20 MHz Preamble 802.11ax (RU26)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/8, 26/0, 26/4, 26/8
		20 MHz Preamble 802.11ax (RU52)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/40,52/37, 52/39, 52/40
		20 MHz Preamble 802.11ax (RU106)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	106/53, 106/53, 106/54, 106/53, 106/54, 106/54, 106/53, 106/53, 106/54, 106/54, 106/53, 106/54, 106/54
Power Spectral Density	A	802.11a	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	6Mb/s	-
		802.11ax (HE20)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	-
		802.11ax (HE40)	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0	-
		802.11ax (HE80)	42, 58, 106, 122, 138, 155	BPSK	MCS0	-
		20 MHz Preamble 802.11ax (RU26)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/8, 26/0, 26/4, 26/8

Test Item	EUT Configure Mode	Mode	Tested Channel	Modulation	Data Rate Parameter	RU Configuration
		20 MHz Preamble 802.11ax (RU52)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/40,52/37, 52/39, 52/40
		20 MHz Preamble 802.11ax (RU106)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	106/53, 106/53, 106/54, 106/53, 106/54, 106/54, 106/53, 106/53, 106/54, 106/54, 106/53, 106/54, 106/54
6 dB Bandwidth	A	802.11a	144, 149, 157, 165	BPSK	6Mb/s	-
		802.11ax (HE20)	144, 149, 157, 165	BPSK	MCS0	-
		802.11ax (HE40)	142, 151, 159	BPSK	MCS0	-
		802.11ax (HE80)	138, 155	BPSK	MCS0	-
		20 MHz Preamble 802.11ax (RU26)	144, 149, 157, 165	BPSK	MCS0	26/8, 26/0, 26/4, 26/8
		20 MHz Preamble 802.11ax (RU52)	144, 149, 157, 165	BPSK	MCS0	52/40, 52/37, 52/39, 52/40
		20 MHz Preamble 802.11ax (RU106)	138, 155	BPSK	MCS0	106/54, 106/53, 106/54, 106/54

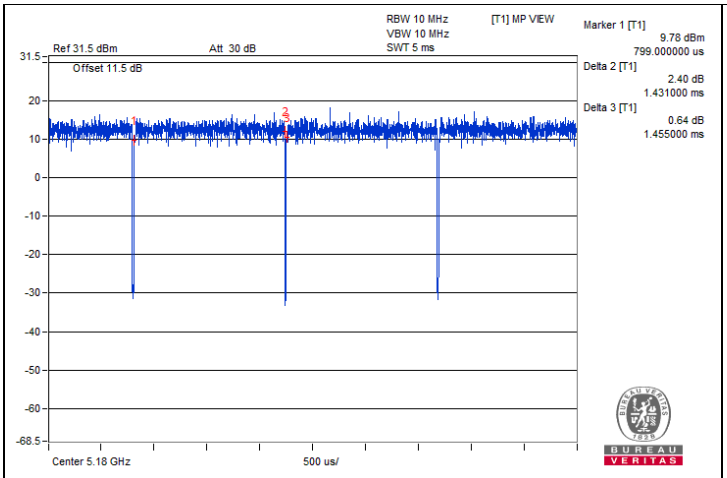
Occupied Bandwidth	A	802.11a	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	6Mb/s	-
		802.11ax (HE20)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	-
		802.11ax (HE40)	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0	-
		802.11ax (HE80)	42, 58, 106, 122, 138, 155	BPSK	MCS0	-
		20 MHz Preamble 802.11ax (RU26)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/8, 26/0, 26/4, 26/8
		20 MHz Preamble 802.11ax (RU52)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/40,52/37, 52/39, 52/40
		20 MHz Preamble 802.11ax (RU106)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	106/53, 106/53, 106/54, 106/53, 106/54, 106/54, 106/53, 106/53, 106/54, 106/54, 106/53, 106/54, 106/54
Frequency Stability	A	802.11a	36	un-modulation	-	-
AC Power Conducted Emissions	B	802.11ax (HE20)	144	BPSK	MCS0	-
Unwanted Emissions below 1 GHz	A, B	802.11ax (HE20)	144	BPSK	MCS0	-

Unwanted Emissions above 1 GHz	A, B	802.11a	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	6Mb/s	-
		802.11ax (HE20)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	-
		802.11ax (HE40)	38, 46, 54, 62, 102, 110, 134, 142, 151, 159	BPSK	MCS0	-
		802.11ax (HE80)	42, 58, 106, 122, 138, 155	BPSK	MCS0	-
		20 MHz Preamble 802.11ax (RU26)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/0, 26/4, 26/8, 26/8, 26/0, 26/4, 26/8
		20 MHz Preamble 802.11ax (RU52)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/37, 52/39, 52/40, 52/40,52/37, 52/39, 52/40
		20 MHz Preamble 802.11ax (RU106)	36, 40, 48, 52, 60, 64, 100, 116, 140, 144, 149, 157, 165	BPSK	MCS0	106/53, 106/53, 106/54, 106/53, 106/54, 106/54, 106/53, 106/53, 106/54, 106/54, 106/53, 106/54, 106/54
EUT Configure Mode:	A	Antenna Port				
	B	with 50ohm teminator				

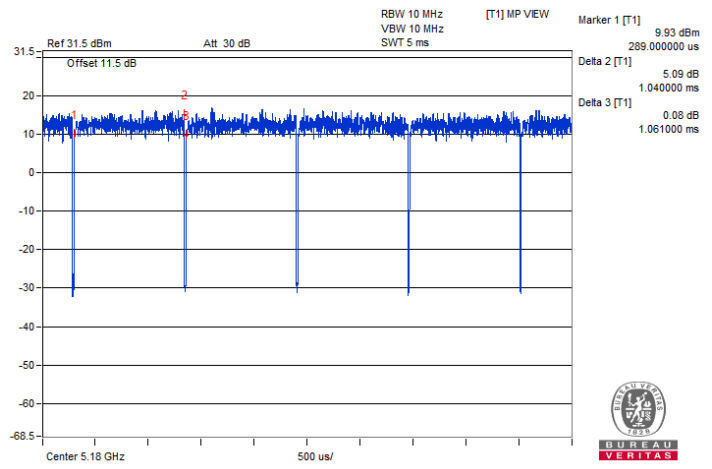
3.5 Duty Cycle of Test Signal

Mode A

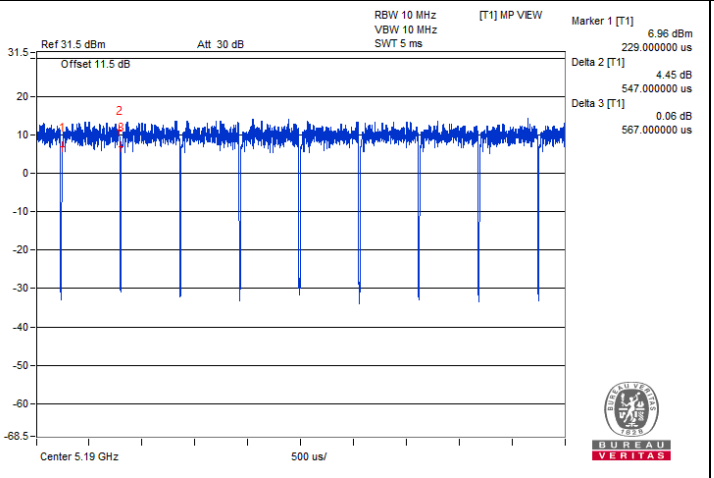
802.11a: Duty cycle = 1.431 ms / 1.455 ms x 100% = 98.4%
802.11ax (HE20): Duty cycle = 1.04 ms / 1.061 ms x 100% = 98.0%
802.11ax (HE40): Duty cycle = 0.547 ms / 0.567 ms x 100% = 96.5%, duty factor = 10 * log (1/Duty cycle) = 0.16 dB
802.11ax (HE80): Duty cycle = 0.292 ms / 0.308 ms x 100% = 94.8%, duty factor = 10 * log (1/Duty cycle) = 0.23 dB
20 MHz Preamble 802.11ax (RU26): Duty cycle = 1.04 ms / 1.061 ms x 100% = 98.0%
20 MHz Preamble 802.11ax (RU52): Duty cycle = 1.04 ms / 1.061 ms x 100% = 98.0%
20 MHz Preamble 802.11ax (RU106): Duty cycle = 1.04 ms / 1.061 ms x 100% = 98.0%



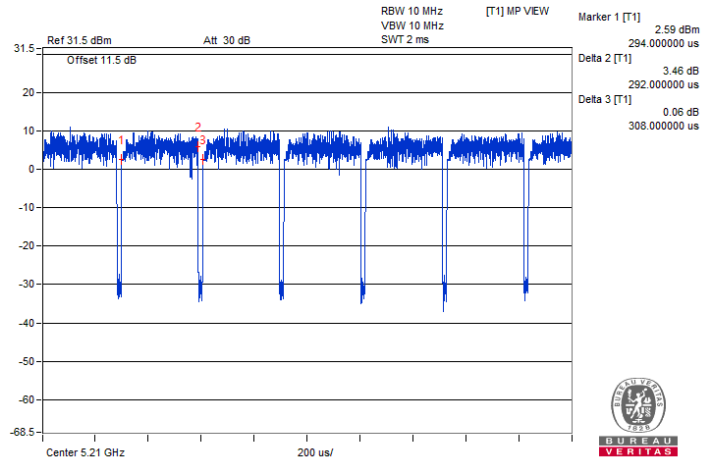
802.11a



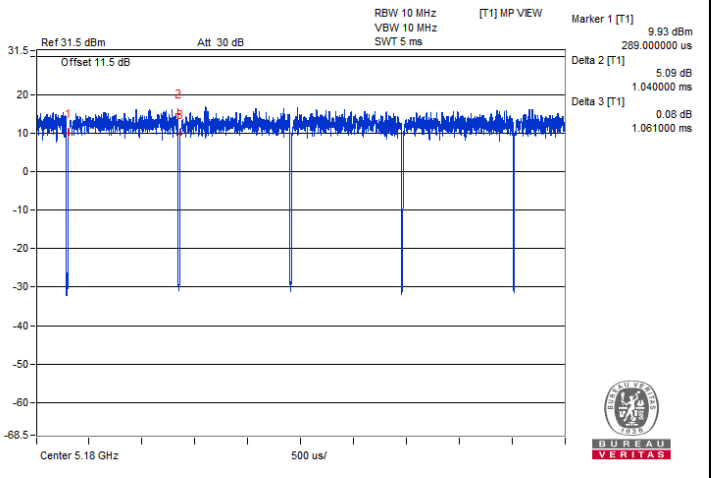
802.11ax (HE20)



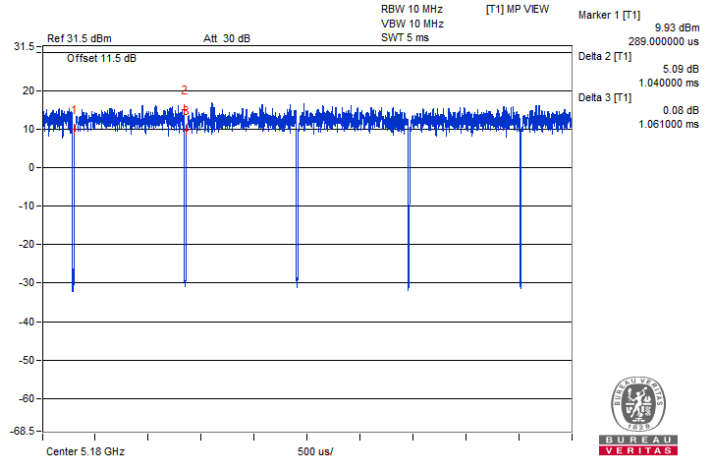
802.11ax (HE40)



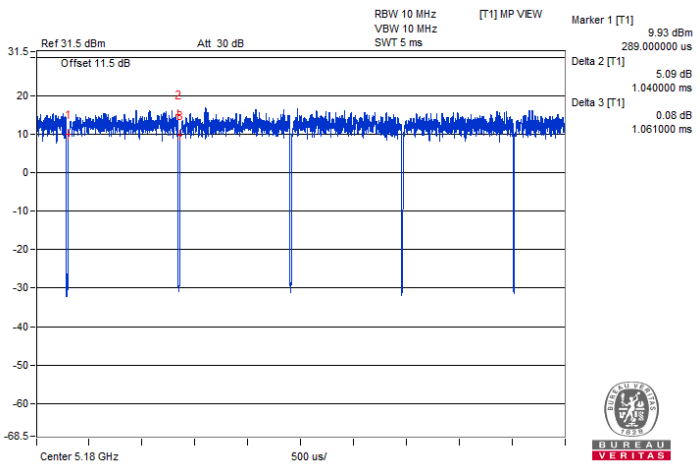
802.11ax (HE80)



20 MHz Preamble 802.11ax (RU26)



20 MHz Preamble 802.11ax (RU52)



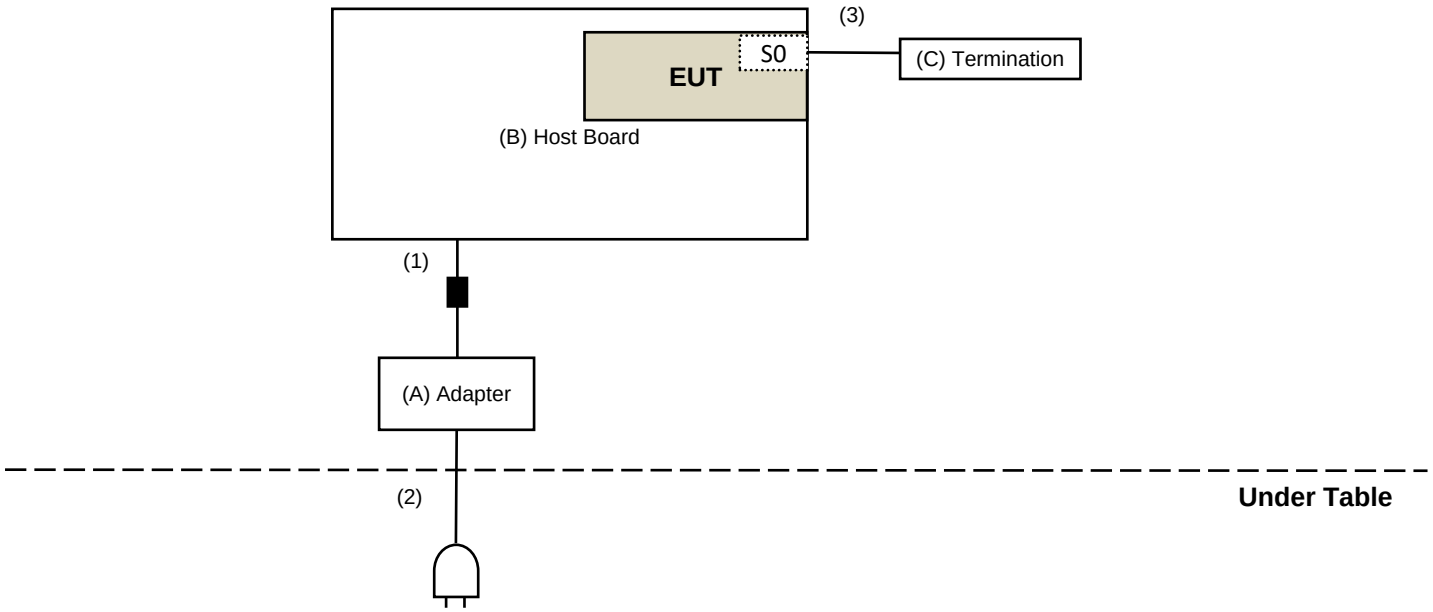
20 MHz Preamble 802.11ax (RU106)

3.6 Test Program Used and Operation Descriptions

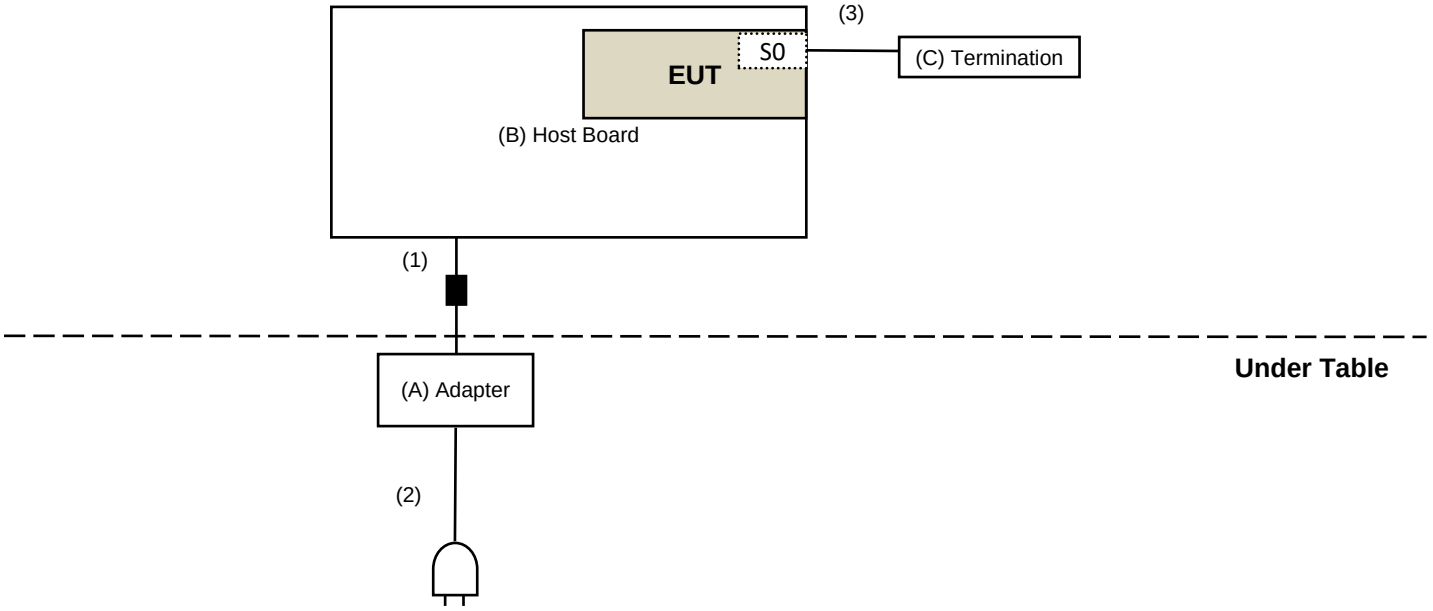
Controlling software (Tera Term Version 4.98) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

For AC Power Conducted Emission test



For Unwanted Emission test



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Adapter	EDACPOWER ELEC.	EA10682N-120	N/A	N/A	Supplied by applicant
B	Host Board	NXP	MCIMX8M-EVKB	N/A	N/A	Supplied by applicant
C	Termination	Marvelous	MVE5185	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.2	No	1	Supplied by applicant
2	AC Cable	1	1.5	No	0	Supplied by applicant
3	RF Cable	1	0.15	No	0	Provided by Lab

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: 2023/1/3

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: 2023/1/3

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
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
DC POWER SUPPLY Topward	6603D	795558	N/A	N/A
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: 2023/1/3

4.7 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance	N/A	EMC-01	2022/9/27	2023/9/26
Fixed attenuator STI	STI02-2200-10	005	2022/8/24	2023/8/23
LISN R&S	ESH3-Z5	848773/004	2022/10/18	2023/10/17
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: 2023/2/13

4.8 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2022/12/28	2023/12/27
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 EMCI	EMC330N	980701	2022/3/8	2023/3/7
RF Coaxial Cable COMMATE/PEWC	8D	966-4-1	2022/3/8	2023/3/7
		966-4-2	2022/3/8	2023/3/7
		966-4-3	2022/3/8	2023/3/7
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/12/19	2023/12/18
		LOOPCAB-002	2022/12/19	2023/12/18
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-406	2022/10/21	2023/10/20

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2023/2/13

4.9 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-783	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980688	2022/10/4	2023/10/3
	EMC184045SE	980387	2022/12/28	2023/12/27
RF Cable-Frequency Range : 1-26.5GHz EMCI	EMC104-SM-SM-1200	160922	2022/12/15	2023/12/14
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/12/28	2023/12/27
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-2000	180502	2022/4/25	2023/4/24
	EMC104-SM-SM-6000	210704	2022/11/4	2023/11/3
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2023/2/13

5 Limits of Test Items

5.1 26 dB Bandwidth

The results are for reference only.

5.2 RF Output Power

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

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

*B is the 26 dB emission bandwidth in megahertz

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)

For transmitters operating in the 5.15-5.25 GHz band:

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

For transmitters operating in the 5.25-5.35 GHz band:

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

For transmitters operating in the 5.47-5.725 GHz band:

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

For transmitters operating in the 5.725-5.850 GHz band:

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

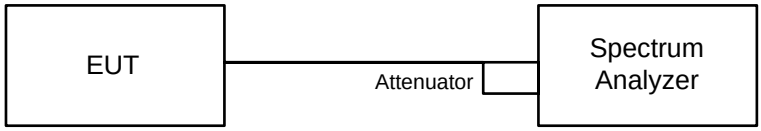
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 26 dB Bandwidth

6.1.1 Test Setup

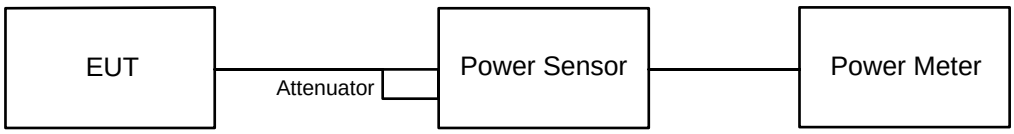


6.1.2 Test Procedure

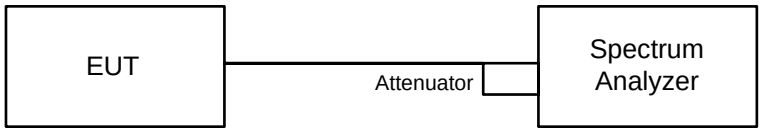
a. Set RBW = approximately 1% of the emission bandwidth.
b. Set the VBW > RBW.
c. Detector = Peak.
d. Trace mode = max hold.
e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

6.2 RF Output Power

6.2.1 Test Setup



For channel straddling:



6.2.2 Test Procedure

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

For channel straddling:

Method SA-1

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

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

For channel straddling:

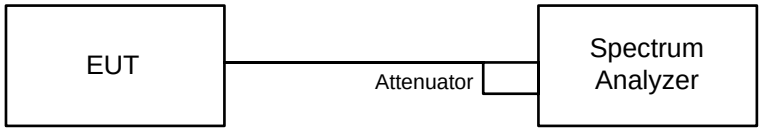
Method SA-2A

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

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

6.3 Power Spectral Density

6.3.1 Test Setup



6.3.2 Test Procedure

For specified measurement bandwidth 1 MHz:
Method SA-1

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

For specified measurement bandwidth 1 MHz:
Method SA-2

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

For specified measurement bandwidth 500 kHz:
Method SA-1

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

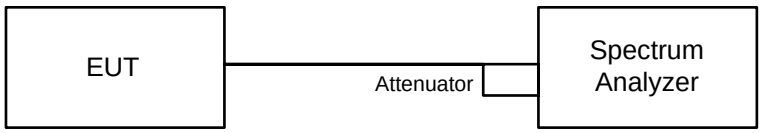
For specified measurement bandwidth 500 kHz:
Method SA-2

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

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

6.4 6 dB Bandwidth

6.4.1 Test Setup

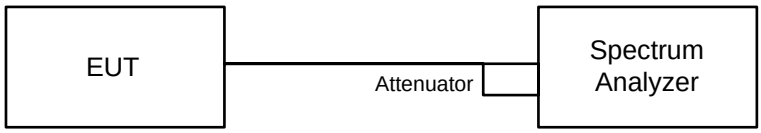


6.4.2 Test Procedure

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

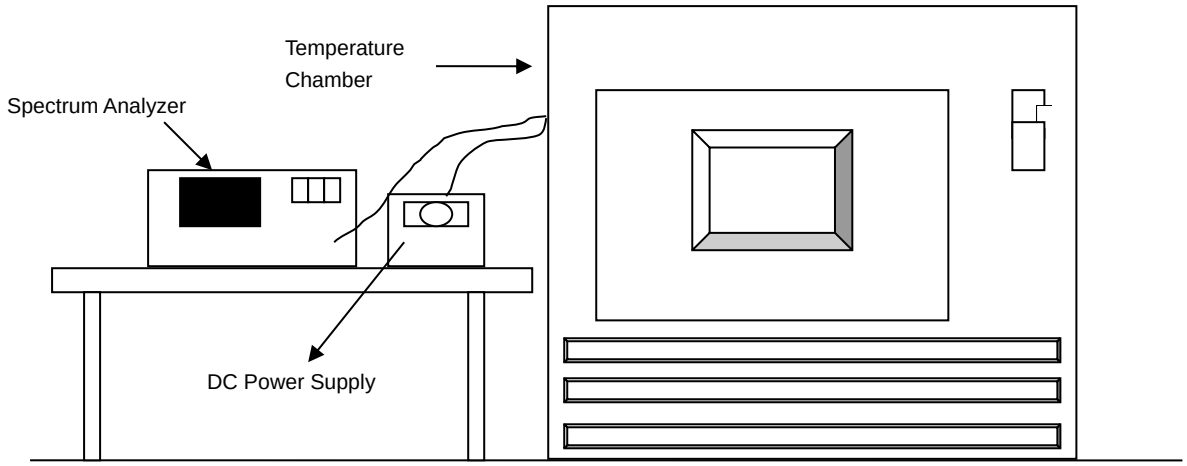


6.5.2 Test Procedure

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

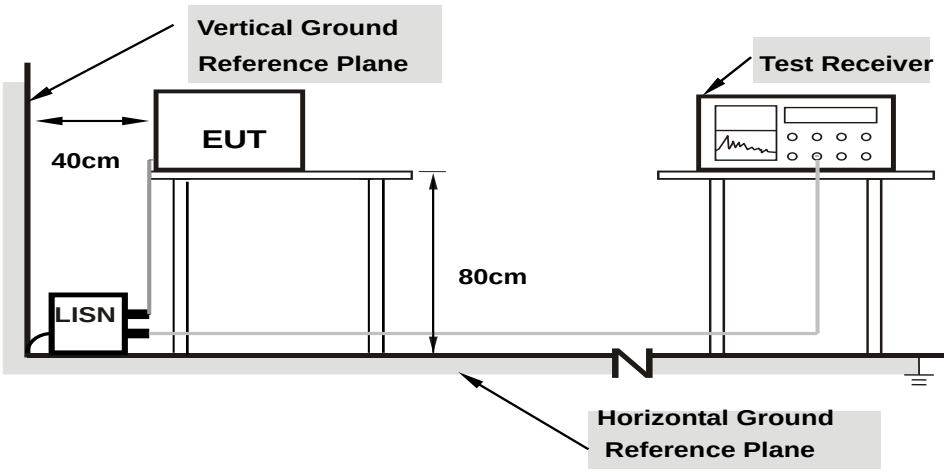


6.6.2 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal DC 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.

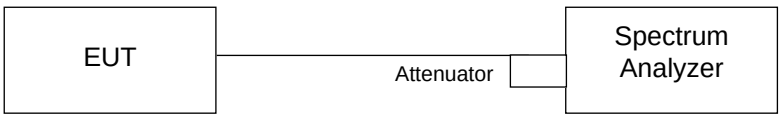
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

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

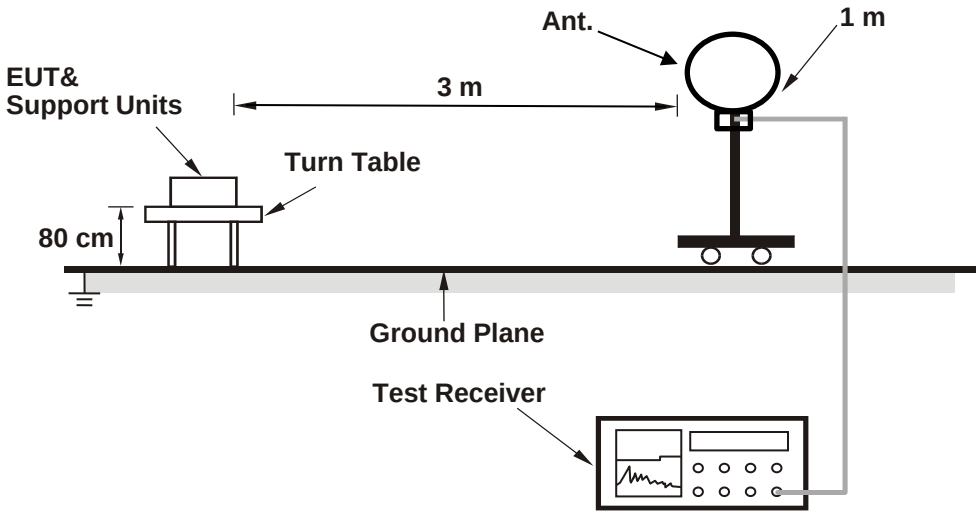
6.8.1 Test Setup

For conducted configuration:

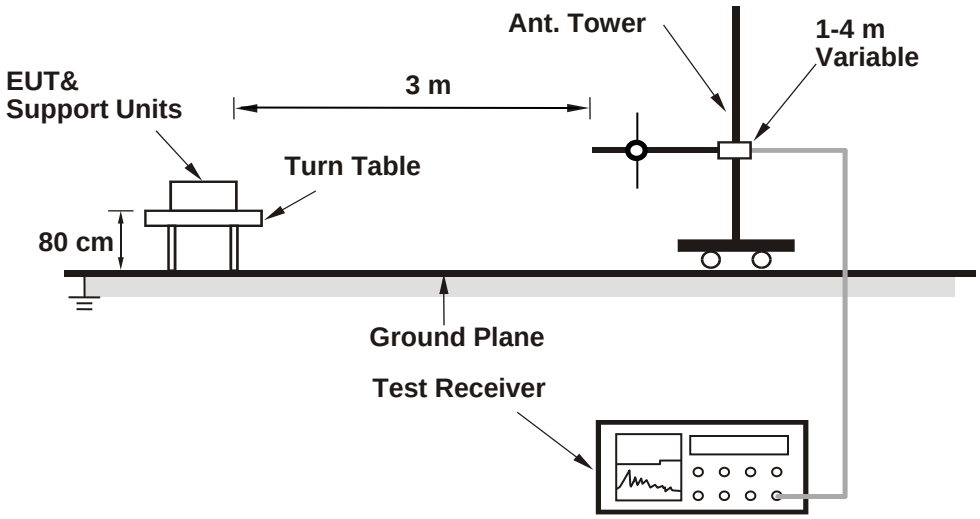


For radiated configuration:

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

Following FCC KDB 558074 D01 DTS Meas. Guidance:

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.

b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.

c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater.

d. For all of Radiation emission test

For Radiated emission below 30 MHz

d-1.1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

d-1.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d-1.3. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d-1.4. 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.

d-1.5. 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

d-2.1. 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.

d-2.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d-2.3. 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-2.4. 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.

d-2.5. 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.

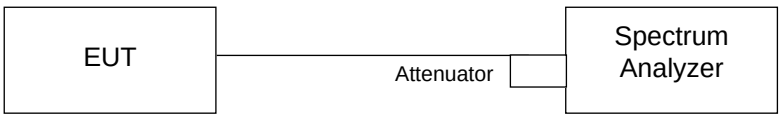
Notes:

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.

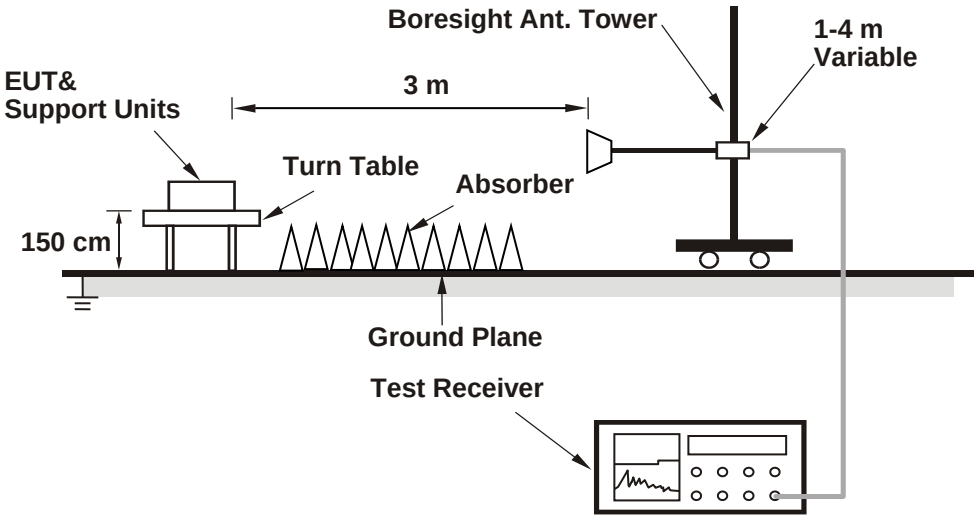
6.9 Unwanted Emissions above 1 GHz

6.9.1 Test Setup

For conducted configuration:



For radiated configuration:



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

6.9.2 Test Procedure

Following FCC KDB 558074 D01 DTS Meas. Guidance:

Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on antenna-port conducted measurements in conjunction with cabinet emissions tests are permitted to demonstrate compliance.

The following steps was performed:

a. Cabinet emissions measurements. Radiated measurement was performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna was replaced by a termination matching the nominal impedance of the antenna.

b. Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.

c. EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater.

d. For all of Radiation emission test

d-1.1. 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.

d-1.2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d-1.3. 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-1.4. 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.

d-1.5. 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 A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

802.11a

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
52	5260	20.08
60	5300	20.22
64	5320	20.19
100	5500	20.18
116	5580	20.16
140	5700	20.16
144 (U-NII-2C)	5720	15.01
144 (U-NII-3)	5720	5.11

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	20.08	24.02	>	24
60	5300	20.22	24.05	>	24
64	5320	20.19	24.05	>	24
100	5500	20.18	24.04	>	24
116	5580	20.16	24.04	>	24
140	5700	20.16	24.04	>	24
144 (U-NII-2C)	5720	15.01	22.76	<	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)	26dB Bandwidth (MHz)
52	5260	20.81
60	5300	20.73
64	5320	20.84
100	5500	20.72
116	5580	20.82
140	5700	20.83
144 (U-NII-2C)	5720	15.38
144 (U-NII-3)	5720	5.47

Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
52	5260	20.81	24.18 > 24
60	5300	20.73	24.16 > 24
64	5320	20.84	24.18 > 24
100	5500	20.72	24.16 > 24
116	5580	20.82	24.18 > 24
140	5700	20.83	24.18 > 24
144 (U-NII-2C)	5720	15.38	22.86 < 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)	26dB Bandwidth (MHz)
54	5270	42.15
62	5310	41.94
102	5510	42.08
110	5550	41.89
134	5670	41.89
142 (U-NII-2C)	5710	35.94
142 (U-NII-3)	5710	5.99

Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
54	5270	42.15	27.24 > 24
62	5310	41.94	27.22 > 24
102	5510	42.08	27.24 > 24
110	5550	41.89	27.22 > 24
134	5670	41.89	27.22 > 24
142 (U-NII-2C)	5710	35.94	26.55 > 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)	26dB Bandwidth (MHz)
58	5290	82.12
106	5530	81.9
122	5610	82.34
138 (U-NII-2C)	5690	75.78
138 (U-NII-3)	5690	6.3

Determined Output Power Limit			
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)
58	5290	82.12	30.14 > 24
106	5530	81.90	30.13 > 24
122	5610	82.34	30.15 > 24
138 (U-NII-2C)	5690	75.78	29.79 > 24

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

20 MHz Preamble 802.11ax (RU26)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
52	5260	19.56
60	5300	18.67
64	5320	19.66
100	5500	19.54
116	5580	18.63
140	5700	19.81
144 (U-NII-2C)	5720	14.49
144 (U-NII-3)	5720	5.36

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	19.56	23.91	<	24
60	5300	18.67	23.71	<	24
64	5320	19.66	23.93	<	24
100	5500	19.54	23.9	<	24
116	5580	18.63	23.7	<	24
140	5700	19.81	23.96	<	24
144 (U-NII-2C)	5720	14.49	22.61	<	24

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

20 MHz Preamble 802.11ax (RU52)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
52	5260	19.67
60	5300	18.85
64	5320	20.09
100	5500	19.68
116	5580	18.89
140	5700	20.06
144 (U-NII-2C)	5720	14.67
144 (U-NII-3)	5720	5.45

Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	19.67	23.93	<	24
60	5300	18.85	23.75	<	24
64	5320	20.09	24.02	>	24
100	5500	19.68	23.94	<	24
116	5580	18.89	23.76	<	24
140	5700	20.06	24.02	>	24
144 (U-NII-2C)	5720	14.67	22.66	<	24

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

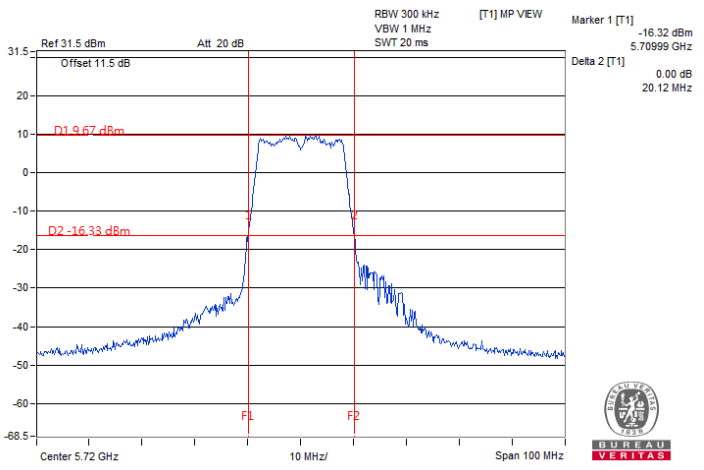
20 MHz Preamble 802.11ax (RU106)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)
52	5260	20.19
60	5300	20.32
64	5320	20.24
100	5500	20.21
116	5580	20.01
140	5700	20.19
144 (U-NII-2C)	5720	14.92
144 (U-NII-3)	5720	5.41

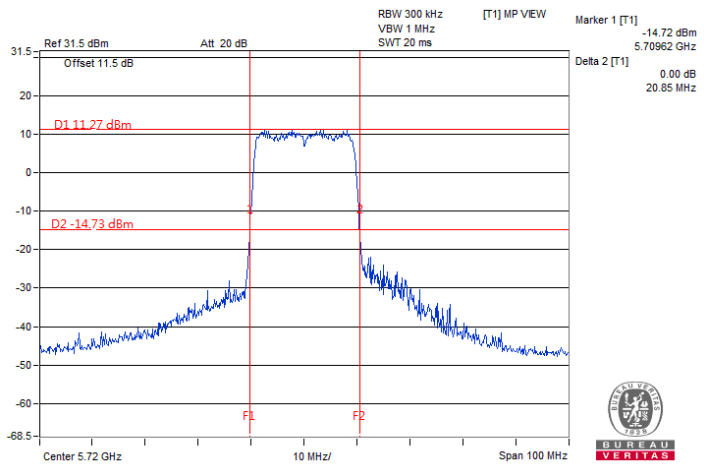
Determined Output Power Limit					
Channel Number	Freq.(MHz)	Min. B(MHz)	Determined Conducted Power Limit (dBm)		
52	5260	20.19	24.05	>	24
60	5300	20.32	24.07	>	24
64	5320	20.24	24.06	>	24
100	5500	20.21	24.05	>	24
116	5580	20.01	24.01	>	24
140	5700	20.19	24.05	>	24
144 (U-NII-2C)	5720	14.92	22.73	<	24

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

Spectrum Plot of Minimum Value

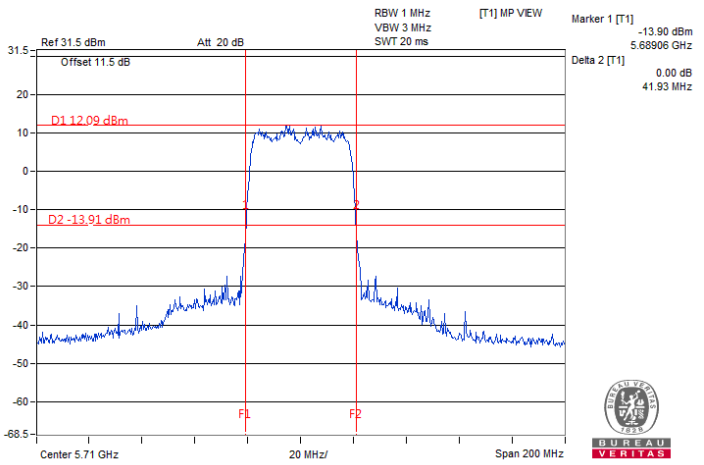


802.11a : CH 144 (U-NII-3)

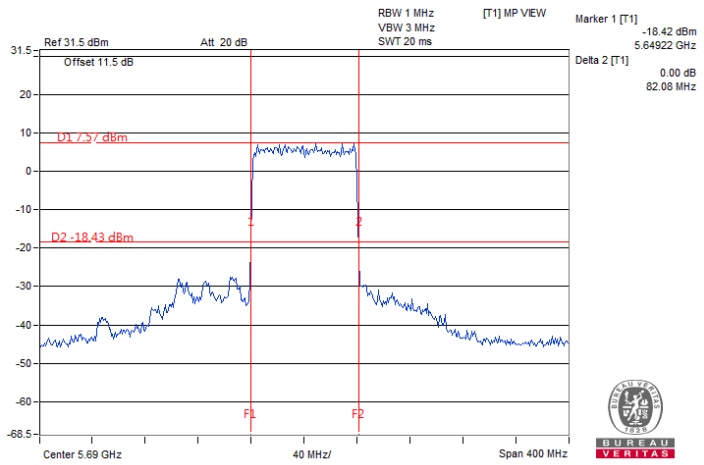


802.11ax (HE20) : CH 144 (U-NII-3)

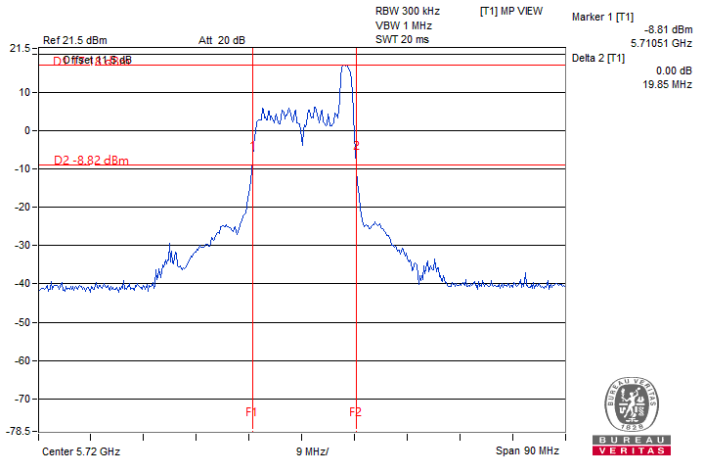
Spectrum Plot of Minimum Value



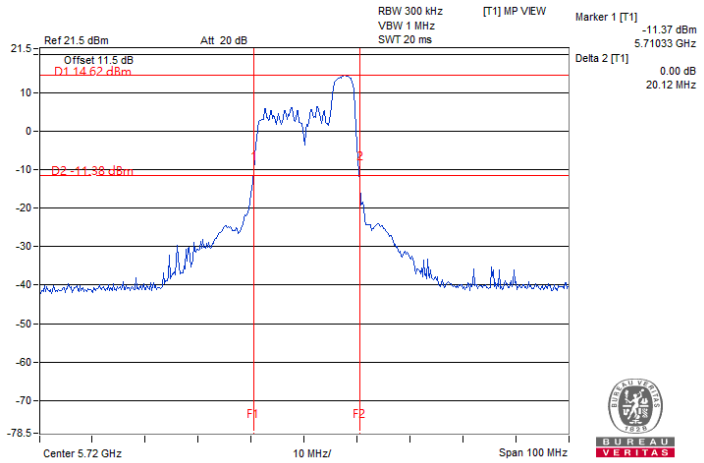
802.11ax (HE40) : CH 142 (U-NII-3)



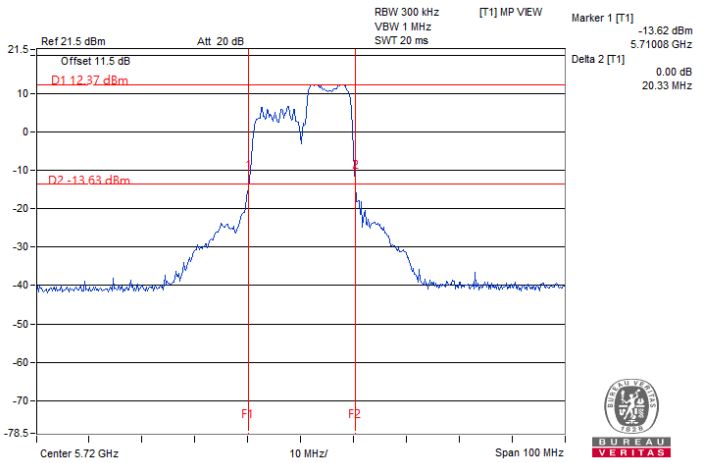
802.11ax (HE80) : CH 138 (U-NII-3)



20 MHz Preamble 802.11ax (RU26) : CH 144 (U-NII-3)



20 MHz Preamble 802.11ax (RU52) : CH 144 (U-NII-3)



20 MHz Preamble 802.11ax (RU106) : CH 144 (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 A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

802.11a

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	41.687	16.20	24	Pass
40	5200	43.853	16.42	24	Pass
48	5240	41.21	16.15	24	Pass
52	5260	41.115	16.14	24	Pass
60	5300	43.351	16.37	24	Pass
64	5320	41.591	16.19	24	Pass
100	5500	40.832	16.11	24	Pass
116	5580	40.644	16.09	24	Pass
140	5700	42.855	16.32	24	Pass
*144 (U-NII-2C)	5720	32.584	15.13	22.76	Pass
*144 (U-NII-3)	5720	8.091	9.08	30	Pass
149	5745	42.855	16.32	30	Pass
157	5785	40.832	16.11	30	Pass
165	5825	41.02	16.13	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	40.738	16.10	24	Pass
40	5200	40.365	16.06	24	Pass
48	5240	40.458	16.07	24	Pass
52	5260	42.267	16.26	24	Pass
60	5300	43.752	16.41	24	Pass
64	5320	41.21	16.15	24	Pass
100	5500	42.855	16.32	24	Pass
116	5580	41.976	16.23	24	Pass
140	5700	40.738	16.10	24	Pass
*144 (U-NII-2C)	5720	34.435	15.37	22.86	Pass
*144 (U-NII-3)	5720	10.023	10.01	30	Pass
149	5745	43.551	16.39	30	Pass
157	5785	40.458	16.07	30	Pass
165	5825	43.251	16.36	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT40)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
38	5190	27.29	14.36	24	Pass
46	5230	31.696	15.01	24	Pass
54	5270	31.842	15.03	24	Pass
62	5310	26.363	14.21	24	Pass
102	5510	26.792	14.28	24	Pass
110	5550	34.754	15.41	24	Pass
134	5670	34.834	15.42	24	Pass
*142 (U-NII-2C)	5710	23.966	13.80	24	Pass
*142 (U-NII-3)	5710	2.562	4.09	30	Pass
151	5755	32.211	15.08	30	Pass
159	5795	32.509	15.12	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
42	5210	21.184	13.26	24	Pass
58	5290	21.38	13.30	24	Pass
106	5530	15.453	11.89	24	Pass
122	5610	33.189	15.21	24	Pass
*138 (U-NII-2C)	5690	21.094	13.24	24	Pass
*138 (U-NII-3)	5690	1.089	0.37	30	Pass
155	5775	31.769	15.02	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	41.783	16.21	24	Pass
40	5200	41.687	16.20	24	Pass
48	5240	41.305	16.16	24	Pass
52	5260	43.053	16.34	24	Pass
60	5300	44.361	16.47	24	Pass
64	5320	41.976	16.23	24	Pass
100	5500	43.752	16.41	24	Pass
116	5580	42.855	16.32	24	Pass
140	5700	41.687	16.20	24	Pass
*144 (U-NII-2C)	5720	34.435	15.37	22.86	Pass
*144 (U-NII-3)	5720	10.023	10.01	30	Pass
149	5745	44.259	16.46	30	Pass
157	5785	41.305	16.16	30	Pass
165	5825	44.157	16.45	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
38	5190	27.99	14.47	24	Pass
46	5230	32.359	15.10	24	Pass
54	5270	32.81	15.16	24	Pass
62	5310	26.73	14.27	24	Pass
102	5510	27.29	14.36	24	Pass
110	5550	35.156	15.46	24	Pass
134	5670	35.237	15.47	24	Pass
*142 (U-NII-2C)	5710	23.966	13.80	24	Pass
*142 (U-NII-3)	5710	2.562	4.09	30	Pass
151	5755	33.037	15.19	30	Pass
159	5795	32.961	15.18	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
42	5210	21.727	13.37	24	Pass
58	5290	21.827	13.39	24	Pass
106	5530	15.704	11.96	24	Pass
122	5610	33.574	15.26	24	Pass
*138 (U-NII-2C)	5690	21.094	13.24	24	Pass
*138 (U-NII-3)	5690	1.089	0.37	30	Pass
155	5775	32.584	15.13	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-2A and use spectrum analyzer test , the duty factor was included in the total power.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

20 MHz Preamble 802.11ax (RU26)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	41.21	16.15	24	Pass
40	5200	41.02	16.13	24	Pass
48	5240	40.832	16.11	24	Pass
52	5260	42.462	16.28	23.91	Pass
60	5300	43.652	16.40	23.71	Pass
64	5320	41.21	16.15	23.93	Pass
100	5500	42.855	16.32	23.9	Pass
116	5580	42.462	16.28	23.7	Pass
140	5700	41.02	16.13	23.96	Pass
*144 (U-NII-2C)	5720	0.008531	-20.69	22.61	Pass
*144 (U-NII-3)	5720	9.484	9.77	30	Pass
149	5745	43.251	16.36	30	Pass
157	5785	40.738	16.10	30	Pass
165	5825	43.351	16.37	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

20 MHz Preamble 802.11ax (RU52)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	40.272	16.05	24	Pass
40	5200	40.832	16.11	24	Pass
48	5240	40.179	16.04	24	Pass
52	5260	41.879	16.22	23.93	Pass
60	5300	43.251	16.36	23.75	Pass
64	5320	40.738	16.10	24	Pass
100	5500	41.879	16.22	23.94	Pass
116	5580	41.591	16.19	23.76	Pass
140	5700	40.644	16.09	24	Pass
*144 (U-NII-2C)	5720	0.04624	-13.35	22.66	Pass
*144 (U-NII-3)	5720	21.232	13.27	30	Pass
149	5745	42.954	16.33	30	Pass
157	5785	40.551	16.08	30	Pass
165	5825	43.251	16.36	30	Pass

Notes:

1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

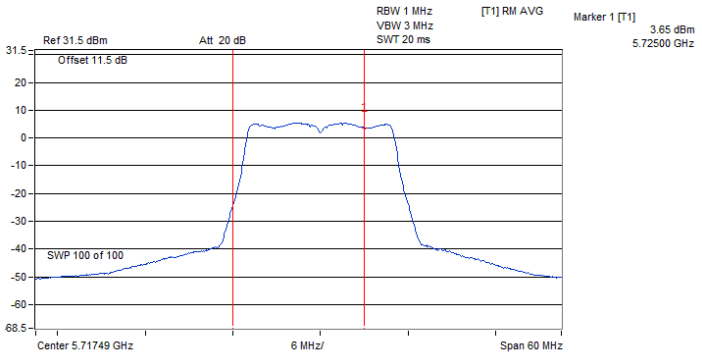
20 MHz Preamble 802.11ax (RU106)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Power Limit (dBm)	Test Result
36	5180	40.458	16.07	24	Pass
40	5200	40.365	16.06	24	Pass
48	5240	40.087	16.03	24	Pass
52	5260	41.783	16.21	24	Pass
60	5300	42.658	16.30	24	Pass
64	5320	41.4	16.17	24	Pass
100	5500	42.658	16.30	24	Pass
116	5580	41.976	16.23	24	Pass
140	5700	41.115	16.14	24	Pass
*144 (U-NII-2C)	5720	16.444	12.16	22.73	Pass
*144 (U-NII-3)	5720	15.56	11.92	30	Pass
149	5745	41.783	16.21	30	Pass
157	5785	40.551	16.08	30	Pass
165	5825	42.364	16.27	30	Pass

Notes:

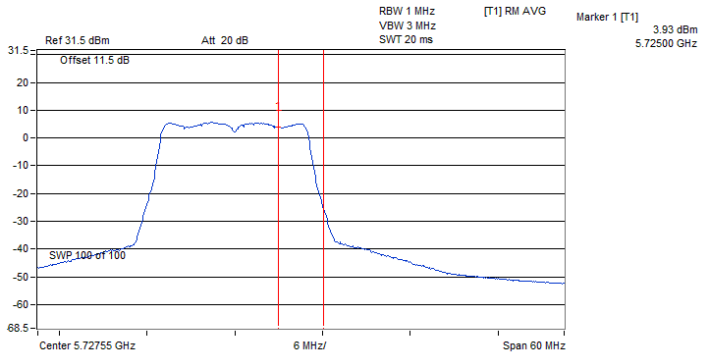
1. * : Test was performed in accordance with measurement follow FCC KDB 789033 UNII test procedure Method SA-1 and use spectrum analyzer test.
2. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the output power limit shall not be reduced.
3. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the output power limit shall not be reduced.
4. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the output power limit shall not be reduced.
5. For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the output power limit shall not be reduced.

Spectrum Plot for channel straddling



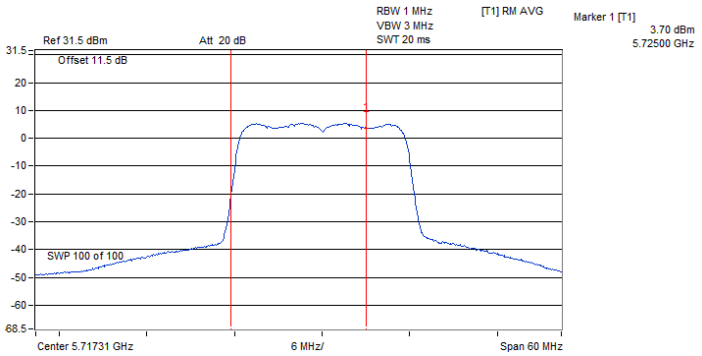
TX Channel Bandwidth 15.01 MHz Power 15.13 dBm

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



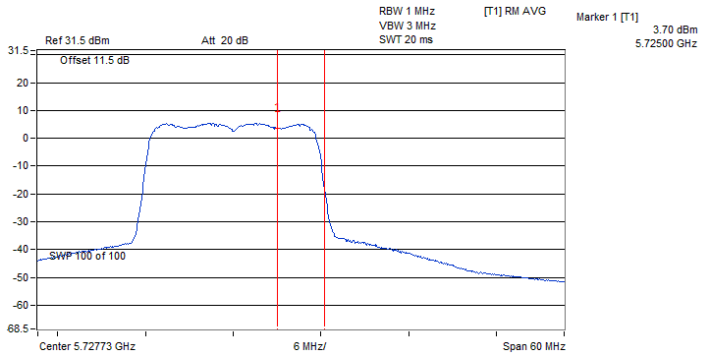
TX Channel Bandwidth 5.11 MHz Power 9.08 dBm

802.11a : CH 144 (U-NII-3)



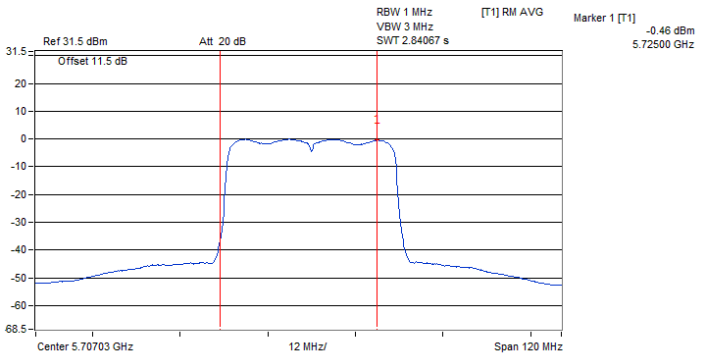
TX Channel Bandwidth 15.38 MHz Power 15.37 dBm

802.11ac (VHT20) : CH 144 (U-NII-2C)



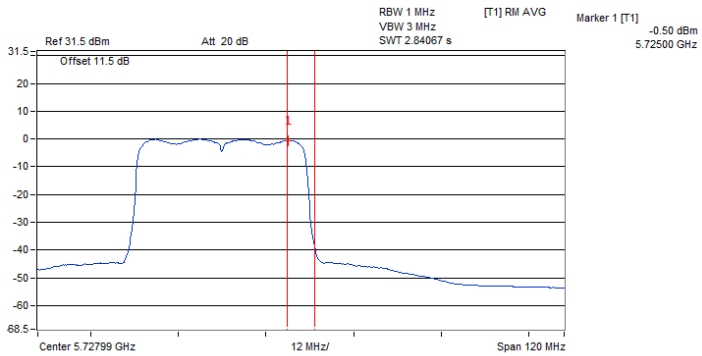
TX Channel Bandwidth 5.47 MHz Power 10.01 dBm

802.11ac (VHT20) : CH 144 (U-NII-3)



TX Channel Bandwidth 35.94 MHz Power 13.64 dBm

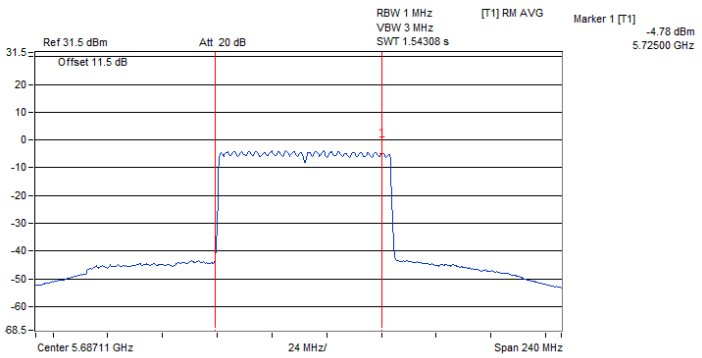
802.11ac (VHT40) : CH 142 (U-NII-2C)



TX Channel Bandwidth 5.99 MHz Power 3.93 dBm

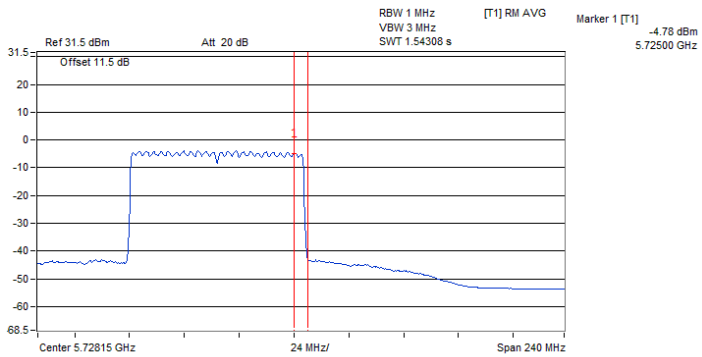
802.11ac (VHT40) : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



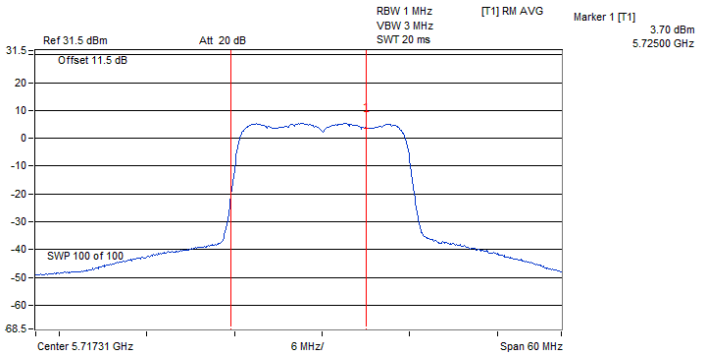
TX Channel Bandwidth 75.78 MHz Power 13.01 dBm

802.11ac (VHT80) : CH 138 (U-NII-2C)



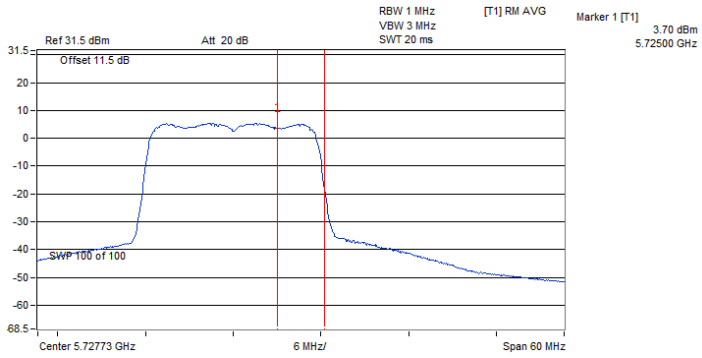
TX Channel Bandwidth 6.3 MHz Power 0.14 dBm

802.11ac (VHT80) : CH 138 (U-NII-3)



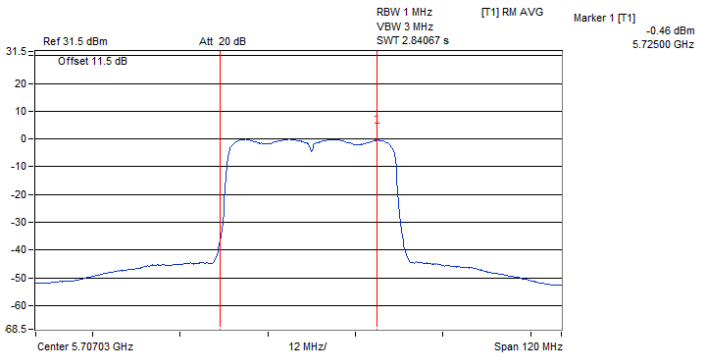
TX Channel Bandwidth 15.38 MHz Power 15.37 dBm

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



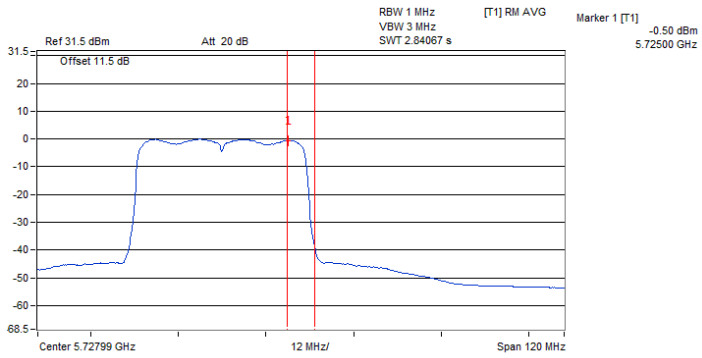
TX Channel Bandwidth 5.47 MHz Power 10.01 dBm

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



TX Channel Bandwidth 35.94 MHz Power 13.64 dBm

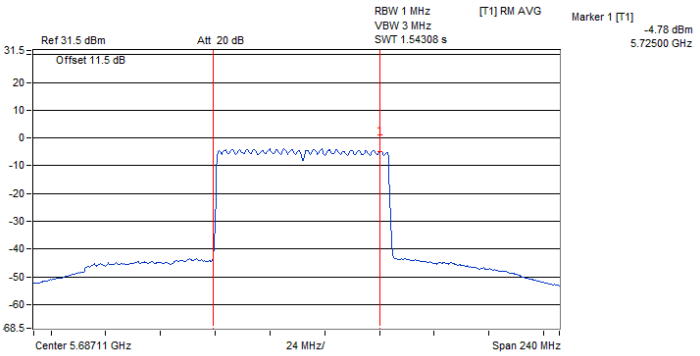
802.11ax (HE40) : CH 142 (U-NII-2C)



TX Channel Bandwidth 5.99 MHz Power 3.93 dBm

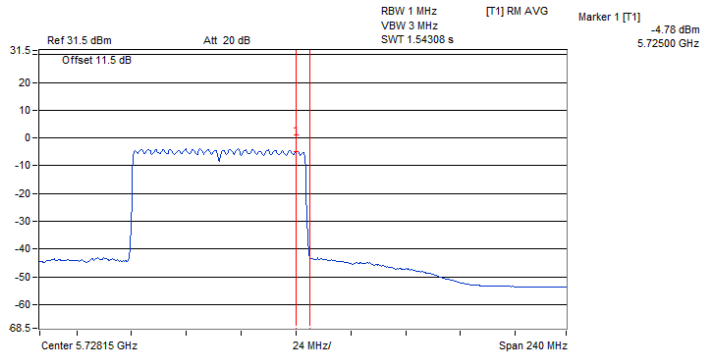
802.11ax (HE40) : CH 142 (U-NII-3)

Spectrum Plot for channel straddling



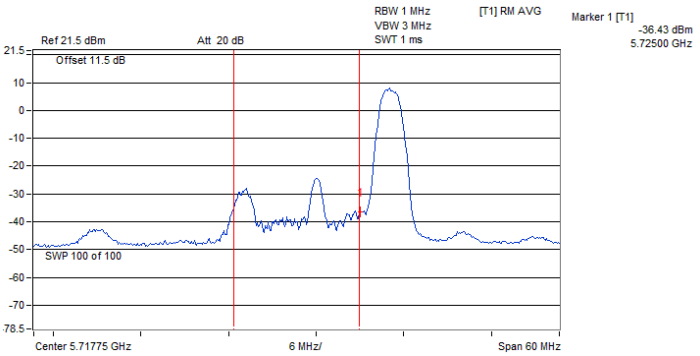
TX Channel Bandwidth 75.78 MHz Power 13.01 dBm

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



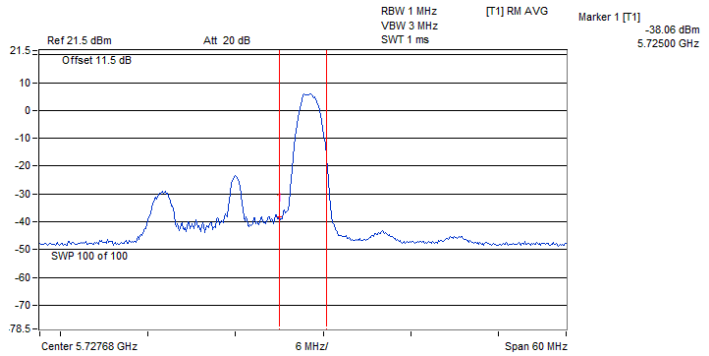
TX Channel Bandwidth 6.3 MHz Power 0.14 dBm

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



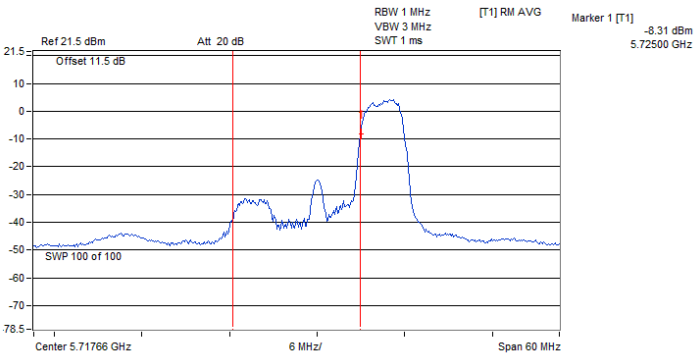
TX Channel Bandwidth 14.49 MHz Power -20.69 dBm

20 MHz Preamble 802.11ax (RU26) : CH 144 (U-NII-2C)



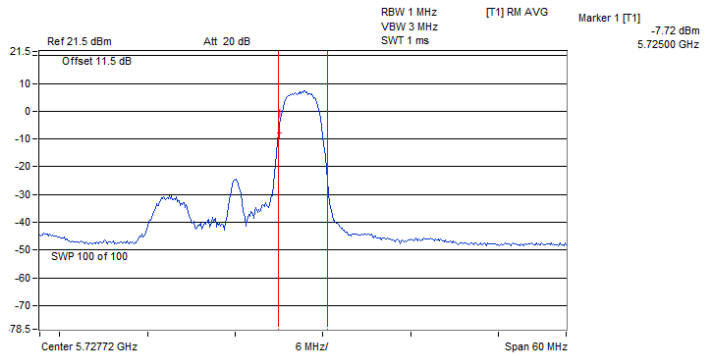
TX Channel Bandwidth 5.36 MHz Power 9.77 dBm

20 MHz Preamble 802.11ax (RU26) : CH 144 (U-NII-3)



TX Channel Bandwidth 14.67 MHz Power -13.35 dBm

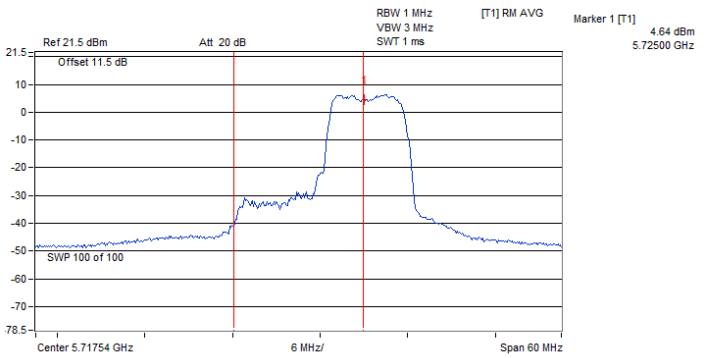
20 MHz Preamble 802.11ax (RU52) : CH 144 (U-NII-2C)



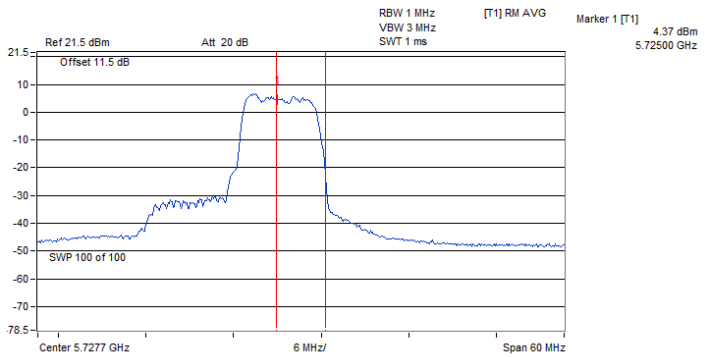
TX Channel Bandwidth 5.45 MHz Power 13.27 dBm

20 MHz Preamble 802.11ax (RU52) : CH 144 (U-NII-3)

Spectrum Plot for channel straddling



20 MHz Preamble 802.11ax (RU106) : CH 144 (U-NII-2C)



20 MHz Preamble 802.11ax (RU106) : CH 144 (U-NII-3)

7.3 Power Spectral Density

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	3.15	11.00	Pass
40	5200	3.41	11.00	Pass
48	5240	3.14	11.00	Pass
52	5260	3.05	11.00	Pass
60	5300	3.39	11.00	Pass
64	5320	3.14	11.00	Pass
100	5500	3.05	11.00	Pass
116	5580	3.01	11.00	Pass
140	5700	3.30	11.00	Pass
144 (U-NII-2C)	5720	3.22	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	3.22	11.00	Pass
40	5200	3.15	11.00	Pass
48	5240	3.10	11.00	Pass
52	5260	3.30	11.00	Pass
60	5300	3.50	11.00	Pass
64	5320	3.16	11.00	Pass
100	5500	3.42	11.00	Pass
116	5580	3.34	11.00	Pass
140	5700	3.19	11.00	Pass
144 (U-NII-2C)	5720	3.42	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
38	5190	-1.60	0.16	-1.44	11.00	Pass
46	5230	-0.91	0.16	-0.75	11.00	Pass
54	5270	-0.85	0.16	-0.69	11.00	Pass
62	5310	-1.81	0.16	-1.65	11.00	Pass
102	5510	-1.73	0.16	-1.57	11.00	Pass
110	5550	-0.59	0.16	-0.43	11.00	Pass
134	5670	-0.64	0.16	-0.48	11.00	Pass
142 (U-NII-2C)	5710	-1.85	0.16	-1.69	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
42	5210	-5.76	0.23	-5.53	11.00	Pass
58	5290	-5.72	0.23	-5.49	11.00	Pass
106	5530	-7.15	0.23	-6.92	11.00	Pass
122	5610	-3.83	0.23	-3.60	11.00	Pass
138 (U-NII-2C)	5690	-5.73	0.23	-5.50	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

20 MHz Preamble 802.11ax (RU26)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	10.65	11.00	Pass
40	5200	10.52	11.00	Pass
48	5240	10.47	11.00	Pass
52	5260	10.72	11.00	Pass
60	5300	10.87	11.00	Pass
64	5320	10.51	11.00	Pass
100	5500	10.80	11.00	Pass
116	5580	10.79	11.00	Pass
140	5700	10.63	11.00	Pass
144 (U-NII-2C)	5720	-18.13	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

20 MHz Preamble 802.11ax (RU52)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	8.08	11.00	Pass
40	5200	8.00	11.00	Pass
48	5240	7.94	11.00	Pass
52	5260	8.12	11.00	Pass
60	5300	8.52	11.00	Pass
64	5320	8.12	11.00	Pass
100	5500	8.39	11.00	Pass
116	5580	8.30	11.00	Pass
140	5700	8.19	11.00	Pass
144 (U-NII-2C)	5720	-3.78	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

20 MHz Preamble 802.11ax (RU106)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)	Max. PSD Limit (dBm/MHz)	Test Result
36	5180	5.66	11.00	Pass
40	5200	5.63	11.00	Pass
48	5240	5.48	11.00	Pass
52	5260	5.82	11.00	Pass
60	5300	5.90	11.00	Pass
64	5320	5.64	11.00	Pass
100	5500	5.92	11.00	Pass
116	5580	5.80	11.00	Pass
140	5700	5.60	11.00	Pass
144 (U-NII-2C)	5720	5.82	11.00	Pass

Notes:

1. For U-NII-1, the antenna gain is 3.15 dBi < 6 dBi, so the power density limit shall not be reduced.
2. For U-NII-2A, the antenna gain is 2.75 dBi < 6 dBi, so the power density limit shall not be reduced.
3. For U-NII-2C, the antenna gain is 4.25 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
144 (U-NII-3)	5720	-4.52	-2.30	30	Pass
149	5745	-3.97	-1.75	30	Pass
157	5785	-4.14	-1.92	30	Pass
165	5825	-4.12	-1.90	30	Pass

Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
144 (U-NII-3)	5720	-4.77	-2.55	30	Pass
149	5745	-4.59	-2.37	30	Pass
157	5785	-4.98	-2.76	30	Pass
165	5825	-4.62	-2.40	30	Pass

Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)	Duty Factor (dB)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
142 (U-NII-3)	5710	-10.84	0.16	-8.46	30	Pass
151	5755	-9.31	0.16	-6.93	30	Pass
159	5795	-9	0.16	-6.62	30	Pass

Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/300kHz)	Duty Factor (dB)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
138 (U-NII-3)	5690	-14.65	0.23	-12.20	30	Pass
155	5775	-12.87	0.23	-10.42	30	Pass

Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

20 MHz Preamble 802.11ax (RU26)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
144 (U-NII-3)	5720	2.71	4.93	30	Pass
149	5745	2.45	4.67	30	Pass
157	5785	2.41	4.63	30	Pass
165	5825	2.35	4.57	30	Pass

Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

20 MHz Preamble 802.11ax (RU52)

Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
144 (U-NII-3)	5720	-0.05	2.17	30	Pass
149	5745	-0.2	2.02	30	Pass
157	5785	-0.4	1.82	30	Pass
165	5825	-0.34	1.88	30	Pass

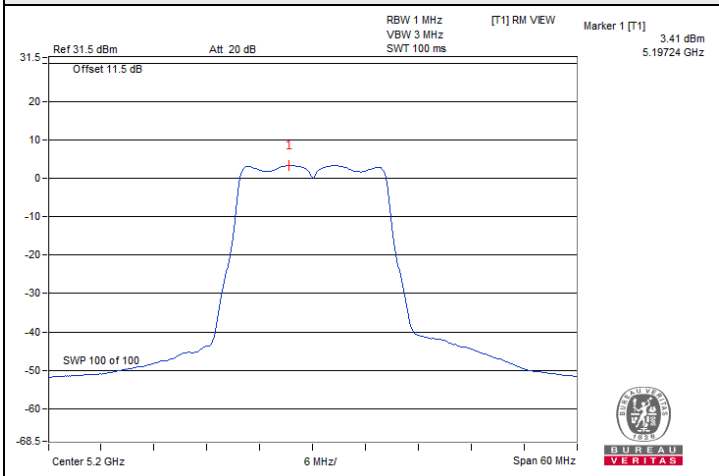
Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

20 MHz Preamble 802.11ax (RU106)

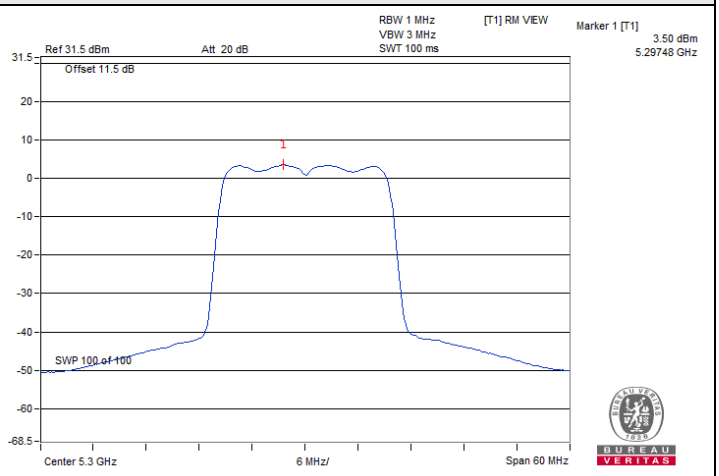
Chan.	Chan. Freq. (MHz)	PSD (dBm/300kHz)	PSD (dBm/500kHz)	PSD Limit (dBm/500kHz)	Test Result
144 (U-NII-3)	5720	-2.55	-0.33	30	Pass
149	5745	-2.34	-0.12	30	Pass
157	5785	-2.53	-0.31	30	Pass
165	5825	-2.49	-0.27	30	Pass

Note: For U-NII-3, the antenna gain is 3.85 dBi < 6 dBi, so the power density limit shall not be reduced.

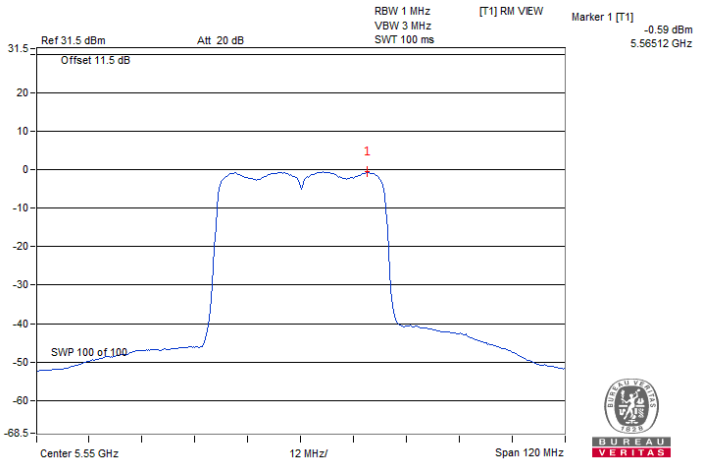
Spectrum Plot of Maximum Value



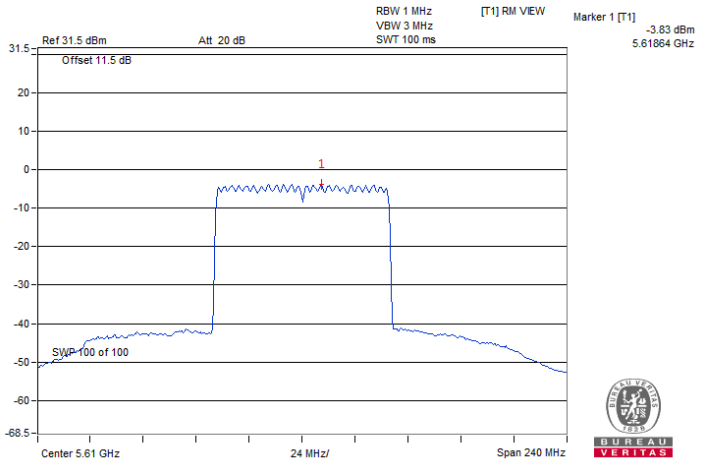
802.11a : CH 40



802.11ax (HE20) : CH 60

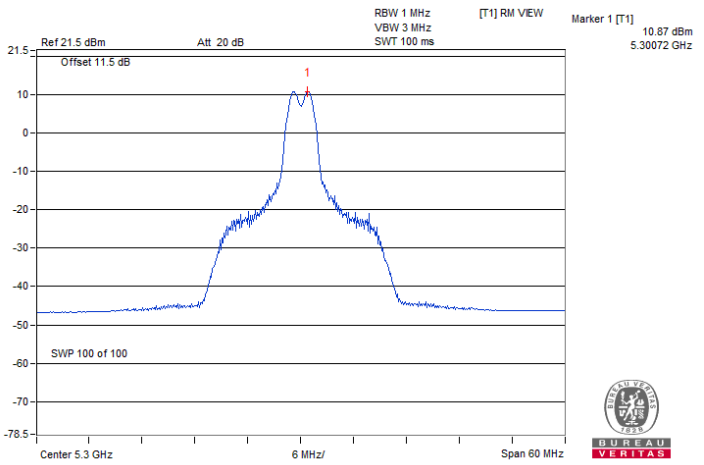


802.11ax (HE40) : CH 110

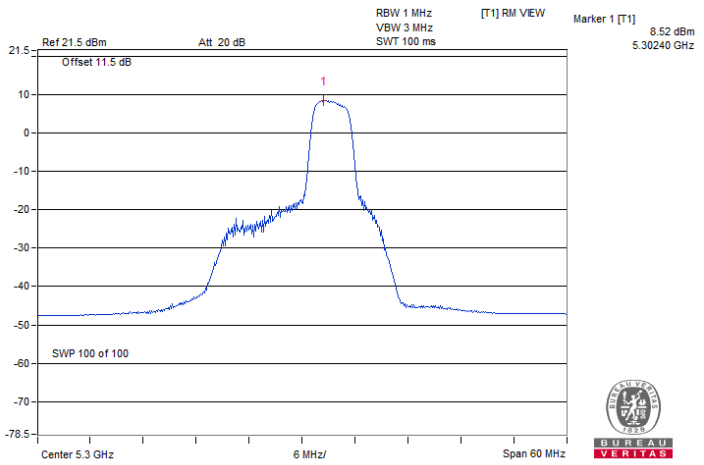


802.11ax (HE80) : CH 122

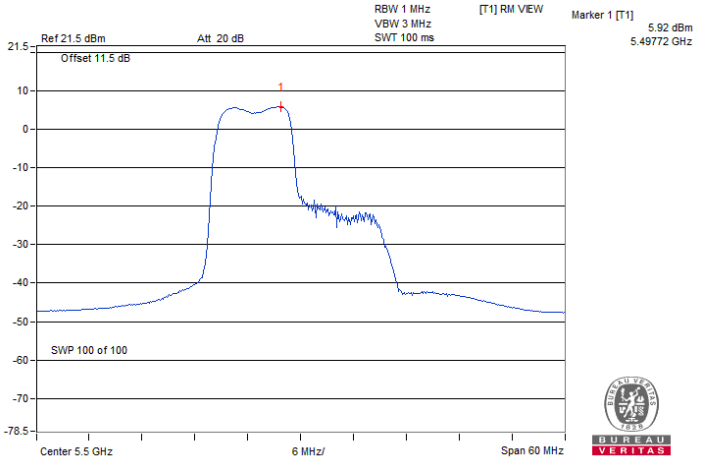
Spectrum Plot of Maximum Value



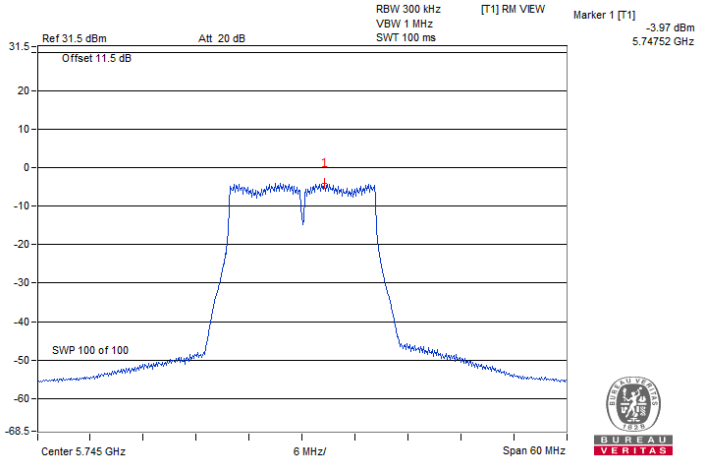
20 MHz Preamble 802.11ax (RU26) : CH 60



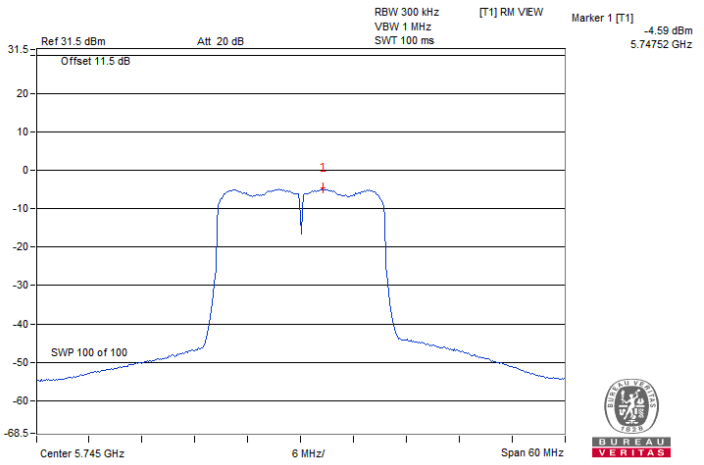
20 MHz Preamble 802.11ax (RU52) : CH 60



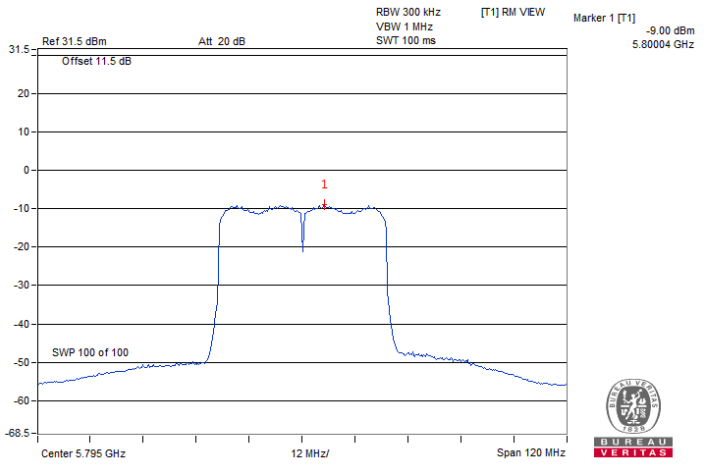
20 MHz Preamble 802.11ax (RU106) : CH 100



802.11a : CH 149

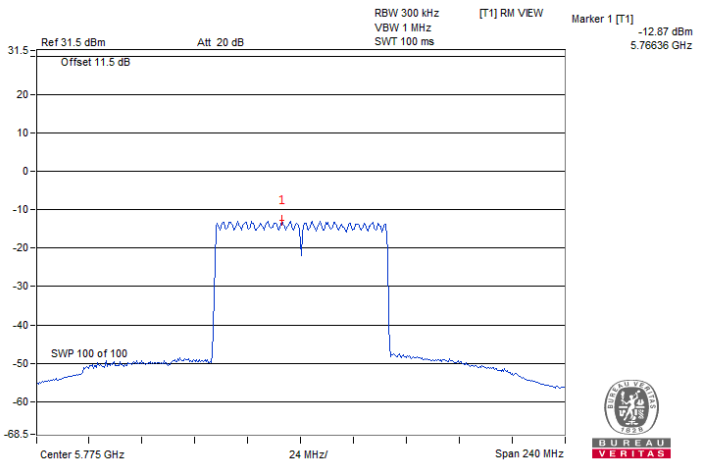


802.11ax (HE20) : CH 149

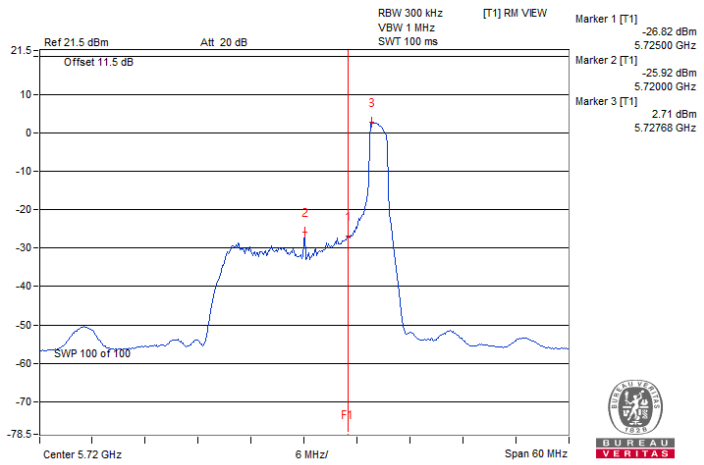


802.11ax (HE40) : CH 159

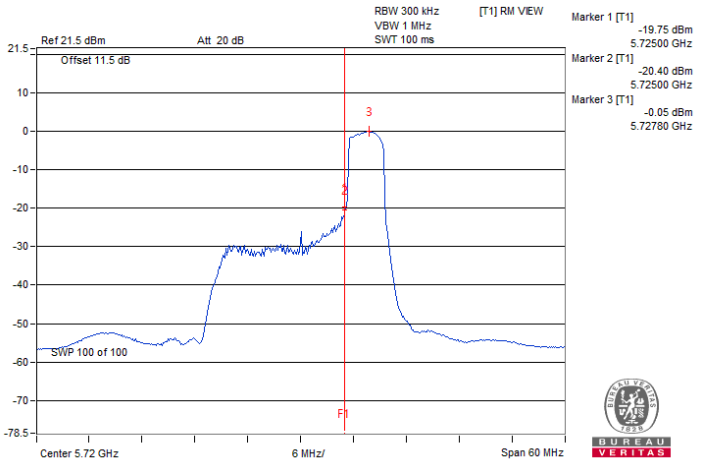
Spectrum Plot of Maximum Value



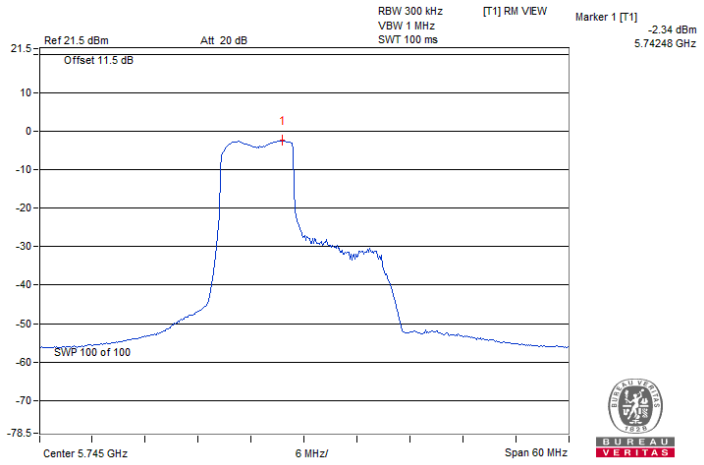
802.11ax (HE80) : CH 155



20 MHz Preamble 802.11ax (RU26) : CH 144 (U-NII-3)



20 MHz Preamble 802.11ax (RU52) : CH 144 (U-NII-3)



20 MHz Preamble 802.11ax (RU106) : CH 149

7.4 6 dB Bandwidth

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
144 (U-NII-3)	5720	3.21	0.5	Pass
149	5745	16.4	0.5	Pass
157	5785	16.37	0.5	Pass
165	5825	16.41	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
144 (U-NII-3)	5720	4.26	0.5	Pass
149	5745	18.42	0.5	Pass
157	5785	18.41	0.5	Pass
165	5825	18.25	0.5	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
142 (U-NII-3)	5710	3.6	0.5	Pass
151	5755	37.03	0.5	Pass
159	5795	37.13	0.5	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
138 (U-NII-3)	5690	4.11	0.5	Pass
155	5775	78.12	0.5	Pass

20 MHz Preamble 802.11ax (RU26)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
144 (U-NII-3)	5720	4.45	0.5	Pass
149	5745	2.03	0.5	Pass
157	5785	2.71	0.5	Pass
165	5825	2.03	0.5	Pass

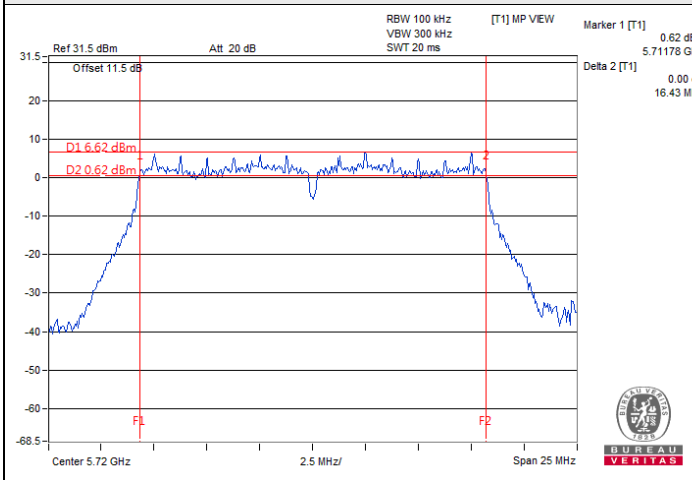
20 MHz Preamble 802.11ax (RU52)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
144 (U-NII-3)	5720	4.46	0.5	Pass
149	5745	17.03	0.5	Pass
157	5785	15.09	0.5	Pass
165	5825	17	0.5	Pass

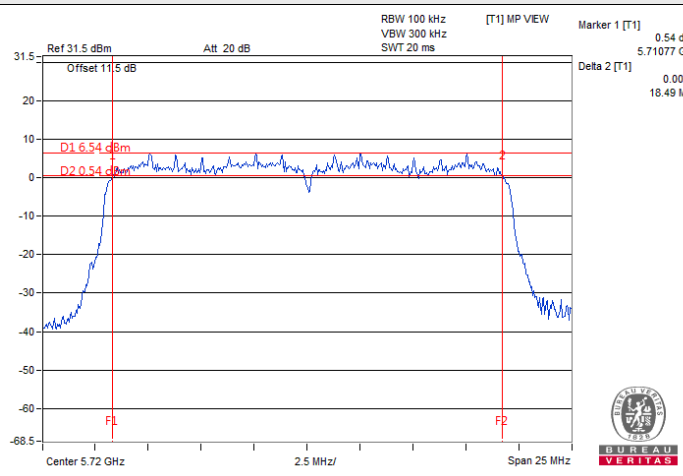
20 MHz Preamble 802.11ax (RU106)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Test Result
144 (U-NII-3)	5720	4.45	0.5	Pass
149	5745	17.08	0.5	Pass
157	5785	17.11	0.5	Pass
165	5825	17.09	0.5	Pass

Spectrum Plot of Minimum Value

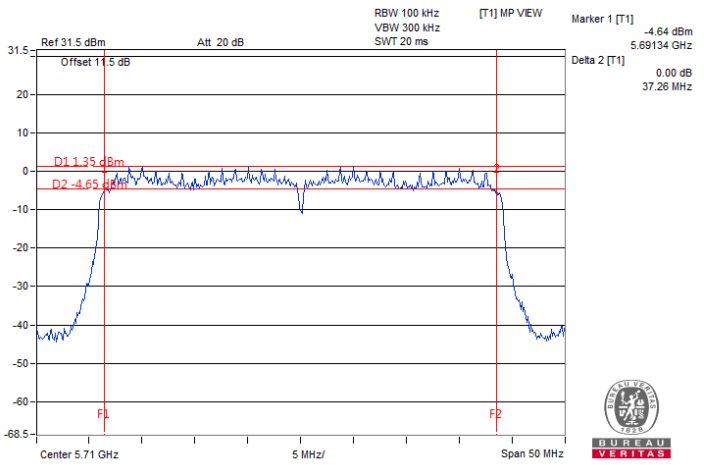


802.11a : CH 144 (U-NII-3)

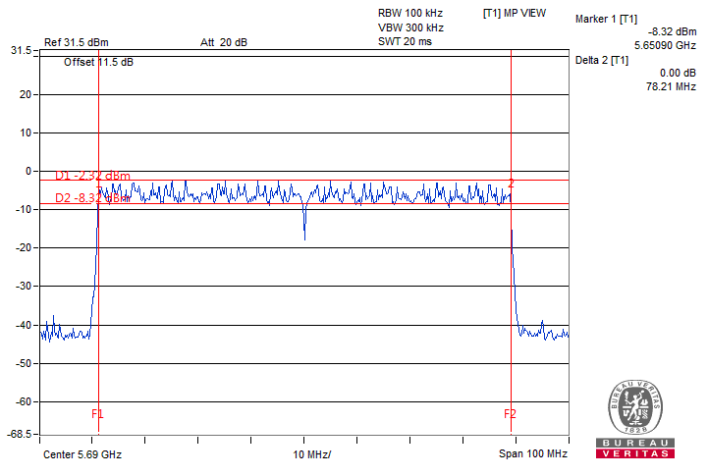


802.11ax (HE20) : CH 144 (U-NII-3)

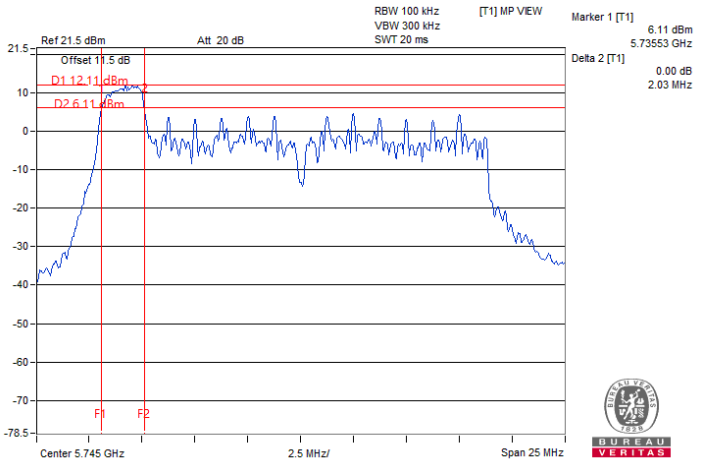
Spectrum Plot of Minimum Value



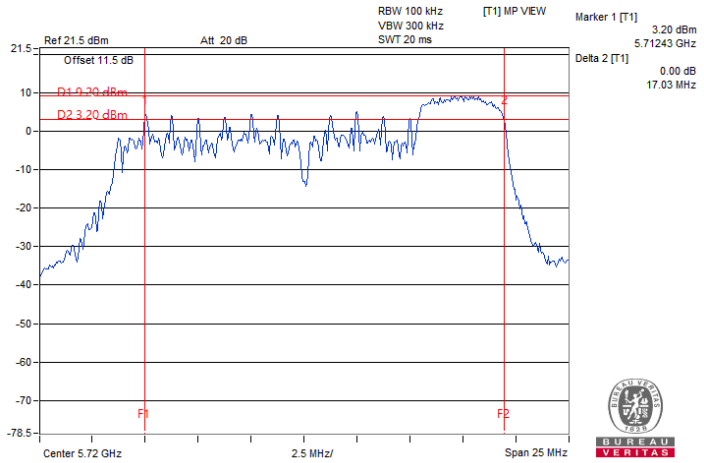
802.11ax (HE40) : CH 142 (U-NII-3)



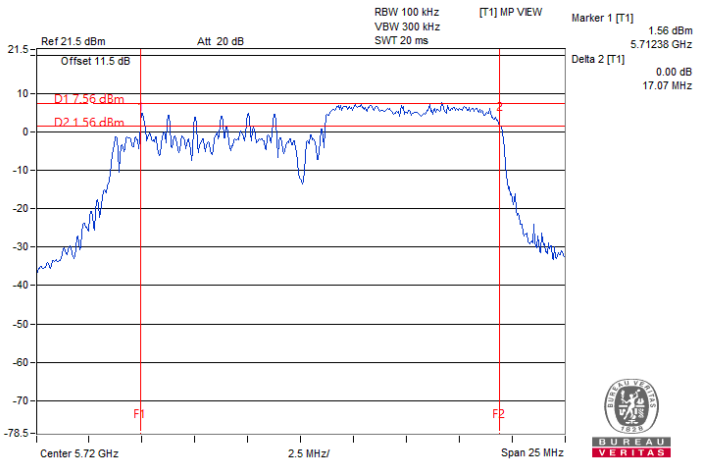
802.11ax (HE80) : CH 138 (U-NII-3)



20 MHz Preamble 802.11ax (RU26) : CH 149



20 MHz Preamble 802.11ax (RU52) : CH 144 (U-NII-3)



20 MHz Preamble 802.11ax (RU106) : CH 144 (U-NII-3)

Notes:

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

7.5 Occupied Bandwidth

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	16.8
40	5200	16.8
48	5240	16.68
52	5260	16.68
60	5300	16.68
64	5320	16.68
100	5500	16.68
116	5580	16.68
140	5700	16.8
144 (U-NII-2C)	5720	13.4
144 (U-NII-3)	5720	3.28
149	5745	16.74
157	5785	16.68
165	5825	16.8

802.11ax (HE20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	18.84
40	5200	18.84
48	5240	18.72
52	5260	18.84
60	5300	18.84
64	5320	18.72
100	5500	18.84
116	5580	18.84
140	5700	18.96
144 (U-NII-2C)	5720	14.48
144 (U-NII-3)	5720	4.36
149	5745	18.75
157	5785	18.84
165	5825	18.84

802.11ax (HE40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	37.92
46	5230	37.68
54	5270	37.92
62	5310	37.68
102	5510	37.92
110	5550	37.92
134	5670	37.92
142 (U-NII-2C)	5710	33.96
142 (U-NII-3)	5710	3.96
151	5755	38.08
159	5795	37.92

802.11ax (HE80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	77.28
58	5290	77.28
106	5530	78.24
122	5610	77.76
138 (U-NII-2C)	5690	73.88
138 (U-NII-3)	5690	3.88
155	5775	77.28

20 MHz Preamble 802.11ax (RU26)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	18.24
40	5200	17.04
48	5240	18.36
52	5260	18.24
60	5300	17.16
64	5320	18.36
100	5500	18.24
116	5580	17.16
140	5700	18.36
144 (U-NII-2C)	5720	13.64
144 (U-NII-3)	5720	4.72
149	5745	18.24
157	5785	17.16
165	5825	18.24

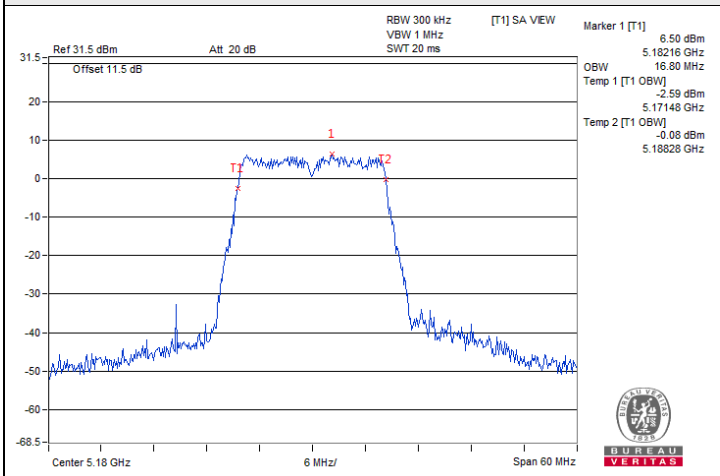
20 MHz Preamble 802.11ax (RU52)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	18.12
40	5200	17.16
48	5240	18.24
52	5260	18.12
60	5300	17.04
64	5320	18.12
100	5500	18.24
116	5580	17.16
140	5700	18.24
144 (U-NII-2C)	5720	13.64
144 (U-NII-3)	5720	4.48
149	5745	18.12
157	5785	17.16
165	5825	18

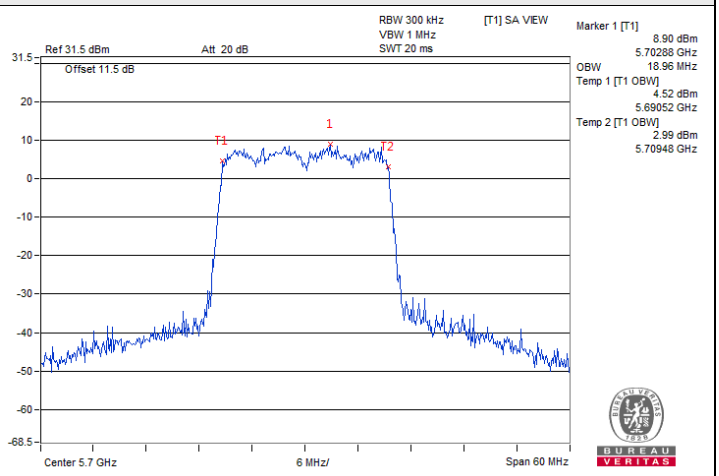
20 MHz Preamble 802.11ax (RU106)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	18.12
40	5200	17.76
48	5240	18.12
52	5260	18.12
60	5300	18.12
64	5320	18.12
100	5500	18.24
116	5580	18.12
140	5700	18.12
144 (U-NII-2C)	5720	13.64
144 (U-NII-3)	5720	4.48
149	5745	18.12
157	5785	18.12
165	5825	18.12

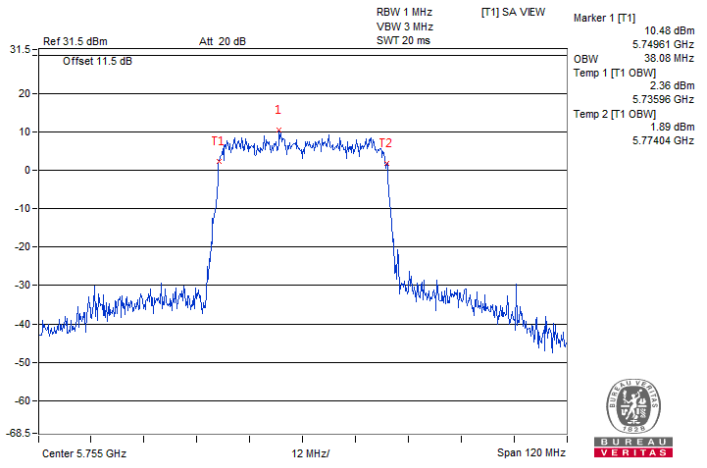
Spectrum Plot of Maximum Value



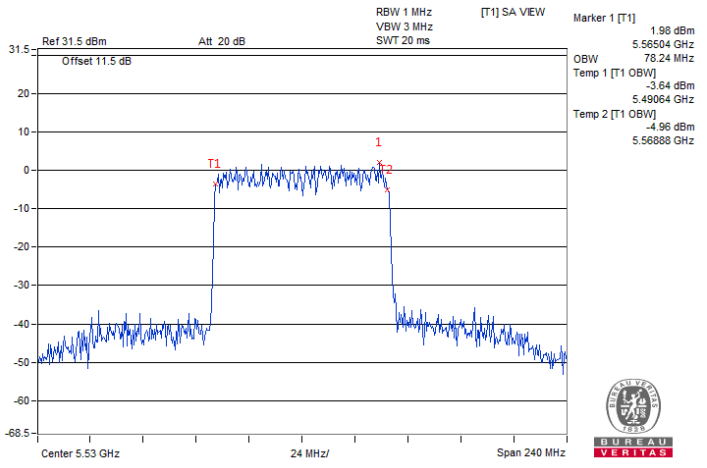
802.11a : CH 36



802.11ax (HE20) : CH 140

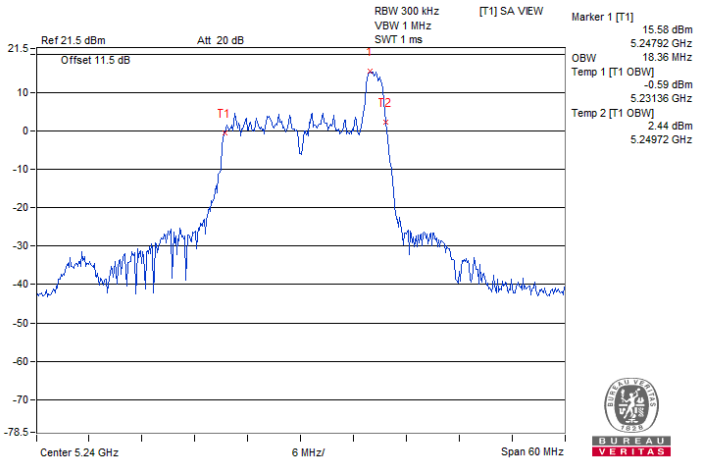


802.11ax (HE40) : CH 151

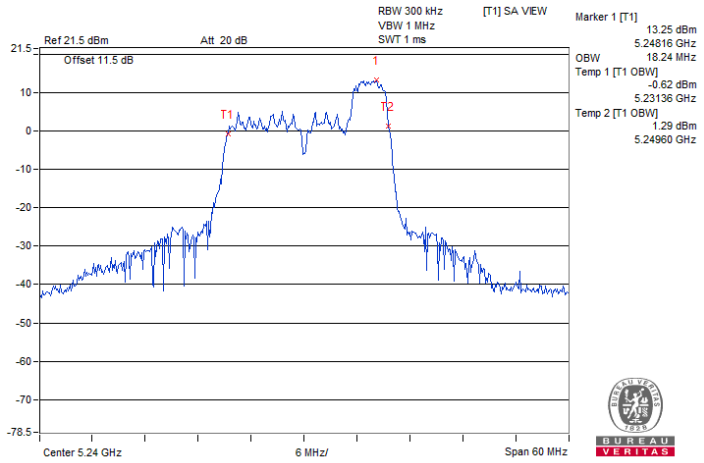


802.11ax (HE80) : CH 106

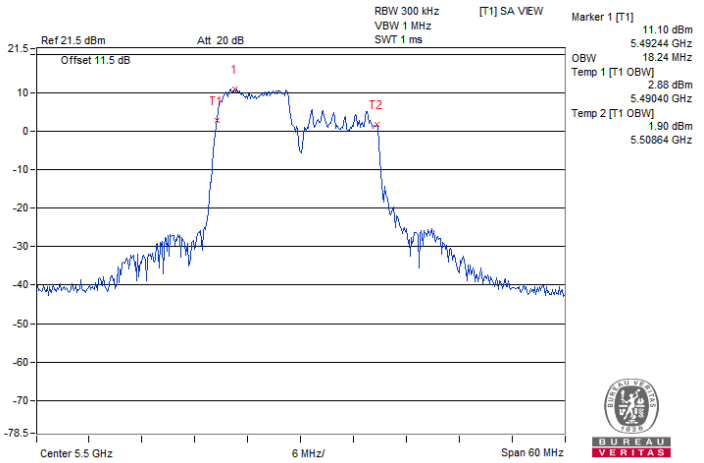
Spectrum Plot of Maximum Value



20 MHz Preamble 802.11ax (RU26) : CH 48



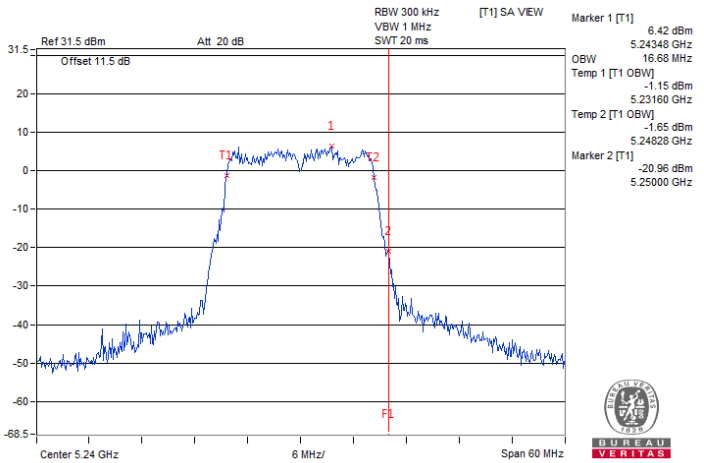
20 MHz Preamble 802.11ax (RU52) : CH 48



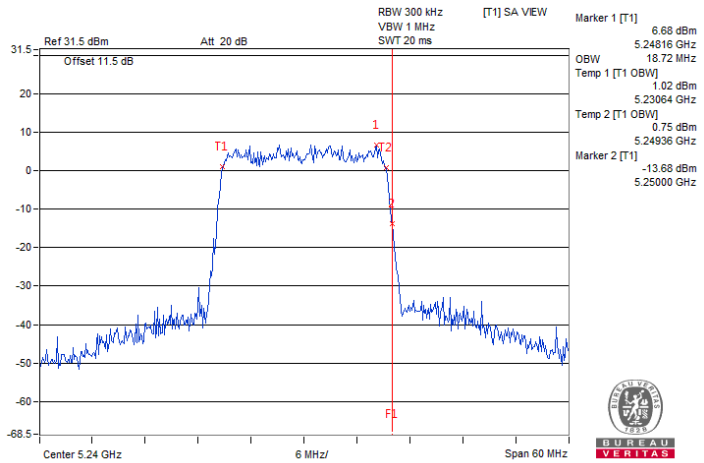
20 MHz Preamble 802.11ax (RU106) : CH 100

Spectrum Plot for nearby DFS band

(DFS is required, if 99% OCP straddle into U-NII-2A)



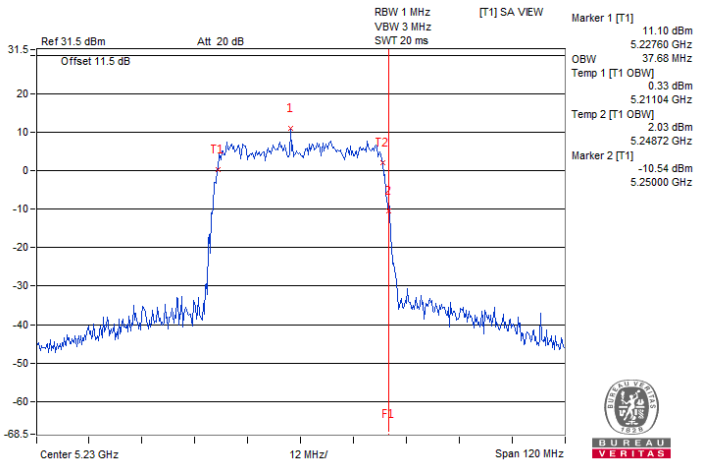
802.11a : CH 48



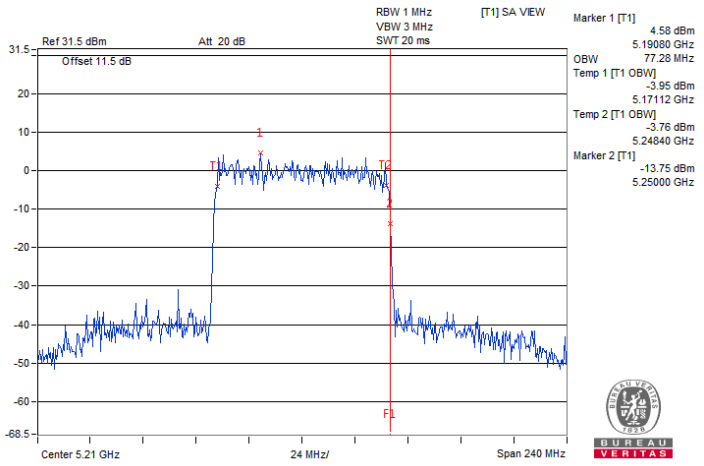
802.11ax (HE20) : CH 48

Spectrum Plot for nearby DFS band

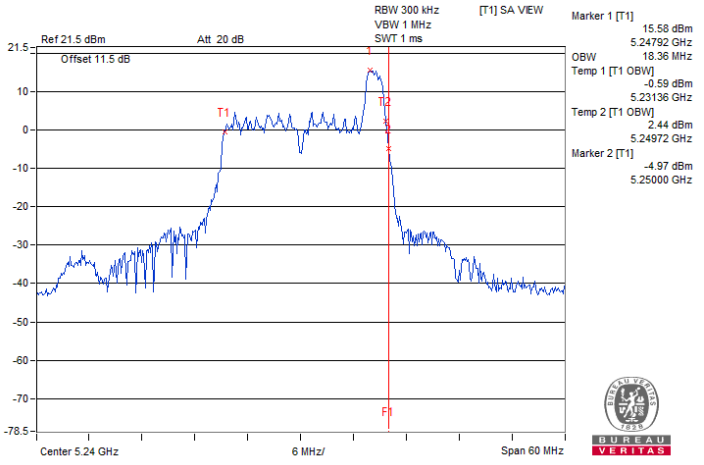
(DFS is required, if 99% OCP straddle into U-NII-2A)



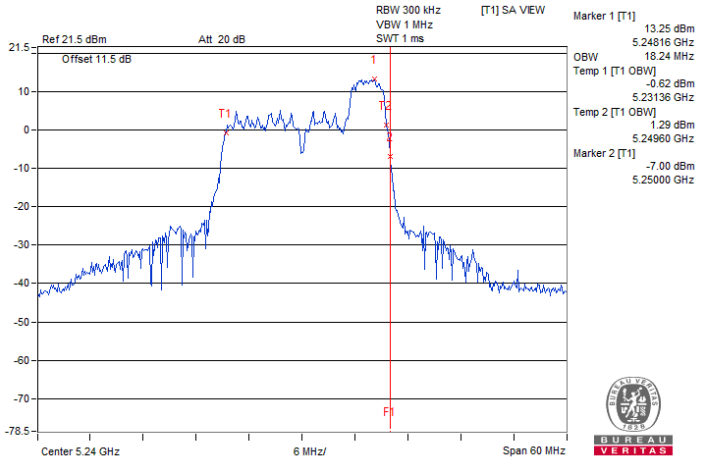
802.11ax (HE40) : CH 46



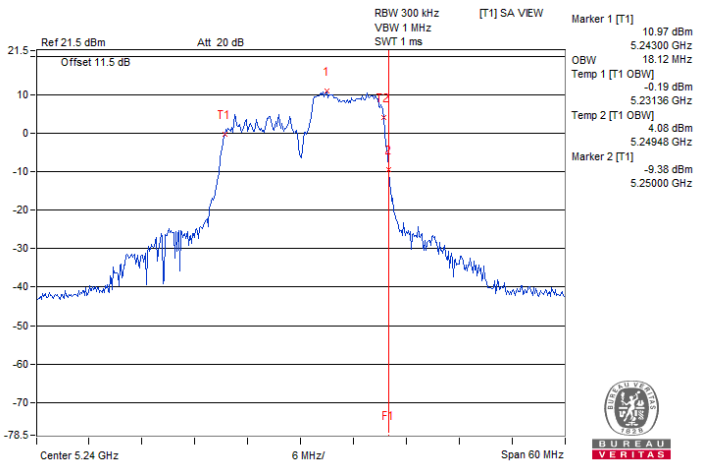
802.11ax (HE80) : CH 42



20 MHz Preamble 802.11ax (RU26) : CH 48



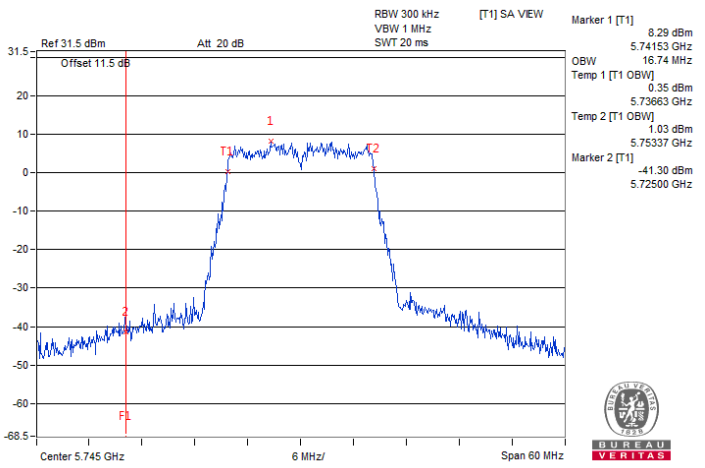
20 MHz Preamble 802.11ax (RU52) : CH 48



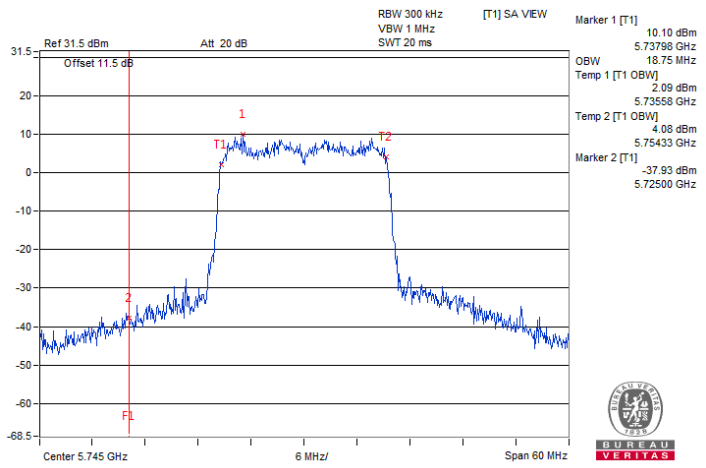
20 MHz Preamble 802.11ax (RU106) : CH 48

Spectrum Plot for nearby DFS band

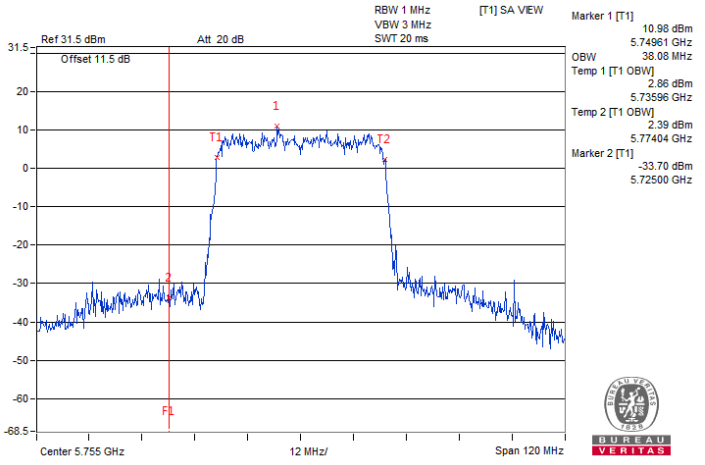
(DFS is required, if 99% OCP straddle into U-NII-2C)



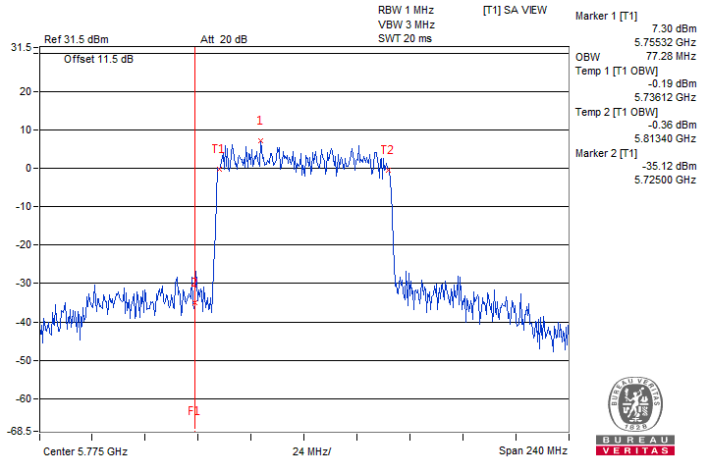
802.11a : CH 149



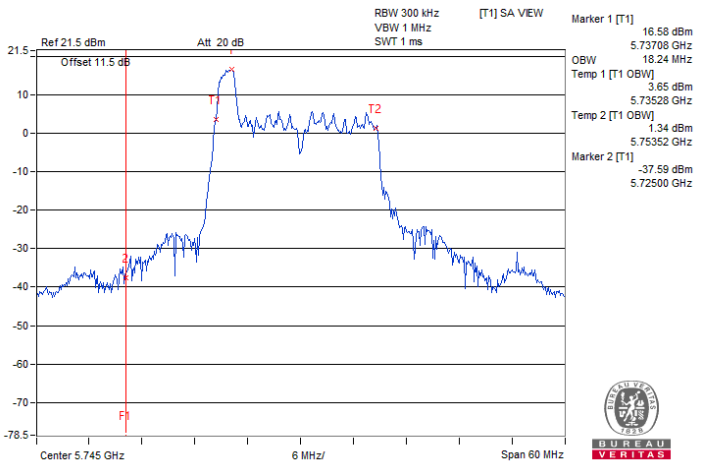
802.11ax (HE20) : CH 149



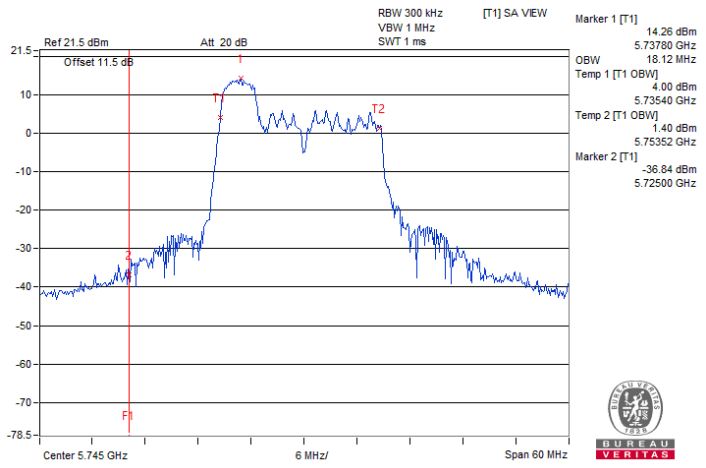
802.11ax (HE40) : CH 151



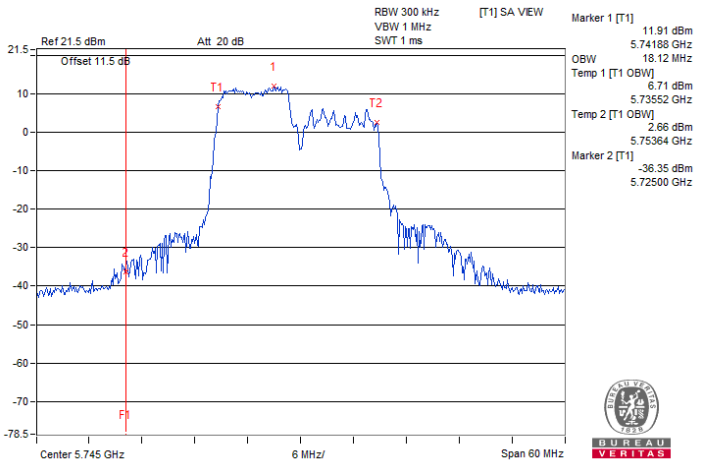
802.11ax (HE80) : CH 155



20 MHz Preamble 802.11ax (RU26) : CH 149



20 MHz Preamble 802.11ax (RU52) : CH 149

Spectrum Plot for nearby DFS band (DFS is required, if 99% OCP straddle into U-NII-2C)	
 20 MHz Preamble 802.11ax (RU106) : CH 149	

7.6 Frequency Stability

Mode A

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Jisyong Wang

802.11a

Frequency Stability Versus Temperature									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result
85	3.3	5179.9847	Pass	5179.9888	Pass	5179.9856	Pass	5179.9847	Pass
80	3.3	5180.0229	Pass	5180.024	Pass	5180.0222	Pass	5180.0222	Pass
70	3.3	5180.0187	Pass	5180.0162	Pass	5180.0184	Pass	5180.0159	Pass
60	3.3	5179.9933	Pass	5179.9899	Pass	5179.9885	Pass	5179.9889	Pass
50	3.3	5180.005	Pass	5180.0047	Pass	5180.0041	Pass	5180.0059	Pass
40	3.3	5180.0027	Pass	5179.9997	Pass	5180.0022	Pass	5180.0027	Pass
30	3.3	5180.0175	Pass	5180.0179	Pass	5180.0193	Pass	5180.0215	Pass
20	3.3	5180.0179	Pass	5180.0189	Pass	5180.0197	Pass	5180.0226	Pass
10	3.3	5179.9901	Pass	5179.9869	Pass	5179.9888	Pass	5179.9883	Pass
0	3.3	5179.9803	Pass	5179.9812	Pass	5179.9812	Pass	5179.9811	Pass
-10	3.3	5180.0245	Pass	5180.0238	Pass	5180.0245	Pass	5180.0223	Pass
-20	3.3	5180.0001	Pass	5180.0018	Pass	5180.0021	Pass	5180.0024	Pass
-30	3.3	5180.0123	Pass	5180.0138	Pass	5180.013	Pass	5180.0115	Pass
-40	3.3	5180.0139	Pass	5180.0107	Pass	5180.0136	Pass	5180.014	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minutes		5 Minutes		10 Minutes	
		Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result	Measured Frequency (MHz)	Test Result
20	3.795	5180.0082	Pass	5180.0103	Pass	5180.0116	Pass	5180.0103	Pass
	3.3	5180.0179	Pass	5180.0189	Pass	5180.0197	Pass	5180.0226	Pass
	2.805	5180.019	Pass	5180.016	Pass	5180.0159	Pass	5180.0187	Pass