

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)
Report No.: RFBBEK-WTW-P21010196S
FCC ID: J9C-QCNFA765
Product: Wi-Fi 6E BT 5.2 M.2 2230 Module
Brand: Qualcomm
Model No.: QCNFA765
Received Date: 2024/7/30
Test Date: 2024/8/12 ~ 2025/3/27
Issued Date: 2025/5/5
Applicant: Qualcomm Technologies, Inc.
Address: 5775 Morehouse Drive, San Diego, CA 92121-1714
Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories
Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration /
Designation Number: 788550 / TW0003

Approved by: _____

Jeremy Lin

Jeremy Lin / Project Engineer

, Date: _____

2025/5/5

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Prepared by : Pettie Chen / Senior Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFBBEK-WTW-P21010196S	Original release.	2025/5/5

1 Certificate

Product: Wi-Fi 6E BT 5.2 M.2 2230 Module

Brand: Qualcomm

Test Model: QCNFA765

Sample Status: Engineering sample

Applicant: Qualcomm Technologies, Inc.

Test Date: 2024/8/12 ~ 2025/3/27

Standard: 47 CFR FCC Part 15, Subpart E (Section 15.407)

Measurement Procedure: ANSI C63.10-2013

KDB 987594 D02 U-NII 6 GHz EMC Measurement v03

KDB 789033 D02 General UNII Test Procedure New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

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

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
Clause	Test Item	Result	Remark
15.407(a)(9)	Maximum RF Output Power	Pass	Meet the requirement of limit.
15.407(a)(9)	Maximum Power Spectral Density	Pass	Meet the requirement of limit.
15.407(a)(11)	Emission Bandwidth	Pass	Meet the requirement of limit.
---	Occupied Bandwidth	-	Reference only.
15.407(b)(9)	AC Power Conducted Emissions	Pass	Minimum passing margin is -13.41 dB at 0.19000 MHz
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -4.42 dB at 48.43 MHz
15.407(b)(6) 15.407(b)(10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -0.2 dB at 5925.00 MHz
15.407(b)(7)	In-Band Emission Mask	Pass	Meet the requirement of limit.
15.407(d)(6)	Contention-based Protocol	Pass	Meet the requirement of limit.
15.407(d)(10)	Transmit power control (TPC) mechanism	NA	Please refer to BVCPS report No.: RFBBEK-WTW-P21010196S-1
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF 4L) not a standard connector.

Notes:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. Per TCBC notice, FCC allows 99% BW measurements for Wi-Fi 320MHz BW mode instead of Emission Bandwidth.

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) (±)
Maximum RF Output Power	-	1.371 dB
Maximum Power Spectral Density	-	1.017 dB
Emission Bandwidth	-	206.5 Hz
Occupied Bandwidth	-	72 Hz
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.90 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.59 dB
	30 MHz ~ 1 GHz	3.6 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	2.29 dB
	18 GHz ~ 40 GHz	2.29 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	Wi-Fi 6E BT 5.2 M.2 2230 Module
Brand	Qualcomm
Test Model	QCNFA765
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 4096QAM for OFDMA in 11ax mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	Up to 2969.7 Mbps
Operating Frequency	5.935 GHz ~ 6.415 GHz 6.535 GHz ~ 6.855 GHz
Number of Channel	802.11a, 802.11ax (HE20): 42 802.11ax (HE40): 20 802.11ax (HE80): 9 802.11ax (HE160): 4
Output Power	5.935 GHz ~ 6.415 GHz : EIRP: 24.734 mW (13.93 dBm) 6.535 GHz ~ 6.855 GHz : EIRP: 22.867 mW (13.59 dBm)

Note:

- This is a supplementary report of FCC ID: J9C-QCNFA765. The differences between them are as below information.
 - Add 6VL equipment class.
- According to above conditions, all of test items need to be performed. And all data was verified to meet the requirements. For Transmit power control (TPC) mechanism test item refer to Report No.: RF201119E01-6 R1.
- Simultaneously transmission condition.

Condition	Technology	
1	WLAN(2.4GHz)	WLAN(6GHz)
2	WLAN(2.4GHz)	WLAN(5GHz)
3	WLAN(6GHz)	Bluetooth
4	WLAN(5GHz)	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

- Regarding simultaneous transmission, after evaluation, since the output power of VLP is lower than the power condition of 6CD, the part of simultaneous transmission is still the worst condition when WiFi works under 6CD conditions, so the simultaneous transmission evaluation of VLP will be covered.
- The device of WLAN (2.4GHz) and Bluetooth technology can't transmit simultaneously, it was used timely shared coexistence technology.
- QCNFA765 covers two hardware variant SKUs that RF design is exactly the same between two SKUs except digital interface circuits change.

Original SKU (NFA765)		
SKU No.	Description	Support platform system and feature
SKU #1	M.2 2230 E-key	Support X86 system
SKU #2	M.2 2230 AE-key	
Newly SKU (NFA765A)		
SKU No.	Description	Support platform system and feature
SKU #3	M.2 2230 E-key	Support WoS system

- The EUT support OFDMA and Partial RU mode, therefore partial RU combination were investigated and the worst case scenario was identified.
- 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 Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain0/1	HONGBO	260-25094	3.53	2.4~2.4835	0.76	PIFA	i-pex(MHF 4L)	300
				3.06	5.15~5.25	1.16			
				3.07	5.25~5.35	1.18			
				4.81	5.47~5.725	1.2			
				4.2	5.725~5.850	1.27			
2	Chain0/1	HONGBO	260-25083	5.09	5.850~5.895	1.29	PIFA	i-pex(MHF 4L)	300
				5.14	5.925~6.425	1.32			
				5.09	6.425~6.525	1.35			
				5.16	6.525~6.875	1.4			
				5.12	6.875~7.125	1.45			
3	Chain0/1	HONGBO	260-25084	3.22	2.4~2.4835	0.5	Monopole	i-pex(MHF 4L)	200
				3.35	5.150~5.250	0.76			
				3.42	5.250~5.350	0.78			
				4.77	5.470~5.725	0.81			
				4.72	5.725~5.850	0.85			
				4.71	5.850~5.895	0.86			
				4.75	5.925~6.425	0.87			
				4.29	6.425~6.525	0.91			
				4.81	6.525~6.875	0.96			
				4.74	6.875~7.125	0.98			

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

2. The EUT incorporates a MIMO function:

6 GHz Band		
Modulation Mode	TX & RX Configuration	
802.11a	2TX	2RX
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX
802.11ax (HE160)	2TX	2RX
802.11ax (RU26/52/106/242/484/996/2x996)	2TX	2RX

Note: The EUT support Beamforming and non-beamforming, therefore both modes were investigated and the worst case scenario was identified. The worst case data were presented in test report.

3.3 Channel List

U-NII-5:

25 channels are provided for 802.11a, 802.11ax (HE20):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
2	5935 MHz	1	5955 MHz	5	5975 MHz	9	5995 MHz
13	6015 MHz	17	6035 MHz	21	6055 MHz	25	6075 MHz
29	6095 MHz	33	6115 MHz	37	6135 MHz	41	6155 MHz
45	6175 MHz	49	6195 MHz	53	6215 MHz	57	6235 MHz
61	6255 MHz	65	6275 MHz	69	6295 MHz	73	6315 MHz
77	6335 MHz	81	6355 MHz	85	6375 MHz	89	6395 MHz
93	6415 MHz						

12 channels are provided for 802.11ax (HE40):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
3	5965 MHz	11	6005 MHz	19	6045 MHz	27	6085 MHz
35	6125 MHz	43	6165 MHz	51	6205 MHz	59	6245 MHz
67	6285 MHz	75	6325 MHz	83	6365 MHz	91	6405 MHz

6 channels are provided for 802.11ax (HE80):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
7	5985 MHz	23	6065 MHz	39	6145 MHz	55	6225 MHz
71	6305 MHz	87	6385 MHz				

3 channels are provided for 802.11ax (HE160):

Channel	Frequency	Channel	Frequency	Channel	Frequency
15	6025 MHz	47	6185 MHz	79	6345 MHz

U-NII-7:

17 channels are provided for 802.11ax (HE20):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
117	6535 MHz	121	6555 MHz	125	6575 MHz	129	6595 MHz
133	6615 MHz	137	6635 MHz	141	6655 MHz	145	6675 MHz
149	6695 MHz	153	6715 MHz	157	6735 MHz	161	6755 MHz
165	6775 MHz	169	6795 MHz	173	6815 MHz	177	6835 MHz
181	6855 MHz						

8 channels are provided for 802.11ax (HE40):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
123	6565 MHz	131	6605 MHz	139	6645 MHz	147	6685 MHz
155	6725 MHz	163	6765 MHz	171	6805 MHz	179	6845 MHz

3 channels are provided for 802.11ax (HE80):

Channel	Frequency	Channel	Frequency	Channel	Frequency
135	6625 MHz	151	6705 MHz	167	6785 MHz

1 channel is provided for 802.11ax (HE160):

Channel	Frequency
143	6665 MHz

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. 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).
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Following channel(s) was (were) selected for the final test as listed below:

Test Item	EUT Configure Mode	Mode	Signal Mode	Category	Tested Channel	Modulation	Data Rate Parameter	RU/MRU Index
Maximum RF Output Power	A	802.11a	Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA
		802.11ax (HE20)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	NA
		802.11ax (HE40)			3, 43, 91 123, 155, 179	BPSK	MCS0	NA
		802.11ax (HE80)			7, 39, 87 135, 151, 167	BPSK	MCS0	NA
		802.11ax (HE160)			15, 47, 79 143	BPSK	MCS0	NA
		802.11ax (HE20) (26-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	0, 0, 0, 8 0, 0, 8
		802.11ax (HE20) (52-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	37, 37, 37, 40 37, 37, 40
		802.11ax (HE20) (106-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	53, 53, 53, 54 53, 53, 54
		802.11ax (HE20) (242-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	61, 61, 61, 61 61, 61, 61
		802.11ax (HE40) (484-tone RU)			3, 43, 91 123, 155, 179	BPSK	MCS0	65, 65, 65 65, 65, 65
		802.11ax (HE80) (996-tone RU)			7, 39, 87 135, 151, 167	BPSK	MCS0	67, 67, 67 67, 67, 67
		802.11ax (HE160) (2x996-tone RU)			15, 47, 79 143	BPSK	MCS0	68, 68, 68 68
Maximum Power Spectral Density	A	802.11a	Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA
		802.11ax (HE20)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	NA
		802.11ax (HE40)			3, 43, 91 123, 155, 179	BPSK	MCS0	NA
		802.11ax (HE80)			7, 39, 87 135, 151, 167	BPSK	MCS0	NA
		802.11ax (HE160)			15, 47, 79 143	BPSK	MCS0	NA
		802.11ax (HE20) (26-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	0, 0, 0, 8 0, 0, 8
		802.11ax (HE20) (52-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	37, 37, 37, 40 37, 37, 40
		802.11ax (HE20) (106-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	53, 53, 53, 54 53, 53, 54
		802.11ax (HE20) (242-tone RU)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	61, 61, 61, 61 61, 61, 61
		802.11ax (HE40) (484-tone RU)			3, 43, 91 123, 155, 179	BPSK	MCS0	65, 65, 65 65, 65, 65
		802.11ax (HE80) (996-tone RU)			7, 39, 87 135, 151, 167	BPSK	MCS0	67, 67, 67 67, 67, 67
		802.11ax (HE160) (2x996-tone RU)			15, 47, 79 143	BPSK	MCS0	68, 68, 68 68
Emission Bandwidth	A	802.11a	Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA
		802.11ax (HE20)			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	NA
		802.11ax (HE40)			3, 43, 91 123, 155, 179	BPSK	MCS0	NA
		802.11ax (HE80)			7, 39, 87 135, 151, 167	BPSK	MCS0	NA
		802.11ax (HE160)			15, 47, 79 143	BPSK	MCS0	NA
		802.11ax (HE20) 26-tone RU			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	0, 0, 0, 8 0, 0, 8
		802.11ax (HE20) 52-tone RU			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	37, 37, 37, 40 37, 37, 40
		802.11ax (HE20) 106-tone RU			2, 1, 45, 93 117, 149, 181	BPSK	MCS0	53, 53, 53, 54 53, 53, 54

Test Item	EUT Configure Mode	Mode	Signal Mode	Category	Tested Channel	Modulation	Data Rate Parameter	RU/MRU Index		
In-Band Emission Mask	A	802.11a	Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
		2, 1, 45, 93 117, 149, 181			BPSK	MCS0	NA			
		3, 43, 91 123, 155, 179			BPSK	MCS0	NA			
		7, 39, 87 135, 151, 167			BPSK	MCS0	NA			
		15, 47, 79 143			BPSK	MCS0	NA			
		2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8			
		2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40			
		2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54			
		802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA
		2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA	
		3, 43, 91 123, 155, 179					BPSK	MCS0	NA	
		7, 39, 87 135, 151, 167					BPSK	MCS0	NA	
15, 47, 79 143	BPSK	MCS0	NA							
2, 1, 45, 93 117, 149, 181	BPSK	MCS0	0, 0, 0, 8 0, 0, 8							
2, 1, 45, 93 117, 149, 181	BPSK	MCS0	37, 37, 37, 40 37, 37, 40							
2, 1, 45, 93 117, 149, 181	BPSK	MCS0	53, 53, 53, 54 53, 53, 54							
802.11a	Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK			6Mb/s	NA		
2, 1, 45, 93 117, 149, 181			BPSK	MCS0			NA			
3, 43, 91 123, 155, 179			BPSK	MCS0			NA			
7, 39, 87 135, 151, 167			BPSK	MCS0			NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
802.11a			Tx Beamforming	VLP	2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143	BPSK	MCS0			NA					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181	BPSK	MCS0			53, 53, 53, 54 53, 53, 54					
802.11a	Tx Beamforming	VLP			2, 1, 45, 93 117, 149, 181	BPSK	6Mb/s	NA		
2, 1, 45, 93 117, 149, 181					BPSK	MCS0	NA			
3, 43, 91 123, 155, 179					BPSK	MCS0	NA			
7, 39, 87 135, 151, 167					BPSK	MCS0	NA			
15, 47, 79 143			BPSK	MCS0	NA					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	0, 0, 0, 8 0, 0, 8					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	37, 37, 37, 40 37, 37, 40					
2, 1, 45, 93 117, 149, 181			BPSK	MCS0	53, 53, 53, 54 53, 53, 54					
80										

Note:

- Channel puncturing mechanism is not supported.
 - Regarding Single RU 26/52/106, the output power levels are the same across different PPDU HE20/40/80/160 modes. After evaluation, HE20 has been chosen as the primary representative test mode for testing.
- * The unwanted emission was verified and the test result was passed by radiated measurement.

3.5 Duty Cycle of Test Signal

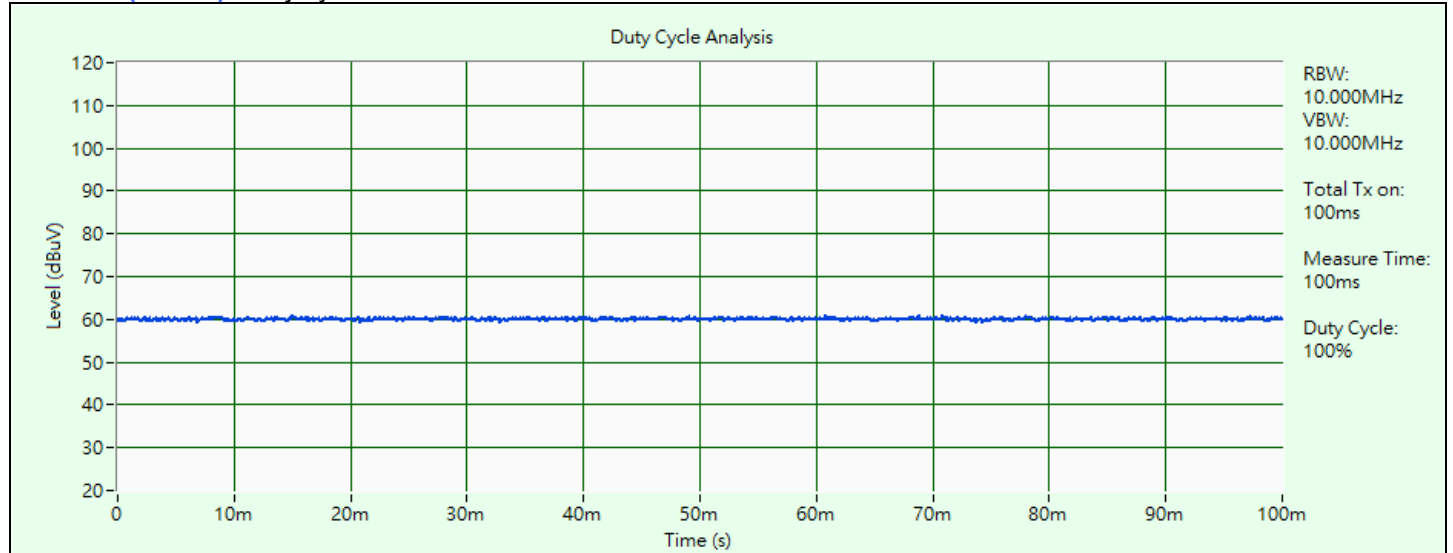
802.11a: Duty cycle = 100 ms / 100 ms x 100% = 100.0%

802.11ax (HE20): Duty cycle = 100 ms / 100 ms x 100% = 100.0%

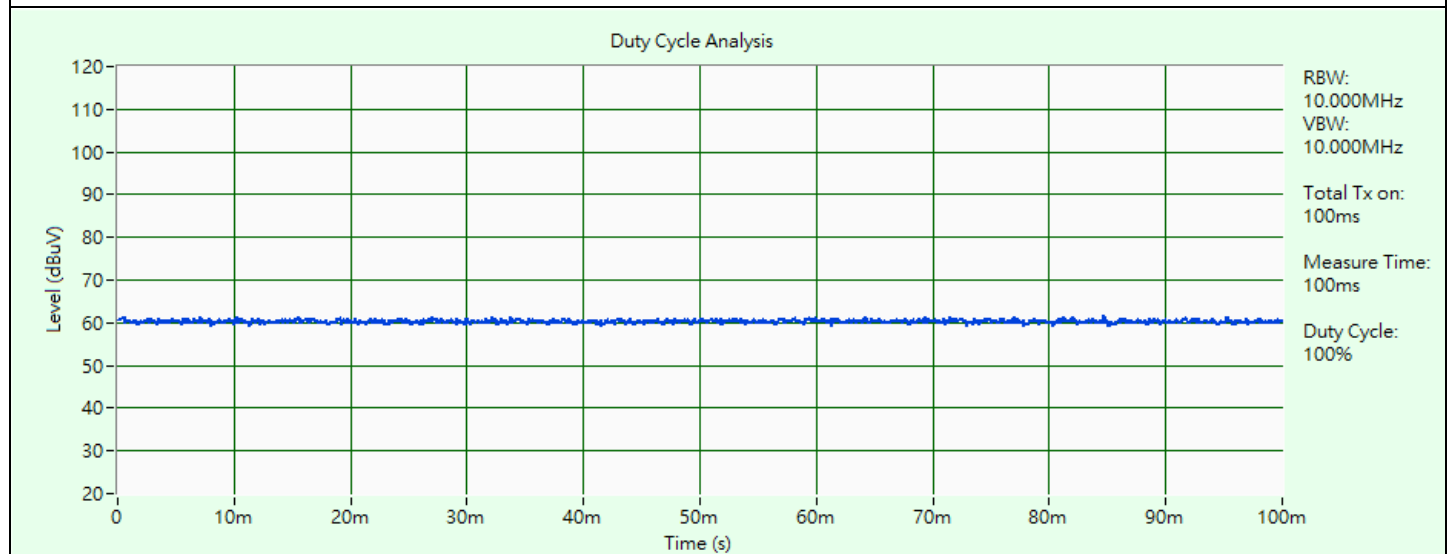
802.11ax (HE40): Duty cycle = 100 ms / 100 ms x 100% = 100.0%

802.11ax (HE80): Duty cycle = 100 ms / 100 ms x 100% = 100.0%

802.11ax (HE160): Duty cycle = 100 ms / 100 ms x 100% = 100.0%

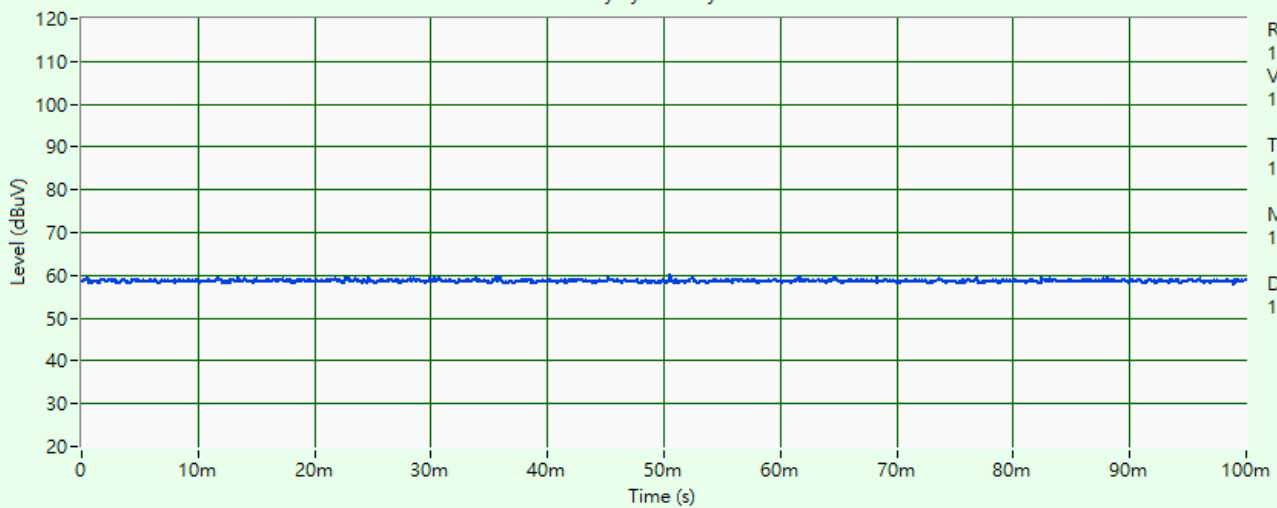


802.11a



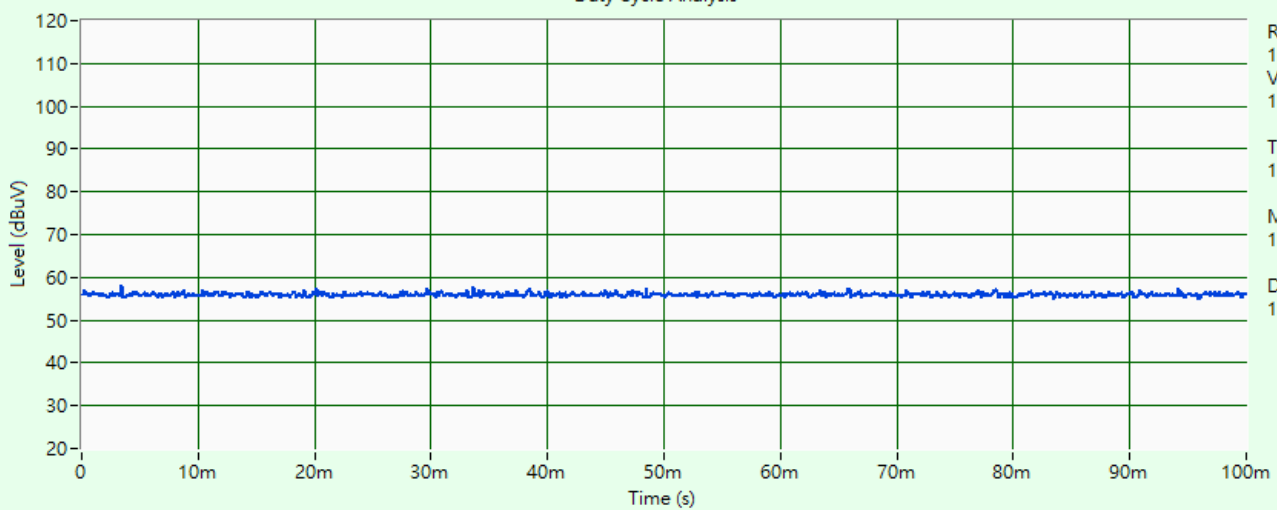
802.11ax (HE20)

Duty Cycle Analysis



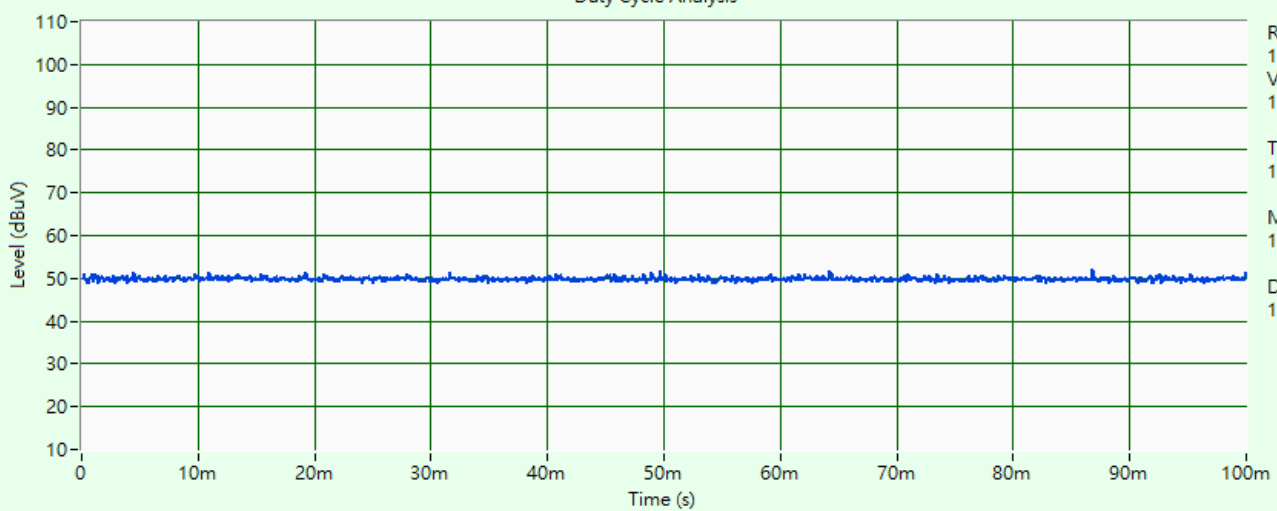
802.11ax (HE40)

Duty Cycle Analysis



802.11ax (HE80)

Duty Cycle Analysis



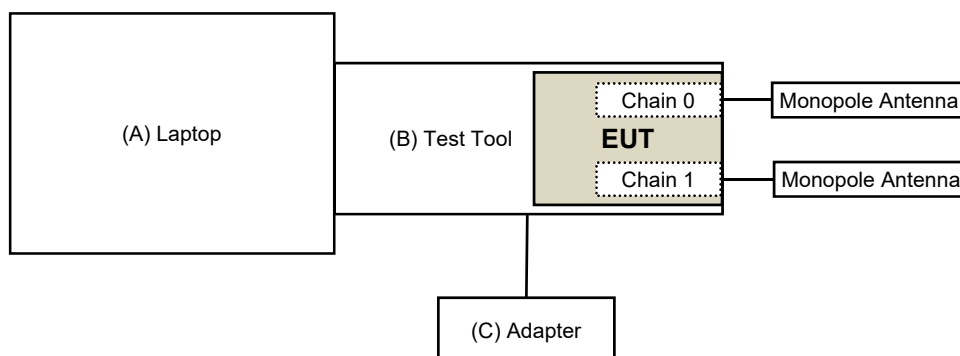
802.11ax (HE160)

3.6 Test Program Used and Operation Descriptions

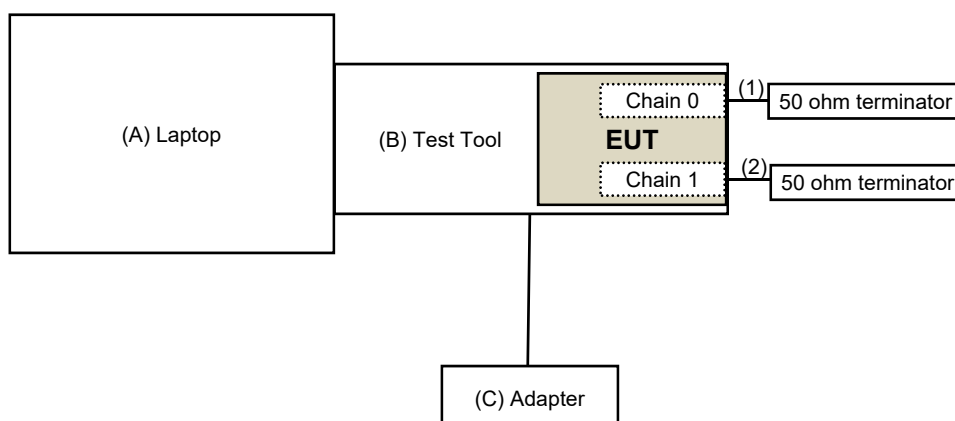
Controlling software (QRCT Version 4.0.97.4) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

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	Laptop	Dell	E5420	6FGHKV1	N/A	Supplied by applicant
B	Test Tool	Qualcomm	Y6570	N/A	N/A	Supplied by applicant
C	Adapter	PHIHONG	PSAA12A-120L6	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	ipex cable	1	0.25	No	0	Provided by Lab
2	ipex cable	1	0.25	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 Maximum RF Output Power

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Peak Power Analyzer Keysight	8990B	MY51000485	2024/1/21	2025/1/20
Wideband Power Sensor Keysight	N1923A	MY58020002	2024/1/18	2025/1/17
		MY58140009	2024/1/18	2025/1/17

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/10/1

4.2 Maximum Power Spectral Density

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Signal & Spectrum Analyzer R&S	FSV3044	101105	2024/2/27	2025/2/26
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/10/1

4.3 Emission Bandwidth

Refer to section 4.2 to get the tested date and information of the instruments.

4.4 In-Band Emission Mask

Refer to section 4.2 to get the tested date and information of the instruments.

4.5 Occupied Bandwidth

Refer to section 4.2 to get the tested date and information of the instruments.

4.6 Contention-based Protocol

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
EXA Signal Analyzer Agilent	N9010A	MY52220207	2023/12/28	2024/12/27
MXG Vector Signal Generator Agilent	N5182B	MY53050430	2023/12/4	2024/12/3
MXG Vector Signal Generator Keysight	N5182BU	MY59360189	2023/12/4	2024/12/3
Power Divider Woken	0120A02058001M	DCMD33WIK3	2024/4/29	2025/4/28
		DCMD33WIK7	2024/4/29	2025/4/28

Notes:

1. The test was performed in Adaptivity room.
2. Tested Date: 2024/11/28

4.7 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance HUBER+SUHNER	E1-011315	13	2023/11/22	2024/11/21
50 ohm terminal resistance	E1-011279	04	2023/11/22	2024/11/21
	E1-011280	05	2023/11/22	2024/11/21
DC-LISN Schwarzbeck	NNBM 8126G	8126G-069	2023/11/7	2024/11/6
EMI Test Receiver R&S	ESR3	102783	2023/12/13	2024/12/12
Fixed Attenuator STI	BNC5W10dB	PAD-COND2-01	2024/8/25	2025/8/24
LISN R&S	ESH2-Z5	100100	2024/3/6	2025/3/5
	ESH3-Z5	100312	2023/9/12	2024/9/11
RF Coaxial Cable Woken	5D-FB	Cable-cond2-01	2024/8/25	2025/8/24
Software BVADT	BVADT_Cond_ V7.4.1.0	N/A	N/A	N/A
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2024/8/28	2025/8/27

Notes:

1. The test was performed in HY - Conduction 2.
2. Tested Date: 2024/9/6

4.8 Unwanted Emissions below 1 GHz

Mode A

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Signal & Spectrum Analyzer R&S	FSV3044	101105	2024/2/27	2025/2/26
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/9/4

Mode B

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn BV ADT	AT100	AT93021705	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-160	2023/10/17	2024/10/16
Loop Antenna Electro-Metrics	EM-6879	269	2023/9/23	2024/9/22
MXE EMI Receiver Keysight	N9038B	MY60180018	2024/3/13	2025/3/12
Preamplifier Agilent	8447D	2944A10638	2024/5/1	2025/4/30
Preamplifier EMCI	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable Woken	8D-FB	Cable-CH9-01	2024/5/1	2025/4/30
Signal & Spectrum Analyzer R&S	FSW43	101867	2023/12/29	2024/12/28
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2024/8/19

4.9 Unwanted Emissions above 1 GHz

Mode A

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Signal & Spectrum Analyzer R&S	FSV3044	101105	2024/2/27 2025/2/25	2025/2/26 2026/2/24
Software BV	ADT_RF Test Software V7.6.5.4	N/A	N/A	N/A

Notes:

1. The test was performed in Oven room.
2. Tested Date: 2024/8/23 ~ 2025/3/22

Mode B, C, D

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn BV ADT	AT100	AT93021705	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	5	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1169	2023/11/12 2024/11/10	2024/11/11 2025/11/9
	BBHA 9170	9170-480	2023/11/12 2024/11/10	2024/11/11 2025/11/9
		BBHA9170243	2023/11/12 2024/11/10	2024/11/11 2025/11/9
MXE EMI Receiver Agilent	N9038A	MY51210203	2024/8/27	2025/8/26
MXE EMI Receiver Keysight	N9038B	MY60180018	2024/3/13	2025/3/12
Preamplifier Agilent	8449B	3008A02367	2024/1/6 2025/1/5	2025/1/5 2026/1/4
Preamplifier EMCI	EMC 184045	980116	2023/9/27 2024/9/24	2024/9/26 2025/9/23
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2024/7/6	2025/7/5
	EMC102-KM-KM-3000	150929	2024/7/6	2025/7/5
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	2024/1/6 2025/1/5	2025/1/5 2026/1/4
RF Coaxial Cable HUBER+SUHNER&EMCI	SUCOFLEX 104& EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	2024/1/6 2025/1/5	2025/1/5 2026/1/4
Signal & Spectrum Analyzer R&S	FSW43	101866	2025/3/25	2026/3/24
		101867	2023/12/29	2024/12/28
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table BV ADT	TT100	TT93021705	N/A	N/A
Turn Table Controller BV ADT	SC100	SC93021705	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 4.
2. Tested Date: 2024/8/12 ~ 2025/3/27

5 Limits of Test Items

5.1 Maximum RF Output Power

Operation Band	Equipment Class	Limit
		Maximum Average Power
U-NII-5 U-NII-6 U-NII-7 U-NII-8	6CD: 15E 6 GHz Dual client (under control of a low-power indoor access point)	EIRP 24 dBm
U-NII-5 U-NII-7	6CD: 15E 6 GHz Dual client (under control of a Standard power access point)	EIRP 30 dBm
U-NII-5 U-NII-7	6VL: 15E 6 GHz VLP device	EIRP 14 dBm

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

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

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

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

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

5.2 Maximum Power Spectral Density

Operation Band	Equipment Class	Limit
		Maximum Power Density
U-NII-5 U-NII-6 U-NII-7 U-NII-8	6CD: 15E 6 GHz Dual client (under control of a low-power indoor access point)	EIRP -1 dBm/MHz
U-NII-5 U-NII-7	6CD: 15E 6 GHz Dual client (under control of a Standard power access point)	EIRP 17 dBm/MHz
U-NII-5 U-NII-7	6VL: 15E 6 GHz VLP device	EIRP -5 dBm/MHz

5.3 Emission Bandwidth

The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 MHz.

5.4 In-Band Emission Mask

Test Item	Frequencies (MHz)	(X) dBc* ¹
Emission Mask	At 1 MHz outside of channel edge	20
	At one channel bandwidth from the channel center* ²	28
	At one- and one-half times the channel bandwidth away from channel center* ³	40
	More than one- and one-half times the channel bandwidth	40

*¹ : The power spectral density must be suppressed by "x" dB

*² : At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression,

*³ : At frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression.

5.5 Occupied Bandwidth

The results are for reference only.

5.6 Contention-based Protocol

Unlicensed indoor low-power devices must detect co-channel radio frequency power that is at least -62 dBm (The threshold is referenced to a 0 dBi antenna gain.) or lower. Additionally, indoor low-power devices must detect co-channel energy with 90% or greater certainty.

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

Frequencies (MHz)	EIRP Limit	Equivalent Field Strength at 3 m
5925 MHz > F > 7125 MHz	Peak: -7 (dBm/MHz)	88.2 (dBuV/m)
	Average: -27 (dBm/MHz)	68.2 (dBuV/m)

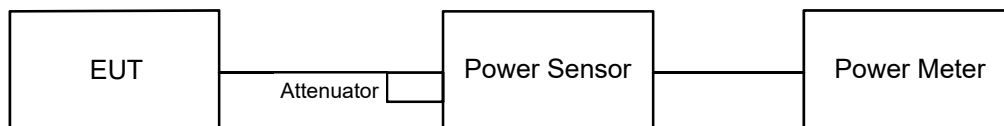
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 Maximum RF Output Power

6.1.1 Test Setup

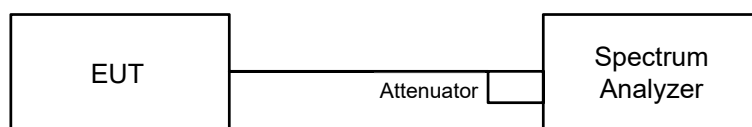


6.1.2 Test Procedure

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.

6.2 Maximum Power Spectral Density

6.2.1 Test Setup



6.2.2 Test Procedure

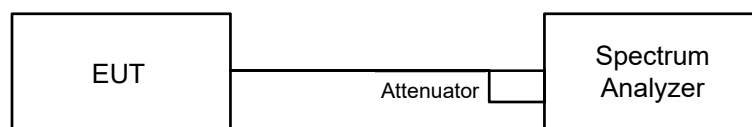
For specified measurement bandwidth 1 MHz:

Method SA-1

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- Sweep points $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- Sweep time = auto, trigger set to "free run".
- Trace average at least 100 traces in power averaging mode.
- Record the max value

6.3 Emission Bandwidth

6.3.1 Test Setup

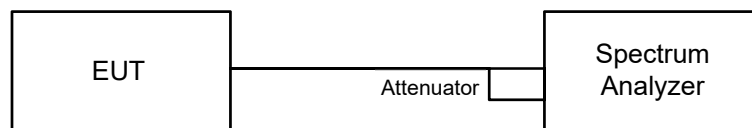


6.3.2 Test Procedure

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

6.4 In-Band Emission Mask

6.4.1 Test Setup

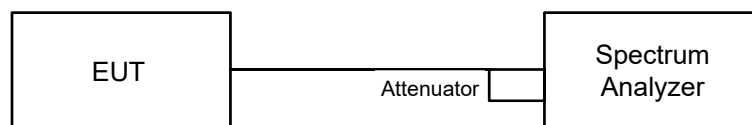


6.4.2 Test Procedure

- a. Connect output of the antenna port to a spectrum analyzer and adjust appropriate attenuation.
- b. Measure the 26 dB EBW using the test procedure 12.4.1 of ANSI C63.10-2013. (Determine the channel edge.)
- c. Measure the power spectral density (for emissions mask reference) using the following procedure:
 - a) Set the span to encompass the entire 26 dB EBW of the signal.
 - b) Set RBW = same RBW used for 26 dB EBW measurement.
 - c) Set VBW $\geq [3 \times \text{RBW}]$.
 - d) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$.
 - e) Sweep time = auto.
 - f) Detector = RMS (i.e., power averaging).
 - g) Trace average at least 100 traces in power averaging (rms) mode.
 - h) Use the peak search function on the instrument to find the peak of the spectrum.
- d. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
 - a) Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the 26-dB point on either side of the carrier center frequency.)
 - b) Suppressed by 28 dB at one channel bandwidth from the channel center.
 - c) Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.
- e. Adjust the span to encompass the entire mask as necessary and clear trace.
- f. Trace average at least 100 traces in power averaging (rms) mode.
- g. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask

6.5 Occupied Bandwidth

6.5.1 Test Setup

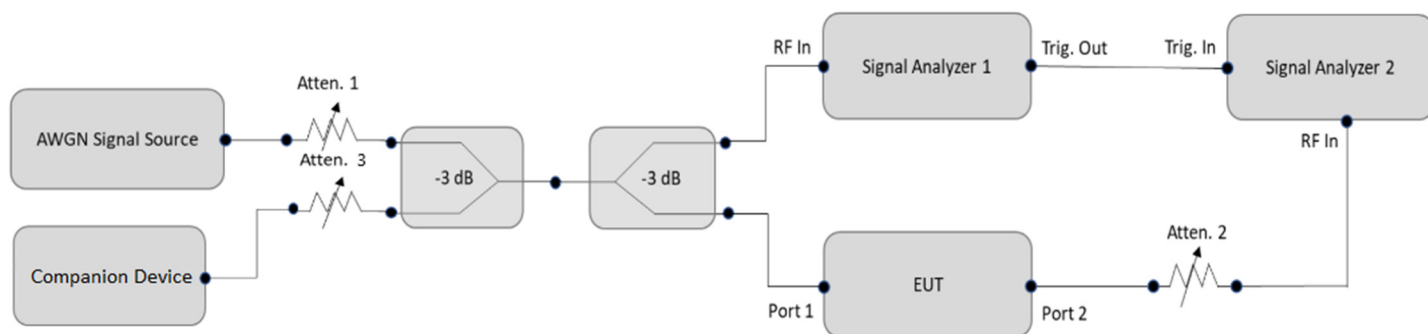


6.5.2 Test Procedure

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 Contention-based Protocol

6.6.1 Test Setup



6.6.2 Test Procedure

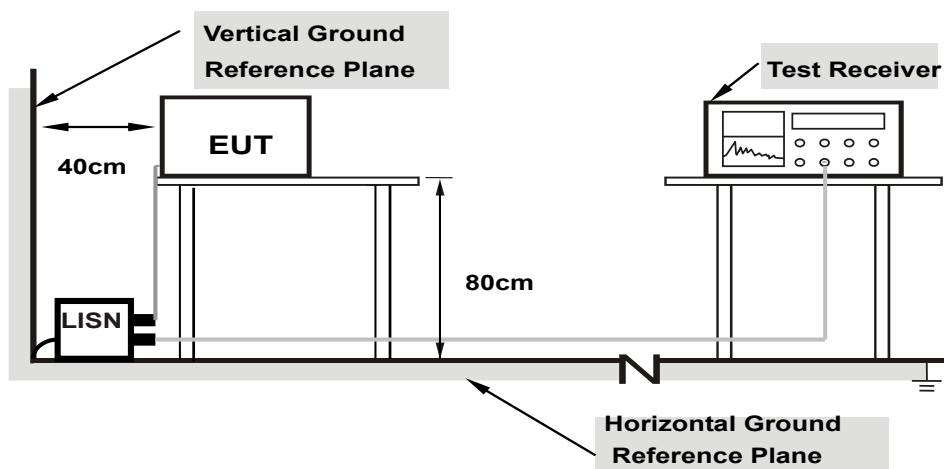
- Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2. Ensure that the attenuator 2 provides enough attenuation to not overload the signal analyzer 2 receiver.
- Monitoring the signal analyzer 2, verify the EUT is operating and transmitting with the parameters (set as following section 4.7.5 EUT operating condition).
- Determine number of times detection threshold test as following table,

If	Number of Tests	Placement of Incumbent Transmission
$BW_{EUT} \leq BW_{Inc}$	Once	Same as EUT transmission
$BW_{Inc} < BW_{EUT} \leq 2x BW_{Inc}$	Once	Contained within BW_{EUT}
$2x BW_{Inc} < BW_{EUT} \leq 4x BW_{Inc}$	Twice. (Incumbent transmission is contained within BW_{EUT})	Closely to the lower edge and upper edge of the EUT Channel
$BW_{EUT} > 4x BW_{Inc}$	Three times	Closely to the lower edge, in the middle and upper edge of the EUT Channel

- Using an AWGN signal source, generate (but do not transmit, i.e., RF OFF) a 10 MHz-wide AWGN signal. Use step c table to determine the center frequency of the 10 MHz AWGN signal relative to the EUT's channel bandwidth and center frequency.
- Set the AWGN signal power to an extremely low level (more than 20 dB below the -62 dBm threshold). Connect the AWGN signal source, via a 3-dB splitter, to the signal analyzer 1 and the EUT.
- Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
- Monitor the signal analyzer 2 to verify if the AWGN signal has been detected and the EUT has ceased transmission. If the EUT continues to transmit, then incrementally increase the AWGN signal power level until the EUT stops transmitting.
- (Including all losses in the RF paths) Determine and record the AWGN signal power level (at the EUT's antenna port) at which the EUT ceased transmission. Repeat the procedure at least 10 times to verify the EUT can detect an AWGN signal with 90% (or better) level of certainty.
- Refer to step c table to determine number of times the detection threshold testing needs to be repeated. If testing is required more than once, then go back to step d, choose a different center frequency for the AWGN signal and repeat the process.

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

- 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.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

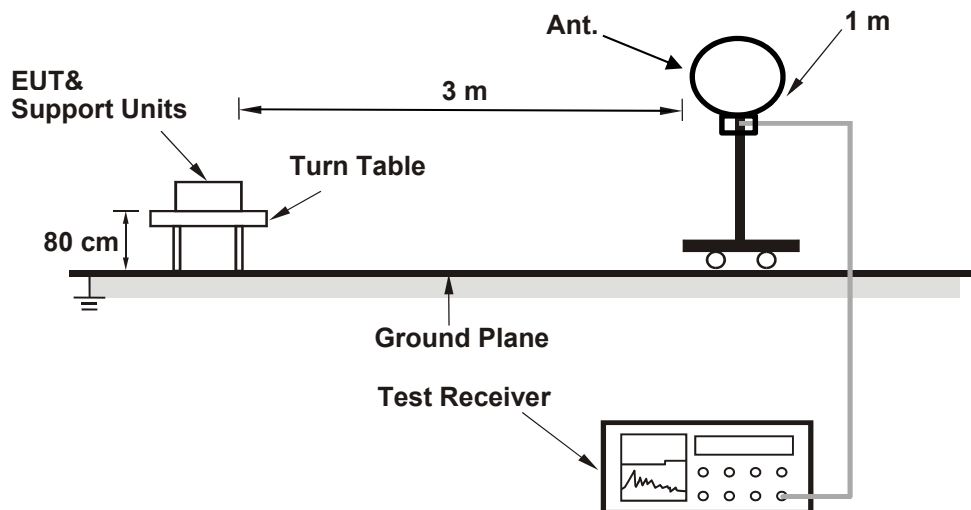
Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

6.8 Unwanted Emissions below 1 GHz

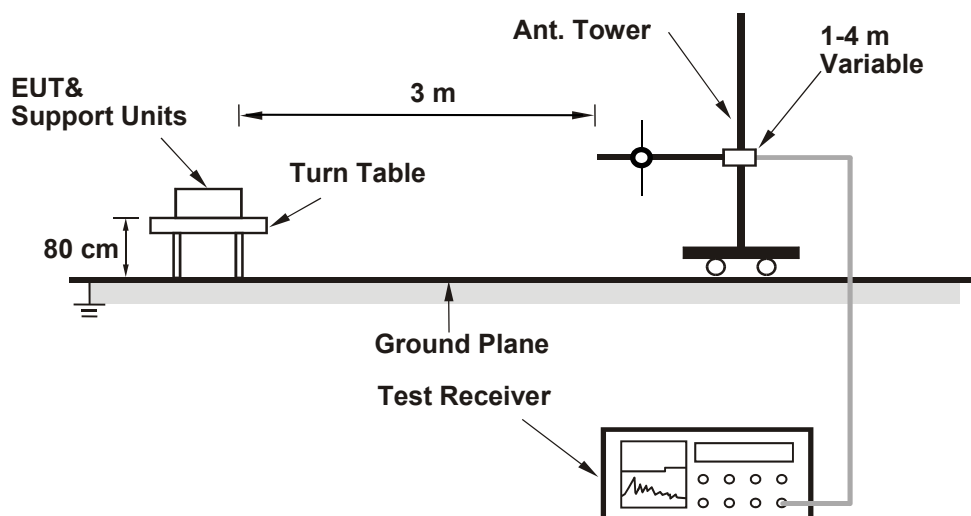
6.8.1 Test Setup

For Radiated Configuration:

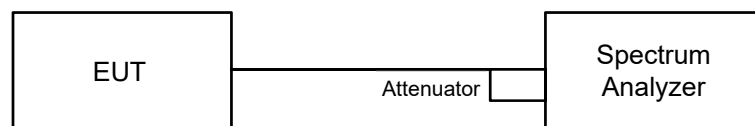
For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



For Conducted Configuration:



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

6.8.2 Test Procedure

Radiated versus Conducted Measurement.

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. EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)
- e. For all of Radiation emission test

For Radiated emission below 30 MHz

- e-1.1. 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.
- e-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.
- e-1.3. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- e-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.
- e-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

- e-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.
- e-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.
- e-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.
- e-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.
- e-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.

Radiated versus Conducted Measurement

For Radiated measurement:

The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation).

For Conducted measurement:

The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions).

Conducted Unwanted Emission Convert Formula

- a. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8
d = measurement distance in 3 meters.
- b. EIRP Level (dBm) = Raw Value(dBm) + Correction Factor(dB)
- c. Correction Factor is directional gain, and the composite gain will be used when signal support the correlated signal.
For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands.
For the band edge the gain for the specific band may have been used.

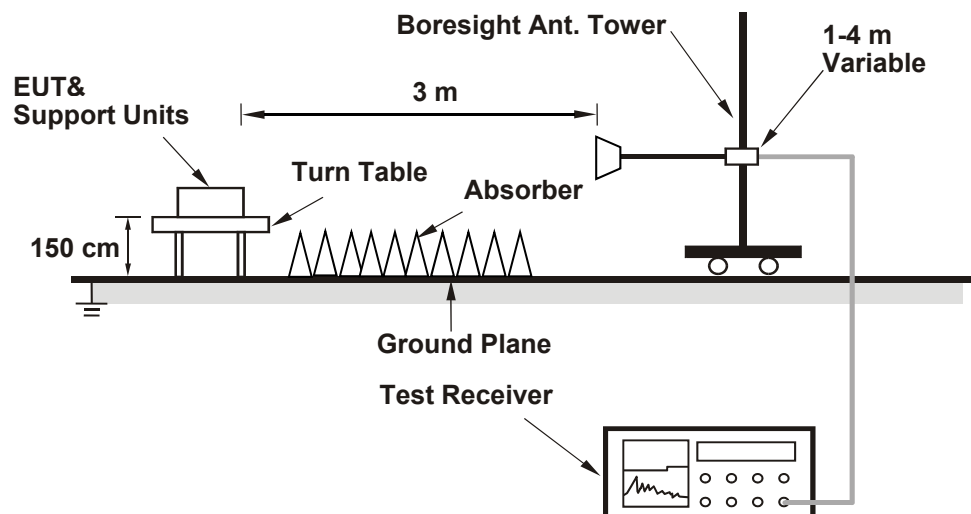
Notes:

1. In restricted bands below 1000 MHz, add upper bound on ground plane reflection:
For frequencies between 30 MHz and 1000 MHz, add 4.7 dB.
2. The conducted emission test was considered some factor to compute test result.

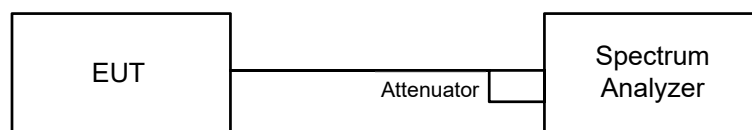
6.9 Unwanted Emissions above 1 GHz

6.9.1 Test Setup

For Radiated Configuration:



For Conducted Configuration:



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

6.9.2 Test Procedure

Radiated versus Conducted Measurement.

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:

- 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.
- Conducted tests was performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.
- 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.
- EIRP adjustments for multiple outputs. (Follow the procedures specified in FCC KDB Publication 662911)

e. For all of Radiation emission test

- e-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.
- e-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.
- e-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.
- e-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.
- e-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 $\geq 1/T$ (Duty cycle $< 98\%$) or 10 Hz (Duty cycle $\geq 98\%$) for Average detection (AV) at frequency above 1 GHz.
3. All modes of operation were investigated and the worst-case emissions are reported.

Radiated versus Conducted Measurement		
<u>For Radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation). <u>For Conducted measurement:</u> The level of unwanted emissions was measured as their power in a specified load (conducted spurious emissions). <u>For Verified radiated measurement:</u> The level of unwanted emissions was measured when radiated by the cabinet or structure of the equipment with the antenna connector(s) terminated by a specified load (cabinet radiation). <tr style="background-color: #f2f2f2;"> <th style="text-align: center; padding: 5px;">Conducted Unwanted Emission Convert Formula</th> </tr> <tr> <td style="padding: 5px;"> a. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8 d = measurement distance in 3 meters. b. EIRP Level (dBm) = Raw Value(dBm) + Correction Factor(dB). c. Correction Factor is directional gain, and the composite gain will be used when signal support the correlated signal. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. For the band edge the gain for the specific band may have been used. Note: The conducted emission test was considered some factor to compute test result. </td> </tr>	Conducted Unwanted Emission Convert Formula	a. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8 d = measurement distance in 3 meters. b. EIRP Level (dBm) = Raw Value(dBm) + Correction Factor(dB). c. Correction Factor is directional gain, and the composite gain will be used when signal support the correlated signal. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. For the band edge the gain for the specific band may have been used. Note: The conducted emission test was considered some factor to compute test result.
Conducted Unwanted Emission Convert Formula		
a. Emission Level (dBuV/m) = EIRP Level (dBm) – 20log(d) + 104.8 d = measurement distance in 3 meters. b. EIRP Level (dBm) = Raw Value(dBm) + Correction Factor(dB). c. Correction Factor is directional gain, and the composite gain will be used when signal support the correlated signal. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. For the band edge the gain for the specific band may have been used. Note: The conducted emission test was considered some factor to compute test result.		

7 Test Results of Test Item

7.1 Maximum RF Output Power

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Henry Hsu
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802.11a

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
2	5935	-4.11	-5.31	0.6826	-1.66	8.15	4.458	6.49	14	Pass
1	5955	-3.91	-4.71	0.7445	-1.28	8.15	4.863	6.87	14	Pass
45	6175	-4.16	-5.84	0.6443	-1.91	8.15	4.208	6.24	14	Pass
93	6415	-4.12	-5.58	0.664	-1.78	8.15	4.337	6.37	14	Pass
117	6535	-4.23	-5.72	0.6455	-1.90	8.17	4.235	6.27	14	Pass
149	6695	-4.16	-4.89	0.708	-1.50	8.17	4.646	6.67	14	Pass
181	6855	-4.25	-4.95	0.6957	-1.58	8.17	4.565	6.59	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 26-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
2	5935	-15.01	-16.68	0.05303	-12.75	8.15	0.3464	-4.6	14	Pass
1	5955	-11.28	-12.75	0.12756	-8.94	8.15	0.8331	-0.79	14	Pass
45	6175	-10.95	-12.39	0.13803	-8.60	8.15	0.9015	-0.45	14	Pass
93	6415	-11.86	-12.82	0.1174	-9.30	8.15	0.7668	-1.15	14	Pass
117	6535	-10.98	-12.46	0.13655	-8.65	8.17	0.896	-0.48	14	Pass
149	6695	-10.98	-12.45	0.13668	-8.64	8.17	0.8968	-0.47	14	Pass
181	6855	-11.84	-12.97	0.11593	-9.36	8.17	0.7607	-1.19	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 52-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
2	5935	-11.91	-13.45	0.1096	-9.60	8.15	0.7158	-1.45	14	Pass
1	5955	-7.92	-9.44	0.2752	-5.60	8.15	1.797	2.55	14	Pass
45	6175	-7.85	-9.25	0.2829	-5.48	8.15	1.848	2.67	14	Pass
93	6415	-8.64	-9.86	0.24	-6.20	8.15	1.568	1.95	14	Pass
117	6535	-7.59	-9.05	0.2986	-5.25	8.17	1.959	2.92	14	Pass
149	6695	-8.44	-10.01	0.24299	-6.14	8.17	1.594	2.03	14	Pass
181	6855	-8.46	-9.91	0.2447	-6.11	8.17	1.606	2.06	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 106-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
2	5935	-11.24	-12.85	0.12704	-8.96	8.15	0.8297	-0.81	14	Pass
1	5955	-5.89	-6.79	0.467	-3.31	8.15	3.05	4.84	14	Pass
45	6175	-5.12	-6.51	0.531	-2.75	8.15	3.468	5.4	14	Pass
93	6415	-5.95	-7.42	0.4352	-3.61	8.15	2.842	4.54	14	Pass
117	6535	-5.22	-6.68	0.5154	-2.88	8.17	3.382	5.29	14	Pass
149	6695	-5.82	-7.05	0.4591	-3.38	8.17	3.012	4.79	14	Pass
181	6855	-6.39	-6.81	0.4381	-3.58	8.17	2.875	4.59	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 242-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
2	5935	-8.34	-9.35	0.2627	-5.81	8.15	1.716	2.34	14	Pass
1	5955	-4.12	-5.29	0.6831	-1.66	8.15	4.462	6.49	14	Pass
45	6175	-4.22	-5.66	0.6501	-1.87	8.15	4.246	6.28	14	Pass
93	6415	-4.35	-5.62	0.6414	-1.93	8.15	4.189	6.22	14	Pass
117	6535	-3.99	-5.31	0.6935	-1.59	8.17	4.55	6.58	14	Pass
149	6695	-4.35	-5.06	0.6792	-1.68	8.17	4.457	6.49	14	Pass
181	6855	-4.08	-4.51	0.7448	-1.28	8.17	4.887	6.89	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
2	5935	-4.80	-5.54	0.6104	-2.14	8.15	3.987	6.01	14	Pass
1	5955	-3.49	-4.30	0.8192	-0.87	8.15	5.35	7.28	14	Pass
45	6175	-3.95	-5.39	0.6918	-1.60	8.15	4.518	6.55	14	Pass
93	6415	-4.05	-5.29	0.6894	-1.62	8.15	4.503	6.53	14	Pass
117	6535	-3.59	-5.06	0.7494	-1.25	8.17	4.917	6.92	14	Pass
149	6695	-4.01	-4.72	0.7345	-1.34	8.17	4.819	6.83	14	Pass
181	6855	-3.84	-4.23	0.7906	-1.02	8.17	5.187	7.15	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE40) 484-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
3	5965	-0.02	-1.26	1.7436	2.41	8.15	11.388	10.56	14	Pass
43	6165	0.04	-1.37	1.7387	2.40	8.15	11.356	10.55	14	Pass
91	6405	0.08	-1.30	1.7599	2.45	8.15	11.494	10.6	14	Pass
123	6565	0.02	-1.44	1.7224	2.36	8.17	11.301	10.53	14	Pass
155	6725	-0.04	-1.52	1.6955	2.29	8.17	11.125	10.46	14	Pass
179	6845	0.18	-1.22	1.7974	2.55	8.17	11.794	10.72	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
3	5965	0.09	-1.13	1.7918	2.53	8.15	11.703	10.68	14	Pass
43	6165	0.12	-1.22	1.7831	2.51	8.15	11.646	10.66	14	Pass
91	6405	0.22	-1.18	1.814	2.59	8.15	11.848	10.74	14	Pass
123	6565	0.15	-1.30	1.7765	2.50	8.17	11.656	10.67	14	Pass
155	6725	0.08	-1.40	1.743	2.41	8.17	11.437	10.58	14	Pass
179	6845	0.38	-1.04	1.8785	2.74	8.17	12.326	10.91	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE80) 996-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
7	5985	1.71	0.38	2.574	4.11	8.15	16.812	12.26	14	Pass
39	6145	2.26	1.41	3.066	4.87	8.15	20.025	13.02	14	Pass
87	6385	2.59	1.52	3.235	5.10	8.15	21.129	13.25	14	Pass
135	6625	1.83	0.50	2.646	4.23	8.17	17.362	12.4	14	Pass
151	6705	2.08	0.63	2.77	4.42	8.17	18.175	12.59	14	Pass
167	6785	2.46	1.26	3.099	4.91	8.17	20.334	13.08	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
7	5985	2.02	0.53	2.722	4.35	8.15	17.778	12.5	14	Pass
39	6145	2.52	1.67	3.255	5.13	8.15	21.259	13.28	14	Pass
87	6385	2.84	1.75	3.419	5.34	8.15	22.331	13.49	14	Pass
135	6625	2.11	0.69	2.798	4.47	8.17	18.359	12.64	14	Pass
151	6705	2.34	0.88	2.939	4.68	8.17	19.284	12.85	14	Pass
167	6785	2.73	1.52	3.294	5.18	8.17	21.613	13.35	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE160) 2x996-tone RU

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
15	6025	3.02	2.04	3.604	5.57	8.15	23.539	13.72	14	Pass
47	6185	3.32	2.01	3.736	5.72	8.15	24.401	13.87	14	Pass
79	6345	2.62	2.05	3.431	5.35	8.15	22.409	13.5	14	Pass
143	6665	2.68	2.06	3.46	5.39	8.17	22.703	13.56	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Directional Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
15	6025	3.02	2.12	3.634	5.60	8.15	23.735	13.75	14	Pass
47	6185	3.37	2.08	3.787	5.78	8.15	24.734	13.93	14	Pass
79	6345	2.62	2.10	3.45	5.38	8.15	22.533	13.53	14	Pass
143	6665	2.72	2.08	3.485	5.42	8.17	22.867	13.59	14	Pass

Notes:

1. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
2. For U-NII-5, The directional gain is 8.15 dBi.
3. For U-NII-7, The directional gain is 8.17 dBi.

7.2 Maximum Power Spectral Density

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Henry Hsu
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802.11a

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
2	5935	-15.91	-17.10	-13.45	8.15	-5.3	-5	Pass
1	5955	-16.20	-16.77	-13.47	8.15	-5.32	-5	Pass
45	6175	-16.04	-17.38	-13.65	8.15	-5.5	-5	Pass
93	6415	-15.78	-17.13	-13.39	8.15	-5.24	-5	Pass
117	6535	-16.13	-17.29	-13.66	8.17	-5.49	-5	Pass
149	6695	-16.39	-16.69	-13.53	8.17	-5.36	-5	Pass
181	6855	-16.23	-17.24	-13.70	8.17	-5.53	-5	Pass

Notes:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
- For U-NII-5, The directional gain is 8.15 dBi.
- For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 26-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
2	5935	-18.30	-18.91	-15.58	8.15	-7.43	-5	Pass
1	5955	-15.87	-17.25	-13.50	8.15	-5.35	-5	Pass
45	6175	-15.58	-17.01	-13.23	8.15	-5.08	-5	Pass
93	6415	-16.17	-17.31	-13.69	8.15	-5.54	-5	Pass
117	6535	-15.66	-17.10	-13.31	8.17	-5.14	-5	Pass
149	6695	-15.62	-17.02	-13.25	8.17	-5.08	-5	Pass
181	6855	-16.09	-17.53	-13.74	8.17	-5.57	-5	Pass

Notes:

- Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
- For U-NII-5, The directional gain is 8.15 dBi.
- For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 52-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
2	5935	-20.40	-20.90	-17.63	8.15	-9.48	-5	Pass
1	5955	-15.59	-17.40	-13.39	8.15	-5.24	-5	Pass
45	6175	-15.68	-17.01	-13.28	8.15	-5.13	-5	Pass
93	6415	-16.05	-17.28	-13.61	8.15	-5.46	-5	Pass
117	6535	-15.59	-17.04	-13.24	8.17	-5.07	-5	Pass
149	6695	-15.85	-17.56	-13.61	8.17	-5.44	-5	Pass
181	6855	-15.89	-17.29	-13.52	8.17	-5.35	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 106-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
2	5935	-19.21	-19.81	-16.49	8.15	-8.34	-5	Pass
1	5955	-15.71	-16.93	-13.27	8.15	-5.12	-5	Pass
45	6175	-15.72	-16.84	-13.23	8.15	-5.08	-5	Pass
93	6415	-15.80	-17.19	-13.43	8.15	-5.28	-5	Pass
117	6535	-15.69	-16.83	-13.21	8.17	-5.04	-5	Pass
149	6695	-15.67	-17.03	-13.29	8.17	-5.12	-5	Pass
181	6855	-16.28	-16.58	-13.42	8.17	-5.25	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20) 242-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
2	5935	-17.45	-18.18	-14.79	8.15	-6.64	-5	Pass
1	5955	-17.52	-18.98	-15.18	8.15	-7.03	-5	Pass
45	6175	-17.53	-18.90	-15.15	8.15	-7	-5	Pass
93	6415	-17.74	-18.88	-15.26	8.15	-7.11	-5	Pass
117	6535	-18.12	-18.84	-15.45	8.17	-7.28	-5	Pass
149	6695	-17.80	-19.58	-15.59	8.17	-7.42	-5	Pass
181	6855	-17.53	-19.33	-15.33	8.17	-7.16	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
2	5935	-16.96	-17.86	-14.38	8.15	-6.23	-5	Pass
1	5955	-16.01	-17.15	-13.53	8.15	-5.38	-5	Pass
45	6175	-16.05	-17.48	-13.70	8.15	-5.55	-5	Pass
93	6415	-15.96	-17.27	-13.56	8.15	-5.41	-5	Pass
117	6535	-15.99	-17.45	-13.65	8.17	-5.48	-5	Pass
149	6695	-16.63	-16.92	-13.76	8.17	-5.59	-5	Pass
181	6855	-16.13	-16.98	-13.52	8.17	-5.35	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE40) 484-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
3	5965	-17.20	-17.72	-14.44	8.15	-6.29	-5	Pass
43	6165	-16.35	-17.46	-13.86	8.15	-5.71	-5	Pass
91	6405	-16.65	-17.84	-14.19	8.15	-6.04	-5	Pass
123	6565	-16.68	-17.72	-14.16	8.17	-5.99	-5	Pass
155	6725	-16.60	-17.53	-14.03	8.17	-5.86	-5	Pass
179	6845	-16.66	-18.30	-14.39	8.17	-6.22	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
3	5965	-15.65	-17.39	-13.42	8.15	-5.27	-5	Pass
43	6165	-16.02	-17.33	-13.62	8.15	-5.47	-5	Pass
91	6405	-15.64	-17.28	-13.37	8.15	-5.22	-5	Pass
123	6565	-16.05	-17.50	-13.70	8.17	-5.53	-5	Pass
155	6725	-15.90	-17.25	-13.51	8.17	-5.34	-5	Pass
179	6845	-15.87	-17.51	-13.60	8.17	-5.43	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE80) 996-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
7	5985	-17.25	-18.59	-14.86	8.15	-6.71	-5	Pass
39	6145	-17.14	-18.06	-14.57	8.15	-6.42	-5	Pass
87	6385	-17.02	-17.80	-14.38	8.15	-6.23	-5	Pass
135	6625	-17.08	-18.30	-14.64	8.17	-6.47	-5	Pass
151	6705	-17.18	-18.54	-14.80	8.17	-6.63	-5	Pass
167	6785	-17.09	-18.18	-14.59	8.17	-6.42	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
7	5985	-15.74	-17.20	-13.40	8.15	-5.25	-5	Pass
39	6145	-15.73	-16.97	-13.30	8.15	-5.15	-5	Pass
87	6385	-15.79	-16.90	-13.30	8.15	-5.15	-5	Pass
135	6625	-15.84	-17.41	-13.54	8.17	-5.37	-5	Pass
151	6705	-15.82	-17.01	-13.36	8.17	-5.19	-5	Pass
167	6785	-15.96	-17.33	-13.58	8.17	-5.41	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

802.11ax (HE160) 2x996-tone RU

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
15	6025	-17.77	-18.77	-15.23	8.15	-7.08	-5	Pass
47	6185	-17.70	-19.05	-15.31	8.15	-7.16	-5	Pass
79	6345	-18.43	-18.93	-15.66	8.15	-7.51	-5	Pass
143	6665	-18.31	-19.04	-15.65	8.17	-7.48	-5	Pass

Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

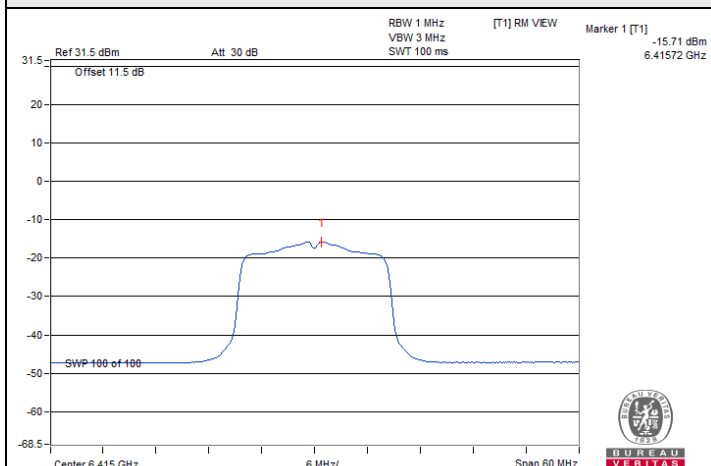
802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Directional Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Test Result
		Chain 0	Chain 1					
15	6025	-17.21	-18.58	-14.83	8.15	-6.68	-5	Pass
47	6185	-17.16	-18.63	-14.82	8.15	-6.67	-5	Pass
79	6345	-17.13	-18.48	-14.74	8.15	-6.59	-5	Pass
143	6665	-17.02	-18.37	-14.63	8.17	-6.46	-5	Pass

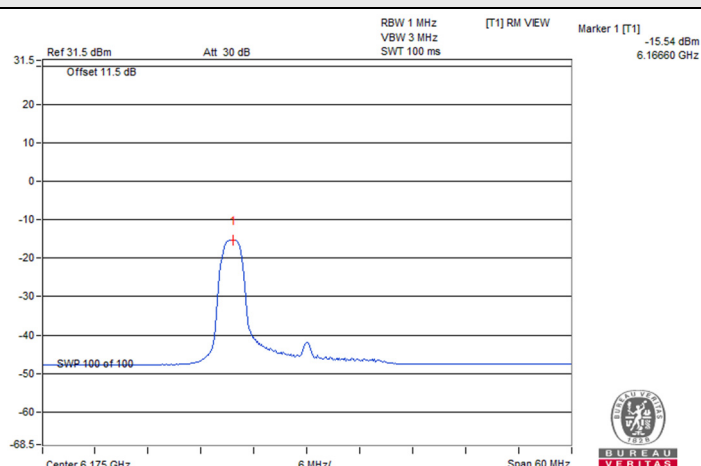
Notes:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = gain of antenna element + 10 log (2 of TX antenna elements)
3. For U-NII-5, The directional gain is 8.15 dBi.
4. For U-NII-7, The directional gain is 8.17 dBi.

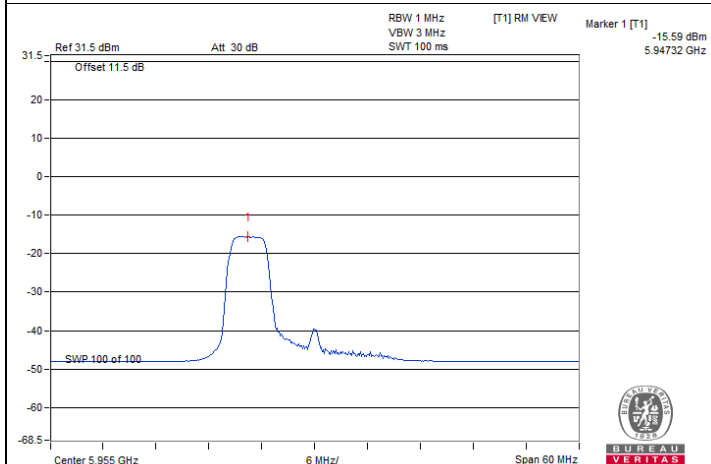
Spectrum Plot of Maximum Value



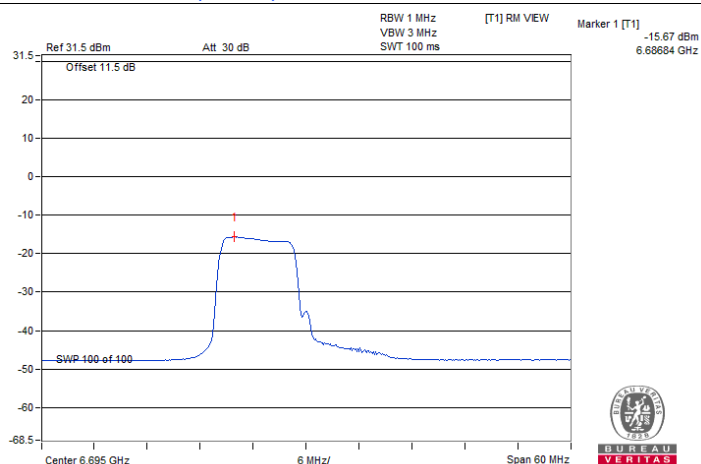
802.11a / Chain 0 : CH 93



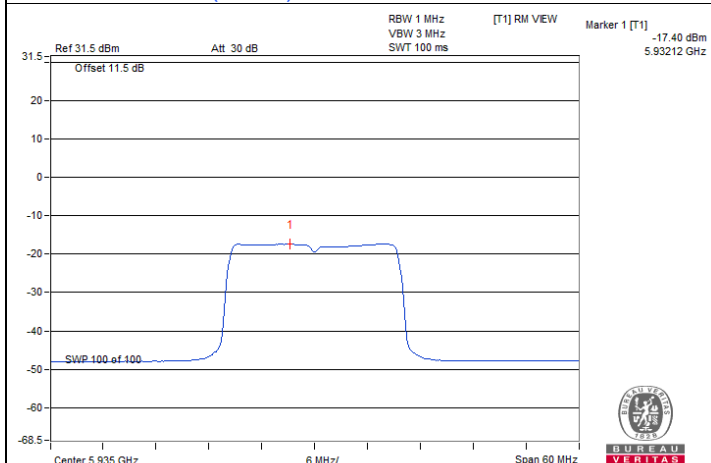
802.11ax (HE20) 26-tone RU / Chain 0 : CH 45



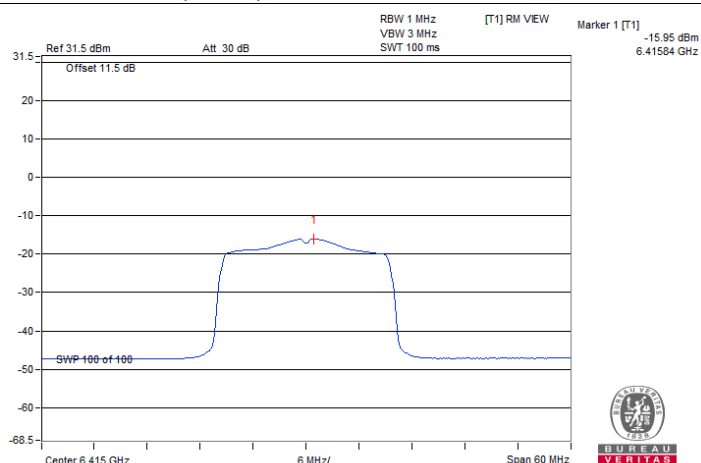
802.11ax (HE20) 52-tone RU / Chain 0 : CH 1



802.11ax (HE20) 106-tone RU / Chain 0 : CH 149

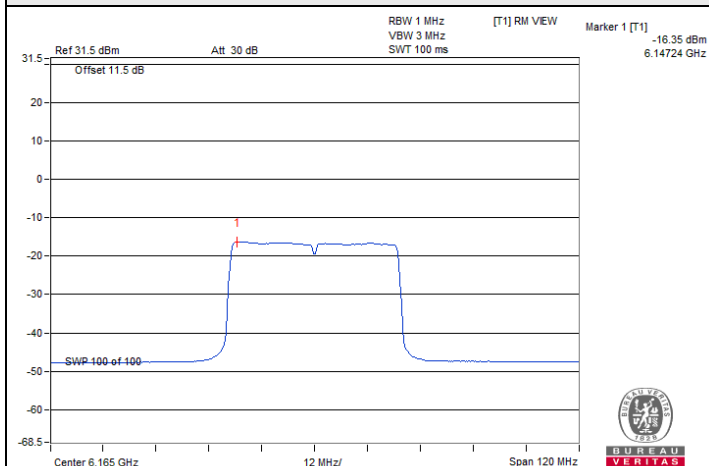


802.11ax (HE20) 242-tone RU / Chain 0 : CH 2

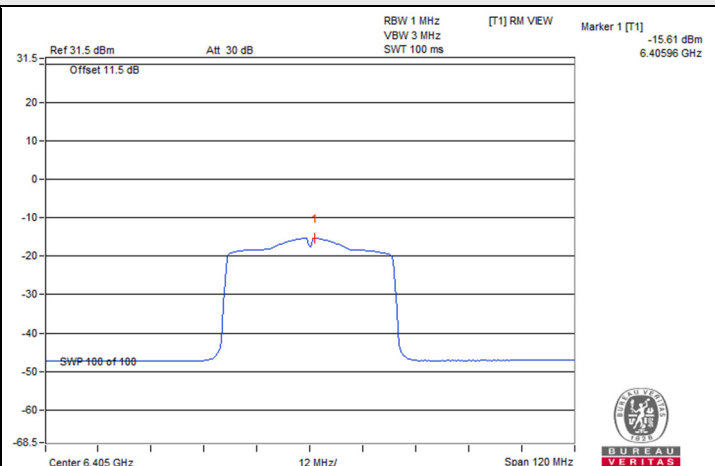


802.11ax (HE20) / Chain 0 : CH 93

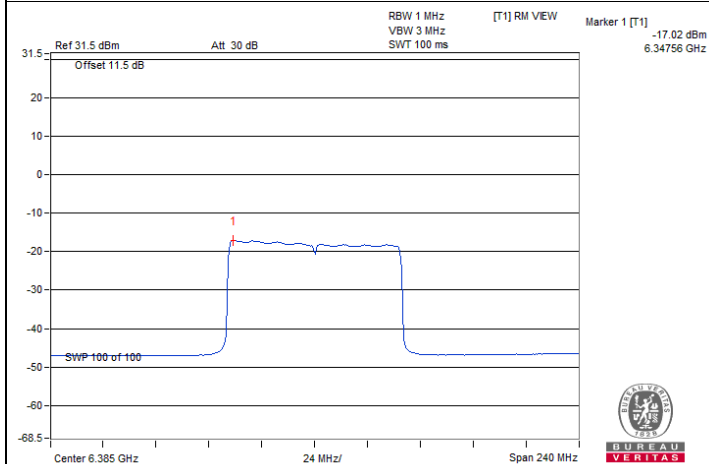
Spectrum Plot of Maximum Value



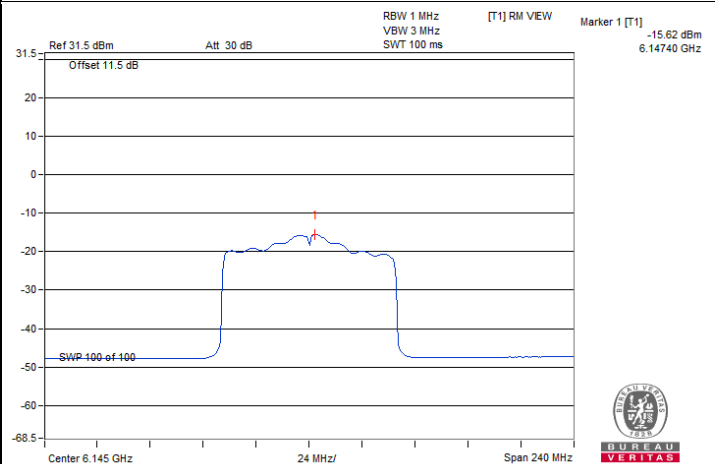
802.11ax (HE40) 484-tone RU / Chain 0 : CH 43



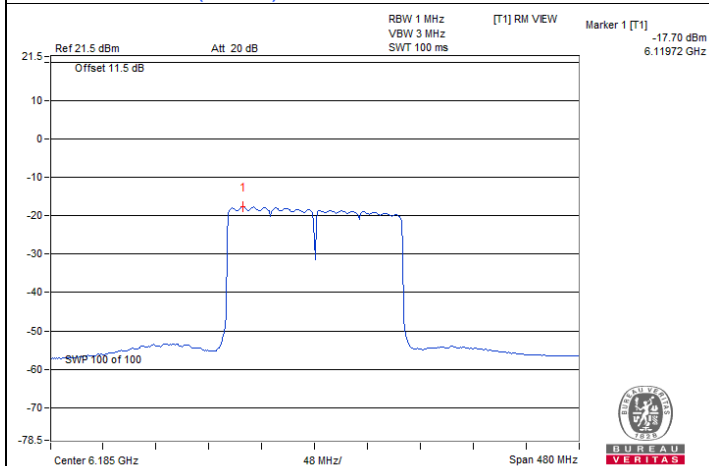
802.11ax (HE40) / Chain 0 : CH 91



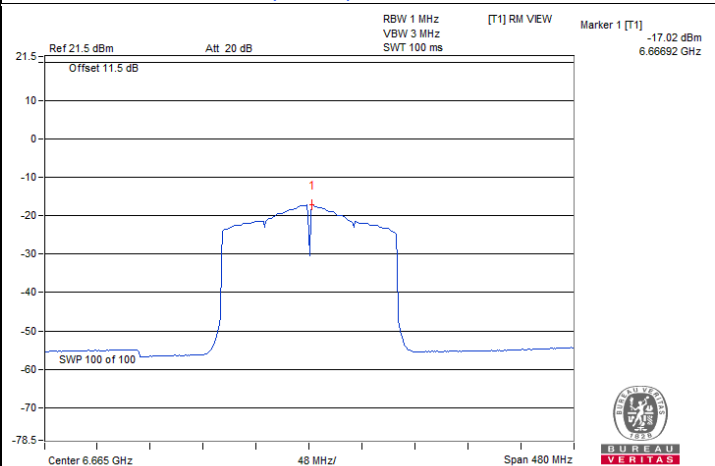
802.11ax (HE80) 996-tone RU / Chain 0 : CH 47



802.11ax (HE80) / Chain 0 : CH 39



802.11ax (HE160) 2x996-tone RU / Chain 0 : CH 47



802.11ax (HE160) / Chain 0 : CH 143

7.3 Emission Bandwidth

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Henry Hsu
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802.11a

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
2	5935	19.21	19.31	320	Pass
1	5955	19.11	19.44	320	Pass
45	6175	19.41	19.53	320	Pass
93	6415	19.31	19.37	320	Pass
117	6535	19.37	19.38	320	Pass
149	6695	19.68	19.45	320	Pass
181	6855	19.37	19.25	320	Pass

802.11ax (HE20) 26-tone RU

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
2	5935	20.39	20.46	320	Pass
1	5955	20.43	20.39	320	Pass
45	6175	20.60	20.57	320	Pass
93	6415	20.76	20.25	320	Pass
117	6535	20.36	20.56	320	Pass
149	6695	20.21	20.55	320	Pass
181	6855	20.42	20.09	320	Pass

802.11ax (HE20) 52-tone RU

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
2	5935	20.80	20.85	320	Pass
1	5955	20.76	20.74	320	Pass
45	6175	20.80	20.82	320	Pass
93	6415	20.59	20.50	320	Pass
117	6535	21.11	20.89	320	Pass
149	6695	20.97	21.31	320	Pass
181	6855	20.51	20.23	320	Pass

802.11ax (HE20) 106-tone RU

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
2	5935	20.89	20.98	320	Pass
1	5955	21.09	21.11	320	Pass
45	6175	20.76	21.46	320	Pass
93	6415	20.70	20.56	320	Pass
117	6535	20.77	20.87	320	Pass
149	6695	21.12	21.00	320	Pass
181	6855	20.45	20.50	320	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
2	5935	20.92	20.83	320	Pass
1	5955	20.73	20.80	320	Pass
45	6175	20.97	20.93	320	Pass
93	6415	20.95	21.00	320	Pass
117	6535	21.19	20.99	320	Pass
149	6695	20.83	20.81	320	Pass
181	6855	20.96	21.14	320	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
3	5965	40.39	40.42	320	Pass
43	6165	40.53	40.82	320	Pass
91	6405	40.65	40.74	320	Pass
123	6565	40.80	40.66	320	Pass
155	6725	40.68	40.85	320	Pass
179	6845	40.74	40.70	320	Pass

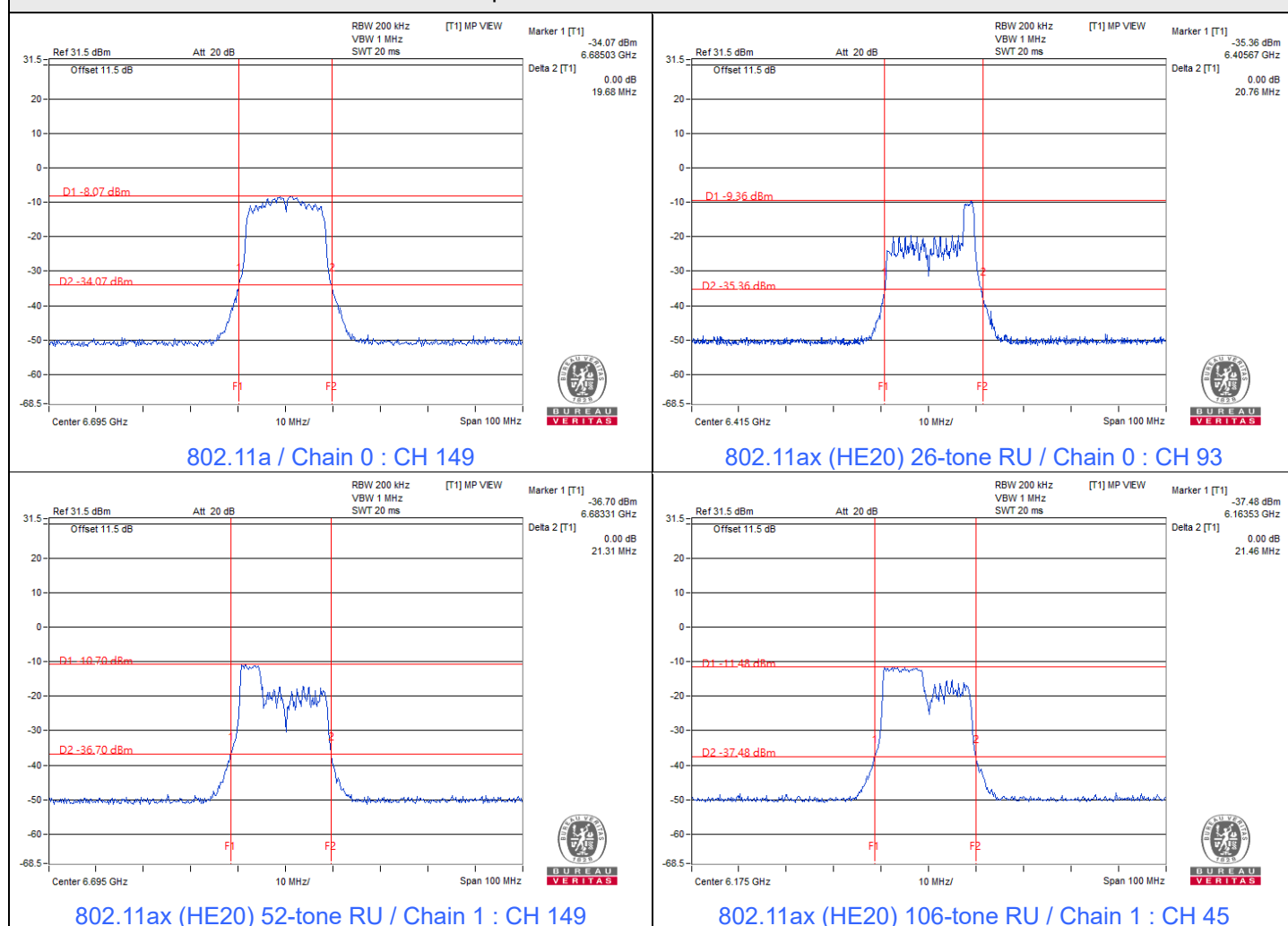
802.11ax (HE80)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
7	5985	82.23	82.01	320	Pass
39	6145	82.96	82.91	320	Pass
87	6385	82.77	82.67	320	Pass
135	6625	82.69	82.27	320	Pass
151	6705	82.80	82.66	320	Pass
167	6785	82.59	82.29	320	Pass

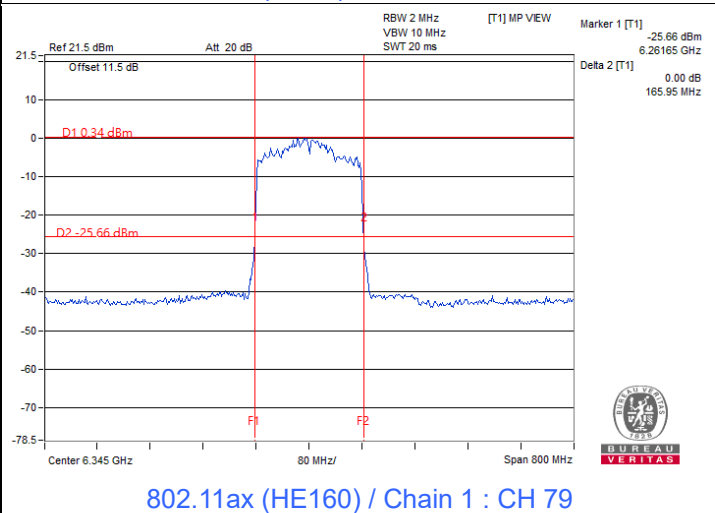
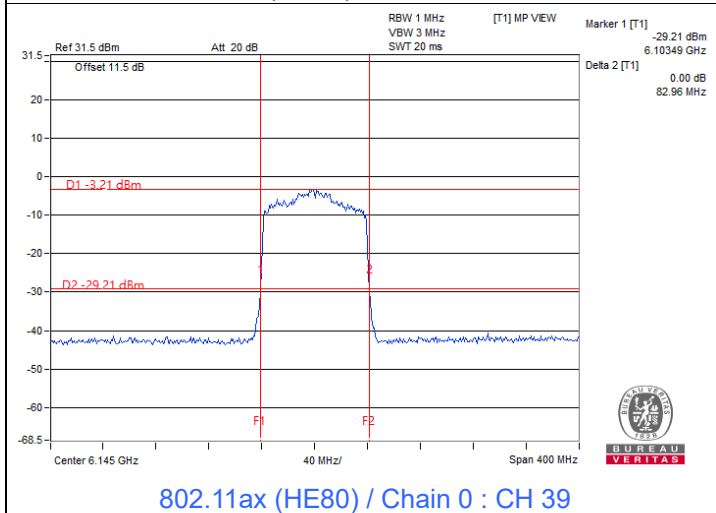
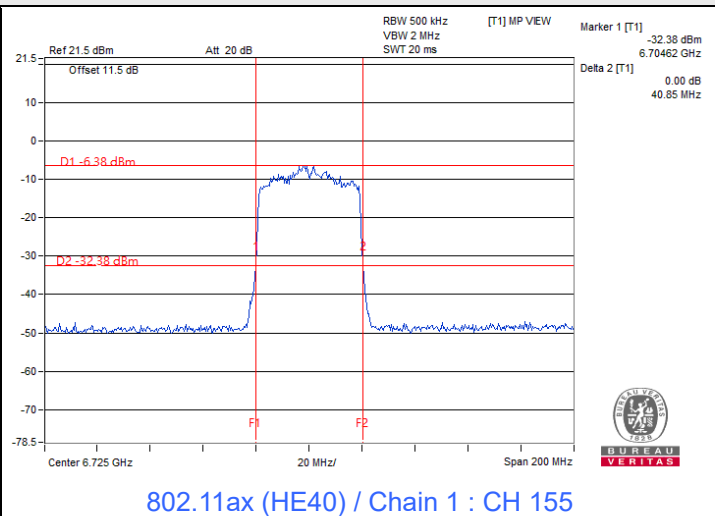
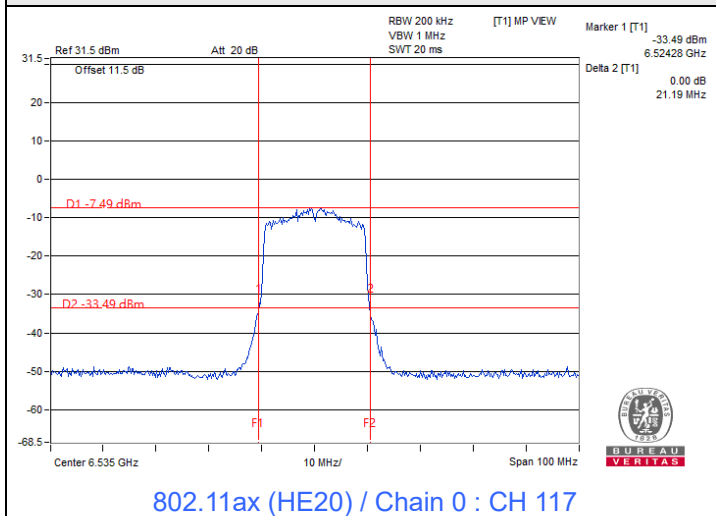
802.11ax (HE160)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)		Maximum Limit (MHz)	Test Result
		Chain 0	Chain 1		
15	6025	164.63	165.45	320	Pass
47	6185	165.80	165.88	320	Pass
79	6345	165.71	165.95	320	Pass
143	6665	165.91	164.94	320	Pass

Spectrum Plot of Maximum Value



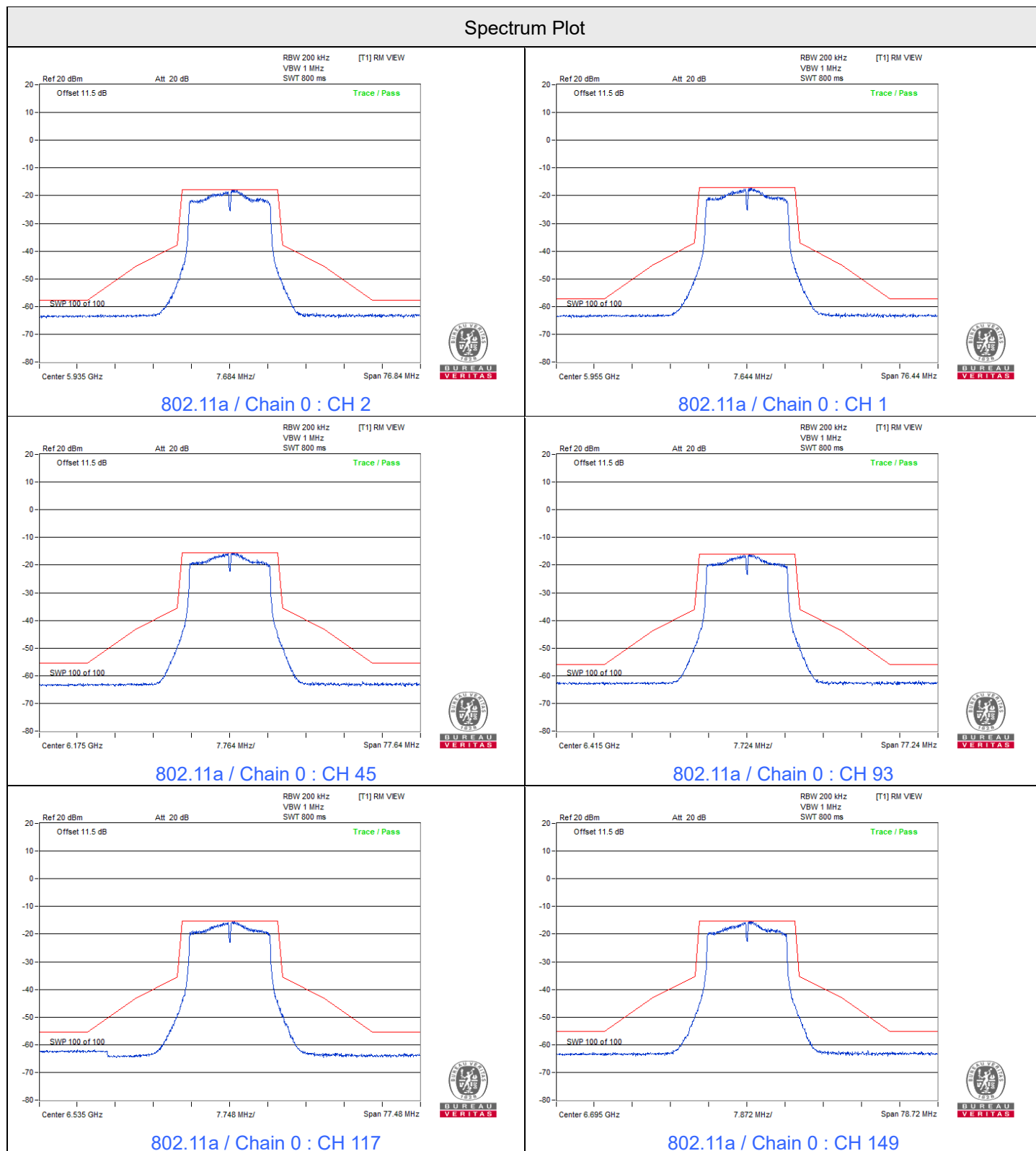
Spectrum Plot of Maximum Value



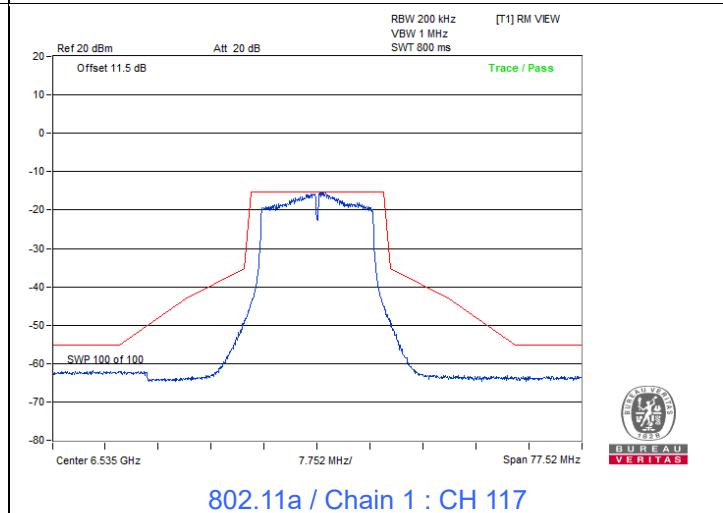
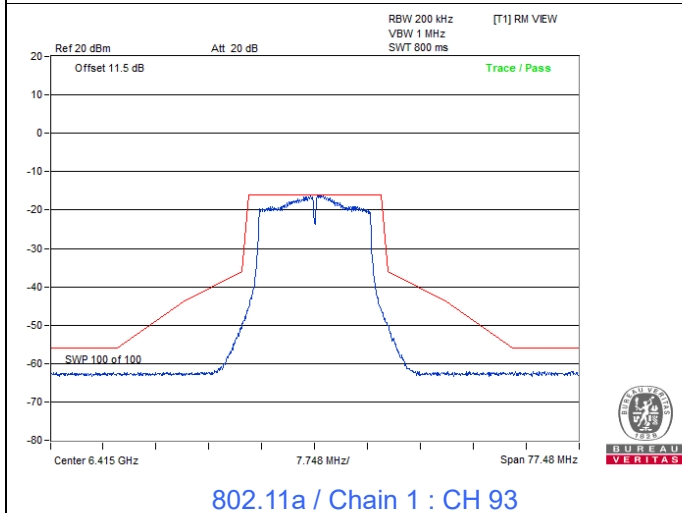
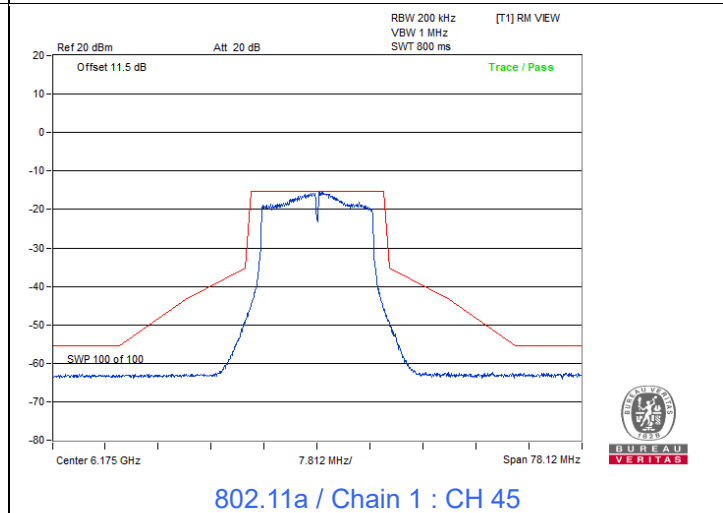
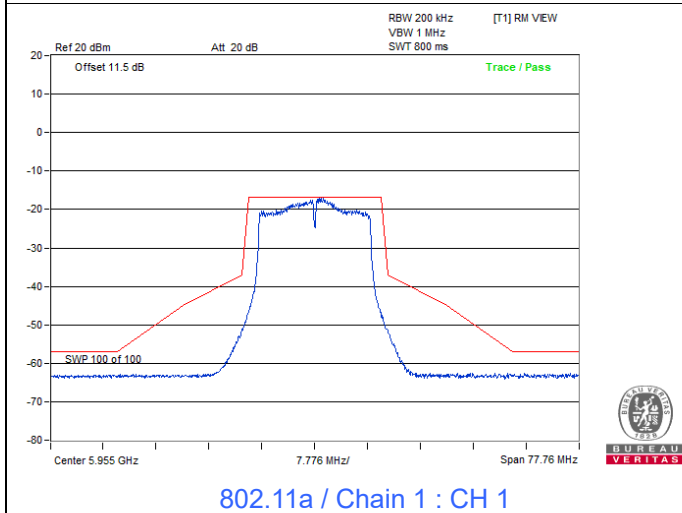
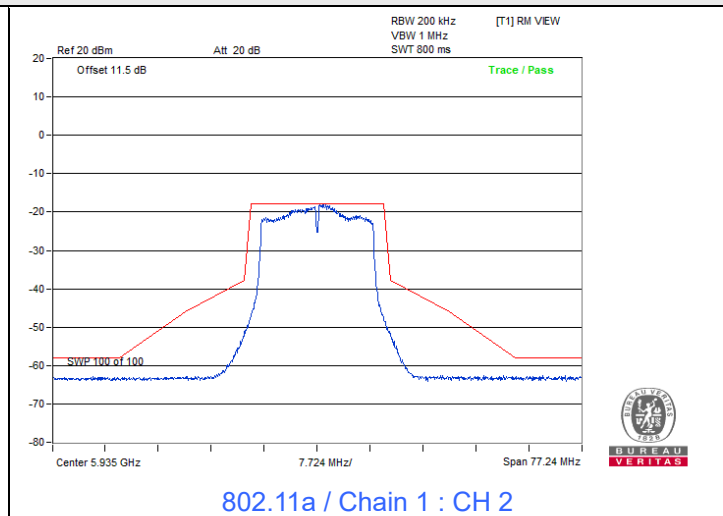
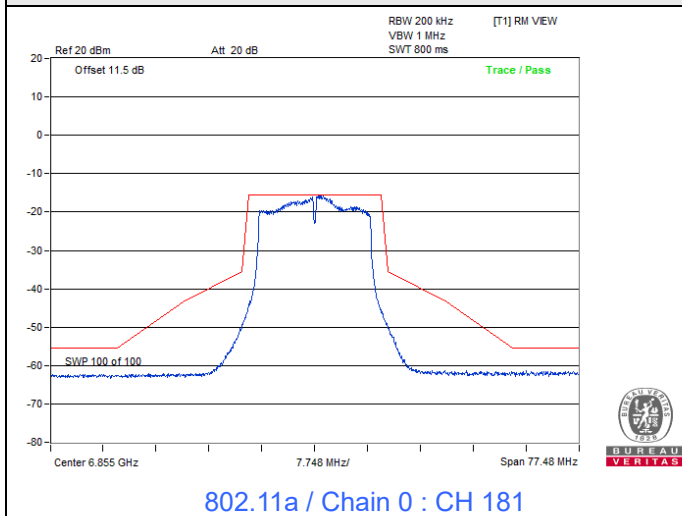
7.4 In-Band Emission Mask

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Henry Hsu
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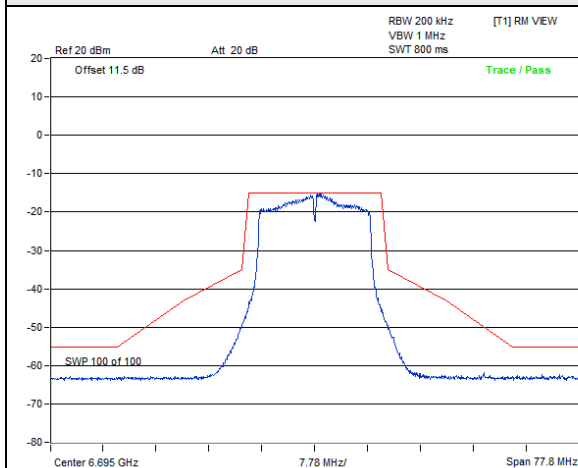
802.11a 802.11a



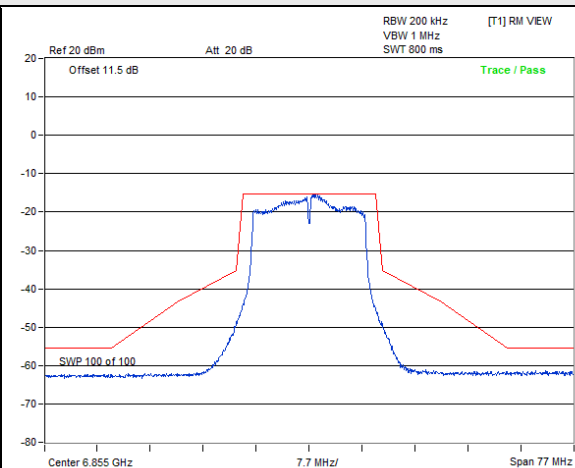
Spectrum Plot



Spectrum Plot



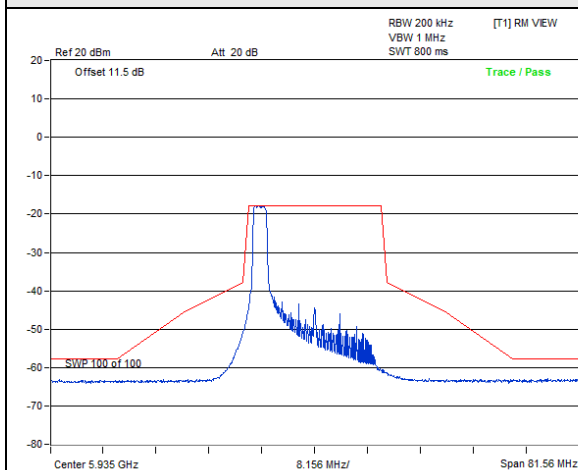
802.11a / Chain 1 : CH 149



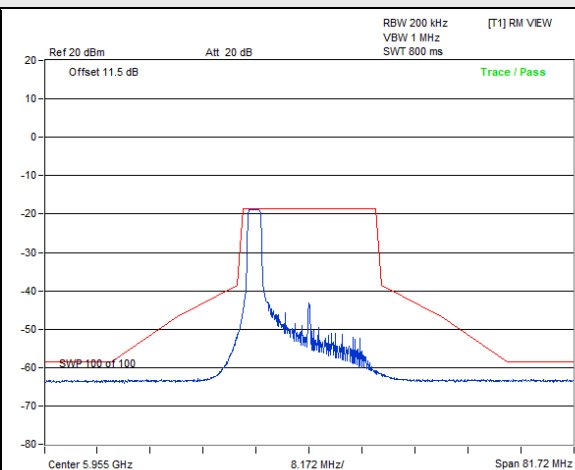
802.11a / Chain 1 : CH 181

802.11ax (HE20) 26-tone RU

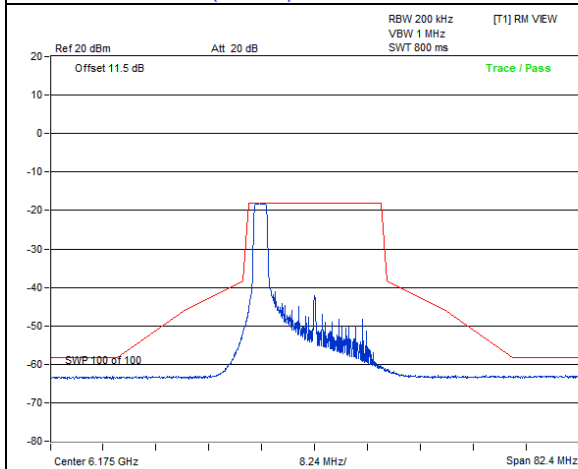
Spectrum Plot



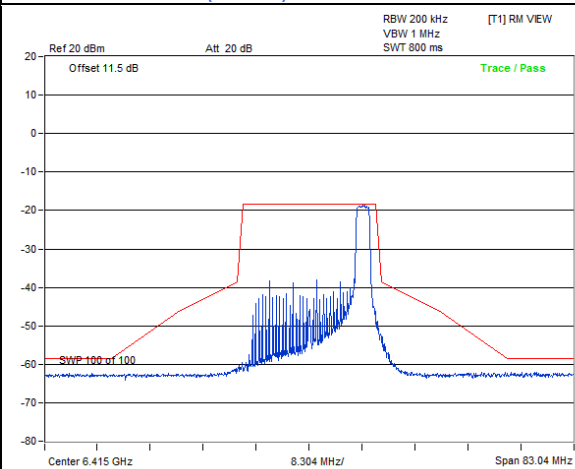
802.11ax (HE20) 26-tone RU / Chain 0 : CH 2



802.11ax (HE20) 26-tone RU / Chain 0 : CH 1

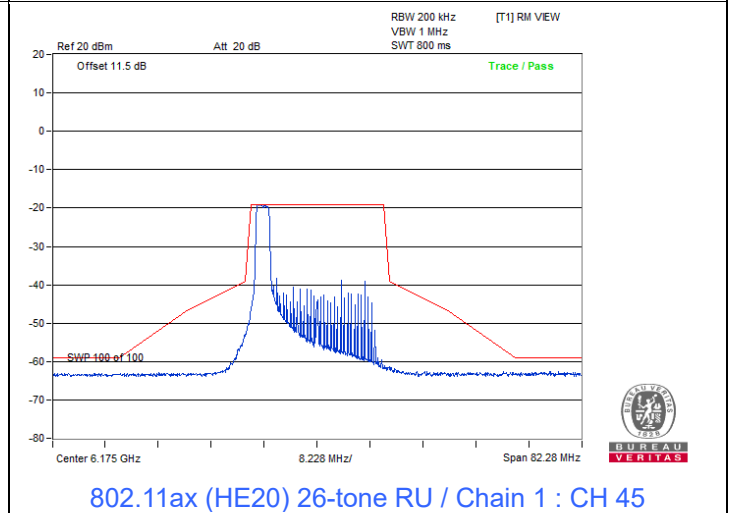
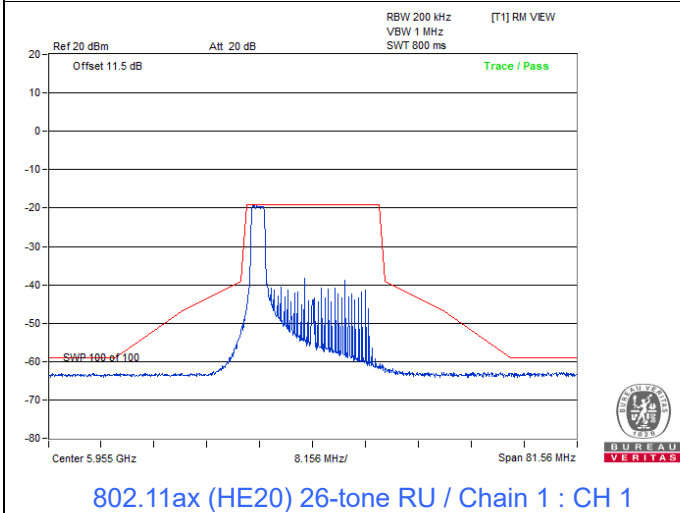
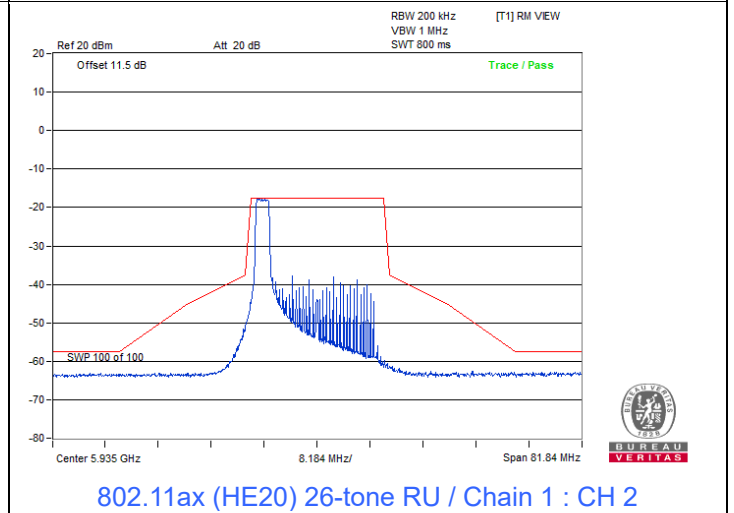
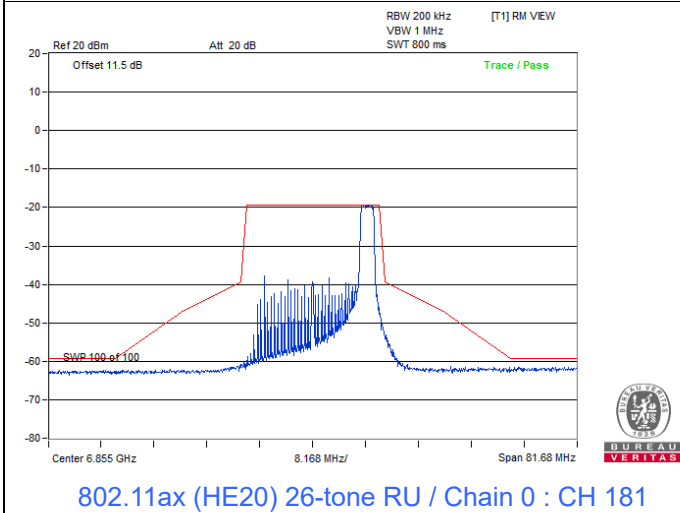
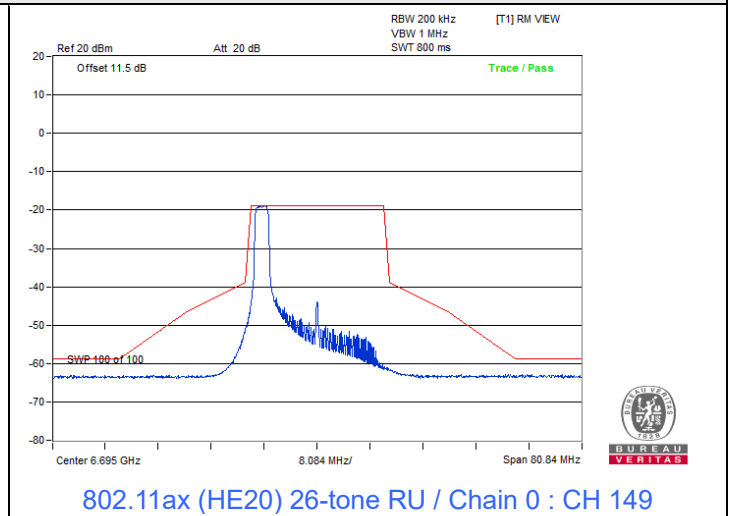
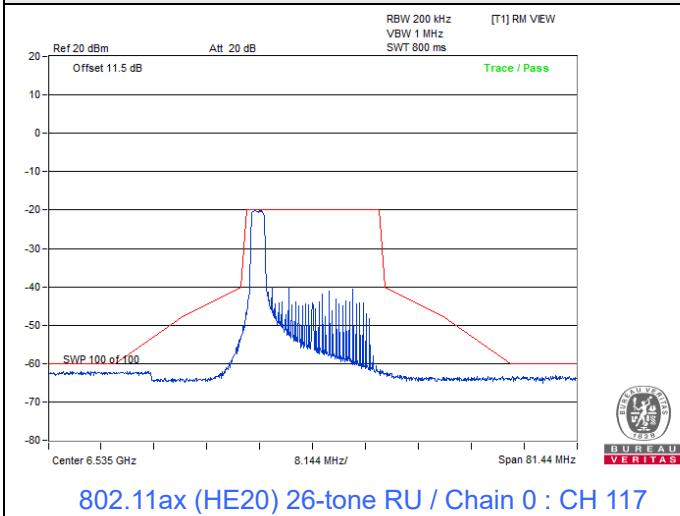


802.11ax (HE20) 26-tone RU / Chain 0 : CH 45

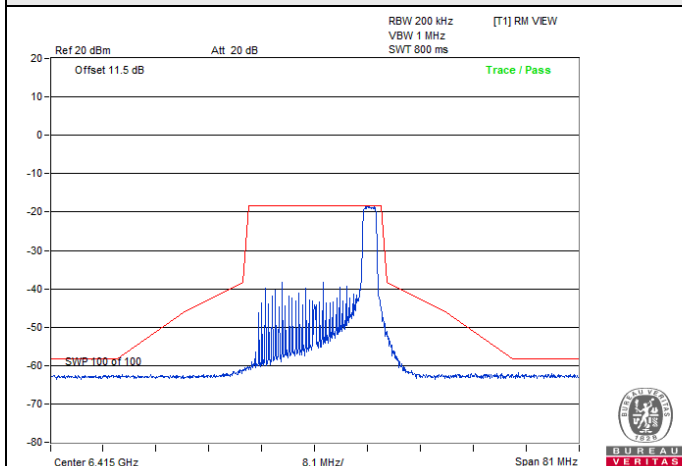


802.11ax (HE20) 26-tone RU / Chain 0 : CH 93

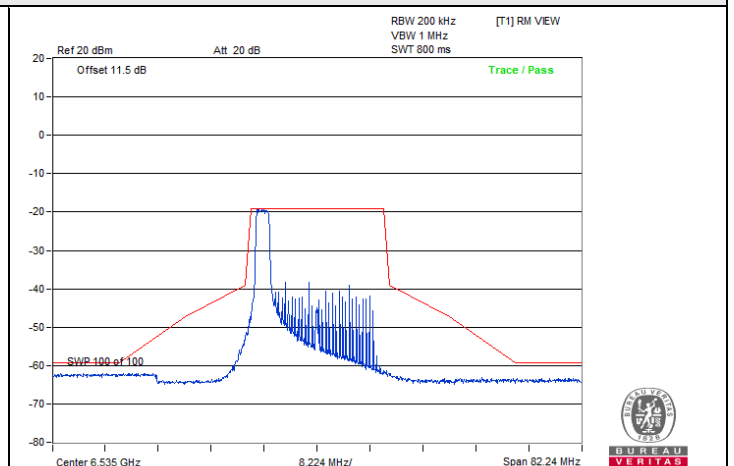
Spectrum Plot



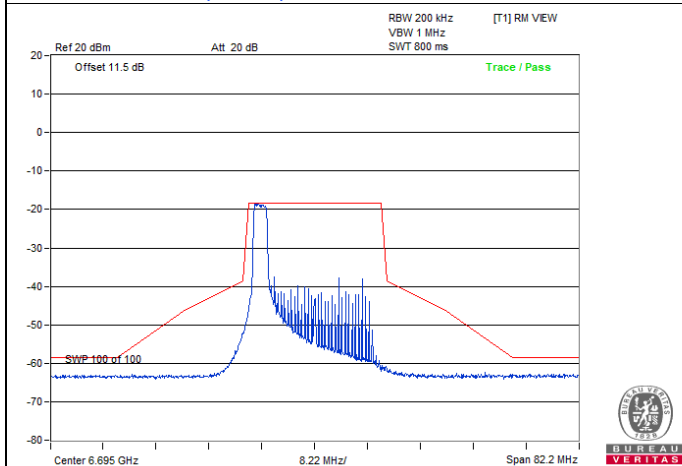
Spectrum Plot



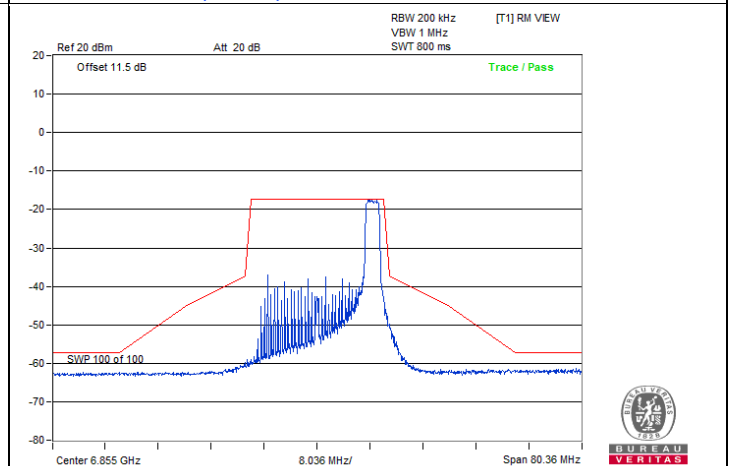
802.11ax (HE20) 26-tone RU / Chain 1 : CH 93



802.11ax (HE20) 26-tone RU / Chain 1 : CH 117



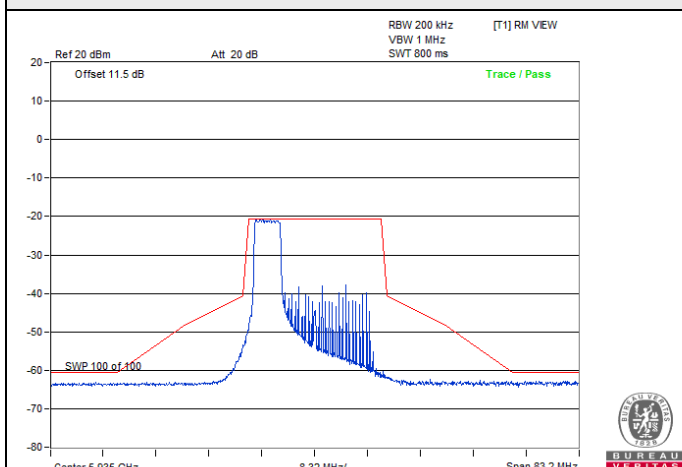
802.11ax (HE20) 26-tone RU / Chain 1 : CH 149



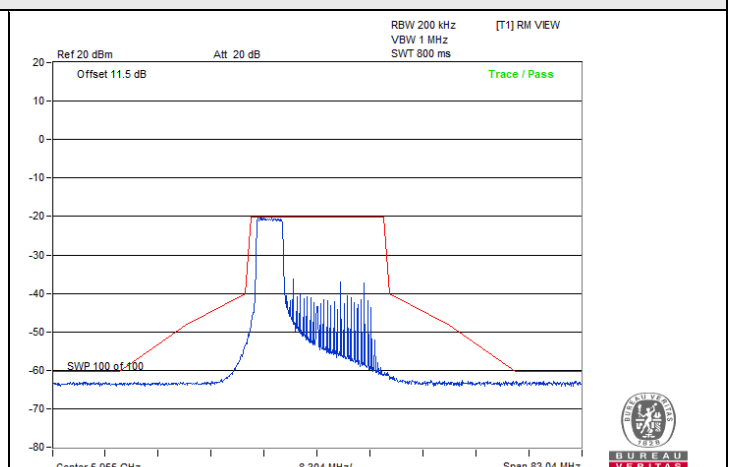
802.11ax (HE20) 26-tone RU / Chain 1 : CH 181

802.11ax (HE20) 52-tone RU

Spectrum Plot

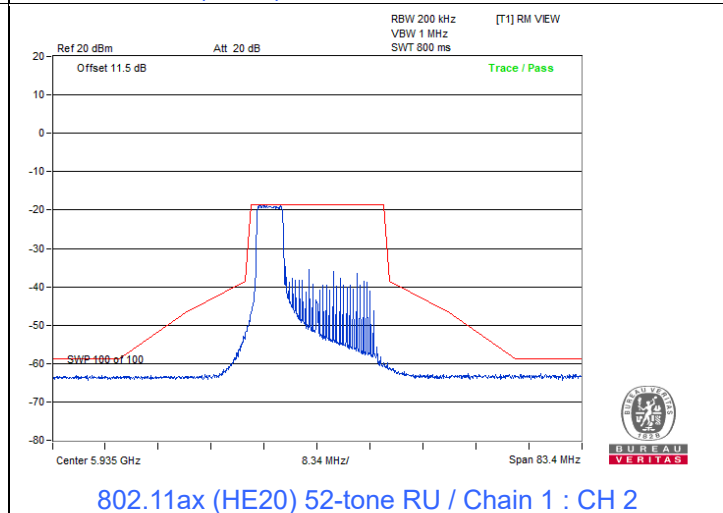
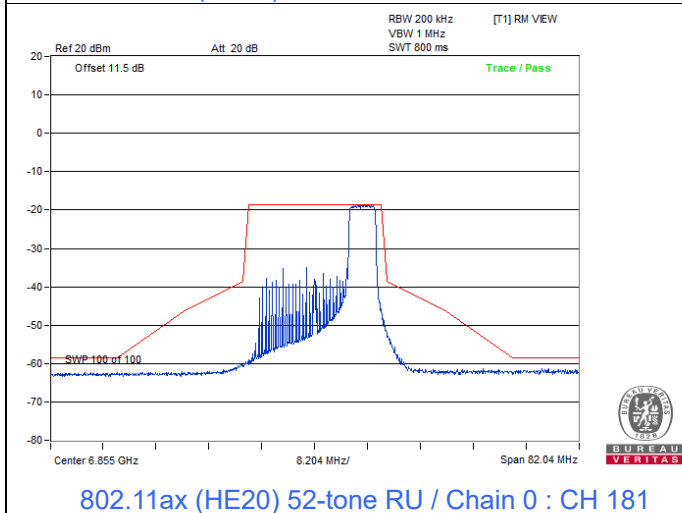
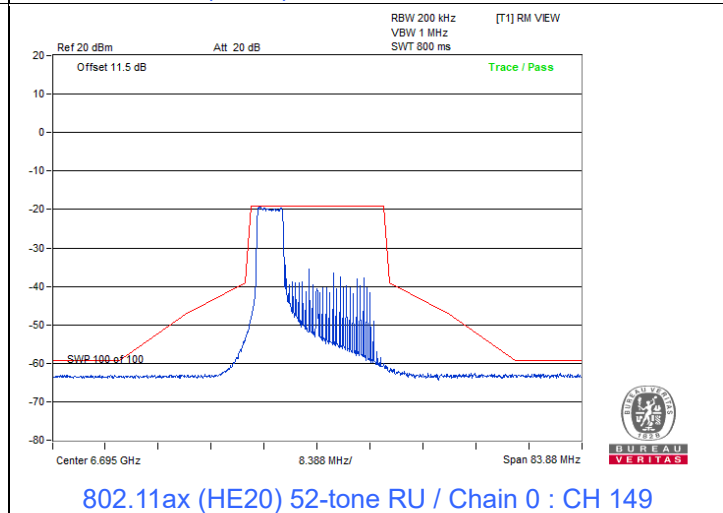
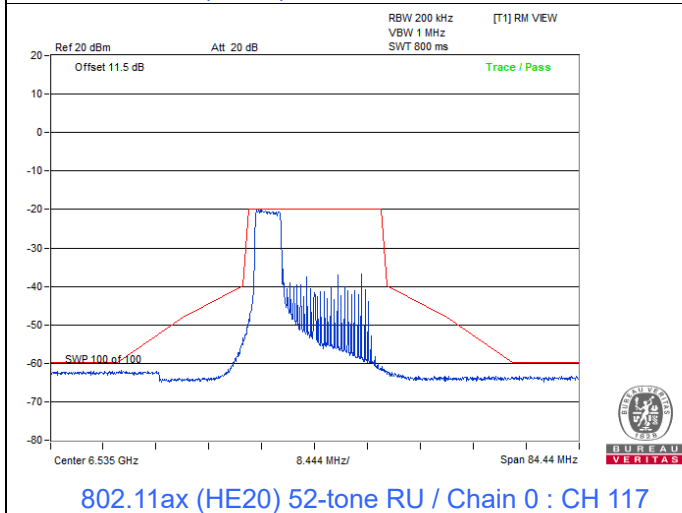
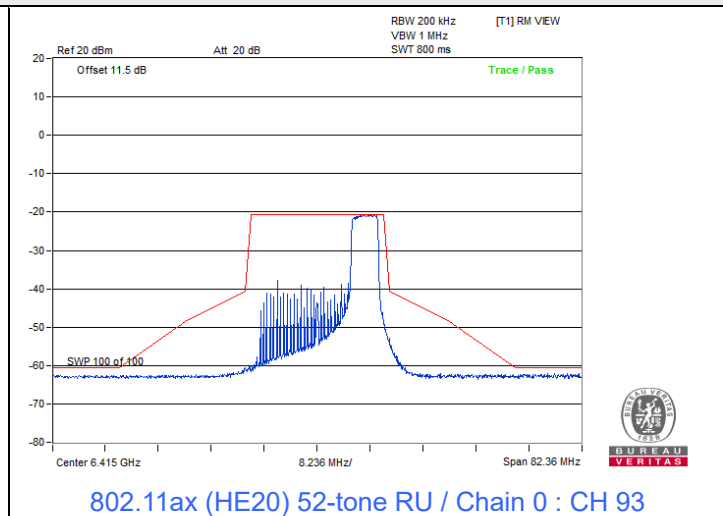
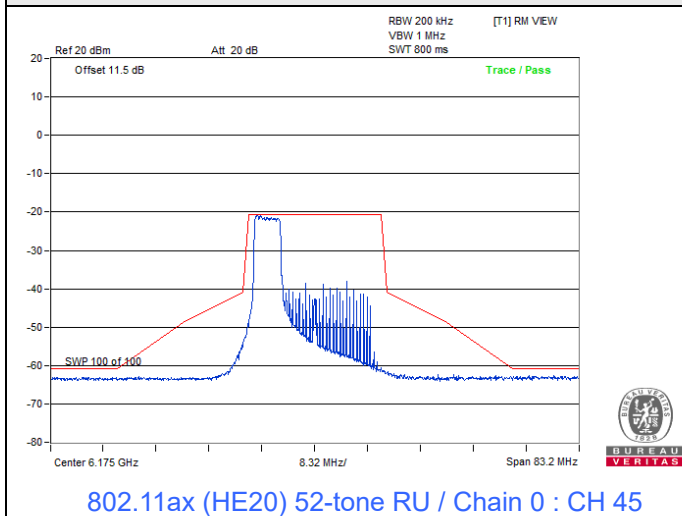


802.11ax (HE20) 52-tone RU / Chain 0 : CH 2

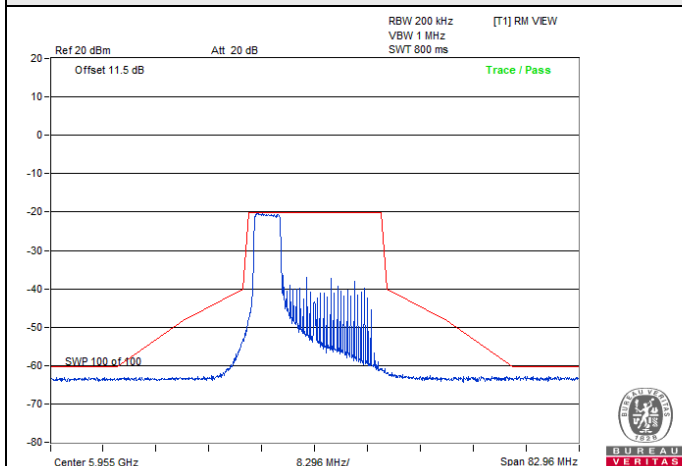


802.11ax (HE20) 52-tone RU / Chain 0 : CH 1

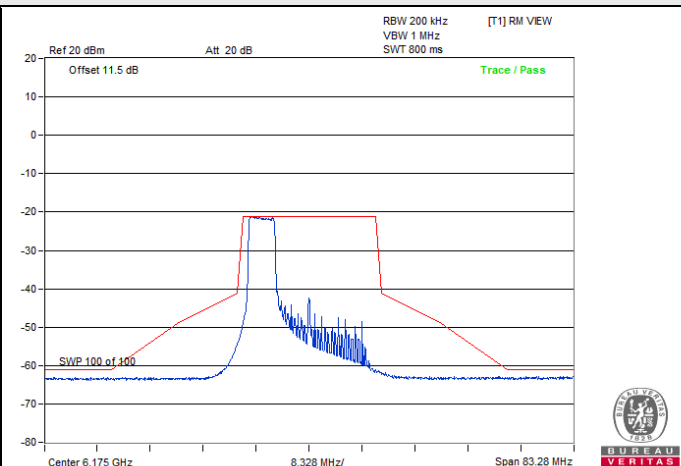
Spectrum Plot



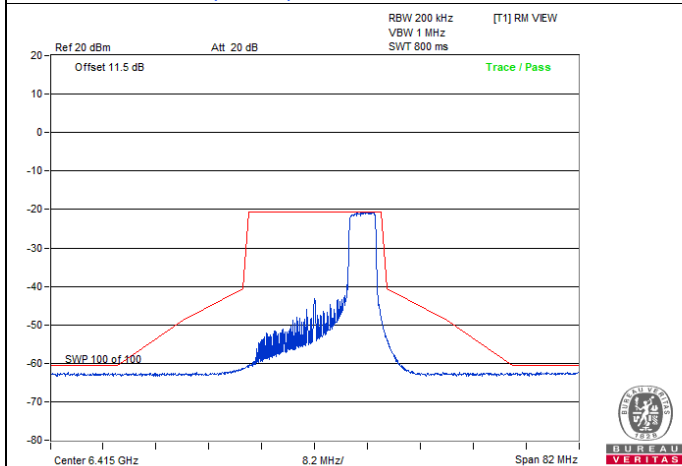
Spectrum Plot



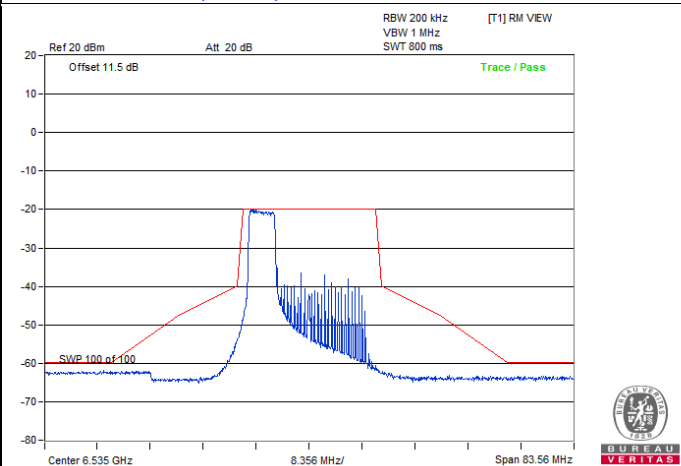
802.11ax (HE20) 52-tone RU / Chain 1 : CH 1



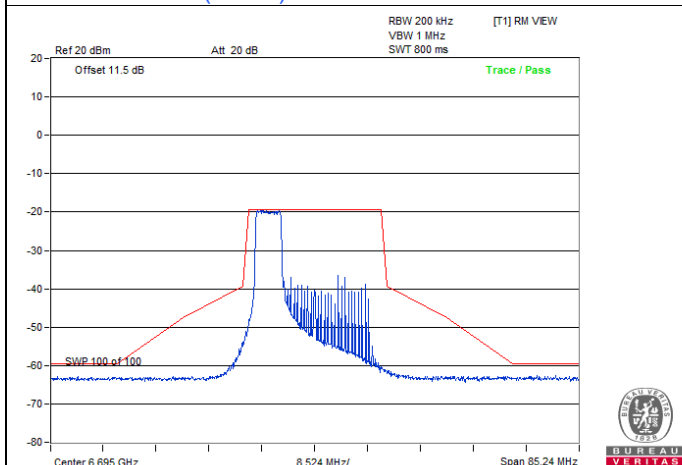
802.11ax (HE20) 52-tone RU / Chain 1 : CH 45



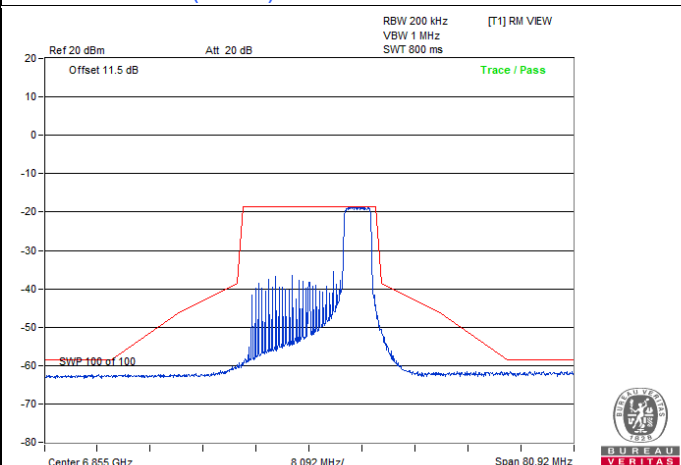
802.11ax (HE20) 52-tone RU / Chain 1 : CH 93



802.11ax (HE20) 52-tone RU / Chain 1 : CH 117



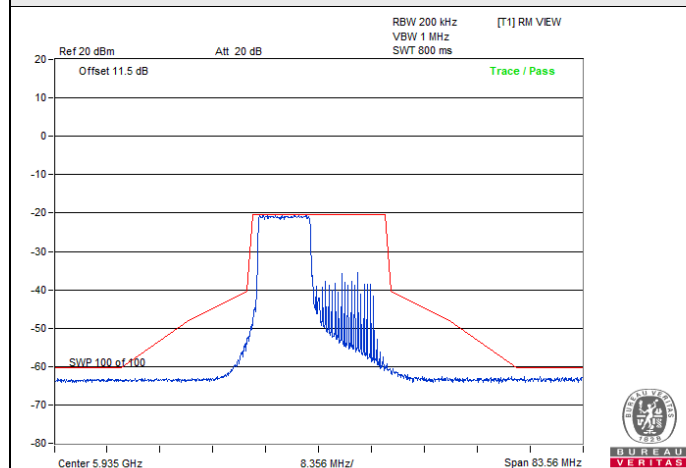
802.11ax (HE20) 52-tone RU / Chain 1 : CH 149



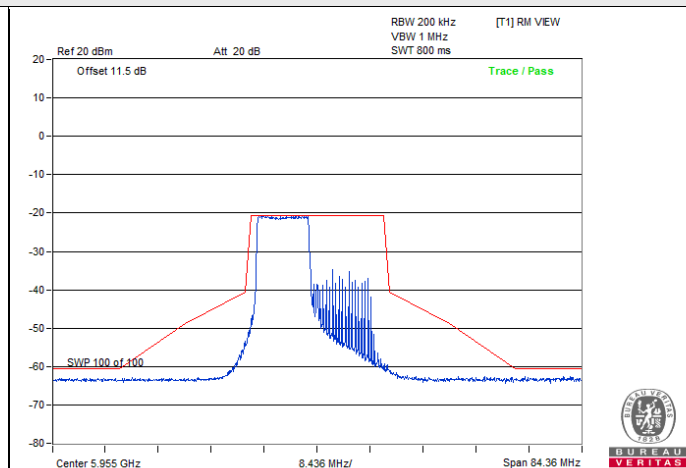
802.11ax (HE20) 52-tone RU / Chain 1 : CH 181

802.11ax (HE20) 106-tone RU

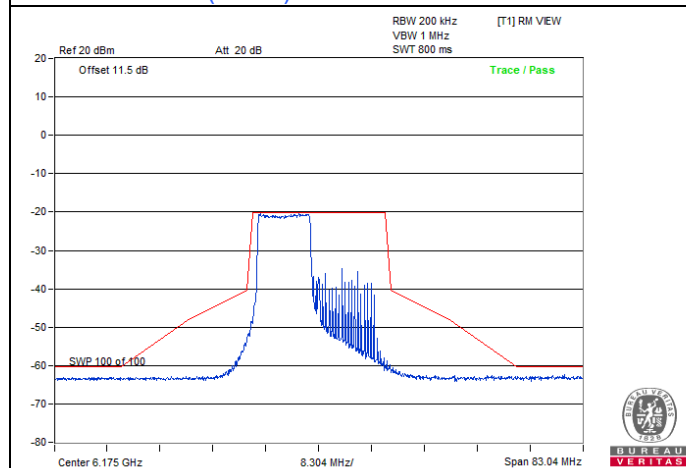
Spectrum Plot



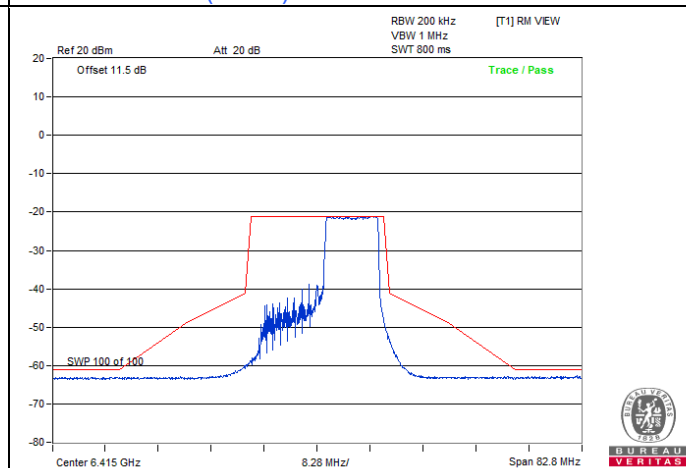
802.11ax (HE20) 106-tone RU / Chain 0 : CH 2



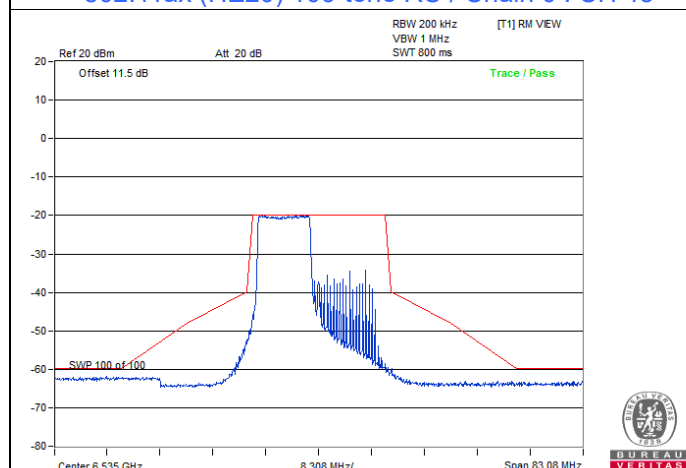
802.11ax (HE20) 106-tone RU / Chain 0 : CH 1



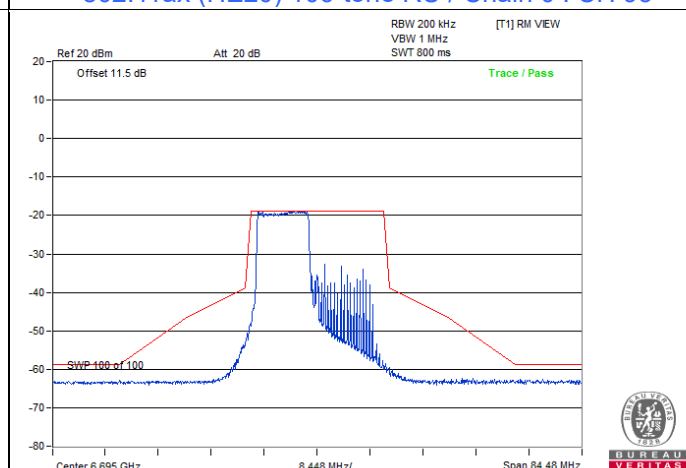
802.11ax (HE20) 106-tone RU / Chain 0 : CH 45



802.11ax (HE20) 106-tone RU / Chain 0 : CH 93

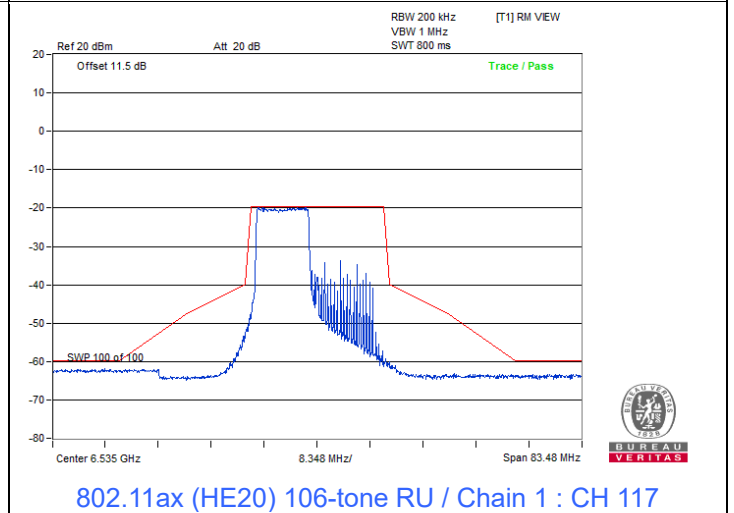
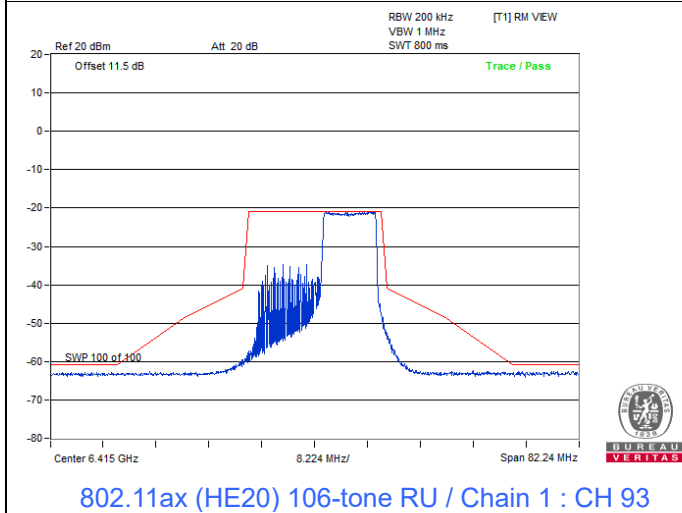
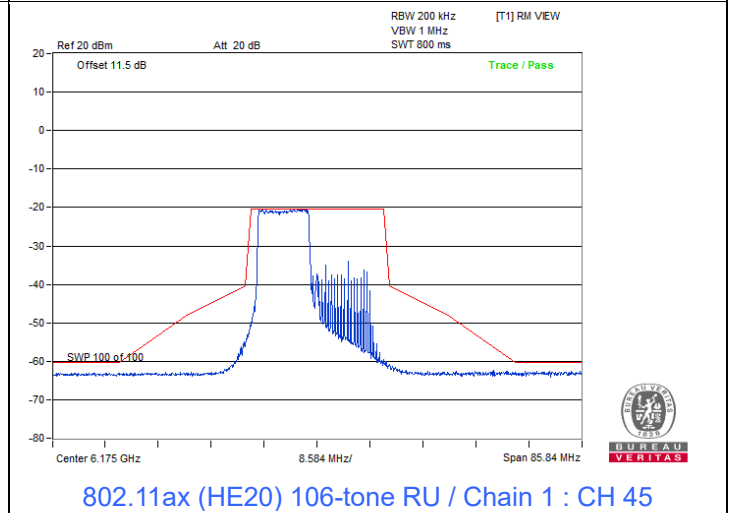
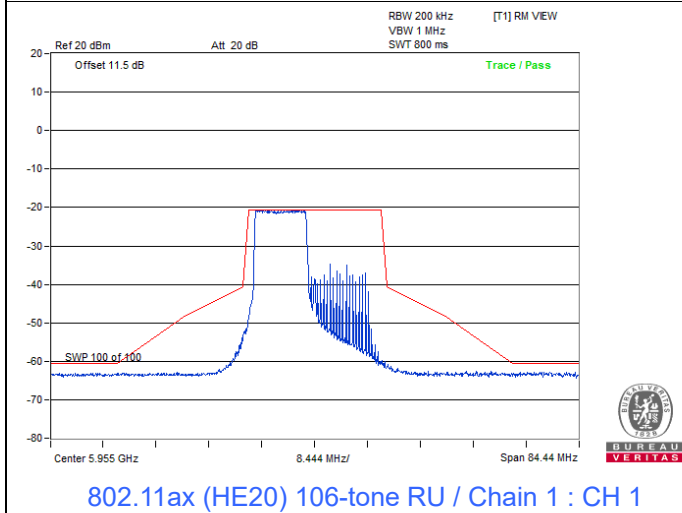
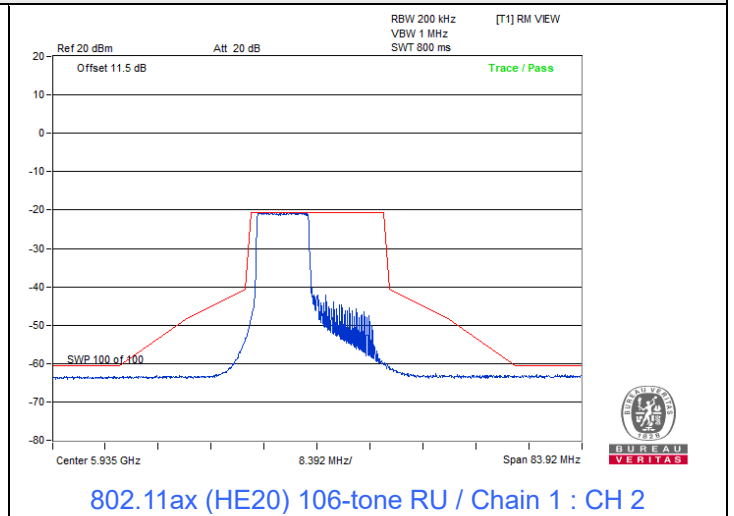
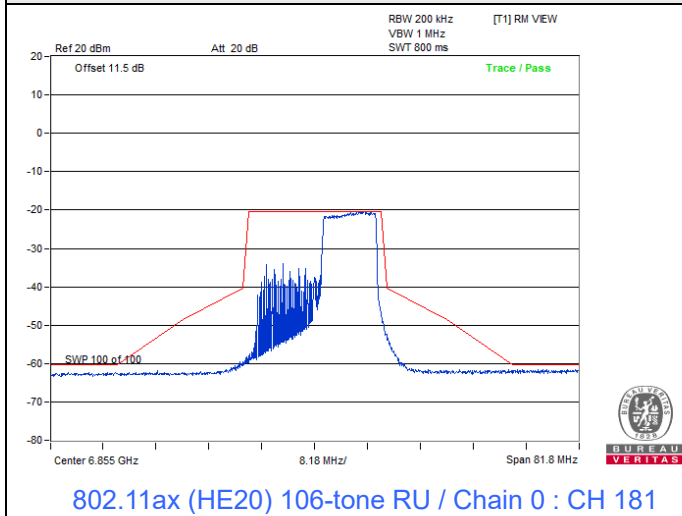


802.11ax (HE20) 106-tone RU / Chain 0 : CH 117

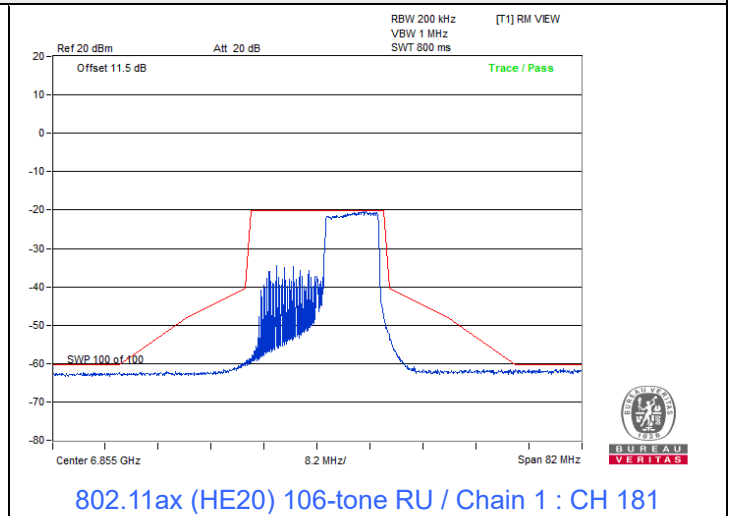
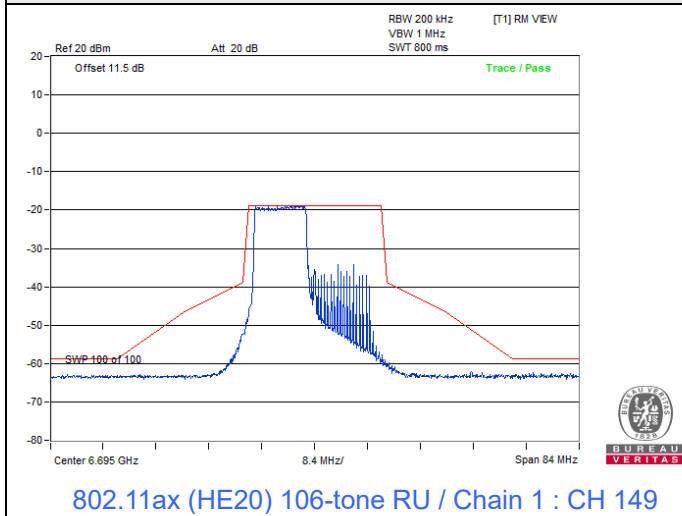


802.11ax (HE20) 106-tone RU / Chain 0 : CH 149

Spectrum Plot

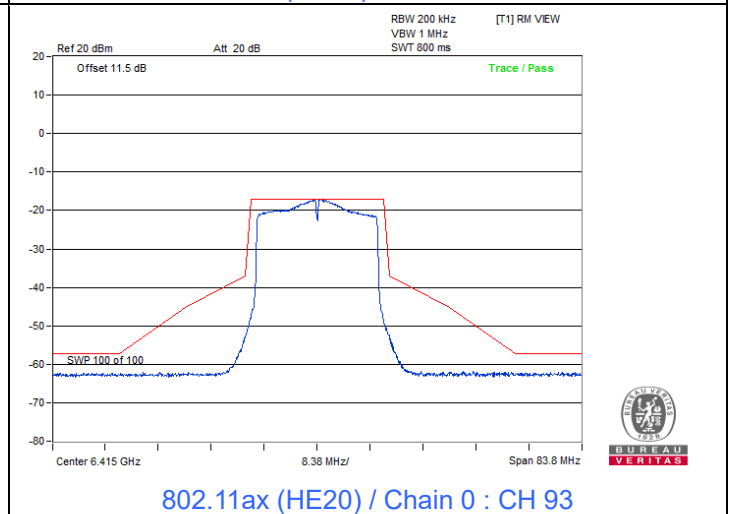
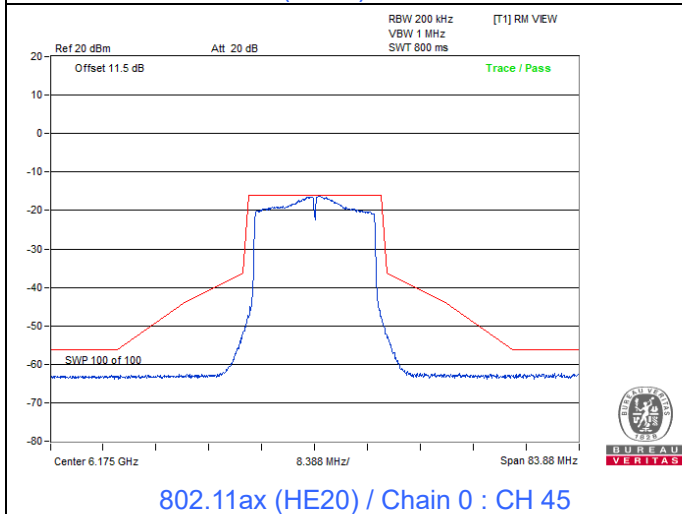
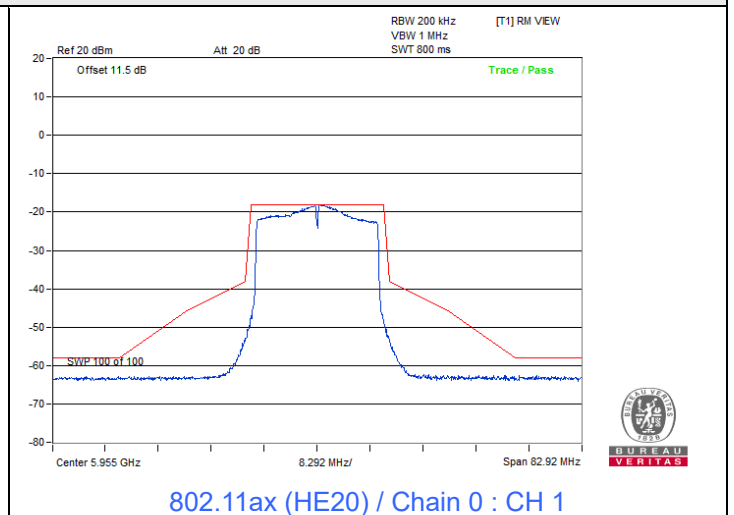
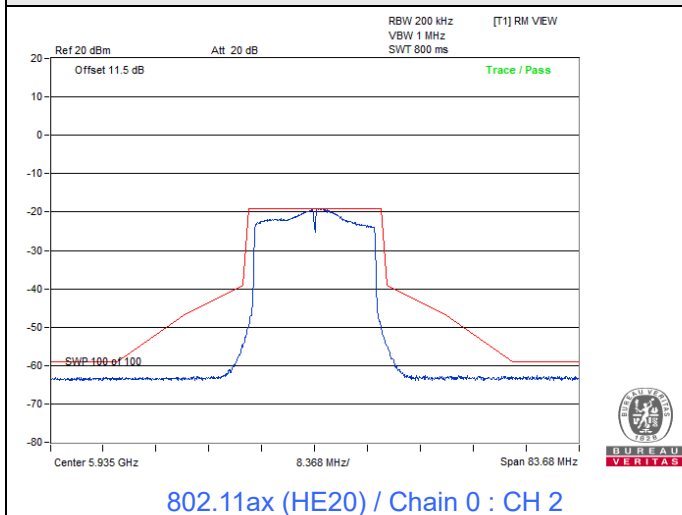


Spectrum Plot

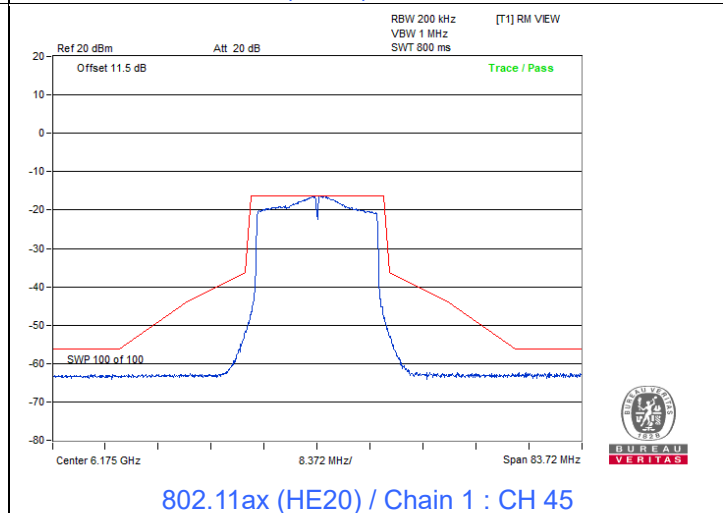
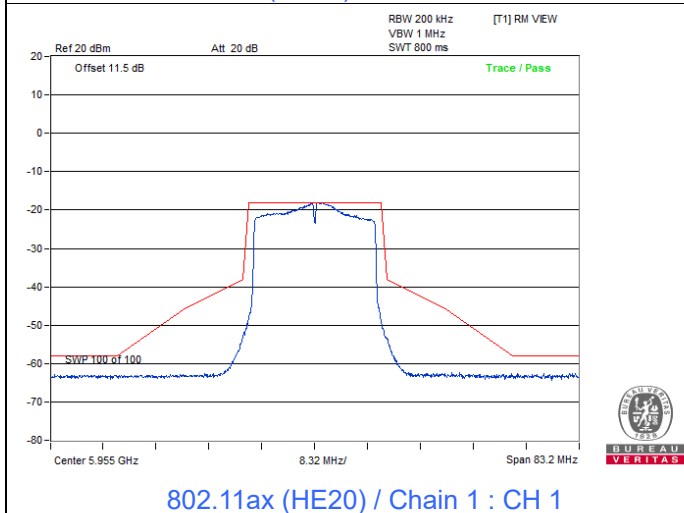
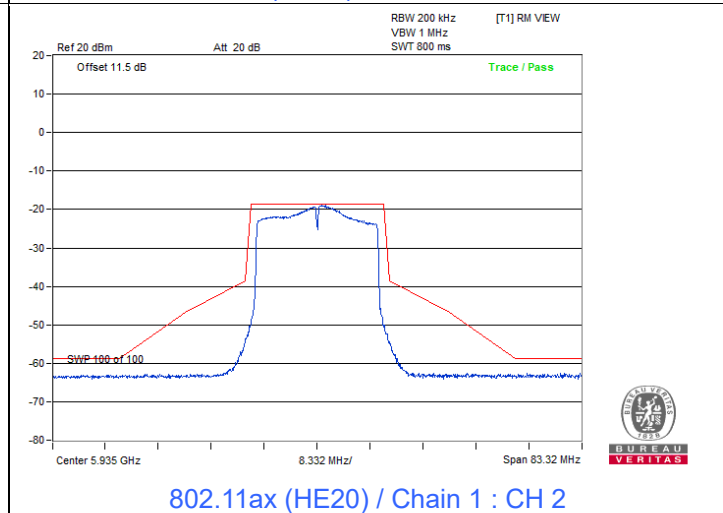
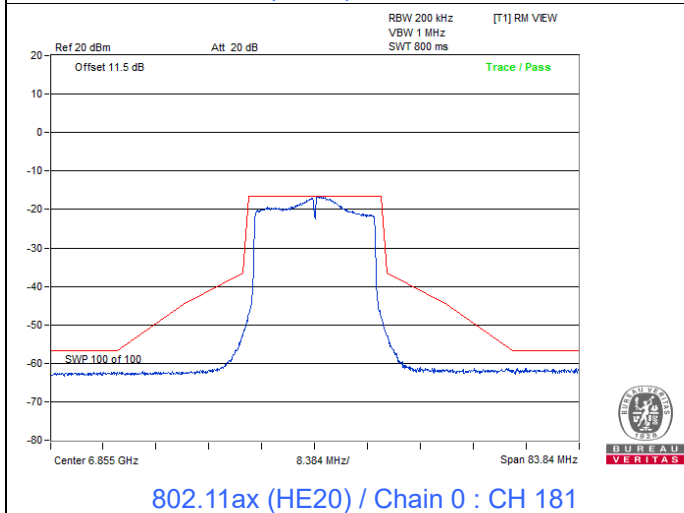
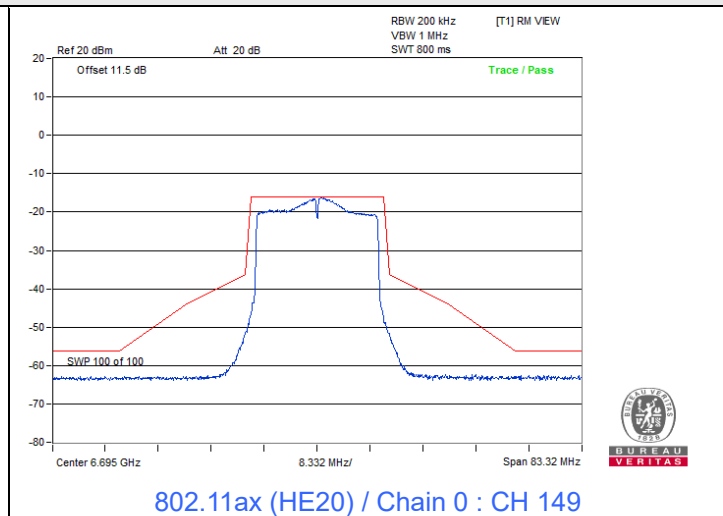
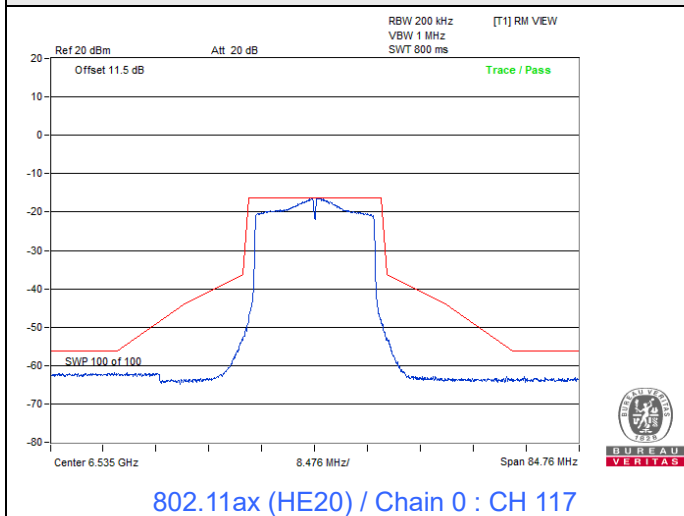


802.11ax (HE20)

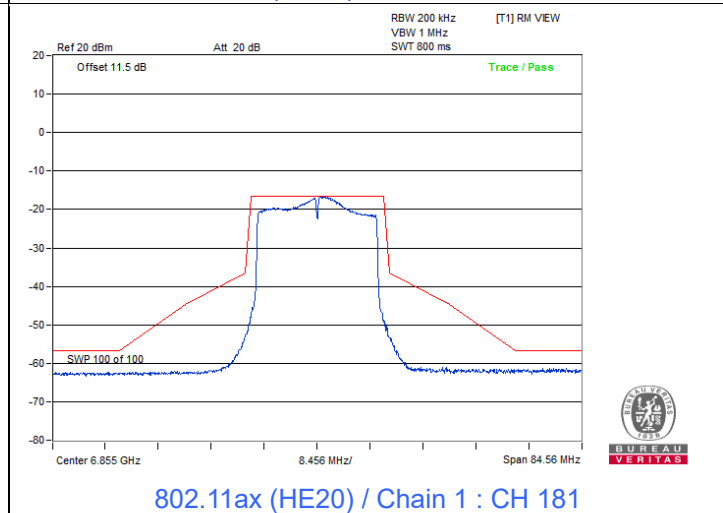
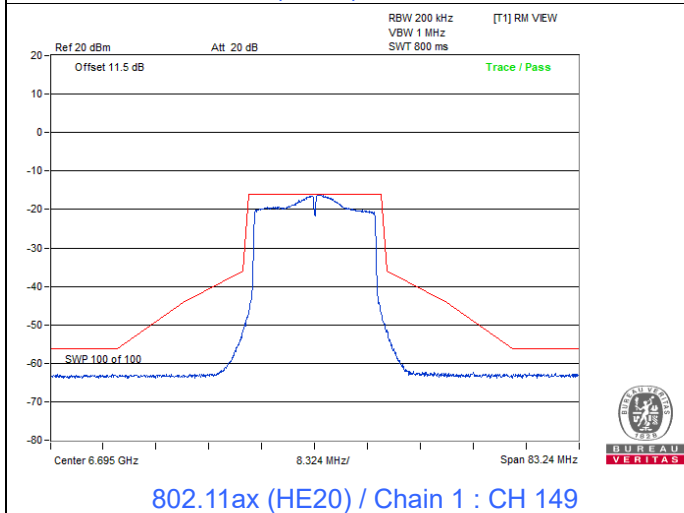
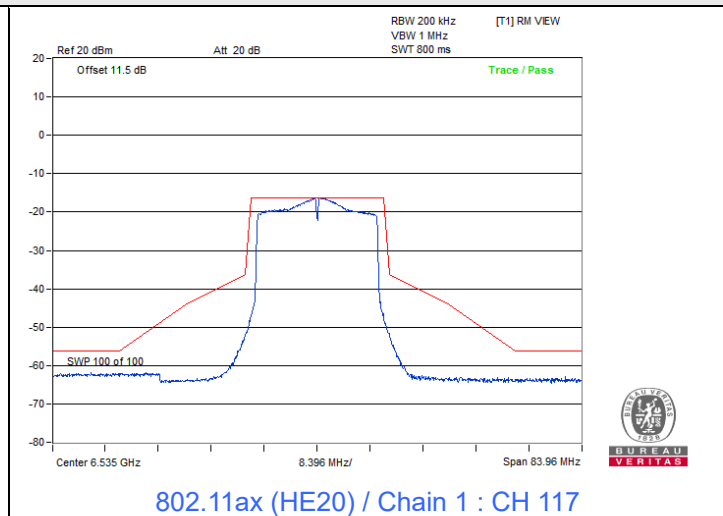
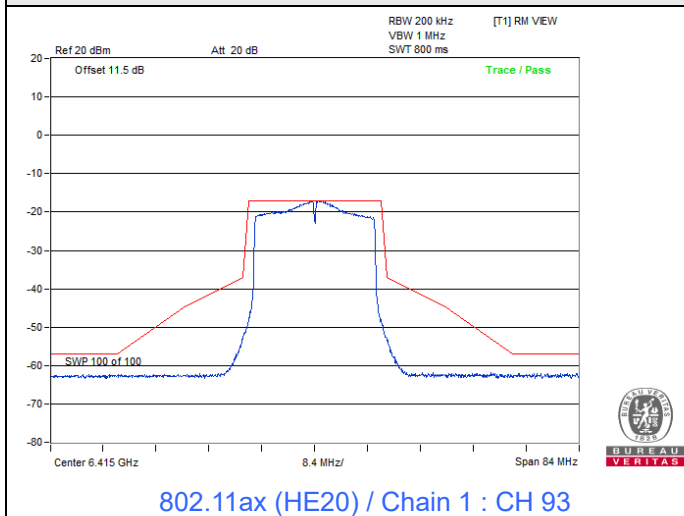
Spectrum Plot



Spectrum Plot

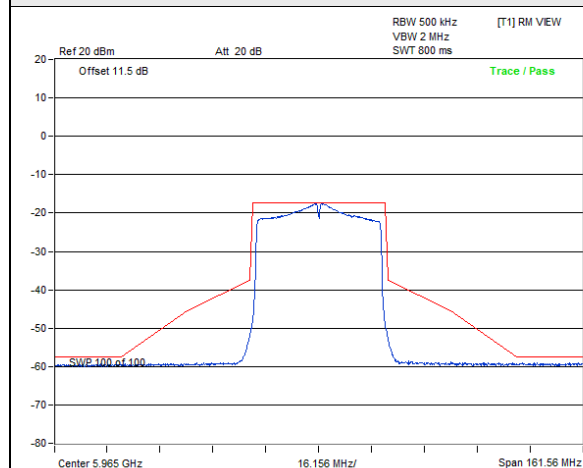


Spectrum Plot

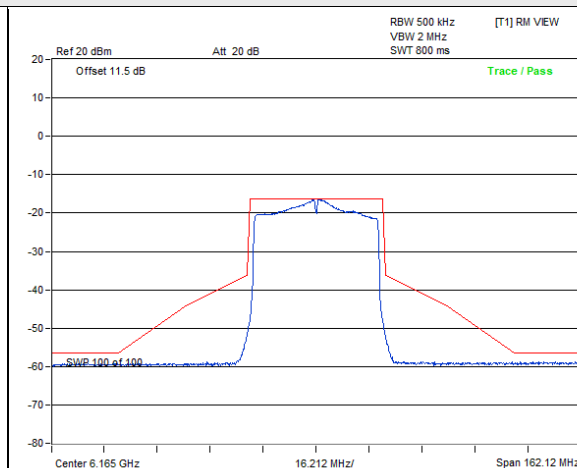


802.11ax (HE40)

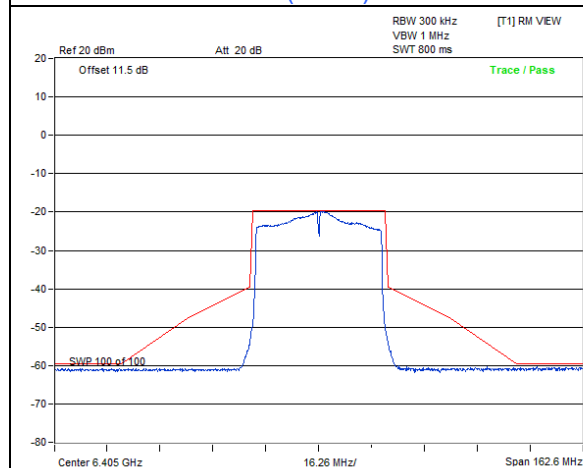
Spectrum Plot



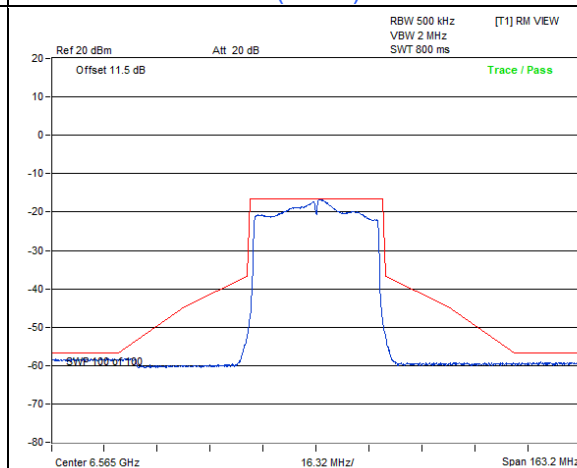
802.11ax (HE40) / Chain 0 : CH 3



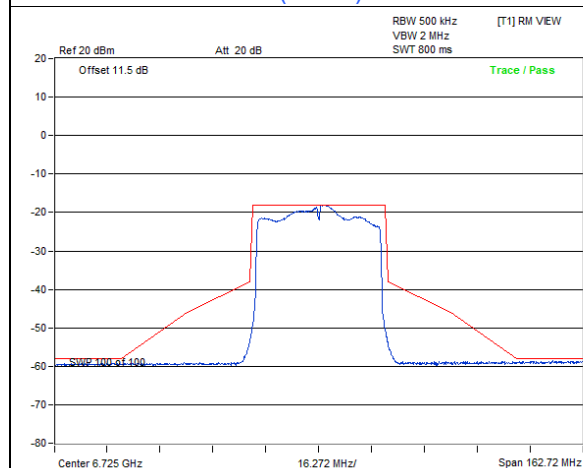
802.11ax (HE40) / Chain 0 : CH 43



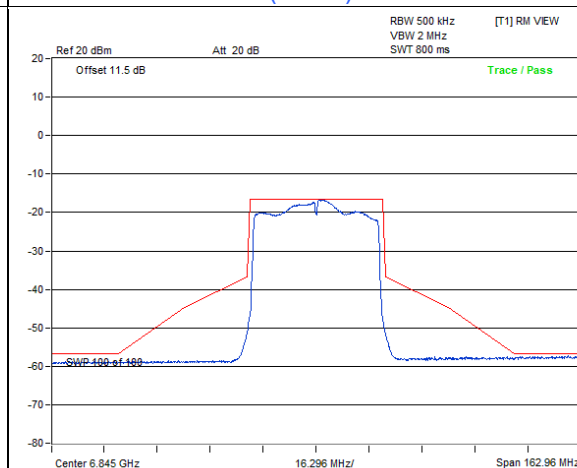
802.11ax (HE40) / Chain 0 : CH 91



802.11ax (HE40) / Chain 0 : CH 123

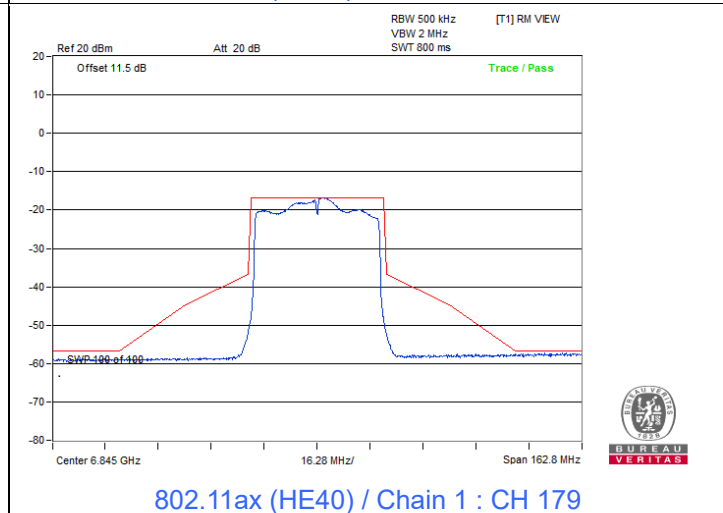
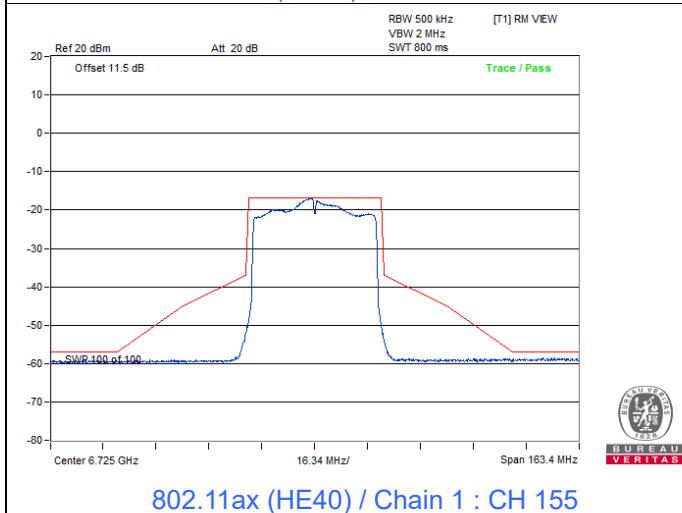
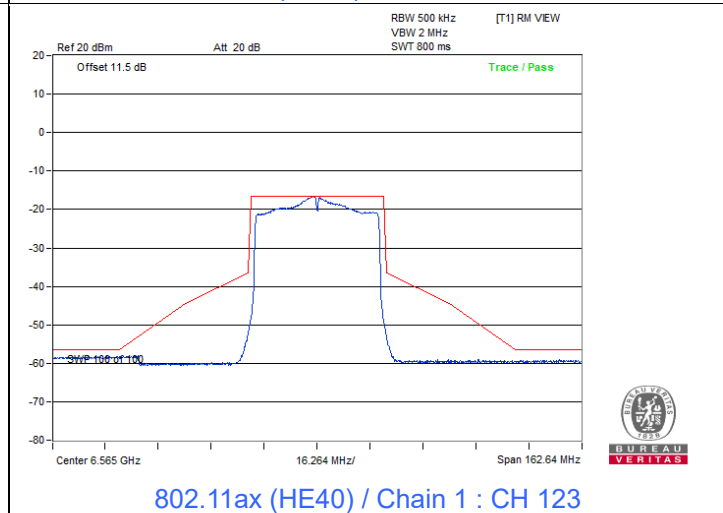
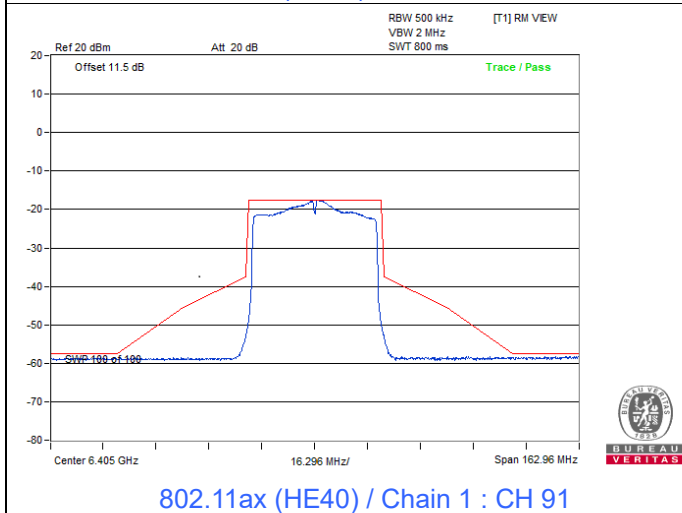
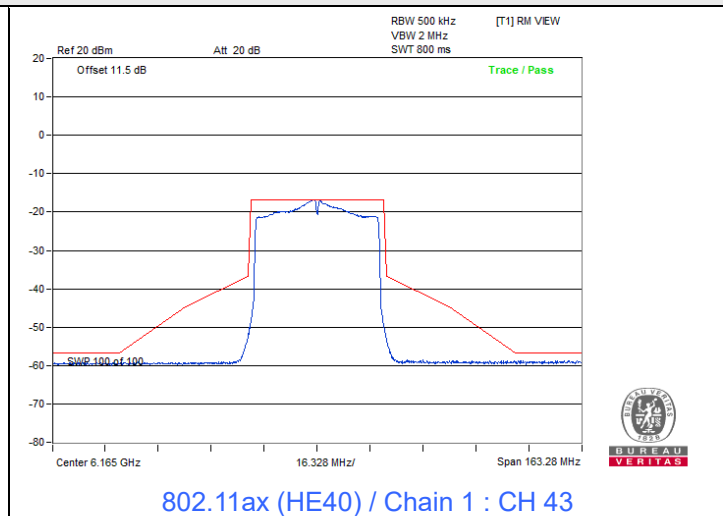
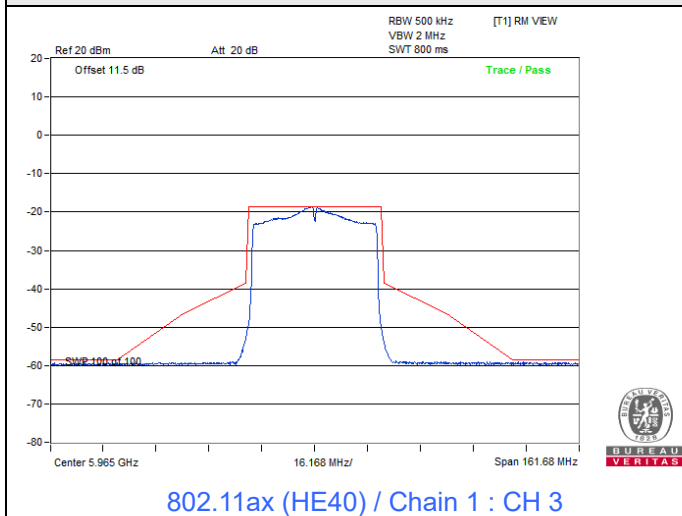


802.11ax (HE40) / Chain 0 : CH 155



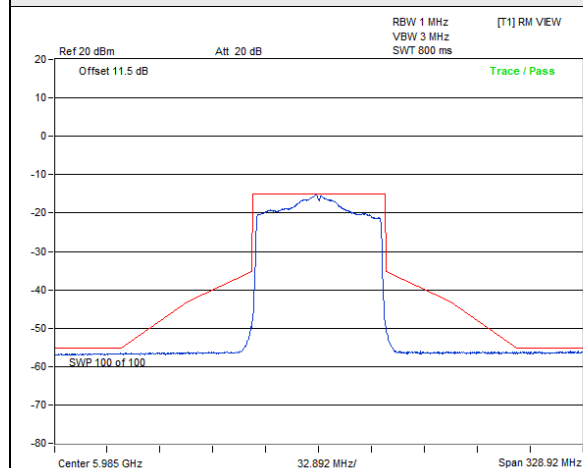
802.11ax (HE40) / Chain 0 : CH 179

Spectrum Plot

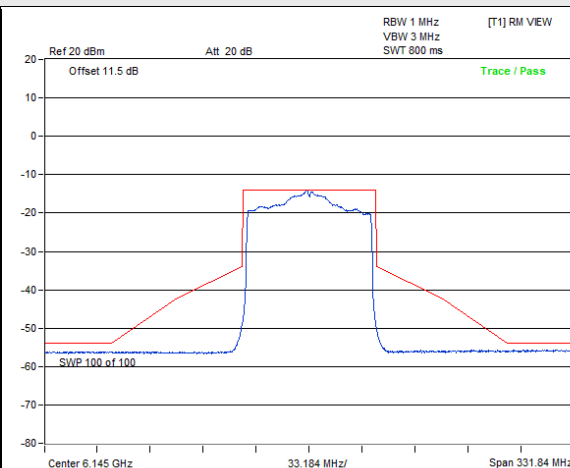


802.11ax (HE80)

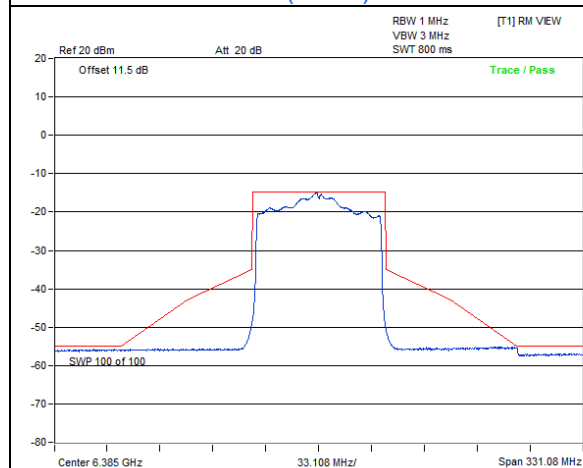
Spectrum Plot



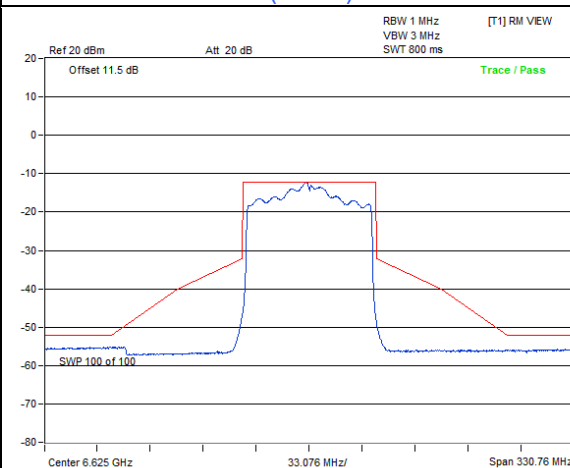
802.11ax (HE80) / Chain 0 : CH 7



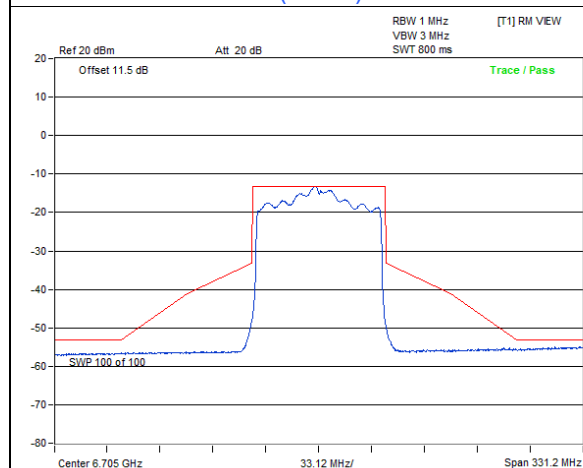
802.11ax (HE80) / Chain 0 : CH 39



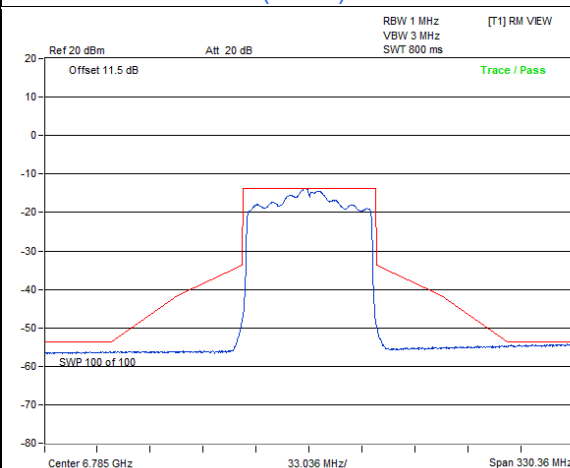
802.11ax (HE80) / Chain 0 : CH 87



802.11ax (HE80) / Chain 0 : CH 135

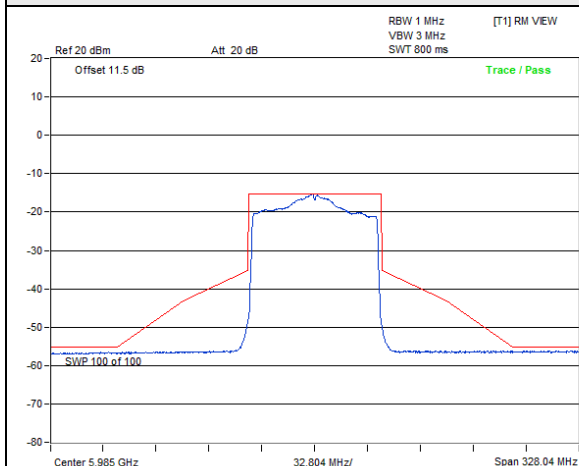


802.11ax (HE80) / Chain 0 : CH 151

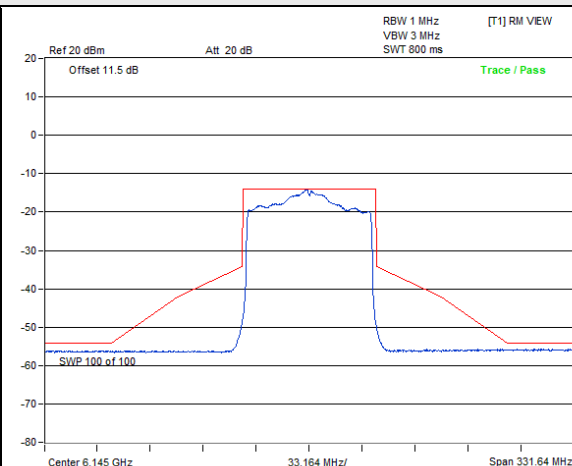


802.11ax (HE80) / Chain 0 : CH 167

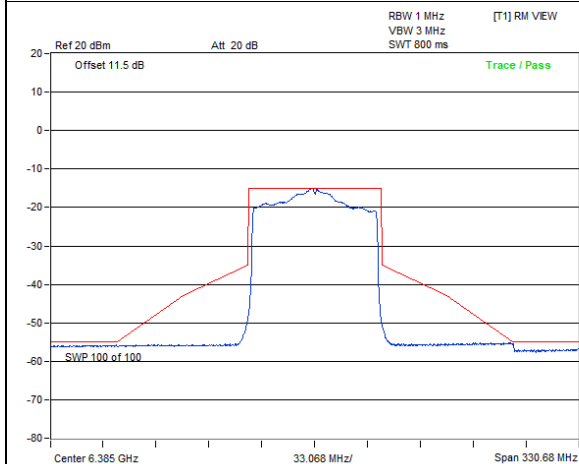
Spectrum Plot



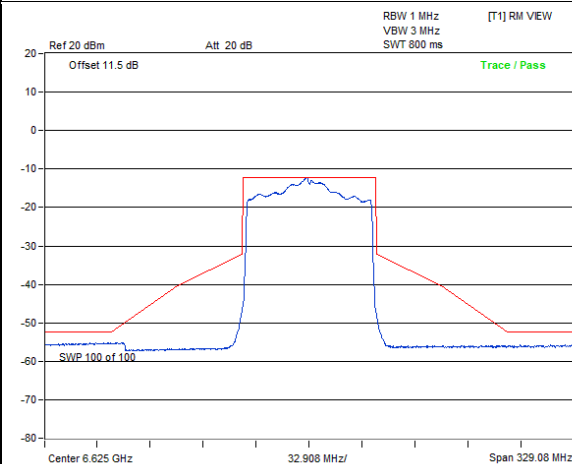
802.11ax (HE80) / Chain 1 : CH 7



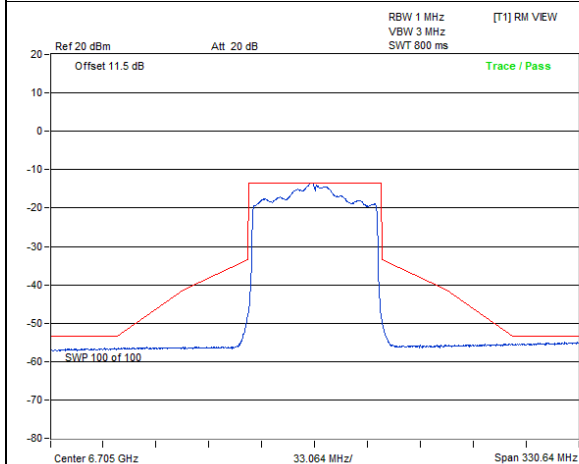
802.11ax (HE80) / Chain 1 : CH 39



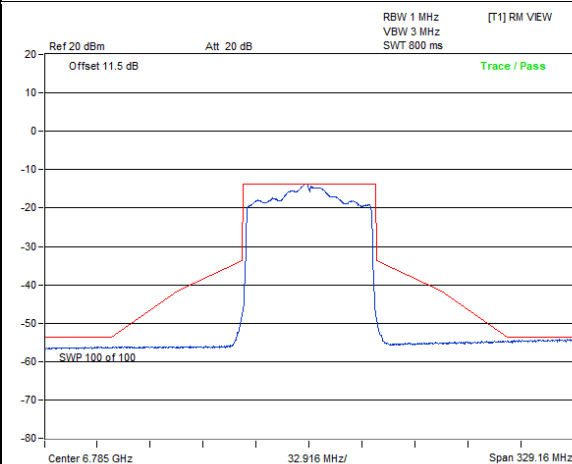
802.11ax (HE80) / Chain 1 : CH 87



802.11ax (HE80) / Chain 1 : CH 135



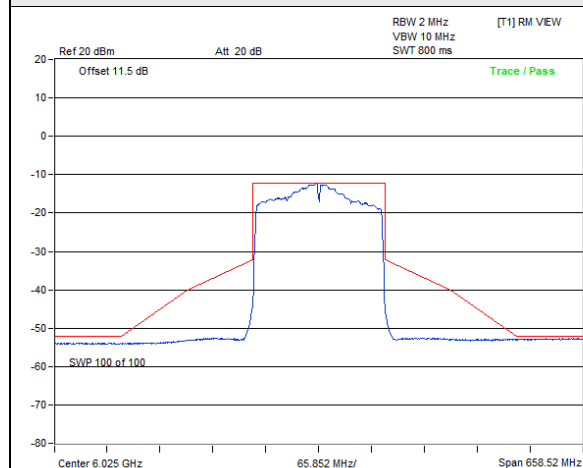
802.11ax (HE80) / Chain 1 : CH 151



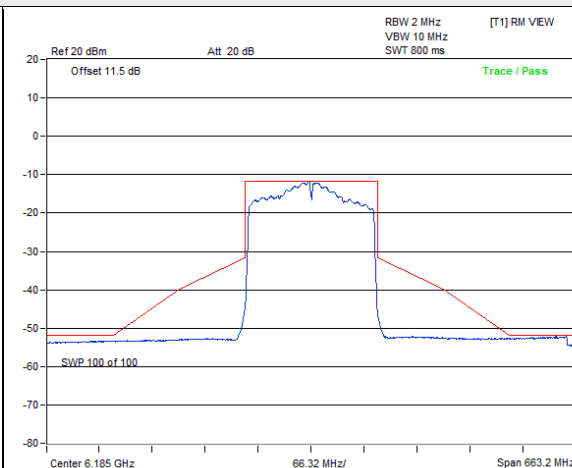
802.11ax (HE80) / Chain 1 : CH 167

802.11ax (HE160)

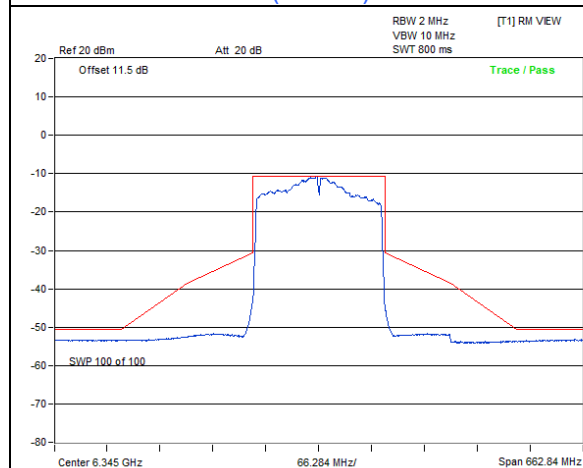
Spectrum Plot



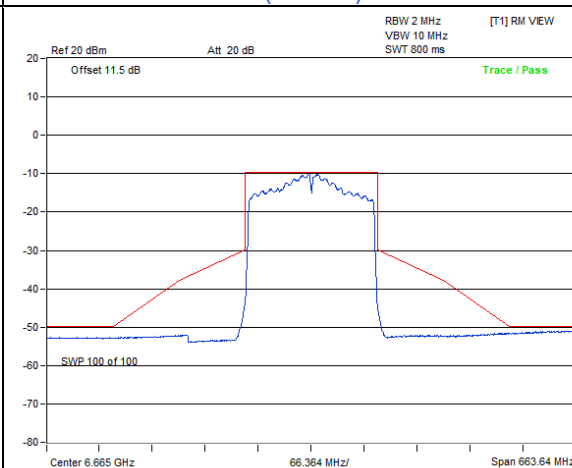
802.11ax (HE160) / Chain 0 : CH 15



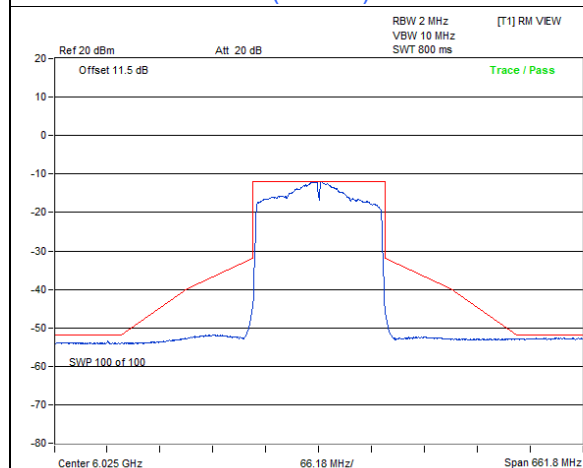
802.11ax (HE160) / Chain 0 : CH 47



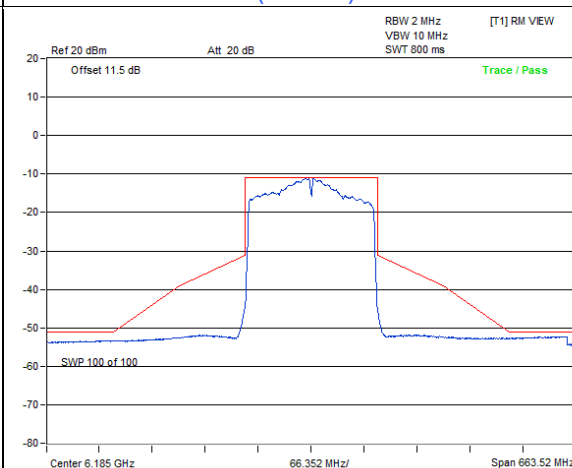
802.11ax (HE160) / Chain 0 : CH 79



802.11ax (HE160) / Chain 0 : CH 143

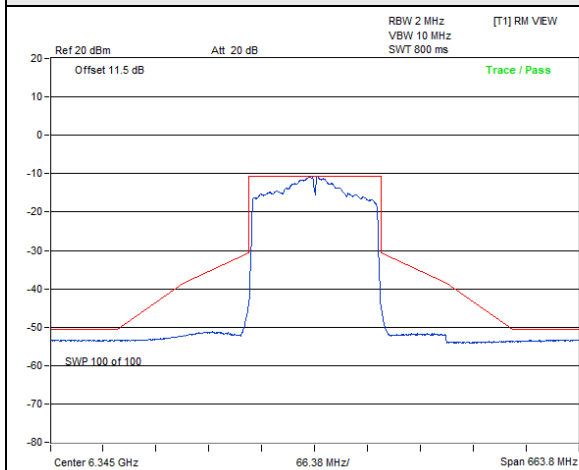


802.11ax (HE160) / Chain 1 : CH 15

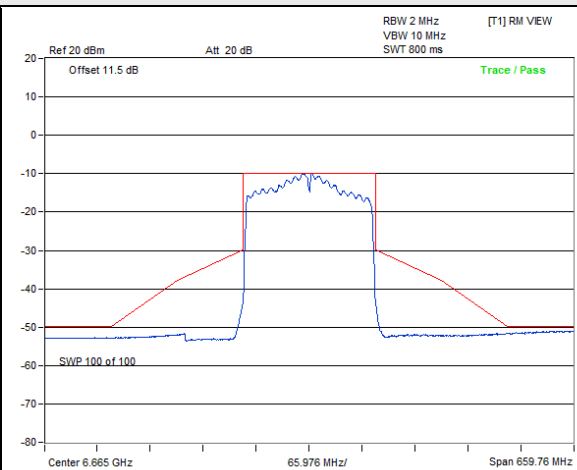


802.11ax (HE160) / Chain 1 : CH 47

Spectrum Plot



802.11ax (HE160) / Chain 1 : CH 79



802.11ax (HE160) / Chain 1 : CH 143



7.5 Occupied Bandwidth

Input Power:	3.3 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Henry Hsu
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802.11a

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
2	5935	16.50	16.44
1	5955	16.44	16.44
45	6175	16.44	16.44
93	6415	16.44	16.44
117	6535	16.44	16.44
149	6695	16.44	16.44
181	6855	16.44	16.44

802.11ax (HE20) 26-tone RU

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
2	5935	19.14	19.20
1	5955	19.38	19.56
45	6175	19.20	19.92
93	6415	19.92	19.68
117	6535	19.68	19.20
149	6695	19.38	19.56
181	6855	21.24	19.38

802.11ax (HE20) 52-tone RU

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
2	5935	18.96	18.72
1	5955	18.90	18.96
45	6175	19.20	19.20
93	6415	19.08	19.02
117	6535	18.72	18.84
149	6695	18.96	18.84
181	6855	18.78	18.66

802.11ax (HE20) 106-tone RU

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
2	5935	18.48	18.48
1	5955	18.48	18.48
45	6175	18.48	18.60
93	6415	18.84	18.84
117	6535	18.42	18.48
149	6695	18.36	18.48
181	6855	18.60	18.54

802.11ax (HE20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
2	5935	18.96	18.96
1	5955	18.96	18.90
45	6175	18.96	18.84
93	6415	18.96	18.84
117	6535	18.96	18.96
149	6695	18.96	18.96
181	6855	18.96	18.96

802.11ax (HE40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
3	5965	38.04	38.16
43	6165	38.16	38.16
91	6405	38.16	38.16
123	6565	38.16	38.16
155	6725	38.16	38.16
179	6845	38.40	38.16

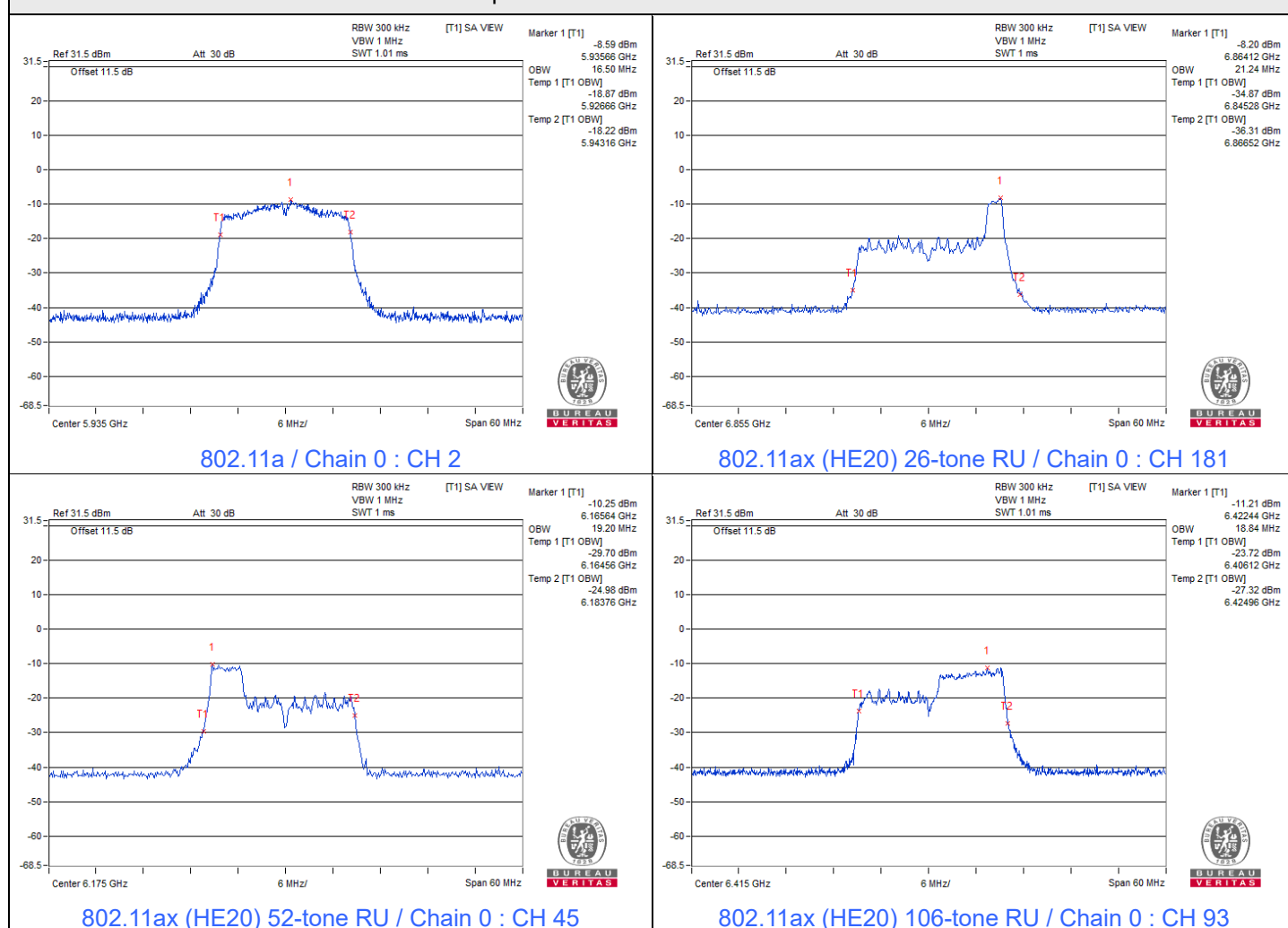
802.11ax (HE80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
7	5985	77.52	77.28
39	6145	77.28	77.28
87	6385	77.28	77.28
135	6625	77.28	77.28
151	6705	77.28	77.28
167	6785	77.28	77.28

802.11ax (HE160)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
15	6025	156.96	156.00
47	6185	156.48	156.48
79	6345	156.48	155.52
143	6665	156.48	156.48

Spectrum Plot of Maximum Value



Spectrum Plot of Maximum Value

