

Partial FCC Test Report

Report No.: RF191231C14-1

FCC ID: C3K1899

Test Model: 1899

Contains Wi-Fi
Module Model No.: 1957

Contains FCC ID: C3K1957

Received Date: Dec. 31, 2019

Test Date: Jan. 09, 2020 ~ Apr. 08, 2020

Issued Date: Apr. 13, 2020

Applicant: Microsoft Corporation

Address: One Microsoft Way Redmond, WA 98052-6399, U.S.A

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lin Kou Laboratories

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33383, Taiwan

FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

Issue No.	Description	Date Issued
RF191231C14-1	Original Release	Apr. 13, 2020

1 Certificate of Conformity

Product: Portable Computing Device

Brand: Microsoft

Test Model: 1899

Sample Status: Engineering Sample

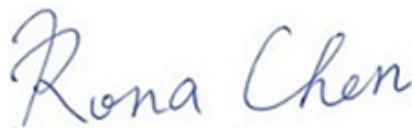
Applicant: Microsoft Corporation

Test Date: Jan. 09, 2020 ~ Apr. 08, 2020

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

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.

Prepared by :

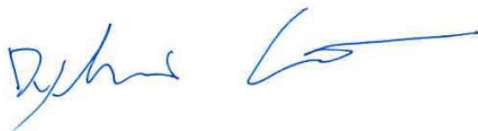


Date:

Apr. 13, 2020

Rona Chen / Specialist

Approved by :



Date:

Apr. 13, 2020

Dylan Chiou / Senior Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	N/A	Refer to Note
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -6.41 dB at 11140 MHz.
	Conducted Band Edge Measurement	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	N/A	Refer to Note
15.407(e)	6 dB Bandwidth	N/A	Refer to Note
15.407(g)	Frequency Stability	N/A	Refer to Note
15.203	Antenna Requirement	N/A	Refer to Note

Note:

1. This report is issued as a partial report. The test item, test mode, and test method are in accordance with client's requirement. Only Radiated Emissions, Max Average Transmit Power and Conducted Band Edge test results were recorded in this report.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Portable Computing Device
Brand	Microsoft
Test Model	1899
FCC ID	C3K1899
Contains Wi-Fi Module Model No.	1957
Contains FCC ID	C3K1957
Status of EUT	Engineering Sample
Power Supply Rating	120 Vac (Adapter)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 300 Mbps 802.11ac: up to 1733.3 Mbps 802.11ax: up to 2402 Mbps
Operating Frequency	5180 ~ 5250 MHz, 5250 ~ 5320 MHz, 5500 ~ 5720 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5250 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) 1 for 802.11ac (VHT160), 802.11ax (HE160) 5250 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80) 1 for 802.11ac (VHT160), 802.11ax (HE160) 5500 ~ 5720 MHz: 12 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 6 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 3 for 802.11ac (VHT80), 802.11ax (HE80) 1 For 802.11ac (VHT160), 802.11ax (HE160) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20) 2 for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40) 1 for 802.11ac (VHT80), 802.11ax (HE80)
Output Power	49.039 mW
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

Modulation Mode	TX Function
802.11a	1TX (SISO)
802.11n (HT20)	2TX (MIMO)
802.11n (HT40)	2TX (MIMO)
802.11ac (VHT20)	2TX (MIMO)
802.11ac (VHT40)	2TX (MIMO)
802.11ac (VHT80)	2TX (MIMO)
802.11ac (VHT160)	2TX (MIMO)
802.11ax (HE20)	2TX (MIMO)
802.11ax (HE40)	2TX (MIMO)
802.11ax (HE80)	2TX (MIMO)
802.11ax (HE160)	2TX (MIMO)

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	Microsoft (Chicony)	1932	I/P: 100-240 Vac, 50-60 Hz, 1.92 A O/P: 15 Vdc, 8 A / 5 Vdc, 1.5A 1.4m power cable w/o core
Top Battery	Dynapack	DYNH02	7.57 Vdc
Base Battery	Simplo	G3HTA063H	11.36 Vdc

3. The antenna information is listed as below.

Ant. Type	Manufacturer	Parts Number	Antenna Gain (dBi)				
			2.4 GHz	5.15~5.25 GHz	5.25~5.35 GHz	5.47~5.725 GHz	5.725~5.85 GHz
PIFA	FIT	Main Antenna: 1415-07H40QS	2.12	3.34	3.34	3.12	2.57
		Aux. Antenna: 1415-061C0QS	2.26	3.36	3.31	3.47	3.51

4. Test Cable Loss is listed as below.

Frequency (MHz)	Mini lpx (dB)
5150	-1.36
5200	-1.38
5250	-1.43
5300	-1.54
5350	-1.64
5400	-1.77
5450	-1.83
5500	-1.86
5550	-1.91
5600	-1.98

5. 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 Description of Test Modes

For 5180 ~ 5250 MHz

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220
40	5200	48	5240

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

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

Channel	Frequency (MHz)
50	5250

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

Channel	Frequency (MHz)
50	5250

For 5250 ~ 5320 MHz

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
58	5290

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

Channel	Frequency (MHz)
50	5250

For 5500 ~ 5720 MHz

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600	144	5720

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590	142	5710

3 channels are provided for 802.11ac (VHT80):

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

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

Channel	Frequency (MHz)
114	5570

For 5745 ~ 5825 MHz:

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

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

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

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
155	5775

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To		Description
	RE	APCM	
-	√	√	-

Where **APCM**: Antenna Port Conducted Measurement **RE**: Radiated Emission

Radiated Emission Test:

☒ 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).

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5250	802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-		802.11ac (VHT160)	50	50	OFDM	BPSK	58.5
-		802.11ax (HE80)	42	42	OFDMA	BPSK	MCS0
-		802.11ax (HE160)	50	50	OFDMA	BPSK	MCS0
-	5250-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-		802.11ax (HE80)	58	58	OFDMA	BPSK	MCS0
-	5500-5720	802.11ac (VHT160)	114	114	OFDM	BPSK	58.5
-		802.11ax (HE160)	114	114	OFDMA	BPSK	MCS0

* After the pretest, only the worst case channel was presented in the report.

Antenna Port Conducted Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ 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).

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5250	802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-		802.11ac (VHT160)	50	50	OFDM	BPSK	58.5
-		802.11ax (HE80)	42	42	OFDMA	BPSK	MCS0
-		802.11ax (HE160)	50	50	OFDMA	BPSK	MCS0
-	5250-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-		802.11ax (HE80)	58	58	OFDMA	BPSK	MCS0
-	5500-5720	802.11ac (VHT160)	114	114	OFDM	BPSK	58.5
-		802.11ax (HE160)	114	114	OFDMA	BPSK	MCS0

Bandedge Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5250	802.11ac (VHT80)	42	42	OFDM	BPSK	29.3
-		802.11ac (VHT160)	50	50	OFDM	BPSK	58.5
-		802.11ax (HE80)	42	42	OFDMA	BPSK	MCS0
-		802.11ax (HE160)	50	50	OFDMA	BPSK	MCS0
-	5250-5320	802.11ac (VHT80)	58	58	OFDM	BPSK	29.3
-		802.11ax (HE80)	58	58	OFDMA	BPSK	MCS0
-	5500-5720	802.11ac (VHT160)	114	114	OFDM	BPSK	58.5
-		802.11ax (HE160)	114	114	OFDMA	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Leo Tsai
RE	25 deg. C, 65 % RH	120 Vac, 60 Hz	Charles Hsiao

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

802.11a: Duty cycle = $2.082/2.145 = 0.97$, Duty factor = $10 * \log(1/0.97) = 0.13$

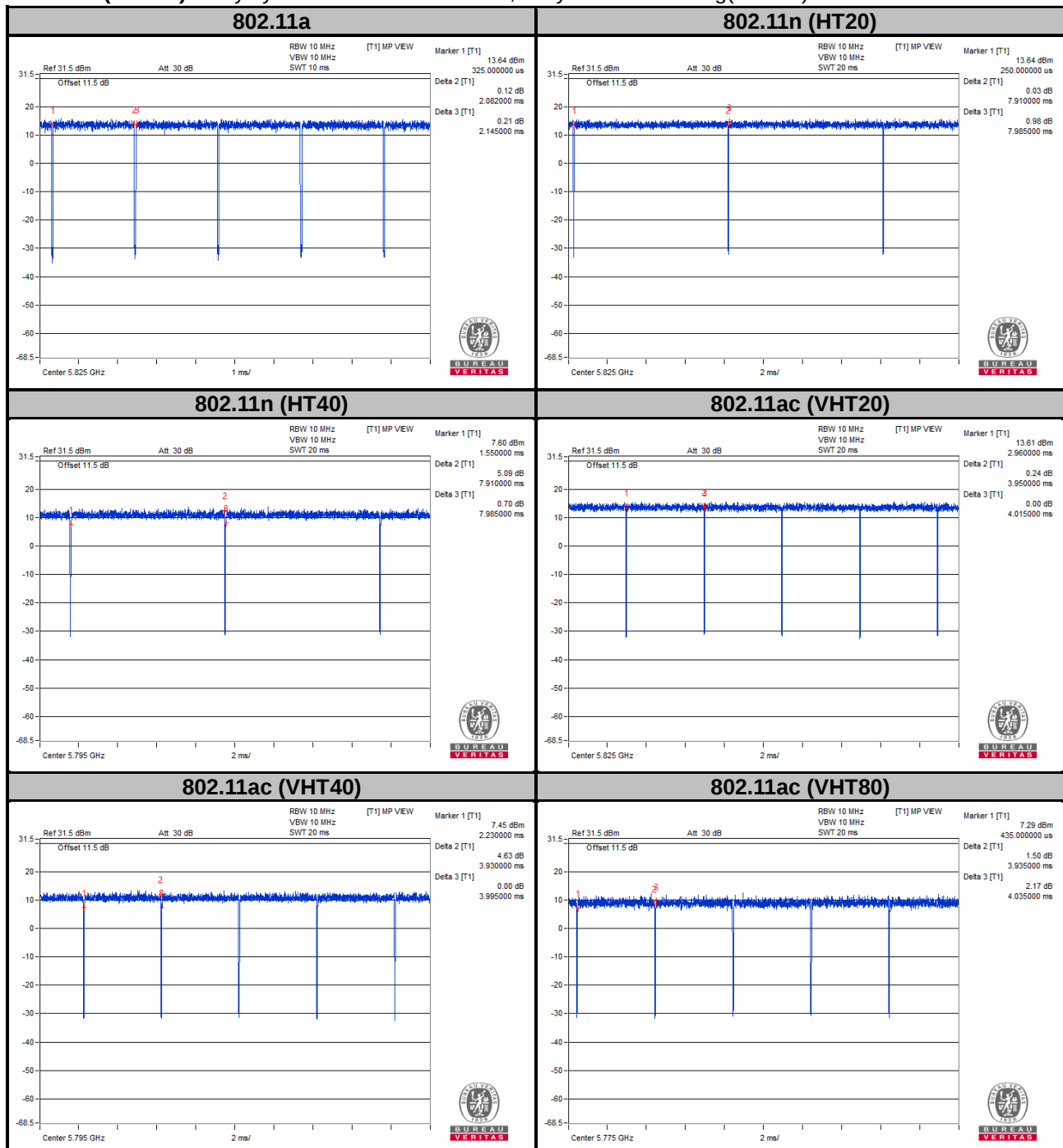
802.11n (HT20): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11n (HT40): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11ac (VHT20): Duty cycle = $3.95/4.015 = 0.98$, Duty factor = $10 * \log(1/0.98) = 0.07$

802.11ac (VHT40): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11ac (VHT80): Duty cycle = $3.935/4.035 = 0.98$, Duty factor = $10 * \log(1/0.98) = 0.11$



802.11ax (HE20): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11ax (HE40): Duty cycle of test signal is > 98 %, duty factor is not required.

802.11ax (HE80): Duty cycle = $3.965/4.045 = 0.98$, Duty factor = $10 * \log(1/0.98) = 0.09$



3.4 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

Test Standard:

FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

References Test Guidance:

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Limits of Unwanted Emission Out of the Restricted Bands

Applicable To		Limit	
789033 D02 General UNII Test Procedures New Rules v02r01		Field Strength at 3 m	
		PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	☒ 15.407(b)(4)(i)	PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4}	PK: 68.2 (dBμV/m) ^{*1} PK:105.2 (dBμV/m) ^{*2} PK: 110.8 (dBμV/m) ^{*3} PK:122.2 (dBμV/m) ^{*4}
	☐ 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

^{*1} beyond 75 MHz or more above of the band edge.

^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note:

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2019	Mar. 17, 2020
			Mar. 18, 2020	Mar. 17, 2021
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 12, 2019	Dec. 11, 2020
Spectrum Analyzer ROHDE & SCHWARZ	FSV40	100980	Apr. 23, 2019	Apr. 22, 2020
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 24, 2019	Nov. 23, 2020
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 24, 2019	Nov. 23, 2020
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 08, 2019	Nov. 07, 2020
Fixed Attenuator WORKEN	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
Preamplifier EMCI	EMC001340	980201	Oct. 14, 2019	Oct. 13, 2020
Preamplifier EMCI	EMC 012645	980115	Oct. 08, 2019	Oct. 07, 2020
Preamplifier EMCI	EMC 184045	980116	Oct. 08, 2019	Oct. 07, 2020
Preamplifier EMCI	EMC 330H	980112	Oct. 08, 2019	Oct. 07, 2020
Peak Power Analyzer KEYSIGHT	8990B	MY51000485	Jan. 15, 2019	Jan. 14, 2020
			Jan. 14, 2020	Jan. 13, 2021
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 15, 2019	Jul 14, 2020
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-8000&3000	140811+170717	Oct. 08, 2019	Oct. 07, 2020
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-1000(140807)	Oct. 08, 2019	Oct. 07, 2020
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 08, 2019	Oct. 07, 2020
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.

4.1.3 Test Procedures

For Radiated Emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

For Radiated Emission above 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected 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.

Note:

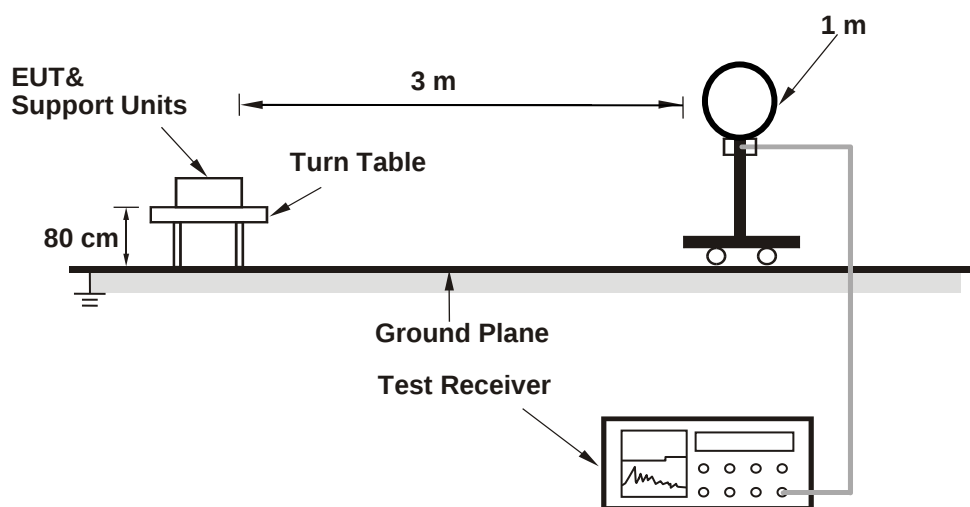
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. 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.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

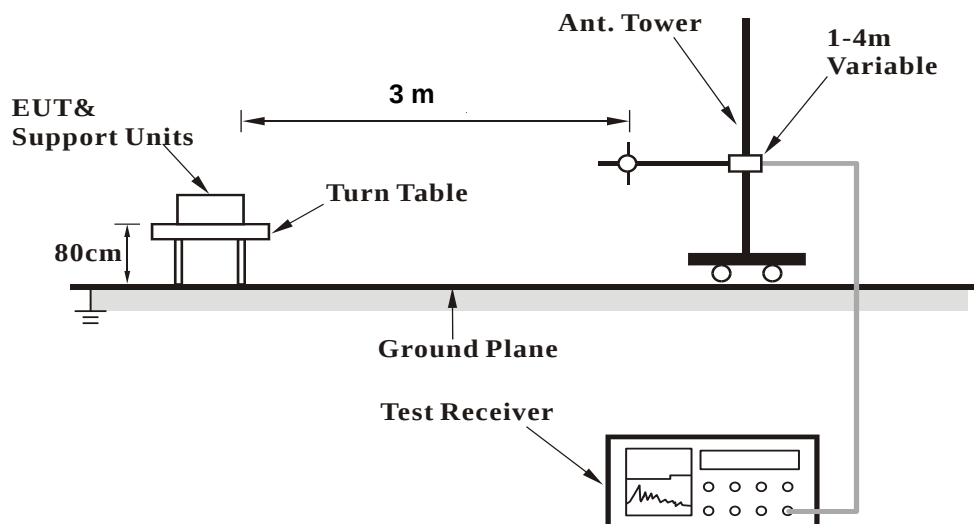
No deviation.

4.1.5 Test Setup

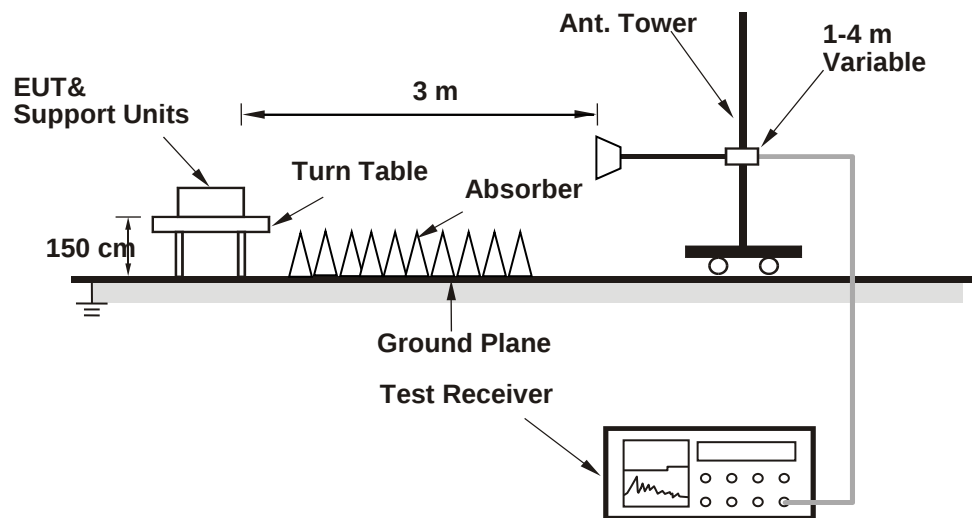
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



<Radiated Emission above 1 GHz>



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

4.1.6 EUT Operating Conditions

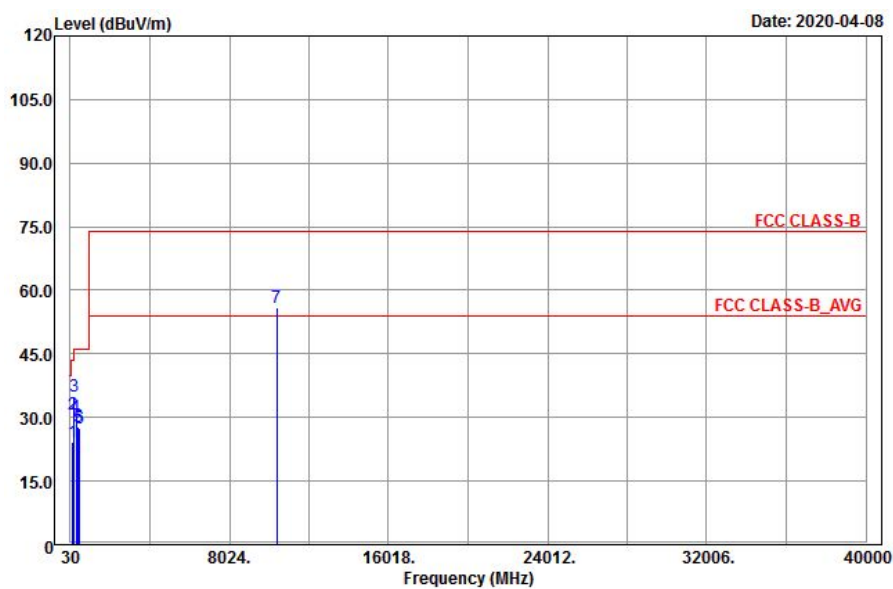
- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

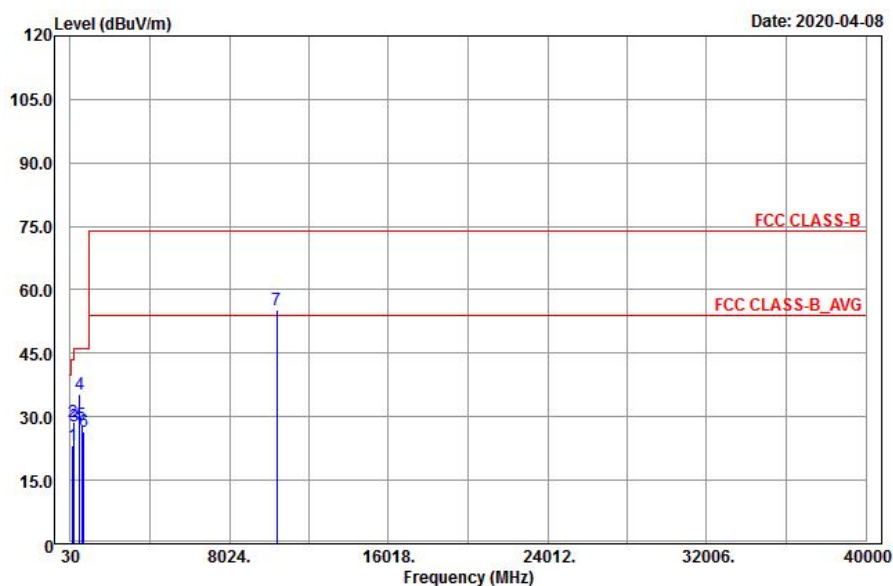
802.11ac (VHT80)

EUT Test Condition		Measurement Detail	
Channel	Channel 42	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



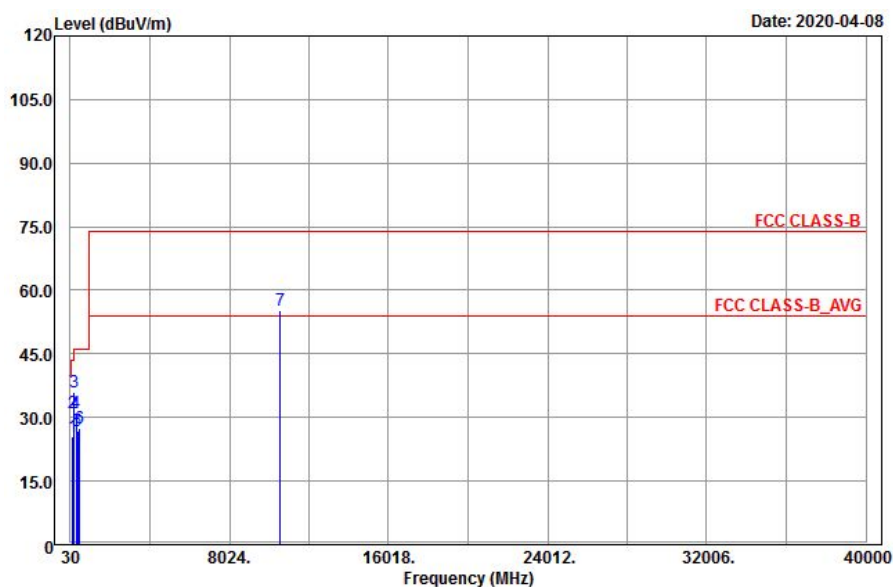
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
156.09	24.24	45	-20.76	43.5	-19.26	165	199	Peak
197.67	30.63	48.94	-18.31	43.5	-12.87	167	174	Peak
221.16	35.11	52.92	-17.81	46	-10.89	105	331	Peak
313.3	30.23	45.82	-15.59	46	-15.77	134	177	Peak
412.7	27.72	41.42	-13.7	46	-18.28	115	14	Peak
486.9	27.47	40.05	-12.58	46	-18.53	164	240	Peak
*10420	55.76	39.6	16.16	68.2	-12.44	115	24	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
162.03	23.27	43.82	-20.55	43.5	-20.23	162	205	Peak
187.14	28.72	47.69	-18.97	43.5	-14.78	135	25	Peak
218.19	27.78	45.68	-17.9	46	-18.22	134	7	Peak
483.4	35.46	48.11	-12.65	46	-10.54	134	177	Peak
605.9	28.2	38.7	-10.5	46	-17.8	164	293	Peak
694.8	26.32	35.6	-9.28	46	-19.68	164	17	Peak
*10420	55.31	39.15	16.16	68.2	-12.89	164	309	Peak

Remarks:

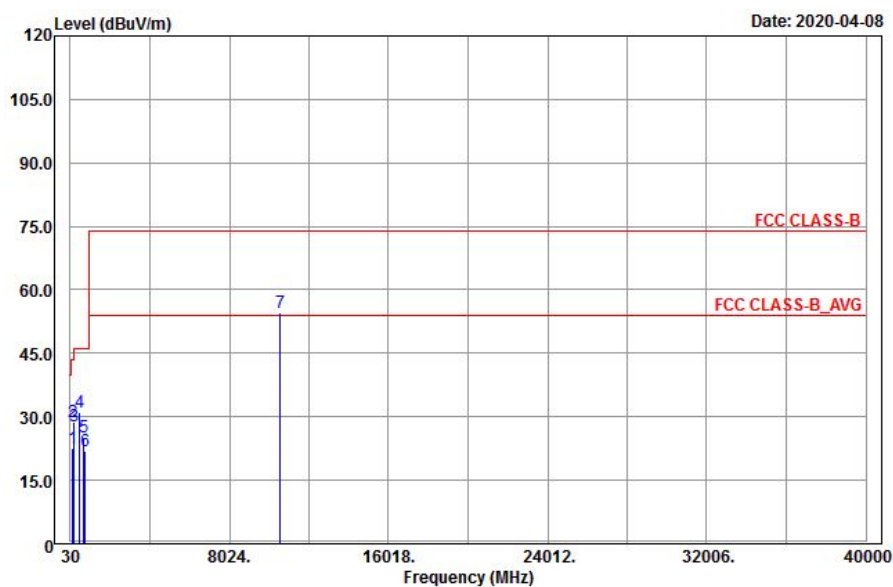
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 58	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
155.82	25.6	46.36	-20.76	43.5	-17.9	164	177	Peak
200.37	31.07	49.31	-18.24	43.5	-12.43	152	200	Peak
218.19	36.04	53.94	-17.9	46	-9.96	164	197	Peak
310.5	30.91	46.5	-15.59	46	-15.09	105	5	Peak
396.6	26.8	40.81	-14.01	46	-19.2	124	174	Peak
489	27.5	40.03	-12.53	46	-18.5	189	255	Peak
*10580	55.13	39.42	15.71	68.2	-13.07	137	147	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
159.87	22.69	43.28	-20.59	43.5	-20.81	157	189	Peak
184.17	28.88	48.12	-19.24	43.5	-14.62	105	104	Peak
217.92	27.89	45.79	-17.9	46	-18.11	174	17	Peak
485.5	31.13	43.73	-12.6	46	-14.87	185	174	Peak
698.3	25.17	34.42	-9.25	46	-20.83	163	333	Peak
771.8	21.99	30.22	-8.23	46	-24.01	127	174	Peak
*10580	54.73	39.02	15.71	68.2	-13.47	185	5	Peak

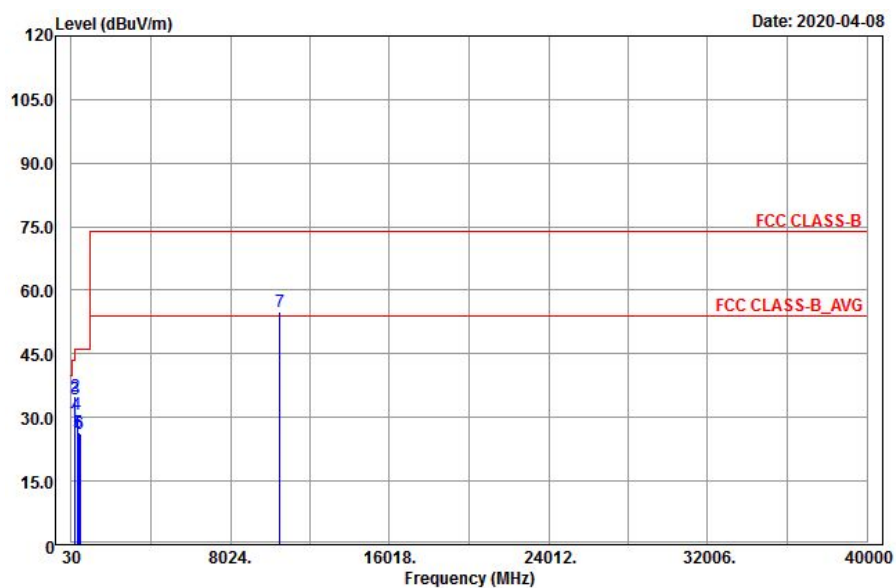
Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

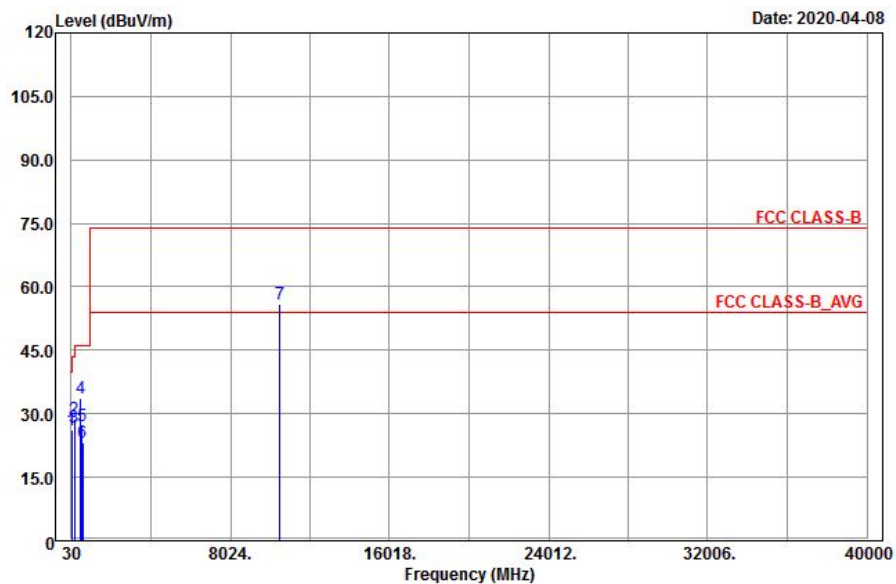
802.11ac (VHT160)

EUT Test Condition		Measurement Detail	
Channel	Channel 50	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



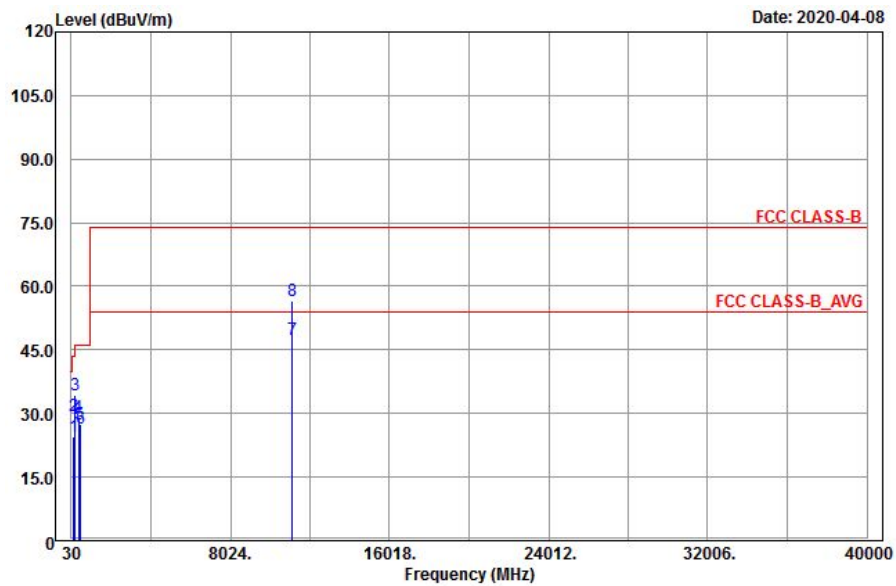
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
183.9	29.01	48.25	-19.24	43.5	-14.49	183	29	Peak
215.22	34.84	52.83	-17.99	43.5	-8.66	127	77	Peak
223.59	34.26	51.92	-17.66	46	-11.74	105	285	Peak
316.8	30.66	46.23	-15.57	46	-15.34	134	163	Peak
402.9	26.37	40.26	-13.89	46	-19.63	150	222	Peak
473.6	26.03	38.9	-12.87	46	-19.97	134	24	Peak
*10500	55.05	39.22	15.83	68.2	-13.15	116	345	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
57.81	26.22	42.08	-15.86	40	-13.78	178	57	Peak
184.17	28.7	47.94	-19.24	43.5	-14.8	105	241	Peak
191.19	26.78	45.43	-18.65	43.5	-16.72	106	352	Peak
492.5	33.66	46.11	-12.45	46	-12.34	124	222	Peak
556.9	27.08	38.54	-11.46	46	-18.92	105	274	Peak
592.6	23.18	33.99	-10.81	46	-22.82	192	345	Peak
*10500	55.81	39.98	15.83	68.2	-12.39	174	4	Peak

Remarks:

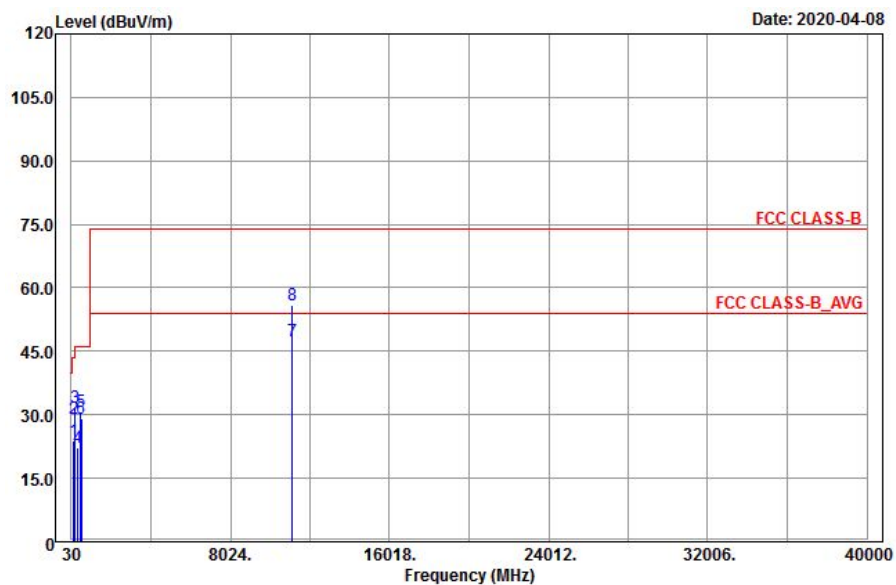
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 114	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
157.17	24.37	45.08	-20.71	43.5	-19.13	117	14	Peak
184.44	29.57	48.81	-19.24	43.5	-13.93	156	256	Peak
222.78	34.48	52.19	-17.71	46	-11.52	105	222	Peak
405.7	29.09	42.93	-13.84	46	-16.91	164	9	Peak
479.2	27.35	40.07	-12.72	46	-18.65	147	178	Peak
500.2	26.52	38.81	-12.29	46	-19.48	150	250	Peak
11140	47.54	31.2	16.34	54	-6.46	168	54	Average
11140	56.47	40.13	16.34	74	-17.53	168	54	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
155.01	24.03	44.83	-20.8	43.5	-19.47	155	205	Peak
184.44	28.96	48.2	-19.24	43.5	-14.54	137	74	Peak
216.84	31.61	49.53	-17.92	46	-14.39	105	13	Peak
374.2	22.1	36.44	-14.34	46	-23.9	135	22	Peak
482	30.58	43.24	-12.66	46	-15.42	105	156	Peak
524.7	29.15	41.13	-11.98	46	-16.85	124	14	Peak
11140	47.34	31	16.34	54	-6.66	156	305	Average
11140	56.03	39.69	16.34	74	-17.97	156	305	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

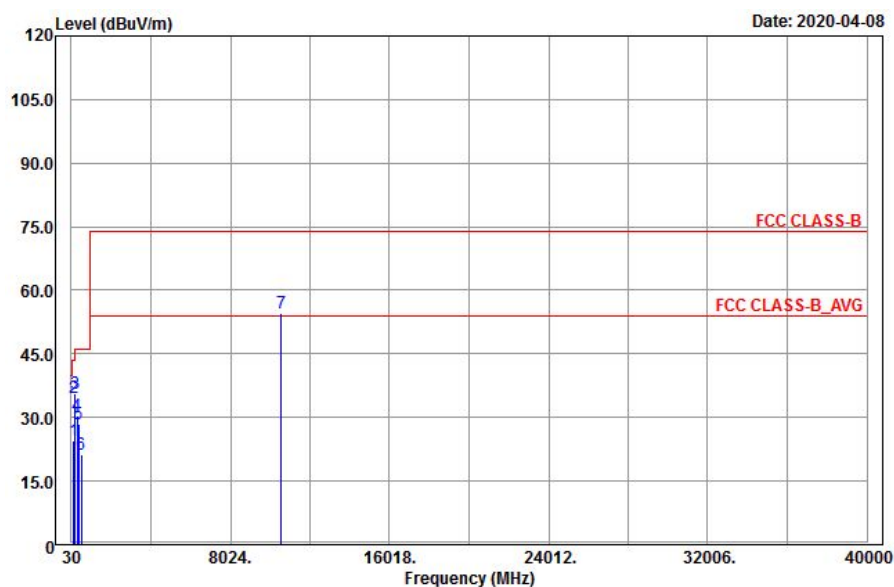
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
122.07	21.1	40.75	-19.65	43.5	-22.4	127	177	Peak
184.44	29.24	48.48	-19.24	43.5	-14.26	105	241	Peak
214.95	36.34	54.33	-17.99	43.5	-7.16	164	19	Peak
396.6	25.69	39.7	-14.01	46	-20.31	134	111	Peak
475.7	27.76	40.58	-12.82	46	-18.24	138	190	Peak
774.6	23.33	31.52	-8.19	46	-22.67	164	255	Peak
*10420	54.96	38.8	16.16	68.2	-13.24	124	177	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
155.01	21.25	42.05	-20.8	43.5	-22.25	155	205	Peak
183.63	29.21	48.55	-19.34	43.5	-14.29	183	263	Peak
220.08	27.54	45.39	-17.85	46	-18.46	138	8	Peak
463.1	28.97	42.06	-13.09	46	-17.03	154	185	Peak
548.5	23.35	34.94	-11.59	46	-22.65	177	174	Peak
608	21.52	32	-10.48	46	-24.48	134	60	Peak
*10420	55.04	38.88	16.16	68.2	-13.16	174	44	Peak

Remarks:

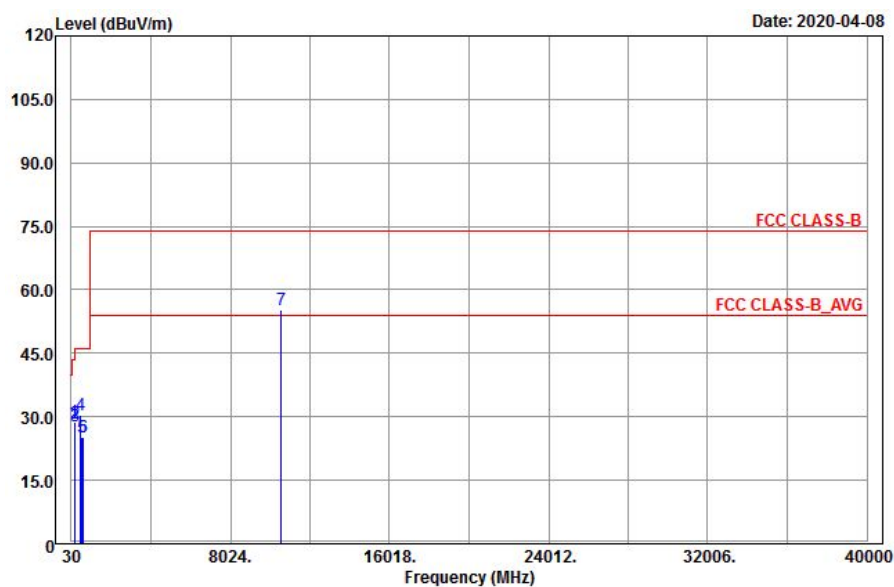
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 58	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
157.44	24.53	45.24	-20.71	43.5	-18.97	127	4	Peak
199.29	34.52	52.77	-18.25	43.5	-8.98	110	105	Peak
213.6	35.57	53.62	-18.05	43.5	-7.93	124	253	Peak
314.7	30.38	45.97	-15.59	46	-15.62	163	322	Peak
407.8	28.36	42.17	-13.81	46	-17.64	127	74	Peak
545.7	21.15	32.79	-11.64	46	-24.85	105	27	Peak
*10580	54.68	38.97	15.71	68.2	-13.52	134	185	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
185.25	28.85	48	-19.15	43.5	-14.65	185	274	Peak
217.38	28.5	46.42	-17.92	46	-17.5	164	186	Peak
220.08	27.94	45.79	-17.85	46	-18.06	124	220	Peak
484.1	30.32	42.95	-12.63	46	-15.68	174	4	Peak
577.9	25.33	36.31	-10.98	46	-20.67	105	214	Peak
655.6	25.34	35.3	-9.96	46	-20.66	156	25	Peak
*10580	55.29	39.58	15.71	68.2	-12.91	142	2	Peak

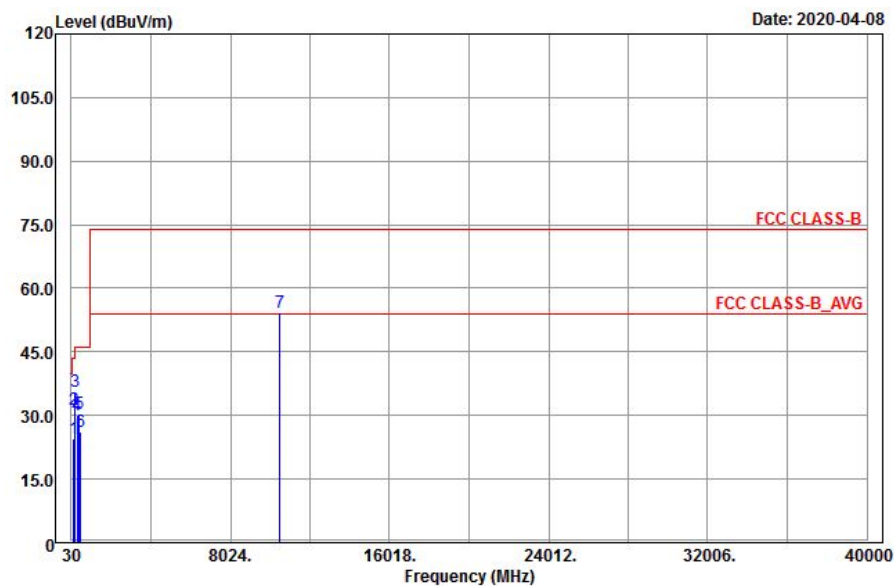
Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

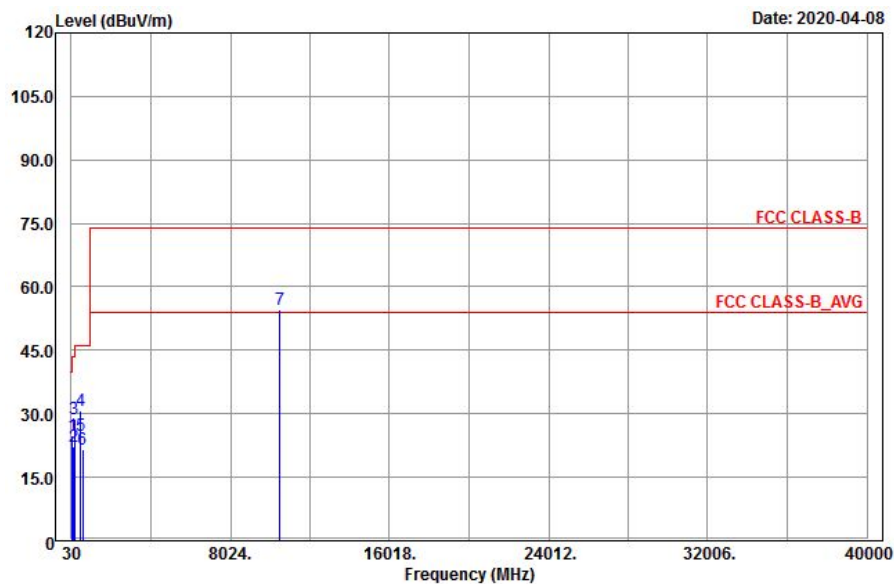
802.11ax (HE160)

EUT Test Condition		Measurement Detail	
Channel	Channel 50	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



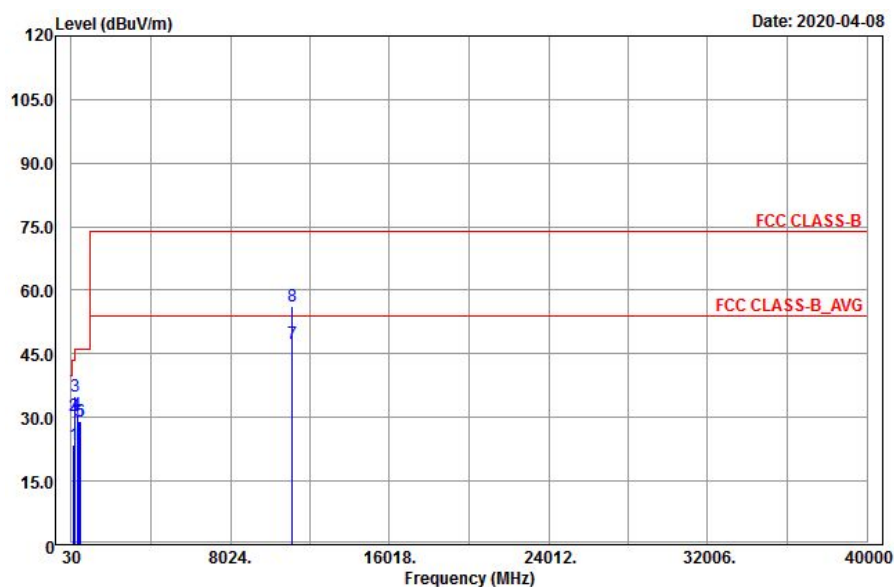
Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
154.74	24.39	45.19	-20.8	43.5	-19.11	154	174	Peak
201.99	31.25	49.46	-18.21	43.5	-12.25	124	202	Peak
223.05	35.61	53.32	-17.71	46	-10.39	124	206	Peak
315.4	30.07	45.66	-15.59	46	-15.93	157	315	Peak
430.9	30.33	43.85	-13.52	46	-15.67	134	156	Peak
501.6	26.19	38.48	-12.29	46	-19.81	154	250	Peak
*10500	54.27	38.44	15.83	68.2	-13.93	137	74	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
67.53	24.73	43.46	-18.73	40	-15.27	153	264	Peak
157.71	22.25	42.93	-20.68	43.5	-21.25	105	241	Peak
184.44	28.75	47.99	-19.24	43.5	-14.75	110	1	Peak
483.4	30.67	43.32	-12.65	46	-15.33	187	7	Peak
501.6	24.84	37.13	-12.29	46	-21.16	124	116	Peak
605.9	21.71	32.21	-10.5	46	-24.29	164	205	Peak
*10500	54.55	38.72	15.83	68.2	-13.65	134	175	Peak

Remarks:

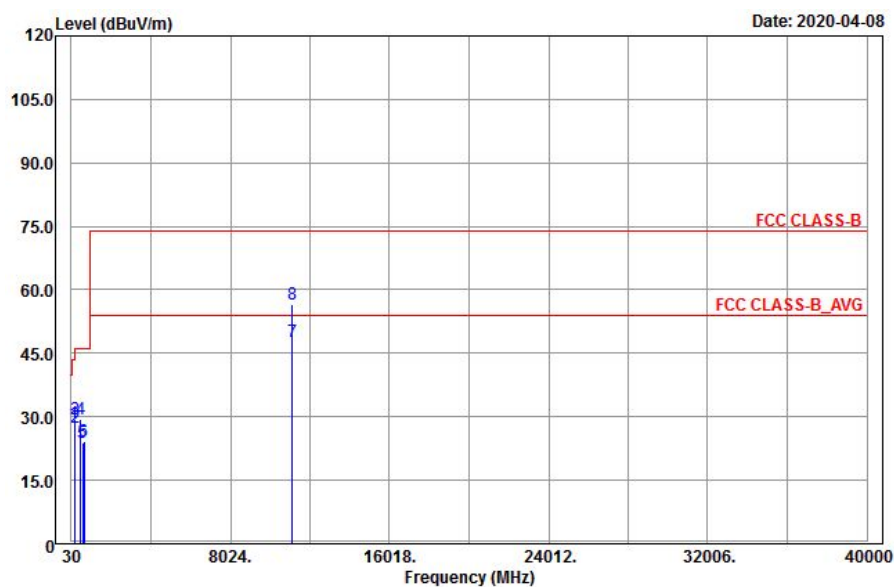
1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 114	Frequency Range	30 MHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Charles Hsiao

Horizontal



Vertical



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
156.09	23.69	44.45	-20.76	43.5	-19.81	156	208	Peak
198.48	30.37	48.65	-18.28	43.5	-13.13	110	241	Peak
220.89	35.05	52.86	-17.81	46	-10.95	126	36	Peak
314.7	30.72	46.31	-15.59	46	-15.28	105	24	Peak
414.1	29.18	42.87	-13.69	46	-16.82	164	153	Peak
488.3	29	41.54	-12.54	46	-17	188	54	Peak
11140	47.47	31.13	16.34	54	-6.53	156	208	Average
11140	56.21	39.87	16.34	74	-17.79	156	208	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
185.25	28.51	47.66	-19.15	43.5	-14.99	185	256	Peak
217.65	27.43	45.35	-17.92	46	-18.57	127	74	Peak
220.89	29.5	47.31	-17.81	46	-16.5	105	113	Peak
493.9	29.31	41.74	-12.43	46	-16.69	149	344	Peak
600.3	24.01	34.56	-10.55	46	-21.99	105	160	Peak
678.7	24.3	33.83	-9.53	46	-21.7	189	97	Peak
11140	47.59	31.25	16.34	54	-6.41	140	108	Average
11140	56.42	40.08	16.34	74	-17.58	140	108	Peak

Remarks:

1. Emission Level = Read Level + Factor
Margin value = Emission level – Limit value
2. *: Out of Restricted Band
3. The emission levels of other frequencies were very low against the limit

4.2 Transmit Power Measurement

4.2.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125 mW (21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	✓	Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A		✓	250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C		✓	250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-3		✓	1 Watt (30 dBm)

*B is the 26 dB emission bandwidth in megahertz

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

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

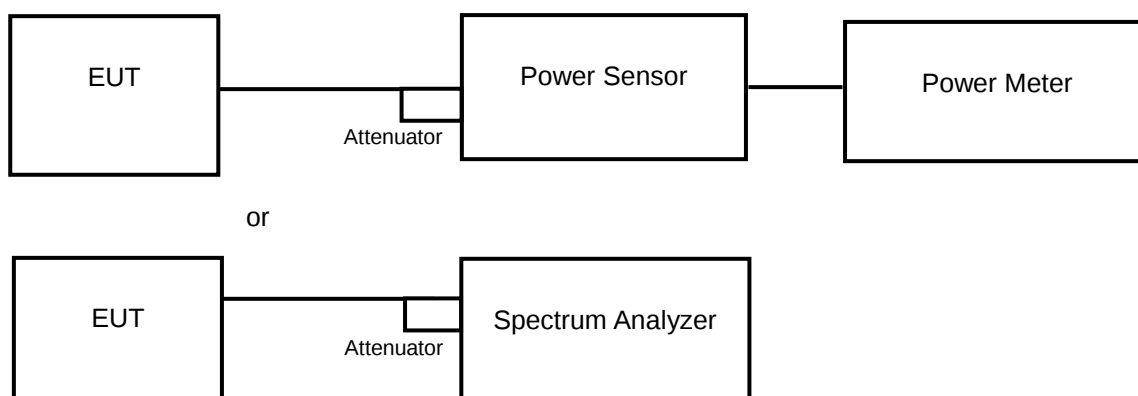
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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.

4.2.2 Test Setup

<Power Output Measurement>



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

Average Power Measurement

<802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ac (VHT80), 802.11HE (VHT160)>

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. Duty factor is not added to measured value.

4.2.5 Deviation from Test Standard

No deviation.

4.2.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 Test Results

Power Output:

802.11ac (VHT80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	15.46	15.42	69.99	18.45	24	Pass
58	5290	13.88	13.72	47.985	16.81	24	Pass

802.11ac (VHT160)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
50	5250	12.24	11.99	32.562	15.13	24	Pass
114	5570	12.65	12.33	35.508	15.50	24	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	15.47	15.30	69.122	18.40	24	Pass
58	5290	13.92	13.87	49.039	16.91	24	Pass

802.11ax (HE160)

Channel	Frequency (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
50	5250	12.09	11.79	31.282	14.95	24	Pass
114	5570	12.52	12.21	34.499	15.38	24	Pass

4.3 Conducted Bandedge Measurement

4.3.1 Limits of Conducted Bandedge Measurement

Radiated versus Conducted Measurement	
☒ Conducted measurement	☐ Radiated 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).	

Conducted Measurement Factor
a. The composite gain will be used when signal support the correlated signal. (Composite gain = 3.62dBi + 10log(2) = 6.63dBi) b. For the out of band spurious the gain for the specific band may have been used rather than the highest gain across all bands. c. For the band edge the gain for the specific band may have been used. d. In restricted bands below 1000 MHz, add upper bound on ground plane reflection: For f = 30 – 1000 MHz, add 4.7 dB. Note: The conducted emission test was considered some factor to compute test result.

4.3.2 Test Procedure Measurement

Following FCC KDB 558074 D01 DTS Meas. Guidance :

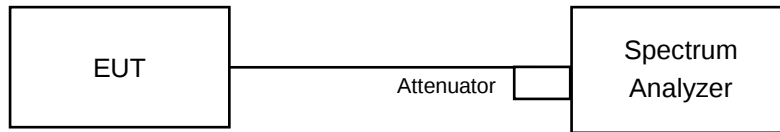
Radiated versus Conducted Measurements.

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

The following steps was performed:

- 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)

4.3.3 Test Setup



4.3.4 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

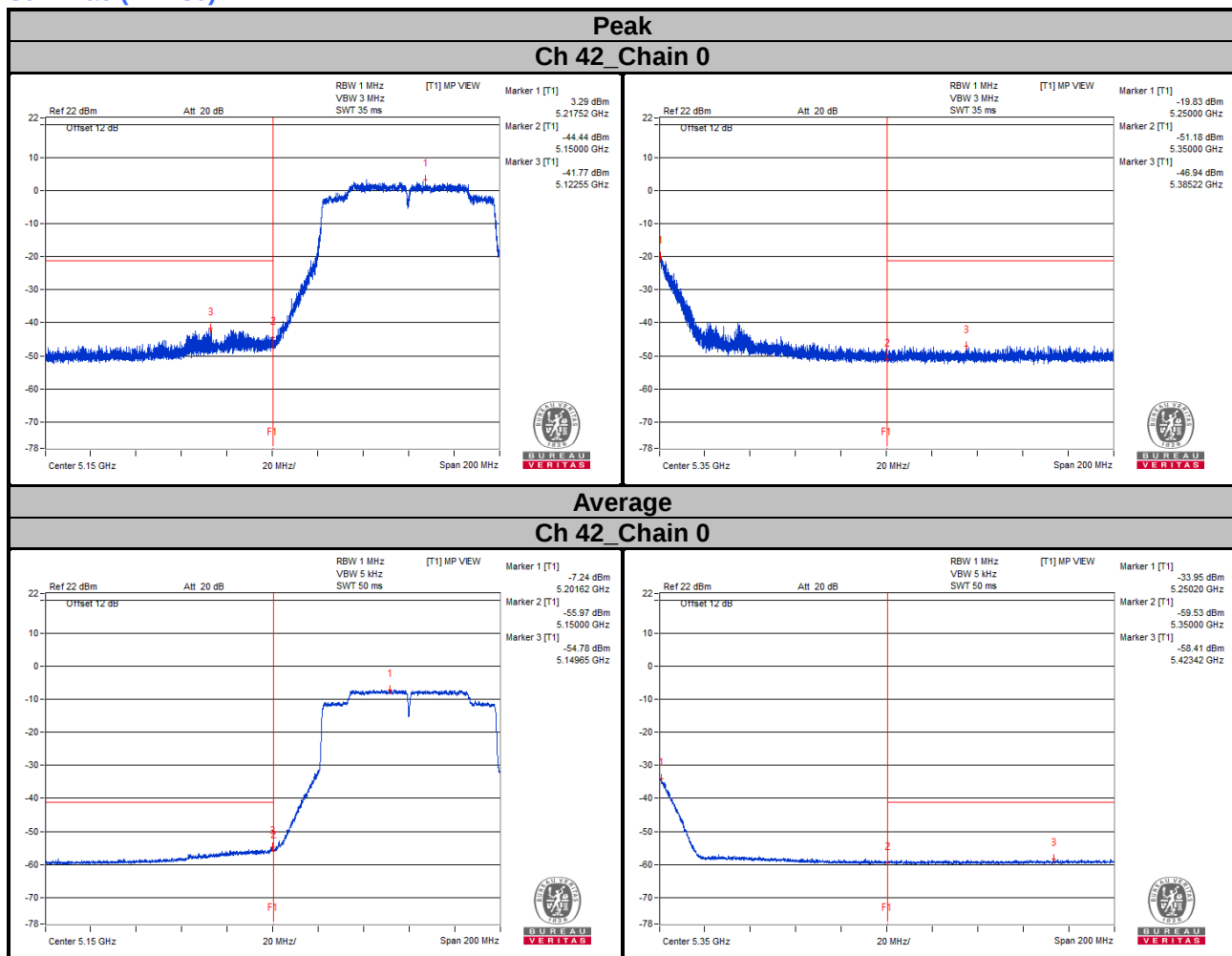
4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

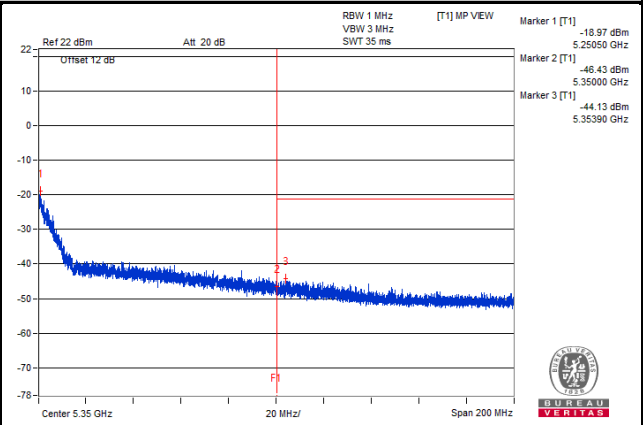
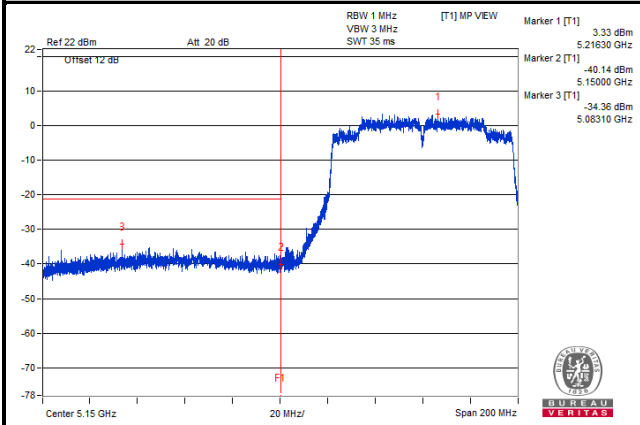
The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

802.11ac (VHT80)

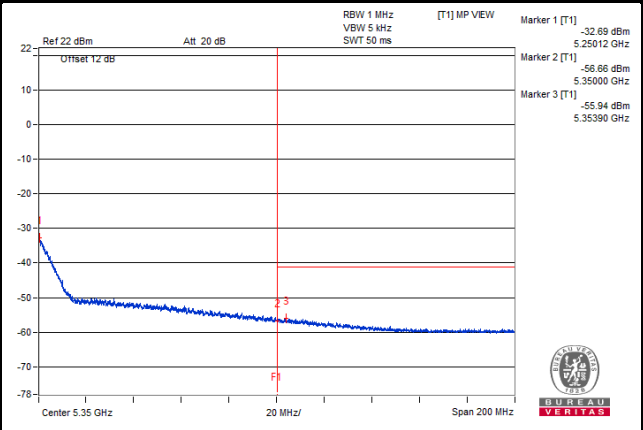
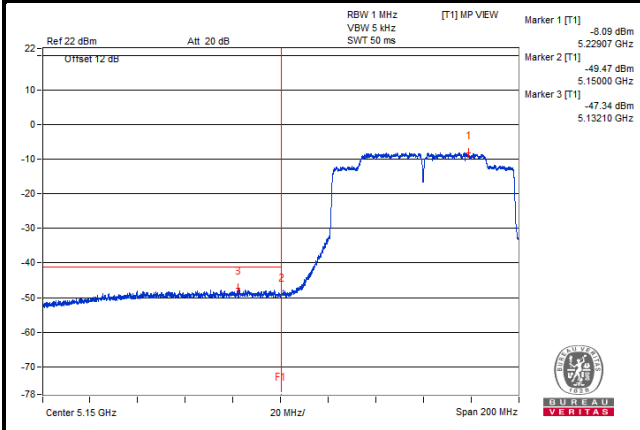


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 42_Chain 1

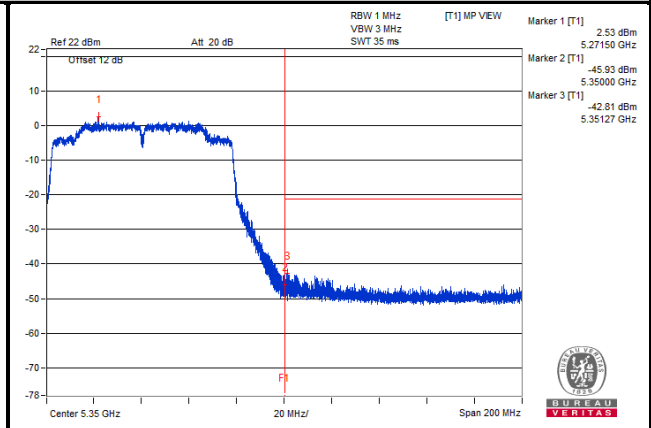
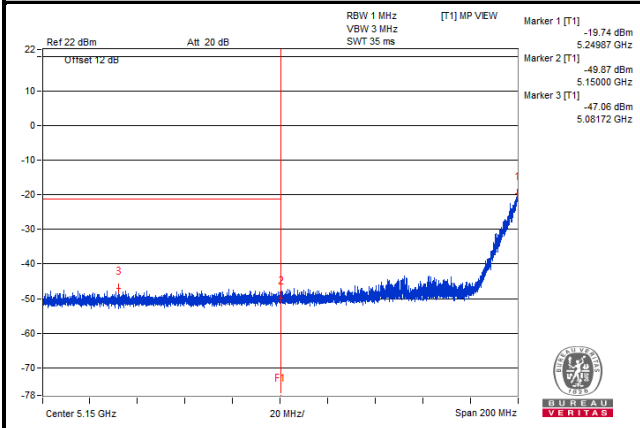


Average Ch 42_Chain 1

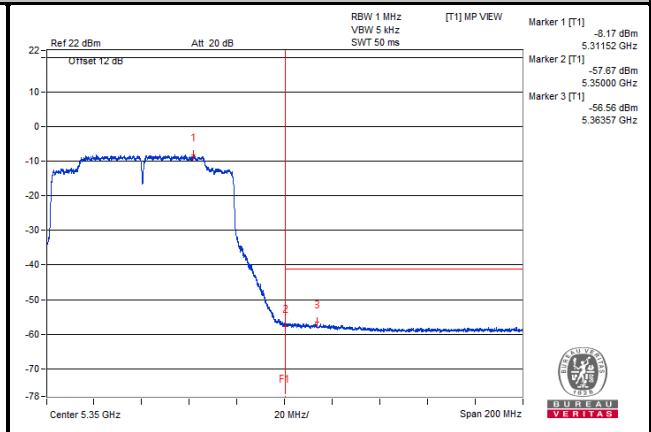
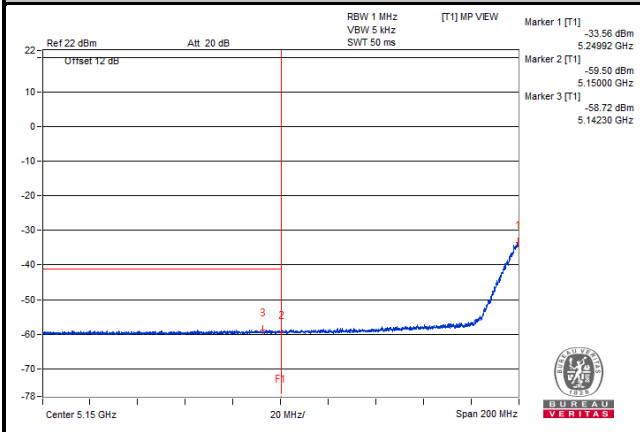


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 58_Chain 0

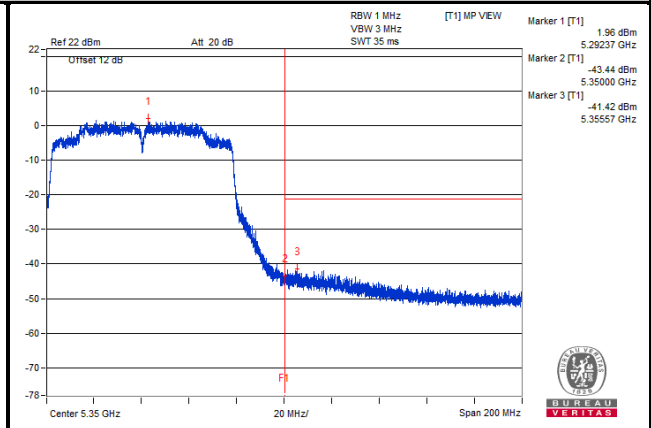
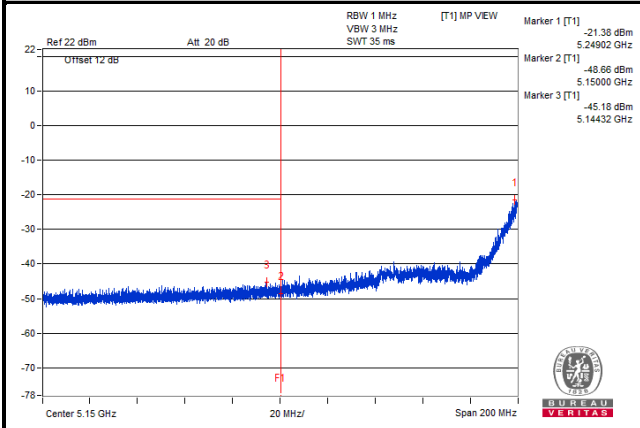


Average Ch 58_Chain 0

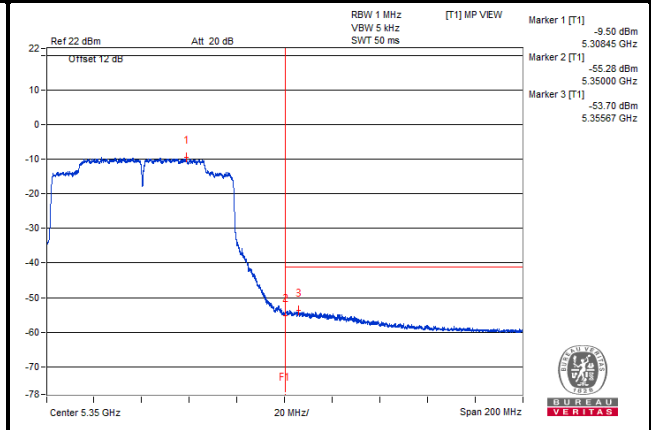
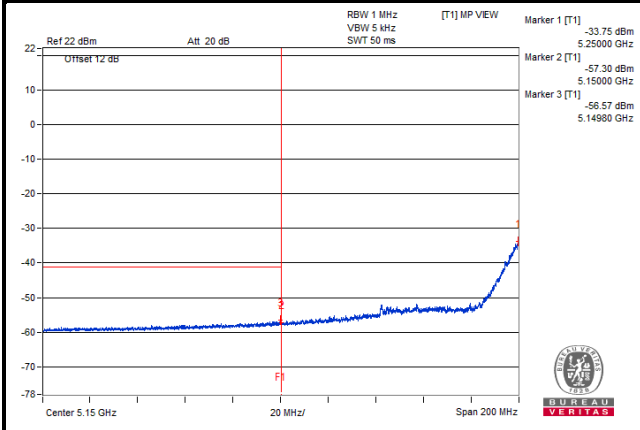


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 58 Chain 1

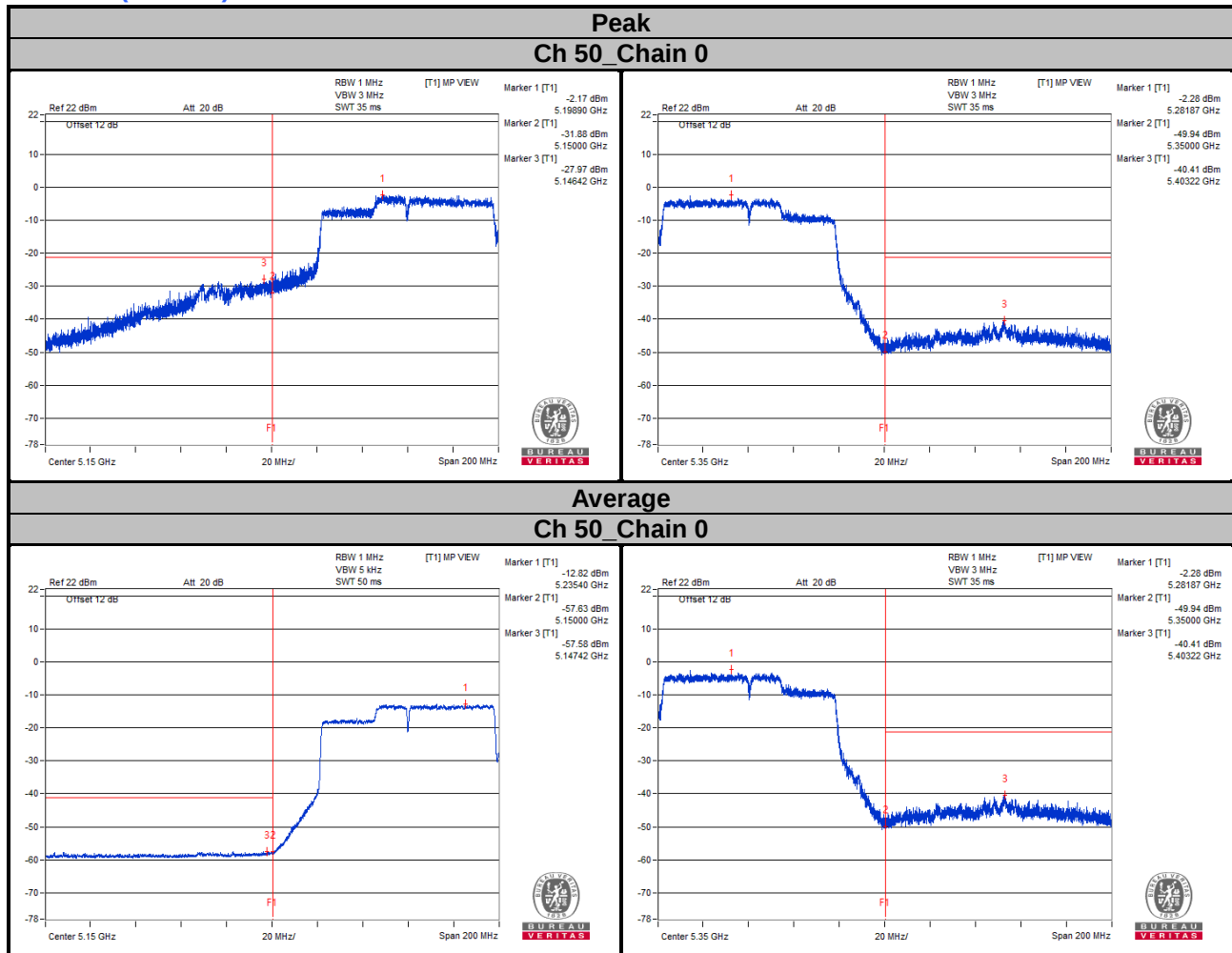


Average Ch 58 Chain 1



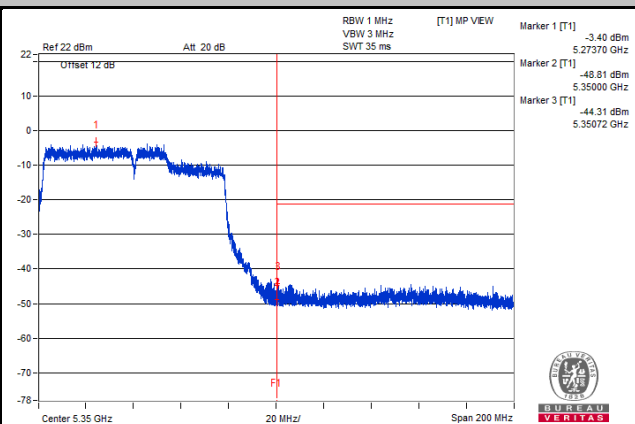
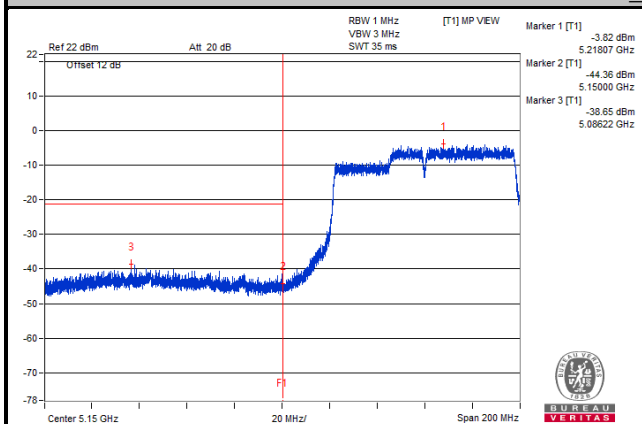
Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

802.11ac (VHT160)

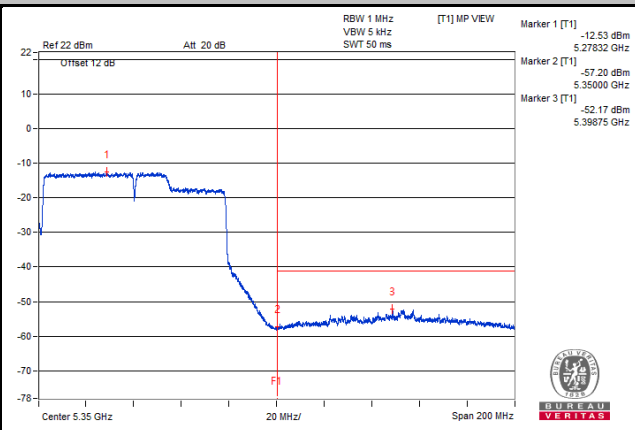
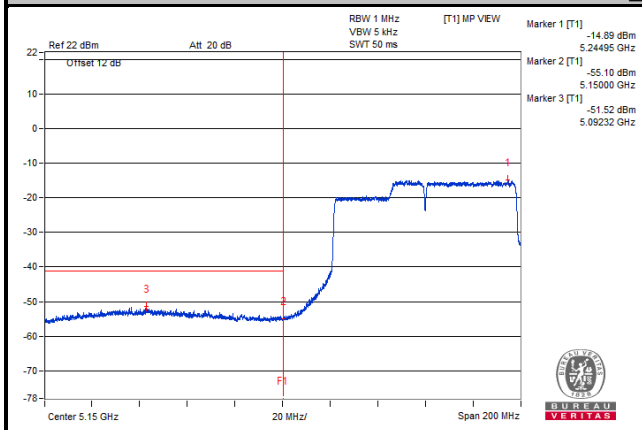


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 50_Chain 1

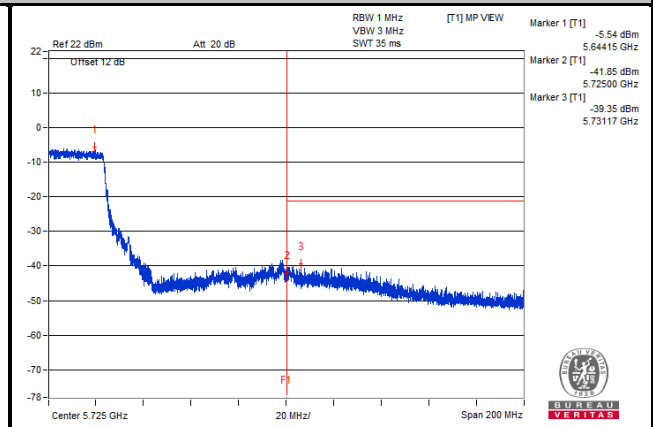
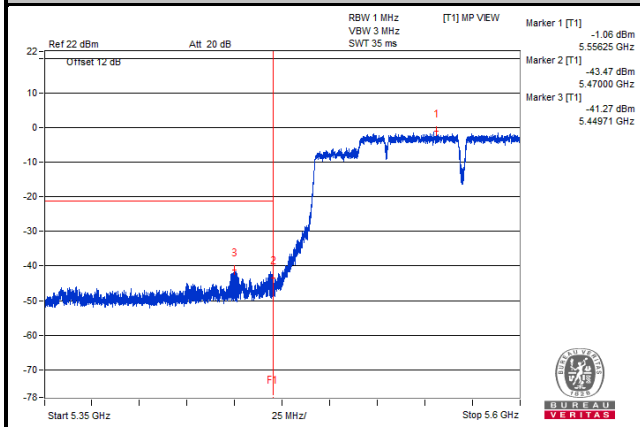


Average Ch 50_Chain 1

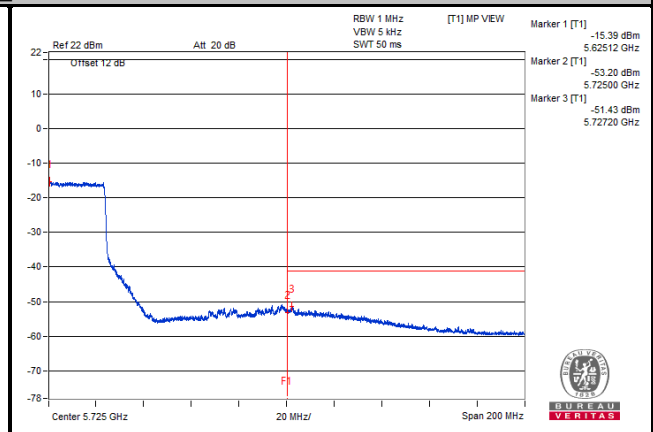
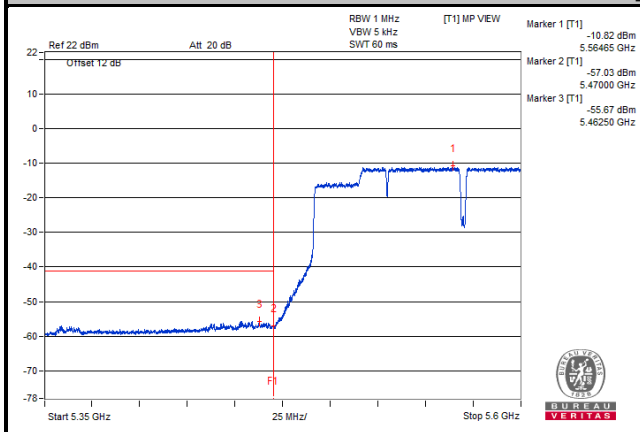


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 114 Chain 0

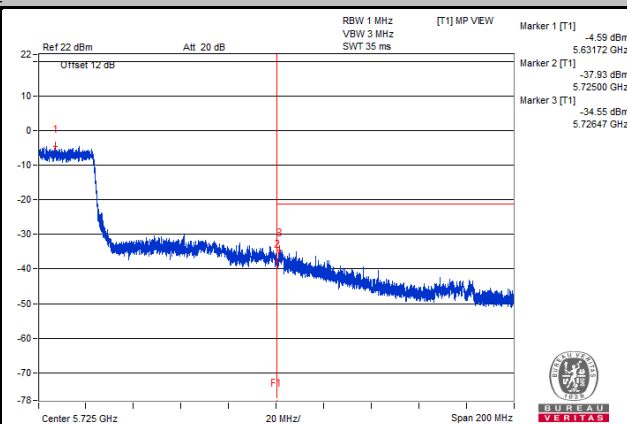
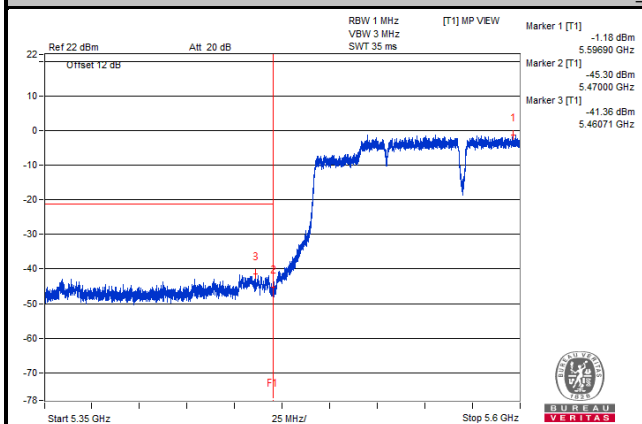


Average Ch 114 Chain 0

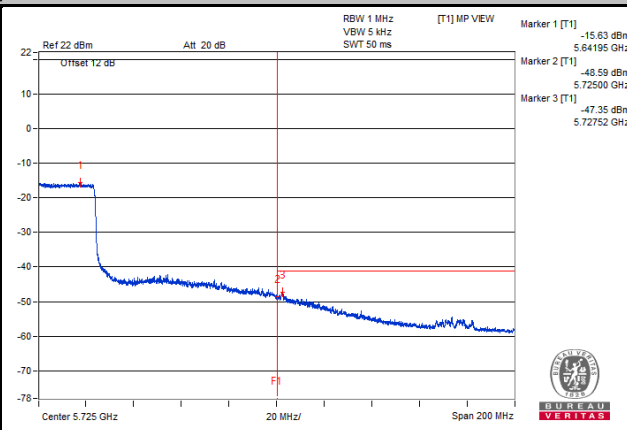
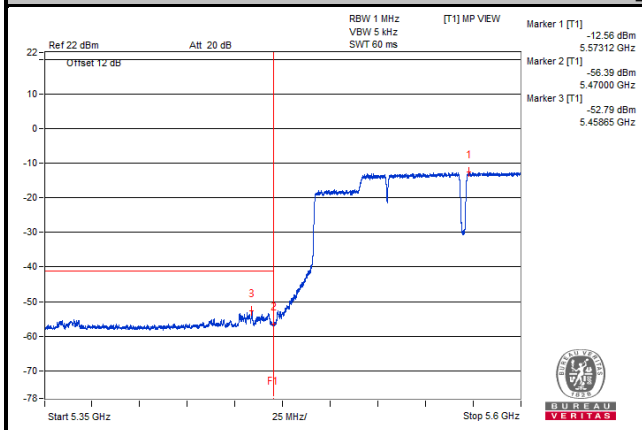


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 114 Chain 1

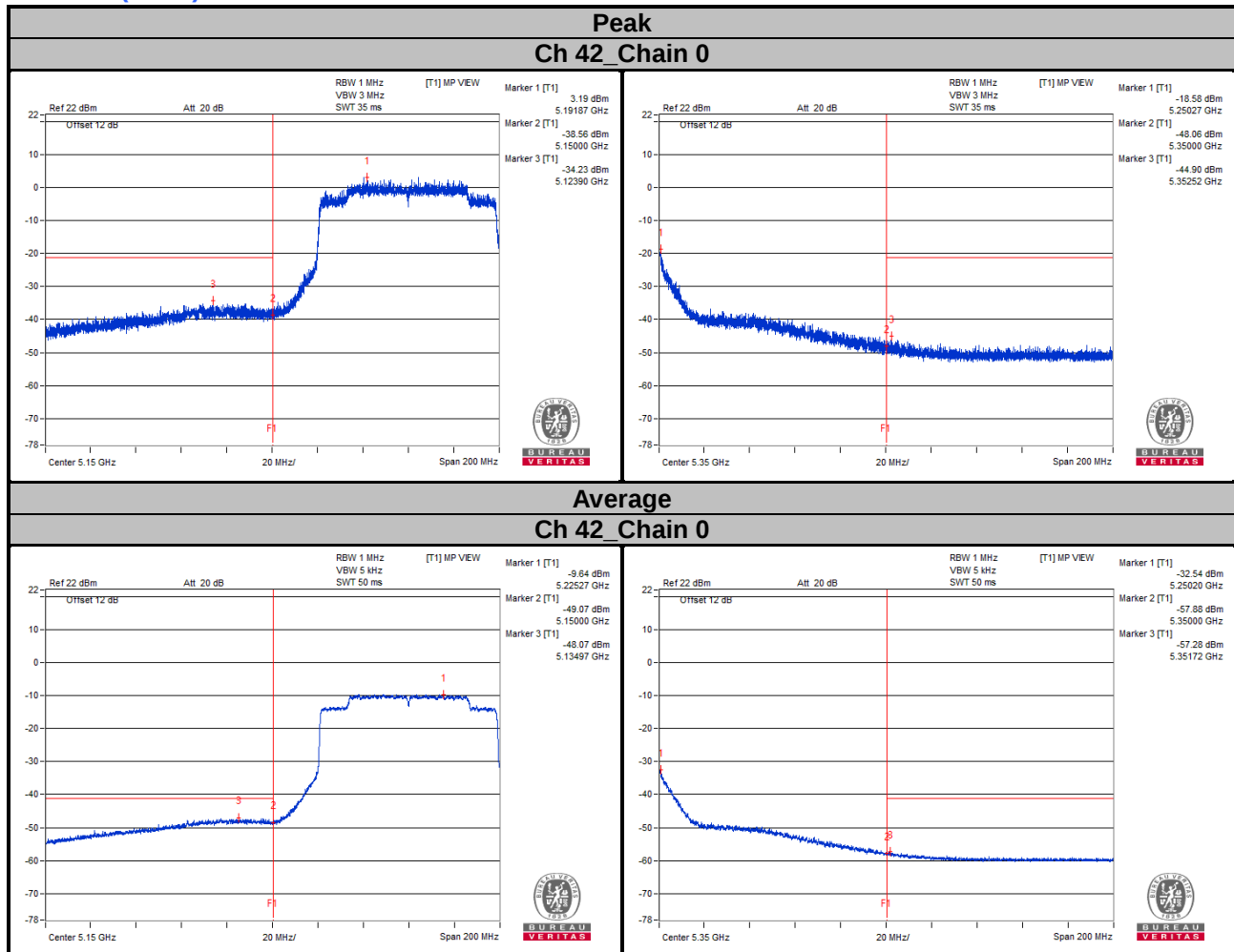


Average Ch 114 Chain 1



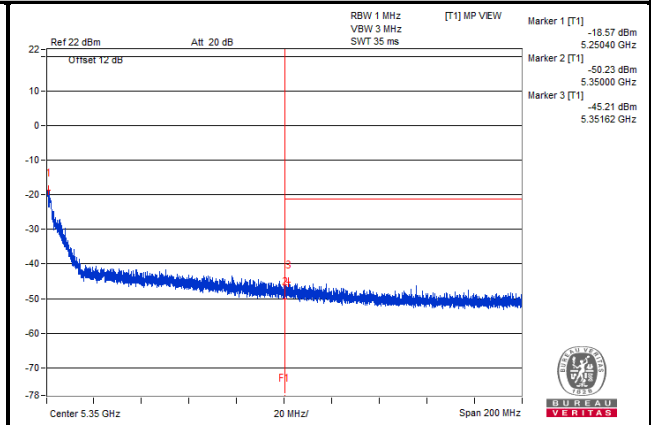
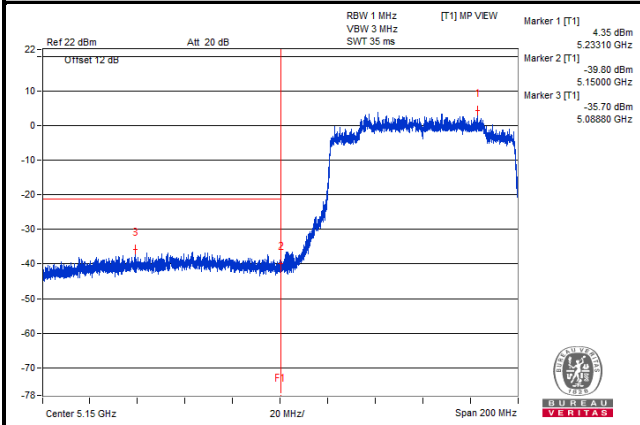
Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

802.11ax (HE80)

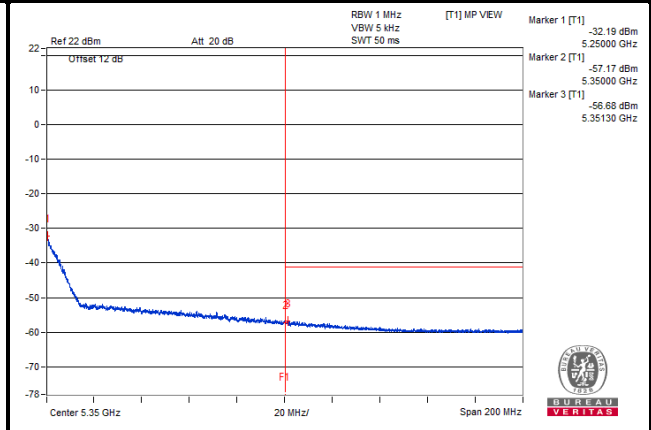
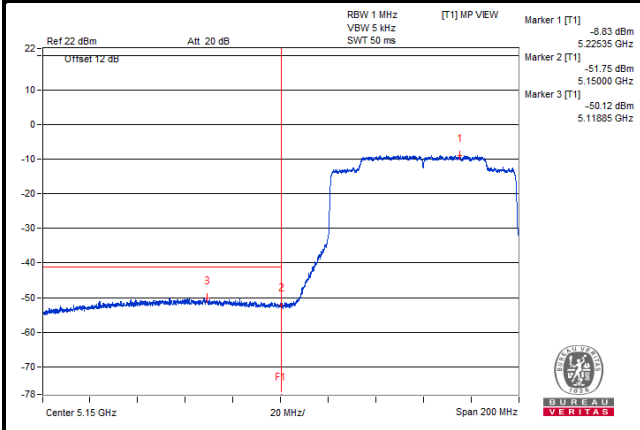


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 42_Chain 1

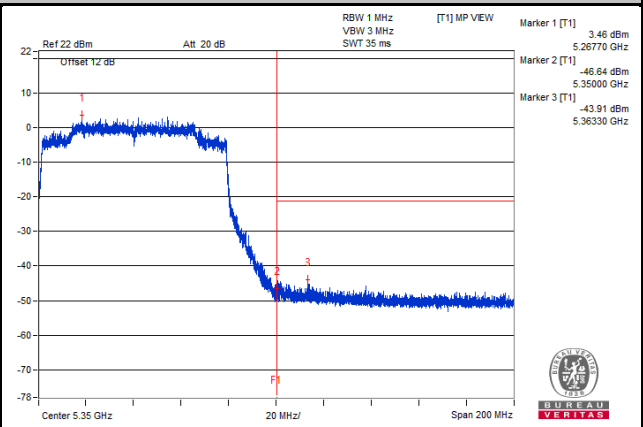
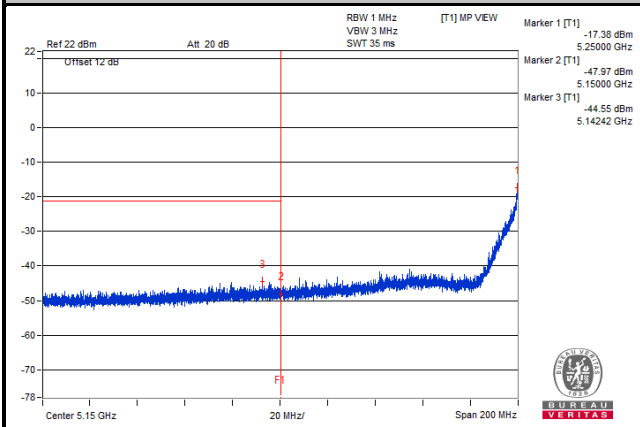


Average Ch 42_Chain 1

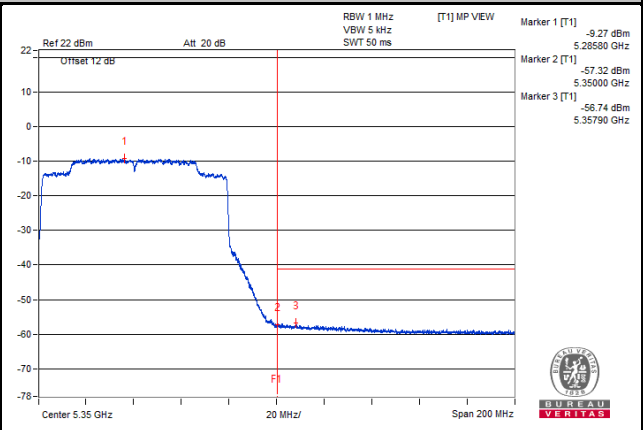
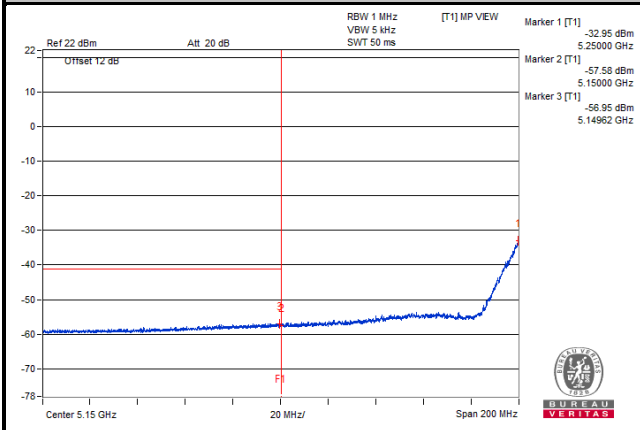


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 58_Chain 0

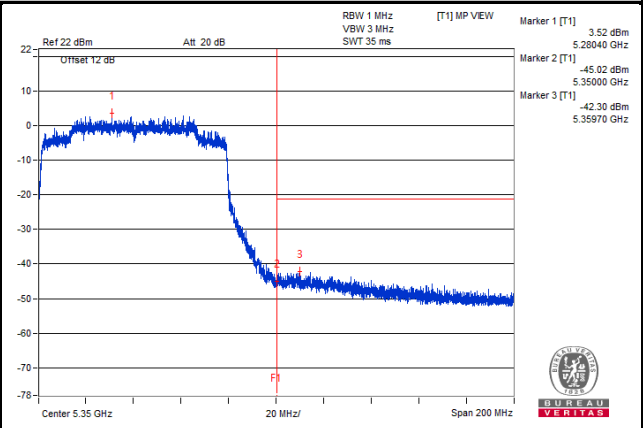
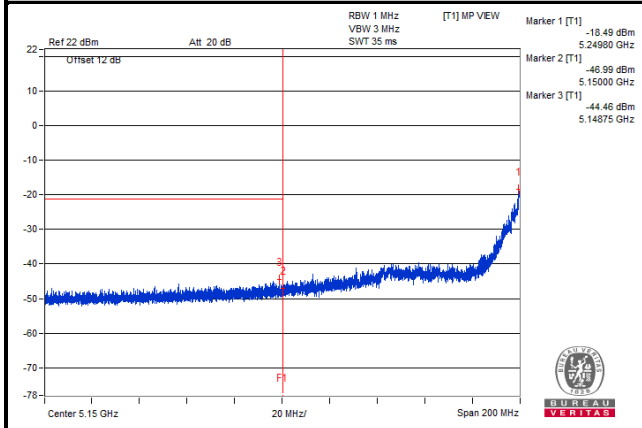


Average Ch 58_Chain 0

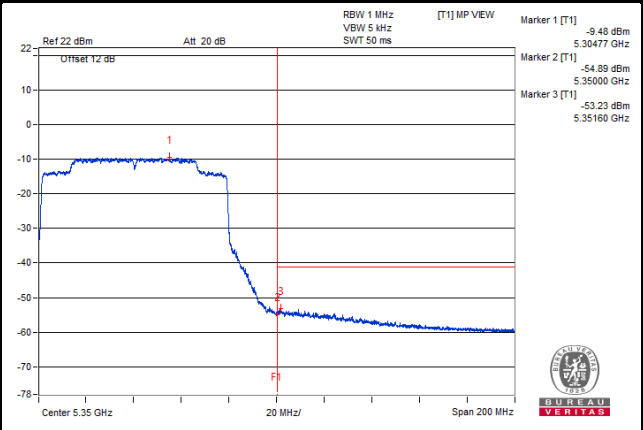
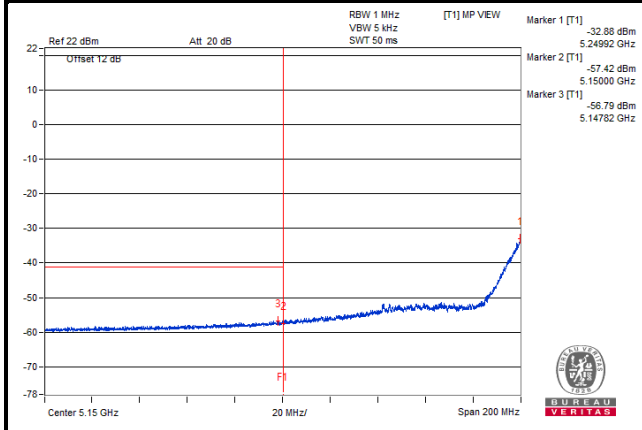


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 58 Chain 1

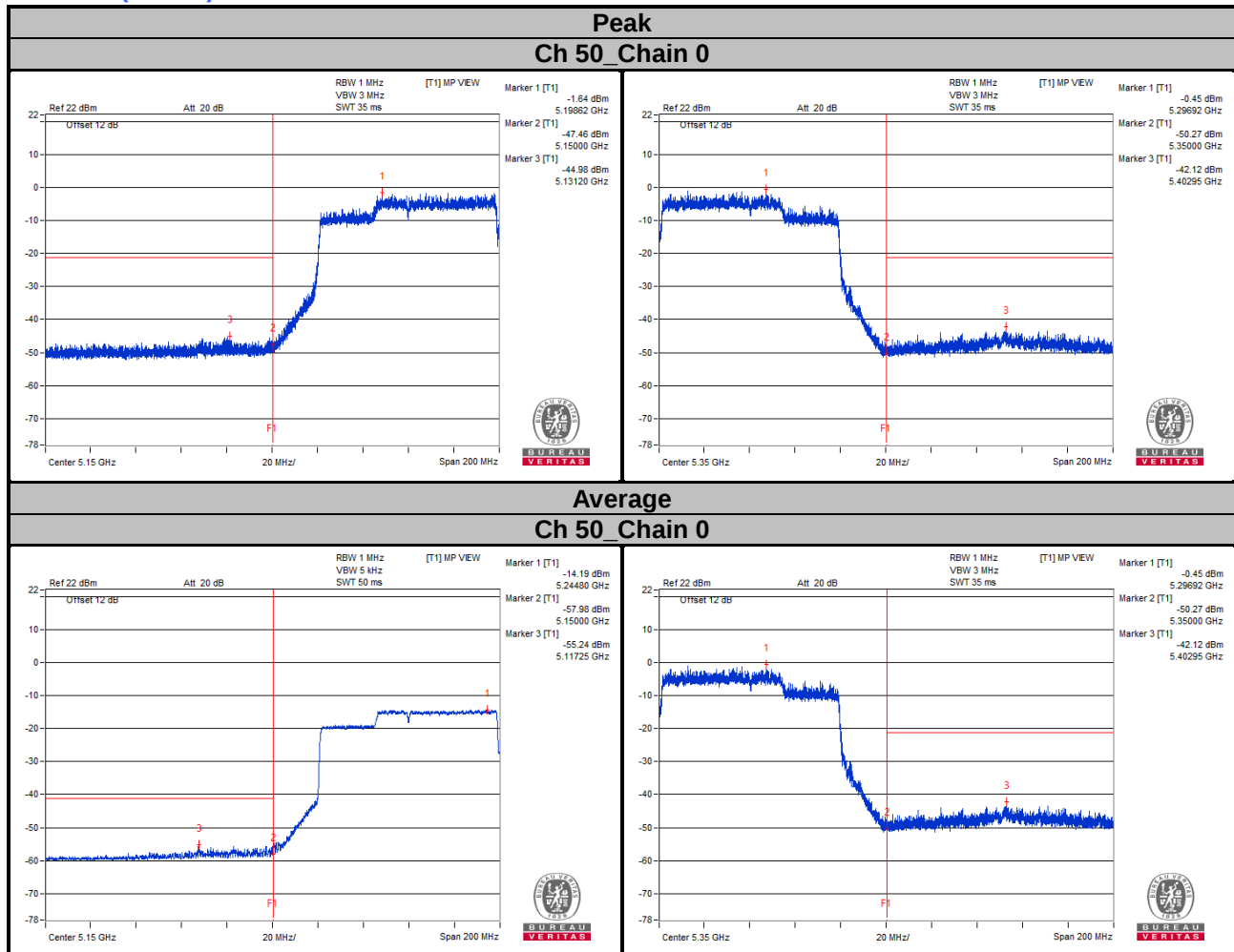


Average Ch 58 Chain 1



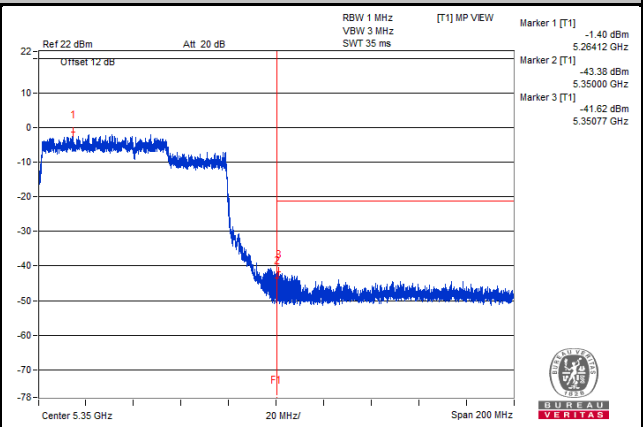
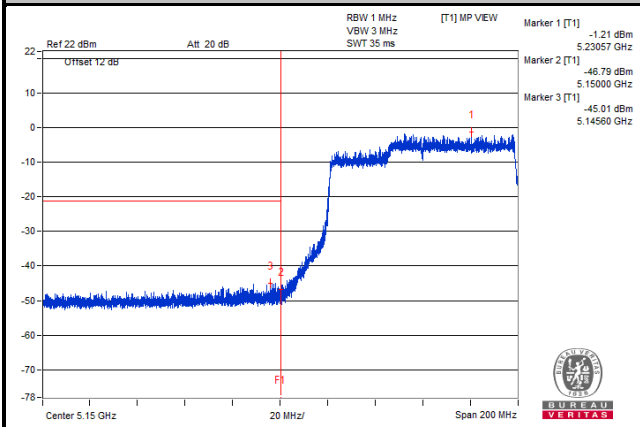
Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

802.11ax (HE160)

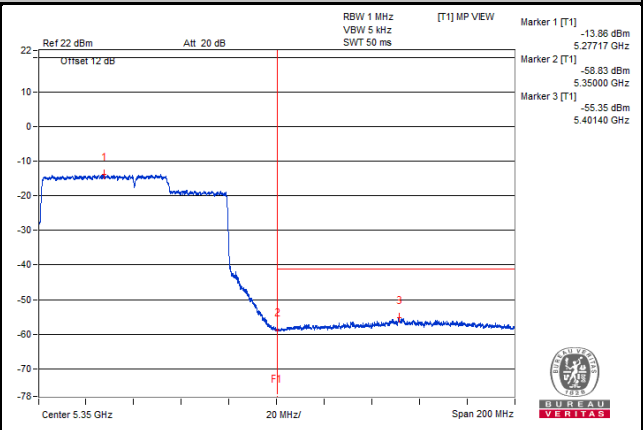
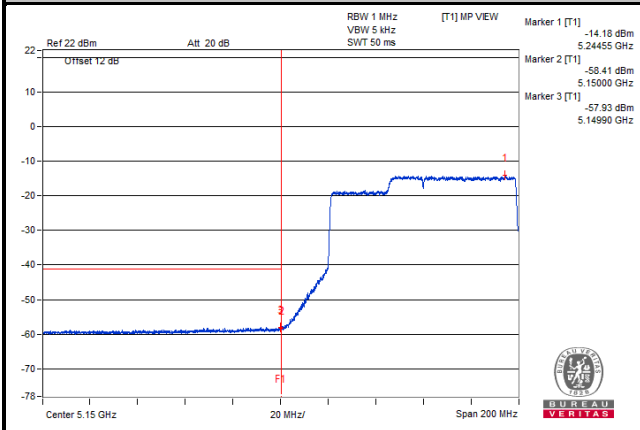


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 50_Chain 1

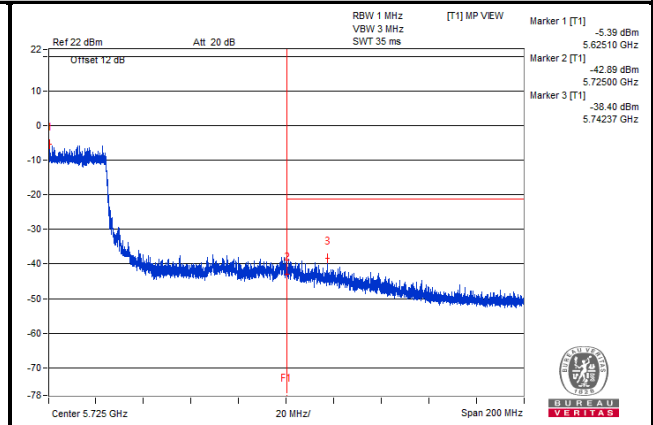
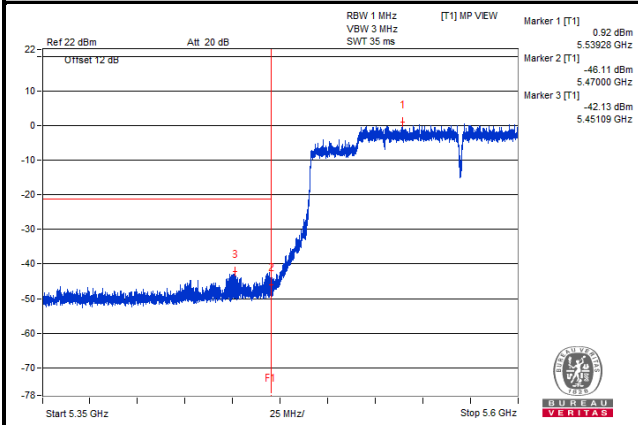


Average Ch 50_Chain 1

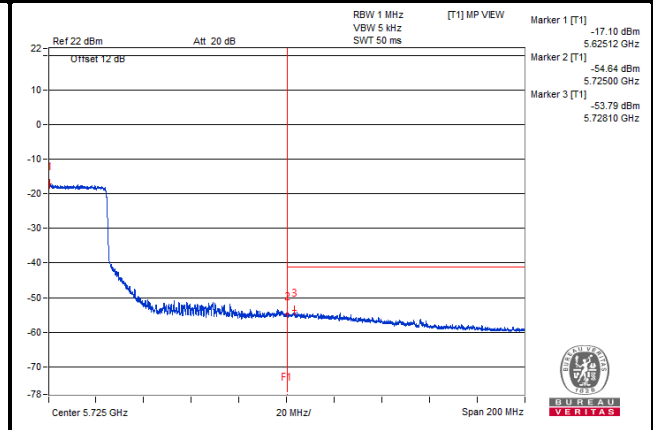
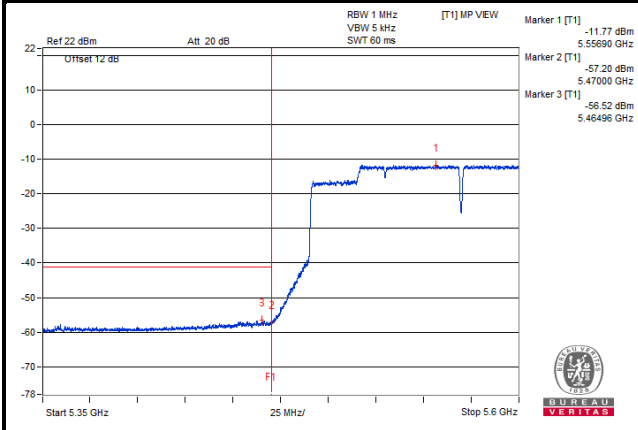


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 114 Chain 0

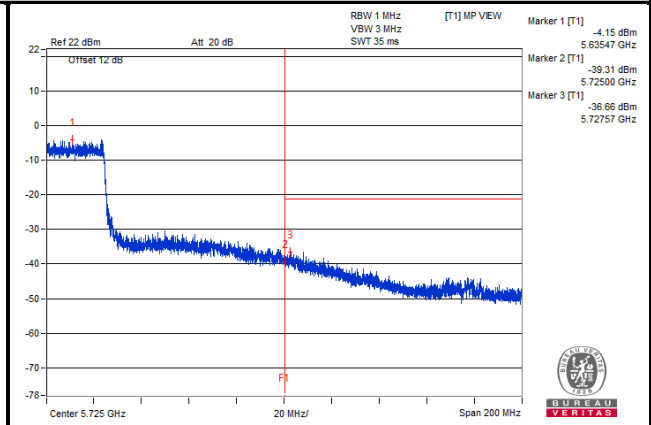
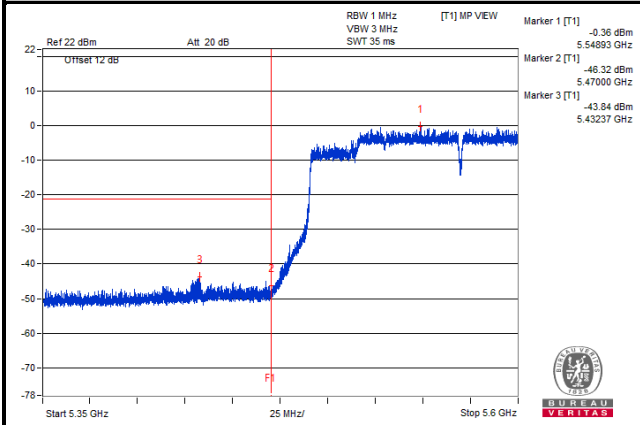


Average Ch 114 Chain 0

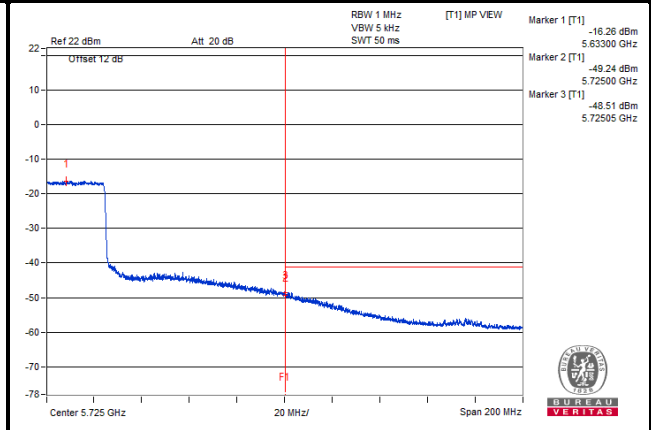
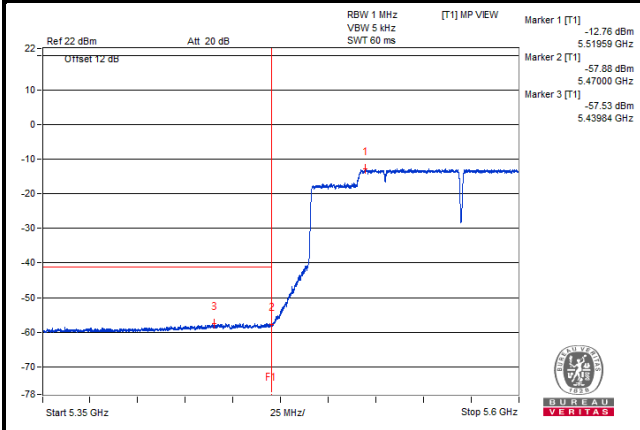


Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Peak Ch 114 Chain 1



Average Ch 114 Chain 1



Note: VIEW is just to prevent pulse from entering. The method is using maxhold first, wait to waveform stable then view.

Device	Band edge Frequency (MHz)	Channel	Mode	BW	Conducted Bandedge		Caravel Antenna Peak Gain (dBi)		EIRP (dBm)		EIRP (10 ⁻⁵ *mW)		EIRP Combine (10 ⁻⁵ *mW)	EIRP Combine (dBm)	Conversion Factor	Field Strength Combine (dBuV/m)	Limit (dBuV/m)	Margin (dB)
					Chain A (dBm)	Chain B (dBm)	Chain (A)	Chain (B)	Chain (A)	Chain (B)	Chain (A)	Chain (B)						
Galleon	2462	11F	11n_HTO	40	-52.19	-51.63	1.83	2.05	-50.36	-49.58	0.92	1.10	2.02	-46.94	95.20	48.26	54.00	-5.74
Galleon	2462	11	11ax_MCS0	20	-52.33	-52.54	1.83	2.05	-50.5	-50.49	0.89	0.89	1.78	-47.48	95.20	47.72	54.00	-6.28
Galleon	2467	12	11ax_MCS0	20	-56.93	-52.66	1.83	2.05	-55.1	-50.61	0.31	0.87	1.18	-49.29	95.20	45.91	54.00	-8.09
Galleon	2472	13	11ax_MCS0	20	-56.35	-52.44	1.83	2.05	-54.52	-50.39	0.35	0.91	1.27	-48.97	95.20	46.23	54.00	-7.77
Galleon	2462	11F	11ax_MCS0	40	-51.1	-51.3	1.83	2.05	-49.27	-49.25	1.18	1.19	2.37	-46.25	95.20	48.95	54.00	-5.05
Galleon	5210	42	11ac_VHT0	80	-54.78	-47.34	3.17	3.36	-51.61	-43.98	0.69	4.00	4.69	-43.29	95.20	51.91	54.00	-2.09
Galleon	5290	58	11ac_VHT0	80	-56.56	-53.7	3.3	3.25	-53.26	-50.45	0.47	0.90	1.37	-48.62	95.20	46.58	54.00	-7.42
Galleon	5250	50	11ac_VHT0	160	-57.58	-51.52	3.3	3.36	-54.28	-48.16	0.37	1.53	1.90	-47.21	95.20	47.99	54.00	-6.01
Galleon	5570	114	11ac_VHT0	160	-51.43	-47.35	3.56	2.29	-47.87	-45.06	1.63	3.12	4.75	-43.23	95.20	51.97	54.00	-2.03
Galleon	5210	42	11ax_MCS0	80	-46.57	-48.62	3.17	3.36	-43.4	-45.26	4.57	2.98	7.55	-41.22	95.20	53.98	54.00	-0.02
Galleon	5290	58	11ax_MCS0	80	-56.74	-53.23	3.3	3.25	-53.44	-49.98	0.45	1.00	1.46	-48.36	95.20	46.84	54.00	-7.16
Galleon	5250	50	11ax_MCS0	160	-55.35	-56.31	3.3	3.36	-52.05	-52.95	0.62	0.51	1.13	-49.47	95.20	45.73	54.00	-8.27
Galleon	5570	114	11ax_MCS0	160	-53.79	-48.51	3.56	2.29	-50.23	-46.22	0.95	2.39	3.34	-44.77	95.20	50.43	54.00	-3.57

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

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Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

The address and road map of all our labs can be found in our web site also.

--- END ---