

TEST REPORT

CERTIFICATE OF CONFORMITY

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

Report No.: RFCDVB-WTW-P24010023-4

FCC ID: QYLAX211NG

Product: Wireless Module

Brand: Getac

Model No.: AX211NGW

Received Date: 2024/1/20

Test Date: 2024/2/20 ~ 2024/3/14

Issued Date: 2024/3/28

Applicant: Getac Technology Corporation.

Address: 5F., Building A, No. 209, Sec.1, Nangang Rd., Nangang Dist., Taipei City 11568, Taiwan, R.O.C.

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., Kewi Shan Dist., Taoyuan City 33383, Taiwan

FCC Registration / 788550 / TW0003

Designation Number:

Approved by: _____

Jeremy Lin

Jeremy Lin / Project Engineer

, Date: _____

2024/3/28

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Prepared by : Gina Liu / Specialist



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Release Control Record

Issue No.	Description	Date Issued
RFCDVB-WTW-P24010023-4	Original release.	2024/3/28

1 Certificate

Product: Wireless Module

Brand: Getac

Test Model: AX211NGW

Sample Status: Engineering sample

Applicant: Getac Technology Corporation.

Test Date: 2024/2/20 ~ 2024/3/14

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

Measurement ANSI C63.10-2013

procedure: KDB 987594 D02 U-NII 6 GHz EMC Measurement v02r01

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)(8)	Maximum RF Output Power	Pass	Meet the requirement of limit.
15.407(a)(8)	Maximum Power Spectral Density	N/A	Refer to Note
15.407(a)(10)	Emission Bandwidth	N/A	Refer to Note
15.407(a)(10)	Occupied Bandwidth	N/A	Refer to Note
15.407(b)(9)	AC Power Conducted Emissions	Pass	Minimum passing margin is -20.69 dB at 0.47800 MHz
15.407(b)(9)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -6.1 dB at 30.97 MHz
15.407(b)(6) 15.407(b)(10)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -5.8 dB at 12050.00 MHz
15.407(d)(6)	Contention-based Protocol	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is MHF-4 not a standard connector.

Notes:

- Only test item of Output Power, AC Power Conducted Emissions, Unwanted Emissions and Contention-based Protocol were performed for this report. Other testing data please refer to module report No.: 200611-01.TR38 and 200611-01.TR39 (Brand: Intel® Wi-Fi 6E AX211, Model: AX211NGW).
- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Specification	Expanded Uncertainty (k=2) (±)
AC Power Conducted Emissions	9 kHz ~ 30 MHz	2.88 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	2.44 dB
	30 MHz ~ 1 GHz	2.95 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

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

2.2 Supplementary Information

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

3 General Information

3.1 General Description of EUT

Product	Wireless Module
Brand	Getac
Test Model	AX211NGW
Status of EUT	Engineering sample
Power Supply Rating	End-product: 19.0 Vdc (from adapter) 10.8 Vdc (from battery)
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA in 11ax mode
Modulation Technology	OFDM, OFDMA
Transfer Rate	Up to 2402.0 Mbps
Operating Frequency	5.955 GHz ~ 6.415 GHz 6.435 GHz ~ 6.525 GHz 6.535 GHz ~ 6.865 GHz 6.875 GHz ~ 7.115 GHz
Number of Channel	802.11ax (HE20), 802.11be (EHT20):59 802.11ax (HE40), 802.11be (EHT40):29 802.11ax (HE80), 802.11be (EHT80):14 802.11ax (HE160), 802.11be (EHT160):7
Output Power	5.955 GHz ~ 6.415 GHz : EIRP: 31.3 mW (14.96 dBm) 6.435 GHz ~ 6.525 GHz : EIRP: 28.447 mW (14.54 dBm) 6.535 GHz ~ 6.865 GHz : EIRP: 29.21 mW (14.66 dBm) 6.875 GHz ~ 7.115 GHz : EIRP: 32.661 mW (15.14 dBm)
Equipment Class	6XD: 15E 6 GHz Low-power Indoor client

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to module report No.: 200611-01.TR38 and 200611-01.TR39 (Brand: Intel® Wi-Fi 6E AX211, Model: AX211NGW). The difference compared with original report are adding End-product. Therefore, only Output Power, AC Power Conducted Emission, Radiated Emissions and Contention-based Protocol were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to module report radiated emission worst channel, and Conducted power were re-test.
2. The EUT is authorized for use in specific End-product. Please refer to below for more details.

Brand	Model	Difference
Getac	S510	marketing purpose
	S510Y (Y= 10 characters, Y can be 0 to 9, A to Z, a to z, "/", "\", "-", " " or blank for marketing purpose)	

3. The End-product contains following accessory devices.

Battery		
Brand	Model	Specification
Getac	BP3S2P3450P-04	Power Rating : Rating: 10.8Vdc , 6600mAh, 72Wh Typical Capacity: 6900mAh, 75Wh
AC Adapter 1		
Brand	Model	Specification
FSP	FSP065-RBBN3	AC Input : 100-240 Vac ; 50-60 Hz ; 1.5 A DC Output : 19.0Vdc ; 3.42A, 65.0W DC Output Cable : 1.45M / 1 core
AC Adapter 2		
Brand	Model	Specification
FSP	FSP090-ABBN3	AC Input : 100-240 Vac ; 50-60 Hz ; 1.2 A DC Output : 19.0Vdc ; 4.74A, 90.0W DC Output Cable : 1.2M / 1 core
Touch Pen		
Brand	Model	
Getac	340GA8900001	

*After the pretesting, adapter 2 mode is found to be the worse case and therefore had been chosen for final test.

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

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Antenna No.	2.4GHz 2400-2483.5 MHz	5.2GHz 5150-5250 MHz	5.3GHz 5250-5350 MHz	5.6GHz 5470-5725 MHz	5.8GHz 5725-5850 MHz	5.9GHz 5850-5895 MHz	6.2GHz 5925-6425 MHz	6.5GHz 6425-6525 MHz	6.7GHz 6525-6875 MHz	7.0GHz 6875-7125 MHz	Antenna Type	Connector Type
1	2.41	1.39	1.21	2.45	2.41	2.39	2.18	1.46	1.83	1.56	PIFA	MHF-4
2	1.68	1.22	1.17	1.8	1.78	0.52	1.2	1.18	1.14	2.3	PIFA	MHF-4

* 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	
802.11ax (HE20)	2TX	2RX
802.11ax (HE40)	2TX	2RX
802.11ax (HE80)	2TX	2RX
802.11ax (HE160)	2TX	2RX

3.3 Channel List

U-NII-5:

24 channels are provided for 802.11ax (HE20):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
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-6:

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
97	6435 MHz	101	6455 MHz	105	6475 MHz	109	6495 MHz
113	6515 MHz						

3 channels are provided for 802.11ax (HE40):

Channel	Frequency	Channel	Frequency	Channel	Frequency
99	6445 MHz	107	6485 MHz	*115	6525 MHz

1 channel is provided for 802.11ax (HE80):

Channel	Frequency
103	6465 MHz

1 channel is provided for 802.11ax (HE160):

Channel	Frequency
*111	6505 MHz

U-NII-7:

17 channels are provided for 802.11a, 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

5 channels are provided for 802.11ax (HE80):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
*119	6545 MHz	135	6625 MHz	151	6705 MHz	167	6785 MHz
*183	6865 MHz						

2 channels are provided for 802.11ax (HE160):

Channel	Frequency	Channel	Frequency
143	6665 MHz	175	*6825 MHz

U-NII-8:

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
185	6875 MHz	189	6895 MHz	193	6915 MHz	197	6935 MHz
201	6955 MHz	205	6975 MHz	209	6995 MHz	213	7015 MHz
217	7035 MHz	221	7055 MHz	225	7075 MHz	229	7095 MHz
233	7115 MHz						

6 channels are provided for 802.11ax (HE40):

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
187	6885 MHz	195	6925 MHz	203	6965 MHz	211	7005 MHz
219	7045 MHz	227	7085 MHz				

2 channels are provided for 802.11ax (HE80):

Channel	Frequency	Channel	Frequency
199	6945 MHz	215	7025 MHz

1 channel is provided for 802.11ax (HE160):

Channel	Frequency
207	6985 MHz

Note: * mean these are straddle channels.

3.4 Test Mode Applicability and Tested Channel Detail

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

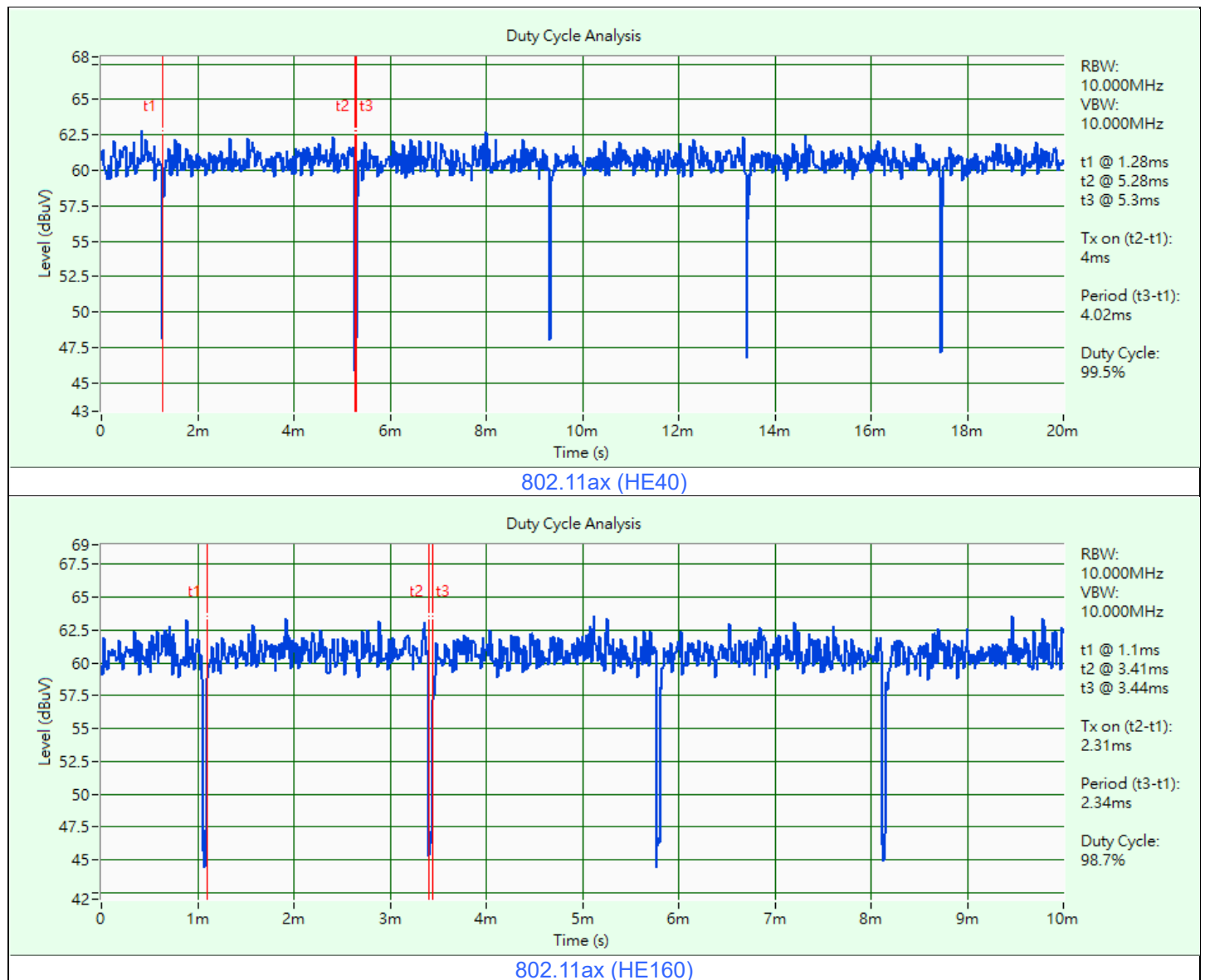
Test Item	Mode	Tested Channel	Modulation	Data Rate Parameter
Maximum RF Output Power	802.11ax (HE20)	1, 45, 93, 97, 105, 113, 117, 149, 181, 185, 209, 233	BPSK	MCS0
	802.11ax (HE40)	3, 43, 91, 99, 107, 115, 123, 155, 179, 187, 211, 227	BPSK	MCS0
	802.11ax (HE80)	7, 39, 87, 103, 119, 151, 183, 199, 215	BPSK	MCS0
	802.11ax (HE160)	15, 47, 79, 111, 143, 175, 207	BPSK	MCS0
Contention-based Protocol	802.11ax (HE20)	45, 105, 149, 209	BPSK	MCS0
	802.11ax (HE160)	47, 111, 143, 207	BPSK	MCS0
AC Power Conducted Emissions	802.11ax (HE160)	111	BPSK	MCS0
Unwanted Emissions below 1 GHz	802.11ax (HE160)	111	BPSK	MCS0
Unwanted Emissions above 1 GHz	802.11ax (HE40)	227	BPSK	MCS0
	802.11ax (HE160)	15, 111, 143	BPSK	MCS0

Note: The EUT is designed to be positioned on the NB Mode only.

3.5 Duty Cycle of Test Signal

802.11ax (HE40): Duty cycle = 4 ms / 4.02 ms x 100% = 99.5%

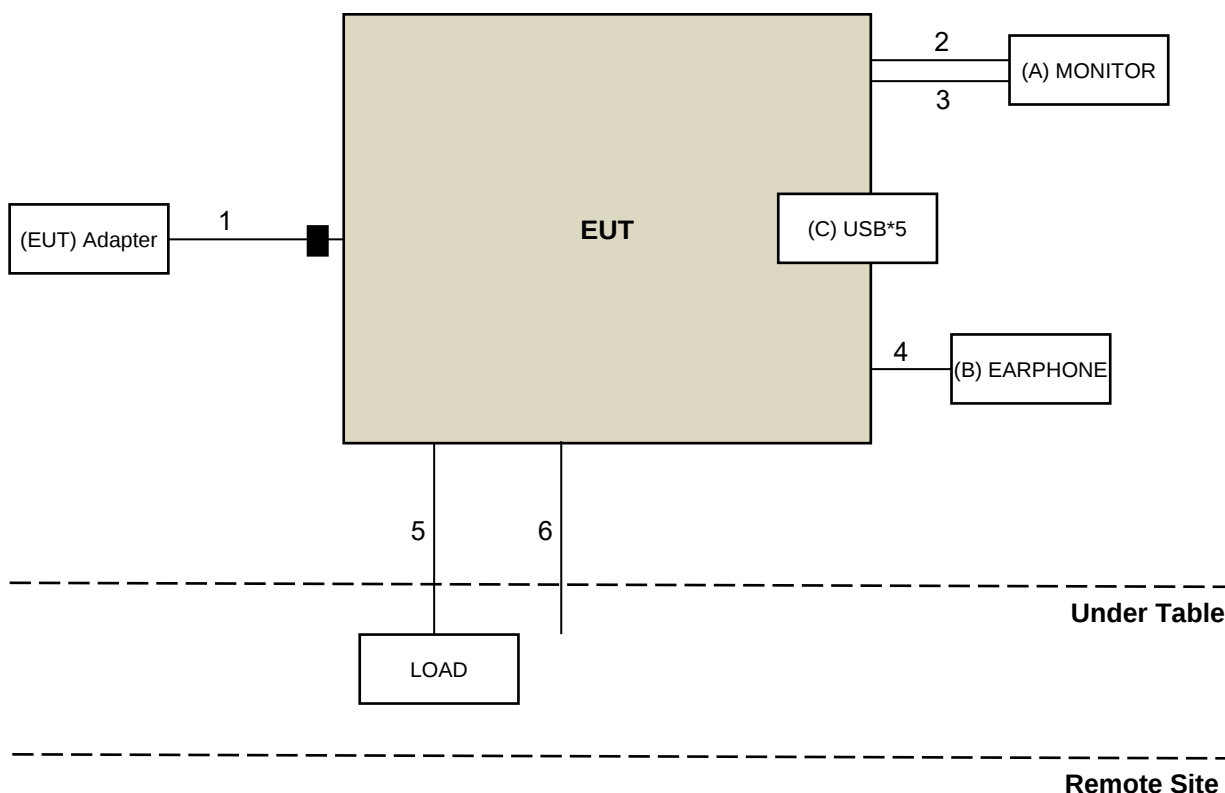
802.11ax (HE160): Duty cycle = 2.31 ms / 2.34 ms x 100% = 98.7%



3.6 Test Program Used and Operation Descriptions

Controlling software DRTU 22.100.1.1 has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Monitor	DELL	A14S2421HSXmTW	CN-01KFWW-WSL00-24C-711B	N/A	Provided by Lab
B	EARPHONE	APPLE	MB77PFEB	N/A	N/A	Provided by Lab
C	USB*5	SanDisk	SDDDC3-032G	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	ADAPTER	1	1.2	Y	1	Accessory of EUT
2	HDMI	1	1.8	Y	0	Provided by Lab
3	DP	1	1.8	Y	0	Provided by Lab
4	AUDIO	1	1.2	N	0	Provided by Lab
5	LAN	1	1.8	N	0	Provided by Lab
6	RS232	1	1.5	N	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: 2024/3/14

4.2 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	2023/5/5	2024/5/4
		DCMD33WIK7	2023/5/5	2024/5/4

Notes:

1. The test was performed in Adaptivity room.
2. Tested Date: 2024/3/9

4.3 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 SGH	BNC10W10dB	PAD-COND2-01	2023/9/2	2024/9/1
LISN R&S	ESH2-Z5	100100	2023/3/7	2024/3/6
	ESH3-Z5	100312	2023/9/12	2024/9/11
RF Coaxial Cable Woken	5D-FB	Cable-cond2-01	2023/9/2	2024/9/1
Software BVADT	BVADT_Cond_ V7.3.7.4	N/A	N/A	N/A
V-LISN Schwarzbeck	NNBL 8226-2	8226-142	2023/8/31	2024/8/30

Notes:

1. The test was performed in HY - Conduction 2.
2. Tested Date: 2024/2/22

4.4 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	N/A	N/A
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-472	2023/10/16	2024/10/15
EXA Signal Analyzer Agilent	N9010A	MY52220207	2023/12/28	2024/12/27
Loop Antenna Electro-Metrics	EM-6879	269	2023/9/23	2024/9/22
Loop Antenna TESEQ	HLA 6121	45745	2023/8/8	2024/8/7
MXE EMI Receiver Keysight	N9038A	MY55420137	2023/5/3	2024/5/2
Preamplifier EMCI	EMC 330H	980112	2023/9/27	2024/9/26
	EMC001340	980201	2023/9/27	2024/9/26
RF Coaxial Cable Woken	8D-FB	Cable-Ch10-01	2023/9/27	2024/9/26
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MG-7802	N/A	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 5.
2. Tested Date: 2024/2/21

4.5 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Antenna Tower & Turn Max-Full	MFA-440H	AT93021705	N/A	N/A
Boresight antenna tower fixture BV	BAF-02	7	N/A	N/A
EXA Signal Analyzer Agilent	N9010A	MY52220207	2023/12/28	2024/12/27
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-969	2023/11/12	2024/11/11
	BBHA 9170	148	2023/11/12	2024/11/11
MXE EMI Receiver Keysight	N9038A	MY55420137	2023/5/3	2024/5/2
Notch Filter Micro-Tronics	BRM17690	004	2024/1/23	2025/1/22
	BRM50716	060	2023/12/25	2024/12/24
Preamplifier EMCI	EMC 012645	980115	2023/9/27	2024/9/26
	EMC 184045	980116	2023/9/27	2024/9/26
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	2023/7/8	2024/7/7
	EMC102-KM-KM-3000	150929	2023/7/8	2024/7/7
	EMC104-SM-SM- 8000+3000	171005	2023/9/27	2024/9/26
RF Coaxial Cable HUBER+SUHNER	SUCOFLEX 104	EMC104-SM-SM- 1000(140807)	2023/9/27	2024/9/26
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	N/A	N/A	N/A
Turn Table Max-Full	MFT-201SS	N/A	N/A	N/A
Turn Table Controller Max-Full	MG-7802	N/A	N/A	N/A

Notes:

1. The test was performed in HY - 966 chamber 5.
2. Tested Date: 2024/2/20 ~ 2024/2/21

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	6XD: 15E 6 GHz Low-power Indoor client	EIRP 24 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 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.

5.3 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.

5.4 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).

5.5 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)

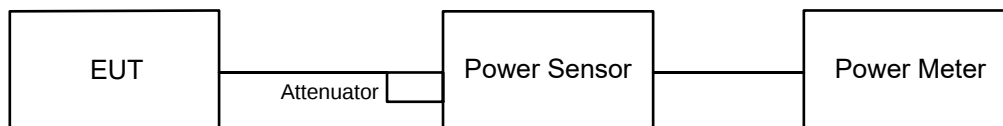
Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

6 Test Arrangements

6.1 Maximum RF Output Power

6.1.1 Test Setup

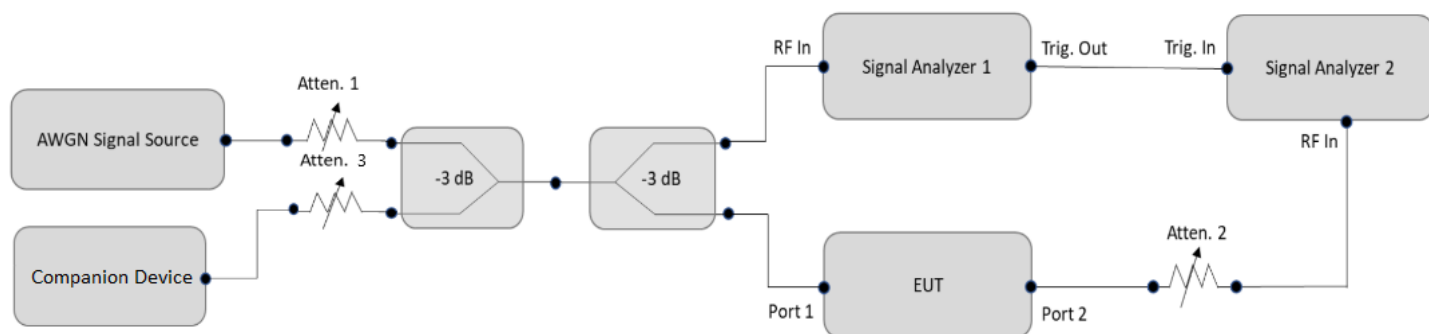


6.1.2 Test Procedure

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 Contention-based Protocol

6.2.1 Test Setup



6.2.2 Test Procedure

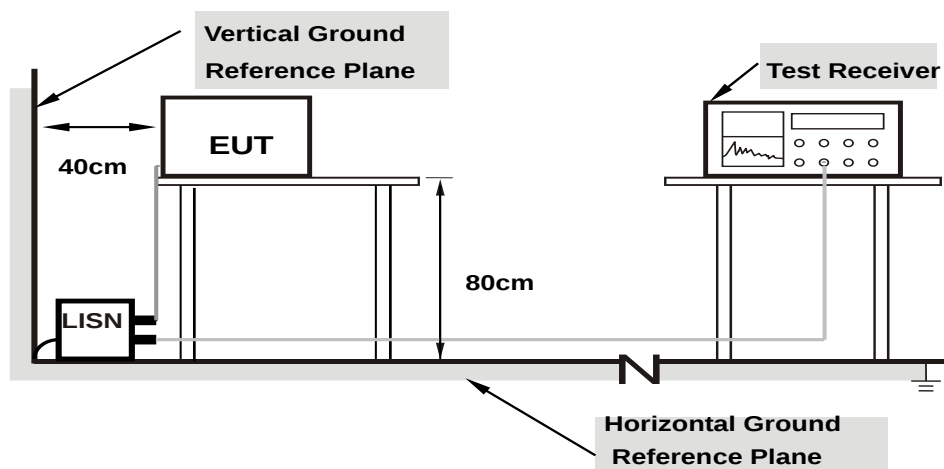
- Set the signal analyzer center frequency to the nominal EUT channel center frequency. The span range of the signal analyzer shall be between two times and five times the OBW of the EUT. Connect the output port of the EUT to the signal analyzer 2. Ensure that the attenuator 2 provides enough attenuation 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.

6.3 AC Power Conducted Emissions

6.3.1 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).

6.3.2 Test Procedure

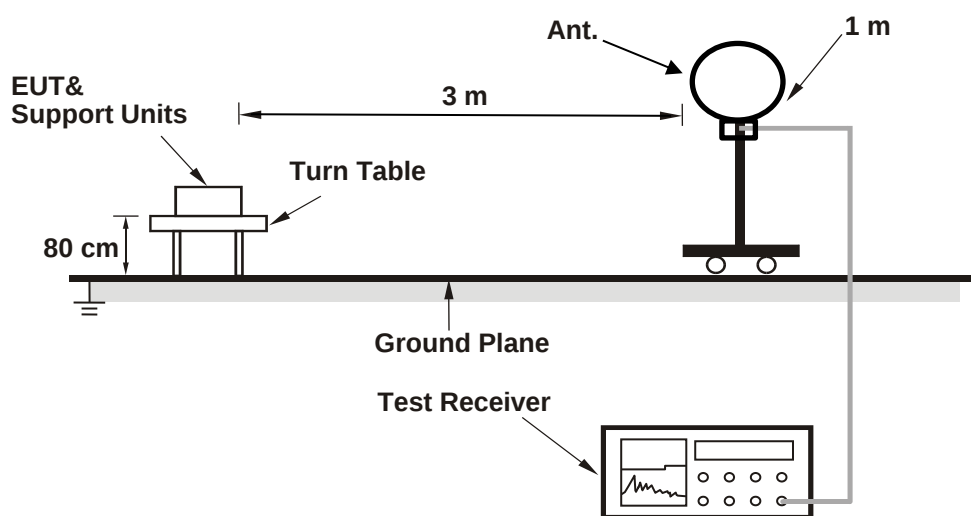
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The 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.

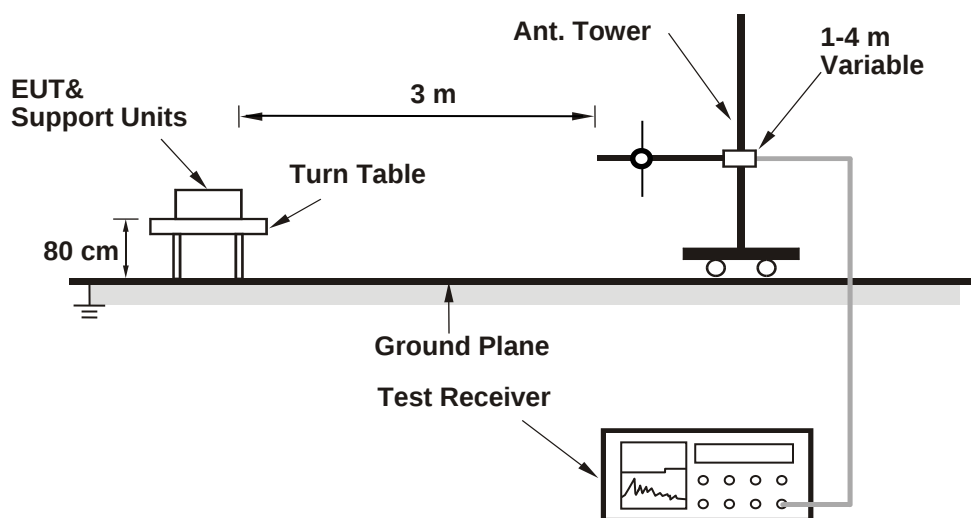
6.4 Unwanted Emissions below 1 GHz

6.4.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.4.2 Test Procedure

For Radiated emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

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

For Radiated emission above 30 MHz

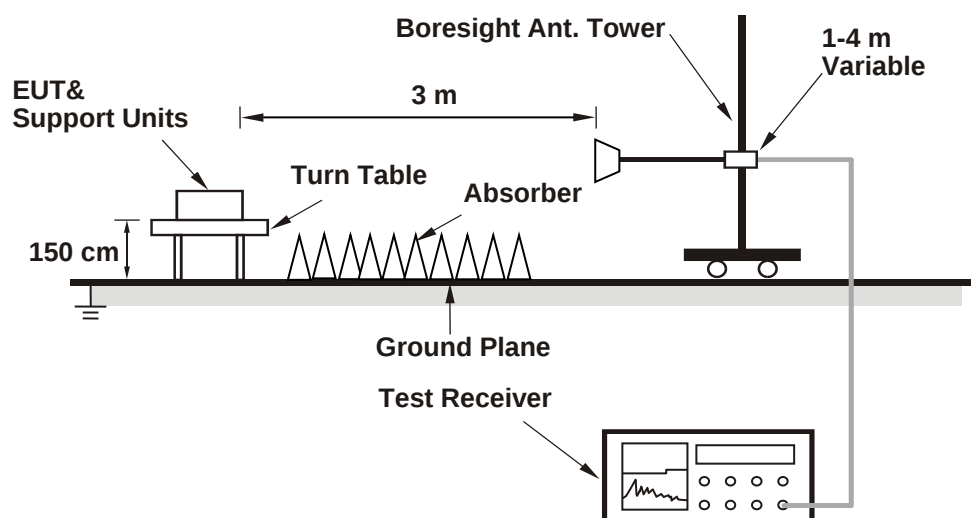
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the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

Notes:

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

6.5 Unwanted Emissions above 1 GHz

6.5.1 Test Setup



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

6.5.2 Test Procedure

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

- 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.
- 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.
- All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

7.1 Maximum RF Output Power

Input Power:	10.8 Vdc	Environmental Conditions:	25°C, 60% RH	Tested By:	Charles Hsiao
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802.11ax (HE20)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Maximum Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
1	5955	1.13	1.18	2.609	4.16	2.18	4.31	6.34	24	Pass
45	6175	1.27	1.23	2.667	4.26	2.18	4.406	6.44	24	Pass
93	6415	0.86	0.84	2.432	3.86	2.18	4.018	6.04	24	Pass
97	6435	2.06	2.00	3.192	5.04	1.46	4.467	6.5	24	Pass
105	6475	1.90	1.90	3.098	4.91	1.46	4.336	6.37	24	Pass
113	6515	1.96	1.99	3.152	4.99	1.46	4.411	6.45	24	Pass
117	6535	1.30	1.35	2.714	4.34	1.83	4.136	6.17	24	Pass
149	6695	1.03	1.00	2.527	4.03	1.83	3.851	5.86	24	Pass
181	6855	1.26	1.26	2.673	4.27	1.83	4.074	6.1	24	Pass
185	6875	1.23	1.22	2.652	4.24	2.30	4.504	6.54	24	Pass
209	6995	1.45	1.47	2.799	4.47	2.30	4.753	6.77	24	Pass
233	7115	-2.15	-2.16	1.2177	0.86	2.30	2.068	3.16	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-5, the maximum gain is 2.18 dBi.
3. For U-NII-6, the maximum gain is 1.46 dBi.
4. For U-NII-7, the maximum gain is 1.83 dBi.
5. For U-NII-8, the maximum gain is 2.3 dBi.

802.11ax (HE40)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Maximum Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
3	5965	4.08	4.16	5.165	7.13	2.18	8.532	9.31	24	Pass
43	6165	3.90	3.86	4.887	6.89	2.18	8.073	9.07	24	Pass
91	6405	4.26	4.22	5.309	7.25	2.18	8.77	9.43	24	Pass
99	6445	4.77	4.76	5.991	7.77	1.46	8.385	9.23	24	Pass
107	6485	4.80	4.79	6.033	7.81	1.46	8.444	9.27	24	Pass
115	6525	5.05	5.01	6.368	8.04	1.83	9.705	9.87	24	Pass
123	6565	4.85	4.82	6.089	7.85	1.83	9.28	9.68	24	Pass
155	6725	4.02	4.03	5.053	7.04	1.83	7.701	8.87	24	Pass
179	6845	4.00	4.01	5.03	7.02	1.83	7.666	8.85	24	Pass
187	6885	4.66	4.61	5.815	7.65	2.30	9.875	9.95	24	Pass
211	7005	4.71	4.72	5.923	7.73	2.30	10.059	10.03	24	Pass
227	7085	4.76	4.79	6.005	7.79	2.30	10.198	10.09	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-5, the maximum gain is 2.18 dBi.
3. For U-NII-6, the maximum gain is 1.46 dBi.
4. For U-NII-7, the maximum gain is 1.83 dBi.
5. For U-NII-8, the maximum gain is 2.3 dBi.

802.11ax (HE80)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Maximum Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
7	5985	7.02	7.06	10.117	10.05	2.18	16.713	12.23	24	Pass
39	6145	6.90	6.87	9.762	9.90	2.18	16.126	12.08	24	Pass
87	6385	6.82	6.82	9.617	9.83	2.18	15.887	12.01	24	Pass
103	6465	7.25	7.26	10.63	10.27	1.46	14.878	11.73	24	Pass
119	6545	7.28	7.29	10.704	10.30	1.83	16.313	12.13	24	Pass
151	6705	6.85	6.88	9.717	9.88	1.83	14.809	11.71	24	Pass
183	6865	6.93	6.95	9.886	9.95	1.83	15.067	11.78	24	Pass
199	6945	7.40	7.43	11.029	10.43	2.30	18.73	12.73	24	Pass
215	7025	7.23	7.24	10.581	10.25	2.30	17.969	12.55	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-5, the maximum gain is 2.18 dBi.
3. For U-NII-6, the maximum gain is 1.46 dBi.
4. For U-NII-7, the maximum gain is 1.83 dBi.
5. For U-NII-8, the maximum gain is 2.3 dBi.

802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Maximum Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Test Result
		Chain 0	Chain 1							
15	6025	9.73	9.72	18.773	12.74	2.18	31.012	14.92	24	Pass
47	6185	9.73	9.68	18.687	12.72	2.18	30.87	14.9	24	Pass
79	6345	9.75	9.78	18.947	12.78	2.18	31.3	14.96	24	Pass
111	6505	10.08	10.06	20.325	13.08	1.46	28.447	14.54	24	Pass
143	6665	9.80	9.78	19.056	12.80	1.83	29.042	14.63	24	Pass
175	6825	9.83	9.80	19.166	12.83	1.83	29.21	14.66	24	Pass
207	6985	9.84	9.82	19.232	12.84	2.30	32.661	15.14	24	Pass

Notes:

1. Directional gain is the maximum gain of antennas.
2. For U-NII-5, the maximum gain is 2.18 dBi.
3. For U-NII-6, the maximum gain is 1.46 dBi.
4. For U-NII-7, the maximum gain is 1.83 dBi.
5. For U-NII-8, the maximum gain is 2.3 dBi.

7.2 Contention-based Protocol

Environmental Conditions:	25°C, 60% RH	Tested By:	Stan Shih
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Companion Device Information			
Product	Brand	Model No.	Software/Firmware Version
Wireless Router	Netgear	WAX630E	V10.3.2.4

Contention Based Protocol Measurement

Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB) (Note 3)	Adjusted Power (dBm)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	20	45	6175	6175	-65	1.14	0	-66.14	-62	OFF
					-67	1.14	0	-68.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
	160	47	6110	6110	-68	1.14	0	-69.14	-62	OFF
					-73	1.14	0	-74.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
			6185	6185	-63	1.14	0	-64.14	-62	OFF
					-68	1.14	0	-69.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
			6260	6260	-63	1.14	0	-64.14	-62	OFF
					-66	1.14	0	-67.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON

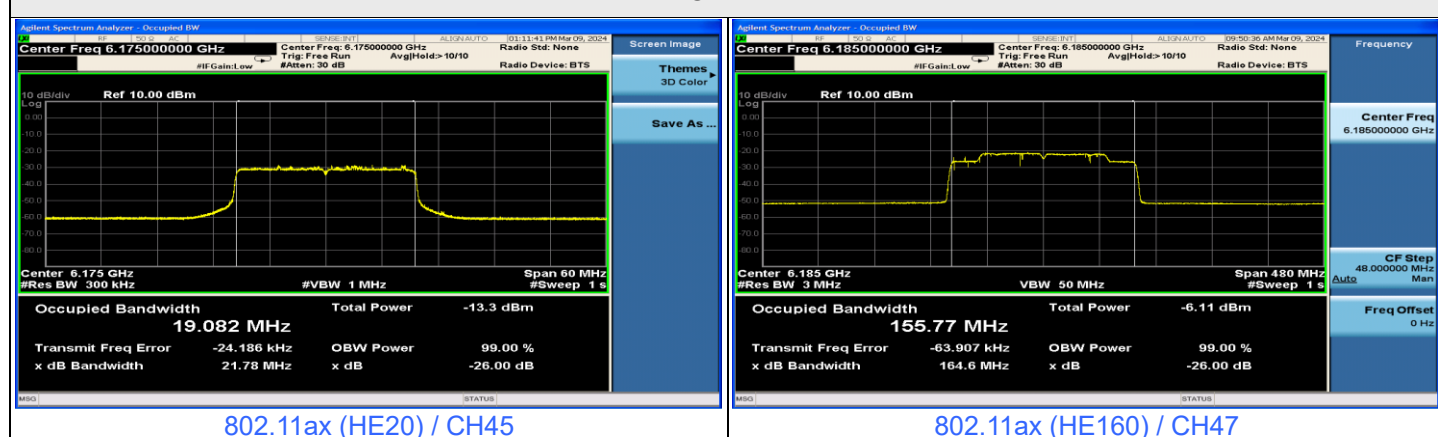
Notes:

1. After investigation (consider antenna gain and path loss) , the one representative port (Chain 0) was measured and presented in the report.
2. Adjusted Power (dBm) = Injected Signal (AWGN) Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)
3. Antenna gain values include all the applicable path losses.

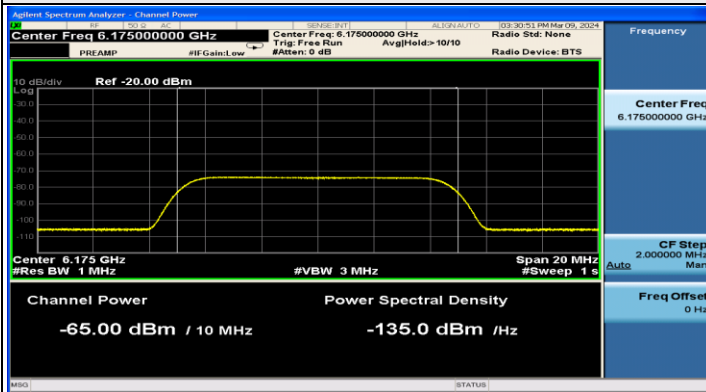
Contention Based Protocol Detection Probability

Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	20	6175	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6110	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6185	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6260	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass

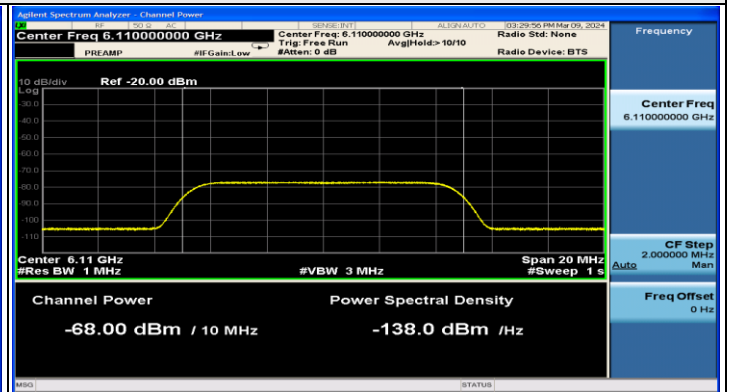
Plots of EUT Tx waveform



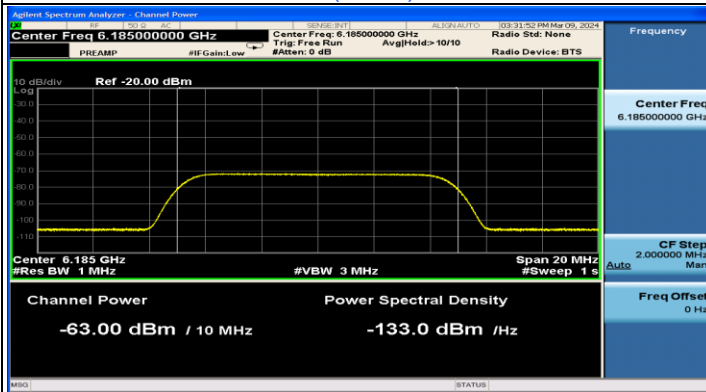
Plots of Injected signal (AWGN) level



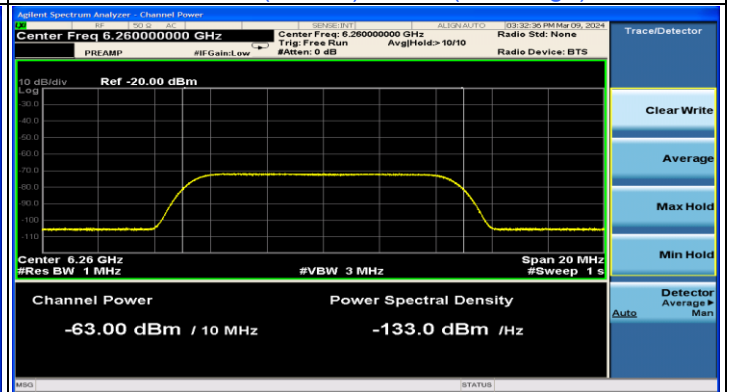
802.11ax (HE20) / CH45



802.11ax (HE160) / CH47(Low Edge)

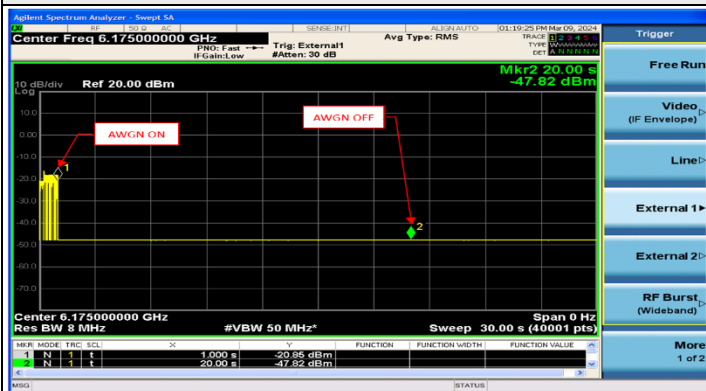


802.11ax (HE160) / CH47(Middle)

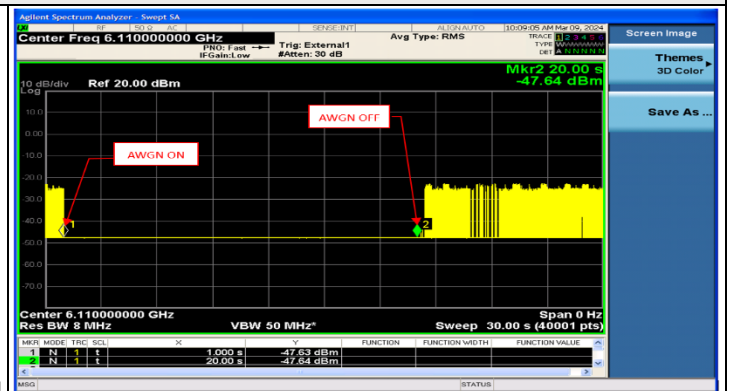


802.11ax (HE160) / CH47(High Edge)

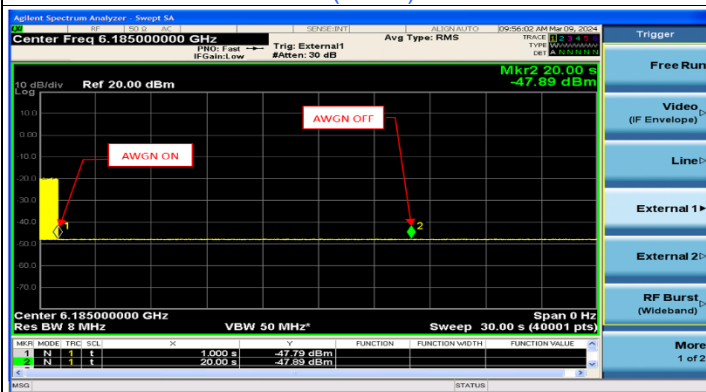
Plots of EUT ceased transmission in the time domain



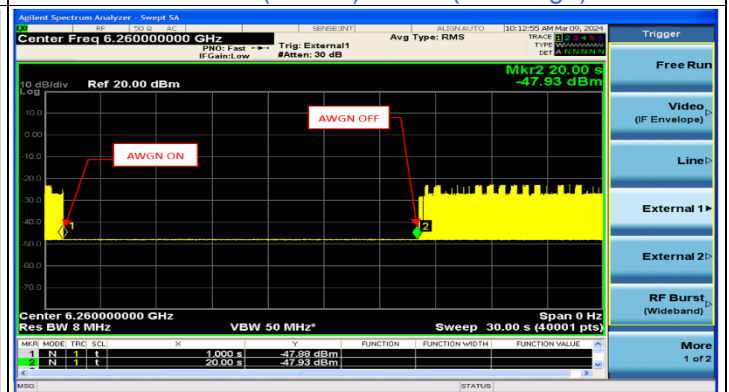
802.11ax (HE20) / CH45



802.11ax (HE160) / CH47(Low Edge)



802.11ax (HE160) / CH47(Middle)



802.11ax (HE160) / CH47(High Edge)

For U-NII-6

Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB) (Note 3)	Adjusted Power (dBm)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	20	105	6475	6475	-67	1.14	0	-68.14	-62	OFF
					-73	1.14	0	-74.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
	160	111	6505	6430	-69	1.14	0	-70.14	-62	OFF
					-73	1.14	0	-74.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
				6505	-63	1.14	0	-64.14	-62	OFF
					-69	1.14	0	-70.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
				6580	-63	1.14	0	-64.14	-62	OFF
					-65	1.14	0	-66.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON

Notes:

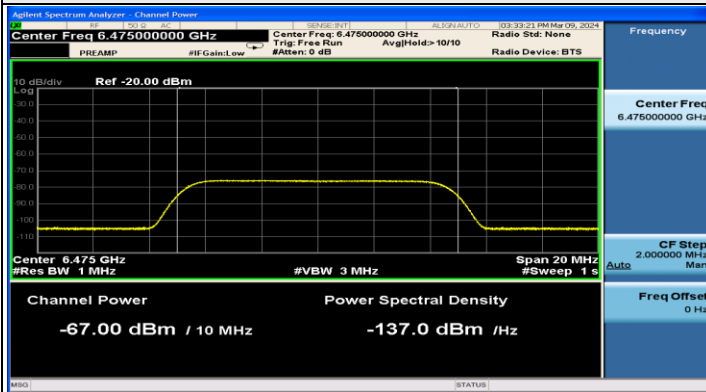
1. After investigation (consider antenna gain and path loss) , the one representative port (Chain 0) was measured and presented in the report.
2. Adjusted Power (dBm) = Injected Signal (AWGN) Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)
3. Antenna gain values include all the applicable path losses.

Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	20	6475	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6430	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6505	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6580	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass

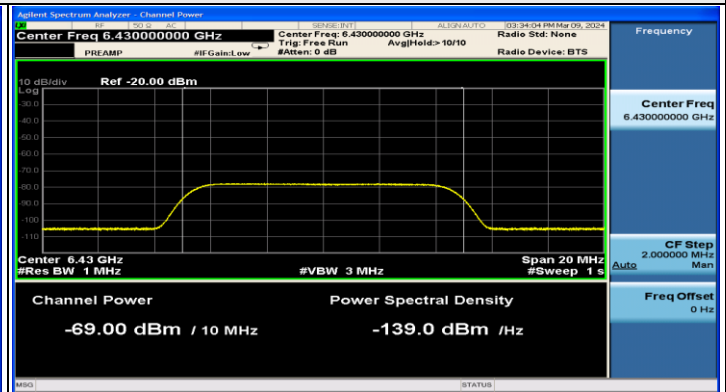
Plots of EUT Tx waveform



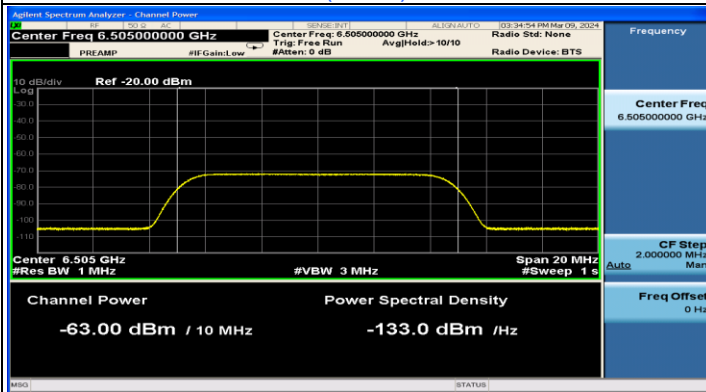
Plots of Injected signal (AWGN) level



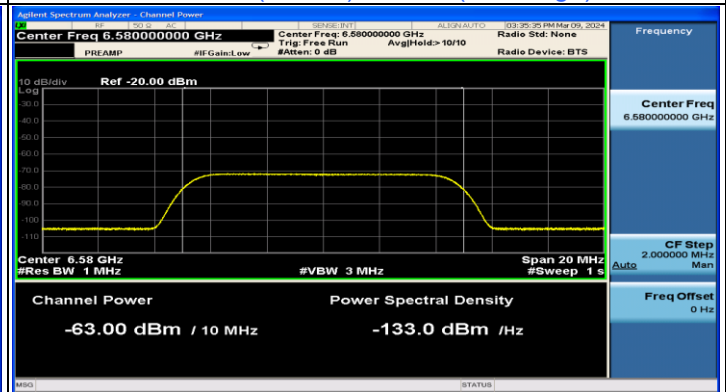
802.11ax (HE20) / CH105



802.11ax (HE160) / CH111(Low Edge)



802.11ax (HE160) / CH111(Middle)

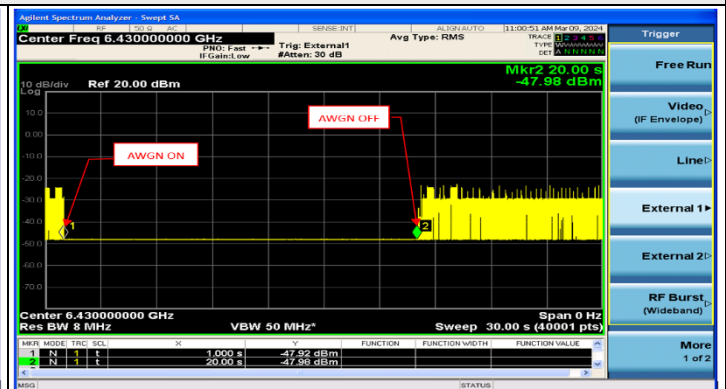


802.11ax (HE160) / CH111(High Edge)

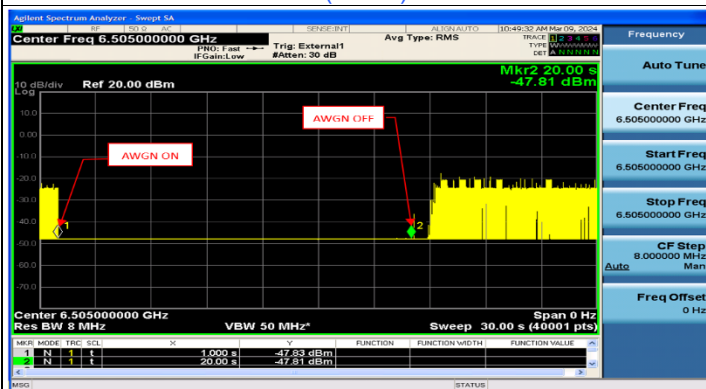
Plots of EUT ceased transmission in the time domain



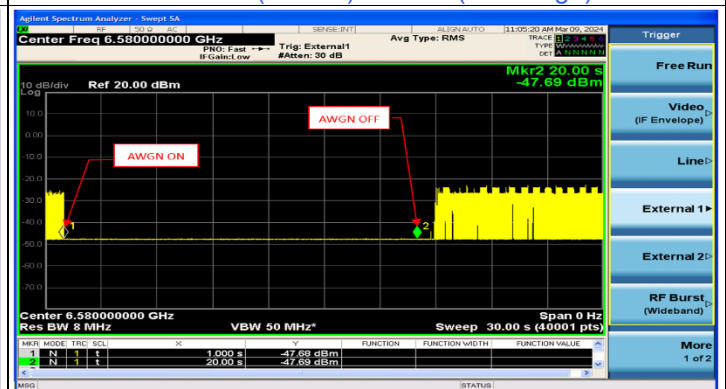
802.11ax (HE20) / CH105



802.11ax (HE160) / CH111(Low Edge)



802.11ax (HE160) / CH111(Middle)



802.11ax (HE160) / CH111(High Edge)

For U-NII-7

Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB) (Note 3)	Adjusted Power (dBm)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	20	149	6695	6695	-67	1.14	0	-68.14	-62	OFF
					-72	1.14	0	-73.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
	160	143	6665	6590	-65	1.14	0	-66.14	-62	OFF
					-66	1.14	0	-67.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
				6665	-66	1.14	0	-67.14	-62	OFF
					-69	1.14	0	-70.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
				6740	-69	1.14	0	-70.14	-62	OFF
					-72	1.14	0	-73.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON

Notes:

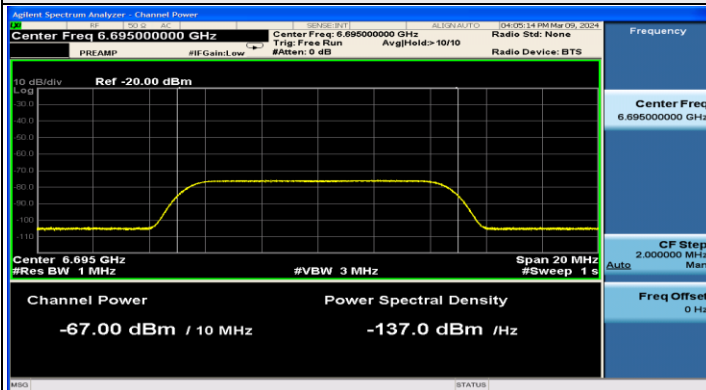
1. After investigation (consider antenna gain and path loss) , the one representative port (Chain 0) was measured and presented in the report.
2. Adjusted Power (dBm) = Injected Signal (AWGN) Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)
3. Antenna gain values include all the applicable path losses.

Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	20	6695	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6590	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6665	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6740	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass

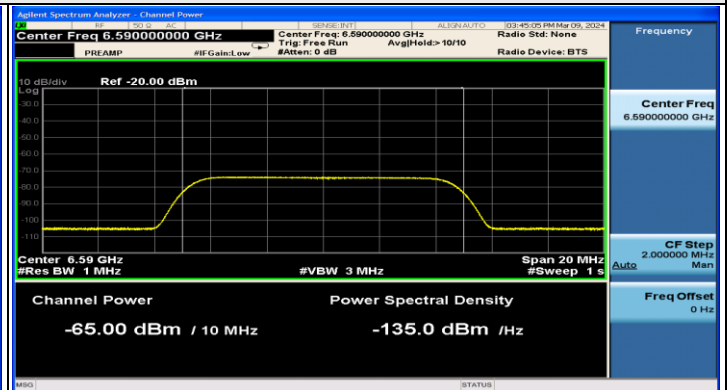
Plots of EUT Tx waveform



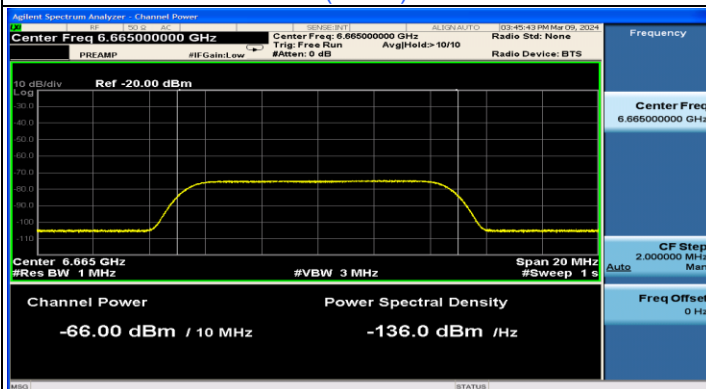
Plots of Injected signal (AWGN) level



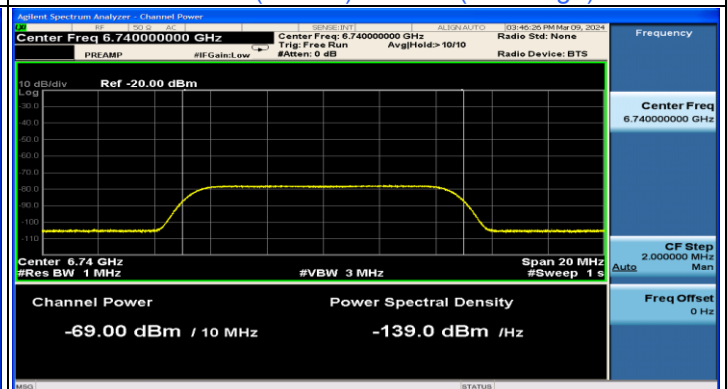
802.11ax (HE20) / CH149



802.11ax (HE160) / CH143(Low Edge)

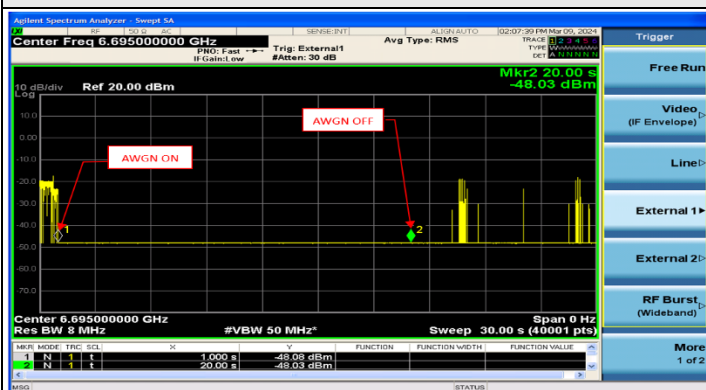


802.11ax (HE160) / CH143(Middle)

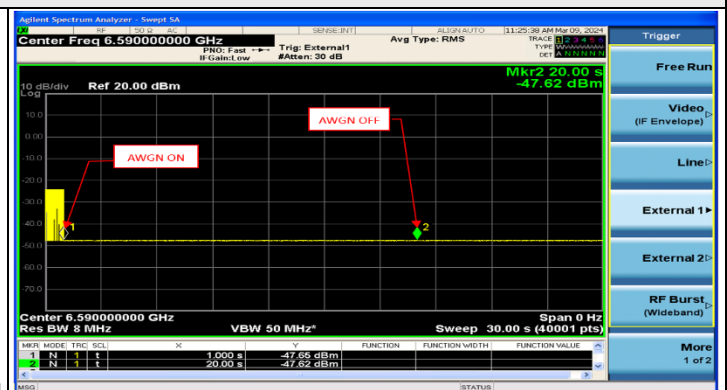


802.11ax (HE160) / CH143(High Edge)

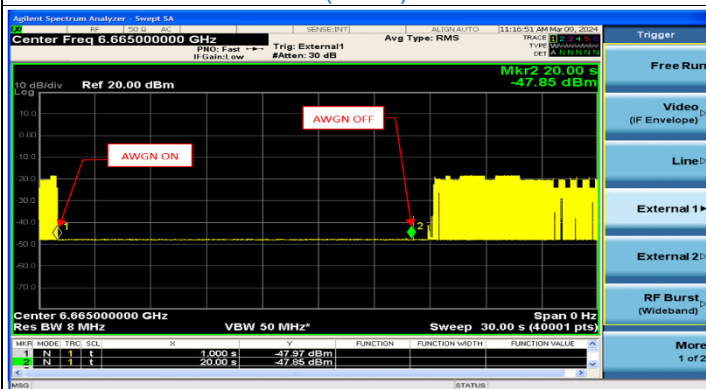
Plots of EUT ceased transmission in the time domain



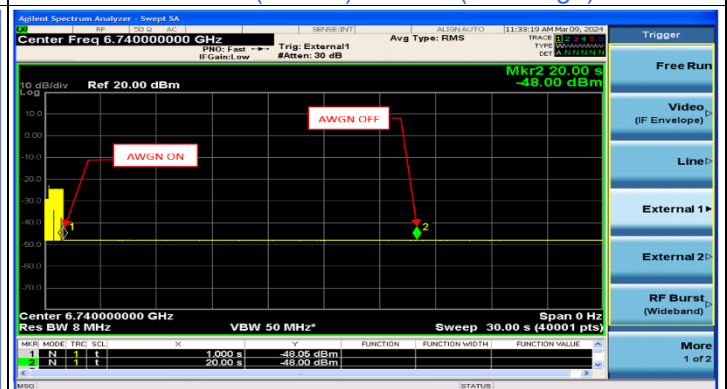
802.11ax (HE20) / CH149



802.11ax (HE160) / CH143(Low Edge)



802.11ax (HE160) / CH143(Middle)



802.11ax (HE160) / CH143(High Edge)

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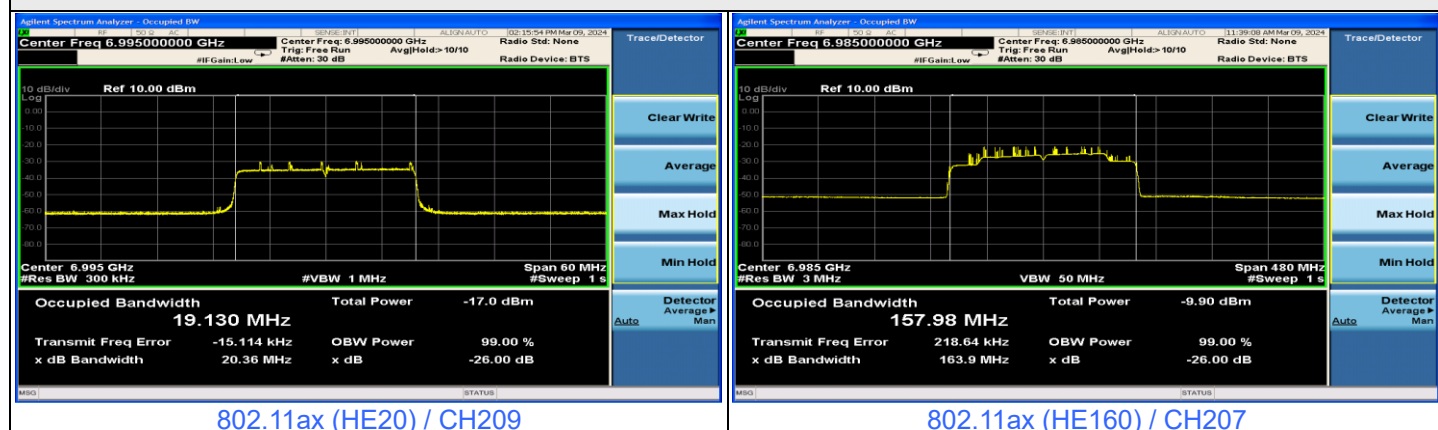
Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB) (Note 3)	Adjusted Power (dBm)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	20	209	6995	6995	-67	1.14	0	-68.14	-62	OFF
					-73	1.14	0	-74.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
	160	207	6985	6910	-63	1.14	0	-64.14	-62	OFF
					-67	1.14	0	-68.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
				6985	-62	1.14	0	-63.14	-62	OFF
					-69	1.14	0	-70.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON
				7060	-66	1.14	0	-67.14	-62	OFF
					-70	1.14	0	-71.14	-62	Minimal
					-80.86	1.14	0	-82	-62	ON

Notes:

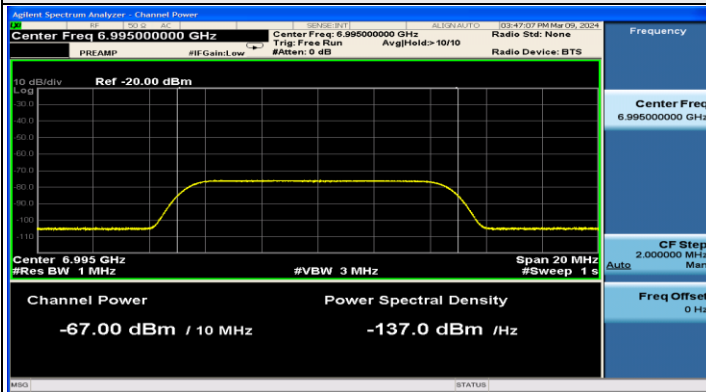
1. After investigation (consider antenna gain and path loss) , the one representative port (Chain 0) was measured and presented in the report.
2. Adjusted Power (dBm) = Injected Signal (AWGN) Power (dBm) - Antenna Gain (dBi) + Path Loss (dB)
3. Antenna gain values include all the applicable path losses.

Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	20	6995	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
	160	6910	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6985	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		7060	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass

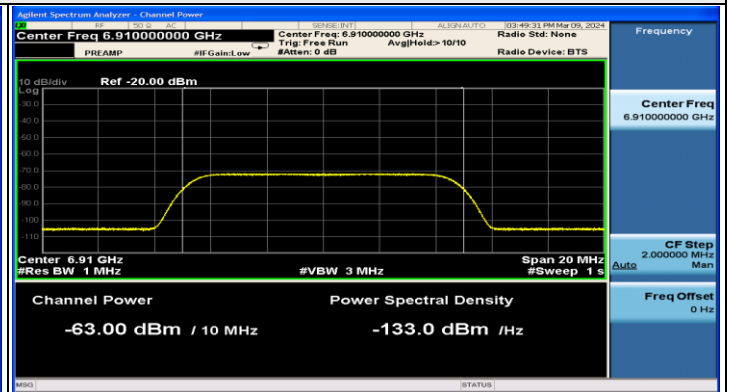
Plots of EUT Tx waveform



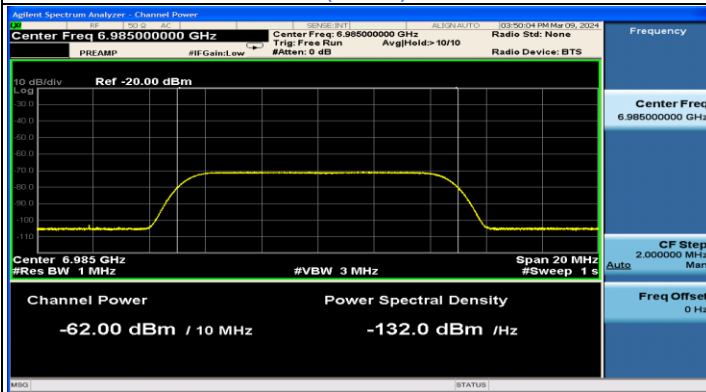
Plots of Injected signal (AWGN) level



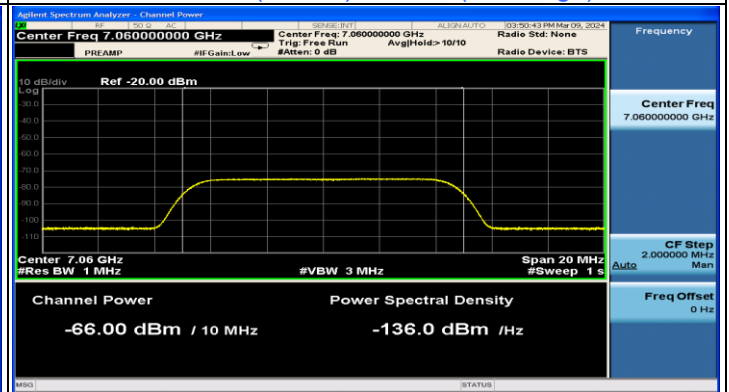
802.11ax (HE20) / CH209



802.11ax (HE160) / CH207(Low Edge)

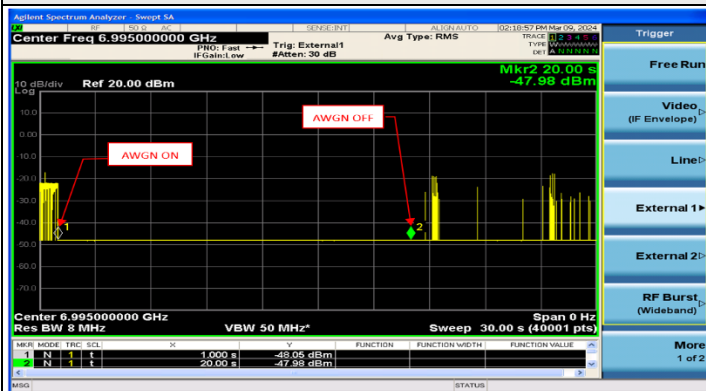


802.11ax (HE160) / CH207(Middle)

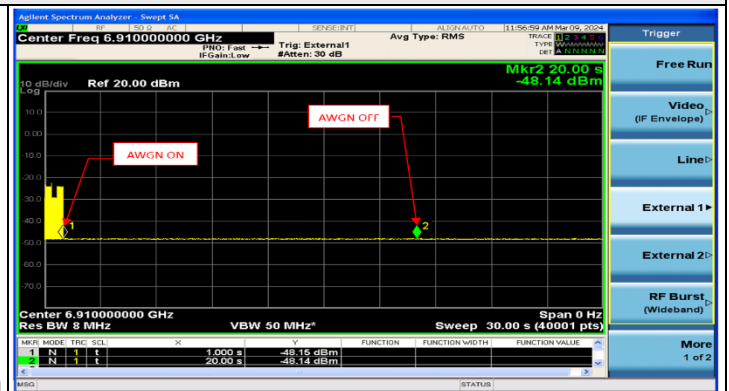


802.11ax (HE160) / CH207(High Edge)

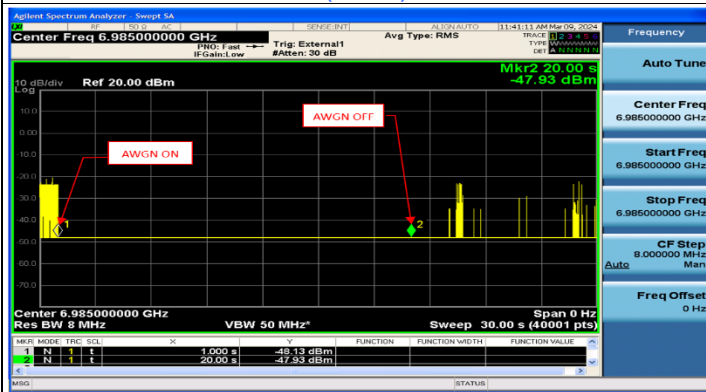
Plots of EUT ceased transmission in the time domain



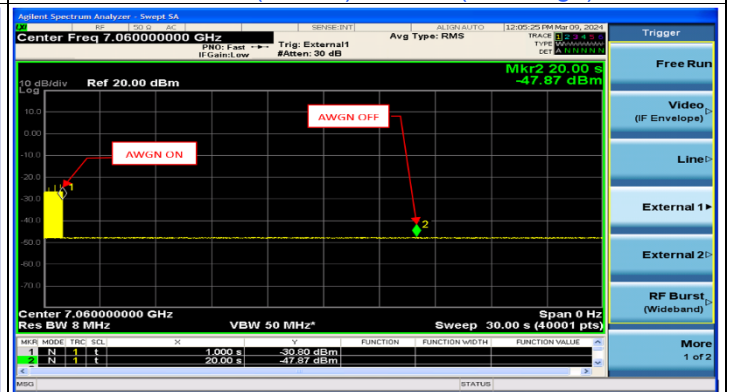
802.11ax (HE20) / CH209



802.11ax (HE160) / CH207(Low Edge)



802.11ax (HE160) / CH207(Middle)



802.11ax (HE160) / CH207(High Edge)

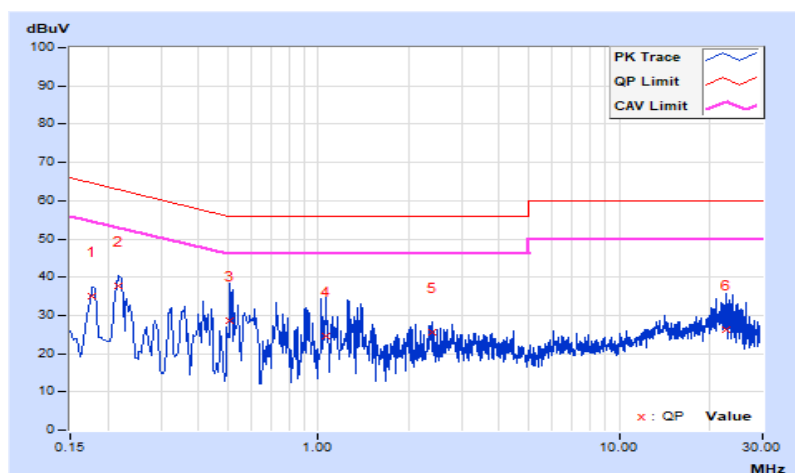
7.3 AC Power Conducted Emissions

RF Mode	802.11be (EHT160)	Channel	CH 111 : 6505 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	22°C, 67% RH
Tested By	Vincent Chen		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17794	10.33	24.78	13.66	35.11	23.99	64.58	54.58	-29.47	-30.59
2	0.21783	10.35	27.47	11.73	37.82	22.08	62.90	52.90	-25.08	-30.82
3	0.51000	10.42	18.22	0.79	28.64	11.21	56.00	46.00	-27.36	-34.79
4	1.06600	10.43	14.16	2.09	24.59	12.52	56.00	46.00	-31.41	-33.48
5	2.38200	10.44	15.04	4.38	25.48	14.82	56.00	46.00	-30.52	-31.18
6	22.57000	10.66	15.68	7.76	26.34	18.42	60.00	50.00	-33.66	-31.58

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

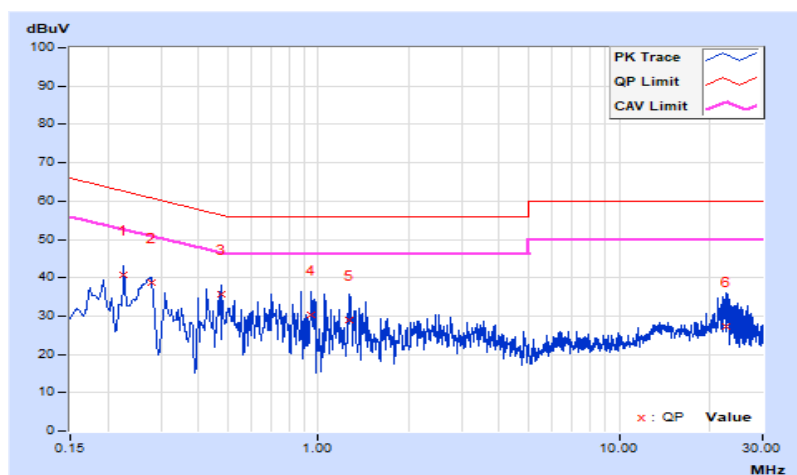


RF Mode	802.11be (EHT160)	Channel	CH 111 : 6505 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120 Vac, 60 Hz	Environmental Conditions	22°C, 67% RH
Tested By	Vincent Chen		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.22600	10.37	30.28	17.22	40.65	27.59	62.60	52.60	-21.95	-25.01
2	0.27786	10.39	28.21	18.70	38.60	29.09	60.88	50.88	-22.28	-21.79
3	0.47800	10.44	25.24	8.22	35.68	18.66	56.37	46.37	-20.69	-27.71
4	0.94200	10.45	19.88	3.78	30.33	14.23	56.00	46.00	-25.67	-31.77
5	1.26600	10.45	18.36	3.41	28.81	13.86	56.00	46.00	-27.19	-32.14
6	22.77400	10.82	16.48	4.57	27.30	15.39	60.00	50.00	-32.70	-34.61

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



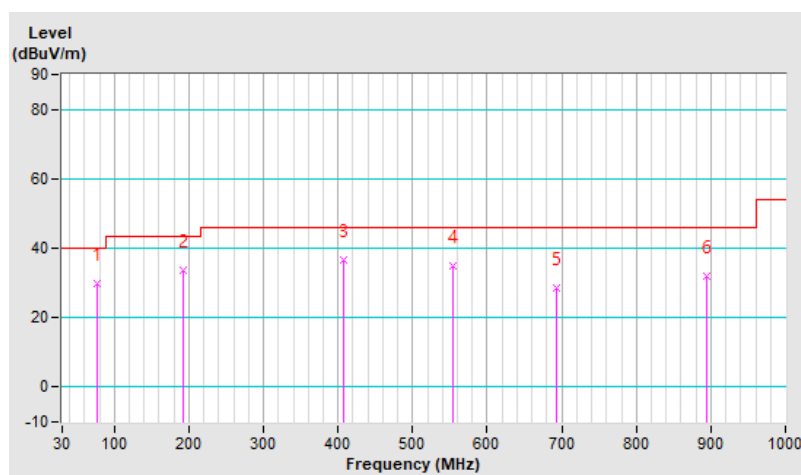
7.4 Unwanted Emissions below 1 GHz

RF Mode	802.11ax (HE160)	Channel	CH 111 : 6505 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	77.53	30.0 QP	40.0	-10.0	1.00 H	2	46.8	-16.8
2	191.99	33.6 QP	43.5	-9.9	2.00 H	298	49.1	-15.5
3	407.33	36.5 QP	46.0	-9.5	1.00 H	275	46.0	-9.5
4	553.80	34.8 QP	46.0	-11.2	2.00 H	52	40.9	-6.1
5	692.51	28.4 QP	46.0	-17.6	2.00 H	257	31.8	-3.4
6	895.24	31.8 QP	46.0	-14.2	1.50 H	147	32.6	-0.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

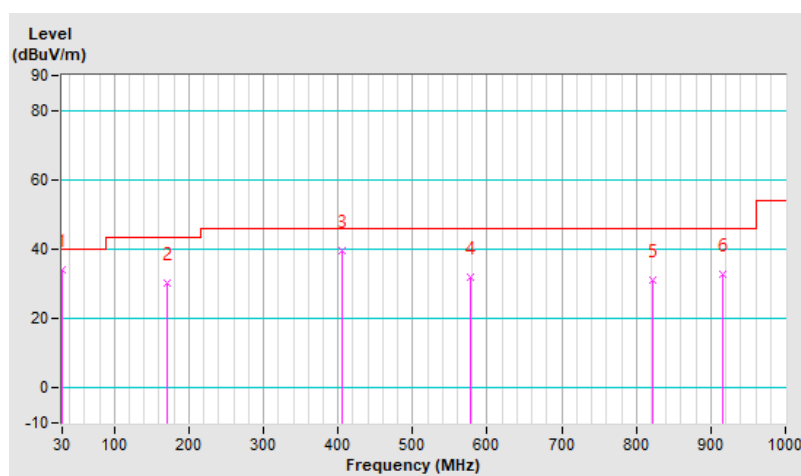


RF Mode	802.11ax (HE160)	Channel	CH 111 : 6505 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.97	33.9 QP	40.0	-6.1	1.00 V	2	47.5	-13.6
2	170.65	30.4 QP	43.5	-13.1	1.50 V	213	43.5	-13.1
3	406.36	39.7 QP	46.0	-6.3	2.00 V	18	49.2	-9.5
4	577.08	32.0 QP	46.0	-14.0	1.00 V	344	37.6	-5.6
5	822.49	31.1 QP	46.0	-14.9	1.00 V	35	32.0	-0.9
6	915.61	32.6 QP	46.0	-13.4	2.00 V	338	33.1	-0.5

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.5 Unwanted Emissions above 1 GHz

RF Mode	802.11ax (HE40)	Channel	CH 227 : 7085 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*7085.00	96.9 PK			1.74 H	101	48.7	48.2
2	*7085.00	83.4 AV			1.74 H	101	35.2	48.2
3	#7125.00	63.7 PK	88.2	-24.5	1.74 H	101	53.8	9.9
4	#7125.00	50.3 AV	68.2	-17.9	1.74 H	101	40.4	9.9
5	#14170.00	65.5 PK	88.2	-22.7	1.53 H	208	52.2	13.3
6	#14170.00	53.1 AV	68.2	-15.1	1.53 H	208	39.8	13.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*7085.00	98.0 PK			1.39 V	187	49.8	48.2
2	*7085.00	84.8 AV			1.39 V	187	36.6	48.2
3	#7125.00	63.9 PK	88.2	-24.3	1.39 V	187	54.0	9.9
4	#7125.00	50.5 AV	68.2	-17.7	1.39 V	187	40.6	9.9
5	#14170.00	65.6 PK	88.2	-22.6	2.41 V	158	52.3	13.3
6	#14170.00	53.3 AV	68.2	-14.9	2.41 V	158	40.0	13.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	802.11ax (HE160)	Channel	CH 15 : 6025 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5925.00	60.4 PK	88.2	-27.8	1.58 H	124	55.9	4.5
2	#5925.00	46.5 AV	68.2	-21.7	1.58 H	124	42.0	4.5
3	*6025.00	95.2 PK			1.58 H	124	52.9	42.3
4	*6025.00	82.2 AV			1.58 H	124	39.9	42.3
5	12050.00	62.3 PK	74.0	-11.7	2.24 H	188	52.1	10.2
6	12050.00	48.0 AV	54.0	-6.0	2.24 H	188	37.8	10.2
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5925.00	62.6 PK	88.2	-25.6	2.90 V	161	58.1	4.5
2	#5925.00	47.5 AV	68.2	-20.7	2.90 V	161	43.0	4.5
3	*6025.00	98.7 PK			2.90 V	161	56.4	42.3
4	*6025.00	85.6 AV			2.90 V	161	43.3	42.3
5	12050.00	62.4 PK	74.0	-11.6	2.31 V	198	52.2	10.2
6	12050.00	48.2 AV	54.0	-5.8	2.31 V	198	38.0	10.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	802.11ax (HE160)	Channel	CH 111 : 6505 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*6505.00	97.7 PK			2.12 H	340	51.9	45.8
2	*6505.00	84.8 AV			2.12 H	340	39.0	45.8
3	#13010.00	61.9 PK	88.2	-26.3	1.65 H	205	51.2	10.7
4	#13010.00	49.3 AV	68.2	-18.9	1.65 H	205	38.6	10.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*6505.00	101.4 PK			1.69 V	181	55.6	45.8
2	*6505.00	87.8 AV			1.69 V	181	42.0	45.8
3	#13010.00	62.0 PK	88.2	-26.2	2.52 V	103	51.3	10.7
4	#13010.00	49.5 AV	68.2	-18.7	2.52 V	103	38.8	10.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # " : The radiated frequency is out of the restricted band.

RF Mode	802.11ax (HE160)	Channel	CH 143 : 6665 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
Input Power	120 Vac, 60 Hz	Environmental Conditions	23°C, 68% RH
Tested By	Vincent Chen		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*6665.00	97.2 PK			2.89 H	353	51.2	46.0
2	*6665.00	84.0 AV			2.89 H	353	38.0	46.0
3	#13010.00	61.7 PK	88.2	-26.5	2.04 H	168	51.0	10.7
4	#13010.00	49.2 AV	68.2	-19.0	2.04 H	168	38.5	10.7
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*6665.00	99.4 PK			1.19 V	191	53.4	46.0
2	*6665.00	85.8 AV			1.19 V	191	39.8	46.0
3	#13010.00	61.8 PK	88.2	-26.4	1.86 V	224	51.1	10.7
4	#13010.00	49.3 AV	68.2	-18.9	1.86 V	224	38.6	10.7

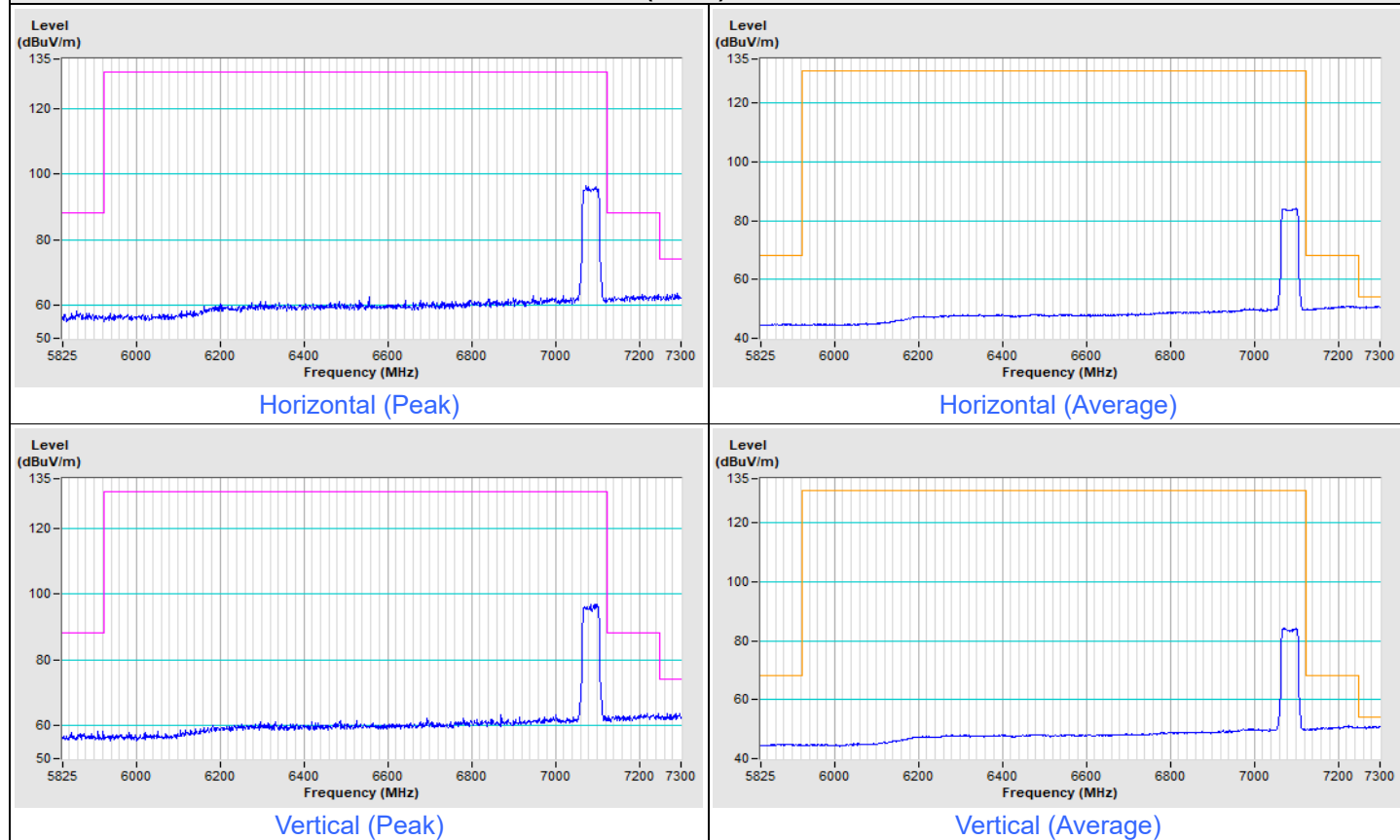
Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. " # " : The radiated frequency is out of the restricted band.

Plot of Band Edge

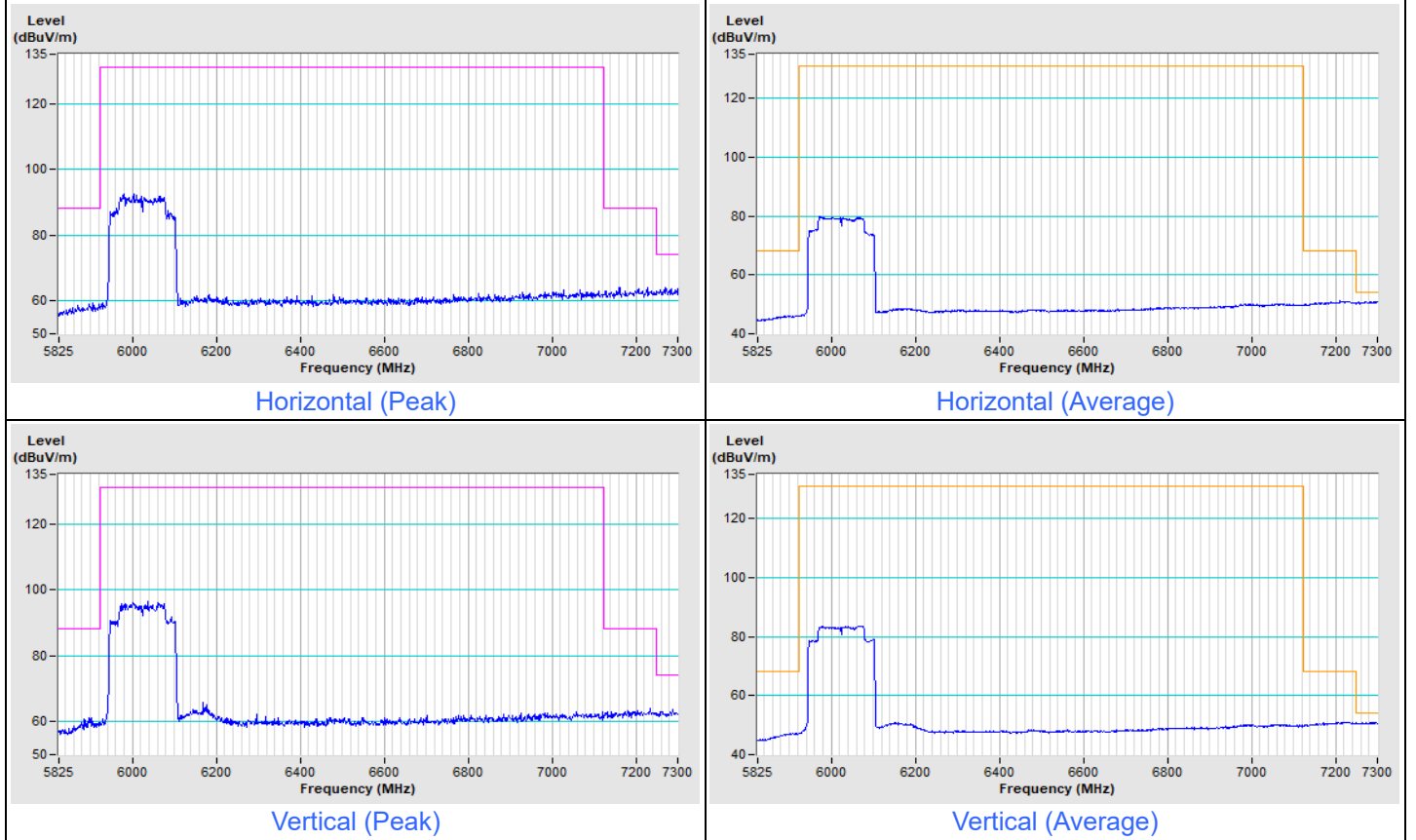
Frequency Range	5.825 GHz ~ 7.225 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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802.11ax (HE40) Channel 227



Frequency Range	5.825 GHz ~ 7.225 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=10 Hz, DET=Peak
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802.11ax (HE160) Channel 15



8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 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:

Lin Kou EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

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@bureauveritas.com

Web Site: <http://ee.bureauveritas.com.tw>

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

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