FCC Test Report

Report No.:	RFBARR-WTW-P21030485P
FCC ID:	RAS-MT7922A22M
Test Model:	MT7922A22M
Received Date:	2022/4/21
Test Date:	2022/5/11 ~ 2022/5/23
Issued Date:	2022/6/8
Applicant:	MediaTek Inc.
Address:	No. 1, Dusing 1st Rd., Hsinchu Science Park Hsinchu City 30078 Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RFBARR-WTW-P21030485P	Original release.	2022/6/8

1 Certificate of Conformity

Product:	2TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Brand:	MediaTek
Test Model:	MT7922A22M
Sample Status:	Engineering sample
Applicant:	MediaTek Inc.
Test Date:	2022/5/11 ~ 2022/5/23
Standard:	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 EMC characteristics under the conditions specified in this report.

Prepared by : Vivian Huang , **Date:** 2022/6/8

Vivian Huang / Specialist

Approved by : , **Date:** 2022/6/8

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(8)	AC Power Conducted Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -15.40dB at 0.19071MHz.
15.407(b)(5) (8)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -0.2dB at 5925.00MHz.
15.407(b)(6)	In-Band Emission (Mask)	PASS	Meet the requirement of limit.
15.407(a) (4/5/6/7/8)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(10)	Emission Bandwidth Measurement	PASS	Meet the requirement of limit.
15.407(a) (4/5/6/7/8)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407 (d)(6)	Contention-based Protocol.	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.407(a)(7) (8)	Dual Client- Proper Power Adjustment	N/A	Device associates with low power indoor AP only.
15.407(d)	Operational restrictions for 6 GHz U-NII devices	PASS	Declaration by applicant
15.203	Antenna Requirement	PASS	Antenna connector is i-pex(MHF)、RP SMA PLUG or R-SMA not a standard connector.

Note:
Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	1.9 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.1 dB
	30MHz ~ 1GHz	5.5 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	5.1 dB
	18GHz ~ 40GHz	5.3 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	2TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Brand	MediaTek
Test Model	MT7922A22M
Status of EUT	Engineering sample
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA in 11ax mode only
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: up to 54 Mbps 802.11ax: up to 2401.9 Mbps
Operating Frequency	5.955 ~ 6.415GHz, 6.435 ~ 6.525GHz, 6.525 ~ 6.875GHz, 6.875 ~ 7.115GHz
Number of Channel	802.11a/ax (HE20): 59 802.11ax (HE40): 29 802.11ax (HE80): 14 802.11ax (HE160): 7
Output Power	**5.955 ~ 6.415GHz:** 18.155 mW (EIRP: 17.35 dBm / 54.325 mW) **6.435 ~ 6.525GHz:** 19.143 mW (EIRP: 17.11 dBm / 51.404 mW) **6.525 ~ 6.855GHz:** 17.579 mW (EIRP: 17.06 dBm / 50.816 mW) **6.875 ~ 7.115GHz:** 19.275 mW (EIRP: 16.94 dBm / 49.431 mW)
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This application is prepared for FCC class II permissive change. The original report (BV CPS report no. RFBARR-WTW-P21030485L-6) for the 6GHz band which is operating in SISO mode for 802.11a and MIMO mode for 802.11a, 802.11ax (HE20) (HE40) (HE80) (HE160) and partial RUs. The difference in this application is only software updating to enable an additional mode, 802.11ax (HE160) in SISO mode, for 6GHz band. The detail we updating mode is green words as below note 7.
2. According to above condition, all test items of 1TX mode for Wi-Fi 6GHz 11ax (HE160) needs to be performed. And all data was verified to meet the requirements.
3. There are Bluetooth and WLAN (2.4GHz & 5GHz & 5.9GHz & 6GHz) technology used for the EUT.
4. The equipment support 2 types of M.2 form factor A-E Key and E Key.
5. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (5GHz)	Bluetooth
2	WLAN (6GHz)	Bluetooth
3	WLAN (5.9GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

6. The antennas provided to the EUT, please refer to the following table:

Ant. Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain0	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.895	PIFA	i-pex(MHF)	200
	Chain1	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.895	PIFA	i-pex(MHF)	200
2	Chain0	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200
	Chain1	PSA	RFMTA311020EMMB301	1.71 4.82 4.76 4.29 4.61 4.09	2.4~2.4835 5.15~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200
3	Chain0	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG	40
	Chain1	VSO	JR2Q00340-1	1.62 3.2 3.93 3.61 3.61 3.14	2.4~2.4835 5.15~5.895 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	RP SMA PLUG	40
4	Chain0	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.895	Dipole	R-SMA	150
	Chain1	Cortec	AN2450-4902BRS	2.42 3.87	2.4~2.4835 5.15~5.895	Dipole	R-SMA	150
5	Chain0	MSI	WA-P-LE-02-045 (Main)	2.24 2.68 3.01 -1.23 -1.96 -3.68	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	IPEX-4L	190
	Chain1	MSI	WA-P-LE-02-046 (Aux)	-2.96 1.16 0.99 -2.31 -2.54 -7.44	2.4~2.4835 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	IPEX-4L	325
6	Chain0	PSA	RFPCA460632IMMB701	-13.20 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX	320mm
	Chain1	PSA	RFPCA460632IMMB701	-13.20 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX	320mm

7	Chain0	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	IPEX	300mm
	Chain1	PSA	RFMTA421230IMMB701	-13.92 -13.91 -13.91 -14.46	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	IPEX	300mm
Note: For above antennas, max. gain was selected for the final test.								

7. The EUT incorporates function:

6GHz Band				
MODULATION MODE	**Tx configuration**		**CDD mode**	**Beamforming mode**
802.11a	SISO	1TX	Not Support	Not Support
802.11ax (HE160)		1TX	Not Support	Not Support
802.11a	MIMO	2TX	Support	Not Support
802.11ax (HE20)		2TX	Support	Not Support
802.11ax (HE40)		2TX	Support	Not Support
802.11ax (HE80)		2TX	Support	Not Support
802.11ax (HE160)		2TX	Support	Not Support
802.11ax (RU26/52/106/242/484/996/1992)		2TX	Support	Not Support

8. 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.
9. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications.

3.2 Description of Test Modes

FOR 5925 ~ 6425MHz (U-NII-5 band)

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

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	5955 MHz	5	5975 MHz	9	5955 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	6415MHz

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

FOR 6425 ~ 6525MHz (U-NII-6 band)

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 channels is provided for 802.11ax (HE80):

Channel	Frequency
103	6465 MHz

1 channel is provided for 802.11ax (HE160):

Channel	Frequency
*111	6505 MHz

FOR 6525 ~ 6875MHz (U-NII-7 band)

18 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	*185	6875 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

FOR 6875 ~ 7125MHz (U-NII-8 band):

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

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

2 channels is 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 this's straddle channel.

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To						Description
	RE≥1G	RE<1G	IBE	PLC	CBP	APCM	
-	√	√	√	√	√	√	-

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement
IBE: In-Band Emission (MASK) **CBP:**Contention Based Protocol

Note: In the original report, the EUT's antenna (PIFA) had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane

Radiated Emission Measurement (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, RU configurations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE160)	5955-6415	15 to 79	15, 47, 79	OFDMA	BPSK	MCS0
	6435-6525	111	111	OFDMA	BPSK	MCS0
	6525-6855	143 to 175	143, 175	OFDMA	BPSK	MCS0
	6875-7115	207	207	OFDMA	BPSK	MCS0

Radiated Emission Measurement (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, RU configurations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE160)	5955-6415 6435-6525 6525-6855 6875-7115	15 to 79 111 143 to 175 207	79	OFDMA	BPSK	MCS0

In-Band Emission (MASK) Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, RU configurations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE160)	5955-6415	15 to 79	15, 47, 79	OFDMA	BPSK	MCS0
	6435-6525	111	111	OFDMA	BPSK	MCS0
	6525-6855	143 to 175	143,175	OFDMA	BPSK	MCS0
	6875-7115	207	207	OFDMA	BPSK	MCS0

Power Line Conducted Emission Measurement:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, RU configurations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE160)	5955-6415 6435-6525 6525-6855 6875-7115	15 to 79 111 143 to 175 207	79	OFDMA	BPSK	MCS0

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, RU configurations and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE160)	5955-6415	15 to 79	15,47,79	OFDMA	BPSK	MCS0
	6435-6525	111	111	OFDMA	BPSK	MCS0
	6525-6855	143 to 175	143, 175	OFDMA	BPSK	MCS0
	6875-7115	207	207	OFDMA	BPSK	MCS0

Contention Based Protocol Measurement:

☒ 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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate Parameter
802.11ax (HE160)	5955-6415	15 to 79	47	OFDMA	BPSK	MCS0
	6435-6525	111	111	OFDMA	BPSK	MCS0
	6525-6855	143 to 175	143	OFDMA	BPSK	MCS0
	6875-7115	207	207	OFDMA	BPSK	MCS0

Test Condition:

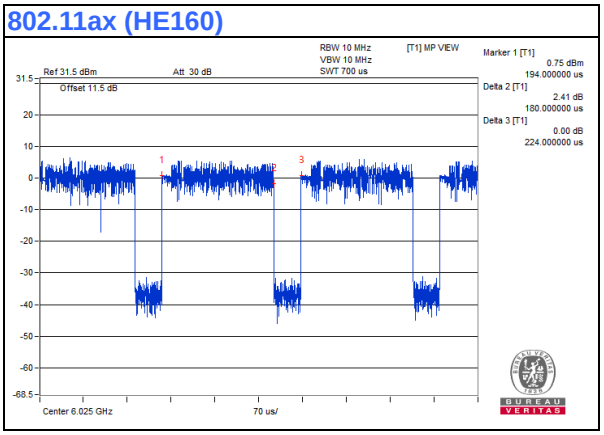
Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE≥1G	25deg. C, 64%RH	120Vac, 60Hz	Tom Yang
RE<1G	25deg. C, 64%RH	120Vac, 60Hz	Tom Yang
PLC	25deg. C, 66%RH	120Vac, 60Hz	Tom Yang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Ivan Tseng

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor is required

802.11ax (HE160): Duty cycle = 0.18 ms/0.224 ms= 0.804, Duty factor = 10 * log(1/ Duty cycle) = 0.95dB

802.11ax (HE160)



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

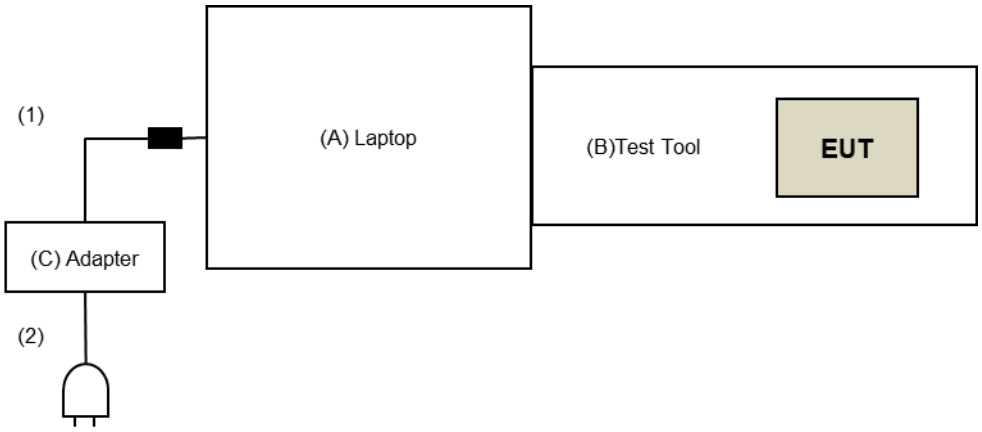
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6440	F9LYQ32	FCC DoC	Provided by Lab
B.	Test Tool	MTK	NA	NA	NA	Supplied by applicant
C.	Adapter	Dell	LA65NS2-01	NA	NA	Provided by Lab

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC Cable	1	1.8	No	1	Provided by Lab
2.	AC Cable	1	1.8	No	0	Provided by Lab

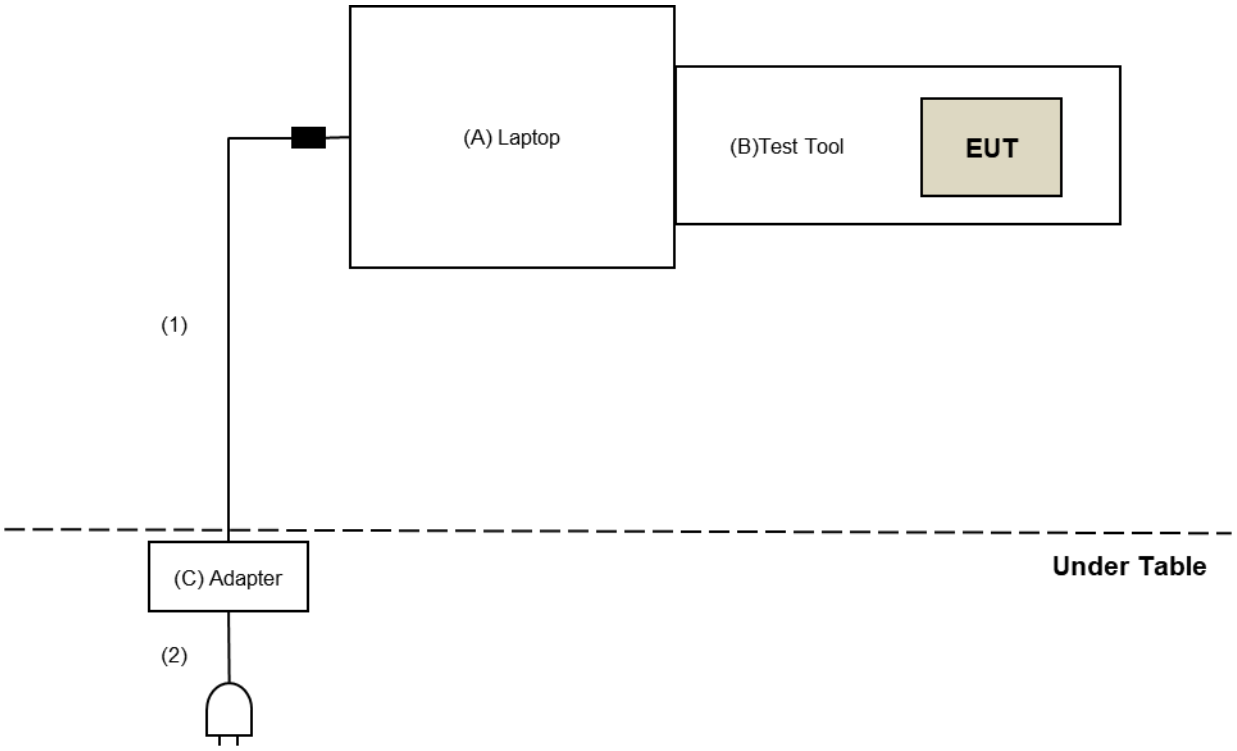
Note: The core(s) is(are) originally attached to the cable(s).

3.4.1 Configuration of System under Test

For AC Power Conducted Emission test:



For Radiated Emission test:



3.5 General Description of Applied Standard

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 987594 D02 EMC Measurement v01r01
KDB 789033 D02 General UNII Test Procedure 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 1000MHz, 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 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

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

Note:

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

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

4.1.2 Test Instruments

For Radiated Emission test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	2021/11/19	2022/11/18
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	NA	NA
Pre_Amplifier Agilent	8447D	2944A10636	2022/3/19	2023/3/18
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6	2023/1/5
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-002	2022/1/6	2023/1/5
Pre_Amplifier EMCI	EMC330N	980701	2022/3/8	2023/3/7
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-406	2021/10/27	2022/10/26
RF Coaxial Cable COMMATE/PEWC	8D	966-4-1	2022/3/8	2023/3/7
RF Coaxial Cable COMMATE/PEWC	8D	966-4-2	2022/3/8	2023/3/7
RF Coaxial Cable COMMATE/PEWC	8D	966-4-3	2022/3/8	2023/3/7
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2022/1/10	2023/1/9
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-783	2021/11/14	2022/11/13
Pre_Amplifier EMCI	EMC 12630 SE	980638	2022/4/5	2023/4/4
RF Cable-Frequency Range : 1-26.5GHz EMCI	EMC104-SM-SM-1200	160922	2021/12/24	2022/12/23
RF Coaxial Cable EMCI	EMC104-SM-SM-2000	180502	2022/4/25	2023/4/24
RF Coaxial Cable EMCI	EMC104-SM-SM-6000	210704	2021/11/9	2022/11/8
Pre_Amplifier EMCI	EMC184045SE	980387	2022/1/10	2023/1/9
Horn Antenna Schwarzbeck	BBHA 9170	9170-739	2021/11/14	2022/11/13
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10	2023/1/9
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7

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 966 Chamber No. 4.
3. Tested Date: 2022/5/11

For other test items:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer R&S	FSV40	101516	2022/3/7	2023/3/6
Power Meter Anritsu	ML2495A	1529002	2021/6/21	2022/6/20
Pulse Power Sensor Anritsu	MA2411B	1726434	2021/6/21	2022/6/20
Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	2022/4/5	2023/4/4
Software	ADT_RF Test Software V6.6.5.4	NA	NA	NA
DC POWER SUPPLY Topward	6603D	795558	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	2022/1/14	2023/1/13
True RMS Clamp Meter Fluke	325	31130711WS	2021/6/2	2022/6/1

NOTE:
1. The test was performed in Oven room 2.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/5/20

4.1.3 Test Procedure

For Radiated emission below 30MHz

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 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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.

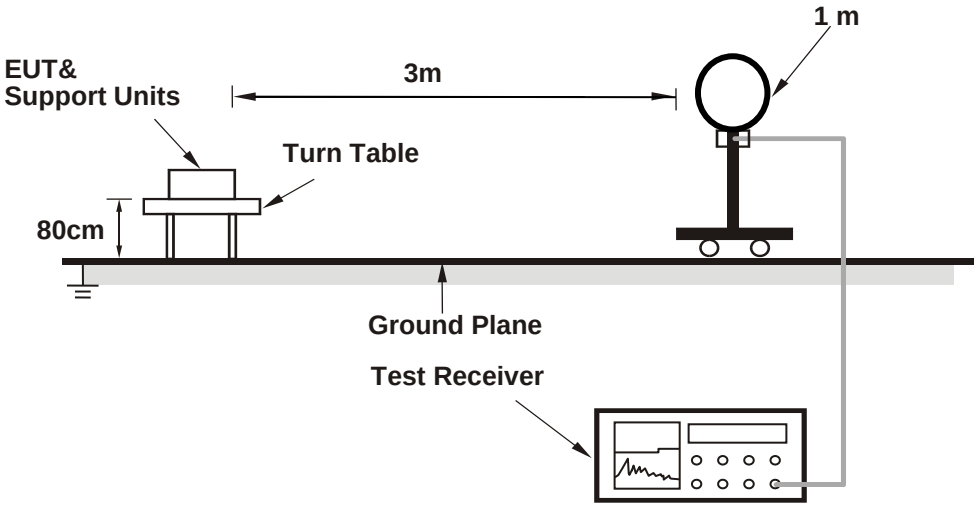
f. The test-receiver system was set to peak detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the RMS detector is unnecessary.

Note:

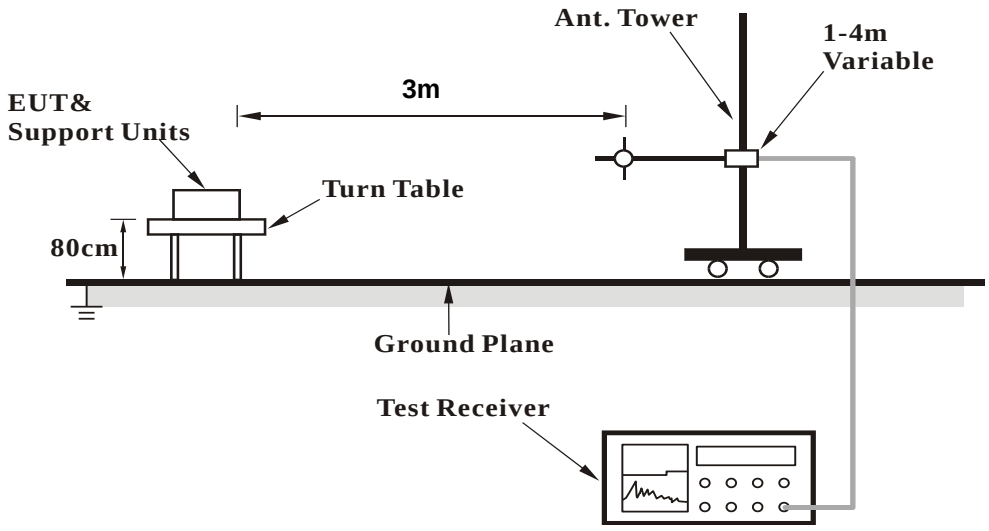
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The detection is peak and the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average measurement (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Test Setup

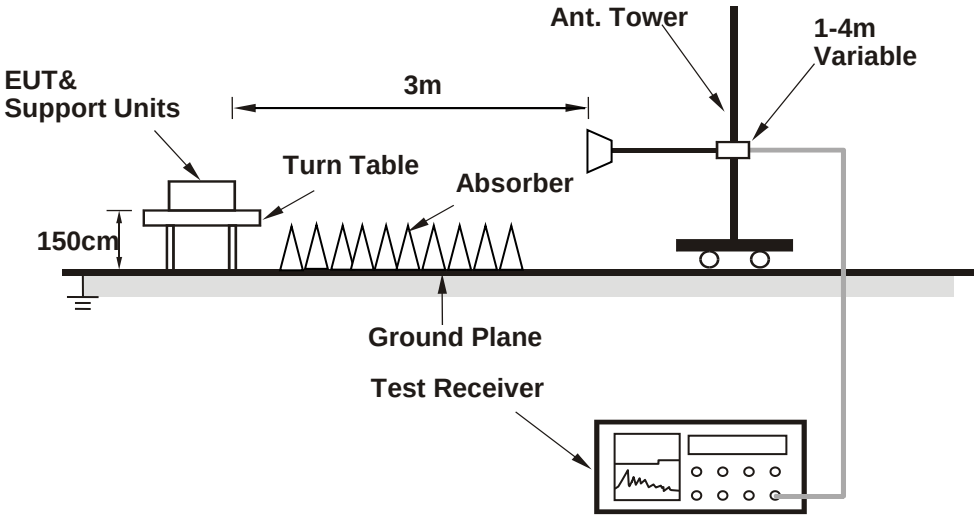
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.5 EUT Operating Condition

a. Connected the EUT with the Laptop which is placed on the testing table.
b. Controlling software (QATool_Dbg.exe 0.0.2.66) has been activated to set the EUT under transmission condition continuously.

4.1.6 Test Results

Above 1GHz Data:

For Dipole Antenna

RF Mode	TX 802.11ax (HE160)	**Channel**	CH 15：6025 MHz
Frequency Range	1 GHz ~ 40 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 64% RH
Tested By	Tom Yang		

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	#5903.02	71.6 PK	88.2	-16.6	1.36 H	194	70.4	1.2
2	#5903.02	58.5 AV	68.2	-9.7	1.36 H	194	57.3	1.2
3	#5925.00	67.3 PK	88.2	-20.9	1.36 H	194	65.9	1.4
4	#5925.00	59.7 AV	68.2	-8.5	1.36 H	194	58.3	1.4
5	*6025.00	96.7 PK			1.36 H	194	95.0	1.7
6	*6025.00	87.6 AV			1.36 H	194	85.9	1.7
7	12050.00	50.7 PK	74.0	-23.3	1.98 H	73	39.8	10.9
8	12050.00	41.6 AV	54.0	-12.4	1.98 H	73	30.7	10.9
9	18075.00	56.5 PK	74.0	-17.5	1.65 H	163	50.7	5.8
10	18075.00	44.8 AV	54.0	-9.2	1.65 H	163	39.0	5.8
11	#24100.00	44.2 PK	88.2	-44.0	2.21 H	136	46.4	-2.2
12	#24100.00	34.2 AV	68.2	-34.0	2.21 H	136	36.4	-2.2
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	#5897.27	78.9 PK	88.2	-9.3	1.66 V	210	77.6	1.3
2	#5897.27	64.8 AV	68.2	-3.4	1.66 V	210	63.5	1.3
3	#5925.00	77.0 PK	88.2	-11.2	1.66 V	210	75.6	1.4
4	#5925.00	67.0 AV	68.2	-1.2	1.66 V	210	65.6	1.4
5	*6025.00	103.7 PK			1.66 V	210	102.0	1.7
6	*6025.00	94.7 AV			1.66 V	210	93.0	1.7
7	12050.00	49.8 PK	74.0	-24.2	1.34 V	205	38.9	10.9
8	12050.00	40.2 AV	54.0	-13.8	1.34 V	205	29.3	10.9
9	18075.00	56.7 PK	74.0	-17.3	2.51 V	311	50.9	5.8
10	18075.00	44.7 AV	54.0	-9.3	2.51 V	311	38.9	5.8
11	#24100.00	46.3 PK	88.2	-41.9	2.07 V	184	48.5	-2.2
12	#24100.00	37.0 AV	68.2	-31.2	2.07 V	184	39.2	-2.2

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 47：6185 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6185.00	96.2 PK			1.35 H	178	94.2	2.0
2	*6185.00	87.2 AV			1.35 H	178	85.2	2.0
3	12370.00	50.2 PK	74.0	-23.8	2.02 H	51	40.2	10.0
4	12370.00	41.3 AV	54.0	-12.7	2.02 H	51	31.3	10.0
5	18555.00	58.6 PK	74.0	-15.4	1.63 H	117	65.6	-7.0
6	18555.00	46.6 AV	54.0	-7.4	1.63 H	117	53.6	-7.0
7	#24740.00	45.3 PK	88.2	-42.9	2.22 H	124	46.8	-1.5
8	#24740.00	35.1 AV	68.2	-33.1	2.22 H	124	36.6	-1.5
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	*6185.00	103.6 PK			1.67 V	226	101.6	2.0
2	*6185.00	94.6 AV			1.67 V	226	92.6	2.0
3	12370.00	49.2 PK	74.0	-24.8	1.35 V	184	39.2	10.0
4	12370.00	39.7 AV	54.0	-14.3	1.35 V	184	29.7	10.0
5	18555.00	58.0 PK	74.0	-16.0	2.59 V	327	65.0	-7.0
6	18555.00	45.8 AV	54.0	-8.2	2.59 V	327	52.8	-7.0
7	#24740.00	46.5 PK	88.2	-41.7	2.00 V	176	48.0	-1.5
8	#24740.00	36.7 AV	68.2	-31.5	2.00 V	176	38.2	-1.5

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 79：6345 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6345.00	95.9 PK			1.31 H	182	93.0	2.9
2	*6345.00	87.0 AV			1.31 H	182	84.1	2.9
3	12690.00	50.5 PK	74.0	-23.5	2.05 H	123	40.2	10.3
4	12690.00	41.6 AV	54.0	-12.4	2.05 H	123	31.3	10.3
5	19035.00	58.8 PK	74.0	-15.2	1.69 H	154	65.4	-6.6
6	19035.00	46.4 AV	54.0	-7.6	1.69 H	154	53.0	-6.6
7	#25380.00	43.7 PK	88.2	-44.5	2.38 H	145	45.1	-1.4
8	#25380.00	33.8 AV	68.2	-34.4	2.38 H	145	35.2	-1.4
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	*6345.00	103.5 PK			1.64 V	195	100.6	2.9
2	*6345.00	94.3 AV			1.64 V	195	91.4	2.9
3	12690.00	50.5 PK	74.0	-23.5	1.29 V	208	40.2	10.3
4	12690.00	41.4 AV	54.0	-12.6	1.29 V	208	31.1	10.3
5	19035.00	57.5 PK	74.0	-16.5	2.56 V	325	64.1	-6.6
6	19035.00	45.5 AV	54.0	-8.5	2.56 V	325	52.1	-6.6
7	#25380.00	47.2 PK	88.2	-41.0	1.96 V	188	48.6	-1.4
8	#25380.00	37.8 AV	68.2	-30.4	1.96 V	188	39.2	-1.4

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 111：6505 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	95.5 PK			1.27 H	175	92.2	3.3
2	*6505.00	86.6 AV			1.27 H	175	83.3	3.3
3	#13010.00	49.9 PK	88.2	-38.3	2.03 H	74	39.3	10.6
4	#13010.00	40.7 AV	68.2	-27.5	2.03 H	74	30.1	10.6
5	19515.00	58.7 PK	74.0	-15.3	1.64 H	111	64.9	-6.2
6	19515.00	46.5 AV	54.0	-7.5	1.64 H	111	52.7	-6.2
7	#26020.00	45.0 PK	88.2	-43.2	2.24 H	125	46.0	-1.0
8	#26020.00	34.9 AV	68.2	-33.3	2.24 H	125	35.9	-1.0
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	103.4 PK			1.66 V	215	100.1	3.3
2	*6505.00	94.4 AV			1.66 V	215	91.1	3.3
3	#13010.00	49.9 PK	88.2	-38.3	1.28 V	213	39.3	10.6
4	#13010.00	40.6 AV	68.2	-27.6	1.28 V	213	30.0	10.6
5	19515.00	56.7 PK	74.0	-17.3	2.56 V	327	62.9	-6.2
6	19515.00	44.8 AV	54.0	-9.2	2.56 V	327	51.0	-6.2
7	#26020.00	46.0 PK	88.2	-42.2	1.94 V	184	47.0	-1.0
8	#26020.00	36.7 AV	68.2	-31.5	1.94 V	184	37.7	-1.0

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 143：6665 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	96.4 PK			1.26 H	167	92.6	3.8
2	*6665.00	87.5 AV			1.26 H	167	83.7	3.8
3	13330.00	50.3 PK	74.0	-23.7	1.99 H	92	38.6	11.7
4	13330.00	41.4 AV	54.0	-12.6	1.99 H	92	29.7	11.7
5	19995.00	57.0 PK	74.0	-17.0	1.71 H	130	62.6	-5.6
6	19995.00	45.4 AV	54.0	-8.6	1.71 H	130	51.0	-5.6
7	#26660.00	44.6 PK	88.2	-43.6	2.23 H	135	45.3	-0.7
8	#26660.00	34.4 AV	68.2	-33.8	2.23 H	135	35.1	-0.7
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	103.8 PK			1.68 V	219	100.0	3.8
2	*6665.00	94.7 AV			1.68 V	219	90.9	3.8
3	13330.00	49.6 PK	74.0	-24.4	1.27 V	181	37.9	11.7
4	13330.00	40.4 AV	54.0	-13.6	1.27 V	181	28.7	11.7
5	19995.00	57.3 PK	74.0	-16.7	2.48 V	322	62.9	-5.6
6	19995.00	45.5 AV	54.0	-8.5	2.48 V	322	51.1	-5.6
7	#26660.00	47.8 PK	88.2	-40.4	1.90 V	201	48.5	-0.7
8	#26660.00	37.8 AV	68.2	-30.4	1.90 V	201	38.5	-0.7

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 175：6825 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6825.00	95.5 PK			1.38 H	189	91.6	3.9
2	*6825.00	86.8 AV			1.38 H	189	82.9	3.9
3	#13650.00	51.1 PK	88.2	-37.1	1.95 H	106	38.2	12.9
4	#13650.00	41.9 AV	68.2	-26.3	1.95 H	106	29.0	12.9
5	20475.00	57.7 PK	74.0	-16.3	1.64 H	141	62.5	-4.8
6	20475.00	45.8 AV	54.0	-8.2	1.64 H	141	50.6	-4.8
7	#27300.00	44.0 PK	88.2	-44.2	2.22 H	137	45.0	-1.0
8	#27300.00	34.4 AV	68.2	-33.8	2.22 H	137	35.4	-1.0
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	*6825.00	104.4 PK			1.64 V	208	100.5	3.9
2	*6825.00	95.1 AV			1.64 V	208	91.2	3.9
3	#13650.00	50.1 PK	88.2	-38.1	1.30 V	193	37.2	12.9
4	#13650.00	40.7 AV	68.2	-27.5	1.30 V	193	27.8	12.9
5	20475.00	57.2 PK	74.0	-16.8	2.53 V	303	62.0	-4.8
6	20475.00	45.1 AV	54.0	-8.9	2.53 V	303	49.9	-4.8
7	#27300.00	46.8 PK	88.2	-41.4	1.88 V	169	47.8	-1.0
8	#27300.00	36.9 AV	68.2	-31.3	1.88 V	169	37.9	-1.0

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 207：6985 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6985.00	97.3 PK			1.26 H	181	92.1	5.2
2	*6985.00	87.8 AV			1.26 H	181	82.6	5.2
3	#7125.00	63.1 PK	88.2	-25.1	1.26 H	181	57.4	5.7
4	#7125.00	52.5 AV	68.2	-15.7	1.26 H	181	46.8	5.7
5	#7136.24	66.3 PK	88.2	-21.9	1.26 H	181	60.5	5.8
6	#7136.24	50.6 AV	68.2	-17.6	1.26 H	181	44.8	5.8
7	#13970.00	50.4 PK	88.2	-37.8	2.00 H	74	37.3	13.1
8	#13970.00	41.5 AV	68.2	-26.7	2.00 H	74	28.4	13.1
9	20955.00	56.8 PK	74.0	-17.2	1.64 H	154	60.9	-4.1
10	20955.00	45.0 AV	54.0	-9.0	1.64 H	154	49.1	-4.1
11	#27940.00	44.5 PK	88.2	-43.7	2.20 H	145	45.6	-1.1
12	#27940.00	34.5 AV	68.2	-33.7	2.20 H	145	35.6	-1.1
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	*6985.00	101.1 PK			1.28 V	191	95.9	5.2
2	*6985.00	90.8 AV			1.28 V	191	85.6	5.2
3	#7125.00	62.5 PK	88.2	-25.7	1.28 V	191	56.8	5.7
4	#7125.00	53.4 AV	68.2	-14.8	1.28 V	191	47.7	5.7
5	#7136.73	69.6 PK	88.2	-18.6	1.28 V	191	63.8	5.8
6	#7136.73	52.5 AV	68.2	-15.7	1.28 V	191	46.7	5.8
7	#13970.00	49.0 PK	88.2	-39.2	1.34 V	187	35.9	13.1
8	#13970.00	39.7 AV	68.2	-28.5	1.34 V	187	26.6	13.1
9	20955.00	57.9 PK	74.0	-16.1	2.60 V	318	62.0	-4.1
10	20955.00	45.8 AV	54.0	-8.2	2.60 V	318	49.9	-4.1
11	#27940.00	46.7 PK	88.2	-41.5	2.04 V	188	47.8	-1.1
12	#27940.00	36.7 AV	68.2	-31.5	2.04 V	188	37.8	-1.1

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.
6. " # ": The radiated frequency is out of the restricted band.

For PIFA Antenna

RF Mode	TX 802.11ax (HE160)	Channel	CH 15：6025 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	#5908.44	82.0 PK	88.2	-6.2	1.96 H	66	80.8	1.2
2	#5908.44	67.1 AV	68.2	-1.1	1.96 H	66	65.9	1.2
3	#5925.00	77.5 PK	88.2	-10.7	1.96 H	66	76.1	1.4
4	**#5925.00**	**68.0 AV**	**68.2**	**-0.2**	**1.96 H**	**66**	**66.6**	**1.4**
5	*6025.00	106.2 PK			1.96 H	66	104.5	1.7
6	*6025.00	96.8 AV			1.96 H	66	95.1	1.7
7	12050.00	50.4 PK	74.0	-23.6	1.99 H	95	39.5	10.9
8	12050.00	41.4 AV	54.0	-12.6	1.99 H	95	30.5	10.9
9	18075.00	57.5 PK	74.0	-16.5	1.62 H	133	51.7	5.8
10	18075.00	45.8 AV	54.0	-8.2	1.62 H	133	40.0	5.8
11	#24100.00	44.2 PK	88.2	-44.0	2.20 H	139	46.4	-2.2
12	#24100.00	34.3 AV	68.2	-33.9	2.20 H	139	36.5	-2.2
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	#5917.15	68.1 PK	88.2	-20.1	2.04 V	36	66.7	1.4
2	#5917.15	60.7 AV	68.2	-7.5	2.04 V	36	59.3	1.4
3	#5922.16	74.6 PK	88.2	-13.6	2.04 V	36	73.2	1.4
4	#5922.16	60.2 AV	68.2	-8.0	2.04 V	36	58.8	1.4
5	*6025.00	101.8 PK			2.04 V	36	100.1	1.7
6	*6025.00	91.9 AV			2.04 V	36	90.2	1.7
7	12050.00	49.9 PK	74.0	-24.1	1.41 V	205	39.0	10.9
8	12050.00	40.2 AV	54.0	-13.8	1.41 V	205	29.3	10.9
9	18075.00	57.4 PK	74.0	-16.6	2.61 V	329	51.6	5.8
10	18075.00	45.2 AV	54.0	-8.8	2.61 V	329	39.4	5.8
11	#24100.00	46.5 PK	88.2	-41.7	2.05 V	158	48.7	-2.2
12	#24100.00	36.6 AV	68.2	-31.6	2.05 V	158	38.8	-2.2

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 47：6185 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6185.00	107.9 PK			1.94 H	70	105.9	2.0
2	*6185.00	98.7 AV			1.94 H	70	96.7	2.0
3	12370.00	50.2 PK	74.0	-23.8	1.98 H	65	40.2	10.0
4	12370.00	41.1 AV	54.0	-12.9	1.98 H	65	31.1	10.0
5	18555.00	58.5 PK	74.0	-15.5	1.66 H	126	65.5	-7.0
6	18555.00	46.3 AV	54.0	-7.7	1.66 H	126	53.3	-7.0
7	#24740.00	45.3 PK	88.2	-42.9	2.27 H	119	46.8	-1.5
8	#24740.00	35.0 AV	68.2	-33.2	2.27 H	119	36.5	-1.5
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	*6185.00	103.3 PK			2.03 V	43	101.3	2.0
2	*6185.00	93.6 AV			2.03 V	43	91.6	2.0
3	12370.00	49.5 PK	74.0	-24.5	1.36 V	214	39.5	10.0
4	12370.00	40.2 AV	54.0	-13.8	1.36 V	214	30.2	10.0
5	18555.00	57.0 PK	74.0	-17.0	2.55 V	314	64.0	-7.0
6	18555.00	44.9 AV	54.0	-9.1	2.55 V	314	51.9	-7.0
7	#24740.00	46.4 PK	88.2	-41.8	2.02 V	170	47.9	-1.5
8	#24740.00	37.0 AV	68.2	-31.2	2.02 V	170	38.5	-1.5

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.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 79：6345 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6345.00	107.8 PK			1.93 H	73	104.9	2.9
2	*6345.00	98.3 AV			1.93 H	73	95.4	2.9
3	12690.00	51.0 PK	74.0	-23.0	2.01 H	114	40.7	10.3
4	12690.00	41.9 AV	54.0	-12.1	2.01 H	114	31.6	10.3
5	19035.00	58.1 PK	74.0	-15.9	1.67 H	139	64.7	-6.6
6	19035.00	46.0 AV	54.0	-8.0	1.67 H	139	52.6	-6.6
7	#25380.00	44.1 PK	88.2	-44.1	2.32 H	148	45.5	-1.4
8	#25380.00	34.1 AV	68.2	-34.1	2.32 H	148	35.5	-1.4
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	*6345.00	103.1 PK			2.01 V	22	100.2	2.9
2	*6345.00	93.5 AV			2.01 V	22	90.6	2.9
3	12690.00	49.6 PK	74.0	-24.4	1.37 V	199	39.3	10.3
4	12690.00	40.1 AV	54.0	-13.9	1.37 V	199	29.8	10.3
5	19035.00	57.9 PK	74.0	-16.1	2.57 V	314	64.5	-6.6
6	19035.00	45.5 AV	54.0	-8.5	2.57 V	314	52.1	-6.6
7	#25380.00	46.4 PK	88.2	-41.8	2.02 V	174	47.8	-1.4
8	#25380.00	36.6 AV	68.2	-31.6	2.02 V	174	38.0	-1.4

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 111：6505 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	107.4 PK			1.89 H	61	104.1	3.3
2	*6505.00	98.4 AV			1.89 H	61	95.1	3.3
3	#13010.00	50.2 PK	88.2	-38.0	2.01 H	73	39.6	10.6
4	#13010.00	41.2 AV	68.2	-27.0	2.01 H	73	30.6	10.6
5	19515.00	58.0 PK	74.0	-16.0	1.67 H	138	64.2	-6.2
6	19515.00	45.9 AV	54.0	-8.1	1.67 H	138	52.1	-6.2
7	#26020.00	44.9 PK	88.2	-43.3	2.22 H	126	45.9	-1.0
8	#26020.00	34.7 AV	68.2	-33.5	2.22 H	126	35.7	-1.0
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	103.3 PK			1.98 V	58	100.0	3.3
2	*6505.00	93.6 AV			1.98 V	58	90.3	3.3
3	#13010.00	49.9 PK	88.2	-38.3	1.31 V	183	39.3	10.6
4	#13010.00	40.8 AV	68.2	-27.4	1.31 V	183	30.2	10.6
5	19515.00	57.1 PK	74.0	-16.9	2.49 V	323	63.3	-6.2
6	19515.00	45.1 AV	54.0	-8.9	2.49 V	323	51.3	-6.2
7	#26020.00	47.8 PK	88.2	-40.4	1.91 V	193	48.8	-1.0
8	#26020.00	37.8 AV	68.2	-30.4	1.91 V	193	38.8	-1.0

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 143：6665 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	107.3 PK			1.89 H	52	103.5	3.8
2	*6665.00	98.0 AV			1.89 H	52	94.2	3.8
3	13330.00	50.6 PK	74.0	-23.4	1.99 H	103	38.9	11.7
4	13330.00	41.5 AV	54.0	-12.5	1.99 H	103	29.8	11.7
5	19995.00	58.0 PK	74.0	-16.0	1.63 H	141	63.6	-5.6
6	19995.00	46.0 AV	54.0	-8.0	1.63 H	141	51.6	-5.6
7	#26660.00	44.5 PK	88.2	-43.7	2.27 H	138	45.2	-0.7
8	#26660.00	34.4 AV	68.2	-33.8	2.27 H	138	35.1	-0.7
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	103.4 PK			1.96 V	15	99.6	3.8
2	*6665.00	93.7 AV			1.96 V	15	89.9	3.8
3	13330.00	50.3 PK	74.0	-23.7	1.34 V	195	38.6	11.7
4	13330.00	41.1 AV	54.0	-12.9	1.34 V	195	29.4	11.7
5	19995.00	57.0 PK	74.0	-17.0	2.54 V	315	62.6	-5.6
6	19995.00	45.2 AV	54.0	-8.8	2.54 V	315	50.8	-5.6
7	#26660.00	47.0 PK	88.2	-41.2	1.91 V	183	47.7	-0.7
8	#26660.00	37.3 AV	68.2	-30.9	1.91 V	183	38.0	-0.7

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 175：6825 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6825.00	106.6 PK			1.98 H	75	102.7	3.9
2	*6825.00	97.2 AV			1.98 H	75	93.3	3.9
3	#13650.00	50.3 PK	88.2	-37.9	2.01 H	89	37.4	12.9
4	#13650.00	41.4 AV	68.2	-26.8	2.01 H	89	28.5	12.9
5	20475.00	57.3 PK	74.0	-16.7	1.67 H	142	62.1	-4.8
6	20475.00	45.5 AV	54.0	-8.5	1.67 H	142	50.3	-4.8
7	#27300.00	44.6 PK	88.2	-43.6	2.18 H	134	45.6	-1.0
8	#27300.00	34.5 AV	68.2	-33.7	2.18 H	134	35.5	-1.0
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	*6825.00	103.4 PK			2.09 V	40	99.5	3.9
2	*6825.00	93.6 AV			2.09 V	40	89.7	3.9
3	#13650.00	49.9 PK	88.2	-38.3	1.33 V	199	37.0	12.9
4	#13650.00	40.6 AV	68.2	-27.6	1.33 V	199	27.7	12.9
5	20475.00	57.4 PK	74.0	-16.6	2.57 V	323	62.2	-4.8
6	20475.00	45.3 AV	54.0	-8.7	2.57 V	323	50.1	-4.8
7	#27300.00	46.4 PK	88.2	-41.8	1.97 V	184	47.4	-1.0
8	#27300.00	36.8 AV	68.2	-31.4	1.97 V	184	37.8	-1.0

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.
6. " # ": The radiated frequency is out of the restricted band.

RF Mode	TX 802.11ax (HE160)	Channel	CH 207：6985 MHz
Frequency Range	1 GHz ~ 40 GHz	Detector Function & Bandwidth	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 2 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	*6985.00	104.4 PK			1.92 H	78	99.2	5.2
2	*6985.00	94.6 AV			1.92 H	78	89.4	5.2
3	#7125.00	66.9 PK	88.2	-21.3	1.92 H	78	61.2	5.7
4	#7125.00	56.8 AV	68.2	-11.4	1.92 H	78	51.1	5.7
5	#7127.73	72.2 PK	88.2	-16.0	1.92 H	78	66.5	5.7
6	#7127.73	56.4 AV	68.2	-11.8	1.92 H	78	50.7	5.7
7	#13970.00	50.3 PK	88.2	-37.9	2.02 H	100	37.2	13.1
8	#13970.00	41.3 AV	68.2	-26.9	2.02 H	100	28.2	13.1
9	20955.00	57.3 PK	74.0	-16.7	1.67 H	135	61.4	-4.1
10	20955.00	45.5 AV	54.0	-8.5	1.67 H	135	49.6	-4.1
11	#27940.00	44.9 PK	88.2	-43.3	2.23 H	145	46.0	-1.1
12	#27940.00	34.7 AV	68.2	-33.5	2.23 H	145	35.8	-1.1
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	*6985.00	110.2 PK			2.33 V	87	105.0	5.2
2	*6985.00	99.3 AV			2.33 V	87	94.1	5.2
3	#7125.00	72.4 PK	88.2	-15.8	2.33 V	87	66.7	5.7
4	#7125.00	63.7 AV	68.2	-4.5	2.33 V	87	58.0	5.7
5	#7132.04	76.2 PK	88.2	-12.0	2.33 V	87	70.5	5.7
6	#7132.04	62.8 AV	68.2	-5.4	2.33 V	87	57.1	5.7
7	#13970.00	50.2 PK	88.2	-38.0	1.34 V	207	37.1	13.1
8	#13970.00	40.9 AV	68.2	-27.3	1.34 V	207	27.8	13.1
9	20955.00	57.2 PK	74.0	-16.8	2.56 V	308	61.3	-4.1
10	20955.00	45.3 AV	54.0	-8.7	2.56 V	308	49.4	-4.1
11	#27940.00	46.9 PK	88.2	-41.3	1.94 V	193	48.0	-1.1
12	#27940.00	37.1 AV	68.2	-31.1	1.94 V	193	38.2	-1.1

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.
6. " # ": The radiated frequency is out of the restricted band.

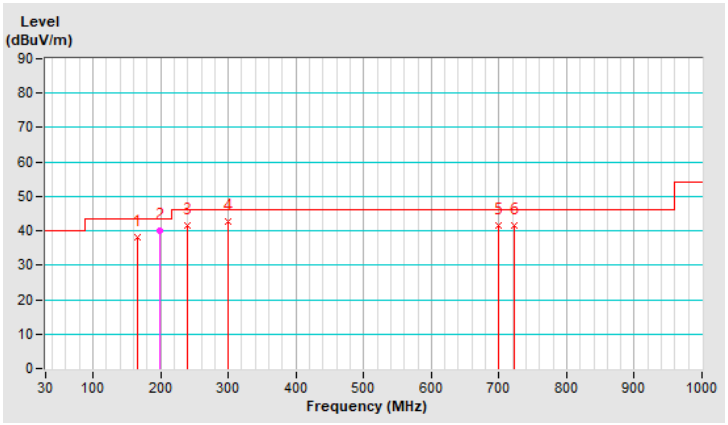
Below 1GHz Data:
For Dipole Antenna

RF Mode	TX 802.11ax (HE160)	**Channel**	CH 79：6345 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 64% RH
Tested By	Tom Yang		

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	165.24	38.2 QP	43.5	-5.3	1.50 H	301	50.1	-11.9
2	199.07	40.1 QP	43.5	-3.4	1.00 H	114	54.8	-14.7
3	239.76	41.6 QP	46.0	-4.4	1.00 H	256	54.5	-12.9
4	299.07	42.7 QP	46.0	-3.3	1.50 H	326	53.1	-10.4
5	698.80	41.5 QP	46.0	-4.5	1.50 H	249	41.8	-0.3
6	722.36	41.7 QP	46.0	-4.3	1.00 H	182	41.7	0.0

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

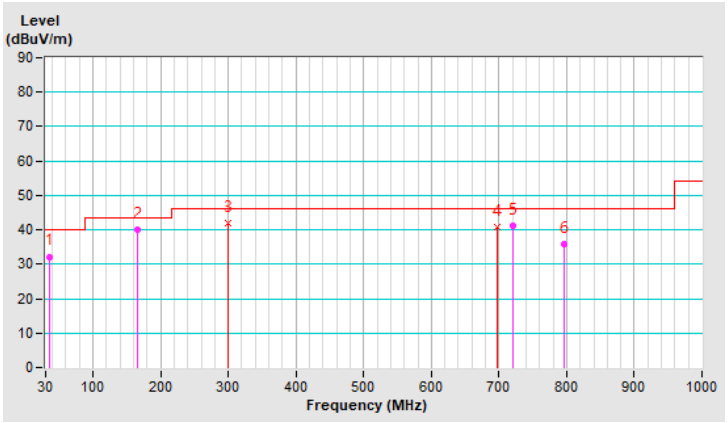


RF Mode	TX 802.11ax (HE160)	**Channel**	CH 79：6345 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 64% RH
Tested By	Tom Yang		

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	35.02	32.2 QP	40.0	-7.8	1.00 V	222	45.3	-13.1
2	165.84	40.1 QP	43.5	-3.4	1.50 V	284	52.0	-11.9
3	298.86	41.9 QP	46.0	-4.1	2.00 V	341	52.4	-10.5
4	697.79	40.9 QP	46.0	-5.1	1.00 V	238	41.2	-0.3
5	720.28	41.3 QP	46.0	-4.7	1.50 V	256	41.4	-0.1
6	796.88	35.8 QP	46.0	-10.2	1.00 V	82	34.4	1.4

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



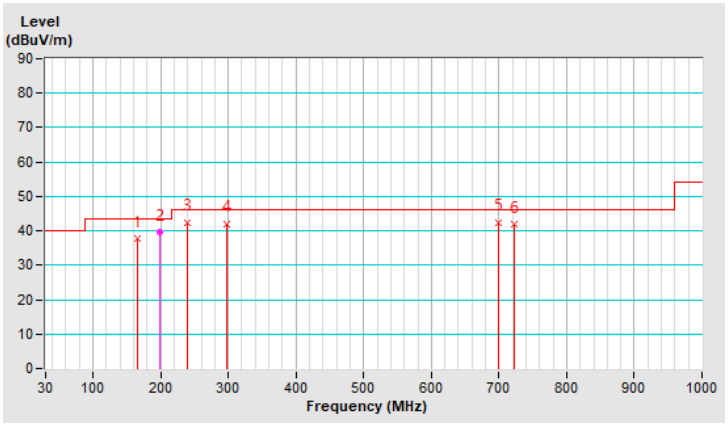
For PIFA Antenna

RF Mode	TX 802.11ax (HE160)	**Channel**	CH 79：6345 MHz
Frequency Range	9 kHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 64% RH
Tested By	Tom Yang		

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	165.56	37.7 QP	43.5	-5.8	1.50 H	254	49.6	-11.9
2	198.53	39.5 QP	43.5	-4.0	1.00 H	108	54.2	-14.7
3	240.02	42.5 QP	46.0	-3.5	1.00 H	339	55.4	-12.9
4	298.63	42.1 QP	46.0	-3.9	1.50 H	221	52.6	-10.5
5	699.28	42.5 QP	46.0	-3.5	2.30 H	240	42.8	-0.3
6	721.92	41.9 QP	46.0	-4.1	1.00 H	222	41.9	0.0

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

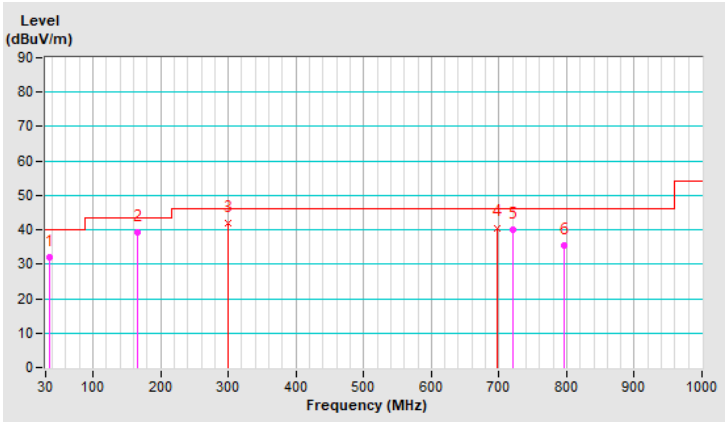


RF Mode	TX 802.11ax (HE160)	Channel	CH 79：6345 MHz
Frequency Range	9 kHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 64% RH
Tested By	Tom Yang		

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	34.86	31.9 QP	40.0	-8.1	1.00 V	207	45.0	-13.1
2	166.37	39.2 QP	43.5	-4.3	1.00 V	356	51.2	-12.0
3	298.92	41.8 QP	46.0	-4.2	2.00 V	354	52.3	-10.5
4	697.56	40.6 QP	46.0	-5.4	1.50 V	206	40.9	-0.3
5	719.93	40.1 QP	46.0	-5.9	1.50 V	227	40.3	-0.2
6	796.78	35.5 QP	46.0	-10.5	1.00 V	66	34.1	1.4

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 In-Band Emission (Mask) Measurement

4.2.1 Limits of In-Band Emission (Mask) Measurement

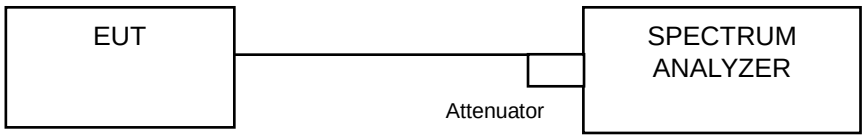
Test Item	Frequencies (MHz)	(X) dBc*1
Emission Mask	At 1 MHz outside of channel edge	20
	At one channel bandwidth from the channel center*2	28
	At one- and one-half times the channel bandwidth away from channel center*3	40
	More than one- and one-half times the channel bandwidth	40

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

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

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

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

a. Connect output of the antenna port to a spectrum analyzer and adjust appropriate attenuation.

b. Measure the 26 dB EBW using the test procedure 12.4.1 of ANSI C63.10-2013. (Determine the channel edge.)

c. Measure the power spectral density (for emissions mask reference) using the following procedure:

a) Set the span to encompass the entire 26 dB EBW of the signal.

b) Set RBW = same RBW used for 26 dB EBW measurement.

c) Set VBW ≥ 3 X RBW

d) Number of points in sweep ≥ [2 X span / RBW].

e) Sweep time = auto.

f) Detector = RMS (i.e., power averaging)

g) Trace average at least 100 traces in power averaging (rms) mode.

h) Use the peak search function on the instrument to find the peak of the spectrum.

d. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:

a) Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the 26-dB point on either side of the carrier center frequency.)

b) Suppressed by 28 dB at one channel bandwidth from the channel center.

c) Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.

e. Adjust the span to encompass the entire mask as necessary and clear trace.

f. Trace average at least 100 traces in power averaging (rms) mode.

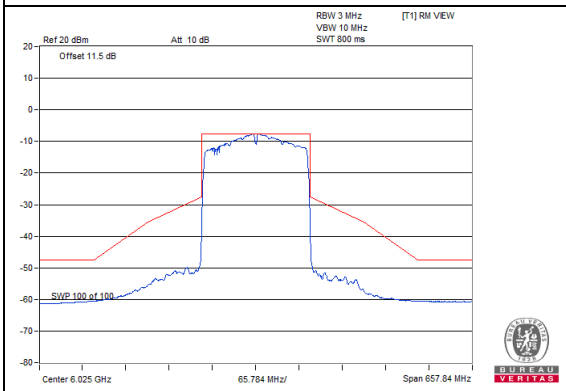
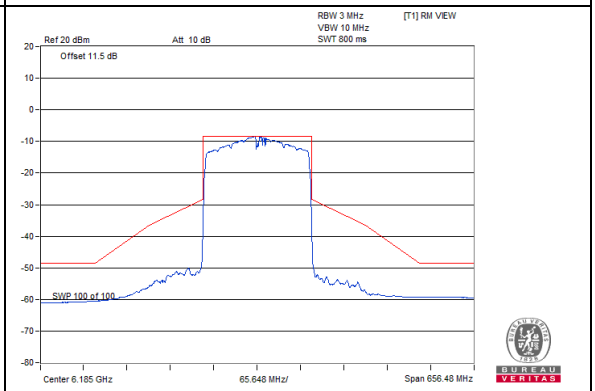
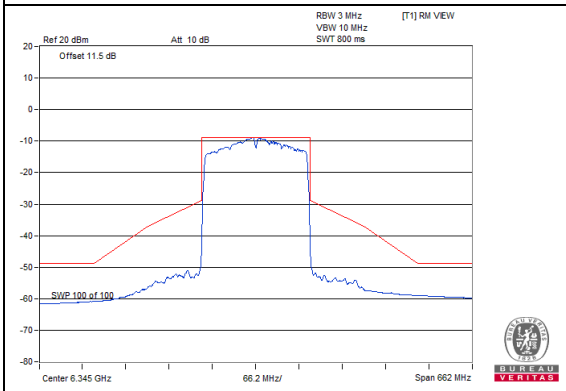
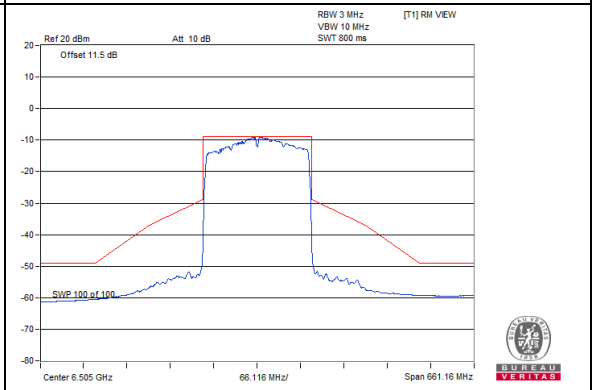
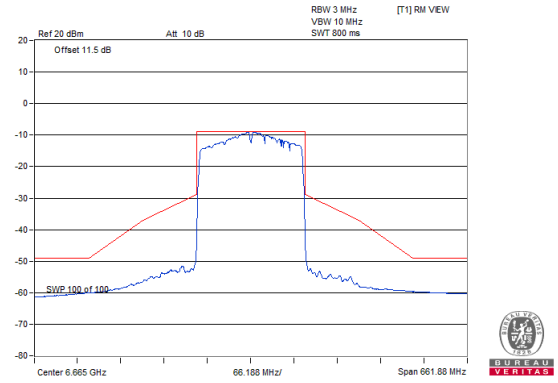
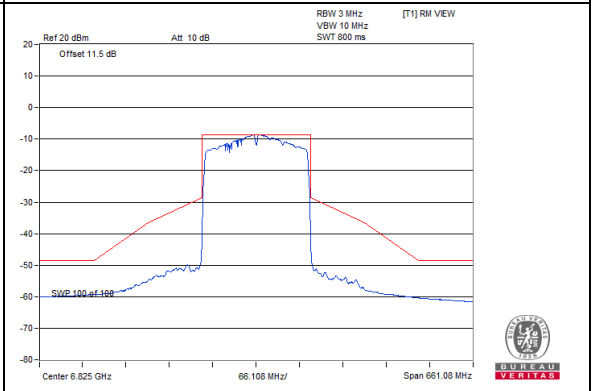
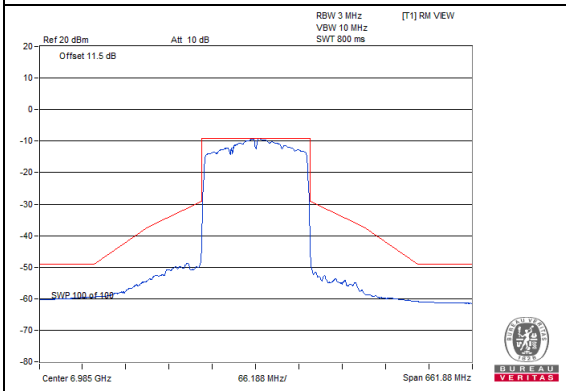
g. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask

4.2.5 EUT Operating Condition

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

4.2.6 Test Results

802.11ax (HE160)

Spectrum Plot of Worst Value	
CH15	**CH47**
	
CH79	**CH111**
	
CH143	**CH175**
	
CH207	
	

4.3 Conducted Emission Measurement

4.3.1 Limits of Conducted Emission Measurement

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

Note: 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 0.50MHz.

4.3.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	2021/10/13	2022/10/12
LISN R&S	ESH3-Z5	848773/004	2021/10/29	2022/10/28
50 ohms Terminator NA	50	3	2021/10/27	2022/10/26
RF Coaxial Cable JYEBO	5D-FB	COCCAB-001	2021/9/25	2022/9/24
Fixed attenuator STI	STI02-2200-10	005	2021/8/27	2022/8/26
Software BVADT	BVADT_Cond_V7.3.7.4	NA	NA	NA

Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Conduction 1.
3 Tested Date: 2022/5/11

4.3.3 Test Procedure

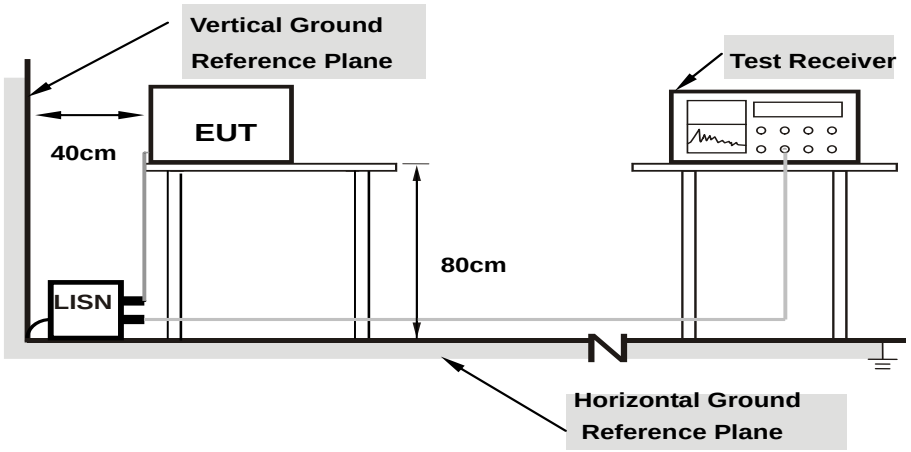
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

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

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

4.3.4 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).

4.3.5 EUT Operating Condition

Same as 4.1.6.

4.3.6 Test Results

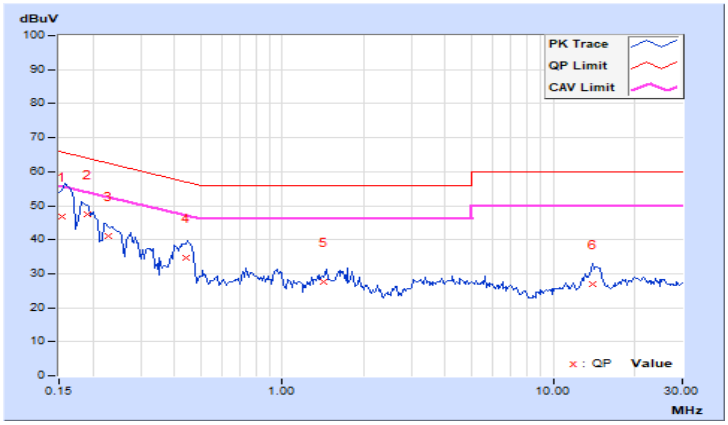
For PIFA Antenna

RF Mode	TX 802.11ax (HE160)	**Channel**	CH 79：6345 MHz
Frequency Range	150 kHz ~ 30 MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120 Vac, 60 Hz	**Environmental Conditions**	25°C, 66% RH
Tested By	Tom Yang		

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	0.15347	10.05	36.76	18.11	46.81	28.16	65.81	55.81	-19.00	-27.65
2	**0.19071**	**10.05**	**37.34**	**28.56**	**47.39**	**38.61**	**64.01**	**54.01**	**-16.62**	**-15.40**
3	0.22849	10.05	30.86	19.47	40.91	29.52	62.50	52.50	-21.59	-22.98
4	0.44256	10.07	24.53	17.42	34.60	27.49	57.01	47.01	-22.41	-19.52
5	1.41579	10.13	17.34	12.33	27.47	22.46	56.00	46.00	-28.53	-23.54
6	13.96152	10.86	16.20	8.73	27.06	19.59	60.00	50.00	-32.94	-30.41

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

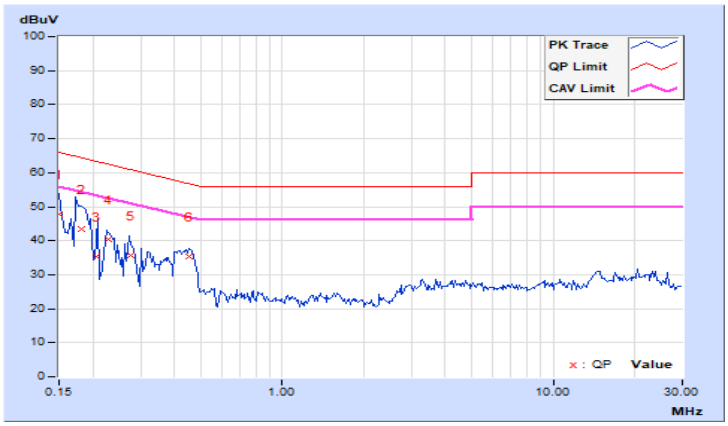


RF Mode	TX 802.11ax (HE160)	Channel	CH 79：6345 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25°C, 66% RH
Tested By	Tom Yang		

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	0.15000	10.02	37.94	19.06	47.96	29.08	66.00	56.00	-18.04	-26.92
2	0.18152	10.03	33.56	17.15	43.59	27.18	64.42	54.42	-20.83	-27.24
3	0.20541	10.03	25.43	8.97	35.46	19.00	63.39	53.39	-27.93	-34.39
4	0.22761	10.03	30.33	17.26	40.36	27.29	62.54	52.54	-22.18	-25.25
5	0.27760	10.03	25.77	16.09	35.80	26.12	60.89	50.89	-25.09	-24.77
6	0.45571	10.04	25.33	20.92	35.37	30.96	56.77	46.77	-21.40	-15.81

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



4.4 Transmit Power Measurement

4.4.1 Limits of Transmit Power Measurement

Operation Band	EUT Category	Limit
		Max Average Power
U-NII-5 U-NII-6 U-NII-7 U-NII-8	Client Devices (controlled of an indoor AP)	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.

4.4.2 Test Setup

4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

Conducted Power (dBm)
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.

EIRP= Conducted Power (dBm) + Directional gain (antenna gain (dBi) + array gain (dB))

4.4.5 EUT Operating Condition

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

4.4.6 Test Result

Power Output:

802.11ax (HE160)

Chan.	Chan. Freq. (MHz)	Average Power (mW)	Average Power (dBm)	Max. Gain (dBi)	EIRP (mW)	EIRP (dBm)	EIRP Limit (dBm)	Pass / Fail
15	6025	17.539	12.44	4.76	52.481	17.2	24	Pass
47	6185	17.62	12.46	4.76	52.723	17.22	24	Pass
79	6345	18.155	12.59	4.76	54.325	17.35	24	Pass
111	6505	19.143	12.82	4.29	51.404	17.11	24	Pass
143	6665	17.579	12.45	4.61	50.816	17.06	24	Pass
175	6825	17.498	12.43	4.61	50.582	17.04	24	Pass
207	6985	19.275	12.85	4.09	49.431	16.94	24	Pass

Notes:

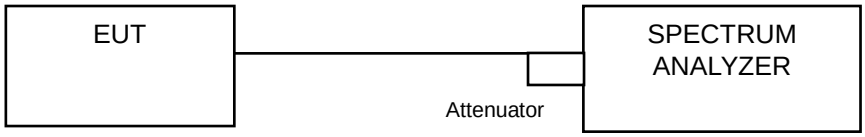
1.For U-NII-5, The antenna gain is 4.76 dBi
2.For U-NII-6, The antenna gain is 4.29 dBi
3.For U-NII-7, The antenna gain is 4.61 dBi
4.For U-NII-8, The antenna gain is 4.09 dBi

4.5 Emission Bandwidth Measurement

4.5.1 Limits of Emission Bandwidth Measurement

The fundamental bandwidth shall be less than 320MHz.

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

FOR 99% OCCUPIED BANDWIDTH

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean power of a given emission.

FOR 26dB BANDWIDTH

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

4.5.5 Test Results

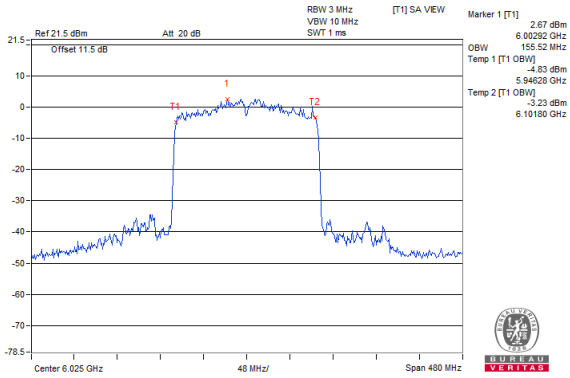
99% Occupied Bandwidth:

802.11ax (HE160)

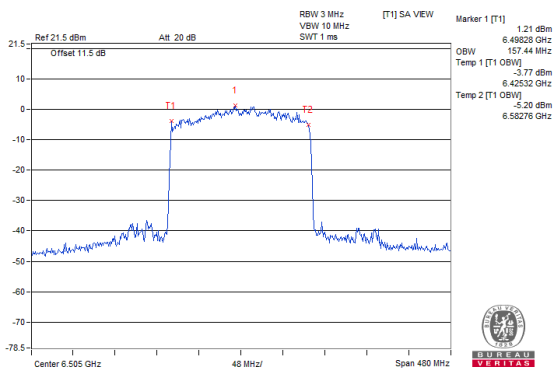
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
15	6025	155.52
47	6185	155.52
79	6345	154.56
111	6505	157.44
143	6665	155.52
175	6825	154.56
207	6985	154.56

Spectrum Plot of Max. Value

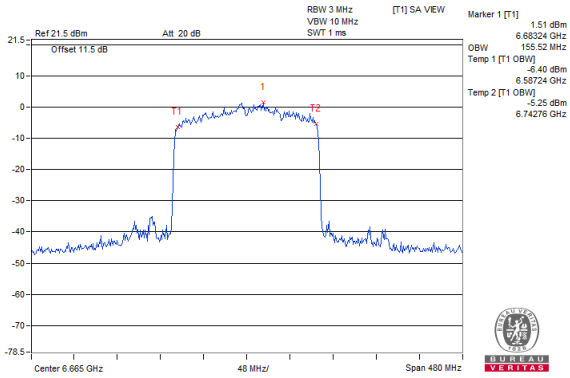
802.11ax (HE160) / CH15 (U-NII-5 Band)



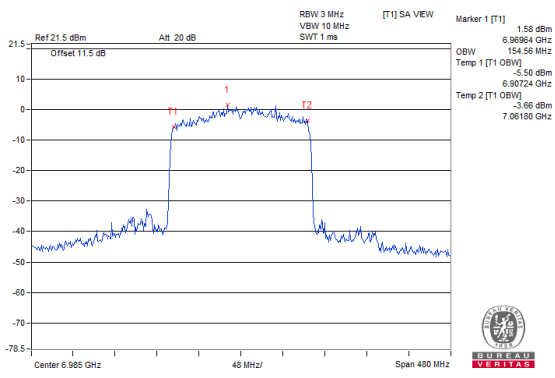
802.11ax (HE160) / CH111 (U-NII-6 Band)



802.11ax (HE160)_ / CH143 (U-NII-7 Band)



802.11ax (HE160) / CH207 (U-NII-8 Band)



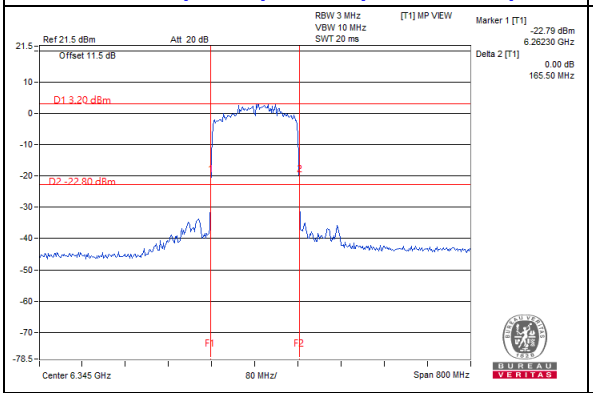
26dB Bandwidth:

802.11ax (HE160)

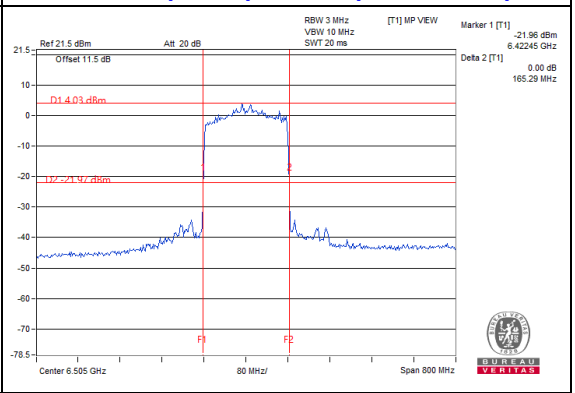
Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Limit (MHz)
15	6025	164.46	320
47	6185	164.12	320
79	6345	165.5	320
111	6505	165.29	320
143	6665	165.47	320
175	6825	165.27	320
207	6985	165.47	320

Spectrum Plot of Max. Value

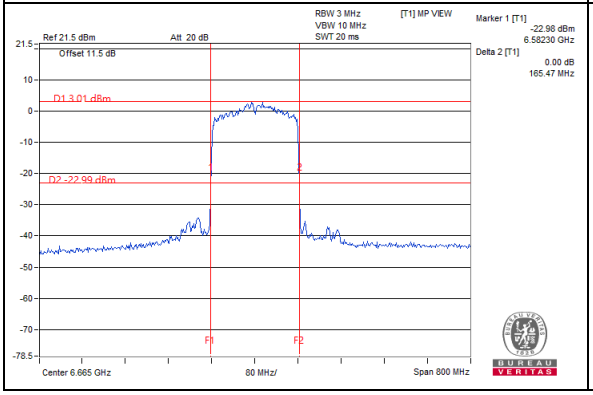
802.11ax (HE160) / CH79 (U-NII-5 Band)



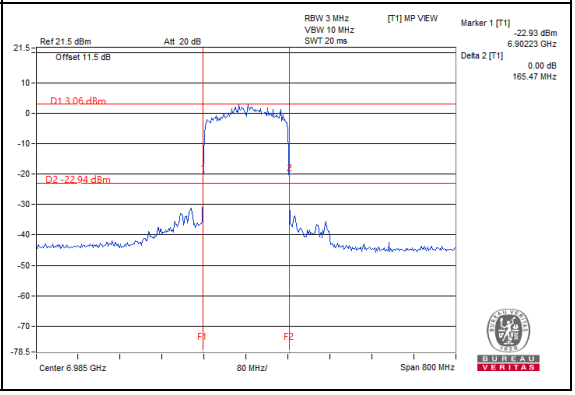
802.11ax (HE160) / CH111 (U-NII-6 Band)



802.11ax (HE160) / CH143 (U-NII-7 Band)



802.11ax (HE160) / CH207 (U-NII-8 Band)

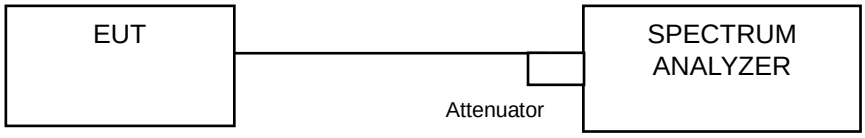


4.6 Peak Power Spectral Density Measurement

4.6.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category	Limit
		Peak Power Density (EIRP)
U-NII-5 U-NII-6 U-NII-7 U-NII-8	Client Devices (controlled of an indoor AP)	-1 dBm/MHz

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

Using method SA-2

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.
b. Set RBW = 1 MHz, Set VBW ≥ 3 MHz
c. Sweep time = auto, trigger set to “free run”.
d. Detector = RMS
e. Trace average at least 100 traces in power averaging mode.
f. Record the max value and add 10 log (1/duty cycle)
g. EIRP PSD = Conducted PSD (dBm) + Directional gain (antenna gain (dBi) + array gain (dB))

4.6.5 EUT Operating Condition

Same as Item 4.3.6.

4.6.6 Test Results

802.11ax (HE160)

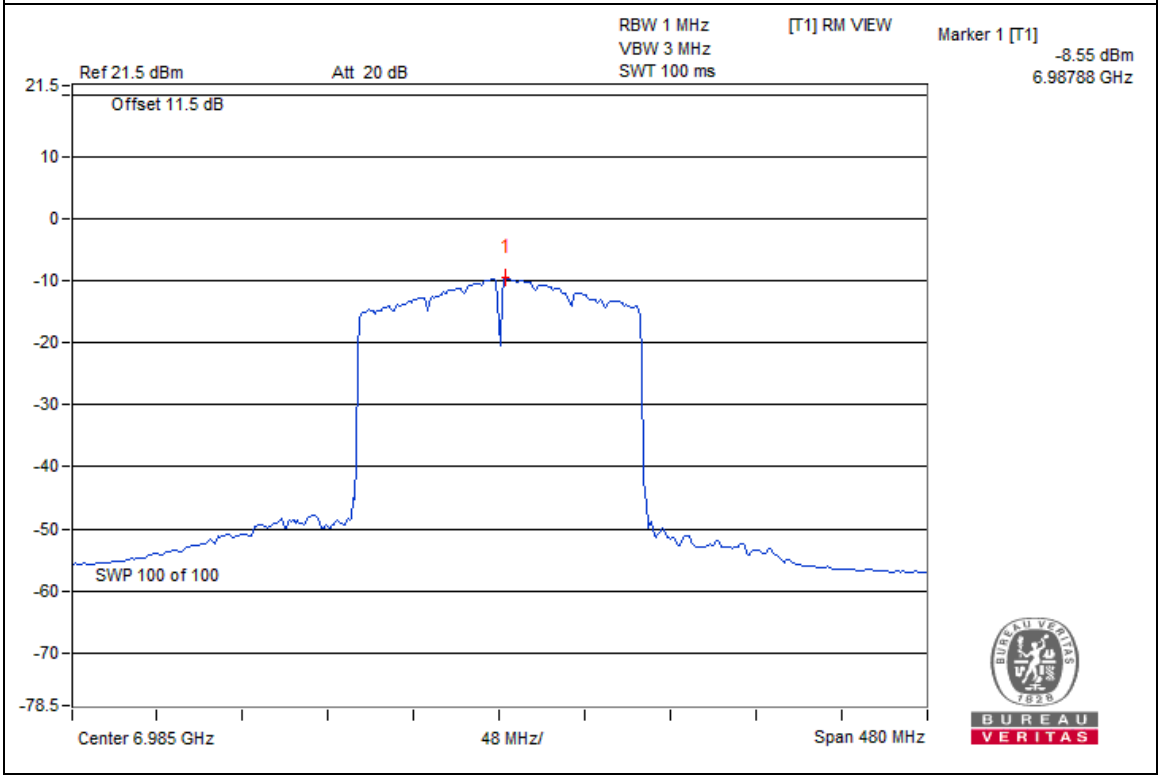
Chan.	Chan. Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Pass / Fail
15	6025	-9.1	0.95	-8.15	4.76	-3.39	-1	Pass
47	6185	-9.09	0.95	-8.14	4.76	-3.38	-1	Pass
79	6345	-8.96	0.95	-8.01	4.76	-3.25	-1	Pass
111	6505	-8.71	0.95	-7.76	4.29	-3.47	-1	Pass
143	6665	-9.06	0.95	-8.11	4.61	-3.5	-1	Pass
175	6825	-9.08	0.95	-8.13	4.61	-3.52	-1	Pass
207	6985	-8.55	0.95	-7.60	4.09	-3.51	-1	Pass

Notes:

1. For U-NII-5, The antenna gain is 4.76 dBi
2. For U-NII-6, The antenna gain is 4.29 dBi
3. For U-NII-7, The antenna gain is 4.61 dBi
4. For U-NII-8, The antenna gain is 4.09 dBi

Spectrum Plot of Worst Value

802.11ax (HE160) / CH207

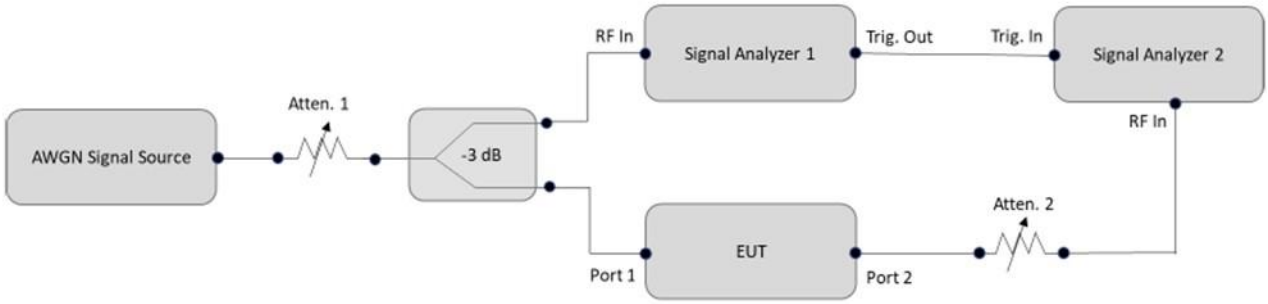


4.7 Contention Based Protocol Measurement

4.7.1 Limits of Contention Based Protocol Measurement

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.

4.7.2 Test Setup



4.7.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Spectrum Analyzer KEYSIGHT	N9030B	MY57141948	2022/04/26	2023/04/25
MXG X-Series RF Vector Signal Generator Keysight	N5182B	MY53052647	2021/11/5	2022/11/4
Combiner / Splitter (Model:ZN2PD-9G) Mini-Circuits	ZN2PD-9G	ZN2PD-9G	2021/6/11	2022/6/10
Signal Analyzer R&S	FSW8	101497	2021/10/25	2022/10/24
Spectrum Analyzer R&S	FSV40	101516	2022/3/7	2023/3/6
MXG X-Series RF Vector Signal Generator Keysight	N5182B	MY53052647	2021/11/5	2022/11/4
Frequency Extender KEYSIGHT	N5182BX07	MY59360198	2021/10/22	2022/10/21
Combiner Mini-Circuits	ZFRSC-123-S+	F698501347_01	2022/1/26	2023/1/25

NOTE:
1. The test was performed in Femtocell room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. Tested Date: 2022/5/23

4.7.4 Test Procedure

a. 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.
b. 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).

c. Determine number of times detection threshold test as following table,

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

d. 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.
e. 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.
f. Transmit the AWGN signal (RF ON) and verify its characteristics on the signal analyzer 1.
g. 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.
h. (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.
i. 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.

4.7.5 EUT Operating Condition

Set the EUT to transmit with a constant duty cycle and relative operating parameters which including power level, operating frequency,modulation and bandwidth.

4.7.6 Test Results

For U-NII-5 band

Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	47	6185	6110	-82	-14.46	0	-67.54	-62	OFF
					-82.05	-14.46	0	-67.59	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6185	-82	-14.46	0	-67.54	-62	OFF
					-82.03	-14.46	0	-67.57	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6260	-82	-14.46	0	-67.54	-62	OFF
					-82.04	-14.46	0	-67.58	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON

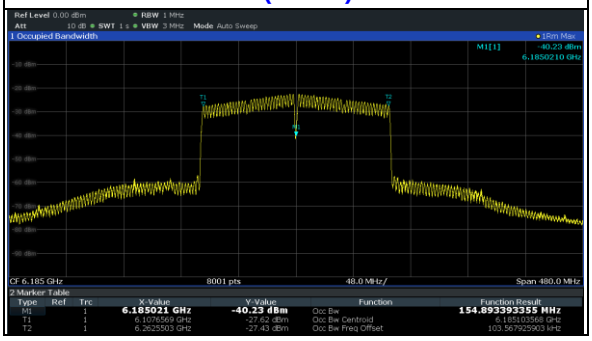
Note:

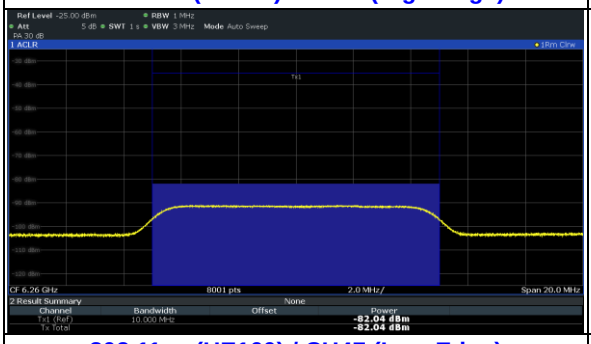
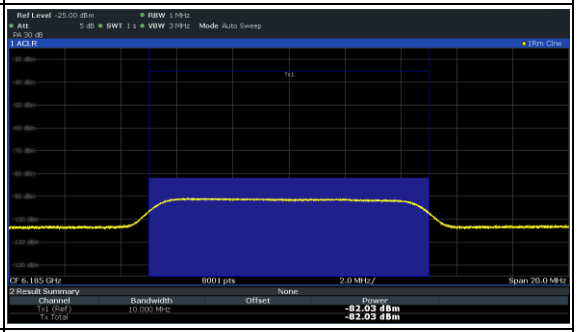
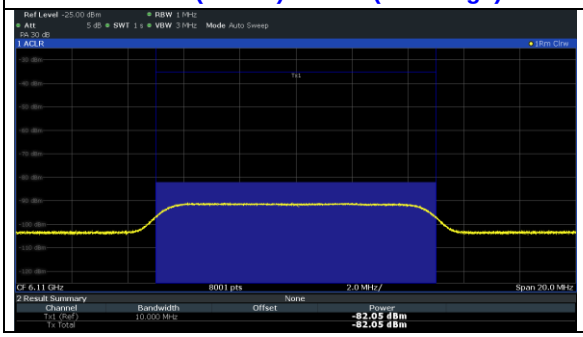
1. Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

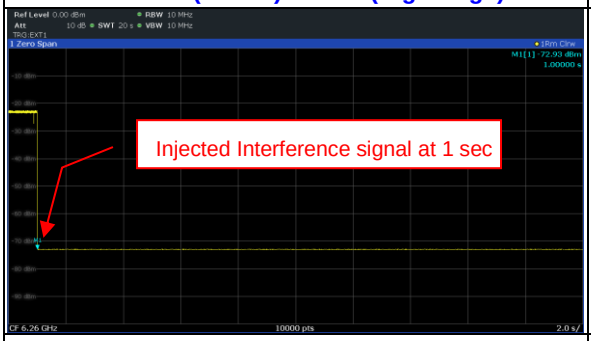
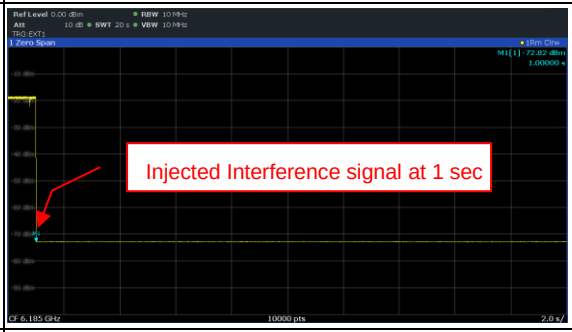
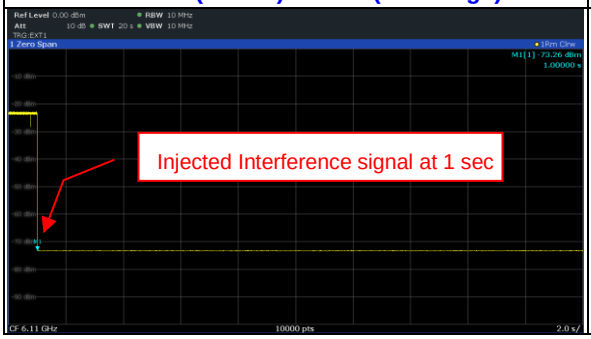
Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6110	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6185	v	v	v	v	v	v	v	v	v	v	100%	90%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

Plots of EUT transmissioin conditions

802.11ax (HE160) / CH47



Plots of Incumbent signal (AWGN) level	
802.11ax (HE160) / CH47 (High Edge)	**802.11ax (HE160) / CH47 (Middle)**
	
802.11ax (HE160) / CH47 (Low Edge)	
	

Plots of EUT ceased transmission in the time domain	
802.11ax (HE160) / CH47 (High Edge)	**802.11ax (HE160) / CH47 (Middle)**
	
802.11ax (HE160) / CH47 (Low Edge)	
	

For U-NII-6 band

Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	111	6505	6430	-82	-14.46	0	-67.54	-62	OFF
					-82.09	-14.46	0	-67.63	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6505	-82	-14.46	0	-67.54	-62	OFF
					-82.12	-14.46	0	-67.66	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6580	-82	-14.46	0	-67.54	-62	OFF
					-82.06	-14.46	0	-67.6	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON

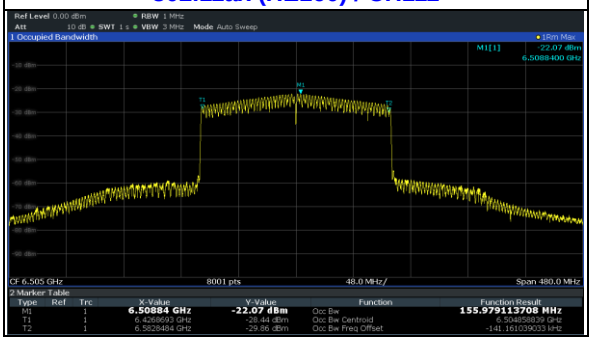
Note:

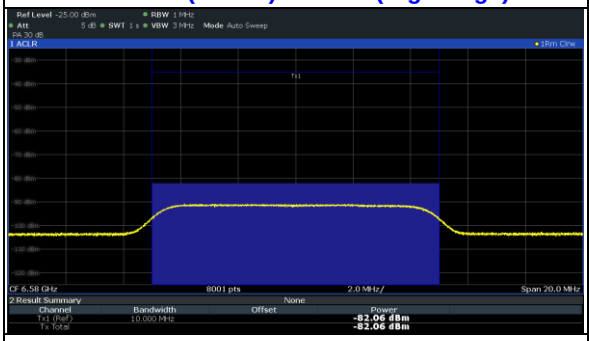
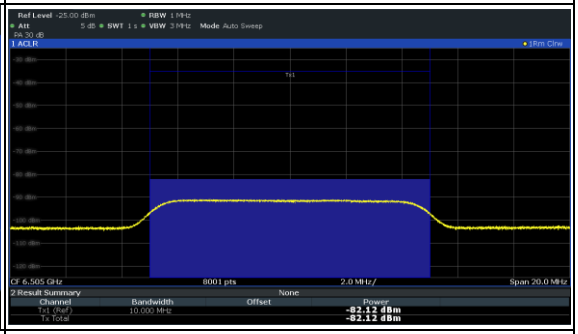
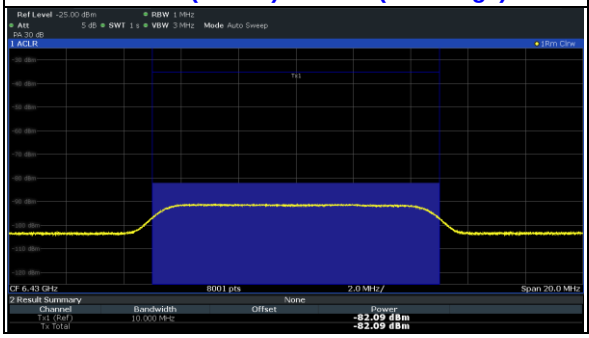
1. Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

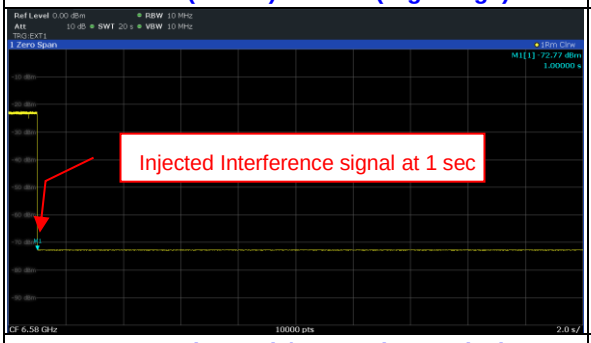
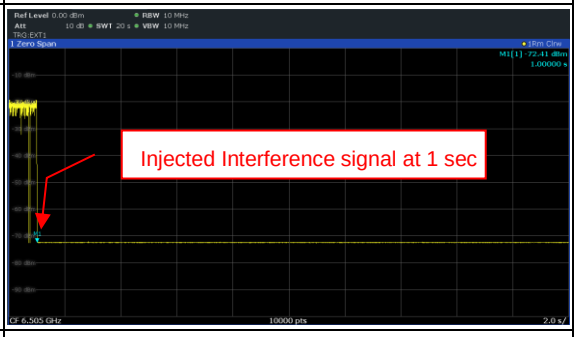
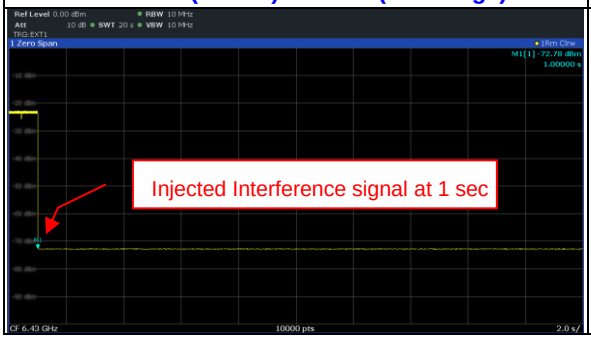
Contention Based Protocol Detection Probability														
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6430	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6505	v	v	v	v	v	v	v	v	v	v	100%	90%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

Plots of EUT transmissioin conditions

802.11ax (HE160) / CH111



Plots of Incumbent signal (AWGN) level	
802.11ax (HE160) / CH111 (High Edge)	**802.11ax (HE160) / CH111 (Middle)**
	
802.11ax (HE160) / CH111 (Low Edge)	
	

Plots of EUT ceased transmission in the time domain	
802.11ax (HE160) / CH111 (High Edge)	**802.11ax (HE160) / CH111 (Middle)**
	
802.11ax (HE160) / CH111 (Low Edge)	
	

For U-NII-7 band

Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	143	6665	6590	-82	-14.46	0	-67.54	-62	OFF
					-82.09	-14.46	0	-67.63	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6665	-82	-14.46	0	-67.54	-62	OFF
					-82.09	-14.46	0	-67.63	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6740	-82	-14.46	0	-67.54	-62	OFF
					-82.09	-14.46	0	-67.63	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON

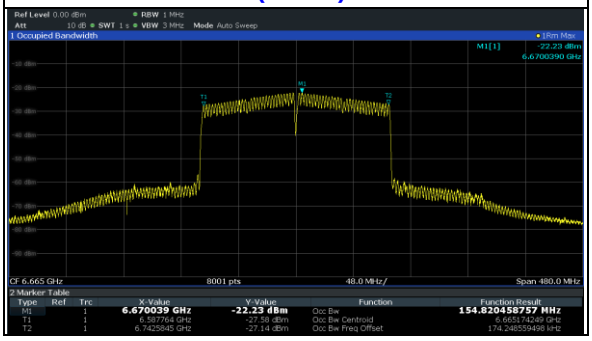
Note:

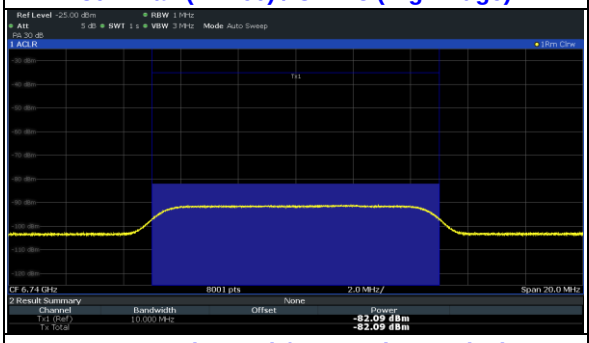
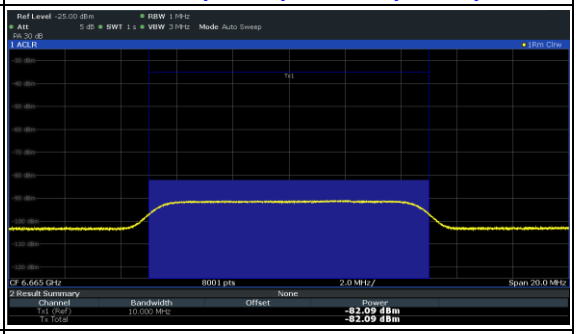
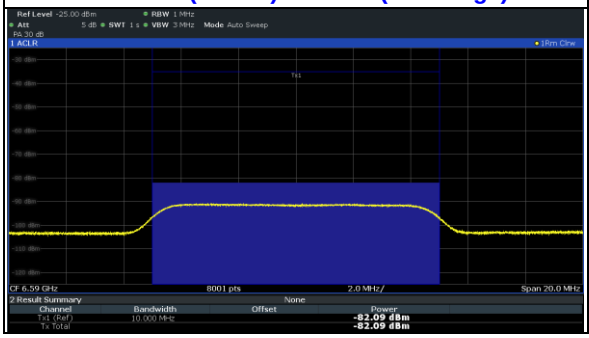
1. Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

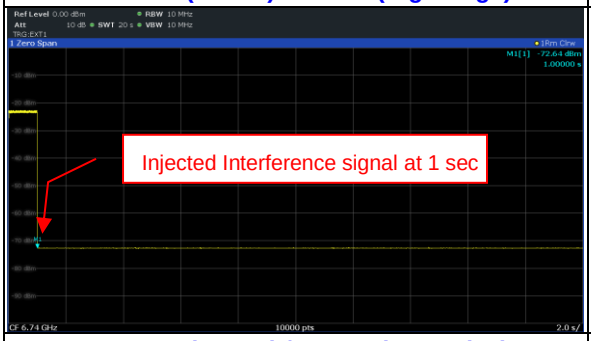
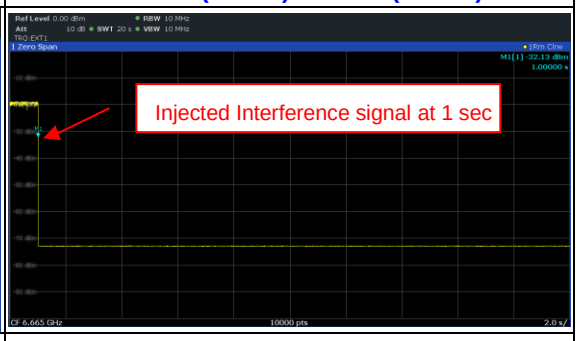
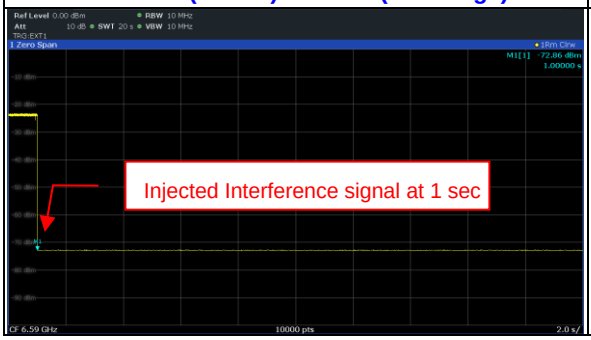
Contention Based Protocol Detection Probability														
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6590	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6665	v	v	v	v	v	v	v	v	v	v	100%	90%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

Plots of EUT transmissioin conditions

802.11ax (HE160) / CH143



Plots of Incumbent signal (AWGN) level	
802.11ax (HE160) / CH143 (High Edge)	**802.11ax (HE160) / CH143 (Middle)**
	
802.11ax (HE160) / CH143 (Low Edge)	
	

Plots of EUT ceased transmission in the time domain	
802.11ax (HE160) / CH143 (High Edge)	**802.11ax (HE160) / CH143 (Middle)**
	
802.11ax (HE160) / CH143 (Low Edge)	
	

For U-NII-8 band

Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	207	6985	6910	-82	-14.46	0	-67.54	-62	OFF
					-82.06	-14.46	0	-67.6	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				6985	-82	-14.46	0	-67.54	-62	OFF
					-82.01	-14.46	0	-67.55	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON
				7060	-82	-14.46	0	-67.54	-62	OFF
					-82.05	-14.46	0	-67.59	-62	Minimal
					-83	-14.46	0	-68.54	-62	ON

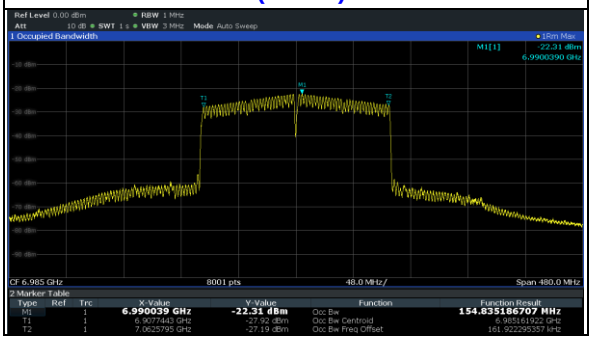
Note:

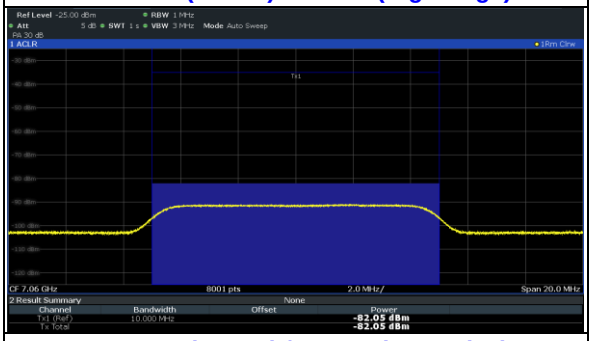
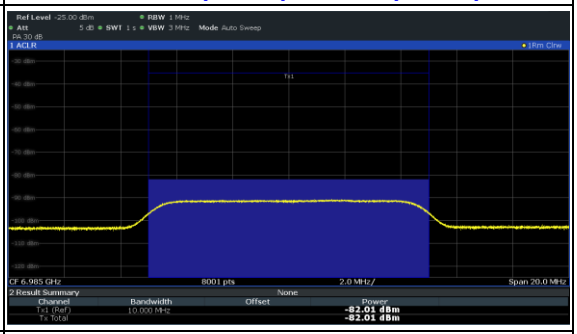
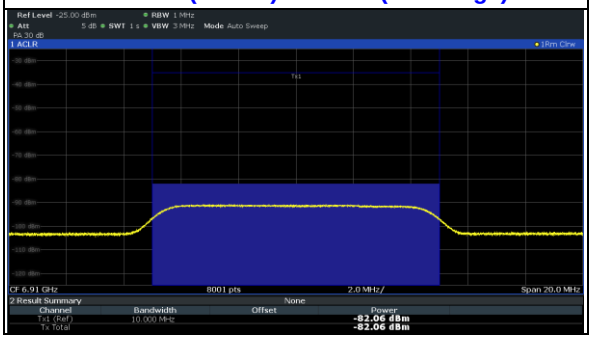
1. Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

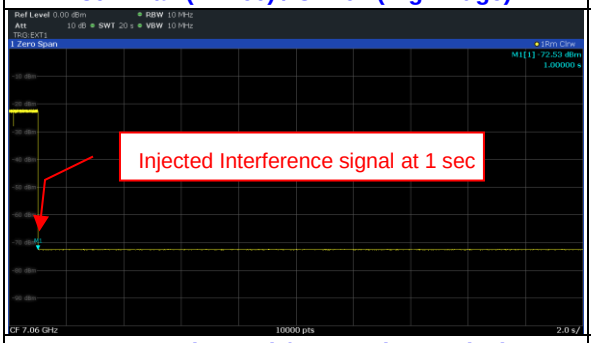
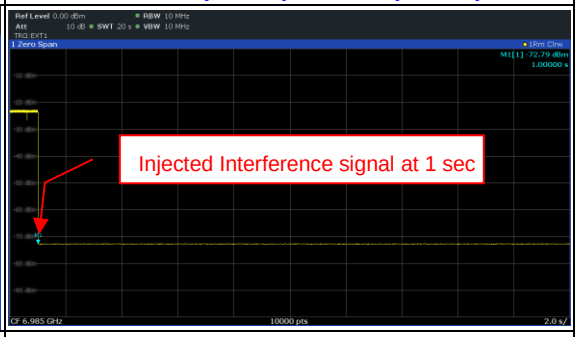
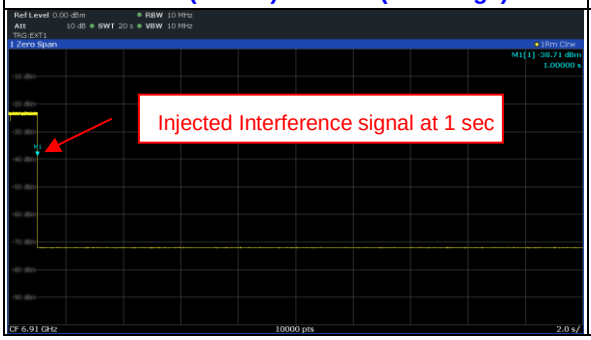
Contention Based Protocol Detection Probability														
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6910	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6985	v	v	v	v	v	v	v	v	v	v	100%	90%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

Plots of EUT transmissioin conditions

802.11ax (HE160) / CH207



Plots of Incumbent signal (AWGN) level	
802.11ax (HE160) / CH207 (High Edge)	**802.11ax (HE160) / CH207 (Middle)**
	
802.11ax (HE160) / CH207 (Low Edge)	
	

Plots of EUT ceased transmission in the time domain	
802.11ax (HE160) / CH207 (High Edge)	**802.11ax (HE160) / CH207 (Middle)**
	
802.11ax (HE160) / CH207 (Low Edge)	
	

4.8 Operational Restrictions for 6GHz U-NII Devices

4.8.1 Limits of Operational Restrictions for 6 GHz U-NII Devices

In the 5.925-7.125 GHz band, client devices, except fixed client devices, must operate under the control of a standard power access point, indoor access point or subordinate devices; Subordinate devices must operate under the control of an indoor access point.

4.8.2 Test Setup

N/A

4.8.3 Test Instruments

N/A

4.8.4 Test Procedure

N/A.

4.8.5 Test Results

Device is an indoor client device under the control of a low power indoor access point. Please refer to the declaration letter exhibit supplied within this application.

5 Pictures of Test Arrangements

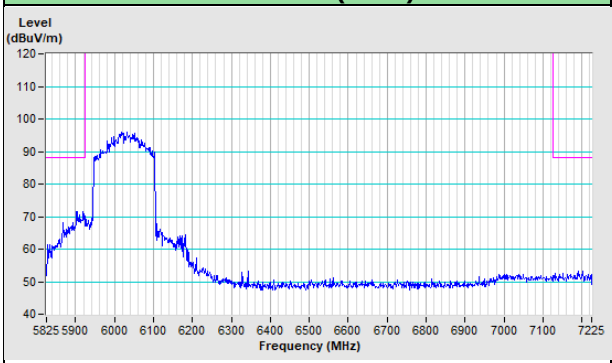
Please refer to the attached file (Test Setup Photo).

Annex A - Band-Edge Measurement

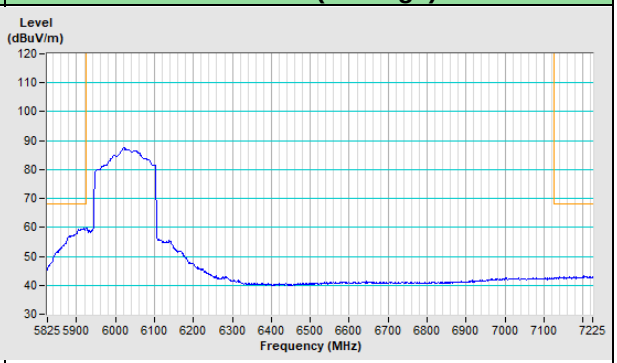
For Dipole Antenna

802.11ax (HE160) Channel 15

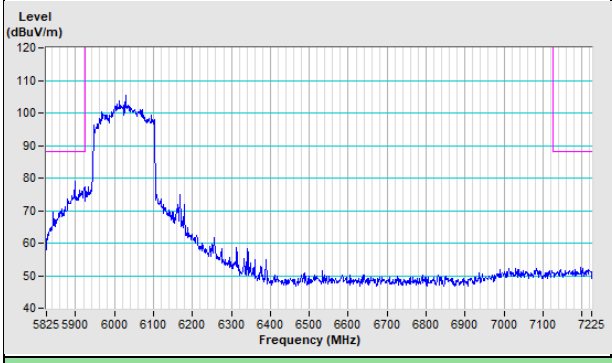
Horizontal (Peak)



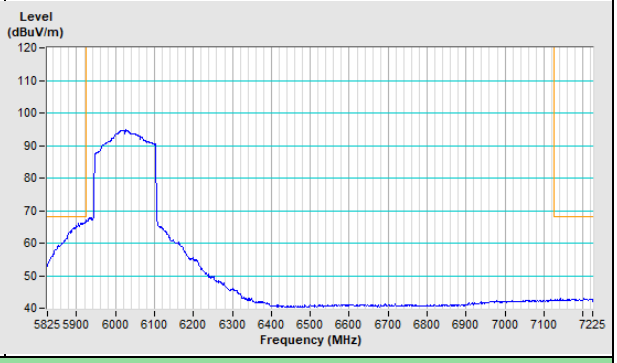
Horizontal (Average)



Vertical (Peak)

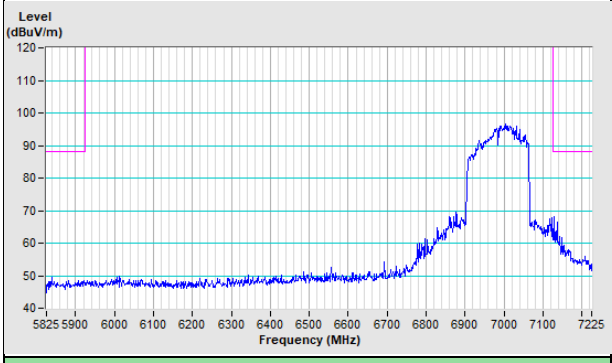


Vertical (Average)

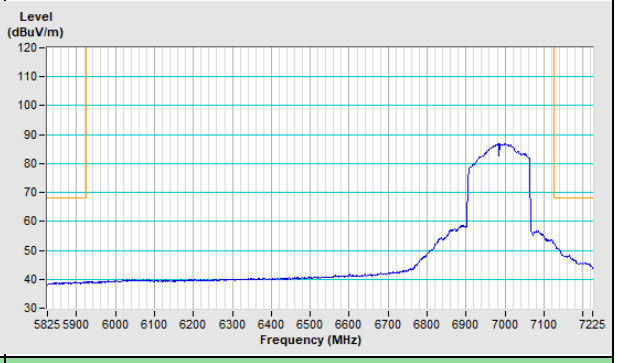


802.11ax (HE160) Channel 207

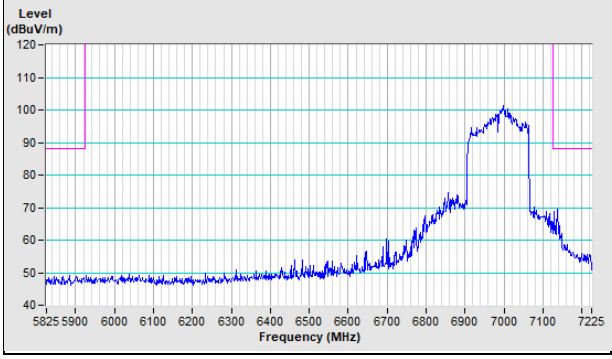
Horizontal (Peak)



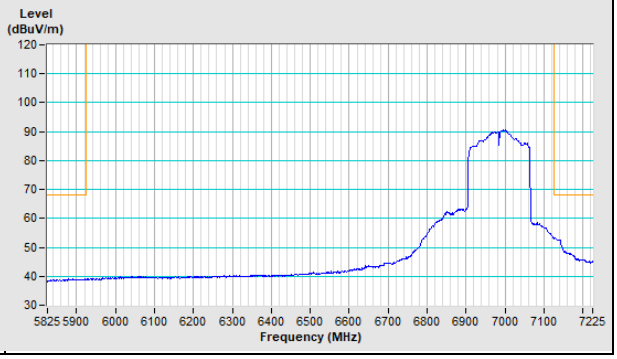
Horizontal (Average)



Vertical (Peak)



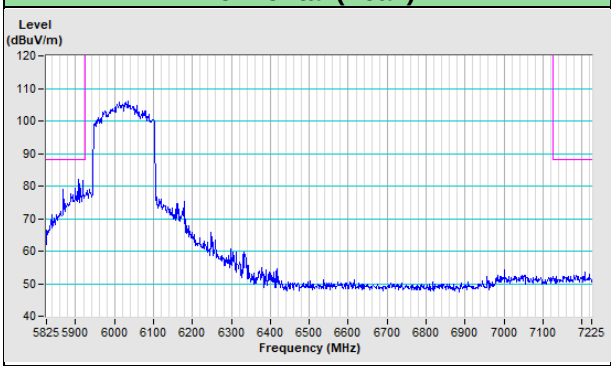
Vertical (Average)



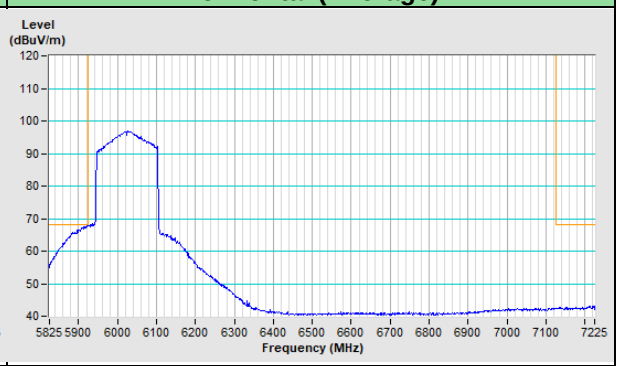
For PIFA Antenna

802.11ax (HE160) Channel 15

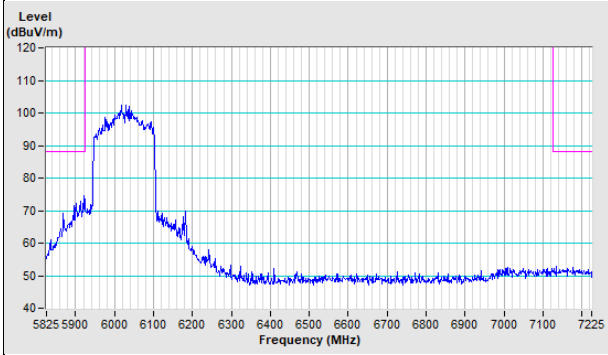
Horizontal (Peak)



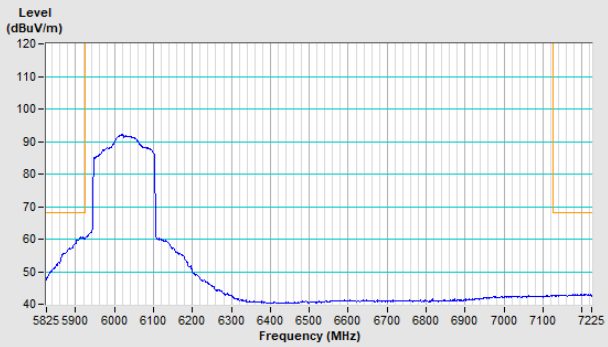
Horizontal (Average)



Vertical (Peak)

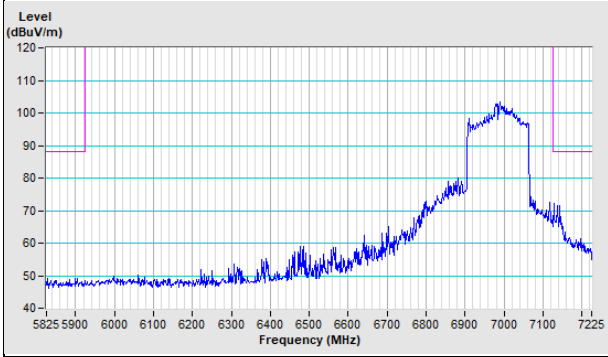


Vertical (Average)

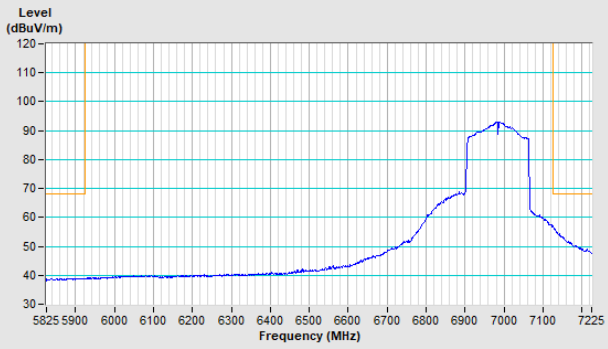


802.11ax (HE160) Channel 207

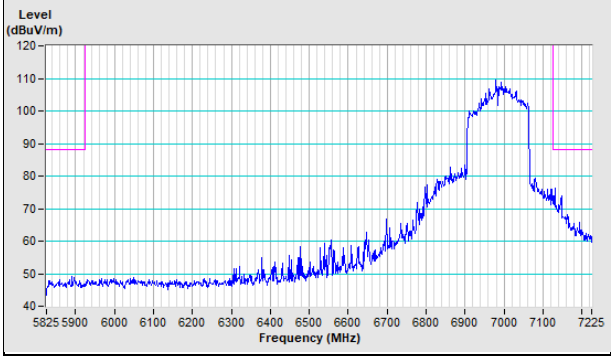
Horizontal (Peak)



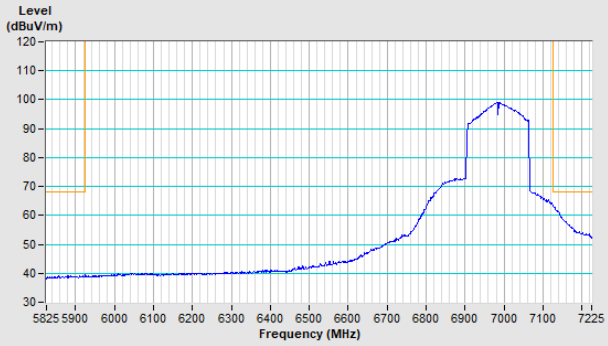
Horizontal (Average)



Vertical (Peak)



Vertical (Average)



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

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