

FCC Test Report

Report No.: RFBARR-WTW-P21060023H

FCC ID: RAS-MT7922A12L

Test Model: MT7922A12L

Received Date: Apr. 21, 2022

Test Date: May 12, 2022 ~ May 25, 2022

Issued Date: Jun. 01, 2022

Applicant: MediaTek Inc.

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 788550 / TW0003



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Table of Contents

Release Control Record	4
1 Certificate of Conformity.....	5
2 Summary of Test Results	6
2.1 Measurement Uncertainty	6
2.2 Modification Record	6
3 General Information.....	7
3.1 General Description of EUT	7
3.2 Antenna Description of EUT.....	8
3.3 Description of Test Modes	9
3.3.1 Test Mode Applicability and Tested Channel Detail	10
3.4 Duty Cycle of Test Signal	12
3.5 Description of Support Units	12
3.5.1 Configuration of System under Test	13
3.6 General Description of Applied Standard	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement.....	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedure	17
4.1.4 Test Setup.....	18
4.1.5 EUT Operating Condition	19
4.1.6 Test Results	20
4.2 In-Band Emission (Mask) Measurement	29
4.2.1 Limits of In-Band Emission (Mask) Measurement.....	29
4.2.2 Test Setup.....	29
4.2.3 Test Instruments	29
4.2.4 Test Procedure	30
4.2.5 EUT Operating Condition	30
4.2.6 Test Results	31
4.3 Conducted Emission Measurement	32
4.3.1 Limits of Conducted Emission Measurement.....	32
4.3.2 Test Instruments	32
4.3.3 Test Procedure	33
4.3.4 Test Setup.....	33
4.3.5 EUT Operating Condition	33
4.3.6 Test Results	34
4.4 Transmit Power Measurement	36
4.4.1 Limits of Transmit Power Measurement.....	36
4.4.2 Test Setup.....	36
4.4.3 Test Instruments	36
4.4.4 Test Procedure	36
4.4.5 EUT Operating Condition	36
4.4.6 Test Result.....	37
4.5 Emission Bandwidth Measurement.....	38
4.5.1 Test Setup.....	38
4.5.2 Test Instruments	38
4.5.3 Test Procedure	38
4.5.4 Test Results	39
4.6 Peak Power Spectral Density Measurement	41
4.6.1 Limits of Peak Power Spectral Density Measurement	41
4.6.2 Test Setup.....	41
4.6.3 Test Instruments	41
4.6.4 Test Procedure	41

4.6.5	EUT Operating Condition	41
4.6.6	Test Results	42
4.7	Contention Based Protocol Measurement	43
4.7.1	Limits of Contention Based Protocol Measurement	43
4.7.2	Test Setup	43
4.7.3	Test Instruments	43
4.7.4	Test Procedure	44
4.7.5	EUT Operating Condition	44
4.7.6	Test Results	45
4.8	Frequency Stability Measurement	53
4.8.1	Limits of Frequency Stability Measurement	53
4.8.2	Test Setup	53
4.8.3	Test Instruments	53
4.8.4	Test Procedure	53
4.8.5	EUT Operating Condition	53
4.8.6	Test Results	54
4.9	Operational Restrictions for 6 GHz U-NII Devices	55
4.9.1	Limits of Operational Restrictions for 6 GHz U-NII Devices	55
4.9.2	Test Setup	55
4.9.3	Test Instruments	55
4.9.4	Test Procedure	55
4.9.5	Test Results	55
5	Pictures of Test Arrangements	56
	Annex A - Band-Edge Measurement	57
	Appendix A– Information of the Testing Laboratories	58

Release Control Record

Issue No.	Description	Date Issued
RFBARR-WTW-P21060023H	Original release.	Jun. 01, 2022

1 Certificate of Conformity

Product: 2TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card

Brand: MediaTek

Test Model: MT7922A12L

Sample Status: Engineering sample

Applicant: MediaTek Inc.

Test Date: May 12, 2022 ~ May 25, 2022

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 RF characteristics under the conditions specified in this report.

Prepared by : Vera Huang, **Date:** Jun. 01, 2022
Vera Huang / Specialist

Approved by : Jeremy Lin, **Date:** Jun. 01, 2022
Jeremy Lin / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(9)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -16.86dB at 2.78531MHz.
15.407(b)(6)(9)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -2.6dB at 498.51MHz.
15.407(b)(7)	In-Band Emission (Mask)	Pass	Meet the requirement of limit.
15.407(a)(6)	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)(6)	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)(5)	Operational restrictions for 6 GHz U-NII devices	Pass	Declaration by applicant
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF) not a standard connector.

N/A: Not applicable

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) ($\pm$)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.79 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 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	MT7922A12L
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	1024QAM
Modulation Technology	OFDMA
Transfer Rate	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	802.11ax (HE160): 7
Output Power	5.955 ~ 6.415GHz: 18.24 mW (EIRP: 17.37 dBm / 54.576 mW) 6.435 ~ 6.525GHz: 17.06 mW (EIRP: 16.61 dBm / 45.814 mW) 6.525 ~ 6.855GHz: 17.62 mW (EIRP: 17.07 dBm / 50.933 mW) 6.875 ~ 7.115GHz: 17.10 mW (EIRP: 16.42 dBm / 43.853 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-P21060023F) 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.

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

2. There are Bluetooth and WLAN (2.4GHz & 5GHz & 5.9GHz & 6GHz) technology used for the EUT.
3. Simultaneously transmission condition.

Condition	Technology	
1	WLAN (5GHz)	Bluetooth
2	WLAN (6GHz)	Bluetooth

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

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

3.2 Antenna Description of EUT

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

Antenna 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 5.15~5.85	PIFA	i-pex(MHF)	200
	Chain1	PSA	RFMTA340718EMLB302	3.18 4.92	2.4~2.4835 5.15~5.85	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 5.15~5.85 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 5.15~5.85 5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	PIFA	i-pex(MHF)	200
3	Chain0	MSI	WA-P-LE-02-045	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	-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
4	Chain0	PSA	RFPCA460632IMMB701	-13.2 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX	320
	Chain1	PSA	RFPCA460632IMMB701	-13.2 -13.67 -13.67 -13.09	5.925~6.425 6.425~6.525 6.525~6.875 6.875~7.125	Dipole	IPEX	320
5	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	300
	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	300

Note: Max. gain was selected for the final test.

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

3.3 Description of Test Modes

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

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)

1 channel is provided for 802.11ax (HE160):

Channel	Frequency
*111	6505 MHz

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

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):

1 channel is provided for 802.11ax (HE160):

Channel	Frequency
207	6985 MHz

Note: * mean this's straddle channel.

3.3.1 Test Mode Applicability and Tested Channel Detail

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

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

Note: 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	15 to 79	175	OFDMA	BPSK	MCS0
	6435-6525	111				
	6525-6855	143 to 175				
	6875-7115	207				

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	15 to 79	175	OFDMA	BPSK	MCS0
	6435-6525	111				
	6525-6855	143 to 175				
	6875-7115	207				

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
	6875-7025	207	207	OFDMA	BPSK	MCS0

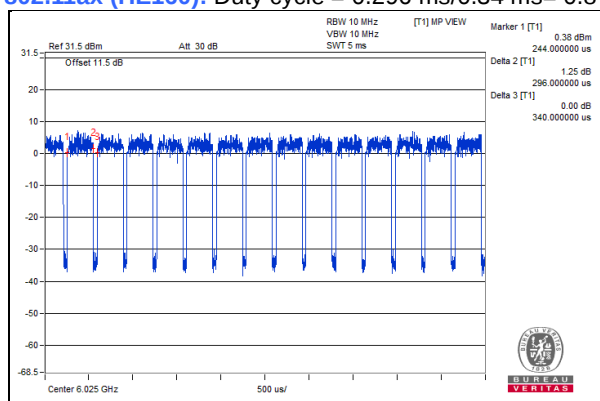
Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE $\geq$ 1G	23deg. C, 68%RH	120Vac, 60Hz	Adair Peng
RE<1G	23deg. C, 68%RH	120Vac, 60Hz	Adair Peng
PLC	25deg. C, 75%RH	120Vac, 60Hz	Rex Wang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Ivan Tseng/Chun Wu

3.4 Duty Cycle of Test Signal

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

802.11ax (HE160): Duty cycle = 0.296 ms/0.34 ms= 0.871, Duty factor = $10 * \log(1/ \text{Duty cycle}) = 0.6 \text{ dB}$



3.5 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.	Notebook	Dell	E6230	255KZW1	NA	Provided by Lab
B.	Test Tool	MediaTek	MTK1849	NA	NA	Supplied by client
C.	Adapter	DELL	LA65NS2-01	NA	NA	Provided by Lab

Note:

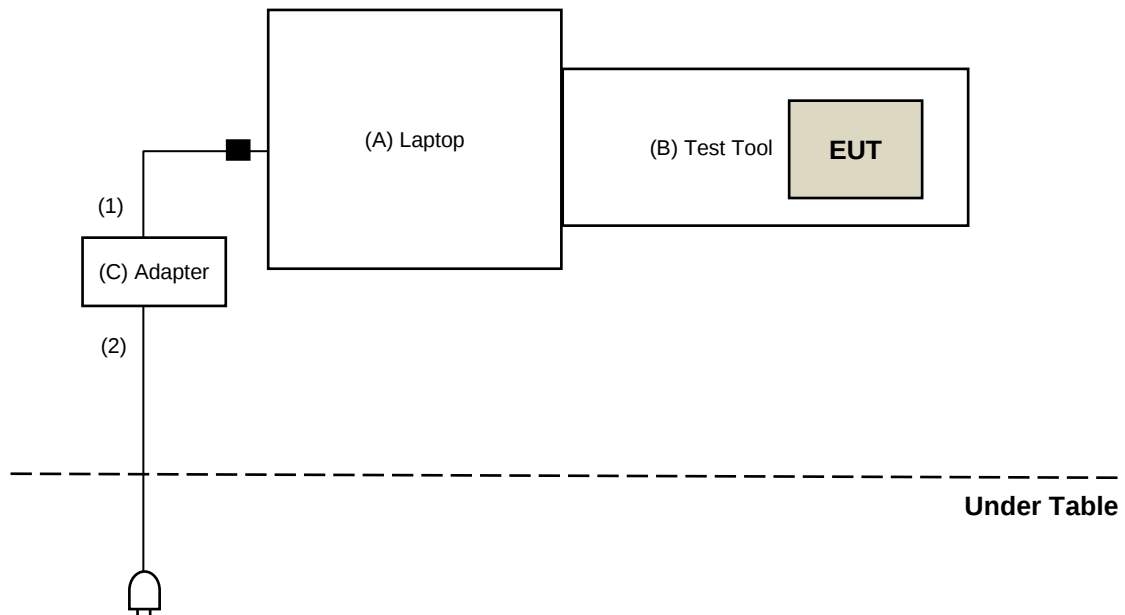
1. All power cords of the above support units are non-shielded (1.8m).

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

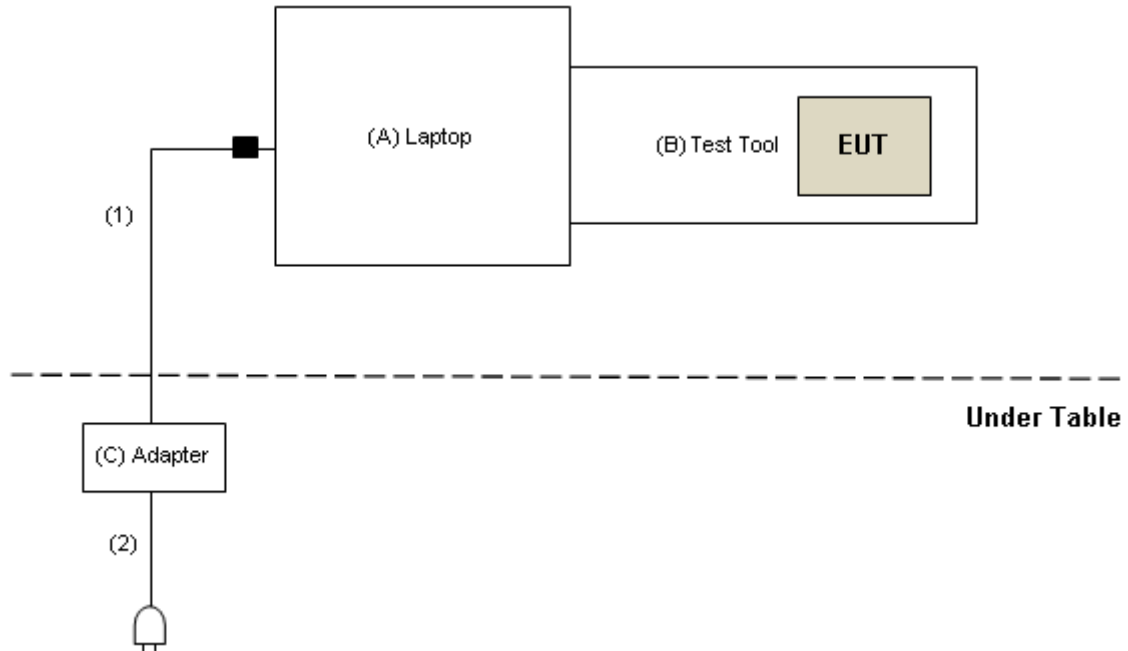
Note: The core(s) is(are) originally attached to the cable(s).

3.5.1 Configuration of System under Test

For AC Power Conducted Emission test:



For Radiated Emissions test:



3.6 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:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver KEYSIGHT	N9038A	MY55420137	Apr. 27, 2022	Apr. 26, 2023
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 16, 2022	Feb. 15, 2023
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9- (250795/4)	Jan. 15, 2022	Jan. 14, 2023
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower & Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 9.

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

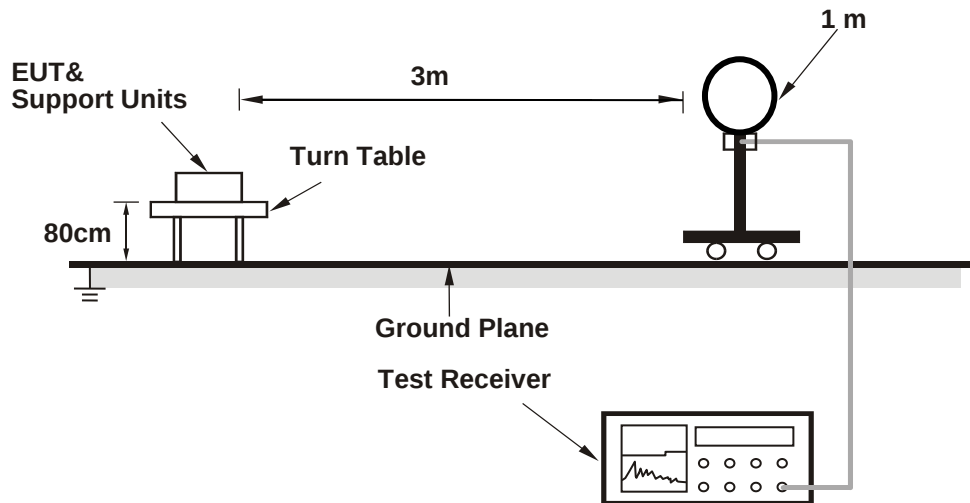
- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving 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:

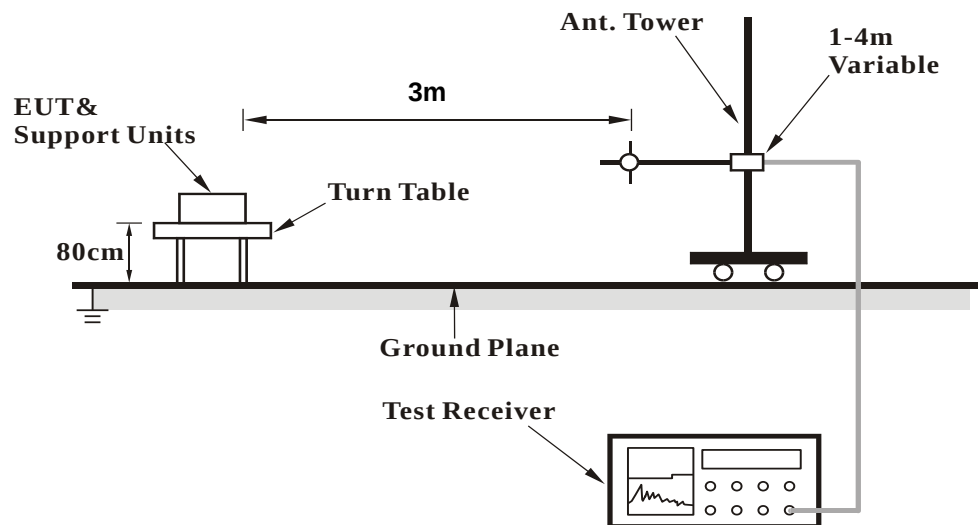
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The detection is peak and the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle $< 98\%$) or 10Hz (Duty cycle $\geq 98\%$) 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

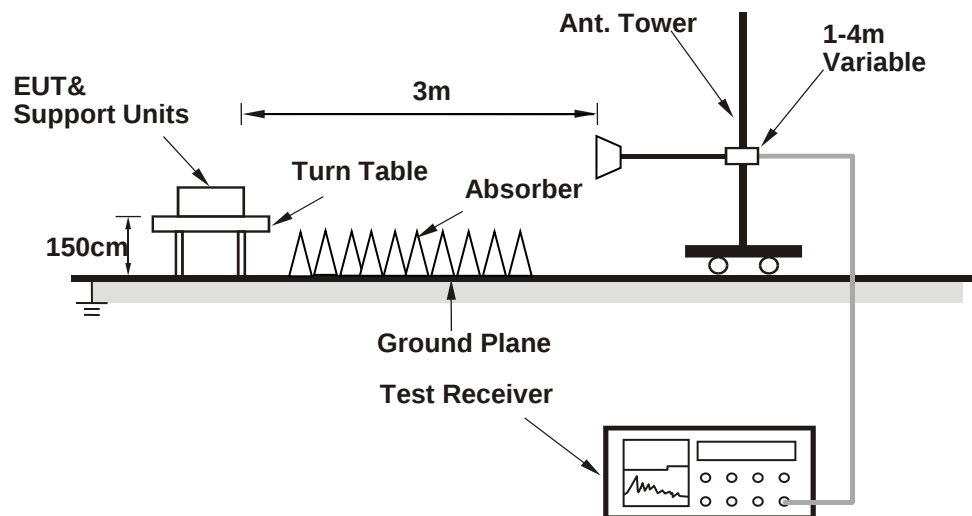
For Radiated emission below 30MHz



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

- Connected the EUT with the Laptop which is placed on the testing table.
- Controlling software (MT7915 QA 0.0..15) has been activated to set the EUT under transmission condition continuously.

4.1.6 Test Results

Above 1GHz Data:

RF Mode	TX 802.11ax (HE160)	Channel	CH 15 : 6025 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5925.00	66.1 PK	88.2	-22.1	2.28 H	36	59.0	7.1
2	#5925.00	51.9 AV	68.2	-16.3	2.28 H	36	44.8	7.1
3	*6025.00	107.9 PK			2.28 H	36	66.5	41.4
4	*6025.00	95.1 AV			2.28 H	36	53.7	41.4
5	12050.00	59.2 PK	74.0	-14.8	1.99 H	35	42.4	16.8
6	12050.00	46.0 AV	54.0	-8.0	1.99 H	35	29.2	16.8
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5925.00	67.1 PK	88.2	-21.1	1.13 V	66	60.0	7.1
2	#5925.00	50.7 AV	68.2	-17.5	1.13 V	66	43.6	7.1
3	*6025.00	104.9 PK			1.13 V	66	63.5	41.4
4	*6025.00	92.4 AV			1.13 V	66	51.0	41.4
5	12050.00	58.4 PK	74.0	-15.6	1.70 V	130	41.6	16.8
6	12050.00	45.7 AV	54.0	-8.3	1.70 V	130	28.9	16.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

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	107.4 PK			2.24 H	36	65.4	42.0
2	*6185.00	95.3 AV			2.24 H	36	53.3	42.0
3	12370.00	58.3 PK	74.0	-15.7	2.01 H	33	41.7	16.6
4	12370.00	45.0 AV	54.0	-9.0	2.01 H	33	28.4	16.6
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	104.5 PK			1.17 V	65	62.5	42.0
2	*6185.00	92.6 AV			1.17 V	65	50.6	42.0
3	12370.00	57.9 PK	74.0	-16.1	1.57 V	116	41.3	16.6
4	12370.00	44.7 AV	54.0	-9.3	1.57 V	116	28.1	16.6

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.

RF Mode	TX 802.11ax (HE160)	Channel	CH 79 : 6345 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

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	109.1 PK			2.40 H	38	66.8	42.3
2	*6345.00	97.1 AV			2.40 H	38	54.8	42.3
3	12690.00	60.1 PK	74.0	-13.9	2.06 H	39	43.0	17.1
4	12690.00	46.0 AV	54.0	-8.0	2.06 H	39	28.9	17.1
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	*6345.00	106.1 PK			1.19 V	68	63.8	42.3
2	*6345.00	94.3 AV			1.19 V	68	52.0	42.3
3	12690.00	59.8 PK	74.0	-14.2	1.77 V	127	42.7	17.1
4	12690.00	45.7 AV	54.0	-8.3	1.77 V	127	28.6	17.1

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.

RF Mode	TX 802.11ax (HE160)	Channel	CH 111 : 6505 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

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	108.5 PK			2.38 H	38	65.2	43.3
2	*6505.00	96.6 AV			2.38 H	38	53.3	43.3
3	#13010.00	59.5 PK	88.2	-28.7	2.12 H	45	41.4	18.1
4	#13010.00	45.7 AV	68.2	-22.5	2.12 H	45	27.6	18.1
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	*6505.00	105.6 PK			1.23 V	69	62.3	43.3
2	*6505.00	93.9 AV			1.23 V	69	50.6	43.3
3	#13010.00	59.1 PK	88.2	-29.1	1.63 V	133	41.0	18.1
4	#13010.00	45.1 AV	68.2	-23.1	1.63 V	133	27.0	18.1

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.

RF Mode	TX 802.11ax (HE160)	Channel	CH 143 : 6665 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

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	108.4 PK			2.39 H	38	64.6	43.8
2	*6665.00	96.6 AV			2.39 H	38	52.8	43.8
3	13330.00	59.7 PK	74.0	-14.3	2.11 H	42	40.9	18.8
4	13330.00	46.5 AV	54.0	-7.5	2.11 H	42	27.7	18.8
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	105.5 PK			1.18 V	64	61.7	43.8
2	*6665.00	93.9 AV			1.18 V	64	50.1	43.8
3	13330.00	59.4 PK	74.0	-14.6	1.76 V	124	40.6	18.8
4	13330.00	46.3 AV	54.0	-7.7	1.76 V	124	27.5	18.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency.

RF Mode	TX 802.11ax (HE160)	Channel	CH 175 : 6825 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

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	109.4 PK			2.49 H	47	65.3	44.1
2	*6825.00	97.2 AV			2.49 H	47	53.1	44.1
3	#13650.00	60.5 PK	88.2	-27.7	2.14 H	38	40.8	19.7
4	#13650.00	47.2 AV	68.2	-21.0	2.14 H	38	27.5	19.7
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	*6825.00	106.4 PK			1.20 V	63	62.3	44.1
2	*6825.00	94.3 AV			1.20 V	63	50.2	44.1
3	#13650.00	60.2 PK	88.2	-28.0	1.59 V	129	40.5	19.7
4	#13650.00	47.0 AV	68.2	-21.2	1.59 V	129	27.3	19.7

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 207 : 6985 MHz
Frequency Range	1GHz ~ 40GHz	Detector Function	Peak (PK) Average (AV)

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	109.3 PK			2.35 H	43	64.9	44.4
2	*6985.00	96.6 AV			2.35 H	43	52.2	44.4
3	#7125.00	70.2 PK	88.2	-18.0	2.35 H	43	59.3	10.9
4	#7125.00	54.2 AV	68.2	-14.0	2.35 H	43	43.3	10.9
5	#13970.00	60.7 PK	88.2	-27.5	2.08 H	38	40.1	20.6
6	#13970.00	47.7 AV	68.2	-20.5	2.08 H	38	27.1	20.6
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	105.9 PK			1.21 V	65	61.5	44.4
2	*6985.00	93.9 AV			1.21 V	65	49.5	44.4
3	#7125.00	67.9 PK	88.2	-20.3	1.21 V	65	57.0	10.9
4	#7125.00	52.5 AV	68.2	-15.7	1.21 V	65	41.6	10.9
5	#13970.00	60.5 PK	88.2	-27.7	1.68 V	132	39.9	20.6
6	#13970.00	47.4 AV	68.2	-20.8	1.68 V	132	26.8	20.6

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.

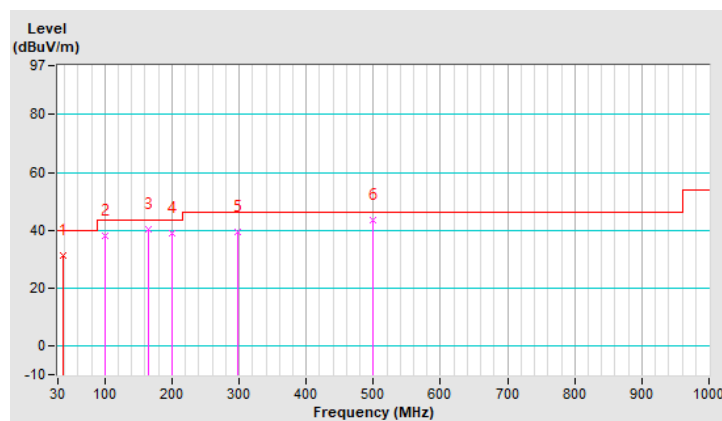
Below 1GHz Data:

RF Mode	TX 802.11ax (HE160)	Channel	CH 175 : 6825 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	37.12	31.2 QP	40.0	-8.8	2.00 H	298	41.2	-10.0
2	99.84	38.2 QP	43.5	-5.3	1.49 H	106	51.9	-13.7
3	165.80	40.3 QP	43.5	-3.2	1.49 H	123	49.1	-8.8
4	199.75	39.1 QP	43.5	-4.4	1.00 H	164	50.6	-11.5
5	298.69	39.6 QP	46.0	-6.4	1.00 H	258	46.6	-7.0
6	498.51	43.4 QP	46.0	-2.6	1.49 H	158	46.0	-2.6

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

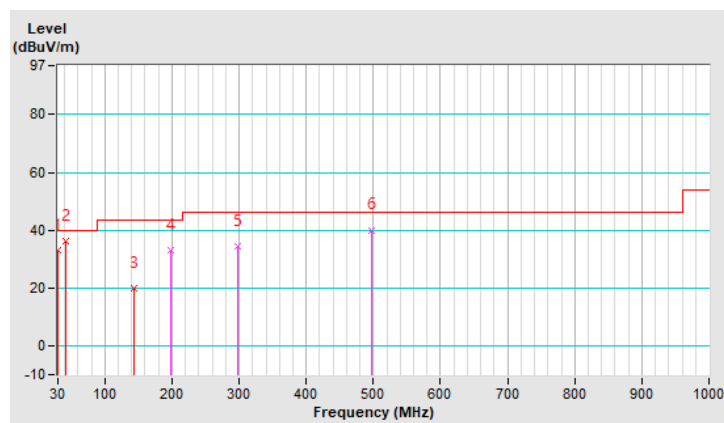


RF Mode	TX 802.11ax (HE160)	Channel	CH 175 : 6825 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.20	32.9 QP	40.0	-7.1	1.00 V	225	43.2	-10.3
2	41.92	36.4 QP	40.0	-3.6	1.00 V	126	45.9	-9.5
3	144.00	20.0 QP	43.5	-23.5	1.99 V	18	29.1	-9.1
4	198.78	33.2 QP	43.5	-10.3	1.99 V	74	44.8	-11.6
5	298.69	34.4 QP	46.0	-11.6	1.99 V	286	41.4	-7.0
6	497.54	40.1 QP	46.0	-5.9	1.00 V	62	42.7	-2.6

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 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: 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

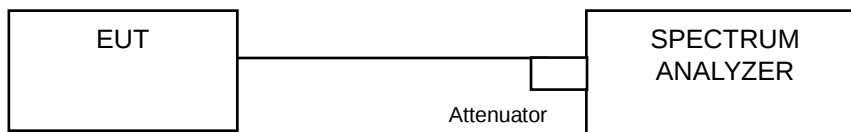
Test Item	Frequencies (MHz)	(X) dBc ^{*1}
Emission Mask	At 1 MHz outside of channel edge	20
	At one channel bandwidth from the channel center ^{*2}	28
	At one- and one-half times the channel bandwidth away from channel center ^{*3}	40
	More than one- and one-half times the channel bandwidth	40

^{*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

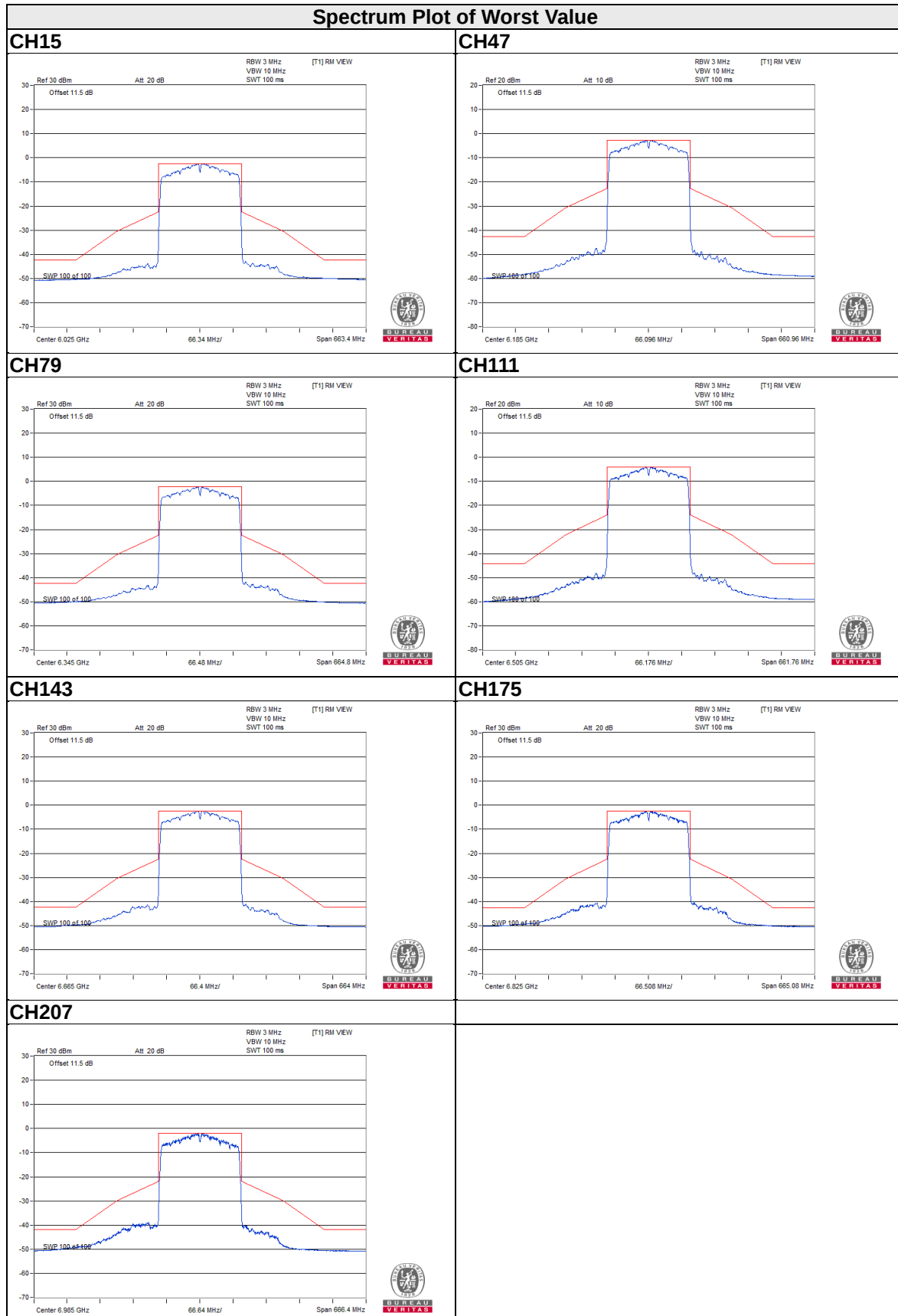
- a. Connect output of the antenna port to a spectrum analyzer and adjust appropriate attenuation.
- b. Measure the 26 dB EBW using the test procedure 12.4.1 of ANSI C63.10-2013. (Determine the channel edge.)
- c. Measure the power spectral density (for emissions mask reference) using the following procedure: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

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)



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.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Dec. 20, 2021	Dec. 19, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2021	Sep. 03, 2022
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Sep. 17, 2021	Sep. 16, 2022
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 2 (Conduction 2).

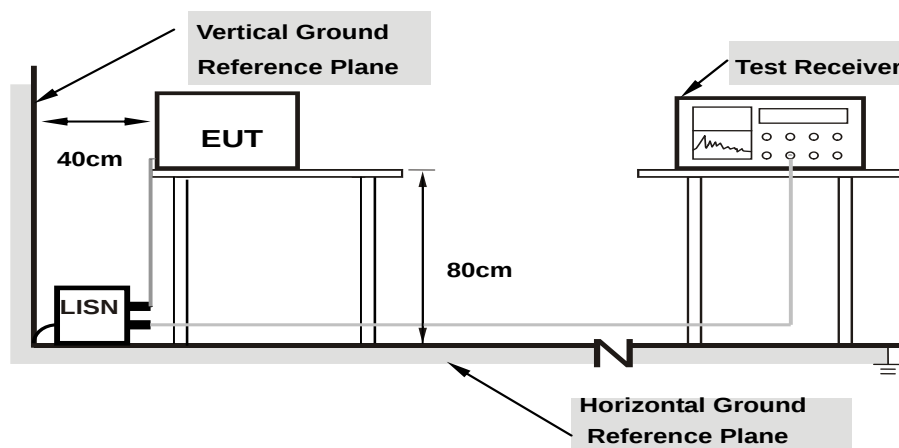
3. The VCCI Site Registration No. is C-12040.

4.3.3 Test Procedure

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

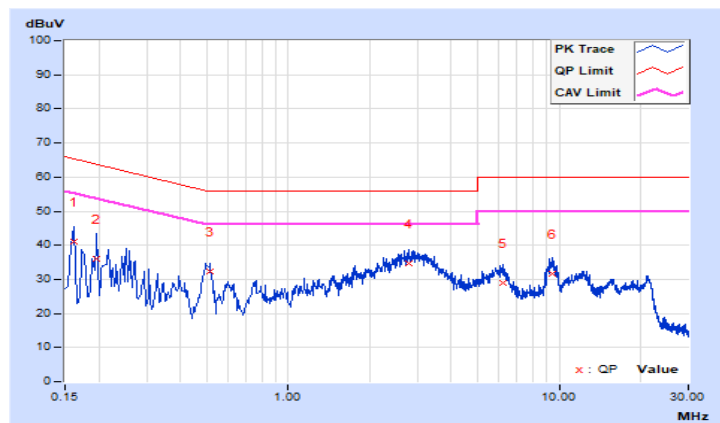
4.3.6 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25 °C, 75% RH
Tested by	Rex Wang		

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	0.16173	10.13	31.02	15.83	41.15	25.96	65.37	55.37	-24.22	-29.41
2	0.19692	10.14	26.02	12.55	36.16	22.69	63.74	53.74	-27.58	-31.05
3	0.51363	10.17	22.10	16.90	32.27	27.07	56.00	46.00	-23.73	-18.93
4	2.78531	10.23	24.54	18.91	34.77	29.14	56.00	46.00	-21.23	-16.86
5	6.21441	10.26	18.82	12.20	29.08	22.46	60.00	50.00	-30.92	-27.54
6	9.49490	10.29	21.40	14.22	31.69	24.51	60.00	50.00	-28.31	-25.49

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

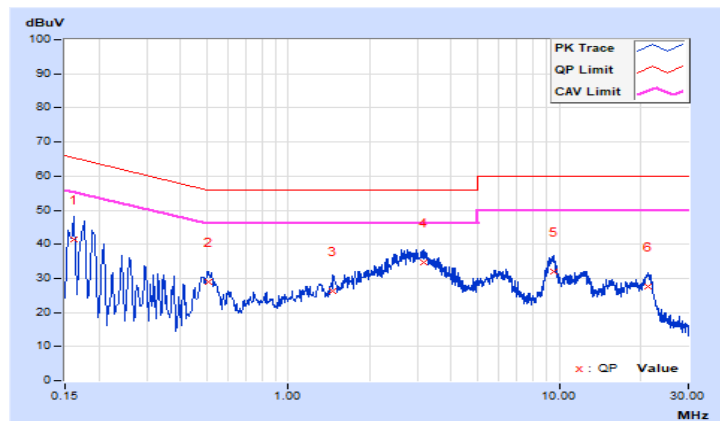


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25 °C, 75% RH
Tested by	Rex Wang		

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	0.16173	10.14	31.16	14.97	41.30	25.11	65.37	55.37	-24.07	-30.26
2	0.50972	10.18	18.77	12.75	28.95	22.93	56.00	46.00	-27.05	-23.07
3	1.46376	10.21	16.16	10.25	26.37	20.46	56.00	46.00	-29.63	-25.54
4	3.16070	10.25	24.29	18.48	34.54	28.73	56.00	46.00	-21.46	-17.27
5	9.55746	10.34	21.72	14.69	32.06	25.03	60.00	50.00	-27.94	-24.97
6	21.35784	10.50	17.23	11.44	27.73	21.94	60.00	50.00	-32.27	-28.06

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 $N_{ANT} \leq 4$;

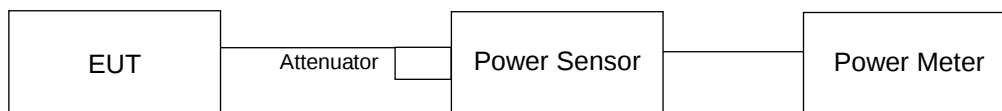
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

FOR POWER OUTPUT MEASUREMENT



4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.4 Test Procedure

FOR POWER OUTPUT MEASUREMENT

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

4.4.5 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

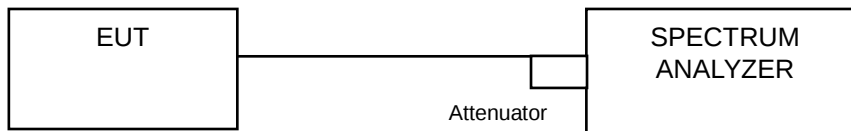
Power Output:

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	18.24	12.61	4.76	54.576	17.37	24	Pass
47	6185	16.63	12.21	4.76	49.774	16.97	24	Pass
79	6345	17.50	12.43	4.76	52.36	17.19	24	Pass
111	6505	17.06	12.32	4.29	45.814	16.61	24	Pass
143	6665	16.83	12.26	4.61	48.641	16.87	24	Pass
175	6825	17.62	12.46	4.61	50.933	17.07	24	Pass
207	6985	17.10	12.33	4.09	43.853	16.42	24	Pass

4.5 Emission Bandwidth Measurement

4.5.1 Test Setup



4.5.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.3 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

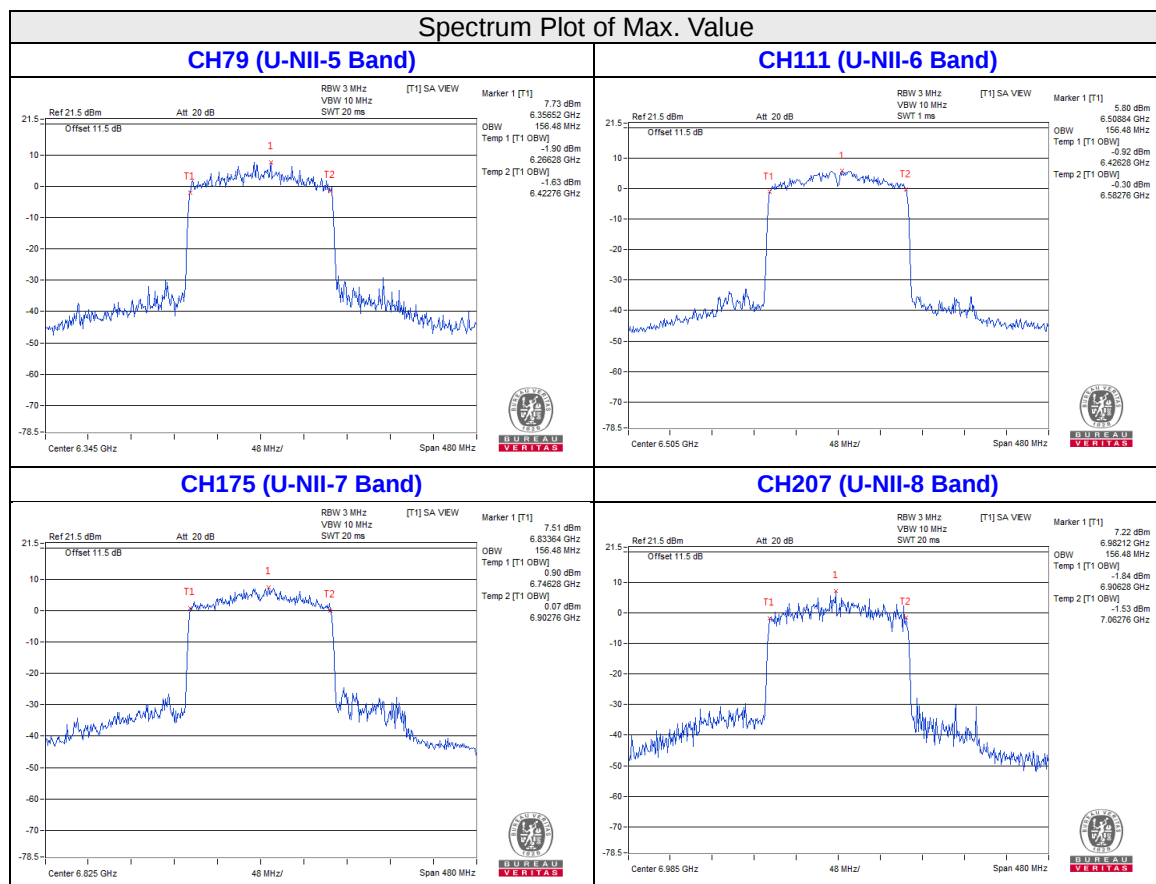
- Set RBW = approximately 1% of the emission bandwidth.
- Set the VBW > RBW.
- Detector = Peak.
- Trace mode = max hold.
- Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement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

4.5.4 Test Results

99% Occupied Bandwidth:

802.11ax (HE160)

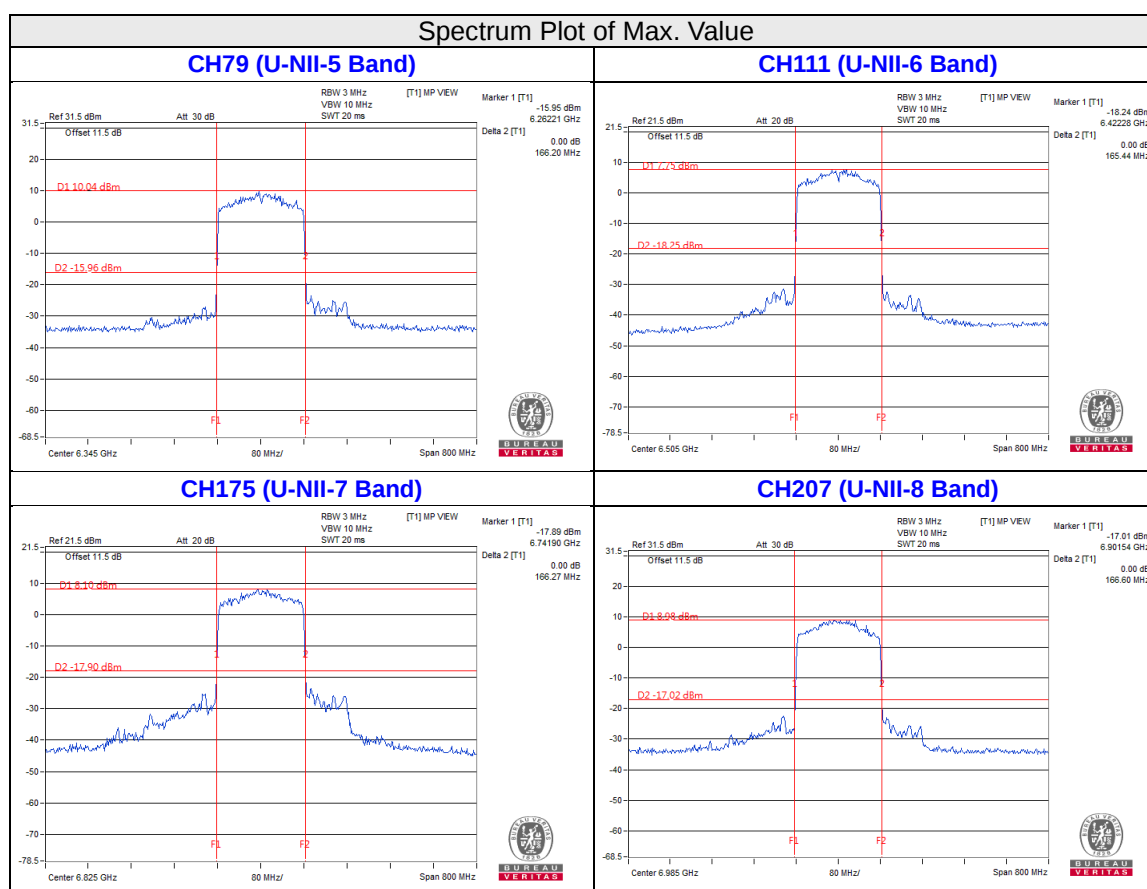
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)	Limit (MHz)
15	6025	156.48	320
47	6185	154.56	320
79	6345	156.48	320
111	6505	156.48	320
143	6665	156.48	320
175	6825	156.48	320
207	6985	156.48	320



26dB Bandwidth:

802.11ax (HE160)

Channel	Frequency (MHz)	26dB Bandwidth (MHz)	Limit (MHz)
15	6025	165.85	320
47	6185	165.24	320
79	6345	166.20	320
111	6505	165.44	320
143	6665	166.00	320
175	6825	166.27	320
207	6985	166.60	320

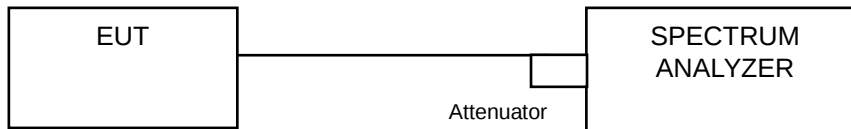


4.6 Peak Power Spectral Density Measurement

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 For Conducted Method



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

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1 MHz, Set VBW $\geq$ 3 MHz
- Sweep time = auto, trigger set to "free run".
- Detector = RMS
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

4.6.5 EUT Operating Condition

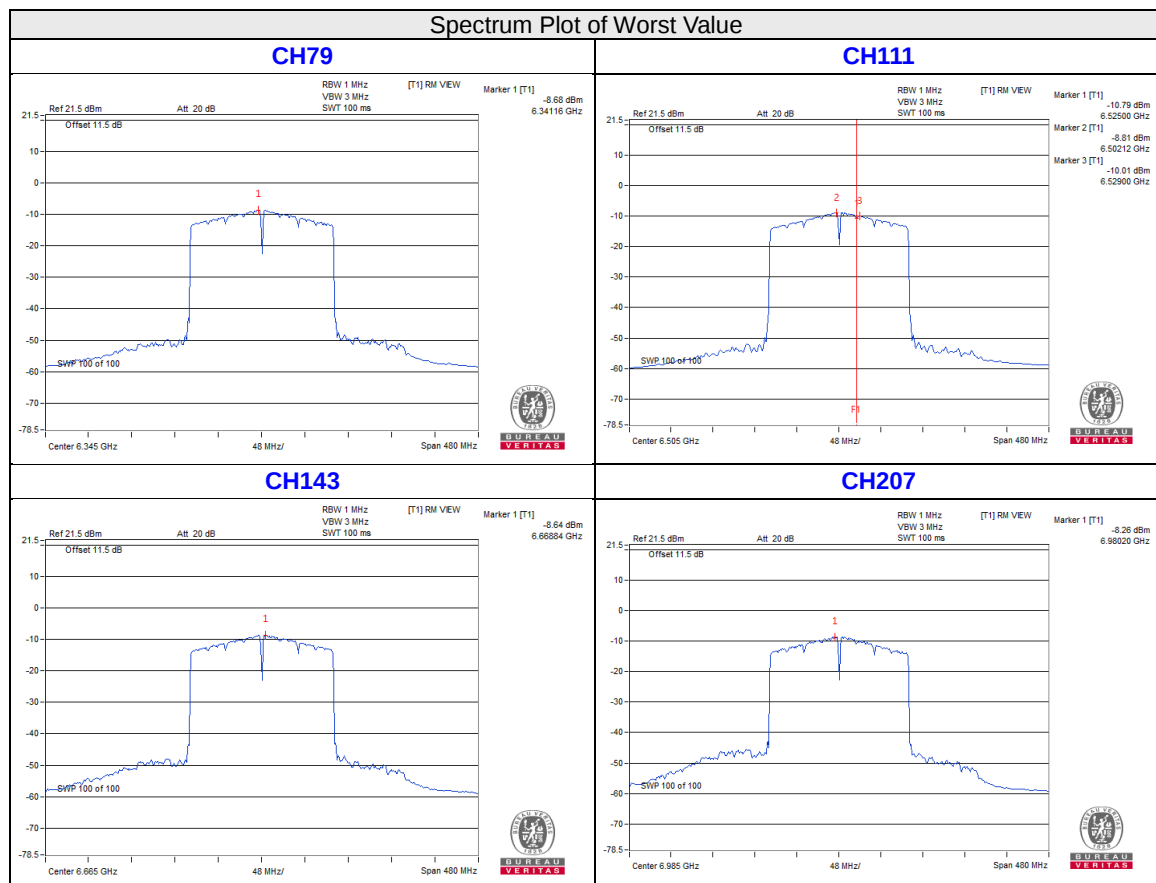
Same as Item 4.3.6.

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	-8.79	0.6	-8.19	4.76	-3.43	-1.00	Pass
47	6185	-8.90	0.6	-8.30	4.76	-3.54	-1.00	Pass
79	6345	-8.68	0.6	-8.08	4.76	-3.32	-1.00	Pass
111	6505	-8.81	0.6	-8.21	4.29	-3.92	-1.00	Pass
143	6665	-8.64	0.6	-8.04	4.61	-3.43	-1.00	Pass
175	6825	-8.76	0.6	-8.16	4.61	-3.55	-1.00	Pass
207	6985	-8.26	0.6	-7.66	4.09	-3.57	-1.00	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

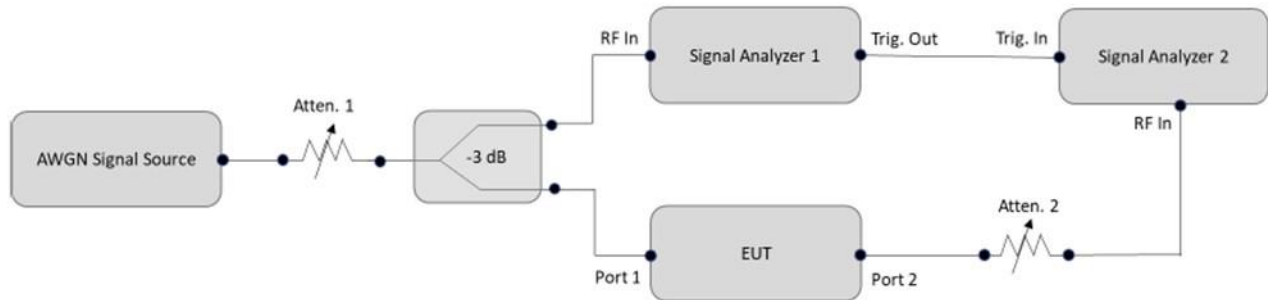


4.7 Contention Based Protocol Measurement

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 R&S	FSW8	101497	Oct. 25, 2021	Oct. 24, 2022
Spectrum Analyzer R&S	FSV40	101516	Mar. 07, 2022	Mar. 06, 2023
MXG X-Series RF Vector Signal Generator Agilent	N5182B	MY53051263	Aug. 31, 2021	Aug. 30, 2022
N5182BU KEYSIGHT	N5182BX07	MY59360203	Dec. 10, 2021	Dec. 09, 2022
Power Splitter/combiner Mini-Circuits	ZFRSC-123-S+	F698501347_01	Jan. 26, 2022	Jan. 25, 2023

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.

4.7.4 Test Procedure

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

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

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

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.

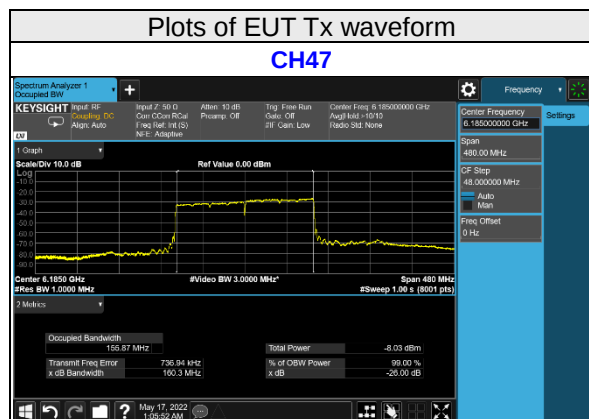
4.7.6 Test Results

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	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6185	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6260	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON

Note: Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

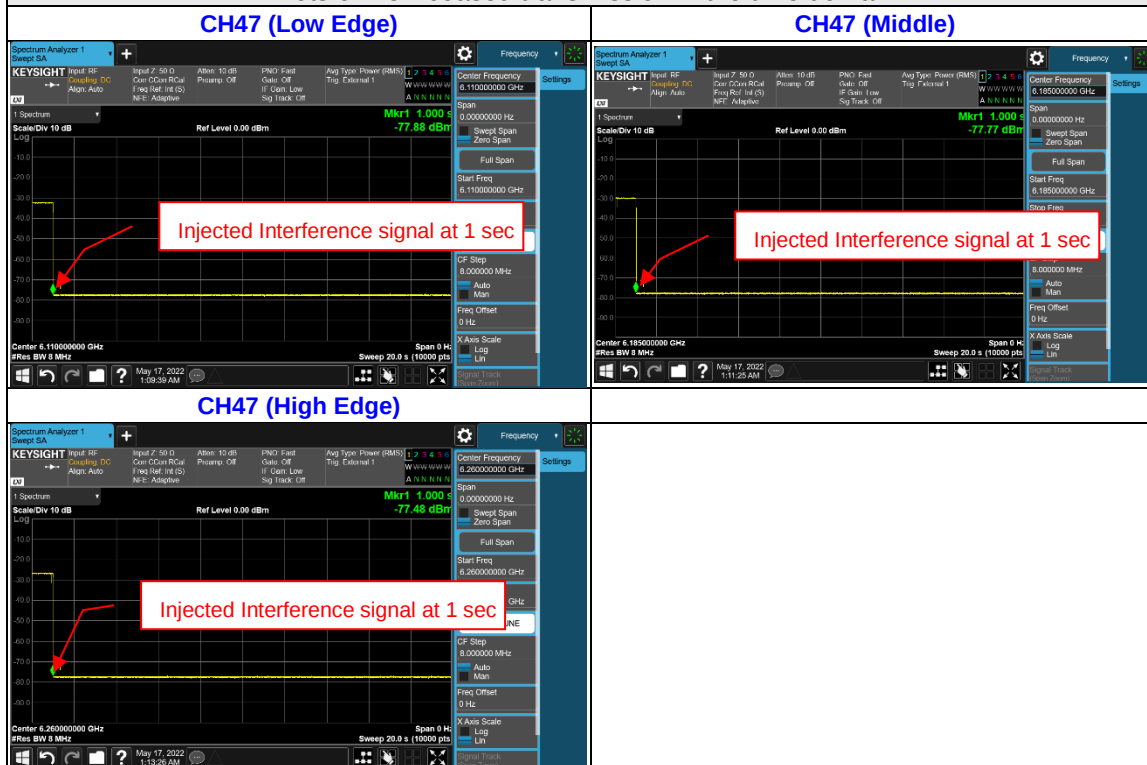
Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6110	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6185	v	v	v	v	v	v	v	v	v	v	100%	90%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



Plots of Incumbent signal(AWGN) Level



Plots of EUT ceased transmission in the time domain

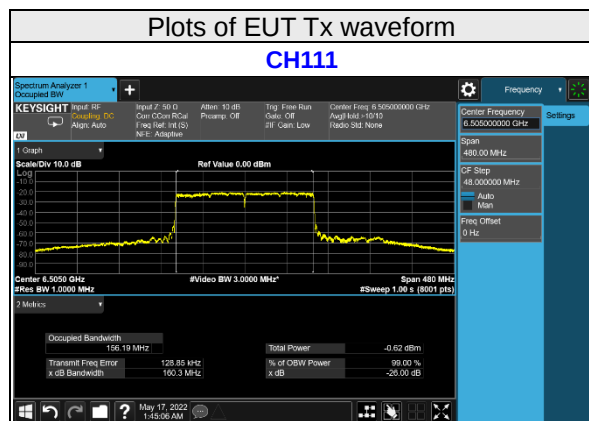


For U-NII-6 band

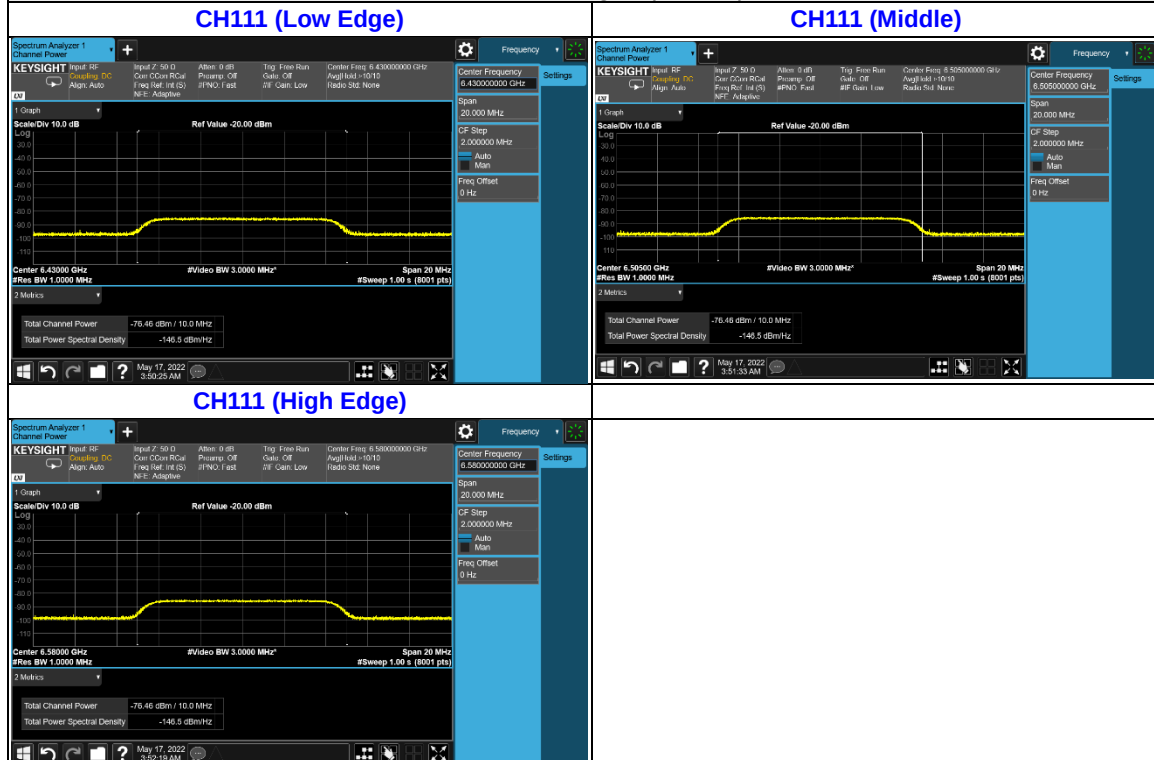
Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	111	6505	6430	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6505	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6580	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON

Note: 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 Incumbent signal(AWGN) Level



Plots of EUT ceased transmission in the time domain

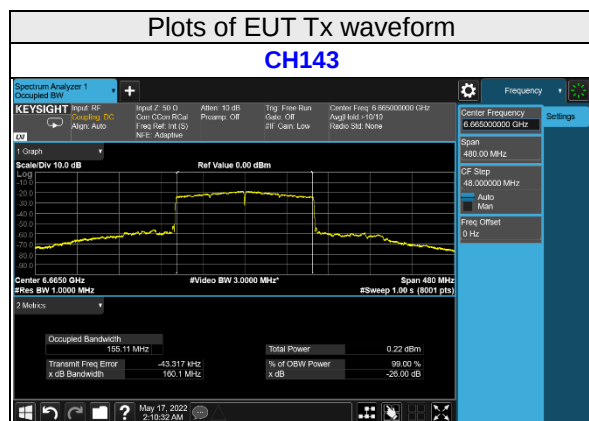


For U-NII-7 band

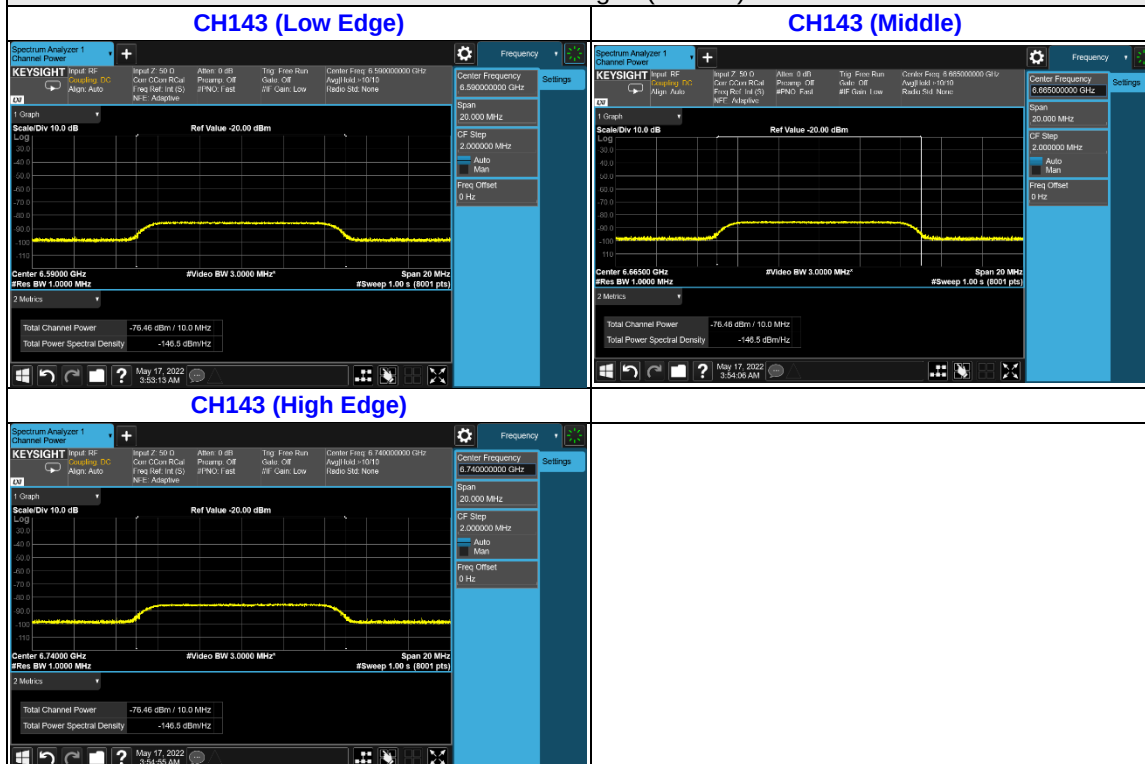
Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	143	6665	6590	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6665	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6740	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON

Note: Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

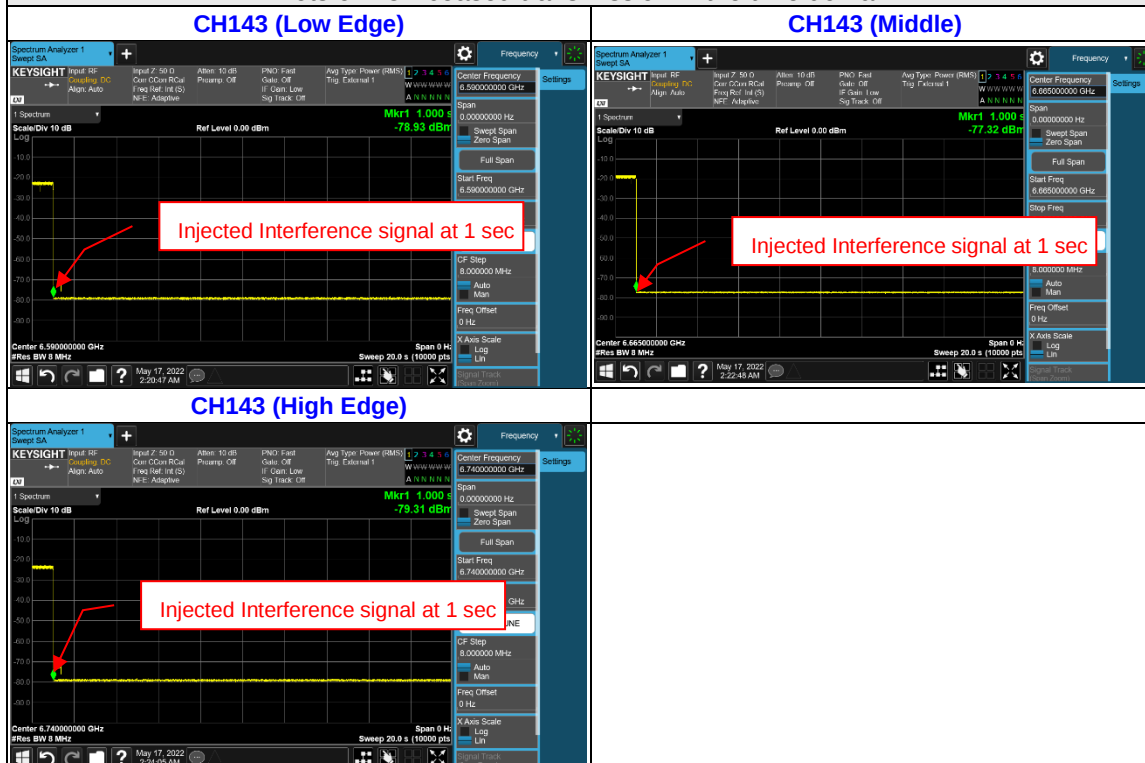
Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6590	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6665	v	v	v	v	v	v	v	v	v	v	100%	90%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



Plots of Incumbent signal(AWGN) Level



Plots of EUT ceased transmission in the time domain

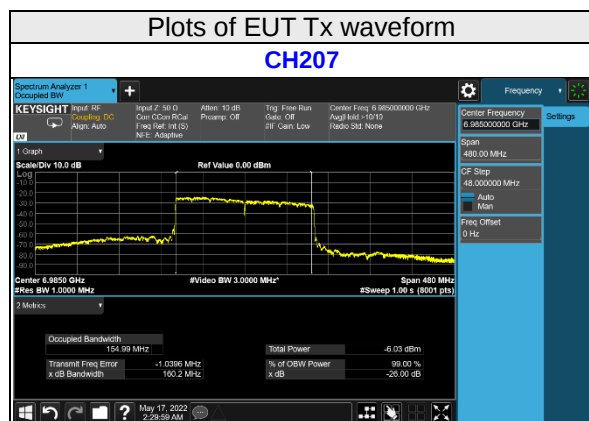


For U-NII-8 band

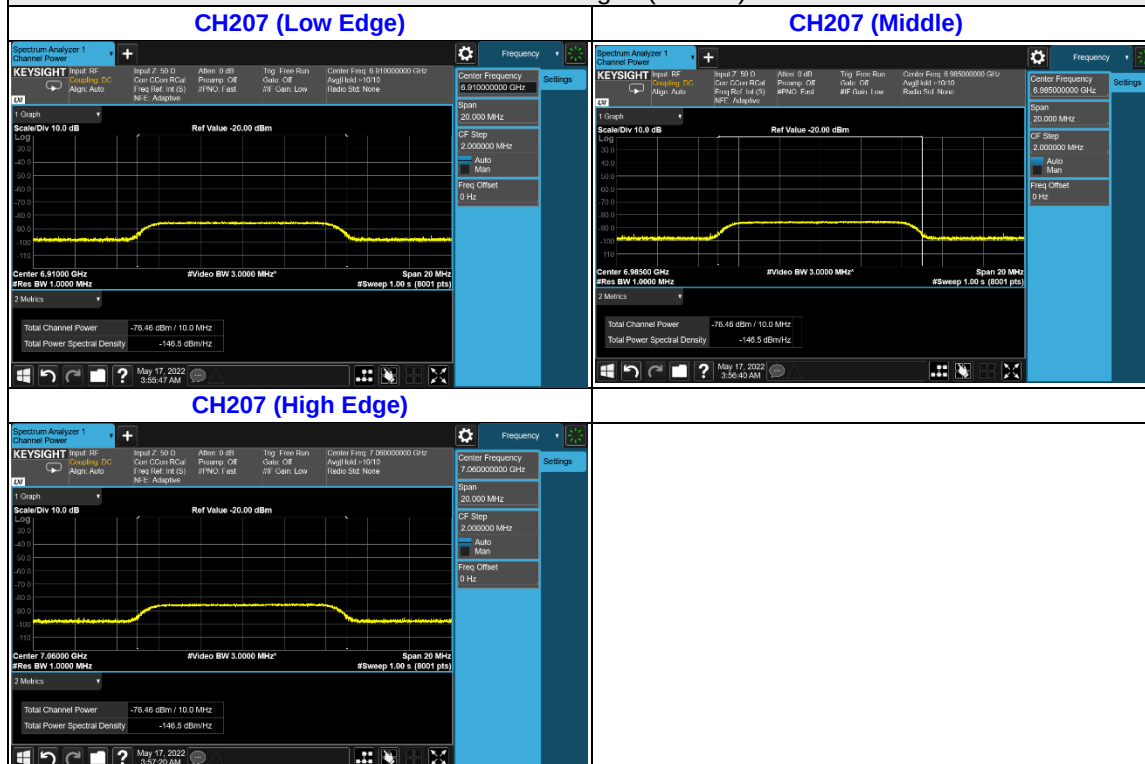
Contention Based Protocol Measurement										
Operation Mode	Channel Bandwidth (MHz)	Channel Number	Channel Freq. (MHz)	Injected Signal (AWGN)		Antenna Gain (dBi)	Path Loss (dB)	Adjusted Power (dBi)	Detection Limit	EUT TX Status
				Freq. (MHz)	Power (dBm)					
802.11ax	160	207	6985	6910	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				6985	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON
				7060	-76.46	-14.46	0	-62	-62	OFF
					-79.46	-14.46	0	-65	-62	Minimal
					-96.46	-14.46	0	-82	-62	ON

Note: Adjusted Power = Injected Signal (AWGN) Power - Antenna Gain + Path Loss

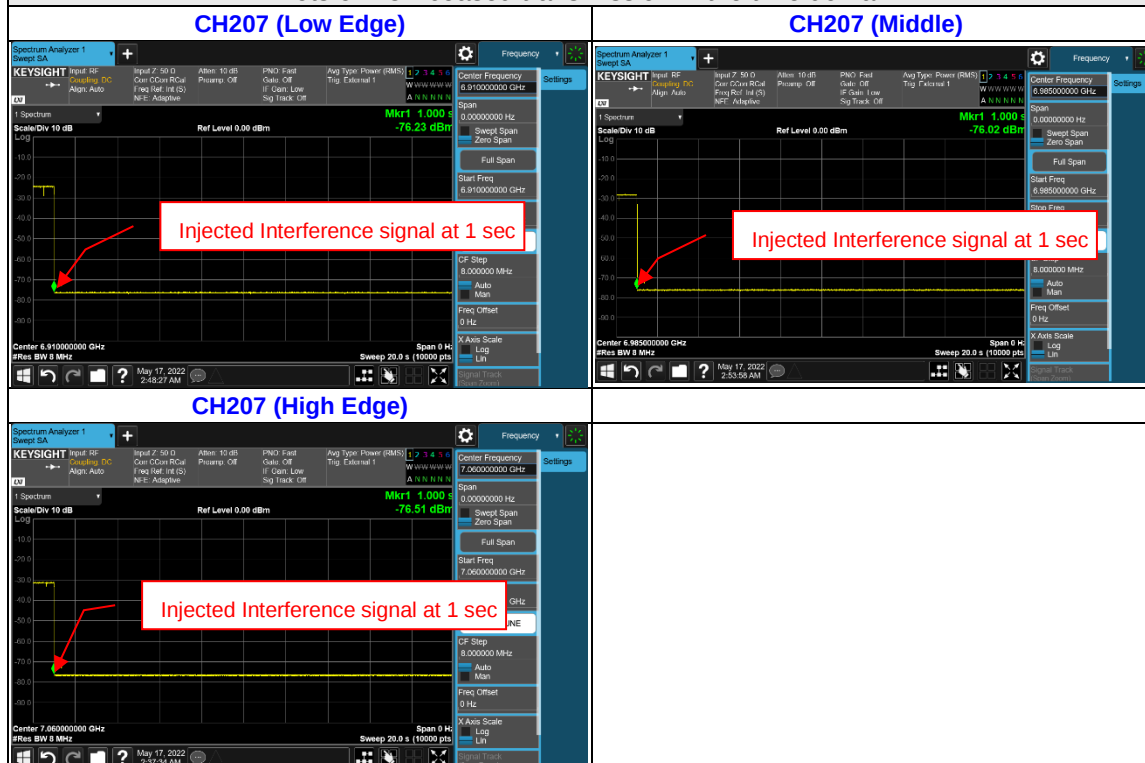
Contention Based Protocol Detection Probability															
Operation Mode	Channel Bandwidth (MHz)	AWGN Signal Freq. (MHz)	#01	#02	#03	#04	#05	#06	#07	#08	#09	#10	Detection Probability	Detection Limit	Test Result
802.11ax	160	6910	v	v	v	v	v	v	v	v	v	v	100%	90%	Pass
		6985	v	v	v	v	v	v	v	v	v	v	100%	90%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



Plots of Incumbent signal(AWGN) Level



Plots of EUT ceased transmission in the time domain

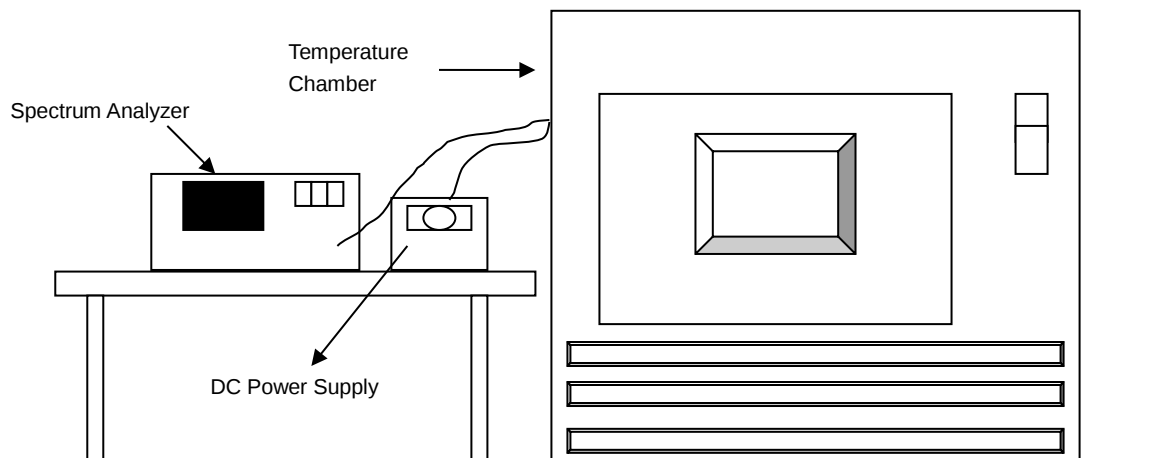


4.8 Frequency Stability Measurement

4.8.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

4.8.2 Test Setup



4.8.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.8.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed..
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.8.5 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.8.6 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 6025MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
70	3.3	6024.9865	Pass	6024.9874	Pass	6024.9882	Pass	6024.9853	Pass
60	3.3	6025.018	Pass	6025.0196	Pass	6025.0211	Pass	6025.0215	Pass
50	3.3	6024.9891	Pass	6024.9891	Pass	6024.9891	Pass	6024.99	Pass
40	3.3	6024.9978	Pass	6024.9983	Pass	6024.9982	Pass	6025.0035	Pass
30	3.3	6024.9996	Pass	6025.0001	Pass	6024.9993	Pass	6024.9973	Pass
20	3.3	6024.9802	Pass	6024.984	Pass	6024.9813	Pass	6024.9812	Pass
10	3.3	6025.0133	Pass	6025.0162	Pass	6025.016	Pass	6025.016	Pass
0	3.3	6024.9898	Pass	6024.9919	Pass	6024.9908	Pass	6024.9932	Pass
-10	3.3	6025.0043	Pass	6025.0095	Pass	6025.0065	Pass	6025.0055	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5955MHz									
TEMP. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency(MHz)	Pass/Fail	Measured Frequency(MHz)	Pass/Fail	Measured Frequency(MHz)	Pass/Fail	Measured Frequency(MHz)	Pass/Fail
20	3.795	6024.9856	Pass	6024.9815	Pass	6024.9835	Pass	6024.9834	Pass
	3.3	6024.9802	Pass	6024.984	Pass	6024.9813	Pass	6024.9812	Pass
	2.805	6024.9833	Pass	6024.9833	Pass	6024.9841	Pass	6024.986	Pass

4.9 Operational Restrictions for 6 GHz U-NII Devices

4.9.1 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.

4.9.2 Test Setup

N/A

4.9.3 Test Instruments

N/A

4.9.4 Test Procedure

N/A.

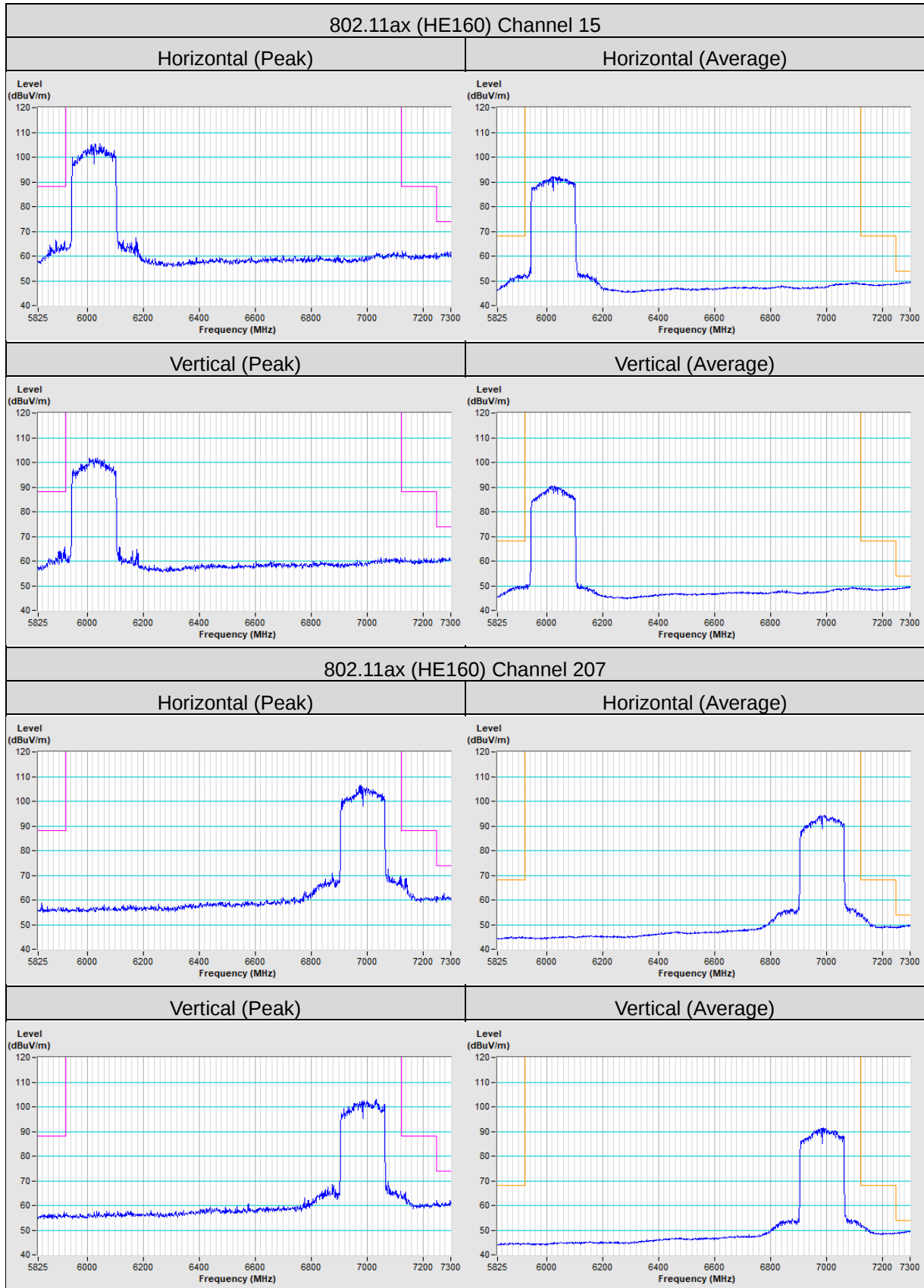
4.9.5 Test Results

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



Appendix A– 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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Web Site: www.bureauveritas-adt.com

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

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