FCC Test Report

Report No.:	RFBEMV-WTW-P22040202-1
FCC ID:	XCNUBC1338
Test Model:	UBC1338
Received Date:	Apr. 26, 2022
Test Date:	May 16 ~ May 25, 2022
Issued Date:	Jul. 15, 2022
Applicant:	Ubee Interactive Corp.
Address:	10F-1, No. 5, Taiyuan 1st St. Zhubei City, Hsinchu County 302, Taiwan, R.O.C.
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan
FCC Registration / Designation Number:	788550 / TW0003

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RFBEMV-WTW-P22040202-1	Original Release	Jul. 15, 2022

1 Certificate of Conformity

Product:	Wireless eMTA
Brand:	Ubee
Test Model:	UBC1338
Sample Status:	Engineering Sample
Applicant:	Ubee Interactive Corp.
Test Date:	May 16 ~ May 25, 2022
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : Pettie Chen , **Date:** Jul. 15, 2022

Pettie Chen / Senior Specialist

Approved by : Jeremy Lin , **Date:** Jul. 15, 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)(8)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -15.76dB at 0.15400MHz.
15.407(b) (1/2/3/4(i/ii)/8)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.1dB at 5150.00, 11570.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector are ipex(MHF) not a standard connector.

Note:

1. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
2. For U-NII-1 band compliance with rule 15.407(b) of the band-edge items, the test plots were recorded in Annex B. Test Procedures refer to report 4.1.3.
3. 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	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	Wireless eMTA
Brand	Ubee
Test Model	UBC1338
Sample Status	Engineering sample
Power Supply Rating	12Vdc from Adapter
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDMA
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n (HT20/40): up to 600Mbps 802.11ac (VHT20/40/80): up to 1733.3Mbps 802.11ax (HE20/40/80): up to 2401.9Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 5 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1
Output Power	CDD Mode: 5180 ~ 5240MHz: 655.741mW 5745 ~ 5825MHz: 817.930mW Beamforming Mode: 5180 ~ 5240MHz: 424.004mW 5745 ~ 5825MHz: 431.111mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Adapter
Cable Supplied	1.5m RJ45 non-shielded cable (Brand: CHANGYANG, Model: U-M2602B5LM0015)

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

Modulation Mode	TX Function	Beamforming Mode
802.11a	4TX	Not Support
802.11n (HT20)	4TX	Support
802.11n (HT40)	4TX	Support
802.11ac (VHT20)	4TX	Support
802.11ac (VHT40)	4TX	Support
802.11ac (VHT80)	4TX	Support
802.11ax (HE20)	4TX	Support
802.11ax (HE40)	4TX	Support
802.11ax (HE80)	4TX	Support

* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40/VHT80 on 802.11ac mode and HE20/HE40/HE80 on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)

* For 802.11n/ac/ax, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The EUT consumes power from the following adapter.

Adapter	
Brand	ASIAN POWER DEVICES
Model	WA-36N12FU
Input Power	100-240Vac, 50-60Hz
Output Power	12Vdc / 3A
Power cord	1.8m non-shielded cable without core

3. The antenna information is listed as below.

Antenna Type		Dipole antenna				
Antenna Connector		ipex(MHF)				
Antenna No.	RF Chain No.	Gain (dBi)				
		2.4~2.4835GHz	5.15~5.25GHz	5.25~5.35GHz	5.47~5.725GHz	5.725~5.85GHz
Ant1	2G chain1/ 5G chain2	3.90	3.90	3.90	1.82	2.82
Ant2	2G chain2/ 5G chain1	3.97	4.15	4.84	4.76	4.78
Ant3	2G chain0/ 5G chain3	3.90	3.13	3.85	3.05	2.69
Ant4	2G chain3/ 5G chain0	3.08	3.47	3.59	3.42	2.60

*The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. For radiated emission (below 1GHz) and power line conducted emission test items chosen the worst maximum power mode.
3. The EUT doesn't support Tone RU.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	MCS0
	802.11ax (HE40)		38 to 46	38, 46	OFDMA	MCS0
	802.11ax (HE80)		42	42	OFDMA	MCS0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	MCS0
	802.11ax (HE40)		151 to 159	151, 159	OFDMA	MCS0
	802.11ax (HE80)		155	155	OFDMA	MCS0

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11ax (HE20)	5745-5825	149 to 165	165	OFDMA	MCS0

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11ax (HE20)	5745-5825	149 to 165	165	OFDMA	MCS0

Transmit Power Measurement:

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	MCS0
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	MCS0
	802.11ac (VHT80)		42	42	OFDM	MCS0
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	MCS0
	802.11ax (HE40)		38 to 46	38, 46	OFDMA	MCS0
	802.11ax (HE80)		42	42	OFDMA	MCS0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	MCS0
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	MCS0
	802.11ac (VHT80)		155	155	OFDM	MCS0
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	MCS0
	802.11ax (HE40)		151 to 159	151, 159	OFDMA	MCS0
	802.11ax (HE80)		155	155	OFDMA	MCS0

Bandwidth, Power Spectral Density and Frequency Stability Measurement:

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDMA	MCS0
	802.11ax (HE40)		38 to 46	38, 46	OFDMA	MCS0
	802.11ax (HE80)		42	42	OFDMA	MCS0
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDMA	MCS0
	802.11ax (HE40)		151 to 159	151, 159	OFDMA	MCS0
	802.11ax (HE80)		155	155	OFDMA	MCS0

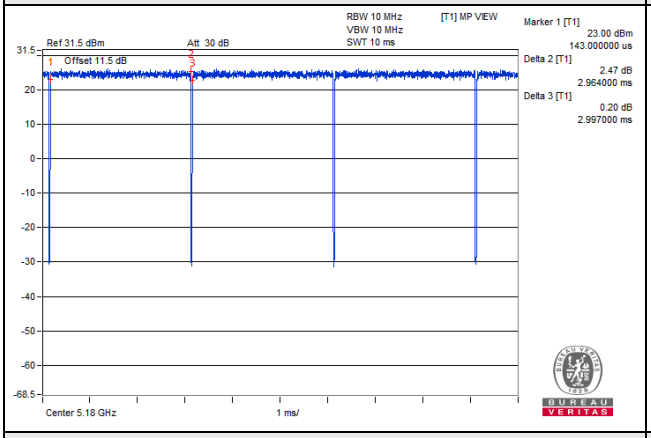
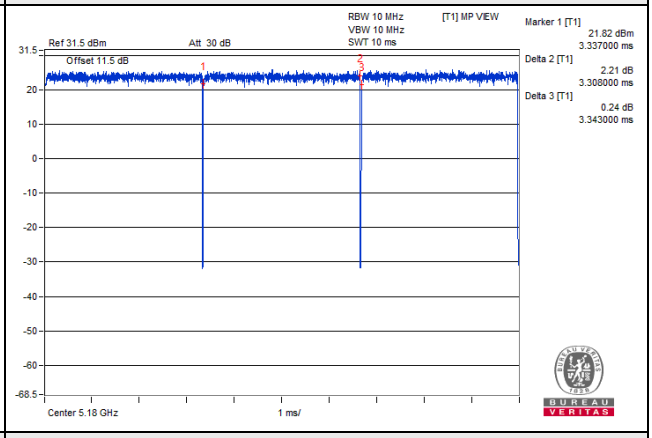
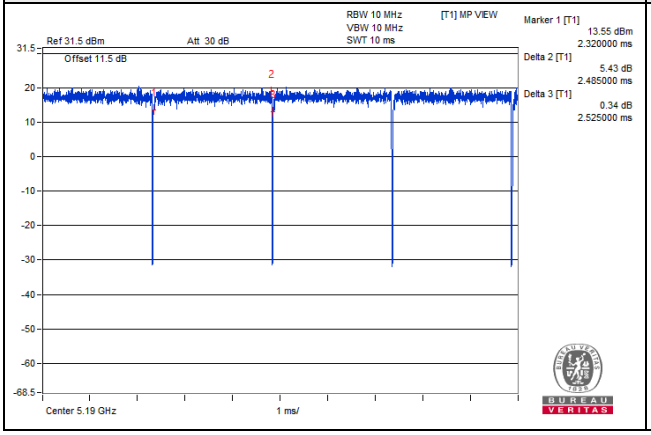
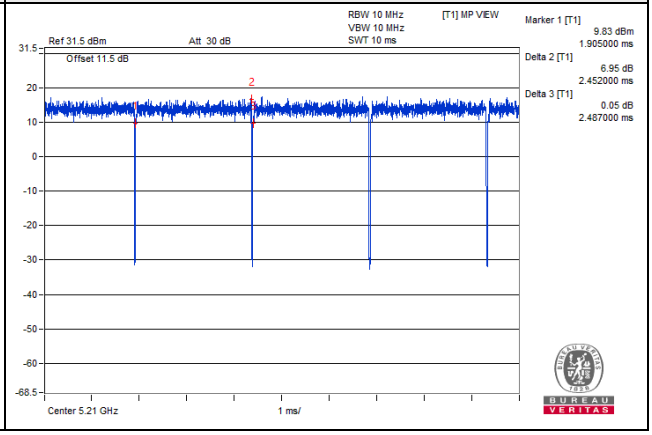
Test Condition:

Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	23 deg. C, 66% RH	120Vac, 60Hz	Titan Hsu
RE<1G	23 deg. C, 66% RH	120Vac, 60Hz	Titan Hsu
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Titan Hsu
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

3.3 Duty Cycle of Test Signal

Duty cycle of test signal is > 98%, duty factor is not required.

802.11a: Duty cycle = 2.964/2.997 = 0.989
802.11ax (HE20): Duty cycle = 3.308/3.343 = 0.990
802.11ax (HE40): Duty cycle = 2.485/2.525 = 0.984
802.11ax (HE80): Duty cycle = 2.452/2.487 = 0.986

802.11a	802.11ax (HE20)
	
802.11ax (HE40)	**802.11ax (HE80)**
	

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.	USB Disk	Sandisk	SDDDC3	NA	NA	Provided by Lab
B.	Notebook	DELL	E5430	2RL3YW1	NA	Provided by Lab
C.	Load	NA	NA	NA	NA	Provided by Lab

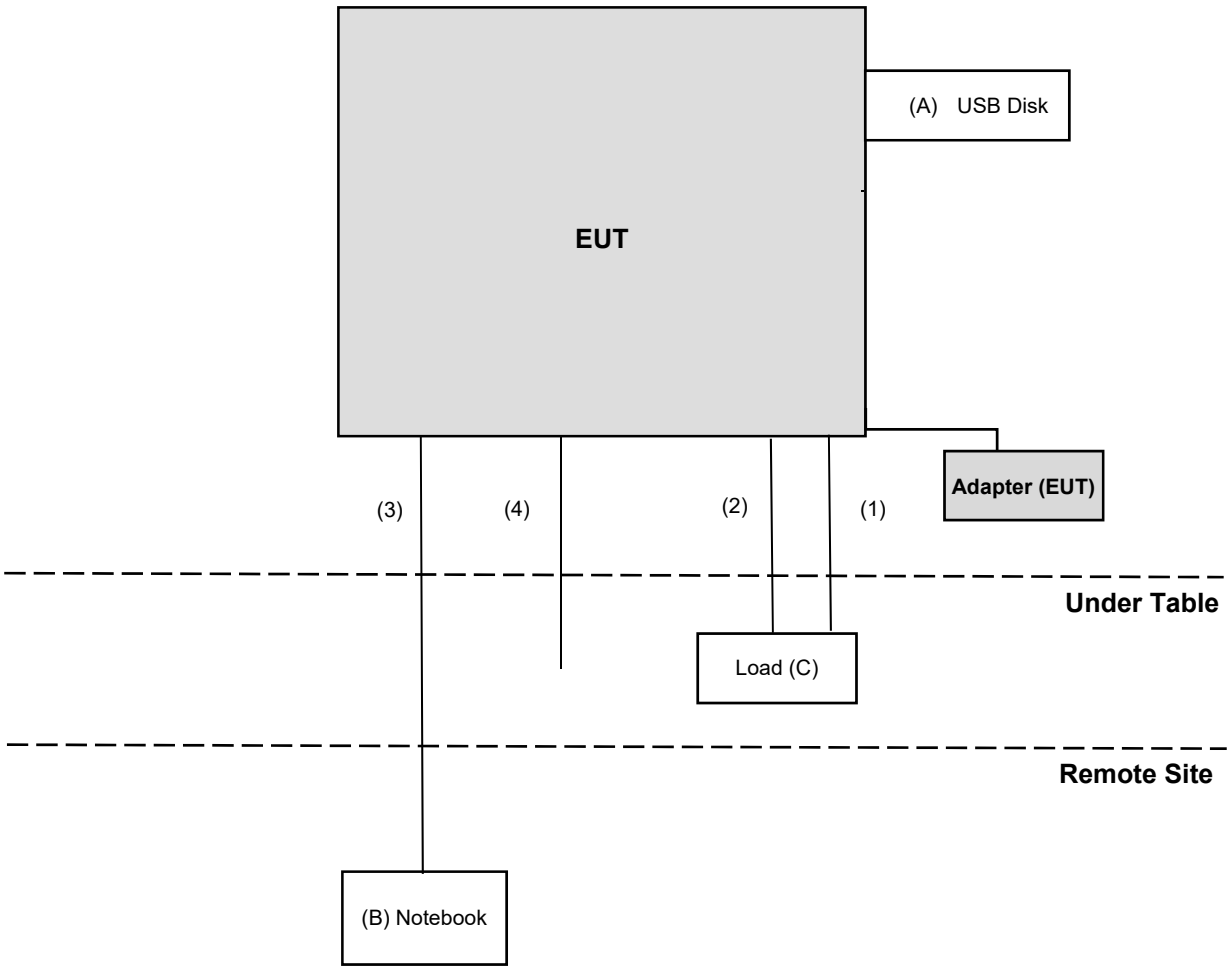
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items A acted as communication partner to transfer data.

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-11 Cable	1	1.5	No	0	Provided by Lab
2.	RJ-45 cable	1	1.5	No	0	Accessory of EUT
3.	RJ-45 cable	1	10	No	0	Provided by Lab
4.	Coaxial Cable	1	1.5	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



3.5 General Description of Applied Standards and References

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

Test standard:
FCC Part 15, Subpart E (15.407)
ANSI C63.10:2013

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

References Test Guidance:
KDB 789033 D02 General UNII Test 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

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

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

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

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

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

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Dec. 30, 2021	Dec. 29, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 15, 2021	Sep. 14, 2022
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Nov. 01, 2021	Oct. 31, 2022
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Nov. 14, 2021	Nov. 13, 2022
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Oct. 26, 2021	Oct. 25, 2022
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Jun. 05, 2021	Jun. 04, 2022
Preamplifier KEYSIGHT (Above 1GHz)	83017A	MY53270295	Jun. 05, 2021	Jun. 04, 2022
RF Coaxial Cable WOKEN With 5dB PAD	8D-FB	Cable-CH4-01	Jul. 24, 2021	Jul. 23, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-3000	150929	Jul. 24, 2021	Jul. 23, 2022
RF Coaxial Cable EMCI	EMC102-KM-KM-600	150928	Jul. 24, 2021	Jul. 23, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Jun. 05, 2021	Jun. 04, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	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	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 12, 2021	Jul. 11, 2022

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 4.

4.1.3 Test Procedures

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 and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

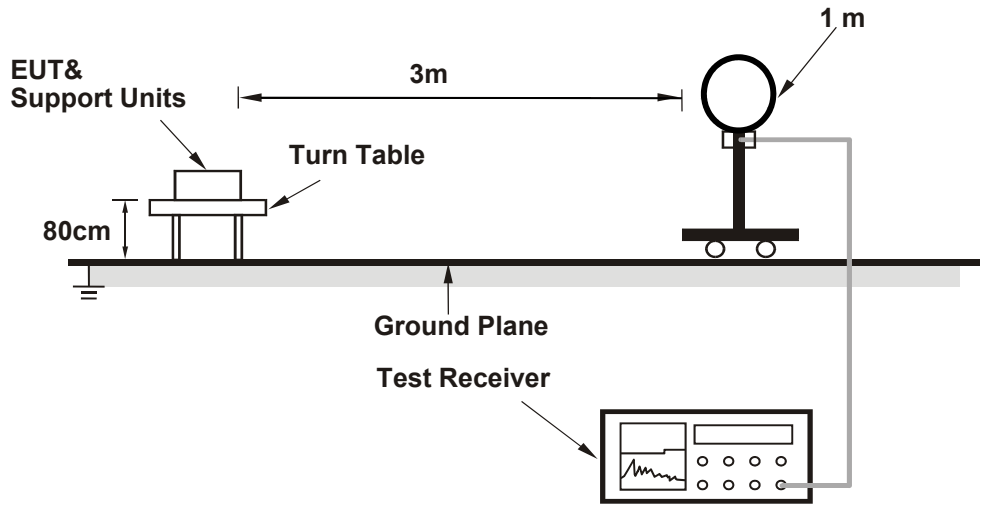
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

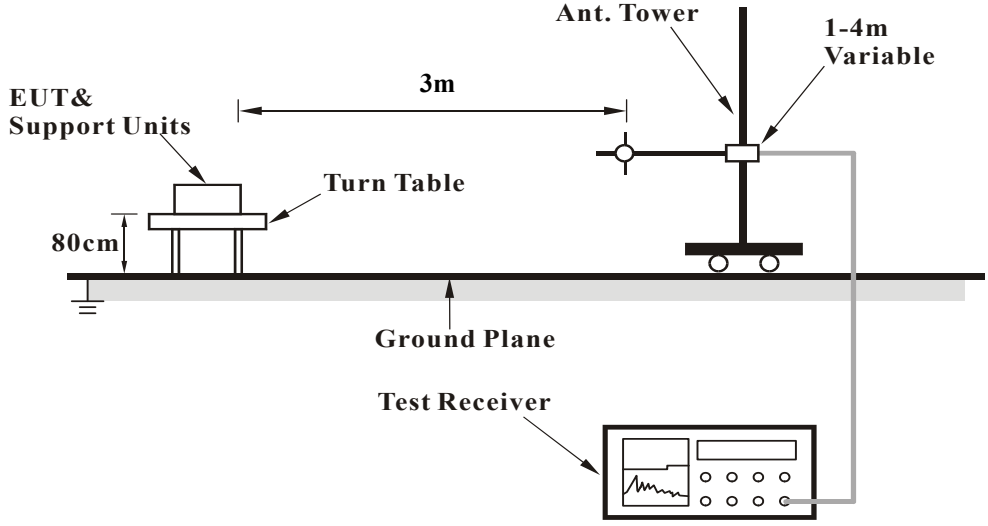
No deviation.

4.1.5 Test Setup

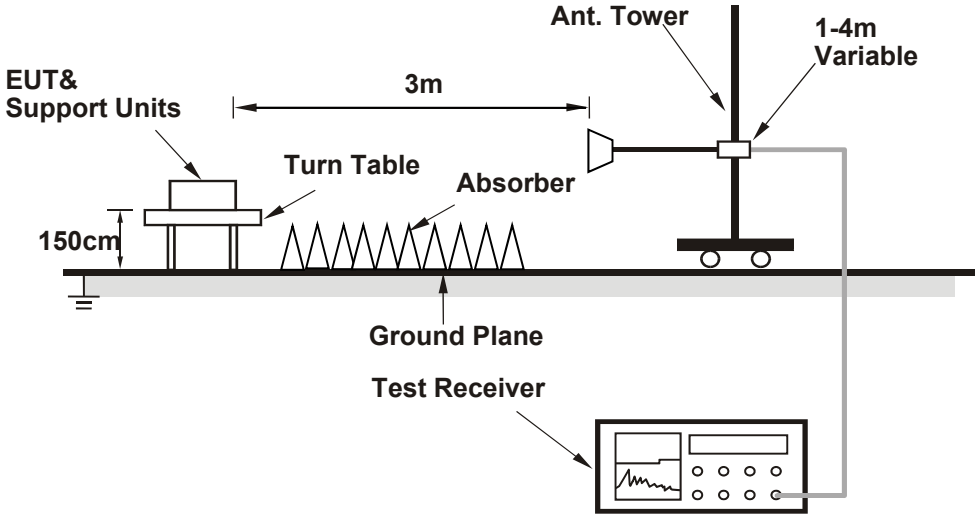
For Radiated emission below 30MHz



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).

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Above 1GHz data:

RF Mode	TX 802.11a	Channel	CH 36：5180 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	5150.00	69.5 PK	74.0	-4.5	1.82 H	119	56.6	12.9
2	5150.00	53.3 AV	54.0	-0.7	1.82 H	119	40.4	12.9
3	*5180.00	122.3 PK			1.82 H	119	79.9	42.4
4	*5180.00	112.6 AV			1.82 H	119	70.2	42.4
5	#10360.00	62.5 PK	68.2	-5.7	2.65 H	93	39.9	22.6
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	5150.00	72.5 PK	74.0	-1.5	3.67 V	40	59.6	12.9
2	5150.00	52.6 AV	54.0	-1.4	3.67 V	40	39.7	12.9
3	*5180.00	119.1 PK			3.67 V	40	76.7	42.4
4	*5180.00	109.7 AV			3.67 V	40	67.3	42.4
5	#10360.00	64.2 PK	68.2	-4.0	1.88 V	96	41.6	22.6

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.

RF Mode	TX 802.11a	Channel	CH 40：5200 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	*5200.00	123.5 PK			1.82 H	119	81.3	42.2
2	*5200.00	113.4 AV			1.82 H	119	71.2	42.2
3	#10400.00	62.8 PK	68.2	-5.4	2.65 H	85	40.0	22.8
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	*5200.00	119.7 PK			3.67 V	40	77.5	42.2
2	*5200.00	110.1 AV			3.67 V	40	67.9	42.2
3	#10400.00	64.8 PK	68.2	-3.4	1.90 V	95	42.0	22.8

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 802.11a	Channel	CH 48：5240 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	*5240.00	123.5 PK			1.82 H	119	81.3	42.2
2	*5240.00	113.5 AV			1.82 H	119	71.3	42.2
3	5350.00	64.3 PK	74.0	-9.7	1.82 H	119	51.3	13.0
4	5350.00	51.1 AV	54.0	-2.9	1.82 H	119	38.1	13.0
5	#10480.00	62.6 PK	68.2	-5.6	2.67 H	90	39.8	22.8
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	*5240.00	119.4 PK			3.66 V	45	77.2	42.2
2	*5240.00	109.6 AV			3.66 V	45	67.4	42.2
3	5350.00	63.0 PK	74.0	-11.0	3.66 V	45	50.0	13.0
4	5350.00	50.4 AV	54.0	-3.6	3.66 V	45	37.4	13.0
5	#10480.00	64.7 PK	68.2	-3.5	1.90 V	92	41.9	22.8

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 802.11a	Channel	CH 149：5745 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	#5620.00	61.4 PK	68.2	-6.8	1.25 H	149	48.0	13.4
2	*5745.00	124.3 PK			1.25 H	148	80.8	43.5
3	*5745.00	114.7 AV			1.25 H	148	71.2	43.5
4	#5940.00	61.7 PK	68.2	-6.5	1.25 H	149	47.5	14.2
5	11490.00	66.6 PK	74.0	-7.4	1.76 H	89	41.4	25.2
6	11490.00	53.5 AV	54.0	-0.5	1.76 H	89	28.3	25.2
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	#5649.60	60.5 PK	68.2	-7.7	3.42 V	83	47.2	13.3
2	*5745.00	120.3 PK			3.42 V	83	76.8	43.5
3	*5745.00	110.1 AV			3.42 V	83	66.6	43.5
4	#5954.00	61.3 PK	68.2	-6.9	3.42 V	83	47.1	14.2
5	11490.00	66.4 PK	74.0	-7.6	1.59 V	49	41.2	25.2
6	11490.00	53.4 AV	54.0	-0.6	1.59 V	49	28.2	25.2

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 802.11a	Channel	CH 157：5785 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	#5609.60	61.5 PK	68.2	-6.7	1.25 H	148	48.1	13.4
2	*5785.00	124.4 PK			1.25 H	148	80.7	43.7
3	*5785.00	114.8 AV			1.25 H	148	71.1	43.7
4	#5976.40	61.5 PK	68.2	-6.7	1.25 H	148	47.3	14.2
5	11570.00	68.7 PK	74.0	-5.3	1.29 H	98	43.8	24.9
6	**11570.00**	**53.9 AV**	**54.0**	**-0.1**	**1.29 H**	**98**	**29.0**	**24.9**
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	#5627.20	61.4 PK	68.2	-6.8	3.41 V	97	48.0	13.4
2	*5785.00	120.3 PK			3.41 V	97	76.6	43.7
3	*5785.00	110.4 AV			3.41 V	97	66.7	43.7
4	#5956.00	61.3 PK	68.2	-6.9	3.41 V	97	47.1	14.2
5	11570.00	67.2 PK	74.0	-6.8	1.62 V	45	42.3	24.9
6	11570.00	53.7 AV	54.0	-0.3	1.62 V	45	28.8	24.9

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 802.11a	Channel	CH 165：5825 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	#5641.60	61.5 PK	68.2	-6.7	1.41 H	146	48.1	13.4
2	*5825.00	125.0 PK			1.41 H	146	81.2	43.8
3	*5825.00	115.1 AV			1.41 H	146	71.3	43.8
4	#5979.20	61.5 PK	68.2	-6.7	1.41 H	146	47.3	14.2
5	11650.00	66.7 PK	74.0	-7.3	1.34 H	101	42.1	24.6
6	11650.00	53.6 AV	54.0	-0.4	1.34 H	101	29.0	24.6
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	#5625.20	60.9 PK	68.2	-7.3	3.53 V	99	47.5	13.4
2	*5825.00	120.7 PK			3.53 V	99	76.9	43.8
3	*5825.00	110.8 AV			3.53 V	99	67.0	43.8
4	#5955.20	62.1 PK	68.2	-6.1	3.53 V	99	47.9	14.2
5	11650.00	66.1 PK	74.0	-7.9	1.62 V	52	41.5	24.6
6	11650.00	53.2 AV	54.0	-0.8	1.62 V	52	28.6	24.6

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 36：5180 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	5150.00	67.4 PK	74.0	-6.6	1.60 H	96	54.5	12.9
2	5150.00	53.5 AV	54.0	-0.5	1.60 H	96	40.6	12.9
3	*5180.00	123.6 PK			1.60 H	96	81.2	42.4
4	*5180.00	111.6 AV			1.60 H	96	69.2	42.4
5	#10360.00	62.8 PK	68.2	-5.4	2.59 H	95	40.2	22.6
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	5150.00	65.3 PK	74.0	-8.7	3.65 V	42	52.4	12.9
2	5150.00	51.7 AV	54.0	-2.3	3.65 V	42	38.8	12.9
3	*5180.00	118.6 PK			3.65 V	42	76.2	42.4
4	*5180.00	107.0 AV			3.65 V	42	64.6	42.4
5	#10360.00	63.8 PK	68.2	-4.4	1.88 V	94	41.2	22.6

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.

RF Mode	TX 802.11ax (HE20)	Channel	CH 40：5200 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	*5200.00	125.7 PK			1.63 H	108	83.5	42.2
2	*5200.00	113.2 AV			1.63 H	108	71.0	42.2
3	#10400.00	63.3 PK	68.2	-4.9	2.59 H	96	40.5	22.8
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	*5200.00	121.1 PK			3.56 V	44	78.9	42.2
2	*5200.00	108.9 AV			3.56 V	44	66.7	42.2
3	#10400.00	64.6 PK	68.2	-3.6	1.89 V	96	41.8	22.8

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 (HE20)	Channel	CH 48：5240 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	*5240.00	125.3 PK			1.63 H	107	83.1	42.2
2	*5240.00	113.1 AV			1.63 H	107	70.9	42.2
3	5350.00	63.9 PK	74.0	-10.1	1.63 H	107	50.9	13.0
4	5350.00	50.8 AV	54.0	-3.2	1.63 H	107	37.8	13.0
5	#10480.00	63.2 PK	68.2	-5.0	2.63 H	96	40.4	22.8
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	*5240.00	120.8 PK			3.60 V	44	78.6	42.2
2	*5240.00	108.4 AV			3.60 V	44	66.2	42.2
3	5350.00	63.0 PK	74.0	-11.0	3.60 V	44	50.0	13.0
4	5350.00	50.4 AV	54.0	-3.6	3.60 V	44	37.4	13.0
5	#10480.00	64.0 PK	68.2	-4.2	1.82 V	95	41.2	22.8

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 (HE20)	Channel	CH 149：5745 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	#5644.00	62.3 PK	68.2	-5.9	1.38 H	180	48.9	13.4
2	*5745.00	125.7 PK			1.38 H	180	82.2	43.5
3	*5745.00	113.6 AV			1.38 H	180	70.1	43.5
4	#5962.00	61.4 PK	68.2	-6.8	1.38 H	180	47.2	14.2
5	11490.00	66.9 PK	74.0	-7.1	1.33 H	99	41.7	25.2
6	11490.00	53.3 AV	54.0	-0.7	1.33 H	99	28.1	25.2
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	#5614.80	60.8 PK	68.2	-7.4	3.43 V	97	47.4	13.4
2	*5745.00	121.3 PK			3.43 V	97	77.8	43.5
3	*5745.00	109.5 AV			3.43 V	97	66.0	43.5
4	#5926.40	61.2 PK	68.2	-7.0	3.43 V	97	47.1	14.1
5	11490.00	66.4 PK	74.0	-7.6	1.63 V	56	41.2	25.2
6	11490.00	53.2 AV	54.0	-0.8	1.63 V	56	28.0	25.2

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 (HE20)	Channel	CH 157：5785 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	#5629.20	61.4 PK	68.2	-6.8	1.33 H	182	48.0	13.4
2	*5785.00	126.4 PK			1.33 H	182	82.7	43.7
3	*5785.00	113.8 AV			1.33 H	182	70.1	43.7
4	#5938.40	61.7 PK	68.2	-6.5	1.33 H	182	47.6	14.1
5	11570.00	68.0 PK	74.0	-6.0	1.47 H	92	43.1	24.9
6	**11570.00**	**53.9 AV**	**54.0**	**-0.1**	**1.47 H**	**92**	**29.0**	**24.9**
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	#5613.60	59.8 PK	68.2	-8.4	3.40 V	98	46.4	13.4
2	*5785.00	121.1 PK			3.40 V	97	77.4	43.7
3	*5785.00	109.4 AV			3.40 V	97	65.7	43.7
4	#5974.40	62.3 PK	68.2	-5.9	3.40 V	98	48.1	14.2
5	11570.00	67.1 PK	74.0	-6.9	1.61 V	48	42.2	24.9
6	11570.00	53.5 AV	54.0	-0.5	1.61 V	48	28.6	24.9

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 (HE20)	Channel	CH 165：5825 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	#5631.60	62.1 PK	68.2	-6.1	1.38 H	181	48.7	13.4
2	*5825.00	126.6 PK			1.38 H	181	82.8	43.8
3	*5825.00	114.4 AV			1.38 H	181	70.6	43.8
4	#5953.20	62.0 PK	68.2	-6.2	1.38 H	181	47.8	14.2
5	11650.00	66.4 PK	74.0	-7.6	1.37 H	103	41.8	24.6
6	11650.00	53.5 AV	54.0	-0.5	1.37 H	103	28.9	24.6
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	#5613.20	61.4 PK	68.2	-6.8	3.52 V	99	48.0	13.4
2	*5825.00	121.7 PK			3.52 V	99	77.9	43.8
3	*5825.00	110.0 AV			3.52 V	99	66.2	43.8
4	#5946.80	60.7 PK	68.2	-7.5	3.52 V	99	46.5	14.2
5	11650.00	66.1 PK	74.0	-7.9	1.55 V	51	41.5	24.6
6	11650.00	53.1 AV	54.0	-0.9	1.55 V	51	28.5	24.6

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.

RF Mode	TX 802.11ax (HE40)	Channel	CH 38：5190 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	5150.00	68.4 PK	74.0	-5.6	1.67 H	107	55.5	12.9
2	5150.00	53.8 AV	54.0	-0.2	1.67 H	107	40.9	12.9
3	*5190.00	117.3 PK			1.67 H	107	75.0	42.3
4	*5190.00	104.4 AV			1.67 H	107	62.1	42.3
5	#10380.00	62.2 PK	68.2	-6.0	2.62 H	95	39.5	22.7
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	5150.00	63.2 PK	74.0	-10.8	3.60 V	93	50.3	12.9
2	5150.00	51.5 AV	54.0	-2.5	3.60 V	93	38.6	12.9
3	*5190.00	111.6 PK			3.60 V	93	69.3	42.3
4	*5190.00	99.4 AV			3.60 V	93	57.1	42.3
5	#10380.00	63.4 PK	68.2	-4.8	1.85 V	93	40.7	22.7

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 (HE40)	Channel	CH 46：5230 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	5150.00	71.5 PK	74.0	-2.5	1.66 H	107	58.6	12.9
2	5150.00	53.7 AV	54.0	-0.3	1.66 H	107	40.8	12.9
3	*5230.00	121.9 PK			1.66 H	107	79.7	42.2
4	*5230.00	109.2 AV			1.66 H	107	67.0	42.2
5	5350.00	65.5 PK	74.0	-8.5	1.66 H	107	52.5	13.0
6	5350.00	51.7 AV	54.0	-2.3	1.66 H	107	38.7	13.0
7	#10460.00	62.7 PK	68.2	-5.5	2.62 H	96	39.8	22.9
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	5150.00	67.0 PK	74.0	-7.0	3.57 V	93	54.1	12.9
2	5150.00	50.9 AV	54.0	-3.1	3.57 V	93	38.0	12.9
3	*5230.00	117.4 PK			3.57 V	93	75.2	42.2
4	*5230.00	105.1 AV			3.57 V	93	62.9	42.2
5	5350.00	63.6 PK	74.0	-10.4	3.57 V	93	50.6	13.0
6	5350.00	51.0 AV	54.0	-3.0	3.57 V	93	38.0	13.0
7	#10460.00	64.1 PK	68.2	-4.1	1.88 V	93	41.2	22.9

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 (HE40)	Channel	CH 151：5755 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	#5642.00	64.5 PK	68.2	-3.7	1.37 H	186	51.1	13.4
2	*5755.00	123.6 PK			1.37 H	186	80.1	43.5
3	*5755.00	111.7 AV			1.37 H	186	68.2	43.5
4	#5948.80	62.0 PK	68.2	-6.2	1.37 H	186	47.8	14.2
5	11510.00	66.4 PK	74.0	-7.6	1.24 H	99	41.3	25.1
6	11510.00	53.1 AV	54.0	-0.9	1.24 H	99	28.0	25.1
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	#5649.20	61.3 PK	68.2	-6.9	3.50 V	98	48.0	13.3
2	*5755.00	119.3 PK			3.50 V	98	75.8	43.5
3	*5755.00	106.6 AV			3.50 V	98	63.1	43.5
4	#5978.80	61.3 PK	68.2	-6.9	3.50 V	98	47.1	14.2
5	11510.00	66.1 PK	74.0	-7.9	1.63 V	53	41.0	25.1
6	11510.00	52.9 AV	54.0	-1.1	1.63 V	53	27.8	25.1

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 (HE40)	Channel	CH 159：5795 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	#5601.60	63.3 PK	68.2	-4.9	1.35 H	185	50.0	13.3
2	*5795.00	124.3 PK			1.35 H	185	80.5	43.8
3	*5795.00	111.9 AV			1.35 H	185	68.1	43.8
4	#5931.60	62.1 PK	68.2	-6.1	1.35 H	185	48.0	14.1
5	11590.00	67.3 PK	74.0	-6.7	1.41 H	100	42.6	24.7
6	11590.00	53.1 AV	54.0	-0.9	1.41 H	100	28.4	24.7
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	#5608.80	61.4 PK	68.2	-6.8	3.53 V	98	48.0	13.4
2	*5795.00	119.9 PK			3.53 V	98	76.1	43.8
3	*5795.00	106.9 AV			3.53 V	98	63.1	43.8
4	#5934.00	61.3 PK	68.2	-6.9	3.53 V	98	47.2	14.1
5	11590.00	66.2 PK	74.0	-7.8	1.62 V	52	41.5	24.7
6	11590.00	52.7 AV	54.0	-1.3	1.62 V	52	28.0	24.7

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 (HE80)	Channel	CH 42：5210 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	5150.00	66.9 PK	74.0	-7.1	1.67 H	108	54.0	12.9
2	**5150.00**	**53.9 AV**	**54.0**	**-0.1**	**1.67 H**	**108**	**41.0**	**12.9**
3	*5210.00	113.6 PK			1.67 H	108	71.4	42.2
4	*5210.00	101.2 AV			1.67 H	108	59.0	42.2
5	5350.00	63.4 PK	74.0	-10.6	1.67 H	108	50.4	13.0
6	5350.00	50.5 AV	54.0	-3.5	1.67 H	108	37.5	13.0
7	#10420.00	62.4 PK	68.2	-5.8	2.65 H	99	39.5	22.9
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	5150.00	63.8 PK	74.0	-10.2	3.68 V	39	50.9	12.9
2	5150.00	51.4 AV	54.0	-2.6	3.68 V	39	38.5	12.9
3	*5210.00	107.6 PK			3.68 V	39	65.4	42.2
4	*5210.00	96.7 AV			3.68 V	39	54.5	42.2
5	5350.00	62.5 PK	74.0	-11.5	3.68 V	39	49.5	13.0
6	5350.00	50.1 AV	54.0	-3.9	3.68 V	39	37.1	13.0
7	#10420.00	63.7 PK	68.2	-4.5	1.85 V	99	40.8	22.9

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 (HE80)	Channel	CH 155：5775 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	#5641.20	67.7 PK	68.2	-0.5	1.36 H	189	54.3	13.4
2	*5775.00	119.3 PK			1.36 H	189	75.7	43.6
3	*5775.00	107.0 AV			1.36 H	189	63.4	43.6
4	#5977.60	63.0 PK	68.2	-5.2	1.36 H	189	48.8	14.2
5	11510.00	65.6 PK	74.0	-8.4	1.26 H	98	40.5	25.1
6	11510.00	51.9 AV	54.0	-2.1	1.26 H	98	26.8	25.1
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	#5649.20	62.9 PK	68.2	-5.3	3.53 V	95	49.6	13.3
2	*5775.00	114.5 PK			3.53 V	95	70.9	43.6
3	*5775.00	102.4 AV			3.53 V	95	58.8	43.6
4	#5940.40	61.6 PK	68.2	-6.6	3.53 V	95	47.4	14.2
5	11550.00	65.1 PK	74.0	-8.9	1.57 V	53	40.1	25.0
6	11550.00	51.5 AV	54.0	-2.5	1.57 V	53	26.5	25.0

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.

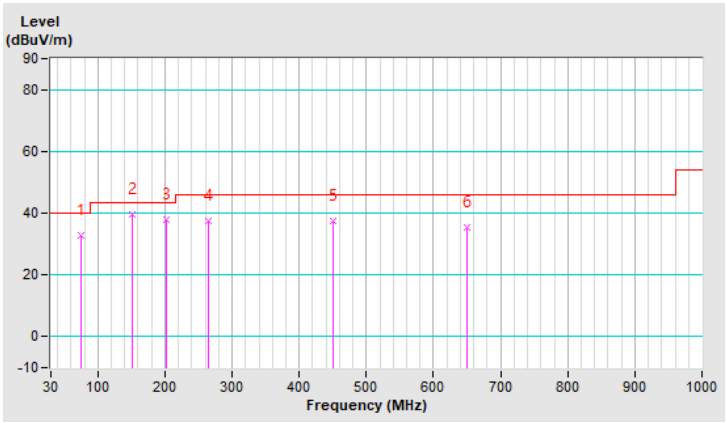
Below 1GHz Worst-Case Data:

RF Mode	TX 802.11ax (HE20)	Channel	CH 165：5825 MHz
Frequency Range	30MHz ~ 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	74.62	32.9 QP	40.0	-7.1	1.00 H	303	44.4	-11.5
2	150.28	39.6 QP	43.5	-3.9	1.49 H	229	48.3	-8.7
3	202.66	38.0 QP	43.5	-5.5	1.99 H	252	49.7	-11.7
4	264.74	37.4 QP	46.0	-8.6	1.99 H	252	46.1	-8.7
5	450.98	37.6 QP	46.0	-8.4	1.49 H	145	42.2	-4.6
6	650.80	35.4 QP	46.0	-10.6	1.00 H	270	36.2	-0.8

Remarks:

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

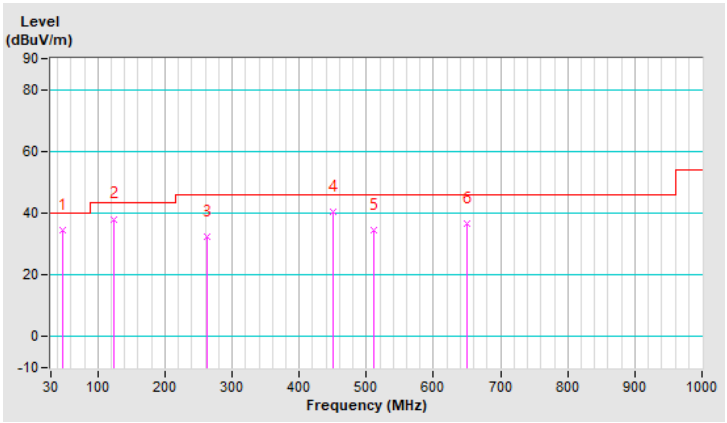


RF Mode	TX 802.11ax (HE20)	Channel	CH 165：5825 MHz
Frequency Range	30MHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	47.46	34.3 QP	40.0	-5.7	1.00 V	159	43.0	-8.7
2	123.12	38.1 QP	43.5	-5.4	1.49 V	224	48.9	-10.8
3	262.80	32.4 QP	46.0	-13.6	1.00 V	221	41.2	-8.8
4	450.98	40.3 QP	46.0	-5.7	1.00 V	286	44.9	-4.6
5	511.12	34.6 QP	46.0	-11.4	1.00 V	240	38.3	-3.7
6	650.80	36.5 QP	46.0	-9.5	1.49 V	268	37.3	-0.8

Remarks:

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

4.2.1 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.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 03, 2021	Dec. 02, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Jan. 15, 2022	Jan. 14, 2023
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Feb. 17, 2022	Feb. 16, 2023
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Sep. 07, 2021	Sep. 06, 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 1 (Conduction 1).
3. The VCCI Site Registration No. is C-12040.

4.2.3 Test Procedures

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.

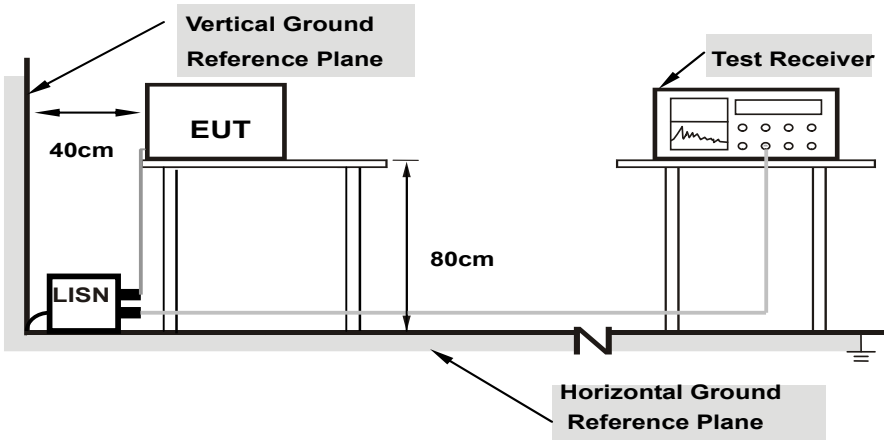
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 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).

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

Worst-case data:

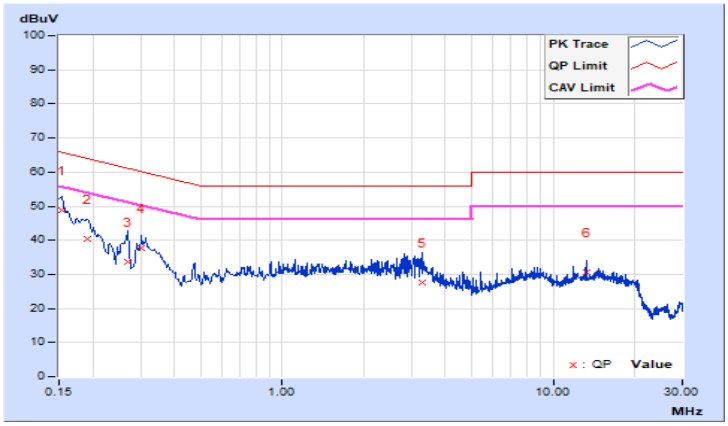
802.11ax (HE20)

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15400	9.68	39.00	29.29	48.68	38.97	65.78	55.78	-17.10	-16.81
2	0.19000	9.71	30.64	19.63	40.35	29.34	64.04	54.04	-23.69	-24.70
3	0.26992	9.75	24.03	12.64	33.78	22.39	61.12	51.12	-27.34	-28.73
4	0.30200	9.76	28.06	17.56	37.82	27.32	60.19	50.19	-22.37	-22.87
5	3.27000	9.93	17.56	9.06	27.49	18.99	56.00	46.00	-28.51	-27.01
6	13.24600	10.10	20.57	16.76	30.67	26.86	60.00	50.00	-29.33	-23.14

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.

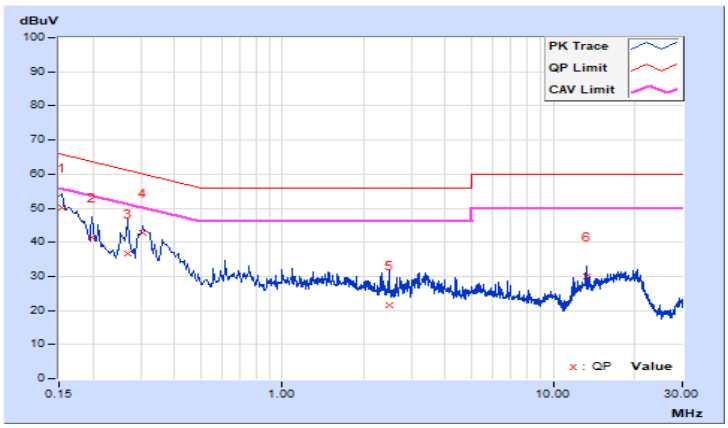


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15400**	**9.68**	**40.34**	**29.77**	**50.02**	**39.45**	**65.78**	**55.78**	**-15.76**	**-16.33**
2	0.19800	9.72	31.69	21.20	41.41	30.92	63.69	53.69	-22.28	-22.77
3	0.27000	9.75	26.88	16.10	36.63	25.85	61.12	51.12	-24.49	-25.27
4	0.30600	9.77	32.88	22.34	42.65	32.11	60.08	50.08	-17.43	-17.97
5	2.47400	9.93	11.70	4.83	21.63	14.76	56.00	46.00	-34.37	-31.24
6	13.23800	10.11	19.82	16.20	29.93	26.31	60.00	50.00	-30.07	-23.69

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.



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

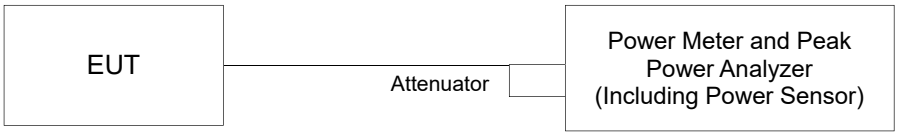
*B is the 26 dB emission bandwidth in megahertz

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

CDD Mode

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.92	20.61	20.92	20.62	477.615	26.79	30.00	Pass
40	5200	20.90	20.67	20.90	20.57	476.760	26.78	30.00	Pass
48	5240	20.91	20.64	20.84	20.56	474.290	26.76	30.00	Pass
149	5745	23.15	22.82	22.86	22.75	779.525	28.92	30.00	Pass
157	5785	23.12	22.75	22.78	22.72	770.220	28.87	30.00	Pass
165	5825	23.55	22.95	22.98	22.75	810.681	29.09	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.70	20.71	21.10	20.34	472.219	26.74	30.00	Pass
40	5200	20.83	20.52	20.81	20.61	469.363	26.72	30.00	Pass
48	5240	20.84	20.47	20.83	20.47	465.258	26.68	30.00	Pass
149	5745	22.95	22.56	22.78	22.62	750.025	28.75	30.00	Pass
157	5785	22.91	22.64	22.71	22.67	750.653	28.75	30.00	Pass
165	5825	23.40	22.75	22.86	22.73	787.837	28.96	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.66	17.20	17.32	16.80	212.639	23.28	30.00	Pass
46	5230	22.27	21.87	22.10	21.73	633.588	28.02	30.00	Pass
151	5755	23.11	22.88	22.82	22.91	785.593	28.95	30.00	Pass
159	5795	22.87	22.86	22.83	22.90	773.690	28.89	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.78	20.76	21.16	20.41	479.316	26.81	30.00	Pass
40	5200	20.90	20.60	20.88	20.68	477.254	26.79	30.00	Pass
48	5240	20.91	20.51	20.89	20.53	471.494	26.73	30.00	Pass
149	5745	23.04	22.63	22.83	22.68	761.824	28.82	30.00	Pass
157	5785	22.98	22.71	22.78	22.70	761.127	28.81	30.00	Pass
165	5825	23.47	22.81	22.93	22.81	800.638	29.03	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.73	17.26	17.37	16.89	215.944	23.34	30.00	Pass
46	5230	22.34	21.93	22.16	21.85	644.897	28.09	30.00	Pass
151	5755	23.16	22.93	22.87	22.96	794.689	29.00	30.00	Pass
159	5795	22.93	22.94	22.91	22.97	786.711	28.96	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	17.48	16.81	16.70	16.28	193.185	22.86	30.00	Pass
155	5775	21.98	21.57	21.81	21.82	605.070	27.82	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11ax (HE20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.86	20.82	21.22	20.53	488.094	26.89	30.00	Pass
40	5200	20.96	20.67	20.97	20.77	485.844	26.86	30.00	Pass
48	5240	20.98	20.60	20.96	20.64	480.746	26.82	30.00	Pass
149	5745	23.12	22.72	22.92	22.75	776.434	28.90	30.00	Pass
157	5785	23.09	22.76	22.85	22.78	774.926	28.89	30.00	Pass
165	5825	23.57	22.92	23.02	22.88	**817.930**	29.13	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11ax (HE40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.85	17.32	17.45	16.95	220.040	23.43	30.00	Pass
46	5230	22.42	22.02	22.21	21.92	**655.741**	28.17	30.00	Pass
151	5755	23.25	23.02	22.95	23.05	810.875	29.09	30.00	Pass
159	5795	23.09	23.05	22.98	23.03	805.060	29.06	30.00	Pass

Note:
For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.
For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

802.11ax (HE80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	17.54	16.95	16.75	17.32	207.566	23.17	30.00	Pass
155	5775	22.02	21.65	21.92	21.94	617.350	27.91	30.00	Pass

Note:

For 5180~5240MHz: Max. gain = 4.15dBi < 6dBi, so the power limit is not reduced.

For 5745~5825MHz: Max. gain = 4.78dBi < 6dBi, so the power limit is not reduced.

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	19.93	20.18	20.11	20.19	409.670	26.12	26.31	Pass
40	5200	20.13	20.12	20.08	20.10	410.029	26.13	26.31	Pass
48	5240	20.02	20.00	20.10	20.18	407.023	26.10	26.31	Pass
149	5745	19.93	20.01	20.06	20.14	403.299	26.06	26.71	Pass
157	5785	20.02	20.15	20.11	20.13	409.580	26.12	26.71	Pass
165	5825	20.11	20.16	20.21	20.16	415.025	26.18	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.69	17.13	17.22	16.74	210.320	23.23	26.31	Pass
46	5230	20.13	20.08	20.16	20.10	410.980	26.14	26.31	Pass
151	5755	20.01	20.11	19.96	20.16	405.632	26.08	26.71	Pass
159	5795	20.02	20.10	20.13	20.16	409.582	26.12	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ac (VHT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.08	20.21	20.18	20.22	416.241	26.19	26.31	Pass
40	5200	20.18	20.22	20.16	20.18	417.413	26.21	26.31	Pass
48	5240	20.11	20.08	20.19	20.22	414.093	26.17	26.31	Pass
149	5745	20.00	20.08	20.10	20.18	408.420	26.11	26.71	Pass
157	5785	20.10	20.23	20.16	20.22	416.717	26.20	26.71	Pass
165	5825	20.22	20.21	20.31	20.22	422.746	26.26	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.77	17.21	17.36	16.82	214.977	23.32	26.31	Pass
46	5230	20.16	20.11	20.28	20.12	415.779	26.19	26.31	Pass
151	5755	20.08	20.18	20.01	20.22	411.518	26.14	26.71	Pass
159	5795	20.08	20.12	20.16	20.21	413.273	26.16	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	17.42	16.82	16.63	17.21	201.919	23.05	26.31	Pass
155	5775	20.09	20.18	20.21	20.22	416.476	26.20	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ax (HE20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	20.15	20.33	20.22	20.31	**424.004**	26.27	26.31	Pass
40	5200	20.22	20.28	20.21	20.20	421.523	26.25	26.31	Pass
48	5240	20.20	20.12	20.24	20.33	421.091	26.24	26.31	Pass
149	5745	20.12	20.18	20.22	20.31	419.629	26.23	26.71	Pass
157	5785	20.16	20.31	20.22	20.28	423.008	26.26	26.71	Pass
165	5825	20.28	20.31	20.41	20.30	**431.111**	26.35	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ax (HE40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.85	17.32	17.45	16.95	220.040	23.43	26.31	Pass
46	5230	20.28	20.15	20.33	20.22	423.265	26.27	26.31	Pass
151	5755	20.16	20.22	20.18	20.36	421.823	26.25	26.71	Pass
159	5795	20.11	20.18	20.21	20.34	419.895	26.23	26.71	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ax (HE80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	17.54	16.95	16.75	17.32	207.566	23.17	26.31	Pass
155	5775	20.18	20.22	20.23	20.31	422.266	26.26	26.71	Pass

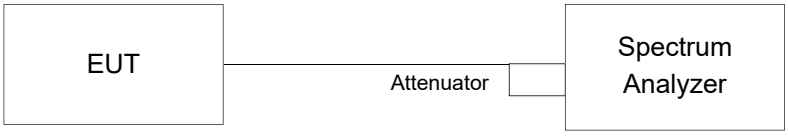
Note:

For 5180~5240MHz: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power limit shall be reduced to 30-(9.69-6) = 26.31dBm.

For 5745~5825MHz: Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power limit shall be reduced to 30-(9.29-6) = 26.71dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.40	17.52	17.52	17.28
40	5200	17.28	17.28	17.28	17.28
48	5240	17.28	17.28	17.28	17.28
149	5745	17.74	17.57	17.65	17.57
157	5785	18.48	18.36	18.12	18.12
165	5825	19.08	18.60	18.84	18.96

802.11ax (HE20)

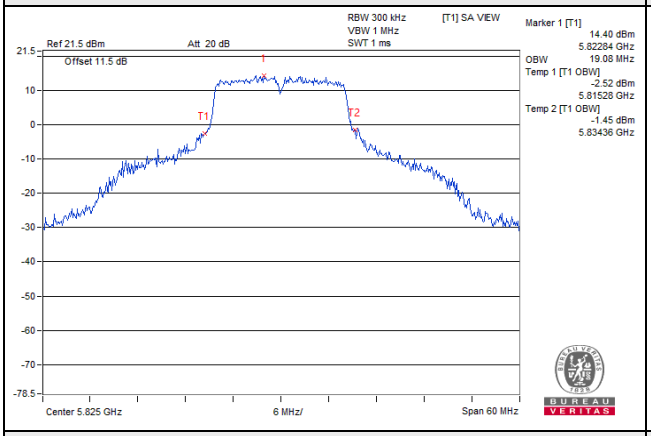
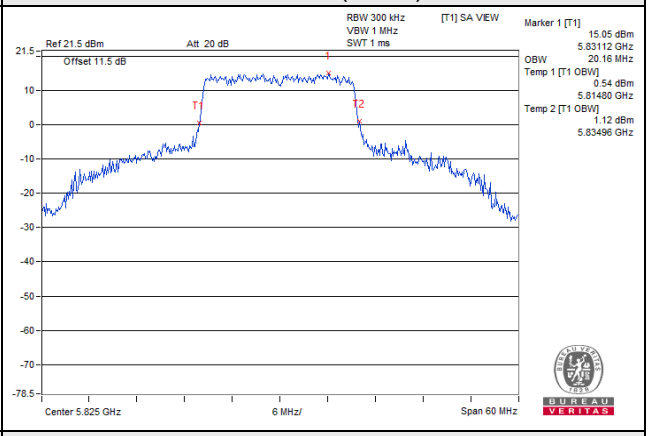
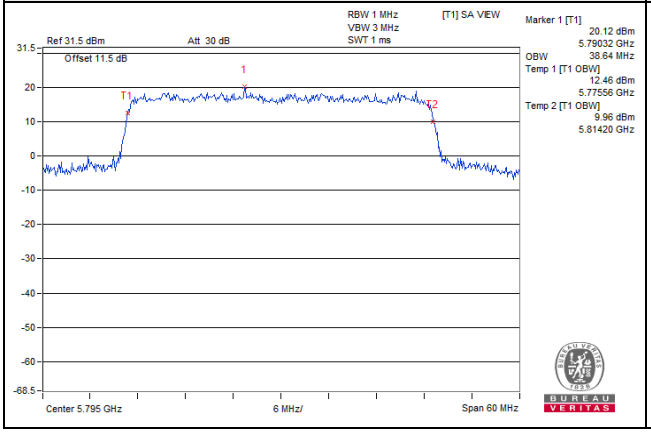
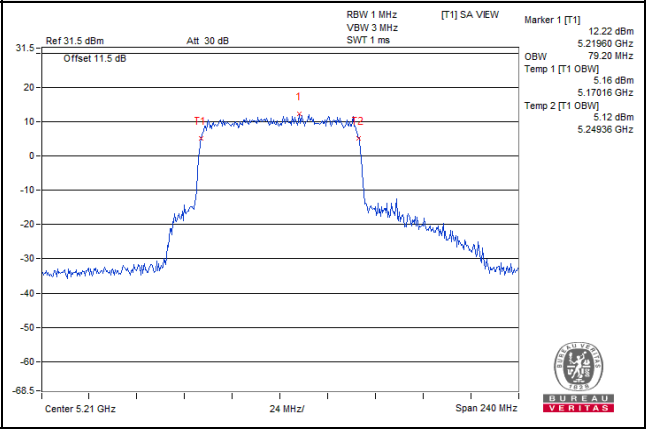
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.44	19.32	19.32	19.32
40	5200	19.20	19.20	19.20	19.20
48	5240	19.32	19.32	19.32	19.32
149	5745	19.48	19.40	19.48	19.40
157	5785	19.68	19.68	19.68	19.08
165	5825	20.16	19.80	19.80	19.92

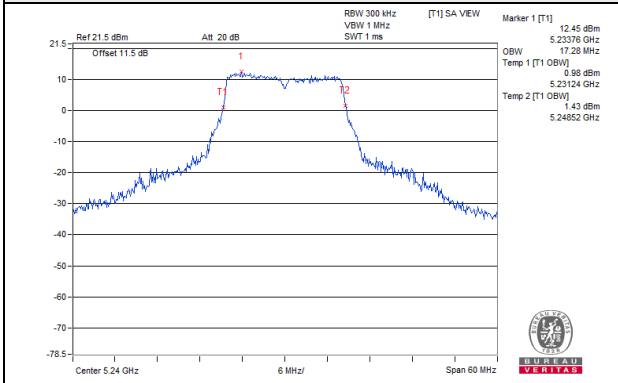
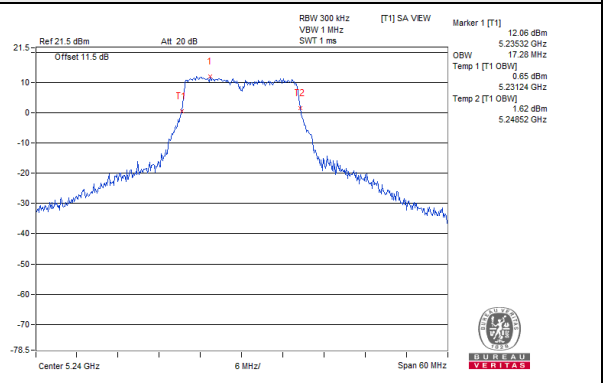
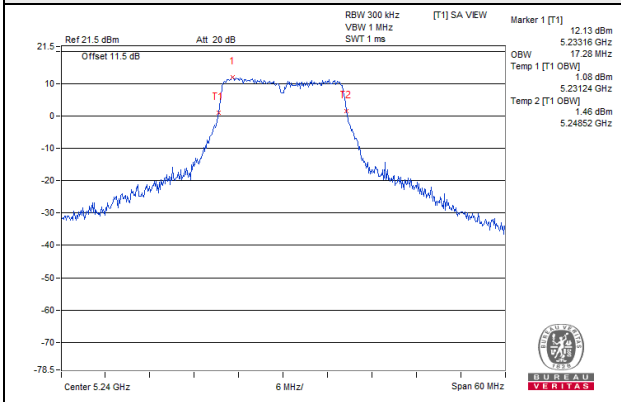
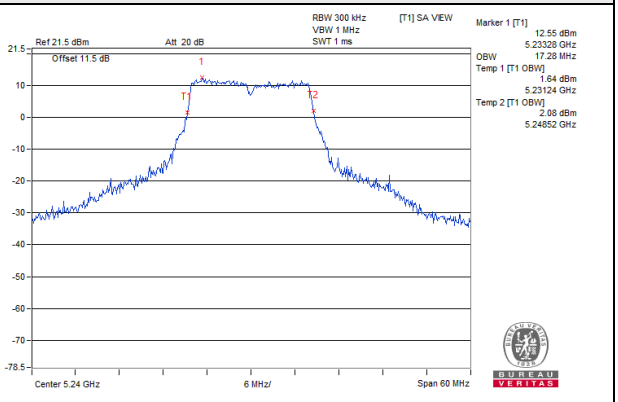
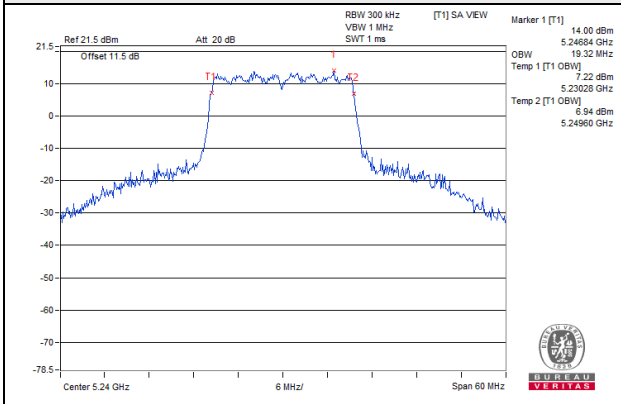
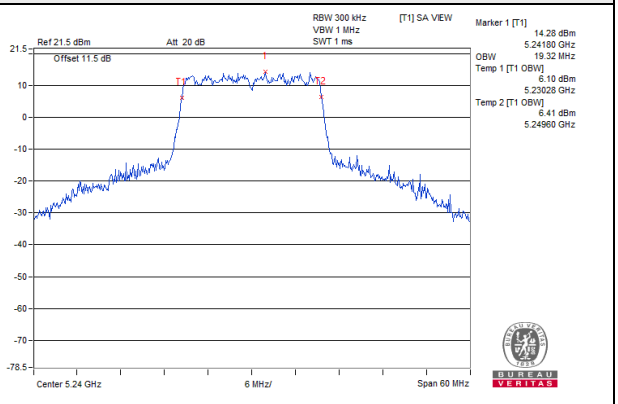
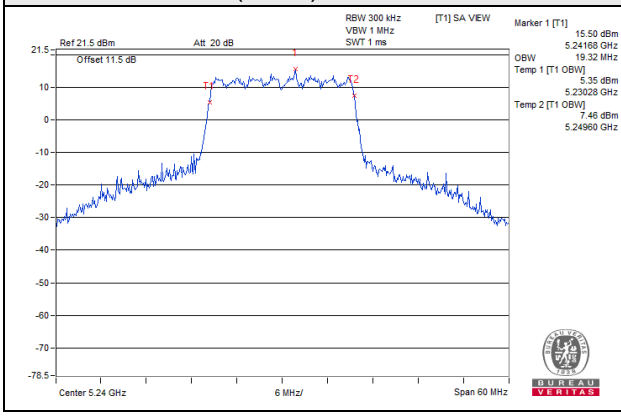
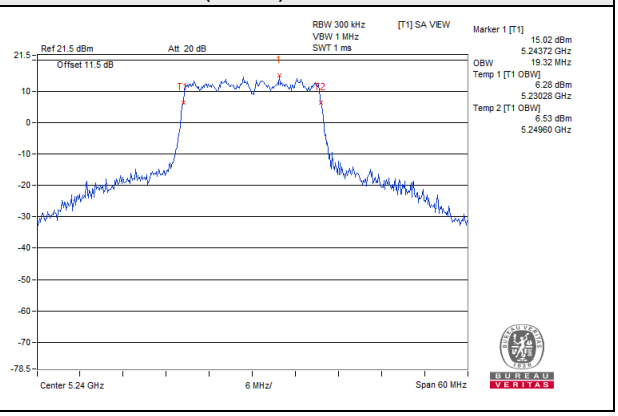
802.11ax (HE40)

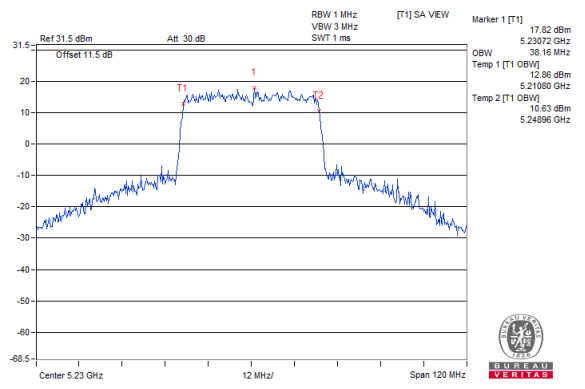
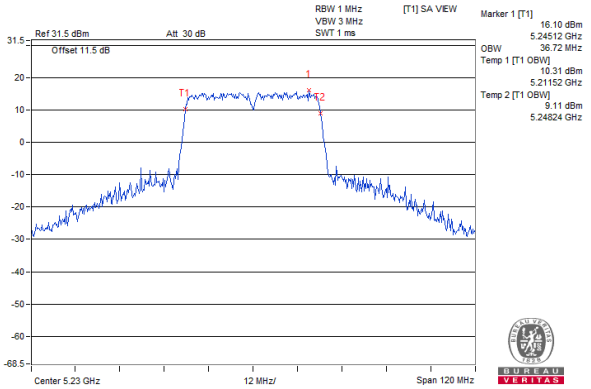
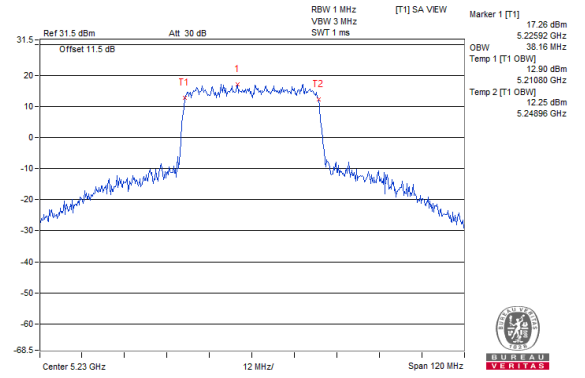
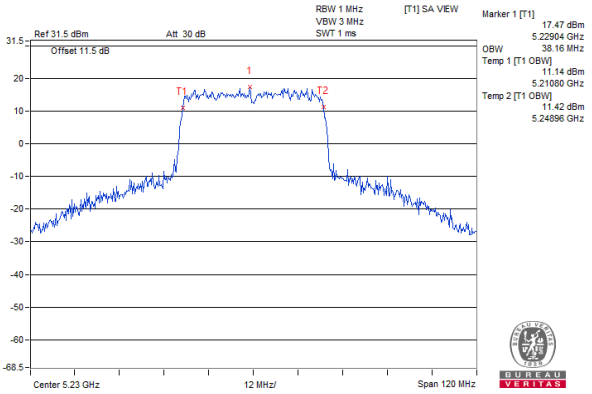
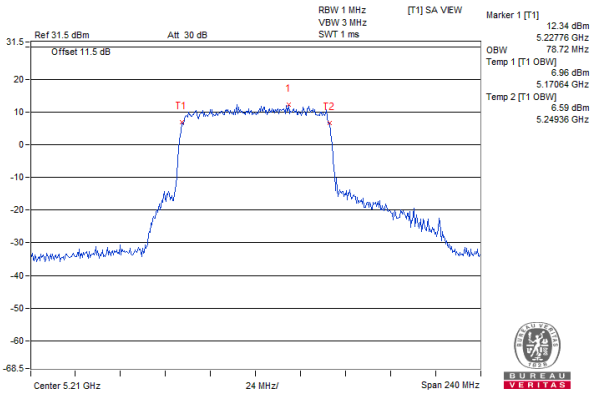
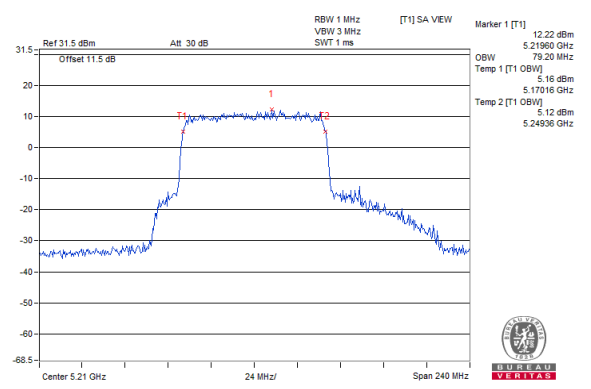
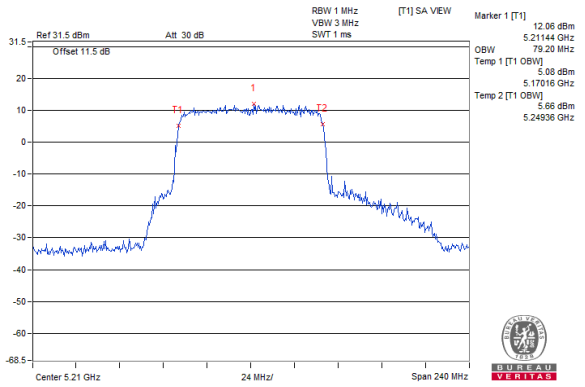
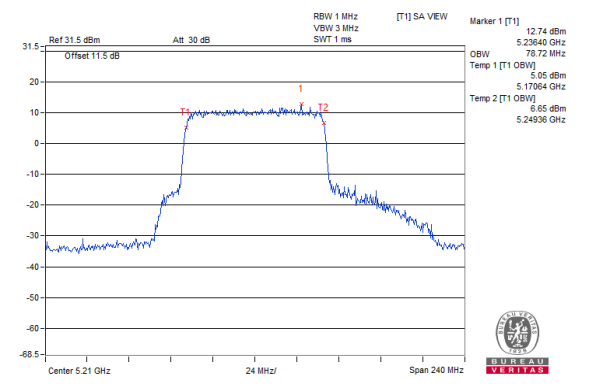
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	38.28	36.84	38.28	36.84
46	5230	38.16	36.72	38.16	38.16
151	5755	37.57	38.61	37.39	38.61
159	5795	38.64	38.52	38.52	38.52

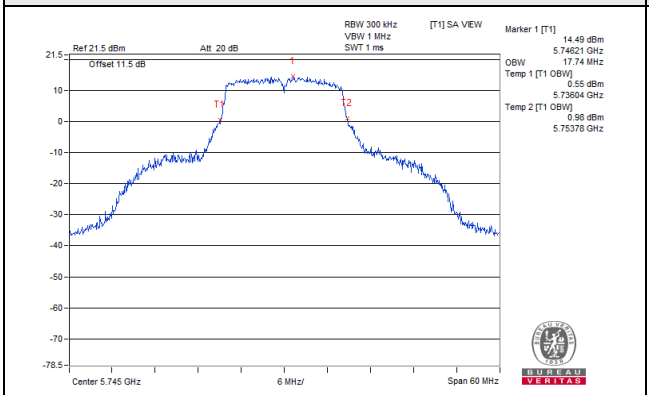
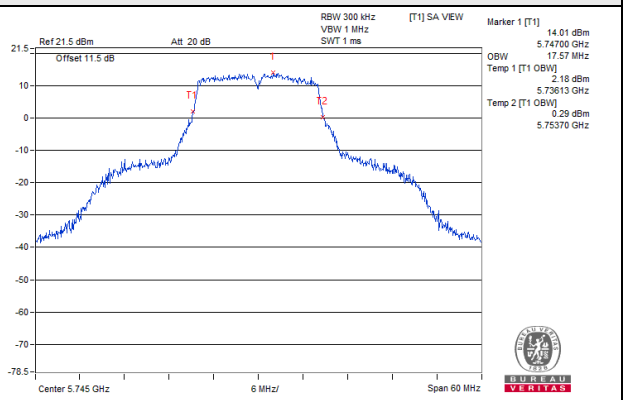
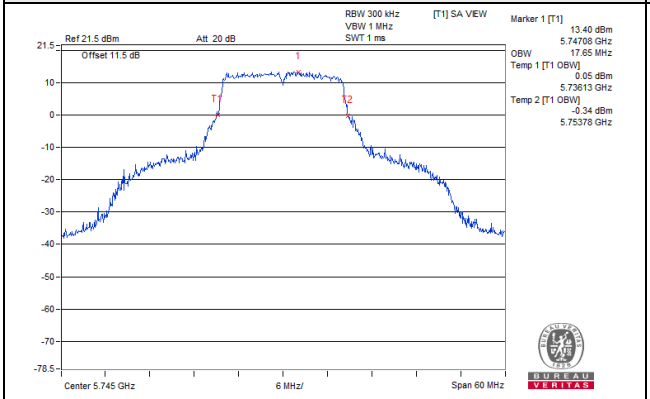
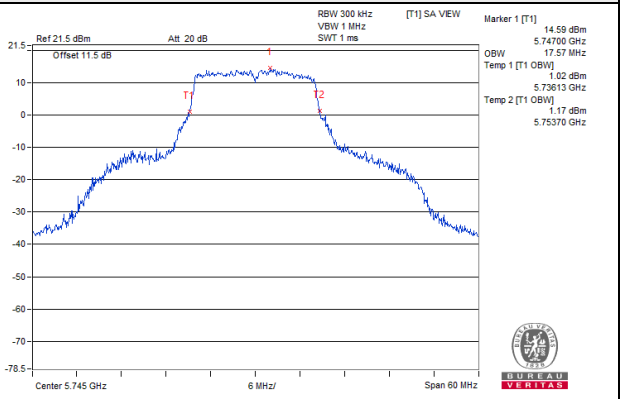
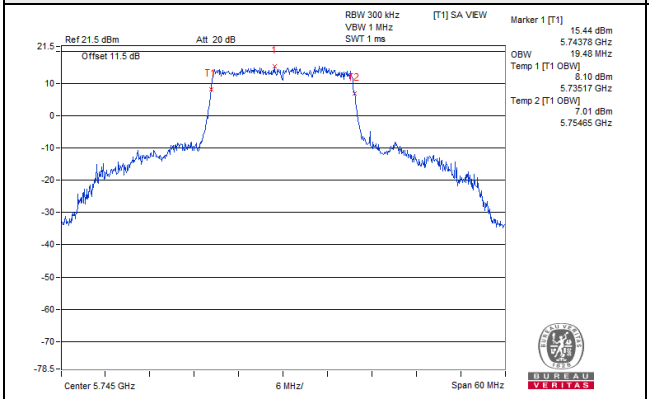
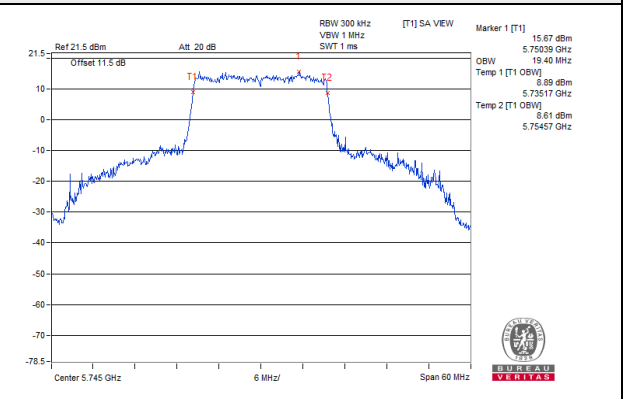
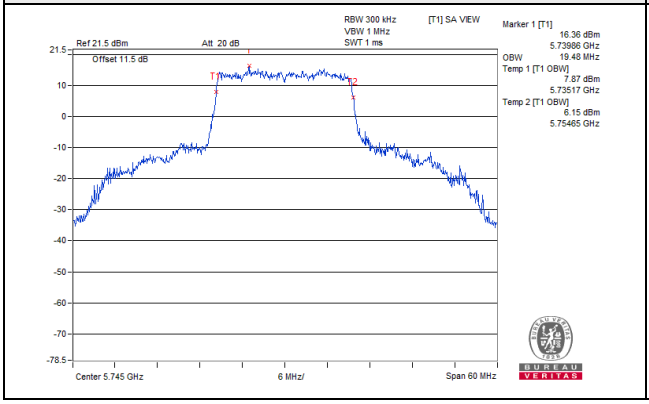
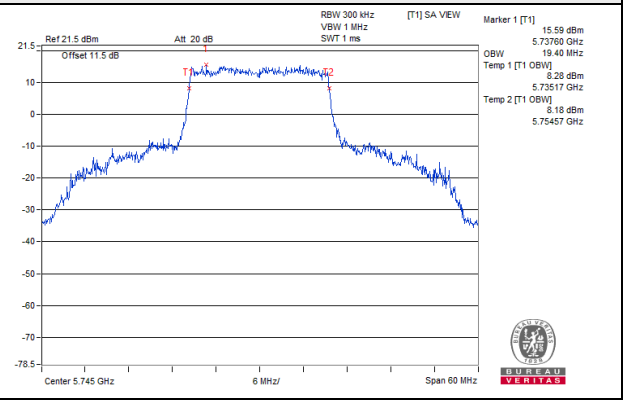
802.11ax (HE80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	78.72	79.20	79.20	78.72
155	5775	77.57	77.57	77.57	77.57

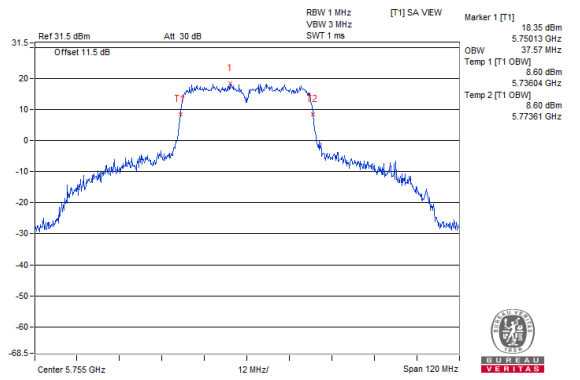
Spectrum Plot of Worst Value	
802.11a	802.11ax (HE20)
	
802.11ax (HE40)	802.11ax (HE80)
	

Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 48	802.11a / Chain 1 / CH 48
	
802.11a / Chain 2 / CH 48	802.11a / Chain 3 / CH 48
	
802.11ax (HE20) / Chain 0 / CH 48	802.11ax (HE20) / Chain 1 / CH 48
	
802.11ax (HE20) / Chain 2 / CH 48	802.11ax (HE20) / Chain 3 / CH 48
	

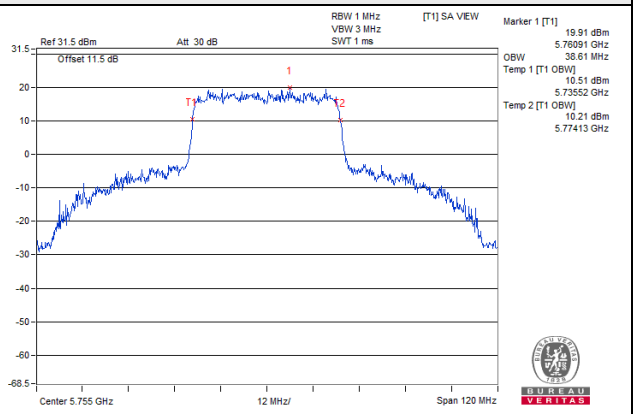
802.11ax (HE40) / Chain 0 / CH 46	802.11ax (HE40) / Chain 1 / CH 46
	
802.11ax (HE40) / Chain 2 / CH 46	**802.11ax (HE40) / Chain 3 / CH 46**
	
802.11ax (HE80) / Chain 0 / CH 42	**802.11ax (HE80) / Chain 1 / CH 42**
	
802.11ax (HE80) / Chain 2 / CH 42	**802.11ax (HE80) / Chain 3 / CH 42**
	

Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 149	802.11a / Chain 1 / CH 149
	
802.11a / Chain 2 / CH 149	802.11a / Chain 3 / CH 149
	
802.11ax (HE20) / Chain 0 / CH 149	802.11ax (HE20) / Chain 1 / CH 149
	
802.11ax (HE20) / Chain 2 / CH 149	802.11ax (HE20) / Chain 3 / CH 149
	

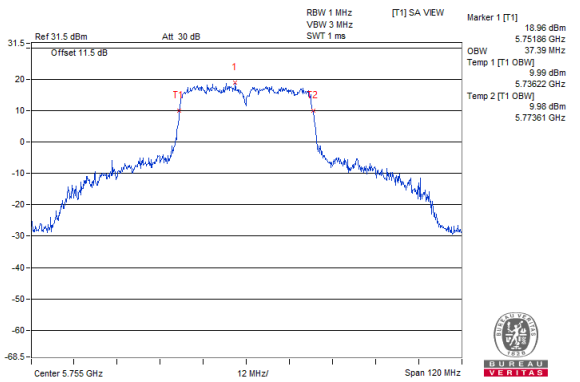
802.11ax (HE40) / Chain 0 / CH 151



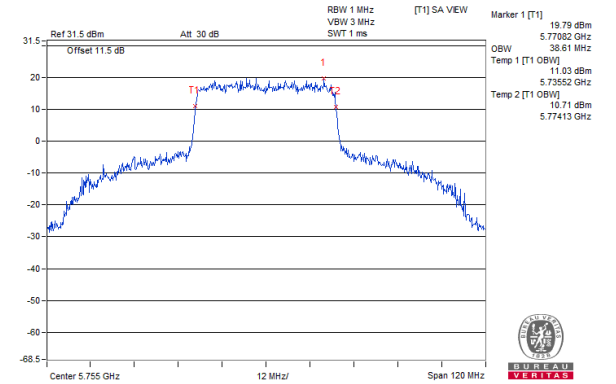
802.11ax (HE40) / Chain 1 / CH 151



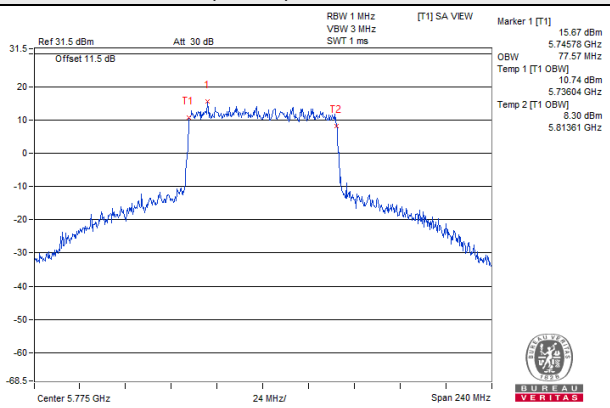
802.11ax (HE40) / Chain 2 / CH 151



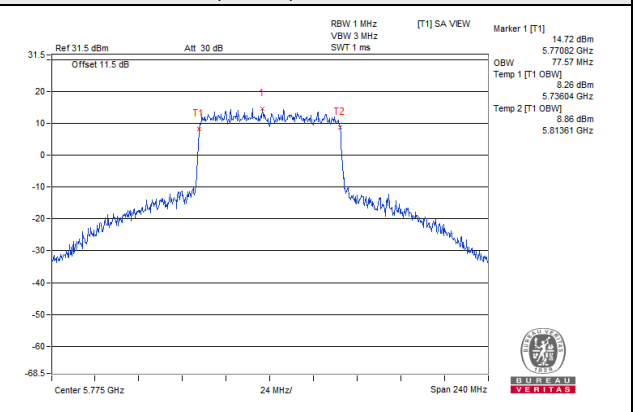
802.11ax (HE40) / Chain 3 / CH 151



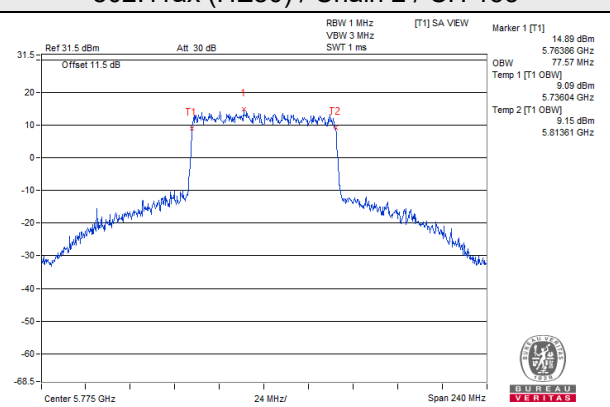
802.11ax (HE80) / Chain 0 / CH 155



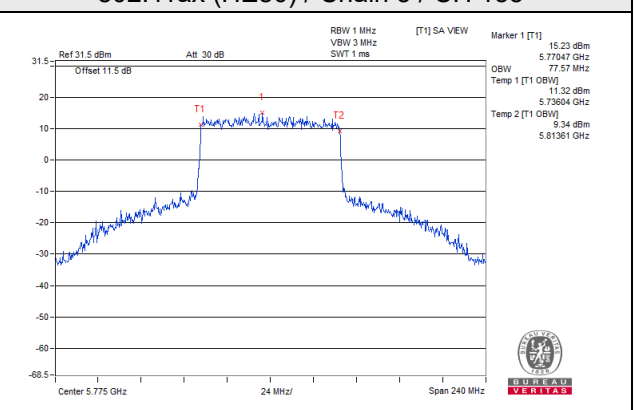
802.11ax (HE80) / Chain 1 / CH 155



802.11ax (HE80) / Chain 2 / CH 155



802.11ax (HE80) / Chain 3 / CH 155

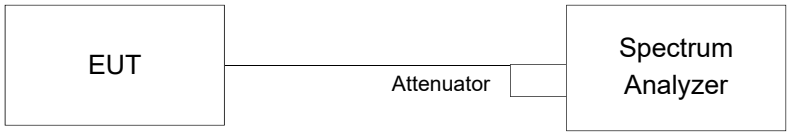


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
	√	Indoor Access Point	
		Mobile and Portable client device	11dBm/ MHz
U-NII-2A	-		11dBm/ MHz
U-NII-2C	-		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

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 Procedures

For U-NII-1 band:

Using method SA-1

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS

c. Set Channel power measure = 1MHz

d. Sweep time = auto, trigger set to “free run”.

e. Trace average at least 100 traces in power averaging mode.

f. Record the max value

For U-NII-3 band:

a. Set span to encompass the entire emission bandwidth (EBW) of the signal.

b. Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS

c. Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.

d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (increasing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz)

e. Sweep time = auto, trigger set to “free run”.

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

g. Record the max value

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	7.33	7.01	7.29	7.06	13.20	13.31	Pass
40	5200	7.29	6.99	7.28	6.97	13.16	13.31	Pass
48	5240	7.26	7.02	7.22	6.94	13.13	13.31	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power density limit shall be reduced to 17-(9.69-6) = 13.31dBm.

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
36	5180	7.18	7.09	7.54	6.81	13.18	13.31	Pass
40	5200	7.34	6.99	7.32	7.25	13.25	13.31	Pass
48	5240	7.37	7.03	7.42	7.10	13.25	13.31	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power density limit shall be reduced to 17-(9.69-6) = 13.31dBm.

802.11ax (HE40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
38	5190	1.30	0.82	0.93	0.42	6.90	13.31	Pass
46	5230	5.93	5.51	5.74	5.40	11.67	13.31	Pass

Note:
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.69dBi > 6dBi, so the power density limit shall be reduced to 17-(9.69-6) = 13.31dBm.

802.11ax (HE80)

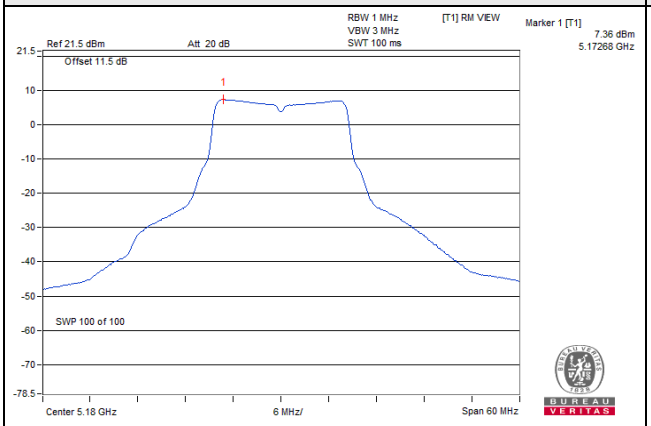
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3			
42	5210	-1.93	-2.52	-2.80	-2.15	3.68	13.31	Pass

Note:

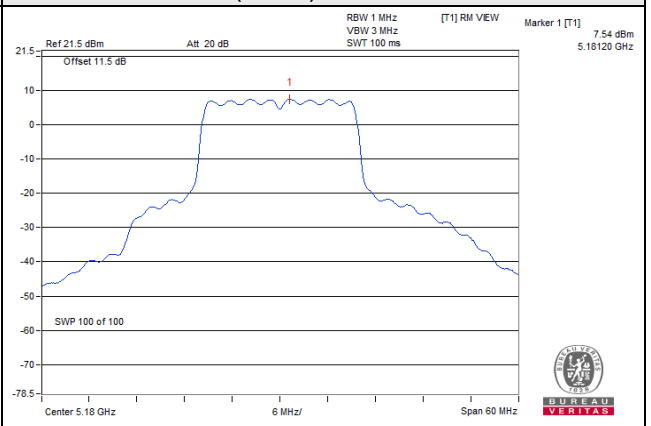
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[($10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2$/4]=9.69dBi > 6dBi, so the power density limit shall be reduced to 17-(9.69-6) = 13.31dBm.

Spectrum Plot of Worst Value

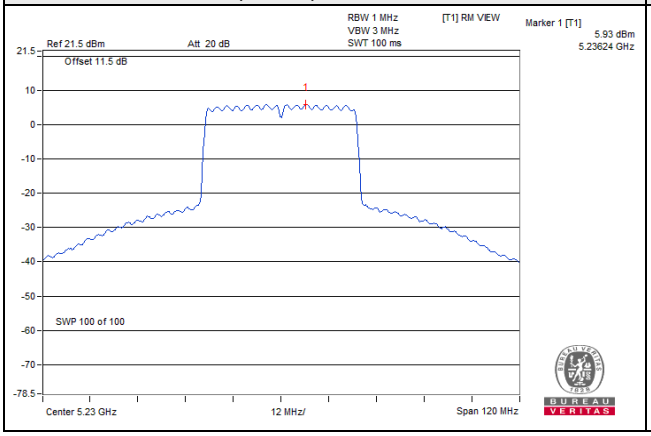
802.11a / Chain 0 / CH 36



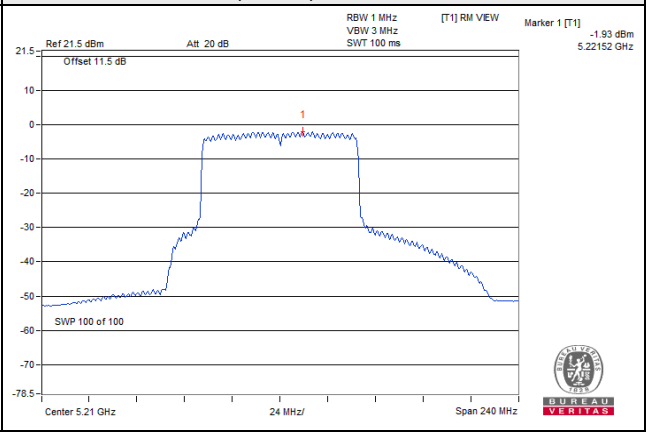
802.11ax (HE20) / Chain 2 / CH 36



802.11ax (HE40) / Chain 0 / CH 46



802.11ax (HE80) / Chain 0 / CH 42



For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	1.72	3.94	6.02	9.96	26.71	Pass
	157	5785	1.81	4.03	6.02	10.05	26.71	Pass
	165	5825	1.83	4.05	6.02	10.07	26.71	Pass
1	149	5745	1.32	3.54	6.02	9.56	26.71	Pass
	157	5785	1.49	3.71	6.02	9.73	26.71	Pass
	165	5825	1.44	3.66	6.02	9.68	26.71	Pass
2	149	5745	1.56	3.78	6.02	9.80	26.71	Pass
	157	5785	1.62	3.84	6.02	9.86	26.71	Pass
	165	5825	1.85	4.07	6.02	10.09	26.71	Pass
3	149	5745	1.76	3.98	6.02	10.00	26.71	Pass
	157	5785	1.79	4.01	6.02	10.03	26.71	Pass
	165	5825	1.97	4.19	6.02	10.21	26.71	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure value and add 10 log (NANT) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power density limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ax (HE20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	0.79	3.01	6.02	9.03	26.71	Pass
	157	5785	0.93	3.15	6.02	9.17	26.71	Pass
	165	5825	1.02	3.24	6.02	9.26	26.71	Pass
1	149	5745	0.41	2.63	6.02	8.65	26.71	Pass
	157	5785	0.85	3.07	6.02	9.09	26.71	Pass
	165	5825	0.92	3.14	6.02	9.16	26.71	Pass
2	149	5745	0.54	2.76	6.02	8.78	26.71	Pass
	157	5785	0.85	3.07	6.02	9.09	26.71	Pass
	165	5825	1.01	3.23	6.02	9.25	26.71	Pass
3	149	5745	0.45	2.67	6.02	8.69	26.71	Pass
	157	5785	1.63	3.85	6.02	9.87	26.71	Pass
	165	5825	0.81	3.03	6.02	9.05	26.71	Pass

Note:

1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure value and add 10 log (NANT) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power density limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ax (HE40)

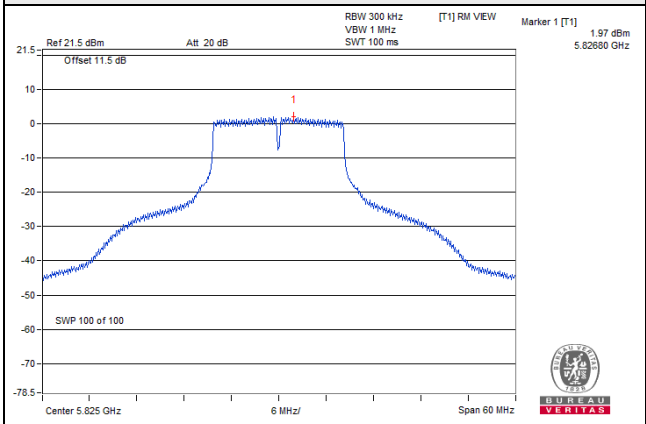
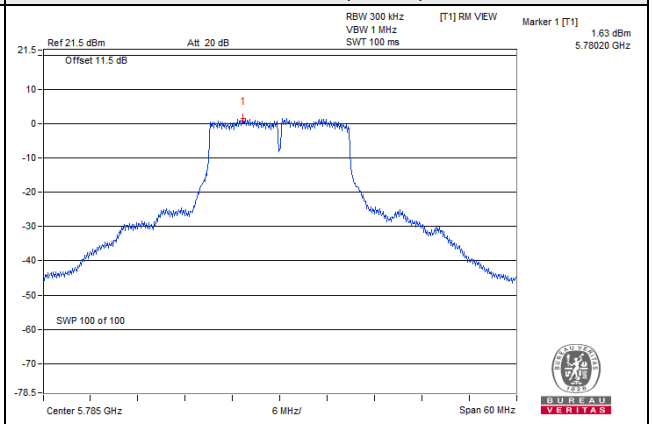
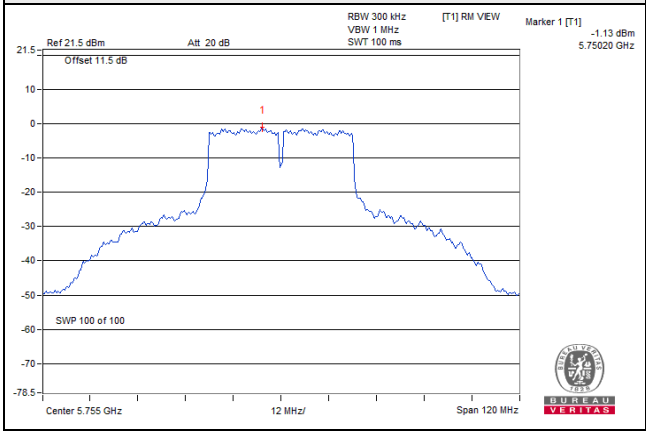
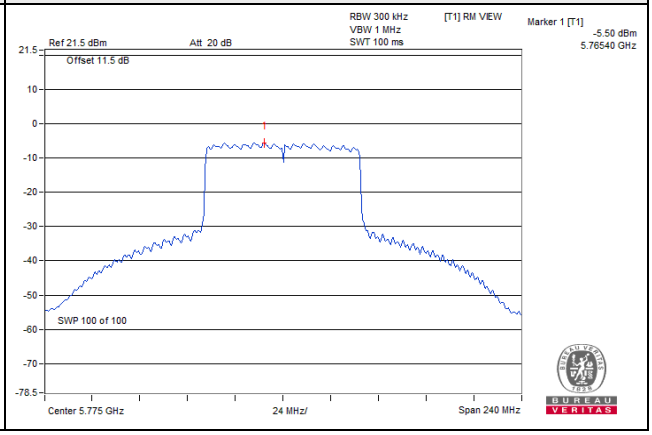
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	151	5755	-1.13	1.09	6.02	7.11	26.71	Pass
	159	5795	-1.81	0.41	6.02	6.43	26.71	Pass
1	151	5755	-1.52	0.70	6.02	6.72	26.71	Pass
	159	5795	-2.00	0.22	6.02	6.24	26.71	Pass
2	151	5755	-1.18	1.04	6.02	7.06	26.71	Pass
	159	5795	-1.64	0.58	6.02	6.60	26.71	Pass
3	151	5755	-1.63	0.59	6.02	6.61	26.71	Pass
	159	5795	-1.70	0.52	6.02	6.54	26.71	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure value and add 10 log (NANT) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power density limit shall be reduced to 30-(9.29-6) = 26.71dBm.

802.11ax (HE80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	155	5775	-5.63	-3.41	6.02	2.61	26.71	Pass
1	155	5775	-5.63	-3.41	6.02	2.61	26.71	Pass
2	155	5775	-5.53	-3.31	6.02	2.71	26.71	Pass
3	155	5775	-5.50	-3.28	6.02	2.74	26.71	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure value and add 10 log (NANT) dB.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=9.29dBi > 6dBi, so the power density limit shall be reduced to 30-(9.29-6) = 26.71dBm.

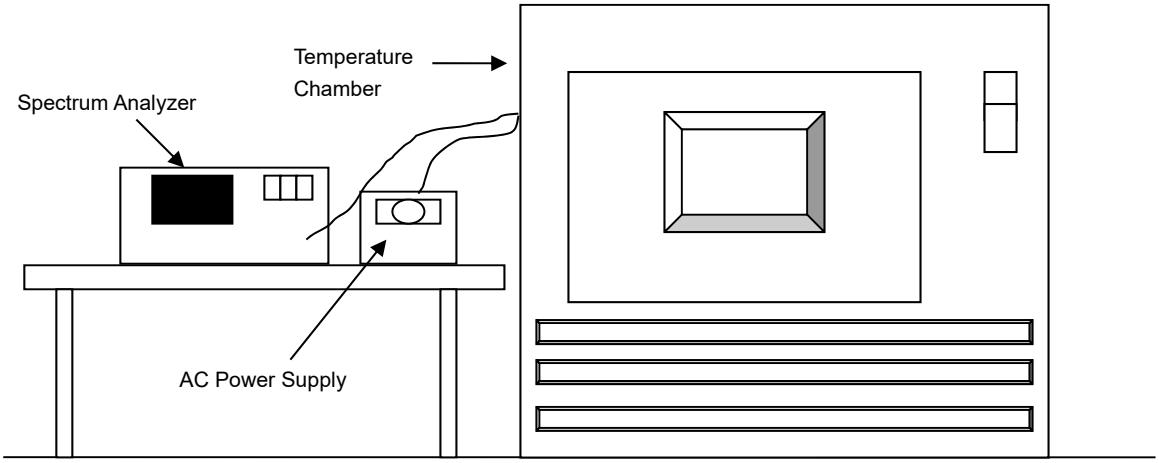
Spectrum Plot of Worst Value	
802.11a	802.11ax (HE20)
	
802.11ax (HE40)	802.11ax (HE80)
	

4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 10, 2021	Jun. 09, 2022
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 10, 2021	Sep. 09, 2022
Digital Multimeter Fluke	87-III	70360742	Jun. 24, 2021	Jun. 23, 2022
AC Power Supply Extech	CFW-105	E000603	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.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. 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.

e. Repeat step (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.

f. 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.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
40	120	5179.9961	Pass	5179.9967	Pass	5179.9965	Pass	5179.9962	Pass
30	120	5179.9854	Pass	5179.9848	Pass	5179.9866	Pass	5179.9864	Pass
20	120	5180.0132	Pass	5180.0103	Pass	5180.0148	Pass	5180.0146	Pass
10	120	5180.0170	Pass	5180.0152	Pass	5180.0187	Pass	5180.0160	Pass
0	120	5179.9769	Pass	5179.9781	Pass	5179.9737	Pass	5179.9772	Pass

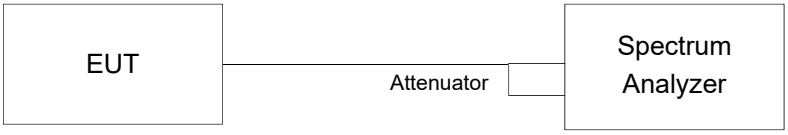
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0030	Pass	5180.0070	Pass	5180.0073	Pass	5180.0053	PASS
	120	5180.0132	Pass	5180.0103	Pass	5180.0148	Pass	5180.0146	PASS
	102	5180.0123	Pass	5180.0121	Pass	5180.0106	Pass	5180.0116	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.34	16.36	16.36	16.36	0.50	Pass
157	5785	16.39	16.40	16.40	16.39	0.50	Pass
165	5825	16.42	16.41	16.44	16.41	0.50	Pass

802.11ax (HE20)

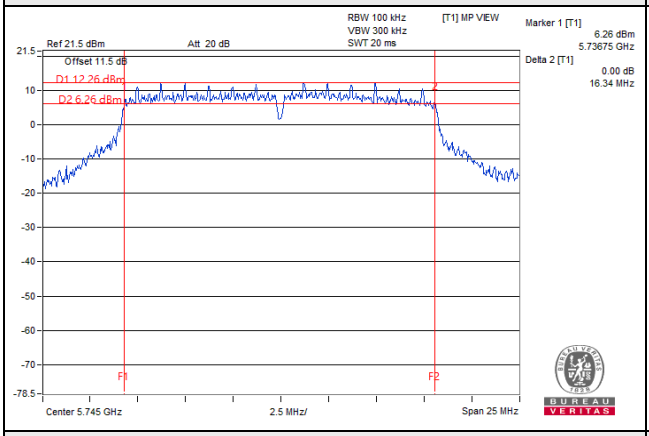
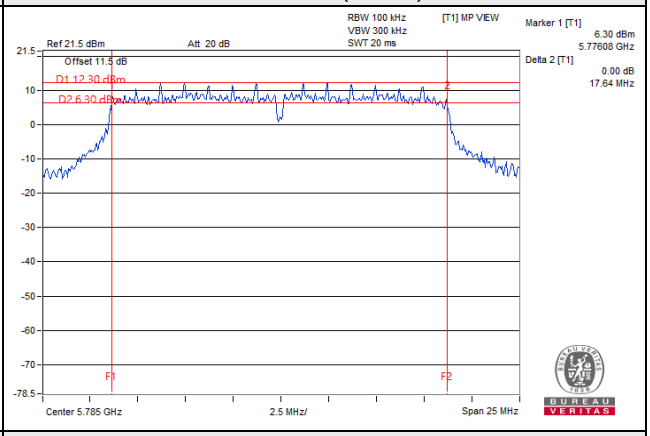
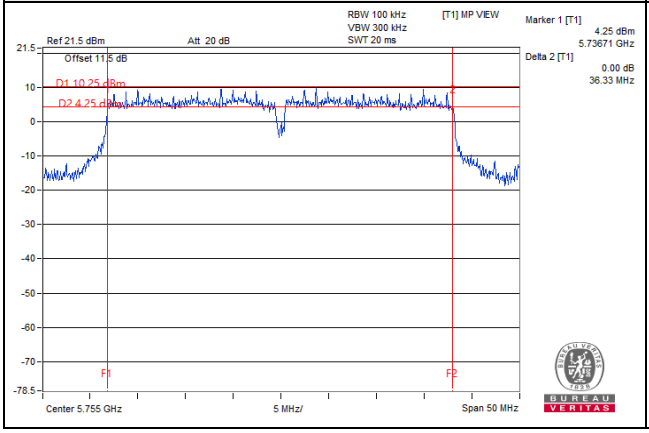
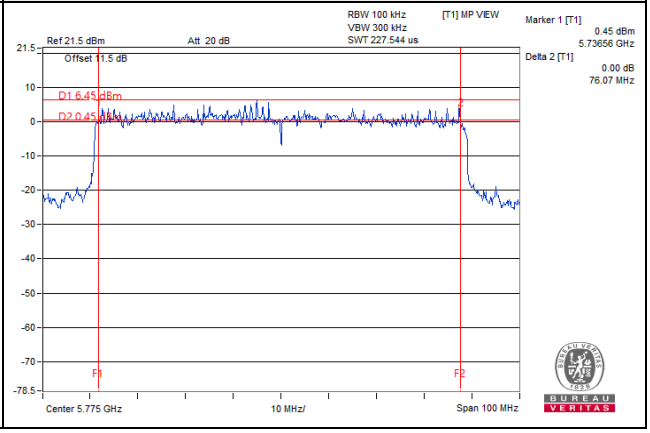
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	18.99	19.05	19.02	19.02	0.50	Pass
157	5785	19.04	19.00	19.02	17.64	0.50	Pass
165	5825	19.07	18.99	19.02	19.07	0.50	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	36.41	37.86	36.33	37.85	0.50	Pass
159	5795	37.83	37.87	37.69	37.93	0.50	Pass

802.11ax (HE80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.80	76.99	76.07	77.51	0.50	Pass

Spectrum Plot of Worst Value	
802.11a	802.11ax (HE20)
	
802.11ax (HE40)	802.11ax (HE80)
	

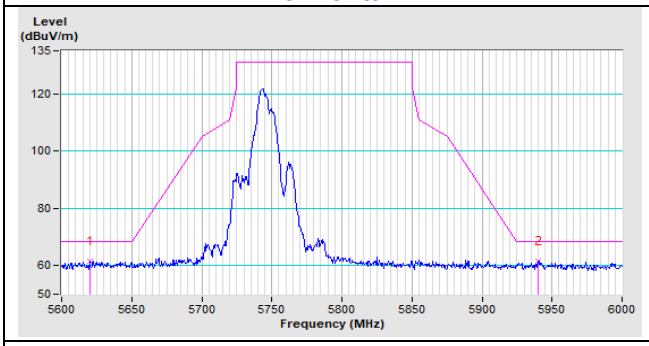
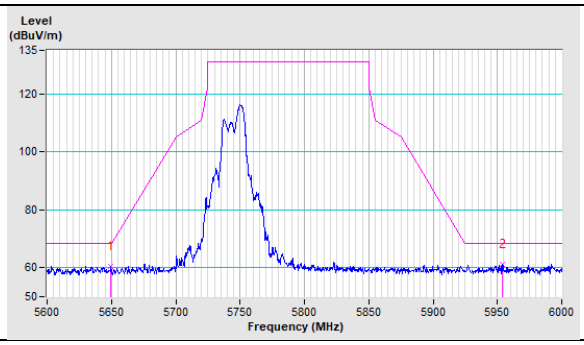
5 Pictures of Test Arrangements

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

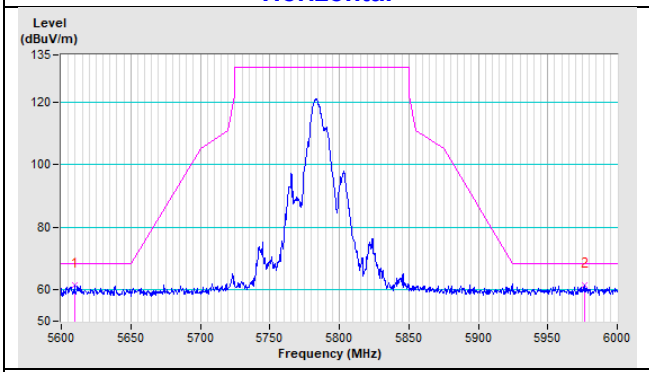
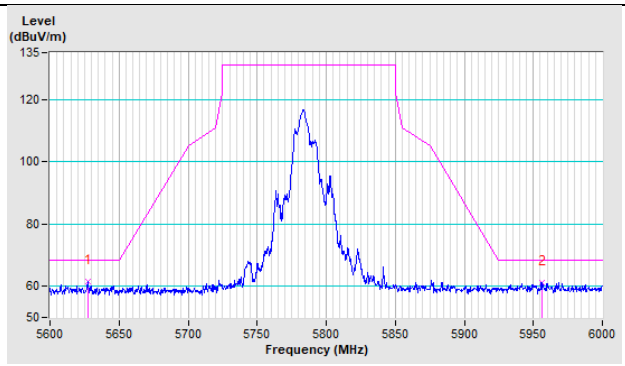
Annex A - Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

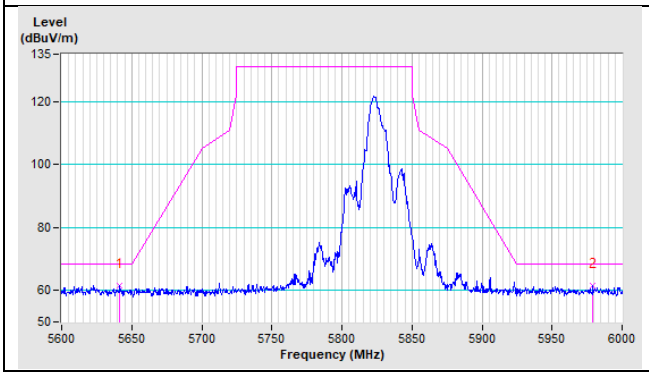
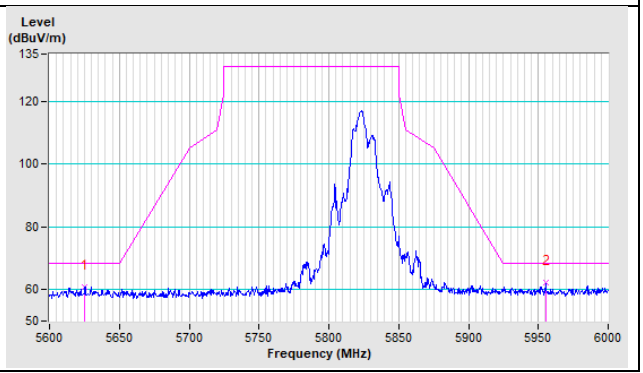
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

Horizontal	Vertical
	

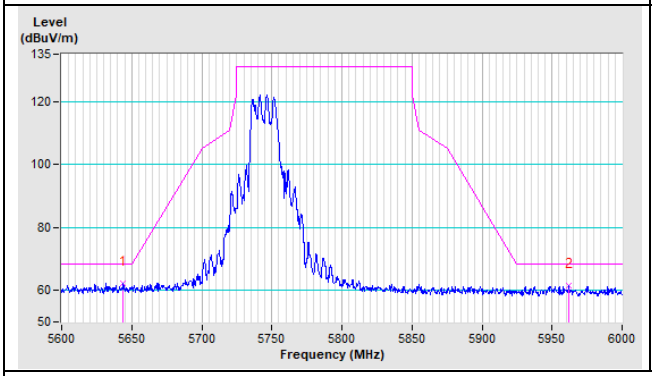
CH 165 5825 MHz

Horizontal	Vertical
	

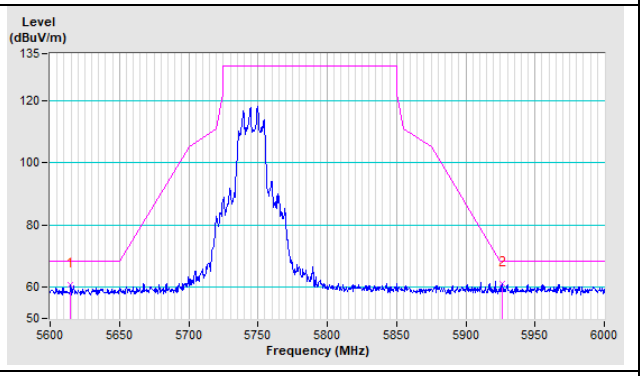
802.11ax (HE20)

CH 149 5745 MHz

Horizontal

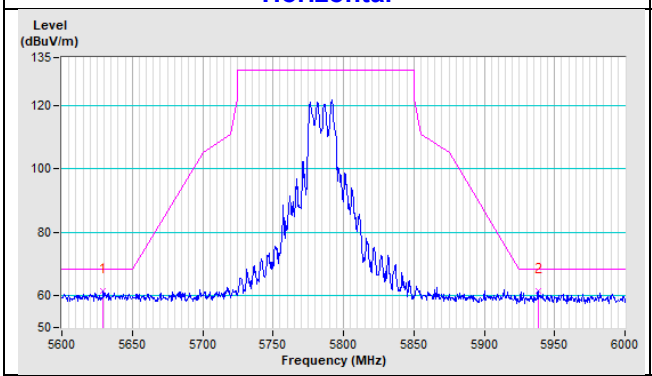


Vertical

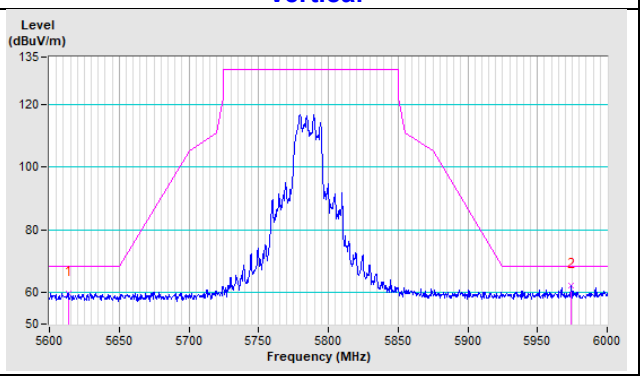


CH 157 5785 MHz

Horizontal

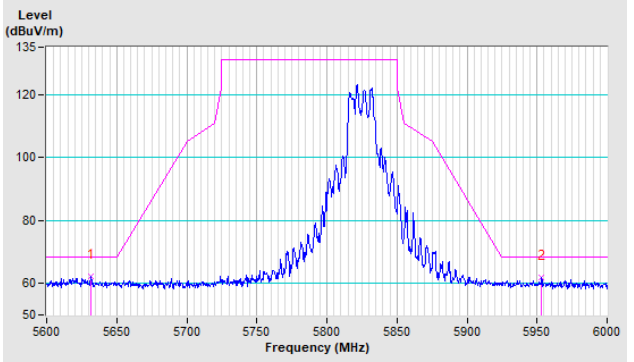


Vertical

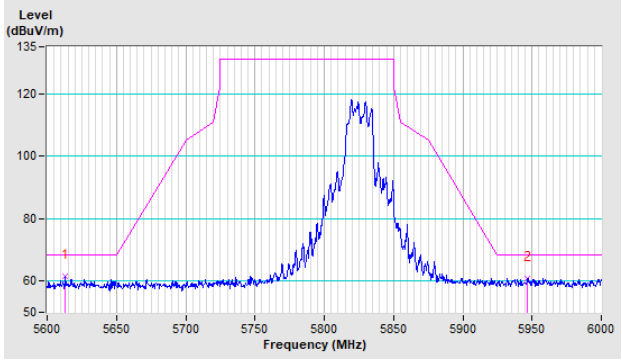


CH 165 5825 MHz

Horizontal

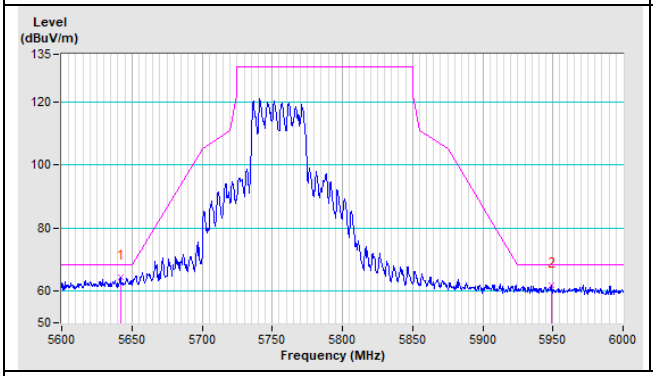
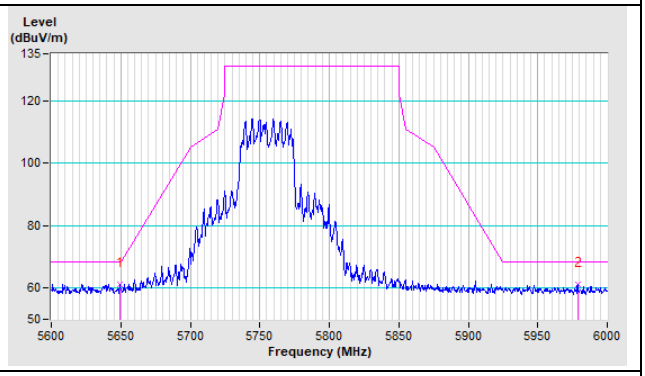


Vertical

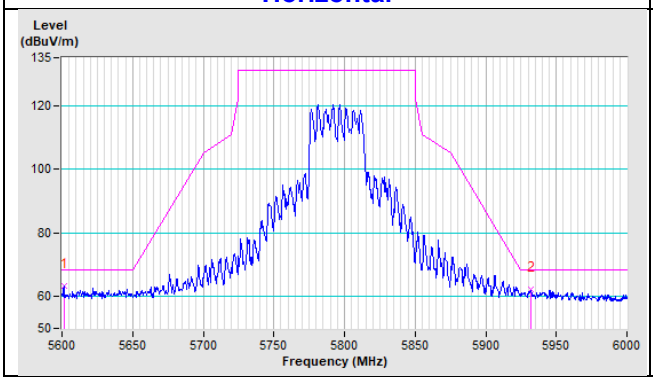
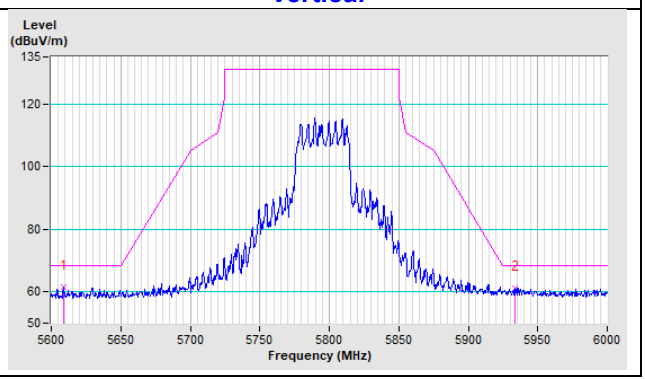


802.11ax (HE40)

CH 151 5755 MHz

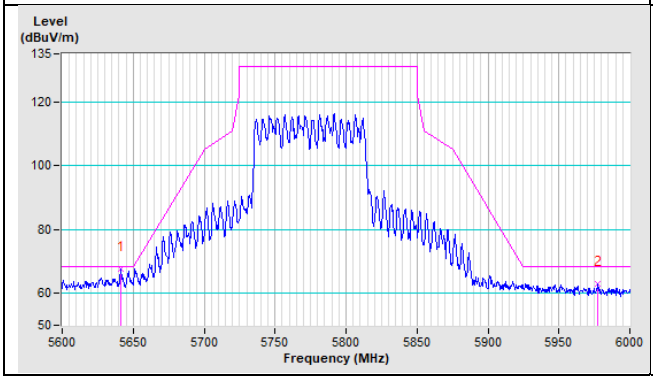
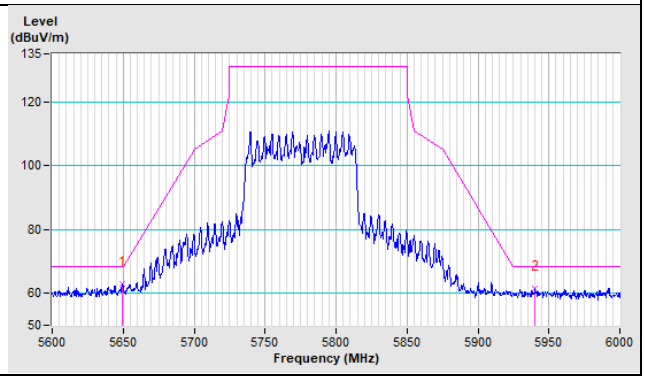
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ax (HE80)

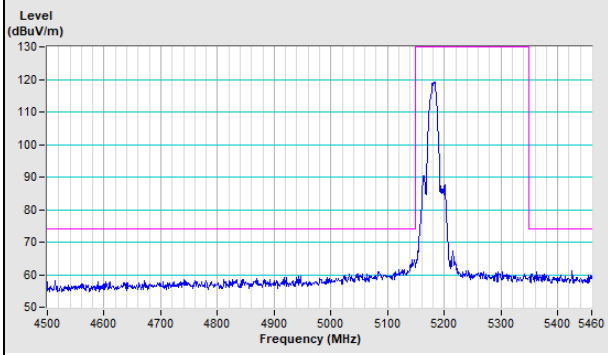
CH 155 5775 MHz

Horizontal	Vertical
	

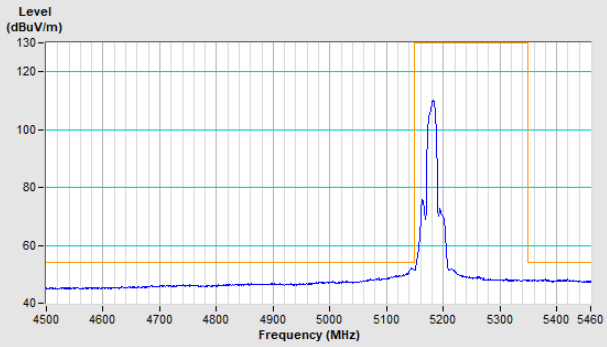
Annex B - Band Edge Measurement

802.11a Channel 36

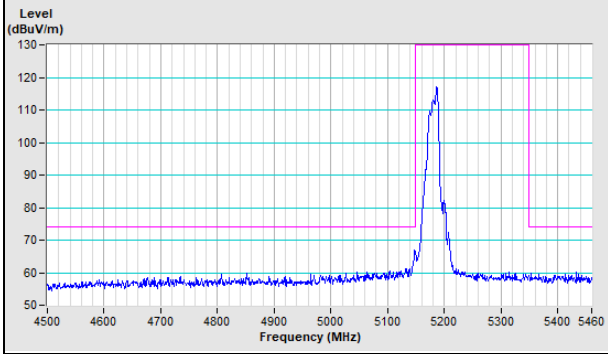
Horizontal (Peak)



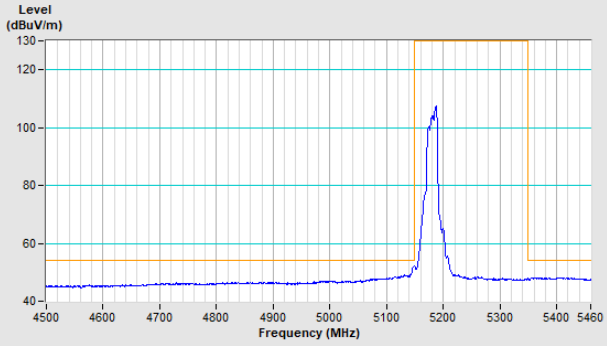
Horizontal (Average)



Vertical (Peak)

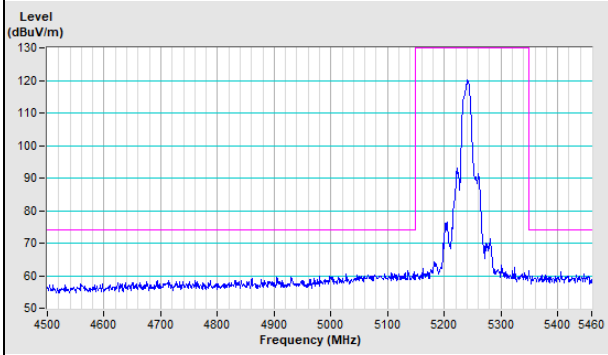


Vertical (Average)

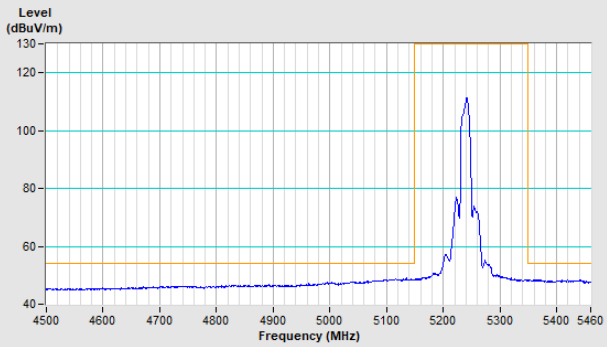


802.11a Channel 48

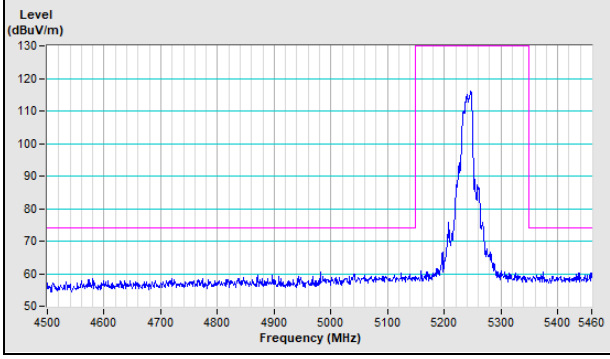
Horizontal (Peak)



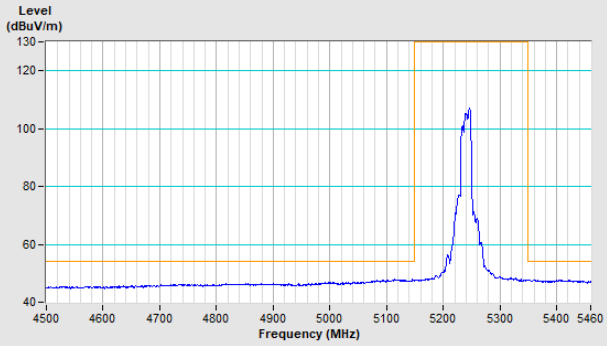
Horizontal (Average)

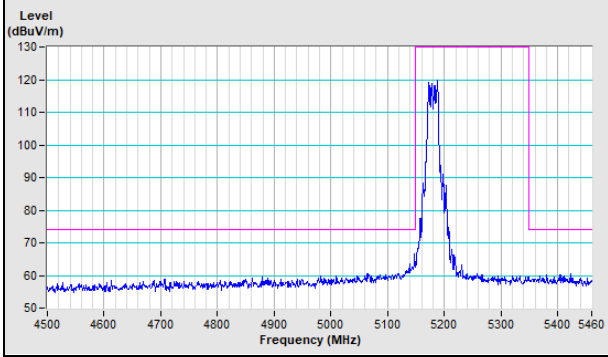
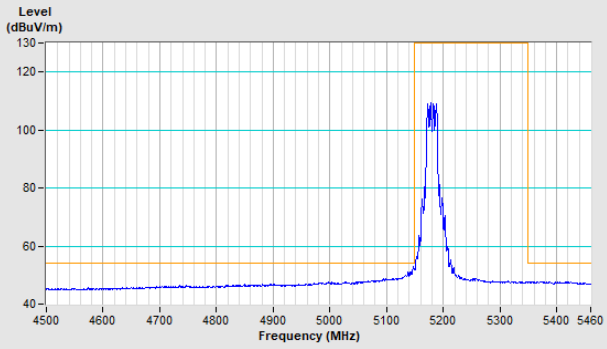
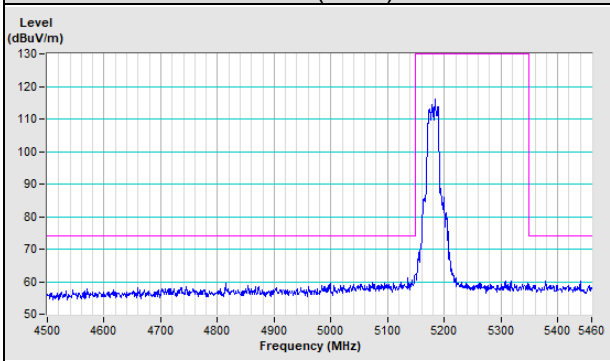
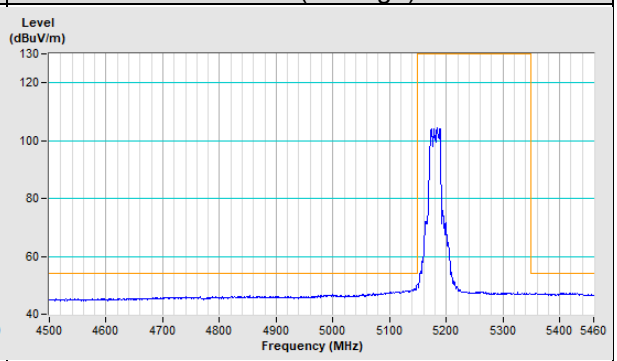
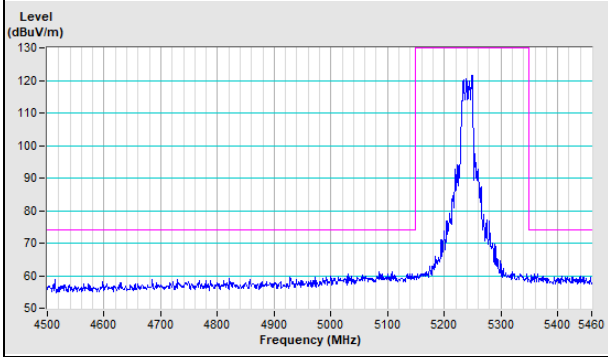
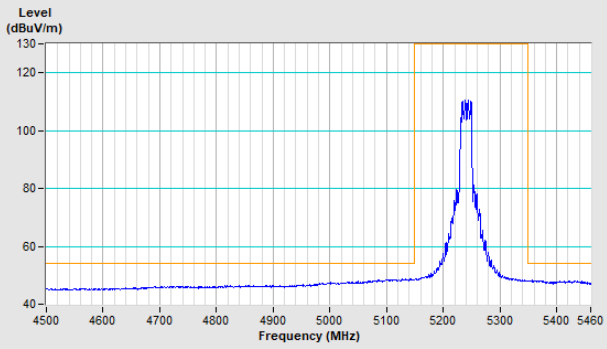
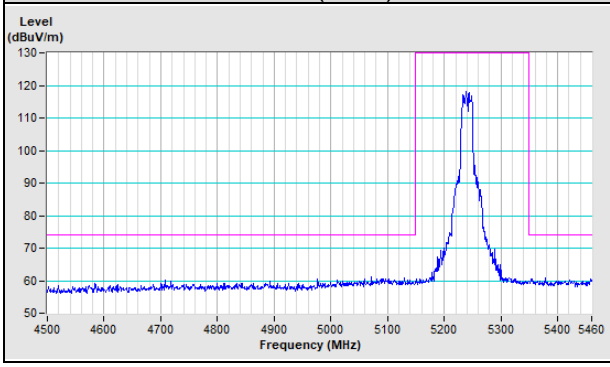
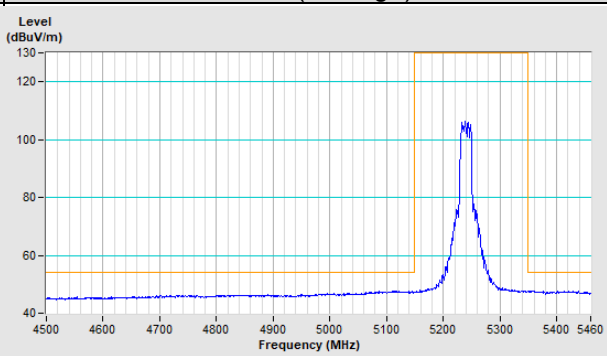


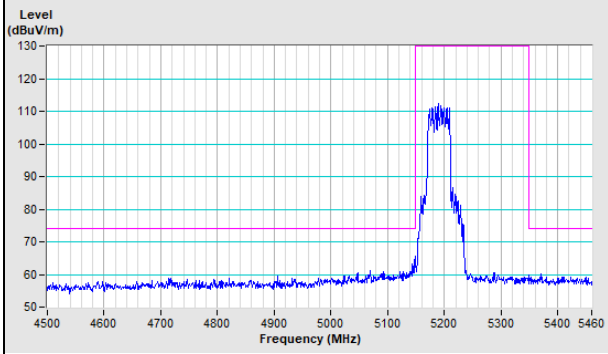
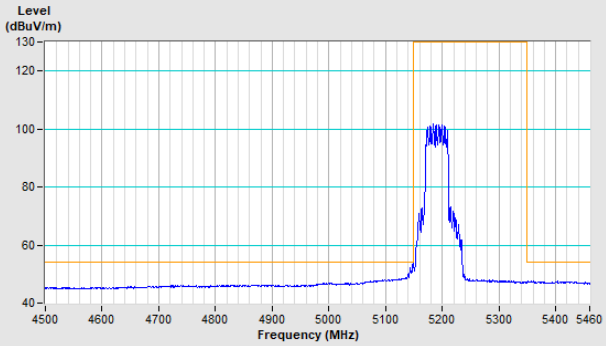
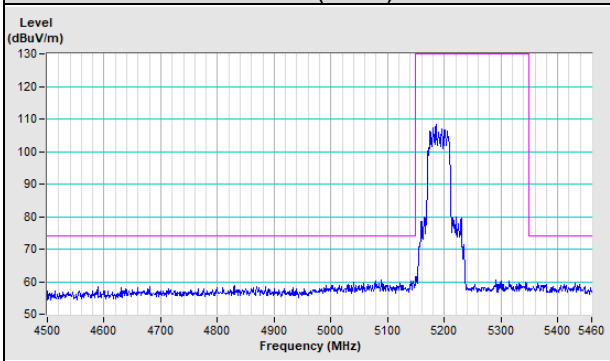
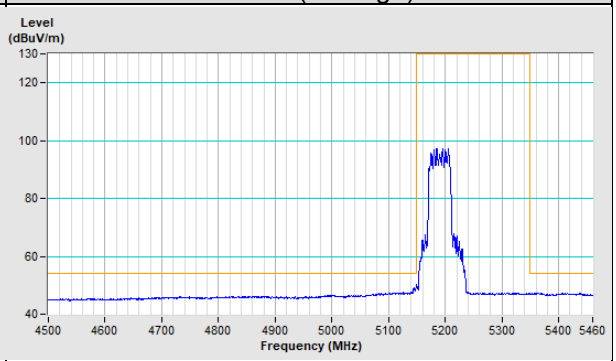
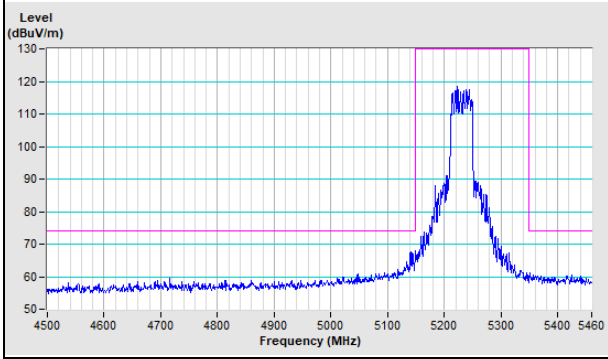
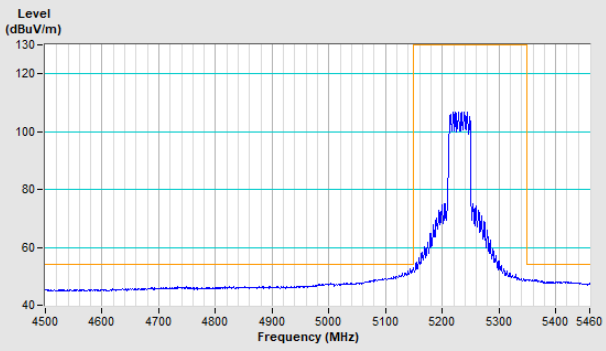
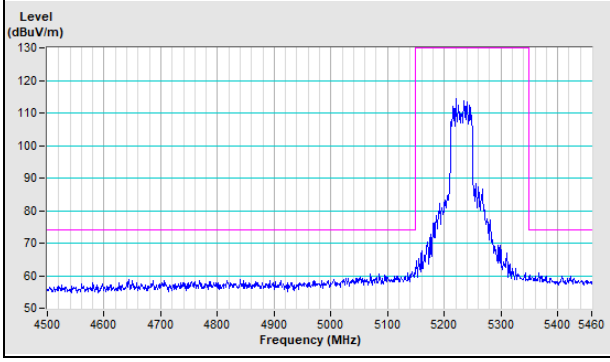
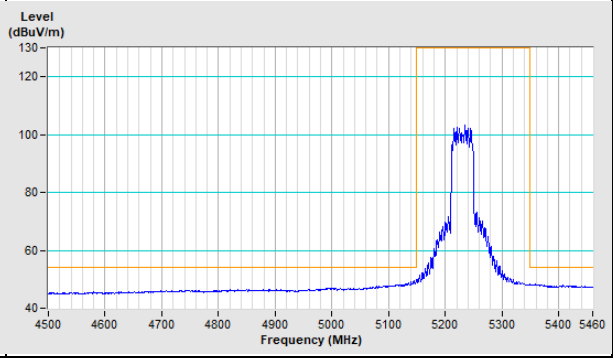
Vertical (Peak)

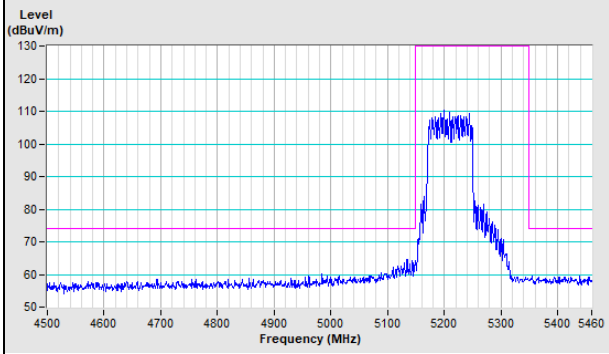
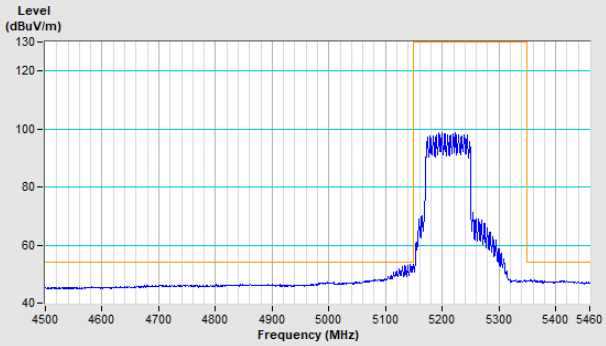
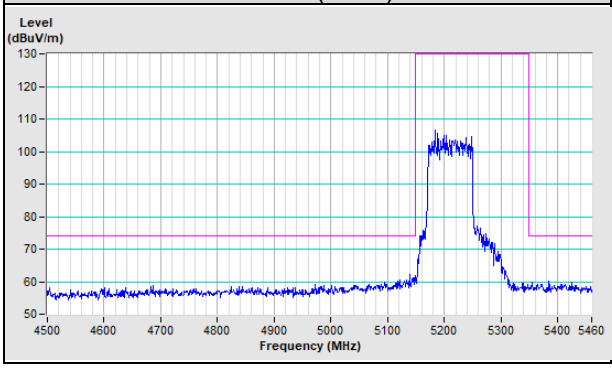
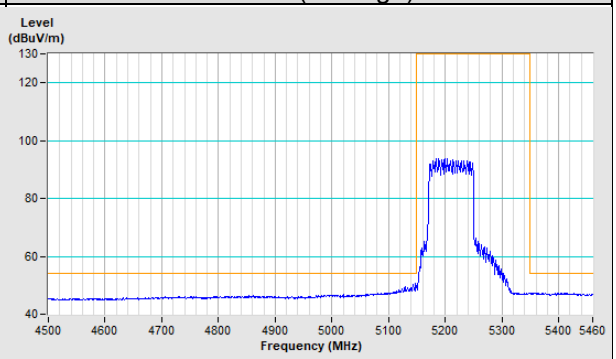


Vertical (Average)



802.11ax (HE20) Channel 36	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11ax (HE20) Channel 48	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ax (HE40) Channel 38	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11ax (HE40) Channel 46	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ax (HE80) Channel 42	
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 and approved according to ISO/IEC 17025.

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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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