FCC Test Report

Report No.: RFBDUI-WTW-P20110878-1

FCC ID: KA2M32A1

Test Model: M32

Series Model: DIR-LX3260, M32-SP, M32-TR (refer to item 3.1 for more details)

Received Date: Mar. 27, 2021

Test Date: Apr. 10 ~ Jun. 22, 2021

Issued Date: Aug. 26, 2021

Applicant: D-Link Corporation

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

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Release Control Record

Issue No.	Description	Date Issued
RFBDUI-WTW-P20110878-1	Original Release	Aug. 26, 2021

1 Certificate of Conformity

Product: AX3200 WI-FI 6 AI MESH SYSTEM, AX3200 WI-FI 6 AI MESH ROUTER, AX3200 MESH ROUTER, AX3200 MESH SYSTEM, AX3200 MESH WI-FI 6 ROUTER (refer to item 3.1 for more details)

Brand: D-Link

Test Model: M32

Series Model: DIR-LX3260, M32-SP, M32-TR (refer to item 3.1 for more details)

Sample Status: Engineering Sample

Applicant: D-Link Corporation

Test Date: Apr. 10 ~ Jun. 22, 2021

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

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

Prepared by : _____ , **Date:** Aug. 26, 2021
Polly Chien / Specialist

Approved by : _____ , **Date:** Aug. 26, 2021
Bruce Chen / Senior 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 -25.52dB at 0.42353MHz.
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 -0.5dB at 5643.60MHz.
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 MHF compatible 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	3.59 dB
	200MHz ~1000MHz	3.60 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	AX3200 WI-FI 6 AI MESH SYSTEM, AX3200 WI-FI 6 AI MESH ROUTER, AX3200 MESH ROUTER, AX3200 MESH SYSTEM, AX3200 MESH WI-FI 6 ROUTER (refer to note for more details)
Brand	D-Link
Test Model	M32
Series Model	DIR-LX3260, M32-SP, M32-TR
Model Difference	Refer to note
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: 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: 549.551mW 5745 ~ 5825MHz: 504.648mW Beamforming Mode: 5180 ~ 5240MHz: 137.407mW 5745 ~ 5825MHz: 126.179mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Refer to note
Cable Supplied	Refer to note

Note:

1. All models are listed as below. Model M32 is the representative for final test.

Brand	Product name	Model	Difference
D-Link	AX3200 WI-FI 6 AI MESH SYSTEM	M32	For marketing purpose
	AX3200 WI-FI 6 AI MESH ROUTER		
	AX3200 MESH ROUTER		
	AX3200 MESH SYSTEM		
	AX3200 MESH WI-FI 6 ROUTER	DIR-LX3260	
	AX3200 WI-FI 6 AI MESH SYSTEM	M32-SP	
	AX3200 WI-FI 6 AI MESH ROUTER		
	AX3200 MESH WI-FI 6 ROUTER		
	AX3200 WI-FI 6 AI MESH SYSTEM	M32-TR	
	AX3200 WI-FI 6 AI MESH ROUTER		
	AX3200 MESH WI-FI 6 ROUTER		

2. The top case of the EUT comes with two part number, which is MPCO3260BAXXU1XX and MPCOX320BAXAU1XX. After pretest, MPCO3260BAXXU1XX is found to be the worst case mode and therefore is recorded in the test report.
3. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitters and 4 receivers.

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

* 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, 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.

4. The EUT consumes power from the following accessory device.

Item	Brand	Model	Description
Adapter	Amigo	AMS200-1202000FU	Input Power: 100-240Vac, 50-60Hz, 0.8A Max Output Power: 12Vdc, 2A
CAT5E 24AWG CCA WHITE CABLE	Nienyi	NYS4710 REV.0	1.0m

5. The following antennas were provided to the EUT.

Antenna Type		Dipole x 4 for WiFi Printed PIFA Antenna x 1 for Bluetooth				
Antenna Connector		MHF compatible				
Antenna No.		Gain (dBi)				
		2400MHz	2450MHz	2500MHz	5150MHz	5825MHz
1	WLAN Dual Band	4.5	4.0	3.5	3.3	3.1
2	WLAN Dual Band	3.0	3.1	3.6	4.0	3.8
3	WLAN Dual Band	4.6	4.5	5.4	5.4	6.7
4	WLAN Dual Band	5.4	5.7	5.9	3.8	6.7
5	BT 2.4G Band	4.4	4.8	4.9	-	-

*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.

6. WLAN 2.4GHz, 5GHz and BT technology can transmit at same time.
7. Spurious emission of the simultaneous operation (WLAN 2.4GHz, 5GHz and BT) has been evaluated and no non-compliance was found.

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 **X-plane**.
2. For radiated emission (below 1GHz) and power line conducted emission test items chosen the worst maximum power mode.

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)	Remark
-	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)	Remark
-	802.11ax (HE40)	5745-5825	38 to 46	46	OFDMA	MCS0	38 to 46

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)	Remark
-	802.11ax (HE40)	5745-5825	38 to 46	46	OFDMA	MCS0	38 to 46

Antenna Port Conducted Measurement:

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

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)	Remark
-	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:

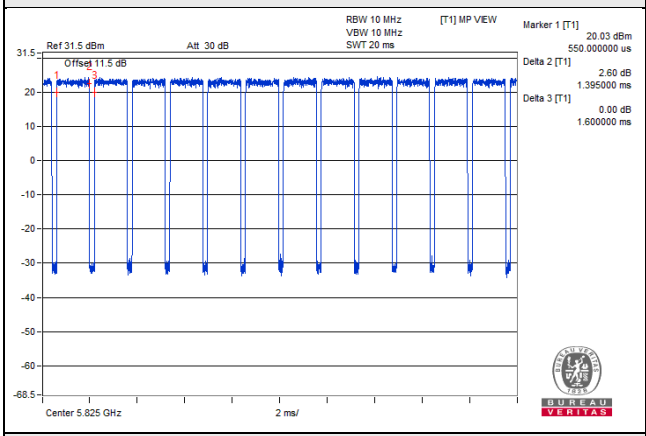
Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	22 deg. C, 68% RH	120Vac, 60Hz	Greg Lin
RE<1G	22 deg. C, 68% RH	120Vac, 60Hz	Greg Lin
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Greg Lin
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Ivan Tseng

3.3 Duty Cycle of Test Signal

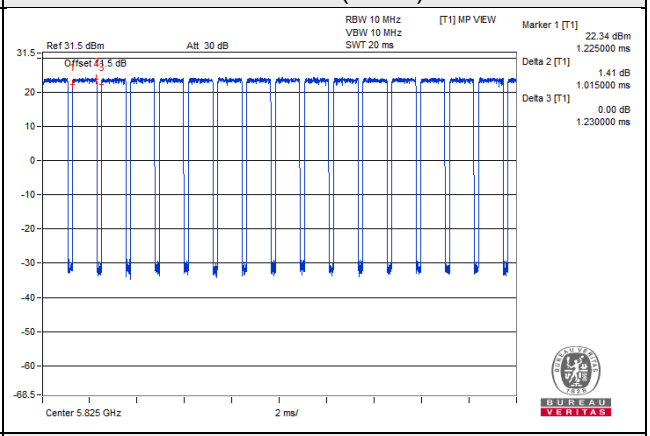
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 1.395/1.600 = 0.872, Duty factor = 10 * log (1/0.872) = 0.60
802.11ax (HE20): Duty cycle = 1.015/1.230 = 0.825, Duty factor = 10 * log (1/0.825) = 0.83
802.11ax (HE40): Duty cycle = 0.544/0.764 = 0.712, Duty factor = 10 * log (1/0.712) = 1.47
802.11ax (HE80): Duty cycle = 0.293/0.506 = 0.579, Duty factor = 10 * log (1/0.579) = 2.37

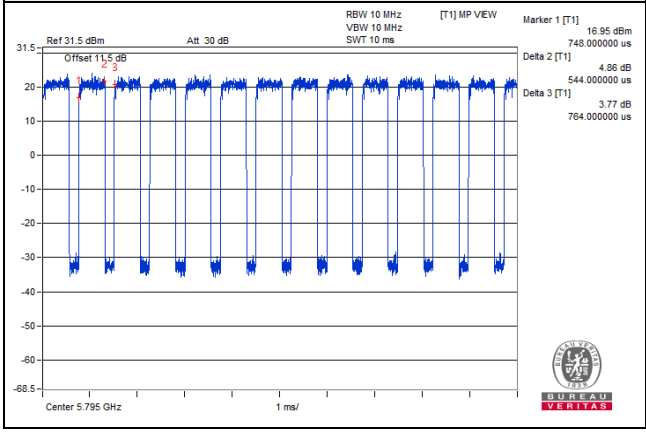
802.11a



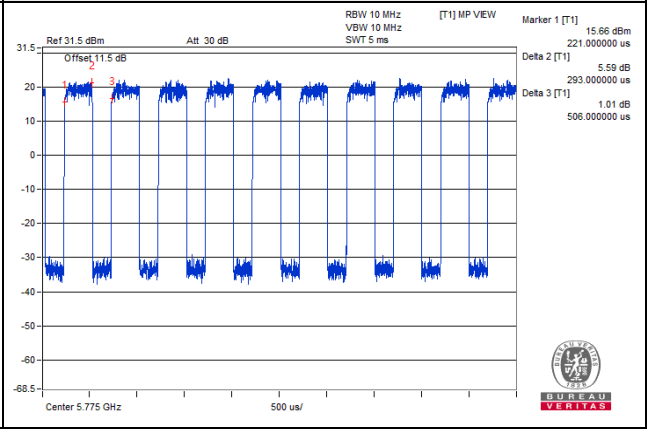
802.11ax (HE20)



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.

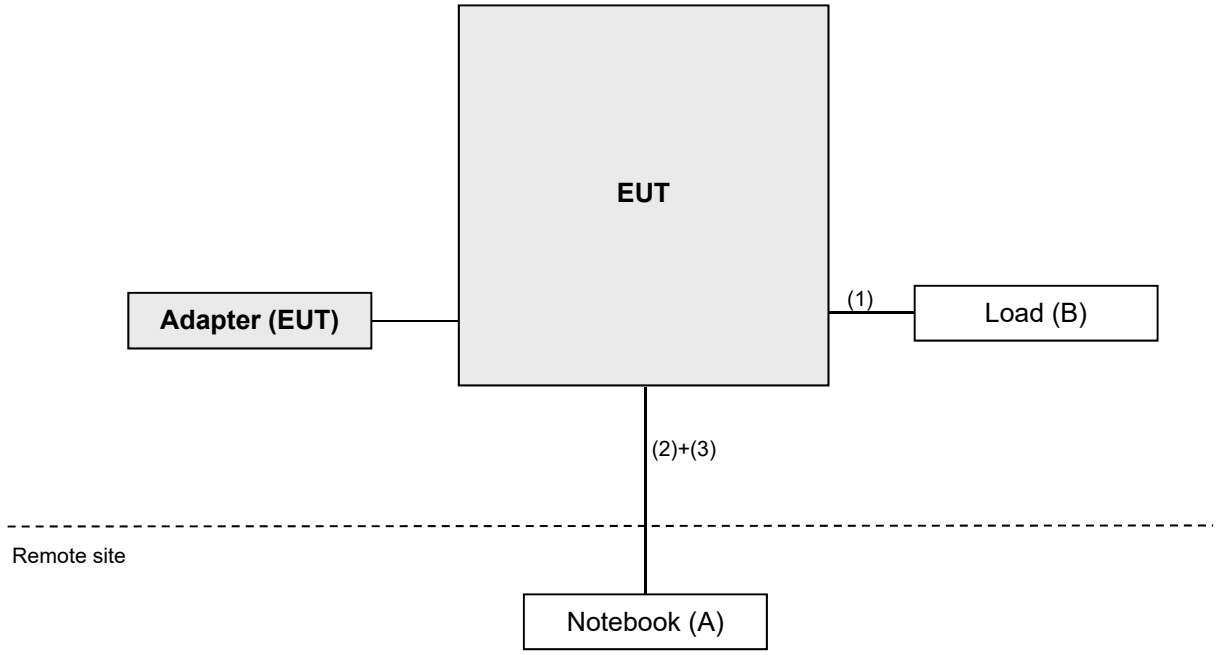
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	LATITUDE	F9MQBW1	FCC DoC Approved	Provided by lab
B.	Load	NA	NA	NA	NA	Provided by lab

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.	LAN	2	1.5	N	0	RJ45, Cat5e (provided by lab)
2.	LAN	1	1.5	N	0	RJ45, Cat5e (Accessory)
3.	LAN	1	7	N	0	RJ45, Cat5e (provided by lab)

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 KEYSIGHT	N9038A	MY55420137	Apr. 09, 2021	Apr. 08, 2022
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020	Sep. 15, 2021
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Nov. 06, 2020	Nov. 05, 2021
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Nov. 22, 2020	Nov. 21, 2021
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 22, 2020	Nov. 21, 2021
Loop Antenna TESEQ	HLA 6121	45745	Jul. 06, 2020	Jul. 05, 2021
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
Preamplifier Agilent (Above 1GHz)	8449B	3008A02367	Feb. 17, 2021	Feb. 16, 2022
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Jan. 16, 2021	Jan. 15, 2022
RF signal cable Woken	8D-FB	Cable-CH9-01	Jun. 08, 2020	Jun. 07, 2021
			Jun. 05, 2021	Jun. 04, 2022
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 13, 2020	Jul. 12, 2021
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Sep. 04, 2020	Sep. 03, 2021
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	10115	Feb. 03, 2021	Feb. 02, 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 9.

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 ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz. (802.11a: RBW = 1MHz, VBW = 1kHz; 802.11ax (HE20): RBW = 1MHz, VBW = 1kHz; 802.11ax (HE40): RBW = 1MHz, VBW = 3kHz; 802.11ax (HE80): RBW = 1MHz, VBW = 10kHz)

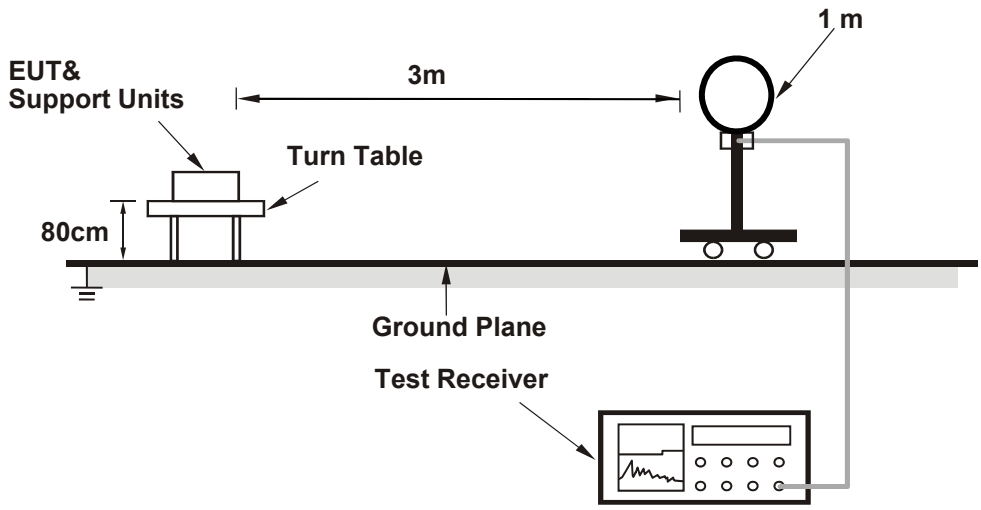
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

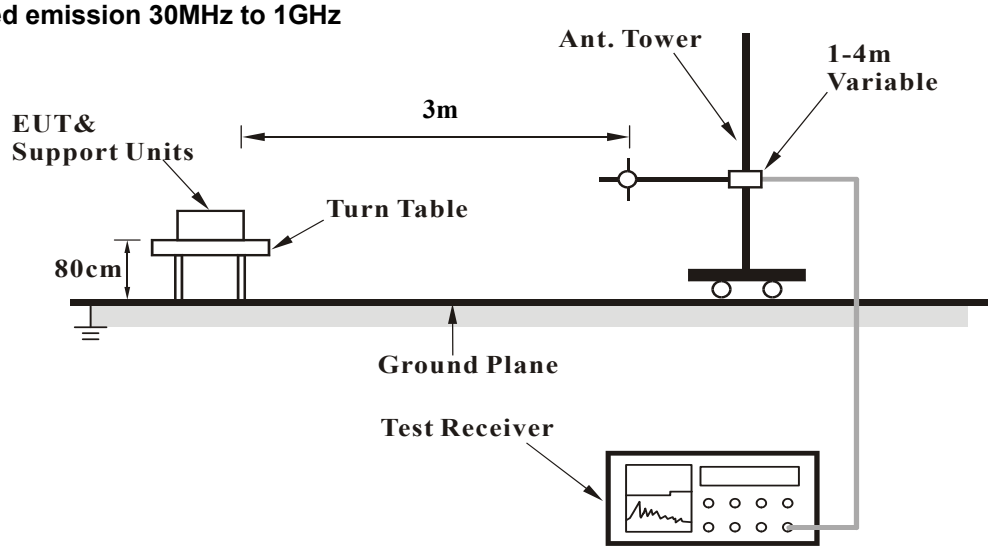
No deviation.

4.1.5 Test Setup

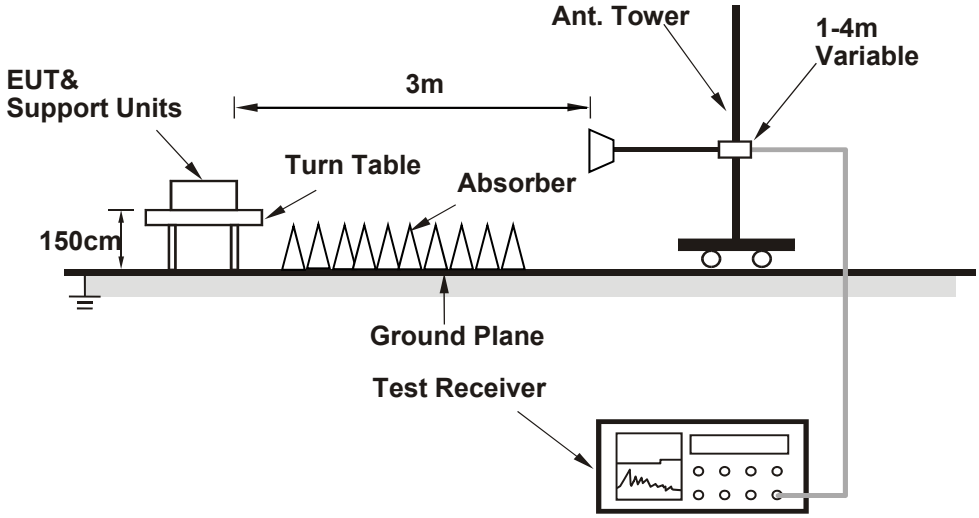
For Radiated emission below 30MHz



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	68.8 PK	74.0	-5.2	1.51 H	56	66.7	2.1
2	5150.00	51.2 AV	54.0	-2.8	1.51 H	56	49.1	2.1
3	*5180.00	113.9 PK			1.51 H	56	77.5	36.4
4	*5180.00	103.6 AV			1.51 H	56	67.2	36.4
5	#10360.00	66.3 PK	68.2	-1.9	1.79 H	307	51.5	14.8
6	15540.00	67.9 PK	74.0	-6.1	2.49 H	310	49.5	18.4
7	15540.00	53.2 AV	54.0	-0.8	2.49 H	310	34.8	18.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	55.7 PK	74.0	-18.3	3.49 V	357	53.6	2.1
2	5150.00	44.2 AV	54.0	-9.8	3.49 V	357	42.1	2.1
3	*5180.00	113.3 PK			3.49 V	357	76.9	36.4
4	*5180.00	103.7 AV			3.49 V	357	67.3	36.4
5	#10360.00	67.4 PK	68.2	-0.8	1.04 V	39	52.6	14.8
6	15540.00	60.8 PK	74.0	-13.2	3.70 V	356	42.4	18.4
7	15540.00	47.2 AV	54.0	-6.8	3.70 V	356	28.8	18.4

Remarks:

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

RF Mode	TX 802.11a	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	111.8 PK			1.61 H	59	75.4	36.4
2	*5200.00	102.0 AV			1.61 H	59	65.6	36.4
3	#10400.00	66.2 PK	68.2	-2.0	2.18 H	310	51.3	14.9
4	15600.00	67.9 PK	74.0	-6.1	2.16 H	321	49.8	18.1
5	15600.00	53.0 AV	54.0	-1.0	2.16 H	321	34.9	18.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	117.7 PK			3.48 V	340	81.3	36.4
2	*5200.00	109.5 AV			3.48 V	340	73.1	36.4
3	#10400.00	67.4 PK	68.2	-0.8	1.00 V	41	52.5	14.9
4	15600.00	62.4 PK	74.0	-11.6	3.80 V	332	44.3	18.1
5	15600.00	50.7 AV	54.0	-3.3	3.80 V	332	32.6	18.1

Remarks:

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

RF Mode	TX 802.11a	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	112.5 PK			1.48 H	57	76.2	36.3
2	*5240.00	102.5 AV			1.48 H	57	66.2	36.3
3	5350.00	52.0 PK	74.0	-22.0	1.48 H	57	50.0	2.0
4	5350.00	39.4 AV	54.0	-14.6	1.48 H	57	37.4	2.0
5	#10480.00	66.1 PK	68.2	-2.1	1.77 H	299	51.2	14.9
6	15720.00	68.3 PK	74.0	-5.7	2.49 H	314	50.9	17.4
7	15720.00	52.7 AV	54.0	-1.3	2.49 H	314	35.3	17.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	116.0 PK			3.41 V	346	79.7	36.3
2	*5240.00	106.2 AV			3.41 V	346	69.9	36.3
3	5350.00	52.6 PK	74.0	-21.4	3.41 V	346	50.6	2.0
4	5350.00	40.5 AV	54.0	-13.5	3.41 V	346	38.5	2.0
5	#10480.00	67.7 PK	68.2	-0.5	1.02 V	38	52.8	14.9
6	15720.00	64.9 PK	74.0	-9.1	3.86 V	321	47.5	17.4
7	15720.00	50.0 AV	54.0	-4.0	3.86 V	321	32.6	17.4

Remarks:

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

RF Mode	TX 802.11a	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	#5618.80	51.9 PK	68.2	-16.3	2.07 H	0	49.2	2.7
2	*5745.00	110.1 PK			2.07 H	0	72.8	37.3
3	*5745.00	100.1 AV			2.07 H	0	62.8	37.3
4	#5940.40	52.4 PK	68.2	-15.8	2.07 H	0	48.9	3.5
5	11490.00	58.6 PK	74.0	-15.4	3.08 H	109	42.4	16.2
6	11490.00	45.2 AV	54.0	-8.8	3.08 H	109	29.0	16.2
7	#17235.00	67.4 PK	68.2	-0.8	1.99 H	162	45.1	22.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5608.00	52.9 PK	68.2	-15.3	1.83 V	298	50.1	2.8
2	*5745.00	115.6 PK			1.83 V	298	78.3	37.3
3	*5745.00	106.7 AV			1.83 V	298	69.4	37.3
4	#5962.00	52.9 PK	68.2	-15.3	1.83 V	298	49.5	3.4
5	11490.00	60.0 PK	74.0	-14.0	1.52 V	215	43.8	16.2
6	11490.00	47.4 AV	54.0	-6.6	1.52 V	215	31.2	16.2
7	#17235.00	61.8 PK	68.2	-6.4	1.98 V	219	39.5	22.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	#5615.20	52.1 PK	68.2	-16.1	2.70 H	4	49.4	2.7
2	*5785.00	110.7 PK			2.70 H	4	73.2	37.5
3	*5785.00	101.7 AV			2.70 H	4	64.2	37.5
4	#5990.80	52.8 PK	68.2	-15.4	2.70 H	4	49.4	3.4
5	11570.00	56.5 PK	74.0	-17.5	3.11 H	107	40.5	16.0
6	11570.00	43.7 AV	54.0	-10.3	3.11 H	107	27.7	16.0
7	#17355.00	67.6 PK	68.2	-0.6	2.04 H	166	45.3	22.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5629.60	53.0 PK	68.2	-15.2	1.67 V	6	50.3	2.7
2	*5785.00	114.9 PK			1.67 V	6	77.4	37.5
3	*5785.00	105.3 AV			1.67 V	6	67.8	37.5
4	#5937.60	52.8 PK	68.2	-15.4	1.67 V	6	49.3	3.5
5	11570.00	60.3 PK	74.0	-13.7	1.04 V	166	44.3	16.0
6	11570.00	46.5 AV	54.0	-7.5	1.04 V	166	30.5	16.0
7	#17355.00	63.5 PK	68.2	-4.7	1.97 V	218	41.2	22.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	#5648.00	52.5 PK	68.2	-15.7	2.71 H	26	49.7	2.8
2	*5825.00	110.1 PK			2.71 H	26	72.5	37.6
3	*5825.00	100.1 AV			2.71 H	26	62.5	37.6
4	#5977.20	53.3 PK	68.2	-14.9	2.71 H	26	49.9	3.4
5	11650.00	60.5 PK	74.0	-13.5	3.03 H	110	44.5	16.0
6	11650.00	45.9 AV	54.0	-8.1	3.03 H	110	29.9	16.0
7	#17475.00	67.5 PK	68.2	-0.7	2.01 H	163	44.5	23.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5623.20	53.5 PK	68.2	-14.7	1.63 V	17	50.8	2.7
2	*5825.00	118.6 PK			1.63 V	17	81.0	37.6
3	*5825.00	108.5 AV			1.63 V	17	70.9	37.6
4	#5934.00	53.8 PK	68.2	-14.4	1.63 V	17	50.3	3.5
5	11650.00	62.3 PK	74.0	-11.7	1.00 V	162	46.3	16.0
6	11650.00	49.0 AV	54.0	-5.0	1.00 V	162	33.0	16.0
7	#17475.00	62.8 PK	68.2	-5.4	2.05 V	211	39.8	23.0

Remarks:

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

RF Mode	TX 802.11ax (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	66.3 PK	74.0	-7.7	1.70 H	52	64.2	2.1
2	5150.00	49.5 AV	54.0	-4.5	1.70 H	52	47.4	2.1
3	*5180.00	114.6 PK			1.70 H	52	78.2	36.4
4	*5180.00	103.3 AV			1.70 H	52	66.9	36.4
5	#10360.00	65.0 PK	68.2	-3.2	1.66 H	309	50.2	14.8
6	15540.00	65.4 PK	74.0	-8.6	1.56 H	323	47.0	18.4
7	15540.00	53.4 AV	54.0	-0.6	1.56 H	323	35.0	18.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	62.0 PK	74.0	-12.0	2.86 V	353	59.9	2.1
2	5150.00	46.3 AV	54.0	-7.7	2.86 V	353	44.2	2.1
3	*5180.00	117.3 PK			2.86 V	353	80.9	36.4
4	*5180.00	106.5 AV			2.86 V	353	70.1	36.4
5	#10360.00	67.6 PK	68.2	-0.6	1.00 V	38	52.8	14.8
6	15540.00	60.9 PK	74.0	-13.1	3.72 V	314	42.5	18.4
7	15540.00	49.5 AV	54.0	-4.5	3.72 V	314	31.1	18.4

Remarks:

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

RF Mode	TX 802.11ax (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	113.2 PK			1.61 H	55	76.8	36.4
2	*5200.00	102.6 AV			1.61 H	55	66.2	36.4
3	#10400.00	63.1 PK	68.2	-5.1	1.72 H	298	48.2	14.9
4	15600.00	64.4 PK	74.0	-9.6	1.77 H	323	46.3	18.1
5	15600.00	52.8 AV	54.0	-1.2	1.77 H	323	34.7	18.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	115.1 PK			3.46 V	351	78.7	36.4
2	*5200.00	105.2 AV			3.46 V	351	68.8	36.4
3	#10400.00	67.5 PK	68.2	-0.7	1.00 V	41	52.6	14.9
4	15600.00	60.0 PK	74.0	-14.0	3.46 V	354	41.9	18.1
5	15600.00	49.3 AV	54.0	-4.7	3.46 V	354	31.2	18.1

Remarks:

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

RF Mode	TX 802.11ax (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	113.7 PK			1.79 H	61	77.4	36.3
2	*5240.00	102.8 AV			1.79 H	61	66.5	36.3
3	5350.00	52.2 PK	74.0	-21.8	1.79 H	61	50.2	2.0
4	5350.00	40.1 AV	54.0	-13.9	1.79 H	61	38.1	2.0
5	#10400.00	64.4 PK	68.2	-3.8	2.15 H	352	49.5	14.9
6	15720.00	64.1 PK	74.0	-9.9	2.15 H	323	46.7	17.4
7	15720.00	53.1 AV	54.0	-0.9	2.15 H	323	35.7	17.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	114.5 PK			3.85 V	342	78.2	36.3
2	*5240.00	104.7 AV			3.85 V	342	68.4	36.3
3	5350.00	53.5 PK	74.0	-20.5	3.85 V	342	51.5	2.0
4	5350.00	40.5 AV	54.0	-13.5	3.85 V	342	38.5	2.0
5	#10480.00	67.3 PK	68.2	-0.9	1.07 V	37	52.4	14.9
6	15720.00	59.9 PK	74.0	-14.1	3.44 V	352	42.5	17.4
7	15720.00	48.5 AV	54.0	-5.5	3.44 V	352	31.1	17.4

Remarks:

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

RF Mode	TX 802.11ax (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	#5635.20	52.7 PK	68.2	-15.5	2.09 H	68	50.0	2.7
2	*5745.00	113.5 PK			2.09 H	68	76.2	37.3
3	*5745.00	102.2 AV			2.09 H	68	64.9	37.3
4	#5988.40	53.0 PK	68.2	-15.2	2.09 H	68	49.6	3.4
5	11490.00	58.0 PK	74.0	-16.0	2.20 H	100	41.8	16.2
6	11490.00	46.1 AV	54.0	-7.9	2.20 H	100	29.9	16.2
7	#17235.00	67.1 PK	68.2	-1.1	2.10 H	166	44.8	22.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5649.60	54.6 PK	68.2	-13.6	2.07 V	6	51.8	2.8
2	*5745.00	119.3 PK			2.07 V	6	82.0	37.3
3	*5745.00	107.8 AV			2.07 V	6	70.5	37.3
4	#5949.60	53.2 PK	68.2	-15.0	2.07 V	6	49.7	3.5
5	11490.00	61.6 PK	74.0	-12.4	1.26 V	220	45.4	16.2
6	11490.00	48.5 AV	54.0	-5.5	1.26 V	220	32.3	16.2
7	#17235.00	62.8 PK	68.2	-5.4	1.88 V	210	40.5	22.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	#5627.20	52.8 PK	68.2	-15.4	1.73 H	65	50.1	2.7
2	*5785.00	116.8 PK			1.73 H	65	79.3	37.5
3	*5785.00	104.2 AV			1.73 H	65	66.7	37.5
4	#5978.40	52.9 PK	68.2	-15.3	1.73 H	65	49.5	3.4
5	11570.00	58.8 PK	74.0	-15.2	2.14 H	100	42.8	16.0
6	11570.00	45.9 AV	54.0	-8.1	2.14 H	100	29.9	16.0
7	#17355.00	67.5 PK	68.2	-0.7	2.08 H	166	45.2	22.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5618.00	52.6 PK	68.2	-15.6	2.47 V	297	49.9	2.7
2	*5785.00	120.7 PK			2.47 V	297	83.2	37.5
3	*5785.00	107.2 AV			2.47 V	297	69.7	37.5
4	#5960.00	53.1 PK	68.2	-15.1	2.47 V	297	49.7	3.4
5	11570.00	60.9 PK	74.0	-13.1	2.29 V	157	44.9	16.0
6	11570.00	47.5 AV	54.0	-6.5	2.29 V	157	31.5	16.0
7	#17355.00	65.5 PK	68.2	-2.7	3.03 V	200	43.2	22.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	#5647.20	52.7 PK	68.2	-15.5	1.84 H	68	49.9	2.8
2	*5825.00	114.7 PK			1.84 H	68	77.1	37.6
3	*5825.00	103.7 AV			1.84 H	68	66.1	37.6
4	#5925.60	54.3 PK	68.2	-13.9	1.84 H	68	50.9	3.4
5	11650.00	57.6 PK	74.0	-16.4	1.77 H	108	41.6	16.0
6	11650.00	44.5 AV	54.0	-9.5	1.77 H	108	28.5	16.0
7	#17475.00	67.5 PK	68.2	-0.7	2.05 H	166	44.5	23.0
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5625.20	52.4 PK	68.2	-15.8	3.13 V	319	49.7	2.7
2	*5825.00	120.3 PK			3.13 V	319	82.7	37.6
3	*5825.00	108.3 AV			3.13 V	319	70.7	37.6
4	#5930.00	54.6 PK	68.2	-13.6	3.13 V	319	51.2	3.4
5	11650.00	59.5 PK	74.0	-14.5	1.15 V	165	43.5	16.0
6	11650.00	45.4 AV	54.0	-8.6	1.15 V	165	29.4	16.0
7	#17475.00	64.6 PK	68.2	-3.6	2.15 V	224	41.6	23.0

Remarks:

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

RF Mode	TX 802.11ax (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	66.6 PK	74.0	-7.4	1.76 H	56	64.5	2.1
2	5150.00	50.4 AV	54.0	-3.6	1.76 H	56	48.3	2.1
3	*5190.00	102.8 PK			1.76 H	56	66.4	36.4
4	*5190.00	91.6 AV			1.76 H	56	55.2	36.4
5	#10380.00	62.2 PK	68.2	-6.0	1.73 H	313	47.3	14.9
6	15570.00	61.8 PK	74.0	-12.2	1.72 H	327	43.5	18.3
7	15570.00	50.7 AV	54.0	-3.3	1.72 H	327	32.4	18.3
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	68.7 PK	74.0	-5.3	3.50 V	344	66.6	2.1
2	5150.00	53.0 AV	54.0	-1.0	3.50 V	344	50.9	2.1
3	*5190.00	116.9 PK			3.50 V	344	80.5	36.4
4	*5190.00	104.8 AV			3.50 V	344	68.4	36.4
5	#10380.00	66.7 PK	68.2	-1.5	1.07 V	39	51.8	14.9
6	15570.00	58.7 PK	74.0	-15.3	1.01 V	349	40.4	18.3
7	15570.00	47.4 AV	54.0	-6.6	1.01 V	349	29.1	18.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
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	65.8 PK	74.0	-8.2	1.53 H	55	63.7	2.1
2	5150.00	53.4 AV	54.0	-0.6	1.53 H	55	51.3	2.1
3	*5230.00	114.6 PK			1.53 H	55	78.3	36.3
4	*5230.00	102.9 AV			1.53 H	55	66.6	36.3
5	5350.00	65.1 PK	74.0	-8.9	1.53 H	55	63.1	2.0
6	5350.00	47.6 AV	54.0	-6.4	1.53 H	55	45.6	2.0
7	#10460.00	61.6 PK	68.2	-6.6	1.71 H	303	46.7	14.9
8	15690.00	64.6 PK	74.0	-9.4	3.28 H	345	47.1	17.5
9	15690.00	53.1 AV	54.0	-0.9	3.28 H	345	35.6	17.5
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5150.00	66.7 PK	74.0	-7.3	3.25 V	349	64.6	2.1
2	5150.00	52.9 AV	54.0	-1.1	3.25 V	349	50.8	2.1
3	*5230.00	117.4 PK			3.25 V	349	81.1	36.3
4	*5230.00	106.8 AV			3.25 V	349	70.5	36.3
5	5350.00	61.7 PK	74.0	-12.3	3.25 V	349	59.7	2.0
6	5350.00	45.6 AV	54.0	-8.4	3.25 V	349	43.6	2.0
7	#10460.00	67.4 PK	68.2	-0.8	1.00 V	41	52.5	14.9
8	15690.00	62.8 PK	74.0	-11.2	3.17 V	349	45.3	17.5
9	15690.00	53.0 AV	54.0	-1.0	3.17 V	349	35.5	17.5

Remarks:

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

RF Mode	TX 802.11ax (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	#5647.20	54.7 PK	68.2	-13.5	1.45 H	72	51.9	2.8
2	*5755.00	110.0 PK			1.45 H	72	72.7	37.3
3	*5755.00	89.7 AV			1.45 H	72	52.4	37.3
4	#5938.80	53.4 PK	68.2	-14.8	1.45 H	72	49.9	3.5
5	11510.00	59.7 PK	74.0	-14.3	1.43 H	101	43.6	16.1
6	11510.00	45.7 AV	54.0	-8.3	1.43 H	101	29.6	16.1
7	#17265.00	67.2 PK	68.2	-1.0	2.14 H	167	44.8	22.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5652.80	68.8 PK	70.3	-1.5	1.75 V	8	66.0	2.8
2	*5755.00	118.2 PK			1.75 V	8	80.9	37.3
3	*5755.00	107.6 AV			1.75 V	8	70.3	37.3
4	#5930.40	60.1 PK	68.2	-8.1	1.75 V	8	56.7	3.4
5	11510.00	57.5 PK	74.0	-16.5	1.62 V	213	41.4	16.1
6	11510.00	44.5 AV	54.0	-9.5	1.62 V	213	28.4	16.1
7	#17265.00	61.1 PK	68.2	-7.1	1.60 V	185	38.7	22.4

Remarks:

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

RF Mode	TX 802.11ax (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	#5602.40	52.2 PK	68.2	-16.0	1.69 H	54	49.4	2.8
2	*5795.00	112.1 PK			1.69 H	54	74.5	37.6
3	*5795.00	101.4 AV			1.69 H	54	63.8	37.6
4	#5986.80	52.9 PK	68.2	-15.3	1.69 H	54	49.5	3.4
5	11590.00	59.3 PK	74.0	-14.7	1.72 H	103	43.3	16.0
6	11590.00	48.3 AV	54.0	-5.7	1.72 H	103	32.3	16.0
7	#17385.00	67.1 PK	68.2	-1.1	1.91 H	164	45.0	22.1
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	#5610.00	53.1 PK	68.2	-15.1	1.68 V	0	50.3	2.8
2	*5795.00	117.1 PK			1.68 V	0	79.5	37.6
3	*5795.00	105.3 AV			1.68 V	0	67.7	37.6
4	#5941.20	53.4 PK	68.2	-14.8	1.68 V	0	49.9	3.5
5	11590.00	60.5 PK	74.0	-13.5	1.26 V	219	44.5	16.0
6	11590.00	48.8 AV	54.0	-5.2	1.26 V	219	32.8	16.0
7	#17385.00	64.4 PK	68.2	-3.8	1.66 V	185	42.3	22.1

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 (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	62.1 PK	74.0	-11.9	1.49 H	55	60.0	2.1
2	5150.00	48.9 AV	54.0	-5.1	1.49 H	55	46.8	2.1
3	*5210.00	107.1 PK			1.49 H	55	70.7	36.4
4	*5210.00	96.2 AV			1.49 H	55	59.8	36.4
5	5350.00	53.5 PK	74.0	-20.5	1.49 H	55	51.5	2.0
6	5350.00	41.0 AV	54.0	-13.0	1.49 H	55	39.0	2.0
7	#10420.00	55.4 PK	68.2	-12.8	1.75 H	302	40.5	14.9
8	15630.00	60.2 PK	74.0	-13.8	3.47 H	331	42.4	17.8
9	15630.00	48.9 AV	54.0	-5.1	3.47 H	331	31.1	17.8
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	5150.00	67.1 PK	74.0	-6.9	3.46 V	358	65.0	2.1
2	5150.00	52.8 AV	54.0	-1.2	3.46 V	358	50.7	2.1
3	*5210.00	110.4 PK			3.46 V	358	74.0	36.4
4	*5210.00	100.7 AV			3.46 V	358	64.3	36.4
5	5350.00	53.9 PK	74.0	-20.1	3.46 V	358	51.9	2.0
6	5350.00	41.9 AV	54.0	-12.1	3.46 V	358	39.9	2.0
7	#10420.00	59.0 PK	68.2	-9.2	1.01 V	37	44.1	14.9
8	15630.00	60.2 PK	74.0	-13.8	3.59 V	325	42.4	17.8
9	15630.00	48.7 AV	54.0	-5.3	3.59 V	325	30.9	17.8

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 (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	#5647.20	63.0 PK	68.2	-5.2	1.62 H	63	60.2	2.8
2	*5775.00	110.2 PK			1.62 H	63	72.7	37.5
3	*5775.00	99.0 AV			1.62 H	63	61.5	37.5
4	#5929.20	60.4 PK	68.2	-7.8	1.62 H	63	57.0	3.4
5	11550.00	56.3 PK	74.0	-17.7	1.65 H	101	40.2	16.1
6	11550.00	44.6 AV	54.0	-9.4	1.65 H	101	28.5	16.1
7	#17325.00	63.5 PK	68.2	-4.7	1.99 H	163	41.1	22.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	**#5643.60**	**67.7 PK**	**68.2**	**-0.5**	**2.11 V**	**26**	**64.9**	**2.8**
2	*5775.00	115.2 PK			2.11 V	26	77.7	37.5
3	*5775.00	104.9 AV			2.11 V	26	67.4	37.5
4	#5933.60	66.4 PK	68.2	-1.8	2.11 V	26	62.9	3.5
5	11550.00	56.5 PK	74.0	-17.5	2.13 V	156	40.4	16.1
6	11550.00	44.9 AV	54.0	-9.1	2.13 V	156	28.8	16.1
7	#17325.00	60.2 PK	68.2	-8.0	1.59 V	183	37.8	22.4

Remarks:

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

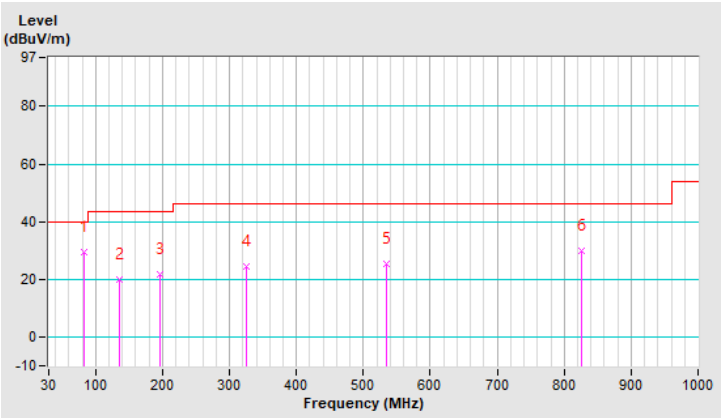
Below 1GHz Worst-Case Data:

RF Mode	TX 802.11ax (HE40)	Channel	CH 46：5230 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	82.38	29.3 QP	40.0	-10.7	1.00 H	7	43.3	-14.0
2	135.73	19.7 QP	43.5	-23.8	1.00 H	260	29.3	-9.6
3	196.84	21.6 QP	43.5	-21.9	1.00 H	102	33.1	-11.5
4	325.85	24.4 QP	46.0	-21.6	1.00 H	272	30.3	-5.9
5	534.40	25.5 QP	46.0	-20.5	1.00 H	37	27.2	-1.7
6	826.37	29.8 QP	46.0	-16.2	1.00 H	57	25.9	3.9

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 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.

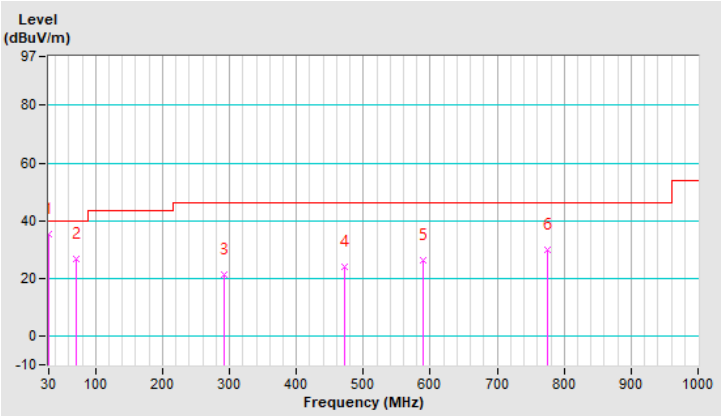


RF Mode	TX 802.11ax (HE40)	Channel	CH 46：5230 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	30.00	35.4 QP	40.0	-4.6	1.25 V	5	45.6	-10.2
2	71.71	26.8 QP	40.0	-13.2	1.25 V	352	38.1	-11.3
3	292.87	21.2 QP	46.0	-24.8	1.50 V	46	28.1	-6.9
4	472.32	24.2 QP	46.0	-21.8	1.00 V	5	27.0	-2.8
5	588.72	26.1 QP	46.0	-19.9	1.00 V	245	26.6	-0.5
6	774.96	29.9 QP	46.0	-16.1	1.25 V	58	27.0	2.9

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 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

Tested date: Jun. 22, 2021

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102783	Dec. 21, 2020	Dec. 20, 2021
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 28, 2021	Jan. 27, 2022
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 18, 2020	Aug. 17, 2021
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2 (Conduction 2).
3. The VCCI Site Registration No. is C-12047.

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.

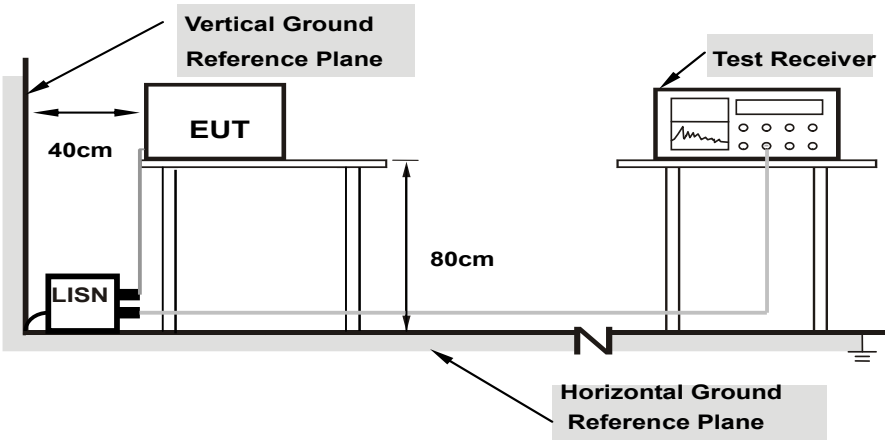
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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:

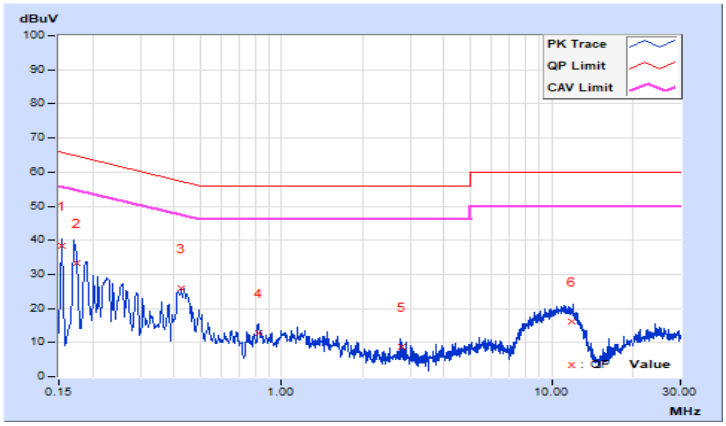
802.11ax (HE40)

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	0.13	38.12	23.80	38.25	23.93	65.78	55.78	-27.53	-31.85
2	0.17400	0.15	33.13	18.49	33.28	18.64	64.77	54.77	-31.49	-36.13
3	**0.42353**	**0.23**	**25.85**	**21.63**	**26.08**	**21.86**	**57.38**	**47.38**	**-31.30**	**-25.52**
4	0.81800	0.28	12.62	7.96	12.90	8.24	56.00	46.00	-43.10	-37.76
5	2.77400	0.38	8.47	5.23	8.85	5.61	56.00	46.00	-47.15	-40.39
6	11.83000	0.56	15.54	9.99	16.10	10.55	60.00	50.00	-43.90	-39.45

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.

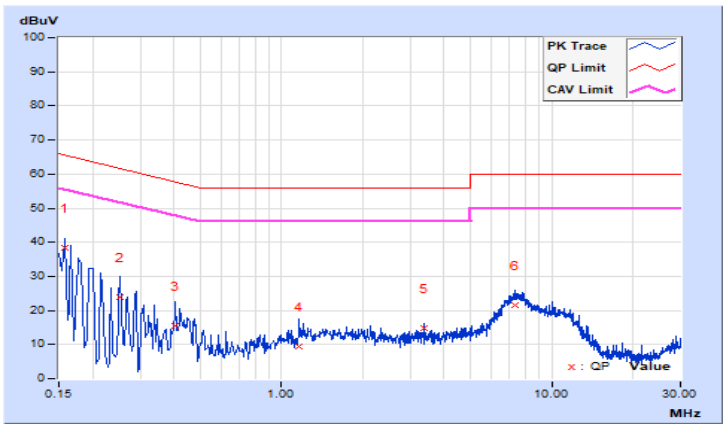


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

No	Freq.	Corr. Factor	Reading Value		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	0.15687	0.14	38.34	24.14	38.48	24.28	65.63	55.63	-27.15	-31.35
2	0.25139	0.19	23.85	10.29	24.04	10.48	61.71	51.71	-37.67	-41.23
3	0.40179	0.25	15.28	6.24	15.53	6.49	57.82	47.82	-42.29	-41.33
4	1.15800	0.33	9.23	4.82	9.56	5.15	56.00	46.00	-46.44	-40.85
5	3.35905	0.45	14.36	3.24	14.81	3.69	56.00	46.00	-41.19	-42.31
6	7.27800	0.57	21.14	15.97	21.71	16.54	60.00	50.00	-38.29	-33.46

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)

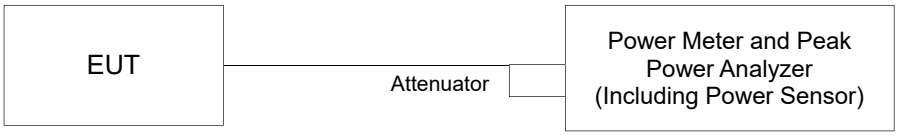
*B is the 26 dB emission bandwidth in megahertz

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	16.94	16.43	16.32	16.68	182.799	22.62	30.00	Pass
40	5200	19.11	18.55	18.24	18.87	296.856	24.73	30.00	Pass
48	5240	18.23	17.89	17.68	18.12	251.522	24.01	30.00	Pass
149	5745	17.76	17.52	17.36	17.64	228.724	23.59	29.30	Pass
157	5785	18.42	17.77	17.68	18.16	253.421	24.04	29.30	Pass
165	5825	18.88	18.36	18.08	18.67	283.706	24.53	29.30	Pass

Note:

For 5180~5240MHz: Max. gain = 5.4dBi < 6dBi, so the power limit is not reduced.

For 5745~5825MHz: Max. gain = 6.7dBi > 6dBi, so the power limit shall be reduced to 30-(6.7-6) = 29.30dBm.

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	18.36	18.10	17.94	18.23	261.872	24.18	30.00	Pass
40	5200	18.44	18.15	17.99	18.32	266.007	24.25	30.00	Pass
48	5240	18.61	18.27	18.09	18.49	274.802	24.39	30.00	Pass
149	5745	19.94	19.41	19.15	19.64	360.194	25.57	29.30	Pass
157	5785	20.68	20.21	20.08	20.55	437.264	26.41	29.30	Pass
165	5825	20.71	20.26	20.11	20.57	440.520	26.44	29.30	Pass

Note:

For 5180~5240MHz: Max. gain = 5.4dBi < 6dBi, so the power limit is not reduced.

For 5745~5825MHz: Max. gain = 6.7dBi > 6dBi, so the power limit shall be reduced to 30-(6.7-6) = 29.30dBm.

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	18.96	18.53	18.27	18.74	291.950	24.65	30.00	Pass
46	5230	21.74	21.16	21.03	21.55	**549.551**	27.40	30.00	Pass
151	5755	19.48	19.17	19.03	19.32	336.809	25.27	29.30	Pass
159	5795	19.12	18.74	18.62	18.84	305.813	24.85	29.30	Pass

Note:

For 5180~5240MHz: Max. gain = 5.4dBi < 6dBi, so the power limit is not reduced.

For 5745~5825MHz: Max. gain = 6.7dBi > 6dBi, so the power limit shall be reduced to 30-(6.7-6) = 29.30dBm.

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	17.81	17.53	17.48	17.72	232.151	23.66	30.00	Pass
155	5775	21.18	20.94	20.85	21.06	**504.648**	27.03	29.30	Pass

Note:

For 5180~5240MHz: Max. gain = 5.4dBi < 6dBi, so the power limit is not reduced.

For 5745~5825MHz: Max. gain = 6.7dBi > 6dBi, so the power limit shall be reduced to 30-(6.7-6) = 29.30dBm.

Beamforming Mode

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	12.34	12.08	11.92	12.21	65.477	18.16	25.82	Pass
40	5200	12.42	12.13	11.97	12.30	66.511	18.23	25.82	Pass
48	5240	12.59	12.25	12.07	12.47	68.710	18.37	25.82	Pass
149	5745	13.92	13.39	13.13	13.62	90.061	19.55	24.75	Pass
157	5785	14.66	14.19	14.06	14.53	109.331	20.39	24.75	Pass
165	5825	14.69	14.24	14.09	14.55	110.145	20.42	24.75	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power limit shall be reduced to 30-(10.18-6) = 25.82dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power limit shall be reduced to 30-(11.25-6) = 24.75dBm.

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	12.94	12.51	12.25	12.72	72.998	18.63	25.82	Pass
46	5230	15.72	15.14	15.01	15.53	**137.407**	21.38	25.82	Pass
151	5755	13.46	13.15	13.01	13.30	84.214	19.25	24.75	Pass
159	5795	13.10	12.72	12.60	12.82	76.464	18.83	24.75	Pass

Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power limit shall be reduced to 30-(10.18-6) = 25.82dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power limit shall be reduced to 30-(11.25-6) = 24.75dBm.

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	11.79	11.51	11.46	11.70	58.046	17.64	25.82	Pass
155	5775	15.16	14.92	14.83	15.04	**126.179**	21.01	24.75	Pass

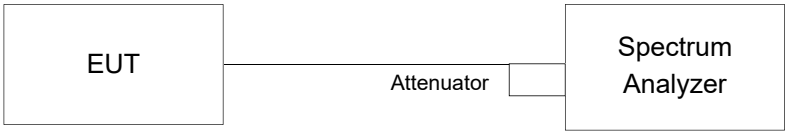
Note:

For 5180~5240MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power limit shall be reduced to 30-(10.18-6) = 25.82dBm.

For 5745~5825MHz: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power limit shall be reduced to 30-(11.25-6) = 24.75dBm.

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	16.68	16.68	16.68	16.68
40	5200	16.68	16.68	16.68	16.68
48	5240	16.68	16.68	16.80	16.68
149	5745	16.80	16.80	16.74	16.92
157	5785	16.80	16.80	16.80	16.92
165	5825	16.68	16.92	16.86	16.92

802.11ax (HE20)

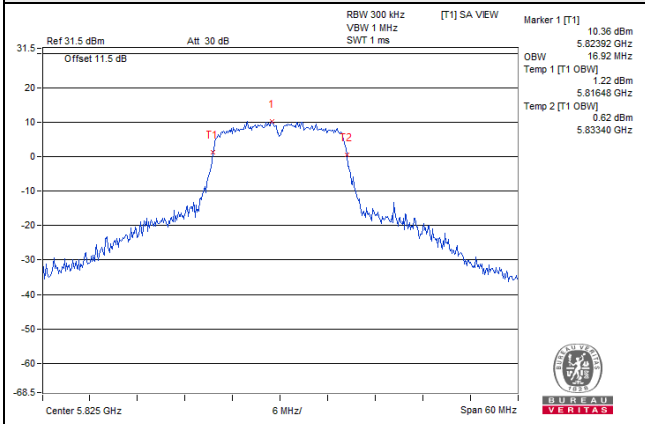
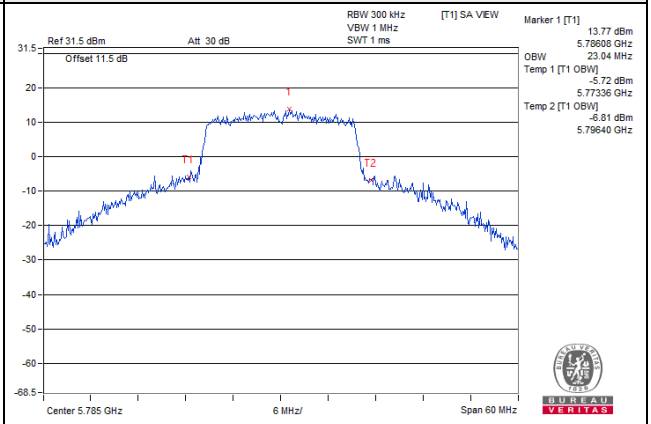
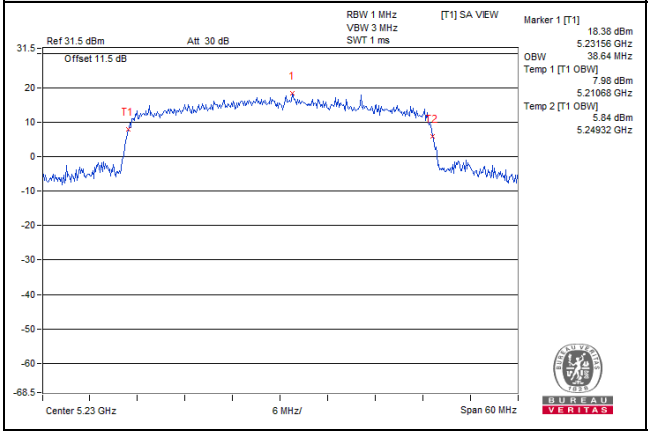
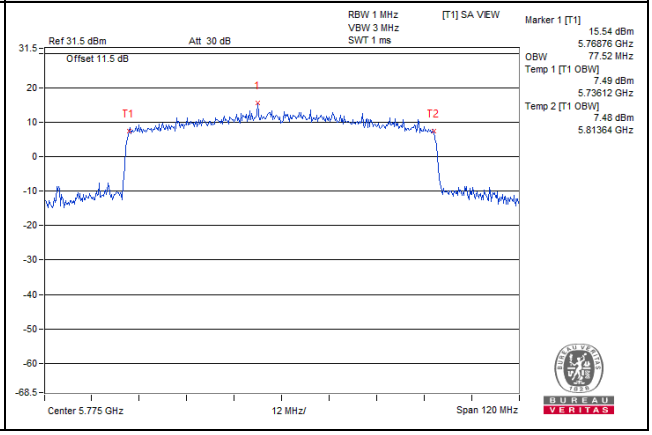
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	19.20	19.20	19.20	19.08
40	5200	19.32	19.08	19.08	19.20
48	5240	18.84	18.84	18.84	18.84
149	5745	19.56	19.80	19.44	19.56
157	5785	22.68	20.28	20.16	23.04
165	5825	22.80	20.40	20.52	22.44

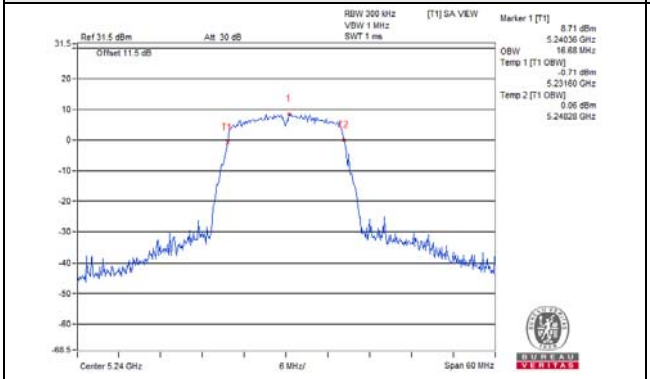
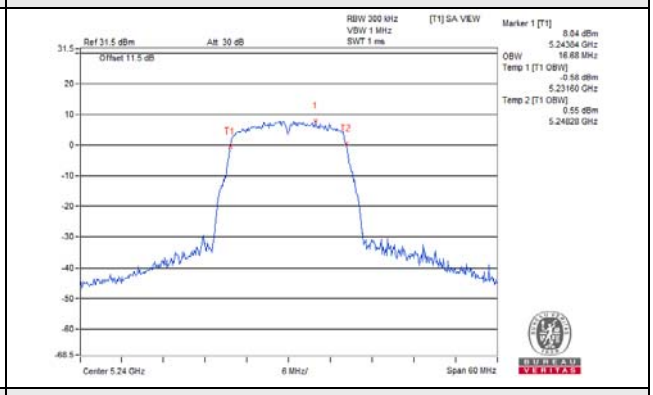
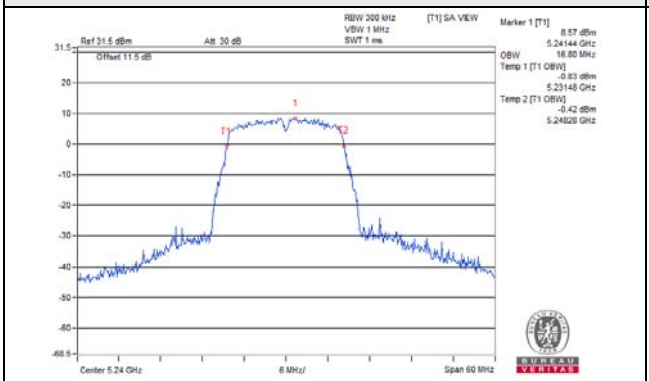
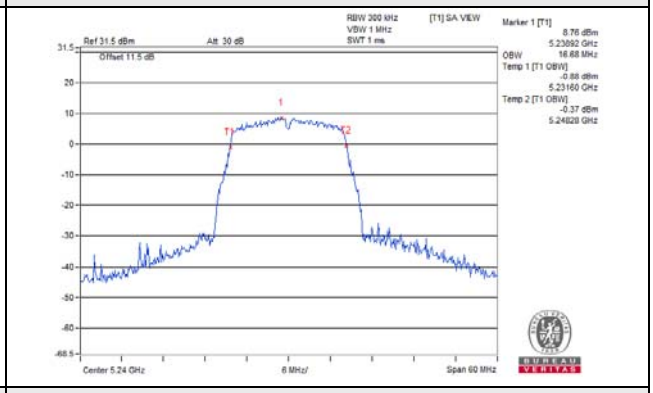
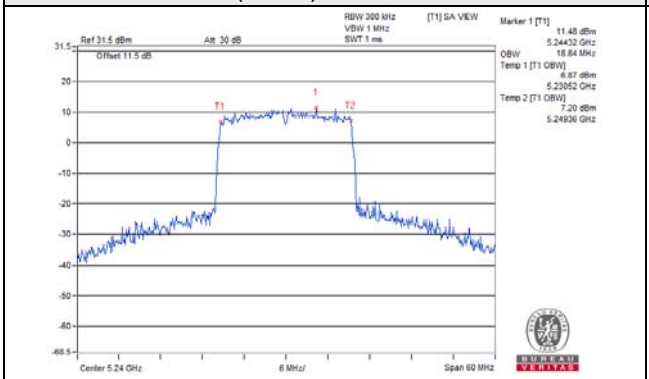
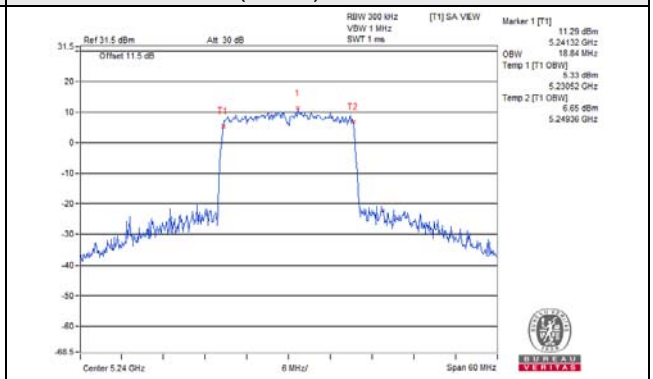
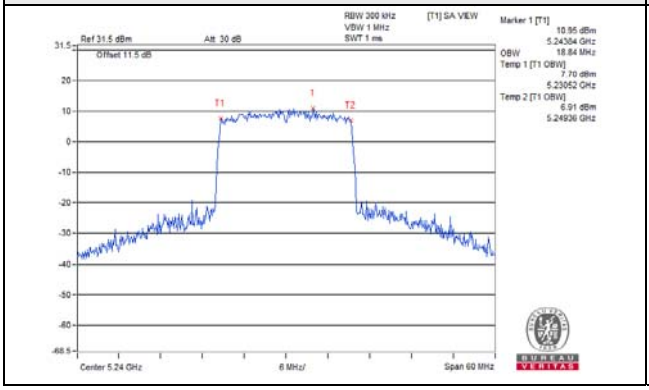
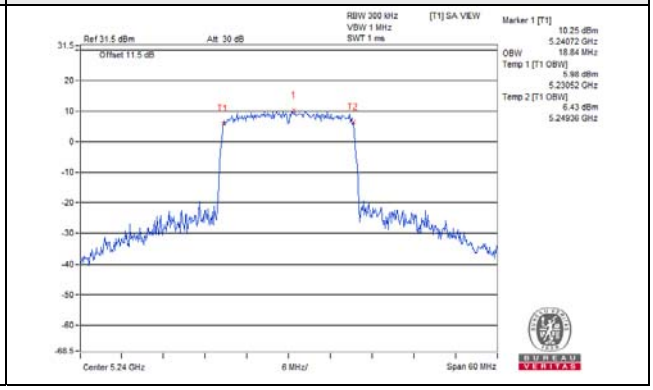
802.11ax (HE40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	37.92	37.80	37.92	37.68
46	5230	38.64	38.28	38.16	38.64
151	5755	38.04	37.92	37.92	38.04
159	5795	38.04	37.92	37.92	38.04

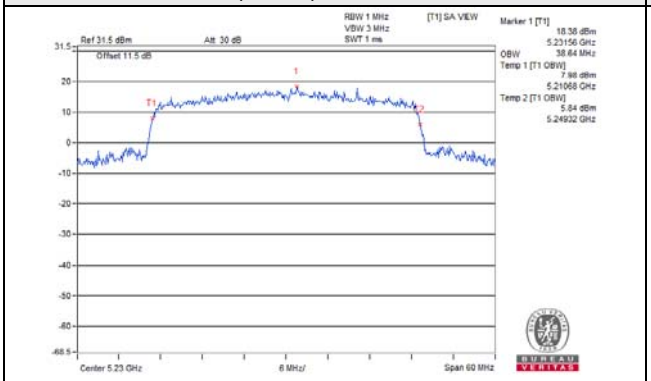
802.11ax (HE80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	76.80	76.56	76.80	76.56
155	5775	77.52	77.52	77.04	77.52

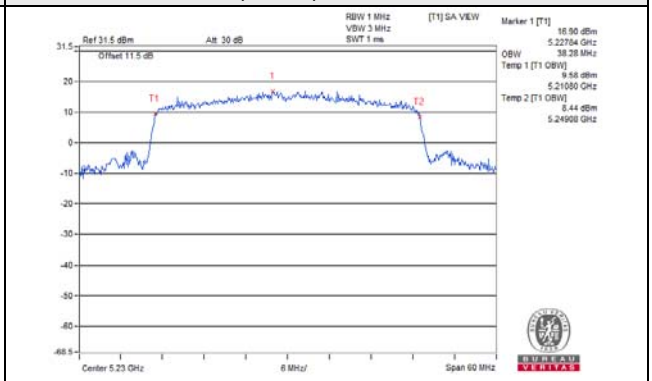
Spectrum Plot of Worst Value	
802.11a	802.11ax (HE20)
	
802.11ax (HE40)	802.11ax (HE80)
	

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
	

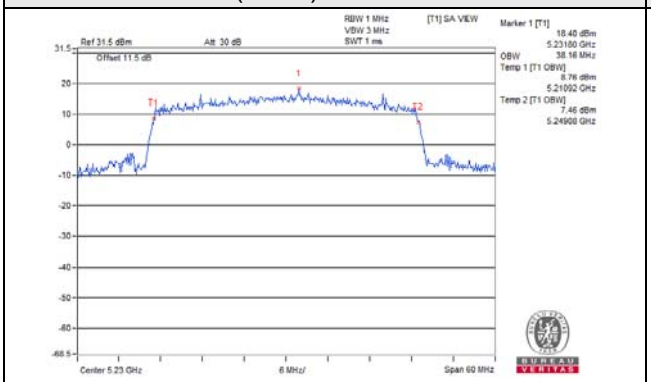
802.11ax (HE40) / Chain 0 / CH 46



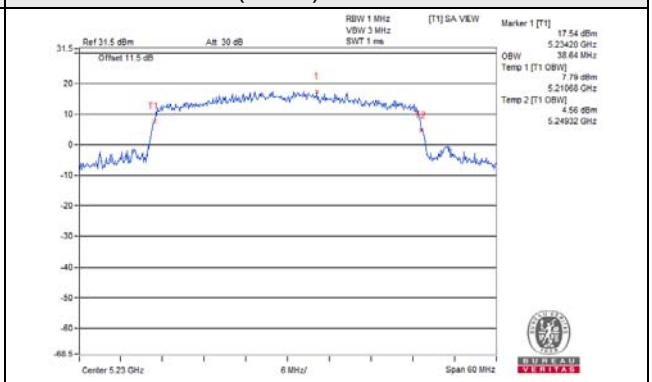
802.11ax (HE40) / Chain 1 / CH 46



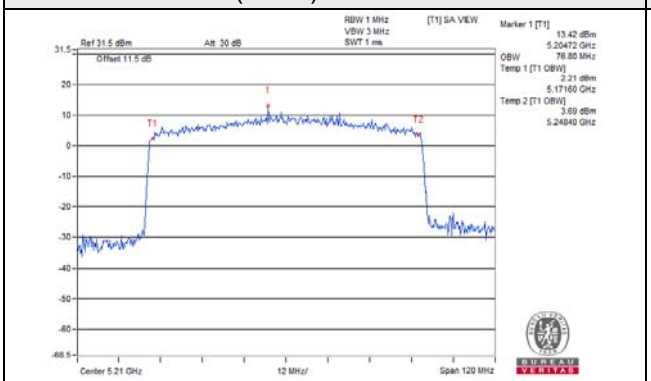
802.11ax (HE40) / Chain 2 / CH 46



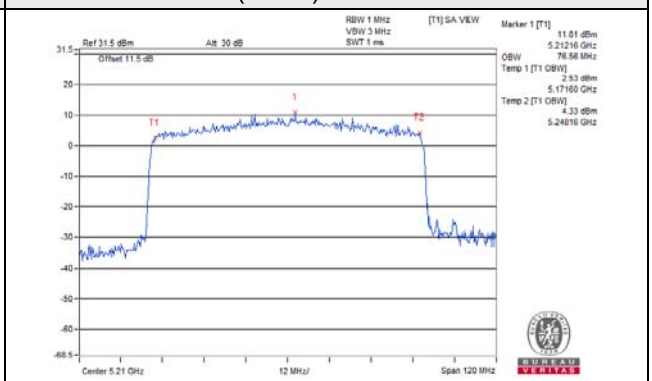
802.11ax (HE40) / Chain 3 / CH 46



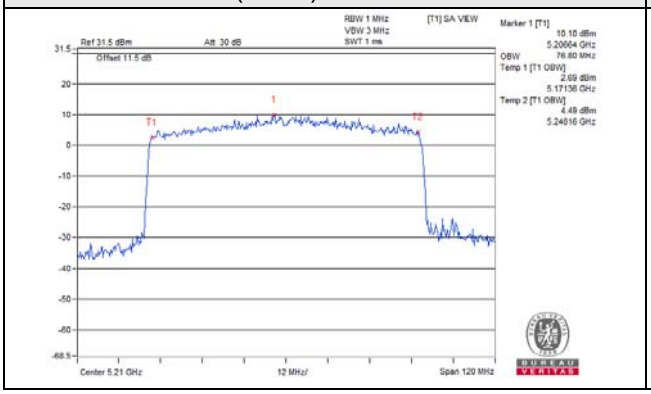
802.11ax (HE80) / Chain 0 / CH 42



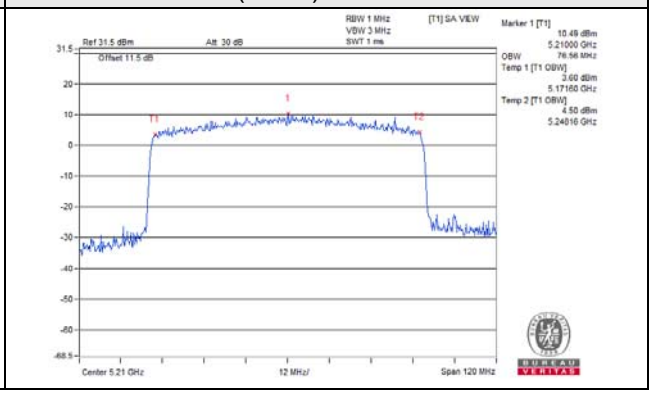
802.11ax (HE80) / Chain 1 / CH 42

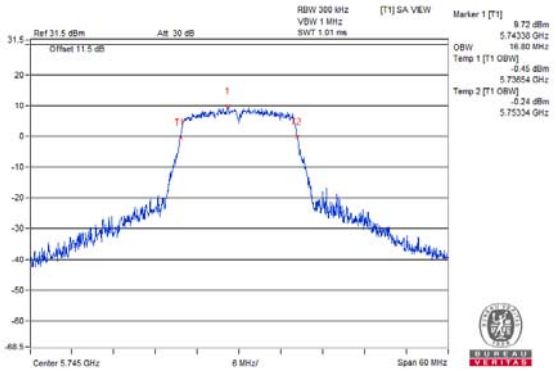
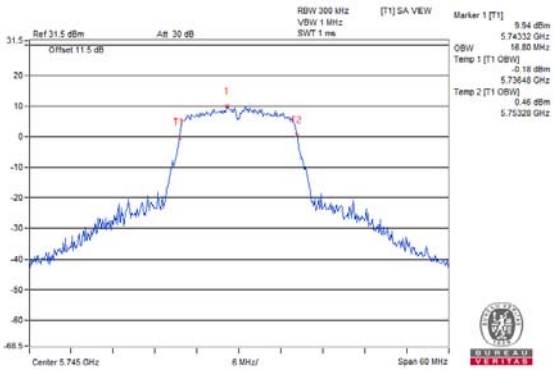
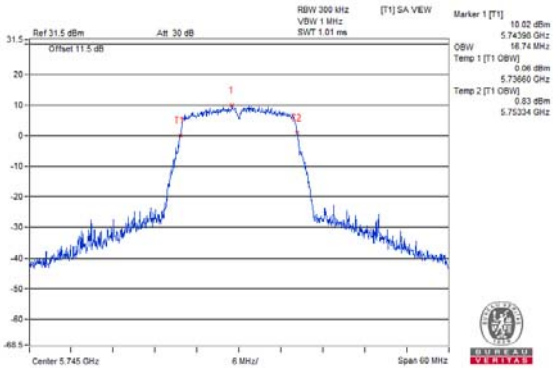
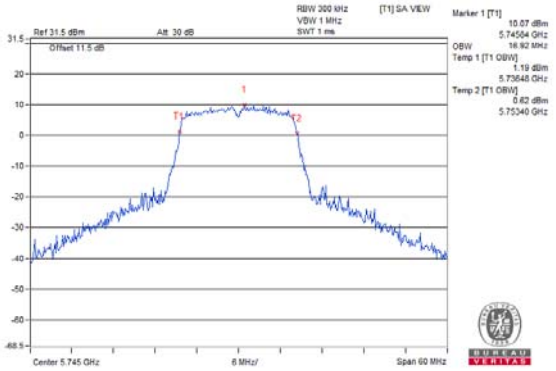
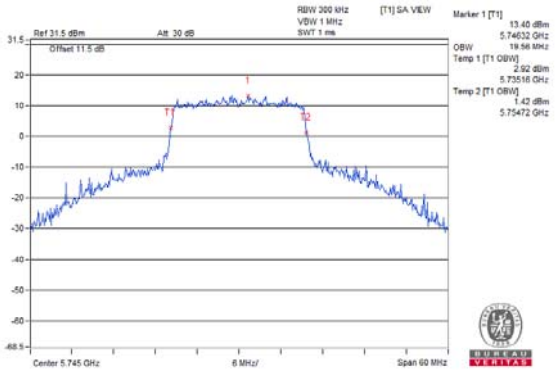
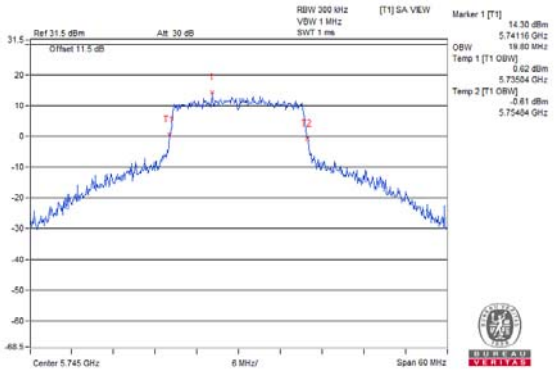
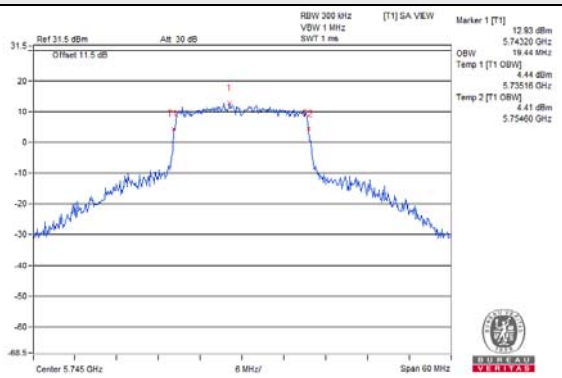
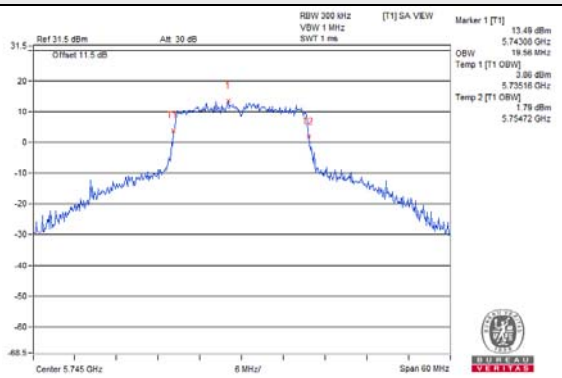


802.11ax (HE80) / Chain 2 / CH 42

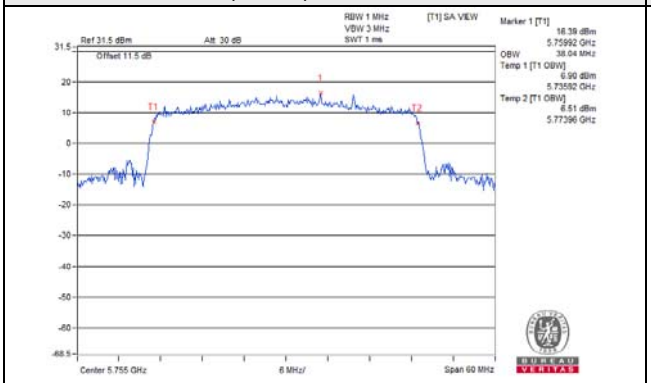


802.11ax (HE80) / Chain 3 / CH 42

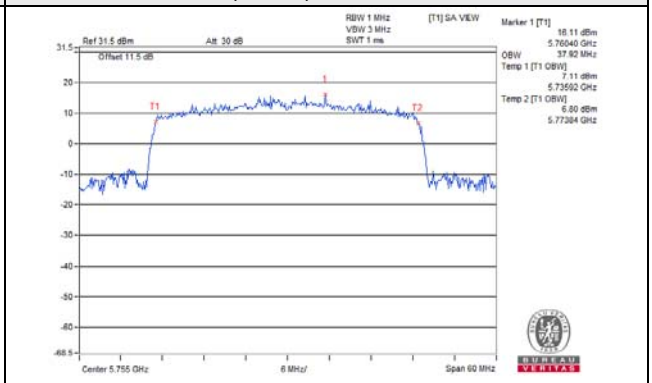


Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 149	802.11a / Chain 1 / CH 149
	
802.11a / Chain 2 / CH 149	802.11a / Chain 3 / CH 149
	
802.11ax (HE20) / Chain 0 / CH 149	802.11ax (HE20) / Chain 1 / CH 149
	
802.11ax (HE20) / Chain 2 / CH 149	802.11ax (HE20) / Chain 3 / CH 149
	

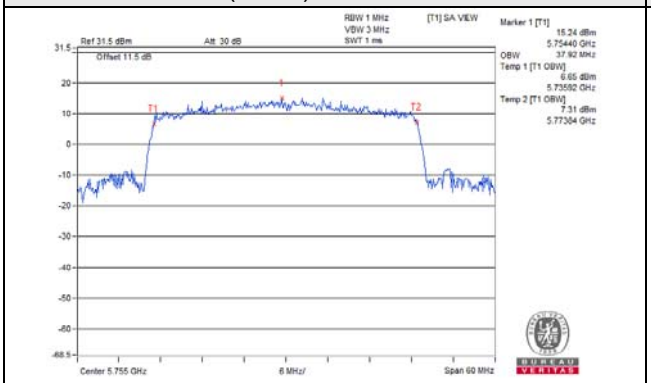
802.11ax (HE40) / Chain 0 / CH 151



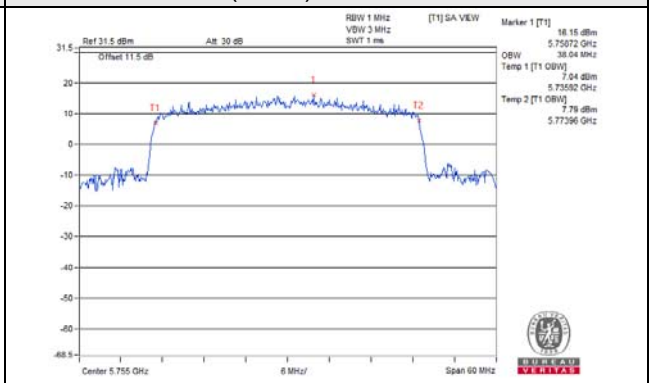
802.11ax (HE40) / Chain 1 / CH 151



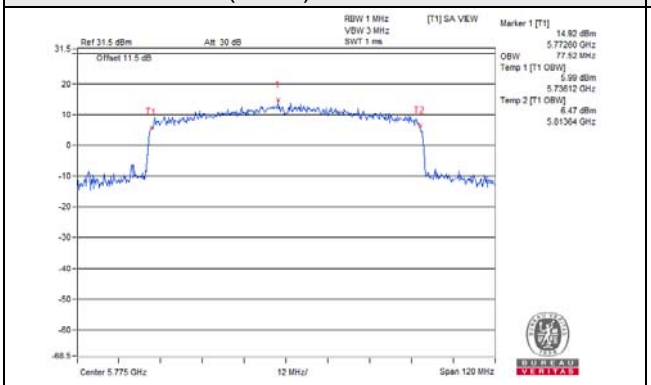
802.11ax (HE40) / Chain 2 / CH 151



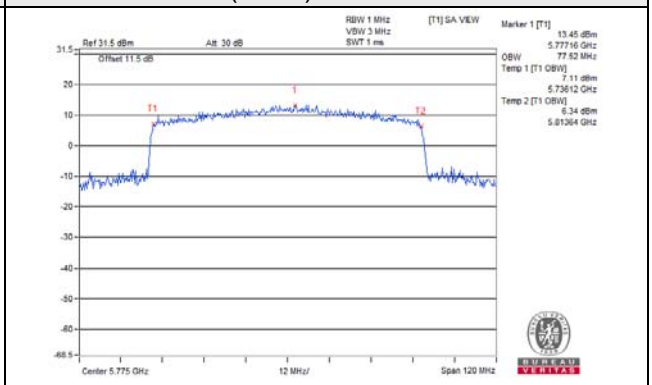
802.11ax (HE40) / Chain 3 / CH 151



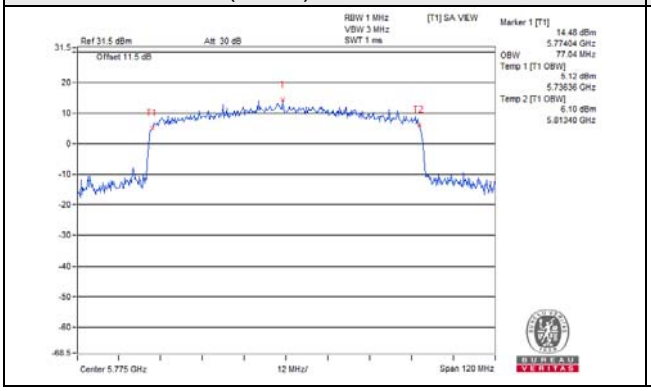
802.11ax (HE80) / Chain 0 / CH 155



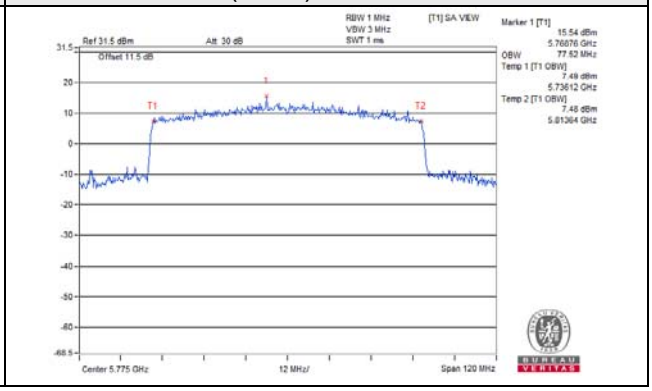
802.11ax (HE80) / Chain 1 / CH 155



802.11ax (HE80) / Chain 2 / CH 155



802.11ax (HE80) / Chain 3 / CH 155

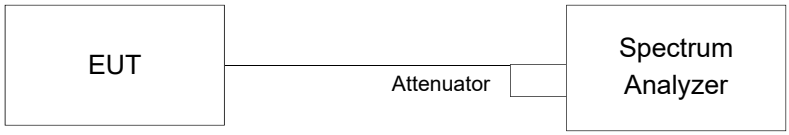


4.5 Peak Power Spectral Density Measurement

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-2

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 and add 10 log (1/duty cycle)

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 and add 10 log (1/duty cycle)

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)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	3.96	3.25	3.25	3.71	0.60	10.17	12.82	Pass
40	5200	5.61	5.59	5.21	5.21	0.60	12.03	12.82	Pass
48	5240	5.97	5.03	4.26	5.32	0.60	11.80	12.82	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power density limit shall be reduced to 17-(10.18-6) = 12.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	5.73	5.79	5.15	5.93	0.83	12.51	12.82	Pass
40	5200	5.41	4.92	5.14	5.35	0.83	12.06	12.82	Pass
48	5240	5.56	5.50	5.37	4.91	0.83	12.20	12.82	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power density limit shall be reduced to 17-(10.18-6) = 12.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	2.52	2.29	2.23	2.25	1.47	9.82	12.82	Pass
46	5230	5.55	5.11	4.75	5.46	1.47	12.72	12.82	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power density limit shall be reduced to 17-(10.18-6) = 12.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

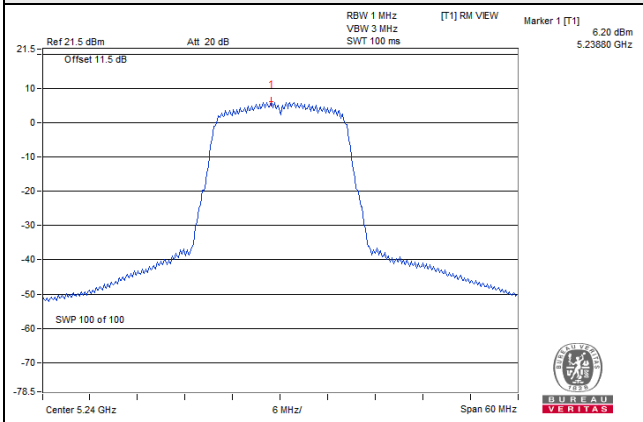
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)				Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-1.64	-2.00	-1.71	-1.87	2.37	6.59	12.82	Pass

Note:

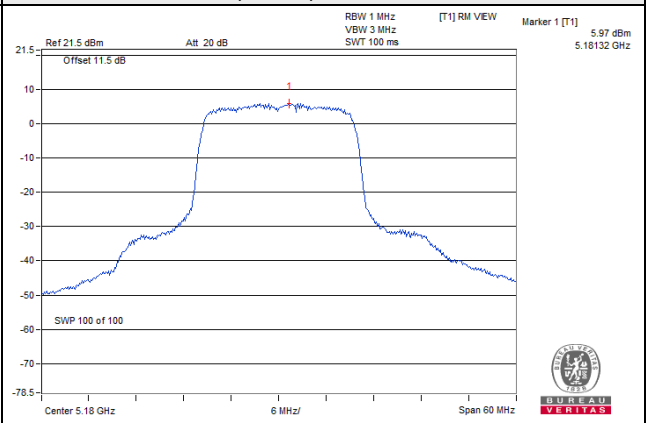
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=10.18dBi > 6dBi, so the power density limit shall be reduced to 17-(10.18-6) = 12.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

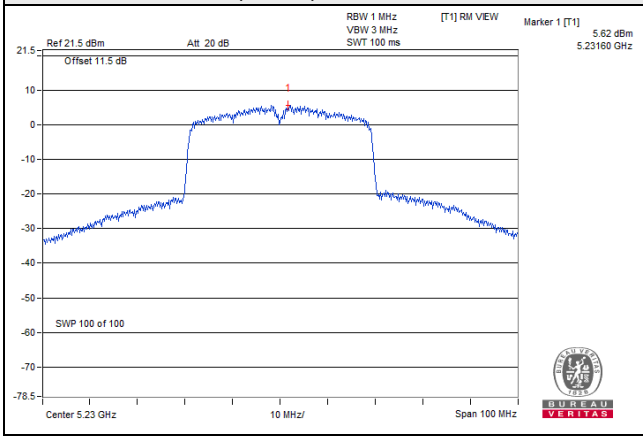
802.11a / Chain 0 / CH 48



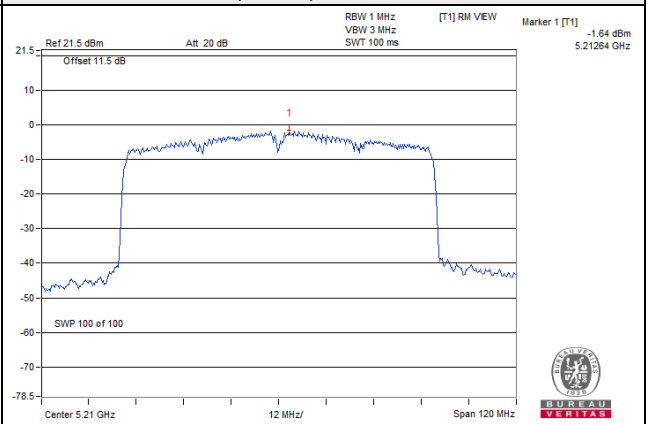
802.11ax (HE20) / Chain 3 / CH 36



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	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	1.86	4.08	6.02	0.6	10.70	24.75	Pass
	157	5785	1.73	3.95	6.02	0.60	10.57	24.75	Pass
	165	5825	1.86	4.08	6.02	0.60	10.70	24.75	Pass
1	149	5745	1.54	3.76	6.02	0.60	10.38	24.75	Pass
	157	5785	1.68	3.90	6.02	0.60	10.52	24.75	Pass
	165	5825	1.98	4.20	6.02	0.60	10.82	24.75	Pass
2	149	5745	1.55	3.77	6.02	0.60	10.39	24.75	Pass
	157	5785	1.80	4.02	6.02	0.60	10.64	24.75	Pass
	165	5825	1.54	3.76	6.02	0.60	10.38	24.75	Pass
3	149	5745	1.46	3.68	6.02	0.60	10.30	24.75	Pass
	157	5785	1.84	4.06	6.02	0.60	10.68	24.75	Pass
	165	5825	1.51	3.73	6.02	0.60	10.35	24.75	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power density limit shall be reduced to 30-(11.25-6) = 24.75dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	2.94	5.16	6.02	0.83	12.01	24.75	Pass
	157	5785	3.28	5.50	6.02	0.83	12.35	24.75	Pass
	165	5825	3.40	5.62	6.02	0.83	12.47	24.75	Pass
1	149	5745	2.91	5.13	6.02	0.83	11.98	24.75	Pass
	157	5785	3.11	5.33	6.02	0.83	12.18	24.75	Pass
	165	5825	2.89	5.11	6.02	0.83	11.96	24.75	Pass
2	149	5745	2.60	4.82	6.02	0.83	11.67	24.75	Pass
	157	5785	3.12	5.34	6.02	0.83	12.19	24.75	Pass
	165	5825	2.71	4.93	6.02	0.83	11.78	24.75	Pass
3	149	5745	3.05	5.27	6.02	0.83	12.12	24.75	Pass
	157	5785	3.61	5.83	6.02	0.83	12.68	24.75	Pass
	165	5825	3.21	5.43	6.02	0.83	12.28	24.75	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power density limit shall be reduced to 30-(11.25-6) = 24.75dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

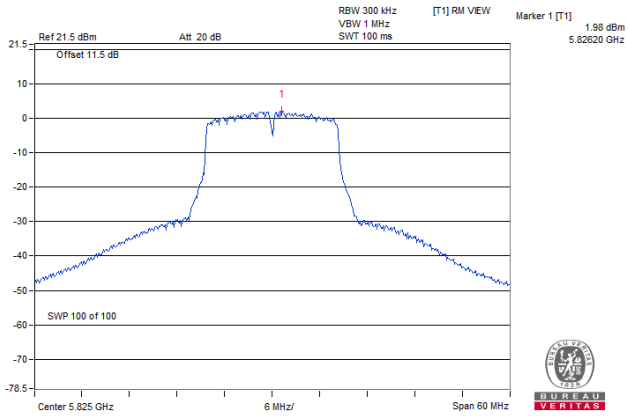
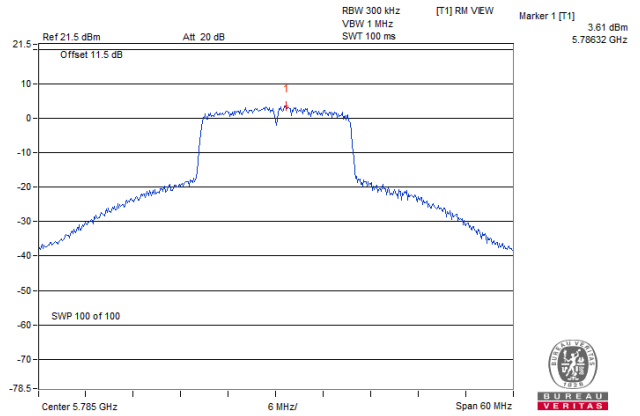
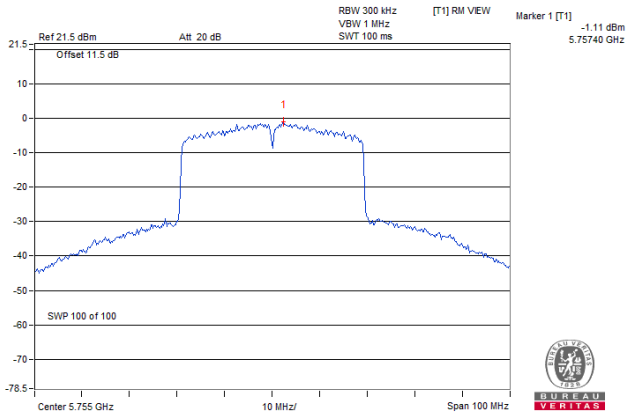
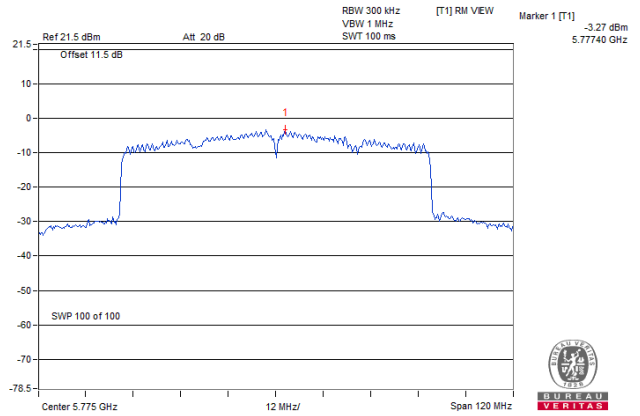
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-1.11	1.11	6.02	1.47	8.60	24.75	Pass
	159	5795	-1.27	0.95	6.02	1.47	8.44	24.75	Pass
1	151	5755	-1.85	0.37	6.02	1.47	7.86	24.75	Pass
	159	5795	-1.19	1.03	6.02	1.47	8.52	24.75	Pass
2	151	5755	-1.94	0.28	6.02	1.47	7.77	24.75	Pass
	159	5795	-1.93	0.29	6.02	1.47	7.78	24.75	Pass
3	151	5755	-1.27	0.95	6.02	1.47	8.44	24.75	Pass
	159	5795	-1.34	0.88	6.02	1.47	8.37	24.75	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power density limit shall be reduced to 30-(11.25-6) = 24.75dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-3.27	-1.05	6.02	2.37	7.34	24.75	Pass
1	155	5775	-3.78	-1.56	6.02	2.37	6.83	24.75	Pass
2	155	5775	-3.96	-1.74	6.02	2.37	6.65	24.75	Pass
3	155	5775	-3.70	-1.48	6.02	2.37	6.91	24.75	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[$(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2/4$]=11.25dBi > 6dBi, so the power density limit shall be reduced to 30-(11.25-6) = 24.75dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

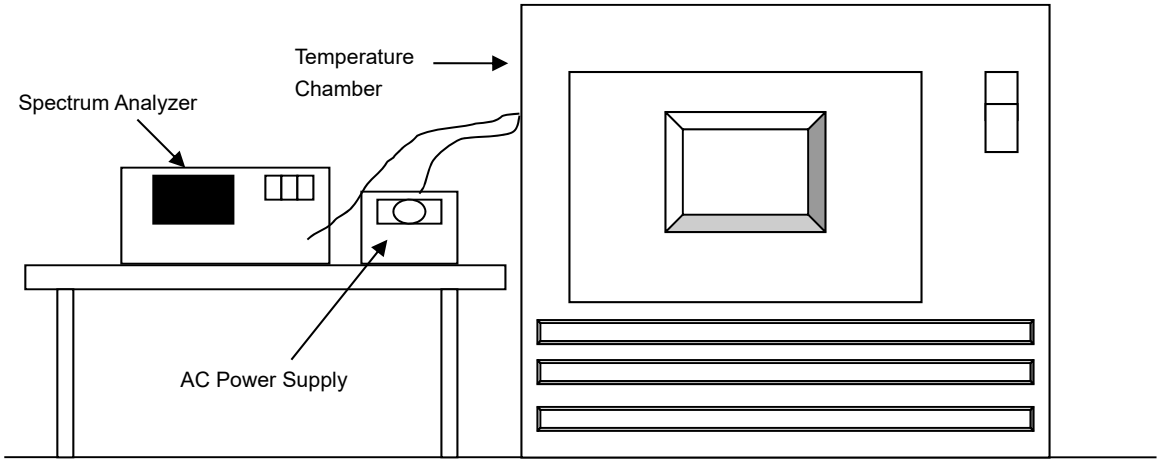
Spectrum Plot of Worst Value	
802.11a	802.11ax (HE20)
	
802.11ax (HE40)	802.11ax (HE80)
	

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

Tested date: Jun. 02, 2021

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 12, 2020	Jun. 11, 2021
Standard Temperature And Humidity Chamber GIANT FORCE	GTH-120-40-CP-AR	MAA1306-019	Sep. 09, 2020	Sep. 08, 2021
Digital Multimeter Fluke	87-III	70360742	Jun. 23, 2020	Jun. 22, 2021
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	5180.0003	PASS	5180.0027	PASS	5180.0005	PASS	5180.0006	PASS
30	120	5180.0123	PASS	5180.0123	PASS	5180.0117	PASS	5180.0145	PASS
20	120	5180.0107	PASS	5180.0101	PASS	5180.0140	PASS	5180.0125	PASS
10	120	5180.0174	PASS	5180.0193	PASS	5180.0192	PASS	5180.0207	PASS
0	120	5180.0186	PASS	5180.0205	PASS	5180.0175	PASS	5180.0217	PASS

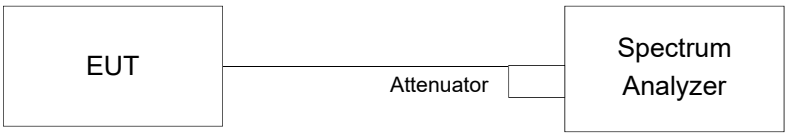
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0098	PASS	5180.0098	PASS	5180.0146	PASS	5180.0118	PASS
	120	5180.0107	PASS	5180.0101	PASS	5180.0140	PASS	5180.0125	PASS
	102	5180.0097	PASS	5180.0104	PASS	5180.0140	PASS	5180.0127	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	15.79	15.86	16.29	15.86	0.50	Pass
157	5785	16.28	15.74	16.09	16.04	0.50	Pass
165	5825	15.38	15.97	15.71	15.51	0.50	Pass

802.11ax (HE20)

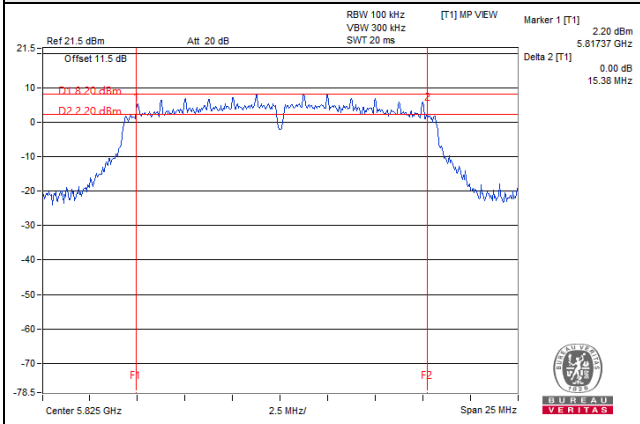
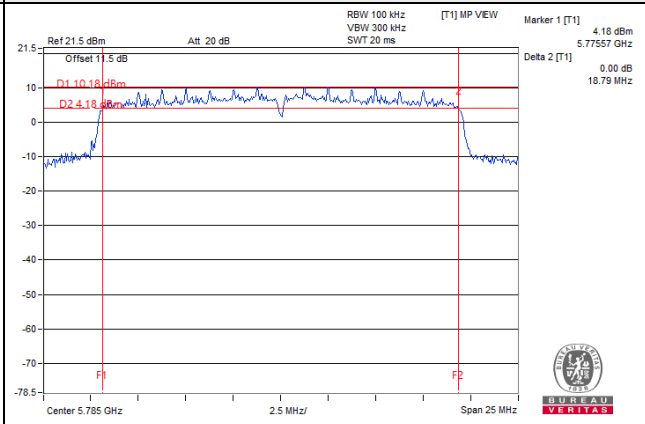
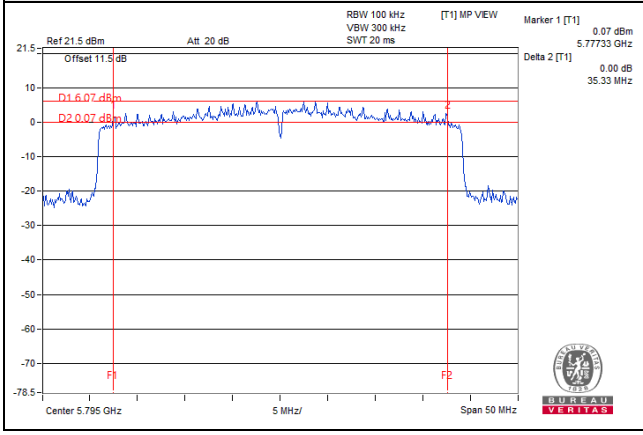
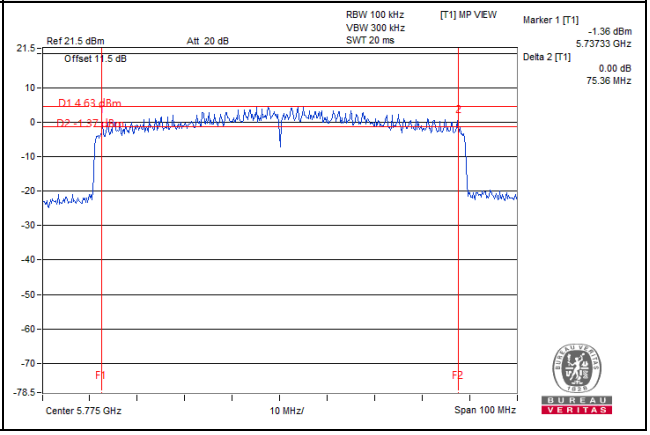
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	18.90	18.94	18.95	18.91	0.50	Pass
157	5785	18.92	18.86	18.97	18.79	0.50	Pass
165	5825	18.80	18.85	18.80	18.80	0.50	Pass

802.11ax (HE40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.68	37.16	36.84	35.60	0.50	Pass
159	5795	35.99	36.01	36.07	35.33	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	75.39	75.43	75.36	75.43	0.50	Pass

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

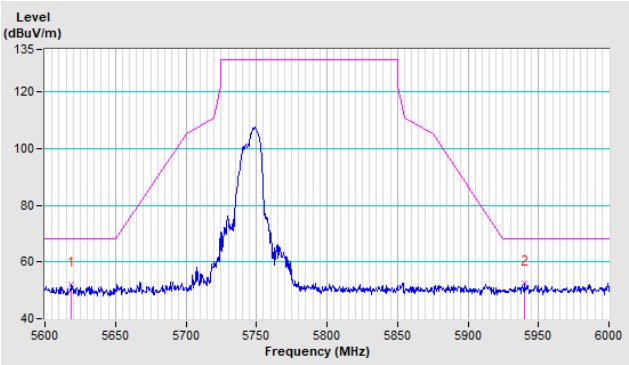
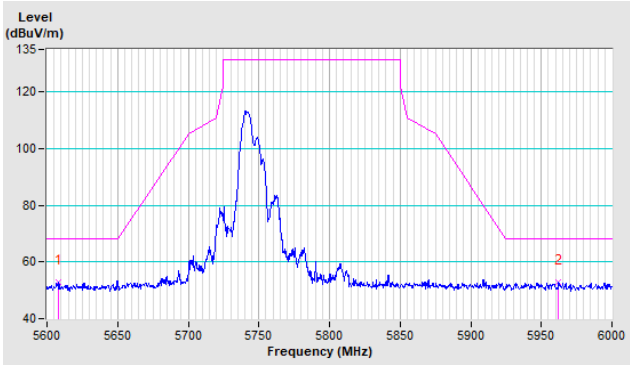
5 Pictures of Test Arrangements

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

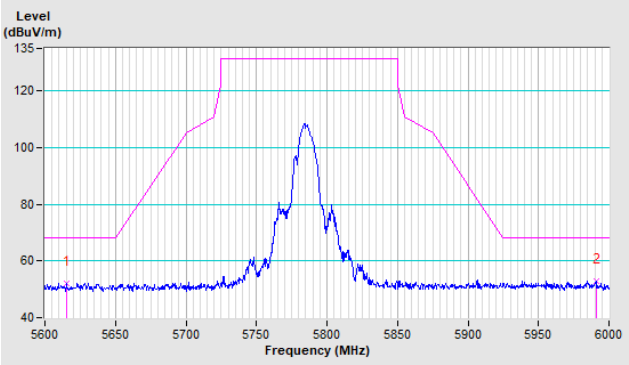
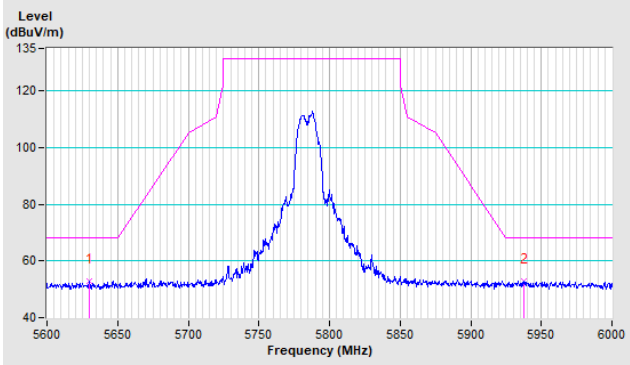
Annex A - Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

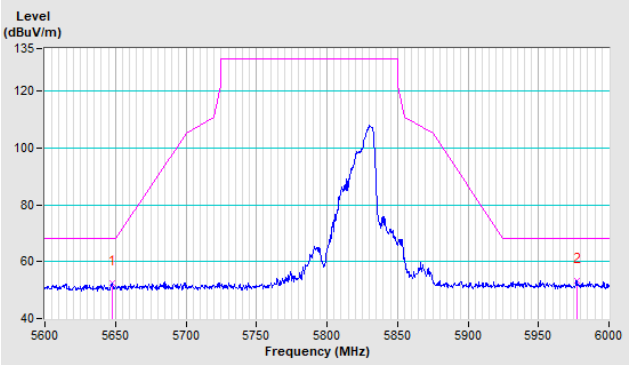
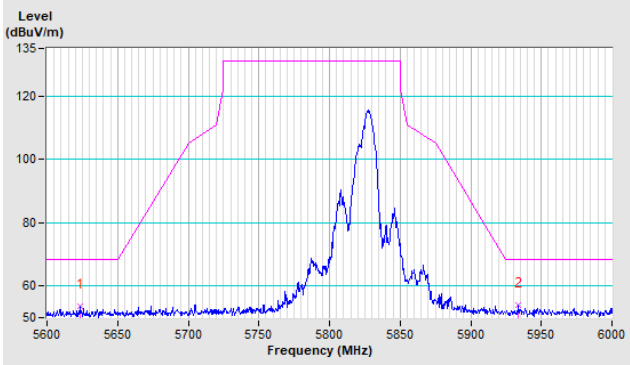
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

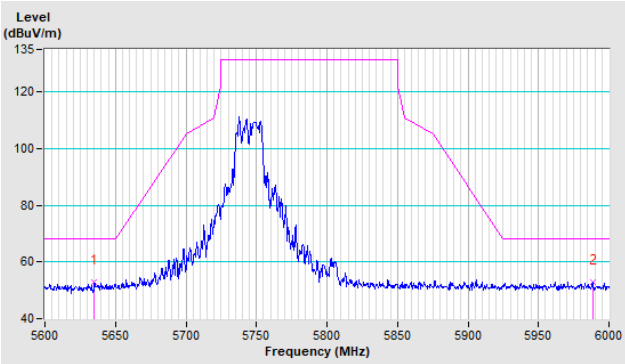
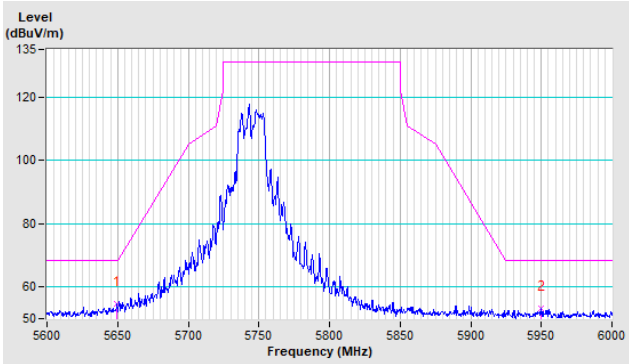
Horizontal	Vertical
	

CH 165 5825 MHz

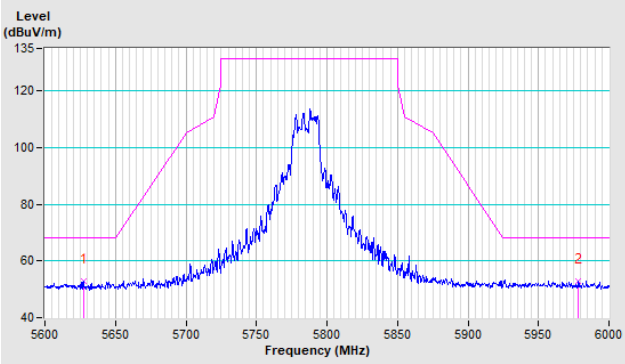
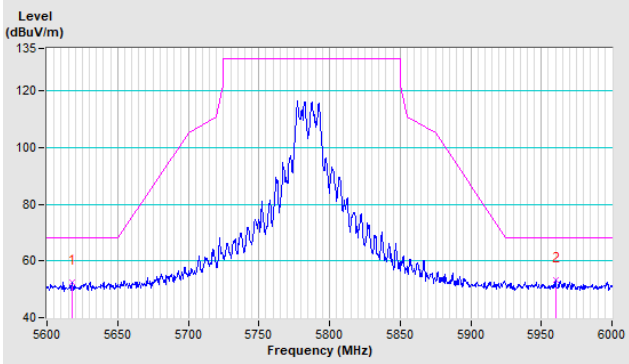
Horizontal	Vertical
	

802.11ax (HE20)

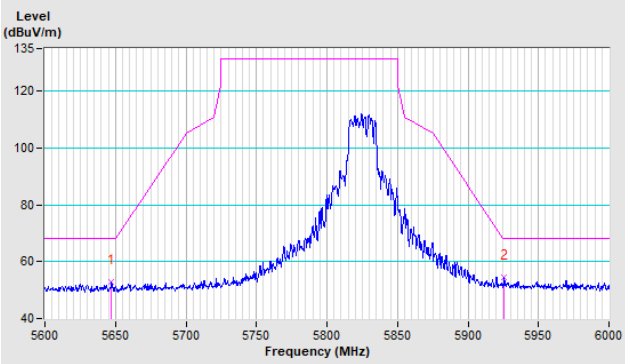
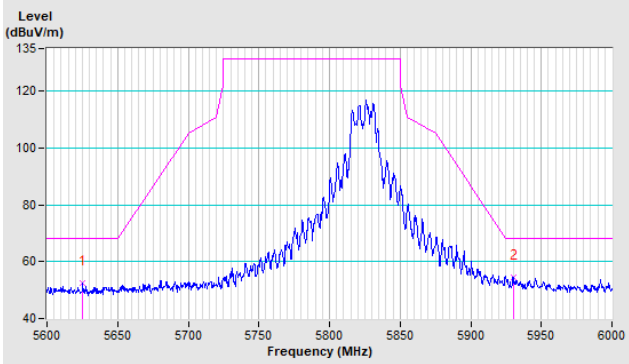
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

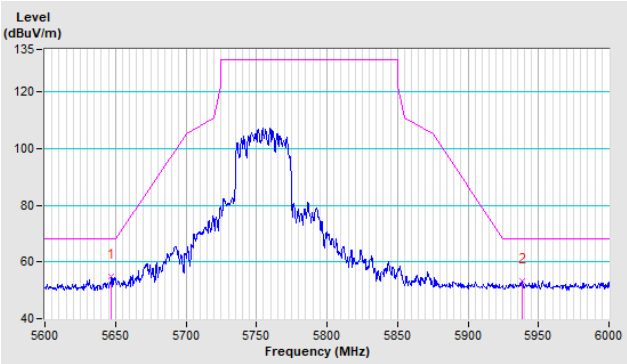
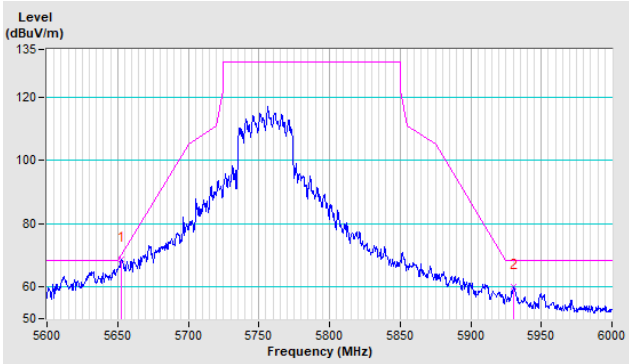
Horizontal	Vertical
	

CH 165 5825 MHz

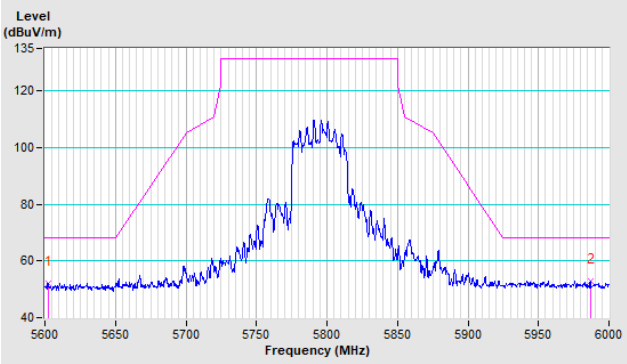
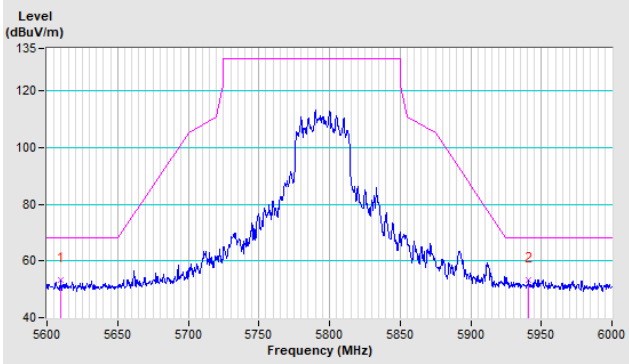
Horizontal	Vertical
	

802.11ax (HE40)

CH 151 5755 MHz

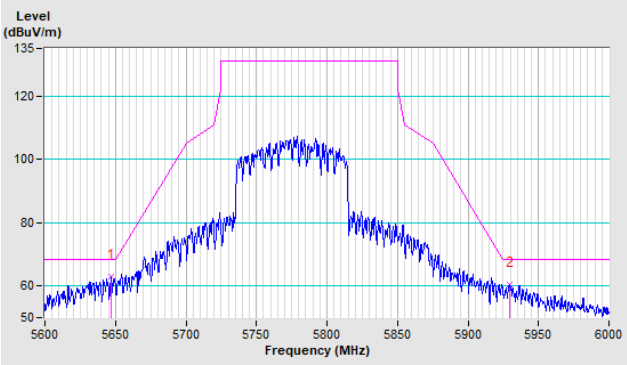
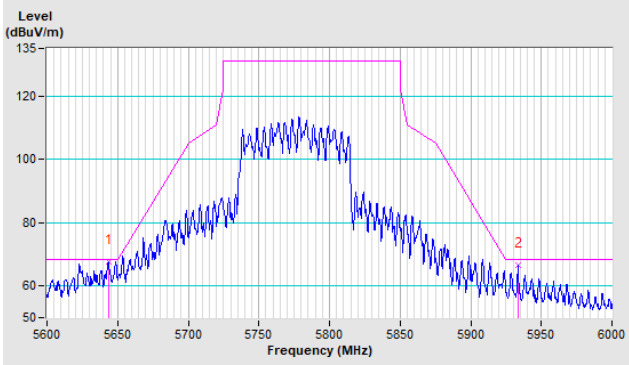
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ax (HE80)

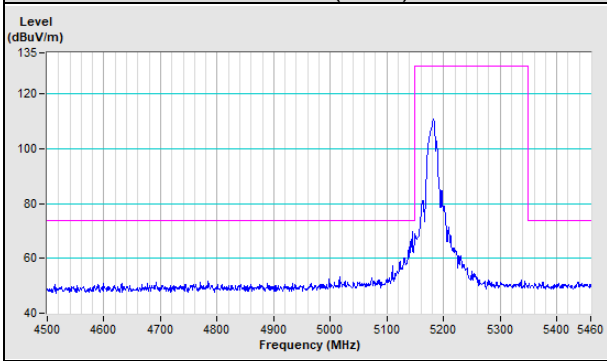
CH 155 5775 MHz

Horizontal	Vertical
	

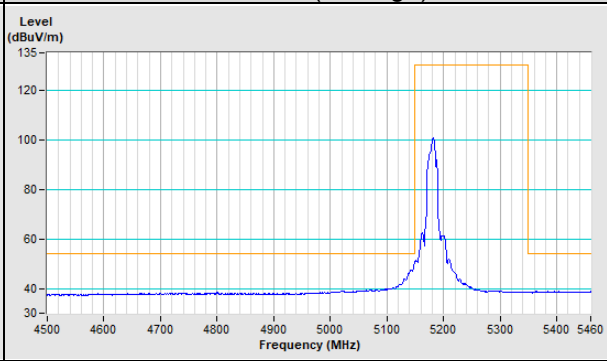
Annex B - Band Edge Measurement

802.11a Channel 36

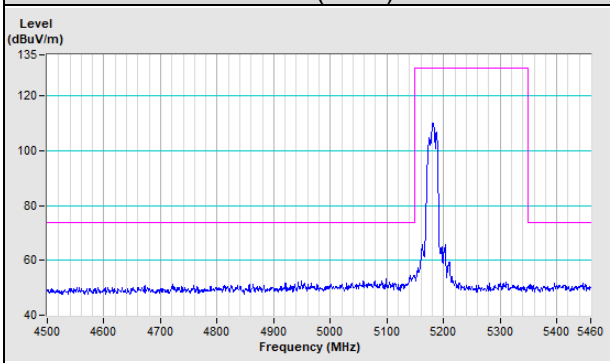
Horizontal (Peak)



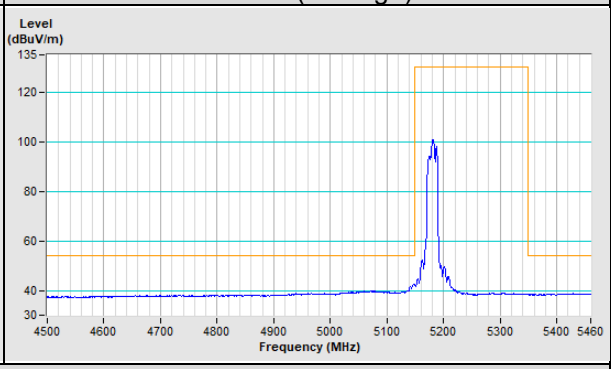
Horizontal (Average)



Vertical (Peak)

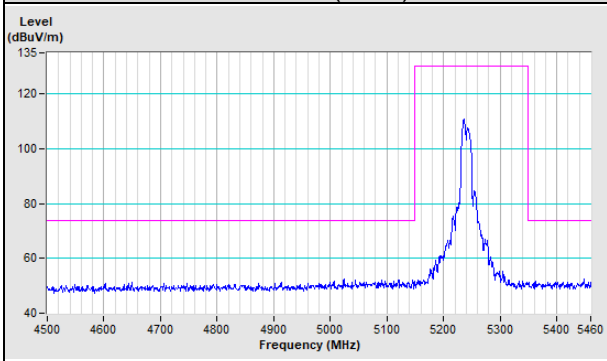


Vertical (Average)

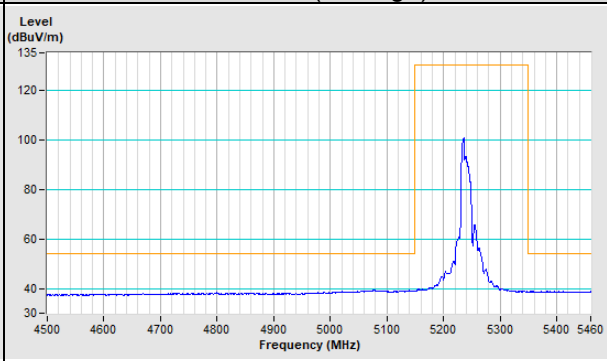


802.11a Channel 48

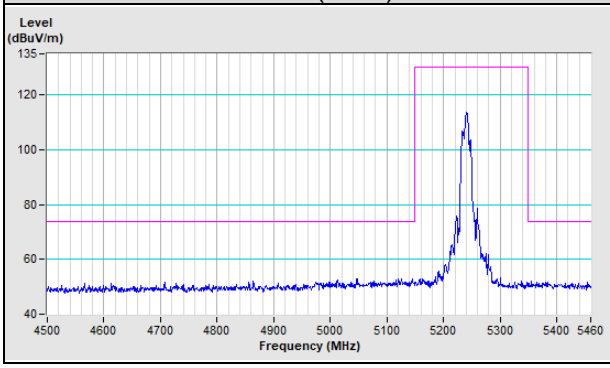
Horizontal (Peak)



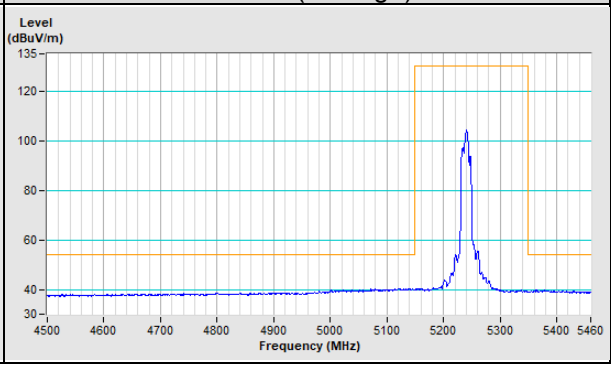
Horizontal (Average)

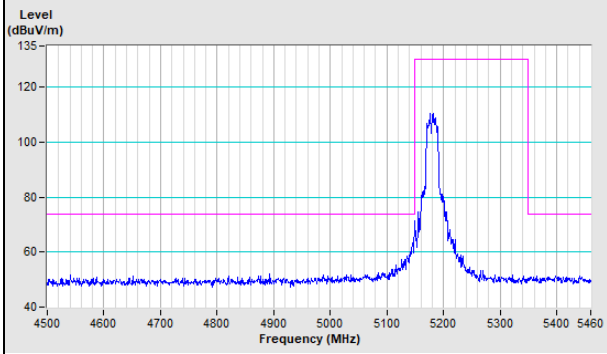
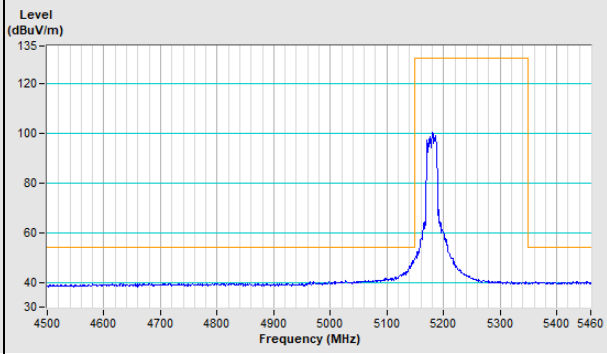
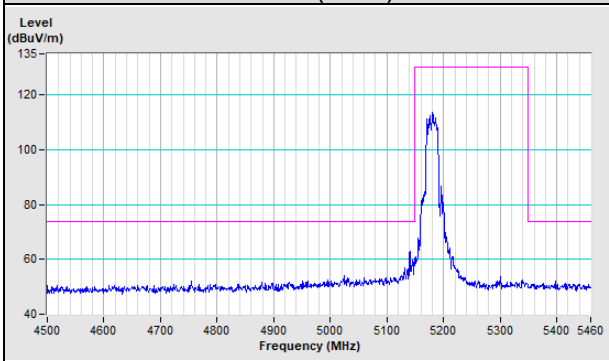
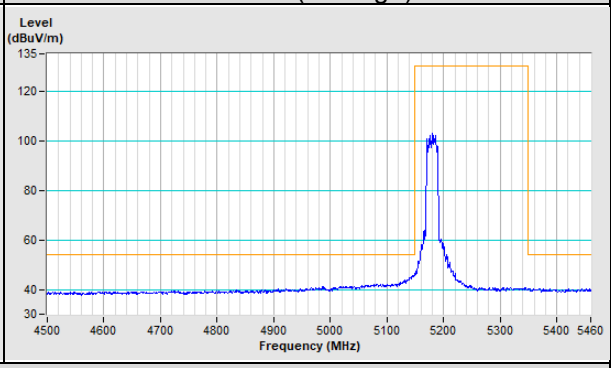


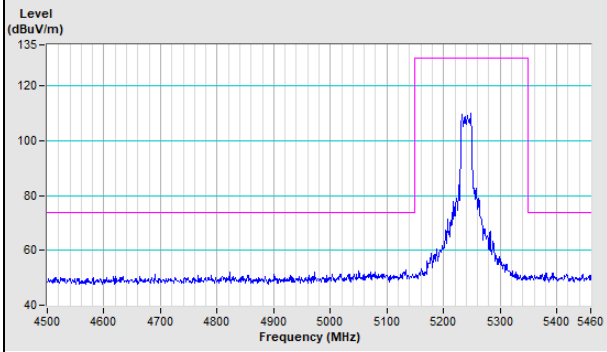
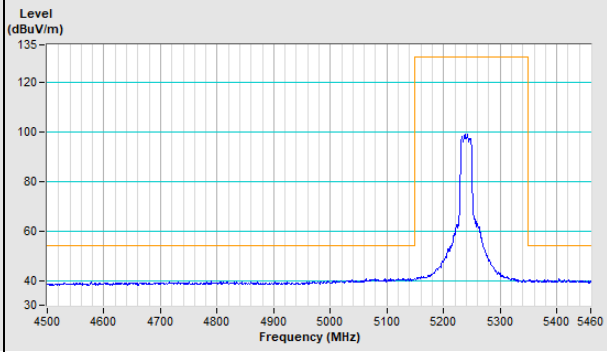
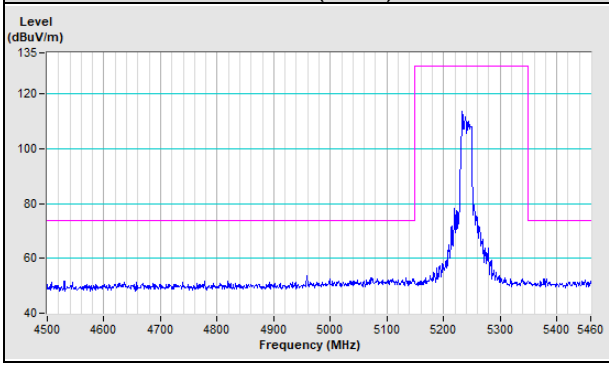
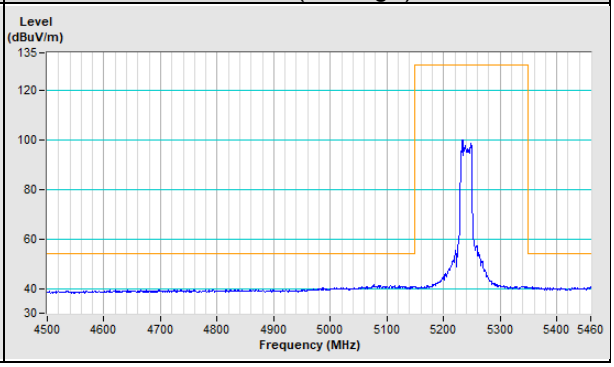
Vertical (Peak)

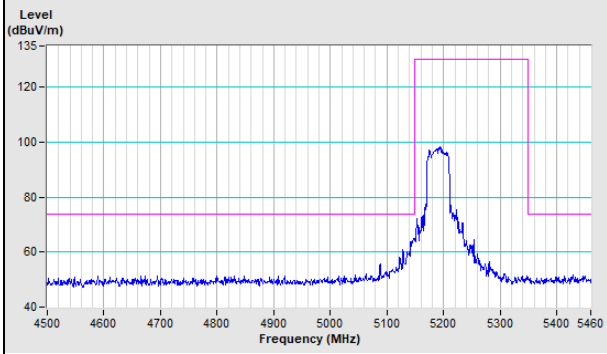
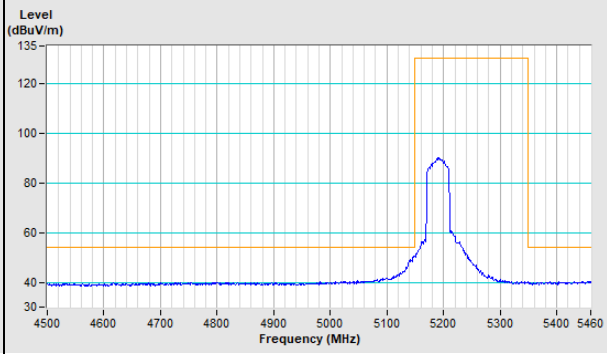
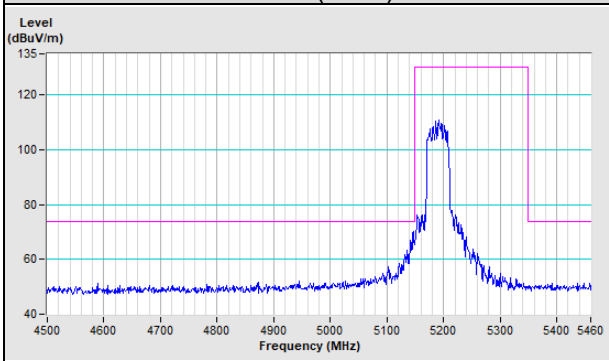
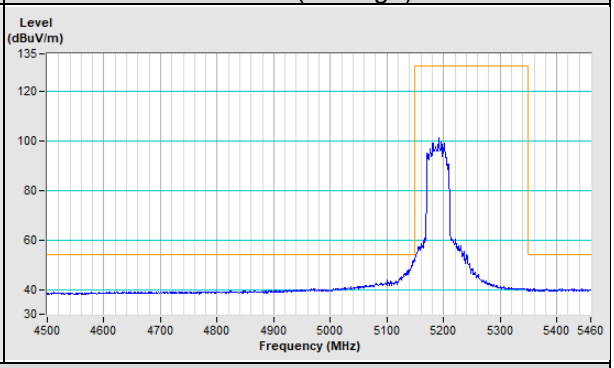


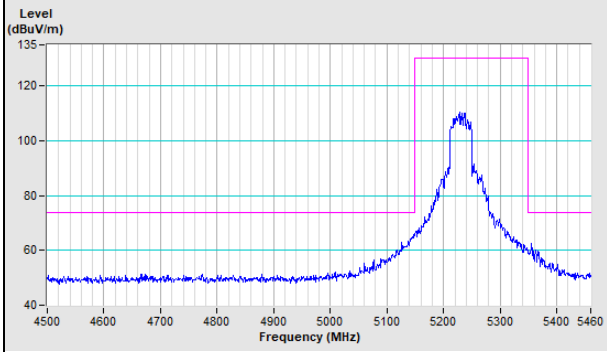
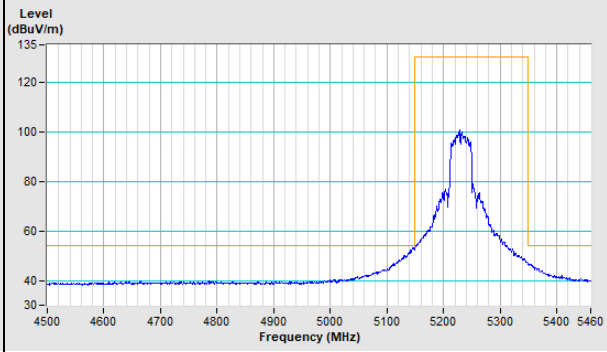
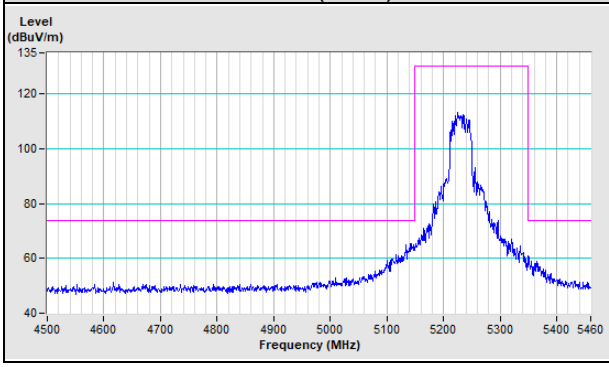
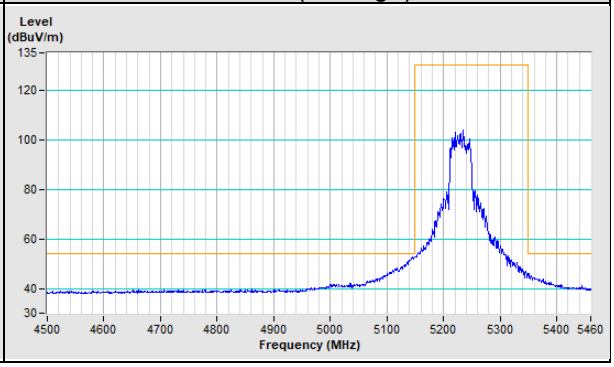
Vertical (Average)

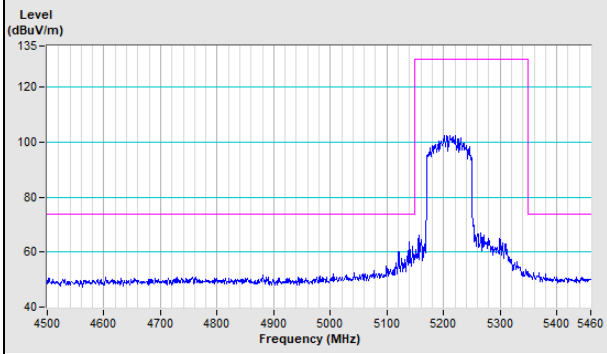
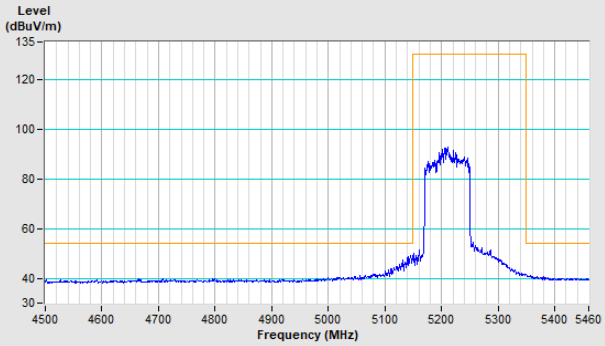
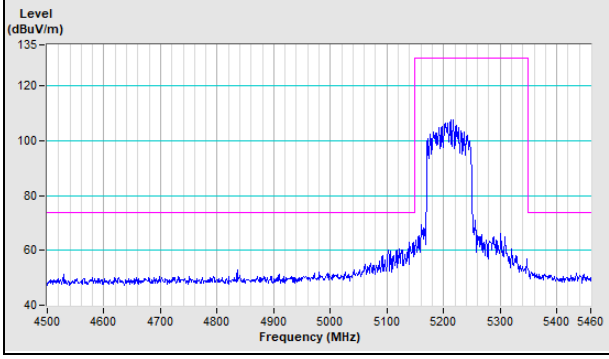
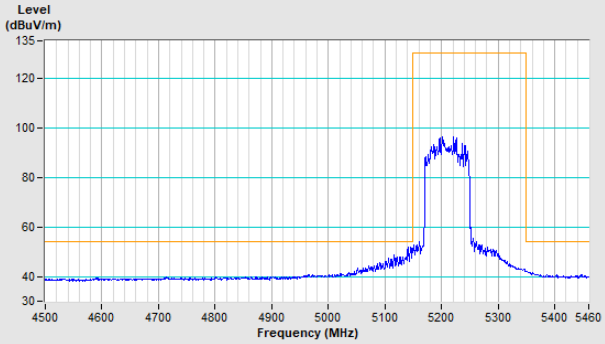


802.11ax (HE20) Channel 36	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

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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Email: service.adt@tw.bureauveritas.com
Web Site: www.bureauveritas-adt.com

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

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