FCC Test Report

Report No.:	RFBEBW-WTW-P21010678-1
FCC ID:	KA2IS3650APA1
Test Model:	DIS-3650AP
Received Date:	Jan. 22, 2021
Test Date:	Apr. 16~ Jun. 24, 2021
Issued Date:	Sep. 03, 2021
Applicant:	D-Link Corporation
Address:	14420 Myford Road Suite 100 Irvine California 92606 United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RFBEBW-WTW-P21010678-1	Original release	Sep. 03, 2021

1 Certificate of Conformity

Product:	Wireless AC1200 Wave 2 Industrial Outdoor Access Point
Brand:	D-Link
Test Model:	DIS-3650AP
Sample Status:	Engineering sample
Applicant:	D-Link Corporation
Test Date:	Apr. 16~ Jun. 24, 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:** Sep. 03, 2021

Polly Chien / Specialist

Approved by : _____ , **Date:** Sep. 03, 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 -10.24dB at 13.93666MHz.
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 -0.7dB at 17265.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is N Plug 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	Wireless AC1200 Wave 2 Industrial Outdoor Access Point
Brand	D-Link
Test Model	DIS-3650AP
Sample Status	Engineering sample
Power Supply Rating	56Vdc (POE)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180 ~ 5240MHz: 35.211mW 5745 ~ 5825MHz: 784.234mW Beamforming Mode: 5180 ~ 5240MHz: 17.607mW 5745 ~ 5825MHz: 392.144mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Cable Supplied	NA

Note:

1. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	Beamforming Mode	TX Function
802.11a	Not Support	2TX
802.11n (HT20)	Support	2TX
802.11n (HT40)	Support	2TX
802.11ac (VHT20)	Support	2TX
802.11ac (VHT40)	Support	2TX
802.11ac (VHT80)	Support	2TX

* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40/VHT80 on 802.11ac mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)
* For 802.11n and 802.11ac, CDD mode and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

2. The EUT consumes power from the following PoE. (Support units only)

POE (Support unit only)	
Brand	D-Link
Model	DPE-311GI
Input Power	100-240Vac, 0.8A, 50-60Hz
Output Power	56Vdc, 0.54A
Power cord	Non-shielded AC (0.55m)

3. The following antennas were provided to the EUT.

Antenna Type	Omni Antenna	
Antenna Connector	N Plug	
Frequency	2400~2500MHz	5150~5850MHz
Gain (dBi)	3.2	6.5

*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.

4. The EUT will install at outdoor area, the highest antenna gain from the horizon above 30 degrees as below, for more detail information please refer to antenna specification and user manual.

Antenna Model	Antenna gain	Antenna install degree
ANT10D (P/N: 1034G00000280)	5.5 dBi	

* Due to device Will restriced installation position as above photo, thus consider to above 30 degrees highest antenna gain are chosen from XZ and YZ Plane (antenna specification of 60~-60 deg and 120~-120 deg)
* 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.

5. WLAN 2.4GHz & 5GHz technology can transmit at same time.

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

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

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):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

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):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

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

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

Radiated Emission Test (Above 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	7.2
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	7.2
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	29.3

Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11ac (VHT40)	5180-5240	38 to 46	159	OFDM	15.0
-	802.11ac (VHT40)	5745-5825	151 to 159		OFDM	15.0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11ac (VHT40)	5180-5240	38 to 46	159	OFDM	15.0
-	802.11ac (VHT40)	5745-5825	151 to 159		OFDM	15.0

Transmit Power Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	7.2
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	13.5
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	7.2
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	13.5
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	29.3

Bandwidth, Peak Power Spectral Density and Frequency Stability Measurement:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	7.2
	802.11ac (VHT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	7.2
	802.11ac (VHT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	29.3

Test Condition:

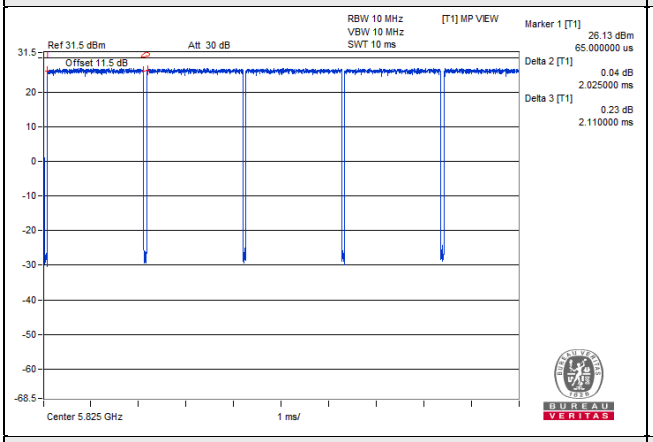
Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	22 deg. C, 68% RH	120Vac, 60Hz	Greg Lin
RE<1G	22 deg. C, 68% RH	120Vac, 60Hz	Rex Wang
PLC	25 deg. C, 75% RH	120Vac, 60Hz	Rex Wang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Jisyong Wang

3.3 Duty Cycle of Test Signal

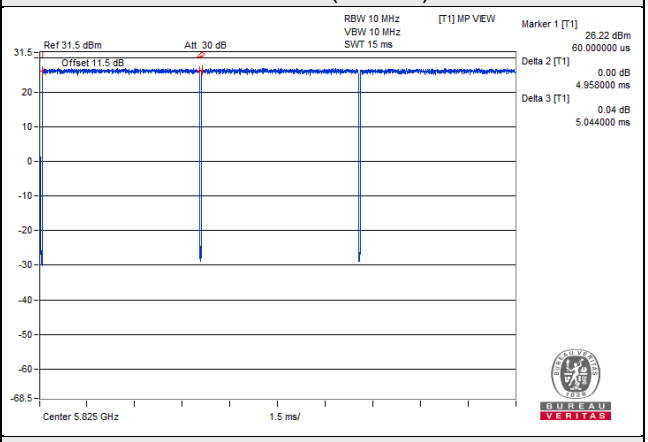
Duty cycle of test signal is > 98%, duty factor is not required.
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.025/2.110 = 0.960, Duty factor = 10 * log (1/0.960) = 0.18
802.11ac (VHT20): Duty cycle = 4.958/5.044 = 0.983
802.11ac (VHT40): Duty cycle = 2.400/2.472 = 0.971, Duty factor = 10 * log (1/0.971) = 0.13
802.11ac (VHT80): Duty cycle = 1.133/1.198 = 0.946, Duty factor = 10 * log (1/0.946) = 0.24

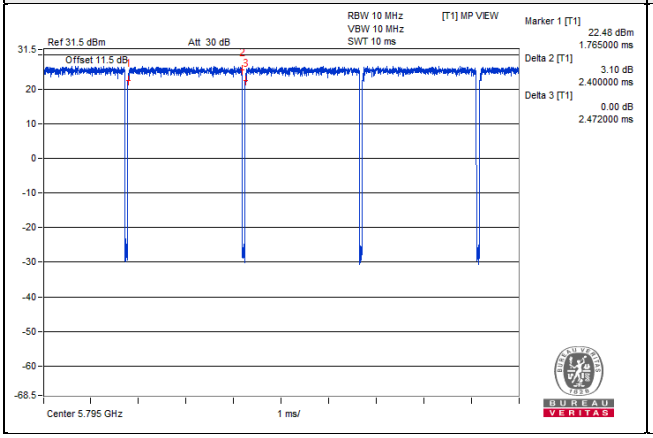
802.11a



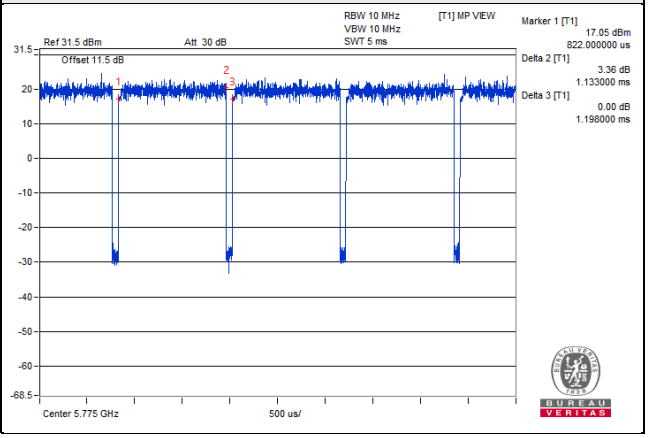
802.11ac (VHT20)



802.11ac (VHT40)



802.11ac (VHT80)



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.

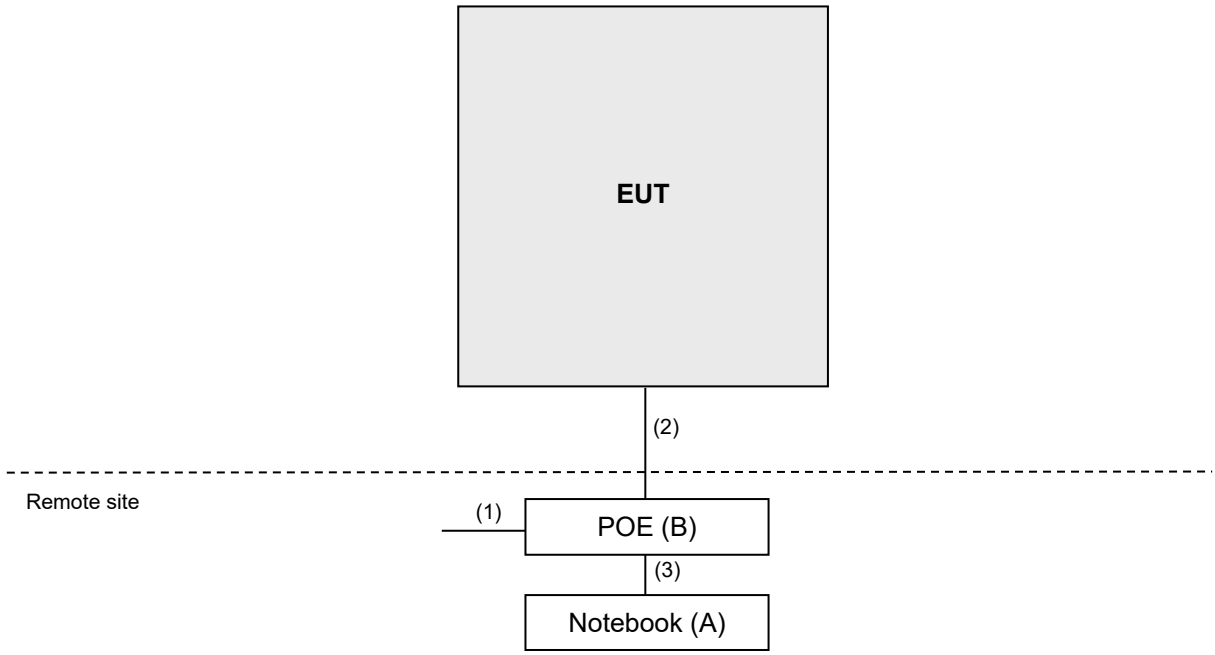
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	81A4	YD02TWF5	FCC DoC Approved	-
B.	POE	D-link	DPE-311GI	NA	NA	Provided by client

Note:

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

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Power cable	1	0.55	N	0	Provided by client
2.	LAN cable	1	1	N	0	RJ45, Cat5e
3.	LAN cable	1	7	N	0	RJ45, Cat5e

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:

$$E = \frac{1000000\sqrt{30P}}{3}$$ 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	FSV40	100979	Mar. 29, 2021	Mar. 28, 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; 802.11ac (VHT20): RBW = 1MHz, VBW = 10Hz; 802.11ac (VHT40): RBW = 1MHz, VBW = 1kHz; 802.11ac (VHT80): RBW = 1MHz, VBW = 1kHz)

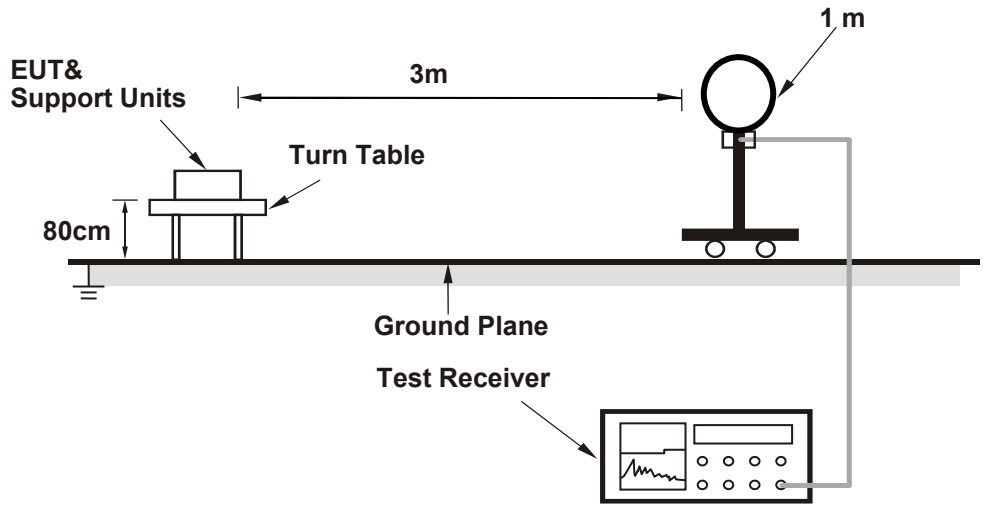
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

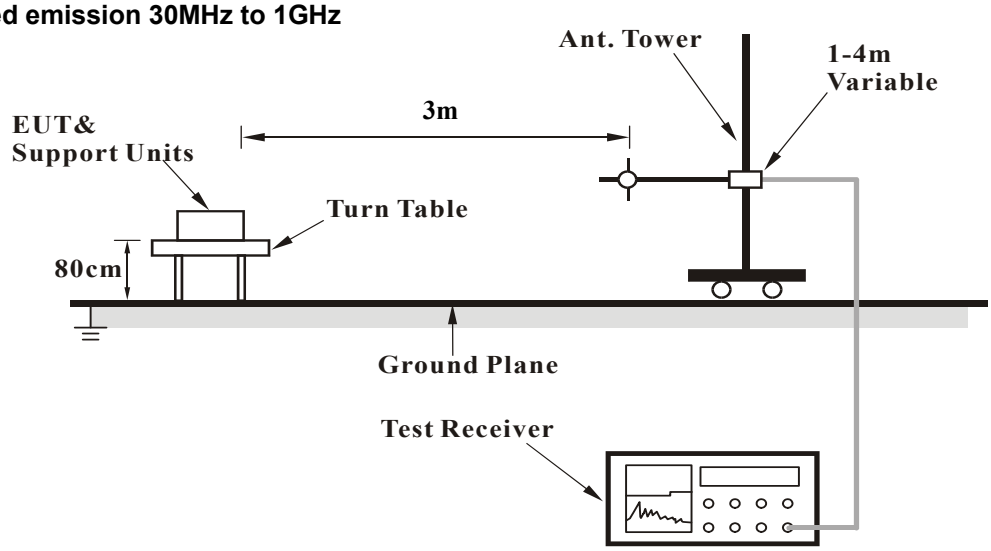
No deviation.

4.1.5 Test Setup

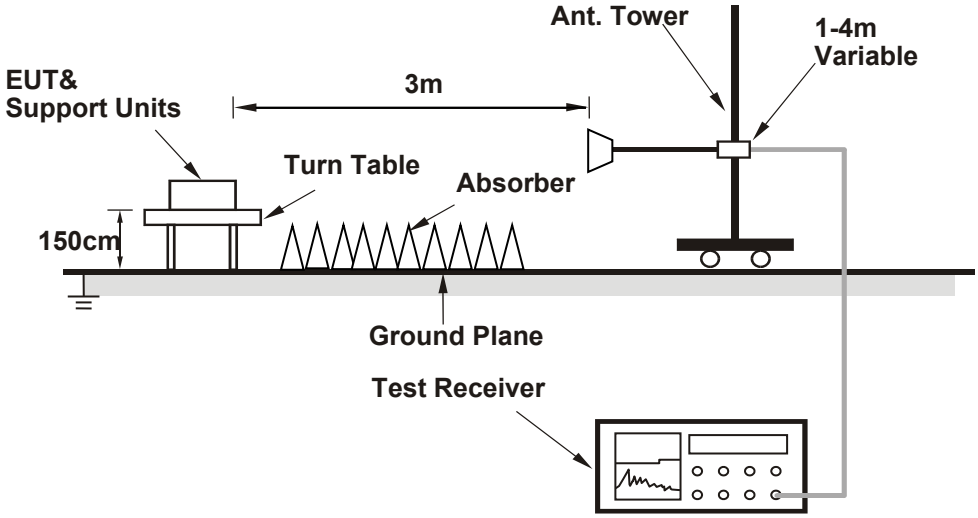
For Radiated emission below 30MHz



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.
d. The communication partner sent data to EUT by command "PING".

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	59.7 PK	74.0	-14.3	2.72 H	198	57.6	2.1
2	5150.00	46.7 AV	54.0	-7.3	2.72 H	198	44.6	2.1
3	*5180.00	109.8 PK			2.72 H	198	73.4	36.4
4	*5180.00	99.7 AV			2.72 H	198	63.3	36.4
5	#10360.00	56.0 PK	68.2	-12.2	2.12 H	162	41.2	14.8
6	15540.00	64.8 PK	74.0	-9.2	1.62 H	171	46.4	18.4
7	15540.00	52.5 AV	54.0	-1.5	1.62 H	171	34.1	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	66.9 PK	74.0	-7.1	2.92 V	1	64.8	2.1
2	5150.00	52.8 AV	54.0	-1.2	2.92 V	1	50.7	2.1
3	*5180.00	117.2 PK			2.91 V	359	80.8	36.4
4	*5180.00	107.0 AV			2.91 V	359	70.6	36.4
5	#10360.00	55.6 PK	68.2	-12.6	3.32 V	214	40.8	14.8
6	15540.00	63.1 PK	74.0	-10.9	3.49 V	116	44.7	18.4
7	15540.00	50.7 AV	54.0	-3.3	3.49 V	116	32.3	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	110.6 PK			2.67 H	191	74.2	36.4
2	*5200.00	100.5 AV			2.67 H	191	64.1	36.4
3	#10400.00	56.3 PK	68.2	-11.9	2.07 H	153	41.4	14.9
4	15600.00	67.2 PK	74.0	-6.8	1.57 H	167	49.1	18.1
5	15600.00	53.1 AV	54.0	-0.9	1.57 H	167	35.0	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			2.90 V	15	81.3	36.4
2	*5200.00	107.8 AV			2.90 V	15	71.4	36.4
3	#10400.00	55.6 PK	68.2	-12.6	3.26 V	209	40.7	14.9
4	15600.00	66.5 PK	74.0	-7.5	3.40 V	112	48.4	18.1
5	15600.00	51.7 AV	54.0	-2.3	3.40 V	112	33.6	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	111.3 PK			2.73 H	202	75.0	36.3
2	*5240.00	101.4 AV			2.73 H	202	65.1	36.3
3	5350.00	54.9 PK	74.0	-19.1	2.73 H	202	52.9	2.0
4	5350.00	41.8 AV	54.0	-12.2	2.73 H	202	39.8	2.0
5	#10480.00	56.1 PK	68.2	-12.1	2.11 H	157	41.2	14.9
6	15720.00	67.2 PK	74.0	-6.8	1.64 H	168	49.8	17.4
7	15720.00	52.8 AV	54.0	-1.2	1.64 H	168	35.4	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	118.1 PK			2.85 V	358	81.8	36.3
2	*5240.00	108.3 AV			2.85 V	358	72.0	36.3
3	5350.00	55.6 PK	74.0	-18.4	2.85 V	358	53.6	2.0
4	5350.00	42.4 AV	54.0	-11.6	2.85 V	358	40.4	2.0
5	#10480.00	55.7 PK	68.2	-12.5	3.25 V	211	40.8	14.9
6	15720.00	64.9 PK	74.0	-9.1	3.42 V	107	47.5	17.4
7	15720.00	51.5 AV	54.0	-2.5	3.42 V	107	34.1	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 802.11a	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	#5626.00	53.6 PK	68.2	-14.6	1.98 H	15	50.9	2.7
2	*5745.00	107.2 PK			1.98 H	15	69.9	37.3
3	*5745.00	97.3 AV			1.98 H	15	60.0	37.3
4	#5934.40	53.5 PK	68.2	-14.7	1.98 H	15	50.0	3.5
5	11490.00	57.7 PK	74.0	-16.3	2.05 H	155	41.5	16.2
6	11490.00	43.0 AV	54.0	-11.0	2.05 H	155	26.8	16.2
7	#17235.00	67.4 PK	68.2	-0.8	1.55 H	135	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	#5644.40	52.4 PK	68.2	-15.8	3.33 V	152	49.6	2.8
2	*5745.00	109.2 PK			3.33 V	152	71.9	37.3
3	*5745.00	99.2 AV			3.33 V	152	61.9	37.3
4	#5970.00	53.6 PK	68.2	-14.6	3.33 V	152	50.2	3.4
5	11490.00	57.4 PK	74.0	-16.6	3.22 V	224	41.2	16.2
6	11490.00	43.0 AV	54.0	-11.0	3.22 V	224	26.8	16.2
7	#17235.00	67.0 PK	68.2	-1.2	3.80 V	207	44.7	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	#5611.20	52.0 PK	68.2	-16.2	1.98 H	308	49.2	2.8
2	*5785.00	106.0 PK			1.98 H	308	68.5	37.5
3	*5785.00	95.3 AV			1.98 H	308	57.8	37.5
4	#5969.60	53.2 PK	68.2	-15.0	1.98 H	308	49.8	3.4
5	11570.00	57.3 PK	74.0	-16.7	2.11 H	159	41.3	16.0
6	11570.00	43.1 AV	54.0	-10.9	2.11 H	159	27.1	16.0
7	#17355.00	65.7 PK	68.2	-2.5	1.57 H	140	43.4	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	#5638.80	51.8 PK	68.2	-16.4	3.28 V	148	49.1	2.7
2	*5785.00	109.2 PK			3.28 V	148	71.7	37.5
3	*5785.00	98.7 AV			3.28 V	148	61.2	37.5
4	#5986.80	53.3 PK	68.2	-14.9	3.28 V	148	49.9	3.4
5	11570.00	57.2 PK	74.0	-16.8	3.18 V	225	41.2	16.0
6	11570.00	43.0 AV	54.0	-11.0	3.18 V	225	27.0	16.0
7	#17355.00	67.5 PK	68.2	-0.7	3.36 V	192	45.2	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	#5641.60	51.7 PK	68.2	-16.5	2.00 H	304	48.9	2.8
2	*5825.00	106.3 PK			2.00 H	304	68.7	37.6
3	*5825.00	95.0 AV			2.00 H	304	57.4	37.6
4	#5962.00	53.5 PK	68.2	-14.7	2.00 H	304	50.1	3.4
5	11650.00	57.2 PK	74.0	-16.8	2.04 H	158	41.2	16.0
6	11650.00	43.0 AV	54.0	-11.0	2.04 H	158	27.0	16.0
7	#17475.00	64.7 PK	68.2	-3.5	1.55 H	132	41.7	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	#5607.20	52.7 PK	68.2	-15.5	3.72 V	154	49.9	2.8
2	*5825.00	109.8 PK			3.72 V	154	72.2	37.6
3	*5825.00	98.9 AV			3.72 V	154	61.3	37.6
4	#5928.40	53.5 PK	68.2	-14.7	3.72 V	154	50.1	3.4
5	11650.00	57.1 PK	74.0	-16.9	3.22 V	227	41.1	16.0
6	11650.00	42.9 AV	54.0	-11.1	3.22 V	227	26.9	16.0
7	#17475.00	65.4 PK	68.2	-2.8	3.71 V	215	42.4	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 802.11ac (VHT20)	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	63.5 PK	74.0	-10.5	2.73 H	196	61.4	2.1
2	5150.00	50.7 AV	54.0	-3.3	2.73 H	196	48.6	2.1
3	*5180.00	108.6 PK			2.73 H	196	72.2	36.4
4	*5180.00	97.9 AV			2.73 H	196	61.5	36.4
5	#10360.00	55.9 PK	68.2	-12.3	2.18 H	157	41.1	14.8
6	15540.00	67.2 PK	74.0	-6.8	2.18 H	184	48.8	18.4
7	15540.00	51.3 AV	54.0	-2.7	2.18 H	184	32.9	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	66.9 PK	74.0	-7.1	2.47 V	25	64.8	2.1
2	5150.00	52.7 AV	54.0	-1.3	2.47 V	25	50.6	2.1
3	*5180.00	115.5 PK			2.47 V	25	79.1	36.4
4	*5180.00	104.8 AV			2.47 V	25	68.4	36.4
5	#10360.00	55.4 PK	68.2	-12.8	3.32 V	201	40.6	14.8
6	15540.00	65.3 PK	74.0	-8.7	3.36 V	127	46.9	18.4
7	15540.00	49.2 AV	54.0	-4.8	3.36 V	127	30.8	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 802.11ac (VHT20)	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			2.76 H	198	75.4	36.4
2	*5200.00	101.0 AV			2.76 H	198	64.6	36.4
3	#10400.00	56.2 PK	68.2	-12.0	2.17 H	159	41.3	14.9
4	15600.00	69.2 PK	74.0	-4.8	1.58 H	164	51.1	18.1
5	15600.00	52.7 AV	54.0	-1.3	1.58 H	164	34.6	18.1
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5200.00	118.8 PK			2.54 V	97	82.4	36.4
2	*5200.00	108.0 AV			2.54 V	97	71.6	36.4
3	#10400.00	55.7 PK	68.2	-12.5	3.22 V	202	40.8	14.9
4	15600.00	67.4 PK	74.0	-6.6	3.36 V	114	49.3	18.1
5	15600.00	50.9 AV	54.0	-3.1	3.36 V	114	32.8	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 802.11ac (VHT20)	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	113.1 PK			2.66 H	194	76.8	36.3
2	*5240.00	103.1 AV			2.66 H	194	66.8	36.3
3	5350.00	54.4 PK	74.0	-19.6	2.66 H	194	52.4	2.0
4	5350.00	42.2 AV	54.0	-11.8	2.66 H	194	40.2	2.0
5	#10480.00	56.5 PK	68.2	-11.7	2.15 H	149	41.6	14.9
6	15720.00	69.2 PK	74.0	-4.8	2.55 H	155	51.8	17.4
7	15720.00	52.9 AV	54.0	-1.1	2.55 H	155	35.5	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	120.2 PK			2.00 V	168	83.9	36.3
2	*5240.00	110.2 AV			2.00 V	168	73.9	36.3
3	5350.00	54.9 PK	74.0	-19.1	2.00 V	168	52.9	2.0
4	5350.00	42.8 AV	54.0	-11.2	2.00 V	168	40.8	2.0
5	#10480.00	55.8 PK	68.2	-12.4	3.18 V	204	40.9	14.9
6	15720.00	67.5 PK	74.0	-6.5	3.36 V	107	50.1	17.4
7	15720.00	51.5 AV	54.0	-2.5	3.36 V	107	34.1	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 802.11ac (VHT20)	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	#5628.00	51.5 PK	68.2	-16.7	2.19 H	308	48.8	2.7
2	*5745.00	102.0 PK			2.19 H	308	64.7	37.3
3	*5745.00	92.3 AV			2.19 H	308	55.0	37.3
4	#5964.00	52.3 PK	68.2	-15.9	2.19 H	308	48.9	3.4
5	11490.00	57.6 PK	74.0	-16.4	2.08 H	157	41.4	16.2
6	11490.00	43.4 AV	54.0	-10.6	2.08 H	157	27.2	16.2
7	#17235.00	66.0 PK	68.2	-2.2	1.61 H	139	43.7	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	#5613.20	52.8 PK	68.2	-15.4	4.00 V	160	50.0	2.8
2	*5745.00	109.2 PK			4.00 V	160	71.9	37.3
3	*5745.00	99.2 AV			4.00 V	160	61.9	37.3
4	#5994.80	53.9 PK	68.2	-14.3	4.00 V	160	50.5	3.4
5	11490.00	57.4 PK	74.0	-16.6	3.26 V	227	41.2	16.2
6	11490.00	43.2 AV	54.0	-10.8	3.26 V	227	27.0	16.2
7	#17235.00	67.0 PK	68.2	-1.2	2.91 V	205	44.7	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 802.11ac (VHT20)	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	#5640.00	51.7 PK	68.2	-16.5	2.13 H	317	49.0	2.7
2	*5785.00	104.8 PK			2.13 H	317	67.3	37.5
3	*5785.00	94.8 AV			2.13 H	317	57.3	37.5
4	#5960.80	52.8 PK	68.2	-15.4	2.13 H	317	49.4	3.4
5	11570.00	57.6 PK	74.0	-16.4	2.03 H	162	41.6	16.0
6	11570.00	42.9 AV	54.0	-11.1	2.03 H	162	26.9	16.0
7	#17355.00	65.9 PK	68.2	-2.3	1.57 H	144	43.6	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	#5648.40	53.5 PK	68.2	-14.7	3.92 V	159	50.7	2.8
2	*5785.00	111.0 PK			3.92 V	159	73.5	37.5
3	*5785.00	100.8 AV			3.92 V	159	63.3	37.5
4	#5938.00	54.0 PK	68.2	-14.2	3.92 V	159	50.5	3.5
5	11570.00	57.4 PK	74.0	-16.6	3.17 V	220	41.4	16.0
6	11570.00	42.8 AV	54.0	-11.2	3.17 V	220	26.8	16.0
7	#17355.00	67.3 PK	68.2	-0.9	2.68 V	211	45.0	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 802.11ac (VHT20)	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	#5618.00	51.8 PK	68.2	-16.4	2.13 H	315	49.1	2.7
2	*5825.00	105.7 PK			2.13 H	315	68.1	37.6
3	*5825.00	96.0 AV			2.13 H	315	58.4	37.6
4	#5927.20	53.0 PK	68.2	-15.2	2.13 H	315	49.6	3.4
5	11650.00	57.0 PK	74.0	-17.0	2.11 H	159	41.0	16.0
6	11650.00	43.2 AV	54.0	-10.8	2.11 H	159	27.2	16.0
7	#17475.00	65.0 PK	68.2	-3.2	1.59 H	136	42.0	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	#5624.00	54.9 PK	68.2	-13.3	3.71 V	158	52.2	2.7
2	*5825.00	108.7 PK			3.71 V	158	71.1	37.6
3	*5825.00	98.7 AV			3.71 V	158	61.1	37.6
4	#5982.80	53.8 PK	68.2	-14.4	3.71 V	158	50.4	3.4
5	11650.00	57.1 PK	74.0	-16.9	3.27 V	233	41.1	16.0
6	11650.00	43.1 AV	54.0	-10.9	3.27 V	233	27.1	16.0
7	#17475.00	67.0 PK	68.2	-1.2	3.76 V	158	44.0	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 802.11ac (VHT40)	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	59.9 PK	74.0	-14.1	2.74 H	189	57.8	2.1
2	5150.00	46.9 AV	54.0	-7.1	2.74 H	189	44.8	2.1
3	*5190.00	103.5 PK			2.74 H	189	67.1	36.4
4	*5190.00	93.4 AV			2.74 H	189	57.0	36.4
5	#10380.00	55.7 PK	68.2	-12.5	2.18 H	155	40.8	14.9
6	15570.00	65.9 PK	74.0	-8.1	1.62 H	177	47.6	18.3
7	15570.00	50.1 AV	54.0	-3.9	1.62 H	177	31.8	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	65.6 PK	74.0	-8.4	2.01 V	160	63.5	2.1
2	5150.00	52.8 AV	54.0	-1.2	2.01 V	160	50.7	2.1
3	*5190.00	110.3 PK			2.01 V	160	73.9	36.4
4	*5190.00	100.2 AV			2.01 V	160	63.8	36.4
5	#10380.00	55.3 PK	68.2	-12.9	3.16 V	224	40.4	14.9
6	15570.00	64.0 PK	74.0	-10.0	3.29 V	128	45.7	18.3
7	15570.00	48.1 AV	54.0	-5.9	3.29 V	128	29.8	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 802.11ac (VHT40)	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	53.9 PK	74.0	-20.1	3.28 H	183	51.8	2.1
2	5150.00	42.5 AV	54.0	-11.5	3.28 H	183	40.4	2.1
3	*5230.00	108.4 PK			3.28 H	183	72.1	36.3
4	*5230.00	97.8 AV			3.28 H	183	61.5	36.3
5	5350.00	52.4 PK	74.0	-21.6	3.28 H	183	50.4	2.0
6	5350.00	39.3 AV	54.0	-14.7	3.28 H	183	37.3	2.0
7	#10460.00	55.7 PK	68.2	-12.5	2.15 H	159	40.8	14.9
8	15690.00	64.0 PK	74.0	-10.0	1.95 H	139	46.5	17.5
9	15690.00	50.8 AV	54.0	-3.2	1.95 H	139	33.3	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	63.4 PK	74.0	-10.6	1.99 V	161	61.3	2.1
2	5150.00	52.3 AV	54.0	-1.7	1.99 V	161	50.2	2.1
3	*5230.00	116.7 PK			1.99 V	161	80.4	36.3
4	*5230.00	107.0 AV			1.99 V	161	70.7	36.3
5	5350.00	55.1 PK	74.0	-18.9	1.99 V	161	53.1	2.0
6	5350.00	43.2 AV	54.0	-10.8	1.99 V	161	41.2	2.0
7	#10460.00	55.4 PK	68.2	-12.8	3.11 V	225	40.5	14.9
8	15690.00	62.9 PK	74.0	-11.1	3.22 V	130	45.4	17.5
9	15690.00	47.3 AV	54.0	-6.7	3.22 V	130	29.8	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 802.11ac (VHT40)	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	#5645.60	52.1 PK	68.2	-16.1	2.08 H	213	49.3	2.8
2	*5755.00	103.2 PK			2.08 H	313	65.9	37.3
3	*5755.00	92.9 AV			2.08 H	313	55.6	37.3
4	#5984.00	53.5 PK	68.2	-14.7	2.08 H	213	50.1	3.4
5	11510.00	57.6 PK	74.0	-16.4	2.09 H	153	41.5	16.1
6	11510.00	43.5 AV	54.0	-10.5	2.09 H	153	27.4	16.1
7	#17265.00	65.7 PK	68.2	-2.5	1.57 H	133	43.3	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	#5608.80	53.8 PK	68.2	-14.4	3.96 V	166	51.0	2.8
2	*5755.00	107.7 PK			3.96 V	166	70.4	37.3
3	*5755.00	97.6 AV			3.96 V	166	60.3	37.3
4	#5992.40	54.9 PK	68.2	-13.3	3.96 V	166	51.5	3.4
5	11510.00	57.5 PK	74.0	-16.5	3.20 V	200	41.4	16.1
6	11510.00	43.3 AV	54.0	-10.7	3.20 V	200	27.2	16.1
7	**#17265.00**	**67.5 PK**	**68.2**	**-0.7**	**3.51 V**	**186**	**45.1**	**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 802.11ac (VHT40)	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	#5615.20	52.8 PK	68.2	-15.4	2.13 H	319	50.1	2.7
2	*5795.00	103.5 PK			2.13 H	319	65.9	37.6
3	*5795.00	93.1 AV			2.13 H	319	55.5	37.6
4	#5929.60	53.8 PK	68.2	-14.4	2.13 H	319	50.4	3.4
5	11590.00	57.7 PK	74.0	-16.3	2.15 H	154	41.7	16.0
6	11590.00	43.3 AV	54.0	-10.7	2.15 H	154	27.3	16.0
7	#17385.00	65.6 PK	68.2	-2.6	1.59 H	135	43.5	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	#5626.00	56.9 PK	68.2	-11.3	3.94 V	162	54.2	2.7
2	*5795.00	109.9 PK			3.94 V	162	72.3	37.6
3	*5795.00	99.3 AV			3.94 V	162	61.7	37.6
4	#5948.00	53.7 PK	68.2	-14.5	3.94 V	162	50.2	3.5
5	11590.00	57.5 PK	74.0	-16.5	3.24 V	226	41.5	16.0
6	11590.00	43.2 AV	54.0	-10.8	3.24 V	226	27.2	16.0
7	#17385.00	67.1 PK	68.2	-1.1	3.92 V	193	45.0	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 802.11ac (VHT80)	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	54.8 PK	74.0	-19.2	3.34 H	182	52.7	2.1
2	5150.00	42.7 AV	54.0	-11.3	3.34 H	182	40.6	2.1
3	*5210.00	97.1 PK			3.34 H	182	60.7	36.4
4	*5210.00	87.2 AV			3.34 H	182	50.8	36.4
5	5350.00	52.5 PK	74.0	-21.5	3.34 H	182	50.5	2.0
6	5350.00	39.4 AV	54.0	-14.6	3.34 H	182	37.4	2.0
7	#10420.00	56.2 PK	68.2	-12.0	2.15 H	154	41.3	14.9
8	15630.00	62.1 PK	74.0	-11.9	2.05 H	137	44.3	17.8
9	15630.00	47.4 AV	54.0	-6.6	2.05 H	137	29.6	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	66.0 PK	74.0	-8.0	2.00 V	162	63.9	2.1
2	5150.00	53.0 AV	54.0	-1.0	2.00 V	162	50.9	2.1
3	*5210.00	106.4 PK			2.00 V	162	70.0	36.4
4	*5210.00	96.9 AV			2.00 V	162	60.5	36.4
5	5350.00	54.5 PK	74.0	-19.5	2.00 V	162	52.5	2.0
6	5350.00	42.2 AV	54.0	-11.8	2.00 V	162	40.2	2.0
7	#10420.00	56.1 PK	68.2	-12.1	3.08 V	226	41.2	14.9
8	15630.00	61.3 PK	74.0	-12.7	3.24 V	135	43.5	17.8
9	15630.00	46.7 AV	54.0	-7.3	3.24 V	135	28.9	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 802.11ac (VHT80)	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	#5633.60	53.4 PK	68.2	-14.8	2.27 H	313	50.7	2.7
2	*5775.00	97.7 PK			2.27 H	313	60.2	37.5
3	*5775.00	87.6 AV			2.27 H	313	50.1	37.5
4	#5947.60	54.7 PK	68.2	-13.5	2.27 H	313	51.2	3.5
5	11550.00	57.5 PK	74.0	-16.5	2.00 H	158	41.4	16.1
6	11550.00	43.3 AV	54.0	-10.7	2.00 H	158	27.2	16.1
7	#17325.00	63.7 PK	68.2	-4.5	1.58 H	136	41.3	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	#5612.80	66.4 PK	68.2	-1.8	1.77 V	145	63.6	2.8
2	*5775.00	114.1 PK			1.77 V	145	76.6	37.5
3	*5775.00	103.5 AV			1.77 V	145	66.0	37.5
4	#5934.40	63.7 PK	68.2	-4.5	1.77 V	145	60.2	3.5
5	11550.00	57.6 PK	74.0	-16.4	3.21 V	224	41.5	16.1
6	11550.00	43.4 AV	54.0	-10.6	3.21 V	224	27.3	16.1
7	#17325.00	65.8 PK	68.2	-2.4	3.10 V	186	43.4	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.

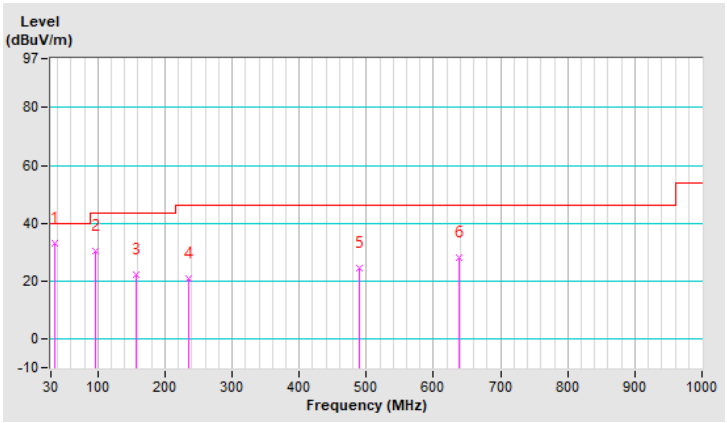
Below 1GHz Worst-Case Data:

RF Mode	TX 802.11ac (VHT40)	Channel	CH 159：5795 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	36.79	33.0 QP	40.0	-7.0	1.25 H	159	42.9	-9.9
2	96.93	30.2 QP	43.5	-13.3	2.00 H	186	44.0	-13.8
3	157.07	22.0 QP	43.5	-21.5	1.00 H	6	30.1	-8.1
4	235.64	20.9 QP	46.0	-25.1	1.00 H	251	30.5	-9.6
5	489.78	24.4 QP	46.0	-21.6	1.50 H	298	27.2	-2.8
6	639.16	27.9 QP	46.0	-18.1	1.00 H	5	27.7	0.2

Remarks:

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

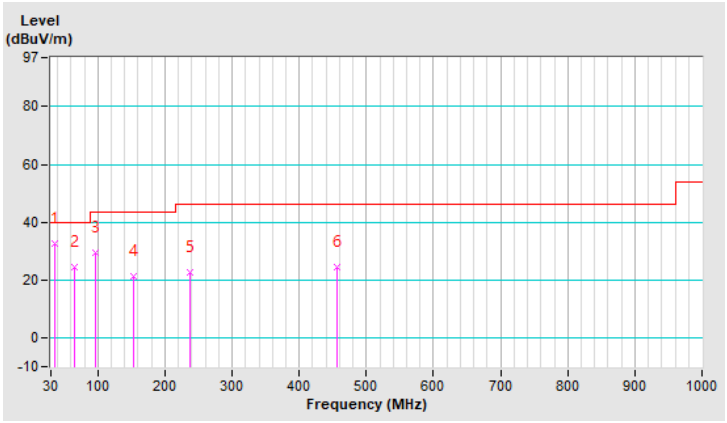


RF Mode	TX 802.11ac (VHT40)	Channel	CH 159：5795 MHz
Frequency Range	9kHz ~ 1GHz	Detector Function	Quasi-Peak (QP)

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	35.82	32.4 QP	40.0	-7.6	1.50 V	168	42.5	-10.1
2	64.92	24.3 QP	40.0	-15.7	1.00 V	227	34.4	-10.1
3	96.93	29.6 QP	43.5	-13.9	1.25 V	159	43.4	-13.8
4	154.16	21.5 QP	43.5	-22.0	2.00 V	10	29.6	-8.1
5	236.61	22.8 QP	46.0	-23.2	1.00 V	246	32.3	-9.5
6	455.83	24.4 QP	46.0	-21.6	1.25 V	29	27.7	-3.3

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Jan. 29, 2021	Jan. 28, 2022
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 04, 2020	Sep. 03, 2021
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 28, 2021	Jan. 27, 2022
LISN/AMN 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.

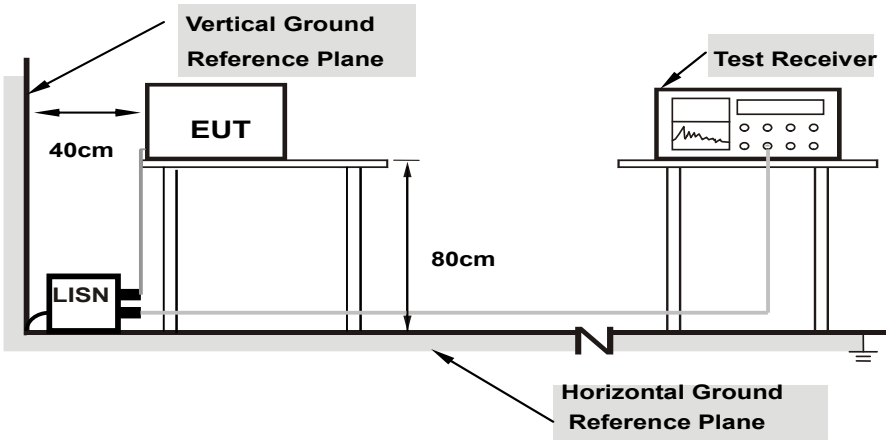
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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:

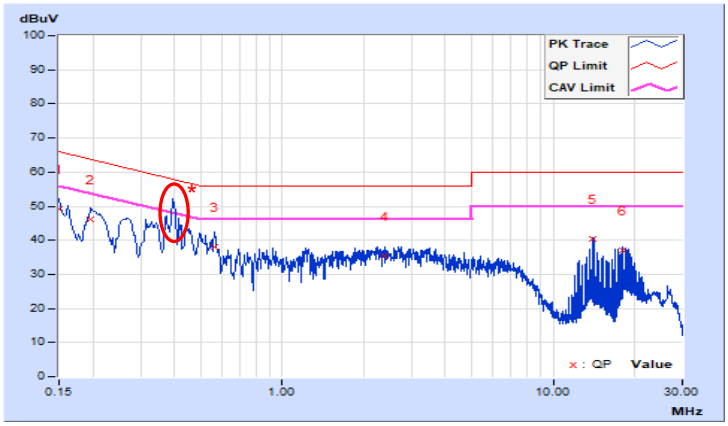
802.11ac (VHT40)

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	0.15000	10.07	39.05	29.34	49.12	39.41	66.00	56.00	-16.88	-16.59
2	0.19692	10.08	36.03	26.01	46.11	36.09	63.74	53.74	-17.63	-17.65
3	0.56055	10.10	27.90	20.46	38.00	30.56	56.00	46.00	-18.00	-15.44
4	2.40607	10.17	25.13	16.03	35.30	26.20	56.00	46.00	-20.70	-19.80
5	**13.93666**	**10.37**	**30.03**	**29.39**	**40.40**	**39.76**	**60.00**	**50.00**	**-19.60**	**-10.24**
6	18.11645	10.42	26.68	25.72	37.10	36.14	60.00	50.00	-22.90	-13.86

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.



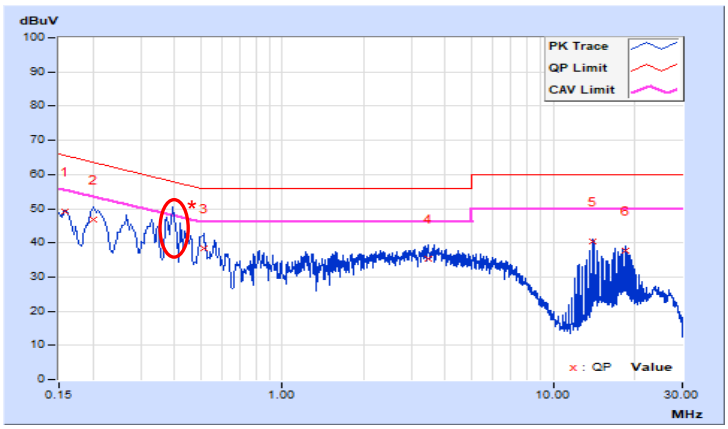
*This EUT is Class A product, the non-RF signal please refer to FCC Part 15, subpart B test report (BV CPS Repor No.: FDBEBW-WTW-P21010678).

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15760	10.08	39.14	29.48	49.22	39.56	65.59	55.59	-16.37	-16.03
2	0.20083	10.08	36.69	27.35	46.77	37.43	63.58	53.58	-16.81	-16.15
3	0.51363	10.11	28.27	20.08	38.38	30.19	56.00	46.00	-17.62	-15.81
4	3.45786	10.24	25.19	16.77	35.43	27.01	56.00	46.00	-20.57	-18.99
5	13.93666	10.50	29.84	29.15	40.34	39.65	60.00	50.00	-19.66	-10.35
6	18.39406	10.61	27.04	25.87	37.65	36.48	60.00	50.00	-22.35	-13.52

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.



*This EUT is Class A product, the non-RF signal please refer to FCC Part 15, subpart B test report (BV CPS Repor No.: FDBEBW-WTW-P21010678).

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)

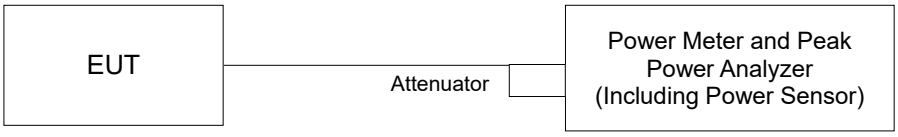
*B is the 26 dB emission bandwidth in megahertz

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

For U-NII-1 band (Outdoor Access Point):

CDD Mode

802.11a

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Ant. Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	12.15	12.00	32.255	15.09	29.50	5.5	20.59	21.00	Pass
40	5200	12.30	12.05	33.015	15.19	29.50	5.5	20.69	21.00	Pass
48	5240	12.50	12.30	34.765	15.41	29.50	5.5	20.91	21.00	Pass

Note:
1. Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. EIRP = average power + (5.5dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Ant. Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	12.29	11.99	32.756	15.15	29.50	5.5	20.65	21.00	Pass
40	5200	12.46	12.30	34.602	15.39	29.50	5.5	20.89	21.00	Pass
48	5240	12.55	12.28	34.893	15.43	29.50	5.5	20.93	21.00	Pass

Note:
1. Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. EIRP = average power + (5.5dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Ant. Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	12.52	12.32	34.926	15.43	29.50	5.5	20.93	21.00	Pass
46	5230	12.10	11.90	31.706	15.01	29.50	5.5	20.51	21.00	Pass

Note:
1. Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. EIRP = average power + (5.5dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11ac (VHT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Ant. Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	12.37	12.02	33.180	15.21	29.50	5.5	20.71	21.00	Pass
40	5200	12.48	12.33	34.801	15.42	29.50	5.5	20.92	21.00	Pass
48	5240	12.57	12.30	35.054	15.45	29.50	5.5	20.95	21.00	Pass

Note:
1. Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. EIRP = average power + (5.5dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11ac (VHT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Ant. Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	12.57	12.34	**35.211**	15.47	29.50	5.5	20.97	21.00	Pass
46	5230	12.28	12.02	32.826	15.16	29.50	5.5	20.66	21.00	Pass

Note:
1. Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. EIRP = average power + (5.5dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11ac (VHT80)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Ant. Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	12.45	12.31	34.601	15.39	29.50	5.5	20.89	21.00	Pass

Note:
1. Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. EIRP = average power + (5.5dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Directional Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	9.28	8.98	16.379	12.14	26.49	8.51	20.65	21.00	Pass
40	5200	9.45	9.29	17.302	12.38	26.49	8.51	20.89	21.00	Pass
48	5240	9.54	9.27	17.448	12.42	26.49	8.51	20.93	21.00	Pass

Note:
1. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = average power + (5.5dBi) + beamforming gain (3.01dBi) = 8.51dBi.

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Directional Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	9.51	9.31	17.464	12.42	26.49	8.51	20.93	21.00	Pass
46	5230	9.09	8.89	15.854	12.00	26.49	8.51	20.51	21.00	Pass

Note:
1. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = average power + (5.5dBi) + beamforming gain (3.01dBi) = 8.51dBi.

802.11ac (VHT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Directional Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	9.36	9.01	16.591	12.20	26.49	8.51	20.71	21.00	Pass
40	5200	9.47	9.32	17.402	12.41	26.49	8.51	20.92	21.00	Pass
48	5240	9.56	9.29	17.528	12.44	26.49	8.51	20.95	21.00	Pass

Note:
1. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = average power + (5.5dBi) + beamforming gain (3.01dBi) = 8.51dBi.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Directional Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	9.56	9.33	**17.607**	12.46	26.49	8.51	20.97	21.00	Pass
46	5230	9.27	9.01	16.414	12.15	26.49	8.51	20.66	21.00	Pass

Note:
1. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = average power + (5.5dBi) + beamforming gain (3.01dBi) = 8.51dBi.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Directional Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	9.44	9.30	17.302	12.38	27.82	8.51	20.89	21.00	Pass

Note:
1. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.
2. Antenna gain = 5.5dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = average power + (5.5dBi) + beamforming gain (3.01dBi) = 8.51dBi.

For U-NII-3 band:

CDD Mode

802.11a

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	22.93	22.72	383.404	25.84	29.50	Pass
157	5785	24.87	24.65	598.645	27.77	29.50	Pass
165	5825	25.23	24.97	647.477	28.11	29.50	Pass

Note: Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	22.65	22.42	358.659	25.55	29.50	Pass
157	5785	24.85	24.47	585.390	27.67	29.50	Pass
165	5825	24.98	24.79	616.075	27.90	29.50	Pass

Note: Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	24.63	24.39	565.192	27.52	29.50	Pass
159	5795	25.95	25.64	759.988	28.81	29.50	Pass

Note: Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.

802.11ac (VHT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	22.75	22.54	367.838	25.66	29.50	Pass
157	5785	24.94	24.53	595.681	27.75	29.50	Pass
165	5825	25.12	24.86	631.284	28.00	29.50	Pass

Note: Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	24.72	24.47	576.381	27.61	29.50	Pass
159	5795	26.12	25.74	**784.234**	28.94	29.50	Pass

Note: Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	23.07	22.84	395.077	25.97	29.50	Pass

Note: Antenna gain = 6.5dBi > 6dBi, so the power limit shall be reduced to 30 - (6.5 - 6) = 29.50dBm.

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	19.64	19.41	179.342	22.54	26.49	Pass
157	5785	21.84	21.46	292.715	24.66	26.49	Pass
165	5825	21.97	21.78	308.059	24.89	26.49	Pass

Note: Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	21.62	21.38	282.615	24.51	26.49	Pass
159	5795	22.94	22.63	380.020	25.80	26.49	Pass

Note: Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.

802.11ac (VHT20)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	19.74	19.53	183.932	22.65	26.49	Pass
157	5785	21.93	21.52	297.861	24.74	26.49	Pass
165	5825	22.11	21.85	315.664	24.99	26.49	Pass

Note: Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.

802.11ac (VHT40)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	21.71	21.46	288.211	24.60	26.49	Pass
159	5795	23.11	22.73	**392.144**	25.93	26.49	Pass

Note: Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.

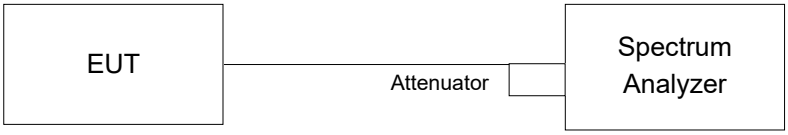
802.11ac (VHT80)

Chan.	Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	20.06	19.83	197.552	22.96	26.49	Pass

Note: Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power limit shall be reduced to 30 - (9.51 - 6) = 26.49dBm.

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
36	5180	16.44	16.56
40	5200	16.44	16.44
48	5240	16.44	16.44
149	5745	16.61	16.61
157	5785	22.20	18.12
165	5825	25.80	19.44

802.11ac (VHT20)

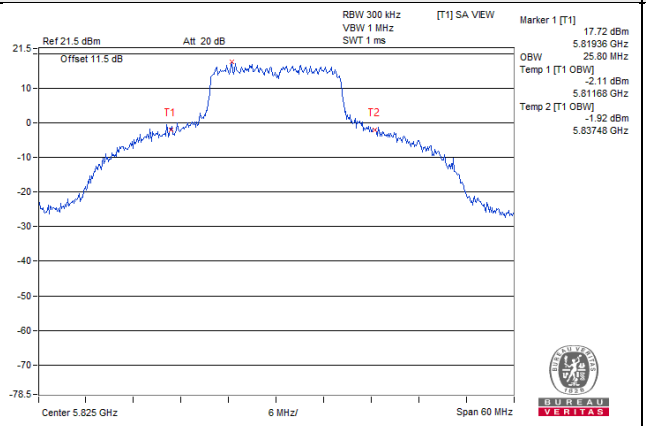
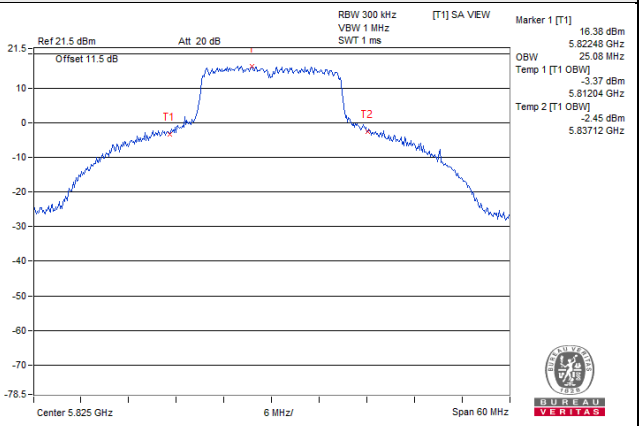
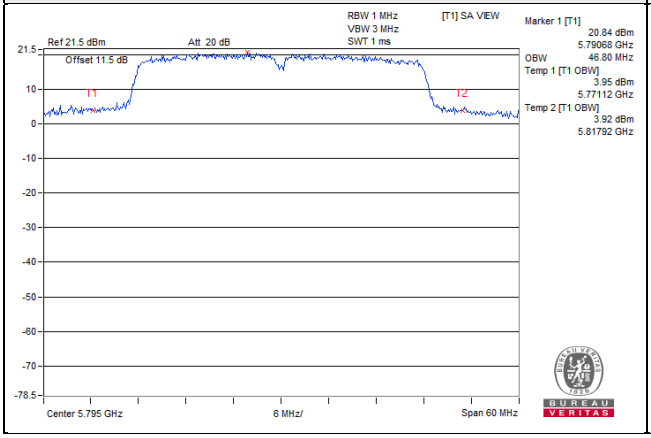
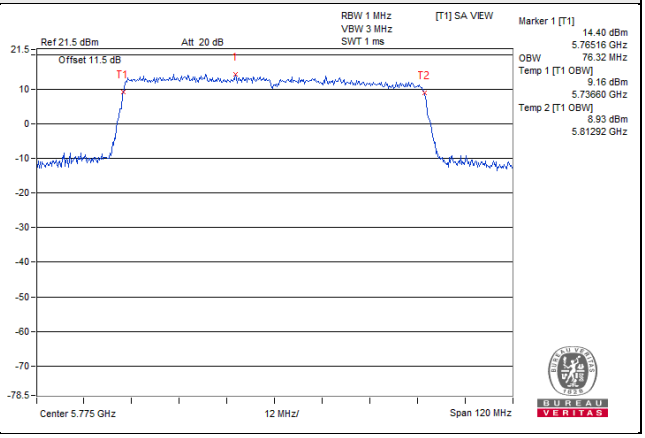
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.64	17.64
48	5240	17.64	17.64
149	5745	17.76	17.64
157	5785	20.88	18.36
165	5825	25.08	19.08

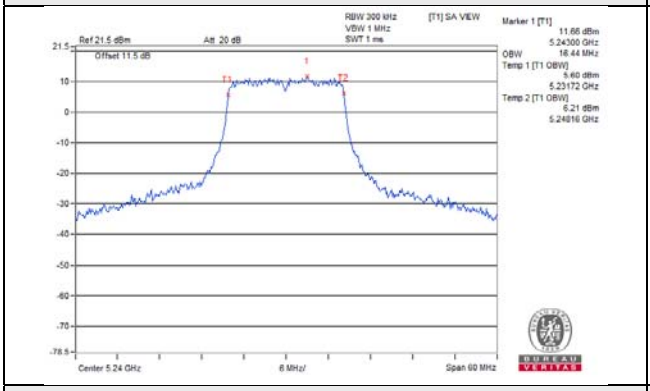
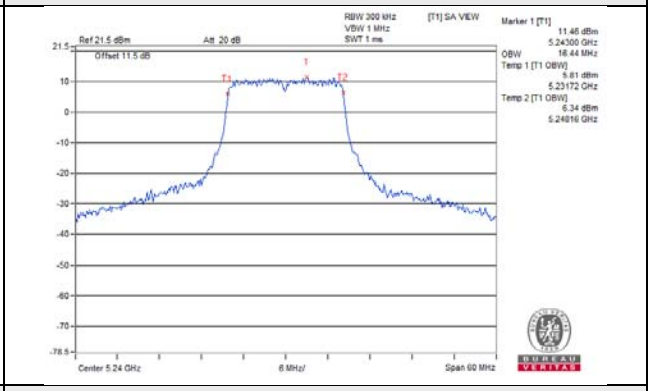
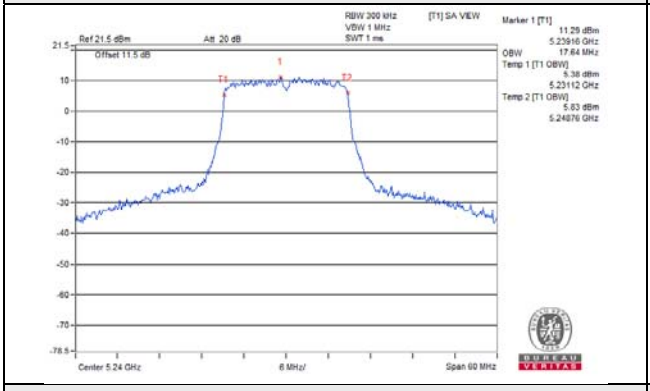
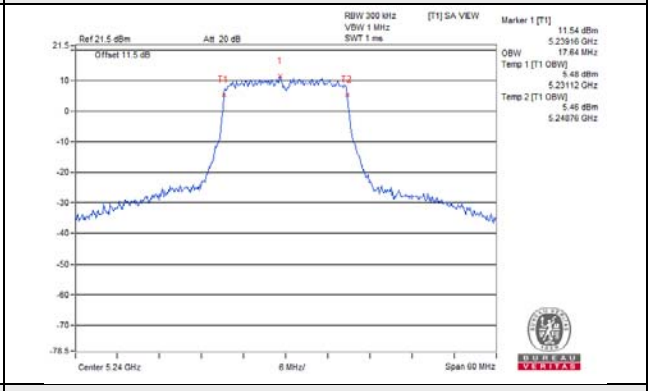
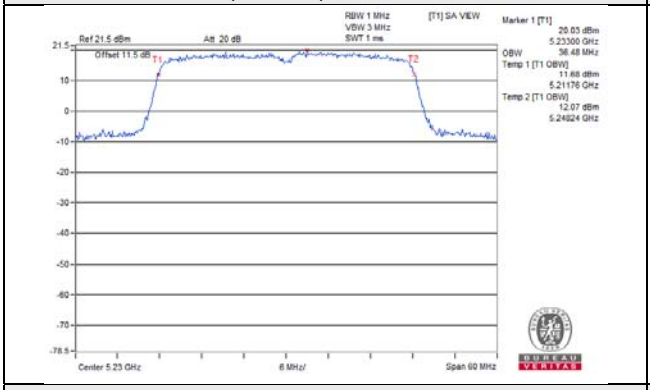
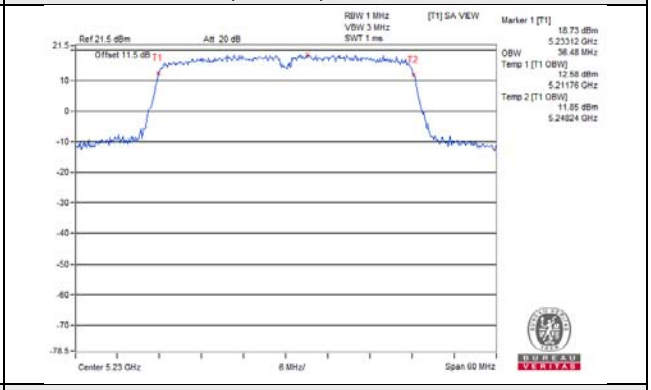
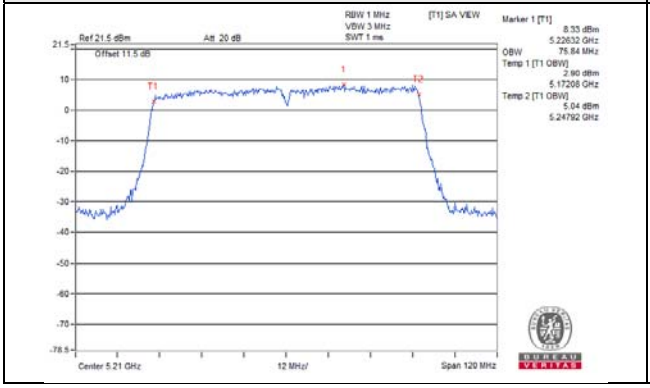
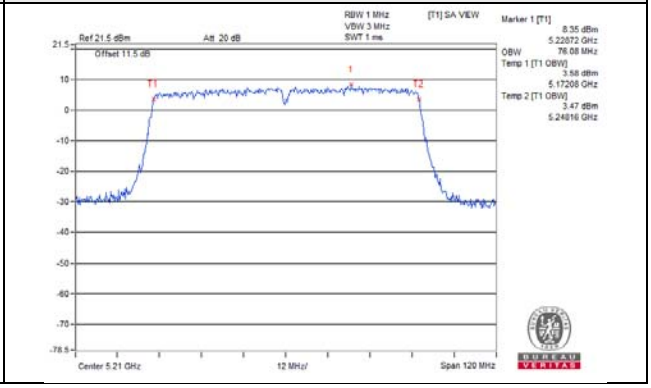
802.11ac (VHT40)

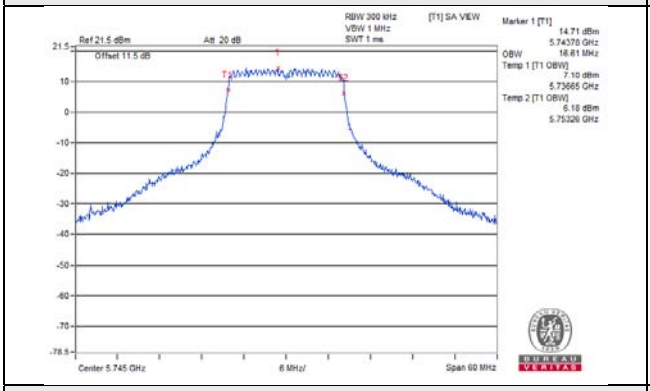
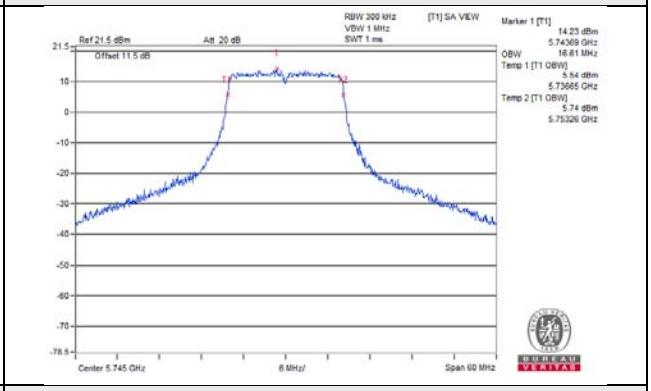
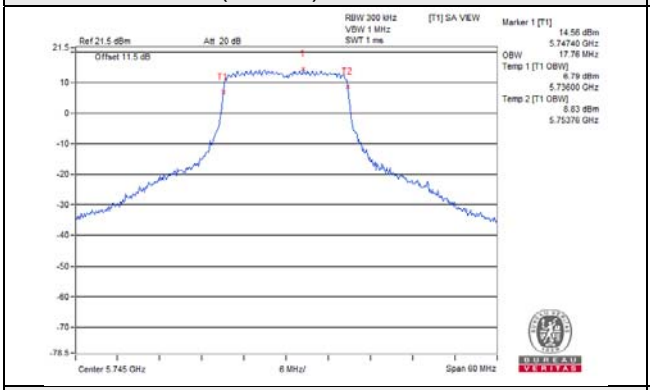
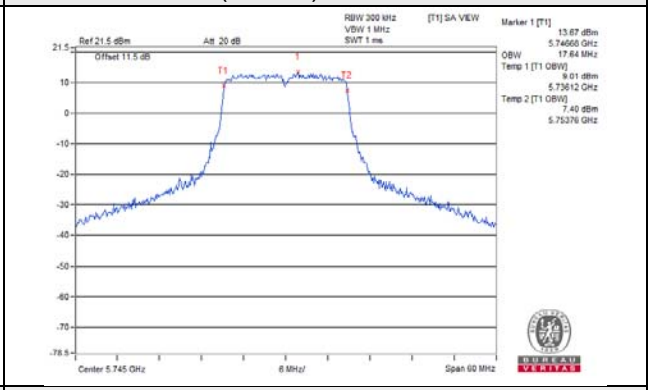
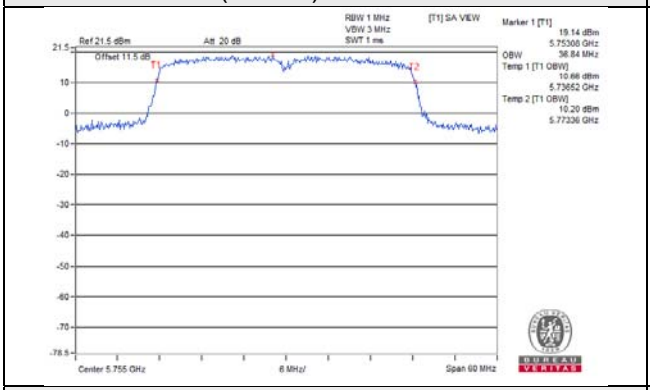
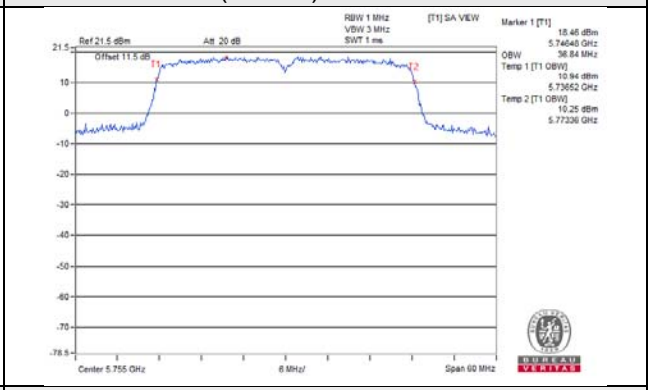
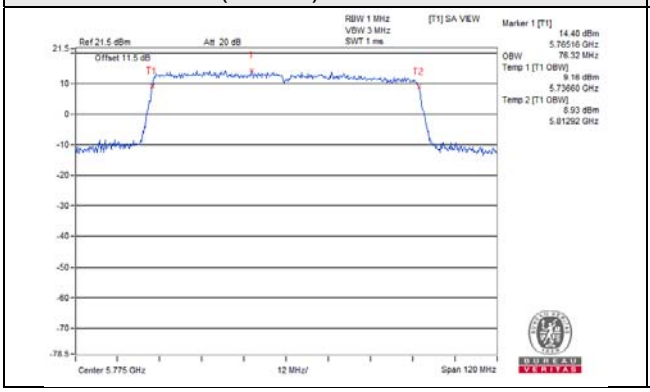
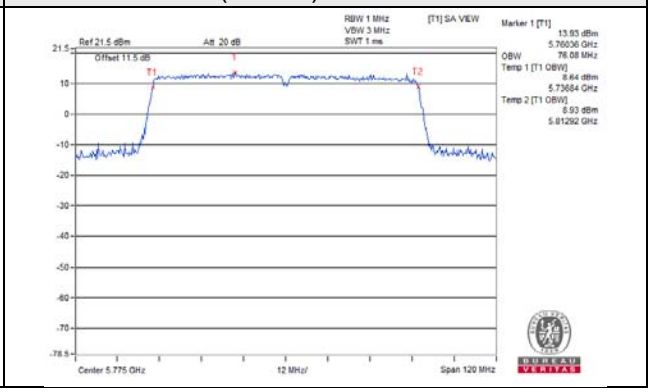
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.24	36.24
46	5230	36.48	36.48
151	5755	36.84	36.84
159	5795	46.80	45.00

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	76.08
155	5775	76.32	76.08

Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 48	802.11a / Chain 1 / CH 48
	
802.11ac (VHT20) / Chain 0 / CH 48	802.11ac (VHT20) / Chain 1 / CH 48
	
802.11ac (VHT40) / Chain 0 / CH 46	802.11ac (VHT40) / Chain 1 / CH 46
	
802.11ac (VHT80) / Chain 0 / CH 42	802.11ac (VHT80) / Chain 1 / CH 42
	

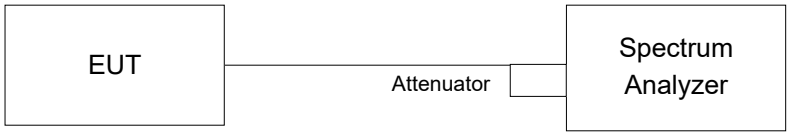
Spectrum Plot for near By DFS Band	
802.11a / Chain 0 / CH 149	802.11a / Chain 1 / CH 149
	
802.11ac (VHT20) / Chain 0 / CH 149	802.11ac (VHT20) / Chain 1 / CH 149
	
802.11ac (VHT40) / Chain 0 / CH 151	802.11ac (VHT40) / Chain 1 / CH 151
	
802.11ac (VHT80) / Chain 0 / CH 155	802.11ac (VHT80) / Chain 1 / 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:

Duty cycle of test signal is > 98%

Using method SA-1

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

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

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

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

e. Record the max value

Duty cycle of test signal is < 98%

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:

Duty cycle of test signal is > 98%

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/300kHz)

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

Duty cycle of test signal is < 98%

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				
36	5180	10.07	10.16	0.18	13.30	13.49	Pass
40	5200	10.23	10.06	0.18	13.33	13.49	Pass
48	5240	10.00	10.05	0.18	13.21	13.49	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 = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 17 - (9.51 - 6) = 13.49dBi.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	9.31	8.59	11.98	13.49	Pass
40	5200	10.17	10.14	13.17	13.49	Pass
48	5240	10.07	10.18	13.14	13.49	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 = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 17 - (9.51 - 6) = 13.49dBi.

802.11ac (VHT40)

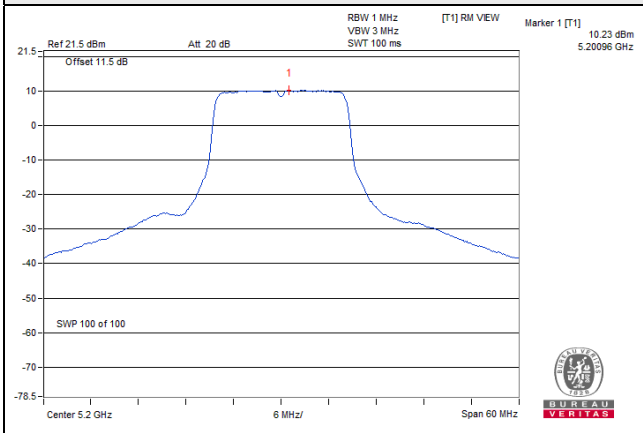
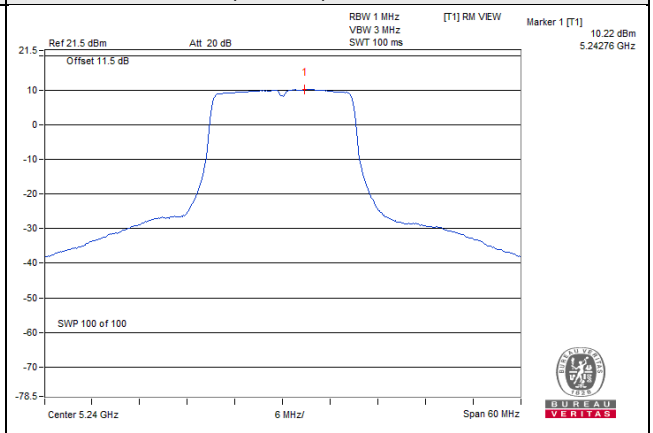
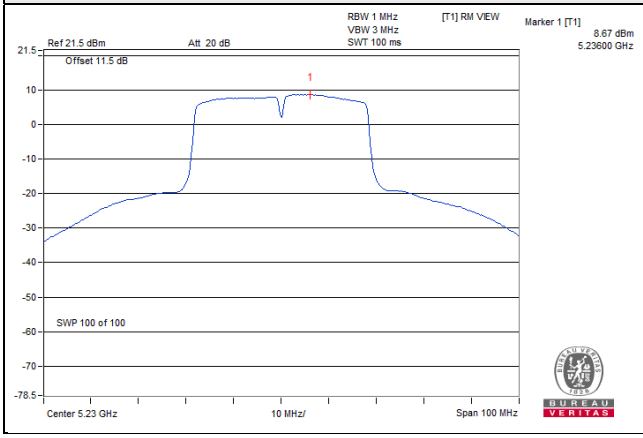
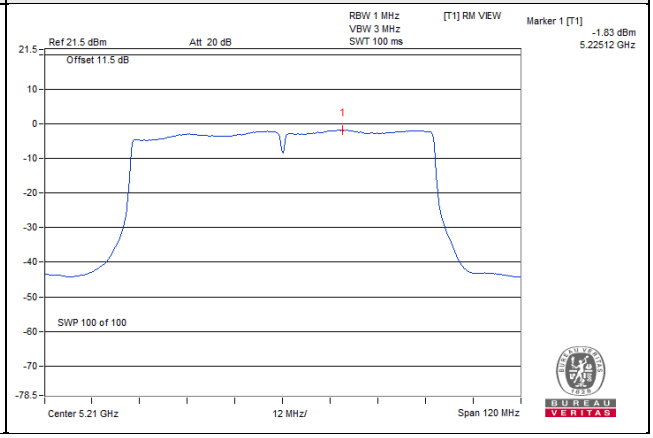
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	1.68	1.15	0.13	4.56	13.49	Pass
46	5230	8.60	8.20	0.13	11.54	13.49	Pass

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 = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 17 - (9.51 - 6) = 13.49dBi.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

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				
42	5210	-1.87	-2.18	0.24	1.23	13.49	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 = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 17 - (9.51 - 6) = 13.49dBi.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 0 / CH 40	802.11ac (VHT20) / Chain 1 / CH 48
	
802.11ac (VHT40) / Chain 0 / CH 46	802.11ac (VHT80) / Chain 0 / CH 42
	

For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	1.08	3.30	3.01	0.18	6.49	26.49	Pass
	157	5785	3.16	5.38	3.01	0.18	8.57	26.49	Pass
	165	5825	3.53	5.75	3.01	0.18	8.94	26.49	Pass
1	149	5745	0.77	2.99	3.01	0.18	6.18	26.49	Pass
	157	5785	2.62	4.84	3.01	0.18	8.03	26.49	Pass
	165	5825	3.10	5.32	3.01	0.18	8.51	26.49	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 30 - (9.51 - 6) = 26.49dBi.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Chan.	Freq. (MHz)	PSD		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	0.56	2.78	3.01	5.79	26.49	Pass
	157	5785	2.80	5.02	3.01	8.03	26.49	Pass
	165	5825	3.09	5.31	3.01	8.32	26.49	Pass
1	149	5745	0.25	2.47	3.01	5.48	26.49	Pass
	157	5785	2.21	4.43	3.01	7.44	26.49	Pass
	165	5825	2.66	4.88	3.01	7.89	26.49	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 30 - (9.51 - 6) = 26.49dBi.

802.11ac (VHT40)

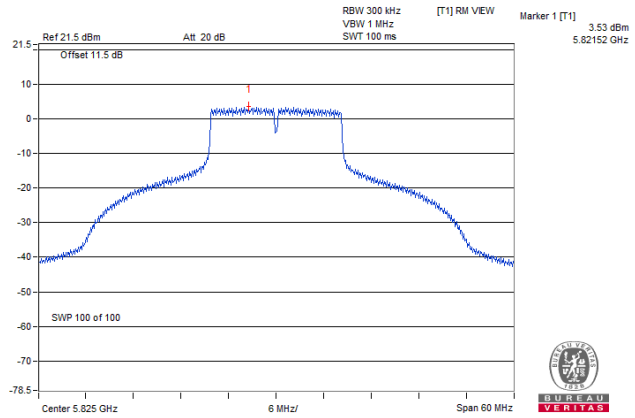
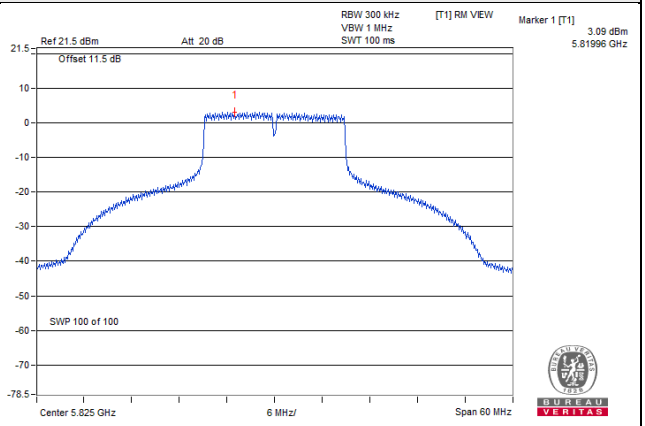
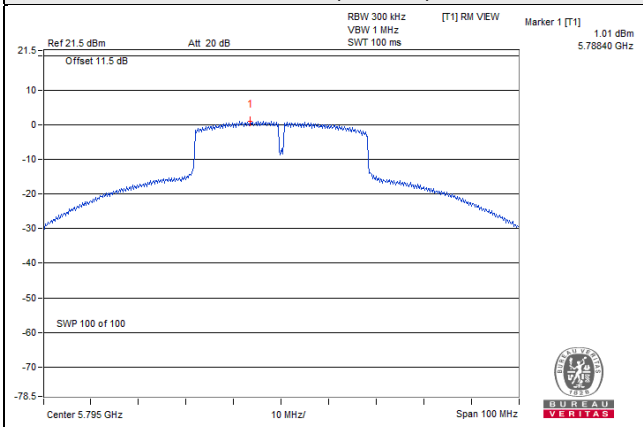
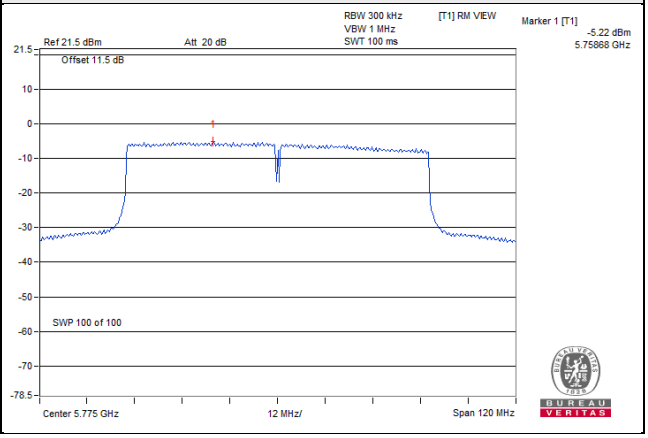
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-0.27	1.95	3.01	0.13	5.09	26.49	Pass
	159	5795	1.01	3.23	3.01	0.13	6.37	26.49	Pass
1	151	5755	-0.95	1.27	3.01	0.13	4.41	26.49	Pass
	159	5795	0.66	2.88	3.01	0.13	6.02	26.49	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 30 - (9.51 - 6) = 26.49dBi.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-5.22	-3.00	3.01	0.24	0.25	26.49	Pass
1	155	5775	-5.85	-3.63	3.01	0.24	-0.38	26.49	Pass

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density, Measure and add 10 log (N_{ANT}) dB.
2. Directional gain = 6.5dBi + 10log(2) = 9.51dBi > 6dBi, so the power density limit shall be reduced to 30 - (9.51 - 6) = 26.49dBi.
3. Refer to section 3.3 for duty cycle spectrum plot.

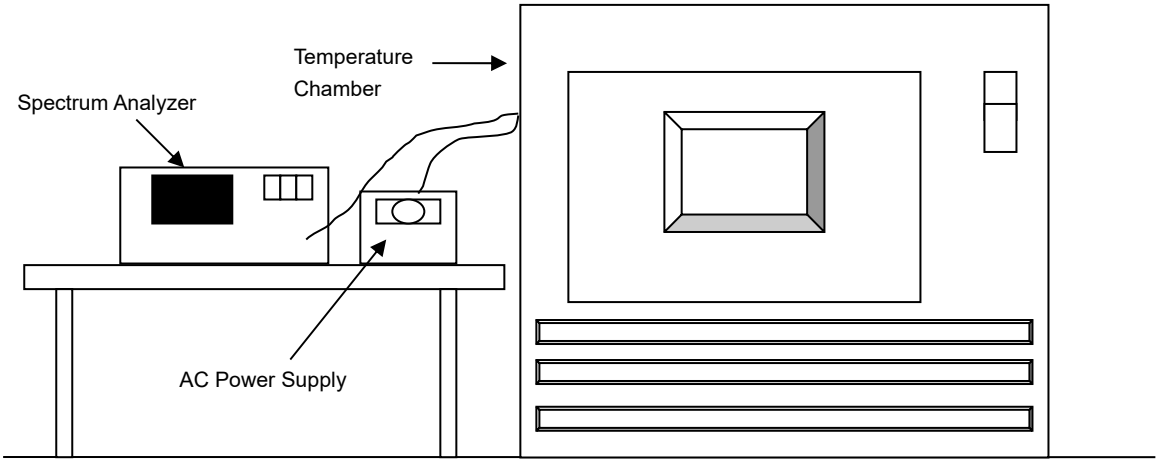
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

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. 24, 2021

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 16, 2020	Sep. 15, 2021
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 01, 2021	May 31, 2022
Digital Multimeter Fluke	87-III	70360755	Jul. 10, 2020	Jul. 09, 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
50	120	5179.9809	PASS	5179.9807	PASS	5179.9773	PASS	5179.9771	Pass
40	120	5179.9847	PASS	5179.9814	PASS	5179.9818	PASS	5179.9829	Pass
30	120	5180.0054	PASS	5180.0035	PASS	5180.0073	PASS	5180.0075	Pass
20	120	5180.0000	PASS	5179.9984	PASS	5179.9996	PASS	5179.9984	Pass
10	120	5179.9752	PASS	5179.9770	PASS	5179.9756	PASS	5179.9764	Pass
0	120	5180.0182	PASS	5180.0185	PASS	5180.0207	PASS	5180.0205	Pass
-10	120	5179.9915	PASS	5179.9900	PASS	5179.9896	PASS	5179.9906	Pass
-20	120	5179.9946	PASS	5179.9900	PASS	5179.9933	PASS	5179.9911	Pass
-30	120	5180.0189	PASS	5180.0214	PASS	5180.0230	PASS	5180.0204	Pass

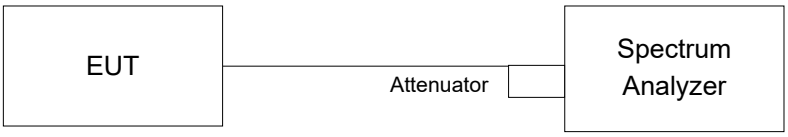
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5180.0001	PASS	5179.9984	PASS	5179.9990	PASS	5179.9985	Pass
	120	5180.0000	PASS	5179.9984	PASS	5179.9996	PASS	5179.9984	Pass
	102	5180.0003	PASS	5179.9982	PASS	5179.9989	PASS	5179.9984	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		
149	5745	16.40	16.36	0.5	Pass
157	5785	16.42	16.38	0.5	Pass
165	5825	16.40	16.38	0.5	Pass

802.11ac (VHT20)

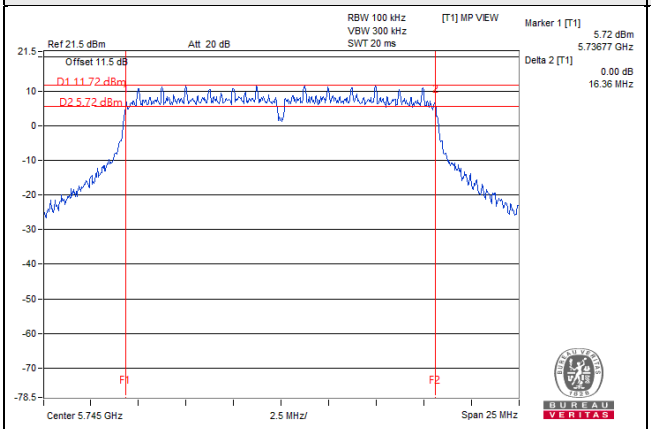
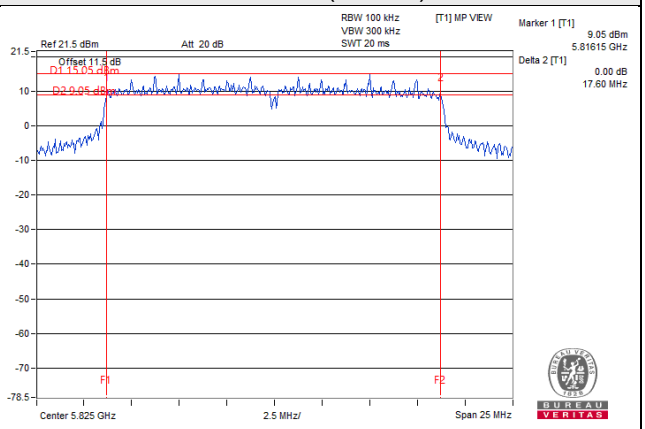
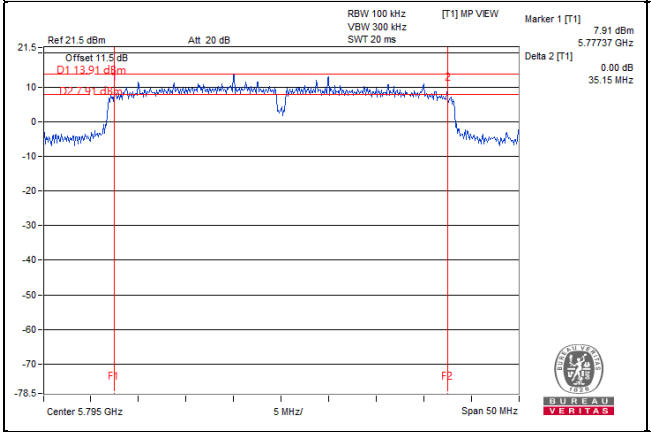
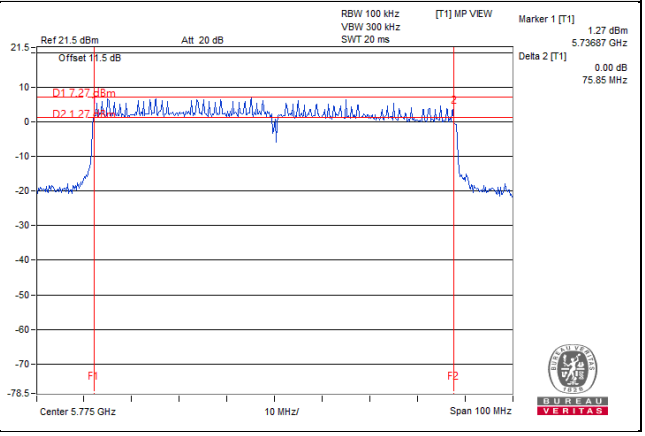
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.63	17.61	0.5	Pass
157	5785	17.61	17.61	0.5	Pass
165	5825	17.60	17.63	0.5	Pass

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.18	35.20	0.5	Pass
159	5795	35.15	35.18	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.85	76.04	0.5	Pass

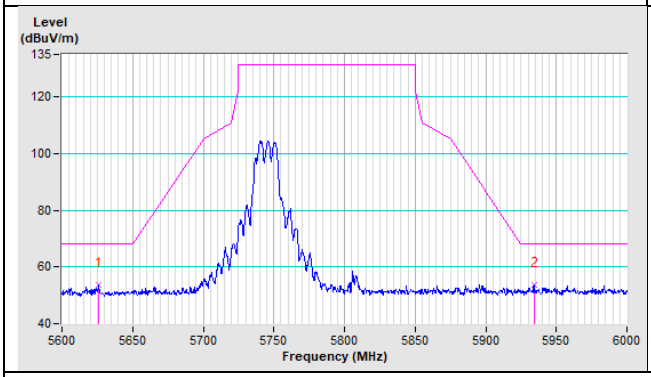
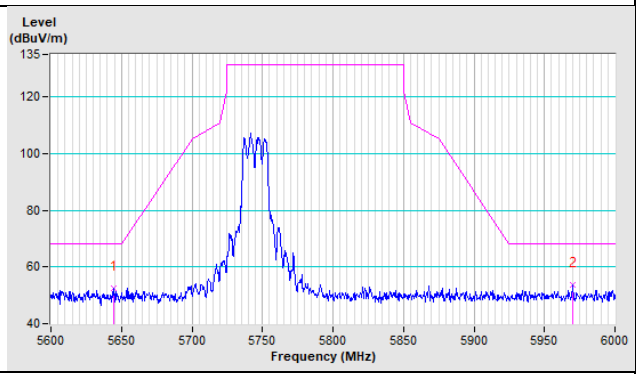
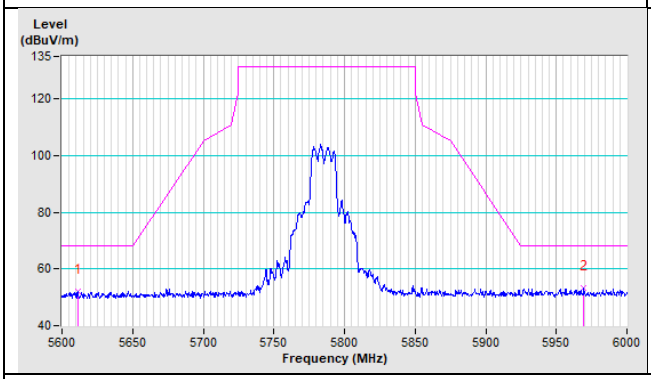
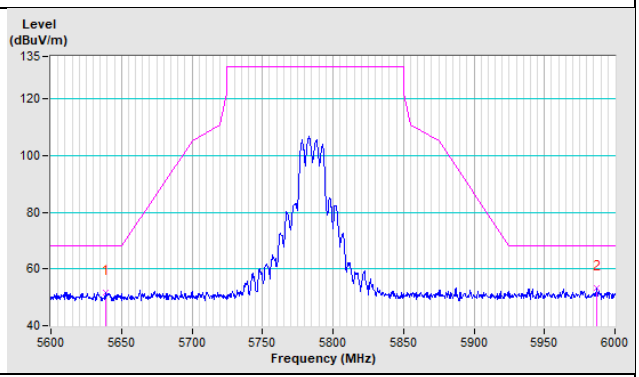
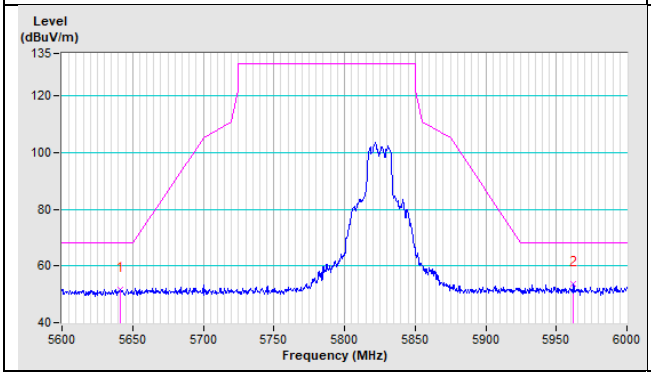
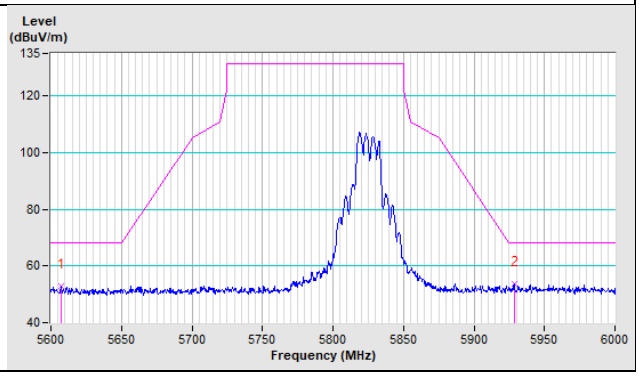
Spectrum Plot of Worst Value	
802.11a	802.11ac (VHT20)
	
802.11ac (VHT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

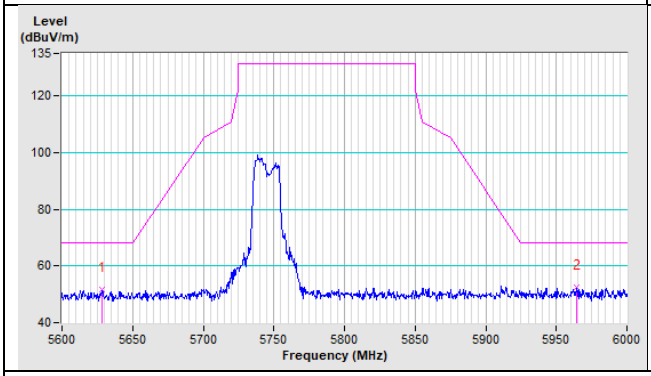
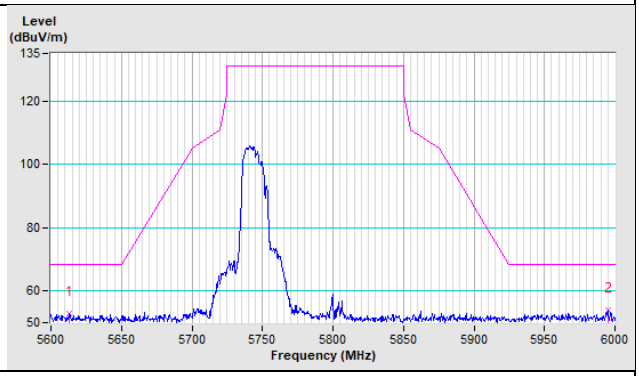
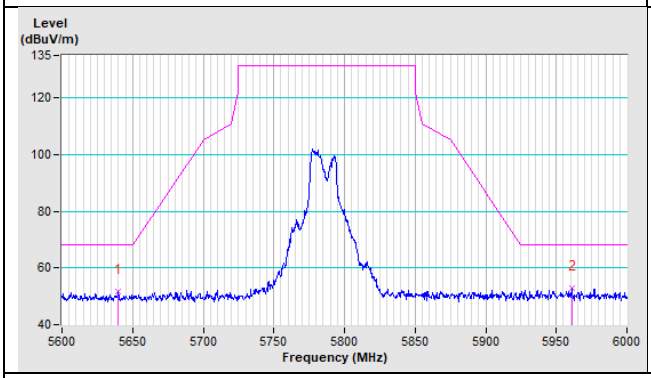
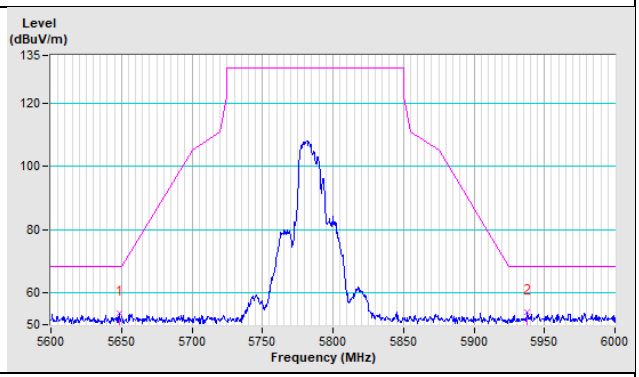
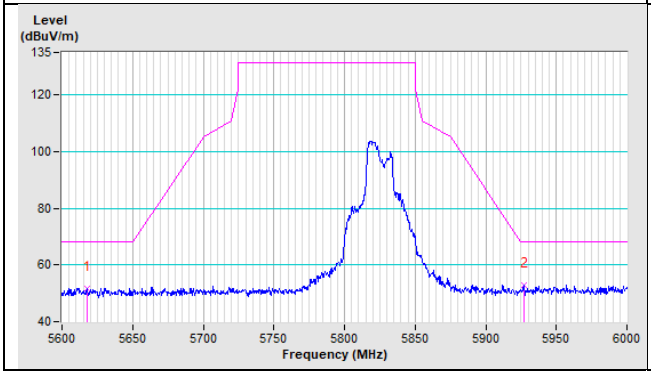
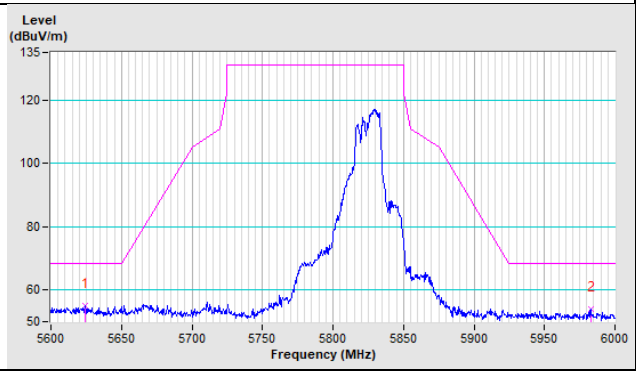
Please refer to the attached file (Test Setup Photo).

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

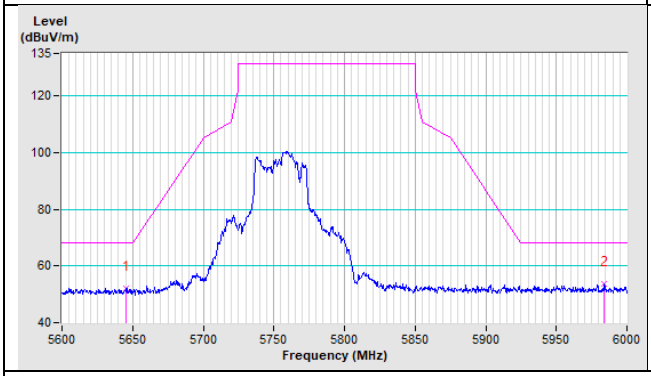
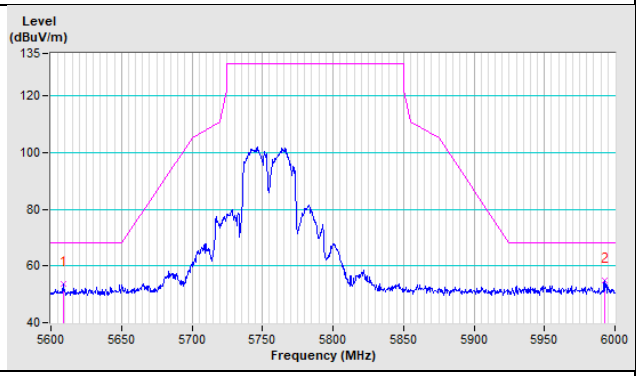
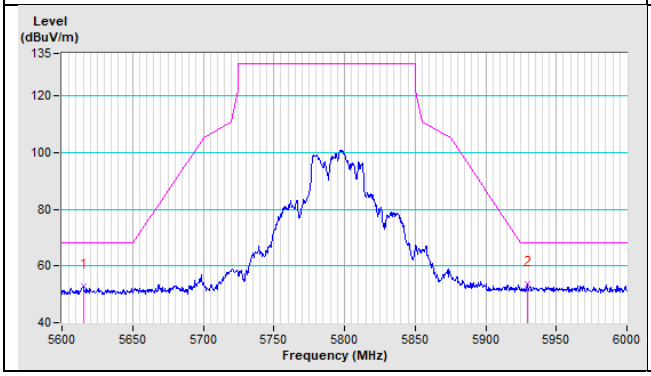
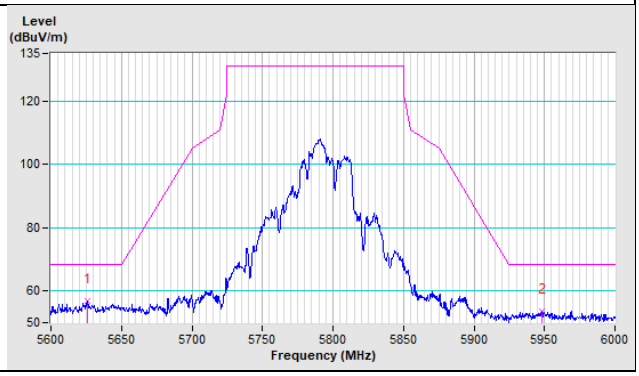
802.11a

CH 149	5745 MHz
Horizontal	Vertical
	
CH 157	5785 MHz
Horizontal	Vertical
	
CH 165	5825 MHz
Horizontal	Vertical
	

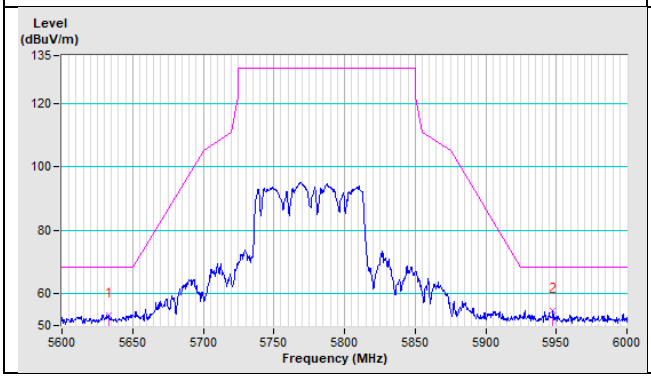
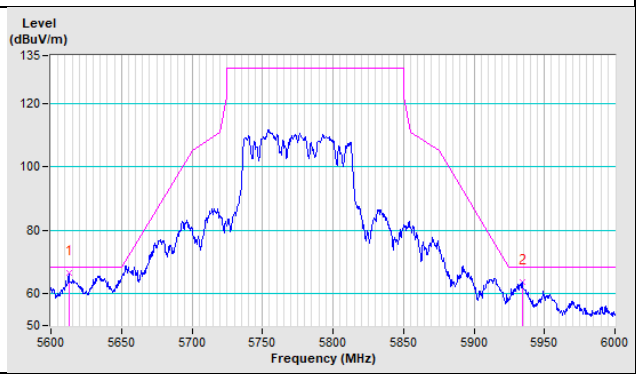
802.11ac (VHT20)

CH 149 5745 MHz	
Horizontal	Vertical
	
CH 157 5785 MHz	
Horizontal	Vertical
	
CH 165 5825 MHz	
Horizontal	Vertical
	

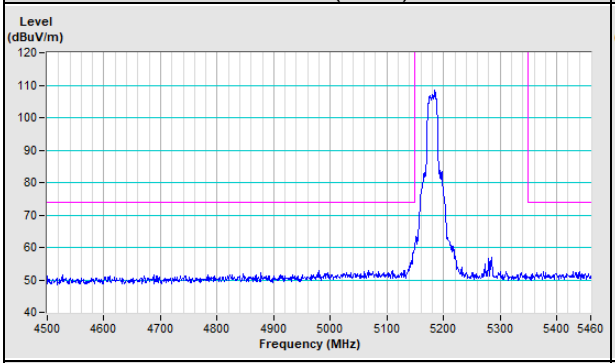
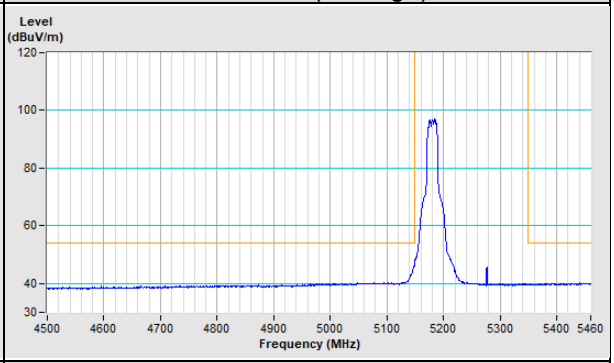
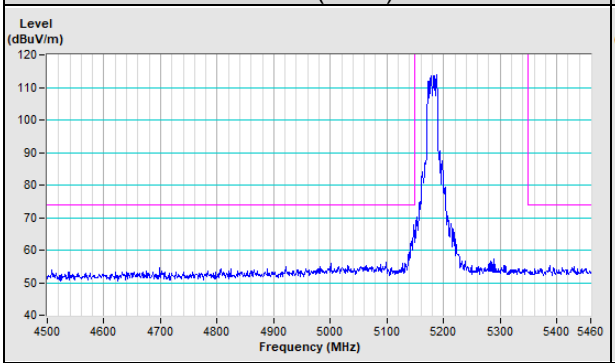
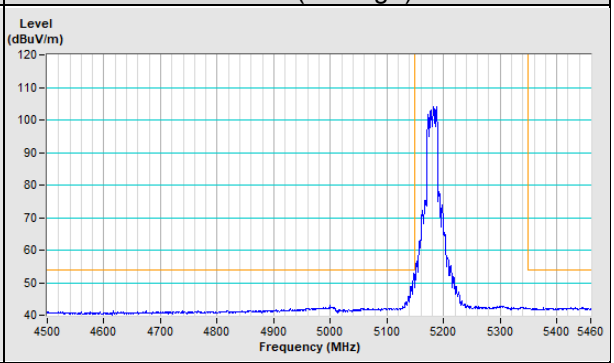
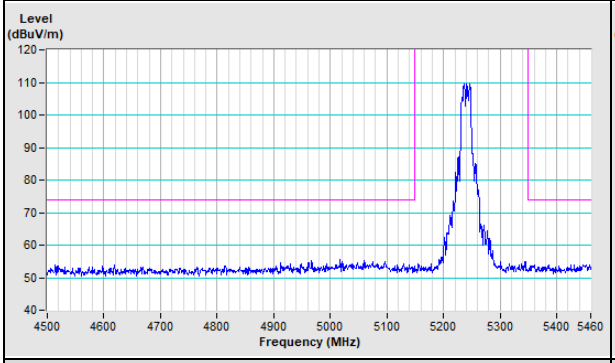
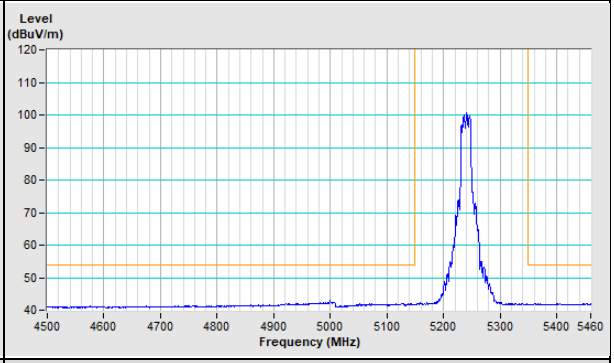
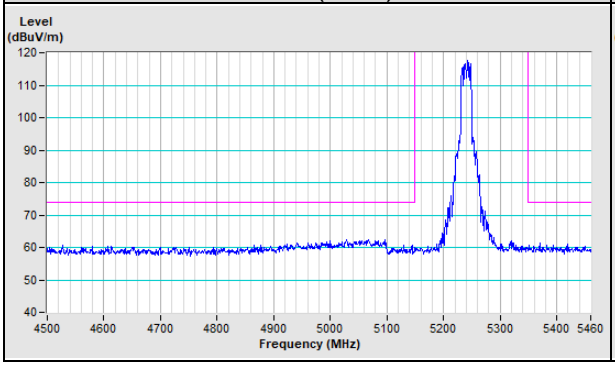
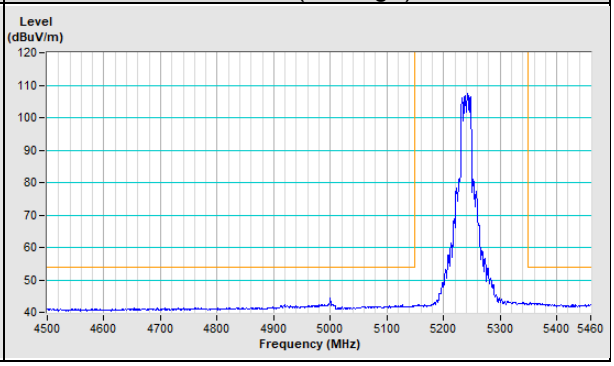
802.11ac (VHT40)

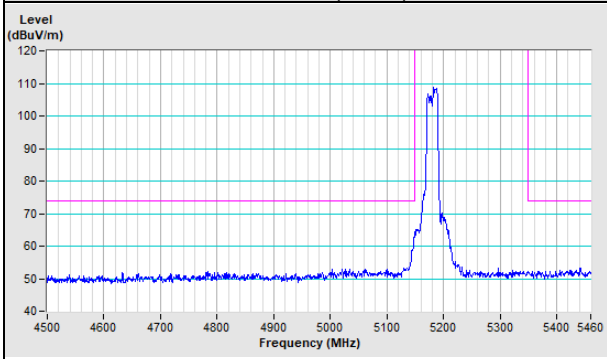
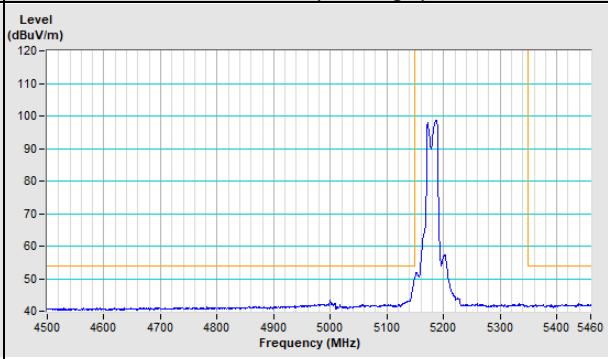
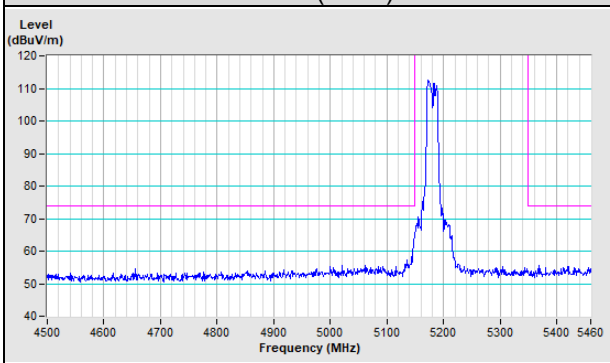
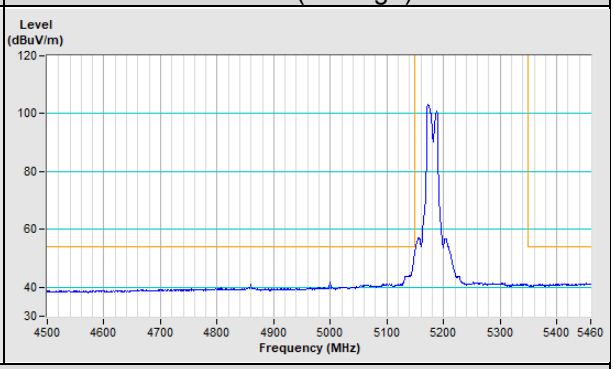
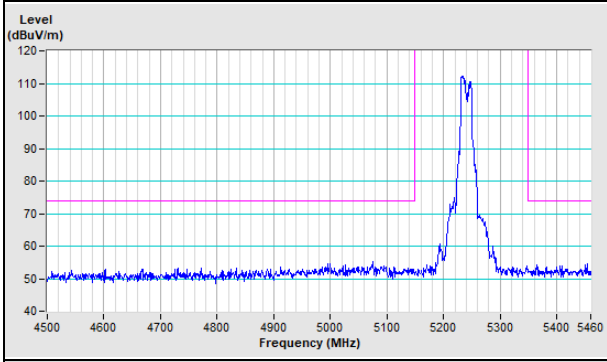
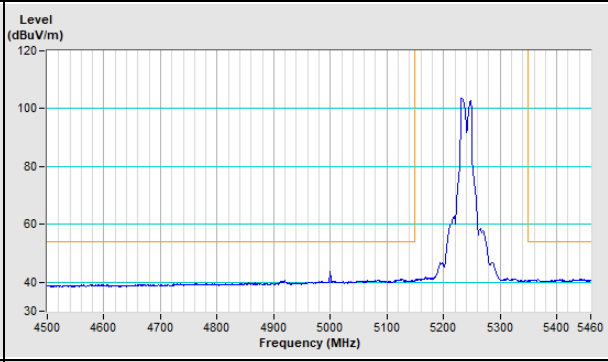
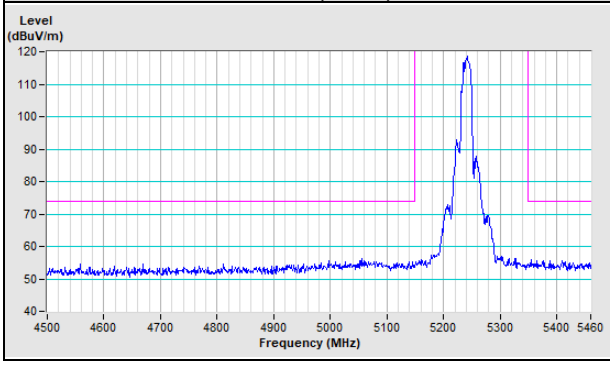
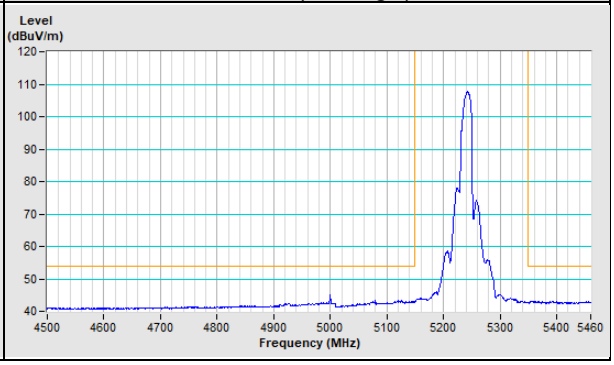
CH 151 5755 MHz	
Horizontal	Vertical
	
CH 159 5795 MHz	
Horizontal	Vertical
	

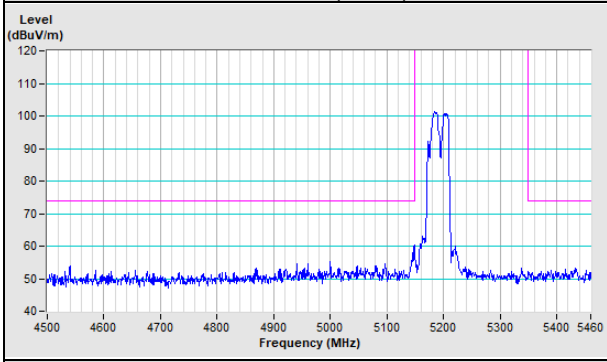
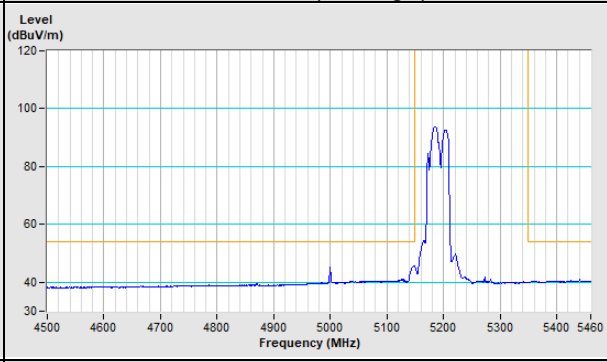
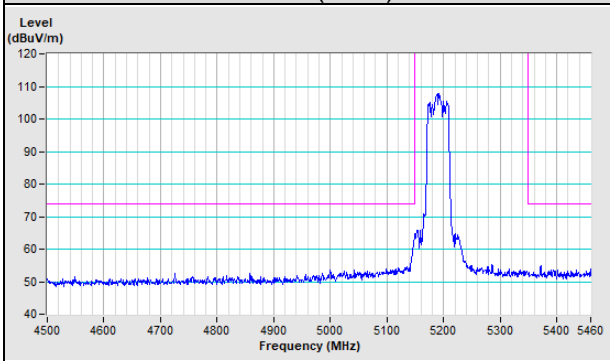
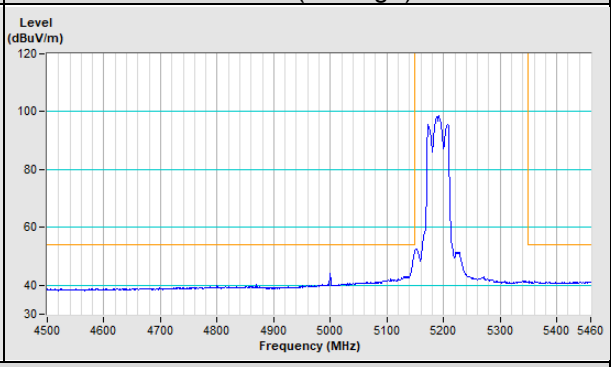
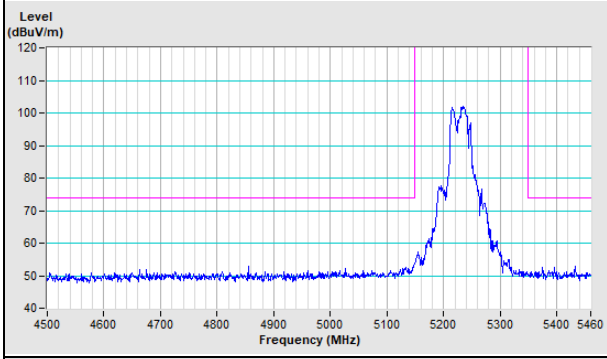
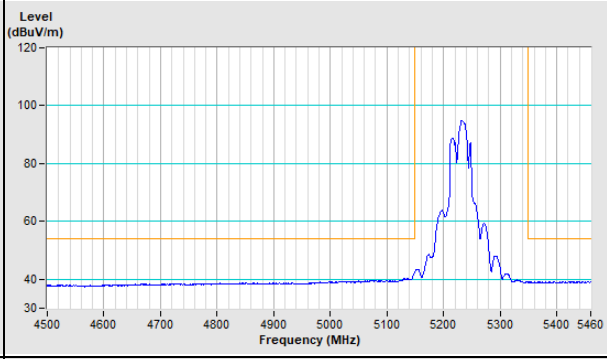
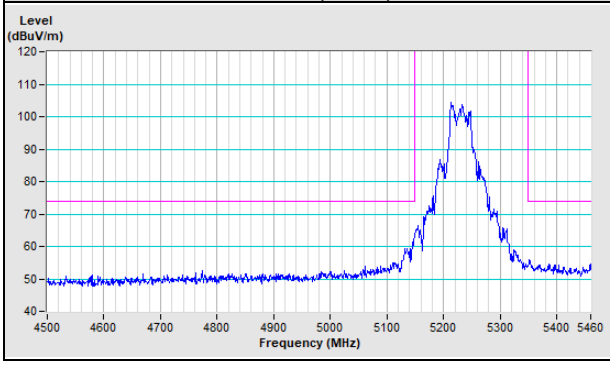
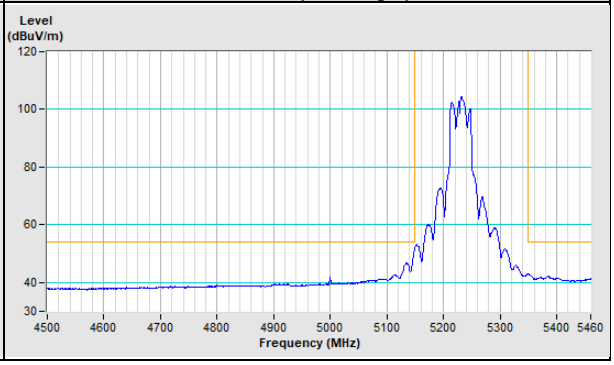
802.11ac (VHT80)

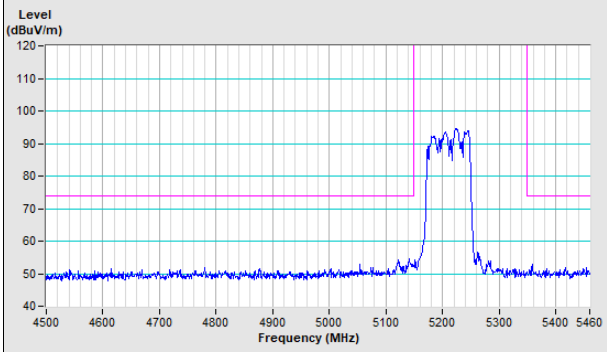
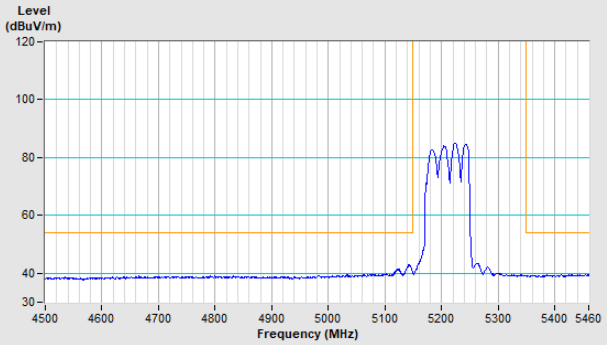
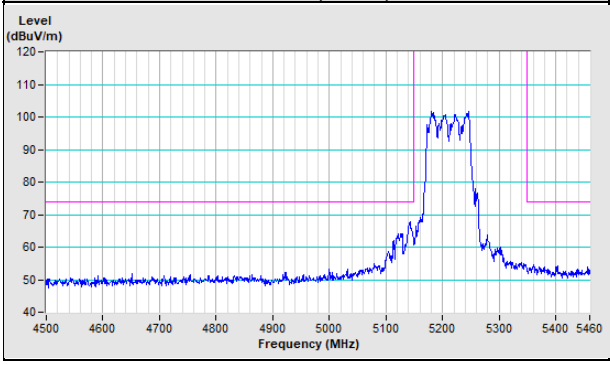
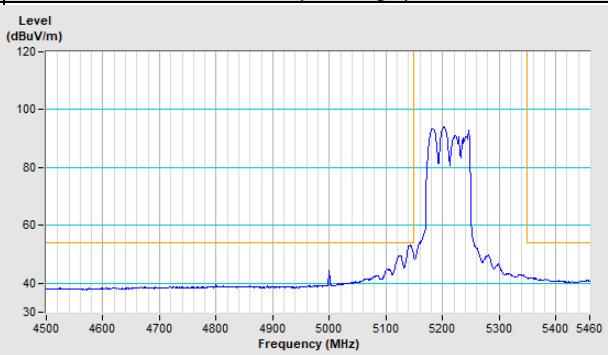
CH 155 5775 MHz	
Horizontal	Vertical
	

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)
	

802.11ac (VHT20) Channel 36	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11ac (VHT20) Channel 48	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ac (VHT40) Channel 38	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	
802.11ac (VHT40) Channel 46	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

802.11ac (VHT80) 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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The address and road map of all our labs can be found in our web site also.

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