FCC Test Report

Report No.:	RF190211C24-1 R1
FCC ID:	A8J-EWS377AP
Test Model:	EWS377AP
Series Model:	ECW630 (Refer to item 3.1 for more details)
Received Date:	Feb. 04, 2019
Test Date:	Feb. 04 ~ Mar. 05, 2019
Issued Date:	Apr. 02, 2019
Applicant:	EnGenius Technologies
Address:	1580 Scenic Avenue, Costa Mesa, CA92626
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
RF190211C24-1	Original release.	Mar. 18, 2019
RF190211C24-1 R1	Revised product name.	Apr. 02, 2019

1 Certificate of Conformity

Product:	802.11AX Indoor Ceiling Mount Access Point
Brand:	EnGenius®
Test Model:	EWS377AP
Series Model:	ECW630 (Refer to item 3.1 for more details)
Sample Status:	Engineering sample
Applicant:	EnGenius Technologies
Test Date:	Feb. 04 ~ Mar. 05, 2019
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : Pettie Chen , **Date:** Apr. 02, 2019

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Apr. 02, 2019

Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -6.74dB at 0.15000MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5150.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	Pass	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit.
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
Note: Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	3.04 dB
	30MHz ~ 200MHz	3.63 dB
	200MHz ~1000MHz	3.64 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11AX Indoor Ceiling Mount Access Point
Brand	EnGenius®
Test Model	EWS377AP
Series Model	ECW630
Model Difference	Refer to Note for more details
Sample Status	Engineering sample
Power Supply Rating	12Vdc (adapter) 54Vdc (PoE)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	OFDM, OFDMA
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 600Mbps 802.11ac: up to 1733Mbps 802.11ax: up to 2400Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 5 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1
Output Power	CDD Mode: 5180~5240MHz: 364.002mW 5745~5825MHz: 407.199mW Beamforming Mode: 5180~5240MHz: 91.012mW 5745~5825MHz: 101.141mW
Antenna Type	PIFA antenna with 4.3dBi gain
Antenna Connector	IPEX
Accessory Device	NA
Cable Supplied	NA

Note:

1. All models are listed as below.

Brand	Model	Difference
EnGenius	EWS377AP	Marketing purposes
	ECW630	

2. The EUT incorporates a MIMO function. Physically, the EUT provides 4 completed transmitter and 4 receivers.

Band	Modulation Mode	CDD mode	Beamforming mode	TX Function
2.4GHz	802.11b	Support	Not Support	4TX
	802.11g	Support	Not Support	4TX
	802.11n(HT20)	Support	Support	4TX
	802.11n(HT40)	Support	Support	4TX
	802.11ax(HE20)	Support	Support	4TX
	802.11ax(HE40)	Support	Support	4TX
5GHz	802.11a	Support	Not Support	4TX
	802.11n(HT20)	Support	Support	4TX
	802.11n(HT40)	Support	Support	4TX
	802.11ac(VHT20)	Support	Support	4TX
	802.11ac(VHT40)	Support	Support	4TX
	802.11ac(VHT80)	Support	Support	4TX
	802.11ax(HE20)	Support	Support	4TX
	802.11ax(HE40)	Support	Support	4TX
	802.11ax(HE80)	Support	Support	4TX

* The bandwidth and modulation are similar for HT20/HT40 on 802.11n mode and VHT20/VHT40 on 802.11ac mode and HE20/HE40 on 802.11ax mode. The bandwidth and modulation are similar for VHT80 on 802.11ac mode and HE80 on 802.11ax mode. Therefore the investigated worst case is the representative mode in test report. (Final test mode refer section 3.2.1)
* CDD mode and Beamforming mode are presented in output power test item. For other test items, CDD mode is the worst case for final tests after pretesting.
* 802.11ax mode only support full resource unit size.

3. The EUT consumes power from the following adapter and PoE. (Support unit only)

Adapter (Support unit)	
Brand	DVE
Model	DSA-24PFD-15
Input Power	100-240Vac~50/60Hz, 0.8A
Output Power	+12Vdc / 2A
Power Cord	1.5m power cable without core attached on adapter

PoE(Support unit)	
Brand	EnGenius
Model	EPA5006GP
Input Power	100-240Vac~0.8A, 50-60Hz
Output Power	54Vdc / 0.6A PIN 4,5:54V PIN 7,8:RETURN

4. 2.4GHz and 5GHz technologies can transmit at same time.
5. Spurious emission of the simultaneous operation (2.4GHz and 5GHz) has been evaluated and no non-compliance was found.

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

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

Channel	Frequency
42	5210 MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

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

Channel	Frequency
155	5775 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Power from adapter
B	-	√	√	-	Power from PoE

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 antenna had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Y-plane for internal antenna.
2. "-" means no effect.

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	Modulation Type	Data Rate (Mbps)	Remark
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0	-
	802.11ax (HE20)		36 to 48	36, 40, 48	OFDM	BPSK	MCS0	-
	802.11ax (HE40)		38 to 46	38, 46	OFDM	BPSK	MCS0	-
	802.11ax (HE80)		42	42	OFDM	BPSK	MCS0	-
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0	-
	802.11ax (HE20)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0	-
	802.11ax (HE40)		151 to 159	151, 159	OFDM	BPSK	MCS0	-
	802.11ax (HE80)		155	155	OFDM	BPSK	MCS0	-

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11a	5180-5240	36 to 48	165	OFDM	BPSK	6.0	-
	802.11a	5745-5825	149 to 165					

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	Modulation Type	Data Rate (Mbps)	Remark
A, B	802.11a	5180-5240	36 to 48	165	OFDM	BPSK	6.0	-
	802.11a	5745-5825	149 to 165					

Antenna Port Conducted Measurement:

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

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

Test Condition:

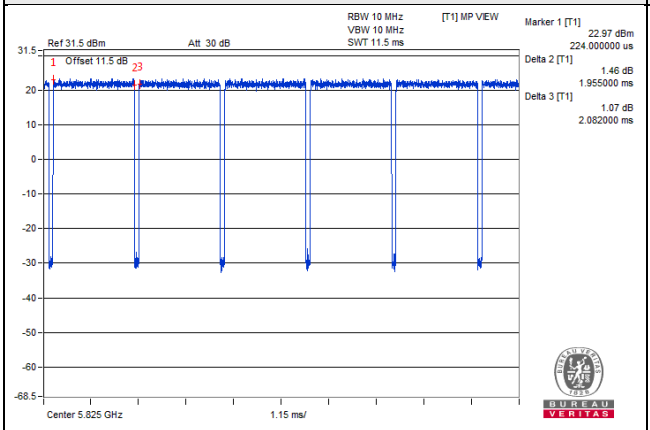
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Willy Cheng
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Adair Peng
PLC	22deg. C, 66%RH	120Vac, 60Hz	Willy Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chris Lin

3.3 Duty Cycle of Test Signal

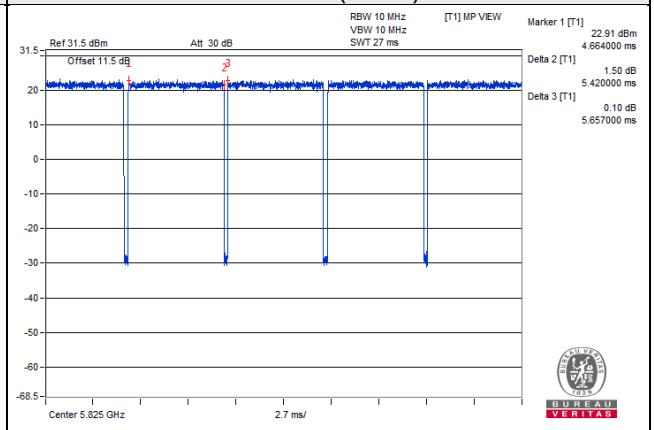
Duty cycle of test signal is < 98%, duty factor shall be considered.

802.11a: Duty cycle = 1.955/2.082 = 0.939, Duty factor = 10 * log(1/0.939) = 0.27
802.11n (HT20): Duty cycle = 5.420/5.657 = 0.958, Duty factor = 10 * log(1/0.958) = 0.19
802.11n (HT40): Duty cycle = 5.370/5.915 = 0.908, Duty factor = 10 * log(1/0.908) = 0.42
802.11ac (VHT80): Duty cycle = 5.407/5.682 = 0.952, Duty factor = 10 * log(1/0.952) = 0.22
802.11ax (HE20): Duty cycle = 5.382/5.647 = 0.953, Duty factor = 10 * log(1/0.953) = 0.21
802.11ax (HE40): Duty cycle = 5.378/5.623 = 0.956, Duty factor = 10 * log(1/0.956) = 0.19
802.11ax (HE80): Duty cycle = 5.397/5.628 = 0.959, Duty factor = 10 * log(1/0.959) = 0.18

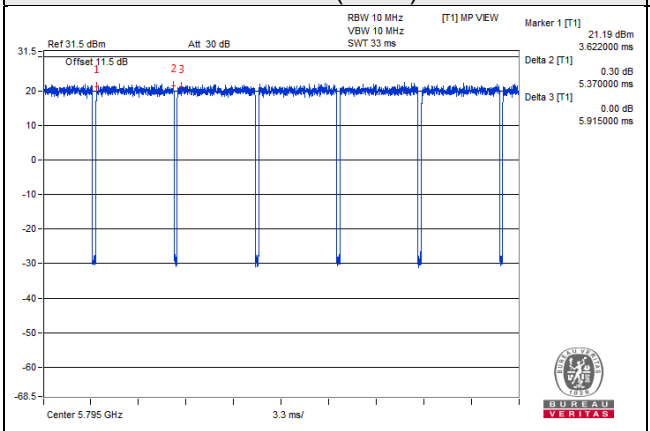
802.11a



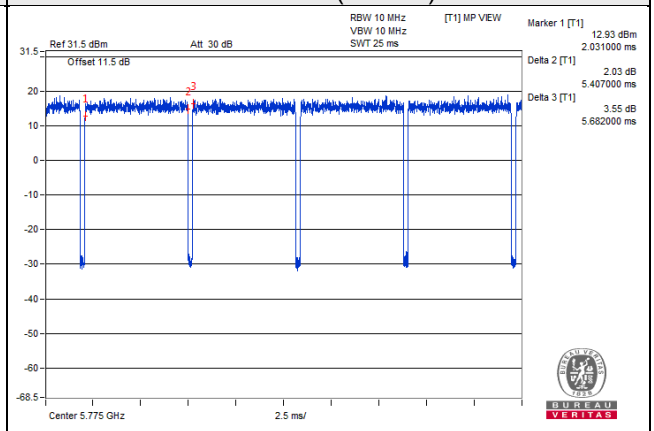
802.11n (HT20)



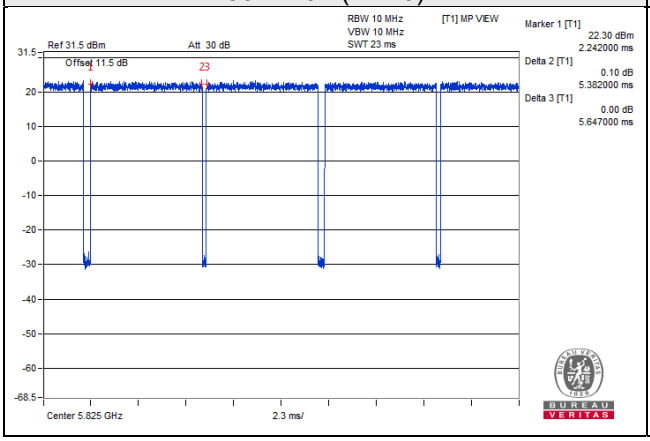
802.11n (HT40)



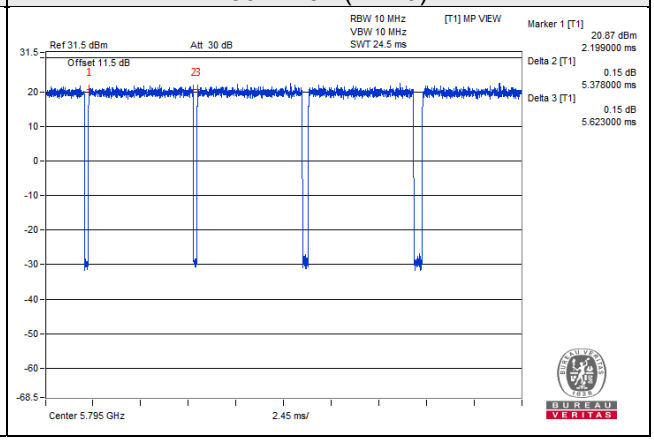
802.11ac (VHT80)

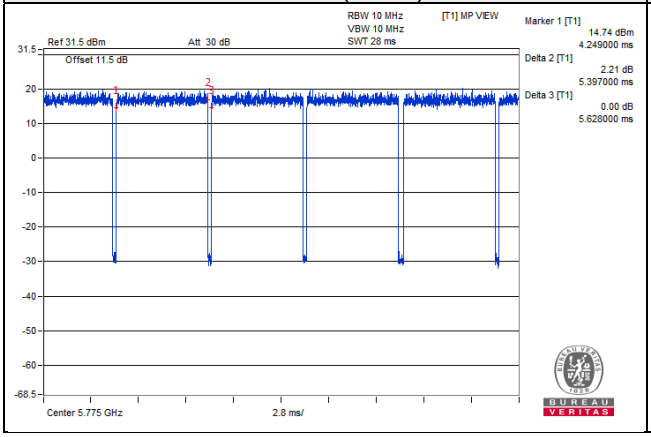


802.11ax (HE20)



802.11ax (HE40)



802.11ax (HE80)	
	

3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	Lenovo	20J4 MD A003TW	PF-11H9AK	FCC DoC Approved	-
B.	Adapter	DVE	DSA-24PFD-15	NA	NA	Provided by client
C.	PoE	EnGenius	EPA5006GP	NA	NA	Provided by client

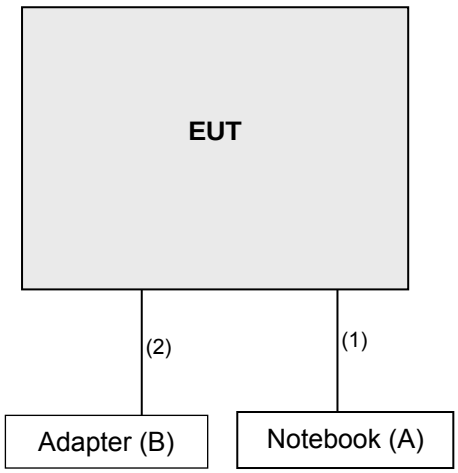
Note:

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.

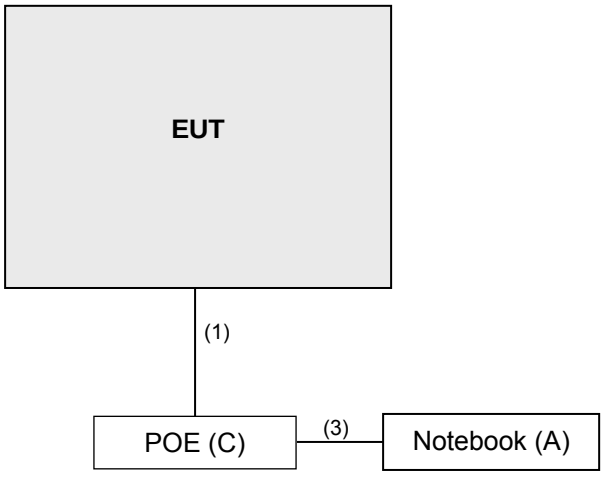
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	6.0	N	0	-
2.	Power cord	1	1.5	N	0	Provided by client
3.	RJ45, Cat5e	1	1.0	N	0	-

3.4.1 Configuration of System under Test

Mode A



Mode B



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)
KDB 789033 D02 General UNII Test Procedure New Rules v02r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10:2013

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

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

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBµV/m)</td><td>AV: 54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBµV/m) *1
PK: 105.2 (dBµV/m) *2
PK: 110.8(dBµV/m) *3
PK: 122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*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.</td></tr>
</table>

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 ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 22, 2018	Nov. 21, 2019
HORN Antenna SCHWARZBECK	9120D	209	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Nov. 25, 2018	Nov. 24, 2019
Loop Antenna EMCI	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2018	Aug. 20, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-SM-8000	Cable-CH3-03 (309224+170907)	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Nov. 14, 2018	Nov. 13, 2019
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 17, 2018	Jul. 16, 2019

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 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is 7450F-3.

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:

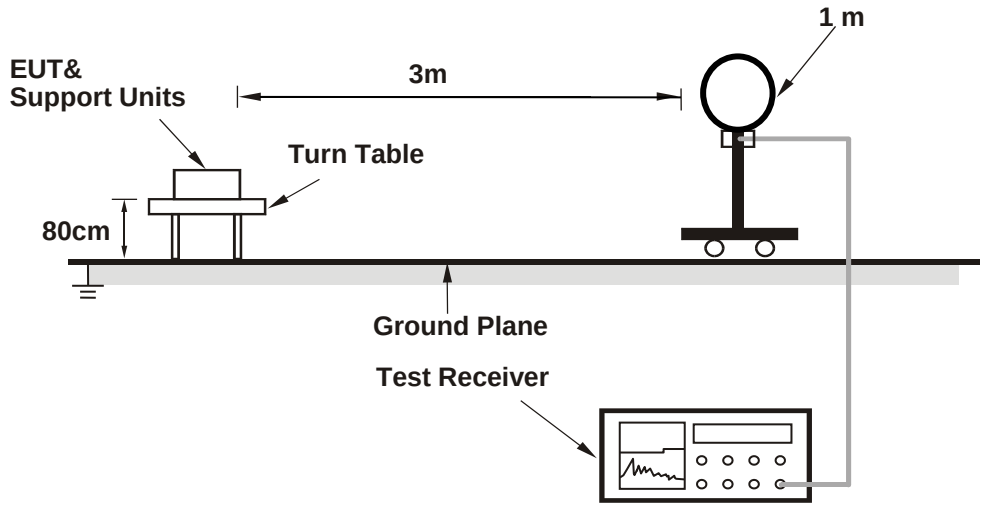
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

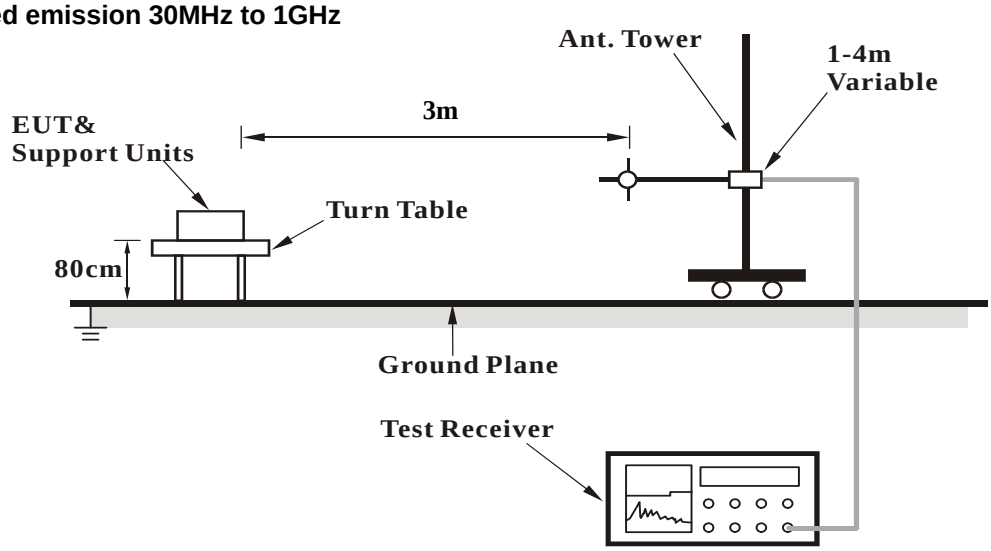
No deviation.

4.1.5 Test Setup

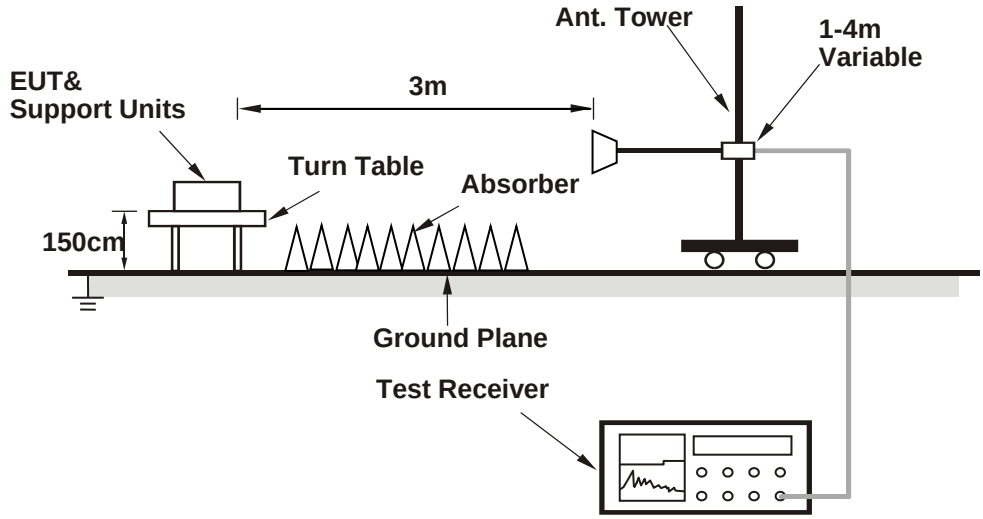
For Radiated emission below 30MHz



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 necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz worst-case data:

802.11a

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.8 PK	74.0	-2.2	1.76 H	6	67.9	3.9
2	5150.00	52.4 AV	54.0	-1.6	1.76 H	6	48.5	3.9
3	*5180.00	118.1 PK			1.96 H	9	78.6	39.5
4	*5180.00	107.9 AV			1.96 H	9	68.4	39.5
5	#10360.00	57.8 PK	68.2	-10.4	3.79 H	57	42.0	15.8
6	#10360.00	46.6 AV	54.0	-7.4	2.56 H	87	31.8	14.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.1 PK	74.0	-4.9	2.03 V	340	65.2	3.9
2	5150.00	50.1 AV	54.0	-3.9	2.03 V	340	46.2	3.9
3	*5180.00	116.1 PK			1.62 V	330	76.6	39.5
4	*5180.00	106.0 AV			1.62 V	330	66.5	39.5
5	#10360.00	58.8 PK	68.2	-9.4	2.10 V	2	43.0	15.8
6	#10360.00	46.4 AV	54.0	-7.6	2.58 V	320	31.6	14.8

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	116.5 PK			2.36 H	95	77.0	39.5
2	*5200.00	106.6 AV			2.36 H	95	67.1	39.5
3	#10400.00	58.7 PK	68.2	-9.5	2.64 H	198	42.8	15.9
4	15600.00	67.3 PK	74.0	-6.7	1.43 H	42	50.6	16.7
5	15600.00	52.9 AV	54.0	-1.1	1.43 H	42	36.2	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	115.9 PK			1.66 V	329	76.4	39.5
2	*5200.00	105.7 AV			1.66 V	329	66.2	39.5
3	#10400.00	57.9 PK	68.2	-10.3	1.65 V	18	42.0	15.9
4	15600.00	64.7 PK	74.0	-9.3	1.50 V	277	48.0	16.7
5	15600.00	49.3 AV	54.0	-4.7	1.50 V	277	32.6	16.7

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	118.8 PK			2.11 H	7	79.5	39.3
2	*5240.00	108.5 AV			2.11 H	7	69.2	39.3
3	5350.00	47.1 PK	74.0	-26.9	2.34 H	29	43.2	3.9
4	5350.00	43.8 AV	54.0	-10.2	2.34 H	29	39.9	3.9
5	#10480.00	58.4 PK	68.2	-9.8	2.26 H	318	41.6	16.8
6	15720.00	61.0 PK	74.0	-13.0	1.98 H	60	45.0	16.0
7	15720.00	47.3 AV	54.0	-6.7	1.98 H	60	31.3	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	118.0 PK			1.76 V	335	78.7	39.3
2	*5240.00	107.5 AV			1.76 V	335	68.2	39.3
3	5350.00	57.1 PK	74.0	-16.9	1.94 V	315	53.2	3.9
4	5350.00	43.5 AV	54.0	-10.5	1.94 V	315	39.6	3.9
5	#10480.00	59.9 PK	68.2	-8.3	2.27 V	2	43.1	16.8
6	15720.00	59.3 PK	74.0	-14.7	2.26 V	54	43.3	16.0
7	15720.00	47.2 AV	54.0	-6.8	2.26 V	54	31.2	16.0

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5607.69	55.7 PK	68.2	-12.5	1.91 H	273	51.4	4.3
2	*5745.00	118.4 PK			1.91 H	273	78.3	40.1
3	*5745.00	108.4 AV			1.91 H	273	68.3	40.1
4	#5980.13	58.9 PK	68.2	-9.3	1.91 H	273	53.8	5.1
5	11490.00	58.9 PK	74.0	-15.1	2.23 H	298	41.3	17.6
6	11490.00	47.4 AV	54.0	-6.6	2.23 H	298	29.8	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5642.31	55.9 PK	68.2	-12.3	1.42 V	18	51.7	4.2
2	*5745.00	115.6 PK			1.42 V	18	75.5	40.1
3	*5745.00	105.5 AV			1.42 V	18	65.4	40.1
4	#5975.00	57.8 PK	68.2	-10.4	1.42 V	18	52.7	5.1
5	11490.00	60.2 PK	74.0	-13.8	1.54 V	23	42.6	17.6
6	11490.00	47.4 AV	54.0	-6.6	1.54 V	23	29.8	17.6

Remarks:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5637.18	55.0 PK	68.2	-13.2	1.89 H	266	50.8	4.2
2	*5785.00	118.6 PK			1.89 H	266	78.3	40.3
3	*5785.00	108.6 AV			1.89 H	266	68.3	40.3
4	#5974.36	59.6 PK	68.2	-8.6	1.89 H	266	54.5	5.1
5	11570.00	60.9 PK	74.0	-13.1	1.91 H	294	43.4	17.5
6	11570.00	49.6 AV	54.0	-4.4	1.91 H	294	32.1	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5604.49	55.3 PK	68.2	-12.9	1.02 V	9	51.0	4.3
2	*5785.00	116.1 PK			1.02 V	9	75.8	40.3
3	*5785.00	105.5 AV			1.02 V	9	65.2	40.3
4	#5980.13	57.3 PK	68.2	-10.9	1.02 V	9	52.2	5.1
5	11570.00	59.6 PK	74.0	-14.4	1.41 V	11	42.1	17.5
6	11570.00	47.1 AV	54.0	-6.9	1.41 V	11	29.6	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5626.92	57.9 PK	68.2	-10.3	2.15 H	276	53.7	4.2
2	*5825.00	121.4 PK			2.15 H	276	81.0	40.4
3	*5825.00	111.5 AV			2.15 H	276	71.1	40.4
4	#5983.33	59.6 PK	68.2	-8.6	2.15 H	276	54.5	5.1
5	11650.00	60.8 PK	74.0	-13.2	2.26 H	296	43.7	17.1
6	11650.00	50.5 AV	54.0	-3.5	2.26 H	296	33.4	17.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.64	56.3 PK	68.2	-11.9	1.05 V	10	52.1	4.2
2	*5825.00	117.2 PK			1.05 V	10	76.8	40.4
3	*5825.00	106.9 AV			1.05 V	10	66.5	40.4
4	#5973.72	59.4 PK	68.2	-8.8	1.05 V	10	54.3	5.1
5	11650.00	60.6 PK	74.0	-13.4	1.15 V	18	43.5	17.1
6	11650.00	46.8 AV	54.0	-7.2	1.15 V	18	29.7	17.1

Remarks:

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

802.11ax (HE20)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.4 PK	74.0	-4.6	1.96 H	6	65.5	3.9
2	5150.00	52.3 AV	54.0	-1.7	1.96 H	6	48.4	3.9
3	*5180.00	118.6 PK			2.52 H	10	79.1	39.5
4	*5180.00	105.5 AV			2.52 H	10	66.0	39.5
5	#10360.00	57.3 PK	68.2	-10.9	1.91 H	264	41.5	15.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.6 PK	74.0	-4.4	1.75 V	6	65.7	3.9
2	5150.00	52.4 AV	54.0	-1.6	1.75 V	6	48.5	3.9
3	*5180.00	120.1 PK			1.72 V	336	80.6	39.5
4	*5180.00	106.7 AV			1.72 V	336	67.2	39.5
5	#10360.00	57.8 PK	68.2	-10.4	1.71 V	15	42.0	15.8

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 40	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	121.3 PK			2.02 H	7	81.8	39.5
2	*5200.00	107.7 AV			2.02 H	7	68.2	39.5
3	#10400.00	57.8 PK	68.2	-10.4	1.98 H	220	41.9	15.9
4	15600.00	67.5 PK	74.0	-6.5	1.42 H	36	50.8	16.7
5	15600.00	50.7 AV	54.0	-3.3	1.42 H	36	34.0	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	121.9 PK			1.82 V	339	82.4	39.5
2	*5200.00	108.5 AV			1.82 V	339	69.0	39.5
3	#10400.00	57.7 PK	68.2	-10.5	1.70 V	16	41.8	15.9
4	15600.00	61.6 PK	74.0	-12.4	1.76 V	276	44.9	16.7
5	15600.00	48.5 AV	54.0	-5.5	1.76 V	276	31.8	16.7

Remarks:

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

CHANNEL	TX Channel 48	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	120.3 PK			1.70 H	5	81.0	39.3
2	*5240.00	107.1 AV			1.70 H	5	67.8	39.3
3	5350.00	57.3 PK	74.0	-16.7	1.73 H	319	53.4	3.9
4	5350.00	43.8 AV	54.0	-10.2	1.73 H	319	39.9	3.9
5	#10480.00	59.3 PK	68.2	-8.9	2.65 H	195	42.5	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	120.8 PK			1.31 V	320	81.5	39.3
2	*5240.00	107.3 AV			1.31 V	320	68.0	39.3
3	5350.00	57.4 PK	74.0	-16.6	1.46 V	333	53.5	3.9
4	5350.00	44.4 AV	54.0	-9.6	1.46 V	333	40.5	3.9
5	#10480.00	59.4 PK	68.2	-8.8	1.88 V	13	42.6	16.8

Remarks:

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

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5614.10	55.4 PK	68.2	-12.8	2.23 H	275	51.1	4.3
2	*5745.00	121.4 PK			2.23 H	275	81.3	40.1
3	*5745.00	108.2 AV			2.23 H	275	68.1	40.1
4	#5935.26	59.7 PK	68.2	-8.5	2.23 H	275	54.8	4.9
5	11490.00	58.9 PK	74.0	-15.1	1.26 H	311	41.3	17.6
6	11490.00	48.1 AV	54.0	-5.9	1.26 H	311	30.5	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.15	54.7 PK	68.2	-13.5	2.86 V	347	50.5	4.2
2	*5745.00	118.5 PK			2.86 V	347	78.4	40.1
3	*5745.00	105.3 AV			2.86 V	347	65.2	40.1
4	#5982.05	57.4 PK	68.2	-10.8	2.86 V	347	52.3	5.1
5	11490.00	60.0 PK	74.0	-14.0	1.43 V	32	42.4	17.6
6	11490.00	47.1 AV	54.0	-6.9	1.43 V	32	29.5	17.6

Remarks:

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

CHANNEL	TX Channel 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5601.28	55.2 PK	68.2	-13.0	2.56 H	272	50.9	4.3
2	*5785.00	121.8 PK			2.56 H	272	81.5	40.3
3	*5785.00	108.3 AV			2.56 H	272	68.0	40.3
4	#5982.69	59.0 PK	68.2	-9.2	2.56 H	272	53.9	5.1
5	11570.00	61.1 PK	74.0	-12.9	2.25 H	292	43.6	17.5
6	11570.00	49.5 AV	54.0	-4.5	2.25 H	292	32.0	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5633.97	54.4 PK	68.2	-13.8	1.19 V	23	50.2	4.2
2	*5785.00	117.4 PK			1.19 V	23	77.1	40.3
3	*5785.00	104.2 AV			1.19 V	23	63.9	40.3
4	#5993.59	57.4 PK	68.2	-10.8	1.19 V	23	52.3	5.1
5	11570.00	60.0 PK	74.0	-14.0	1.69 V	25	42.5	17.5
6	11570.00	46.8 AV	54.0	-7.2	1.69 V	25	29.3	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.64	57.8 PK	68.2	-10.4	2.20 H	273	53.6	4.2
2	*5825.00	122.3 PK			2.20 H	273	81.9	40.4
3	*5825.00	109.3 AV			2.20 H	273	68.9	40.4
4	#5968.59	57.9 PK	68.2	-10.3	2.20 H	273	52.9	5.0
5	11650.00	60.9 PK	74.0	-13.1	2.21 H	295	43.8	17.1
6	11650.00	50.1 AV	54.0	-3.9	2.21 H	295	33.0	17.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5637.18	55.3 PK	68.2	-12.9	1.16 V	13	51.1	4.2
2	*5825.00	119.2 PK			1.16 V	13	78.8	40.4
3	*5825.00	105.9 AV			1.16 V	13	65.5	40.4
4	#5925.64	58.8 PK	68.2	-9.4	1.16 V	13	53.9	4.9
5	11650.00	58.9 PK	74.0	-15.1	2.13 V	21	41.8	17.1
6	11650.00	45.6 AV	54.0	-8.4	2.13 V	21	28.5	17.1

Remarks:

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

802.11ax (HE40)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.2 PK	74.0	-4.8	3.08 H	283	65.3	3.9
2	5150.00	52.5 AV	54.0	-1.5	3.08 H	283	48.6	3.9
3	*5190.00	113.0 PK			2.14 H	277	73.5	39.5
4	*5190.00	100.3 AV			2.14 H	277	60.8	39.5
5	#10380.00	56.0 PK	68.2	-12.2	3.08 H	164	40.1	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	70.5 PK	74.0	-3.5	1.21 V	336	66.6	3.9
2	5150.00	52.9 AV	54.0	-1.1	1.21 V	336	49.0	3.9
3	*5190.00	115.7 PK			1.72 V	330	76.2	39.5
4	*5190.00	102.7 AV			1.72 V	330	63.2	39.5
5	#10380.00	58.4 PK	68.2	-9.8	1.68 V	13	42.5	15.9

Remarks:

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

CHANNEL	TX Channel 46	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	116.9 PK			1.52 H	58	77.6	39.3
2	*5230.00	104.2 AV			1.52 H	58	64.9	39.3
3	5350.00	57.0 PK	74.0	-17.0	1.64 H	69	53.1	3.9
4	5350.00	43.9 AV	54.0	-10.1	1.64 H	69	40.0	3.9
5	#10460.00	58.6 PK	68.2	-9.6	2.51 H	199	42.0	16.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	117.8 PK			1.49 V	322	78.5	39.3
2	*5230.00	104.9 AV			1.49 V	322	65.6	39.3
3	5350.00	57.5 PK	74.0	-16.5	1.62 V	357	53.6	3.9
4	5350.00	44.2 AV	54.0	-9.8	1.62 V	357	40.3	3.9
5	#10460.00	58.6 PK	68.2	-9.6	1.72 V	15	42.0	16.6

Remarks:

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

CHANNEL	TX Channel 151	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5649.36	57.2 PK	68.2	-11.0	2.00 H	275	53.0	4.2
2	*5755.00	118.9 PK			2.00 H	275	78.8	40.1
3	*5755.00	105.6 AV			2.00 H	275	65.5	40.1
4	#5946.15	58.7 PK	68.2	-9.5	2.00 H	275	53.8	4.9
5	11510.00	59.5 PK	74.0	-14.5	1.43 H	339	41.8	17.7
6	11510.00	48.0 AV	54.0	-6.0	1.43 H	339	30.3	17.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5603.21	54.0 PK	68.2	-14.2	2.79 V	349	49.7	4.3
2	*5755.00	114.9 PK			2.79 V	349	74.8	40.1
3	*5755.00	102.2 AV			2.79 V	349	62.1	40.1
4	#5983.97	56.9 PK	68.2	-11.3	2.79 V	349	51.8	5.1
5	11510.00	59.2 PK	74.0	-14.8	1.43 V	1	41.5	17.7
6	11510.00	45.9 AV	54.0	-8.1	1.43 V	1	28.2	17.7

Remarks:

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

CHANNEL	TX Channel 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5603.21	56.7 PK	68.2	-11.5	1.78 H	273	52.4	4.3
2	*5795.00	119.4 PK			1.78 H	273	79.0	40.4
3	*5795.00	106.7 AV			1.78 H	273	66.3	40.4
4	#5937.18	58.1 PK	68.2	-10.1	1.78 H	273	53.2	4.9
5	11590.00	60.9 PK	74.0	-13.1	2.26 H	296	43.4	17.5
6	11590.00	50.2 AV	54.0	-3.8	2.26 H	296	32.7	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5618.59	56.9 PK	68.2	-11.3	1.09 V	14	52.6	4.3
2	*5795.00	117.3 PK			1.09 V	14	76.9	40.4
3	*5795.00	103.7 AV			1.09 V	14	63.3	40.4
4	#5956.41	57.4 PK	68.2	-10.8	1.09 V	14	52.5	4.9
5	11590.00	60.2 PK	74.0	-13.8	2.19 V	2	42.7	17.5
6	11590.00	47.3 AV	54.0	-6.7	2.19 V	2	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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ax (HE80)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (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	70.1 PK	74.0	-3.9	1.94 H	7	66.2	3.9
2	5150.00	52.4 AV	54.0	-1.6	1.94 H	7	48.5	3.9
3	*5210.00	111.4 PK			1.74 H	5	72.0	39.4
4	*5210.00	98.8 AV			1.74 H	5	59.4	39.4
5	5350.00	57.9 PK	74.0	-16.1	1.85 H	352	54.0	3.9
6	5350.00	44.3 AV	54.0	-9.7	1.85 H	352	40.4	3.9
7	#10420.00	57.7 PK	68.2	-10.5	2.36 H	159	41.5	16.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (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	70.5 PK	74.0	-3.5	1.17 V	318	66.6	3.9
2	**5150.00**	**53.0 AV**	**54.0**	**-1.0**	**1.17 V**	**318**	**49.1**	**3.9**
3	*5210.00	112.8 PK			1.30 V	320	73.4	39.4
4	*5210.00	100.0 AV			1.30 V	320	60.6	39.4
5	5350.00	57.0 PK	74.0	-17.0	1.32 V	286	53.1	3.9
6	5350.00	44.1 AV	54.0	-9.9	1.32 V	286	40.2	3.9
7	#10420.00	57.7 PK	68.2	-10.5	1.92 V	188	41.5	16.2

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 155	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.74	61.7 PK	68.2	-6.5	2.01 H	272	57.5	4.2
2	#5650.00	67.0 PK	68.2	-1.2	1.50 H	72	62.8	4.2
3	*5775.00	114.4 PK			2.01 H	272	74.1	40.3
4	*5775.00	101.6 AV			2.01 H	272	61.3	40.3
5	#5925.00	63.9 PK	68.2	-4.3	1.49 H	41	59.0	4.9
6	#5942.31	59.0 PK	68.2	-9.2	2.01 H	272	54.1	4.9
7	11550.00	61.0 PK	74.0	-13.0	2.27 H	296	43.4	17.6
8	11550.00	49.6 AV	54.0	-4.4	2.27 H	296	32.0	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5641.67	59.1 PK	68.2	-9.1	2.11 V	302	54.9	4.2
2	#5650.00	65.2 PK	68.2	-3.0	1.48 V	19	61.0	4.2
3	*5775.00	109.2 PK			2.11 V	302	68.9	40.3
4	*5775.00	96.4 AV			2.11 V	302	56.1	40.3
5	#5925.00	59.3 PK	68.2	-8.9	1.78 V	55	54.4	4.9
6	#5931.41	57.5 PK	68.2	-10.7	2.11 V	302	52.6	4.9
7	11550.00	59.2 PK	74.0	-14.8	2.06 V	3	41.6	17.6
8	11550.00	45.9 AV	54.0	-8.1	2.06 V	3	28.3	17.6

Remarks:

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

Below 1GHz worst-case data:

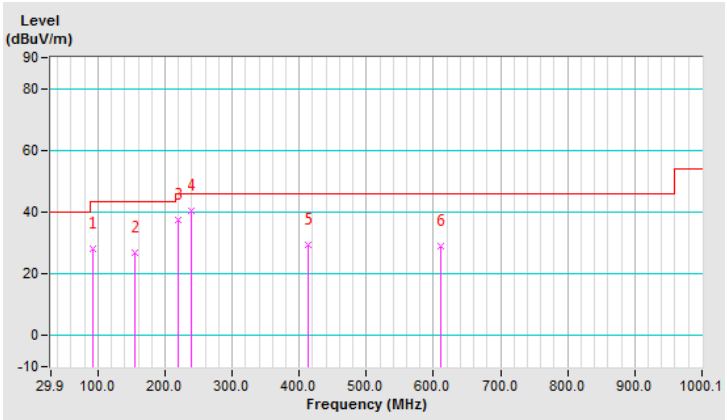
802.11a

CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	92.12	28.3 QP	43.5	-15.2	1.99 H	285	42.7	-14.4
2	154.33	27.0 QP	43.5	-16.5	1.00 H	109	36.0	-9.0
3	220.44	37.4 QP	46.0	-8.6	1.50 H	93	48.0	-10.6
4	239.88	40.3 QP	46.0	-5.7	1.00 H	114	49.9	-9.6
5	412.92	29.3 QP	46.0	-16.7	1.99 H	356	34.6	-5.3
6	611.24	29.0 QP	46.0	-17.0	1.50 H	7	30.0	-1.0

Remarks:

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

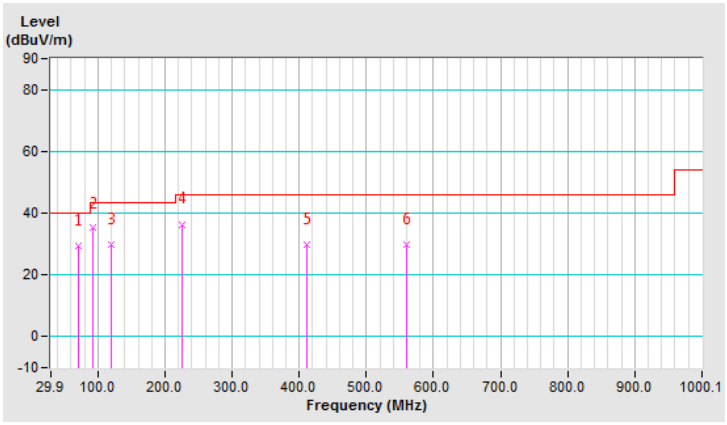


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	A

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	70.73	29.3 QP	40.0	-10.7	1.51 V	5	41.3	-12.0
2	92.12	35.1 QP	43.5	-8.4	1.00 V	114	49.5	-14.4
3	119.34	29.8 QP	43.5	-13.7	1.00 V	224	41.4	-11.6
4	226.27	36.4 QP	46.0	-9.6	1.00 V	279	46.9	-10.5
5	410.98	29.9 QP	46.0	-16.1	1.00 V	10	35.3	-5.4
6	560.69	29.9 QP	46.0	-16.1	1.00 V	355	32.4	-2.5

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 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.

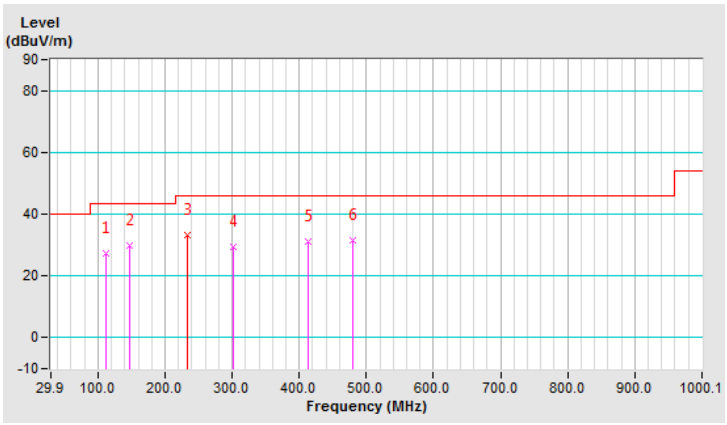


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	111.56	27.4 QP	43.5	-16.1	1.51 H	106	39.8	-12.4
2	146.56	30.0 QP	43.5	-13.5	2.00 H	98	39.2	-9.2
3	234.16	33.1 QP	46.0	-12.9	1.50 H	126	43.2	-10.1
4	302.10	29.5 QP	46.0	-16.5	1.00 H	155	36.9	-7.4
5	412.92	30.9 QP	46.0	-15.1	2.00 H	10	36.2	-5.3
6	479.03	31.6 QP	46.0	-14.4	1.51 H	7	35.6	-4.0

Remarks:

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

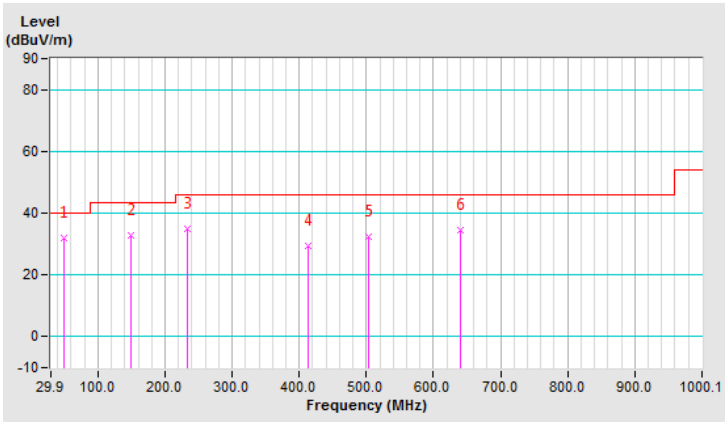


CHANNEL	TX Channel 165	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz	TEST MODE	B

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	49.34	32.0 QP	40.0	-8.0	1.00 V	47	41.7	-9.7
2	148.50	32.9 QP	43.5	-10.6	1.00 V	145	42.1	-9.2
3	234.05	35.1 QP	46.0	-10.9	1.00 V	288	45.2	-10.1
4	412.92	29.5 QP	46.0	-16.5	1.00 V	182	34.8	-5.3
5	502.36	32.5 QP	46.0	-13.5	1.00 V	354	36.1	-3.6
6	640.41	34.6 QP	46.0	-11.4	1.50 V	3	35.2	-0.6

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



4.2 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	ESCS 30	100288	Jan. 03, 2019	Jan. 02, 2020
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 1.
3. The VCCI Site Registration No. is C-2040.

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.

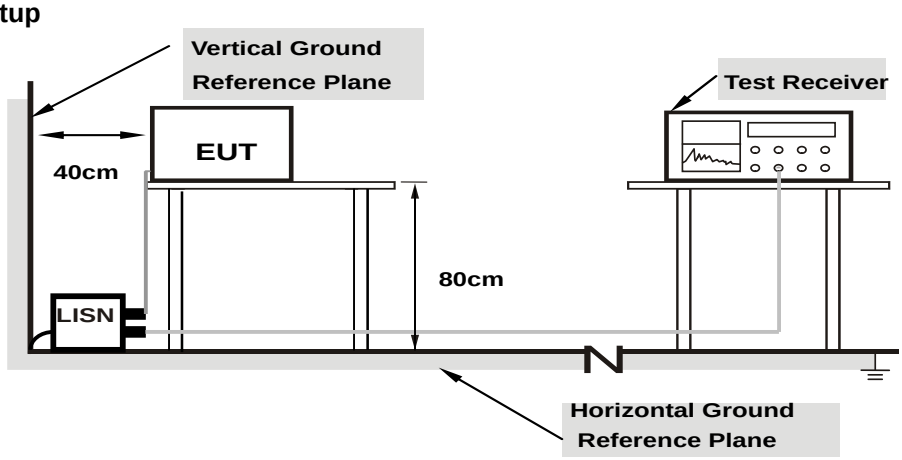
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 item 4.3.6.

4.2.7 Test Results

Worst-case data:

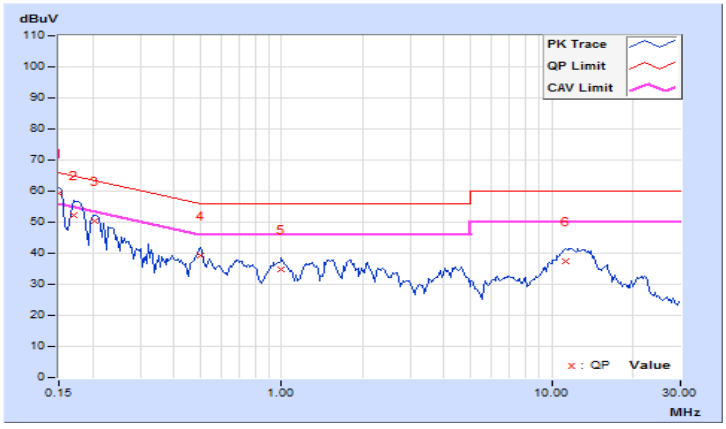
802.11a

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

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**	**9.73**	**49.53**	**37.09**	**59.26**	**46.82**	**66.00**	**56.00**	**-6.74**	**-9.18**
2	0.16953	9.73	42.40	23.55	52.13	33.28	64.98	54.98	-12.85	-21.70
3	0.20469	9.72	40.54	29.31	50.26	39.03	63.42	53.42	-13.16	-14.39
4	0.50156	9.74	29.51	24.38	39.25	34.12	56.00	46.00	-16.75	-11.88
5	0.99766	9.68	25.22	19.99	34.90	29.67	56.00	46.00	-21.10	-16.33
6	11.24219	9.89	27.62	22.71	37.51	32.60	60.00	50.00	-22.49	-17.40

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

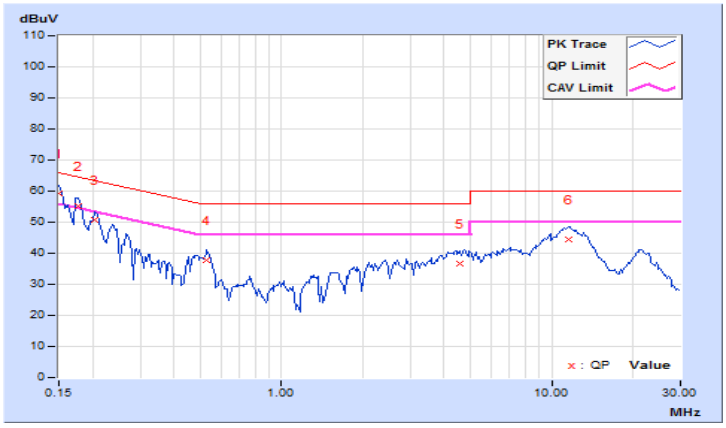


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	9.72	49.51	37.35	59.23	47.07	66.00	56.00	-6.77	-8.93
2	0.17734	9.73	45.52	34.06	55.25	43.79	64.61	54.61	-9.36	-10.82
3	0.20469	9.73	41.05	29.24	50.78	38.97	63.42	53.42	-12.64	-14.45
4	0.52891	9.74	28.07	22.60	37.81	32.34	56.00	46.00	-18.19	-13.66
5	4.56641	9.82	26.93	19.27	36.75	29.09	56.00	46.00	-19.25	-16.91
6	11.51563	9.94	34.53	28.53	44.47	38.47	60.00	50.00	-15.53	-11.53

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

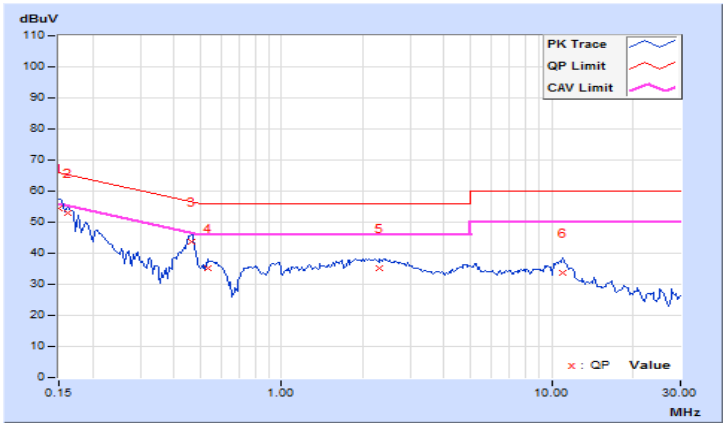


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	9.73	44.78	31.42	54.51	41.15	66.00	56.00	-11.49	-14.85
2	0.16172	9.73	43.07	28.98	52.80	38.71	65.38	55.38	-12.58	-16.67
3	0.46250	9.74	34.13	29.91	43.87	39.65	56.65	46.65	-12.78	-7.00
4	0.53281	9.73	25.32	21.92	35.05	31.65	56.00	46.00	-20.95	-14.35
5	2.30078	9.75	25.57	21.50	35.32	31.25	56.00	46.00	-20.68	-14.75
6	11.02734	9.89	23.77	19.31	33.66	29.20	60.00	50.00	-26.34	-20.80

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

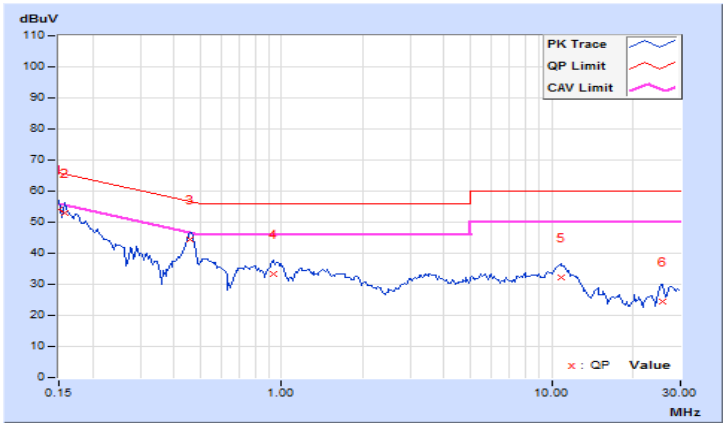


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	9.72	44.31	31.13	54.03	40.85	66.00	56.00	-11.97	-15.15
2	0.15781	9.72	43.07	30.08	52.79	39.80	65.58	55.58	-12.79	-15.78
3	0.45859	9.75	34.57	29.92	44.32	39.67	56.72	46.72	-12.40	-7.05
4	0.93906	9.72	23.56	21.18	33.28	30.90	56.00	46.00	-22.72	-15.10
5	10.80078	9.93	22.28	17.30	32.21	27.23	60.00	50.00	-27.79	-22.77
6	25.65234	10.10	14.40	8.80	24.50	18.90	60.00	50.00	-35.50	-31.10

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

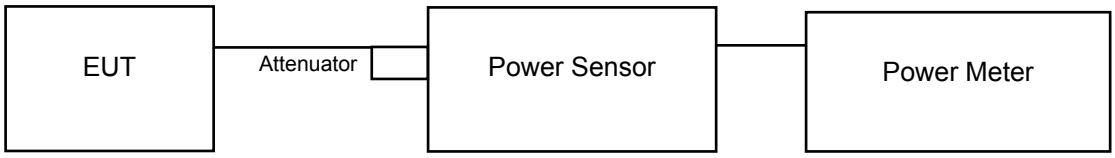
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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

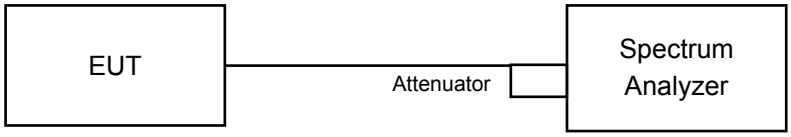
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

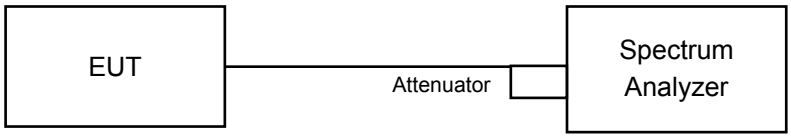
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40), 802.11ax (HE20), 802.11ax (HE40)



802.11ac (VHT80), 802.11ax (HE80)



For Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

802.11a, 802.11ac (VHT20), 802.11ac (VHT40), 802.11ax (HE20), 802.11ax (HE40)
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

802.11ac (VHT80), 802.11ax (HE80)

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
b. Set sweep trigger to “free run”.
c. Set RBW = 1 MHz
d. Set VBW ≥ 3 MHz
e. Number of points in sweep ≥ 2 Span / RBW
f. Sweep time ≤ (number of points in sweep) * T
g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
h. Detector = RMS
i. Trace mode = max hold
j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth

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

4.3.5 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

Power Output:

CDD Mode

802.11a

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.49	17.48	17.86	18.08	251.971	24.01	30.00	Pass
40	5200	19.19	18.29	18.64	18.63	296.498	24.72	30.00	Pass
48	5240	19.28	19.13	19.59	19.55	347.717	25.41	30.00	Pass
149	5745	20.44	19.06	20.27	19.99	397.384	25.99	30.00	Pass
157	5785	20.49	19.22	20.37	20.12	**407.199**	26.10	30.00	Pass
165	5825	20.39	19.18	20.19	20.37	405.555	26.08	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

802.11n (HT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.81	17.74	18.17	18.25	267.911	24.28	30.00	Pass
40	5200	19.62	18.77	19.11	20.09	350.522	25.45	30.00	Pass
48	5240	19.00	18.85	19.21	19.51	328.868	25.17	30.00	Pass
149	5745	20.25	18.87	20.23	19.70	381.779	25.82	30.00	Pass
157	5785	20.14	18.97	20.06	20.05	384.711	25.85	30.00	Pass
165	5825	20.53	19.01	19.82	20.26	394.706	25.96	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

802.11n (HT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.61	16.83	17.12	17.21	209.997	23.22	30.00	Pass
46	5230	19.67	18.86	19.39	20.17	360.484	25.57	30.00	Pass
151	5755	20.32	18.87	20.36	20.08	395.239	25.97	30.00	Pass
159	5795	20.39	18.94	20.36	20.21	401.336	26.04	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.82	16.10	16.63	16.33	177.802	22.50	30.00	Pass
155	5775	18.35	18.24	18.37	18.16	269.243	24.30	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

802.11ax (HE20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	18.72	17.69	18.18	18.45	268.972	24.30	30.00	Pass
40	5200	19.89	18.89	19.12	20.31	**364.002**	25.61	30.00	Pass
48	5240	18.98	18.87	19.31	19.62	333.090	25.23	30.00	Pass
149	5745	20.30	18.77	20.22	19.83	383.845	25.84	30.00	Pass
157	5785	20.12	18.99	20.13	20.06	386.482	25.87	30.00	Pass
165	5825	20.36	19.17	20.06	20.32	400.285	26.02	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

802.11ax (HE40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	17.66	16.81	17.16	17.20	210.799	23.24	30.00	Pass
46	5230	19.73	18.86	19.65	19.97	362.454	25.59	30.00	Pass
151	5755	20.39	18.94	20.34	20.05	397.040	25.99	30.00	Pass
159	5795	20.55	18.99	20.41	20.08	404.511	26.07	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

802.11ax (HE80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	16.84	16.13	16.67	16.47	180.139	22.56	30.00	Pass
155	5775	18.36	18.29	18.38	18.19	270.784	24.33	30.00	Pass

Note: Directional Gain = 4.30dBi < 6dBi, so the limit no need to be reduced.

Beamforming Mode

802.11n (HT20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	12.79	11.72	12.15	12.23	66.987	18.26	25.68	Pass
40	5200	13.60	12.75	13.09	14.07	87.642	19.43	25.68	Pass
48	5240	12.98	12.83	13.19	13.49	82.229	19.15	25.68	Pass
149	5745	14.23	12.85	14.21	13.68	95.458	19.80	25.68	Pass
157	5785	14.12	12.95	14.04	14.03	96.191	19.83	25.68	Pass
165	5825	14.51	12.99	13.80	14.24	98.690	19.94	25.68	Pass

Note: Directional Gain = 4.30dBi + 10log(4) = 10.32dBi > 6dBi, so the power limit shall be reduced to 30-(10.32-6) = 25.68dBm.

802.11n (HT40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	11.59	10.81	11.10	11.19	52.505	17.20	25.68	Pass
46	5230	13.65	12.84	13.37	14.15	90.134	19.55	25.68	Pass
151	5755	14.30	12.85	14.34	14.06	98.822	19.95	25.68	Pass
159	5795	14.37	12.92	14.34	14.19	100.347	20.02	25.68	Pass

Note: Directional Gain = 4.30dBi + 10log(4) = 10.32dBi > 6dBi, so the power limit shall be reduced to 30-(10.32-6) = 25.68dBm.

802.11ac (VHT80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	10.80	10.08	10.61	10.31	44.457	16.48	25.68	Pass
155	5775	12.33	12.22	12.35	12.14	67.319	18.28	25.68	Pass

Note: Directional Gain = 4.30dBi + 10log(4) = 10.32dBi > 6dBi, so the power limit shall be reduced to 30-(10.32-6) = 25.68dBm.

802.11ax (HE20)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	12.70	11.67	12.16	12.43	67.252	18.28	25.68	Pass
40	5200	13.87	12.87	13.10	14.29	**91.012**	19.59	25.68	Pass
48	5240	12.96	12.85	13.29	13.60	83.284	19.21	25.68	Pass
149	5745	14.28	12.75	14.20	13.81	95.975	19.82	25.68	Pass
157	5785	14.10	12.97	14.11	14.04	96.633	19.85	25.68	Pass
165	5825	14.34	13.15	14.04	14.30	100.084	20.00	25.68	Pass

Note: Directional Gain = 4.30dBi + 10log(4) = 10.32dBi > 6dBi, so the power limit shall be reduced to 30-(10.32-6) = 25.68dBm.

802.11ax (HE40)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	11.64	10.79	11.14	11.18	52.707	17.22	25.68	Pass
46	5230	13.71	12.84	13.63	13.95	90.625	19.57	25.68	Pass
151	5755	14.37	12.92	14.32	14.03	99.274	19.97	25.68	Pass
159	5795	14.53	12.97	14.39	14.06	**101.141**	20.05	25.68	Pass

Note: Directional Gain = 4.30dBi + 10log(4) = 10.32dBi > 6dBi, so the power limit shall be reduced to 30-(10.32-6) = 25.68dBm.

802.11ax (HE80)

Channel	Freq. (MHz)	Maximum Conducted Power (dBm)				Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	10.82	10.11	10.65	10.45	45.041	16.54	25.68	Pass
155	5775	12.34	12.27	12.36	12.17	67.707	18.31	25.68	Pass

Note: Directional Gain = 4.30dBi + 10log(4) = 10.32dBi > 6dBi, so the power limit shall be reduced to 30-(10.32-6) = 25.68dBm.

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	24.20	23.28	24.77	23.93
40	5200	27.56	27.26	26.46	34.96
48	5240	31.72	33.08	33.04	34.62

802.11n (HT20)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	21.44	21.43	21.24	21.63
40	5200	22.05	21.91	21.49	23.38
48	5240	22.00	22.08	21.62	22.77

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	42.27	42.29	42.53	42.11
46	5230	44.92	42.88	43.47	46.85

802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	82.82	83.16	83.00	82.58

802.11ax (HE20)

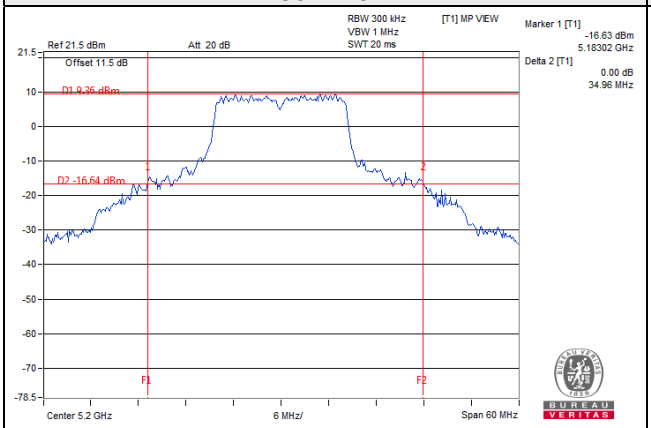
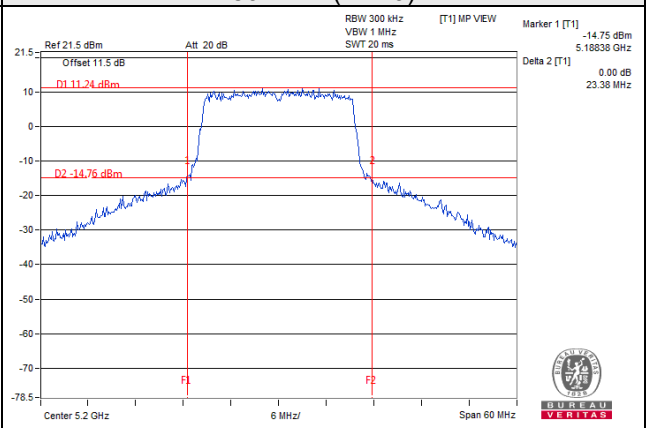
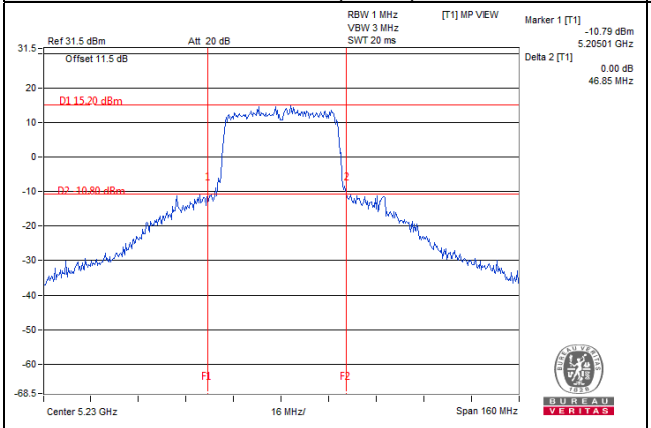
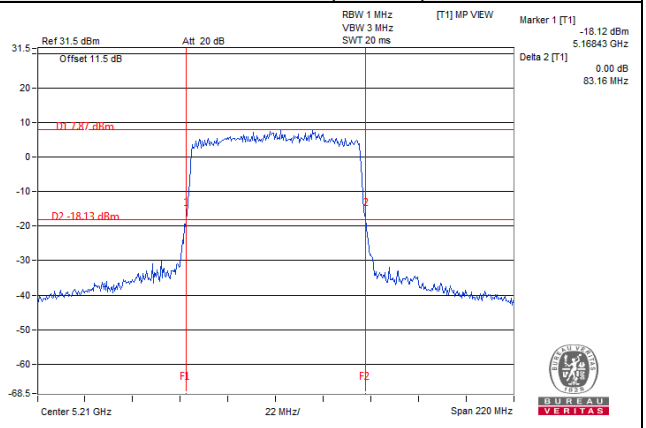
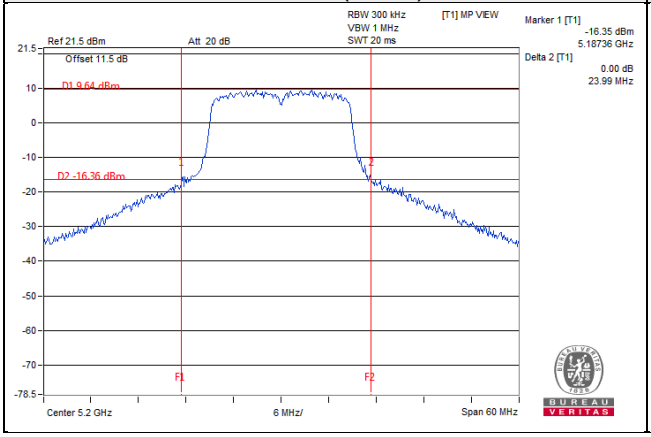
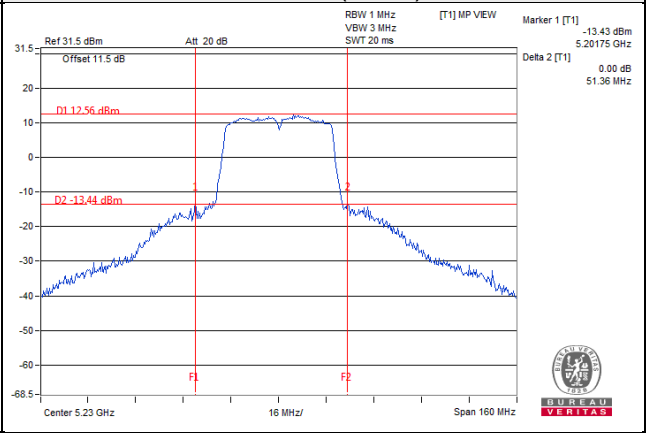
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	20.86	20.89	20.91	21.11
40	5200	22.89	21.56	21.03	23.99
48	5240	21.77	21.25	22.19	22.57

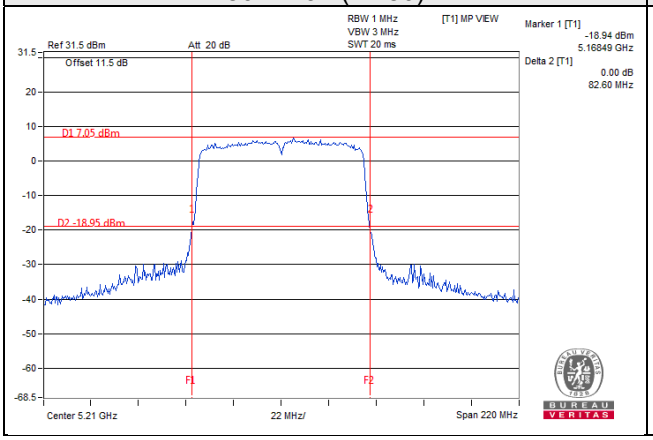
802.11ax (HE40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	42.14	41.37	41.62	41.38
46	5230	51.36	41.58	42.94	44.40

802.11ax (HE80)

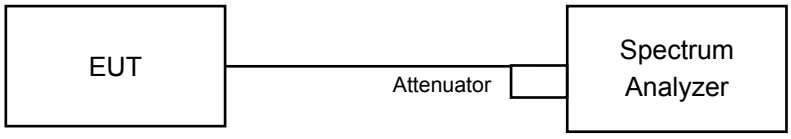
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	82.51	81.75	82.60	81.63

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	
802.11ax (HE20)	802.11ax (HE40)
	

802.11ax (HE80)	
	

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

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	16.80	16.80	16.92	16.80
40	5200	17.04	16.92	17.04	17.52
48	5240	17.04	17.04	17.16	17.28
149	5745	17.64	17.04	18.84	17.40
157	5785	18.36	17.16	18.72	17.76
165	5825	17.40	17.16	18.24	18.48

802.11n (HT20)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	18.96	18.96	18.96	18.96
40	5200	18.96	18.96	18.96	19.20
48	5240	18.96	18.96	18.96	18.96
149	5745	19.08	19.08	19.08	18.96
157	5785	19.20	18.96	19.20	18.96
165	5825	18.96	18.96	19.08	19.20

802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	37.92	38.04	38.04	38.04
46	5230	38.16	38.04	38.16	38.28
151	5755	38.28	38.16	38.28	38.04
159	5795	38.16	38.16	38.28	38.04

802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	77.28	77.52	77.52	77.28
155	5775	77.28	77.04	77.76	77.28

802.11ax (HE20)

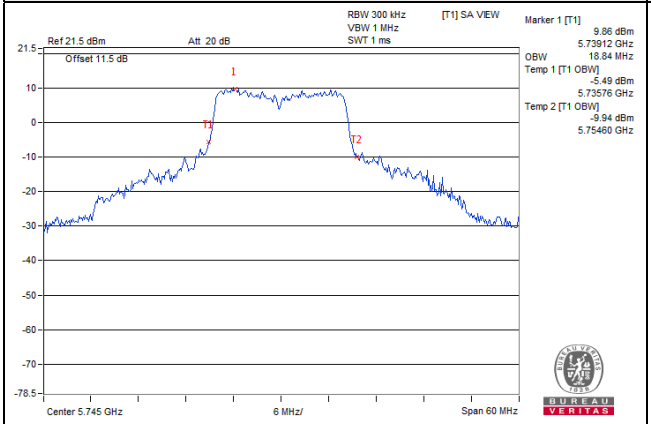
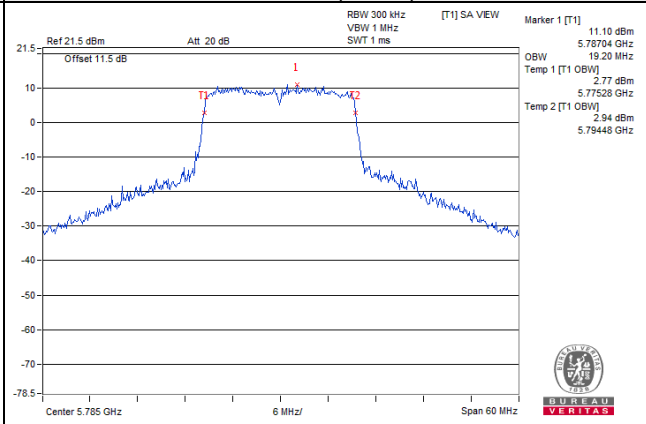
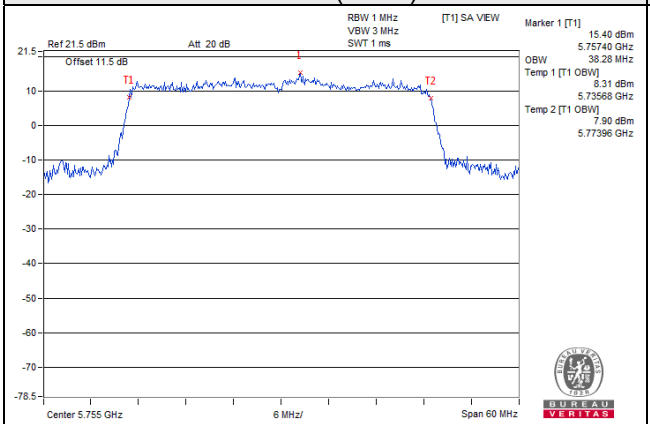
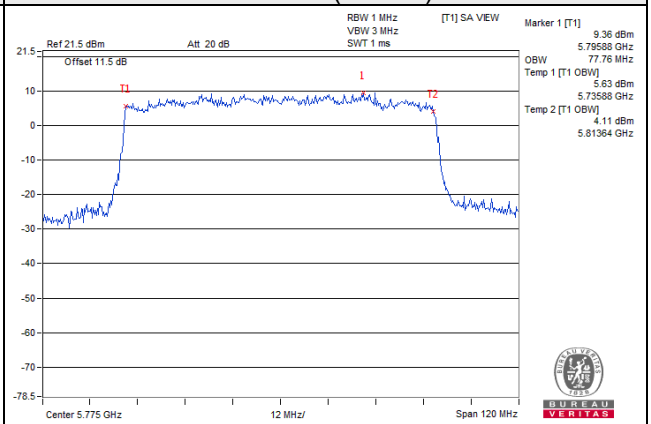
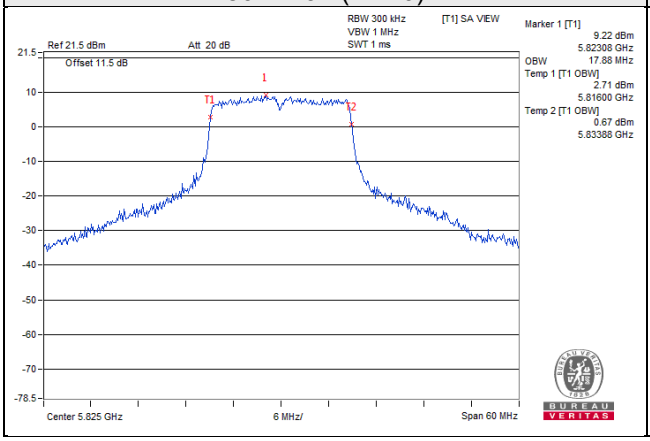
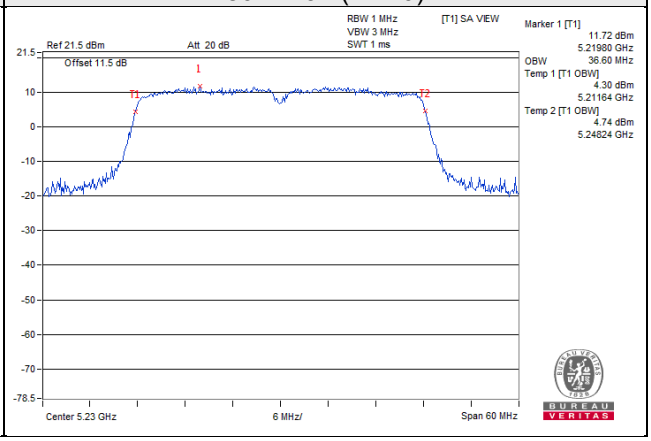
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
36	5180	17.64	17.64	17.64	17.64
40	5200	17.76	17.64	17.64	17.76
48	5240	17.64	17.64	17.64	17.64
149	5745	17.76	17.76	17.76	17.76
157	5785	17.88	17.64	17.76	17.76
165	5825	17.88	17.76	17.88	17.88

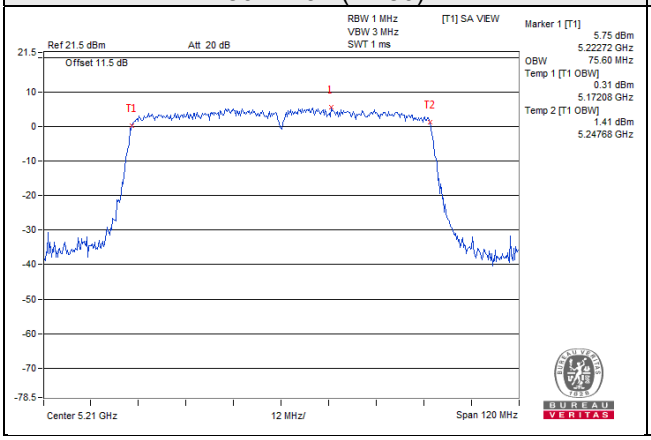
802.11ax (HE40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
38	5190	36.36	36.36	36.36	36.36
46	5230	36.60	36.48	36.48	36.60
151	5755	36.48	36.24	36.60	36.48
159	5795	36.48	36.48	36.60	36.48

802.11ax (HE80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)			
		Chain 0	Chain 1	Chain 2	Chain 3
42	5210	75.36	75.36	75.60	75.60
155	5775	75.48	75.48	75.60	75.60

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	
802.11ax (HE20)	802.11ax (HE40)
	

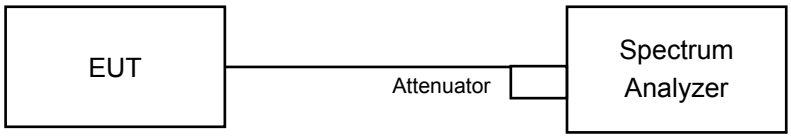
802.11ax (HE80)	
	

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
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value.

Duty cycle of test signal is < 98%
Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle).

For U-NII-3 band
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured 1) power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value.

Duty cycle of test signal is < 98%
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) 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 item 4.3.6.

4.5.7 Test Results

For U-NII-1 band

802.11a

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	3.02	1.23	2.21	1.83	0.27	8.41	12.68	Pass
40	5200	3.73	2.43	2.81	4.64	0.27	9.78	12.68	Pass
48	5240	4.05	3.78	3.61	3.85	0.27	10.12	12.68	Pass

Note:
1. Method 1 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. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	2.43	0.76	2.20	1.82	0.19	8.06	12.68	Pass
40	5200	3.00	2.65	2.20	3.95	0.19	9.21	12.68	Pass
48	5240	2.03	3.08	3.47	3.88	0.19	9.38	12.68	Pass

Note:
1. Method 1 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. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-1.91	-1.85	-1.96	-1.43	0.42	4.66	12.68	Pass
46	5230	0.88	-0.25	0.43	0.60	0.42	6.88	12.68	Pass

Note:
1. Method 1 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. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-4.87	-5.81	-5.00	-5.38	0.22	0.99	12.68	Pass

Note:
1. Method 1 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. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
36	5180	2.74	1.74	1.56	1.95	0.21	8.25	12.68	Pass
40	5200	3.88	2.16	2.78	4.17	0.21	9.55	12.68	Pass
48	5240	3.83	2.19	3.57	3.35	0.21	9.51	12.68	Pass

Note:
1. Method 1 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. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

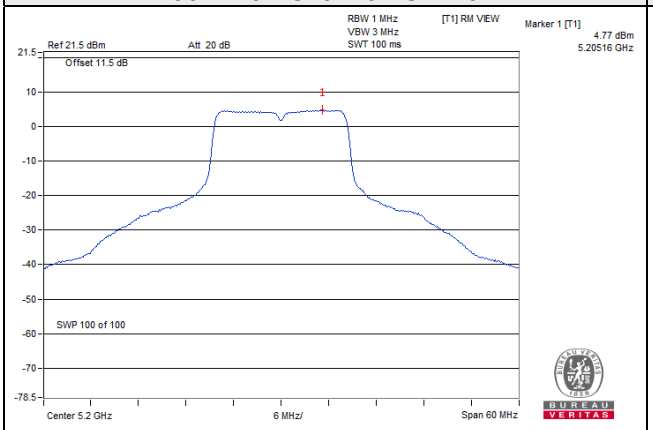
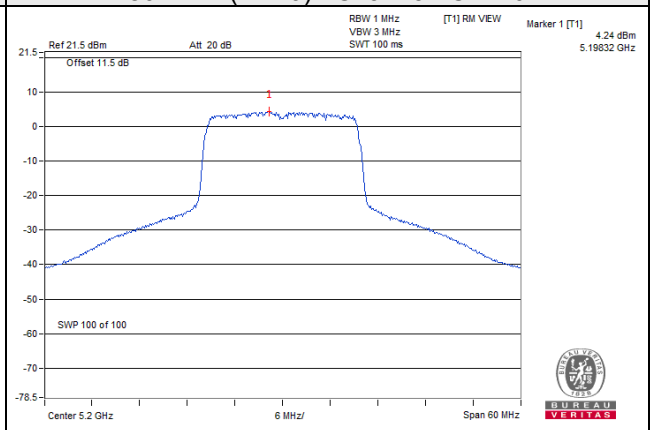
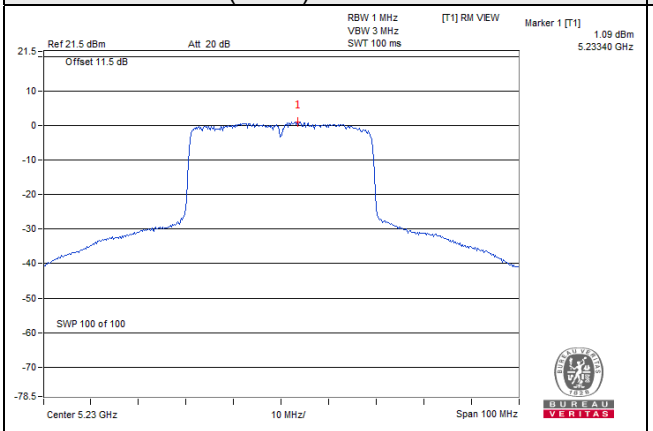
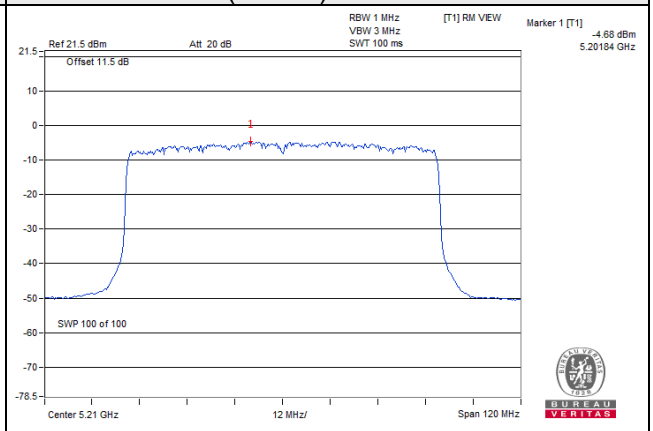
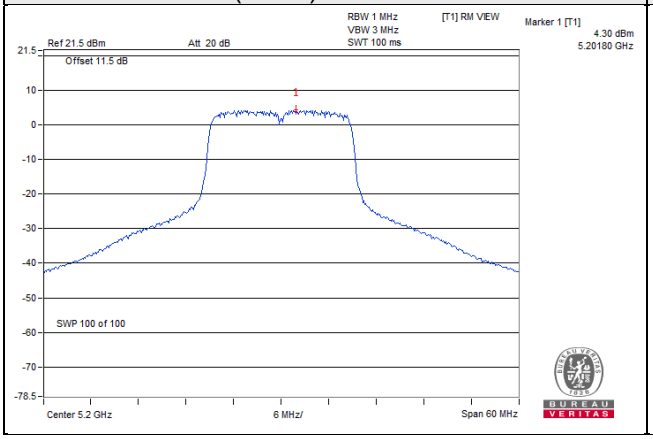
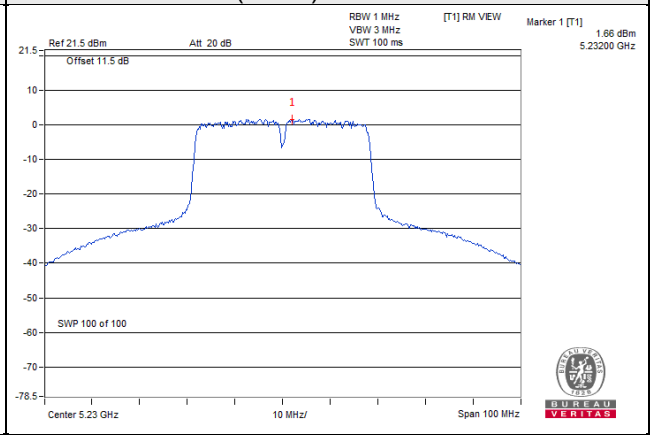
Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
38	5190	-0.90	-2.08	-1.86	-1.27	0.19	4.71	12.68	Pass
46	5230	0.84	0.09	0.43	1.31	0.19	6.90	12.68	Pass

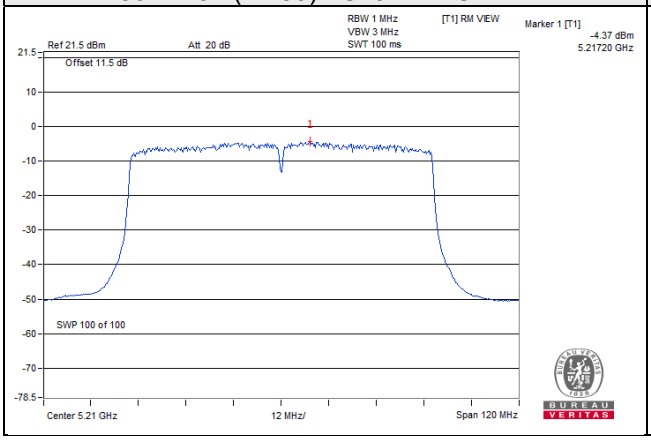
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

Chan.	Freq. (MHz)	PSD (dBm)				Duty factor (dB)	Total PSD with duty factor (dBm/MHz))	Max. Limit (dBm/ MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3				
42	5210	-5.08	-5.45	-4.37	-5.79	0.18	1.06	12.68	Pass

Note:
1. Method 1 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. **For U-NII-1:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 17-(10.32-6) = 12.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 3 / Ch. 40	802.11n (HT20) / Chain 3 / Ch. 40
	
802.11n (HT40) / Chain 0 / Ch. 46	802.11ac (VHT80) / Chain 0 / Ch. 42
	
802.11ax (HE20) / Chain 3 / Ch. 40	802.11ax (HE40) / Chain 3 / Ch. 46
	

802.11ax (HE80) / Chain 2 / Ch. 42	
	

For U-NII-3 band

802.11a

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-2.60	-0.38	6.02	0.27	5.91	25.68	Pass
	157	5785	-2.59	-0.37	6.02	0.27	5.92	25.68	Pass
	165	5825	-2.59	-0.37	6.02	0.27	5.92	25.68	Pass
1	149	5745	-4.17	-1.95	6.02	0.27	4.34	25.68	Pass
	157	5785	-3.75	-1.53	6.02	0.27	4.76	25.68	Pass
	165	5825	-3.42	-1.20	6.02	0.27	5.09	25.68	Pass
2	149	5745	-2.32	-0.10	6.02	0.27	6.19	25.68	Pass
	157	5785	-2.70	-0.48	6.02	0.27	5.81	25.68	Pass
	165	5825	-3.00	-0.78	6.02	0.27	5.51	25.68	Pass
3	149	5745	-3.53	-1.31	6.02	0.27	4.98	25.68	Pass
	157	5785	-3.32	-1.10	6.02	0.27	5.19	25.68	Pass
	165	5825	-3.13	-0.91	6.02	0.27	5.38	25.68	Pass

Note:

1. Method 1 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. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-4.47	-2.25	6.02	0.19	3.96	25.68	Pass
	157	5785	-4.34	-2.12	6.02	0.19	4.09	25.68	Pass
	165	5825	-4.20	-1.98	6.02	0.19	4.23	25.68	Pass
1	149	5745	-5.56	-3.34	6.02	0.19	2.87	25.68	Pass
	157	5785	-5.55	-3.33	6.02	0.19	2.88	25.68	Pass
	165	5825	-5.19	-2.97	6.02	0.19	3.24	25.68	Pass
2	149	5745	-3.88	-1.66	6.02	0.19	4.55	25.68	Pass
	157	5785	-3.84	-1.62	6.02	0.19	4.59	25.68	Pass
	165	5825	-4.07	-1.85	6.02	0.19	4.36	25.68	Pass
3	149	5745	-4.61	-2.39	6.02	0.19	3.82	25.68	Pass
	157	5785	-4.39	-2.17	6.02	0.19	4.04	25.68	Pass
	165	5825	-4.42	-2.20	6.02	0.19	4.01	25.68	Pass

Note:

1. Method 1 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. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-6.57	-4.35	6.02	0.42	2.09	25.68	Pass
	159	5795	-6.70	-4.48	6.02	0.42	1.96	25.68	Pass
1	151	5755	-8.10	-5.88	6.02	0.42	0.56	25.68	Pass
	159	5795	-7.89	-5.67	6.02	0.42	0.77	25.68	Pass
2	151	5755	-6.86	-4.64	6.02	0.42	1.80	25.68	Pass
	159	5795	-6.30	-4.08	6.02	0.42	2.36	25.68	Pass
3	151	5755	-7.44	-5.22	6.02	0.42	1.22	25.68	Pass
	159	5795	-7.21	-4.99	6.02	0.42	1.45	25.68	Pass

Note:
1. Method 1 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. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-11.39	-9.17	6.02	0.22	-2.93	25.68	Pass
1	155	5775	-11.68	-9.46	6.02	0.22	-3.22	25.68	Pass
2	155	5775	-11.02	-8.80	6.02	0.22	-2.56	25.68	Pass
3	155	5775	-11.93	-9.71	6.02	0.22	-3.47	25.68	Pass

Note:
1. Method 1 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. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE20)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-2.52	-0.30	-2.52	0.21	5.93	25.68	Pass
	157	5785	-3.33	-1.11	-3.33	0.21	5.12	25.68	Pass
	165	5825	-3.57	-1.35	-3.57	0.21	4.88	25.68	Pass
1	149	5745	-4.85	-2.63	-4.85	0.21	3.60	25.68	Pass
	157	5785	-4.43	-2.21	-4.43	0.21	4.02	25.68	Pass
	165	5825	-4.11	-1.89	-4.11	0.21	4.34	25.68	Pass
2	149	5745	-3.17	-0.95	-3.17	0.21	5.28	25.68	Pass
	157	5785	-2.77	-0.55	-2.77	0.21	5.68	25.68	Pass
	165	5825	-3.13	-0.91	-3.13	0.21	5.32	25.68	Pass
3	149	5745	-3.74	-1.52	-3.74	0.21	4.71	25.68	Pass
	157	5785	-3.91	-1.69	-3.91	0.21	4.54	25.68	Pass
	165	5825	-3.49	-1.27	-3.49	0.21	4.96	25.68	Pass

Note:

1. Method 1 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. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE40)

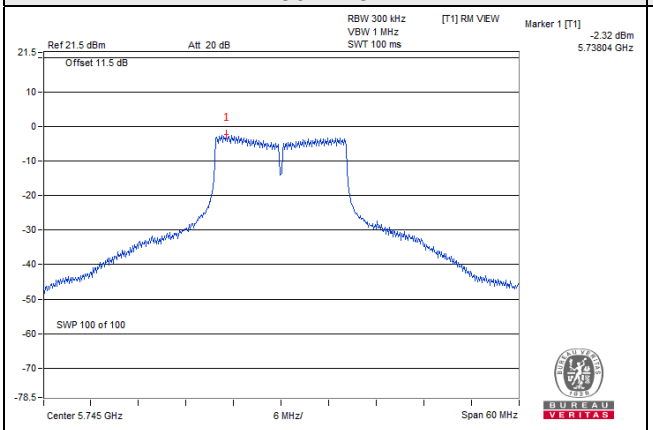
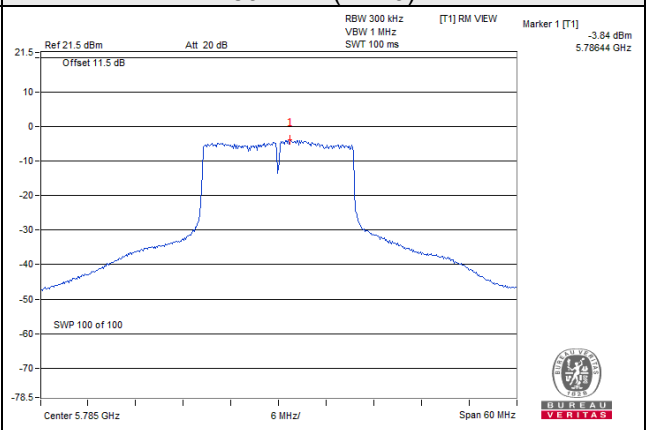
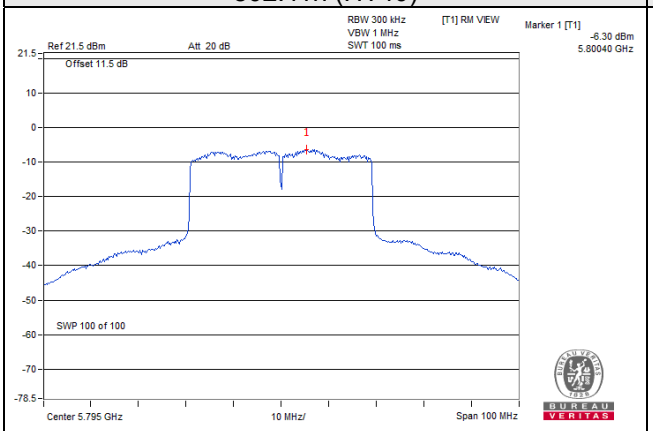
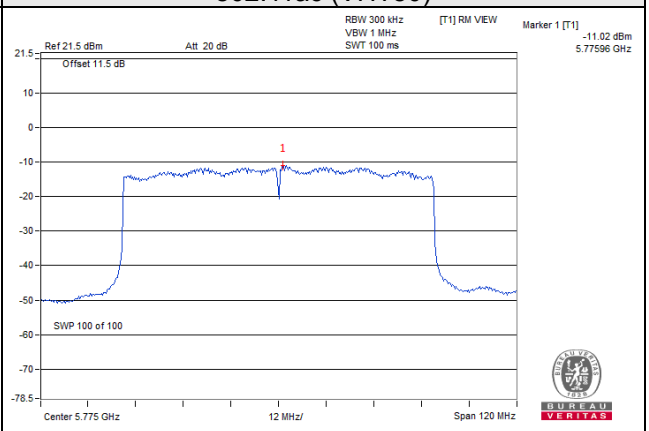
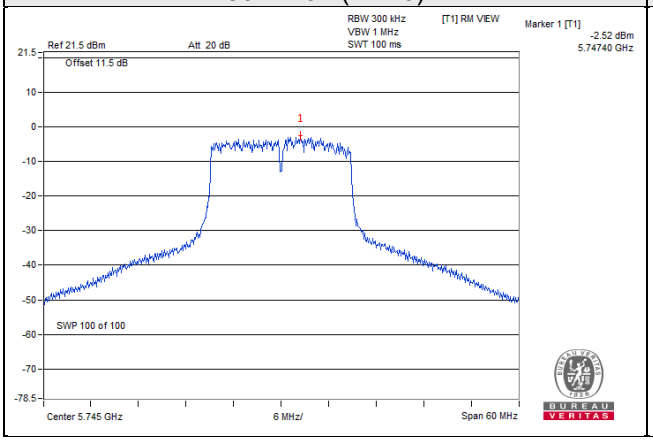
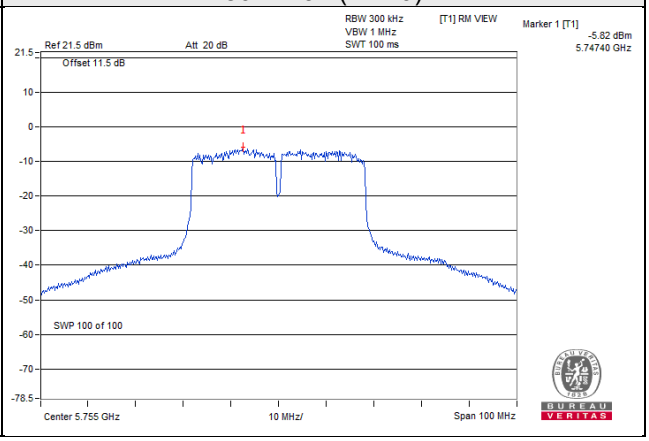
TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-5.82	-3.60	6.02	0.19	2.61	25.68	Pass
	159	5795	-6.30	-4.08	6.02	0.19	2.13	25.68	Pass
1	151	5755	-7.82	-5.60	6.02	0.19	0.61	25.68	Pass
	159	5795	-7.33	-5.11	6.02	0.19	1.10	25.68	Pass
2	151	5755	-6.47	-4.25	6.02	0.19	1.96	25.68	Pass
	159	5795	-6.03	-3.81	6.02	0.19	2.40	25.68	Pass
3	151	5755	-7.01	-4.79	6.02	0.19	1.42	25.68	Pass
	159	5795	-6.51	-4.29	6.02	0.19	1.92	25.68	Pass

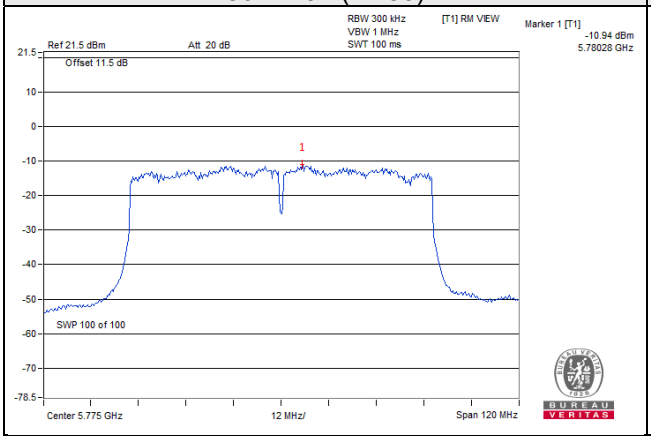
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ax (HE80)

TX chain	Channel	Chan. Freq. (MHz)	PSD W/O Duty Factor		10 log (N=4) dB	Duty factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-10.98	-8.76	6.02	0.18	-2.56	25.68	Pass
1	155	5775	-11.14	-8.92	6.02	0.18	-2.72	25.68	Pass
2	155	5775	-10.94	-8.72	6.02	0.18	-2.52	25.68	Pass
3	155	5775	-11.88	-9.66	6.02	0.18	-3.46	25.68	Pass

Note:
1. Method 1 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. **For U-NII-3:** Directional gain = 4.3dBi +10log (4) = 10.32dBi > 6dBi, so the power density limit shall be reduced to 30-(10.32-6) = 25.68dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	
802.11ax (HE20)	802.11ax (HE40)
	

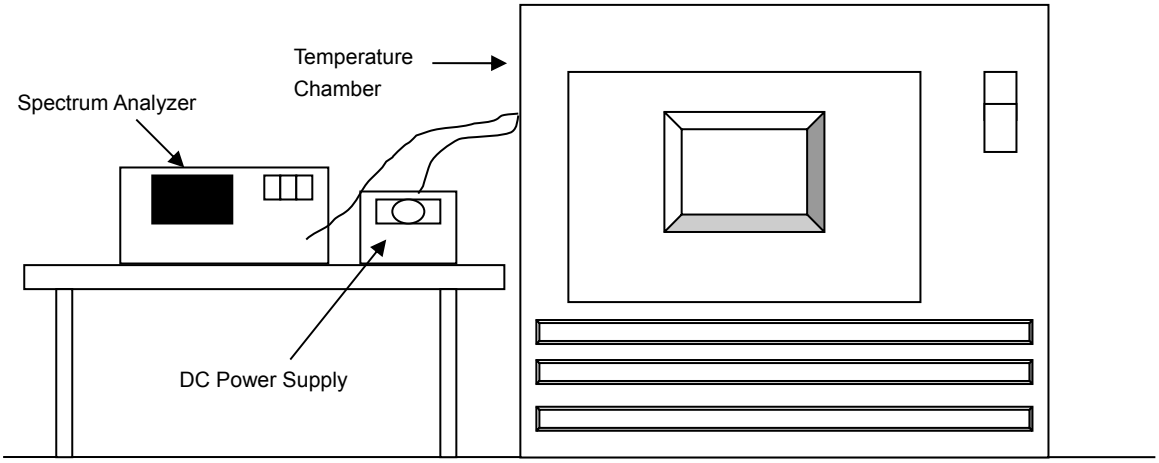
802.11ax (HE80)	
	

4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100040	Sep. 25, 2018	Sep. 24, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019
DC Power Supply Topward	6306A	727263	NA	NA

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal DC 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 2 and 3 with the temperature chamber set to the lowest temperature.
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 (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
40	12	5179.9832	PASS	5179.9832	PASS	5179.9833	PASS	5179.9862	PASS
30	12	5179.9956	PASS	5179.9966	PASS	5179.9975	PASS	5179.9934	PASS
20	12	5180.0024	PASS	5180.0008	PASS	5180.0001	PASS	5179.9984	PASS
10	12	5180.0087	PASS	5180.0081	PASS	5180.0117	PASS	5180.0075	PASS
0	12	5179.9927	PASS	5179.9888	PASS	5179.9882	PASS	5179.9895	PASS

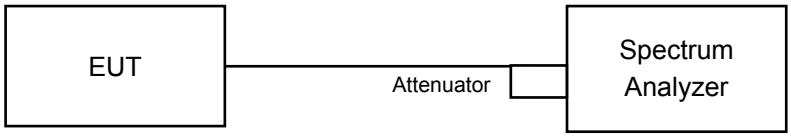
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	13.8	5180.0027	PASS	5180.0012	PASS	5180.0004	PASS	5179.9982	PASS
	12	5180.0024	PASS	5180.0008	PASS	5180.0001	PASS	5179.9984	PASS
	10.2	5180.0019	PASS	5180.0008	PASS	5180.0005	PASS	5179.9983	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

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.33	16.42	16.41	16.41	0.5	Pass
157	5785	16.40	16.39	16.41	16.41	0.5	Pass
165	5825	16.38	16.39	16.38	16.41	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	19.04	18.69	18.89	18.75	0.5	Pass
157	5785	18.54	18.58	18.90	18.94	0.5	Pass
165	5825	18.48	18.73	18.66	18.92	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	37.64	37.89	38.07	38.00	0.5	Pass
159	5795	37.64	37.90	37.72	37.78	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	76.80	76.20	77.88	76.87	0.5	Pass

802.11ax (HE20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
149	5745	16.97	17.63	17.57	17.33	0.5	Pass
157	5785	17.19	17.63	17.24	17.60	0.5	Pass
165	5825	17.60	17.32	17.24	17.59	0.5	Pass

802.11ax (HE40)

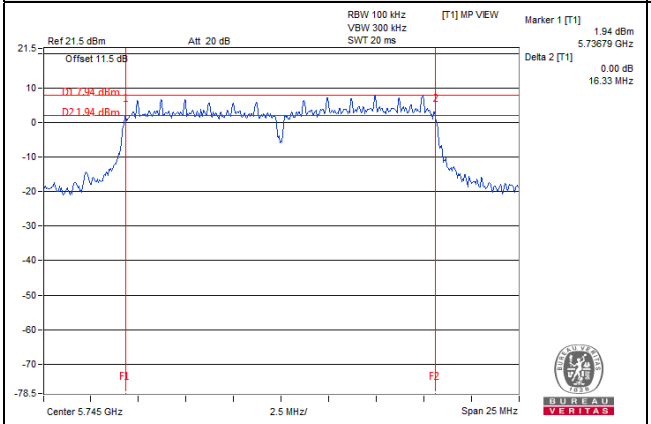
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
151	5755	35.56	35.24	35.77	36.04	0.5	Pass
159	5795	34.73	36.35	35.87	35.65	0.5	Pass

802.11ax (HE80)

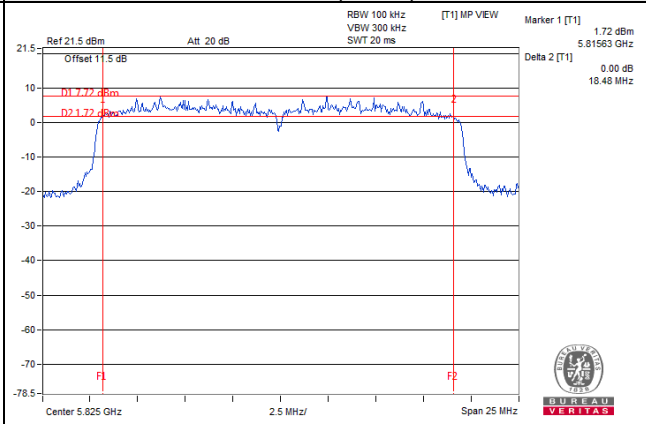
Channel	Frequency (MHz)	6dB Bandwidth (MHz)				Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1	Chain 2	Chain 3		
155	5775	75.63	74.51	75.48	75.96	0.5	Pass

Spectrum Plot of Worst Value

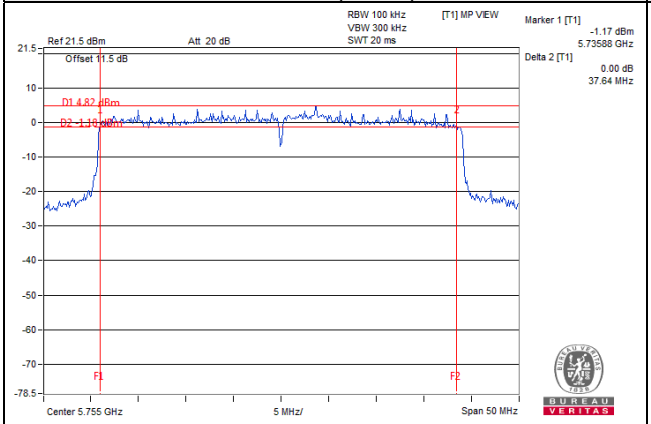
802.11a



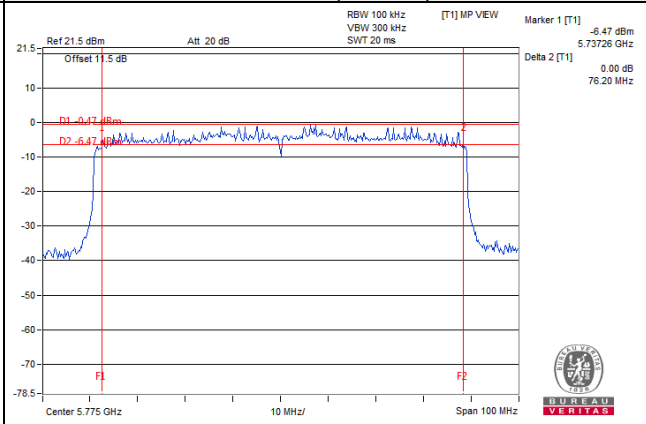
802.11n (HT20)



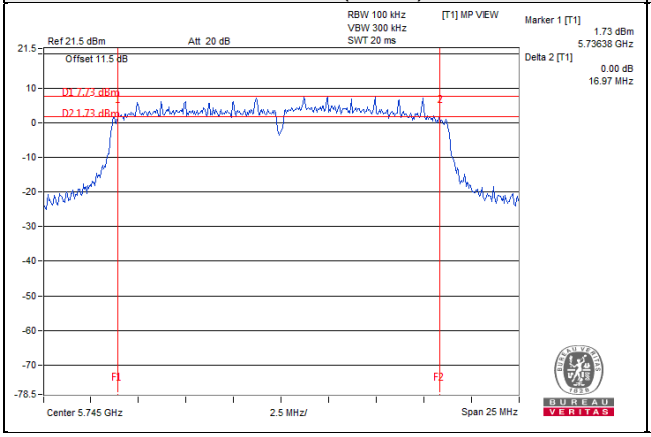
802.11n (HT40)



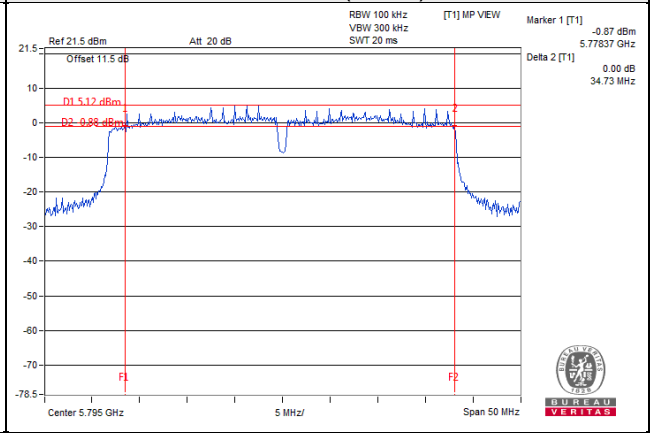
802.11ac (VHT80)

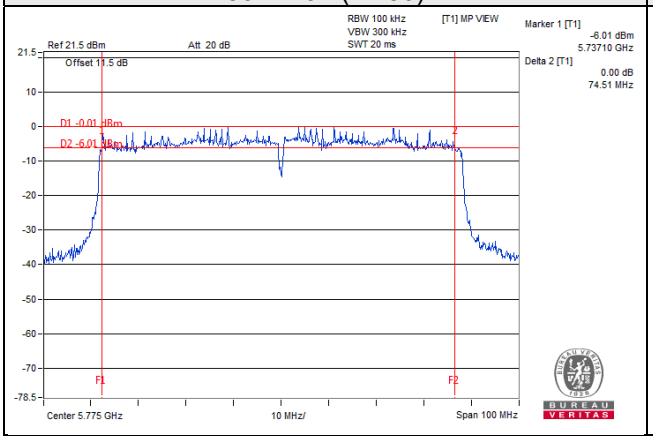


802.11ax (HE20)



802.11ax (HE40)



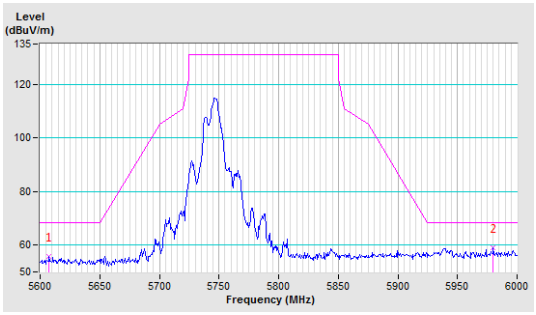
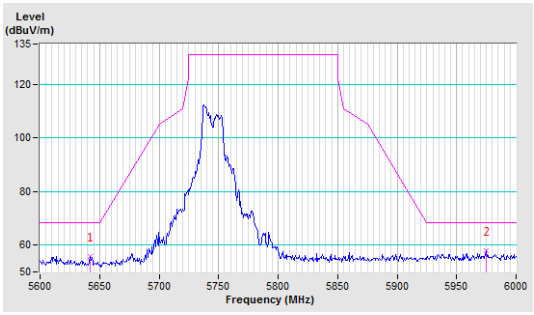
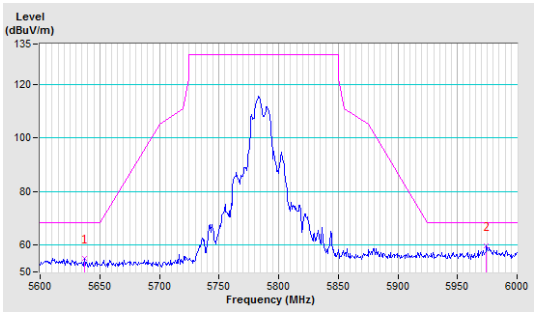
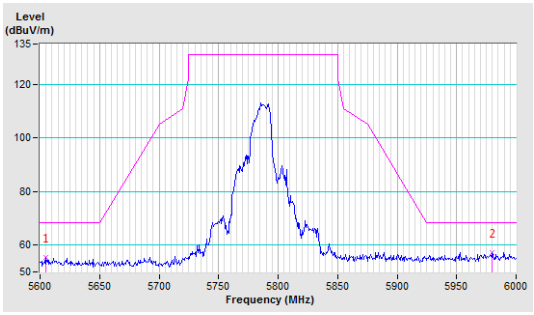
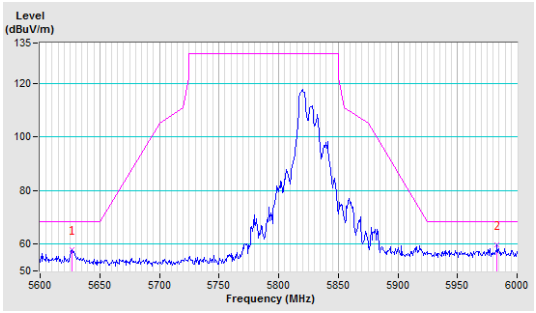
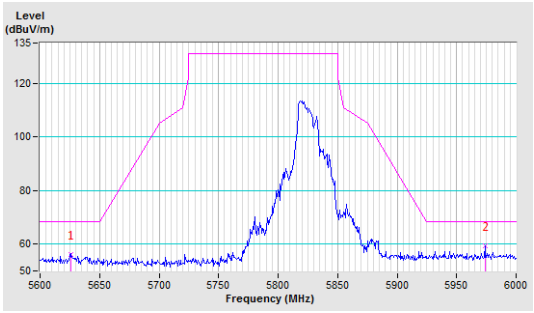
802.11ax (HE80)	
	

5 Pictures of Test Arrangements

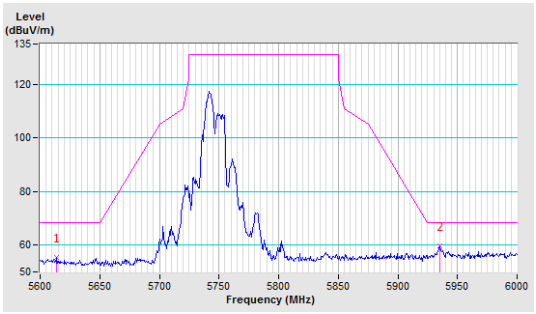
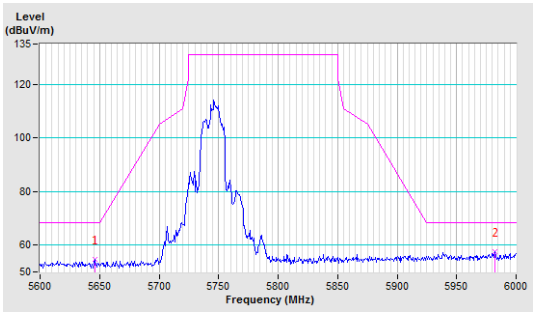
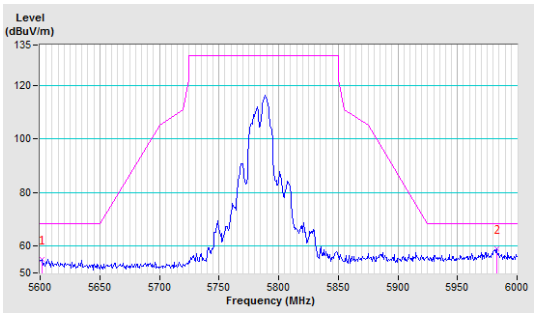
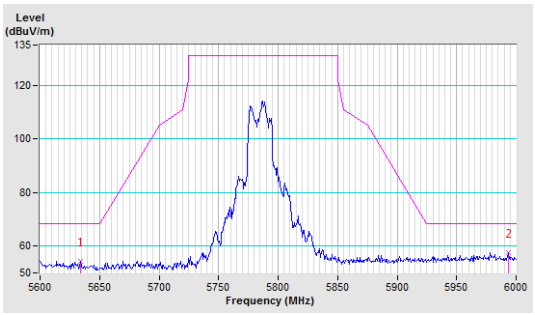
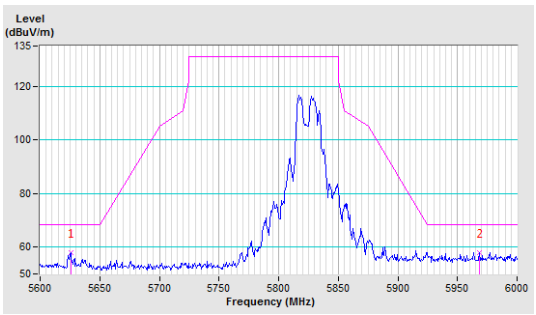
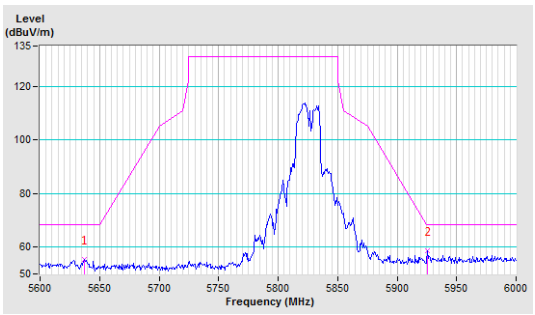
Please refer to the attached file (Test Setup Photo).

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

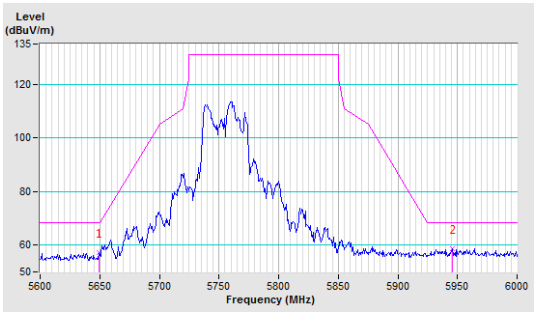
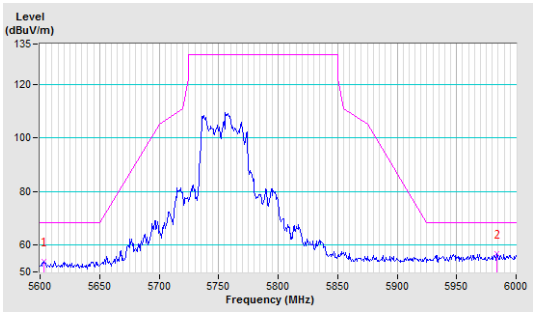
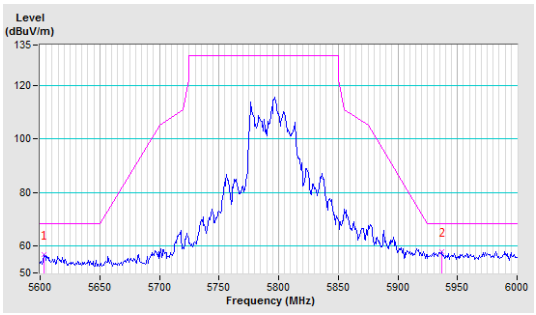
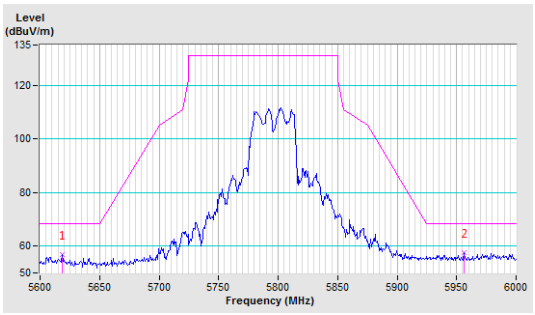
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

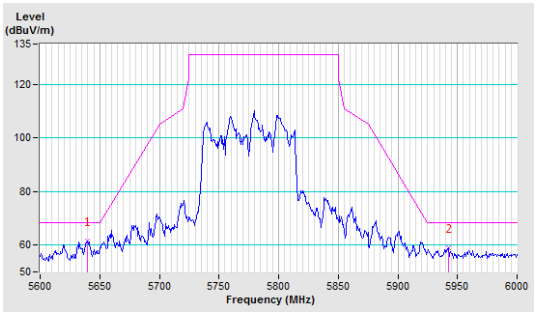
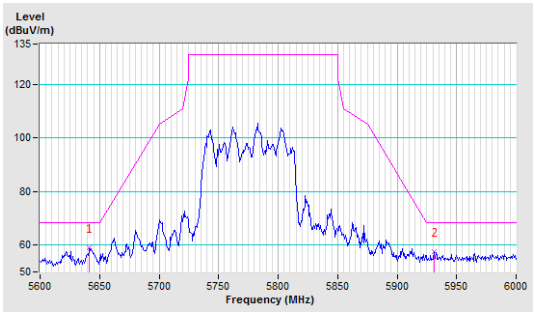
802.11ax (HE20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11ax (HE40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ax (HE80)

CH155	
Horizontal	Vertical
	

Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited and approved according to ISO/IEC 17025.

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

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

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