FCC Test Report

Report No.:	RF180717C32-1
FCC ID:	2ACTO-APX120
Test Model:	APX 120
Received Date:	Jul. 17, 2018
Test Date:	Aug. 05 ~ Aug. 15, 2018
Issued Date:	Oct. 15, 2018
Applicant:	Sophos Ltd
Address:	The Pentagon, Abingdon Science Park, Abingdon, OX14 3YP, UK
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

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF180717C32-1	Original release	Oct. 15, 2018

1 Certificate of Conformity

Product:	Sophos Access Point
Brand:	Sophos
Test Model:	APX 120
Sample Status:	Engineering sample
Applicant:	Sophos Ltd
Test Date:	Aug. 05 ~ Aug. 15, 2018
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 : Celine Chou , **Date:** Oct. 15, 2018

Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Oct. 15, 2018

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 -11.81dB at 8.46657MHz.
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 -0.8dB at 15600.00MHz and 11570.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector are IPEX 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.

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	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.60 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Sophos Access Point
Brand	Sophos
Test Model	APX 120
Sample Status	Engineering sample
Power Supply Rating	12Vdc from adapter 55Vdc from POE
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180 ~ 5240MHz: 316.745mW 5745 ~ 5825MHz: 227.555mW Beamforming Mode: 5180 ~ 5240MHz: 316.745mW 5745 ~ 5825MHz: 227.555mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Adapter
Cable Supplied	N/A

Note:

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

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

* The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for 20MHz/40MHz, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

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

2. The EUT consumes power from the following adapter and POE.

Adapter	
Brand	Asian Power Devices Inc.
Model	WA-12M12R
Input Power	100-240Vac, 50-60Hz, 0.5A Max.
Output Power	12Vdc, 1A
Power Line	1.5m power cable without core attached on adapter

POE (Support unit only)	
Brand	Power Desine
Model	PD-9001GR/AC
Input Power	100-240Vac, 50-60Hz, 0.67A
Output Power	55Vdc, 0.6A

3. The following antennas were provided to the EUT.

No.	Brand	Model	Type	Connector	Gain (dBi)	
					2.4G	5G
1	LYNwave	ALX18P-222AA3-00	PCB	IPEX	3.7	3.6
2	LYNwave	ALX18P-222AA3-01	PCB	IPEX	3.7	4.2

3.2 Description of Test Modes

For 5180 ~ 5240MHz:

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5745 ~ 5825MHz:

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	√	Powered by adapter
B	-	√	√	-	Powered by 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 EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane**.
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	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
A	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A, B	802.11a	5180-5240	36 to 48	40	OFDM	6.0
	802.11a	5745-5825	149 to 165		OFDM	6.0

Power Line Conducted Emission Test:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
A, B	802.11a	5180-5240	36 to 48	40	OFDM	6.0
	802.11a	5745-5825	149 to 165		OFDM	6.0

Antenna Port Conducted Measurement:

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

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

Test Condition:

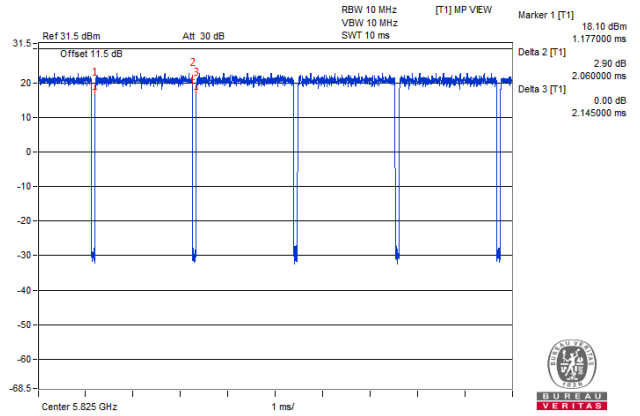
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65% RH 25 deg. C, 67% RH	120Vac, 60Hz	Greg Lin Willy Cheng
RE<1G	25 deg. C, 67% RH	120Vac, 60Hz 55Vdc	Willy Cheng
PLC	22 deg. C, 66% RH	120Vac, 60Hz 55Vdc	Adair Peng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Kevin Kuo

3.3 Duty Cycle of Test Signal

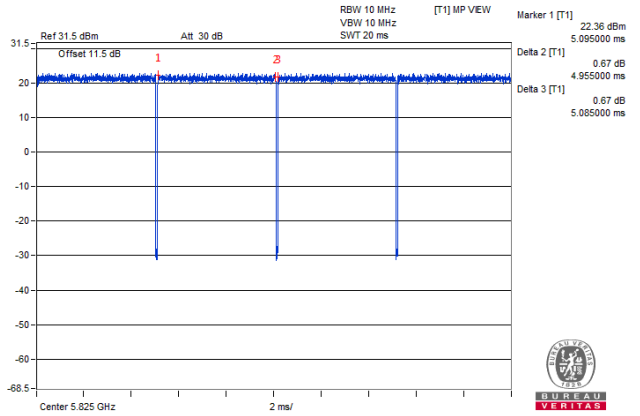
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.060/2.145 = 0.960, Duty factor = 10 * log (1/0.960) = 0.18
802.11n (HT20): Duty cycle = 4.955/5.085 = 0.974, Duty factor = 10 * log (1/0.974) = 0.11
802.11n (HT40): Duty cycle = 2.422/2.505 = 0.967, Duty factor = 10 * log (1/0.967) = 0.15
802.11ac (VHT80): Duty cycle = 1.144/1.239 = 0.923, Duty factor = 10 * log (1/0.923) = 0.35

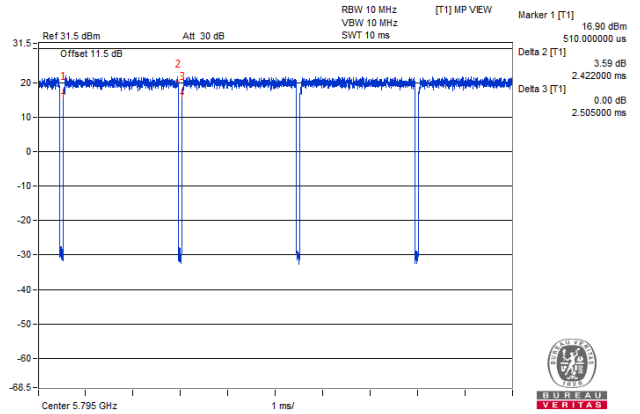
802.11a



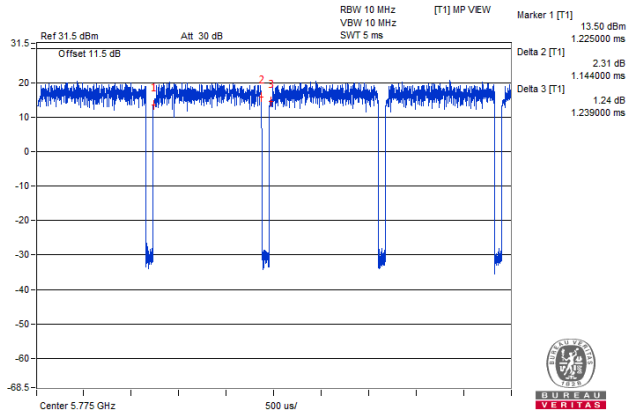
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5420	33MJMQ1	FCC DoC Approved	-
B.	POE	Power Desine	PD-9001GR/AC	NA	NA	Provided by client

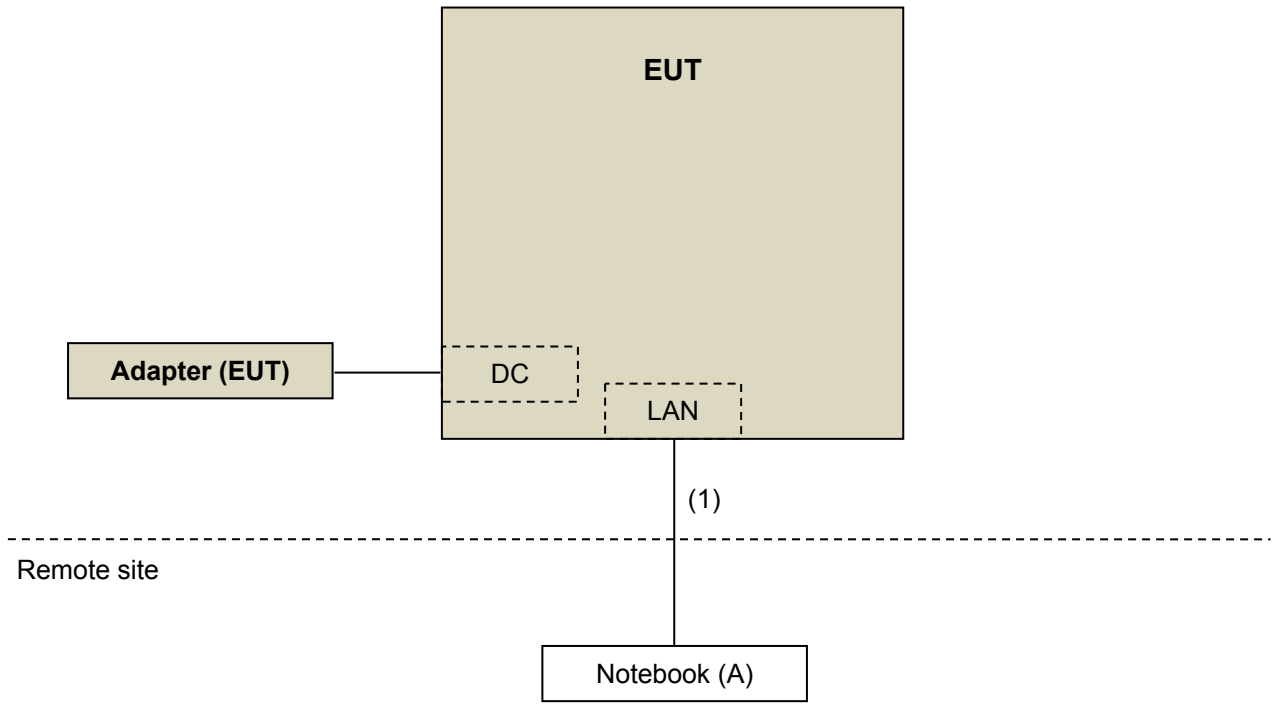
Note:

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.

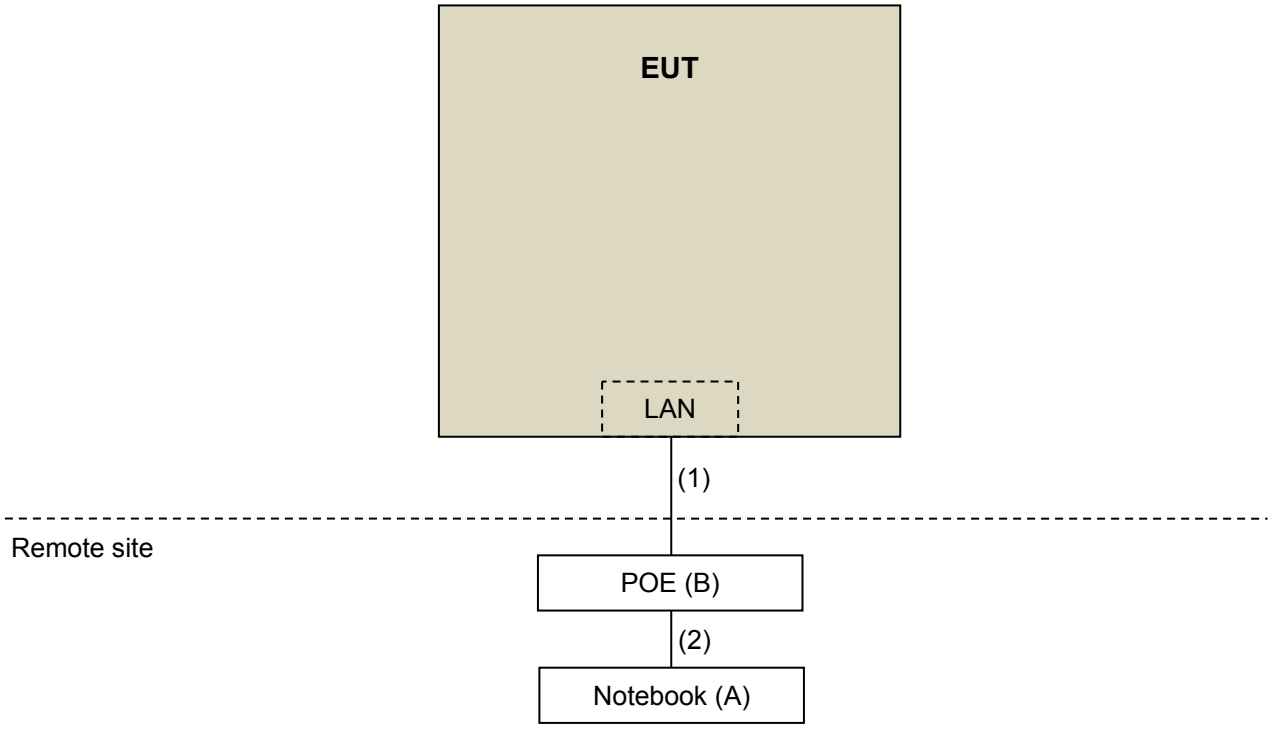
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	3	N	0	-
2.	RJ45, Cat5e	1	1.8	N	0	-

3.4.1 Configuration of System under Test

Test Mode A



Test 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 KEYSIGHT	N9038A	MY55420137	Apr. 11, 2018	Apr. 10, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-148	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-1169	Dec. 12, 2017	Dec. 11, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10638	Aug. 08, 2017	Aug. 07, 2018
			Aug. 08, 2018	Aug. 07, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A01638	Feb. 22, 2018	Feb. 21, 2019
RF signal cable HUBER+SUHNER&EMCI	SUCOFLEX 104 & EMC104-SM-SM8000	CABLE-CH9-02 (248780+171006)	Jan. 15, 2018	Jan. 14, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	CABLE-CH9-(250795/4)	Aug. 08, 2017	Aug. 07, 2018
			Aug. 08, 2018	Aug. 07, 2019
RF signal cable Woken	8D-FB	Cable-CH9-01	Jul. 31, 2018	Jul. 30, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA	NA
Turn Table EMCO	2087-2.03	NA	NA	NA
Antenna Tower &Turn BV ADT	AT100	AT93021705	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Nov. 14, 2017	Nov. 13, 2018
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 9.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is IC 7450F-9.

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

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

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

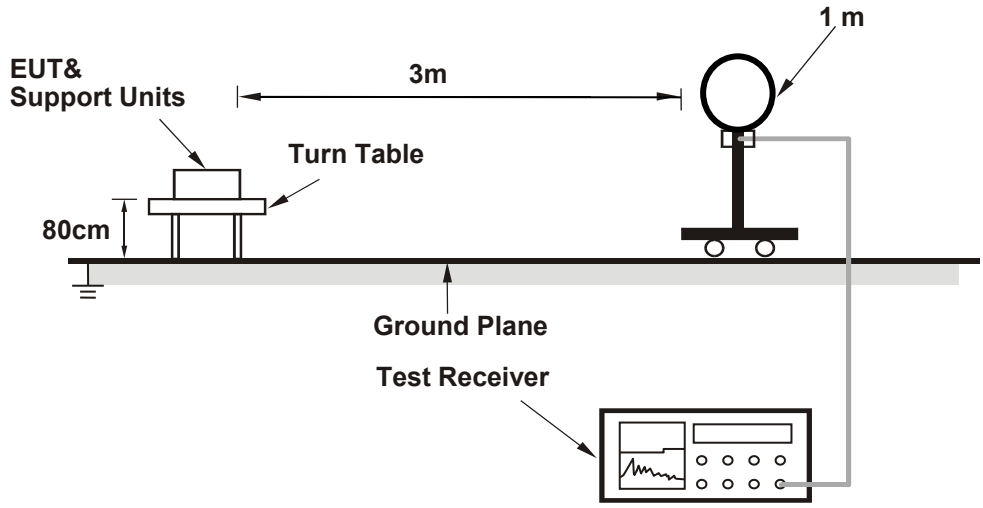
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

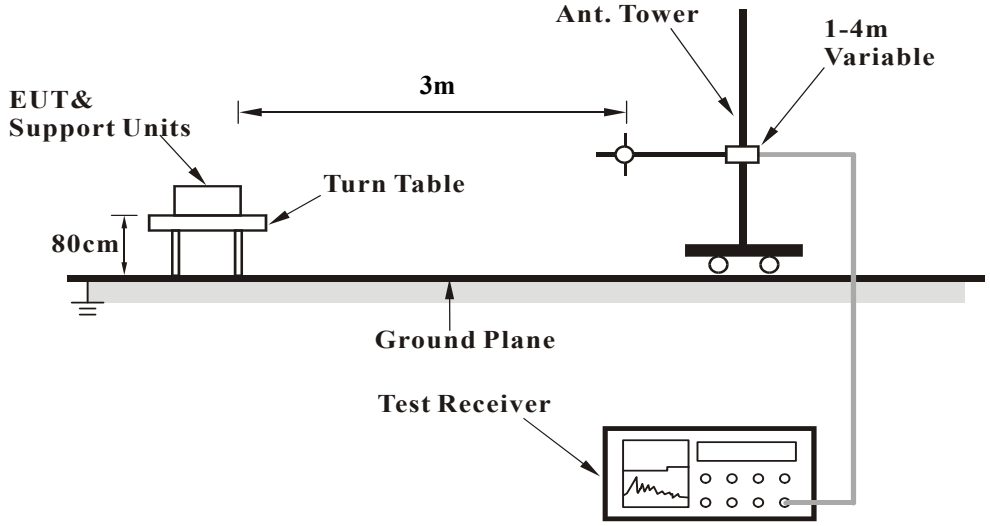
No deviation.

4.1.5 Test Setup

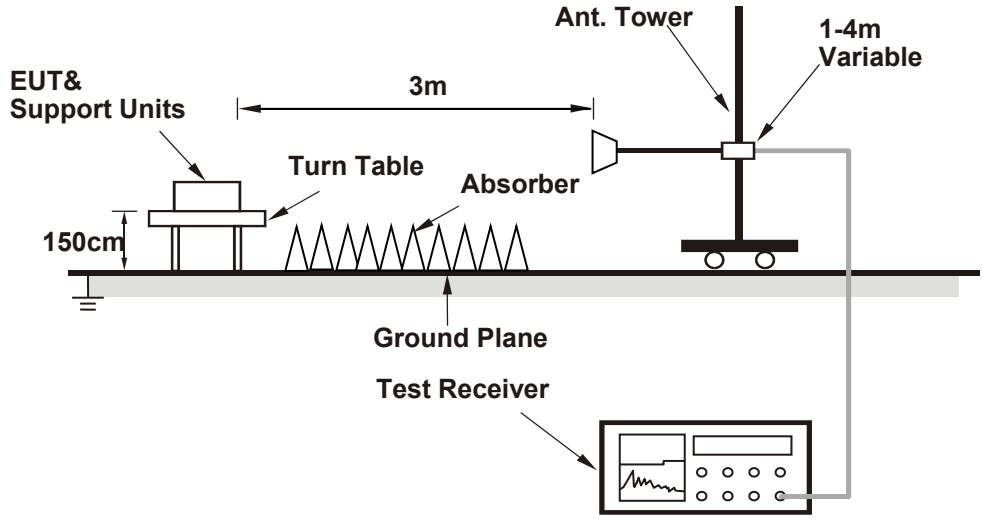
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

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	69.5 PK	74.0	-4.5	2.76 H	302	65.6	3.9
2	5150.00	51.3 AV	54.0	-2.7	2.76 H	302	47.4	3.9
3	*5180.00	113.8 PK			2.88 H	315	74.2	39.6
4	*5180.00	103.2 AV			2.88 H	315	63.6	39.6
5	#10360.00	56.0 PK	68.2	-12.2	3.47 H	86	40.2	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	70.4 PK	74.0	-3.6	3.24 V	352	66.5	3.9
2	5150.00	52.8 AV	54.0	-1.2	3.24 V	352	48.9	3.9
3	*5180.00	115.4 PK			3.28 V	234	75.8	39.6
4	*5180.00	104.4 AV			3.28 V	234	64.8	39.6
5	#10360.00	55.9 PK	68.2	-12.3	3.25 V	159	40.1	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	113.1 PK			2.86 H	302	74.6	38.5
2	*5200.00	102.9 AV			2.86 H	302	64.4	38.5
3	#10400.00	58.0 PK	68.2	-10.2	3.51 H	107	43.2	14.8
4	15600.00	65.3 PK	74.0	-8.7	1.59 H	28	50.1	15.2
5	15600.00	51.6 AV	54.0	-2.4	1.59 H	28	36.4	15.2
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	*5200.00	114.3 PK			2.45 V	275	75.8	38.5
2	*5200.00	104.0 AV			2.45 V	275	65.5	38.5
3	#10400.00	58.6 PK	68.2	-9.6	1.00 V	184	43.8	14.8
4	15600.00	66.7 PK	74.0	-7.3	1.04 V	14	51.5	15.2
5	**15600.00**	**53.2 AV**	**54.0**	**-0.8**	**1.04 V**	**14**	**38.0**	**15.2**

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 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	112.2 PK			2.78 H	313	73.8	38.4
2	*5240.00	102.1 AV			2.78 H	313	63.7	38.4
3	5350.00	50.4 PK	74.0	-23.6	2.69 H	297	48.8	1.6
4	5350.00	41.8 AV	54.0	-12.2	2.69 H	297	40.2	1.6
5	#10480.00	58.9 PK	68.2	-9.3	2.66 H	88	43.8	15.1
6	15720.00	65.9 PK	74.0	-8.1	1.42 H	32	51.3	14.6
7	15720.00	51.7 AV	54.0	-2.3	1.42 H	32	37.1	14.6
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	*5240.00	113.2 PK			2.95 V	238	74.8	38.4
2	*5240.00	103.1 AV			2.95 V	238	64.7	38.4
3	5350.00	50.7 PK	74.0	-23.3	2.74 V	242	49.1	1.6
4	5350.00	42.4 AV	54.0	-11.6	2.74 V	242	40.8	1.6
5	#10480.00	59.6 PK	68.2	-8.6	1.06 V	198	44.5	15.1
6	15720.00	67.2 PK	74.0	-6.8	1.02 V	3	52.6	14.6
7	15720.00	53.0 AV	54.0	-1.0	1.02 V	3	38.4	14.6

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 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	#5616.80	51.9 PK	68.2	-16.3	1.73 H	25	49.7	2.2
2	*5745.00	114.1 PK			1.73 H	25	74.5	39.6
3	*5745.00	103.5 AV			1.73 H	25	63.9	39.6
4	#5948.00	51.9 PK	68.2	-16.3	1.73 H	25	48.4	3.5
5	11490.00	67.0 PK	74.0	-7.0	3.74 H	284	51.7	15.3
6	11490.00	52.2 AV	54.0	-1.8	3.74 H	284	36.9	15.3
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	#5608.00	52.6 PK	68.2	-15.6	3.00 V	155	50.4	2.2
2	*5745.00	115.1 PK			3.00 V	155	75.5	39.6
3	*5745.00	104.8 AV			3.00 V	155	65.2	39.6
4	#5950.40	52.7 PK	68.2	-15.5	3.00 V	155	49.2	3.5
5	11490.00	67.2 PK	74.0	-6.8	3.65 V	32	51.9	15.3
6	11490.00	52.3 AV	54.0	-1.7	3.65 V	32	37.0	15.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5629.60	52.4 PK	68.2	-15.8	1.71 H	25	50.1	2.3
2	*5785.00	113.4 PK			1.71 H	25	73.6	39.8
3	*5785.00	103.3 AV			1.71 H	25	63.5	39.8
4	#5944.80	53.4 PK	68.2	-14.8	1.71 H	25	49.9	3.5
5	11570.00	65.4 PK	74.0	-8.6	3.22 H	274	50.3	15.1
6	11570.00	51.3 AV	54.0	-2.7	3.22 H	274	36.2	15.1
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	#5629.60	52.2 PK	68.2	-16.0	2.84 V	138	49.9	2.3
2	*5785.00	113.5 PK			2.84 V	138	73.7	39.8
3	*5785.00	103.6 AV			2.84 V	138	63.8	39.8
4	#5952.00	52.5 PK	68.2	-15.7	2.84 V	138	49.0	3.5
5	11570.00	68.6 PK	74.0	-5.4	3.80 V	30	53.5	15.1
6	**11570.00**	**53.2 AV**	**54.0**	**-0.8**	**3.80 V**	**30**	**38.1**	**15.1**

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

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	#5639.20	51.6 PK	68.2	-16.6	1.70 H	25	49.3	2.3
2	*5825.00	113.4 PK			1.70 H	25	73.4	40.0
3	*5825.00	103.3 AV			1.70 H	25	63.3	40.0
4	#5984.80	52.8 PK	68.2	-15.4	1.70 H	25	49.2	3.6
5	11650.00	65.4 PK	74.0	-8.6	3.91 H	276	50.4	15.0
6	11650.00	51.9 AV	54.0	-2.1	3.91 H	276	36.9	15.0
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	#5614.40	51.7 PK	68.2	-16.5	2.66 V	157	49.5	2.2
2	*5825.00	115.0 PK			2.66 V	157	75.0	40.0
3	*5825.00	104.8 AV			2.66 V	157	64.8	40.0
4	#5960.00	52.7 PK	68.2	-15.5	2.66 V	157	49.2	3.5
5	11650.00	68.4 PK	74.0	-5.6	3.72 V	32	53.4	15.0
6	11650.00	52.6 AV	54.0	-1.4	3.72 V	32	37.6	15.0

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

802.11n (HT20)

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	68.2 PK	74.0	-5.8	2.71 H	296	64.3	3.9
2	5150.00	51.3 AV	54.0	-2.7	2.71 H	296	47.4	3.9
3	*5180.00	114.3 PK			2.83 H	306	74.7	39.6
4	*5180.00	103.0 AV			2.83 H	306	63.4	39.6
5	#10360.00	56.1 PK	68.2	-12.1	3.58 H	98	40.3	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	69.1 PK	74.0	-4.9	2.43 V	15	65.2	3.9
2	5150.00	52.6 AV	54.0	-1.4	2.43 V	15	48.7	3.9
3	*5180.00	115.7 PK			2.61 V	241	76.1	39.6
4	*5180.00	104.0 AV			2.61 V	241	64.4	39.6
5	#10360.00	56.4 PK	68.2	-11.8	3.14 V	110	40.6	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	114.4 PK			2.78 H	302	75.9	38.5
2	*5200.00	104.3 AV			2.78 H	302	65.8	38.5
3	#10400.00	59.3 PK	68.2	-8.9	3.62 H	90	44.5	14.8
4	15600.00	62.9 PK	74.0	-11.1	1.51 H	16	47.7	15.2
5	15600.00	49.5 AV	54.0	-4.5	1.51 H	16	34.3	15.2
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	*5200.00	115.4 PK			2.73 V	238	76.9	38.5
2	*5200.00	105.4 AV			2.73 V	238	66.9	38.5
3	#10400.00	58.2 PK	68.2	-10.0	1.02 V	185	43.4	14.8
4	15600.00	69.0 PK	74.0	-5.0	1.00 V	15	53.8	15.2
5	15600.00	53.1 AV	54.0	-0.9	1.00 V	15	37.9	15.2

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 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	115.0 PK			2.81 H	310	76.6	38.4
2	*5240.00	104.8 AV			2.81 H	310	66.4	38.4
3	5350.00	54.2 PK	74.0	-19.8	2.74 H	295	52.6	1.6
4	5350.00	41.8 AV	54.0	-12.2	2.74 H	295	40.2	1.6
5	#10480.00	58.5 PK	68.2	-9.7	3.64 H	104	43.4	15.1
6	15720.00	66.2 PK	74.0	-7.8	1.47 H	22	51.6	14.6
7	15720.00	50.6 AV	54.0	-3.4	1.47 H	22	36.0	14.6
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	*5240.00	115.6 PK			2.57 V	273	77.2	38.4
2	*5240.00	105.7 AV			2.57 V	273	67.3	38.4
3	5350.00	55.3 PK	74.0	-18.7	2.87 V	235	53.7	1.6
4	5350.00	42.3 AV	54.0	-11.7	2.87 V	235	40.7	1.6
5	#10480.00	60.0 PK	68.2	-8.2	1.03 V	234	44.9	15.1
6	15720.00	68.3 PK	74.0	-5.7	1.03 V	16	53.7	14.6
7	15720.00	52.5 AV	54.0	-1.5	1.03 V	16	37.9	14.6

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 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	#5640.80	51.7 PK	68.2	-16.5	1.73 H	30	49.4	2.3
2	*5745.00	115.2 PK			1.73 H	30	75.6	39.6
3	*5745.00	104.8 AV			1.73 H	30	65.2	39.6
4	#5945.60	52.6 PK	68.2	-15.6	1.73 H	30	49.1	3.5
5	11490.00	66.9 PK	74.0	-7.1	3.64 H	285	51.6	15.3
6	11490.00	50.8 AV	54.0	-3.2	3.64 H	285	35.5	15.3
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	#5623.20	51.9 PK	68.2	-16.3	3.12 V	156	49.7	2.2
2	*5745.00	116.1 PK			3.12 V	156	76.5	39.6
3	*5745.00	105.5 AV			3.12 V	156	65.9	39.6
4	#5972.00	52.5 PK	68.2	-15.7	3.12 V	156	49.0	3.5
5	11490.00	69.1 PK	74.0	-4.9	3.66 V	33	53.8	15.3
6	11490.00	52.8 AV	54.0	-1.2	3.66 V	33	37.5	15.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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	#5644.00	51.5 PK	68.2	-16.7	1.77 H	36	49.2	2.3
2	*5785.00	113.4 PK			1.77 H	36	73.6	39.8
3	*5785.00	103.0 AV			1.77 H	36	63.2	39.8
4	#5976.00	52.5 PK	68.2	-15.7	1.77 H	36	49.0	3.5
5	11570.00	66.9 PK	74.0	-7.1	3.67 H	284	51.8	15.1
6	11570.00	50.6 AV	54.0	-3.4	3.67 H	284	35.5	15.1
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	#5643.20	51.7 PK	68.2	-16.5	2.91 V	147	49.4	2.3
2	*5785.00	114.4 PK			2.91 V	147	74.6	39.8
3	*5785.00	103.7 AV			2.91 V	147	63.9	39.8
4	#5980.00	53.1 PK	68.2	-15.1	2.91 V	147	49.5	3.6
5	11570.00	68.6 PK	74.0	-5.4	3.97 V	29	53.5	15.1
6	11570.00	52.5 AV	54.0	-1.5	3.97 V	29	37.4	15.1

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

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	#5642.40	51.5 PK	68.2	-16.7	1.75 H	32	49.2	2.3
2	*5825.00	113.8 PK			1.75 H	32	73.8	40.0
3	*5825.00	103.3 AV			1.75 H	32	63.3	40.0
4	#5928.00	53.0 PK	68.2	-15.2	1.75 H	32	49.4	3.6
5	11650.00	66.7 PK	74.0	-7.3	3.66 H	281	51.7	15.0
6	11650.00	50.8 AV	54.0	-3.2	3.66 H	281	35.8	15.0
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	#5624.00	51.5 PK	68.2	-16.7	3.17 V	142	49.3	2.2
2	*5825.00	115.0 PK			3.17 V	142	75.0	40.0
3	*5825.00	103.9 AV			3.17 V	142	63.9	40.0
4	#5927.20	52.7 PK	68.2	-15.5	3.17 V	142	49.1	3.6
5	11650.00	68.6 PK	74.0	-5.4	3.72 V	29	53.6	15.0
6	11650.00	53.0 AV	54.0	-1.0	3.72 V	29	38.0	15.0

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

802.11n (HT40)

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	56.6 PK	74.0	-17.4	1.55 H	344	52.7	3.9
2	5150.00	51.7 AV	54.0	-2.3	1.55 H	344	47.8	3.9
3	*5190.00	109.0 PK			1.43 H	357	69.4	39.6
4	*5190.00	97.8 AV			1.43 H	357	58.2	39.6
5	#10380.00	54.5 PK	68.2	-13.7	3.44 H	107	38.6	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	67.9 PK	74.0	-6.1	2.74 V	256	64.0	3.9
2	5150.00	53.0 AV	54.0	-1.0	2.74 V	256	49.1	3.9
3	*5190.00	109.9 PK			2.70 V	3	70.3	39.6
4	*5190.00	98.7 AV			2.70 V	3	59.1	39.6
5	#10380.00	54.8 PK	68.2	-13.4	1.00 V	351	38.9	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	112.1 PK			1.53 H	348	73.7	38.4
2	*5230.00	102.0 AV			1.53 H	348	63.6	38.4
3	5350.00	56.8 PK	74.0	-17.2	1.41 H	337	55.2	1.6
4	5350.00	43.3 AV	54.0	-10.7	1.41 H	337	41.7	1.6
5	#10460.00	55.2 PK	68.2	-13.0	3.36 H	112	40.3	14.9
6	15690.00	65.7 PK	74.0	-8.3	1.62 H	21	51.1	14.6
7	15690.00	51.9 AV	54.0	-2.1	1.62 H	21	37.3	14.6
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	113.0 PK			2.84 V	238	74.6	38.4
2	*5230.00	102.9 AV			2.84 V	238	64.5	38.4
3	5350.00	58.9 PK	74.0	-15.1	2.90 V	255	57.3	1.6
4	5350.00	43.9 AV	54.0	-10.1	2.90 V	255	42.3	1.6
5	#10460.00	55.5 PK	68.2	-12.7	1.24 V	354	40.6	14.9
6	15690.00	66.8 PK	74.0	-7.2	1.02 V	359	52.2	14.6
7	15690.00	53.0 AV	54.0	-1.0	1.02 V	359	38.4	14.6

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	#5644.00	53.5 PK	68.2	-14.7	1.70 H	28	51.2	2.3
2	*5755.00	112.7 PK			1.70 H	28	73.0	39.7
3	*5755.00	102.1 AV			1.70 H	28	62.4	39.7
4	#5992.00	52.7 PK	68.2	-15.5	1.70 H	28	49.2	3.5
5	11510.00	63.9 PK	74.0	-10.1	3.65 H	284	48.7	15.2
6	11510.00	50.9 AV	54.0	-3.1	3.65 H	284	35.7	15.2
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	#5648.80	52.5 PK	68.2	-15.7	3.28 V	157	50.2	2.3
2	*5755.00	113.5 PK			3.28 V	157	73.8	39.7
3	*5755.00	103.9 AV			3.28 V	157	64.2	39.7
4	#5993.60	53.1 PK	68.2	-15.1	3.28 V	157	49.6	3.5
5	11510.00	65.8 PK	74.0	-8.2	3.20 V	54	50.6	15.2
6	11510.00	52.7 AV	54.0	-1.3	3.20 V	54	37.5	15.2

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 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	#5632.80	52.4 PK	68.2	-15.8	1.79 H	27	50.1	2.3
2	*5795.00	112.5 PK			1.79 H	27	72.6	39.9
3	*5795.00	102.8 AV			1.79 H	27	62.9	39.9
4	#5931.20	52.9 PK	68.2	-15.3	1.79 H	27	49.3	3.6
5	11590.00	63.9 PK	74.0	-10.1	3.68 H	280	48.8	15.1
6	11590.00	50.6 AV	54.0	-3.4	3.68 H	280	35.5	15.1
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	#5639.20	52.3 PK	68.2	-15.9	3.24 V	156	50.0	2.3
2	*5795.00	113.5 PK			3.24 V	156	73.6	39.9
3	*5795.00	103.9 AV			3.24 V	156	64.0	39.9
4	#5932.80	52.2 PK	68.2	-16.0	3.24 V	156	48.6	3.6
5	11590.00	65.4 PK	74.0	-8.6	3.12 V	44	50.3	15.1
6	11590.00	52.6 AV	54.0	-1.4	3.12 V	44	37.5	15.1

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

802.11ac (VHT80)

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	68.0 PK	74.0	-6.0	1.62 H	348	64.1	3.9
2	5150.00	52.6 AV	54.0	-1.4	1.62 H	348	48.7	3.9
3	*5210.00	104.1 PK			1.49 H	354	64.6	39.5
4	*5210.00	93.9 AV			1.49 H	354	54.4	39.5
5	5350.00	56.4 PK	74.0	-17.6	1.33 H	343	52.4	4.0
6	5350.00	43.2 AV	54.0	-10.8	1.33 H	343	39.2	4.0
7	#10420.00	52.9 PK	68.2	-15.3	3.41 H	103	36.9	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	5150.00	66.6 PK	74.0	-7.4	2.56 V	252	62.7	3.9
2	5150.00	52.9 AV	54.0	-1.1	2.56 V	252	49.0	3.9
3	*5210.00	104.8 PK			2.52 V	237	65.3	39.5
4	*5210.00	94.4 AV			2.52 V	237	54.9	39.5
5	5350.00	55.9 PK	74.0	-18.1	2.63 V	239	51.9	4.0
6	5350.00	43.1 AV	54.0	-10.9	2.63 V	239	39.1	4.0
7	#10420.00	53.2 PK	68.2	-15.0	1.19 V	353	37.2	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 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	#5632.80	64.8 PK	68.2	-3.4	1.69 H	23	62.5	2.3
2	#5650.00	65.4 PK	68.2	-2.8	1.73 H	46	63.2	2.2
3	*5775.00	108.1 PK			1.69 H	23	68.3	39.8
4	*5775.00	98.6 AV			1.69 H	23	58.8	39.8
5	#5925.00	58.4 PK	68.2	-9.8	1.73 H	46	54.8	3.6
6	#5933.60	59.9 PK	68.2	-8.3	1.69 H	23	56.3	3.6
7	11550.00	62.0 PK	74.0	-12.0	3.65 H	280	46.8	15.2
8	11550.00	50.5 AV	54.0	-3.5	3.65 H	280	35.3	15.2
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	#5649.60	64.9 PK	68.2	-3.3	2.82 V	152	62.6	2.3
2	#5650.00	66.7 PK	68.2	-1.5	3.12 V	150	64.5	2.2
3	*5775.00	109.0 PK			2.82 V	152	69.2	39.8
4	*5775.00	99.1 AV			2.82 V	152	59.3	39.8
5	#5925.00	58.8 PK	68.2	-9.4	3.12 V	150	55.2	3.6
6	#5926.40	58.3 PK	68.2	-9.9	2.82 V	152	54.7	3.6
7	11550.00	62.9 PK	74.0	-11.1	3.17 V	41	47.7	15.2
8	11550.00	51.4 AV	54.0	-2.6	3.17 V	41	36.2	15.2

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

Below 1GHz Worst-Case Data:

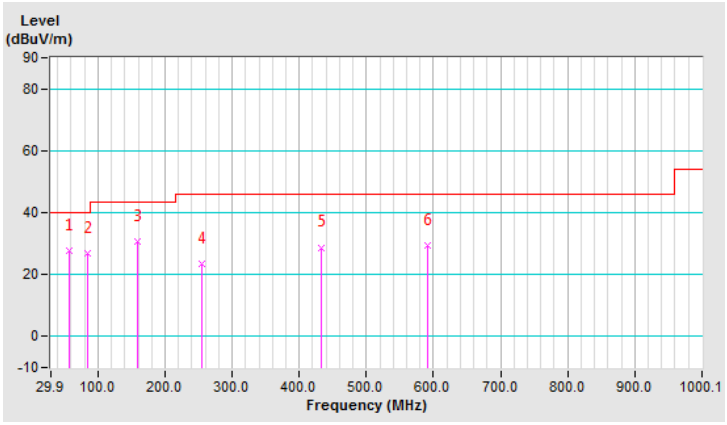
802.11a

CHANNEL	TX Channel 40	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	57.12	27.7 QP	40.0	-12.3	1.99 H	8	37.2	-9.5
2	84.34	26.8 QP	40.0	-13.2	1.99 H	88	41.0	-14.2
3	158.22	30.5 QP	43.5	-13.0	1.99 H	254	39.2	-8.7
4	255.44	23.5 QP	46.0	-22.5	1.01 H	64	32.3	-8.8
5	432.37	28.8 QP	46.0	-17.2	1.01 H	233	32.9	-4.1
6	591.80	29.5 QP	46.0	-16.5	1.51 H	33	30.2	-0.7

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 of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
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

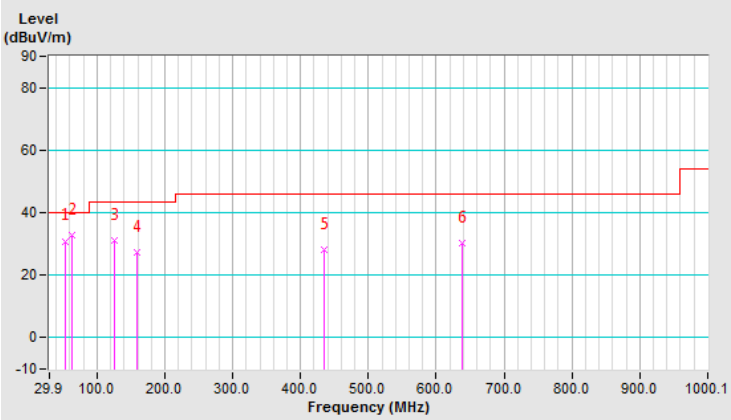


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	A		

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	53.23	30.9 QP	40.0	-9.1	1.00 V	6	40.2	-9.3
2	62.95	32.8 QP	40.0	-7.2	1.00 V	6	42.9	-10.1
3	125.17	31.0 QP	43.5	-12.5	1.00 V	2	41.9	-10.9
4	158.22	27.1 QP	43.5	-16.4	1.00 V	244	35.8	-8.7
5	434.31	28.0 QP	46.0	-18.0	1.49 V	18	32.0	-4.0
6	638.46	30.3 QP	46.0	-15.7	1.00 V	109	30.0	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
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

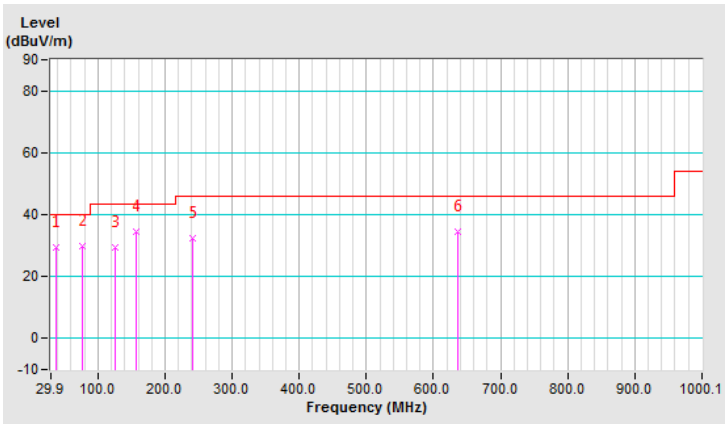


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

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	37.68	29.4 QP	40.0	-10.6	2.00 H	82	39.8	-10.4
2	76.56	29.7 QP	40.0	-10.3	1.50 H	240	42.2	-12.5
3	125.17	29.3 QP	43.5	-14.2	2.00 H	242	40.2	-10.9
4	156.28	34.4 QP	43.5	-9.1	2.00 H	99	43.0	-8.6
5	241.83	32.5 QP	46.0	-13.5	1.01 H	219	41.9	-9.4
6	636.52	34.5 QP	46.0	-11.5	1.50 H	62	34.2	0.3

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
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

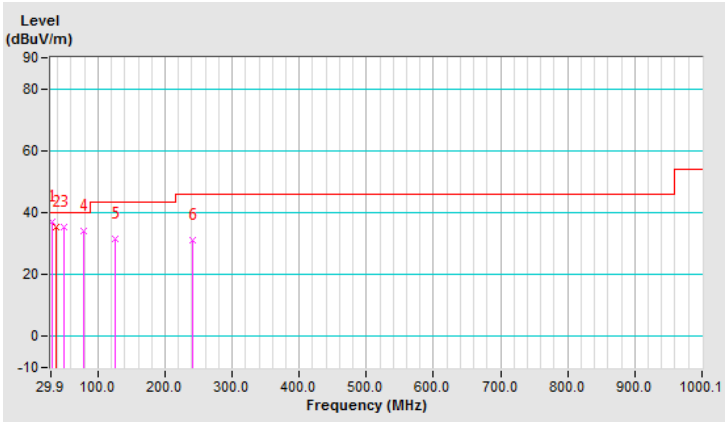


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

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	31.84	37.0 QP	40.0	-3.0	1.00 V	37	48.0	-11.0
2	38.42	35.3 QP	40.0	-4.7	1.48 V	15	45.6	-10.3
3	49.34	35.3 QP	40.0	-4.7	1.49 V	15	44.6	-9.3
4	78.51	33.9 QP	40.0	-6.1	1.00 V	125	46.9	-13.0
5	125.17	31.4 QP	43.5	-12.1	1.49 V	15	42.3	-10.9
6	241.83	31.0 QP	46.0	-15.0	1.99 V	159	40.4	-9.4

Remarks:

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



4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 16, 2017	Aug. 15, 2018
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.

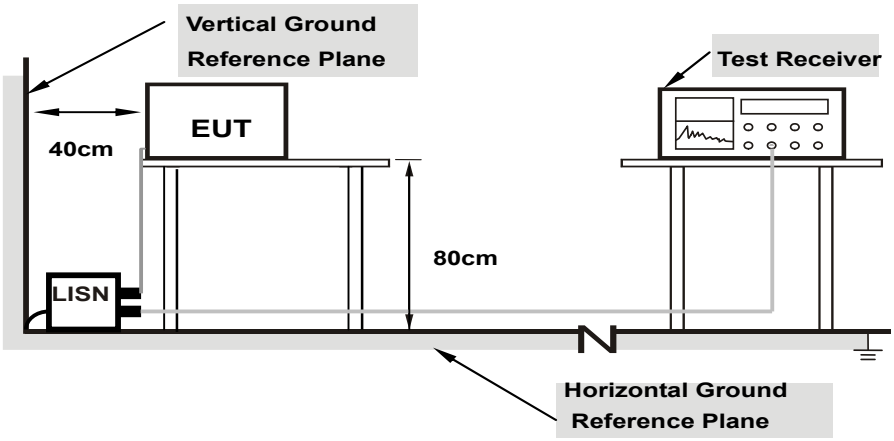
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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 4.1.6.

4.2.7 Test Results

Worst-case data:

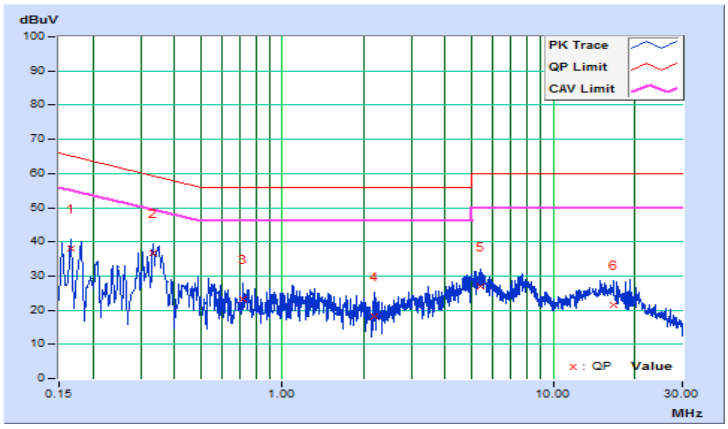
802.11a

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	0.16564	10.16	27.84	14.38	38.00	24.54	65.18	55.18	-27.18	-30.64
2	0.33308	10.19	26.39	18.22	36.58	28.41	59.37	49.37	-22.79	-20.96
3	0.71304	10.19	12.88	5.13	23.07	15.32	56.00	46.00	-32.93	-30.68
4	2.19493	10.25	7.98	1.96	18.23	12.21	56.00	46.00	-37.77	-33.79
5	5.39331	10.42	16.48	8.14	26.90	18.56	60.00	50.00	-33.10	-31.44
6	16.76750	11.06	10.50	4.00	21.56	15.06	60.00	50.00	-38.44	-34.94

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.

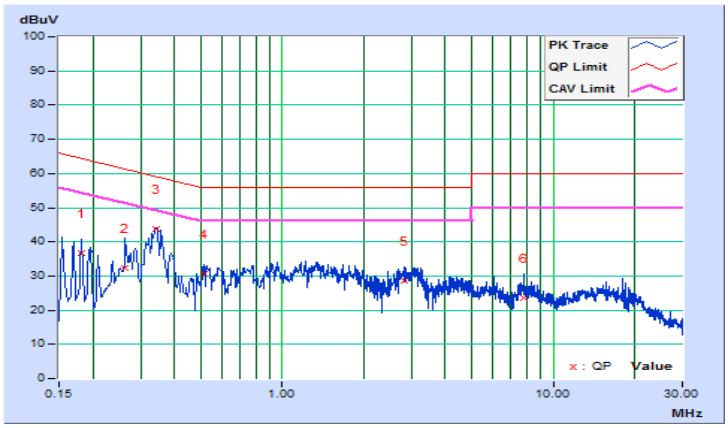


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.18128	10.16	26.54	12.82	36.70	22.98	64.43	54.43	-27.73	-31.45
2	0.26346	10.17	22.27	14.99	32.44	25.16	61.32	51.32	-28.88	-26.16
3	0.34198	10.19	33.56	26.34	43.75	36.53	59.16	49.16	-15.41	-12.63
4	0.51312	10.20	20.33	14.48	30.53	24.68	56.00	46.00	-25.47	-21.32
5	2.82053	10.27	18.33	12.39	28.60	22.66	56.00	46.00	-27.40	-23.34
6	7.80187	10.49	13.07	7.13	23.56	17.62	60.00	50.00	-36.44	-32.38

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.

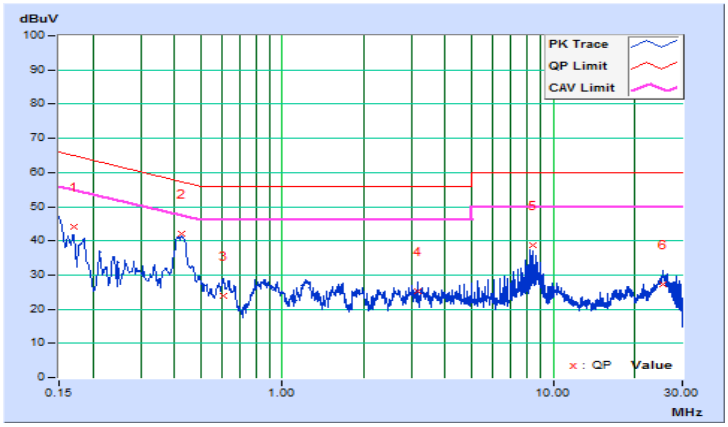


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.16955	10.10	33.87	20.00	43.97	30.10	64.98	54.98	-21.01	-24.88
2	0.42334	10.12	32.08	23.21	42.20	33.33	57.38	47.38	-15.18	-14.05
3	0.60356	10.12	13.85	7.07	23.97	17.19	56.00	46.00	-32.03	-28.81
4	3.17634	10.24	15.17	9.84	25.41	20.08	56.00	46.00	-30.59	-25.92
5	**8.46657**	**10.53**	**28.12**	**27.66**	**38.65**	**38.19**	**60.00**	**50.00**	**-21.35**	**-11.81**
6	25.54936	11.31	15.98	11.28	27.29	22.59	60.00	50.00	-32.71	-27.41

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.

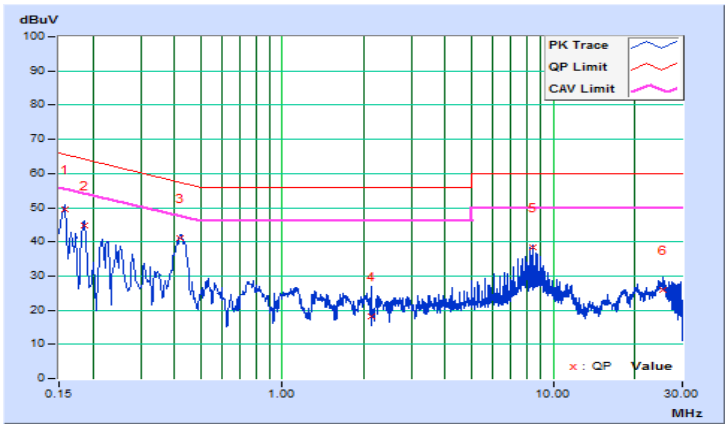


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15782	10.10	39.42	28.89	49.52	38.99	65.58	55.58	-16.06	-16.59
2	0.18508	10.10	34.53	22.16	44.63	32.26	64.25	54.25	-19.62	-21.99
3	0.41890	10.12	30.91	22.57	41.03	32.69	57.47	47.47	-16.44	-14.78
4	2.13237	10.18	8.10	1.79	18.28	11.97	56.00	46.00	-37.72	-34.03
5	8.46657	10.45	27.88	27.22	38.33	37.67	60.00	50.00	-21.67	-12.33
6	25.55327	11.02	15.06	10.54	26.08	21.56	60.00	50.00	-33.92	-28.44

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

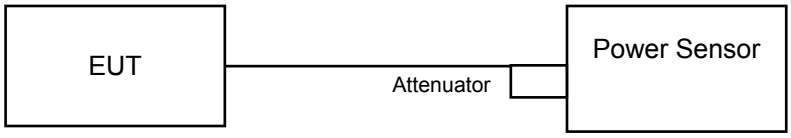
*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

CDD Mode

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.56	20.39	223.159	23.49	30.00	Pass
40	5200	19.92	19.74	192.364	22.84	30.00	Pass
48	5240	20.82	21.02	247.255	23.93	30.00	Pass
149	5745	18.97	18.93	157.049	21.96	30.00	Pass
157	5785	18.81	18.85	152.769	21.84	30.00	Pass
165	5825	18.48	18.78	145.978	21.64	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.01	19.91	198.180	22.97	30.00	Pass
40	5200	20.92	20.73	241.899	23.84	30.00	Pass
48	5240	21.09	20.82	249.310	23.97	30.00	Pass
149	5745	19.27	19.45	172.633	22.37	30.00	Pass
157	5785	19.17	19.51	171.935	22.35	30.00	Pass
165	5825	19.49	19.85	185.525	22.68	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.24	17.10	104.252	20.18	30.00	Pass
46	5230	22.12	21.87	**316.745**	25.01	30.00	Pass
151	5755	20.51	20.60	227.275	23.57	30.00	Pass
159	5795	20.49	20.63	**227.555**	23.57	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	16.27	16.10	83.102	19.20	30.00	Pass
155	5775	20.09	20.16	205.847	23.14	30.00	Pass

Beamforming Mode

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	20.01	19.91	198.180	22.97	29.08	Pass
40	5200	20.92	20.73	241.899	23.84	29.08	Pass
48	5240	21.09	20.82	249.310	23.97	29.08	Pass
149	5745	19.27	19.45	172.633	22.37	29.08	Pass
157	5785	19.17	19.51	171.935	22.35	29.08	Pass
165	5825	19.49	19.85	185.525	22.68	29.08	Pass

Note:
1. U-NII-1 band: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power limit shall be reduced to 30-(6.92-6) = 29.08dBm.
2. U-NII-3 band: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power limit shall be reduced to 30-(6.92-6) = 29.08dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	17.24	17.10	104.252	20.18	29.08	Pass
46	5230	22.12	21.87	**316.745**	25.01	29.08	Pass
151	5755	20.51	20.60	227.275	23.57	29.08	Pass
159	5795	20.49	20.63	**227.555**	23.57	29.08	Pass

Note:
1. U-NII-1 band: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power limit shall be reduced to 30-(6.92-6) = 29.08dBm.
2. U-NII-3 band: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power limit shall be reduced to 30-(6.92-6) = 29.08dBm.

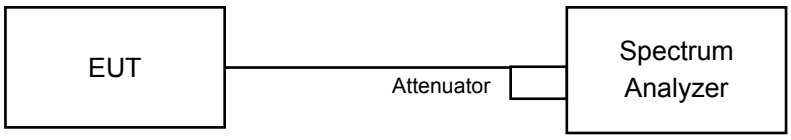
802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	16.27	16.10	83.102	19.20	29.08	Pass
155	5775	20.09	20.16	205.847	23.14	29.08	Pass

Note:
1. U-NII-1 band: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power limit shall be reduced to 30-(6.92-6) = 29.08dBm.
2. U-NII-3 band: Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power limit shall be reduced to 30-(6.92-6) = 29.08dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.56
40	5200	16.44	16.56
48	5240	16.56	16.56
149	5745	16.56	16.56
157	5785	16.56	16.56
165	5825	16.56	16.56

802.11n (HT20)

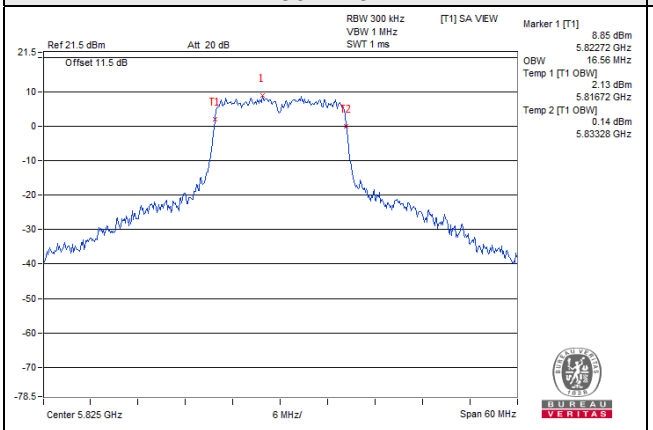
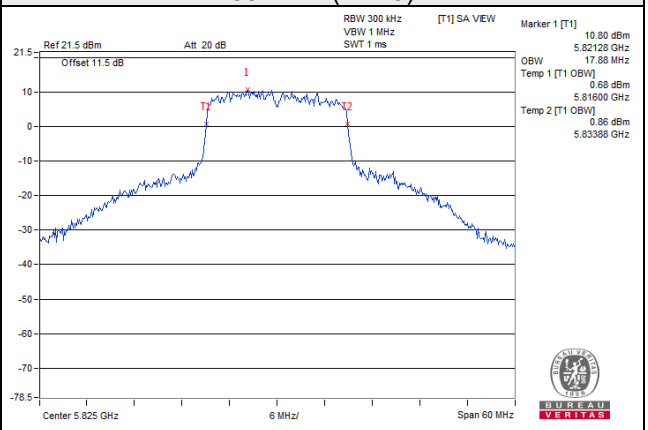
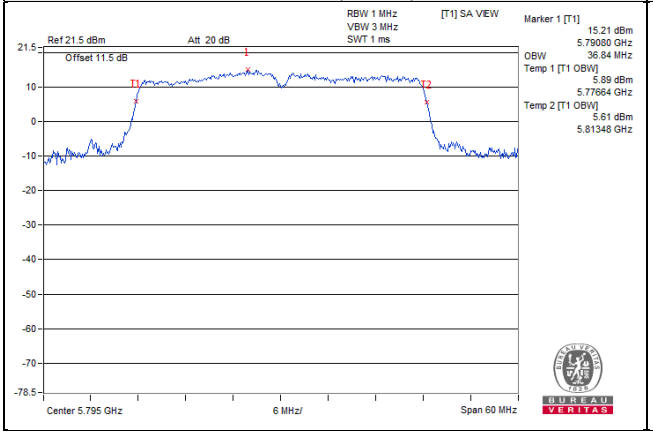
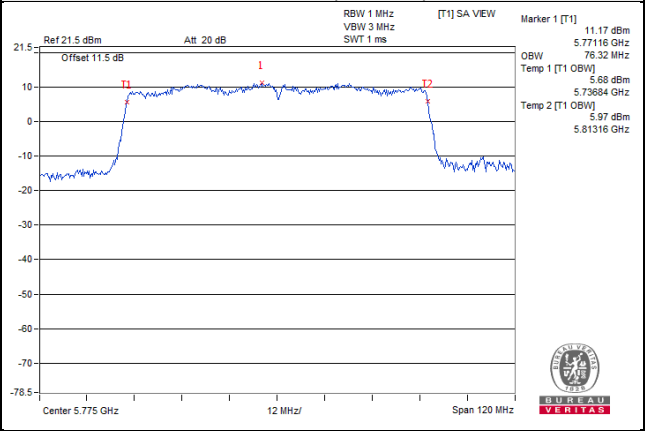
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.64
40	5200	17.76	17.76
48	5240	17.76	17.76
149	5745	17.64	17.64
157	5785	17.64	17.64
165	5825	17.76	17.88

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.00
46	5230	36.48	36.36
151	5755	36.24	36.84
159	5795	36.36	36.84

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	75.60
155	5775	75.84	76.32

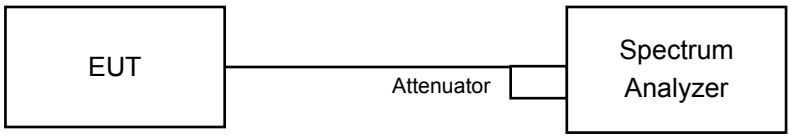
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

Using method SA-2

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

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

c. Set Channel power measure = 1MHz

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

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

f. Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

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

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

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

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

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

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

g. Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	6.32	5.88	0.18	9.29	16.08	Pass
40	5200	5.83	5.50	0.18	8.85	16.08	Pass
48	5240	7.04	6.65	0.18	10.04	16.08	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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 17-(6.92-6) = 16.08dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	5.15	4.83	0.11	8.12	16.08	Pass
40	5200	6.29	6.12	0.11	9.33	16.08	Pass
48	5240	6.48	6.42	0.11	9.57	16.08	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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 17-(6.92-6) = 16.08dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-0.52	-0.21	0.15	2.79	16.08	Pass
46	5230	4.68	4.96	0.15	7.98	16.08	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. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 17-(6.92-6) = 16.08dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

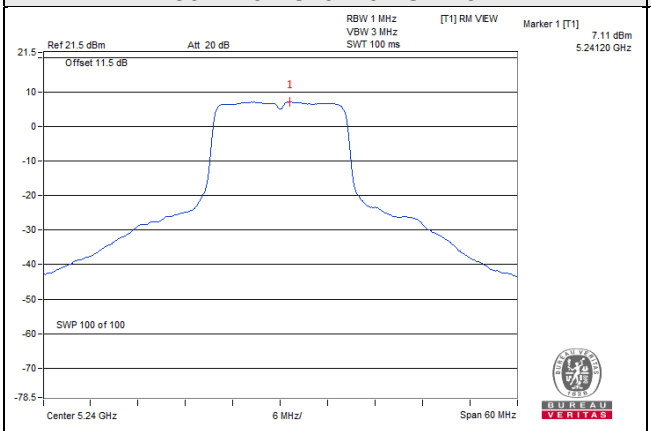
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-4.85	-4.91	0.35	-1.52	16.08	Pass

Note:

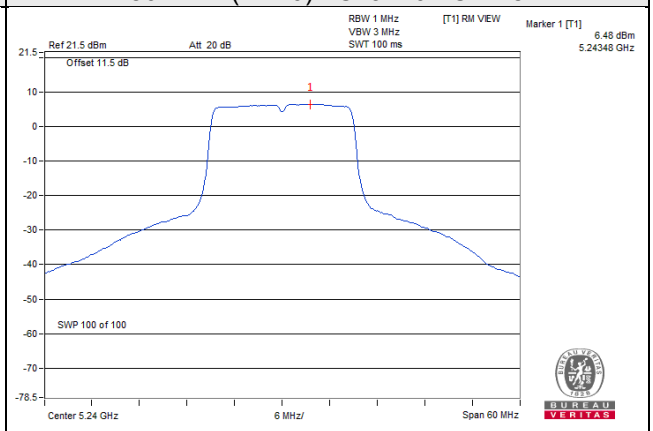
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 17-(6.92-6) = 16.08dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

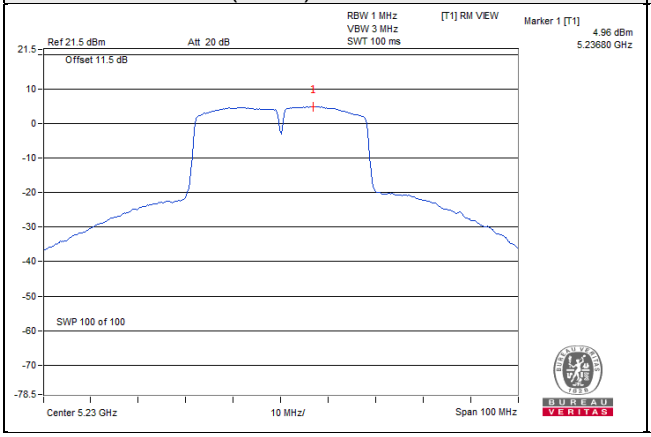
802.11a / Chain 0 / CH 48



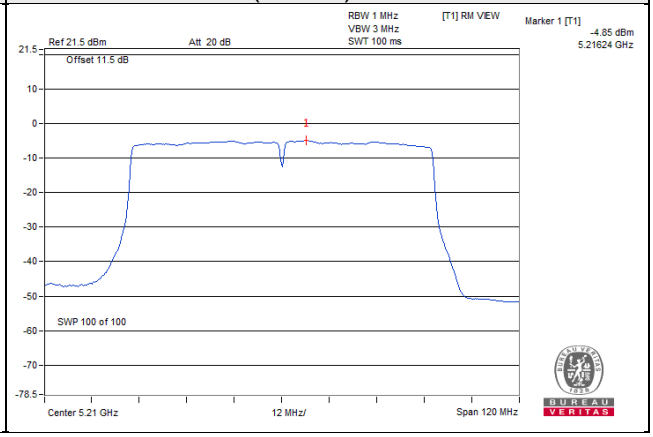
802.11n (HT20) / Chain 0 / CH 48



802.11n (HT40) / Chain 1 / CH 46



802.11ac (VHT80) / Chain 0 / 42



For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-3.00	-0.78	3.01	0.18	2.41	29.08	Pass
	157	5785	-3.05	-0.83	3.01	0.18	2.36	29.08	Pass
	165	5825	-3.82	-1.60	3.01	0.18	1.59	29.08	Pass
1	149	5745	-2.28	-0.06	3.01	0.18	3.13	29.08	Pass
	157	5785	-2.20	0.02	3.01	0.18	3.21	29.08	Pass
	165	5825	-2.43	-0.21	3.01	0.18	2.98	29.08	Pass

Note:
1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 30-(6.29-6) = 29.08dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-2.93	-0.71	3.01	0.11	2.41	29.08	Pass
	157	5785	-3.04	-0.82	3.01	0.11	2.30	29.08	Pass
	165	5825	-3.19	-0.97	3.01	0.11	2.15	29.08	Pass
1	149	5745	-1.69	0.53	3.01	0.11	3.65	29.08	Pass
	157	5785	-1.62	0.60	3.01	0.11	3.72	29.08	Pass
	165	5825	-1.77	0.45	3.01	0.11	3.57	29.08	Pass

Note:
1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 30-(6.29-6) = 29.08dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-4.84	-2.62	3.01	0.15	0.54	29.08	Pass
	159	5795	-4.84	-2.62	3.01	0.15	0.54	29.08	Pass
1	151	5755	-3.88	-1.66	3.01	0.15	1.50	29.08	Pass
	159	5795	-3.90	-1.68	3.01	0.15	1.48	29.08	Pass

Note:
1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 30-(6.29-6) = 29.08dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

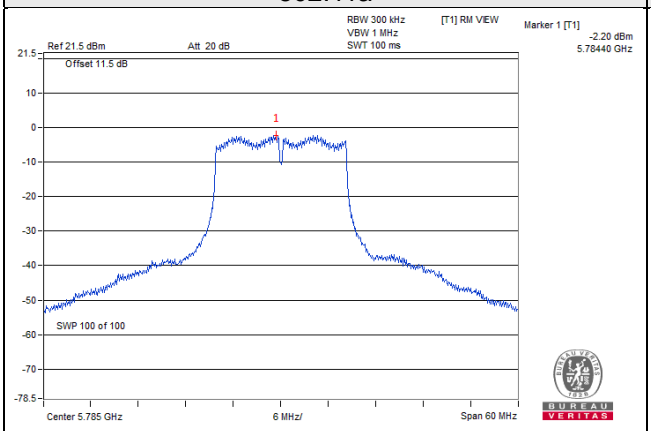
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-8.64	-6.42	3.01	0.35	-3.06	29.08	Pass
1	155	5775	-7.88	-5.66	3.01	0.35	-2.30	29.08	Pass

Note:

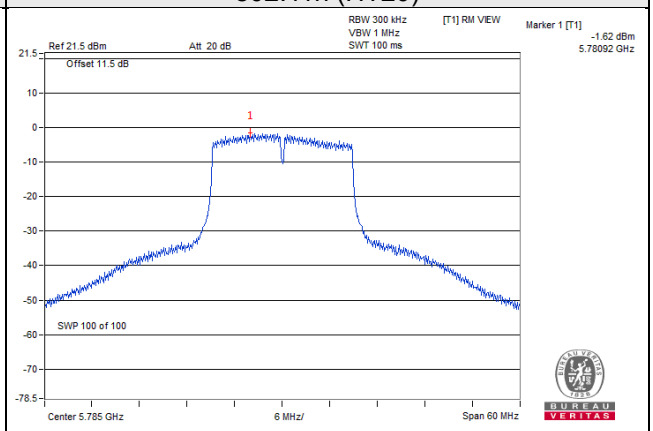
1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20} + \cdots + 10^{GN/20})^2/2$] = 6.92dBi > 6dBi, so the power density limit shall be reduced to 30-(6.29-6) = 29.08dBm.
2. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

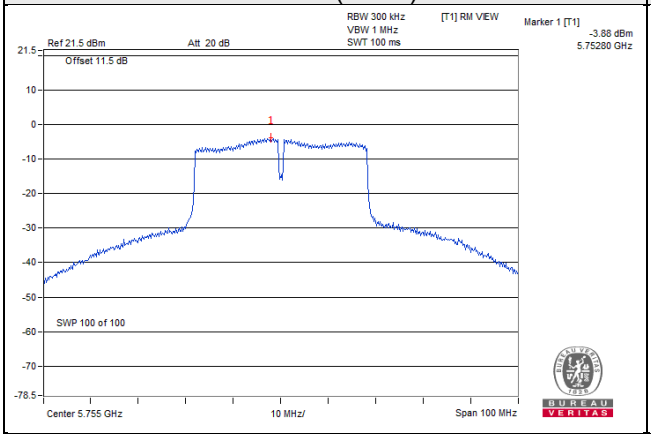
802.11a



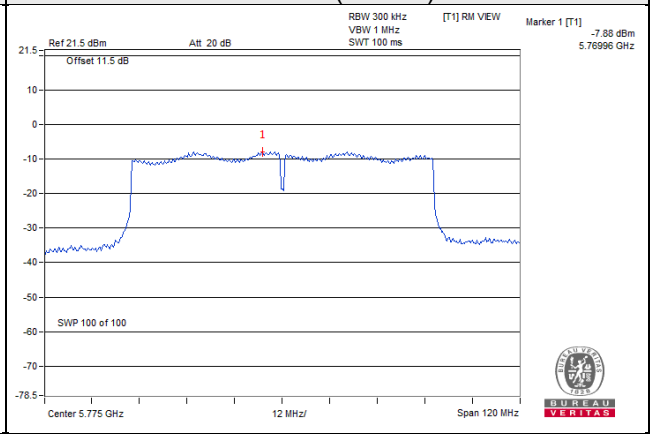
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

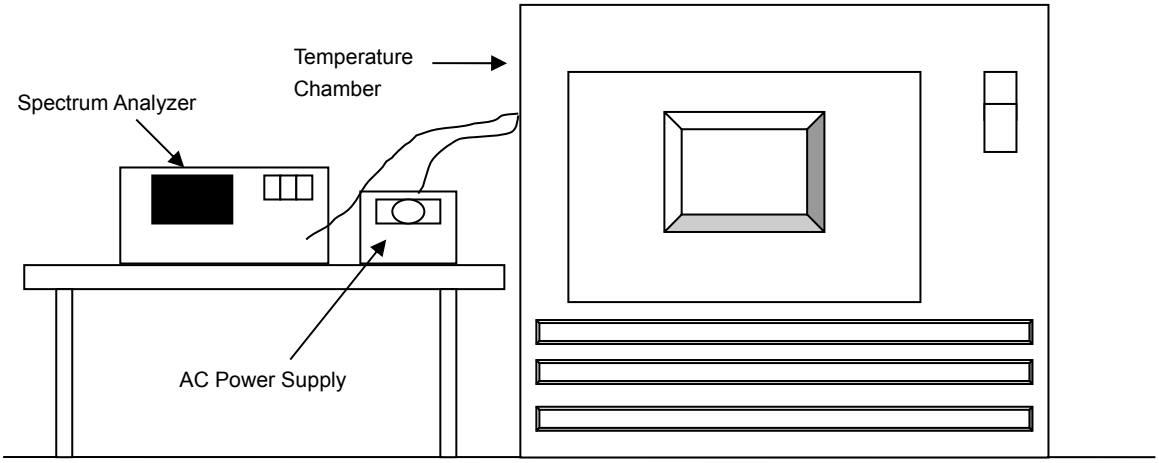


4.6 Frequency Stability

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

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

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

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

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 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 (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
50	120	5180.0161	Pass	5180.0169	Pass	5180.0149	Pass	5180.0179	Pass
40	120	5180.0119	Pass	5180.0118	Pass	5180.0096	Pass	5180.0125	Pass
30	120	5179.9912	Pass	5179.9938	Pass	5179.9939	Pass	5179.9916	Pass
20	120	5179.981	Pass	5179.9812	Pass	5179.9842	Pass	5179.982	Pass
10	120	5179.9918	Pass	5179.9907	Pass	5179.9922	Pass	5179.9915	Pass
0	120	5180.0022	Pass	5180.0032	Pass	5180.0051	Pass	5180.0051	Pass
-10	120	5180.0056	Pass	5180.01	Pass	5180.0068	Pass	5180.0079	Pass
-20	120	5179.9862	Pass	5179.984	Pass	5179.9871	Pass	5179.9848	Pass
-30	120	5179.9945	Pass	5179.9951	Pass	5179.9965	Pass	5179.9966	Pass

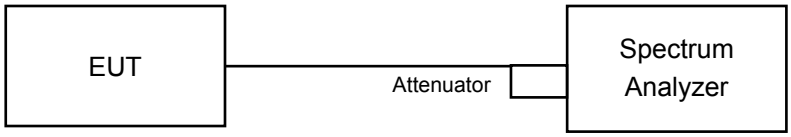
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5179.9801	Pass	5179.9818	Pass	5179.9836	Pass	5179.9811	Pass
	120	5179.981	Pass	5179.9812	Pass	5179.9842	Pass	5179.982	Pass
	102	5179.9814	Pass	5179.9808	Pass	5179.9838	Pass	5179.9813	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		
149	5745	16.40	15.78	0.5	Pass
157	5785	16.42	15.97	0.5	Pass
165	5825	16.40	15.94	0.5	Pass

802.11n (HT20)

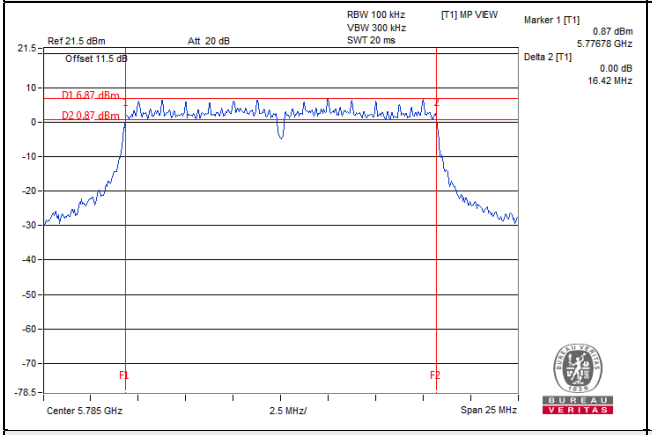
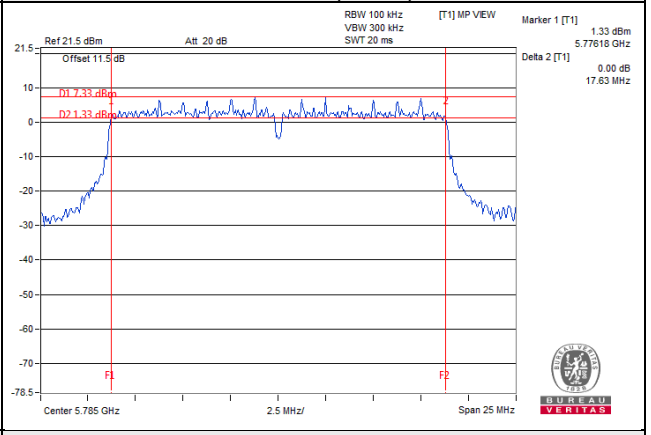
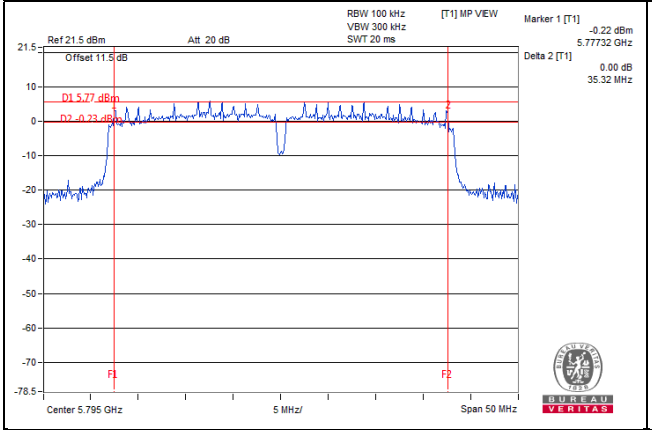
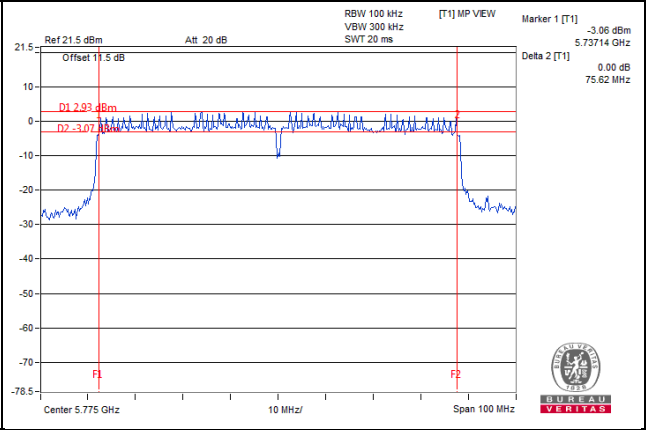
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.63	16.57	0.5	Pass
157	5785	17.63	16.57	0.5	Pass
165	5825	17.62	16.02	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.31	35.17	0.5	Pass
159	5795	35.32	35.18	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.62	75.48	0.5	Pass

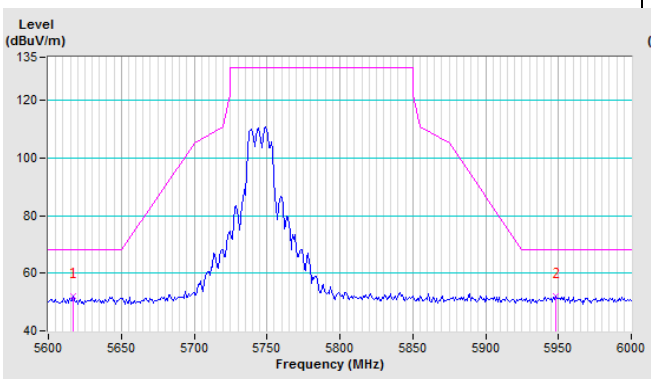
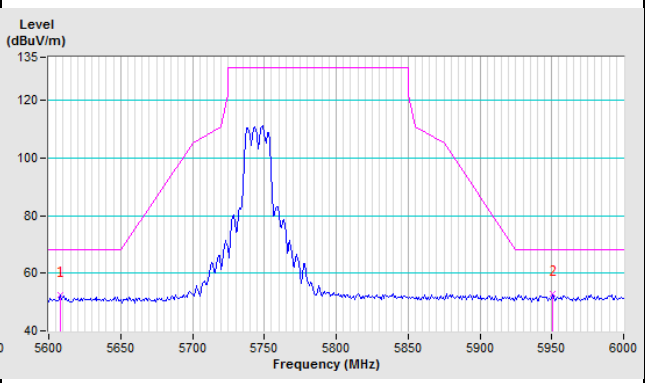
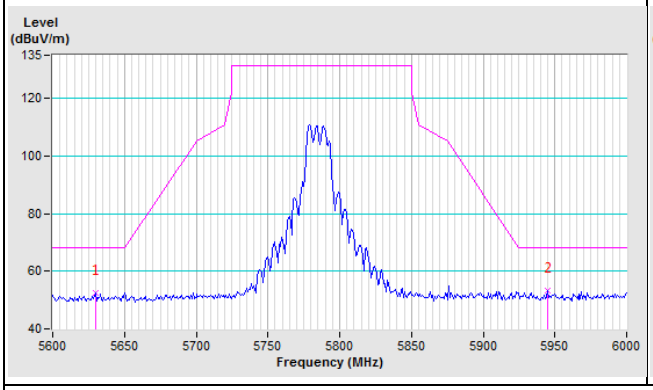
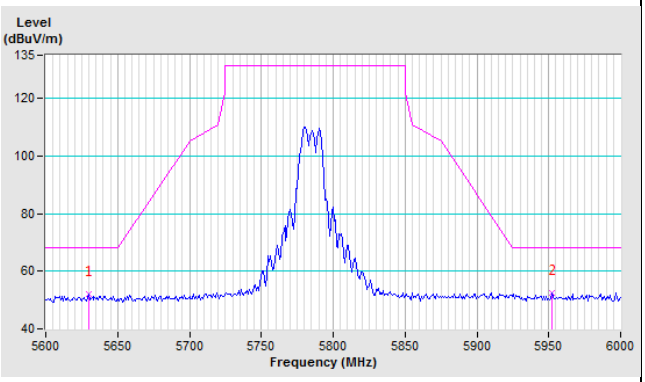
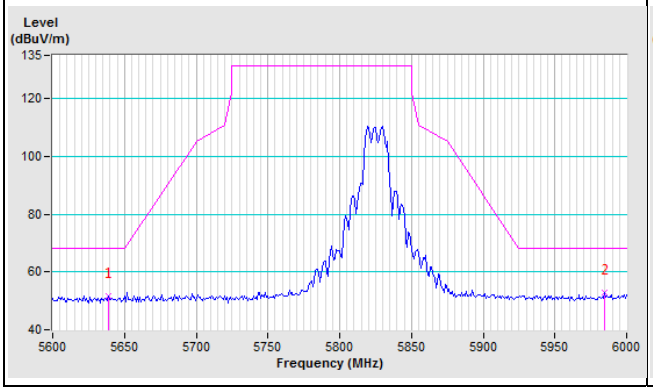
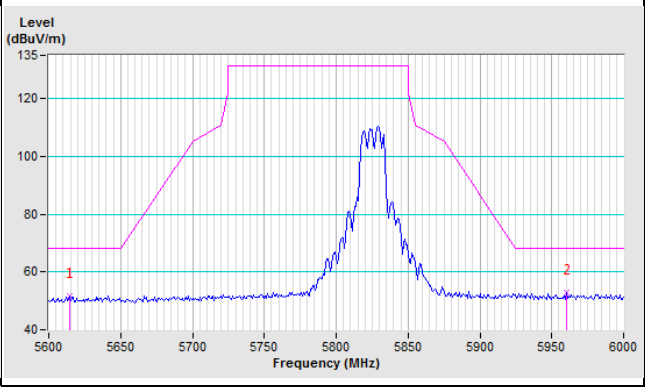
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

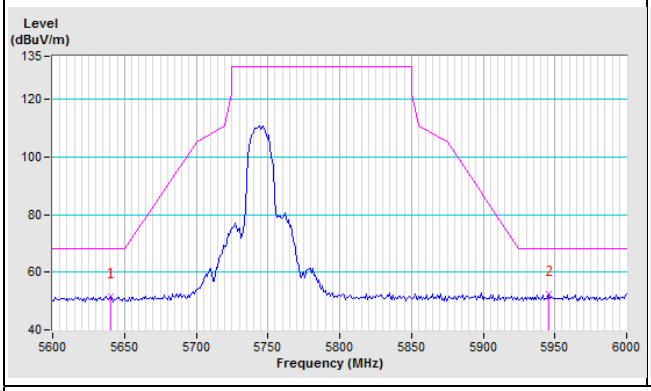
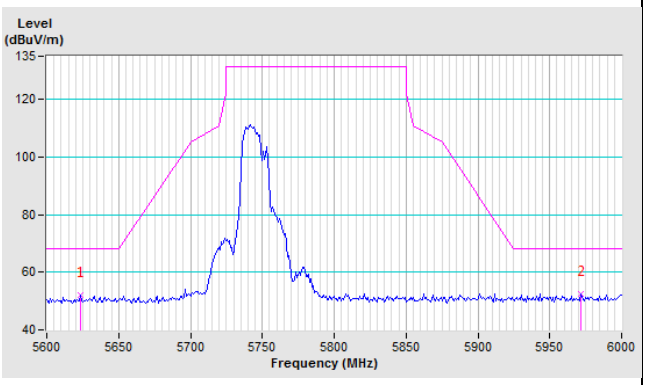
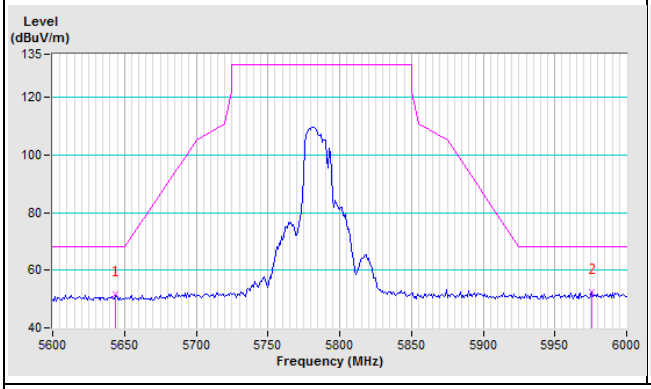
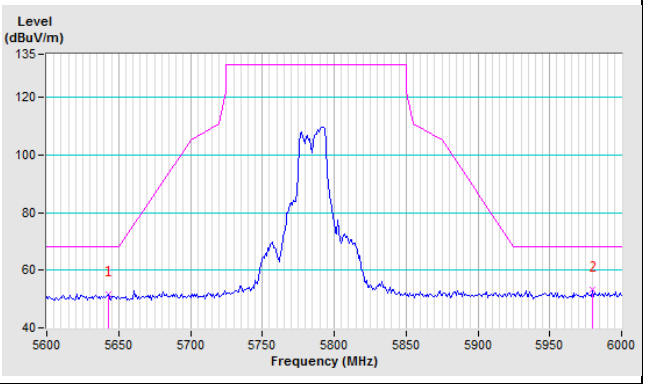
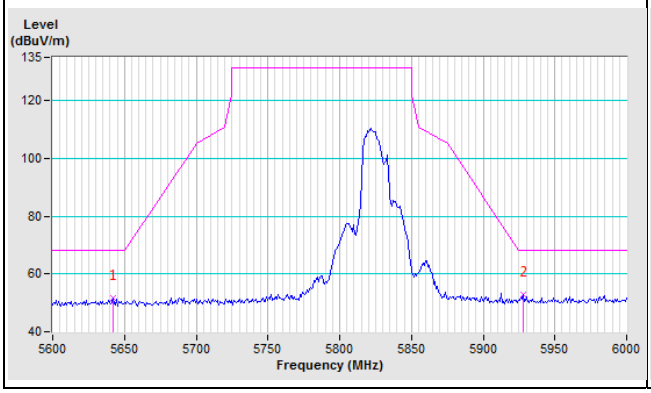
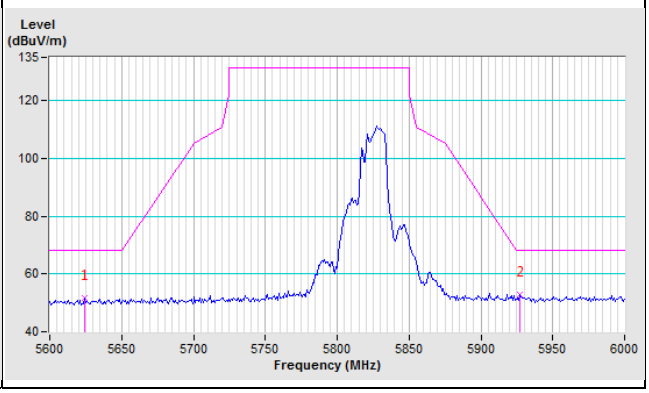
Please refer to the attached file (Test Setup Photo).

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

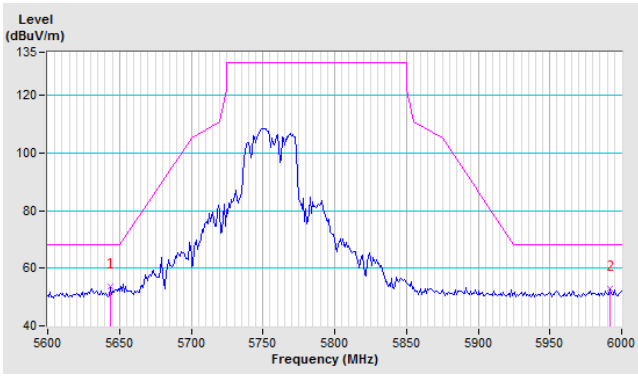
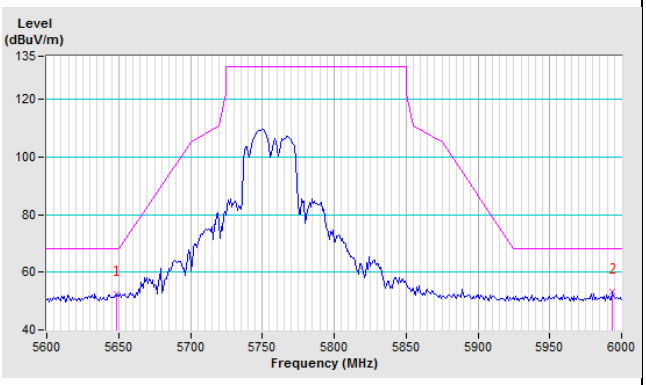
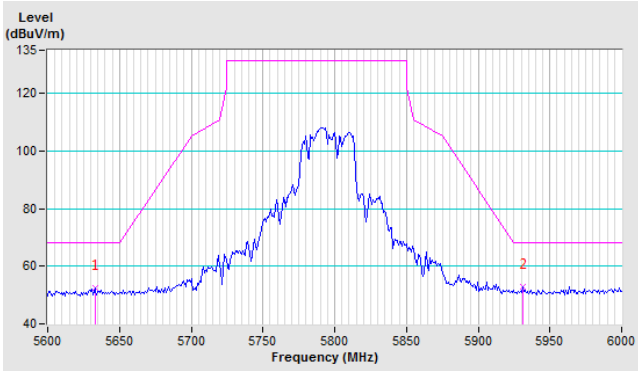
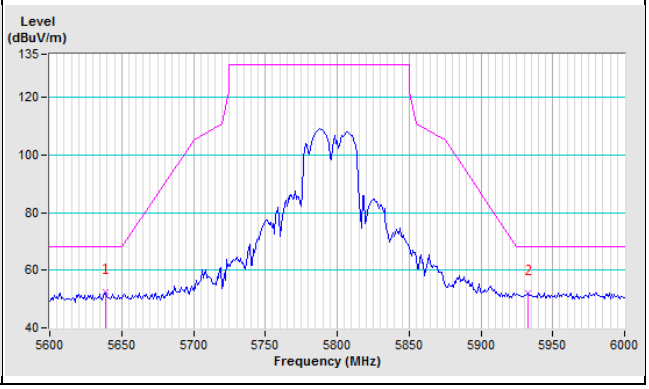
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

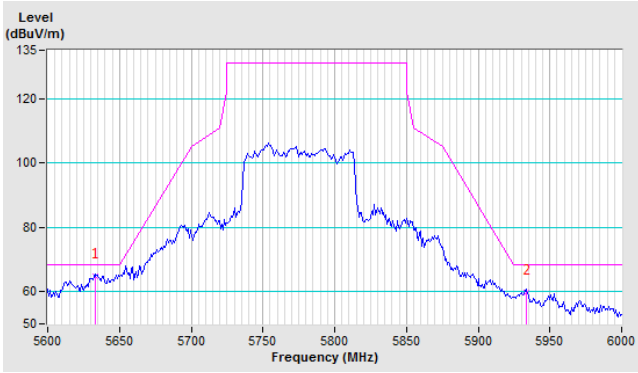
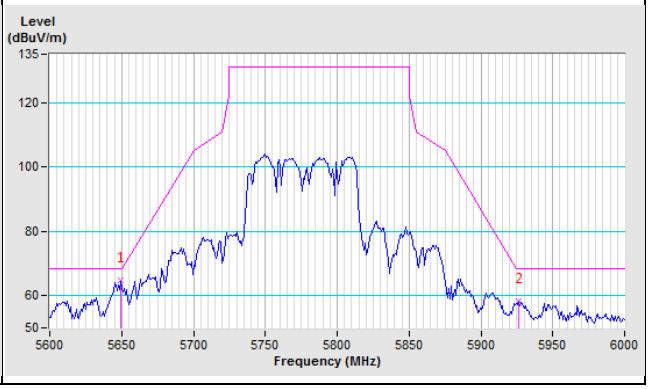
802.11n (HT20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

Appendix – Information on 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.

If you have any comments, please feel free to contact us at the following:

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Web Site: www.bureauveritas-adt.com

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

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