FCC Test Report

Report No.:	RF180717C32B
FCC ID:	2ACTO-APX120
Test Model:	APX 120
Received Date:	Jul. 17, 2018
Test Date:	Aug. 05 ~ Aug. 15, 2018
Issued Date:	Oct. 16, 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
RF180717C32B	Original release	Oct. 16, 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. 16, 2018

Celine Chou / Senior Specialist

Approved by : Bruce Chen , **Date:** Oct. 16, 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 -11.52dB at 0.33768MHz.
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 11160.00MHz.
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.

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	5260 ~ 5320MHz, 5500 ~ 5700MHz
Number of Channel	5260 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500 ~ 5700MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 11 802.11n (HT40), 802.11ac (VHT40): 5 802.11ac (VHT80): 2
Output Power	CDD Mode: 5260 ~ 5320MHz: 245.771mW 5500 ~ 5700MHz: 236.671mW Beamforming Mode: 5260 ~ 5320MHz: 185.683mW 5500 ~ 5700MHz: 187.819mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	Adapter
Cable Supplied	N/A

Note:

1. This report is prepared for FCC class II permissive change. The differences compared with the original report (BV CPS report no.: RF180717C32-1) are adding 5.26GHz to 5.32GHz and 5.50GHz to 5.70GHz by software.

2. 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.

3. 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

4. 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 5260 ~ 5320MHz:

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

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

For 5500 ~ 5700MHz:

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

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz

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	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11n (HT20)		52 to 64	52, 60, 64	OFDM	6.5
	802.11n (HT40)		54 to 62	54, 62	OFDM	13.5
	802.11ac (VHT80)		58	58	OFDM	29.3
A	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
	802.11n (HT20)		100 to 140	100, 116, 140	OFDM	6.5
	802.11n (HT40)		102 to 134	102, 110, 134	OFDM	13.5
	802.11ac (VHT80)		106 to 122	106, 122	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	5260-5320	52 to 64	52	OFDM	6.0
	802.11a	5500-5700	100 to 140		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	5260-5320	52 to 64	52	OFDM	6.0
	802.11a	5500-5700	100 to 140		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	5260-5320	52 to 64	52, 60, 64	OFDM	6.0
	802.11n (HT20)		52 to 64	52, 60, 64	OFDM	6.5
	802.11n (HT40)		54 to 62	54, 62	OFDM	13.5
	802.11ac (VHT80)		58	58	OFDM	29.3
A	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	6.0
	802.11n (HT20)		100 to 140	100, 116, 140	OFDM	6.5
	802.11n (HT40)		102 to 134	102, 110, 134	OFDM	13.5
	802.11ac (VHT80)		106 to 122	106, 122	OFDM	29.3

Test Condition:

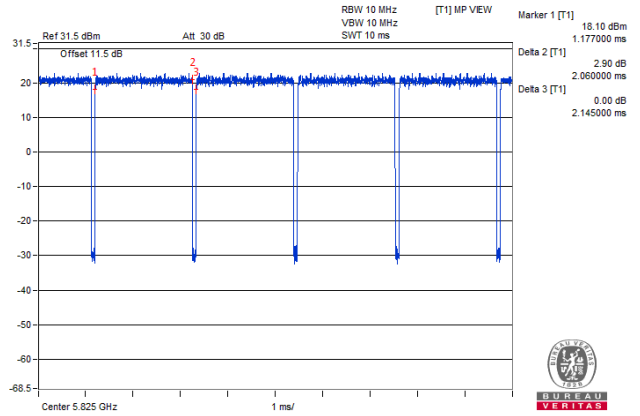
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65% RH 25 deg. C, 67% RH	120Vac, 60Hz	Greg Lin Willy Cheng
RE<1G	25 deg. C, 67% RH	120Vac, 60Hz 55Vdc	Willy Cheng
PLC	22 deg. C, 66% RH	120Vac, 60Hz 55Vdc	Adair Peng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Kevin Kuo

3.3 Duty Cycle of Test Signal

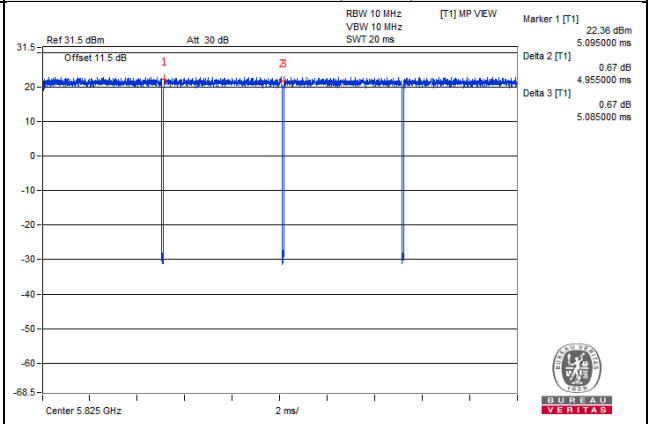
Duty cycle of test signal is < 98%, duty factor is required.

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

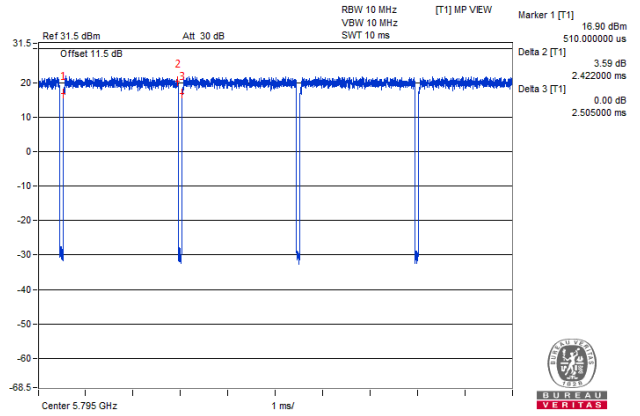
802.11a



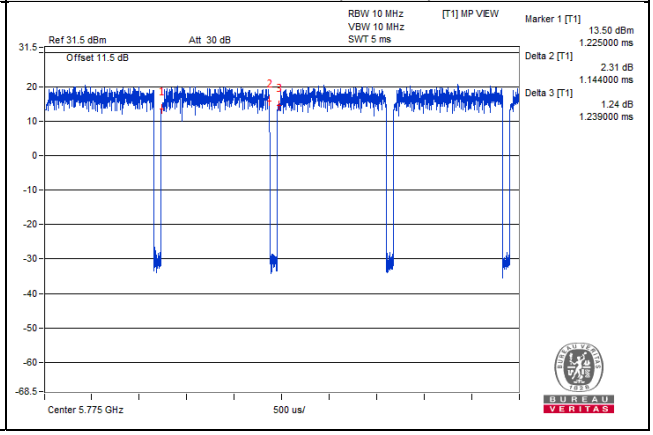
802.11n (HT20)



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

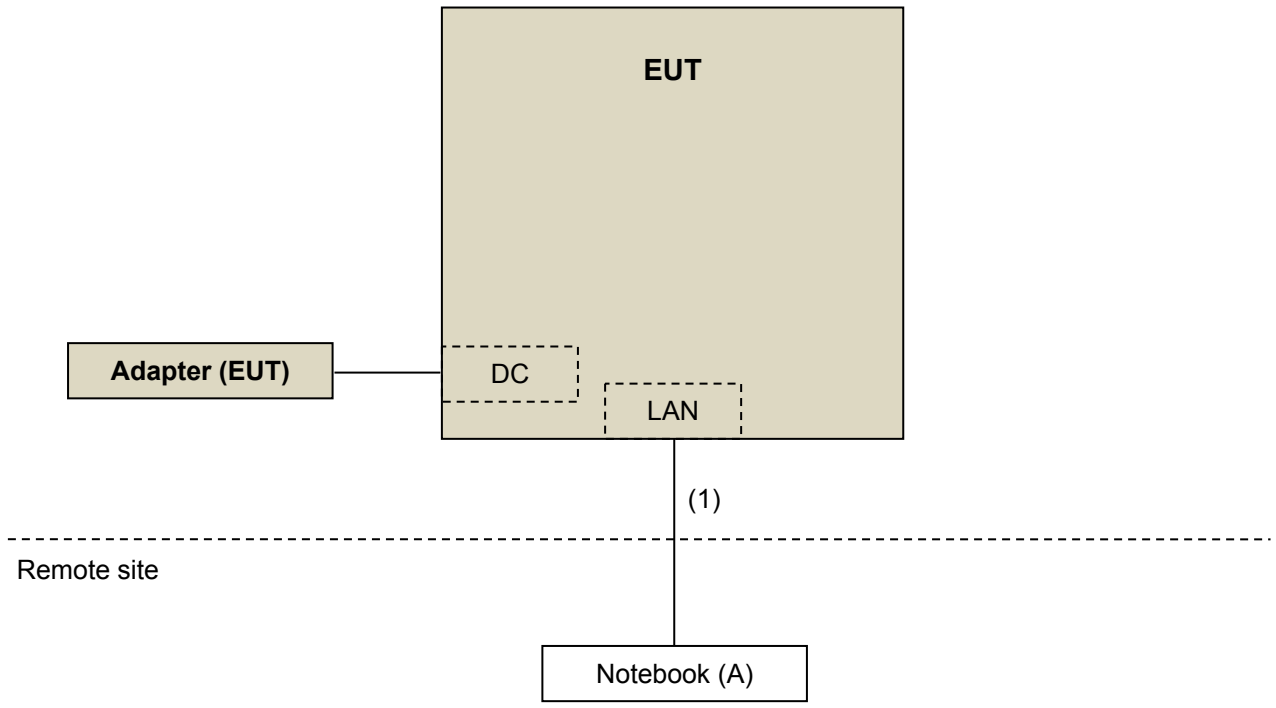
Note:

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.

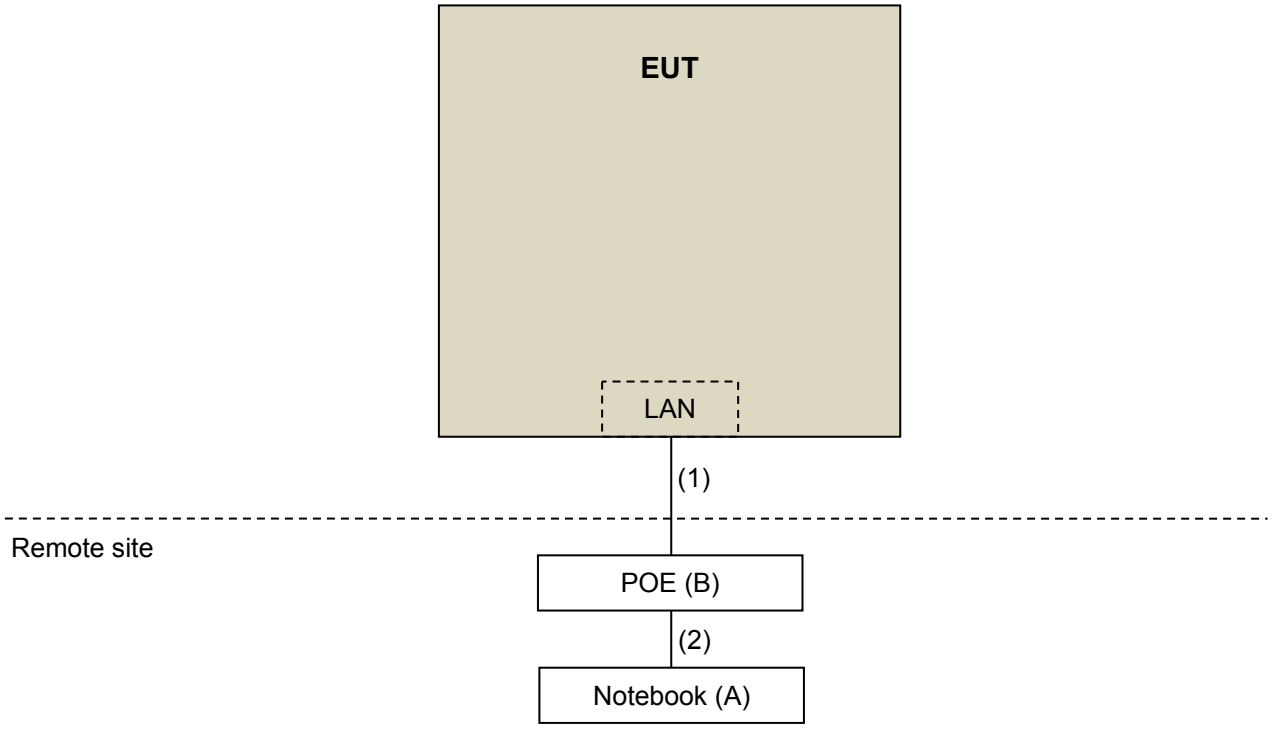
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	3	N	0	-
2.	RJ45, Cat5e	1	1.8	N	0	-

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.

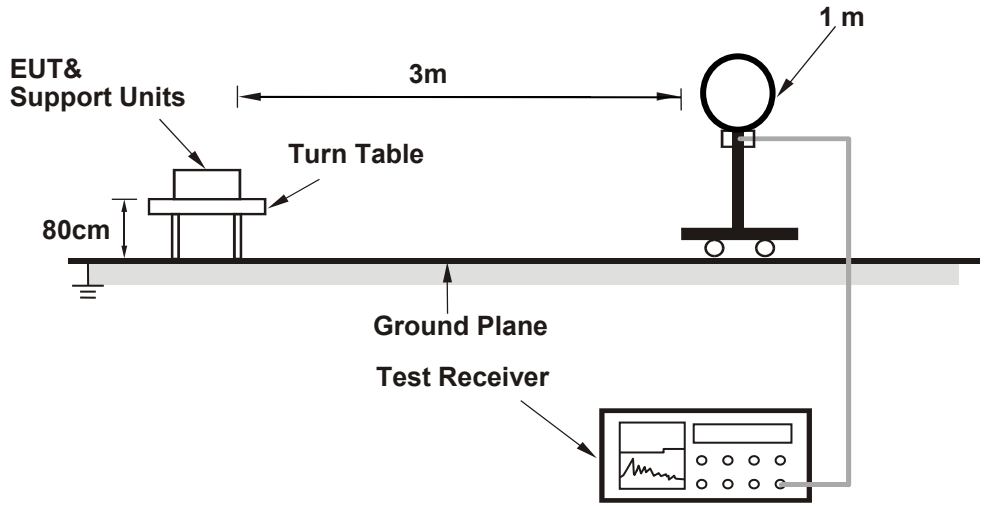
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

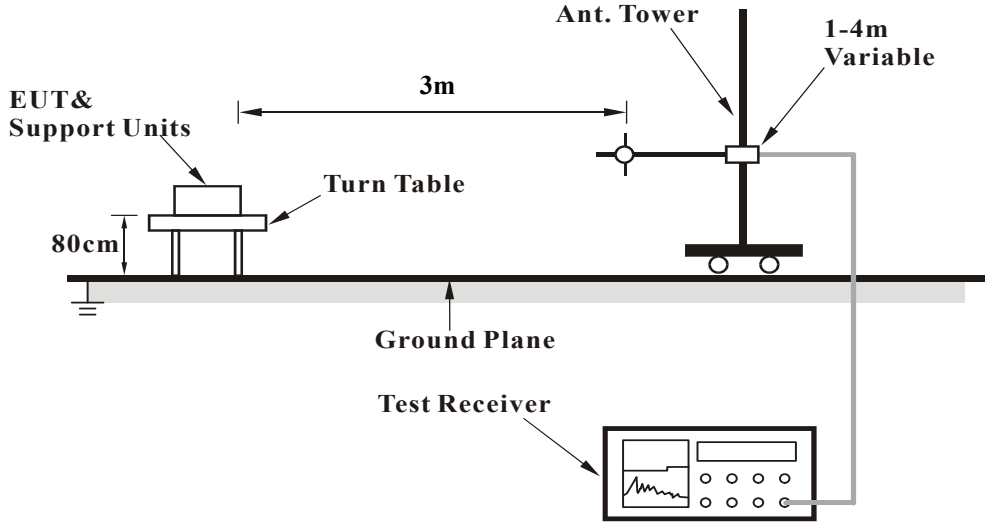
No deviation.

4.1.5 Test Setup

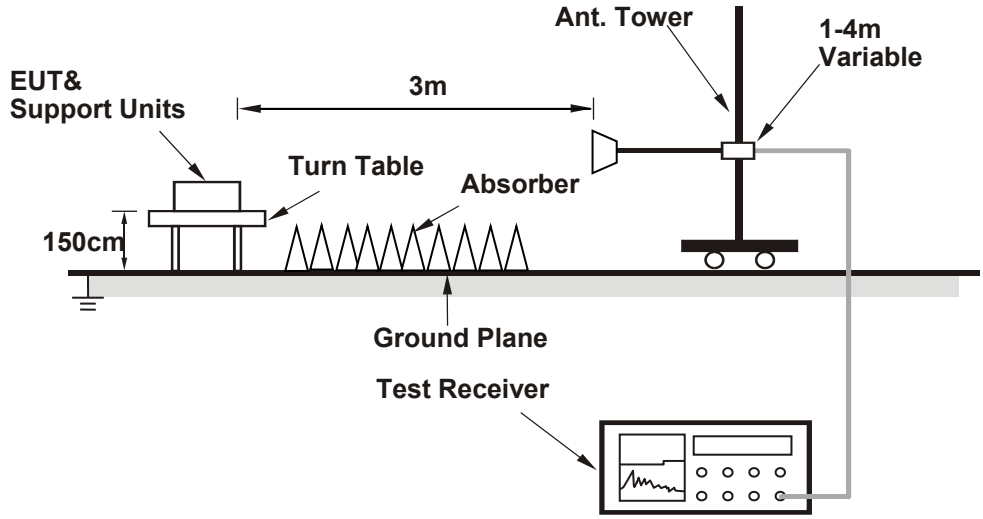
For Radiated emission below 30MHz



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 52	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	54.4 PK	74.0	-19.6	2.37 H	352	50.5	3.9
2	5150.00	41.7 AV	54.0	-12.3	2.37 H	352	37.8	3.9
3	*5260.00	118.0 PK			1.90 H	348	78.6	39.4
4	*5260.00	106.9 AV			1.90 H	348	67.5	39.4
5	#10520.00	57.7 PK	68.2	-10.5	2.37 H	297	40.9	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	5150.00	54.6 PK	74.0	-19.4	2.22 V	287	50.7	3.9
2	5150.00	41.5 AV	54.0	-12.5	2.22 V	287	37.6	3.9
3	*5260.00	115.8 PK			2.11 V	267	76.4	39.4
4	*5260.00	105.0 AV			2.11 V	267	65.6	39.4
5	#10520.00	65.2 PK	68.2	-3.0	1.04 V	354	48.4	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 60	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	*5300.00	115.7 PK			2.45 H	294	76.3	39.4
2	*5300.00	104.6 AV			2.45 H	294	65.2	39.4
3	10600.00	56.9 PK	74.0	-17.1	2.38 H	326	39.9	17.0
4	10600.00	43.4 AV	54.0	-10.6	2.38 H	326	26.4	17.0
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	*5300.00	115.8 PK			2.31 V	270	76.4	39.4
2	*5300.00	104.9 AV			2.31 V	270	65.5	39.4
3	10600.00	63.1 PK	74.0	-10.9	1.00 V	357	46.1	17.0
4	10600.00	48.8 AV	54.0	-5.2	1.00 V	357	31.8	17.0

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 64	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	*5320.00	114.4 PK			2.82 H	293	74.9	39.5
2	*5320.00	103.4 AV			2.82 H	293	63.9	39.5
3	5350.00	68.4 PK	74.0	-5.6	2.10 H	341	64.4	4.0
4	5350.00	50.5 AV	54.0	-3.5	2.10 H	341	46.5	4.0
5	10640.00	55.7 PK	74.0	-18.3	2.47 H	318	38.7	17.0
6	10640.00	42.6 AV	54.0	-11.4	2.47 H	318	25.6	17.0
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	*5320.00	115.4 PK			2.46 V	237	75.9	39.5
2	*5320.00	103.9 AV			2.46 V	237	64.4	39.5
3	5350.00	69.9 PK	74.0	-4.1	2.29 V	260	65.9	4.0
4	5350.00	52.5 AV	54.0	-1.5	2.29 V	260	48.5	4.0
5	10640.00	60.2 PK	74.0	-13.8	1.03 V	357	43.2	17.0
6	10640.00	43.8 AV	54.0	-10.2	1.03 V	357	26.8	17.0

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 100	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	5460.00	58.0 PK	74.0	-16.0	2.73 H	296	53.6	4.4
2	5460.00	43.3 AV	54.0	-10.7	2.73 H	296	38.9	4.4
3	#5470.00	61.7 PK	68.2	-6.5	2.58 H	266	57.3	4.4
4	*5500.00	114.4 PK			2.48 H	286	74.3	40.1
5	*5500.00	103.4 AV			2.48 H	286	63.3	40.1
6	11000.00	60.4 PK	74.0	-13.6	2.44 H	207	41.7	18.7
7	11000.00	47.0 AV	54.0	-7.0	2.44 H	207	28.3	18.7
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	5460.00	57.1 PK	74.0	-16.9	2.56 V	233	52.7	4.4
2	5460.00	44.2 AV	54.0	-9.8	2.56 V	233	39.8	4.4
3	#5470.00	66.6 PK	68.2	-1.6	2.74 V	252	62.2	4.4
4	*5500.00	115.3 PK			2.77 V	240	75.2	40.1
5	*5500.00	104.0 AV			2.77 V	240	63.9	40.1
6	11000.00	65.7 PK	74.0	-8.3	1.05 V	231	47.0	18.7
7	11000.00	49.0 AV	54.0	-5.0	1.05 V	231	30.3	18.7

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 116	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	*5580.00	113.2 PK			2.29 H	357	73.2	40.0
2	*5580.00	102.7 AV			2.29 H	357	62.7	40.0
3	11160.00	68.4 PK	74.0	-5.6	3.91 H	270	50.9	17.5
4	**11160.00**	**53.0 AV**	**54.0**	**-1.0**	**3.91 H**	**270**	**35.5**	**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	*5580.00	115.1 PK			1.13 V	64	75.1	40.0
2	*5580.00	104.1 AV			1.13 V	64	64.1	40.0
3	11160.00	69.3 PK	74.0	-4.7	1.02 V	230	51.8	17.5
4	11160.00	52.9 AV	54.0	-1.1	1.02 V	230	35.4	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 140	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	*5700.00	111.0 PK			2.97 H	301	71.0	40.0
2	*5700.00	100.2 AV			2.97 H	301	60.2	40.0
3	#5725.00	64.2 PK	68.2	-4.0	2.61 H	301	59.8	4.4
4	11400.00	58.2 PK	74.0	-15.8	2.74 H	351	40.8	17.4
5	11400.00	44.9 AV	54.0	-9.1	2.74 H	351	27.5	17.4
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	*5700.00	112.6 PK			2.47 V	233	72.6	40.0
2	*5700.00	102.0 AV			2.47 V	233	62.0	40.0
3	#5725.00	66.5 PK	68.2	-1.7	2.39 V	263	62.1	4.4
4	11400.00	65.7 PK	74.0	-8.3	1.05 V	226	48.3	17.4
5	11400.00	50.0 AV	54.0	-4.0	1.05 V	226	32.6	17.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 52	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	54.4 PK	74.0	-19.6	2.06 H	338	50.5	3.9
2	5150.00	41.7 AV	54.0	-12.3	2.06 H	338	37.8	3.9
3	*5260.00	117.1 PK			1.90 H	348	77.7	39.4
4	*5260.00	106.5 AV			1.90 H	348	67.1	39.4
5	#10520.00	63.5 PK	68.2	-4.7	3.56 H	6	46.7	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	5150.00	55.4 PK	74.0	-18.6	1.34 V	272	51.5	3.9
2	5150.00	42.3 AV	54.0	-11.7	1.34 V	272	38.4	3.9
3	*5260.00	116.3 PK			1.27 V	265	76.9	39.4
4	*5260.00	105.4 AV			1.27 V	265	66.0	39.4
5	#10520.00	64.4 PK	68.2	-3.8	1.07 V	354	47.6	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 60	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	*5300.00	116.2 PK			1.58 H	352	76.8	39.4
2	*5300.00	105.1 AV			1.58 H	352	65.7	39.4
3	10600.00	60.6 PK	74.0	-13.4	3.49 H	24	43.6	17.0
4	10600.00	46.6 AV	54.0	-7.4	3.49 H	24	29.6	17.0
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	*5300.00	116.8 PK			2.45 V	256	77.4	39.4
2	*5300.00	105.6 AV			2.45 V	256	66.2	39.4
3	10600.00	61.8 PK	74.0	-12.2	1.03 V	352	44.8	17.0
4	10600.00	47.5 AV	54.0	-6.5	1.03 V	352	30.5	17.0

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 64	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	*5320.00	114.4 PK			1.76 H	346	74.9	39.5
2	*5320.00	103.0 AV			1.76 H	346	63.5	39.5
3	5350.00	68.4 PK	74.0	-5.6	1.99 H	351	64.4	4.0
4	5350.00	51.3 AV	54.0	-2.7	1.99 H	351	47.3	4.0
5	10640.00	56.7 PK	74.0	-17.3	3.57 H	12	39.7	17.0
6	10640.00	43.4 AV	54.0	-10.6	3.57 H	12	26.4	17.0
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	*5320.00	114.2 PK			2.48 V	241	74.7	39.5
2	*5320.00	103.3 AV			2.48 V	241	63.8	39.5
3	5350.00	69.6 PK	74.0	-4.4	2.22 V	234	65.6	4.0
4	5350.00	52.5 AV	54.0	-1.5	2.22 V	234	48.5	4.0
5	10640.00	57.2 PK	74.0	-16.8	1.08 V	352	40.2	17.0
6	10640.00	43.6 AV	54.0	-10.4	1.08 V	352	26.6	17.0

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 100	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	5460.00	57.7 PK	74.0	-16.3	2.66 H	218	53.3	4.4
2	5460.00	43.9 AV	54.0	-10.1	2.66 H	218	39.5	4.4
3	#5470.00	65.6 PK	68.2	-2.6	2.35 H	284	61.2	4.4
4	*5500.00	115.0 PK			2.55 H	296	74.9	40.1
5	*5500.00	103.5 AV			2.55 H	296	63.4	40.1
6	11000.00	60.4 PK	74.0	-13.6	2.96 H	355	41.7	18.7
7	11000.00	46.7 AV	54.0	-7.3	2.96 H	355	28.0	18.7
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	5460.00	56.2 PK	74.0	-17.8	2.02 V	247	51.8	4.4
2	5460.00	42.3 AV	54.0	-11.7	2.02 V	247	37.9	4.4
3	#5470.00	66.4 PK	68.2	-1.8	2.34 V	234	62.0	4.4
4	*5500.00	115.0 PK			3.12 V	244	74.9	40.1
5	*5500.00	103.4 AV			3.12 V	244	63.3	40.1
6	11000.00	63.5 PK	74.0	-10.5	1.94 V	137	44.8	18.7
7	11000.00	48.5 AV	54.0	-5.5	1.94 V	137	29.8	18.7

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 116	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	*5580.00	114.3 PK			2.78 H	292	74.3	40.0
2	*5580.00	103.4 AV			2.78 H	292	63.4	40.0
3	11160.00	63.9 PK	74.0	-10.1	3.25 H	269	46.4	17.5
4	11160.00	48.7 AV	54.0	-5.3	3.25 H	269	31.2	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	*5580.00	114.5 PK			1.05 V	63	74.5	40.0
2	*5580.00	103.2 AV			1.05 V	63	63.2	40.0
3	11160.00	70.3 PK	74.0	-3.7	1.01 V	222	52.8	17.5
4	11160.00	52.9 AV	54.0	-1.1	1.01 V	222	35.4	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 140	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	*5700.00	111.2 PK			2.04 H	8	71.2	40.0
2	*5700.00	100.2 AV			2.04 H	8	60.2	40.0
3	#5725.00	63.9 PK	68.2	-4.3	3.11 H	296	59.5	4.4
4	11400.00	58.0 PK	74.0	-16.0	1.88 H	253	40.6	17.4
5	11400.00	44.8 AV	54.0	-9.2	1.88 H	253	27.4	17.4
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	*5700.00	111.6 PK			1.01 V	264	71.6	40.0
2	*5700.00	100.6 AV			1.01 V	264	60.6	40.0
3	#5725.00	67.1 PK	68.2	-1.1	2.38 V	250	62.7	4.4
4	11400.00	65.6 PK	74.0	-8.4	1.03 V	220	48.2	17.4
5	11400.00	48.8 AV	54.0	-5.2	1.03 V	220	31.4	17.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 54	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	51.6 PK	74.0	-22.4	2.01 H	331	49.8	1.8
2	5150.00	39.9 AV	54.0	-14.1	2.01 H	331	38.1	1.8
3	*5270.00	114.2 PK			1.82 H	357	75.9	38.3
4	*5270.00	104.1 AV			1.82 H	357	65.8	38.3
5	#10540.00	57.3 PK	68.2	-10.9	3.24 H	6	42.1	15.2
6	15810.00	60.3 PK	74.0	-13.7	1.02 H	15	45.8	14.5
7	15810.00	47.7 AV	54.0	-6.3	1.02 H	15	33.2	14.5
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	5150.00	52.4 PK	74.0	-21.6	2.30 V	276	50.6	1.8
2	5150.00	40.7 AV	54.0	-13.3	2.30 V	276	38.9	1.8
3	*5270.00	115.0 PK			2.39 V	279	76.7	38.3
4	*5270.00	104.9 AV			2.39 V	279	66.6	38.3
5	#10540.00	58.0 PK	68.2	-10.2	1.51 V	358	42.8	15.2
6	15810.00	66.7 PK	74.0	-7.3	1.04 V	7	52.2	14.5
7	15810.00	52.6 AV	54.0	-1.4	1.04 V	7	38.1	14.5

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 62	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	*5310.00	110.6 PK			1.83 H	339	72.3	38.3
2	*5310.00	100.5 AV			1.83 H	339	62.2	38.3
3	5350.00	66.4 PK	74.0	-7.6	1.91 H	324	64.8	1.6
4	5350.00	51.7 AV	54.0	-2.3	1.91 H	324	50.1	1.6
5	10620.00	55.4 PK	74.0	-18.6	3.47 H	358	40.2	15.2
6	10620.00	42.6 AV	54.0	-11.4	3.47 H	358	27.4	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	*5310.00	111.2 PK			2.26 V	277	72.9	38.3
2	*5310.00	101.2 AV			2.26 V	277	62.9	38.3
3	5350.00	68.5 PK	74.0	-5.5	2.35 V	273	66.9	1.6
4	5350.00	52.5 AV	54.0	-1.5	2.35 V	273	50.9	1.6
5	10620.00	56.1 PK	74.0	-17.9	1.06 V	14	40.9	15.2
6	10620.00	43.4 AV	54.0	-10.6	1.06 V	14	28.2	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

CHANNEL	TX Channel 102	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	5460.00	64.0 PK	74.0	-10.0	2.43 H	281	59.6	4.4
2	5460.00	46.6 AV	54.0	-7.4	2.43 H	281	42.2	4.4
3	#5470.00	66.0 PK	68.2	-2.2	3.14 H	297	61.6	4.4
4	*5510.00	109.5 PK			2.98 H	294	69.4	40.1
5	*5510.00	99.6 AV			2.98 H	294	59.5	40.1
6	11020.00	60.0 PK	74.0	-14.0	2.26 H	284	41.6	18.4
7	11020.00	46.9 AV	54.0	-7.1	2.26 H	284	28.5	18.4
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	5460.00	62.2 PK	74.0	-11.8	2.20 V	273	57.8	4.4
2	5460.00	46.4 AV	54.0	-7.6	2.20 V	273	42.0	4.4
3	#5470.00	66.8 PK	68.2	-1.4	2.22 V	255	62.4	4.4
4	*5510.00	109.7 PK			1.37 V	62	69.6	40.1
5	*5510.00	99.5 AV			1.37 V	62	59.4	40.1
6	11020.00	60.4 PK	74.0	-13.6	1.48 V	196	42.0	18.4
7	11020.00	46.7 AV	54.0	-7.3	1.48 V	196	28.3	18.4

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 110	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	*5550.00	111.7 PK			1.89 H	7	71.7	40.0
2	*5550.00	101.8 AV			1.89 H	7	61.8	40.0
3	11100.00	61.5 PK	74.0	-12.5	3.01 H	77	44.0	17.5
4	11100.00	48.1 AV	54.0	-5.9	3.01 H	77	30.6	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	*5550.00	111.5 PK			1.02 V	260	71.5	40.0
2	*5550.00	101.4 AV			1.02 V	260	61.4	40.0
3	11100.00	66.1 PK	74.0	-7.9	1.01 V	219	48.6	17.5
4	11100.00	52.3 AV	54.0	-1.7	1.01 V	219	34.8	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

CHANNEL	TX Channel 134	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	*5670.00	109.8 PK			2.09 H	8	69.7	40.1
2	*5670.00	99.9 AV			2.09 H	8	59.8	40.1
3	#5725.00	65.1 PK	68.2	-3.1	2.19 H	338	60.7	4.4
4	11340.00	60.2 PK	74.0	-13.8	2.30 H	292	42.4	17.8
5	11340.00	47.4 AV	54.0	-6.6	2.30 H	292	29.6	17.8
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	*5670.00	110.2 PK			1.05 V	264	70.1	40.1
2	*5670.00	99.9 AV			1.05 V	264	59.8	40.1
3	#5725.00	66.8 PK	68.2	-1.4	1.08 V	270	62.4	4.4
4	11340.00	66.3 PK	74.0	-7.7	1.00 V	225	48.5	17.8
5	11340.00	52.7 AV	54.0	-1.3	1.00 V	225	34.9	17.8

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 58	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	59.9 PK	74.0	-14.1	1.97 H	344	58.1	1.8
2	5150.00	48.1 AV	54.0	-5.9	1.97 H	344	46.3	1.8
3	*5290.00	106.8 PK			1.87 H	352	68.5	38.3
4	*5290.00	96.7 AV			1.87 H	352	58.4	38.3
5	5350.00	63.8 PK	74.0	-10.2	1.94 H	342	62.2	1.6
6	5350.00	51.9 AV	54.0	-2.1	1.94 H	342	50.3	1.6
7	#10580.00	54.4 PK	68.2	-13.8	3.42 H	11	39.4	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	5150.00	62.4 PK	74.0	-11.6	2.51 V	266	60.6	1.8
2	5150.00	50.5 AV	54.0	-3.5	2.51 V	266	48.7	1.8
3	*5290.00	107.7 PK			2.48 V	260	69.4	38.3
4	*5290.00	97.5 AV			2.48 V	260	59.2	38.3
5	5350.00	64.7 PK	74.0	-9.3	2.42 V	264	63.1	1.6
6	5350.00	52.6 AV	54.0	-1.4	2.42 V	264	51.0	1.6
7	#10580.00	54.7 PK	68.2	-13.5	1.12 V	322	39.7	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

CHANNEL	TX Channel 106	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	5460.00	65.7 PK	74.0	-8.3	1.83 H	352	61.3	4.4
2	5460.00	50.9 AV	54.0	-3.1	1.83 H	352	46.5	4.4
3	#5470.00	65.1 PK	68.2	-3.1	1.82 H	351	60.7	4.4
4	*5530.00	106.9 PK			2.64 H	289	66.8	40.1
5	*5530.00	96.7 AV			2.64 H	289	56.6	40.1
6	#5725.00	54.7 PK	68.2	-13.5	1.96 H	287	50.3	4.4
7	11060.00	60.5 PK	74.0	-13.5	2.55 H	294	42.6	17.9
8	11060.00	46.7 AV	54.0	-7.3	2.55 H	294	28.8	17.9
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	5460.00	62.7 PK	74.0	-11.3	1.26 V	260	58.3	4.4
2	5460.00	48.4 AV	54.0	-5.6	1.26 V	260	44.0	4.4
3	#5470.00	66.7 PK	68.2	-1.5	1.01 V	261	62.3	4.4
4	*5530.00	105.8 PK			1.04 V	258	65.7	40.1
5	*5530.00	95.5 AV			1.04 V	258	55.4	40.1
6	#5725.00	55.3 PK	68.2	-12.9	1.31 V	286	50.9	4.4
7	11060.00	60.1 PK	74.0	-13.9	1.44 V	269	42.2	17.9
8	11060.00	46.9 AV	54.0	-7.1	1.44 V	269	29.0	17.9

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 122	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	5460.00	63.6 PK	74.0	-10.4	2.82 H	288	59.2	4.4
2	5460.00	47.0 AV	54.0	-7.0	2.82 H	288	42.6	4.4
3	#5470.00	65.6 PK	68.2	-2.6	2.35 H	334	61.2	4.4
4	*5610.00	108.6 PK			2.72 H	290	68.5	40.1
5	*5610.00	98.0 AV			2.72 H	290	57.9	40.1
6	#5725.00	62.6 PK	68.2	-5.6	2.39 H	279	58.2	4.4
7	11220.00	60.1 PK	74.0	-13.9	2.29 H	138	42.4	17.7
8	11220.00	47.3 AV	54.0	-6.7	2.29 H	138	29.6	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	5460.00	62.9 PK	74.0	-11.1	2.27 V	277	58.5	4.4
2	5460.00	48.1 AV	54.0	-5.9	2.27 V	277	43.7	4.4
3	#5470.00	66.7 PK	68.2	-1.5	1.01 V	261	62.3	4.4
4	*5610.00	108.6 PK			2.52 V	237	68.5	40.1
5	*5610.00	98.4 AV			2.52 V	237	58.3	40.1
6	#5725.00	64.5 PK	68.2	-3.7	2.43 V	235	60.1	4.4
7	11220.00	64.9 PK	74.0	-9.1	1.01 V	222	47.2	17.7
8	11220.00	51.1 AV	54.0	-2.9	1.01 V	222	33.4	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

Below 1GHz Worst-Case Data:

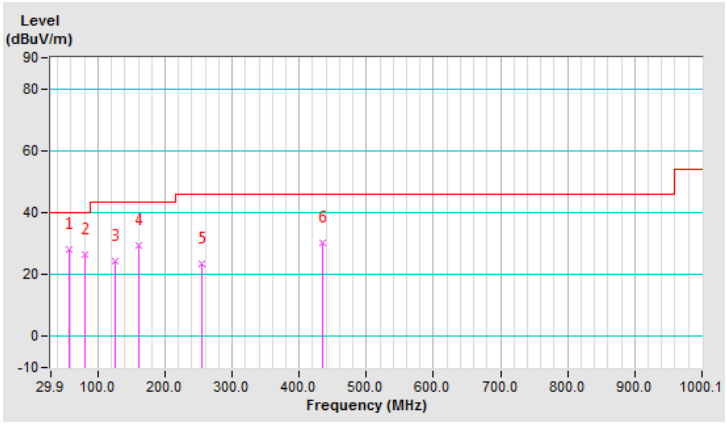
802.11a

CHANNEL	TX Channel 52	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	28.3 QP	40.0	-11.7	1.99 H	46	37.8	-9.5
2	80.45	26.4 QP	40.0	-13.6	1.99 H	69	39.8	-13.4
3	125.17	24.3 QP	43.5	-19.2	1.49 H	208	35.2	-10.9
4	160.17	29.3 QP	43.5	-14.2	1.49 H	81	38.0	-8.7
5	255.44	23.6 QP	46.0	-22.4	1.00 H	247	32.4	-8.8
6	434.31	30.3 QP	46.0	-15.7	1.00 H	235	34.3	-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. 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

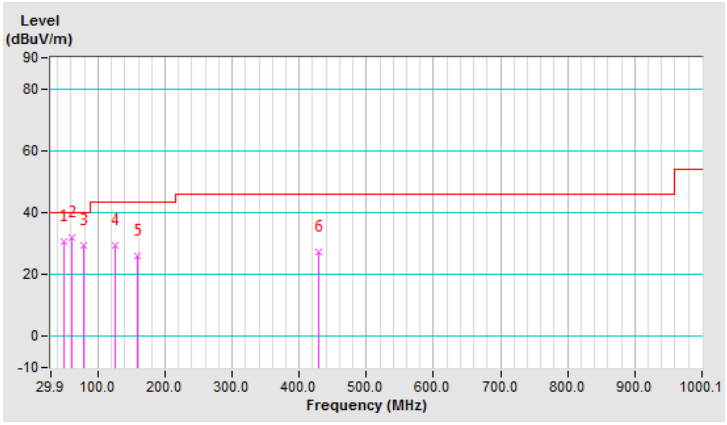


CHANNEL	TX Channel 52	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	A		

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	49.34	30.6 QP	40.0	-9.4	1.01 V	1	39.9	-9.3
2	61.01	32.0 QP	40.0	-8.0	1.51 V	5	41.8	-9.8
3	78.51	29.6 QP	40.0	-10.4	1.51 V	113	42.6	-13.0
4	125.17	29.6 QP	43.5	-13.9	1.01 V	354	40.5	-10.9
5	158.22	26.1 QP	43.5	-17.4	1.01 V	260	34.8	-8.7
6	428.48	27.4 QP	46.0	-18.6	1.99 V	30	31.6	-4.2

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 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

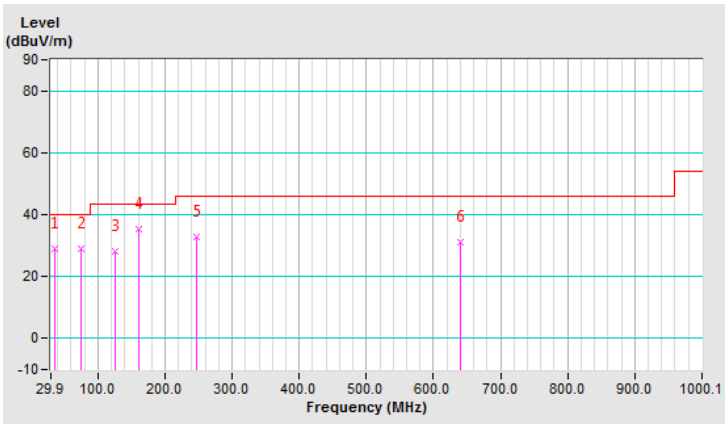


CHANNEL	TX Channel 52	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

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	35.73	29.1 QP	40.0	-10.9	1.99 H	212	39.8	-10.7
2	74.62	28.8 QP	40.0	-11.2	1.00 H	231	40.8	-12.0
3	125.17	28.3 QP	43.5	-15.2	1.99 H	277	39.2	-10.9
4	160.17	35.5 QP	43.5	-8.0	1.49 H	265	44.2	-8.7
5	247.66	32.8 QP	46.0	-13.2	1.00 H	105	42.0	-9.2
6	640.41	30.9 QP	46.0	-15.1	1.49 H	16	30.6	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

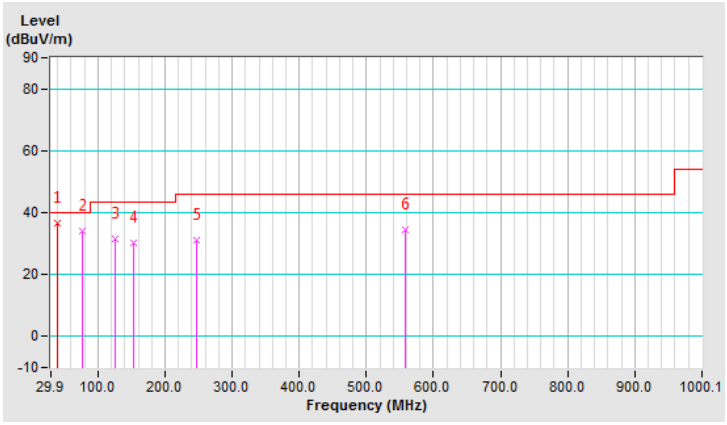


CHANNEL	TX Channel 52	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		
TEST MODE	B		

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	40.48	36.7 QP	40.0	-3.3	1.00 V	187	46.6	-9.9
2	76.56	34.2 QP	40.0	-5.8	1.00 V	306	46.7	-12.5
3	125.17	31.4 QP	43.5	-12.1	1.00 V	193	42.3	-10.9
4	152.39	30.4 QP	43.5	-13.1	1.00 V	251	39.2	-8.8
5	247.66	31.0 QP	46.0	-15.0	1.99 V	152	40.2	-9.2
6	558.75	34.6 QP	46.0	-11.4	1.00 V	105	36.4	-1.8

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 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.

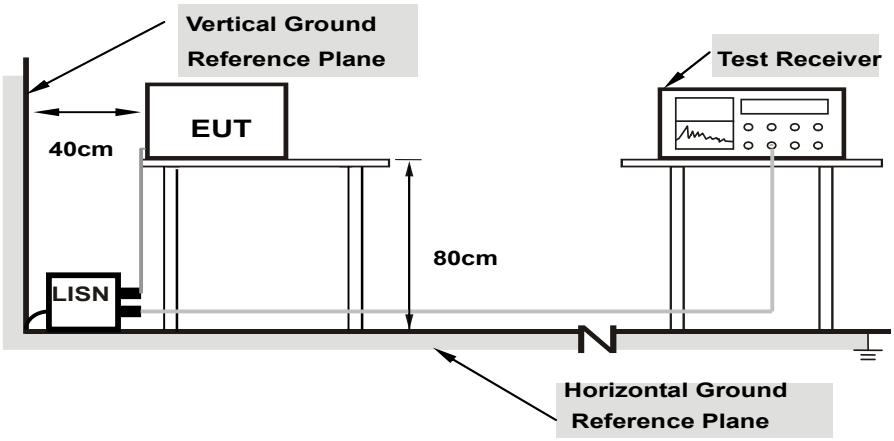
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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:

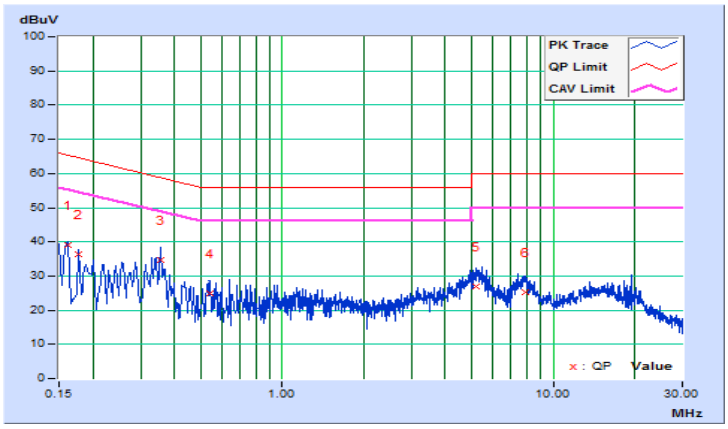
802.11a

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	0.16139	10.16	28.89	16.06	39.05	26.22	65.39	55.39	-26.34	-29.17
2	0.17744	10.16	26.14	10.53	36.30	20.69	64.60	54.60	-28.30	-33.91
3	0.35723	10.19	24.37	15.73	34.56	25.92	58.79	48.79	-24.23	-22.87
4	0.53804	10.20	14.86	6.62	25.06	16.82	56.00	46.00	-30.94	-29.18
5	5.18999	10.41	16.54	7.65	26.95	18.06	60.00	50.00	-33.05	-31.94
6	7.88398	10.54	14.59	7.63	25.13	18.17	60.00	50.00	-34.87	-31.83

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.

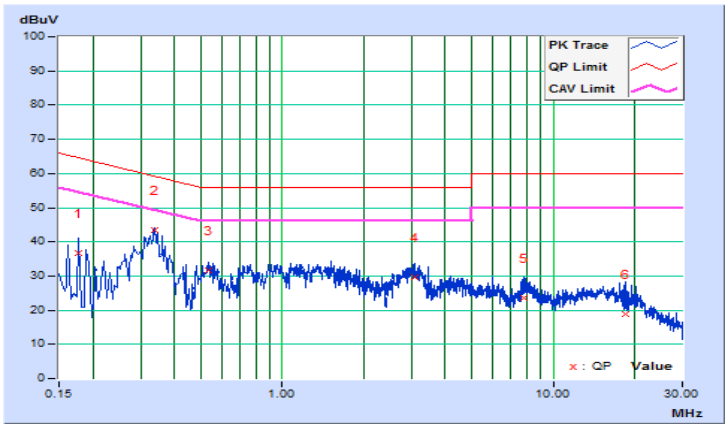


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.17737	10.15	26.41	10.82	36.56	20.97	64.61	54.61	-28.05	-33.64
2	**0.33768**	**10.19**	**33.19**	**27.55**	**43.38**	**37.74**	**59.26**	**49.26**	**-15.88**	**-11.52**
3	0.53709	10.20	21.52	15.77	31.72	25.97	56.00	46.00	-24.28	-20.03
4	3.09032	10.29	19.47	12.98	29.76	23.27	56.00	46.00	-26.24	-22.73
5	7.79014	10.49	13.21	7.19	23.70	17.68	60.00	50.00	-36.30	-32.32
6	18.44880	10.95	7.90	1.81	18.85	12.76	60.00	50.00	-41.15	-37.24

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.

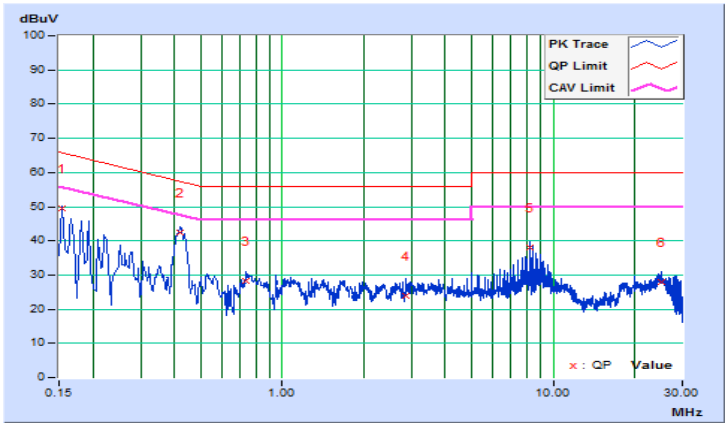


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15391	10.10	39.51	27.79	49.61	37.89	65.79	55.79	-16.18	-17.90
2	0.41890	10.12	32.47	24.44	42.59	34.56	57.47	47.47	-14.88	-12.91
3	0.73650	10.13	17.99	11.66	28.12	21.79	56.00	46.00	-27.88	-24.21
4	2.87136	10.23	13.77	7.95	24.00	18.18	56.00	46.00	-32.00	-27.82
5	8.16550	10.52	27.69	27.26	38.21	37.78	60.00	50.00	-21.79	-12.22
6	25.10362	11.31	16.79	12.16	28.10	23.47	60.00	50.00	-31.90	-26.53

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.

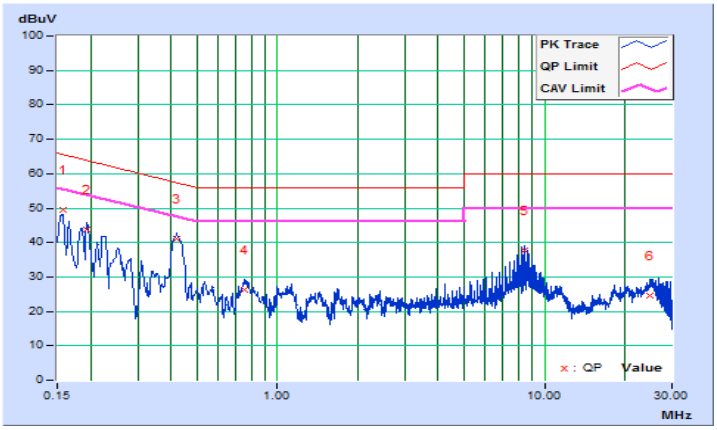


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.15719	10.10	39.55	28.99	49.65	39.09	65.61	55.61	-15.96	-16.52
2	0.19305	10.10	33.56	20.56	43.66	30.66	63.90	53.90	-20.24	-23.24
3	0.41979	10.12	31.04	22.69	41.16	32.81	57.45	47.45	-16.29	-14.64
4	0.75214	10.13	15.97	9.73	26.10	19.86	56.00	46.00	-29.90	-26.14
5	8.46657	10.45	27.30	26.57	37.75	37.02	60.00	50.00	-22.25	-12.98
6	24.95113	11.01	13.68	8.65	24.69	19.66	60.00	50.00	-35.31	-30.34

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

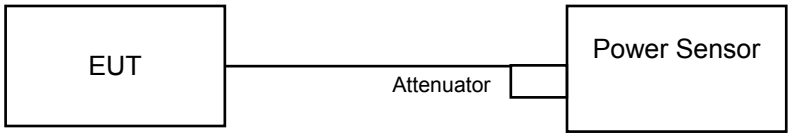
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

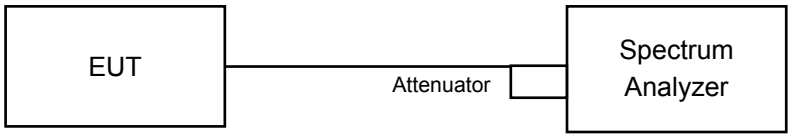
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

For Power Output



For 26dB 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, 802.11n (HT20), 802.11n (HT40)

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.

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

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	20.77	20.40	229.047	23.60	24.00	Pass
60	5300	20.45	20.31	218.316	23.39	23.89	Pass
64	5320	19.81	19.61	187.130	22.72	23.85	Pass
100	5500	18.76	18.49	145.794	21.64	23.81	Pass
116	5580	19.41	19.37	173.794	22.40	23.80	Pass
140	5700	17.30	17.40	108.657	20.36	23.83	Pass

Note:

Chain 0

1. 11dBm + 10log (20.66) = 24.15 > 24dBm
2. 11dBm + 10log (19.46) = 23.89 < 24dBm
3. 11dBm + 10log (19.52) = 23.90 < 24dBm
4. 11dBm + 10log (19.43) = 23.88 < 24dBm
5. 11dBm + 10log (19.42) = 23.88 < 24dBm
6. 11dBm + 10log (19.48) = 23.89 < 24dBm

Chain 1

1. 11dBm + 10log (20.02) = 24.01 > 24dBm
2. 11dBm + 10log (19.46) = 23.89 < 24dBm
3. 11dBm + 10log (19.29) = 23.85 < 24dBm
4. 11dBm + 10log (19.11) = 23.81 < 24dBm
5. 11dBm + 10log (19.07) = 23.80 < 24dBm
6. 11dBm + 10log (19.19) = 23.83 < 24dBm

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				
52	5260	20.81	20.50	232.706	23.67	24.00	Pass
60	5300	20.90	20.89	245.771	23.91	24.00	Pass
64	5320	19.22	19.20	166.736	22.22	24.00	Pass
100	5500	19.24	19.10	165.229	22.18	24.00	Pass
116	5580	20.63	20.83	**236.671**	23.74	24.00	Pass
140	5700	17.32	17.69	112.700	20.52	24.00	Pass

Note:

Chain 0

1. 11dBm + 10log (20.89) = 24.19 > 24dBm
2. 11dBm + 10log (20.77) = 24.17 > 24dBm
3. 11dBm + 10log (20.44) = 24.10 > 24dBm
4. 11dBm + 10log (20.47) = 24.11 > 24dBm
5. 11dBm + 10log (20.54) = 24.12 > 24dBm
6. 11dBm + 10log (20.40) = 24.09 > 24dBm

Chain 1

1. 11dBm + 10log (21.05) = 24.23 > 24dBm
2. 11dBm + 10log (20.74) = 24.16 > 24dBm
3. 11dBm + 10log (20.51) = 24.11 > 24dBm
4. 11dBm + 10log (20.18) = 24.04 > 24dBm
5. 11dBm + 10log (20.01) = 24.01 > 24dBm
6. 11dBm + 10log (20.07) = 24.02 > 24dBm

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				
54	5270	20.89	20.90	**245.771**	23.91	24.00	Pass
62	5310	19.17	19.12	164.262	22.16	24.00	Pass
102	5510	18.08	17.63	122.212	20.87	24.00	Pass
110	5550	20.40	20.01	209.879	23.22	24.00	Pass
134	5670	19.46	19.40	175.404	22.44	24.00	Pass

Note:
Chain 0
1. 11dBm + 10log (41.20) = 27.14 > 24dBm
2. 11dBm + 10log (40.75) = 27.10 > 24dBm
3. 11dBm + 10log (40.74) = 27.10 > 24dBm
4. 11dBm + 10log (40.98) = 27.12 > 24dBm
5. 11dBm + 10log (56.14) = 28.49 > 24dBm

Chain 1
1. 11dBm + 10log (50.93) = 28.06 > 24dBm
2. 11dBm + 10log (40.91) = 27.11 > 24dBm
3. 11dBm + 10log (40.86) = 27.11 > 24dBm
4. 11dBm + 10log (41.25) = 27.15 > 24dBm
5. 11dBm + 10log (55.64) = 28.45 > 24dBm

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				
58	5290	18.46	18.47	140.453	21.48	24.00	Pass
106	5530	17.82	17.41	115.615	20.63	24.00	Pass
122	5610	19.62	19.65	183.879	22.65	24.00	Pass

Note:
Chain 0
1. 11dBm + 10log (83.67) = 30.22 > 24dBm
2. 11dBm + 10log (83.56) = 30.21 > 24dBm
3. 11dBm + 10log (84.13) = 30.24 > 24dBm

Chain 1
1. 11dBm + 10log (83.40) = 30.21 > 24dBm
2. 11dBm + 10log (83.62) = 30.22 > 24dBm
3. 11dBm + 10log (83.65) = 30.22 > 24dBm

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				
52	5260	19.82	19.53	**185.683**	22.69	23.08	Pass
60	5300	19.54	19.58	180.732	22.57	23.08	Pass
64	5320	19.22	19.20	166.736	22.22	23.08	Pass
100	5500	19.24	19.10	165.229	22.18	23.08	Pass
116	5580	19.59	19.86	**187.819**	22.74	23.08	Pass
140	5700	17.32	17.69	112.700	20.52	23.08	Pass

Note: 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 24-(6.92-6) = 23.08dBm.

Chain 0

1. 11dBm + 10log (20.89) = 24.19 > 24dBm
2. 11dBm + 10log (20.77) = 24.17 > 24dBm
3. 11dBm + 10log (20.44) = 24.10 > 24dBm
4. 11dBm + 10log (20.47) = 24.11 > 24dBm
5. 11dBm + 10log (20.54) = 24.12 > 24dBm
6. 11dBm + 10log (20.40) = 24.09 > 24dBm

Chain 1

1. 11dBm + 10log (21.05) = 24.23 > 24dBm
2. 11dBm + 10log (20.74) = 24.16 > 24dBm
3. 11dBm + 10log (20.51) = 24.11 > 24dBm
4. 11dBm + 10log (20.18) = 24.04 > 24dBm
5. 11dBm + 10log (20.01) = 24.01 > 24dBm
6. 11dBm + 10log (20.07) = 24.02 > 24dBm

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				
54	5270	19.52	19.55	179.693	22.55	23.08	Pass
62	5310	19.17	19.12	164.262	22.16	23.08	Pass
102	5510	18.08	17.63	122.212	20.87	23.08	Pass
110	5550	19.91	19.53	187.692	22.73	23.08	Pass
134	5670	19.46	19.40	175.404	22.44	23.08	Pass

Note: 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 24-(6.92-6) = 23.08dBm.

Chain 0

1. 11dBm + 10log (41.20) = 27.14 > 24dBm
2. 11dBm + 10log (40.75) = 27.10 > 24dBm
3. 11dBm + 10log (40.74) = 27.10 > 24dBm
4. 11dBm + 10log (40.98) = 27.12 > 24dBm
5. 11dBm + 10log (56.14) = 28.49 > 24dBm

Chain 1

1. 11dBm + 10log (50.93) = 28.06 > 24dBm
2. 11dBm + 10log (40.91) = 27.11 > 24dBm
3. 11dBm + 10log (40.86) = 27.11 > 24dBm
4. 11dBm + 10log (41.25) = 27.15 > 24dBm
5. 11dBm + 10log (55.64) = 28.45 > 24dBm

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				
58	5290	18.46	18.47	140.453	21.48	23.08	Pass
106	5530	17.82	17.41	115.615	20.63	23.08	Pass
122	5610	19.62	19.65	183.879	22.65	23.08	Pass

Note: 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 24-(6.92-6) = 23.08dBm.

Chain 0

1. 11dBm + 10log (83.67) = 30.22 > 24dBm
2. 11dBm + 10log (83.56) = 30.21 > 24dBm
3. 11dBm + 10log (84.13) = 30.24 > 24dBm

Chain 1

1. 11dBm + 10log (83.40) = 30.21 > 24dBm
2. 11dBm + 10log (83.62) = 30.22 > 24dBm
3. 11dBm + 10log (83.65) = 30.22 > 24dBm

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	20.66	20.02
60	5300	19.46	19.46
64	5320	19.52	19.29
100	5500	19.43	19.11
116	5580	19.42	19.07
140	5700	19.48	19.19

802.11n (HT20)

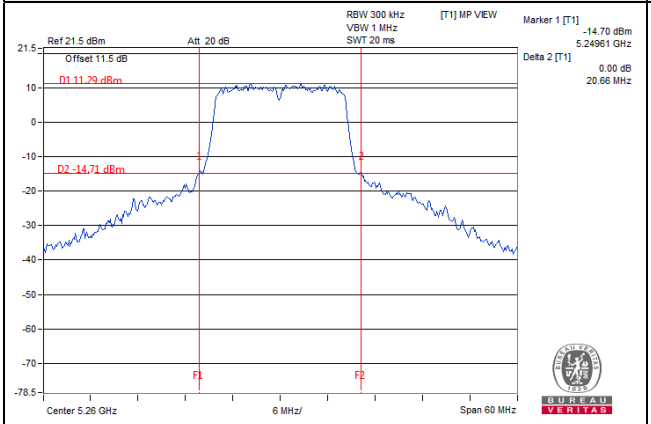
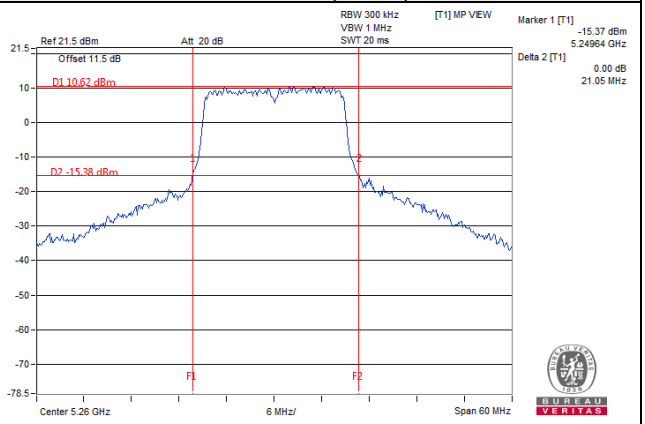
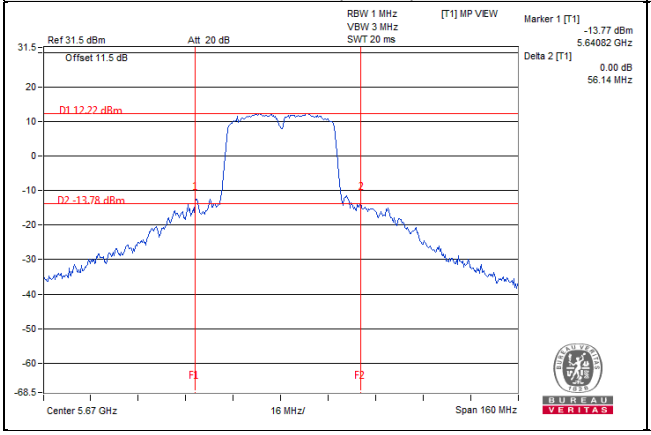
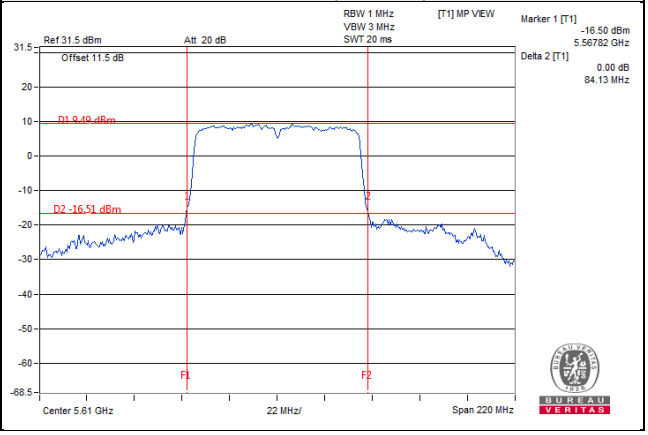
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	20.89	21.05
60	5300	20.77	20.74
64	5320	20.44	20.51
100	5500	20.47	20.18
116	5580	20.54	20.01
140	5700	20.40	20.07

802.11n (HT40)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	41.20	50.93
62	5310	40.75	40.91
102	5510	40.74	40.86
110	5550	40.98	41.25
134	5670	56.14	55.64

802.11ac (VHT80)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	83.67	83.40
106	5530	83.56	83.62
122	5610	84.13	83.65

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

EUT Maximum Conducted Power

CDD Mode

802.11a

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	229.047	23.60
5470~5725	173.794	22.40

802.11n (HT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	245.771	23.91
5470~5725	236.671	23.74

802.11n (HT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	245.771	23.91
5470~5725	209.879	23.22

802.11ac (VHT80)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	140.453	21.48
5470~5725	183.879	22.65

Beamforming Mode

802.11n (HT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	185.683	22.69
5470~5725	187.819	22.74

802.11n (HT40)

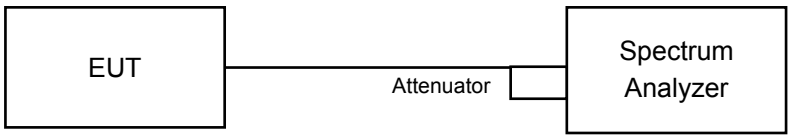
Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	179.693	22.55
5470~5725	187.692	22.73

802.11ac (VHT80)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	140.453	21.48
5470~5725	183.879	22.65

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
52	5260	16.56	16.56
60	5300	16.56	16.56
64	5320	16.44	16.44
100	5500	16.44	16.44
116	5580	16.44	16.44
140	5700	16.44	16.44

802.11n (HT20)

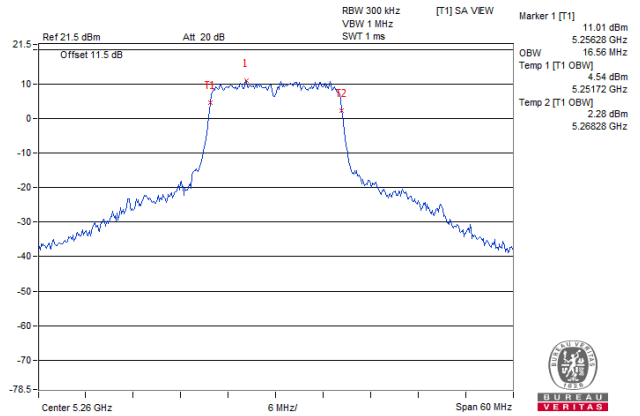
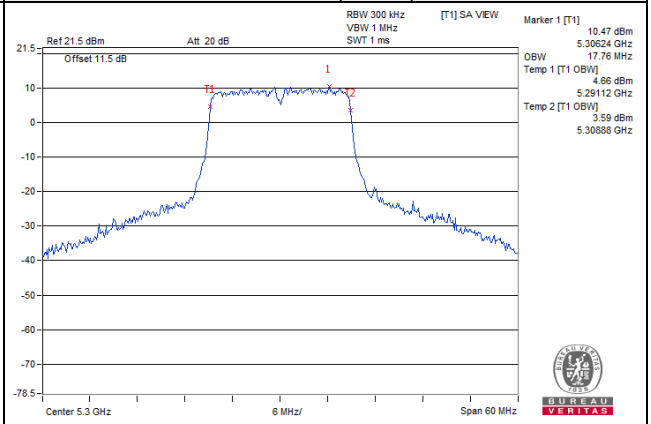
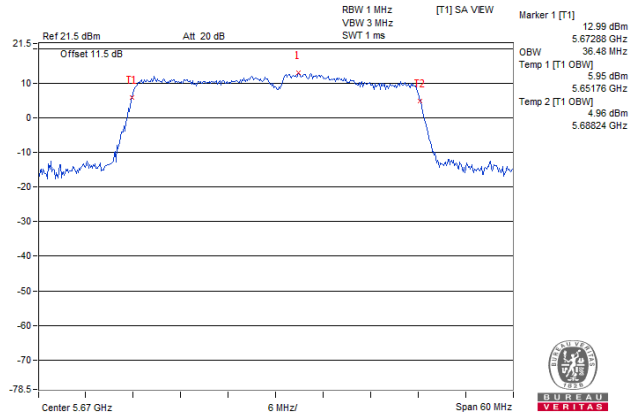
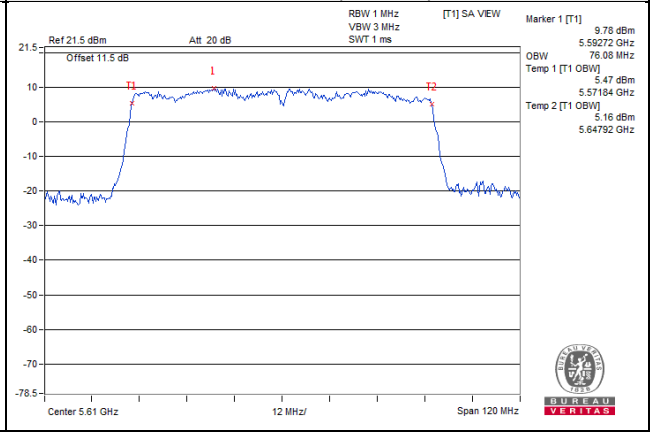
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	17.64	17.76
60	5300	17.76	17.64
64	5320	17.64	17.64
100	5500	17.64	17.52
116	5580	17.64	17.52
140	5700	17.64	17.52

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	36.24	36.24
62	5310	36.00	36.00
102	5510	36.00	36.24
110	5550	36.12	36.24
134	5670	36.12	36.48

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	75.84	75.60
106	5530	75.84	76.08
122	5610	75.84	76.08

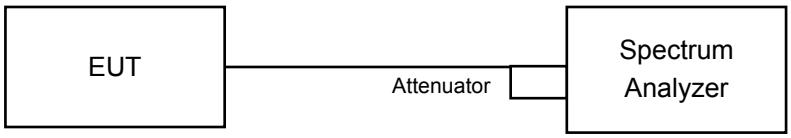
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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

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)

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

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				
52	5260	6.60	6.22	0.18	9.60	10.08	Pass
60	5300	6.50	6.33	0.18	9.60	10.08	Pass
64	5320	5.80	5.51	0.18	8.84	10.08	Pass
100	5500	4.65	4.74	0.18	7.88	10.08	Pass
116	5580	4.73	5.80	0.18	8.48	10.08	Pass
140	5700	3.04	3.91	0.18	6.68	10.08	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 11-(6.92-6) = 10.08dBm.
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				
52	5260	6.11	6.00	0.11	9.18	10.08	Pass
60	5300	6.32	6.47	0.11	9.52	10.08	Pass
64	5320	4.60	5.35	0.11	8.11	10.08	Pass
100	5500	4.72	5.26	0.11	8.12	10.08	Pass
116	5580	4.43	5.87	0.11	8.33	10.08	Pass
140	5700	2.71	4.29	0.11	6.69	10.08	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 11-(6.92-6) = 10.08dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

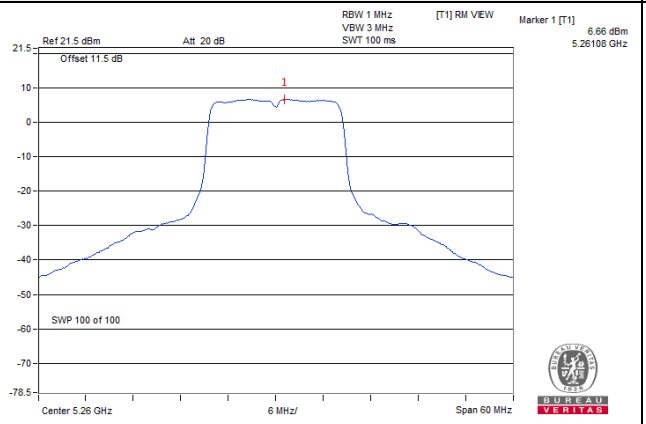
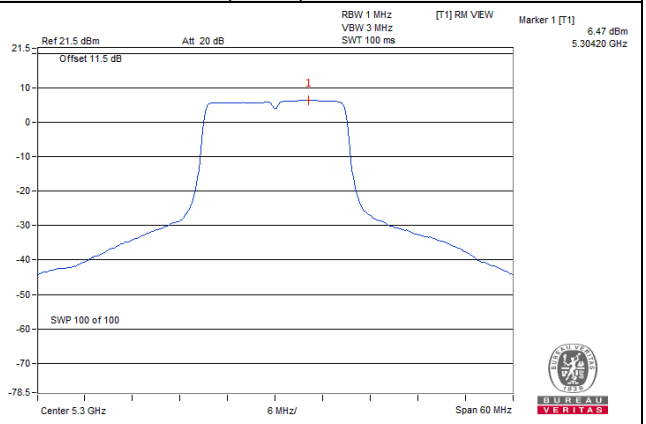
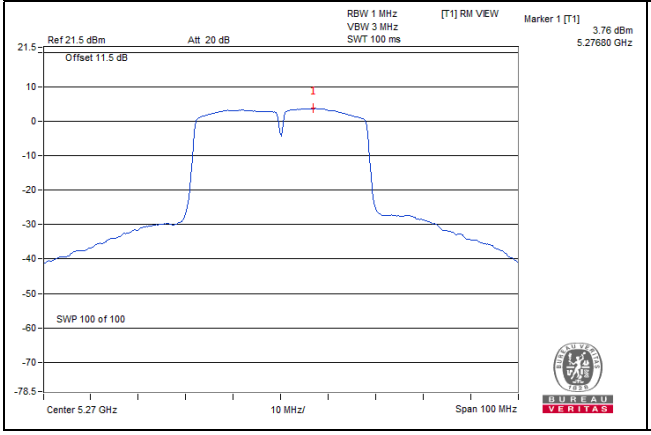
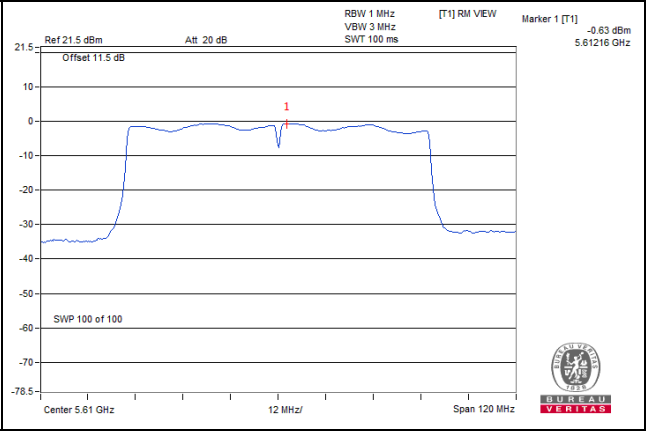
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
54	5270	3.43	3.76	0.15	6.75	10.08	Pass
62	5310	1.86	2.12	0.15	5.15	10.08	Pass
102	5510	0.67	1.19	0.15	4.09	10.08	Pass
110	5550	2.46	3.74	0.15	6.30	10.08	Pass
134	5670	1.74	3.13	0.15	5.65	10.08	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 11-(6.92-6) = 10.08dBm.
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				
58	5290	-2.27	-2.18	0.35	1.13	10.08	Pass
106	5530	-2.85	-2.98	0.35	0.44	10.08	Pass
122	5610	-1.39	-1.00	0.35	2.17	10.08	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 11-(6.92-6) = 10.08dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

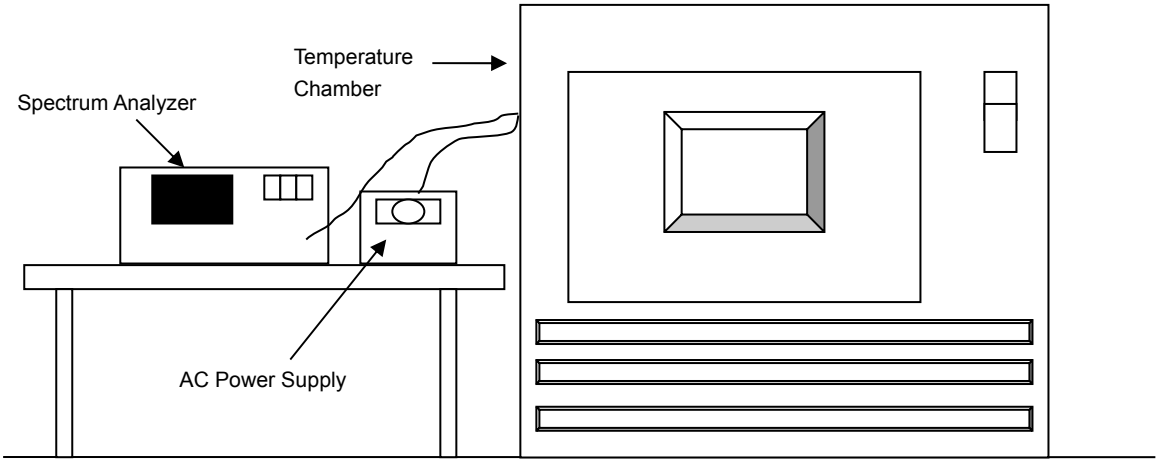
Spectrum Plot of Worst Value	
802.11a / Chain 0 / CH 52	802.11n (HT20) / Chain 1 / CH 60
	
802.11n (HT40) / Chain 1 / CH 54	802.11ac (VHT80) / Chain 1 / 122
	

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: 5260MHz									
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	5260.0165	Pass	5260.0187	Pass	5260.0195	Pass	5260.0195	Pass
40	120	5259.9863	Pass	5259.9892	Pass	5259.9891	Pass	5259.9899	Pass
30	120	5259.9857	Pass	5259.9843	Pass	5259.9852	Pass	5259.9834	Pass
20	120	5259.9949	Pass	5259.9923	Pass	5259.9961	Pass	5259.9934	Pass
10	120	5260.0022	Pass	5260.0016	Pass	5260.0031	Pass	5260.003	Pass
0	120	5259.9839	Pass	5259.9872	Pass	5259.9879	Pass	5259.9855	Pass
-10	120	5259.9861	Pass	5259.9878	Pass	5259.9868	Pass	5259.9893	Pass
-20	120	5259.9784	Pass	5259.9781	Pass	5259.9736	Pass	5259.9747	Pass
-30	120	5259.9949	Pass	5259.9958	Pass	5259.9929	Pass	5259.9958	Pass

Frequency Stability Versus Voltage									
Operating Frequency: 5260MHz									
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	5259.9948	Pass	5259.9923	Pass	5259.9964	Pass	5259.9935	Pass
	120	5259.9949	Pass	5259.9923	Pass	5259.9961	Pass	5259.9934	Pass
	102	5259.994	Pass	5259.9915	Pass	5259.9959	Pass	5259.9935	Pass

5 Pictures of Test Arrangements

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

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:

Linko EMC/RF Lab
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab
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The address and road map of all our labs can be found in our web site also.

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