FCC Test Report

Report No.:	RF180316C33A
FCC ID:	2AKCZ-0CF
Test Model:	APL44-0CF
Received Date:	Mar. 16, 2018
Test Date:	Mar. 19 ~ Mar. 29, 2018
Issued Date:	Jun. 05, 2018
Applicant:	SonicWall Inc.
Address:	1033 McCarthy Blvd., Milpitas, CA 95035, USA
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
RF180316C33A	Original release	Jun. 05, 2018

1 Certificate of Conformity

Product:	Wireless Access Point
Brand:	SONICWALL
Test Model:	APL44-0CF
Sample Status:	Engineering sample
Applicant:	SonicWall Inc.
Test Date:	Mar. 19 ~ Mar. 29, 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:** Jun. 05, 2018

Celine Chou / Specialist

Approved by : Bruce Chen , **Date:** Jun. 05, 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 -11.40dB at 0.20201MHz.
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 -1.3dB at 5725.00MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only.
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	Antenna connector is I-PEX 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	3.86 dB
	200MHz ~1000MHz	3.87 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.29 dB
	18GHz ~ 40GHz	2.29 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Wireless Access Point
Brand	SONICWALL
Test Model	APL44-0CF
Sample Status	Engineering sample
Power Supply Rating	12Vdc from Adapter 52Vdc 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 ~ 5720MHz
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 ~ 5720MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 12 802.11n (HT40), 802.11ac (VHT40): 6 802.11ac (VHT80): 3
Output Power	CDD Mode: 5260 ~ 5320MHz: 227.597mW 5500 ~ 5720MHz: 241.481mW Beamforming Mode: 5260 ~ 5320MHz: 113.806mW 5500 ~ 5720MHz: 120.749mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Cable Supplied	1.75m non-shielded RJ45 cable without core

Note:

1. This report is prepared for FCC class II permissive change. The differences compared with the original report (BV ADT report no.: RF180316C33-1) are adding 5.26GHz to 5.32GHz and 5.50GHz to 5.72GHz by software and adding a crystal (BTY2) and corresponding passive components(BC46, C208) in our platform for BTE. This RTC has nothing to do with BLE RF power, regardless of any BLE signal quality.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 2 completed transmitters and 2 receivers.

Modulation Mode	Beamforming Mode	TX Function	Remark
802.11a	Not Support	2TX	Radio 2 (Ant. 3, 4)
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. (support unit only)

Adapter	
Brand	Powertron Electronics Corp.
Model	PA1015-120DUB150
Input	100-240Vac~50-60Hz 0.4A
Output	12Vdc/ 1.5A 18W Max.
Power Line	1.5m cable without core attached on adapter

PoE	
Brand	DELL
Model	ADPE01-0B1
Input	100-240Vac~50-60Hz 0.6A
Output	52Vdc/ 0.58A

4. The following antennas were provided to the EUT.

Ant. No.	1	2	3	4	5 (BLE)	6 (Scan)
Ant. Type	PIFA	PIFA	PIFA	PIFA	PCB	PCB
Ant. Connector	IPEX	IPEX	IPEX	IPEX	IPEX	IPEX
Frequency (MHz)	2400-2500		5150-5850		2400-2500	2400-2500
Peak Gain (dBi)	4.58	3.63	5.56	4.58	5.80	3.89

3.2 Description of Test Modes

For 5260 ~ 5320MHz:

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

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

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

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

For 5500 ~ 5720MHz:

12 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	144	5720 MHz

6 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	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz
138	5690 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 **Z-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	5500-5720	100 to 144	100, 116, 140, 144	OFDM	6.0
	802.11n (HT20)		100 to 144	100, 116, 140, 144	OFDM	6.5
	802.11n (HT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	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	5500-5720	100 to 144		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	5500-5720	100 to 144		OFDM	6.0

Peak Power Spectral Density, Bandwidth and Frequency Stability Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
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	5500-5720	100 to 144	100, 116, 140, 144	OFDM	6.0
	802.11n (HT20)		100 to 144	100, 116, 140, 144	OFDM	6.5
	802.11n (HT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	29.3

Transmit Power Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
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	5500-5720	100 to 144	100, 116, 140, 144	OFDM	6.0
	802.11n (HT20)		100 to 144	100, 116, 140, 144	OFDM	6.5
	802.11n (HT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	29.3
Beamforming Mode						
A	802.11n (HT20)	5260-5320	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	802.11n (HT20)	5500-5720	100 to 144	100, 116, 140, 144	OFDM	6.5
	802.11n (HT40)		102 to 142	102, 110, 134, 142	OFDM	13.5
	802.11ac (VHT80)		106 to 138	106, 122, 138	OFDM	29.3

Test Condition:

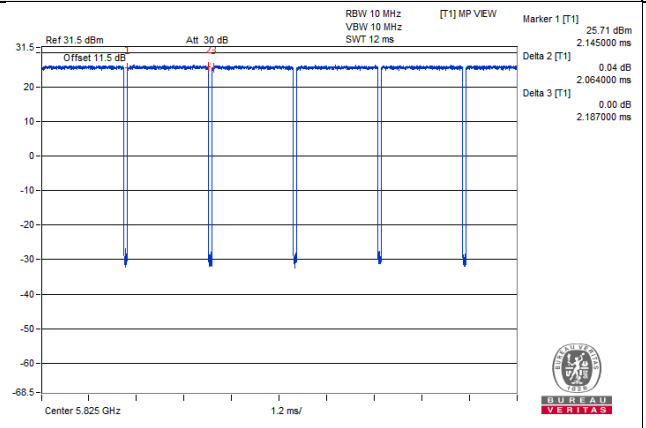
Applicable to	Environmental Conditions	Input Power (System)	Tested by
RE≥1G	24 deg. C, 66% RH 23 deg. C, 69% RH	120Vac, 60Hz	Adair Peng Will Cheng
RE<1G	23 deg. C, 66% RH	120Vac, 60Hz 52Vdc	Will Cheng
PLC	25 deg. C, 75% RH	120Vac, 60Hz 52Vdc	Adair Peng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Chris Lin

3.3 Duty Cycle of Test Signal

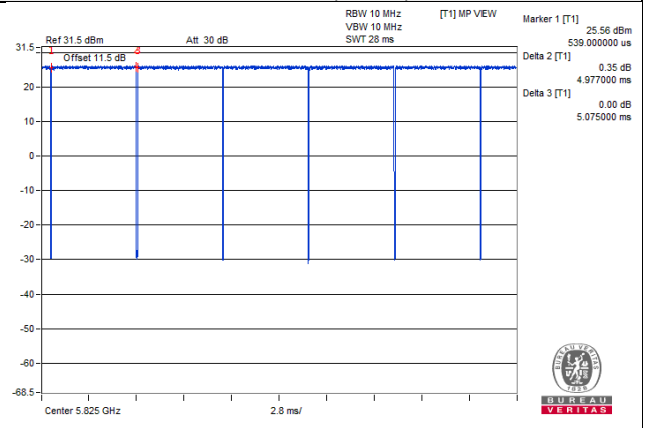
802.11n (HT20): Duty cycle of test signal is > 98%, duty factor is not required.
802.11a, 802.11n (HT40), 802.11ac (VHT80): Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.064/2.187 = 0.944, Duty factor = 10 * log (1/0.944) = 0.25
802.11n (HT20): Duty cycle = 4.977/5.075 = 0.981
802.11n (HT40): Duty cycle = 2.415/2.508 = 0.963, Duty factor = 10 * log (1/0.963) = 0.16
802.11ac (VHT80): Duty cycle = 1.140/1.234 = 0.924, Duty factor = 10 * log (1/0.924) = 0.34

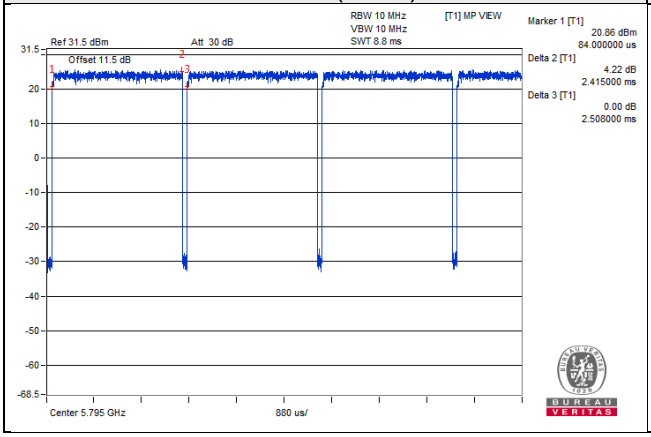
802.11a



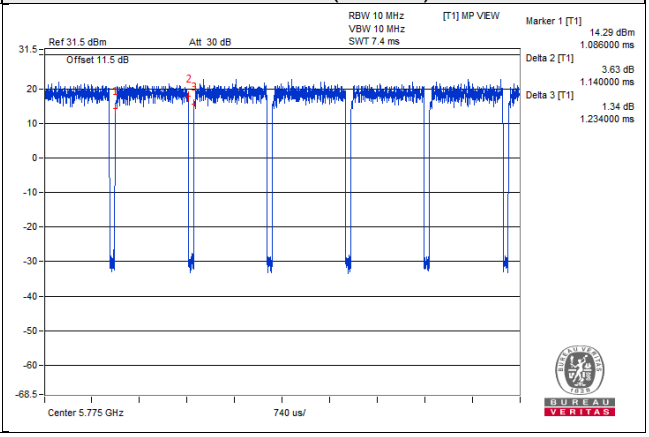
802.11n (HT20)



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	E5410	6RP2YM1	FCC DoC Approved	-
B.	USB Flash	HP	v250W	01	FCC DoC Approved	-
C.	Adapter	Powertron Electronics Corp.	PA1015-120DUB150	NA	NA	Provided by client
D.	PoE	DELL	ADPE01-0B1	NA	NA	Provided by client

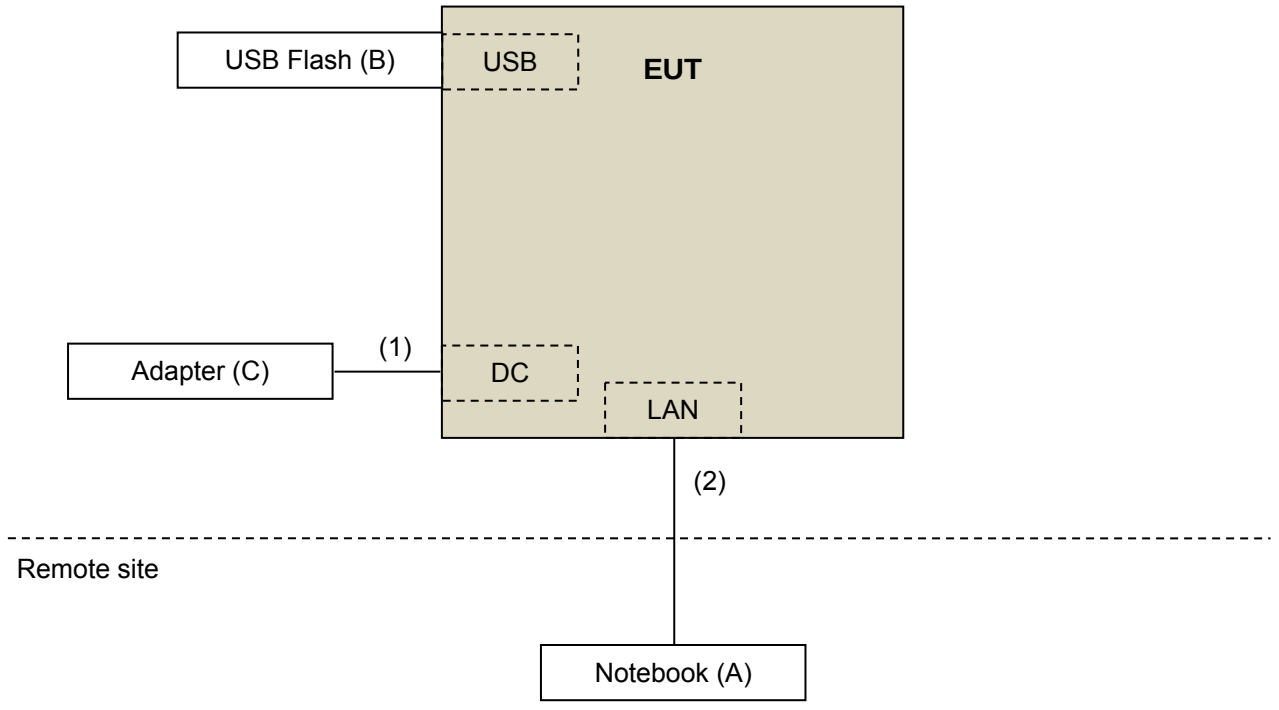
Note:

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.

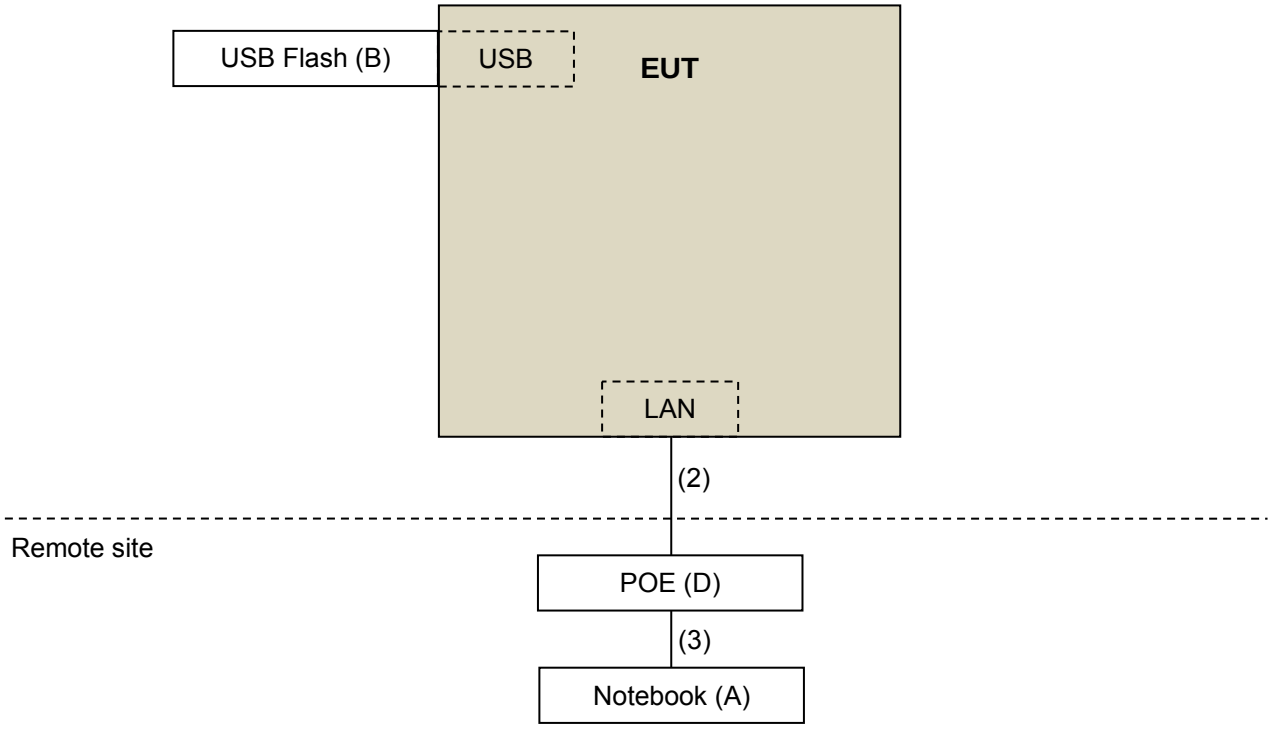
ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	DC cable	1	1.5	N	0	Attached on adapter
2.	RJ45, Cat5e	1	3	N	0	-
3.	RJ45, Cat5e	1	1.8	N	0	-

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 ROHDE & SCHWARZ	ESIB7	100187	May 02, 2017	May 01, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2017	Aug. 20, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A01976	Aug. 21, 2017	Aug. 20, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2017	Aug. 20, 2018
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-SM-8000	Cable-CH3-03 (309224+170907)	Sep.11, 2017	Sep. 10, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A1960	Aug. 08, 2017	Aug. 07, 2018
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 3.
3. The horn antenna and preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
5. The IC Site Registration No. is IC 7450F-3.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.

3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.

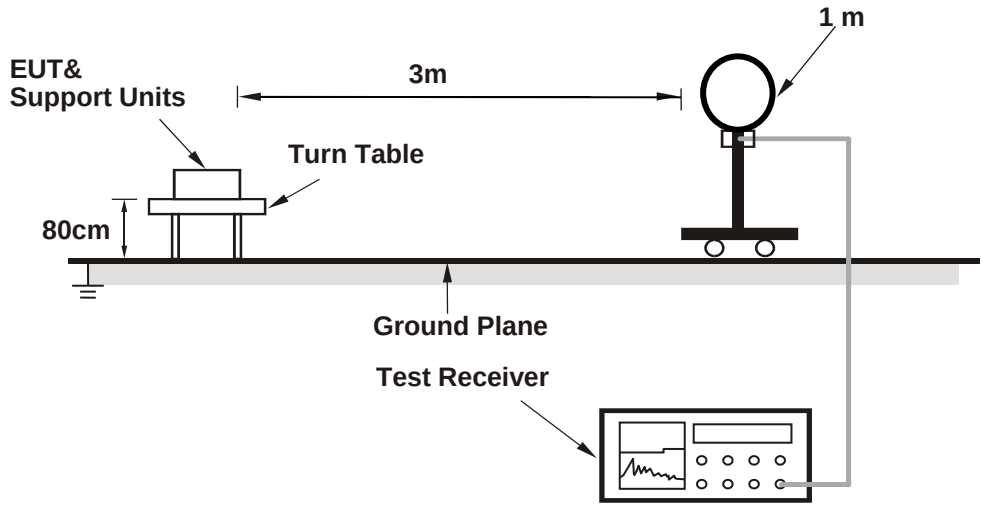
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

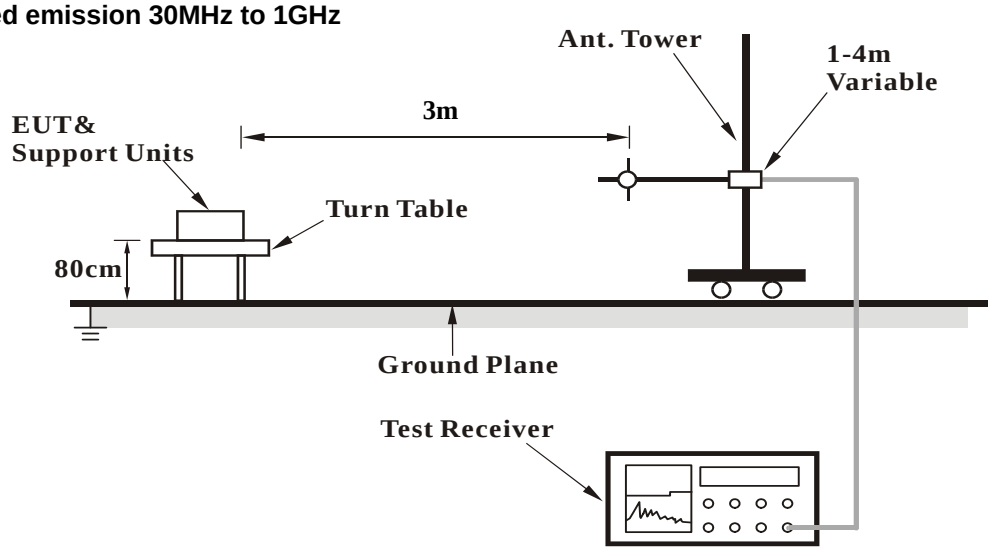
No deviation.

4.1.5 Test Setup

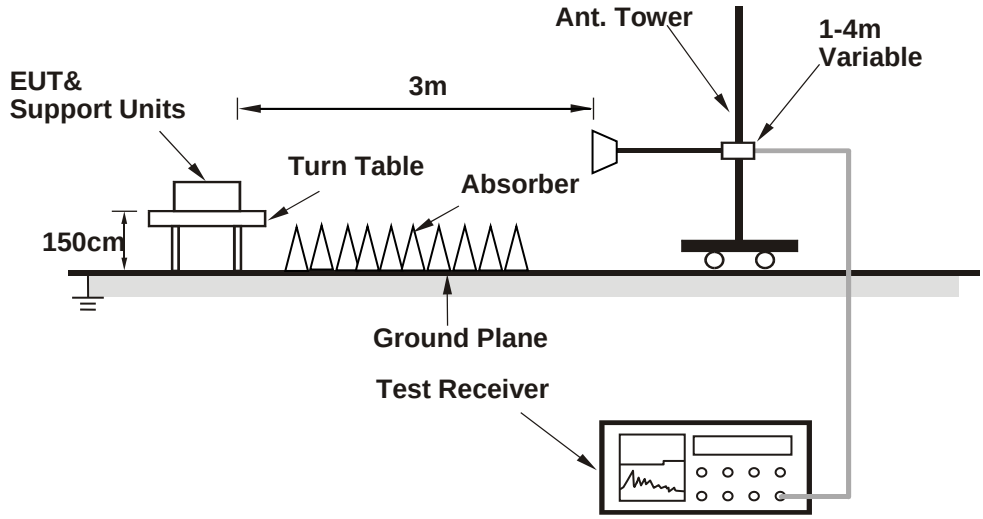
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The 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	56.0 PK	74.0	-18.0	1.91 H	293	52.3	3.7
2	5150.00	43.7 AV	54.0	-10.3	1.91 H	293	40.0	3.7
3	*5260.00	118.1 PK			1.80 H	289	78.7	39.4
4	*5260.00	107.5 AV			1.80 H	289	68.1	39.4
5	#10520.00	58.4 PK	74.0	-15.6	2.04 H	188	41.6	16.8
6	#10520.00	45.4 AV	54.0	-8.6	2.04 H	188	28.6	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	55.2 PK	74.0	-18.8	1.69 V	343	51.5	3.7
2	5150.00	42.3 AV	54.0	-11.7	1.69 V	343	38.6	3.7
3	*5260.00	117.4 PK			1.61 V	355	78.0	39.4
4	*5260.00	106.3 AV			1.61 V	355	66.9	39.4
5	#10520.00	58.0 PK	74.0	-16.0	1.93 V	199	41.2	16.8
6	#10520.00	45.1 AV	54.0	-8.9	1.93 V	199	28.3	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	118.3 PK			1.91 H	283	78.9	39.4
2	*5300.00	107.6 AV			1.91 H	283	68.2	39.4
3	10600.00	58.3 PK	74.0	-15.7	2.22 H	188	41.4	16.9
4	10600.00	45.1 AV	54.0	-8.9	2.22 H	188	28.2	16.9
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	*5300.00	117.3 PK			1.61 V	352	77.9	39.4
2	*5300.00	106.1 AV			1.61 V	352	66.7	39.4
3	10600.00	57.9 PK	74.0	-16.1	2.22 V	193	41.0	16.9
4	10600.00	44.7 AV	54.0	-9.3	2.22 V	193	27.8	16.9

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 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	117.0 PK			1.71 H	279	77.5	39.5
2	*5320.00	106.4 AV			1.71 H	279	66.9	39.5
3	5350.00	70.7 PK	74.0	-3.3	1.72 H	287	66.9	3.8
4	5350.00	52.3 AV	54.0	-1.7	1.72 H	287	48.5	3.8
5	10640.00	58.0 PK	74.0	-16.0	1.97 H	231	41.0	17.0
6	10640.00	44.9 AV	54.0	-9.1	1.97 H	231	27.9	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	116.8 PK			1.40 V	359	77.3	39.5
2	*5320.00	105.5 AV			1.40 V	359	66.0	39.5
3	5350.00	65.7 PK	74.0	-8.3	1.54 V	353	61.9	3.8
4	5350.00	48.2 AV	54.0	-5.8	1.54 V	353	44.4	3.8
5	10640.00	57.6 PK	74.0	-16.4	1.77 V	288	40.6	17.0
6	10640.00	44.2 AV	54.0	-9.8	1.77 V	288	27.2	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	61.0 PK	74.0	-13.0	1.76 H	293	56.8	4.2
2	5460.00	46.3 AV	54.0	-7.7	1.76 H	293	42.1	4.2
3	#5470.00	71.6 PK	74.0	-2.4	1.89 H	287	67.4	4.2
4	#5470.00	52.3 AV	54.0	-1.7	1.89 H	287	48.1	4.2
5	*5500.00	117.8 PK			2.49 H	294	77.7	40.1
6	*5500.00	106.9 AV			2.49 H	294	66.8	40.1
7	11000.00	59.9 PK	74.0	-14.1	1.89 H	203	41.2	18.7
8	11000.00	46.6 AV	54.0	-7.4	1.89 H	203	27.9	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	59.8 PK	74.0	-14.2	3.71 V	309	55.6	4.2
2	5460.00	45.3 AV	54.0	-8.7	3.71 V	309	41.1	4.2
3	#5470.00	69.6 PK	74.0	-4.4	3.62 V	318	65.4	4.2
4	#5470.00	50.4 AV	54.0	-3.6	3.62 V	318	46.2	4.2
5	*5500.00	116.0 PK			3.80 V	333	75.9	40.1
6	*5500.00	104.8 AV			3.80 V	333	64.7	40.1
7	11000.00	59.7 PK	74.0	-14.3	2.47 V	188	41.0	18.7
8	11000.00	46.2 AV	54.0	-7.8	2.47 V	188	27.5	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	118.3 PK			2.51 H	293	78.3	40.0
2	*5580.00	107.3 AV			2.51 H	293	67.3	40.0
3	11160.00	58.9 PK	74.0	-15.1	1.77 H	204	41.2	17.7
4	11160.00	45.6 AV	54.0	-8.4	1.77 H	204	27.9	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	*5580.00	115.8 PK			3.85 V	319	75.8	40.0
2	*5580.00	104.9 AV			3.85 V	319	64.9	40.0
3	11160.00	58.8 PK	74.0	-15.2	1.89 V	217	41.1	17.7
4	11160.00	45.5 AV	54.0	-8.5	1.89 V	217	27.8	17.7

Remarks:

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

CHANNEL	TX Channel 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	116.9 PK			2.34 H	301	76.9	40.0
2	*5700.00	106.1 AV			2.34 H	301	66.1	40.0
3	#5725.00	69.7 PK	74.0	-4.3	1.71 H	297	65.6	4.1
4	**#5725.00**	**52.7 AV**	**54.0**	**-1.3**	**1.71 H**	**297**	**48.6**	**4.1**
5	11400.00	60.8 PK	74.0	-13.2	1.89 H	212	43.1	17.7
6	11400.00	46.6 AV	54.0	-7.4	1.89 H	212	28.9	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	*5700.00	114.4 PK			3.83 V	323	74.4	40.0
2	*5700.00	103.5 AV			3.83 V	323	63.5	40.0
3	#5725.00	68.0 PK	74.0	-6.0	3.97 V	324	63.9	4.1
4	#5725.00	50.6 AV	54.0	-3.4	3.97 V	324	46.5	4.1
5	11400.00	60.4 PK	74.0	-13.6	1.78 V	218	42.7	17.7
6	11400.00	46.6 AV	54.0	-7.4	1.78 V	218	28.9	17.7

Remarks:

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

CHANNEL	TX Channel 144	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	54.5 PK	74.0	-19.5	2.25 H	301	50.3	4.2
2	5460.00	42.2 AV	54.0	-11.8	2.25 H	301	38.0	4.2
3	#5470.00	56.4 PK	74.0	-17.6	2.20 H	290	52.2	4.2
4	#5470.00	42.5 AV	54.0	-11.5	2.20 H	290	38.3	4.2
5	*5720.00	119.0 PK			2.42 H	298	79.0	40.0
6	*5720.00	107.5 AV			2.42 H	298	67.5	40.0
7	#5825.00	56.9 PK	74.0	-17.1	2.55 H	313	52.3	4.6
8	#5825.00	43.5 AV	54.0	-10.5	2.55 H	313	38.9	4.6
9	11440.00	60.5 PK	74.0	-13.5	2.01 H	243	42.6	17.9
10	11440.00	47.5 AV	54.0	-6.5	2.01 H	243	29.6	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	54.4 PK	74.0	-19.6	1.43 V	10	50.2	4.2
2	5460.00	42.1 AV	54.0	-11.9	1.43 V	10	37.9	4.2
3	#5470.00	56.3 PK	74.0	-17.7	1.39 V	13	52.1	4.2
4	#5470.00	42.4 AV	54.0	-11.6	1.39 V	13	38.2	4.2
5	*5720.00	116.7 PK			1.35 V	7	76.7	40.0
6	*5720.00	105.5 AV			1.35 V	7	65.5	40.0
7	#5825.00	56.6 PK	74.0	-17.4	1.51 V	355	52.0	4.6
8	#5825.00	43.0 AV	54.0	-11.0	1.51 V	355	38.4	4.6
9	11440.00	60.0 PK	74.0	-14.0	2.43 V	222	42.1	17.9
10	11440.00	47.0 AV	54.0	-7.0	2.43 V	222	29.1	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.

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	55.5 PK	74.0	-18.5	1.76 H	299	51.8	3.7
2	5150.00	43.2 AV	54.0	-10.8	1.76 H	299	39.5	3.7
3	*5260.00	118.7 PK			1.62 H	288	79.3	39.4
4	*5260.00	107.7 AV			1.62 H	288	68.3	39.4
5	#10520.00	58.1 PK	74.0	-15.9	2.21 H	148	41.3	16.8
6	#10520.00	44.7 AV	54.0	-9.3	2.21 H	148	27.9	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	1.98 V	266	50.9	3.7
2	5150.00	42.5 AV	54.0	-11.5	1.98 V	266	38.8	3.7
3	*5260.00	116.9 PK			1.36 V	346	77.5	39.4
4	*5260.00	105.7 AV			1.36 V	346	66.3	39.4
5	#10520.00	57.7 PK	74.0	-16.3	1.89 V	216	40.9	16.8
6	#10520.00	44.4 AV	54.0	-9.6	1.89 V	216	27.6	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	118.1 PK			1.60 H	289	78.7	39.4
2	*5300.00	107.1 AV			1.60 H	289	67.7	39.4
3	10600.00	58.4 PK	74.0	-15.6	2.09 H	184	41.5	16.9
4	10600.00	44.8 AV	54.0	-9.2	2.09 H	184	27.9	16.9
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	*5300.00	116.0 PK			3.53 V	335	76.6	39.4
2	*5300.00	104.7 AV			3.53 V	335	65.3	39.4
3	10600.00	58.6 PK	74.0	-15.4	2.34 V	271	41.7	16.9
4	10600.00	44.3 AV	54.0	-9.7	2.34 V	271	27.4	16.9

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 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	116.9 PK			1.79 H	284	77.4	39.5
2	*5320.00	106.2 AV			1.79 H	284	66.7	39.5
3	5350.00	70.3 PK	74.0	-3.7	2.90 H	295	66.5	3.8
4	5350.00	52.4 AV	54.0	-1.6	2.90 H	295	48.6	3.8
5	10640.00	58.5 PK	74.0	-15.5	1.93 H	212	41.5	17.0
6	10640.00	44.8 AV	54.0	-9.2	1.93 H	212	27.8	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	115.5 PK			3.70 V	336	76.0	39.5
2	*5320.00	104.4 AV			3.70 V	336	64.9	39.5
3	5350.00	68.6 PK	74.0	-5.4	3.66 V	347	64.8	3.8
4	5350.00	49.8 AV	54.0	-4.2	3.66 V	347	46.0	3.8
5	10640.00	57.6 PK	74.0	-16.4	2.64 V	188	40.6	17.0
6	10640.00	45.8 AV	54.0	-8.2	2.64 V	188	28.8	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	57.9 PK	74.0	-16.1	2.49 H	288	53.7	4.2
2	5460.00	44.5 AV	54.0	-9.5	2.49 H	288	40.3	4.2
3	#5470.00	71.2 PK	74.0	-2.8	2.65 H	304	67.0	4.2
4	#5470.00	52.4 AV	54.0	-1.6	2.65 H	304	48.2	4.2
5	*5500.00	118.0 PK			2.50 H	288	77.9	40.1
6	*5500.00	106.6 AV			2.50 H	288	66.5	40.1
7	11000.00	60.3 PK	74.0	-13.7	1.89 H	216	41.6	18.7
8	11000.00	46.1 AV	54.0	-7.9	1.89 H	216	27.4	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	57.7 PK	74.0	-16.3	3.77 V	334	53.5	4.2
2	5460.00	45.4 AV	54.0	-8.6	3.77 V	334	41.2	4.2
3	#5470.00	69.1 PK	74.0	-4.9	3.85 V	345	64.9	4.2
4	#5470.00	50.3 AV	54.0	-3.7	3.85 V	345	46.1	4.2
5	*5500.00	115.9 PK			3.59 V	326	75.8	40.1
6	*5500.00	104.3 AV			3.59 V	326	64.2	40.1
7	11000.00	60.0 PK	74.0	-14.0	2.31 V	178	41.3	18.7
8	11000.00	46.6 AV	54.0	-7.4	2.31 V	178	27.9	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	117.9 PK			2.43 H	287	77.9	40.0
2	*5580.00	106.7 AV			2.43 H	287	66.7	40.0
3	11160.00	59.5 PK	74.0	-14.5	2.02 H	189	41.8	17.7
4	11160.00	45.6 AV	54.0	-8.4	2.02 H	189	27.9	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	*5580.00	116.2 PK			3.84 V	321	76.2	40.0
2	*5580.00	104.7 AV			3.84 V	321	64.7	40.0
3	11160.00	59.5 PK	74.0	-14.5	1.87 V	231	41.8	17.7
4	11160.00	45.6 AV	54.0	-8.4	1.87 V	231	27.9	17.7

Remarks:

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

CHANNEL	TX Channel 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	116.4 PK			2.40 H	288	76.4	40.0
2	*5700.00	105.0 AV			2.40 H	288	65.0	40.0
3	#5725.00	69.0 PK	74.0	-5.0	2.42 H	299	64.9	4.1
4	#5725.00	52.3 AV	54.0	-1.7	2.42 H	299	48.2	4.1
5	11400.00	59.8 PK	74.0	-14.2	1.79 H	214	42.1	17.7
6	11400.00	46.2 AV	54.0	-7.8	1.79 H	214	28.5	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	*5700.00	114.9 PK			4.00 V	323	74.9	40.0
2	*5700.00	103.6 AV			4.00 V	323	63.6	40.0
3	#5725.00	66.3 PK	74.0	-7.7	4.00 V	336	62.2	4.1
4	#5725.00	50.5 AV	54.0	-3.5	4.00 V	336	46.4	4.1
5	11400.00	61.1 PK	74.0	-12.9	2.03 V	221	43.4	17.7
6	11400.00	46.9 AV	54.0	-7.1	2.03 V	221	29.2	17.7

Remarks:

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

CHANNEL	TX Channel 144	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	54.5 PK	74.0	-19.5	2.50 H	339	50.3	4.2
2	5460.00	42.2 AV	54.0	-11.8	2.50 H	339	38.0	4.2
3	#5470.00	56.2 PK	74.0	-17.8	2.57 H	333	52.0	4.2
4	#5470.00	42.7 AV	54.0	-11.3	2.57 H	333	38.5	4.2
5	*5720.00	118.8 PK			2.33 H	301	78.8	40.0
6	*5720.00	107.3 AV			2.33 H	301	67.3	40.0
7	#5825.00	56.7 PK	74.0	-17.3	2.13 H	297	52.1	4.6
8	#5825.00	43.3 AV	54.0	-10.7	2.13 H	297	38.7	4.6
9	11440.00	61.8 PK	74.0	-12.2	1.86 H	211	43.9	17.9
10	11440.00	47.6 AV	54.0	-6.4	1.86 H	211	29.7	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	54.3 PK	74.0	-19.7	1.50 V	359	50.1	4.2
2	5460.00	42.1 AV	54.0	-11.9	1.50 V	359	37.9	4.2
3	#5470.00	55.7 PK	74.0	-18.3	1.53 V	355	51.5	4.2
4	#5470.00	42.4 AV	54.0	-11.6	1.53 V	355	38.2	4.2
5	*5720.00	116.3 PK			1.35 V	5	76.3	40.0
6	*5720.00	105.3 AV			1.35 V	5	65.3	40.0
7	#5825.00	56.3 PK	74.0	-17.7	1.44 V	15	51.7	4.6
8	#5825.00	43.0 AV	54.0	-11.0	1.44 V	15	38.4	4.6
9	11440.00	61.1 PK	74.0	-12.9	2.22 V	209	43.2	17.9
10	11440.00	47.2 AV	54.0	-6.8	2.22 V	209	29.3	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.

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	55.3 PK	74.0	-18.7	2.00 H	312	51.6	3.7
2	5150.00	43.8 AV	54.0	-10.2	2.00 H	312	40.1	3.7
3	*5270.00	114.7 PK			1.80 H	284	75.3	39.4
4	*5270.00	104.5 AV			1.80 H	284	65.1	39.4
5	#10540.00	58.3 PK	74.0	-15.7	1.93 H	221	41.4	16.9
6	#10540.00	45.2 AV	54.0	-8.8	1.93 H	221	28.3	16.9
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	55.5 PK	74.0	-18.5	3.57 V	314	51.8	3.7
2	5150.00	42.4 AV	54.0	-11.6	3.57 V	314	38.7	3.7
3	*5270.00	114.0 PK			3.95 V	327	74.6	39.4
4	*5270.00	103.5 AV			3.95 V	327	64.1	39.4
5	#10540.00	58.2 PK	74.0	-15.8	1.78 V	212	41.3	16.9
6	#10540.00	44.8 AV	54.0	-9.2	1.78 V	212	27.9	16.9

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 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	112.9 PK			1.78 H	283	73.5	39.4
2	*5310.00	102.5 AV			1.78 H	283	63.1	39.4
3	5350.00	71.6 PK	74.0	-2.4	1.88 H	285	67.8	3.8
4	5350.00	52.3 AV	54.0	-1.7	1.88 H	285	48.5	3.8
5	10620.00	58.4 PK	74.0	-15.6	1.94 H	226	41.3	17.1
6	10620.00	45.0 AV	54.0	-9.0	1.94 H	226	27.9	17.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5310.00	111.1 PK			3.88 V	324	71.7	39.4
2	*5310.00	100.9 AV			3.88 V	324	61.5	39.4
3	5350.00	68.5 PK	74.0	-5.5	3.65 V	334	64.7	3.8
4	5350.00	50.0 AV	54.0	-4.0	3.65 V	334	46.2	3.8
5	10620.00	58.7 PK	74.0	-15.3	1.96 V	217	41.6	17.1
6	10620.00	44.8 AV	54.0	-9.2	1.96 V	217	27.7	17.1

Remarks:

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

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	57.3 PK	74.0	-16.7	2.71 H	296	53.1	4.2
2	5460.00	43.7 AV	54.0	-10.3	2.71 H	296	39.5	4.2
3	#5470.00	67.1 PK	74.0	-6.9	1.86 H	289	62.9	4.2
4	#5470.00	52.2 AV	54.0	-1.8	1.86 H	289	48.0	4.2
5	*5510.00	111.7 PK			2.60 H	293	71.6	40.1
6	*5510.00	101.5 AV			2.60 H	293	61.4	40.1
7	11020.00	59.7 PK	74.0	-14.3	2.21 H	183	41.2	18.5
8	11020.00	46.0 AV	54.0	-8.0	2.21 H	183	27.5	18.5
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	5460.00	57.0 PK	74.0	-17.0	3.57 V	308	52.8	4.2
2	5460.00	44.4 AV	54.0	-9.6	3.57 V	308	40.2	4.2
3	#5470.00	64.6 PK	74.0	-9.4	3.83 V	320	60.4	4.2
4	#5470.00	49.8 AV	54.0	-4.2	3.83 V	320	45.6	4.2
5	*5510.00	110.6 PK			3.97 V	342	70.5	40.1
6	*5510.00	100.0 AV			3.97 V	342	59.9	40.1
7	11020.00	60.3 PK	74.0	-13.7	2.31 V	221	41.8	18.5
8	11020.00	46.8 AV	54.0	-7.2	2.31 V	221	28.3	18.5

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 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	115.1 PK			2.69 H	294	75.1	40.0
2	*5550.00	104.8 AV			2.69 H	294	64.8	40.0
3	11100.00	58.9 PK	74.0	-15.1	1.78 H	221	41.3	17.6
4	11100.00	45.4 AV	54.0	-8.6	1.78 H	221	27.8	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5550.00	113.8 PK			3.88 V	322	73.8	40.0
2	*5550.00	103.1 AV			3.88 V	322	63.1	40.0
3	11100.00	59.6 PK	74.0	-14.4	1.96 V	205	42.0	17.6
4	11100.00	45.9 AV	54.0	-8.1	1.96 V	205	28.3	17.6

Remarks:

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

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	115.4 PK			2.27 H	295	75.3	40.1
2	*5670.00	105.0 AV			2.27 H	295	64.9	40.1
3	#5725.00	68.4 PK	74.0	-5.6	3.67 H	295	64.3	4.1
4	#5725.00	52.3 AV	54.0	-1.7	3.67 H	295	48.2	4.1
5	11340.00	59.8 PK	74.0	-14.2	1.96 H	201	41.9	17.9
6	11340.00	46.1 AV	54.0	-7.9	1.96 H	201	28.2	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	*5670.00	113.0 PK			3.85 V	323	72.9	40.1
2	*5670.00	103.0 AV			3.85 V	323	62.9	40.1
3	#5725.00	66.9 PK	74.0	-7.1	4.00 V	358	62.8	4.1
4	#5725.00	51.3 AV	54.0	-2.7	4.00 V	358	47.2	4.1
5	11340.00	60.1 PK	74.0	-13.9	1.79 V	261	42.2	17.9
6	11340.00	47.1 AV	54.0	-6.9	1.79 V	261	29.2	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 142	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	54.8 PK	74.0	-19.2	2.49 H	317	50.6	4.2
2	5460.00	42.1 AV	54.0	-11.9	2.49 H	317	37.9	4.2
3	#5470.00	56.3 PK	74.0	-17.7	2.41 H	309	52.1	4.2
4	#5470.00	42.7 AV	54.0	-11.3	2.41 H	309	38.5	4.2
5	*5710.00	116.0 PK			2.54 H	297	76.0	40.0
6	*5710.00	105.4 AV			2.54 H	297	65.4	40.0
7	#5825.00	57.2 PK	74.0	-16.8	2.36 H	333	52.6	4.6
8	#5825.00	43.6 AV	54.0	-10.4	2.36 H	333	39.0	4.6
9	11420.00	61.3 PK	74.0	-12.7	1.90 H	254	43.5	17.8
10	11420.00	47.2 AV	54.0	-6.8	1.90 H	254	29.4	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	5460.00	54.3 PK	74.0	-19.7	1.50 V	351	50.1	4.2
2	5460.00	41.7 AV	54.0	-12.3	1.50 V	351	37.5	4.2
3	#5470.00	56.2 PK	74.0	-17.8	1.51 V	357	52.0	4.2
4	#5470.00	42.5 AV	54.0	-11.5	1.51 V	357	38.3	4.2
5	*5710.00	113.3 PK			1.30 V	3	73.3	40.0
6	*5710.00	102.6 AV			1.30 V	3	62.6	40.0
7	#5825.00	56.7 PK	74.0	-17.3	1.39 V	10	52.1	4.6
8	#5825.00	43.3 AV	54.0	-10.7	1.39 V	10	38.7	4.6
9	11420.00	60.5 PK	74.0	-13.5	2.03 V	193	42.7	17.8
10	11420.00	46.5 AV	54.0	-7.5	2.03 V	193	28.7	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	58.9 PK	74.0	-15.1	1.76 H	296	55.2	3.7
2	5150.00	44.3 AV	54.0	-9.7	1.76 H	296	40.6	3.7
3	*5290.00	109.0 PK			1.78 H	280	69.6	39.4
4	*5290.00	98.6 AV			1.78 H	280	59.2	39.4
5	5350.00	68.0 PK	74.0	-6.0	2.64 H	290	64.2	3.8
6	5350.00	52.6 AV	54.0	-1.4	2.64 H	290	48.8	3.8
7	#10580.00	58.6 PK	74.0	-15.4	2.11 H	168	41.6	17.0
8	#10580.00	45.5 AV	54.0	-8.5	2.11 H	168	28.5	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	5150.00	56.9 PK	74.0	-17.1	4.00 V	332	53.2	3.7
2	5150.00	44.0 AV	54.0	-10.0	4.00 V	332	40.3	3.7
3	*5290.00	107.6 PK			3.95 V	334	68.2	39.4
4	*5290.00	97.2 AV			3.95 V	334	57.8	39.4
5	5350.00	67.0 PK	74.0	-7.0	4.00 V	335	63.2	3.8
6	5350.00	51.5 AV	54.0	-2.5	4.00 V	335	47.7	3.8
7	#10580.00	58.6 PK	74.0	-15.4	2.17 V	222	41.6	17.0
8	#10580.00	44.9 AV	54.0	-9.1	2.17 V	222	27.9	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 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	69.5 PK	74.0	-4.5	2.67 H	303	65.3	4.2
2	5460.00	51.1 AV	54.0	-2.9	2.67 H	303	46.9	4.2
3	#5470.00	68.1 PK	74.0	-5.9	1.80 H	284	63.9	4.2
4	#5470.00	52.6 AV	54.0	-1.4	1.80 H	284	48.4	4.2
5	*5530.00	107.2 PK			2.60 H	294	67.1	40.1
6	*5530.00	96.8 AV			2.60 H	294	56.7	40.1
7	#5725.00	55.7 PK	74.0	-18.3	2.17 H	266	51.6	4.1
8	#5725.00	42.8 AV	54.0	-11.2	2.17 H	266	38.7	4.1
9	11060.00	58.5 PK	74.0	-15.5	1.88 H	212	40.5	18.0
10	11060.00	45.7 AV	54.0	-8.3	1.88 H	212	27.7	18.0
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	5460.00	63.5 PK	74.0	-10.5	3.47 V	341	59.3	4.2
2	5460.00	48.7 AV	54.0	-5.3	3.47 V	341	44.5	4.2
3	#5470.00	64.3 PK	74.0	-9.7	3.76 V	301	60.1	4.2
4	#5470.00	50.0 AV	54.0	-4.0	3.76 V	301	45.8	4.2
5	*5530.00	105.4 PK			3.75 V	335	65.3	40.1
6	*5530.00	94.9 AV			3.75 V	335	54.8	40.1
7	#5725.00	56.3 PK	74.0	-17.7	3.88 V	314	52.2	4.1
8	#5725.00	42.7 AV	54.0	-11.3	3.88 V	314	38.6	4.1
9	11060.00	60.6 PK	74.0	-13.4	1.88 V	201	42.6	18.0
10	11060.00	46.4 AV	54.0	-7.6	1.88 V	201	28.4	18.0

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 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	58.9 PK	74.0	-15.1	2.69 H	241	54.7	4.2
2	5460.00	43.8 AV	54.0	-10.2	2.69 H	241	39.6	4.2
3	#5470.00	65.0 PK	74.0	-9.0	2.48 H	281	60.8	4.2
4	#5470.00	48.7 AV	54.0	-5.3	2.48 H	281	44.5	4.2
5	*5610.00	111.7 PK			2.51 H	294	71.6	40.1
6	*5610.00	101.3 AV			2.51 H	294	61.2	40.1
7	#5725.00	68.4 PK	74.0	-5.6	2.48 H	314	64.3	4.1
8	#5725.00	52.2 AV	54.0	-1.8	2.48 H	314	48.1	4.1
9	11220.00	59.6 PK	74.0	-14.4	1.73 H	189	41.7	17.9
10	11220.00	46.5 AV	54.0	-7.5	1.73 H	189	28.6	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	58.0 PK	74.0	-16.0	1.26 V	357	53.8	4.2
2	5460.00	43.9 AV	54.0	-10.1	1.26 V	357	39.7	4.2
3	#5470.00	64.6 PK	74.0	-9.4	1.46 V	19	60.4	4.2
4	#5470.00	47.9 AV	54.0	-6.1	1.46 V	19	43.7	4.2
5	*5610.00	108.6 PK			1.35 V	358	68.5	40.1
6	*5610.00	98.5 AV			1.35 V	358	58.4	40.1
7	#5725.00	67.9 PK	74.0	-6.1	1.21 V	6	63.8	4.1
8	#5725.00	51.1 AV	54.0	-2.9	1.21 V	6	47.0	4.1
9	11220.00	59.1 PK	74.0	-14.9	2.21 V	199	41.2	17.9
10	11220.00	46.2 AV	54.0	-7.8	2.21 V	199	28.3	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 138	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	56.4 PK	74.0	-17.6	2.20 H	303	52.2	4.2
2	5460.00	42.4 AV	54.0	-11.6	2.20 H	303	38.2	4.2
3	#5470.00	56.9 PK	74.0	-17.1	2.13 H	321	52.7	4.2
4	#5470.00	43.4 AV	54.0	-10.6	2.13 H	321	39.2	4.2
5	*5690.00	112.1 PK			2.38 H	299	72.1	40.0
6	*5690.00	101.5 AV			2.38 H	299	61.5	40.0
7	#5825.00	65.0 PK	74.0	-9.0	2.37 H	294	60.4	4.6
8	#5825.00	49.8 AV	54.0	-4.2	2.37 H	294	45.2	4.6
9	11380.00	60.5 PK	74.0	-13.5	1.95 H	229	42.7	17.8
10	11380.00	47.2 AV	54.0	-6.8	1.95 H	229	29.4	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	5460.00	55.2 PK	74.0	-18.8	1.30 V	11	51.0	4.2
2	5460.00	42.4 AV	54.0	-11.6	1.30 V	11	38.2	4.2
3	#5470.00	55.7 PK	74.0	-18.3	1.21 V	8	51.5	4.2
4	#5470.00	42.9 AV	54.0	-11.1	1.21 V	8	38.7	4.2
5	*5690.00	110.7 PK			1.33 V	4	70.7	40.0
6	*5690.00	100.0 AV			1.33 V	4	60.0	40.0
7	#5825.00	64.8 PK	74.0	-9.2	1.44 V	349	60.2	4.6
8	#5825.00	49.0 AV	54.0	-5.0	1.44 V	349	44.4	4.6
9	11380.00	60.0 PK	74.0	-14.0	1.99 V	195	42.2	17.8
10	11380.00	46.5 AV	54.0	-7.5	1.99 V	195	28.7	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.

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	25.8 QP	40.0	-14.2	2.00 H	86	40.2	-14.4
2	276.82	31.5 QP	46.0	-14.5	1.00 H	228	44.8	-13.3
3	374.04	32.1 QP	46.0	-13.9	1.00 H	266	43.7	-11.6
4	416.81	34.4 QP	46.0	-11.6	1.00 H	37	45.3	-10.9
5	473.20	38.3 QP	46.0	-7.7	1.51 H	124	48.0	-9.7
6	624.85	39.0 QP	46.0	-7.0	1.00 H	138	45.8	-6.8
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	35.73	33.7 QP	40.0	-6.3	1.00 V	148	49.3	-15.6
2	55.18	31.7 QP	40.0	-8.3	1.00 V	304	46.0	-14.3
3	99.89	30.2 QP	43.5	-13.3	1.00 V	91	48.7	-18.5
4	412.92	38.7 QP	46.0	-7.3	1.49 V	16	49.7	-11.0
5	469.31	36.1 QP	46.0	-9.9	1.00 V	274	45.9	-9.8
6	624.85	37.5 QP	46.0	-8.5	1.00 V	244	44.3	-6.8

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

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	57.12	26.7 QP	40.0	-13.3	2.00 H	220	41.1	-14.4
2	152.39	28.5 QP	43.5	-15.0	1.00 H	278	42.3	-13.8
3	187.39	28.4 QP	43.5	-15.1	2.00 H	300	44.5	-16.1
4	274.88	29.8 QP	46.0	-16.2	1.00 H	269	43.1	-13.3
5	467.36	37.2 QP	46.0	-8.8	2.00 H	312	47.1	-9.9
6	624.85	37.3 QP	46.0	-8.7	1.00 H	145	44.1	-6.8
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	47.00	30.8 QP	40.0	-9.2	1.00 V	4	45.1	-14.3
2	103.78	35.5 QP	43.5	-8.0	1.00 V	124	53.6	-18.1
3	185.44	28.6 QP	43.5	-14.9	1.00 V	103	44.4	-15.8
4	278.77	30.6 QP	46.0	-15.4	1.99 V	288	43.8	-13.2
5	412.92	38.0 QP	46.0	-8.0	1.50 V	117	49.0	-11.0
6	624.85	36.7 QP	46.0	-9.3	1.00 V	237	43.5	-6.8

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

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 (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 06, 2018	Mar. 05, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	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.

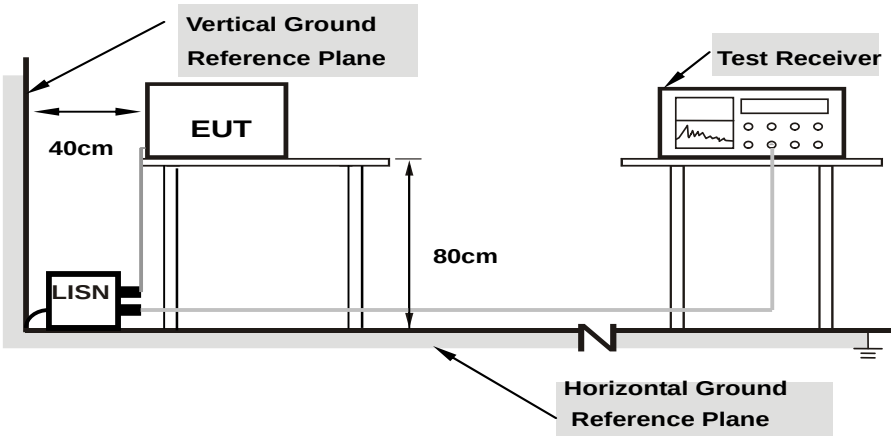
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

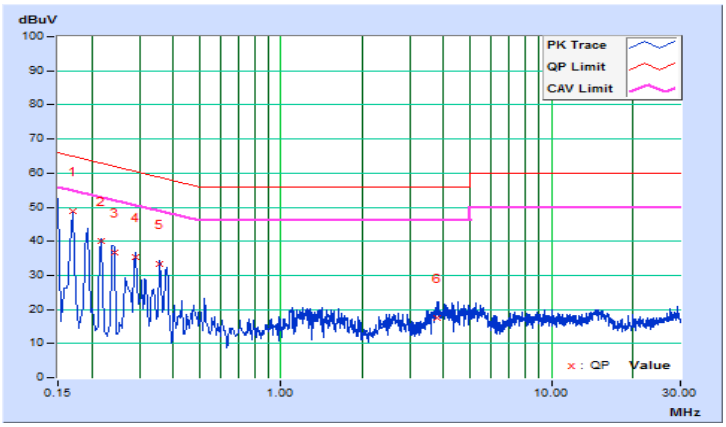
Worst-case data: 802.11a

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17000	10.16	38.70	22.34	48.86	32.50	64.96	54.96	-16.10	-22.46
2	0.21800	10.16	29.92	12.78	40.08	22.94	62.89	52.89	-22.81	-29.95
3	0.24200	10.16	26.46	11.25	36.62	21.41	62.03	52.03	-25.41	-30.62
4	0.28982	10.18	25.02	17.02	35.20	27.20	60.53	50.53	-25.33	-23.33
5	0.35800	10.20	22.98	17.47	33.18	27.67	58.77	48.77	-25.59	-21.10
6	3.76198	10.33	7.20	1.57	17.53	11.90	56.00	46.00	-38.47	-34.10

Remarks:

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

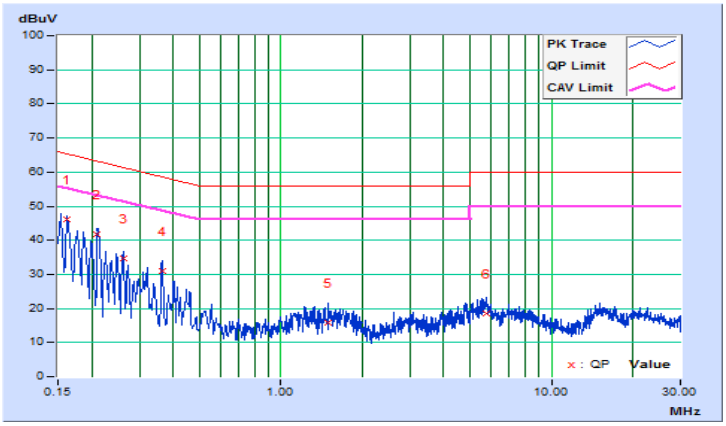


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	A		

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	0.16200	10.15	36.08	22.39	46.23	32.54	65.36	55.36	-19.13	-22.82
2	0.21000	10.17	31.52	15.47	41.69	25.64	63.21	53.21	-21.52	-27.57
3	0.26200	10.17	24.46	9.58	34.63	19.75	61.37	51.37	-26.74	-31.62
4	0.36600	10.19	20.93	8.42	31.12	18.61	58.59	48.59	-27.47	-29.98
5	1.50200	10.21	5.73	1.57	15.94	11.78	56.00	46.00	-40.06	-34.22
6	5.73800	10.41	8.13	2.35	18.54	12.76	60.00	50.00	-41.46	-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.

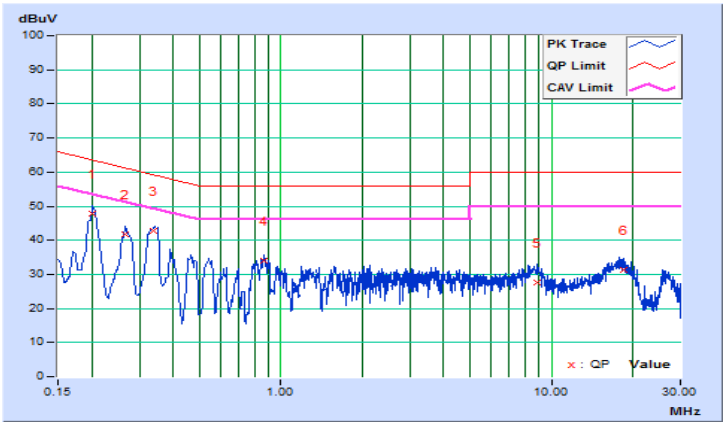


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	**0.20201**	**10.10**	**37.81**	**32.03**	**47.91**	**42.13**	**63.53**	**53.53**	**-15.62**	**-11.40**
2	0.26639	10.11	31.74	24.60	41.85	34.71	61.23	51.23	-19.38	-16.52
3	0.33678	10.11	32.51	25.64	42.62	35.75	59.28	49.28	-16.66	-13.53
4	0.87000	10.14	24.01	11.40	34.15	21.54	56.00	46.00	-21.85	-24.46
5	8.83800	10.55	17.12	9.98	27.67	20.53	60.00	50.00	-32.33	-29.47
6	18.40200	11.12	20.10	15.26	31.22	26.38	60.00	50.00	-28.78	-23.62

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.

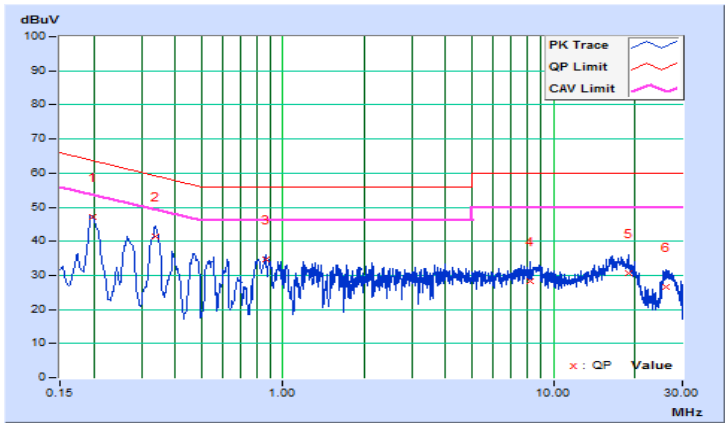


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	B		

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	0.19728	10.10	36.95	29.43	47.05	39.53	63.72	53.72	-16.67	-14.19
2	0.33678	10.11	31.37	22.72	41.48	32.83	59.28	49.28	-17.80	-16.45
3	0.86200	10.13	24.67	12.65	34.80	22.78	56.00	46.00	-21.20	-23.22
4	8.21800	10.44	17.70	10.89	28.14	21.33	60.00	50.00	-31.86	-28.67
5	18.89800	10.89	19.85	14.48	30.74	25.37	60.00	50.00	-29.26	-24.63
6	26.08200	11.02	15.44	9.42	26.46	20.44	60.00	50.00	-33.54	-29.56

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

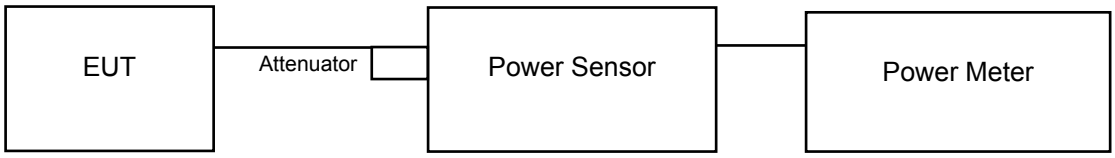
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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

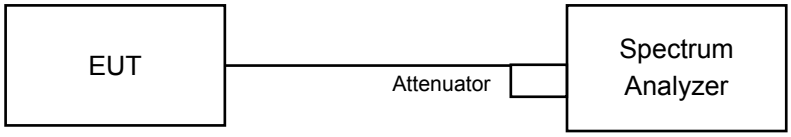
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

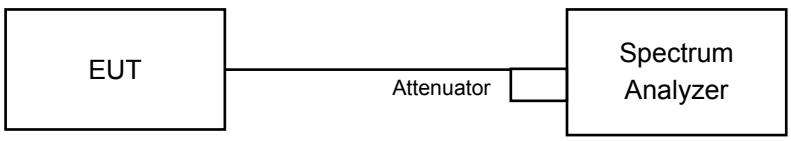
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



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

For 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 802.11ac (VHT80)

a. Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

b. Set sweep trigger to “free run”.

c. Set RBW = 1 MHz.

d. Set VBW ≥ 3 MHz.

e. Number of points in sweep ≥ 2 Span / RBW.

f. Sweep time ≤ (number of points in sweep) * T

g. Using emission bandwidth to determine the frequency span for integration the channel bandwidth.

h. Detector = RMS.

i. Trace mode = max hold.

j. Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.

k. Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth

a. Set RBW = approximately 1% of the emission bandwidth.

b. Set the VBW > RBW.

c. Detector = Peak.

d. Trace mode = max hold.

e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

CDD Mode

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
52	5260	18.65	18.65	146.564	21.66	23.82	Pass
60	5300	18.66	18.74	148.268	21.71	23.83	Pass
64	5320	18.69	18.77	149.297	21.74	23.82	Pass
100	5500	17.78	17.89	121.497	20.85	23.86	Pass
116	5580	17.88	17.96	123.893	20.93	23.86	Pass
140	5700	18.65	18.74	148.099	21.71	23.86	Pass
144	5720 (For U-NII-2C)	17.77	17.48	122.719	20.89	22.64	Pass
144	5720 (For U-NII-3)	12.75	12.54	38.975	15.91	30.00	Pass

Note:
For U-NII-2A, U-NII-2C band:
Chain 0
1. 11dBm + 10log (19.51) = 23.90 < 24dBm
2. 11dBm + 10log (19.56) = 23.91 < 24dBm
3. 11dBm + 10log (19.61) = 23.92 < 24dBm
4. 11dBm + 10log (19.51) = 23.90 < 24dBm
5. 11dBm + 10log (19.48) = 23.89 < 24dBm
6. 11dBm + 10log (19.44) = 23.88 < 24dBm
7. 11dBm + 10log (5725.00 - 5710.20) = 22.70 < 24dBm

Chain 1
1. 11dBm + 10log (19.18) = 23.82 < 24dBm
2. 11dBm + 10log (19.19) = 23.83 < 24dBm
3. 11dBm + 10log (19.18) = 23.82 < 24dBm
4. 11dBm + 10log (19.36) = 23.86 < 24dBm
5. 11dBm + 10log (19.33) = 23.86 < 24dBm
6. 11dBm + 10log (19.36) = 23.86 < 24dBm
7. 11dBm + 10log (5725.00 - 5710.41) = 22.64 < 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	18.74	18.69	148.778	21.73	24.00	Pass
60	5300	18.75	18.88	152.257	21.83	24.00	Pass
64	5320	18.76	18.69	149.123	21.74	24.00	Pass
100	5500	17.68	17.85	119.568	20.78	24.00	Pass
116	5580	17.88	17.81	121.771	20.86	24.00	Pass
140	5700	18.65	18.49	143.914	21.58	24.00	Pass
144	5720 (For U-NII-2C)	17.43	17.50	111.569	20.48	22.80	Pass
144	5720 (For U-NII-3)	12.69	12.84	37.809	15.78	30.00	Pass

Note:
For U-NII-2A, U-NII-2C band:
Chain 0
1. 11dBm + 10log (20.29) = 24.07 > 24dBm
2. 11dBm + 10log (20.41) = 24.09 > 24dBm
3. 11dBm + 10log (20.54) = 24.12 > 24dBm
4. 11dBm + 10log (20.30) = 24.07 > 24dBm
5. 11dBm + 10log (20.25) = 24.06 > 24dBm
6. 11dBm + 10log (20.34) = 24.08 > 24dBm
7. 11dBm + 10log (5725.00 - 5709.81) = 22.81 < 24dBm
Chain 1
1. 11dBm + 10log (20.26) = 24.06 > 24dBm
2. 11dBm + 10log (20.32) = 24.07 > 24dBm
3. 11dBm + 10log (20.38) = 24.09 > 24dBm
4. 11dBm + 10log (20.30) = 24.07 > 24dBm
5. 11dBm + 10log (20.39) = 24.09 > 24dBm
6. 11dBm + 10log (20.34) = 24.08 > 24dBm
7. 11dBm + 10log (5725.00 - 5709.83) = 22.80 < 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	20.79	20.32	**227.597**	23.57	24.00	Pass
62	5310	19.63	19.14	173.868	22.40	24.00	Pass
102	5510	18.44	17.87	131.058	21.17	24.00	Pass
110	5550	20.99	20.64	**241.481**	23.83	24.00	Pass
134	5670	20.93	20.26	230.050	23.62	24.00	Pass
142	5710 (For U-NII-2C)	19.86	19.54	193.971	22.88	24.00	Pass
142	5710 (For U-NII-3)	10.91	11.31	26.848	14.29	30.00	Pass

Note:
For U-NII-2A, U-NII-2C band:
Chain 0
1. 11dBm + 10log (69.93) = 29.44 > 24dBm
2. 11dBm + 10log (41.01) = 27.12 > 24dBm
3. 11dBm + 10log (40.79) = 27.10 > 24dBm
4. 11dBm + 10log (51.61) = 28.12 > 24dBm
5. 11dBm + 10log (40.87) = 27.11 > 24dBm
6. 11dBm + 10log (5725.00 - 5681.18) = 27.41 > 24dBm

Chain 1
1. 11dBm + 10log (41.40) = 27.17 > 24dBm
2. 11dBm + 10log (41.18) = 27.14 > 24dBm
3. 11dBm + 10log (40.87) = 27.11 > 24dBm
4. 11dBm + 10log (41.22) = 27.15 > 24dBm
5. 11dBm + 10log (41.03) = 27.13 > 24dBm
6. 11dBm + 10log (5725.00 - 5689.48) = 26.50 > 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	19.24	18.96	162.651	22.11	24.00	Pass
106	5530	17.19	16.57	97.754	19.90	24.00	Pass
122	5610	20.94	20.13	227.204	23.56	24.00	Pass
138	5690 (For U-NII-2C)	20.67	20.00	234.548	23.70	24.00	Pass
138	5690 (For U-NII-3)	10.33	9.57	21.482	13.32	30.00	Pass

Note:
For U-NII-2A, U-NII-2C band:
Chain 0
1. 11dBm + 10log (84.10) = 30.24 > 24dBm
2. 11dBm + 10log (84.41) = 30.26 > 24dBm
3. 11dBm + 10log (83.80) = 30.23 > 24dBm
4. 11dBm + 10log (5725.00 - 5647.88) = 29.87 > 24dBm
Chain 1
1. 11dBm + 10log (83.93) = 30.23 > 24dBm
2. 11dBm + 10log (84.06) = 30.24 > 24dBm
3. 11dBm + 10log (83.78) = 30.23 > 24dBm
4. 11dBm + 10log (5725.00 - 5648.37) = 29.84 > 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	15.73	15.68	74.394	18.72	21.43	Pass
60	5300	15.74	15.87	76.134	18.82	21.43	Pass
64	5320	15.75	15.68	74.567	18.73	21.43	Pass
100	5500	14.67	14.84	59.788	17.77	21.43	Pass
116	5580	14.87	14.80	60.890	17.85	21.43	Pass
140	5700	15.64	15.48	71.962	18.57	21.43	Pass
144	5720 (For U-NII-2C)	14.42	14.49	55.788	17.47	20.23	Pass
144	5720 (For U-NII-3)	9.68	9.83	18.906	12.77	27.43	Pass

Note:
For U-NII-2A, U-NII-2C band:
1. 5260 ~ 5320MHz and 5500 ~ 5700MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 24-(8.57-6) = 21.43dBm.
2. 5720MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 22.80-(8.57-6) = 20.23dBm.
3. 5745 ~ 5825MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 30-(8.57-6) = 27.43dBm.

Chain 0
1. 11dBm + 10log (20.29) = 24.07 > 24dBm
2. 11dBm + 10log (20.41) = 24.09 > 24dBm
3. 11dBm + 10log (20.54) = 24.12 > 24dBm
4. 11dBm + 10log (20.30) = 24.07 > 24dBm
5. 11dBm + 10log (20.25) = 24.06 > 24dBm
6. 11dBm + 10log (20.34) = 24.08 > 24dBm
7. 11dBm + 10log (5725.00 - 5709.81) = 22.81 < 24dBm

Chain 1
1. 11dBm + 10log (20.26) = 24.06 > 24dBm
2. 11dBm + 10log (20.32) = 24.07 > 24dBm
3. 11dBm + 10log (20.38) = 24.09 > 24dBm
4. 11dBm + 10log (20.30) = 24.07 > 24dBm
5. 11dBm + 10log (20.39) = 24.09 > 24dBm
6. 11dBm + 10log (20.34) = 24.08 > 24dBm
7. 11dBm + 10log (5725.00 - 5709.83) = 22.80 < 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	17.78	17.31	**113.806**	20.56	21.43	Pass
62	5310	16.62	16.13	86.940	19.39	21.43	Pass
102	5510	15.43	14.86	65.534	18.16	21.43	Pass
110	5550	17.98	17.63	**120.749**	20.82	21.43	Pass
134	5670	17.92	17.25	115.032	20.61	21.43	Pass
142	5710 (For U-NII-2C)	16.85	16.53	96.992	19.87	21.43	Pass
142	5710 (For U-NII-3)	7.90	8.30	13.425	11.28	27.43	Pass

Note:
For U-NII-2A, U-NII-2C band:
1. 5260 ~ 5320MHz and 5500 ~ 5700MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 24-(8.57-6) = 21.43dBm.
2. 5745 ~ 5825MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 30-(8.57-6) = 27.43dBm.

Chain 0
1. 11dBm + 10log (69.93) = 29.44 > 24dBm
2. 11dBm + 10log (41.01) = 27.12 > 24dBm
3. 11dBm + 10log (40.79) = 27.10 > 24dBm
4. 11dBm + 10log (51.61) = 28.12 > 24dBm
5. 11dBm + 10log (40.87) = 27.11 > 24dBm
6. 11dBm + 10log (5725.00 - 5681.18) = 27.41 > 24dBm

Chain 1
1. 11dBm + 10log (41.40) = 27.17 > 24dBm
2. 11dBm + 10log (41.18) = 27.14 > 24dBm
3. 11dBm + 10log (40.87) = 27.11 > 24dBm
4. 11dBm + 10log (41.22) = 27.15 > 24dBm
5. 11dBm + 10log (41.03) = 27.13 > 24dBm
6. 11dBm + 10log (5725.00 - 5689.48) = 26.50 > 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	16.23	15.95	81.331	19.10	21.43	Pass
106	5530	14.18	13.56	48.881	16.89	21.43	Pass
122	5610	17.93	17.12	113.610	20.55	21.43	Pass
138	5690 (For U-NII-2C)	17.66	16.99	117.282	20.69	21.43	Pass
138	5690 (For U-NII-3)	7.32	6.56	10.742	10.31	27.43	Pass

Note:
For U-NII-2A, U-NII-2C band:
1. 5260 ~ 5320MHz and 5500 ~ 5700MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 24-(8.57-6) = 21.43dBm.
2. 5745 ~ 5825MHz: Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power limit shall be reduced to 30-(8.57-6) = 27.43dBm.

Chain 0
1. 11dBm + 10log (84.10) = 30.24 > 24dBm
2. 11dBm + 10log (84.41) = 30.26 > 24dBm
3. 11dBm + 10log (83.80) = 30.23 > 24dBm
4. 11dBm + 10log (5725.00 - 5647.88) = 29.87 > 24dBm

Chain 1
1. 11dBm + 10log (83.93) = 30.23 > 24dBm
2. 11dBm + 10log (84.06) = 30.24 > 24dBm
3. 11dBm + 10log (83.78) = 30.23 > 24dBm
4. 11dBm + 10log (5725.00 - 5648.37) = 29.84 > 24dBm

26dB Bandwidth:

802.11a

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	19.51	19.18
60	5300	19.56	19.19
64	5320	19.61	19.18
100	5500	19.51	19.36
116	5580	19.48	19.33
140	5700	19.44	19.36
144	5720 (For U-NII-2C)	14.80	14.59
144	5720 (For U-NII-3)	4.65	4.68

802.11n (HT20)

Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	20.29	20.26
60	5300	20.41	20.32
64	5320	20.54	20.38
100	5500	20.30	20.30
116	5580	20.25	20.39
140	5700	20.34	20.34
144	5720 (For U-NII-2C)	15.19	15.17
144	5720 (For U-NII-3)	5.09	5.18

802.11n (HT40)

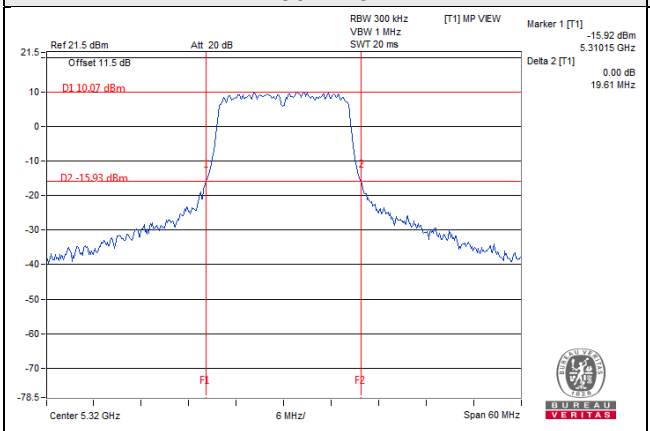
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	69.93	41.40
62	5310	41.01	41.18
102	5510	40.79	40.87
110	5550	51.61	41.22
134	5670	40.87	41.03
142	5710 (For U-NII-2C)	43.82	35.52
142	5710 (For U-NII-3)	5.58	5.34

802.11ac (VHT80)

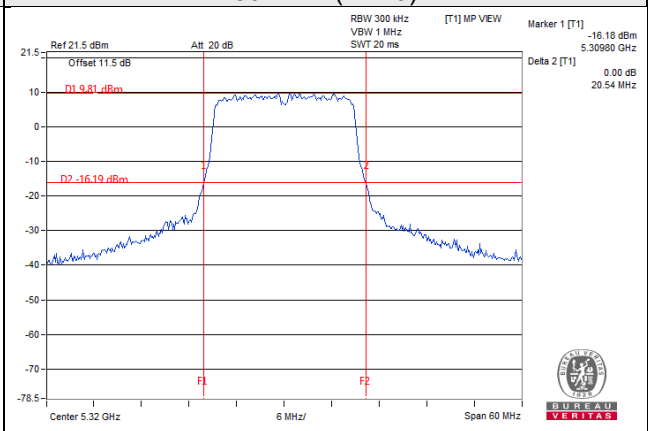
Chan.	Freq. (MHz)	26dBc Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	84.10	83.93
106	5530	84.41	84.06
122	5610	83.80	83.78
138	5690 (For U-NII-2C)	77.12	76.63
138	5690 (For U-NII-3)	7.14	6.93

Spectrum Plot of Worst Value

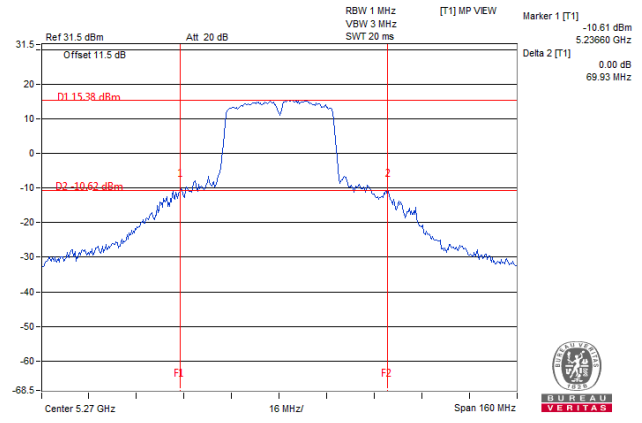
802.11a



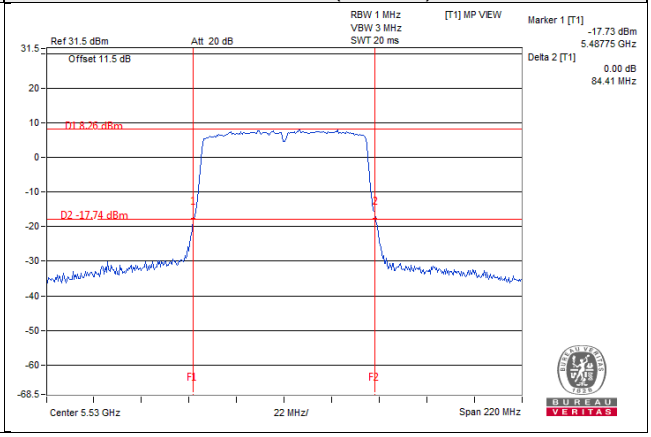
802.11n (HT20)



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	149.297	21.74
5470~5725	148.099	21.71

802.11n (HT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	152.257	21.83
5470~5725	143.914	21.58

802.11n (HT40)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	227.597	23.57
5470~5725	241.481	23.83

802.11ac (VHT80)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	162.651	22.11
5470~5725	234.548	23.70

Beamforming Mode

802.11n (HT20)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	76.134	18.82
5470~5725	71.962	18.57

802.11n (HT40)

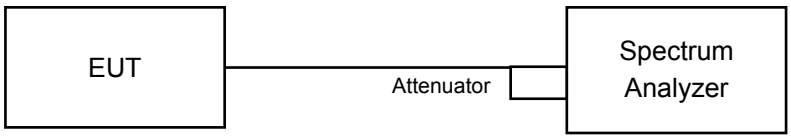
Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	113.806	20.56
5470~5725	120.749	20.82

802.11ac (VHT80)

Frequency Band (MHz)	Max. Power	
	Output Power (mW)	Output Power (dBm)
5250~5350	81.331	19.10
5470~5725	117.282	20.69

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

Occupied Bandwidth

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	16.43	16.43
60	5300	16.44	16.44
64	5320	16.44	16.44
100	5500	16.44	16.44
116	5580	16.44	16.44
140	5700	16.44	16.44
144	5720 (For U-NII-2C)	13.16	13.28
144	5720 (For U-NII-3)	3.16	3.16

802.11n (HT20)

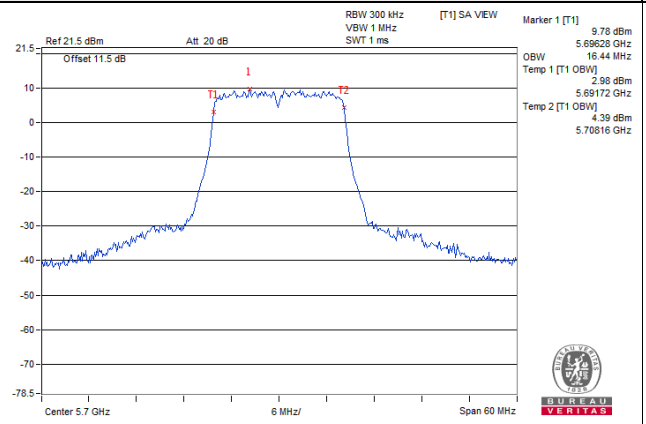
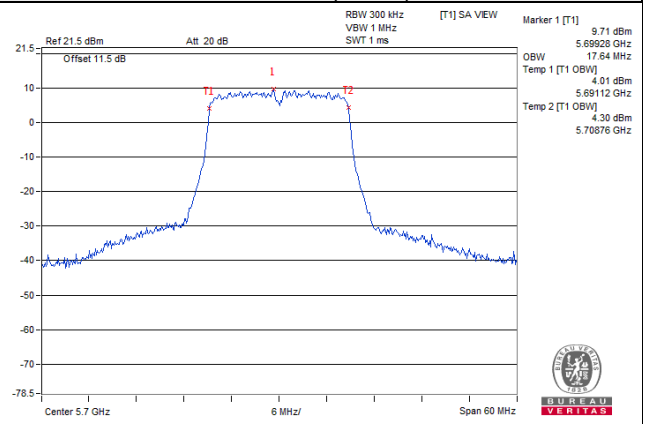
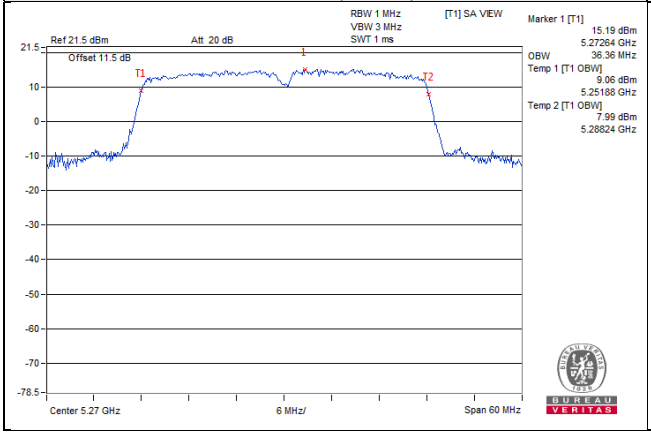
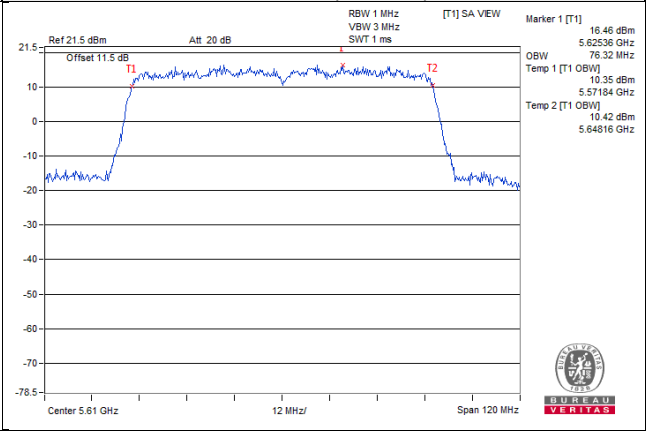
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
52	5260	17.56	17.64
60	5300	17.64	17.64
64	5320	17.64	17.64
100	5500	17.64	17.64
116	5580	17.64	17.64
140	5700	17.64	17.64
144	5720 (For U-NII-2C)	13.88	13.88
144	5720 (For U-NII-3)	3.76	3.76

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
54	5270	36.36	36.12
62	5310	36.12	36.12
102	5510	36.12	36.12
110	5550	36.24	36.12
134	5670	36.24	36.00
142	5710 (For U-NII-2C)	33.12	33.12
142	5710 (For U-NII-3)	3.12	3.00

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
58	5290	75.84	75.84
106	5530	75.84	75.84
122	5610	76.32	75.84
138	5690 (For U-NII-2C)	72.92	72.92
138	5690 (For U-NII-3)	2.92	2.92

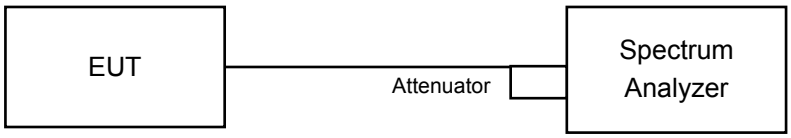
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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-2A, U-NII-2C band:

Duty cycle of test signal is > 98%

Using method SA-1

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

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

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

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

e. Record the max value

Duty cycle of test signal is < 98%

Using method SA-2

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

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

c. Set Channel power measure = 1MHz

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

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

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

For U-NII-3 band:

Duty cycle of test signal is > 98%

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

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

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

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

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

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

g. Record the max value

Duty cycle of test signal is < 98%

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

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

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

d. Scale the observed power level to an equivalent value in 500 kHz by adjusting (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-2A, U-NII-2C 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				
52	5260	5.19	4.75	0.25	8.24	8.43	Pass
60	5300	5.43	4.86	0.25	8.42	8.43	Pass
64	5320	5.43	4.76	0.25	8.37	8.43	Pass
100	5500	5.37	4.94	0.25	8.42	8.43	Pass
116	5580	5.15	5.02	0.25	8.35	8.43	Pass
140	5700	5.10	4.65	0.25	8.14	8.43	Pass
144	5720	5.41	4.74	0.25	8.35	8.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 11-(8.57-6) = 8.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
52	5260	5.33	4.70	8.04	8.43	Pass
60	5300	5.03	4.96	8.01	8.43	Pass
64	5320	5.09	4.88	8.00	8.43	Pass
100	5500	5.21	5.01	8.12	8.43	Pass
116	5580	5.46	4.79	8.15	8.43	Pass
140	5700	5.42	4.81	8.14	8.43	Pass
144	5720	5.26	4.74	8.02	8.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 11-(8.57-6) = 8.43dBm.

802.11n (HT40)

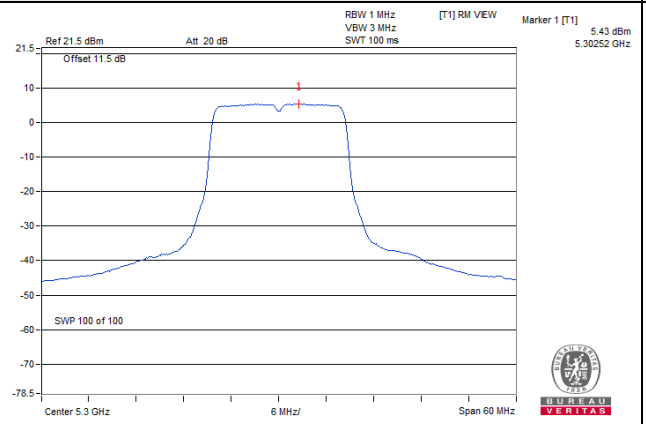
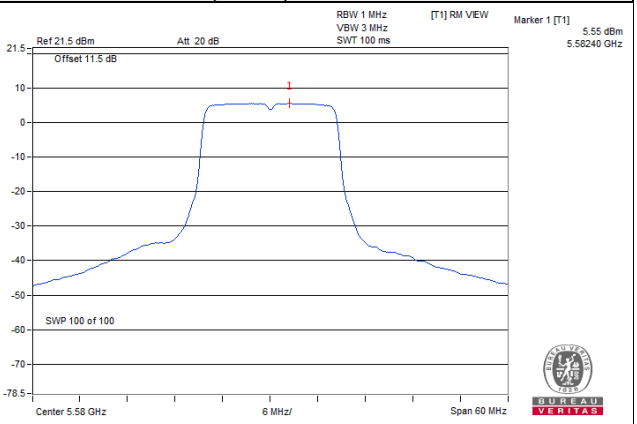
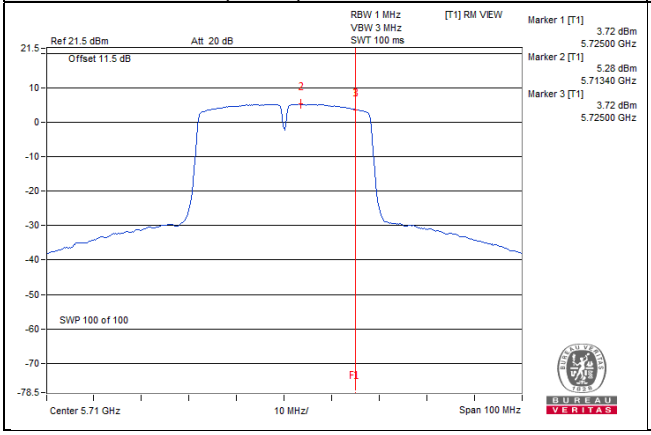
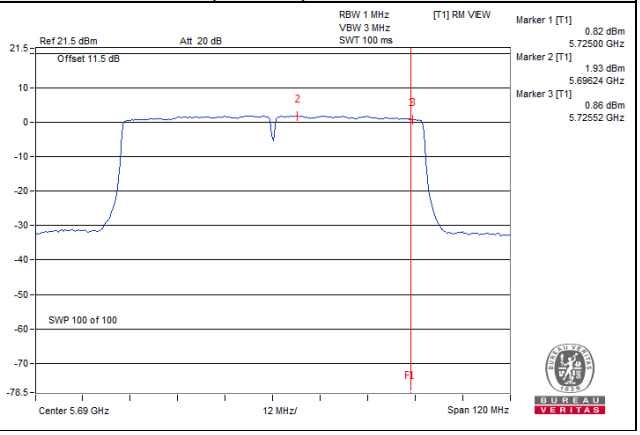
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
54	5270	5.23	4.72	0.16	8.16	8.43	Pass
62	5310	3.33	2.90	0.16	6.29	8.43	Pass
102	5510	2.20	1.39	0.16	4.99	8.43	Pass
110	5550	5.10	4.96	0.16	8.20	8.43	Pass
134	5670	5.16	4.70	0.16	8.11	8.43	Pass
142	5710	5.27	4.62	0.16	8.13	8.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 11-(8.57-6) = 8.43dBm.
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	-0.36	-0.90	0.34	2.73	8.43	Pass
106	5530	-2.56	-3.09	0.34	0.54	8.43	Pass
122	5610	1.49	0.84	0.34	4.53	8.43	Pass
138	5690	1.93	1.49	0.34	5.07	8.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 11-(8.57-6) = 8.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / Chain 0 / CH 60	802.11n (HT20) / Chain 0 / CH 116
	
802.11n (HT40) / Chain 0 / CH 142	802.11ac (VHT80) / Chain 0 / CH 138
	

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	144	5720	-3.29	-1.07	3.01	0.25	2.19	27.43	Pass
1	144	5720	-3.99	-1.77	3.01	0.25	1.49	27.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 30-(8.57-6) = 27.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD (dBm/300 kHz)	PSD (dBm/500 kHz)	10 log (N=2) dB	Total PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
0	144	5720	-3.37	-1.15	3.01	1.86	27.43	Pass
1	144	5720	-3.60	-1.38	3.01	1.63	27.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 30-(8.57-6) = 27.43dBm.

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	142	5710	-5.04	-2.82	3.01	0.16	0.35	27.43	Pass
1	142	5710	-6.16	-3.94	3.01	0.16	-0.77	27.43	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 = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 30-(8.57-6) = 27.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

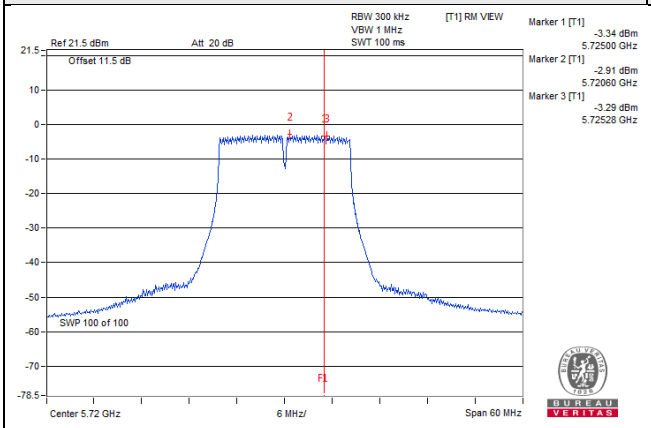
802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	138	5690	-7.98	-5.76	3.01	0.34	-2.41	27.43	Pass
1	138	5690	-8.99	-6.77	3.01	0.34	-3.42	27.43	Pass

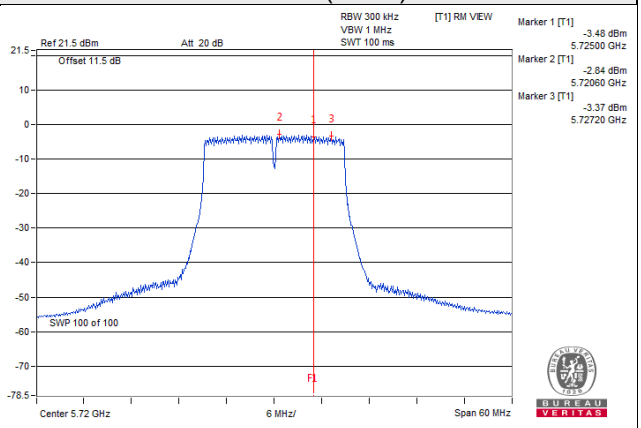
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.56dBi + 10log(2) = 8.57dBi > 6dBi, so the power density limit shall be reduced to 30-(8.57-6) = 27.43dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

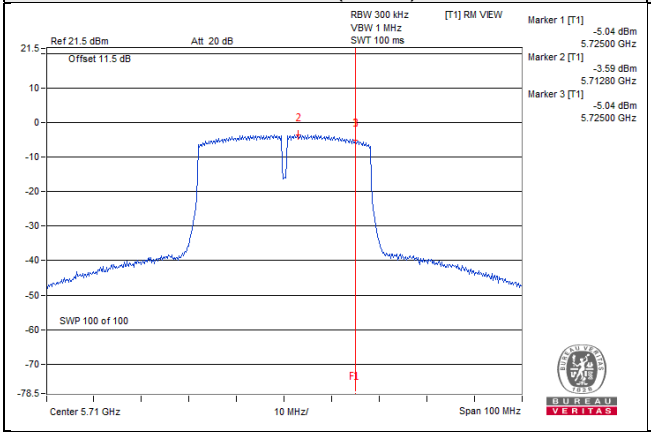
802.11a



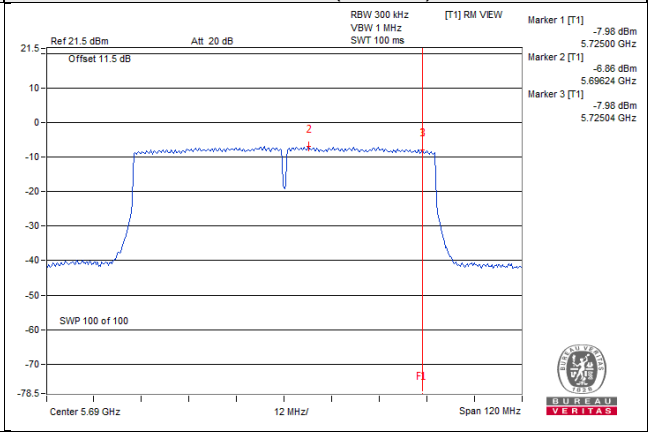
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

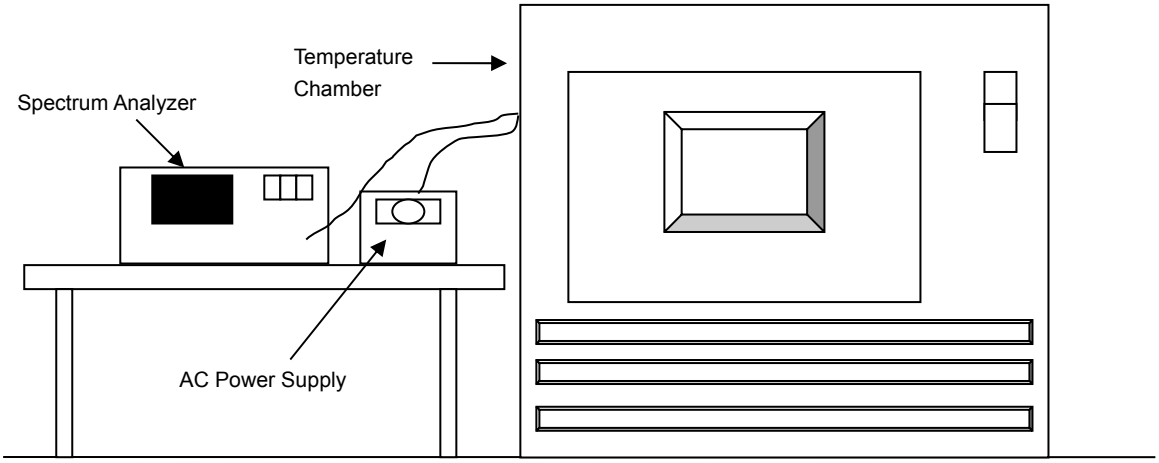


4.6 Frequency Stability

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	5260.0261	Pass	5260.0272	Pass	5260.0267	Pass	5260.0232	Pass
40	120	5260.0139	Pass	5260.0104	Pass	5260.0115	Pass	5260.0147	Pass
30	120	5259.999	Pass	5259.9983	Pass	5259.9975	Pass	5259.9988	Pass
20	120	5260.0233	Pass	5260.0222	Pass	5260.0248	Pass	5260.0212	Pass
10	120	5260.009	Pass	5260.0095	Pass	5260.0083	Pass	5260.009	Pass
0	120	5260.0104	Pass	5260.0127	Pass	5260.0143	Pass	5260.0096	Pass
-10	120	5260.0138	Pass	5260.009	Pass	5260.0123	Pass	5260.0107	Pass
-20	120	5260.0253	Pass	5260.0246	Pass	5260.0244	Pass	5260.0239	Pass
-30	120	5260.0119	Pass	5260.0137	Pass	5260.0141	Pass	5260.0103	Pass

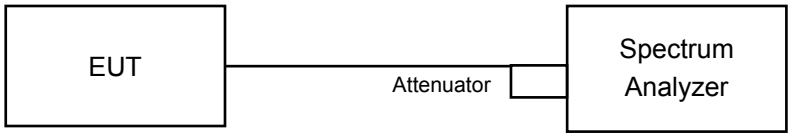
Frequency Stability Versus Voltage									
Operating Frequency: 5260MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5260.0239	Pass	5260.0219	Pass	5260.0252	Pass	5260.0208	Pass
	120	5260.0233	Pass	5260.0222	Pass	5260.0248	Pass	5260.0212	Pass
	102	5260.0226	Pass	5260.0219	Pass	5260.0251	Pass	5260.0212	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		
144 (For U-NII-3)	5720	3.19	3.20	0.5	Pass

802.11n (HT20)

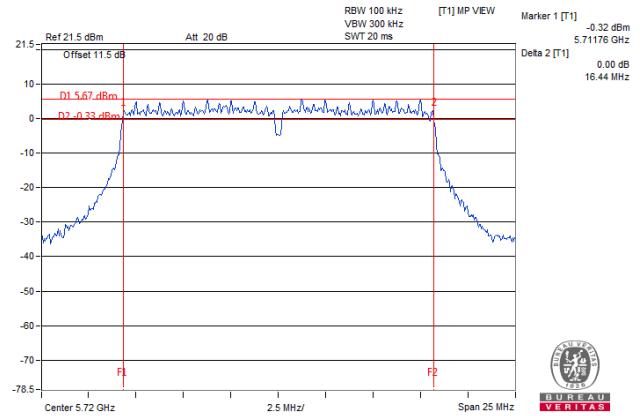
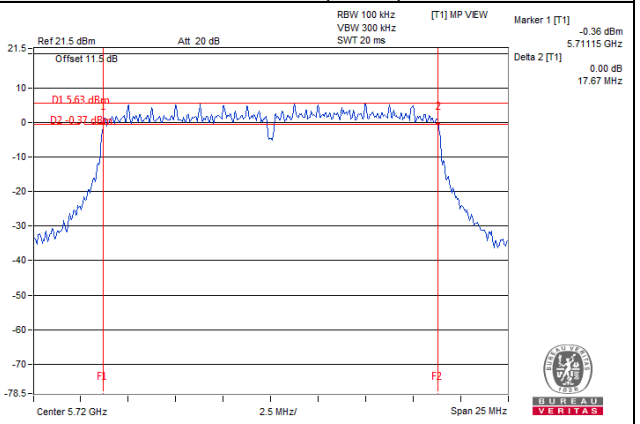
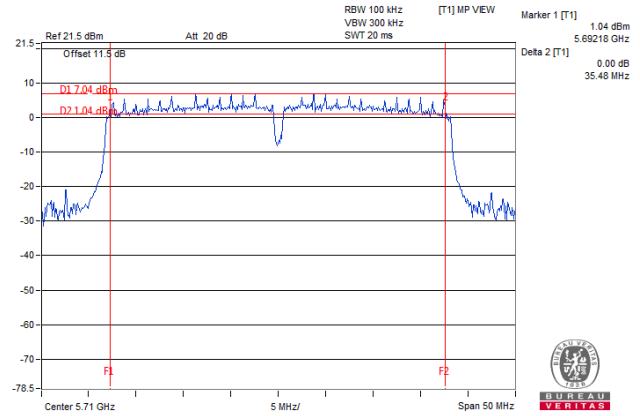
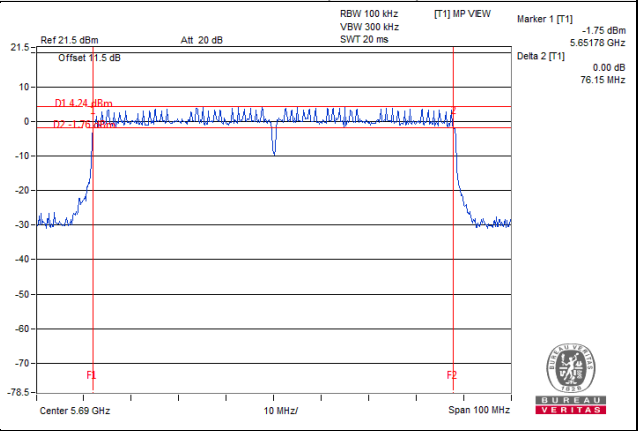
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
144 (For U-NII-3)	5720	3.80	3.82	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
142 (For U-NII-3)	5710	2.66	2.57	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
138 (For U-NII-3)	5690	2.93	2.89	0.5	Pass

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

Note:

For CH144 (UNII-3 Band): The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

For CH142 (UNII-3 Band): The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

For CH138 (UNII-3 Band): The 6dB bandwidth above 5725MHz = Marker 1 + Delta 2 - 5725MHz

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:

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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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