FCC Test Report

Report No.:	RF181108C27B-1
FCC ID:	VW7-SE80AC
Test Model:	SE80ac
Received Date:	Nov. 06, 2018
Test Date:	Nov. 07, 2018 ~ Mar. 12, 2019
Issued Date:	Mar. 25, 2019
Applicant:	SmartRG, Inc.
Address:	501 SE Columbia Shores Blvd Suite 500 , Vancouver WA 98661 US
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

Table of Contents

Release Control Record

Issue No.	Description	Date Issued
RF181108C27B-1	Original release.	Mar. 25, 2019

1 Certificate of Conformity

Product:	Intellifi Wall Plug Satellite
Brand:	EnGenius
Test Model:	SE80ac
Sample Status:	Engineering sample
Applicant:	SmartRG, Inc.
Test Date:	Nov. 07, 2018 ~ Mar. 12, 2019
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : _____ , **Date:** Mar. 25, 2019
Polly Chien /Specialist

Approved by : _____ , **Date:** Mar. 25, 2019
Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -12.15dB at 0.49017MHz.
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 -1.1dB at 5650.00MHz.
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.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	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	Intellifi Wall Plug Satellite
Brand	EnGenius
Test Model	SE80ac
Sample Status	Engineering sample
Power Supply Rating	100-240Vac, 50-60Hz
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180~5240MHz: For Indoor Access Point: 255.164mW For Client device: 229.558mW 5745~5825MHz: 384.488mW Beamforming Mode: 5180~5240MHz: For Indoor Access Point: 126.275mW For Client device:114.787mW 5745~5825MHz: 192.257mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	NA
Cable Supplied	NA

Note:

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

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

* The 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)

2. The following antennas were provided to the EUT.

Ant. Type	PIFA	
Connecter Type	I-PEX	
Antenna Gain (dBi)		
Item	2.4G	5G
Ant. 1	1.64	**4.29**
Ant. 2	**1.95**	3.75

* The maximum antenna gain is chosen for final test.

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

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

Radiated Emission Test (Above 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	7.2
	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	58.5

Radiated Emission Test (Below 1GHz):

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

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

Power Line Conducted Emission Test:

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

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

Transmit Power Measurement:

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
CDD Mode						
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	7.2
	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	58.5
Beamforming Mode						
-	802.11n (HT20)	5180-5240	36 to 48	36, 40, 48	OFDM	7.2
	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	58.5
	802.11n (HT20)	5745-5825	149 to 165	149, 157, 165	OFDM	7.2
	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	58.5

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)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	7.2
	802.11n (HT40)		38 to 46	38, 46	OFDM	15.0
	802.11ac (VHT80)		42	42	OFDM	58.5
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	7.2
	802.11n (HT40)		151 to 159	151, 159	OFDM	15.0
	802.11ac (VHT80)		155	155	OFDM	58.5

Test Condition:

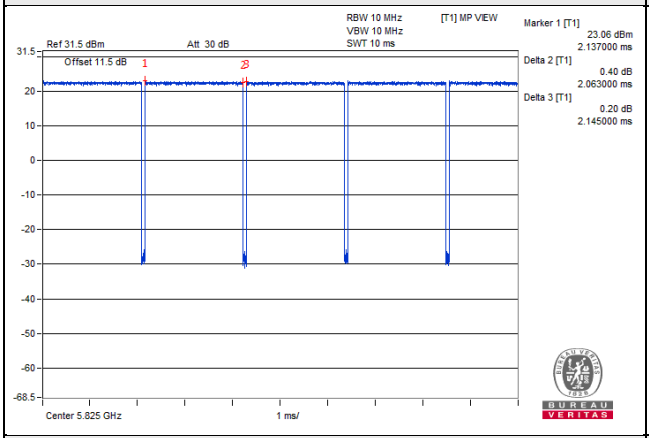
Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 67% RH	120Vac, 60Hz	Willy Cheng
RE<1G	24 deg. C, 67% RH	120Vac, 60Hz	Willy Cheng
PLC	25 deg. C, 66% RH	120Vac, 60Hz	Jones Chang
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Leo Tsai

3.3 Duty Cycle of Test Signal

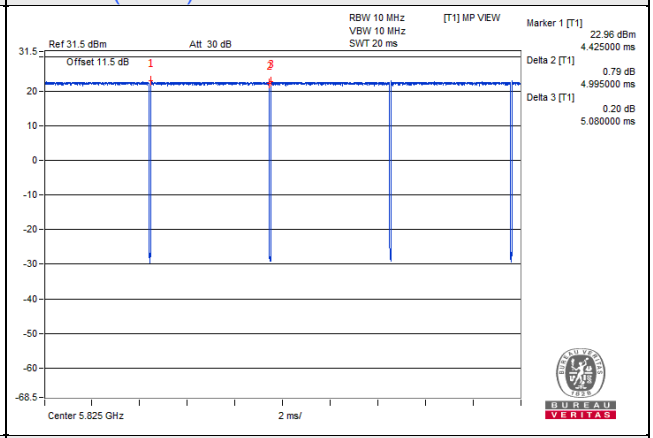
Duty cycle of test signal is > 98%, duty factor is not required
Duty cycle of test signal is < 98 %, duty factor is required

802.11a: Duty cycle = 2.063/2.145 = 0.962, Duty factor = 10 * log(1/0.962) = 0.17
802.11n (HT20): Duty cycle = 4.995/5.080 = 0.983
802.11n (HT40): Duty cycle = 2.415/2.520 = 0.958, Duty factor = 10 * log(1/0.958) = 0.18
802.11ac (VHT80): Duty cycle = 1.137/1.225 = 0.928, Duty factor = 10 * log(1/0.928) = 0.32

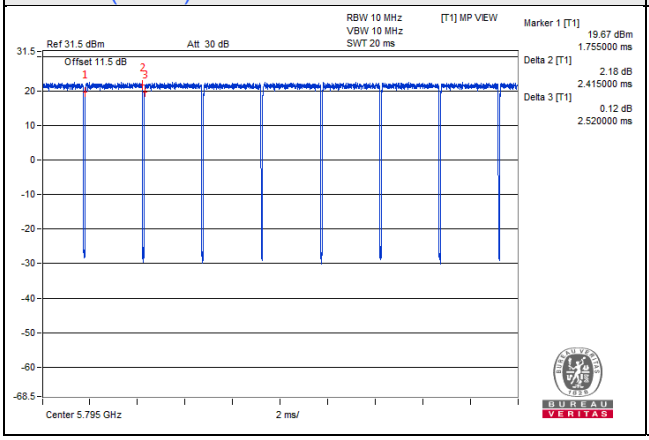
802.11a



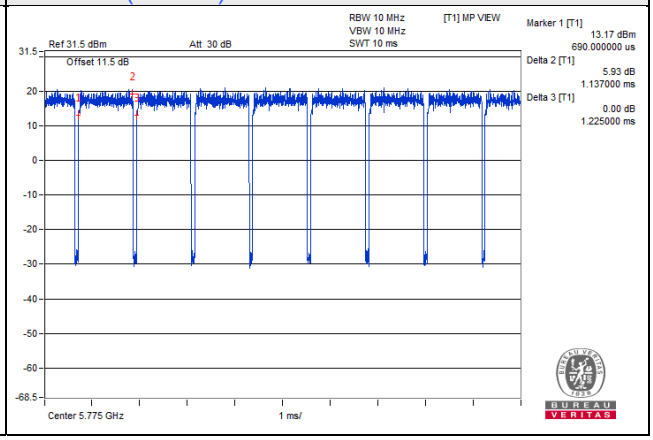
802.11n (HT20)



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.

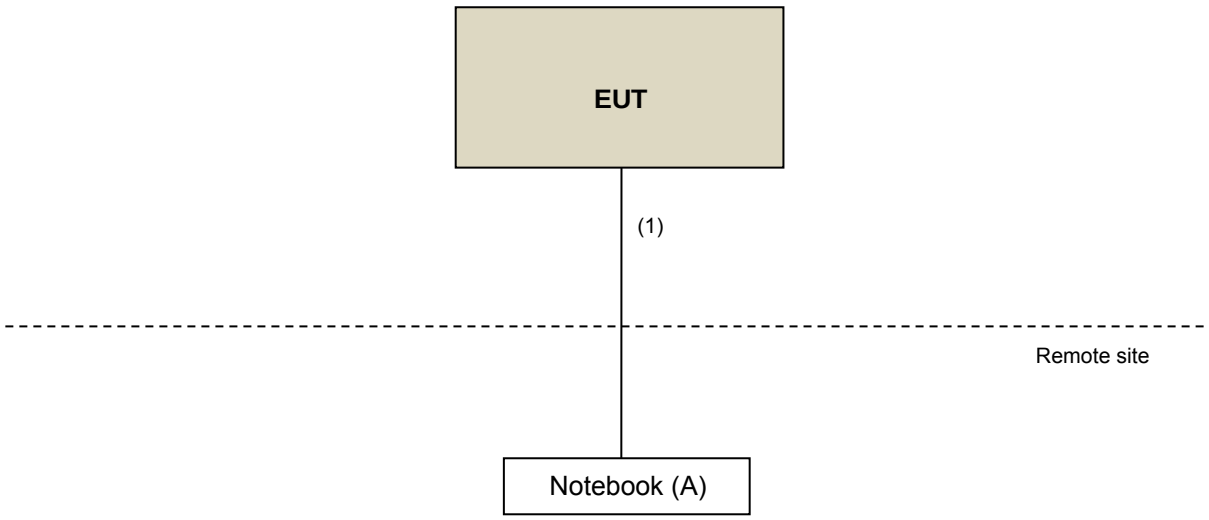
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45 cable	1	6	N	0	Cat5e

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

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

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBμV/m)</td><td>AV: 54 (dBμV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBμV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1
PK: 10 (dBm/MHz) *2
PK: 15.6 (dBm/MHz) *3
PK: 27 (dBm/MHz) *4</td><td>PK: 68.2(dBμV/m) *1
PK: 105.2 (dBμV/m) *2
PK: 110.8(dBμV/m) *3
PK: 122.2 (dBμV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.
*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.
*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.
*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

Note: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\ \sqrt{30P}}{3}$$ μV/m, where P is the eirp (Watts).

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 29, 2018	May 28, 2019
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Nov. 11, 2017	Nov. 10, 2018
			Nov. 22, 2018	Nov. 21, 2019
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
			Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
			Nov. 25, 2018	Nov. 24, 2019
Loop Antenna EMCI	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2018	Aug. 20, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2018	Aug. 20, 2019
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-SM-8000	Cable-CH3-03 (309224+170907)	Aug. 21, 2018	Aug. 20, 2019
Software BV ADT	ADT_Radiated_V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Pre-amplifier (18GHz-40GHz) EMC	EMC184045B	980175	Nov. 14, 2017	Nov. 13, 2018
			Nov. 14, 2018	Nov. 13, 2019
USB Wideband Power Sensor KEYSIGHT	U2021XA	MY55050005/MY55190004/MY55190007/MY55210005	Jul. 17, 2018	Jul. 16, 2019

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

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

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

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

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

Note:

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

For Radiated emission above 30MHz

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

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

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

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

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

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

Note:

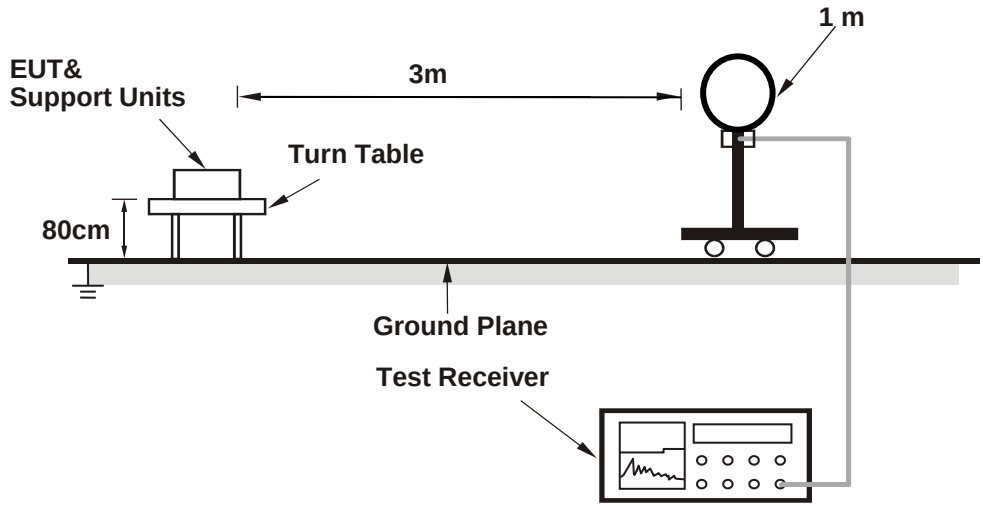
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

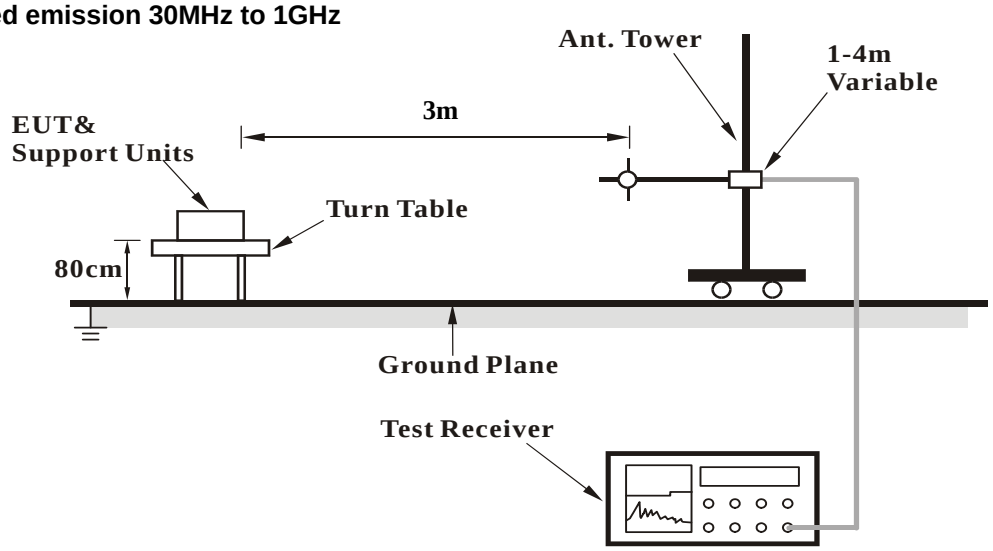
No deviation.

4.1.5 Test Setup

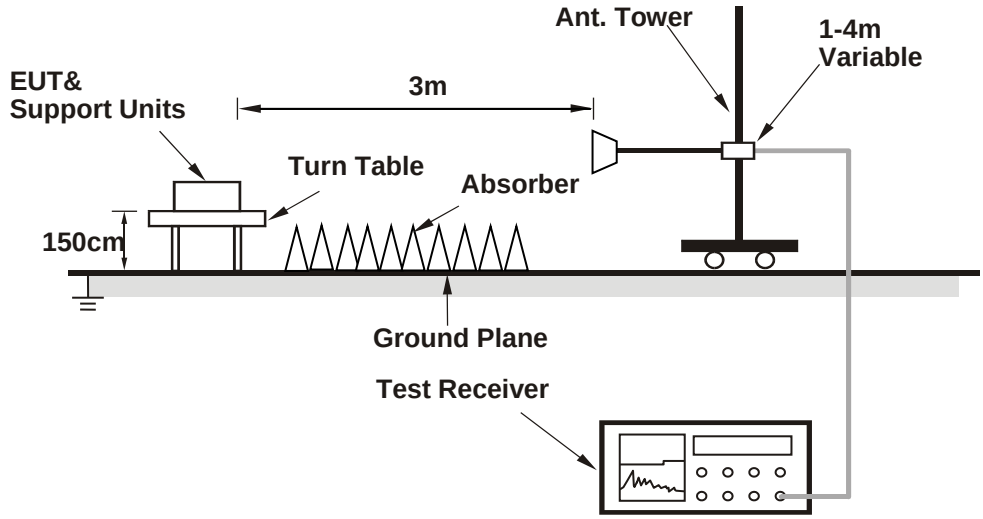
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

Above 1GHz data:

802.11a

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.3 PK	74.0	-7.7	2.36 H	126	62.8	3.5
2	5150.00	47.7 AV	54.0	-6.3	2.36 H	126	44.2	3.5
3	*5180.00	111.2 PK			2.37 H	53	72.0	39.2
4	*5180.00	100.5 AV			2.37 H	53	61.3	39.2
5	#10360.00	56.9 PK	68.2	-11.3	2.69 H	232	41.5	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	71.8 PK	74.0	-2.2	1.83 V	312	68.3	3.5
2	5150.00	52.8 AV	54.0	-1.2	1.83 V	312	49.3	3.5
3	*5180.00	115.7 PK			1.96 V	326	76.5	39.2
4	*5180.00	105.2 AV			1.96 V	326	66.0	39.2
5	#10360.00	56.7 PK	68.2	-11.5	1.99 V	202	41.3	15.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.1 PK	74.0	-10.9	2.71 H	82	59.6	3.5
2	5150.00	46.0 AV	54.0	-8.0	2.71 H	82	42.5	3.5
3	*5200.00	115.2 PK			2.93 H	87	75.9	39.3
4	*5200.00	104.3 AV			2.93 H	87	65.0	39.3
5	#10400.00	57.3 PK	68.2	-10.9	2.61 H	255	41.7	15.6
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	5150.00	69.3 PK	74.0	-4.7	1.59 V	339	65.8	3.5
2	5150.00	52.3 AV	54.0	-1.7	1.59 V	339	48.8	3.5
3	*5200.00	118.9 PK			1.00 V	332	79.6	39.3
4	*5200.00	107.9 AV			1.00 V	332	68.6	39.3
5	#10400.00	56.8 PK	68.2	-11.4	1.83 V	231	41.2	15.6

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	116.1 PK			2.10 H	54	77.0	39.1
2	*5240.00	104.8 AV			2.10 H	54	65.7	39.1
3	5350.00	56.7 PK	74.0	-17.3	1.96 H	113	53.0	3.7
4	5350.00	42.9 AV	54.0	-11.1	1.96 H	113	39.2	3.7
5	#10480.00	59.5 PK	68.2	-8.7	2.11 H	287	43.3	16.2
6	15720.00	64.8 PK	74.0	-9.2	2.06 H	300	49.2	15.6
7	15720.00	51.0 AV	54.0	-3.0	2.06 H	300	35.4	15.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	120.3 PK			1.51 V	329	81.2	39.1
2	*5240.00	109.0 AV			1.51 V	329	69.9	39.1
3	5350.00	56.0 PK	74.0	-18.0	1.66 V	302	52.3	3.7
4	5350.00	42.9 AV	54.0	-11.1	1.66 V	302	39.2	3.7
5	#10480.00	57.8 PK	68.2	-10.4	2.09 V	174	41.6	16.2
6	15720.00	65.6 PK	74.0	-8.4	1.70 V	253	50.0	15.6
7	15720.00	51.8 AV	54.0	-2.2	1.70 V	253	36.2	15.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5622.44	54.4 PK	68.2	-13.8	2.16 H	275	50.2	4.2
2	*5745.00	113.5 PK			2.16 H	275	73.7	39.8
3	*5745.00	102.6 AV			2.16 H	275	62.8	39.8
4	#5940.38	57.1 PK	68.2	-11.1	2.16 H	275	52.3	4.8
5	11490.00	61.4 PK	74.0	-12.6	1.93 H	23	44.6	16.8
6	11490.00	47.7 AV	54.0	-6.3	1.93 H	23	30.9	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	#5637.82	55.7 PK	68.2	-12.5	2.00 V	295	51.5	4.2
2	*5745.00	116.0 PK			2.00 V	295	76.2	39.8
3	*5745.00	105.0 AV			2.00 V	295	65.2	39.8
4	#5998.08	56.7 PK	68.2	-11.5	2.00 V	295	51.7	5.0
5	11490.00	62.5 PK	74.0	-11.5	2.02 V	56	45.7	16.8
6	11490.00	48.7 AV	54.0	-5.3	2.02 V	56	31.9	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 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5626.92	54.4 PK	68.2	-13.8	2.16 H	273	50.2	4.2
2	*5785.00	113.1 PK			2.16 H	273	73.0	40.1
3	*5785.00	102.2 AV			2.16 H	273	62.1	40.1
4	#5994.23	57.4 PK	68.2	-10.8	2.16 H	273	52.4	5.0
5	11570.00	65.2 PK	74.0	-8.8	1.99 H	26	48.2	17.0
6	11570.00	50.2 AV	54.0	-3.8	1.99 H	26	33.2	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	#5606.41	54.0 PK	68.2	-14.2	1.85 V	304	49.8	4.2
2	*5785.00	116.7 PK			1.85 V	304	76.6	40.1
3	*5785.00	105.1 AV			1.85 V	304	65.0	40.1
4	#5978.21	56.9 PK	68.2	-11.3	1.85 V	304	51.9	5.0
5	11570.00	60.4 PK	74.0	-13.6	1.26 V	298	43.4	17.0
6	11570.00	46.9 AV	54.0	-7.1	1.26 V	298	29.9	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 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5603.85	54.4 PK	68.2	-13.8	2.12 H	272	50.2	4.2
2	*5825.00	113.7 PK			2.12 H	272	73.4	40.3
3	*5825.00	102.6 AV			2.12 H	272	62.3	40.3
4	#5953.21	57.2 PK	68.2	-11.0	2.12 H	272	52.4	4.8
5	11650.00	64.9 PK	74.0	-9.1	1.79 H	28	48.3	16.6
6	11650.00	51.0 AV	54.0	-3.0	1.79 H	28	34.4	16.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5618.59	53.8 PK	68.2	-14.4	1.88 V	314	49.6	4.2
2	*5825.00	116.3 PK			1.88 V	314	76.0	40.3
3	*5825.00	105.1 AV			1.88 V	314	64.8	40.3
4	#5989.74	57.2 PK	68.2	-11.0	1.88 V	314	52.2	5.0
5	11650.00	61.8 PK	74.0	-12.2	1.56 V	299	45.2	16.6
6	11650.00	48.4 AV	54.0	-5.6	1.56 V	299	31.8	16.6

Remarks:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4874.00	48.1 PK	74.0	-25.9	2.35 H	137	45.4	2.7
2	4874.00	40.5 AV	54.0	-13.5	2.35 H	137	37.8	2.7
3	5150.00	64.9 PK	74.0	-9.1	2.37 H	83	61.4	3.5
4	5150.00	47.7 AV	54.0	-6.3	2.37 H	83	44.2	3.5
5	*5180.00	110.3 PK			2.36 H	47	71.1	39.2
6	*5180.00	98.8 AV			2.36 H	47	59.6	39.2
7	#10360.00	56.3 PK	68.2	-11.9	2.65 H	198	40.9	15.4
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4874.00	52.7 PK	74.0	-21.3	1.29 V	353	50.0	2.7
2	4874.00	48.3 AV	54.0	-5.7	1.29 V	353	45.6	2.7
3	5150.00	71.0 PK	74.0	-3.0	1.59 V	339	67.5	3.5
4	5150.00	52.6 AV	54.0	-1.4	1.59 V	339	49.1	3.5
5	*5180.00	114.9 PK			1.65 V	331	75.7	39.2
6	*5180.00	103.9 AV			1.65 V	331	64.7	39.2
7	#10360.00	57.2 PK	68.2	-11.0	1.88 V	265	41.8	15.4

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	65.0 PK	74.0	-9.0	2.41 H	81	61.5	3.5
2	5150.00	47.1 AV	54.0	-6.9	2.41 H	81	43.6	3.5
3	*5200.00	114.0 PK			2.70 H	87	74.7	39.3
4	*5200.00	103.1 AV			2.70 H	87	63.8	39.3
5	#10400.00	58.5 PK	68.2	-9.7	2.31 H	268	42.9	15.6
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	5150.00	71.9 PK	74.0	-2.1	1.41 V	336	68.4	3.5
2	5150.00	52.7 AV	54.0	-1.3	1.41 V	336	49.2	3.5
3	*5200.00	117.9 PK			1.69 V	331	78.6	39.3
4	*5200.00	106.9 AV			1.69 V	331	67.6	39.3
5	#10400.00	57.3 PK	68.2	-10.9	2.36 V	167	41.7	15.6

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	115.5 PK			2.77 H	89	76.4	39.1
2	*5240.00	104.4 AV			2.77 H	89	65.3	39.1
3	5350.00	56.4 PK	74.0	-17.6	2.05 H	131	52.7	3.7
4	5350.00	42.7 AV	54.0	-11.3	2.05 H	131	39.0	3.7
5	#10480.00	58.1 PK	68.2	-10.1	2.31 H	176	41.9	16.2
6	15720.00	63.9 PK	74.0	-10.1	1.64 H	300	48.3	15.6
7	15720.00	50.3 AV	54.0	-3.7	1.64 H	300	34.7	15.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	119.9 PK			1.55 V	331	80.8	39.1
2	*5240.00	108.6 AV			1.55 V	331	69.5	39.1
3	5350.00	56.1 PK	74.0	-17.9	1.72 V	299	52.4	3.7
4	5350.00	42.9 AV	54.0	-11.1	1.72 V	299	39.2	3.7
5	#10480.00	58.8 PK	68.2	-9.4	2.64 V	193	42.6	16.2
6	15720.00	65.5 PK	74.0	-8.5	1.72 V	253	49.9	15.6
7	15720.00	51.5 AV	54.0	-2.5	1.72 V	253	35.9	15.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5607.69	55.1 PK	68.2	-13.1	2.12 H	289	50.9	4.2
2	*5745.00	113.5 PK			2.12 H	289	73.7	39.8
3	*5745.00	102.3 AV			2.12 H	289	62.5	39.8
4	#5949.36	56.9 PK	68.2	-11.3	2.12 H	289	52.1	4.8
5	11490.00	62.6 PK	74.0	-11.4	1.94 H	27	45.8	16.8
6	11490.00	48.8 AV	54.0	-5.2	1.94 H	27	32.0	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	#5619.23	54.6 PK	68.2	-13.6	1.61 V	314	50.4	4.2
2	*5745.00	115.3 PK			1.61 V	314	75.5	39.8
3	*5745.00	104.4 AV			1.61 V	314	64.6	39.8
4	#5931.41	57.3 PK	68.2	-10.9	1.61 V	314	52.4	4.9
5	11490.00	58.9 PK	74.0	-15.1	1.50 V	297	42.1	16.8
6	11490.00	45.6 AV	54.0	-8.4	1.50 V	297	28.8	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 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5642.31	54.5 PK	68.2	-13.7	2.05 H	277	50.2	4.3
2	*5785.00	113.3 PK			2.05 H	277	73.2	40.1
3	*5785.00	102.1 AV			2.05 H	277	62.0	40.1
4	#5973.08	56.8 PK	68.2	-11.4	2.05 H	277	51.8	5.0
5	11570.00	63.7 PK	74.0	-10.3	1.90 H	28	46.7	17.0
6	11570.00	49.7 AV	54.0	-4.3	1.90 H	28	32.7	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	#5648.08	53.8 PK	68.2	-14.4	1.84 V	301	49.5	4.3
2	*5785.00	115.8 PK			1.84 V	301	75.7	40.1
3	*5785.00	104.8 AV			1.84 V	301	64.7	40.1
4	#5996.79	56.8 PK	68.2	-11.4	1.84 V	301	51.8	5.0
5	11570.00	60.4 PK	74.0	-13.6	1.27 V	297	43.4	17.0
6	11570.00	46.7 AV	54.0	-7.3	1.27 V	297	29.7	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 165	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.59	54.6 PK	68.2	-13.6	2.01 H	284	50.3	4.3
2	*5825.00	113.5 PK			2.01 H	284	73.2	40.3
3	*5825.00	102.2 AV			2.01 H	284	61.9	40.3
4	#5971.79	57.0 PK	68.2	-11.2	2.01 H	284	52.0	5.0
5	11650.00	62.9 PK	74.0	-11.1	1.81 H	30	46.3	16.6
6	11650.00	48.2 AV	54.0	-5.8	1.81 H	30	31.6	16.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5603.21	54.8 PK	68.2	-13.4	1.71 V	318	50.6	4.2
2	*5825.00	116.1 PK			1.71 V	318	75.8	40.3
3	*5825.00	104.8 AV			1.71 V	318	64.5	40.3
4	#5976.92	58.2 PK	68.2	-10.0	1.71 V	318	53.2	5.0
5	11650.00	61.0 PK	74.0	-13.0	1.56 V	295	44.4	16.6
6	11650.00	47.6 AV	54.0	-6.4	1.56 V	295	31.0	16.6

Remarks:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.9 PK	74.0	-10.1	2.98 H	83	60.4	3.5
2	5150.00	48.5 AV	54.0	-5.5	2.98 H	83	45.0	3.5
3	*5190.00	106.3 PK			3.19 H	52	67.0	39.3
4	*5190.00	96.2 AV			3.19 H	52	56.9	39.3
5	#10380.00	58.0 PK	68.2	-10.2	3.02 H	258	42.5	15.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	68.1 PK	74.0	-5.9	1.66 V	335	64.6	3.5
2	5150.00	52.5 AV	54.0	-1.5	1.66 V	335	49.0	3.5
3	*5190.00	111.1 PK			1.89 V	330	71.8	39.3
4	*5190.00	100.9 AV			1.89 V	330	61.6	39.3
5	#10380.00	57.4 PK	68.2	-10.8	1.96 V	237	41.9	15.5

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.1 PK	74.0	-11.9	3.01 H	88	58.6	3.5
2	5150.00	46.7 AV	54.0	-7.3	3.01 H	88	43.2	3.5
3	*5230.00	110.8 PK			2.33 H	48	71.7	39.1
4	*5230.00	100.6 AV			2.33 H	48	61.5	39.1
5	5350.00	56.5 PK	74.0	-17.5	2.85 H	49	52.8	3.7
6	5350.00	43.6 AV	54.0	-10.4	2.85 H	49	39.9	3.7
7	#10460.00	58.0 PK	68.2	-10.2	3.22 H	176	42.0	16.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.1 PK	74.0	-7.9	1.75 V	338	62.6	3.5
2	5150.00	52.3 AV	54.0	-1.7	1.75 V	338	48.8	3.5
3	*5230.00	115.3 PK			1.76 V	329	76.2	39.1
4	*5230.00	105.0 AV			1.76 V	329	65.9	39.1
5	5350.00	59.3 PK	74.0	-14.7	1.92 V	351	55.6	3.7
6	5350.00	44.5 AV	54.0	-9.5	1.92 V	351	40.8	3.7
7	#10460.00	58.2 PK	68.2	-10.0	1.86 V	254	42.2	16.0

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.74	60.9 PK	68.2	-7.3	1.91 H	290	56.7	4.2
2	#5650.00	63.4 PK	68.2	-4.8	1.99 H	264	59.1	4.3
3	*5755.00	110.5 PK			1.91 H	290	70.7	39.8
4	*5755.00	99.5 AV			1.91 H	290	59.7	39.8
5	#5968.59	57.5 PK	68.2	-10.7	1.91 H	290	52.6	4.9
6	11510.00	59.9 PK	74.0	-14.1	1.92 H	23	43.0	16.9
7	11510.00	46.2 AV	54.0	-7.8	1.92 H	23	29.3	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	#5640.38	61.2 PK	68.2	-7.0	1.90 V	306	57.0	4.2
2	#5650.00	64.7 PK	68.2	-3.5	1.99 V	289	60.4	4.3
3	*5755.00	111.6 PK			1.90 V	306	71.8	39.8
4	*5755.00	100.8 AV			1.90 V	306	61.0	39.8
5	#5973.72	58.8 PK	68.2	-9.4	1.90 V	306	53.8	5.0
6	11510.00	60.7 PK	74.0	-13.3	1.89 V	52	43.8	16.9
7	11510.00	46.8 AV	54.0	-7.2	1.89 V	52	29.9	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 159	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5643.59	56.4 PK	68.2	-11.8	2.10 H	289	52.1	4.3
2	*5795.00	111.2 PK			2.10 H	289	71.1	40.1
3	*5795.00	100.3 AV			2.10 H	289	60.2	40.1
4	#5955.77	59.4 PK	68.2	-8.8	2.10 H	289	54.6	4.8
5	11590.00	61.2 PK	74.0	-12.8	1.83 H	29	44.2	17.0
6	11590.00	47.7 AV	54.0	-6.3	1.83 H	29	30.7	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	#5644.87	59.0 PK	68.2	-9.2	1.77 V	320	54.7	4.3
2	*5795.00	112.2 PK			1.77 V	320	72.1	40.1
3	*5795.00	101.3 AV			1.77 V	320	61.2	40.1
4	#5934.62	58.7 PK	68.2	-9.5	1.77 V	320	53.9	4.8
5	11590.00	59.9 PK	74.0	-14.1	2.03 V	357	42.9	17.0
6	11590.00	46.0 AV	54.0	-8.0	2.03 V	357	29.0	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.

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	4805.00	50.4 PK	74.0	-23.6	2.03 H	252	47.6	2.8
2	4805.00	45.2 AV	54.0	-8.8	2.03 H	252	42.4	2.8
3	5150.00	62.1 PK	74.0	-11.9	3.41 H	49	58.6	3.5
4	5150.00	48.7 AV	54.0	-5.3	3.41 H	49	45.2	3.5
5	*5210.00	102.7 PK			2.32 H	51	63.5	39.2
6	*5210.00	92.4 AV			2.32 H	51	53.2	39.2
7	5350.00	56.1 PK	74.0	-17.9	2.96 H	11	52.4	3.7
8	5350.00	43.2 AV	54.0	-10.8	2.96 H	11	39.5	3.7
9	#10420.00	57.8 PK	68.2	-10.4	3.36 H	142	42.1	15.7
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	4805.00	55.8 PK	74.0	-18.2	1.40 V	358	53.0	2.8
2	4805.00	52.6 AV	54.0	-1.4	1.40 V	358	49.8	2.8
3	5150.00	67.0 PK	74.0	-7.0	1.76 V	28	63.5	3.5
4	5150.00	52.4 AV	54.0	-1.6	1.76 V	28	48.9	3.5
5	*5210.00	106.9 PK			1.81 V	329	67.7	39.2
6	*5210.00	96.9 AV			1.81 V	329	57.7	39.2
7	5350.00	56.5 PK	74.0	-17.5	2.03 V	76	52.8	3.7
8	5350.00	43.6 AV	54.0	-10.4	2.03 V	76	39.9	3.7
9	#10420.00	57.2 PK	68.2	-11.0	2.28 V	212	41.5	15.7

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.72	64.1 PK	68.2	-4.1	2.25 H	296	59.8	4.3
2	**#5650.00**	**67.1 PK**	**68.2**	**-1.1**	**2.03 H**	**305**	**62.8**	**4.3**
3	*5775.00	105.2 PK			2.25 H	296	65.2	40.0
4	*5775.00	94.8 AV			2.25 H	296	54.8	40.0
5	#5925.00	63.7 PK	68.2	-4.5	2.17 H	265	58.8	4.9
6	#5928.85	62.0 PK	68.2	-6.2	2.25 H	296	57.1	4.9
7	11550.00	60.0 PK	74.0	-14.0	2.00 H	46	43.0	17.0
8	11550.00	46.5 AV	54.0	-7.5	2.00 H	46	29.5	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	#5644.23	63.9 PK	68.2	-4.3	1.66 V	302	59.6	4.3
2	#5650.00	66.9 PK	68.2	-1.3	1.96 V	316	62.6	4.3
3	*5775.00	106.5 PK			1.66 V	302	66.5	40.0
4	*5775.00	96.2 AV			1.66 V	302	56.2	40.0
5	#5925.00	66.6 PK	68.2	-1.6	1.98 V	315	61.7	4.9
6	#5930.13	63.3 PK	68.2	-4.9	1.66 V	302	58.4	4.9
7	11550.00	58.8 PK	74.0	-15.2	2.27 V	264	41.8	17.0
8	11550.00	45.0 AV	54.0	-9.0	2.27 V	264	28.0	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.

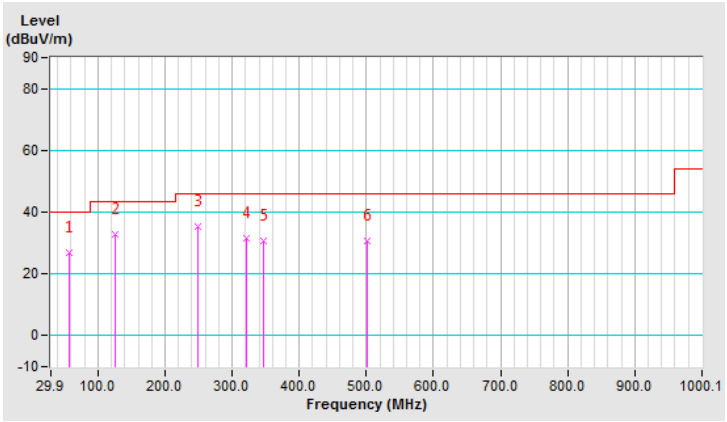
Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	84	36.3	-9.6
2	125.17	32.6 QP	43.5	-10.9	1.51 H	254	43.7	-11.1
3	249.60	35.2 QP	46.0	-10.8	1.00 H	268	44.6	-9.4
4	321.54	31.6 QP	46.0	-14.4	1.00 H	91	38.5	-6.9
5	346.82	30.8 QP	46.0	-15.2	1.00 H	153	37.5	-6.7
6	500.42	30.5 QP	46.0	-15.5	1.51 H	153	34.0	-3.5

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 of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz.

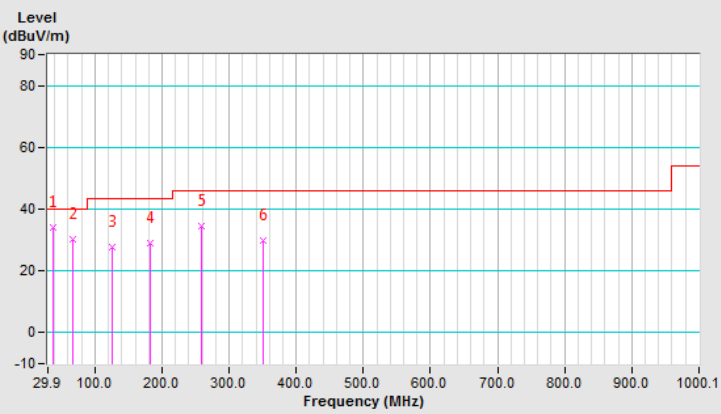


CHANNEL	TX Channel 149	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	37.68	34.2 QP	40.0	-5.8	1.00 V	176	44.6	-10.4
2	66.84	30.4 QP	40.0	-9.6	1.00 V	214	40.9	-10.5
3	125.17	27.7 QP	43.5	-15.8	1.49 V	148	38.8	-11.1
4	181.55	29.0 QP	43.5	-14.5	1.00 V	135	39.3	-10.3
5	259.33	34.7 QP	46.0	-11.3	2.00 V	137	43.8	-9.1
6	350.71	29.8 QP	46.0	-16.2	1.00 V	27	36.3	-6.5

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 of frequency range 30MHz~1000MHz.
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz.



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

Tested date: Nov. 14, 2018

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESR3	102412	Feb. 08, 2018	Feb. 07, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 26, 2018	Feb. 25, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 19, 2018	Aug. 18, 2019
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

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

4.2.3 Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

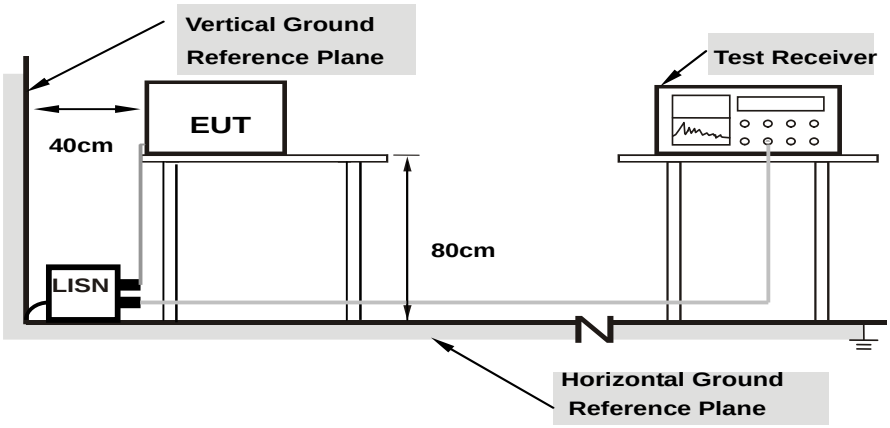
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



Note: 1.Support units were connected to second LISN.

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

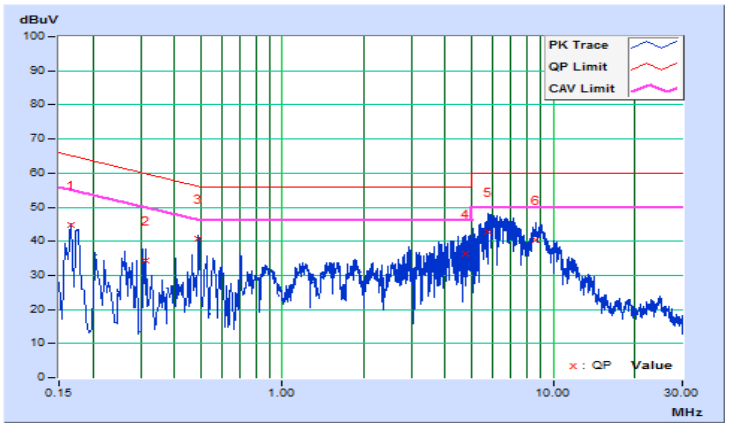
Worst-case data: 802.11a

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

No	Freq.	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16564	9.73	35.14	19.31	44.87	29.04	65.18	55.18	-20.31	-26.14
2	0.31422	9.74	24.61	9.16	34.35	18.90	59.86	49.86	-25.51	-30.96
3	**0.49017**	**9.74**	**30.84**	**24.27**	**40.58**	**34.01**	**56.16**	**46.16**	**-15.58**	**-12.15**
4	4.78335	9.80	26.68	12.00	36.48	21.80	56.00	46.00	-19.52	-24.20
5	5.76476	9.82	32.99	19.59	42.81	29.41	60.00	50.00	-17.19	-20.59
6	8.64643	9.86	30.65	19.45	40.51	29.31	60.00	50.00	-19.49	-20.69

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.

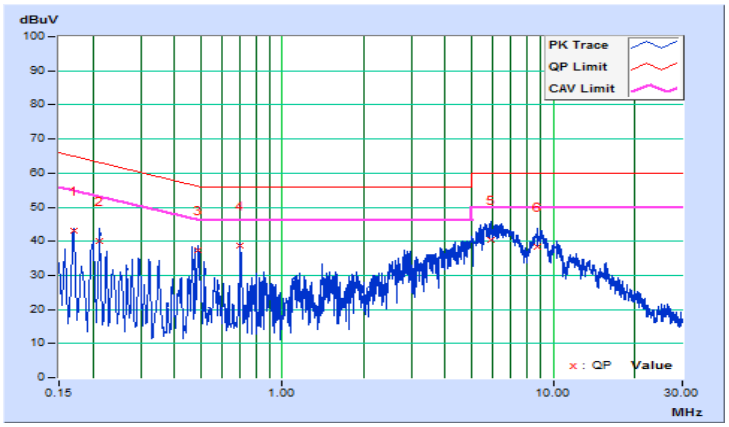


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.16955	9.72	33.30	15.05	43.02	24.77	64.98	54.98	-21.96	-30.21
2	0.21256	9.73	30.28	10.16	40.01	19.89	63.10	53.10	-23.09	-33.21
3	0.49064	9.75	27.56	13.75	37.31	23.50	56.16	46.16	-18.85	-22.66
4	0.70209	9.73	28.87	17.19	38.60	26.92	56.00	46.00	-17.40	-19.08
5	5.92507	9.84	30.73	19.22	40.57	29.06	60.00	50.00	-19.43	-20.94
6	8.77155	9.89	28.56	17.55	38.45	27.44	60.00	50.00	-21.55	-22.56

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)
	√	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

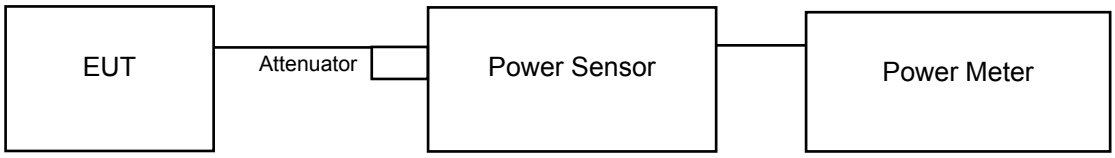
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 $N_{ANT} \geq 5$.

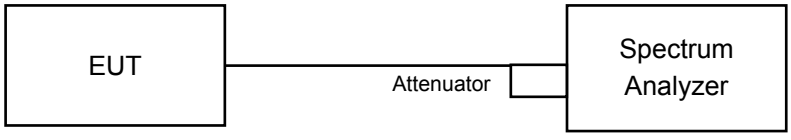
For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.3.2 Test Setup

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



802.11ac (VHT80)



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.

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:

U-NII-1 Band

For Indoor Access Point:

802.11a

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.21	18.79	128.285	21.08	30.00	Pass
40	5200	20.22	21.76	**255.164**	24.07	30.00	Pass
48	5240	19.37	20.83	207.557	23.17	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	16.21	17.89	103.301	20.14	30.00	Pass
40	5200	20.11	21.76	252.533	24.02	30.00	Pass
48	5240	19.42	20.89	210.242	23.23	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	14.85	16.58	76.048	18.81	30.00	Pass
46	5230	19.66	21.37	229.558	23.61	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.63	16.19	70.631	18.49	30.00	Pass

For Client device:

802.11a

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	17.21	18.79	128.285	21.08	24.00	Pass
40	5200	17.79	19.18	142.911	21.55	24.00	Pass
48	5240	17.40	18.81	130.987	21.17	24.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	16.21	17.89	103.301	20.14	24.00	Pass
40	5200	17.12	18.73	126.168	21.01	24.00	Pass
48	5240	17.46	18.87	132.809	21.23	24.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	14.85	16.58	76.048	18.81	24.00	Pass
46	5230	19.66	21.37	**229.558**	23.61	24.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.63	16.19	70.631	18.49	24.00	Pass

U-NII-3 Band

802.11a

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	22.41	21.69	321.752	25.08	30.00	Pass
157	5785	22.36	21.96	329.223	25.17	30.00	Pass
165	5825	22.33	22.46	347.200	25.41	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	22.39	21.76	323.348	25.10	30.00	Pass
157	5785	22.25	22.01	326.735	25.14	30.00	Pass
165	5825	22.23	22.51	345.347	25.38	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	22.60	22.59	363.522	25.61	30.00	Pass
159	5795	22.66	23.01	**384.488**	25.85	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	20.14	19.74	197.465	22.95	30.00	Pass

Beamforming Mode

U-NII-1 Band

For Indoor Access Point:

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	13.20	14.88	51.654	17.13	28.70	Pass
40	5200	17.10	18.75	**126.275**	21.01	28.70	Pass
48	5240	16.41	17.88	105.128	20.22	28.70	Pass

Note:
U-NII-1: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 30-(7.3-6) = 28.70dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	11.84	13.57	38.027	15.80	28.70	Pass
46	5230	16.65	18.36	114.787	20.60	28.70	Pass

Note:
U-NII-1: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 30-(7.3-6) = 28.70dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	11.62	13.18	35.318	15.48	28.70	Pass

Note:
U-NII-1: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 30-(7.3-6) = 28.70dBm.

For Client device:

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	13.20	14.88	51.654	17.13	22.70	Pass
40	5200	14.11	15.72	63.088	18.00	22.70	Pass
48	5240	14.45	15.86	66.409	18.22	22.70	Pass

Note:
U-NII-1: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 24-(7.3-6) = 22.70dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	11.84	13.57	38.027	15.80	22.70	Pass
46	5230	16.65	18.36	**114.787**	20.60	22.70	Pass

Note:
U-NII-1: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 24-(7.3-6) = 22.70dBm.

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	11.62	13.18	35.318	15.48	22.70	Pass

Note:
U-NII-1: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 24-(7.3-6) = 22.70dBm.

U-NII-3 Band

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	19.38	18.75	161.685	22.09	28.70	Pass
157	5785	19.24	19.00	163.379	22.13	28.70	Pass
165	5825	19.22	19.50	172.685	22.37	28.70	Pass

Note:
U-NII-3: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 30-(7.3-6) = 28.70dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	19.59	19.58	181.773	22.60	28.70	Pass
159	5795	19.65	20.00	**192.257**	22.84	28.70	Pass

Note:
U-NII-3: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 30-(7.3-6) = 28.70dBm.

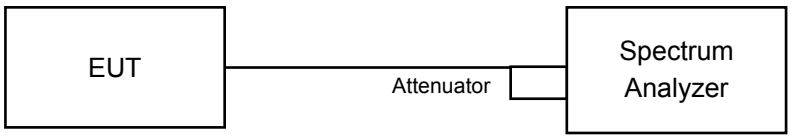
802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	17.13	16.73	98.740	19.94	28.70	Pass

Note:
U-NII-3: Beamforming gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power limit shall be reduced to 30-(7.3-6) = 28.70dBm.

4.4 Occupied Bandwidth Measurement

4.4.1 Test Setup



4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.4.3 Test Procedure

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

4.4.4 Test Result

802.11a

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	16.44	16.56
40	5200	17.04	24.96
48	5240	16.92	18.84
149	5745	31.92	26.52
157	5785	32.88	28.08
165	5825	34.20	30.12

802.11n (HT20)

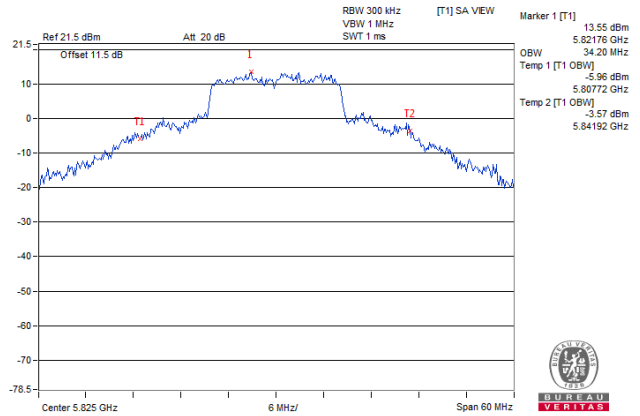
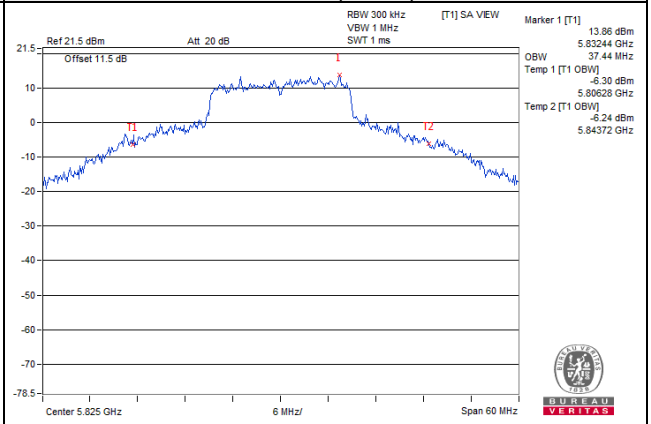
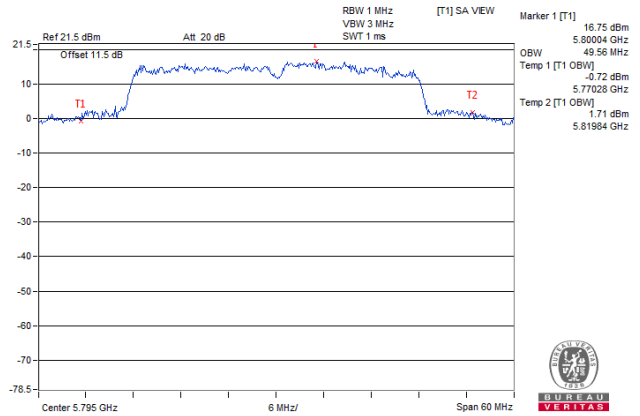
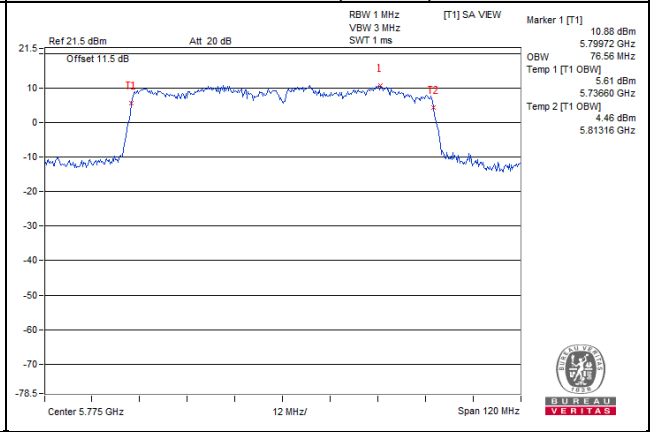
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.52
40	5200	18.00	36.12
48	5240	17.88	18.48
149	5745	34.80	24.48
157	5785	35.76	28.08
165	5825	37.44	32.76

802.11n (HT40)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.12
46	5230	36.48	37.80
151	5755	48.84	47.40
159	5795	49.56	45.48

802.11ac (VHT80)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	75.84	75.84
155	5775	76.56	76.56

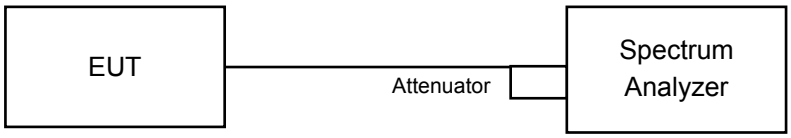
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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	
	√	Client device	11dBm/ MHz
U-NII-2A			11dBm/ MHz
U-NII-2C			11dBm/ MHz
U-NII-3		√	30dBm/ 500kHz

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

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

Using method SA-2, Duty cycle <98%

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

Duty cycle of test signal is ≥ 98%

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

Duty cycle <98%

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

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

For Indoor Access Point:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	4.06	6.64	0.17	8.72	15.70	Pass
40	5200	7.11	9.59	0.17	11.70	15.70	Pass
48	5240	6.70	9.19	0.17	11.30	15.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 17-(7.3-6) = 15.70dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.80	5.85	7.60	15.70	Pass
40	5200	6.79	10.47	12.02	15.70	Pass
48	5240	6.45	8.94	10.88	15.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 17-(7.3-6) = 15.70dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.27	1.87	0.18	3.77	15.70	Pass
46	5230	3.42	6.18	0.18	8.21	15.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 17-(7.3-6) = 15.70dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

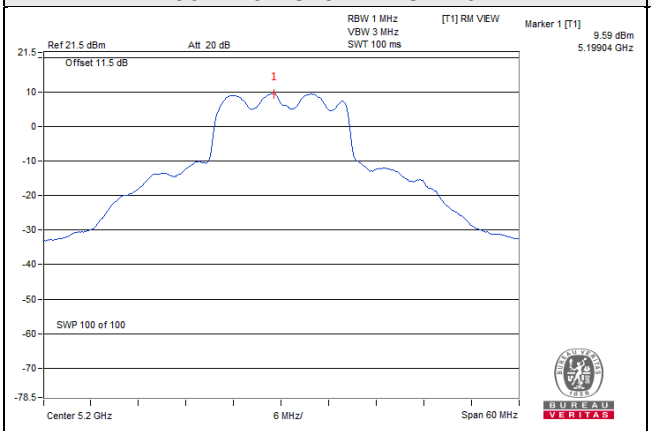
Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-4.90	-2.27	0.32	-0.06	15.70	Pass

Note:

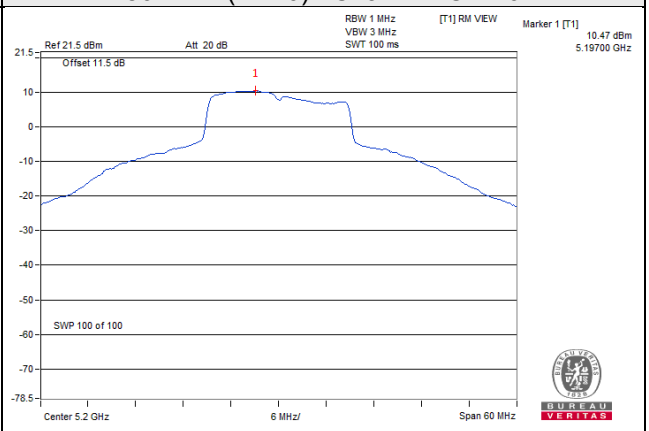
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 17-(7.3-6) = 15.70dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

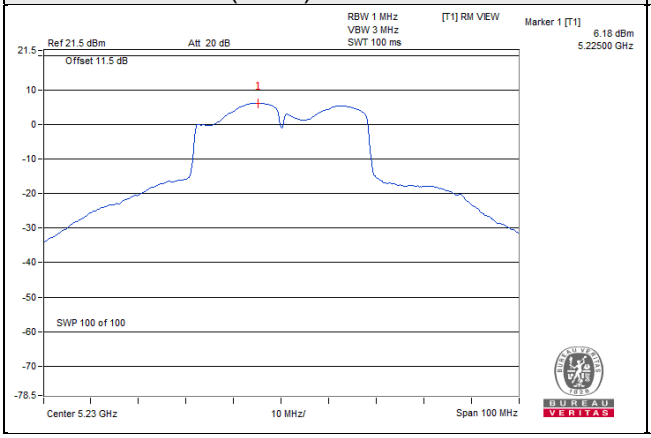
802.11a / Chain 1 / CH 40



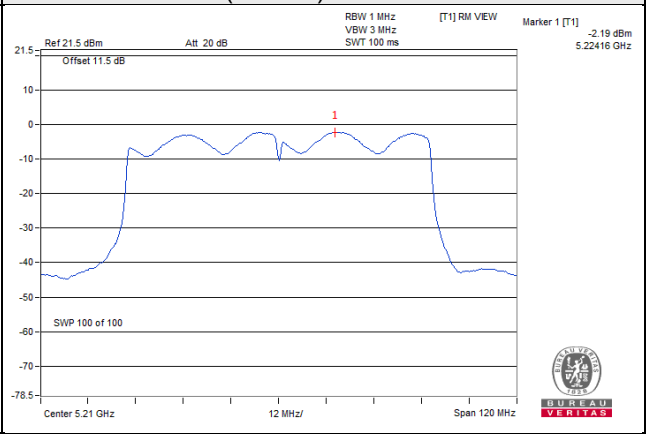
802.11n (HT20) / Chain 1 / CH 40



802.11n (HT40) / Chain 1 / CH 46



802.11ac (VHT80) / Chain 1 / CH 42



For Client device:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	4.06	6.64	0.17	8.72	9.70	Pass
40	5200	4.91	7.36	0.17	9.49	9.70	Pass
48	5240	5.27	7.19	0.17	9.52	9.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 11-(7.3-6) = 9.70dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Total PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1			
36	5180	2.80	5.85	7.60	9.70	Pass
40	5200	4.85	7.50	9.38	9.70	Pass
48	5240	5.26	7.40	9.47	9.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 11-(7.3-6) = 9.70dBm.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.27	1.87	0.18	3.77	9.70	Pass
46	5230	3.42	6.18	0.18	8.21	9.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 11-(7.3-6) = 9.70dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

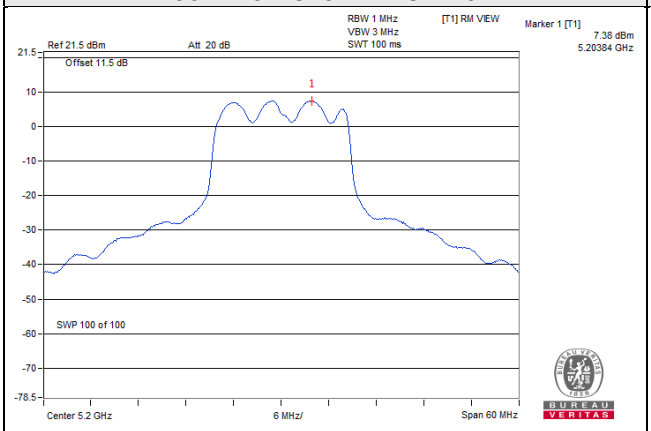
802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-4.90	-2.27	0.32	-0.06	9.70	Pass

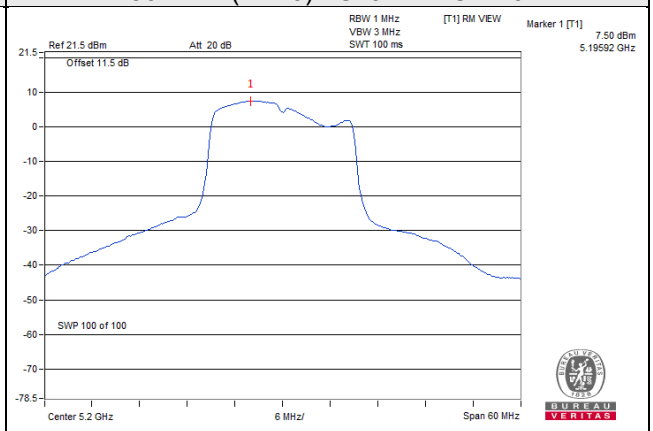
Note:
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 11-(7.3-6) = 9.70dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

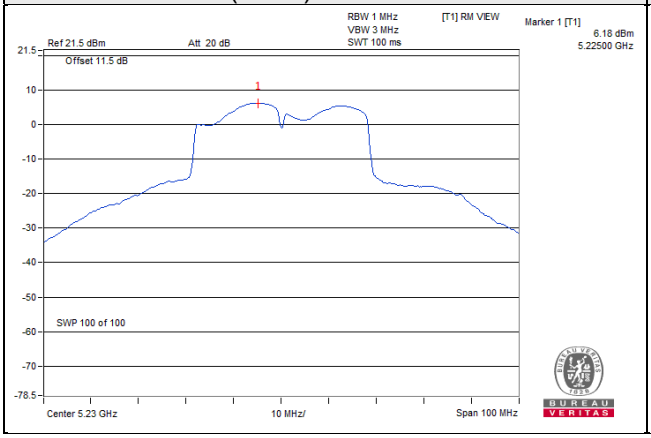
802.11a / Chain 1 / CH 40



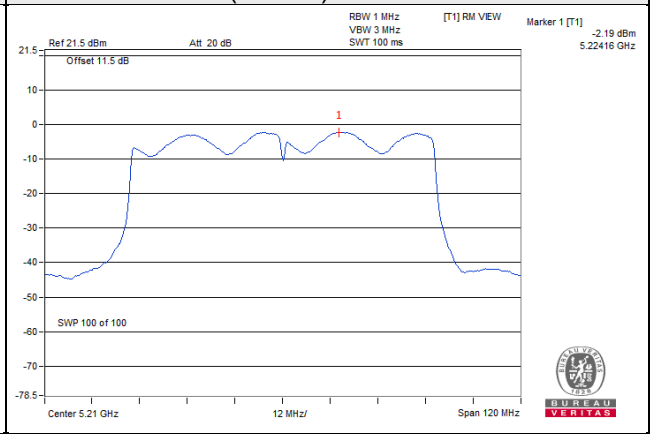
802.11n (HT20) / Chain 1 / CH 40



802.11n (HT40) / Chain 1 / CH 46



802.11ac (VHT80) / Chain 1 / CH 42



For U-NII-3 band:

802.11a

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	1.15	3.37	3.01	0.17	6.55	28.70	Pass
	157	5785	0.74	2.96	3.01	0.17	6.14	28.70	Pass
	165	5825	0.83	3.05	3.01	0.17	6.23	28.70	Pass
1	149	5745	1.51	3.73	3.01	0.17	6.91	28.70	Pass
	157	5785	1.34	3.56	3.01	0.17	6.74	28.70	Pass
	165	5825	1.09	3.31	3.01	0.17	6.49	28.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 30-(7.3-6) = 28.7dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)				
0	149	5745	0.73	2.95	3.01	5.96	28.70	Pass
	157	5785	0.45	2.67	3.01	5.68	28.70	Pass
	165	5825	0.53	2.75	3.01	5.76	28.70	Pass
1	149	5745	1.01	3.23	3.01	6.24	28.70	Pass
	157	5785	0.70	2.92	3.01	5.93	28.70	Pass
	165	5825	0.57	2.79	3.01	5.80	28.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 30-(7.3-6) = 28.7dBm.

802.11n (HT40)

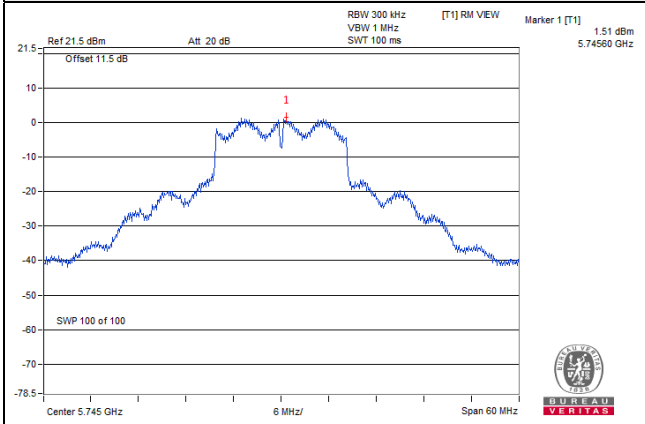
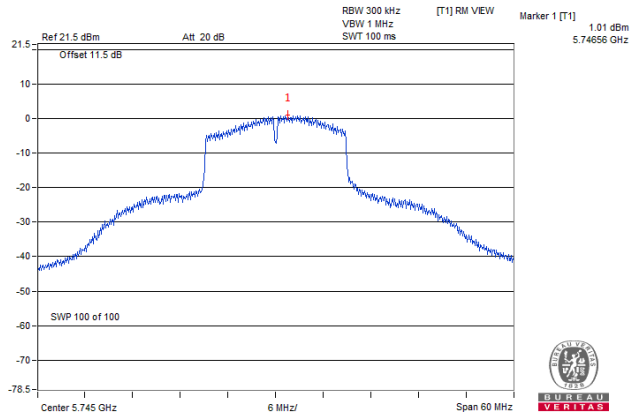
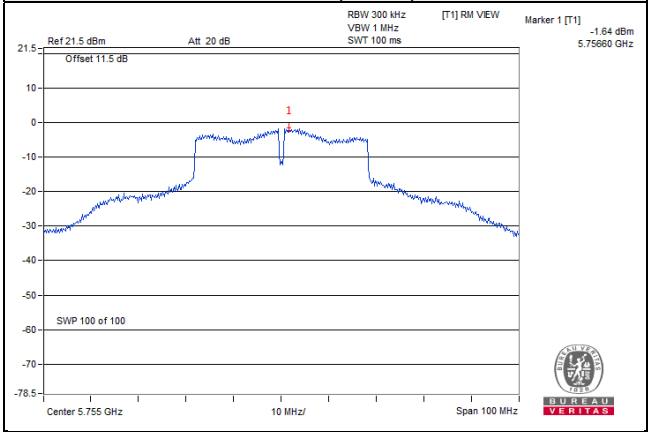
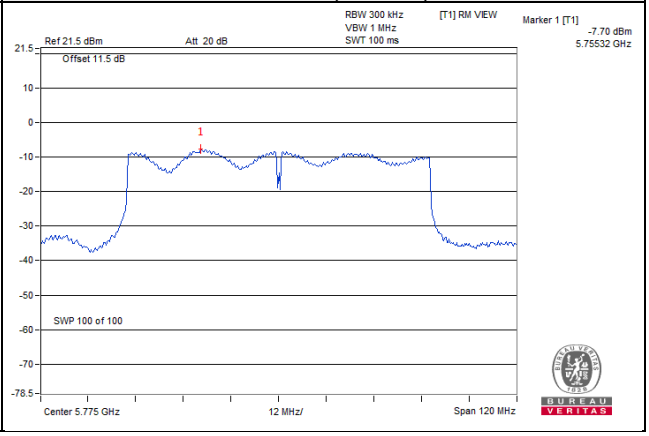
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-2.79	-0.57	3.01	0.18	2.62	28.70	Pass
	159	5795	-2.67	-0.45	3.01	0.18	2.74	28.70	Pass
1	151	5755	-1.64	0.58	3.01	0.18	3.77	28.70	Pass
	159	5795	-2.35	-0.13	3.01	0.18	3.06	28.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 30-(7.3-6) = 28.7dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/ 500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-8.32	-6.10	3.01	0.32	-2.77	28.70	Pass
1	155	5775	-7.70	-5.48	3.01	0.32	-2.15	28.70	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 = $G_{ANT\ MAX}$ + 10 log(N_{ANT}/N_{SS}) = 4.29dBi +10 log(2/1)=7.3dBi > 6dBi, so the power density limit shall be reduced to 30-(7.3-6) = 28.7dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

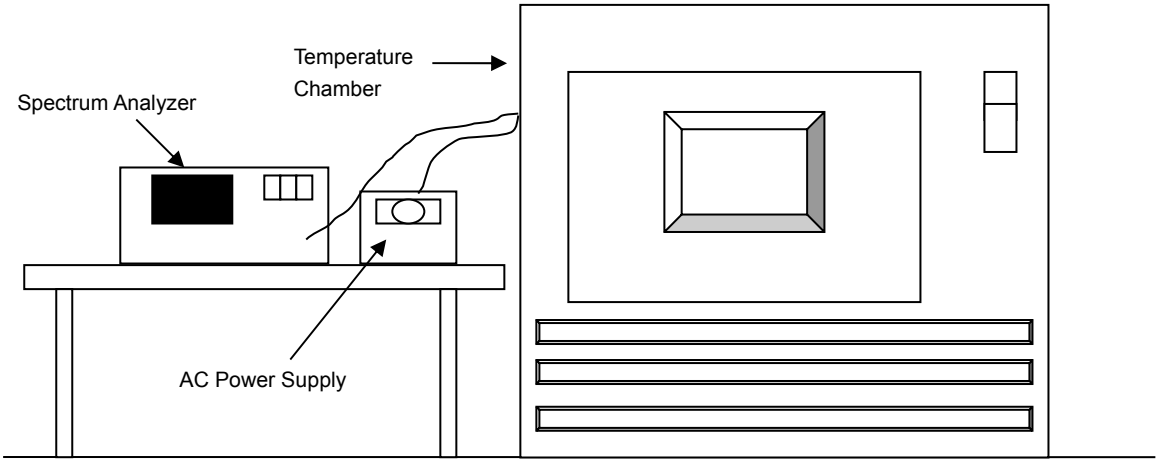
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jun. 11, 2018	Jun. 10, 2019
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 04, 2018	Jun. 03, 2019
Digital Multimeter Fluke	87-III	70360742	Jun. 29, 2018	Jun. 28, 2019
AC Power Supply Extech	CFW-105	E000603	NA	NA

4.6.4 Test Procedure

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

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

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

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

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
50	120	5180.0086	PASS	5180.0081	PASS	5180.0065	PASS	5180.0083	PASS
40	120	5179.9873	PASS	5179.9913	PASS	5179.9875	PASS	5179.9893	PASS
30	120	5179.9866	PASS	5179.9862	PASS	5179.984	PASS	5179.9863	PASS
20	120	5179.9937	PASS	5179.9942	PASS	5179.994	PASS	5179.9929	PASS
10	120	5180.0184	PASS	5180.0162	PASS	5180.0175	PASS	5180.0176	PASS
0	120	5180.0208	PASS	5180.0224	PASS	5180.0228	PASS	5180.0212	PASS
-10	120	5179.9972	PASS	5179.9982	PASS	5179.9939	PASS	5179.9962	PASS
-20	120	5180.0179	PASS	5180.0151	PASS	5180.018	PASS	5180.0178	PASS
-30	120	5179.9976	PASS	5179.9977	PASS	5179.9971	PASS	5179.9984	PASS

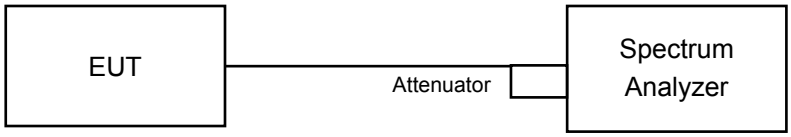
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5179.993	PASS	5179.9944	PASS	5179.9939	PASS	5179.9937	PASS
	120	5179.9937	PASS	5179.9942	PASS	5179.994	PASS	5179.9929	PASS
	102	5179.9928	PASS	5179.9949	PASS	5179.9949	PASS	5179.9929	PASS

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.07	12.68	0.5	Pass
157	5785	16.32	15.09	0.5	Pass
165	5825	15.80	15.17	0.5	Pass

802.11n (HT20)

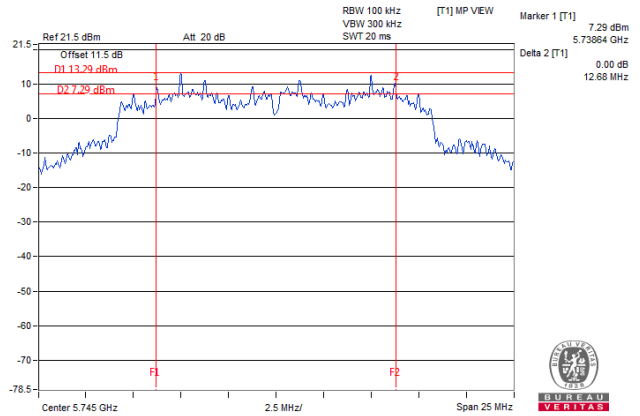
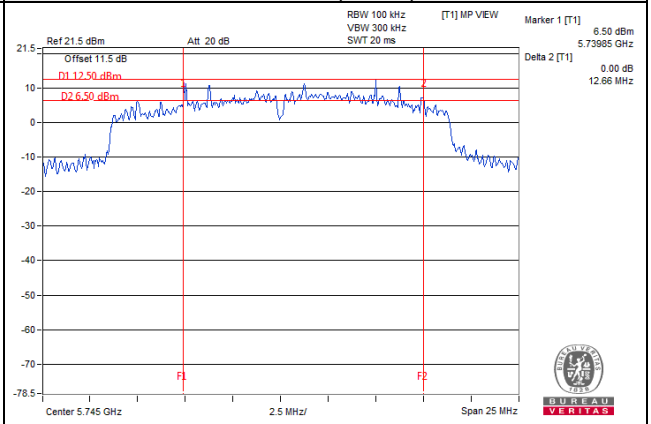
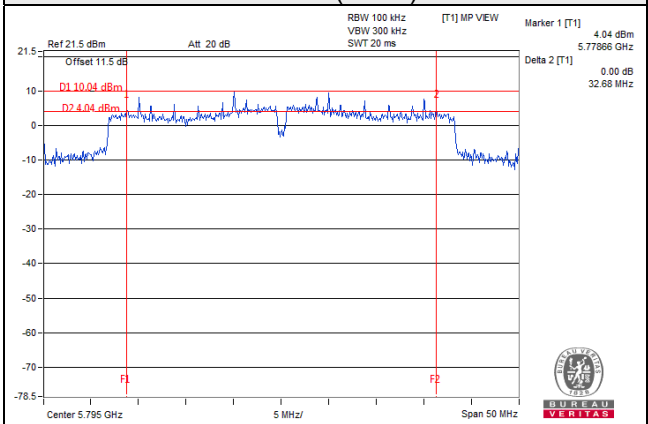
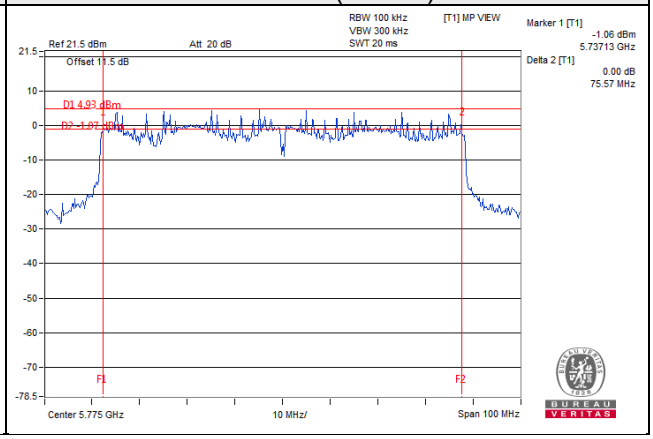
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	16.98	12.66	0.5	Pass
157	5785	17.22	15.11	0.5	Pass
165	5825	17.60	15.14	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.41	36.42	0.5	Pass
159	5795	33.00	32.68	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.61	75.57	0.5	Pass

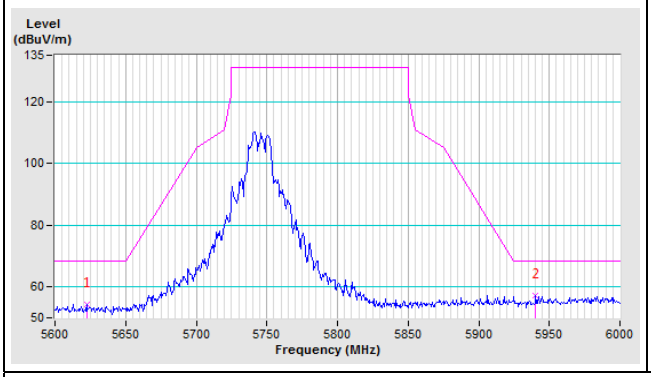
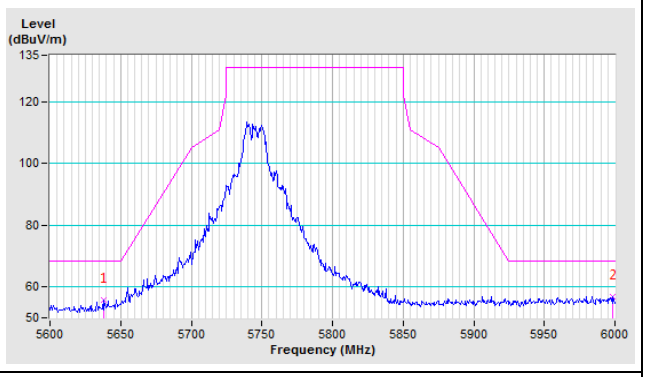
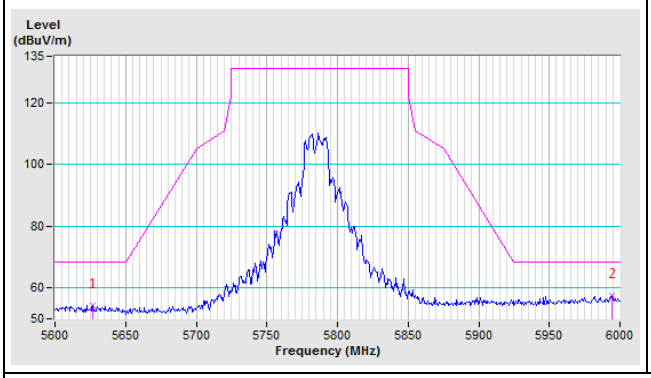
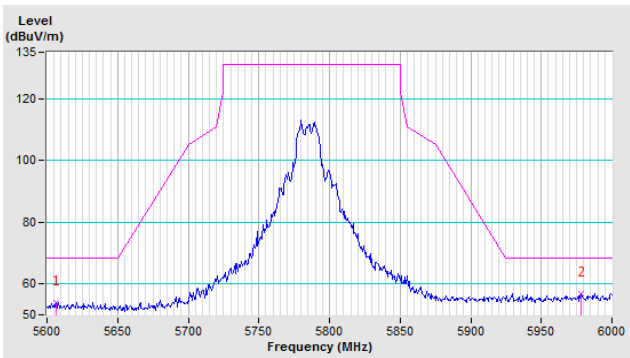
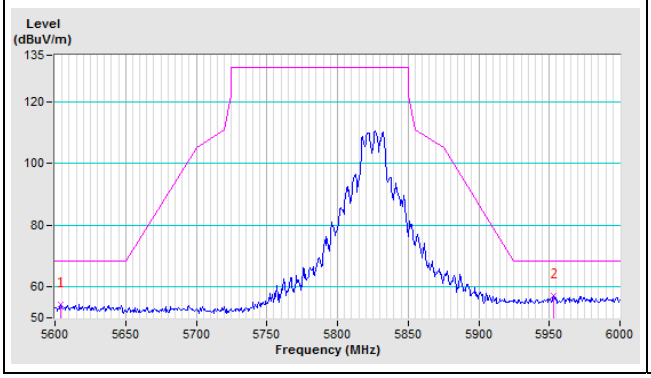
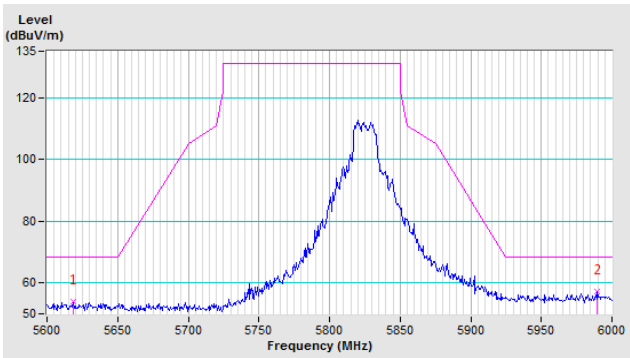
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

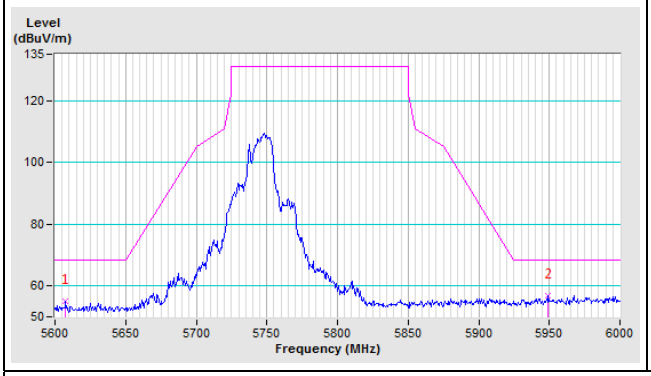
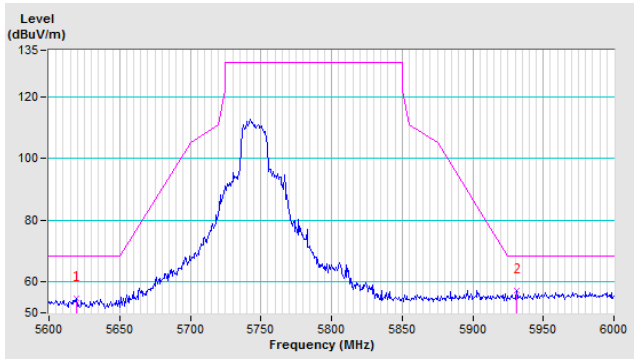
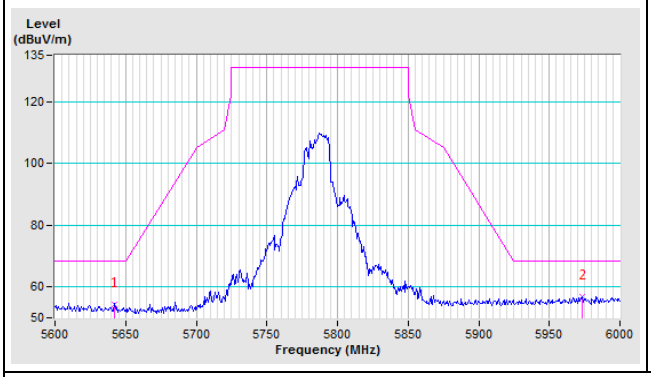
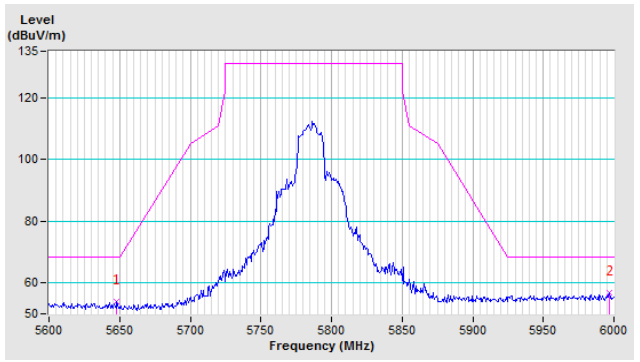
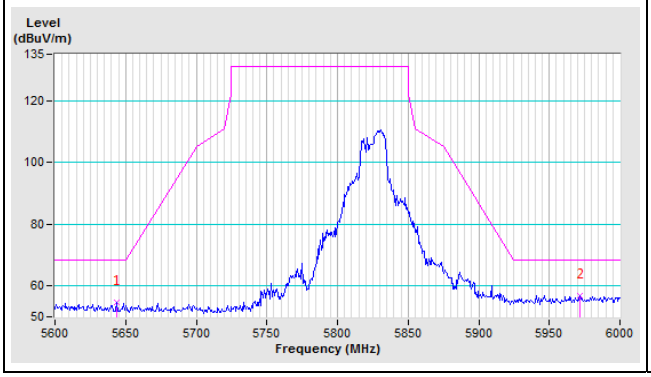
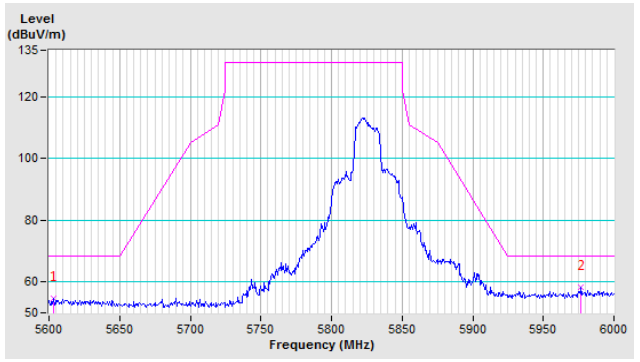
Please refer to the attached file (Test Setup Photo).

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

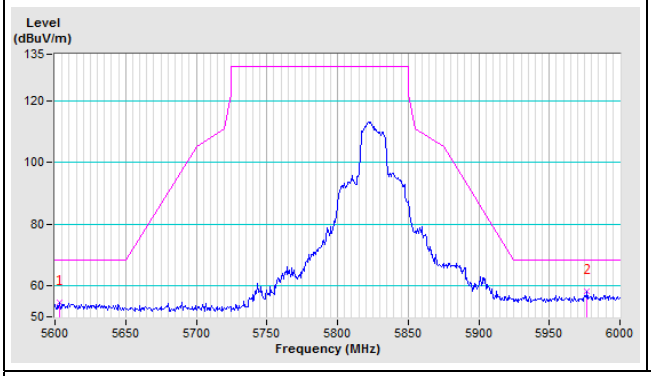
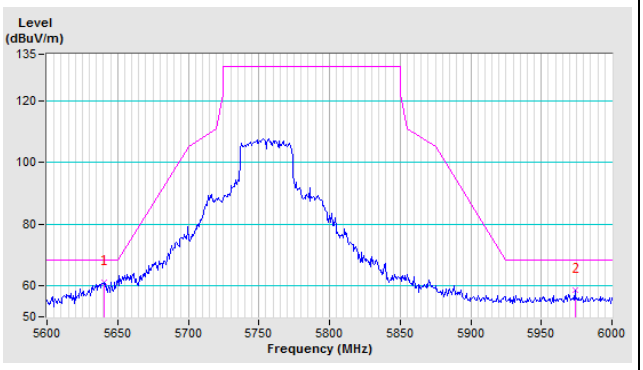
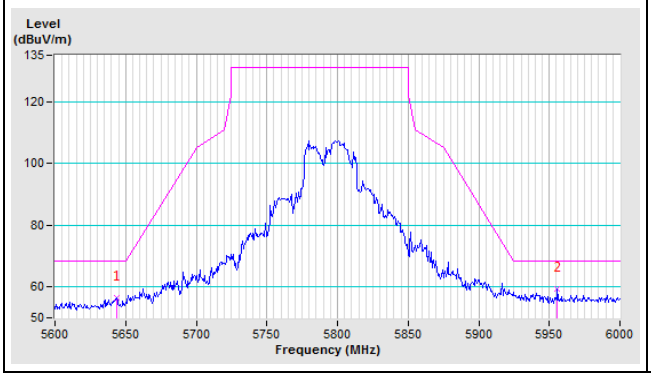
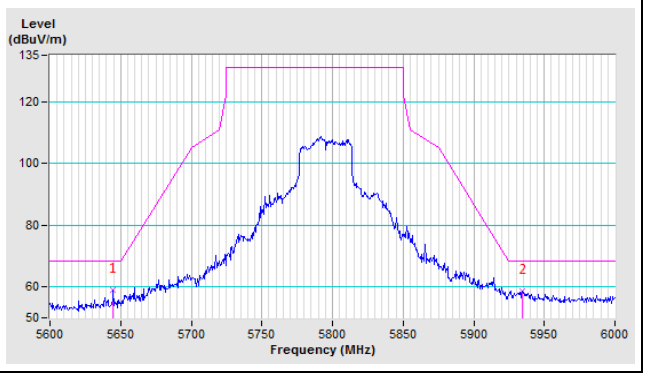
802.11a

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

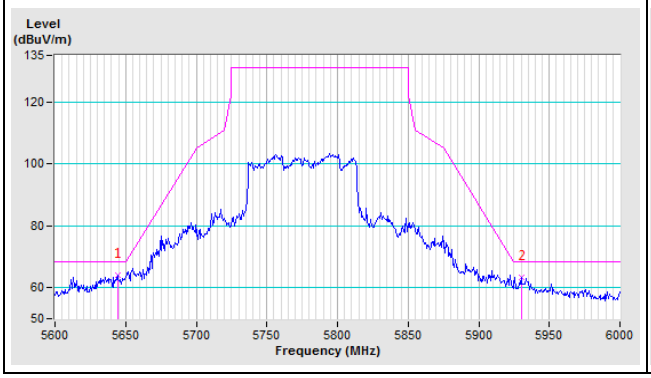
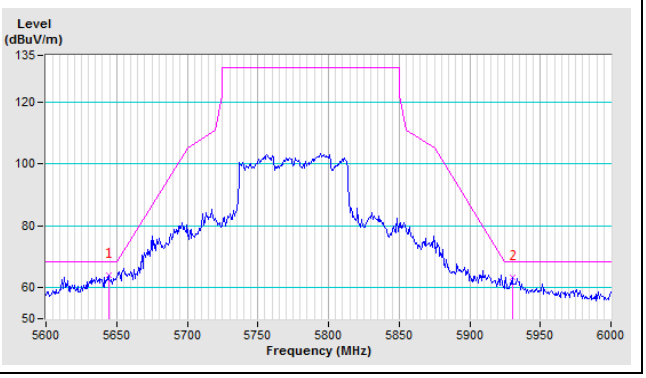
802.11n (HT20)

CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT40)

CH151	
Horizontal	Vertical
	
CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

Appendix – Information of the Testing Laboratories

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

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

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

Hsin Chu EMC/RF/Telecom Lab
Tel: 886-3-6668565
Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety
Tel: 886-3-3183232
Fax: 886-3-3270892

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

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

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