

FCC Test Report

Report No.: RF180503C11-1

FCC ID: A8J-ENH1350EXT

Test Model: ENH1350EXT

Received Date: May 03, 2018

Test Date: May 25 ~ Jun. 06, 2018

Issued Date: Jun. 08, 2018

Applicant: EnGenius Technologies

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FCC Registration / 788550 / TW0003
Designation Number:



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Release Control Record

Issue No.	Description	Date Issued
RF180503C11-1	Original release	Jun. 08, 2018

1 Certificate of Conformity

Product: Outdoor Long Range Wireless Access Point

Brand: EnGenius

Test Model: ENH1350EXT

Sample Status: Engineering sample

Applicant: EnGenius Technologies

Test Date: May 25 ~ Jun. 06, 2018

Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2013

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

Prepared by : Celine Chou , **Date:** Jun. 08, 2018
Celine Chou / Specialist

Approved by : Bruce Chen , **Date:** Jun. 08, 2018
Bruce Chen / Project Engineer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -9.11dB at 0.47309MHz.
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 -1.6dB 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 brass not a standard connector.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.94 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.86 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	Outdoor Long Range Wireless Access Point
Brand	EnGenius
Test Model	ENH1350EXT
Sample Status	Engineering sample
Power Supply Rating	54Vdc from PoE
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
Output Power	CDD Mode: 5180 ~ 5240MHz: 42.543mW 5745 ~ 5825MHz: 211.366mW Beamforming Mode: 5180 ~ 5240MHz: 21.281mW 5745 ~ 5825MHz: 105.682mW
Antenna Type	Refer to note
Antenna Connector	Refer to note
Accessory Device	PoE, Antenna x4
Cable Supplied	0.55m non-shielded AC power cable without core

Note:

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

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

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

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

2. The EUT consumes power from the following PoE.

PoE	
Brand	EnGenius
Model	EPA5006GPR
Input Power	100-240Vac, 50-60Hz, 0.8A
Output Power	54Vdc, 0.6A

3. The EUT with follow antennas gain is listed as table below.

Ant. Type	Dipole					
Connector	brass					
Frequency (MHz)	2400MHz	2450MHz	2500MHz	5150MHz	5550MHz	5850MHz
Gain (dBi)	5.08	5.13	5.17	5.12	5.09	5.17

4. The EUT will install at outdoor area, the highest antenna gain from the horizon above 30 degrees as below, for more detail information please refer to antenna specification and user manual.

Antenna Model	Antenna gain	Antenna install degree
7102A0414000	4.45 dBi	

Due to device Will restricted installation position as above photo, thus consider to above 30 degrees highest antenna gain are chosen from XZ and YZ Plane (antenna specification of 60~-60 dug and 120~-120 dug)

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

3.2 Description of Test Modes

For 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

For 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 $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement

PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

APCM: Antenna Port Conducted Measurement

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	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Radiated Emission Test (Below 1GHz):

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

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	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

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	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

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.

Following channels (s) was (were) selected for the final test as noted 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	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	6.0
	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3
Beamforming Mode						
-	802.11n (HT20)	5180-5240	36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11n (HT20)	5745-5825	149 to 165	149, 157, 165	OFDM	6.5
	802.11n (HT40)		151 to 159	151, 159	OFDM	13.5
	802.11ac (VHT80)		155	155	OFDM	29.3

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	23 deg. C, 68% RH	120Vac, 60Hz	Adair Peng Will Cheng
RE<1G	23 deg. C, 68% RH	120Vac, 60Hz	Adair Peng
PLC	25 deg. C, 70% RH	120Vac, 60Hz	Will Cheng
APCM	25 deg. C, 60% RH	120Vac, 60Hz	Alan Wu

3.3 Duty Cycle of Test Signal

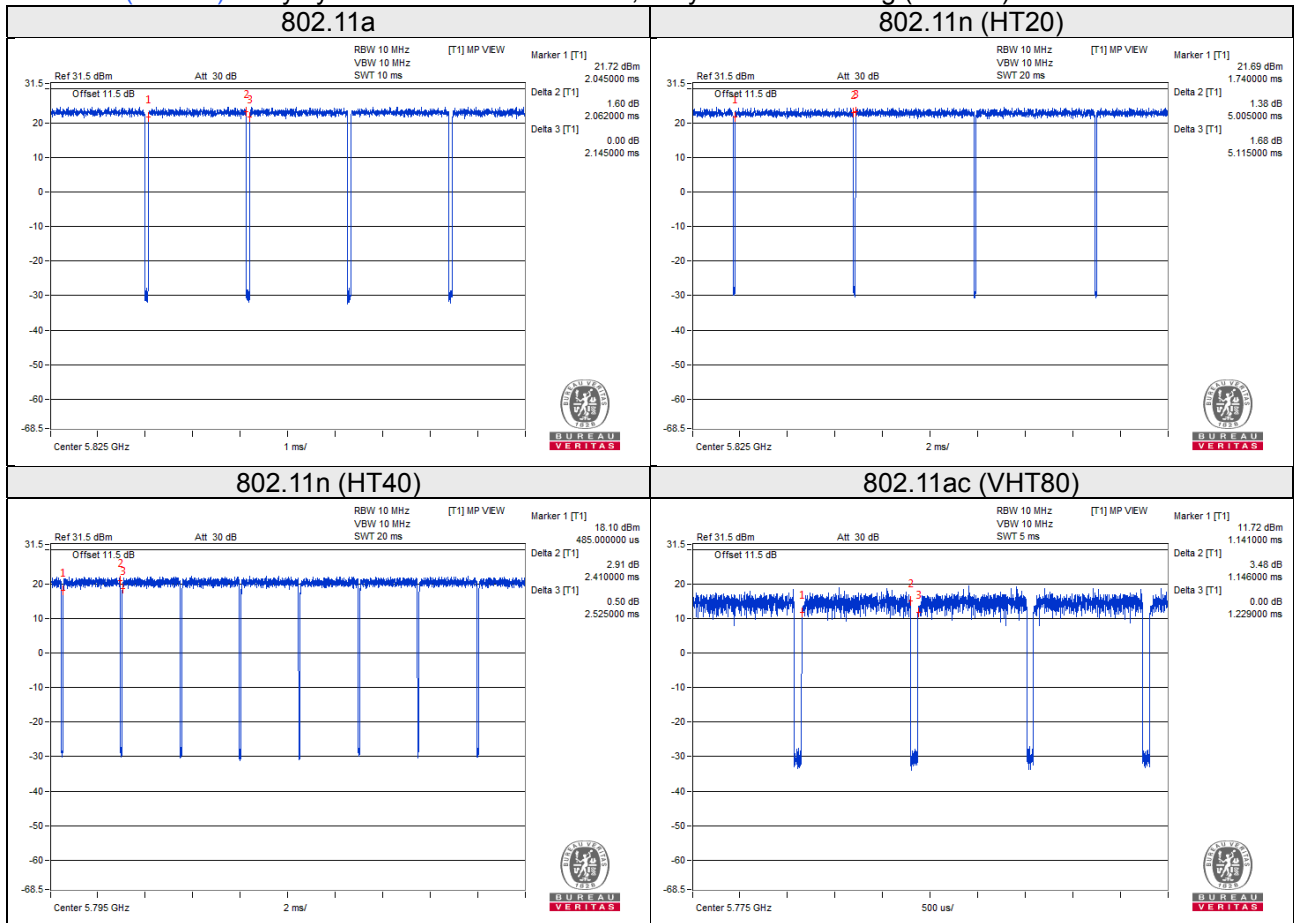
Duty cycle of test signal is < 98%, duty factor is required.

802.11a: Duty cycle = 2.062/2.145 = 0.961, Duty factor = $10 \cdot \log(1/0.961) = 0.17$

802.11n (HT20): Duty cycle = 5.005/5.115 = 0.978, Duty factor = $10 \cdot \log(1/0.978) = 0.09$

802.11n (HT40): Duty cycle = 2.410/2.525 = 0.954, Duty factor = $10 \cdot \log(1/0.954) = 0.20$

802.11ac (VHT80): Duty cycle = 1.146/1.229 = 0.932, Duty factor = $10 \cdot \log(1/0.932) = 0.30$



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.

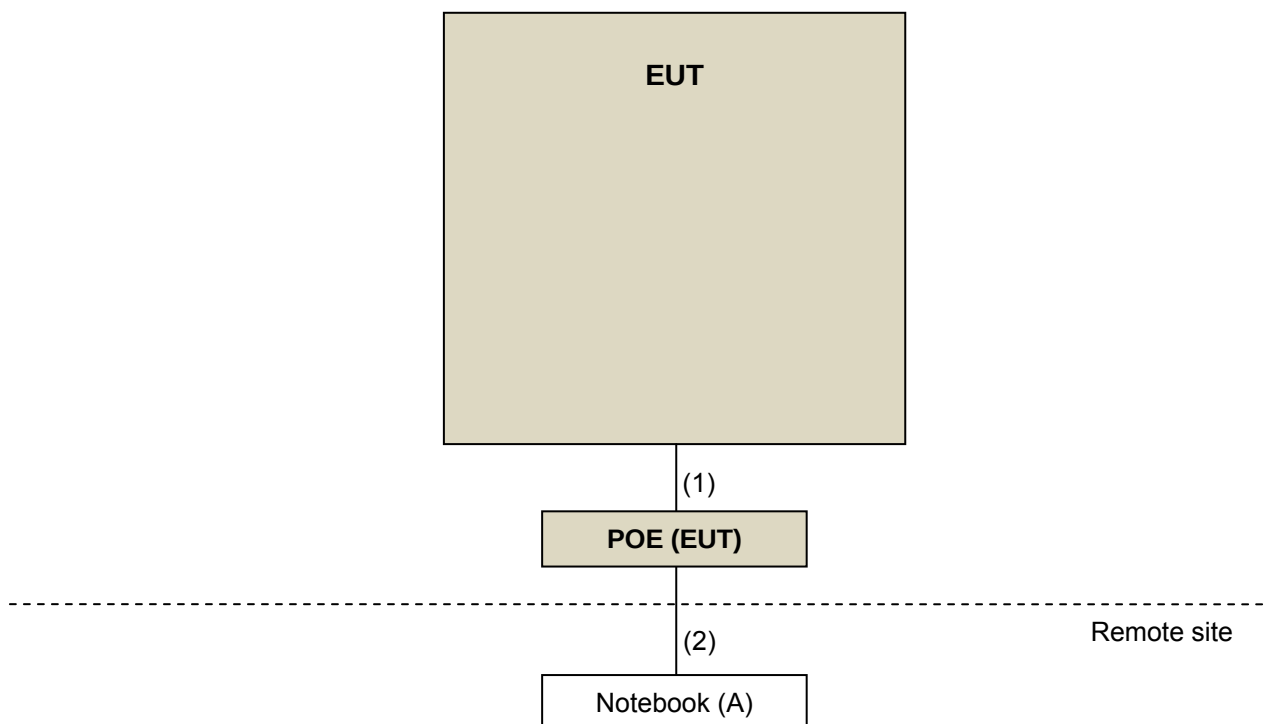
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	DELL	E5410	1HC2XM1	FCC DoC Approved	-

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, Cat5e	1	1	N	0	-
2.	RJ45, Cat5e	1	6	N	0	-

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

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

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 17, 2017	Oct. 16, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2017	Aug. 20, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 03, 2018	Apr. 02, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2017	Aug. 20, 2018
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-SM-8 000	Cable-CH3-03 (309224+170907)	Sep.11, 2017	Sep. 10, 2018
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
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A1960	Aug. 08, 2017	Aug. 07, 2018
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 07, 2017	Jun. 06, 2018

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

4.1.3 Test Procedures

For Radiated emission below 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

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

For Radiated emission above 30MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

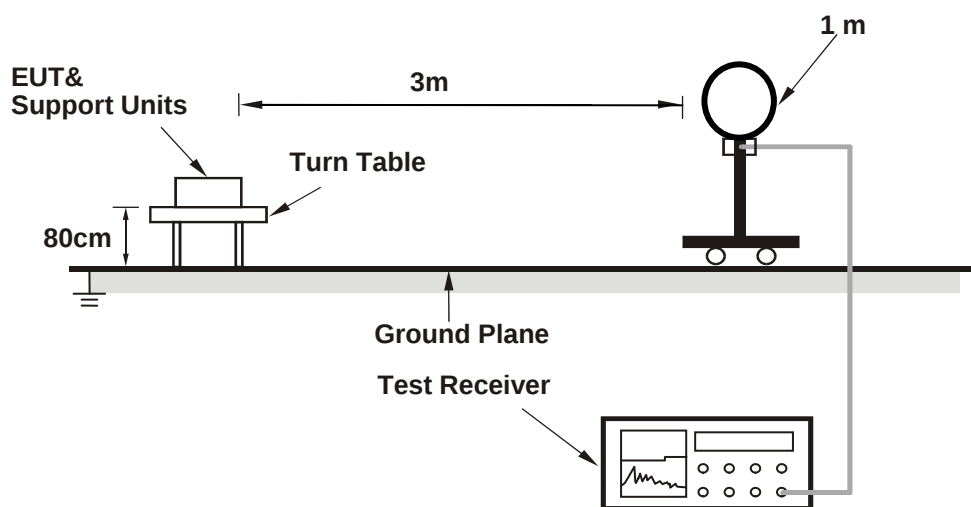
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 10Hz (Duty cycle $\geq 98\%$) 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

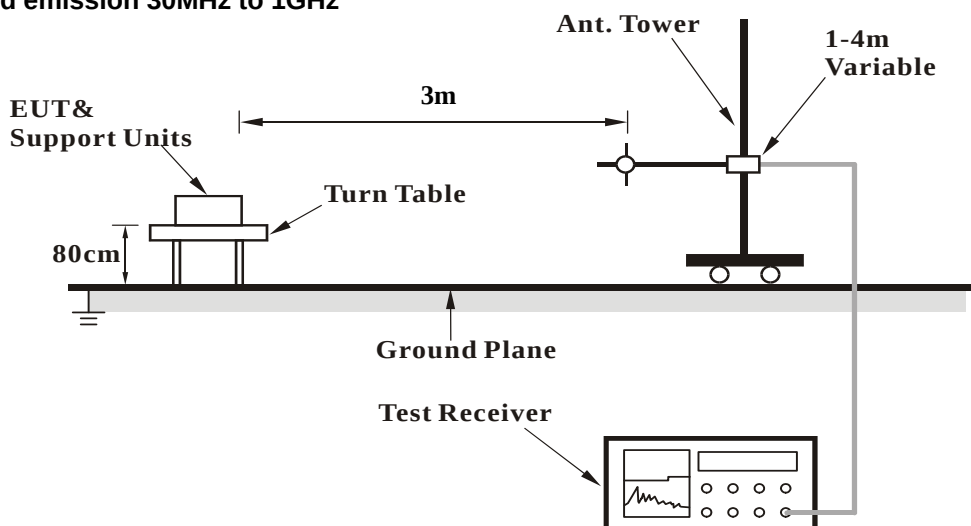
No deviation.

4.1.5 Test Setup

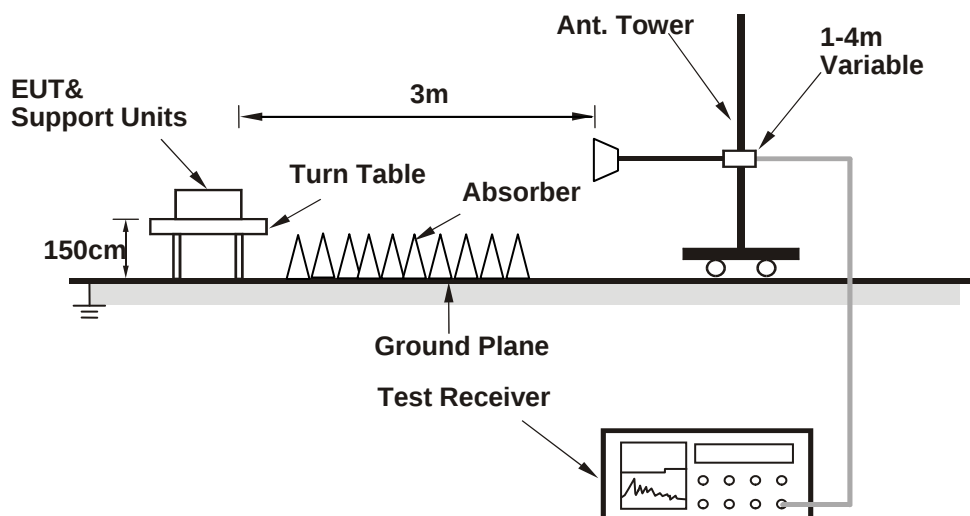
For Radiated emission below 30MHz



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

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- 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.
- 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)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.3 PK	74.0	-17.7	2.51 H	149	52.4	3.9
2	5150.00	43.2 AV	54.0	-10.8	2.51 H	149	39.3	3.9
3	*5180.00	100.1 PK			2.83 H	0	60.5	39.6
4	*5180.00	89.3 AV			2.83 H	0	49.7	39.6
5	#10360.00	59.0 PK	74.0	-15.0	2.43 H	167	43.2	15.8
6	#10360.00	45.3 AV	54.0	-8.7	2.43 H	167	29.5	15.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.3 PK	74.0	-16.7	1.47 V	356	53.4	3.9
2	5150.00	44.0 AV	54.0	-10.0	1.47 V	356	40.1	3.9
3	*5180.00	114.2 PK			1.52 V	1	74.6	39.6
4	*5180.00	103.0 AV			1.52 V	1	63.4	39.6
5	#10360.00	58.8 PK	74.0	-15.2	2.31 V	189	43.0	15.8
6	#10360.00	45.3 AV	54.0	-8.7	2.31 V	189	29.5	15.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	99.4 PK			1.28 H	29	59.8	39.6
2	*5200.00	88.6 AV			1.28 H	29	49.0	39.6
3	#10400.00	59.2 PK	74.0	-14.8	2.33 H	264	43.3	15.9
4	#10400.00	45.2 AV	54.0	-8.8	2.33 H	264	29.3	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	113.9 PK			1.49 V	59	74.3	39.6
2	*5200.00	103.2 AV			1.49 V	59	63.6	39.6
3	#10400.00	58.9 PK	74.0	-15.1	1.89 V	239	43.0	15.9
4	#10400.00	45.2 AV	54.0	-8.8	1.89 V	239	29.3	15.9

Remarks:

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

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

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	99.7 PK			1.20 H	31	60.3	39.4
2	*5240.00	88.8 AV			1.20 H	31	49.4	39.4
3	5350.00	46.3 PK	74.0	-27.7	2.38 H	289	42.3	4.0
4	5350.00	43.7 AV	54.0	-10.3	2.38 H	289	39.7	4.0
5	#10480.00	58.9 PK	74.0	-15.1	2.39 H	244	42.2	16.7
6	#10480.00	46.0 AV	54.0	-8.0	2.39 H	244	29.3	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	113.9 PK			1.48 V	62	74.5	39.4
2	*5240.00	103.2 AV			1.48 V	62	63.8	39.4
3	5350.00	57.4 PK	74.0	-16.6	1.51 V	55	53.4	4.0
4	5350.00	44.3 AV	54.0	-9.7	1.51 V	55	40.3	4.0
5	#10480.00	59.7 PK	74.0	-14.3	2.07 V	188	43.0	16.7
6	#10480.00	45.7 AV	54.0	-8.3	2.07 V	188	29.0	16.7

Remarks:

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

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

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	#5607.20	56.5 PK	68.2	-11.7	2.40 H	292	52.0	4.5
2	*5745.00	107.6 PK			2.40 H	292	67.5	40.1
3	*5745.00	96.7 AV			2.40 H	292	56.6	40.1
4	#5990.40	57.6 PK	68.2	-10.6	2.40 H	292	52.3	5.3
5	11490.00	64.0 PK	74.0	-10.0	2.39 H	336	46.4	17.6
6	11490.00	50.5 AV	54.0	-3.5	2.39 H	336	32.9	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.80	56.7 PK	68.2	-11.5	1.86 V	317	52.1	4.6
2	*5745.00	121.2 PK			1.86 V	317	81.1	40.1
3	*5745.00	110.4 AV			1.86 V	317	70.3	40.1
4	#5932.80	58.2 PK	68.2	-10.0	1.86 V	317	53.0	5.2
5	11490.00	65.9 PK	74.0	-8.1	2.06 V	346	48.3	17.6
6	11490.00	52.1 AV	54.0	-1.9	2.06 V	346	34.5	17.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5640.80	56.0 PK	68.2	-12.2	2.38 H	291	51.5	4.5
2	*5785.00	107.2 PK			2.38 H	291	66.9	40.3
3	*5785.00	96.4 AV			2.38 H	291	56.1	40.3
4	#5950.40	56.9 PK	68.2	-11.3	2.38 H	291	51.7	5.2
5	11570.00	64.4 PK	74.0	-9.6	2.35 H	341	46.5	17.9
6	11570.00	50.3 AV	54.0	-3.7	2.35 H	341	32.4	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5623.20	56.9 PK	68.2	-11.3	1.85 V	313	52.4	4.5
2	*5785.00	120.3 PK			1.85 V	313	80.0	40.3
3	*5785.00	109.9 AV			1.85 V	313	69.6	40.3
4	#5942.40	57.6 PK	68.2	-10.6	1.85 V	313	52.5	5.1
5	11570.00	65.5 PK	74.0	-8.5	2.01 V	351	47.6	17.9
6	11570.00	51.7 AV	54.0	-2.3	2.01 V	351	33.8	17.9

Remarks:

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

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

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	#5636.80	56.4 PK	68.2	-11.8	2.39 H	291	51.9	4.5
2	*5825.00	106.1 PK			2.39 H	291	65.6	40.5
3	*5825.00	95.9 AV			2.39 H	291	55.4	40.5
4	#5949.60	57.6 PK	68.2	-10.6	2.39 H	291	52.4	5.2
5	11650.00	62.0 PK	74.0	-12.0	2.44 H	341	44.5	17.5
6	11650.00	49.4 AV	54.0	-4.6	2.44 H	341	31.9	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5613.60	56.1 PK	68.2	-12.1	1.84 V	315	51.6	4.5
2	*5825.00	120.8 PK			1.84 V	315	80.3	40.5
3	*5825.00	110.2 AV			1.84 V	315	69.7	40.5
4	#5928.00	58.2 PK	68.2	-10.0	1.84 V	315	53.0	5.2
5	11650.00	63.4 PK	74.0	-10.6	2.02 V	351	45.9	17.5
6	11650.00	50.3 AV	54.0	-3.7	2.02 V	351	32.8	17.5

Remarks:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.6 PK	74.0	-18.4	1.87 H	149	51.7	3.9
2	5150.00	43.6 AV	54.0	-10.4	1.87 H	149	39.7	3.9
3	*5180.00	99.5 PK			2.07 H	0	59.9	39.6
4	*5180.00	88.3 AV			2.07 H	0	48.7	39.6
5	#10360.00	57.9 PK	74.0	-16.1	2.38 H	214	42.1	15.8
6	#10360.00	44.8 AV	54.0	-9.2	2.38 H	214	29.0	15.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.57 V	91	54.1	3.9
2	5150.00	43.9 AV	54.0	-10.1	1.57 V	91	40.0	3.9
3	*5180.00	113.6 PK			1.62 V	70	74.0	39.6
4	*5180.00	101.8 AV			1.62 V	70	62.2	39.6
5	#10360.00	58.6 PK	74.0	-15.4	2.13 V	117	42.8	15.8
6	#10360.00	45.3 AV	54.0	-8.7	2.13 V	117	29.5	15.8

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	99.1 PK			1.50 H	119	59.5	39.6
2	*5200.00	87.9 AV			1.50 H	119	48.3	39.6
3	#10400.00	57.8 PK	74.0	-16.2	2.38 H	179	41.9	15.9
4	#10400.00	44.6 AV	54.0	-9.4	2.38 H	179	28.7	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	114.2 PK			1.41 V	55	74.6	39.6
2	*5200.00	102.5 AV			1.41 V	55	62.9	39.6
3	#10400.00	58.6 PK	74.0	-15.4	1.89 V	231	42.7	15.9
4	#10400.00	45.3 AV	54.0	-8.7	1.89 V	231	29.4	15.9

Remarks:

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

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

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	100.0 PK			1.20 H	33	60.6	39.4
2	*5240.00	88.8 AV			1.20 H	33	49.4	39.4
3	5350.00	57.7 PK	74.0	-16.3	1.84 H	263	53.7	4.0
4	5350.00	43.8 AV	54.0	-10.2	1.84 H	263	39.8	4.0
5	#10480.00	59.3 PK	74.0	-14.7	2.37 H	218	42.6	16.7
6	#10480.00	45.9 AV	54.0	-8.1	2.37 H	218	29.2	16.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	114.2 PK			1.39 V	64	74.8	39.4
2	*5240.00	102.7 AV			1.39 V	64	63.3	39.4
3	5350.00	57.4 PK	74.0	-16.6	1.62 V	101	53.4	4.0
4	5350.00	44.5 AV	54.0	-9.5	1.62 V	101	40.5	4.0
5	#10480.00	59.1 PK	74.0	-14.9	2.13 V	206	42.4	16.7
6	#10480.00	46.2 AV	54.0	-7.8	2.13 V	206	29.5	16.7

Remarks:

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

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

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	#5608.80	56.4 PK	68.2	-11.8	2.40 H	292	51.9	4.5
2	*5745.00	106.5 PK			2.40 H	292	66.4	40.1
3	*5745.00	95.7 AV			2.40 H	292	55.6	40.1
4	#5945.60	57.7 PK	68.2	-10.5	2.40 H	292	52.5	5.2
5	11490.00	63.4 PK	74.0	-10.6	2.33 H	331	45.8	17.6
6	11490.00	49.7 AV	54.0	-4.3	2.33 H	331	32.1	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5617.60	55.8 PK	68.2	-12.4	1.81 V	316	51.3	4.5
2	*5745.00	118.9 PK			1.81 V	316	78.8	40.1
3	*5745.00	108.3 AV			1.81 V	316	68.2	40.1
4	#5940.00	57.4 PK	68.2	-10.8	1.81 V	316	52.3	5.1
5	11490.00	64.6 PK	74.0	-9.4	2.04 V	348	47.0	17.6
6	11490.00	50.8 AV	54.0	-3.2	2.04 V	348	33.2	17.6

Remarks:

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

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

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	#5636.80	56.2 PK	68.2	-12.0	2.37 H	289	51.7	4.5
2	*5785.00	106.1 PK			2.37 H	289	65.8	40.3
3	*5785.00	95.6 AV			2.37 H	289	55.3	40.3
4	#5987.20	57.2 PK	68.2	-11.0	2.37 H	289	51.9	5.3
5	11570.00	63.1 PK	74.0	-10.9	2.43 H	333	45.2	17.9
6	11570.00	49.4 AV	54.0	-4.6	2.43 H	333	31.5	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5609.60	56.7 PK	68.2	-11.5	1.79 V	317	52.2	4.5
2	*5785.00	120.5 PK			1.79 V	317	80.2	40.3
3	*5785.00	109.4 AV			1.79 V	317	69.1	40.3
4	#5945.60	58.0 PK	68.2	-10.2	1.79 V	317	52.8	5.2
5	11570.00	64.4 PK	74.0	-9.6	1.99 V	353	46.5	17.9
6	11570.00	50.7 AV	54.0	-3.3	1.99 V	353	32.8	17.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5644.80	56.1 PK	68.2	-12.1	2.23 H	289	51.5	4.6
2	*5825.00	106.3 PK			2.23 H	289	65.8	40.5
3	*5825.00	96.0 AV			2.23 H	289	55.5	40.5
4	#5928.00	58.0 PK	68.2	-10.2	2.23 H	289	52.8	5.2
5	11650.00	62.6 PK	74.0	-11.4	2.45 H	339	45.1	17.5
6	11650.00	49.0 AV	54.0	-5.0	2.45 H	339	31.5	17.5
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5604.80	56.1 PK	68.2	-12.1	1.78 V	314	51.6	4.5
2	*5825.00	120.7 PK			1.78 V	314	80.2	40.5
3	*5825.00	109.8 AV			1.78 V	314	69.3	40.5
4	#5954.40	59.3 PK	68.2	-8.9	1.78 V	314	54.1	5.2
5	11650.00	63.5 PK	74.0	-10.5	1.93 V	348	46.0	17.5
6	11650.00	50.1 AV	54.0	-3.9	1.93 V	348	32.6	17.5

Remarks:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.7 PK	74.0	-17.3	2.17 H	145	52.8	3.9
2	5150.00	43.5 AV	54.0	-10.5	2.17 H	145	39.6	3.9
3	*5190.00	95.8 PK			1.52 H	1	56.2	39.6
4	*5190.00	85.3 AV			1.52 H	1	45.7	39.6
5	#10380.00	58.6 PK	74.0	-15.4	2.33 H	176	42.7	15.9
6	#10380.00	45.0 AV	54.0	-9.0	2.33 H	176	29.1	15.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	66.8 PK	74.0	-7.2	1.19 V	147	62.9	3.9
2	5150.00	50.7 AV	54.0	-3.3	1.19 V	147	46.8	3.9
3	*5190.00	111.2 PK			1.38 V	147	71.6	39.6
4	*5190.00	100.2 AV			1.38 V	147	60.6	39.6
5	#10380.00	59.3 PK	74.0	-14.7	2.31 V	184	43.4	15.9
6	#10380.00	45.3 AV	54.0	-8.7	2.31 V	184	29.4	15.9

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	96.3 PK			1.20 H	27	56.9	39.4
2	*5230.00	86.0 AV			1.20 H	27	46.6	39.4
3	5350.00	55.7 PK	74.0	-18.3	2.17 H	162	51.7	4.0
4	5350.00	43.6 AV	54.0	-10.4	2.17 H	162	39.6	4.0
5	#10460.00	59.2 PK	74.0	-14.8	2.38 H	261	42.8	16.4
6	#10460.00	45.8 AV	54.0	-8.2	2.38 H	261	29.4	16.4
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	*5230.00	110.5 PK			1.49 V	64	71.1	39.4
2	*5230.00	100.4 AV			1.49 V	64	61.0	39.4
3	5350.00	57.2 PK	74.0	-16.8	1.74 V	189	53.2	4.0
4	5350.00	44.2 AV	54.0	-9.8	1.74 V	189	40.2	4.0
5	#10460.00	58.8 PK	74.0	-15.2	4.00 V	284	42.4	16.4
6	#10460.00	45.4 AV	54.0	-8.6	4.00 V	284	29.0	16.4

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

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	#5612.80	56.5 PK	68.2	-11.7	2.28 H	289	52.0	4.5
2	*5755.00	103.9 PK			2.28 H	289	63.8	40.1
3	*5755.00	93.7 AV			2.28 H	289	53.6	40.1
4	#5957.60	57.6 PK	68.2	-10.6	2.28 H	289	52.4	5.2
5	11510.00	62.7 PK	74.0	-11.3	2.41 H	330	45.1	17.6
6	11510.00	49.9 AV	54.0	-4.1	2.41 H	330	32.3	17.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5648.00	64.0 PK	68.2	-4.2	1.86 V	314	59.4	4.6
2	*5755.00	117.3 PK			1.86 V	314	77.2	40.1
3	*5755.00	107.3 AV			1.86 V	314	67.2	40.1
4	#5929.60	59.1 PK	68.2	-9.1	1.86 V	314	53.9	5.2
5	11510.00	63.6 PK	74.0	-10.4	2.08 V	348	46.0	17.6
6	11510.00	50.6 AV	54.0	-3.4	2.08 V	348	33.0	17.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5640.00	56.9 PK	68.2	-11.3	2.41 H	288	52.4	4.5
2	*5795.00	104.0 PK			2.41 H	288	63.7	40.3
3	*5795.00	93.6 AV			2.41 H	288	53.3	40.3
4	#5992.00	57.2 PK	68.2	-11.0	2.41 H	288	51.9	5.3
5	11590.00	62.9 PK	74.0	-11.1	2.35 H	337	45.0	17.9
6	11590.00	49.8 AV	54.0	-4.2	2.35 H	337	31.9	17.9
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.20	58.0 PK	68.2	-10.2	1.87 V	313	53.5	4.5
2	*5795.00	118.5 PK			1.87 V	313	78.2	40.3
3	*5795.00	108.2 AV			1.87 V	313	67.9	40.3
4	#5929.60	59.6 PK	68.2	-8.6	1.87 V	313	54.4	5.2
5	11590.00	64.1 PK	74.0	-9.9	1.97 V	348	46.2	17.9
6	11590.00	50.5 AV	54.0	-3.5	1.97 V	348	32.6	17.9

Remarks:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.7 PK	74.0	-17.3	2.63 H	196	52.8	3.9
2	5150.00	44.2 AV	54.0	-9.8	2.63 H	196	40.3	3.9
3	*5210.00	91.6 PK			1.21 H	32	52.1	39.5
4	*5210.00	81.7 AV			1.21 H	32	42.2	39.5
5	5350.00	56.9 PK	74.0	-17.1	1.86 H	217	52.9	4.0
6	5350.00	43.8 AV	54.0	-10.2	1.86 H	217	39.8	4.0
7	#10420.00	58.9 PK	74.0	-15.1	2.35 H	184	42.9	16.0
8	#10420.00	45.4 AV	54.0	-8.6	2.35 H	184	29.4	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	66.5 PK	74.0	-7.5	1.21 V	147	62.6	3.9
2	5150.00	52.4 AV	54.0	-1.6	1.21 V	147	48.5	3.9
3	*5210.00	105.8 PK			1.35 V	150	66.3	39.5
4	*5210.00	95.7 AV			1.35 V	150	56.2	39.5
5	5350.00	57.4 PK	74.0	-16.6	1.42 V	183	53.4	4.0
6	5350.00	44.5 AV	54.0	-9.5	1.42 V	183	40.5	4.0
7	#10420.00	59.2 PK	74.0	-14.8	2.37 V	342	43.2	16.0
8	#10420.00	45.5 AV	54.0	-8.5	2.37 V	342	29.5	16.0

Remarks:

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

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

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	#5621.60	56.9 PK	68.2	-11.3	2.37 H	291	52.4	4.5
2	#5650.00	56.6 PK	68.2	-11.6	2.29 H	293	52.0	4.6
3	*5775.00	98.4 PK			2.37 H	291	58.2	40.2
4	*5775.00	88.3 AV			2.37 H	291	48.1	40.2
5	#5925.00	58.3 PK	68.2	-9.9	2.31 H	297	53.1	5.2
6	#5949.60	57.9 PK	68.2	-10.3	2.37 H	291	52.7	5.2
7	11550.00	61.4 PK	74.0	-12.6	2.11 H	180	43.6	17.8
8	11550.00	47.6 AV	54.0	-6.4	2.11 H	180	29.8	17.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5646.40	63.2 PK	68.2	-5.0	1.84 V	314	58.6	4.6
2	#5650.00	66.6 PK	68.2	-1.6	1.90 V	304	62.0	4.6
3	*5775.00	112.3 PK			1.84 V	314	72.1	40.2
4	*5775.00	102.3 AV			1.84 V	314	62.1	40.2
5	#5925.00	65.2 PK	68.2	-3.0	1.96 V	311	60.0	5.2
6	#5932.00	62.3 PK	68.2	-5.9	1.84 V	314	57.1	5.2
7	11550.00	61.7 PK	74.0	-12.3	2.15 V	346	43.9	17.8
8	11550.00	47.8 AV	54.0	-6.2	2.15 V	346	30.0	17.8

Remarks:

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

Below 1GHz Worst-Case Data:

802.11a

CHANNEL	TX Channel 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	27.9 QP	40.0	-12.1	1.99 H	140	37.4	-9.5
2	125.17	28.9 QP	43.5	-14.6	1.50 H	257	39.8	-10.9
3	255.44	30.6 QP	46.0	-15.4	1.01 H	266	39.4	-8.8
4	424.59	29.5 QP	46.0	-16.5	1.99 H	123	34.0	-4.5
5	519.86	33.1 QP	46.0	-12.9	1.01 H	3	35.6	-2.5
6	834.84	33.9 QP	46.0	-12.1	1.99 H	336	29.8	4.1
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	68.79	30.5 QP	40.0	-9.5	1.00 V	350	41.3	-10.8
2	125.17	28.0 QP	43.5	-15.5	1.00 V	213	38.9	-10.9
3	261.27	34.3 QP	46.0	-11.7	2.00 V	9	42.9	-8.6
4	331.26	34.3 QP	46.0	-11.7	1.49 V	96	40.7	-6.4
5	525.69	38.0 QP	46.0	-8.0	1.00 V	256	40.5	-2.5
6	832.89	33.4 QP	46.0	-12.6	1.00 V	14	29.4	4.0

Remarks:

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 23, 2017	Nov. 22, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 06, 2018	Mar. 05, 2019
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Aug. 15, 2017	Aug. 14, 2018
Software ADT	BV ADT_Conc_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The test was performed in HwaYa Shielded Room 1.

3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

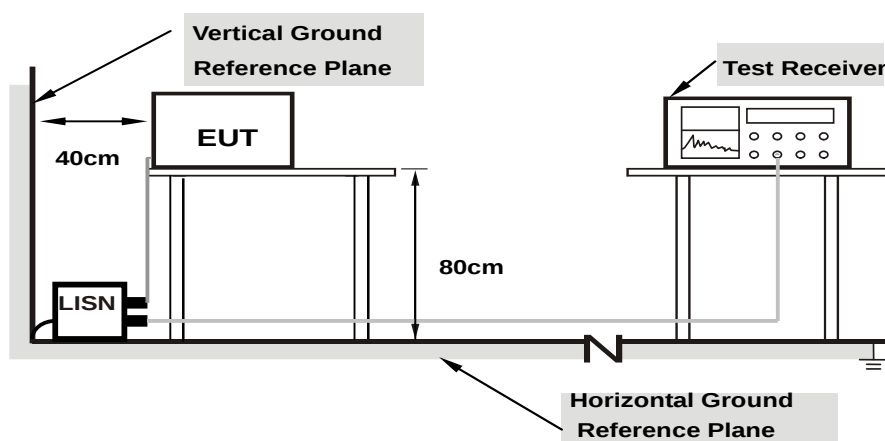
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

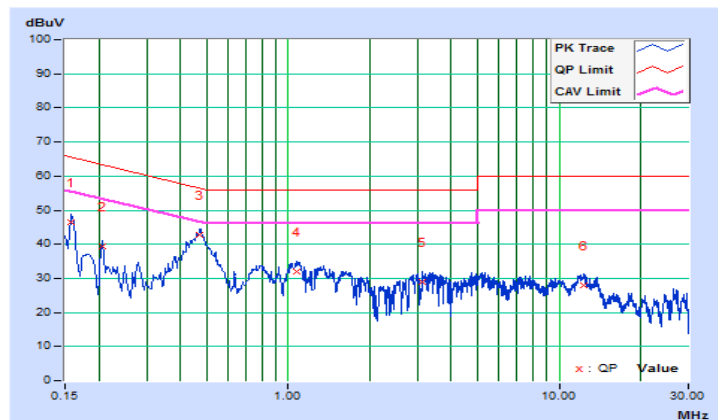
802.11a

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

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15811	10.10	36.50	23.74	46.60	33.84	65.56	55.56	-18.96	-21.72
2	0.20600	10.10	29.28	18.77	39.38	28.87	63.37	53.37	-23.99	-24.50
3	0.47309	10.12	32.72	27.23	42.84	37.35	56.46	46.46	-13.62	-9.11
4	1.07913	10.15	21.80	18.48	31.95	28.63	56.00	46.00	-24.05	-17.37
5	3.13800	10.24	18.64	13.18	28.88	23.42	56.00	46.00	-27.12	-22.58
6	12.27400	10.75	17.15	11.81	27.90	22.56	60.00	50.00	-32.10	-27.44

Remarks:

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

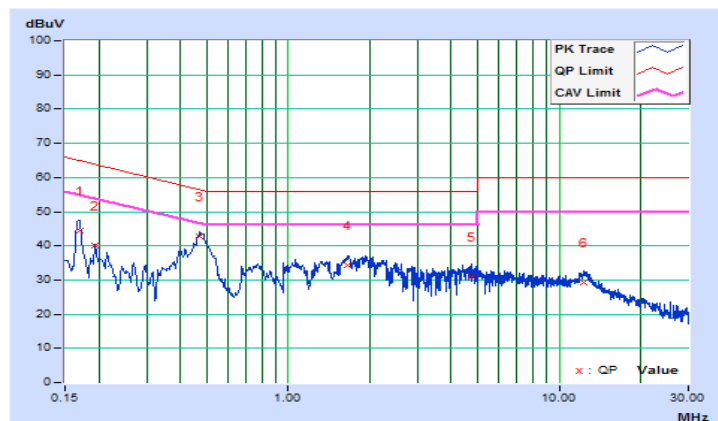


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16932	10.10	34.32	22.48	44.42	32.58	64.99	54.99	-20.57	-22.41
2	0.19400	10.10	29.80	19.11	39.90	29.21	63.86	53.86	-23.96	-24.65
3	0.47000	10.12	32.79	27.25	42.91	37.37	56.51	46.51	-13.60	-9.14
4	1.64925	10.16	24.26	20.48	34.42	30.64	56.00	46.00	-21.58	-15.36
5	4.72600	10.30	20.63	14.92	30.93	25.22	56.00	46.00	-25.07	-20.78
6	12.28600	10.62	18.51	13.25	29.13	23.87	60.00	50.00	-30.87	-26.13

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;

Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

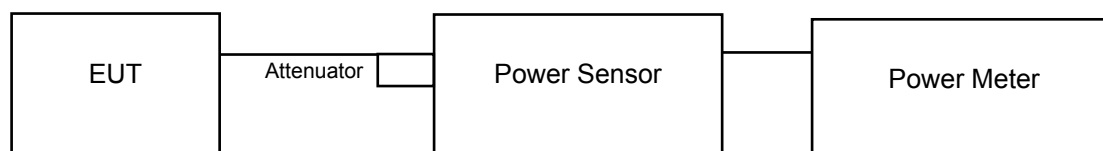
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

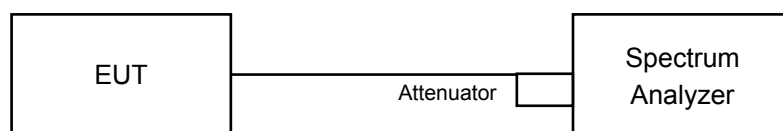
4.3.2 Test Setup

For Power Output

802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



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 $\geq$ 3 MHz.
- e. Number of points in sweep $\geq$ 2 Span / RBW.
- f. Sweep time $\leq$ (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

For U-NII-1 Band (Outdoor Access Point)

802.11a

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	13.44	12.81	41.179	16.15	30.00	4.45	20.60	21.00	Pass
40	5200	13.57	12.91	42.294	16.26	30.00	4.45	20.71	21.00	Pass
48	5240	13.32	13.11	41.942	16.23	30.00	4.45	20.68	21.00	Pass

Note:

1. Gain = 5.12dBi < 6dBi, so the power limit no need to reduce.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. EIRP = conducted power + (4.45dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11n (HT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	13.54	12.72	41.301	16.16	30.00	4.45	20.61	21.00	Pass
40	5200	13.62	12.84	42.245	16.26	30.00	4.45	20.71	21.00	Pass
48	5240	13.21	13.10	41.358	16.17	30.00	4.45	20.62	21.00	Pass

Note:

1. Gain = 5.12dBi < 6dBi, so the power limit no need to reduce.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. EIRP = conducted power + (4.45dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11n (HT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	13.60	12.93	42.543	16.29	30.00	4.45	20.74	21.00	Pass
46	5230	13.36	13.03	41.768	16.21	30.00	4.45	20.66	21.00	Pass

Note:

1. Gain = 5.12dBi < 6dBi, so the power limit no need to reduce.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. EIRP = conducted power + (4.45dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	12.93	12.36	36.853	15.66	30.00	4.45	20.11	21.00	Pass

Note:

1. Gain = 5.12dBi < 6dBi, so the power limit no need to reduce.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. EIRP = conducted power + (4.45dBi) + array gain = (0 dB (i.e., no array gain) for $N_{ANT} \leq 4$).

For U-NII-3 Band

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	19.07	19.91	178.673	22.52	30.00	Pass
157	5785	19.77	19.45	182.947	22.62	30.00	Pass
165	5825	20.47	19.45	199.534	23.00	30.00	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	19.02	19.52	169.335	22.29	30.00	Pass
157	5785	19.55	19.17	172.761	22.37	30.00	Pass
165	5825	20.32	19.10	188.930	22.76	30.00	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	19.11	20.39	190.866	22.81	30.00	Pass
159	5795	20.22	20.26	211.366	23.25	30.00	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	17.29	17.42	108.788	20.37	30.00	Pass

Beamforming Mode

For U-NII-1 Band (Outdoor Access Point)

802.11n (HT20)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
36	5180	10.53	9.71	20.654	13.15	27.82	4.45	20.61	21.00	Pass
40	5200	10.61	9.83	21.135	13.25	27.82	4.45	20.71	21.00	Pass
48	5240	10.20	10.09	20.701	13.16	27.82	4.45	20.62	21.00	Pass

Note:

1. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = conducted power + (4.45dBi) + beamforming gain (3.01dBi) .

802.11n (HT40)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
38	5190	10.59	9.92	21.281	13.28	27.82	4.45	20.74	21.00	Pass
46	5230	10.35	10.02	20.893	13.20	27.82	4.45	20.66	21.00	Pass

Note:

1. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = conducted power + (4.45dBi) + beamforming gain (3.01dBi) .

802.11ac (VHT80)

Chan.	Freq. (MHz)	Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Gain (dBi)	EIRP (dBm)	EIRP limit (dBm)	Pass / Fail
		Chain 0	Chain 1							
42	5210	9.92	9.35	18.408	12.65	27.82	4.45	20.11	21.00	Pass

Note:

1. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.
2. Gain = 4.45dBi (above 30 degrees from the horizon).
3. Beamforming gain = 3.01dBi
4. EIRP = conducted power + (4.45dBi) + beamforming gain (3.01dBi) .

For U-NII-3 Band

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
149	5745	16.01	16.51	84.723	19.28	27.82	Pass
157	5785	16.54	16.16	86.298	19.36	27.82	Pass
165	5825	17.31	16.09	94.406	19.75	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
151	5755	16.10	17.38	95.499	19.80	27.82	Pass
159	5795	17.21	17.25	105.682	20.24	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.

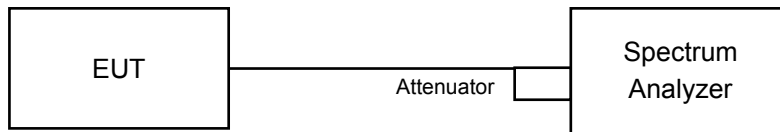
802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Power Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
155	5775	14.28	14.41	54.450	17.36	27.82	Pass

Note: Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.

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	16.56	16.56
40	5200	16.44	16.44
48	5240	16.44	16.32
149	5745	16.80	16.61
157	5785	17.04	16.80
165	5825	17.28	16.68

802.11n (HT20)

Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
36	5180	17.64	17.76
40	5200	17.76	17.64
48	5240	17.64	17.64
149	5745	17.88	17.82
157	5785	18.12	18.00
165	5825	18.24	17.88

802.11n (HT40)

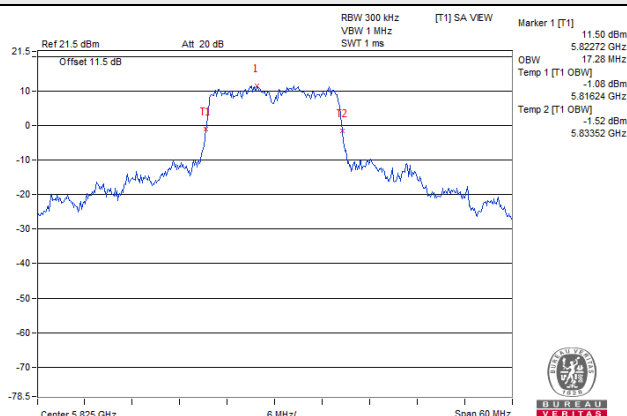
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
38	5190	36.12	36.00
46	5230	36.12	36.00
151	5755	36.24	36.12
159	5795	36.36	36.12

802.11ac (VHT80)

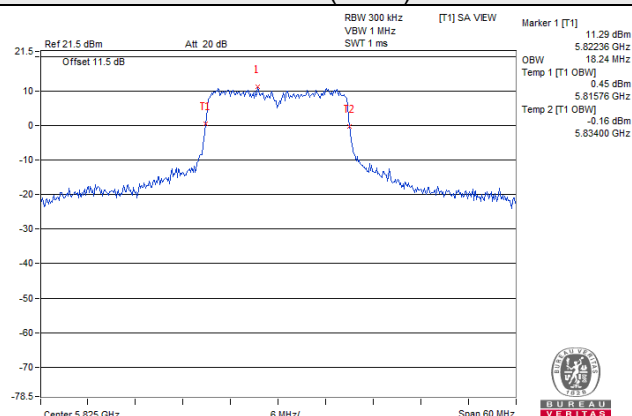
Chan.	Freq. (MHz)	Occupied Bandwidth (MHz)	
		Chain 0	Chain 1
42	5210	76.32	75.84
155	5775	76.08	75.84

Spectrum Plot of Worst Value

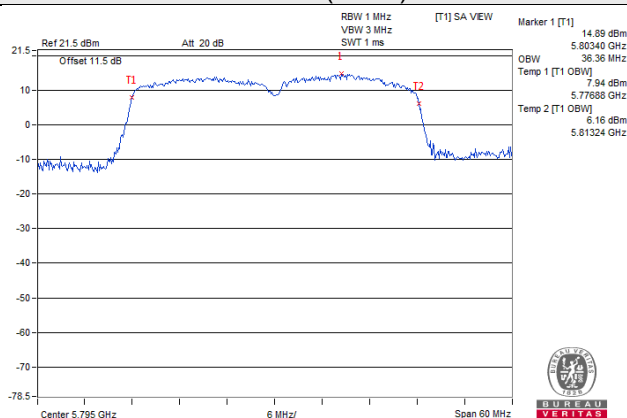
802.11a



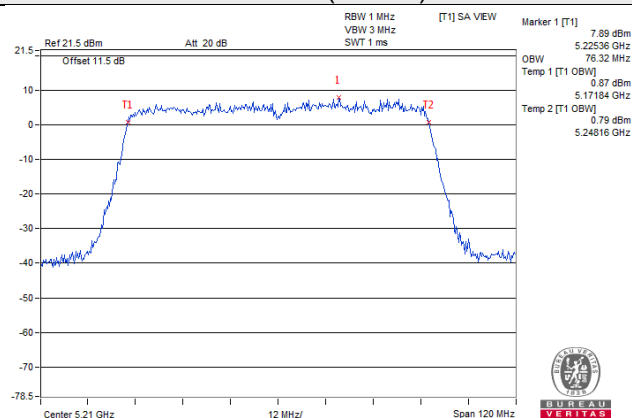
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

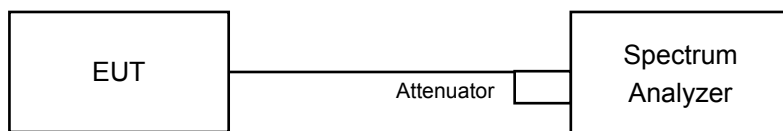


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

Using method SA-2

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 1MHz, Set VBW $\geq$ 3 MHz, Detector = RMS
- Set Channel power measure = 1MHz
- Sweep time = auto, trigger set to "free run".
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

- Set span to encompass the entire emission bandwidth (EBW) of the signal.
- Set RBW = 300 kHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
- 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 $BWCF = 10\log(500 \text{ kHz} / 300 \text{ kHz})$
- Sweep time = auto, trigger set to "free run".
- Trace average at least 100 traces in power averaging mode.
- Record the max value and add 10 log (1/duty cycle)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

Same as 4.3.6.

4.5.7 Test Results

For U-NII-1 band:

802.11a

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	-0.03	-0.25	0.17	3.04	14.82	Pass
40	5200	0.00	-0.01	0.17	3.18	14.82	Pass
48	5240	-0.26	0.47	0.17	3.30	14.82	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(8.18-6) = 14.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
36	5180	-0.89	-0.86	0.09	2.23	14.82	Pass
40	5200	-0.52	-0.21	0.09	2.74	14.82	Pass
48	5240	-0.77	0.29	0.09	2.90	14.82	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(8.18-6) = 14.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

Chan.	Freq. (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor (dB)	Total PSD with Duty Factor (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-3.30	-2.95	0.20	0.09	14.82	Pass
46	5230	-3.52	-2.35	0.20	0.32	14.82	Pass

Note:

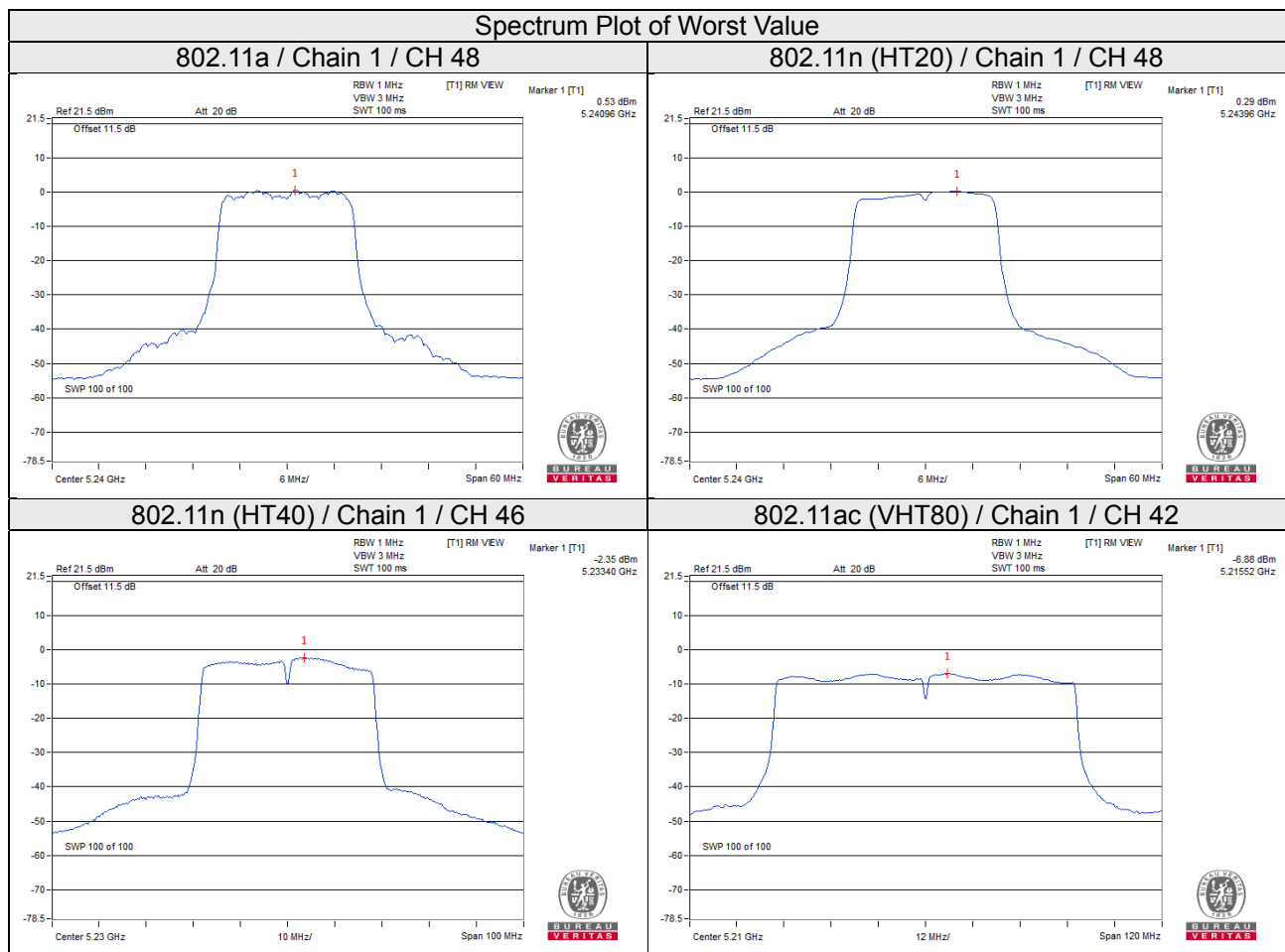
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(8.18-6) = 14.82\text{dBm}$.
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	-6.94	-6.92	0.30	-3.62	14.82	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (8.18 - 6) = 14.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.



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	-2.15	0.07	3.01	0.17	3.25	27.82	Pass
	157	5785	-1.49	0.73	3.01	0.17	3.91	27.82	Pass
	165	5825	-0.57	1.65	3.01	0.17	4.83	27.82	Pass
1	149	5745	-1.08	1.14	3.01	0.17	4.32	27.82	Pass
	157	5785	-0.80	1.42	3.01	0.17	4.60	27.82	Pass
	165	5825	-0.20	2.02	3.01	0.17	5.20	27.82	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.17dBi + 10log(2) = 8.18dBi > 6dBi, so the power density limit shall be reduced to 30-(8.18-6) = 27.82dBm.
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	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	149	5745	-2.50	-0.28	3.01	0.09	2.82	27.82	Pass
	157	5785	-1.66	0.56	3.01	0.09	3.66	27.82	Pass
	165	5825	-1.26	0.96	3.01	0.09	4.06	27.82	Pass
1	149	5745	-1.08	1.14	3.01	0.09	4.24	27.82	Pass
	157	5785	-0.57	1.65	3.01	0.09	4.75	27.82	Pass
	165	5825	0.27	2.49	3.01	0.09	5.59	27.82	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 5.17dBi + 10log(2) = 8.18dBi > 6dBi, so the power density limit shall be reduced to 30-(8.18-6) = 27.82dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	151	5755	-5.23	-3.01	3.01	0.20	0.20	27.82	Pass
	159	5795	-4.01	-1.79	3.01	0.20	1.42	27.82	Pass
1	151	5755	-3.73	-1.51	3.01	0.20	1.70	27.82	Pass
	159	5795	-2.99	-0.77	3.01	0.20	2.44	27.82	Pass

Note:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

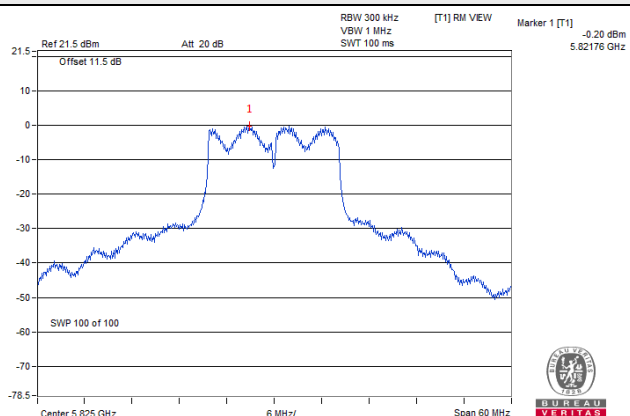
TX chain	Chan.	Freq. (MHz)	PSD W/O Duty Factor		10 log (N=2) dB	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass / Fail
			(dBm/300kHz)	(dBm/500kHz)					
0	155	5775	-10.18	-7.96	3.01	0.30	-4.65	27.82	Pass
1	155	5775	-8.96	-6.74	3.01	0.30	-3.43	27.82	Pass

Note:

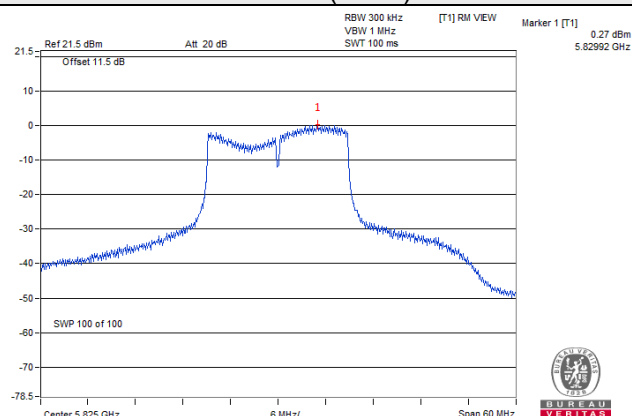
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.17\text{dBi} + 10\log(2) = 8.18\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.18 - 6) = 27.82\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

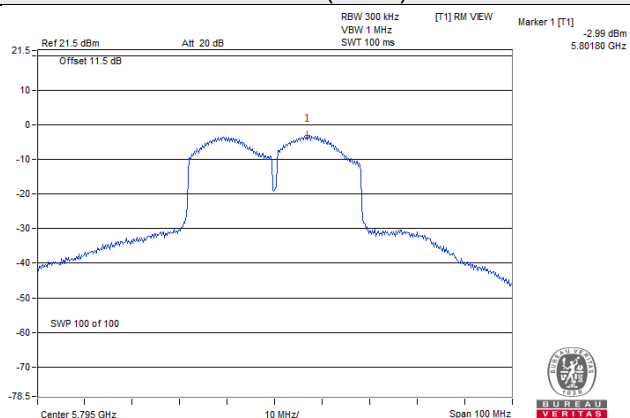
802.11a



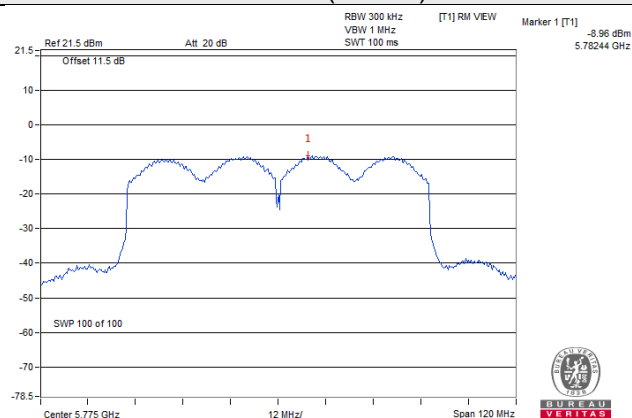
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

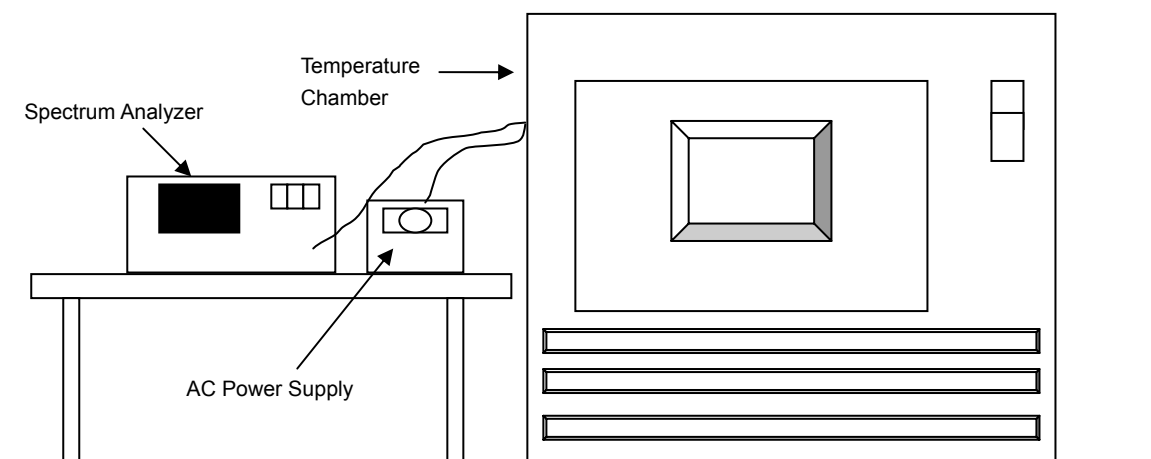


4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- 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.
- Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- 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. (°C)	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
60	120	5179.9883	Pass	5179.9872	Pass	5179.9879	Pass	5179.9871	Pass
50	120	5180.0177	Pass	5180.0216	Pass	5180.0226	Pass	5180.018	Pass
40	120	5180.017	Pass	5180.0145	Pass	5180.0163	Pass	5180.0187	Pass
30	120	5179.9972	Pass	5179.9988	Pass	5179.9969	Pass	5179.996	Pass
20	120	5179.9927	Pass	5179.9916	Pass	5179.9949	Pass	5179.9934	Pass
10	120	5180.0051	Pass	5180.003	Pass	5180.0031	Pass	5180.0055	Pass
0	120	5180.0244	Pass	5180.0237	Pass	5180.0273	Pass	5180.023	Pass
-10	120	5179.9857	Pass	5179.988	Pass	5179.9875	Pass	5179.9875	Pass
-20	120	5179.9821	Pass	5179.9827	Pass	5179.9809	Pass	5179.9797	Pass

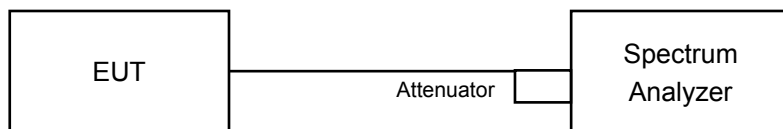
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (°C)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result	Measured Frequency (MHz)	Result
20	138	5179.9975	Pass	5179.9992	Pass	5179.9968	Pass	5179.9968	Pass
	120	5179.9972	Pass	5179.9988	Pass	5179.9969	Pass	5179.996	Pass
	102	5179.9978	Pass	5179.9993	Pass	5179.9978	Pass	5179.9957	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

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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	16.39	16.00	0.5	Pass
157	5785	16.38	16.38	0.5	Pass
165	5825	16.37	15.83	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.65	17.59	0.5	Pass
157	5785	17.24	17.65	0.5	Pass
165	5825	17.64	17.24	0.5	Pass

802.11n (HT40)

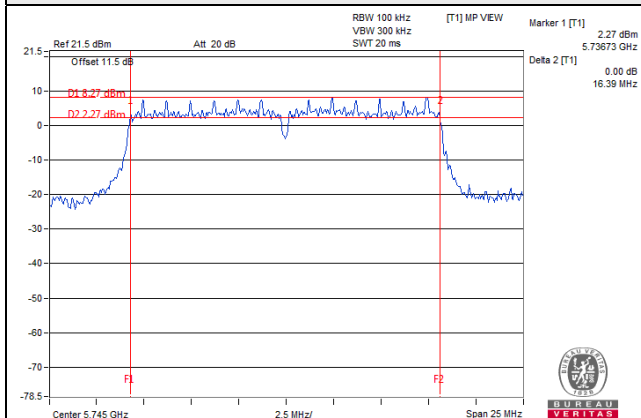
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.31	35.27	0.5	Pass
159	5795	35.22	35.24	0.5	Pass

802.11ac (VHT80)

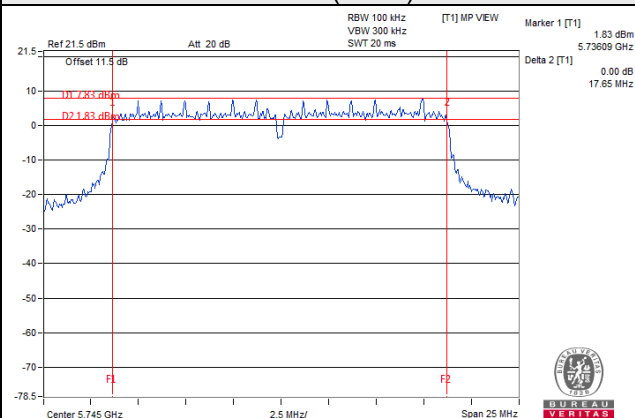
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.42	75.60	0.5	Pass

Spectrum Plot of Worst Value

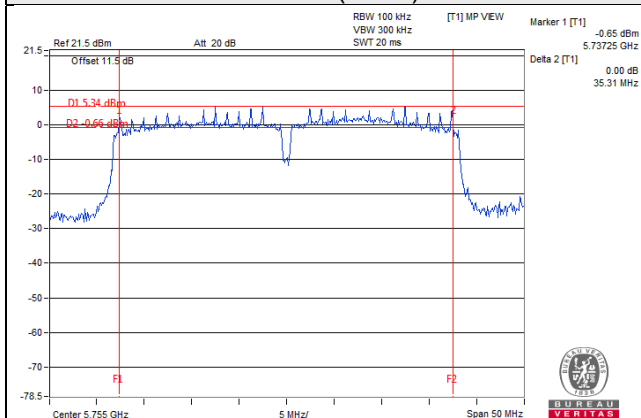
802.11a



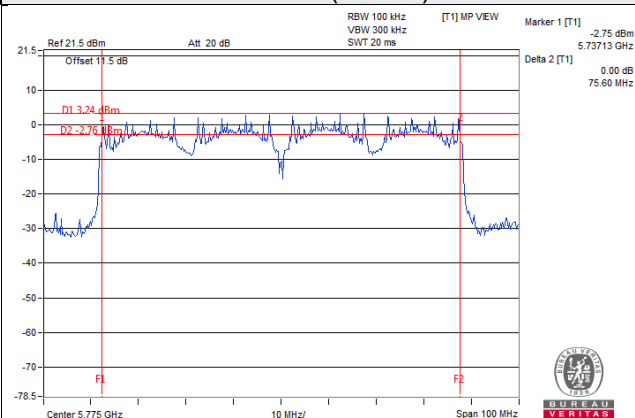
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

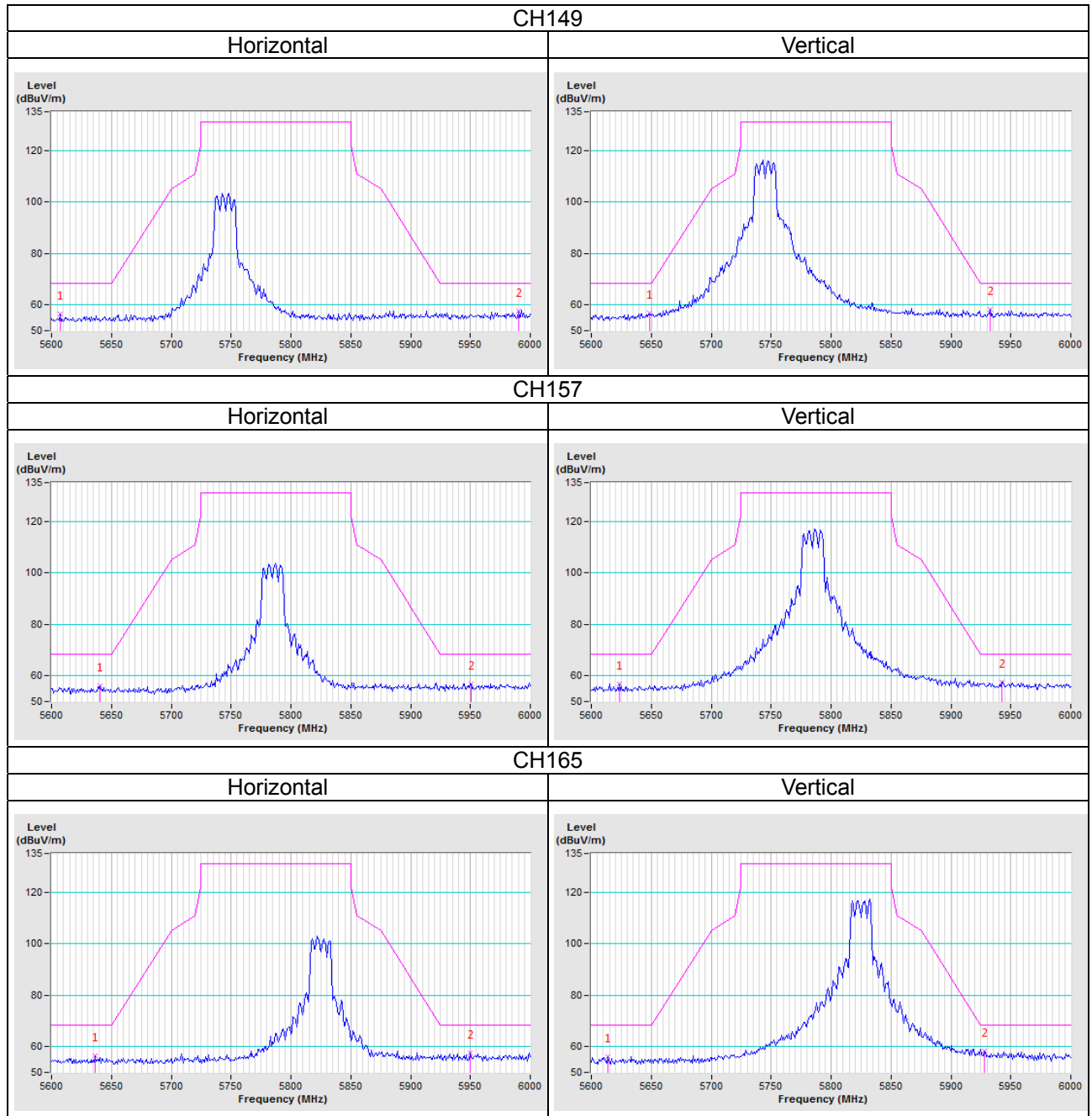


5 Pictures of Test Arrangements

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

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

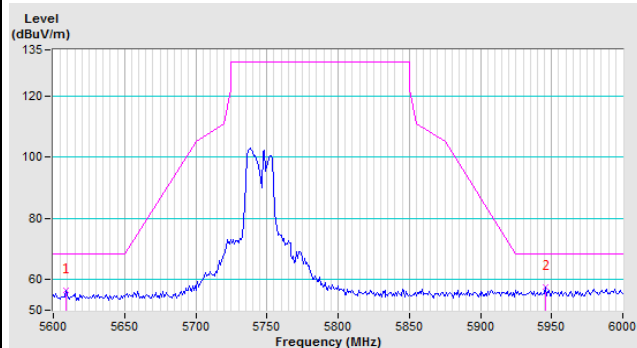
802.11a



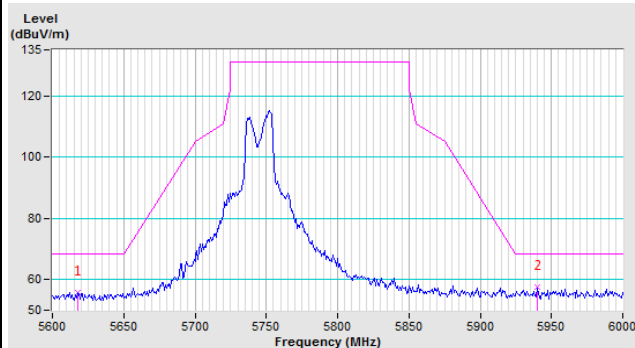
802.11n (HT20)

CH149

Horizontal

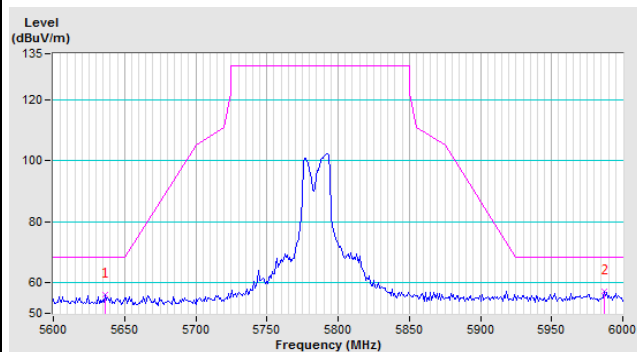


Vertical

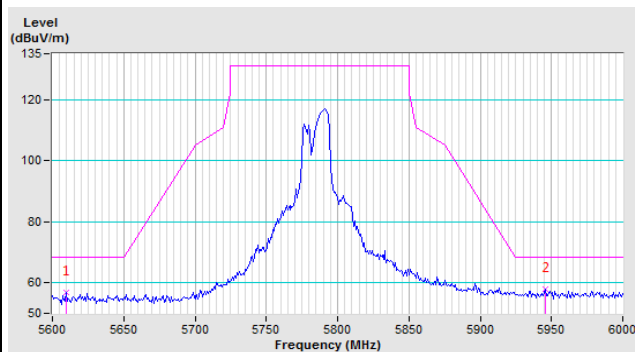


CH157

Horizontal

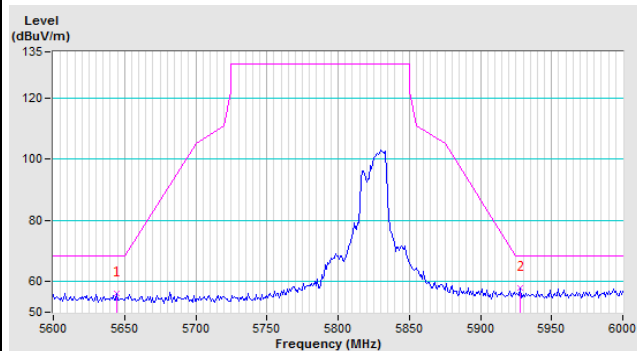


Vertical

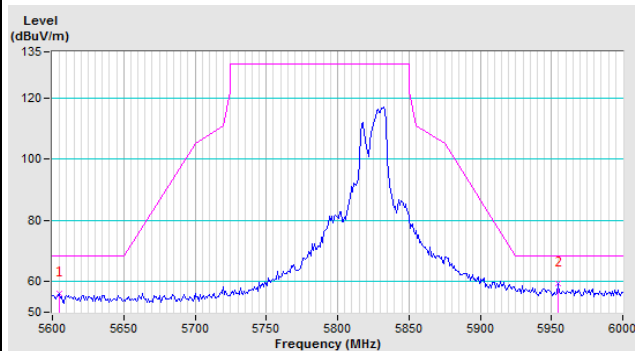


CH165

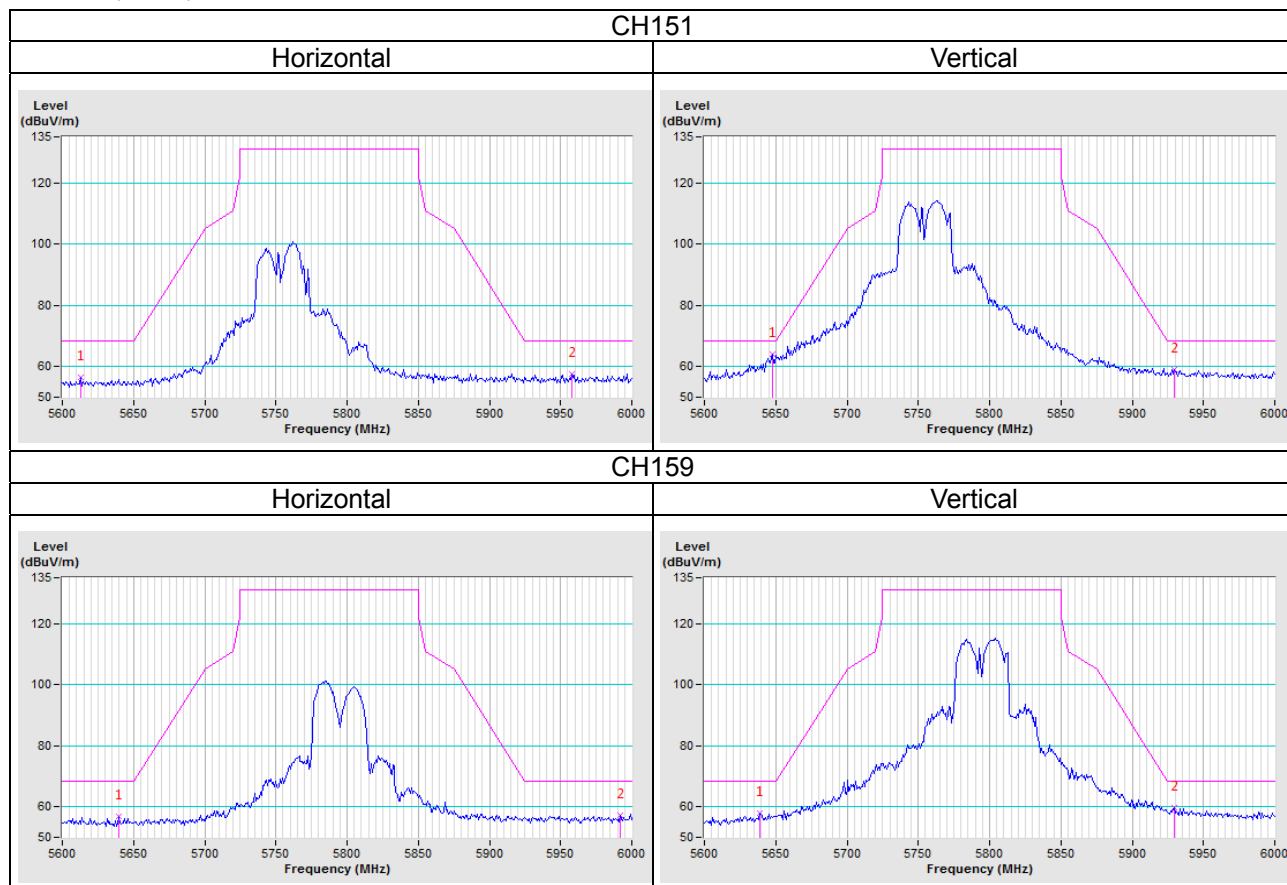
Horizontal



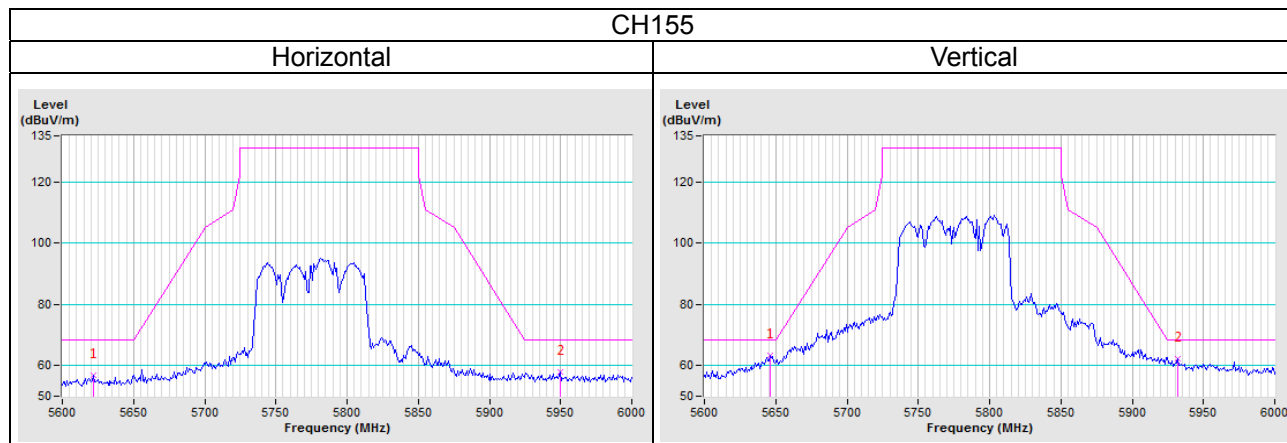
Vertical



802.11n (HT40)



802.11ac (VHT80)



Appendix – Information on the Testing Laboratories

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

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

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

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Fax: 886-3-6668323

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Web Site: www.bureauveritas-adt.com

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

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