FCC Test Report

Report No.:	RF170407E01-1
FCC ID:	S9GH320
Model No.:	H320
Received Date:	Apr. 07, 2017
Test Date:	Apr. 12 to May 03, 2017
Issued Date:	May 26, 2017
Applicant:	Ruckus Wireless, Inc.
Address:	350 West Java Drive, Sunnyvale, CA 94089
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (1):	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location (2):	No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF170407E01-1	Original release.	May 26, 2017

1 Certificate of Conformity

Product:	H320 Access Point
Brand:	Ruckus
Model No.:	H320
Sample Status:	ENGINEERING SAMPLE
Applicant:	Ruckus Wireless, Inc.
Test Date:	Apr. 12 to May 03, 2017
Standard:	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 EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** May 26, 2017

Wendy Wu / Specialist

Approved by : _____ , **Date:** May 26, 2017

May Chen / Manager

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 -2.39dB at 0.47031MHz.
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 5150.00MHz.
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.

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	1.84 dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.32 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.82 dB
	6GHz ~ 18GHz	4.58 dB
	18GHz ~ 40GHz	5.03 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	H320 Access Point
Brand	Ruckus
Model No.	H320
Status of EUT	ENGINEERING SAMPLE
Power Supply Rating	DC 48V from POE
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT20/40 mode in 2.4GHz band
Modulation Technology	DSSS, OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n: up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.462GHz **5GHz:** 5.18GHz ~ 5.24GHz, 5.745GHz ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20), VHT20: 11 802.11n (HT40), VHT40: 7 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 9 802.11n (HT40), 802.11ac (VHT40): 4 802.11ac (VHT80): 2
Output Power	**2.4GHz:** 221.82mW **5.18 ~ 5.24GHz:** 122.782mW **5.745 ~ 5.825GHz:** 125.354mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. Simultaneously transmission condition.

Condition	Technology	
1	WLAN 2.4GHz	WLAN 5GHz
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

2. The EUT must be supplied with a POE (only for test not for sale) as following table:

Brand	Model No.	Spec.
Ruckus Wireless, Inc	740-64214-001	Input: 100-240Vac, 50/60Hz, 0.75A Output: 48Vdc, 0.5A

3. The antennas provided to the EUT, please refer to the following table:

No.	PCB Chain No	Brand	Model	Antenna Gain(dBi)	Frequency range	Antenna Type	Connector type
1	Chain 0	Ruckus	H320 Hpol	1	2.4~2.4835GHz	Printed	I-pex
				3	5.15~5.85GHz		
2	Chain 1	Ruckus	H320 Vpol	1	5.15~5.85GHz	Printed	I-pex

4. The EUT incorporates a MIMO function:

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	1TX	1RX
802.11g	6 ~ 54Mbps	1TX	1RX
802.11n (HT20)	MCS 0~7	1TX	1RX
802.11n (HT40)	MCS 0~7	1TX	1RX
VHT20	MCS 0~8, Nss=1	1TX	1RX
VHT40	MCS 0~9, Nss=1	1TX	1RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
802.11ac (VHT40)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
802.11ac (VHT80)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX

Note:
1. 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)

5. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

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	5180MHz	44	5220MHz
40	5200MHz	48	5240MHz

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

Channel	Frequency	Channel	Frequency
38	5190MHz	46	5230MHz

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≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

NOTE:
1. The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240 5745-5825	38 to 46 151 to 159	159	OFDM	BPSK	13.5

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.

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11ac (VHT40)	5180-5240 5745-5825	38 to 46 151 to 159	159	OFDM	BPSK	13.5

Antenna Port Conducted Measurement:

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

Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
802.11ac (VHT20)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
802.11ac (VHT40)		38 to 46	38, 46	OFDM	BPSK	13.5
802.11ac (VHT80)		42	42	OFDM	BPSK	29.3
802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
802.11ac (VHT20)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
802.11ac (VHT40)		151 to 159	151, 159	OFDM	BPSK	13.5
802.11ac (VHT80)		155	155	OFDM	BPSK	29.3

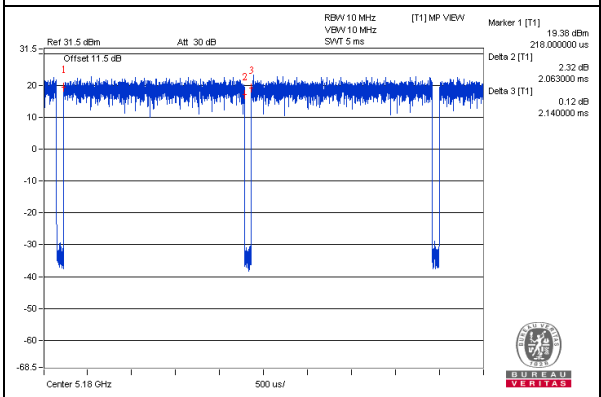
Test Condition:

Applicable To	Environmental Conditions	Input Power (System)	Tested By
RE≥1G	23deg. C, 66%RH	120Vac, 60Hz	Terry Huang
RE<1G	22deg. C, 66%RH	120Vac, 60Hz	Terry Huang
PLC	23deg. C, 61%RH	120Vac, 60Hz	Weiwei Lo
APCM	25deg. C, 60%RH	120Vac, 60Hz	Robert Cheng

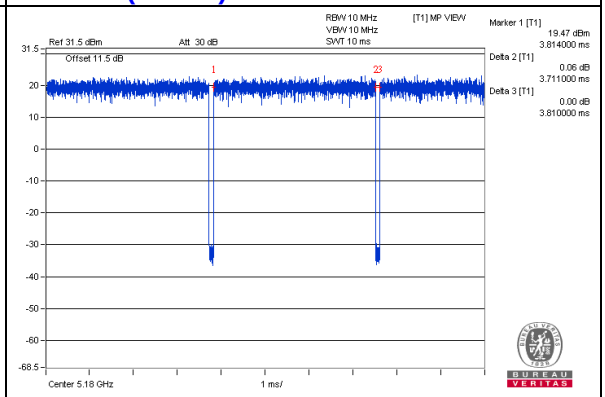
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor shall be considered.
802.11a: Duty cycle = 2.063 ms/2.14 ms = 0.964, Duty factor = 10 * log(1/0.964) = 0.16
802.11ac (VHT20): Duty cycle = 3.711ms/3.81 ms = 0.974, Duty factor = 10 * log(1/0.974) = 0.11
802.11ac (VHT40): Duty cycle = 1.807 ms/1.904 ms = 0.949, Duty factor = 10 * log(1/0.949) = 0.23
802.11ac (VHT80): Duty cycle = 0.855 ms/0.96 ms = 0.891, Duty factor = 10 * log(1/0.891) = 0.50

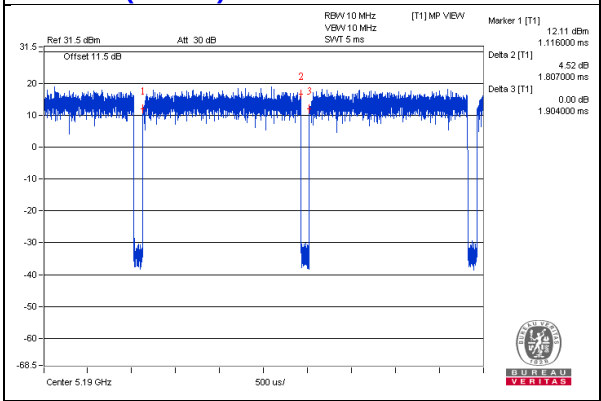
802.11a



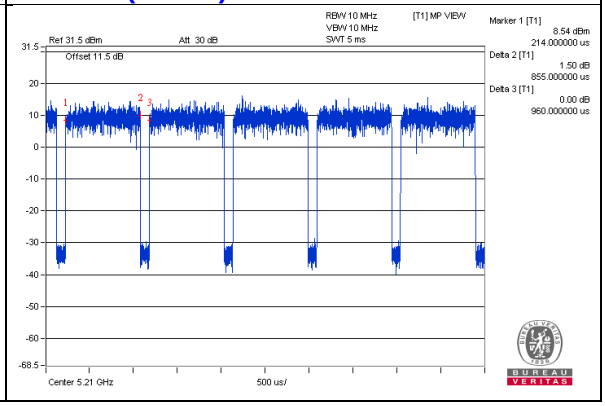
802.11ac (VHT20)



802.11ac (VHT40)



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.

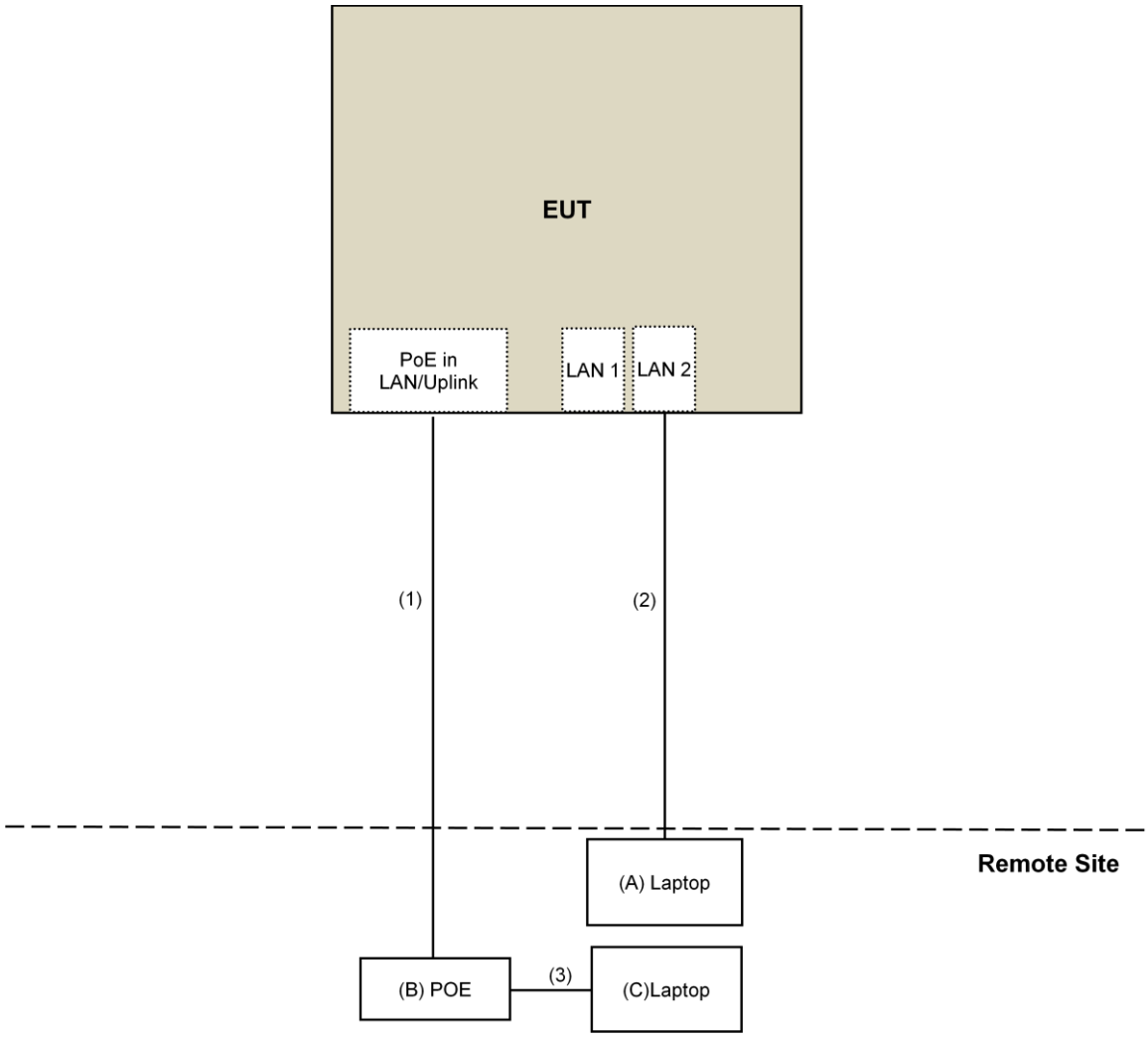
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	DELL	E6440	F9LYQ32	F9LYQ32	Provided by Lab
B.	POE	Ruckus Wireless, Inc	740-64214-001	NA	NA	Supplied by client
C.	Laptop	DELL	XPS 13	NA	NA	Supplied by client

Note:

1. All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ-45 Cable	1	10	No	0	Provided by Lab
2.	RJ-45 Cable	1	10	No	0	Provided by Lab
3.	RJ-45 Cable	1	3	No	0	Provided by Lab

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standard

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 v01r04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

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="2">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="2" rowspan="2">789033 D02 General UNII Test Procedure New Rules v01r04</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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 18, 2016	Aug. 17, 2017
Pre-Amplifier(*) EMCI	EMC001340	980142	Jan. 20, 2016	Jan. 19, 2018
Loop Antenna(*) Electro-Metrics	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable	NA	LOOPCAB-001 LOOPCAB-002	Jan. 17, 2017	Jan. 16, 2018
Pre-Amplifier Mini-Circuits	ZFL-1000VH2B	AMP-ZFL-05	May 07, 2016	May 06, 2017
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Dec. 29, 2016	Dec. 28, 2017
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 01, 2017	Mar. 31, 2018
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-3m-3-01	Oct. 05, 2016	Oct. 04, 2017
Horn_Antenna SCHWARZBECK	BBHA9120-D	9120D-406	Dec. 28, 2016	Dec. 27, 2017
Pre-Amplifier EMCI	EMC12630SE	980384	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160922 150317 150322	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Spectrum Analyzer Keysight	N9030A	MY54490520	July 29, 2016	July 28, 2017
Pre-Amplifier EMCI	EMC184045SE	980386	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 15, 2016	Dec. 14, 2017
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 15, 2017	Jan. 14, 2018
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Spectrum Analyzer R&S	FSv40	100964	June 28, 2016	June 27, 2017
Power meter Anritsu	ML2495A	1014008	May 5, 2016	May 4, 2017
Power sensor Anritsu	MA2411B	0917122	May 5, 2016	May 4, 2017
AC Power Source Extech Electronics	6205	1440452	NA	NA
Temperature & Humidity Chamber Giant Force	GTH-150-40-SP-AR	MAA0812-008	Jan. 11, 2017	Jan. 10, 2018
Digital Multimeter FLUKE	87III	73680266	Nov. 10, 2016	Nov. 09, 2017

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 calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The FCC Site Registration No. is 147459
5. The CANADA Site Registration No. is 20331-1
6 Loop antenna was used for all emissions below 30 MHz.
7. Tested Date: Apr. 12 to May 03, 2017

4.1.3 Test Procedure

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. Both X and Y axes 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:

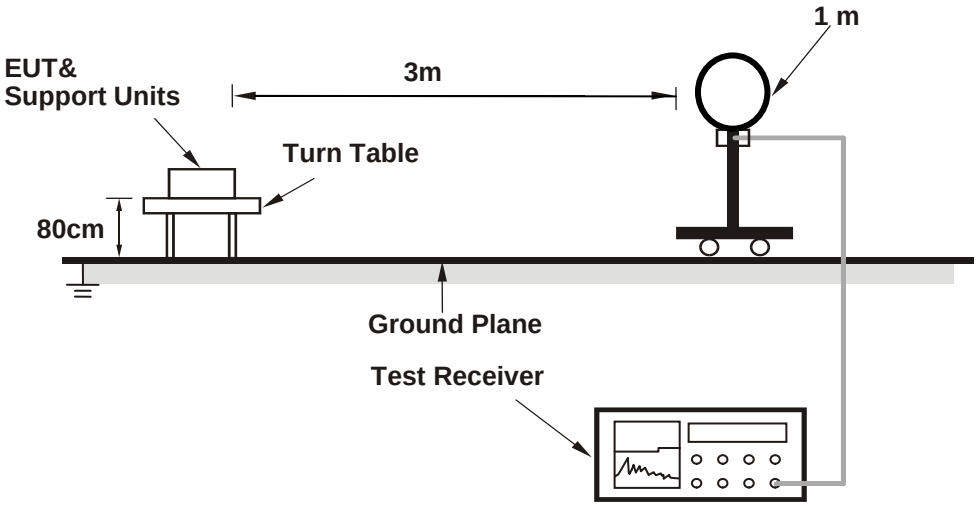
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
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

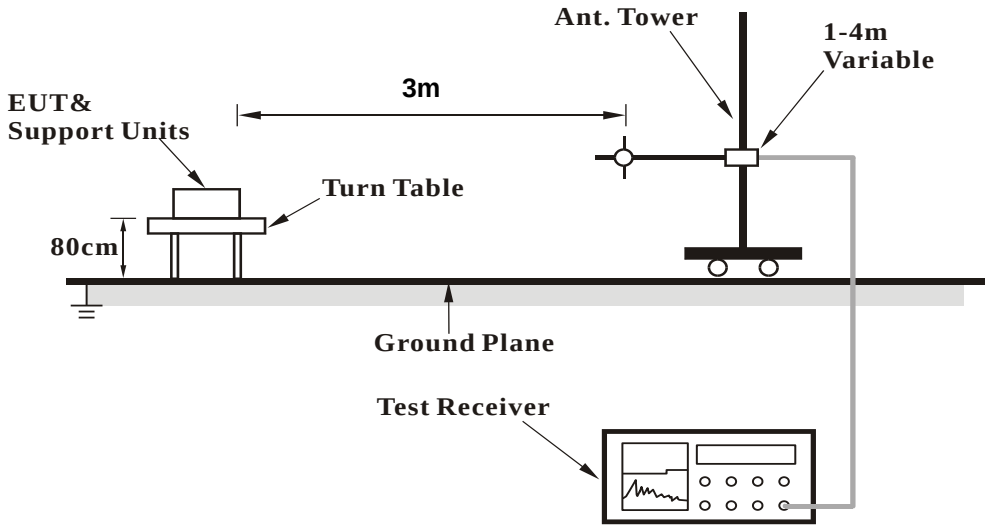
No deviation.

4.1.5 Test Setup

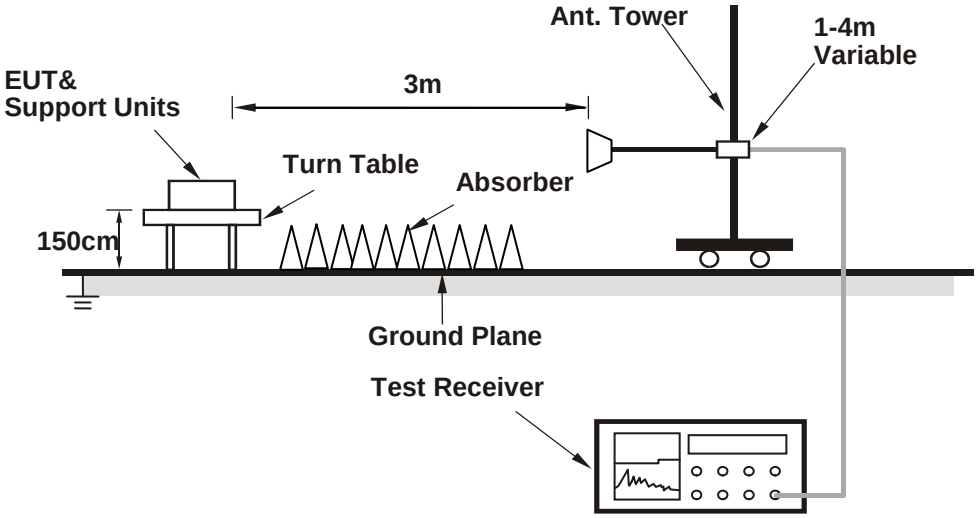
For Radiated emission below 30MHz



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 Condition

a. Connected the EUT with the Laptop which is placed on remote site.

b. Contorlling software (QRCT.exe[Ver3.0.187.0]) has been activated to set the EUT on specific status.

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	63.2 PK	74.0	-10.8	2.47 H	133	59.5	3.7
2	5150.00	47.2 AV	54.0	-6.8	2.47 H	133	43.5	3.7
3	*5180.00	112.7 PK			2.47 H	133	109.0	3.7
4	*5180.00	101.9 AV			2.47 H	133	98.2	3.7
5	#10360.00	59.8 PK	74.0	-14.2	1.05 H	199	46.8	13.0
6	#10360.00	47.6 AV	54.0	-6.4	1.05 H	199	34.6	13.0
7	15540.00	51.0 PK	74.0	-23.0	1.79 H	168	37.9	13.1
8	15540.00	37.8 AV	54.0	-16.2	1.79 H	168	24.7	13.1
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	5150.00	54.6 PK	74.0	-19.4	1.48 V	152	50.9	3.7
2	5150.00	41.3 AV	54.0	-12.7	1.48 V	152	37.6	3.7
3	*5180.00	105.8 PK			1.48 V	152	102.1	3.7
4	*5180.00	94.8 AV			1.48 V	152	91.1	3.7
5	#10360.00	57.3 PK	74.0	-16.7	3.97 V	360	44.3	13.0
6	#10360.00	44.2 AV	54.0	-9.8	3.97 V	360	31.2	13.0
7	15540.00	55.4 PK	74.0	-18.6	2.56 V	185	42.3	13.1
8	15540.00	41.0 AV	54.0	-13.0	2.56 V	185	27.9	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	112.4 PK			2.41 H	136	108.7	3.7
2	*5200.00	101.0 AV			2.41 H	136	97.3	3.7
3	#10400.00	59.6 PK	74.0	-14.4	1.05 H	202	46.6	13.0
4	#10400.00	47.7 AV	54.0	-6.3	1.05 H	202	34.7	13.0
5	15600.00	50.7 PK	74.0	-23.3	1.85 H	180	37.4	13.3
6	15600.00	37.5 AV	54.0	-16.5	1.85 H	180	24.2	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.5 PK			1.48 V	151	101.8	3.7
2	*5200.00	93.9 AV			1.48 V	151	90.2	3.7
3	#10400.00	57.2 PK	74.0	-16.8	3.92 V	360	44.2	13.0
4	#10400.00	43.9 AV	54.0	-10.1	3.92 V	360	30.9	13.0
5	15600.00	55.4 PK	74.0	-18.6	2.50 V	169	42.1	13.3
6	15600.00	41.0 AV	54.0	-13.0	2.50 V	169	27.7	13.3

REMARKS:

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

CHANNEL	TX Channel 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	111.5 PK			2.45 H	130	107.7	3.8
2	*5240.00	100.3 AV			2.45 H	130	96.5	3.8
3	5350.00	50.1 PK	74.0	-23.9	2.45 H	130	46.0	4.1
4	5350.00	38.8 AV	54.0	-15.2	2.45 H	130	34.7	4.1
5	#10480.00	58.4 PK	74.0	-15.6	1.09 H	188	45.2	13.2
6	#10480.00	45.6 AV	54.0	-8.4	1.09 H	188	32.4	13.2
7	15720.00	49.3 PK	74.0	-24.7	1.81 H	159	35.7	13.6
8	15720.00	35.9 AV	54.0	-18.1	1.81 H	159	22.3	13.6
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	104.6 PK			1.44 V	160	100.8	3.8
2	*5240.00	93.2 AV			1.44 V	160	89.4	3.8
3	5350.00	41.5 PK	74.0	-32.5	1.44 V	160	37.4	4.1
4	5350.00	32.9 AV	54.0	-21.1	1.44 V	160	28.8	4.1
5	#10480.00	57.1 PK	74.0	-16.9	3.99 V	351	43.9	13.2
6	#10480.00	43.7 AV	54.0	-10.3	3.99 V	351	30.5	13.2
7	15720.00	55.3 PK	74.0	-18.7	2.57 V	182	41.7	13.6
8	15720.00	41.0 AV	54.0	-13.0	2.57 V	182	27.4	13.6

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	#5644.89	56.8 PK	68.2	-11.4	2.56 H	173	52.4	4.4
2	*5745.00	115.8 PK			2.56 H	173	111.4	4.4
3	*5745.00	103.9 AV			2.56 H	173	99.5	4.4
4	#5985.35	57.4 PK	68.2	-10.8	2.56 H	173	52.7	4.7
5	11490.00	58.3 PK	74.0	-15.7	1.88 H	198	44.8	13.5
6	11490.00	43.5 AV	54.0	-10.5	1.88 H	198	30.0	13.5
7	#17235.00	58.2 PK	74.0	-15.8	1.70 H	165	40.9	17.3
8	#17235.00	45.0 AV	54.0	-9.0	1.70 H	165	27.7	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5633.47	56.5 PK	68.2	-11.7	1.08 V	79	52.1	4.4
2	*5745.00	105.9 PK			1.08 V	79	101.5	4.4
3	*5745.00	94.4 AV			1.08 V	79	90.0	4.4
4	#5935.43	56.9 PK	68.2	-11.3	1.08 V	79	52.2	4.7
5	11490.00	52.5 PK	74.0	-21.5	3.94 V	149	39.0	13.5
6	11490.00	39.3 AV	54.0	-14.7	3.94 V	149	25.8	13.5
7	#17235.00	59.3 PK	74.0	-14.7	1.73 V	216	42.0	17.3
8	#17235.00	45.9 AV	54.0	-8.1	1.73 V	216	28.6	17.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5580.13	57.6 PK	68.2	-10.6	2.53 H	176	53.4	4.2
2	*5785.00	115.0 PK			2.53 H	176	110.6	4.4
3	*5785.00	103.0 AV			2.53 H	176	98.6	4.4
4	#5978.55	57.6 PK	68.2	-10.6	2.53 H	176	52.9	4.7
5	11570.00	58.1 PK	74.0	-15.9	1.86 H	207	44.6	13.5
6	11570.00	43.5 AV	54.0	-10.5	1.86 H	207	30.0	13.5
7	#17355.00	57.5 PK	74.0	-16.5	1.66 H	161	39.5	18.0
8	#17355.00	44.7 AV	54.0	-9.3	1.66 H	161	26.7	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5594.86	57.3 PK	68.2	-10.9	1.04 V	77	53.0	4.3
2	*5785.00	105.4 PK			1.04 V	77	101.0	4.4
3	*5785.00	94.0 AV			1.04 V	77	89.6	4.4
4	#5983.83	57.8 PK	68.2	-10.4	1.04 V	77	53.1	4.7
5	11570.00	52.2 PK	74.0	-21.8	3.96 V	157	38.7	13.5
6	11570.00	39.3 AV	54.0	-14.7	3.96 V	157	25.8	13.5
7	#17355.00	58.0 PK	74.0	-16.0	1.71 V	208	40.0	18.0
8	#17355.00	45.0 AV	54.0	-9.0	1.71 V	208	27.0	18.0

REMARKS:

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

CHANNEL	TX Channel 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	#5599.16	57.3 PK	68.2	-10.9	2.50 H	174	52.9	4.4
2	*5825.00	114.9 PK			2.50 H	174	110.5	4.4
3	*5825.00	102.8 AV			2.50 H	174	98.4	4.4
4	#6021.03	58.0 PK	68.2	-10.2	2.50 H	174	53.1	4.9
5	11650.00	58.1 PK	74.0	-15.9	1.87 H	212	44.4	13.7
6	11650.00	43.3 AV	54.0	-10.7	1.87 H	212	29.6	13.7
7	#17475.00	57.5 PK	74.0	-16.5	1.67 H	154	38.9	18.6
8	#17475.00	44.6 AV	54.0	-9.4	1.67 H	154	26.0	18.6
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	#5560.08	57.0 PK	68.2	-11.2	1.00 V	75	52.8	4.2
2	*5825.00	106.3 PK			1.00 V	75	101.9	4.4
3	*5825.00	95.7 AV			1.00 V	75	91.3	4.4
4	#5948.32	57.7 PK	68.2	-10.5	1.00 V	75	53.0	4.7
5	11650.00	52.1 PK	74.0	-21.9	3.92 V	148	38.4	13.7
6	11650.00	39.1 AV	54.0	-14.9	3.92 V	148	25.4	13.7
7	#17475.00	58.6 PK	74.0	-15.4	1.72 V	219	40.0	18.6
8	#17475.00	45.4 AV	54.0	-8.6	1.72 V	219	26.8	18.6

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.

802.11ac (VHT20)

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	57.3 PK	74.0	-16.7	2.63 H	125	53.6	3.7
2	5150.00	41.6 AV	54.0	-12.4	2.63 H	125	37.9	3.7
3	*5180.00	113.8 PK			2.63 H	125	110.1	3.7
4	*5180.00	102.3 AV			2.63 H	125	98.6	3.7
5	#10360.00	59.6 PK	74.0	-14.4	1.02 H	210	46.6	13.0
6	#10360.00	47.6 AV	54.0	-6.4	1.02 H	210	34.6	13.0
7	15540.00	51.2 PK	74.0	-22.8	1.85 H	153	38.1	13.1
8	15540.00	37.9 AV	54.0	-16.1	1.85 H	153	24.8	13.1
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	5150.00	55.8 PK	74.0	-18.2	1.09 V	149	52.1	3.7
2	5150.00	41.0 AV	54.0	-13.0	1.09 V	149	37.3	3.7
3	*5180.00	105.3 PK			1.09 V	149	101.6	3.7
4	*5180.00	94.5 AV			1.09 V	149	90.8	3.7
5	#10360.00	57.2 PK	74.0	-16.8	3.97 V	360	44.2	13.0
6	#10360.00	44.4 AV	54.0	-9.6	3.97 V	360	31.4	13.0
7	15540.00	55.0 PK	74.0	-19.0	2.50 V	191	41.9	13.1
8	15540.00	40.8 AV	54.0	-13.2	2.50 V	191	27.7	13.1

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	113.7 PK			2.61 H	122	110.0	3.7
2	*5200.00	102.1 AV			2.61 H	122	98.4	3.7
3	#10400.00	57.9 PK	74.0	-16.1	1.10 H	185	44.9	13.0
4	#10400.00	45.5 AV	54.0	-8.5	1.10 H	185	32.5	13.0
5	15600.00	49.5 PK	74.0	-24.5	1.78 H	141	36.2	13.3
6	15600.00	35.6 AV	54.0	-18.4	1.78 H	141	22.3	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.2 PK			1.08 V	156	101.5	3.7
2	*5200.00	94.3 AV			1.08 V	156	90.6	3.7
3	#10400.00	56.1 PK	74.0	-17.9	3.98 V	360	43.1	13.0
4	#10400.00	42.7 AV	54.0	-11.3	3.98 V	360	29.7	13.0
5	15600.00	53.5 PK	74.0	-20.5	2.60 V	169	40.2	13.3
6	15600.00	38.3 AV	54.0	-15.7	2.60 V	169	25.0	13.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	112.8 PK			2.59 H	127	109.0	3.8
2	*5240.00	102.0 AV			2.59 H	127	98.2	3.8
3	5350.00	50.2 PK	74.0	-23.8	2.59 H	127	46.1	4.1
4	5350.00	38.7 AV	54.0	-15.3	2.59 H	127	34.6	4.1
5	#10480.00	57.5 PK	74.0	-16.5	1.06 H	200	44.3	13.2
6	#10480.00	44.8 AV	54.0	-9.2	1.06 H	200	31.6	13.2
7	15720.00	49.7 PK	74.0	-24.3	1.87 H	148	36.1	13.6
8	15720.00	36.3 AV	54.0	-17.7	1.87 H	148	22.7	13.6
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	104.3 PK			1.07 V	139	100.5	3.8
2	*5240.00	94.2 AV			1.07 V	139	90.4	3.8
3	5350.00	48.7 PK	74.0	-25.3	1.07 V	139	44.6	4.1
4	5350.00	38.1 AV	54.0	-15.9	1.07 V	139	34.0	4.1
5	#10480.00	56.0 PK	74.0	-18.0	3.96 V	360	42.8	13.2
6	#10480.00	42.5 AV	54.0	-11.5	3.96 V	360	29.3	13.2
7	15720.00	52.6 PK	74.0	-21.4	2.59 V	193	39.0	13.6
8	15720.00	37.8 AV	54.0	-16.2	2.59 V	193	24.2	13.6

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	#5635.51	57.9 PK	68.2	-10.3	2.70 H	178	53.5	4.4
2	*5745.00	113.9 PK			2.70 H	178	109.5	4.4
3	*5745.00	102.6 AV			2.70 H	178	98.2	4.4
4	#5964.47	58.1 PK	68.2	-10.1	2.70 H	178	53.4	4.7
5	11490.00	57.7 PK	74.0	-16.3	1.81 H	223	44.2	13.5
6	11490.00	43.0 AV	54.0	-11.0	1.81 H	223	29.5	13.5
7	#17235.00	56.8 PK	74.0	-17.2	1.70 H	157	39.5	17.3
8	#17235.00	44.1 AV	54.0	-9.9	1.70 H	157	26.8	17.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5610.62	57.0 PK	68.2	-11.2	1.07 V	73	52.6	4.4
2	*5745.00	105.6 PK			1.07 V	73	101.2	4.4
3	*5745.00	95.3 AV			1.07 V	73	90.9	4.4
4	#5960.28	57.4 PK	68.2	-10.8	1.07 V	73	52.7	4.7
5	11490.00	52.6 PK	74.0	-21.4	3.98 V	140	39.1	13.5
6	11490.00	39.6 AV	54.0	-14.4	3.98 V	140	26.1	13.5
7	#17235.00	59.1 PK	74.0	-14.9	1.75 V	231	41.8	17.3
8	#17235.00	45.6 AV	54.0	-8.4	1.75 V	231	28.3	17.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5617.59	57.9 PK	68.2	-10.3	2.72 H	175	53.5	4.4
2	*5785.00	114.2 PK			2.72 H	175	109.8	4.4
3	*5785.00	102.5 AV			2.72 H	175	98.1	4.4
4	#5980.71	58.5 PK	68.2	-9.7	2.72 H	175	53.8	4.7
5	11570.00	57.7 PK	74.0	-16.3	1.89 H	225	44.2	13.5
6	11570.00	42.8 AV	54.0	-11.2	1.89 H	225	29.3	13.5
7	#17355.00	57.8 PK	74.0	-16.2	1.62 H	169	39.8	18.0
8	#17355.00	44.9 AV	54.0	-9.1	1.62 H	169	26.9	18.0
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5593.75	57.2 PK	68.2	-11.0	1.10 V	81	52.9	4.3
2	*5785.00	106.0 PK			1.10 V	81	101.6	4.4
3	*5785.00	95.5 AV			1.10 V	81	91.1	4.4
4	#5932.89	57.9 PK	68.2	-10.3	1.10 V	81	53.2	4.7
5	11570.00	53.0 PK	74.0	-21.0	4.00 V	134	39.5	13.5
6	11570.00	39.7 AV	54.0	-14.3	4.00 V	134	26.2	13.5
7	#17355.00	58.9 PK	74.0	-15.1	1.77 V	202	40.9	18.0
8	#17355.00	45.7 AV	54.0	-8.3	1.77 V	202	27.7	18.0

REMARKS:

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

CHANNEL	TX Channel 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	#5636.32	57.2 PK	68.2	-11.0	2.71 H	152	52.8	4.4
2	*5825.00	113.1 PK			2.71 H	152	108.7	4.4
3	*5825.00	102.0 AV			2.71 H	152	97.6	4.4
4	#6004.87	57.5 PK	68.2	-10.7	2.71 H	152	52.7	4.8
5	11650.00	57.6 PK	74.0	-16.4	1.90 H	213	43.9	13.7
6	11650.00	42.9 AV	54.0	-11.1	1.90 H	213	29.2	13.7
7	#17475.00	57.3 PK	74.0	-16.7	1.70 H	158	38.7	18.6
8	#17475.00	44.5 AV	54.0	-9.5	1.70 H	158	25.9	18.6
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	#5589.90	56.4 PK	68.2	-11.8	1.13 V	76	52.2	4.2
2	*5825.00	106.5 PK			1.13 V	76	102.1	4.4
3	*5825.00	96.1 AV			1.13 V	76	91.7	4.4
4	#5972.45	57.8 PK	68.2	-10.4	1.13 V	76	53.1	4.7
5	11650.00	52.7 PK	74.0	-21.3	3.98 V	140	39.0	13.7
6	11650.00	39.2 AV	54.0	-14.8	3.98 V	140	25.5	13.7
7	#17475.00	59.2 PK	74.0	-14.8	1.74 V	229	40.6	18.6
8	#17475.00	45.6 AV	54.0	-8.4	1.74 V	229	27.0	18.6

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.

802.11ac (VHT40)

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	66.8 PK	74.0	-7.2	2.41 H	128	63.1	3.7
2	**5150.00**	**52.9 AV**	**54.0**	**-1.1**	**2.41 H**	**128**	**49.2**	**3.7**
3	*5190.00	106.5 PK			2.41 H	128	102.8	3.7
4	*5190.00	98.0 AV			2.41 H	128	94.3	3.7
5	5350.00	50.3 PK	74.0	-23.7	2.41 H	128	46.2	4.1
6	5350.00	39.1 AV	54.0	-14.9	2.41 H	128	35.0	4.1
7	#10380.00	53.2 PK	74.0	-20.8	1.03 H	185	40.1	13.1
8	#10380.00	41.2 AV	54.0	-12.8	1.03 H	185	28.1	13.1
9	15570.00	46.3 PK	74.0	-27.7	1.83 H	161	33.0	13.3
10	15570.00	33.5 AV	54.0	-20.5	1.83 H	161	20.2	13.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	64.5 PK	74.0	-9.5	1.12 V	87	60.8	3.7
2	5150.00	52.1 AV	54.0	-1.9	1.12 V	87	48.4	3.7
3	*5190.00	98.2 PK			1.12 V	87	94.5	3.7
4	*5190.00	90.3 AV			1.12 V	87	86.6	3.7
5	5350.00	50.1 PK	74.0	-23.9	1.12 V	87	46.0	4.1
6	5350.00	38.5 AV	54.0	-15.5	1.12 V	87	34.4	4.1
7	#10380.00	52.2 PK	74.0	-21.8	3.99 V	360	39.1	13.1
8	#10380.00	38.3 AV	54.0	-15.7	3.99 V	360	25.2	13.1
9	15570.00	46.3 PK	74.0	-27.7	2.59 V	154	33.0	13.3
10	15570.00	33.5 AV	54.0	-20.5	2.59 V	154	20.2	13.3

REMARKS:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	109.5 PK			2.43 H	129	105.7	3.8
2	*5230.00	100.8 AV			2.43 H	129	97.0	3.8
3	5350.00	50.7 PK	74.0	-23.3	2.43 H	129	46.6	4.1
4	5350.00	38.9 AV	54.0	-15.1	2.43 H	129	34.8	4.1
5	#10460.00	53.8 PK	74.0	-20.2	1.02 H	186	40.7	13.1
6	#10460.00	42.0 AV	54.0	-12.0	1.02 H	186	28.9	13.1
7	15690.00	47.0 PK	74.0	-27.0	1.86 H	175	33.2	13.8
8	15690.00	34.0 AV	54.0	-20.0	1.86 H	175	20.2	13.8
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	*5230.00	101.1 PK			1.13 V	89	97.3	3.8
2	*5230.00	93.0 AV			1.13 V	89	89.2	3.8
3	5350.00	50.3 PK	74.0	-23.7	1.13 V	89	46.2	4.1
4	5350.00	38.2 AV	54.0	-15.8	1.13 V	89	34.1	4.1
5	#10460.00	52.8 PK	74.0	-21.2	3.99 V	360	39.7	13.1
6	#10460.00	38.8 AV	54.0	-15.2	3.99 V	360	25.7	13.1
7	15690.00	46.0 PK	74.0	-28.0	2.55 V	143	32.2	13.8
8	15690.00	33.0 AV	54.0	-21.0	2.55 V	143	19.2	13.8

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 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	#5617.75	53.1 PK	68.2	-15.1	3.74 H	294	48.7	4.4
2	*5755.00	111.2 PK			2.60 H	171	106.8	4.4
3	*5755.00	101.7 AV			2.60 H	171	97.3	4.4
4	#5995.91	53.1 PK	68.2	-15.1	3.74 H	294	48.4	4.7
5	11510.00	57.3 PK	74.0	-16.7	1.90 H	224	43.7	13.6
6	11510.00	42.8 AV	54.0	-11.2	1.90 H	224	29.2	13.6
7	#17265.00	58.0 PK	74.0	-16.0	1.71 H	174	40.4	17.6
8	#17265.00	45.0 AV	54.0	-9.0	1.71 H	174	27.4	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	#5578.67	55.4 PK	68.2	-12.8	2.60 V	171	51.2	4.2
2	*5755.00	109.0 PK			3.94 V	294	104.6	4.4
3	*5755.00	98.9 AV			3.94 V	294	94.5	4.4
4	#5940.18	53.9 PK	68.2	-14.3	2.60 V	171	49.2	4.7
5	11510.00	52.5 PK	74.0	-21.5	3.93 V	146	38.9	13.6
6	11510.00	38.8 AV	54.0	-15.2	3.93 V	146	25.2	13.6
7	#17265.00	58.4 PK	74.0	-15.6	1.76 V	236	40.8	17.6
8	#17265.00	45.1 AV	54.0	-8.9	1.76 V	236	27.5	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 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	#5647.61	53.4 PK	68.2	-14.8	3.48 H	283	49.0	4.4
2	*5795.00	112.1 PK			2.69 H	170	107.7	4.4
3	*5795.00	102.2 AV			2.69 H	170	97.8	4.4
4	#5975.91	53.0 PK	68.2	-15.2	3.48 H	283	48.3	4.7
5	11590.00	57.9 PK	74.0	-16.1	1.85 H	200	44.4	13.5
6	11590.00	42.9 AV	54.0	-11.1	1.85 H	200	29.4	13.5
7	#17385.00	57.0 PK	74.0	-17.0	1.65 H	149	38.7	18.3
8	#17385.00	44.2 AV	54.0	-9.8	1.65 H	149	25.9	18.3
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5604.14	53.4 PK	68.2	-14.8	2.69 V	170	49.0	4.4
2	*5795.00	109.4 PK			3.48 V	283	105.0	4.4
3	*5795.00	99.2 AV			3.48 V	283	94.8	4.4
4	#5974.46	52.8 PK	68.2	-15.4	2.69 V	170	48.1	4.7
5	11590.00	52.6 PK	74.0	-21.4	3.94 V	143	39.1	13.5
6	11590.00	39.3 AV	54.0	-14.7	3.94 V	143	25.8	13.5
7	#17385.00	58.9 PK	74.0	-15.1	1.68 V	238	40.6	18.3
8	#17385.00	45.4 AV	54.0	-8.6	1.68 V	238	27.1	18.3

REMARKS:

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

802.11ac (VHT80)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	63.0 PK	74.0	-11.0	1.02 H	138	59.3	3.7
2	5150.00	52.5 AV	54.0	-1.5	1.02 H	138	48.8	3.7
3	*5210.00	101.8 PK			1.02 H	138	98.1	3.7
4	*5210.00	92.8 AV			1.02 H	138	89.1	3.7
5	5350.00	49.0 PK	74.0	-25.0	1.02 H	138	44.9	4.1
6	5350.00	38.4 AV	54.0	-15.6	1.02 H	138	34.3	4.1
7	#10420.00	50.9 PK	74.0	-23.1	1.04 H	172	37.8	13.1
8	#10420.00	35.5 AV	54.0	-18.5	1.04 H	172	22.4	13.1
9	15630.00	49.5 PK	74.0	-24.5	1.85 H	155	35.9	13.6
10	15630.00	34.3 AV	54.0	-19.7	1.85 H	155	20.7	13.6
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	61.8 PK	74.0	-12.2	1.10 V	90	58.1	3.7
2	5150.00	51.6 AV	54.0	-2.4	1.10 V	90	47.9	3.7
3	*5210.00	93.4 PK			1.10 V	90	89.7	3.7
4	*5210.00	85.1 AV			1.10 V	90	81.4	3.7
5	5350.00	48.3 PK	74.0	-25.7	1.10 V	90	44.2	4.1
6	5350.00	38.1 AV	54.0	-15.9	1.10 V	90	34.0	4.1
7	#10420.00	50.2 PK	74.0	-23.8	3.97 V	360	37.1	13.1
8	#10420.00	34.7 AV	54.0	-19.3	3.97 V	360	21.6	13.1
9	15630.00	48.7 PK	74.0	-25.3	2.52 V	154	35.1	13.6
10	15630.00	33.8 AV	54.0	-20.2	2.52 V	154	20.2	13.6

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 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	#5640.11	54.3 PK	68.2	-13.9	2.52 H	77	49.9	4.4
2	*5775.00	108.2 PK			2.46 H	171	103.8	4.4
3	*5775.00	98.2 AV			2.46 H	171	93.8	4.4
4	#6007.67	53.5 PK	68.2	-14.7	2.52 H	77	48.7	4.8
5	11550.00	58.0 PK	74.0	-16.0	1.82 H	186	44.5	13.5
6	11550.00	42.9 AV	54.0	-11.1	1.82 H	186	29.4	13.5
7	#17325.00	56.3 PK	74.0	-17.7	1.61 H	147	38.5	17.8
8	#17325.00	43.7 AV	54.0	-10.3	1.61 H	147	25.9	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	#5645.56	61.1 PK	68.2	-7.1	2.46 V	171	56.7	4.4
2	*5775.00	100.0 PK			2.52 V	77	95.6	4.4
3	*5775.00	89.9 AV			2.52 V	77	85.5	4.4
4	#5926.83	56.0 PK	68.2	-12.2	2.46 V	171	51.3	4.7
5	11550.00	52.8 PK	74.0	-21.2	3.95 V	137	39.3	13.5
6	11550.00	39.7 AV	54.0	-14.3	3.95 V	137	26.2	13.5
7	#17325.00	59.4 PK	74.0	-14.6	1.67 V	247	41.6	17.8
8	#17325.00	45.8 AV	54.0	-8.2	1.67 V	247	28.0	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 Data:

802.11ac (VHT40)

CHANNEL	TX Channel 159	**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	30.65	25.3 QP	40.0	-14.7	1.00 H	245	34.9	-9.6
2	72.32	24.8 QP	40.0	-15.2	1.50 H	228	36.0	-11.2
3	164.73	34.4 QP	43.5	-9.1	1.00 H	296	42.9	-8.5
4	250.00	28.3 QP	46.0	-17.7	1.00 H	82	37.8	-9.5
5	499.96	27.7 QP	46.0	-18.3	2.00 H	42	30.4	-2.7
6	921.60	30.4 QP	46.0	-15.6	1.00 H	278	26.0	4.4
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	55.07	35.6 QP	40.0	-4.4	1.00 V	41	44.2	-8.6
2	71.35	31.5 QP	40.0	-8.5	2.00 V	360	42.4	-10.9
3	163.52	34.0 QP	43.5	-9.5	1.00 V	162	42.3	-8.3
4	558.46	27.7 QP	46.0	-18.3	1.50 V	35	29.2	-1.5
5	644.35	29.3 QP	46.0	-16.7	1.00 V	5	28.9	0.4
6	849.63	30.3 QP	46.0	-15.7	1.00 V	66	27.1	3.2

REMARKS:

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

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.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver R&S	ESCS 30	847124/029	Oct. 24, 2016	Oct. 23, 2017
Line-Impedance Stabilization Network (for EUT) R&S	ESH3-Z5	848773/004	Oct. 26, 2016	Oct. 25, 2017
Line-Impedance Stabilization Network (for Peripheral) R&S	ENV216	100072	June 13, 2016	June 12, 2017
50 ohms Terminator	N/A	EMC-02	Sep. 29, 2016	Sep. 28, 2017
RF Cable	5D-FB	COCCAB-001	Sep. 30, 2016	Sep. 29, 2017
10 dB PAD Mini-Circuits	HAT-10+	CONATT-004	June 20, 2016	June 19, 2017
Software BVADT	BVADT_Cond_ V7.3.7.4	NA	NA	NA

Note:
1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. 1.
3 Tested Date: May 02, 2017

4.2.3 Test Procedure

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.

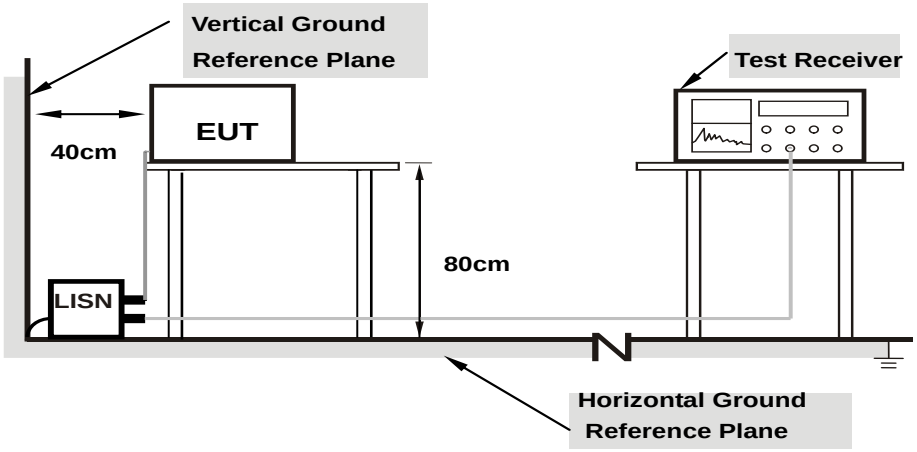
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

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 Condition

Same as 4.1.6.

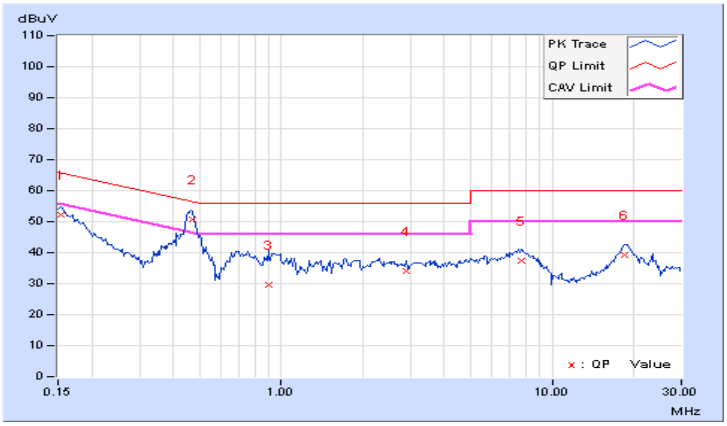
4.2.7 Test Results

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	0.15391	10.19	41.88	26.80	52.07	36.99	65.79	55.79	-13.72	-18.80
2	**0.47031**	**10.22**	**40.61**	**33.90**	**50.83**	**44.12**	**56.51**	**46.51**	**-5.68**	**-2.39**
3	0.89609	10.25	19.46	10.28	29.71	20.53	56.00	46.00	-26.29	-25.47
4	2.87891	10.24	23.82	17.06	34.06	27.30	56.00	46.00	-21.94	-18.70
5	7.69141	10.43	26.91	21.28	37.34	31.71	60.00	50.00	-22.66	-18.29
6	18.58203	11.29	27.90	23.28	39.19	34.57	60.00	50.00	-20.81	-15.43

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.

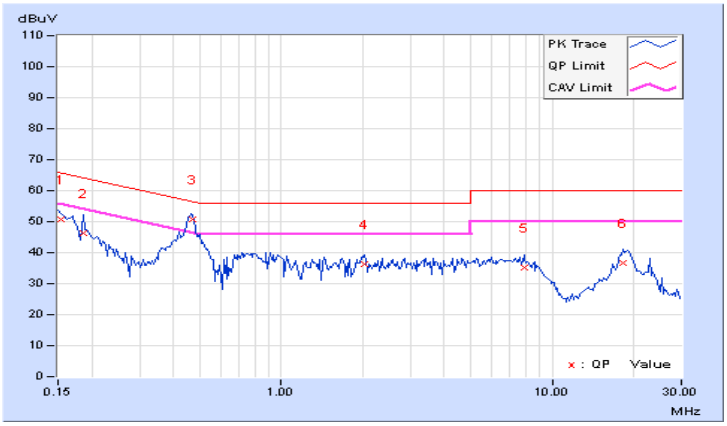


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	0.15391	10.18	40.53	25.54	50.71	35.72	65.79	55.79	-15.08	-20.07
2	0.18516	10.17	36.08	23.34	46.25	33.51	64.25	54.25	-18.00	-20.74
3	0.47031	10.21	40.46	33.54	50.67	43.75	56.51	46.51	-5.84	-2.76
4	2.02344	10.28	25.94	16.74	36.22	27.02	56.00	46.00	-19.78	-18.98
5	7.85547	10.37	24.72	17.97	35.09	28.34	60.00	50.00	-24.91	-21.66
6	18.32031	11.03	25.69	20.97	36.72	32.00	60.00	50.00	-23.28	-18.00

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 Measurment

4.3.1 Limits of Transmit Power Measurement

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

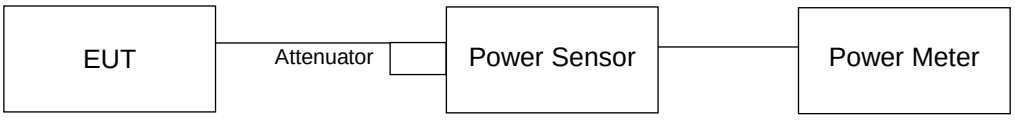
*B is the 26 dB emission bandwidth in megahertz

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

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

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

4.3.2 Test Setup



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

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

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Condition

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

4.3.7 Test Result

802.11a

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	18.05	17.25	116.914	20.68	30.00	Pass
40	5200	18.18	17.56	122.782	20.89	30.00	Pass
48	5240	17.98	17.52	119.3	20.77	30.00	Pass
149	5745	17.41	17.06	105.897	20.25	30.00	Pass
157	5785	17.09	18.01	114.409	20.58	30.00	Pass
165	5825	17.24	18.26	119.954	20.79	30.00	Pass

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	18.10	17.41	119.646	20.78	30.00	Pass
40	5200	17.78	17.10	111.265	20.46	30.00	Pass
48	5240	17.43	17.09	106.503	20.27	30.00	Pass
149	5745	17.35	18.12	119.188	20.76	30.00	Pass
157	5785	17.07	18.15	116.246	20.65	30.00	Pass
165	5825	17.28	18.40	122.639	20.89	30.00	Pass

802.11ac (VHT40)

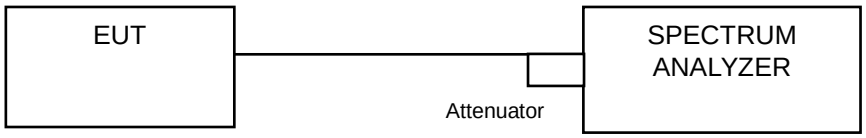
Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	15.90	15.18	71.866	18.57	30.00	Pass
46	5230	17.76	17.31	113.531	20.55	30.00	Pass
151	5755	17.21	18.03	116.135	20.65	30.00	Pass
159	5795	17.42	18.46	125.354	20.98	30.00	Pass

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	Maximum Conducted Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	14.83	14.06	55.877	17.47	30.00	Pass
155	5775	17.28	18.06	117.429	20.70	30.00	Pass

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 SAMPLE. 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 Results

802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	16.56	16.56
40	5200	16.56	16.56
48	5240	16.56	16.56
149	5745	16.56	16.56
157	5785	16.68	16.68
165	5825	16.56	16.68

802.11ac (VHT20)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
36	5180	17.76	17.64
40	5200	17.76	17.76
48	5240	17.76	17.76
149	5745	17.76	17.76
157	5785	17.76	17.76
165	5825	17.76	17.88

802.11ac (VHT40)

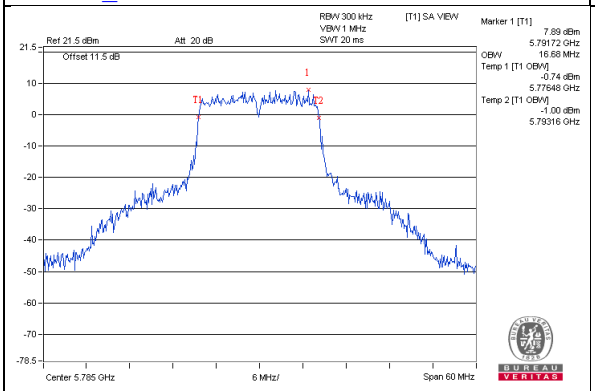
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
38	5190	36.48	36.24
46	5230	36.48	36.24
151	5755	36.48	36.24
159	5795	36.48	36.72

802.11ac (VHT80)

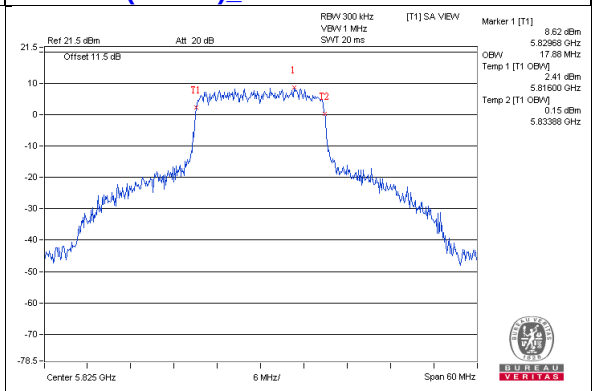
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)	
		CHAIN 0	CHAIN 1
42	5210	75.84	75.84
155	5775	76.32	76.32

Spectrum Plot of Worst Value

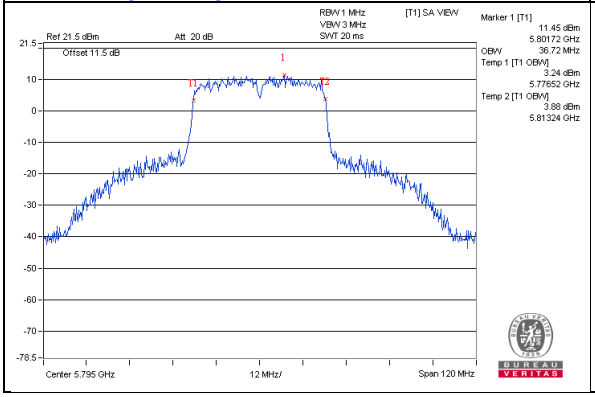
802.11a_Chain0 / CH157



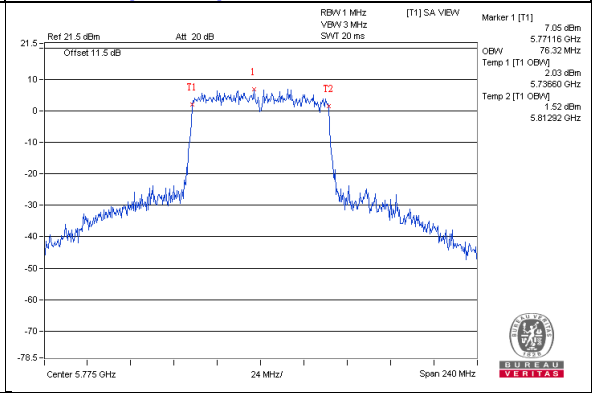
802.11ac (VHT20)_Chain1 / CH165

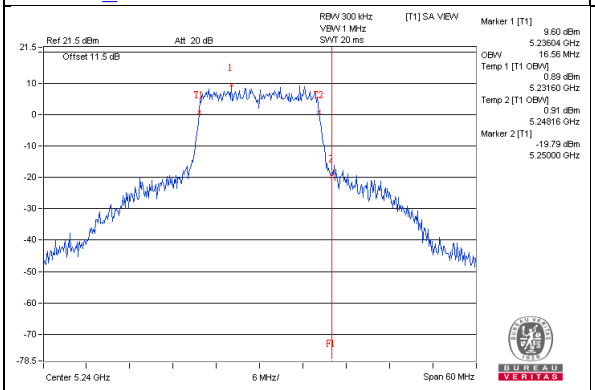
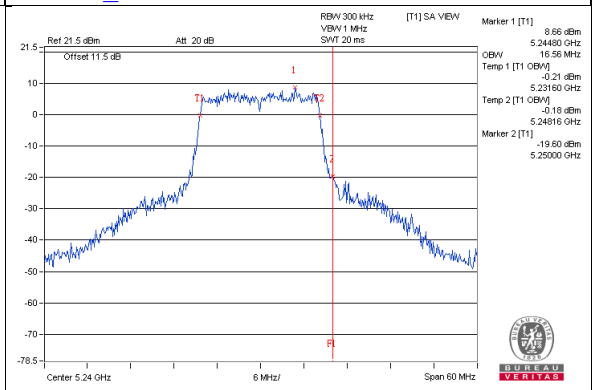
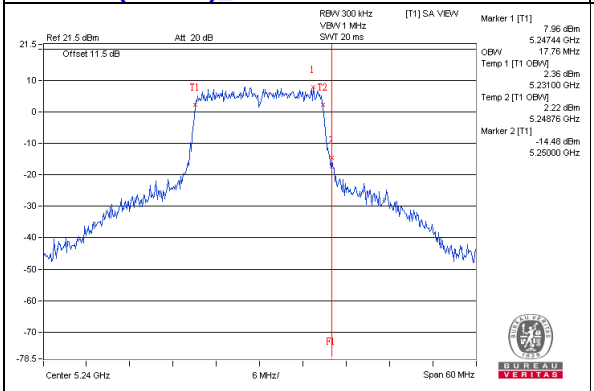
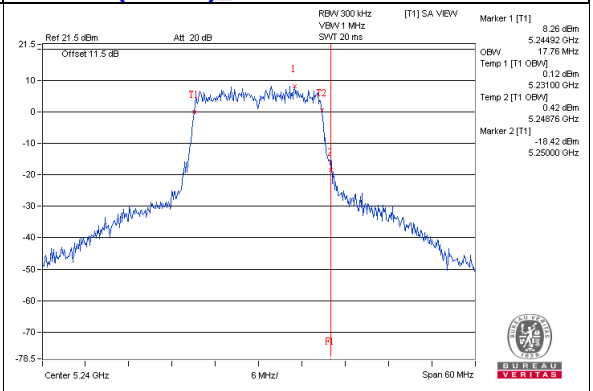
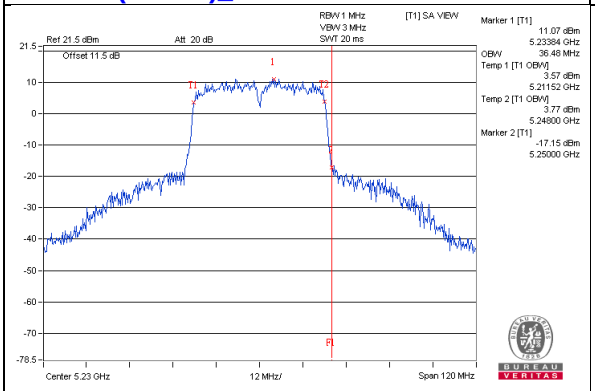
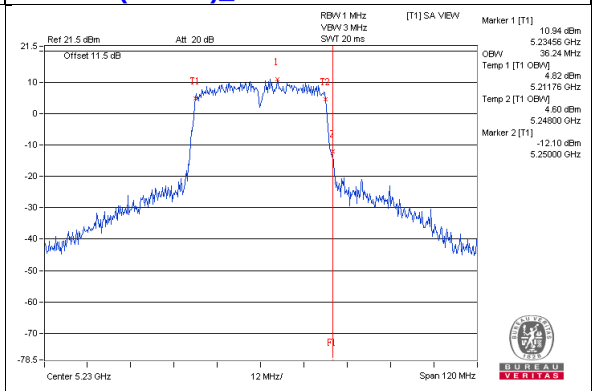
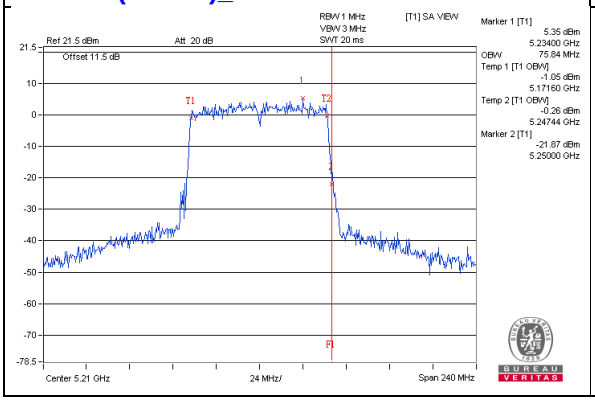
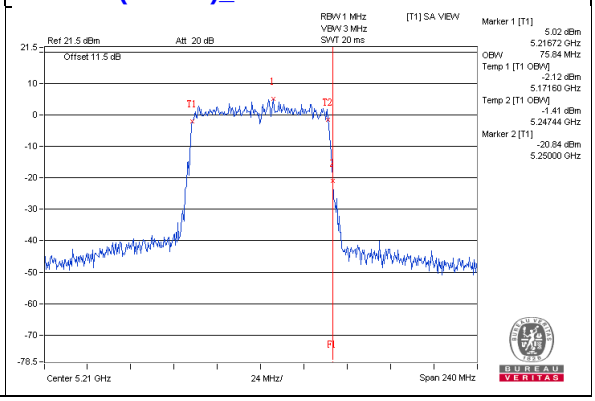


802.11ac (VHT40)_Chain1 / CH159



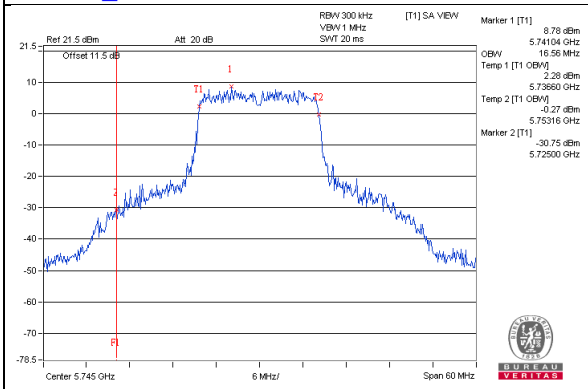
802.11ac (VHT80)_Chain0 / CH155



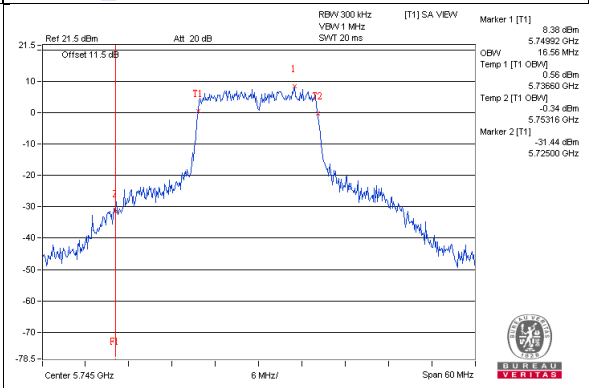
Spectrum Plot for near by DFS band (DFS is required, if 99% OCP straddle into U-NII-2A band)	
802.11a_Chain0 / CH48	802.11a_Chain1 / CH48
	
802.11ac(VHT20)_Chain0 / CH48	802.11ac(VHT20)_Chain1 / CH48
	
802.11ac(VHT40)_Chain0 / CH46	802.11ac(VHT40)_Chain1 / CH46
	
802.11ac(VHT80)_Chain0 / CH42	802.11ac(VHT80)_Chain1 / CH42
	

Spectrum Plot for near by DFS band
(DFS is required, if 99% OCP straddle into U-NII-2C band)

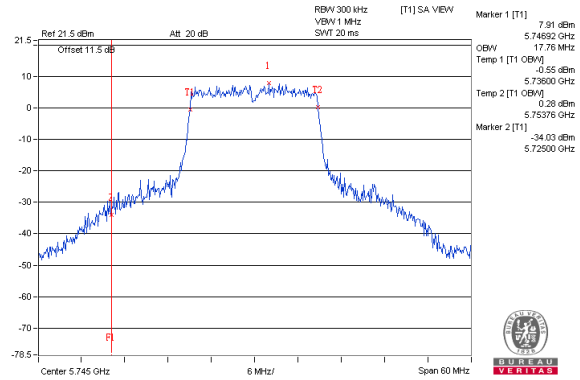
802.11a_Chain0 / CH149



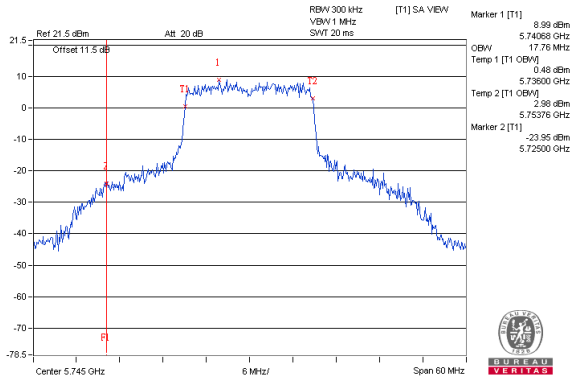
802.11a_Chain1 / CH149



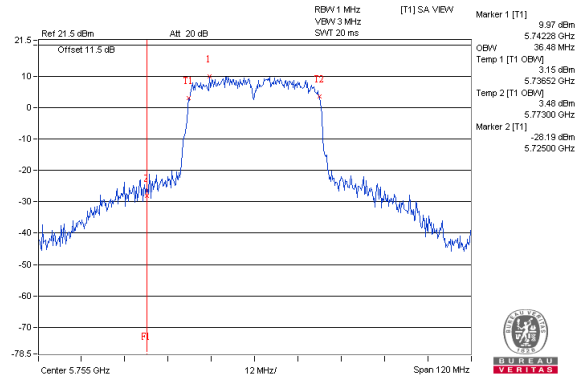
802.11ac(VHT20)_Chain0 / CH149



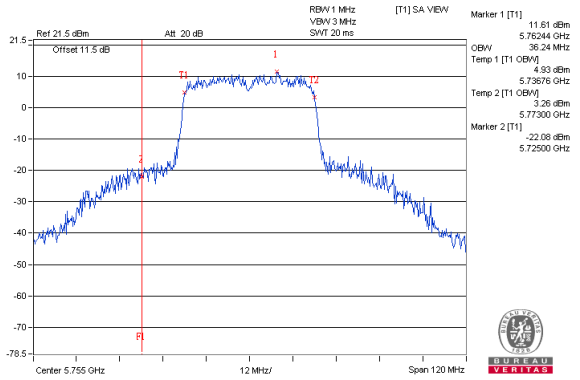
802.11ac(VHT20)_Chain1 / CH149



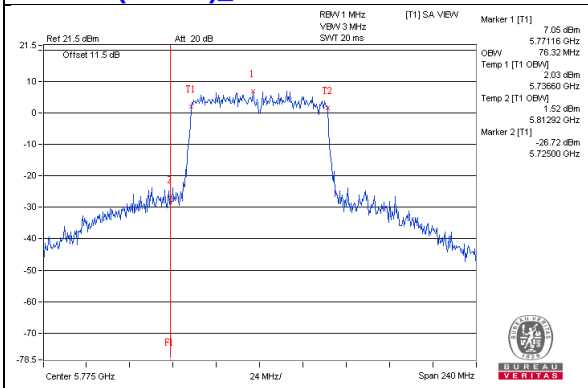
802.11ac(VHT40)_Chain0 / CH151



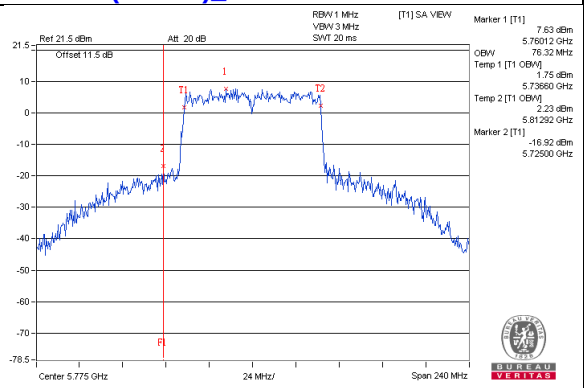
802.11ac(VHT40)_Chain1 / CH151



802.11ac(VHT80)_Chain0 / CH155



802.11ac(VHT80)_Chain1 / CH155

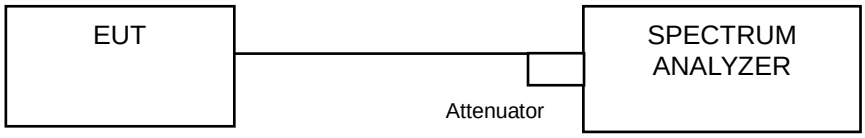


4.5 Peak Power Spectral Density Measurement

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 Procedure

For U-NII-1:

Using method SA-2

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

For U-NII-3:

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 Condition

Same as Item 4.3.6.

4.5.7 Test Results

For U-NII-1:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	3.99	2.30	0.16	6.40	17.00	Pass
40	5200	4.60	2.70	0.16	6.92	17.00	Pass
48	5240	4.50	2.83	0.16	6.91	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
36	5180	3.78	2.94	0.11	6.50	17.00	Pass
40	5200	3.76	3.04	0.11	6.54	17.00	Pass
48	5240	3.67	3.23	0.11	6.58	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

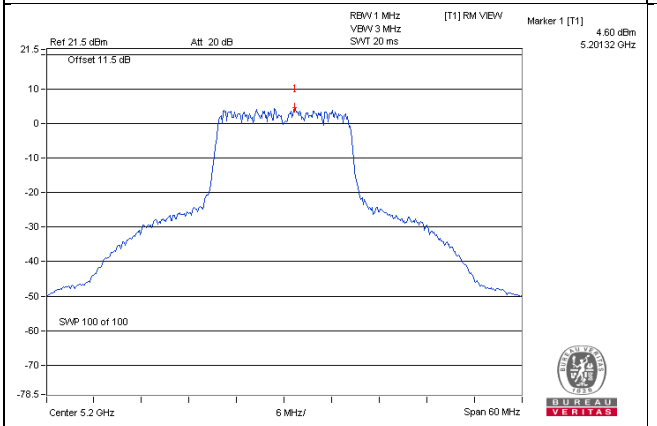
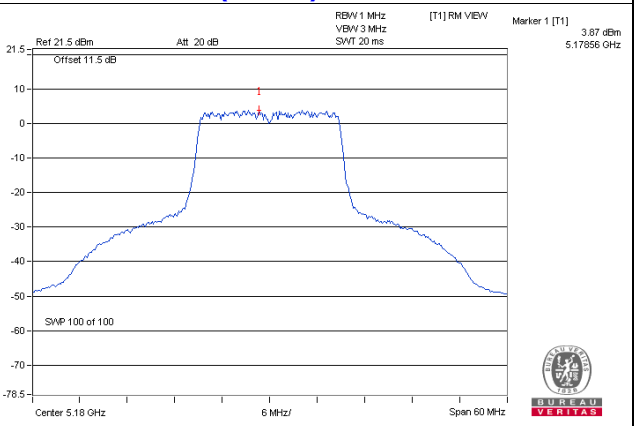
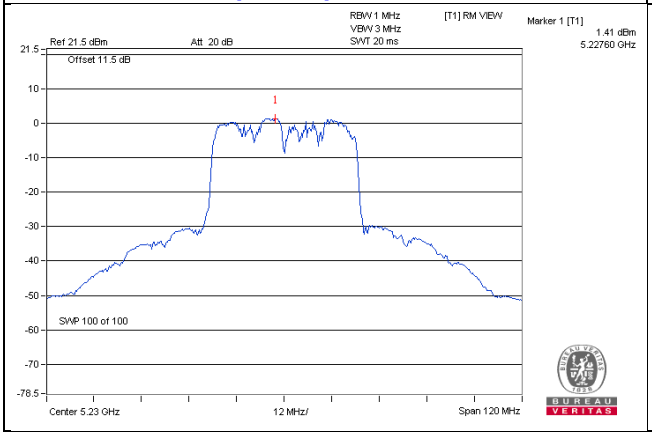
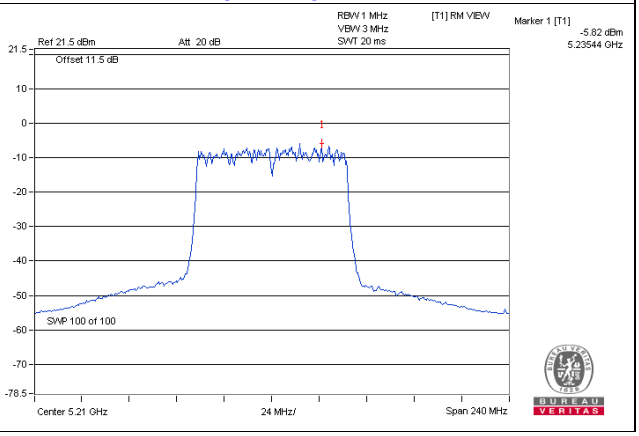
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
38	5190	-1.41	-1.74	0.23	1.67	17.00	Pass
46	5230	1.29	-0.04	0.23	3.91	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm)		Duty Factor (dB)	Total PSD With Duty Factor (dBm)	MAX. Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
42	5210	-5.82	-6.97	0.50	-2.84	17.00	Pass

Note: 1. Method a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a_Chain 0 / CH40	**802.11ac (VHT20)_Chain 0 / CH36**
	
802.11ac (VHT40)_Chain 0 / CH46	**802.11ac (VHT80)_Chain 0 / CH42**
	

For U-NII-3:

802.11a

TX chain	Chan.	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	-4.49	-2.27	3.01	0.16	0.90	30.00	Pass
	157	5785	-5.41	-3.19	3.01	0.16	-0.02	30.00	Pass
	165	5825	-5.34	-3.12	3.01	0.16	0.05	30.00	Pass
1	149	5745	-4.72	-2.50	3.01	0.16	0.67	30.00	Pass
	157	5785	-4.40	-2.18	3.01	0.16	0.99	30.00	Pass
	165	5825	-4.22	-2.00	3.01	0.16	1.17	30.00	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT20)

TX chain	Chan.	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	-4.52	-2.30	3.01	0.11	0.82	30.00	Pass
	157	5785	-5.16	-2.94	3.01	0.11	0.18	30.00	Pass
	165	5825	-5.74	-3.52	3.01	0.11	-0.40	30.00	Pass
1	149	5745	-3.88	-1.66	3.01	0.11	1.46	30.00	Pass
	157	5785	-3.82	-1.60	3.01	0.11	1.52	30.00	Pass
	165	5825	-3.76	-1.54	3.01	0.11	1.58	30.00	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT40)

TX chain	Chan.	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	-7.79	-5.57	3.01	0.23	-2.33	30.00	Pass
	159	5795	-8.29	-6.07	3.01	0.23	-2.83	30.00	Pass
1	151	5755	-7.31	-5.09	3.01	0.23	-1.85	30.00	Pass
	159	5795	-6.53	-4.31	3.01	0.23	-1.07	30.00	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.

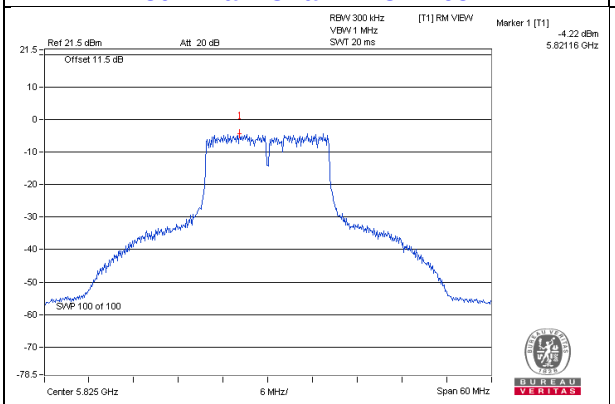
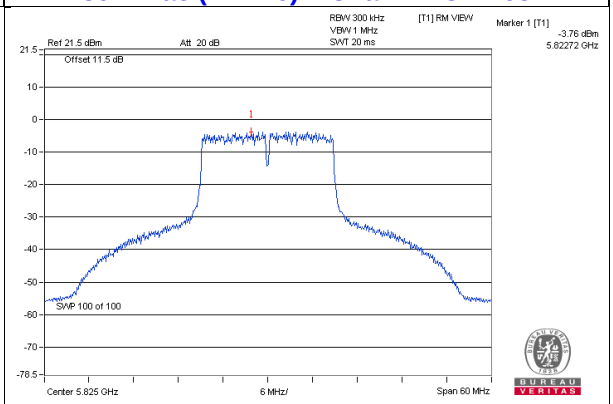
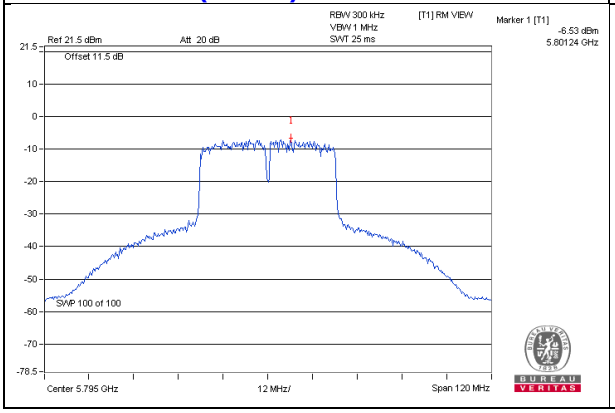
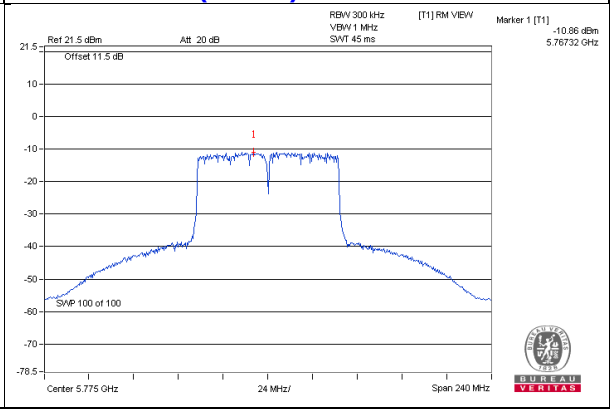
2. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

TX chain	Chan.	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	-12.08	-9.86	3.01	0.50	-6.35	30.00	Pass
1	155	5775	-10.86	-8.64	3.01	0.50	-5.13	30.00	Pass

Note: 1. Directional gain = 10 log[$(10^{G1/20} + 10^{G2/20})^2$ / 2] = 5.07dBi < 6dBi , so the power density limit shall not be reduced.

2. Refer to section 3.3 for duty cycle spectrum plot.

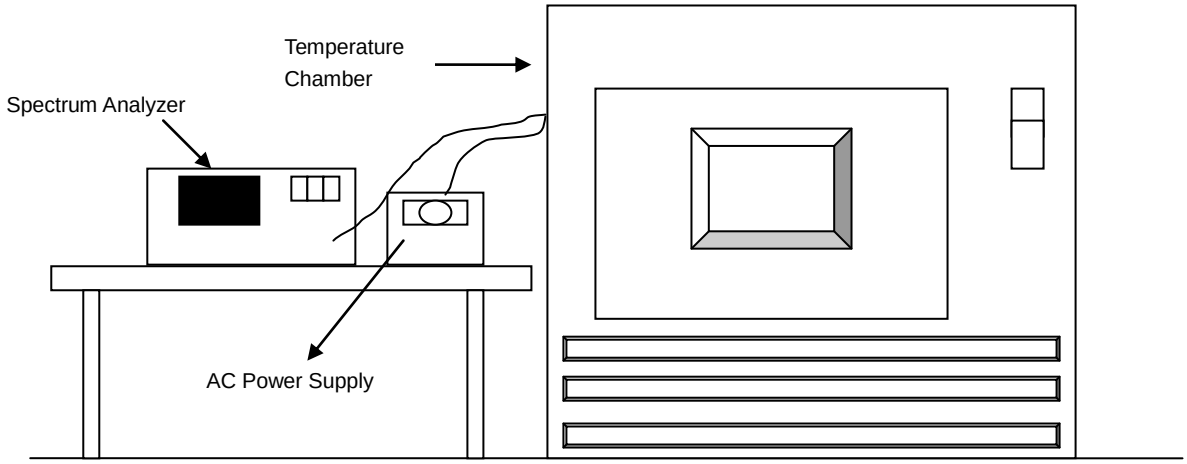
Spectrum Plot of Worst Value	
802.11a – Chain 1: CH 165	**802.11ac (VHT20) – Chain 1: CH 165**
	
802.11ac (VHT40) – Chain 1: CH 159	**802.11ac (VHT80) – Chain 1: CH 155**
	

4.6 Frequency Stability Measurement

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
.

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
50	120	5180.019	PASS	5180.0202	PASS	5180.0212	PASS	5180.0231	PASS
40	120	5180.0217	PASS	5180.0181	PASS	5180.0192	PASS	5180.019	PASS
30	120	5180.0222	PASS	5180.018	PASS	5180.0194	PASS	5180.0188	PASS
20	120	5179.9745	PASS	5179.9732	PASS	5179.9759	PASS	5179.9739	PASS
10	120	5180.0016	PASS	5179.9996	PASS	5180.0028	PASS	5179.9999	PASS
0	120	5179.9787	PASS	5179.979	PASS	5179.9806	PASS	5179.9831	PASS
-10	120	5179.9988	PASS	5179.9968	PASS	5179.9989	PASS	5179.9948	PASS
-20	120	5179.9985	PASS	5179.9987	PASS	5180.0004	PASS	5180.0012	PASS
-30	120	5180.0014	PASS	5180.0022	PASS	5180.002	PASS	5180.0044	PASS

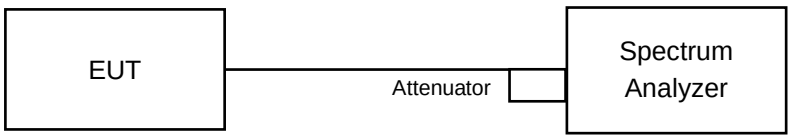
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9742	PASS	5179.9733	PASS	5179.9751	PASS	5179.973	PASS
	120	5179.9745	PASS	5179.9732	PASS	5179.9759	PASS	5179.9739	PASS
	102	5179.9737	PASS	5179.9735	PASS	5179.9761	PASS	5179.9741	PASS

4.7 6dB Bandwidth Measurment

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	16.39	16.38	0.5	PASS
157	5785	16.40	16.36	0.5	PASS
165	5825	16.39	16.36	0.5	PASS

802.11ac (VHT20)

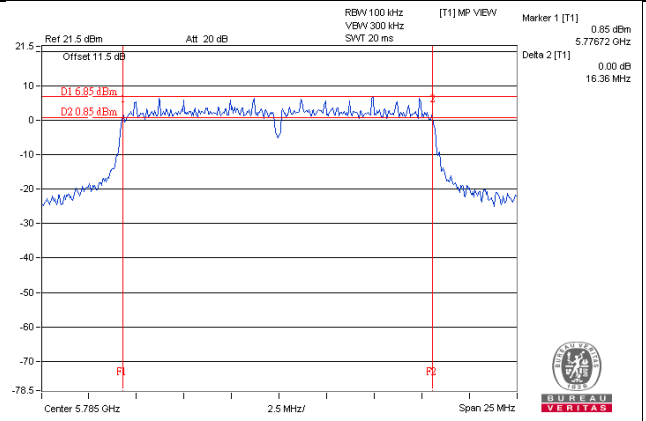
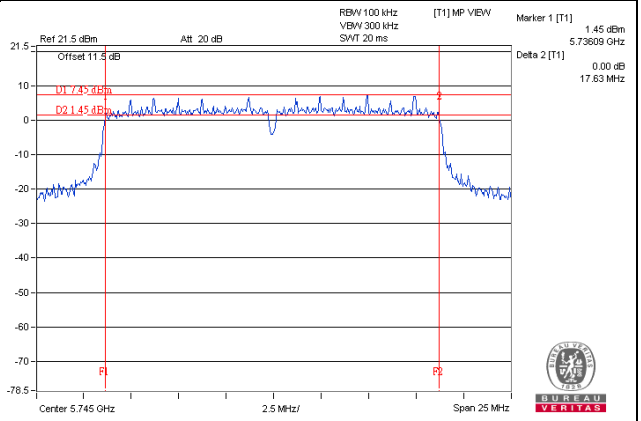
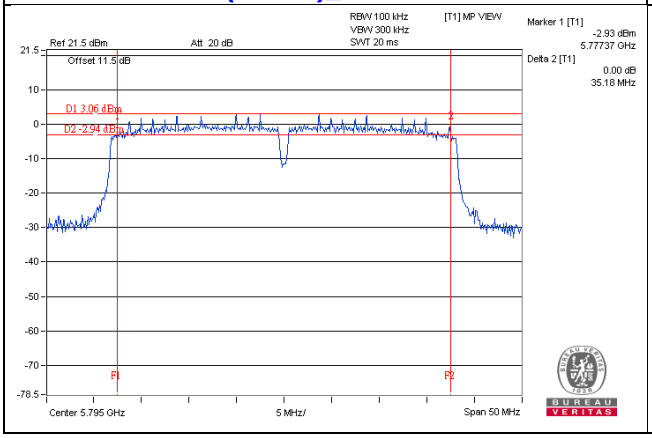
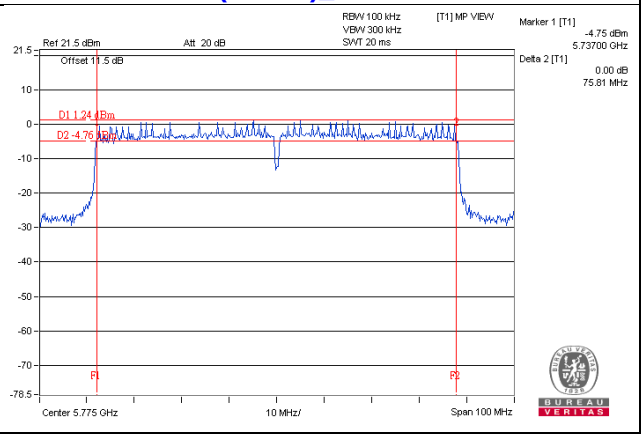
Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
149	5745	17.64	17.63	0.5	PASS
157	5785	17.64	17.63	0.5	PASS
165	5825	17.65	17.64	0.5	PASS

802.11ac (VHT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
151	5755	35.58	35.25	0.5	PASS
159	5795	35.18	35.40	0.5	PASS

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)		Minimum Limit (MHz)	Pass / Fail
		Chain 0	Chain 1		
155	5775	75.92	75.81	0.5	PASS

Spectrum Plot of Worst Value	
802.11a_Chain 1 / CH157	**802.11ac (VHT20)_Chain 1 / CH149**
	
802.11ac (VHT40)_Chain 0 / CH159	**802.11ac (VHT80)_Chain 1 / CH155**
	

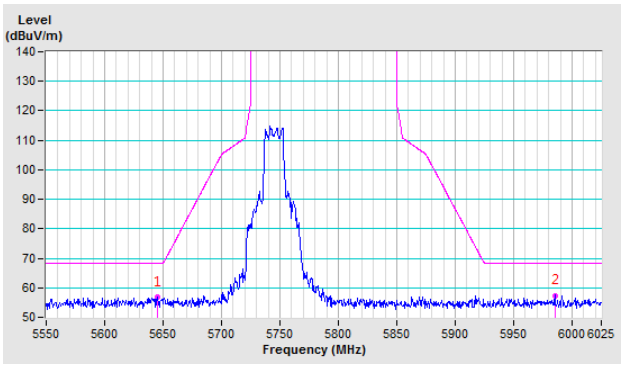
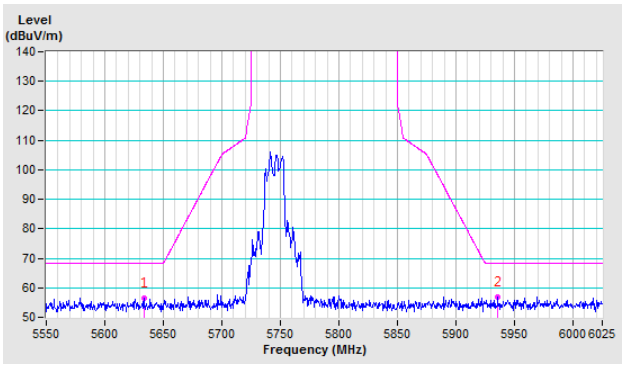
5 Pictures of Test Arrangements

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

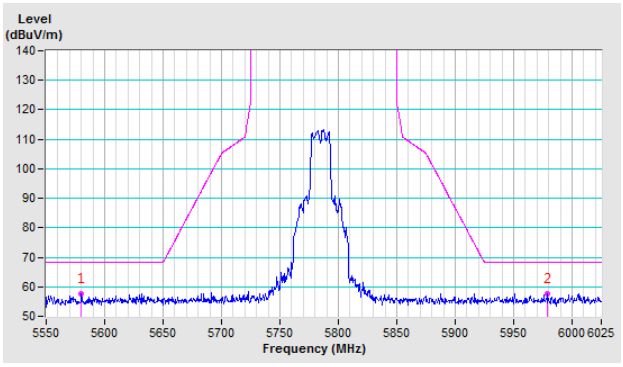
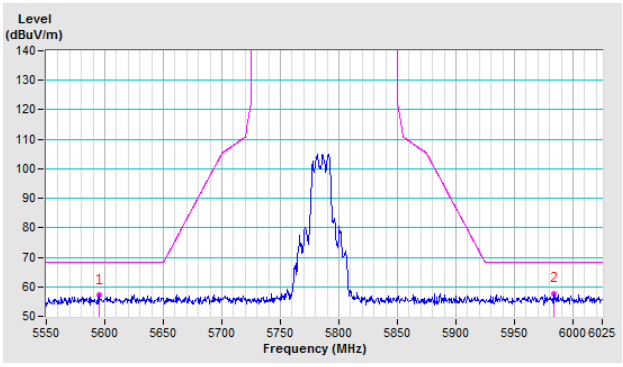
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

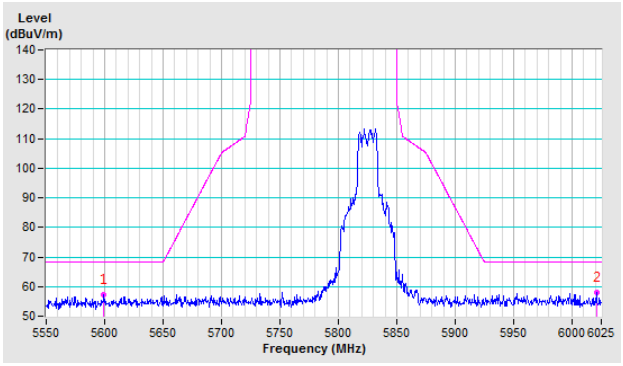
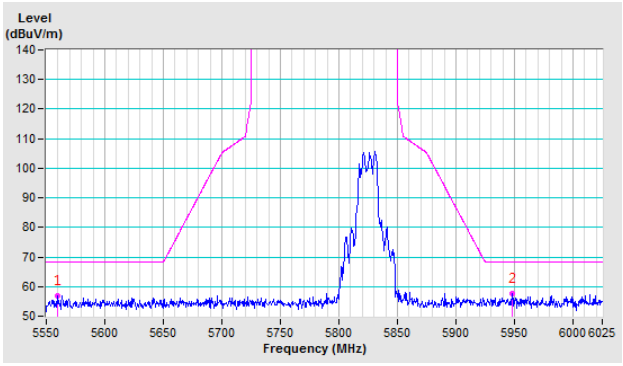
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

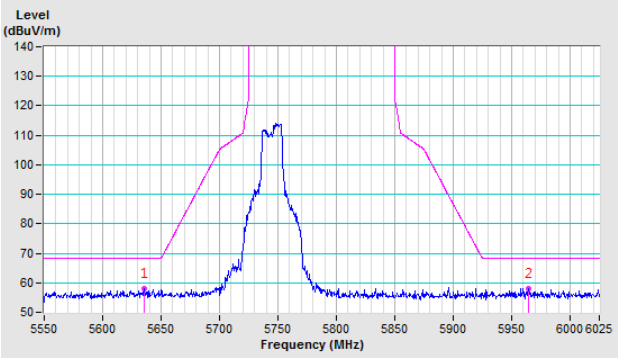
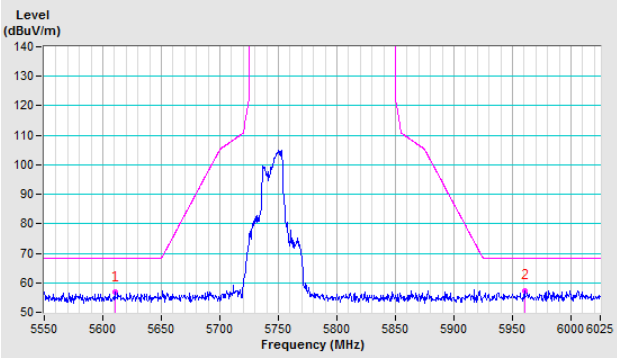
Horizontal	Vertical
	

CH 165 5825 MHz

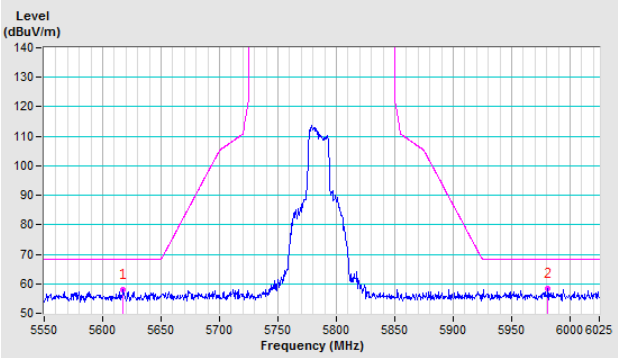
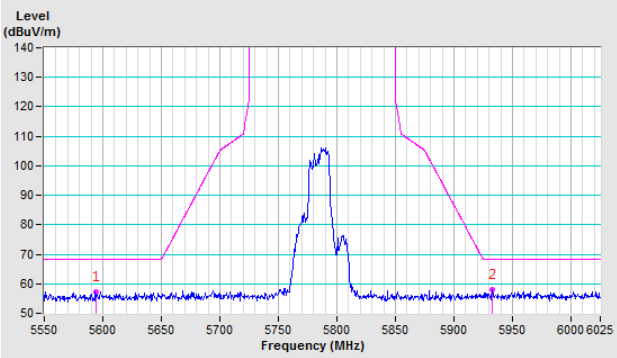
Horizontal	Vertical
	

802.11ac (VHT20)

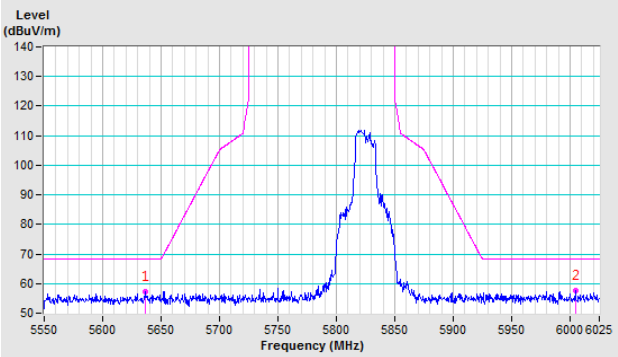
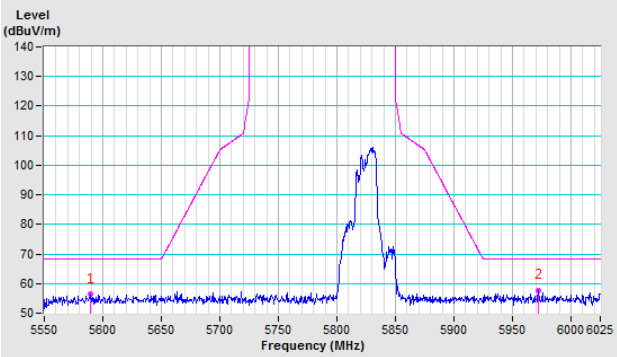
CH 149 5745 MHz

Horizontal	Vertical
	

CH 157 5785 MHz

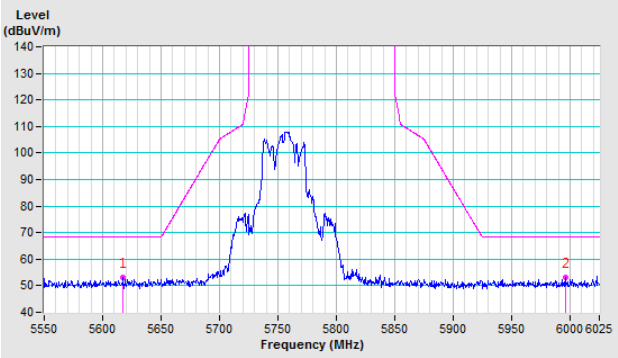
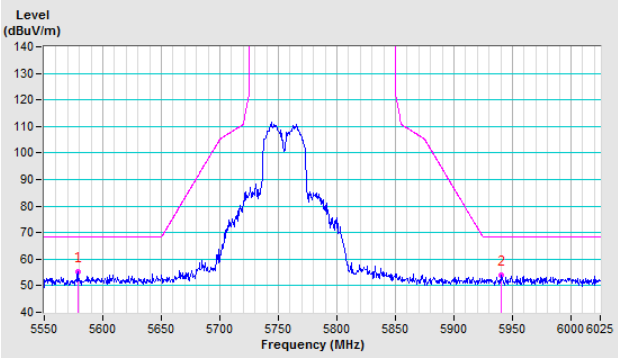
Horizontal	Vertical
	

CH 165 5825 MHz

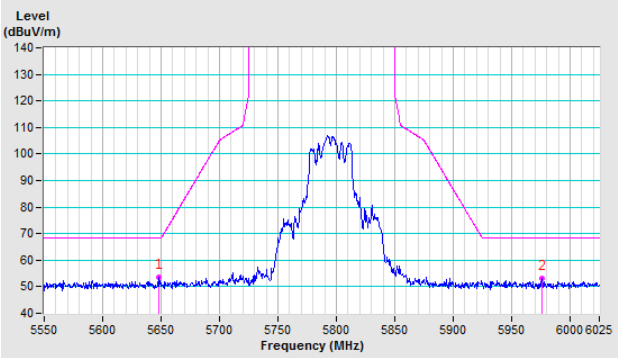
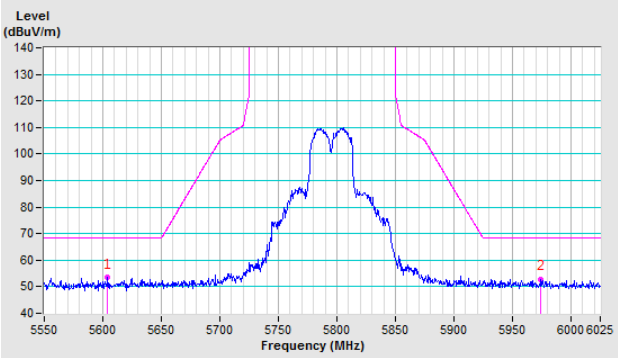
Horizontal	Vertical
	

802.11ac (VHT40)

CH 151 5755 MHz

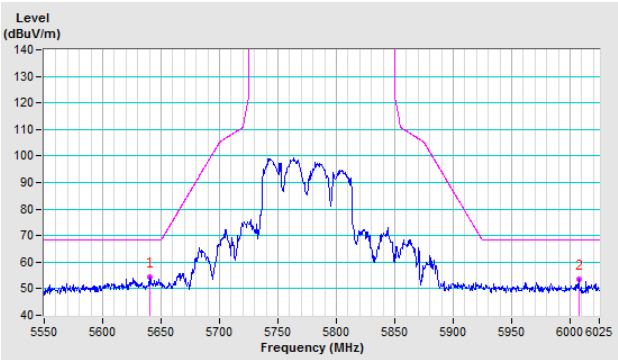
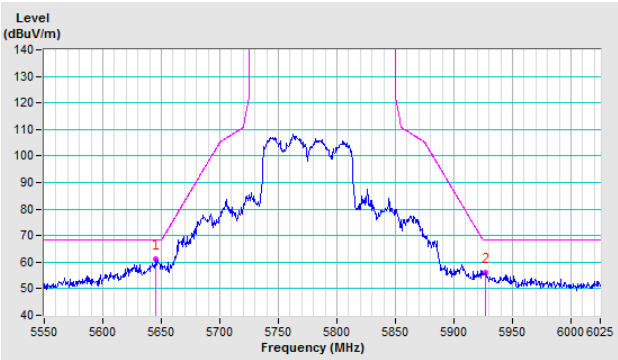
Horizontal	Vertical
	

CH 159 5795 MHz

Horizontal	Vertical
	

802.11ac (VHT80)

CH 155 5775 MHz

Horizontal	Vertical
	

Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are 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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Hwa Ya EMC/RF/Safety Lab
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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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