FCC Test Report

Report No.:	RF171201C07-1
FCC ID:	TYM-J179
Test Model:	J179
Received Date:	Dec. 01, 2017
Test Date:	Dec. 12 ~ Dec. 27, 2017
Issued Date:	Jan. 04, 2018
Applicant:	AVAYA
Address:	250 Sidney Street, Belleville, Ontario, K8P 3Z3, Canada
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, Taiwan, R.O.C.
FCC Registration:	788550
Designation Number:	TW0003

Testing Laboratory
2021

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The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

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Release Control Record

Issue No.	Description	Date Issued
RF171201C07-1	Original release.	Jan. 04, 2018

1 Certificate of Conformity

Product:	IP Phone
Brand:	AVAYA
Test Model:	J179
Sample Status:	Production Unit
Applicant:	AVAYA
Test Date:	Dec. 12 ~ Dec. 27, 2017
Standards:	47 CFR FCC Part 15, Subpart E (Section 15.407) ANSI C63.10:2013

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

Prepared by : _____ , **Date:** Jan. 04, 2018

Pettie Chen / Senior Specialist

Approved by : _____ , **Date:** Jan. 04, 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 -6.02dB at 0.81016MHz.
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 -1.2dB at 5150.00, 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	No antenna connector is used.

*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	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	IP Phone
Brand	AVAYA
Test Model	J179
Sample Status	Production Unit
Power Supply Rating	5Vdc (adapter)
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 150Mbps 802.11ac: up to 433.3Mbps
Operating Frequency	5180~5240MHz, 5745~5825MHz
Number of Channel	5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11n (HT40): 2 802.11ac (VHT80): 1 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11n (HT40): 2 802.11ac (VHT80): 1
Output Power	5180~5240MHz: 25.410mW 5745~5825MHz: 20.701mW
Antenna Type	PCB antenna with 2.4dBi gain
Antenna Connector	NA
Accessory Device	Adapter
Cable Supplied	NA

Note:

1. The EUT provides one completed transmitter and one receiver.

Modulation Mode	TX Function
802.11a	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX
802.11ac (VHT20)	1TX
802.11ac (VHT40)	1TX
802.11ac (VHT80)	1TX

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

2. The EUT consumes power from the following adapter.

Adapter	
Brand	CISCO
Model	PSAC12R-050
Input Power	100-240Vac~0.5A, 50-60Hz, 26-36VA
Output Power	5.0Vdc / 2.4A, 12W max.
Power Line	1.5m non-shielded cable with one core

3. The WLAN 2.4 and 5GHz and BT cannot transmit simultaneously.

3.2 Description of Test Modes

5180~5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

5745~5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission APCM: Antenna Port Conducted Measurement

Note:

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

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	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	36	OFDM	6.0
		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	36	OFDM	6.0
		5745-5825	149 to 165		OFDM	6.0

Antenna Port Conducted Measurement:

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

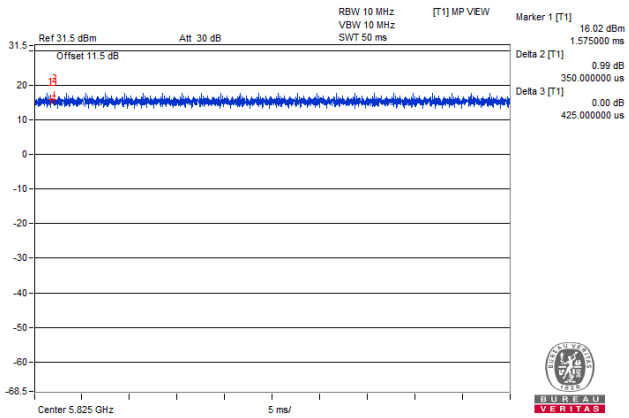
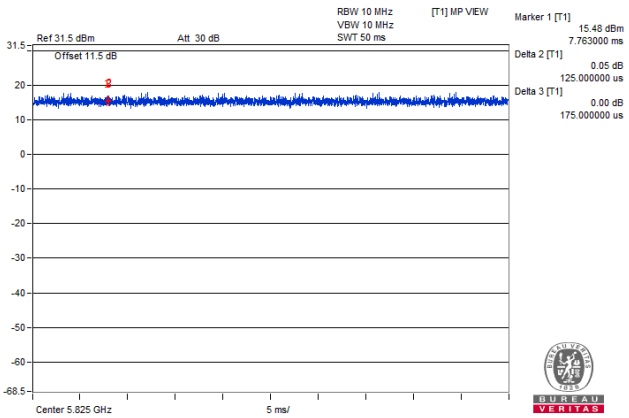
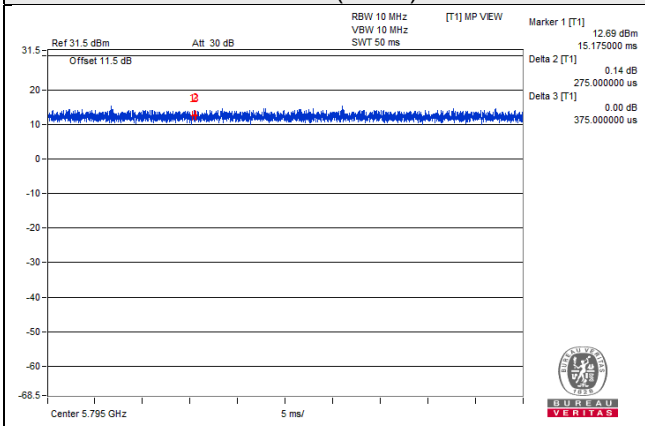
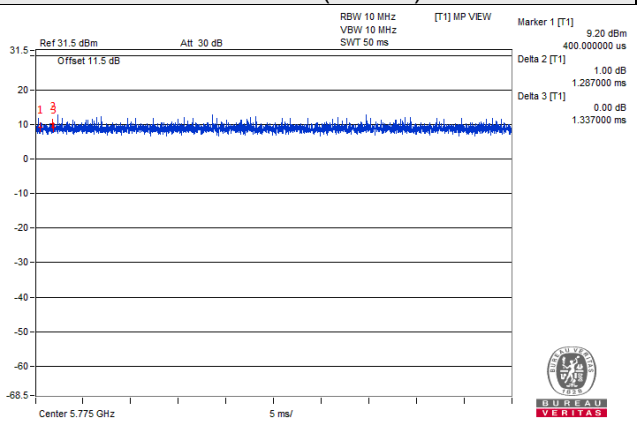
EUT Configure Mode	Mode	Frequency Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Data Rate (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	6.0
	802.11n (HT20)		36 to 48	36, 40, 48	OFDM	6.5
	802.11n (HT40)		38 to 46	38, 46	OFDM	13.5
	802.11ac (VHT80)		42	42	OFDM	29.3
-	802.11a	5745-5825	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

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	22deg. C, 65%RH	120Vac, 60Hz	Adair Peng
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Willy Cheng
PLC	24deg. C, 61%RH	120Vac, 60Hz	Willy Cheng
APCM	25deg. C, 60%RH	120Vac, 60Hz	Chris Lin

3.3 Duty Cycle of Test Signal

Duty cycle = 100%

802.11a	802.11n (HT20)
	
802.11n (HT40)	**802.11ac (VHT80)**
	

3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Load	NA	NA	NA	NA	-
B.	Load	NA	NA	NA	NA	-

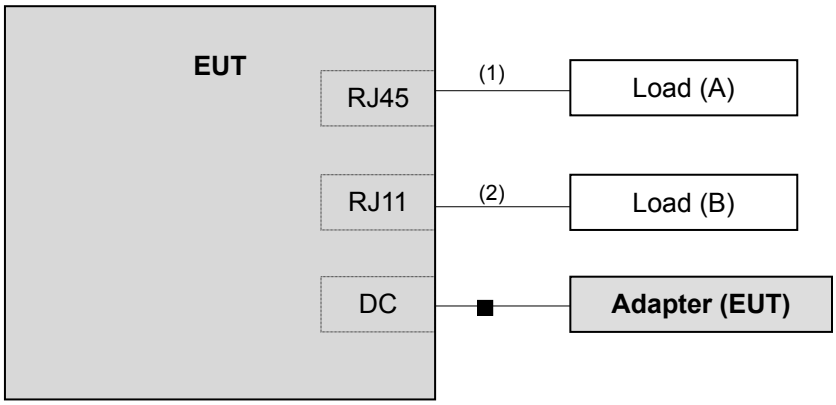
Note:

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.	RJ45 cable	2	1.5	N	0	-
2.	RJ11 cable	1	1.5	N	0	-

Note: The core(s) is(are) originally attached to the cable(s).

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

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESIB7	100187	May 02, 2017	May 01, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-171	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	9120D	209	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna EMCI	EM-6879	269	Aug. 11, 2017	Aug. 10, 2018
Preamplifier Agilent (Below 1GHz)	8447D	2944A10738	Aug. 21, 2017	Aug. 20, 2018
Preamplifier Agilent (Above 1GHz)	8449B	3008A02465	Apr. 05, 2017	Apr. 04, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH3-03 (223653/4)	Aug. 21, 2017	Aug. 20, 2018
RF signal cable HUBER+SUHNER& EMCI	SUCOFLEX 104&EMC104-SM-SM- 8000	Cable-CH3-03 (309224+170907)	Sep.11, 2017	Sep. 10, 2018
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021702	NA	NA
Turn Table BV ADT	TT100	TT93021702	NA	NA
Turn Table Controller BV ADT	SC100	SC93021702	NA	NA
Turn Table BV ADT	TT100	TT93021705	NA	NA
Turn Table Controller BV ADT	SC100	SC93021705	NA	NA
High Speed Peak Power Meter	ML2495A	0824012	Aug. 18, 2017	Aug. 17, 2018
Power Sensor	MA2411B	0738171	Aug. 18, 2017	Aug. 17, 2018

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

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

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

c. 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.

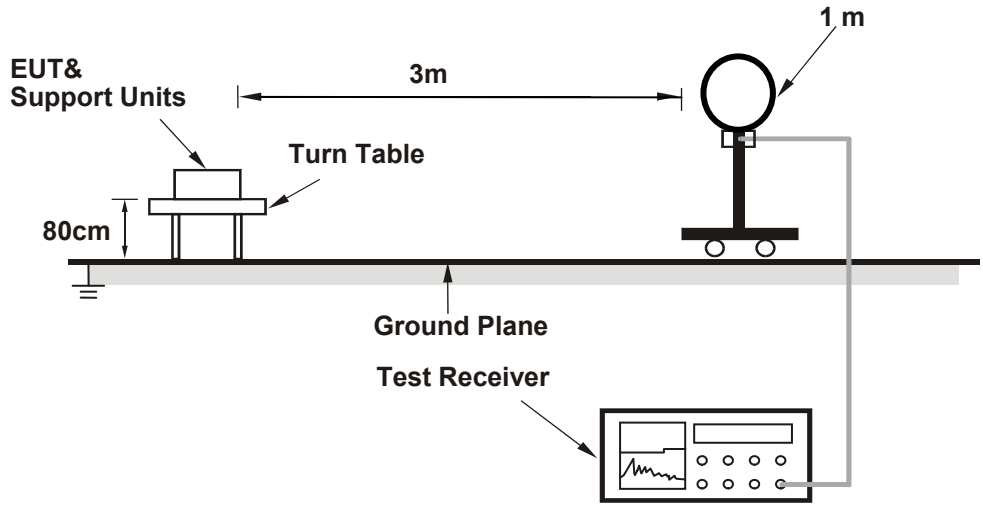
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

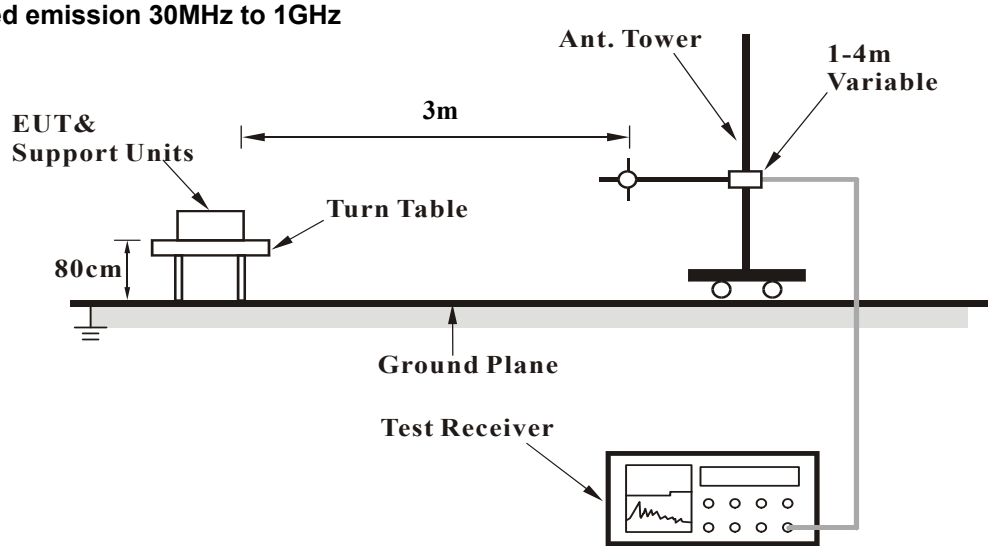
No deviation.

4.1.5 Test Setup

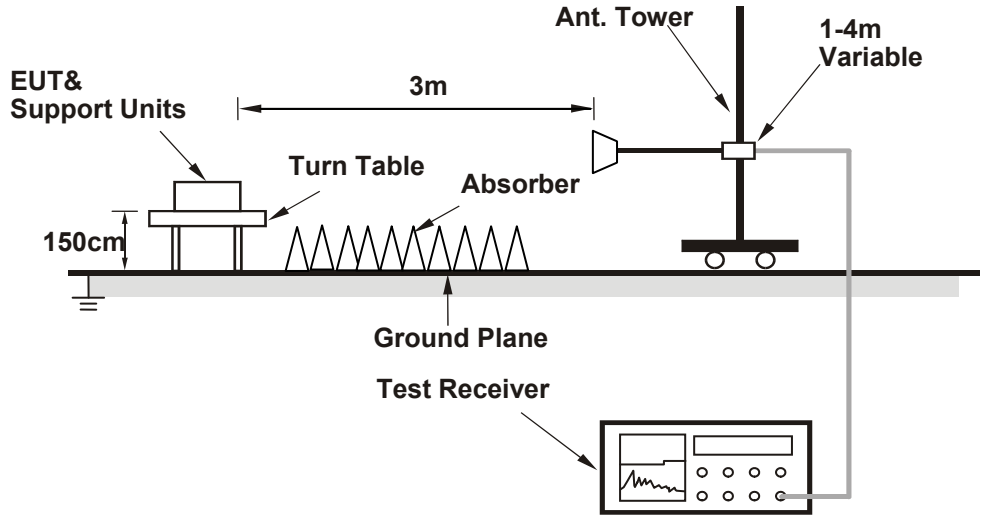
For Radiated emission below 30MHz



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 Conditions

a. Placed the EUT on the testing table.
b. Set the EUT under transmission condition continuously at specific channel frequency.
c. The necessary accessories enable the system in full functions.

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	72.5 PK	74.0	-1.5	1.67 H	176	68.9	3.6
2	**5150.00**	**52.8 AV**	**54.0**	**-1.2**	**1.67 H**	**176**	**49.2**	**3.6**
3	*5180.00	108.4 PK			1.79 H	179	68.9	39.5
4	*5180.00	97.3 AV			1.79 H	179	57.8	39.5
5	#10360.00	58.0 PK	74.0	-16.0	1.81 H	201	42.3	15.7
6	#10360.00	43.9 AV	54.0	-10.1	1.81 H	201	28.2	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.3 PK	74.0	-17.7	1.51 V	171	52.7	3.6
2	5150.00	42.4 AV	54.0	-11.6	1.51 V	171	38.8	3.6
3	*5180.00	96.6 PK			1.46 V	166	57.1	39.5
4	*5180.00	85.5 AV			1.46 V	166	46.0	39.5
5	#10360.00	58.3 PK	74.0	-15.7	1.89 V	200	42.6	15.7
6	#10360.00	43.8 AV	54.0	-10.2	1.89 V	200	28.1	15.7

Remarks:

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

CHANNEL	TX Channel 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	106.8 PK			2.12 H	178	67.3	39.5
2	*5200.00	96.2 AV			2.12 H	178	56.7	39.5
3	#10400.00	57.5 PK	74.0	-16.5	2.00 H	203	41.9	15.6
4	#10400.00	43.3 AV	54.0	-10.7	2.00 H	203	27.7	15.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	96.1 PK			1.29 V	166	56.6	39.5
2	*5200.00	85.3 AV			1.29 V	166	45.8	39.5
3	#10400.00	56.9 PK	74.0	-17.1	1.71 V	193	41.3	15.6
4	#10400.00	43.1 AV	54.0	-10.9	1.71 V	193	27.5	15.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	106.1 PK			2.35 H	181	66.6	39.5
2	*5240.00	96.2 AV			2.35 H	181	56.7	39.5
3	5350.00	54.9 PK	74.0	-19.1	2.11 H	203	51.0	3.9
4	5350.00	40.9 AV	54.0	-13.1	2.11 H	203	37.0	3.9
5	#10480.00	58.0 PK	74.0	-16.0	1.93 H	220	41.2	16.8
6	#10480.00	44.0 AV	54.0	-10.0	1.93 H	220	27.2	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	96.3 PK			1.33 V	160	56.8	39.5
2	*5240.00	85.8 AV			1.33 V	160	46.3	39.5
3	5350.00	56.9 PK	74.0	-17.1	1.55 V	171	53.0	3.9
4	5350.00	40.9 AV	54.0	-13.1	1.55 V	171	37.0	3.9
5	#10480.00	58.0 PK	74.0	-16.0	1.93 V	211	41.2	16.8
6	#10480.00	43.8 AV	54.0	-10.2	1.93 V	211	27.0	16.8

Remarks:

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

CHANNEL	TX Channel 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	#5648.00	54.5 PK	68.2	-13.7	1.14 H	158	50.2	4.3
2	*5745.00	108.5 PK			1.14 H	158	68.4	40.1
3	*5745.00	98.3 AV			1.14 H	158	58.2	40.1
4	#5964.00	55.4 PK	68.2	-12.8	1.14 H	158	50.4	5.0
5	11490.00	60.0 PK	74.0	-14.0	1.66 H	211	42.2	17.8
6	11490.00	47.3 AV	54.0	-6.7	1.66 H	211	29.5	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	#5600.80	55.7 PK	68.2	-12.5	1.21 V	208	51.5	4.2
2	*5745.00	97.7 PK			1.21 V	208	57.6	40.1
3	*5745.00	88.0 AV			1.21 V	208	47.9	40.1
4	#5929.60	56.5 PK	68.2	-11.7	1.21 V	208	51.5	5.0
5	11490.00	59.2 PK	74.0	-14.8	1.69 V	187	41.4	17.8
6	11490.00	47.0 AV	54.0	-7.0	1.69 V	187	29.2	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.

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	#5604.80	55.8 PK	68.2	-12.4	1.24 H	159	51.6	4.2
2	*5785.00	108.2 PK			1.22 H	158	67.9	40.3
3	*5785.00	97.8 AV			1.22 H	158	57.5	40.3
4	#5942.40	56.8 PK	68.2	-11.4	1.24 H	159	51.9	4.9
5	11570.00	59.9 PK	74.0	-14.1	1.87 H	253	41.8	18.1
6	11570.00	46.6 AV	54.0	-7.4	1.87 H	253	28.5	18.1
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	#5648.00	55.4 PK	68.2	-12.8	1.21 V	208	51.1	4.3
2	*5785.00	98.2 PK			1.21 V	208	57.9	40.3
3	*5785.00	88.2 AV			1.21 V	208	47.9	40.3
4	#5975.20	56.5 PK	68.2	-11.7	1.21 V	208	51.5	5.0
5	11570.00	60.1 PK	74.0	-13.9	1.66 V	187	42.0	18.1
6	11570.00	48.0 AV	54.0	-6.0	1.66 V	187	29.9	18.1

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 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	#5620.00	55.6 PK	68.2	-12.6	1.15 H	158	51.4	4.2
2	*5825.00	107.9 PK			1.15 H	158	67.4	40.5
3	*5825.00	97.4 AV			1.15 H	158	56.9	40.5
4	#5934.40	58.5 PK	68.2	-9.7	1.15 H	158	53.5	5.0
5	11650.00	60.2 PK	74.0	-13.8	1.93 H	269	42.5	17.7
6	11650.00	46.2 AV	54.0	-7.8	1.93 H	269	28.5	17.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5641.60	55.3 PK	68.2	-12.9	1.10 V	208	51.1	4.2
2	*5825.00	98.3 PK			1.10 V	208	57.8	40.5
3	*5825.00	88.0 AV			1.10 V	208	47.5	40.5
4	#5944.00	57.4 PK	68.2	-10.8	1.10 V	208	52.4	5.0
5	11650.00	60.3 PK	74.0	-13.7	1.69 V	156	42.6	17.7
6	11650.00	48.9 AV	54.0	-5.1	1.69 V	156	31.2	17.7

Remarks:

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

802.11n (HT20)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	70.3 PK	74.0	-3.7	2.06 H	179	66.7	3.6
2	**5150.00**	**52.8 AV**	**54.0**	**-1.2**	**2.06 H**	**179**	**49.2**	**3.6**
3	*5180.00	107.4 PK			2.14 H	181	67.9	39.5
4	*5180.00	96.7 AV			2.14 H	181	57.2	39.5
5	#10360.00	57.5 PK	74.0	-16.5	1.89 H	223	41.8	15.7
6	#10360.00	43.8 AV	54.0	-10.2	1.89 H	223	28.1	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	62.8 PK	74.0	-11.2	1.30 V	142	59.2	3.6
2	5150.00	44.9 AV	54.0	-9.1	1.30 V	142	41.3	3.6
3	*5180.00	97.5 PK			1.29 V	159	58.0	39.5
4	*5180.00	86.8 AV			1.29 V	159	47.3	39.5
5	#10360.00	57.8 PK	74.0	-16.2	1.77 V	203	42.1	15.7
6	#10360.00	44.2 AV	54.0	-9.8	1.77 V	203	28.5	15.7

Remarks:

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

CHANNEL	TX Channel 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	106.9 PK			1.95 H	181	67.4	39.5
2	*5200.00	96.4 AV			1.95 H	181	56.9	39.5
3	#10400.00	57.5 PK	74.0	-16.5	1.87 H	214	41.9	15.6
4	#10400.00	43.6 AV	54.0	-10.4	1.87 H	214	28.0	15.6
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	97.5 PK			1.03 V	147	58.0	39.5
2	*5200.00	86.9 AV			1.03 V	147	47.4	39.5
3	#10400.00	56.8 PK	74.0	-17.2	1.55 V	179	41.2	15.6
4	#10400.00	44.1 AV	54.0	-9.9	1.55 V	179	28.5	15.6

Remarks:

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

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	106.6 PK			2.00 H	185	67.1	39.5
2	*5240.00	95.7 AV			2.00 H	185	56.2	39.5
3	5350.00	54.9 PK	74.0	-19.1	1.89 H	191	51.0	3.9
4	5350.00	40.7 AV	54.0	-13.3	1.89 H	191	36.8	3.9
5	#10480.00	57.0 PK	74.0	-17.0	1.76 H	222	40.2	16.8
6	#10480.00	44.1 AV	54.0	-9.9	1.76 H	222	27.3	16.8
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	97.7 PK			1.27 V	148	58.2	39.5
2	*5240.00	87.0 AV			1.27 V	148	47.5	39.5
3	5350.00	54.8 PK	74.0	-19.2	1.33 V	159	50.9	3.9
4	5350.00	40.7 AV	54.0	-13.3	1.33 V	159	36.8	3.9
5	#10480.00	58.3 PK	74.0	-15.7	1.69 V	188	41.5	16.8
6	#10480.00	44.0 AV	54.0	-10.0	1.69 V	188	27.2	16.8

Remarks:

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

CHANNEL	TX Channel 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	#5623.20	55.3 PK	68.2	-12.9	1.10 H	159	51.1	4.2
2	*5745.00	108.5 PK			1.10 H	159	68.4	40.1
3	*5745.00	97.9 AV			1.10 H	159	57.8	40.1
4	#5935.20	56.7 PK	68.2	-11.5	1.10 H	159	51.8	4.9
5	11490.00	60.1 PK	74.0	-13.9	1.55 H	293	42.3	17.8
6	11490.00	46.5 AV	54.0	-7.5	1.55 H	293	28.7	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	#5627.20	55.4 PK	68.2	-12.8	1.22 V	208	51.2	4.2
2	*5745.00	98.3 PK			1.22 V	209	58.2	40.1
3	*5745.00	88.0 AV			1.22 V	209	47.9	40.1
4	#5966.40	57.0 PK	68.2	-11.2	1.22 V	208	52.0	5.0
5	11490.00	59.3 PK	74.0	-14.7	1.77 V	188	41.5	17.8
6	11490.00	47.5 AV	54.0	-6.5	1.77 V	188	29.7	17.8

Remarks:

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

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	#5644.80	55.9 PK	68.2	-12.3	1.16 H	158	51.6	4.3
2	*5785.00	108.1 PK			1.16 H	158	67.8	40.3
3	*5785.00	97.5 AV			1.16 H	158	57.2	40.3
4	#5967.20	57.0 PK	68.2	-11.2	1.16 H	158	52.0	5.0
5	11570.00	60.7 PK	74.0	-13.3	1.79 H	253	42.6	18.1
6	11570.00	46.9 AV	54.0	-7.1	1.79 H	253	28.8	18.1
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	#5617.60	55.6 PK	68.2	-12.6	1.22 V	209	51.4	4.2
2	*5785.00	98.7 PK			1.22 V	209	58.4	40.3
3	*5785.00	88.2 AV			1.22 V	209	47.9	40.3
4	#5962.40	56.6 PK	68.2	-11.6	1.22 V	209	51.6	5.0
5	11570.00	60.5 PK	74.0	-13.5	1.63 V	189	42.4	18.1
6	11570.00	47.7 AV	54.0	-6.3	1.63 V	189	29.6	18.1

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 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	#5636.00	55.4 PK	68.2	-12.8	1.14 H	158	51.2	4.2
2	*5825.00	108.1 PK			1.14 H	158	67.6	40.5
3	*5825.00	97.4 AV			1.14 H	158	56.9	40.5
4	#5940.80	56.1 PK	68.2	-12.1	1.14 H	158	51.2	4.9
5	11650.00	59.4 PK	74.0	-14.6	1.70 H	219	41.7	17.7
6	11650.00	46.0 AV	54.0	-8.0	1.70 H	219	28.3	17.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5625.60	55.7 PK	68.2	-12.5	1.11 V	209	51.5	4.2
2	*5825.00	98.2 PK			1.11 V	209	57.7	40.5
3	*5825.00	87.7 AV			1.11 V	209	47.2	40.5
4	#5951.20	57.2 PK	68.2	-11.0	1.11 V	209	52.2	5.0
5	11650.00	59.6 PK	74.0	-14.4	1.59 V	193	41.9	17.7
6	11650.00	47.8 AV	54.0	-6.2	1.59 V	193	30.1	17.7

Remarks:

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

802.11n (HT40)

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	69.8 PK	74.0	-4.2	2.01 H	183	66.2	3.6
2	5150.00	52.6 AV	54.0	-1.4	2.01 H	183	49.0	3.6
3	*5190.00	102.3 PK			2.03 H	181	62.8	39.5
4	*5190.00	91.7 AV			2.03 H	181	52.2	39.5
5	#10380.00	57.7 PK	74.0	-16.3	1.87 H	222	42.0	15.7
6	#10380.00	43.9 AV	54.0	-10.1	1.87 H	222	28.2	15.7
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.0 PK	74.0	-16.0	1.51 V	144	54.4	3.6
2	5150.00	43.8 AV	54.0	-10.2	1.51 V	144	40.2	3.6
3	*5190.00	93.3 PK			1.45 V	146	53.8	39.5
4	*5190.00	82.9 AV			1.45 V	146	43.4	39.5
5	#10380.00	56.9 PK	74.0	-17.1	1.77 V	213	41.2	15.7
6	#10380.00	43.7 AV	54.0	-10.3	1.77 V	213	28.0	15.7

Remarks:

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

CHANNEL	TX Channel 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	103.4 PK			2.11 H	180	63.9	39.5
2	*5230.00	92.8 AV			2.11 H	180	53.3	39.5
3	5350.00	54.4 PK	74.0	-19.6	2.03 H	199	50.5	3.9
4	5350.00	40.7 AV	54.0	-13.3	2.03 H	199	36.8	3.9
5	#10460.00	57.6 PK	74.0	-16.4	1.89 H	233	41.2	16.4
6	#10460.00	44.3 AV	54.0	-9.7	1.89 H	233	27.9	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	94.3 PK			1.23 V	146	54.8	39.5
2	*5230.00	83.8 AV			1.23 V	146	44.3	39.5
3	5350.00	54.6 PK	74.0	-19.4	1.33 V	150	50.7	3.9
4	5350.00	40.7 AV	54.0	-13.3	1.33 V	150	36.8	3.9
5	#10460.00	58.6 PK	74.0	-15.4	1.89 V	246	42.2	16.4
6	#10460.00	44.3 AV	54.0	-9.7	1.89 V	246	27.9	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) 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	#5621.60	55.9 PK	68.2	-12.3	1.20 H	158	51.7	4.2
2	*5755.00	105.1 PK			1.20 H	158	65.0	40.1
3	*5755.00	94.5 AV			1.20 H	158	54.4	40.1
4	#5925.60	56.9 PK	68.2	-11.3	1.20 H	158	52.0	4.9
5	11510.00	60.4 PK	74.0	-13.6	1.69 H	244	42.6	17.8
6	11510.00	47.1 AV	54.0	-6.9	1.69 H	244	29.3	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	#5636.00	55.8 PK	68.2	-12.4	1.11 V	216	51.6	4.2
2	*5755.00	95.2 PK			1.11 V	216	55.1	40.1
3	*5755.00	84.6 AV			1.11 V	216	44.5	40.1
4	#5938.40	56.8 PK	68.2	-11.4	1.11 V	216	51.9	4.9
5	11510.00	60.3 PK	74.0	-13.7	1.67 V	188	42.5	17.8
6	11510.00	48.0 AV	54.0	-6.0	1.67 V	188	30.2	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.

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	#5614.40	55.7 PK	68.2	-12.5	1.17 H	156	51.5	4.2
2	*5795.00	104.9 PK			1.17 H	156	64.6	40.3
3	*5795.00	94.1 AV			1.17 H	156	53.8	40.3
4	#5976.80	57.1 PK	68.2	-11.1	1.17 H	156	52.1	5.0
5	11590.00	60.9 PK	74.0	-13.1	1.99 H	263	42.9	18.0
6	11590.00	47.3 AV	54.0	-6.7	1.99 H	263	29.3	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	#5617.60	55.7 PK	68.2	-12.5	1.13 V	209	51.5	4.2
2	*5795.00	94.6 PK			1.13 V	209	54.3	40.3
3	*5795.00	84.5 AV			1.13 V	209	44.2	40.3
4	#5966.40	57.1 PK	68.2	-11.1	1.13 V	209	52.1	5.0
5	11590.00	60.1 PK	74.0	-13.9	1.66 V	189	42.1	18.0
6	11590.00	48.2 AV	54.0	-5.8	1.66 V	189	30.2	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.

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	67.1 PK	74.0	-6.9	2.17 H	180	63.5	3.6
2	5150.00	52.2 AV	54.0	-1.8	2.17 H	180	48.6	3.6
3	*5210.00	96.8 PK			2.12 H	180	57.3	39.5
4	*5210.00	86.0 AV			2.12 H	180	46.5	39.5
5	5350.00	54.7 PK	74.0	-19.3	2.11 H	190	50.8	3.9
6	5350.00	41.1 AV	54.0	-12.9	2.11 H	190	37.2	3.9
7	#10420.00	58.2 PK	74.0	-15.8	1.93 H	254	42.3	15.9
8	#10420.00	44.1 AV	54.0	-9.9	1.93 H	254	28.2	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	58.2 PK	74.0	-15.8	1.55 V	144	54.6	3.6
2	5150.00	44.4 AV	54.0	-9.6	1.55 V	144	40.8	3.6
3	*5210.00	87.5 PK			1.48 V	137	48.0	39.5
4	*5210.00	77.1 AV			1.48 V	137	37.6	39.5
5	5350.00	55.0 PK	74.0	-19.0	1.59 V	141	51.1	3.9
6	5350.00	40.6 AV	54.0	-13.4	1.59 V	141	36.7	3.9
7	#10420.00	57.3 PK	74.0	-16.7	1.71 V	193	41.4	15.9
8	#10420.00	43.8 AV	54.0	-10.2	1.71 V	193	27.9	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 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	**#5650.00**	**67.0 PK**	**68.2**	**-1.2**	**1.70 H**	**170**	**62.7**	**4.3**
2	#5652.00	63.4 PK	69.7	-6.3	1.70 H	161	59.1	4.3
3	*5775.00	102.0 PK			1.70 H	161	61.8	40.2
4	*5775.00	91.7 AV			1.70 H	161	51.5	40.2
5	#5936.80	58.6 PK	68.2	-9.6	1.70 H	161	53.7	4.9
6	11550.00	60.0 PK	74.0	-14.0	1.87 H	199	42.0	18.0
7	11550.00	46.5 AV	54.0	-7.5	1.87 H	199	28.5	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	#5603.20	56.2 PK	68.2	-12.0	1.19 V	215	52.0	4.2
2	#5650.00	57.9 PK	68.2	-10.3	1.22 V	220	53.6	4.3
3	*5775.00	91.3 PK			1.19 V	215	51.1	40.2
4	*5775.00	81.4 AV			1.19 V	215	41.2	40.2
5	#5972.00	56.4 PK	68.2	-11.8	1.19 V	215	51.4	5.0
6	11550.00	60.7 PK	74.0	-13.3	1.35 V	187	42.7	18.0
7	11550.00	20.0 AV	54.0	-34.0	1.35 V	187	2.0	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.

Below 1GHz Worst-Case Data: 802.11a

CHANNEL	TX Channel 36	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	199.05	37.6 QP	43.5	-5.9	1.00 H	233	54.4	-16.8
2	249.60	36.1 QP	46.0	-9.9	1.50 H	91	50.7	-14.6
3	550.97	36.3 QP	46.0	-9.7	1.50 H	182	44.9	-8.6
4	599.58	39.0 QP	46.0	-7.0	2.00 H	325	46.3	-7.3
5	650.13	41.0 QP	46.0	-5.0	1.00 H	182	47.6	-6.6
6	850.39	41.5 QP	46.0	-4.5	1.00 H	6	45.1	-3.6
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	33.79	33.8 QP	40.0	-6.2	2.00 V	305	49.7	-15.9
2	199.05	36.2 QP	43.5	-7.3	1.51 V	33	53.0	-16.8
3	249.60	34.2 QP	46.0	-11.8	1.51 V	245	48.8	-14.6
4	348.76	40.2 QP	46.0	-5.8	1.00 V	122	52.3	-12.1
5	650.13	41.4 QP	46.0	-4.6	1.51 V	271	48.0	-6.6
6	850.39	37.8 QP	46.0	-8.2	1.51 V	285	41.4	-3.6

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

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

Note: 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCS 30	100288	Aug. 17, 2017	Aug. 16, 2018
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond2-01	Sep. 08, 2017	Sep. 07, 2018
LISN ROHDE & SCHWARZ (EUT)	ESH2-Z5	100100	Jan. 17, 2017	Jan. 16, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 02, 2017	Aug. 01, 2018
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Shielded Room 2.
3. The VCCI Site Registration No. is C-2047.

4.2.3 Test Procedures

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

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

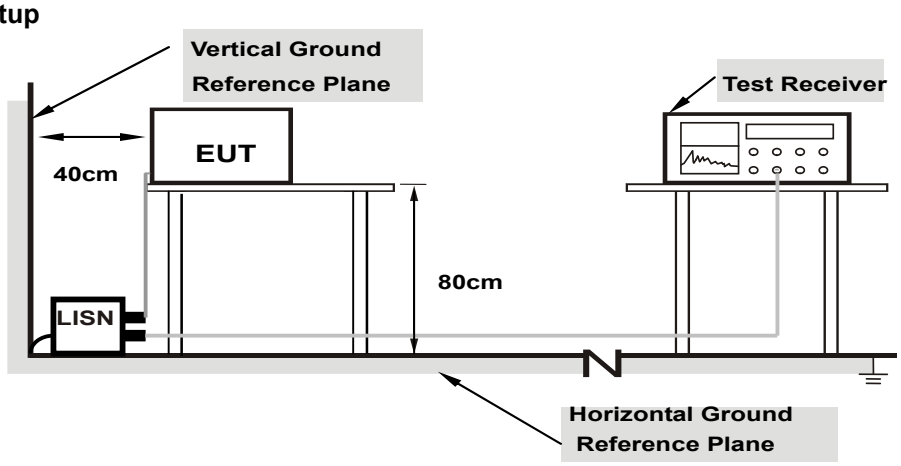
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

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

4.2.6 EUT Operating Conditions

Same as 4.1.6.

4.2.7 Test Results

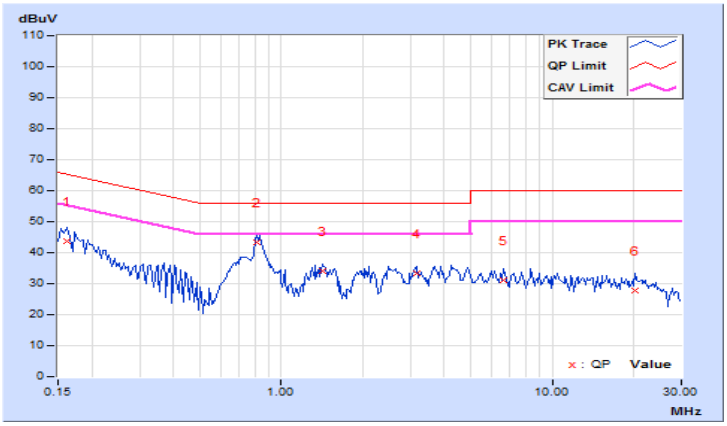
Worst-case data: 802.11a

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

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
	[MHz]	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16172	10.40	33.29	22.66	43.69	33.06	65.38	55.38	-21.69	-22.32
2	0.81406	10.46	32.82	29.18	43.28	39.64	56.00	46.00	-12.72	-6.36
3	1.41406	10.51	23.50	20.51	34.01	31.02	56.00	46.00	-21.99	-14.98
4	3.17969	10.58	22.74	18.56	33.32	29.14	56.00	46.00	-22.68	-16.86
5	6.64453	10.65	20.45	14.80	31.10	25.45	60.00	50.00	-28.90	-24.55
6	20.32813	10.88	16.79	12.33	27.67	23.21	60.00	50.00	-32.33	-26.79

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.

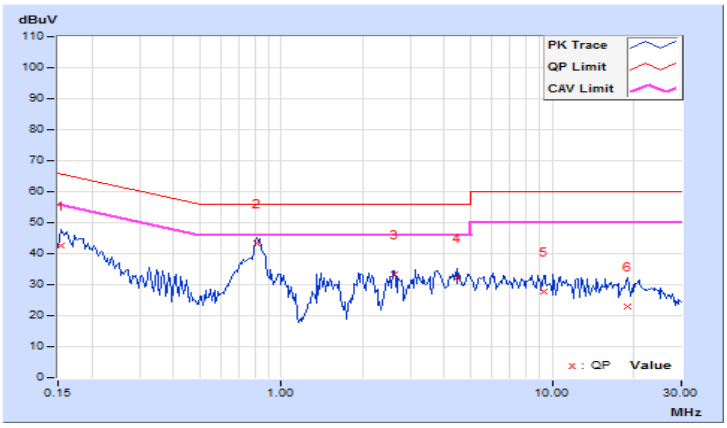


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)

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	10.43	32.24	18.94	42.67	29.37	65.79	55.79	-23.12	-26.42
2	**0.81016**	**10.46**	**32.80**	**29.52**	**43.26**	**39.98**	**56.00**	**46.00**	**-12.74**	**-6.02**
3	2.61328	10.52	22.64	18.76	33.16	29.28	56.00	46.00	-22.84	-16.72
4	4.43359	10.61	21.59	16.01	32.20	26.62	56.00	46.00	-23.80	-19.38
5	9.33984	10.65	17.10	11.15	27.75	21.80	60.00	50.00	-32.25	-28.20
6	18.96875	10.95	11.91	8.58	22.86	19.53	60.00	50.00	-37.14	-30.47

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

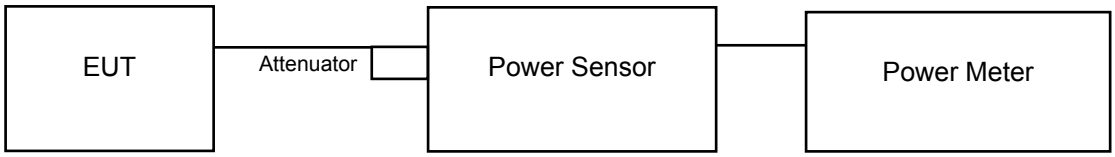
4.3.1 Limits of Transmit Power Measurement

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)

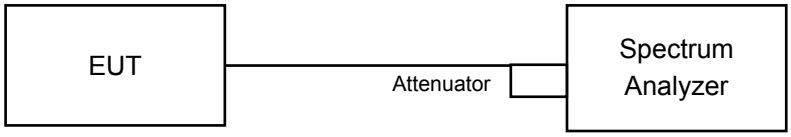
*B is the 26 dB emission bandwidth in megahertz

4.3.2 Test Setup

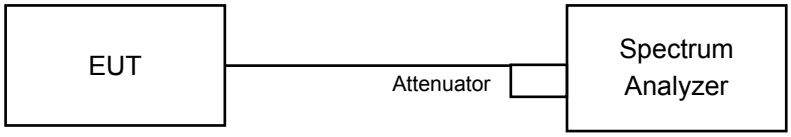
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40)



802.11ac (VHT80)



For Bandwidth



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11n (HT20), 802.11n (HT40)
Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

For 802.11ac (VHT80)
1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2) Set sweep trigger to “free run”.
3) Set RBW = 1 MHz.
4) Set VBW ≥ 3 MHz.
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (number of points in sweep) * T
7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
8) Detector = RMS.
9) Trace mode = max hold.
10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
11) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth
1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

4.3.5 Deviation from Test Standard

No deviation.

4.3.6 EUT Operating Conditions

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

4.3.7 Test Result

Power Output:

802.11a

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	24.210	13.84	24	Pass
40	5200	24.547	13.90	24	Pass
48	5240	24.434	13.88	24	Pass
149	5745	19.498	12.90	30	Pass
157	5785	19.679	12.94	30	Pass
165	5825	19.907	12.99	30	Pass

802.11n (HT20)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	**25.410**	14.05	24	Pass
40	5200	25.235	14.02	24	Pass
48	5240	25.177	14.01	24	Pass
149	5745	20.559	13.13	30	Pass
157	5785	**20.701**	13.16	30	Pass
165	5825	20.512	13.12	30	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	18.113	12.58	24	Pass
46	5230	21.979	13.42	24	Pass
151	5755	17.989	12.55	30	Pass
159	5795	18.239	12.61	30	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
42	5210	11.376	10.56	24	Pass
155	5775	19.999	13.01	30	Pass

26dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
36	5180	25.56
40	5200	20.22
48	5240	24.31

802.11n (HT20)

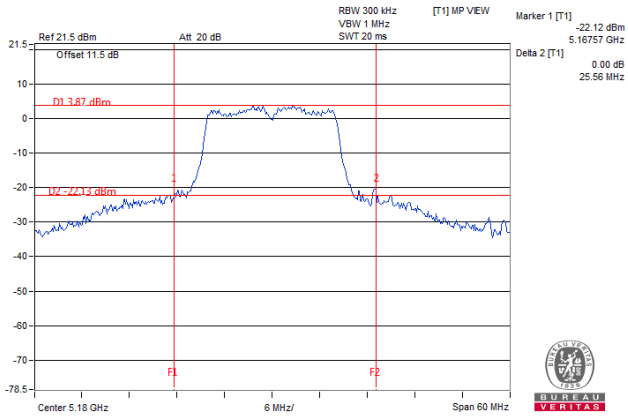
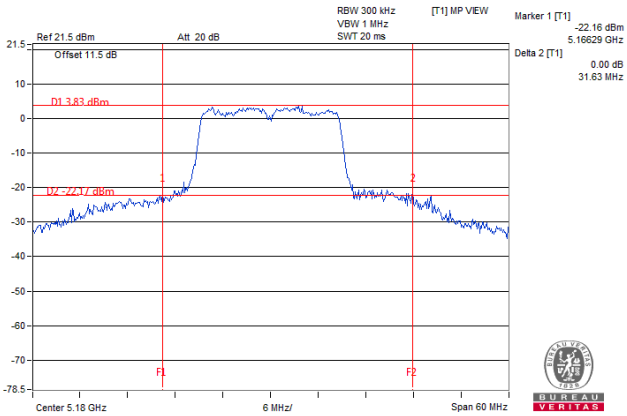
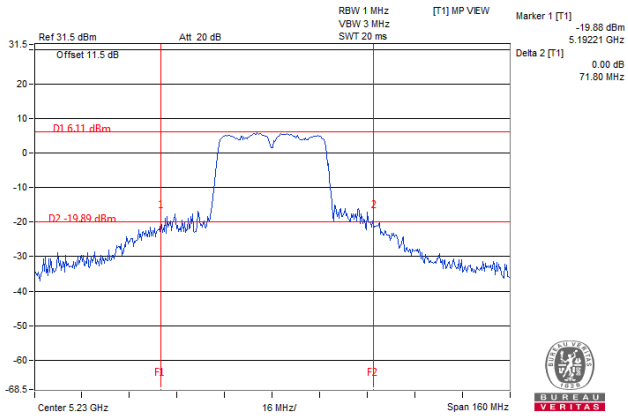
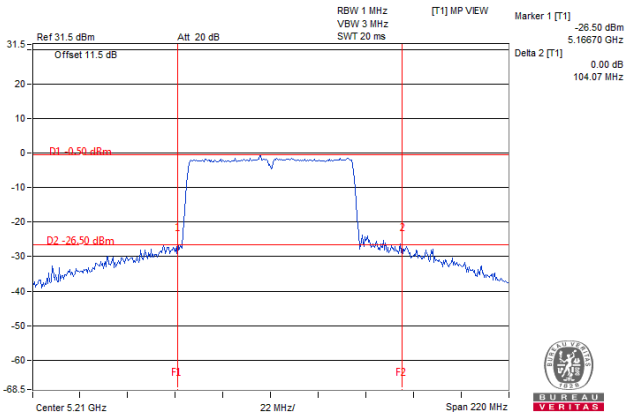
Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
36	5180	31.63
40	5200	30.44
48	5240	30.77

802.11n (HT40)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
38	5190	58.94
46	5230	71.80

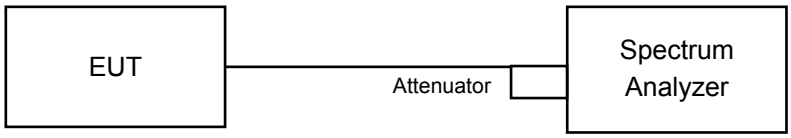
802.11ac (VHT80)

Channel	Frequency (MHz)	26dBc Bandwidth (MHz)
42	5210	104.07

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

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

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.04
40	5200	16.92
48	5240	16.80
149	5745	16.80
157	5785	17.04
165	5825	16.80

802.11n (HT20)

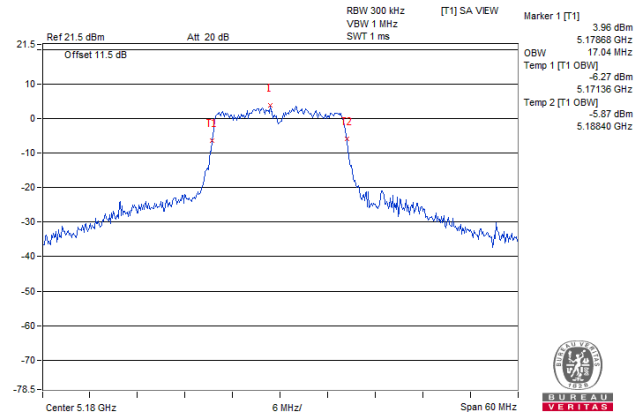
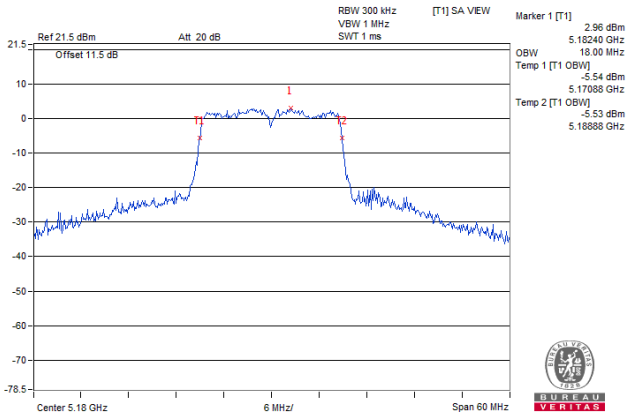
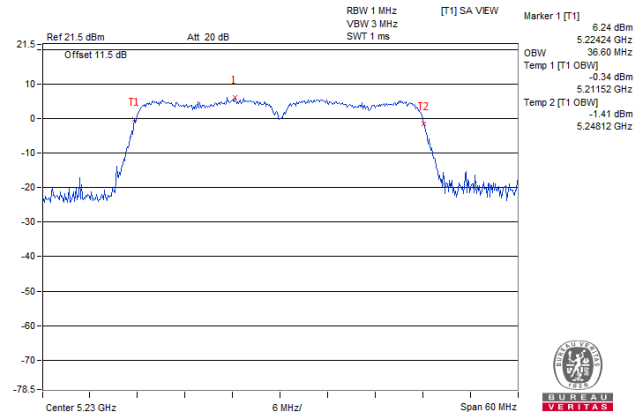
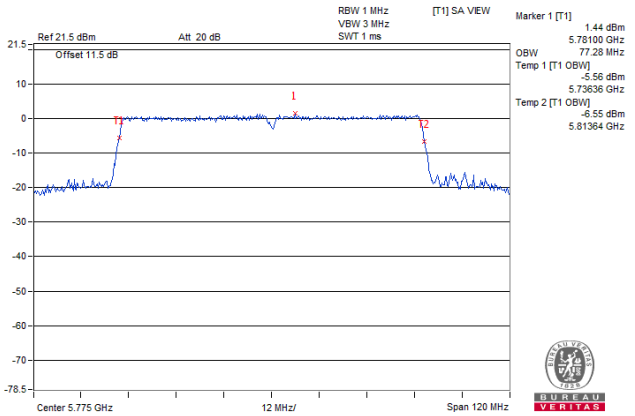
Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	18.00
40	5200	18.00
48	5240	18.00
149	5745	17.88
157	5785	18.00
165	5825	17.76

802.11n (HT40)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	36.48
46	5230	36.60
151	5755	36.60
159	5795	36.48

802.11ac (VHT80)

Channel	Frequency (MHz)	Occupied Bandwidth (MHz)
42	5210	76.08
155	5775	77.28

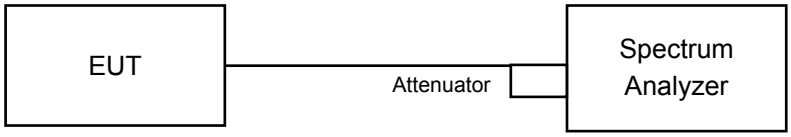
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

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

Duty cycle of test signal is < 98%
Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured 1) power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value.

Duty cycle of test signal is < 98%
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz)
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value 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 (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	-0.05	11	Pass
40	5200	-0.08	11	Pass
48	5240	-0.30	11	Pass

802.11n (HT20)

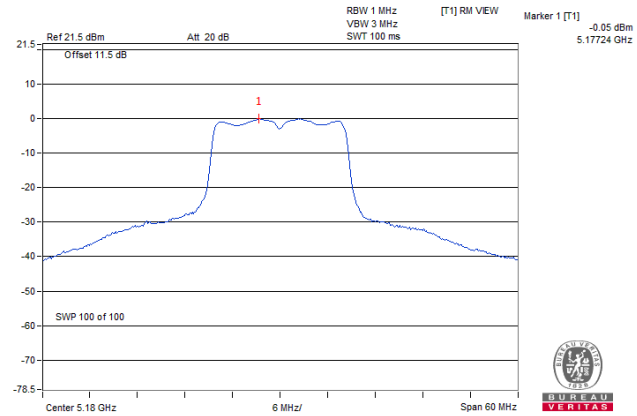
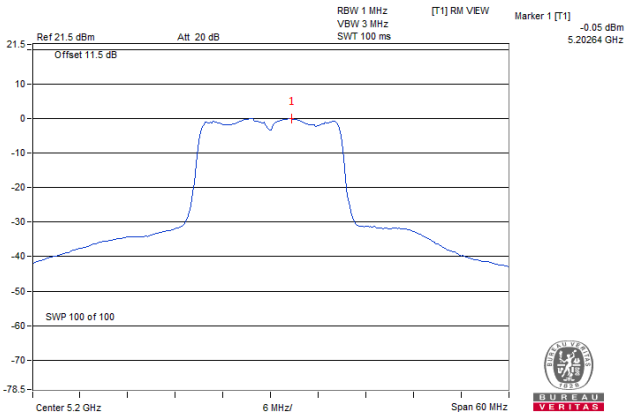
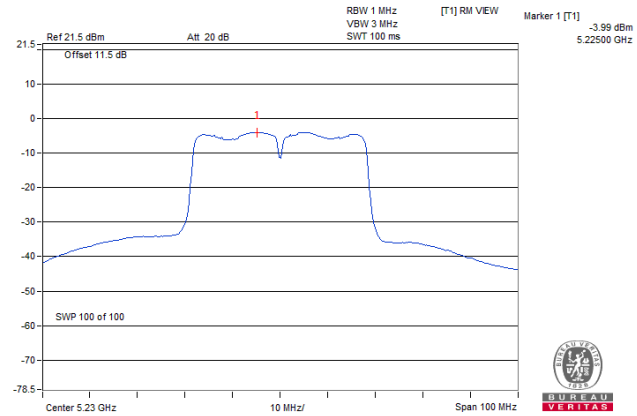
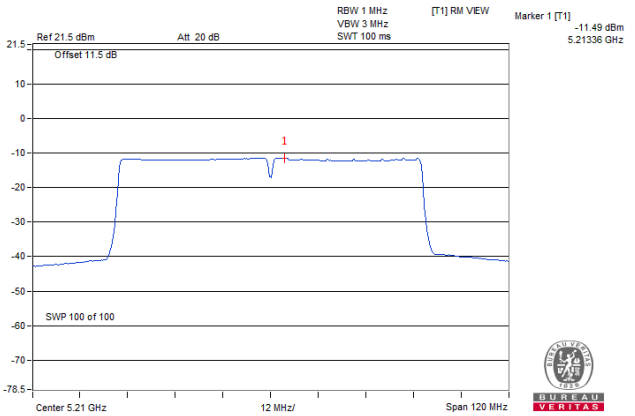
Chan.	Freq. (MHz)	PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
36	5180	-0.36	11	Pass
40	5200	-0.05	11	Pass
48	5240	-0.66	11	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
38	5190	-5.46	11	Pass
46	5230	-3.99	11	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD (dBm/MHz)	Max. Limit (dBm/MHz)	Pass / Fail
42	5210	-11.49	11	Pass

Spectrum Plot of Worst Value	
802.11a / CH 36	802.11n (HT20) / CH 40
	
802.11n (HT40) / CH 46	802.11ac (VHT80) / CH 42
	

For U-NII-3 band:

802.11a

Chan.	Freq. (MHz)	PSD W/O Duty Factor		Limit (dBm/500kHz)	Pass / Fail
		(dBm/300kHz)	(dBm/500kHz)		
149	5745	-10.55	-8.33	30	Pass
157	5785	-10.10	-7.88	30	Pass
165	5825	-9.91	-7.69	30	Pass

802.11n (HT20)

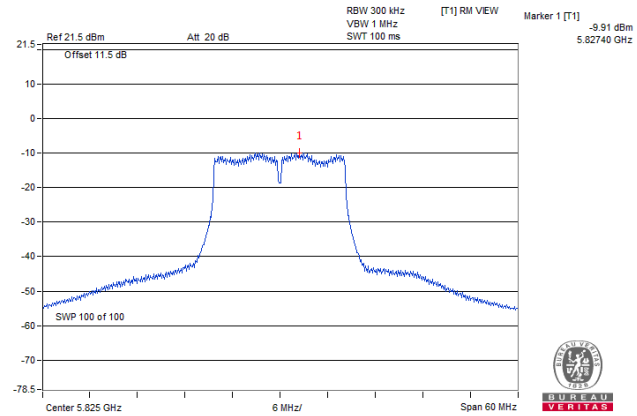
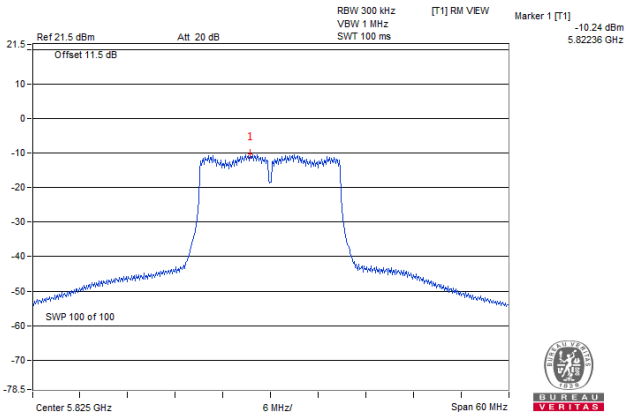
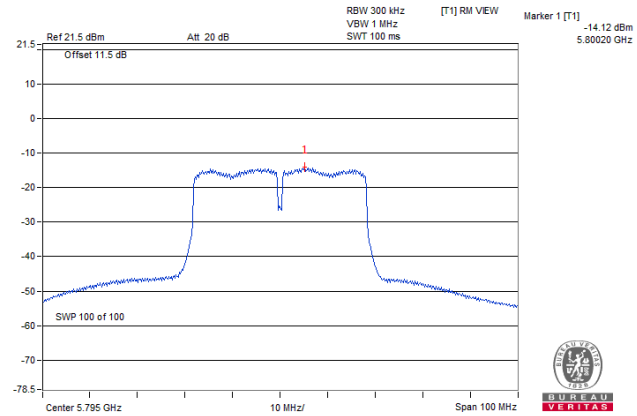
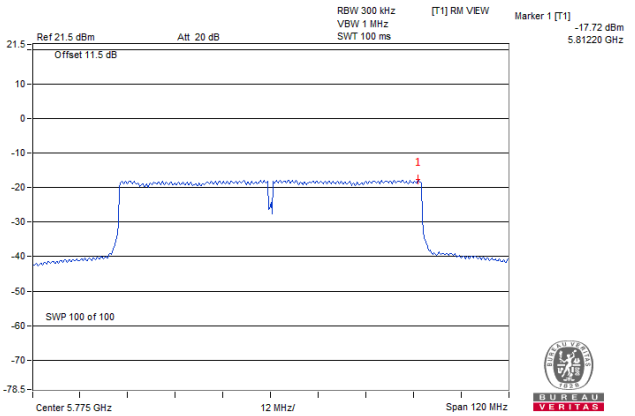
Chan.	Freq. (MHz)	PSD W/O Duty Factor		Limit (dBm/500kHz)	Pass / Fail
		(dBm/300kHz)	(dBm/500kHz)		
149	5745	-10.64	-8.42	30	Pass
157	5785	-10.25	-8.03	30	Pass
165	5825	-10.24	-8.02	30	Pass

802.11n (HT40)

Chan.	Freq. (MHz)	PSD W/O Duty Factor		Limit (dBm/500kHz)	Pass / Fail
		(dBm/300kHz)	(dBm/500kHz)		
151	5755	-14.27	-12.05	30	Pass
159	5795	-14.12	-11.90	30	Pass

802.11ac (VHT80)

Chan.	Freq. (MHz)	PSD W/O Duty Factor		Limit (dBm/500kHz)	Pass / Fail
		(dBm/300kHz)	(dBm/500kHz)		
155	5775	-17.72	-15.50	30	Pass

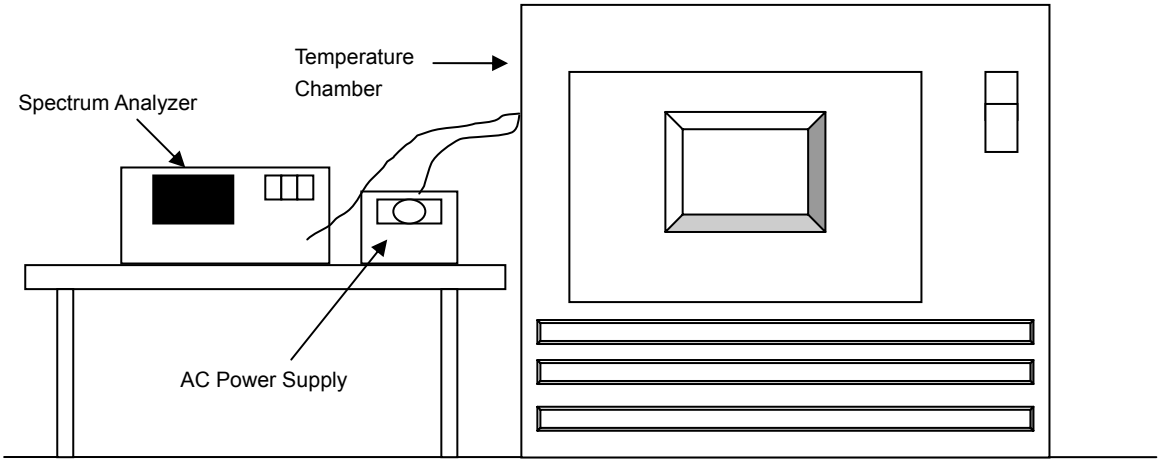
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

4.6 Frequency Stability

4.6.1 Limits of Frequency Stability Measurement

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

4.6.2 Test Setup



4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.6.4 Test Procedure

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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5180.0145	0.00028	5180.0162	0.00031	5180.0180	0.00035	5180.0161	0.00031
40	120	5179.9973	-0.00005	5179.9994	-0.00001	5179.9971	-0.00006	5179.9965	-0.00007
30	120	5179.9757	-0.00047	5179.9781	-0.00042	5179.9749	-0.00048	5179.9786	-0.00041
20	120	5180.0014	0.00003	5180.0027	0.00005	5179.9986	-0.00003	5180.0035	0.00007
10	120	5179.9743	-0.00050	5179.9765	-0.00045	5179.9745	-0.00049	5179.9754	-0.00047
0	120	5180.0135	0.00026	5180.0123	0.00024	5180.0118	0.00023	5180.0151	0.00029
-10	120	5179.9838	-0.00031	5179.9822	-0.00034	5179.9828	-0.00033	5179.9842	-0.00031
-20	120	5179.9995	-0.00001	5180.0007	0.00001	5180.0004	0.00001	5179.9992	-0.00002
-30	120	5180.0153	0.00030	5180.0116	0.00022	5180.0115	0.00022	5180.0122	0.00024

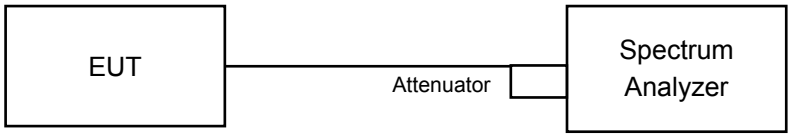
Frequency Stability Versus Voltage									
Operating Frequency: 5180MHz									
Temp. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5180.0017	0.00003	5180.0026	0.00005	5179.9992	-0.00002	5180.0042	0.00008
	120	5180.0014	0.00003	5180.0027	0.00005	5179.9986	-0.00003	5180.0035	0.00007
	102	5180.0021	0.00004	5180.0030	0.00006	5179.9985	-0.00003	5180.0030	0.00006

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

Measurement Procedure REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.62	0.5	Pass
157	5785	16.62	0.5	Pass
165	5825	16.62	0.5	Pass

802.11n (HT20)

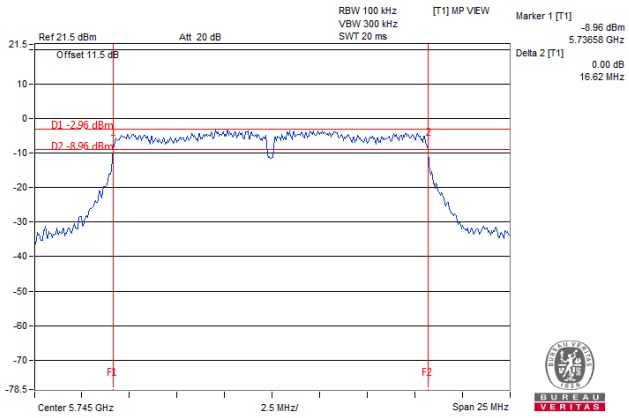
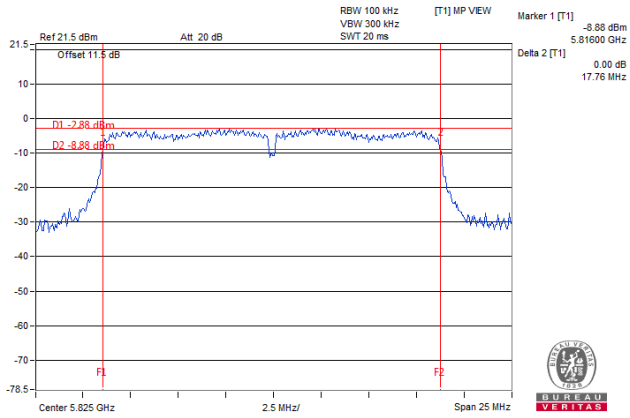
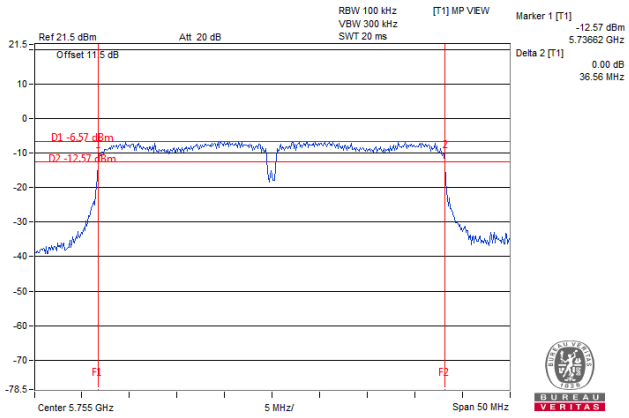
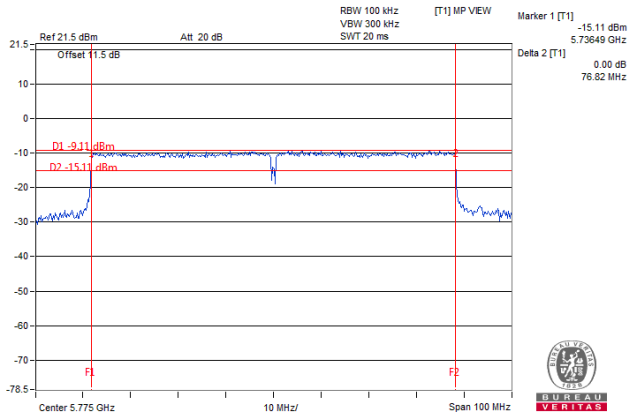
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.72	0.5	Pass
157	5785	17.68	0.5	Pass
165	5825	17.76	0.5	Pass

802.11n (HT40)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	36.56	0.5	Pass
159	5795	36.46	0.5	Pass

802.11ac (VHT80)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
155	5775	76.82	0.5	Pass

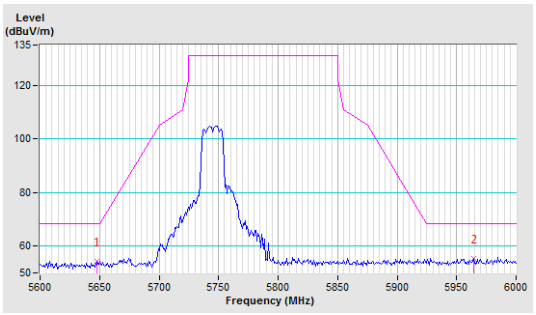
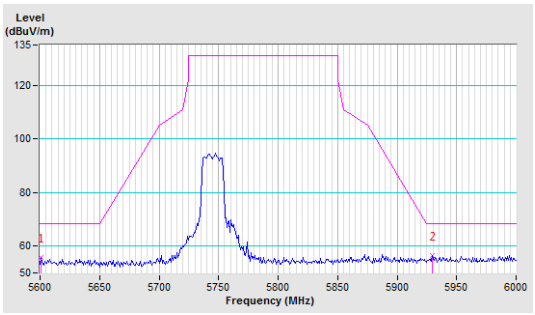
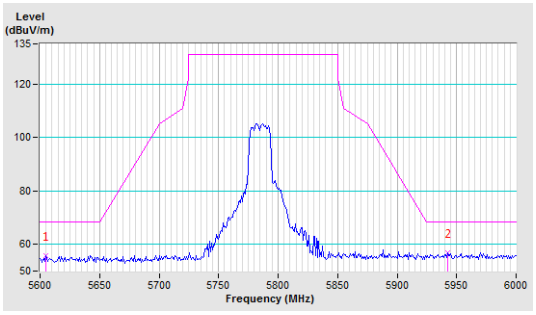
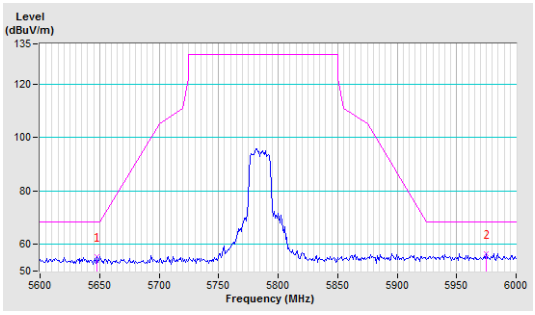
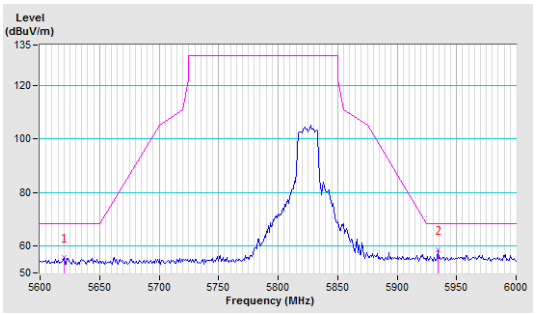
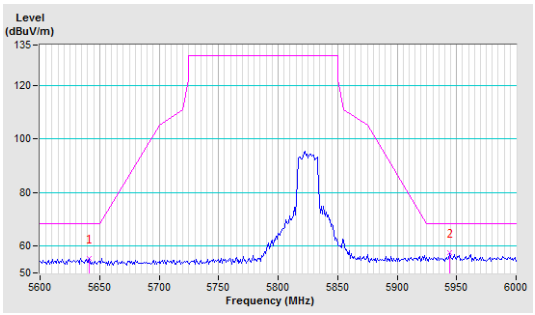
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	802.11ac (VHT80)
	

5 Pictures of Test Arrangements

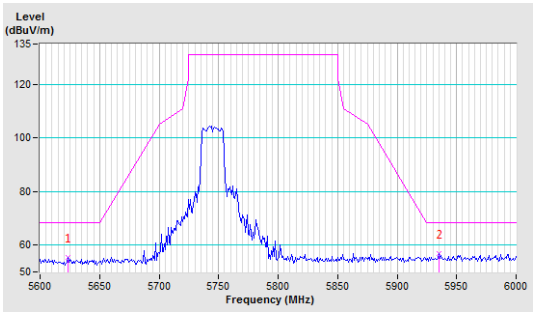
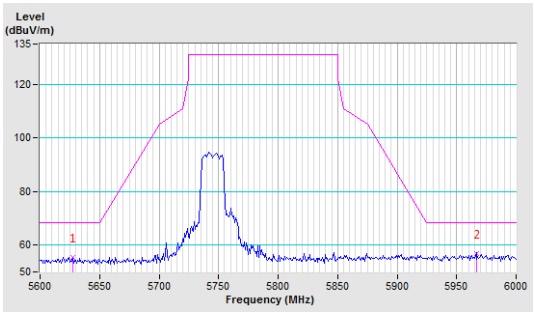
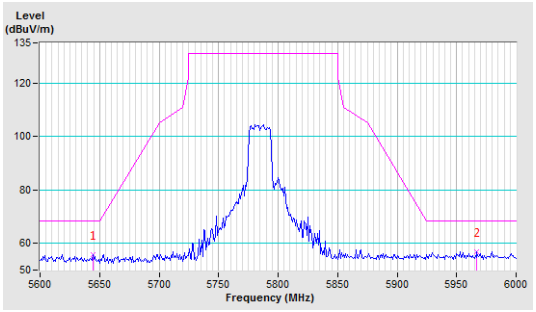
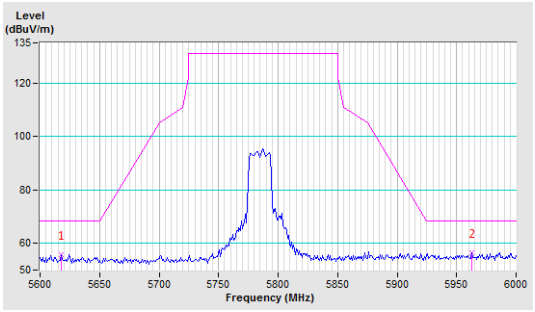
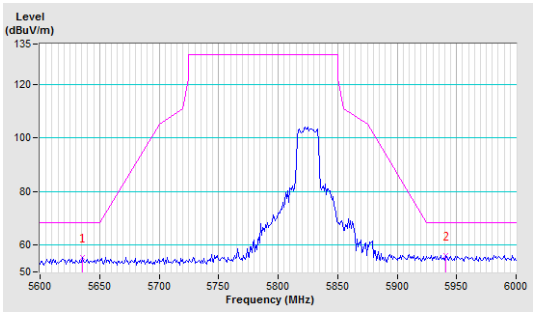
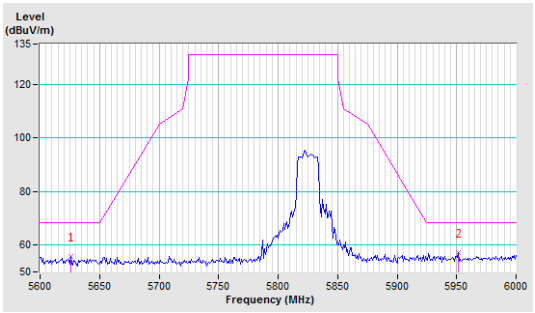
Please refer to the attached file (Test Setup Photo).

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

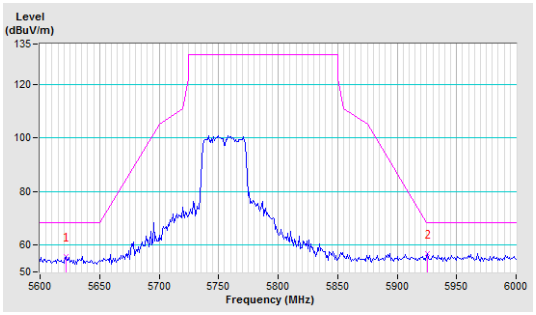
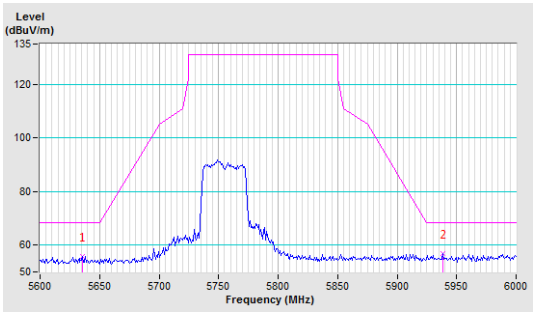
802.11a

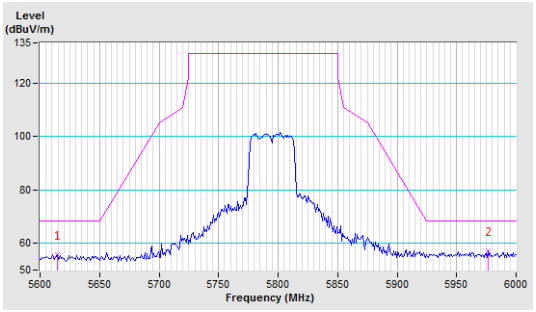
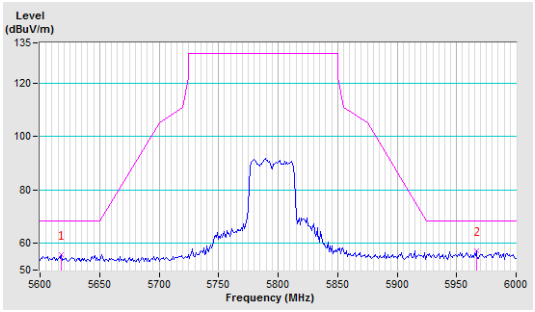
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT20)

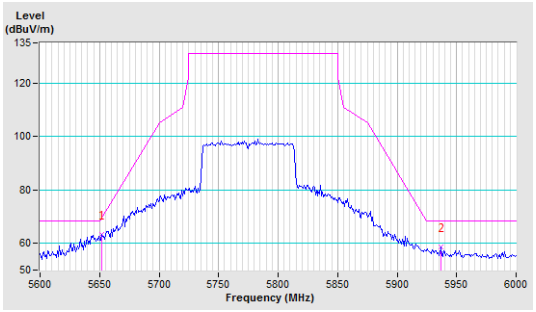
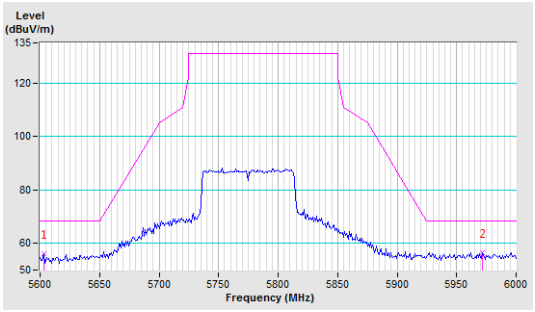
CH149	
Horizontal	Vertical
	
CH157	
Horizontal	Vertical
	
CH165	
Horizontal	Vertical
	

802.11n (HT40)

CH151	
Horizontal	Vertical
	

CH159	
Horizontal	Vertical
	

802.11ac (VHT80)

CH155	
Horizontal	Vertical
	

Appendix – Information 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.

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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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