FCC Test Report

Report No.:	RF190409D12
FCC ID:	EMJOORBIPRIME
Test Model:	Orbi Prime
Received Date:	Apr. 9, 2019
Test Date:	Apr. 25 to May 14, 2019
Issued Date:	May 14, 2019
Applicant:	PRIMAX ELECTRONICS LTD.
Address:	No. 669, Ruey Kuang Road, Neihu, Taipei, Taiwan, R.O.C.
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.)
FCC Registration / Designation Number:	198487 / TW2021

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF190409D12	Original release.	May 14, 2019

1 Certificate of Conformity

Product:	360° Video Recording Eyewear
Brand:	Orbi
Test Model:	Orbi Prime
Sample Status:	Engineering sample
Applicant:	PRIMAX ELECTRONICS LTD.
Test Date:	Apr. 25 to May 14, 2019
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 RF characteristics under the conditions specified in this report.

Prepared by : Annie Chang , **Date:** May 14, 2019

Annie Chang / Senior Specialist

Approved by : Rex. Lai , **Date:** May 14, 2019

Rex Lai / Associate Technical 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 -5.75dB at 0.15000MHz.
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 -9.17dB at 10480.00MHz.
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 U.FL not a standard connector.

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

Note:
Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.77 dB
Radiated Emissions up to 1 GHz	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1000MHz	5.43 dB
Radiated Emissions above 1 GHz	Above 1GHz	5.42 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	360° Video Recording Eyewear
Brand	Orbi
Test Model	Orbi Prime
Status of EUT	Engineering sample
Power Supply Rating	3.7Vdc from battery or 5Vdc from USB port
Modulation Type	64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	OFDM
Transfer Rate	802.11a: 54/48/36/24/18/12/9/6Mbps 802.11ac: up to 150Mbps
Operating Frequency	5180 ~ 5240MHz, 5745 ~ 5825MHz
Number of Channel	**5180 ~ 5240MHz** 4 for 802.11a, 802.11ac (20MHz) 2 for 802.11ac (40MHz) **5745 ~ 5825MHz** 5 for 802.11a, 802.11ac (20MHz) 2 for 802.11ac (40MHz)
Output Power	**5180 ~ 5240MHz:** 9.954mW **5745 ~ 5825MHz:** 9.908mW
Antenna Type	Printed antenna with 2.53dBi gain
Antenna Connector	U.FL
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

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

Modulation Mode	TX FUNCTION
802.11a	1TX
802.11ac (20MHz)	1TX
802.11ac (40MHz)	1TX

2. The above EUT information is declared by manufacturer and for more detailed features description, please refers 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, 802.11ac (20MHz):

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

2 channels are provided for 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

FOR 5745 ~ 5825MHz:

5 channels are provided for 802.11a, 802.11ac (20MHz):

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

2 channels are provided for 802.11ac (40MHz):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	-	√	Operating Mode (EUT Stand-alone)
B	-	-	√	-	Charging Mode (Powered from Notebook)
C	-	-	√	-	Charging Mode (Powered from Adapter)

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

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

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
	802.11ac (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
	802.11ac (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
	802.11ac (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

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

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

EUT Configure Mode	Mode	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	40	OFDM	BPSK	6
	802.11a	5745-5825	149 to 165		OFDM	BPSK	6

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
B & C	-	-	-	-	-	-	-

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	FREQ. Band (MHz)	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
A	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6
	802.11ac (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	6.5
	802.11ac (40MHz)		38 to 46	38, 46	OFDM	BPSK	13.5
	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6
	802.11ac (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	6.5
	802.11ac (40MHz)		151 to 159	151, 159	OFDM	BPSK	13.5

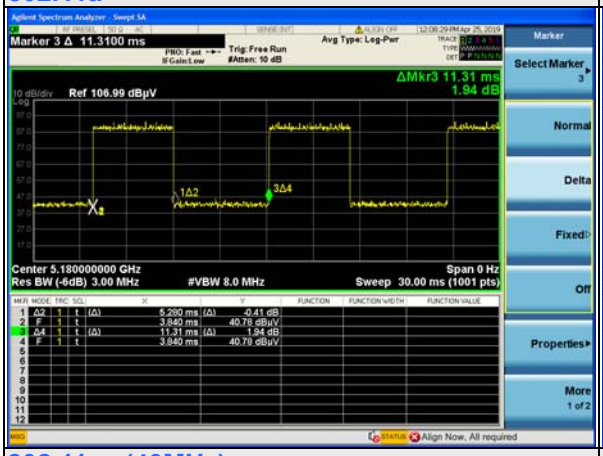
Test Condition:

Applicable To	EUT Configure Mode	Environmental Conditions	Input Power	Tested By
RE≥1G	A	20deg. C, 65%RH	3.7Vdc	Dalen Dai
RE<1G	A	20deg. C, 65%RH	3.7Vdc	Dalen Dai
PLC	B	23deg. C, 79%RH	120Vac, 60Hz (System)	Starltaly Wu
	C	23deg. C, 79%RH	120Vac, 60Hz (Adapter)	Starltaly Wu
APCM	A	25deg. C, 76%RH	3.7Vdc	Saxon Lee

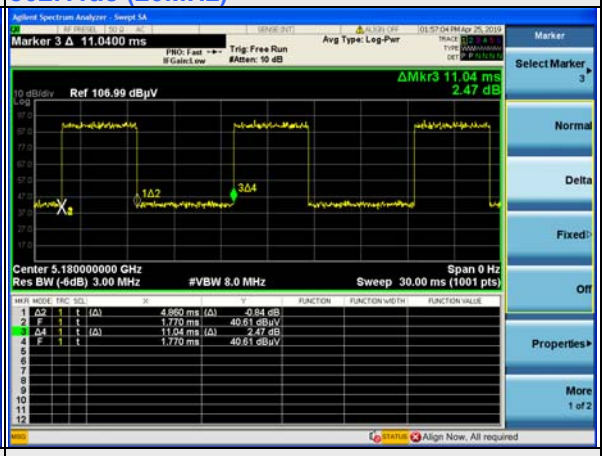
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is < 98 %, duty factor is required
802.11a: Duty cycle = 5.28/11.31 = 0.467, Duty factor = 10 * log(1/0.467) = 3.31
802.11ac (20MHz): Duty cycle = 4.86/11.04 = 0.440, Duty factor = 10 * log(1/0.440) = 3.56
802.11ac (40MHz): Duty cycle = 2.4/11.01 = 0.218, Duty factor = 10 * log(1/0.218) = 6.62

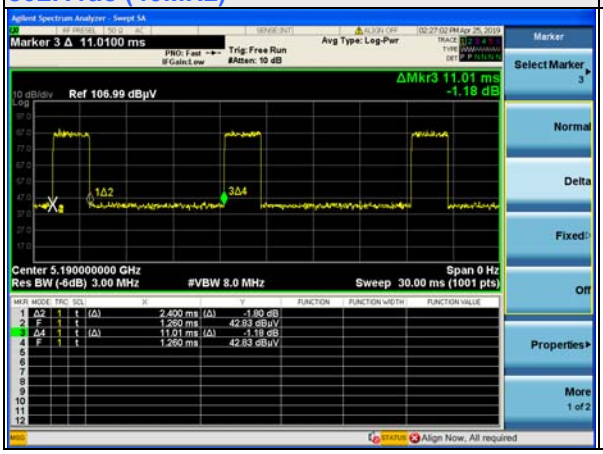
802.11a



802.11ac (20MHz)



802.11ac (40MHz)



3.4 Description of Support Units

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

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook PC	SONY	SVS151A12P	275548477000760	FCC DoC Approved	Provided by Lab
B.	Adapter	HTC	TC U250	N/A	N/A	Provided by Lab

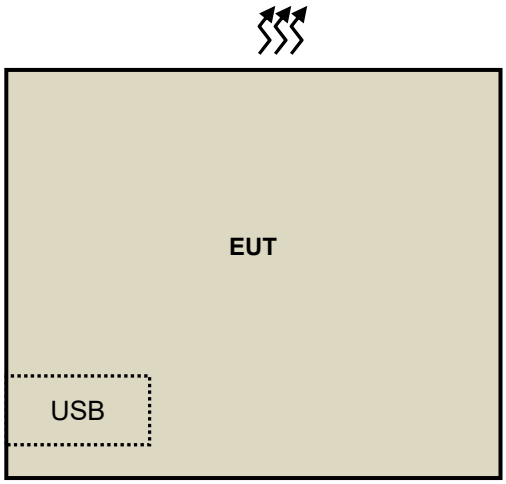
Note: All power cords of the above support units are non-shielded (1.8m).

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	USB cable	1	0.9	Y	0	Provided by Lab

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

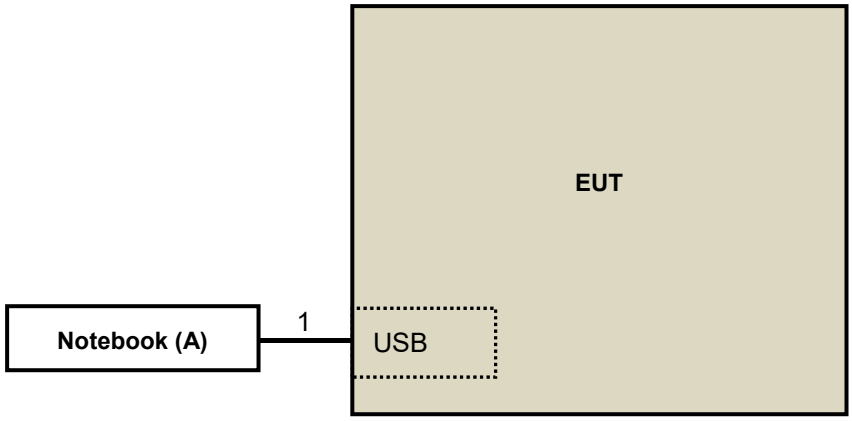
3.4.1 Configuration of System under Test

Mode A:



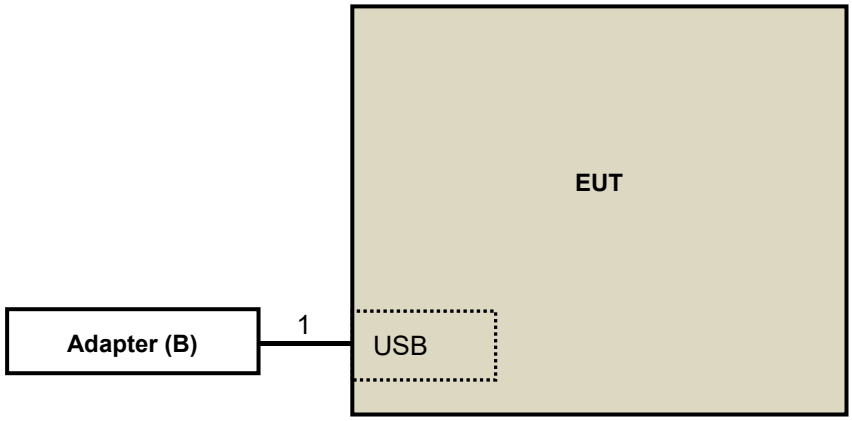
(Powered from battery)

Mode B:



(Powered from host equipment)

Mode C:



(Powered from Adapter)

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 v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Radiated Emission and Bandedge Measurement

4.1.1 Limits of Radiated Emission and Bandedge Measurement

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

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

NOTE:

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

Limits of unwanted emission out of the restricted bands

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

Note:

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

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

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
HP Preamplifier	8447D	2432A03504	Feb. 20, 2019	Feb. 19, 2020
HP Preamplifier	8449B	3008A01201	Feb. 21, 2019	Feb. 20, 2020
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 20, 2019	Feb. 19, 2020
Agilent TEST RECEIVER	N9038A	MY51210129	Mar. 05, 2019	Mar. 04, 2020
Schwarzbeck Antenna	VULB 9168	139	Nov. 26, 2018	Nov. 25, 2019
Schwarzbeck Antenna	VHBA 9123	480	May 19, 2017	May 18, 2019
Schwarzbeck Horn Antenna	BBHA-9170	212	Nov. 25, 2018	Nov. 24, 2019
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Nov. 25, 2018	Nov. 24, 2019
ADT. Turn Table	TT100	0306	NA	NA
ADT. Tower	AT100	0306	NA	NA
Software	Radiated_V7.6.15.9.5	NA	NA	NA
SUHNER RF cable With 4dB PAD	SF102	Cable-CH6-01	Aug. 13, 2018	Aug. 12, 2019
SUHNER RF cable With 3/4dB PAD	SF102	Cable-CH8-3.6m	Aug. 13, 2018	Aug. 12, 2019
KEYSIGHT MIMO Powermeasurement Test set	U2021XA	U2021XA-001	Jun. 4, 2018	Jun. 3, 2019
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Aug. 3, 2018	Aug. 2, 2019
Loop Antenna EMCI	LPA600	270	Aug. 11, 2017	Aug. 10, 2019
EMCO Horn Antenna	3115	00028257	Nov. 25, 2018	Nov. 24, 2019
Highpass filter Wainwright Instruments	WHK 3.1/18G-10SS	SN 8	NA	NA
ROHDE & SCHWARZ Spectrum Analyzer	FSV40	101042	Sep. 27, 2018	Sep. 26, 2019
Anritsu Power Sensor	MA2411B	0738404	Apr. 16, 2019	Apr. 15, 2020
Anritsu Power Meter	ML2495A	0842014	Apr. 16, 2019	Apr. 15, 2020

NOTE: 1. The calibration interval of the above test instruments is 12/24 months. And the calibrations are traceable to NML/ROC and NIST/USA.
2. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in Chamber No. 6.

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

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

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

NOTE:

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

For Radiated emission above 30MHz

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

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

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

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

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

f. The test-receiver system was set to peak and average detects 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:

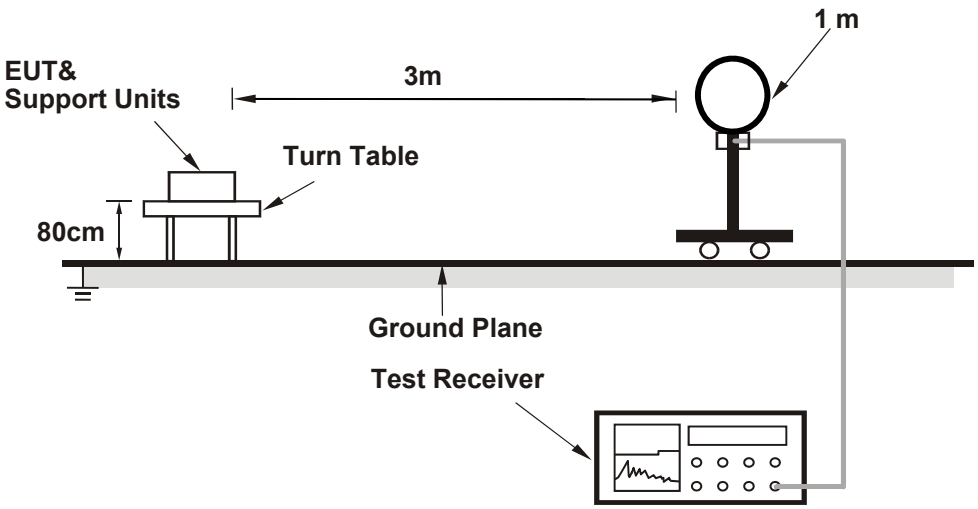
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

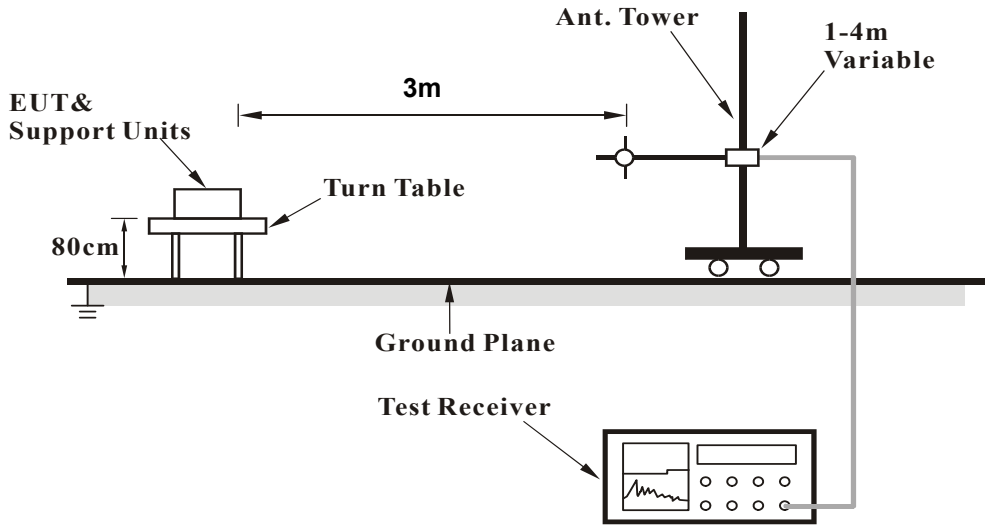
No deviation.

4.1.5 Test Setup

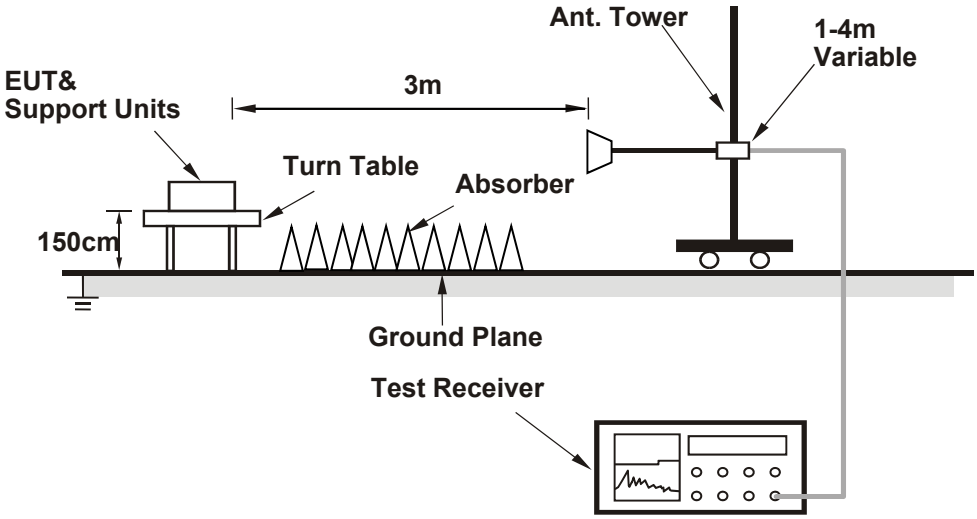
For Radiated emission below 30MHz



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

Set the EUT under transmission condition continuously at specific channel frequency.

4.1.7 Test Results

Mode A

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	49.17 PK	74.00	-24.83	3.30 H	263	41.96	7.21
2	5150.00	38.90 AV	54.00	-15.10	3.30 H	263	31.69	7.21
3	*5180.00	90.27 PK			3.30 H	263	83.02	7.25
4	*5180.00	79.92 AV			3.30 H	263	72.67	7.25
5	#10360.00	57.83 PK	68.20	-10.37	1.83 H	354	40.69	17.14
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	50.16 PK	74.00	-23.84	1.53 V	260	42.95	7.21
2	5150.00	39.17 AV	54.00	-14.83	1.53 V	260	31.96	7.21
3	*5180.00	96.42 PK			1.53 V	260	89.17	7.25
4	*5180.00	85.98 AV			1.53 V	260	78.73	7.25
5	#10360.00	58.43 PK	68.20	-9.77	1.62 V	159	41.29	17.14

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	90.53 PK			3.41 H	255	83.27	7.26
2	*5200.00	80.20 AV			3.41 H	255	72.94	7.26
3	#10400.00	57.92 PK	68.20	-10.28	1.88 H	349	40.58	17.34
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	96.93 PK			1.45 V	257	89.67	7.26
2	*5200.00	86.64 AV			1.45 V	257	79.38	7.26
3	#10400.00	58.69 PK	68.20	-9.51	1.74 V	135	41.35	17.34

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	90.07 PK			3.35 H	261	83.11	6.96
2	*5240.00	79.90 AV			3.35 H	261	72.94	6.96
3	5350.00	49.19 PK	74.00	-24.81	3.35 H	261	41.82	7.37
4	5350.00	38.83 AV	54.00	-15.17	3.35 H	261	31.46	7.37
5	#10480.00	58.43 PK	68.20	-9.77	1.94 H	353	40.73	17.70
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	96.44 PK			1.50 V	259	89.48	6.96
2	*5240.00	85.19 AV			1.50 V	259	78.23	6.96
3	5350.00	49.95 PK	74.00	-24.05	1.50 V	259	42.58	7.37
4	5350.00	39.08 AV	54.00	-14.92	1.50 V	259	31.71	7.37
5	#10480.00	58.93 PK	68.20	-9.27	1.66 V	142	41.23	17.70

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5588.48	51.66 PK	68.20	-16.54	3.31 H	349	41.29	10.37
2	*5745.00	99.78 PK			3.31 H	349	89.39	10.39
3	*5745.00	89.37 AV			3.31 H	349	78.98	10.39
4	#5942.35	53.53 PK	68.20	-14.67	3.31 H	349	42.73	10.80
5	11490.00	55.81 PK	74.00	-18.19	2.36 H	194	39.44	16.37
6	11490.00	43.25 AV	54.00	-10.75	2.36 H	194	26.88	16.37
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	#5627.90	52.01 PK	68.20	-16.19	1.16 V	259	41.73	10.28
2	*5745.00	103.08 PK			1.16 V	259	92.69	10.39
3	*5745.00	92.81 AV			1.16 V	259	82.42	10.39
4	#5996.50	53.47 PK	68.20	-14.73	1.16 V	259	42.57	10.90
5	11490.00	56.40 PK	74.00	-17.60	1.20 V	252	40.03	16.37
6	11490.00	44.14 AV	54.00	-9.86	1.20 V	252	27.77	16.37

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5601.77	51.68 PK	68.20	-16.52	3.27 H	352	41.31	10.37
2	*5785.00	99.97 PK			3.27 H	352	89.52	10.45
3	*5785.00	89.64 AV			3.27 H	352	79.19	10.45
4	#5930.00	53.17 PK	68.20	-15.03	3.27 H	352	42.40	10.77
5	11570.00	55.68 PK	74.00	-18.32	2.29 H	188	39.26	16.42
6	11570.00	43.15 AV	54.00	-10.85	2.29 H	188	26.73	16.42
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	#5630.27	52.43 PK	68.20	-15.77	1.13 V	266	42.15	10.28
2	*5785.00	103.29 PK			1.13 V	266	92.84	10.45
3	*5785.00	93.15 AV			1.13 V	266	82.70	10.45
4	#5991.27	53.58 PK	68.20	-14.62	1.13 V	266	42.69	10.89
5	11570.00	56.81 PK	74.00	-17.19	1.34 V	257	40.39	16.42
6	11570.00	44.32 AV	54.00	-9.68	1.34 V	257	27.90	16.42

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5606.05	52.25 PK	68.20	-15.95	3.34 H	346	41.89	10.36
2	*5825.00	99.73 PK			3.34 H	346	89.24	10.49
3	*5825.00	89.52 AV			3.34 H	346	79.03	10.49
4	#5987.95	53.18 PK	68.20	-15.02	3.34 H	346	42.29	10.89
5	11650.00	55.92 PK	74.00	-18.08	2.31 H	190	39.44	16.48
6	11650.00	43.37 AV	54.00	-10.63	2.31 H	190	26.89	16.48
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	#5604.62	51.35 PK	68.20	-16.85	1.15 V	273	40.98	10.37
2	*5825.00	103.18 PK			1.15 V	273	92.69	10.49
3	*5825.00	92.94 AV			1.15 V	273	82.45	10.49
4	#5987.48	53.47 PK	68.20	-14.73	1.15 V	273	42.59	10.88
5	11650.00	56.77 PK	74.00	-17.23	1.31 V	249	40.29	16.48
6	11650.00	44.23 AV	54.00	-9.77	1.31 V	249	27.75	16.48

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (20MHz)

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	49.36 PK	74.00	-24.64	3.27 H	258	42.15	7.21
2	5150.00	38.30 AV	54.00	-15.70	3.27 H	258	31.09	7.21
3	*5180.00	90.47 PK			3.27 H	258	83.22	7.25
4	*5180.00	80.06 AV			3.27 H	258	72.81	7.25
5	#10360.00	57.69 PK	68.20	-10.51	1.70 H	347	40.55	17.14
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	50.98 PK	74.00	-23.02	3.68 V	277	43.77	7.21
2	5150.00	38.89 AV	54.00	-15.11	3.68 V	277	31.68	7.21
3	*5180.00	96.37 PK			3.68 V	277	89.12	7.25
4	*5180.00	85.88 AV			3.68 V	277	78.63	7.25
5	#10360.00	58.29 PK	68.20	-9.91	2.41 V	166	41.15	17.14

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	90.61 PK			3.31 H	251	83.35	7.26
2	*5200.00	80.12 AV			3.31 H	251	72.86	7.26
3	#10400.00	57.96 PK	68.20	-10.24	1.74 H	350	40.62	17.34
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	96.53 PK			3.66 V	278	89.27	7.26
2	*5200.00	86.05 AV			3.66 V	278	78.79	7.26
3	#10400.00	58.62 PK	68.20	-9.58	2.36 V	169	41.28	17.34

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	90.12 PK			3.29 H	244	83.16	6.96
2	*5240.00	79.65 AV			3.29 H	244	72.69	6.96
3	5350.00	48.98 PK	74.00	-25.02	3.29 H	244	41.61	7.37
4	5350.00	38.12 AV	54.00	-15.88	3.29 H	244	30.75	7.37
5	#10480.00	58.32 PK	68.20	-9.88	1.78 H	353	40.62	17.70
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	96.37 PK			3.71 V	274	89.41	6.96
2	*5240.00	85.90 AV			3.71 V	274	78.94	6.96
3	5350.00	49.50 PK	74.00	-24.50	3.71 V	274	42.13	7.37
4	5350.00	38.93 AV	54.00	-15.07	3.71 V	274	31.56	7.37
5	**#10480.00**	**59.03 PK**	**68.20**	**-9.17**	**2.31 V**	**164**	**41.33**	**17.70**

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5570.90	52.77 PK	68.20	-15.43	3.30 H	344	42.41	10.36
2	*5745.00	99.21 PK			3.30 H	344	88.82	10.39
3	*5745.00	89.04 AV			3.30 H	344	78.65	10.39
4	#5932.37	54.11 PK	68.20	-14.09	3.30 H	344	43.32	10.79
5	11490.00	55.63 PK	74.00	-18.37	2.27 H	189	39.26	16.37
6	11490.00	43.16 AV	54.00	-10.84	2.27 H	189	26.79	16.37
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	#5597.98	52.44 PK	68.20	-15.76	1.11 V	279	42.05	10.39
2	*5745.00	103.54 PK			1.11 V	279	93.15	10.39
3	*5745.00	93.22 AV			1.11 V	279	82.83	10.39
4	#5988.43	53.31 PK	68.20	-14.89	1.11 V	279	42.42	10.89
5	11490.00	56.38 PK	74.00	-17.62	1.25 V	256	40.01	16.37
6	11490.00	44.09 AV	54.00	-9.91	1.25 V	256	27.72	16.37

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5616.98	51.52 PK	68.20	-16.68	3.34 H	348	41.19	10.33
2	*5785.00	98.57 PK			3.34 H	348	88.12	10.45
3	*5785.00	88.24 AV			3.34 H	348	77.79	10.45
4	#5991.75	53.27 PK	68.20	-14.93	3.34 H	348	42.38	10.89
5	11570.00	55.70 PK	74.00	-18.30	2.29 H	193	39.28	16.42
6	11570.00	43.11 AV	54.00	-10.89	2.29 H	193	26.69	16.42
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	#5624.57	52.19 PK	68.20	-16.01	1.08 V	294	41.89	10.30
2	*5785.00	103.28 PK			1.08 V	294	92.83	10.45
3	*5785.00	93.02 AV			1.08 V	294	82.57	10.45
4	#5944.73	53.33 PK	68.20	-14.87	1.08 V	294	42.52	10.81
5	11570.00	56.27 PK	74.00	-17.73	1.29 V	263	39.85	16.42
6	11570.00	44.15 AV	54.00	-9.85	1.29 V	263	27.73	16.42

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5598.45	51.20 PK	68.20	-17.00	3.32 H	353	40.82	10.38
2	*5825.00	99.15 PK			3.32 H	353	88.66	10.49
3	*5825.00	88.93 AV			3.32 H	353	78.44	10.49
4	#5943.30	53.02 PK	68.20	-15.18	3.32 H	353	42.22	10.80
5	11650.00	55.84 PK	74.00	-18.16	2.32 H	191	39.36	16.48
6	11650.00	43.19 AV	54.00	-10.81	2.32 H	191	26.71	16.48
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	#5598.93	52.22 PK	68.20	-15.98	1.03 V	299	41.84	10.38
2	*5825.00	103.31 PK			1.03 V	299	92.82	10.49
3	*5825.00	93.09 AV			1.03 V	299	82.60	10.49
4	#5981.30	53.58 PK	68.20	-14.62	1.03 V	299	42.70	10.88
5	11650.00	56.33 PK	74.00	-17.67	1.33 V	257	39.85	16.48
6	11650.00	44.20 AV	54.00	-9.80	1.33 V	257	27.72	16.48

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (40MHz)

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	55.94 PK	74.00	-18.06	3.34 H	253	48.73	7.21
2	5150.00	38.43 AV	54.00	-15.57	3.34 H	253	31.22	7.21
3	*5190.00	88.59 PK			3.34 H	253	81.34	7.25
4	*5190.00	78.52 AV			3.34 H	253	71.27	7.25
5	#10380.00	57.61 PK	68.20	-10.59	1.62 H	351	40.37	17.24
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	57.65 PK	74.00	-16.35	3.69 V	277	50.44	7.21
2	5150.00	39.84 AV	54.00	-14.16	3.69 V	277	32.63	7.21
3	*5190.00	94.62 PK			3.69 V	277	87.37	7.25
4	*5190.00	84.55 AV			3.69 V	277	77.30	7.25
5	#10380.00	58.32 PK	68.20	-9.88	2.53 V	159	41.08	17.24

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	88.60 PK			3.30 H	258	81.56	7.04
2	*5230.00	78.52 AV			3.30 H	258	71.48	7.04
3	5350.00	48.62 PK	74.00	-25.38	3.30 H	258	41.25	7.37
4	5350.00	37.74 AV	54.00	-16.26	3.30 H	258	30.37	7.37
5	#10460.00	58.13 PK	68.20	-10.07	1.69 H	348	40.52	17.61
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	94.50 PK			3.65 V	279	87.46	7.04
2	*5230.00	84.43 AV			3.65 V	279	77.39	7.04
3	5350.00	49.80 PK	74.00	-24.20	3.65 V	279	42.43	7.37
4	5350.00	38.46 AV	54.00	-15.54	3.65 V	279	31.09	7.37
5	#10460.00	58.74 PK	68.20	-9.46	2.45 V	154	41.13	17.61

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5639.30	51.68 PK	68.20	-16.52	3.22 H	350	41.42	10.26
2	*5755.00	97.22 PK			3.22 H	350	86.82	10.40
3	*5755.00	86.81 AV			3.22 H	350	76.41	10.40
4	#5971.32	53.33 PK	68.20	-14.87	3.22 H	350	42.47	10.86
5	11510.00	55.45 PK	74.00	-18.55	2.24 H	167	39.05	16.40
6	11510.00	43.22 AV	54.00	-10.78	2.24 H	167	26.82	16.40
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	#5621.73	51.56 PK	68.20	-16.64	1.56 V	301	41.25	10.31
2	*5755.00	102.13 PK			1.56 V	301	91.73	10.40
3	*5755.00	91.58 AV			1.56 V	301	81.18	10.40
4	#5986.05	53.12 PK	68.20	-15.08	1.56 V	301	42.24	10.88
5	11510.00	56.23 PK	74.00	-17.77	1.34 V	245	39.83	16.40
6	11510.00	44.14 AV	54.00	-9.86	1.34 V	245	27.74	16.40

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
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	#5629.80	51.06 PK	68.20	-17.14	3.21 H	354	40.78	10.28
2	*5795.00	98.06 PK			3.21 H	354	87.59	10.47
3	*5795.00	87.54 AV			3.21 H	354	77.07	10.47
4	#5996.02	53.18 PK	68.20	-15.02	3.21 H	354	42.28	10.90
5	11590.00	55.38 PK	74.00	-18.62	2.27 H	158	38.96	16.42
6	11590.00	43.12 AV	54.00	-10.88	2.27 H	158	26.70	16.42
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	#5590.85	53.60 PK	68.20	-14.60	1.58 V	297	43.23	10.37
2	*5795.00	102.25 PK			1.58 V	297	91.78	10.47
3	*5795.00	91.74 AV			1.58 V	297	81.27	10.47
4	#5940.93	53.62 PK	68.20	-14.58	1.58 V	297	42.83	10.79
5	11590.00	56.34 PK	74.00	-17.66	1.29 V	248	39.92	16.42
6	11590.00	44.26 AV	54.00	-9.74	1.29 V	248	27.84	16.42

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Data:

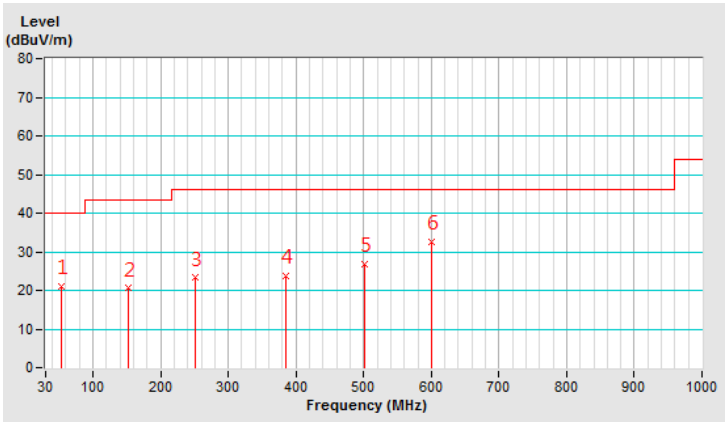
802.11a

CHANNEL	TX Channel 40	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	53.13	21.03 QP	40.00	-18.97	1.54 H	104	28.22	-7.19
2	152.95	20.59 QP	43.50	-22.91	1.33 H	194	27.47	-6.88
3	251.89	23.23 QP	46.00	-22.77	1.76 H	250	30.12	-6.89
4	385.36	23.89 QP	46.00	-22.11	1.41 H	50	27.40	-3.51
5	501.23	26.80 QP	46.00	-19.20	2.02 H	119	28.04	-1.24
6	600.02	32.67 QP	46.00	-13.33	1.93 H	74	31.73	0.94

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

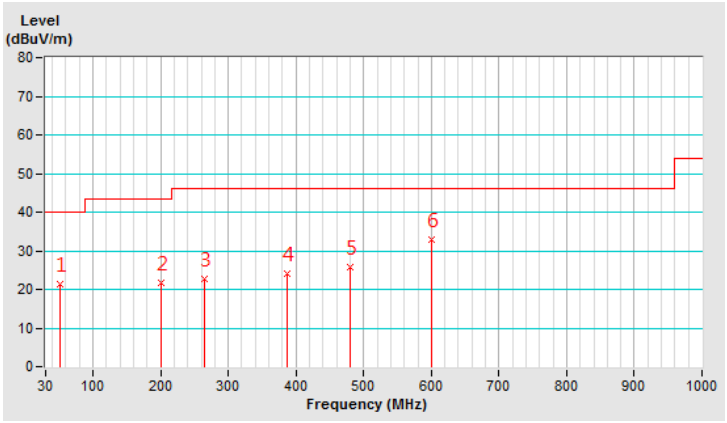


CHANNEL	TX Channel 40	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	51.73	21.30 QP	40.00	-18.70	1.90 V	35	28.48	-7.18
2	200.04	21.73 QP	43.50	-21.77	1.37 V	274	30.81	-9.08
3	264.21	22.83 QP	46.00	-23.17	1.62 V	92	29.15	-6.32
4	387.69	24.17 QP	46.00	-21.83	1.77 V	186	27.64	-3.47
5	479.98	25.71 QP	46.00	-20.29	2.17 V	181	27.28	-1.57
6	600.02	32.90 QP	46.00	-13.10	1.85 V	92	31.96	0.94

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



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
ROHDE & SCHWARZ TEST RECEIVER	ESCS 30	838251/021	Nov. 1, 2018	Oct. 31, 2019
ROHDE & SCHWARZ Artificial Mains Network (For EUT)	ENV216	101196	Apr. 16, 2019	Apr. 15, 2020
LISN With Adapter (for EUT)	101196	NA	Apr. 16, 2019	Apr. 15, 2020
EMCO L.I.S.N. (For peripherals)	3825/2	9504-2359	Jul. 26, 2018	Jul. 25, 2019
SCHWARZBECK Artificial Mains Network (For EUT)	NNLK8129	8129229	May 3, 2018	May 2, 2019
Software	Cond_V7.3.7.4	NA	NA	NA
RF cable (JYEBAO) With10dB PAD	5D-FB	Cable-C03.01	Sep. 18, 2018	Sep. 17, 2019
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-300	Jan. 25, 2019	Jan. 24, 2020
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-301	Jan. 25, 2019	Jan. 24, 2020
ROHDE & SCHWARZ Artificial Mains Network (For TV EUT)	ESH3-Z5	100220	Nov. 21, 2018	Nov. 20, 2019
LISN With Adapter (for TV EUT)	100220	N/A	Nov. 21, 2018	Nov. 20, 2019

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

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.

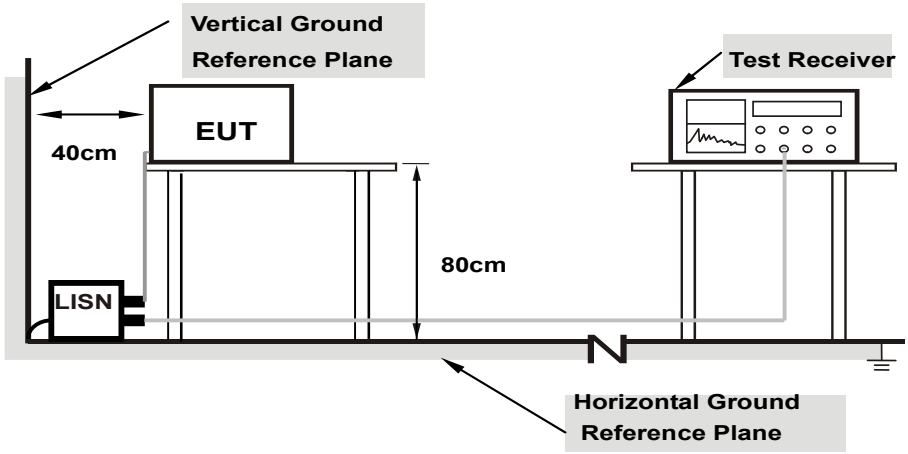
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

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

For Mode B:

a. Connected the EUT with the Notebook.

b. Set the EUT under charging condition continuously.

For Mode C:

a. Connected the EUT with the Adapter.

b. Set the EUT under charging condition continuously.

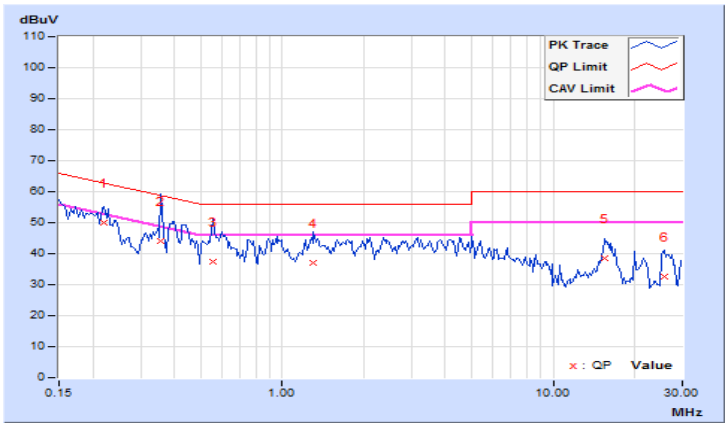
4.2.7 Test Results

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

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	0.22031	9.64	40.39	31.68	50.03	41.32	62.81	52.81	-12.78	-11.49
2	0.35703	9.66	34.54	23.91	44.20	33.57	58.80	48.80	-14.60	-15.23
3	0.55234	9.67	27.83	19.05	37.50	28.72	56.00	46.00	-18.50	-17.28
4	1.30078	9.72	27.44	22.85	37.16	32.57	56.00	46.00	-18.84	-13.43
5	15.39844	9.96	28.64	20.41	38.60	30.37	60.00	50.00	-21.40	-19.63
6	25.81641	10.05	22.68	16.94	32.73	26.99	60.00	50.00	-27.27	-23.01

REMARKS:

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

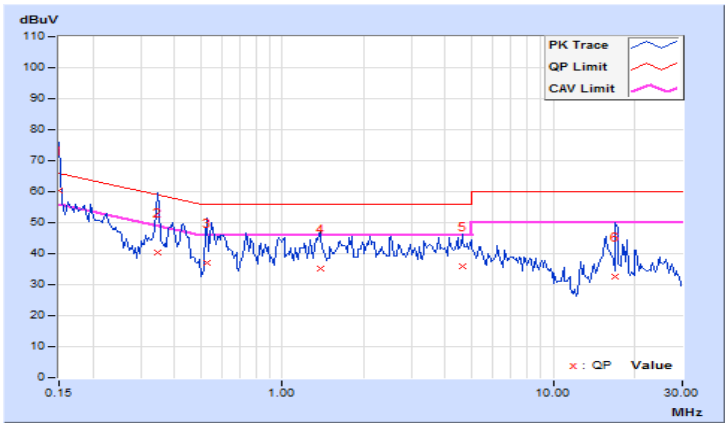


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	Mode B		

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	**0.15000**	**9.67**	**50.58**	**33.91**	**60.25**	**43.58**	**66.00**	**56.00**	**-5.75**	**-12.42**
2	0.34531	9.67	30.86	25.84	40.53	35.51	59.07	49.07	-18.54	-13.56
3	0.52500	9.69	27.43	12.18	37.12	21.87	56.00	46.00	-18.88	-24.13
4	1.38281	9.74	25.32	19.89	35.06	29.63	56.00	46.00	-20.94	-16.37
5	4.60938	9.83	26.12	21.33	35.95	31.16	56.00	46.00	-20.05	-14.84
6	17.00000	10.03	22.61	15.17	32.64	25.20	60.00	50.00	-27.36	-24.80

REMARKS:

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

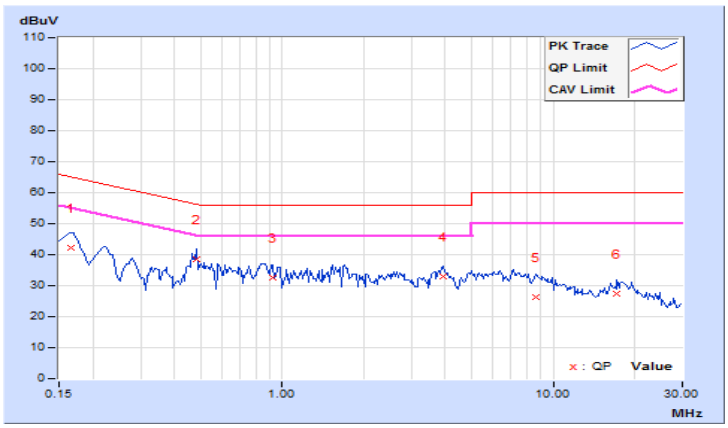


Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	Mode C		

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	0.16562	9.68	32.40	15.61	42.08	25.29	65.18	55.18	-23.10	-29.89
2	0.48203	9.73	28.86	21.08	38.59	30.81	56.30	46.30	-17.71	-15.49
3	0.92344	9.80	22.87	14.02	32.67	23.82	56.00	46.00	-23.33	-22.18
4	3.94141	10.00	22.84	15.22	32.84	25.22	56.00	46.00	-23.16	-20.78
5	8.67188	10.13	16.11	7.36	26.24	17.49	60.00	50.00	-33.76	-32.51
6	17.23047	10.27	16.99	8.36	27.26	18.63	60.00	50.00	-32.74	-31.37

REMARKS:

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

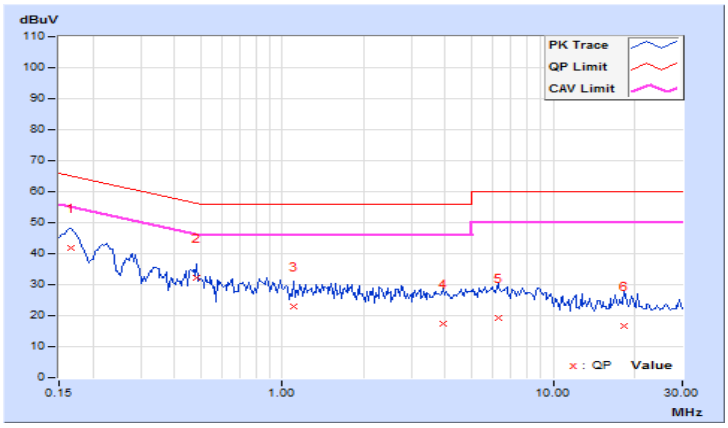


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
Test Mode	Mode C		

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	0.16562	9.92	32.08	15.03	42.00	24.95	65.18	55.18	-23.18	-30.23
2	0.48203	9.77	22.43	14.42	32.20	24.19	56.30	46.30	-24.10	-22.11
3	1.10547	9.84	13.03	4.60	22.87	14.44	56.00	46.00	-33.13	-31.56
4	3.92578	10.00	7.47	0.12	17.47	10.12	56.00	46.00	-38.53	-35.88
5	6.28516	10.05	9.34	2.37	19.39	12.42	60.00	50.00	-40.61	-37.58
6	18.32813	10.31	6.22	0.99	16.53	11.30	60.00	50.00	-43.47	-38.70

REMARKS:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

For Average Power Measurement

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

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

Power Output:

802.11a

CHAN.	FREQ. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
36	5180	9.594	9.82	24	Pass
40	5200	**9.954**	9.98	24	Pass
48	5240	9.908	9.96	24	Pass
149	5745	8.770	9.43	30	Pass
157	5785	**9.908**	9.96	30	Pass
165	5825	8.630	9.36	30	Pass

802.11ac (20MHz)

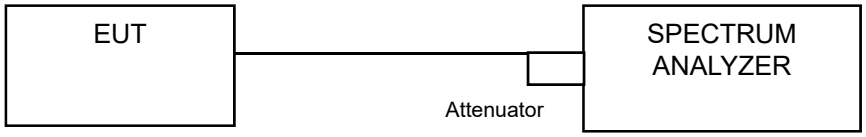
CHAN.	FREQ. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
36	5180	9.931	9.97	24	Pass
40	5200	9.908	9.96	24	Pass
48	5240	9.886	9.95	24	Pass
149	5745	8.730	9.41	30	Pass
157	5785	9.727	9.88	30	Pass
165	5825	8.531	9.31	30	Pass

802.11ac (40MHz)

CHAN.	FREQ. (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass/Fail
38	5190	9.772	9.90	24	Pass
46	5230	**9.954**	9.98	24	Pass
151	5755	**9.908**	9.96	30	Pass
159	5795	9.817	9.92	30	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

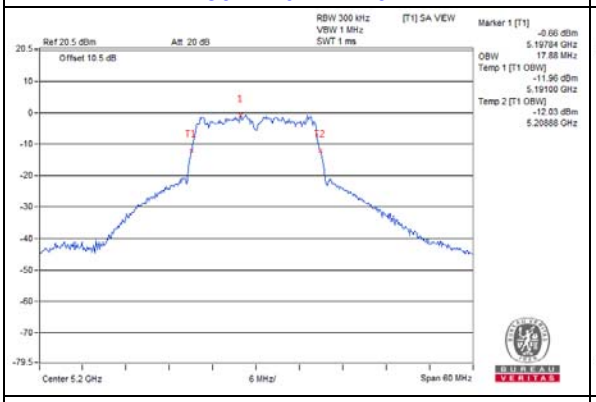
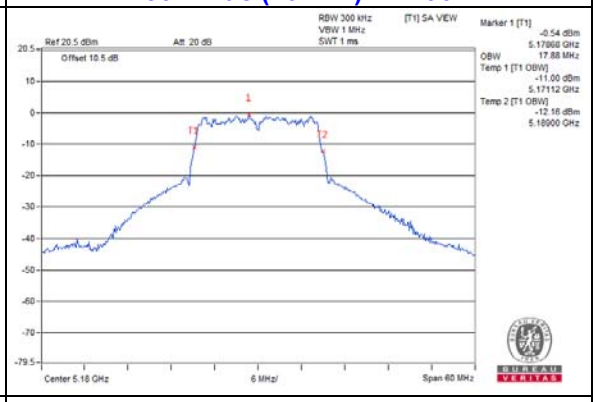
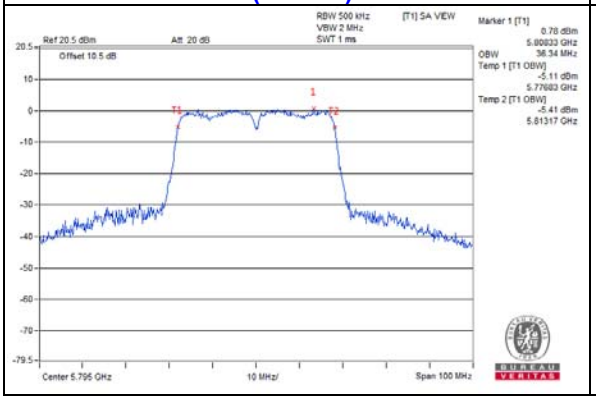
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.76
40	5200	17.88
48	5240	17.76
149	5745	17.65
157	5785	17.70
165	5825	17.70

802.11ac (20MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.88
40	5200	17.88
48	5240	17.76
149	5745	17.65
157	5785	17.80
165	5825	17.70

802.11ac (40MHz)

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	36.20
46	5230	36.20
151	5755	36.24
159	5795	36.34

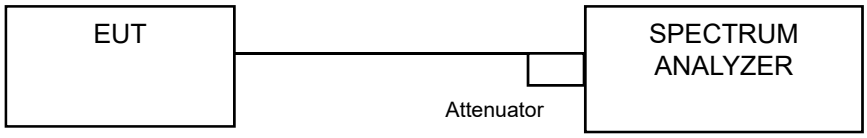
Spectrum Plot of Worst Value	
802.11a / CH40	802.11ac (20MHz) / CH36
	
802.11ac (40MHz) / CH159	
	

4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.5.4 Test Procedure

For U-NII-1 band:

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 = 500 kHz, Set VBW ≥ 3 RBW, 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)

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

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	-4.14	3.31	-0.83	11	Pass
40	5200	-3.83	3.31	-0.52	11	Pass
48	5240	-3.87	3.31	-0.56	11	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (20MHz)

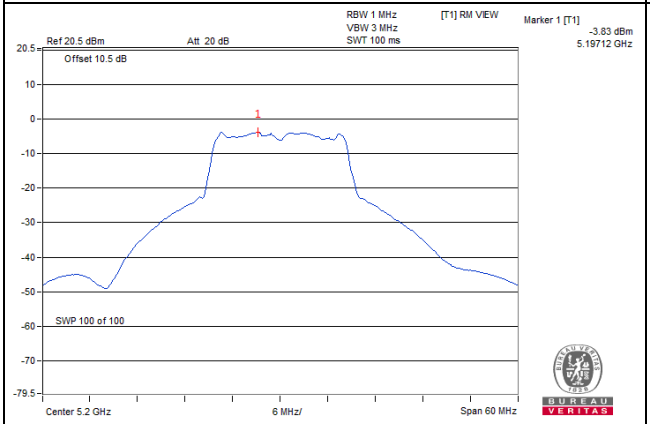
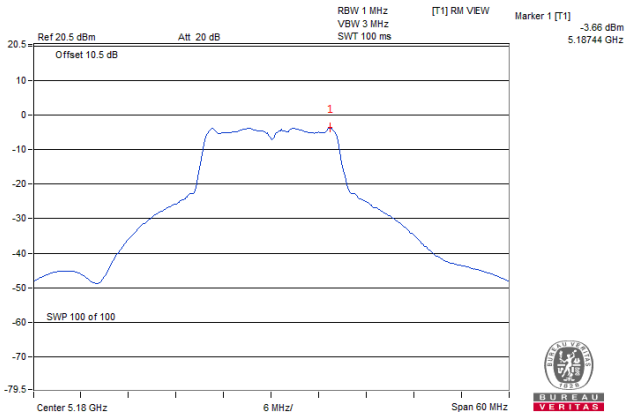
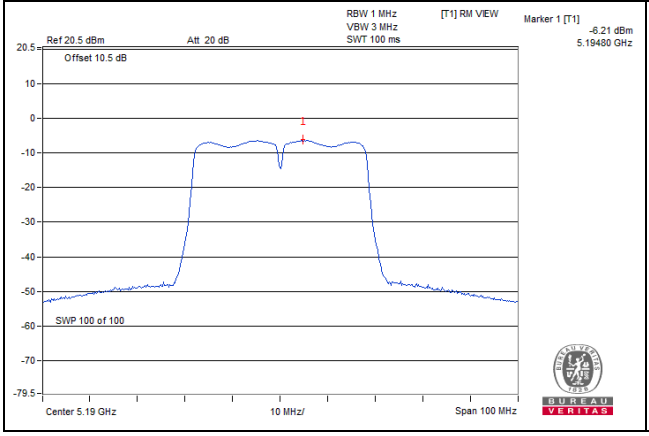
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
36	5180	-3.66	3.56	-0.10	11	Pass
40	5200	-3.76	3.56	-0.20	11	Pass
48	5240	-3.91	3.56	-0.35	11	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (40MHz)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD With Duty Factor (dBm/MHz)	MAX. Limit (dBm/MHz)	Pass / Fail
38	5190	-6.21	6.62	0.41	11	Pass
46	5230	-6.62	6.62	0.00	11	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value	
802.11a / CH40	**802.11ac (20MHz) / CH36**
	
802.11ac (40MHz) / CH38	
	

For U-NII-3:

802.11a

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	-12.85	3.31	-9.54	30	Pass
157	5785	-12.79	3.31	-9.48	30	Pass
165	5825	-12.76	3.31	-9.45	30	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (20MHz)

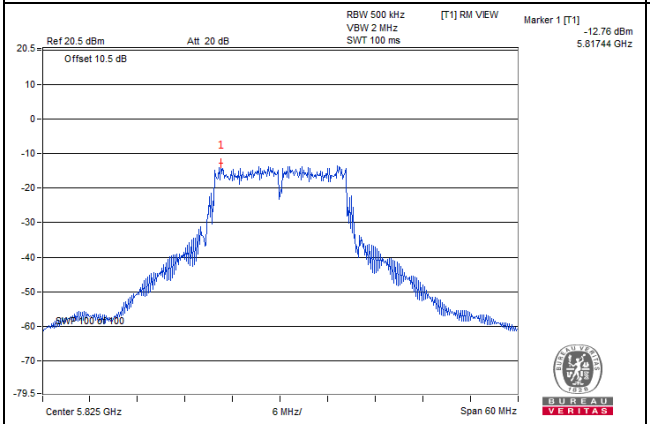
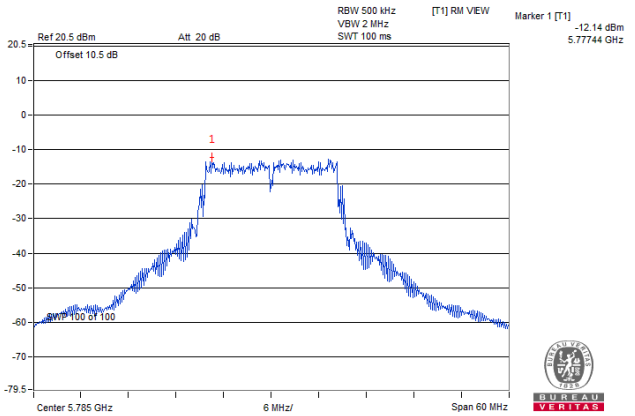
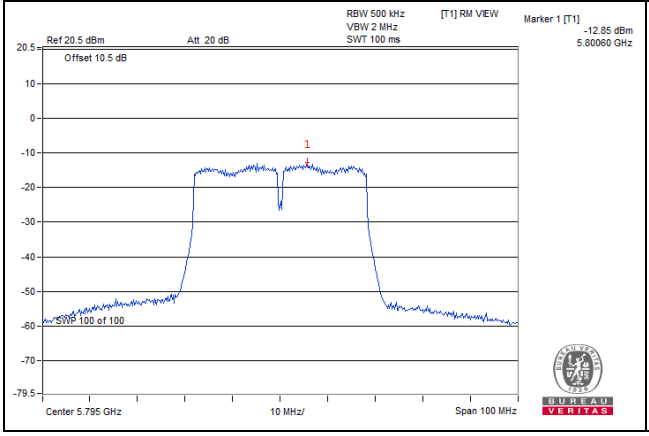
Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
149	5745	-13.02	3.56	-9.46	30	Pass
157	5785	-12.14	3.56	-8.58	30	Pass
165	5825	-12.64	3.56	-9.08	30	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (40MHz)

Chan.	Chan. Freq. (MHz)	PSD W/O Duty Factor (dBm/500kHz)	Duty Factor (dB)	Total PSD With Duty Factor (dBm/500kHz)	Limit (dBm/500kHz)	Pass /Fail
151	5755	-13.34	6.62	-6.72	30	Pass
159	5795	-12.85	6.62	-6.23	30	Pass

Note: Refer to section 3.3 for duty cycle spectrum plot.

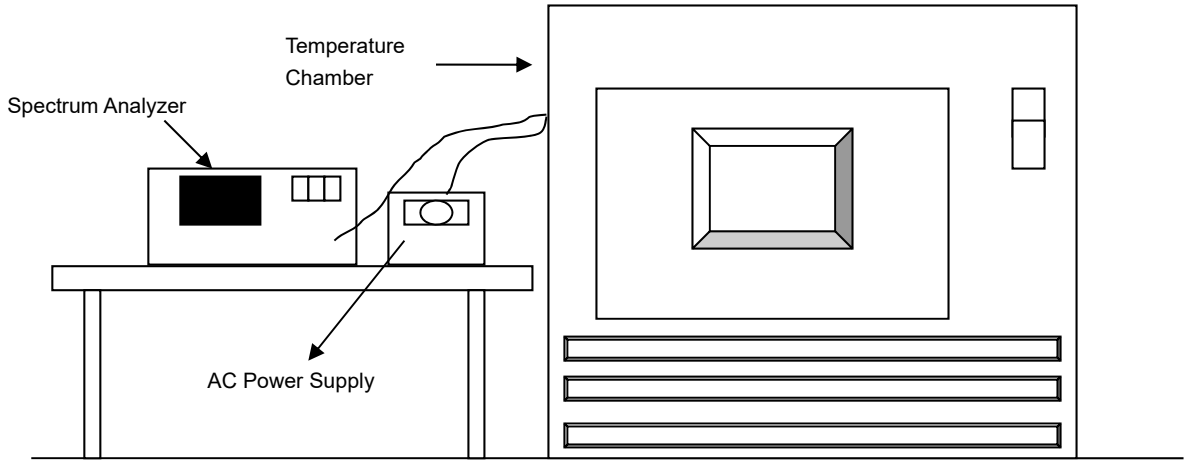
Spectrum Plot of Worst Value	
802.11a / CH165	**802.11ac (20MHz) / CH157**
	
802.11ac (40MHz) / CH159	
	

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 (d) with the temperature chamber set to the next desired temperature until measurements down to the lowest specified temperature have been completed.
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	5179.9822	Pass	5179.9872	Pass	5179.9824	Pass	5179.9842	Pass
40	120	5179.9927	Pass	5179.9953	Pass	5179.9929	Pass	5179.9924	Pass
30	120	5180.0213	Pass	5180.0208	Pass	5180.0231	Pass	5180.0235	Pass
20	120	5179.9963	Pass	5179.9966	Pass	5179.9954	Pass	5179.9958	Pass
10	120	5180.0193	Pass	5180.0174	Pass	5180.0196	Pass	5180.0206	Pass
0	120	5179.9983	Pass	5179.9971	Pass	5179.9953	Pass	5179.9996	Pass
-10	120	5180.0244	Pass	5180.0226	Pass	5180.024	Pass	5180.026	Pass
-20	120	5179.9906	Pass	5179.9872	Pass	5179.9873	Pass	5179.9867	Pass
-30	120	5179.9855	Pass	5179.9853	Pass	5179.9836	Pass	5179.9825	Pass

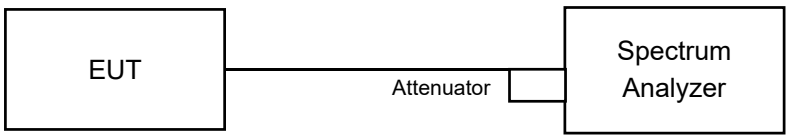
Frequency Stability Versus Voltage									
Operating Frequency: 5180 MHz									
TEMP. (℃)	Power Supply (Vac)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail	Measured Frequency (MHz)	Pass/Fail
20	138	5179.9954	Pass	5179.9966	Pass	5179.9954	Pass	5179.9962	Pass
	120	5179.9963	Pass	5179.9966	Pass	5179.9954	Pass	5179.9958	Pass
	102	5179.9972	Pass	5179.9972	Pass	5179.9957	Pass	5179.9959	Pass

4.7 6dB Bandwidth Measurement

4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

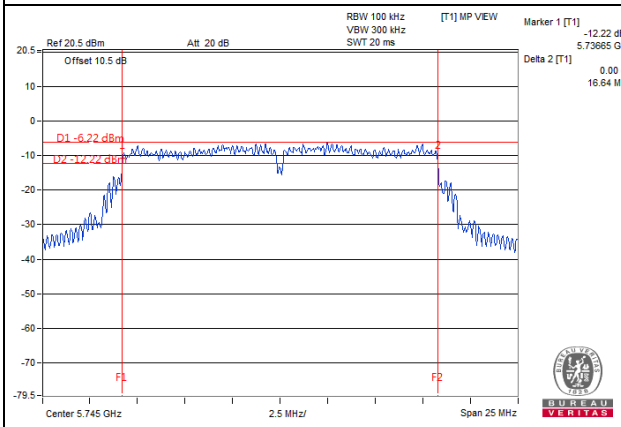
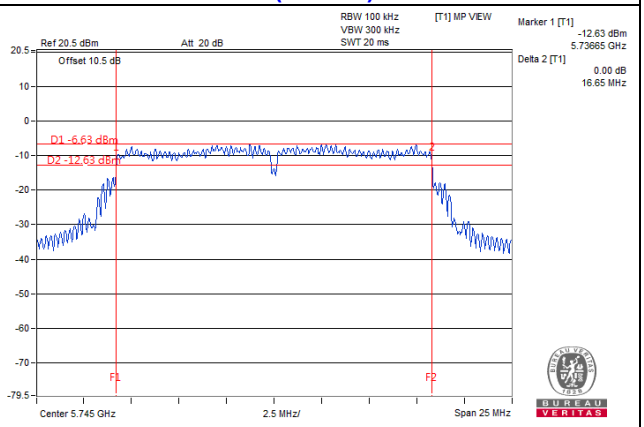
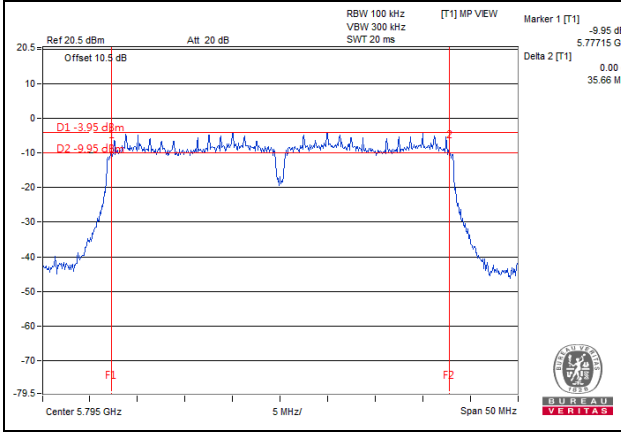
Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.64	0.5	PASS
157	5785	16.67	0.5	PASS
165	5825	16.67	0.5	PASS

802.11ac (20MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.65	0.5	PASS
157	5785	16.66	0.5	PASS
165	5825	16.66	0.5	PASS

802.11ac (40MHz)

Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.74	0.5	PASS
159	5795	35.66	0.5	PASS

Spectrum Plot of Worst Value	
802.11a / CH149	**802.11ac (20MHz) / CH149**
	
802.11ac (40MHz) / CH159	
	

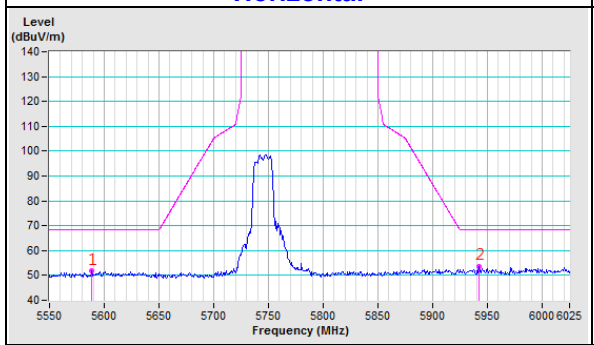
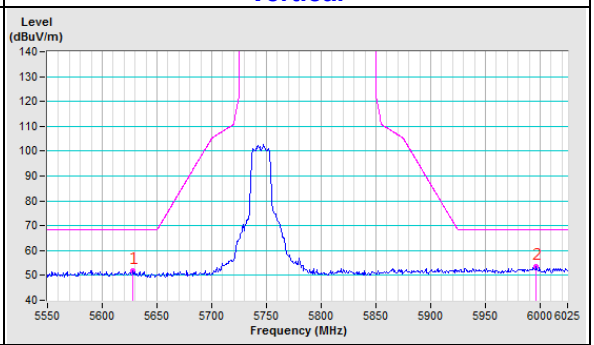
5 Pictures of Test Arrangements

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

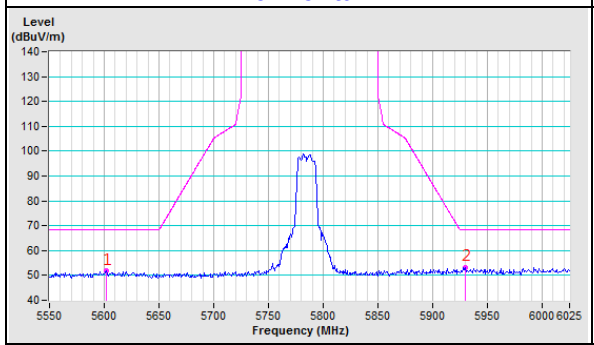
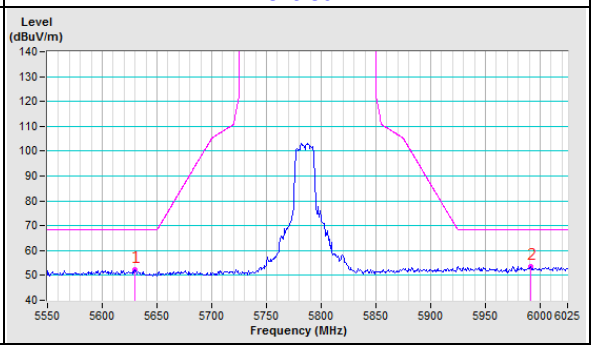
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

802.11a

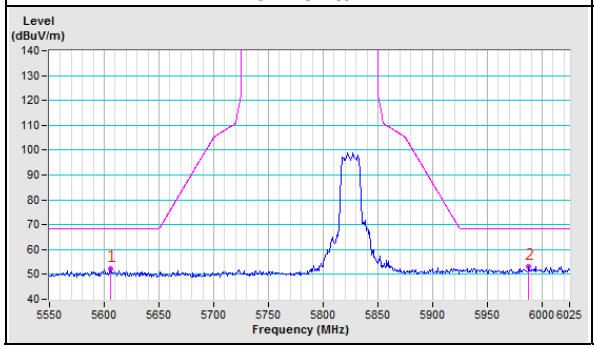
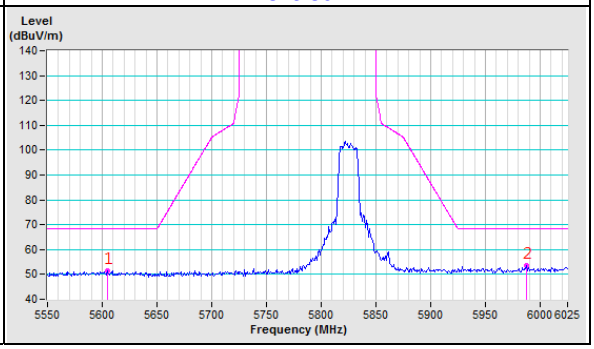
CH149

Horizontal	Vertical
	

CH157

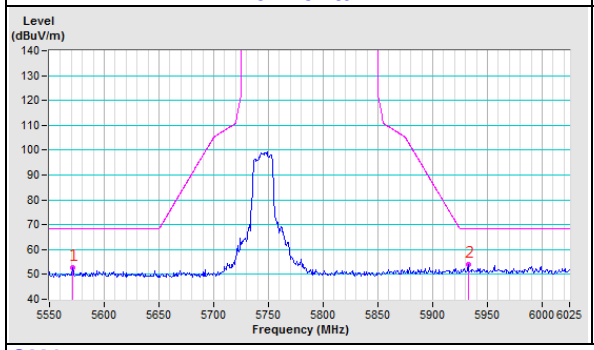
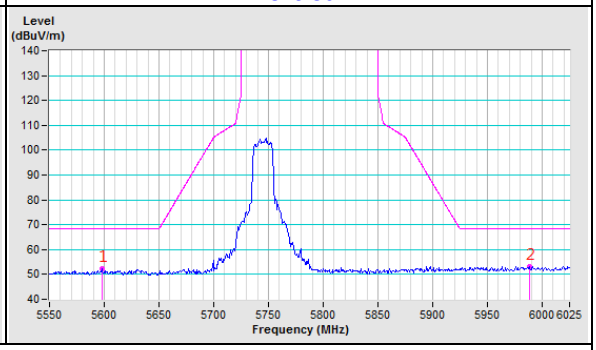
Horizontal	Vertical
	

CH165

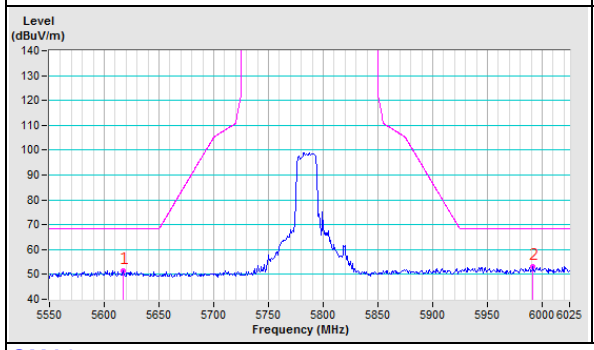
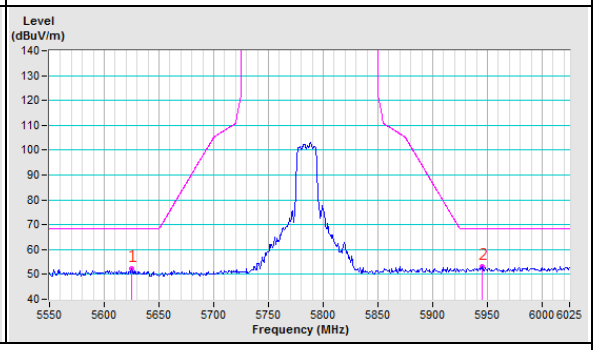
Horizontal	Vertical
	

802.11ac (20MHz)

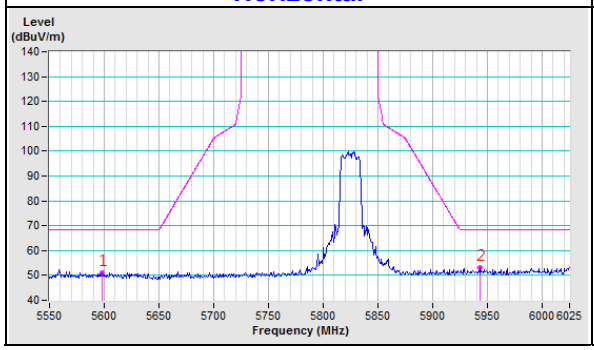
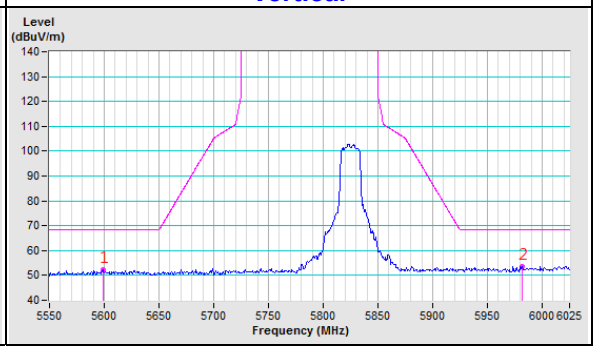
CH149

Horizontal	Vertical
	

CH157

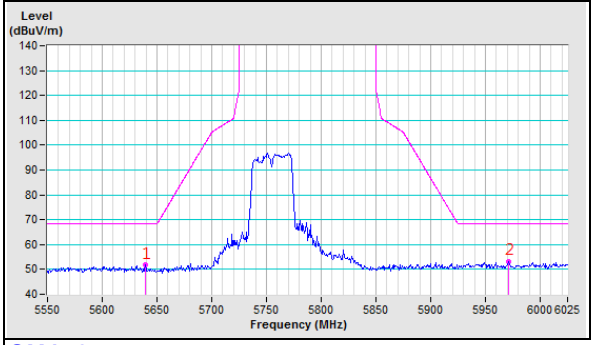
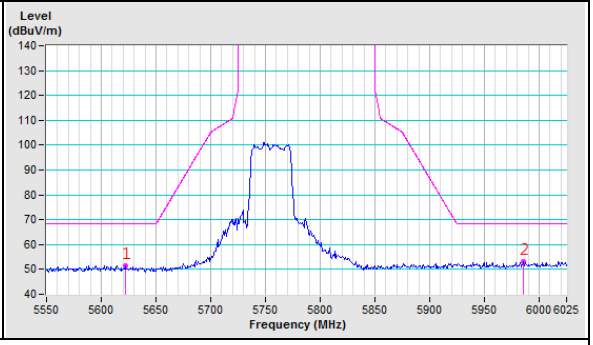
Horizontal	Vertical
	

CH165

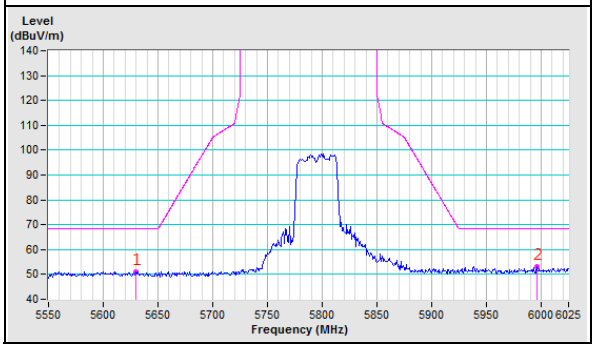
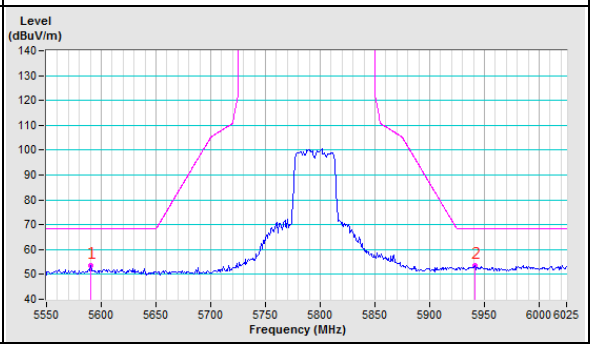
Horizontal	Vertical
	

802.11ac (40MHz)

CH151

Horizontal	Vertical
	

CH159

Horizontal	Vertical
	

Appendix – Information of the Testing Laboratories

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

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

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