

FCC Test Report (Co-Located)

Report No.: RF180613C24B-1

FCC ID: PY317300397

Test Model: Leopard

Received Date: Jun. 13, 2018

Test Date: Aug. 02 ~ Sep. 21, 2018

Issued Date: Sep. 21, 2018

Applicant: NETGEAR, INC.

Address: 350 East Plumeria Drive San Jose, CA 95134

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration /
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	3
1 Certificate of Conformity.....	4
2 Summary of Test Results	5
2.1 Measurement Uncertainty	5
2.2 Modification Record	5
3 General Information.....	6
3.1 General Description of EUT	6
3.2 Description of Test Modes	10
3.2.1 Test Mode Applicability and Tested Channel Detail.....	12
3.3 Description of Support Units	14
3.3.1 Configuration of System under Test	14
3.4 General Description of Applied Standards	14
4 Test Types and Results	15
4.1 Radiated Emission and Bandedge Measurement.....	15
4.1.1 Limits of Radiated Emission and Bandedge Measurement	15
4.1.2 Test Instruments	16
4.1.3 Test Procedures.....	17
4.1.4 Deviation from Test Standard	17
4.1.5 Test Setup.....	18
4.1.6 EUT Operating Conditions.....	19
4.1.7 Test Results	20
4.2 Conducted Out of Band Emission Measurement.....	32
4.2.1 Limits of Conducted Out of Band Emission Measurement	32
4.2.2 Test Setup.....	32
4.2.3 Test Instruments	32
4.2.4 Test Procedure	32
4.2.5 Deviation from Test Standard	32
4.2.6 EUT Operating Condition	32
4.2.7 Test Results	32
5 Pictures of Test Arrangements.....	34
Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)	35
Appendix – Information on the Testing Laboratories	36

Release Control Record

Issue No.	Description	Date Issued
RF180613C24B-1	Original release.	Sep. 21, 2018

1 Certificate of Conformity

Product: Leopard

Brand: NETGEAR

Test Model: Leopard

Sample Status: Engineering sample

Applicant: NETGEAR, INC.

Test Date: Aug. 02 ~ Sep. 21, 2018

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)

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 : Sunt Lee, **Date:** Sep. 21, 2018
Sunt Lee / Specialist

Approved by : Bruce Chen, **Date:** Sep. 21, 2018
Bruce Chen / Project Engineer

2 Summary of Test Results

Applied Standard	47 CFR FCC Part 15, Subpart C (Section 15.247) 47 CFR FCC Part 15, Subpart E (Section 15.407)		
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d) 15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -0.6dB at 5150.00MHz.

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

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	3.63 dB
	200MHz ~ 1000MHz	3.64 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	Leopard
Brand	NETGEAR
Test Model	Leopard
Sample Status	Engineering sample
Power Supply Rating	19Vdc (adapter)
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM 1024QAM for OFDMA
Modulation Technology	DSSS, OFDM, OFDMA
Transfer Rate	802.11b: 11/5.5/2/1Mbps 802.11a/g: 54/48/36/24/18/12/9/6Mbps 802.11n 2.4GHz: up to 600Mbps 802.11n 5.0GHz: up to 1200Mbps 802.11ac: up to 3466.4Mbps 802.11ax 2.4GHz: up to 1148Mbps 802.11ax 5.0GHz: up to 4804Mbps
Operating Frequency	2.4GHz: 2412~2462MHz 5.0GHz: 5180~5240MHz, 5745~5825MHz
Number of Channel	2412~2462MHz: 802.11b, 802.11g, 802.11n (HT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11ax (HE40): 7 5180~5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5260~5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 4 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 5500~5700MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 11 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 5 802.11ac (VHT80), 802.11ax (HE80): 2 5745~5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20): 5 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40): 2 802.11ac (VHT80), 802.11ax (HE80): 1 Simultaneous transmission: 802.11ac (VHT160(80+80)), 802.11ax (HE160(80+80)): 3 sets
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	Adapter

Cable Supplied	1.95m non-shielded RJ45 cable without core
----------------	--

Note:

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report of the original report no.: RF180613C24-2. The difference compared with the original report is adding 5.26GHz to 5.32GHz and 5.50GHz to 5.72GHz by software.
2. The EUT incorporates a MIMO function. Physically, the EUT provides 8 completed transmitter and 8 receivers.

Band	Modulation Mode	CDD mode	Beamforming mode
2.4GHz	802.11b	Support	Not Support
	802.11g	Support	Not Support
	802.11n (HT20)	Support	Not Support
	802.11n (HT40)	Support	Not Support
	802.11ax (HE20)	Support	Not Support
	802.11ax (HE40)	Support	Not Support
5GHz	802.11a	Support	Not Support
	802.11n(HT20)	Support	Support(Nss1/Nss2)
	802.11n(HT40)	Support	Support(Nss1/Nss2)
	802.11ac(VHT20)	Support	Support(Nss1/Nss2)
	802.11ac(VHT40)	Support	Support(Nss1/Nss2)
	802.11ac(VHT80)	Support	Support(Nss1/Nss2)
	802.11ac(VHT80+80)	Support	Not Support
	802.11ax(HE20)	Support	Support(Nss1/Nss2)
	802.11ax(HE40)	Support	Support(Nss1/Nss2)
	802.11ax(HE80)	Support	Support(Nss1/Nss2)
	802.11ax(HE80+80)	Support	Not Support

Note: The CDD mode supports Nss1 to Nss4. The Nss 1 configuration is the worst case for final testing.

Band	Modulation Mode	Ant1	Ant2	Ant3	Ant4	Ant5	Ant6	Ant7	Ant8
2.4GHz	802.11b	TX/RX	TX/RX	TX/RX	TX/RX				
	802.11g	TX/RX	TX/RX	TX/RX	TX/RX				
	802.11n (HT20)	TX/RX	TX/RX	TX/RX	TX/RX				
	802.11n (HT40)	TX/RX	TX/RX	TX/RX	TX/RX				
	802.11ax (HE20)	TX/RX	TX/RX	TX/RX	TX/RX				
	802.11ax (HE40)	TX/RX	TX/RX	TX/RX	TX/RX				
5GHz	802.11a	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11n(HT20)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11n(HT40)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ac(VHT20)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ac(VHT40)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ac(VHT80)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ac(VHT80+80)*	TX/RX (UNII-1)	TX/RX (UNII-1)	TX/RX (UNII-1)	TX/RX (UNII-1)				
						TX/RX (UNII-3)	TX/RX (UNII-3)	TX/RX (UNII-3)	TX/RX (UNII-3)
	802.11ax(HE20)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ax(HE40)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ax(HE80)	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX	TX/RX
	802.11ax(HE80+80)*	TX/RX (UNII-1)	TX/RX (UNII-1)	TX/RX (UNII-1)	TX/RX (UNII-1)				
						TX/RX (UNII-3)	TX/RX (UNII-3)	TX/RX (UNII-3)	TX/RX (UNII-3)

Note*: When VHT80+80 configured by 4Tx+4Tx, by using 8Tx directional gain as the worst case for final testing.

3. The EUT uses following antenna.

Antenna Type		Dipole			Connector Type			I-PEX					
Directional Antenna Gain (dBi)													
Antenna No.	2.4G	5G Band 1			5G Band 2			5G Band 3			5G Band 4		
		CDD	NSS1	NSS2	CDD	NSS1	NSS2	CDD	NSS1	NSS2	CDD	NSS1	NSS2
4TX	3.29	-	-	-	-	-	-	-	-	-	-	-	-
8TX	-	3.22	11.37	8.76	3.25	11.72	8.81	3.32	11.38	8.40	3.10	11.55	8.32
4TX+4TX	-	3.22	-	-	3.25	-	-	3.32	-	-	3.10	-	-

4. The EUT consumes power from the following adapters.

Adapter 1	
Brand	NETGEAR
Model	2ABS060K NA
P/N	332-10856-01
Input Power	100-240Vac, 50/60Hz, 1.7A
Output Power	19Vdc, 3.16A
Power Cord	1.8m power cable without core attached on adapter

Adapter 2	
Brand	NETGEAR
Model	AD2073F20
P/N	332-10835-01
Input Power	100-240Vac, 50/60Hz, 1.5A
Output Power	19Vdc, 3.16A
Power Cord	1.8m power cable without core attached on adapter

* Adapter 2 is the worst case for final test after pretesting.

3.2 Description of Test Modes

2412~2462MHz:

11 channels are provided for 802.11b, 802.11g, 802.11n (HT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
3	2422 MHz	7	2442 MHz
4	2427 MHz	8	2447 MHz
5	2432 MHz	9	2452 MHz
6	2437 MHz		

5180~5240MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
42	5210 MHz

5260~5320MHz:

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
58	5290 MHz

5500~5700MHz:

11 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

Channel	Frequency	Channel	Frequency
100	5500 MHz	124	5620 MHz
104	5520 MHz	128	5640 MHz
108	5540 MHz	132	5660 MHz
112	5560 MHz	136	5680 MHz
116	5580 MHz	140	5700 MHz
120	5600 MHz		

5 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz		

2 channels are provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz

5745~5825MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20), 802.11ax (HE20):

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

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40), 802.11ax (HE40):

Channel	Frequency	Channel	Frequency
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (VHT80), 802.11ax (HE80):

Channel	Frequency
155	5775 MHz

For simultaneous transmission:

10 sets are provided for 802.11ac (VHT160(80+80)), 802.11ax (HE160(80+80)):

Channel	Frequency
42+58	5210 + 5290 MHz
42+155	5210 + 5775 MHz
106+122	5530 + 5610 MHz

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to			Description
	RE $\geq$ 1G	RE<1G	OB	
-	√	√	√	-

Where RE $\geq$ 1G: Radiated Emission above 1GHz & Bandedge Measurement
 RE<1G: Radiated Emission below 1GHz
 OB: Conducted Out of Band Emission

Note:

1. The worst case spurious emission of the simultaneous operation mode is listed as below.

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	Remark
-	802.11b + 802.11a	2412-2462	1 to 11	6 + 157	-
		5745-5825	149 to 165		
-	802.11b + 802.11ac (VHT40)	2412-2462	1 to 11	6 + 54	-
		5260-5320	54 to 62		
-	802.11b + 802.11ac (VHT160(80+80))	2412-2462	1 to 11	6 + (42+58)	-
		5180-5240	42+58		
		5260-5320			
-	802.11b + 802.11ac (VHT160(80+80))	2412-2462	1 to 11	6 + (106+122)	-
		5500-5700	106+122		
		5500-5700	122+155		
		5745-5825			

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	Remark
-	802.11b + 802.11a	2412-2462	1 to 11	6 + 157	-
		5745-5825	149 to 165		
-	802.11b + 802.11ac (VHT40)	2412-2462	1 to 11	6 + 54	-
		5260-5320	54 to 62		
-	802.11b + 802.11ac (VHT160(80+80))	2412-2462	1 to 11	6 + (42+58)	-
		5180-5240	42+58		
		5260-5320			
-	802.11b + 802.11ac (VHT160(80+80))	2412-2462	1 to 11	6 + (106+122)	-
		5500-5700	106+122		
		5500-5700	122+155		
		5745-5825			

Conducted Out of Band Emission Measurement:

- ☒ 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	Remark
-	802.11b + 802.11a	2412-2462	1 to 11	6 + 157	-
		5745-5825	149 to 165		

Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25deg. C, 70%RH	120Vac, 60Hz	Noah Chang Luis Lee
RE<1G	25deg. C, 71%RH	120Vac, 60Hz	Noah Chang Luis Lee
OB	25deg. C, 75%RH	120Vac, 60Hz	Noah Chang

3.3 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.

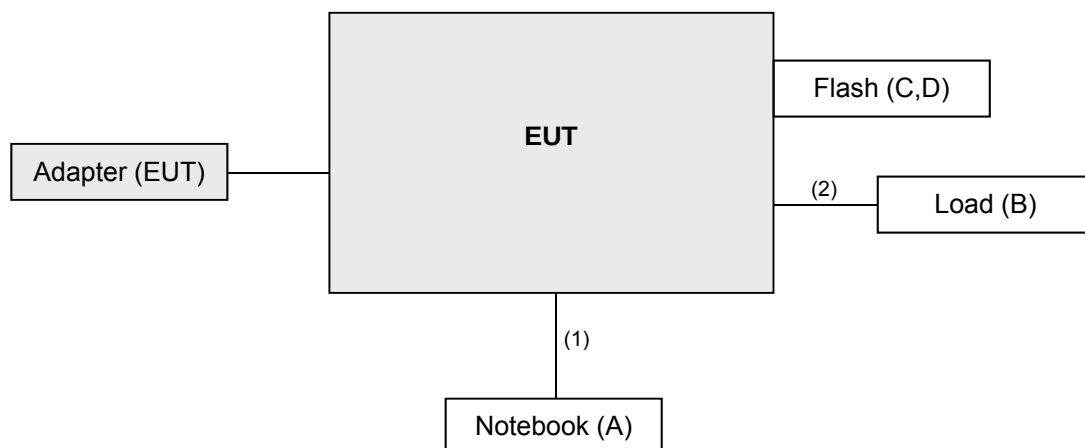
ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Notebook	HP	11-u018TU	8CG70505V9	FCC DoC Approved	-
B.	Load	NA	NA	NA	NA	-
C.	Flash	HP	v250W	06	NA	-
D.	Flash	HP	v250W	03	NA	-

Note:

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

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	RJ45, Cat5e	1	5	N	0	-
2.	RJ45, Cat5e	5	1.5	N	0	-

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)

FCC Part 15, Subpart E (15.407)

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:

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

Limits of unwanted emission out of the restricted bands

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

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

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Oct. 17, 2017	Oct. 16, 2018
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Dec. 12, 2017	Dec. 11, 2018
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Dec. 11, 2017	Dec. 10, 2018
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-1170	Dec. 13, 2017	Dec. 12, 2018
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170241	Dec. 01, 2017	Nov. 30, 2018
Loop Antenna TESEQ	HLA 6121	45745	Jun. 14, 2018	Jun. 13, 2019
Preamplifier Agilent (Below 1GHz)	8447D	2944A10631	Aug. 08, 2017 Aug. 08, 2018	Aug. 07, 2018 Aug. 07, 2019
Preamplifier Agilent (Above 1GHz)	8449B	3008A01961	Oct. 16, 2017	Oct. 15, 2018
RF signal cable HUBER+SUHNER	SUCOFLEX 104	MY 13380+295012/04	Aug. 08, 2017 Aug. 08, 2018	Aug. 07, 2018 Aug. 07, 2019
RF signal cable HUBER+SUHNER	SUCOFLEX 104	Cable-CH4-03 (250724)	Aug. 08, 2017 Aug. 08, 2018	Aug. 07, 2018 Aug. 07, 2019
Software BV ADT	ADT_Radiated_ V7.6.15.9.5	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller BV ADT	AT100	AT93021703	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
26GHz ~ 40GHz Amplifier Agilent	8449B	3008A01961	Oct. 16, 2017	Oct. 15, 2018
High Speed Peak Power Meter	ML2495A	1232001	Dec. 13, 2017	Dec. 12, 2018
Power Sensor	MA2411B	1207334	Dec. 13, 2017	Dec. 12, 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 4.
3. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.
4. The IC Site Registration No. is 7450F-4.

4.1.3 Test Procedures

For Radiated emission below 30MHz

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

Note:

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

For Radiated emission above 30MHz

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

Note:

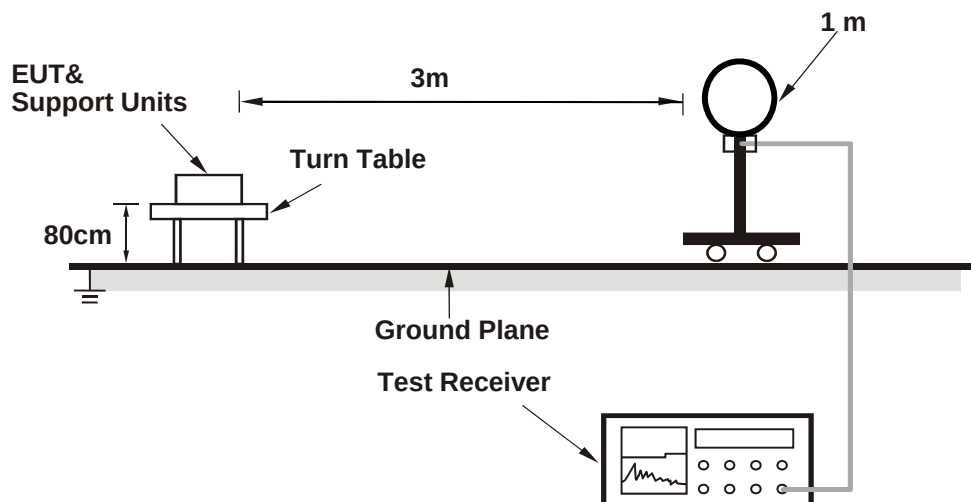
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

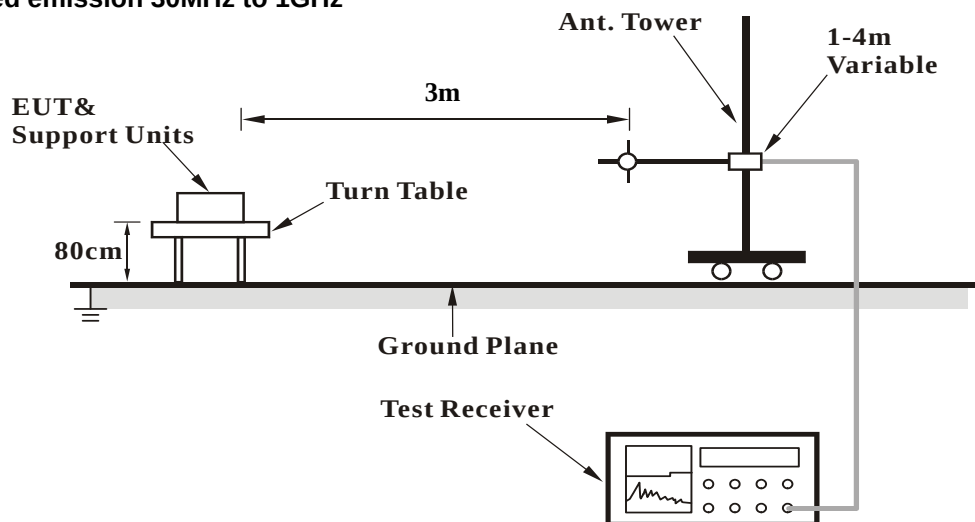
No deviation.

4.1.5 Test Setup

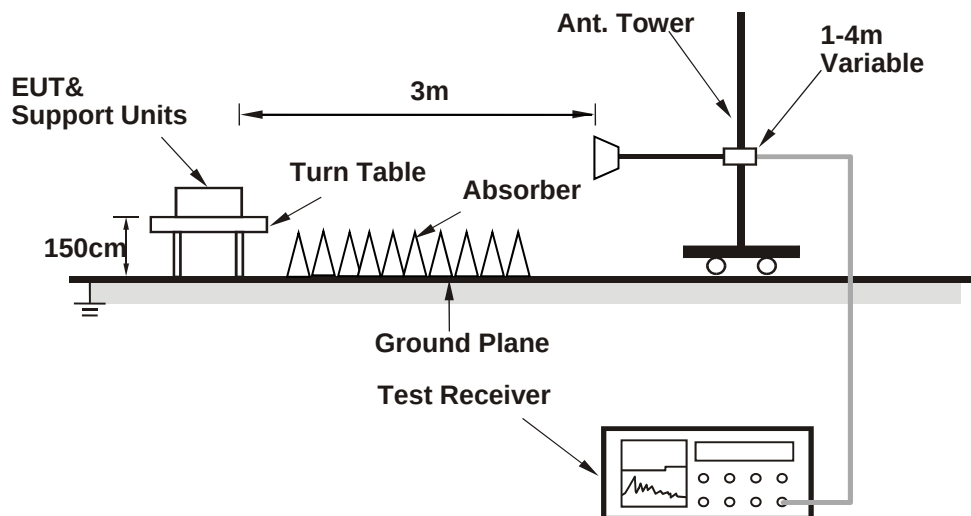
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

- Placed the EUT on the testing table.
- Prepared a notebook to act as a communication partner and placed it outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

4.1.7 Test Results

Above 1GHz data:

802.11b + 802.11a

CHANNEL	CH 6 + 157	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.6 PK			1.20 H	40	79.2	33.4
2	*2437.00	108.0 AV			1.20 H	40	74.6	33.4
3	4874.00	49.3 PK	74.0	-24.7	2.42 H	344	46.0	3.3
4	4874.00	40.2 AV	54.0	-13.8	2.42 H	344	36.9	3.3
5	#5622.40	57.7 PK	68.2	-10.5	3.23 H	212	54.2	3.5
6	*5785.00	116.8 PK			3.23 H	212	74.4	42.4
7	*5785.00	106.7 AV			3.23 H	212	64.3	42.4
8	#5938.40	59.3 PK	68.2	-8.9	3.23 H	212	54.8	4.5
9	11570.00	60.3 PK	74.0	-13.7	2.66 H	144	44.3	16.0
10	11570.00	47.7 AV	54.0	-6.3	2.66 H	144	31.7	16.0

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	122.9 PK			1.75 V	45	89.5	33.4
2	*2437.00	118.1 AV			1.75 V	45	84.7	33.4
3	4874.00	51.3 PK	74.0	-22.7	1.25 V	199	48.0	3.3
4	4874.00	44.3 AV	54.0	-9.7	1.25 V	199	41.0	3.3
5	#5614.40	62.9 PK	68.2	-5.3	1.40 V	21	59.4	3.5
6	*5785.00	123.9 PK			1.40 V	21	81.5	42.4
7	*5785.00	113.6 AV			1.40 V	21	71.2	42.4
8	#5950.40	64.2 PK	68.2	-4.0	1.40 V	21	59.6	4.6
9	11570.00	61.1 PK	74.0	-12.9	1.70 V	320	45.1	16.0
10	11570.00	48.1 AV	54.0	-5.9	1.70 V	320	32.1	16.0

Remarks:

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

802.11b + 802.11ac (VHT40)

CHANNEL	CH 6 + 54	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.2 PK			1.65 H	79	78.8	33.4
2	*2437.00	107.3 AV			1.65 H	79	73.9	33.4
3	4874.00	51.0 PK	74.0	-23.0	1.59 H	243	38.6	12.4
4	4874.00	37.6 AV	54.0	-16.4	1.59 H	243	25.2	12.4
5	5150.00	57.0 PK	74.0	-17.0	1.06 H	55	45.2	11.8
6	5150.00	43.8 AV	54.0	-10.2	1.06 H	55	32.0	11.8
7	*5270.00	105.9 PK			1.06 H	55	65.5	40.4
8	*5270.00	96.2 AV			1.06 H	55	55.8	40.4
9	#10540.00	61.8 PK	68.2	-6.4	3.14 H	115	39.6	22.2

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	*2437.00	122.8 PK			1.77 V	80	89.4	33.4
2	*2437.00	117.7 AV			1.77 V	80	84.3	33.4
3	4874.00	51.9 PK	74.0	-22.1	2.30 V	124	39.5	12.4
4	4874.00	38.3 AV	54.0	-15.7	2.30 V	124	25.9	12.4
5	5150.00	57.2 PK	74.0	-16.8	2.83 V	165	45.4	11.8
6	5150.00	48.4 AV	54.0	-5.6	2.83 V	165	36.6	11.8
7	*5270.00	113.4 PK			2.83 V	165	73.0	40.4
8	*5270.00	102.5 AV			2.83 V	165	62.1	40.4
9	#10540.00	62.0 PK	68.2	-6.2	1.65 V	217	39.8	22.2

Remarks:

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

802.11b + 802.11ac (VHT160(80+80))

CHANNEL	CH 6 + (42+58)	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.4 PK			1.45 H	68	79.0	33.4
2	*2437.00	107.6 AV			1.45 H	68	74.2	33.4
3	4874.00	51.1 PK	74.0	-22.9	1.69 H	251	38.7	12.4
4	4874.00	37.8 AV	54.0	-16.2	1.69 H	251	25.4	12.4
5	5150.00	59.8 PK	74.0	-14.2	1.33 H	358	48.0	11.8
6	5150.00	46.7 AV	54.0	-7.3	1.33 H	358	34.9	11.8
7	*5210.00	104.4 PK			1.33 H	358	63.7	40.7
8	*5210.00	93.3 AV			1.33 H	358	52.6	40.7
9	*5290.00	103.6 PK			1.45 H	277	63.2	40.4
10	*5290.00	93.0 AV			1.45 H	277	52.6	40.4
11	5350.00	59.5 PK	74.0	-14.5	1.45 H	277	47.6	11.9
12	5350.00	46.2 AV	54.0	-7.8	1.45 H	277	34.3	11.9
13	#10420.00	61.8 PK	68.2	-6.4	2.65 H	154	39.5	22.3
14	#10580.00	61.5 PK	68.2	-6.7	2.87 H	126	39.3	22.2

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	*2437.00	122.7 PK			1.63 V	69	89.3	33.4
2	*2437.00	117.9 AV			1.63 V	69	84.5	33.4
3	4874.00	51.8 PK	74.0	-22.2	2.38 V	114	39.4	12.4
4	4874.00	38.3 AV	54.0	-15.7	2.38 V	114	25.9	12.4
5	5150.00	65.9 PK	74.0	-8.1	1.33 V	346	54.1	11.8
6	5150.00	53.4 AV	54.0	-0.6	1.33 V	346	41.6	11.8
7	*5210.00	113.2 PK			1.33 V	346	72.5	40.7
8	*5210.00	101.9 AV			1.33 V	346	61.2	40.7
9	*5290.00	108.6 PK			1.09 V	299	68.2	40.4
10	*5290.00	98.2 AV			1.09 V	299	57.8	40.4
11	5350.00	61.1 PK	74.0	-12.9	1.09 V	299	49.2	11.9
12	5350.00	47.6 AV	54.0	-6.4	1.09 V	299	35.7	11.9
13	#10420.00	62.3 PK	68.2	-5.9	1.72 V	41	40.0	22.3
14	#10580.00	62.6 PK	68.2	-5.6	1.63 V	51	40.4	22.2

Remarks:

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

802.11b + 802.11ac (VHT160(80+80))

CHANNEL	CH 6 + (106+122)	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	112.3 PK			1.53 H	75	78.9	33.4
2	*2437.00	107.5 AV			1.53 H	75	74.1	33.4
3	4874.00	51.3 PK	74.0	-22.7	1.66 H	231	38.9	12.4
4	4874.00	37.8 AV	54.0	-16.2	1.66 H	231	25.4	12.4
5	5460.00	58.2 PK	74.0	-15.8	1.03 H	81	45.7	12.5
6	5460.00	45.3 AV	54.0	-8.7	1.03 H	81	32.8	12.5
7	#5470.00	58.8 PK	68.2	-9.4	1.03 H	81	46.3	12.5
8	*5530.00	104.2 PK			1.03 H	81	62.5	41.7
9	*5530.00	94.0 AV			1.03 H	81	52.3	41.7
10	*5610.00	105.6 PK			2.64 H	218	63.9	41.7
11	*5610.00	95.2 AV			2.64 H	218	53.5	41.7
12	#5725.00	58.6 PK	68.2	-9.6	2.64 H	218	45.8	12.8
13	11060.00	62.3 PK	74.0	-11.7	2.59 H	142	39.5	22.8
14	11060.00	50.6 AV	54.0	-3.4	2.59 H	142	27.8	22.8
15	11220.00	62.1 PK	74.0	-11.9	2.03 H	179	39.5	22.6
16	11220.00	50.2 AV	54.0	-3.8	2.03 H	179	27.6	22.6

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	*2437.00	123.0 PK			1.69 V	102	89.6	33.4
2	*2437.00	117.9 AV			1.69 V	102	84.5	33.4
3	4874.00	51.6 PK	74.0	-22.4	2.41 V	126	39.2	12.4
4	4874.00	38.1 AV	54.0	-15.9	2.41 V	126	25.7	12.4
5	5460.00	62.0 PK	74.0	-12.0	1.89 V	53	49.5	12.5
6	5460.00	48.2 AV	54.0	-5.8	1.89 V	53	35.7	12.5
7	#5470.00	62.8 PK	68.2	-5.4	1.89 V	53	50.3	12.5
8	*5530.00	111.9 PK			1.89 V	53	70.2	41.7
9	*5530.00	101.6 AV			1.89 V	53	59.9	41.7
10	*5610.00	111.5 PK			2.88 V	201	69.8	41.7
11	*5610.00	101.0 AV			2.88 V	201	59.3	41.7
12	#5725.00	60.3 PK	68.2	-7.9	2.88 V	201	47.5	12.8
13	11060.00	62.5 PK	74.0	-11.5	2.66 V	195	39.7	22.8
14	11060.00	50.3 AV	54.0	-3.7	2.66 V	195	27.5	22.8
15	11220.00	62.4 PK	74.0	-11.6	2.37 V	142	39.8	22.6
16	11220.00	50.1 AV	54.0	-3.9	2.37 V	142	27.5	22.6

Remarks:

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

Below 1GHz data:

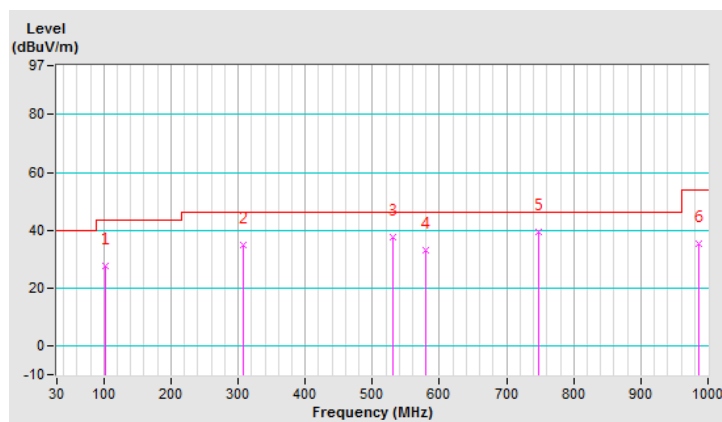
802.11b + 802.11a

CHANNEL	CH 6 + 157	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	101.69	27.6 QP	43.5	-15.9	1.00 H	297	40.7	-13.1
2	307.38	35.0 QP	46.0	-11.0	1.00 H	94	41.9	-6.9
3	530.52	37.7 QP	46.0	-8.3	1.49 H	220	40.5	-2.8
4	579.03	33.0 QP	46.0	-13.0	1.49 H	169	34.5	-1.5
5	747.85	39.3 QP	46.0	-6.7	1.49 H	6	36.9	2.4
6	986.52	35.2 QP	54.0	-18.8	1.49 H	189	29.0	6.2

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

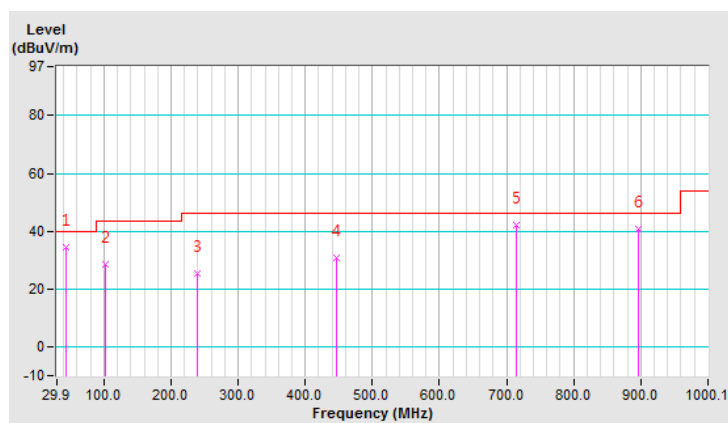


CHANNEL	CH 6 + 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	43.48	34.3 QP	40.0	-5.7	2.00 V	208	43.7	-9.4
2	101.69	28.7 QP	43.5	-14.8	1.00 V	213	41.8	-13.1
3	239.46	25.5 QP	46.0	-20.5	2.00 V	252	35.1	-9.6
4	447.09	30.6 QP	46.0	-15.4	1.49 V	16	34.7	-4.1
5	714.86	42.0 QP	46.0	-4.0	2.00 V	316	40.7	1.3
6	897.26	40.9 QP	46.0	-5.1	1.49 V	300	36.2	4.7

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



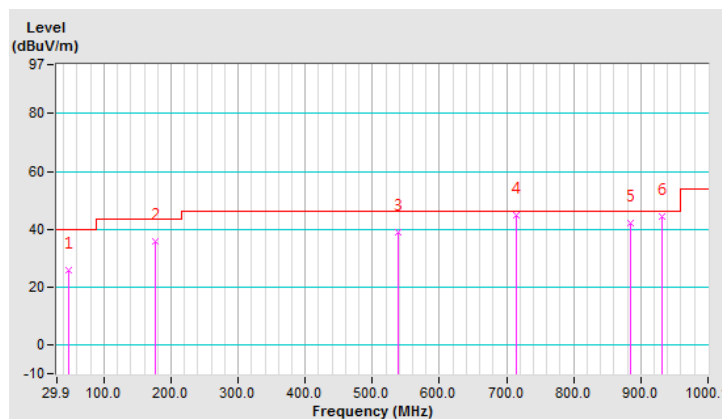
802.11b + 802.11ac (VHT40)

CHANNEL	CH 6 + 54	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	47.36	25.6 QP	40.0	-14.4	1.49 H	26	34.6	-9.0
2	177.37	35.9 QP	43.5	-7.6	1.00 H	274	45.4	-9.5
3	538.28	39.1 QP	46.0	-6.9	1.49 H	233	41.8	-2.7
4	714.86	45.0 QP	46.0	-1.0	1.99 H	259	43.7	1.3
5	885.62	42.0 QP	46.0	-4.0	1.49 H	6	37.5	4.5
6	932.19	44.3 QP	46.0	-1.7	1.99 H	13	38.7	5.6

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

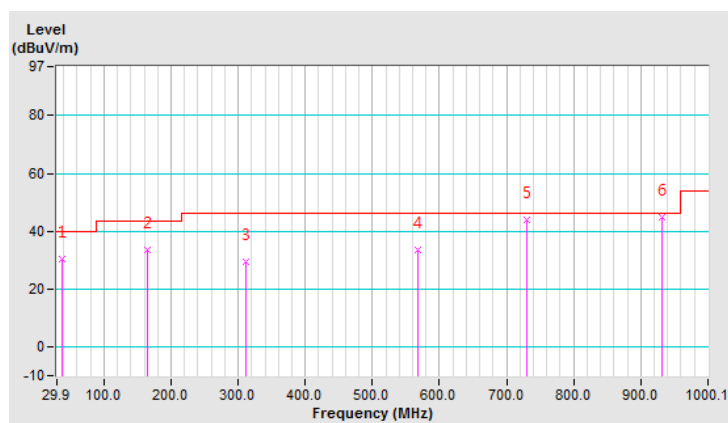


CHANNEL	CH 6 + 54	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	37.66	30.3 QP	40.0	-9.7	1.00 V	174	40.3	-10.0
2	165.73	33.3 QP	43.5	-10.2	1.00 V	310	42.0	-8.7
3	311.26	29.6 QP	46.0	-16.4	1.00 V	250	36.4	-6.8
4	567.39	33.3 QP	46.0	-12.7	1.00 V	129	35.3	-2.0
5	730.38	44.0 QP	46.0	-2.0	3.99 V	13	42.1	1.9
6	932.19	44.7 QP	46.0	-1.3	3.99 V	14	39.1	5.6

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



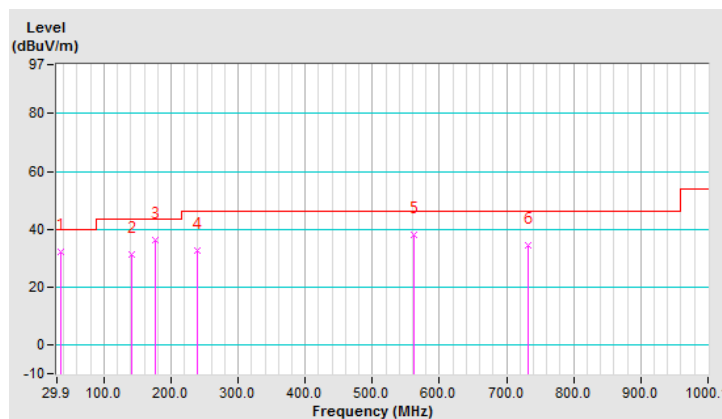
802.11b + 802.11ac (VHT160(80+80))

CHANNEL	CH 6 + (42+58)	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	35.72	32.1 QP	40.0	-7.9	1.01 H	188	42.4	-10.3
2	140.50	31.2 QP	43.5	-12.3	1.01 H	7	40.3	-9.1
3	177.37	36.4 QP	43.5	-7.1	1.01 H	265	45.9	-9.5
4	239.46	32.5 QP	46.0	-13.5	1.99 H	157	42.1	-9.6
5	561.57	37.9 QP	46.0	-8.1	1.50 H	229	40.1	-2.2
6	732.32	34.6 QP	46.0	-11.4	1.01 H	168	32.6	2.0

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

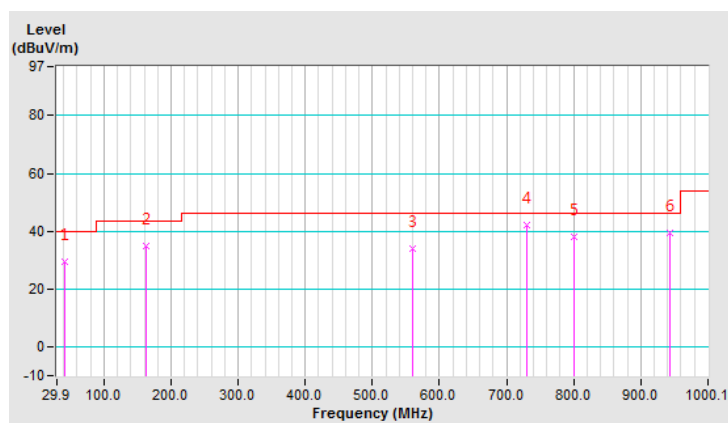


CHANNEL	CH 6 + (42+58)	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	41.54	29.3 QP	40.0	-10.7	2.00 V	28	38.7	-9.4
2	163.79	34.9 QP	43.5	-8.6	1.00 V	346	43.5	-8.6
3	559.63	33.8 QP	46.0	-12.2	1.00 V	233	36.0	-2.2
4	730.38	42.1 QP	46.0	-3.9	1.00 V	253	40.2	1.9
5	800.24	37.9 QP	46.0	-8.1	1.49 V	291	34.6	3.3
6	943.83	39.2 QP	46.0	-6.8	1.49 V	100	33.1	6.1

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



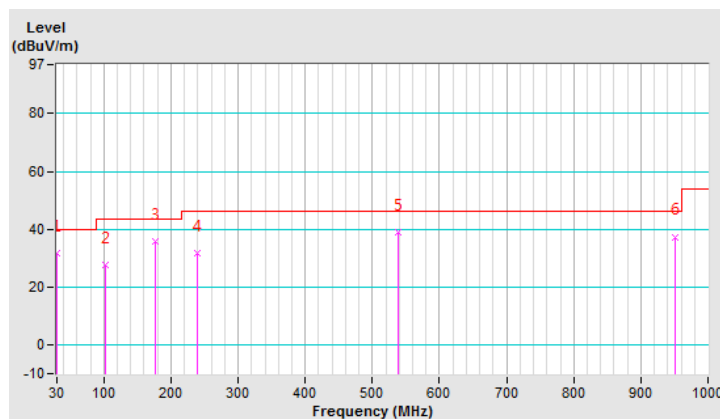
802.11b + 802.11ac (VHT160(80+80))

CHANNEL	CH 6 + (106+122)	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	30.00	31.9 QP	40.0	-8.1	1.49 H	6	42.6	-10.7
2	101.69	27.6 QP	43.5	-15.9	1.00 H	297	40.7	-13.1
3	177.37	35.9 QP	43.5	-7.6	1.00 H	274	45.4	-9.5
4	239.46	31.9 QP	46.0	-14.1	1.49 H	196	41.5	-9.6
5	538.28	39.1 QP	46.0	-6.9	1.49 H	233	41.8	-2.7
6	951.59	37.4 QP	46.0	-8.6	1.49 H	9	31.3	6.1

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

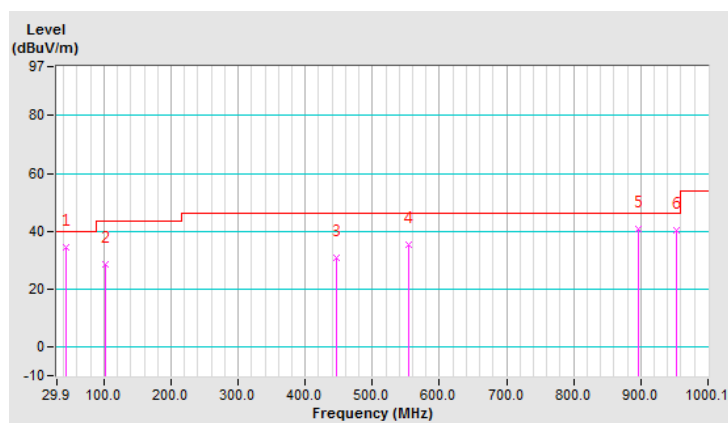


CHANNEL	CH 6 + (106+122)	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	43.48	34.3 QP	40.0	-5.7	2.00 V	208	43.7	-9.4
2	101.69	28.7 QP	43.5	-14.8	1.00 V	213	41.8	-13.1
3	447.09	30.6 QP	46.0	-15.4	1.49 V	16	34.7	-4.1
4	553.81	35.2 QP	46.0	-10.8	1.00 V	74	37.6	-2.4
5	897.26	40.9 QP	46.0	-5.1	1.49 V	300	36.2	4.7
6	953.53	40.1 QP	46.0	-5.9	1.49 V	42	34.0	6.1

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

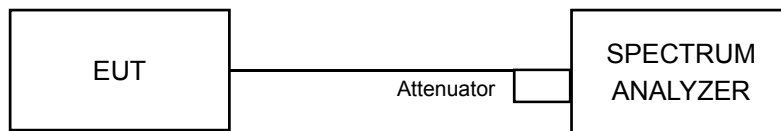


4.2 Conducted Out of Band Emission Measurement

4.2.1 Limits of Conducted Out of Band Emission Measurement

Below 30dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.2.2 Test Setup



4.2.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.2.4 Test Procedure

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = average.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

4.2.5 Deviation from Test Standard

No deviation.

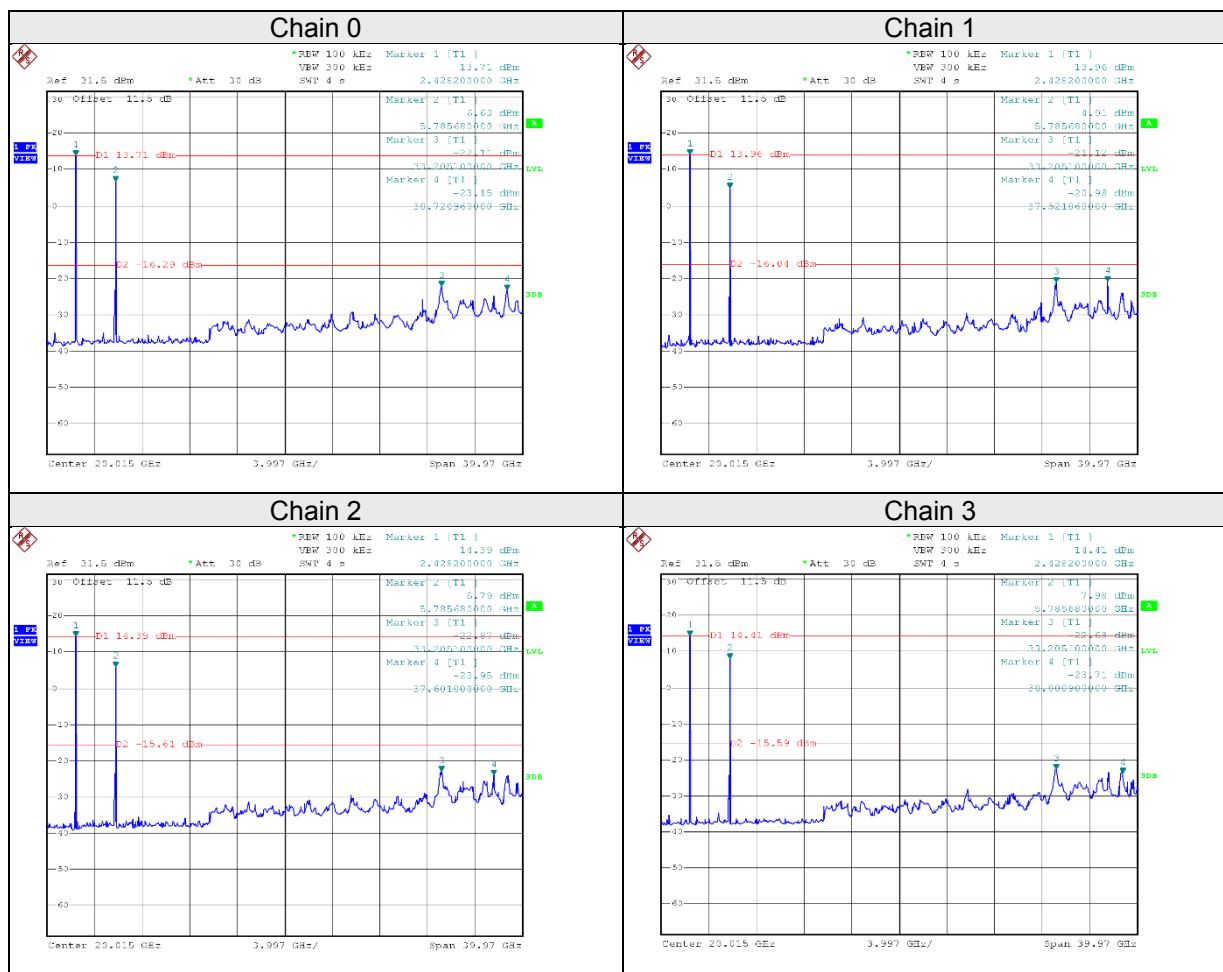
4.2.6 EUT Operating Condition

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

4.2.7 Test Results

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 30dB offset below D1. It shows compliance with the requirement.

Worst case: 802.11b: CH 6 + 802.11a: CH 157

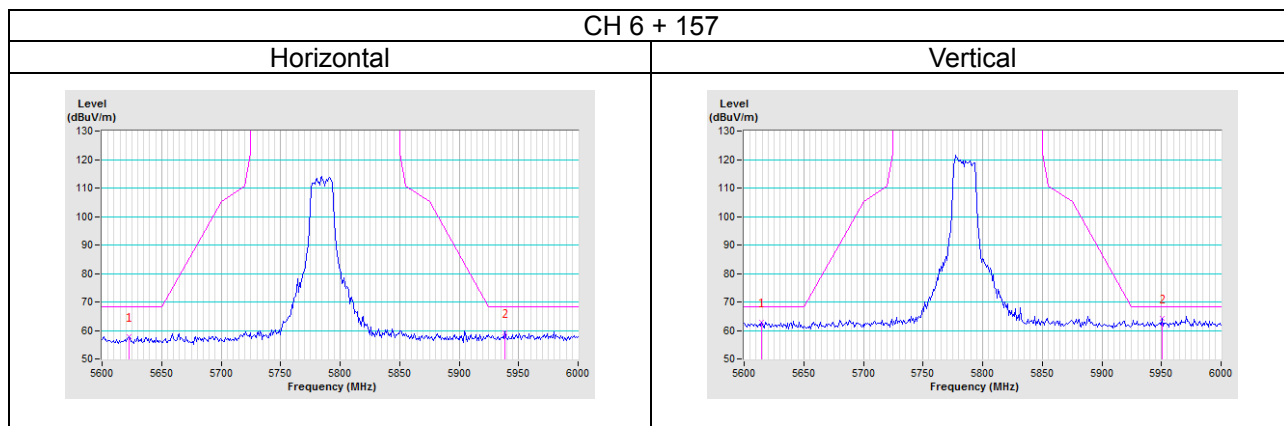


5 Pictures of Test Arrangements

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

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

802.11b + 802.11a



Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety Lab

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

--- END ---