FCC Test Report

(Co-Located)

Report No.:	RF181001C14-6
FCC ID:	A4RG020F
Model Name:	G020F
Received Date:	Oct. 01, 2018
Test Date:	Dec. 06 ~ Dec. 07, 2018
Issued Date:	Dec. 25, 2018
Applicant:	Google LLC
Address:	1600 Amphitheatre Parkway, Mountain View, CA 94043
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 (1):	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)
Test Location (2):	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)
FCC Registration / Designation Number (1):	788550 / TW0003
FCC Registration / Designation Number (2):	198487 / TW2021

Testing Laboratory
2021

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Release Control Record

Issue No.	Description	Date Issued
RF181001C14-6	Original release	Dec. 25, 2018

1 Certificate of Conformity

Product:	Smartphone
Model Name:	G020F
Sample Status:	Identical Prototype
Applicant:	Google LLC
Test Date:	Dec. 06 ~ Dec. 07, 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 : Pettie Chen , **Date:** Dec. 25, 2018

Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Dec. 25, 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 -3.26dB at 18000.00MHz.

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	9kHz ~ 30MHz	2.38 dB
	30MHz ~ 1GHz	5.54 dB
	Above 1GHz	5.48 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Smartphone	
Model Name	G020F	
Status of EUT	Identical Prototype	
Power Supply Rating	3.85Vdc (Battery) 5Vdc or 9Vdc (Adapter) 5Vdc (Host equipment)	
Modulation Type	WLAN	CCK, DQPSK, DBPSK for DSSS 256QAM, 64QAM, 16QAM, QPSK, BPSK for OFDM
	Bluetooth EDR	GFSK, π/4-DQPSK, 8DPSK
	Bluetooth LE	GFSK
Modulation Technology	WLAN	DSSS, OFDM
Transfer Rate	WLAN	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11a: 54/48/36/24/18/12/9/6Mbps 802.11n: up to 300Mbps 802.11ac: up to 867Mbps
	Bluetooth EDR	1/2/3Mbps
	Bluetooth LE	2Mbps
Operating Frequency	WLAN	2.4GHz: 2412~2472MHz 5.0GHz: 5180~5240MHz, 5260~5320MHz, 5500~5720MHz, 5745~5825MHz
	Bluetooth EDR	2402 ~ 2480MHz
	Bluetooth LE	2402 ~ 2480MHz

Number of Channel	WLAN	2412 ~ 2472MHz: 802.11b, 802.11g, 802.11n (HT20): 13 5180 ~ 5240MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5260 ~ 5320MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 4 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1 5500 ~ 5720MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 12 802.11n (HT40), 802.11ac (VHT40): 6 802.11ac (VHT80): 3 5745 ~ 5825MHz: 802.11a, 802.11n (HT20), 802.11ac (VHT20): 5 802.11n (HT40), 802.11ac (VHT40): 2 802.11ac (VHT80): 1
	Bluetooth EDR	79
	Bluetooth LE	40
Output Power	WLAN	2412 ~ 2472MHz: 380.211mW 5180 ~ 5240MHz: 111.439mW 5260 ~ 5320MHz: 110.165mW 5500 ~ 5720MHz: 111.335mW 5745 ~ 5825MHz: 111.850mW
	Bluetooth EDR	60.117mW
	Bluetooth LE	LE 4.0: 8.750mW LE 5.0: 9.247mW
Antenna Type	Refer to Note as below	
Antenna Connector	Refer to Note as below	
Power cable	Refer to Note as below	
Accessory Device	Refer to Note as below	

Note:

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

Band	Modulation Mode	TX Function
2.4GHz	802.11g	1TX(SISO)/2TX(MIMO)
	802.11b	1TX(SISO)/2TX(MIMO)
	802.11n (HT20)	1TX(SISO)/2TX(MIMO)
	802.11ac (VHT20)	1TX(SISO)/2TX(MIMO)
5GHz	802.11a	1TX(SISO)/2TX(MIMO)
	802.11n (HT20)	1TX(SISO)/2TX(MIMO)
	802.11n (HT40)	1TX(SISO)/2TX(MIMO)
	802.11ac (VHT20)	1TX(SISO)/2TX(MIMO)
	802.11ac (VHT40)	1TX(SISO)/2TX(MIMO)
	802.11ac (VHT80)	1TX(SISO)/2TX(MIMO)

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

2. There're 2 configurations for the EUT listed as below.
   - Main Sample: EUT + Battery 1
   - 2nd Sample: EUT + Battery 2

   After pre-tested with the EUT, only the worst configuration (main sample) was chosen for the final test.
3. The EUT accessories list refers to EUT Photo.pdf.
4. The following antennas were provided to the EUT.

No.	Type	Connector	Gain (dBi)				
			2.4-2.4835GHz	5.15-5.25GHz	5.25-5.35GHz	5.47-5.725GHz	5.725-5.85GHz
0	PIFA	NA	-0.6	-2.2	-2.5	-3.6	-3.0
1	PIFA	NA	0	-0.5	-0.5	-1.2	-2.2

3.2 Description of Test Modes

For 2.4GHz

13 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	8	2447MHz
2	2417MHz	9	2452MHz
3	2422MHz	10	2457MHz
4	2427MHz	11	2462MHz
5	2432MHz	12	2467MHz
6	2437MHz	13	2472MHz
7	2442MHz		

For 5180 ~ 5240MHz:

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

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

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

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

For 5260 ~ 5320MHz:

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

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):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

For 5500 ~ 5720MHz:

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

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	144	5720 MHz

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

Channel	Frequency	Channel	Frequency
102	5510 MHz	126	5630 MHz
110	5550 MHz	134	5670 MHz
118	5590 MHz	142	5710 MHz

3 channels are provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530 MHz	122	5610 MHz
138	5690 MHz		

For 5745 ~ 5825MHz:

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

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

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

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

For Bluetooth EDR:

79 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

For Bluetooth LE:

40 channels are provided to this EUT:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement
RE<1G: Radiated Emission below 1GHz
OB: Conducted Out-Band Emission 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. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)	2412 ~ 2472	1 to 13	6 + 36	DSSS
		5180 ~ 5240	38 to 46		OFDM
		5260 ~ 5320	52 to 64		OFDM
		5500 ~ 5720	100 to 144		OFDM
		5745 ~ 5825	149 to 165		OFDM
-	BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)	2402 ~ 2480	0 to 78	39 + 6	FHSS
		2412 ~ 2472	1 to 13		DSSS
-	BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)	2402 ~ 2480	0 to 78	39 + 157	FHSS
		5180 ~ 5240	38 to 46		OFDM
		5260 ~ 5320	52 to 64		OFDM
		5500 ~ 5720	100 to 144		OFDM
		5745 ~ 5825	149 to 165		OFDM

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. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)	2412 ~ 2472	1 to 13	6 + 36	DSSS
		5180 ~ 5240	38 to 46		OFDM
		5260 ~ 5320	52 to 64		OFDM
		5500 ~ 5720	100 to 144		OFDM
		5745 ~ 5825	149 to 165		OFDM
-	BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)	2402 ~ 2480	0 to 78	39 + 6	FHSS
		2412 ~ 2472	1 to 13		DSSS
-	BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)	2402 ~ 2480	0 to 78	39 + 157	FHSS
		5180 ~ 5240	38 to 46		OFDM
		5260 ~ 5320	52 to 64		OFDM
		5500 ~ 5720	100 to 144		OFDM
		5745 ~ 5825	149 to 165		OFDM

Conducted Out-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	Freq. Range (MHz)	Available Channel	Tested Channel	Modulation Technology
-	BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)	2402 ~ 2480	0 to 78	39 + 157	FHSS
		5180 ~ 5240	38 to 46		OFDM
		5260 ~ 5320	52 to 64		OFDM
		5500 ~ 5720	100 to 144		OFDM
		5745 ~ 5825	149 to 165		OFDM

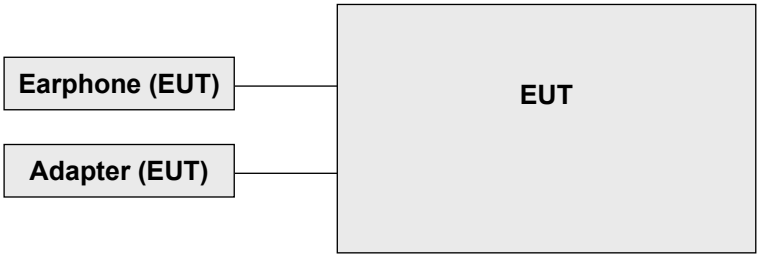
Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 75% RH	120Vac, 60Hz	Ian Chang
RE<1G	25 deg. C, 75% RH	120Vac, 60Hz	Ian Chang
OB	25 deg. C, 75% RH	120Vac, 60Hz	Ian Chang

3.3 Description of Support Units

The EUT has been tested as an independent unit.

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. Other emissions shall be at least 30dB below the highest level of the desired power:

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><th colspan="3">Applicable To</th><th colspan="2">Limit</th></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.	Cal. Date	Cal. Due
HP Preamplifier	8447D	2432A03504	Feb. 21, 2018	Feb. 20, 2019
HP Preamplifier	8449B	3008A01201	Feb. 22, 2018	Feb. 21, 2019
MITEQ Preamplifier	AMF-6F-260400-33-8P	892164	Feb. 21, 2018	Feb. 20, 2019
Agilent TEST RECEIVER	N9038A	MY51210129	Feb. 06, 2018	Feb. 05, 2019
Schwarzbeck Antenna	VULB 9168	139	Dec. 29, 2017	Dec. 28, 2018
Schwarzbeck Antenna	VHBA 9123	480	May 19, 2017	May 18, 2019
Schwarzbeck Horn Antenna	BBHA-9170	212	Dec. 29, 2017	Dec. 28, 2018
Schwarzbeck Horn Antenna	BBHA 9120-D1	D130	Mar. 29, 2018	Mar. 28, 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. 04, 2018	Jun. 03, 2019
KEYSIGHT Spectrum Analyzer	N9030A	MY54490260	Aug. 03, 2018	Aug. 02, 2019
Loop Antenna EMCI	LPA600	270	Aug. 11, 2017	Aug. 10, 2019
EMCO Horn Antenna	3115	00028257	Mar. 29, 2018	Mar. 28, 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. 26, 2018	Apr. 25, 2019
Anritsu Power Meter	ML2495A	0842014	Apr. 26, 2018	Apr. 25, 2019

Note: 1. The calibration interval of the above test instruments is 12 months (24 months for Loop Antenna) 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 Lin Kou Chamber No. 6.
4. The Industry Canada Reference No. 7450E-6.

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:

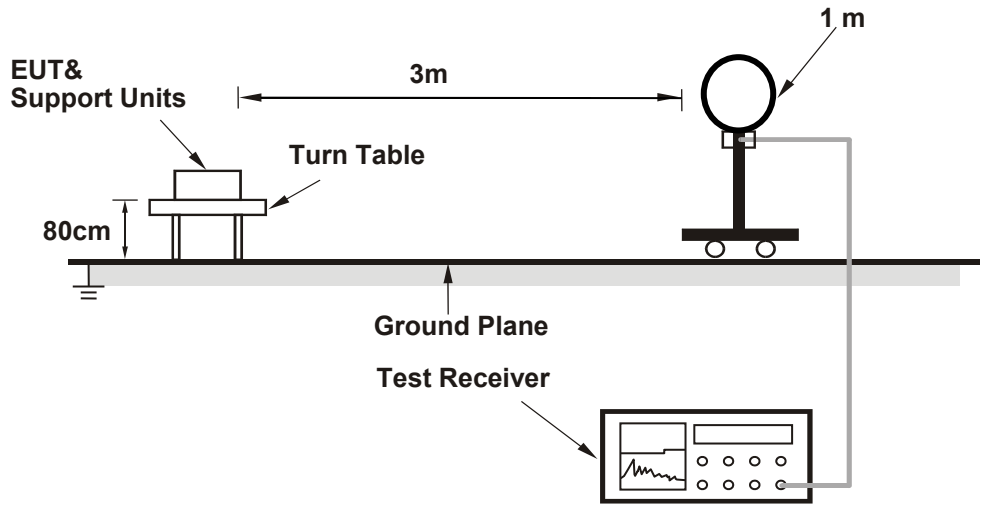
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

4.1.4 Deviation from Test Standard

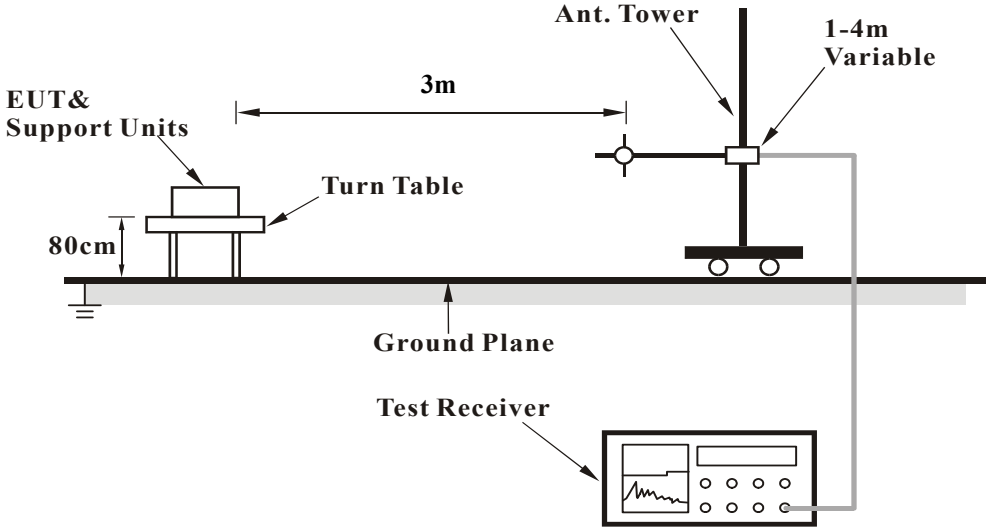
No deviation.

4.1.5 Test Setup

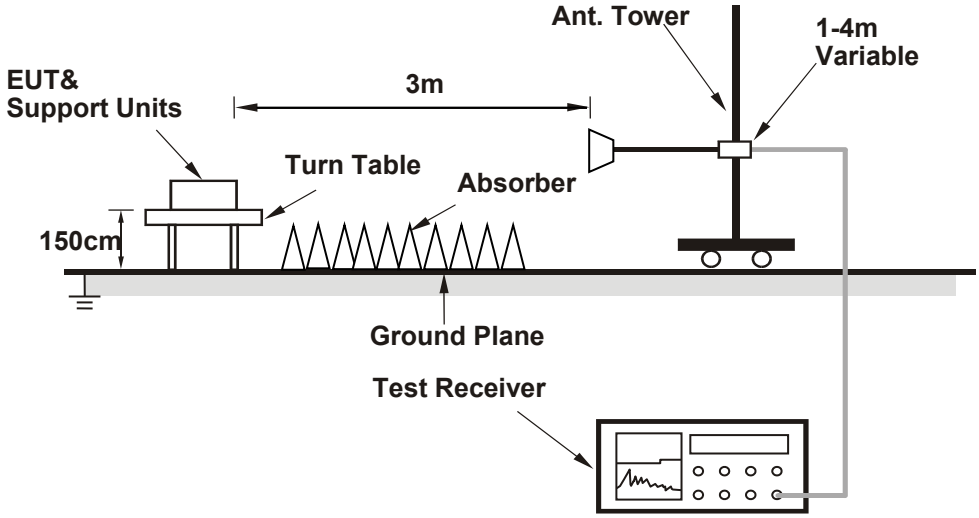
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



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

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results for Fundamental and Harmonic above 1GHz

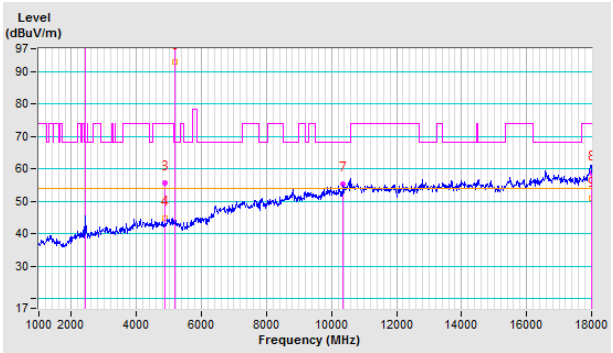
802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)

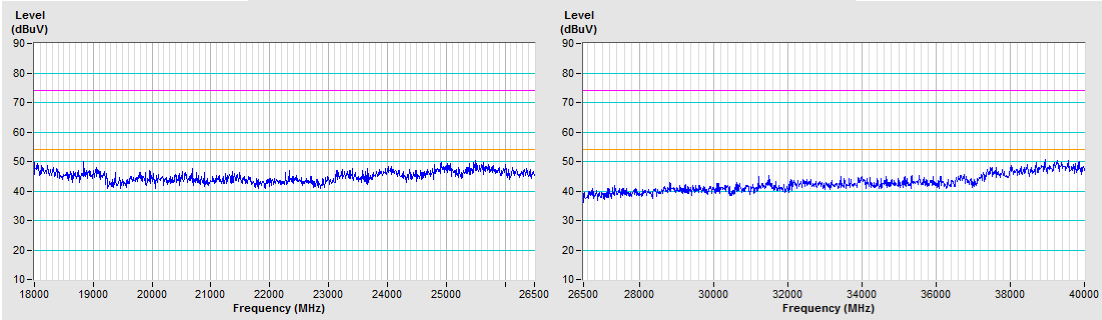
CHANNEL	CH 6 + CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*2437.00	106.25 PK			1.48 H	237	107.99	-1.74
2	*2437.00	103.01 AV			1.48 H	237	104.75	-1.74
3	4874.00	55.78 PK	74.00	-18.22	1.96 H	238	50.91	4.87
4	4874.00	44.89 AV	54.00	-9.11	1.96 H	238	40.02	4.87
5	*5180.00	105.47 PK			1.09 H	276	100.42	5.05
6	*5180.00	92.95 AV			1.09 H	276	87.90	5.05
7	#10360.00	55.46 PK	68.20	-12.74	1.47 H	158	39.72	15.74
8	18000.00	58.86 PK	74.00	-15.14	1.77 H	120	36.38	22.48
9	**18000.00**	**50.74 AV**	**54.00**	**-3.26**	**1.77 H**	**120**	**28.26**	**22.48**

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



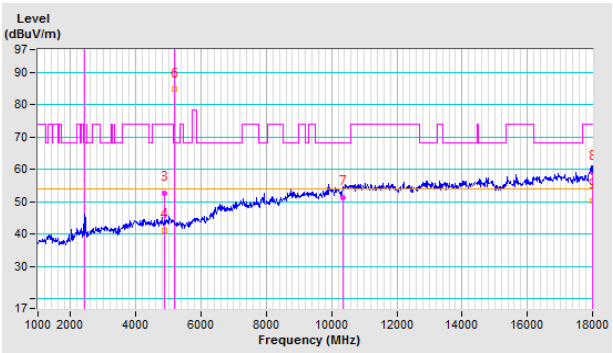


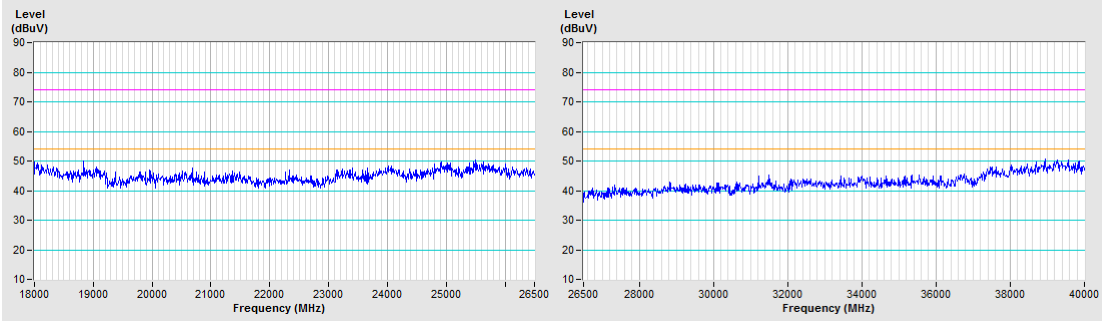
CHANNEL	CH 6 + CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	104.51 PK			1.87 V	146	106.25	-1.74
2	*2437.00	101.66 AV			1.87 V	146	103.40	-1.74
3	4874.00	52.64 PK	74.00	-21.36	2.26 V	195	47.77	4.87
4	4874.00	41.16 AV	54.00	-12.84	2.26 V	195	36.29	4.87
5	*5180.00	102.03 PK			2.45 V	115	96.98	5.05
6	*5180.00	84.65 AV			2.45 V	115	79.60	5.05
7	#10360.00	51.19 PK	68.20	-17.01	1.89 V	224	35.45	15.74
8	18000.00	59.10 PK	74.00	-14.90	1.92 V	334	36.62	22.48
9	18000.00	50.23 AV	54.00	-3.77	1.92 V	334	27.75	22.48

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. 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.





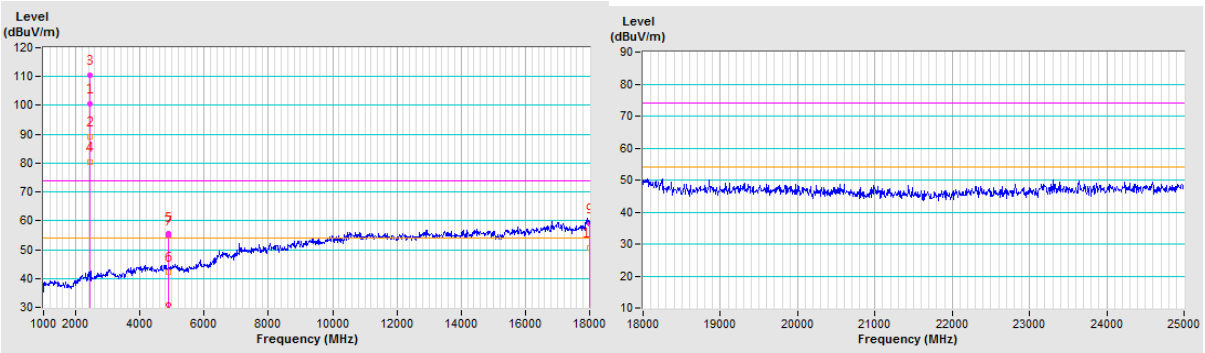
BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)

CHANNEL	CH 39 + CH 6	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	*2437.00	100.43 PK			2.72 H	333	102.17	-1.74
2	*2437.00	89.04 AV			2.72 H	333	90.78	-1.74
3	*2441.00	110.47 PK			1.63 H	124	112.23	-1.76
4	*2441.00	80.37 AV			1.63 H	124	82.13	-1.76
5	4874.00	55.74 PK	74.00	-18.26	1.00 H	229	50.87	4.87
6	4874.00	42.08 AV	54.00	-11.92	1.00 H	229	37.21	4.87
7	4882.00	54.87 PK	74.00	-19.13	1.94 H	236	50.00	4.87
8	4882.00	24.77 AV	54.00	-29.23	1.94 H	236	19.90	4.87
9	18000.00	59.05 PK	74.00	-14.95	1.91 H	201	36.57	22.48
10	18000.00	50.63 AV	54.00	-3.37	1.91 H	201	28.15	22.48

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.

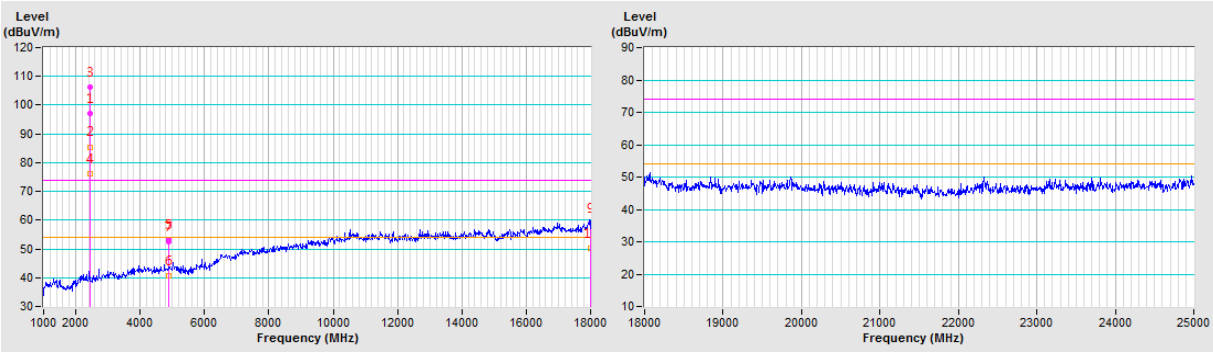


CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	96.96 PK			2.63 V	225	98.70	-1.74
2	*2437.00	85.47 AV			2.63 V	225	87.21	-1.74
3	*2441.00	106.35 PK			1.87 V	201	108.11	-1.76
4	*2441.00	76.25 AV			1.87 V	201	78.01	-1.76
5	4874.00	53.16 PK	74.00	-20.84	1.69 V	229	48.29	4.87
6	4874.00	40.66 AV	54.00	-13.34	1.69 V	229	35.79	4.87
7	4882.00	52.56 PK	74.00	-21.44	1.78 V	54	47.69	4.87
8	4882.00	22.46 AV	54.00	-31.54	1.78 V	54	17.59	4.87
9	18000.00	58.85 PK	74.00	-15.15	2.23 V	189	36.37	22.48
10	18000.00	50.08 AV	54.00	-3.92	2.23 V	189	27.60	22.48

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



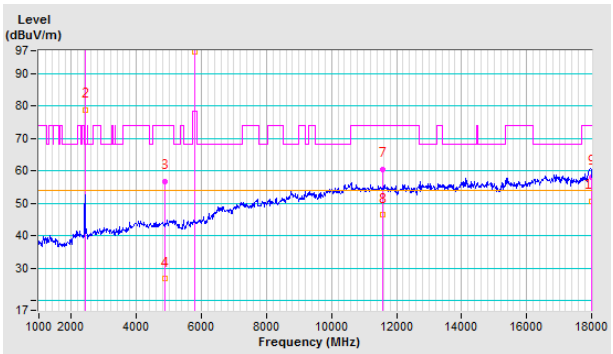
BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)

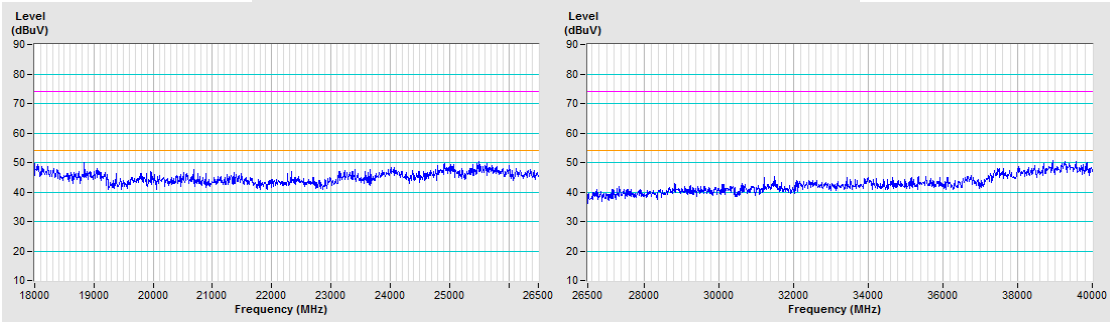
CHANNEL	CH 39 + CH 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*2441.00	108.91 PK			3.02 H	236	110.67	-1.76
2	*2441.00	78.81 AV			3.02 H	236	80.57	-1.76
3	4880.00	56.78 PK	74.00	-17.22	1.69 H	268	51.91	4.87
4	4880.00	26.68 AV	54.00	-27.32	1.69 H	268	21.81	4.87
5	*5785.00	108.97 PK			1.95 H	9	103.07	5.90
6	*5785.00	96.54 AV			1.95 H	9	90.64	5.90
7	11570.00	60.44 PK	74.00	-13.56	2.34 H	168	43.08	17.36
8	11570.00	46.36 AV	54.00	-7.64	2.34 H	168	29.00	17.36
9	18000.00	58.16 PK	74.00	-15.84	1.58 H	296	35.68	22.48
10	18000.00	50.52 AV	54.00	-3.48	1.58 H	296	28.04	22.48

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.



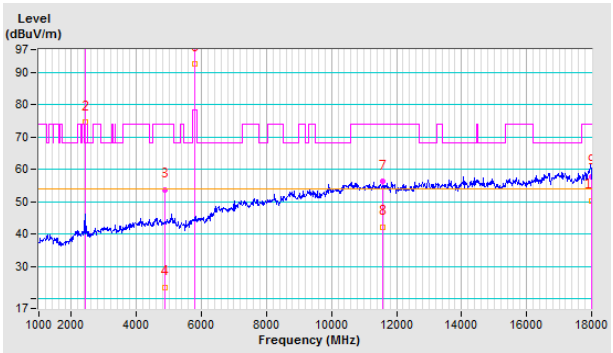


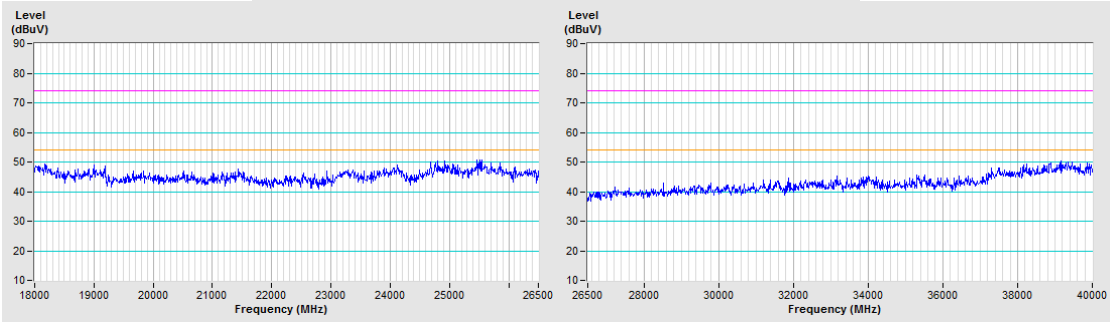
CHANNEL	CH 39 + CH 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*2441.00	104.56 PK			1.82 V	214	106.32	-1.76
2	*2441.00	74.46 AV			1.82 V	214	76.22	-1.76
3	4882.00	53.69 PK	74.00	-20.31	2.01 V	115	48.82	4.87
4	4882.00	23.59 AV	54.00	-30.41	2.01 V	115	18.72	4.87
5	*5785.00	104.87 PK			1.74 V	288	98.97	5.90
6	*5785.00	92.65 AV			1.74 V	288	86.75	5.90
7	11570.00	56.22 PK	74.00	-17.78	1.80 V	294	38.86	17.36
8	11570.00	42.19 AV	54.00	-11.81	1.80 V	294	24.83	17.36
9	18000.00	57.65 PK	74.00	-16.35	1.23 V	167	35.17	22.48
10	18000.00	50.16 AV	54.00	-3.84	1.23 V	167	27.68	22.48

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.





4.1.8 Test Results for Bandedge above 1GHz

802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)

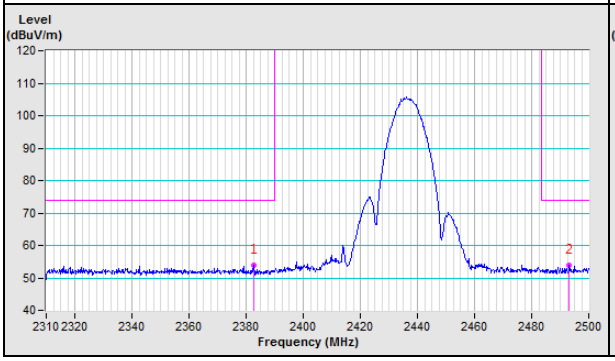
CHANNEL	CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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)
PK.1	2382.64	53.76 PK	74.00	-20.24	1.48 H	237	54.90	-1.14
PK.2	2493.17	53.74 PK	74.00	-20.26	1.48 H	237	54.69	-0.95
AV.1	2381.66	41.38 AV	54.00	-12.62	1.48 H	237	42.52	-1.14
AV.2	2484.99	41.58 AV	54.00	-12.42	1.48 H	237	42.56	-0.98

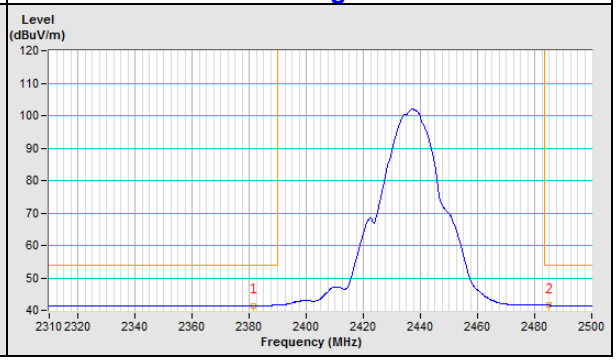
Remarks:

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

Peak



Average



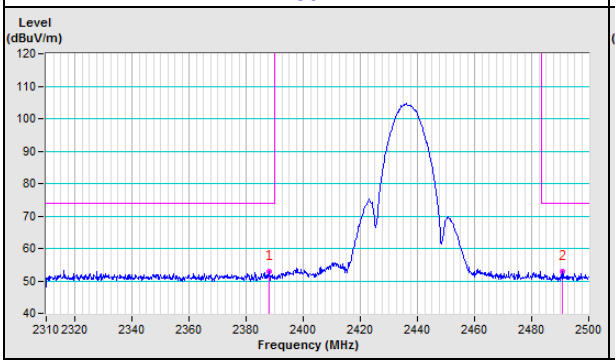
CHANNEL	CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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)
PK.1	2388.03	52.75 PK	74.00	-21.25	1.87 V	146	53.90	-1.15
PK.2	2490.59	52.78 PK	74.00	-21.22	1.87 V	146	53.74	-0.96
AV.1	2380.44	41.41 AV	54.00	-12.59	1.87 V	146	42.55	-1.14
AV.2	2485.66	41.64 AV	54.00	-12.36	1.87 V	146	42.61	-0.97

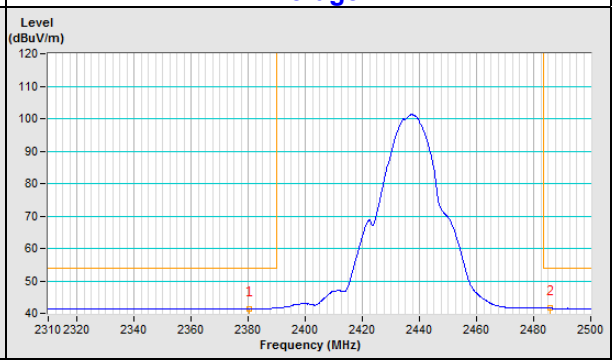
Remarks:

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

Peak



Average

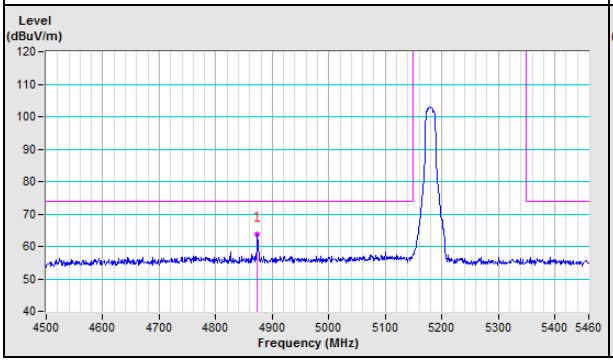
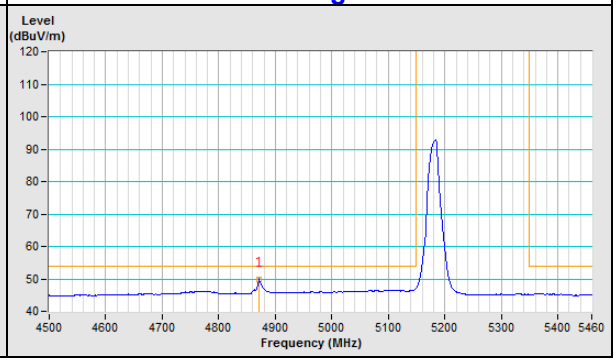


CHANNEL	CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	4500MHz ~ 5460MHz		

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)
PK.1	4873.85	63.73 PK	74.00	-10.27	1.09 H	276	58.66	5.07
AV.1	4870.78	49.96 AV	54.00	-4.04	1.09 H	276	44.88	5.08

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

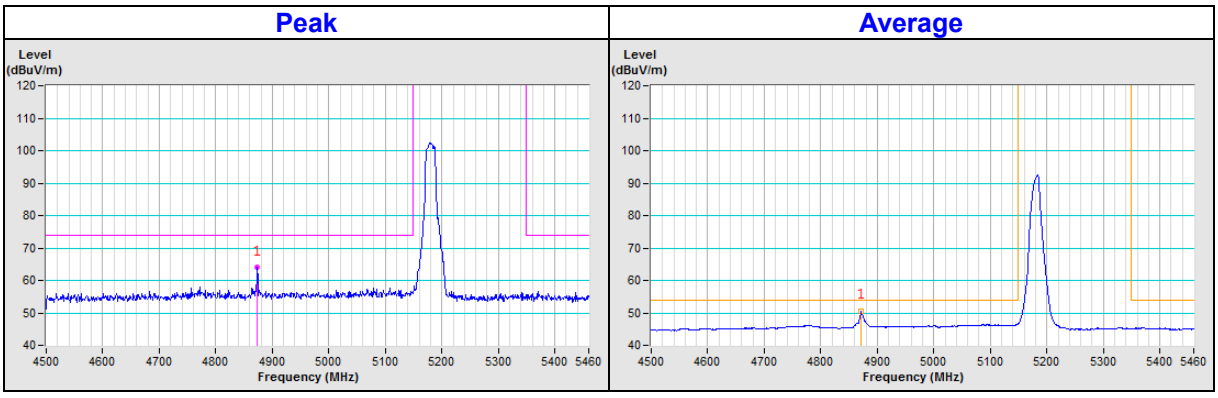
Peak	Average
	

CHANNEL	CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	4500MHz ~ 5460MHz		

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)
PK.1	4874.06	63.90 PK	74.00	-10.10	2.45 V	115	58.83	5.07
AV.1	4870.87	50.57 AV	54.00	-3.43	2.45 V	115	45.49	5.08

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



BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)

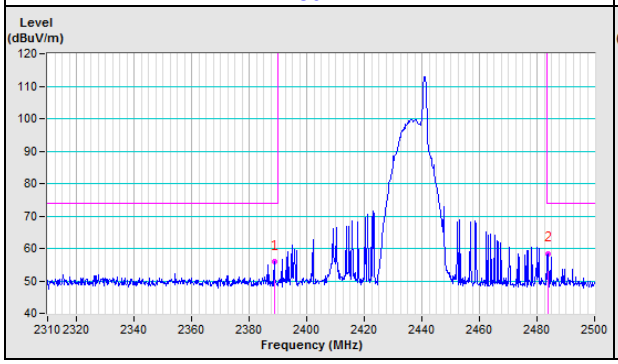
CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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)
PK.1	2388.80	55.80 PK	74.00	-18.20	1.18 H	197	58.48	-2.68
PK.2	2483.86	58.40 PK	74.00	-15.60	1.18 H	197	61.29	-2.89
AV.1	**2377.48**	**42.30 AV**	**54.00**	**-11.70**	**1.18 H**	**197**	**44.92**	**-2.62**
AV.2	2490.71	42.00 AV	54.00	-12.00	1.18 H	197	44.87	-2.87

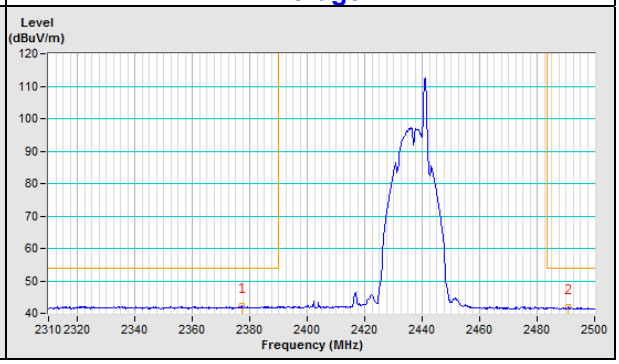
Remarks:

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

Peak



Average



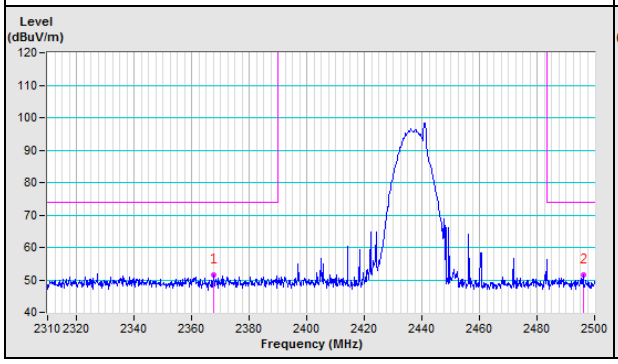
CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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)
PK.1	2367.77	51.40 PK	74.00	-22.60	1.09 V	149	53.98	-2.58
PK.2	2496.00	51.40 PK	74.00	-22.60	1.09 V	149	54.23	-2.83
AV.1	2388.98	39.90 AV	54.00	-14.10	1.09 V	149	42.58	-2.68
AV.2	2484.07	39.70 AV	54.00	-14.30	1.09 V	149	42.59	-2.89

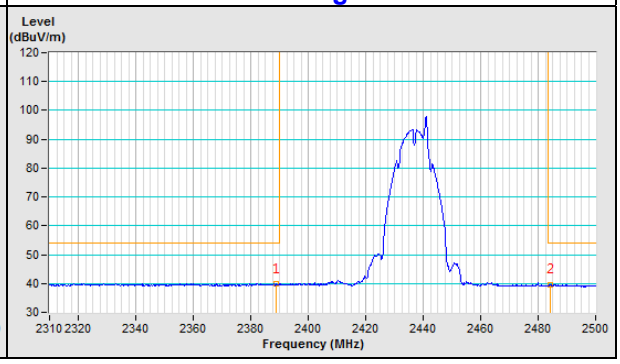
Remarks:

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

Peak



Average



BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)

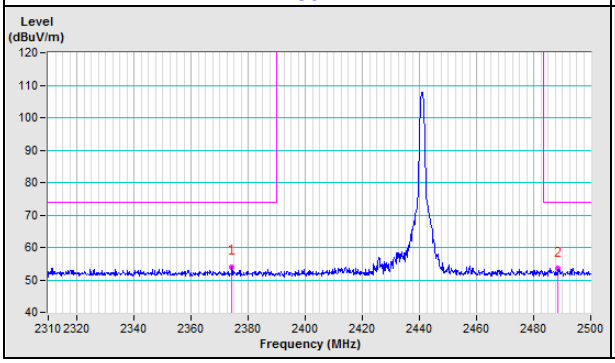
CHANNEL	CH 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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)
PK.1	2374.35	53.82 PK	74.00	-20.18	3.02 H	236	54.96	-1.14
PK.2	2488.44	53.39 PK	74.00	-20.61	3.02 H	236	54.36	-0.97
AV.1	2385.66	41.29 AV	54.00	-12.71	3.02 H	236	42.43	-1.14
AV.2	2490.51	41.39 AV	54.00	-12.61	3.02 H	236	42.35	-0.96

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

Peak



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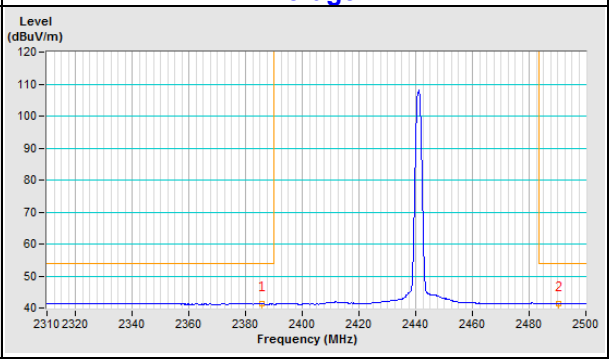


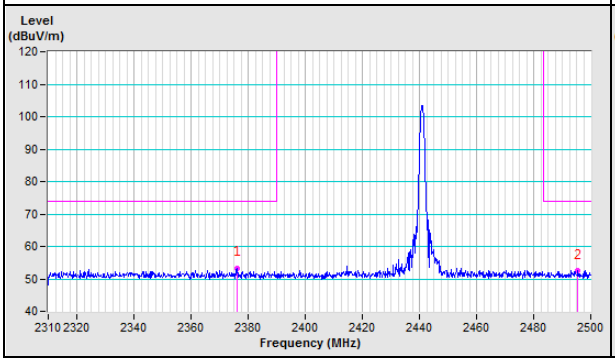
CHANNEL	CH 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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)
PK.1	2376.24	53.18 PK	74.00	-20.82	1.82 V	214	54.32	-1.14
PK.2	2495.47	52.41 PK	74.00	-21.59	1.82 V	214	53.37	-0.96
AV.1	2342.07	41.37 AV	54.00	-12.63	1.82 V	214	42.48	-1.11
AV.2	2488.54	41.36 AV	54.00	-12.64	1.82 V	214	42.32	-0.96

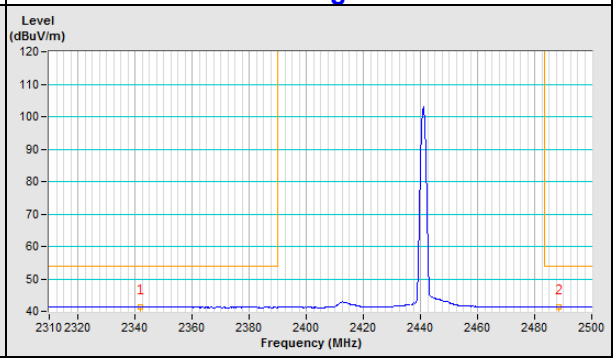
Remarks:

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

Peak



Average

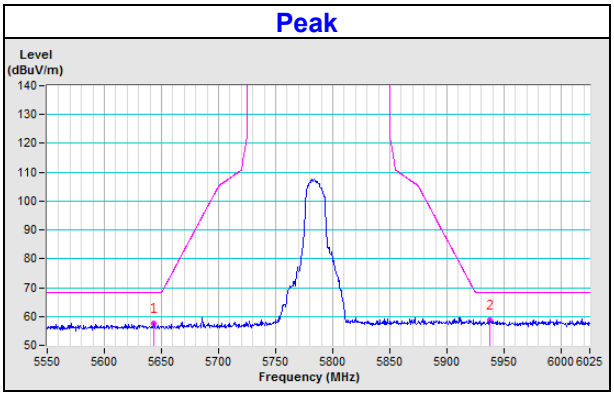


CHANNEL	CH 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	5550MHz ~ 6025MHz		

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)
PK.1	#5643.34	57.60 PK	68.20	-10.60	1.95 H	9	52.24	5.36
PK.2	#5937.51	58.75 PK	68.20	-9.45	1.95 H	9	52.06	6.69

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. " # ": The radiated frequency is out of the restricted band.

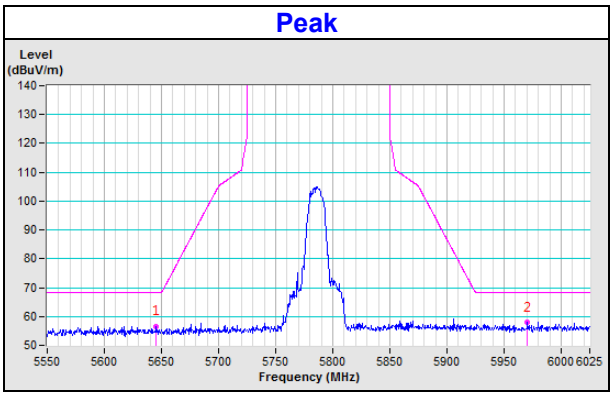


CHANNEL	CH 157	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	5550MHz ~ 6025MHz		

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)
PK.1	#5645.53	56.67 PK	68.20	-11.53	1.74 V	288	51.31	5.36
PK.2	#5970.56	58.01 PK	68.20	-10.19	1.74 V	288	51.34	6.67

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. " # ": The radiated frequency is out of the restricted band.



4.1.9 Test Results for below 1GHz

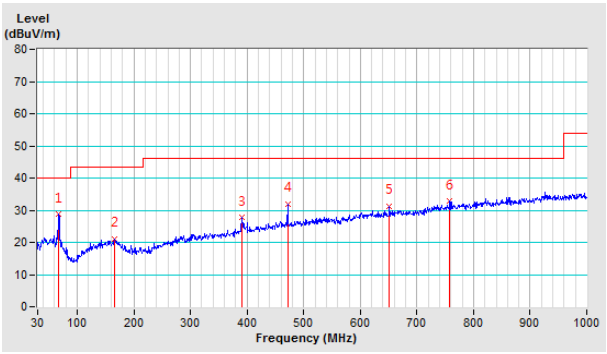
802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)

CHANNEL	CH 6 + CH 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	67.01	28.65 PK	40.00	-11.35	1.55 H	198	37.33	-8.68
2	166.72	21.05 PK	43.50	-22.45	2.38 H	143	28.24	-7.19
3	390.65	27.63 PK	46.00	-18.37	1.94 H	148	31.23	-3.60
4	472.13	31.79 PK	46.00	-14.21	1.85 H	86	33.65	-1.86
5	651.24	31.20 PK	46.00	-14.80	2.63 H	143	29.49	1.71
6	758.37	32.72 PK	46.00	-13.28	1.48 H	183	29.24	3.48

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report
6. The PK detector measurement value is much smaller than the limit QP value, so the pass is determined

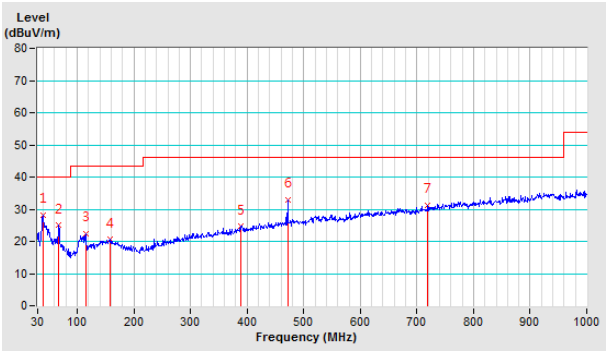


CHANNEL	CH 6 + CH 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	39.75	28.13 PK	40.00	-11.87	1.25 V	288	36.22	-8.09
2	67.44	24.94 PK	40.00	-15.06	1.51 V	136	33.72	-8.78
3	114.54	22.29 PK	43.50	-21.21	1.37 V	356	32.15	-9.86
4	157.41	20.56 PK	43.50	-22.94	2.10 V	81	27.46	-6.90
5	389.43	24.65 PK	46.00	-21.35	2.28 V	178	28.27	-3.62
6	472.13	33.02 PK	46.00	-12.98	1.96 V	116	34.88	-1.86
7	719.28	31.19 PK	46.00	-14.81	1.00 V	351	28.61	2.58

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report
6. The PK detector measurement value is much smaller than the limit QP value, so the pass is determined



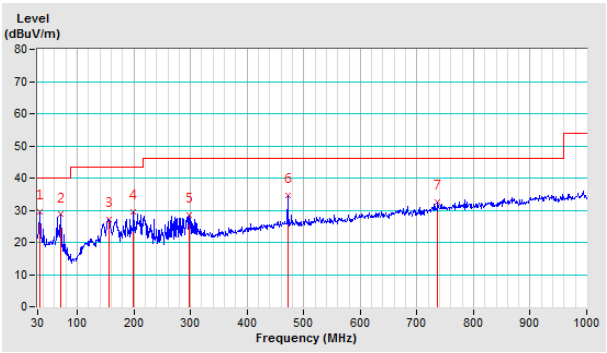
BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)

CHANNEL	CH 39 + CH 6	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	33.83	29.43 PK	40.00	-10.57	2.51 H	86	38.06	-8.63
2	70.64	28.67 PK	40.00	-11.33	2.64 H	166	38.04	-9.37
3	155.66	27.26 PK	43.50	-16.24	2.05 H	198	34.19	-6.93
4	199.70	29.42 PK	43.50	-14.08	1.88 H	154	38.70	-9.28
5	298.01	28.60 PK	46.00	-17.40	1.48 H	146	33.96	-5.36
6	472.13	34.56 PK	46.00	-11.44	1.66 H	81	36.42	-1.86
7	736.89	32.58 PK	46.00	-13.42	1.00 H	94	29.45	3.13

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report
6. The PK detector measurement value is much smaller than the limit QP value, so the pass is determined

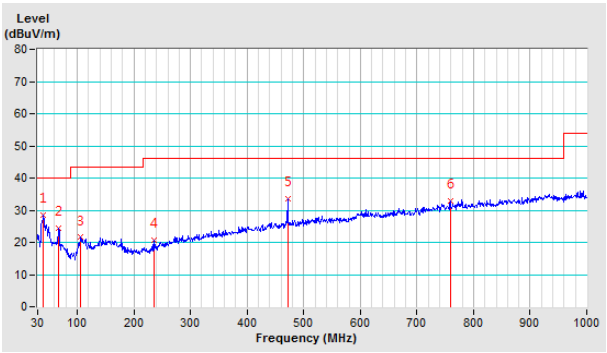


CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	40.38	28.55 PK	40.00	-11.45	1.52 V	51	36.53	-7.98
2	67.25	24.38 PK	40.00	-15.62	1.03 V	86	33.12	-8.74
3	105.95	21.61 PK	43.50	-21.89	1.45 V	17	32.35	-10.74
4	236.03	20.61 PK	46.00	-25.39	2.33 V	336	28.57	-7.96
5	472.13	33.53 PK	46.00	-12.47	1.94 V	133	35.39	-1.86
6	759.10	32.88 PK	46.00	-13.12	1.80 V	205	29.40	3.48

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report
6. The PK detector measurement value is much smaller than the limit QP value, so the pass is determined



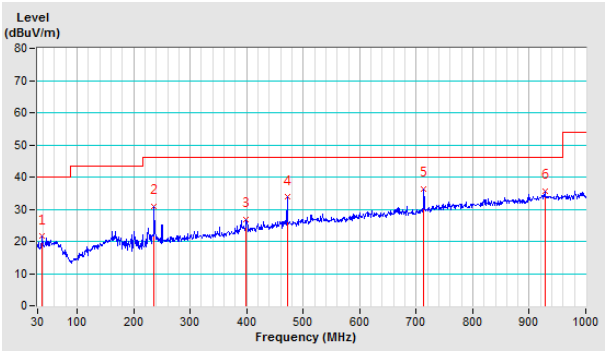
BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)

CHANNEL	CH 39 + CH 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	37.71	21.56 PK	40.00	-18.44	2.05 H	360	29.85	-8.29
2	236.08	30.86 PK	46.00	-15.14	1.67 H	240	38.82	-7.96
3	399.52	26.87 PK	46.00	-19.13	2.28 H	360	30.43	-3.56
4	472.13	33.74 PK	46.00	-12.26	1.29 H	235	35.60	-1.86
5	713.80	36.43 PK	46.00	-9.57	2.39 H	174	33.84	2.59
6	927.54	35.60 PK	46.00	-10.40	1.87 H	337	29.12	6.48

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. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report
6. The PK detector measurement value is much smaller than the limit QP value, so the pass is determined

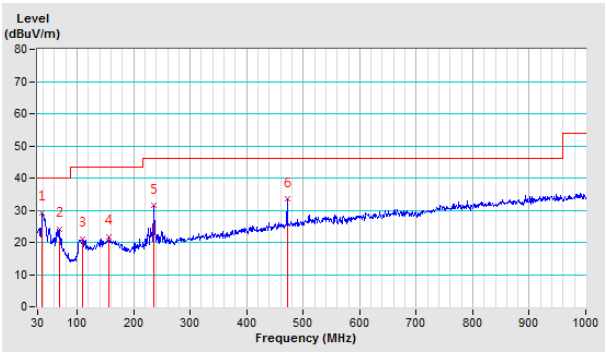


CHANNEL	CH 39 + CH 157	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	37.91	29.11 PK	40.00	-10.89	1.64 V	73	37.38	-8.27
2	67.93	24.21 PK	40.00	-15.79	1.00 V	161	33.12	-8.91
3	109.73	21.18 PK	43.50	-22.32	1.28 V	142	31.45	-10.27
4	156.63	21.81 PK	43.50	-21.69	1.84 V	171	28.73	-6.92
5	236.08	31.37 PK	46.00	-14.63	1.19 V	16	39.33	-7.96
6	472.13	33.43 PK	46.00	-12.57	1.27 V	31	35.29	-1.86

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit of frequency range 30MHz ~ 1000MHz
4. Margin value = Emission Level – Limit value
5. The emission levels were very low against the limit of frequency range 9kHz ~ 30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report
6. The PK detector measurement value is much smaller than the limit QP value, so the pass is determined

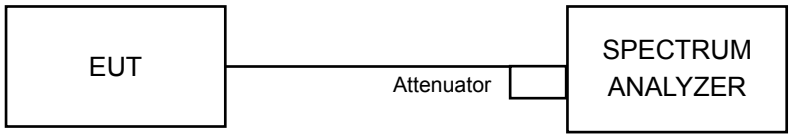


4.2 Conducted Out of Band Emission Measurement

4.2.1 Limits of Conducted Out of Band Emission Measurement

Below 20dB 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

a. Set the RBW = 100 kHz.
b. Set the VBW ≥ 300 kHz.
c. Detector = average.
d. Sweep time = auto couple.
e. Trace mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOBE

a. Set RBW = 100 kHz.
b. Set VBW ≥ 300 kHz.
c. Detector = average.
d. Sweep = auto couple.
e. Trace Mode = max hold.
f. Allow trace to fully stabilize.
g. Use the peak marker function to determine the maximum amplitude level.

4.2.5 Deviation from Test Standard

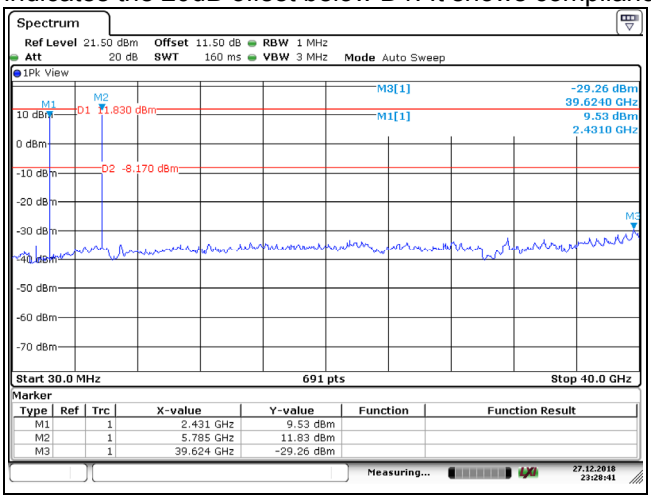
No deviation.

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 20dB offset below D1. It shows compliance with the requirement.



5 Pictures of Test Arrangements

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

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

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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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