

FCC Test Report (Co-Located)

Report No.: RF181001C06-6

FCC ID: A4RG020A

Model Name: G020A

Received Date: Oct. 01, 2018

Test Date: Dec. 04 ~ Dec. 14, 2018

Issued Date: Dec. 18, 2018

Applicant: Google LLC

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

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FCC Registration / Designation Number (1): 788550 / TW0003

FCC Registration / Designation Number (2): 723255 / TW2022



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Release Control Record

Issue No.	Description	Date Issued
RF181001C06-6	Original release	Dec. 18, 2018

1 Certificate of Conformity

Product: Smartphone

Model Name: G020A

Sample Status: Identical Prototype

Applicant: Google LLC

Test Date: Dec. 04 ~ Dec. 14, 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. 18, 2018
Pettie Chen / Senior Specialist

Approved by : Bruce Chen , **Date:** Dec. 18, 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 -1.6dB at 5150.00MHz.

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) ($\pm$)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1 GHz ~ 6 GHz	3.40 dB
	6GHz ~ 18GHz	3.73 dB
	18GHz ~ 40GHz	4.11 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	G020A	
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, $\pi/4$ -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: 320.547mW 5180 ~ 5240MHz: 111.713mW 5260 ~ 5320MHz: 109.417mW 5500 ~ 5720MHz: 110.927mW 5745 ~ 5825MHz: 108.674mW
	Bluetooth EDR	51.050mW
	Bluetooth LE	LE 4.0: 9.333mW LE 5.0: 9.120mW
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 $\geq$ 1G	RE<1G	OB	
-	√	√	√	-

Where RE $\geq$ 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 + 100	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 + 36	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 + 100	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 + 36	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 + 36	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

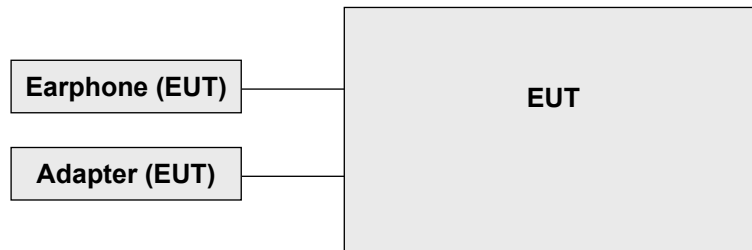
Test Condition:

Applicable to	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	22 deg. C, 69% RH	120Vac, 60Hz	Rey Chen
RE<1G	23 deg. C, 68% RH	120Vac, 60Hz	Weiwei Lo
OB	25 deg. C, 75% RH	120Vac, 60Hz	Weiwei Lo

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

Applicable To			Limit	
789033 D02 General UNII Test Procedure New Rules v02r01			Field Strength at 3m	
			PK: 74 (dBµV/m)	AV: 54 (dBµV/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(dBµV/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(dBµV/m) ^{*1} PK: 105.2 (dBµV/m) ^{*2} PK: 110.8(dBµV/m) ^{*3} PK: 122.2 (dBµV/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:

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

4.1.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due
Test Receiver Agilent	N9038A	MY50010156	July 12, 2018	July 11, 2019
Pre-Amplifier EMCI (Below 30MHz)	EMC001340	980142	Feb. 09, 2018	Feb. 08, 2019
Loop Antenna(*) Electro-Metrics (Below 30MHz)	EM-6879	264	Dec. 16, 2016	Dec. 15, 2018
RF Cable (Below 30MHz)	NA	LOOPCAB-001	Jan. 15, 2018	Jan. 14, 2019
RF Cable (Below 30MHz)	NA	LOOPCAB-002	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier Mini-Circuits (30MHz~1GHz)	ZFL-1000VH2B	AMP-ZFL-05	May 05, 2018	May 04, 2019
Trilog Broadband Antenna SCHWARZBECK (30MHz~1GHz)	VULB 9168	9168-361	Jan. 15, 2018	Jan. 14, 2019
RF Cable (30MHz~1GHz)	8D	966-3-1	Mar. 20, 2018	Mar. 19, 2019
RF Cable (30MHz~1GHz)	8D	966-3-2	Mar. 20, 2018	Mar. 19, 2019
RF Cable (30MHz~1GHz)	8D	966-3-3	Mar. 20, 2018	Mar. 19, 2019
Fixed attenuator Mini-Circuits (30MHz~1GHz)	UNAT-5+	PAD-3m-3-01	Sep. 27, 2018	Sep. 26, 2019
Horn_Antenna SCHWARZBECK (1GHz~18GHz)	BBHA9120-D	9120D-406	Jan. 15, 2018	Jan. 14, 2019
Pre-Amplifier EMCI (1GHz~18GHz)	EMC12630SE	980384	Jan. 29, 2018	Jan. 28, 2019
RF Cable (1GHz~18GHz)	EMC104-SM-SM-1200	160922	Jan. 29, 2018	Jan. 28, 2019
RF Cable (1GHz~18GHz)	EMC104-SM-SM-2000	150317	Jan. 29, 2018	Jan. 28, 2019
RF Cable (1GHz~18GHz)	EMC104-SM-SM-5000	150322	Jan. 29, 2018	Jan. 28, 2019
Spectrum Analyzer Keysight (18GHz~40GHz)	N9030A	MY54490679	July 23, 2018	July 22, 2019
Pre-Amplifier EMCI (18GHz~40GHz)	EMC184045SE	980386	Jan. 29, 2018	Jan. 28, 2019
Horn_Antenna SCHWARZBECK (18GHz~40GHz)	BBHA 9170	BBHA9170519	Jan. 15, 2018	Jan. 14, 2019
RF Cable (18GHz~40GHz)	EMC102-KM-KM-1200	160924	Jan. 29, 2018	Jan. 28, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208406	NA	NA
Boresight Antenna Fixture (1GHz~18GHz)	FBA-01	FBA-SIP01	NA	NA

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. *The calibration interval of the above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. 3.
4. The CANADA Site Registration No. is 20331-1

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:

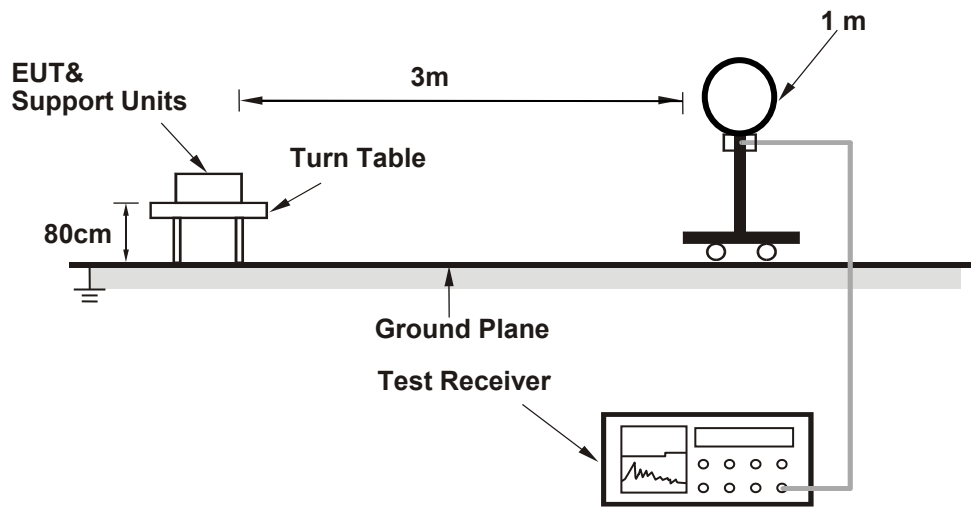
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

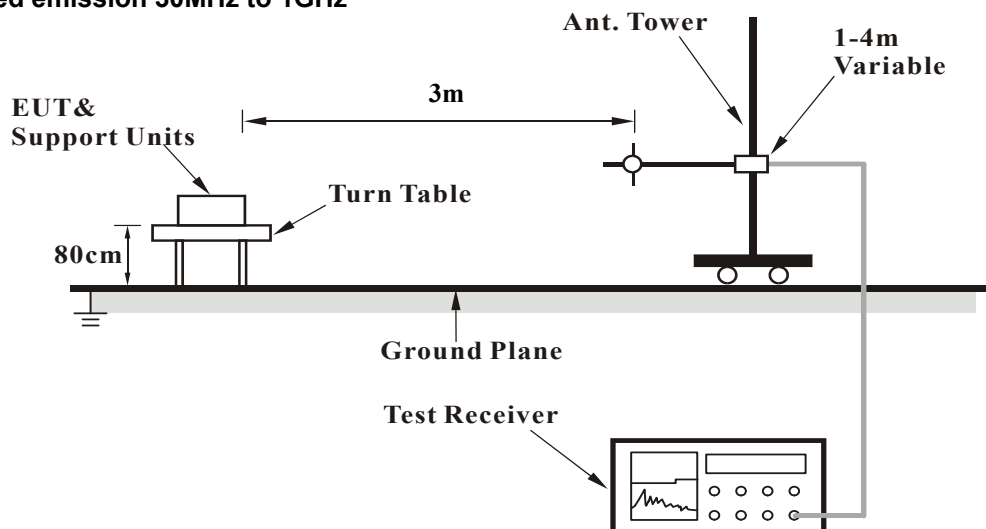
No deviation.

4.1.5 Test Setup

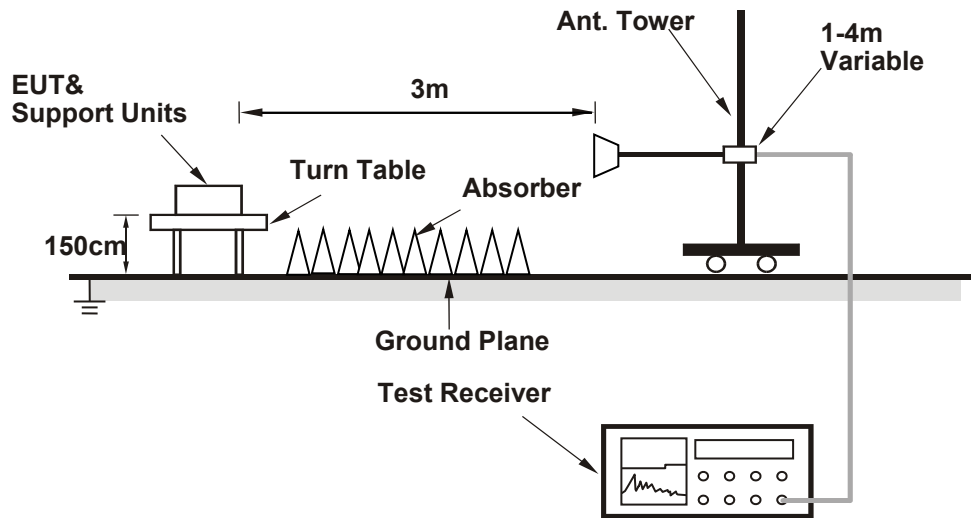
For Radiated emission below 30MHz



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

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

4.1.7 Test Results for Fundamental and Harmonic above 1GHz

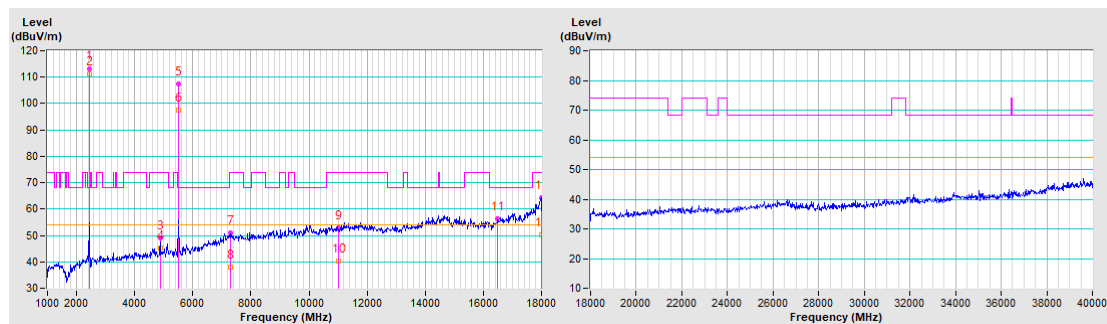
802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)

CHANNEL	CH 6 + CH 100	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	113.3 PK			3.01 H	181	116.3	-3.0
2	*2437.00	111.1 AV			3.01 H	181	114.1	-3.0
3	4874.00	49.2 PK	74.0	-24.8	1.42 H	197	47.6	1.6
4	4874.00	45.1 AV	54.0	-8.9	1.42 H	197	43.5	1.6
5	*5500.00	107.4 PK			1.15 H	278	104.9	2.5
6	*5500.00	97.6 AV			1.15 H	278	95.1	2.5
7	7311.00	50.8 PK	74.0	-23.2	1.52 H	204	43.1	7.7
8	7311.00	38.1 AV	54.0	-15.9	1.52 H	204	30.4	7.7
9	11000.00	53.0 PK	74.0	-21.0	1.68 H	171	40.8	12.2
10	11000.00	40.3 AV	54.0	-13.7	1.68 H	171	28.1	12.2
11	#16500.00	56.4 PK	68.2	-11.8	1.79 H	188	42.7	13.7
12	17996.60	64.3 PK	74.0	-9.7	1.34 H	79	42.4	21.9
13	17996.60	50.3 AV	54.0	-3.7	1.34 H	79	28.4	21.9

Remarks:

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

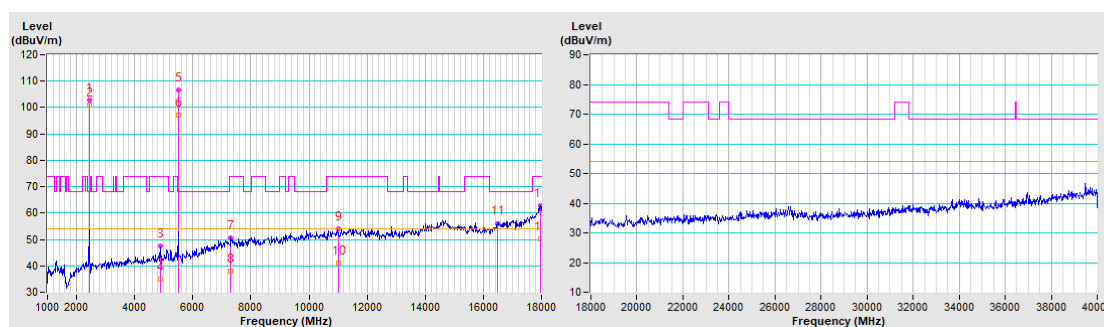


CHANNEL	CH 6 + CH 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	102.9 PK			2.53 V	267	105.9	-3.0
2	*2437.00	100.8 AV			2.53 V	267	103.8	-3.0
3	4874.00	47.5 PK	74.0	-26.5	3.01 V	168	45.9	1.6
4	4874.00	34.8 AV	54.0	-19.2	3.01 V	168	33.2	1.6
5	*5500.00	106.8 PK			1.15 V	278	104.3	2.5
6	*5500.00	97.1 AV			1.15 V	278	94.6	2.5
7	7311.00	50.7 PK	74.0	-23.3	1.73 V	112	43.0	7.7
8	7311.00	38.0 AV	54.0	-16.0	1.73 V	112	30.3	7.7
9	11000.00	53.9 PK	74.0	-20.1	1.69 V	316	41.7	12.2
10	11000.00	41.2 AV	54.0	-12.8	1.69 V	316	29.0	12.2
11	#16500.00	56.1 PK	68.2	-12.1	1.97 V	164	42.4	13.7
12	17975.35	62.8 PK	74.0	-11.2	1.45 V	177	41.3	21.5
13	17975.35	50.1 AV	54.0	-3.9	1.45 V	177	28.6	21.5

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.



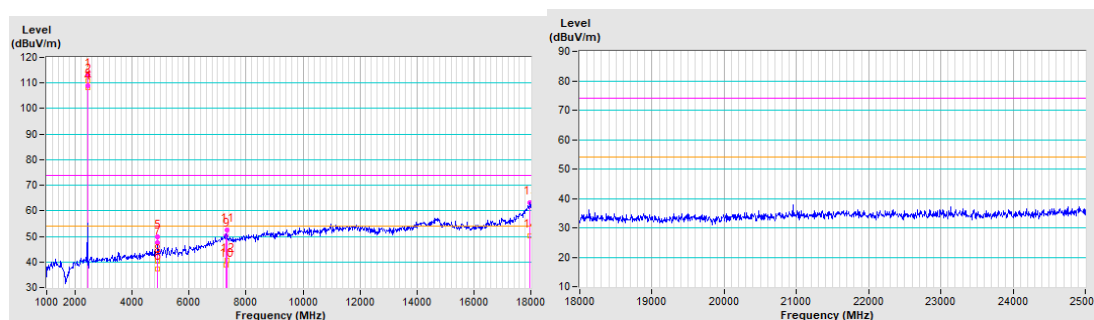
BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)

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	113.2 PK			2.51 H	251	116.2	-3.0
2	*2437.00	110.8 AV			2.51 H	251	113.8	-3.0
3	*2441.00	109.0 PK			1.51 H	175	112.0	-3.0
4	*2441.00	108.1 AV			1.51 H	175	111.1	-3.0
5	4874.00	49.9 PK	74.0	-24.1	1.11 H	166	48.3	1.6
6	4874.00	37.4 AV	54.0	-16.6	1.11 H	166	35.8	1.6
7	4882.00	47.5 PK	74.0	-26.5	1.46 H	197	45.8	1.7
8	4882.00	40.2 AV	54.0	-13.8	1.46 H	197	38.5	1.7
9	7311.00	50.4 PK	74.0	-23.6	1.73 H	154	42.7	7.7
10	7311.00	38.8 AV	54.0	-15.2	1.73 H	154	31.1	7.7
11	7323.00	52.6 PK	74.0	-21.4	1.46 H	197	44.8	7.8
12	7323.00	40.8 AV	54.0	-13.2	1.46 H	197	33.0	7.8
13	17977.05	63.1 PK	74.0	-10.9	1.19 H	196	41.6	21.5
14	17977.05	50.2 AV	54.0	-3.8	1.19 H	196	28.7	21.5

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.

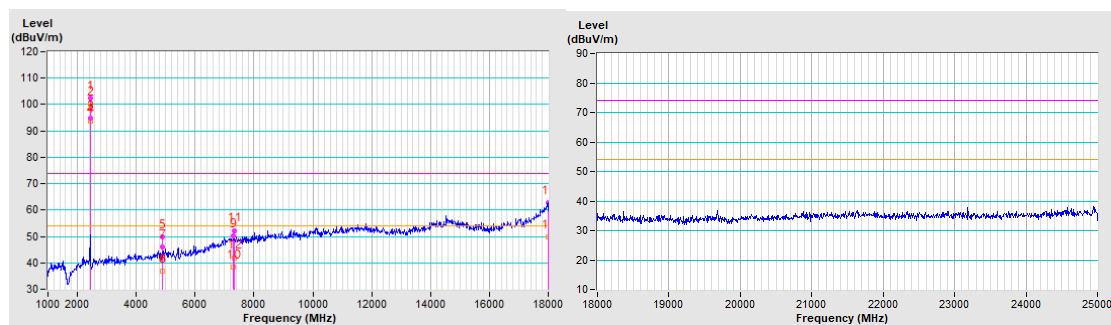


CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	102.5 PK			2.51 V	186	105.5	-3.0
2	*2437.00	100.3 AV			2.51 V	186	103.3	-3.0
3	*2441.00	94.9 PK			1.54 V	339	97.9	-3.0
4	*2441.00	93.8 AV			1.54 V	339	96.8	-3.0
5	4874.00	49.7 PK	74.0	-24.3	1.16 V	165	48.1	1.6
6	4874.00	37.0 AV	54.0	-17.0	1.16 V	165	35.4	1.6
7	4882.00	45.9 PK	74.0	-28.1	1.59 V	332	44.2	1.7
8	4882.00	36.8 AV	54.0	-17.2	1.59 V	332	35.1	1.7
9	7311.00	50.1 PK	74.0	-23.9	1.68 V	155	42.4	7.7
10	7311.00	38.4 AV	54.0	-15.6	1.68 V	155	30.7	7.7
11	7323.00	52.3 PK	74.0	-21.7	2.05 V	188	44.5	7.8
12	7323.00	42.0 AV	54.0	-12.0	2.05 V	188	34.2	7.8
13	17993.20	62.8 PK	74.0	-11.2	1.46 V	158	41.0	21.8
14	17993.20	49.9 AV	54.0	-4.1	1.46 V	158	28.1	21.8

Remarks:

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



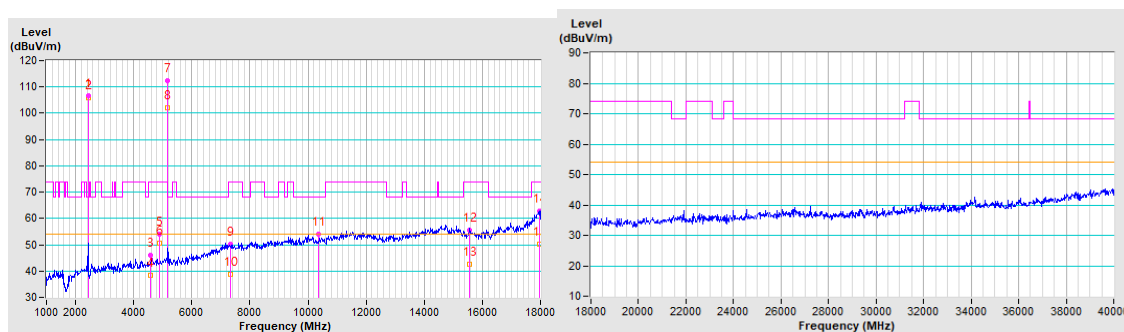
BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)

CHANNEL	CH 39 + 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	*2441.00	106.5 PK			3.02 H	178	109.5	-3.0
2	*2441.00	106.0 AV			3.02 H	178	109.0	-3.0
3	4584.00	45.9 PK	74.0	-28.1	1.69 H	217	44.7	1.2
4	4584.00	38.5 AV	54.0	-15.5	1.69 H	217	37.3	1.2
5	4882.00	54.1 PK	74.0	-19.9	1.19 H	185	52.4	1.7
6	4882.00	50.7 AV	54.0	-3.3	1.19 H	185	49.0	1.7
7	*5180.00	112.2 PK			1.10 H	341	109.7	2.5
8	*5180.00	102.0 AV			1.10 H	341	99.5	2.5
9	7323.00	50.3 PK	74.0	-23.7	1.48 H	211	42.5	7.8
10	7323.00	38.7 AV	54.0	-15.3	1.48 H	211	30.9	7.8
11	#10360.00	54.0 PK	68.2	-14.2	1.71 H	158	42.1	11.9
12	15540.00	55.5 PK	74.0	-18.5	1.85 H	201	43.1	12.4
13	15540.00	42.6 AV	54.0	-11.4	1.85 H	201	30.2	12.4
14	17954.95	62.8 PK	74.0	-11.2	1.27 H	69	41.7	21.1
15	17954.95	50.3 AV	54.0	-3.7	1.27 H	69	29.2	21.1

Remarks:

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

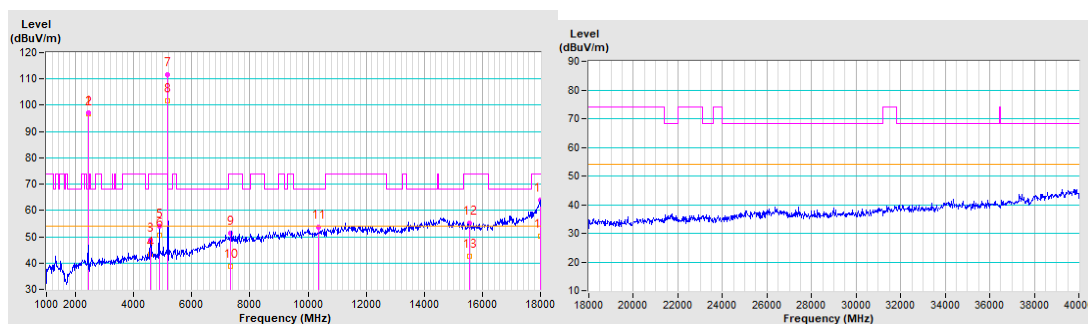


CHANNEL	CH 39 + CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

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	*2441.00	97.1 PK			2.82 V	273	100.1	-3.0
2	*2441.00	96.7 AV			2.82 V	273	99.7	-3.0
3	4584.00	48.6 PK	74.0	-25.4	2.85 V	168	47.4	1.2
4	4584.00	43.2 AV	54.0	-10.8	2.85 V	168	42.0	1.2
5	4882.00	54.0 PK	74.0	-20.0	2.96 V	173	52.3	1.7
6	4882.00	50.5 AV	54.0	-3.5	2.96 V	173	48.8	1.7
7	*5180.00	111.7 PK			2.29 V	171	109.2	2.5
8	*5180.00	101.7 AV			2.29 V	171	99.2	2.5
9	7323.00	51.5 PK	74.0	-22.5	1.67 V	108	43.7	7.8
10	7323.00	38.8 AV	54.0	-15.2	1.67 V	108	31.0	7.8
11	#10360.00	53.5 PK	68.2	-14.7	1.65 V	331	41.6	11.9
12	15540.00	55.3 PK	74.0	-18.7	2.01 V	149	42.9	12.4
13	15540.00	42.5 AV	54.0	-11.5	2.01 V	149	30.1	12.4
14	17985.55	63.8 PK	74.0	-10.2	1.49 V	268	42.2	21.6
15	17985.55	50.1 AV	54.0	-3.9	1.49 V	268	28.5	21.6

Remarks:

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



4.1.8 Test Results for Bandedge above 1GHz

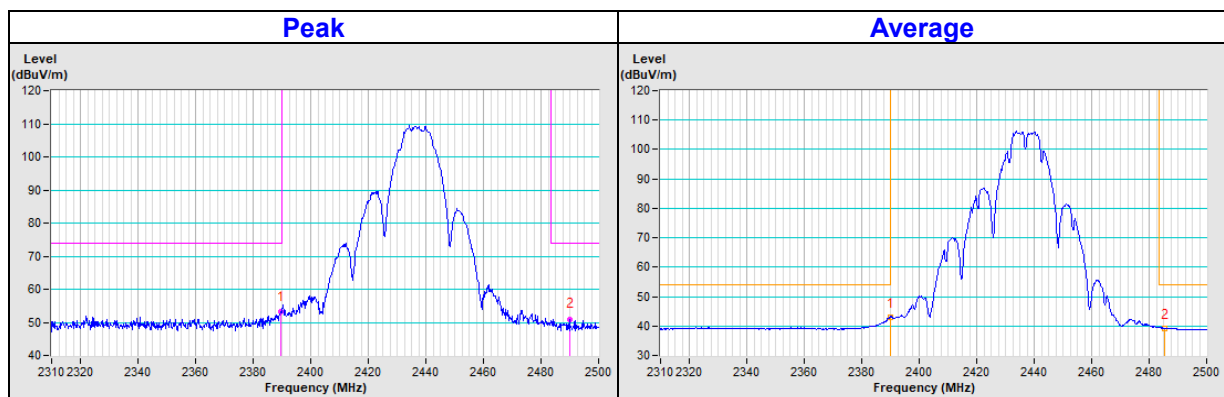
802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)

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	2389.59	53.1 PK	74.0	-20.9	3.01 H	181	55.8	-2.7
PK.2	2489.93	50.9 PK	74.0	-23.1	3.01 H	181	53.8	-2.9
AV.1	2389.94	43.0 AV	54.0	-11.0	3.01 H	181	45.7	-2.7
AV.2	2485.46	39.2 AV	54.0	-14.8	3.01 H	181	42.1	-2.9

Remarks:

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

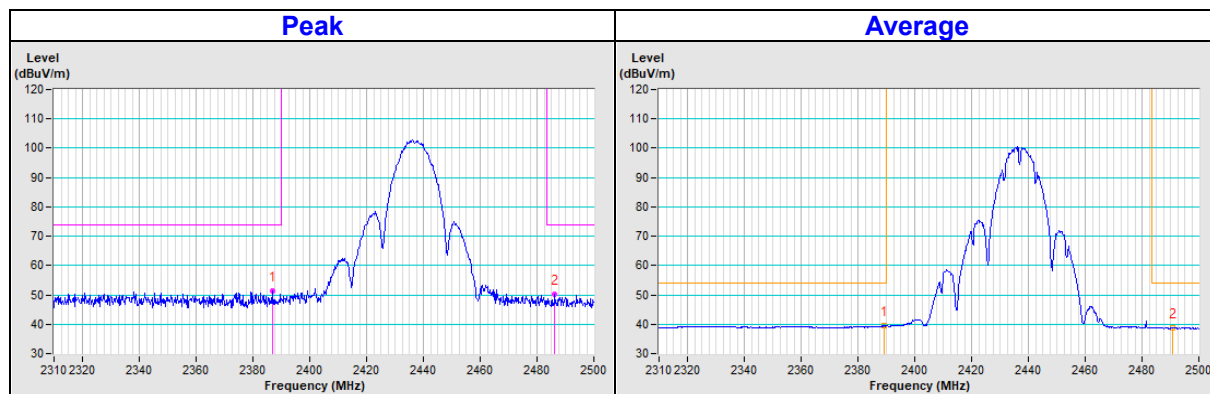


CHANNEL	CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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	2386.86	51.5 PK	74.0	-22.5	2.53 V	267	54.2	-2.7
PK.2	2486.34	50.2 PK	74.0	-23.8	2.53 V	267	53.1	-2.9
AV.1	2389.26	39.4 AV	54.0	-14.6	2.53 V	267	42.1	-2.7
AV.2	2490.78	38.8 AV	54.0	-15.2	2.53 V	267	41.7	-2.9

Remarks:

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

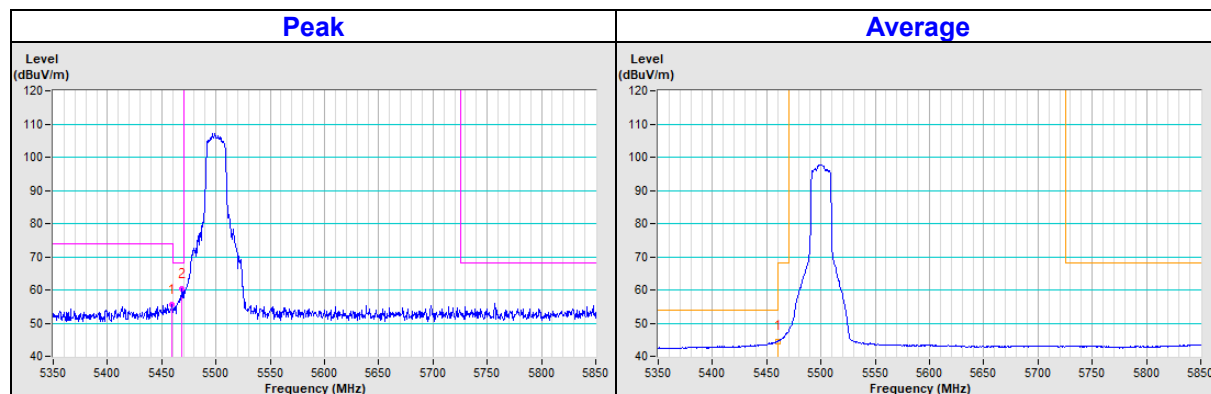


CHANNEL	CH 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	5350MHz ~ 5850MHz		

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	5459.51	55.5 PK	74.0	-18.5	1.15 H	278	52.8	2.7
PK.2	#5468.57	60.2 PK	68.2	-8.0	1.15 H	278	57.6	2.6
AV.1	5459.90	44.4 AV	54.0	-9.6	1.15 H	278	41.7	2.7

Remarks:

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

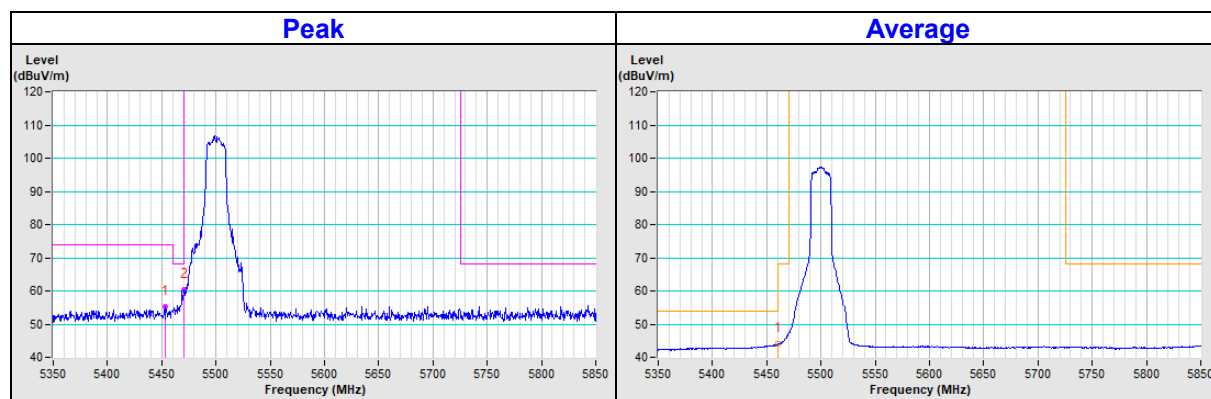


CHANNEL	CH 100	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	5350MHz ~ 5850MHz		

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	5453.68	55.2 PK	74.0	-18.8	1.00 V	171	52.5	2.7
PK.2	#5470.00	60.4 PK	68.2	-7.8	2.29 V	171	57.8	2.6
AV.1	5459.90	44.0 AV	54.0	-10.0	2.52 V	170	41.3	2.7

Remarks:

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



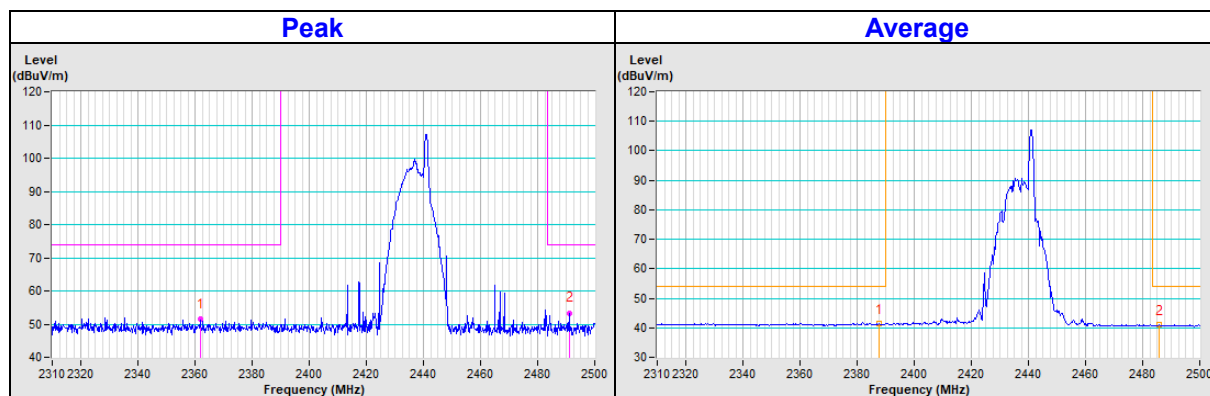
BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)

CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	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	2361.74	51.4 PK	74.0	-22.6	1.52 H	179	54.0	-2.6
PK.2	2491.00	53.3 PK	74.0	-20.7	1.52 H	179	56.2	-2.9
AV.1	2387.52	41.3 AV	54.0	-12.7	1.52 H	179	44.0	-2.7
AV.2	2485.75	40.9 AV	54.0	-13.1	1.52 H	179	43.8	-2.9

Remarks:

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

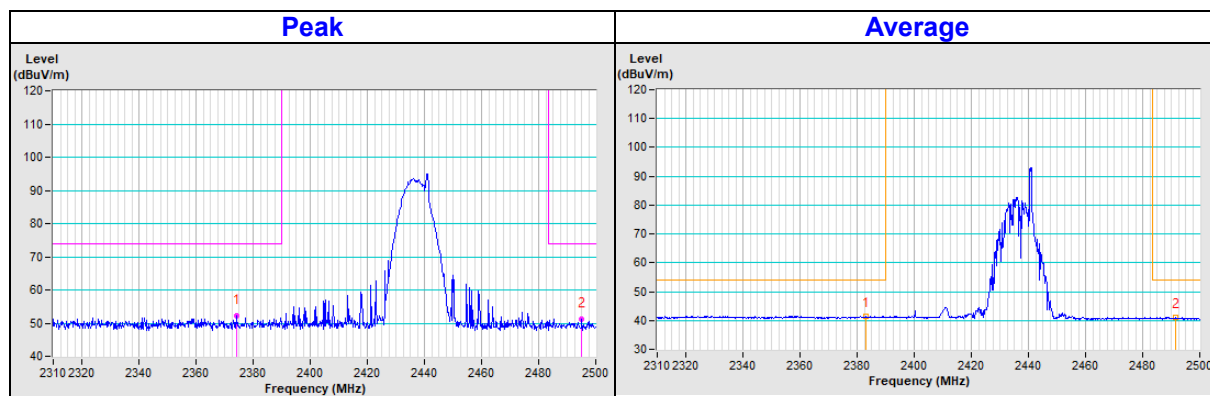


CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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	2374.19	52.2 PK	74.0	-21.8	1.54 V	339	54.8	-2.6
PK.2	2495.03	51.2 PK	74.0	-22.8	1.54 V	339	54.1	-2.9
AV.1	2383.25	41.4 AV	54.0	-12.6	1.54 V	339	44.1	-2.7
AV.2	2491.39	41.0 AV	54.0	-13.0	1.54 V	339	43.9	-2.9

Remarks:

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



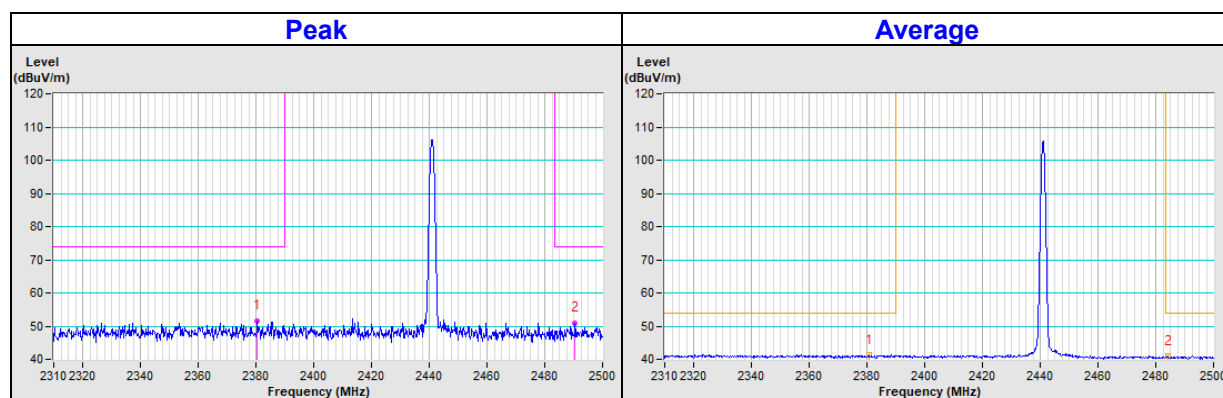
BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)

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	2380.52	51.6 PK	74.0	-22.4	3.02 H	178	54.2	-2.6
PK.2	2490.37	50.8 PK	74.0	-23.2	3.02 H	178	53.7	-2.9
AV.1	2380.78	41.2 AV	54.0	-12.8	3.02 H	178	43.9	-2.7
AV.2	2484.13	40.9 AV	54.0	-13.1	3.02 H	178	43.9	-3.0

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

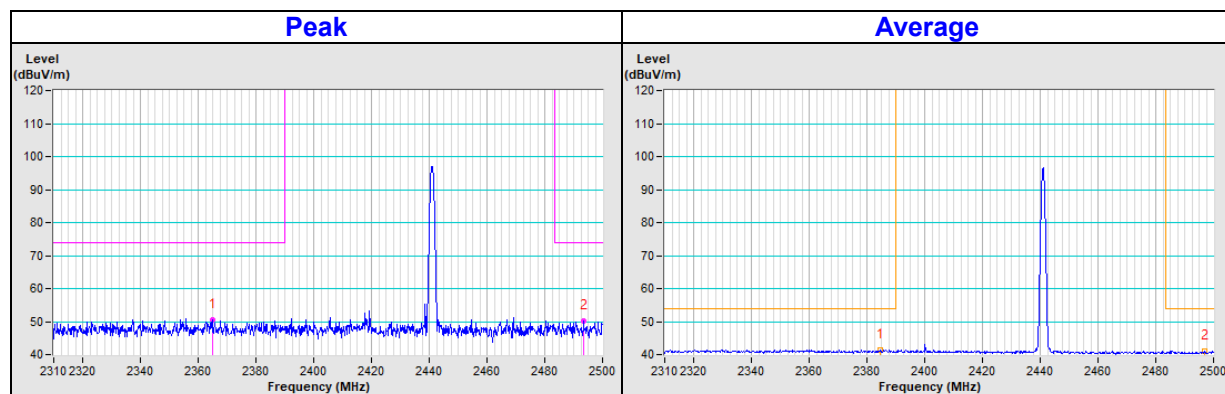


CHANNEL	CH 39	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	2310MHz ~ 2500MHz		

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	2364.95	50.5 PK	74.0	-23.5	2.82 V	273	53.1	-2.6
PK.2	2493.45	50.1 PK	74.0	-23.9	2.82 V	273	53.0	-2.9
AV.1	2384.44	41.4 AV	54.0	-12.6	2.82 V	273	44.1	-2.7
AV.2	2496.81	41.0 AV	54.0	-13.0	2.82 V	273	43.9	-2.9

Remarks:

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

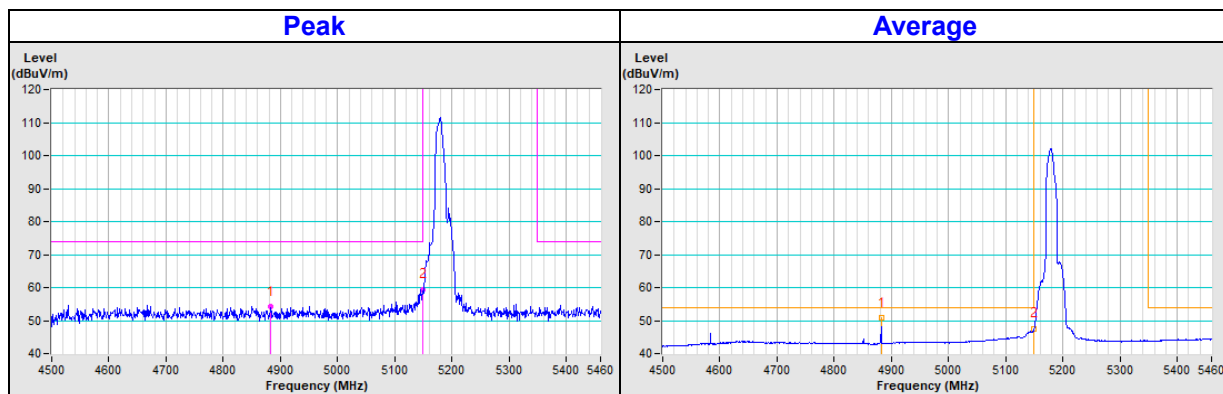


CHANNEL	CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	4500MHz ~ 5460MHz		

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	4882.00	54.1 PK	74.0	-19.9	1.19 H	185	52.4	1.7
PK.2	5150.00	59.3 PK	74.0	-14.7	1.10 H	341	56.7	2.6
AV.1	4882.00	50.7 AV	54.0	-3.3	1.19 H	185	49.0	1.7
AV.2	5150.00	47.4 AV	54.0	-6.6	1.10 H	341	44.8	2.6

Remarks:

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

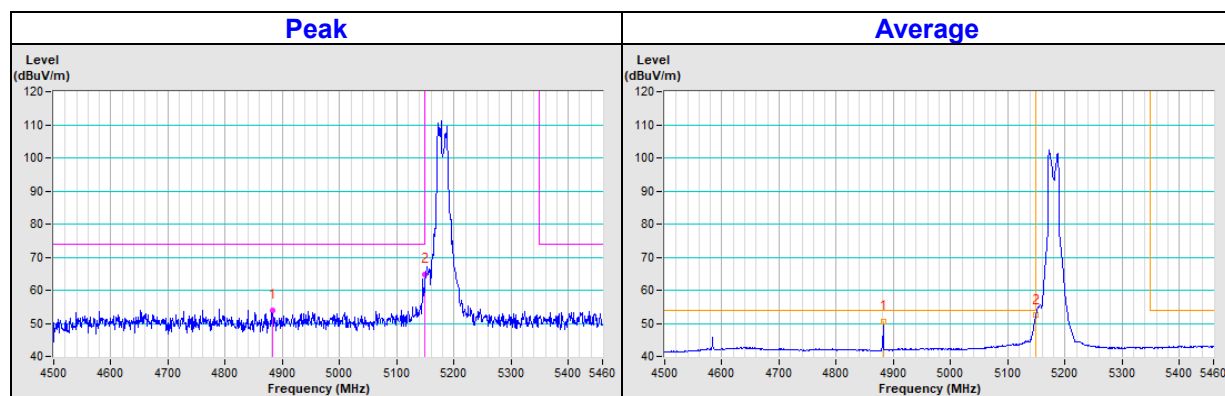


CHANNEL	CH 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	4500MHz ~ 5460MHz		

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	4882.00	54.0 PK	74.0	-20.0	2.64 V	173	52.3	1.7
PK.2	5150.00	64.9 PK	74.0	-9.1	2.29 V	171	62.3	2.6
AV.1	4882.00	50.5 AV	54.0	-3.5	2.64 V	173	48.8	1.7
AV.2	5150.00	52.4 AV	54.0	-1.6	2.29 V	171	49.8	2.6

Remarks:

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



4.1.9 Test Results for below 1GHz

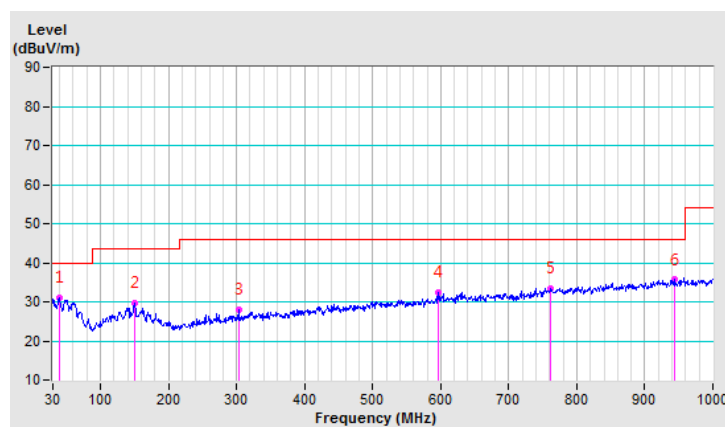
802.11b (SISO Ant. 0) + 802.11ac (VHT20) (SISO Ant. 1)

CHANNEL	CH 6 + CH 100	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	38.78	31.0 PK	40.0	-9.0	1.50 H	252	40.6	-9.6
2	150.57	29.6 PK	43.5	-13.9	2.00 H	121	37.6	-8.0
3	302.98	27.9 PK	46.0	-18.1	2.00 H	304	34.9	-7.0
4	595.83	32.5 PK	46.0	-13.5	1.50 H	149	32.5	0.0
5	760.80	33.6 PK	46.0	-12.4	2.00 H	183	30.6	3.0
6	943.09	35.6 PK	46.0	-10.4	2.00 H	32	30.2	5.4

Remarks:

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

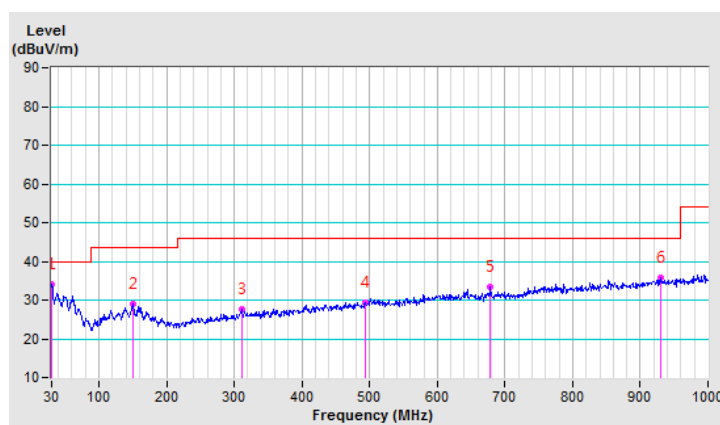


CHANNEL	CH 6 + CH 100	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	30.10	34.2 PK	40.0	-5.8	1.00 V	0	43.9	-9.7
2	150.09	29.1 PK	43.5	-14.4	2.00 V	4	37.1	-8.0
3	311.32	27.7 PK	46.0	-18.3	2.00 V	282	34.4	-6.7
4	493.90	29.5 PK	46.0	-16.5	2.00 V	145	31.8	-2.3
5	678.47	33.4 PK	46.0	-12.6	1.50 V	360	32.0	1.4
6	929.92	35.7 PK	46.0	-10.3	1.00 V	67	30.4	5.3

Remarks:

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



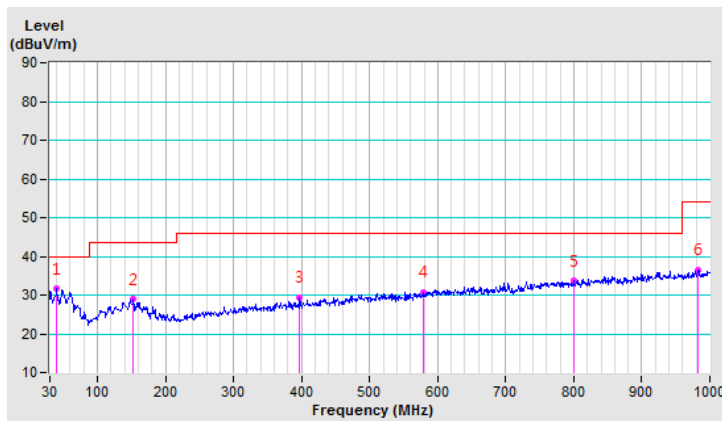
BT GFSK (Ant. 0) + 802.11b (SISO Ant. 1)

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	38.83	31.6 PK	40.0	-8.4	2.00 H	161	41.2	-9.6
2	152.32	28.8 PK	43.5	-14.7	1.50 H	1	36.9	-8.1
3	396.95	29.3 PK	46.0	-16.7	2.00 H	106	34.0	-4.7
4	579.84	30.7 PK	46.0	-15.3	1.00 H	246	31.2	-0.5
5	800.93	33.6 PK	46.0	-12.4	1.50 H	338	30.4	3.2
6	983.46	36.5 PK	54.0	-17.5	2.00 H	32	30.7	5.8

Remarks:

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

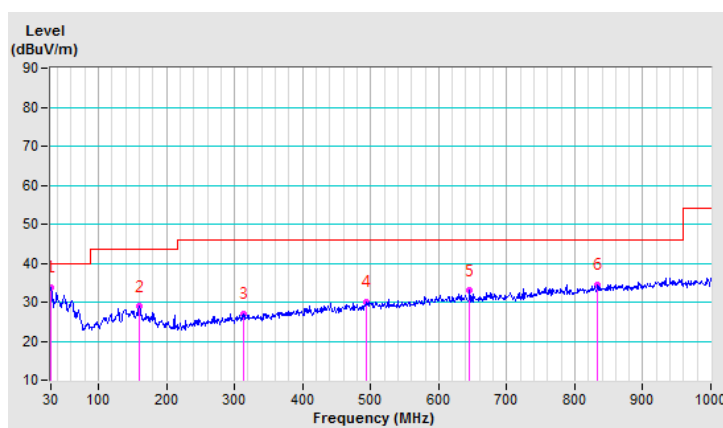


CHANNEL	CH 39 + CH 6	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	30.00	33.7 PK	40.0	-6.3	1.50 V	360	43.3	-9.6
2	160.44	28.8 PK	43.5	-14.7	2.00 V	360	37.3	-8.5
3	313.19	26.9 PK	46.0	-19.1	1.50 V	360	33.5	-6.6
4	494.44	30.1 PK	46.0	-15.9	2.00 V	360	32.3	-2.2
5	644.30	32.9 PK	46.0	-13.1	1.50 V	37	31.9	1.0
6	833.50	34.5 PK	46.0	-11.5	2.00 V	188	30.5	4.0

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 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



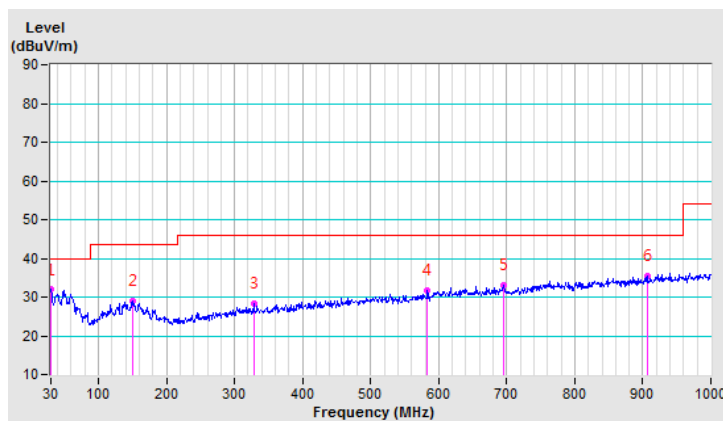
BT GFSK (Ant. 0) + 802.11ac (VHT20) (MIMO Ant. 0+1)

CHANNEL	CH 39 + CH 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	30.02	31.9 PK	40.0	-8.1	1.00 H	33	41.6	-9.7
2	149.96	29.1 PK	43.5	-14.4	1.50 H	97	37.1	-8.0
3	327.79	28.3 PK	46.0	-17.7	2.00 H	270	34.6	-6.3
4	583.36	31.7 PK	46.0	-14.3	1.50 H	142	32.1	-0.4
5	695.42	33.0 PK	46.0	-13.0	1.00 H	17	31.3	1.7
6	906.13	35.6 PK	46.0	-10.4	1.50 H	237	30.7	4.9

Remarks:

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

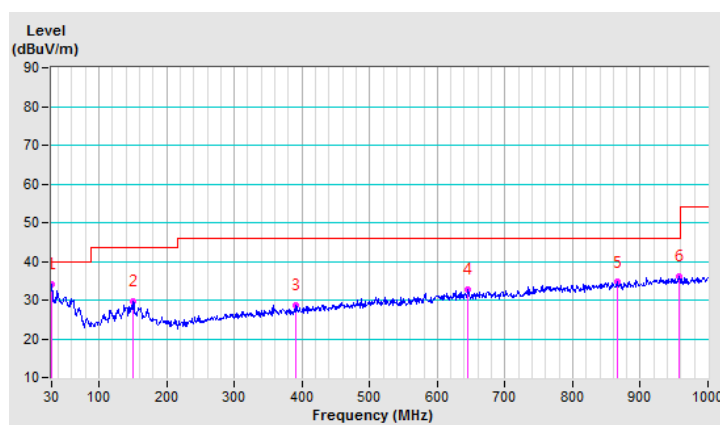


CHANNEL	CH 39 + CH 36	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9kHz ~ 1GHz		

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	30.05	34.2 PK	40.0	-5.8	1.00 V	78	43.9	-9.7
2	150.11	29.8 PK	43.5	-13.7	1.50 V	0	37.8	-8.0
3	391.40	28.8 PK	46.0	-17.2	1.00 V	231	33.6	-4.8
4	645.47	32.9 PK	46.0	-13.1	1.00 V	360	31.9	1.0
5	865.49	34.6 PK	46.0	-11.4	1.50 V	110	30.3	4.3
6	956.50	36.1 PK	46.0	-9.9	1.50 V	54	30.7	5.4

Remarks:

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

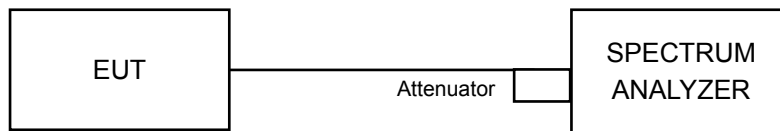


4.2 Conducted Out of Band Emission Measurement

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

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

MEASUREMENT PROCEDURE OOB

- Set RBW = 100 kHz.
- Set VBW $\geq$ 300 kHz.
- Detector = average.
- Sweep = auto couple.
- Trace Mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

4.2.5 Deviation from Test Standard

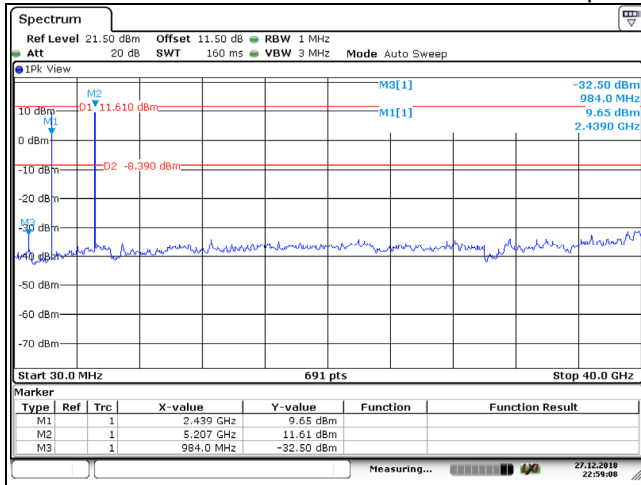
No deviation.

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 of the Testing Laboratories

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

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