FCC Test Report (WLAN)

Report No.:	RF170816E07D
FCC ID:	PPD-QCNFA344AH
Test Model:	QCNFA344A
Received Date:	Jan. 03, 2018
Test Date:	Jan. 20 to 23, 2018
Issued Date:	Apr. 11, 2018
Applicant:	Qualcomm Atheros, Inc.
Address:	1700 Technology Dr San Jose California 95110 United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory
Lab Address:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
Test Location:	E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.
FCC Registration / Designation Number:	723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
RF170816E07D	Original release.	Apr. 11, 2018

1 Certificate of Conformity

Product:	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand:	Qualcomm Atheros
Test Model:	QCNFA344A
Sample Status:	R&D SAMPLE
Applicant:	Qualcomm Atheros, Inc.
Test Date:	Jan. 20 to 23, 2018
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) 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 EMC characteristics under the conditions specified in this report.

Prepared by : Wendy Wu , **Date:** Apr. 11, 2018

Wendy Wu / Specialist

Approved by : , **Date:** Apr. 11, 2018

May Chen / Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.205 / 15.209 / 15.247(d)	Radiated Emissions and Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(d)	Antenna Port Emission	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is IPEX and RSMA not a standard connector.

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 above 1 GHz	1GHz ~ 6GHz	5.10 dB
	6GHz ~ 18GHz	4.85 dB
	18GHz ~ 40GHz	5.24 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11a/b/g/n/ac + BT 4.1 M.2 2230 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA344A
Status of EUT	R&D SAMPLE
Power Supply Rating	3.3Vdc form host equipment
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 11ac mode and VHT (20/40) mode in 2.4GHz
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11a/g: up to 54Mbps 802.11n : up to 300Mbps 802.11ac: up to 866.7Mbps
Operating Frequency	**2.4GHz:** 2.412 ~ 2.472GHz **5GHz:** 5.18 ~ 5.24GHz, 5.26 ~ 5.32GHz, 5.50 ~ 5.72GHz, 5.745 ~ 5.825GHz
Number of Channel	**2.4GHz:** 802.11b, 802.11g, 802.11n (HT20): 13 802.11n (HT40): 9 **5GHz:** 802.11a, 802.11n (HT20), 802.11ac (VHT20): 25 802.11n (HT40), 802.11ac (VHT40): 12 802.11ac (VHT80): 6
Output Power	**2.4GHz:** 492.813mW **5GHz:** **5.18 ~ 5.24GHz:** 70.156mW **5.26 ~ 5.32GHz:** 64.548mW **5.50 ~ 5.72GHz:** 70.881mW **5.745 ~ 5.825GH:** 71.633mW
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RF150107E06B as the following:
   - ◆ Added new Antenna as following table:

Original

Antenna set 1

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dB)	5G Cable Loss (dB)	Connector Type	Cable Length (mm)
Chain (0)	WNC	81-EBJ15.005	PIFA	3.00	Band 1&2: 2.56 Band 3: 4.76 Band 4: 4.76	1.15	Band 1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300
Chain (1)	WNC	81-EBJ15.005	PIFA	3.62	Band 1&2: 3.08 Band 3: 3.31 Band 4: 2.42	1.15	Band 1&2: 1.70 Band 3: 1.74 Band 4: 1.79	IPEX	300

Newly

Antenna set 2

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dB)	5G Cable Loss (dB)	Ant. Connector Type	Cable Connector Type	Cable Length (mm)
Chain (0)	HONGBO	290-30641	Dipole	1.64	Band 1&2: 2.6 Band 3: 2.22 Band 4: 2.38	0.51	Band 1&2: 0.78 Band 3: 0.61 Band 4: 0.81	RSMA	IPEX to RSMA	210
Chain (1)	HONGBO	290-30641	Dipole	1.64	Band 1&2: 2.6 Band 3: 2.22 Band 4: 2.38	0.51	Band 1&2: 0.78 Band 3: 0.61 Band 4: 0.81	RSMA	IPEX to RSMA	210

Antenna set 3

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dB)	5G Cable Loss (dB)	Ant. Connector Type	Cable Connector Type	Cable Length (mm)
Chain (0)	Speed	F.0G.LS-6008-003-00	Dipole	-1.22	Band 1&2: 1.17 Band 3: 1.48 Band 4: 0.38	0.50	Band 1&2: 0.74 Band 3: 0.75 Band 4: 0.76	RSMA	IPEX to RSMA	210
Chain (1)	Speed	F.0G.LS-6008-003-00	Dipole	-1.22	Band 1&2: 1.17 Band 3: 1.48 Band 4: 0.38	0.50	Band 1&2: 0.74 Band 3: 0.75 Band 4: 0.76	RSMA	IPEX to RSMA	210

Note: From the above newly antennas, model: **290-30641** was selected as representative model for the test and its data was recorded in this report.

2. According to above conditions, only Conducted power and Radiated Emissions (VHT40) – CH6 to verify Dipole antenna) test item need to be performed. And all data was verified to meet the requirements.
3. There are Bluetooth technology and WLAN technology used for the EUT.

4. The EUT incorporates a 2T2R function.

2.4GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11b	1 ~ 11Mbps	2TX	2RX
802.11g	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
VHT20	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
VHT40	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
5GHz Band			
MODULATION MODE	**DATA RATE (MCS)**	**TX & RX CONFIGURATION**	
802.11a	6 ~ 54Mbps	2TX	2RX
802.11n (HT20)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11n (HT40)	MCS 0~7	2TX	2RX
	MCS 8~15	2TX	2RX
802.11ac (VHT20)	MCS 0~8, Nss=1	2TX	2RX
	MCS 0~8, Nss=2	2TX	2RX
802.11ac (VHT40)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX
802.11ac (VHT80)	MCS 0~9, Nss=1	2TX	2RX
	MCS 0~9, Nss=2	2TX	2RX

Note: 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)

5. The EUT was pre-tested under the following modes:

Test Mode	Data rate
Mode A	400ns GI
Mode B	**800ns GI**

From the above modes, the worst case was found in **Mode B**. Therefore only the test data of the mode was recorded in this report.

6. WLAN/BT coexistence mode:

- 2x2 WLAN + BT:
  - 5GHz 802.11a/an (or 11ac) transmit concurrent with BT.
  - 2.4GHz: timely shared coexistence.

7. The emission (conducted & radiated emission) of the simultaneous operation (WiFi <5GHz> & Bluetooth) have been evaluated and no non-compliance found. The detail combinations of transmitters / frequencies / modes as below table

Mode	Available Channel	Tested Channel	Modulation Technology
5 GHz (802.11a) + Bluetooth (GFSK)	149 to 165	157	OFDM
	0 to 78	39	FHSS

8. The above EUT information was declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

13 channels are provided for 802.11b, 802.11g and 802.11n (HT20), VHT20:

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		

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

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

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO		DESCRIPTION
	APCM	RE≥1G	
-	√	√	-

Where **APCM:** Antenna Port Conducted Measurement **RE≥1G:** Radiated Emission above 1GHz & Bandedge Measurement

Note: The EUT's antenna (Dipole) had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

Radiated Emission Test (Above 1GHz):

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

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
VHT40	3 to 11	6	OFDM	BPSK	13.5

Antenna Port Conducted 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.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
802.11b	1 to 13	1, 6, 11, 12, 13	DSSS	DBPSK	1
802.11g	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6
VHT20	1 to 13	1, 6, 11, 12, 13	OFDM	BPSK	6.5
VHT40	3 to 11	3, 6, 9, 10, 11	OFDM	BPSK	13.5

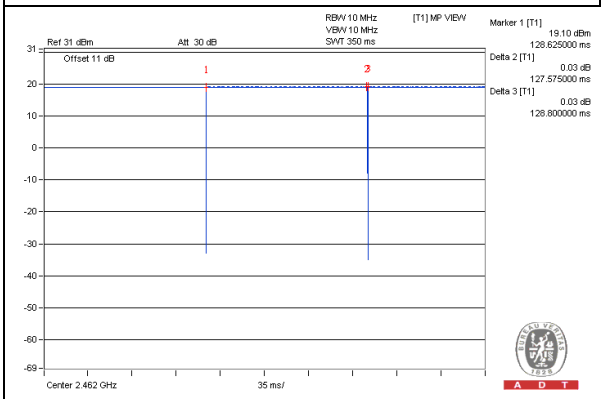
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
APCM	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen
RE≥1G	23deg. C, 63%RH	120Vac, 60Hz	Jyunchun Lin

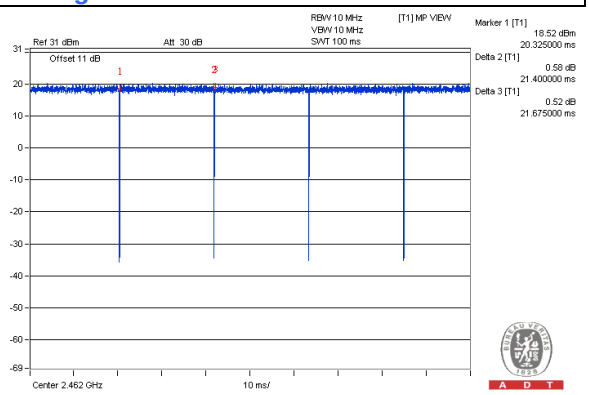
3.3 Duty Cycle of Test Signal

Duty cycle of test signal is ≥ 98 %, duty factor is not required.
802.11b: Duty cycle = 127.575 ms/128.8 ms = 0.99
802.11g: Duty cycle = 21.4 ms/21.675 ms = 0.987
VHT20: Duty cycle = 19.75 ms/19.875 ms = 0.994
VHT40: Duty cycle = 9.508 ms/9.7 ms = 0.98

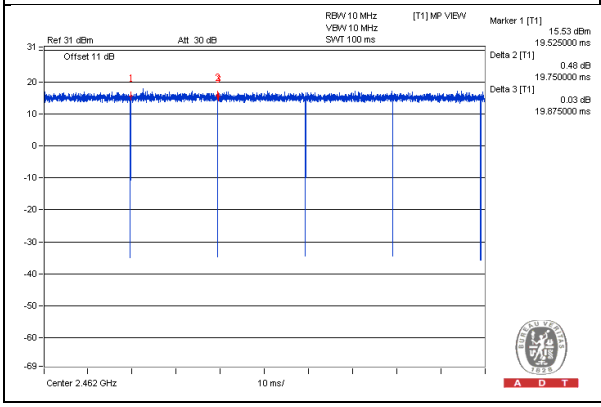
802.11b



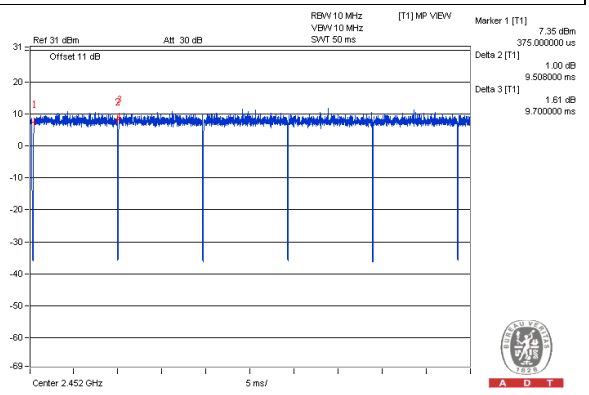
802.11g



VHT20



VHT40



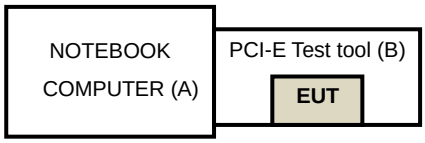
3.4 Description of Support Units

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

No.	Product	Brand	Model No.	Serial No.	FCC ID	Remark
A	NOTEBOOK COMPUTER	DELL	E5430	HYV4VY1	FCC DoC	Provided by Lab
B	PCI-E Test tool	Qualcomm Atheros	NA	NA	NA	Supplied by Client

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart C (15.247)
KDB 558074 D01 DTS Meas Guidance v04
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

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

4 Test Types and Results

4.1 Conducted Output Power Measurement

4.1.1 Limits of Conducted Output Power Measurement

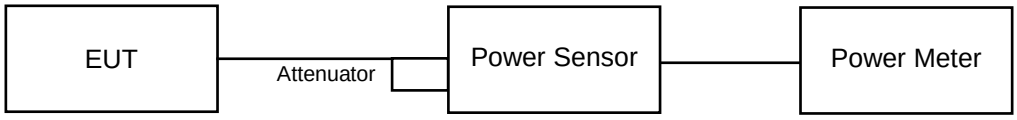
For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

Per KDB 662911 D01 Multiple Transmitter Output Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT};
Array Gain = 5 log(N_{ANT}/N_{SS}) dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

For power measurements on all other devices: Array Gain = 10 log(N_{ANT}/N_{SS}) dB.

4.1.2 Test Setup



4.1.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.1.4 Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

4.1.5 Deviation from Test Standard

No deviation.

4.1.6 EUT Operating Conditions

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

4.1.7 Test Results

FOR PEAK POWER

802.11b

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.15	20.93	254.197	24.05	29.37	Pass
6	2437	21.51	21.45	281.216	24.49	29.37	Pass
11	2462	21.20	20.68	248.776	23.96	29.37	Pass
12	2467	15.89	15.99	78.534	18.95	29.37	Pass
13	2472	12.28	11.99	32.716	15.15	29.37	Pass

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(6.63-6) = 29.37dBm.

802.11g

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	22.98	22.19	364.186	25.61	29.37	Pass
6	2437	24.03	23.80	492.813	26.93	29.37	Pass
11	2462	22.70	22.23	353.318	25.48	29.37	Pass
12	2467	18.86	19.01	156.529	21.95	29.37	Pass
13	2472	7.95	7.41	11.745	10.70	29.37	Pass

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(6.63-6) = 29.37dBm.

VHT20

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
1	2412	21.27	21.32	269.487	24.31	29.37	Pass
6	2437	23.42	24.01	471.554	26.74	29.37	Pass
11	2462	20.99	21.03	252.368	24.02	29.37	Pass
12	2467	19.69	19.55	183.268	22.63	29.37	Pass
13	2472	6.67	5.98	8.608	9.35	29.37	Pass

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(6.63-6) = 29.37dBm.

VHT40

Chan.	Chan. Freq. (MHz)	Peak Power (dBm)		Total Power (mW)	Total Power (dBm)	Limit (dBm)	Pass / Fail
		Chain 0	Chain 1				
3	2422	18.11	18.06	128.687	21.10	29.37	Pass
6	2437	23.88	23.48	467.187	26.69	29.37	Pass
9	2452	15.86	16.16	79.853	19.02	29.37	Pass
10	2457	16.50	16.66	91.013	19.59	29.37	Pass
11	2462	7.96	7.60	12.006	10.79	29.37	Pass

NOTE: Directional gain = 3.62dBi + 10log(2) = 6.63dBi > 6dBi , therefore the limit needs to reduce, so the power limit shall be reduced to 30-(6.63-6) = 29.37dBm.

FOR AVERAGE POWER

802.11b

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	18.74	18.58	146.928	21.67
6	2437	19.23	19.23	167.506	22.24
11	2462	18.85	18.54	148.186	21.71
12	2467	13.55	13.73	46.251	16.65
13	2472	9.67	9.79	18.796	12.74

802.11g

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	16.55	15.96	84.632	19.28
6	2437	18.28	18.16	132.762	21.23
11	2462	16.30	16.00	82.469	19.16
12	2467	13.11	13.17	41.213	16.15
13	2472	1.48	1.23	2.733	4.37

VHT20

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
1	2412	14.93	15.20	64.23	18.08
6	2437	18.27	18.81	143.176	21.56
11	2462	14.38	14.47	55.406	17.44
12	2467	12.82	12.69	37.721	15.77
13	2472	-0.23	-0.53	1.8335	2.63

VHT40

Chan.	Chan. Freq. (MHz)	Average Power (dBm)		Total Power (mW)	Total Power (dBm)
		Chain 0	Chain 1		
3	2422	11.33	10.99	26.143	14.17
6	2437	17.45	17.26	108.801	20.37
9	2452	9.14	9.37	16.854	12.27
10	2457	9.74	9.72	18.795	12.74
11	2462	0.88	0.92	2.461	3.91

5 Pictures of Test Arrangements

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

6 Appendix A – Radiated Emission Measurement

6.1.1 Limits of Radiated Emission 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 20dB 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.

6.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Keysight	N9038A	MY54450088	July 08, 2017	July 07, 2018
Horn_Antenna SCHWARZBECK	BBHA 9120D	9120D-783	Dec. 12, 2017	Dec. 11, 2018
Pre-Amplifier EMCI	EMC12630SE	980385	Feb. 02, 2017	Feb. 01, 2018
RF Cable	EMC104-SM-SM-1200 EMC104-SM-SM-2000 EMC104-SM-SM-5000	160923 150318 150321	Feb. 02, 2017 Mar. 29, 2017 Mar. 29, 2017	Feb. 01, 2018 Mar. 28, 2018 Mar. 28, 2018
Pre-Amplifier EMCI	EMC184045SE	980387	Feb. 02, 2017	Feb. 01, 2018
Horn_Antenna SCHWARZBECK	BBHA 9170	BBHA9170608	Dec. 14, 2017	Dec. 13, 2018
RF Cable	SUCOFLEX 102	36432/2 36433/2	Jan. 11, 2018	Jan. 10, 2019
Software	ADT_Radiated_V8.7.08	NA	NA	NA
Antenna Tower & Turn Table Max-Full	MF-7802	MF780208410	NA	NA
Boresight Antenna Fixture	FBA-01	FBA-SIP02	NA	NA
Spectrum Analyzer R&S	FSv40	100964	July 1, 2017	June 30, 2018
Power meter Anritsu	ML2495A	1014008	May 11, 2017	May 10, 2018
Power sensor Anritsu	MA2411B	0917122	May 11, 2017	May 10, 2018

Note:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in 966 Chamber No. 4.
3. The CANADA Site Registration No. is 20331-2
4. Tested Date: Jan. 20 to 23, 2018

6.1.3 Test Procedures

a. The EUT was placed on the top of a rotating table 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 peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

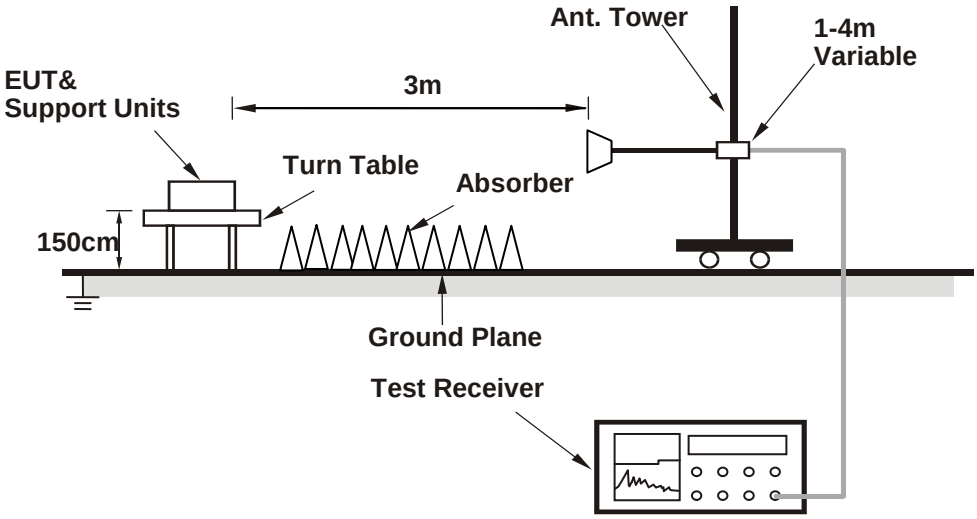
Note:

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

6.1.4 Deviation from Test Standard

No deviation

6.1.5 Test Setup



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

6.1.6 EUT Operating Conditions

1. Connect the EUT with the support unit A (Notebook Computer) which is placed on a testing table.
2. The communication partner run test program “QCART Version: 3.0.33.0” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

6.1.7 Test Results

This result was tested by radiated measurement to verify Dipole antenna.

VHT40

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

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	2381.63	62.1 PK	74.0	-11.9	1.24 H	252	63.0	-0.9
2	2381.63	46.2 AV	54.0	-7.8	1.24 H	252	47.1	-0.9
3	2389.99	67.0 PK	74.0	-7.0	1.24 H	252	68.0	-1.0
4	2389.99	51.0 AV	54.0	-3.0	1.24 H	252	52.0	-1.0
5	2483.50	62.7 PK	74.0	-11.3	1.24 H	252	63.9	-1.2
6	2483.50	47.8 AV	54.0	-6.2	1.24 H	252	49.0	-1.2
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	**FREQ. (MHz)**	**EMISSION LEVEL (dBuV/m)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA HEIGHT (m)**	**TABLE ANGLE (Degree)**	**RAW VALUE (dBuV)**	**CORRECTION FACTOR (dB/m)**
1	2381.63	71.0 PK	74.0	-3.0	1.00 V	252	71.9	-0.9
2	2381.63	50.0 AV	54.0	-4.0	1.00 V	252	50.9	-0.9
3	2389.99	72.2 PK	74.0	-1.8	1.00 V	252	73.2	-1.0
4	**2389.99**	**53.9 AV**	**54.0**	**-0.1**	**1.00 V**	**252**	**54.9**	**-1.0**
5	2483.50	68.8 PK	74.0	-5.2	1.00 V	252	70.0	-1.2
6	2483.50	51.5 AV	54.0	-2.5	1.00 V	252	52.7	-1.2

REMARKS:

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

Appendix B – 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 according to ISO/IEC 17025.

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

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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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