



## FCC/IC Test Report (BT-EDR)

**Report No.:** RF130223E01H-2

**FCC ID:** PPD-QCNFA222

**IC:** 4104A-QCNFA222

**Test Model:** QCNFA222

**Received Date:** July 23, 2015

**Test Date:** July 29 to Aug. 03, 2015

**Issued Date:** Aug. 06, 2015

**Applicant:** Qualcomm Atheros, Inc.

**Address:** 1700 Technology Drive, San Jose, CA 95110

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

**Lab Address:** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

**Test Location (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

**Test Location (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

**Test Location (3):** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City, Taiwan  
R.O.C.

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### Release Control Record

Issue No.	Description	Date Issued
RF130223E01H-2	Original release.	Aug. 06, 2015



**2 Summary of Test Results**

APPLIED STANDARD: 47 CFR FCC Part 15, Subpart C (SECTION 15.247) ; RSS-247; RSS-Gen				
STANDARD SECTION		Test Item	Result	Remarks
FCC Clause	RSS-Gen RSS-247			
15.247(b)	RSS-247 5.4 (2)	Maximum Peak Output Power	PASS	Meet the requirement of limit.
15.205 15.209 15.247(d)	RSS-247 5.5	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -3.4dB at 166.24MHz.

**NOTE:** 1. This report is prepared for FCC Class II change. Only Radiated Emissions and Band Edge and Conducted power Measurement were presented in this test report.

**2.1 Measurement Uncertainty**

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

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.43 dB
	1GHz ~ 6GHz	3.72 dB
Radiated Emissions above 1 GHz	6GHz ~ 18GHz	4.00 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 (BT-EDR)

Product	PCIE 802.11a/b/g/n 2.4GHz/5GHz + USB BT 4.0 card
Brand	Qualcomm Atheros
Test Model	QCNFA222
Status of EUT	ENGINEERING SAMPLE
Test Software Version	BtTest Jupiter.exe Version: V2.0.197
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	Up to 3Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	79
Output Power	6.730mW
Antenna Type	See item 3.2
Antenna Connector	See item 3.2
Accessory Device	NA
Data Cable Supplied	NA

Note:

- This report is prepared for FCC Class II change. The difference compared with the Report No.: RF130223E01-2 design is as the following:
  - ◆ Create Single band SKU (FVIN AW-NB234NF) by disable 5GHz function with software. There is no Hardware change or depopulation of components in new Single band from original certified design.
  - ◆ Reactive 5GHz band to this Single band SKU is not accessible by end user once disable of 5GHz is programmed in modular factory. Software loading is a One Time Programmable(OTP) action that is performed in the factory
  - ◆ List antenna model: WA-F-LBLB-04-028 (same type and lower gain to original typical antenna) to this Single band SKU.
  - ◆ Add modular SAR in 5mm antenna to body distance to this Single band SKU.
- According to above conditions, Only Radiated Emissions and Band Edge and Conducted power Measurement were presented in this test report.
- There are Bluetooth technology and WLAN technology used for the EUT.
- The EUT support multiple function, therefore the WLAN OFDM will be cover BT OFDM (low power) scenario.
- The power setting are list as below:

Modulation Mode	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
GFSK	2402	8	2440	8	2480	8
8DPSK	2402	8	2440	8	2480	8

- This device support the power back off for WLAN/BT coexist mode. The WiFi output power will reduce to 10.5dBm from Maximum power in 802.11n HT20 (2TX) mode of 2.4GHz when WLAN and BT simultaneously transmission.

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

Mode	Available Channel	Tested Channel	Modulation Technology
802.11g +	1 to 11	6	OFDM
Bluetooth (8DPSK)	0 to 78	78	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 Antenna

The antenna gain was declared by client; please refer to the following table:

Ant. No.	Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dB)	Connector Type	Cable Length (mm)
1	Main	INPAQ	WA-F-LBLB-04-028	PIFA	2.38	-0.47	IPEX MHF	143
	Aux	INPAQ	WA-F-LBLB-04-028	PIFA	2.30	-0.47	IPEX MHF	143

Note: 1. Above antenna gains of antenna are Total (H+V).

### 3.3 Description of Test Modes

79 channels are provided for BT-EDR mode:

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		



### 3.3.1 Test Mode Applicability and Tested Channel Detail

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

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

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

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	GFSK	DH5
0 to 78	0, 39, 78	8DPSK	3DH5

#### 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
0 to 78	78	8DPSK	3DH5

#### 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.

AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TYPE	PACKET TYPE
0 to 78	0, 39, 78	GFSK	DH5
0 to 78	0, 39, 78	8DPSK	3DH5

#### Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
<b>RE≥1G</b>	23deg. C, 69%RH	120Vac, 60Hz	Robert Cheng
<b>RE&lt;1G</b>	24deg. C, 66%RH	120Vac, 60Hz	Robert Cheng
<b>APCM</b>	25deg. C, 60%RH	120Vac, 60Hz	Anderson Chen

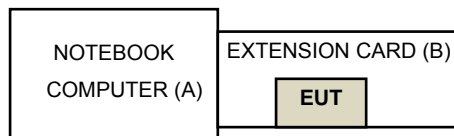
### 3.4 Description of Support Units

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	E6420	H62T3R1	FCC DoC	Provided by Lab
B	EXTENSION CARD	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)**  
**FCC Public Notice DA 00-705**  
**Canada RSS-247 Issue 1 (2015-05)**  
**Canada RSS-Gen Issue 4 (2014-11)**  
**ANSI C63.10-2013**

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

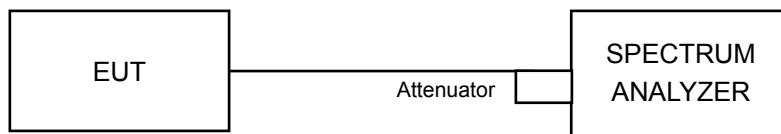
## 4 Test Types and Results

### 4.1 Maximum Output Power Measurement

#### 4.1.1 Limits of Maximum Output Power Measurement

The Maximum Output Power Measurement is 125mW.

#### 4.1.2 Test Setup



#### 4.1.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
SPECTRUM ANALYZER R&S	FSP 40	100060	May 08, 2015	May 07, 2016

- NOTE:**
1. The test was performed in Oven room B.
  2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  3. Tested Date: Aug. 03, 2015

#### 4.1.4 Test Procedure

- a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 3MHz RBW and 10 MHz VBW.
- d. Measure the captured power within the band and recording the plot.
- e. Repeat above procedures until all frequencies required were complete.

#### 4.1.5 Deviation from Test Standard

No deviation.

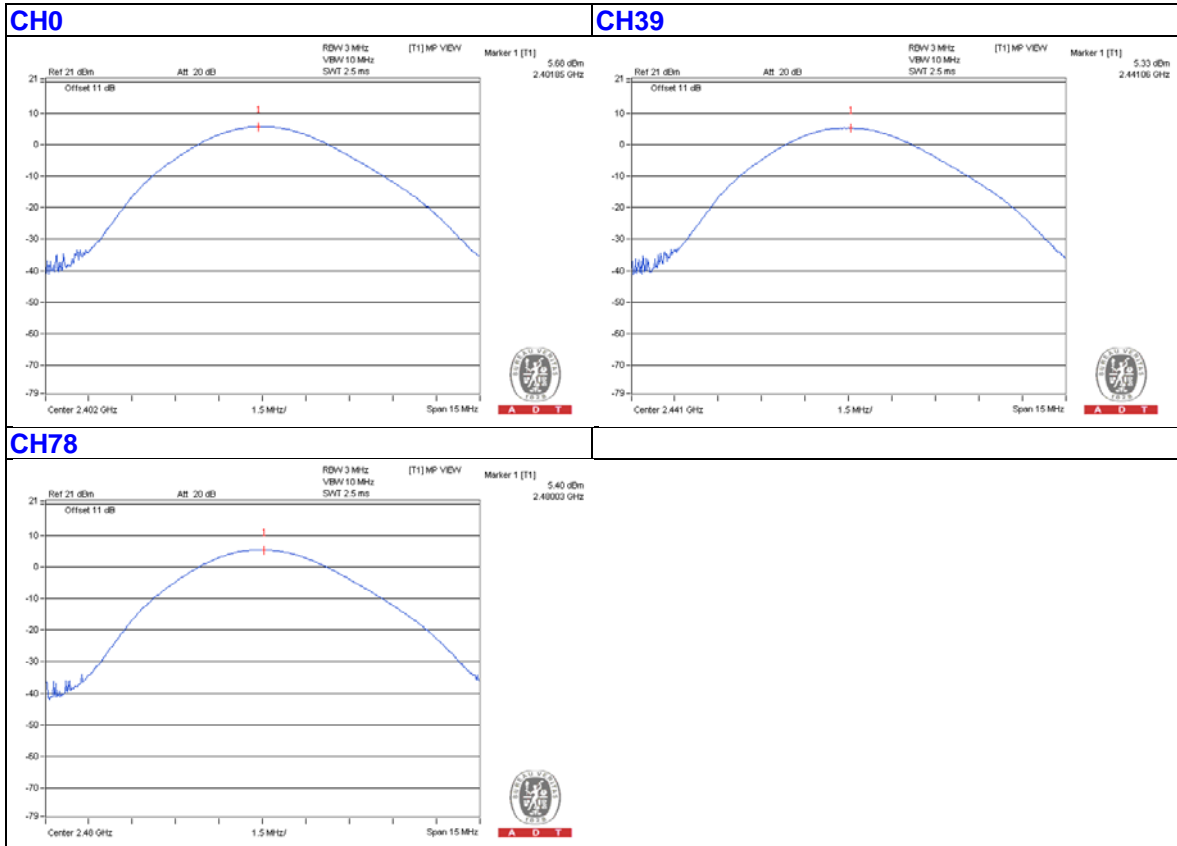
#### 4.1.6 EUT Operating Condition

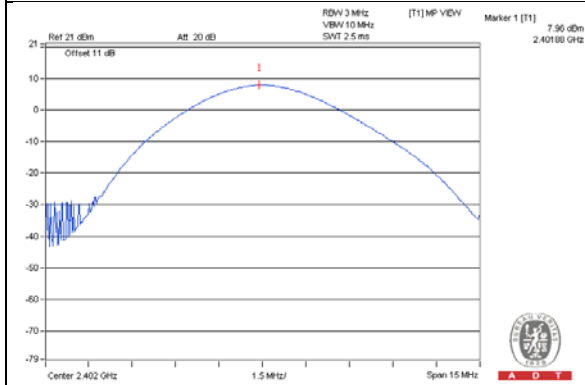
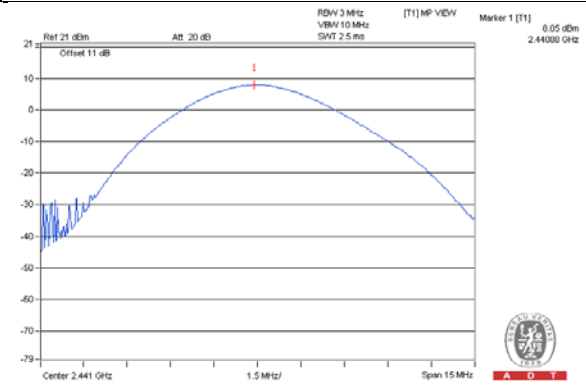
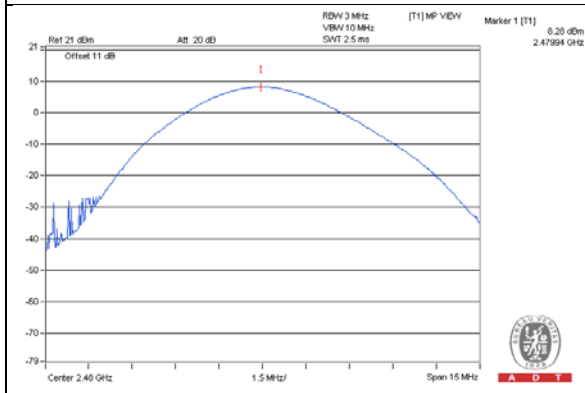
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

### 4.1.7 Test Results

Channel	Frequency (MHZ)	Output Power (mW)		Output Power (dBm)		Power Limit (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	3.698	6.252	5.68	7.96	125	Pass
39	2441	3.412	6.383	5.33	8.05	125	Pass
78	2480	3.467	6.730	5.40	8.28	125	Pass

#### GFSK



**8DPSK****CH0****CH39****CH78**

## 4.2 Radiated Emission and Bandedge Measurement

### 4.2.1 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 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.



#### 4.2.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY50010156	Aug. 11, 2014	Aug. 10, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-04	Nov. 12, 2014	Nov. 11, 2015
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-361	Feb. 09, 2015	Feb. 08, 2016
RF Cable	8D-FB	CHHCAB-001-1 CHHCAB-001-2	Oct. 05, 2014	Oct. 04, 2015
	RF-141	CHHCAB-004	Oct. 05, 2014	Oct. 04, 2015
Horn_Antenna AISI	AIH.8018	0000220091110	Feb. 06, 2015	Feb. 05, 2016
Pre-Amplifier Agilent	8449B	3008A01923	Oct. 28, 2014	Oct. 27, 2015
RF Cable	NA	131206 131213 131215 SNMY23685/4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	Jun. 26, 2015	Jun. 25, 2016
Pre-Amplifier SPACEK LABS	SLKKa-48-6	9K16	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna SCHWARZBECK	BBHA 9170	9170-424	Feb. 05, 2015	Feb. 04, 2016
RF Cable	NA	329751/4 RF104-204	Dec. 11, 2014	Dec. 10, 2015
Software	ADT_Radiated _V8.7.07	NA	NA	NA
Antenna Tower & Turn Table CT	NA	NA	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 test was performed in 966 Chamber No. H.
3. The FCC Site Registration No. is 797305.
4. The CANADA Site Registration No. is IC 7450H-3.
5. Tested Date: July 29, 2015

#### 4.2.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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:**

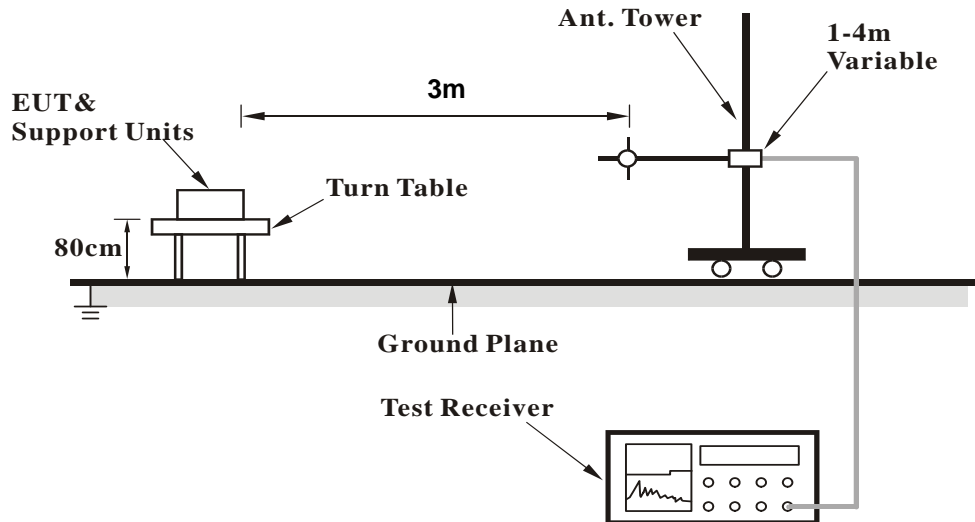
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.2.4 Deviation from Test Standard

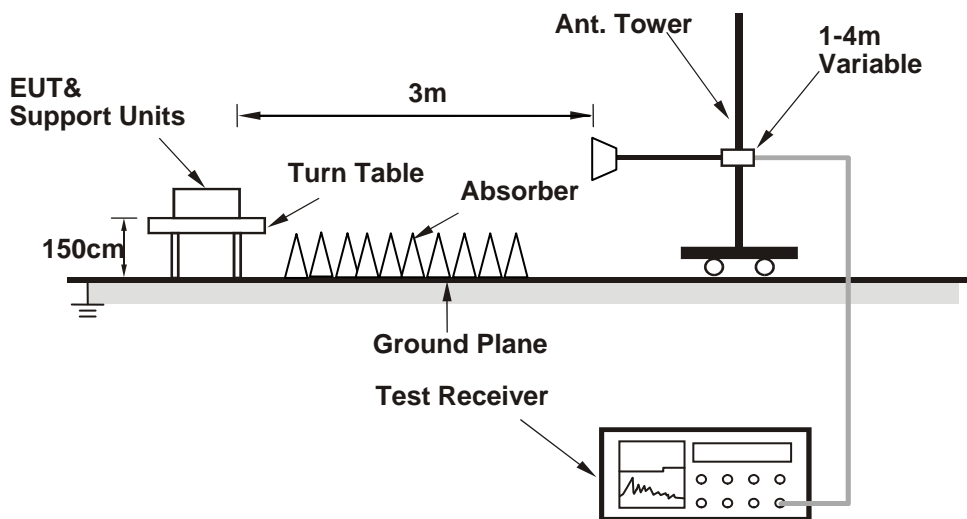
No deviation.

#### 4.2.5 Test Set Up

##### <Frequency Range below 1GHz>



##### <Frequency Range above 1GHz>



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

#### 4.2.6 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 "BtTest Jupiter.exe Version: V2.0.197" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.2.7 Test Results

Above 1GHz Data:

BT\_GFSK

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2322.00	52.2 PK	74.0	-21.8	1.42 H	336	55.55	-3.35
2	2322.00	45.1 AV	54.0	-8.9	1.42 H	336	48.45	-3.35
3	2390.00	46.5 PK	74.0	-27.5	1.00 H	333	49.69	-3.19
4	2390.00	34.0 AV	54.0	-20.0	1.00 H	333	37.19	-3.19
5	*2402.00	101.2 PK			1.00 H	333	104.36	-3.16
6	*2402.00	93.3 AV			1.00 H	333	96.46	-3.16
7	4804.00	46.8 PK	74.0	-27.2	1.24 H	77	40.86	5.94
8	4804.00	35.5 AV	54.0	-18.5	1.24 H	77	29.56	5.94
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	2322.00	53.1 PK	74.0	-20.9	1.00 V	264	56.45	-3.35
2	2322.00	45.8 AV	54.0	-8.2	1.00 V	264	49.15	-3.35
3	2390.00	47.0 PK	74.0	-27.0	1.00 V	264	50.19	-3.19
4	2390.00	34.6 AV	54.0	-19.4	1.00 V	264	37.79	-3.19
5	*2402.00	101.7 PK			1.00 V	264	104.86	-3.16
6	*2402.00	93.9 AV			1.00 V	264	97.06	-3.16
7	4804.00	46.3 PK	74.0	-27.7	1.06 V	221	40.36	5.94
8	4804.00	35.0 AV	54.0	-19.0	1.06 V	221	29.06	5.94

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2361.00	52.0 PK	74.0	-22.0	1.45 H	348	55.26	-3.26
2	2361.00	45.0 AV	54.0	-9.0	1.45 H	348	48.26	-3.26
3	*2441.00	100.2 PK			1.00 H	331	103.22	-3.02
4	*2441.00	91.9 AV			1.00 H	331	94.92	-3.02
5	4882.00	46.8 PK	74.0	-27.2	1.25 H	97	40.75	6.05
6	4882.00	35.3 AV	54.0	-18.7	1.25 H	97	29.25	6.05
7	7323.00	50.1 PK	74.0	-23.9	1.00 H	301	39.08	11.02
8	7323.00	39.5 AV	54.0	-14.5	1.00 H	301	28.48	11.02

**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	2361.00	56.2 PK	74.0	-17.8	1.00 V	261	59.46	-3.26
2	2361.00	49.2 AV	54.0	-4.8	1.00 V	261	52.46	-3.26
3	*2441.00	100.3 PK			1.08 V	262	103.32	-3.02
4	*2441.00	92.6 AV			1.08 V	262	95.62	-3.02
5	4882.00	46.1 PK	74.0	-27.9	1.00 V	198	40.05	6.05
6	4882.00	34.5 AV	54.0	-19.5	1.00 V	198	28.45	6.05
7	7323.00	51.1 PK	74.0	-22.9	1.39 V	113	40.08	11.02
8	7323.00	40.2 AV	54.0	-13.8	1.39 V	113	29.18	11.02

**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.

<b>CHANNEL</b>	TX Channel 78	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	99.1 PK			1.00 H	322	101.98	-2.88
2	*2480.00	91.4 AV			1.00 H	322	94.28	-2.88
3	2483.50	46.8 PK	74.0	-27.2	1.00 H	320	49.67	-2.87
4	2483.50	34.2 AV	54.0	-19.8	1.00 H	320	37.07	-2.87
5	4960.00	47.0 PK	74.0	-27.0	1.21 H	81	40.96	6.04
6	4960.00	35.5 AV	54.0	-18.5	1.21 H	81	29.46	6.04
7	7440.00	50.1 PK	74.0	-23.9	1.00 H	306	38.37	11.73
8	7440.00	39.2 AV	54.0	-14.8	1.00 H	306	27.47	11.73

**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	*2480.00	99.5 PK			1.08 V	264	102.38	-2.88
2	*2480.00	92.0 AV			1.08 V	264	94.88	-2.88
3	2483.50	48.1 PK	74.0	-25.9	1.08 V	264	50.97	-2.87
4	2483.50	39.6 AV	54.0	-14.4	1.08 V	264	42.47	-2.87
5	4960.00	45.9 PK	74.0	-28.1	1.00 V	216	39.86	6.04
6	4960.00	34.2 AV	54.0	-19.8	1.00 V	216	28.16	6.04
7	7440.00	50.6 PK	74.0	-23.4	1.46 V	112	38.87	11.73
8	7440.00	39.6 AV	54.0	-14.4	1.46 V	112	27.87	11.73

**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\_8DPSK**

<b>CHANNEL</b>	TX Channel 0	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	2322.00	52.5 PK	74.0	-21.5	1.47 H	349	55.85	-3.35
2	2322.00	48.5 AV	54.0	-5.5	1.47 H	349	51.85	-3.35
3	2390.00	46.4 PK	74.0	-27.6	1.02 H	318	49.59	-3.19
4	2390.00	33.8 AV	54.0	-20.2	1.02 H	318	36.99	-3.19
5	*2402.00	102.5 PK			1.05 H	324	105.66	-3.16
6	*2402.00	91.9 AV			1.05 H	324	95.06	-3.16
7	4804.00	47.0 PK	74.0	-27.0	1.23 H	69	41.06	5.94
8	4804.00	35.6 AV	54.0	-18.4	1.23 H	69	29.66	5.94

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	2322.00	52.5 PK	74.0	-21.5	1.06 V	270	55.85	-3.35
2	2322.00	45.4 AV	54.0	-8.6	1.06 V	270	48.75	-3.35
3	2390.00	47.4 PK	74.0	-26.6	1.03 V	258	50.59	-3.19
4	2390.00	34.9 AV	54.0	-19.1	1.03 V	258	38.09	-3.19
5	*2402.00	103.4 PK			1.10 V	264	106.56	-3.16
6	*2402.00	92.4 AV			1.10 V	264	95.56	-3.16
7	4804.00	46.2 PK	74.0	-27.8	1.04 V	226	40.26	5.94
8	4804.00	34.7 AV	54.0	-19.3	1.04 V	226	28.76	5.94

**REMARKS:**

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

<b>CHANNEL</b>	TX Channel 39	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2361.00	52.6 PK	74.0	-21.4	1.01 H	330	55.86	-3.26
2	2361.00	45.4 AV	54.0	-8.6	1.01 H	330	48.66	-3.26
3	*2441.00	101.4 PK			1.01 H	330	104.42	-3.02
4	*2441.00	90.6 AV			1.01 H	330	93.62	-3.02
5	4882.00	46.8 PK	74.0	-27.2	1.26 H	100	40.75	6.05
6	4882.00	35.1 AV	54.0	-18.9	1.26 H	100	29.05	6.05
7	7323.00	50.2 PK	74.0	-23.8	1.04 H	310	39.18	11.02
8	7323.00	39.2 AV	54.0	-14.8	1.04 H	310	28.18	11.02

**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	2361.00	56.3 PK	74.0	-17.7	1.01 V	272	59.56	-3.26
2	2361.00	49.3 AV	54.0	-4.7	1.01 V	272	52.56	-3.26
3	*2441.00	101.9 PK			1.07 V	277	104.92	-3.02
4	*2441.00	91.1 AV			1.07 V	277	94.12	-3.02
5	4882.00	46.5 PK	74.0	-27.5	1.00 V	213	40.45	6.05
6	4882.00	34.8 AV	54.0	-19.2	1.00 V	213	28.75	6.05
7	7323.00	51.1 PK	74.0	-22.9	1.40 V	113	40.08	11.02
8	7323.00	40.3 AV	54.0	-13.7	1.40 V	113	29.28	11.02

**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.



<b>CHANNEL</b>	TX Channel 78	<b>DETECTOR FUNCTION</b>	Peak (PK)
<b>FREQUENCY RANGE</b>	1GHz ~ 25GHz		Average (AV)

**ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M**

NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	100.9 PK			1.05 H	328	103.78	-2.88
2	*2480.00	90.1 AV			1.05 H	328	92.98	-2.88
3	2483.50	46.8 PK	74.0	-27.2	1.05 H	328	49.67	-2.87
4	2483.50	34.4 AV	54.0	-19.6	1.05 H	328	37.27	-2.87
5	4960.00	46.6 PK	74.0	-27.4	1.20 H	80	40.56	6.04
6	4960.00	35.3 AV	54.0	-18.7	1.20 H	80	29.26	6.04
7	7440.00	50.1 PK	74.0	-23.9	1.04 H	301	38.37	11.73
8	7440.00	39.5 AV	54.0	-14.5	1.04 H	301	27.77	11.73

**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	*2480.00	101.5 PK			1.08 V	249	104.38	-2.88
2	*2480.00	90.6 AV			1.08 V	249	93.48	-2.88
3	2483.50	47.5 PK	74.0	-26.5	1.07 V	277	50.37	-2.87
4	2483.50	39.2 AV	54.0	-14.8	1.07 V	277	42.07	-2.87
5	4960.00	46.5 PK	74.0	-27.5	1.00 V	227	40.46	6.04
6	4960.00	34.8 AV	54.0	-19.2	1.00 V	227	28.76	6.04
7	7440.00	50.6 PK	74.0	-23.4	1.47 V	94	38.87	11.73
8	7440.00	39.8 AV	54.0	-14.2	1.47 V	94	28.07	11.73

**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.

**Below 1GHz Data**

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<b>CHANNEL</b>	TX Channel 78	<b>DETECTOR FUNCTION</b>	Quasi-Peak (QP)
<b>FREQUENCY RANGE</b>	Below 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	88.77	34.4 QP	43.5	-9.1	1.54 H	201	53.29	-18.88
2	<b>166.24</b>	<b>40.1 QP</b>	<b>43.5</b>	<b>-3.4</b>	<b>1.64 H</b>	<b>20</b>	<b>53.34</b>	<b>-13.23</b>
3	233.30	35.3 QP	46.0	-10.7	1.24 H	241	50.05	-14.71
4	373.24	38.2 QP	46.0	-7.9	1.64 H	301	48.39	-10.24
5	624.61	36.5 QP	46.0	-9.5	1.24 H	67	40.85	-4.34
6	697.24	37.5 QP	46.0	-8.5	1.64 H	300	40.90	-3.39

**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	31.60	32.5 QP	40.0	-7.5	1.00 V	26	47.40	-14.89
2	71.13	30.9 QP	40.0	-9.1	1.00 V	304	46.40	-15.50
3	89.66	31.8 QP	43.5	-11.8	1.00 V	316	50.66	-18.91
4	166.62	33.6 QP	43.5	-9.9	1.00 V	34	46.86	-13.23
5	373.38	34.7 QP	46.0	-11.3	1.00 V	320	44.94	-10.24
6	697.07	34.7 QP	46.0	-11.3	1.00 V	268	38.11	-3.39

**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 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 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 Lab/Telecom Lab**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://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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