

FCC/IC Test Report (BT-EDR)

Report No.: RF141008E03H-2

FCC ID: PPD-QCNFA435

IC: 4104A-QCNFA435

Test Model: QCNFA435

Received Date: June 15, 2015

Test Date: July 29 to 30, 2015

Issued Date: Aug. 07, 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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A D T

Release Control Record

Issue No.	Description	Date Issued
RF141008E03H-2	Original release.	Aug. 07, 2015

1 Certificate of Conformity

Product: Single Stream 802.11a/b/g/n/ac + BT 4.1 M.2 Type Card

Brand: Qualcomm Atheros

Test Model: QCNFA435

Sample Status: R&D SAMPLE

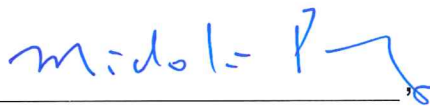
Applicant: Qualcomm Atheros, Inc.

Test Date: July 29 to 30, 2015

Standards: 47 CFR FCC Part 15, Subpart C (Section 15.247)
ANSI C63.10: 2013
Canada RSS-247 Issue 1 (2015-05)
Canada RSS-Gen Issue 4 (2014-11)

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 :

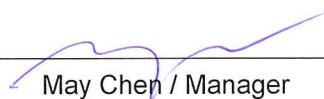


Date:

Aug. 07, 2015

Midoli Peng / Specialist

Approved by :



Date:

Aug. 07, 2015

May Chen / Manager

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 -3.7dB at 497.63MHz.

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	Expended Uncertainty (k=2) ($\pm$)
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	5.31 dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	3.65 dB
	6GHz ~ 18GHz	3.88 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	Single Stream 802.11a/b/g/n/ac + BT 4.1 M.2 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA435
Status of EUT	R&D SAMPLE
Test Software Version	QCART Version: 3.0.33.0
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	14.158mW
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.: RF141008E03-2 R1 design is as the following:
 - ◆ Chip revision (QCA9377) from V1.0 to V1.1. No RF change is made in chip revision.
 - ◆ Update UNII-3 band to new UNII rule
 - ◆ Add Single Antenna hardware variant (remove RX diversity antenna connector).
 - ◆ Add 5mm Modular SAR.
 - ◆ Enable TX diversity for 2 antenna connectors SKU to allow transmission in another antenna connector
- 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 modular has four variant designs as following table:

Variant No.	Desceiption	Version
SKU #1	2 Antenna connectors	1.0
SKU #2	1 Antenna connector	1.0
SKU #3	2 Antenna connectors	1.1
SKU #4	1 Antenna connect	1.1

Note: From the above Variants, SKU #3 was selected as representative model for the test and its data was recorded in this report.

- The power setting are list as below:

Modulation Mode	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting	Frequency (MHz)	Power Setting
GFSK	2402	9	2440	9	2480	9
8DPSK	2402	9	2440	9	2480	9

- WLAN/BT coexistence mode:

- ◆ 1x1 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)	36 to 165	52	OFDM
+			
Bluetooth (GFSK)	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 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)	5GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dB)	5GHz Cable Loss (dB)	Connector Type	Cable Length (mm)
1	Chain (0)	WNC	81.EBJ15.005	PIFA	3.00	5.15~5.35GHz: 2.56	1.15	5.15~5.35GHz: 1.70	IPEX	300
						5.47~5.725GHz: 4.76		5.47~5.725GHz: 1.74		
						5.725~5.85GHz: 4.76		5.725~5.85GHz: 1.79		
	Chain (1)	WNC	81.EBJ15.005	PIFA	3.62	5.15~5.35GHz: 3.08	1.15	5.15~5.35GHz: 1.70	IPEX	300
						5.47~5.725GHz: 3.31		5.47~5.725GHz: 1.74		
						5.725~5.85GHz: 2.42		5.725~5.85GHz: 1.79		
2	Chain (0)	WNC	81.ED415.001	PIFA	0.22	5.15~5.35GHz: 5.56	0.96	5.15~5.35GHz: 1.29	IPEX	300
						5.47~5.725GHz: 5.03		5.47~5.725GHz: 1.36		
						5.725~5.85GHz: 3.14		5.725~5.85GHz: 1.38		
	Chain (1)	WNC	81.ED415.001	PIFA	1.48	5.15~5.35GHz: 5.17	0.96	5.15~5.35GHz: 1.29	IPEX	300
						5.47~5.725GHz: 5.34		5.47~5.725GHz: 1.36		
						5.725~5.85GHz: 2.94		5.725~5.85GHz: 1.38		

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

Following antenna combination(s) was (were) selected as representative mode for test or evaluate in this report as listed.

2400~2483.5MHz:

Transmitter Circuit	Brand	Model	Ant. Type	2.4GHz Gain with cable loss (dBi)	2.4GHz Cable Loss (dB)	Connector Type	Cable Length (mm)
Chain (0)+(1)	WNC	81.EBJ15.005	PIFA	3.62	1.15	IPEX	300

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	39	GFSK	DH5

Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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
RE $\geq$ 1G	25deg. C, 66%RH	120Vac, 60Hz	Tim Ho
RE<1G	25deg. C, 68%RH	120Vac, 60Hz	Tim Ho
APCM	25deg. C, 65%RH	120Vac, 60Hz	Anderson Chen

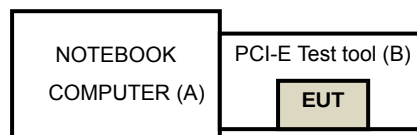
3.4 Description of Support Units

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	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)
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.

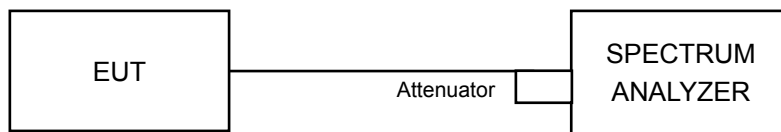
4 Test Types and Results

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: July 29, 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

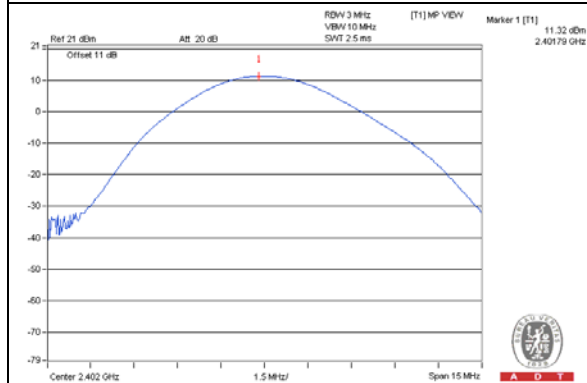
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.1.7 Test Results

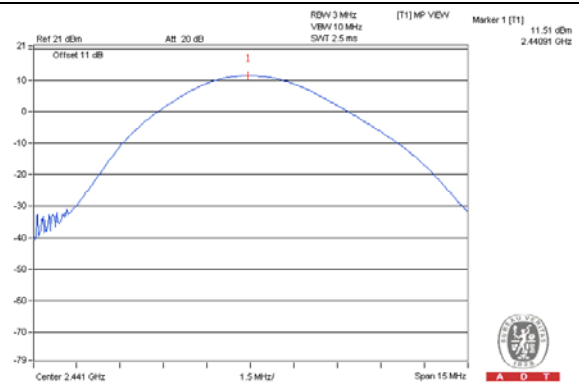
Channel	Frequency (MHZ)	Output Power (mW)		Output Power (dBm)		Power Limit (mW)	Pass / Fail
		GFSK	8DPSK	GFSK	8DPSK		
0	2402	13.552	10.471	11.32	10.20	125	Pass
39	2441	14.158	10.715	11.51	10.30	125	Pass
78	2480	13.677	10.257	11.36	10.11	125	Pass

GFSK

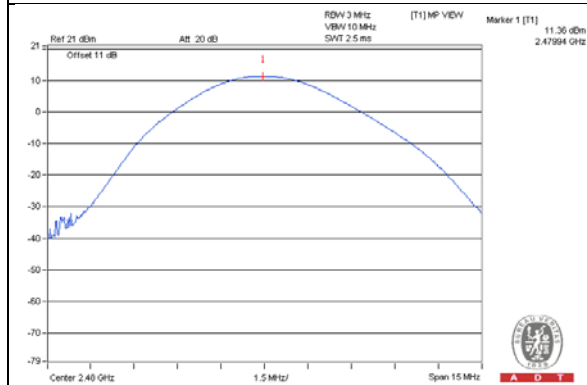
CH0



CH39

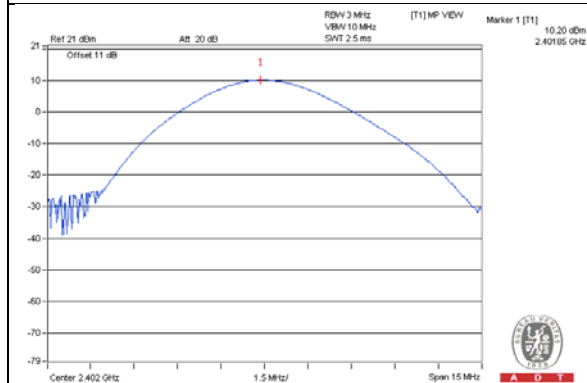


CH78

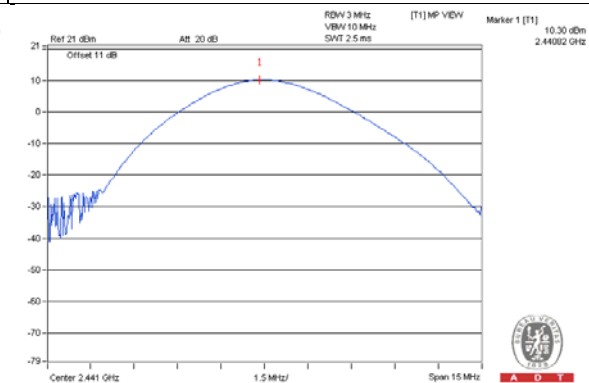


8DPSK

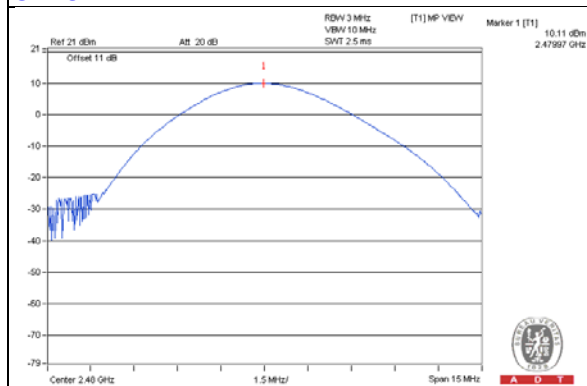
CH0



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

For above 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Horn_Antenna AISl	AIH.8018	000032009111 0	Feb. 09, 2015	Feb. 08, 2016
Pre-Amplifier Agilent	8449B	3008A02578	June 23, 2015	June 22, 2016
RF Cable	NA	131205 131216 131217 SNMY23684/ 4	Jan. 16, 2015	Jan. 15, 2016
Spectrum Analyzer R&S	FSV40	100964	June 26, 2015	June 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. G.
3. The FCC Site Registration No. is 966073.
4. The VCCI Site Registration No. is G-137.
5. The CANADA Site Registration No. is IC 7450H-2.
6. Tested Date: July 30, 2015

For below 1GHz test:

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED DATE	CALIBRATED UNTIL
Test Receiver Agilent	N9038A	MY51210202	Dec. 12, 2014	Dec. 11, 2015
Pre-Amplifier Mini-Circuits	ZFL-1000VH2 B	AMP-ZFL-07	May 08, 2015	May 07, 2016
Trilog Broadband Antenna SCHWARZBECK	VULB 9168	9168-406	Feb. 03, 2015	Feb. 02, 2016
RF Cable	8D	966-3-1 966-3-2 966-3-3	Apr. 03, 2015	Apr. 02, 2016
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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in 966 Chamber No. 3.
4. The FCC Site Registration No. is
6. The CANADA Site Registration No. is
7. Tested Date: July 30, 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:

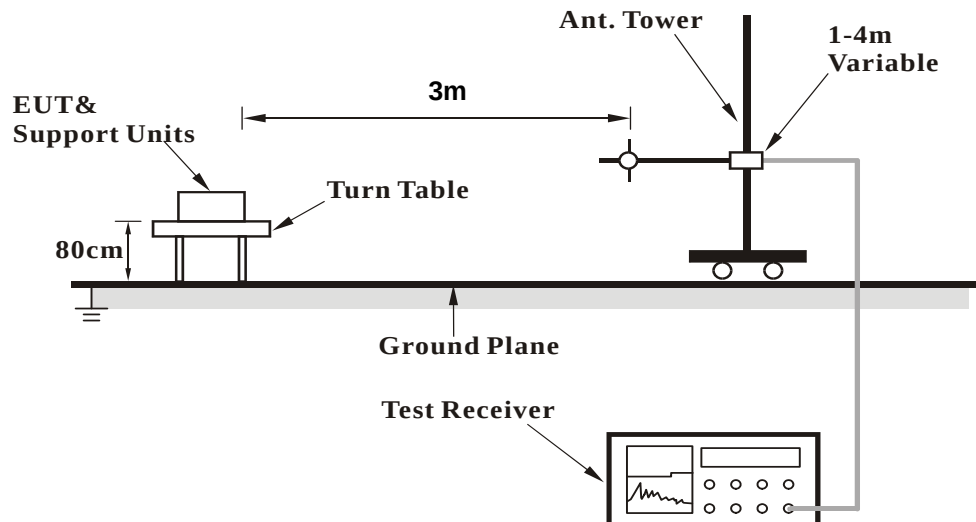
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

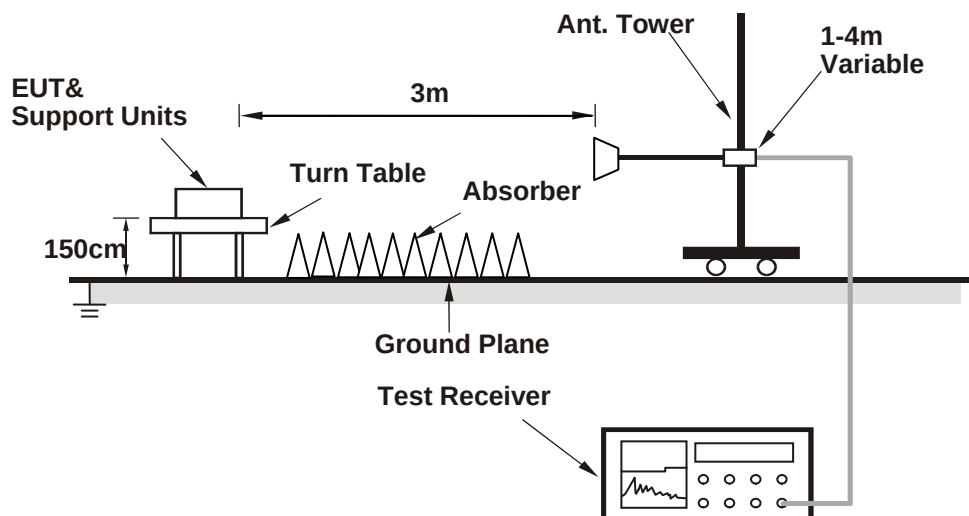
No deviation.

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 "QCART Version: 3.0.33.0.exe" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

4.2.7 Test Results

Above 1GHz Data:

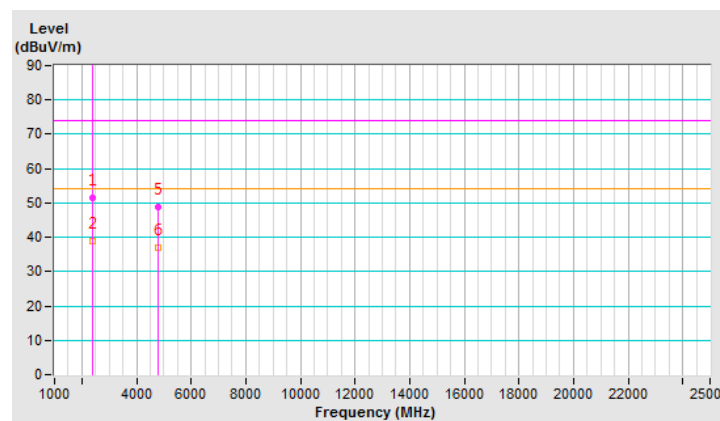
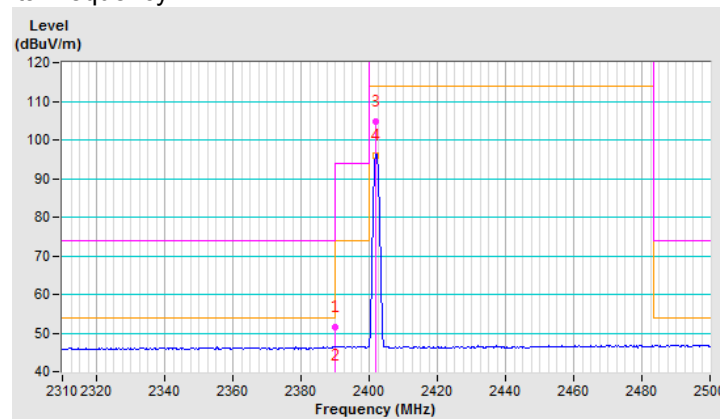
BT_GFSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	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	2390.00	51.5 PK	74.0	-22.5	1.77 H	216	52.93	-1.43
2	2390.00	39.0 AV	54.0	-15.0	1.77 H	216	40.43	-1.43
3	*2402.00	104.7 PK			1.77 H	216	106.10	-1.40
4	*2402.00	96.1 AV			1.77 H	216	97.50	-1.40
5	4804.00	48.7 PK	74.0	-25.3	1.88 H	348	41.69	7.01
6	4804.00	37.1 AV	54.0	-16.9	1.88 H	348	30.09	7.01

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.

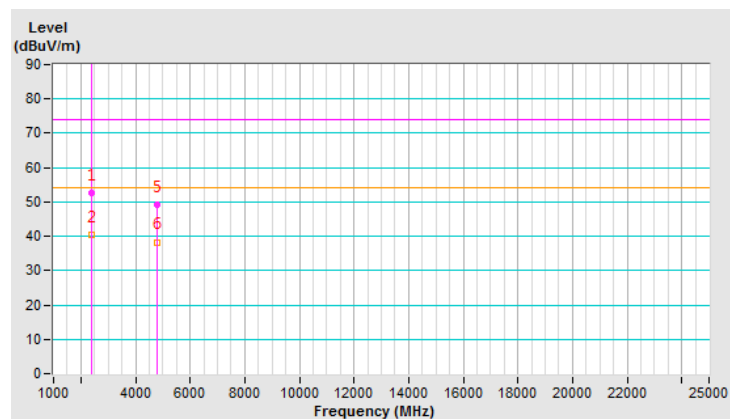
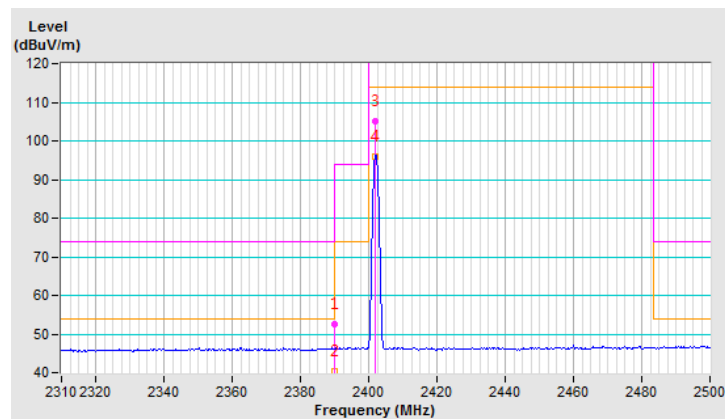


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2390.00	52.7 PK	74.0	-21.3	1.91 V	322	54.13	-1.43
2	2390.00	40.4 AV	54.0	-13.6	1.91 V	322	41.83	-1.43
3	*2402.00	105.2 PK			1.91 V	322	106.60	-1.40
4	*2402.00	96.1 AV			1.91 V	322	97.50	-1.40
5	4804.00	49.2 PK	74.0	-24.8	1.91 V	22	42.19	7.01
6	4804.00	38.3 AV	54.0	-15.7	1.91 V	22	31.29	7.01

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.

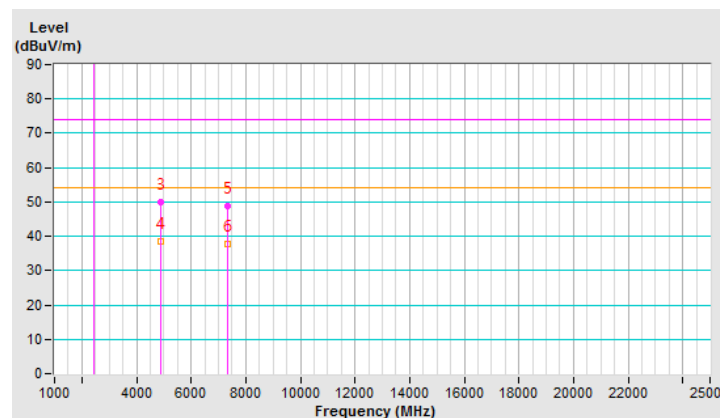
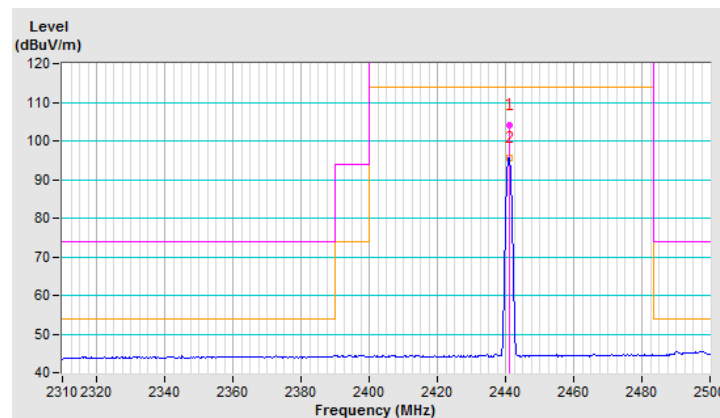


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2441.00	104.1 PK			1.77 H	216	105.41	-1.31
2	*2441.00	95.6 AV			1.77 H	216	96.91	-1.31
3	4882.00	49.8 PK	74.0	-24.2	1.87 H	342	42.53	7.27
4	4882.00	38.4 AV	54.0	-15.6	1.87 H	342	31.13	7.27
5	7323.00	48.9 PK	74.0	-25.1	1.86 H	235	34.42	14.48
6	7323.00	37.8 AV	54.0	-16.2	1.86 H	235	23.32	14.48

REMARKS:

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

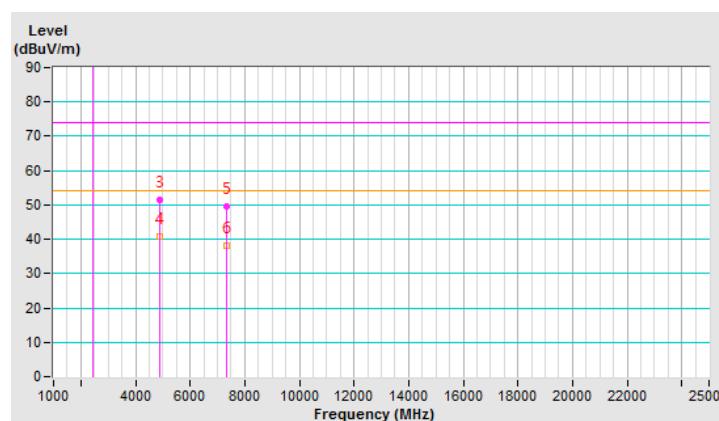
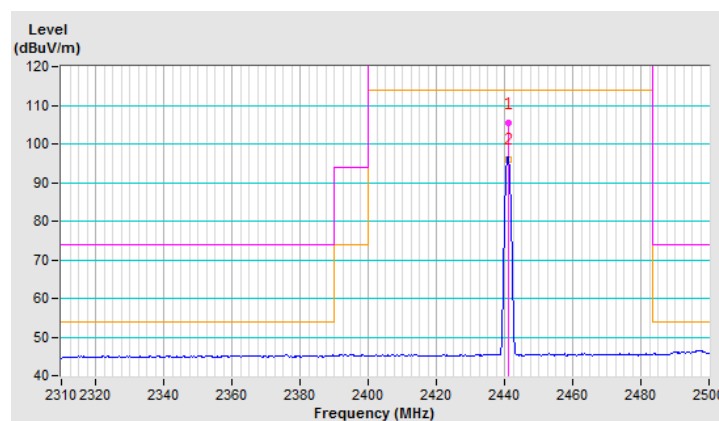


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	105.3 PK			1.87 V	286	106.61	-1.31
2	*2441.00	96.1 AV			1.87 V	286	97.41	-1.31
3	4882.00	51.5 PK	74.0	-22.5	1.87 V	122	44.23	7.27
4	4882.00	40.9 AV	54.0	-13.1	1.87 V	122	33.63	7.27
5	7323.00	49.5 PK	74.0	-24.5	1.88 V	277	35.02	14.48
6	7323.00	38.2 AV	54.0	-15.8	1.88 V	277	23.72	14.48

REMARKS:

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

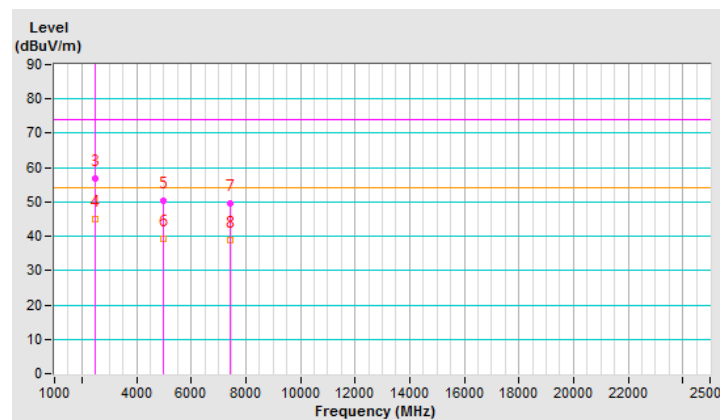
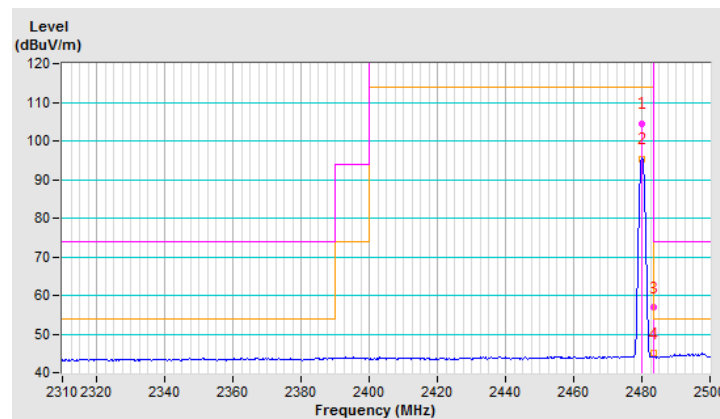


CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	104.4 PK			1.77 H	216	105.61	-1.21
2	*2480.00	95.3 AV			1.77 H	216	96.51	-1.21
3	2483.50	56.8 PK	74.0	-17.2	1.77 H	216	58.01	-1.21
4	2483.50	45.0 AV	54.0	-9.0	1.77 H	216	46.21	-1.21
5	4960.00	50.3 PK	74.0	-23.7	1.87 H	342	42.66	7.64
6	4960.00	39.3 AV	54.0	-14.7	1.87 H	342	31.66	7.64
7	7440.00	49.4 PK	74.0	-24.6	1.86 H	235	34.89	14.51
8	7440.00	38.8 AV	54.0	-15.2	1.86 H	235	24.29	14.51

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.

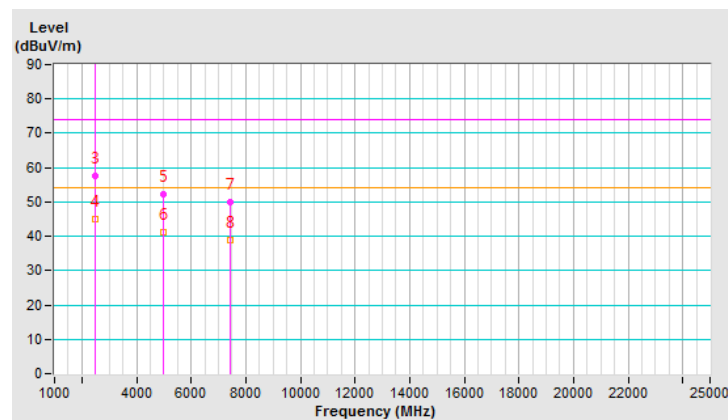
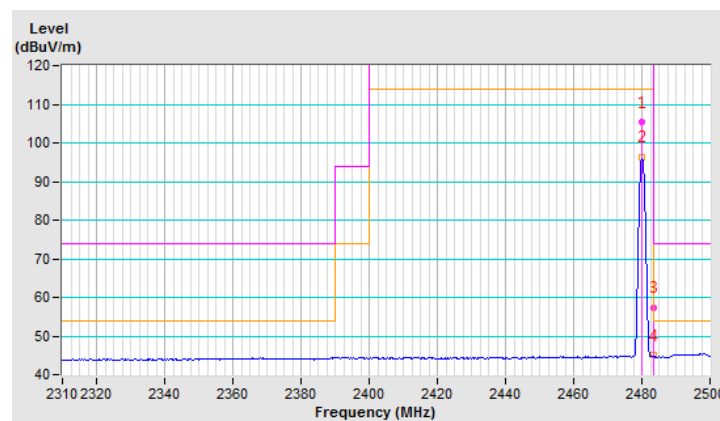


CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	105.3 PK			1.87 V	286	106.51	-1.21
2	*2480.00	96.3 AV			1.87 V	286	97.51	-1.21
3	2483.50	57.4 PK	74.0	-16.6	1.87 V	286	58.61	-1.21
4	2483.50	45.0 AV	54.0	-9.0	1.87 V	286	46.21	-1.21
5	4960.00	52.2 PK	74.0	-21.8	1.87 V	122	44.56	7.64
6	4960.00	41.1 AV	54.0	-12.9	1.87 V	122	33.46	7.64
7	7440.00	50.1 PK	74.0	-23.9	1.88 V	277	35.59	14.51
8	7440.00	38.8 AV	54.0	-15.2	1.88 V	277	24.29	14.51

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.



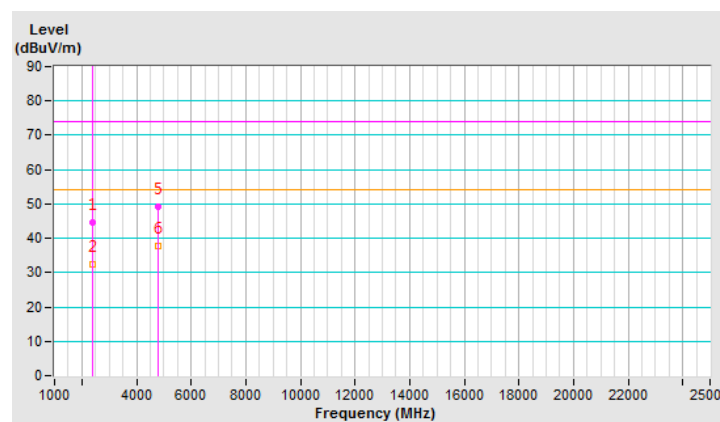
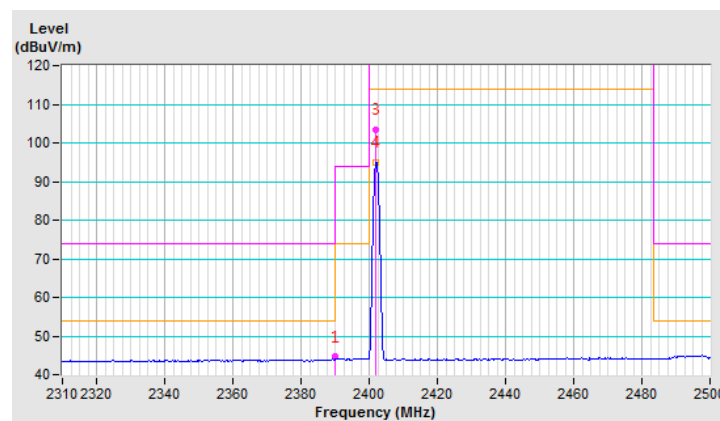
BT_8DPSK

CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	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	2390.00	44.6 PK	74.0	-29.4	1.70 H	226	46.03	-1.43
2	2390.00	32.5 AV	54.0	-21.5	1.70 H	226	33.93	-1.43
3	*2402.00	103.4 PK			1.70 H	226	104.80	-1.40
4	*2402.00	94.9 AV			1.70 H	226	96.30	-1.40
5	4804.00	49.1 PK	74.0	-24.9	2.04 H	191	42.09	7.01
6	4804.00	37.7 AV	54.0	-16.3	2.04 H	191	30.69	7.01

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.

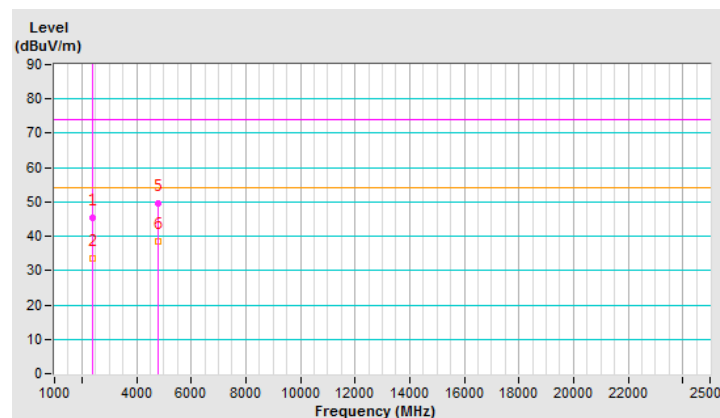
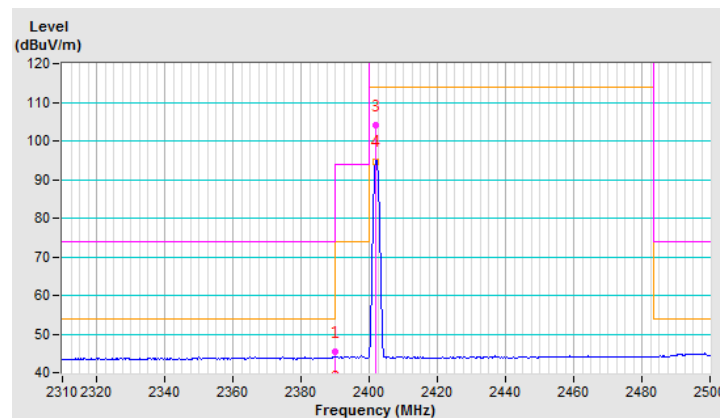


CHANNEL	TX Channel 0	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	2390.00	45.3 PK	74.0	-28.7	1.79 V	315	46.73	-1.43
2	2390.00	33.5 AV	54.0	-20.5	1.79 V	315	34.93	-1.43
3	*2402.00	103.9 PK			1.79 V	315	105.30	-1.40
4	*2402.00	94.6 AV			1.79 V	315	96.00	-1.40
5	4804.00	49.7 PK	74.0	-24.3	2.05 V	25	42.69	7.01
6	4804.00	38.5 AV	54.0	-15.5	2.05 V	25	31.49	7.01

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.

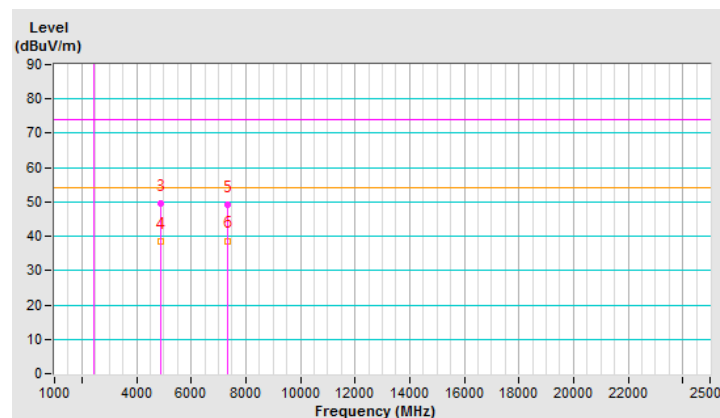
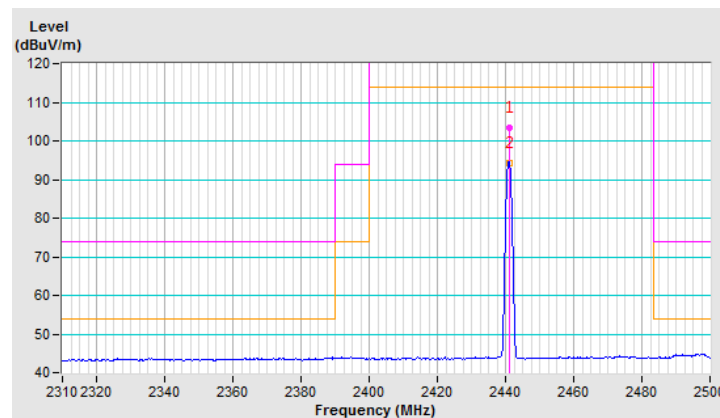


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	*2441.00	103.5 PK			1.73 H	210	104.81	-1.31
2	*2441.00	94.2 AV			1.73 H	210	95.51	-1.31
3	4882.00	49.6 PK	74.0	-24.4	1.97 H	180	42.33	7.27
4	4882.00	38.4 AV	54.0	-15.6	1.97 H	180	31.13	7.27
5	7323.00	49.2 PK	74.0	-24.8	1.05 H	227	34.72	14.48
6	7323.00	38.7 AV	54.0	-15.3	1.05 H	227	24.22	14.48

REMARKS:

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

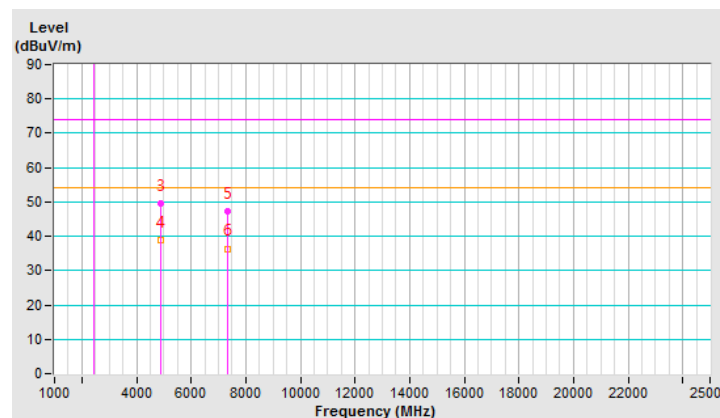
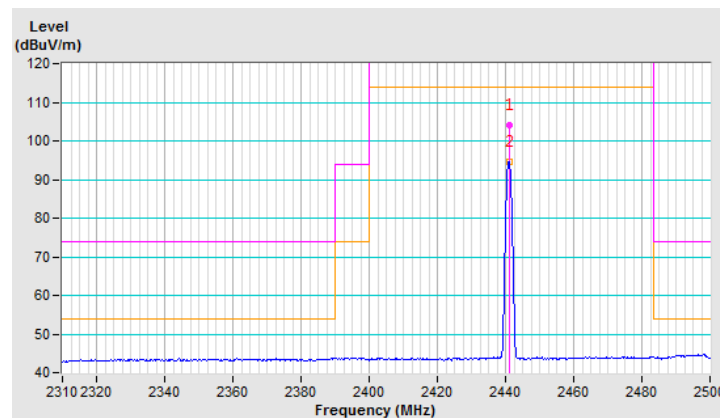


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	104.1 PK			1.83 V	315	105.41	-1.31
2	*2441.00	94.6 AV			1.83 V	315	95.91	-1.31
3	4882.00	49.5 PK	74.0	-24.5	1.97 V	13	42.23	7.27
4	4882.00	38.8 AV	54.0	-15.2	1.97 V	13	31.53	7.27
5	7323.00	47.3 PK	74.0	-26.7	1.03 V	360	32.82	14.48
6	7323.00	36.4 AV	54.0	-17.6	1.03 V	360	21.92	14.48

REMARKS:

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

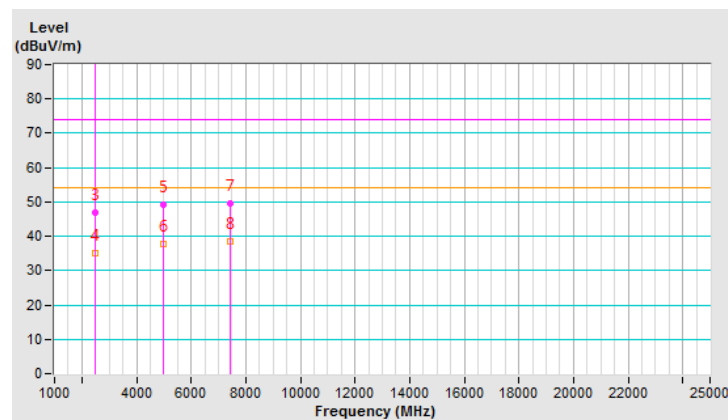
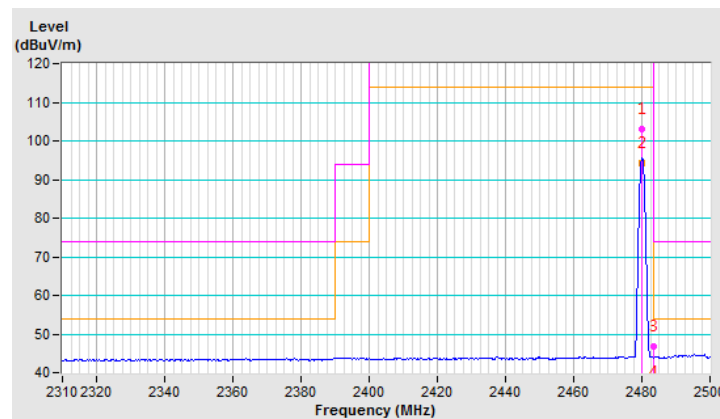


CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	103.0 PK			1.74 H	214	104.21	-1.21
2	*2480.00	94.2 AV			1.74 H	214	95.41	-1.21
3	2483.50	46.8 PK	74.0	-27.2	1.74 H	214	48.01	-1.21
4	2483.50	35.0 AV	54.0	-19.0	1.74 H	214	36.21	-1.21
5	4960.00	49.2 PK	74.0	-24.8	2.00 H	178	41.56	7.64
6	4960.00	37.9 AV	54.0	-16.1	2.00 H	178	30.26	7.64
7	7440.00	49.5 PK	74.0	-24.5	1.00 H	242	34.99	14.51
8	7440.00	38.5 AV	54.0	-15.5	1.00 H	242	23.99	14.51

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.

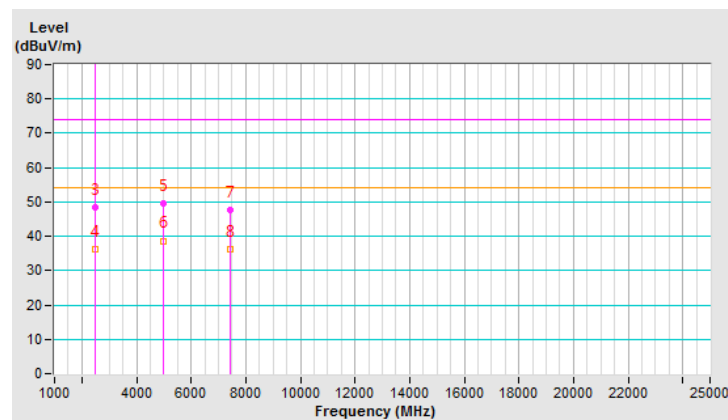
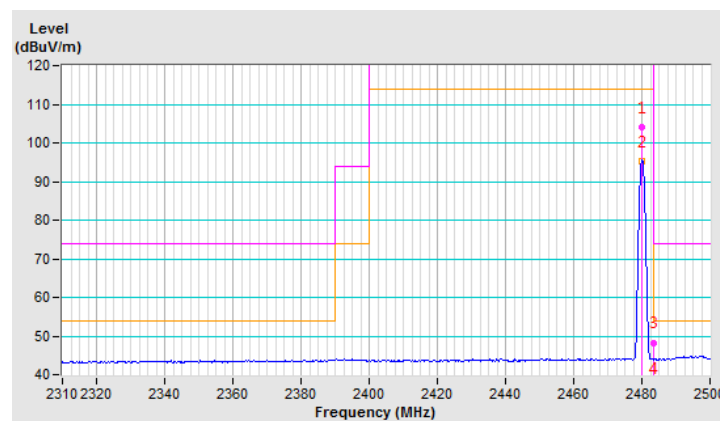


CHANNEL	TX Channel 78	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

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	103.9 PK			1.81 V	327	105.11	-1.21
2	*2480.00	95.1 AV			1.81 V	327	96.31	-1.21
3	2483.50	48.3 PK	74.0	-25.7	1.81 V	327	49.51	-1.21
4	2483.50	36.3 AV	54.0	-17.7	1.81 V	327	37.51	-1.21
5	4960.00	49.4 PK	74.0	-24.6	2.00 V	11	41.76	7.64
6	4960.00	38.7 AV	54.0	-15.3	2.00 V	11	31.06	7.64
7	7440.00	47.5 PK	74.0	-26.5	1.00 V	360	32.99	14.51
8	7440.00	36.2 AV	54.0	-17.8	1.00 V	360	21.69	14.51

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

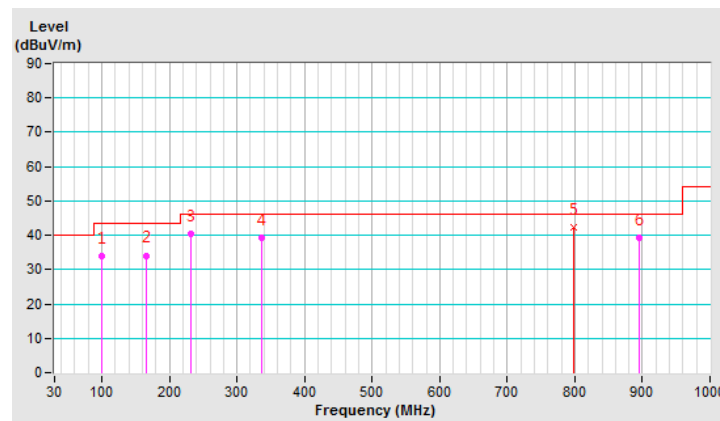
BT_GFSK

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	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	99.59	33.8 QP	43.5	-9.7	2.00 H	208	51.71	-17.95
2	166.13	34.1 QP	43.5	-9.4	1.50 H	260	47.21	-13.12
3	232.63	40.6 QP	46.0	-5.4	1.50 H	262	55.90	-15.34
4	336.13	39.2 QP	46.0	-6.8	1.00 H	246	50.77	-11.60
5	798.12	42.2 QP	46.0	-3.8	1.00 H	235	44.20	-2.00
6	896.11	39.4 QP	46.0	-6.6	1.50 H	218	40.34	-0.93

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

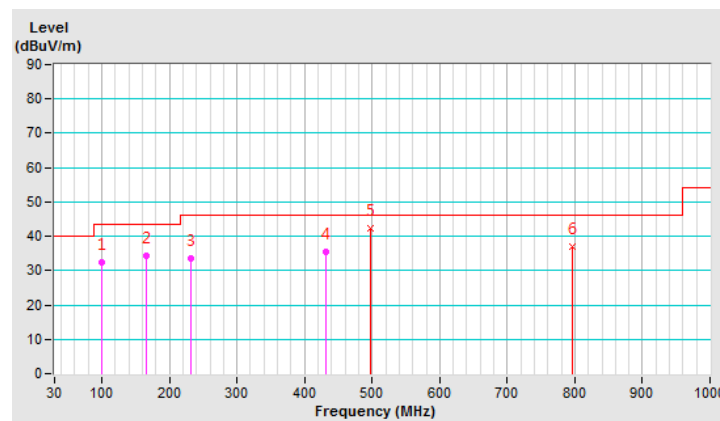


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	Below 1GHz		

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	99.47	32.5 QP	43.5	-11.0	2.00 V	267	50.48	-18.00
2	165.71	34.3 QP	43.5	-9.2	1.00 V	268	47.33	-13.07
3	232.62	33.4 QP	46.0	-12.6	1.00 V	260	48.75	-15.34
4	432.17	35.3 QP	46.0	-10.7	2.00 V	161	44.25	-8.93
5	497.63	42.3 QP	46.0	-3.7	1.50 V	215	50.13	-7.82
6	796.30	37.1 QP	46.0	-8.9	1.50 V	210	39.15	-2.04

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:

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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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