

TEST REPORT

CERTIFICATE OF CONFORMITY

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)
Report No.: RFBARR-WTW-P22120081S-5
FCC ID: RAS-MT7922A22M
Product: 2TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Brand: MediaTek
Model No.: MT7922A22M
Received Date: 2024/9/26
Test Date: 2024/11/6 ~ 2024/11/20
Issued Date: 2024/12/5
Applicant: MediaTek Inc.
Address: No. 1, Dusing 1st Rd., Hsinchu Science Park, Hsinchu City, 30078 Taiwan
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
Test Location: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan
FCC Registration / 723255 / TW2022
Designation Number:

Approved by:



, Date:

2024/12/5

Wen Yu / Assistant Manager

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Prepared by : Phoenix Huang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBARR-WTW-P22120081S-5	Original release.	2024/12/5

1 Certificate

Product: 2TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card

Brand: MediaTek

Test Model: MT7922A22M

Sample Status: Engineering sample

Applicant: MediaTek Inc.

Test Date: 2024/11/6 ~ 2024/11/20

Standard: 47 CFR FCC Part 15, Subpart C (Section 15.247)

Measurement ANSI C63.10-2013

procedure: KDB 558074 D01 15.247 Meas Guidance v05r02

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.

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
Standard / Clause	Test Item	Result	Remark
15.247 (a)(1)	RF Output Power	N/A	Refer to Note 1 below
15.247(a)(1) (iii)	Number of Hopping Frequency Used	N/A	Refer to Note 1 below
15.247(a)(1) (iii)	Dwell Time on Each Channel	N/A	Refer to Note 1 below
15.247(a)(1)	Hopping Channel Separation	N/A	Refer to Note 1 below
15.247(a)(1)	20 dB Bandwidth	N/A	Refer to Note 1 below
15.247(d)	Conducted Out of Band Emissions	N/A	Refer to Note 1 below
15.207	AC Power Conducted Emissions	Pass	Minimum passing margin is -11.97 dB at 0.16600 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -5.9 dB at 298.69 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -6.7 dB at 2390.00 MHz
15.203	Antenna Requirement	Pass	Antenna connector is i-pex(MHF), RP SMA PLUG, R-SMA, IPEX-4L or IPEX not a standard connector.

Notes:

1. AC Power Conducted Emissions and Unwanted Emissions were performed for this addendum. The others testing data refer to original test report.
2. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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:

Parameter	Specification	Uncertainty (±)
AC Power Conducted Emissions	150 kHz ~ 30 MHz	1.9 dB
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.0 dB
	18 GHz ~ 40 GHz	5.3 dB

The other instruments specified are routine verified to remain within the calibrated levels, no measurement uncertainty is required to be calculated.

2.2 Supplementary Information

There is not any deviation from the test standards for the test method, and no modifications required for compliance.

3 General Information

3.1 General Description

Product	2TX 11ax (WiFi6E) BW160 + BT/BLE Combo Card
Brand	MediaTek
Test Model	MT7922A22M
Status of EUT	Engineering sample
Power Supply Rating	3.3 Vdc from host equipment
Modulation Type	GFSK, $\pi/4$ -DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	Up to 3 Mbps
Operating Frequency	2.402 GHz ~ 2.480 GHz
Number of Channel	79

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the Report No.: RFBARR-WTW-P21030485Z-1 as the following:
 - ◆ Add Monopole antennas (Refer to section 3.2).
2. According to above conditions and there is no increase in authorized power level, only AC Power Conducted Emissions and Unwanted Emissions test need to be performed. And all data are verified to meet the requirements.
3. There are Bluetooth and WLAN (2.4 GHz & 5 GHz & 5.9 GHz & 6 GHz) technology used for the EUT.
4. The equipment support 2 types of M.2 form factor A-E Key and E Key.
5. Simultaneously transmission combination.

Combination.	Technology	
1	WLAN (5 GHz)	Bluetooth
2	WLAN (6 GHz)	Bluetooth
3	WLAN (5.9 GHz)	Bluetooth

Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.

6. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

3.2 Antenna Description of EUT

1. The antenna information is listed as below.

Original								
Antenna Set	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain0	PSA	RFMTA340718EMLB302	3.18	2.4~2.4835	PIFA	ipex(MHF)	200
				4.92	5.15~5.895			
	Chain1	PSA	RFMTA340718EMLB302	3.18	2.4~2.4835			
				4.92	5.15~5.895			
2	Chain0	PSA	RFMTA311020EMMB301	1.71	2.4~2.4835	PIFA	ipex(MHF)	200
				4.82	5.15~5.895			
				4.76	5.925~6.425			
				4.29	6.425~6.525			
				4.61	6.525~6.875			
				4.09	6.875~7.125			
	Chain1	PSA	RFMTA311020EMMB301	1.71	2.4~2.4835			
				4.82	5.15~5.895			
				4.76	5.925~6.425			
				4.29	6.425~6.525			
				4.61	6.525~6.875			
				4.09	6.875~7.125			
3	Chain0	Cortec	AN2450-4902BRS	2.42	2.4~2.4835	Dipole	R-SMA	150
				3.87	5.15~5.895			
	Chain1	Cortec	AN2450-4902BRS	2.42	2.4~2.4835			
				3.87	5.15~5.895			
4	Chain0	VSO	JR2Q00340-1	1.62	2.4~2.4835	Dipole	RP SMA PLUG	40
				3.2	5.15~5.895			
				3.93	5.925~6.425			
				3.61	6.425~6.525			
				3.61	6.525~6.875			
				3.14	6.875~7.125			
	Chain1	VSO	JR2Q00340-1	1.62	2.4~2.4835			
				3.2	5.15~5.895			
				3.93	5.925~6.425			
				3.61	6.425~6.525			
				3.61	6.525~6.875			
				3.14	6.875~7.125			
5	Chain0	MSI	WA-P-LE-02-045 (Main)	2.24	2.4~2.4835	PIFA	IPEX-4L	190
				2.68	5.15~5.895			
				3.01	5.925~6.425			
				-1.23	6.425~6.525			
				-1.96	6.525~6.875			
				-3.68	6.875~7.125			
	Chain1	MSI	WA-P-LE-02-046 (Aux)	-2.96	2.4~2.4835	PIFA	IPEX-4L	325
				1.16	5.15~5.895			
				0.99	5.925~6.425			
				-2.31	6.425~6.525			
				-2.54	6.525~6.875			
				-7.44	6.875~7.125			

Antenna Set	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
6	Chain0	PSA	RFPCA460632IMMB701	-13.2	5.925~6.425	Dipole	IPEX	320
				-13.67	6.425~6.525			
				-13.67	6.525~6.875			
				-13.09	6.875~7.125			
	Chain1	PSA	RFPCA460632IMMB701	-13.2	5.925~6.425	Dipole	IPEX	
				-13.67	6.425~6.525			
				-13.67	6.525~6.875			
				-13.09	6.875~7.125			
7	Chain0	PSA	RFMTA421230IMMB701	-13.92	5.925~6.425	PIFA	IPEX	300
				-13.91	6.425~6.525			
				-13.91	6.525~6.875			
				-14.46	6.875~7.125			
	Chain1	PSA	RFMTA421230IMMB701	-13.92	5.925~6.425	PIFA	IPEX	
				-13.91	6.425~6.525			
				-13.91	6.525~6.875			
				-14.46	6.875~7.125			

Newly

Antenna Set	RF Chain NO.	Brand	Model	Antenna Net Gain(dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
8	Chain0	HongBo	260-25105	3.1	2.4~2.4835	Monopole	ipex(MHF)	486
				3.33	5.15~5.895			
				4.23	5.925~6.425			
				4.22	6.425~6.525			
				4.01	6.525~6.875			
	Chain1	HongBo	260-25105	3.07	6.875~7.125	Monopole	ipex(MHF)	486
				3.1	2.4~2.4835			
				3.33	5.15~5.895			
				4.23	5.925~6.425			
				4.22	6.425~6.525			
9	Chain0	HongBo	260-25106	4.91	5.15~5.895	Monopole	ipex(MHF)	350
				4.73	5.925~6.425			
				4.29	6.425~6.525			
				4.58	6.525~6.875			
				4.09	6.875~7.125			
	Chain1	HongBo	260-25106	4.91	5.15~5.895	Monopole	ipex(MHF)	350
				4.73	5.925~6.425			
				4.29	6.425~6.525			
				4.58	6.525~6.875			
				4.09	6.875~7.125			

Note: Above Monopole antennas, Antenna Set. 8 was selected for the final test of Bluetooth.

* Detail antenna specification please refer to antenna datasheet and/or antenna measurement report.

3.3 Channel List

79 channels are provided for BT-EDR:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (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		

3.4 Test Mode Applicability and Tested Channel Detail

Pre-Scan:	1. EUT's Monopole antenna can be used in the following ways: X-axis/ Y-axis/ Z-axis. Pre-scan these ways and find the worst case as a representative test condition. 2. 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).
Worst Case:	1. EUT's Monopole antenna worst condition: X-axis

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

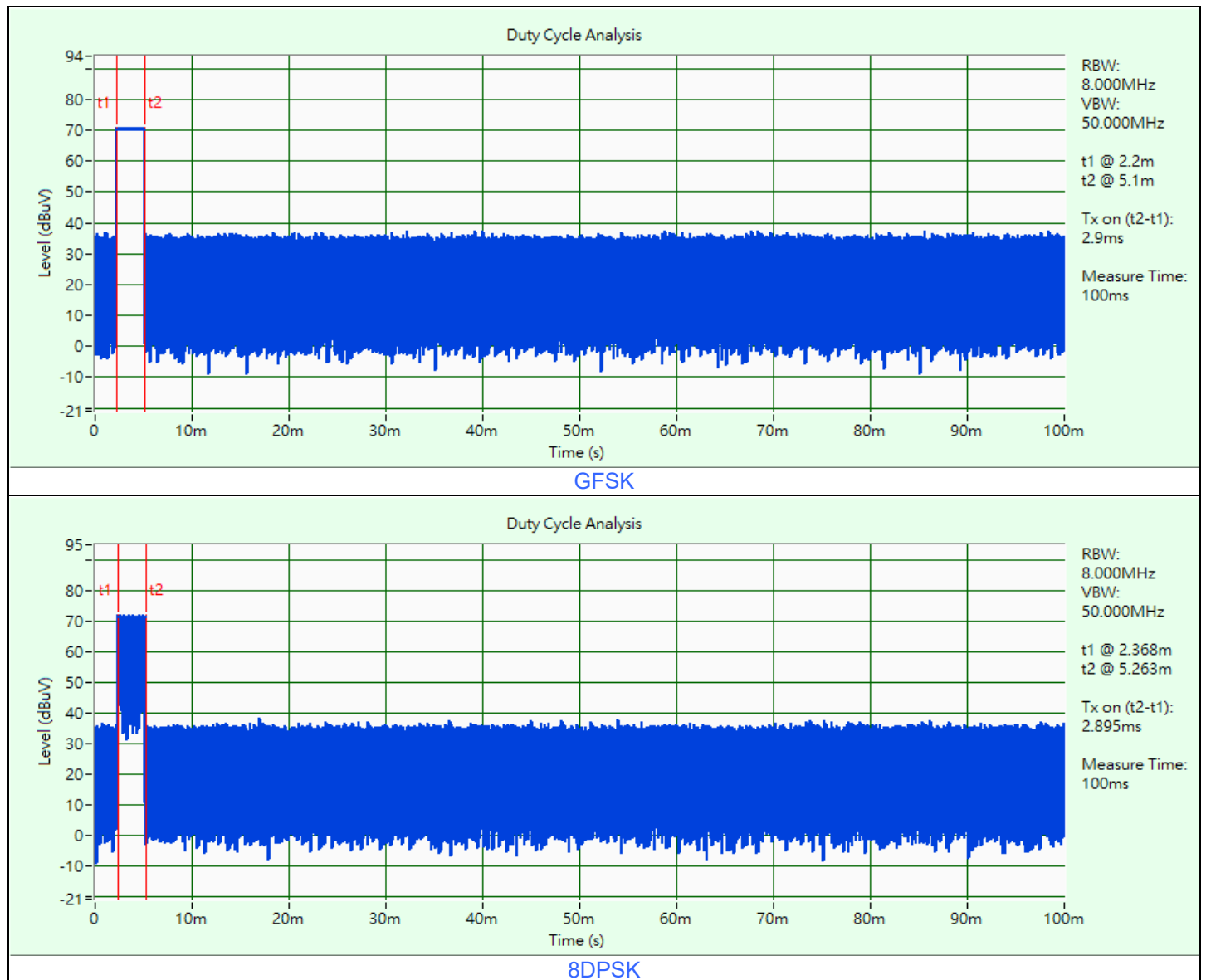
Test Item	Tested Channel	Modulation	Data Rate Parameter
AC Power Conducted Emissions	39	GFSK	DH5
Unwanted Emissions below 1 GHz	39	GFSK	DH5
Unwanted Emissions above 1 GHz	0, 39, 78	GFSK	DH5
		8DPSK	3DH5

Note: The worst types of M.2 form is A-E Key. This evaluation condition is determined by referring to the evaluation results of the original report.

3.5 Duty Cycle of Test Signal

GFSK: Duty cycle = 2.9 ms / 100 ms x 100% = 2.9%

8DPSK: Duty cycle = 2.895 ms / 100 ms x 100% = 2.9%

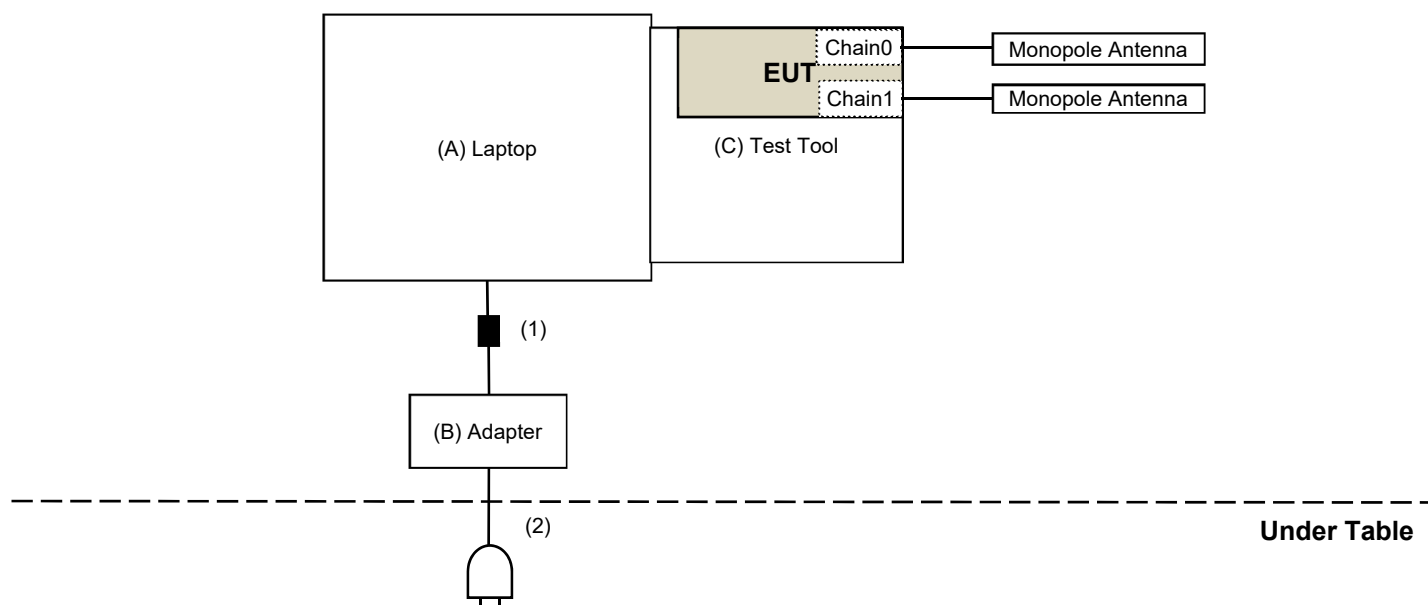


3.6 Test Program Used and Operation Descriptions

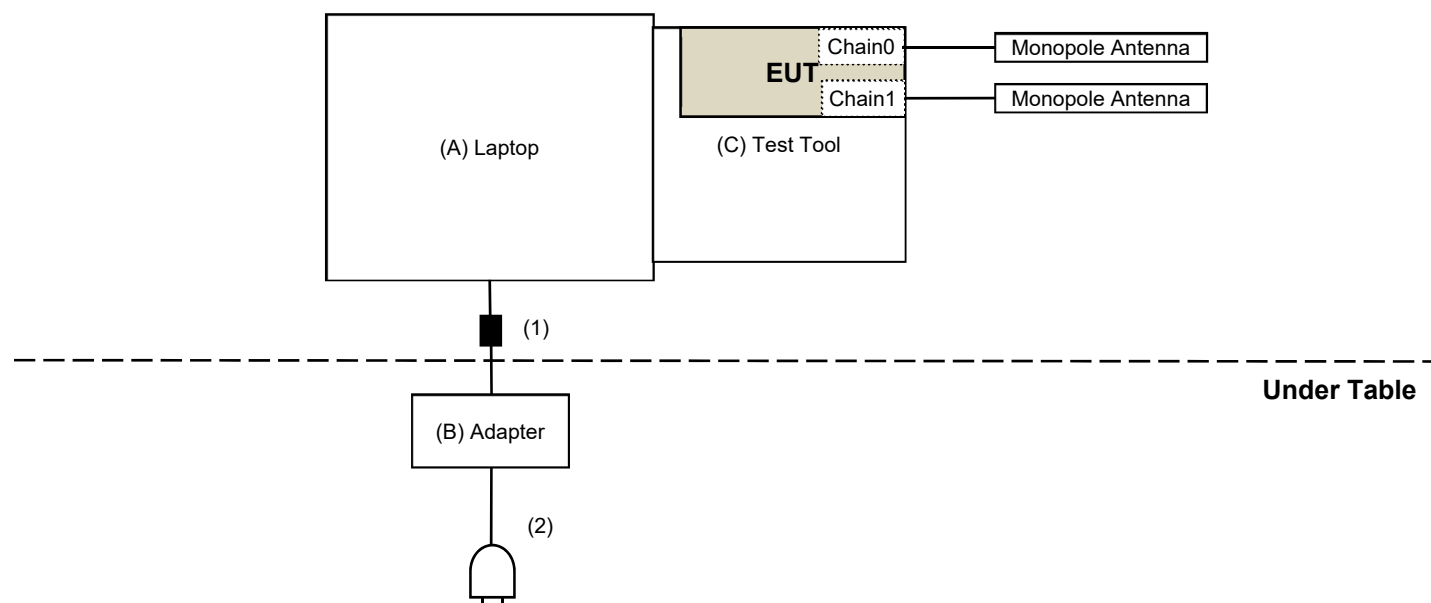
Controlling software (QATool_Ulv2.55) has been activated to set the EUT under transmission condition continuously at specific channel frequency.

3.7 Connection Diagram of EUT and Peripheral Devices

For AC Power Conducted Emission test



For Unwanted Emission test



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	Lenovo	L440	R907JXDG	N/A	Provided by Lab
B	Adapter	Lenovo	ADLX45NCC3A	N/A	N/A	Provided by Lab
C	Test Tool	MediaTek	MTK1849	N/A	N/A	Supplied by applicant

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	DC Cable	1	1.8	No	1	Provided by Lab
2	AC Cable	1	1	No	0	Provided by Lab

4 Test Instruments

The calibration interval of the all test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.1 AC Power Conducted Emissions

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
50 ohm terminal resistance Telegartner	50 ohm	3	2024/11/1	2025/10/31
EMI Test Receiver R&S	ESCS 30	100375	2024/5/20	2025/5/19
Fixed Attenuator STI	STI02-2200-10	005	2024/2/19	2025/2/18
LISN R&S	ESH3-Z5	835239/001	2024/4/3	2025/4/2
		848773/004	2024/10/7	2025/10/6
RF Coaxial Cable JYEBAO	5D-FB	COCCAB-001	2024/2/19	2025/2/18
Software BVADT	BVADT_Cond_V7.3.7.4	N/A	N/A	N/A

Notes:

1. The test was performed in Conduction 1
2. Tested Date: 2024/11/19 ~ 2024/11/20

4.2 Unwanted Emissions below 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0942	2024/10/14	2025/10/13
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-01	2024/5/16	2025/5/15
Loop Antenna TESEQ	HLA 6121	63620	2024/10/17	2025/10/16
MXA Signal Analyzer Keysight	N9020B	MY60112410	2024/3/13	2025/3/12
MXE EMI Receiver Keysight	N9038A	MY59050100	2024/6/19	2025/6/18
Preamplifier EMCI	EMC330N	980852	2024/2/17	2025/2/16
	EMC001340	980142	2024/2/19	2025/2/18
RF Coaxial Cable JYEBAO	5D-FB	LOOPCAB-001	2024/2/19	2025/2/18
		LOOPCAB-002	2024/2/19	2025/2/18
RF Coaxial Cable PEWC	8D	966-6-1	2024/5/16	2025/5/15
		966-6-2	2024/5/16	2025/5/15
		966-6-3	2024/5/16	2025/5/15
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 6.
2. Tested Date: 2024/11/6

4.3 Unwanted Emissions above 1 GHz

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-2035	2024/11/10	2025/11/9
	BBHA 9170	BBHA9170519	2024/11/10	2025/11/9
MXA Signal Analyzer Keysight	N9020B	MY60112410	2024/3/13	2025/3/12
MXE EMI Receiver Keysight	N9038A	MY59050100	2024/6/19	2025/6/18
Preamplifier EMCI	EMC12630SE	980385	2024/6/1	2025/5/31
	EMC184045SE	980387	2024/8/8	2025/8/7
RF Coaxial Cable EMCI	EMC104-SM-SM-1300	210205	2024/6/1	2025/5/31
	EMC104-SM-SM-2000	210203	2024/6/1	2025/5/31
	EMC104-SM-SM-8000	221015	2024/6/1	2025/5/31
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

Notes:

1. The test was performed in 966 Chamber No. 6.
2. Tested Date: 2024/11/13

5 Limits of Test Items

5.1 AC Power Conducted Emissions

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

Notes:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

5.2 Unwanted Emissions below 1 GHz

Radiated emissions up to 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20 dB 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

Notes:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).

5.3 Unwanted Emissions above 1 GHz

Radiated emissions above 1 GHz which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Other emissions:

- (1) For Peak conducted power limits shall be at least 20 dB below the highest level of the desired power:
- (2) For RMS averaging conducted power limits shall be at least 30 dB below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

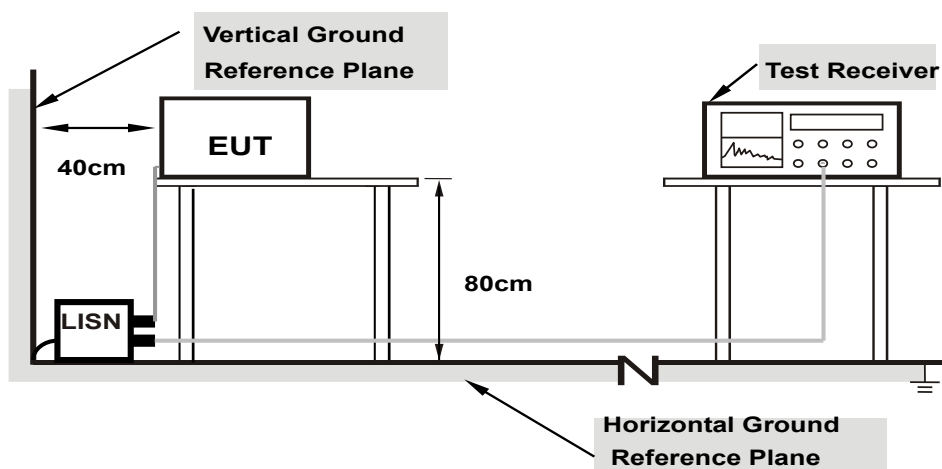
Notes:

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 1000 MHz, 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 20 dB under any condition of modulation.

6 Test Arrangements

6.1 AC Power Conducted Emissions

6.1.1 Test Setup



Note: 1.Support units were connected to second LISN.

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

6.1.2 Test Procedure

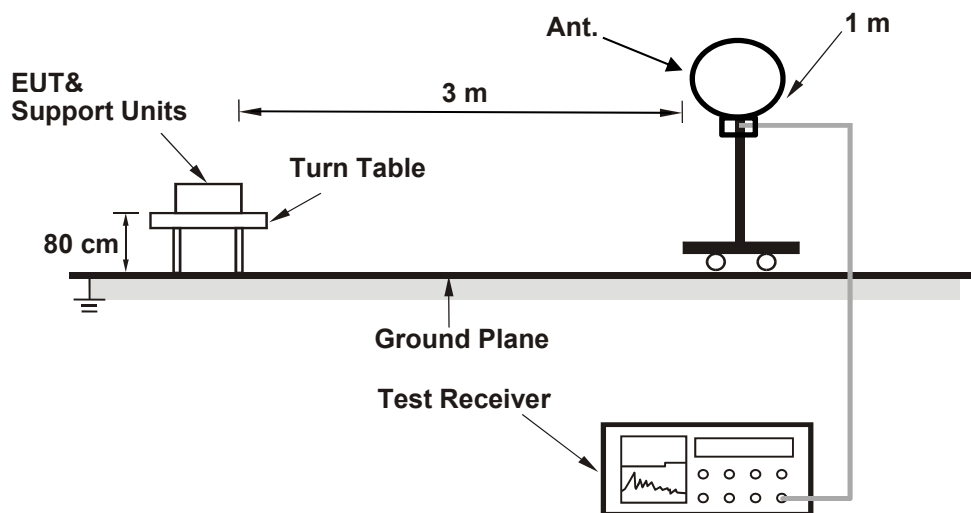
- The EUT was placed on a 0.8 meter to the top of table and placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz-30 MHz.

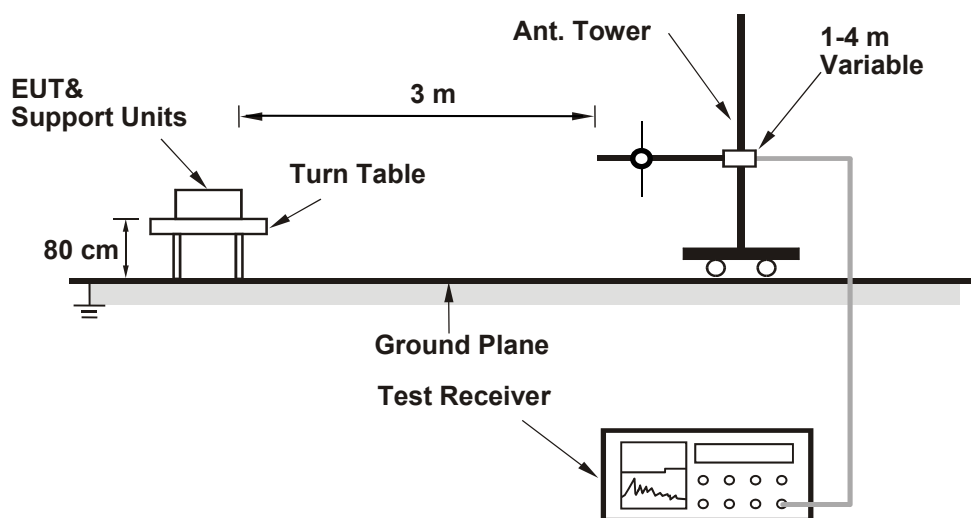
6.2 Unwanted Emissions below 1 GHz

6.2.1 Test Setup

For Radiated emission below 30 MHz



For Radiated emission above 30 MHz



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

6.2.2 Test Procedure

For Radiated emission below 30 MHz

- a. The EUT was placed on the top of a rotating table 0.8 meters 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. 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, except for the frequency band (9 kHz to 90 kHz and 110 kHz to 490 kHz) set to average detect function and peak detect function.

Notes:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 200 Hz at frequency below 150 kHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz or 10 kHz at frequency (150 kHz to 30 MHz).
3. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated emission above 30 MHz

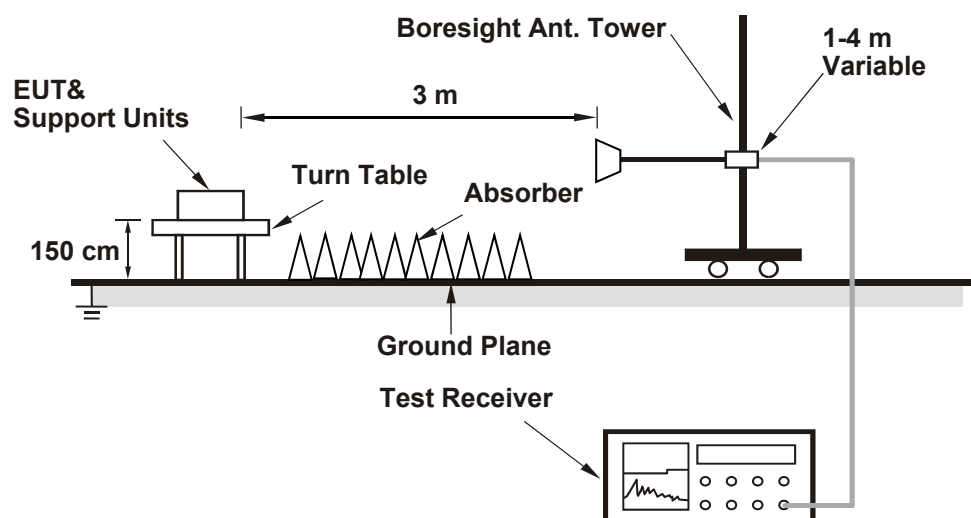
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the 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.

Notes:

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

6.3 Unwanted Emissions above 1 GHz

6.3.1 Test Setup



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

6.3.2 Test Procedure

- The EUT was placed on the top of a rotating table 1.5 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 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.
- 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.
- 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.

Notes:

- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) and Average detection (AV) at frequency above 1 GHz.
- According to ANSI C63.10 section 6.6.4 and 4.1.4.2.2. For fundamental and harmonic signal measurement, according to ANSI C63.10 section 7.5, the average value = peak value + duty cycle correction factor. For duty cycle correction factor values, see the Test Signal Duty Cycle section in this report.
- All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

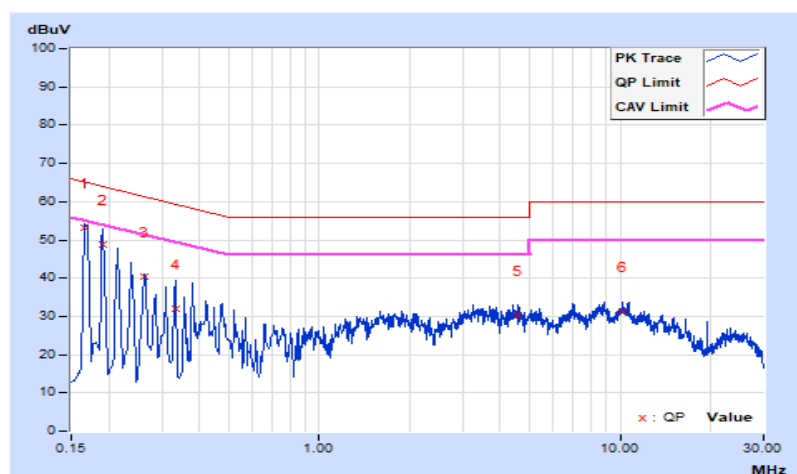
7.1 AC Power Conducted Emissions

RF Mode	BT GFSK	Channel	CH 39 : 2441 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Greg Lin		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16600	9.67	43.52	21.61	53.19	31.28	65.16	55.16	-11.97	-23.88
2	0.19000	9.66	39.20	16.95	48.86	26.61	64.04	54.04	-15.18	-27.43
3	0.26200	9.67	30.59	13.93	40.26	23.60	61.37	51.37	-21.11	-27.77
4	0.33400	9.68	22.36	5.34	32.04	15.02	59.35	49.35	-27.31	-34.33
5	4.59800	9.79	20.54	10.96	30.33	20.75	56.00	46.00	-25.67	-25.25
6	10.17000	9.87	21.32	14.37	31.19	24.24	60.00	50.00	-28.81	-25.76

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

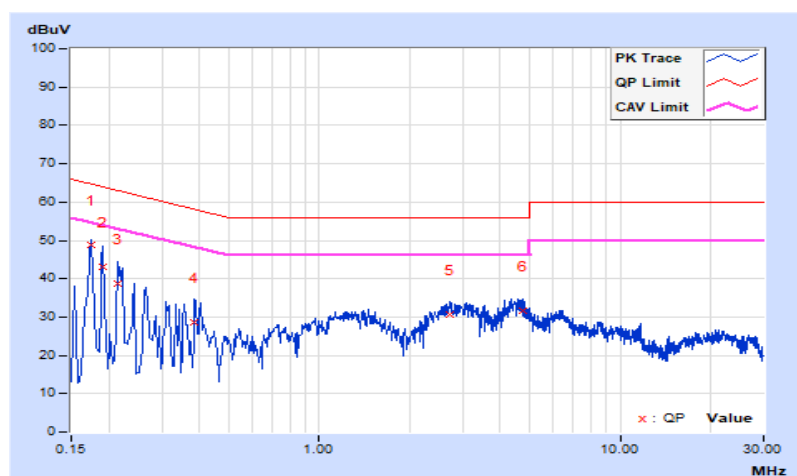


RF Mode	BT GFSK	Channel	CH 39 : 2441 MHz
Frequency Range	150 kHz ~ 30 MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	25 °C, 75 % RH
Tested By	Greg Lin		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.17400	9.64	39.20	21.36	48.84	31.00	64.77	54.77	-15.93	-23.77
2	0.19000	9.65	33.37	15.35	43.02	25.00	64.04	54.04	-21.02	-29.04
3	0.21400	9.65	28.92	9.19	38.57	18.84	63.05	53.05	-24.48	-34.21
4	0.38600	9.71	19.05	6.16	28.76	15.87	58.15	48.15	-29.39	-32.28
5	2.73400	9.77	20.77	13.06	30.54	22.83	56.00	46.00	-25.46	-23.17
6	4.74600	9.80	21.87	13.55	31.67	23.35	56.00	46.00	-24.33	-22.65

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



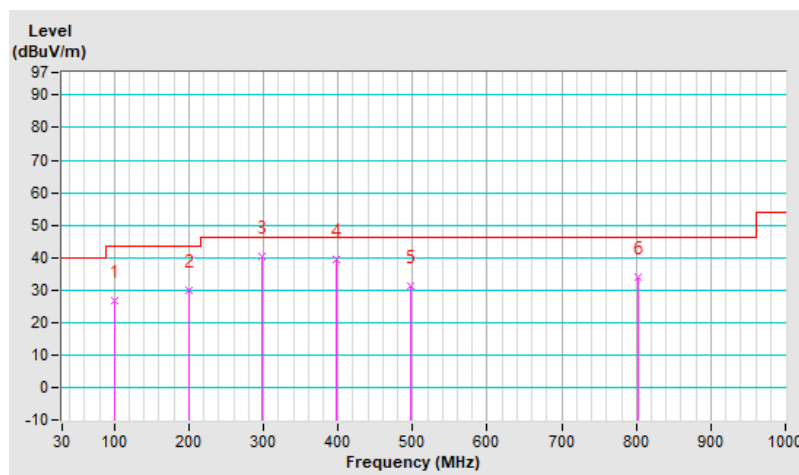
7.2 Unwanted Emissions below 1 GHz

RF Mode	BT GFSK	Channel	CH 39 : 2441 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	21 °C, 67 % RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	99.84	26.9 QP	43.5	-16.6	1.25 H	40	44.5	-17.6
2	199.75	29.7 QP	43.5	-13.8	1.00 H	178	46.1	-16.4
3	298.69	40.1 QP	46.0	-5.9	1.50 H	73	52.5	-12.4
4	398.60	39.5 QP	46.0	-6.5	1.00 H	262	49.3	-9.8
5	497.54	31.4 QP	46.0	-14.6	1.00 H	159	39.1	-7.7
6	802.12	34.0 QP	46.0	-12.0	1.25 H	188	36.0	-2.0

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.

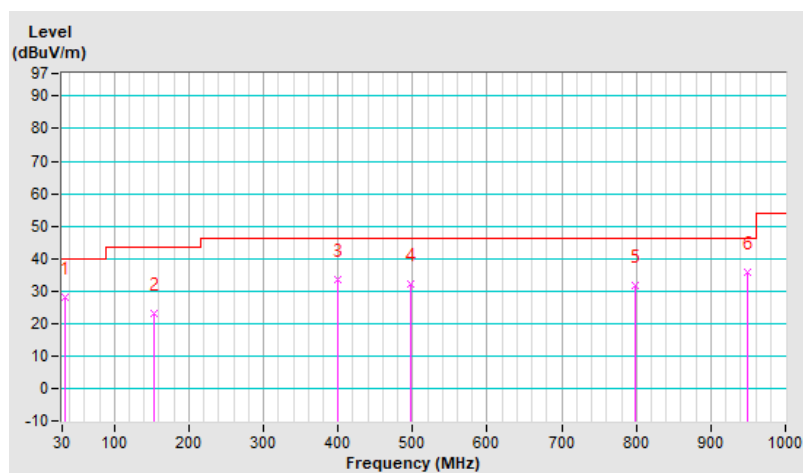


RF Mode	BT GFSK	Channel	CH 39 : 2441 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	QP: RB=120kHz, DET=Quasi-Peak
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	21 °C, 67 % RH
Tested By	Greg Lin		

Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	34.85	28.2 QP	40.0	-11.8	1.25 V	2	42.2	-14.0
2	154.16	22.9 QP	43.5	-20.6	1.50 V	141	35.7	-12.8
3	399.57	33.4 QP	46.0	-12.6	1.00 V	50	43.2	-9.8
4	497.54	32.2 QP	46.0	-13.8	1.50 V	284	39.9	-7.7
5	799.21	31.9 QP	46.0	-14.1	1.25 V	248	33.9	-2.0
6	949.56	35.7 QP	46.0	-10.3	1.25 V	2	35.5	0.2

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30 MHz ~ 1 GHz.
5. The frequency range 9 kHz ~ 30 MHz: all emissions are more than 20 dB below the limit, therefore do not be recorded in this report.



7.3 Unwanted Emissions above 1 GHz

RF Mode	BT GFSK	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65 % RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	57.4 PK	74.0	-16.6	2.43 H	347	25.3	32.1
2	2390.00	47.1 AV	54.0	-6.9	2.43 H	347	15.0	32.1
3	*2402.00	111.1 PK			2.43 H	347	79.0	32.1
4	*2402.00	80.3 AV			2.43 H	347	48.2	32.1
5	4804.00	48.0 PK	74.0	-26.0	4.00 H	34	45.1	2.9
6	4804.00	17.2 AV	54.0	-36.8	4.00 H	34	14.3	2.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	57.0 PK	74.0	-17.0	3.79 V	52	24.9	32.1
2	2390.00	46.8 AV	54.0	-7.2	3.79 V	52	14.7	32.1
3	*2402.00	107.7 PK			3.79 V	52	75.6	32.1
4	*2402.00	76.9 AV			3.79 V	52	44.8	32.1
5	4804.00	47.9 PK	74.0	-26.1	2.24 V	123	45.0	2.9
6	4804.00	17.1 AV	54.0	-36.9	2.24 V	123	14.2	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.9 \text{ ms} / 100 \text{ ms}) = -30.8 \text{ dB}$$

RF Mode	BT GFSK	Channel	CH 39 : 2441 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65 % RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	111.6 PK			2.35 H	347	79.4	32.2
2	*2441.00	80.8 AV			2.35 H	347	48.6	32.2
3	4882.00	49.6 PK	74.0	-24.4	3.95 H	40	46.2	3.4
4	4882.00	18.8 AV	54.0	-35.2	3.95 H	40	15.4	3.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2441.00	108.2 PK			3.68 V	51	76.0	32.2
2	*2441.00	77.4 AV			3.68 V	51	45.2	32.2
3	4882.00	48.9 PK	74.0	-25.1	2.20 V	127	45.5	3.4
4	4882.00	18.1 AV	54.0	-35.9	2.20 V	127	14.7	3.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
 $20 \log(\text{Duty cycle}) = 20 \log(2.9 \text{ ms} / 100 \text{ ms}) = -30.8 \text{ dB}$

RF Mode	BT GFSK	Channel	CH 78 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65 % RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	112.5 PK			2.53 H	352	80.0	32.5
2	*2480.00	81.7 AV			2.53 H	352	49.2	32.5
3	2483.50	51.0 PK	74.0	-23.0	2.53 H	352	55.0	-4.0
4	2483.50	20.2 AV	54.0	-33.8	2.53 H	352	24.2	-4.0
5	4960.00	48.9 PK	74.0	-25.1	4.00 H	33	45.5	3.4
6	4960.00	18.1 AV	54.0	-35.9	4.00 H	33	14.7	3.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	107.8 PK			3.55 V	32	75.3	32.5
2	*2480.00	77.0 AV			3.55 V	32	44.5	32.5
3	2483.50	46.1 PK	74.0	-27.9	3.55 V	32	50.1	-4.0
4	2483.50	15.3 AV	54.0	-38.7	3.55 V	32	19.3	-4.0
5	4804.00	48.0 PK	74.0	-26.0	2.21 V	127	45.1	2.9
6	4804.00	17.2 AV	54.0	-36.8	2.21 V	127	14.3	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
 $20 \log(\text{Duty cycle}) = 20 \log(2.9 \text{ ms} / 100 \text{ ms}) = -30.8 \text{ dB}$

RF Mode	BT 8DPSK	Channel	CH 0 : 2402 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65 % RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	58.1 PK	74.0	-15.9	2.39 H	356	26.0	32.1
2	2390.00	47.3 AV	54.0	-6.7	2.39 H	356	15.2	32.1
3	*2402.00	110.6 PK			2.39 H	356	78.5	32.1
4	*2402.00	79.8 AV			2.39 H	356	47.7	32.1
5	4804.00	48.2 PK	74.0	-25.8	3.96 H	38	45.3	2.9
6	4804.00	17.4 AV	54.0	-36.6	3.96 H	38	14.5	2.9
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	57.6 PK	74.0	-16.4	3.85 V	48	25.5	32.1
2	2390.00	46.9 AV	54.0	-7.1	3.85 V	48	14.8	32.1
3	*2402.00	107.2 PK			3.85 V	48	75.1	32.1
4	*2402.00	76.4 AV			3.85 V	48	44.3	32.1
5	4804.00	47.8 PK	74.0	-26.2	2.30 V	128	44.9	2.9
6	4804.00	17.0 AV	54.0	-37.0	2.30 V	128	14.1	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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.9 \text{ ms} / 100 \text{ ms}) = -30.8 \text{ dB}$$

RF Mode	BT 8DPSK	Channel	CH 39 : 2441 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65 % RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	111.7 PK			2.58 H	351	79.5	32.2
2	*2441.00	80.9 AV			2.58 H	351	48.7	32.2
3	4882.00	49.3 PK	74.0	-24.7	3.98 H	30	45.9	3.4
4	4882.00	18.5 AV	54.0	-35.5	3.98 H	30	15.1	3.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	106.8 PK			3.69 V	49	74.6	32.2
2	*2441.00	76.0 AV			3.69 V	49	43.8	32.2
3	4882.00	48.9 PK	74.0	-25.1	2.35 V	136	45.5	3.4
4	4882.00	18.1 AV	54.0	-35.9	2.35 V	136	14.7	3.4

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:

$$20 \log(\text{Duty cycle}) = 20 \log(2.9 \text{ ms} / 100 \text{ ms}) = -30.8 \text{ dB}$$

RF Mode	BT 8DPSK	Channel	CH 78 : 2480 MHz
Frequency Range	1 GHz ~ 25 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak AV: RB=1 MHz, VB=3 MHz, DET=RMS
Input Power (System)	120 Vac, 60 Hz	Environmental Conditions	24 °C, 65 % RH
Tested By	Edison Lee		

Antenna Polarity & Test Distance : Horizontal at 3 m								
No	Frequency (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	112.1 PK			2.54 H	348	79.6	32.5
2	*2480.00	81.3 AV			2.54 H	348	48.8	32.5
3	2483.50	51.7 PK	74.0	-22.3	2.54 H	348	55.7	-4.0
4	2483.50	20.9 AV	54.0	-33.1	2.54 H	348	24.9	-4.0
5	4960.00	48.8 PK	74.0	-25.2	3.99 H	36	45.4	3.4
6	4960.00	18.0 AV	54.0	-36.0	3.99 H	36	14.6	3.4
Antenna Polarity & Test Distance : Vertical at 3 m								
No	Frequency (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	107.5 PK			3.49 V	34	75.0	32.5
2	*2480.00	76.7 AV			3.49 V	34	44.2	32.5
3	2483.50	46.2 PK	74.0	-27.8	3.49 V	34	50.2	-4.0
4	2483.50	15.4 AV	54.0	-38.6	3.49 V	34	19.4	-4.0
5	4960.00	48.4 PK	74.0	-25.6	2.18 V	121	45.0	3.4
6	4960.00	17.6 AV	54.0	-36.4	2.18 V	121	14.2	3.4

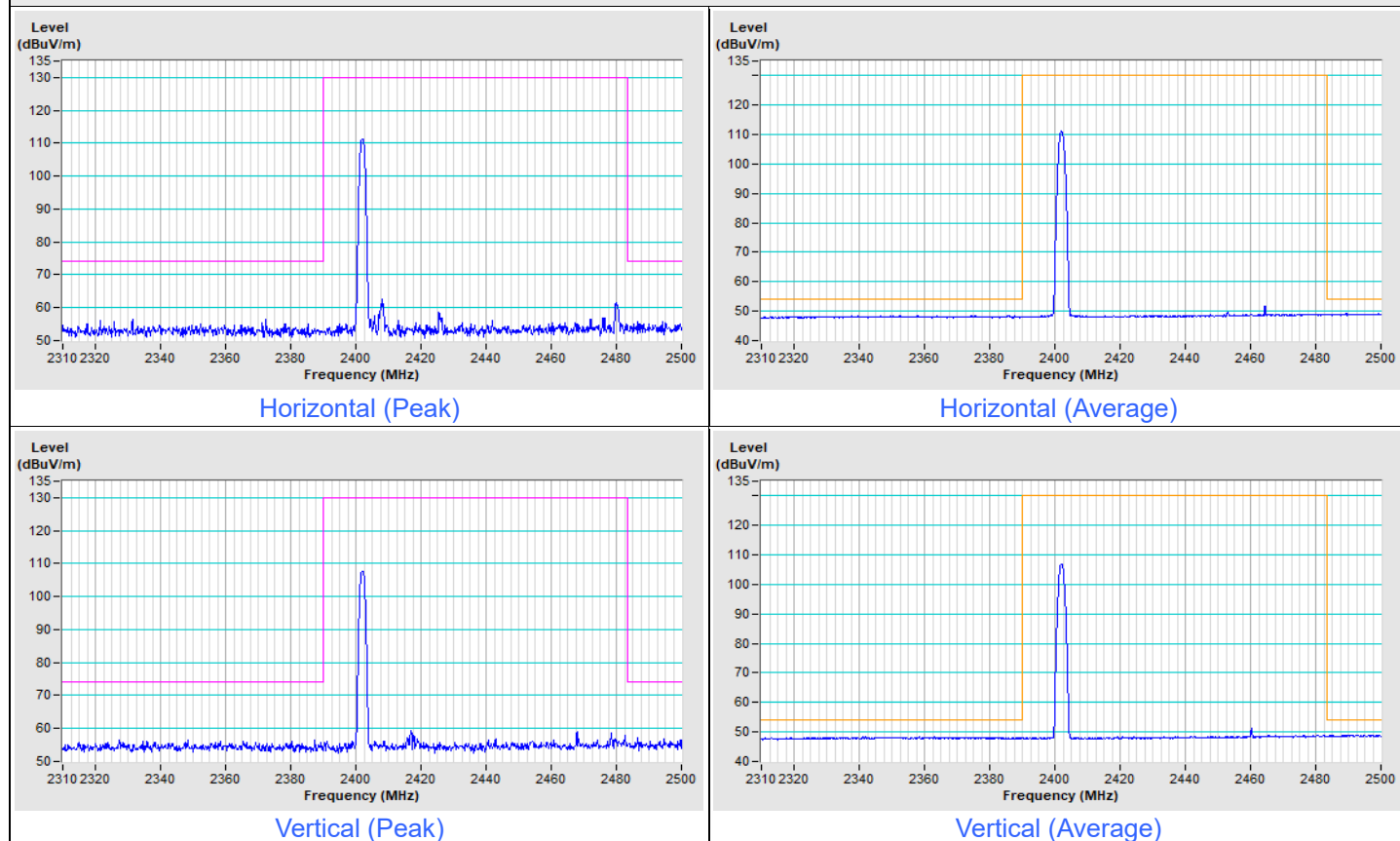
Remarks:

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. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * " : Fundamental frequency, the limit was restricted at the RF Output Power.
6. The average value of fundamental and harmonic frequency is: Average = Peak value + 20 log(Duty cycle) Where the duty cycle correction factor is calculated from following formula:
 $20 \log(\text{Duty cycle}) = 20 \log(2.9 \text{ ms} / 100 \text{ ms}) = -30.8 \text{ dB}$

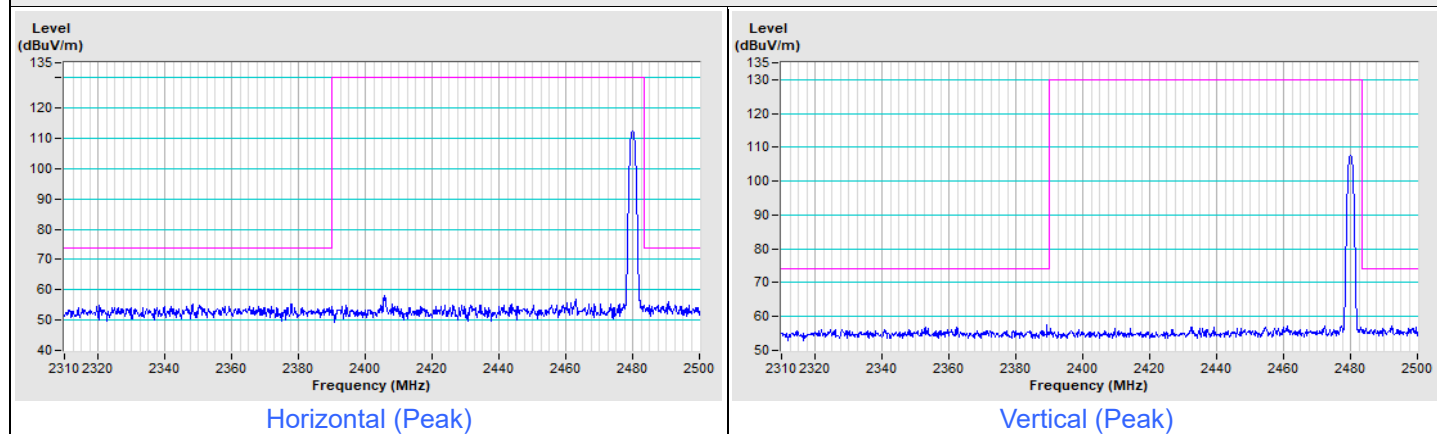
Plot of Band Edge

Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak
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BT GFSK Channel 0

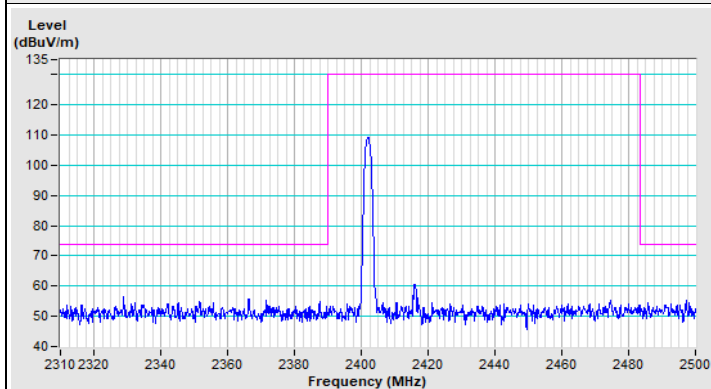


BT GFSK Channel 78

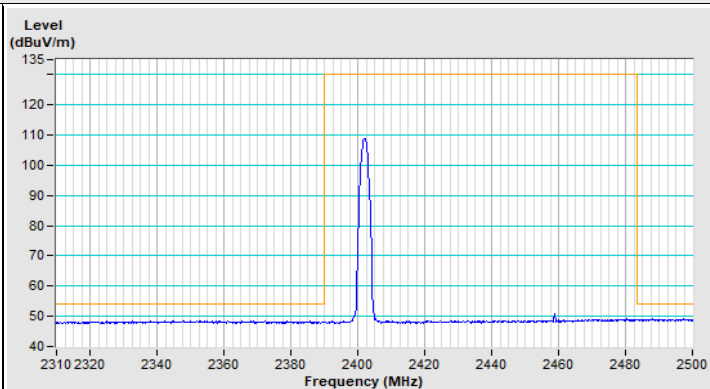


Frequency Range	2.31 GHz ~ 2.5 GHz	Detector Function & Bandwidth	PK: RB=1 MHz, VB=3 MHz, DET=Peak
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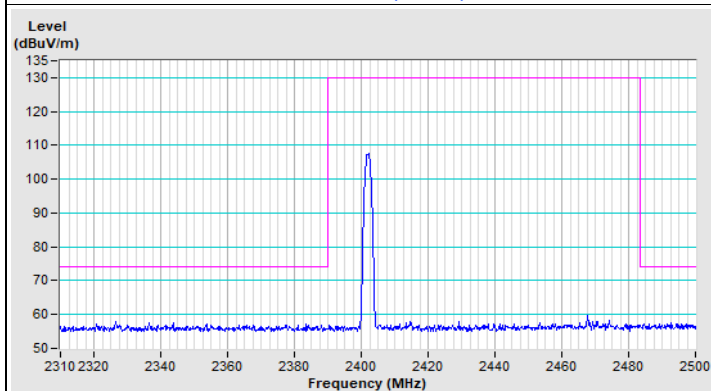
BT 8DPSK Channel 0



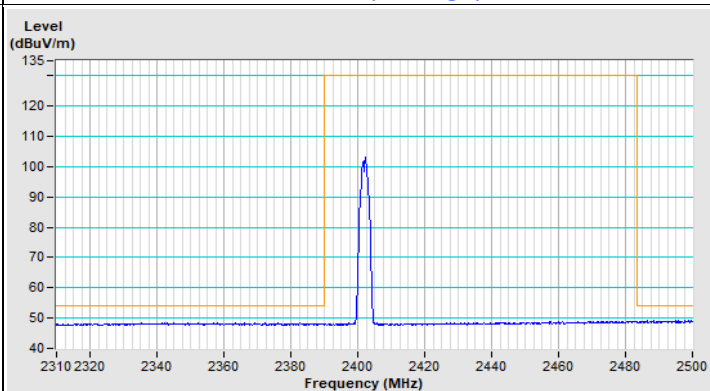
Horizontal (Peak)



Horizontal (Average)

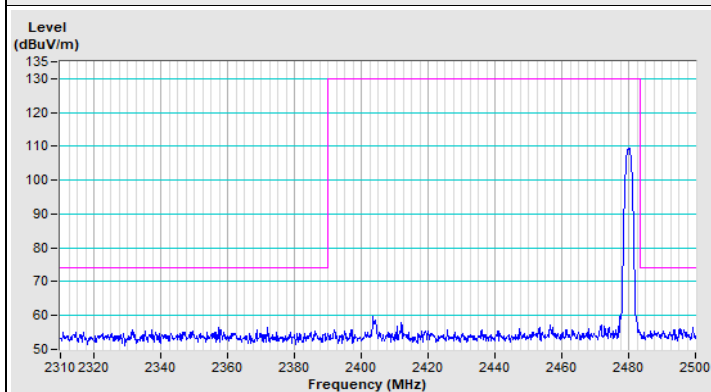


Vertical (Peak)

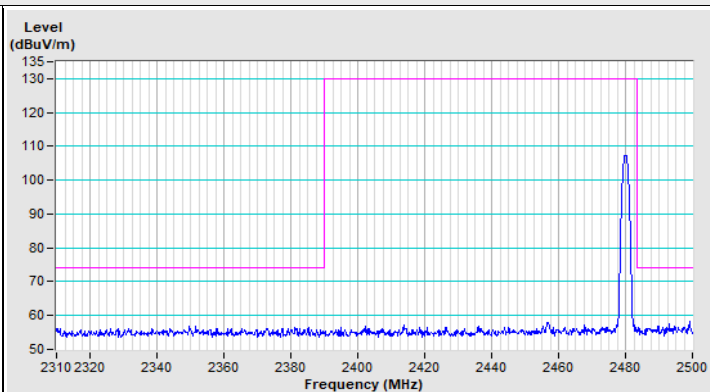


Vertical (Average)

BT 8DPSK Channel 78



Horizontal (Peak)



Vertical (Peak)

8 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo)

9 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 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: <http://ee.bureauveritas.com.tw>

The address and road map of all our labs can be found in our web site also.

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