TEST REPORT

CERTIFICATE OF CONFORMITY

Standard:	**47 CFR FCC Part 15, Subpart C (Section 15.247)**
Report No.:	RFBVSW-WTW-P22080967-2
FCC ID:	2A3G3-WMX720X
Product:	Wi-Fi 6E BT 5.2 M.2 2230 Module, Wi-Fi 6E BT 5.2 Mini PCIe Module
Brand:	EmWicon Corporation
Model No.:	WMX7205, WMX7203
Series Model:	WMX7203-F
Received Date:	2022/8/30
Test Date:	2022/11/24 ~ 2023/1/17
Issued Date:	2023/2/21
Applicant:	EmWicon Corporation
Address:	7F.-5, No. 258, Liancheng Rd., Zhonghe Dist., New Taipei City, Taiwan 235
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 / Designation Number:	723255 / TW2022

Approved by: _____ , **Date:** 2023/2/21

May Chen / Manager

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Prepared by : Vivian Huang / Specialist

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Release Control Record

Issue No.	Description	Date Issued
RFBVSW-WTW-P22080967-2	Original release.	2023/2/21

1 Certificate

Product:	Wi-Fi 6E BT 5.2 M.2 2230 Module, Wi-Fi 6E BT 5.2 Mini PCIe Module
Brand:	EmWicon Corporation
Test Model:	WMX7205, WMX7203
Series Model:	WMX7203-F
Sample Status:	Engineering sample
Applicant:	EmWicon Corporation
Test Date:	2022/11/24 ~ 2023/1/17
Standard:	47 CFR FCC Part 15, Subpart C (Section 15.247)
Measurement procedure:	ANSI C63.10-2013 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	NA	Refer to Note 1 below
15.247(a)(1) (iii)	Number of Hopping Frequency Used	NA	Refer to Note 1 below
15.247(a)(1) (iii)	Dwell Time on Each Channel	NA	Refer to Note 1 below
15.247(a)(1)	Hopping Channel Separation	NA	Refer to Note 1 below
15.247(a)(1)	20 dB Bandwidth	NA	Refer to Note 1 below
15.247(d)	Conducted Out of Band Emissions	NA	Refer to Note 1 below
15.207	AC Power Conducted Emissions	NA	Refer to Note 1 below
15.205 / 15.209 / 15.247(d)	Unwanted Emissions below 1 GHz	Pass	Minimum passing margin is -5.2 dB at 40.10 MHz
15.205 / 15.209 / 15.247(d)	Unwanted Emissions above 1 GHz	Pass	Minimum passing margin is -8.7 dB at 2483.50 MHz
15.203	Antenna Requirement	Pass	Antenna connector is i-pex & RP-SMA not a standard connector.

Notes:

1. Unwanted Emissions Measurement were performed for this addendum. The others testing data refer to original test report. (Original FCC ID: J9C-QCNFA765, Report No.: RF201119E01-2).
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:

Measurement	Specification	Expanded Uncertainty (k=2) (±)
Unwanted Emissions below 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.5 dB
Unwanted Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 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	Wi-Fi 6E BT 5.2 M.2 2230 Module, Wi-Fi 6E BT 5.2 Mini PCIe Module
Brand	EmWicon Corporation
Test Model	WMX7205, WMX7203
Series Model	WMX7203-F
Status of EUT	Engineering sample
Power Supply Rating	3.3Vdc from host equipment
Modulation Type	GFSK, π/4-DQPSK, 8DPSK
Modulation Technology	FHSS
Transfer Rate	Up to 3 Mbps
Operating Frequency	2402MHz ~ 2480MHz
Number of Channel	79
Output Power	29.309 mW

Note:

1. This report is prepared for FCC class II permissive change. The difference compared with the original design is as the following:
   - ◆ Added two models (refer to note 3).
   - ◆ Added new antenna (refer to section 3.2).
2. According to above conditions, only unwanted emissions needs to be performed. And all data are verified to meet the requirements.
3. The EUT has below model names which are identical to each other in all aspects except for the following table:

Original					
Model Name	Product Name	PCB size	Interface	IPEX	Difference
WMX7205	Wi-Fi 6E BT 5.2 M.2 2230 Module	Original size	M.2 E-Key M.2 AE-Key	i-pex (MHF 4L)	-
Newly					
Model Name	Product Name	PCB size	Interface	IPEX	Difference
WMX7203	Wi-Fi 6E BT 5.2 Mini PCIe Module	Bigger than original	mini PCIe	i-pex (MHF 1)	Market segment
WMX7203-F		Bigger than original	mini PCIe		
Note: From the above models, model: **WMX7205, WMX7203** was selected as representative model for the test and its data was recorded in this report.					

4. This device of WLAN (2.4GHz & 5GHz U-NII-1 Band) can support hotspot mode.
5. Simultaneously transmission condition.

Condition	Technology	
1	WLAN(2.4GHz)	WLAN(6GHz)
2	WLAN(2.4GHz)	WLAN(5GHz)
3	WLAN(2.4GHz)	WLAN(5.9GHz)
4	WLAN(6GHz)	Bluetooth
5	WLAN(5GHz)	Bluetooth
6	WLAN(5.9GHz)	Bluetooth
Note: The emission of the simultaneous operation has been evaluated and no non-compliance was found.		

6. The device of WLAN (2.4GHz) and Bluetooth technology can't transmit simultaneously, it was used timely shared coexistence technology.
7. The module (Model: WMX7205) has two variant designs as following table:

SKU No.	Description
SKU #1	M.2 2230 E-key
SKU #2	M.2 2230 AE-key
From the above variants designs, the worst case was found in **SKU #1.** Therefore only the test data of the mode was recorded in this report.	

8. The product provides option to depopulate external LNA (Low-Noise amplifier) from 5GHz/6GHz receive path. This test report covers variation of with/without external LNA and test was conducted to confirm not change in RF compliance and EMC. And worst case was found in without external LNA.
9. 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	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
1	Chain0/1	HONGBO	260-25094	3.53 3.06 3.07 4.81 4.2	2.4~2.4835 GHz 5.15~5.25 GHz 5.25~5.35 GHz 5.47~5.725 GHz 5.725~5.850 GHz	0.76 1.16 1.18 1.2 1.27	PIFA	ipex(MHF 4L) ipex(MHF 1)	300mm
2	Chain0/1	HONGBO	260-25083	5.09 5.14 5.09 5.16 5.12	5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	1.29 1.32 1.35 1.4 1.45	PIFA	ipex(MHF 4L) ipex(MHF 1)	300mm
3	Chain0/1	HONGBO	260-25084	3.22 3.35 3.42 4.77 4.72 4.71 4.75 4.29 4.81 4.74	2.4~2.4835 GHz 5.150~5.250 GHz 5.250~5.350 GHz 5.470~5.725 GHz 5.725~5.850 GHz 5.850~5.895 GHz 5.925~6.425 GHz 6.425~6.525 GHz 6.525~6.875 GHz 6.875~7.125 GHz	0.5 0.76 0.78 0.81 0.85 0.86 0.87 0.91 0.96 0.98	Monopole	ipex(MHF 4L) ipex(MHF 1)	200mm

Newly

Antenna Set	RF Chain No.	Brand	Model	Antenna Net Gain (dBi)	Frequency Range	Cable Loss (dB)	Antenna Type	Connector Type	Cable Length
4	Chain0/1	emwicon	ATD7351	2.51 2.66 2.07 3.21 3.64 3.73 3.13 3.54 3.06	2400 MHz 2450 MHz 2500 MHz 5150 MHz 5500 MHz 5850 MHz 6125 MHz 6750 MHz 7125 MHz	0.64 0.64 0.64 1.27 1.27 1.27 1.24 1.24 1.24	Monopole	RP-SMA	0.15m

* 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 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.
Worst Case:	1. X-axis/ Y-axis/ Z-axis Worst Condition: Y-axis for Unwanted Emissions Above 1GHz of Mode A; X-axis for Unwanted Emissions Below 1GHz of Mode A; Z-axis for Unwanted Emissions Above 1GHz of Mode B; X-axis for Unwanted Emissions Below 1GHz of Mode B

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

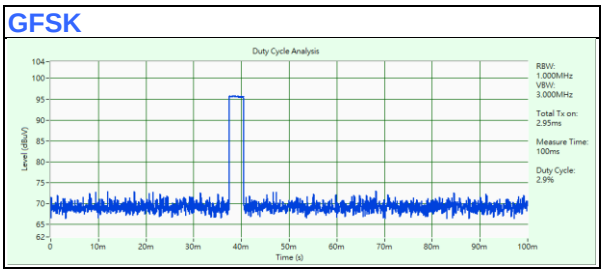
Test Item	EUT Configure Mode	Tested Channel	Modulation	Data Rate Parameter
Unwanted Emissions below 1 GHz	A	78	GFSK	DH5
	B	78	GFSK	DH5
Unwanted Emissions above 1 GHz	A	78	GFSK	DH5
	B	78	GFSK	DH5
EUT Configure Mode:	A	Old Module + Antenna 4		
	B	New Module + Antenna 4		

Note:
1. For the Unwanted Emission test mode, after evaluation, it is tested with the worst channel in all bandwidths/rate, and finally tested with GFSK channel 78.

3.5 Duty Cycle of Test Signal

GFSK: Duty cycle = 2.95 ms/100 ms = -30.6 dB

GFSK

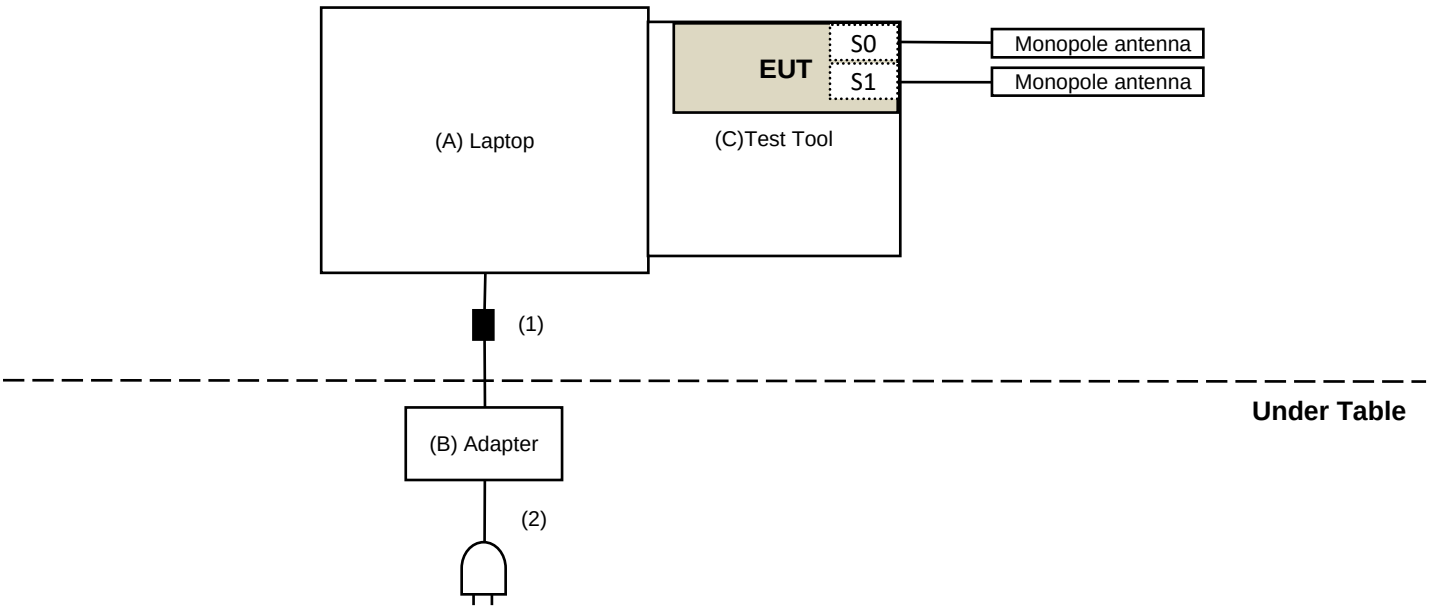


3.6 Test Program Used and Operation Descriptions

Controlling software (QRCT_v4.0-00182) 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 Unwanted Emission test (Monopole)



3.8 Configuration of Peripheral Devices and Cable Connections

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A	Laptop	DELL	E6320	N/A	N/A	Supplied by applicant
B	Adapter	DELL	DA90PM111	N/A	N/A	Supplied by applicant
C	Test Tool	Phiyo	N/A	N/A	N/A	Supplied by applicant
D	Test Tool	EmWicon	N/A	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	Supplied by applicant
2	AC Cable	1	1.8	No	0	Supplied by applicant

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 Unwanted Emissions below 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
Fixed attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-03	2022/1/10 2022/12/28	2023/1/9 2023/12/27
LOOP ANTENNA Electro-Metrics	EM-6879	264	2022/3/18	2023/3/17
Pre_Amplifier Agilent	8447D	2944A10636	2022/3/19	2023/3/18
Pre_Amplifier EMCI	EMC330N	980701	2022/3/8	2023/3/7
RF Coaxial Cable COMMATE/PEWC	8D	966-4-1	2022/3/8	2023/3/7
		966-4-2	2022/3/8	2023/3/7
		966-4-3	2022/3/8	2023/3/7
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/1/6 2022/12/19	2023/1/5 2023/12/18
		LOOPCAB-002	2022/1/6 2022/12/19	2023/1/5 2023/12/18
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25
Trilog Broadband Antenna Schwarzbeck	VULB 9168	9168-406	2022/10/21	2023/10/20

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2022/11/24 ~ 2023/1/17

4.2 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-783	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
Pre_Amplifier EMCI	EMC12630SE	980688	2022/10/4	2023/10/3
	EMC184045SE	980387	2022/1/10 2022/12/28	2023/1/9 2023/12/27
RF Cable-Frequency Range : 1-26.5GHz EMCI	EMC104-SM-SM-1200	160922	2021/12/24 2022/12/15	2022/12/23 2023/12/14
RF Cable-Frequency range: 1-40GHz EMCI	EMC102-KM-KM-1200	160924	2022/1/10 2022/12/28	2023/1/9 2023/12/27
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2022/3/8	2023/3/7
	EMC104-SM-SM-2000	180502	2022/4/25	2023/4/24
	EMC104-SM-SM-6000	210704	2022/11/4	2023/11/3
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A
Spectrum Analyzer Keysight	N9020B	MY60112410	2022/3/13	2023/3/12
Spectrum Analyzer KEYSIGHT	N9030B	MY57142938	2022/4/26	2023/4/25

Notes:

1. The test was performed in 966 Chamber No. 4.
2. Tested Date: 2022/11/24 ~ 2023/1/17

5 Limits of Test Items

5.1 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).

5.2 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 shall be at least 20 dB below the highest level of the desired power:

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

Notes:

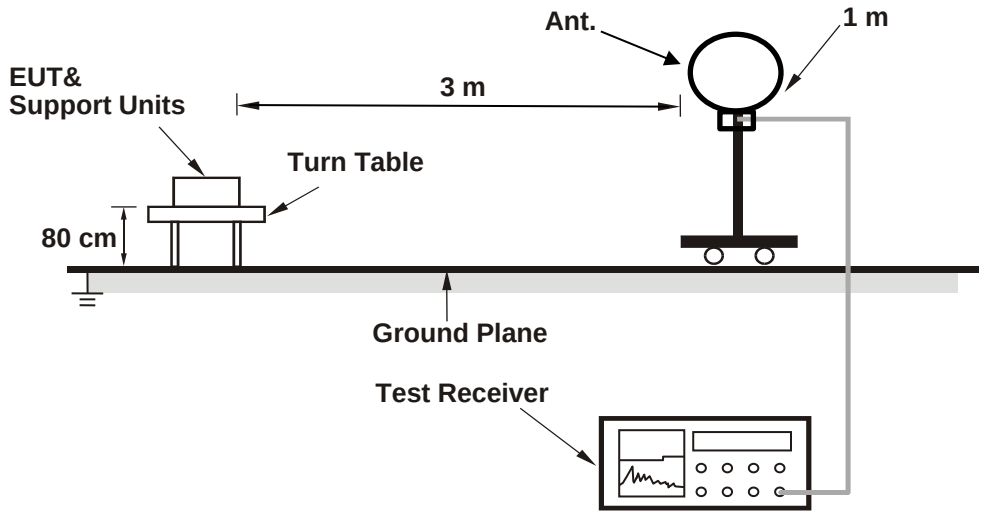
1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

6 Test Arrangements

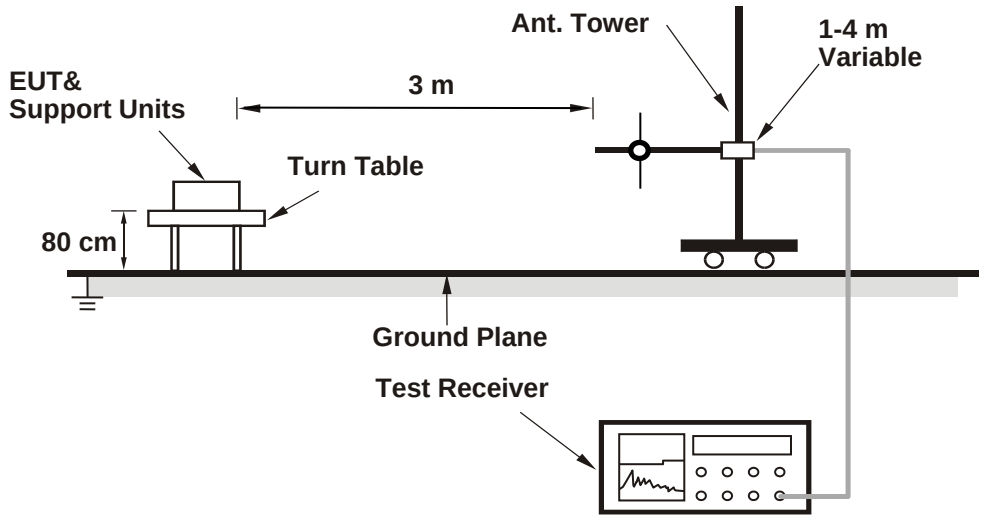
6.1 Unwanted Emissions below 1 GHz

6.1.1 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).

6.1.2 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.

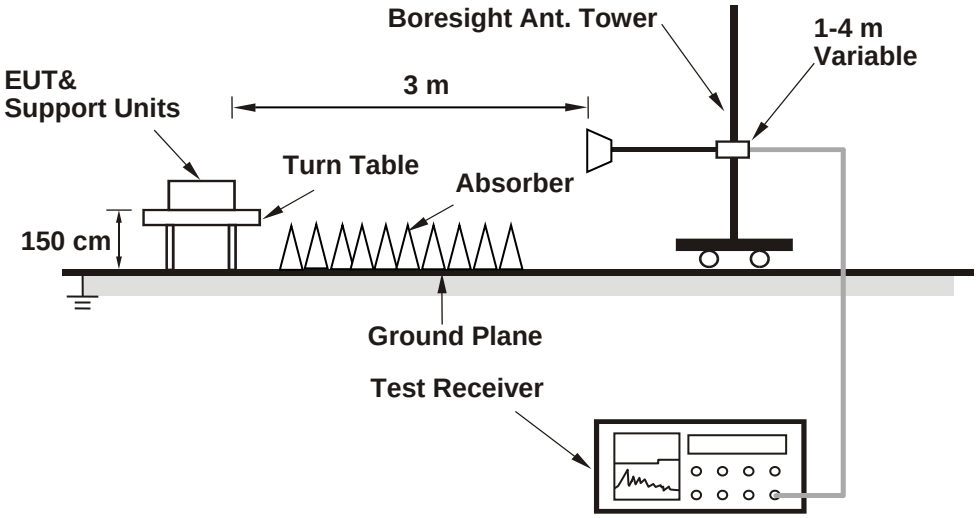
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

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.

6.2 Unwanted Emissions above 1 GHz

6.2.1 Test Setup



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

6.2.2 Test Procedure

a. 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.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Notes:

1. 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.
2. 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.
3. All modes of operation were investigated and the worst-case emissions are reported.

7 Test Results of Test Item

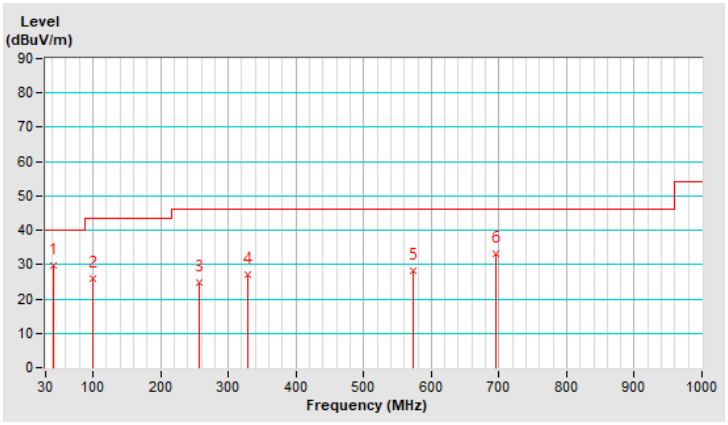
7.1 Unwanted Emissions below 1 GHz

RF Mode	BT GFSK	**Channel**	CH 78：2480 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60Hz	**Environmental Conditions**	25°C, 68% RH
Tested By	Tom Yang		

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	41.76	29.8 QP	40.0	-10.2	1.00 H	19	42.6	-12.8
2	99.99	25.9 QP	43.5	-17.6	1.50 H	156	42.4	-16.5
3	256.46	24.8 QP	46.0	-21.2	1.50 H	308	37.3	-12.5
4	329.35	27.1 QP	46.0	-18.9	1.00 H	215	37.0	-9.9
5	573.17	28.1 QP	46.0	-17.9	2.00 H	211	31.5	-3.4
6	696.14	33.2 QP	46.0	-12.8	1.00 H	53	33.9	-0.7

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

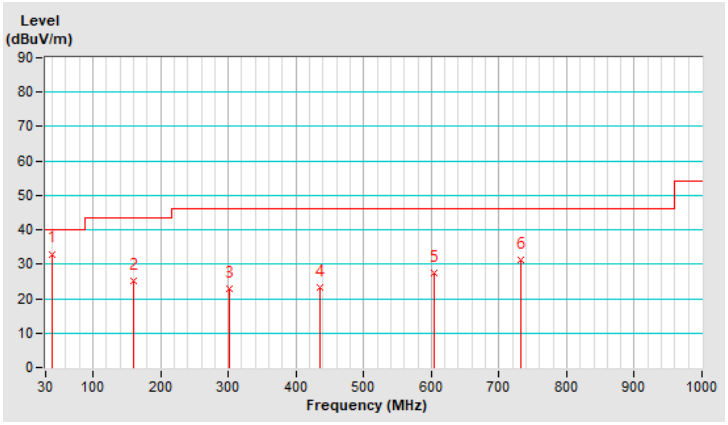


RF Mode	BT GFSK	**Channel**	CH 78：2480 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60Hz	**Environmental Conditions**	25°C, 68% RH
Tested By	Tom Yang		

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	38.89	33.0 QP	40.0	-7.0	1.00 V	13	46.1	-13.1
2	160.48	25.3 QP	43.5	-18.2	1.50 V	320	37.3	-12.0
3	301.14	23.0 QP	46.0	-23.0	1.50 V	165	33.7	-10.7
4	434.65	23.1 QP	46.0	-22.9	2.00 V	27	29.6	-6.5
5	604.00	27.4 QP	46.0	-18.6	1.00 V	49	29.7	-2.3
6	731.93	31.3 QP	46.0	-14.7	1.00 V	231	31.3	0.0

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



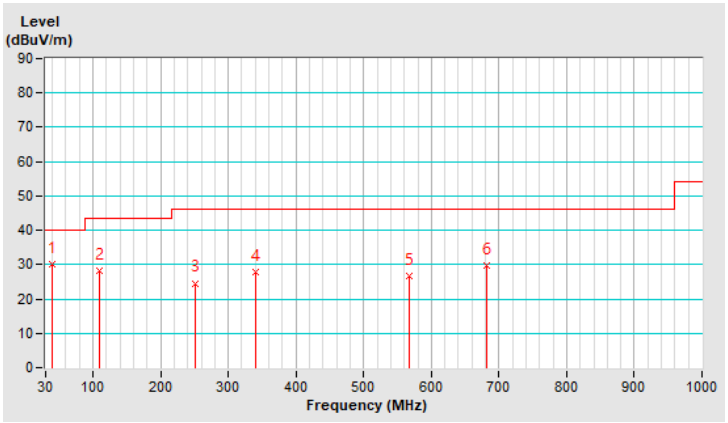
Mode B

RF Mode	BT GFSK	Channel	CH 78：2480 MHz
Frequency Range	30 MHz ~ 1 GHz	Detector Function & Bandwidth	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60Hz	Environmental Conditions	25°C, 68% RH
Tested By	Tom Yang		

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	38.88	30.1 QP	40.0	-9.9	1.50 H	33	43.2	-13.1
2	109.00	28.1 QP	43.5	-15.4	1.00 H	228	43.2	-15.1
3	251.25	24.6 QP	46.0	-21.4	1.50 H	351	37.3	-12.7
4	340.47	27.9 QP	46.0	-18.1	1.50 H	176	37.6	-9.7
5	567.70	26.6 QP	46.0	-19.4	1.50 H	192	30.2	-3.6
6	682.60	29.8 QP	46.0	-16.2	1.00 H	42	30.8	-1.0

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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

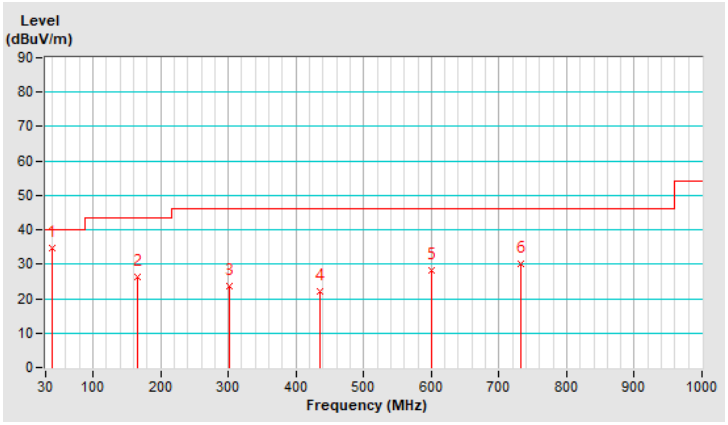


RF Mode	BT GFSK	**Channel**	CH 78：2480 MHz
Frequency Range	30 MHz ~ 1 GHz	**Detector Function & Bandwidth**	(QP) RB = 120kHz
Input Power (System)	120 Vac, 60Hz	**Environmental Conditions**	25°C, 68% RH
Tested By	Tom Yang		

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	**40.10**	**34.8 QP**	**40.0**	**-5.2**	**1.50 V**	**58**	**48.0**	**-13.2**
2	165.87	26.4 QP	43.5	-17.1	2.00 V	89	38.7	-12.3
3	301.52	23.7 QP	46.0	-22.3	1.00 V	193	34.3	-10.6
4	435.07	22.2 QP	46.0	-23.8	1.50 V	337	28.7	-6.5
5	600.72	28.1 QP	46.0	-17.9	1.50 V	12	30.5	-2.4
6	733.16	30.2 QP	46.0	-15.8	2.00 V	317	30.1	0.1

Remarks:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. 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 emission levels were very low against the limit of frequency range 9 kHz ~ 30 MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



7.2 Unwanted Emissions above 1 GHz

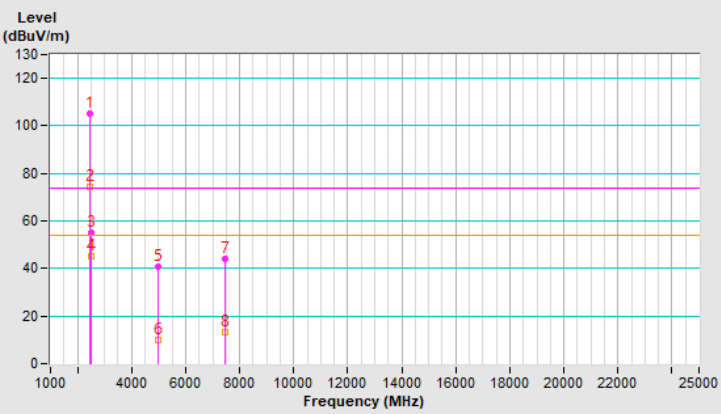
Mode A

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 (AV) RB = 1 MHz, VB = 3 MHz
Input Power (System)	120 Vac, 60Hz	**Environmental Conditions**	25°C, 66% RH
Tested By	Tom Yang		

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	105.1 PK			1.50 H	121	106.0	-0.9
2	*2480.00	74.5 AV			1.50 H	121	75.4	-0.9
3	2483.50	55.3 PK	74.0	-18.7	1.50 H	121	56.3	-1.0
4	**2483.50**	**45.3 AV**	**54.0**	**-8.7**	**1.50 H**	**121**	**46.3**	**-1.0**
5	4960.00	40.5 PK	74.0	-33.5	1.79 H	291	36.6	3.9
6	4960.00	9.9 AV	54.0	-44.1	1.79 H	291	6.0	3.9
7	7440.00	44.0 PK	74.0	-30.0	1.37 H	350	33.6	10.4
8	7440.00	13.4 AV	54.0	-40.6	1.37 H	350	3.0	10.4

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(Duty cycle) = 20 log(2.95 ms / 100 ms) = -30.6 dB

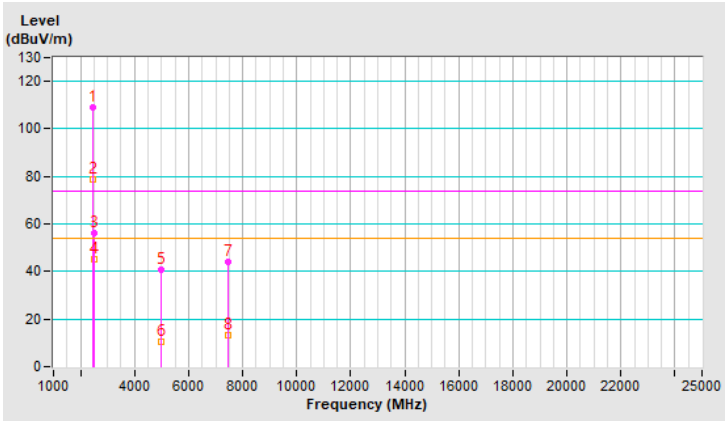


RF Mode	BT GFSK	**Channel**	CH 78：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power (System)	120 Vac, 60Hz	**Environmental Conditions**	25°C, 66% RH
Tested By	Tom Yang		

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	109.3 PK			1.54 V	216	110.2	-0.9
2	*2480.00	78.7 AV			1.54 V	216	79.6	-0.9
3	2483.50	56.2 PK	74.0	-17.8	1.54 V	216	57.2	-1.0
4	2483.50	45.0 AV	54.0	-9.0	1.54 V	216	46.0	-1.0
5	4960.00	40.9 PK	74.0	-33.1	1.63 V	199	37.0	3.9
6	4960.00	10.3 AV	54.0	-43.7	1.63 V	199	6.4	3.9
7	7440.00	44.0 PK	74.0	-30.0	1.14 V	257	33.6	10.4
8	7440.00	13.4 AV	54.0	-40.6	1.14 V	257	3.0	10.4

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(Duty cycle) = 20 log(2.95 ms / 100 ms) = -30.6 dB



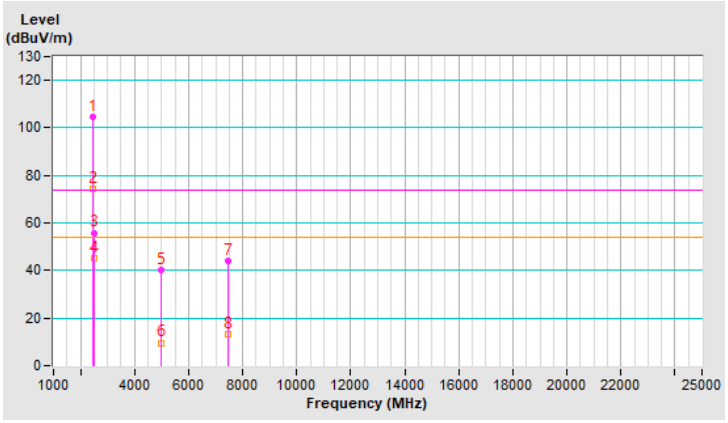
Mode B

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 (AV) RB = 1 MHz, VB = 3 MHz
Input Power (System)	120 Vac, 60Hz	Environmental Conditions	25°C, 67% RH
Tested By	Tom Yang		

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	104.8 PK			1.45 H	114	105.7	-0.9
2	*2480.00	74.2 AV			1.45 H	114	75.1	-0.9
3	2483.50	55.9 PK	74.0	-18.1	1.45 H	114	56.9	-1.0
4	2483.50	44.9 AV	54.0	-9.1	1.45 H	114	45.9	-1.0
5	4960.00	40.2 PK	74.0	-33.8	1.84 H	286	36.3	3.9
6	4960.00	9.6 AV	54.0	-44.4	1.84 H	286	5.7	3.9
7	7440.00	43.9 PK	74.0	-30.1	1.32 H	359	33.5	10.4
8	7440.00	13.3 AV	54.0	-40.7	1.32 H	359	2.9	10.4

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(Duty cycle) = 20 log(2.95 ms / 100 ms) = -30.6 dB

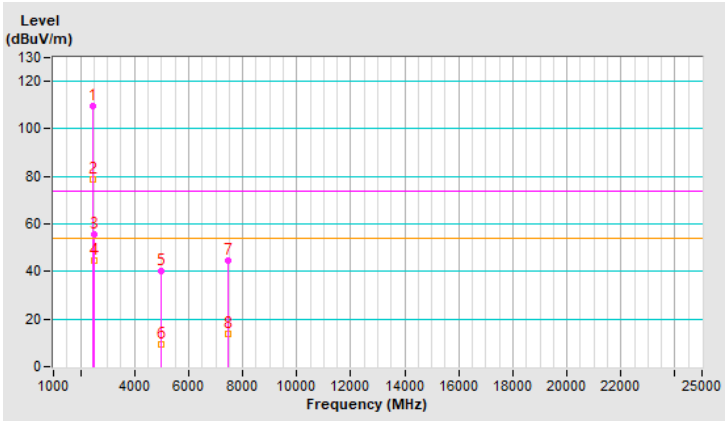


RF Mode	BT GFSK	**Channel**	CH 78：2480 MHz
Frequency Range	1 GHz ~ 25 GHz	**Detector Function & Bandwidth**	(PK) RB = 1 MHz, VB = 3 MHz (AV) RB = 1 MHz, VB = 3 MHz
Input Power (System)	120 Vac, 60Hz	**Environmental Conditions**	25°C, 67% RH
Tested By	Tom Yang		

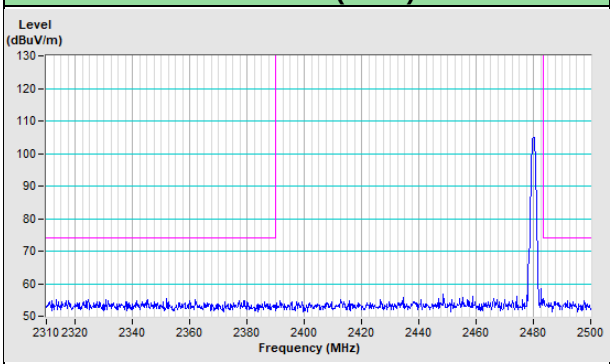
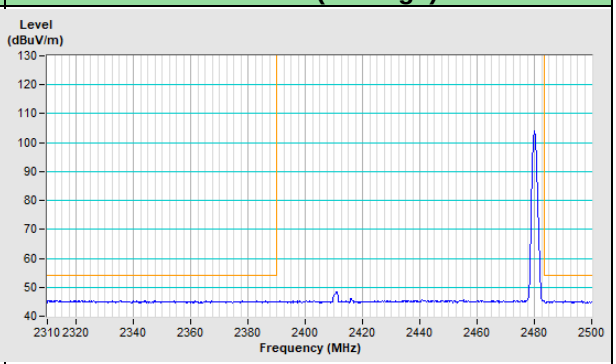
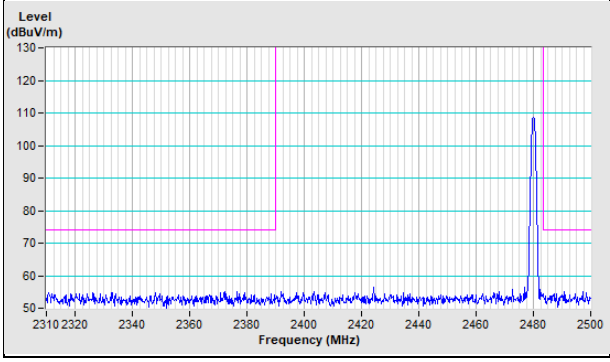
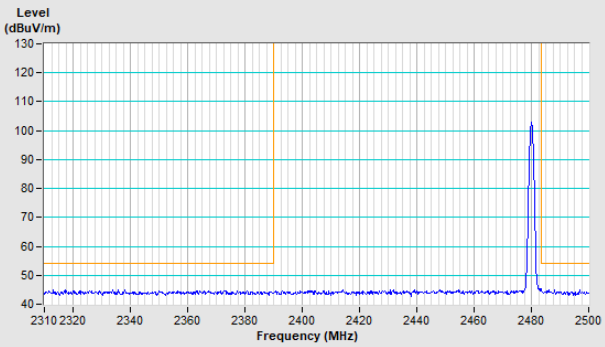
Antenna Polarity & Test Distance : Vertical at 3 m								
No	**Frequency (MHz)**	**Emission Level (dBuV/m)**	**Limit (dBuV/m)**	**Margin (dB)**	**Antenna Height (m)**	**Table Angle (Degree)**	**Raw Value (dBuV)**	**Correction Factor (dB/m)**
1	*2480.00	109.4 PK			1.58 V	223	110.3	-0.9
2	*2480.00	78.8 AV			1.58 V	223	79.7	-0.9
3	2483.50	55.6 PK	74.0	-18.4	1.58 V	223	56.6	-1.0
4	2483.50	44.6 AV	54.0	-9.4	1.58 V	223	45.6	-1.0
5	4960.00	40.0 PK	74.0	-34.0	1.63 V	218	36.1	3.9
6	4960.00	9.4 AV	54.0	-44.6	1.63 V	218	5.5	3.9
7	7440.00	44.6 PK	74.0	-29.4	1.22 V	238	34.2	10.4
8	7440.00	14.0 AV	54.0	-40.0	1.22 V	238	3.6	10.4

Remarks:

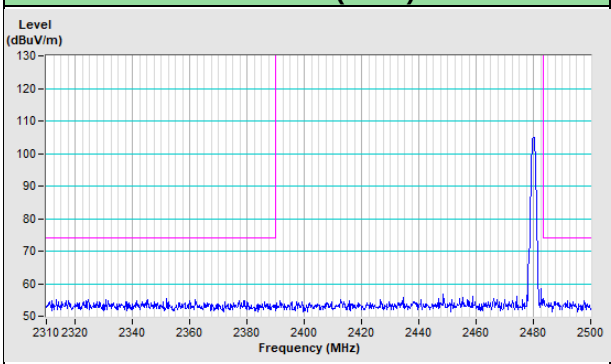
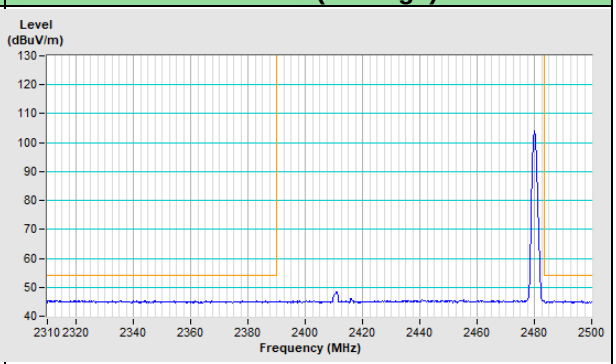
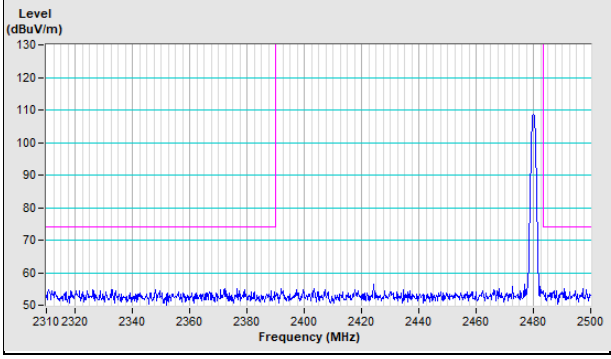
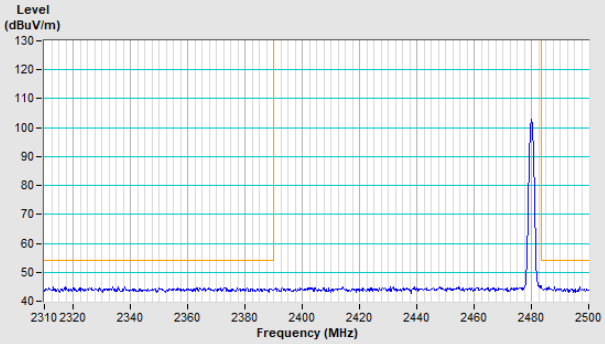
1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " * ": Fundamental frequency, 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(Duty cycle) = 20 log(2.95 ms / 100 ms) = -30.6 dB



Plot of Band Edge Mode A

BT GFSK Channel 78	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

Plot of Band Edge Mode B

BT GFSK Channel 78	
Horizontal (Peak)	Horizontal (Average)
	
Vertical (Peak)	Vertical (Average)
	

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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