

## FCC Test Report

**Report No.:** RFBDKG-WTW-P22010302A

**FCC ID:** JNZCU0014

**Test Model:** C-U0014

**Received Date:** 2023/6/9

**Test Date:** 2023/6/29 ~ 2023/6/30

**Issued Date:** 2023/7/10

**Applicant:** Logitech Far East Ltd.

**Address:** 3930 North First Street, San Jose, California 95134

**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



This report is governed by, and incorporates by reference, the Conditions of Testing as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions/> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. Statements of conformity are based on simple acceptance criteria without taking measurement uncertainty into account, unless otherwise requested in writing. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

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### Release Control Record

Issue No.	Description	Date Issued
RFBDKG-WTW-P22010302A	Original release.	2023/7/10

## 1 Certificate of Conformity

**Product:** 2.4GHz USB Transceiver

**Brand:** Logitech

**Test Model:** C-U0014

**Sample Status:** Engineering sample

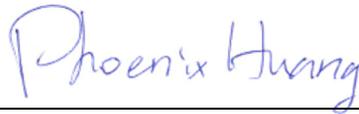
**Applicant:** Logitech Far East Ltd.

**Test Date:** 2023/6/29 ~ 2023/6/30

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.249)  
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**

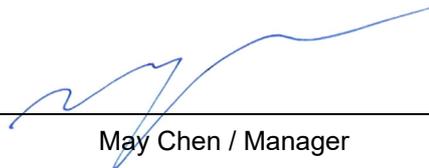


**Date:**

2023/7/10

Phoenix Huang / Specialist

**Approved by :**



**Date:**

2023/7/10

May Chen / Manager

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (SECTION 15.249)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	NA	Refer to Note 1 below
15.209 15.249 15.249 (d)	Radiated Emission Test Band Edge Measurement Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -5.4 dB at 37.76 MHz
15.203	Antenna Requirement	PASS	No antenna connector is used.

### Note:

1. Radiated Emissions and Band Edge test item was 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:

Measurement	Frequency	Expanded Uncertainty (k=2) ( $\pm$ )
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.1 dB
	30 MHz ~ 1 GHz	5.1 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	5.1 dB
	18 GHz ~ 40 GHz	5.3 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

Product	2.4GHz USB Transceiver
Brand	Logitech
Test Model	C-U0014
Status of EUT	Engineering sample
Power Supply Rating	5 Vdc from USB interface
Modulation Type	DTS
Modulation Technology	GFSK
Transfer Rate	2 Mbps
Operating Frequency	2.405 GHz ~ 2.474 GHz
Number of Channel	12
Output Power (Field Strength)	95.3 dBuV/m (Peak) at 3m
Antenna Type	Refer to Note
Antenna Connector	Refer to Note
Accessory Device	NA
Data Cable Supplied	NA

Note:

- This is a supplementary report of Report No.: RF131025E06. The differences between them are as below information:
  - ◆ Change address of applicant.
  - ◆ Upgraded standard.
  - ◆ RF inductor L1, L2, L3 changed to 0201 size.
- According to above condition, there are Radiated Emission and Band Edge Measurement need to be performed. All data for meeting the requirement is verified.
- The EUT may have a lot of colors for marketing requirement.

- The antenna provided to the EUT, please refer to the following table:

Antenna Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type
2.66	2.4~2.4835	PCB printed	none

- Due to radiated measurements are made and the antenna gain is already accounted for this device, so provide an antenna datasheet and/or antenna measurement report is not required. The antenna dimensions and pictures (include antenna wire length if have) are stated in EUT photo exhibit.
- 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 Description of Test Modes

12 channels are provided to this EUT:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	7	2441
2	2408	8	2444
3	2414	9	2462
4	2417	10	2465
5	2432	11	2471
6	2435	12	2474

### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable to		Description
	RE $\geq$ 1G	RE $<$ 1G	
-	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz & Bandedge Measurement      **RE $<$ 1G**: Radiated Emission below 1GHz

**Note:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-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
1 to 12	1, 8, 12	GFSK

#### **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.

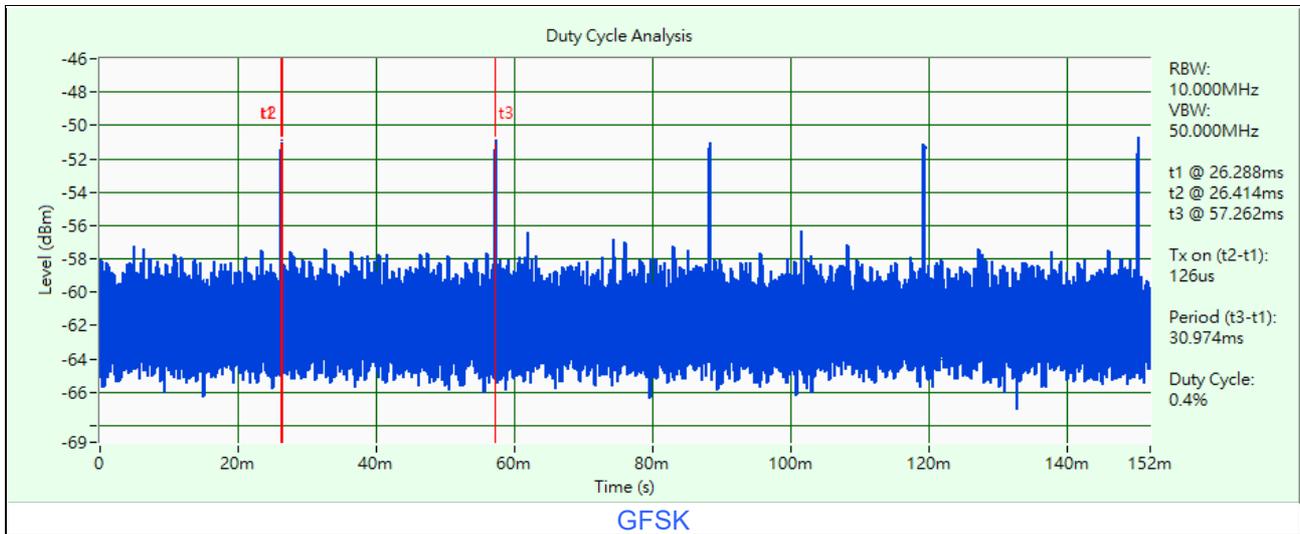
Available Channel	Tested Channel	Modulation Type
1 to 12	12	GFSK

#### **Test Condition:**

Applicable to	Environmental Conditions	Input Power (System)	Tested By
RE $\geq$ 1G	29deg. C, 72%RH	120 Vac, 50 Hz	Louis Yang
RE $<$ 1G	29deg. C, 77%RH	120 Vac, 50 Hz	Louis Yang

### 3.3 Duty Cycle of Test Signal

Duty cycle =  $0.126 \text{ ms} / 30.974 \text{ ms} \times 100\% = 0.4\%$ .



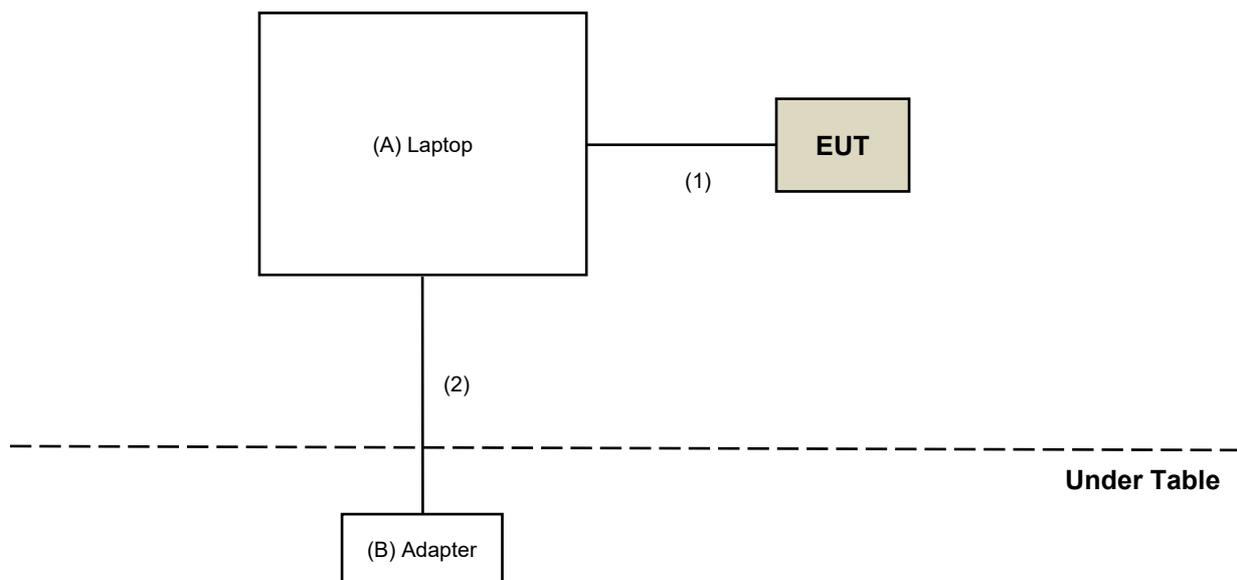
### 3.4 Description of Support Units

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.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Laptop	Lenovo	81A4	YD02YN2A	PD93165NGU	Provided by Lab
B.	Adapter	Lenovo	PA-1450-55LL	N/A	N/A	Provided by Lab

ID	Cable Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1	USB Extension Cable	1	1.4	Yes	0	Provided by Lab
2	DC Cable	1	1.8	No	0	Provided by Lab

#### 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 (15.249)**

ANSI C63.10-2013

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

Fundamental Frequency	Field Strength of Fundamental (millivolts/meter)	Field Strength of Harmonics (microvolts/meter)
902 ~ 928 MHz	50	500
2400 ~ 2483.5 MHz	50	500
5725 ~ 5875 MHz	50	500
24 ~ 24.25 GHz	250	2500

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits as below table, whichever is the lesser attenuation

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.

#### 4.1.2 Test Instruments

##### For below 1 GHz test:

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Bi_Log Antenna Schwarzbeck	VULB 9168	9168-0842	2022/10/24	2023/10/23
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR3	102528	2023/2/10	2024/2/9
Fixed Attenuator Mini-Circuits	UNAT-5+	PAD-ATT5-02	2022/12/28	2023/12/27
Loop Antenna Electro-Metrics	EM-6879	264	2023/2/21	2024/2/20
MXA Signal Analyzer Keysight	N9020B	MY60112410	2023/3/6	2024/3/5
Preamplifier Agilent	8447D	2944A10636	2023/3/12	2024/3/11
Preamplifier EMCI	EMC330N	980538	2023/4/6	2024/4/5
PXA Signal Analyzer Keysight	N9030B	MY57141948	2023/5/19	2024/5/18
RF Coaxial Cable JYEBO	5D-FB	LOOPCAB-001	2022/12/19	2023/12/18
		LOOPCAB-002	2022/12/19	2023/12/18
RF Coaxial Cable PEWC	8D	966-5-1	2023/4/6	2024/4/5
		966-5-2	2023/4/6	2024/4/5
		966-5-3	2023/4/6	2024/4/5
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

##### Notes:

1. The test was performed in 966 Chamber No. 5.
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: 2023/6/29

**For above 1 GHz test:**

Description Manufacturer	Model No.	Serial No.	Calibrated Date	Calibrated Until
Boresight Antenna Tower & Turn Table Max-Full	MF-7802BS	MF780208530	N/A	N/A
EMI Test Receiver R&S	ESR3	102528	2023/2/10	2024/2/9
Horn Antenna Schwarzbeck	BBHA 9120D	9120D-1819	2022/11/13	2023/11/12
	BBHA 9170	9170-739	2022/11/13	2023/11/12
MXA Signal Analyzer Keysight	N9020B	MY60112410	2023/3/6	2024/3/5
Preamplifier EMCI	EMC12630SE	980509	2023/4/7	2024/4/6
	EMC184045SE	980387	2022/12/28	2023/12/27
RF Coaxial Cable EMCI	EMC-KM-KM-4000	200214	2023/2/20	2024/2/19
	EMC102-KM-KM-1200	160924	2022/12/28	2023/12/27
	EMC104-SM-SM-1500	180503	2023/4/7	2024/4/6
	EMC104-SM-SM-2000	180501	2023/4/7	2024/4/6
	EMC104-SM-SM-6000	180506	2023/4/7	2024/4/6
Software	ADT_Radiated_V8.7.08	N/A	N/A	N/A

**Notes:**

1. The test was performed in 966 Chamber No. 5.
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: 2023/6/30

#### 4.1.3 Test Procedures

##### **For Radiated emission below 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. 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.

##### **Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

##### **For Radiated emission above 30MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 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:**

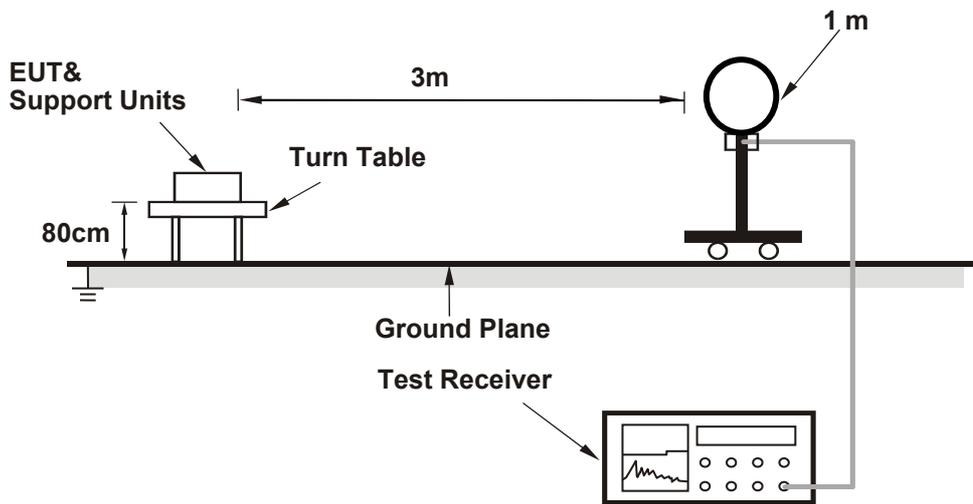
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. According to ANSI C63.10 section 7.5. For fundamental and harmonic signal measurement, the average value = peak value + duty cycle correction factor. The duty cycle measurement refer to FCC 47 CFR Part 15C section 15.35 (c). For duty cycle correction factor values, see the Test Signal Duty Cycle section in this report.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

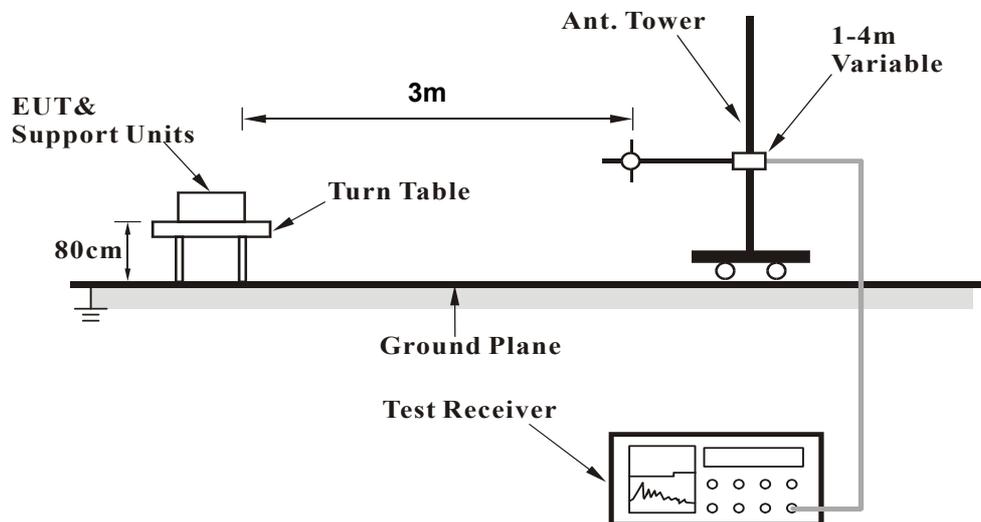
No deviation.

4.1.5 Test Setup

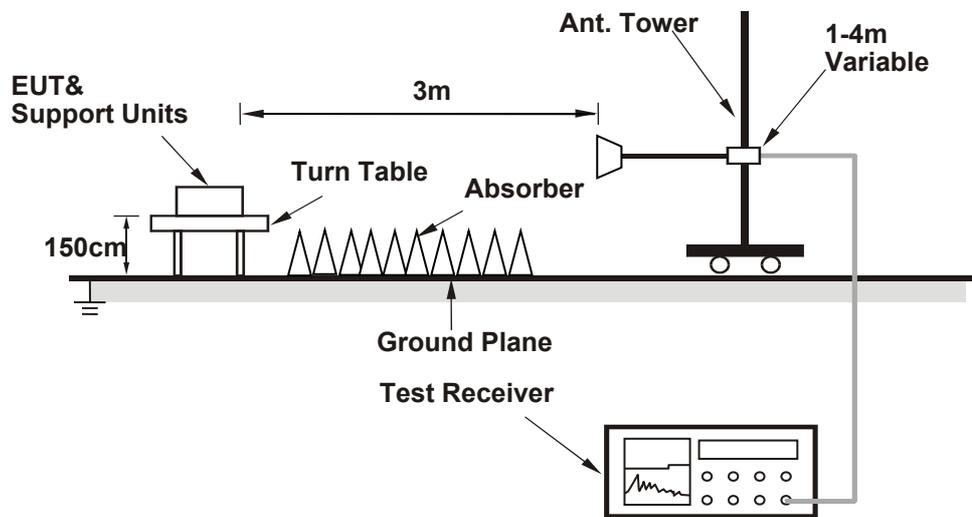
**For Radiated emission below 30MHz**



**For Radiated emission 30MHz to 1GHz**



### For Radiated emission above 1GHz



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

#### 4.1.6 EUT Operating Conditions

- a. Placed the EUT on the testing table.
- b. Controlling software (RF Sample [Number Lock]) has been activated to set the EUT under transmission condition continuously at specific channel frequency.
  - ◆ Modulated carrier 2.405 GHz
  - ◆ Modulated carrier 2.444 GHz
  - ◆ Modulated carrier 2.474 GHz

#### 4.1.7 Test Results

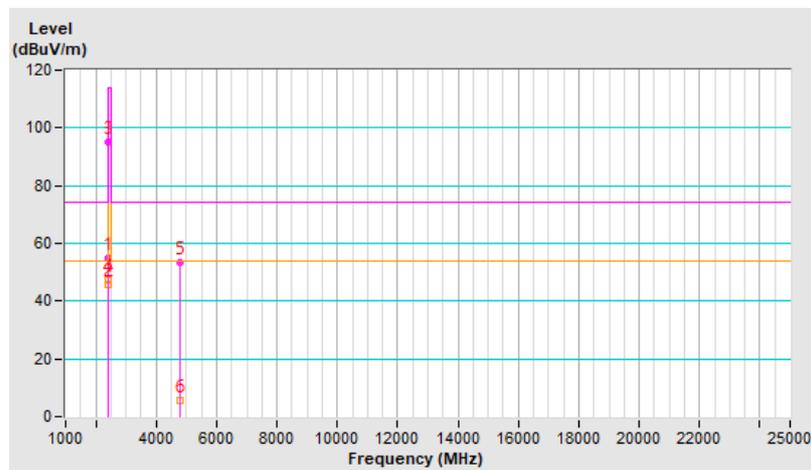
##### Above 1GHz Data:

<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 1 : 2405 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	Peak (PK), RB = 1 MHz, VB = 3 MHz RMS (AV), RB = 1 MHz, VB = 3 MHz

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	2400.00	54.9 PK	74.0	-19.1	1.24 H	341	57.7	-2.8
2	2400.00	45.7 AV	54.0	-8.3	1.24 H	341	48.5	-2.8
3	*2405.00	95.0 PK	114.0	-19.0	1.24 H	341	97.8	-2.8
4	*2405.00	47.2 AV	94.0	-46.8	1.24 H	341	50.0	-2.8
5	4810.00	53.3 PK	74.0	-20.7	1.07 H	225	51.3	2.0
6	4810.00	5.5 AV	54.0	-48.5	1.07 H	225	3.5	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.
5. " \* ": Fundamental frequency.
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:  
 $20 \log(\text{Duty cycle}) = 20 \log(0.126 \text{ ms} / 30.974 \text{ ms}) = -47.8 \text{ dB}$

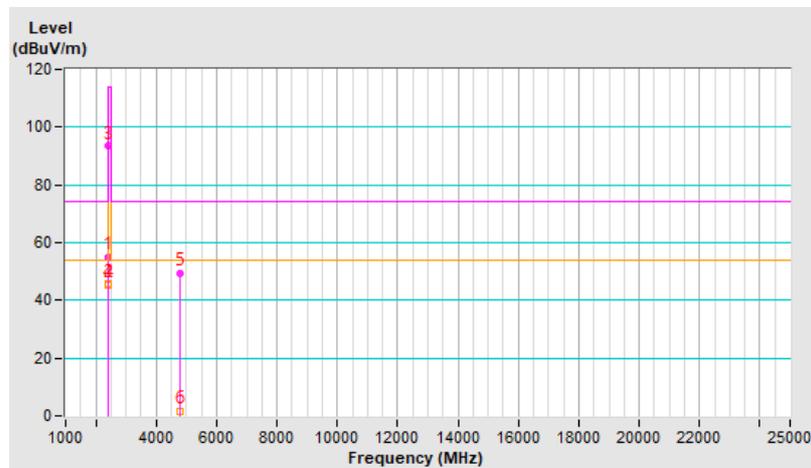


<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 1 : 2405 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	Peak (PK), RB = 1 MHz, VB = 3 MHz RMS (AV), RB = 1 MHz, VB = 3 MHz

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	2400.00	55.0 PK	74.0	-19.0	1.00 V	27	57.8	-2.8
2	2400.00	45.4 AV	54.0	-8.6	1.00 V	27	48.2	-2.8
3	*2405.00	93.3 PK	114.0	-20.7	1.00 V	27	96.1	-2.8
4	*2405.00	45.5 AV	94.0	-48.5	1.00 V	27	48.3	-2.8
5	4810.00	49.2 PK	74.0	-24.8	1.17 V	17	47.2	2.0
6	4810.00	1.4 AV	54.0	-52.6	1.17 V	17	-0.6	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.
5. " \* ": Fundamental frequency.
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:  
 $20 \log(\text{Duty cycle}) = 20 \log(0.126 \text{ ms} / 30.974 \text{ ms}) = -47.8 \text{ dB}$



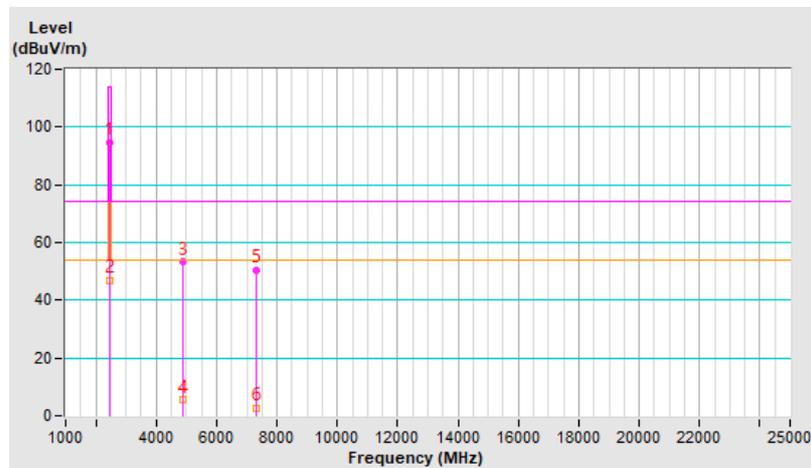
<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 8 : 2444 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	Peak (PK), RB = 1 MHz, VB = 3 MHz RMS (AV), RB = 1 MHz, VB = 3 MHz

**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	*2444.00	94.8 PK	114.0	-19.2	1.22 H	341	97.5	-2.7
2	*2444.00	47.0 AV	94.0	-47.0	1.22 H	341	49.7	-2.7
3	4888.00	53.2 PK	74.0	-20.8	1.02 H	238	51.1	2.1
4	4888.00	5.4 AV	54.0	-48.6	1.02 H	238	3.3	2.1
5	7332.00	50.2 PK	74.0	-23.8	1.09 H	317	42.6	7.6
6	7332.00	2.4 AV	54.0	-51.6	1.09 H	317	-5.2	7.6

**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.
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:  
 $20 \log(\text{Duty cycle}) = 20 \log(0.126 \text{ ms} / 30.974 \text{ ms}) = -47.8 \text{ dB}$

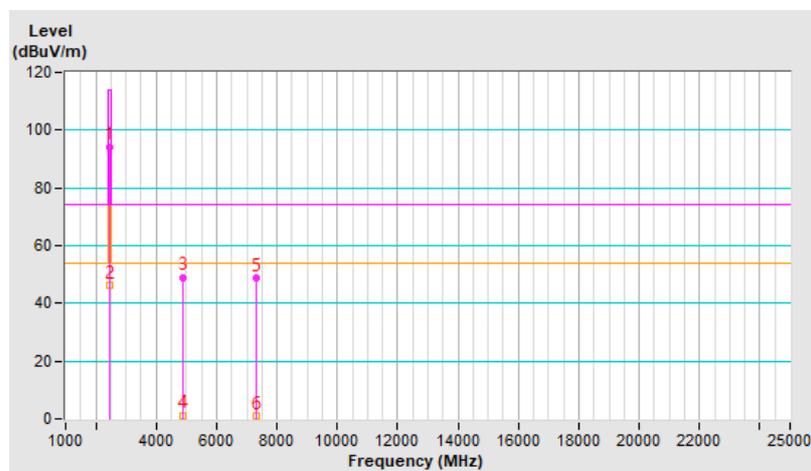


<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 8 : 2444 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	Peak (PK), RB = 1 MHz, VB = 3 MHz RMS (AV), RB = 1 MHz, VB = 3 MHz

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	*2444.00	93.9 PK	114.0	-20.1	1.05 V	36	96.6	-2.7
2	*2444.00	46.1 AV	94.0	-47.9	1.05 V	36	48.8	-2.7
3	4888.00	48.9 PK	74.0	-25.1	1.20 V	22	46.8	2.1
4	4888.00	1.1 AV	54.0	-52.9	1.20 V	22	-1.0	2.1
5	7332.00	48.6 PK	74.0	-25.4	2.09 V	61	41.0	7.6
6	7332.00	0.8 AV	54.0	-53.2	2.09 V	61	-6.8	7.6

**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.
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:  
 $20 \log(\text{Duty cycle}) = 20 \log(0.126 \text{ ms} / 30.974 \text{ ms}) = -47.8 \text{ dB}$



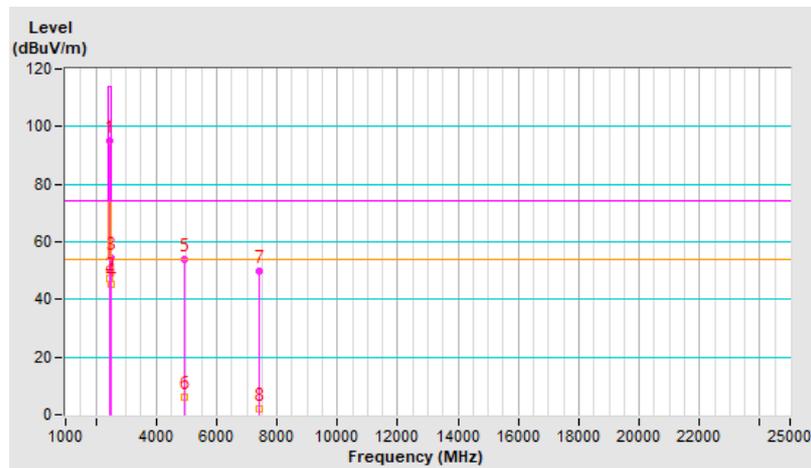
<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 12 : 2474 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	Peak (PK), RB = 1 MHz, VB = 3 MHz RMS (AV), RB = 1 MHz, VB = 3 MHz

**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	*2474.00	95.3 PK	114.0	-18.7	1.21 H	342	97.9	-2.6
2	*2474.00	47.5 AV	94.0	-46.5	1.21 H	342	50.1	-2.6
3	2483.50	54.4 PK	74.0	-19.6	1.21 H	342	57.0	-2.6
4	2483.50	45.4 AV	54.0	-8.6	1.21 H	342	48.0	-2.6
5	4948.00	53.9 PK	74.0	-20.1	1.00 H	244	51.7	2.2
6	4948.00	6.1 AV	54.0	-47.9	1.00 H	244	3.9	2.2
7	7422.00	50.0 PK	74.0	-24.0	1.11 H	311	42.4	7.6
8	7422.00	2.2 AV	54.0	-51.8	1.11 H	311	-5.4	7.6

**Remarks:**

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
- Margin value = Emission Level – Limit value
- The other emission levels were very low against the limit.
- " \* " : Fundamental frequency.
- 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:  
 $20 \log(\text{Duty cycle}) = 20 \log(0.126 \text{ ms} / 30.974 \text{ ms}) = -47.8 \text{ dB}$

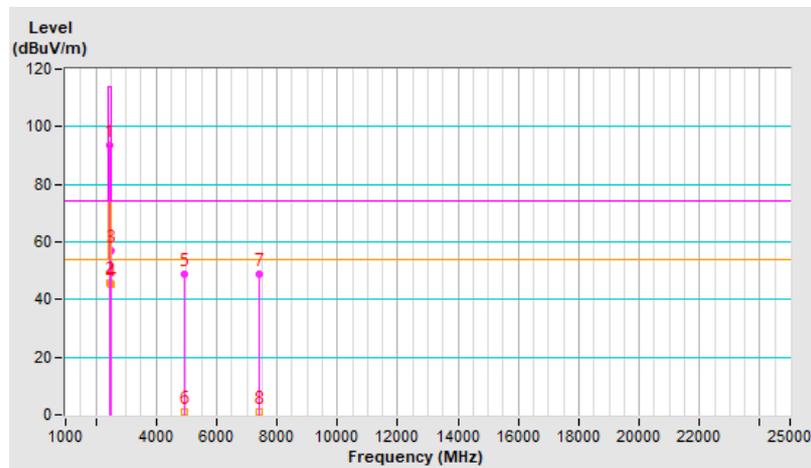


<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 12 : 2474 MHz
<b>Frequency Range</b>	1 GHz ~ 25 GHz	<b>Detector Function &amp; Bandwidth</b>	Peak (PK), RB = 1 MHz, VB = 3 MHz RMS (AV), RB = 1 MHz, VB = 3 MHz

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	*2474.00	93.4 PK	114.0	-20.6	1.01 V	28	96.0	-2.6
2	*2474.00	45.6 AV	94.0	-48.4	1.01 V	28	48.2	-2.6
3	2483.50	57.0 PK	74.0	-17.0	1.01 V	28	59.6	-2.6
4	2483.50	45.3 AV	54.0	-8.7	1.01 V	28	47.9	-2.6
5	4948.00	49.0 PK	74.0	-25.0	1.16 V	22	46.8	2.2
6	4948.00	1.2 AV	54.0	-52.8	1.16 V	22	-1.0	2.2
7	7422.00	48.9 PK	74.0	-25.1	2.13 V	52	41.3	7.6
8	7422.00	1.1 AV	54.0	-52.9	2.13 V	52	-6.5	7.6

**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.
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:  
 $20 \log(\text{Duty cycle}) = 20 \log(0.126 \text{ ms} / 30.974 \text{ ms}) = -47.8 \text{ dB}$



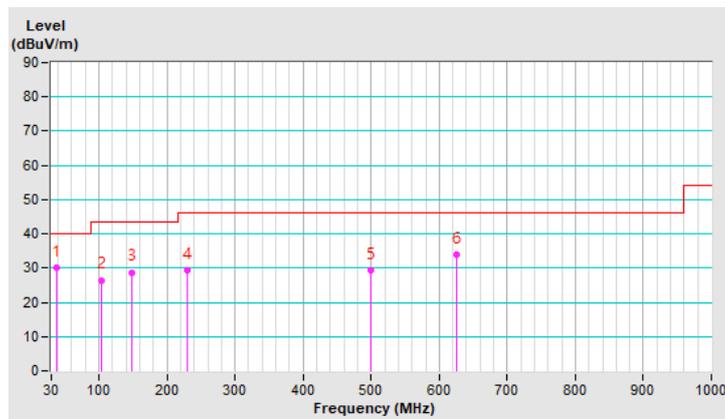
### Below 1GHz Data:

<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 12 : 2474 MHz
<b>Frequency Range</b>	30 MHz ~ 1 GHz	<b>Detector Function &amp; Bandwidth</b>	Quasi-Peak (QP), RB = 120kHz

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	37.61	30.0 QP	40.0	-10.0	2.00 H	282	43.3	-13.3
2	104.40	26.5 QP	43.5	-17.0	2.00 H	121	43.1	-16.6
3	148.05	28.8 QP	43.5	-14.7	2.00 H	114	41.4	-12.6
4	229.25	29.2 QP	46.0	-16.8	1.50 H	255	44.6	-15.4
5	499.41	29.3 QP	46.0	-16.7	2.00 H	266	36.8	-7.5
6	625.66	33.8 QP	46.0	-12.2	1.50 H	266	38.4	-4.6

### 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.

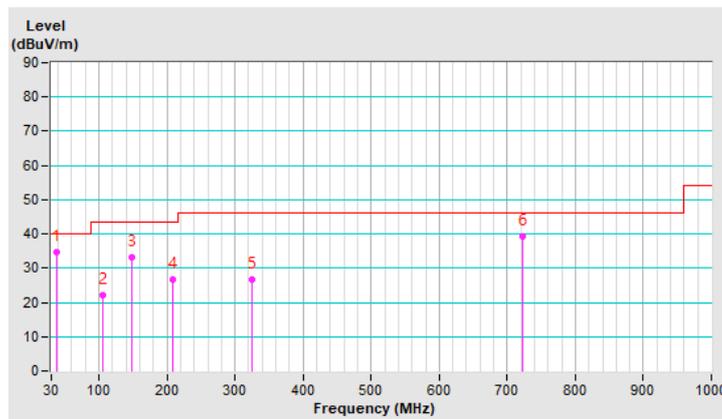


<b>RF Mode</b>	GFSK	<b>Channel</b>	CH 12 : 2474 MHz
<b>Frequency Range</b>	30 MHz ~ 1 GHz	<b>Detector Function &amp; Bandwidth</b>	Quasi-Peak (QP), RB = 120kHz

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	37.76	34.6 QP	40.0	-5.4	2.00 V	1	47.9	-13.3
2	105.47	22.0 QP	43.5	-21.5	2.00 V	269	38.5	-16.5
3	147.76	33.1 QP	43.5	-10.4	1.00 V	318	45.7	-12.6
4	209.22	26.6 QP	43.5	-16.9	2.00 V	254	42.7	-16.1
5	325.33	26.7 QP	46.0	-19.3	1.00 V	0	38.0	-11.3
6	723.54	39.2 QP	46.0	-6.8	1.50 V	51	42.4	-3.2

**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.



## 5 Pictures of Test Arrangements

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

## Appendix – 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.

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

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

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