# Test Report

**Date : 2020-03-02** 
**No. : HP20010809**

| | |
|---|---|
| **Applicant:** | BANDAI (SHENZHEN) CO., LTD.<br>13/F., Dingfeng Building, No. 1036, Baoan Nan Rd., Luohu District, Shenzhen, China |
| **Manufacturer:** | Idea Kids<br>Mao Wan Industrial District, San Xiang Town, Zhong Shan City, Guangdong, China |
| **Description of Sample(s):** | Product: Complete selection modification KIVATTO BELT<br>Brand Name: BANDAI<br>Model Number: 2509230<br>FCC ID: PQ32509230 |
| **Date Sample(s) Received:** | 2020-02-18 |
| **Date Tested:** | 2020-02-25 to 2020-02-28 |
| **Investigation Requested:** | Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2018 and ANSI C63.10:2013 for FCC Certification. |
| **Conclusion(s):** | The submitted product COMPLIED with the requirements of Federal Communications Commission [FCC] Rules and Regulations Part 15. The tests were performed in accordance with the standards described above and on Section 2.2 in this Test Report. |
| **Remark(s):** | --- |

LEUNG Kwun Hang, Joey
Authorized Signatory

# Test Report



**CONTENT:**

## 1.0 General Details

### 1.1 Equipment Under Test [EUT]
**Description of Sample(s)**

| | |
|---|---|
| Product: | Complete selection modification KIVATTO BELT |
| Manufacturer: | Idea Kids |
| Brand Name: | BANDAI |
| Model Number: | 2509230 |
| Rating: | AAA x 2 = 3.0Vd.c |

### 1.2 Description of EUT Operation

The Equipment Under Test (EUT) is 2.4GHz RF Transmitter Toy, which is 2.4GHz transceiver fixed transmit at 2477MHz, modulation is GFSK type which is provided by IC.

### 1.3 Date of Order

2020-02-18

### 1.4 Submitted Sample(s):

1 Sample

### 1.5 Test Duration

2020-02-25 to 2020-02-28

### 1.6 Country of Origin

China

## 2.0 Technical Details

### 2.1 Investigations Requested

Perform Electromagnetic Interference measurements in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2017 Regulations and ANSI C63.10:2013 for FCC Certification.

### 2.2 Test Standards and Results Summary Tables

| EMISSION<br>Results Summary | | | | | |
|---|---|---|---|---|---|
| Test Condition | Test Requirement | Test Method | Class / Severity | Test Result | |
| | | | | Pass | Fail |
| Field Strength of Fundamental & Harmonics Emissions | FCC 47CFR 15.249 | ANSI C63.10:2013 | N/A | ☒ | ☐ |
| AC power-line conducted emissions | FCC 47CFR 15.207 | ANSI C63.10:2013 | N/A | N/A | |
| 20 dB Bandwidth | FCC 47CFR 15.215 | ANSI C63.10:2013 | N/A | ☒ | ☐ |
| Radio Frequency powered Tags | FCC 47CFR 15.225(f) | ANSI C63.10:2013 | N/A | N/A | |
| Antenna requirement | FCC 47CFR 15.203 | N/A | N/A | ☒ | ☐ |
| Radiated Emissions | FCC 47CFR 15.209 | ANSI C63.10:2013 | N/A | ☒ | ☐ |

Note: N/A - Not Applicable

## 3.0 Test Results

### 3.1 Emission

#### 3.1.1 Field Strength of Fundamental & Harmonics Emissions

| | |
|---|---|
| Test Requirement: | FCC 47CFR 15.249 |
| Test Method: | ANSI C63.10:2013 |
| Test Date: | 2020-02-26 |
| Mode of Operation: | Tx Test mode |

**Test Method:**

For emission measurements at or below 1 GHz, the sample was placed 0.8m above the ground plane of semi-anechoic Chamber*. For emission measurements above 1 GHz, the sample was placed 1.5m above the ground plane of semi-anechoic Chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. In the frequency range of 9kHz to 30MHz, The center of the loop antenna shall be 1 meter above the ground and rotated loop axis for maximum reading. The emissions worst-case are shown in Test Results of the following pages.

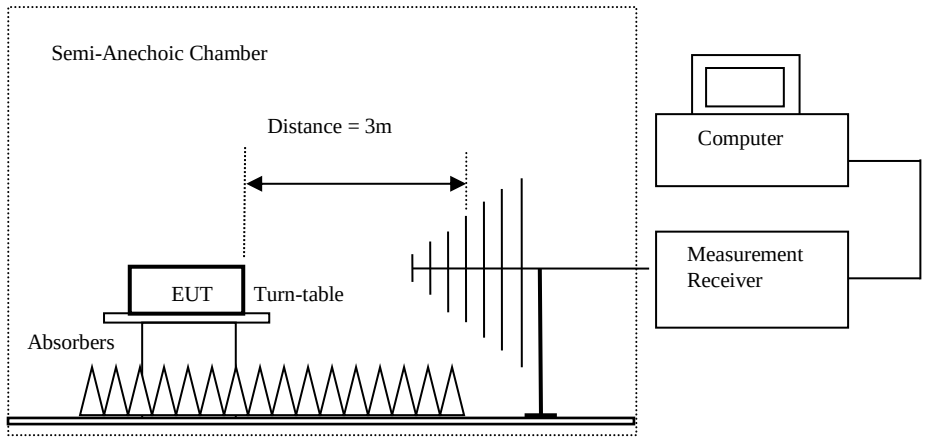
Remark: 3 orthogonal axis apply to hand-held device only.

*: Semi-anechoic chamber located on the G/F of The Hong Kong Standards and Testing Centre Ltd.
FCC Test Firm Registration Number 723883
Designation Number HK0001

**Spectrum Analyzer Setting:**

| | | |
|---|---|---|
| 9KHz – 30MHz (Pk & Av) | RBW: | 10kHz |
| | VBW: | 30kHz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |
| 30MHz – 1GHz (QP) | RBW: | 120kHz |
| | VBW: | 120kHz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |
| Above 1GHz (Pk & Av) | RBW: | 3MHz |
| | VBW: | 3MHz |
| | Sweep: | Auto |
| | Span: | Fully capture the emissions being measured |
| | Trace: | Max. hold |

**Test Setup:**



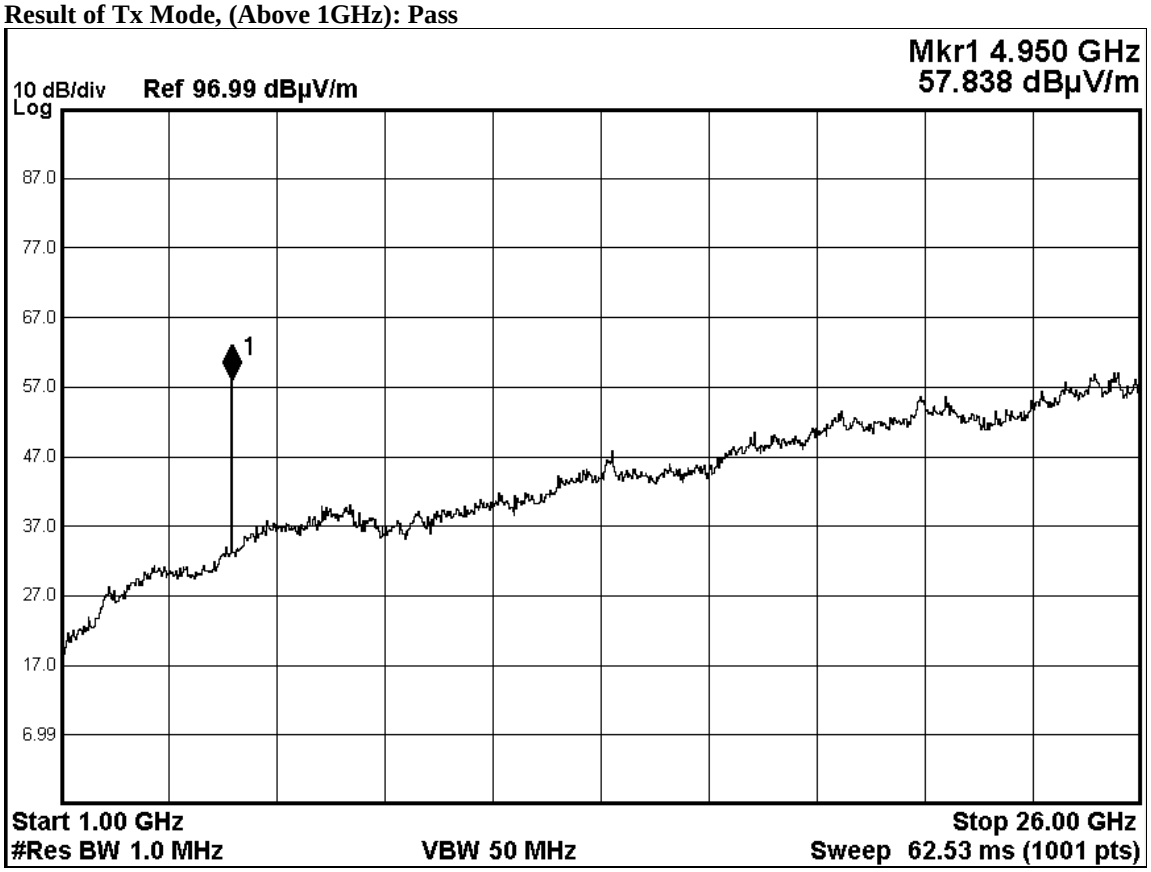

Ground Plane

- Absorbers placed on top of the ground plane are for measurements above 1000MHz only.
- Measurements between 30MHz to 1000MHz made with Bi-log antennas, above 1000MHz horn antennas are used,
9kHz to 30MHz loop antennas are used.
-For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground

**Limits for Field Strength of Fundamental & Harmonics Emissions [FCC 47CFR 15.249]:**

| Fundamental frequency [MHz] | 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 |
| 24.0-24.25 GHz | 250 | 2500 |

**Result of Tx Mode, (Above 1GHz): Pass**



**Result of TX mode, (Above 1GHz): Pass**

| Field Strength of Fundamental and Harmonics Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV/m | Correction Factor dBµV/m | Field Strength dBµV/m | Field Strength µV/m | Limit @3m µV/m | E-Field Polarity |
| 2477.0 | 57.3 | 27.9 | 85.2 | 18,197.0 | 500,000 | Vertical |
| * 4950.0 | 25.7 | 32.1 | 57.8 | 776.2 | 5,000 | Vertical |
| 7431.0 | 3.4 | 38.6 | 42.0 | 125.9 | 5,000 | Vertical |
| 9908.0 | Emissions detected are more than 20 dB below the FCC Limits | | | | 5,000 | Vertical |
| * 12385.0 | | | | | 5,000 | Vertical |
| 14862.0 | | | | | 5,000 | Vertical |
| 17339.0 | | | | | 5,000 | Vertical |
| * 19816.0 | | | | | 5,000 | Vertical |
| 22293.0 | | | | | 5,000 | Vertical |
| 24770.0 | | | | | 5,000 | Vertical |

| Field Strength of Fundamental and Harmonics Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV/m | Correction Factor dBµV/m | Field Strength dBµV/m | Field Strength µV/m | Limit @3m µV/m | E-Field Polarity |
| 2477.0 | 4.8 | 27.9 | 32.7 | 43.2 | 50,000 | Vertical |
| * 4950.0 | 1.1 | 32.1 | 33.2 | 45.7 | 500 | Vertical |
| 7431.0 | -1.3 | 38.6 | 37.3 | 73.3 | 500 | Vertical |
| 9908.0 | Emissions detected are more than 20 dB below the FCC Limits | | | | 500 | Vertical |
| * 12385.0 | | | | | 500 | Vertical |
| 14862.0 | | | | | 500 | Vertical |
| 17339.0 | | | | | 500 | Vertical |
| * 19816.0 | | | | | 500 | Vertical |
| 22293.0 | | | | | 500 | Vertical |
| 24770.0 | | | | | 500 | Vertical |

Remarks: The fundamental frequency was not included in the pre-scan plot, a 2.4G notch filter was added prior to the Receiver, please refer the band-edge plot for the level of fundamental frequency.

**No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz**

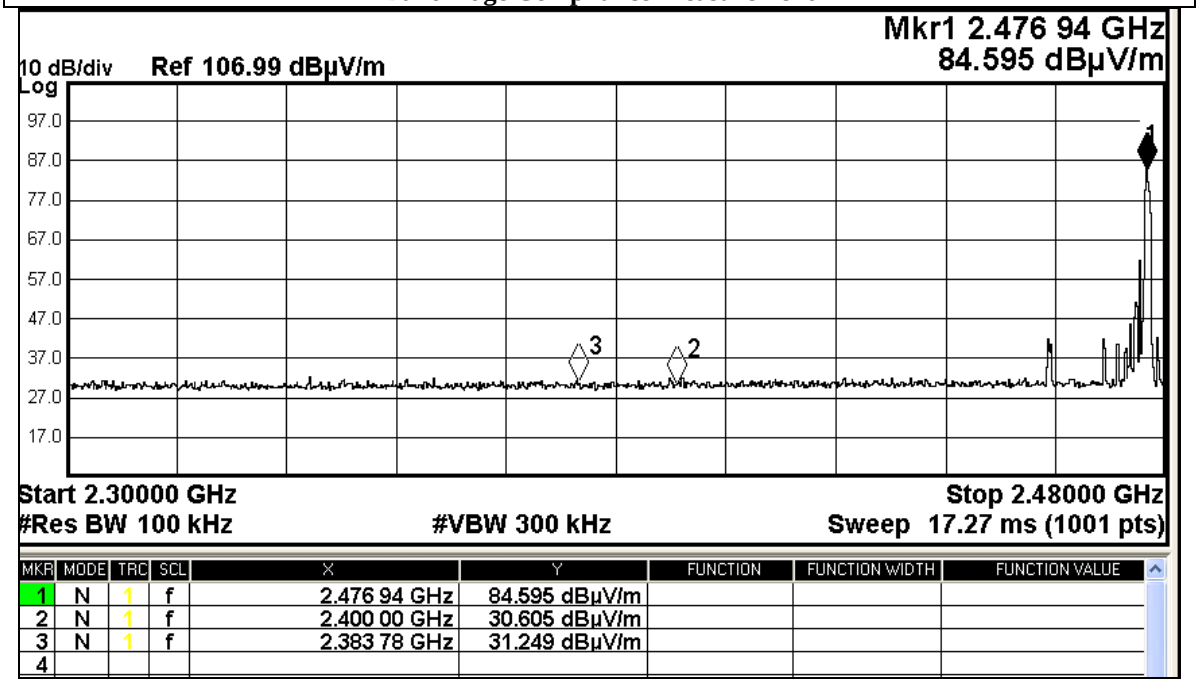
***: Denotes restricted band of operation.**
**Measurements were made using a peak detector. Any emission less than 1000 MHz and falling within the restricted bands of FCC Rules Part 15 Section 15.205 and the limits of FCC Rules Part 15 Section 15.209 were applied.**

**Calculated measurement uncertainty :** **9kHz to 30MHz: 2.4dB**
**30MHz to 18GHz: 5.0dB**
**18GHz – 26.5Hz: 5.24dB**

**Band Edge Measurement:**

| Frequency Range [MHz] | Radiated Emission Attenuated below the Fundamental [dB] |
|---|---|
| 2400MHz – Lowest Fundamental | 54.0 |

**Band Edge Compliance Measurement**

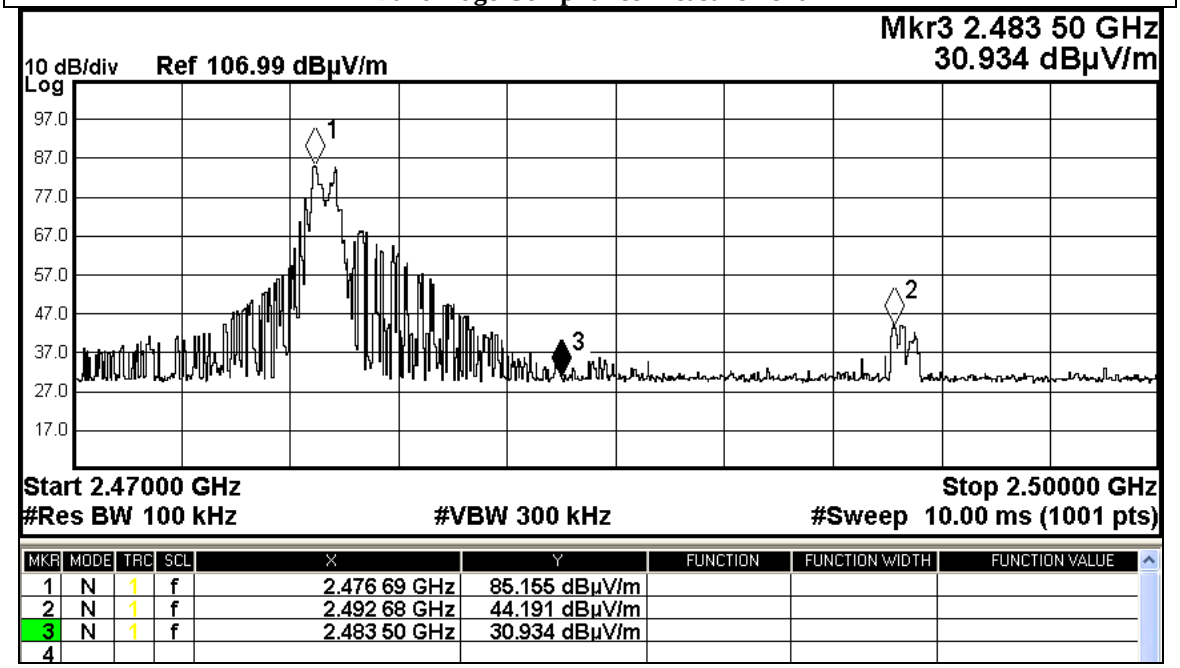



| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.476 94 GHz | 84.595 dBµV/m | | | |
| 2 | N | 1 | f | 2.400 00 GHz | 30.605 dBµV/m | | | |
| 3 | N | 1 | f | 2.383 78 GHz | 31.249 dBµV/m | | | |
| 4 | | | | | | | | |

**Band Edge Measurement:**

| Frequency Range [MHz] | Radiated Emission Attenuated below the Fundamental [dB] |
|---|---|
| Highest Fundamental – 2483.5MHz | 54.3 |

**Band Edge Compliance Measurement**




| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE |
|---|---|---|---|---|---|---|---|---|
| 1 | N | 1 | f | 2.476 69 GHz | 85.155 dBµV/m | | | |
| 2 | N | 1 | f | 2.492 68 GHz | 44.191 dBµV/m | | | |
| 3 | N | 1 | f | 2.483 50 GHz | 30.934 dBµV/m | | | |
| 4 | | | | | | | | |

**Result of TX Test mode, Band-edge measurement: PASS**

| Field Strength of Fundamental and Harmonics Emissions Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV/m | Correction Factor dBµV/m | Field Strength dBµV/m | Field Strength µV/m | Limit @3m µV/m | E-Field Polarity |
| 2383.8 | 3.3 | 27.9 | 31.2 | 36.3 | 5,000 | Vertical |
| 2492.7 | 16.2 | 27.9 | 44.1 | 160.3 | 5,000 | Vertical |

| Field Strength of Fundamental and Harmonics Emissions Average Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency MHz | Measured Level @3m dBµV/m | Correction Factor dBµV/m | Field Strength dBµV/m | Field Strength µV/m | Limit @3m µV/m | E-Field Polarity |
| 2383.8 | -2.7 | 27.9 | 25.2 | 18.2 | 500 | Vertical |
| 2492.7 | -1.9 | 27.9 | 26.0 | 20.0 | 500 | Vertical |

**Limits for Radiated Emissions [FCC 47 CFR 15.209]:**

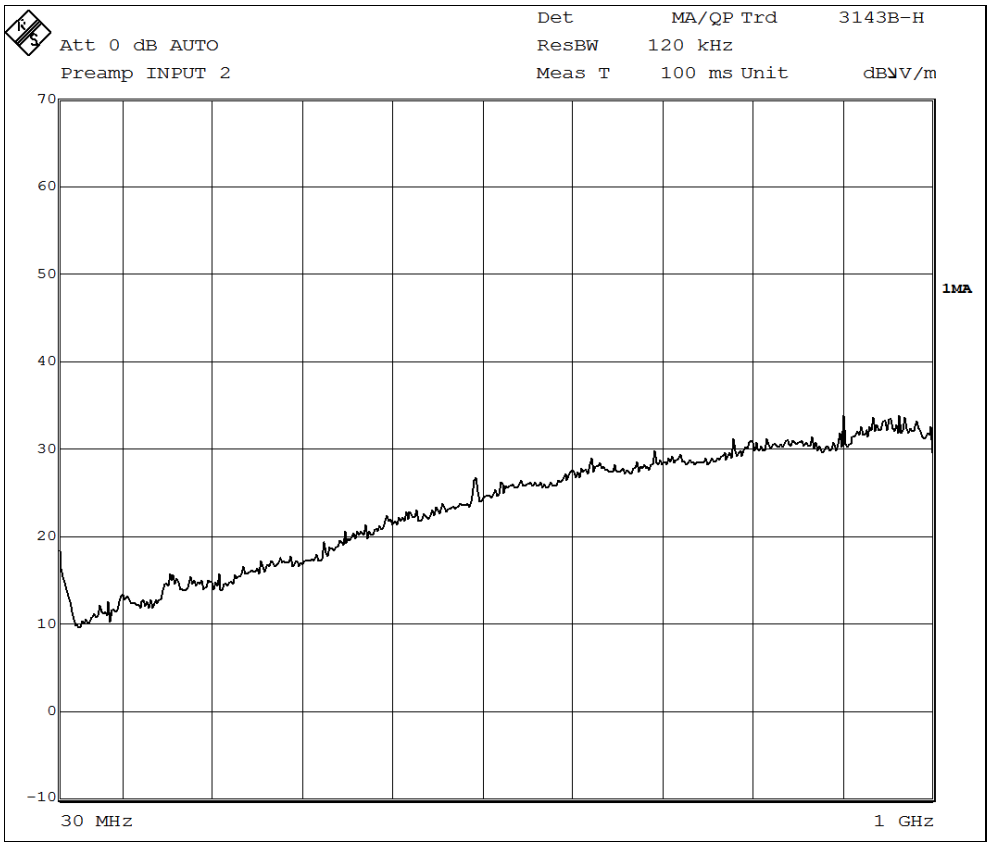
| Frequency Range [MHz] | Quasi-Peak Limits [μV/m] |
|---|---|
| 0.009-0.490 | 2400/F (kHz) |
| 0.490-1.705 | 24000/F (kHz) |
| 1.705-30 | 30 |
| 30-88 | 100 |
| 88-216 | 150 |
| 216-960 | 200 |
| Above960 | 500 |

The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

Remarks: Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate in the table below is the worst case rate with respect to the specific test item.
Investigation has been done on all the possible configurations for searching the worst cases.

**Result of TX mode, (9kHz – 30MHz): PASS**
Emissions detected are more than 20 dB below the FCC Limits

**Result of TX mode (30MHz – 1GHz): PASS**




| Field Strength of Fundamental and Harmonics Emissions<br>Quasi-Peak Value | | | | | | |
|---|---|---|---|---|---|---|
| Frequency<br>MHz | Measured Level @3m<br>dBµV/m | Correction Factor<br>dBµV/m | Field Strength<br>dBµV/m | Field Strength<br>µV/m | Limit @3m<br>µV/m | E-Field Polarity |
| 39.8 | 5.1 | 13.4 | 18.5 | 8.4 | 100 | Horizontal |
| 104.3 | 4.3 | 8.8 | 13.1 | 4.5 | 150 | Horizontal |
| 198.9 | 7.7 | 8.0 | 15.7 | 6.1 | 150 | Horizontal |
| 345.7 | 8.8 | 17.9 | 26.7 | 21.6 | 200 | Horizontal |
| 425.9 | 4.6 | 21.1 | 25.7 | 19.3 | 200 | Horizontal |
| 756.4 | 3.8 | 23.1 | 26.9 | 22.1 | 200 | Horizontal |

**Result of Receiver mode, (9kHz – 30MHz):**
Emissions detected are more than 20 dB below the FCC Limits

**Result of Receiver mode, (30MHz – 1GHz):**
Emissions detected are more than 20 dB below the FCC Limits

**Result of Receiver mode, (1GHz – 18GHz):**
Emissions detected are more than 20 dB below the FCC Limits

Remarks:

No additional spurious emissions found between lowest internal used/generated frequency and 30 MHz
Correction Factor included Antenna Factor and Cable Attenuation.

| | | | |
|---|---|---|---|
| Calculated measurement uncertainty | : | (9kHz – 30MHz): | 2.4dB |
| | | (30MHz – 18GHz): | 5.0dB |
| | | (18GHz - 26GHz): | 5.24dB |

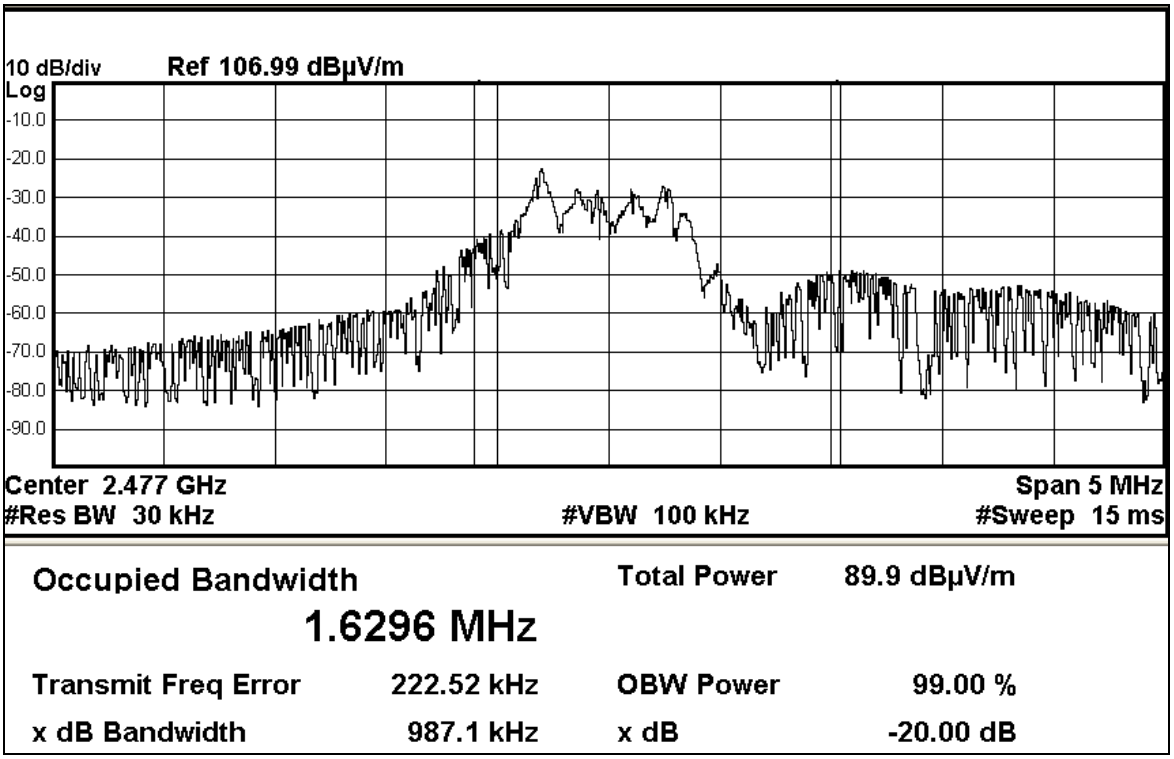
**3.1.2 20 dB Bandwidth [FCC 47 CFR 15.215]**

**Limits for 20dB Bandwidth of Fundamental Emission:**

| Frequency Range [MHz] | 20dB Bandwidth [MHz] |
|---|---|
| 2477.0 | 0.99 |

**Tx Mode**

| 20dB Bandwidth of Fundamental Emission |
|---|



### 3.1.3 Antenna Requirement

Ambient temperature 21°C Relative humidity 50%

**Test Requirements: § 15.203**

**Test Specification:**

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

**Test Results:**

This is integral antenna. There is no external antenna, the antenna gain =0dBi. User is unable to remove or changed the Antenna.

# Appendix A

## LIST OF MEASUREMENT EQUIPMENT

**Radiated Emission**

| EQP NO. | DESCRIPTION | MANUFACTURER | MODEL NO. | SERIAL NO. | LAST CAL | DUE CAL |
|---|---|---|---|---|---|---|
| EM215 | MULTIDEVICE CONTROLLER | EMCO | 2090 | 00024676 | N/A | N/A |
| EM217 | ELECTRIC POWERED TURNTABLE | EMCO | 2088 | 00029144 | N/A | N/A |
| EM218 | ANECHOIC CHAMBER | ETS-LINDGREN | FACT-3 | -- | 2019/04/24 | 2020/04/24 |
| EM356 | ANTENNA POSITIONING TOWER | ETS-LINDGREN | 2171B | 00150346 | N/A | N/A |
| EM355 | BICONILOG ANTENNA | ETS-LINDGREN | 3143B | 00201783 | 2019/03/11 | 2021/03/11 |
| EM229 | EMI TEST RECEIVER | R&S | ESIB40 | 100248 | 2019/06/11 | 2020/06/11 |
| EM299 | DOUBLE-RIDGED WAVEGUIDE HORN ANTENNA | ETS-LINDGREN | 3115 | 00114120 | 2018/04/27 | 2020/04/27 |
| EM300 | PYRAMIDAL STANDARD GAIN HORN ANTENNA | ETS-LINDGREN | 3160-09 | 00130130 | 2018/05/13 | 2020/05/13 |
| EM353 | LOOP ANTENNA | ETS_LINDGREN | 6502 | 00206533 | 2018/03/16 | 2020/03/16 |

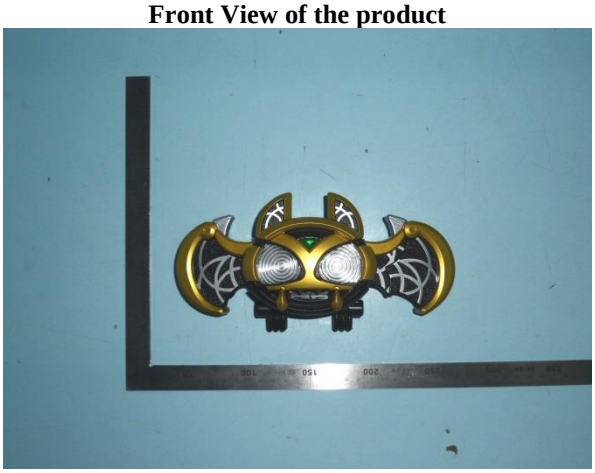
Remarks:

CM Corrective Maintenance
N/A Not Applicable or Not Available
TBD To Be Determined

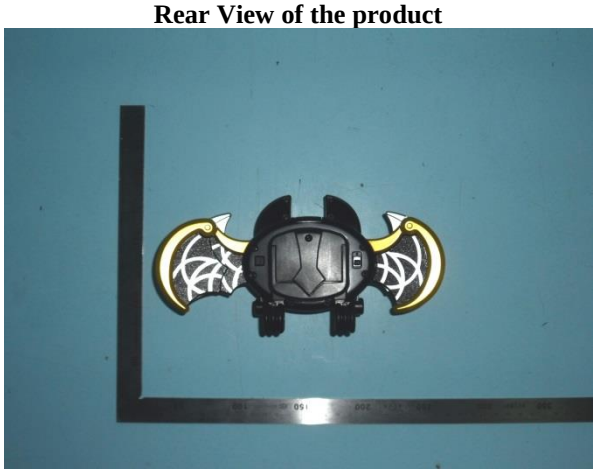
## Appendix B

**Photographs of EUT**

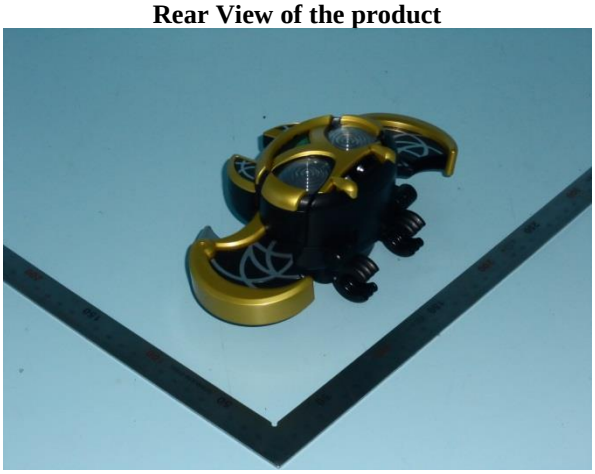
**Front View of the product**



**Rear View of the product**



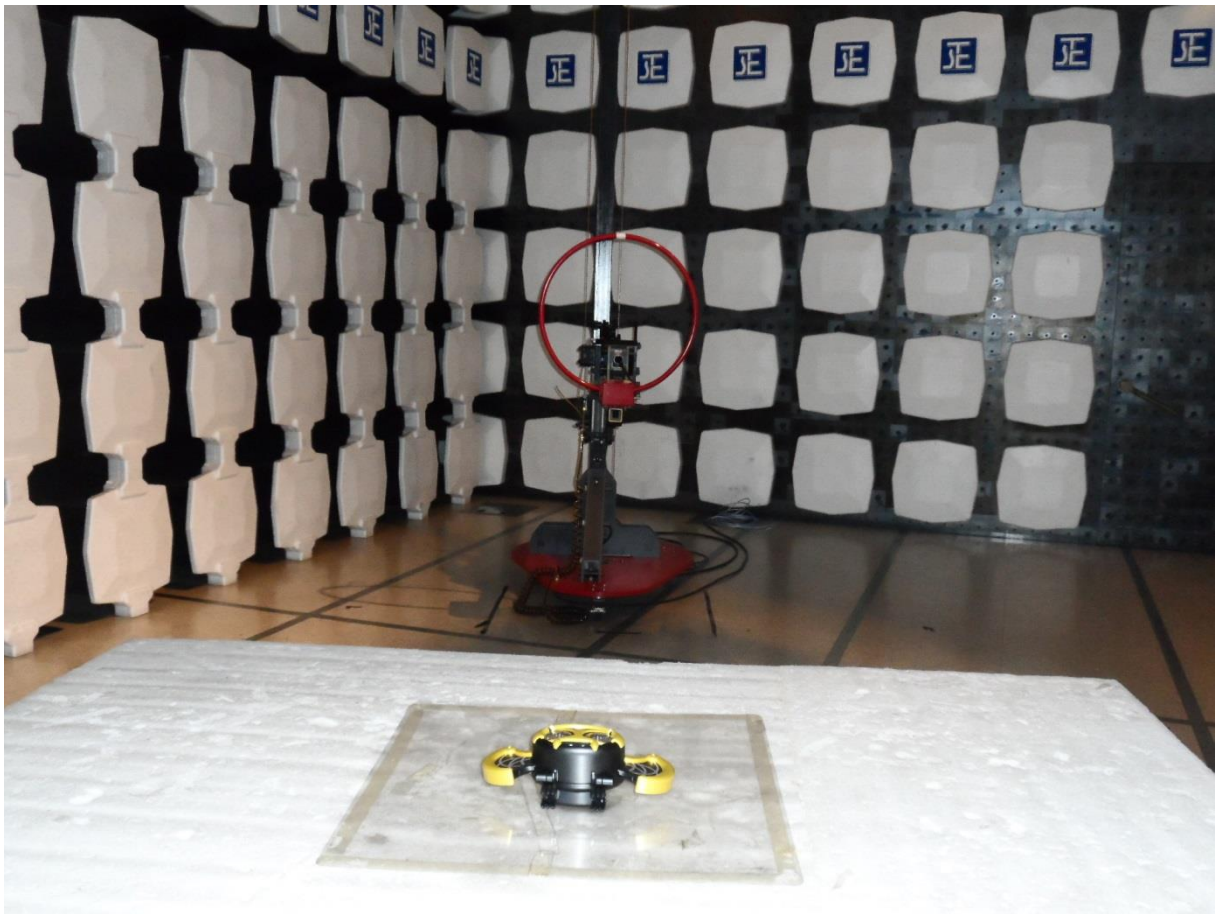
**Rear View of the product**



**Rear View of the product**

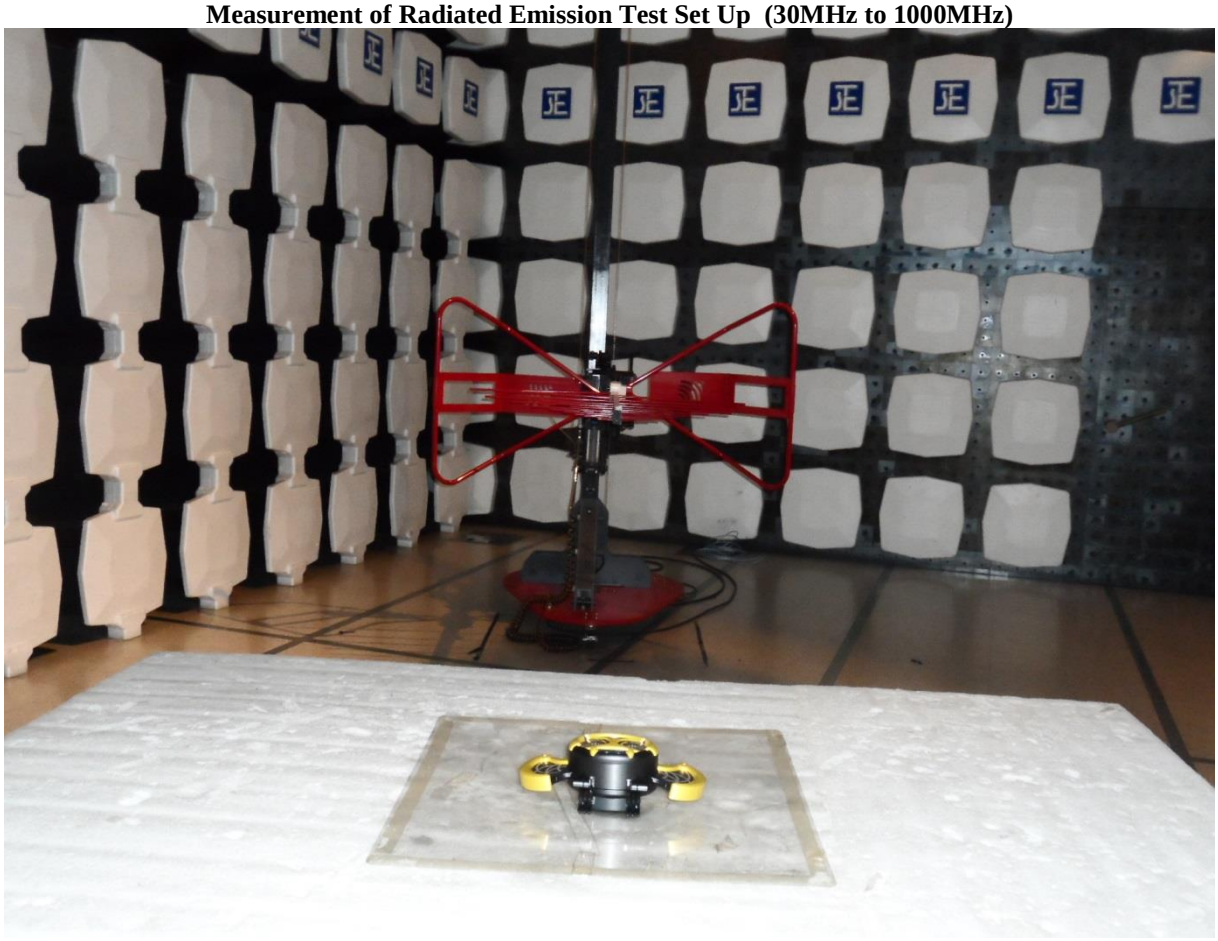
**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (9kHz to 30MHz)**



**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (30MHz to 1000MHz)**



**Photographs of EUT**

**Measurement of Radiated Emission Test Set Up (Above 1000MHz)**

******* End of Test Report *******

# Conditions of Issuance of Test Reports

1. All samples and goods are accepted by The Hong Kong Standards & Testing Centre Limited (the "Company") solely for testing and reporting in accordance with the following terms and conditions. The Company provides its services on the basis that such terms and conditions constitute express agreement between the Company and any person, firm or company requesting its services (the "Clients").

2. Any report issued by the Company as a result of this application for testing service (the "Report") shall be issued in confidence to the Clients and the Report will be strictly treated as such by the Company. It may not be reproduced either in its entirety or in part and it may not be used for advertising or other unauthorized purposes without the written consent of the Company. The Clients to whom the Report is issued may, however, show or send it, or a certified copy thereof prepared by the Company to his customer, supplier or other persons directly concerned. Subject to clause 3, the Company will not, without the consent of the Clients, enter into any discussion or correspondence with any third party concerning the contents of the Report, unless required by the relevant governmental authorities, laws or court orders.

3. The Company shall be at liberty to disclose the testing-related documents and/or files anytime to any third-party accreditation and/or recognition bodies for audit or other related purposes. No liabilities whatsoever shall attach to the Company's act of disclosure.

4. The Company shall not be called or be liable to be called to give evidence or testimony on the Report in a court of law without its prior written consent, unless required by the relevant governmental authorities, laws or court orders.

5. The results in Report apply only to the sample as received and do not apply to the bulk, unless the sampling has been carried out by the Company and is stated as such in the Report.

6. When a statement of conformity to a specification or standard is provided, the ILAC-G8 Guidance document (and/or IEC Guide 115 in the electrotechnical sector) will be adopted as a decision rule for the determination of conformity unless it is inherent in the requested specification or standard, or otherwise specified in the Report.

7. In the event of the improper use the report as determined by the Company, the Company reserves the right to withdraw it, and to adopt any other additional remedies which may be appropriate.

8. Sample submitted for testing are accepted on the understanding that the Report issued cannot form the basis of, or be the instrument for, any legal action against the Company.

9. The Company will not be liable for or accept responsibility for any loss or damage howsoever arising from the use of information contained in any of its Reports or in any communication whatsoever about its said tests or investigations.

10. Clients wishing to use the Report in court proceedings or arbitration shall inform the Company to that effect prior to submitting the sample for testing.

11. Subject to the variable length of retention time for test data and report stored hereinto as to otherwise specifically required by individual accreditation authorities, the Company will only keep the supporting test data and information of this test report for a period of three years. The data and information will be disposed of after the aforementioned retention period has elapsed. Under no circumstances shall we provide any data and information which has been disposed of after the retention period. Under no circumstances shall we be liable for damages of any kind, including (but not limited to) compensatory damages, lost profits, lost data, or any form of special, incidental, indirect, consequential or punitive damages of any kind, whether based on breach of contract of warranty, tort (including negligence), product liability or otherwise, even if we are informed in advance of the possibility of such damages.

12. Issuance records of the Report are available on the internet at www.stc.group. Further enquiry of validity or verification of the Reports should be addressed to the Company.