

# TEST REPORT

| To:             | HALLMARK   |                | To:  | -                            |
|-----------------|--|----------------|--|------------------------------|
| Attn:           | Anthony Leung  |                | Attn:  | -                            |
| Address:        | 6/F., Harbourfront Landmark, 11 Wan Hoi<br>Street, Hunghom, Kowloon, Hong Kong |                | Address:   | -                            |
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| E-mail:         |  |                | E-mail:  | -                            |
| Folder No.:     |  |                |  |                              |
| Factory name:   | FORWARD WI   | INSO           |  | LTD.                         |
| Location:       | Eltee Building, 3 Ning   | j Foo          | Street, Chai Wan,  | Hong Kong                    |
| Product:        | (Assortment: DECO<br>Moo   | RATI<br>del No | IE BROWN CONT<br>ON PEANUT CON<br>o.: XKT1501<br>umber: XKT1628) |                              |
|                 |  |                | Sample No:   | (5215)104-0595               |
|                 |  |                | Test date:   | April 20, 2015               |
|                 |  |                | Test Requested:  | FCC Part 15 - 2012           |
|                 |  |                | Test Method:   | ANSI C63.4 - 2009            |
|                 |  |                | FCC ID:  | SQ9XKT1501                   |
| The results     | given in this report are related to the teste                                  | ed sp          | ecimen of the des  | cribed electrical apparatus. |
| CONCLUSION:     | The submitted sample was found to <u>CON</u>                                   | IPLY           | with requirement   | of FCC Part 15 Subpart C.    |
|                 | Authorized S   | ignat          | ure:   |                              |
|                 |  |                |  |                              |
|                 |  |                |  |                              |
|                 | Cayh   |                | Brl  | ais                          |
| Reviewed by: Ke |  |                | ed by: Steven Tsa  | lg                           |
| Date: May 15, 2 |  |                | May 15, 2015   |                              |

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# TEST REPORT No: (5215)104-0595 Test Result Summary

| EMISSION TEST                           |             |             |        |  |  |  |  |  |  |  |
|---|-------------|-------------|--------|--|--|--|--|--|--|--|
| Test requirement: FCC Part 15 - 2012    |             |             |        |  |  |  |  |  |  |  |
| Test Condition                          | Test Method | Test        | Result |  |  |  |  |  |  |  |
| Test Condition                          | Test Method | Pass        | Failed |  |  |  |  |  |  |  |
| Radiated Emission Test,                 | ANSI C63.4  | $\boxtimes$ |        |  |  |  |  |  |  |  |
| 9kHz to 40GHz                           |             |             |        |  |  |  |  |  |  |  |
| Frequency range of Fundamental Emission | ANSI C63.4  | $\boxtimes$ |        |  |  |  |  |  |  |  |
| 26dB Bandwidth of Fundamental Emission  | ANSI C63.4  | $\boxtimes$ |        |  |  |  |  |  |  |  |
| Duty Cycle Correction During 100msec    | ANSI C63.4  | $\square$   |        |  |  |  |  |  |  |  |

**Report Revision & Sample Re-submit History:** 

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#### Location of the test laboratory

Radiated and Conducted emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009. An Open Area Test Site and Full Anechoic Chamber (FCC Listed Site, Registration No. 642151) are set up for investigation and located at :

#### BUREAU VERITAS HONG KONG LIMITED, EMC CENTRE

No. 2106-2107, 21/F., Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong

## List of measuring equipment

| Radiated Emission                    |                 |                   |              |                  |                 |  |  |  |  |
|--------------------------------------|-----------------|-------------------|--------------|------------------|-----------------|--|--|--|--|
| EQUIPMENT                            | MANUFACTURER    | MODEL NO.         | SERIAL NO.   | LAST CALIBRATION | CALIBRATION DUE |  |  |  |  |
| EMI TEST RECEIVER                    | R&S             | ESCI              | 100379       | 21-JAN-2015      | 20-JAN-2016     |  |  |  |  |
| SPECTRUM<br>ANALYZER                 | R&S             | R3127             | 111000909    | 26-MAR-2015      | 25-MAR-2016     |  |  |  |  |
| LOOP ANTENNA                         | ETS LINDGREN    | 6502              | 00102266     | 28-SEP-2014      | 27-SEP-2015     |  |  |  |  |
| BILOG ANTENNA                        | SCHAFFNER       | CBL6112D          | 25229        | 02-JAN-2015      | 02-JAN-2016     |  |  |  |  |
| HORN ANTENNA                         | SCHWARZBECK     | BBHA9120D         | 9120D-692    | 27-DEC-2014      | 26-DEC-2015     |  |  |  |  |
| OPEN AREA TEST<br>SITE               | BVCPS           | N/A               | N/A          | 07-JUL-2014      | 06-JUL-2015     |  |  |  |  |
| ANECHOIC CHAMBER                     | ALBATROSS       | M-CDC             | 80374004499B | 05-FEB-2014      | 03-FEB-2016     |  |  |  |  |
| COAXIAL CABLE                        | HUBER + SUHNER  | RG223             | N/A          | 23-DEC-2014      | 22-DEC-2015     |  |  |  |  |
| COAXIAL CABLE                        | HUBER + SUHNER  | RG214             | N/A          | 23-DEC-2014      | 22-DEC-2015     |  |  |  |  |
| Signal Analyzer 40GHz                | Rohde & Schwarz | FSV 40            | 100977       | 13-MAY-2014      | 12-MAY-2015     |  |  |  |  |
| Wideband Horn<br>Antenna 18 to 40GHz | STEATITE        | QWH-SL-18-40-K-SG | 12688        | 02-SEP-2014      | 01-SEP-2015     |  |  |  |  |
| High frequency RF cable              | Rohde & Schwarz | N/A               | N/A          | 15-SEP-2014      | 14-SEP-2015     |  |  |  |  |

#### Remarks:-

N/A : Not Applicable or Not Available

The measurement instrumentation uncertainty would be taking into consideration on each of the test result



## Equipment Under Test [EUT]

| Description of Sample:  |  |
|-------------------------|--|
| Model Name:             | DECORATION CHARLIE BROWN CONTINUITY  |
| Model Number:           | XKT1501  |
| Assortment Name:        | DECORATION PEANUT CONTINUITY   |
| Assortment Number:      | XKT1628  |
| Assortment information: | <ul> <li>This assortment include the follow items:</li> <li>1.) XKT1501: DECORATION CHARLIE BROWN CONTINUITY<br/>(FCC ID: SQ9XKT1501)</li> <li>2.) XKT1502: DECORATION LUCY CONTINUITY<br/>(FCC ID: SQ9XKT1502)</li> <li>3.) XKT1503: DECORATION WOODSTOCK CONTINUITY<br/>(FCC ID: SQ9XKT1503)</li> <li>4.) XKT1504: DECORATION LINUS CONTINUITY<br/>(FCC ID: SQ9XKT1504)</li> <li>5.) XKT1505: DECORATION SNOOPY CONTINUITY<br/>(FCC ID: SQ9XKT1505)</li> </ul> |

4.5 Vd.c. ("AAA" size battery x 3)

## Description of EUT Operation:

Rating:

The Equipment Under Test (EUT) is a **HALLMARK.** of Remote Control Transceiver. It is a 1 switch and 1 button transceiver and operating at 2412MHz to 2454MHz. The lowest, middle and highest frequencies were tested and the results are shown in the report. The EUT transmit while buttons is being pressed, Modulation by IC, and type is GFSK.

There are total 3 channels and below is the frequency list :

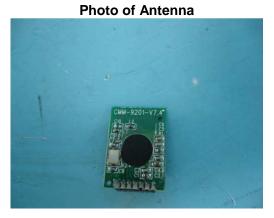
| Γ | ch.no | freq.   | ch.no | freq.   | ch.no | freq.   |
|---|-------|---------|-------|---------|-------|---------|
|   | 1     | 2412MHz | 2     | 2432MHz | 3     | 2454MHz |

The transmitter has different control:

- 1. Switch control power ON/OFF
- 2. Button control operation

#### Antenna Requirement (Section 15.203)

The EUT is use of a permanently antenna. It is the PCB trace antenna. The antenna is not replaceable or user serviceable. The requirements of S15.203 are met. There are no deviations or exceptions to the specifications.



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## **Test Results**

## **Radiated Emissions (Fundamental)**

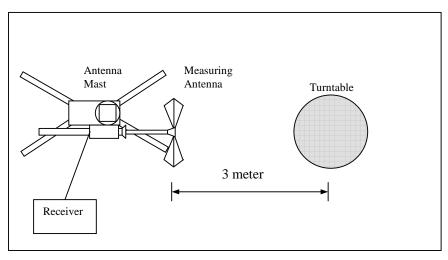
| Test Requirement:     | FCC Part 15 Section 15.249        |
|-----------------------|-----------------------------------|
| Test Method:          | ANSI C63.4                        |
| Test Date(s):         | 2015-04-20                        |
| Temperature:          | 25.0 °C                           |
| Humidity:             | 75.0 %                            |
| Atmospheric Pressure: | 100.8 kPa                         |
| Mode of Operation:    | Transmission mode                 |
| Tested Voltage:       | 4.5Vd.c. ("AAA" size battery x 3) |

#### **Test Procedure:**

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 - 2009.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. 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, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

Location: The Roof, Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong



## Test Setup: Open Area Test Site

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#### Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.249]:

| Frequency Range of | Field Strength of    | Field Strength of  |
|--------------------|----------------------|--------------------|
| Fundamental        | Fundamental Emission | Harmonics Emission |
|                    | (Average)            | (Average)          |
| [MHz]              | [mV/m]               | [µV/m]             |
| 2400-2483.5        | 50                   | 500                |

#### **Measurement Data**

## Test Result of (Transmission mode, Lowest frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 2412.00            | Н                 | 0.0  | -20.0                                | 88.0   | 114.0                                | -26.0                    | **68.0  | 94.0                                    | -26.0                       |
| 2412.00            | V                 | 0.0  | -20.0                                | 88.7   | 114.0                                | -25.3                    | **68.7  | 94.0                                    | -25.3                       |

## Test Result of (Transmission mode, Middle frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 2432.00            | Н                 | 0.0  | -20.0                                | 87.6   | 114.0                                | -26.4                    | **67.6  | 94.0                                    | -26.4                       |
| 2432.00            | V                 | 0.0  | -20.0                                | 88.9   | 114.0                                | -25.1                    | **68.9  | 94.0                                    | -25.1                       |

## Test Result of (Transmission mode, Highest frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 2454.00            | Н                 | 0.0  | -20.0                                | 88.7   | 114.0                                | -25.3                    | **68.7  | 94.0                                    | -25.3                       |
| 2454.00            | V                 | 0.0  | -20.0                                | 90.2   | 114.0                                | -23.8                    | **70.2  | 94.0                                    | -23.8                       |

# For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

\*\*Duty Cycle Correction = 20Log(0.057) = -24.8dB.

\*\*Therefore, -20dB is taken.

Note: Field Strength includes Antenna Factor and Cable Loss. Receiver setting: RBW = 1MHz VBW = 1MHz

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## **Radiated Emissions (Spurious Emission)**

| Test Requirement:     | FCC Part 15 Section 15.249        |
|-----------------------|-----------------------------------|
| Test Method:          | ANSI C63.4                        |
| Test Date(s):         | 2015-04-20                        |
| Temperature:          | 25.0 °C                           |
| Humidity:             | 75.0 %                            |
| Atmospheric Pressure: | 100.8 kPa                         |
| Mode of Operation:    | Transmission mode                 |
| Tested Voltage:       | 4.5Vd.c. ("AAA" size battery x 3) |

#### **Measurement Data**

## Test Result of (Transmission mode, Lowest frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 4824.00            | Н                 | 5.9  | -20.0                                | 56.4   | 74.0                                 | -17.6                    | **36.4  | 54.0                                    | -17.6                       |
| 7236.00            | Н                 | 12.7   | -20.0                                | 52.5   | 74.0                                 | -21.5                    | **32.5  | 54.0                                    | -21.5                       |
| 9648.00            | Н                 | 16.4   | -20.0                                | 62.7   | 74.0                                 | -11.3                    | **42.7  | 54.0                                    | -11.3                       |
| 12060.00           | Н                 | 18.4   | -20.0                                | 53.7   | 74.0                                 | -20.3                    | **33.7  | 54.0                                    | -20.3                       |
| 14472.00           | Н                 | 23.2   | -20.0                                | 61.7   | 74.0                                 | -12.3                    | **41.7  | 54.0                                    | -12.3                       |
| 16884.00           | Н                 | 22.0   | -20.0                                | 61.5   | 74.0                                 | -12.5                    | **41.5  | 54.0                                    | -12.5                       |
| 19296.00           | Н                 | 46.3   | -20.0                                | 63.2   | 74.0                                 | -10.8                    | **43.2  | 54.0                                    | -10.8                       |
| 21708.00           | Н                 | 47.0   | -20.0                                | 61.8   | 74.0                                 | -12.2                    | **41.8  | 54.0                                    | -12.2                       |
| 24120.00           | Н                 | 47.5   | -20.0                                | 61.5   | 74.0                                 | -12.5                    | **41.5  | 54.0                                    | -12.5                       |
| 26532.00           | Н                 | 48.6   | -20.0                                | 64.3   | 74.0                                 | -9.7                     | **44.3  | 54.0                                    | -9.7                        |

# For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

\*\*Duty Cycle Correction = 20Log(0.057) = -24.8dB.

\*\*Therefore, -20dB is taken.

Note: Field Strength includes Antenna Factor and Cable Loss. Receiver setting: RBW = 1MHz VBW = 1MHz



#### **Measurement Data**

## Test Result of (Transmission mode, Lowest frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 4824.00            | V                 | 5.9  | -20.0                                | 60.5   | 74.0                                 | -13.5                    | **40.5  | 54.0                                    | -13.5                       |
| 7236.00            | V                 | 12.7   | -20.0                                | 52.4   | 74.0                                 | -21.6                    | **32.4  | 54.0                                    | -21.6                       |
| 9648.00            | V                 | 16.4   | -20.0                                | 57.9   | 74.0                                 | -16.1                    | **37.9  | 54.0                                    | -16.1                       |
| 12060.00           | V                 | 18.4   | -20.0                                | 54.7   | 74.0                                 | -19.3                    | **34.7  | 54.0                                    | -19.3                       |
| 14472.00           | V                 | 23.2   | -20.0                                | 61.6   | 74.0                                 | -12.4                    | **41.6  | 54.0                                    | -12.4                       |
| 16884.00           | V                 | 22.0   | -20.0                                | 61.9   | 74.0                                 | -12.1                    | **41.9  | 54.0                                    | -12.1                       |
| 19296.00           | V                 | 46.3   | -20.0                                | 64.4   | 74.0                                 | -9.6                     | **44.4  | 54.0                                    | -9.6                        |
| 21708.00           | V                 | 47.0   | -20.0                                | 62.6   | 74.0                                 | -11.4                    | **42.6  | 54.0                                    | -11.4                       |
| 24120.00           | V                 | 47.5   | -20.0                                | 63.3   | 74.0                                 | -10.7                    | **43.3  | 54.0                                    | -10.7                       |
| 26532.00           | V                 | 48.6   | -20.0                                | 62.3   | 74.0                                 | -11.7                    | **42.3  | 54.0                                    | -11.7                       |

# For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation. \*\*Duty Cycle Correction = 20Log(0.057) = -24.8dB.

\*\*Therefore, -20dB is taken.

Note: Field Strength includes Antenna Factor and Cable Loss. Receiver setting:

RBW = 1MHz

VBW = 1MHz

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## Measurement Data Test Result of (Transmission mode, Middle frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 4864.00            | Н                 | 5.9  | -20.0                                | 54.5   | 74.0                                 | -19.5                    | **34.5  | 54.0                                    | -19.5                       |
| 7296.00            | Н                 | 12.7   | -20.0                                | 52.7   | 74.0                                 | -21.3                    | **32.7  | 54.0                                    | -21.3                       |
| 9728.00            | Н                 | 16.4   | -20.0                                | 62.0   | 74.0                                 | -12.0                    | **42.0  | 54.0                                    | -12.0                       |
| 12160.00           | Н                 | 18.4   | -20.0                                | 54.7   | 74.0                                 | -19.3                    | **34.7  | 54.0                                    | -19.3                       |
| 14592.00           | Н                 | 25.0   | -20.0                                | 61.2   | 74.0                                 | -12.8                    | **41.2  | 54.0                                    | -12.8                       |
| 17024.00           | Н                 | 27.2   | -20.0                                | 62.0   | 74.0                                 | -12.0                    | **42.0  | 54.0                                    | -12.0                       |
| 19456.00           | Н                 | 46.4   | -20.0                                | 62.4   | 74.0                                 | -11.6                    | **42.4  | 54.0                                    | -11.6                       |
| 21888.00           | Н                 | 47.0   | -20.0                                | 60.9   | 74.0                                 | -13.1                    | **40.9  | 54.0                                    | -13.1                       |
| 24320.00           | Н                 | 47.9   | -20.0                                | 62.2   | 74.0                                 | -11.8                    | **42.2  | 54.0                                    | -11.8                       |
| 26752.00           | Н                 | 48.5   | -20.0                                | 62.7   | 74.0                                 | -11.3                    | **42.7  | 54.0                                    | -11.3                       |

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 4864.00            | V                 | 5.9  | -20.0                                | 55.7   | 74.0                                 | -18.3                    | **35.7  | 54.0                                    | -18.3                       |
| 7296.00            | V                 | 12.7   | -20.0                                | 53.6   | 74.0                                 | -20.4                    | **33.6  | 54.0                                    | -20.4                       |
| 9728.00            | V                 | 16.4   | -20.0                                | 59.4   | 74.0                                 | -14.6                    | **39.4  | 54.0                                    | -14.6                       |
| 12160.00           | V                 | 18.4   | -20.0                                | 55.0   | 74.0                                 | -19.0                    | **35.0  | 54.0                                    | -19.0                       |
| 14592.00           | V                 | 25.0   | -20.0                                | 62.9   | 74.0                                 | -11.1                    | **42.9  | 54.0                                    | -11.1                       |
| 17024.00           | V                 | 27.2   | -20.0                                | 62.2   | 74.0                                 | -11.8                    | **42.2  | 54.0                                    | -11.8                       |
| 19456.00           | V                 | 46.4   | -20.0                                | 62.3   | 74.0                                 | -11.7                    | **42.3  | 54.0                                    | -11.7                       |
| 21888.00           | V                 | 47.0   | -20.0                                | 61.9   | 74.0                                 | -12.1                    | **41.9  | 54.0                                    | -12.1                       |
| 24320.00           | V                 | 47.9   | -20.0                                | 62.5   | 74.0                                 | -11.5                    | **42.5  | 54.0                                    | -11.5                       |
| 26752.00           | V                 | 48.5   | -20.0                                | 63.5   | 74.0                                 | -10.5                    | **43.5  | 54.0                                    | -10.5                       |

# For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

\*\*Duty Cycle Correction = 20Log(0.057) = -24.8dB.

\*\*Therefore, -20dB is taken.

Note: Field Strength includes Antenna Factor and Cable Loss. Receiver setting: RBW = 1MHz

VBW = 1MHz

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## Measurement Data Test Result of (Transmission mode, Highest frequency): PASS

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 4908.00            | Н                 | 5.9  | -20.0                                | 54.1   | 74.0                                 | -19.9                    | **34.1  | 54.0                                    | -19.9                       |
| 7362.00            | Н                 | 12.7   | -20.0                                | 52.5   | 74.0                                 | -21.5                    | **32.5  | 54.0                                    | -21.5                       |
| 9816.00            | Н                 | 16.4   | -20.0                                | 58.0   | 74.0                                 | -16.0                    | **38.0  | 54.0                                    | -16.0                       |
| 12270.00           | Н                 | 18.6   | -20.0                                | 55.1   | 74.0                                 | -18.9                    | **35.1  | 54.0                                    | -18.9                       |
| 14724.00           | Н                 | 25.0   | -20.0                                | 61.3   | 74.0                                 | -12.7                    | **41.3  | 54.0                                    | -12.7                       |
| 17178.00           | Н                 | 27.2   | -20.0                                | 62.9   | 74.0                                 | -11.1                    | **42.9  | 54.0                                    | -11.1                       |
| 19632.00           | Н                 | 46.6   | -20.0                                | 63.8   | 74.0                                 | -10.2                    | **43.8  | 54.0                                    | -10.2                       |
| 22086.00           | Н                 | 47.0   | -20.0                                | 63.0   | 74.0                                 | -11.0                    | **43.0  | 54.0                                    | -11.0                       |
| 24540.00           | Н                 | 48.1   | -20.0                                | 62.0   | 74.0                                 | -12.0                    | **42.0  | 54.0                                    | -12.0                       |
| 26994.00           | Н                 | 48.4   | -20.0                                | 62.6   | 74.0                                 | -11.4                    | **42.6  | 54.0                                    | -11.4                       |

| Frequency<br>(MHz) | Polarity<br>(H/V) | Antenna<br>Factor &<br>Cable<br>Loss<br>(dB/m) | Duty-<br>cycle<br>correction<br>(dB) | Field<br>Strength<br>at 3m –<br>Peak<br>(dBµV/m) | Limit at<br>3m –<br>Peak<br>(dBµV/m) | Margin -<br>Peak<br>(dB) | Field<br>Strength<br>at 3m –<br>Average<br>(dBµV/m) | Limit at<br>3m –<br>Average<br>(dBµV/m) | Margin -<br>Average<br>(dB) |
|--------------------|-------------------|--|--------------------------------------|--|--------------------------------------|--------------------------|---|---|-----------------------------|
| 4908.00            | V                 | 5.9  | -20.0                                | 53.9   | 74.0                                 | -20.1                    | **33.9  | 54.0                                    | -20.1                       |
| 7362.00            | V                 | 12.7   | -20.0                                | 51.1   | 74.0                                 | -22.9                    | **31.1  | 54.0                                    | -22.9                       |
| 9816.00            | V                 | 16.4   | -20.0                                | 56.9   | 74.0                                 | -17.1                    | **36.9  | 54.0                                    | -17.1                       |
| 12270.00           | V                 | 18.6   | -20.0                                | 55.5   | 74.0                                 | -18.5                    | **35.5  | 54.0                                    | -18.5                       |
| 14724.00           | V                 | 25.0   | -20.0                                | 61.7   | 74.0                                 | -12.3                    | **41.7  | 54.0                                    | -12.3                       |
| 17178.00           | V                 | 27.2   | -20.0                                | 62.4   | 74.0                                 | -11.6                    | **42.4  | 54.0                                    | -11.6                       |
| 19632.00           | V                 | 46.6   | -20.0                                | 64.0   | 74.0                                 | -10.0                    | **44.0  | 54.0                                    | -10.0                       |
| 22086.00           | V                 | 47.0   | -20.0                                | 61.7   | 74.0                                 | -12.3                    | **41.7  | 54.0                                    | -12.3                       |
| 24540.00           | V                 | 48.1   | -20.0                                | 62.6   | 74.0                                 | -11.4                    | **42.6  | 54.0                                    | -11.4                       |
| 26994.00           | V                 | 48.4   | -20.0                                | 63.7   | 74.0                                 | -10.3                    | **43.7  | 54.0                                    | -10.3                       |

# For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

\*\*Duty Cycle Correction = 20Log(0.057) = -24.8dB.

\*\*Therefore, -20dB is taken.

Note: Field Strength includes Antenna Factor and Cable Loss. Receiver setting: RBW = 1MHz

VBW = 1MHz

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## Radiated Emissions (9kHz - 40GHz)

| Test Requirement:     | FCC Part 15 Section 15.209        |
|-----------------------|-----------------------------------|
| Test Method:          | ANSI C63.4                        |
| Test Date(s):         | 2015-04-20                        |
| Temperature:          | 25.0 °C                           |
| Humidity:             | 75.0 %                            |
| Atmospheric Pressure: | 100.8 kPa                         |
| Mode of Operation:    | On mode                           |
| Tested Voltage:       | 4.5Vd.c. ("AAA" size battery x 3) |

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

| Frequency Range | Quasi-Peak Limits | Measurement Distance |  |  |  |  |
|-----------------|-------------------|----------------------|--|--|--|--|
| [MHz]           | [µV/m]            | m                    |  |  |  |  |
| 0.009-0.490     | 2400/F(kHz)       | 300                  |  |  |  |  |
| 0.490-1.705     | 24000/F(kHz)      | 30                   |  |  |  |  |
| 1.705-30        | 30                | 30                   |  |  |  |  |
| 30-88           | 100               | 3                    |  |  |  |  |
| 88-216          | 150               | 3                    |  |  |  |  |
| 216-960         | 200               | 3                    |  |  |  |  |
| Above960        | 500               | 3                    |  |  |  |  |

#### **Measurement Data**

#### **Test Result of (On mode): PASS**

#### **Detection mode: Quasi-Peak**

|   | Frequency | Polarity<br>(H/V) | Field<br>Strength | Limit           | Margin (dB)    |
|---|-----------|-------------------|-------------------|-----------------|----------------|
|   |           |                   |                   |                 |                |
| I | Emissions | detected are n    | nore than 20 d    | B below the lin | nit line(s) in |
|   |           |                   | 9kHz to 30MH      | Z               |                |
|   |           |                   |                   |                 |                |
|   |           |                   |                   |                 |                |

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 200Hz VBW = 200Hz



#### **Measurement Data**

## Test Result of (On mode): PASS

#### **Detection mode: Quasi-Peak**

| Frequency<br>(MHz) | Polarity<br>(H/V) | Field<br>Strength at<br>3m<br>(dBµV/m) | Limit at 3m<br>(dBµV/m) | Margin (dB) |
|--------------------|-------------------|--|-------------------------|-------------|
| 39.08              | Н                 | 28.9                                   | 40.0                    | -11.1       |
| 58.68              | Н                 | 21.2                                   | 40.0                    | -18.8       |
| 135.86             | Н                 | 23.5                                   | 43.5                    | -20.0       |
| 235.04             | Н                 | 22.7                                   | 46.0                    | -23.3       |
| 374.96             | Н                 | 26.1                                   | 46.0                    | -19.9       |
| 502.68             | Н                 | 29.8                                   | 46.0                    | -16.2       |

| Frequency<br>(MHz) | Polarity<br>(H/V) | Field<br>Strength at<br>3m<br>(dBµV/m) | Limit at 3m<br>(dBµV/m) | Margin (dB) |
|--------------------|-------------------|--|-------------------------|-------------|
| 39.08              | V                 | 28.3                                   | 40.0                    | -11.7       |
| 58.68              | V                 | 21.3                                   | 40.0                    | -18.7       |
| 135.86             | V                 | 23.8                                   | 43.5                    | -19.7       |
| 235.04             | V                 | 22.3                                   | 46.0                    | -23.7       |
| 374.96             | V                 | 26.5                                   | 46.0                    | -19.5       |
| 502.68             | V                 | 29.8                                   | 46.0                    | -16.2       |

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 120KHz VBW = 120KHz



#### **Frequency range of Fundamental Emission**

| Test Requirement:     | FCC 47 CFR 15.249                |
|-----------------------|----------------------------------|
| Test Method:          | ANSI C63.4:2009 (Section 13.1.7) |
| Test Date(s):         | 2015-04-20                       |
| Temperature:          | 25.0 °C                          |
| Humidity:             | 75.0 %                           |
| Atmospheric Pressure: | 100.8 kPa                        |
| Mode of Operation:    | Transmission mode                |
| Tested Voltage:       | 4.5Vd.c.("AAA" size battery x 3) |

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

#### Limits for Frequency range of Fundamental Emission:

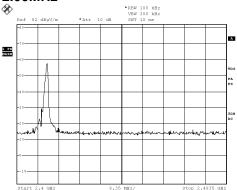
| Frequency           | FCC Limits        |
|---------------------|-------------------|
| [MHz]               | [MHz]             |
| 2410.540 - 2454.900 | 2400.00 - 2483.50 |

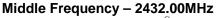


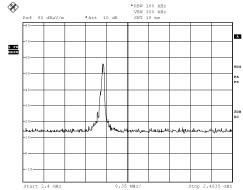
**Measurement Data :** 

Test Result of Frequency Range of Fundamental Emission: PASS

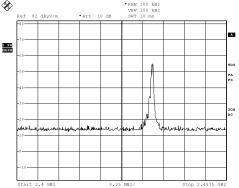
Lowest Frequency – 2412.00MHz







## Highest Frequency – 2454.00MHz



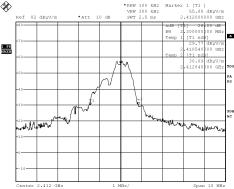
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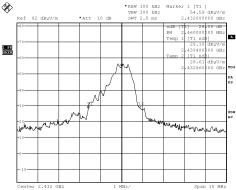
#### TEST REPORT No: (5215)104-0595 Measurement Data :

#### Test Result of 26dB Bandwidth of Fundamental Emission: PASS

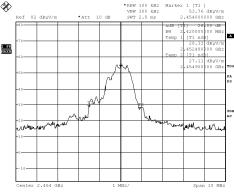
Lowest Frequency – 2412.00MHz



Middle Frequency – 2432.00MHz



Highest Frequency – 2454.00MHz



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#### **Duty Cycle Correction During 100msec:**

Each function key sends a different series of characters, but each packet period (<u>100</u>msec) never exceeds a series of 3 pulses (<u>1.9</u> msec). Assuming any combination of short and long pulses maybe obtained due to encoding the worst case transmit duty cycle would be considered <u>1.9\*3</u> per <u>100</u>msec = 5.<u>7</u>% duty cycle.

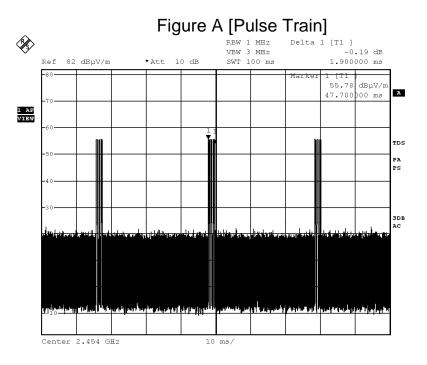
Remarks:

Duty Cycle Correction = 20Log(0.057) = -24.8dBTherefore, -20dB is taken

The following figures [Figure A] show the characteristics of the pulse train for one of these functions.



## **Measurement Data :**



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#### Photographs of EUT

### Front View of the product



Top View of the product



Side View of the product



### Battery compartment



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#### **Rear View of the product**



Bottom View of the product



## Side View of the product



#### **Battery Cover**





#### Photographs of EUT

## Internal View of the product



Inner Circuit Top View



**Inner Circuit Top View** 



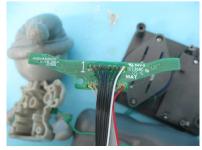
Inner Circuit Top View



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Inner Circuit Bottom View



**Inner Circuit Bottom View** 

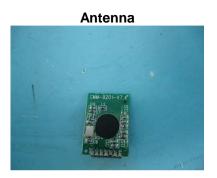


**Inner Circuit Bottom View** 





#### Photographs of EUT



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## Measurement of Radiated Emission Test Set Up

\*\*\*\*\* End of Report \*\*\*\*\*

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