



## STC Test Report



Date: 2014-03-05

Page 1 of 18

No. : DM114382

**Applicant (ANH001):** Ablelink Electronics Limited  
Flat 1004, 10/F, Kodak House II, 39 Healthy Street East,  
North Point, Hong Kong

**Description of Sample(s):** Submitted sample(s) said to be  
Product: P2798  
Brand Name: Griffin  
Model Number: P2798  
FCC ID: YHEP2798A

**Date Sample(s) Received:** 2014-02-26

**Date Tested:** 2014-02-27 to 2014-03-04

**Investigation Requested:** Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2012 and ANSI C63.4: 2009 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):** ---

LONG Yun Jian, Along  
Authorized Signatory  
ElectroMagnetic Compatibility Department  
For and on behalf of  
STC (Dongguan) Company Limited



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## **STC Test Report**

Date: 2014-03-05

Page 2 of 18

No. : DM114382

### **CONTENT:**

|   |                  |
|---|------------------|
| Cover   | Page 1 of 18     |
| Content   | Page 2-3 of 18   |
| <b><u>1.0</u></b> <b><u>General Details</u></b>                   |                  |
| 1.1    Equipment Under Test [EUT]<br>Description of EUT operation | Page 4 of 18     |
| 1.2    Date of Order  | Page 4 of 18     |
| 1.3    Submitted Sample(s)  | Page 4 of 18     |
| 1.4    Test Duration  | Page 4 of 18     |
| 1.5    Country of Origin  | Page 4 of 18     |
| <b><u>2.0</u></b> <b><u>Technical Details</u></b>                 |                  |
| 2.1    Investigations Requested                                   | Page 5 of 18     |
| 2.2    Test Standards and Results Summary                         | Page 5 of 18     |
| <b><u>3.0</u></b> <b><u>Test Results</u></b>                      |                  |
| 3.1    Emission   | Page 6-10 of 18  |
| 3.2    Emission Bandwidth   | Page 11-14 of 18 |

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## **STC Test Report**

Date: 2014-03-05

Page 3 of 18

No. : DM114382

### **Appendix A**

A description of the device

Page 15 of 18

### **Appendix B**

List of Measurement Equipment

Page 16 of 18

### **Appendix C**

Ancillary Equipment

Page 16 of 18

### **Appendix D**

Photographs

Page 17-18 of 18

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## **STC Test Report**

Date: 2014-03-05

Page 4 of 18

No. : DM114382

### **1.0 General Details**

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

Submitted sample(s) said to be

Product: P2798

Manufacturer: ANFAIR ELECTRONICS PLASTIC FACTORY  
CHANGSANTOU VILLAGE, DONGGUAN CITY,  
GUANGDONG PROVINCE, CHINA .

Brand Name: Griffin

Model Number: P2798

Rating: 3Vd.c. ("AAA" size battery x 2)

#### **1.1.1 Description of EUT Operation**

The Equipment Under Test (EUT) is a P2798 of ANFAIR ELECTRONICS PLASTIC FACTORY. The transmitter is a manually operated transmitter. It is FM transmitter. Modulation by IC; and type is FM modulation. The maximum tuning range 88.1MHz-107.9MHz.

#### **1.2 Date of Order**

2014-02-26

#### **1.3 Submitted Sample(s):**

1 Sample

#### **1.4 Test Duration**

2014-02-27 to 2014-03-04

#### **1.5 Country of Origin**

China

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## STC Test Report

Date: 2014-03-05

Page 5 of 18

No. : DM114382

### **2.0 Technical Details**

#### **2.1 Investigations Requested**

Perform ElectroMagnetic Interference measurement in accordance with FCC 47CFR [Codes of Federal Regulations] Part 15: 2013 and ANSI C63.4: 2009 for FCC Certification.

#### **2.2 Test Standards and Results Summary Tables**

| EMISSION<br>Results Summary                |                  |                  |                     |                                     |                          |                          |
|--|------------------|------------------|---------------------|-------------------------------------|--------------------------|--------------------------|
| Test Condition                             | Test Requirement | Test Method      | Class /<br>Severity | Test Result                         |                          |                          |
|  |                  |                  |                     | Pass                                | Failed                   | N/A                      |
| Field Strength of<br>Fundamental Emissions | FCC 47CFR 15.239 | ANSI C63.4: 2009 | N/A                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Radiated Emissions                         | FCC 47CFR 15.209 | ANSI C63.4: 2009 | N/A                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Emission Bandwidth                         | FCC 47CFR 15.239 | ANSI C63.4: 2009 | N/A                 | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Note: N/A - Not Applicable

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## STC Test Report

Date: 2014-03-05

Page 6 of 18

No. : DM114382

### **3.0 Test Results**

#### **3.1 Emission**

##### **3.1.1 Radiated Emissions**

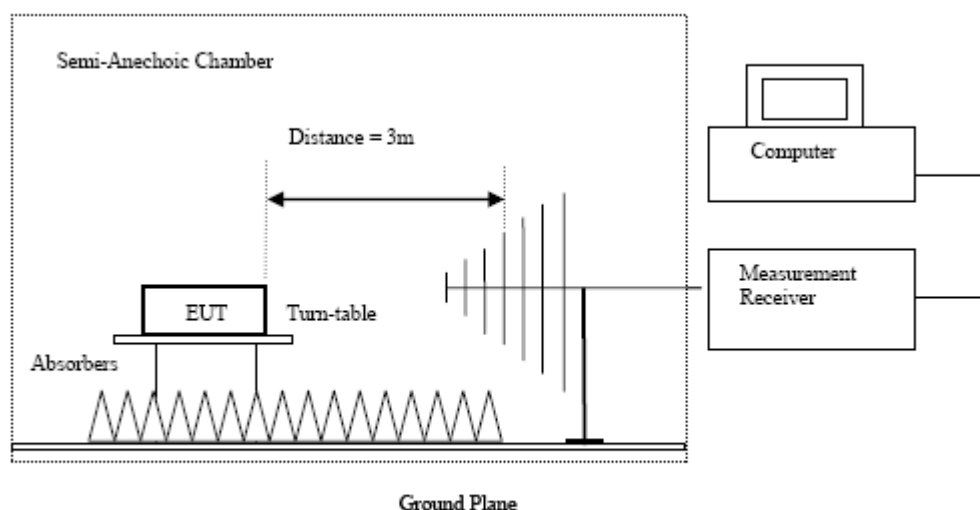
|                    |                  |
|--------------------|------------------|
| Test Requirement:  | FCC 47CFR 15.239 |
| Test Method:       | ANSI C63.4:2009  |
| Test Date:         | 2014-02-27       |
| Mode of Operation: | Tx mode          |

#### **Test Method:**

The sample was placed 0.8m 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. The emissions worst-case are shown in Test Results of the following pages.

\*: Semi-anechoic chamber located on the STC (Dongguan) Company Ltd. 68 Fumin Nan Road, Dalang, Dongguan, Guangdong, PRC with a metal ground plane filed with the FCC pursuant to section 2.948 of the FCC rules, with Registration Number: 629686.

#### **Test Setup:**



- 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.

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## STC Test Report

Date: 2014-03-05

Page 7 of 18

No. : DM114382

### **Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.239]:**

| Frequency Range of Fundamental<br>[MHz] | Field Strength of Fundamental Emission<br>[Average]<br>[ $\mu\text{V}/\text{m}$ ] |
|---|---|
| 88-108                                  | 250   |

The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply

### **Results of Tx mode(88.1MHz): PASS**

| <b>Field Strength of Fundamental Emissions<br/>Peak Value</b> |  |   |   |  |                                     |                  |
|---|--|---|---|--|-------------------------------------|------------------|
| Frequency<br>MHz  | Measured Level @3m<br>$\text{dB}\mu\text{V}$ | Correction Factor<br>$\text{dB}/\text{m}$ | Field Strength<br>$\text{dB}\mu\text{V}/\text{m}$ | Field Strength<br>$\mu\text{V}/\text{m}$ | Limit @3m<br>$\mu\text{V}/\text{m}$ | E-Field Polarity |
| 88.10   | 26.5   | 10.1                                      | 36.6  | 67.6                                     | 2,500.0                             | Vertical         |
| 88.10   | 35.0   | 10.0                                      | 45.0  | 177.8                                    | 2,500.0                             | Horizontal       |

| <b>Field Strength of Fundamental Emissions<br/>Average Value</b> |  |   |   |  |                                     |                  |
|--|--|---|---|--|-------------------------------------|------------------|
| Frequency<br>MHz   | Measured Level @3m<br>$\text{dB}\mu\text{V}$ | Correction Factor<br>$\text{dB}/\text{m}$ | Field Strength<br>$\text{dB}\mu\text{V}/\text{m}$ | Field Strength<br>$\mu\text{V}/\text{m}$ | Limit @3m<br>$\mu\text{V}/\text{m}$ | E-Field Polarity |
| 88.10  | 26.4   | 10.1                                      | 36.5  | 66.8                                     | 250.0                               | Vertical         |
| 88.10  | 34.8   | 10.0                                      | 44.8  | 173.8                                    | 250.0                               | Horizontal       |

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## STC Test Report

Date: 2014-03-05

Page 8 of 18

No. : DM114382

### Results of Tx mode(98.1MHz): PASS

| Field Strength of Fundamental Emissions<br>Peak Value |                                     |                              |                                   |                                |                           |                     |
|---|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Frequency<br>MHz                                      | Measured<br>Level @3m<br>dB $\mu$ V | Correction<br>Factor<br>dB/m | Field<br>Strength<br>dB $\mu$ V/m | Field<br>Strength<br>$\mu$ V/m | Limit<br>@3m<br>$\mu$ V/m | E-Field<br>Polarity |
| 98.10   | 26.4                                | 12.2                         | 38.6                              | 85.1                           | 2,500.0                   | Vertical            |
| 98.10   | 34.8                                | 12.8                         | 47.6                              | 239.9                          | 2,500.0                   | Horizontal          |

| Field Strength of Fundamental Emissions<br>Average Value |                                     |                              |                                   |                                |                           |                     |
|--|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Frequency<br>MHz   | Measured<br>Level @3m<br>dB $\mu$ V | Correction<br>Factor<br>dB/m | Field<br>Strength<br>dB $\mu$ V/m | Field<br>Strength<br>$\mu$ V/m | Limit<br>@3m<br>$\mu$ V/m | E-Field<br>Polarity |
| 98.10  | 26.3                                | 12.2                         | 38.5                              | 84.1                           | 250.0                     | Vertical            |
| 98.10  | 34.7                                | 12.8                         | 47.5                              | 237.1                          | 250.0                     | Horizontal          |

### Results of Tx mode(107.9MHz): PASS

| Field Strength of Fundamental Emissions<br>Peak Value |                                     |                              |                                   |                                |                           |                     |
|---|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Frequency<br>MHz                                      | Measured<br>Level @3m<br>dB $\mu$ V | Correction<br>Factor<br>dB/m | Field<br>Strength<br>dB $\mu$ V/m | Field<br>Strength<br>$\mu$ V/m | Limit<br>@3m<br>$\mu$ V/m | E-Field<br>Polarity |
| 107.90  | 23.9                                | 13.3                         | 37.2                              | 72.4                           | 2,500.0                   | Vertical            |
| 107.90  | 33.7                                | 13.5                         | 47.2                              | 229.1                          | 2,500.0                   | Horizontal          |

| Field Strength of Fundamental Emissions<br>Average Value |                                     |                              |                                   |                                |                           |                     |
|--|-------------------------------------|------------------------------|-----------------------------------|--------------------------------|---------------------------|---------------------|
| Frequency<br>MHz   | Measured<br>Level @3m<br>dB $\mu$ V | Correction<br>Factor<br>dB/m | Field<br>Strength<br>dB $\mu$ V/m | Field<br>Strength<br>$\mu$ V/m | Limit<br>@3m<br>$\mu$ V/m | E-Field<br>Polarity |
| 107.90   | 23.8                                | 13.3                         | 37.1                              | 71.6                           | 250.0                     | Vertical            |
| 107.90   | 23.6                                | 13.5                         | 37.1                              | 71.6                           | 250.0                     | Horizontal          |

#### Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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## STC Test Report

Date: 2014-03-05

Page 9 of 18

No. : DM114382

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

| Frequency Range [MHz] | Quasi-Peak Limits [ $\mu\text{V}/\text{m}$ ] |
|-----------------------|--|
| 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.

### Result of Tx mode (9kHz - 30MHz): PASS

Emissions detected are more than 20 dB below the limit line(s).

### Result of Tx mode (88.1MHz): PASS

| Radiated Emissions<br>Quasi-Peak |                  |                                     |                                     |                                  |                                  |
|----------------------------------|------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|
| Emission Frequency MHz           | E-Field Polarity | Level @3m dB $\mu\text{V}/\text{m}$ | Limit @3m dB $\mu\text{V}/\text{m}$ | Level @3m $\mu\text{V}/\text{m}$ | Limit @3m $\mu\text{V}/\text{m}$ |
| 30.2                             | Vertical         | 28.9                                | 40.0                                | 27.9                             | 100                              |
| 350.6                            | Vertical         | 32.1                                | 46.0                                | 40.3                             | 200                              |
| 87.9                             | Horizontal       | 38.2                                | 40.0                                | 81.3                             | 100                              |
| 264.1                            | Horizontal       | 34.1                                | 46.0                                | 50.7                             | 200                              |

### Result of Tx mode (98.1MHz): PASS

| Radiated Emissions<br>Quasi-Peak |                  |                                     |                                     |                                  |                                  |
|----------------------------------|------------------|-------------------------------------|-------------------------------------|----------------------------------|----------------------------------|
| Emission Frequency MHz           | E-Field Polarity | Level @3m dB $\mu\text{V}/\text{m}$ | Limit @3m dB $\mu\text{V}/\text{m}$ | Level @3m $\mu\text{V}/\text{m}$ | Limit @3m $\mu\text{V}/\text{m}$ |
| 196.2                            | Vertical         | 32.1                                | 43.5                                | 40.3                             | 150                              |
| 294.3                            | Vertical         | 35.5                                | 46.0                                | 59.6                             | 200                              |
| 47.6                             | Horizontal       | 30.1                                | 40.0                                | 32.0                             | 100                              |

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## STC Test Report

Date: 2014-03-05

Page 10 of 18

No. : DM114382

### Result of Tx mode (107.9MHz): PASS

| Radiated Emissions<br>Quasi-Peak |                     |                              |                              |                           |                           |
|----------------------------------|---------------------|------------------------------|------------------------------|---------------------------|---------------------------|
| Emission<br>Frequency<br>MHz     | E-Field<br>Polarity | Level<br>@3m<br>dB $\mu$ V/m | Limit<br>@3m<br>dB $\mu$ V/m | Level<br>@3m<br>$\mu$ V/m | Limit<br>@3m<br>$\mu$ V/m |
| 156.2                            | Vertical            | 26.5                         | 43.5                         | 21.1                      | 150                       |
| 108.1                            | Horizontal          | 39.2                         | 43.5                         | 91.2                      | 150                       |
| 215.8                            | Horizontal          | 33.1                         | 43.5                         | 45.2                      | 150                       |
| 323.7                            | Horizontal          | 38.8                         | 46.0                         | 87.1                      | 200                       |

#### Remarks:

Correction Factor includes Antenna Factor and Cable Attenuation.

Calculated measurement uncertainty (30MHz – 1GHz): 4.6dB

Emissions in the vertical and horizontal polarizations have been investigated and the worst-case test results are recorded in this report.

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## STC Test Report

Date: 2014-03-05

Page 11 of 18

No. : DM114382

### 3.2 Emission Bandwidth

|                    |                   |
|--------------------|-------------------|
| Test Requirement:  | FCC 47 CFR 15.239 |
| Test Method:       | ANSI C63.4:2009   |
| Test Date:         | 2014-03-04        |
| Mode of Operation: | Tx mode           |

#### 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.

#### The Requirement For Section 15.239(a)

Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz

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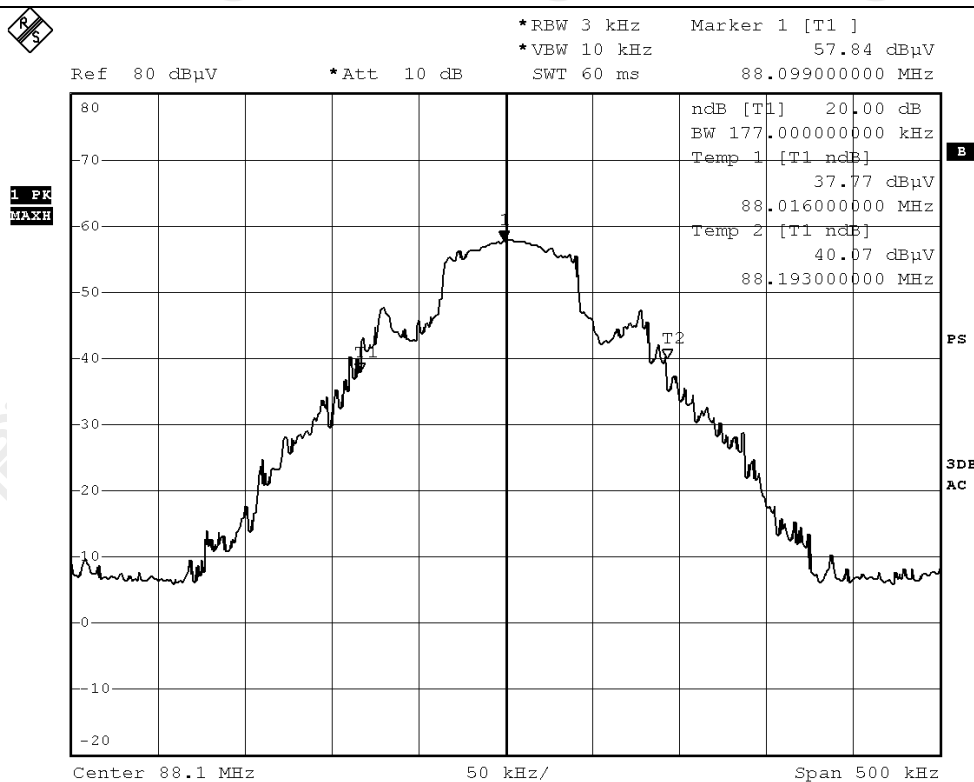
Page 12 of 18

No. : DM114382

### Tx mode (88.1MHz) Emission Bandwidth:

| Frequency Range<br>[MHz] | 20dB Bandwidth<br>[kHz] | FCC Limits *<br>[kHz] |
|--------------------------|-------------------------|-----------------------|
| 88-108                   | 177.0                   | 200                   |

### Bandwidth of Fundamental Emission



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Date: 2014-03-05

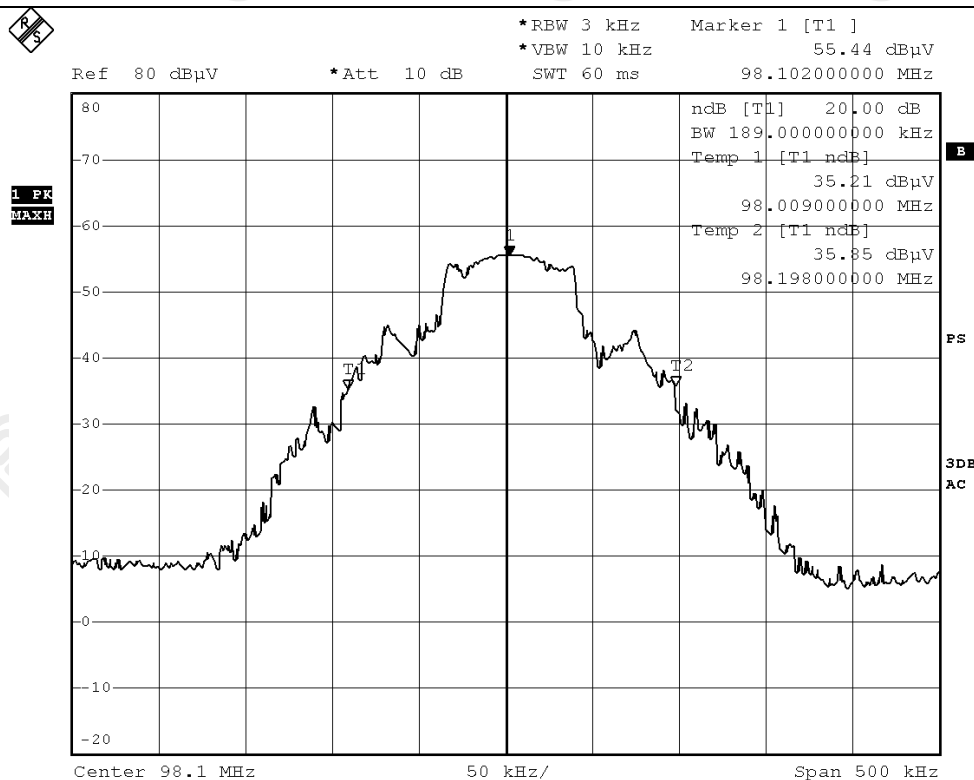
Page 13 of 18

No. : DM114382

### Tx mode (98.1MHz) Emission Bandwidth:

| Frequency Range<br>[MHz] | 20dB Bandwidth<br>[kHz] | FCC Limits *<br>[kHz] |
|--------------------------|-------------------------|-----------------------|
| 88-108                   | 189.0                   | 200                   |

### Bandwidth of Fundamental Emission



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Date: 2014-03-05

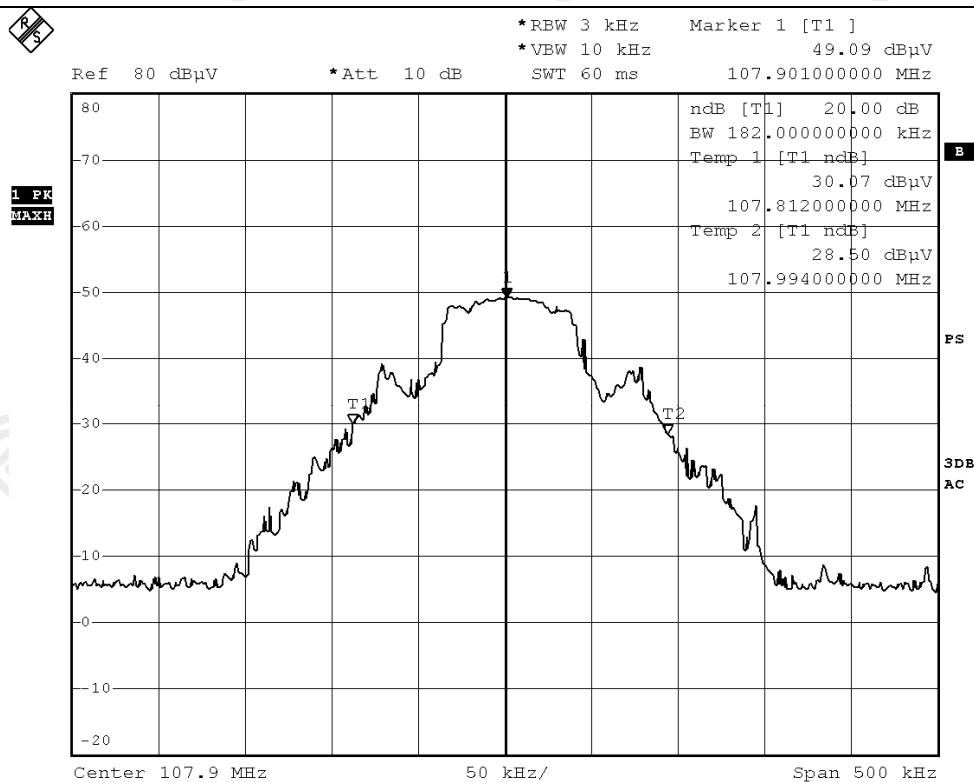
Page 14 of 18

No. : DM114382

### Tx mode (107.9MHz) Emission Bandwidth:

| Frequency Range<br>[MHz] | 20dB Bandwidth<br>[kHz] | FCC Limits *<br>[kHz] |
|--------------------------|-------------------------|-----------------------|
| 88-108                   | 182.0                   | 200                   |

### Bandwidth of Fundamental Emission



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## STC Test Report

Date: 2014-03-05

Page 15 of 18

No. : DM114382

### Appendix A

#### A description of the device:

FCC ID: YHEP2798A

Category 1: FM band modulators / transmitters operating under 15.239 of the FCC rules.

The Equipment Under Test (EUT) is a FM Transmitter. The transmitter is modulation by IC; and type is frequency modulation.

Q1: Describe the operation of the device

A1: (Please see user manual)

The transmitter is operating at 88.1-107.9.1MHz band. The transmitter is powered by a 3V.d.c. Battery(AAA\*2) and the transmitting frequency is IC controlled. The operation is achieved by different combinations of form frequency modulating signal on the 88.1-107.9.1MHz carrier frequency.

Q2: Provide information on the device and its PCB antenna.

A2: The antenna consists of a 31mm long metal antenna. There is no external ground connection. The ground is only that of the printed circuit board. Electric current is supplied by a3V.d.c. Battery(AAA\*2)

Q3: How is it installed?

A3: (Please see user manual)

Q4: Describe the test procedure used.

A4: ANSI C63.4 test method is adopted.

Q5: If tested in a car, describe how was it configured and tested.

A5: The EUT does not uses the car wiring as antenna nor having any direct connection to the car wiring, therefore in-vehicle test is not required.

Q6: At the present time, FM transmitters (subject to 15.239) tested in vehicles must also be tested on a test table. Provide both sets of data. All data must be compliant

A6: Please see test report.

Q7: Was the tuning range properly verified? The test lab should indicate in the report that the tuning controls were manually adjusted to verify maximum tuning range.

A7: We have Verified it, The EUT just only operation on 88.1-107.9MHz. (the IC controlled)

Q8: Was the bandwidth properly tested with maximum audio input?

A8: Yes, the bandwidth properly tested with maximum audio input, the maximum audio input is 500mV (please see user manual)

Q9: Use a typical audio file from a typical device. e.g. do not use a 1 kHz signal from a signal generator.

A9: Use MP3 player input audio signal to EUT and turn max. Volume 500mV, in order to get worst result. (please see user manual)

Q10: Provide the test report showing compliance with the rules.

A10: HKSTC provided test report.

#### **The Hong Kong Standards and Testing Centre Ltd.**

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## STC Test Report

Date: 2014-03-05

Page 16 of 18

No. : DM114382

### Appendix B

#### List of Measurement Equipment

| EQP NO. | DESCRIPTION                         | MANUFACTURER              | MODEL NO. | SERIAL NO.   | LAST CAL   | DUE CAL    |
|---------|-------------------------------------|---------------------------|-----------|--------------|------------|------------|
| EMD015  | Signal Generator                    | MARCONI INSTRUMENTS       | 2030      | 112191/012   | 2013.03.15 | 2014.03.14 |
| EMD036  | EMI Test Receiver                   | ROHDE & SCHWARZ           | ESIB26    | 100388       | 2013.05.28 | 2014.05.27 |
| EMD061  | Biconilog Antenna                   | ETS.LINDGREN              | 3142C     | 00060439     | 2012.11.03 | 2014.11.03 |
| EMD062  | Double-Ridged Waveguide (1 – 18GHz) | ETS.LINDGREN              | 3117      | 00075933     | 2012.11.28 | 2014.11.28 |
| EMD084  | MULTI-DVICE CONTROLLER              | ETS.LINDGREN              | 2090      | 00060107     | N/A        | N/A        |
| EMD088  | Video Contol Unit                   | ETS.LINDGREN              | Y21953A   | 2601073      | N/A        | N/A        |
| EMD093  | Monitor                             | ViewSonic                 | VA9036    | Q8X064201876 | N/A        | N/A        |
| EMD102  | Intelligent Frequency               | Ainuo Instrument Co., Ltd | AN97005SS | 79707454     | N/A        | N/A        |
| EMD105  | FACT-3 EMC Chamber                  | ETS.LINDGREN              | FACT-3    | 3803         | N/A        | N/A        |
| EMD124  | Loop Antenna                        | ETS-Lindgren              | 6502      | 00104905     | 2012.03.26 | 2014.03.26 |

#### Remarks:-

N/A Not Applicable

### Appendix C

#### Ancillary Equipment

| ITEM NO. | DESCRIPTION | MODEL NO. | FCC ID    | REMARK |
|----------|-------------|-----------|-----------|--------|
| 1        | iPod Touch  | A1367     | BCG-E2407 | N/A    |

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## STC Test Report

Date: 2014-03-05

Page 17 of 18

No. : DM114382

### Appendix D

#### Photographs of EUT

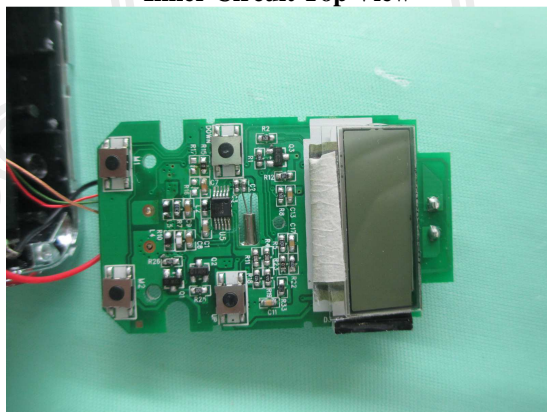
**Front View of the product**



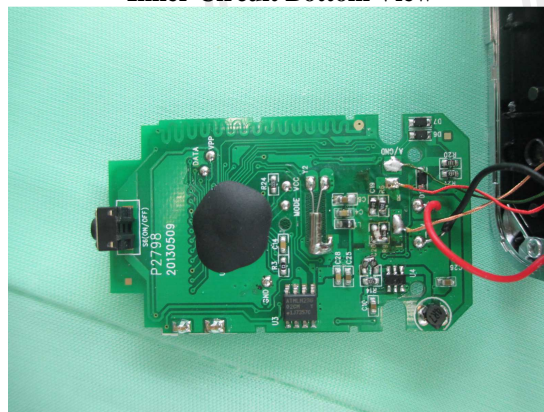
**Rear View of the product**



**Inner Circuit Top View**



**Inner Circuit Bottom View**



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## STC Test Report

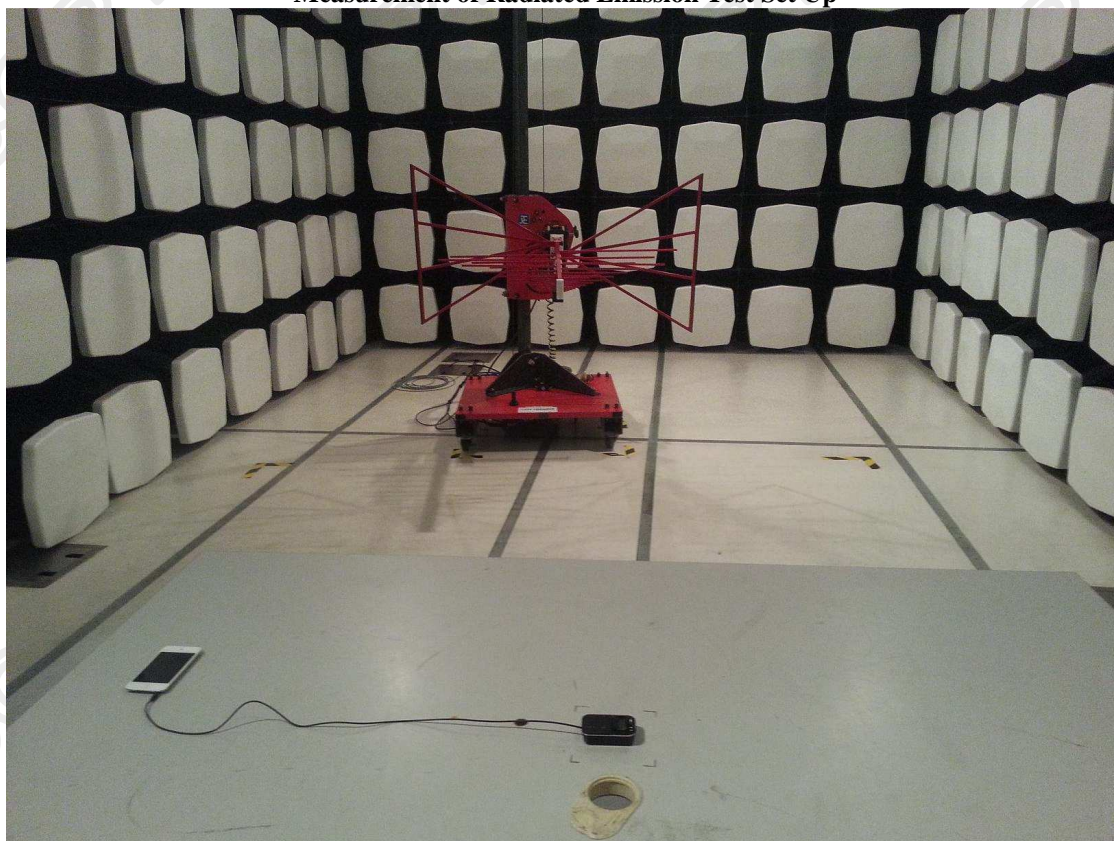
Date: 2014-03-05

Page 18 of 18

No. : DM114382

### Photographs of EUT

Measurement of Radiated Emission Test Set Up



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

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