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# **FCC Test Report**

Application No.: HKES131100274401

Applicant: 9141-0720 Quebec Inc. DBA MANARAS/OPERA

Address 136 Oneida Drive, POINTE-CLAIRE, Quebec, Canada, H9R 1A8

**Product Information:** 

Product Description: Remote Transmitter

Model: EM101R1 / EM103R1 ♣

Please refer to section 2 of this report which indicates which item was actually

tested and which were electrically identical.

Product Class: Low Power Communication Device – Transmitter (390 MHz)

FCC ID: X70EM101R1

**Requirement**: CFR 47 FCC PART 15 SUBPART C, 2012

- Intentional Radiators (Section 15.231)

 Date of Receipt:
 2013-11-01

 Date of Test:
 2013-11-05

 Date of Issue:
 2013-11-07

Test Result : PASS\*

\* In the configuration tested, the EUT complied with the requirements for the relevant clauses of Federal Communications Commission Rules as specified above.

Authorized Signature:

LOKE Sai Kit, Wilson Senior Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of International Electrical Certification Centre Ltd. or testing done by International Electrical Certification Centre Ltd. in connection with, distribution or use of the product described in this report must be approved by International Electrical Certification Centre Ltd. in writing.

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## **Test Summary**

| Test                             | Test Requirement                                | Test Method     | Result |
|----------------------------------|---|-----------------|--------|
| Antenna Requirement              | FCC PART 15,<br>SUBPART C: 2012 ANSI C63.4:2003 |                 | PASS   |
| Radiated Emission                | FCC PART 15,<br>SUBPART C: 2012                 | ANSI C63.4:2003 | PASS   |
| Bandwidth                        | FCC PART 15,<br>SUBPART C: 2012                 | ANSI C63.4:2003 | PASS   |
| Provision of Momentary operation | FCC PART 15,<br>SUBPART C: 2012                 | ANSI C63.4:2003 | PASS   |

#### Remark:

FCC ID: X70EM101R1

Item no.: EM101R1 / EM103R1

According to the confirmation from the applicant, the above models are identical in all electrical aspects in relating to the circuit design, PCB layout, electrical components used, internal wiring and function. only the numbers of buttons are in different.

Therefore only the model EM101R1 was tested in this report.



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### 4 General Information

### 4.1 General Description of EUT

EUT Name: Remote Transmitter

Model: EM101R1

Serial No.:

Type of modification: OOK
Operating frequency: 390MHz

Antenna type: Integral antenna

### 4.2 Details of EUT

Power Supply: DC 3V (CR2032 battery x 1)

Power Cord: --

### 4.3 Conditions of EUT

The received sample was under good condition.

### 4.4 Description of Support Units

The EUT has been tested as an independent unit.

### 4.5 Standards Applicable for Testing

CFR 47, FCC Part 15, Oct 2012 ANSI C63.4:2003

#### 4.6 Test Location

All tests were performed at: -

SGS IECC Limited (Member of the SGS Group (SGS SA))

Units 303-305, 3/F., 31 Lok Yip Road, On Lok Tsuen, Fanling, N.T., Hong Kong

Tel: +852 2305 2570 Fax: +852 2756 4480.

No tests were sub-contracted.

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### 4.7 Test Facility

Measurement facility located at Fanling (Hong Kong), placed on file with the FCC Pursuant to Section 2.948 of the FCC Rules (FCC Registration No.: 97774).

The test facility is recognized, certified, or accredited by the following organizations:

### FCC - CAB Registration No.: 446297

Measurement facility located at Fanling (Hong Kong), accredited as a Conformity Assessment Body (CAB) and was designated by FCC to perform compliance testing on equipment subject to Declaration Of Conformity (DOC) and Certification under Part 15 and 18 of the Commission's Rules.

### 4.8 Deviation from Standards

None.

#### 4.9 Abnormalities from Standard Conditions

None.

### 4.10 Declaration of Family Grouping

None.

FCC ID: X70EM101R1

#### 4.11 Abbreviations

N/A: Not Applicable

**EUT: Equipment Under Test** 

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## 5 Equipments Used during Test

| Radiated Emission                      |                 |                        |            |               |  |  |  |
|--|-----------------|------------------------|------------|---------------|--|--|--|
| Equipment                              | Manufacturer    | Model / Serial No.     | Cal. Date  | Cal. Due Date |  |  |  |
| 3m Semi-Anechoic<br>Chamber (pre-test) |                 |                        |            |               |  |  |  |
| 3m / 10m Open Aera Test<br>Site        |                 |                        | 2012/02/24 | 2015/02/23    |  |  |  |
| Test Receiver                          | Rohde & Schwarz | ESCS 30 / 100388       | 2013/10/23 | 2014/10/22    |  |  |  |
| Spectrum Analyzer                      | Rohde & Schwarz | FSP 30 / 101474        | 2013/8/8   | 2014/08/07    |  |  |  |
| Antenna 30-1000MHz                     | Schaffner       | CBL6111C / 2791        | 2012/10/12 | 2014/10/11    |  |  |  |
| Horn Antenna 1-18GHz                   | Schwarzbeck     | BBHA9120D / 9120D-1070 | 2012/11/13 | 2014/11/12    |  |  |  |
| Preamplifier 10MHz –<br>6GHz           | Schwarzbeck     | BBV9743 / 9743-052     | 2012/11/13 | 2014/11/12    |  |  |  |
| Preamplifier 1-18GHz                   | Schwarzbeck     | BBV9718 / 9718-223     | 2012/11/13 | 2014/11/12    |  |  |  |
| Coaxial Cable                          |                 | E167                   | 2013/06/28 | 2014/06/27    |  |  |  |
| RF Cable                               | HUBER+SUHNER    | E207                   | 2012/11/14 | 2013/11/13    |  |  |  |
| Antenna Mast System                    | Schwarzbeck     | AM9104 / -             |            |               |  |  |  |
| Turntable with Controller              | Drehtisch       | DT312 / -              |            |               |  |  |  |
| General Use Equipment                  |                 |                        |            |               |  |  |  |
| Equipment                              | Manufacturer    | Model / Serial No.     | Cal. Date  | Cal. Due Date |  |  |  |
| Digital Multimeter                     | Fluke           | 189 / 83640020         | 2013/04/10 | 2014/04/09    |  |  |  |
| Temperature / Humidity<br>meter        | -               | E158                   | 2013/11/05 | 2014/11/04    |  |  |  |

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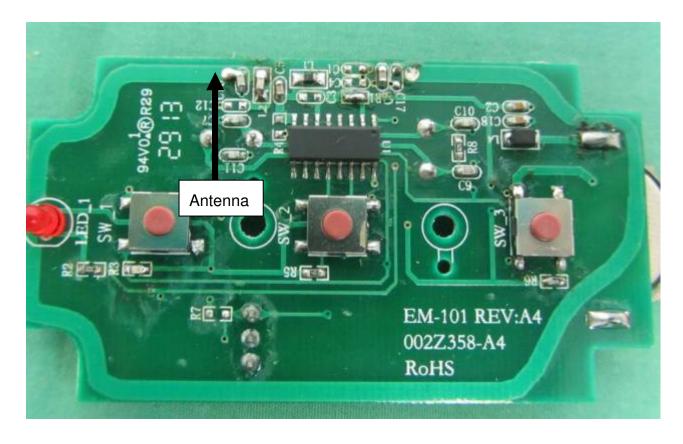
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### 6 Test Results

### 6.1 Antenna Requirment

According to 15.203, 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 EuT has component antenna, which accordance to the above sections, is considered sufficient to comply with the provisions of these sections.



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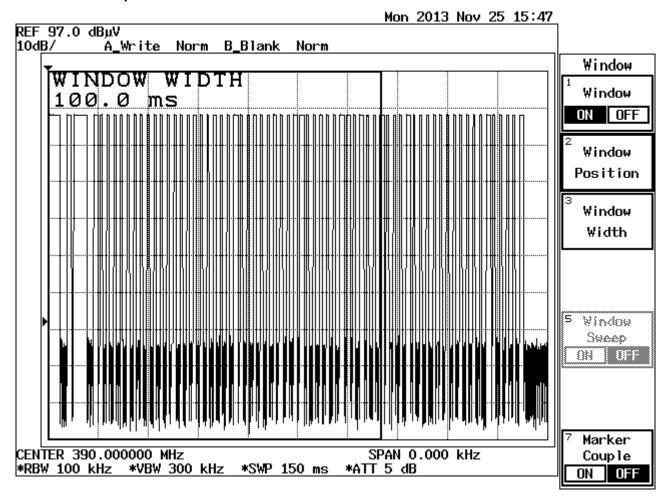
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#### **Average Factor** 6.2

#### 6.2.1 Measurement Data

Time Domain Plots (Fundamental frequency of Transmitter at 390MHz, worst case):

Test results on operation with control for transmition mode :

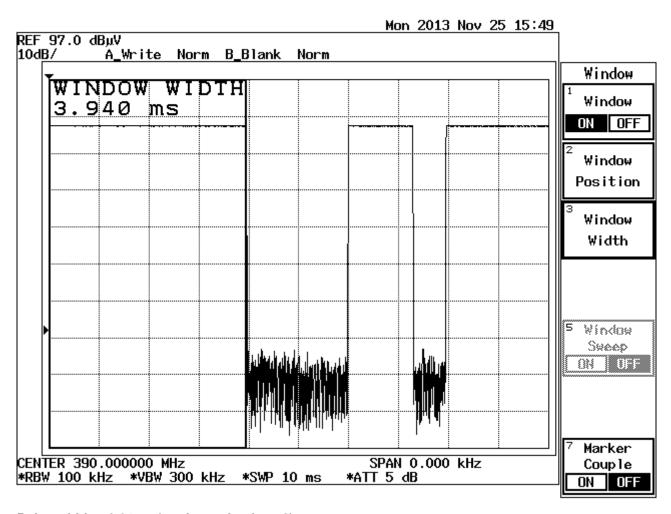


Pulse cycle period > 100ms

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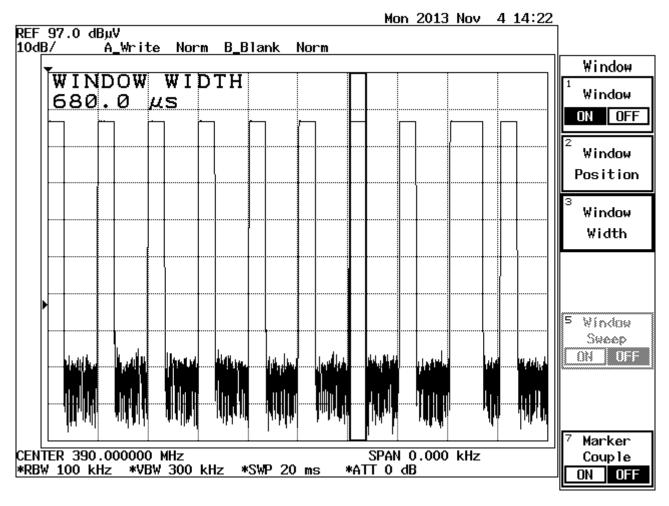


Pulse width = 3.94ms (total no. of pulse : 2)

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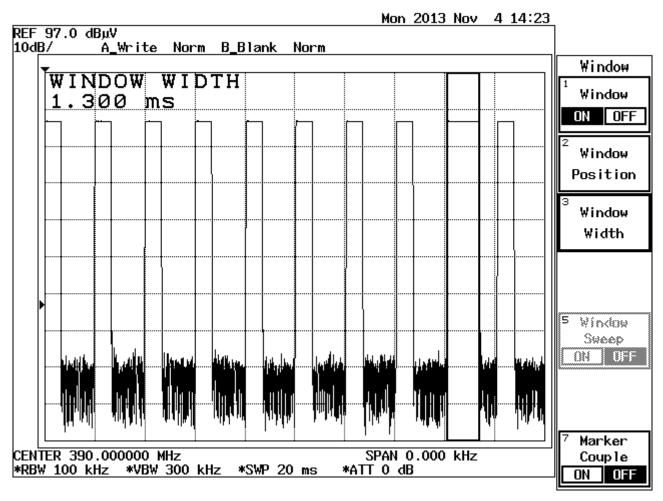


Pulse width = 0.68ms (total no. of pulse : 31)

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Pulse width = 1.30 ms (total no. of pulse : 13)

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#### Calculation for radiation (average):

Formula:

Duty cycle = (N1L1 + N2L2 + ... + Nn-1Ln-1 + NnLn) / 100 or T

where

N1 is the number of type 1 pulse, L1 is length of type 1 pulse, etc.

T is the period of the pulse train (if less than 100ms)

According to the time domain plots shown on the next two pages :

Duty cycle of the EUT =  $(3.94 \times 2 + 1.3 \times 13 + 0.68 \times 31) / 100 = 0.459$ 

Av correction factor =  $20 \times \log(0.459) dB$ = -6.76 dB

#### Remarks:

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Average factor of three buttons are measured and the wrost case average factor is shown above.

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### 6.3 Radiated Emissions

Test Requirement: FCC Part15 Subpart C Section 15.231(b)

Test Method: ANSI C63.4
Test Date: 2013-11-05

Frequency Range: 30MHz to 3900MHz

Measurement Distance: 3m

Detector: Peak for pre-scan (120kHz resolution bandwidth)

Quasi-Peak if maximised peak within 6dB of limit

| Start frequency | Stop frequency | Resolution | Video     | Step size | Measurement | Detector |
|-----------------|----------------|------------|-----------|-----------|-------------|----------|
| (MHz)           | (MHz)          | bandwidth  | bandwidth |           | time        |          |
| 30              | 1000           | 120 kHz    | 1 MHz     | 40 kHz    | 100ms       | Peak     |
| 1000            | 3900           | 1 MHz      | 3 MHz     | 400 kHz   | 100ms       | Peak     |

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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#### 6.3.1 Measurement Data

An initial pre-scan was performed in the 3m chamber using the spectrum analyser in peak detection mode. The EUT was measured by Bilog antenna with 2 orthogonal polarities and frequencies of peak emissions from the EUT were detected within 6dB of the limit line. Final measurement was conducted in the open area test site with data as follows:

### Test results on operation with control for transmittion mode (Fundamental frequency of Transmitter at 390MHz):

| Frequency (MHz) | Antenna<br>Polarization | Correction<br>Factor<br>(dB/m) | Receiver<br>Reading<br>(dBµV) | Emission<br>Level<br>(dBµV/m) | PK Limit<br>(dBμV/m) | Over Limit<br>(dB) |
|-----------------|-------------------------|--------------------------------|-------------------------------|-------------------------------|----------------------|--------------------|
| 390             | Н                       | 16.3                           | 67.6                          | 83.9                          | 99.2                 | -15.3              |
| 390             | V                       | 16.3                           | 66.4                          | 82.7                          | 99.2                 | -16.5              |
| 780.02          | V                       | 21.5                           | 37.18                         | 58.68                         | 79.2                 | -20.52             |
| 1170            | V                       | -9.7                           | 65.9                          | 56.2                          | 74                   | -17.8              |
| 1560            | V                       | -9.98                          | 65.88                         | 55.9                          | 74                   | -18.1              |
| 1950            | V                       | -8.31                          | 64.41                         | 56.1                          | 79.2                 | -23.1              |
| 2340            | V                       | -5.84                          | 61.34                         | 55.5                          | 74                   | -18.5              |
| 2730            | V                       | -4.46                          | 54.86                         | 50.4                          | 74                   | -23.6              |
| 3510            | V                       | -3.04                          | 46.04                         | 43                            | 79.2                 | -36.2              |

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| Frequency<br>(MHz) | Antenna<br>Polarization | Detector | Emission<br>Level<br>(dBµV/m) | Average<br>Factor<br>(dB) | Calculated<br>Average<br>Value<br>(dBµV/m) | AV Limit<br>(dBμV/m) | Over Limit<br>(dB) |
|--------------------|-------------------------|----------|-------------------------------|---------------------------|--|----------------------|--------------------|
| 390                | Н                       | Peak     | 83.9                          | -6.76                     | 77.14                                      | 79.2                 | -2.06              |
| 390                | V                       | Peak     | 82.7                          | -6.76                     | 75.94                                      | 79.2                 | -3.26              |
| 780.02             | V                       | Peak     | 58.68                         | -6.76                     | 51.92                                      | 59.2                 | -7.28              |
| 1170               | V                       | Peak     | 56.2                          | -6.76                     | 49.44                                      | 54                   | -4.56              |
| 1560               | V                       | Peak     | 55.9                          | -6.76                     | 49.14                                      | 54                   | -4.86              |
| 1950               | V                       | Peak     | 56.1                          | -6.76                     | 49.34                                      | 59.2                 | -9.86              |
| 2340               | V                       | Peak     | 55.5                          | -6.76                     | 48.74                                      | 54                   | -5.26              |
| 2730               | V                       | Peak     | 50.4                          | -6.76                     | 43.64                                      | 54                   | -10.36             |
| 3510               | V                       | Peak     | 43                            | -6.76                     | 36.24                                      | 59.2                 | -22.96             |

#### Note:

- 1) Correction Factor = Antenna Factor + Cable Loss.
- 2) The above results were the worst case results with the EUT positioned in all 3 axis during the test. The EUT was positioned vertically and horizontally on the table for vertical and horizontal measurement respectively.



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### 6.4 Bandwidth

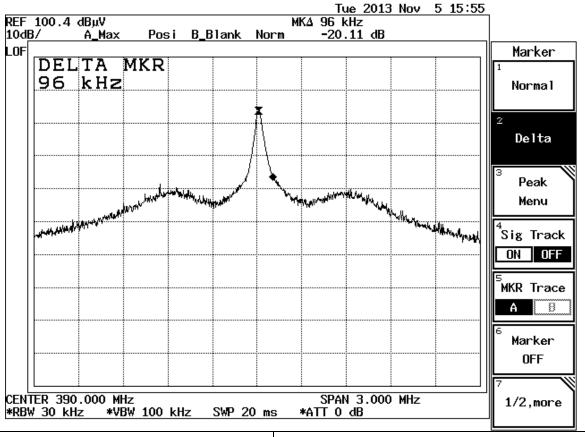
Test Requirement: FCC Part15 Subpart C Section 15.231(C)

Test Method: ANSI C63.4
Test Date: 2013-11-05

#### 6.4.1 Measurement data

Frequency Domain Plots (Fundamental frequency of Transmitter at <u>390MHz</u>):

Test results on operation with control for transmittion mode :



| Measured Occupied Bandwidth (kHz) | Limit (KHz) |
|-----------------------------------|-------------|
| 192                               | ≤ 975       |

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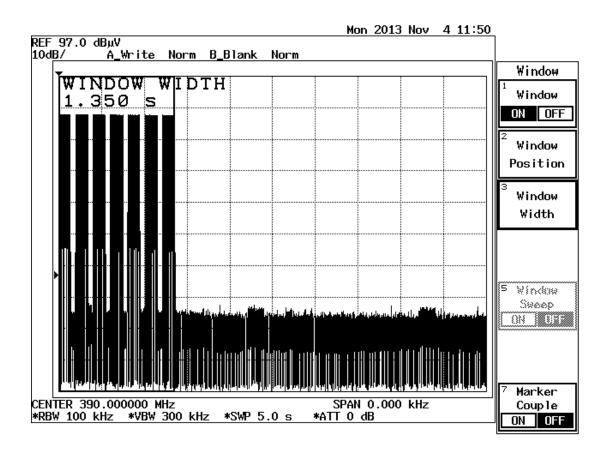
### 6.5 Provision of Momentary operation

Test Requirement: FCC Part15 Subpart C Section 15.231(a) (1)

Test Method: ANSI C63.4
Test Date: 2013-10-31

#### 6.5.1 Measurement data

Time Domain Plots (Fundamental frequency of Transmitter at <u>390MHz</u>): Test results on operation with control for transmittion mode:



| The time of stopping transmission after switch releasing (s) | Limit (s) |
|--|-----------|
| 1.35   | 5.00      |

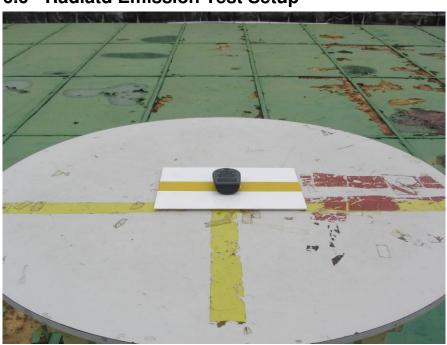
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## **Photographs**

## 6.6 Radiatd Emission Test Setup





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### 6.7 EUT Constructional Details





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-- END OF REPORT --

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