TEST REPORT

Report No.	:	AA0017008(5)	Date :	April 30, 2021

Application No. : LA008862(2)

Applicant : 9141-0720 Quebec Inc. DBA MANARAS/OPERA
136 Oneida Drive, Pointe-Claire
Canada, H9R 1A8

Sample Description : One(1) item of submitted sample stated to be:

Sample Description	Model No.
390MHz Transmitter	KEYLESS042

Radio Frequency : 390 MHz
Rating : DC1.5V (one AAA battery)
Sample registration No. : RA020101-005(9) and RA020101-006(0)
PMN : KEYLESS042
HVIN : KEYLESS042

Date Received : Apr 19, 2021

Test Period : Apr 20, 2021 – Apr 30, 2021

Test Requested : FCC 47CFR Part 15 Certification
ISED Certification for License-exempt Device

Test Method : 47 CFR Part 15 (10-1-19 Edition)
ANSI C63.10 – 2013
ANSI C63.4 – 2014
RSS-210 Issue 10
RSS-Gen Issue 5

Test Result : See attached sheet(s) from page 2 to 16.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C, section 15.231 and ISED Canada Radio Standard Specification RSS-210.

Remark : NIL

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____ Page 1 of 16

Wong Lap Pong / Andrew
Deputy Technical Manager

FCC ID: X7OAKEYLESS042
IC: 8860A-AKEYLESS042

The conformity statement stated in Conclusion above is based on the decision rule agreed with applicant and listed in www.cmatesting.org/qac/statement-of-conformity.pdf.
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This document shall not be reproduced except in full without written approval by CMA Testing. The results apply to the sample as received unless otherwise specified. The observations and test results in this report are relevant only to the sample tested.

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1 General Information

1.1 General Description

The EUT is a 390MHz Transmitter, model: KEYLESS042. It is used to lock and unlock the remote doors. It is equipped with a 390MHz transmitter. The voltage input of the KEYLESS042 is DC1.5V by one AAA battery.

The 390MHz transmitter is operating in frequency 390MHz and operated by the RF IC, CMT2189B with 23.6363MHz oscillator. OOK modulation is used. The RF signal is transmitted with a wire antenna, 0.0dBi antenna gain.

Brief Circuit Description is listed below

U1	:	RF IC of 390MHz Transmitter, CMT2189B
Y1	:	23.6363MHz clock for 390MHz RF IC
C6, L6, L5	:	Matching circuit
S1 – S12	:	Keypad

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1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2014. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2014. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
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New Territories,
Hong Kong.

FCC Accredited Lab (Designation Number: HK0004)
ISED Wireless Test Site (ISED Assigned Code: 4093A)

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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	15 Jan 2022	1Year
Spectrum Analyzer	Rohde & Schwarz	FSP 30	100628	29 Oct 2021	1Year
Log Periodic Antenna	Teseq	UPA6109	43666	07 Oct 2022	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	02 Feb 2023	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	02 Feb 2023	2Years
Loop Antenna	EMCO	6502	00056620	28 Oct 2022	2Years
Coaxial Cable	Schaffner	RG213/U	N/A	06 May 2021	1Year
Coaxial Cable	Suhner	RG214/U	N/A	06 May 2021	1Year

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1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.59dB
30MHz ~ 200MHz (Vertical)	4.49dB
200MHz ~1000MHz (Horizontal)	4.94dB
200MHz ~1000MHz (Vertical)	4.97dB
1GHz ~ 6GHz	4.52dB
6GHz – 18GHz	4.58dB

1.5 Test Summary

TEST ITEM	FCC REFERANCE	RSS REFERENCE	RESULT
Radiated emission	15.231(a)	RSS-210 Annex A, A.1.2	Comply
Assigned bandwidth (20dB bandwidth)	15.231(c)	-	Comply
Occupied bandwidth >0.25% of centre frequency	-	RSS-210 Annex A, A.1.3	Comply
Transmission time after automatic activation	15.231(b)	RSS-210 Annex A, A.1.1	Comply

1.6 External Photo, Internal Photo and Test Configuration Photo

The External Photo, Internal Photo and Test Configuration Photo associated with this report for the tested product are saved in separated pdf file listed in the following

File content	**File name**
External Photo	X7OAKEYLESS02_8860A-AKEYLESS02 External Photo.pdf
Internal Photo	X7OAKEYLESS02_8860A-AKEYLESS02 Internal Photo.pdf
Test Configuration Photo	X7OAKEYLESS02_8860A-AKEYLESS02 Test SetupPhoto.pdf

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2 Description of the radiated emission test

2.1 Test Procedure

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

A non-conductive turntable with dimensions of 1.5m x 0.4m x 0.8m (L x W x H) placed above the reference ground plane. The equipment under test (EUT) was placed at 0.8m height for below 1GHz measurement and 1.5m height for above 1GHz measurement. The test distance is 3m between EUT and receiving antenna. A broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was 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. Additional absorbing material will be placed between the EUT and receiving antenna for above 1GHz measurement.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

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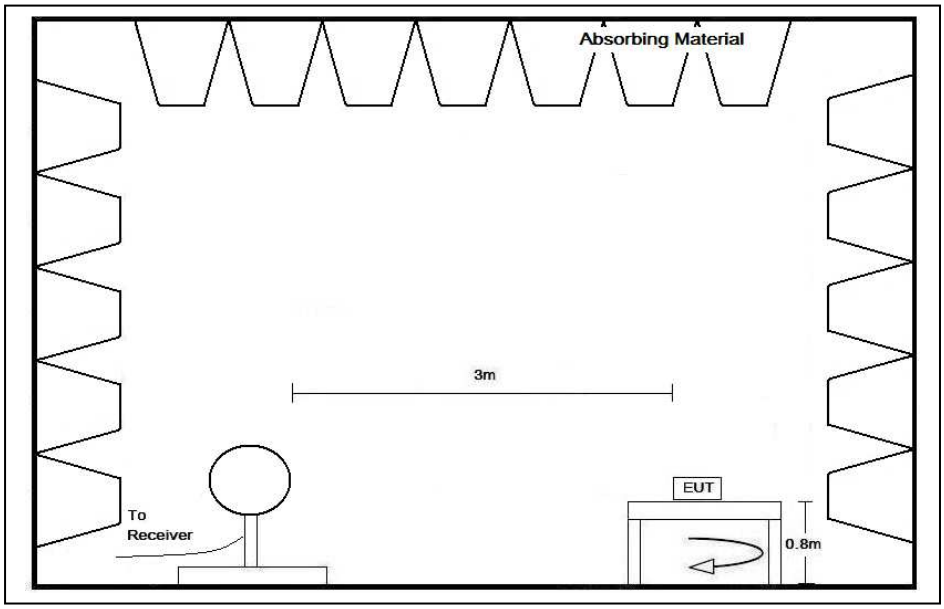
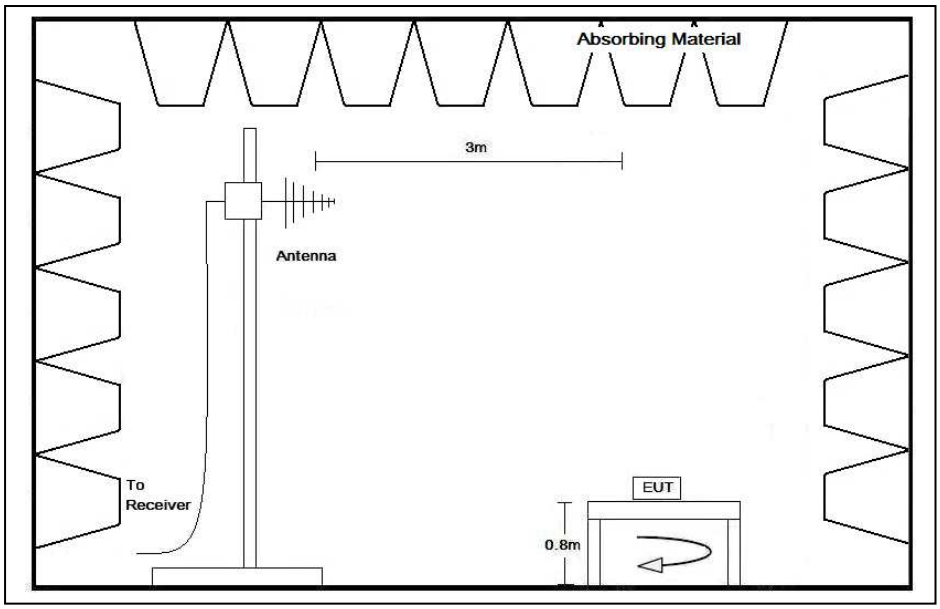
2.2 Test Setup



Below 30MHz



30MHz – 1GHz

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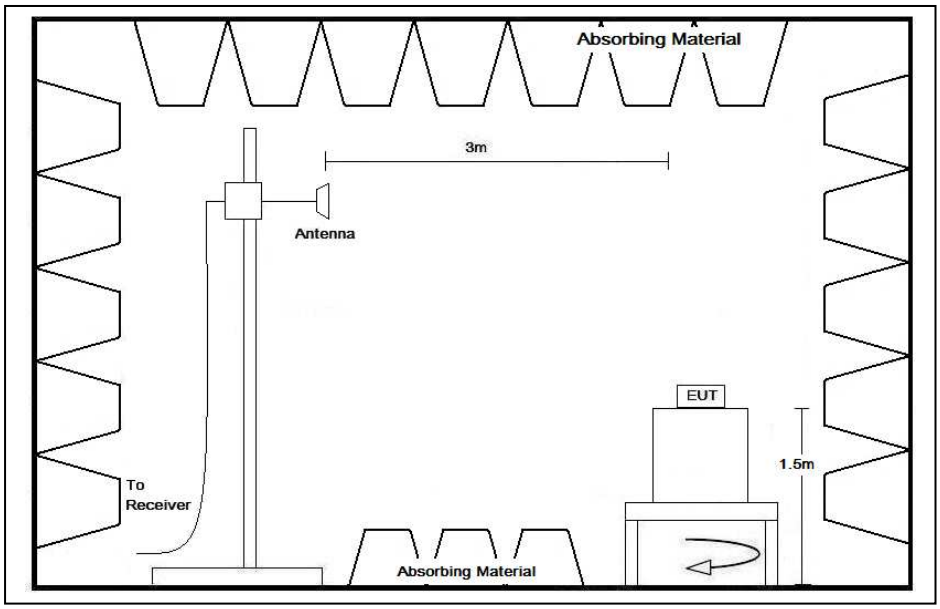
2.2 Test Setup



Above 1GHz

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2.3 Test Result

Peak Detector data was measured unless otherwise stated.

The radiated emissions are measured from 9kHz to 4GHz (the tenth harmonics)

The worst case configuration is shown on the worst case configuration of test setup photo.

The frequencies from fundamental up to tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next pages.

The EUT has been tested in Transmission mode.

It was found that the EUT meet the FCC and RSS requirement.

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2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	24.3	° C
Relative humidity:	52.5	%

Polarization	Frequency (MHz)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Detector Type
H	389.980	67.6	16.9	84.5	99.2	-14.7	PK
H	390.002	61.2	16.9	78.1	79.2	-1.1	AV
V	389.975	65.5	16.9	82.4	99.2	-16.8	PK
V	389.994	59.6	16.9	76.5	79.2	-2.7	AV
H	779.942	40.1	25.1	65.2	79.2	-14.0	PK
H	779.952	10.7	25.1	35.8	59.2	-23.4	AV
H	1169.903[1,2]	73.1	-9.0	64.1	74.0	-9.9	PK
H	1170.052[1,2]	44.8	-9.0	35.8	54.0	-18.2	AV
H	1559.915[1,2]	81.5	-8.0	73.5	74.0	-0.5	PK
H	1560.036[1,2]	59.1	-8.0	51.1	54.0	-2.9	AV
H	1949.977	80.9	-7.2	73.7	79.2	-5.5	PK
H	1950.051	60.9	-7.2	53.7	59.2	-5.5	AV
H	2339.876[1,2]	79.9	-6.7	73.2	74.0	-0.8	PK
H	2340.041[1,2]	49.7	-6.7	43.0	54.0	-11.0	AV
H	2729.865[1,2]	78.5	-4.7	73.8	74.0	-0.2	PK
H	2730.021[1,2]	53.2	-6.7	46.5	54.0	-7.5	AV
H	3119.844	76.8	-3.3	73.5	79.2	-5.7	PK
H	3120.003	41.4	-3.3	38.1	59.2	-21.1	AV
H	3509.951[2]	70.0	-2.3	67.7	74.0	-6.3	PK
H	3509.918[2]	45.7	-2.3	43.4	54.0	-10.6	AV
H	3899.944[1,2]	62.0	-2.3	59.7	74.0	-14.3	PK
H	3889.965[1,2]	36.4	-2.3	34.1	54.0	-19.9	AV

Remark: 1) The emissions fall in the restricted band under 15.205, so the average limit shown on 15.209 applied.

2) The emission fall in the restricted band under Table 7 of RSS-Gen and General limit under RSS-Gen is applied.

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3 Description of the Line-conducted Test

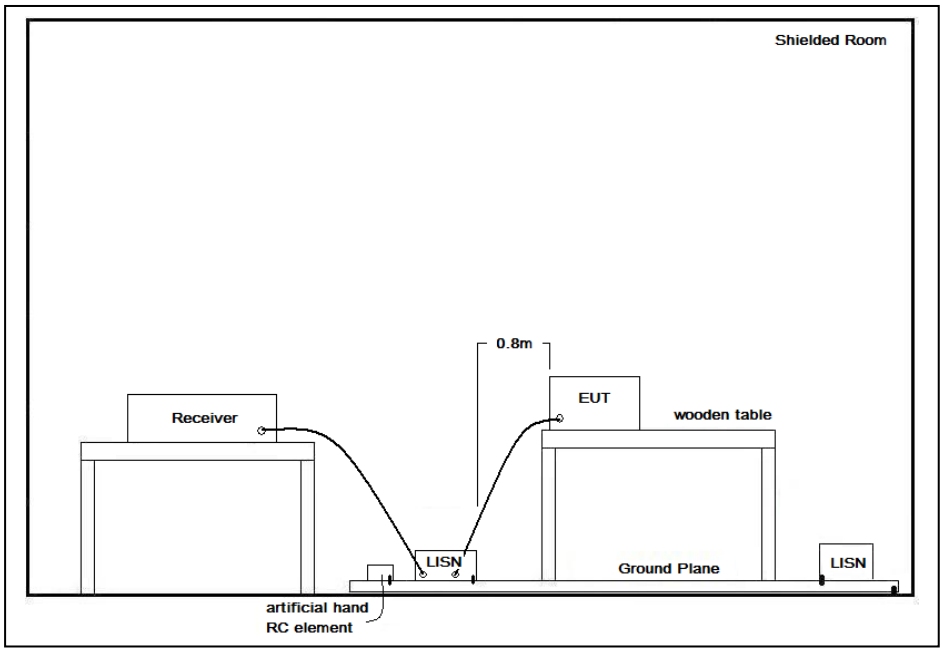
3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

No measurement is required as the EUT is operating with 24VAC

3.3 Test Setup



3.4 Graph and Table of Conducted Emission Measurement Data

Not Applicable

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4 Additional requirement

4.1 Bandwidth

Appendices A1 show the fundamental emission is confined in the specified band. The 20dB bandwidth is 185.375kHzand 99% bandwidth is 327.25kHz. The bandwidth requirement is 0.25% of 390MHz = 975kHz. It also shows that the EUT meets the FCC Part 15.231(c) and RSS-210 Annex A A.1.3 bandwidth requirement.

4.2 Transmission time

Duration of each transmission after release the final button = 1.3075s

The duration of the transmission is less than 5s after the switch being released. An Appendices A2 is shown the EUT to comply with FCC Part 15, section 15.231(a)(1) and RSS-210, Annex A, section A.1.1(a)

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5 Appendices

A1.	Bandwidth Plot	1	page(s)
A2.	Transmission Time	1	Page(s)

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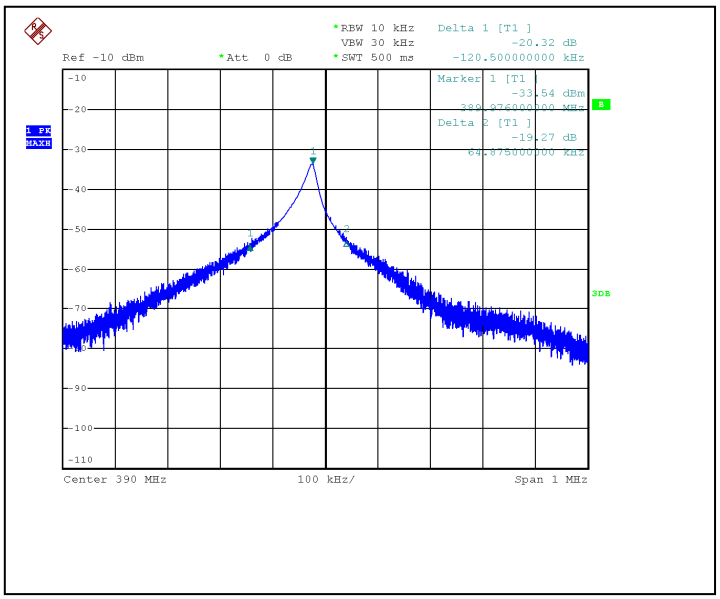
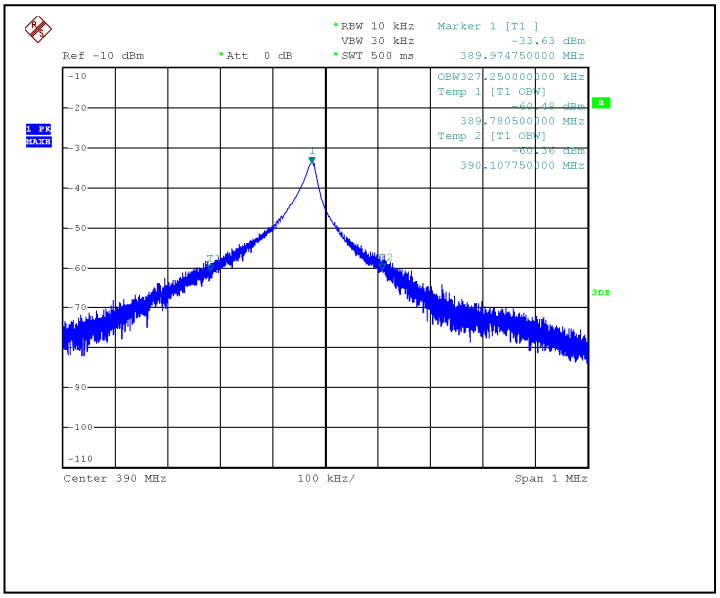
A1. Bandwidth Plot



20dB bandwidth



99% bandwidth

FCC ID: X7OAKEYLESS042
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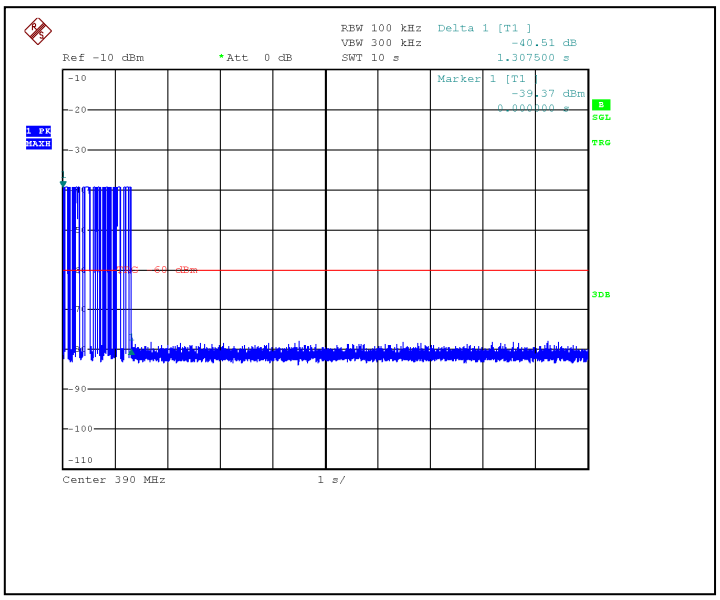
A2. Transmission Time



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