



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1) Date : 3 April, 2018

Application No. : LW007653

Applicant : Skylink Technologies Inc.,

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

Sample Description	Model No.
Garage Door Opener	AQ-600, AQ-800, AQ-803 MQ-600, MQ-800, MQ-803 LQ-600, LQ-800, LQ-803

Radio Frequency : 433.92MHz

Rating : AC 120V, 60Hz

No. of submitted sample : Six (6) piece (s)

Sample registration No. : RW010716

Date Received : March 19, 2018

Test Period : March 26 – 29, 2018

Test Requested : FCC 47CFR Part 15 Certification.
ISED Canada Radio Standards Specification RSS-210.


Test Method : 47 CFR Part 15 (10-1-17 Edition)
ANSI C63.10 – 2013
RSS-210 Issue 9
RSS-GEN Issue 4

Test Result : See attached sheet(s) from page 2 to 21.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C and ISED Canada RSS-210 Issue 9.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____


Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

Page 1 of 21

FCC ID: X7ORADIOEM903
IC: 8860A-RADIOEM903

CMA Industrial Development Foundation Limited

Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.

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CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

Table of Contents

1	General Information	3
1.1	General Description	3
1.2	Location of the test site	4
1.3	List of measuring equipment.....	5
1.4	Measurement Uncertainty.....	6
1.5	Test Summary	6
2	Description of the radiated emission test	7
2.1	Test Procedure	7
2.2	Test Setup	8
2.3	Test Result	10
3	Description of the Line-conducted Test.....	13
3.1	Test Procedure	13
3.2	Test Result	13
3.3	Test Setup	13
3.4	Graph and Table of Conducted Emission Measurement Data	14
4	Supplementary document.....	18
4.1	Bandwidth.....	18
4.2	Duty cycle.....	18
4.3	Transmission time.....	18
5	Appendices.....	19



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

1 General Information

1.1 General Description

The equipment under test (EUT) model AQ-600, AQ-800, AQ-803, MQ-600, MQ-800, MQ-803, LQ-600, LQ-800 and LQ-803 are a garage door opener with RF function. Its primary functions is open the garage door triggered by a 318MHz remote control key, wall console and wall button; and it also transmit the signal to main console to notice the operating state of the garage door.

The transmitter is operating at 433.92MHz with 13.56MHz oscillator, and the receiver is operating at 318MHz with 9.909115MHz oscillator. The EUT is powered by AC120V, 60Hz.

The model difference is only on the output power of transformer for the motor driver, type of front light of behind light, type of wall console and software version used. The Transmitter and receiver module are same on all models.

The wire antenna is permanently attached in EUT and the radio output power is unable to adjust.

The brief circuit description is listed as follows:

-U7	and its associated circuit act as MCU
-CON4	and its associated circuit act as receiver module
-4PIN	and its associated circuit act as transmitter module
-U2 in TX module	and its associated circuit act as transmitter RF IC
-U1 in RX module	and its associated circuit act as receiver RF IC



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

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,
Fo Tan, Shatin,
New Territories,
Hong Kong.

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



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	Rohde & Schwarz	ESCS30	100001	01 Feb 2019	1Year
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	07 Dec 2018	1Year
Spectrum Analyzer	R&S	FSV40	100964	08 Feb 2019	1Year
Spectrum Analyzer	Rohde & Schwarz	FSP30	100628	28 Mar 2018	1Year
Broadband Antenna	Schaffner	CBL6112B	2692	29 Mar 2018	2Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2020	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	21 Dec 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2018	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2018	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2018	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	21 Dec 2018	1Year
LISN	Rohde & Schwarz	ENV216	101323	16 Jan 2019	1Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	24 Oct 2018	1Year



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

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

1.5 Test Summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Radiated emission	15.231(b)	RSS-210 Issue 9 Annex A1.1 Table A & Clause 2.2	Comply
Assigned bandwidth (20dB bandwidth)	15.231(c)	-	Comply
Occupied bandwidth >0.25% of the centre frequency	-	RSS-210 Issue 9 Annex A1.1.3	Comply
Transmission time after manual activation	15.231(a)	RSS-210 Issue Annex A1.1.1	Comply
Conducted Emission	15.109	RSS-Gen Issue 4 Clause 8.8	Comply



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

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.

Model: MQ-800 and LQ-803 are selected as test model because they are contain difference LED lighting circuit board and highest output of transformer.



CMA Testing and Certification Laboratories

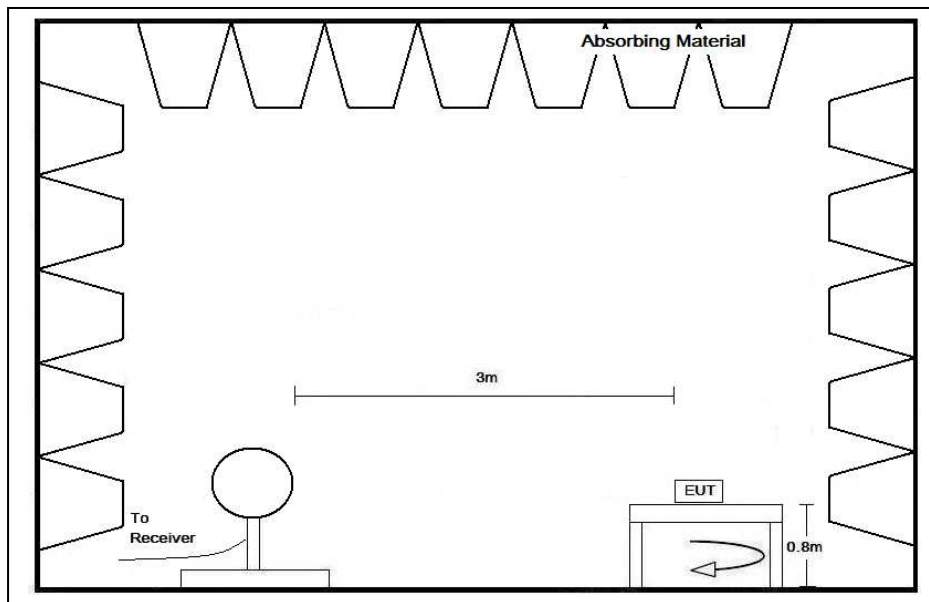
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TEST REPORT

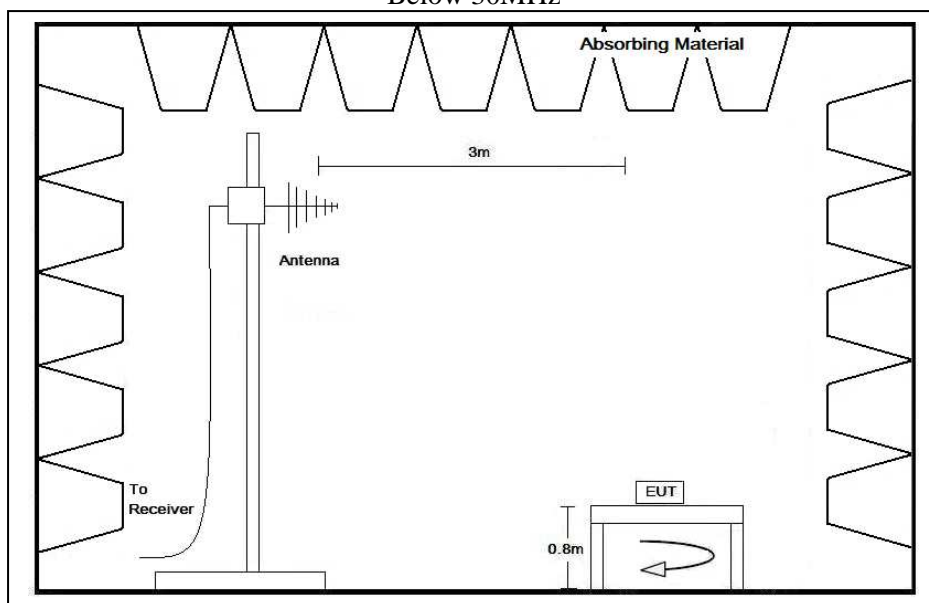
Report No. : AW0016410(1)

Date : 3 April, 2018

2.2 Test Setup



Below 30MHz



30MHz – 1GHz

FCC ID: MY5ATOM2
IC: 3133B-ATOMS2

Page 8 of 21



CMA Testing and Certification Laboratories

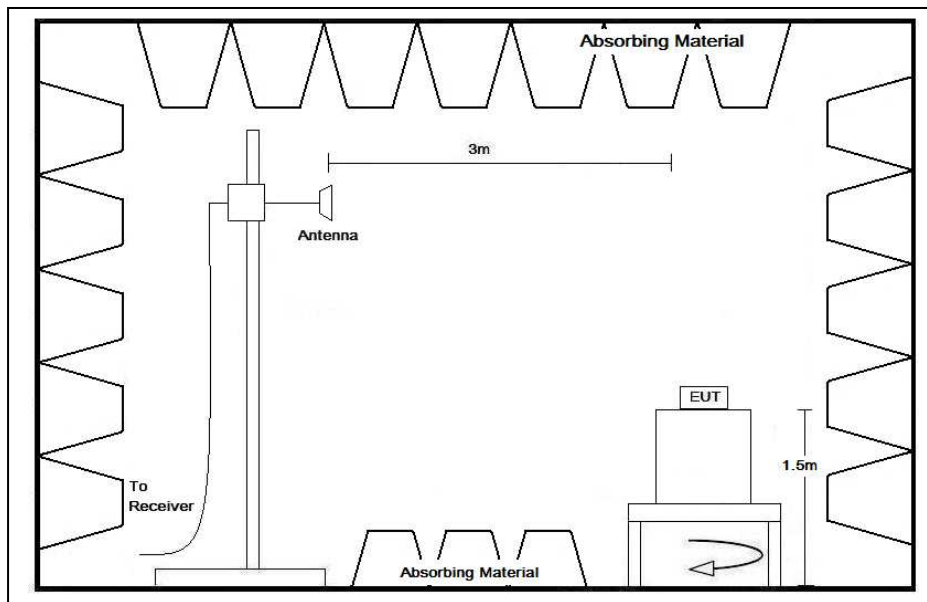
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TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

2.2 Test Setup



Above 1GHz

FCC ID: MY5ATOM2
IC: 3133B-ATOMS2

Page 9 of 21



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

2.3 Test Result

Peak Detector data was measured unless otherwise stated.

The radiated emissions are measured from 9kHz to 5GHz (the tenth harmonics)

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

“#” means emissions appearing within the restricted bands of 47 CFR Part 15 section 15.205 and “*” means emission appearing within the restricted band of RSS-GEN section 8.10.

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.

According to model difference description, model: MQ-800 and LQ-803 are selected as represented model for testing.

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



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	23.9	° C
Relative humidity:	54.7	%

Model: MQ-800

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	433.926	43.0	20.9	63.9	80.8	-16.9	Peak
H	867.849	32.3	26.9	59.2	60.8	-1.6	Peak
V	433.923	37.5	20.9	58.4	80.8	-22.4	Peak
V	867.856	31.9	26.9	58.8	60.8	-2.0	Peak
H	*#1301.176	40.5	-7.8	32.7	54.0	-21.3	Peak
H	2169.622	45.2	-6.7	38.5	60.8	-22.3	Peak
H	2603.554	44.9	-4.7	40.2	60.8	-20.6	Peak
V	*#1301.780	42.6	-7.8	34.8	54.0	-19.2	Peak
V	2169.632	43.3	-6.7	36.6	60.8	-24.2	Peak
V	2603.558	42.8	-4.7	38.1	60.8	-22.7	Peak

Remark: 1) The peak detector value is below the average limit, so no average measurement is done.

2) * The emission is fall in the restricted band of FCC section 15.205.

3) # The emission is fall in the restricted band of RSS-Gen Table 6.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	23.9	° C
Relative humidity:	54.7	%

Model: LQ-803

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	433.920	39.6	20.9	60.5	80.8	-20.3	Peak
H	867.842	32.1	26.9	59.0	60.8	-1.8	Peak
V	433.926	46.1	20.9	67.0	80.8	-13.8	Peak
V	867.865	29.5	26.9	56.4	60.8	-4.4	Peak
H	*#1301.176	42.8	-7.8	35.0	54.0	-19.0	Peak
H	1735.340	41.5	-7.9	33.6	60.8	-27.2	Peak
H	2169.596	42.9	-6.7	36.2	60.8	-24.6	Peak
H	2603.458	43.3	-4.7	38.6	60.8	-22.2	Peak
H	3037.330	42.5	-3.3	39.2	60.8	-21.6	Peak
V	*#1301.794	44.8	-7.8	37.0	54.0	-17.0	Peak
V	2169.546	42.2	-6.7	35.5	60.8	-25.3	Peak
V	2603.520	41.1	-4.7	36.4	60.8	-24.4	Peak
V	3037.384	41.8	-3.3	38.5	60.8	-22.3	Peak

- Remark: 1) The peak detector value is below the average limit, so no average measurement is done.
 2) * The emission is fall in the restricted band of FCC section 15.205.
 3) # The emission is fall in the restricted band of RSS-Gen Table 6.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

3 Description of the Line-conducted Test

3.1 Test Procedure

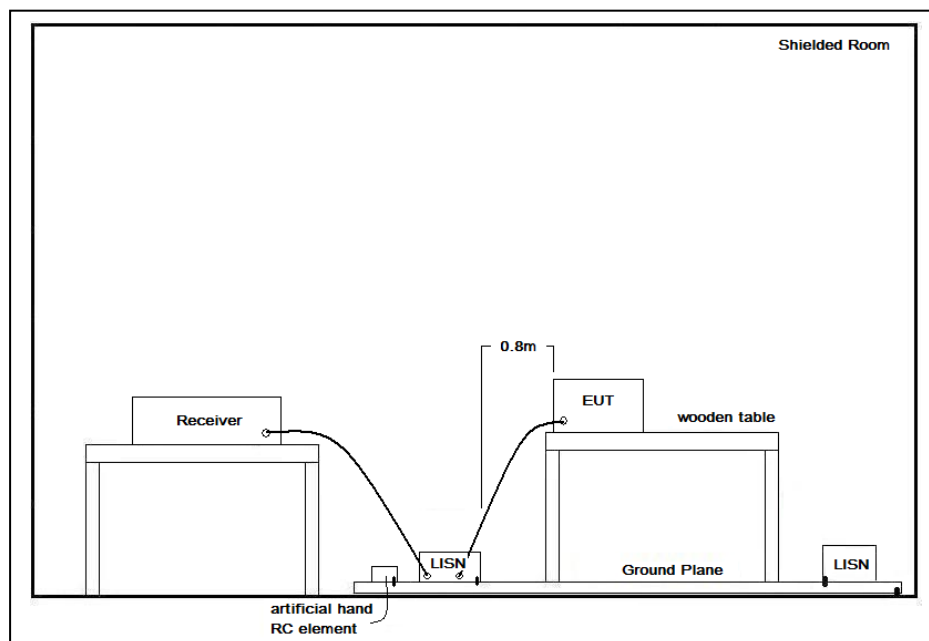
Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

Model: MQ-800 and LQ-803 are selected as test model because they are contain difference LED lighting circuit board and highest output of transformer.

3.2 Test Result

PASS

3.3 Test Setup





CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

3.4 Graph and Table of Conducted Emission Measurement Data

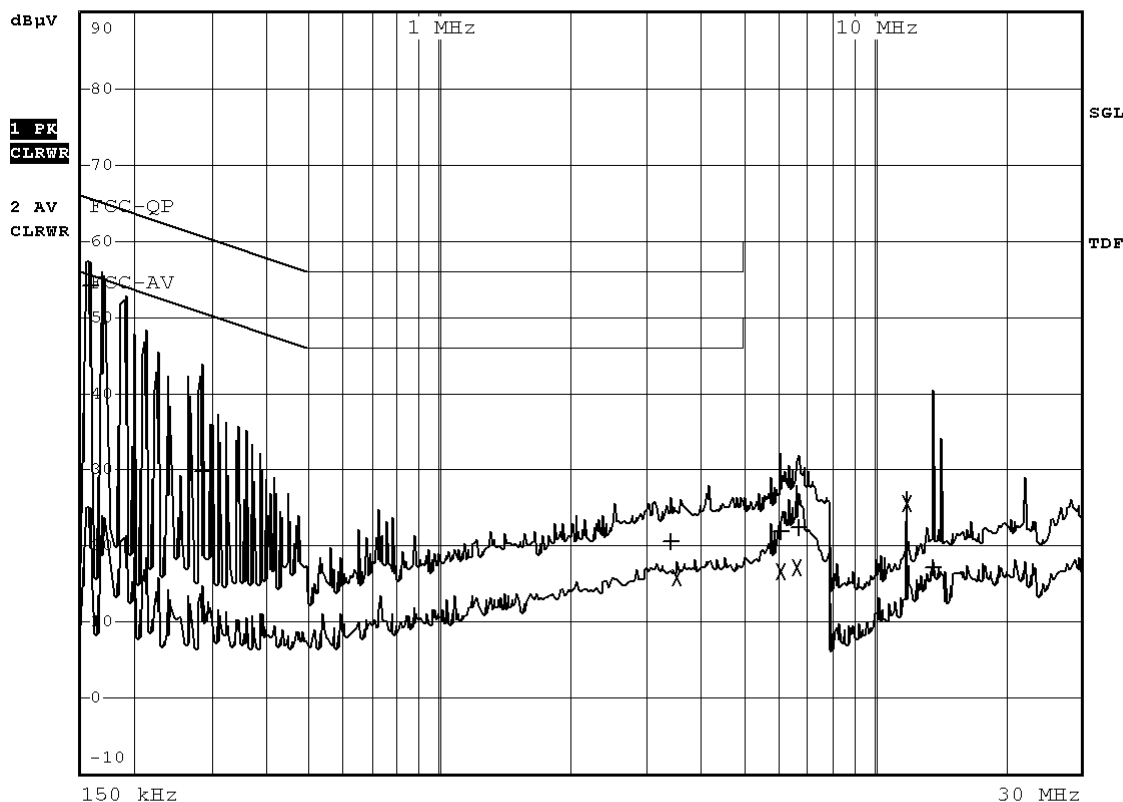
Model: MQ-800



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Date: 28.MAR.2018 16:51:49



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
1 Quasi Peak	159 kHz	54.10	L1 gnd	-11.41
1 Quasi Peak	285 kHz	29.66	N gnd	-31.00
1 Quasi Peak	3.398 MHz	20.63	L1 gnd	-35.36
2 Average	3.5285 MHz	15.75	N gnd	-30.24
2 Average	6.1115 MHz	16.65	N gnd	-33.34
1 Quasi Peak	6.116 MHz	21.91	N gnd	-38.08
2 Average	6.647 MHz	17.03	L1 gnd	-32.96
1 Quasi Peak	6.755 MHz	22.31	N gnd	-37.68
2 Average	11.9885 MHz	25.44	L1 gnd	-24.56
1 Quasi Peak	13.676 MHz	17.26	L1 gnd	-42.73

Date: 28.MAR.2018 16:51:35

FCC ID: MY5ATOM2
IC: 3133B-ATOMS2



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

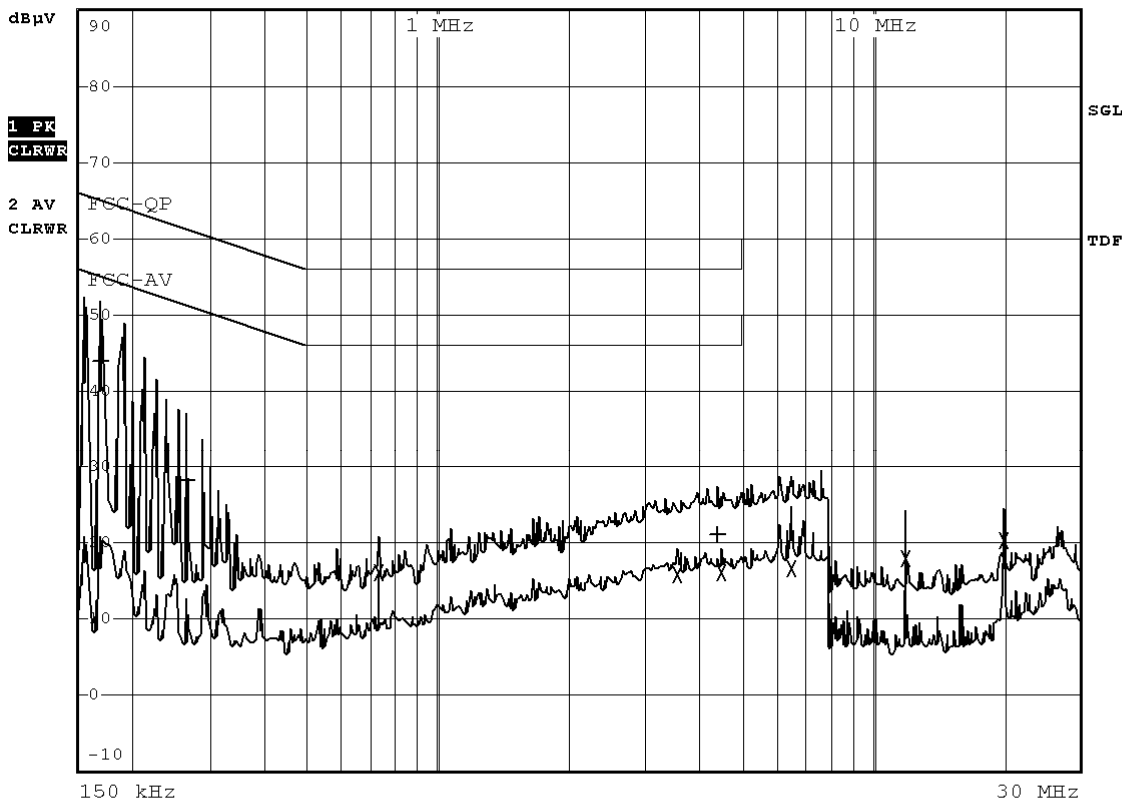
Model: LQ-803



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



Date: 28.MAR.2018 17:07:16

FCC ID: MY5ATOM2
IC: 3133B-ATOMS2



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

EDIT PEAK LIST (Final Measurement Results)			
Trace1:	FCC-QP		
Trace2:	FCC-AV		
Trace3:	---		
TRACE	FREQUENCY	LEVEL dBμV	DELTA LIMIT dB
1 Quasi Peak	168 kHz	43.89 L1 gnd	-21.16
1 Quasi Peak	267 kHz	28.22 L1 gnd	-32.98
2 Average	734 kHz	16.13 N gnd	-29.86
2 Average	3.5645 MHz	15.75 L1 gnd	-30.24
1 Quasi Peak	4.4195 MHz	21.17 N gnd	-34.82
2 Average	4.496 MHz	16.13 L1 gnd	-29.86
2 Average	6.512 MHz	16.62 N gnd	-33.37
2 Average	11.984 MHz	18.06 N gnd	-31.93
2 Average	19.9805 MHz	20.40 L1 gnd	-29.59

Date: 28.MAR.2018 17:07:00

FCC ID: MY5ATOM2
IC: 3133B-ATOMS2



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

4 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	Label artwork and location.pdf
Block Diagram	Block diagram.pdf
Schematic Diagram	Schematic.pdf
Users Manual	User Manual.pdf
Operational Description	Operation Description.pdf

4.1 Bandwidth

Appendices A1 is shown the fundamental emission is confined in the specified band. The 20dB bandwidth is 2.16kHz and 99% bandwidth is 8.52kHz. The bandwidth requirement is 0.25% of 433.92MHz = 1084.8kHz . It also shows that the EUT met the FCC Part 15.231(c) and RSS-210 Annex A1.1.3 bandwidth requirement.

4.2 Transmission time

The device is triggered to transmit the signal when the motor is “ON” or “OFF”. The transmission is less than 3s after triggering.

Duration of each transmission =2.88s

The duration of the transmission is less than 5s after the transmission is triggered by the motion of motor. An Appendices A2 is shown the EUT to comply with FCC part 15, section 15.231(a)(2) and RSS-210, Annex 1, section A1.1.1.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

5 Appendices

A1.	Bandwidth Plot	1	page(s)
A2.	Transmission time	1	page(s)



CMA Testing and Certification Laboratories

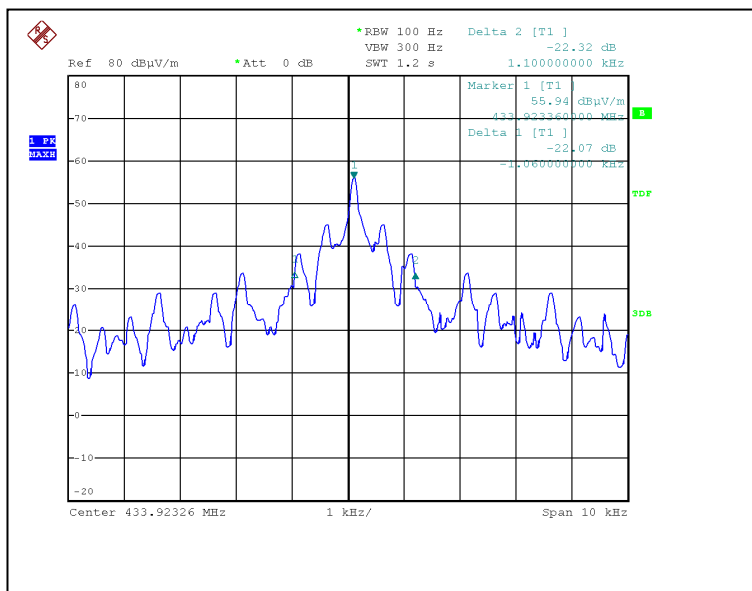
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TEST REPORT

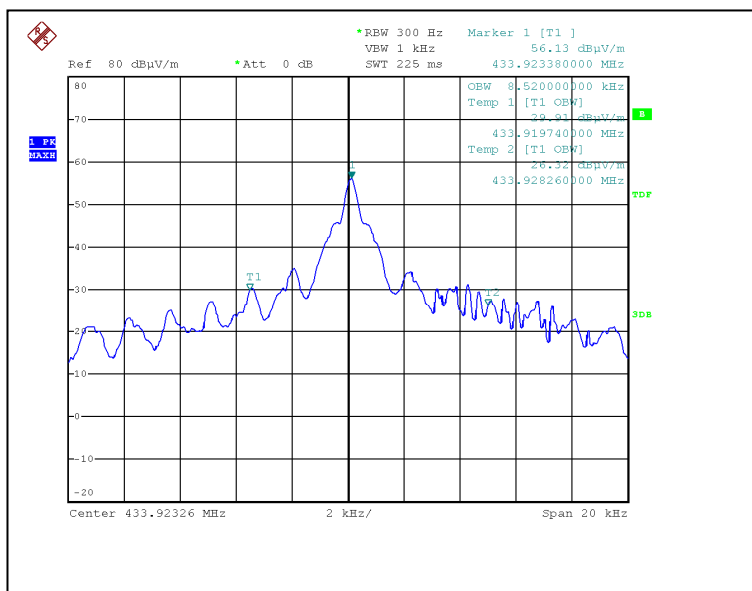
Report No. : AW0016410(1)

Date : 3 April, 2018

A1. Bandwidth Plot



20dB bandwidth



99% occupied bandwidth



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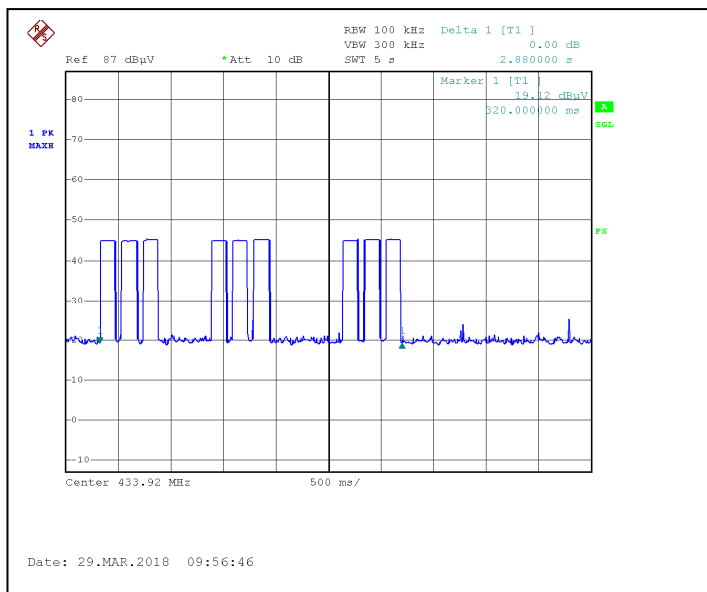
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TEST REPORT

Report No. : AW0016410(1)

Date : 3 April, 2018

A2. Transmission time



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