



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8) Date : August 30, 2018

Application No. : LW024138(7)

Applicant : Capital Prospect Ltd.
Rm 03, 13/F, Block B, Veristrong Ind. Building,
34-36 Au Pui Wan Street, Fo Tan,
N.T., Hong Kong

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

Sample Description	Model No.
Garage Door Internet Gateway	NV-001

Radio Frequency : 910 - 918MHz and 2412 – 2462MHz

Rating : 100 – 240V, 50/60Hz, 0.6A

No. of submitted sample : One (1) set (s)

Sample registration No. : RW023136-001(5)

Date Received : 31 Jul 2018.

Test Period : 2 Aug 2018 to 29 Aug 2018

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

Test Method : 47 CFR Part 15 (10-1-17 Edition)
ANSI C63.10 – 2013
ANSI C63.4 – 2014
RSS-210 Issue 9
RSS-Gen Issue 5

Test Result : See attached sheet(s) from page 2 to 19.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C, section 15.249 and ISED Canada Radio Standard Specification.

Remark : The WiFi module operating from 2412 – 2462MHz are certified with FCC ID: 2ADUIESP and IC: 23236-ESP12F under module approval.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

Page 1 of 19

FCC ID: KUTNV001
IC: 4454A-NV001



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 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
3.1	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.....	16
4.1	Bandwidth.....	16
5	Appendices.....	17



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

1 General Information

1.1 General Description

This is a garage door internet gateway for existing garage door openers product. This gateway is connected to the internet via Wi-Fi, meaning it will allow App remote access, so it will have all the required elements for remote operation such as flashing light and beeping alert when closing the door thru the app. It controls the garage door opener with a relay momentary contact thru the push button wire, so just like pressing the push button electronically.

The device is powered by 100 – 240Vac AC/DC adaptor with 12Vdc output. The device has two transceivers for communication with sensor and WiFi router. Two transceivers are operating with 910 - 918MHz and 2412 – 2462MHz respectively.

The 900MHz transceiver uses RF IC, CMT2300A with external clock, 26MHz to generate a FSK modulation signal for communication by an integral coil antenna, 0.0dBi. Its channel frequencies are 910MHz, 912MHz, 914MHz, 916MHz and 918MHz. The channels selection is randomly and will change other channels if any interference occurs on that channels.

The WiFi module, ESP8266MOD, uses IEEE 802.11b/g/n technology for the WiFi communication with WiFi router. The module is under module approval of FCC and ISED certification with FCC ID: 2ADUIESP and IC: 23236-ESP12F respectively.

This report is mainly on the measurement on the transmitter part of the 900MHz transceiver. The WiFi module compliance is under its module approval certification and the receiver part of the 900MHz transceiver is under sDoC procedure.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 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 Lab (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. : AW0048972(8)

Date : August 30, 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	Rohde & Schwarz	FSV40	100964	08 Feb 2019	1Year
Broadband Antenna	Schaffner	CBL6112B	2692	28 Mar 2020	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	01 Aug 2020	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	01 Aug 2020	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	17 May 2019	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	17 May 2019	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

1.4 Supporting Equipment

- 1) Four 1m wires connected to the switch socket to simulate the open switch



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

1.5 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

1.6 Test Summary

TEST ITEM	FCC REFERANCE	RSS REFERENCE	RESULT
Fundamental and harmonic emission	15.249(a)	RSS-210, Annex B.10(a)	Comply
Out-band emission	15.249(d)	RSS-210, Annex B.10(b)	Comply
Peak Limit	15.249(e)	RSS-Gen, 8.1	Comply
Bandwidth	15.215(c)	RSS-Gen, 6.7	Comply

FCC ID: KUTNV001
IC: 4454A-NV001



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 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.

The USB port and the 8 pin socket are only used maintenance and firmware upgrade purpose and are not used by user. Therefore, they are not connected during test.



CMA Testing and Certification Laboratories

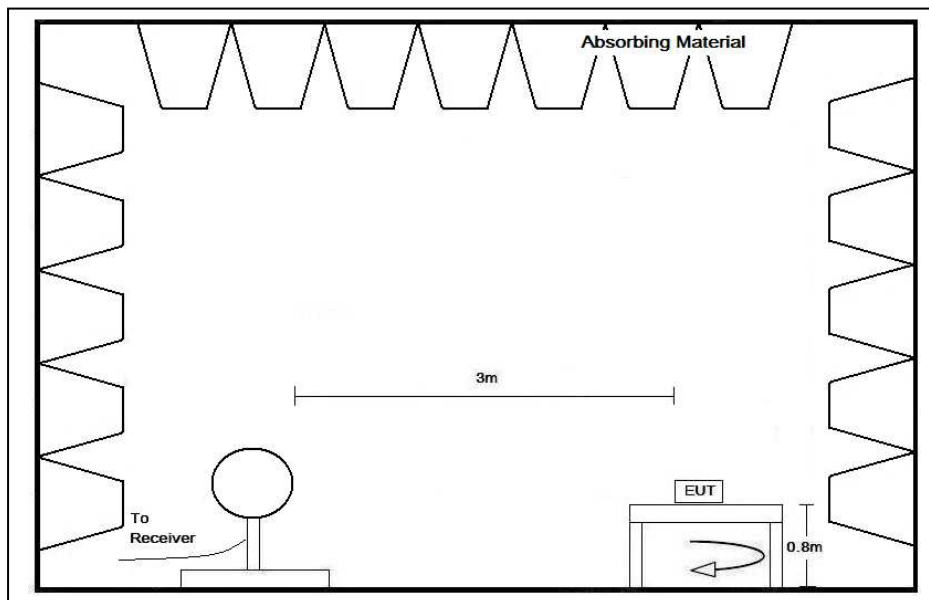
廠商會檢定中心

TEST REPORT

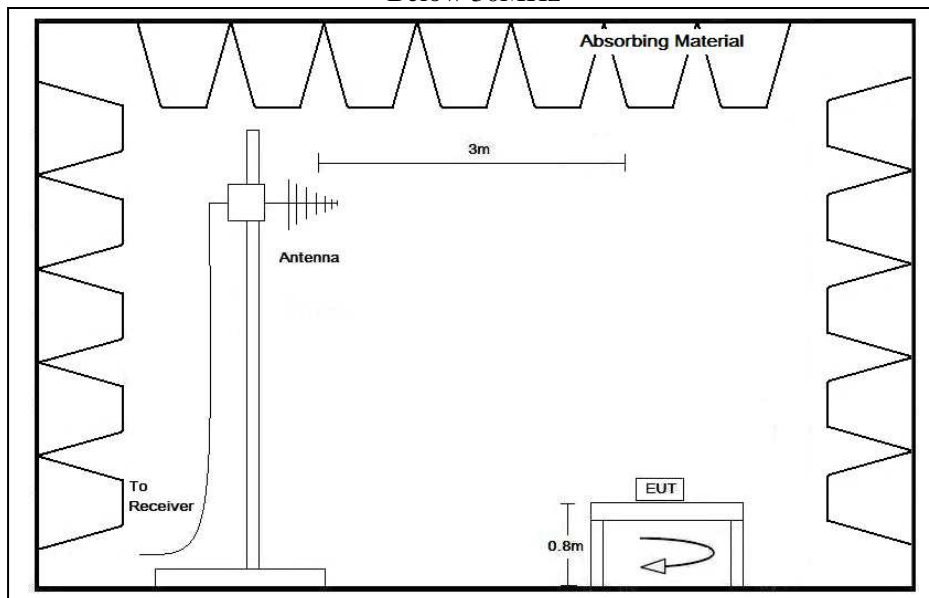
Report No. : AW0048972(8)

Date : August 30, 2018

2.2 Test Setup



Below 30MHz



30MHz – 1GHz

FCC ID: KUTNV001
IC: 4454A-NV001

Page 8 of 19



CMA Testing and Certification Laboratories

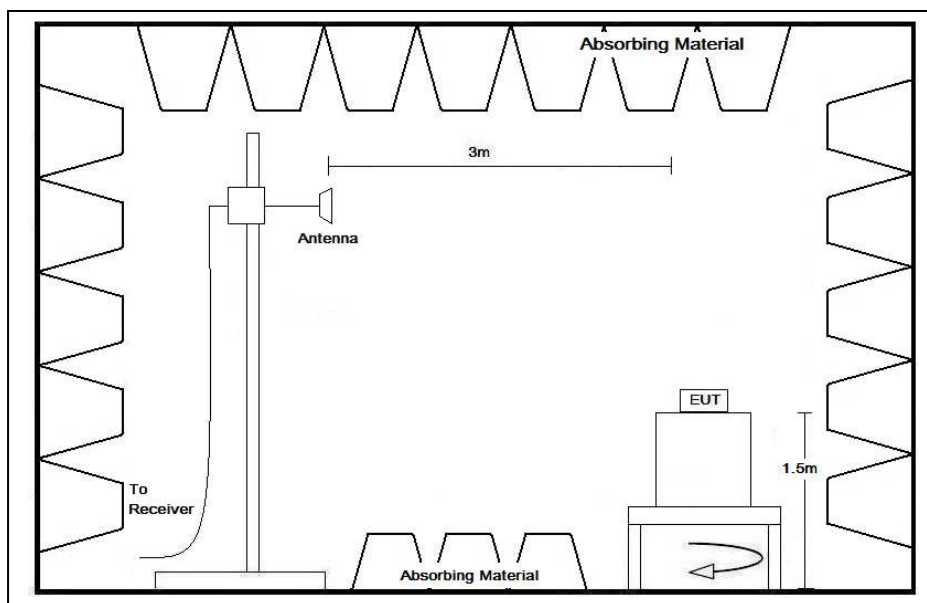
廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

2.2 Test Setup



Above 1GHz

FCC ID: KUTNV001
IC: 4454A-NV001

Page 9 of 19



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

2.3 Test Result

Quasi-Peak Detector data was measured from 9kHz to 1000MHz and Peak Detector data was measured above 1GHz unless otherwise stated.

The radiated emissions are measured from 9kHz to 9GHz (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.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

Parameter	Recorded value
Ambient temperature:	27.0 °C
Relative humidity:	63.8 %

Channel: 910MHz

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	909.965	58.6	28.3	86.9	94.0	-7.1	Quasi-Peak
V	909.963	58.9	28.3	87.2	94.0	-6.8	Quasi-Peak
H	902.000	15.9	28.3	44.2	46.0	-1.8	Quasi-Peak
H	1819.849	56.8	-7.6	49.2	54.0	-4.8	Peak
V	2730.056	43.0	-4.7	38.3	54.0	-15.7	Peak
V	3639.869	43.4	-2.3	41.1	54.0	-12.9	Peak
V	4550.043	50.2	0.9	51.1	54.0	-2.9	Peak
V	5460.324	43.0	3.2	46.2	54.0	-7.8	Peak

Remark: 1) The peak values of emission are below the average limit, so no average measurement is performed.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

Channel: 918 MHz

Polarization	Frequency (MHz)	Reading at 3m (dB μ V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)	Detector Type
H	917.960	58.9	28.3	87.2	94.0	-6.8	Quasi-Peak
V	917.964	58.6	28.3	86.9	94.0	-7.1	Quasi-Peak
V	928.000	16.0	28.3	44.3	46.0	-1.7	Quasi-Peak
V	1835.924	55.1	-7.6	47.5	54.0	-6.5	Peak
V	2754.134	43.4	-4.7	38.7	54.0	-15.3	Peak
V	3671.904	43.5	-2.3	41.2	54.0	-12.8	Peak
V	4589.871	49.5	0.9	50.4	54.0	-3.6	Peak
V	5507.848	42.7	4.1	46.8	54.0	-7.2	Peak

Remark: 1) The peak values of emission are below the average limit, so no average measurement is performed.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 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.

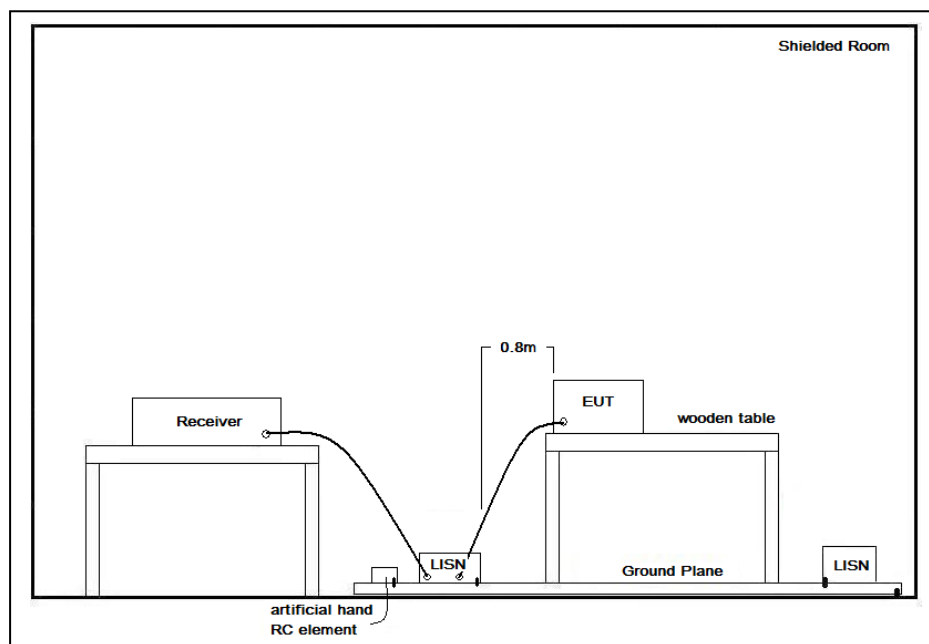
The USB port and the 8 pin socket are only used maintenance and firmware upgrade purpose and are not used by user. Therefore, they are not connected during test.

3.2 Test Result

The EUT has been tested in Transmission mode.

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

3.3 Test Setup





CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

3.4 Graph and Table of Conducted Emission Measurement Data

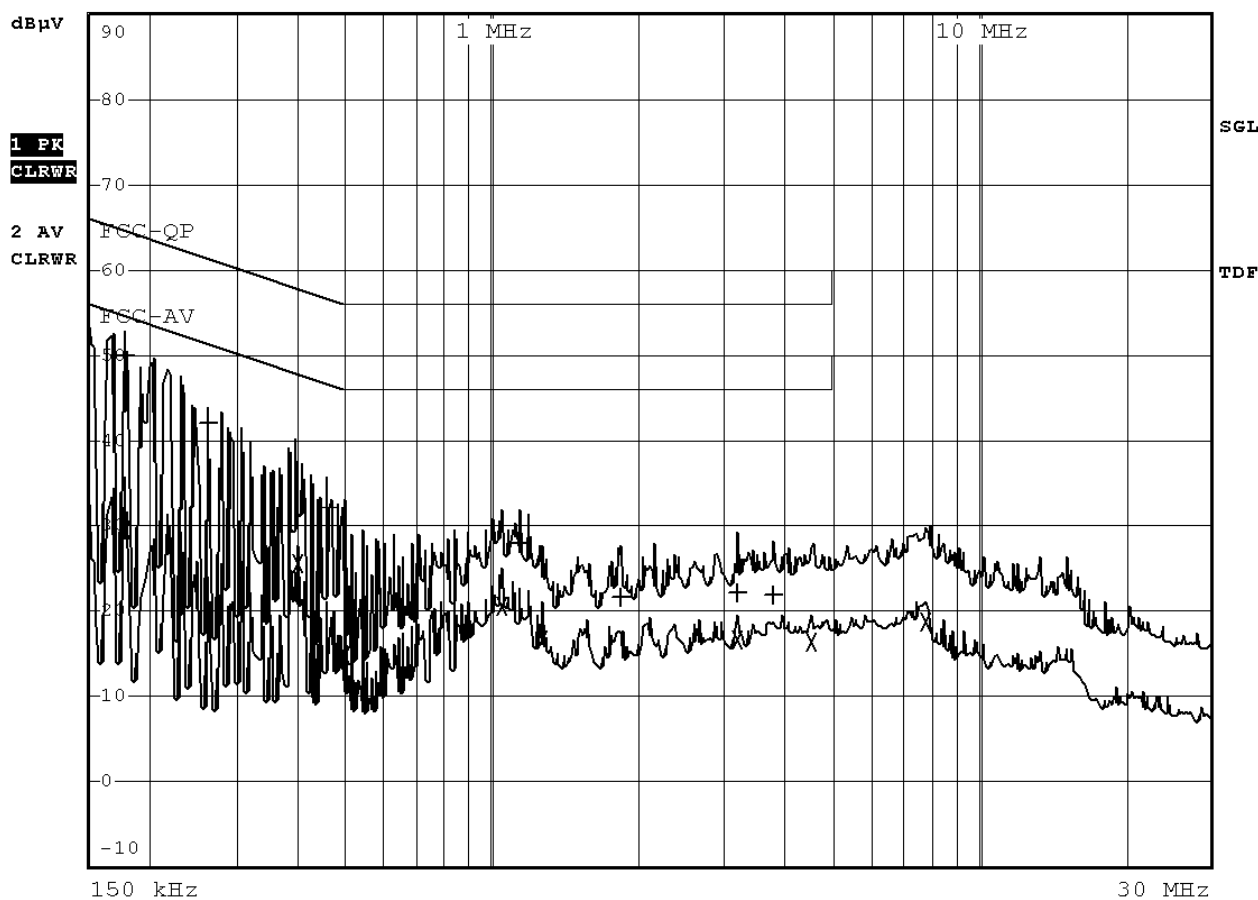
1) Emission Graph:



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



FCC ID: KUTNV001
IC: 4454A-NV001



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

2) Emission Graph

EDIT PEAK LIST (Final Measurement Results)				
TRACE	FREQUENCY	LEVEL dB μ V		DELTA LIMIT dB
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
1 Quasi Peak	177 kHz	49.86	N gnd	-14.75
2 Average	177 kHz	29.51	L1 gnd	-25.10
1 Quasi Peak	262.5 kHz	41.99	N gnd	-19.35
2 Average	402 kHz	25.51	L1 gnd	-22.29
1 Quasi Peak	460.5 kHz	32.21	N gnd	-24.47
2 Average	500 kHz	14.82	L1 gnd	-31.17
2 Average	1.0445 MHz	20.61	L1 gnd	-25.38
1 Quasi Peak	1.148 MHz	28.00	N gnd	-27.99
2 Average	1.265 MHz	16.55	L1 gnd	-29.44
1 Quasi Peak	1.8455 MHz	21.65	L1 gnd	-34.34
1 Quasi Peak	3.218 MHz	22.18	L1 gnd	-33.81
2 Average	3.218 MHz	16.57	L1 gnd	-29.42
1 Quasi Peak	3.812 MHz	21.96	L1 gnd	-34.03
2 Average	4.5365 MHz	16.34	L1 gnd	-29.65
2 Average	7.7855 MHz	18.74	N gnd	-31.25

FCC ID: KUTNV001
IC: 4454A-NV001



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 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 and A2 show the fundamental emission is confined in the specified band. 20dB bandwidth is 153.4kHz and 99% bandwidth is 198.3kHz. Both bandwidths fall in the band of 902 – 928MHz. It also shows that the EUT met the requirement of FCC Part 15.215(c) and RSS-GEN.



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0048972(8)

Date : August 30, 2018

5 Appendices

A1.	20dB Bandwidth Plot	2	page(s)
A2.	99% Bandwidth Plot	2	Page(s)

FCC ID: KUTNV001
IC: 4454A-NV001

Page 17 of 19



CMA Testing and Certification Laboratories

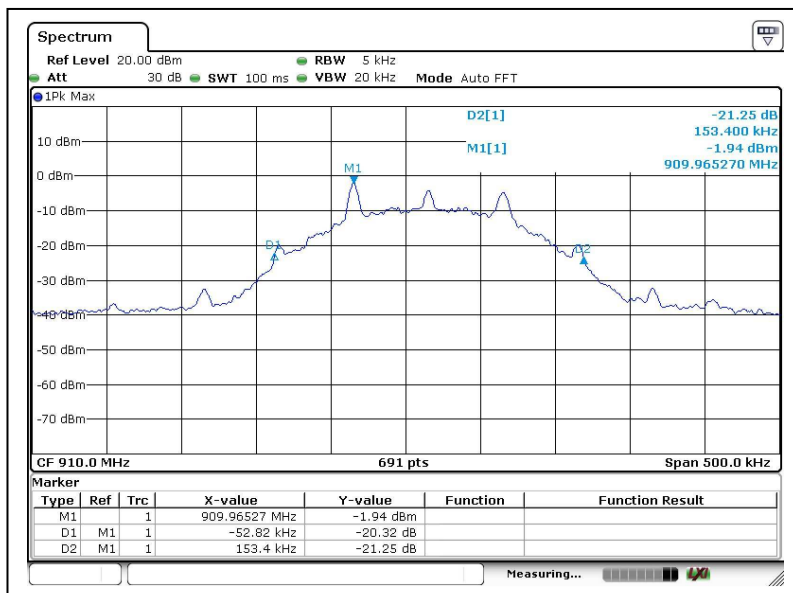
廠商會檢定中心

TEST REPORT

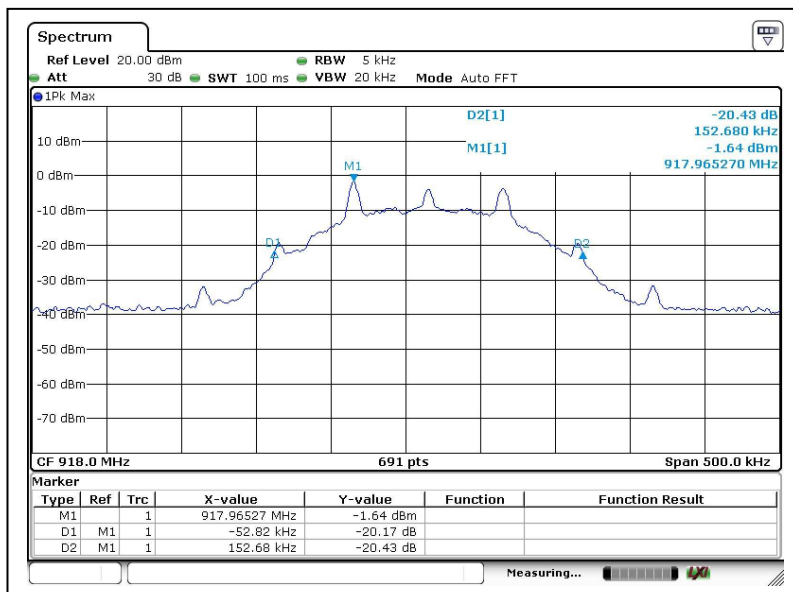
Report No. : AW0048972(8)

Date : August 30, 2018

A1. 20dB Bandwidth Plot



Channel: 910MHz



Channel: 918MHz

FCC ID: KUTNV001
IC: 4454A-NV001



CMA Testing and Certification Laboratories

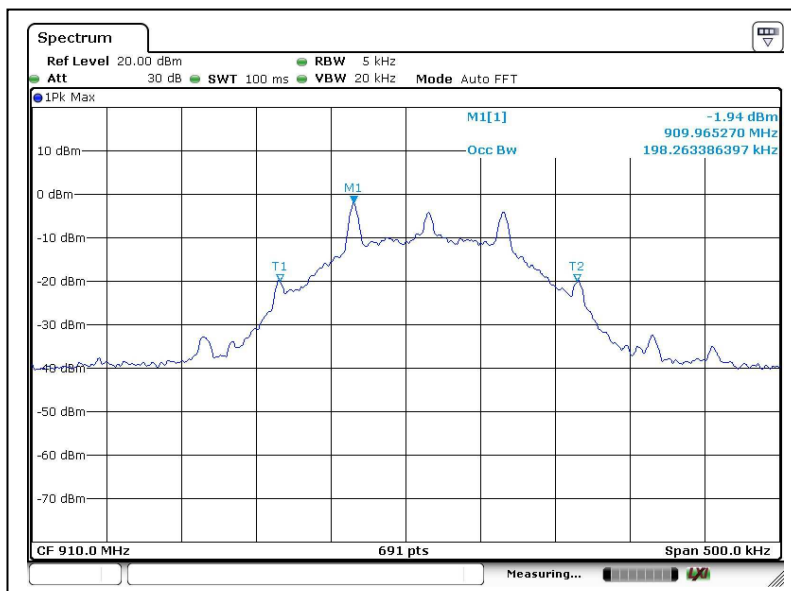
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TEST REPORT

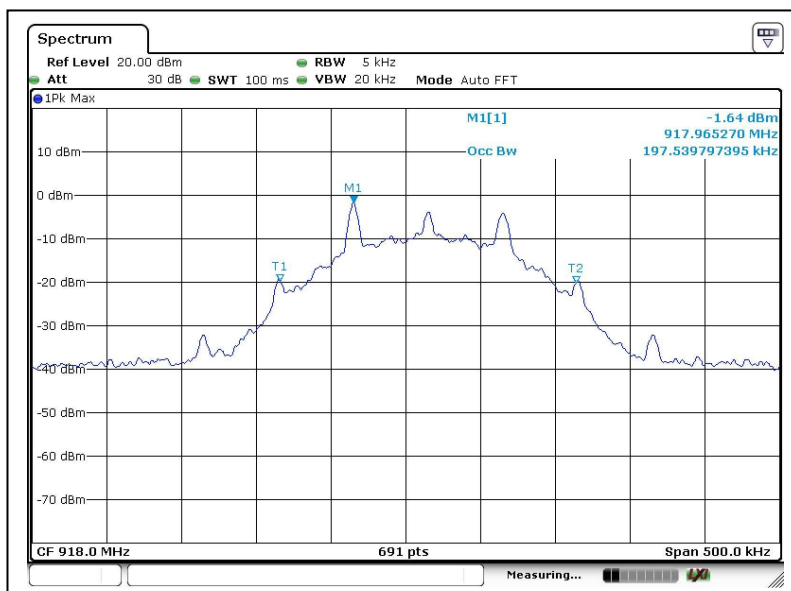
Report No. : AW0048972(8)

Date : August 30, 2018

A2. 99% Bandwidth Plot



Channel: 910MHz



Channel: 918MHz

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