CMA Testing and Certification Laboratories
廠商會檢定中心

TEST REPORT

Report No.	:	AV0015688(6)	Date :	20 Mar 2017
Application No.	:	LV008578(6)		
Applicant	:	Wellsino Electric Company Limited 2 Zhen Xing Road, Pearl Industrial Zone, Cong Hua City, Guang Zhou, China		
Sample Description	:	One(1) item of submitted sample stated to be Remote for LED of Christmas tree of Model No. JS-8F-M01 Sample registration no. : RV014732-001 Radio Frequency : 433.92MHz Transmitter Rating : 3 x 1.5V AAA size battery No. of submitted sample : Three (3) piece (s)		
Date Received	:	14 Mar 2017		
Test Period	:	14 Jan 2017 to 16 Mar 2017		
Test Requested	:	FCC Part 15 Certification, FCC Part 15 Verification Procedure		
Test Method	:	47 CFR Part 15 (10-1-15 Edition), ANSI C63.4 – 2014, ANSI C63.10 – 2013		
Test Engineer	:	Mr. LEUNG Shu-kan, Ken		
Test Result	:	See attached sheet(s) from page 2 to 23.		
Conclusion	:	The submitted sample was found to comply with requirement of FCC Subpart C.		

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

FCC ID: 2ALHXJS-8F-M01

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1 General Information

1.1 General Description

The equipment under test (EUT) is a remoter for LED of Christmas tree. The EUT is power by 3 x 1.5V AAA size batteries. It operates at 433.92MHz. There are buttons on the EUT. When the buttons are pressed, the EUT will transmit the radio control signal to the received LED.

The brief circuit description is listed as follows:

- U3	and its associated circuit act as MCU
- U2	and its associated circuit act as power regulator
- XT1	and its associated circuit act as oscillator
- U1	and its associated circuit act as RF circuit
- Up, Power, Down	and its associated circuit act as control buttons

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1.2 Location of the test site

FCC Registered Test Site Number: 416666

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013. 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 C63.10 – 2013. A shielded room is located at :

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

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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	R&S	ESCI	100152	15 Nov 2017	1Year
Spectrum Analyzer	R&S	FSV40	100964	08 Feb 2018	1Year
Broadband Antenna	Schaffner	CBL6112B	2718	15 Mar 2017	2Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	19 Dec 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2018	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2017	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2017	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	20 Dec 2017	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)	4.83dB
30MHz ~ 200MHz (Vertical)	4.84dB
200MHz ~1000MHz (Horizontal)	4.87dB
200MHz ~1000MHz (Vertical)	5.94dB
1GHz ~6GHz	4.41dB
6GHz ~18GHz	4.64dB

Line-conducted emissions

Frequency	Uncertainty (U_{lab})
150kHz~30MHz	2.64dB

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2 Description of the emission test

2.1 Test Procedure

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

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground for below 1GHz measurement and 1.5m high above the ground for above 1GHz measurement. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was then 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.

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.

For 30MHz to 1GHz, broadband antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. And the reference point of antenna shall be 1 m above the ground.

For above 1GHz, horn antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. Preamplifier and High Pass filter was used for measurements. The reference point of antenna shall be 1 m above the ground.

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

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2.2 Radiated Emission Measurement Data

Duty Cycle

The pulse train is over 100ms, therefore need to find the 100ms period with most 'ON' time of the pulses.

All pulses' widths in the pulse train are the same

Time of pulse:	490us

Number of pulse in 100ms:	40

Duty cycle = 40*490us / 100ms

Average factor = 20*log(0.196) = -14.2dB

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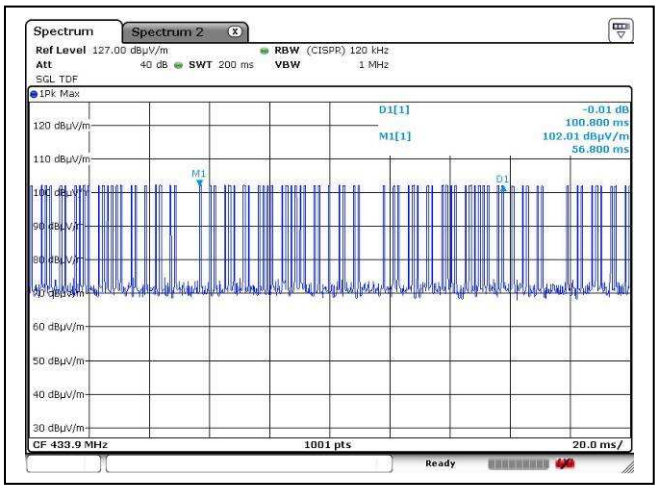
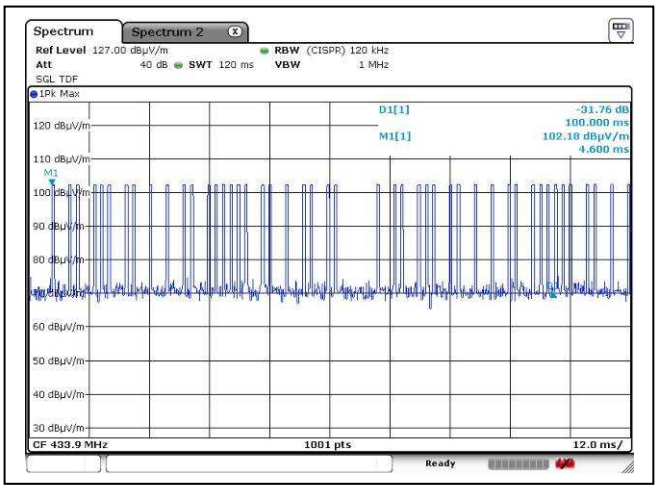
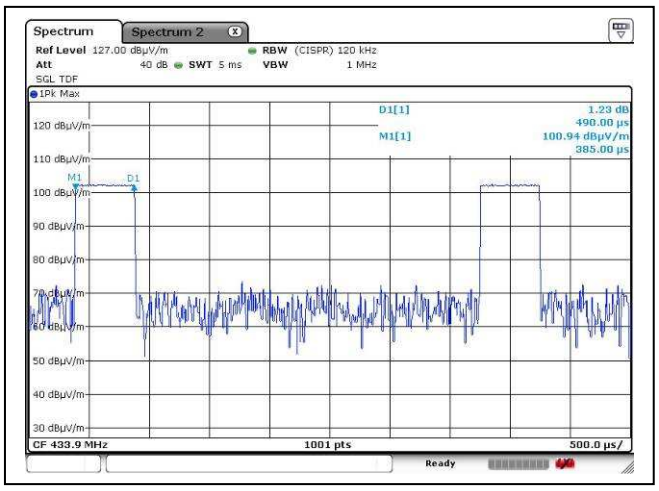
2.2 Radiated Emission Measurement Data (Con't)

Plots of Duty Cycle







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2.2 Radiated Emission Measurement Data (Con't)

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	21	° C
Relative humidity:	72	%

Testing frequency range: 9kHz to 5GHz Mode: Transmission
Measurement: Quasi-peak (9kHz – 1GHz), Peak (above 1GHz)
RBW: 9kHz (below 30MHz), 120kHz (30MHz – 1GHz), 1MHz (above 1GHz)
VBW: 30kHz (below 30MHz), 300kHz (30MHz – 1GHz,), 3MHz (above 1GHz)

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBµV)	Transducer Factor (dB/m)	Field Strength at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)	Measurement (Peak/ Average)
433.941	H	69.1	20.6	89.7	100.8	- 11.1	Peak
433.932	V	69.4	20.6	90.0	100.8	- 10.8	Peak

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m (dBµV/m)	Average Factor (dB)	Average Value at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)	Measurement (Peak/ Average)
433.941	H	89.7	- 14.2	75.5	80.8	- 5.3	Average
433.932	V	90.0	- 14.2	75.8	80.8	- 5.0	Average

Remark: Other emissions more than 20dB below the limit are not reported.
If Peak measurement values are lower than average limit, average measurement is not necessary.

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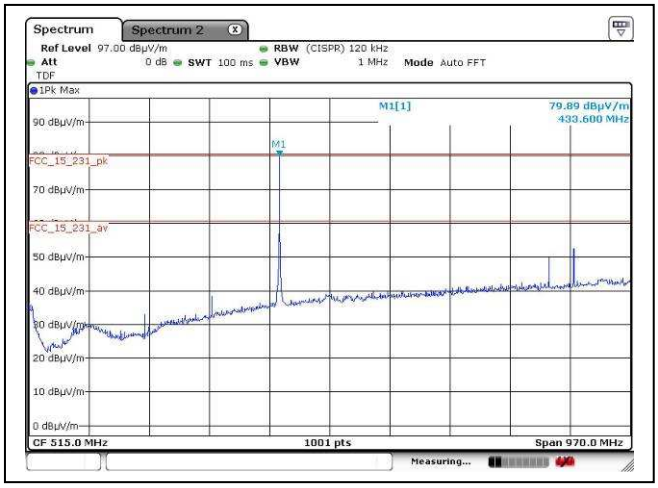
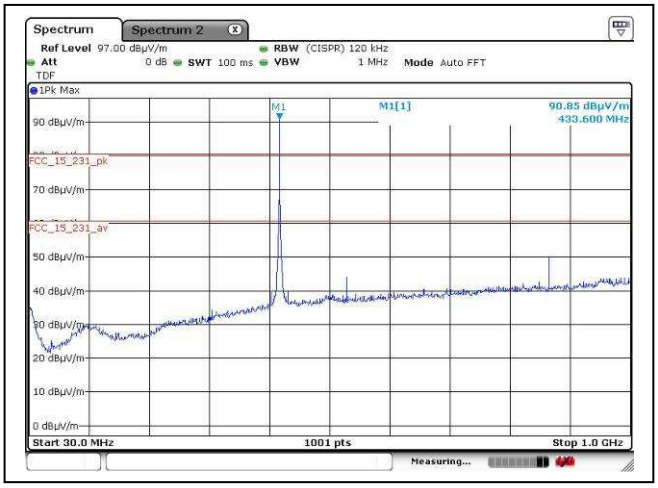
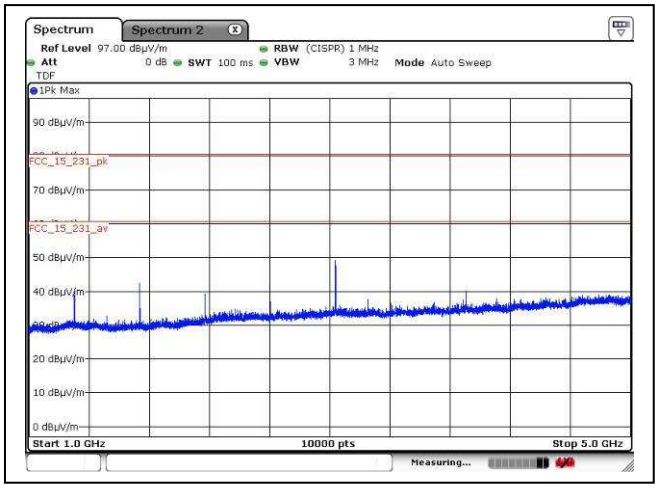
2.2 Radiated Emission Measurement Data (Con't)



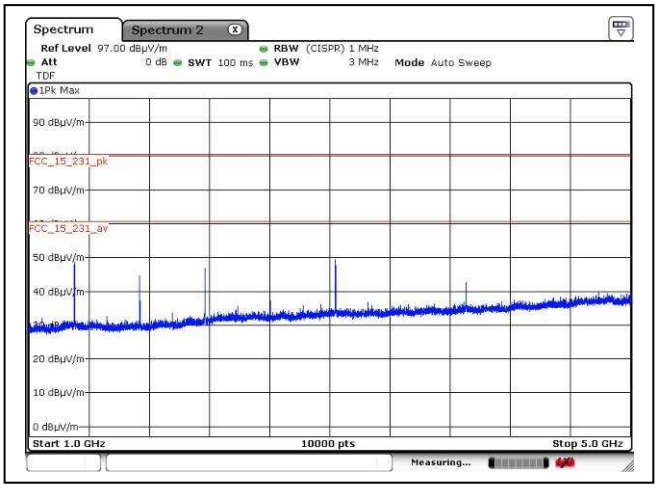
Lower channel, 30MHz – 1GHz, Horizontal



Lower channel, 30MHz – 1GHz, Vertical



Lower channel, 1GHz – 5GHz, Horizontal



Lower channel, 1GHz – 5GHz, Vertical

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2.2 Radiated Emission Measurement Data (Con't)

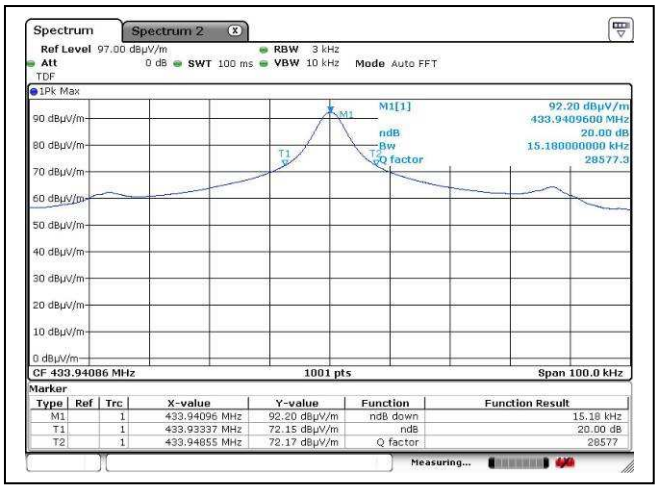
20dB Bandwidth

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	21	° C
Relative humidity:	72	%

Measurement: Peak
RBW: 3kHz
VBW: 10kHz

Bandwidth (kHz)	Carrier frequency (MHz)	Limit (MHz)
15.18	433.92	1.08



Remark:
The bandwidth is less 0.25% of carrier frequency which meet 15.231(c) requirement.

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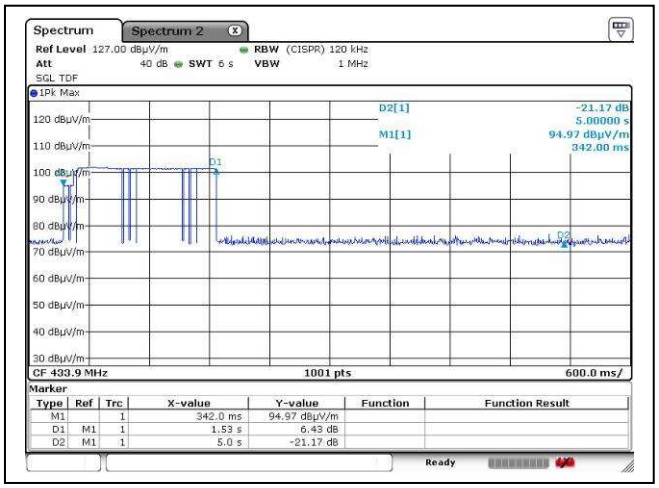
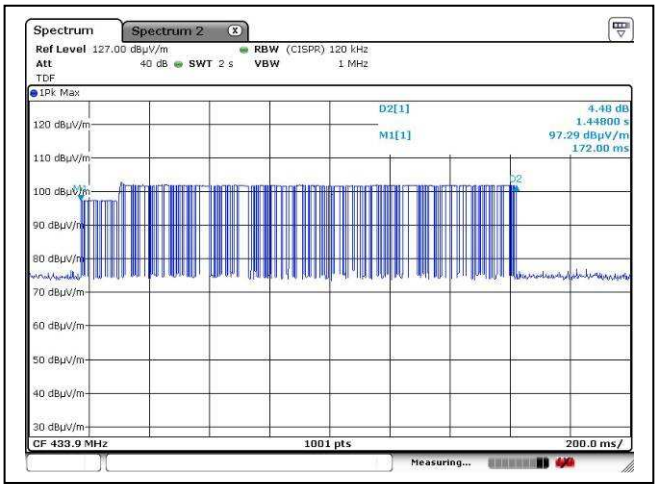
2.2 Radiated Emission Measurement Data (Con't)

Transmission Time

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	21	° C
Relative humidity:	72	%





Remark:
The transmitter will cease transmission within 5 seconds after activation which meet **15.231(a)(1)** requirement.

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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 a battery-operated product

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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conducted Emission

For electronic filing, the photos are saved with filename 2ALHXJS-8F-M01 TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename 2ALHXJS-8F-M01 ExPho.pdf and 2ALHXJS-8F-M01 InPho.pdf.

4.3 Antenna requirement

Appendices A3 shows the antenna is permanently attached and cannot be changed. Therefore it fulfils the section 15.203 requirement

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5 Appendices

A1	Photos of the set-up of Radiated Emissions	2	pages
A2	Photos of External Configurations	2	pages
A3	Photos of Internal Configurations	2	pages
A4	ID Label/Location	1	page

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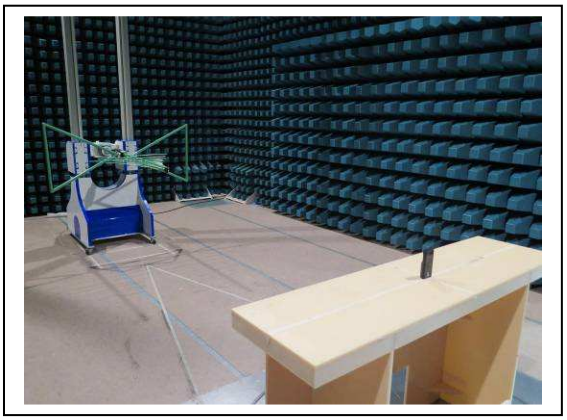
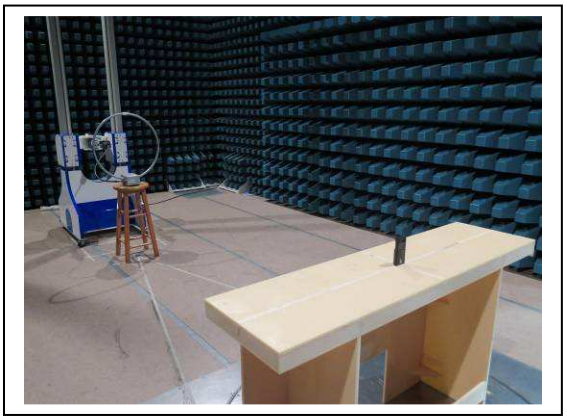
A1. Photos of the set-up of Radiated Emissions



30MHz – 1GHz



9kHz – 30MHz

Tested by: Mr. LEUNG Shu-kan, Ken

Reviewed by: Mr. WONG Lap-pong, Andrew

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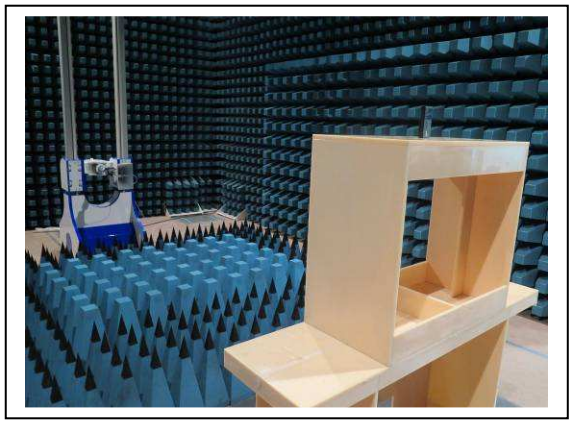
A1. Photos of the set-up of Radiated Emissions



1GHz – 5GHz

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Reviewed by: Mr. WONG Lap-pong, Andrew

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A2 Photos of External Configurations

External Configuration 1

External Configuration 2

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A2 Photos of External Configurations

External Configuration 3

External Configuration 4

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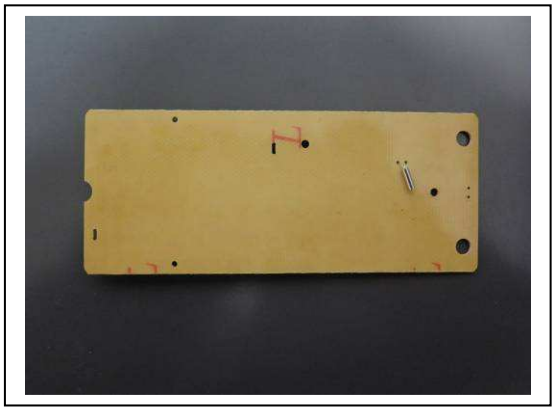
A3 Photos of Internal Configurations

Internal Configuration 1



Internal Configuration 2

Tested by: Mr. LEUNG Shu-kan, Ken

Reviewed by: Mr. WONG Lap-pong, Andrew

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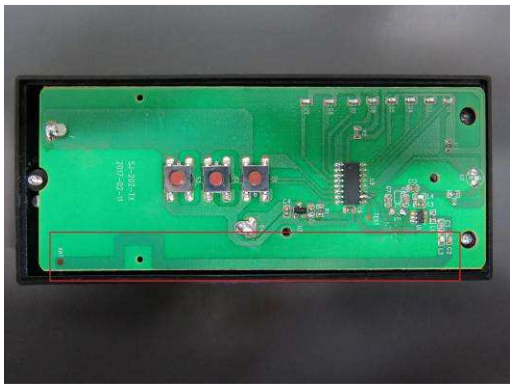
A3 Photos of Internal Configurations



EUT antenna

Tested by: Mr. LEUNG Shu-kan, Ken

Reviewed by: Mr. WONG Lap-pong, Andrew

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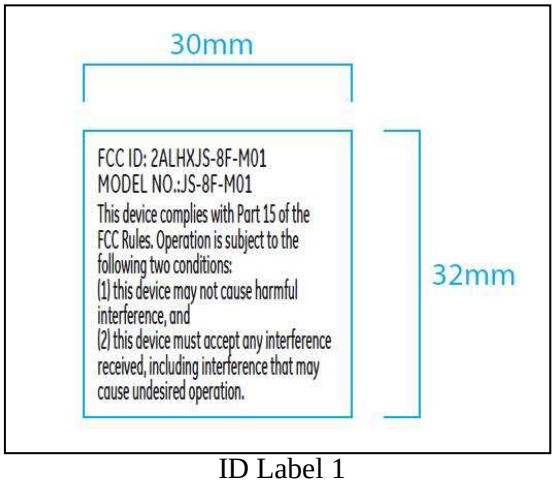
A4 ID Label / Location



ID Label 1

ID Label 2

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

Tested by: Mr. LEUNG Shu-kan, Ken

Reviewed by: Mr. WONG Lap-pong, Andrew

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