



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5) Date : 18 Jan 2016

Application No. : LT037763(4)

Applicant : Capital Prospect Ltd  
RM03 13/F., Block B, Veristrong Ind. Bldg.,  
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.
Lighting Remote Control	PR-318

Radio Frequency : 318MHz Transceiver

Rating : AC 120 V

No. of submitted sample : Two (2) piece (s)

Sample registration No. : RT057161-001

Date Received : 14 Dec 2015.

Test Period : 14 Dec 2015 to 27 Dec 2015.

Test Requested : FCC 47CFR Part 15 Certification – Class II Permissive Change.


Test Method : 47 CFR Part 15 (10-1-15 Edition)  
ANSI C63.10 – 2013

Test Result : See attached sheet(s) from page 2 to 25.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C.

For and on behalf of  
CMA Industrial Development Foundation Limited

Authorized Signature : \_\_\_\_\_

  
Mr. WONG Lap-pong, Andrew  
Manager  
Electrical Division

Page 1 of 25

FCC ID: KUTPR318



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 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 .....	5
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
2.4	Radiated Emission Measurement Data.....	11
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 .....	13
4	Supplementary document .....	14
4.1	Bandwidth .....	14
4.2	Duty cycle .....	14
4.3	Transmission time .....	15
5	Appendices .....	16



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 1 General Information

#### 1.1 General Description

The equipment under test (EUT) is a 318MHz transceiver. The oscillation of radio control is generated by 9.9375MHz crystal for transmitter and 9.893MHz for part of receiver. The EUT acts as a remote control to receive the signal from the transmitters and repeat the signal to other receiver unit and it can communicate with up to 16 transmitters so users has the option to add more transmitters to the system. It allows users to wirelessly turn on /off, dim, and brighten the light fixtures. The EUT is powered by 120Vac.

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

The brief circuit description is listed as follows:

For main board:

-U5, Y1	and its associated circuit act as MCU and oscillator
-U4	and its associated circuit act as EEPROM
-U1, T1, Q4, J3, J4	and its associated circuit act as load control
-U3, U6	and its associated circuit act as voltage regulator
-Q1, Q6-Q7, D1, D4	and its associated circuit act as step down voltage convertor
-Q2, D3, D6-D7	and its associated circuit act as zero detector
-D10	and its associated circuit act as rectifier
-Q3	and its associated circuit act as RF power control
-U2, Y2, ANT2	and its associated circuit act as TX modular

For receiver board:

-U1, Y1	and its associated circuit act as RX modular
---------	--



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009. 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 – 2009. 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 Registration Number: 552221



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	28 Sep 2016
Spectrum Analyze	Rohde & Schwarz	FSV 40	100964	03 Feb 2016
Broadband Antenna	Schaffner	CBL6112B	2718	20 Feb 2016
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	25 Nov 2016
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	25 Nov 2016
Loop Antenna	EMCO	6502	00056620	28 Dec 2015
Artificial Main Network	Rohde & Schwarz	ENV216	101232	22 Oct 2016
Coaxial Cable	Schaffner	RG213/U	N/A	18 May 2016
Coaxial Cable	Suhner	RG214/U	N/A	18 May 2016
Coaxial Cable	HUBER+SUHNER	84225426	MY24201/4	24 Nov 2016

Supporting equipment

300W light bulbs (supplied by CMA)

### 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)	4.66dB
30MHz ~ 200MHz (Vertical)	4.67dB
200MHz ~1000MHz (Horizontal)	4.68dB
200MHz ~1000MHz (Vertical)	4.67dB

Conducted emissions

Frequency	Uncertainty ( $U_{lab}$ )
150kHz ~ 30MHz	2.63dB



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 1.5 Test Summary

TEST ITEM	FCC REFERANCE	RESULT
Radiated emission	15.231(b)	Comply
Assigned bandwidth (20dB bandwidth)	15.231(c)	Comply
Power line conducted emission	15.207	Comply
Transmission time after manual activation	15.231(a)	Comply



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

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.



# CMA Testing and Certification Laboratories

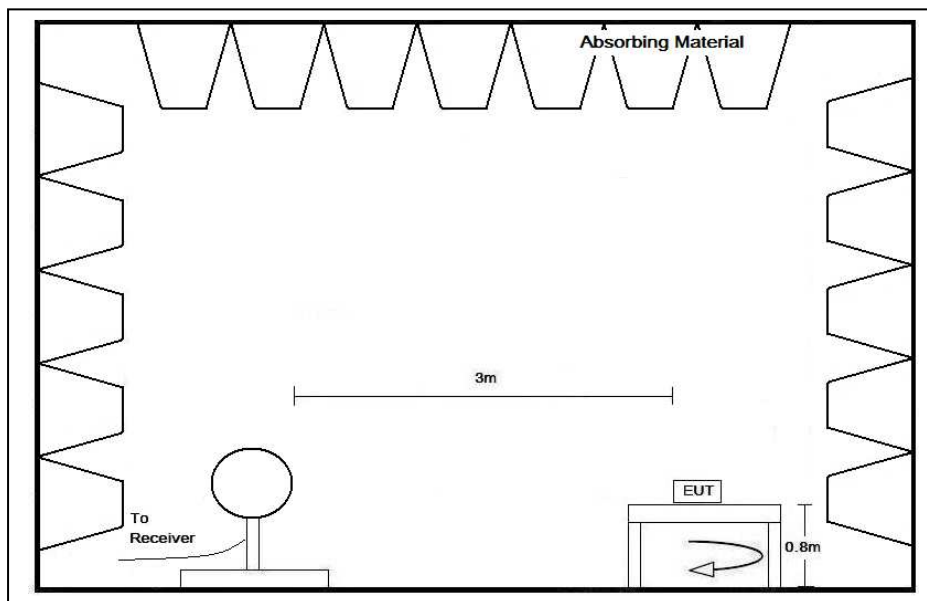
廠商會檢定中心

## TEST REPORT

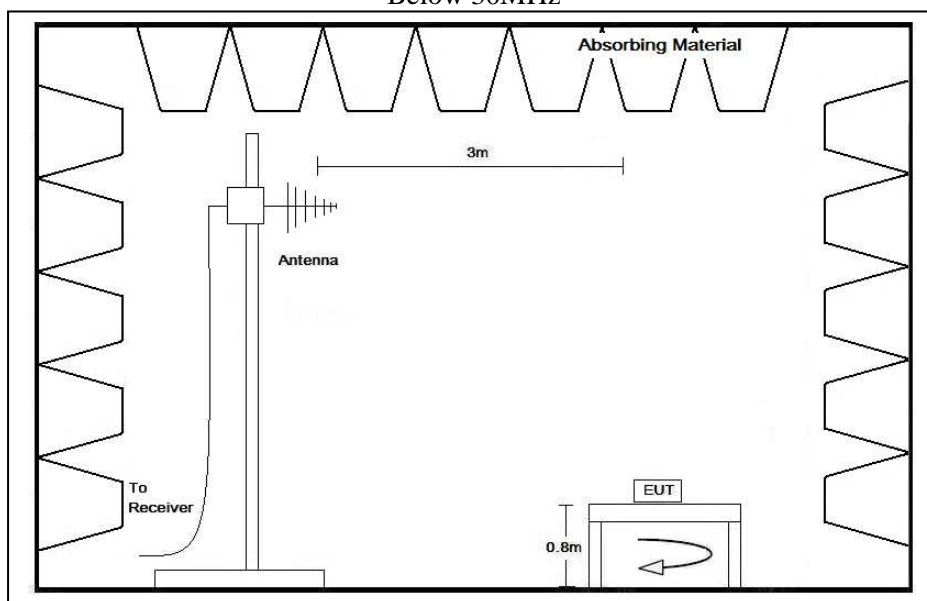
Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 2.2 Test Setup



Below 30MHz



30MHz – 1GHz





# CMA Testing and Certification Laboratories

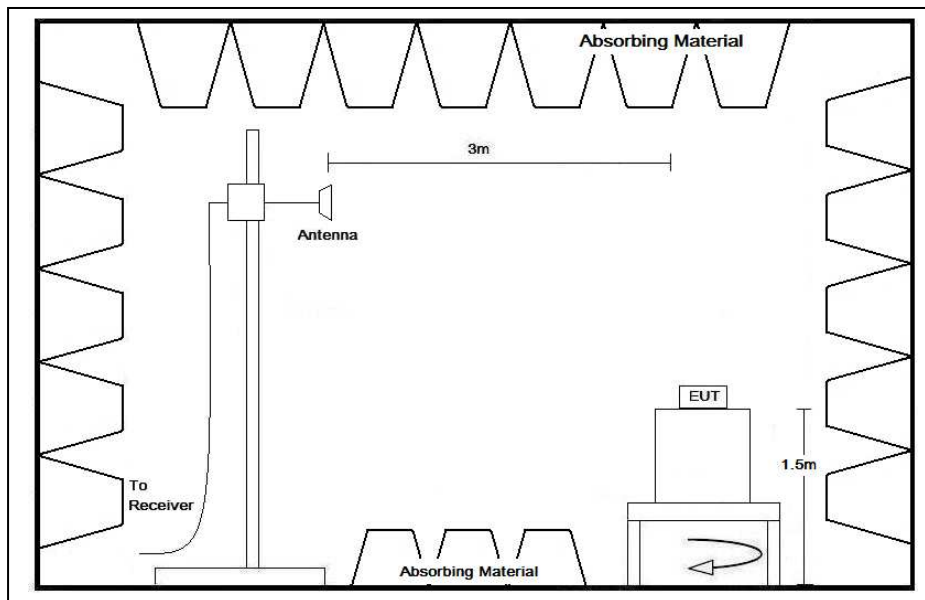
廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 2.2 Test Setup



Above 1GHz



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 2.3 Test Result

The radiated emissions are measured from 9kHz to 3.18GHz (the tenth harmonics)

“#” means emissions appearing within the restricted bands shall follow the requirement of 47 CFR Part 15.205.

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 test in transmission mode.

It was found that the EUT meet the FCC requirement.



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 2.4 Radiated Emission Measurement Data

#### Radiated emission

##### Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	22	° C
Relative humidity:	58	%

Frequency (MHz)	Polarity (H/V)	Reading at 3m (dB $\mu$ V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB $\mu$ V/m)	Limit at 3m (dB $\mu$ V/m)	Margin (dB)	Detector Type
317.498	H	56.7	16.7	73.4	95.8	-22.4	Peak
635.002	V	37.2	22.9	60.1	75.8	-15.7	Peak
952.512	H	23.0	26.1	49.1	75.8	-26.7	Peak
1269.984	V	64.6	-8.4	56.2	75.8	-19.6	Peak
#1587.632	H	58.5	-8.1	50.4	74.0	-23.6	Peak
1905.021	H	67.2	-6.9	60.3	75.8	-15.5	Peak
#2222.540	H	65.2	-6.5	58.7	74.0	-15.3	Peak
2540.024	V	58.4	-4.2	54.2	75.8	-21.6	Peak
#2857.314	H	39.1	-4.2	34.9	74.0	-39.1	Peak
3174.945	H	53.5	-2.8	50.7	75.8	-25.1	Peak



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 2.4 Radiated Emission Measurement Data

#### Radiated emission

##### Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	22	° C
Relative humidity:	58	%

Frequency (MHz)	Polarity (H/V)	Peak Reading at 3m (dBµV/m)	Average Factor (dB)	Average Value at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
317.498	H	73.4	-6.9	66.5	75.8	-9.3
635.002	V	60.1	-6.9	53.2	55.8	-2.6
952.512	H	49.1	-6.9	42.2	55.8	-13.6
1269.984	V	56.2	-6.9	49.3	55.8	-6.5
#1587.632	H	50.4	-6.9	43.5	54.0	-10.5
1905.021	H	60.3	-6.9	53.4	55.8	-2.4
#2222.540	H	58.7	-6.9	51.8	54.0	-2.2
2540.024	V	54.2	-6.9	47.3	55.8	-8.5
#2857.314	H	34.9	-6.9	28.0	54.0	-26.0
3174.945	H	50.7	-6.9	43.8	55.8	-12.0

Remark: According to FCC Part15 C clause 15.231 (b), the EUT shall demonstrate the compliance with the limits on the field strength of emissions based on the average value of the measured emissions. The equation with a sample calculation as follow: Average value = Peak value + 20 Log<sub>10</sub>(Duty cycle), where the Duty cycle is calculated from following section 4.2.



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 3 Description of the Line-conducted Test

#### 3.1 Test Procedure

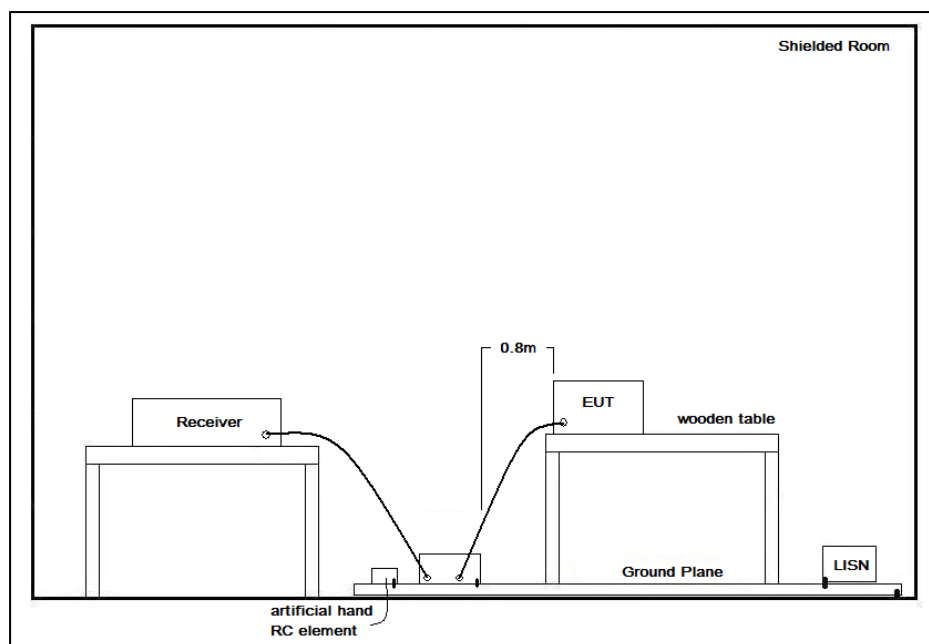
Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

#### 3.2 Test Result

The EUT has been tested in Transmission mode.

It was found that the EUT met the FCC requirement.

#### 3.3 Test Setup



#### 3.4 Graph and Table of Conducted Emission Measurement Data

The test data and graphs had shown in Appendices A4.



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 4 Supplementary document

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

Document	Filename
Schematic Diagram	KUTPR318 Schematic.pdf
Schematic Diagram for receiver	KUTPR318 RF schematic.pdf
Users Manual	KUTPR318 User manual.pdf

### 4.1 Bandwidth

Appendices A6 is shown the fundamental emission is confined in the specified band. The 20dB bandwidth is 476.85 kHz. The bandwidth requirement is 0.25% of 317 MHz = 792.5 kHz. It shows that the 20dB bandwidth met the 15.231(c) requirement.

### 4.2 Duty cycle

Base on the EUT characteristic, the duty cycle may be difference for the different receiver; therefore the worst case duty cycle is used for the average factor calculation.

The duty cycle is simply the on-time divided by the period:

$$\begin{aligned}
 \text{Time duration of one cycle} &= 77.128\text{ms} \\
 \text{Effective period of one cycle} &= (2.784\text{ms} \times 1) + (476 \mu\text{s} \times 9) + (724\mu\text{s} \times 26) + (340\mu\text{s} \times 26) \\
 &= 34.732\text{ms} \\
 \text{Duty Cycle} &= 34.732 \div 77.128 \\
 &= 0.450
 \end{aligned}$$

Therefore, the average correction factor is found by  $20 \log_{10} 0.450 = -6.9\text{dB}$



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 4.3 Transmission time

Duration of each transmission = 791.09ms

The duration of the transmission is less than 5s after the transmission is activated by remote controller. An Appendices A2 is shown the EUT to comply with FCC part 15, section 15.231(a)(1).



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### 5 Appendices

A1.	Bandwidth Plot	1	page(s)
A2.	Average Factor	3	page(s)
A3.	Transmission time	1	page(s)
A4.	Conducted Emission Measurement Data	4	page(s)





# CMA Testing and Certification Laboratories

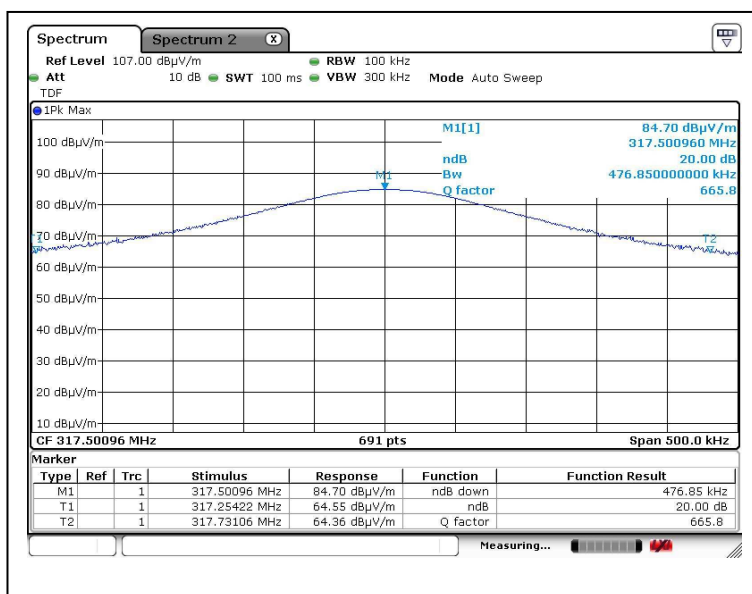
廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A1. Bandwidth Plot



20dB bandwidth



# CMA Testing and Certification Laboratories

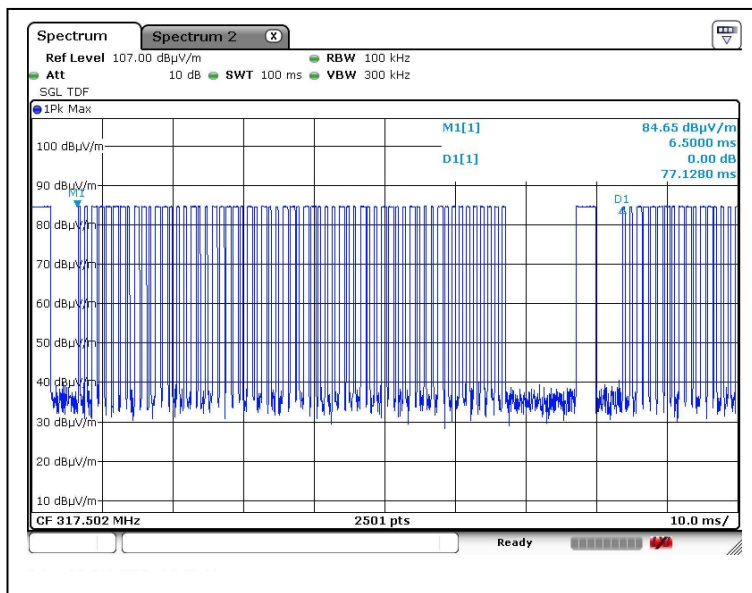
廠商會檢定中心

## TEST REPORT

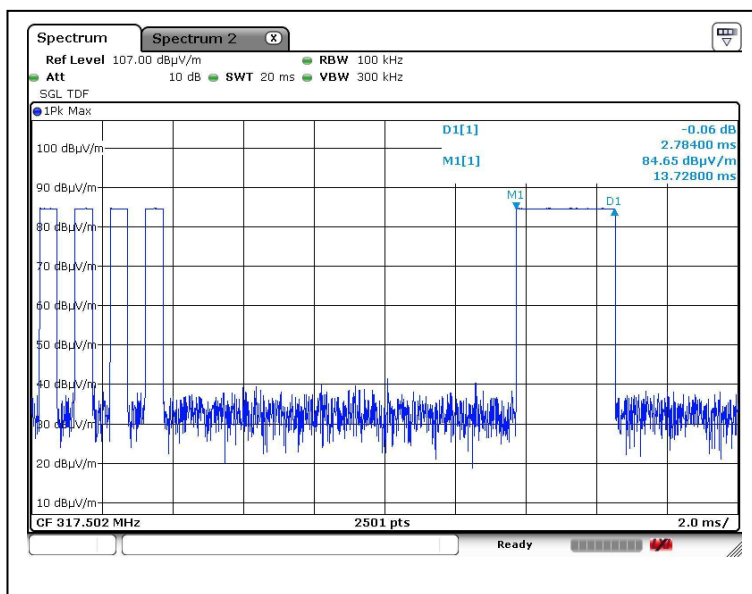
Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A2. Duty Cycle



Duty Cycle 1



Duty Cycle 2



# CMA Testing and Certification Laboratories

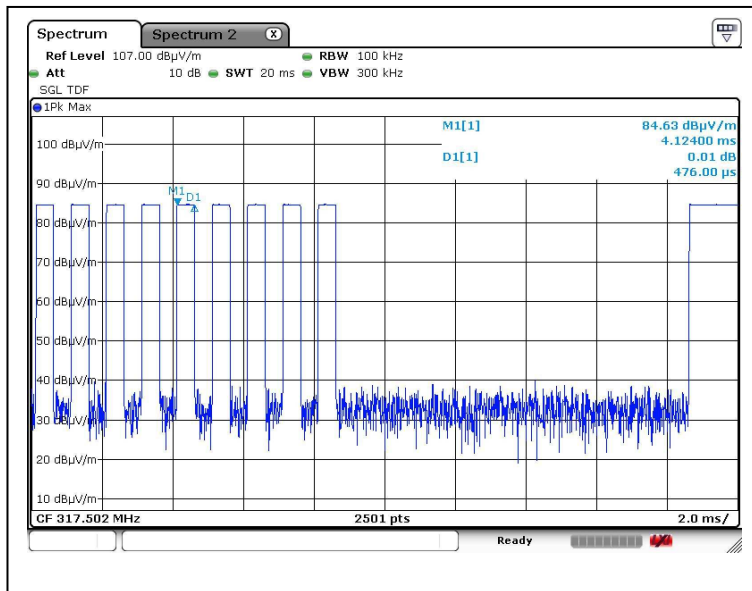
廠商會檢定中心

## TEST REPORT

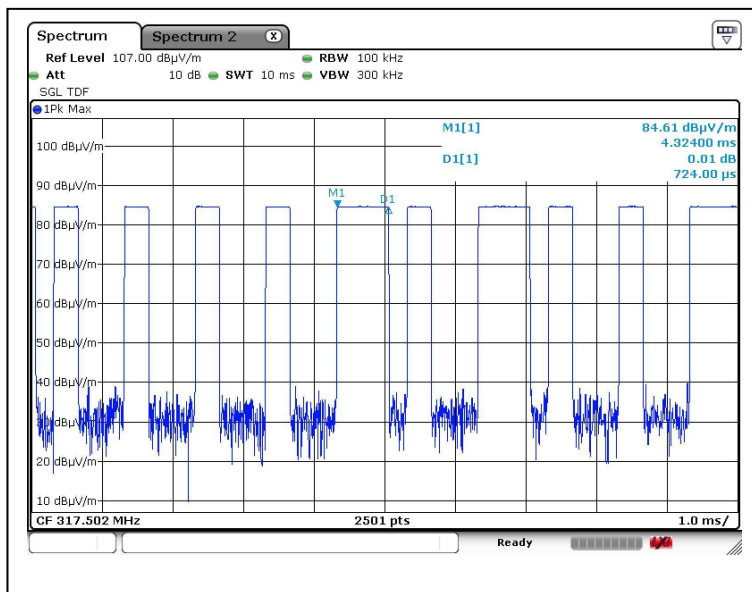
Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A2. Duty Cycle



Duty Cycle 3



Duty Cycle 4



# CMA Testing and Certification Laboratories

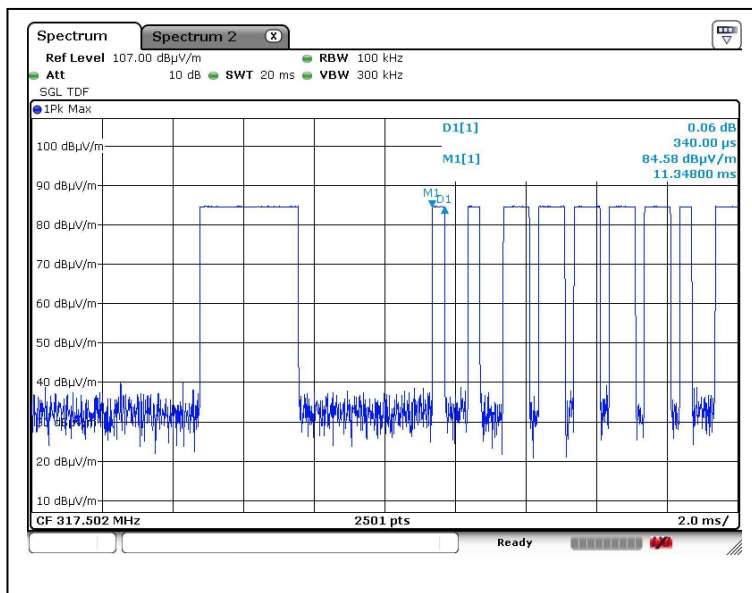
廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A2. Duty Cycle



Duty Cycle 5



# CMA Testing and Certification Laboratories

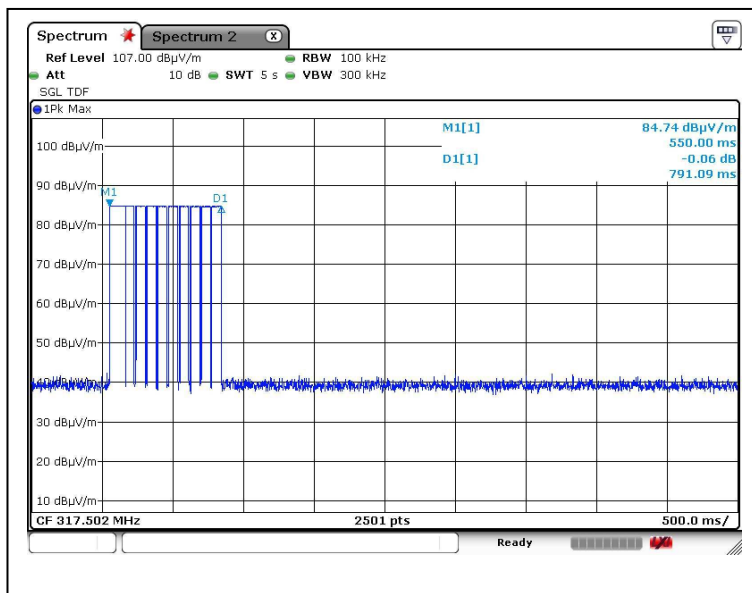
廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A3. Transmission time





# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A4 Line conducted measurement data

Parameter	Recorded value	
Ambient temperature:	24	°C
Relative humidity:	62	%

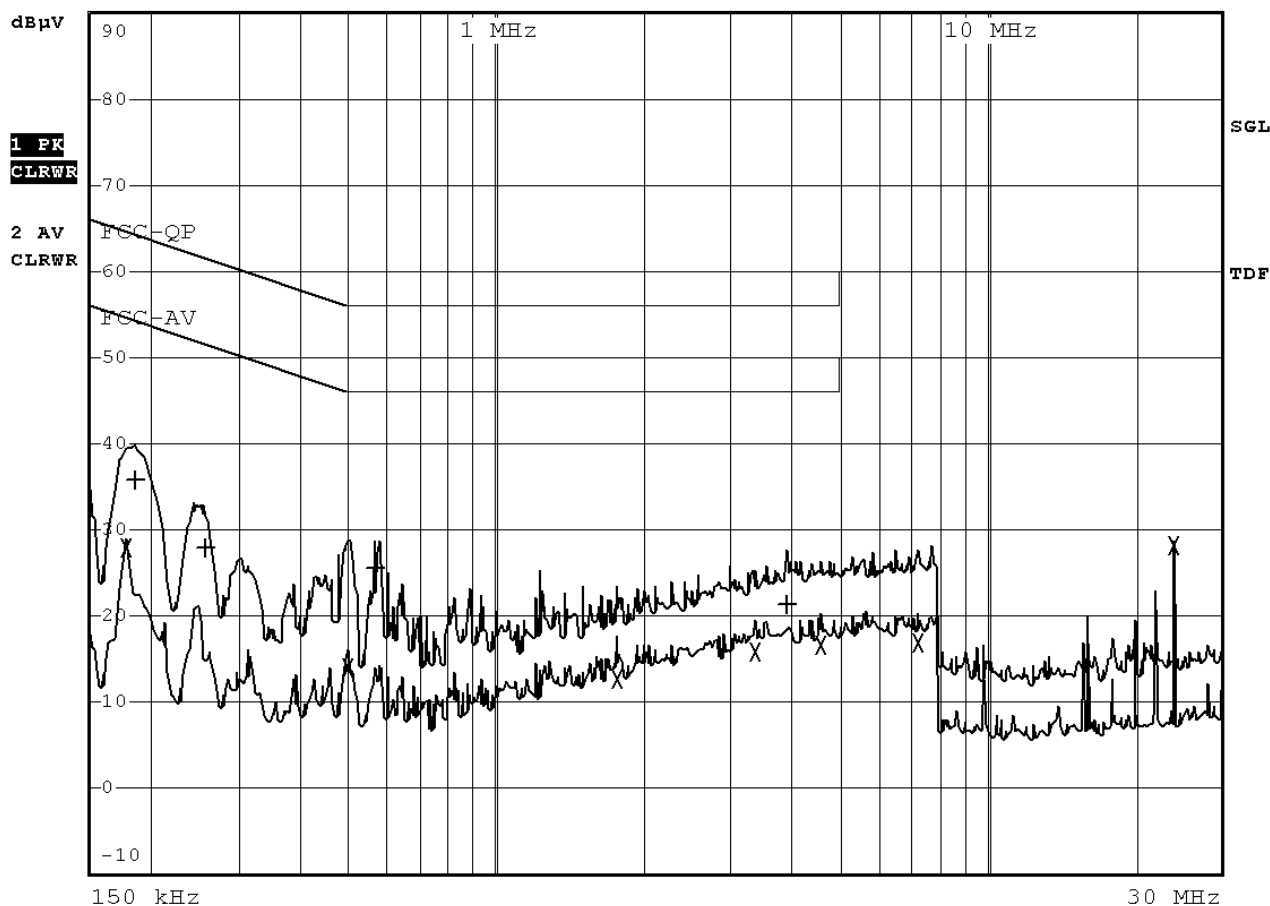
Terminal:	AC Mains
Line:	Live
Mode:	Transmitting



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF





# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A4 Line conducted measurement data

Parameter	Recorded value	
Ambient temperature:	24	°C
Relative humidity:	62	%

Terminal:	AC Mains
Line:	Live
Mode:	Transmitting

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBμV		DELTA LIMIT dB
2 Average	177 kHz	27.92	L1 gnd	-26.69
1 Quasi Peak	186 kHz	35.92	L1 gnd	-28.28
1 Quasi Peak	258 kHz	28.03	L1 gnd	-33.45
2 Average	500 kHz	13.97	L1 gnd	-32.02
1 Quasi Peak	567.5 kHz	25.48	L1 gnd	-30.51
2 Average	1.7645 MHz	12.79	L1 gnd	-33.20
2 Average	3.389 MHz	15.80	L1 gnd	-30.19
1 Quasi Peak	3.8975 MHz	21.38	L1 gnd	-34.61
2 Average	4.604 MHz	16.51	L1 gnd	-29.48
2 Average	7.277 MHz	16.90	L1 gnd	-33.09
2 Average	23.999 MHz	28.28	L1 gnd	-21.71



# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A4 Line conducted measurement data

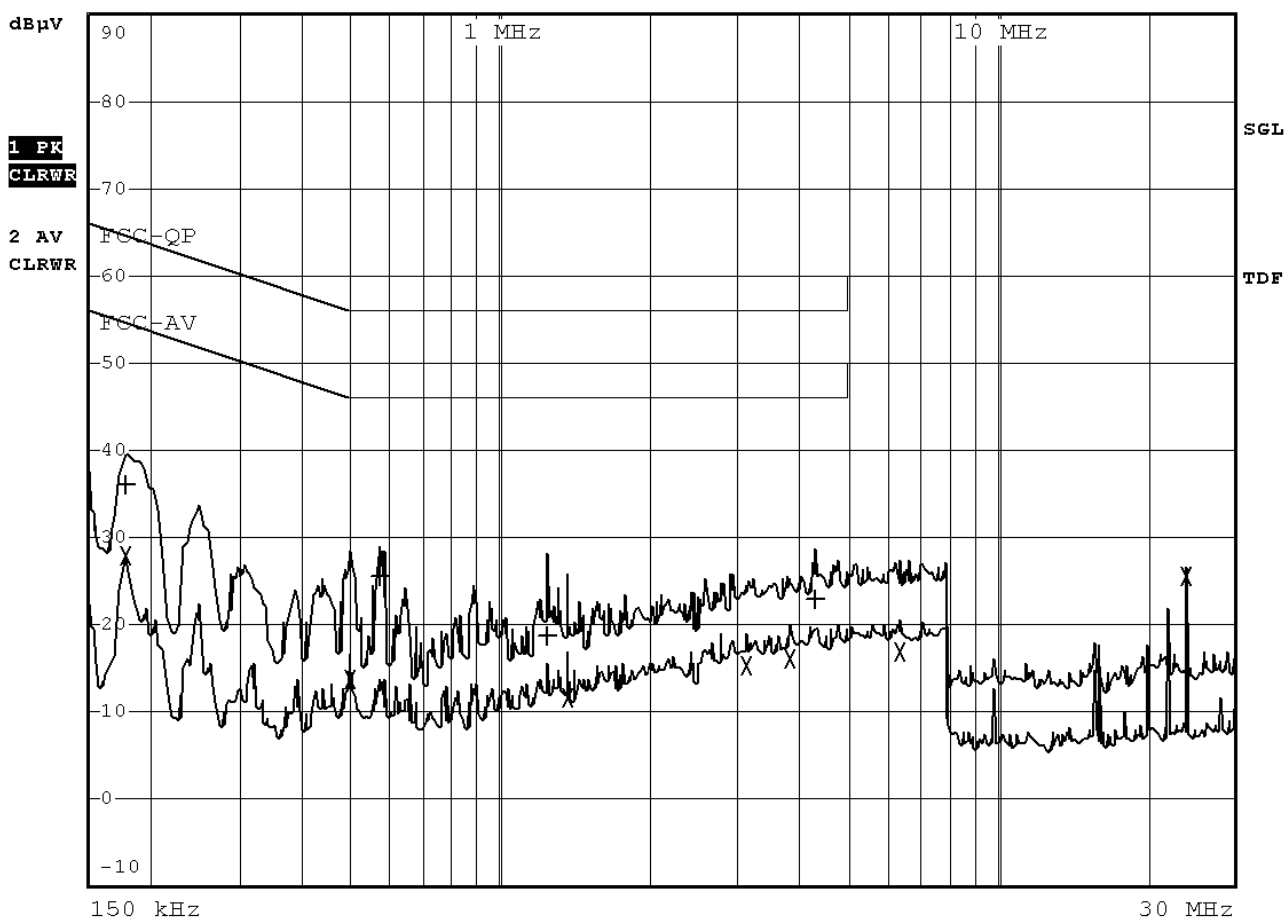
Parameter	Recorded value
Ambient temperature:	24 °C
Relative humidity:	62 %

Terminal:	AC Mains
Line:	Neutral
Mode:	Transmitting



RBW 9 kHz  
MT 1 s

Att 10 dB AUTO PREAMP OFF







# CMA Testing and Certification Laboratories

廠商會檢定中心

## TEST REPORT

Report No. : AU0004309 (5)

Date : 18 Jan 2016

### A4 Line conducted measurement data

Parameter	Recorded value	
Ambient temperature:	24	°C
Relative humidity:	62	%

Terminal:	AC Mains
Line:	Neutral
Mode:	Transmitting

EDIT PEAK LIST (Final Measurement Results)				
Trace1:	FCC-QP			
Trace2:	FCC-AV			
Trace3:	---			
TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1 Quasi Peak	177 kHz	36.09	N gnd	-28.53
2 Average	177 kHz	27.88	N gnd	-26.73
2 Average	500 kHz	13.83	N gnd	-32.16
1 Quasi Peak	572 kHz	25.52	N gnd	-30.47
1 Quasi Peak	1.238 MHz	18.61	N gnd	-37.38
2 Average	1.364 MHz	11.77	N gnd	-34.22
2 Average	3.1415 MHz	15.42	N gnd	-30.57
2 Average	3.83 MHz	16.16	N gnd	-29.83
1 Quasi Peak	4.289 MHz	23.03	N gnd	-32.96
2 Average	6.4085 MHz	16.95	N gnd	-33.04
2 Average	23.999 MHz	25.54	N gnd	-24.45

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