

APPLICATION FOR VERIFICATION

On Behalf of
American Lighting Inc

RF Controller

Model No.: AL-RFC

FCC ID: 2AIQ4-AL-RFC

Prepared for : American Lighting Inc.
Address : 11775 E. 45th AVE, Denver, Colorado, United States
80239

Prepared by : Accurate Technology Co., Ltd.
Address : F1, Bldg. A&D, Changyuan New Material Port, Keyuan
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Report No. : ATE20160631
Date of Test : Apr 13, 2016-Jun 06, 2016
Date of Report : Jun 07, 2016

TABLE OF CONTENTS

Description	Page
Test Report Declaration	
1. TEST RESULTS SUMMARY	4
2. GENERAL INFORMATION	5
2.1. Product of Device (EUT)	5
2.2. Accessory and Auxiliary Equipment.....	5
2.3. Description of Test Facility	6
2.4. Measurement Uncertainty.....	6
3. MEASURING DEVICE AND TEST EQUIPMENT	7
4. POWER LINE CONDUCTED MEASUREMENT.....	8
4.1. Block Diagram of Test Setup	8
4.2. The Emission Limit.....	8
4.3. Configuration of EUT on Measurement	9
4.4. Operating Condition of EUT	9
4.5. Test Procedure	9
4.6. Power Line Conducted Emission Measurement Results.....	10
5. RADIATED EMISSION MEASUREMENT	13
5.1. Block Diagram of Test Setup	13
5.2. The Emission Limit For Section 15.109 (a).....	14
5.3. EUT Configuration on Measurement	14
5.4. Operating Condition of EUT	14
5.5. Test Procedure	14
5.6. Radiated Emission Noise Measurement Result.....	15

Test Report Declaration

Applicant& address : American Lighting Inc.
11775 E. 45th AVE, Denver, Colorado, United States
80239.

Manufacturer& address : Gateway Plastic Hardware & Lighting Co., Ltd.
Jingfu Road, Xincheng Industrial Area, Hengli Town,
Dongguan city, Guangdong province, China

Product : RF Controller

Model No. : AL-RFC

Trade name : American Lighting

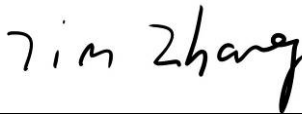
Measurement Procedure Used:

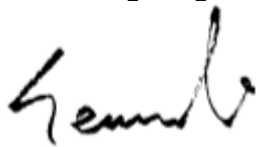
FCC Rules and Regulations Part 15 Subpart B ANSI C63.4: 2014

The device described above is tested by Accurate Technology Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart B Class B limits both radiated and conducted emissions. The measurement results are contained in this test report and Accurate Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Accurate Technology Co., Ltd.

Date of Test : Apr 13, 2016-Jun 06, 2016
Date of Report : Jun 07, 2016

Prepared by : 
(Tim.zhang, Engineer)

Approved & Authorized Signer : 
(Sean Liu, Manager)

1. TEST RESULTS SUMMARY

Test Items	Test Standard	Test Results
Power Line Conducted Emission	FCC Part 15 Subpart B	Pass
Radiated Emission	FCC Part 15 Subpart B	Pass

2. GENERAL INFORMATION

2.1.Product of Device (EUT)

EUT	: RF Controller
Model Number	: AL-RFC
Trade Mark	: American Lighting
Power Supply	: AC 120V/60Hz
Modulation:	: ASK
Receiver Frequency	: 433.92MHz RX
Applicant	: American Lighting Inc
Address	: 11775 E. 45th AVE, Denver, Colorado, United States 80239
Manufacturer	: Gateway Plastic Hardware & Lighting Co., Ltd.
Address	: Jingfu Road, Xincheng Industrial Area, Hengli Town, Dongguan city, Guangdong province, China
Date of sample received	: Apr 13, 2016
Date of Test	: Apr 13, 2016-Jun 06, 2016

2.2.Accessory and Auxiliary Equipment

1.Remote control



2. Load: Lamp string

2.3. Description of Test Facility

EMC Lab : Accredited by TUV Rheinland Shenzhen, May 10, 2004

Listed by FCC

The Registration Number is 253065

Listed by FCC

The Registration Number is 752051

Listed by Industry Canada

The Registration Number is 5077A-1

Listed by Industry Canada

The Registration Number is 5077A-2

Accredited by China National Accreditation Committee for Laboratories

The Certificate Registration Number is L3193

Name of Firm : Accurate Technology Co., Ltd.

Site Location : F1, Bldg. A&D, Changyuan New Material Port, Keyuan Rd., Science & Industry Park, Nanshan District, Shenzhen 518057, P.R. China

2.4. Measurement Uncertainty

Conducted emission expanded uncertainty : U=2.23dB, k=2

Power disturbance expanded uncertainty : U=2.92dB, k=2

Radiated emission expanded uncertainty : U=3.08dB, k=2
(9kHz-30MHz)

Radiated emission expanded uncertainty : U=4.42dB, k=2
(30MHz-1000MHz)

Radiated emission expanded uncertainty : U=4.06dB, k=2
(Above 1GHz)

3. MEASURING DEVICE AND TEST EQUIPMENT

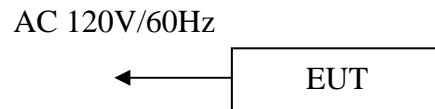
Table 1: List of Test and Measurement Equipment

Kind of equipment	Manufacturer	Type	S/N	Calibrated date	Calibrated until
EMI Test REMOTE CONTROL	Rohde&Schwarz	ESCS30	100307	Jan. 10, 2016	Jan. 09, 2017
EMI Test REMOTE CONTROL	Rohde&Schwarz	ESPI3	101526/003	Jan. 10, 2016	Jan. 09, 2017
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 10, 2016	Jan. 09, 2017
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 10, 2016	Jan. 09, 2017
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 14, 2016	Jan. 13, 2017
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 14, 2016	Jan. 13, 2017
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 14, 2016	Jan. 13, 2017
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 14, 2016	Jan. 13, 2017
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 10, 2016	Jan. 09, 2017
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 10, 2016	Jan. 09, 2017

4. POWER LINE CONDUCTED MEASUREMENT

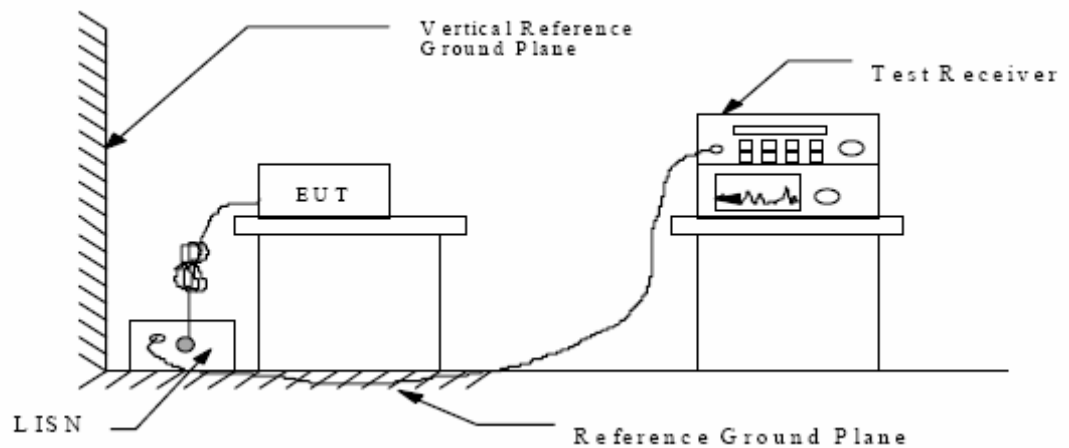
4.1. Block Diagram of Test Setup

4.1.1. Block diagram of connection between the EUT and simulators



(EUT: RF Controller)

4.1.2. Shielding Room Test Setup Diagram



(EUT: RF Controller)

4.2. The Emission Limit

4.2.1. Conducted Emission Measurement Limits According to Section 15.107(a)

Frequency (MHz)	Limit dB(μV)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0

* Decreases with the logarithm of the frequency.

4.3. Configuration of EUT on Measurement

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

4.3.1.RF Controller (EUT)

Model Number: AL-RFC

Serial Number: N/A

Manufacturer: Gateway Plastic Hardware & Lighting Co., Ltd.

4.4. Operating Condition of EUT

4.4.1.Setup the EUT and simulator as shown as Section 4.1

4.4.2.Turn on the power of all equipment.

4.4.3.Let the EUT work in test mode and measure it.

4.5. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4: 2014 on Conducted Emission Measurement.

The bandwidth of the test receiver (R & S ESCS30) is set at 9kHz in 0.15MHz-30MHz.

The frequency range from 150kHz to 30MHz is checked.

4.6. Power Line Conducted Emission Measurement Results

PASS.

Test Mode: ON&RX								
MEASUREMENT RESULT: "INCP007_fin"								
2016-6-1 9:17								
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE	
0.324000	46.10	11.1	60	13.5	QP	L1	GND	
0.524000	42.20	11.5	56	13.8	QP	L1	GND	
4.029500	38.30	11.8	56	17.7	QP	L1	GND	
MEASUREMENT RESULT: "INCP007_fin2"								
2016-6-1 9:17								
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE	
0.324000	36.90	11.1	50	12.7	AV	L1	GND	
0.518000	30.80	11.5	46	15.2	AV	L1	GND	
4.038500	26.00	11.8	46	20.0	AV	L1	GND	
MEASUREMENT RESULT: "INCP008_fin"								
2016-6-1 9:20								
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE	
0.182000	46.20	10.5	64	18.2	QP	N	GND	
0.516000	39.10	11.5	56	16.9	QP	N	GND	
3.908000	37.90	11.7	56	18.1	QP	N	GND	
MEASUREMENT RESULT: "INCP008_fin2"								
2016-6-1 9:20								
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE	
0.326000	34.70	11.1	50	14.9	AV	N	GND	
0.522000	26.40	11.5	46	19.6	AV	N	GND	
3.908000	24.80	11.7	46	21.2	AV	N	GND	

Emissions attenuated more than 20 dB below the permissible value are not reported.

The spectral diagrams are shown in the following pages.

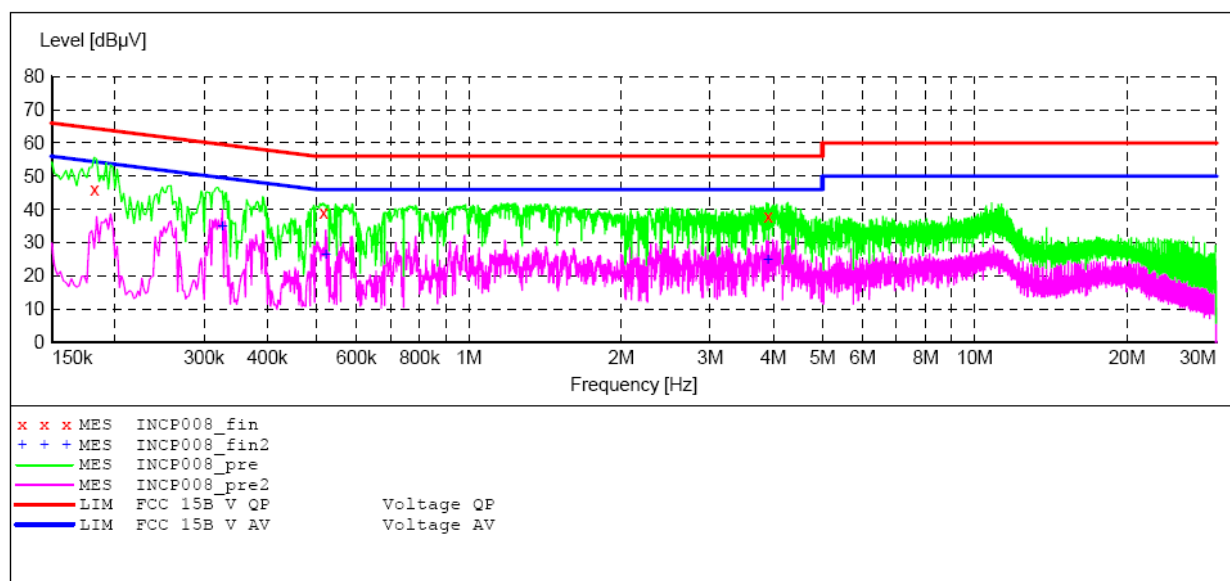
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART15 B

EUT: RF Controller M/N:AL-RFC
 Manufacturer: Gateway
 Operating Condition: ON&RX
 Test Site: 2#Shielding Room
 Operator: Star
 Test Specification: N 120V/60Hz
 Comment: Report NO.:ATE20160631
 Start of Test: 2016-6-1 / 9:18:34

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70
 Start Stop Step Detector Meas. IF Transducer
 Frequency Frequency Width Time Bandw.
 150.0 kHz 30.0 MHz 4.5 kHz QuasiPeak 1.0 s 9 kHz LISN(ESH3-Z5)
 Average



MEASUREMENT RESULT: "INCP008_fin"

2016-6-1 9:20

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.182000	46.20	10.5	64	18.2	QP	N	GND
0.516000	39.10	11.5	56	16.9	QP	N	GND
3.908000	37.90	11.7	56	18.1	QP	N	GND

MEASUREMENT RESULT: "INCP008_fin2"

2016-6-1 9:20

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.326000	34.70	11.1	50	14.9	AV	N	GND
0.522000	26.40	11.5	46	19.6	AV	N	GND
3.908000	24.80	11.7	46	21.2	AV	N	GND

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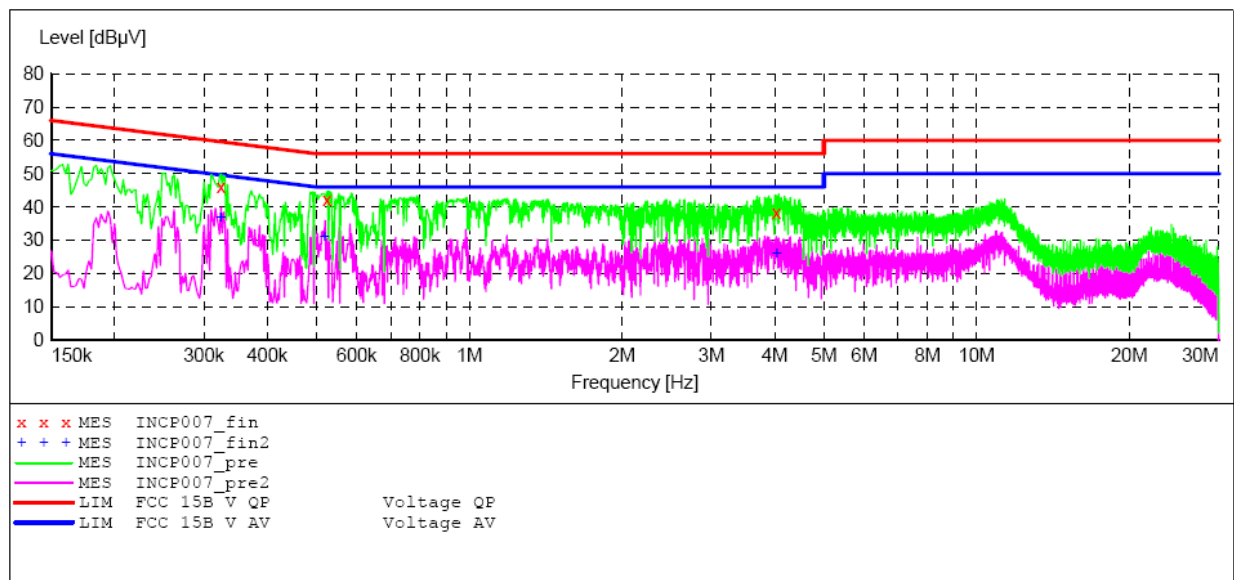
CONDUCTED EMISSION STANDARD FCC PART15 B

EUT: RF Controller M/N:AL-RFC
 Manufacturer: Gateway
 Operating Condition: ON&RX
 Test Site: 2#Shielding Room
 Operator: Star
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20160631
 Start of Test: 2016-6-1 / 9:14:35

SCAN TABLE: "V 150K-30MHz fin"

Short Description: _SUB_STD_VTERM2 1.70

Start	Stop	Step	Detector	Meas. Time	IF Bandw.	Transducer
Frequency 150.0 kHz	Frequency 30.0 MHz	Width 4.5 kHz	QuasiPeak	1.0 s	9 kHz	LISN (ESH3-Z5)
Average						



MEASUREMENT RESULT: "INCP007_fin"

2016-6-1 9:17

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.324000	46.10	11.1	60	13.5	QP	L1	GND
0.524000	42.20	11.5	56	13.8	QP	L1	GND
4.029500	38.30	11.8	56	17.7	QP	L1	GND

MEASUREMENT RESULT: "INCP007_fin2"

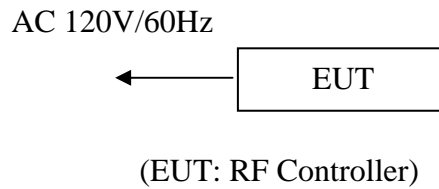
2016-6-1 9:17

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.324000	36.90	11.1	50	12.7	AV	L1	GND
0.518000	30.80	11.5	46	15.2	AV	L1	GND
4.038500	26.00	11.8	46	20.0	AV	L1	GND

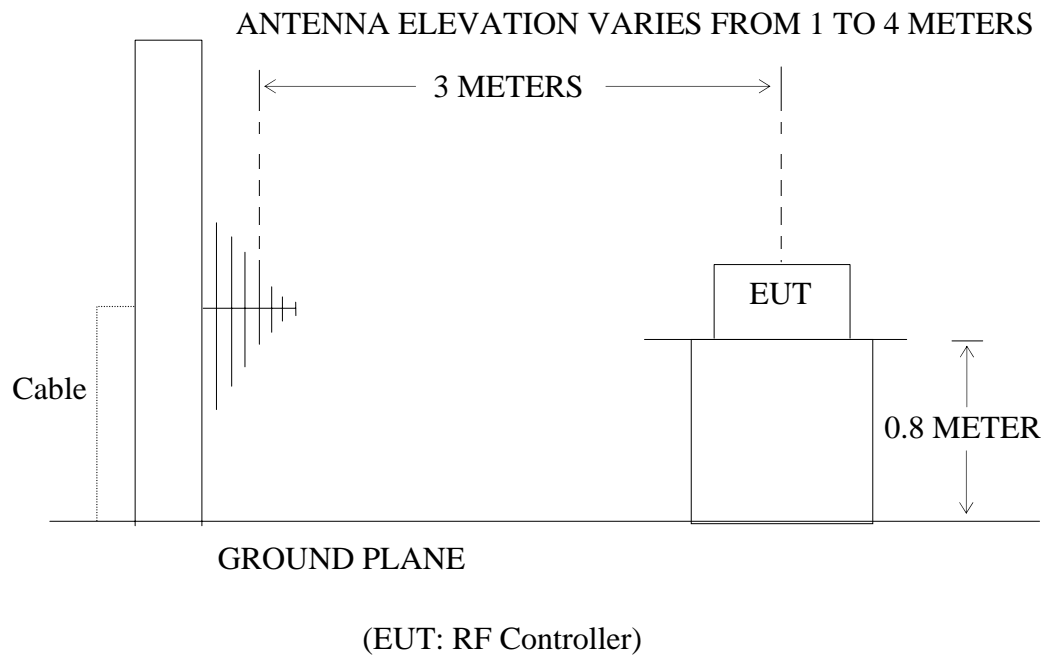
5. RADIATED EMISSION MEASUREMENT

5.1. Block Diagram of Test Setup

5.1.1. Block diagram of connection between the EUT and simulators



5.1.2. Semi-Anechoic Chamber Test Setup Diagram



5.2.The Emission Limit For Section 15.109 (a)

5.2.1.Radiation Emission Measurement Limits According to Section 15.109 (a).

Frequency MHz	Distance Meters	Field Strengths Limit	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V/m})$
30-88	3	100	40.0
88-216	3	150	43.5
216-960	3	200	46.0
960-1000	3	500	54.0
Remark: (1) Emission level $\text{dB}(\mu\text{V}) = 20 \log$ Emission level $\mu\text{V/m}$. (2)The smaller limit shall apply at the cross point between two frequency bands. (3)Distance is the distance in meters between the measuring instrument antenna and the closest point of any part of the device or system.			

5.3.EUT Configuration on Measurement

The following equipment is installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.3.1.RF Controller

Model Number: AL-RFC

Serial Number: N/A

Manufacturer: Gateway Plastic Hardware & Lighting Co., Ltd.

5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in test mode and measure it.

5.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4: 2014 on radiated emission measurement.

The bandwidth of the EMI test receiver (R&S ESCS30) is set at 120kHz from 30MHz to 1000MHz.

The frequency range from 30MHz to 5000MHz is checked.

5.6.Radiated Emission Noise Measurement Result

PASS.

Model Number: AL-RFC Test mode: On&RX								
Horizontal	No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	125.3645	57.67	-20.10	37.57	43.50	-5.93	QP
	2	186.4684	58.40	-19.22	39.18	43.50	-4.32	QP
	3	258.5332	56.87	-17.82	39.05	46.00	-6.95	QP
Vertical	No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	97.6864	59.40	-19.13	40.27	43.50	-3.23	QP
	2	154.2427	60.14	-21.39	38.75	43.50	-4.75	QP
	3	195.8701	57.36	-19.09	38.27	43.50	-5.23	QP
Above 1G								
Horizontal	No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	4755.226	48.50	-6.86	41.64	74.00	-32.36	peak
	2	4755.226	40.17	-6.86	33.31	54.00	-20.69	AVG
Vertical	No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	3239.778	49.43	-8.58	40.85	74.00	-33.15	peak
	2	3239.778	41.79	-8.58	33.21	54.00	-20.79	AVG



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Report No.: ATE20160631

Page 16 of 19

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: STAR2016 #597
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: RF Controller
Mode: ON&RX
Model: AL-RFC
Manufacturer: Gateway

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 16/04/15/
Time: 9/05/56
Engineer Signature: star
Distance: 3m

Note: Report No.:ATE20160631





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Report No.: ATE20160631

Page 17 of 19

Site: 1# Chamber

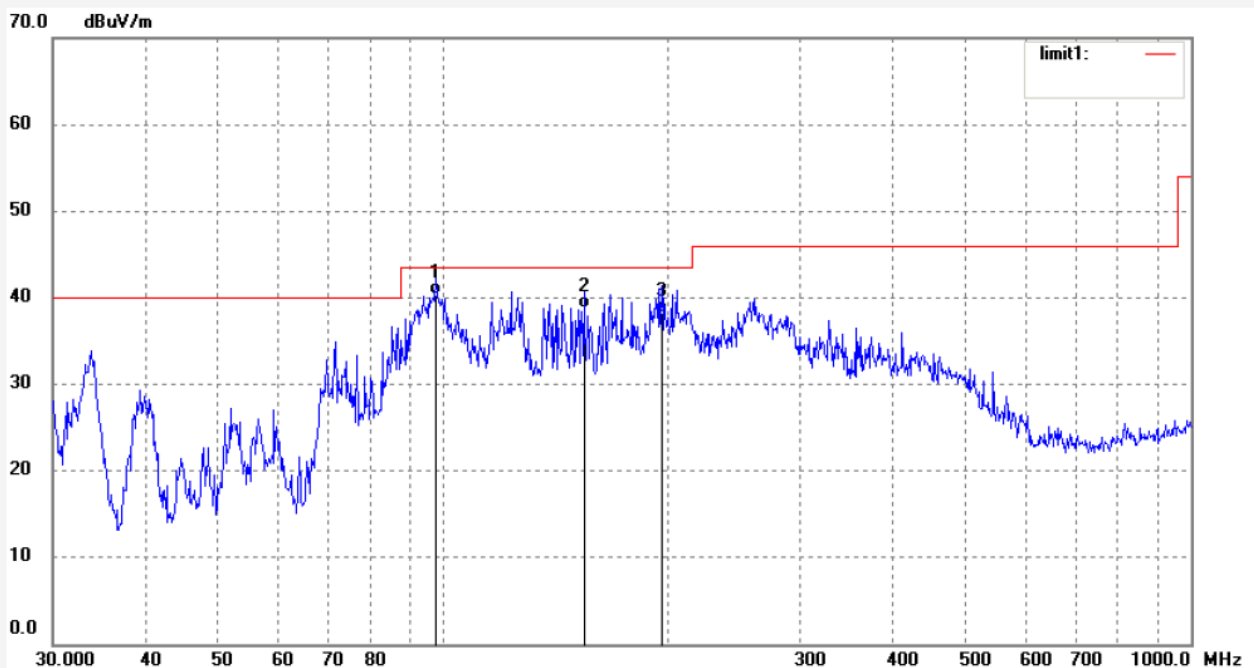
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: STAR2016 #595
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: RF Controller
Mode: ON&RX
Model: AL-RFC
Manufacturer: Gateway

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 16/04/15/
Time: 9/00/52
Engineer Signature: star
Distance: 3m

Note: Report No.:ATE20160631



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	97.6864	59.40	-19.13	40.27	43.50	-3.23	QP			
2	154.2427	60.14	-21.39	38.75	43.50	-4.75	QP			
3	195.8701	57.36	-19.09	38.27	43.50	-5.23	QP			



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Report No.: ATE20160631

Page 18 of 19

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: STAR2016 #962

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: RF Controller

Mode: ON&RX

Model: AL-RFC

Manufacturer: Gateway

Polarization: Horizontal

Power Source: AC 120V/60Hz

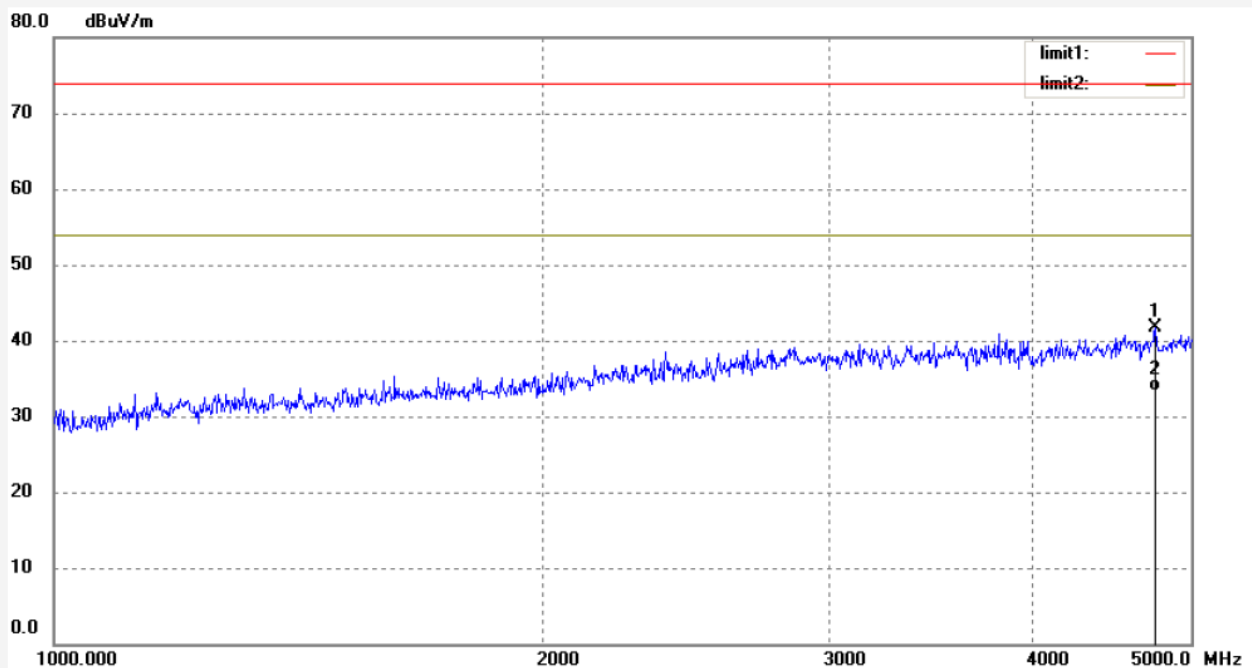
Date: 16/06/02/

Time: 11/24/01

Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20160631



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4755.226	48.50	-6.86	41.64	74.00	-32.36	peak			
2	4755.226	40.17	-6.86	33.31	54.00	-20.69	AVG			



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Report No.: ATE20160631

Page 19 of 19

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: STAR2016 #963

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: RF Controller

Mode: ON&RX

Model: AL-RFC

Manufacturer: Gateway

Polarization: Vertical

Power Source: AC 120V/60Hz

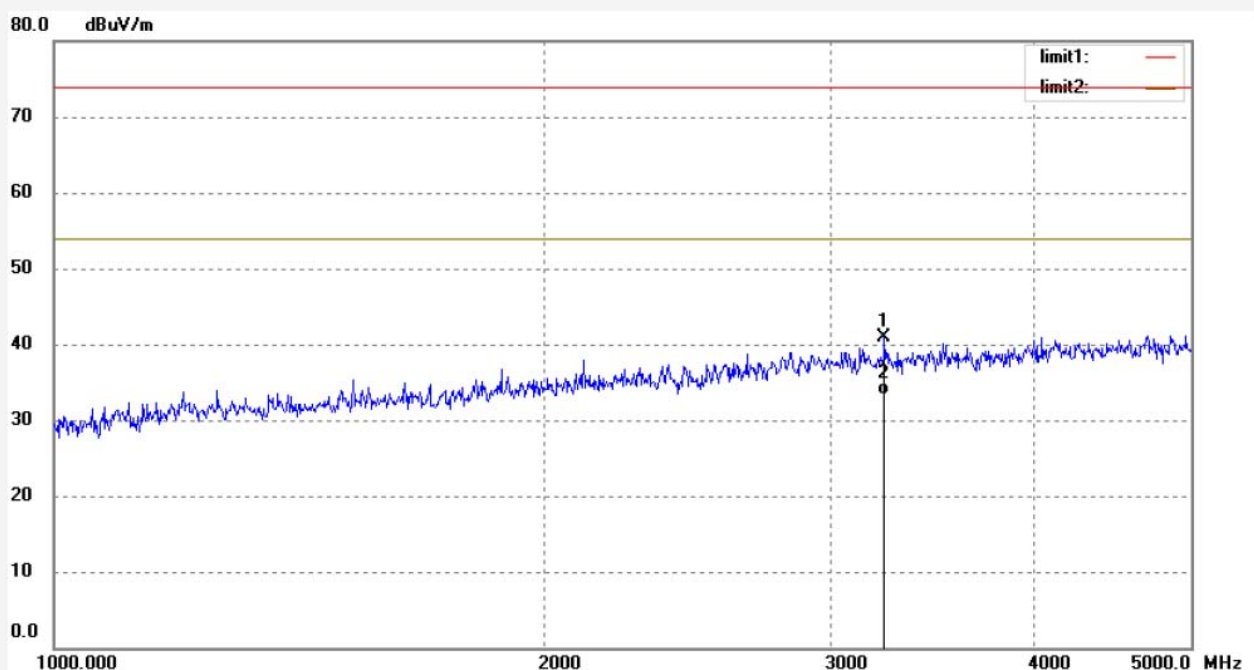
Date: 16/06/02/

Time: 11/27/39

Engineer Signature: star

Distance: 3m

Note: Report No.:ATE20160631



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	3239.778	49.43	-8.58	40.85	74.00	-33.15	peak			
2	3239.778	41.79	-8.58	33.21	54.00	-20.79	AVG			