

EMC EMISSION - TEST REPORT

Report Number : **64.740.17.05003.01 – (E)** Date of Issue: 2017-09-29

Model / Serial No. : G4-2-XX/E18/14-FZ
(XX=18-65, means the correlated colour temperature 1800K-6500K.)

Product Type : LED bulb

Applicant : FOSHAN ELECTRICAL AND LIGHTING CO., LTD.

Manufacturer : FOSHAN ELECTRICAL AND LIGHTING CO., LTD.

Address : 64 North Fenjiang Road, 528000 Foshan, Guangdong,

: People's Republic of China

Test Result : **Positive** **Negative**



Total pages including Appendices : 25

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch is a subcontractor to TÜV SÜD Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

D I R E C T O R Y - E M I S S I O N S

	Pages
A) Documentation	
Directory	2
Test Regulations	3
General Remarks and Summary	11
B) Test Data	
Conducted Emissions 9kHz - 30 MHz	5, 10
Radiated Emissions 9kHz - 30 MHz	6, 10
Radiated Emissions 30MHz - 300 MHz	7, 10
Harmonic Current Emissions and Voltage Fluctuations and Flicker 2nd through 40th Harmonics	8, 10
C) Appendix A	
Test Setup Photo(s) and Test Data Sheets	12 – 21
D) Appendix B	
Constructional Data Form and Product Information Form(s)	22 – 23
E) Appendix C	
Constructional Photographs	24 – 25

EMISSIONS TEST REGULATIONS:

The emissions tests were performed according to the following regulations:

■ - EMC - Directive 2014/30/EU and its amendments

■ - EN 55015:2013+A1:2015

Environmental Conditions In The Laboratory:

	Actual
Temperature:	: 23.1-23.7 °C
Relative Humidity:	: 57-59%
Atmospheric Pressure:	: 100.7-101.0kPa

Power Ratings of EUT

Rated voltage : 12V AC/DC

STATEMENT OF MEASUREMENT UNCERTAINTY

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities that can account for a nominal measurement error (Please refer to each test item). Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Symbol Definitions:

- - Applicable
- - Not Applicable

Test laboratory:

□ - TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
Add: 5F,Communication Building,163 Pingyun Rd, Huangpu Ave. West Guangzhou, P.R.China

■ - TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Add: Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen 518052, P.R. China

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The **CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)** measurements were performed at the following test location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) – Shielded room
- Test Area (TÜV SÜD Shenzhen) – Shielded room

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/>	ESCI	Rohde & Schwarz	EMI Test Receiver	100727	2017-10-31
<input type="checkbox"/>	ENV216	Rohde & Schwarz	AMN	3506.6550.05	2017-10-31
<input type="checkbox"/>	ESH2-Z3	Rohde & Schwarz	Passive voltage probe	0299.7810.56	2017-10-31
<input type="checkbox"/>	RSU-M314-N	Compliance Direction Systems Inc.	RF Switch Box	08042801	2017-10-31
<input type="checkbox"/>			Artificial Hand		
<input checked="" type="checkbox"/>	ENV432	Rohde & Schwarz	LISN	100318	2018-07-14
<input checked="" type="checkbox"/>	ESR 3	Rohde & Schwarz	EMI Test Receiver	101782	2018-07-14
<input type="checkbox"/>	N/A	TÜV SÜD	Insulating support	N/A	N/A
<input checked="" type="checkbox"/>	D-69250	Schwarzbeck	Conical metal housing	N/A	N/A

Measurement Uncertainty: TÜV SÜD Shenzhen: $\pm 3.88\text{dB}$ (9kHz-150kHz), $\pm 3.50\text{dB}$ (150kHz-30MHz)
 TÜV SÜD Guangzhou: $\pm 3.30\text{dB}$ (9 kHz-150 kHz), $\pm 2.48\text{dB}$ (150 kHz-30MHz);

Remarks: All test equipment used are calibrated on a regular basis.

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The **RADIATED EMISSIONS (MAGNETIC FIELD)** measurements were performed at the following test location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) –Shielded room
- Test Area (TÜV SÜD Shenzhen) –Shielded room

Testing was performed at a test distance of :

- 2 meters loops
- 3 meters loops
- 4 meters loops

Test Equipment Used:

Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/> - HXYZ 9170	Rohde & Schwarz	Loop Antenna	YP170-193	2017-10-31
<input type="checkbox"/> - RSU-M314-N	Compliance Direction Systems Inc.	RF Switch Box	08042801	2017-10-31
<input type="checkbox"/> - ESCI	Rohde & Schwarz	EMI Test Receiver	100727	2017-10-31
<input checked="" type="checkbox"/> - ESR 3	Rohde & Schwarz	EMI Test Receiver	101782	2018-07-14
<input checked="" type="checkbox"/> - HM020	Rohde & Schwarz	Triple Loop Antenna	100951	2018-07-14

Measurement Uncertainty: TÜV SÜD Guangzhou: $\pm 2.50\text{dB}$ (9 kHz-30MHz)
 TÜV SÜD Shenzhen: $\pm 3.34\text{dB}$ (9 kHz-30MHz)

Remarks: All test equipments used are calibrated on a regular basis.

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-300 MHz, were tested in a horizontal and vertical polarization at the following test location :

- Test not applicable

■ - Test Area (TÜV SÜD Shenzhen) - Anechoic ferrite lined shielded room

Testing was performed at a test distance of:

- - 3 meters
- 10 meters

Test Equipment Used:

Model Number	Manufacturer	Description	Serial Number	Cal. Due
■ - ESR 26	Rohde & Schwarz	EMI Test Receiver	101269	2018-07-14
■ - VULB 9163	Schwarzbeck	Trilog Super Broadband Test Antenna	707	2018-07-14
■ - SCU 18	Rohde & Schwarz	Pre-amplifier	102230	2018-07-14

Measurement Uncertainty: $\pm 4.91\text{B}$ (30MHz-300MHz)

Remarks: All test equipments used are calibrated on a regular basis.

Emissions Test Conditions: CONDUCTED EMISSIONS (Harmonics and Flicker)

The *Harmonic Current Emissions and Voltage Fluctuations and Flicker* measurements were performed at the following test location :

- Test not performed

- Test Area (TÜV SÜD Guangzhou) – Laboratory open area

Test Equipment Used:

	Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/>	PCR6000LA	Kikusui	Multi purpose power supply	MG002890	2018-03-12
<input type="checkbox"/>	PM6000-1	Voltech	Power analyser	100006700229	2018-03-12
<input type="checkbox"/>	IMP555	Voltech	Impedance network	1494	2018-03-12

Remarks: All test equipments used are calibrated on a regular basis.

Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

The equipment under test was operated under the following conditions during emissions testing:

- Standby
- Test Program (H - Pattern)
- Test Program (Color Bar)
- Test Program (Customer Specified)
- Normal Operating Mode
- _____

Configuration of the equipment under test:

- See Constructional Data Form in Appendix B
- See Product Information Form(s) in Appendix B

The following peripheral devices and interface cables were connected during the testing:

- DC battery Type : 12V DC battery
- AC power source Type : Output:12V AC
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- unshielded power cable
- unshielded cables
- shielded cables TUV.No.: _____
- customer specific cables
- _____
- _____

Emissions Test Results:

Conducted Emissions, 9 kHz - 30 MHz

- PASS - FAIL - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: Power supplied: 12V AC.

Radiated Emissions (Magnetic Field), 9 kHz - 30 MHz

- PASS - FAIL - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: Power supplied: 12V AC. Worst case was reported.

Radiated Emissions (Electric Field), 30 MHz - 300 MHz

- PASS - FAIL - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: Power supplied: 12V AC/DC. Worst case was reported.

Harmonic Current Emissions and Voltage Fluctuations and Flicker

- PASS - FAIL - NOT APPLICABLE

Harmonic measurement exceeding limit _____ Above at _____ Harmonic

Flicker measurement exceeding limit _____ Above the _____ Requirement

Remarks: _____



China

GENERAL REMARKS:

Different CCT of LED would have no influence on EMC performance.
Tests were applied to model G4-2-30/E18/14-FZ only.

SUMMARY:

All tests according to the regulations cited on page 3 were

- Performed

- **Not** Performed

The Equipment Under Test

- **Fulfills** the general approval requirements cited on page 3.

- **Does not** fulfill the general approval requirements cited on page 3.

Testing Start Date: 2017-09-27

Testing End Date: 2017-09-29

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH -

Reviewed by:

Prepared by:

Tony Liu



Wendy Ye

Appendix A

Test Setup Photo(s)

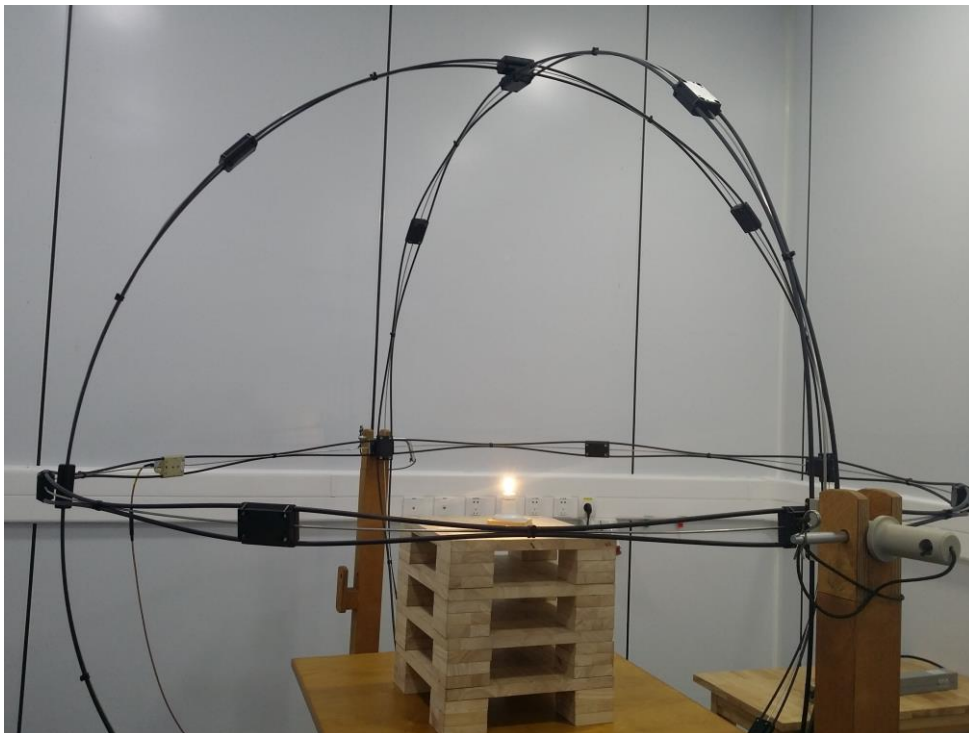
and

Test Data Sheets

Test Setup: Conducted Emissions (9 kHz-30 MHz)



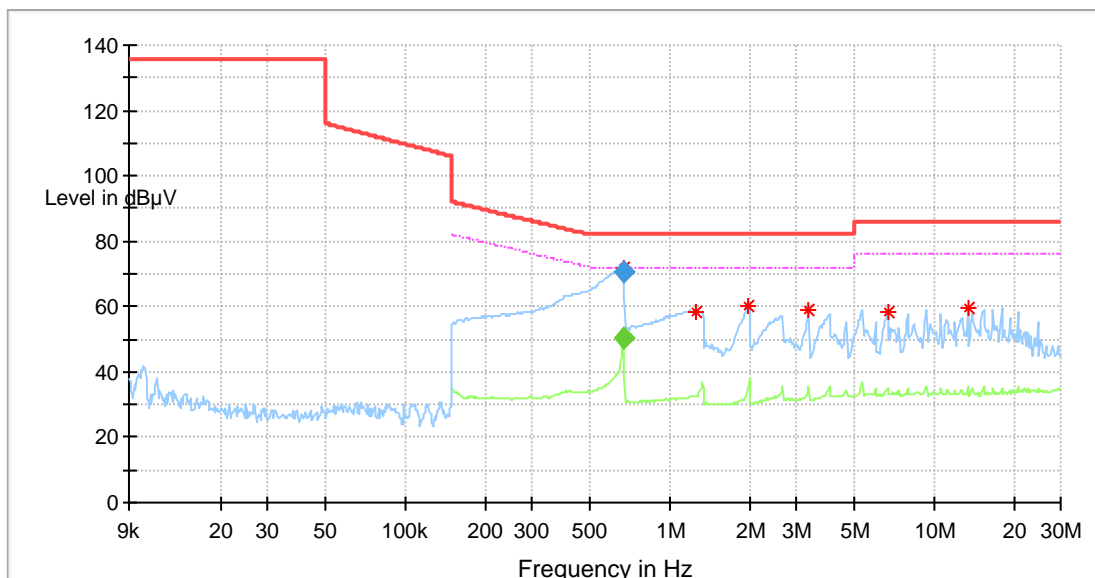
Test Setup: Radiated Emissions (Magnetic Field: 9 kHz-30 MHz)



Test Setup: Radiated Emissions (Electric Field: 30MHz-300MHz)



Conducted Emissions (9 kHz-30MHz)

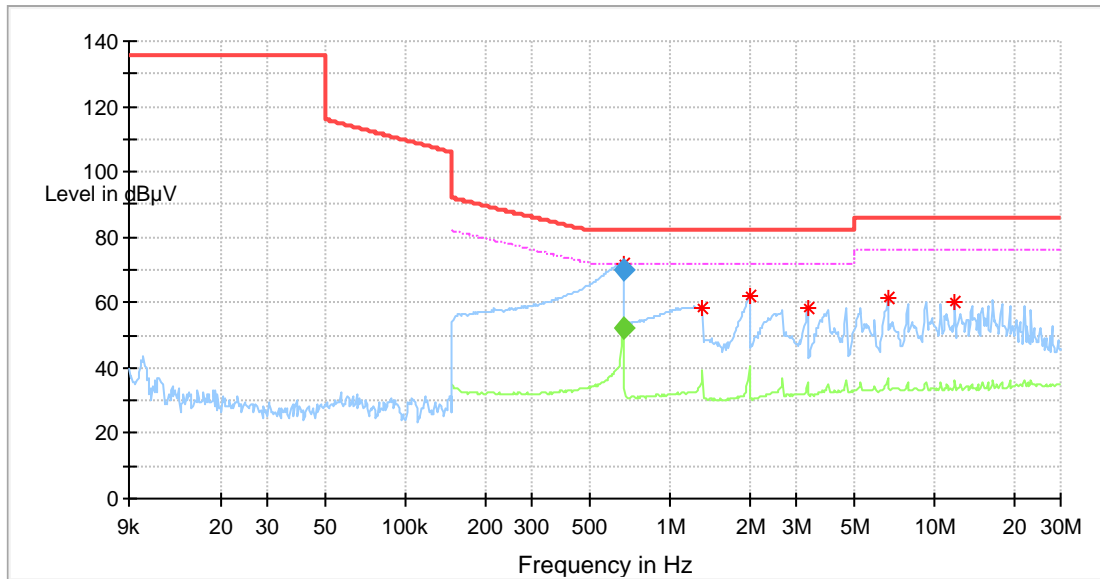


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.669392	---	50.27	72.00	21.73	L1	36.2
0.669392	70.32	---	82.00	11.68	L1	36.2

Model : G4-2-30/E18/14-FZ
Operating Mode : Continuous lighting
Conduct Line/Port : L
Test By : Wendy Ye
Test Date : 2017-09-29

Conducted Emissions (9 kHz-30MHz)

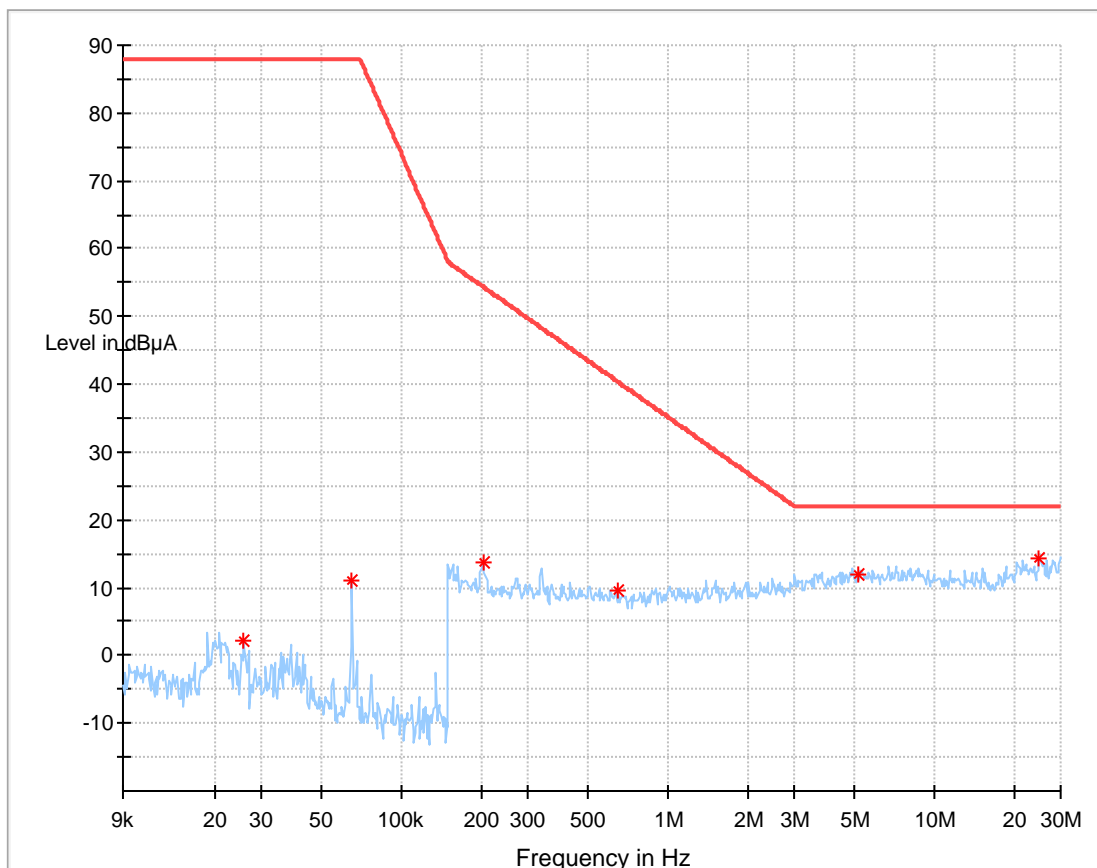


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.665157	---	51.93	72.00	20.07	N	36.3
0.665157	70.28	---	82.00	11.72	N	36.3

Model : G4-2-30/E18/14-FZ
Operating Mode : Continuous lighting
Conduct Line/Port : N
Test By : Wendy Ye
Test Date : 2017-09-29

Radiated Emission (9 kHz-30MHz)

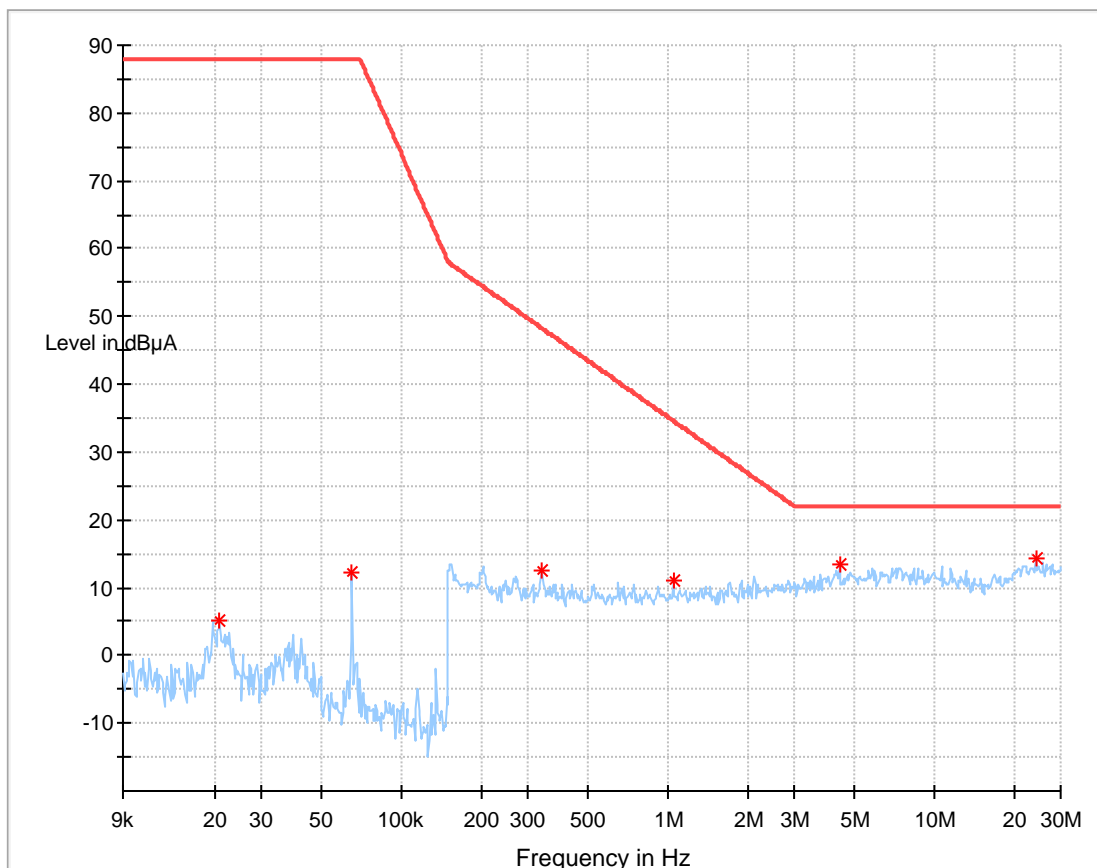


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Corr. (dB)
0.025585	2.17	88.00	85.83	6.0
0.065192	11.09	88.00	76.91	6.0
0.202177	13.58	54.41	40.83	6.0
0.654116	9.63	40.30	30.68	6.0
5.182038	12.06	22.00	9.94	6.1
24.961902	14.32	22.00	7.68	6.3

Model : G4-2-30/E18/14-FZ
Operating Mode : Continuous lighting
Antenna : LOOP X
Test By : Wendy Ye
Test Date : 2017-09-27

Radiated Emission (9 kHz-30MHz)

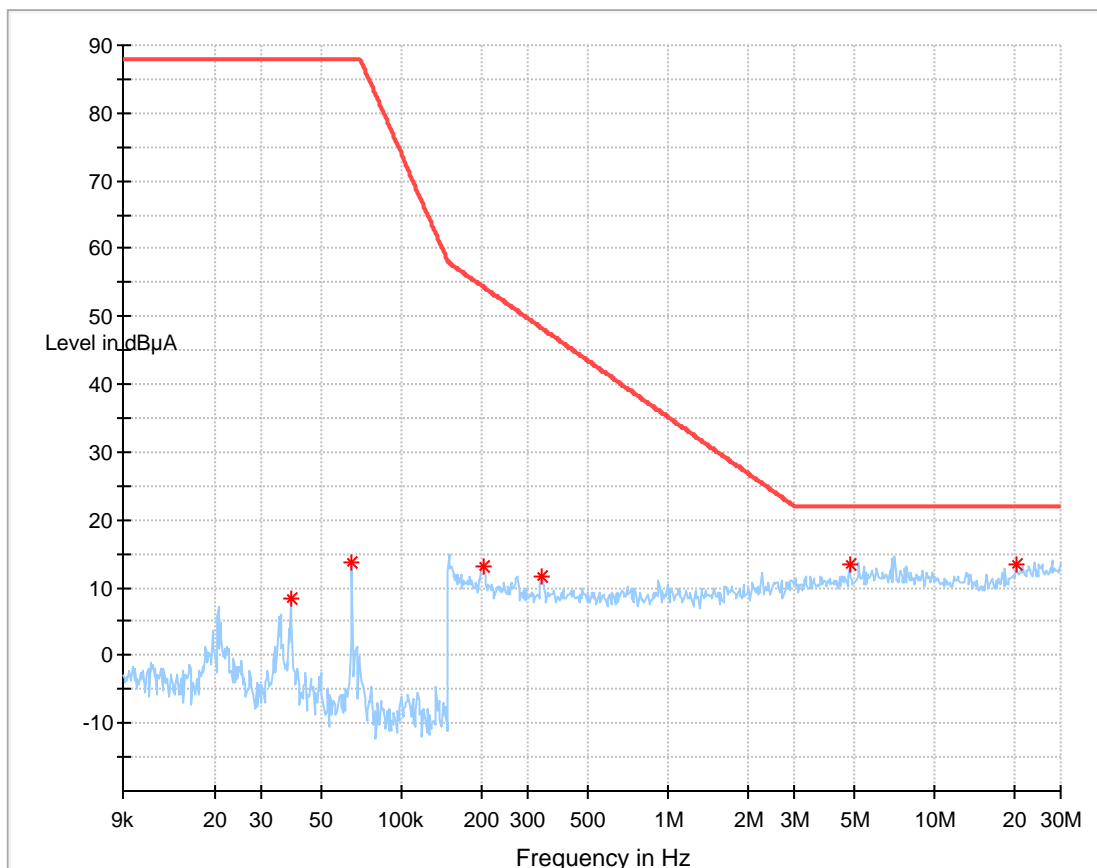


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Corr. (dB)
0.020761	5.17	88.00	82.83	6.0
0.065192	12.37	88.00	75.63	6.0
0.339191	12.60	48.19	35.59	6.0
1.054583	10.92	34.56	23.65	6.0
4.419352	13.29	22.00	8.71	6.1
24.227776	14.33	22.00	7.67	6.3

Model : G4-2-30/E18/14-FZ
Operating Mode : Continuous lighting
Antenna : LOOP Y
Test By : Wendy Ye
Test Date : 2017-09-27

Radiated Emission (9 kHz-30MHz)

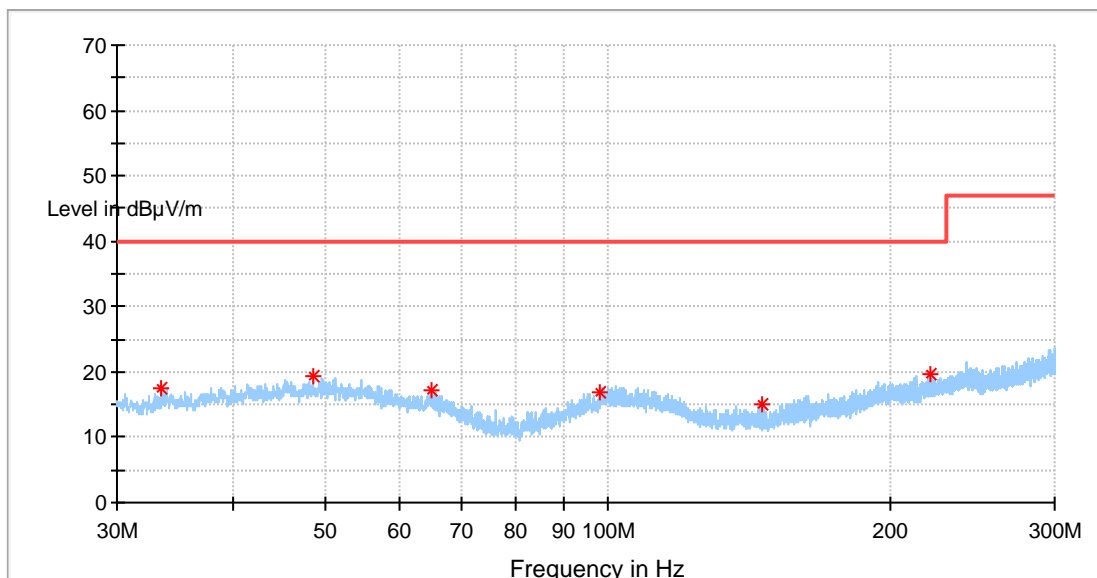


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Corr. (dB)
0.038474	8.33	88.00	79.67	6.0
0.065192	13.62	88.00	74.38	6.0
0.202177	13.11	54.41	41.31	6.0
0.335833	11.73	48.31	36.58	6.0
4.833381	13.43	22.00	8.57	6.1
20.457389	13.32	22.00	8.68	6.2

Model : G4-2-30/E18/14-FZ
Operating Mode : Continuous lighting
Antenna : LOOP Z
Test By : Wendy Ye
Test Date : 2017-09-27

Radiated emission 30MHz-300MHz

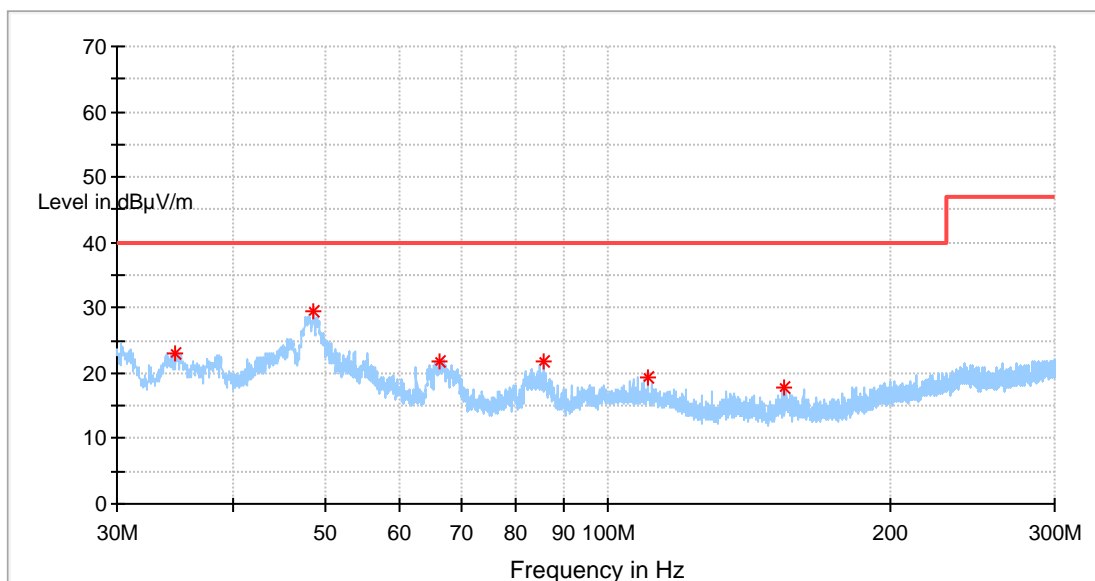


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol
33.510000	17.64	40.00	22.36	H
48.511875	19.37	40.00	20.63	H
64.897500	17.12	40.00	22.88	H
98.259375	16.85	40.00	23.15	H
146.218125	15.03	40.00	24.97	H
221.227500	19.55	40.00	20.45	H

Model : G4-2-30/E18/14-FZ
Antenna polarity : Horizontal
Operation Mode : Continuous lighting (supplied by 12V~)
Test engineer : Wendy Ye
Test date : 2017-09-27

Radiated emission 30MHz-300MHz



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol
34.640625	23.07	40.00	16.93	H
48.680625	29.45	40.00	10.55	H
66.298125	21.91	40.00	18.09	H
85.434375	21.86	40.00	18.14	H
110.561250	19.34	40.00	20.66	H
154.166250	17.70	40.00	22.30	H

Model : G4-2-30/E18/14-FZ
Antenna polarity : Vertical
Operation Mode : Continuous lighting (supplied by 12V~)
Test engineer : Wendy Ye
Test date : 2017-09-27

Appendix B

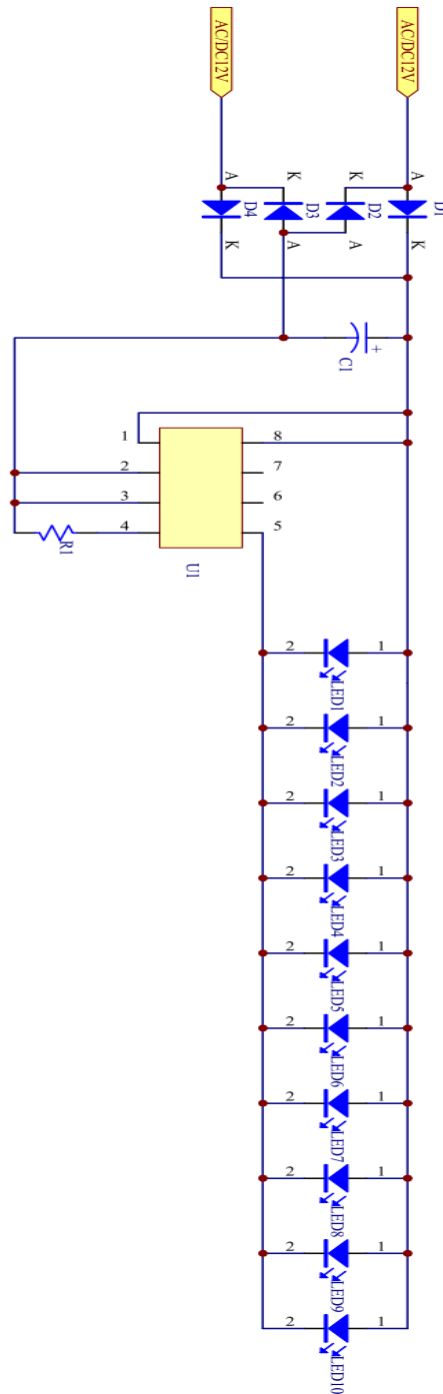
Constructional Data Form
and
Product Information Form(s)

Any safety relevant information or constructional aspect concerning the sample or equipment under test as submitted by the applicant / report holder / certificate holder or any authorized agent is deemed to have no adverse effect on the electromagnetic compatibility (EMC) performance. Insofar as safety or compliance with Low Voltage Directive (LVD) or any relevant directive is concerned, the applicant / report holder / certificate holder or any authorized agent is required, by virtue of the relevant EU Directive provisions, to have satisfied that the product concerned (for which a sample was tested) meets with LVD or other relevant directives before placing it on the market.

Where applicable, changes or modifications made to the original sample submitted for testing are documented herein. The applicant or manufacturer shall ensure that such changes or modifications are applied to the production units. Any further changes or modifications made to the production units may void the validity of this test report unless such changes or modifications have been formally assessed by TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch through technical evaluations or other means as appropriate and it has been confirmed that the EMC performance of such units is not adversely affected.

The enclosed, if any, circuit diagram / parts list / printed circuit board diagram / component layout / user manual are strictly for reference only. TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch shall not be held responsible for any error or omission in such documents. It is the manufacturer's responsibility to ensure that production units conform to the tested sample.

Electric design



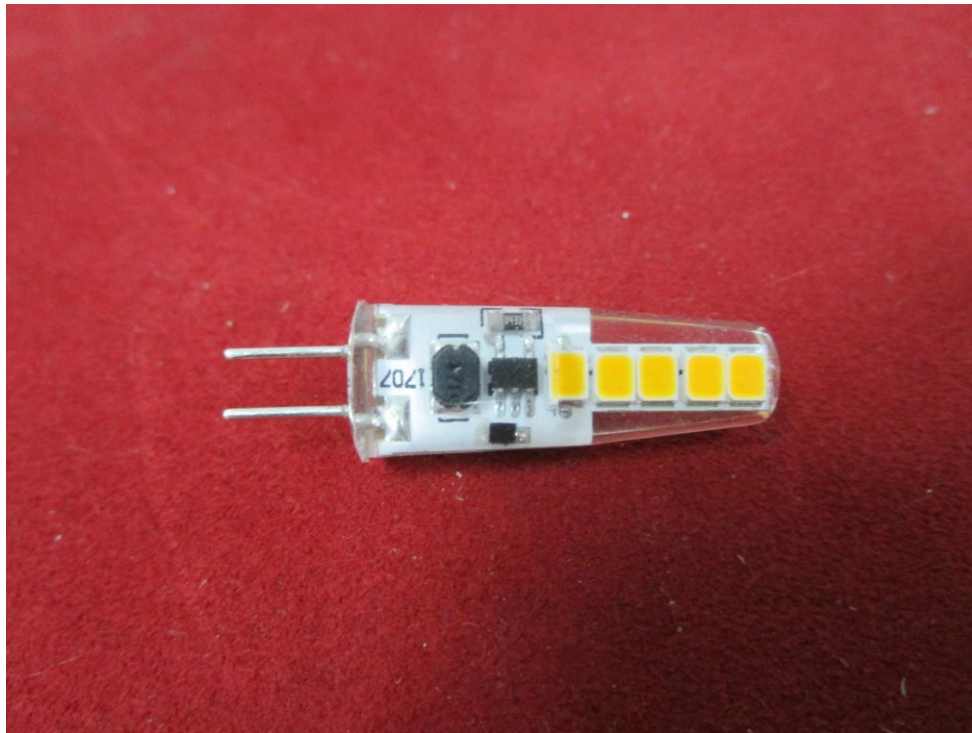
Appendix C

Constructional Photographs of Equipment under test (EUT)

Any safety relevant information or constructional aspect concerning the sample or equipment under test as submitted by the applicant / report holder / certificate holder or any authorized agent is deemed to have no adverse effect on the electromagnetic compatibility (EMC) performance. Insofar as safety or compliance with Low Voltage Directive (LVD) or any relevant directive is concerned, the applicant / report holder / certificate holder or any authorized agent is required, by virtue of the relevant EU Directive provisions, to have satisfied that the product concerned (for which a sample was tested) meets with LVD or other relevant directives before placing it on the market.

Constructional Photographs

G4-2-XX/E18/14-FZ





EMC IMMUNITY - TEST REPORT

Report Number : **64.740.17.05003.01 – (I)** Date of Issue: 2017-09-29

Model / Serial No. : G4-2-XX/E18/14-FZ
(XX=18-65, means the correlated colour temperature 1800K-6500K.)

Product Type : LED bulb

Applicant : FOSHAN ELECTRICAL AND LIGHTING CO., LTD.

Manufacturer : FOSHAN ELECTRICAL AND LIGHTING CO., LTD.

Address : 64 North Fenjiang Road, 528000 Foshan, Guangdong,
: People's Republic of China

Test Result : Positive Negative



Total pages including Appendices : 18

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch is a subcontractor to TÜV SÜD Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch reports apply only to the specific samples tested under stated test conditions. Construction of the actual test samples has been documented. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. The manufacturer/importer is responsible to the Competent Authorities in Europe for any modifications made to the production units which result in non-compliance to the relevant regulations. TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval.

DIRECTORY - IMMUNITY

	Pages
A) Documentation	
Directory	<u>2</u>
Test Regulations	<u>3</u>
General Remarks and Summary	<u>16</u>
B) Test data: Immunity against	
Electrostatic Discharge	<u>5</u>
Radiated field immunity	<u>6 - 7</u>
Fast Transients (Burst)	<u>8 - 9</u>
Surge Transients	<u>10 - 11</u>
Conducted Disturbance	<u>12 - 13</u>
Voltage Dips, Interruptions & Variations	<u>14</u>
C) Appendix A	
Test Setup Photo(s)	<u>17 - 18</u>

Remark:

Constructional Data Form and Product Information Form(s) and Constructional Photographs of EUT refer to emission test report

IMMUNITY TEST REGULATIONS:

The immunity tests were performed according to the following regulations:

■ - EMC - Directive 2014/30/EU and its amendments

■ - EN 61547:2009

Following basic standards were used as reference:

■ - IEC 61000-4-2:2008

■ - IEC 61000-4-3:2006+A1:2007

□ - IEC 61000-4-4:2004

□ - IEC 61000-4-5:2005

□ - IEC 61000-4-6:2008

□ - IEC 61000-4-8:1993+A1:2000

□ - IEC 61000-4-11:2004



Environmental Conditions In The Laboratory:

	<u>Actual</u>
Temperature:	: 22.4-22.7 °C
Relative Humidity:	: 43-50%
Atmospheric Pressure:	: 100.7-101.0kPa

Power Ratings of EUT

Rated voltage : 12V AC/DC

STATEMENT OF MEASUREMENT UNCERTAINTY

The tolerances for each tests are reduced by the uncertainty reported on the calibration certificate for the measurement, all the parameters are within the tolerances required by the relevant standard, reduced by the uncertainty reported on the calibration certificate, so the laboratory has confidence that all the tests compliant with the relevant standards with a 95% confidence level.

Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Symbol Definitions:

- - Applicable
- - Not Applicable

Test laboratory:

□ - TÜV SÜD Certification and Testing (China) Co., Ltd. Guangzhou Branch
Add: 5F,Communication Building,163 Pingyun Rd, Huangpu Ave. West Guangzhou, P.R.China

■ - TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Add: Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen 518052, P.R. China



Immunity Test Conditions: ELECTROSTATIC DISCHARGE (ESD)

The immunity against *ELECTROSTATIC DISCHARGE (ESD)* events was performed in the following location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) - Laboratory open area

- Test Area (TÜV SÜD Shenzhen) - Laboratory open area

Test Equipment Used :

Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/> - NSG435	Teseq	ESD tester	6155	2017-11-01
<input type="checkbox"/> - ---	TÜV	H/V Coupling Plane	TÜV	/
<input checked="" type="checkbox"/> - ESS-2002	Noiseken	Electrostatic Discharge Simulator	ESS0615075	2017-07-14
<input checked="" type="checkbox"/> - ---	TÜV SÜD Shenzhen	H/V Coupling Plane	/	/

Remarks: All test equipments used are calibrated on a regular basis.

Test Specification:

Discharge Voltage (Air): - 2 kV - 8 kV - 6 kV
 - 4 kV - 15 kV - _ kV

Discharge Voltage (Contact): - 2 kV - 6 kV - _ kV
 - 4 kV - 8 kV

Discharge Impedance: - 330 Ω / 150 pF - 150 Ω / 150 pF

Discharge Repetition Rate: - ≥ 1 sec.

Number of Discharges: - ≥ 10 at all locations

Kind of Discharges: - Air discharge - Conducted discharge
 - Direct - Indirect

Polarity: - Positive - Negative

Location of Discharge: - HCP/VCP
 - Each location on the surface touchable by hand
 - See drawing in Appendix A
 - _____

Result :

- No degradation of function - Met Criterion A
 - Distortion of function - Met Criterion B
 - Error of function - Met Criterion C
 - Loss of function - Unrecoverable Failure

Remarks: Power supplied: 12V AC



Immunity Test Conditions: RADIATED ELECTROMAGNETIC FIELDS

The immunity against *RADIATED ELECTROMAGNETIC FIELDS* exposure was performed in the following location:

- Test not applicable

■ - Test Area (TÜV SÜD Shenzhen) – Anechoic ferrite lined shielded room

Test Equipment Used :

Model Number	Manufacturer	Description	Serial Number	Cal. Due
■ - BBA100	Rohde & Schwarz	Power Amplifier	101238	2018-07-14
<input type="checkbox"/> - BBA150	Rohde & Schwarz	Power Amplifier	101671	2018-07-14
■ - HL046E	Rohde & Schwarz	Log-Periodic Antenna	100160	2018-07-14
■ - SMB100A	Rohde & Schwarz	Signal Generator	177600	2018-07-14
■ - NRP-Z91	Rohde & Schwarz	Average Power Sensor	102538	2018-07-14
■ - NRP-Z91	Rohde & Schwarz	Average Power Sensor	102539	2018-07-14
■ - NRP2	Rohde & Schwarz	Power Meter	103497	2018-07-14
■ - FL7006/KIT	AMPLIFIER RESEARCH	Starprobe Laser-Powered Probe	0433720	2018-07-14
■ - 8X4X4	TDK	Full Anechoic Chamber	(TÜV SÜD)	2019-05-19

Remarks: All test equipments used are calibrated on a regular basis.

Test Specification:

Frequency Range: - 27 MHz - 500 MHz - 26 MHz - 1000 MHz
 - 9 kHz - 27 MHz - 80 MHz - 1000 MHz

Field Strength: - 1 V/m - 3 V/m
 - 10 V/m - _ V/m

Distance Antenna - EUT: - 1 m - 3 m



Test Specification (continued):

Modulation: - AM : 80% 1kHz
 - FM : ___ kHz dev. ___ kHz
 - sine wave:
 - unmodulated
 - Pulse ON/OFF Duty Cycle: ___ %

Step: ≤ 0.015 decades / sec - 1%

Polarization of Antenna: - Horizontal - Vertical

Result :
 - No degradation of function - Met Criterion A
 - Distortion of function - Met Criterion B
 - Error of function - Met Criterion C
 - Loss of function - Unrecoverable Failure

Remarks: Power supplied: 12V AC

Immunity Test Conditions: FAST TRANSIENTS (BURST)

The immunity against *FAST TRANSIENTS (BURST)* events was performed in the following test location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) - Laboratory open area

Test Equipment Used :

Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/> - MODULA6150	Teseq	Immunity test system	34595	2017-10-31
<input type="checkbox"/> - CDN8014	Teseq	Coupling Clamp	25528	2017-10-31

Remarks: All test equipments used are calibrated on a regular basis.

Test Specification:

Pulse Amplitude - AC Power Port: - 1,0 kV - 2,0 kV
 - 4,0 kV - ___ kV

Pulse Amplitude - DC Power Port: - 1,0 kV - 2,0 kV
 - 4,0 kV - ___ kV

Pulse Amplitude - Signal/Data Non control Port: - 0,5 kV - 1,0 kV
 - 2,0 kV - ___ kV

Pulse Amplitude - Process: Measurement & Control Port - 0,5 kV - 1,0 kV
 - 2,0 kV - ___ kV

Burst Frequency: - 2,5 kHz - 5,0 kHz - ___ kHz

Time of Coupling: - 60 seconds - 120 seconds - ___ seconds

Coupling Method: - Coupling/decoupling network - Coupling clamp

Polarity: - Positive - Negative

Immunity Test Conditions: FAST TRANSIENTS (BURST), continued

Location of Coupling:

name of lines: AC POWER CORD
 type of lines: - shielded - unshielded
 status of lines: - Passive - active
 kind of transmission: - analog - digital
 length of lines: _____

name of lines: _____
 type of lines: - shielded - unshielded
 status of lines: - Passive - active
 kind of transmission: - analog - digital
 length of lines: _____

name of lines: _____
 type of lines: - shielded - unshielded
 status of lines: - Passive - active
 kind of transmission: - analog - digital
 length of lines: _____

Result :

- | | |
|---|-------------------------|
| <input type="checkbox"/> - No degradation of function | - Met Criterion A |
| <input type="checkbox"/> - Distortion of function | - Met Criterion B |
| <input type="checkbox"/> - Error of function | - Met Criterion C |
| <input type="checkbox"/> - Loss of function | - Unrecoverable Failure |

Remarks: _____

Immunity Test Conditions: SURGE TRANSIENTS

The immunity against *SURGE TRANSIENTS* events was performed in the following test location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) - Laboratory open area

Test Equipment Used:

Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/> - MODULA6150	Teseq	Immunity test system	34595	2017-10-31

Remarks: All test equipments used are calibrated on a regular basis.

Test Specification:

Pulse Amplitude - AC Power Port: - 1,0 kV (for others) - 2,0 kV
 - 4,0 kV - 0.5 kV

Pulse Amplitude - DC Power Port: - 1,0 kV - 2,0 kV
 - 4,0 kV - ___ kV

Pulse Amplitude - Signal/Data Non control Port: - 0,5 kV - 1,0 kV
 - 2,0 kV - ___ kV

Pulse Amplitude - Process: Measurement & Control Port - 0,5 kV - 1,0 kV
 - 2,0 kV - ___ kV

Source Impedance: - 2 Ω + 18 μ F - 12 Ω + 9 μ F
 - 42 Ω + 0,1 μ F - 42 Ω + 0,5 μ F

Number of Surges: - 5 surges/angle - ___ surges /angle

Angle: - 90 °
 - 270 °

Repetition Rate: - 60 sec. - ___ sec.

Polarity: - Positive - Negative

Immunity Test Conditions: SURGE TRANSIENTS, continued

Location of Coupling:

name of lines: AC POWER CORD
 type of lines: - shielded - unshielded
 status of lines: - Passive - active
 kind of transmission: - analog - digital
 length of lines: _____

name of lines: _____
 type of lines: - shielded - unshielded
 status of lines: - Passive - active
 kind of transmission: - analog - digital
 length of lines: _____

name of lines: _____
 type of lines: - shielded - unshielded
 status of lines: - Passive - active
 kind of transmission: - analog - digital
 length of lines: _____

Result:

- | | |
|---|-------------------------|
| <input type="checkbox"/> - No degradation of function | - Met Criterion A |
| <input type="checkbox"/> - Distortion of function | - Met Criterion B |
| <input type="checkbox"/> - Error of function | - Met Criterion C |
| <input type="checkbox"/> - Loss of function | - Unrecoverable Failure |

Remarks: _____

Immunity Test Conditions: CONDUCTED DISTURBANCE

The immunity against *CONDUCTED DISTURBANCE* events, induced by radio frequency fields above 9 kHz, was performed in the following test location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) - Laboratory open area

Test Equipment Used:

Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/> - CIT-10/75	Frankonia	C/S test generator	102D1319	2017-10-31
<input type="checkbox"/> - 75-A-MFN-06	BIRD	6dB attenuator	0638	2017-10-31
<input type="checkbox"/> - M2+M3-801	Frankonia	CDN	A3011123	2017-10-31
<input type="checkbox"/> - F-203I-32mm	FCC	EM Injected Clamp	08511	2017-10-31

Remarks: All test equipments used are calibrated on a regular basis.

Test Specification:

Frequency Range: - 0,15 MHz - 230 MHz - 0,15 MHz - 80 MHz

Voltage Level (EMF): - 1 V - 3 V
 - 10 V - __ V

Modulation: - AM : 80 % 1 kHz
 - FM : __ kHz dev. __ kHz
 - sine wave:
 - unmodulated
 - Pulse ON/OFF Duty Cycle: __ %

Step: \leq 1%



Immunity Test Conditions: CONDUCTED DISTURBANCE, continued

Location of Coupling:

name of lines: AC POWER CORD
type of lines: - shielded - unshielded
status of lines: - Passive - active
kind of transmission: - analog - digital
length of lines: _____

name of lines: _____
type of lines: - shielded - unshielded
status of lines: - Passive - active
kind of transmission: - analog - digital
length of lines: _____

name of lines: _____
type of lines: - shielded - unshielded
status of lines: - Passive - active
kind of transmission: - analog - digital
length of lines: _____

Result:

- | | |
|---|-------------------------|
| <input type="checkbox"/> - No degradation of function | - Met Criterion A |
| <input type="checkbox"/> - Distortion of function | - Met Criterion B |
| <input type="checkbox"/> - Error of function | - Met Criterion C |
| <input type="checkbox"/> - Loss of function | - Unrecoverable Failure |

Remarks: _____



Immunity Test Conditions: VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS

The immunity against *VOLTAGE DIPS, INTERRUPTIONS & VARIATIONS* events, induced by radio frequency fields above 9 kHz, was performed in the following test location:

- Test not applicable

- Test Area (TÜV SÜD Guangzhou) - Laboratory open area

Test Equipment Used:

Model Number	Manufacturer	Description	Serial Number	Cal. Due
<input type="checkbox"/> - MODULA6150	Teseq	Immunity test system	34595	2017-10-31
<input type="checkbox"/> - INA6501	Teseq	Step power supply	159	2017-10-31

Remarks: All test equipments used are calibrated on a regular basis.

Test Specification:

Nominal Mains Voltage (V_{NOM}): - 230 Vac - 100 Vac - 120 Vdc

Level of Reduction (dip): - 200ms at 30% of V_{NOM}
 - 10 mS at 30% of V_{NOM}

Duration of Interruption ($>.95*V_{NOM}$): - 0.5cycles

Voltage Fluctuation: - $V_{NOM} + 10\%$ - $V_{NOM} - 10\%$

Result :

- | | |
|---|-------------------------|
| <input type="checkbox"/> - No degradation of function | - Met Criterion A |
| <input type="checkbox"/> - Distortion of function | - Met Criterion B |
| <input type="checkbox"/> - Error of function | - Met Criterion C |
| <input type="checkbox"/> - Loss of function | - Unrecoverable Failure |

Remarks: _____



Equipment Under Test (EUT) Test Operation Mode - Immunity Tests :

The equipment under test was operated under the following conditions during immunity testing :

- Standby
- Test Program (H - Pattern)
- Test Program (Color Bar)
- Test Program (Customer Specified)
- Normal Operation
- _____

Configuration of the equipment under test:

- See Constructional Data Form in Appendix B - Page B2
- See Product Information Form(s) in Appendix B - Page B2

The following peripheral devices and interface cables were connected during the testing:

- DC battery Type : 12V DC battery
- AC power source Type : Output:12V AC
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____
- _____ Type : _____

- unshielded power cable
- unshielded cables
- shielded cables
- customer specific cables
- _____
- _____

TÜV. No.: _____



China

GENERAL REMARKS:

Different CCT of LED would have no influence on EMC performance.
Tests were applied to model G4-2-30/E18/14-FZ only.

SUMMARY:

All tests according to the regulations cited on page 3 were

- Performed

- Not Performed

The Equipment Under Test

- **Fulfills** the general approval requirements cited on page 3.

- **Does not** fulfill the general approval requirements cited on page 3.

Testing Start Date: 2017-09-22

Testing End Date: 2017-09-27

- TÜV SÜD CERTIFICATION AND TESTING (CHINA) CO., LTD. GUANGZHOU BRANCH -

Reviewed by:

Prepared by:

Tony Liu



Wendy Ye

Appendix A

Test Setup Photo(s),

Test setup: ESD



Test setup: Radiated Electromagnetic Fields

