EMC - TEST REPORT

Report Number	:	**68.740.21.0244.01** Date of Issue: **October 13, 2021**
Model	:	**NL59-E-YYYYLW-3PK-EU; NL59-E-YYYYLW-3PK;** **NL59-K-YYYYLW-4PK-EU; NL59-K-YYYYLW-4PK;** **NL59-K-YYYYLW-5PK-EU; NL59-K-YYYYLW-5PK;** **NL59-K-YYYYLW-6PK-EU; NL59-K-YYYYLW-6PK;** **NL59-K-YYYYLW-7PK-EU; NL59-K-YYYYLW-7PK;** **NL59-K-YYYYLW-8PK-EU; NL59-K-YYYYLW-8PK;** **NL59-K-YYYYLW-9PK-EU; NL59-K-YYYYLW-9PK;** **NL59-K-YYYYLW-10PK-EU; NL59-K-YYYYLW-10PK;** **NL59-K-YYYYLW-11PK-EU; NL59-K-YYYYLW-11PK;** **NL59-K-YYYYLW-12PK-EU; NL59-K-YYYYLW-12PK;** **NL59-K-YYYYLW-13PK-EU; NL59-K-YYYYLW-13PK;** **NL59-K-YYYYLW-14PK-EU; NL59-K-YYYYLW-14PK;** **NL59-K-YYYYLW-15PK-EU; NL59-K-YYYYLW-15PK;** **NL59-K-YYYYLW-16PK-EU; NL59-K-YYYYLW-16PK;** **NL59-K-YYYYLW-17PK-EU; NL59-K-YYYYLW-17PK;** **NL59-K-YYYYLW-18PK-EU; NL59-K-YYYYLW-18PK** **['YYYY' can be 0000-9999, stands for different sales area]**
Product Type	:	Fixed general purpose luminaires
Applicant	:	NANOGRID LIMITED
Address	:	Room 1301, 13/F, Excel Centre, 483A Castle Peak Road, Lai Chi Kok, Kowloon, HONG KONG
Production Facility	:	SEVECO GLOBAL LTD.
Address	:	2 Jianxiang St. Hanxishui Chashan Town, 523377 Dongguan, Guangdong, PEOPLE'S REPUBLIC OF CHINA
Test Result	:	■ **Positive** ☐ **Negative**
Total pages including Appendices	:	**93**

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1 Report Version

Revision	Release Date	History/Memo.
1.0	October 13, 2021	Initial Release

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2 General Information

2.1 Notes

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Prepared By	2021-10-13	Henry Chen	
Project Engineer	Date	Name	Signature
Approved By	2021-10-13	Dawi Xu	
Project Manager	Date	Name	Signature

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2.2 Testing Laboratory

Site 1

Company Name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
Company Address:	Building 12&13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District, Shenzhen City, 518052, P. R. China.
Telephone:	86 755 8828 6998
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2.3 Application Details

Sample Received Date:	July 19, 2021
Testing Start Date:	July 19, 2021
Testing End Date:	October 13, 2021

2.4 Applied Standard

Test standards	Test description
ETSI EN 301 489-1 V2.2.3 (2019-11)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility
ETSI EN 301 489-3 V2.1.1 (2019-03)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
ETSI EN 301 489-17 V3.2.4 (2020-09)	ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard for ElectroMagnetic Compatibility
EN IEC 55015:2019/A11:2020	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment
EN 61547:2009	Equipment for general lighting purposes - EMC immunity requirements
EN IEC 61000-3-2:2019	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤16 A per phase)
EN 61000-3-3:2013/A1:2019	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <= 16 A per phase and not subject to conditional connection

Remark: Unless otherwise specified, the latest edition of the referenced standards (including any amendments) applies.

2.5 **Test Summary**

Test Items	Test Mode	Performance Class & Required Performance Criteria	Result	Site
Radiated Emissions Enclosure Port	TM1, TM2	CLASS B	Pass	Site 1
Conducted Emissions ☐DC Power Port ☒AC Power Port ☐Telecommunication Ports	TM1, TM2	CLASS B	Pass	Site 1
Magnetic Field Test	TM1	N/A	Pass	Site 1
Current harmonics emissions AC Power Port*1	TM1	CLASS B	Pass	Site 1
Voltage fluctuations and flickers AC Power Port*2	N/A	N/A	N/A	N/A
Immunity To Radiated Electromagnetic Fields Enclosure Port	TM3	CT/CR	Pass	Site 1
Immunity To Electrostatic Discharge Enclosure Port	TM3	TT/TR	Pass	Site 1
Immunity To Electrical Fast Transient Bursts ☒AC Power Port ☐DC Power Port ☐Telecommunication Ports	TM3	TT/TR	Pass	Site 1
Immunity To Surges ☒AC Power Port ☐DC Power Port ☐Telecommunication Ports	TM3	TT/TR	Pass	Site 1
Immunity To Continuous Conducted Interference ☒AC Power Port ☐DC Power Port ☐Telecommunication Ports	TM3	CT/CR	Pass	Site 1
Immunity To Power frequency magnetic field*3 Enclosure Port	N/A	N/A	N/A	N/A
Immunity To Voltage dips and Short Interruption AC Power Port	TM3	TT/TR	Pass	Site 1

Note:
1, Measurement taken is within the measurement uncertainty of measurement system.
2, ☒ The item has been tested; ☐ The item has not been tested.
"*1" Limits are not specified when LED luminaires with rating less than or equal to 600W (EN 61000-3-3:2013/A1:2019, Annex A (A.2)).
"*2" Only applied to equipment containing components susceptible to magnetic fields, such as Hall elements or magnetic field sensors.

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2.6 **Performance Criteria**

Clause 6 of EN 301 489-1	
Criteria	**Performance Criteria**
CT/CR	During the test, the equipment shall: • continue to operate as intended; • not unintentionally transmit; • not unintentionally change its operating state; • not unintentionally change critical stored data.
TT/TR	For all ports and transient phenomena with the exception described below, the following applies: • The application of the transient phenomena shall not result in a change of the mode of operation (e.g. unintended transmission) or the loss of critical stored data. • After application of the transient phenomena, the equipment shall operate as intended. For surges applied to symmetrically operated wired network ports intended to be connected directly to outdoor lines the following criteria applies: • For products with only one symmetrical port intended for connection to outdoor lines, loss of function is allowed, provided the function is self-recoverable, or can be otherwise restored. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost. • For products with more than one symmetrical port intended for connection to outdoor lines, loss of function on the port under test is allowed, provided the function is self-recoverable. Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

Clause 6 of EN301 489-3		
Criteria	**During test**	**After test**
A	Operate as intended No loss of function No unintentional responses	Operate as intended No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May show loss of function No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
NOTE performance criteria A for immunity tests with phenomena of a continuous nature; performance criteria B for immunity tests with phenomena of a transient nature;		

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Clause 6 of EN 301 489-17		
Criteria	**During test**	**After test**
A	Shall operate as intended. (see note). Shall be no loss of function. Shall be no unintentional transmissions.	Shall operate as intended. Shall be no degradation of performance. Shall be no loss of function. Shall be no loss of critical stored data.
B	May be loss of function.	Functions shall be self-recoverable. Shall operate as intended after recovering. Shall be no loss of critical stored data.
C	May be loss of function.	Functions shall be recoverable by the operator. Shall operate as intended after recovering. Shall be no loss of critical stored data.
NOTE: Operate as intended during the test allows a level of degradation in accordance with clause 6.2.2.		
Minimum performance level		
For equipment that supports a PER or FER, the minimum performance level shall be a PER or FER less than or equal to 10 %. For equipment that does not support a PER or a FER, the minimum performance level shall be no loss of the wireless transmission function needed for the intended use of the equipment.		

Clause 4 of EN 61547	
A	During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.
B	During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min. Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands were given.
C	During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control. Additional requirement for lighting equipment incorporating a starting device: After the test the lighting equipment is switched off. After half an hour it is switched on again. The lighting equipment shall start and operate as intended.

Remark: The EUT should meet the requirements of performance criterion defined in the corresponding product standards.

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3 EUT Information

3.1 EUT Description

EUT is a Fixed general purpose luminaires which support 2.4G proprietary protocol, Thread, NFC and 2.4GWiFi.

The products covered in this report named 'Nanoleaf Lines' are Class II luminaires for indoor use only, equipped with non replaceable light source.
The products contain three parts, LED driver, LED controller and LED panel.
The back surfaces of LED controller, LED panel and interconnection connector are with adhere tape for mounting.
The plastic cove of LED panel and enclosure is secured via. ultrasonic wave or glue.
LED driver and LED controller for all models are same.
All models have similar electrical and mechanical structures except that quantities of LED panel is different.

Model list:

Model No.	LED Quantities (pcs)	Rated Power (W)	LED Panel			
			Model No.	Rated Voltage (VDC)	Rated Power (W)	Quantities (pcs)
NL59-E-YYYYLW-3PK-EU NL59-E-YYYYLW-3PK	(24White+24RGB) x 3	10	NL59-L	42	2,2	3
NL59-K-YYYYLW-4PK-EU NL59-K-YYYYLW-4PK	(24White+24RGB) x 4	12,5	NL59-L	42	2,2	4
NL59-K-YYYYLW-5PK-EU NL59-K-YYYYLW-5PK	(24White+24RGB) x 5	15	NL59-L	42	2,2	5
NL59-K-YYYYLW-6PK-EU NL59-K-YYYYLW-6PK	(24White+24RGB) x 6	17,5	NL59-L	42	2,2	6
NL59-K-YYYYLW-7PK-EU NL59-K-YYYYLW-7PK	(24White+24RGB) x 7	20	NL59-L	42	2,2	7
NL59-K-YYYYLW-8PK-EU NL59-K-YYYYLW-8PK	(24White+24RGB) x 8	22,5	NL59-L	42	2,2	8
NL59-K-YYYYLW-9PK-EU NL59-K-YYYYLW-9PK	(24White+24RGB) x 9	25	NL59-L	42	2,2	9
NL59-K-YYYYLW-10PK-EU NL59-K-YYYYLW-10PK	(24White+24RGB) x 10	27,5	NL59-L	42	2,2	10
NL59-K-YYYYLW-11PK-EU NL59-K-YYYYLW-11PK	(24White+24RGB) x 11	30	NL59-L	42	2,2	11
NL59-K-YYYYLW-12PK-EU NL59-K-YYYYLW-12PK	(24White+24RGB) x 12	32,5	NL59-L	42	2,2	12
NL59-K-YYYYLW-13PK-EU NL59-K-YYYYLW-13PK	(24White+24RGB) x 13	35	NL59-L	42	2,2	13
NL59-K-YYYYLW-14PK-EU NL59-K-YYYYLW-14PK	(24White+24RGB) x 14	37,5	NL59-L	42	2,2	14
NL59-K-YYYYLW-15PK-EU NL59-K-YYYYLW-15PK	(24White+24RGB) x 15	40	NL59-L	42	2,2	15
NL59-K-YYYYLW-16PK-EU NL59-K-YYYYLW-16PK	(24White+24RGB) x 16	42,5	NL59-L	42	2,2	16
NL59-K-YYYYLW-17PK-EU NL59-K-YYYYLW-17PK	(24White+24RGB) x 17	45	NL59-L	42	2,2	17
NL59-K-YYYYLW-18PK-EU NL59-K-YYYYLW-18PK	(24White+24RGB) x 18	47,5	NL59-L	42	2,2	18
Remark: 'YYYY' can be 0000-9999, stands for different sales area						

Unless otherwise specified, EMC full tests were applied on NL59-K-0002LW-18PK and other models are deemed to fulfill the relevant EMC requirements with addition Harmonic test on model NL59-K-0002LW-3PK.

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3.2 **Technical Data**

EUT Description	
Product Name	Fixed general purpose luminaires
Model Number	NL59-E-YYYYLW-3PK-EU; NL59-E-YYYYLW-3PK; NL59-K-YYYYLW-4PK-EU; NL59-K-YYYYLW-4PK; NL59-K-YYYYLW-5PK-EU; NL59-K-YYYYLW-5PK; NL59-K-YYYYLW-6PK-EU; NL59-K-YYYYLW-6PK; NL59-K-YYYYLW-7PK-EU; NL59-K-YYYYLW-7PK; NL59-K-YYYYLW-8PK-EU; NL59-K-YYYYLW-8PK; NL59-K-YYYYLW-9PK-EU; NL59-K-YYYYLW-9PK; NL59-K-YYYYLW-10PK-EU; NL59-K-YYYYLW-10PK; NL59-K-YYYYLW-11PK-EU; NL59-K-YYYYLW-11PK; NL59-K-YYYYLW-12PK-EU; NL59-K-YYYYLW-12PK; NL59-K-YYYYLW-13PK-EU; NL59-K-YYYYLW-13PK; NL59-K-YYYYLW-14PK-EU; NL59-K-YYYYLW-14PK; NL59-K-YYYYLW-15PK-EU; NL59-K-YYYYLW-15PK; NL59-K-YYYYLW-16PK-EU; NL59-K-YYYYLW-16PK; NL59-K-YYYYLW-17PK-EU; NL59-K-YYYYLW-17PK; NL59-K-YYYYLW-18PK-EU; NL59-K-YYYYLW-18PK ['YYYY' can be 0000-9999, stands for different sales area]
Ratings	100-240VAC; 50/60Hz; Protection Class: II Other ratings see " Model list " for details.
TX & RX Frequency	2402-2480MHz for 2.4G proprietary protocol 2405-2480MHz for Thread 2412-2472MHz for WiFi
S/N	NIL
EUT Accessory	
Adapter:	Model: DSL-42WA-42 420100 I/P: 100-240V~; 50/60Hz; 1,0A O/P: 42,0Vdc; 1,0A; 42,0W;
	Model: LGSPS420100SPT I/P: 100-240V~; 50/60Hz; 1,0A O/P: 42,0Vdc; 1,0A; 42,0W; ta:40°C;

NOTE 1: The above EUT's information is declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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4 System Configuration during EMC Test

4.1 Test Configurations

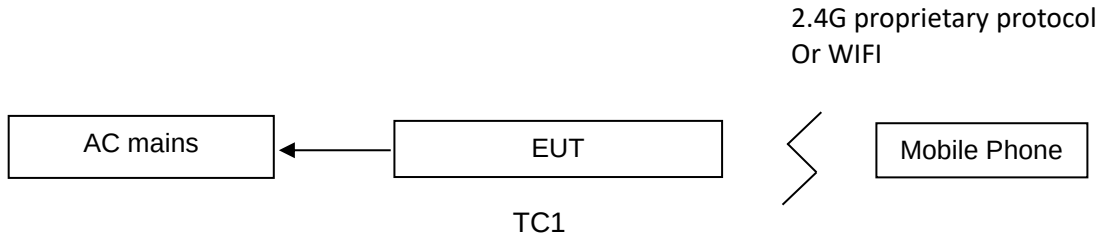
The applicant has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was in this test report and defined as:

Test Mode	
TC1	TM1
TC1	TM2
TC1	TM3

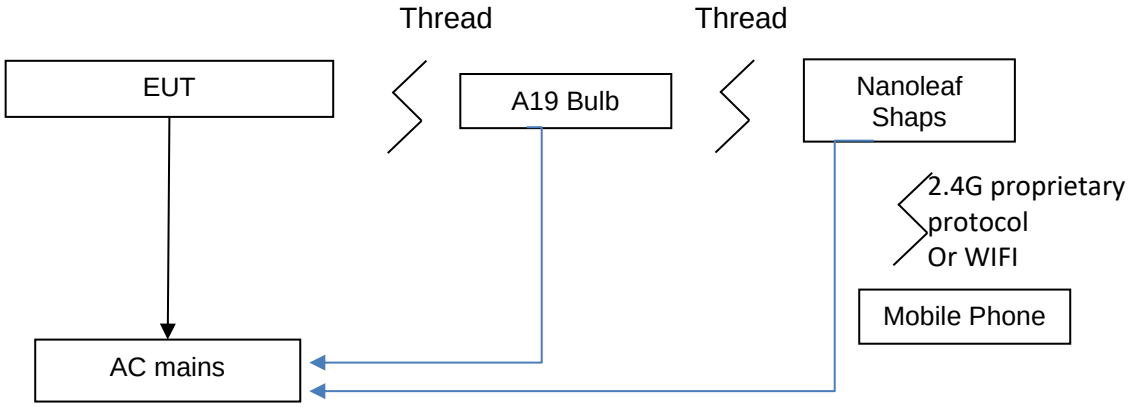
4.2 Test Mode

TM1: Normal working with transmitting + Light On(Max)
TM2: Normal working with transmitting + Light On(Min)
TM3: Normal working with transmitting + Light On(Mid)

4.3 Configurations of Test System



TC1



TC2

4.4 Associated Equipment Used during Test

Name	Model	Manufacturer	S/N	Cal Due Date
Mobile Phone	iPhone 6	Apple	--	--
iPad	--	Apple	--	--
A19 Bulb	--	NANOGRID	--	--

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5 Electromagnetic Interference (EMI)

5.1 Radiated Disturbance 30MHz to 6000MHz

5.1.1 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4. The test distance was 3m for 30 ~ 1GHz.
The test site full-anechoic chamber has met the requirement of VSWR tolerance 6dB according to the standards: CISPR 16-1-4. The test distance was 3m for 1GHz ~ 6GHz.
The set-up and test methods were according to EN 55032/EN 55015.
A preliminary scan and a final scan of the emissions were made from 30 MHz to 1GHz by using test script of software; the emissions were measured using Quasi-Peak Detector (30MHz~1GHz) and AV/PK Detector (above 1GHz). The maximal emission value was acquired by adjusting the antenna height, polarization and turntable azimuth in accordance with the software setup. Normally, the height range of antenna was 1m to 4m, the azimuth range of turntable was 0°to 360°, The receive antenna has two polarizations V and H.

5.1.2 Test Setup

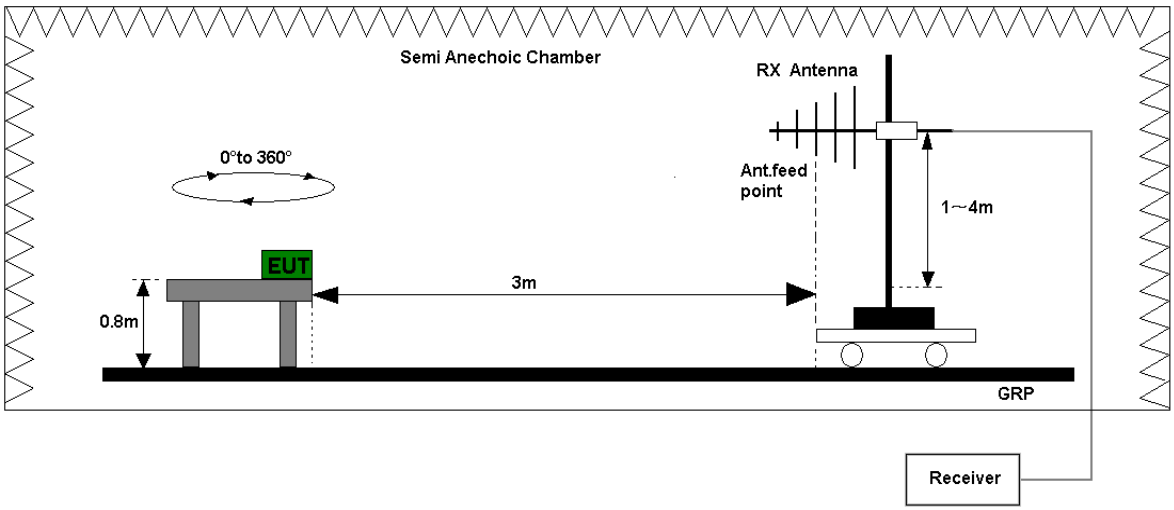

Figure 1. Test set-up of radiated disturbance(30MHz-1GHz)

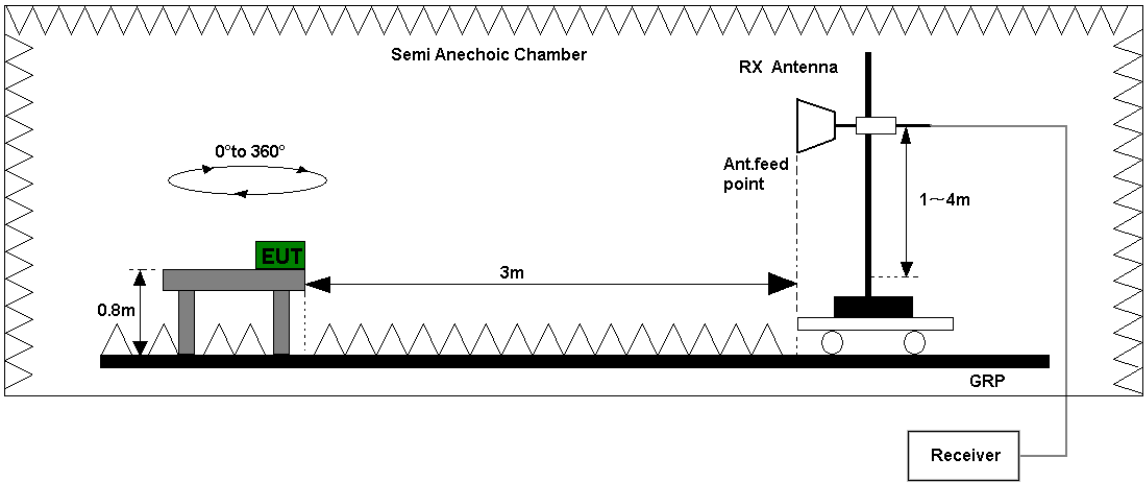

Figure 2. Test set-up of radiated disturbance(above 1GHz)

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5.1.3 Test Results

The EUT has met requirements for Radiated disturbance.
The test data see section 9.1 of this report.

Test Limits			
Frequency (MHz)	Distance (m)	QP (dBuV/m)	
30 - 230	3	40	
230 - 1000	3	47	
Frequency (GHz)	Distance (m)	Average (dBuV/m)	Peak (dBuV/m)
1-3	3	50	70
3-6	3	54	74

Remark：
Below 1GHz
Level=Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss

Above 1GHz
Level=Reading Level + Correction Factor
Correction Factor=Antenna Factor + Cable Loss – Pre-amplifier
(The Reading Level is recorded by software which is not shown in the sheet)

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5.2 Conducted Disturbance 9 kHz to 30MHz

5.2.1 Test Procedure

The EUT was configured as described in section 4 for this test. The mains cable of the EUT being measured shall be connected to LISN, The LISN shall be placed 0.8m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.
All telecommunication and signal ports must be correctly terminated using either appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.
Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.1m.
The set-up and test methods were according to EN 55015.

5.2.2 Test Setup

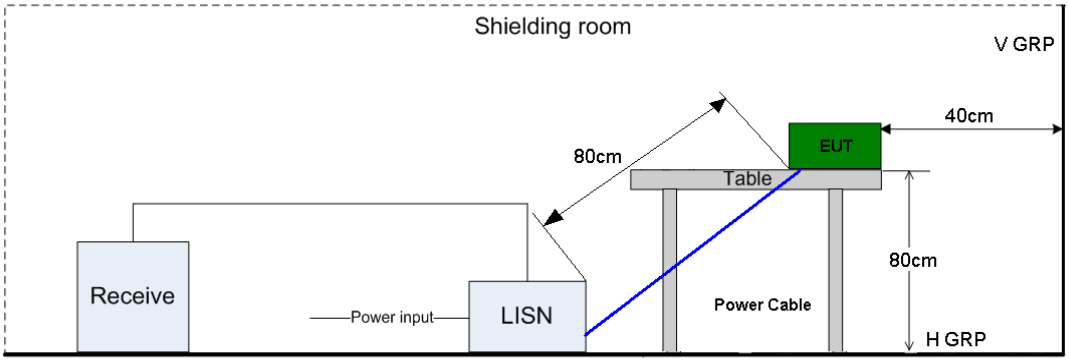

Figure 3. Test set-up of conducted disturbance for power port

5.2.3 Test Results

The EUT has met requirements for Conducted disturbance.
The test data see section 9.2 of this report.

Test Limit of AC Power Port

Frequency range	9kHz~ 30MHz	
Classification	N/A	
Limit	Voltage limits	
	QP	AV
9 kHz to 50 kHz	110dBµV	--
50 kHz to 0.15MHz	90-80dBµV	--
0.15MHz~0.5MHz	66-56dBµV	56-46dBµV
0.5MHz~5MHz	56dBuV	46dBuV
5MHz~30MHz	60dBµV	50dBµV

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Cable Loss + LISN Factor
(The Reading Level is recorded by software which is not shown in the sheet)

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5.3 Magnetic Field Test (9kHz – 30MHz)

5.3.1 Test Procedure

The EUT was configured to full load mode according to TC1 and the test performed at worst emission state.

The set-up and test methods were according to EN 55015.The EUT was configured to Line in mode according to TC1.

5.3.2 Test Setup

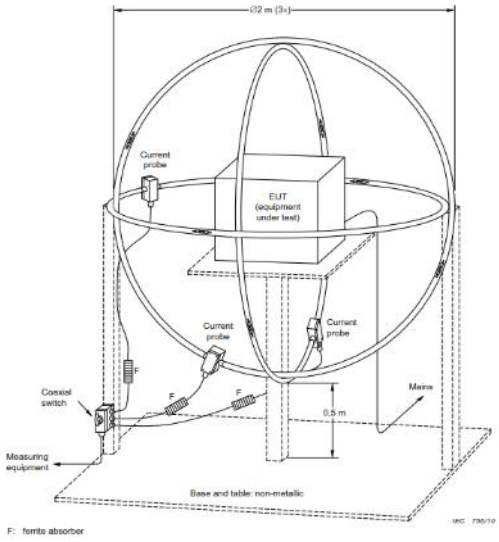

Figure 4. Test set-up of conducted disturbance for power port

5.3.3 Test Results

The EUT has met requirements for Magnetic Field.
The test data see section 9.3 of this report

Test Limits

Frequency range	9kHz~ 30MHz	
Classification	N/A	
Limit	QP	AV
9 kHz to 70 kHz	88dBμA	--
70 kHz to 150 kHz	88-58dBμV	--
150 kHz to 3,0 MHz	58-22dBμV	--
3,0 MHz to 30 MHz	22dBuV	--

Remark：
Level=Reading Level + Correction Factor
Correction Factor=Loop Antenna Factor + Cable Loss
(The Reading Level is recorded by software which is not shown in the sheet)

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5.4 Current Harmonics Emissions

5.4.1 Test Procedure

The EUT is to be powered from 230V50Hz ac main source. The EUT was configured as described in section 4 for this test.

The set-up and test methods were according to EN IEC 61000-3-2/IEC 61000-3-2, The test set-up diagram is shown as below

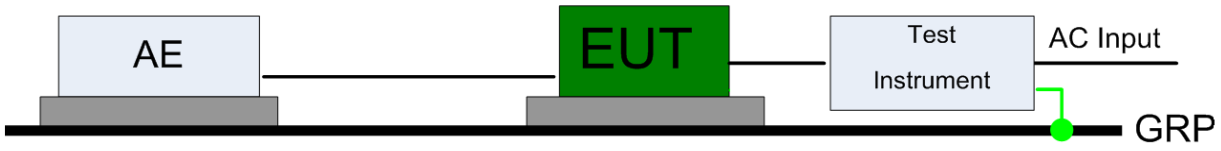

Figure 5. Test set-up of current harmonics emissions

The test environment conditions recorded were:

Performed Item	Item	Required	Actual
Current Harmonics Emissions	Ambient temperature	15°C～35°C	23.1°C
	Relative humidity	25%～75%	58.0%
	Atmospheric pressure	86 kPa～106kPa	101.2kPa

5.4.2 Test Results

The EUT has met the requirements (class C) of EN 61000-3-2 for harmonics of AC power ports.

The test data see section 9.4 of this report.

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6 Electromagnetic Susceptibility (EMS)

6.1 Immunity to Electrostatic Discharge

6.1.1 Test Procedure

The EUT was configured as described in section 4 for this test. The set-up and test methods were according to IEC 61000-4-*2*.

6.1.2 Test Set up

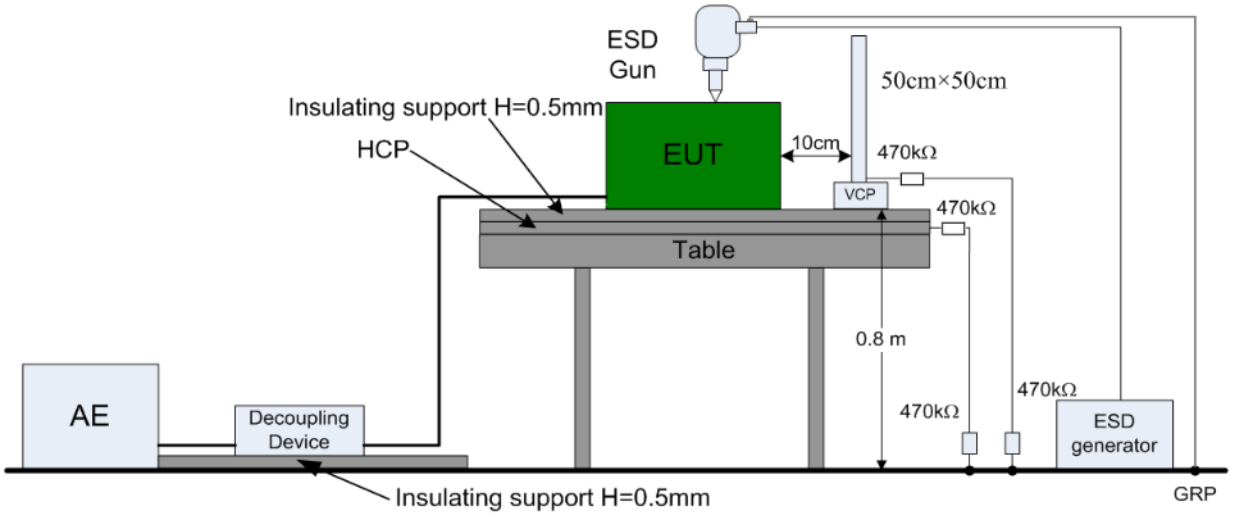

Figure 6. Test set-up of electrostatic discharge

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6.1.3 Test Results

Details of the points tested were presented in below:

Test Results					
Test Points	Specification Level				Conclusion
	±2Kv, ±4Kv Contact Discharges		±2Kv, ±4Kv, ±8Kv Air Discharges		
	Positive	Negative	Positive	Negative	
Indirect Contact					
Indirect Contact, HCP(left, right, front, rear)	✓	✓	N/A	N/A	Pass
Indirect Contact, VCP(left, right, front, rear)	✓	✓	N/A	N/A	Pass
Direct Contact/ Air Contact					
Housing	N/A	N/A	✓	✓	Pass
Gaps	N/A	N/A	✓	✓	Pass
Controller	✓	✓	N/A	N/A	Pass

✓ The EUT's performance was paired at this test point when the ESD pulse was applied.

Test environment condition:

Performed Item	Item	Required	Actual
Immunity to Electrostatic Discharge	Ambient temperature	15°C～35°C	22.4 – 24.5°C
	Relative humidity	30%～60%	45.7 – 52.1%
	Atmospheric pressure	86 kPa～106kPa	101.5kPa

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6.2 Immunity to Radiated Electric Fields 80MHz to 6000MHz

6.2.1 Test Procedure

The EUT was configured as described in section 4 for this test. The set-up and test methods were according to IEC 61000-4-3. All sides of the EUT (front, rear, left and right) were tested by antenna with vertical and horizontal polarization.

6.2.2 Test Setup

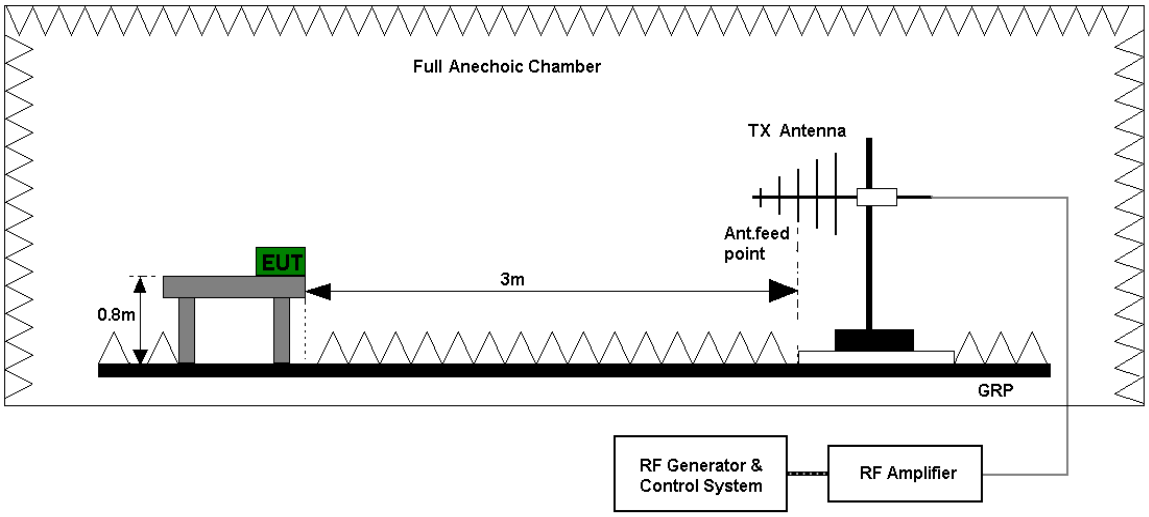

Figure 7. Test set-up of Immunity to Radiated Electric Fields (80MHz-1GHz)

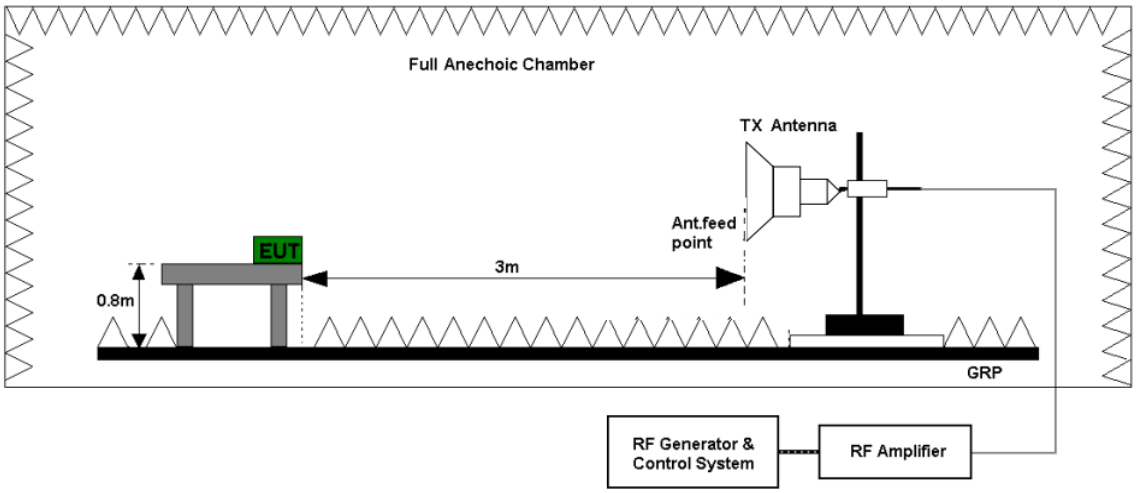

Figure 8. Test set-up of Immunity to Radiated Electric Fields (1GHz-6GHz)

6.2.3 Test Results

Test Results of Radiated Electric Fields	
Test side of EUT	Front, Rear, Left, Right
Criterion	CT&CR
Frequency range & Test Level	80MHz –6000MHz test level：3 V/m(Unmodulated, rms)
Modulation	80% AM, 1kHz
Conclusion	Pass

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6.3 Immunity to Electrical Fast Transient Bursts

6.3.1 Test Procedure

The EUT was configured as described in section 4 for this test. A series of Fast Transient Bursts meeting the specification were applied for a period of 120 seconds. The Transient Bursts were applied for both Positive and Negative Burst Trains to Power Port. The set-up and test methods were according to IEC 61000-4-4.

6.3.2 Test Setup

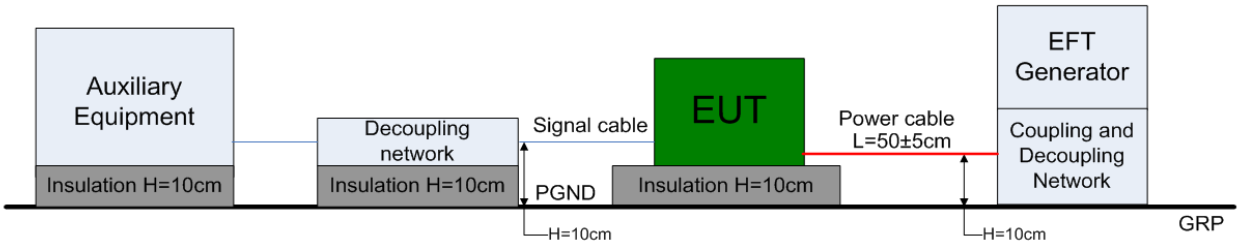

Figure 9. Test set-up of immunity to electrical fast transient bursts

6.3.3 Test Results

Test Results of Electrical Fast Transient Bursts			
Ports	Measuring condition Couple mode	Description	Conclusion
AC Power Port	L-Ref G, N-Ref G, L+N-Ref G Level: ±1.0kV, Tr/Th: 5/50ns, 5kHz Test Duration: 120 seconds	No fail detected	Pass

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6.4 Immunity to Surges

6.4.1 Test Procedure

The EUT was configured as described in section 4 for this test. A series of High Energy Surges were applied to Power Port. The set-up and test methods were according to IEC 61000-4-5.

6.4.2 Test Setup

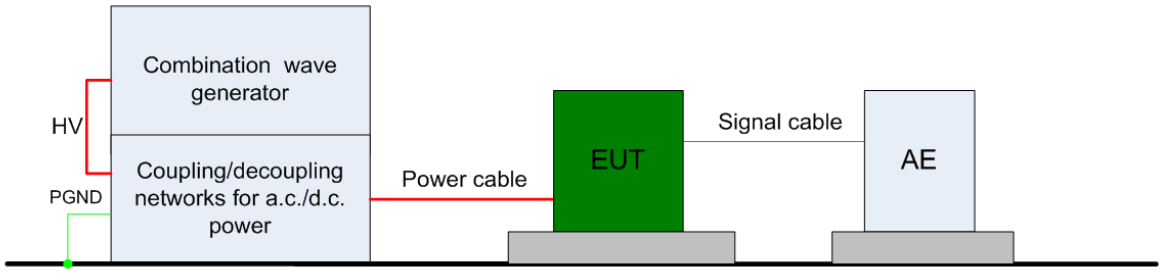

Figure 10. Test set-up of immunity to surge

6.4.3 Test Results

Test Results of Surges			
Ports	Measuring condition	Description	Conclusion
AC Power Port	Line to Line: L-N Level:±1.0kV, Tr/Th:1.2/50μs Interval: 60 seconds Phase: Sync	No fail detected	Pass

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6.5 Immunity to Continuous Conducted Interference 0.15MHz to 80MHz

6.5.1 Test Procedure

The EUT was configured as described in section 4 for this test. The applied level was Amplitude Modulated by a 1 kHz sinusoidal signal to a modulation depth of 80%. The set-up and test methods were according to IEC 61000-4-6.

6.5.2 Test Setup

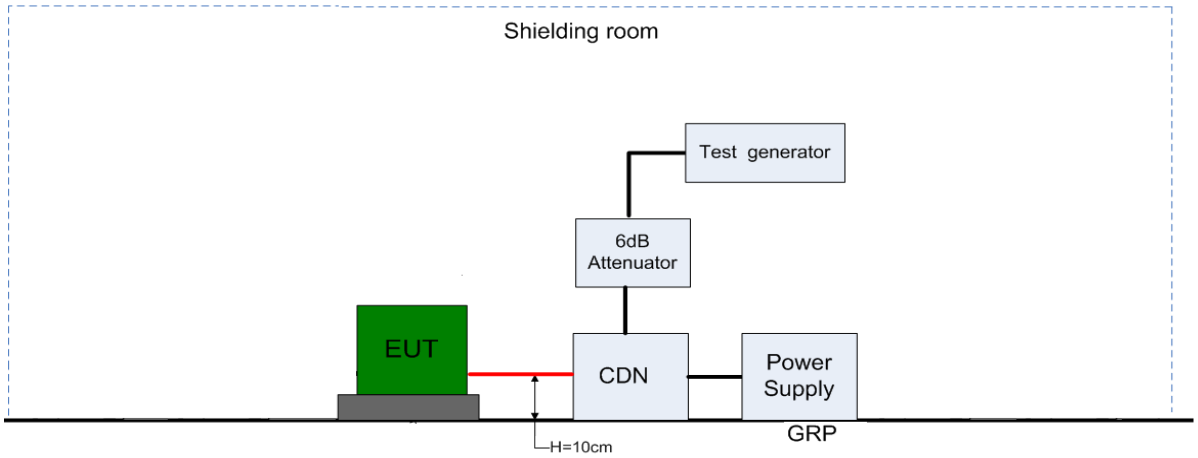

Figure 11. Test set-up of immunity to continuous conducted interference

6.5.3 Test Results

Test Results of Continuous Conducted Interference				
Ports	Measuring condition	Inject method	Description	Conclusion
AC Power Port	Frequency range: 0.15 MHz to 80 MHz Induced voltage :3 V (rms)	CDN M2	No fail detected	Pass

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6.6 Immunity to Voltage Dips and Short Interruption of AC Power Port

6.6.1 Test Procedure

The EUT was configured as described in section 4 for this test. The set-up and test methods were according to IEC 61000-4-11.

6.6.2 Test Setup

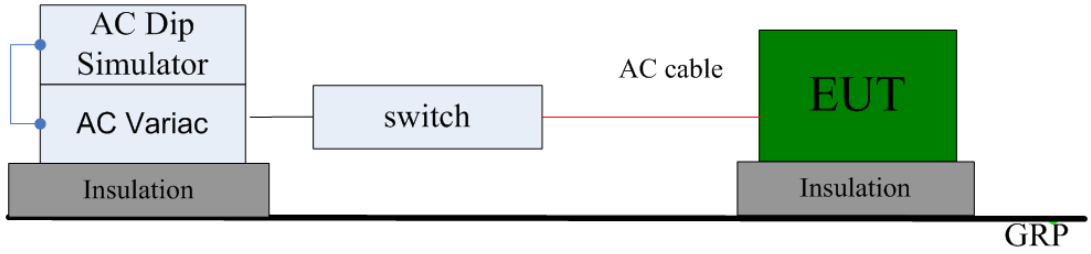

Figure 12. Test set-up of Voltage Dips and Short Interruption of AC Power Port

6.6.3 Test Results

In the case where the equipment is fitted with or connected to a battery back-up, the performance criteria for transient phenomena shall apply.
In the case where the equipment is powered solely from the AC mains supply (without the use of a parallel battery back-up) volatile user data may have been lost and if applicable the communication link need not to be maintained and lost functions should be recoverable by user or operator; no unintentional responses shall occur at the end of the test.

Test Results of Voltage Dips and Short Interruption				
Ports	Measuring condition	Performance Criterion	Description	Conclusion
EN 301489-1				
AC Power Port	Voltage dip: 70 % residual voltage for 25 cycles (at 50 Hz)	TT&TR	No fail detected	Pass
	Voltage dip: 0 % residual voltage for 0,5 cycle	TT&TR	No fail detected	Pass
	Voltage dip: 0 % residual voltage for 1 cycle	TT&TR	No fail detected	Pass
	Voltage interruption: 0 % residual voltage for 250 cycles (at 50 Hz)	TT&TR	No fail detected	Pass
EN 61547				
AC Power Port	Voltage dip: 0 % residual voltage for 0.5 cycles	B	No fail detected	Pass
	Voltage dip: 70 % residual voltage for 10 cycles	C	No fail detected	Pass

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7 Main Test Instruments

Radiated Emission 2# Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 26	68-4-74-14-002	101269	1	2022-6-4
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9162	68-4-80-19-003	284	1	2022-2-2
Wave Guide Antenna	ETS	3117	68-4-80-19-001	00218954	1	2022-5-24
Pre-amplifier	Rohde & Schwarz	SCU 18F	68-4-29-19-001	100745	1	2021-10-25
Pre-amplifier	Rohde & Schwarz	SCU 08F2	68-4-29-19-004	08400018	1	2021-10-25
Sideband Horn Antenna	Q-PAR	QWH-SL-18-40-K-SG	68-4-80-14-008	12827	1	2022-7-21
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	1	2022-7-27
3m Semi-anechoic chamber	TDK	9X6X6	68-4-90-19-006	----	3	2023-5-28
Test software	Rohde & Schwarz	EMC32	68-4-90-19-006-A01	Version10.35.02	N/A	N/A

Conducted Emission 2# Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-19-002	102590	1	2022-6-4
LISN	Rohde & Schwarz	ENV216	68-4-87-19-001	102472	1	2022-6-5
ISN	Rohde & Schwarz	ENY81	68-4-87-14-003	100177	1	2022-6-5
ISN	Rohde & Schwarz	ENY81-CA6	68-4-87-14-004	101664	1	2022-6-5
High Voltage Probe	Schwarzbeck	TK9420(VT9420)	68-4-27-14-001	9420-584	1	2022-6-5
RF Current Probe	Rohde & Schwarz	EZ-17	68-4-27-14-002	100816	1	2022-6-5
Attenuator	Shanghai Huaxiang	TS2-26-3	68-4-81-16-003	080928189	1	2022-6-3
Test software	Rohde & Schwarz	EMC32	68-4-90-19-005-A01	Version10.35.02	N/A	N/A
Shielding Room	TDK	CSR #2	68-4-90-19-005	----	1	2022-11-07

Radiated Electromagnetic Disturbance

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
EMI Test Receiver	Rohde & Schwarz	ESR 3	68-4-74-19-002	102590	1	2022-6-4
Triple Loop Antenna	Rohde & Schwarz	HM020	68-4-80-14-001	100951	1	2022-6-6
Test software	Rohde & Schwarz	EMC32	68-4-90-19-005-A01	Version 10.35.02	N/A	N/A

Harmonic Test / Flicker Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Three Phase Harmonic flicker test system	CI	MX45-3PI-400-413-CTSHL-LF-SNK	68-4-74-14-006	1424A00547	1	2022-6-6
Test software	Ametek	CTSMXL	68-4-74-14-006-A11	Version 2.9.0&Version 2.24.0	N/A	N/A
Test software	Ametek	CTSMXH	68-4-74-14-006-A12	Version 2.10.0	N/A	N/A

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Electrostatic Discharge Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Electrostatic Discharge Simulator	Noiseken	ESS-2002	68-4-75-14-007	ESS0615075	1	2022-6-21

Radiated Immunity Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Signal Generator	Rohde & Schwarz	SMB100A	68-4-48-14-002	177600	1	2022-6-3
Power Amplifier	Rohde & Schwarz	BBA100	68-4-28-14-001	101238	1	2022-6-3
Power Amplifier	Rohde & Schwarz	BBA150	68-4-28-14-002	101671	1	2022-6-2
Power Amplifier	Rohde & Schwarz	BBA150-E100	68-4-28-17-001	102640	1	2022-6-3
Log-Periodic Antenna	Rohde & Schwarz	HL046E	68-4-80-14-009	100160	1	N/A
Microwave Log-Periodic Antenna	Rohde & Schwarz	STLP 9149	68-4-80-17-001	9149-453	1	N/A
Power Meter	Rohde & Schwarz	NRP2	68-4-32-14-001	103497	1	2022-6-3
Average Power Sensor	Rohde & Schwarz	NRP-Z91	68-4-32-14-001-A01	102538	1	2022-6-3
Average Power Sensor	Rohde & Schwarz	NRP-Z91	68-4-32-14-001-A02	102539	1	2022-6-3
Starprobe Laser-Powered Probe	AMPLIFIER RESEARCH	FL7006/KIT	68-4-27-14-003	0433720	1	2022-7-27
Audio Analyzer	Rohde & Schwarz	UPV	68-4-74-18-001	104348	1	2021-11-10
Fully Anechoic Chamber	TDK	8X4X4	68-4-90-14-002	--	3	2022-12-6
Test software	Rohde & Schwarz	EMC32	68-4-90-14-002-A11	Version 9.15.03	N/A	N/A

Electrical Fast Transients Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	UCS 500N7	68-4-75-14-001	P1313116005	1	2022-6-5
7kV Coupling network 3-phase	EMTEST	CNI 503B5	68-4-75-14-001-A07	P1425134991	1	2022-6-5
Capacitive Coupling Clamp	EMTEST	HFK	68-4-75-14-001-A01	P1426135389	1	2022-6-5
Test software	EMTEST	iec.control	68-4-75-14-001-A10	Version 5.3.1	N/A	N/A

Surges Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	UCS 500N7	68-4-75-14-001	P1313116005	1	2022-6-5
7kV Coupling network 3-phase	EMTEST	CNI 503B5	68-4-75-14-001-A07	P1425134991	1	2022-6-5
Telecom Surge Module	EMTEST	Tsurge 7	68-4-75-14-001-A08	P1420134206	1	2022-6-5
4kV coupling/decoupling network	EMTEST	CNV 504 N1	68-4-75-14-001-A02	P1420134192	1	2022-6-5
4kV CDN for 8 telecom lines	EMTEST	CNV 508 S1	68-4-75-14-001-A03	P1431137565	1	2022-6-5
Test software	EMTEST	iec.control	68-4-75-14-001-A10	Version 5.3.1	N/A	N/A

Conducted Immunity Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Continuous Wave Simulator	EMTEST	CWS 500N1	68-4-75-14-002	P1420134224	1	2021-10-23
Attenuator	EMTEST	ATT6/80	68-4-75-14-002-A01	P1402129090	1	2022-6-3
CDN	EMTEST	CDN-M2/M3	68-4-75-14-002-A02	P1420134163	1	2022-6-5
CDN	EMTEST	CDN-M4	68-4-75-14-002-A03	P1346125919	1	2022-6-5
Electromagnetic Injection Clamp	EMTEST	EM101	68-4-75-14-002-A04	P1411132453	1	2022-6-5
Test software	EMTEST	icd.control	68-4-75-14-002-A10	Version 5.2.9	N/A	N/A

Voltage Dips and Interruptions Test

DESCRIPTION	MANUFACTURER	MODEL NO.	EQUIPMENT ID	SERIAL NO.	CAL INTERVAL (YEAR)	CAL. DUE DATE
Immunity simulator	EMTEST	UCS 500N7	68-4-75-14-001	P1313116005	1	2022-6-5
Motorized Variac	EMTEST	MV2616	68-4-75-14-001-A04	P1401128623	1	2022-6-5
Switch-Box for phase by phase	EMTEST	PFLS 32N1	68-4-75-14-001-A09	P1251107106	N/A	N/A
Test software	EMTEST	iec.control	68-4-75-14-001-A10	Version 5.3.1	N/A	N/A

8 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty	
Test Items	Extended Uncertainty
Uncertainty for Radiated Emission in 3m chamber 30MHz-1000MHz	Horizontal: 4.70dB; Vertical: 4.67dB;
Uncertainty for Radiated Emission in 3m chamber 1000MHz-18000MHz	Horizontal: 4.65dB; Vertical: 4.63dB;
Uncertainty for Conducted Emission 150kHz-30MHz (for test using AMN ENV216)	3.20dB
Uncertainty for Radiated Electromagnetic Disturbance in shielding room 9KHz-30MHz	3.21dB
Uncertainty for Harmonic test	3.16%
Uncertainty for Flicker test	4.69%
Uncertainty for RS test	49%, K=2
Uncertainty for CS test	28%(CDN), 45%(EM Clamp) K=2
Uncertainty for ESD test	The immunity measurement system uncertainty is within standard requirement and is based on a standard uncertainty multiplied by a coverage factor k=2, providing a level of confidence of approximately 95%.
Uncertainty for EFT test	
Uncertainty for Surges test	
Uncertainty for Voltage Dips, Voltage Variations and Short Interruptions Test	

Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2007, clause 4.4.3 and 4.5.1.

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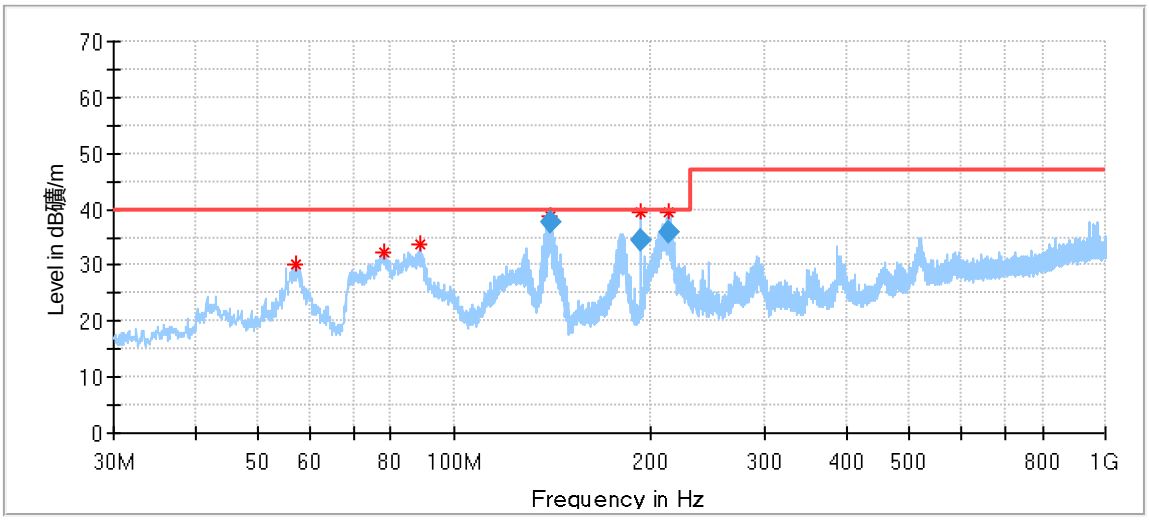
9 Graph and Data of Emission Test

Note: tests were applied on all modes, only the worst test data was shown in the report.

9.1 Radiated Disturbance

9.1.1 30MHz~1GHz

EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
57.106111	30.20	40.00	9.80	200.0	H	194.0	13.93
77.907222	32.22	40.00	7.78	200.0	H	18.0	8.43
88.469444	33.71	40.00	6.29	200.0	H	18.0	10.52
140.266934	38.63	40.00	1.37	192.0	H	246.0	9.32
193.337355	39.51	40.00	0.49	187.0	H	163.0	12.43
214.074556	39.37	40.00	0.63	131.0	H	306.0	13.01

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
140.266934	37.87	40.00	2.13	192.0	H	246.0	9.32
193.337355	34.50	40.00	5.50	187.0	H	163.0	12.43
214.074556	35.99	40.00	4.01	131.0	H	306.0	13.01

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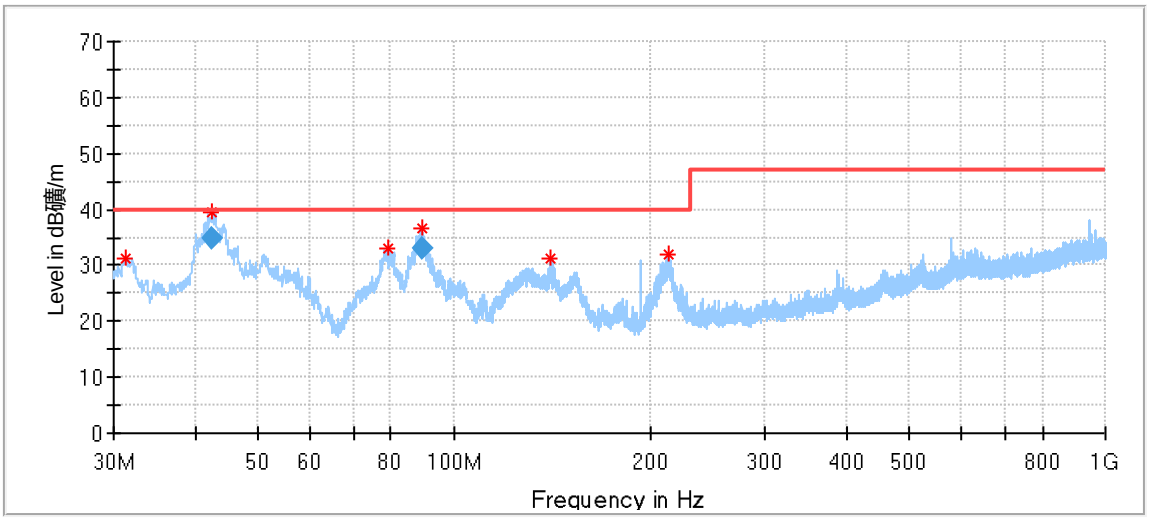
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.401111	31.26	40.00	8.74	100.0	V	299.0	11.51
42.482800	39.65	40.00	0.35	100.0	V	41.0	13.84
79.308333	33.11	40.00	6.89	200.0	V	139.0	8.08
89.170311	36.70	40.00	3.30	104.0	V	89.0	10.57
140.364444	31.26	40.00	8.74	200.0	V	191.0	9.33
212.845000	32.06	40.00	7.94	100.0	V	230.0	13.02

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.482800	34.84	40.00	5.16	100.0	V	41.0	13.82
89.170311	32.88	40.00	7.12	104.0	V	89.0	10.73

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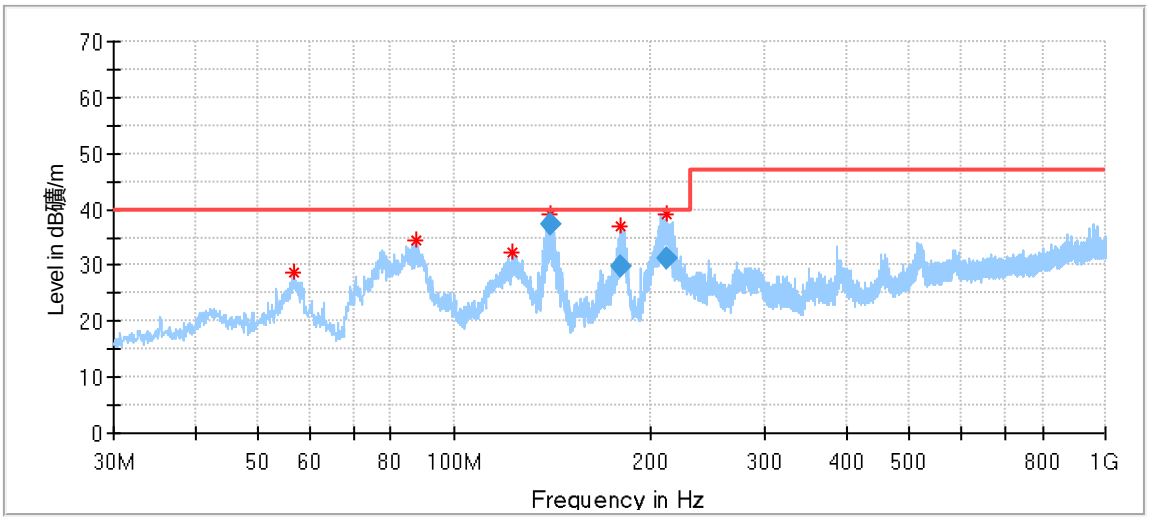
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.621111	28.65	40.00	11.35	200.0	H	155.0	13.99
87.230000	34.46	40.00	5.54	200.0	H	357.0	10.15
123.120000	32.22	40.00	7.78	200.0	H	239.0	10.66
140.432177	39.14	40.00	0.86	194.0	H	229.0	9.33
180.566377	36.82	40.00	3.18	100.0	H	137.0	10.96
211.487955	39.14	40.00	0.86	103.0	H	205.0	13.03

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
140.432177	37.21	40.00	2.79	194.0	H	229.0	9.33
180.566377	29.86	40.00	10.14	100.0	H	137.0	10.95
211.487955	31.36	40.00	8.64	103.0	H	205.0	13.03

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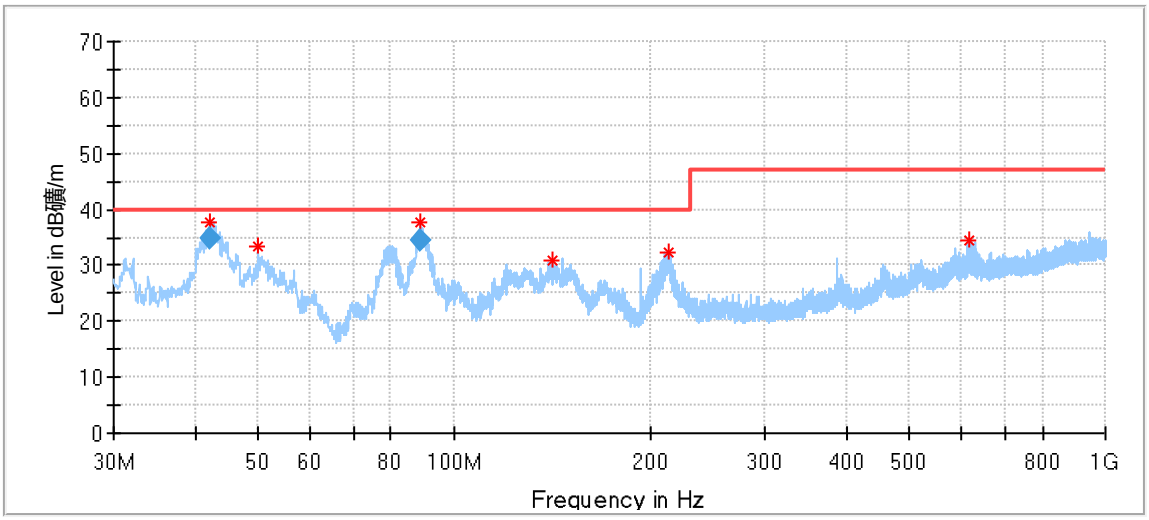
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.178889	37.69	40.00	2.31	100.0	V	24.0	13.78
50.046667	33.44	40.00	6.56	100.0	V	1.0	14.82
88.577222	37.64	40.00	2.36	100.0	V	59.0	10.55
141.496111	30.74	40.00	9.26	100.0	V	80.0	9.36
213.653333	32.17	40.00	7.83	100.0	V	215.0	13.01
616.850000	34.42	47.00	12.58	100.0	V	194.0	22.04

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.178889	34.69	40.00	5.32	100.0	V	24.0	13.78
88.577222	34.64	40.00	5.36	100.0	V	59.0	10.55

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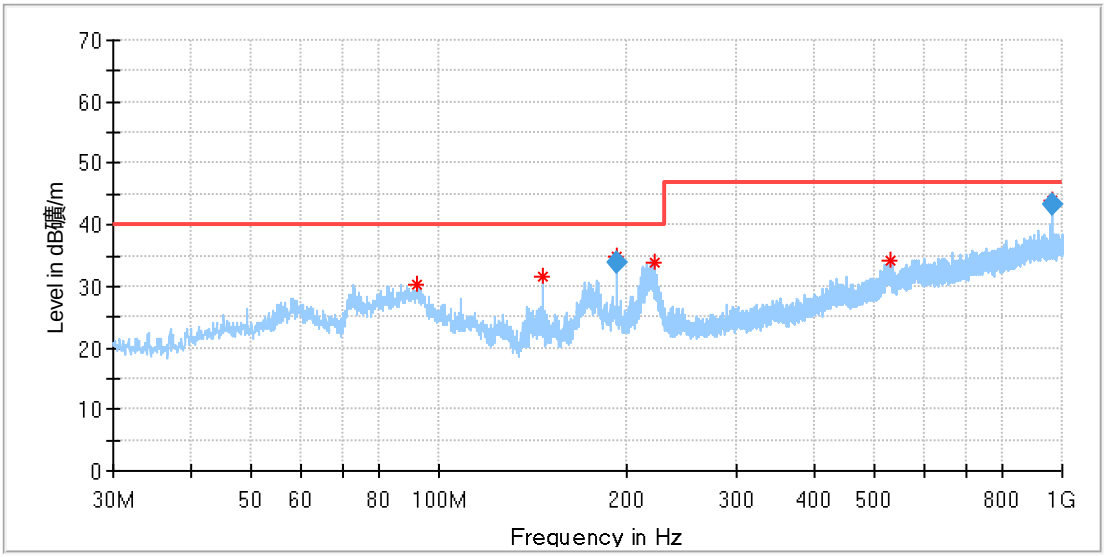
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
92.322500	30.17	40.00	9.83	200.0	H	0.0	17.64
147.006250	31.73	40.00	8.27	200.0	H	132.0	15.51
193.323750	34.74	40.00	5.26	200.0	H	328.0	18.81
221.635625	33.98	40.00	6.02	200.0	H	356.0	19.38
528.337500	34.18	47.00	12.82	200.0	H	0.0	26.50
966.716875	43.89	47.00	3.11	200.0	H	295.0	32.77

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
193.323750	33.77	40.00	6.23	200.0	H	328.0	18.81
966.716875	43.20	47.00	3.80	200.0	H	295.0	32.77

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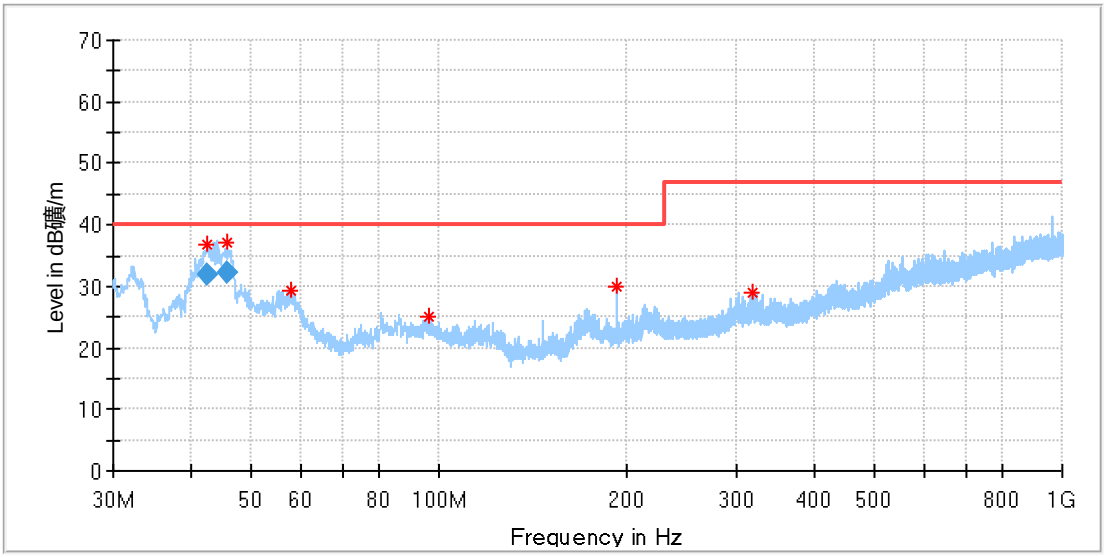
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.367500	36.67	40.00	3.33	100.0	V	0.0	20.12
45.858750	37.02	40.00	2.98	100.0	V	89.0	20.36
57.766250	29.24	40.00	10.76	100.0	V	201.0	20.38
96.505625	25.08	40.00	14.92	100.0	V	0.0	18.51
193.263125	29.92	40.00	10.08	100.0	V	42.0	18.81
318.393125	28.94	47.00	18.06	100.0	V	0.0	22.05

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
42.367500	32.05	40.00	7.95	100.0	V	0.0	20.12
45.858750	32.20	40.00	7.80	100.0	V	89.0	20.36

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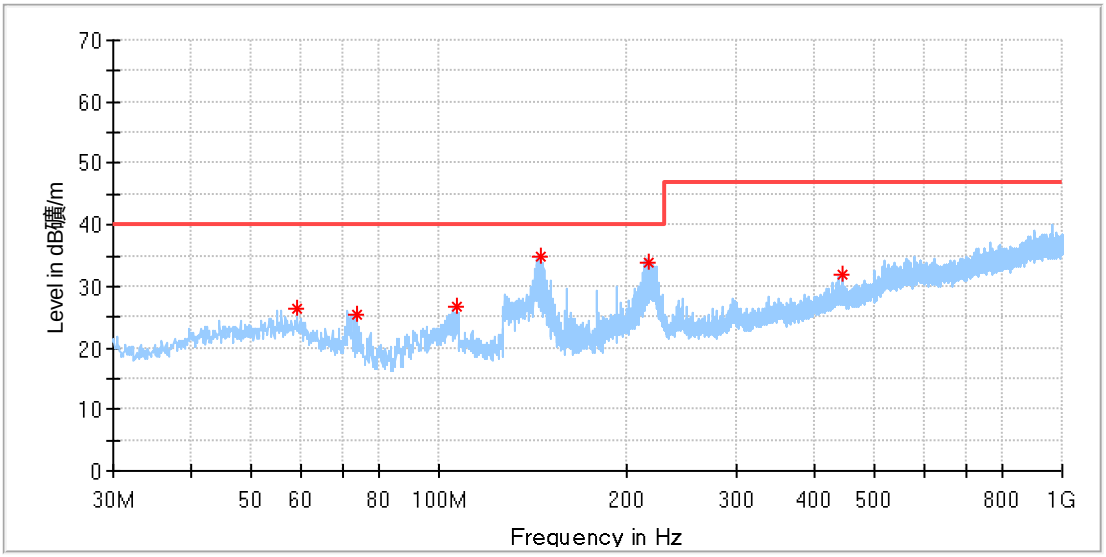
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
59.160625	26.44	40.00	13.56	200.0	H	191.0	20.05
73.953125	25.25	40.00	14.75	200.0	H	0.0	15.75
106.690625	26.71	40.00	13.29	200.0	H	71.0	19.12
145.430000	34.81	40.00	5.19	200.0	H	0.0	15.48
217.695000	33.82	40.00	6.18	200.0	H	0.0	19.11
443.159375	31.94	47.00	15.06	200.0	H	0.0	25.08

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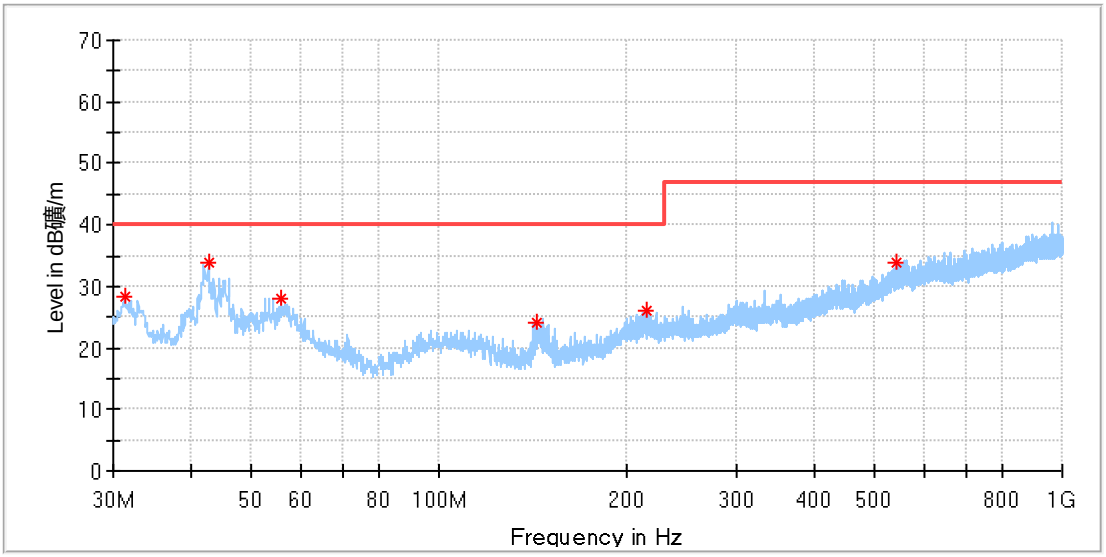
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.273125	28.18	40.00	11.82	100.0	V	55.0	17.13
42.670625	33.76	40.00	6.24	100.0	V	105.0	20.15
55.826250	28.06	40.00	11.94	100.0	V	202.0	20.63
143.853750	24.04	40.00	15.96	100.0	V	162.0	15.46
215.148750	26.13	40.00	13.87	100.0	V	316.0	18.97
540.705000	33.71	47.00	13.29	100.0	V	339.0	26.64

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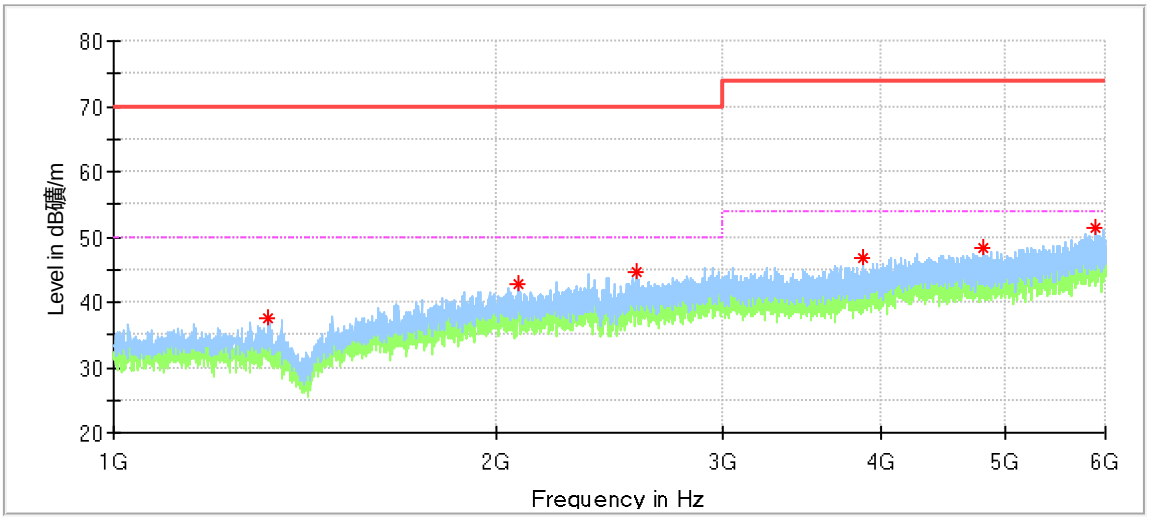
9.1.2 1GHz~6GHz

EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1321.500000	37.39	---	70.00	32.61	100.0	H	258.0	-8.48
2080.500000	42.86	---	70.00	27.14	100.0	H	157.0	-3.13
2569.500000	44.72	---	70.00	25.28	100.0	H	185.0	-1.49
3873.500000	46.76	---	74.00	27.24	100.0	H	108.0	1.43
4805.500000	48.31	---	74.00	25.69	100.0	H	157.0	3.79
5885.000000	51.51	---	74.00	22.49	100.0	H	2.0	6.82

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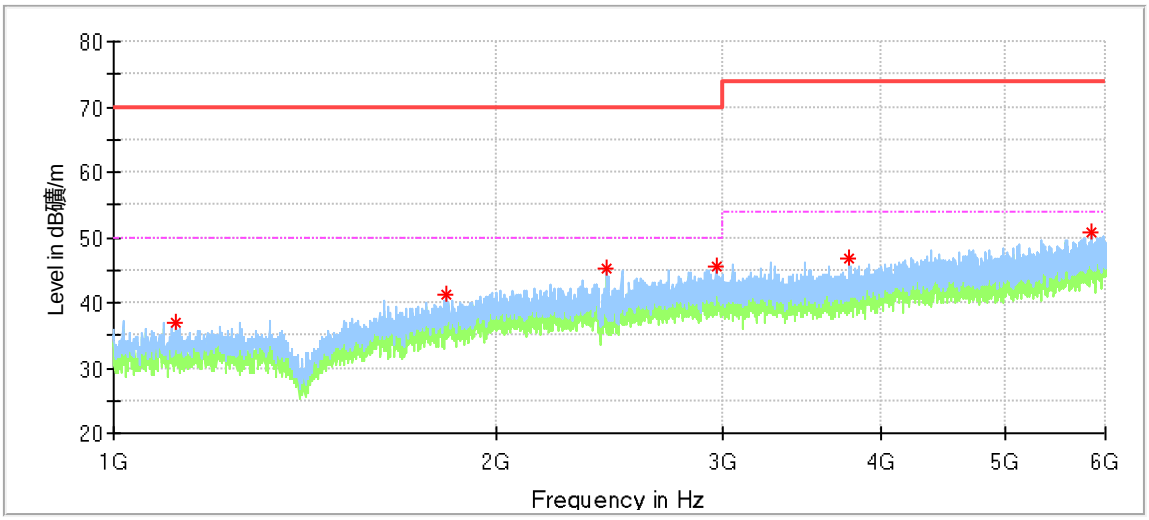
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1120.500000	37.03	---	70.00	32.97	100.0	V	0.0	-9.50
1826.000000	41.12	---	70.00	28.88	100.0	V	141.0	-4.66
2440.000000	45.23	---	70.00	24.77	100.0	V	186.0	-1.91
2968.000000	45.55	---	70.00	24.45	100.0	V	132.0	-0.09
3770.000000	46.77	---	74.00	27.23	100.0	V	186.0	1.31
5849.000000	50.67	---	74.00	23.33	100.0	V	254.0	6.72

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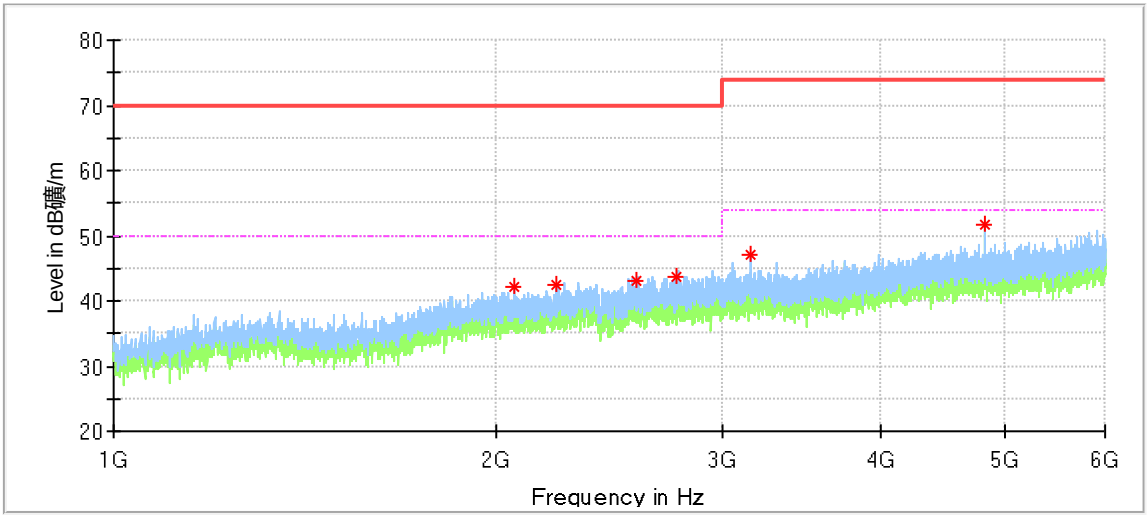
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Horizontal



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2065.000000	42.15	---	70.00	27.85	100.0	H	29.0	-3.57
2222.500000	42.58	---	70.00	27.42	100.0	H	356.0	-2.81
2574.500000	43.18	---	70.00	26.82	100.0	H	131.0	-1.49
2764.500000	43.56	---	70.00	26.44	100.0	H	331.0	-1.16
3163.500000	47.08	---	74.00	26.92	100.0	H	310.0	0.38
4824.500000	51.64	---	74.00	22.36	100.0	H	49.0	4.47

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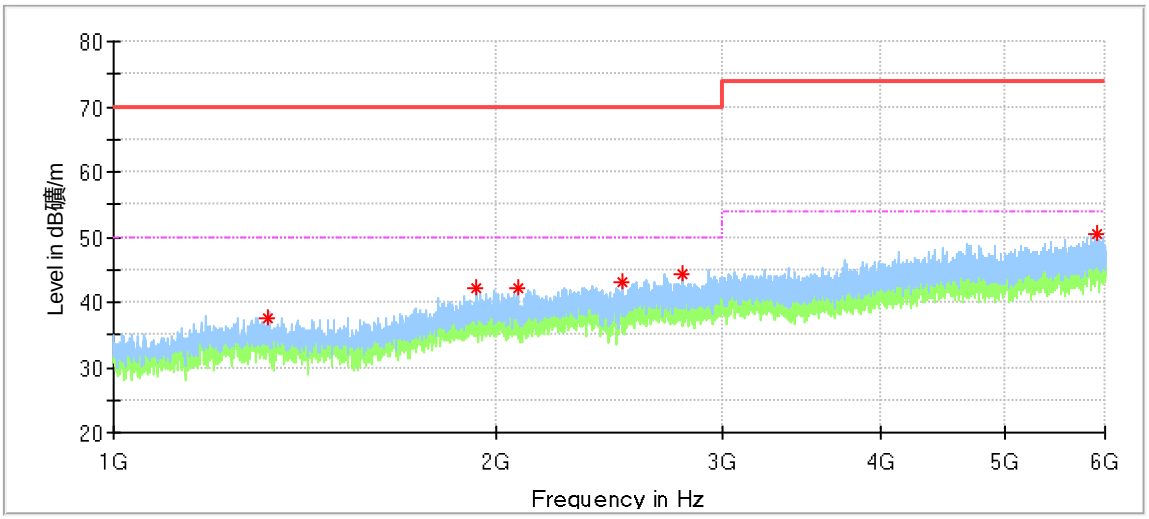
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Vertical



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1319.500000	37.61	---	70.00	32.39	100.0	V	40.0	-7.87
1928.500000	42.15	---	70.00	27.85	100.0	V	322.0	-3.78
2074.000000	42.19	---	70.00	27.81	100.0	V	166.0	-3.57
2507.000000	43.21	---	70.00	26.79	100.0	V	250.0	-1.74
2797.500000	44.45	---	70.00	25.55	100.0	V	197.0	-1.14
5912.500000	50.60	---	74.00	23.40	100.0	V	342.0	6.58

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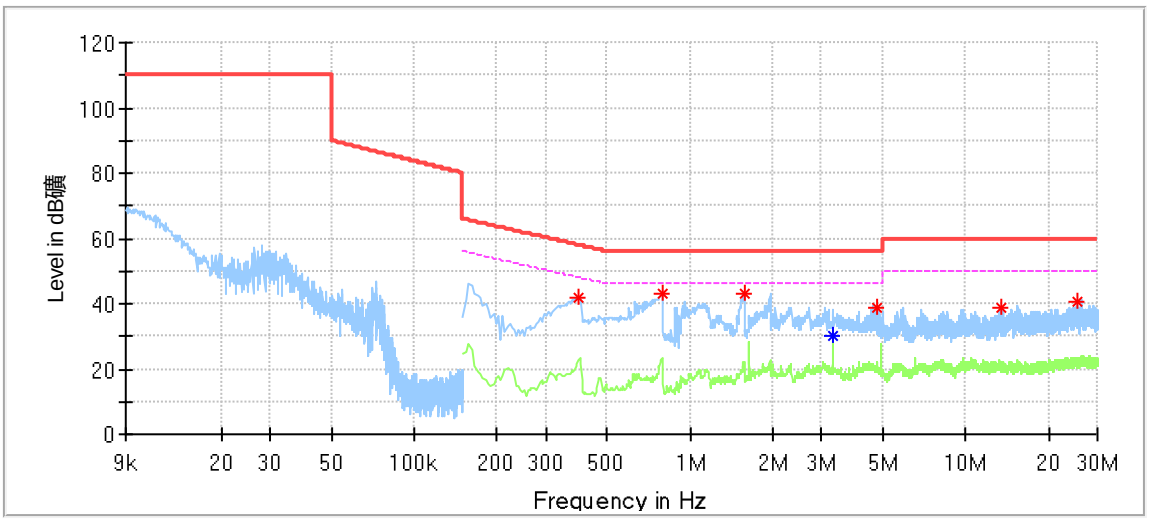
9.2 Conducted Disturbance

9.2.1 Conducted Emission Test Data

EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Line



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.394000	41.82	---	57.98	16.16	L1	9.64
0.794000	42.98	---	56.00	13.02	L1	9.66
1.570000	43.31	---	56.00	12.69	L1	9.67
3.282000	---	29.97	46.00	16.03	L1	9.72
4.750000	39.02	---	56.00	16.98	L1	9.76
13.506000	39.03	---	60.00	20.97	L1	9.88
25.170000	40.54	---	60.00	19.46	L1	10.06

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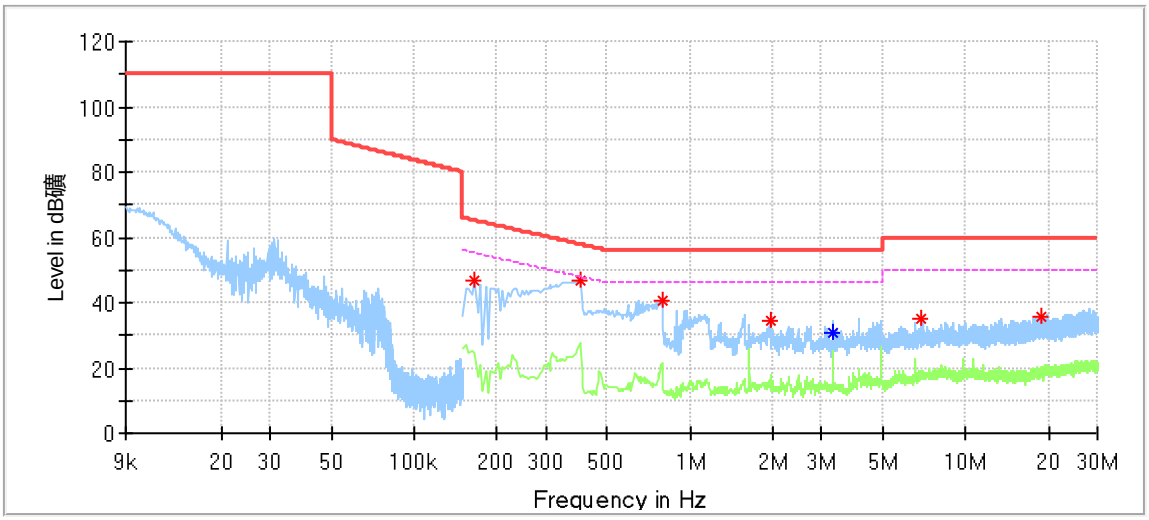
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Neutral



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.166000	46.67	---	65.16	18.49	N	9.62
0.402000	46.72	---	57.81	11.09	N	9.63
0.794000	40.84	---	56.00	15.16	N	9.65
1.950000	34.53	---	56.00	21.47	N	9.67
3.282000	---	30.57	46.00	15.43	N	9.71
6.890000	35.03	---	60.00	24.97	N	9.82
18.930000	35.93	---	60.00	24.07	N	10.00

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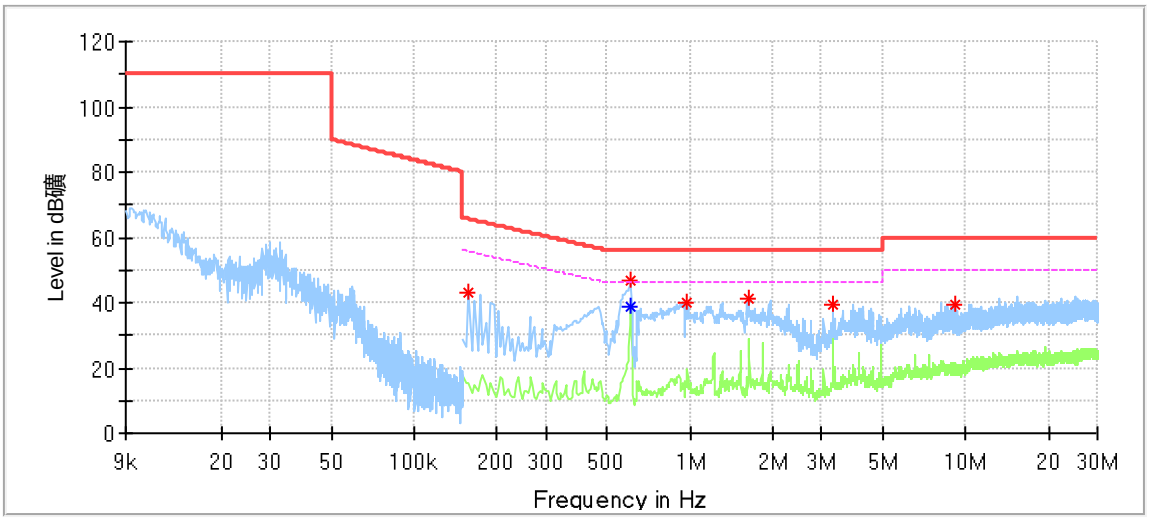
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Line



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.158000	42.83	---	65.57	22.74	L1	9.64
0.610000	---	38.81	46.00	7.19	L1	9.65
0.610000	46.69	---	56.00	9.31	L1	9.65
0.978000	40.02	---	56.00	15.98	L1	9.66
1.638000	40.96	---	56.00	15.04	L1	9.67
3.286000	39.47	---	56.00	16.53	L1	9.72
9.114000	39.66	---	60.00	20.34	L1	9.87

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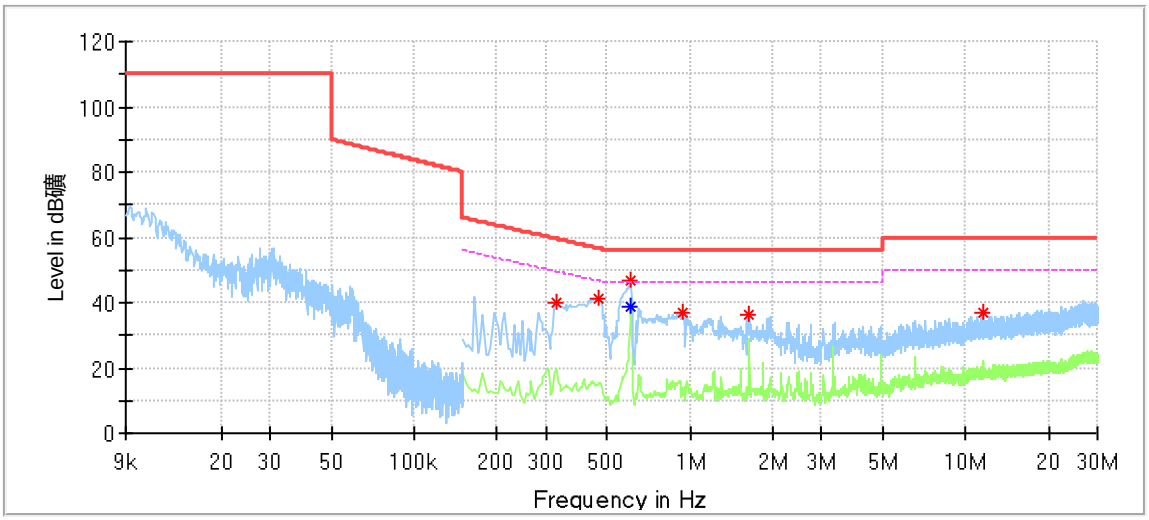
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Neutral



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.326000	39.98	---	59.55	19.57	N	9.63
0.470000	41.37	---	56.51	15.14	N	9.64
0.610000	---	38.70	46.00	7.30	N	9.65
0.610000	46.55	---	56.00	9.45	N	9.65
0.942000	37.21	---	56.00	18.79	N	9.65
1.642000	36.17	---	56.00	19.83	N	9.67
11.490000	36.70	---	60.00	23.30	N	9.88

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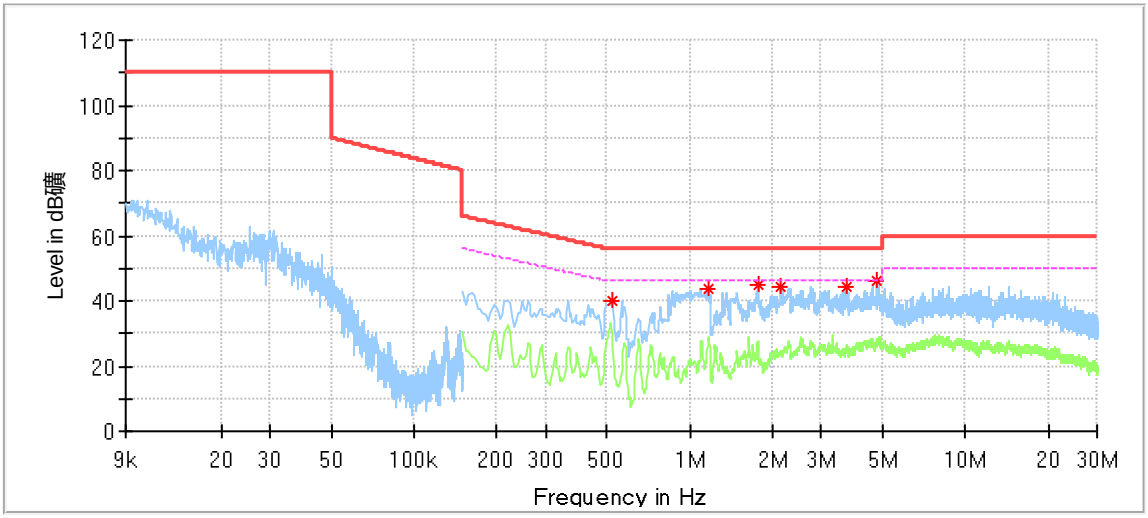
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Line



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.522000	39.83	---	56.00	16.17	L1	9.20
1.170000	43.71	---	56.00	12.29	L1	9.20
1.770000	44.72	---	56.00	11.28	L1	9.22
2.122000	44.05	---	56.00	11.95	L1	9.23
3.710000	44.30	---	56.00	11.70	L1	9.27
4.802000	46.30	---	56.00	9.70	L1	9.30

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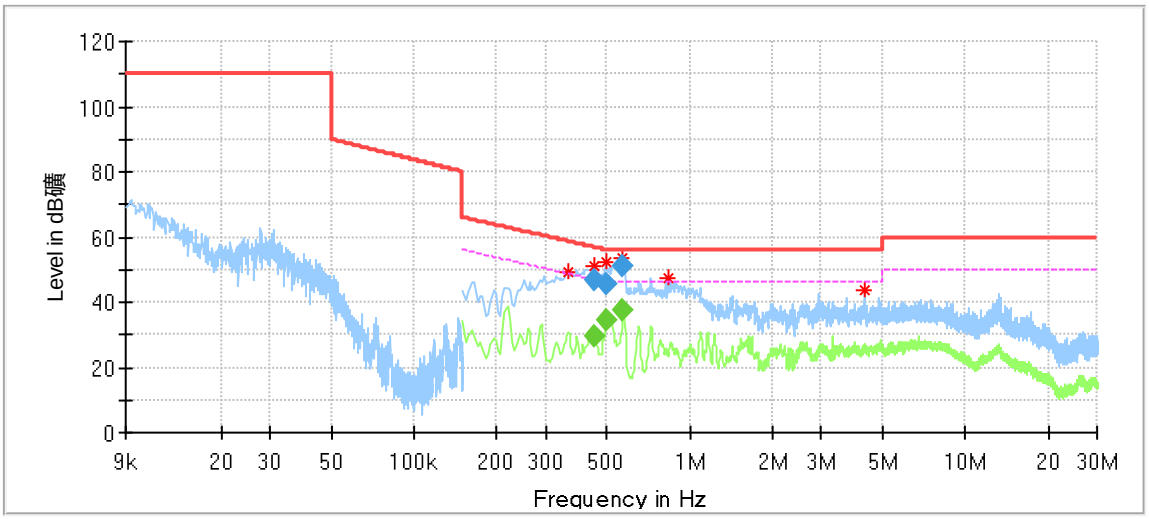
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Neutral



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.362000	49.21	---	58.68	9.47	N	9.39
0.450000	50.93	---	56.88	5.94	N	9.39
0.498435	52.06	---	56.03	3.98	N	9.40
0.574000	53.39	---	56.00	2.61	N	9.39
0.842000	47.51	---	56.00	8.49	N	9.39
4.310000	43.77	---	56.00	12.23	N	9.48

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.450000	---	29.36	46.96	17.60	N	9.39
0.450000	47.02	---	56.96	9.94	N	9.39
0.498435	---	34.35	46.03	11.68	N	9.40
0.498435	45.71	---	56.03	10.32	N	9.40
0.574000	---	37.54	46.00	8.46	N	9.39
0.574000	51.27	---	56.00	4.73	N	9.39

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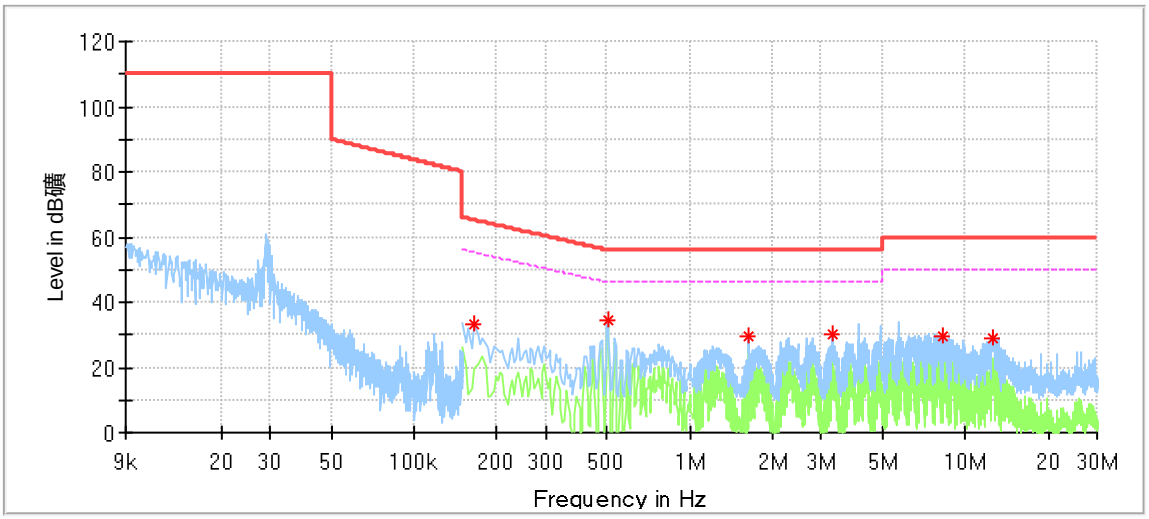
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Line



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.166000	33.38	---	65.16	31.78	L1	9.25
0.506000	34.63	---	56.00	21.37	L1	9.20
1.638000	29.72	---	56.00	26.28	L1	9.22
3.286000	30.05	---	56.00	25.95	L1	9.26
8.222000	29.62	---	60.00	30.38	L1	9.38
12.482000	28.91	---	60.00	31.09	L1	9.39

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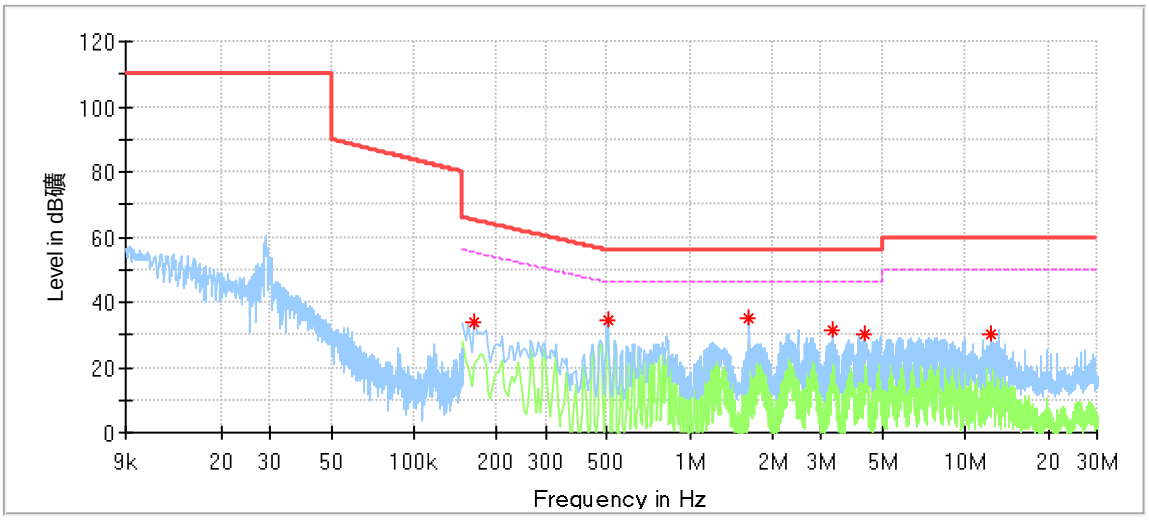
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM2
Test Specification: Neutral



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.166000	33.93	---	65.16	31.23	N	9.40
0.506000	34.63	---	56.00	21.37	N	9.40
1.646000	35.17	---	56.00	20.83	N	9.41
3.286000	31.64	---	56.00	24.36	N	9.45
4.282000	30.18	---	56.00	25.82	N	9.48
12.342000	30.32	---	60.00	29.68	N	9.62

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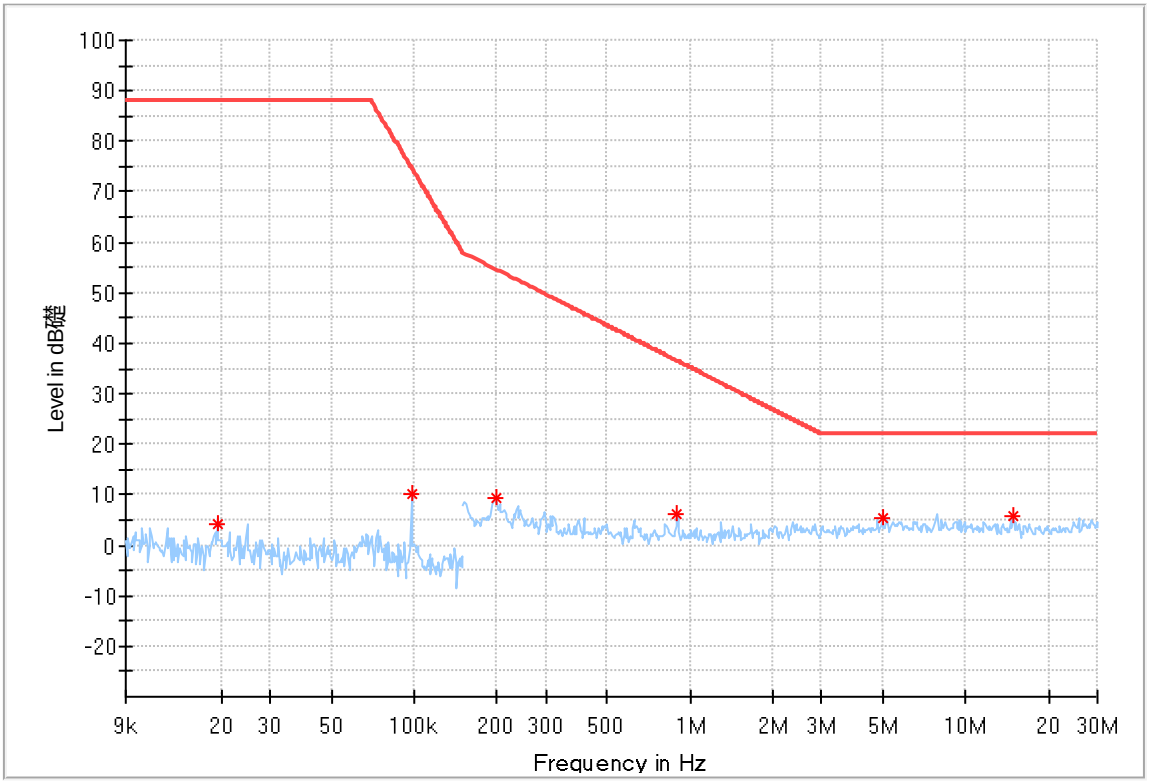
9.3 **Magnetic Field Test**

EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: X



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Axis	Corr. (dB)
0.019364	4.11	88.00	83.89	X	6.00
0.098033	10.01	74.74	64.73	X	6.01
0.198194	9.27	54.65	45.38	X	6.01
0.899371	6.15	36.48	30.33	X	6.03
4.979837	5.24	22.00	16.76	X	6.10
14.878743	5.68	22.00	16.32	X	6.19

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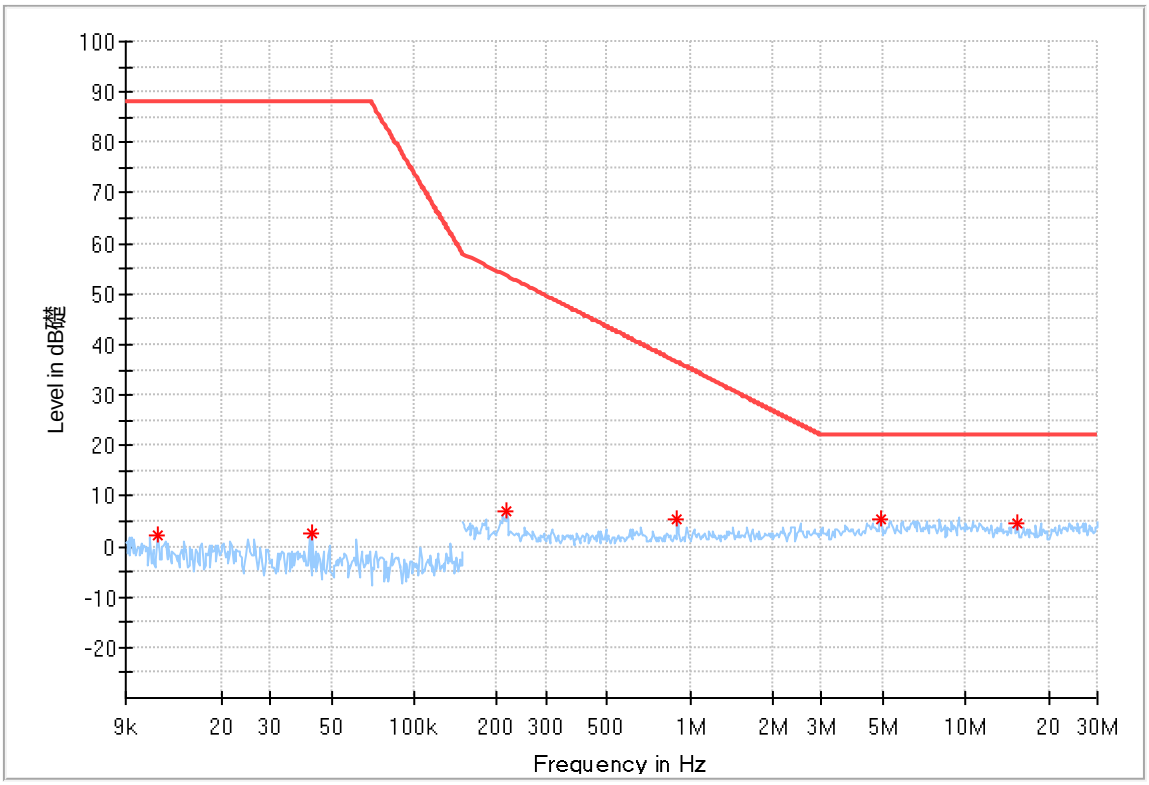
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Y



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Axis	Corr. (dB)
0.011774	2.12	88.00	85.88	Y	6.00
0.042924	2.59	88.00	85.41	Y	6.00
0.216762	7.06	53.58	46.52	Y	6.01
0.899371	5.30	36.48	31.18	Y	6.03
4.930532	5.24	22.00	16.76	Y	6.10
15.482879	4.71	22.00	17.29	Y	6.20

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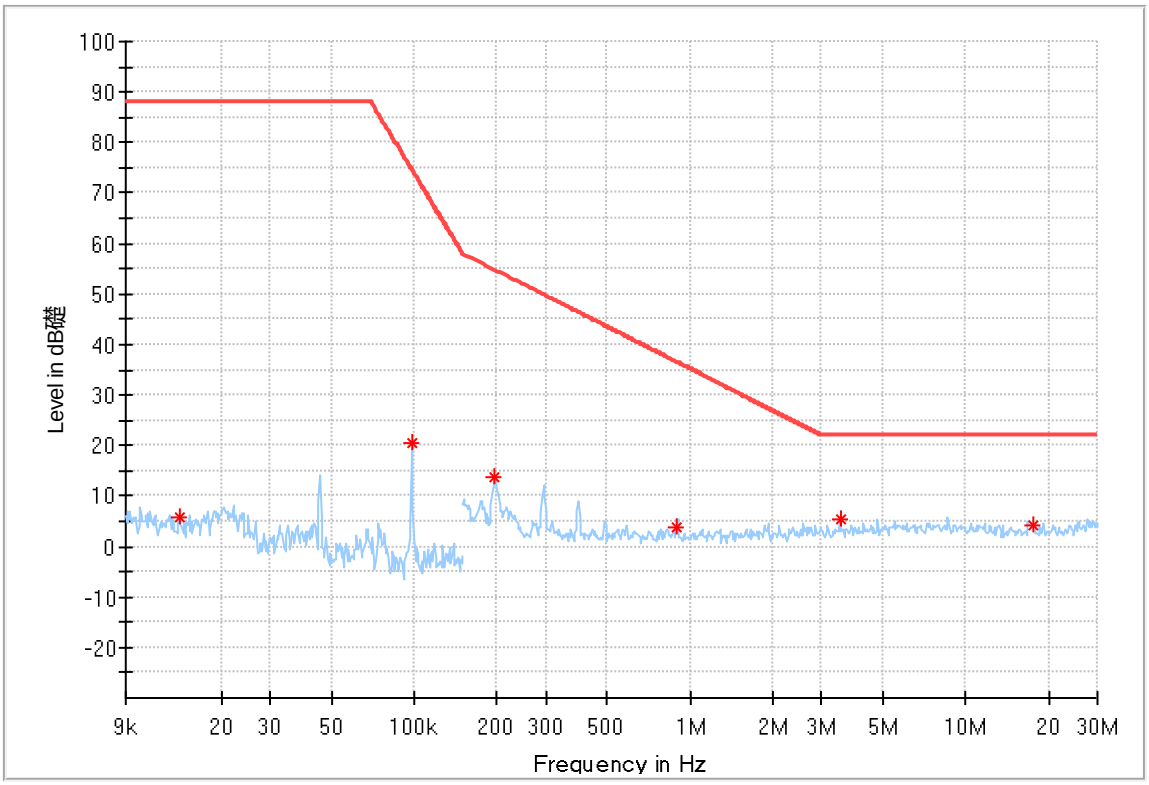
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: DSL-42WA-42 420100
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Z



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Axis	Corr. (dB)
0.014083	5.94	88.00	82.06	Z	6.00
0.098033	20.44	74.74	54.31	Z	6.01
0.196232	13.90	54.77	40.87	Z	6.01
0.890466	3.86	36.60	32.74	Z	6.03
3.515338	5.25	22.00	16.75	Z	6.08
17.620961	4.19	22.00	17.81	Z	6.21

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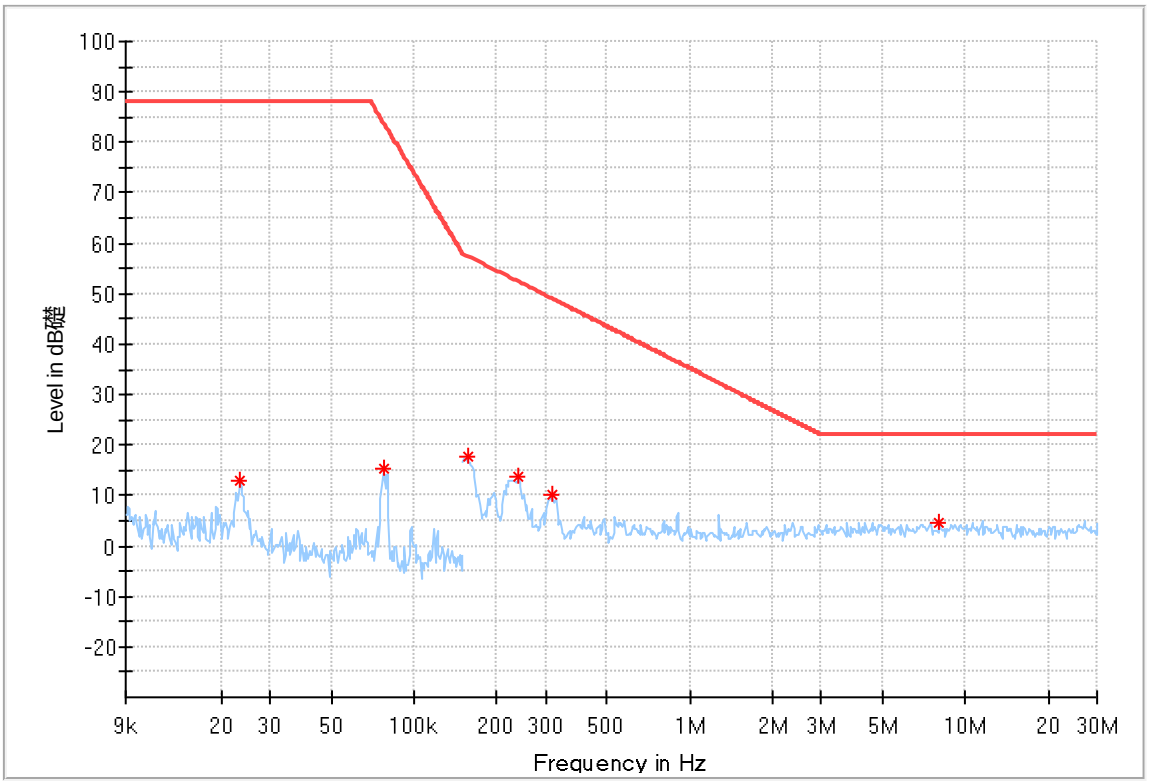
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: X



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Axis	Corr. (dB)
0.023394	12.84	88.00	75.16	X	6.00
0.077208	15.16	84.14	68.98	X	6.00
0.156091	17.62	57.52	39.91	X	6.00
0.239440	13.64	52.38	38.74	X	6.00
0.316370	10.33	49.03	38.71	X	6.01
8.028623	4.64	22.00	17.36	X	6.01

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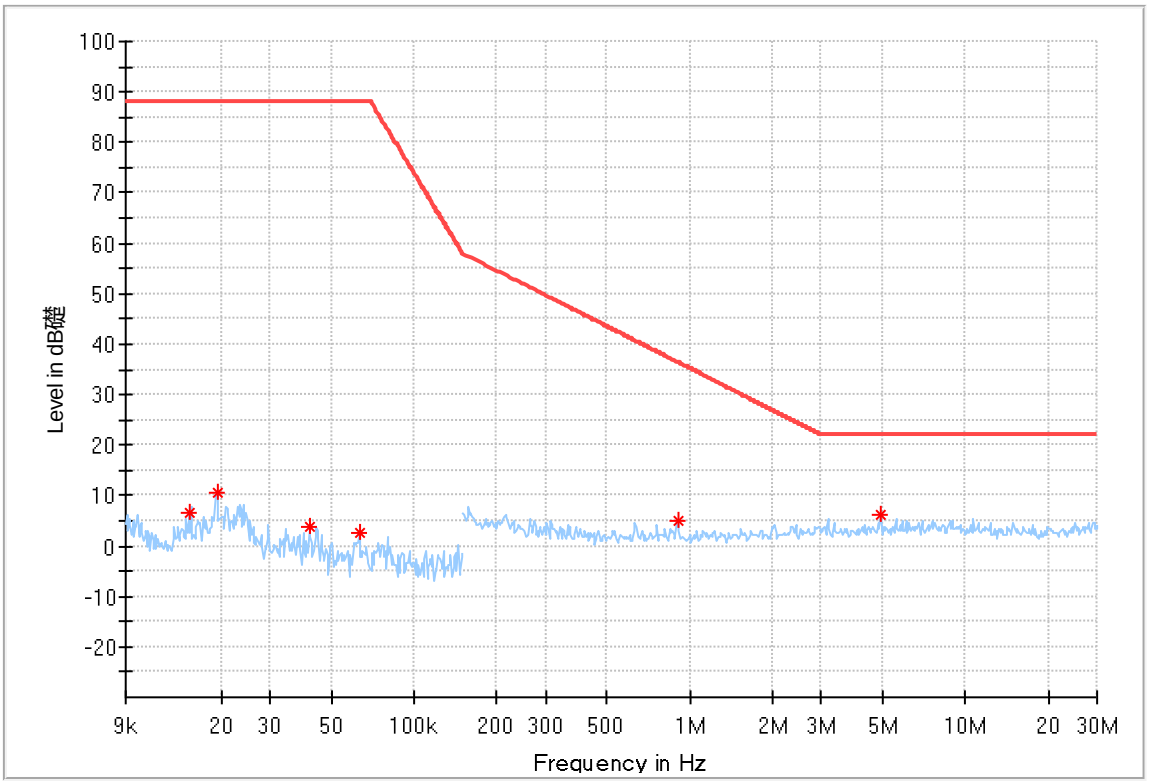
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Y



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Axis	Corr. (dB)
0.015250	6.67	88.00	81.33	Y	6.00
0.019364	10.52	88.00	77.48	Y	6.00
0.041661	3.77	88.00	84.23	Y	6.00
0.063275	2.45	88.00	85.55	Y	6.00
0.908365	4.97	36.36	31.38	Y	6.01
4.930532	6.34	22.00	15.66	Y	6.01

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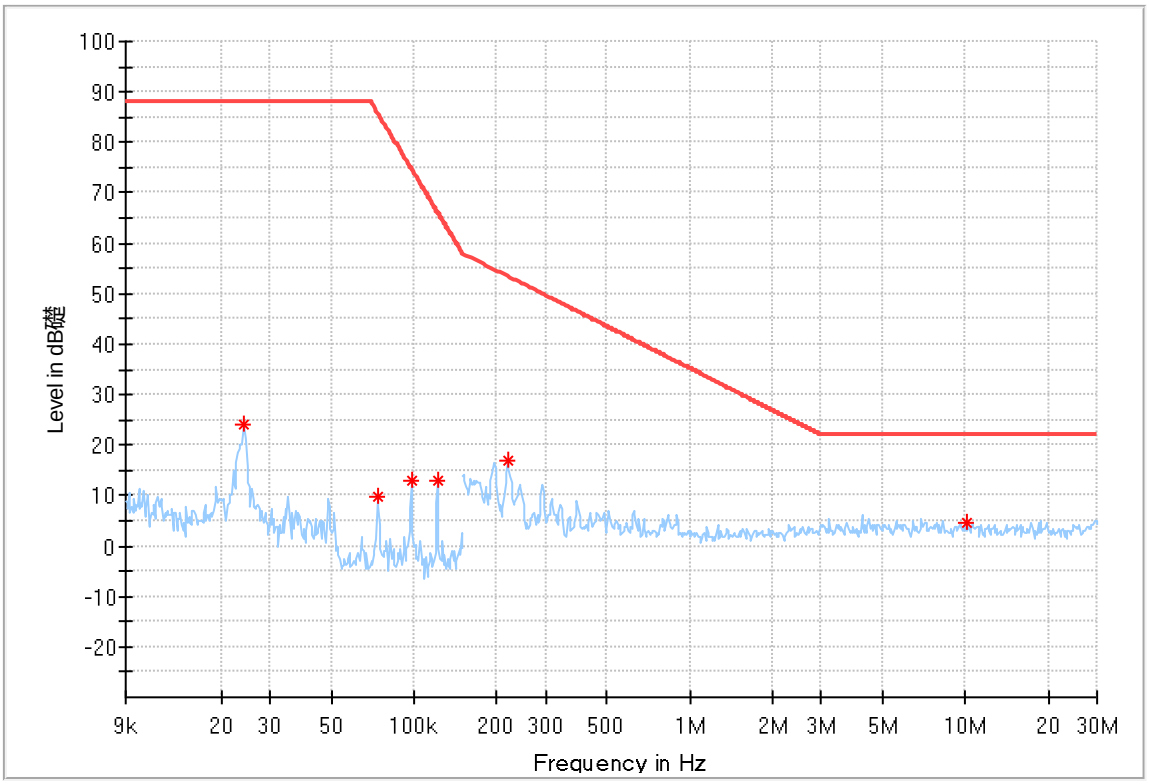
EUT: Nanoleaf Lines
M/N: NL59-K-0002LW-18PK
Adapter: LGSPS420100SPT
Comment: AC 230V/50Hz
Operating Condition: TM1
Test Specification: Z



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµA)	Limit (dBµA)	Margin (dB)	Axis	Corr. (dB)
0.024343	23.98	88.00	64.02	Z	6.00
0.073460	9.84	86.10	76.26	Z	6.00
0.098033	12.81	74.74	61.94	Z	6.00
0.122023	12.96	66.13	53.17	Z	6.00
0.218929	16.76	53.46	36.70	Z	6.00
10.093288	4.45	22.00	17.55	Z	6.01

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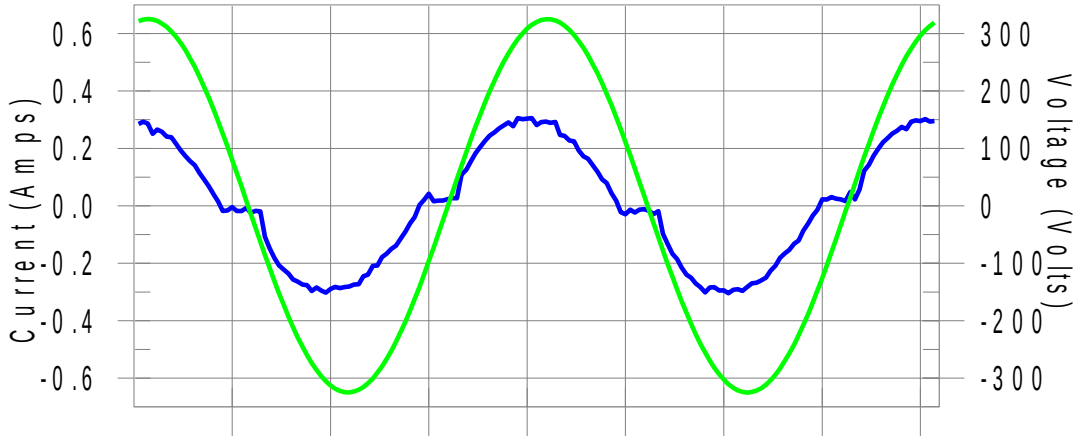
9.4 Current Harmonics Emissions

Harmonics – Class-C Dimmer Test per Ed. 5.0 (2018)(Run time)

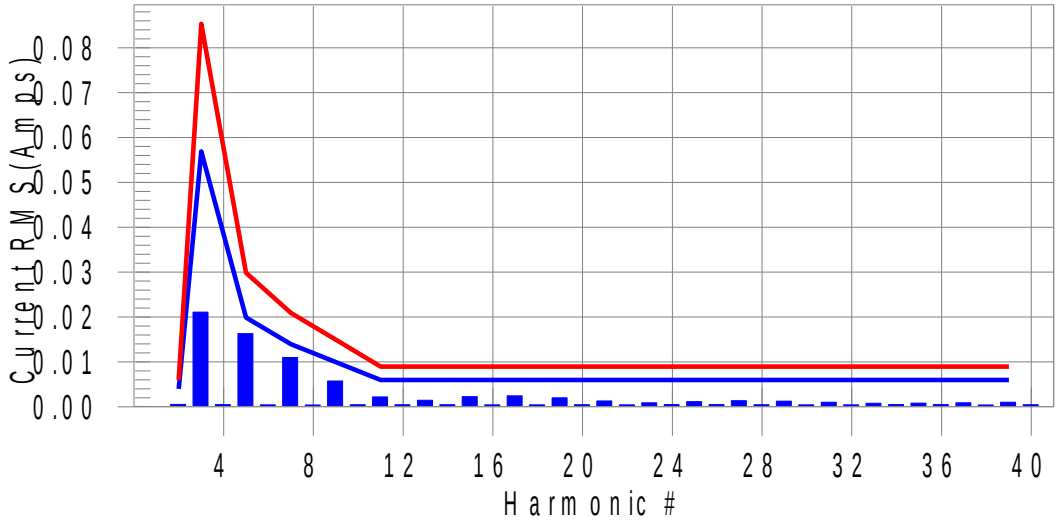
M/N: NL59-K-0002LW-18PK **Tested by: Adam**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 22/07/2021 **Start time: 10:14:51** **End time: 10:17:33**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000719.cts_data**
Comment: TM1
Remark: DSL-42WA-42 420100

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line **European Limits**



Test result: Pass **Worst harmonics H5-55.5% of 150% limit, H5-81.9% of 100% limit.**

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.030 **I-THD(%): 14.8** **POHC(A): 0.003** **POHC Limit(A): 0.019**

Highest parameter values during test:

V_RMS (Volts):	**229.962**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.408**	**I_RMS (Amps):**	**0.207**
I_Fund (Amps):	**0.202**	**Crest Factor:**	**2.009**
Power (Watts):	**44.9**	**Power Factor:**	**0.954**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.004	N/A	0.001	0.006	N/A	Pass
3	0.021	0.057	37.1	0.021	0.085	25.0	Pass
4	0.000	0.000	N/A	0.001	0.000	N/A	Pass
5	0.016	0.020	81.9	0.017	0.030	55.5	Pass
6	0.000	0.000	N/A	0.001	0.000	N/A	Pass
7	0.011	0.014	78.8	0.011	0.021	53.4	Pass
8	0.000	0.000	N/A	0.001	0.000	N/A	Pass
9	0.006	0.010	57.7	0.006	0.015	39.9	Pass
10	0.000	0.000	N/A	0.001	0.000	N/A	Pass
11	0.002	0.006	N/A	0.002	0.009	N/A	Pass
12	0.000	0.000	N/A	0.001	0.000	N/A	Pass
13	0.001	0.006	N/A	0.002	0.009	N/A	Pass
14	0.000	0.000	N/A	0.001	0.000	N/A	Pass
15	0.002	0.006	N/A	0.002	0.009	N/A	Pass
16	0.000	0.000	N/A	0.001	0.000	N/A	Pass
17	0.002	0.006	N/A	0.003	0.009	N/A	Pass
18	0.000	0.000	N/A	0.001	0.000	N/A	Pass
19	0.002	0.006	N/A	0.002	0.009	N/A	Pass
20	0.000	0.000	N/A	0.001	0.000	N/A	Pass
21	0.001	0.006	N/A	0.001	0.009	N/A	Pass
22	0.000	0.000	N/A	0.001	0.000	N/A	Pass
23	0.001	0.006	N/A	0.001	0.009	N/A	Pass
24	0.000	0.000	N/A	0.001	0.000	N/A	Pass
25	0.001	0.006	N/A	0.001	0.009	N/A	Pass
26	0.000	0.000	N/A	0.001	0.000	N/A	Pass
27	0.001	0.006	N/A	0.001	0.009	N/A	Pass
28	0.000	0.000	N/A	0.001	0.000	N/A	Pass
29	0.001	0.006	N/A	0.001	0.009	N/A	Pass
30	0.000	0.000	N/A	0.001	0.000	N/A	Pass
31	0.001	0.006	N/A	0.001	0.009	N/A	Pass
32	0.000	0.000	N/A	0.001	0.000	N/A	Pass
33	0.001	0.006	N/A	0.001	0.009	N/A	Pass
34	0.000	0.000	N/A	0.001	0.000	N/A	Pass
35	0.001	0.006	N/A	0.001	0.009	N/A	Pass
36	0.000	0.000	N/A	0.001	0.000	N/A	Pass
37	0.001	0.006	N/A	0.001	0.009	N/A	Pass
38	0.000	0.000	N/A	0.001	0.000	N/A	Pass
39	0.001	0.006	N/A	0.001	0.009	N/A	Pass
40	0.000	0.000	N/A	0.001	0.000	N/A	Pass

Note: Rated I(f) & PF limits were applied for this test. The rated I(f)(RMS) is 0.199 Amps & the rated PF is 0.953.

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.101	0.460	22.07	OK
3	0.135	2.069	6.52	OK
4	0.026	0.460	5.74	OK
5	0.064	0.920	6.99	OK
6	0.019	0.460	4.14	OK
7	0.026	0.690	3.80	OK
8	0.017	0.460	3.65	OK
9	0.017	0.460	3.79	OK
10	0.017	0.460	3.72	OK
11	0.025	0.230	11.02	OK
12	0.016	0.230	6.96	OK
13	0.017	0.230	7.27	OK
14	0.015	0.230	6.55	OK
15	0.021	0.230	9.13	OK
16	0.014	0.230	6.10	OK
17	0.017	0.230	7.28	OK
18	0.013	0.230	5.82	OK
19	0.023	0.230	9.93	OK
20	0.019	0.230	8.14	OK
21	0.015	0.230	6.45	OK
22	0.014	0.230	6.22	OK
23	0.018	0.230	7.89	OK
24	0.015	0.230	6.60	OK
25	0.021	0.230	9.15	OK
26	0.014	0.230	5.96	OK
27	0.015	0.230	6.41	OK
28	0.011	0.230	4.91	OK
29	0.018	0.230	7.99	OK
30	0.015	0.230	6.41	OK
31	0.016	0.230	7.17	OK
32	0.013	0.230	5.85	OK
33	0.016	0.230	6.91	OK
34	0.014	0.230	5.96	OK
35	0.017	0.230	7.21	OK
36	0.017	0.230	7.24	OK
37	0.013	0.230	5.58	OK
38	0.012	0.230	5.02	OK
39	0.018	0.230	7.67	OK
40	0.015	0.230	6.65	OK

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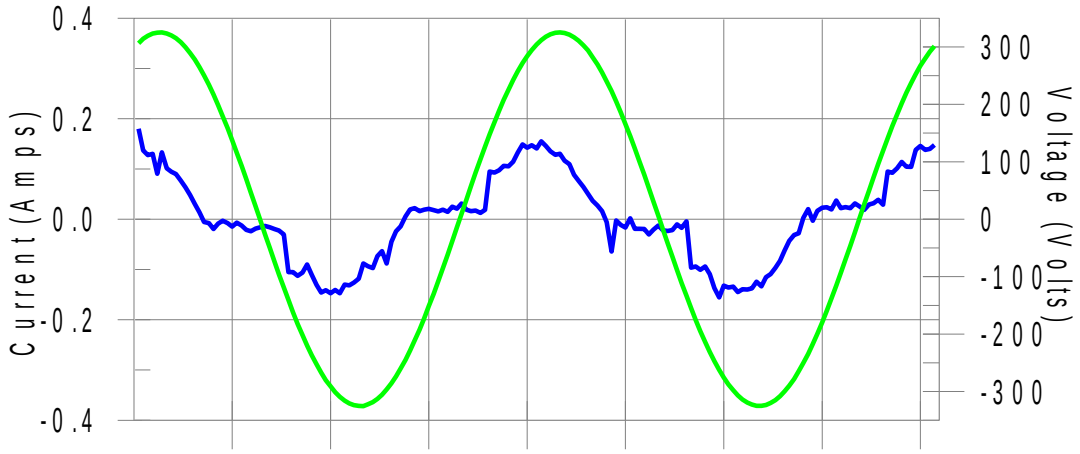
Harmonics – Class-C Dimmer Test per Ed. 5.0 (2018)(Run time)

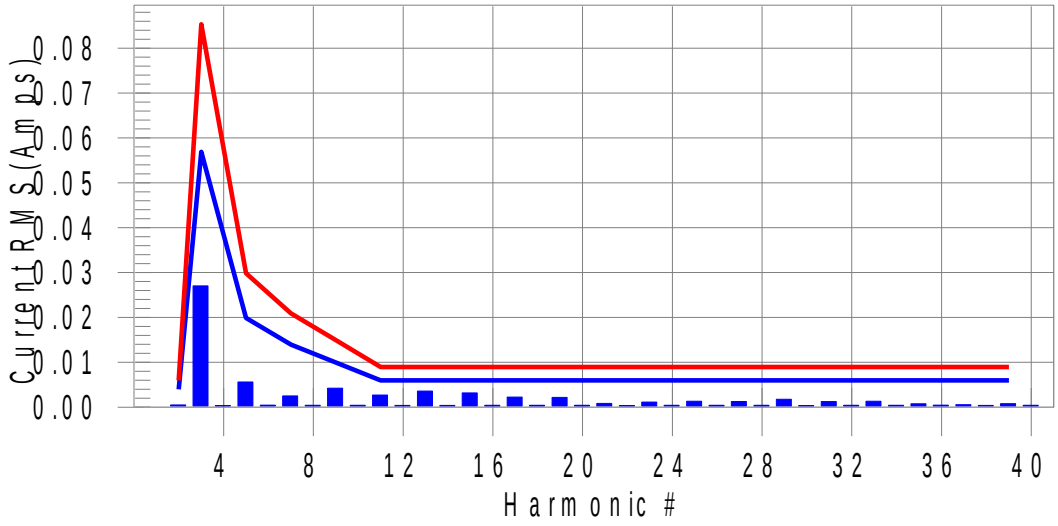
M/N: NL59-K-0002LW-18PK **Tested by: Adam**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 22/07/2021 **Start time: 10:27:10** **End time: 10:29:52**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000723.cts_data**
Comment: TM3
Remark: DSL-42WA-42 420100

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line **European Limits**



Test result: Pass Worst harmonics H3-31.8% of 150% limit, H3-47.5% of 100% limit.

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.029 **I-THD(%): 37.0** **POHC(A): 0.004** **POHC Limit(A): 0.019**

Highest parameter values during test:

V_RMS (Volts):	**229.970**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.252**	**I_RMS (Amps):**	**0.084**
I_Fund (Amps):	**0.078**	**Crest Factor:**	**3.008**
Power (Watts):	**16.1**	**Power Factor:**	**0.836**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.001	0.004	N/A	0.001	0.006	N/A	Pass
3	0.027	0.057	47.5	0.027	0.085	31.8	Pass
4	0.000	0.000	N/A	0.000	0.000	N/A	Pass
5	0.006	0.020	28.2	0.006	0.030	19.8	Pass
6	0.000	0.000	N/A	0.001	0.000	N/A	Pass
7	0.002	0.014	N/A	0.003	0.021	N/A	Pass
8	0.000	0.000	N/A	0.001	0.000	N/A	Pass
9	0.004	0.010	N/A	0.004	0.015	N/A	Pass
10	0.000	0.000	N/A	0.001	0.000	N/A	Pass
11	0.003	0.006	N/A	0.003	0.009	N/A	Pass
12	0.000	0.000	N/A	0.000	0.000	N/A	Pass
13	0.004	0.006	N/A	0.004	0.009	N/A	Pass
14	0.000	0.000	N/A	0.001	0.000	N/A	Pass
15	0.003	0.006	N/A	0.003	0.009	N/A	Pass
16	0.000	0.000	N/A	0.001	0.000	N/A	Pass
17	0.002	0.006	N/A	0.002	0.009	N/A	Pass
18	0.000	0.000	N/A	0.001	0.000	N/A	Pass
19	0.002	0.006	N/A	0.002	0.009	N/A	Pass
20	0.000	0.000	N/A	0.001	0.000	N/A	Pass
21	0.001	0.006	N/A	0.001	0.009	N/A	Pass
22	0.000	0.000	N/A	0.001	0.000	N/A	Pass
23	0.001	0.006	N/A	0.001	0.009	N/A	Pass
24	0.000	0.000	N/A	0.001	0.000	N/A	Pass
25	0.001	0.006	N/A	0.001	0.009	N/A	Pass
26	0.000	0.000	N/A	0.001	0.000	N/A	Pass
27	0.001	0.006	N/A	0.001	0.009	N/A	Pass
28	0.000	0.000	N/A	0.001	0.000	N/A	Pass
29	0.002	0.006	N/A	0.002	0.009	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.006	N/A	0.001	0.009	N/A	Pass
32	0.000	0.000	N/A	0.001	0.000	N/A	Pass
33	0.001	0.006	N/A	0.001	0.009	N/A	Pass
34	0.000	0.000	N/A	0.001	0.000	N/A	Pass
35	0.001	0.006	N/A	0.001	0.009	N/A	Pass
36	0.000	0.000	N/A	0.001	0.000	N/A	Pass
37	0.001	0.006	N/A	0.001	0.009	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.001	0.006	N/A	0.001	0.009	N/A	Pass
40	0.000	0.000	N/A	0.001	0.000	N/A	Pass

Note: Rated I(f) & PF limits were applied for this test. The rated I(f)(RMS) is 0.199 Amps & the rated PF is 0.953.

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.102	0.460	22.25	OK
3	0.134	2.070	6.50	OK
4	0.020	0.460	4.35	OK
5	0.072	0.920	7.88	OK
6	0.020	0.460	4.35	OK
7	0.034	0.690	4.96	OK
8	0.018	0.460	4.00	OK
9	0.023	0.460	5.07	OK
10	0.019	0.460	4.11	OK
11	0.027	0.230	11.60	OK
12	0.013	0.230	5.47	OK
13	0.018	0.230	7.94	OK
14	0.015	0.230	6.35	OK
15	0.020	0.230	8.76	OK
16	0.016	0.230	6.94	OK
17	0.016	0.230	6.87	OK
18	0.018	0.230	7.80	OK
19	0.019	0.230	8.30	OK
20	0.015	0.230	6.56	OK
21	0.017	0.230	7.31	OK
22	0.014	0.230	6.17	OK
23	0.022	0.230	9.69	OK
24	0.014	0.230	6.02	OK
25	0.014	0.230	6.24	OK
26	0.014	0.230	6.02	OK
27	0.015	0.230	6.35	OK
28	0.013	0.230	5.61	OK
29	0.017	0.230	7.48	OK
30	0.013	0.230	5.73	OK
31	0.019	0.230	8.07	OK
32	0.014	0.230	6.04	OK
33	0.017	0.230	7.19	OK
34	0.019	0.230	8.44	OK
35	0.017	0.230	7.27	OK
36	0.016	0.230	6.97	OK
37	0.015	0.230	6.66	OK
38	0.017	0.230	7.32	OK
39	0.017	0.230	7.55	OK
40	0.016	0.230	6.81	OK

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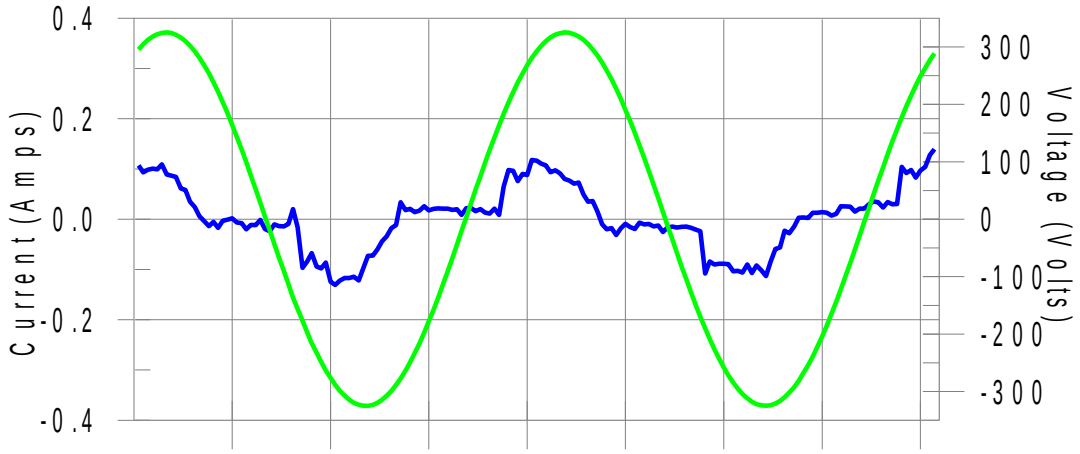
Harmonics – Class-C Dimmer Test per Ed. 5.0 (2018)(Run time)

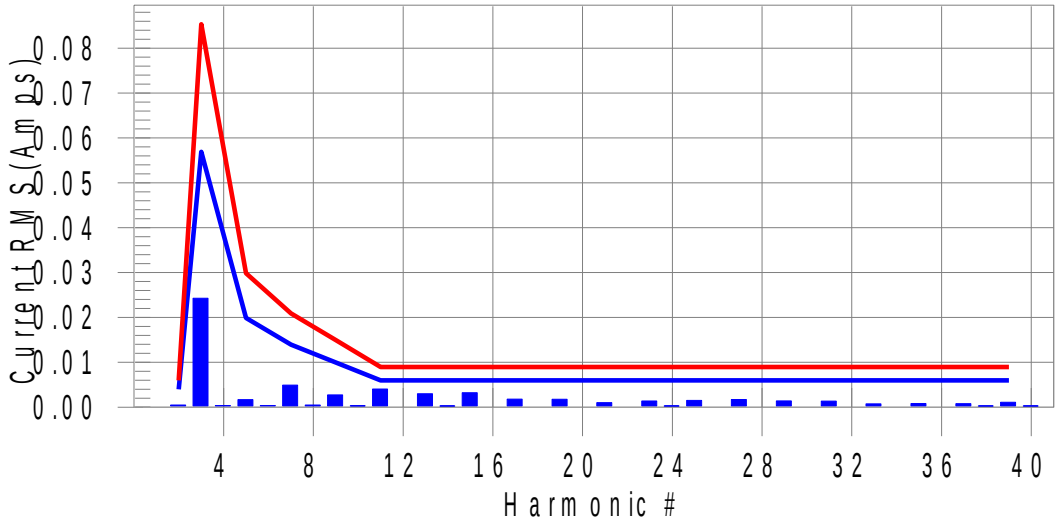
M/N: NL59-K-0002LW-18PK **Tested by: Adam**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 22/07/2021 **Start time: 10:32:29** **End time: 10:35:11**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000724.cts_data**
Comment: TM2
Remark: DSL-42WA-42 420100

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line **European Limits**



Test result: Pass Worst harmonics H3-29.7% of 150% limit, H3-42.7% of 100% limit.

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.026 **I-THD(%): 43.5** **POHC(A): 0.004** **POHC Limit(A): 0.019**

Highest parameter values during test:

V_RMS (Volts):	**229.970**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.215**	**I_RMS (Amps):**	**0.067**
I_Fund (Amps):	**0.060**	**Crest Factor:**	**3.491**
Power (Watts):	**12.0**	**Power Factor:**	**0.786**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.000	0.004	N/A	0.002	0.006	N/A	Pass
3	0.024	0.057	42.7	0.025	0.085	29.7	Pass
4	0.000	0.000	N/A	0.001	0.000	N/A	Pass
5	0.002	0.020	N/A	0.002	0.030	N/A	Pass
6	0.000	0.000	N/A	0.001	0.000	N/A	Pass
7	0.005	0.014	N/A	0.005	0.021	N/A	Pass
8	0.000	0.000	N/A	0.002	0.000	N/A	Pass
9	0.003	0.010	N/A	0.003	0.015	N/A	Pass
10	0.000	0.000	N/A	0.001	0.000	N/A	Pass
11	0.004	0.006	N/A	0.004	0.009	N/A	Pass
12	0.000	0.000	N/A	0.000	0.000	N/A	Pass
13	0.003	0.006	N/A	0.004	0.009	N/A	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.003	0.006	N/A	0.003	0.009	N/A	Pass
16	0.000	0.000	N/A	0.000	0.000	N/A	Pass
17	0.002	0.006	N/A	0.002	0.009	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.002	0.006	N/A	0.002	0.009	N/A	Pass
20	0.000	0.000	N/A	0.000	0.000	N/A	Pass
21	0.001	0.006	N/A	0.001	0.009	N/A	Pass
22	0.000	0.000	N/A	0.000	0.000	N/A	Pass
23	0.001	0.006	N/A	0.002	0.009	N/A	Pass
24	0.000	0.000	N/A	0.000	0.000	N/A	Pass
25	0.002	0.006	N/A	0.002	0.009	N/A	Pass
26	0.000	0.000	N/A	0.000	0.000	N/A	Pass
27	0.002	0.006	N/A	0.002	0.009	N/A	Pass
28	0.000	0.000	N/A	0.000	0.000	N/A	Pass
29	0.001	0.006	N/A	0.002	0.009	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.006	N/A	0.001	0.009	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.001	0.006	N/A	0.001	0.009	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.001	0.006	N/A	0.001	0.009	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.001	0.006	N/A	0.001	0.009	N/A	Pass
38	0.000	0.000	N/A	0.001	0.000	N/A	Pass
39	0.001	0.006	N/A	0.001	0.009	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

Note: Rated I(f) & PF limits were applied for this test. The rated I(f)(RMS) is 0.199 Amps & the rated PF is 0.953.

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.108	0.460	23.41	OK
3	0.136	2.070	6.56	OK
4	0.027	0.460	5.86	OK
5	0.066	0.920	7.22	OK
6	0.019	0.460	4.23	OK
7	0.043	0.690	6.20	OK
8	0.017	0.460	3.67	OK
9	0.027	0.460	5.87	OK
10	0.017	0.460	3.70	OK
11	0.021	0.230	9.17	OK
12	0.017	0.230	7.59	OK
13	0.013	0.230	5.48	OK
14	0.014	0.230	6.28	OK
15	0.017	0.230	7.23	OK
16	0.013	0.230	5.74	OK
17	0.015	0.230	6.65	OK
18	0.014	0.230	5.91	OK
19	0.017	0.230	7.27	OK
20	0.016	0.230	6.98	OK
21	0.015	0.230	6.54	OK
22	0.015	0.230	6.64	OK
23	0.021	0.230	9.02	OK
24	0.017	0.230	7.46	OK
25	0.018	0.230	7.82	OK
26	0.012	0.230	5.34	OK
27	0.014	0.230	6.01	OK
28	0.013	0.230	5.75	OK
29	0.014	0.230	5.99	OK
30	0.017	0.230	7.58	OK
31	0.014	0.230	6.08	OK
32	0.013	0.230	5.84	OK
33	0.013	0.230	5.75	OK
34	0.014	0.230	6.23	OK
35	0.017	0.230	7.24	OK
36	0.014	0.230	6.08	OK
37	0.013	0.230	5.68	OK
38	0.020	0.230	8.69	OK
39	0.017	0.230	7.32	OK
40	0.017	0.230	7.46	OK

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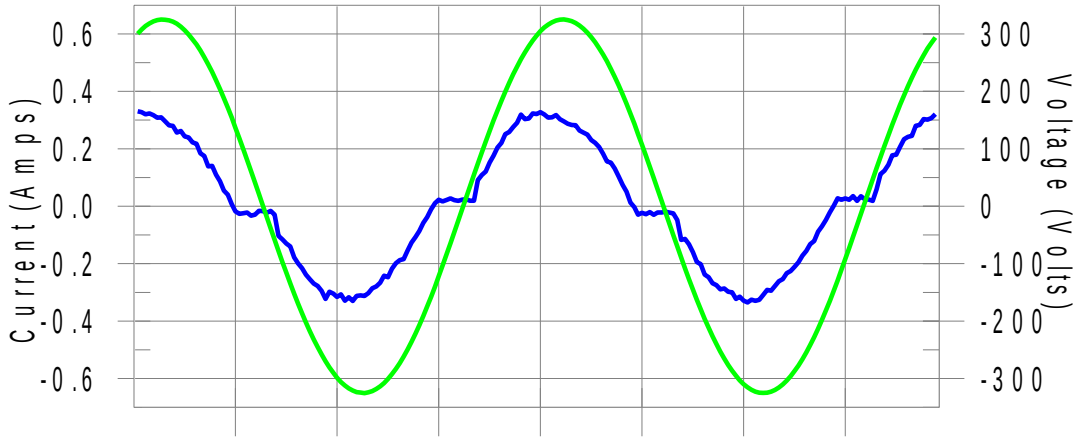
Harmonics – Class-C per Ed. 5.0 (2018)(Run time)

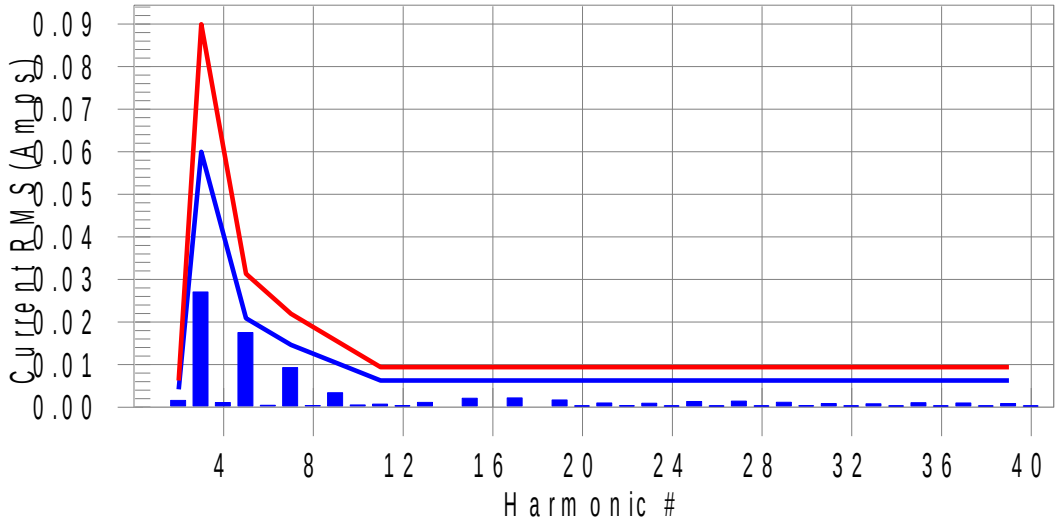
M/N: NL59-K-0002LW-18PK **Tested by: JACOB**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 22/09/2021 **Start time: 14:42:21** **End time: 14:45:03**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000633.cts_data**
Comment: TM1
Remark: LGSPS420100SPT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line **European Limits**



Test result: Pass Worst harmonics H5-57.1% of 150% limit, H5-83.9% of 100% limit.

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.034 **I-THD(%): 16.4** **POHC(A): 0.003** **POHC Limit(A): 0.020**

Highest parameter values during test:

V_RMS (Volts):	**230.050**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.412**	**I_RMS (Amps):**	**0.212**
I_Fund (Amps):	**0.209**	**Crest Factor:**	**1.947**
Power (Watts):	**46.6**	**Power Factor:**	**0.957**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.004	N/A	0.002	0.006	N/A	Pass
3	0.027	0.060	45.1	0.029	0.090	32.3	Pass
4	0.001	0.000	N/A	0.002	0.000	N/A	Pass
5	0.018	0.021	83.9	0.018	0.031	57.1	Pass
6	0.000	0.000	N/A	0.001	0.000	N/A	Pass
7	0.009	0.015	63.6	0.010	0.022	45.6	Pass
8	0.000	0.000	N/A	0.001	0.000	N/A	Pass
9	0.003	0.010	N/A	0.004	0.016	N/A	Pass
10	0.001	0.000	N/A	0.002	0.000	N/A	Pass
11	0.001	0.006	N/A	0.001	0.009	N/A	Pass
12	0.000	0.000	N/A	0.001	0.000	N/A	Pass
13	0.001	0.006	N/A	0.001	0.009	N/A	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.002	0.006	N/A	0.002	0.009	N/A	Pass
16	0.000	0.000	N/A	0.000	0.000	N/A	Pass
17	0.002	0.006	N/A	0.003	0.009	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.002	0.006	N/A	0.002	0.009	N/A	Pass
20	0.000	0.000	N/A	0.000	0.000	N/A	Pass
21	0.001	0.006	N/A	0.001	0.009	N/A	Pass
22	0.000	0.000	N/A	0.000	0.000	N/A	Pass
23	0.001	0.006	N/A	0.001	0.009	N/A	Pass
24	0.000	0.000	N/A	0.001	0.000	N/A	Pass
25	0.001	0.006	N/A	0.002	0.009	N/A	Pass
26	0.000	0.000	N/A	0.001	0.000	N/A	Pass
27	0.001	0.006	N/A	0.002	0.009	N/A	Pass
28	0.000	0.000	N/A	0.000	0.000	N/A	Pass
29	0.001	0.006	N/A	0.002	0.009	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.006	N/A	0.001	0.009	N/A	Pass
32	0.000	0.000	N/A	0.001	0.000	N/A	Pass
33	0.001	0.006	N/A	0.001	0.009	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.001	0.006	N/A	0.001	0.009	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.001	0.006	N/A	0.001	0.009	N/A	Pass
38	0.000	0.000	N/A	0.001	0.000	N/A	Pass
39	0.001	0.006	N/A	0.001	0.009	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

Note: Dynamic limits were applied for this test. The highest harmonics values in the above table may not occur at the same window as the maximum harmonics/limit ratio.

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.141	0.460	30.57	OK
3	0.182	2.070	8.77	OK
4	0.054	0.460	11.78	OK
5	0.053	0.920	5.71	OK
6	0.023	0.460	5.08	OK
7	0.046	0.690	6.66	OK
8	0.018	0.460	3.93	OK
9	0.020	0.460	4.38	OK
10	0.019	0.460	4.15	OK
11	0.029	0.230	12.67	OK
12	0.012	0.230	5.41	OK
13	0.023	0.230	10.09	OK
14	0.011	0.230	4.76	OK
15	0.020	0.230	8.61	OK
16	0.014	0.230	6.10	OK
17	0.015	0.230	6.74	OK
18	0.010	0.230	4.56	OK
19	0.018	0.230	7.65	OK
20	0.022	0.230	9.65	OK
21	0.014	0.230	6.27	OK
22	0.013	0.230	5.66	OK
23	0.020	0.230	8.75	OK
24	0.012	0.230	5.32	OK
25	0.019	0.230	8.07	OK
26	0.012	0.230	5.00	OK
27	0.015	0.230	6.52	OK
28	0.015	0.230	6.47	OK
29	0.018	0.230	7.99	OK
30	0.014	0.230	5.89	OK
31	0.015	0.230	6.65	OK
32	0.014	0.230	6.04	OK
33	0.011	0.230	4.99	OK
34	0.013	0.230	5.59	OK
35	0.016	0.230	7.03	OK
36	0.011	0.230	4.97	OK
37	0.016	0.230	6.88	OK
38	0.012	0.230	5.11	OK
39	0.015	0.230	6.34	OK
40	0.020	0.230	8.53	OK

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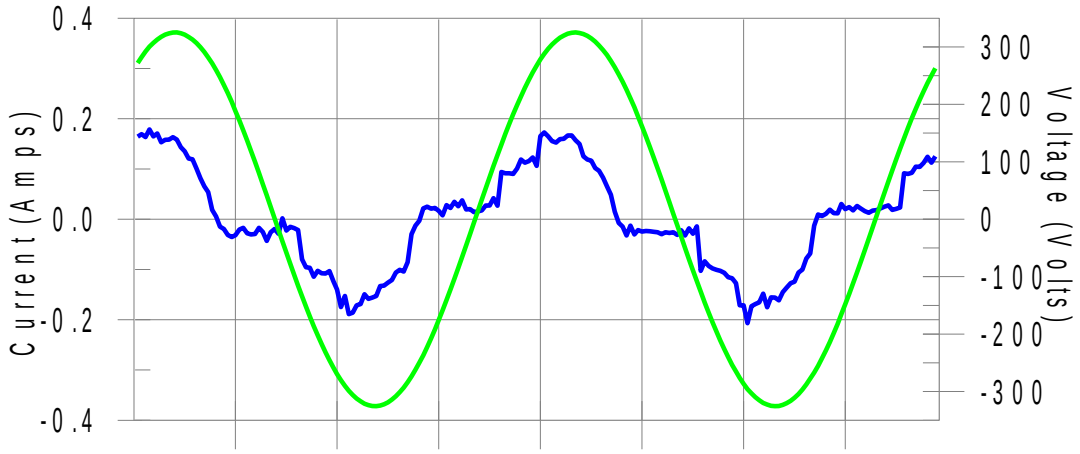
Harmonics – Class-C Dimmer Test per Ed. 5.0 (2018)(Run time)

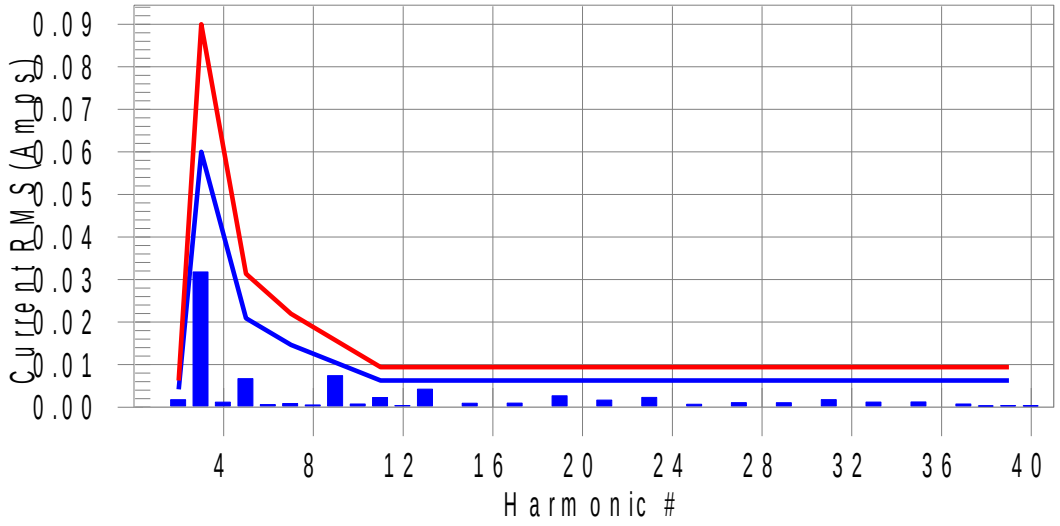
M/N: NL59-K-0002LW-18PK **Tested by: JACOB**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 22/09/2021 **Start time: 14:56:08** **End time: 14:58:50**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000637.cts_data**
Comment: TM3
Remark: LGSPS420100SPT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line **European Limits**



Test result: Pass Worst harmonics H9-48.9% of 150% limit, H9-70.8% of 100% limit.

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.034 **I-THD(%): 37.1** **POHC(A): 0.004** **POHC Limit(A): 0.020**

Highest parameter values during test:

V_RMS (Volts):	**230.049**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.266**	**I_RMS (Amps):**	**0.100**
I_Fund (Amps):	**0.092**	**Crest Factor:**	**2.682**
Power (Watts):	**19.3**	**Power Factor:**	**0.857**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.004	N/A	0.002	0.006	N/A	Pass
3	0.032	0.060	53.0	0.033	0.090	37.1	Pass
4	0.001	0.000	N/A	0.002	0.000	N/A	Pass
5	0.007	0.021	32.1	0.007	0.031	22.5	Pass
6	0.001	0.000	N/A	0.001	0.000	N/A	Pass
7	0.001	0.015	N/A	0.001	0.022	N/A	Pass
8	0.001	0.000	N/A	0.001	0.000	N/A	Pass
9	0.007	0.010	70.8	0.008	0.016	48.9	Pass
10	0.001	0.000	N/A	0.002	0.000	N/A	Pass
11	0.002	0.006	N/A	0.003	0.009	N/A	Pass
12	0.000	0.000	N/A	0.001	0.000	N/A	Pass
13	0.004	0.006	N/A	0.004	0.009	N/A	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.001	0.006	N/A	0.001	0.009	N/A	Pass
16	0.000	0.000	N/A	0.000	0.000	N/A	Pass
17	0.001	0.006	N/A	0.001	0.009	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.003	0.006	N/A	0.003	0.009	N/A	Pass
20	0.000	0.000	N/A	0.000	0.000	N/A	Pass
21	0.002	0.006	N/A	0.002	0.009	N/A	Pass
22	0.000	0.000	N/A	0.000	0.000	N/A	Pass
23	0.002	0.006	N/A	0.003	0.009	N/A	Pass
24	0.000	0.000	N/A	0.000	0.000	N/A	Pass
25	0.001	0.006	N/A	0.001	0.009	N/A	Pass
26	0.000	0.000	N/A	0.000	0.000	N/A	Pass
27	0.001	0.006	N/A	0.001	0.009	N/A	Pass
28	0.000	0.000	N/A	0.000	0.000	N/A	Pass
29	0.001	0.006	N/A	0.001	0.009	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.002	0.006	N/A	0.002	0.009	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.001	0.006	N/A	0.001	0.009	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.001	0.006	N/A	0.001	0.009	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.001	0.006	N/A	0.001	0.009	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.000	0.006	N/A	0.000	0.009	N/A	Pass
40	0.000	0.000	N/A	0.001	0.000	N/A	Pass

Note: Rated I(f) & PF limits were applied for this test. The rated I(f)(RMS) is 0.209 Amps & the rated PF is 0.957.

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.150	0.460	32.61	OK
3	0.177	2.070	8.56	OK
4	0.055	0.460	11.89	OK
5	0.052	0.920	5.61	OK
6	0.027	0.460	5.76	OK
7	0.055	0.690	8.00	OK
8	0.019	0.460	4.05	OK
9	0.026	0.460	5.73	OK
10	0.022	0.460	4.71	OK
11	0.029	0.230	12.54	OK
12	0.015	0.230	6.52	OK
13	0.021	0.230	9.05	OK
14	0.012	0.230	5.32	OK
15	0.021	0.230	9.02	OK
16	0.012	0.230	5.35	OK
17	0.016	0.230	6.87	OK
18	0.011	0.230	4.64	OK
19	0.021	0.230	8.98	OK
20	0.026	0.230	11.15	OK
21	0.014	0.230	6.04	OK
22	0.011	0.230	5.00	OK
23	0.021	0.230	8.97	OK
24	0.012	0.230	5.42	OK
25	0.015	0.230	6.31	OK
26	0.013	0.230	5.46	OK
27	0.016	0.230	6.98	OK
28	0.011	0.230	4.85	OK
29	0.016	0.230	7.12	OK
30	0.011	0.230	4.98	OK
31	0.018	0.230	7.65	OK
32	0.011	0.230	4.78	OK
33	0.015	0.230	6.48	OK
34	0.014	0.230	5.96	OK
35	0.016	0.230	7.02	OK
36	0.011	0.230	4.76	OK
37	0.017	0.230	7.46	OK
38	0.011	0.230	5.00	OK
39	0.016	0.230	6.88	OK
40	0.022	0.230	9.70	OK

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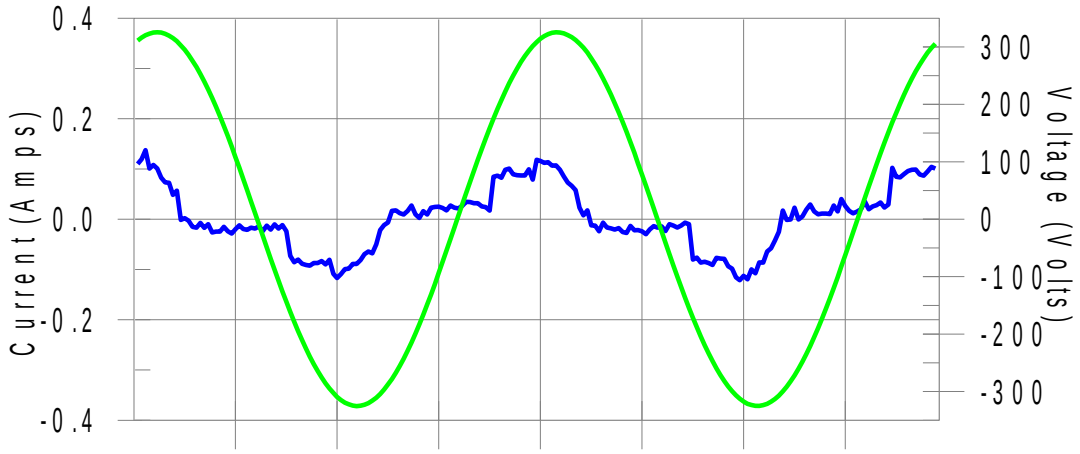
Harmonics – Class-C Dimmer Test per Ed. 5.0 (2018)(Run time)

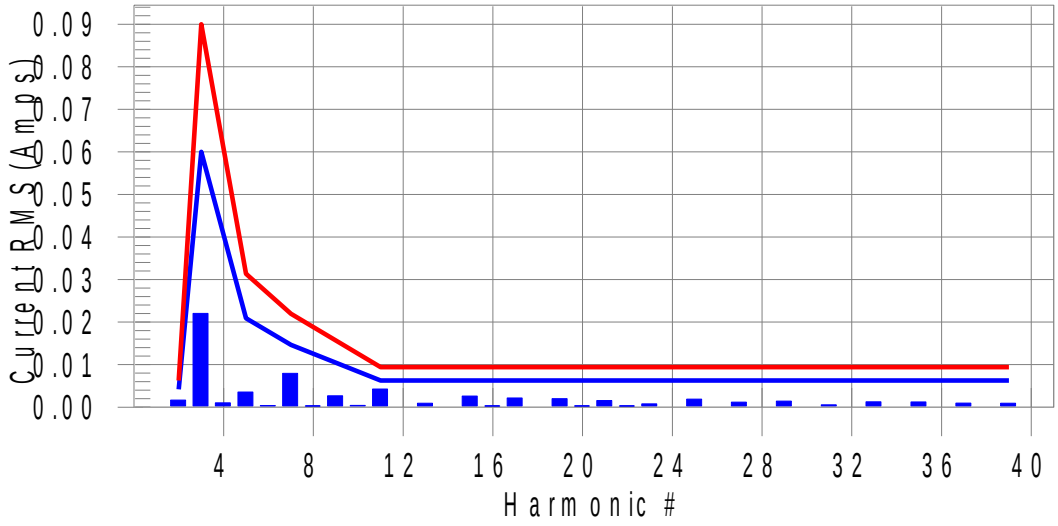
M/N: NL59-K-0002LW-18PK **Tested by: JACOB**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 22/09/2021 **Start time: 14:49:54** **End time: 14:52:36**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000635.cts_data**
Comment: TM2
Remark: LGSPS420100SPT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line **European Limits**



Test result: Pass Worst harmonics H7-40.4% of 150% limit, H7-54.3% of 100% limit.

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.025 **I-THD(%): 45.5** **POHC(A): 0.004** **POHC Limit(A): 0.020**

Highest parameter values during test:

V_RMS (Volts):	**230.055**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.206**	**I_RMS (Amps):**	**0.062**
I_Fund (Amps):	**0.055**	**Crest Factor:**	**3.361**
Power (Watts):	**10.4**	**Power Factor:**	**0.750**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.004	N/A	0.002	0.006	N/A	Pass
3	0.022	0.060	36.7	0.024	0.090	26.3	Pass
4	0.001	0.000	N/A	0.002	0.000	N/A	Pass
5	0.004	0.021	N/A	0.004	0.031	N/A	Pass
6	0.000	0.000	N/A	0.001	0.000	N/A	Pass
7	0.008	0.015	54.3	0.009	0.022	40.4	Pass
8	0.000	0.000	N/A	0.001	0.000	N/A	Pass
9	0.003	0.010	N/A	0.003	0.016	N/A	Pass
10	0.000	0.000	N/A	0.002	0.000	N/A	Pass
11	0.004	0.006	N/A	0.005	0.009	N/A	Pass
12	0.000	0.000	N/A	0.001	0.000	N/A	Pass
13	0.001	0.006	N/A	0.001	0.009	N/A	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.003	0.006	N/A	0.003	0.009	N/A	Pass
16	0.000	0.000	N/A	0.000	0.000	N/A	Pass
17	0.002	0.006	N/A	0.002	0.009	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.002	0.006	N/A	0.002	0.009	N/A	Pass
20	0.000	0.000	N/A	0.001	0.000	N/A	Pass
21	0.002	0.006	N/A	0.002	0.009	N/A	Pass
22	0.000	0.000	N/A	0.001	0.000	N/A	Pass
23	0.001	0.006	N/A	0.001	0.009	N/A	Pass
24	0.000	0.000	N/A	0.000	0.000	N/A	Pass
25	0.002	0.006	N/A	0.002	0.009	N/A	Pass
26	0.000	0.000	N/A	0.000	0.000	N/A	Pass
27	0.001	0.006	N/A	0.001	0.009	N/A	Pass
28	0.000	0.000	N/A	0.000	0.000	N/A	Pass
29	0.001	0.006	N/A	0.002	0.009	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.006	N/A	0.001	0.009	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.001	0.006	N/A	0.001	0.009	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.001	0.006	N/A	0.001	0.009	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.001	0.006	N/A	0.001	0.009	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.001	0.006	N/A	0.001	0.009	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

Note: Rated I(f) & PF limits were applied for this test. The rated I(f)(RMS) is 0.209 Amps & the rated PF is 0.957.

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.151	0.460	32.77	OK
3	0.177	2.070	8.54	OK
4	0.051	0.460	11.00	OK
5	0.051	0.920	5.59	OK
6	0.023	0.460	5.09	OK
7	0.054	0.690	7.78	OK
8	0.019	0.460	4.24	OK
9	0.029	0.460	6.40	OK
10	0.019	0.460	4.24	OK
11	0.028	0.230	12.10	OK
12	0.013	0.230	5.61	OK
13	0.022	0.230	9.47	OK
14	0.012	0.230	5.14	OK
15	0.020	0.230	8.83	OK
16	0.014	0.230	5.87	OK
17	0.015	0.230	6.49	OK
18	0.012	0.230	5.26	OK
19	0.020	0.230	8.71	OK
20	0.025	0.230	10.67	OK
21	0.020	0.230	8.61	OK
22	0.013	0.230	5.77	OK
23	0.020	0.230	8.52	OK
24	0.013	0.230	5.72	OK
25	0.021	0.230	9.17	OK
26	0.011	0.230	4.73	OK
27	0.017	0.230	7.44	OK
28	0.012	0.230	5.42	OK
29	0.017	0.230	7.21	OK
30	0.012	0.230	5.33	OK
31	0.017	0.230	7.30	OK
32	0.010	0.230	4.54	OK
33	0.016	0.230	6.88	OK
34	0.012	0.230	5.30	OK
35	0.015	0.230	6.69	OK
36	0.011	0.230	4.86	OK
37	0.018	0.230	7.71	OK
38	0.012	0.230	5.10	OK
39	0.017	0.230	7.33	OK
40	0.021	0.230	9.08	OK

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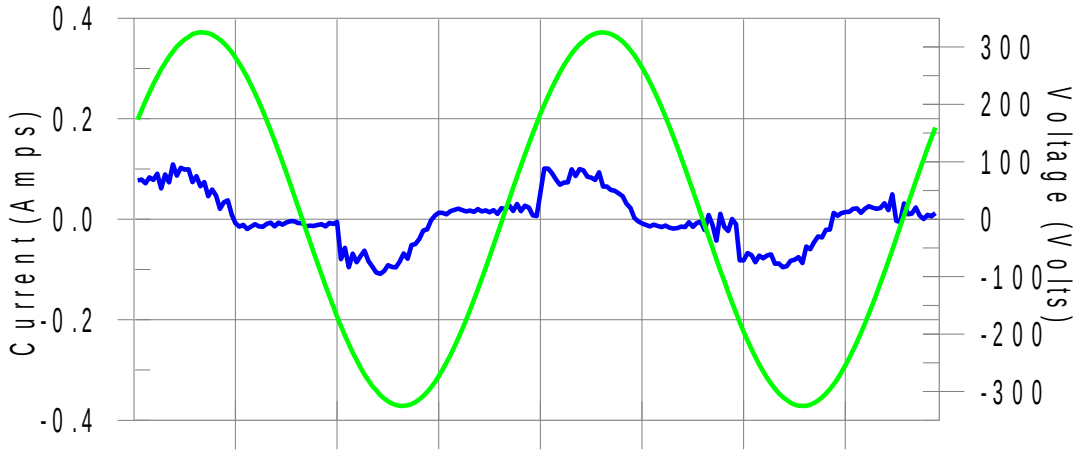
Harmonics – Class-C (>=5W and <= 25W) per Ed. 5.0 (2018)(Run time)

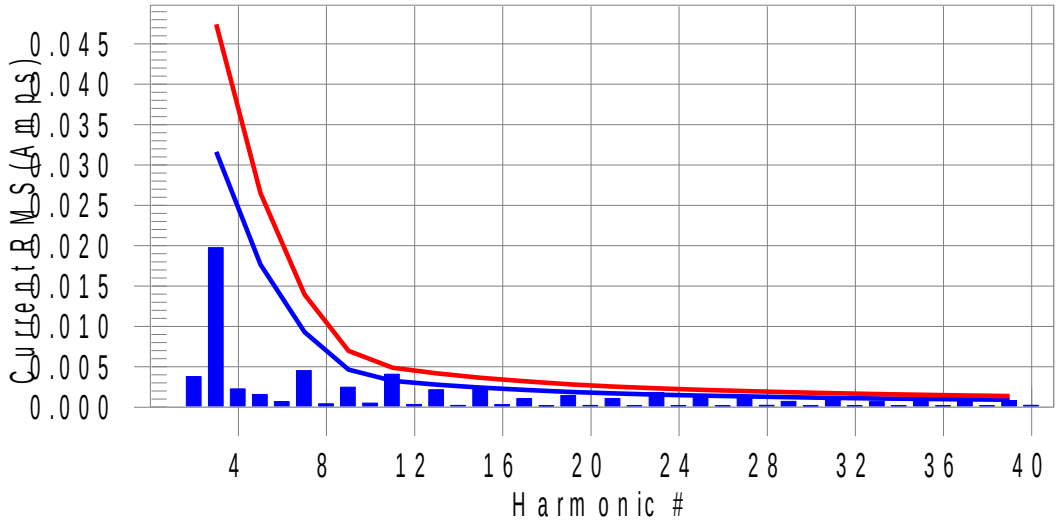
M/N: NL59-K-0002LW-3PK **Tested by: Abel**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 13/10/2021 **Start time: 10:25:25** **End time: 10:28:07**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000919.cts_data**
Comment: TM1
Remark: DSL-42WA-42 420100

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C) **European Limits**



Test result: Pass

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.022 **I-THD(%): 46.9** **POHC(A): 0.004** **POHC Limit(A): 0.004**

Highest parameter values during test:

V_RMS (Volts):	**230.072**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.168**	**I_RMS (Amps):**	**0.054**
I_Fund (Amps):	**0.047**	**Crest Factor:**	**3.396**
Power (Watts):	**9.3**	**Power Factor:**	**0.778**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.004	0.000	N/A	0.009	0.000	N/A	Pass
3	0.020	0.032	62.5	0.023	0.047	48.1	Pass
4	0.002	0.000	N/A	0.007	0.000	N/A	Pass
5	0.002	0.018	N/A	0.004	0.027	N/A	Pass
6	0.001	0.000	N/A	0.002	0.000	N/A	Pass
7	0.005	0.009	N/A	0.005	0.014	N/A	Pass
8	0.000	0.000	N/A	0.001	0.000	N/A	Pass
9	0.002	0.005	N/A	0.003	0.007	N/A	Pass
10	0.001	0.000	N/A	0.001	0.000	N/A	Pass
11	0.004	0.003	N/A	0.005	0.005	N/A	Pass
12	0.000	0.000	N/A	0.001	0.000	N/A	Pass
13	0.002	0.003	N/A	0.002	0.004	N/A	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.002	0.002	N/A	0.003	0.004	N/A	Pass
16	0.000	0.000	N/A	0.001	0.000	N/A	Pass
17	0.001	0.002	N/A	0.001	0.003	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.001	0.002	N/A	0.002	0.003	N/A	Pass
20	0.000	0.000	N/A	0.000	0.000	N/A	Pass
21	0.001	0.002	N/A	0.001	0.003	N/A	Pass
22	0.000	0.000	N/A	0.000	0.000	N/A	Pass
23	0.002	0.002	N/A	0.002	0.002	N/A	Pass
24	0.000	0.000	N/A	0.000	0.000	N/A	Pass
25	0.001	0.001	N/A	0.001	0.002	N/A	Pass
26	0.000	0.000	N/A	0.000	0.000	N/A	Pass
27	0.001	0.001	N/A	0.002	0.002	N/A	Pass
28	0.000	0.000	N/A	0.001	0.000	N/A	Pass
29	0.001	0.001	N/A	0.001	0.002	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.001	N/A	0.001	0.002	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.001	0.001	N/A	0.001	0.002	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.001	0.001	N/A	0.002	0.002	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.001	0.001	N/A	0.001	0.001	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.001	0.001	N/A	0.001	0.001	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

Note: Dynamic limits were applied for this test (Class C < 25 Watts).

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.117	0.460	25.53	OK
3	0.177	2.071	8.56	OK
4	0.055	0.460	11.88	OK
5	0.053	0.920	5.74	OK
6	0.018	0.460	3.88	OK
7	0.049	0.690	7.05	OK
8	0.018	0.460	3.92	OK
9	0.030	0.460	6.53	OK
10	0.017	0.460	3.77	OK
11	0.020	0.230	8.82	OK
12	0.011	0.230	4.95	OK
13	0.021	0.230	8.99	OK
14	0.013	0.230	5.86	OK
15	0.018	0.230	7.78	OK
16	0.013	0.230	5.79	OK
17	0.012	0.230	5.04	OK
18	0.010	0.230	4.15	OK
19	0.017	0.230	7.21	OK
20	0.020	0.230	8.74	OK
21	0.016	0.230	6.96	OK
22	0.011	0.230	4.98	OK
23	0.016	0.230	6.83	OK
24	0.009	0.230	3.87	OK
25	0.013	0.230	5.78	OK
26	0.012	0.230	5.40	OK
27	0.013	0.230	5.83	OK
28	0.011	0.230	4.75	OK
29	0.011	0.230	4.86	OK
30	0.011	0.230	4.91	OK
31	0.012	0.230	5.17	OK
32	0.010	0.230	4.37	OK
33	0.015	0.230	6.67	OK
34	0.010	0.230	4.23	OK
35	0.019	0.230	8.16	OK
36	0.011	0.230	4.76	OK
37	0.019	0.230	8.32	OK
38	0.012	0.230	5.01	OK
39	0.019	0.230	8.08	OK
40	0.020	0.230	8.66	OK

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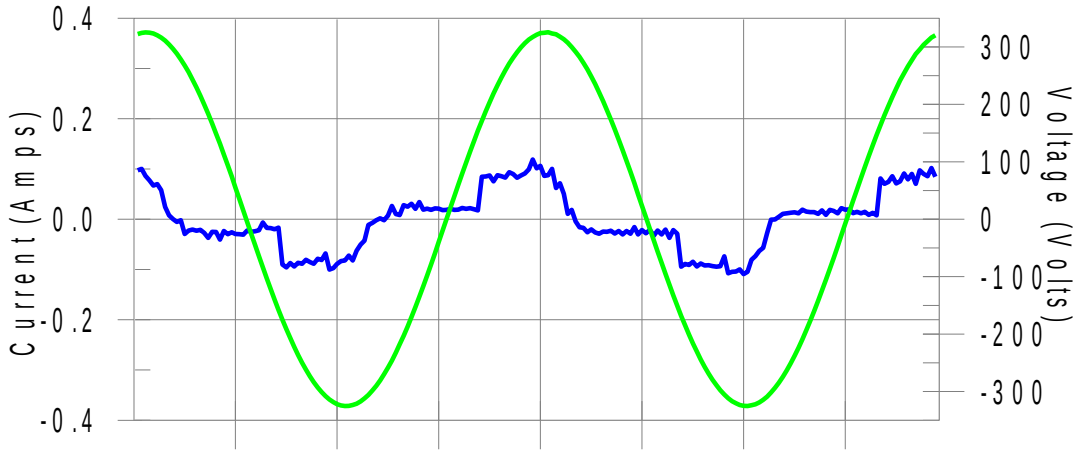
Harmonics – Class-C (>=5W and <= 25W) per Ed. 5.0 (2018)(Run time)

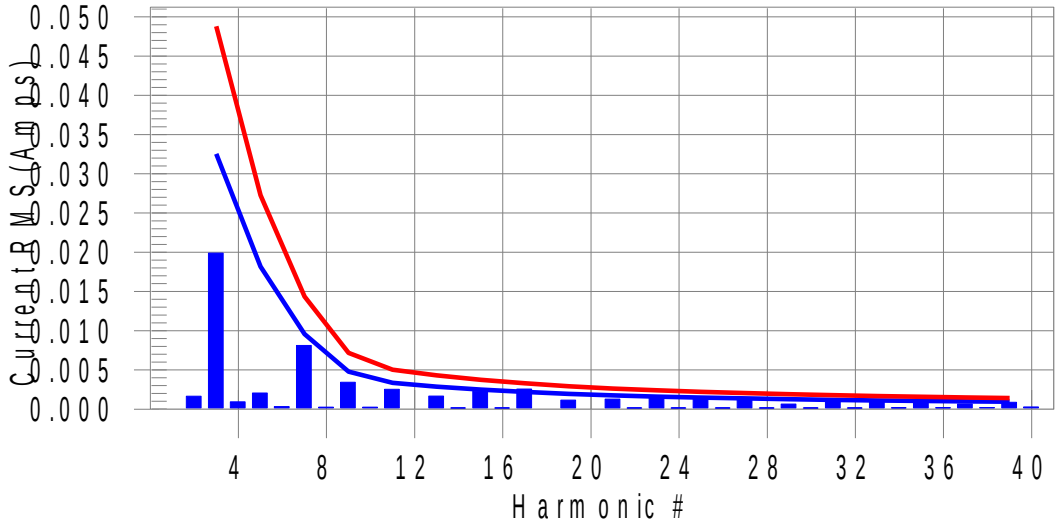
M/N: NL59-K-0002LW-3PK **Tested by: Abel**
Test category: Class-C per Ed. 5.0 (2018) (European limits) **Test Margin: 100**
Test date: 13/10/2021 **Start time: 10:41:53** **End time: 10:44:36**
Test duration (min): 2.5 **Data file name: CTSMXL_H-000923.cts_data**
Comment: TM1
Remark: LGSPS420100SPT

Test Result: Pass **Source qualification: Normal**

Current & voltage waveforms



Harmonics and Class C limit line (Table-2 Class-C) **European Limits**



Test result: Pass

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Current Test Result Summary (Run time)

Test Result: Pass **Source qualification: Normal**
THC(A): 0.023 **I-THD(%): 43.6** **POHC(A): 0.004** **POHC Limit(A): 0.004**

Highest parameter values during test:

V_RMS (Volts):	**230.060**	**Frequency(Hz):**	**50.00**
I_Peak (Amps):	**0.164**	**I_RMS (Amps):**	**0.059**
I_Fund (Amps):	**0.052**	**Crest Factor:**	**2.976**
Power (Watts):	**9.6**	**Power Factor:**	**0.732**

Harm#	Harms(avg)	100%Limit	%of Limit	Harms(max)	150%Limit	%of Limit	Status
2	0.002	0.000	N/A	0.002	0.000	N/A	Pass
3	0.020	0.033	61.1	0.023	0.049	47.0	Pass
4	0.001	0.000	N/A	0.001	0.000	N/A	Pass
5	0.002	0.018	N/A	0.003	0.027	N/A	Pass
6	0.000	0.000	N/A	0.000	0.000	N/A	Pass
7	0.008	0.010	84.7	0.009	0.014	61.8	Pass
8	0.000	0.000	N/A	0.000	0.000	N/A	Pass
9	0.003	0.005	N/A	0.004	0.007	N/A	Pass
10	0.000	0.000	N/A	0.000	0.000	N/A	Pass
11	0.003	0.003	N/A	0.003	0.005	N/A	Pass
12	0.000	0.000	N/A	0.000	0.000	N/A	Pass
13	0.002	0.003	N/A	0.002	0.004	N/A	Pass
14	0.000	0.000	N/A	0.000	0.000	N/A	Pass
15	0.002	0.002	N/A	0.003	0.004	N/A	Pass
16	0.000	0.000	N/A	0.000	0.000	N/A	Pass
17	0.003	0.002	N/A	0.003	0.003	N/A	Pass
18	0.000	0.000	N/A	0.000	0.000	N/A	Pass
19	0.001	0.002	N/A	0.001	0.003	N/A	Pass
20	0.000	0.000	N/A	0.000	0.000	N/A	Pass
21	0.001	0.002	N/A	0.001	0.003	N/A	Pass
22	0.000	0.000	N/A	0.000	0.000	N/A	Pass
23	0.002	0.002	N/A	0.002	0.002	N/A	Pass
24	0.000	0.000	N/A	0.000	0.000	N/A	Pass
25	0.001	0.001	N/A	0.002	0.002	N/A	Pass
26	0.000	0.000	N/A	0.000	0.000	N/A	Pass
27	0.001	0.001	N/A	0.002	0.002	N/A	Pass
28	0.000	0.000	N/A	0.000	0.000	N/A	Pass
29	0.001	0.001	N/A	0.001	0.002	N/A	Pass
30	0.000	0.000	N/A	0.000	0.000	N/A	Pass
31	0.001	0.001	N/A	0.002	0.002	N/A	Pass
32	0.000	0.000	N/A	0.000	0.000	N/A	Pass
33	0.001	0.001	N/A	0.001	0.002	N/A	Pass
34	0.000	0.000	N/A	0.000	0.000	N/A	Pass
35	0.001	0.001	N/A	0.001	0.002	N/A	Pass
36	0.000	0.000	N/A	0.000	0.000	N/A	Pass
37	0.001	0.001	N/A	0.001	0.001	N/A	Pass
38	0.000	0.000	N/A	0.000	0.000	N/A	Pass
39	0.001	0.001	N/A	0.001	0.001	N/A	Pass
40	0.000	0.000	N/A	0.000	0.000	N/A	Pass

Note: Dynamic limits were applied for this test (Class C < 25 Watts).

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Voltage Source Verification Data (Run time)

Harm#	Harmonics V-rms	Limit V-rms	% of Limit	Status
2	0.149	0.460	32.45	OK
3	0.167	2.070	8.08	OK
4	0.049	0.460	10.54	OK
5	0.048	0.920	5.18	OK
6	0.019	0.460	4.06	OK
7	0.045	0.690	6.58	OK
8	0.017	0.460	3.79	OK
9	0.026	0.460	5.75	OK
10	0.018	0.460	3.81	OK
11	0.023	0.230	10.05	OK
12	0.012	0.230	5.01	OK
13	0.019	0.230	8.18	OK
14	0.011	0.230	4.83	OK
15	0.016	0.230	7.03	OK
16	0.012	0.230	5.14	OK
17	0.013	0.230	5.71	OK
18	0.011	0.230	4.59	OK
19	0.016	0.230	7.15	OK
20	0.021	0.230	8.99	OK
21	0.014	0.230	6.26	OK
22	0.010	0.230	4.49	OK
23	0.014	0.230	6.30	OK
24	0.010	0.230	4.41	OK
25	0.014	0.230	6.09	OK
26	0.013	0.230	5.58	OK
27	0.011	0.230	4.72	OK
28	0.010	0.230	4.35	OK
29	0.014	0.230	6.00	OK
30	0.010	0.230	4.14	OK
31	0.015	0.230	6.56	OK
32	0.011	0.230	4.92	OK
33	0.016	0.230	6.75	OK
34	0.011	0.230	4.71	OK
35	0.018	0.230	8.01	OK
36	0.010	0.230	4.21	OK
37	0.019	0.230	8.26	OK
38	0.013	0.230	5.56	OK
39	0.017	0.230	7.60	OK
40	0.028	0.230	12.30	OK

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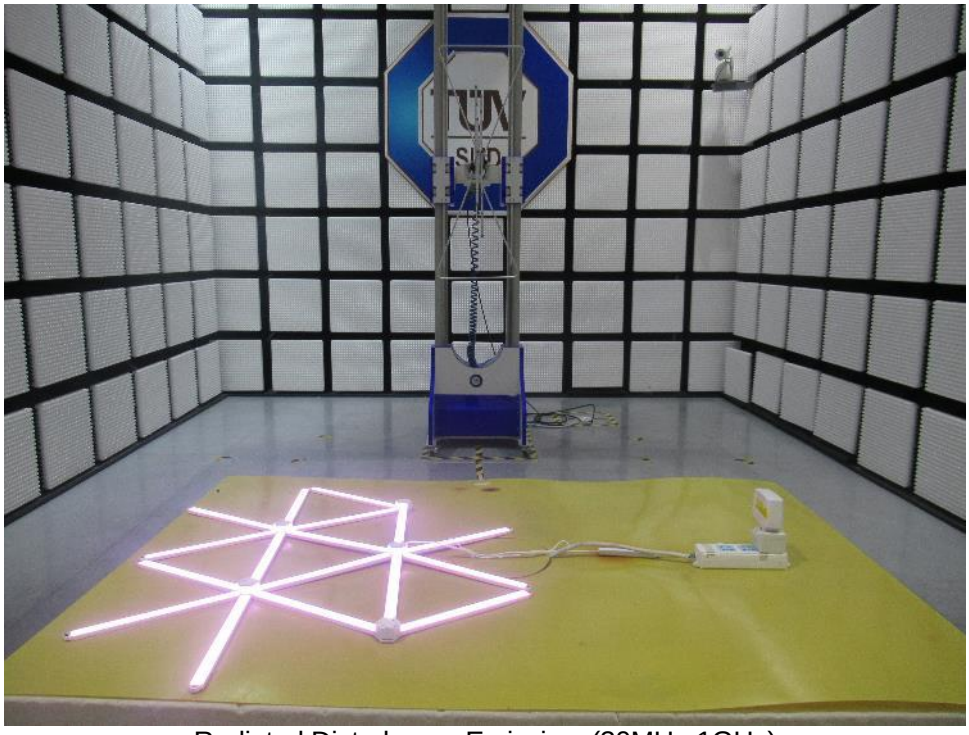
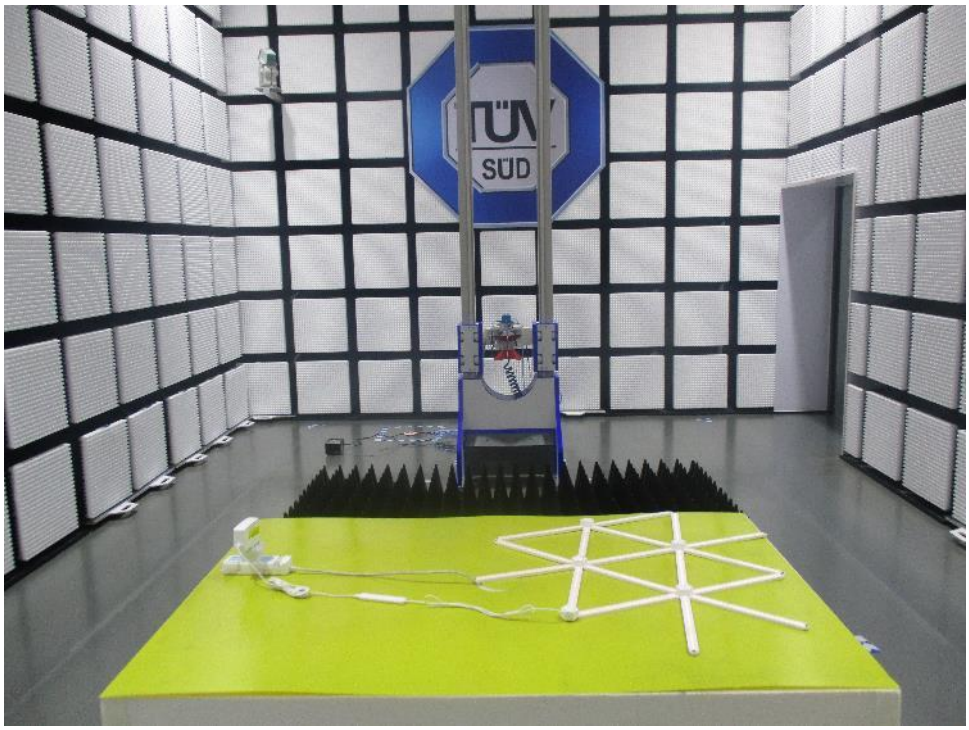
10 **Photographs of Test Set-up**

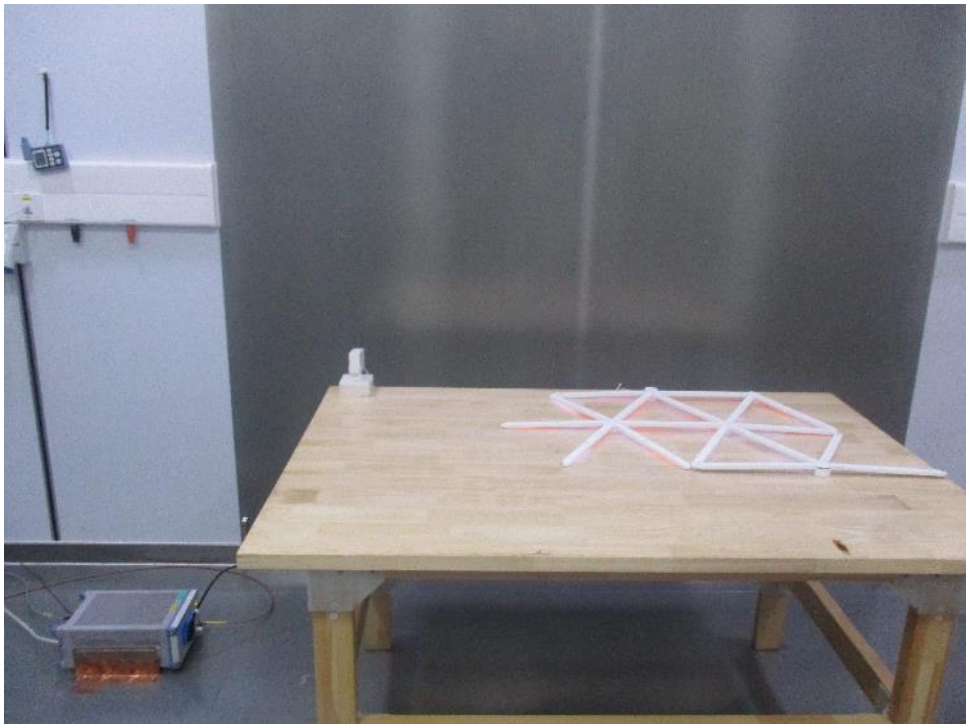
10.1.1 Radiated Emission



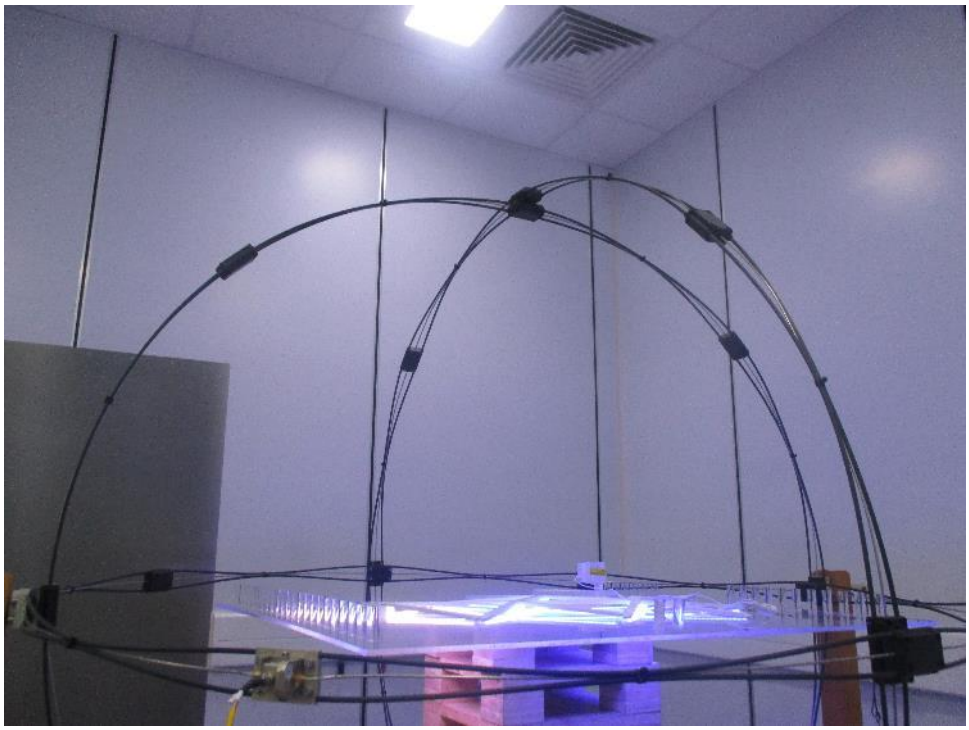
Radiated Disturbance Emissions(30MHz-1GHz)



Radiated Disturbance Emissions(1GHz-6GHz)



Conducted Emission test of AC Power Port



Magnetic Field Test

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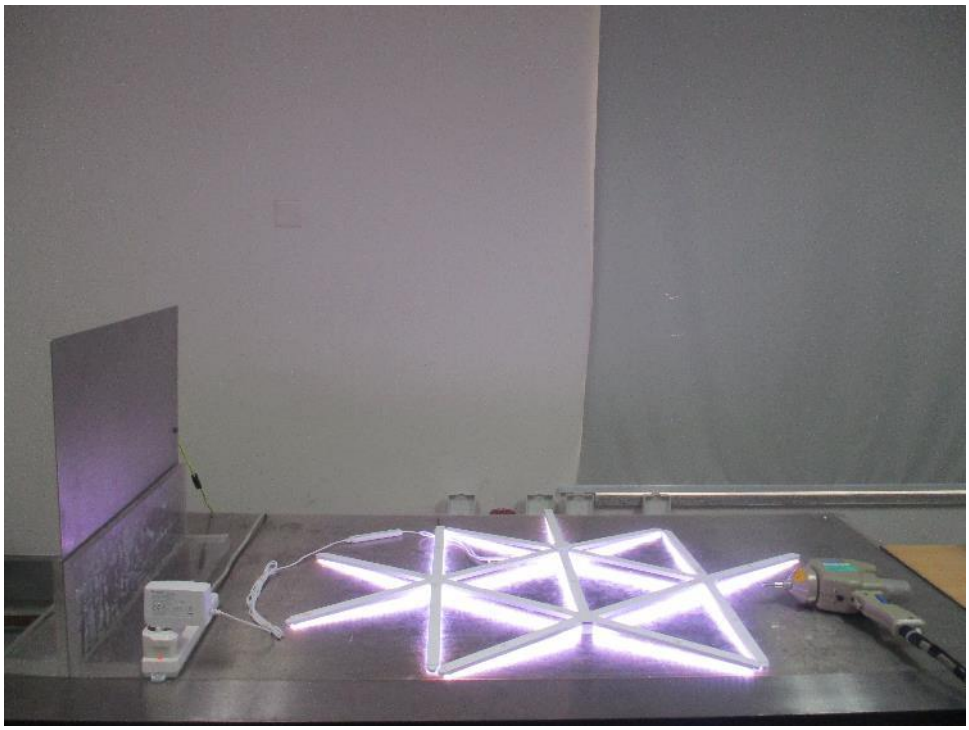
Current Harmonics Emissions Test

10.1.2 Immunity



Immunity to Electrostatic Discharge

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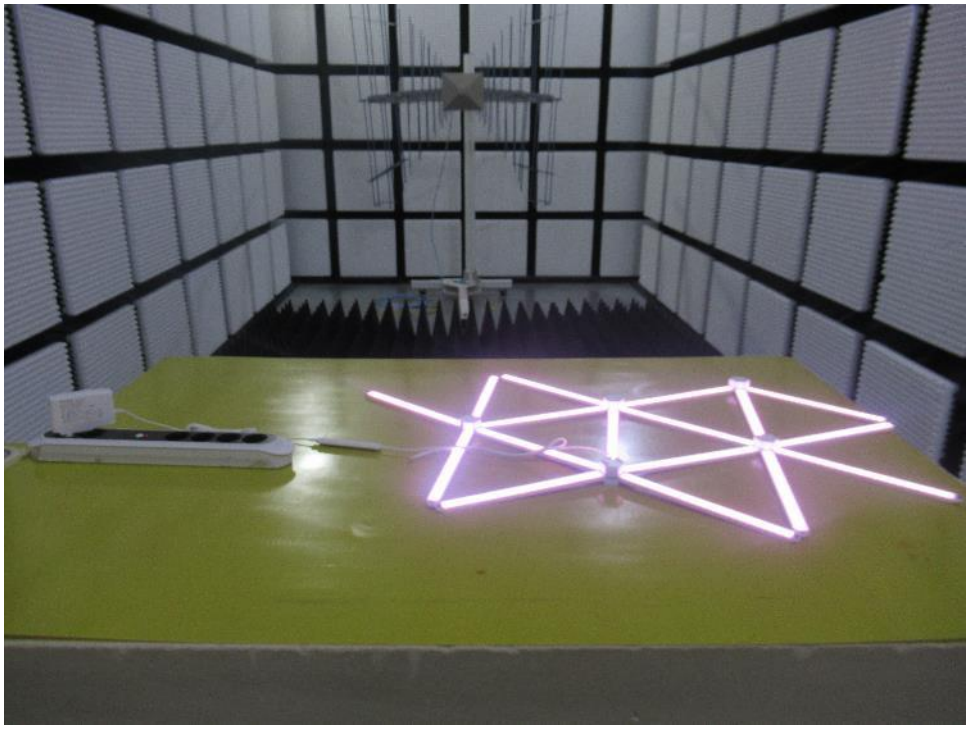
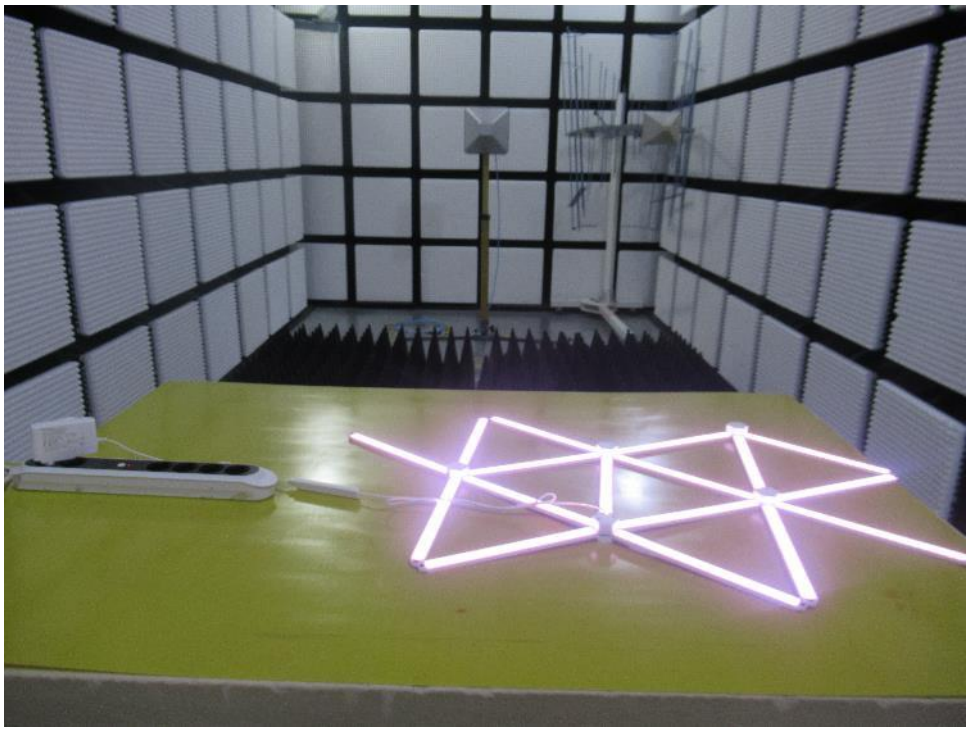


Immunity to Radiated Electric Fields for 80MHz-1GHz



Immunity to Radiated Electric Fields for 1GHz-6GHz

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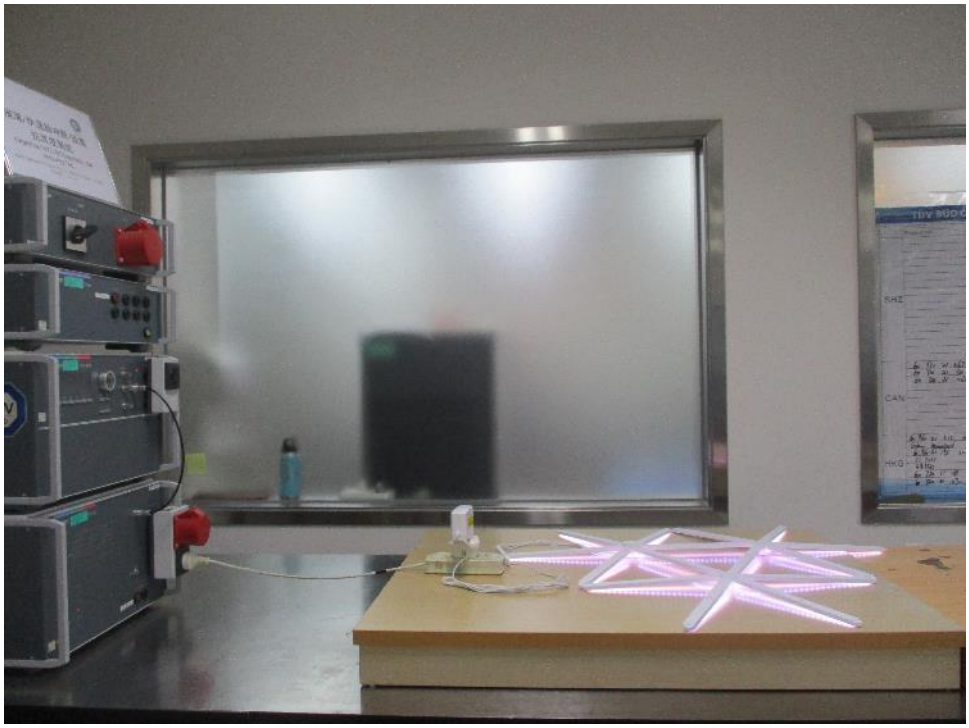
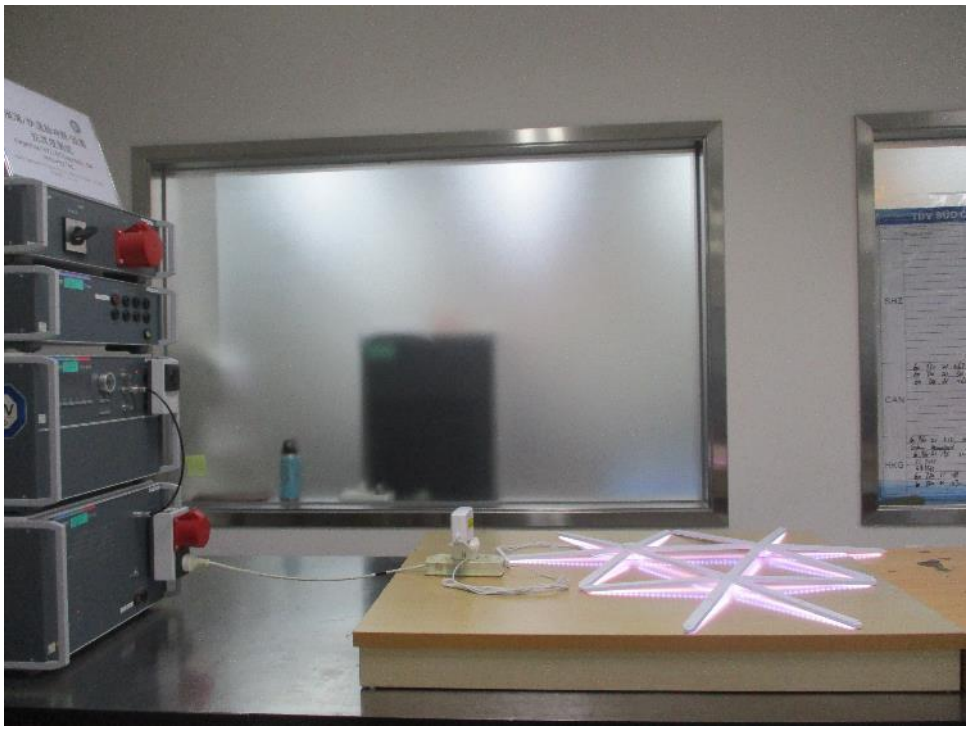


Immunity to Electrical Fast Transient Bursts of AC Power Port



Immunity to Surge of AC Power Port

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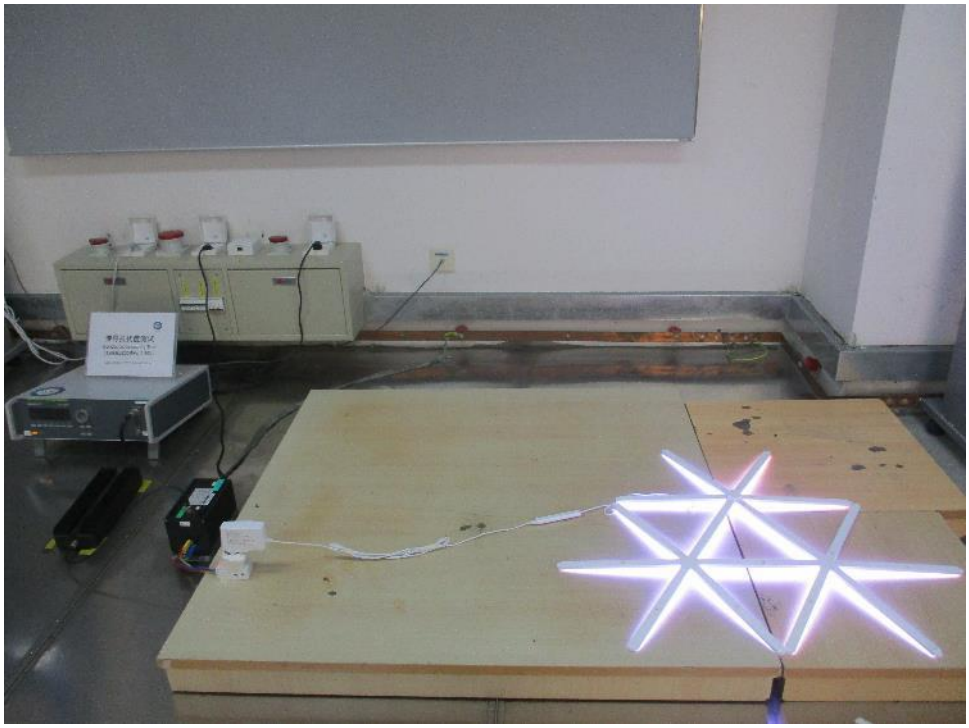

Immunity to Continuous Conducted Interference 0.15MHz to 80MHz

Immunity to Voltage Dips and Short Interruption of AC Power Port

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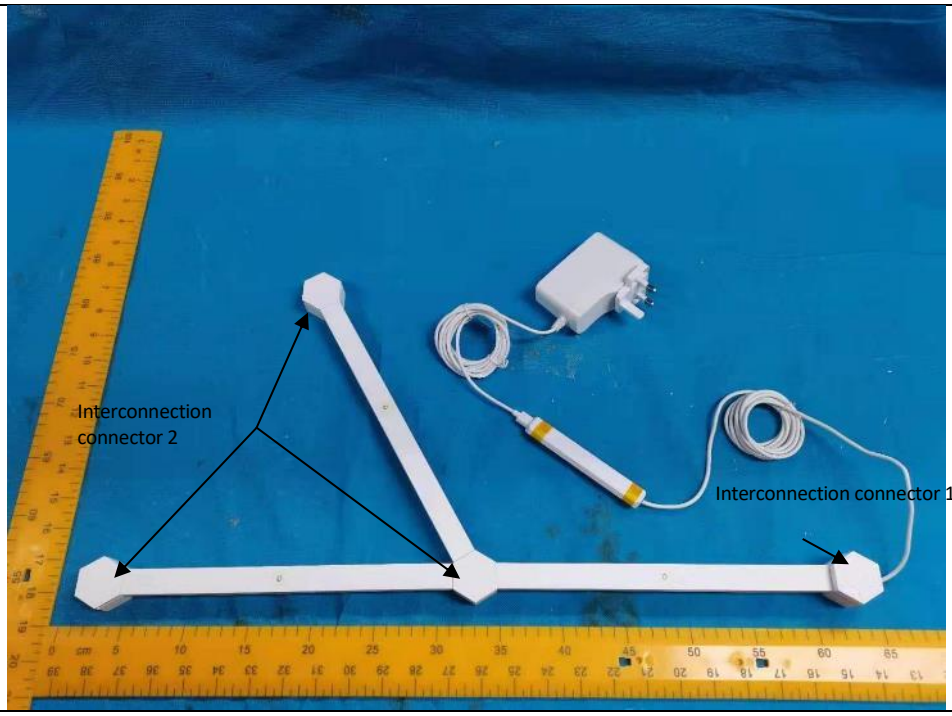
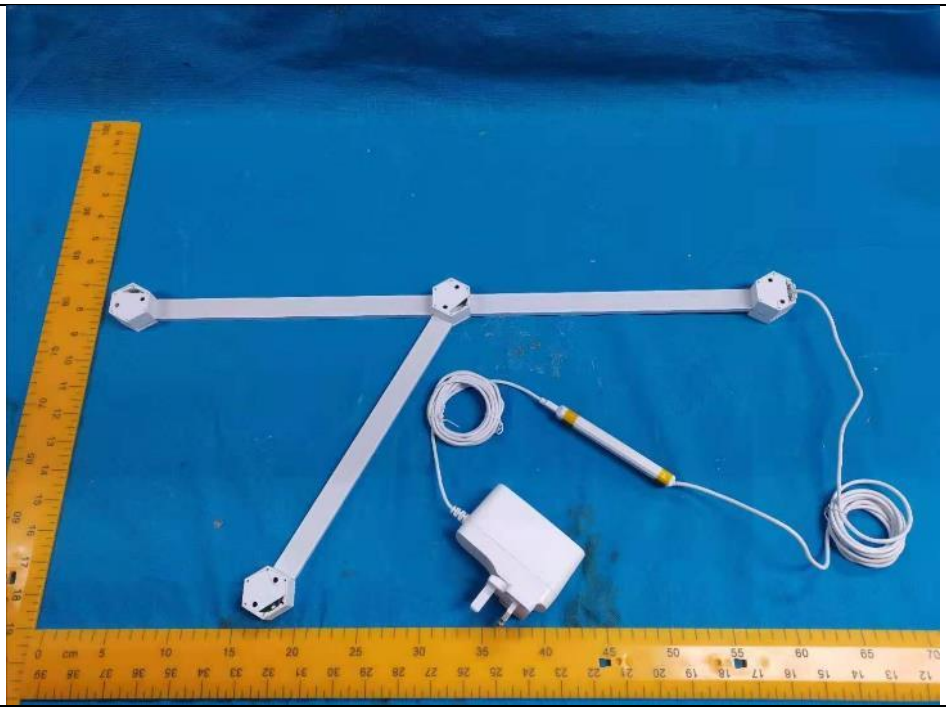
11 **Photographs of EUT**

Details of: Front view for NL59-E-0002LW-3PK (representative model)
Remark:



Details of: Front view for NL59-E-0002LW-3PK (representative model)
Remark:



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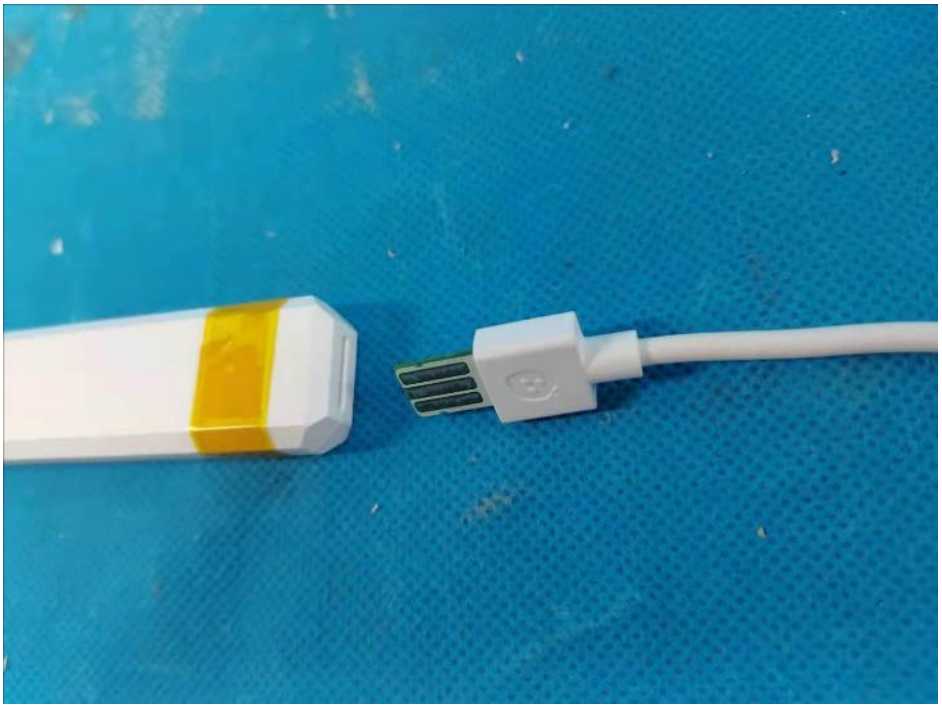
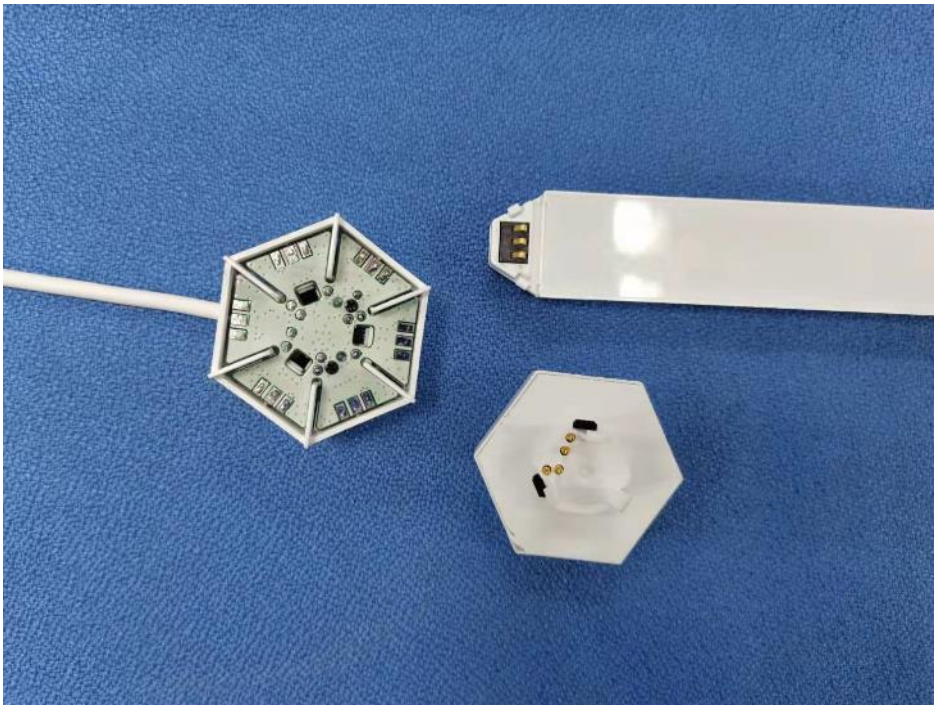
Details of: Output plug of LED driver and input socket of controller
Remark:



Details of: Interconnection connector connected to LED panel
Remark:



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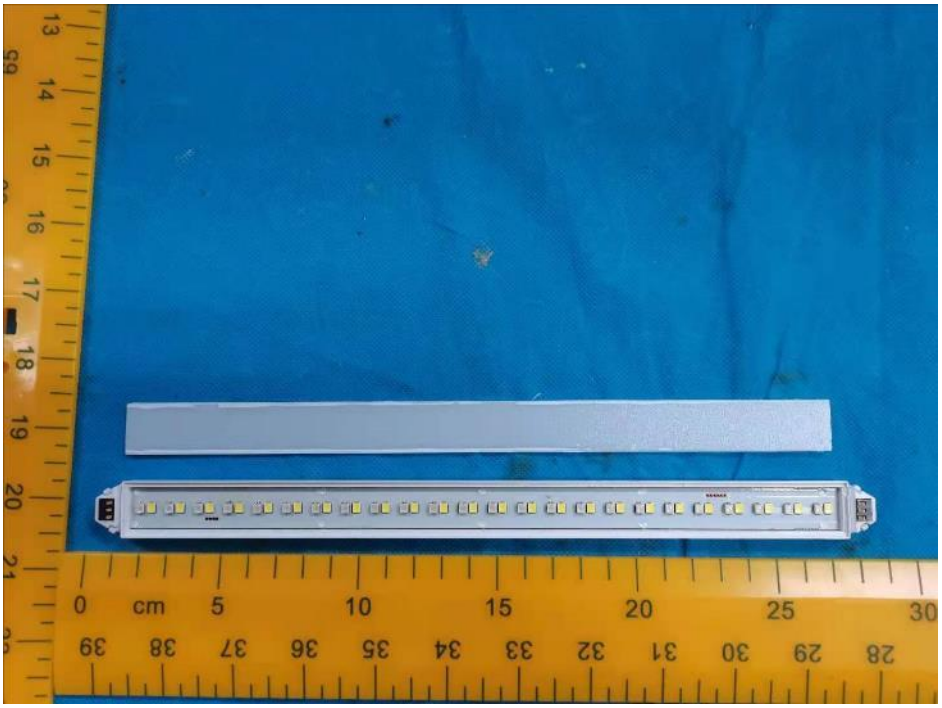
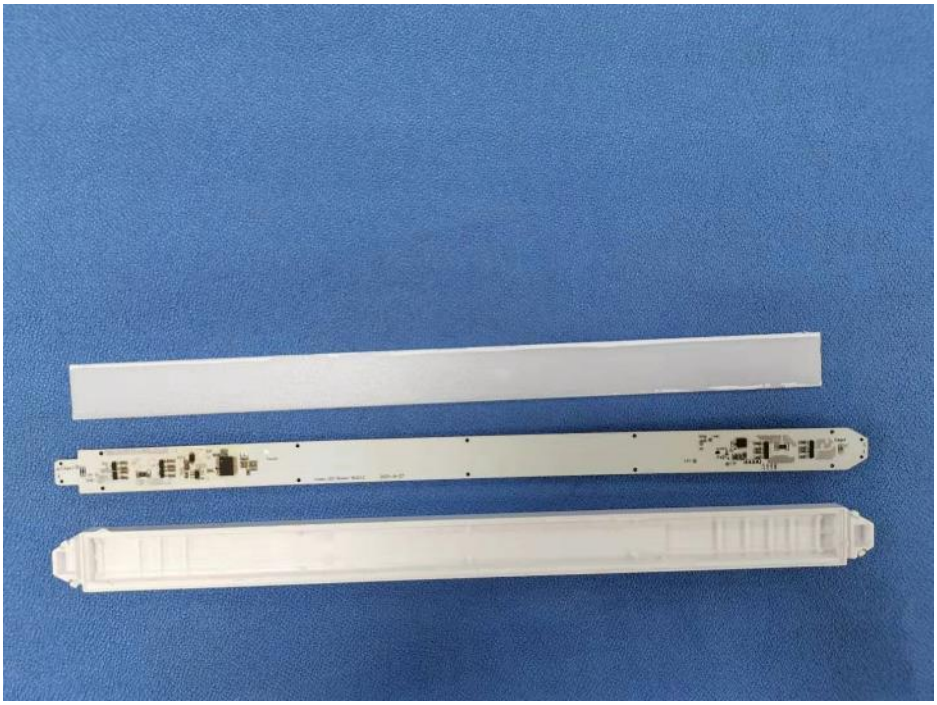
Details of: Internal view for LED panel
Remark:



Details of: Internal view for LED panel
Remark:



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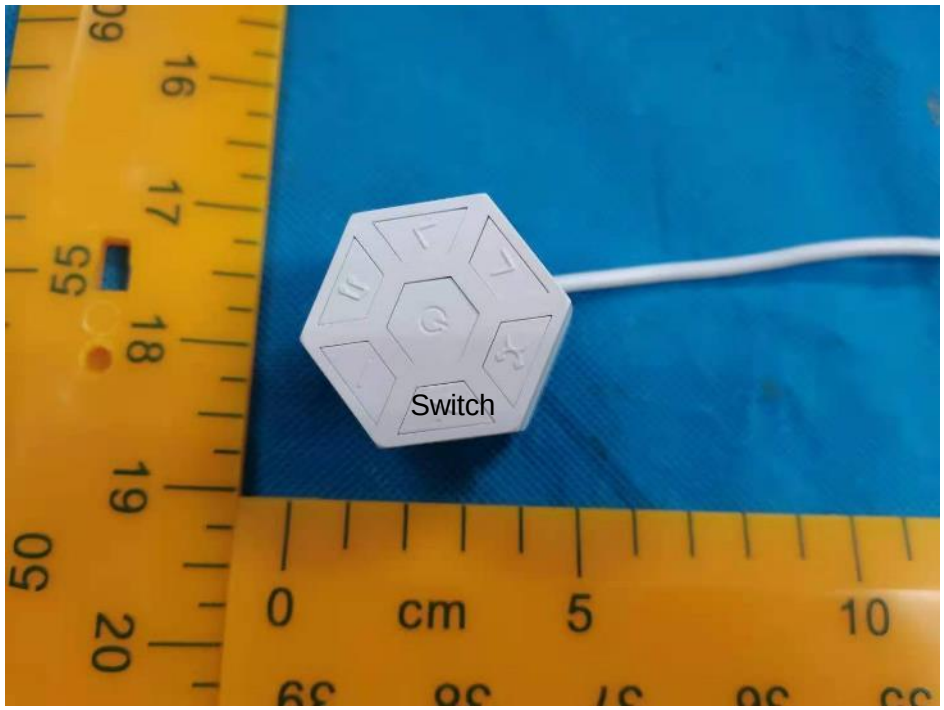
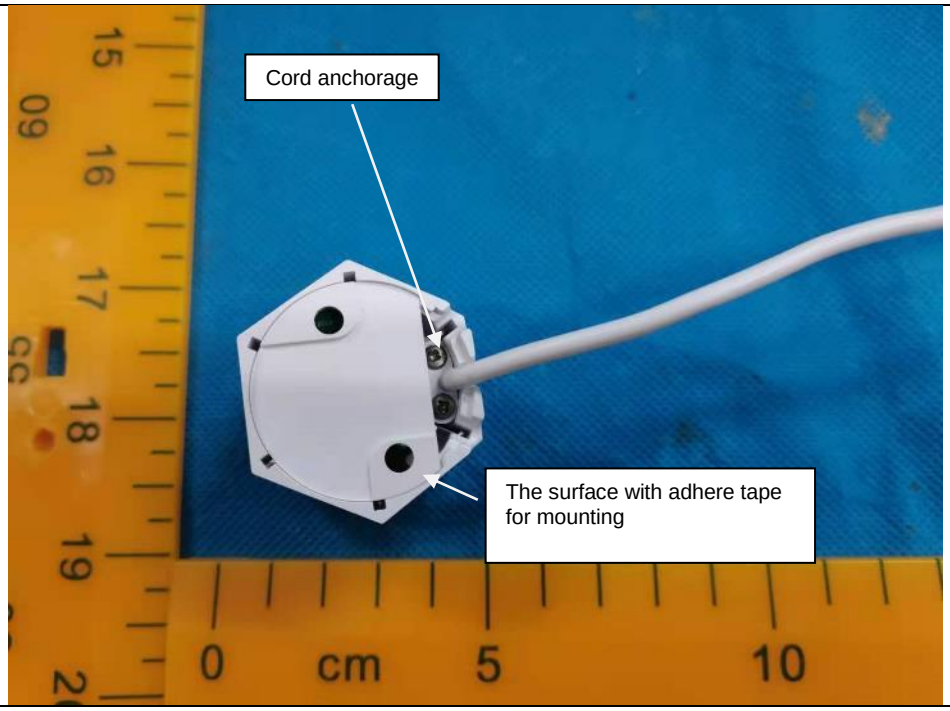
Details of: Interconnection connector 1 view
Remark:



Details of: Interconnection connector 1 view
Remark:



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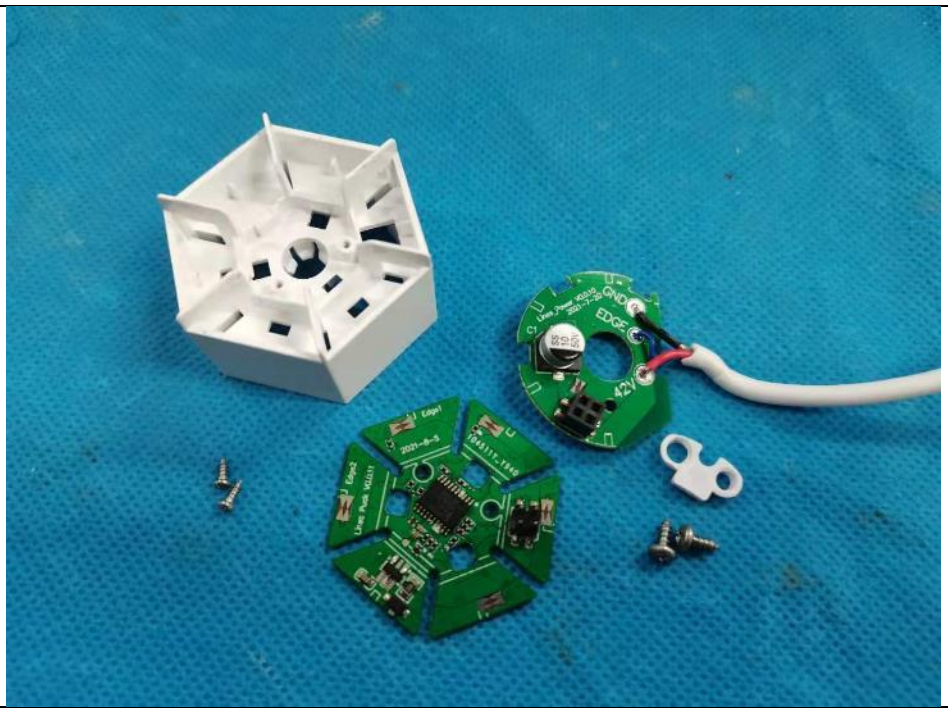
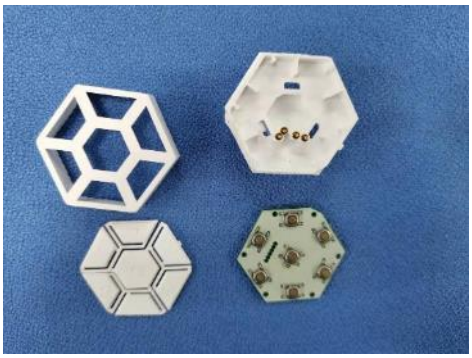
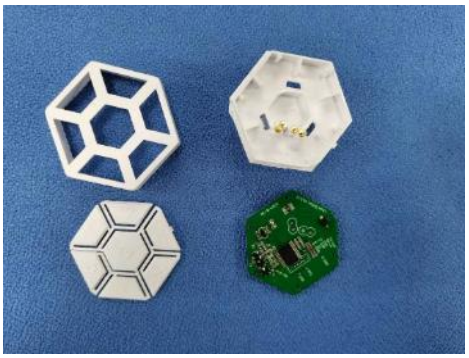
Details of: Interconnection connector 1 internal view
Remark:



Details of: Interconnection connector 1 internal view
Remark:





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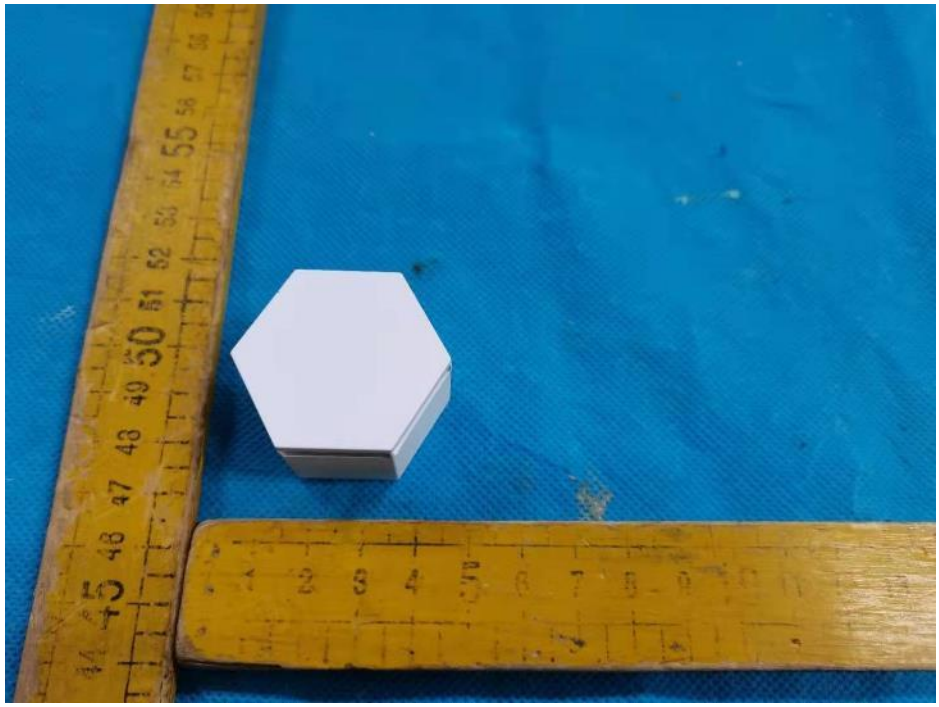
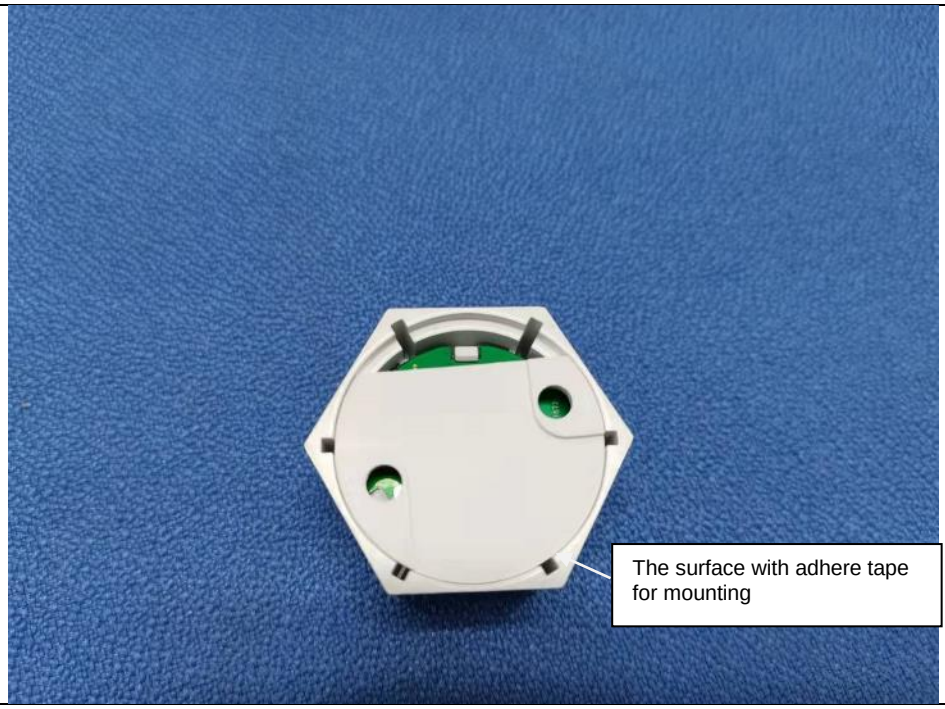
Details of: Interconnection connector 2 view
Remark:



Details of: Interconnection connector 2 view
Remark:



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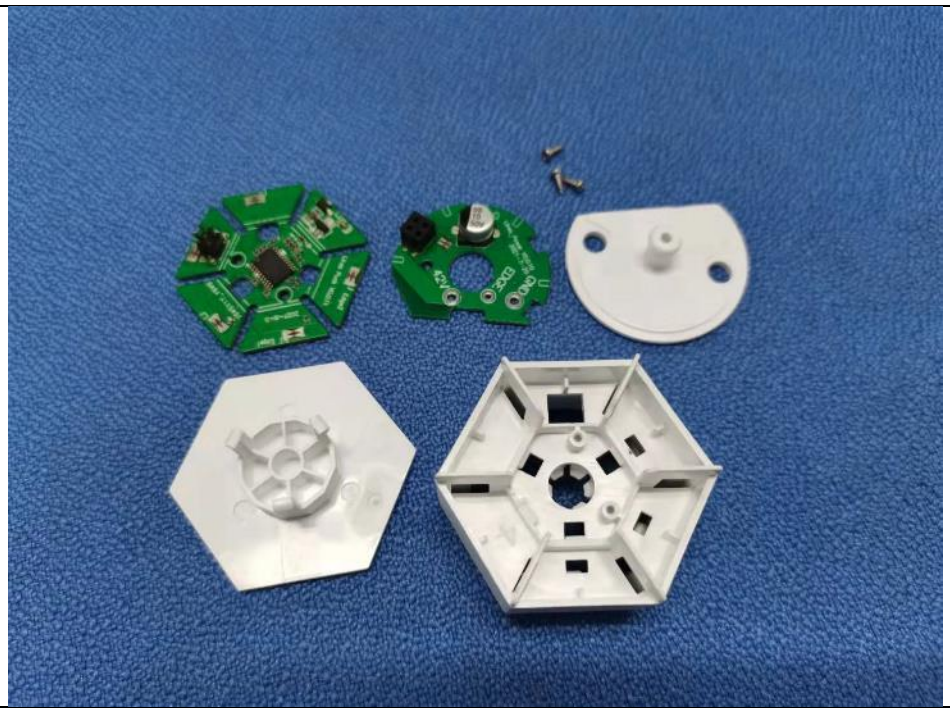
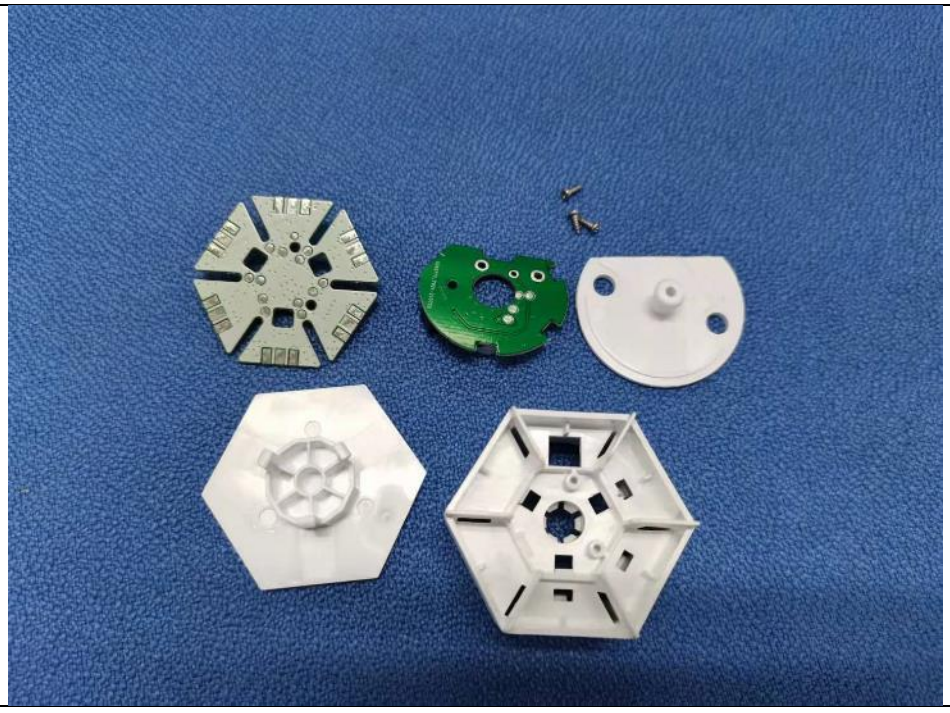
Shenzhen, 518052 China Tel. +86 755 8828 6998, Fax: +86 755 8828 5299

Details of: Interconnection connector 2 internal view
Remark:



Details of: Interconnection connector 2 internal view
Remark:



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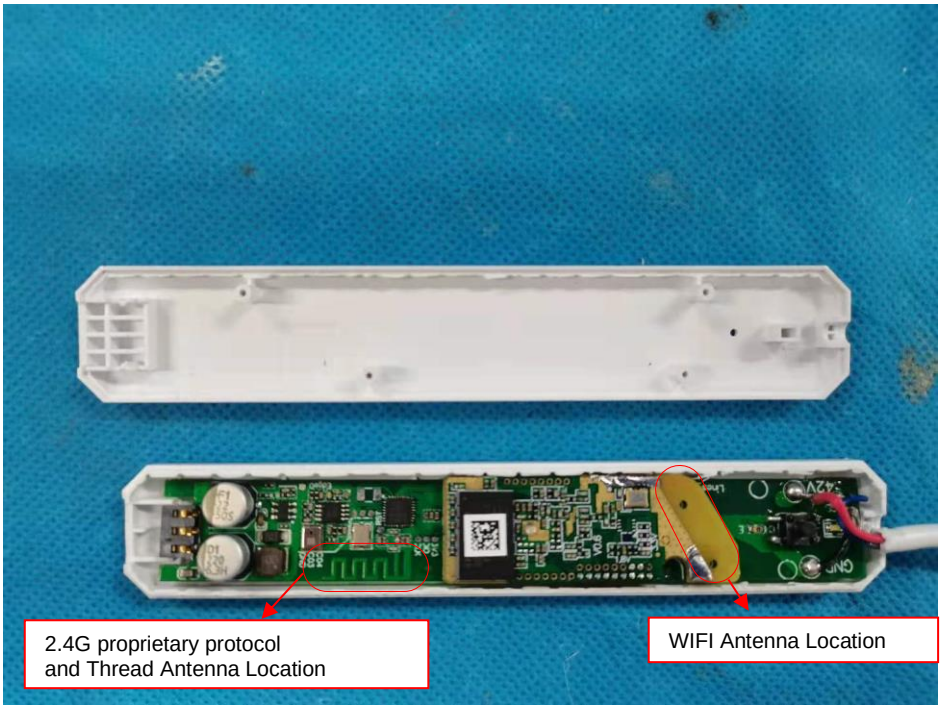
Details of: Controller view
Remark:

Details of: Controller internal view
Remark:



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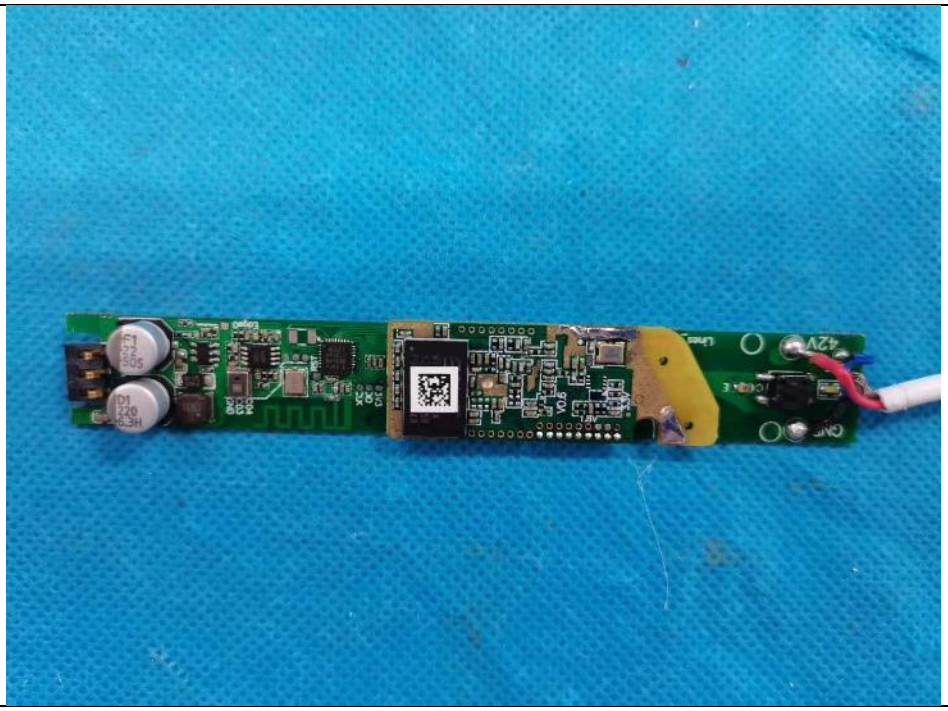
Details of: Controller PCB view
Remark:



Details of: Controller PCB view
Remark:

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Details of: LED driver view (DSL-42WA-42 420100)
Remark:

Details of: LED driver view (LGSPS420100SPT)
Remark:

THE END

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