2/F., Garment Centre,
576 Castle Peak Road, Kowloon,
Hong Kong.

Telephone: (852) 2173 8888
Facsimile: (852) 2785 5487
www.intertek.com

EMC VERIFICATION SUMMARY
Pursuant to EMC Directive 2014/30/EU

Report No.:	19020527HKG-003
Applicant:	Advance Dimming Technology Ltd. Unit 15, 6/F., Kenning Industrial Building, 19 Wang Hoi Road, Kowloon Bay, Kowloon, Hong Kong.
Equipment Under Test (EUT):	
Product Description:	LED Duo Dimmer Module
Model:	ATE-VRT100EU
Sample Receipt Date:	22 Feb 2019
Test Conducted Date:	22 Feb 2019 to 04 Jul 2019
Issue Date:	09 Jul 2019
Test Site Location:	2nd Floor, Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Relevant Standard(s):	BS EN 60669-2-1:2004 + A1 + A12 (Clause 26)
Remark:	Test was conducted by client submitted sample. The submitted sample as received complied with the EMC requirement.

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Prepared and Checked by:

Signed on File
Kan Chung Ting, Clement
Senior Lead Engineer

Approved by:

Digitally signed by Terry Chan
Location: Intertek Testing Services Hong Kong Ltd.

Chan Chi Hung, Terry
Manager

TEST REPORT

EMC RESULTS CONCLUSION (WITH JUSTIFICATION)

RE: EMC Testing Pursuant to EMC Directive 2014/30/EU Performed On the LED Duo Dimmer Module, Model: ATE-VRT100EU

We tested the LED Duo Dimmer Module, Model: ATE-VRT100EU, to determine if it was in compliance with the relevant BS EN standards as marked on the EMC Verification Summary. We found that the unit met the requirement of BS EN 60669-2-1:2004 (Clasue 26) standards when tested as received.

The production units are required to conform to the initial sample as received when the units are placed on the market.

Standards against which no testing of the captioned model has been conducted and the engineering judgement is stated as follows:

Clause 26: Independent dimmers for incandescent lamps with a rated power less than or equal to 1 kW, limits are not specified in EN 61000-3-2.

Electronic switches other than those incorporating automatic controls giving rise to fluctuation of the firing angle, for example, automatic systems to be used in dance halls, discos and the like, are deemed to meet the requirements of EN 61000-3-3 without need for testing.

TEST REPORT

LABORATORY MEASUREMENTS

CONFIGURATION INFORMATION

Equipment Under Test (EUT):	LED Duo Dimmer Module
Model:	ATE-VRT100EU
Serial No.:	Not Labelled
Support Equipment:	1 x 100W Incandesent Lamps
Cables:	N/A
Adaptor:	N/A
Rated Voltage:	220-240VAC

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Terminal Voltage Test (Mains Terminals)

Model No.: ATE-VRT100EU
Worst Case Operating Mode: Full Dim

Basic Standard

EN 55015:2013

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-2501	Artificial Mains Network	ROHDE & SCHWARZ	ENV-216	100483
EW-2500	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100847

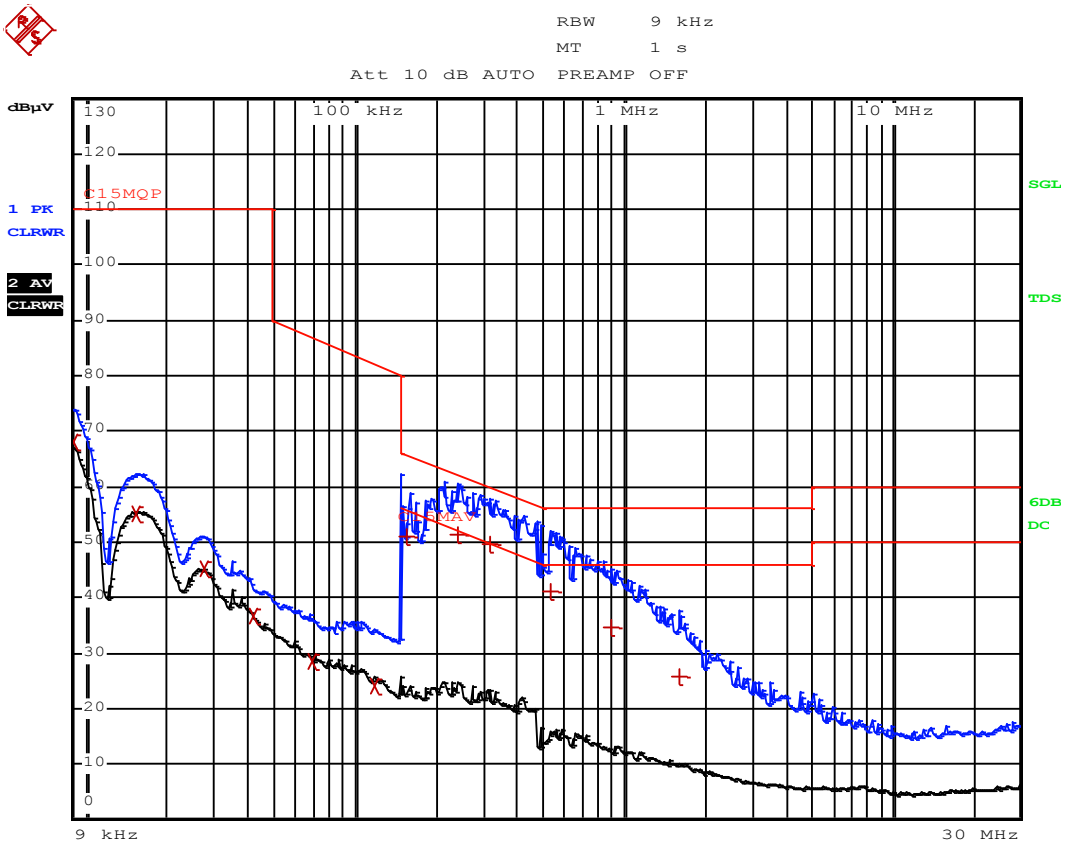
Test Data

Frequency (Mhz)	Quasi-Peak		Average	
	Disturbance Level dB(μV)	Permitted Limit dB(μV)	Disturbance Level dB(μV)	Permitted Limit dB(μV)
0.009	68.2	110.0	--	N/A
0.050	< 40.0	90.0	--	N/A
0.100	< 40.0	83.7	--	N/A
0.150	51.4	66.0	55.1	56.0
0.240	51.4	62.1	43.2	52.1
0.550	41.3	56.0	32.4	46.0
1.000	< 40.0	56.0	< 30.0	46.0
1.400	< 40.0	56.0	< 30.0	46.0
2.000	< 40.0	56.0	< 30.0	46.0
3.500	< 40.0	56.0	< 30.0	46.0
6.000	< 40.0	60.0	< 30.0	50.0
10.00	< 40.0	60.0	< 30.0	50.0
22.00	< 40.0	60.0	< 30.0	50.0
30.00	< 40.0	60.0	< 30.0	50.0

Note: A graph of Ctrl. No.: 2.1.1 consisting of one page and a data table of Ctrl. No.: 2.1.2 are attached in the following pages in this report.

TEST REPORT

Model No.: ATE-VRT100EU
Worst Case Operating Mode: Full Dim



19020527hkg-002(b0527-3-c2) FULL DIM

Date: 24.JUN.2019 18:29:51

Ctrl. No.: 2.1.1

TEST REPORT

Model No.: ATE-VRT100EU
Worst Case Operating Mode: Full Dim

EDIT PEAK LIST (Final Measurement Results)

Trace1: C15MQP
Trace2: C15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	9 kHz	68.18	N	
2	CISPR Average	15.2 kHz	55.12	N	
2	CISPR Average	27.5 kHz	45.23	N	
2	CISPR Average	41.8 kHz	36.74	N	
2	CISPR Average	69.6 kHz	28.44	N	
2	CISPR Average	119 kHz	24.01	L1	
1	Quasi Peak	159 kHz	51.15	N	-14.36
1	Quasi Peak	240 kHz	51.42	L1	-10.66
1	Quasi Peak	316.5 kHz	49.66	N	-10.13
1	Quasi Peak	528 kHz	41.27	L1	-14.72
1	Quasi Peak	897 kHz	34.58	L1	-21.42
1	Quasi Peak	1.6215 MHz	25.85	L1	-30.14

19020527hkg-002(b0527-3-c2) FULL DIM

Date: 24.JUN.2019 18:29:16

Ctrl. No.: 2.1.2

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Terminal Voltage Test (Load Terminals)

Model No.: ATE-VRT100EU
Worst Case Operating Mode: Full Dim

Basic Standard

EN 55015:2013

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-2501	Artificial Mains Network	ROHDE & SCHWARZ	ENV-216	100483
EW-2500	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	100847

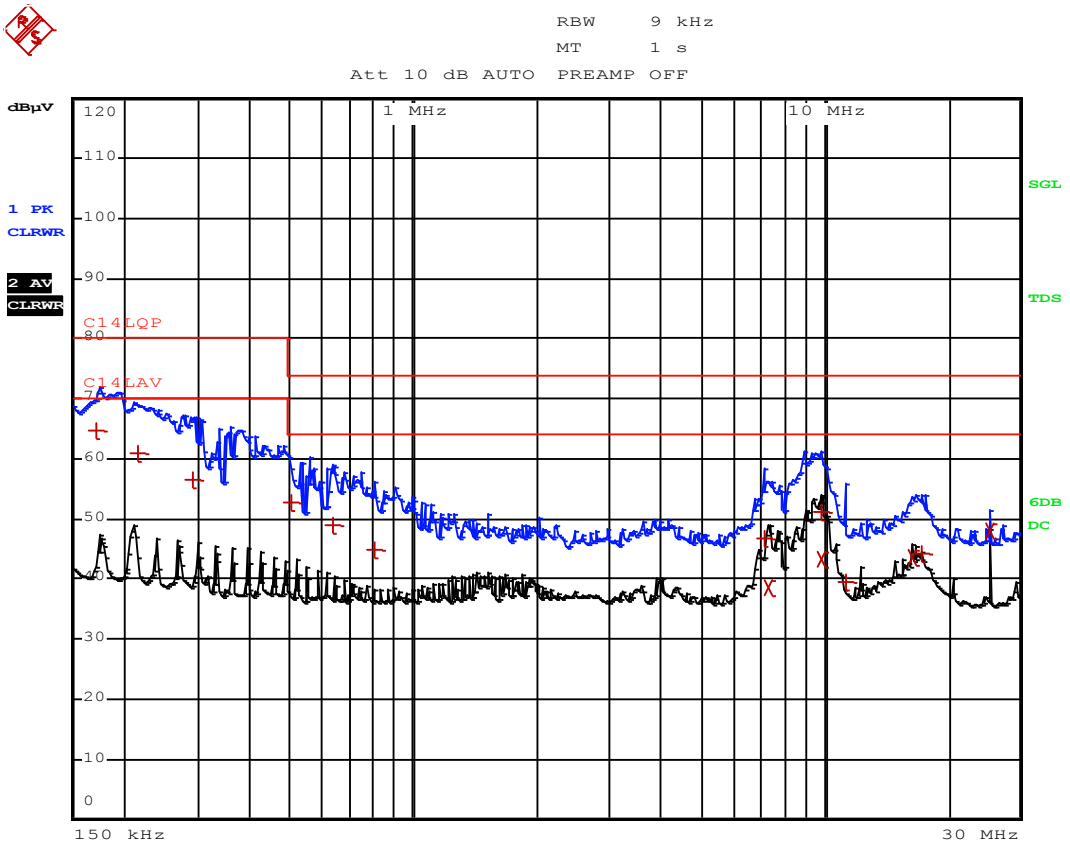
Test Data

Frequency (Mhz)	Quasi-Peak		Average	
	Disturbance Level dB(μV)	Permitted Limit dB(μV)	Disturbance Level dB(μV)	Permitted Limit dB(μV)
0.15	64.1	80.0	< 50.0	70.0
0.24	61.1	80.0	< 50.0	70.0
0.55	< 60.0	74.0	< 50.0	64.0
1.00	< 60.0	74.0	< 50.0	64.0
1.40	< 60.0	74.0	< 50.0	64.0
2.00	< 60.0	74.0	< 50.0	64.0
3.50	< 60.0	74.0	< 50.0	64.0
6.00	< 60.0	74.0	< 50.0	64.0
10.0	< 60.0	74.0	50.1	64.0
22.0	< 60.0	74.0	< 50.0	64.0
30.0	< 60.0	74.0	< 50.0	64.0

Note: A graph of Ctrl. No.: 2.2.1 consisting of one page and a data table of Ctrl. No.: 2.2.2 are attached in the following pages in this report.

TEST REPORT

Model No.: ATE-VRT100EU
Worst Case Operating Mode: Full Dim



19020527hkg-002(b05271002)FULL DIM

Date: 27.JUN.2019 12:53:23

Ctrl. No.: 2.2.1

TEST REPORT

Model No.: ATE-VRT100EU
Worst Case Operating Mode: Full Dim

EDIT PEAK LIST (Final Measurement Results)

Trace1: C14LQP
Trace2: C14LAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	172.5 kHz	64.87	-15.12
1	Quasi Peak	217.5 kHz	61.08	-18.91
1	Quasi Peak	294 kHz	56.58	-23.41
1	Quasi Peak	501 kHz	52.78	-21.21
1	Quasi Peak	636 kHz	49.03	-24.96
1	Quasi Peak	802.5 kHz	44.92	-29.07
1	Quasi Peak	7.17 MHz	46.76	-27.23
2	CISPR Average	7.323 MHz	38.73	-25.27
1	Quasi Peak	9.834 MHz	51.13	-22.86
2	CISPR Average	9.834 MHz	43.33	-20.66
1	Quasi Peak	11.3685 MHz	39.56	-34.44
2	CISPR Average	16.3815 MHz	43.60	-20.39
1	Quasi Peak	17.2365 MHz	44.22	-29.77
2	CISPR Average	25.2015 MHz	48.12	-15.87

19020527hkg-002(b05271002)FULL DIM

Date: 27.JUN.2019 12:52:59

Ctrl. No.: 2.2.2

TEST REPORT

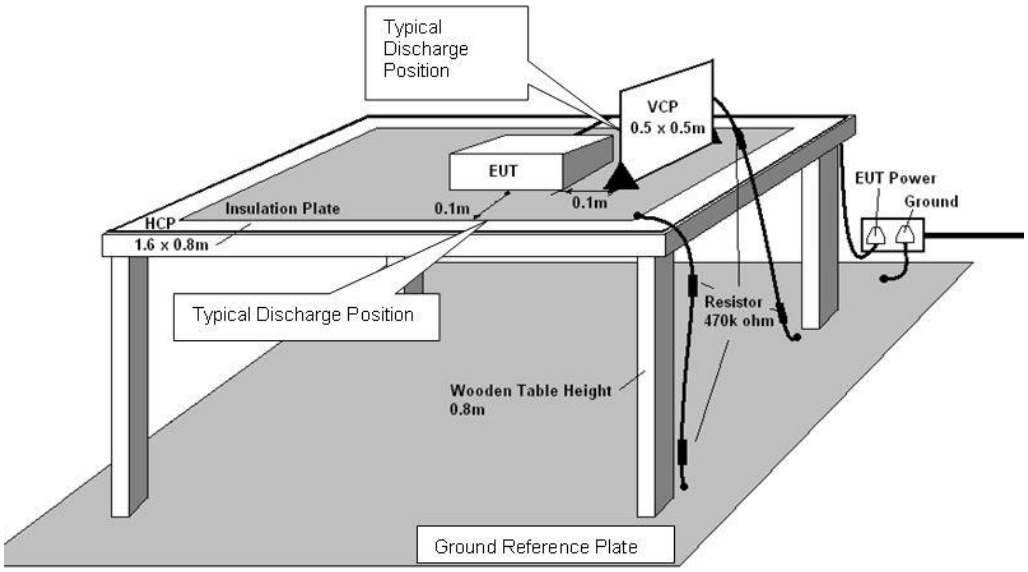
BS EN 60669-2-1:2004 (Clasue 26) Electrostatic Discharge

Test Summary (Pursuant to BS EN 60669-2-1)

Basic Standard:		EN 61000-4-2
Port:		Enclosure
Level:		±8.0 kV (Air Discharge)
		±4.0 kV (Contact Discharge)
		±4.0 kV (Indirect Contact Discharge)
Required Performance Criterion:		After the test, the electronic switch state should be in its original switch state and the setting should be unchanged.
Ambient Temperature:		25.0°C
Relative Humidity:		50.0%
Atmospheric Pressure:		100.2kPa
Time Between Each Discharge:		1 second
Test Mode:		Full ON, Full Dim & OFF
Test Setup:		Table-top
Test of Post-installation		N/A
Test Point:	Air Discharge :	All accessible insulated enclosure and seams
		All accessible points where contact discharge cannot be applied
	Contact :	All conductive surfaces of the EUT
	HCP :	All sides of the EUT (Floor-stand product excluded)
	VCP :	Four faces of the EUT

TEST REPORT

The typical table-top test setup is as follow:



Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-2305	ESD Gun	Kikusui	KES4021	LJ004068

Ctrl. No.: 7.1

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Electrostatic Discharge

Test Result

Discharge Type	No. of Discharge	Applied Voltage	Result (Pursuant to BS EN 60669-2-1)
Contact Discharge	20	+4.0kV	N/A
		-4.0kV	N/A
Air Discharge	20	+8.0kV	OK
		-8.0kV	OK
Indirect HCP Discharge	20	+4.0kV	OK
		-4.0kV	OK
Indirect VCP Discharge	20	+4.0kV	OK
		-4.0kV	OK

☒ There was no observable degradation in performance.

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Radiated Immunity

Test Summary (Pursuant to BS EN 60669-2-1)

Basic Standard:	EN 61000-4-3
Port:	Enclosure
Required Performance Criterion:	After the test, the electronic switch state should be in its original switch state and the setting should be unchanged.
Level:	3.0 V/m (rms)
Test Modulation:	1kHz, 80% AM
Frequency:	80MHz to 1000MHz and 1400MHz to 2000MHz
Dwell Time:	1s
Frequency Step:	1%
Temperature:	24.0°C
Relative Humidity:	52.0%
Test Facility:	Full Anechoic Chamber
Antenna Polarization:	Horizontal and Vertical
Type of Antenna:	Biconical / Log-periodic
Test Distance:	3m
Test Mode:	Full ON, Full Dim & OFF
Test Setup:	Table-top
Size of the EUT:	7.1 (cm) x 7.1 (cm) x 4.1 (cm)

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-1568	Anechonic Chamber	Universal Shielding Corp.	IEC/EN 61000-4-3	Nil
EW-3289	Broadband Amplifier (0.69GHz - 6GHz) 60W with OSP120 Switch	ROHDESCHWARZ	BBA150	102400
EW-3290	High Frequency Antenna	SCHWARZBECK	STLP9149	9149-425
EW-3251	Signal Generator (100kHz to 6GHz)	ROHDESCHWARZ	SMB100A	113690
EW-3332	RF Amplifier (80MHz to 1000MHz)	AMPRESARCH	150W1000	307008

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Radiated Immunity

Test Result

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result (Pursuant to BS EN 60669-2-1)
80 to 1000	Front	3.0V/m (rms)	OK
80 to 1000	Left	3.0V/m (rms)	OK
80 to 1000	Rear	3.0V/m (rms)	OK
80 to 1000	Right	3.0V/m (rms)	OK

Frequency (MHz)	Exposed Side	Field Strength (V/m)	Result (Pursuant to BS EN 60669-2-1)
1400 to 2000	Front	3.0V/m (rms)	OK
1400 to 2000	Left	3.0V/m (rms)	OK
1400 to 2000	Rear	3.0V/m (rms)	OK
1400 to 2000	Right	3.0V/m (rms)	OK

☒ Additional Information

☒ No observable change

☐ EUT stopped operation and could / could not be reset by operator.

☐ EUT was in abnormal operation:
- operation mode was changed from _____ to _____ at _____ V/m.

☐ _____

Ctrl. No.: 8.2

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Electrical Fast Transient/Burst

Test Summary (Pursuant to BS EN 60669-2-1)

Basic Standard:	EN 61000-4-4	
Port:	A.C. Power Ports and D.C. Power Ports	Control Ports
Required Performance Criterion:	After the test, the electronic switch state should be in its original switch state and the setting should be unchanged.	
Level:	±1.0kV	±0.5kV
Test Duration:	1 minute	
Test Mode:	Full ON, Full Dim & OFF	
Test Setup:	Table-top	
Generator Drive:	Internal	
Sequence of Application:	Each One	

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-3167	CE Immunity Compact Tester : EN61000-4-X	TESEQ	NSG3060	1821

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Electrical Fast Transient/Burst

Test Result

Port	Level	Result (Pursuant to BS EN 60669-2-1)
A.C. Power Ports	+1.0kV	OK
	-1.0kV	OK
D.C. Power Ports	+1.0kV	N/A
	-1.0kV	N/A
Control Ports	+0.5kV	N/A
	-0.5kV	N/A

☒ Additional Information

☒ No observable change

☐ EUT stopped operation and could / could not be reset by operator.

☐ EUT was in abnormal operation:
- operation mode was changed from _____ to _____ at _____ V/m.

☐ _____

Ctrl. No.: 9.2

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Surge Immunity

Test Summary (Pursuant to BS EN 60669-2-1)

Basic Standard:	EN 61000-4-5		
Port:	A.C. Power Ports		
	Phase And Neutral	Phase And Earth	Neutral And Earth
Level:	2 Positive And 2 Negative Surges		
	±0.5kV - ±1.0kV	±0.5kV - ±2.0kV	±0.5kV - ±2.0kV
Generator Impedance:	2 ohm	12 ohm	12 ohm
Required Performance Criterion:	After the test, the electronic switch state should be in its original switch state and the setting should be unchanged.		
Repetition Rate:	1 minute		
Test Mode:	Full ON, Full Dim & OFF		
Test Setup:	Table-top		
Surge Generator Trigger:	Internal		
Installation Condition:	Class 3: Electrical environment where cables run in parallel.		
Phase Angle:	0°, 90°, 270°		

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-3167	CE Immunity Compact Tester : EN61000-4-X	TESEQ	NSG3060	1821

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Surge Immunity

Test Result

Level		Result (Pursuant to BS EN 60669-2-1)
Between Phase And Neutral:	±1.0kV	OK
Between Phase And Earth:	±2.0kV	N/A
Between Neutral And Earth:	±2.0kV	N/A

☒ Additional Information

☒ No observable change

☐ EUT stopped operation and could / could not be reset by operator.

☐ EUT was in abnormal operation:
- operation mode was changed from _____ to _____ at _____ V/m.

☐ _____

Ctrl. No.: 10.2

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Injected Current (0.15 MHz to 80 MHz)

Test Summary (Pursuant to BS EN 60669-2-1)

Basic Standard:	EN 61000-4-6	
Port:	A.C. Power Ports	D.C. Power Ports, Signal Ports and Telecommunication Ports
Required Performance Criterion:	After the test, the electronic switch state should be in its original switch state and the setting should be unchanged.	
Level:	3.0V (rms)	3.0V (rms)
Cable Length between CDN and EUT:	20 ± 9 cm	20 ± 9 cm
Used coupling and decoupling device:	EW-1454	EW-0992
CDN terminated by 50Ω load:	Non-excited input port of the CDN	
Test Modulation:	1 kHz, 80% AM	
Frequency	0.15 MHz to 80 MHz	
Dwell Time:	1s	
Frequency Step:	1%	
Temperature:	24.0°C	
Relative Humidity:	50.0%	
Coupling Factor of CDN:	-1.0dB ~ -1.7dB	
Test Mode:	Full ON, Full Dim & OFF	
Test Setup:	Table-top	
Size of the EUT:	7.1 (cm) x 7.1 (cm) x 4.1 (cm)	
Equipment Under Test:	Single Unit	

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-0611	AM/FM Signal Generator	MARCONI	2024	112139/025
EW-1454	Coupling Decoupling Network	LUTHI	L801/M2/M3	1904
EW-2502	2/F Conduct Immunity Test Site	UNKNOWN	EN/IEC 61000-4-6	Nil
EW-2986	RF Amplifier	AMP SEARCH	75A250A	0554502

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Injected Current (0.15 MHz to 80 MHz)

Test Result

Port	Frequency (MHz)	Level	Result (Pursuant to BS EN 60669-2-1)
A.C. Power Ports	0.15 to 80	3.0V (rms)	OK
D.C. Power Ports	0.15 to 80	3.0V (rms)	N/A
Signal Ports	0.15 to 80	3.0V (rms)	N/A
Telecommunication Ports	0.15 to 80	3.0V (rms)	N/A

☒ Additional Information

☒ No observable change

☐ EUT stopped operation and could / could not be reset by operator.

☐ EUT was in abnormal operation:
- operation mode was changed from _____ to _____ at _____ V/m.

☐ _____

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Voltage Dips and Interruptions

Test Summary (Pursuant to BS EN 60669-2-1)

Basic Standard:	EN 61000-4-11	
Port:	A.C. Power Ports	
Level:	Test level in %U_T	Duration (number of cycles at rated frequency)
	0	10
	40	10
	70	10
Required Performance Criterion:	After the test, the electronic switch state should be in its original switch state and the setting should be unchanged.	
Test Mode:	Full ON, Full Dim & OFF	
Test Setup:	Test generator causes the interference to the EUT AC mains	

U_T is the rated voltage for the equipment.

Used Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-3167	CE Immunity Compact Tester : EN61000-4-X	TESEQ	NSG3060	1821

TEST REPORT

BS EN 60669-2-1:2004 (Clasue 26) Voltage Dips and Interruptions

Test Result

Test condition		Result
Test Level in %U_T	Duration(sec)	(Pursuant to BS EN 60669-2-1)
0	0.2	OK
40	0.2	OK
70	0.2	OK

☒ Additional Information

☒ No observable change

☐ EUT stopped operation and could / could not be reset by operator.

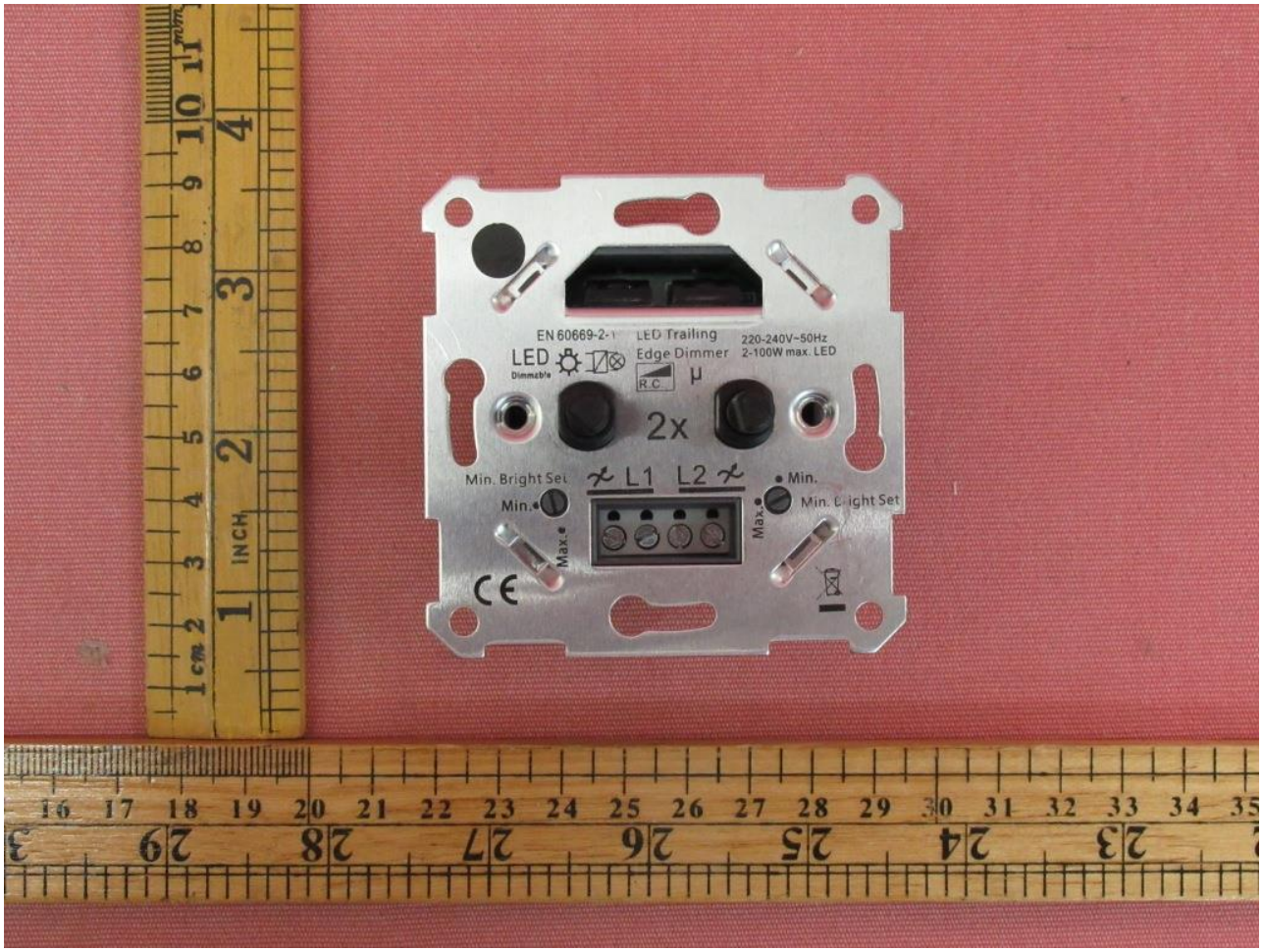
☐ EUT was in abnormal operation:
- operation mode was changed from _____ to _____ at _____ V/m.

☐ _____

Ctrl. No.: 13.2

TEST REPORT

Appendix - Photo of EUT



Guidelines On Issuing EC Declaration Of Conformity Pursuant To EMC Directive

To attest the compliance of apparatus with the relevant EMC Directive, an EC Declaration of Conformity shall be issued by the manufacturer or his authorised representative in the European Community, and the attached EC Declaration of Conformity template contains all mandatory requirements pursuant to EMC Directive 2014/30/EU. Please follow the steps listed below when preparing an EC Declaration of Conformity:

1. Provide the name and address of the manufacturer;
2. Provide the name and address of the authorised representative in the European Community, where applicable;
3. For Apparatus' Description, specify the brand name and any other information allowing for the description of the apparatus to which the EC Declaration of Conformity refers;
4. For Apparatus' Identification, specify the type, batch, serial number or any other information allowing for the identification of the apparatus to which the EC Declaration of Conformity refers;
5. Specify the relevant EMC Directive with which the apparatus are in compliance;
6. List all dated specifications under which conformity is declared to ensure the conformity of the apparatus with the relevant EMC Directive, you may refer the standards shown in the Test Verification of Conformity issued by Intertek;
7. Sign the EC Declaration of Conformity by the person empowered to bind the manufacturer or his authorised representative in the European Community. The Name, Position and Company of this person shall be specified for identification;
8. State the date of issuing the EC Declaration of Conformity.

NOTES:

a. The EC Declaration of Conformity shall be held by the manufacturer or his authorised representative in the European Community at the disposal of the competent authorities for a period of at least ten years after the date on which such apparatus was last manufactured. If neither the manufacturer nor his authorised representative is established within the European Community, the obligation to hold the EC Declaration of Conformity at the disposal of the competent authorities shall lie with the person who places the apparatus on the European Community market.

b. If EMC Directive 2014/30/EU is applied, the manufacturer shall draw up technical documentation according to Annex IV of this EMC Directive; and in addition to CE Marking, the apparatus shall also meet other marks and information as stated in Article 9 of the same EMC Directive.

c. The EC Declaration of Conformity guidelines and template are for your reference only, you shall ensure that the EMC Directive 2014/30/EU are applied correctly.

EC DECLARATION OF CONFORMITY

I, the undersigned,

Manufacturer's Name:

Manufacturer's Address:

Authorised Representative's Name:

Authorised Representative's Address:

certify and declare under our sole responsibility that the following apparatus:

Apparatus' Description:

Apparatus' Identification:

conforms with the essential requirements of

Directive:

based on the following specifications applied:

Dated Specifications:

and therefore complies with the essential requirements and provisions of the EMC Directive.

Signature:

Full Name:

Position:

Company:

Date: