

**KES Co., Ltd.**

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Report No.:

KES-EM-20T0741-R2

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EMC TEST REPORT

Test Report No. : KES-EM-20T0741-R2

Date of Issue : Feb. 24, 2023

Product name : LENS MODULE

Model/Type No. : SLA-T2480VA

Variant Model : -

Applicant : Hanwha Vision Co., Ltd

Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea

Manufacturer : 1. HANWHA VISION VIETNAM COMPANY LIMITED
2. D-TECH CO.,LTD.

Manufacturer Address : 1. Lot O-2, Que Vo Industrial Zone extended area,
Nam Son commune, Bac Ninh city, Bac Ninh province, Vietnam
2. 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi- do,
Korea (Suwon Industrial Complex)

Date of Receipt : Oct. 06, 2020

Test date : Oct. 12, 2020 ~ Oct. 16, 2020

Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dae Jung, Choi
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

This test report is not related to KS Q ISO/IEC 17025 and KOLAS.

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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Oct. 28, 2020	KES-EM-20T0741	Issued
Jun. 08, 2022	KES-EM-20T0741-R1	Test regulation addition on customer request.
Feb. 24, 2023	KES-EM-20T0741-R2	Change the Applicant and manufacturer at the request of the customer

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1.0 General Product Description

Main Specifications of EUT are:

Video	
Imaging Device	1/2.8" 2M CMOS
Total Pixels	1945(H) x 1109(V) 2.16M
Effective Pixels	1945(H) x 1097(V) 2.13M
Scanning System	Progressive Scan
Min. Illumination	Color : 0.45lux(F2.0, 1/30sec)
S / N Ratio	50dB
Wide Dynamic Range	120dB
Day & Night	Electrical
Lens	
Focal Length (Zoom Ratio)	2.4mm
Max. Aperture Ratio	F2.0
Angular Field of View	H: 138°, V: 73°, D: 165°
Min. Object Distance	0.3m(0.98ft)
Focus Control	-
Lens Type	Fixed focal
Mount Type	RJ12 connected with main unit
Environmental	
Operating Temperature / Humidity	-10°C ~ +55°C (-14°F ~ +131°F) / Less than 90% RH
Storage Temperature / Humidity	-50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH
Ingress Protection	-
Vandal Resistance	-
Mechanical	
Color / Material	Lens : Black / Plastic, Metal Cable : Black
Dimension (WxHxD)	Lens : W30 x H27.9 x D45 Cable : 8m
Weight	328g



1.1 Test Voltage & Frequency

Unless indicated otherwise on the individual data sheet or test results, the test voltage and frequency was as indicated below.

Voltage ☒ 230 Vac ☐ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☐ PoE
Frequency ☒ 50 Hz ☐ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
LENS MODULE	SLA-T2480VA	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	PNM-9000QB	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
LENS MODULE	SLA-T1080FA	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
LENS MODULE	SLA-T4680A	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
LENS MODULE	SLA-T2480A	-	HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.	-
DC Adaptor	2ACB022F	-	Channel Well Technology (Guangzhou) Co.,Ltd.	-
Monitor	SMT-2232	C95V67VF900025B	Weihai Daewoo Electronics Co., Ltd.	-



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
LENS MODULE (EUT)	6 Pin	NETWORK CAMERA	6 Pin	15.0	S
NETWORK CAMERA	6 Pin	LENS MODULE	6 Pin	15.0	S
	6 Pin	LENS MODULE	6 Pin	15.0	S
	6 Pin	LENS MODULE	6 Pin	15.0	S
	HDMI	Monitor	HDMI	1.5	S

* Unshielded=U, Shielded=S

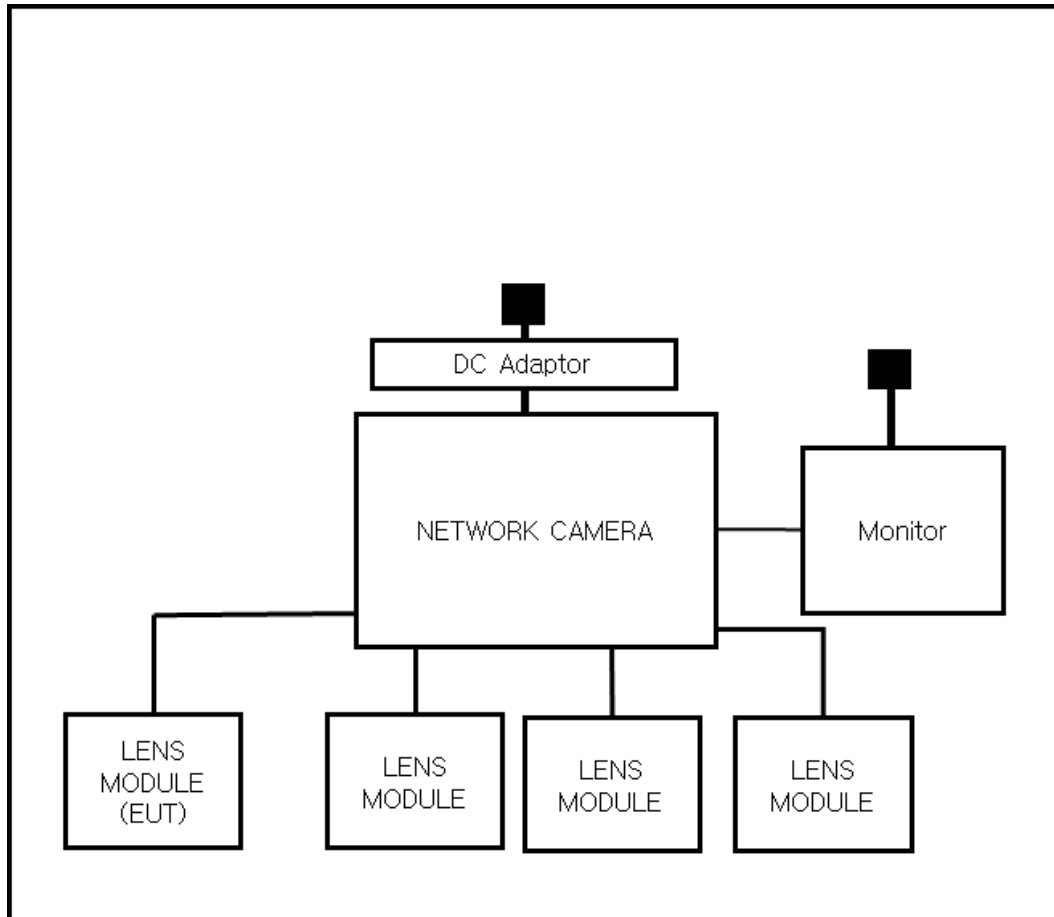
1.7 EUT Operating Mode(s)

Test Mode	operating
Operation mode	Monitoring EUT

EUT Test operating S/W		
Name	Version	Manufacture Company
-	-	-

1.8 Configuration

■ AC Main
 □ DC Main



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less.

1.11 Test Facility

The measurement facility is located at 473-21, Gayeo-ro, Yeosu-si, Gyeonggi-do, 12658, Korea, Republic of. The sites are constructed in conformance with the requirements of ANSI C63.4a-2017 and CISPR 16-1-4:2019

1.12 Laboratory Accreditations and Listings

Country	Agency	Scope of Accreditation	Logo
KOREA	RRA	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KR0100
International	KOLAS	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 KT489
USA	FCC	3 m & 10 m Semi-Anechoic Chamber Conducted test site to perform FCC Part 15/18 measurements.	 KR0100
Canada	ISED	3 m & 10 m Semi-Anechoic Chamber and Conducted test site	 23298
JAPAN	VCCI	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)	 C-20136, T-20137, R-20181, G-20176
Europe	TÜV SÜD	EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site) EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions)	 CARAT 001633 0004



2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 50130-4:2011

☒ EN 61000-3-2:2014

☒ EN 61000-3-3:2013

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2.1 Conducted Emissions at Mains Power Ports

Test Date

Oct. 12, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	01, 20, 2021
☒	LISN	ENV216	R & S	101787	01, 02, 2021
☒	LISN	ESH2-Z5	R & S	100450	01, 02, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	01, 02, 2021

Test Conditions

Temperature: 22,3 °C
Relative Humidity: 46,7 % R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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2.2 Conducted Emissions at Telecommunication Ports

Test Date

N/A

Test Location

Electro wave Shieldroom

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☐	EMI Test S/W	EMC32	R & S	9.12.00	-
☐	EMI TEST RECEIVER	ESR3	R & S	101783	01, 20, 2021
☐	LISN	ENV216	R & S	101787	01, 02, 2021
☐	LISN	ESH2-Z5	R & S	100450	01, 02, 2021
☐	PULSE LIMITER	ESH3-Z2	R & S	101915	01, 02, 2021
☐	8-WIRE ISN CAT3,5	ENY81	R & S	100174	01, 07, 2021
☐	CDN	CDNS502A	TESEQ	40431	01, 02, 2021

Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Frequency Range of Measurement

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☐ PASS
☐ NOT PASS
☒ NOT APPLICABLE

Remarks

Does not apply because no IP is assigned

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2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Oct. 12, 2020

Test Location☐ OPEN AREA TEST SITE #2☒ SEMI ANECHOIC CHAMBER #4(10m)**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 01, 2021
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2020
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 29, 2020
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2021

Test Conditions

Temperature: 22,7 °C

Relative Humidity: 52,0 % R.H.

Frequency Range of Measurement

30 MHz to 1 GHz

Instrument Settings

IF Band Width: 120 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Oct. 13, 2020

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESR7	R & S	101190	08, 05, 2021
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 20, 2021
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2021
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2021

Test Conditions

Temperature: 22,1 °C
Relative Humidity: 51,1 % R.H.

Frequency Range of Measurement

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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2.5 Harmonic Current Emissions

Test Date

Oct. 16, 2020

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	04, 06, 2021
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 19,4 °C
Relative Humidity: 47,3 % R.H.

Classification of Equipment for Harmonic Current Emissions

- ☒ Class A
☐ Class B
☐ Class C(Below 25 W)
☐ Class C(Above 25 W)
☐ Class D

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

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2.6 Voltage Fluctuations and Flicker

Test Date

Oct. 16, 2020

Test Location

Electro wave Shieldroom #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	net.control	EM TEST	2.1.4	-
☒	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	04, 06, 2021
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: 19,4 °C
Relative Humidity: 47,3 % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

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3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:
EN 50130-4:2011 Alarm systems-Part 4: Electromagnetic compatibility Product family
standard: Immunity requirements for components of fire, intruder and social alarm systems

The variety and the diversity of the apparatus within the scope of this document makes it difficult to define precise criteria for the evaluation of the immunity test results.

If as a result of the application of the tests defined in this standard, the apparatus becomes dangerous or unsafe then the apparatus shall be deemed to have failed the test.

A functional description and a definition of performance by the manufacture and noted in the test report, based on the following criteria:

Electrostatic discharge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing that is no residual change in the EUT or any change in outputs, which could be interpreted by associated equipment as a change.

Radiated electromagnetic fields

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing which could be interpreted by associated equipment as a change, and no such
Flickering of indicators occurs at a field strength of 3 V/m.

For components of CCTV systems, where the picture is allowed at 10 V/m, providing.

- (a) there is no permanent damage or change to EUT
(e.g. no corruption of memory or changes to programmable setting etc.)
- (b) at 3 V/m, any deterioration of the picture is so minor that the system could still be used;
and
- (c) there is no observable deterioration of the picture at 1 V/m.



Fast transient burst / slow high energy voltage surge

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change.

Conducted RF immunity

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the application of discharge is permissible, providing
That there is no residual is permissible, providing that there is no residual change in the EUT or
any
change in outputs, which could be interpreted by associated equipment as a change,
and no such flickering of indicators oeuvres at $U = 130 \text{ dB}\mu\text{V}$.
For component of CCTV systems, where the status is monitored by observing the TV picture,
then deterioration of the picture is allowed at $U = 140 \text{ dB}\mu\text{V}$, providing:
(a) there is no permanent damage or change to the EUT
(e.g. no corruption of memory or changes to programmable settings etc.)
(b) at $U = 130 \text{ dB}\mu\text{V}$, any deterioration of the picture is so minor that the system could
still be used; and
(c) there in no observable deterioration of the picture at $U = 120 \text{ dB}\mu\text{V}$.

Voltage dip/interruption / Voltage variation

There shall be no damage, malfunction or change of status due to the conditioning.
Flickering of an indicator during the conditioning is permissible, providing that there is no
residual
change in the EUT or any change in outputs, which could be interpreted by associated
equipment
as a change. The EUT shall meet the acceptance criteria for the functional test, after the
conditioning.



3.1 Electrostatic Discharge

Reference Standard

EN 61000-4-2:2009

Test Date

Oct.16, 2020

Test Location

EMS-ESD: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	ESD SIMULATOR	ESS-2000	Noise Ken	ESS05X4620	01, 28, 2021
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: 22,3 °C
Relative Humidity: 47,0 % R.H.
Atmospheric Pressure: 100,5 kPa

Test Specifications

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

Kind of Discharge: Air, Contact (direct and indirect)

Polarity: Positive and Negative

Number of Discharge: 10 at all locations for Air discharge
10 at all locations for Contact discharge

Discharge Voltage:	Contact	Air	HCP	VCP
	☐ 2 kV	☒ 2 kV	☐ 2 kV	☐ 2 kV
	☐ 4 kV	☒ 4 kV	☐ 4 kV	☐ 4 kV
	☒ 6 kV	☐ 6 kV	☒ 6 kV	☒ 6 kV
	☐ 8 kV	☒ 8 kV	☐ 8 kV	☐ 8 kV
	☐ 15 kV	☐ 15 kV	☐ 15 kV	☐ 15 kV

Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

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Location of Discharge:

Air
Contact



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Test Data

Indirect Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	HCP Contact	Contact Discharge	Complied	-
2	VCP Contact	Contact Discharge	Complied	-

Direct Discharge

No.	Test Point	Discharge Method	Observations	Remarks
1	Enclosure1	Air Discharge	Complied	-
2	Enclosure1	Contact Discharge	Complied	-
3	Lens	Air Discharge	Complied	-
4	Port	Air Discharge	Complied	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

Remarks

PASS Required Performance Criteria

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3.2 Radiated Electric Field Immunity

Reference Standard

EN IEC 61000-4-3:2020

Test Date

Oct. 13, 2020

Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2

☒ SEMI ANECHOIC CHAMBER #3

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	EMC32	R & S	9.12.00	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 05, 2021
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	04, 20, 2021
☒	CW POWER SENSOR	E4412A	Agilent	US38488240	04, 20, 2021
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	04, 20, 2021
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM, INC	781	03, 11, 2021

Test Conditions

Temperature: 22,1 °C
Relative Humidity: 51,1 % R.H.
Atmospheric Pressure: 100,6 kPa



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Test Specifications

Antenna Polarization: Horizontal & vertical unless indicated otherwise

Antenna Distance: ☒ 3 m

Field Strength: ☐ 1 V/m ☐ 3 V/m
☒ 10 V/m

Frequency Range: ☐ 80 MHz to 1 GHz ☐ 1,4 GHz to 2,7 GHz
☒ 80 MHz to 2,7 GHz

Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)

Frequency step: ☒ 1 % step

Dwell Time: ☐ 1 s ☒ 3 s

of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ Complied

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Test Data

Side Exposed	Observations	
	Horizontal	Vertical
Front	Complied	Complied
Right	Complied	Complied
Back	Complied	Complied
Left	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

RemarksPASS Required Performance Criteria

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3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

Test Date

Oct. 16, 2020

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2020
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 27, 2020

Test Conditions

Temperature: 22,3 °C
Relative Humidity: 47,0 % R.H.
Atmospheric Pressure: 100,5 kPa

Test Specifications

Pulse Amplitude & Polarity:
(AC Power Lines) ☐ ± 1.0 kV ☒ ± 2.0 kV
☐ ± 4.0 kV

Pulse Amplitude & Polarity:
(Other supply / Signal Lines) ☐ ± 0.5 kV ☒ ± 1.0 kV
☐ ± 2.0 kV

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☐ 5 kHz ☒ 100 kHz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ Complied

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Test Data☒ Input a.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
L	Complied	Complied
N	Complied	Complied
PE	-	-
L – N	Complied	Complied
L – PE	-	-
N – PE	-	-
L – N – PE	-	-

☐ Input d.c. power ports – Coupling/Decoupling Network used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
-	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Observations	
	(+) Burst (kV)	(-) Burst (kV)
6 Pin	Complied	Complied

Note: “Blank” = Not performed

Observations:

Complied – No degradation of function

Test Results☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**PASS Required Performance Criteria

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3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014/A1:2017

Test Date

Oct. 16, 2020

Test Location

EMS-EFT: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2020
☐	CDN	CNV 508N1	EM TEST	P1610176296	11, 27, 2020

Test Conditions

Temperature: 22,3 °C
Relative Humidity: 47,0 % R.H.
Atmospheric Pressure: 100,5 kPa

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Test Specifications

AC Power Lines

Source Impedance: 12 ohm for common Mode and 2 ohm for differential Mode

Surge Amplitude :

Common Mode

☐ (0,5 / 1,0 / 2,0) kV

Differential Mode

☒ (0,5 / 1,0) kV

Number of Surges:

☒ 5 surges per angle

Angle:

☒ 0°, 90°, 180°, 270° (input a.c. power port)

Polarity:

☒ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☒ 1 surge per 30 sec.

Required Performance Criteria: ☒ Complied

Other supply / Signal Lines

Source Impedance:

42 ohm for common Mode

Surge Amplitude:

Common Mode

☐ (0,5 / 1,0) kV

Number of Surges:

☐ 5 Surges

Polarity:

☐ Positive & Negative

Repetition Rate:

☐ 1 surge per min ☐ 1 surge per 30 sec.

Required Performance Criteria: ☐ Complied

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Test Data

☒ Line to Line – Differential Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – N	Complied	Complied

☐ Line to Earth – Common Mode

Mode of Application	Observations	
	(+) Surge (kV)	(-) Surge (kV)
L – PE	-	-
N – PE	-	-

Signal Lines

☐ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
-	CDN	-	-
	LINE	-	-

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☐ NOT APPLICABLE

Remarks

PASS Required Performance Criteria



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014

Test Date

Oct. 15, 2020

Test Location

EMS-CS: Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	icd.control	EM TEST	5.3.11	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	07, 22, 2021
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 25, 2020
☒	CDN	CDN M016	TESEQ	43694	11, 25, 2020
☒	CDN	CDN M016	TESEQ	43697	11, 25, 2020
☐	CDN	CDN T800	TESEQ	42800	11, 25, 2020
☒	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 26, 2020

Test Conditions

Temperature: 22,3 °C
Relative Humidity: 48,1 % R.H.
Atmospheric Pressure: 100,7 kPa

Test Specifications

Frequency range: ☒ 150 kHz to 100 MHz ☐ 150 kHz to 80 MHz
Voltage Level: ☐ 1 Vrms ☐ 3 Vrms
☒ 10 Vrms
Modulation: ☒ AM, 80 %, 1 kHz sine wave
☒ PM, 1 Hz (0,5 s ON : 0,5 s OFF)
Frequency step: ☒ 1 % step
Dwell Time: ☐ 1 s ☒ 3 s
Required Performance Criteria: ☒ Complied

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Test Data☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N	CDN	Complied

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
-	-	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Observations
6 Pin	Clamp	Complied

Notes: CDN = Coupling Decoupling Network
"blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria

RemarksPASS Required Performance Criteria

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3.6 Voltage Dips and Short Interruptions

Reference Standard

EN IEC 61000-4-11:2020

Test Date

Oct. 16, 2020

Test Location

EMS-Voltage dip: Electro wave Shieldroom #7

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMS Test S/W	iec.control	EM TEST	5.4.7	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 27, 2020
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 27, 2020

Test Conditions

Temperature: 22,3 °C
Relative Humidity: 47,0 % R.H.
Atmospheric Pressure: 100,5 kPa

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Test Specifications & Observations/Remarks**- Voltage Dips and Short Interruptions**

<u>Test Level</u>	<u>Duration [in period/ms (50 Hz)]</u>	<u>Results</u>
☒ 20 % dip	☒ 250 / 5 000	<u>Complied</u>
☒ 30 % dip	☒ 25 / 500	<u>Complied</u>
☒ 60 % dip	☒ 10 / 200	<u>Complied</u>
☒ 100 % dip	☒ 250 / 5 000	<u>Degradation</u>

- Voltage variations

☒ Unom + 10 %	☒ 253.0 V (ac)	<u>Complied</u>
☒ Unom - 15 %	☒ 195.5 V (ac)	<u>Complied</u>

Observations:

Complied – No degradation of function

Degradation - See "Remarks "

Test Results

- ☒ PASS Required Performance Criteria
☐ NOT PASS Required Performance Criteria
☐ NOT APPLICABLE

Remarks

During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered by no operator's intervention.

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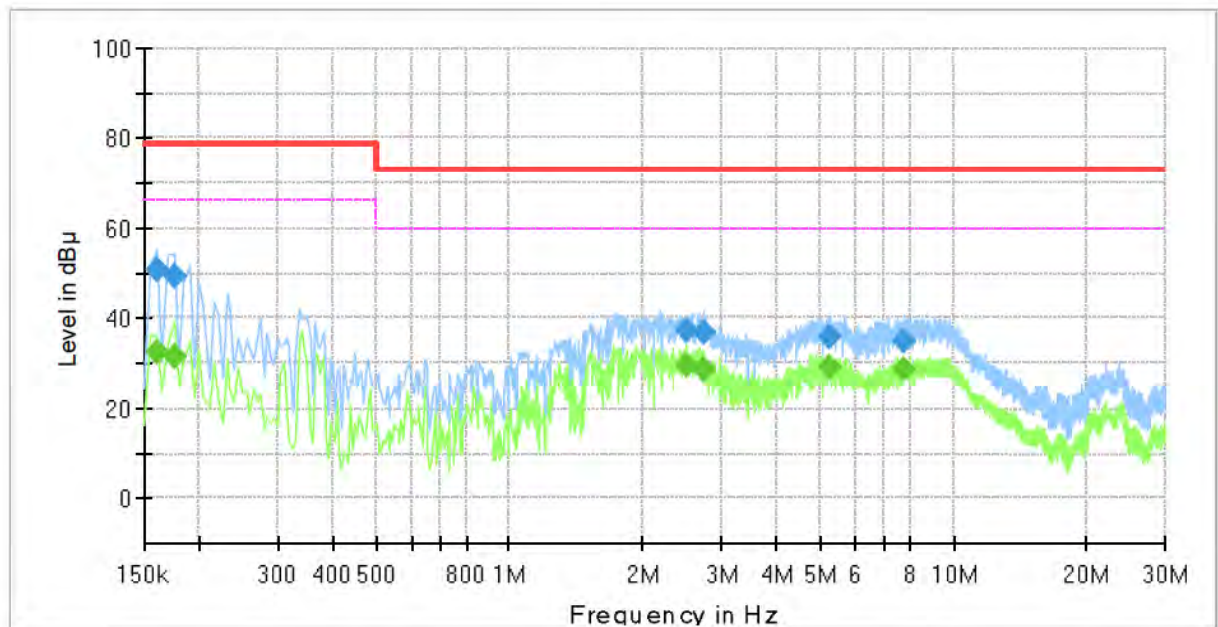
APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports

[HOT]

Common Information

Test Description: Conducted Emission
Model No.: SLA-T2480VA
Phase: L1
Mode:
Operator Name: KES



Final Result

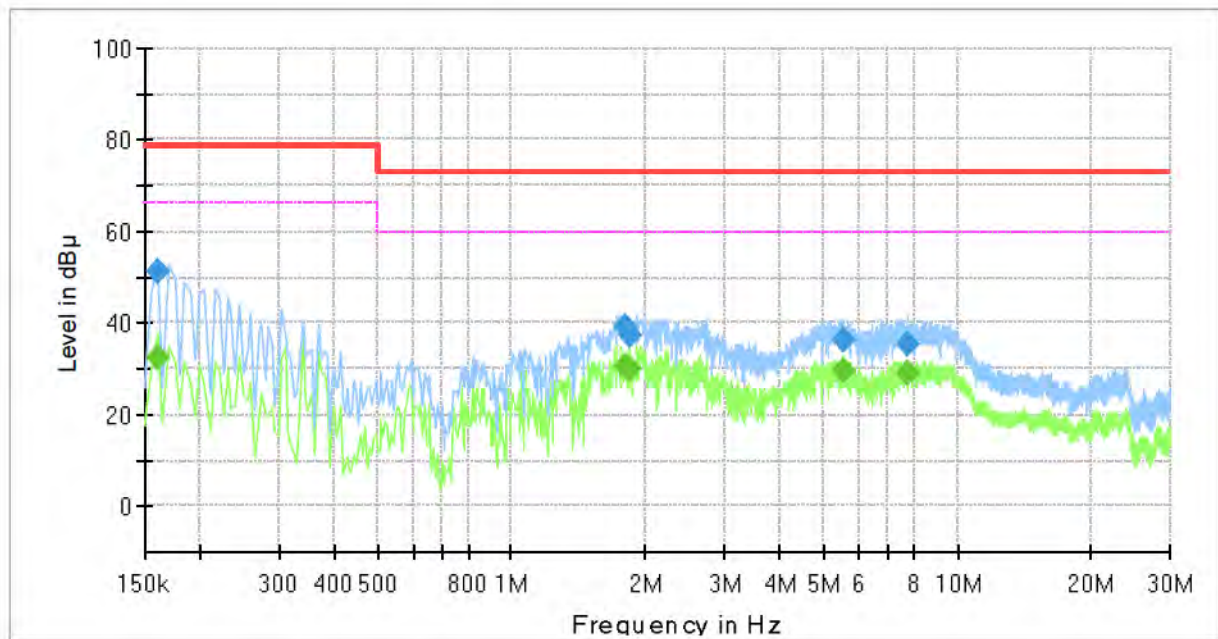
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	32.23	66.00	33.77	1000.0	9.000	L1	19.5
0.160000	50.86	---	79.00	28.14	1000.0	9.000	L1	19.5
0.175000	---	31.63	66.00	34.37	1000.0	9.000	L1	19.5
0.175000	49.49	---	79.00	29.51	1000.0	9.000	L1	19.5
2.510000	---	29.77	60.00	30.23	1000.0	9.000	L1	20.2
2.510000	37.24	---	73.00	35.76	1000.0	9.000	L1	20.2
2.745000	---	28.53	60.00	31.47	1000.0	9.000	L1	20.1
2.745000	36.67	---	73.00	36.33	1000.0	9.000	L1	20.1
5.220000	---	28.91	60.00	31.09	1000.0	9.000	L1	19.5
5.220000	35.68	---	73.00	37.32	1000.0	9.000	L1	19.5
7.760000	---	28.48	60.00	31.52	1000.0	9.000	L1	19.6
7.760000	35.03	---	73.00	37.97	1000.0	9.000	L1	19.6

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[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	SLA-T2480VA
Phase:	N
Mode:	
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.160000	---	32.63	66.00	33.37	1000.0	9.000	N	19.4
0.160000	51.16	---	79.00	27.84	1000.0	9.000	N	19.4
1.795000	---	30.60	60.00	29.40	1000.0	9.000	N	20.2
1.795000	38.97	---	73.00	34.03	1000.0	9.000	N	20.2
1.845000	---	30.16	60.00	29.84	1000.0	9.000	N	20.2
1.845000	37.16	---	73.00	35.84	1000.0	9.000	N	20.2
5.570000	---	29.45	60.00	30.55	1000.0	9.000	N	19.6
5.570000	36.11	---	73.00	36.89	1000.0	9.000	N	19.6
7.715000	---	28.98	60.00	31.02	1000.0	9.000	N	19.6
7.715000	35.39	---	73.00	37.61	1000.0	9.000	N	19.6

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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Conducted Emissions at Telecommunication Ports

[1 000 Mbps]

N/A

◆ Calculation

QuasiPeak[dBuV] / CAverage [dBuV] = Reading Value[dBuV] + Corr. [dB]

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

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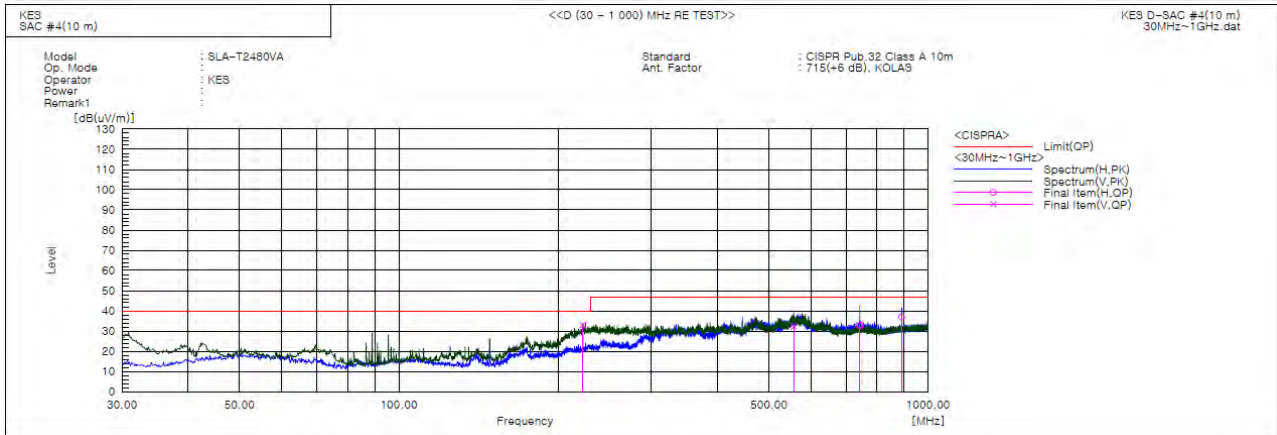


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Radiated Electric Field Emissions(Below 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	222.752	V	53.5	-20.5	33.0	40.0	7.0	162.0	158.0	
2	557.438	V	43.7	-11.5	32.2	47.0	14.8	400.0	172.0	
3	742.465	H	40.2	-7.4	32.8	47.0	14.2	374.0	340.0	
4	890.996	H	42.7	-5.7	37.0	47.0	10.0	100.0	71.0	

◆ Calculation – SEMI ANECHOIC CHAMBER #4(10 m)

Result(QP) [dB(μV/m)] = (Reading(QP)[dB(μV)] + c.f[dB(1/m)]

Margin(QP)[dB] = Limit[dB(μV/m)] - Result(QP) [dB(μV/m)]

Reading(QP) : Reading value, Result(QP) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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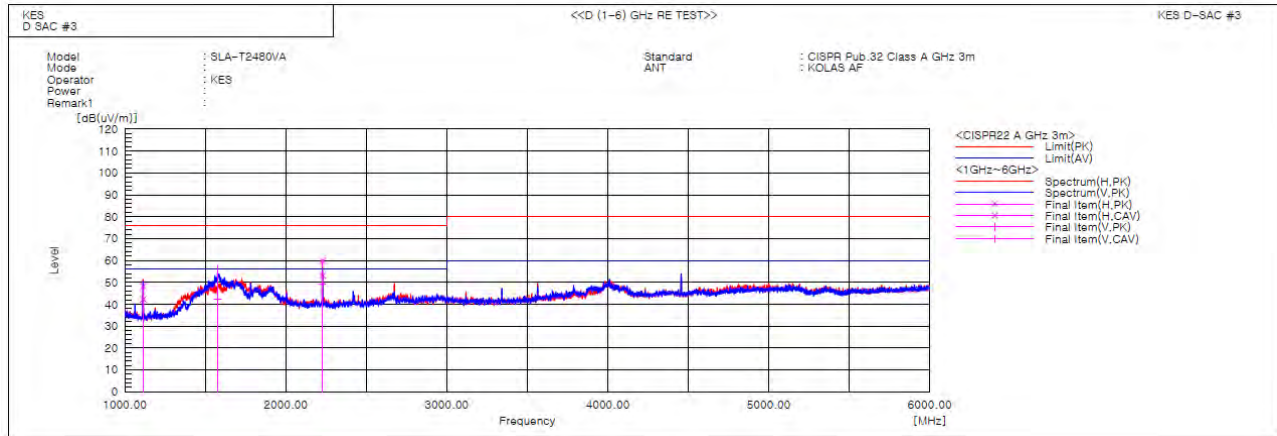
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Radiated Electric Field Emissions(Above 1 GHz)



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB(1/m)]	Result PK [dB(uV/m)]	Result CAV [dB(uV/m)]	Limit PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1114.080	H	57.0	51.2	-8.9	48.1	42.3	76.0	56.0	27.9	13.7	100.0	69.8	
2	1577.749	V	61.9	48.2	-6.0	55.9	42.2	76.0	56.0	20.1	13.8	100.0	5.5	
3	2227.220	H	61.0	54.3	-1.2	59.8	53.1	76.0	56.0	16.2	2.9	100.0	160.6	
4	2227.380	V	57.3	50.5	-1.2	56.1	49.3	76.0	56.0	19.9	6.7	100.0	41.1	

◆ Calculation

Result(PK/CAV) [dB(μV/m)] = (Reading(PK/CAV)[dB(μV)] + c.f[dB(1/m)])

Margin(PK/CAV)[dB] = Limit[dB(μV/m)] - Result(PK/CAV) [dB(μV/m)]

Reading(PK/CAV) : Reading value, Result(PK/CAV) : Reading value + Factor value

Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

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Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.067			
2	0.002	0.155	1.080	n/a
3	0.060	2.623	2.300	PASS
4	0.002	0.454	0.430	n/a
5	0.060	5.280	1.140	PASS
6	0.002	0.558	0.300	n/a
7	0.058	7.582	0.770	PASS
8	0.002	0.718	0.230	n/a
9	0.054	13.426	0.400	PASS
10	0.001	0.814	0.184	n/a
11	0.050	15.075	0.330	PASS
12	0.001	0.958	0.153	n/a
13	0.046	21.708	0.210	PASS
14	0.002	1.187	0.131	n/a
15	0.041	27.262	0.150	PASS
16	0.001	1.275	0.115	n/a
17	0.036	27.330	0.132	PASS
18	0.001	1.435	0.102	n/a
19	0.032	26.690	0.118	PASS
20	0.001	1.617	0.092	n/a
21	0.027	16.966	0.161	PASS
22	0.002	1.886	0.084	n/a
23	0.023	15.586	0.147	PASS
24	0.002	2.066	0.077	n/a
25	0.019	14.322	0.135	PASS
26	0.002	2.248	0.071	n/a
27	0.016	13.040	0.125	PASS
28	0.002	2.384	0.066	n/a
29	0.014	12.037	0.116	PASS
30	0.002	2.586	0.061	n/a
31	0.012	11.403	0.109	PASS
32	0.002	2.727	0.058	n/a
33	0.011	11.131	0.102	PASS
34	0.001	2.644	0.054	n/a
35	0.011	11.476	0.096	PASS
36	0.001	2.804	0.051	n/a
37	0.010	11.432	0.091	PASS
38	0.001	2.619	0.048	n/a
39	0.010	11.779	0.087	PASS
40	0.001	2.628	0.046	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.



Test Data - Harmonics (continued)

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.067			
2	0.002	0.128	1.620	n/a
3	0.061	1.769	3.450	PASS
4	0.002	0.359	0.645	n/a
5	0.060	3.528	1.710	PASS
6	0.002	0.431	0.450	n/a
7	0.059	5.077	1.155	PASS
8	0.002	0.572	0.345	n/a
9	0.054	8.985	0.600	PASS
10	0.002	0.623	0.276	n/a
11	0.050	10.089	0.495	PASS
12	0.002	0.750	0.230	n/a
13	0.046	14.543	0.315	PASS
14	0.002	0.949	0.197	n/a
15	0.041	18.273	0.225	PASS
16	0.002	1.007	0.173	n/a
17	0.036	18.298	0.199	PASS
18	0.002	1.109	0.153	n/a
19	0.032	17.916	0.178	PASS
20	0.002	1.279	0.138	n/a
21	0.028	17.113	0.161	PASS
22	0.002	1.441	0.125	n/a
23	0.023	15.721	0.147	PASS
24	0.002	1.566	0.115	n/a
25	0.020	14.469	0.135	PASS
26	0.002	1.704	0.106	n/a
27	0.016	13.153	0.125	PASS
28	0.002	1.812	0.099	n/a
29	0.014	12.183	0.116	PASS
30	0.002	2.023	0.092	n/a
31	0.013	11.543	0.109	PASS
32	0.002	2.057	0.086	n/a
33	0.012	11.277	0.102	PASS
34	0.002	2.028	0.081	n/a
35	0.011	11.613	0.096	PASS
36	0.002	2.221	0.077	n/a
37	0.011	11.555	0.091	PASS
38	0.002	2.091	0.073	n/a
39	0.010	11.929	0.087	PASS
40	0.001	2.094	0.069	n/a

Note: Harmonic currents less than 0.6 % of the input current measured under the test conditions, or less than 5 mA, whichever is greater, are disregarded.

* Application of limits for average is 100% except for odd harmonics from 21 to 39, where 150% applies.

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Test Data - Voltage Fluctuations

Maximum Flicker results

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.028	0.028	0	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

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Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



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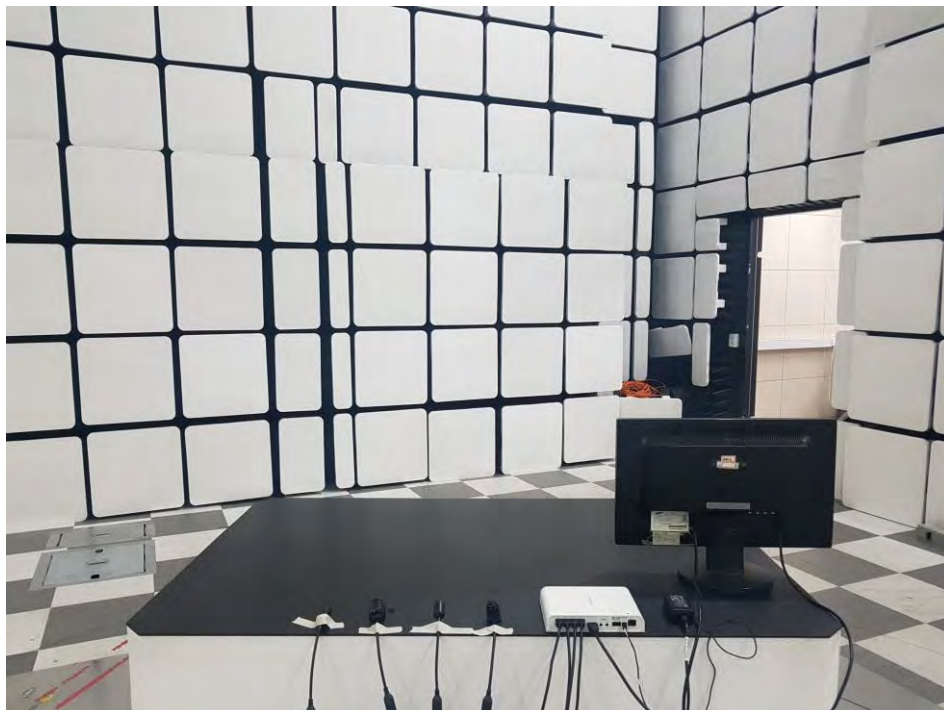
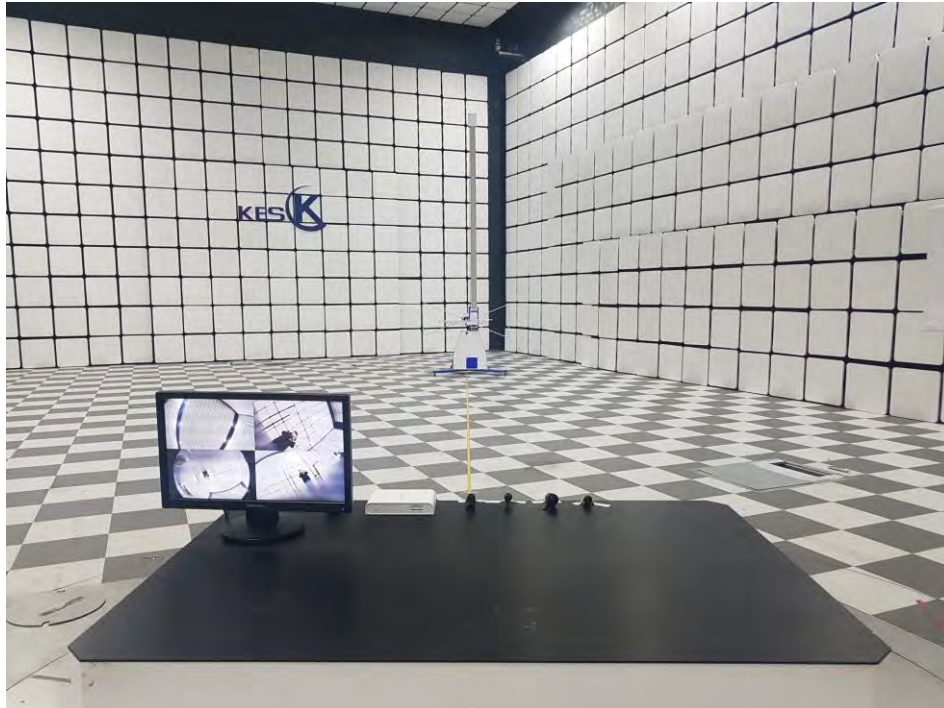
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Conducted Emissions at Telecommunication Ports

N/A

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Radiated Electric Field Emissions(Below 1 GHz)



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Radiated Electric Field Emissions(Above 1 GHz)



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Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



Radiated Electric Field Immunity



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Electrical Fast Transients/Bursts



Surge Transients



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Conducted Disturbance



Voltage Dips and Short Interruptions



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EUT External Photographs

(Top)



(Bottom)



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EUT Internal Photographs

(Internal View)



EUT Internal View – LENS

(Top)



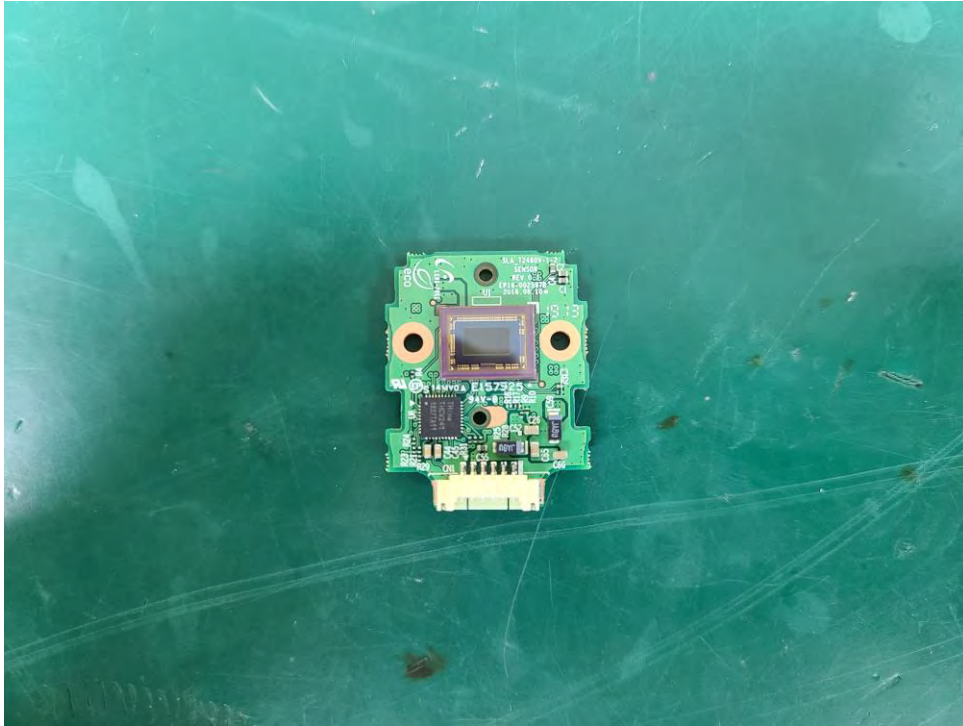
(Bottom)



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EUT Internal View – Board

(Top)

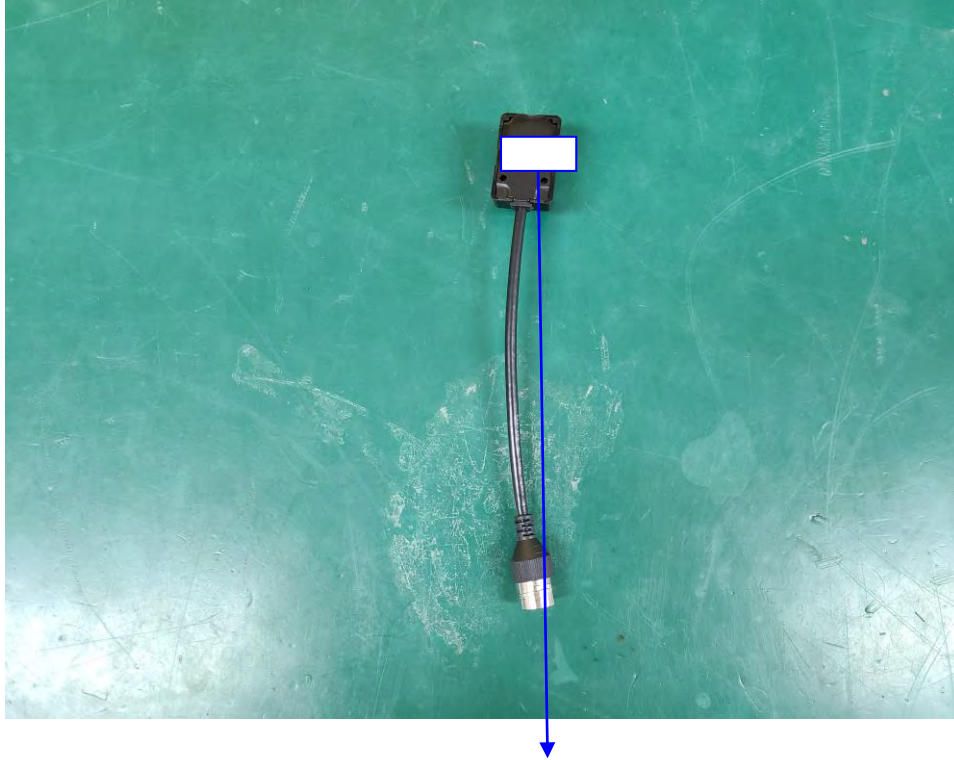


(Bottom)



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Label and Location

**LENS MODULE**

Model No : SLA-T2480VA

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

