



EMC TEST REPORT For CE

Test Report No. : KES-EM-22T0223-R1
Date of Issue : Feb. 24, 2023
Product name : SSM Workstation
Model/Type No. : XWV-3010
Variant Model : -
Applicant : Hanwha Vision Co., Ltd
Applicant Address : 6, Pangyo-ro 319Beon-gil, Bundang-gu, Seongnam-si,
Gyeonggi-do, Republic of Korea
Manufacturer : Dell (China) Company Limited
Manufacturer Address : No.2388 Jinshang Road, Information Photo-Electronic Park,
Xiamen, Torch Hi-tech Zone 36100 China
Date of Receipt : Feb. 10, 2022
Test date : Feb. 11, 2022 ~ Feb. 13, 2022
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Min Seong, Kim
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.

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (2) of (66)

REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Mar. 03, 2022	KES-EM-22T0223	Issued
Feb. 24, 2023	KES-EM-22T0223-R1	Change the Applicant

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd. This document may be altered or revised by KES Co., Ltd. personnel only, and shall be noted in the revision section of the document. Any alteration of this document not carried out by KES Co., Ltd. will constitute fraud and shall nullify the document.

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



TABLE OF CONTENTS

1.0	General Product Description	4
1.1	Test Voltage & Frequency	5
1.2	Variant Model Differences.....	5
1.3	Device Modifications	5
1.4	Equipment Under Test.....	5
1.5	Support Equipments	6
1.6	External I/O Cabling	7
1.7	EUT Operating Mode(s)	8
1.8	Configuration.....	8
1.9	Remarks when standards applied	9
1.10	Calibration Details of Equipment Used for Measurement	9
1.11	Test Facility	9
1.12	Laboratory Accreditations and Listings	9
2.0	Test Regulations.....	10
2.1	Conducted Emissions at Mains Power Ports	11
2.2	Conducted Emissions at Telecommunication Ports	12
2.3	Radiated Electric Field Emissions(Below 1 GHz)	13
2.4	Radiated Electric Field Emissions(Above 1 GHz)	14
2.5	Harmonic Current Emissions	15
2.6	Voltage Fluctuations and Flicker	16
3.0	Criteria for compliance	17
3.1	Electrostatic Discharge.....	19
3.2	Radiated Electric Field Immunity	22
3.3	Electrical Fast Transients/Bursts	25
3.4	Surge Transients	27
3.5	Conducted Disturbance	30
3.6	Voltage Dips and Short Interruptions	33
APPENDIX A – TEST DATA.....		35
Conducted Emissions at Mains Power Ports.....		35
Conducted Emissions at Telecommunication Ports		37
Radiated Electric Field Emissions(Below 1 GHz)		38
Radiated Electric Field Emissions(Above 1 GHz)		39
Harmonic Current Emissions and Voltage Fluctuations and Flicker		40
Test Setup Photos and Configuration		43
Conducted Emissions at Mains Power Ports.....		43
Conducted Emissions at Telecommunication Ports		44
Radiated Electric Field Emissions(Below 1 GHz)		45
Radiated Electric Field Emissions(Above 1 GHz)		46
Harmonic Current Emissions and Voltage Fluctuations and Flicker		47
Electrostatic Discharge		48
Radiated Electric Field Immunity		48
Electrical Fast Transients/Bursts		49
Surge Transients.....		49
Conducted Disturbance.....		50
Voltage Dips and Short Interruptions.....		50
EUT External Photographs		51
EUT Internal Photographs		52



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (4) of (66)

1.0 General Product Description

Main Specifications of EUT are:

			XWV-3010
기능 / 성능			
운영체제			Windows 10 Professional
CMS			SSM Console Client preinstalled
Software	Camera	Input	Max. 256CH
		Resolution	CIF ~ 12MP
		Protocol	Wisenet, ONVIF Profile-S
		Registration	Auto Discovery, Manual
		설정	Automatic device IP scanning, Add profile edit, Resolution, Fisheye dewarping mode, Hallway View Setup, Brightness/Contrast, Viewing the device settings(Device webpage), Exporting/Importing devices settings,, Updating the device firmware
	Live	Minitor Output	Max. Dual
		Display	Max.256 (Dual Track)
	Recording	분할화면	1/4/9/16/25/36/49/64/72/81/100/121/132/Custom/Auto Mode
		Throughput	via PRO Server
		Recording mode	via PRO Server
		Event Type	via PRO Server
	Search / Playback	이벤트 동작	via PRO Server
		Throughput	Max. 150Mbps
		Search Mode	Date & Time(Calendar)/ Event / Smart search
		동시 재생	Max.256 (Dual Track)
	Backup	재생 제어	Start/stop, Pause, Faster/Slower forward/backward, Step Forward/Backward, Skip Forward/Backward
		File Format	AVI, SEC
	Video	기능	Manual Backup, Onetime Schedule Backup
		압축 방식	H.265, H.264, MJPEG, WiseStream(H.264, H.265)
	Decordng	Resolution	CIF ~ 12MP
		Decordng Power	1080fps@1080p (36 Division), 3072fps@640x360 (128 Division)
	Audio	Fisheye Dewaarping	지원
		압축 방식	G.711 u-law(PCM), G723, G726(ADPCM), AAC
	Date/Time Synchronication		지원
	PTZ	2-way	
		NTP Server	
	시스템 안정성	Control	Via GUI, Controller (SPC-2000, SPC-7000)
Preset		255	
Server Clustering	Failover / ARB	Yes(Active&Active)/Yes	
시스템 제어	Client Console		
Log information	Mouse, Controller		
PROCESSOR	System, Event, User, Device 180 Days		
MEMORY	Intel® Core™ i7-11700 (8 코어, 16MB 캐시, 최대 4.9GHz)		
OS DISK	8GB (1x8GB) DDR4 UDIMM x 2		
DRIVER TYPE	256GB PCIe NVMe Class 40 M.2 SSD		
하드웨어	SATA 6Gb/s		
	HDD	4TB 5400rpm SATA 3.5인치 HDD, 256GB PCIe NVMe Class 40 M.2 SSD, 8x DVD+/-RW 9.5mm 옵티컬 디스크 드라이브	
	RAID		
	DISPLAY PORT	D-sub x 1, HDMI x 1, mDP x 4	
NETWORK	NVIDIA Quadro P620 2GB LP (4 mDP to DP adapters)		
	1 RJ-45: Intel Ethernet Connection I219-LM 10/100/1000 Mbps, Qualcomm QCA61x4A, 867 Mbps, 2.40 Ghz/5 GHz, Wi-Fi 5 (WiFi 802.11ac), Bluetooth 5.0		
전원/환경/기구			
Electric	Intel® AX201, 2.40 Gbps, 2.40 Ghz/5 GHz, Wi-Fi 6 (WiFi 802.11ax), Bluetooth 5.1		
	AC INPUT	100 ~ 240VAC, 50 ~ 60Hz	
	POWER SUPPLY	260W PSU (80PLUS Bronze Certified)	
Environmental	CURRENT(Max)	4A (100V); 2A (240V)	
	OPERATING	+5°C to +40°C(+41°F to +104°F) / Less than 80%	
Mechanical	COLOR/MATERIAL	Black	
	FORM FACTOR	Middle Tower	
	DIMENSIONS (WxHxD)	29cmx9.26cmx29.28cm	
Warranty	WEIGHT	Default: 4.48kg (With optional devices Maximum: 5.956 kg)	
	WARRANTY	3 Year	

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



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.

☒ AC 230 V, 50 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
SSM Workstation	XWV-3010	-	Dell (China) Company Limited	EUT
CPU	I7-11700 SRKNS 2.50GHZ	-	INTEL	-
DVD-ROM	GU90N	-	Hitachi-LG Data Storage, Inc.	-
Ethernet Adapter	G60071	-	INTEL	-
HDD	ST4000DM004	-	SEAGATE	4 TB
M.2 SSD	KXG60ZNV256G	-	KIOXIA Corporation	256 GB
Memory	K9CXF2-MIE	-	Kingston	8 GB, 2 EA
VGA Card	PG172	-	NVIDIA	-

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (6) of (66)

1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
PC NVR	PRO-7410B6	-	Dream I System co.,Ltd.	-
Monitor	HSTND-7041-L	6CM6020YQQ	HP Inc.	-
Camera	XNV-9083R	-	Hanwha Vision Co., Ltd	-
Camera Adapter	2ACB022F	-	Channel Well Tecgnology (Guangzhou) Co., Ltd.	-
Mouse 1	SML-210PB	-	MONTERY INTERNATOIN CORP	-
Mouse 2	CC-93-9F	-	Logitech	-
Keyboard	GP-K5000	-	QSENN	-
Earphone	SES-Q40	-	Samsung	-
USB 3.0 Memory	-	-	SONY	64 GB
USB 2.0 Memory	-	-	SanDisk	16 GB
USB Type-C Memory	-	-	SONY	64 GB
Router	V504	-	Iptime	-
Router Adapter	SAW06D-050- 1000KD	-	SHENZHEN YINGYUAN ELECTRONICS CO., LTD	-

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



1.6 External I/O Cabling

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
SSM Workstation (EUT)	RJ-45	Router	RJ-45	3.0	U
	MINI DP	Monitor	DP	1.6	S
	PS/2	Mouse 1	Line-Out (PS/2)	1.4	U
	RS-232	Mouse 2	Line-Out (RS-232)	1.6	U
	PS/2	Keyboard	Line-Out (PS/2)	1.5	U
	3.5 mm	Earphone	Line-Out (3.5 mm)	1.5	U
	USB 3.0	USB 3.0 Memory	USB 3.0	-	-
	USB 2.0	USB 2.0 Memory	USB 2.0	-	-
	USB Type-C	USB Type-C Memory	USB Type-C	-	-
Router	DC Jack	Router Adapter	Line-Out (DC Jack)	1.0	U
	RJ-45	PC NVR	RJ-45	2.5	U
	RJ-45	Camera	RJ-45	2.0	U
Camera	DC Jack (2 Pin)	Camera Adapter	Line-Out (DC Jack)	1.0	U

* Unshielded=U, Shielded=S

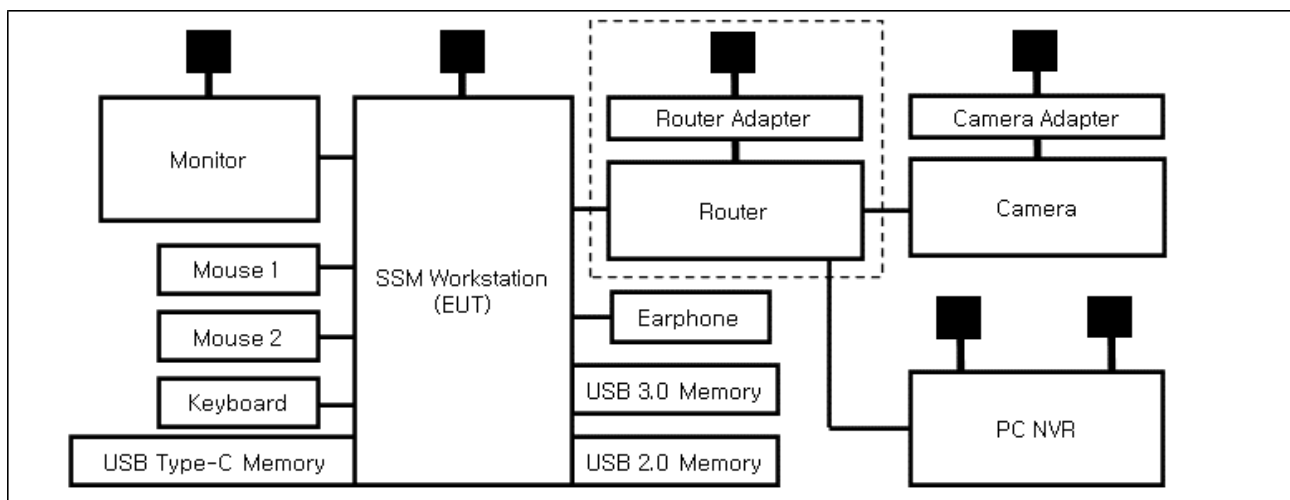
1.7 EUT Operating Mode(s)

Test Mode	operating
Operation	- Checked the video output of the EUT by using the A program from the EUT and checked whether the network function is working normally while performing a ping test. - After turning on the server in the PC NVR, run the SSM Console program of the EUT to check whether the camera image is output normally. - Repeat reading/writing data of connected memories using EMI TOOL program. - By playing the 1 KHz Sound on the EUT, check whether the sound is normally output from the earphone.

EUT Test operating S/W		
Name	Version	Manufacture Company
SSM Console	-	-
EMI TOOL	-	-

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 2016/1091**

☒ BS EN 55032:2015/A11:2020 ☒ Class A ☐ Class B

☒ BS EN 50130-4:2011

☒ BS EN 61000-3-2:2014

☒ BS EN 61000-3-3:2013



2.1 Conducted Emissions at Mains Power Ports

Test Date

Feb. 11, 2022

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	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022

Test Conditions

Temperature: (22,7 ± 0,1) °C

Relative Humidity: (42,9 ± 0,2) % 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

See Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Feb. 11, 2022

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	12, 28, 2022
☒	LISN	ENV216	R & S	101787	12, 27, 2022
☒	LISN	ESH2-Z5	R & S	100450	12, 27, 2022
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 27, 2022
☒	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 28, 2022
☐	ISN	ISN S8	SCHWARZBECK	ISN-S8-0019	03, 10, 2022

Test Conditions

Temperature: (22,7 ± 0,1) °C

Relative Humidity: (42,9 ± 0,2) % 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

- See Appendix A for test data.
- For Ethernet interfaces, measurements are required at the highest data rate supported by the interface.



2.3 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Feb. 11, 2022

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, 2022
☒	AMPLIFIER	SCU 01	R & S	100603	11, 24, 2022
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2022

Test Conditions

Temperature: (22,8 ± 0,2) °C
Relative Humidity: (43,2 ± 0,3) % 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

Remarks

See Appendix A for test data.



2.4 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Feb. 11, 2022

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, 03, 2022
☒	PREAMPLIFIER	8449B	AGILENT	3008A01967	04, 07, 2022
☐	ATTENUATOR	8491A	HP	35496	03, 10, 2022
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (22,8 ± 0,1) °C

Relative Humidity: (42,6 ± 0,2) % 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

Remarks

See Appendix A for test data.



2.5 Harmonic Current Emissions

Test Date

Feb. 11, 2022

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, 2022
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,1 ± 0,1) °C
Relative Humidity: (43,5 ± 0,1) % 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.



2.6 Voltage Fluctuations and Flicker

Test Date

Feb. 11, 2022

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, 2022
☒	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

Test Conditions

Temperature: (23,3 ± 0,1) °C
Relative Humidity: (43,2 ± 0,2) % R.H.

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks

See Appendix A for test data.

3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

EN 50130-4:2011 / BS EN 50130-4:2011/A1:2014 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
BS EN 61000-4-2:2009

Test Date

Feb. 13, 2022

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	ESS01Z0454	02, 01, 2022
☒	HCP	-	KES	-	-
☒	VCP	-	Noise Ken	-	-

Test Conditions

Temperature: (22,9 ± 0,1) °C
Relative Humidity: (42,7 ± 0,2) % R.H.
Atmospheric Pressure: (101,0 ± 0,0) 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 ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	Air ☒ 2 kV ☒ 4 kV ☐ 6 kV ☒ 8 kV ☐ 15 kV	HCP ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV	VCP ☐ 2 kV ☐ 4 kV ☒ 6 kV ☐ 8 kV ☐ 15 kV
--------------------	---	---	---	---

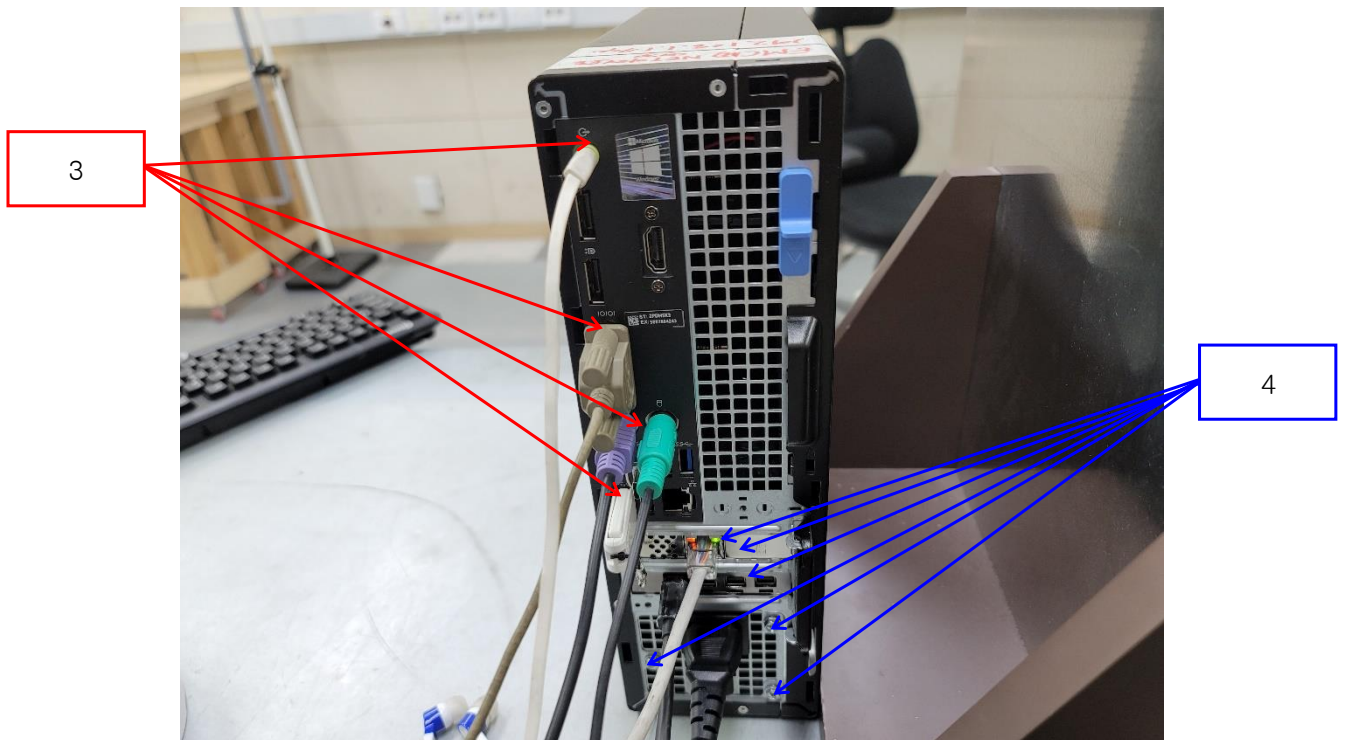
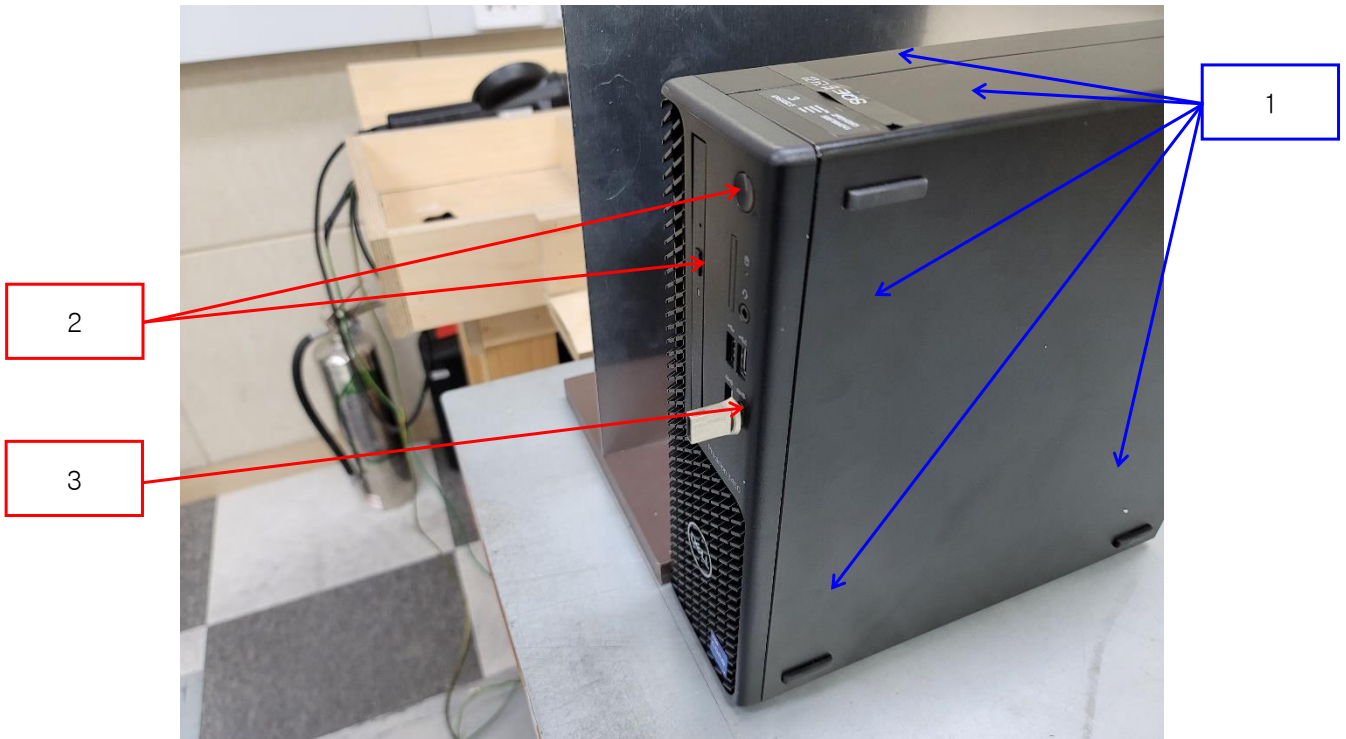
Notes: HCP: Horizontal coupling plane
VCP: Vertical coupling plane

Required Performance Criteria: ☒ Complied

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Location of Discharge:

Air
Contact



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (21) of (66)

Test Data

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	Enclosure	Contact Discharge	Complied	-
2	Button	Air Discharge	Complied	-
3	Ports	Air Discharge	Complied	-
4	RJ-45 Port, Back panel, Screws	Contact Discharge	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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

3.2 Radiated Electric Field Immunity

Reference Standard

EN 61000-4-3:2006 +A2:2010
BS EN 61000-4-3:2006 +A2:2010

Test Date

Feb. 12, 2022

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	10.10.02	-
☒	SIGNAL GENERATOR	SMB 100A	Rohde & Schwarz	108252	08, 03, 2022
☒	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
☒	POWER METER	E4419B	Agilent	GB40203000	04, 01, 2022
☒	CW POWER SENSOR	E4412A	Agilent	US38488240	04, 01, 2022
☒	CW POWER SENSOR	E4412A	Agilent	MY41501662	04, 01, 2022
☒	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
☒	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 11, 2022

Test Conditions

Temperature: (22,8 ± 0,2) °C
Relative Humidity: (42,9 ± 0,4) % R.H.
Atmospheric Pressure: (101,0 ± 0,0) kPa



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (23) of (66)

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (24) of (66)

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

3.3 Electrical Fast Transients/Bursts

Reference Standard

EN 61000-4-4:2012

BS EN 61000-4-4:2012

Test Date

Feb. 13, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	04, 01, 2022
☒	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	12, 03, 2022

Test Conditions

Temperature: (23,2 ± 0,2) °C
Relative Humidity: (42,1 ± 0,3) % R.H.
Atmospheric Pressure: (101,0 ± 0,0) kPa

Test Specifications

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

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

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	Complied	Complied
L – N	Complied	Complied
L – PE	Complied	Complied
N – PE	Complied	Complied
L – N – PE	Complied	Complied

☐ 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)
RJ-45	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

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (27) of (66)

3.4 Surge Transients

Reference Standard

EN 61000-4-5:2014

BS EN 61000-4-5:2014

Test Date

Feb. 13, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	12, 03, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	04, 01, 2022
☒	CDN	CNV 508N1	EM TEST	P1610176296	12, 03, 2022

Test Conditions

Temperature: (22,8 ± 0,1) °C
Relative Humidity: (42,8 ± 0,3) % R.H.
Atmospheric Pressure: (101,0 ± 0,0) kPa

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (28) of (66)

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

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (29) of (66)

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	Complied	Complied
N – PE	Complied	Complied

Signal Lines☒ Line to Earth – Common Mode

Mode of Application	Coupling Method	Observations	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45	CDN	Complied	Complied
	LINE	Complied	Complied

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

Test Results

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

RemarksPASS Required Performance Criteria



3.5 Conducted Disturbance

Reference Standard

EN 61000-4-6:2014
BS EN 61000-4-6:2014

Test Date

Feb. 13, 2022

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	5.3.12	-
☒	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 24, 2022
☒	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43694	11, 24, 2022
☒	CDN	CDN M016	TESEQ	43697	11, 24, 2022
☒	CDN	CDN T8RJ45	EM TEST	0909-09	08, 03, 2022
☐	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 25, 2022

Test Conditions

Temperature: (23,2 ± 0,2) °C
Relative Humidity: (43,0 ± 0,4) % R.H.
Atmospheric Pressure: (101,0 ± 0,0) kPa



KES Co., Ltd.

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (31) of (66)

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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (32) of (66)

Test Data☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Observations
L – N – PE	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
RJ-45	CDN	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**Remarks**PASS Required Performance Criteria

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (33) of (66)

3.6 Voltage Dips and Short Interruptions

Reference Standard

EN 61000-4-11:2004

BS EN 61000-4-11:2004

Test Date

Feb. 13, 2022

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	5.4.8	-
☒	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	04, 01, 2022
☒	MOTOR VARIAC	MV2616	EM TEST	P1552169719	04, 01, 2022

Test Conditions

Temperature: (23,1 ± 0,1) °C
Relative Humidity: (42,3 ± 0,1) % R.H.
Atmospheric Pressure: (101,0 ± 0,0) kPa

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr



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

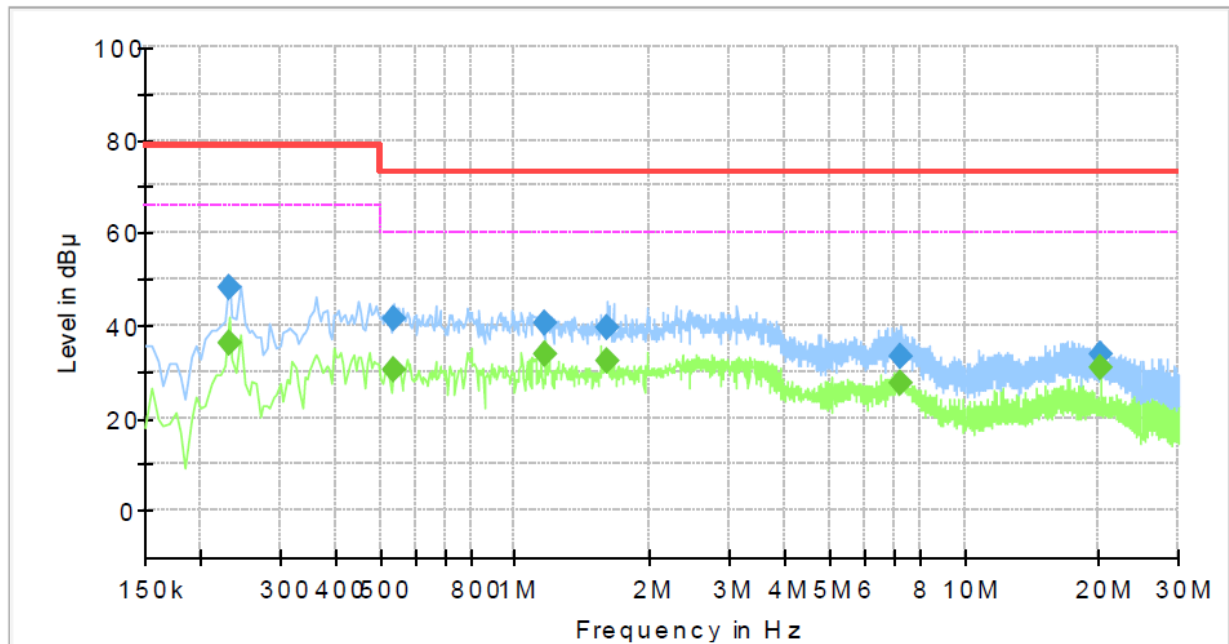
During the test(100%, 250cycle), EUT was turned off but after the test, it was recovered without operator's intervention.

APPENDIX A – TEST DATA

Conducted Emissions at Mains Power Ports [HOT]

Common Information

Test Description:	Conducted Emission
Model No.:	XWV-3010
Phase:	H
Mode:	-
Operator Name:	KES



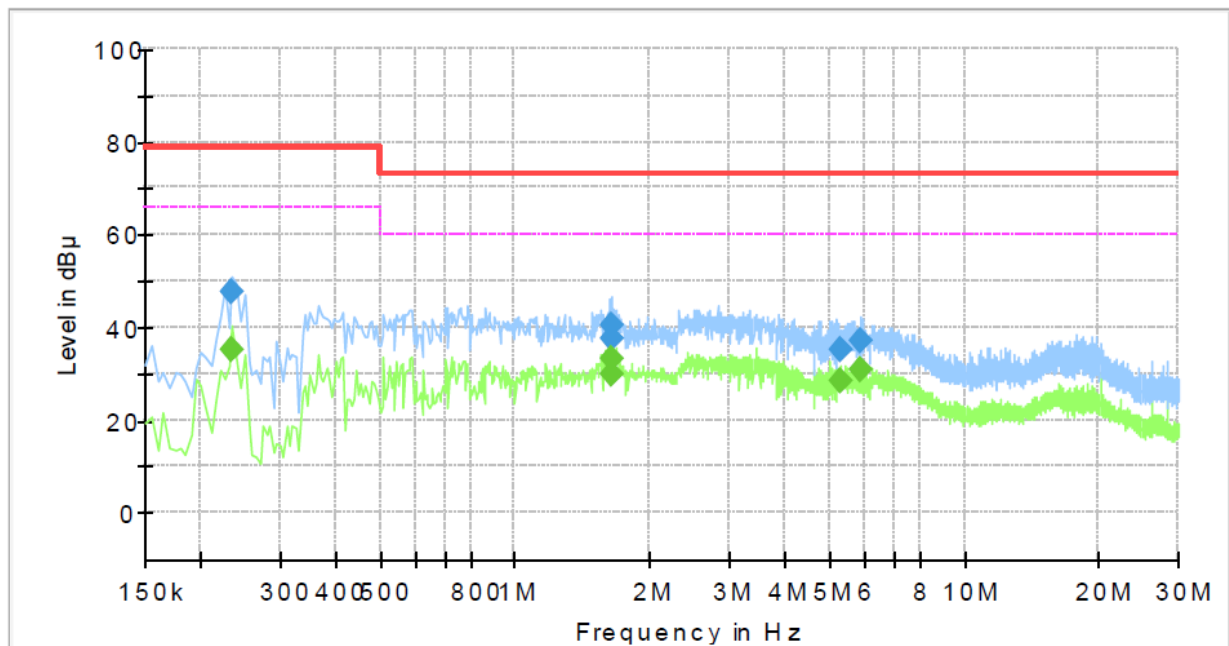
Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.230000	---	36.06	66.00	29.94	1000.0	9.000	L1	19.5
0.230000	47.98	---	79.00	31.02	1000.0	9.000	L1	19.5
0.535000	---	30.28	60.00	29.72	1000.0	9.000	L1	19.8
0.535000	41.47	---	73.00	31.53	1000.0	9.000	L1	19.8
1.170000	---	33.88	60.00	26.12	1000.0	9.000	L1	20.1
1.170000	40.22	---	73.00	32.78	1000.0	9.000	L1	20.1
1.605000	---	32.39	60.00	27.61	1000.0	9.000	L1	20.2
1.605000	39.65	---	73.00	33.35	1000.0	9.000	L1	20.2
7.260000	---	27.41	60.00	32.59	1000.0	9.000	L1	19.5
7.260000	33.41	---	73.00	39.59	1000.0	9.000	L1	19.5
20.230000	---	30.63	60.00	29.37	1000.0	9.000	L1	20.1
20.230000	33.66	---	73.00	39.34	1000.0	9.000	L1	20.1

[NEUTRAL]

Common Information

Test Description:	Conducted Emission
Model No.:	XWV-3010
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)
0.235000	---	35.07	66.00	30.93	1000.0	9.000	N	19.5
0.235000	47.80	---	79.00	31.20	1000.0	9.000	N	19.5
1.635000	---	33.27	60.00	26.73	1000.0	9.000	N	20.3
1.635000	40.61	---	73.00	32.39	1000.0	9.000	N	20.3
1.645000	---	30.05	60.00	29.95	1000.0	9.000	N	20.3
1.645000	37.37	---	73.00	35.63	1000.0	9.000	N	20.3
5.330000	---	28.19	60.00	31.81	1000.0	9.000	N	19.6
5.330000	35.29	---	73.00	37.71	1000.0	9.000	N	19.6
5.905000	---	30.76	60.00	29.24	1000.0	9.000	N	19.5
5.905000	37.12	---	73.00	35.88	1000.0	9.000	N	19.5

◆ 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))

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

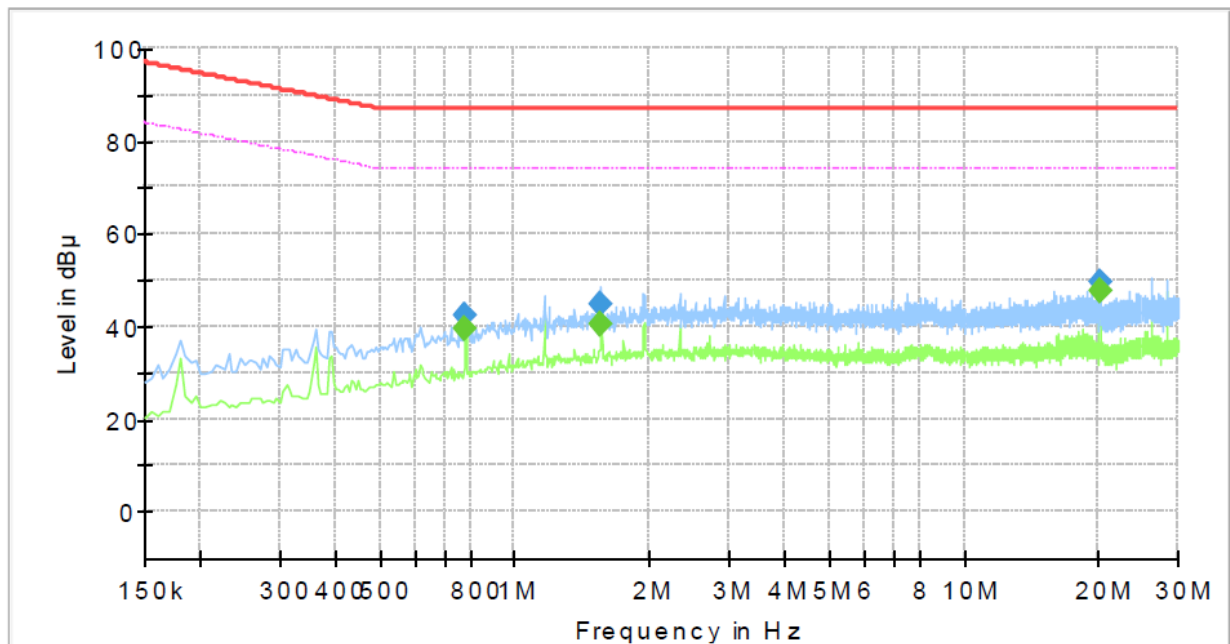
The authenticity of the test report, contact kes@kes.co.kr

Conducted Emissions at Telecommunication Ports

1 000 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	XWV-3010
Mode :	-
Speed :	1 000 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.775000	---	39.26	74.00	34.74	1000.0	9.000	Single Line	19.9
0.775000	42.58	---	87.00	44.42	1000.0	9.000	Single Line	19.9
1.550000	---	40.26	74.00	33.74	1000.0	9.000	Single Line	20.1
1.550000	44.53	---	87.00	42.47	1000.0	9.000	Single Line	20.1
20.230000	---	47.51	74.00	26.49	1000.0	9.000	Single Line	19.9
20.230000	49.74	---	87.00	37.26	1000.0	9.000	Single Line	19.9

◆ Calculation

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

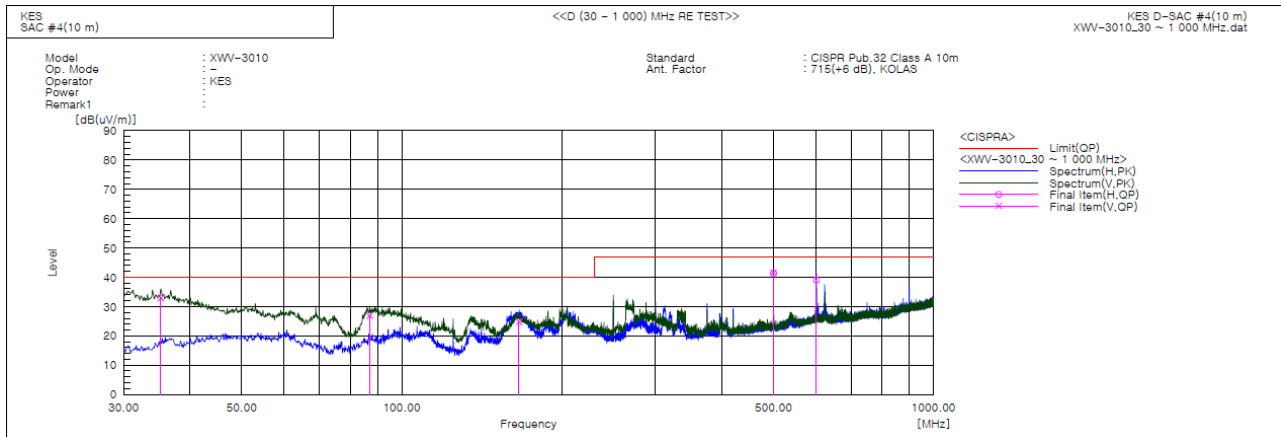
QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



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	35.214	V	57.7	-24.7	33.0	40.0	7.0	114.0	50.0	
2	86.988	V	52.2	-25.3	26.9	40.0	13.1	147.0	219.0	
3	166.043	V	49.2	-24.4	24.8	40.0	15.2	100.0	37.0	
4	499.965	V	53.1	-11.5	41.6	47.0	5.4	109.0	135.0	
5	500.012	H	52.9	-11.5	41.4	47.0	5.6	273.0	65.0	
6	602.300	H	47.6	-8.5	39.1	47.0	7.9	214.0	114.0	

◆ 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



KES Co., Ltd.

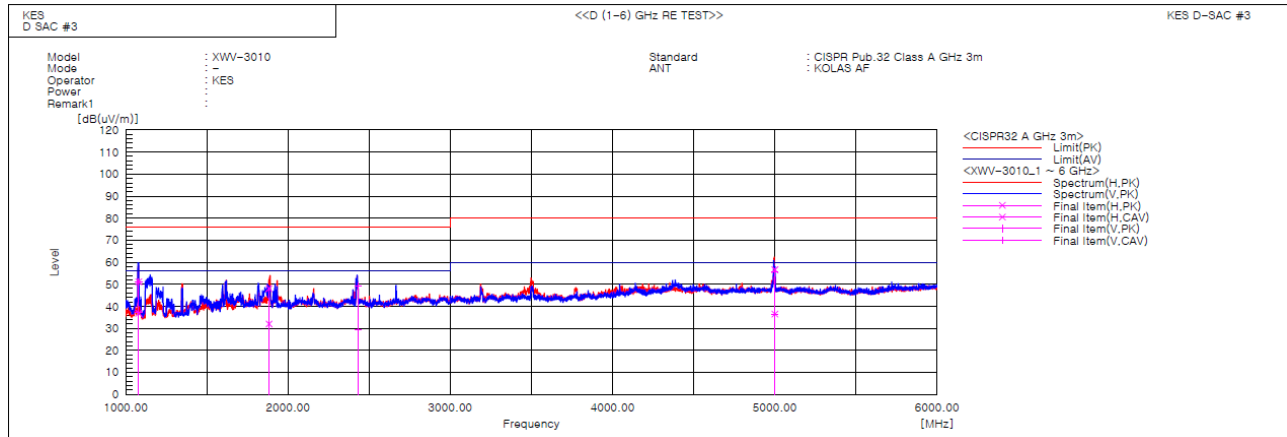
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-22T0223-R1

Page (39) of (66)

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	1079.439	V	59.8	46.1	-9.0	50.8	37.1	76.0	56.0	25.2	18.9	100.0	61.2	
2	1079.542	H	60.1	45.8	-9.0	51.1	36.8	76.0	56.0	24.9	19.2	100.0	177.7	
3	1883.161	H	49.7	33.7	-1.7	48.0	32.0	76.0	56.0	28.0	24.0	100.0	135.6	
4	2430.371	V	48.4	28.5	1.0	49.4	29.5	76.0	56.0	26.6	26.5	100.0	135.7	
5	4999.551	H	47.3	27.2	9.3	56.6	36.5	80.0	60.0	23.4	23.5	100.0	343.1	
6	5000.531	V	46.5	26.9	9.3	55.8	36.2	80.0	60.0	24.2	23.8	100.0	200.9	

◆ 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

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.

The authenticity of the test report, contact kes@kes.co.kr



Harmonic Current Emissions and Voltage Fluctuations and Flicker

Average harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	0.315			
2	0.003	0.295	1.080	n/a
3	0.047	2.042	2.300	PASS
4	0.003	0.744	0.430	n/a
5	0.016	1.407	1.140	PASS
6	0.002	0.664	0.300	n/a
7	0.008	1.051	0.770	PASS
8	0.002	0.735	0.230	n/a
9	0.012	2.995	0.400	PASS
10	0.001	0.767	0.184	n/a
11	0.011	3.338	0.330	PASS
12	0.001	0.854	0.153	n/a
13	0.007	3.558	0.210	PASS
14	0.001	1.020	0.131	n/a
15	0.006	4.145	0.150	PASS
16	0.001	1.082	0.115	n/a
17	0.004	2.694	0.132	n/a
18	0.001	1.269	0.102	n/a
19	0.005	3.926	0.118	n/a
20	0.001	1.436	0.092	n/a
21	0.005	2.997	0.161	n/a
22	0.001	1.448	0.084	n/a
23	0.004	2.746	0.147	n/a
24	0.001	1.509	0.077	n/a
25	0.005	3.440	0.135	n/a
26	0.001	1.495	0.071	n/a
27	0.002	1.817	0.125	n/a
28	0.001	1.647	0.066	n/a
29	0.003	2.532	0.116	n/a
30	0.001	1.649	0.061	n/a
31	0.004	3.356	0.109	n/a
32	0.001	1.848	0.058	n/a
33	0.004	3.506	0.102	n/a
34	0.001	1.887	0.054	n/a
35	0.002	2.581	0.096	n/a
36	0.001	1.966	0.051	n/a
37	0.002	1.933	0.091	n/a
38	0.001	2.088	0.048	n/a
39	0.002	2.292	0.087	n/a
40	0.001	2.191	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	0.361			
2	0.005	0.320	1.620	PASS
3	0.059	1.696	3.450	PASS
4	0.005	0.815	0.645	PASS
5	0.021	1.218	1.710	PASS
6	0.003	0.682	0.450	n/a
7	0.011	0.946	1.155	PASS
8	0.003	0.756	0.345	n/a
9	0.013	2.123	0.600	PASS
10	0.002	0.751	0.276	n/a
11	0.013	2.556	0.495	PASS
12	0.002	0.776	0.230	n/a
13	0.009	2.786	0.315	PASS
14	0.002	0.992	0.197	n/a
15	0.008	3.748	0.225	PASS
16	0.002	0.873	0.173	n/a
17	0.005	2.568	0.199	PASS
18	0.002	1.109	0.153	n/a
19	0.005	3.064	0.178	PASS
20	0.002	1.216	0.138	n/a
21	0.006	3.794	0.161	PASS
22	0.001	1.143	0.125	n/a
23	0.005	3.499	0.147	PASS
24	0.001	1.207	0.115	n/a
25	0.006	4.536	0.135	PASS
26	0.001	1.171	0.106	n/a
27	0.003	2.369	0.125	n/a
28	0.001	1.343	0.099	n/a
29	0.003	2.909	0.116	n/a
30	0.001	1.250	0.092	n/a
31	0.004	4.006	0.109	n/a
32	0.001	1.500	0.086	n/a
33	0.004	3.767	0.102	n/a
34	0.001	1.462	0.081	n/a
35	0.003	3.088	0.096	n/a
36	0.001	1.541	0.077	n/a
37	0.002	2.271	0.091	n/a
38	0.001	1.640	0.073	n/a
39	0.002	2.725	0.087	n/a
40	0.001	1.677	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.

**KES Co., Ltd.**

3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:
KES-EM-22T0223-R1
Page (42) of (66)

Test Data - Voltage Fluctuations

Maximum Flicker results

Flicker Measurements					
	Plt	Max Pst	Max Dc	Max Dmax	Max Tmax
Line 1:	0.038	0.041	0.026	< 0.2	0
Limits:	0.65	1	3.3	4	0.5
Results:	PASS	PASS	PASS	PASS	PASS

This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports



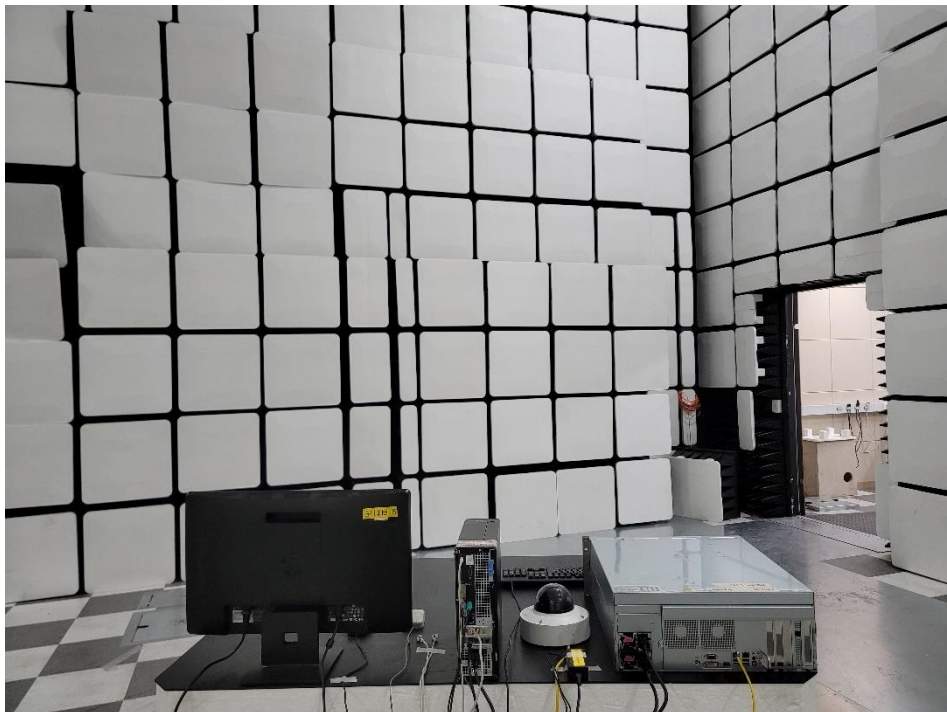
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Conducted Emissions at Telecommunication Ports



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Below 1 GHz)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Radiated Electric Field Emissions(Above 1 GHz)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

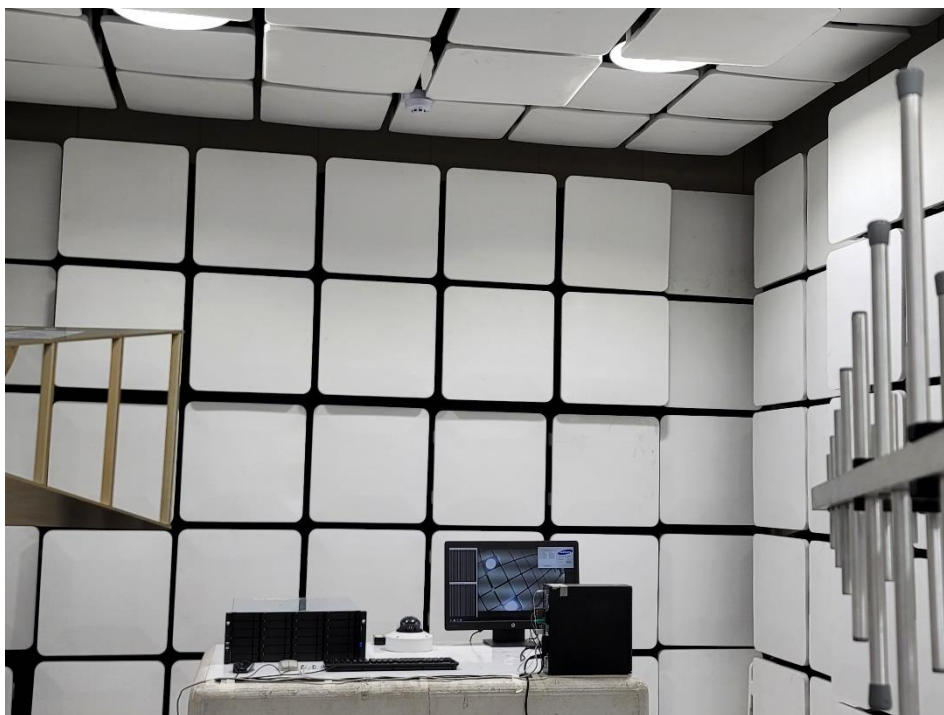
Harmonic Current Emissions and Voltage Fluctuations and Flicker



Electrostatic Discharge



Radiated Electric Field Immunity



Electrical Fast Transients/Bursts



Surge Transients

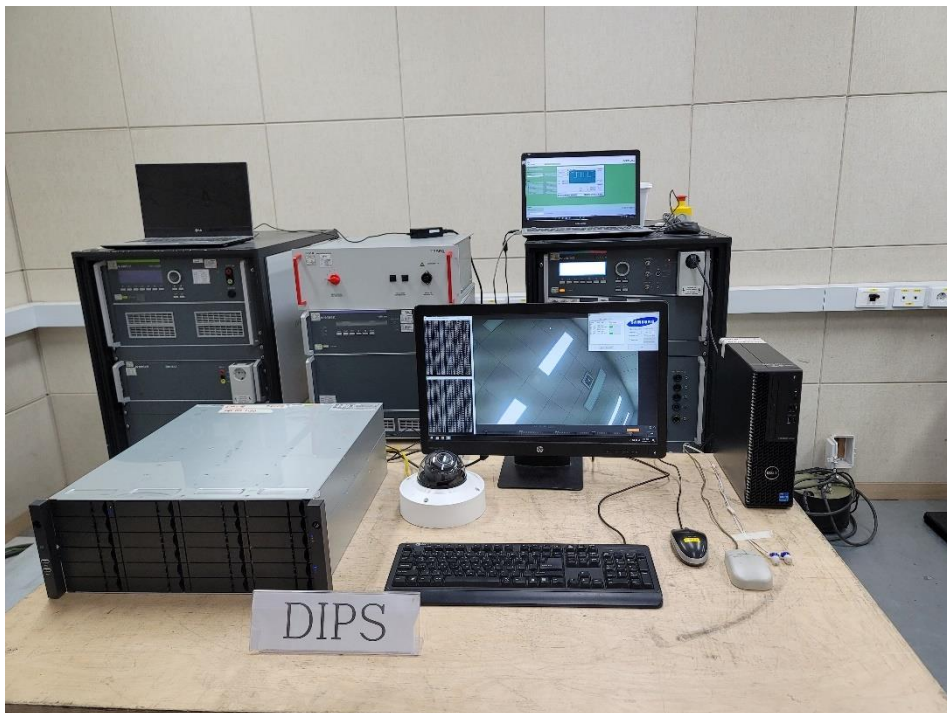


This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Conducted Disturbance



Voltage Dips and Short Interruptions



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT External Photographs

(Top)



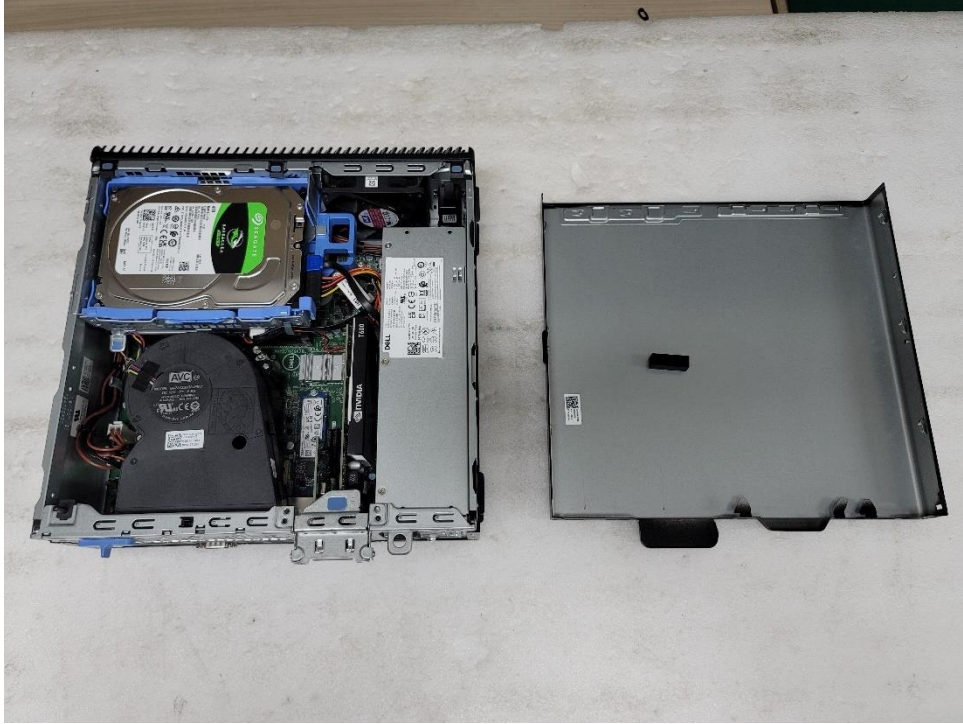
(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal Photographs

(Internal View)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – CPU

(Top)



(Bottom)



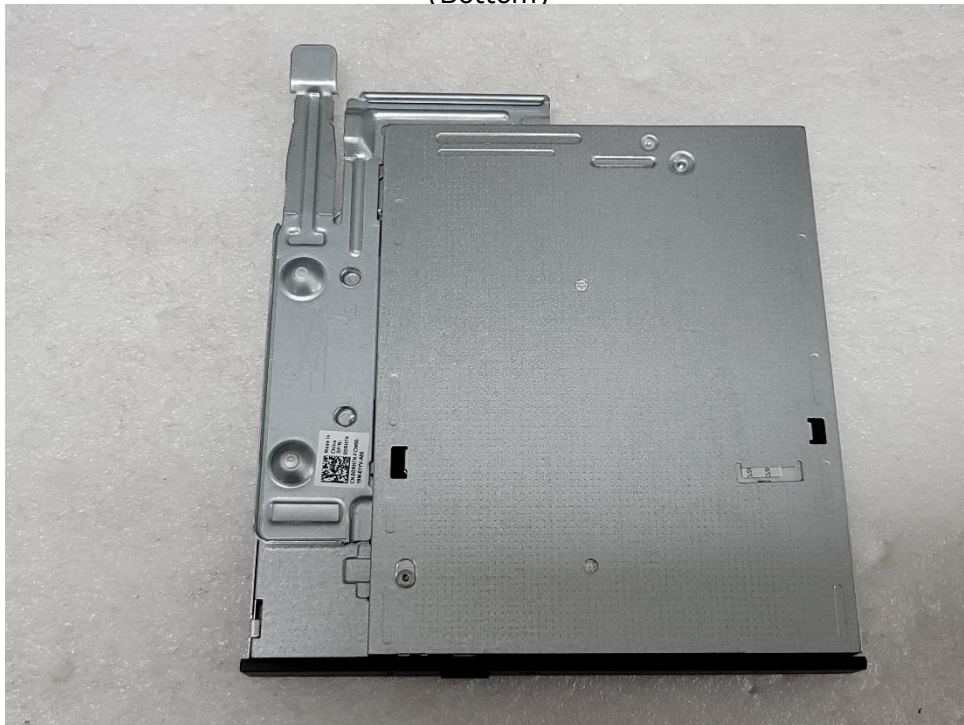
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – DVD-ROM

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Ethernet Adapter

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
 The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
 The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – FAN

(Top) - 1



(Top) - 2



EUT Internal View – HDD

(Top)



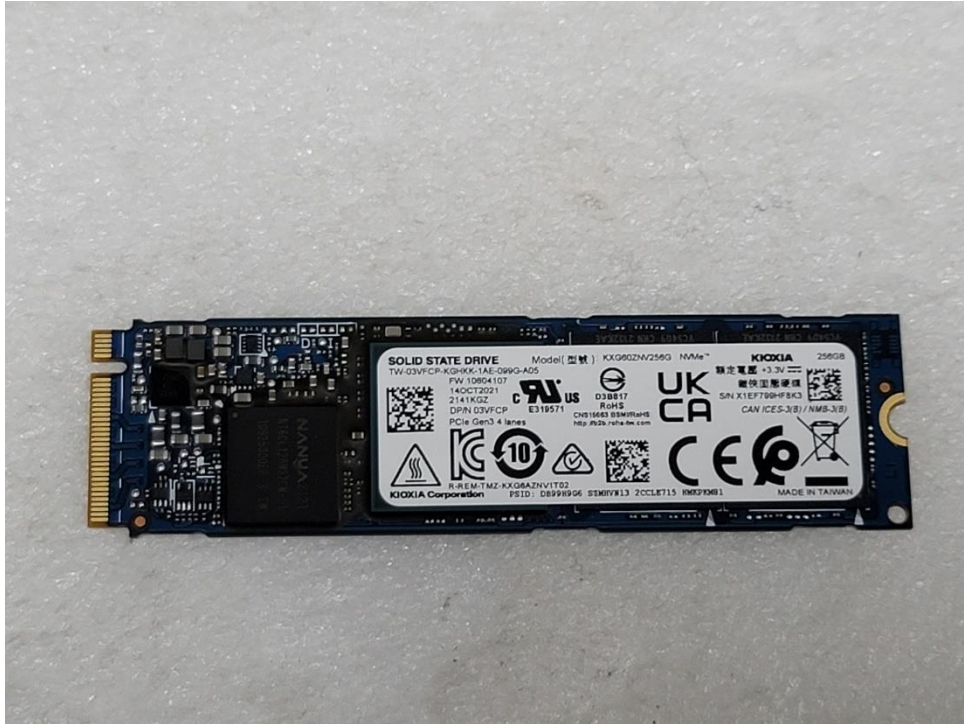
(Bottom)



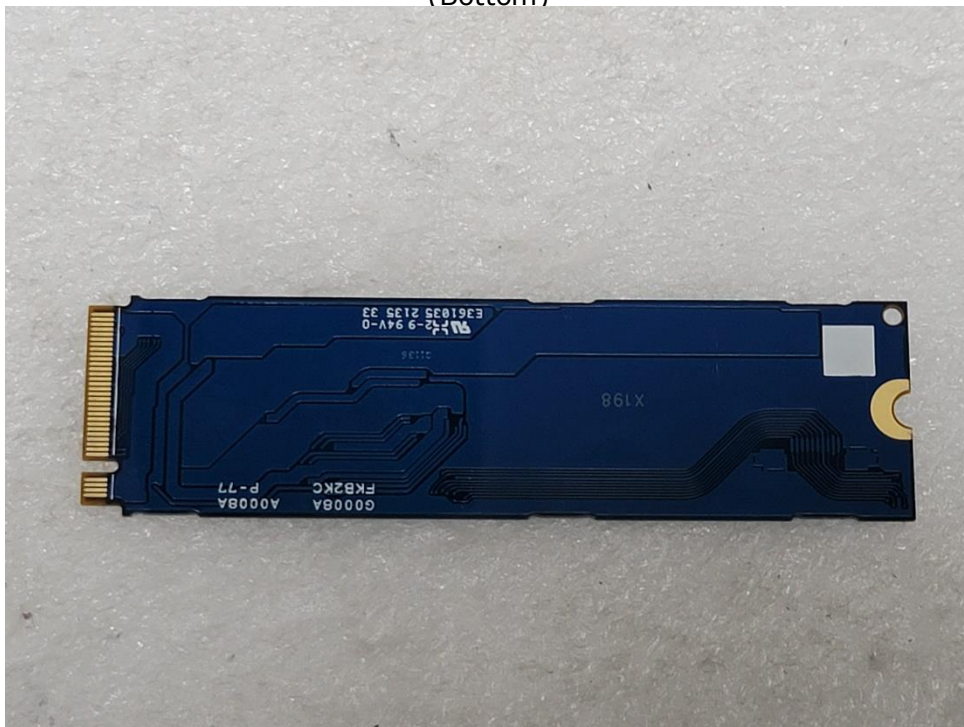
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – M.2 SSD

(Top)



(Bottom)



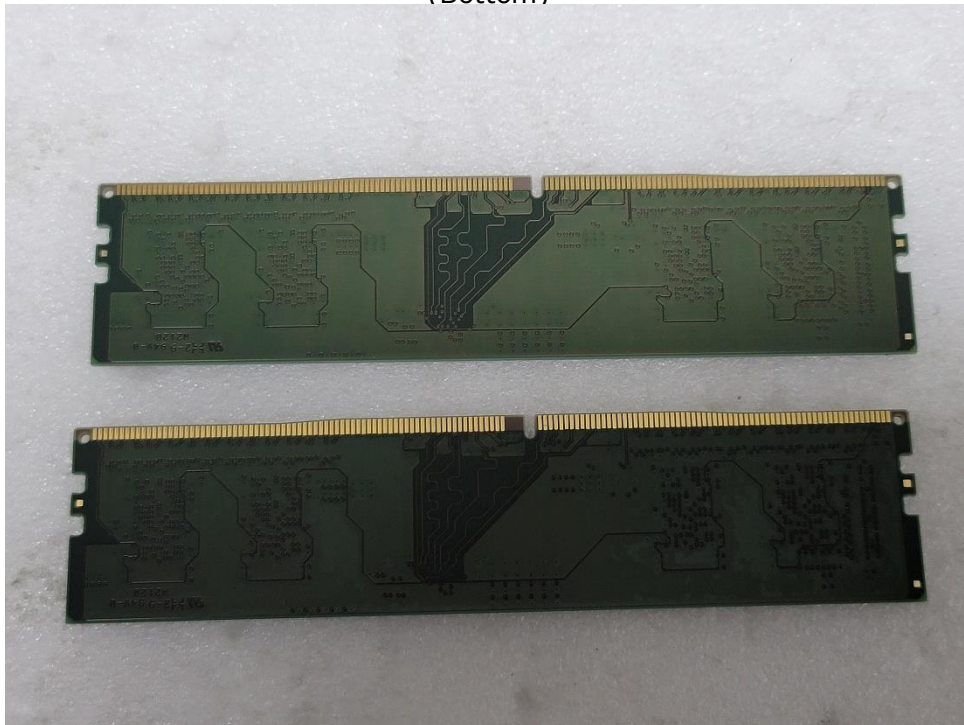
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Memory

(Top)



(Bottom)



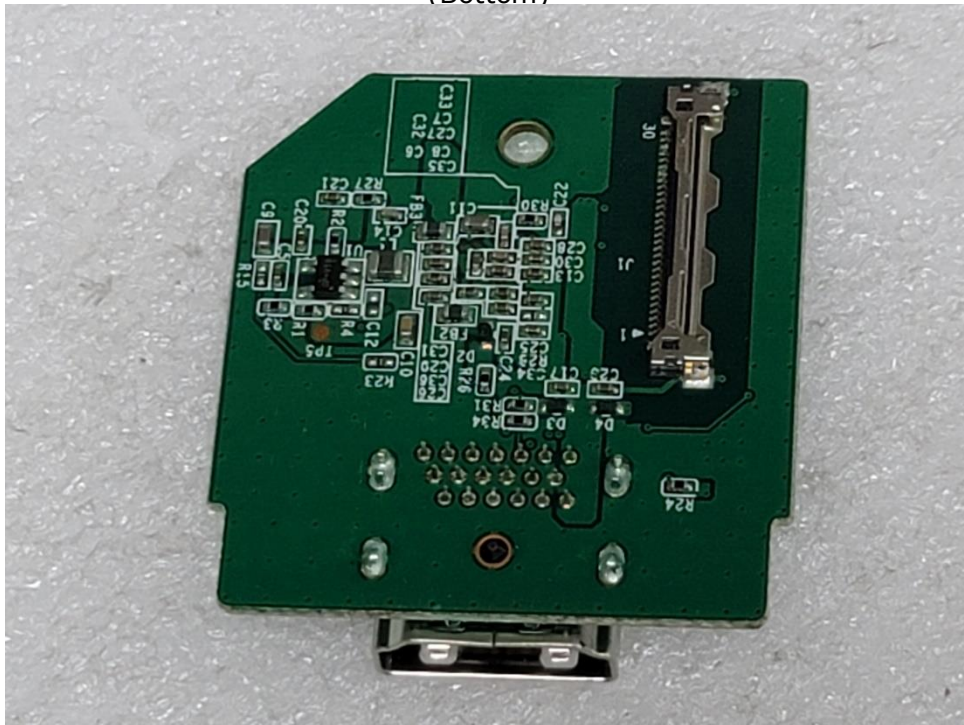
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – USB Board

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Graphic Card

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Mother Board

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Speaker

(Top)



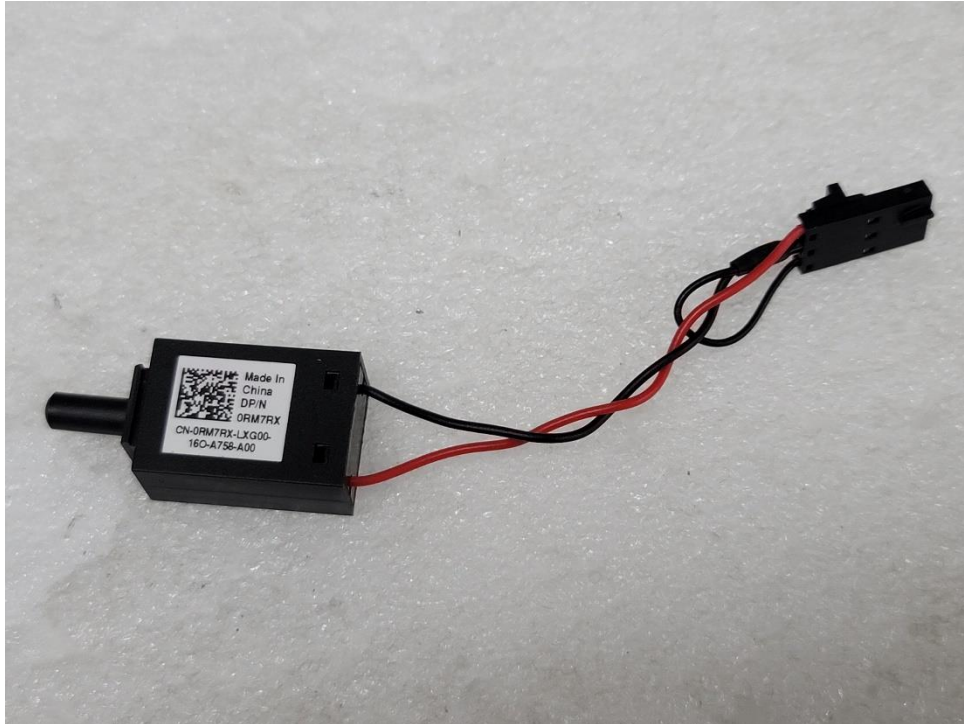
(Bottom)



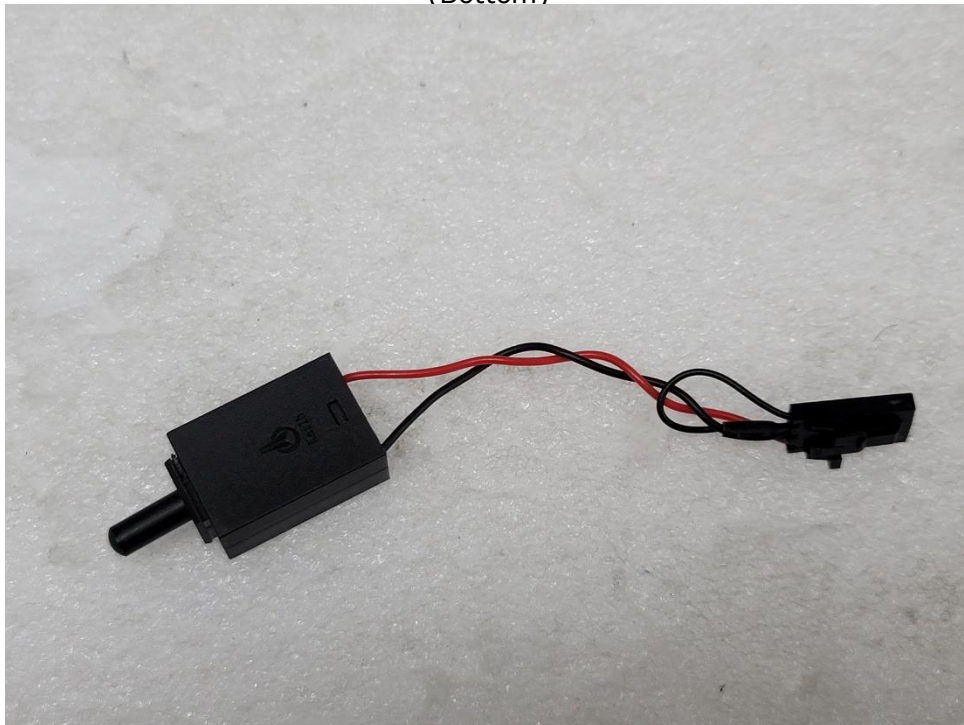
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

EUT Internal View – Cover Sensor

(Top)

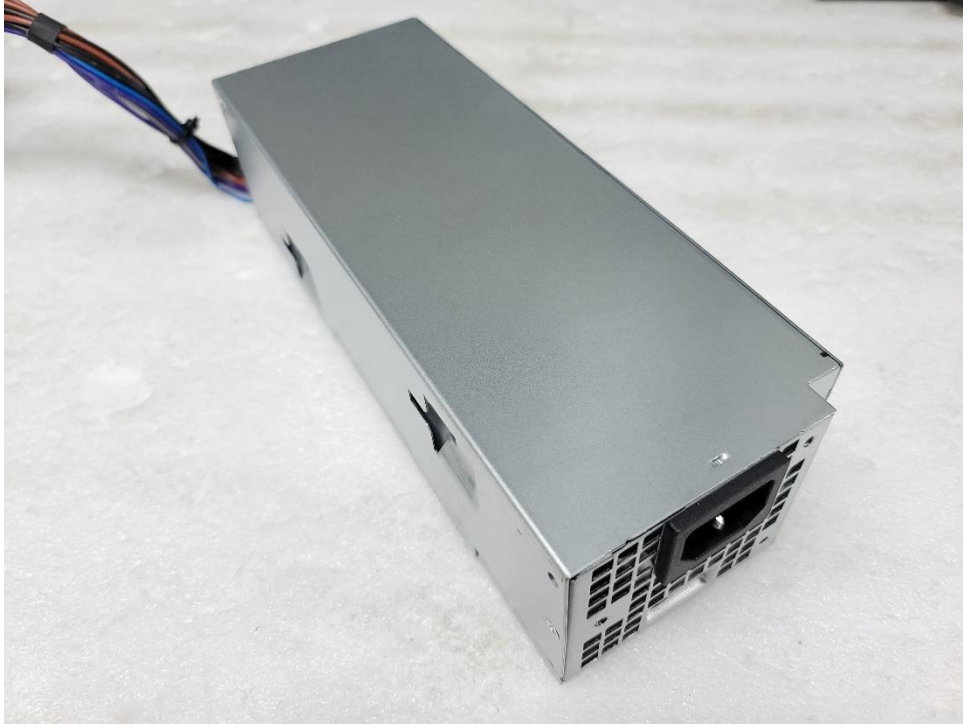


(Bottom)



EUT Internal View – Power Supply

(Top)



(Bottom)



This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.
The authenticity of the test report, contact kes@kes.co.kr

Label and Location



SSM Workstation

Model No : XWV-3010

Manufacturer : Dell (China) Company Limited

Made in China

