



## EMC TEST REPORT For CE

Test Report No. : KES-E1-19T0103-R1  
Date of Issue : Feb. 24, 2023  
Product name : Network Camera  
Model/Type No. : XND-8081RF  
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 : Jan. 21, 2019  
Test date : Feb. 16, 2019 ~ Feb. 18, 2019  
Test Results : ☒ In Compliance ☐ Not in Compliance

Tested by

Young Ho, Lee  
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-E1-19T0103-R1  
Page (2) of (66)

## REPORT REVISION HISTORY

| Date          | Test Report No.   | Revision History                                                                                                         |
|---------------|-------------------|--------------------------------------------------------------------------------------------------------------------------|
| Feb. 19, 2019 | KES-E1-19T0103    | Issued                                                                                                                   |
| Feb. 24, 2023 | KES-E1-19T0103-R1 | Change the Applicant and manufacturer at the request of the customer,<br>Factory deletion at the request of the customer |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |
|               |                   |                                                                                                                          |

***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 .....                             | 7  |
| 1.2                                                                   | Variant Model Differences.....                             | 7  |
| 1.3                                                                   | Device Modifications .....                                 | 7  |
| 1.4                                                                   | Equipment Under Test.....                                  | 7  |
| 1.5                                                                   | Support Equipments .....                                   | 7  |
| 1.6                                                                   | External I/O Cabling .....                                 | 8  |
| 1.7                                                                   | EUT Operating Mode(s) .....                                | 9  |
| 1.8                                                                   | Configuration.....                                         | 10 |
| 1.9                                                                   | Remarks when standards applied .....                       | 11 |
| 1.10                                                                  | Calibration Details of Equipment Used for Measurement..... | 11 |
| 1.11                                                                  | Test Facility .....                                        | 11 |
| 1.12                                                                  | Laboratory Accreditations and Listings .....               | 11 |
| 2.0                                                                   | Test Regulations.....                                      | 11 |
| 2.1                                                                   | Conducted Emissions at Mains Power Ports .....             | 14 |
| 2.2                                                                   | Conducted Emissions at Telecommunication Ports .....       | 15 |
| 2.3                                                                   | Radiated Electric Field Emissions(Below 1 GHz) .....       | 16 |
| 2.4                                                                   | Radiated Electric Field Emissions(Above 1 GHz) .....       | 17 |
| 2.5                                                                   | Harmonic Current Emissions .....                           | 18 |
| 2.6                                                                   | Voltage Fluctuations and Flicker .....                     | 19 |
| 3.0                                                                   | Criteria for compliance .....                              | 20 |
| 3.1                                                                   | Electrostatic Discharge.....                               | 22 |
| 3.2                                                                   | Radiated Electric Field Immunity .....                     | 25 |
| 3.3                                                                   | Electrical Fast Transients/Bursts .....                    | 28 |
| 3.4                                                                   | Surge Transients .....                                     | 31 |
| 3.5                                                                   | Conducted Disturbance .....                                | 34 |
| 3.6                                                                   | Voltage Dips and Short Interruptions .....                 | 37 |
| APPENDIX A – TEST DATA.....                                           |                                                            | 39 |
| Conducted Emissions at Mains Power Ports.....                         |                                                            | 39 |
| Conducted Emissions at Telecommunication Ports .....                  |                                                            | 41 |
| Radiated Electric Field Emissions(Below 1 GHz) .....                  |                                                            | 45 |
| Radiated Electric Field Emissions(Above 1 GHz).....                   |                                                            | 47 |
| Harmonic Current Emissions and Voltage Fluctuations and Flicker ..... |                                                            | 49 |
| Test Setup Photos and Configuration .....                             |                                                            | 52 |
| Conducted Voltage Emissions .....                                     |                                                            | 52 |
| Conducted Telecommunication Emissions .....                           |                                                            | 53 |
| Radiated Electric Field Emissions(Below 1 GHz) .....                  |                                                            | 54 |
| Radiated Electric Field Emissions(Above 1 GHz).....                   |                                                            | 55 |
| Harmonic Current Emissions and Voltage Fluctuations and Flicker ..... |                                                            | 56 |
| Electrostatic Discharge .....                                         |                                                            | 57 |
| Radiated Electric Field Immunity .....                                |                                                            | 57 |
| Electrical Fast Transients/Bursts .....                               |                                                            | 58 |
| Surge Transients .....                                                |                                                            | 58 |
| Conducted Disturbance.....                                            |                                                            | 59 |
| Voltage Dips and Short Interruptions .....                            |                                                            | 59 |
| EUT External Photographs .....                                        |                                                            | 60 |
| EUT Internal Photographs .....                                        |                                                            | 61 |



## 1.0 General Product Description

### Main Specifications of EUT are:

| Items               |                             | Description                                                                                                                                                                                                                                      |                      |                      |
|---------------------|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------|
|                     |                             | XNV-6081/XNV-6081R                                                                                                                                                                                                                               | XND-6081V/XND-6081RV | XND-6081F/XND-6081RF |
| Video               | Imaging Device              | 1/2.8" 2MP CMOS                                                                                                                                                                                                                                  |                      |                      |
|                     | Effective Pixels            | 1945(H) x 1097(V)                                                                                                                                                                                                                                |                      |                      |
|                     | NETD                        | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Pixel Size                  | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Min. Illumination           | XNV-6081/XND-6081V/XND-6081F - Color : 0.015 Lux(F1.4, 1/30sec),<br>B/W : 0.0015 Lux(F1.4, 1/30sec)<br>XNV-6081R/XND-6081RV/XND-6081RF - Color : 0.015 Lux(F1.4, 1/30sec),<br>B/W : 0 Lux(IR LED on)                                             |                      |                      |
|                     | Video Out                   | CVBS: 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P) for installation<br>USB : Micro USB type B, 1280x720 for installation                                                                                                                     |                      |                      |
| Lens                | Focal Length (Zoom Ratio)   | 2.8~12mm(4.3x) motorized varifocal                                                                                                                                                                                                               |                      |                      |
|                     | Max. Aperture Ratio         | F1.4(Wide) ~ F3.6(Tele)                                                                                                                                                                                                                          |                      |                      |
|                     | Angular Field of View       | H : 119.5°(Wide) ~ 27.9°(Tele)<br>V : 62.8°(Wide) ~ 15.7°(Tele)<br>D : 142.1°(Wide) ~ 32.0°(Tele)                                                                                                                                                |                      |                      |
|                     | Min. Object Distance        | 0.5m (1.64ft)                                                                                                                                                                                                                                    |                      |                      |
|                     | Focus Control               | Simple focus                                                                                                                                                                                                                                     |                      |                      |
|                     | Lens Type                   | DC Auto Iris, P-Iris                                                                                                                                                                                                                             |                      |                      |
|                     | Mount Type                  | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Optional Lens               | None                                                                                                                                                                                                                                             |                      |                      |
| Pan / Tilt / Rotate | Pan / Tilt / Rotate range   | 0°~360° / -45°~85° / 0°~355°                                                                                                                                                                                                                     |                      |                      |
|                     | Pan Range                   | Remote adjustment (Max. 200 cycles)                                                                                                                                                                                                              |                      |                      |
|                     | Pan Speed                   | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Tilt Range                  | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Tilt Speed                  | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Rotate Range                | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Sequence                    | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Preset Accuracy             | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Azimuth                     | None                                                                                                                                                                                                                                             |                      |                      |
| Operational         | Auto Tracking               | None                                                                                                                                                                                                                                             |                      |                      |
|                     | IR Viewable Length          | 50m(164.04ft)                                                                                                                                                                                                                                    |                      |                      |
|                     | Camera Title                | Displayed up to 85 characters                                                                                                                                                                                                                    |                      |                      |
|                     | Day & Night                 | Auto (ICR)                                                                                                                                                                                                                                       |                      |                      |
|                     | Backlight Compensation      | BLC, HLC, WDR, SSDR                                                                                                                                                                                                                              |                      |                      |
|                     | Wide Dynamic Range          | 150dB                                                                                                                                                                                                                                            |                      |                      |
|                     | Digital Noise Reduction     | SSNR V                                                                                                                                                                                                                                           |                      |                      |
|                     | Digital Image Stabilization | Support (built-in Gyro Sensor)                                                                                                                                                                                                                   |                      |                      |
|                     | Defog                       | Support                                                                                                                                                                                                                                          |                      |                      |
|                     | Motion Detection            | Bea, 8point Polygonal zones                                                                                                                                                                                                                      |                      |                      |
|                     | Privacy Masking             | 32ea, polygonal zones<br>~ Color : Gray, Green, Red, Blue, Black, White<br>~ Mosaic                                                                                                                                                              |                      |                      |
|                     | Gain Control                | Low / Middle / High                                                                                                                                                                                                                              |                      |                      |
|                     | White Balance               | ATW / AWC / Manual / Indoor / Outdoor                                                                                                                                                                                                            |                      |                      |
|                     | LDC                         | Support                                                                                                                                                                                                                                          |                      |                      |
|                     | Electronic Shutter Speed    | Minimum / Maximum / Anti flicker (2 ~ 1/12,000sec)                                                                                                                                                                                               |                      |                      |
|                     | Video Rotation              | Flip, Mirror, Halfway view(90°/270°)                                                                                                                                                                                                             |                      |                      |
|                     | Analytics                   | Defocus detection, Directional detection, Fog detection, Face detection,<br>Motion detection, Digital auto tracking, Appear/Disappear, Enter/Exit, Loitering,<br>Tampering, Virtual line, Audio detection, Sound classification, Shock detection |                      |                      |
|                     | Business Intelligence       | People counting, Queue management, Heatmap                                                                                                                                                                                                       |                      |                      |
|                     | Serial Interface            | None                                                                                                                                                                                                                                             |                      |                      |
|                     | Alarm I/O                   | Input 1ea / Output 1ea                                                                                                                                                                                                                           |                      |                      |
|                     | Alarm Triggers              | Analytics, Network disconnect, Alarm input                                                                                                                                                                                                       |                      |                      |

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-E1-19T0103-R1  
Page (5) of (66)

| Items       | Description                       |                                                                                                                                                                                                                                              |                                                                                                          |
|-------------|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
|             | XNV-6081/XNV-6081R                | XND-6081V/XND-6081RV                                                                                                                                                                                                                         | XND-6081F/XND-6081RF                                                                                     |
| Operational | Alarm events                      | <ul style="list-style-type: none"><li>• File upload via FTP, E-Mail</li><li>• Notification via E-Mail</li><li>• SD/SDHC/SDXC or NAS recording at event triggers</li><li>• Alarm output</li><li>• Handover</li><li>• Audio playback</li></ul> |                                                                                                          |
|             | Audio In                          | Selectable (Mic IN/Line IN)<br>Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm                                                                                                                                                  | Selectable (Mic IN/Line IN/Built-in mic)<br>Supply voltage: 2.5VDC(4mA), Input impedance: approx. 2K Ohm |
|             | Audio out                         | Line out, Max output level: 1 Vrms                                                                                                                                                                                                           |                                                                                                          |
|             | Wiper                             | None                                                                                                                                                                                                                                         |                                                                                                          |
|             | Coaxial Protocol                  | None                                                                                                                                                                                                                                         |                                                                                                          |
|             | Video Transmission Distance       | None                                                                                                                                                                                                                                         |                                                                                                          |
| Radiometry  | Temperature detect range          | None                                                                                                                                                                                                                                         |                                                                                                          |
|             | Temperature accuracy              | None                                                                                                                                                                                                                                         |                                                                                                          |
|             | Temperature detection             | None                                                                                                                                                                                                                                         |                                                                                                          |
|             | Additional                        | None                                                                                                                                                                                                                                         |                                                                                                          |
| Network     | Ethernet                          | RJ-45 (10/100BASE-T)                                                                                                                                                                                                                         |                                                                                                          |
|             | Video Compression                 | H.265/H.264: Main/Baseline/High, MJPEG                                                                                                                                                                                                       |                                                                                                          |
|             | Resolution                        | 1920x1080, 1280x1024, 1280x960, 1280x720, 1024x768, 800x600, 800x448, 720x576, 720x480, 640x480, 640x360, 320x240                                                                                                                            |                                                                                                          |
|             | Max. Framerate                    | H.265/H.264: Max. 60fps/50fps(60Hz/50Hz)<br>MJPEG: Max. 30fps/25fps(60Hz/50Hz)                                                                                                                                                               |                                                                                                          |
| Network     | Smart Codec                       | Manual(Sea area), WiseStream II                                                                                                                                                                                                              |                                                                                                          |
|             | Bitrate Control                   | H.264/H.265 : CBR or VBR<br>MJPEG : VBR                                                                                                                                                                                                      |                                                                                                          |
|             | Streaming                         | Unicast(20 users) / Multicast<br>Multiple streaming(Up to 10 profiles)                                                                                                                                                                       |                                                                                                          |
|             | Audio Compression                 | G.711 $\mu$ -law /G.726 Selectable<br>G.726 (ADPCM) 8KHz, G.711 8KHz<br>G.726 : 16Kbps, 24Kbps, 32Kbps, 40Kbps<br>AAC-LC : 48Kbps at 16KHz                                                                                                   |                                                                                                          |
|             | Protocol                          | IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTP(TCP), RTCP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, PIM-SM, UPnP, Bonjour, LLDP                                                   |                                                                                                          |
|             | Security                          | HTTPS(SSL) Login Authentication<br>Digest Login Authentication<br>IP Address Filtering<br>User access Log<br>802.1x Authentication (EAP-TLS, EAP-LEAP)                                                                                       |                                                                                                          |
|             | Edge Storage                      | Micro SD/SDHC/SDXC 2slot 512GB                                                                                                                                                                                                               |                                                                                                          |
|             | Application Programming Interface | ONVIF Profile S/G/T<br>SUNAPI(HTTP API)<br>Wisenet Open Platform                                                                                                                                                                             |                                                                                                          |
|             | Web Viewer                        | Supported OS : Windows 7 / 8.1 / 10, MAC OS X 10.10, 10.11, 10.12<br>Recommended Browser : Google Chrome<br>Supported web browsers : MS Explorer11, MS Edge, Mozilla Firefox (Window 64bit only), Apple Safari (Mac OS X only)               |                                                                                                          |
|             | Memory                            | 1024MB RAM, 256MB Flash                                                                                                                                                                                                                      |                                                                                                          |

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-E1-19T0103-R1  
Page (6) of (66)

| Items         |                                  | Description                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                   |                                            |
|---------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|--------------------------------------------|
|               |                                  | XNV-6081/XNV-6081R                                                                                                                                                                                                                                                                                                                                                                                                               | XND-6081V/XND-6081RV                              | XND-6081F/XND-6081RF                       |
| Environmental | Operating Temperature / Humidity | -50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH<br>* Start up should be done at above -35°C                                                                                                                                                                                                                                                                                                                                    | -25°C ~ +60°C (-13°F ~ +140°F) / Less than 90% RH |                                            |
|               | Storage Temperature / Humidity   | -50°C ~ +60°C (-58°F ~ +140°F) / Less than 90% RH                                                                                                                                                                                                                                                                                                                                                                                |                                                   |                                            |
|               | Certification                    | IP66/IP67, IK10+, NEMA4X                                                                                                                                                                                                                                                                                                                                                                                                         | IP52, IK10                                        | IP52, Plenum rate(UL2820)                  |
| Electrical    | Input Voltage                    | PoE(IEEE802.3af, Class3), 24VAC, 12VDC                                                                                                                                                                                                                                                                                                                                                                                           | PoE(IEEE802.3af, Class3), 12VDC                   |                                            |
|               | Power Consumption                | XNV-6081 - PoE: Max 7.0W, typical 4.90W<br>12VDC: Max 5.4W, typical 3.70W<br>24VAC: Max 7.1W, typical 4.90W<br><br>XNV-6081R - PoE: Max 12.95W, typical 10.30W<br>12VDC: Max 10.8W, typical 8.40W<br>24VAC: Max 13.3W, typical 10.40W<br><br>XND-6081V/XND-6081F - PoE: Max 7.0W, typical 4.20W<br>12VDC: Max 5.4W, typical 3.10W<br><br>XND-6081RV/XND-6081RF - PoE: Max 12.95W, typical 9.4W<br>12VDC: Max 10.8W, typical 7.6W |                                                   |                                            |
|               |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                   |                                            |
| Mechanical    | Color / Material                 | White / Aluminum                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   |                                            |
|               | RAL Code                         | RAL9003                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                   |                                            |
|               | Product dimensions / weight      | XNV-6081 :<br>Ø180x125mm(7.09x4.92"),<br>1.45kg(3.20 lb)<br><br>XNV-6081R :<br>Ø180x125mm(7.09x4.92"),<br>1.75kg(3.86 lb)                                                                                                                                                                                                                                                                                                        | Ø160x125mm<br>(6.30x4.92"),<br>1.45kg(3.20 lb)    | Ø205x155mm(8.07x6.10"),<br>1.80kg(3.97 lb) |

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.

Voltage ☐ 230Vac ☐ 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 |
|----------------|--------------|---------------|---------------------------------------------|---------|
| Network Camera | XND-8081RF   | -             | HANWHA VISION<br>VIETNAM COMPANY<br>LIMITED | EUT     |

## 1.5 Support Equipments

| Description         | Model Number   | Serial Number          | Manufacturer                                     | Remarks |
|---------------------|----------------|------------------------|--------------------------------------------------|---------|
| PoE Adaptor         | ANY4805C-LT1   | RD935608201696420<br>0 | Power Dsine                                      | -       |
| Notebook            | ProBook4430s   | -                      | HP                                               | -       |
| Notebook<br>Adaptor | SeriesPPP0009H | -                      | CHICONY POWER<br>TECHNOLOGY<br>(SUZHOU) CO.,LTD, | -       |
| Speaker             | BR10000A CUVE  | -                      | BEIJING EDIFIER HI-<br>TECH GROUP.               | -       |
| MIC                 | CMK-303        | -                      | CAMAC                                            | -       |
| Alarm 1             | SIP-1201DD D0  | -                      | SAMSUNG TECHWIN<br>CO., LTD.                     | -       |
| Alarm 2             | -              | -                      | -                                                | -       |
| Cellular phone      | LG-SU760       | 108KPQJ0186212         | LG                                               | -       |

## 1.6 External I/O Cabling

### ■ DC 12 V

| Start                |           | END            |           | Cable Spec. |        |
|----------------------|-----------|----------------|-----------|-------------|--------|
| Description          | I/O Port  | Description    | I/O Port  | Length      | Shield |
| Network Camera (EUT) | RJ-45     | Notebook       | RJ-45     | 3.0         | U      |
|                      | 3.5 mm    | Speaker        | 3.5 mm    | 1.6         | U      |
|                      | 3.5 mm    | MIC            | 3.5 mm    | 1.7         | U      |
|                      | Alarm Out | Alarm 1        | Alarm In  | 3.0         | U      |
|                      | Alarm In  | Alarm 2        | Alarm Out | 3.0         | U      |
| Notebook             | 3.5 mm    | Cellular phone | 3.5 mm    | 1.0         | U      |

\* Unshielded=U, Shielded=S

### ■ PoE

| Start                |           | END            |           | Cable Spec. |        |
|----------------------|-----------|----------------|-----------|-------------|--------|
| Description          | I/O Port  | Description    | I/O Port  | Length      | Shield |
| Network Camera (EUT) | RJ-45     | PoE Adaptor    | RJ-45     | 3.0         | U      |
|                      | 3.5 mm    | Speaker        | 3.5 mm    | 1.6         | U      |
|                      | 3.5 mm    | MIC            | 3.5 mm    | 1.7         | U      |
|                      | Alarm Out | Alarm 1        | Alarm In  | 3.0         | U      |
|                      | Alarm In  | Alarm 2        | Alarm Out | 3.0         | U      |
| Notebook             | 3.5 mm    | Cellular phone | 3.5 mm    | 1.0         | U      |
|                      | RJ-45     | PoE Adaptor    | RJ-45     | 3.0         | U      |

\* Unshielded=U, Shielded=S



## 1.7 EUT Operating Mode(s)

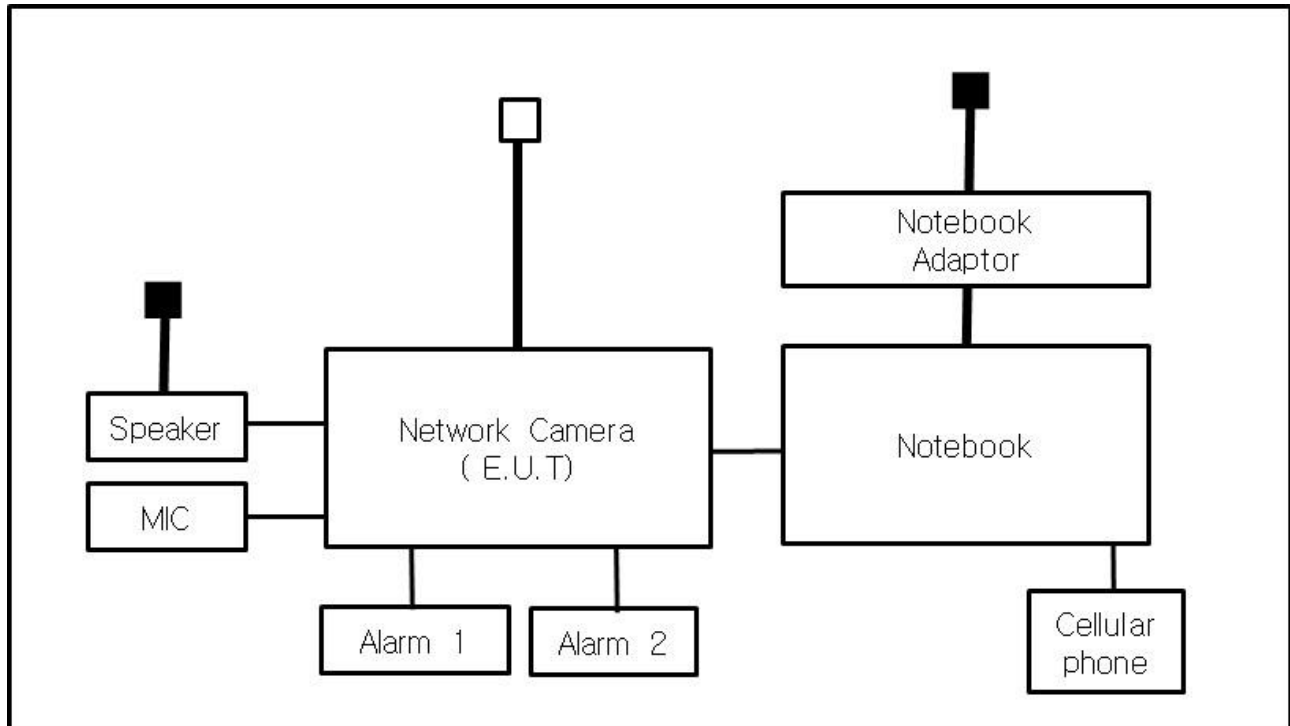
| Test Mode | operating                 |
|-----------|---------------------------|
| DC 12 V   | EUT Monitoring, Ping Test |
| PoE       | EUT Monitoring, Ping Test |

| EUT Test operating S/W |         |                        |
|------------------------|---------|------------------------|
| Name                   | Version | Manufacture Company    |
| WebViewer              | -       | Hanwha Vision Co., Ltd |

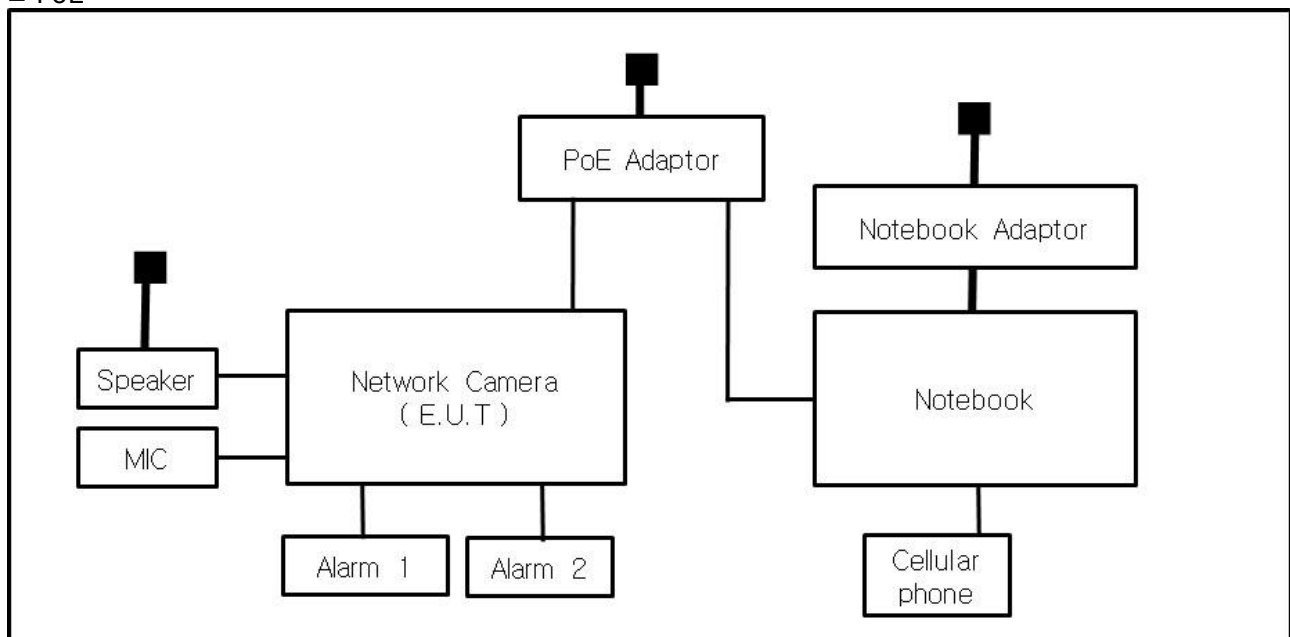
## 1.8 Configuration

■ AC Main  
 □ DC Main

### ■ DC 12 V



### ■ PoE



## 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)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KR0100                                 |
| International | KOLAS   | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>KT489                                 |
| USA           | FCC     | 3 m & 10 m Semi-Anechoic Chamber<br>Conducted test site to perform FCC Part 15/18 measurements.                                         | <br>KR0100                                |
| Canada        | ISED    | 3 m & 10 m Semi-Anechoic Chamber and Conducted test site                                                                                | <br>23298                                 |
| JAPAN         | VCCI    | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)                                                                          | <br>C-20136, T-20137,<br>R-20181, G-20176 |
| Europe        | TÜV SÜD | EMI (3 m & 10 m Semi-Anechoic Chamber and conducted test site)<br>EMS (ESD, RS, EFT/Burst, Surge, CS, Magnetic, Dips and interruptions) | <br>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



- 
- |                                                               |                                  |                                  |
|---------------------------------------------------------------|----------------------------------|----------------------------------|
| <input type="checkbox"/> <b>VCCI-CISPR 32:2016</b>            | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>AS/NZS CISPR32:2015</b>           | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> <b>47 CFR Part 15, Subpart B</b>     |                                  |                                  |
| <input type="checkbox"/> CISPR 22:2009 +A1:2010               | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                      |                                  |                                  |
| <input type="checkbox"/> <b>IC Regulation ICES-003 : 2016</b> |                                  |                                  |
| <input type="checkbox"/> CAN/CSA CISPR 22-10                  | <input type="checkbox"/> Class A | <input type="checkbox"/> Class B |
| <input type="checkbox"/> ANSI C63.4-2014                      |                                  |                                  |
| <input type="checkbox"/> <b>RE- Directive 2014/53/EU</b>      |                                  |                                  |
| <input type="checkbox"/> EN 301 489-1 V1.9.2                  |                                  |                                  |
| <input type="checkbox"/> Equipment for fixed use              |                                  |                                  |
| <input type="checkbox"/> Equipment for vehicular use          |                                  |                                  |
| <input type="checkbox"/> Equipment for portable use           |                                  |                                  |
| <input type="checkbox"/> EN 301 489-3 V1.6.1                  |                                  |                                  |
| <input type="checkbox"/> EN 301 489-17 V2.2.1                 |                                  |                                  |
| <input type="checkbox"/> EN 60945:2002                        |                                  |                                  |



## 2.1 Conducted Emissions at Mains Power Ports

### Test Date

N/A

### Test Location

Electro wave Shieldroom #6

### Test Equipment

| Used                     | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101781        | 04, 25, 2019 |
| <input type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 04, 2020 |
| <input type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 04, 25, 2019 |

### 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

It is not tested apply because it is powered by DC and PoE

## 2.2 Conducted Emissions at Telecommunication Ports

**Test Date**

Feb. 15, 2019

**Test Location**

Electro wave Shieldroom #6

**Test Equipment**

| Used                                | Description       | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|-------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W      | EMC32        | R & S        | 9.12.00       | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESR3         | R & S        | 101781        | 04, 25, 2019 |
| <input checked="" type="checkbox"/> | LISN              | ENV216       | R & S        | 101787        | 01, 04, 2020 |
| <input checked="" type="checkbox"/> | LISN              | ESH2-Z5      | R & S        | 100450        | 04, 25, 2019 |
| <input checked="" type="checkbox"/> | PULSE LIMITER     | ESH3-Z2      | R & S        | 101915        | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | 8-WIRE ISN CAT3,5 | ENY81        | R & S        | 100174        | 01, 07, 2020 |
| <input type="checkbox"/>            | 8-WIRE ISN CAT6   | ENY81-CAT6   | R & S        | 101665        | 01, 07, 2020 |

**Test Conditions**Temperature: 21,9 °C  
Relative Humidity: 43,7 % 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

**Remarks**See Appendix A for test data.



## 2.3 Radiated Electric Field Emissions(Below 1 GHz)

### Test Date

Feb. 14, 2019

### Test Location

☐ OPEN AREA TEST SITE #2

☒ SEMI ANECHOIC CHAMBER #4(10m)

### Test Equipment

| Used                                | Description              | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|--------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W             | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER        | ESU26        | R & S            | 100551        | 04, 11, 2019 |
| <input checked="" type="checkbox"/> | AMPLIFIER                | SCU 01       | R & S            | 100603        | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | ATTENUATOR               | 8491A        | HP               | 32173         | 03, 21, 2019 |
| <input checked="" type="checkbox"/> | TRILOG-BROADBAND ANTENNA | VULB9163     | Schwarzbeck      | 715           | 11, 29, 2020 |

### Test Conditions

Temperature: 22,4 °C

Relative Humidity: 41,8 % 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. 14, 2019

**Test Location**

SEMI ANECHOIC CHAMBER #3

**Test Equipment**

| Used                                | Description                | Model Number | Manufacturer     | Serial Number | Cal. Due     |
|-------------------------------------|----------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W               | EP5/RE       | TOYO Corporation | 6.0.0         | -            |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER          | ESR7         | R & S            | 101190        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER               | 8449B        | AGILENT          | 3008A01967    | 05, 31, 2019 |
| <input type="checkbox"/>            | ATTENUATOR                 | 8491A        | HP               | 35496         | 03, 21, 2019 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA | SAS-571      | A.H.SYSTEM,INC   | 781           | 05, 02, 2019 |

**Test Conditions**

Temperature: 22,8 °C

Relative Humidity: 41,6 % 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

N/A

### Test Location

Electro wave Shieldroom #3

### Test Equipment

| Used                     | Description            | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|------------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | EMI Test S/W           | dpa.control  | EM TEST      | 5.4.11.0      | -            |
| <input type="checkbox"/> | DIGITAL POWER ANALYZER | DPA 500N     | EM TEST      | V1024106759   | 08, 08, 2019 |
| <input type="checkbox"/> | POWER SOURCE           | ACS 500N6    | EM TEST      | V1024106760   | -            |

### Test Conditions

Temperature:

°C

Relative Humidity:

% 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

It is not tested apply because it is powered by DC and PoE



## 2.6 Voltage Fluctuations and Flicker

### Test Date

N/A

### Test Location

Electro wave Shieldroom #3

### Test Equipment

| Used                     | Description            | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|------------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | EMI Test S/W           | dpa.control  | EM TEST      | 5.4.11.0      | -            |
| <input type="checkbox"/> | DIGITAL POWER ANALYZER | DPA 500N     | EM TEST      | V1024106759   | 08, 08, 2019 |
| <input type="checkbox"/> | POWER SOURCE           | ACS 500N6    | EM TEST      | V1024106760   | -            |

### Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

### Test Results

The requirements are:

- ☐ PASS  
☐ NOT PASS  
☒ NOT APPLICABLE

### Remarks

It is not tested apply because it is powered by DC and PoE

### 3.0 Criteria for compliance

Criteria for compliance was based on the following guidelines:

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

**Test Date**

Feb. 18, 2019

**Test Location**

EMS-ESD: Electro wave Shieldroom #7

**Test Equipment**

| Used                                | Description   | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | ESD SIMULATOR | ESS-2000     | Noise Ken    | ESS01Z0454    | 10, 11, 2019 |
| <input checked="" type="checkbox"/> | HCP           | -            | KES          | -             | -            |
| <input checked="" type="checkbox"/> | VCP           | -            | KES          | -             | -            |

**Test Conditions**

Temperature: 22,4 °C  
Relative Humidity: 42,7 % R.H.  
Atmospheric Pressure: 101,2 kPa

**Test Specifications**Discharge Factor:  $\geq 1$  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

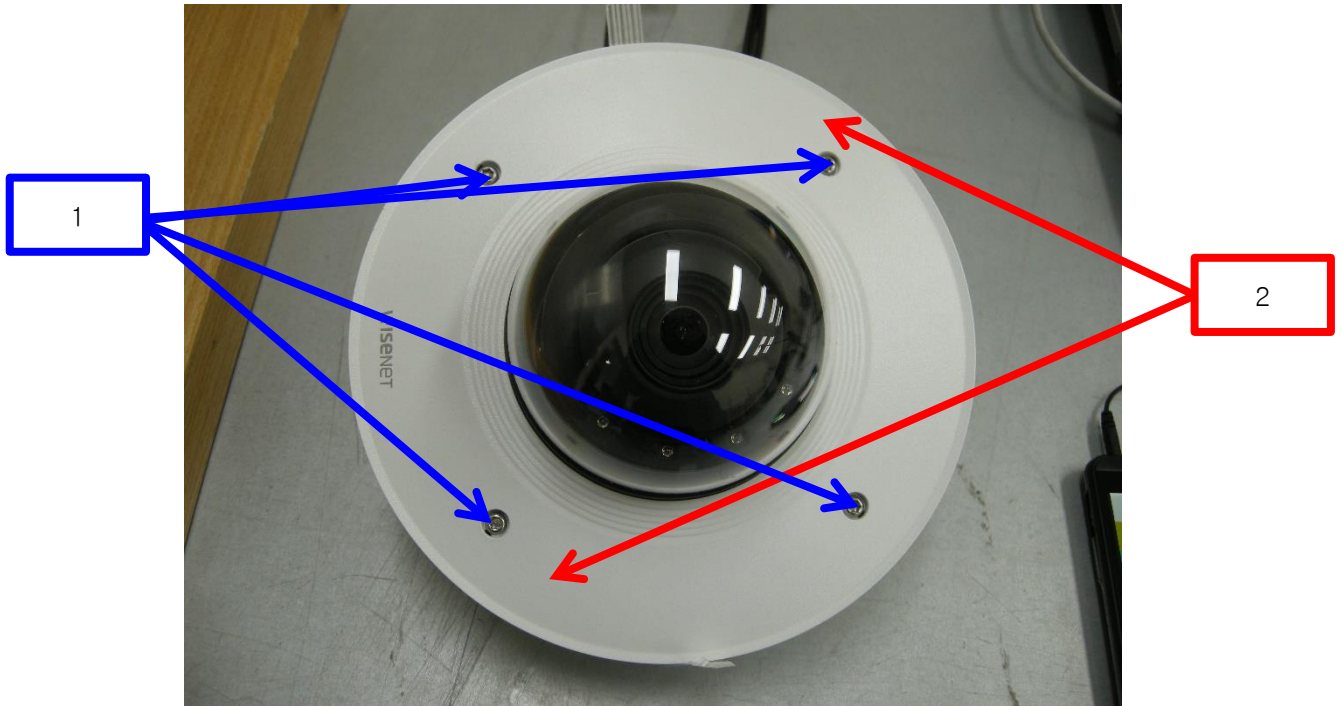
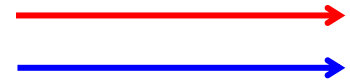
|                    |                                          |                                          |                                          |                                          |
|--------------------|------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------|
| Discharge Voltage: | Contact                                  | Air                                      | HCP                                      | VCP                                      |
|                    | <input type="checkbox"/> 2 kV            | <input checked="" type="checkbox"/> 2 kV | <input type="checkbox"/> 2 kV            | <input type="checkbox"/> 2 kV            |
|                    | <input type="checkbox"/> 4 kV            | <input checked="" type="checkbox"/> 4 kV | <input type="checkbox"/> 4 kV            | <input type="checkbox"/> 4 kV            |
|                    | <input checked="" type="checkbox"/> 6 kV | <input type="checkbox"/> 6 kV            | <input checked="" type="checkbox"/> 6 kV | <input checked="" type="checkbox"/> 6 kV |
|                    | <input type="checkbox"/> 8 kV            | <input checked="" type="checkbox"/> 8 kV | <input type="checkbox"/> 8 kV            | <input type="checkbox"/> 8 kV            |
|                    | <input type="checkbox"/> 15 kV           | <input type="checkbox"/> 15 kV           | <input type="checkbox"/> 15 kV           | <input type="checkbox"/> 15 kV           |

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

Required Performance Criteria: ☒ Complied

**Location of Discharge:**

|         |
|---------|
| Air     |
| Contact |



**Test Data**

## ■ DC 12 V

## 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   | Screw      | Contact Discharge | Complied     | -       |
| 2   | Enclosure  | Air Discharge     | Complied     | -       |

Note: "Blank" = Not performed

## ■ PoE

## 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   | Screw      | Contact Discharge | Complied     | -       |
| 2   | Enclosure  | 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

## 3.2 Radiated Electric Field Immunity

### Reference Standard

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

### Test Date

Feb. 15, 2019

### Test Location

EMS-RS: ☐ SEMI ANECHOIC CHAMBER #2

☒ SEMI ANECHOIC CHAMBER #3

### Test Equipment

| Used                                | Description                     | Model Number    | Manufacturer    | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------------|-----------------|-----------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W                    | EMC32           | R & S           | 10.10.02      | -            |
| <input checked="" type="checkbox"/> | SIGNAL GENERATOR                | SMB 100A        | R & S           | 177586        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | BROADBAND AMPLIFIER             | BBA100          | R & S           | 101239        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | BROADBAND AMPLIFIER             | 100S1G6M1       | AR              | 579931        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | POWER METER                     | NRP2            | R & S           | 103475        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | AVG POWER SENSOR                | NRP-Z91         | R & S           | 102526        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | AVG POWER SENSOR                | NRP-Z91         | R & S           | 102527        | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | STACKED DOUBLE LOG-PER- ANTENNA | STPL9128 E      | Schwarzbeck     | 9128ES-121    | -            |
| <input checked="" type="checkbox"/> | DIRECTIONAL COUPLER             | KYDC-D1070-DX40 | KY TELECOM      | KY150001      | 08, 06, 2019 |
| <input checked="" type="checkbox"/> | DOUBLE RIDGED HORN ANTENNA      | SAS-571         | A.H.SYSTEM, INC | 781           | 05, 02, 2019 |

### Test Conditions

Temperature: 22,2 °C  
Relative Humidity: 43,3 % R.H.  
Atmospheric Pressure: 101,3 kPa



### 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



## Test Data

### ■ DC 12 V

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

### ■ PoE

| 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

### Remarks

PASS Required Performance Criteria

### 3.3 Electrical Fast Transients/Bursts

**Reference Standard**

EN 61000-4-4:2012

**Test Date**

Feb. 18, 2019

**Test Location**

EMS-EFT: Electro wave Shieldroom #7

**Test Equipment**

| Used                                | Description               | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W              | iec.control  | EM TEST      | 5.4.7         | -            |
| <input checked="" type="checkbox"/> | ULTRA COMPACT SIMULATOR   | UCS 500N7    | EM TEST      | P1608172950   | 11, 27, 2019 |
| <input type="checkbox"/>            | MOTOR VARIAC              | MV2616       | EM TEST      | P1552169719   | 11, 27, 2019 |
| <input checked="" type="checkbox"/> | CAPACITIVE COUPLING CLAMP | HFK          | EM TEST      | P1633183115   | 11, 26, 2019 |

**Test Conditions**Temperature: 22,4 °C  
Relative Humidity: 42,7 % R.H.  
Atmospheric Pressure: 101,2 kPa**Test Specifications**

|                                                              |                                                                        |                                              |
|--------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------|
| Pulse Amplitude & Polarity:<br>(AC Power Lines)              | <input type="checkbox"/> ± 1.0 kV<br><input type="checkbox"/> ± 4.0 kV | <input type="checkbox"/> ± 2.0 kV            |
| Pulse Amplitude & Polarity:<br>(Other supply / Signal Lines) | <input type="checkbox"/> ± 0.5 kV<br><input type="checkbox"/> ± 2.0 kV | <input checked="" type="checkbox"/> ± 1.0 kV |
| Burst Period:                                                | <input checked="" type="checkbox"/> 300 ms                             | <input type="checkbox"/> 2 s                 |
| Repetition Rate:                                             | <input type="checkbox"/> 5 kHz                                         | <input checked="" type="checkbox"/> 100 kHz  |
| Duration of Test Voltage:                                    | <input checked="" type="checkbox"/> ≥ 1 min                            |                                              |
| Required Performance Criteria:                               | <input checked="" type="checkbox"/> Complied                           |                                              |

## Test Data

### ■ DC 12 V

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

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

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

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| L1                  | Complied       | Complied       |
| L2                  | Complied       | Complied       |
| L1 – L2             | Complied       | Complied       |

☒ Signal ports and telecommunication ports – Coupling Clamp used

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Burst (kV) | (-) Burst (kV) |
| RJ-45               | Complied       | Complied       |
| Alarm IN            | Complied       | Complied       |
| Alarm OUT           | Complied       | Complied       |

**■ PoE**
☐ Input a.c. power ports – Coupling/Decoupling Network used

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

☐ 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       |
| Alarm IN            | Complied       | Complied       |
| Alarm OUT           | 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



### 3.4 Surge Transients

#### Reference Standard

EN 61000-4-5:2014

#### Test Date

N/A

#### Test Location

EMS-Surge: Electro wave Shieldroom #7

#### Test Equipment

| Used                     | Description                | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|----------------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | EMS Test S/W               | iec.control  | EM TEST      | 5.4.7         | -            |
| <input type="checkbox"/> | ULTRA COMPACT<br>SIMULATOR | UCS 500N7    | EM TEST      | P1608172950   | 11, 26, 2019 |
| <input type="checkbox"/> | MOTOR VARIAC               | MV2616       | EM TEST      | P1552169719   | 11, 27, 2019 |
| <input type="checkbox"/> | CDN                        | CNV 508N1    | EM TEST      | P1610176296   | 11, 28, 2019 |

#### Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Atmospheric Pressure:

kPa



## 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



## Test Data

☐ Line to Line – Differential Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| -                   | -              | -              |

☐ Line to Earth – Common Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| -                   | -              | -              |

## Signal Lines

☐ Line to Earth – Common Mode

| Mode of Application | Observations   |                |
|---------------------|----------------|----------------|
|                     | (+) Surge (kV) | (-) Surge (kV) |
| -                   | -              | -              |

Note: "Blank" = Not performed

Observations:

Complied – No degradation of function

## Test Results

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

## Remarks

N/A : No test is required because it is not permitted to connect cables > 30 m long.

### 3.5 Conducted Disturbance

**Reference Standard**

EN 61000-4-6:2014

**Test Date**

Feb. 18, 2019

**Test Location**

EMS-CS: Electro wave Shieldroom #6

**Test Equipment**

| Used                                | Description               | Model Number | Manufacturer | Serial Number | Cal. Due     |
|-------------------------------------|---------------------------|--------------|--------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMS Test S/W              | icd.control  | EM TEST      | 5.3.11        | -            |
| <input checked="" type="checkbox"/> | CONTINUOUS WAVE SIMULATOR | CWS 500N1.4  | EM TEST      | P1602169880   | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | ATTENUATOR                | ATT 6/80     | EM TEST      | P1614178148   | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | CDN                       | CDN M016     | TESEQ        | 43694         | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | CDN                       | CDN M016     | TESEQ        | 43697         | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | CDN                       | CDN T800     | TESEQ        | 42800         | 11, 26, 2019 |
| <input checked="" type="checkbox"/> | EM CLAMP                  | KEMZ 801A    | TESEQ        | 44099         | 11, 27, 2019 |

**Test Conditions**Temperature: 22,3 °C  
Relative Humidity: 42,9 % R.H.  
Atmospheric Pressure: 101,4 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: ☒ CompliedThis 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 Data

### ■ DC 12 V

☐ Input a.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| -                                    | -               | -            |

☒ Input d.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| L1 – L2                              | CDN             | Complied     |

☒ Signal ports and telecommunication ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| RJ-45                                | CDN             | Complied     |
| Alarm IN                             | Clamp           | Complied     |
| Alarm OUT                            | Clamp           | 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-E1-19T0103-R1

Page (36) of (66)

## ■ PoE

☐ Input a.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| -                                    | -               | -            |

☐ Input d.c. power ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| -                                    | -               | -            |

☒ Signal ports and telecommunication ports

| Coupling Location<br>(Line Stressed) | Coupling Method | Observations |
|--------------------------------------|-----------------|--------------|
| RJ-45                                | CDN             | Complied     |
| Alarm IN                             | Clamp           | Complied     |
| Alarm OUT                            | 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

**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



### 3.6 Voltage Dips and Short Interruptions

#### Reference Standard

EN 61000-4-11:2004

#### Test Date

N/A

#### Test Location

EMS-Voltage dip: Electro wave Shieldroom #3

#### Test Equipment

| Used                     | Description             | Model Number | Manufacturer | Serial Number | Cal. Due     |
|--------------------------|-------------------------|--------------|--------------|---------------|--------------|
| <input type="checkbox"/> | EMS Test S/W            | iec.control  | AMETEK CTS   | 7.1.2         | -            |
| <input type="checkbox"/> | ULTRA COMPACT SIMULATOR | UCS 500 N5   | EM TEST      | V0936105120   | 06, 26, 2019 |
| <input type="checkbox"/> | MOTOR VARIAC            | MV2616       | EM TEST      | V0936105123   | 06, 26, 2019 |

#### Test Conditions

Temperature:

°C

Relative Humidity:

% R.H.

Atmospheric Pressure:

kPa



## Test Specifications & Observations/Remarks

(Test Voltage : )

| <u>Test Level</u>                  | <u>Duration [in period/ms (50 Hz)]</u> | <u>Results</u> |
|------------------------------------|----------------------------------------|----------------|
| <input type="checkbox"/> 20 % dip  | <input type="checkbox"/> 250 / 5 000   | _____          |
| <input type="checkbox"/> 30 % dip  | <input type="checkbox"/> 25 / 500      | _____          |
| <input type="checkbox"/> 60 % dip  | <input type="checkbox"/> 10 / 200      | _____          |
| <input type="checkbox"/> 100 % dip | <input type="checkbox"/> 250 / 5 000   | _____          |

- Voltage variations

|                                      |                                       |       |
|--------------------------------------|---------------------------------------|-------|
| <input type="checkbox"/> Unom + 10 % | <input type="checkbox"/> 253.0 V (ac) | _____ |
| <input type="checkbox"/> Unom - 15 % | <input type="checkbox"/> 195.5 V (ac) | _____ |

Observations:

Complied – No degradation of function

### Test Results

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

### Remarks

It is not tested apply because it is powered by DC and PoE



---

## **APPENDIX A – TEST DATA**

### **Conducted Emissions at Mains Power Ports**

**[HOT]**

N/A



**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-E1-19T0103-R1  
Page (40) of (66)

[ NEUTRAL ]

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 (LISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

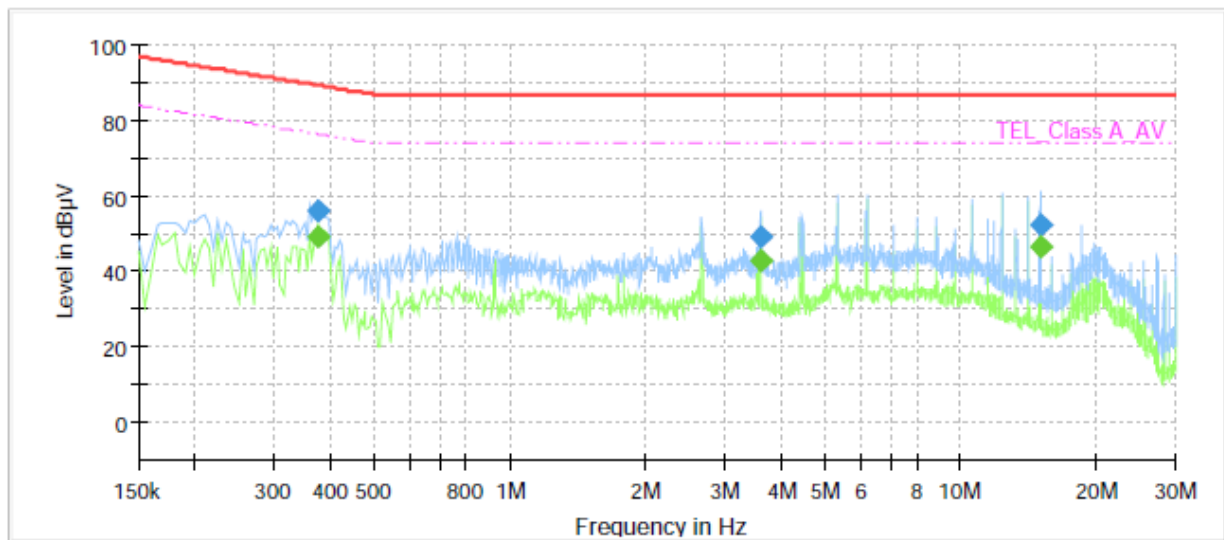
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact kes@kes.co.kr

## Conducted Emissions at Telecommunication Ports

■ DC 12 V  
[10 Mbps]

### Common Information

|                   |                            |
|-------------------|----------------------------|
| Test Description: | Telecommunication Emission |
| Model No.:        | XND-8081RF                 |
| Mode              | DC12V 10Mbps               |
| Operator Name:    | KES                        |



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.375000        | ---              | 49.04           | 76.39        | 27.35       | 1000.0          | 9.000           | Single Line | 19.9       |
| 0.375000        | 56.23            | ---             | 89.39        | 33.16       | 1000.0          | 9.000           | Single Line | 19.9       |
| 3.585000        | ---              | 42.78           | 74.00        | 31.22       | 1000.0          | 9.000           | Single Line | 19.7       |
| 3.585000        | 48.98            | ---             | 87.00        | 38.02       | 1000.0          | 9.000           | Single Line | 19.7       |
| 15.000000       | ---              | 46.39           | 74.00        | 27.61       | 1000.0          | 9.000           | Single Line | 20.1       |
| 15.000000       | 52.27            | ---             | 87.00        | 34.73       | 1000.0          | 9.000           | Single Line | 20.1       |

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

**[100 Mbps]**

## Common Information

Test Description:

Model No.:

Mode

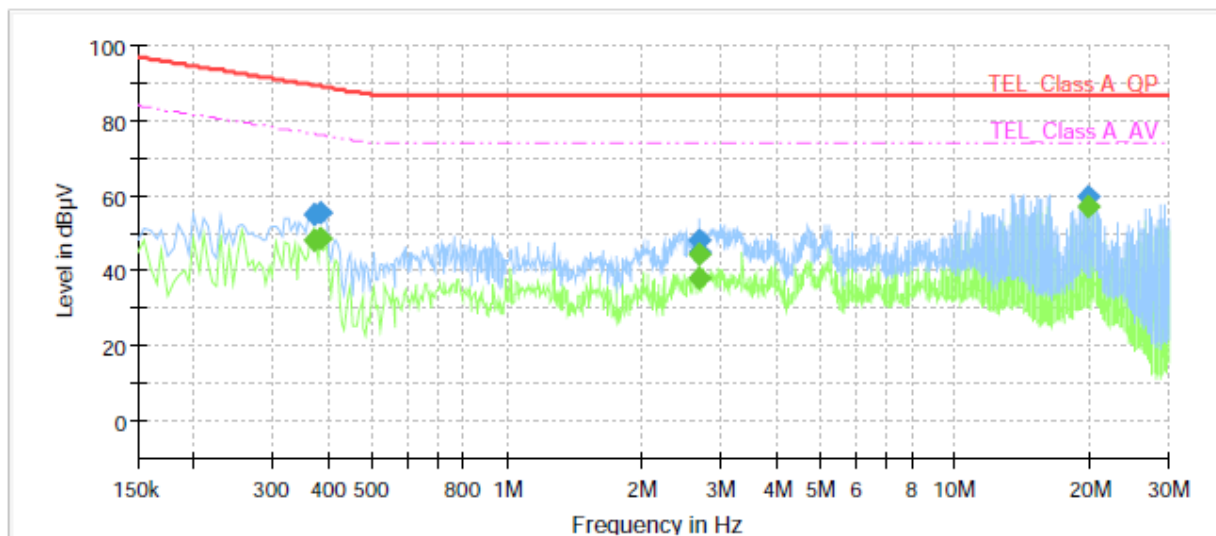
Operator Name:

Telecommunication Emission

XND-8081RF

DC12V 100Mbps

KES



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.370000        | ---              | 48.03           | 76.50        | 28.47       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.370000        | 55.00            | ---             | 89.50        | 34.50       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.385000        | ---              | 48.70           | 76.17        | 27.47       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.385000        | 55.52            | ---             | 89.17        | 33.65       | 1000.0          | 9.000           | Single Line | 19.7       |
| 2.685000        | ---              | 44.42           | 74.00        | 29.58       | 1000.0          | 9.000           | Single Line | 19.6       |
| 2.685000        | 48.36            | ---             | 87.00        | 38.64       | 1000.0          | 9.000           | Single Line | 19.6       |
| 2.690000        | ---              | 38.11           | 74.00        | 35.89       | 1000.0          | 9.000           | Single Line | 19.6       |
| 2.690000        | 45.23            | ---             | 87.00        | 41.77       | 1000.0          | 9.000           | Single Line | 19.6       |
| 19.710000       | ---              | 57.26           | 74.00        | 16.74       | 1000.0          | 9.000           | Single Line | 20.1       |
| 19.710000       | 59.78            | ---             | 87.00        | 27.22       | 1000.0          | 9.000           | Single Line | 20.1       |

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.

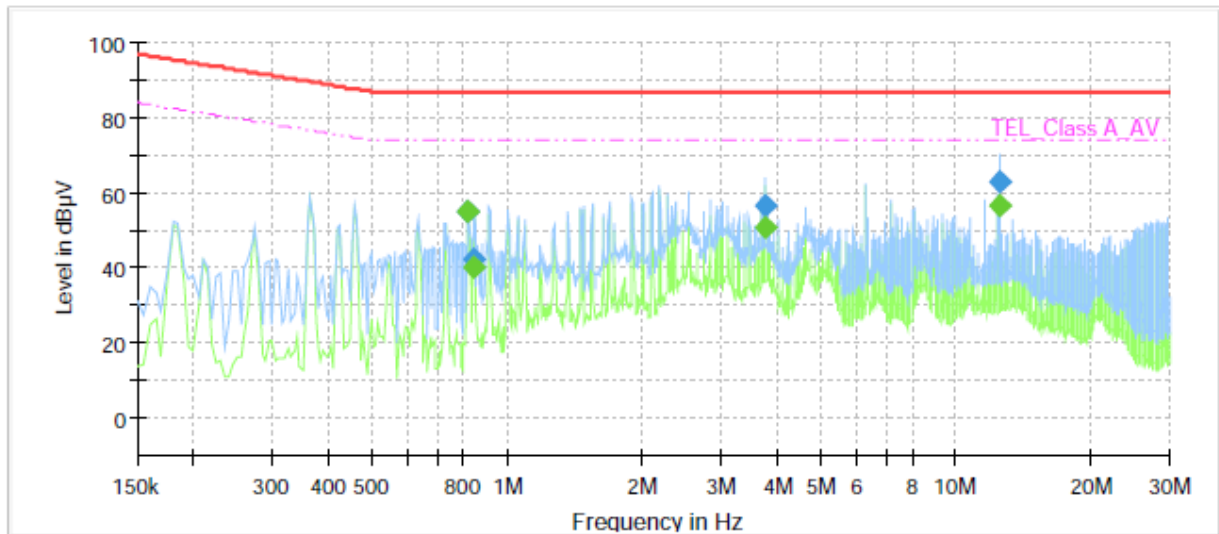
The authenticity of the test report, contact kes@kes.co.kr

■ PoE  
[10 Mbps]

## Common Information

Test Description:  
Model No.:  
Mode  
Operator Name:

Telecommunication Emission  
XND-8081RF  
PoE 10Mbps  
KES



## Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.820000        | ---              | 55.25           | 74.00        | 18.75       | 1000.0          | 9.000           | Single Line | 19.8       |
| 0.820000        | 55.27            | ---             | 87.00        | 31.73       | 1000.0          | 9.000           | Single Line | 19.8       |
| 0.845000        | ---              | 40.16           | 74.00        | 33.84       | 1000.0          | 9.000           | Single Line | 19.8       |
| 0.845000        | 42.37            | ---             | 87.00        | 44.63       | 1000.0          | 9.000           | Single Line | 19.8       |
| 3.750000        | ---              | 50.57           | 74.00        | 23.43       | 1000.0          | 9.000           | Single Line | 19.7       |
| 3.750000        | 56.72            | ---             | 87.00        | 30.28       | 1000.0          | 9.000           | Single Line | 19.7       |
| 12.500000       | ---              | 56.43           | 74.00        | 17.57       | 1000.0          | 9.000           | Single Line | 20.0       |
| 12.500000       | 63.14            | ---             | 87.00        | 23.86       | 1000.0          | 9.000           | Single Line | 20.0       |

## [100 Mbps]

### Common Information

Test Description:

Model No.:

Mode

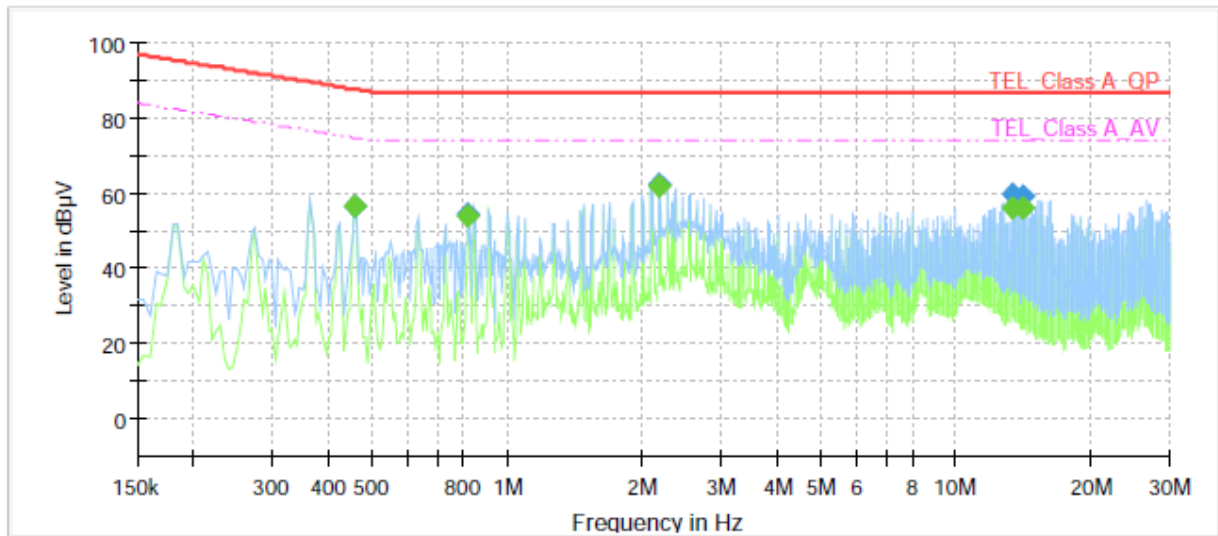
Operator Name:

Telecommunication Emission

XND-8081RF

PoE 100Mbps

KES



### Final Result

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line        | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|-------------|------------|
| 0.455000        | ---              | 56.60           | 74.78        | 18.18       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.455000        | 56.62            | ---             | 87.78        | 31.16       | 1000.0          | 9.000           | Single Line | 19.7       |
| 0.820000        | ---              | 54.19           | 74.00        | 19.81       | 1000.0          | 9.000           | Single Line | 19.6       |
| 0.820000        | 54.34            | ---             | 87.00        | 32.66       | 1000.0          | 9.000           | Single Line | 19.6       |
| 2.190000        | ---              | 61.93           | 74.00        | 12.07       | 1000.0          | 9.000           | Single Line | 19.6       |
| 2.190000        | 62.48            | ---             | 87.00        | 24.52       | 1000.0          | 9.000           | Single Line | 19.6       |
| 13.420000       | ---              | 56.35           | 74.00        | 17.65       | 1000.0          | 9.000           | Single Line | 19.9       |
| 13.420000       | 59.66            | ---             | 87.00        | 27.34       | 1000.0          | 9.000           | Single Line | 19.9       |
| 14.150000       | ---              | 56.14           | 74.00        | 17.86       | 1000.0          | 9.000           | Single Line | 19.9       |
| 14.150000       | 59.23            | ---             | 87.00        | 27.77       | 1000.0          | 9.000           | Single Line | 19.9       |

#### ◆ Calculation

$$\text{QuasiPeak [dBμV]} / \text{CAverage [dBμV]} = \text{Reading Value [dBμV]} + \text{Corr. [dB]}$$

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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



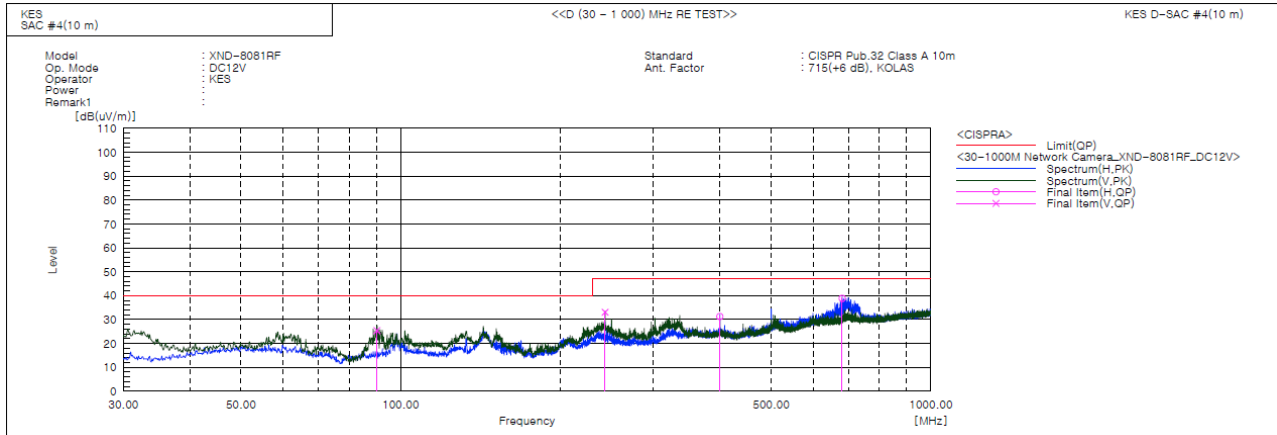
# KES Co., Ltd.

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-E1-19T0103-R1  
Page (45) of (66)

## Radiated Electric Field Emissions(Below 1 GHz)

### ■ DC 12 V



### 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   | 90.257          | V   | 50.2                | -24.8         | 25.4                 | 40.0                | 14.6           | 145.0       | 225.0       |        |
| 2   | 243.036         | V   | 53.3                | -20.2         | 33.1                 | 47.0                | 13.9           | 100.0       | 135.0       |        |
| 3   | 400.055         | H   | 46.6                | -15.3         | 31.3                 | 47.0                | 15.7           | 241.0       | 214.0       |        |
| 4   | 680.506         | H   | 47.9                | -9.0          | 38.9                 | 47.0                | 8.1            | 228.0       | 214.0       |        |

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

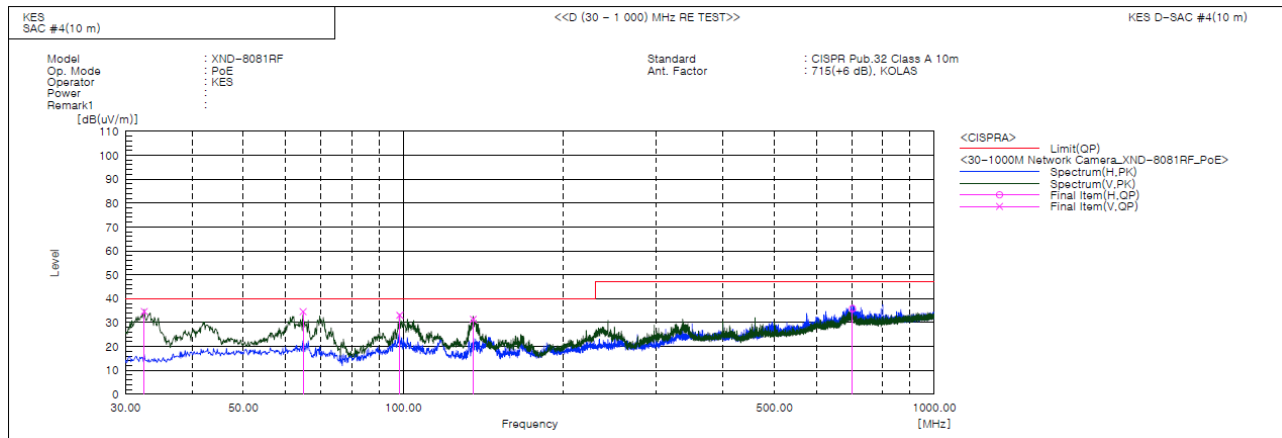


## KES Co., Ltd.

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-E1-19T0103-R1  
Page (46) of (66)

### ■ PoE



### Final Result

| No. | Frequency<br>[MHz] | (P) | Reading<br>QP<br>[dB(uV)] | c.f<br>[dB(1/m)] | Result<br>QP<br>[dB(uV/m)] | Limit<br>QP<br>[dB(uV/m)] | Margin<br>QP<br>[dB] | Height<br>[cm] | Angle<br>[deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1   | 32.546             | V   | 59.8                      | -25.1            | 34.7                       | 40.0                      | 5.3                  | 100.0          | 290.0          |        |
| 2   | 64.799             | V   | 58.2                      | -23.6            | 34.6                       | 40.0                      | 5.4                  | 142.0          | 126.0          |        |
| 3   | 98.506             | V   | 55.8                      | -22.7            | 33.1                       | 40.0                      | 6.9                  | 100.0          | 334.0          |        |
| 4   | 135.488            | V   | 57.4                      | -26.0            | 31.4                       | 40.0                      | 8.6                  | 100.0          | 222.0          |        |
| 5   | 701.361            | H   | 44.7                      | -8.8             | 35.9                       | 47.0                      | 11.1                 | 124.0          | 143.0          |        |

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

Result(QP) [dB( $\mu$ V/m)] = (Reading(QP)[dB( $\mu$ V)] + c.f[dB(1/m)])

Margin(QP)[dB] = Limit[dB( $\mu$ V/m)] - Result(QP) [dB( $\mu$ V/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

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

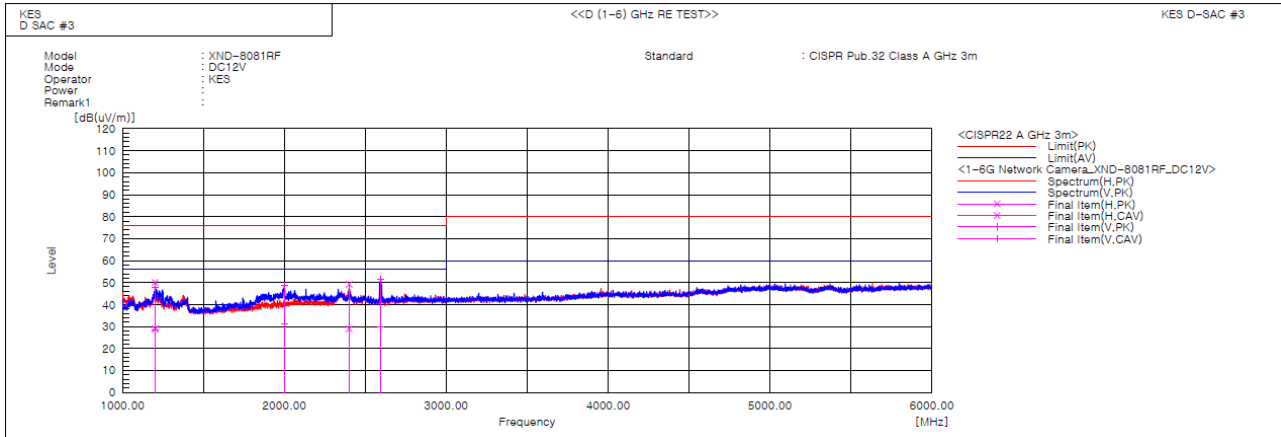
Report No.:

KES-E1-19T0103-R1

Page (47) of (66)

## Radiated Electric Field Emissions(Above 1 GHz)

### ■ DC 12 V



### 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   | 1199.224        | V   | 54.8                | 35.6                 | -7.2          | 47.6                 | 28.4                  | 76.0                | 56.0                | 28.4           | 27.6            | 100.0       | 31.8        |        |
| 2   | 1201.067        | H   | 57.3                | 36.1                 | -7.2          | 50.1                 | 28.9                  | 76.0                | 56.0                | 25.9           | 27.1            | 100.0       | 101.7       |        |
| 3   | 2000.007        | V   | 50.8                | 33.2                 | -2.1          | 48.7                 | 31.1                  | 76.0                | 56.0                | 27.3           | 24.9            | 100.0       | 0.8         |        |
| 4   | 2400.016        | H   | 49.5                | 29.2                 | -0.3          | 49.2                 | 28.9                  | 76.0                | 56.0                | 26.8           | 27.1            | 100.0       | 316.5       |        |
| 5   | 2595.192        | V   | 51.4                | 29.8                 | 0.1           | 51.5                 | 29.9                  | 76.0                | 56.0                | 24.5           | 26.1            | 100.0       | 296.4       |        |

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.

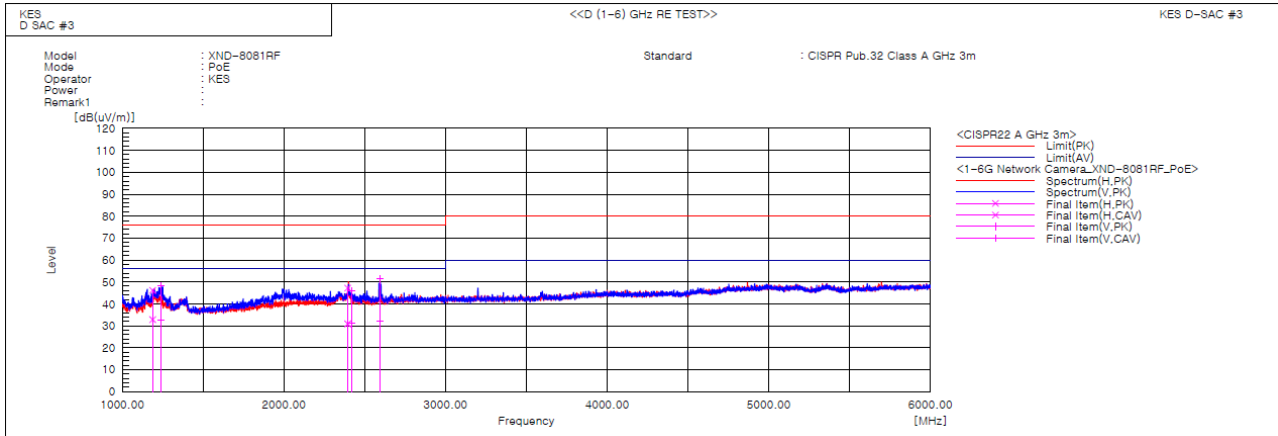
3701, 40, Simin-daero 365beon-gil,  
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea  
Tel: +82-31-425-6200 / Fax: +82-31-424-0450  
www.kes.co.kr

Report No.:

KES-E1-19T0103-R1

Page (48) of (66)

### ■ PoE



#### 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   | 1187.342        | H   | 53.4                | 40.0                 | -7.2          | 46.2                 | 32.8                  | 76.0                | 56.0                | 29.8           | 23.2            | 100.0       | 111.1       |        |
| 2   | 1236.461        | V   | 55.3                | 39.5                 | -7.0          | 48.3                 | 32.5                  | 76.0                | 56.0                | 27.7           | 23.5            | 100.0       | 40.4        |        |
| 3   | 2393.841        | H   | 47.4                | 31.2                 | -0.3          | 47.1                 | 30.9                  | 76.0                | 56.0                | 28.9           | 25.1            | 100.0       | 141.6       |        |
| 4   | 2421.156        | V   | 46.2                | 31.3                 | -0.3          | 45.9                 | 31.0                  | 76.0                | 56.0                | 30.1           | 25.0            | 100.0       | 43.5        |        |
| 5   | 2596.279        | V   | 51.3                | 31.8                 | 0.1           | 51.4                 | 31.9                  | 76.0                | 56.0                | 24.6           | 24.1            | 100.0       | 301.2       |        |

### ◆ Calculation

Result(PK/CAV) [dB( $\mu$ V/m)] = (Reading(PK/CAV)[dB( $\mu$ V)] + c.f[dB(1/m)])

Margin(PK/CAV)[dB] = Limit[dB( $\mu$ V/m)] - Result(PK/CAV) [dB( $\mu$ V/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







Test Data - Voltage Fluctuations

**Maximum Flicker results**

|          | <b>EUT values</b> | <b>Limit</b> | <b>Result</b> |
|----------|-------------------|--------------|---------------|
| Pst      |                   |              |               |
| Plt      |                   |              |               |
| dc [%]   |                   |              |               |
| dmax [%] |                   |              |               |
| Tmax [s] |                   |              |               |



---

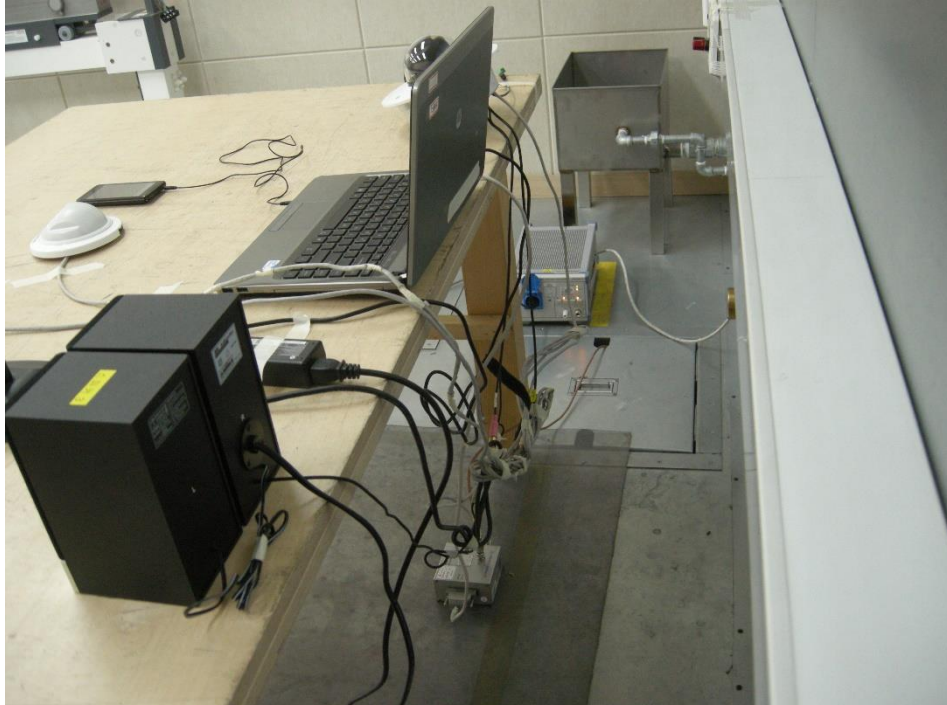
## Test Setup Photos and Configuration

### Conducted Voltage Emissions

N/A

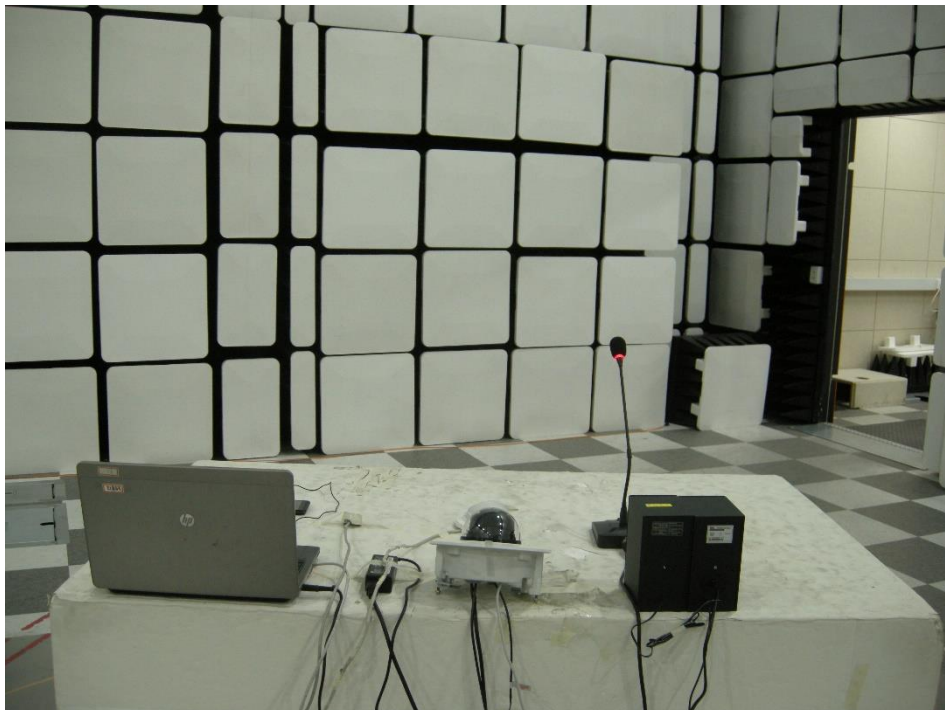
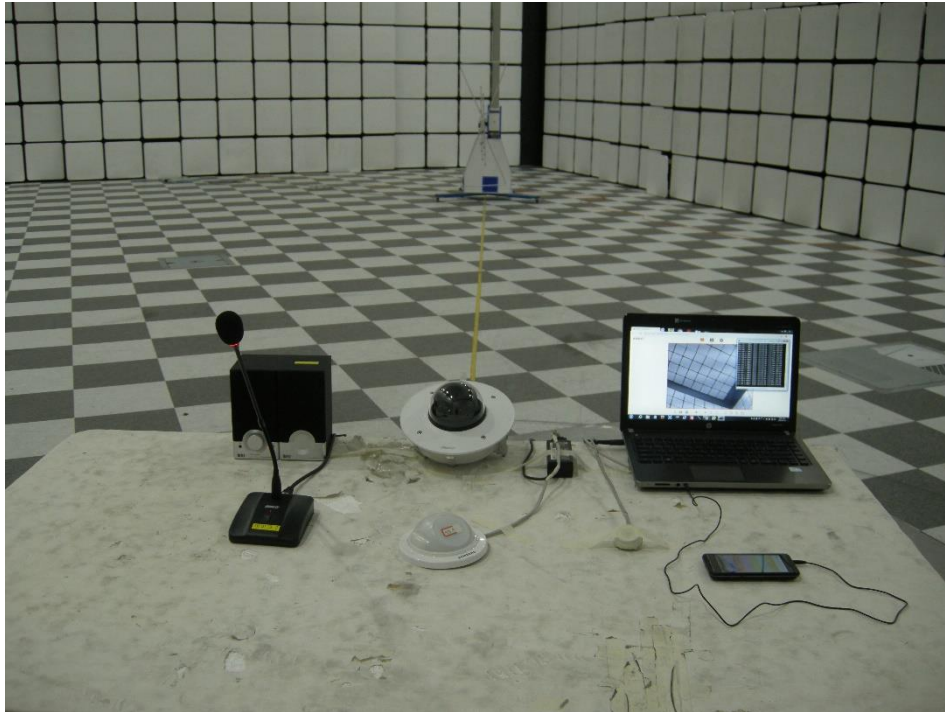
N/A

## Conducted Telecommunication Emissions



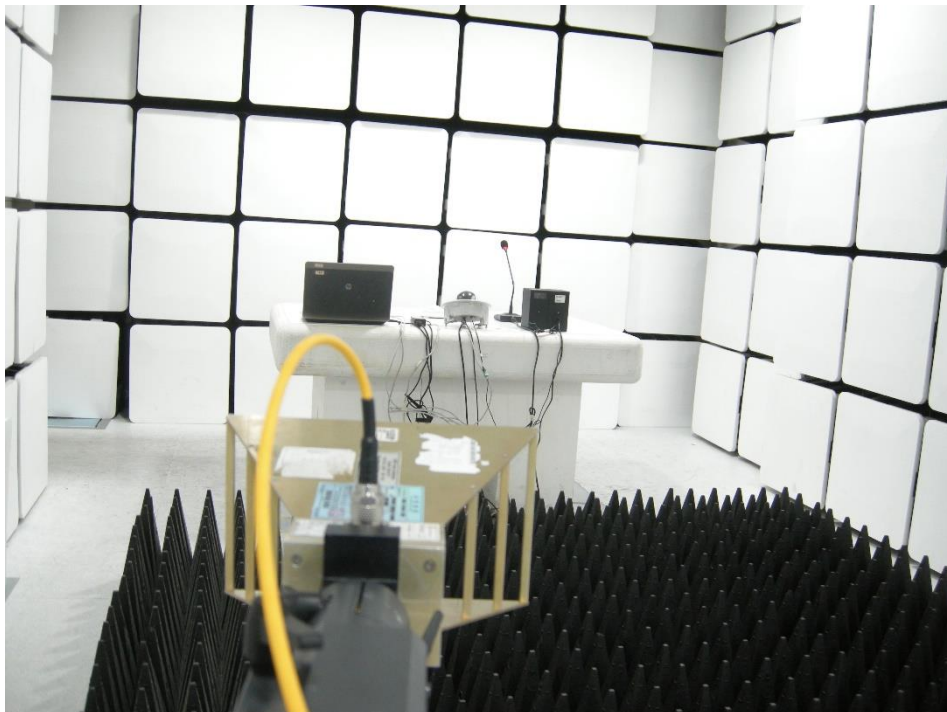
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact kes@kes.co.kr

## 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



**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-E1-19T0103-R1  
Page (56) of (66)

---

## Harmonic Current Emissions and Voltage Fluctuations and Flicker

N/A

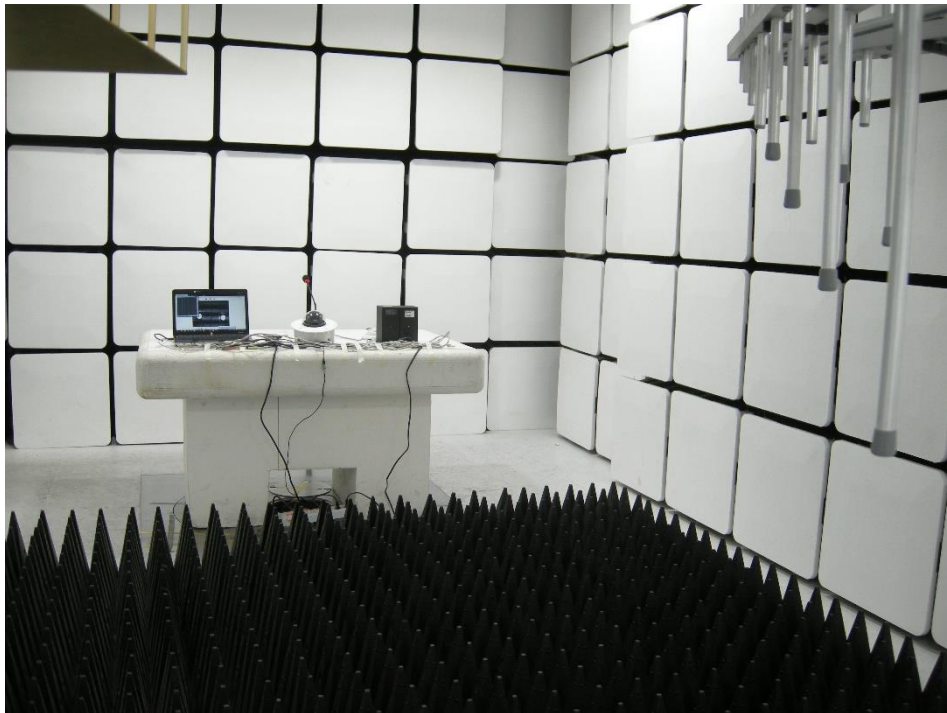
---

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

## Electrostatic Discharge



## Radiated Electric Field Immunity



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

## Electrical Fast Transients/Bursts



## Surge Transients

N/A

## Conducted Disturbance



## Voltage Dips and Short Interruptions

N/A

## EUT External Photographs

(Top)



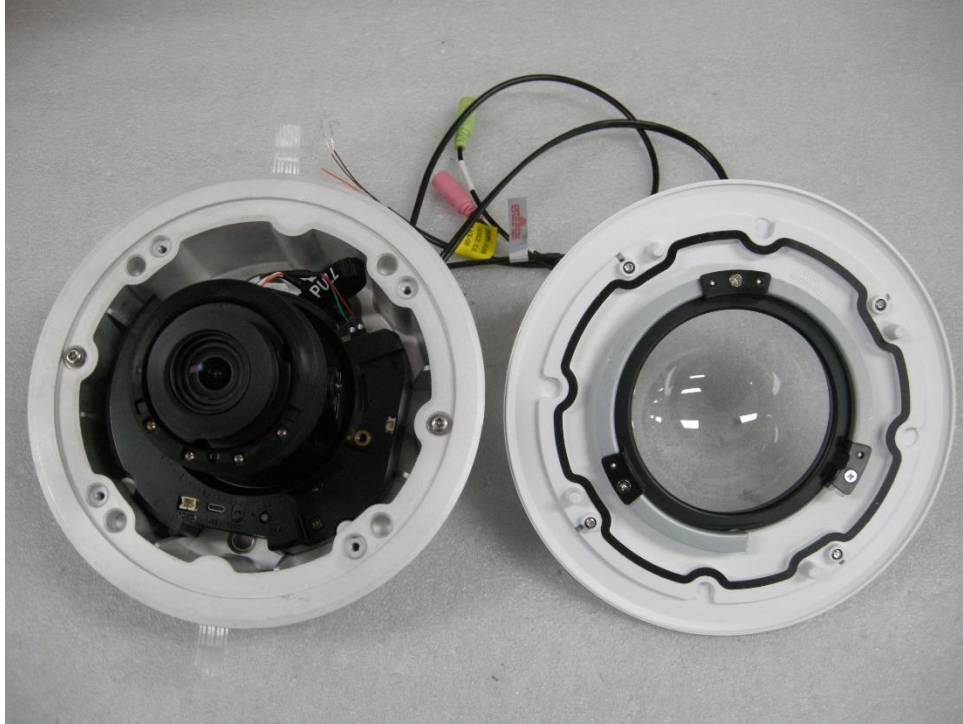
(Bottom)



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

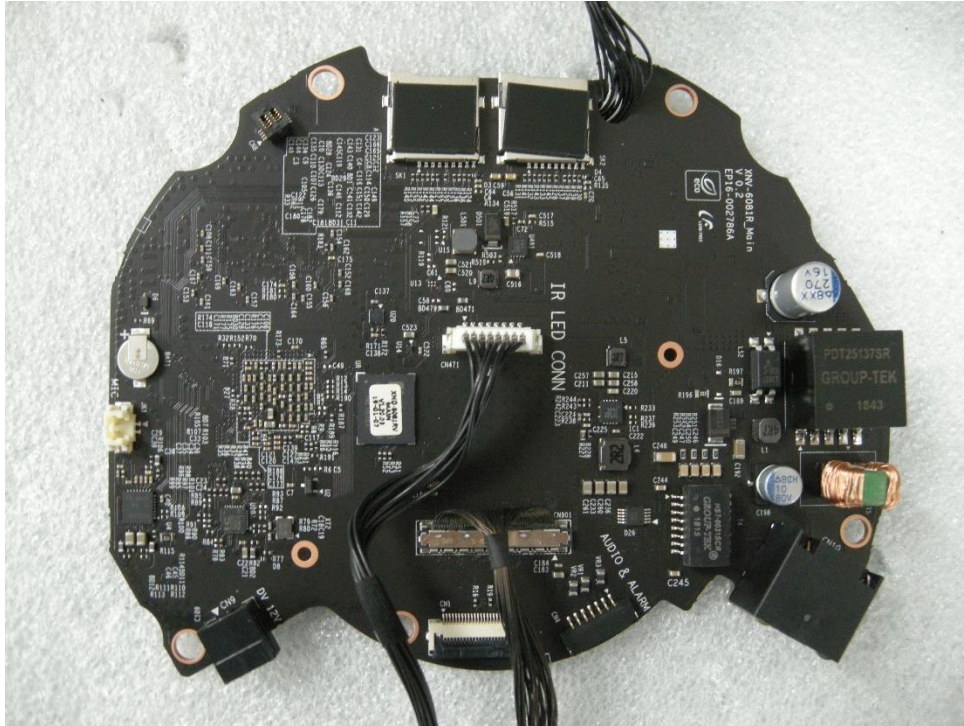
## EUT Internal Photographs

(Internal View)

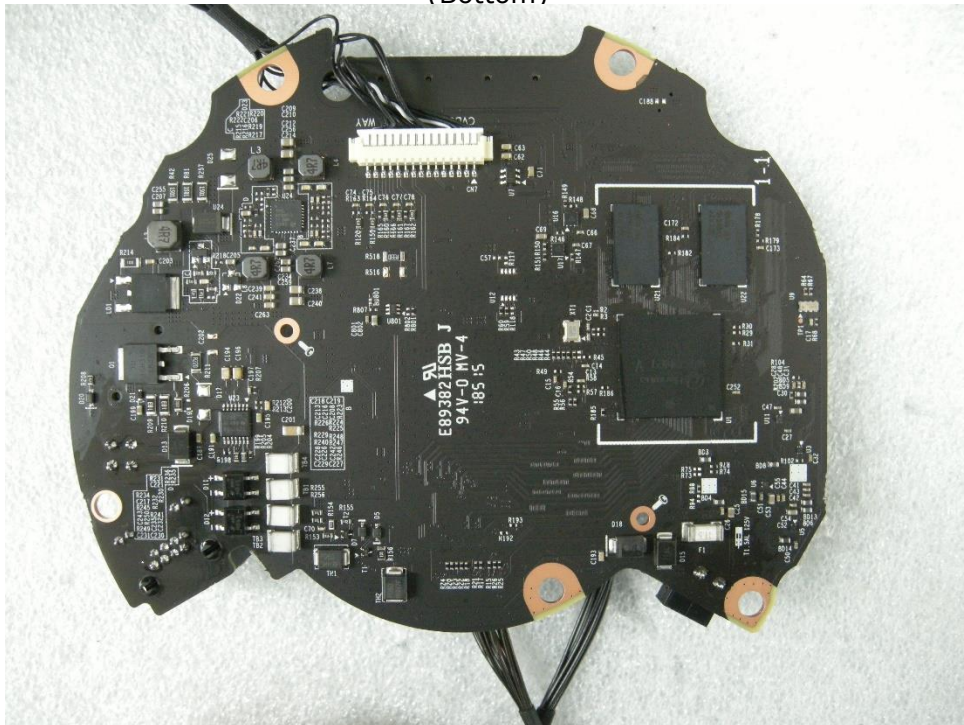


## EUT Internal View – Board

(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 – Lens

(Top)



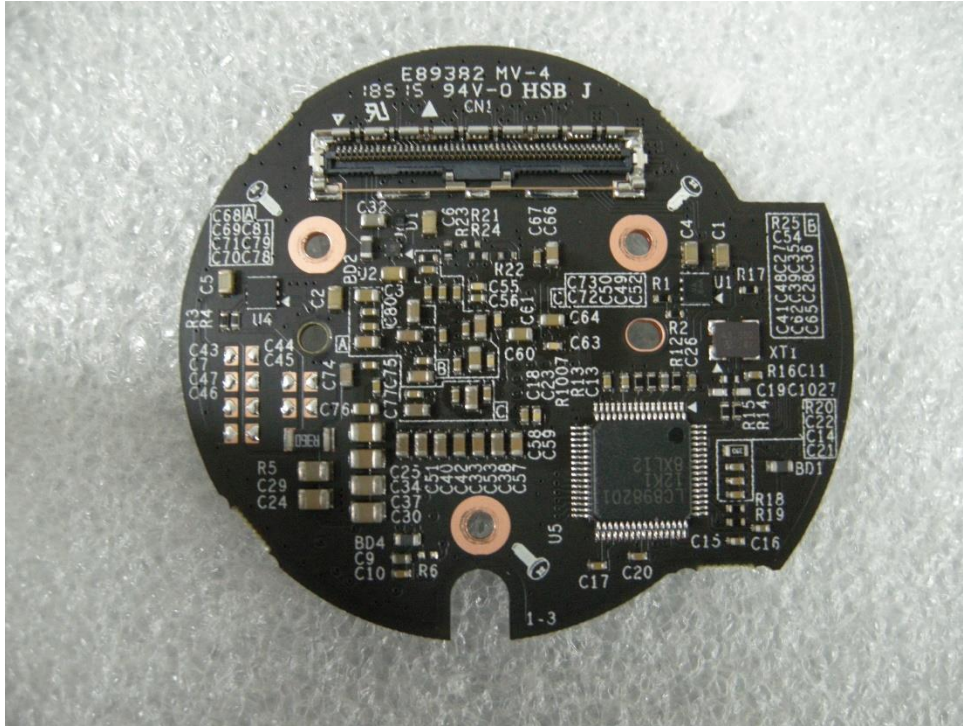
(Bottom)



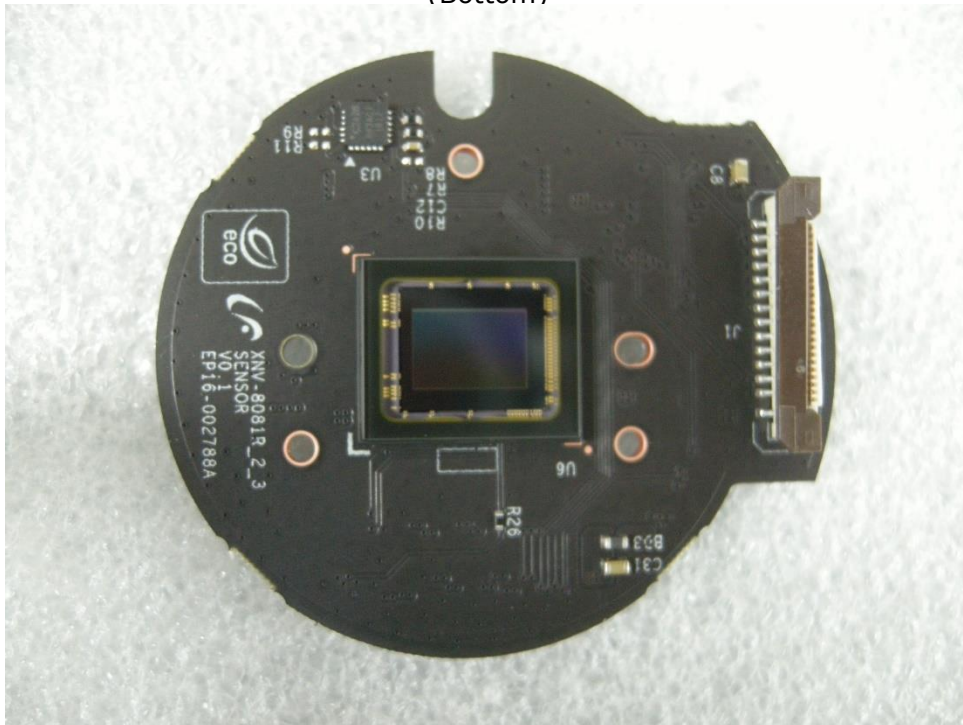
This report shall not be reproduced except in full, without the written approval of KES Co., Ltd.  
The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
The authenticity of the test report, contact kes@kes.co.kr

## EUT Internal View – Lens Board

(Top)



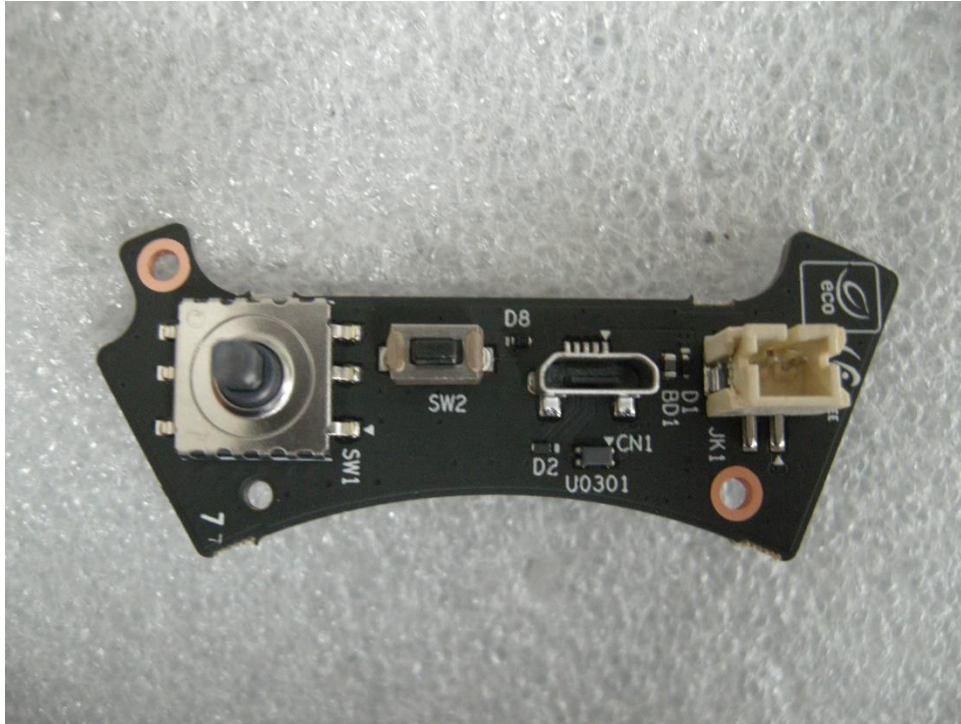
(Bottom)



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 – Switch Board

(Top)

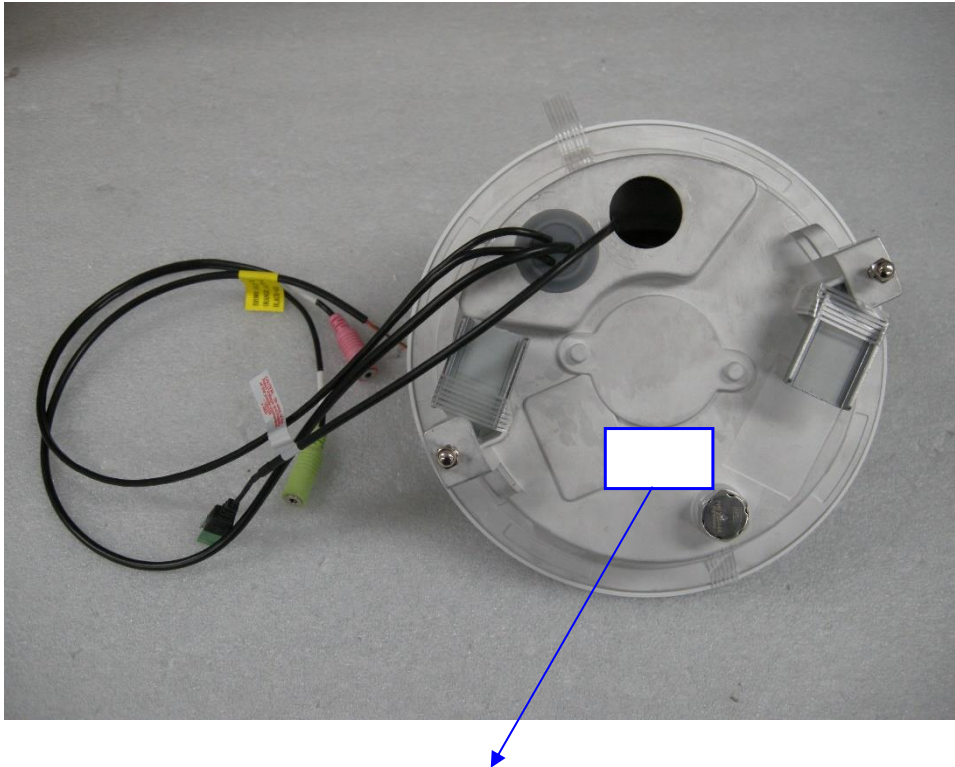


(Bottom)



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

## Label and Location



### **Network Camera**

Model No : XND-8081RF

Manufacturer : HANWHA VISION VIETNAM COMPANY LIMITED

Made in Vietnam

