



EMC TEST REPORT For VCCI

Test Report No. : KES-EM-21T0011-R1
Date of Issue : Feb. 24, 2023
Product name : NETWORK CAMERA
Model/Type No. : TNF-9010
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 : Dec. 07, 2020
Test date : Dec. 20, 2020 ~ Dec. 21, 2020
Test Results : ☒ **In Compliance** ☐ **Not in Compliance**

Tested by

Dong In, Kim
EMC Test Engineer

Reviewed by

Dong-Hun, Jang
EMC Technical Manager

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



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REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Jan. 05, 2021	KES-EM-21T0011	Issued
Feb. 24, 2023	KES-EM-21T0011-R1	Change the Applicant and manufacturer at the request of the customer.

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1.0 General Product Description

Main Specifications of EUT are:

TNF-9010			
Video		Radiometry	
Imaging Device	1/2.3" 12MP CMOS	Temperature detect range	None
Resolution	Original view(1:1): 3008x3008~480x480,	Temperature accuracy	None
	Quad view: 3584x2688~640x480,	Temperature detection	None
	Q1/Q2/Q3/Q4(4:3): 1792x1344~640x480	Additional	None
Max. Framerate	H.265/H.264: Max.30fps/25fps@3008x3008(60Hz/50Hz), MJPEG: Max.30fps/25fps@1080x1080(60Hz/50Hz)	Network	
NETD	None	Ethernet	Metal shielded RJ-45(10/100BASE-T)
Pixel Size	None	Video Compression	H.265/H.264: Main/Baseline/High, MJPEG G.711 u-law /G.726 Selectable
Min. Illumination	Color: 0.39 Lux (F2.2, 1/30sec), BW : 0Lux(IR LED on)	Audio Compression	G.726(ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for Installation		
Video Transmission Distance	None		
Lens		Smart Codec	Manual(Sea area), WiseStreamII
Focal Length (Zoom Ratio)	1.08mm fixed focal	Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Quality level control
Max. Aperture Ratio	F2.2	Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Angular Field of View	H: 187° / V: 187° / D: 187°	Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles)
Min. Object Distance	0.5m(1.64ft)		
Focus Control	None		
Lens Type	None	Protocol	IPv4, IPv6, TCP/IP, UDP/IP, RTP(UDP), RTCP(TCP), RTSP, RTSP, NTP, HTTP, HTTPS, SSL/TLS, DHCP, FTP, SMTP, ICMP, IGMP, SNMPv1/v2c/v3(MIB-2), ARP, DNS, DDNS, QoS, UPnP, Bonjour, LLDP, SRTP (TCP, UDP Unicast)
Mount Type	None		
Optional Lens	None		
Pan / Tilt / Rotate		Security	HTTPS(SSL) Login Authentication Digest Login Authentication IP Address Filtering User access log 802.1X Authentication(EAP-TLS, EAP-LEAP) Device Certificate(Hanwha Techwin Root CA, pre-installed) Secure by default certificate HTPM (Hanwha Trusted platform module) Secure OS/Boot/Storage, Verify firmware forgery
Pan / Tilt / Rotate Range	Rotate : +/- 180		
Pan Range	None		
Pan Speed	None	Application Programming Interface	ONVIF Profile S/T SUNAPI(HTTP API) Wisenet open platform(T8D)
Tilt Range	None		
Tilt Speed	None		
Rotate Range	None	General	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Sequence	None		
Preset Accuracy	None		
Operational		Webpage Language	None
Camera Title	Displayed up to 85 characters		
Direction Indicator	None		
Day & Night	Auto(Electrical)	Web Viewer	None
Backlight Compensation	BLC, HLC, WDR, SSDR		
Wide Dynamic Range	extremeWDR (120dB)		
Digital Noise Reduction	SSNRV	Edge Storage	Micro SD/SDHC/SDXC 1slot 512GB
Digital Image Stabilization	None	Memory	4096MB RAM, 512MB Flash
Defog	None	Environmental & Electrical	
Motion Detection	8ea, 8point polygonal zones	Operating Temperature / Humidity	-10°C ~ +50°C (14°F ~ +122°F) / Less than 95% RH
Privacy Masking	32ea, polygonal zones	Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 95% RH
	- Color: Grey/Green/Red/Blue/Black/White	Certification	None
	- Mosaic	Input Voltage	PoE(IEEE802.3af, Class3), 12VDC
Gain Control	Low / Middle / High	Power Consumption	PoE : Max 12.95W, Typical 10W 12VDC: Max 10W, Typical 8.3W
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor	Mechanical	
LDC	None	Color / Material	White / Aluminum
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec)	RAL Code	RAL9003
Digital PTZ	Support(Preset, Group)	Product dimensions / weight	Ø158x80.5mm(6.22x3.17), 1,280g(2.82lb)
Video Rotation	Flip, Mirror	Conduit hole	None
Analytics	- Parking detection based on AI engine (LED color: Green/Red/Blue/Pink/Yellow/Skyblue/Purple)	Hanging mount(Dome)	None
	- Analytics events : Defocus detection, Motion detection, Tampering	Skin cover(Dome)	None
		Weather cap(Dome)	None
Business Intelligence	None	Power module	None
Serial Interface	None	Backbox	None
Alarm I/O	1/1	DORI (EN62676-4 standard)	
Alarm Triggers	Analytics, Network disconnect, Alarm input	Detect (25PPM/ 8PPF)	34.9m(114.49ft)
Alarm Events	File upload via FTP and e-mail	Observe (63PPM/ 19PPF)	13.9m(45.60ft)
	Notification via e-mail	Recognize (125PPM/ 38PPF)	7.0m(22.96ft)
	SD/SDHC/SDXC or NAS recording at event triggers	Identify (250PPM/ 76PPF)	3.5m(11.48ft)
Audio In	Alarm output		
	PTZ Preset		
	Handover		
Audio Out	Audio clip playback		
	LED status		
	Selectable(mic in/line in)		
IR Viewable Length	Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm		
IR Illuminator (Optional)	Line out, Max. output level: 1Vrms		
Water Removal	None		
Auto Tracking	None		
Coaxial Protocol	None		
Color Palettes	None		

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1.1 Test Voltage & Frequency

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

Voltage ☐ 230 Vac ☒ 100 Vac ☐ 24 Vac ☐ 12 Vdc ☒ PoE

Frequency ☐ 50 Hz ☒ 60 Hz ☐ Hz

1.2 Variant Model Differences

Not applicable

1.3 Device Modifications

Not applicable

1.4 Equipment Under Test

Description	Model Number	Serial Number	Manufacturer	Remarks
NETWORK CAMERA	TNF-9010	-	HANWHA VISION VIETNAM COMPANY LIMITED	EUT

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1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
AC/DC Adapter	FSP060-DIBAN2	-	FSP GROUP INC.	-
PoE Adapter	GS728TPP	-	NETGEAR	-
Notebook	CQ61-127TU	CNF91801TM	HP	-
Notebook Adapter	PPP09D	601W94D1CKU	HP	-
Speaker	BR1000A Cuve Black 2	-	DONGGUAN EDIFIER TECHNOLOGY Co., Ltd	-
Mic	MP1000	-	-	-
SmartPhone	SM-G900	-	SAMSUNG	-
Alarm	-	-	-	-
Alarm Adapter	2ACB022F	-	Channel Well Technology (Guangzhou) Co., Ltd.	-
Button Alarm	-	-	-	-
Micro SD Card	-	-	Sandisk	-

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1.6 External I/O Cabling

■ DC Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45 (LAN)	Notebook	RJ-45 (LAN)	3.0	U
	3.5 mm	Speaker	3.5 mm	1.4	U
	3.5 mm	Mic	3.5 mm	1.4	U
	2 Pin	Button Alarm	2 Pin	3.0	U
	2 Pin	Alarm	2 Pin	3.0	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
Notebook	3.5 mm	SmartPhone	3.5 mm	1.2	U

* Unshielded=U, Shielded=S

■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
NETWORK CAMERA (EUT)	RJ-45 (PoE)	PoE Adapter	RJ-45 (PoE)	3.0	U
	3.5 mm	Speaker	3.5 mm	1.4	U
	3.5 mm	Mic	3.5 mm	1.4	U
	2 Pin	Button Alarm	2 Pin	3.0	U
	2 Pin	Alarm	2 Pin	3.0	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	-	-
PoE Adapter	RJ-45 (LAN)	Notebook	RJ-45 (LAN)	3.0	U
Notebook	3.5 mm	SmartPhone	3.5 mm	1.2	U

* Unshielded=U, Shielded=S



1.7 EUT Operating Mode(s)

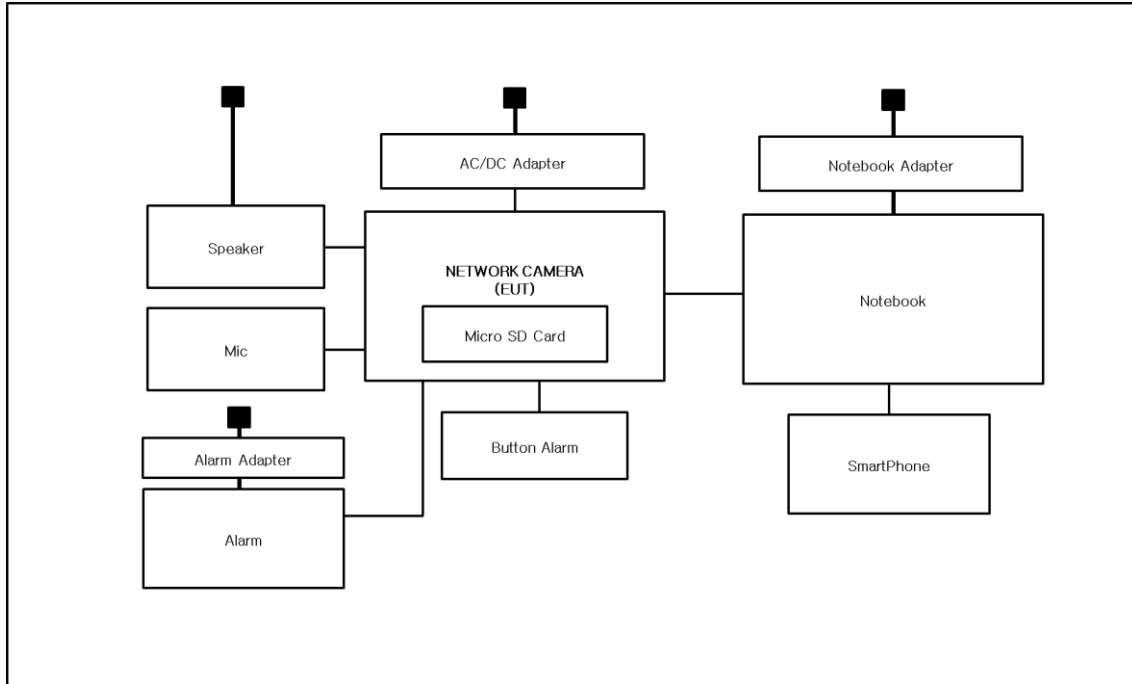
Test Mode	operating
DC	Tested by checking the operation status through the screen transmitted to the web viewer and Notebook and conducting a PING test.
PoE	

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

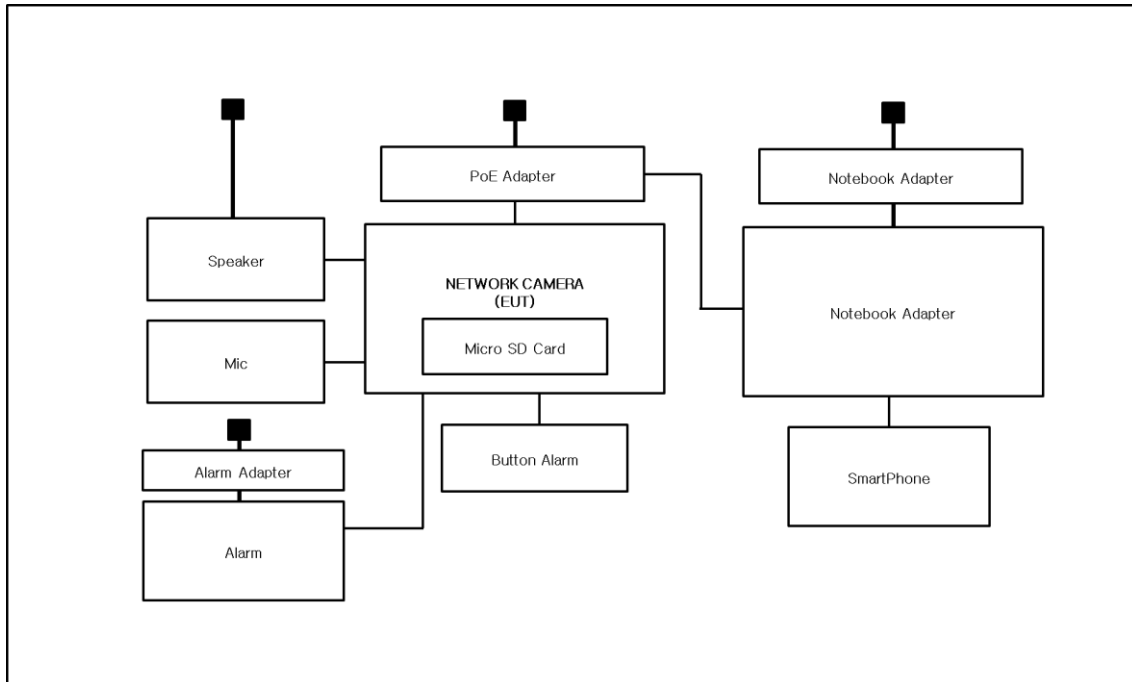
1.8 Configuration

■ AC Main
 □ DC Main

■ DC Mode



■ PoE Mode



1.9 Remarks when standards applied

N/A

1.10 Calibration Details of Equipment Used for Measurement

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

1.11 Test Facility

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

1.12 Laboratory Accreditations and Listings

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

2.0 Test Regulations

The emissions tests were performed according to following regulations:

☐ **EMC – Directive 2014/30/EU**

☐ EN 61000-6-3:2011

☐ EN 61000-6-1:2007

☐ EN 61000-6-4:2007 +A1:2011

☐ EN 61000-6-2:2005

☐ EN 55011:2007 +A1:2010

☐ Group 1

☐ Group 2

☐ Class A

☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 61547 :2009

☐ EN 55032:2015

☐ Class A

☐ Class B

☐ EN 55024:2010 +A1:2015

☐ EN 50130-4:2011 +A1:2014

☐ EN 61000-3-2:2014

☐ EN 61000-3-3:2013

☐ EN 61326-1:2013



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

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2.1 Conducted Emissions Mains Power Ports

Test Date

Dec. 20, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	01, 20, 2021
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021

Test ConditionsTemperature: 22,6 °C
Relative Humidity: 46,9 % R.H.**Frequency Range of Measurement**

150 kHz to 30 MHz

Instrument Settings

IF Band Width: 9 kHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

2.2 Conducted Emissions at Telecommunication Ports

Test Date

Dec. 20, 2020

Test Location

Electro wave Shieldroom #6

Test Equipment

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EMC32	R & S	9.12.00	-
☒	EMI TEST RECEIVER	ESR3	R & S	101783	01, 20, 2021
☒	LISN	ENV216	R & S	101787	12, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	12, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	12, 29, 2021
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	12, 30, 2021
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	12, 30, 2021
☐	CDN	CDNS502A	TESEQ	40431	12, 29, 2021

Test Conditions

Temperature: 22,6 °C
Relative Humidity: 46,9 % 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

Dec. 20, 2020

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

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
☒	EMI Test S/W	EP5/RE	TOYO Corporation	6.0.0	-
☒	EMI TEST RECEIVER	ESU26	R & S	100551	04, 01, 2021
☒	AMPLIFIER	SCU 01	R & S	100603	11, 25, 2021
☒	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	12, 08, 2022
☒	ATTENUATOR	8491A	HP	32173	03, 10, 2021

Test ConditionsTemperature: 23,1 °C
Relative Humidity: 47,6 % 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

Dec. 21, 2020

Test Location

SEMI ANECHOIC CHAMBER #3

Test Equipment

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

Test ConditionsTemperature: 23,4 °C
Relative Humidity: 47,3 % R.H.**Frequency Range of Measurement**

1 GHz to 6 GHz

Instrument Settings

IF Band Width: 1 MHz

Test Results

The requirements are:

- ☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

RemarksSee Appendix A for test data.

APPENDIX A – TEST DATA

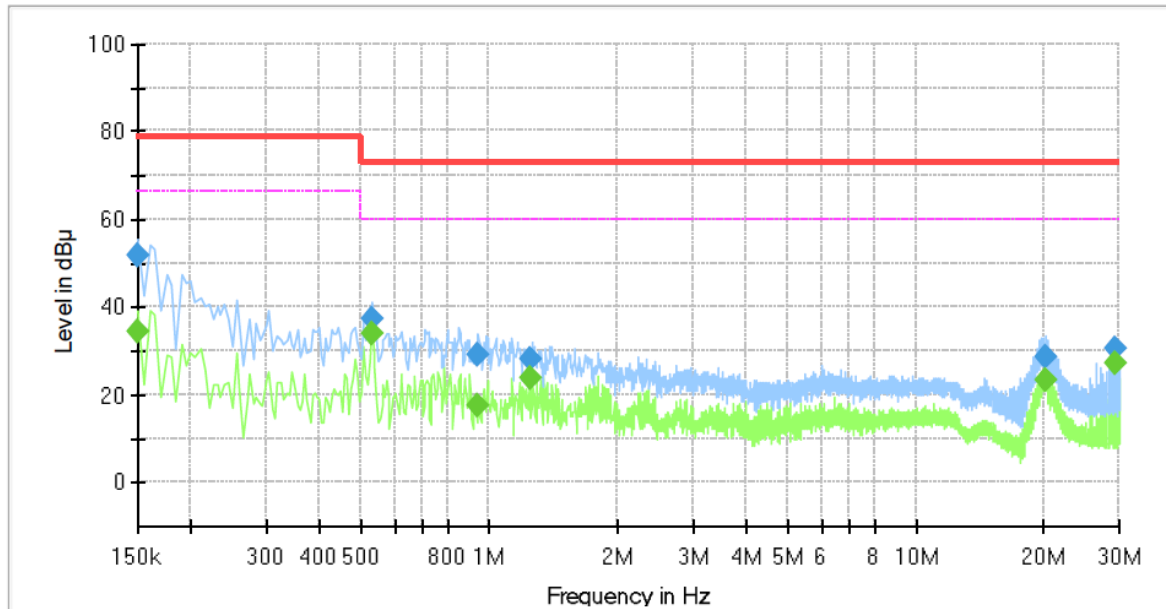
Conducted Emissions at Mains Power Ports

■ DC Mode

HOT LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNF-9010
Phase:	L1
Mode:	DC
Operator Name:	KES



Final Result

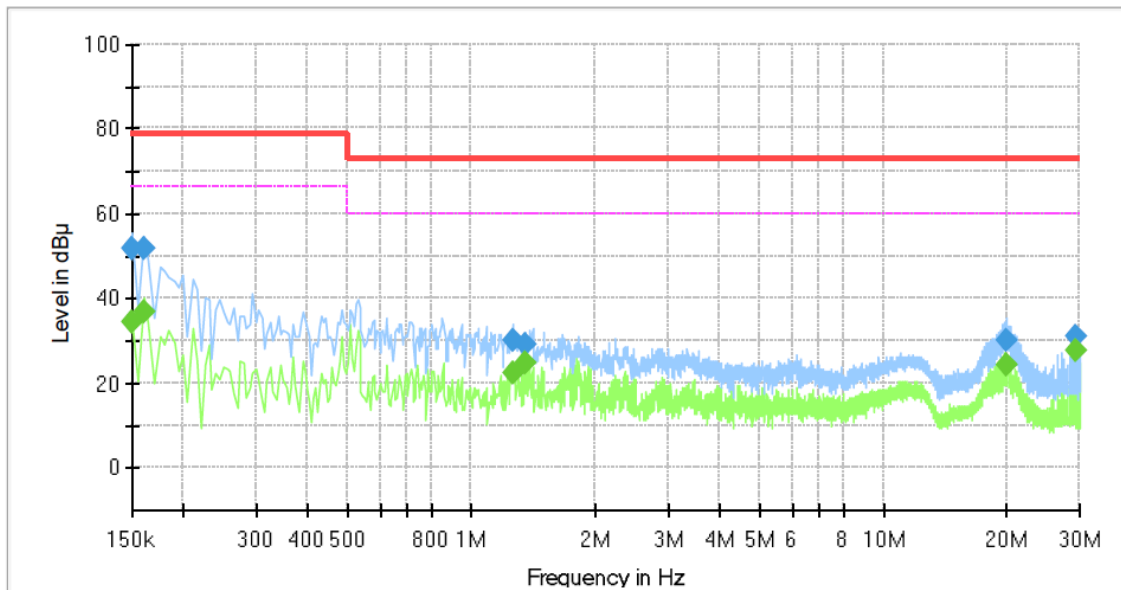
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	34.17	66.00	31.83	1000.0	9.000	L1	19.5
0.150000	51.71	---	79.00	27.29	1000.0	9.000	L1	19.5
0.530000	---	33.86	60.00	26.14	1000.0	9.000	L1	19.8
0.530000	37.15	---	73.00	35.85	1000.0	9.000	L1	19.8
0.940000	---	17.57	60.00	42.43	1000.0	9.000	L1	20.1
0.940000	28.93	---	73.00	44.07	1000.0	9.000	L1	20.1
1.245000	---	23.59	60.00	36.41	1000.0	9.000	L1	20.1
1.245000	28.05	---	73.00	44.95	1000.0	9.000	L1	20.1
20.100000	---	23.48	60.00	36.52	1000.0	9.000	L1	20.2
20.100000	28.47	---	73.00	44.53	1000.0	9.000	L1	20.2
29.235000	---	27.31	60.00	32.69	1000.0	9.000	L1	20.5
29.235000	30.52	---	73.00	42.48	1000.0	9.000	L1	20.5

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NEUTRAL LINE

Common Information

Test Description:	Conducted Emission
Model No.:	TNF-9010
Phase:	N
Mode:	DC
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.150000	---	34.40	66.00	31.60	1000.0	9.000	N	19.4
0.150000	51.82	---	79.00	27.18	1000.0	9.000	N	19.4
0.160000	---	37.02	66.00	28.98	1000.0	9.000	N	19.4
0.160000	51.69	---	79.00	27.31	1000.0	9.000	N	19.4
1.265000	---	22.27	60.00	37.73	1000.0	9.000	N	20.1
1.265000	29.85	---	73.00	43.15	1000.0	9.000	N	20.1
1.360000	---	24.83	60.00	35.17	1000.0	9.000	N	20.1
1.360000	28.84	---	73.00	44.16	1000.0	9.000	N	20.1
19.825000	---	24.27	60.00	35.73	1000.0	9.000	N	20.3
19.825000	30.06	---	73.00	42.94	1000.0	9.000	N	20.3
29.235000	---	27.65	60.00	32.35	1000.0	9.000	N	20.5
29.235000	30.91	---	73.00	42.09	1000.0	9.000	N	20.5

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

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

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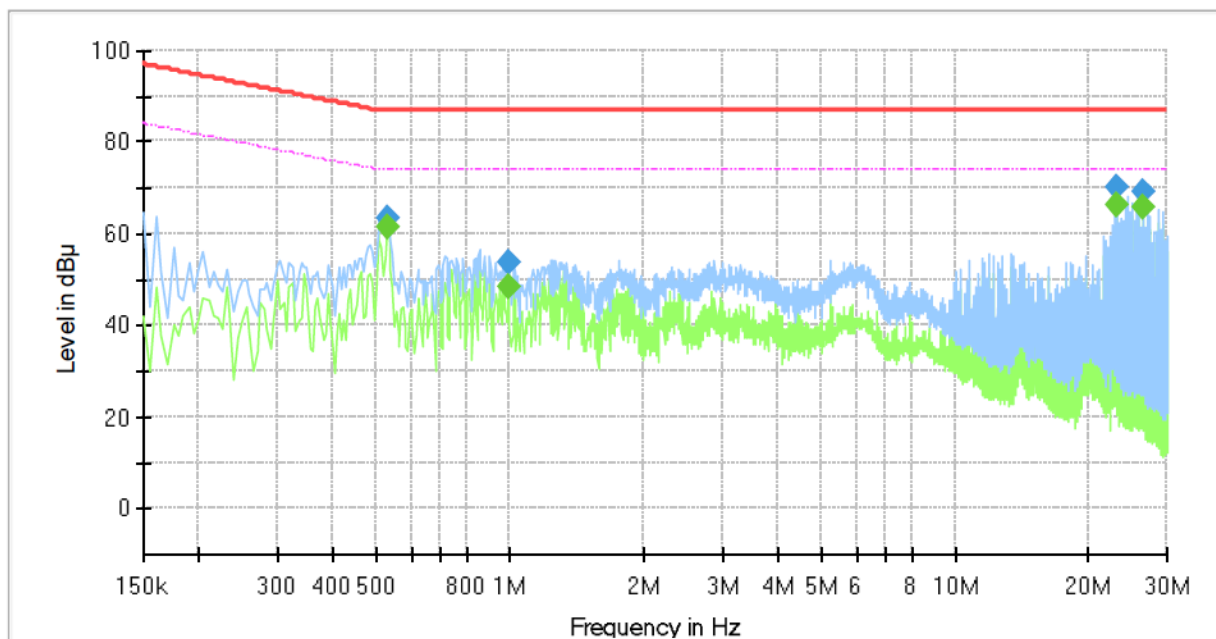
Conducted Emissions at Telecommunication Ports

■ DC Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNF-9010
Mode :	DC
Speed :	100 Mbps
Operator Name:	KES



Final Result

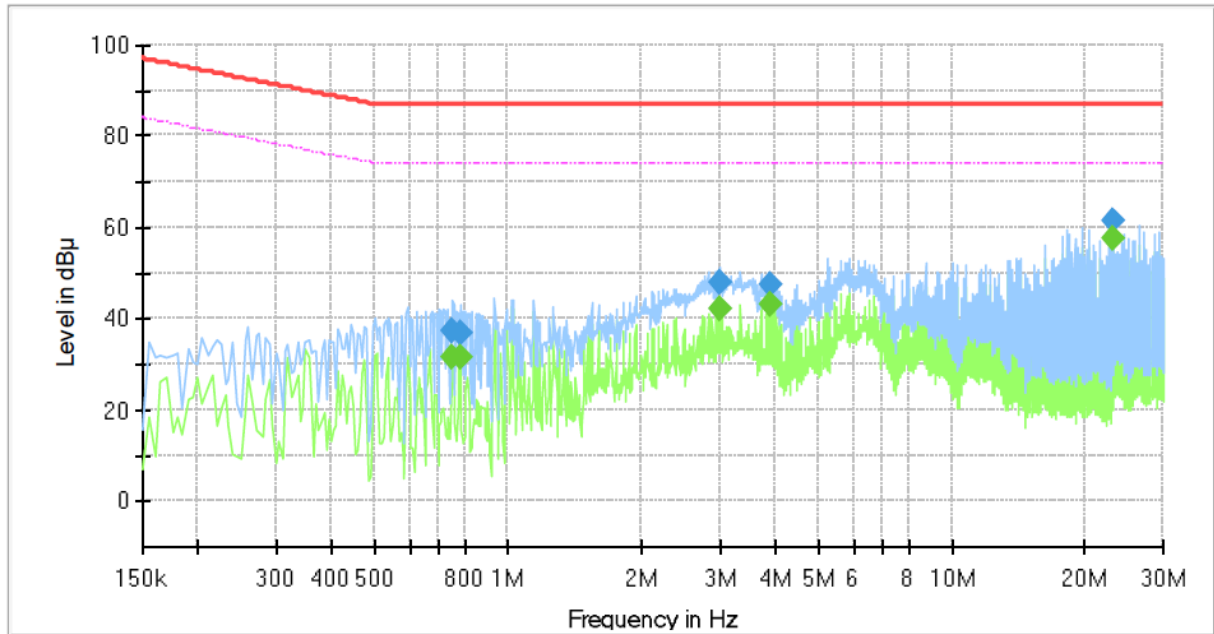
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.530000	---	61.58	74.00	12.42	1000.0	9.000	Single Line	19.8
0.530000	63.50	---	87.00	23.50	1000.0	9.000	Single Line	19.8
0.995000	---	48.48	74.00	25.52	1000.0	9.000	Single Line	20.0
0.995000	53.81	---	87.00	33.19	1000.0	9.000	Single Line	20.0
23.130000	---	66.08	74.00	7.92	1000.0	9.000	Single Line	20.1
23.130000	69.87	---	87.00	17.13	1000.0	9.000	Single Line	20.1
26.610000	---	65.94	74.00	8.06	1000.0	9.000	Single Line	20.3
26.610000	69.20	---	87.00	17.80	1000.0	9.000	Single Line	20.3

■ PoE Mode

[100 Mbps]

Common Information

Test Description:	Telecommunication Emission
Model No.:	TNF-9010
Mode :	PoE
Speed :	100 Mbps
Operator Name:	KES



Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.750000	---	31.70	74.00	42.30	1000.0	9.000	Single Line	19.9
0.750000	37.05	---	87.00	49.95	1000.0	9.000	Single Line	19.9
0.780000	---	31.54	74.00	42.46	1000.0	9.000	Single Line	19.9
0.780000	36.95	---	87.00	50.05	1000.0	9.000	Single Line	19.9
3.010000	---	42.06	74.00	31.94	1000.0	9.000	Single Line	19.8
3.010000	47.69	---	87.00	39.31	1000.0	9.000	Single Line	19.8
3.895000	---	42.85	74.00	31.15	1000.0	9.000	Single Line	19.6
3.895000	47.29	---	87.00	39.71	1000.0	9.000	Single Line	19.6
23.130000	---	57.55	74.00	16.45	1000.0	9.000	Single Line	20.1
23.130000	61.20	---	87.00	25.80	1000.0	9.000	Single Line	20.1

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

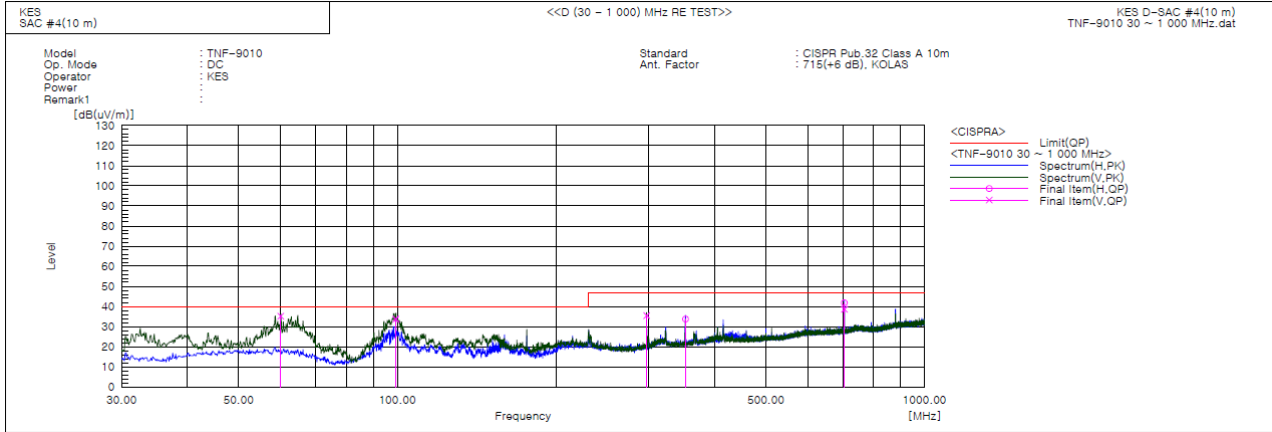
Reading Value : Not shown in the table.

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

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Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



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	60.118	V	57.6	-22.4	35.2	40.0	4.8	100.0	264.0	
2	99.286	V	56.9	-23.2	33.7	40.0	6.3	111.0	210.0	
3	297.038	V	54.4	-18.9	35.5	47.0	11.5	122.0	178.0	
4	352.040	H	50.0	-16.3	33.7	47.0	13.3	381.0	96.0	
5	704.000	V	47.6	-9.0	38.6	47.0	8.4	188.0	201.0	
6	703.996	H	50.8	-9.0	41.8	47.0	5.2	355.0	133.0	



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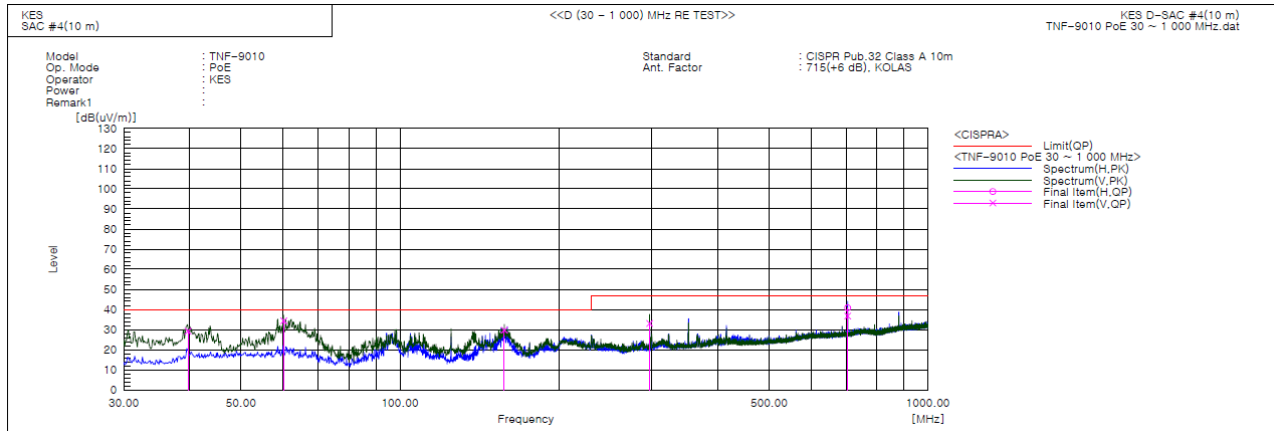
3701, 40, Simin-daero 365beon-gil,
Dongan-gu, Anyang-si, Gyeonggi-do, 14057, Korea
Tel: +82-31-425-6200 / Fax: +82-31-424-0450
www.kes.co.kr

Report No.:

KES-EM-21T0011-R1

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PoE Mode



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	39.677	V	52.3	-23.1	29.2	40.0	10.8	100.0	296.0	
2	60.258	V	56.9	-22.5	34.4	40.0	5.6	100.0	52.0	
3	157.577	V	55.3	-25.5	29.8	40.0	10.2	122.0	203.0	
4	297.022	V	52.0	-18.9	33.1	47.0	13.9	132.0	156.0	
5	703.996	V	45.8	-9.0	36.8	47.0	10.2	192.0	144.0	
6	703.992	H	49.8	-9.0	40.8	47.0	6.2	325.0	126.0	

◆ Calculation

Corrected Amplitude [dBuV] = Amplitude[dBuV] + Correction Factor [dB]

Corrected Amplitude : The Final Value, Amplitude : Reading Value,

Correction Factor : ANT FACTOR + Cable loss

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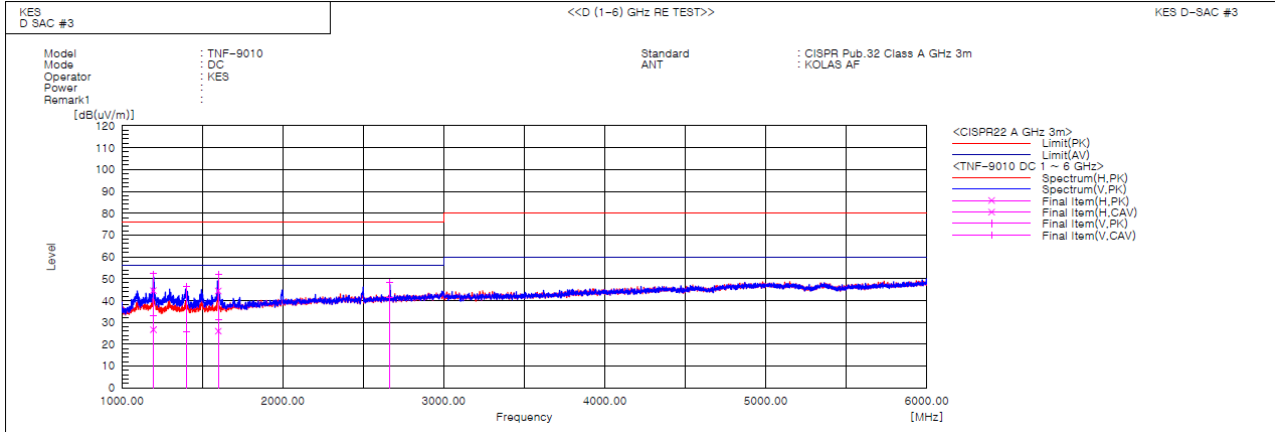
Report No.:

KES-EM-21T0011-R1

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Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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	1195.690	H	53.1	35.1	-8.5	44.6	26.6	76.0	56.0	31.4	29.4	100.0	136.4	
2	1197.290	V	60.7	41.7	-8.5	52.2	33.2	76.0	56.0	23.8	22.8	100.0	171.0	
3	1399.429	V	53.7	33.0	-7.3	46.4	25.7	76.0	56.0	29.6	30.3	100.0	211.3	
4	1598.539	V	57.8	36.7	-5.8	52.0	30.9	76.0	56.0	24.0	25.1	100.0	229.3	
5	1599.260	H	50.1	31.8	-5.8	44.3	26.0	76.0	56.0	31.7	30.0	100.0	32.7	
6	2665.910	V	47.8	40.9	0.3	48.1	41.2	76.0	56.0	27.9	14.8	100.0	336.0	

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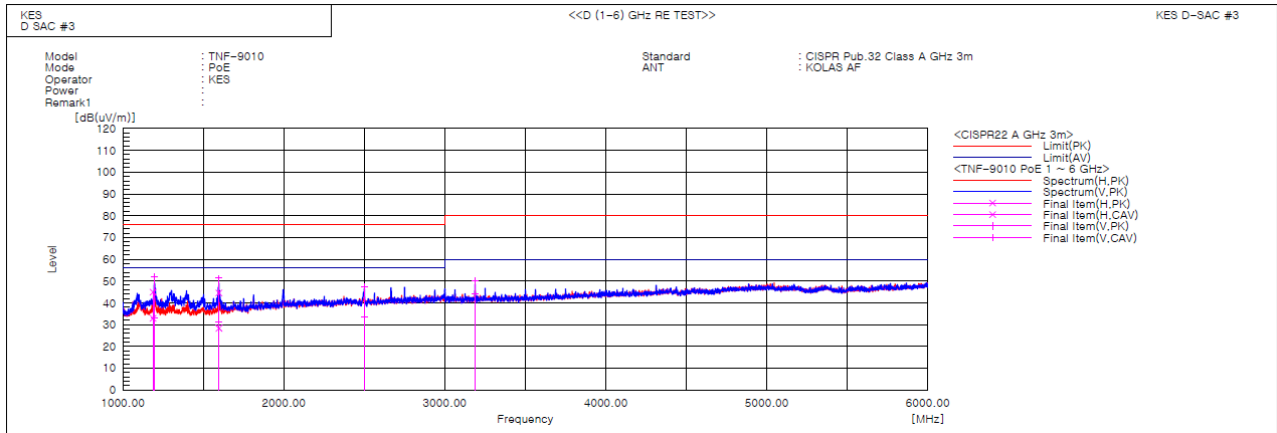
3701, 40, Simin-daero 365beon-gil,
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■ PoE Mode



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result CAV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin CAV [dB]	Height [cm]	Angle [deg]	Remark
1	1198.110	V	60.3	41.4	-8.5	51.8	32.9	76.0	56.0	24.2	23.1	100.0	209.2	
2	1187.392	H	53.4	41.5	-8.5	44.9	33.0	76.0	56.0	31.1	23.0	100.0	117.3	
3	1596.160	H	50.3	34.2	-5.8	44.5	28.4	76.0	56.0	31.5	27.6	100.0	270.9	
4	1596.440	V	57.1	36.9	-5.8	51.3	31.1	76.0	56.0	24.7	24.9	100.0	221.6	
5	2499.590	V	47.8	33.7	-0.3	47.5	33.4	76.0	56.0	28.5	22.6	100.0	174.4	
6	3187.810	V	48.5	42.6	1.6	50.1	44.2	80.0	60.0	29.9	15.8	100.0	169.9	

◆ Calculation

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

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

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

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

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Test Setup Photos and Configuration

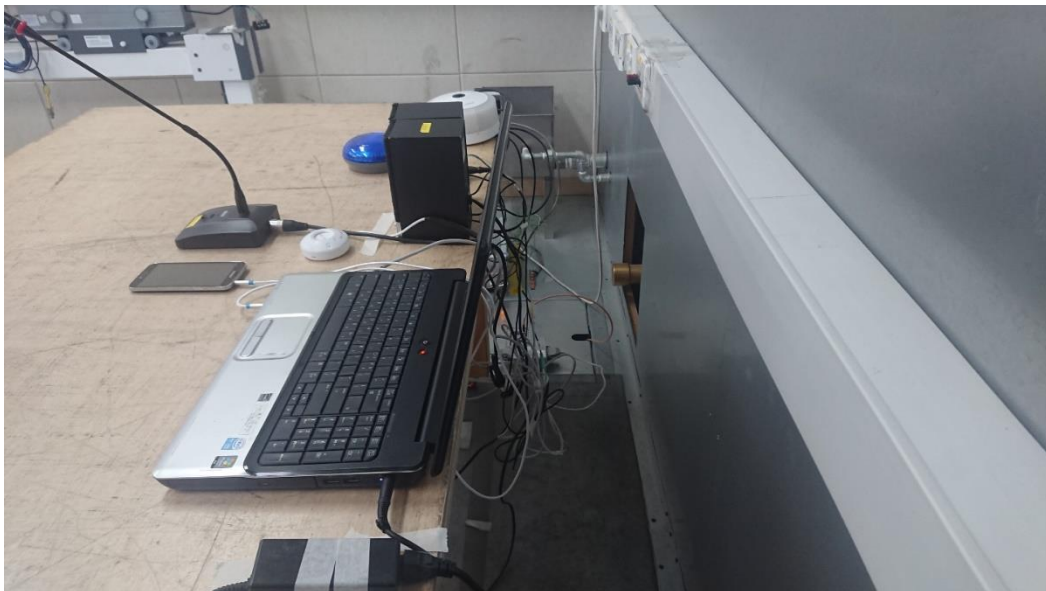
Conducted Emissions at Mains Power Ports

■ DC Mode



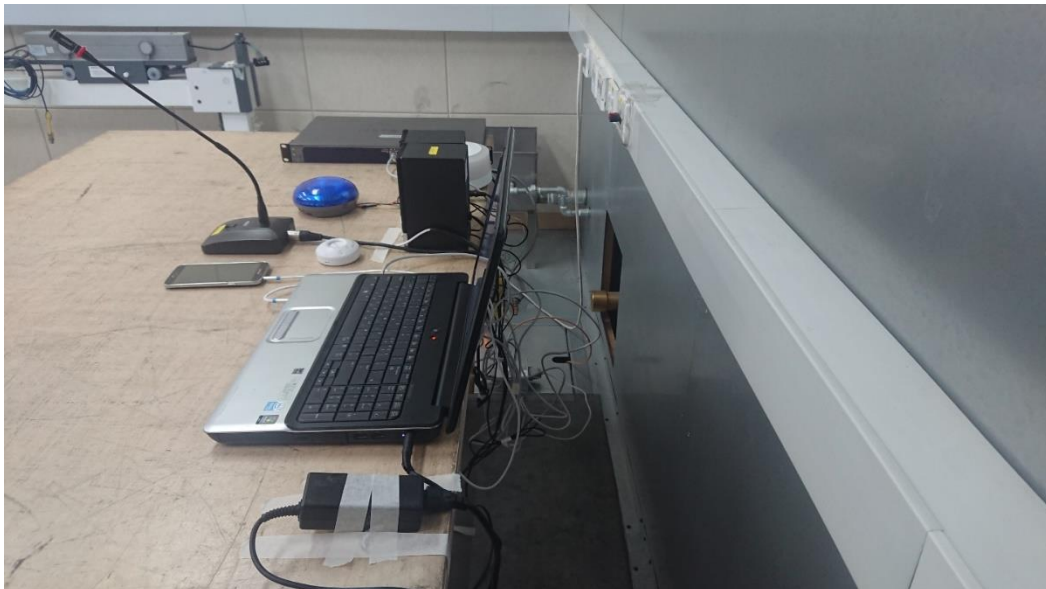
Conducted Emissions at Telecommunication Ports

■ DC Mode



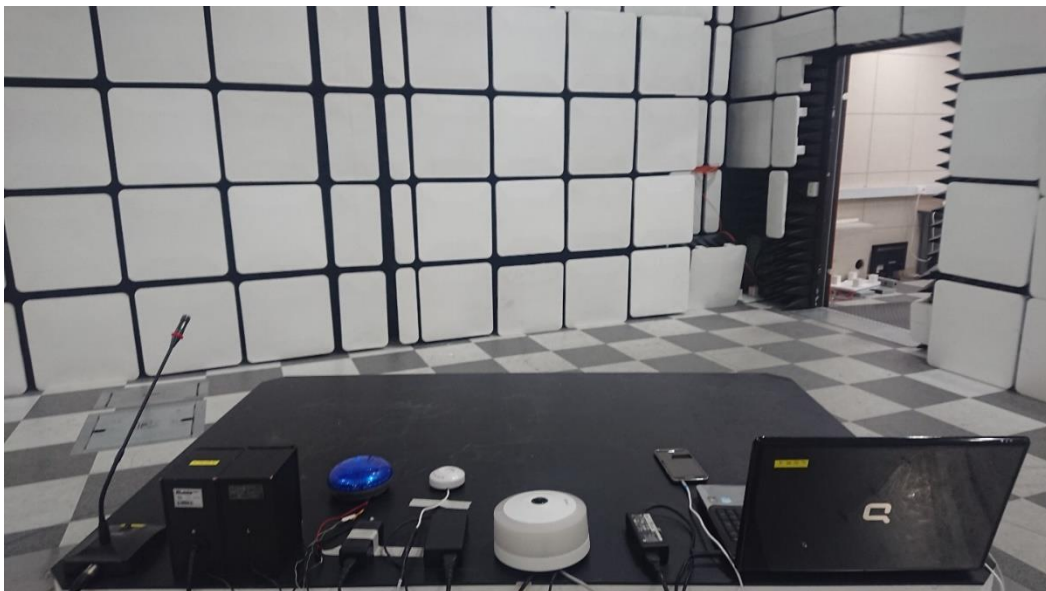
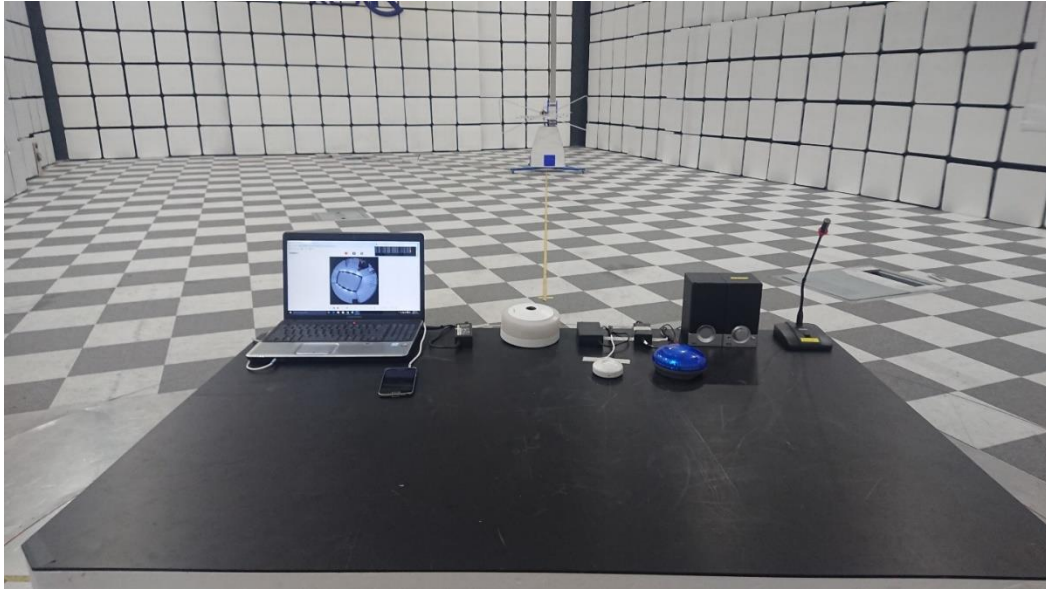
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■ PoE Mode



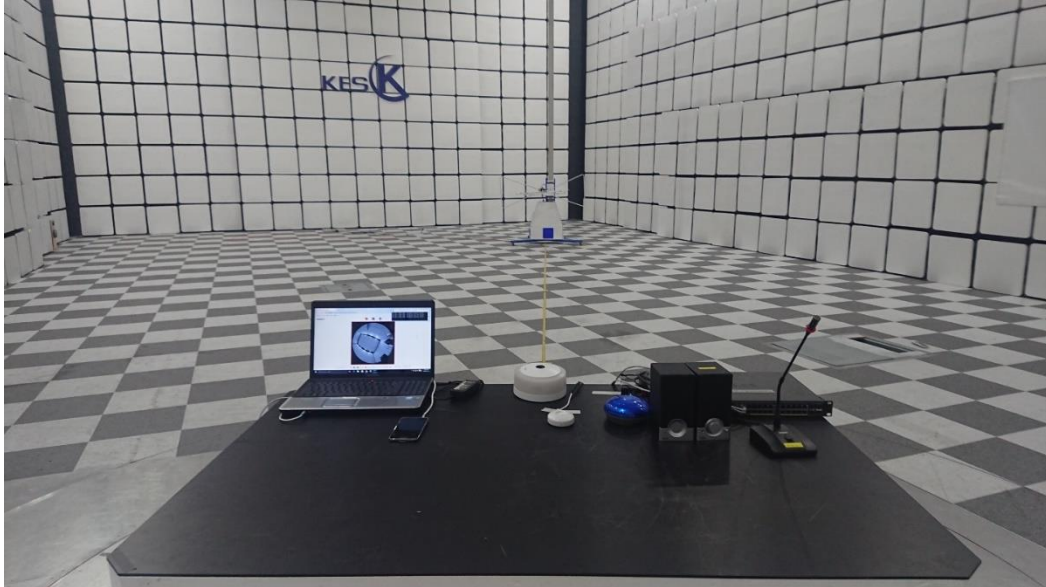
Radiated Electric Field Emissions(Below 1 GHz)

■ DC Mode



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■ PoE Mode



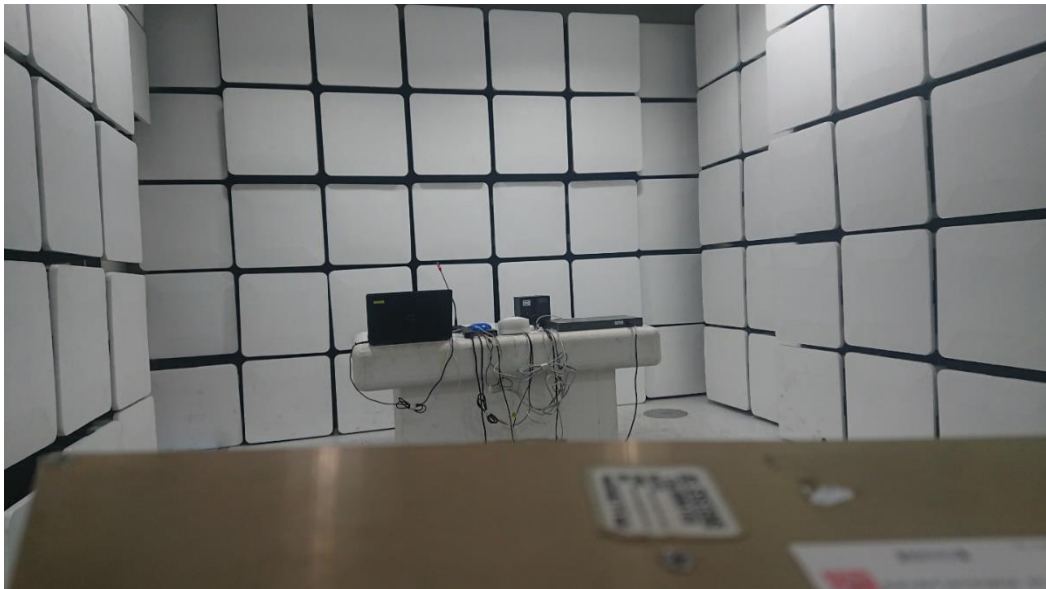
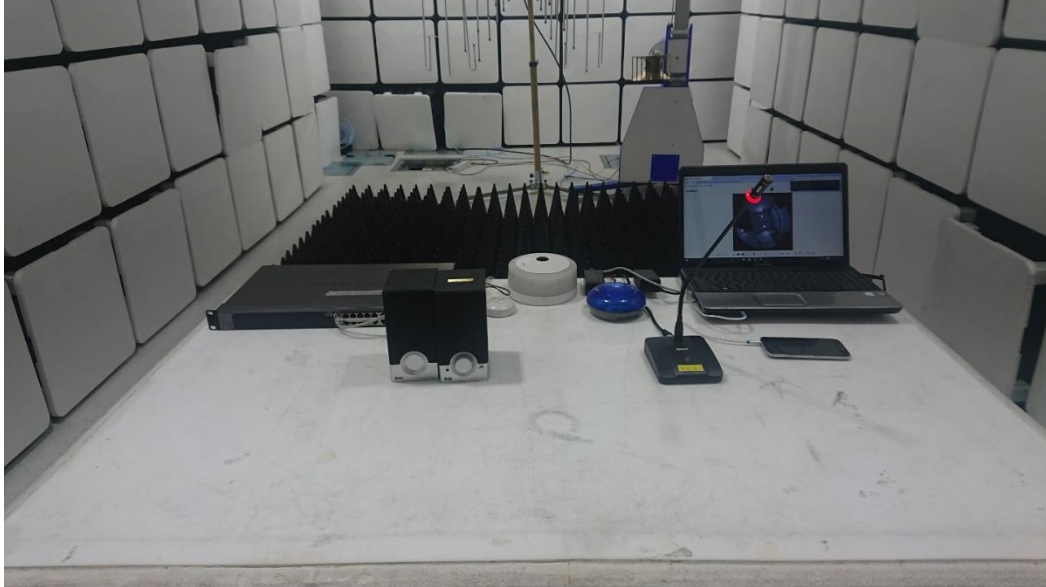
Radiated Electric Field Emissions(Above 1 GHz)

■ DC Mode



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■ PoE Mode



EUT External Photographs

(Top)

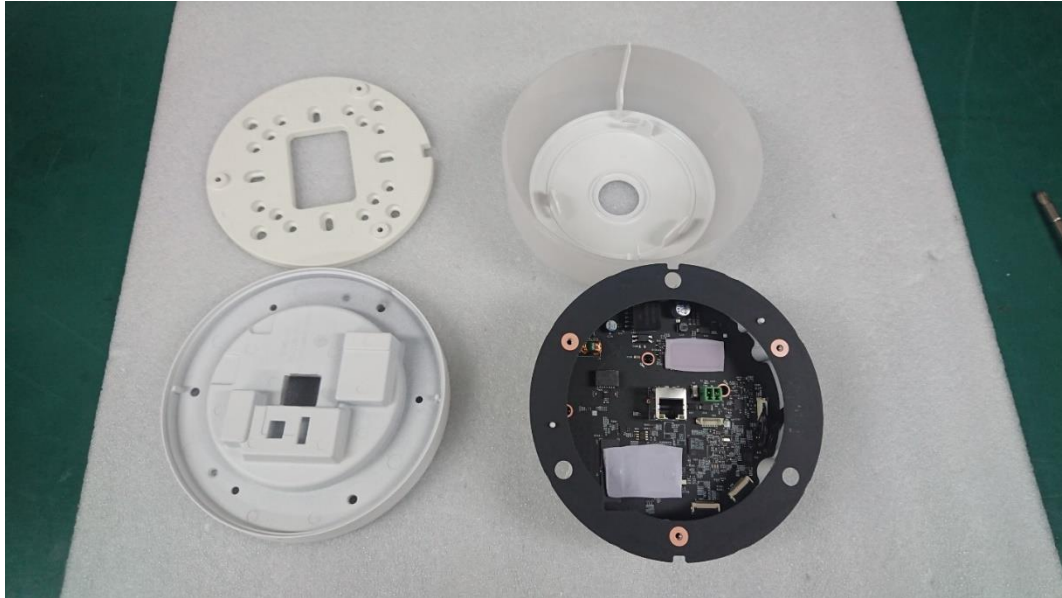


(Bottom)



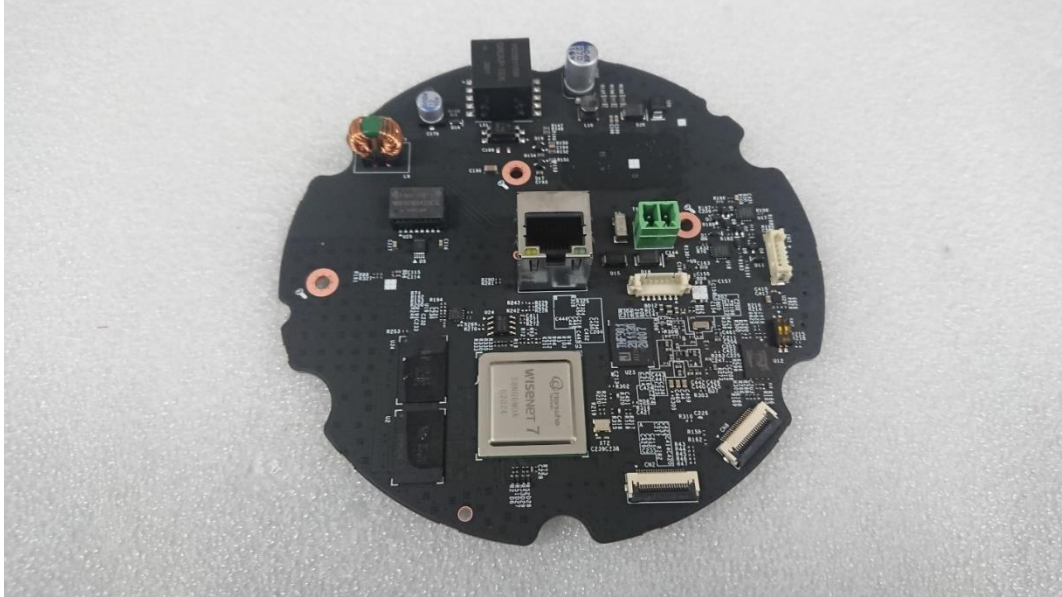
EUT Internal Photographs

(Internal View)

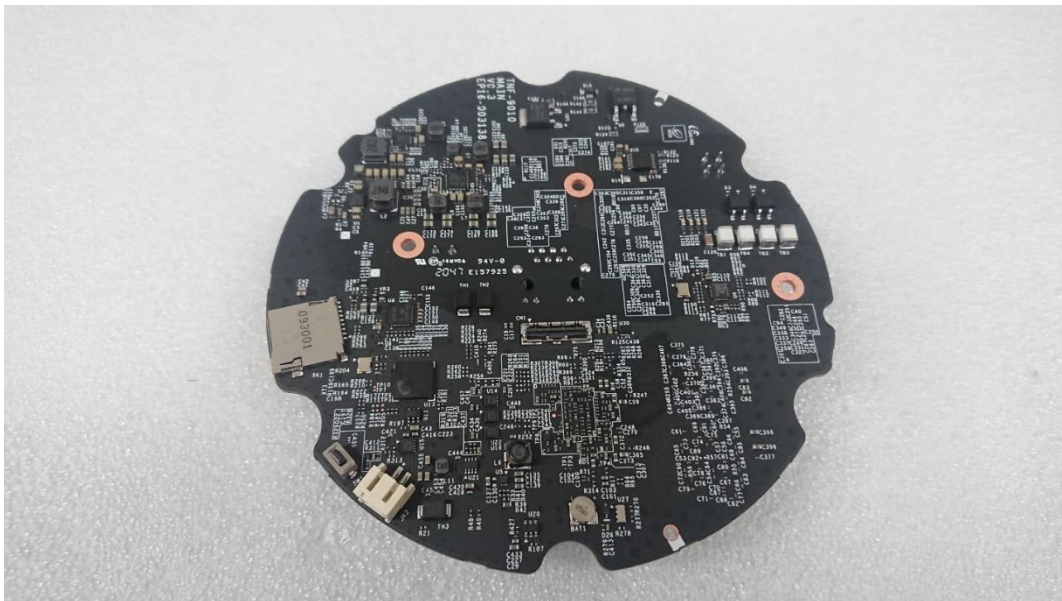


EUT Internal View – Main Board

(Top)



(Bottom)



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EUT Internal View – LED Board

(Top)



(Bottom)



Label Photographs



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