EMC TEST REPORT For RCM

Test Report No.	:	KES-EM-21T0012-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

김동인

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-21T0012	Issued
Feb. 24, 2023	KES-EM-21T0012-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	
Imaging Device	1/2.3" 12MP CMOS
Resolution	Original view(1:1): 3008x3008~480x480, Quad view: 3584x2688~640x480, Q1/Q2/Q3/Q4(4:3): 1792x1344~640x480
Max. Framerate	H.265/H.264: Max.30fps/25fps@3008x3008(60Hz/50Hz), MJPEG: Max.30fps/25fps@1080x1080(60Hz/50Hz)
NETD	None
Pixel Size	None
Min. Illumination	Color: 0.39 Lux (F2.2, 1/30sec), BW : 0Lux(IR LED on)
Video Out	CVBS : 1.0 Vp-p / 75Ω composite, 720x480(N), 720x576(P), for Installation
Video Transmission Distance	None
Lens	
Focal Length (Zoom Ratio)	1.08mm fixed focal
Max. Aperture Ratio	F2.2
Angular Field of View	H: 187° / V: 187° / D: 187°
Min. Object Distance	0.5m(1.64ft)
Focus Control	None
Lens Type	None
Mount Type	None
Optional Lens	None
Pan / Tilt / Rotate	
Pan / Tilt / Rotate Range	Rotate : +/- 180
Pan Range	None
Pan Speed	None
Tilt Range	None
Tilt Speed	None
Rotate Range	None
Sequence	None
Preset Accuracy	None
Operational	
Camera Title	Displayed up to 85 characters
Direction Indicator	None
Day & Night	Auto(Electrical)
Backlight Compensation	BLC, HLC, WDR, SSDR
Wide Dynamic Range	extremeWDR (120dB)
Digital Noise Reduction	SSNRV
Digital Image Stabilization	None
Defog	None
Motion Detection	8ea, 8point polygonal zones
Privacy Masking	32ea, polygonal zones - Color: Grey/Green/Red/Blue/Black/White - Mosaic
Gain Control	Low / Middle / High
White Balance	ATW / Narrow ATW / AWC / Manual / Indoor / Outdoor
LDC	None
Electronic Shutter Speed	Minimum / Maximum / Anti flicker (1/5~1/12,000sec)
Digital PTZ	Support(Preset, Group)
Video Rotation	Flip, Mirror
Analytics	- Parking detection based on AI engine (LED color: Green/Red/Blue/Pink/Yellow/Skyblue/Purple) - Analytics events : Defocus detection, Motion detection, Tampering
Business Intelligence	None
Serial Interface	None
Alarm I/O	1/1
Alarm Triggers	Analytics, Network disconnect, Alarm input
Alarm Events	File upload via FTP and e-mail Notification via e-mail SD/SDHC/SDXC or NAS recording at event triggers Alarm output PTZ Preset Handover Audio clip playback LED status
Audio In	Selectable(mic in/line in) Supply voltage: 2.5VDC(4mA), Input impedance: 2K Ohm
Audio Out	Line out, Max. output level: 1Vrms
IR Viewable Length	None
IR Illuminator (Optional)	None
Water Removal	None
Auto Tracking	None
Coaxial Protocol	None
Color Palettes	None

Radiometry	
Temperature detect range	None
Temperature accuracy	None
Temperature detection	None
Additional	None
Network	
Ethernet	Metal shielded RJ-45(10/100BASE-T)
Video Compression	H.265/H.264: Main/Baseline/High, MJPEG
Audio Compression	G.711 u-law /G.726 Selectable G.726(ADPCM) 8KHz, G.711 8KHz G.726: 16Kbps, 24Kbps, 32Kbps, 40Kbps AAC-LC: 48Kbps at 16KHz
Smart Codec	Manual(5ea area), WiseStreamⅡ
Video Quality Adjustment	H.264/H.265: Target bitrate level control MJPEG: Quality level control
Bitrate Control	H.264/H.265: CBR or VBR MJPEG: VBR
Streaming	Unicast(20 users) / Multicast Multiple streaming(Up to 10 profiles)
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, UPnP, Bonjour, LLDP, SRTP (TCP, UDP Unicast)
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
Application Programming Interface	ONVIF Profile S/T SUNAPI(HTTP API) Wisenet open platform(TBD)
General	
Webpage Language	English, Korean, Chinese, French, Italian, Spanish, German, Japanese, Russian, Swedish,, Portuguese, Czech, Polish, Turkish, Dutch, Hungarian, Greek
Web Viewer	None
Edge Storage	Micro SD/SDHC/SDXC 1slot 512GB
Memory	4096MB RAM, 512MB Flash
Environmental & Electrical	
Operating Temperature / Humidity	-10°C ~ +50°C (14°F ~ +122°F) / Less than 95% RH
Storage Temperature / Humidity	-50°C ~ +60°C(-58°F ~ +140°F) / Less than 95% RH
Certification	None
Input Voltage	PoE(IEEE802.3af, Class3), 12VDC
Power Consumption	PoE : Max 12.95W, Typical 10W 12VDC: Max 10W, Typical 8.3W
Mechanical	
Color / Material	White / Aluminum
RAL Code	RAL9003
Product dimensions / weight	Ø158x80.5mm(6.22x"3.17), 1,280g(2.82lb)
Conduit hole	None
Hanging mount(Dome)	None
Skin cover(Dome)	None
Weather cap(Dome)	None
Power module	None
Backbox	None
DORI (EN62676-4 standard)	
Detect (25PPM/ 8PPF)	34.9m(114.49ft)
Observe (63PPM/ 19PPF)	13.9m(45.60ft)
Recognize (125PPM/ 38PPF)	7.0m(22.96ft)
Identify (250PPM/ 76PPF)	3.5m(11.48ft)

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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 ☒ 240 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 ㎜	Speaker	3.5 ㎜	1.4	U
	3.5 ㎜	Mic	3.5 ㎜	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 ㎜	SmartPhone	3.5 ㎜	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 ㎜	Speaker	3.5 ㎜	1.4	U
	3.5 ㎜	Mic	3.5 ㎜	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 ㎜	SmartPhone	3.5 ㎜	1.2	U

* Unshielded=U, Shielded=S

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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

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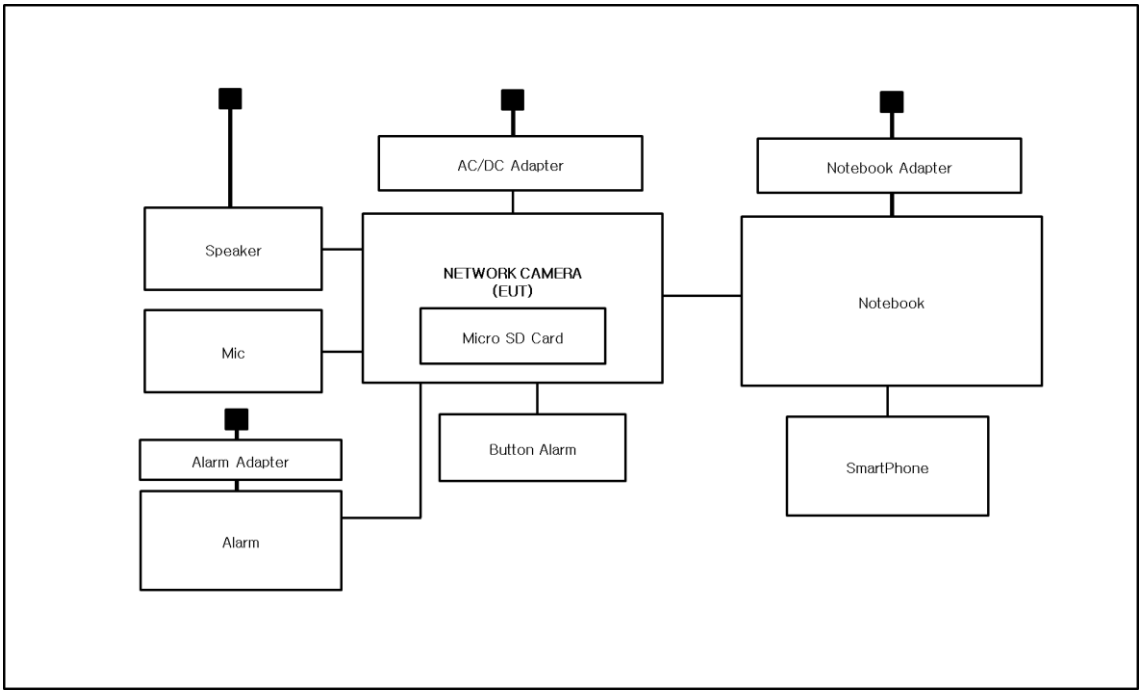
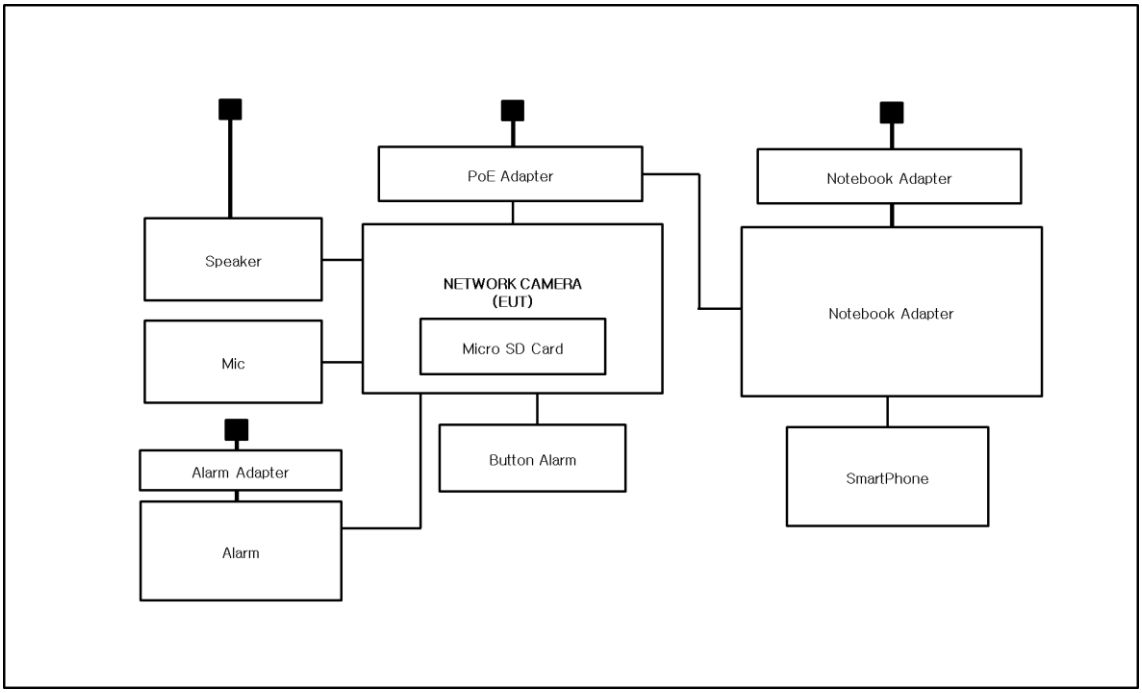
1.8 Configuration

■ AC Main
□ DC Main

■ DC Mode



■ PoE Mode



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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, Yeoju-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

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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 ☐ Class A ☐ Group 2 ☐ Class B

☐ EN 55014-1:2006 +A2:2011

☐ EN 55014-2:1997 +A2:2008

☐ EN 55015:2013

☐ EN 55032:2015 ☐ Class A ☐ Class B

☐ EN 55024:2010

☐ 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 at 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	11, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	11, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 29, 2021

Test Conditions
Temperature: 22,6 ℃
Relative Humidity: 46,9 % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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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	11, 29, 2021
☒	LISN	ESH2-Z5	R & S	100450	11, 29, 2021
☒	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 29, 2021
☒	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 30, 2021
☐	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101665	11, 30, 2021
☐	CDN	CDNS502A	TESEQ	40431	11, 29, 2021

Test Conditions
Temperature: 22,6 ℃
Relative Humidity: 46,9 % R.H.

Frequency Range of Measurement
150 ㎑ to 30 ㎒

Instrument Settings
IF Band Width: 9 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.3 Radiated Electric Field Emissions(Below 1 ㎓)

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 Conditions
Temperature: 23,1 ℃
Relative Humidity: 47,6 % R.H.

Frequency Range of Measurement
30 ㎒ to 1 ㎓

Instrument Settings
IF Band Width: 120 ㎑

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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2.4 Radiated Electric Field Emissions(Above 1 ㎓)

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 Conditions
Temperature: 23,4 ℃
Relative Humidity: 47,3 % R.H.

Frequency Range of Measurement
1 ㎓ to 6 ㎓

Instrument Settings
IF Band Width: 1 ㎒

Test Results
The requirements are:

☒ PASS
☐ NOT PASS
☐ NOT APPLICABLE

Remarks
See Appendix A for test data.

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APPENDIX A – TEST DATA

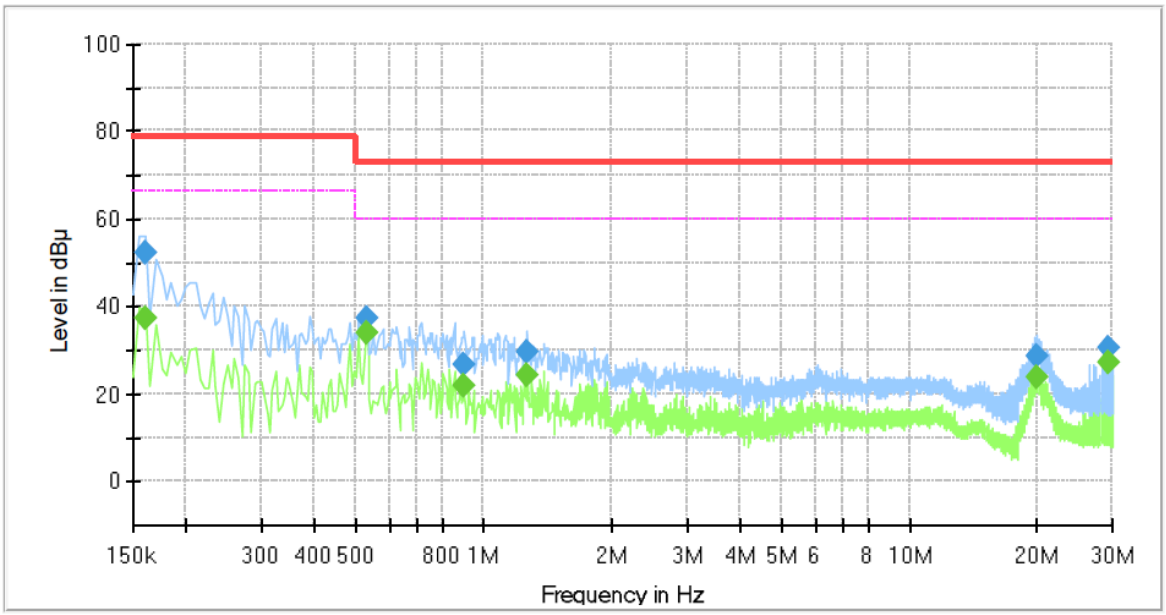
Conducted Emissions at Mains Power Ports

■ 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)
0.160000	---	37.43	66.00	28.57	1000.0	9.000	L1	19.5
0.160000	52.11	---	79.00	26.89	1000.0	9.000	L1	19.5
0.530000	---	34.07	60.00	25.93	1000.0	9.000	L1	19.8
0.530000	37.17	---	73.00	35.83	1000.0	9.000	L1	19.8
0.900000	---	21.93	60.00	38.07	1000.0	9.000	L1	20.1
0.900000	26.85	---	73.00	46.15	1000.0	9.000	L1	20.1
1.270000	---	24.46	60.00	35.54	1000.0	9.000	L1	20.1
1.270000	29.57	---	73.00	43.43	1000.0	9.000	L1	20.1
19.855000	---	23.68	60.00	36.32	1000.0	9.000	L1	20.2
19.855000	28.73	---	73.00	44.27	1000.0	9.000	L1	20.2
29.235000	---	27.28	60.00	32.72	1000.0	9.000	L1	20.5
29.235000	30.51	---	73.00	42.49	1000.0	9.000	L1	20.5

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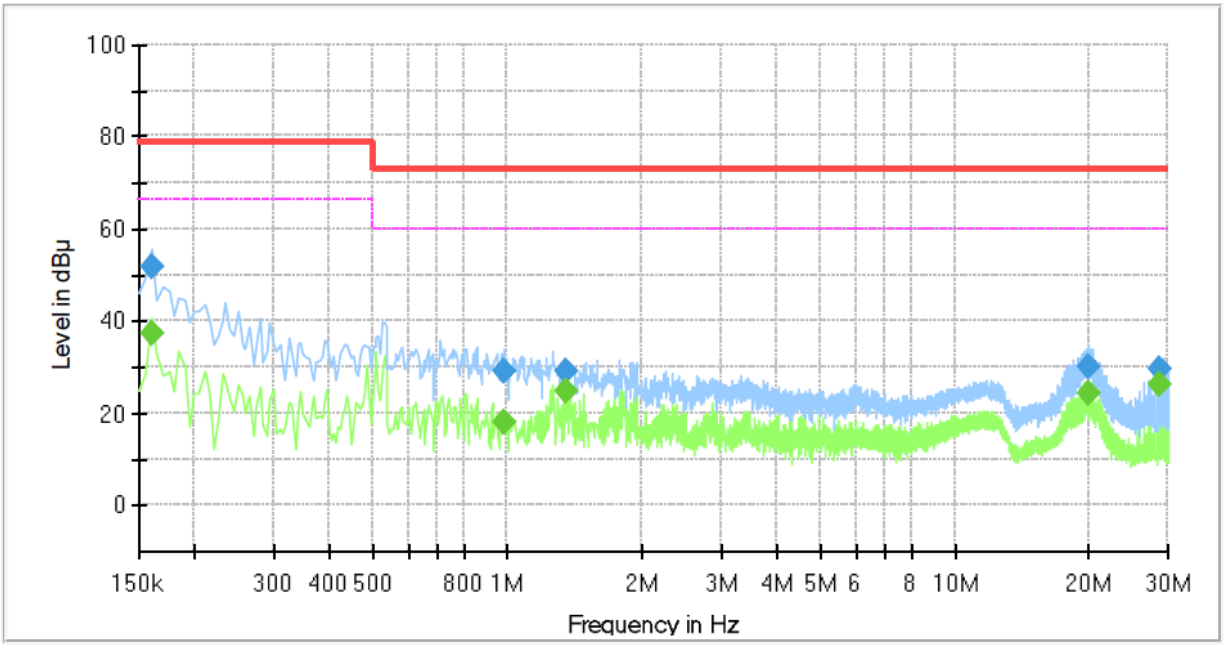
NEUTRAL LINE

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)
0.160000	---	37.05	66.00	28.95	1000.0	9.000	N	19.4
0.160000	51.83	---	79.00	27.17	1000.0	9.000	N	19.4
0.985000	---	18.05	60.00	41.95	1000.0	9.000	N	20.1
0.985000	28.93	---	73.00	44.07	1000.0	9.000	N	20.1
1.360000	---	24.90	60.00	35.10	1000.0	9.000	N	20.1
1.360000	29.00	---	73.00	44.00	1000.0	9.000	N	20.1
19.925000	---	24.05	60.00	35.95	1000.0	9.000	N	20.3
19.925000	29.94	---	73.00	43.06	1000.0	9.000	N	20.3
28.685000	---	26.39	60.00	33.61	1000.0	9.000	N	20.5
28.685000	29.66	---	73.00	43.34	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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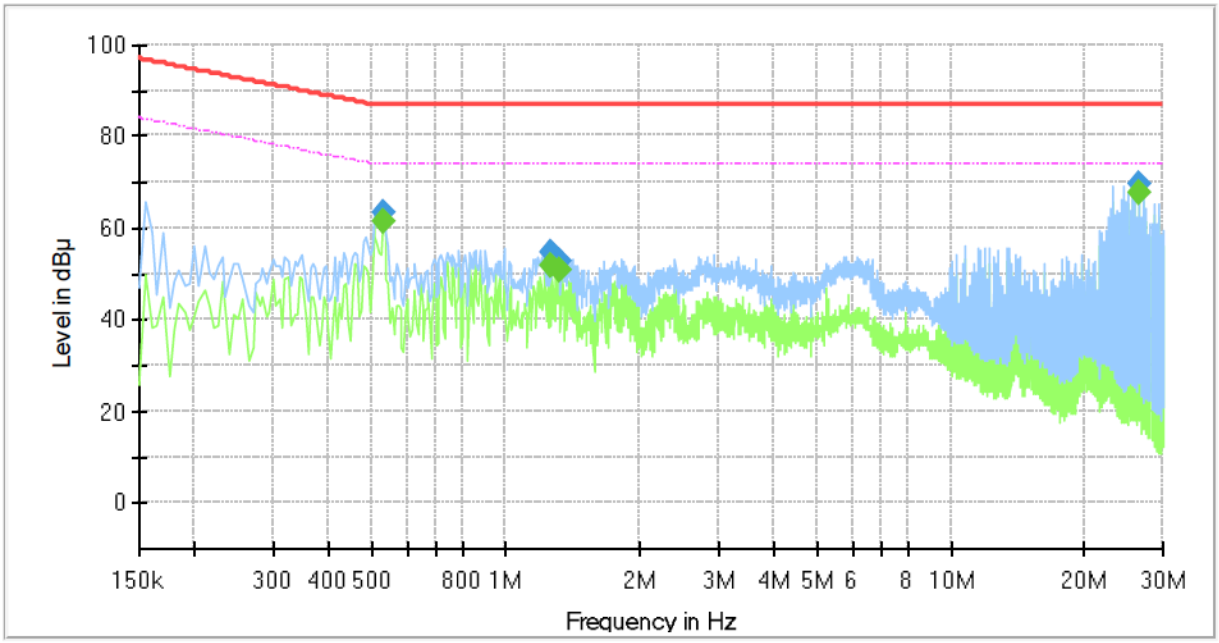
Conducted Emissions at Telecommunication Ports

■ 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	---	61.60	74.00	12.40	1000.0	9.000	Single Line	19.8
0.530000	63.41	---	87.00	23.59	1000.0	9.000	Single Line	19.8
1.270000	---	51.73	74.00	22.27	1000.0	9.000	Single Line	20.0
1.270000	54.86	---	87.00	32.14	1000.0	9.000	Single Line	20.0
1.315000	---	50.67	74.00	23.33	1000.0	9.000	Single Line	20.0
1.315000	52.66	---	87.00	34.34	1000.0	9.000	Single Line	20.0
26.610000	---	67.55	74.00	6.45	1000.0	9.000	Single Line	20.3
26.610000	69.71	---	87.00	17.29	1000.0	9.000	Single Line	20.3

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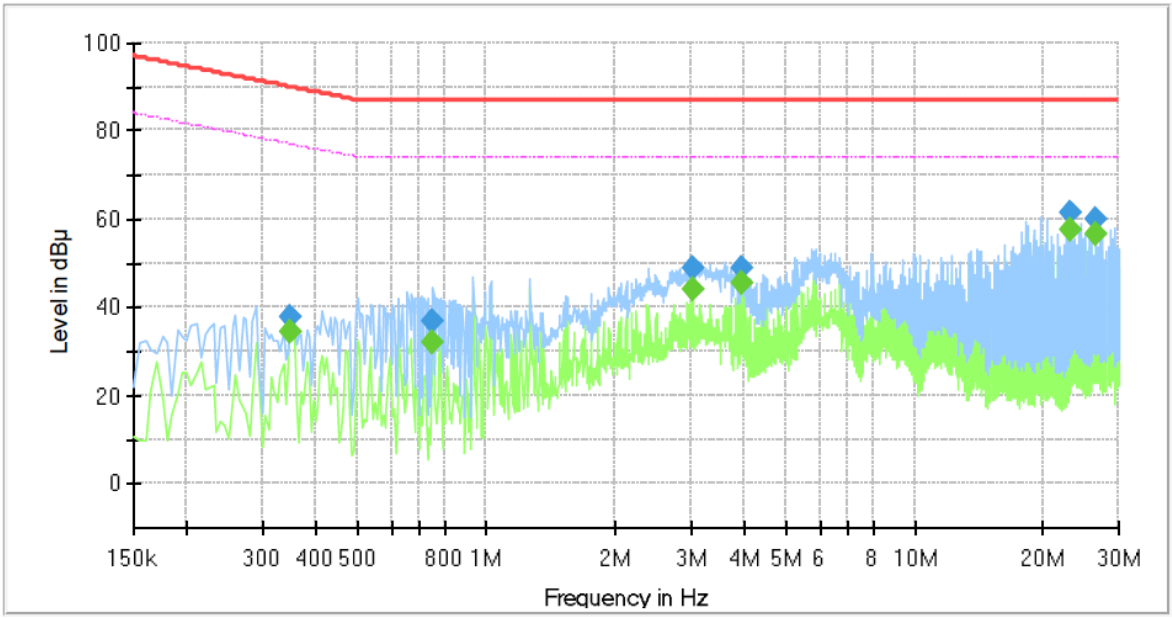
■ PoE Mode

[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)
0.350000	---	34.55	76.96	42.41	1000.0	9.000	Single Line	19.7
0.350000	37.64	---	89.96	52.32	1000.0	9.000	Single Line	19.7
0.750000	---	31.94	74.00	42.06	1000.0	9.000	Single Line	19.9
0.750000	36.94	---	87.00	50.06	1000.0	9.000	Single Line	19.9
3.040000	---	43.87	74.00	30.13	1000.0	9.000	Single Line	19.8
3.040000	49.06	---	87.00	37.94	1000.0	9.000	Single Line	19.8
3.955000	---	45.31	74.00	28.69	1000.0	9.000	Single Line	19.6
3.955000	48.63	---	87.00	38.37	1000.0	9.000	Single Line	19.6
23.130000	---	57.60	74.00	16.40	1000.0	9.000	Single Line	20.1
23.130000	61.30	---	87.00	25.70	1000.0	9.000	Single Line	20.1
26.610000	---	56.73	74.00	17.27	1000.0	9.000	Single Line	20.3
26.610000	59.89	---	87.00	27.11	1000.0	9.000	Single Line	20.3

♦ 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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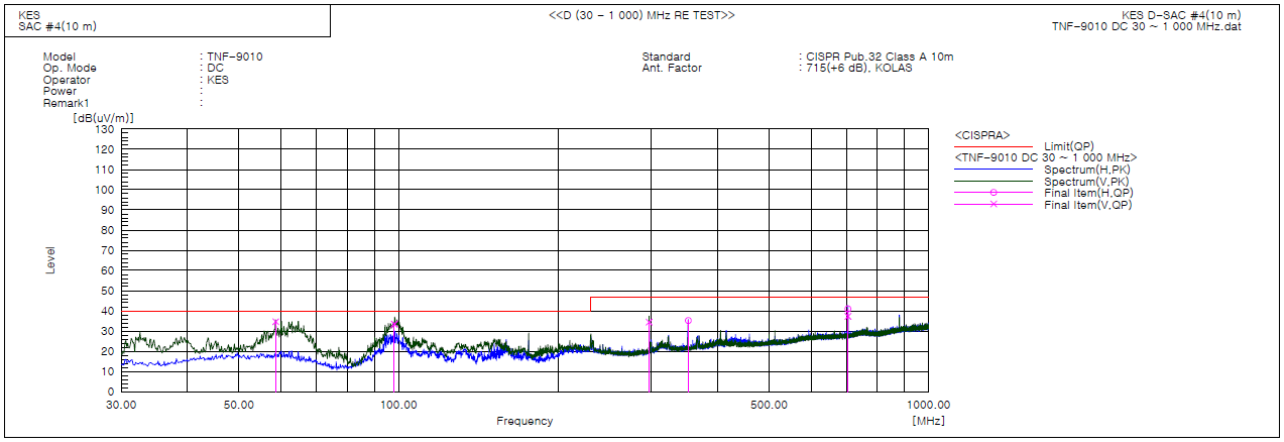
Radiated Electric Field Emissions(Below 1 ㎓)

■ 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	58.668	V	56.9	-22.2	34.7	40.0	5.3	100.0	228.0	
2	98.229	V	56.8	-23.3	33.5	40.0	6.5	105.0	256.0	
3	297.038	V	53.4	-18.9	34.5	47.0	12.5	127.0	166.0	
4	352.005	H	51.5	-16.3	35.2	47.0	11.8	376.0	66.0	
5	704.006	V	46.3	-9.0	37.3	47.0	9.7	167.0	242.0	
6	704.029	H	50.0	-9.0	41.0	47.0	6.0	100.0	121.0	

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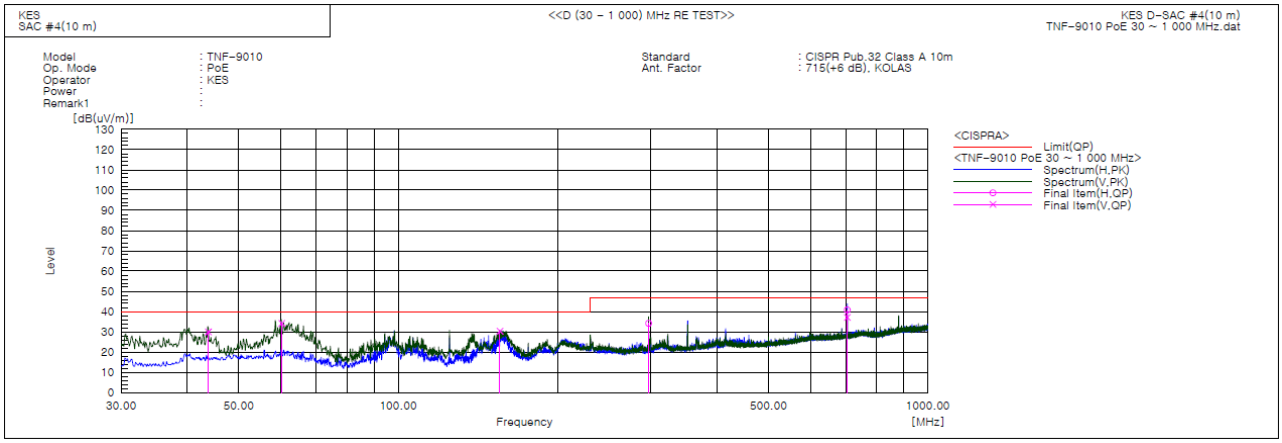
■ PoE Mode



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	43.816	V	51.9	-21.9	30.0	40.0	10.0	100.0	132.0	
2	60.311	V	56.7	-22.5	34.2	40.0	5.8	100.0	184.0	
3	155.610	V	55.9	-25.6	30.3	40.0	9.7	115.0	163.0	
4	297.051	H	53.1	-18.9	34.2	47.0	12.8	400.0	249.0	
5	704.001	V	46.1	-9.0	37.1	47.0	9.9	184.0	132.0	
6	703.986	H	49.8	-9.0	40.8	47.0	6.2	311.0	128.0	

♦ Calculation

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

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

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

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

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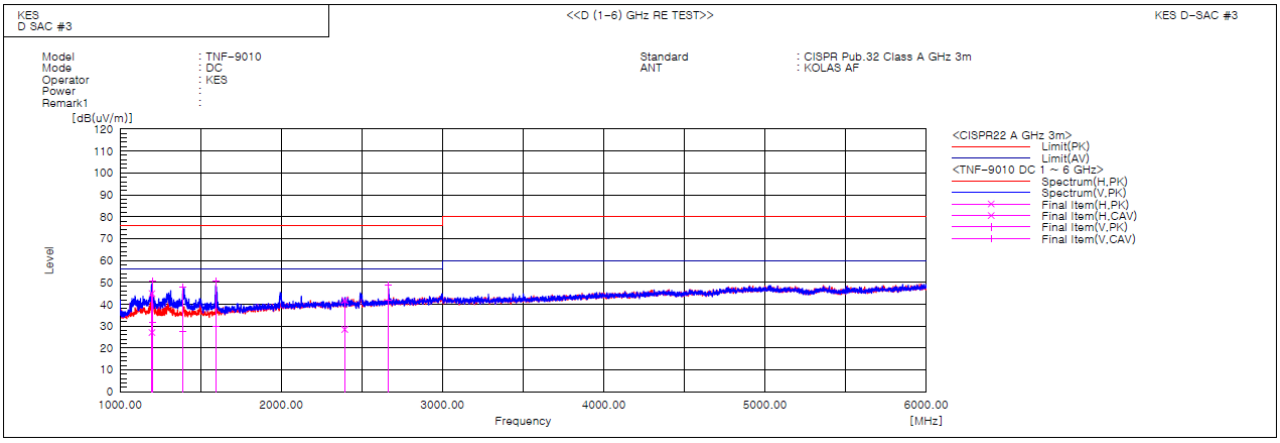
Radiated Electric Field Emissions(Above 1 GHz)

■ 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	1198.150	H	53.4	35.6	-8.5	44.9	27.1	76.0	56.0	31.1	28.9	100.0	122.1	
2	1198.710	V	59.3	40.0	-8.5	50.8	31.5	76.0	56.0	25.2	24.5	100.0	335.6	
3	1391.241	V	54.9	34.6	-7.3	47.6	27.3	76.0	56.0	28.4	28.7	100.0	24.4	
4	1596.839	V	56.5	35.7	-5.8	50.7	29.9	76.0	56.0	25.3	26.1	100.0	246.2	
5	2393.364	H	42.4	29.2	-0.7	41.7	28.5	76.0	56.0	34.3	27.5	100.0	124.8	
6	2665.960	V	48.3	41.4	0.3	48.6	41.7	76.0	56.0	27.4	14.3	100.0	328.6	

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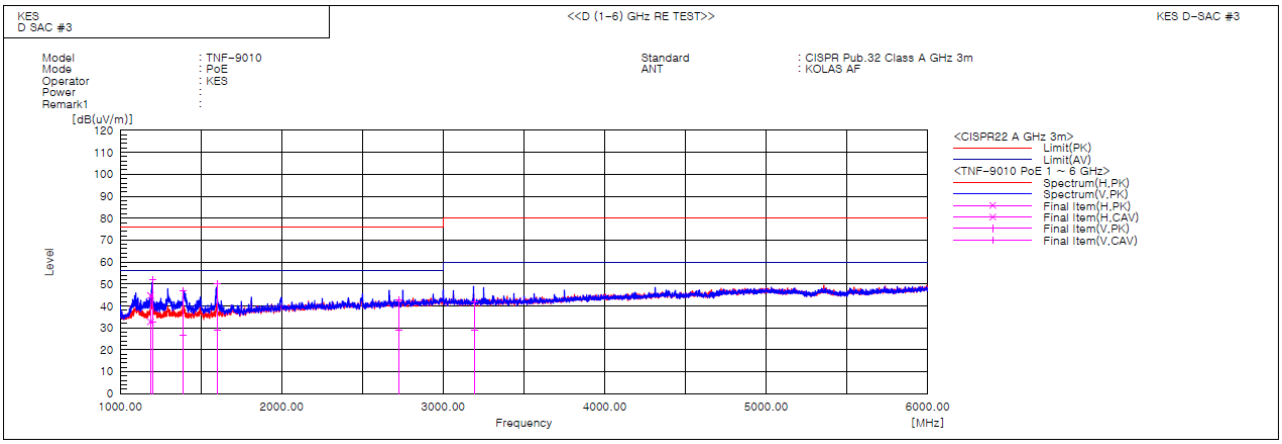
■ PoE Mode



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	1198.450	V	60.4	40.9	-8.5	51.9	32.4	76.0	56.0	24.1	23.6	100.0	212.2	
2	1187.292	H	53.2	41.2	-8.5	44.7	32.7	76.0	56.0	31.3	23.3	100.0	125.8	
3	1387.590	V	54.1	33.9	-7.3	46.8	26.6	76.0	56.0	29.2	29.4	100.0	188.7	
4	1600.409	V	56.1	34.8	-5.8	50.3	29.0	76.0	56.0	25.7	27.0	100.0	229.4	
5	2725.925	V	42.4	28.4	0.5	42.9	28.9	76.0	56.0	33.1	27.1	100.0	14.7	
6	3195.638	V	40.1	27.1	1.6	41.7	28.7	80.0	60.0	38.3	31.3	100.0	168.7	

♦ Calculation

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

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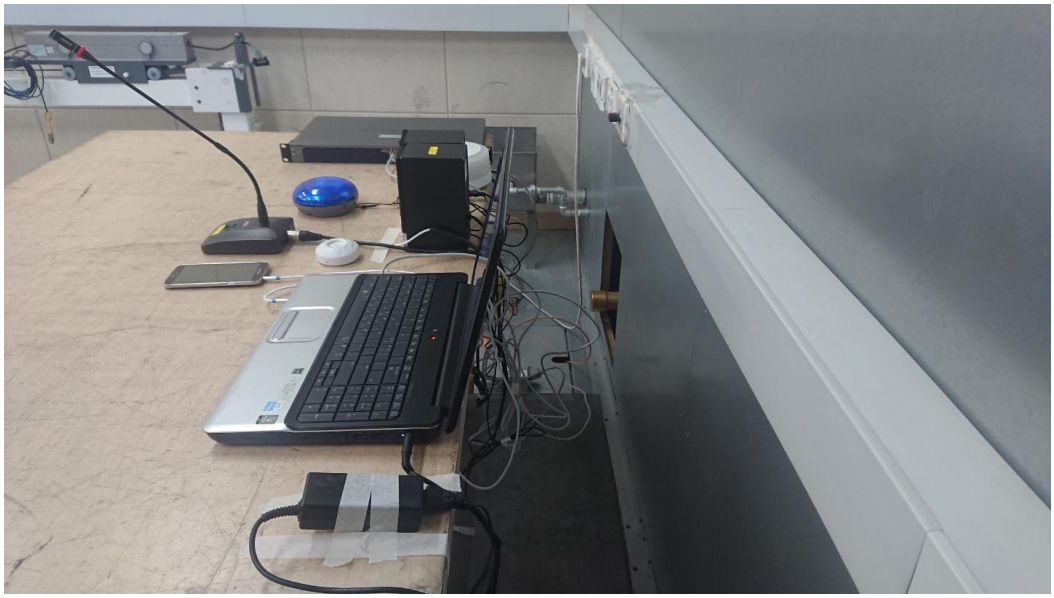
■ PoE Mode



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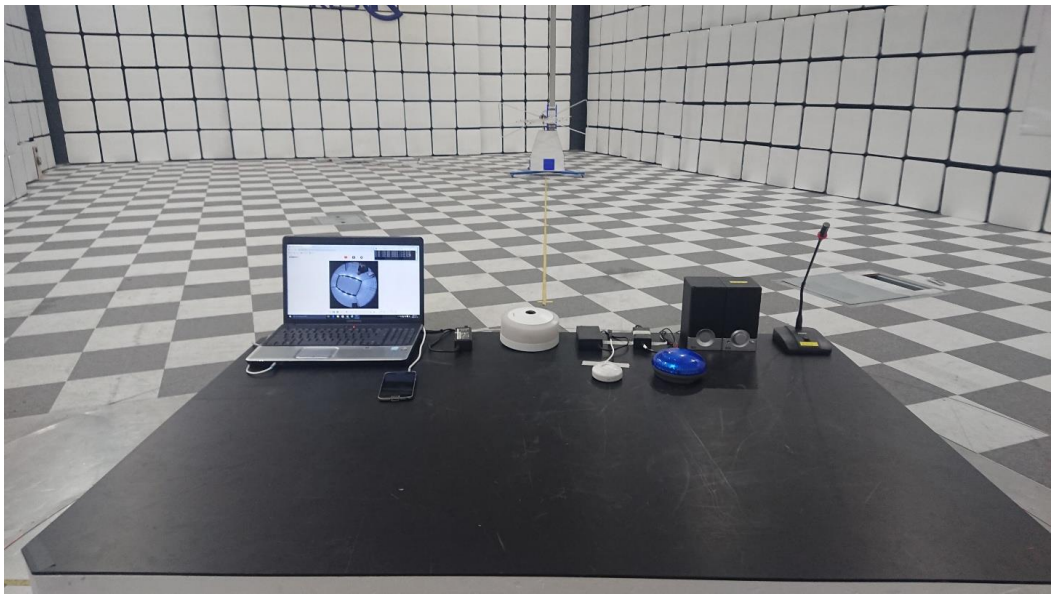
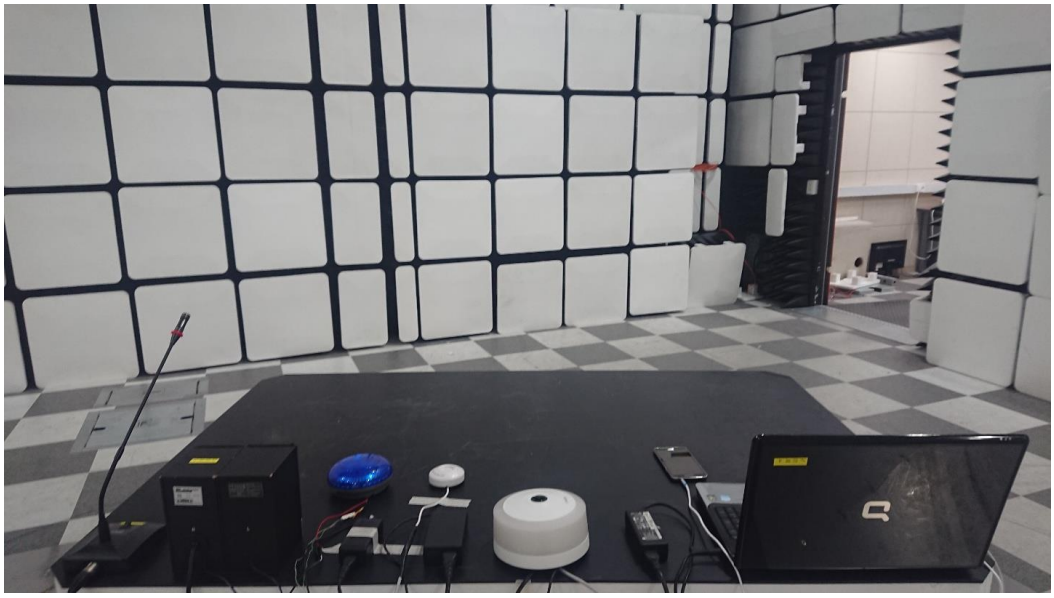
Radiated Electric Field Emissions(Below 1 ㎓)

■ DC Mode





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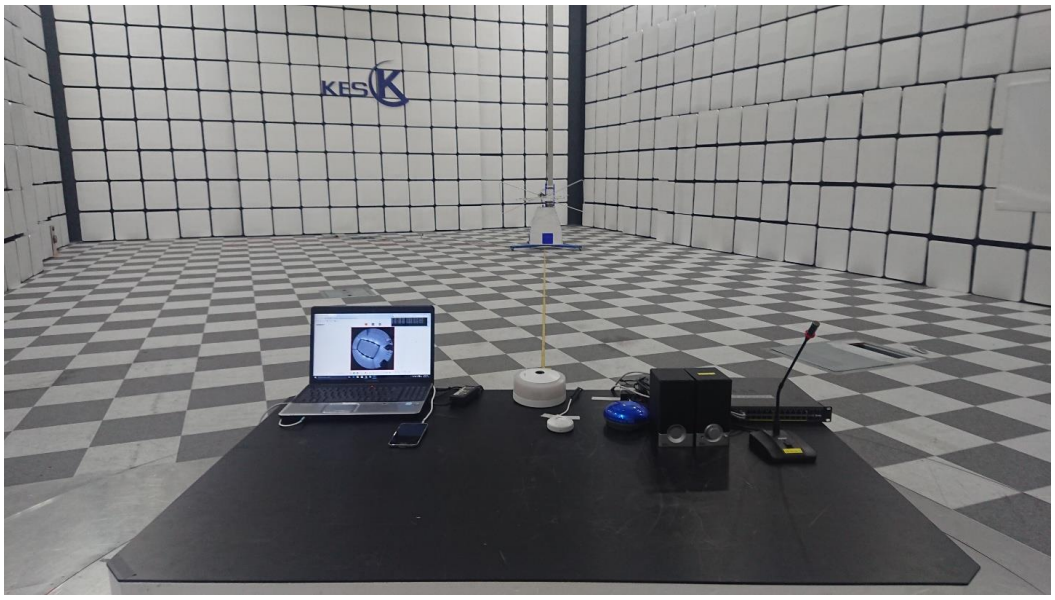
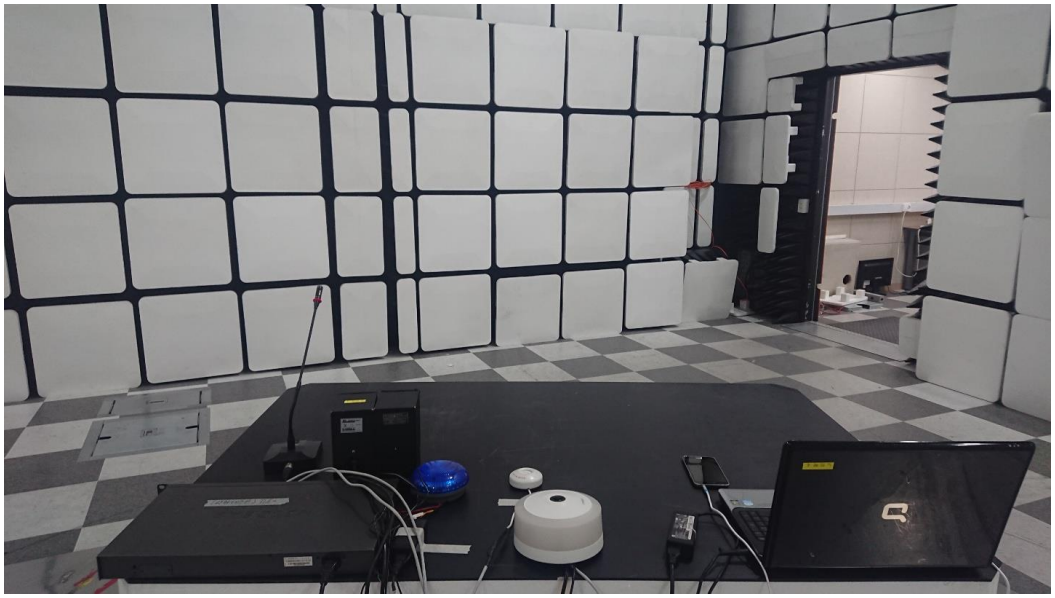
■ PoE Mode





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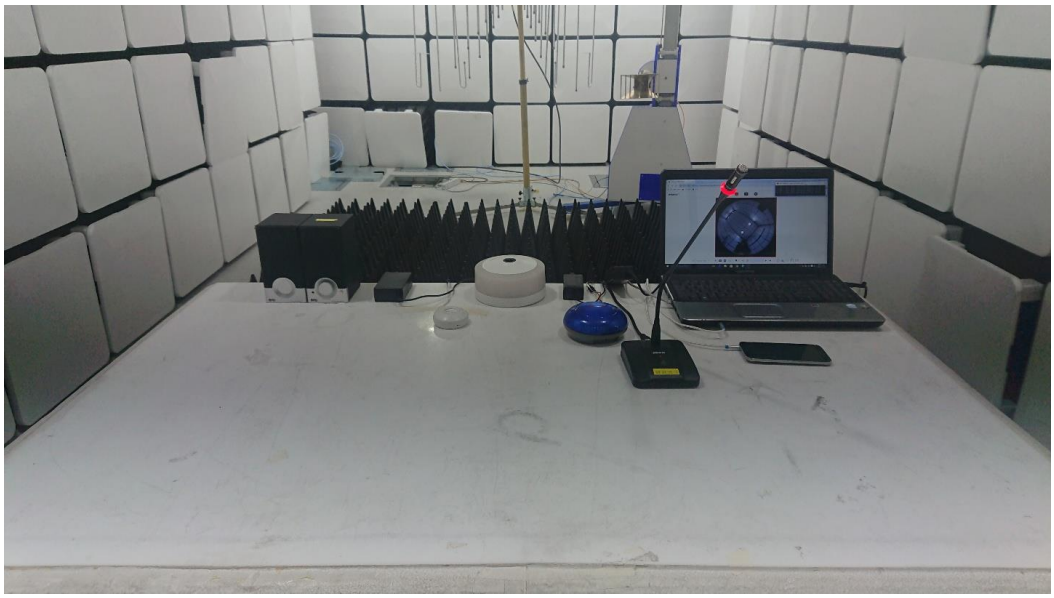
Radiated Electric Field Emissions(Above 1 ㎓)

■ DC Mode



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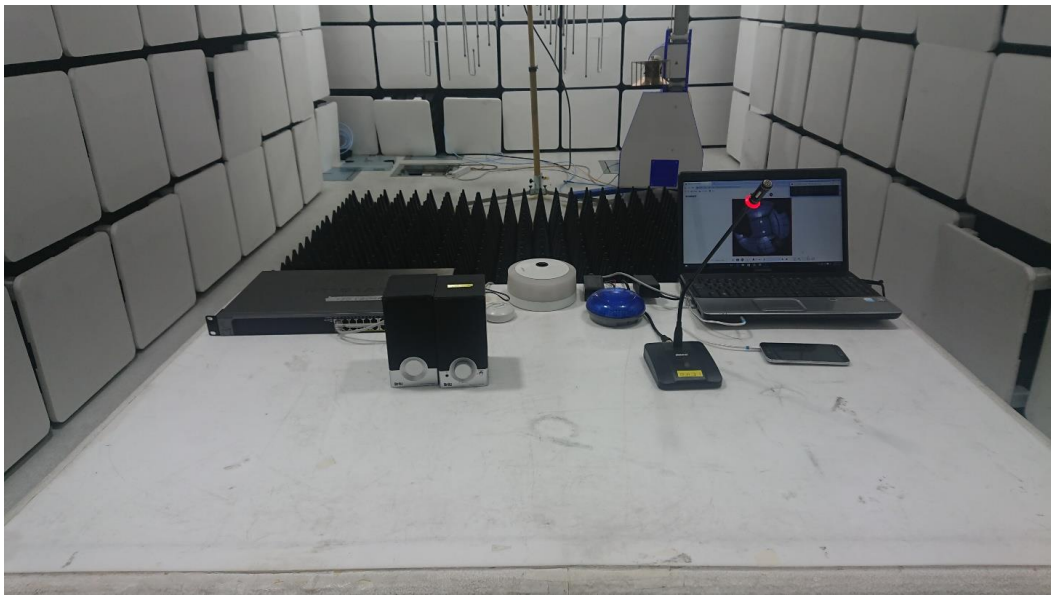
■ PoE Mode



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EUT External Photographs

(Top)

(Bottom)

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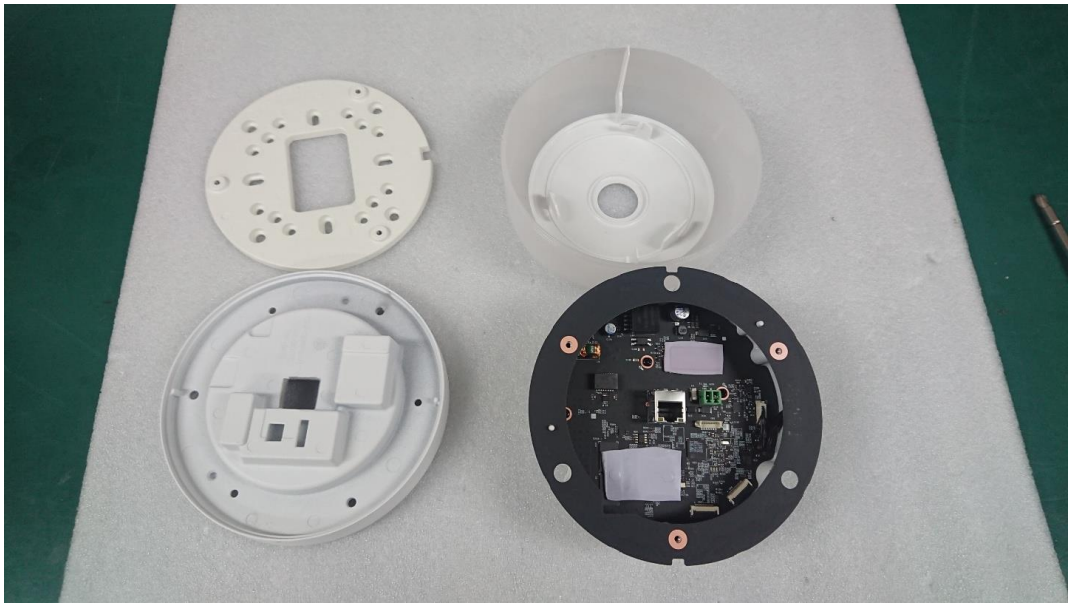
EUT Internal Photographs

(Internal View)



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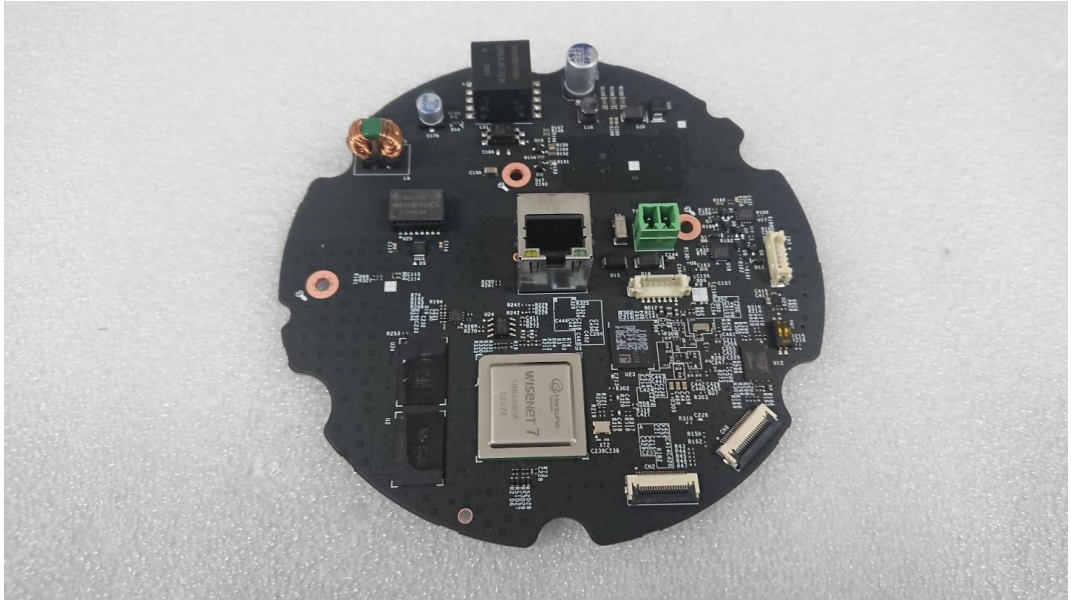
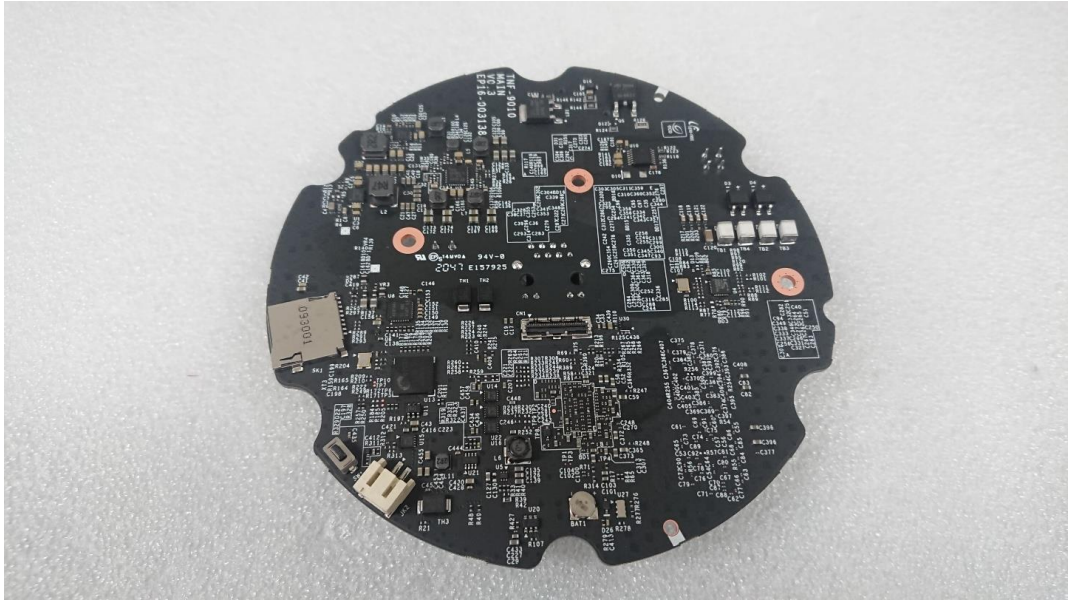
EUT Internal View – Main Board

(Top)



(Bottom)



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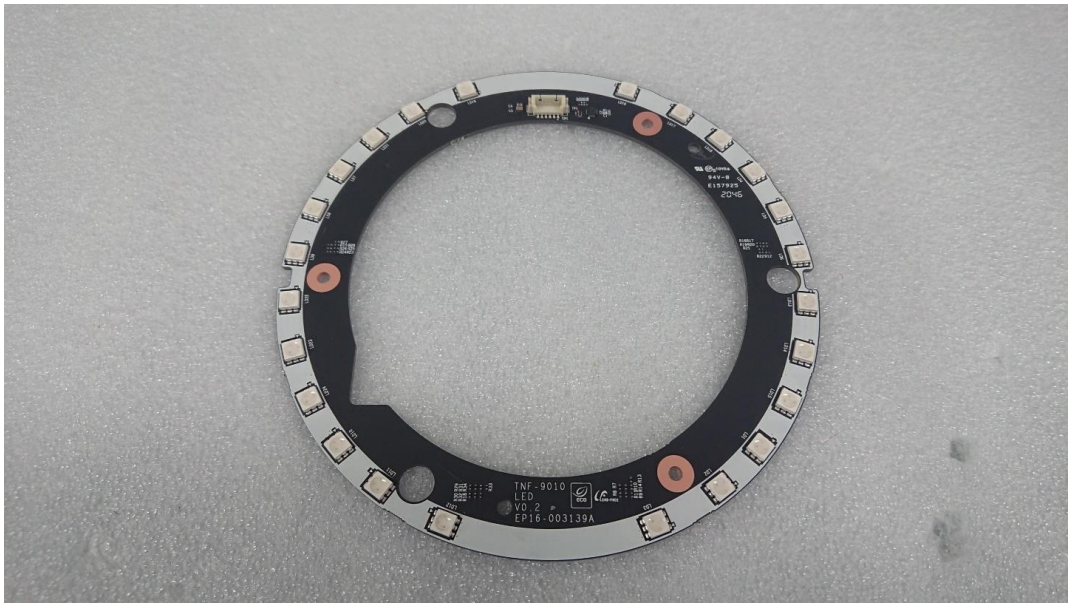
EUT Internal View – LED Board

(Top)



(Bottom)

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