



# TEST REPORT



Report No. : KES-EM240347  
Page 1 / 70

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## 1. Client

Applicant : Hanwha Vision Co., Ltd

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

## 2. Sample Description

Product name : IP AUDIO BRIDGE

Model/Type No. : SPA-B1000

Variant Model : -

Manufacturer : Inter-M Corporation

Manufacturer Address : 73, Hwahap-ro 1402beon-gil, Yangju-si, Gyeonggi-do, Republic of  
Korea

3. Date of Receipt : Jan. 25, 2024

4. Test date : Apr. 20, 2024 ~ Apr. 24, 2024

5. Date of Issue : Apr. 30, 2024

6. Test Results : In Compliance

*Tested by*

*Reviewed by*

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Seon Ho, Choi  
EMC Test Engineer

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Dong Hun, Jang  
EMC Technical Manager

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



REPORT REVISION HISTORY

Date	Test Report No.	Revision History
Apr. 30, 2024	KES-EM240347	Issued

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## 1.0 General Product Description

### Main Specifications of EUT are:

Product	
Type	IP Audio Bridge
Line Output	
Output Level	None
Frequency Response	None
THD + N Ratio (AES17 LPF)	None
S/N Ratio (20kHz LPF, A-WTD)	None
Line Input	
Maximum Input Level	+6dBV Max
Amplifier	
Description	None
Network	
Ethernet	10/100 Base-T
Memory	
Internal Memory	1 GBytes
External Memory (Micro SD)	SDHC upto 32GB (SANDISK)
Contact	
Contact Input. Dry contact	One channel
Contact Output. Dry contact (NO)	One channel
General	
Operating Temperature	-20 ~ +50°C (-4°F ~ +122°F)
Operating Humidity	10~95% RH (Non-Condensing)
IP code	None
Weight	0.24 Kg
Size	123(W)*80(H)*30.6(D)mm
Color	White
Certificate	EMC : KS C 9832/9835, EN 55032/55035, FCC Part 15 Subpart B, ICES-003 Safety : KC 62368-1, UL 62368-1, CAN/CSA 62368-1



<b>Power</b>	
PoE	PoE (IEEE 802.3 af type 1 Class 3)
PoE+	DC 8V ~ 24V
<b>Embedded MIC</b>	
Input Sensitivity	None
Frequency Response	None
<b>Audio</b>	
Supported Audio Format	File Streaming: WAV, MP3 in mono/stereo from 64 kbps to 320 kbps. Sampling rate from 16 kHz up to 48 kHz
<b>Speaker</b>	
Speaker Component	None
Max. Sound Pressure Level (PoE)	None
Max. Sound Pressure Level (PoE+)	None
Frequency Range (-10dB)	None
Sensitivity (1Watt)	None
Coverage Pattern	None
<b>Network Protocol</b>	
Security	Password protection : admin,setup,user,guest (sha-2, Digest authentication, User access log) Digest authentication, User access log
Supported Protocols	IPv4, HTTP, mDNS, DNS, NTP, TCP, UDP, DHCP, ARP, ICMP
<b>System Integration</b>	
API (Application Programming Interface)	SUNAPI
Multi-source Dynamic PA control	None
VoIP	None
TTS	None
Audio Monitoring	None
Event & Preset	Virtual Contact, Dry contact
Functional Monitoring	Connection verification, Built-in system logging



## 1.1 Test Voltage & Frequency

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

☒ AC 230 V 50 Hz

☒ PoE

## 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
IP AUDIO BRIDGE	SPA-B1000	-	Inter-M Corporation	EUT
AC / DC Adapter	KPL-060M-VI	-	Channel Well Technology (Guangzhou) Co.,Ltd.	-

## 1.5 Support Equipments

Description	Model Number	Serial Number	Manufacturer	Remarks
Speaker	-	-	-	-
Notebook	LG15U590	-	LG Electronics Co., Ltd.	-
Notebook Adapter	A13-040N3A	-	CHICONY POWER TECHNOLOGY (Chongqing) CO., LTD.	-
PoE Switch	GS728TPP	3AR3595700005	NETGEAR®	-
Smart Phone	SM-G991N	-	SAMSUNG	-
switching hub	H508	-	IpTIME	-
switching hub Adapter	DWA05200K	-	Dongguan City Rongrun Industry Co.,Ltd	-
Micro SD Card	-	-	Sandisk	8 GB
Multimeter	-	-	-	-



## 1.6 External I/O Cabling

### ■ AC/DC Adaptor Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
IP AUDIO BRIDGE (EUT)	DC Jack	AC / DC Adapter (EUT)	Line out	1.5	U
	AUX IN	Notebook	3.5 mm	1.0	U
	RJ-45(LAN)	switching hub	RJ-45(LAN)	3.5	U
	1 Pin	IP AUDIO BRIDGE (EUT)	1 Pin	0.1	U
	1 Pin	Multimeter	1 Pin	0.1	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	0.1	-
	GND	Earth	GND	1.2	U
Poe Switch	RJ-45(LAN)	switching hub	RJ-45(LAN)	1.5	U
	RJ-45(PoE)	Speaker	RJ-45(PoE)	1.6	U
	RJ-45(LAN)	Notebook	RJ-45(LAN)	1.2	U
Notebook	DC Jack	Notebook Adapter	DC Jack	1.4	U
switching hub	DC Jack	switching hub Adapter	DC Jack	1.2	U

\* Unshielded=U, Shielded=S

### ■ PoE Mode

Start		END		Cable Spec.	
Description	I/O Port	Description	I/O Port	Length	Shield
IP AUDIO BRIDGE (EUT)	RJ-45(PoE)	PoE Switch	RJ-45(PoE)	3.5	U
	AUX IN	Notebook	3.5 mm	1.0	U
	1 Pin	IP AUDIO BRIDGE (EUT)	1 Pin	0.1	U
	1 Pin	Multimeter	1 Pin	0.1	U
	Micro SD Card Slot	Micro SD Card	Micro SD Card Slot	0.1	-
	GND	Earth	GND	1.2	U
Poe Switch	RJ-45(PoE)	Speaker	RJ-45(PoE)	1.6	U
	RJ-45(LAN)	Notebook	RJ-45(LAN)	1.2	U
Notebook	DC Jack	Notebook Adapter	DC Jack	1.4	U

\* Unshielded=U, Shielded=S



## 1.7 EUT Operating Mode(s)

■ AC/DC Adaptor Mode, PoE Mode

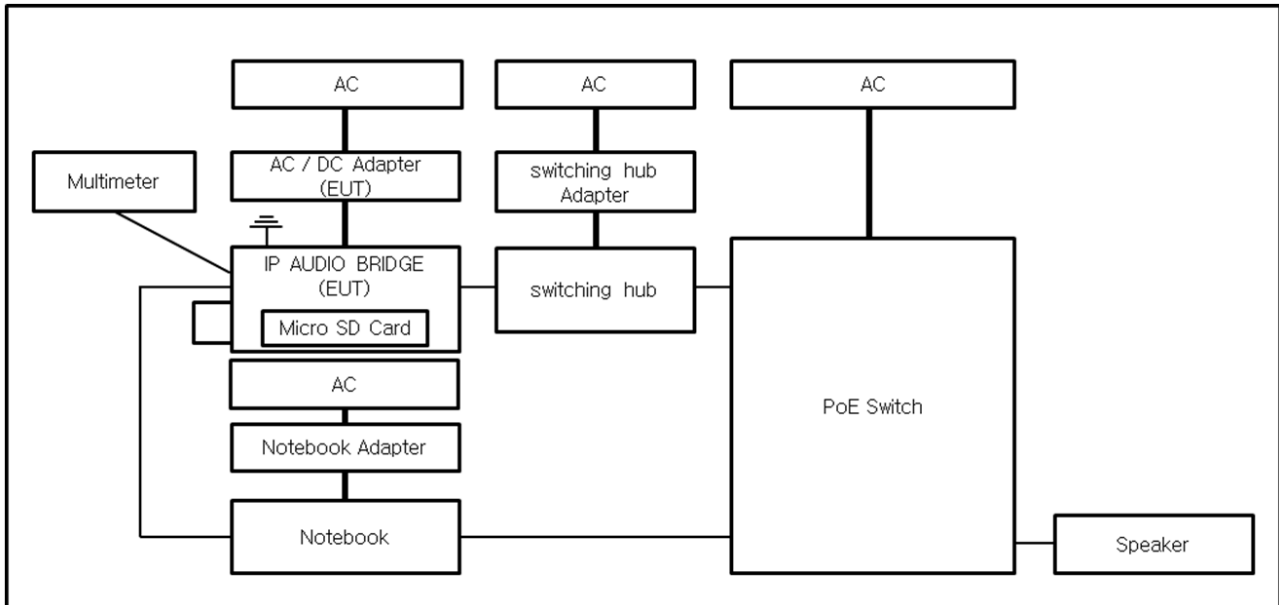
Test mode	Normal operating	Test Voltages
Operating	The test was performed by running Pingtest on a Notebook to check whether the test equipment was connected properly and whether 1 kHz tone was output to the speaker through the test equipment.	AC 230 V, 50 Hz

EUT Test operating S/W - Vendor Support Program		
Name	Version	Manufacture Company
Web Viewer	-	-

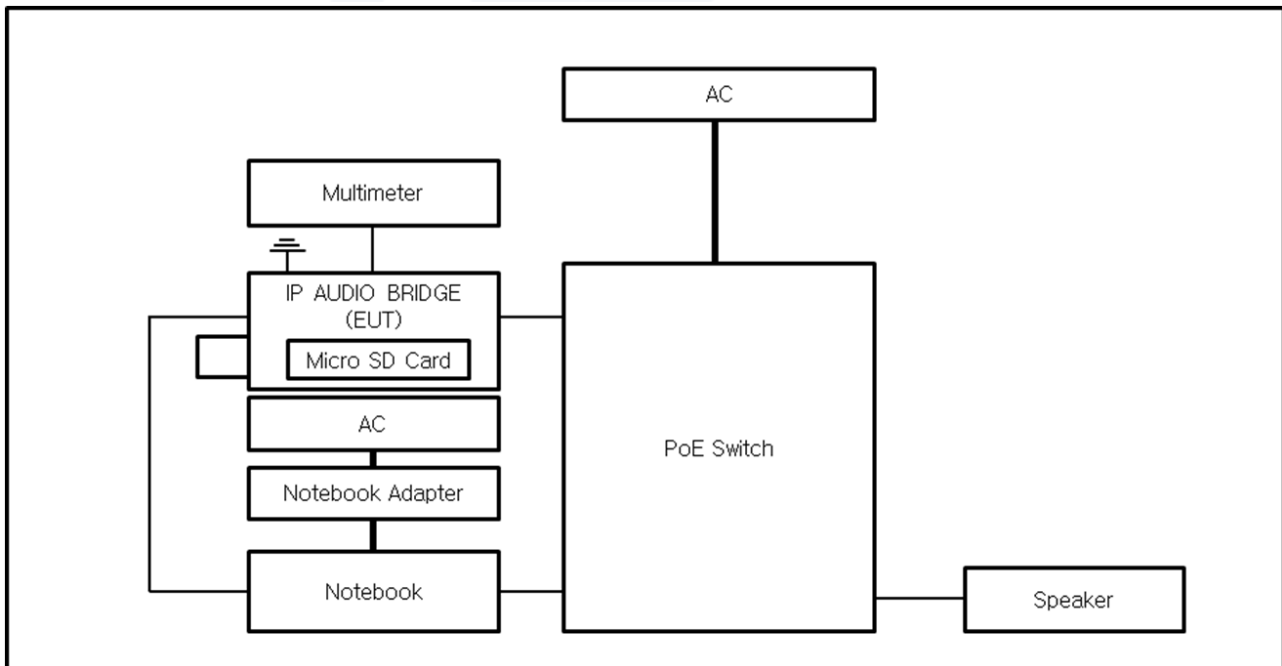


## 1.8 Configuration

### ■ AC/DC Adaptor Mode



### ■ PoE Mode



**1.9 Remarks when standards applied**

In PoE mode, the LAN port is regarded as a wired communication network port and power-related ports are not tested.

**1.10 Calibration Details of Equipment Used for Measurement**

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

**1.11 Test Facility**

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

**1.12 Laboratory Accreditations and Listings**

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



## 2.0 Test Regulations

The emissions tests were performed according to following regulations:

☒ **EMC – Directive 2014/30/EU**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 55035:2017/A11:2020

☒ EN IEC 61000-3-2:2019

☒ EN 61000-3-3:2013/A2:2021

☒ **EMC – Regulations 2016**

☒ EN 55032:2015/A11:2020

☒ Class A

☐ Class B

☒ EN 55035:2017/A11:2020

☒ EN IEC 61000-3-2:2019

☒ EN 61000-3-3:2013/A2:2021



## 2.1 Conducted Emissions at Mains Power Ports

**Test Date**

Apr. 23, 2024

**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	101783	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101137	01, 10, 2025
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024

**Test Conditions**

Temperature: (22,4 ± 0,2) °C

Relative Humidity: (46,3 ± 0,2) % R.H.

**Frequency Range of Measurement**

150 kHz to 30 MHz

**Instrument Settings**

IF Band Width: 9 kHz

**Test Results**

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

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



## 2.2 Conducted Emissions at Telecommunication Ports

**Test Date**

Apr. 23, 2024

**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	101783	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101787	11, 08, 2024
<input checked="" type="checkbox"/>	LISN	ENV216	R & S	101137	01, 10, 2025
<input checked="" type="checkbox"/>	PULSE LIMITER	ESH3-Z2	R & S	101915	11, 08, 2024
<input checked="" type="checkbox"/>	8-WIRE ISN CAT3,5	ENY81	R & S	100174	11, 09, 2024
<input type="checkbox"/>	8-WIRE ISN CAT6	ENY81-CAT6	R & S	101666	03, 05, 2025

**Test Conditions**

Temperature: (22,4 ± 0,1) °C  
Relative Humidity: (46,3 ± 0,3) % 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**

Apr. 23, 2024

**Test Location**☐ OPEN AREA TEST SITE #2☒ SEMI ANECHOIC CHAMBER #4(10 m)**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	02, 13, 2025
<input checked="" type="checkbox"/>	AMPLIFIER	SCU 01	R & S	100603	11, 08, 2024
<input checked="" type="checkbox"/>	TRILOG-BROADBAND ANTENNA	VULB9163	Schwarzbeck	715	11, 17, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	32173	02, 13, 2025

**Test Conditions**

Temperature: (22,8 ± 0,3) °C

Relative Humidity: (45,5 ± 0,4) % R.H.

**Frequency Range of Measurement**

30 MHz to 1 GHz

**Measurement distance**

10 m

**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**

Apr. 23, 2024

**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	07, 31, 2024
<input checked="" type="checkbox"/>	PREAMPLIFIER	8449B	AGILENT	3008A01967	03, 05, 2025
<input checked="" type="checkbox"/>	ATTENUATOR	8491A	HP	35496	02, 13, 2025
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 05, 2025

**Test Conditions**

Temperature: (22,4 ± 0,2) °C

Relative Humidity: (46,1 ± 0,4) % 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**

Apr. 24, 2024

**Test Location**

Electro wave Shieldroom #3

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 28, 2025
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

**Test Conditions**

Temperature: (22,5 ± 0,1) °C

Relative Humidity: (45,4 ± 0,2) % R.H.

**Classification of Equipment for Harmonic Current Emissions**

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

**Test Results**

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

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



## 2.6 Voltage Fluctuations and Flicker

**Test Date**

Apr. 24, 2024

**Test Location**

Electro wave Shieldroom #3

**Test Equipment**

Used	Description	Model Number	Manufacturer	Serial Number	Cal. Due
<input checked="" type="checkbox"/>	EMI Test S/W	net.control	EM TEST	2.1.4	-
<input checked="" type="checkbox"/>	DIGITAL POWER ANALYZER	DPA 500N	EM TEST	V1024106759	03, 28, 2025
<input checked="" type="checkbox"/>	POWER SOURCE	ACS 500N6	EM TEST	V1024106760	-

**Test Conditions**

Temperature: (22,5 ± 0,3) °C

Relative Humidity: (45,4 ± 0,6) % R.H.

**Test Results**

The requirements are:

- ☒ PASS  
☐ NOT PASS  
☐ NOT APPLICABLE

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



### 3.0 Criteria for compliance

#### General performance criteria

General performance criteria are defined in 8.2, 8.3 and 8.4. These criteria shall be used during the testing of primary functions where no relevant annex is applicable.

When assessing the impact of a disturbance on a function, the assessment should take into consideration the function's performance prior to the application of the disturbance and only identify as failures those changes in performance that are a result of the disturbance.

#### Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance, loss of function or change of operating state is allowed

below a performance level specified by the manufacturer when the equipment is used as intended.

The performance level may be replaced by a permissible loss of performance. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### Performance criterion B

During the application of the disturbance, degradation of performance is allowed. However, no unintended change of actual operating state or stored data is allowed to persist after the test.

After the test, the equipment shall continue to operate as intended without operator intervention; no degradation of performance or loss of function is allowed,

below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance.

If the minimum performance level (or the permissible performance loss), or recovery time, is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and by what the user may reasonably expect from the equipment if used as intended.

#### Performance criterion C

Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions. A reboot or re-start operation is allowed.

Information stored in non-volatile memory, or protected by a battery backup, shall not be lost.



### 3.1 Electrostatic Discharge

**Reference Standard**

EN 61000-4-2:2009

**Test Date**

Apr. 21, 2024

**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	01, 30, 2025
<input checked="" type="checkbox"/>	HCP	-	KES	-	-
<input checked="" type="checkbox"/>	VCP	-	Noise Ken	-	-

**Test Conditions**

Temperature: (22,3 ± 0,1) °C  
Relative Humidity: (46,0 ± 0,1) % R.H.  
Atmospheric Pressure: (100,2 ± 0,0) kPa

**Test Specifications**

Discharge Factor: ≥ 1 s

Discharge Impedance: 330 ohm / 150 pF

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

Polarity: Positive and Negative

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

Discharge Voltage:	Contact	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 checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV	<input checked="" type="checkbox"/> 4 kV
	<input type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input type="checkbox"/> 6 kV	<input 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

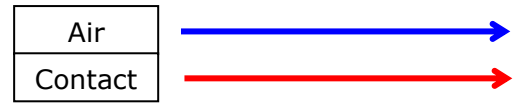
Notes: HCP: Horizontal coupling plane

VCP: Vertical coupling plane

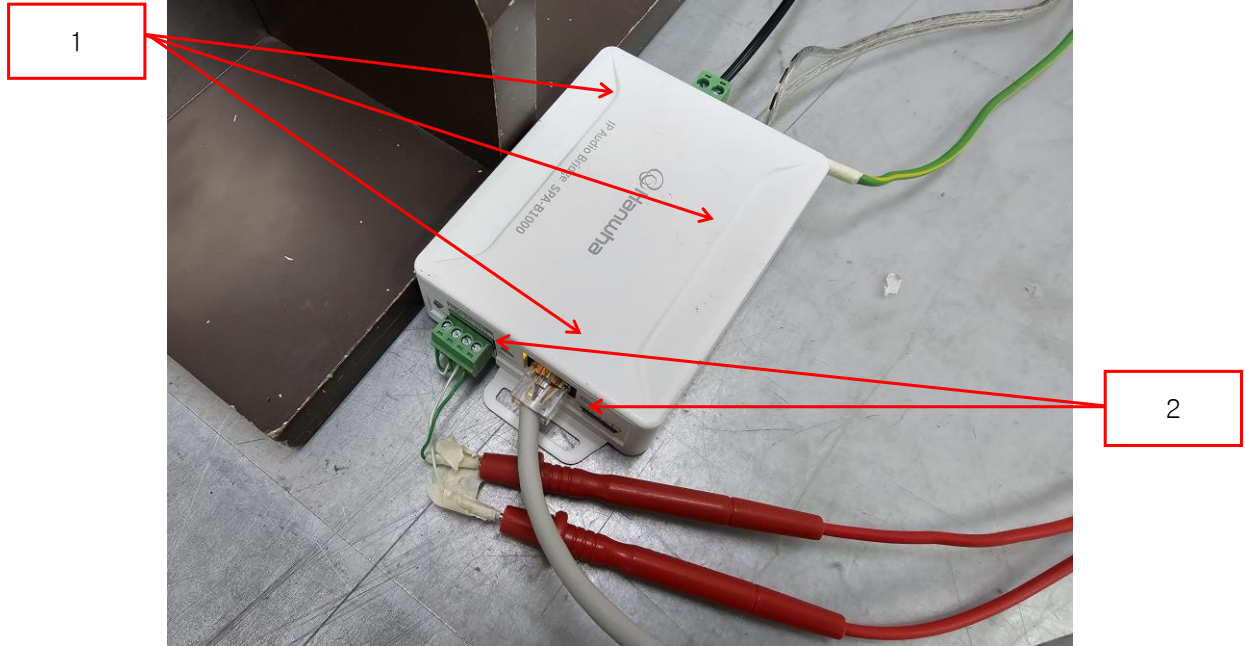
Required Performance Criteria: ☒ B



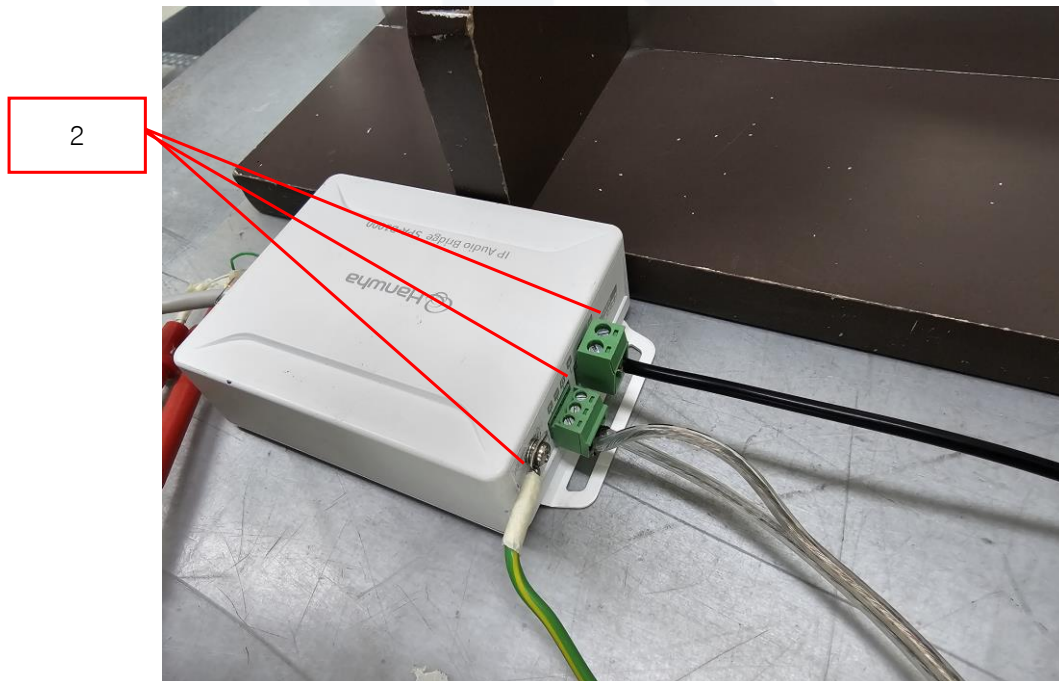
**Location of Discharge:**



■ AC/DC Adaptor Mode, PoE Mode



[인가부위 2]





3



**Test Data****■ AC/DC Adaptor Mode**

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

**Direct Discharge**

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	Enclosure	Contact Discharge	B	A	-
2	Ports	Contact Discharge	B	A	-
3	AC/DC Adapter	Air Discharge	B	A	-

**■ PoE Mode**

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	HCP Contact	Contact Discharge	B	A	-
2	VCP Contact	Contact Discharge	B	A	-

**Direct Discharge**

No.	Test Point	Discharge Method	Performance		Remarks
			Criteria	Results	
1	Enclosure	Contact Discharge	B	A	-
2	Ports	Contact Discharge	B	A	-

Note: "Blank" = Not performed

**Results:**

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

**Test Results**

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

**Remarks**

Any degradations of performance was not observed during in the test.



### 3.2 Radiated Electric Field Immunity

**Reference Standard**

EN IEC 61000-4-3:2020

**Test Date**

Apr. 20, 2024

**Test Location**EMS-RS: ☐ SEMI ANECHOIC CHAMBER #1☒ 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	Rohde & Schwarz	108252	07, 31, 2024
<input checked="" type="checkbox"/>	HIGH POWER DUAL AMP	SSA532	SUNGSAN	SSA532-001	-
<input checked="" type="checkbox"/>	POWER METER	E4419B	Agilent	GB40203000	02, 13, 2025
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY52170007	02, 13, 2025
<input checked="" type="checkbox"/>	AVERAGE POWER SENSOR	E9301A	Agilent	MY41498669	02, 13, 2025
<input checked="" type="checkbox"/>	STACKED DOUBLE LOG-PER- ANTENNA	STPL9128 E	Schwarzbeck	9128ES-121	-
<input checked="" type="checkbox"/>	DOUBLE RIDGED HORN ANTENNA	SAS-571	A.H.SYSTEM,INC	781	03, 05, 2025



### Test Conditions

Temperature: (22,0 ± 0,2) °C  
Relative Humidity: (45,8 ± 0,5) % R.H.  
Atmospheric Pressure: (99,8 ± 0,0) 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 (swept test) ☐ 1,4 GHz to 2,7 GHz  
☒ 1.8 GHz , 2.6 GHz , 3.5 GHz , 5 GHz (± 1 %)(spot test)

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 (spot test)

# of Sides Radiated: ☒ 4

Required Performance Criteria: ☒ A

**Test Data****■ AC/DC Adaptor Mode**

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
-	-	-	-	A	-	-

\* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

**■ PoE Mode**

Side Exposed	Performance Criteria	Results	
		Horizontal	Vertical
Front	A	A	A
Right	A	A	A
Back	A	A	A
Left	A	A	A

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Observations	
		Criteria	Measured		Horizontal	Vertical
-	-	-	-	A	-	-

\* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

**Test Results**☒ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria**Remarks**Any degradations of performance was not observed during in the test.



### 3.3 Electrical Fast Transients/Bursts

**Reference Standard**

EN 61000-4-4:2012

**Test Date**

Apr. 21, 2024

**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	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input checked="" type="checkbox"/>	CAPACITIVE COUPLING CLAMP	HFK	EM TEST	P1633183115	11, 10, 2024

**Test Conditions**

Temperature: (22,3 ± 0,2) °C  
Relative Humidity: (46,0 ± 0,2) % R.H.  
Atmospheric Pressure: (100,2 ± 0,0) kPa

**Test Specifications**

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

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

Burst Period: ☒ 300 ms ☐ 2 s

Repetition Rate: ☒ 5 klz ☐ 100 klz

Duration of Test Voltage: ☒ ≥ 1 min

Required Performance Criteria: ☒ B

**Test Data**

■ AC/DC Adaptor Mode

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
L	B	A	A
N	B	A	A
PE	B	A	A
L – N	B	A	A
L – PE	B	A	A
N – PE	B	A	A
L – N – PE	B	A	A

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
RJ-45 (LAN)	B	A	A

■ PoE Mode

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

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

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
-	B	-	-

☒ Signal ports and telecommunication ports – Coupling Clamp used

Mode of Application	Performance Criteria	Results	
		(+) Burst (kV)	(-) Burst (kV)
RJ-45 (PoE)	B	A	A



Note: "Blank" = Not performed

Results:

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

**Test Results**

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

**Remarks**

Any degradations of performance was not observed during in the test.





### 3.4 Surge

**Reference Standard**

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

**Test Date**

Apr. 21, 2024

**Test Location**

EMS-Surge: 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	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input checked="" type="checkbox"/>	CDN	CNV 508N1	EM TEST	P1610176296	11, 10, 2024

**Test Conditions**

Temperature: (22,3 ± 0,2) °C  
Relative Humidity: (46,0 ± 0,4) % R.H.  
Atmospheric Pressure: (100,2 ± 0,0) 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: ☒ 90°, 270° (input a.c. power port)

Polarity: ☒ Positive & Negative

Repetition Rate: ☐ 1 surge per min ☒ 1 surge per 30 sec.

Required Performance Criteria: ☒ B

#### Signal Lines

Source Impedance: 42 ohm for common mode

Surge Amplitude: Common Mode  
☒ (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: ☒ B

**Test Data**☒ AC/DC Adaptor Mode☒ Line to Line – Differential Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L - N	B	A	A

☒ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
L – PE	B	A	A
N – PE	B	A	A

**Signal Lines**☒ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (LAN)-	B	A	A

☒ PoE Mode☐ Line to Line – Differential Mode

-	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

☐ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
-	B	-	-

**Signal Lines**☒ Line to Earth – Common Mode

Mode of Application	Performance Criteria	Results	
		(+) Surge (kV)	(-) Surge (kV)
RJ-45 (PoE)-	B	A	A

Note: "Blank" = Not performed

**Results:**

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

**Test Results**

☒ PASS Required Performance Criteria

☐ NOT PASS Required Performance Criteria

**Remarks**

Any degradations of performance was not observed during in the test.



### 3.5 Conducted Disturbance

**Reference Standard**

EN 61000-4-6:2014

**Test Date**

Apr. 21, 2024

**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	5.3.12	-
<input checked="" type="checkbox"/>	CONTINUOUS WAVE SIMULATOR	CWS 500N1.4	EM TEST	P1602169880	11, 08, 2024
<input checked="" type="checkbox"/>	ATTENUATOR	ATT 6/80	EM TEST	P1614178148	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43694	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN M016	TESEQ	43697	11, 08, 2024
<input checked="" type="checkbox"/>	CDN	CDN T8RJ45	EM TEST	0909-09	07, 31, 2024
<input type="checkbox"/>	EM CLAMP	KEMZ 801A	TESEQ	44099	11, 09, 2024

**Test Conditions**

Temperature: (21,9 ± 0,3) °C  
Relative Humidity: (46,0 ± 0,4) % R.H.  
Atmospheric Pressure: (100,4 ± 0,0) kPa



### Test Specifications

Frequency range:

☒ 150 kHz to 100 MHz

☐ 150 kHz to 80 MHz

Voltage Level:

☒ 3 Vrms (150 kHz to 10 MHz)

☒ 3 Vrms to 1Vrms (10 MHz to 30 MHz)

☒ 1 Vrms (30 MHz to 80 MHz)

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:

☒ A

**Test Data**

■ AC/DC Adaptor Mode

☒ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
L – N – PE	CDN	A	A

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	A	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45 (LAN)	CDN	A	A

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Results
		Criteria	Measured		
-	-	-	-	A	-

\* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.

■ PoE Mode

☐ Input a.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	A	-

☐ Input d.c. power ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
-	-	A	-

☒ Signal ports and telecommunication ports

Coupling Location (Line Stressed)	Coupling Method	Performance Criteria	Results
RJ-45 (PoE)	CDN	A	A

[Audio output function]

☐ Electrical Measurements / ☐ Acoustic Measurements

Measured parts	Test method	Level (dB)		Performance criteria	Results
		Criteria	Measured		
-	-	-	-	A	-

\* The SOUND ACOUSTIC TESTER mark characteristics indicate low if less than 50 dB.



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

**Results:**

A – No degradation of function  
B – Distortion/Error of function (self-recoverable)  
C – Loss of function

**Test Results**

☒ PASS Required Performance Criteria  
☐ NOT PASS Required Performance Criteria

**Remarks**

- Any degradations of performance was not observed during in the test.





### 3.6 Power Frequency Magnetic Field Immunity

**Reference Standard**

EN 61000-4-8:2010

**Test Date**

N/A

**Test Location**

EMS-Magnetic: 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	5.4.8	-
<input type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024
<input type="checkbox"/>	MAGNETIC FIELD COIL	MS 100N	EM TEST	P1536163691	11, 10, 2024
<input type="checkbox"/>	CURRENT TRANSFORMER	MC 2630	EM TEST	P1629182219	11, 10, 2024

**Test Conditions**

Temperature:

°C

Relative Humidity:

% R.H.

Atmospheric Pressure:

kPa

**Test Specifications**

Field Strength:

☐ 1 A/m☐ 3 A/m☐ 30 A/m

Frequency:

☐ 50 Hz☐ 60 Hz

Required Performance Criteria:

☐ A

**Test Data**☐ Immersion method

Coil orientation	Performance Criteria	Results
X - axis	A	-
Y - axis	A	-
Z - axis	A	-

Note: "blank" = Not performed

**Results:**

A – No degradation of function

B – Distortion/Error of function (self-recoverable)

C – Loss of function

**Test Results**☐ PASS Required Performance Criteria☐ NOT PASS Required Performance Criteria☒ NOT APPLICABLE**Remarks**Not affected by magnetic fields.



### 3.7 Voltage Dips and Short Interruptions

**Reference Standard**

EN IEC 61000-4-11:2020

**Test Date**

Apr. 21, 2024

**Test Location**

EMS-Voltage dip: 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	5.4.8	-
<input checked="" type="checkbox"/>	ULTRA COMPACT SIMULATOR	UCS 500N7	EM TEST	P1608172950	11, 09, 2024
<input checked="" type="checkbox"/>	MOTOR VARIAC	MV2616	EM TEST	P1552169719	11, 09, 2024

**Test Conditions**

Temperature: (22,3 ± 0,1) °C  
Relative Humidity: (46,0 ± 0,2) % R.H.  
Atmospheric Pressure: (100,2 ± 0,0) kPa

**Test Data**

■ AC/DC Adaptor Mode

NO	Depth	Duration	Performance		Remarks
			Criteria	Results	
1	95 %	0.5	B	A	-
2	30 %	25	C	A	-
3	95 %	250	C	C	-

**Results:**

- A – No response observed from EUT  
B – Unit shuts down then automatically restarts when full voltage is restored.  
C – Unit shuts down then manually restarts when full voltage is restored or Loss of function.

**Test Results**

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

**Remarks**

Any degradations of performance was not observed during in the test.

C : During the interruption (95 %, 250 cycle), EUT was turned off but after the test, it was recovered by operator's intervention.



## APPENDIX A – TEST DATA

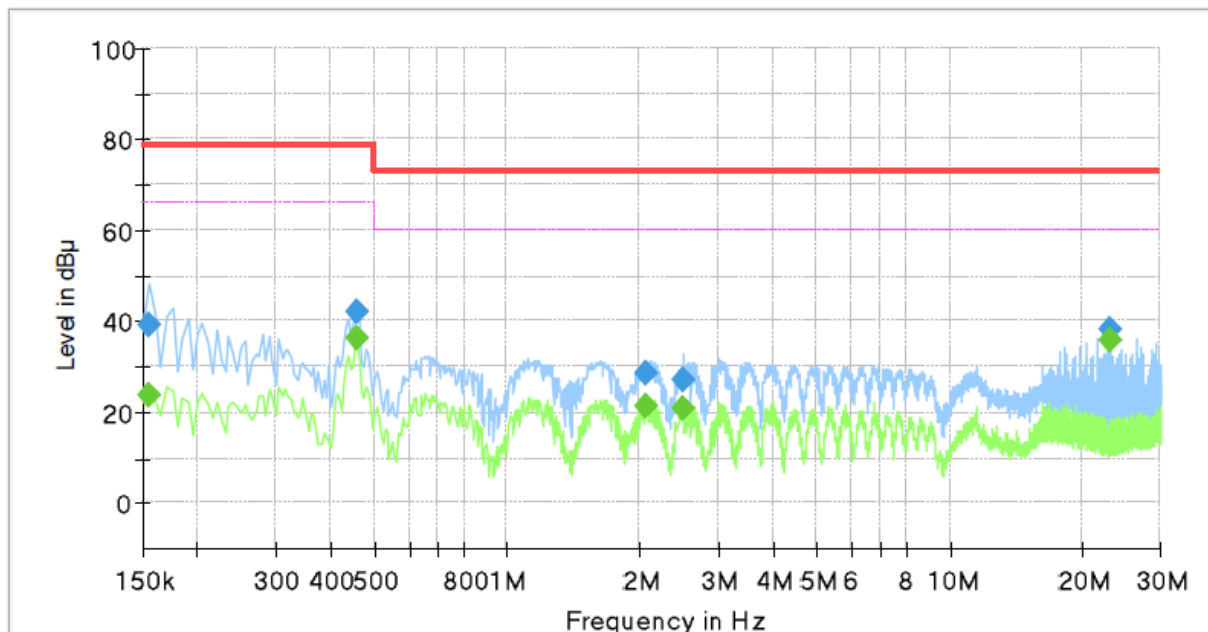
### Conducted Emissions at Mains Power Ports

■ AC/DC Adaptor Mode

[HOT]

#### Common Information

Test Description:	Conducted Emission
Model No.:	SPA-B1000
Phase:	H
Mode:	AC/DC Adapter
Operator Name:	KES



#### Final Result

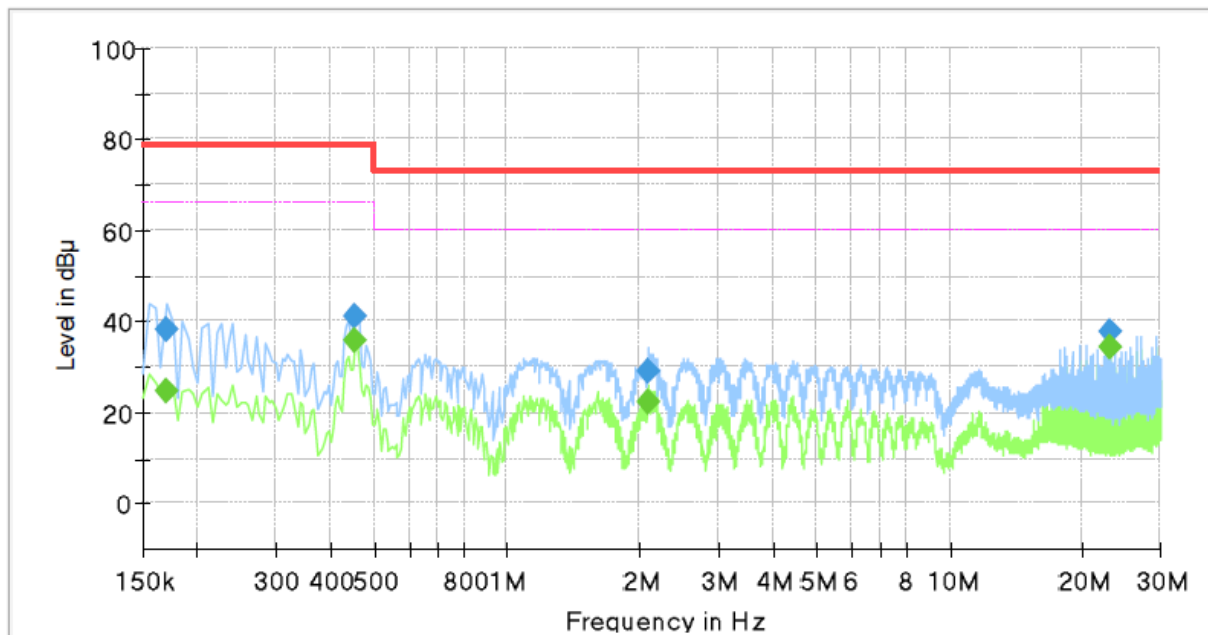
Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.155000	---	23.74	66.00	42.26	1000.0	9.000	L1	19.4
0.155000	38.99	---	79.00	40.01	1000.0	9.000	L1	19.4
0.460000	---	36.11	66.00	29.89	1000.0	9.000	L1	19.4
0.460000	41.99	---	79.00	37.01	1000.0	9.000	L1	19.4
2.055000	---	21.22	60.00	38.78	1000.0	9.000	L1	19.5
2.055000	28.40	---	73.00	44.60	1000.0	9.000	L1	19.5
2.510000	---	20.70	60.00	39.30	1000.0	9.000	L1	19.5
2.510000	27.10	---	73.00	45.90	1000.0	9.000	L1	19.5
23.130000	---	35.88	60.00	24.12	1000.0	9.000	L1	20.3
23.130000	38.19	---	73.00	34.81	1000.0	9.000	L1	20.3



[NEUTRAL]

## Common Information

Test Description: Conducted Emission  
Model No.: SPA-B1000  
Phase: N  
Mode: AC/DC Adapter  
Operator Name: KES



## Final Result

Frequency (MHz)	QuasiPeak (dBμV)	CAverage (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.170000	---	24.61	66.00	41.39	1000.0	9.000	N	19.3
0.170000	38.40	---	79.00	40.60	1000.0	9.000	N	19.3
0.455000	---	35.98	66.00	30.02	1000.0	9.000	N	19.4
0.455000	40.95	---	79.00	38.05	1000.0	9.000	N	19.4
2.085000	---	22.48	60.00	37.52	1000.0	9.000	N	19.5
2.085000	29.10	---	73.00	43.90	1000.0	9.000	N	19.5
23.130000	---	34.61	60.00	25.39	1000.0	9.000	N	20.3
23.130000	37.69	---	73.00	35.31	1000.0	9.000	N	20.3

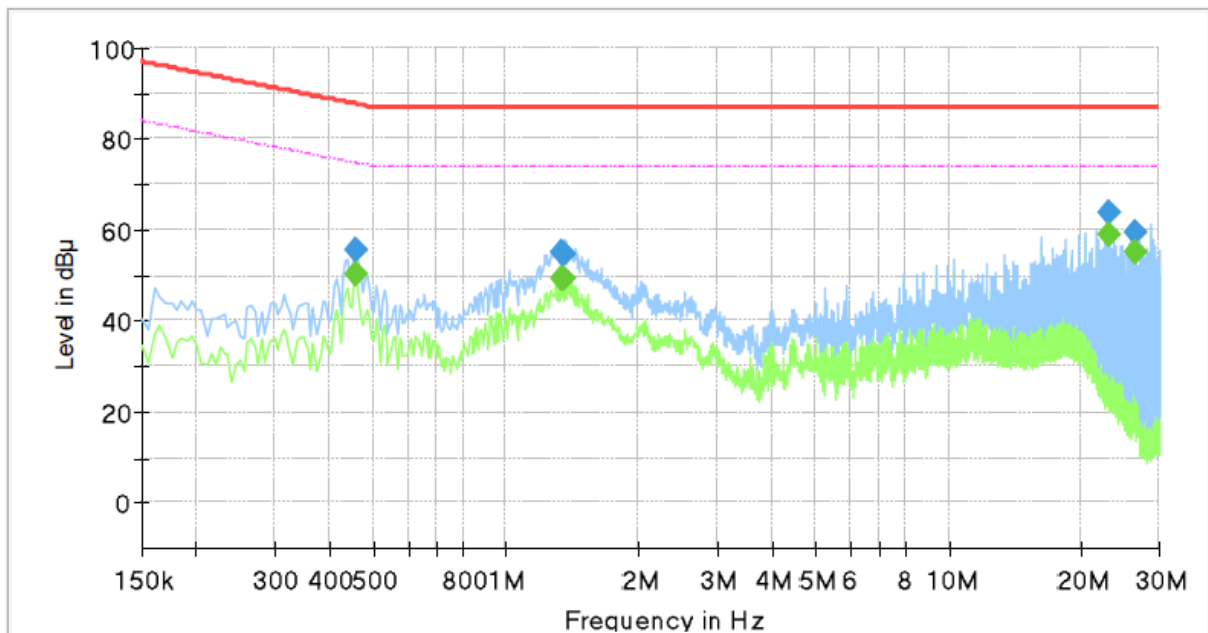
**Conducted Emissions at Telecommunication Ports**

■ AC/DC Adaptor Mode

[1 000 Mbps]

**Common Information**

Test Description: Telecommunication Emission  
Model No.: SPA-B1000  
Mode : AC/DC Adapter  
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)
0.460000	---	50.25	74.69	24.44	1000.0	9.000	Single Line	19.4
0.460000	55.49	---	87.69	32.20	1000.0	9.000	Single Line	19.4
1.335000	---	49.24	74.00	24.76	1000.0	9.000	Single Line	19.3
1.335000	54.90	---	87.00	32.10	1000.0	9.000	Single Line	19.3
1.360000	---	49.31	74.00	24.69	1000.0	9.000	Single Line	19.3
1.360000	54.86	---	87.00	32.14	1000.0	9.000	Single Line	19.3
23.130000	---	59.22	74.00	14.78	1000.0	9.000	Single Line	20.1
23.130000	63.65	---	87.00	23.35	1000.0	9.000	Single Line	20.1
26.490000	---	55.14	74.00	18.86	1000.0	9.000	Single Line	20.2
26.490000	59.51	---	87.00	27.49	1000.0	9.000	Single Line	20.2

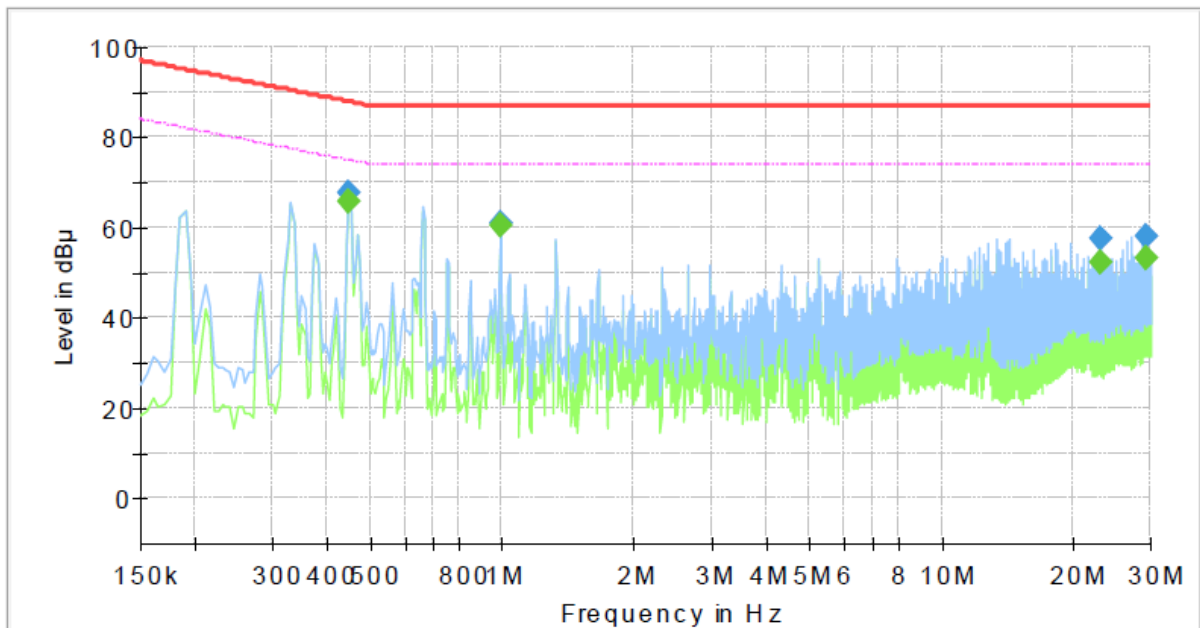


## ■ PoE Mode

[1 000 Mbps]

**Common Information**

Test Description: Telecommunication Emission  
Model No.: SPA-B1000  
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)
0.450000	---	65.98	74.88	8.90	1000.0	9.000	Single Line	19.4
0.450000	67.45	---	87.88	20.43	1000.0	9.000	Single Line	19.4
0.995000	---	60.60	74.00	13.40	1000.0	9.000	Single Line	19.3
0.995000	60.72	---	87.00	26.28	1000.0	9.000	Single Line	19.3
23.130000	---	52.41	74.00	21.59	1000.0	9.000	Single Line	20.1
23.130000	57.48	---	87.00	29.52	1000.0	9.000	Single Line	20.1
29.235000	---	53.28	74.00	20.72	1000.0	9.000	Single Line	20.3
29.235000	58.04	---	87.00	28.96	1000.0	9.000	Single Line	20.3

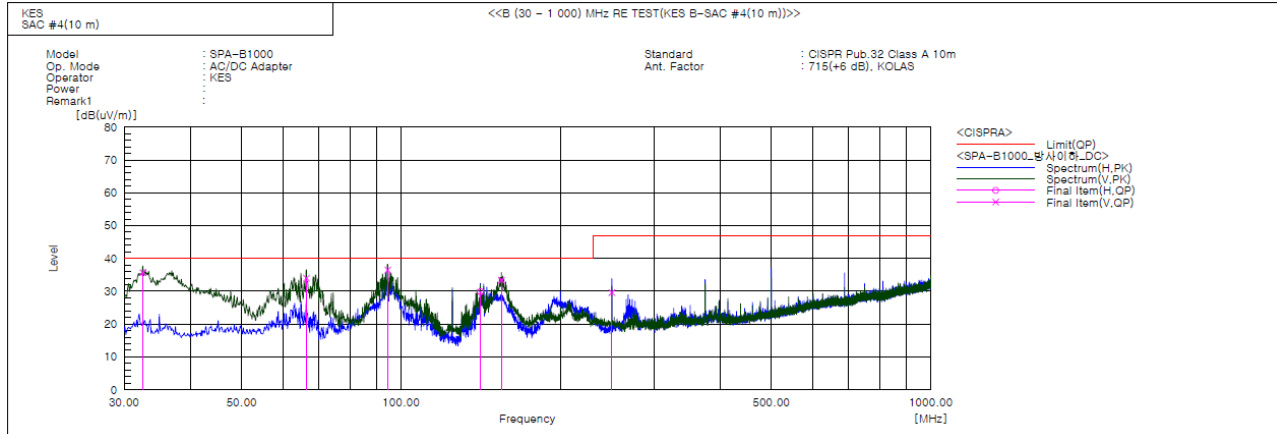
## ◆ Calculation

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

QuasiPeak / CAverage : The Final Value

Reading Value : Not shown in the table.

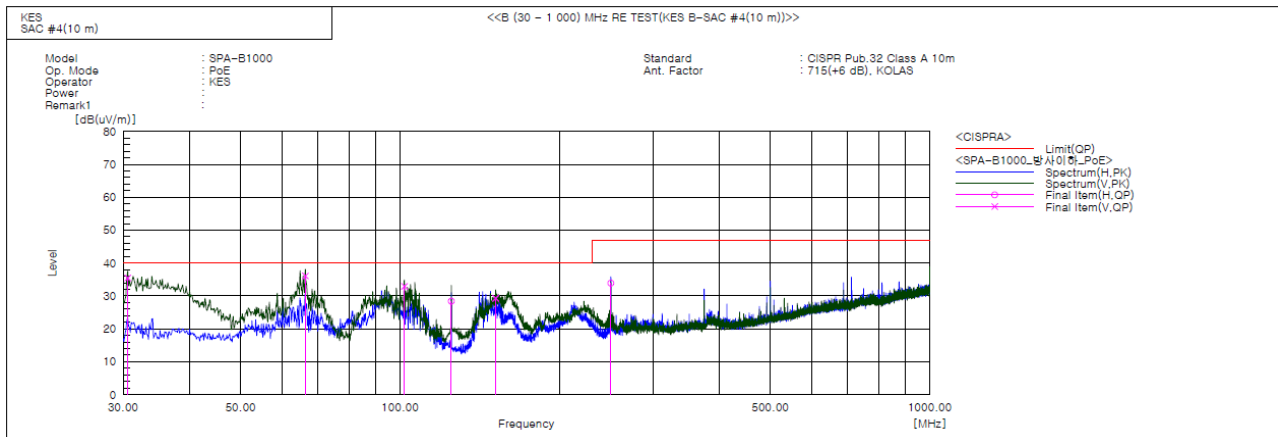
Corr. : Correction values (ISN FACTOR + (Cable Loss + Pulse Limiter FACTOR))

**Radiated Electric Field Emissions(Below 1 GHz)****■ AC/DC Adaptor Mode****Final Result**

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	32.546	V	61.0	-25.3	35.7	40.0	4.3	195.0	15.0	
2	66.254	V	57.7	-23.7	34.0	40.0	6.0	100.0	143.0	
3	94.384	V	59.4	-22.9	36.5	40.0	3.5	106.0	329.0	
4	141.186	H	55.2	-25.3	29.9	40.0	10.1	400.0	90.0	
5	154.766	V	58.4	-25.0	33.4	40.0	6.6	109.0	358.0	
6	249.948	V	48.4	-18.8	29.6	47.0	17.4	100.0	300.0	



## ■ PoE Mode



## Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.606	V	61.0	-25.5	35.5	40.0	4.5	100.0	318.0	
2	66.254	V	59.8	-23.7	36.1	40.0	3.9	108.0	93.0	
3	101.901	V	55.3	-22.4	32.9	40.0	7.1	100.0	7.0	
4	124.939	H	53.0	-24.6	28.4	40.0	11.6	400.0	236.0	
5	151.493	V	54.4	-25.1	29.3	40.0	10.7	100.0	187.0	
6	249.948	H	52.7	-18.8	33.9	47.0	13.1	392.0	14.0	

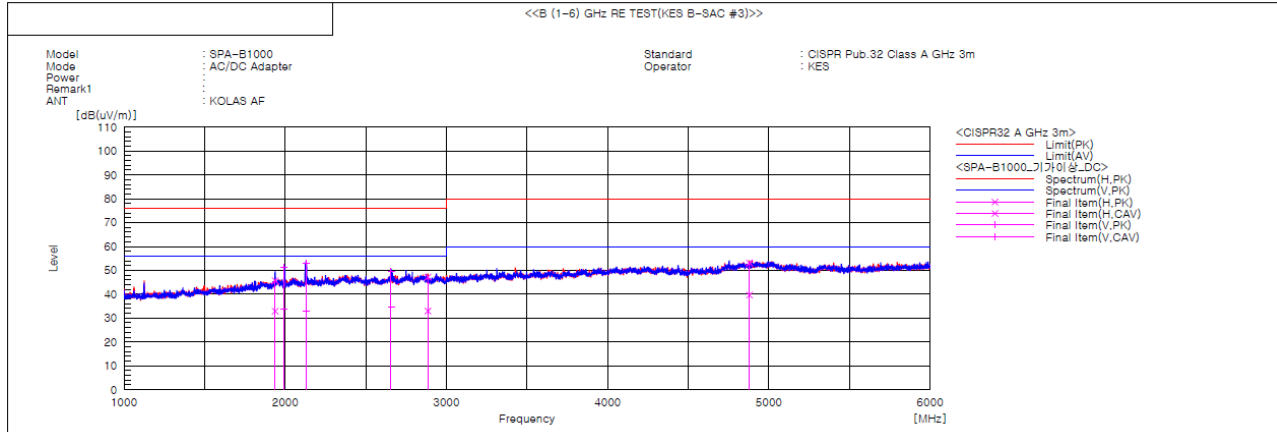
## ◆ Calculation

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

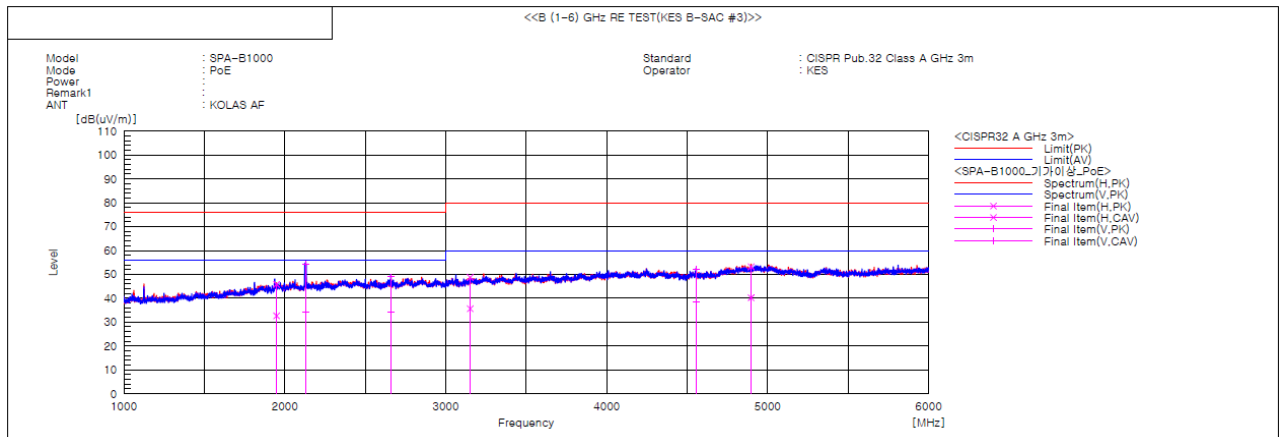
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

**Radiated Electric Field Emissions(Above 1 GHz)****■ AC/DC Adaptor 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	1938.441	H	41.4	28.6	4.3	45.7	32.9	76.0	56.0	30.3	23.1	100.0	62.7	
2	1994.230	V	46.5	29.1	4.8	51.3	33.9	76.0	56.0	24.7	22.1	100.0	202.4	
3	2129.368	V	47.9	27.9	4.9	52.8	32.8	76.0	56.0	23.2	23.2	100.0	182.8	
4	2656.510	V	43.2	28.3	6.4	49.6	34.7	76.0	56.0	26.4	21.3	100.0	193.0	
5	2884.980	H	39.9	25.7	7.3	47.2	33.0	76.0	56.0	28.8	23.0	100.0	117.9	
6	4878.885	H	38.1	24.7	15.0	53.1	39.7	80.0	60.0	26.9	20.3	100.0	347.8	



## ■ 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	1948.209	H	41.4	28.3	4.4	45.8	32.7	76.0	56.0	30.2	23.3	100.0	343.1	
2	2131.402	V	49.3	29.5	4.9	54.2	34.4	76.0	56.0	21.8	21.6	100.0	194.1	
3	2659.210	V	42.5	27.7	6.4	48.9	34.1	76.0	56.0	27.1	21.9	100.0	219.5	
4	3151.377	H	40.9	27.8	7.8	48.7	35.6	80.0	60.0	31.3	24.4	100.0	125.8	
5	4555.584	V	39.5	25.8	12.5	52.0	38.3	80.0	60.0	28.0	21.7	100.0	132.4	
6	4896.716	H	38.1	25.1	15.1	53.2	40.2	80.0	60.0	26.8	19.8	100.0	354.4	

## ◆ 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

**Harmonic Current Emissions and Voltage Fluctuations and Flicker**

■ AC/DC Adaptor Mode

<b>Average harmonic current results</b>				
Hn	I <sub>eff</sub> [A]	% of Limit	Limit [A]	Result
1	0.027			
2	0.004	0.332	1.080	n/a
3	0.009	0.410	2.300	PASS
4	0.002	0.403	0.430	n/a
5	0.009	0.798	1.140	PASS
6	0.004	1.290	0.300	n/a
7	0.009	1.164	0.770	PASS
8	0.003	1.249	0.230	n/a
9	0.009	2.271	0.400	PASS
10	0.002	0.940	0.184	n/a
11	0.009	2.762	0.330	PASS
12	0.002	1.257	0.153	n/a
13	0.009	4.224	0.210	PASS
14	0.002	1.729	0.131	n/a
15	0.008	5.605	0.150	PASS
16	0.003	2.196	0.115	n/a
17	0.008	6.182	0.132	PASS
18	0.003	2.609	0.102	n/a
19	0.008	6.776	0.118	PASS
20	0.002	2.559	0.092	n/a
21	0.007	4.620	0.161	PASS
22	0.002	2.558	0.084	n/a
23	0.007	5.030	0.147	PASS
24	0.002	2.821	0.077	n/a
25	0.007	5.217	0.135	PASS
26	0.002	2.835	0.071	n/a
27	0.007	5.290	0.125	PASS
28	0.002	3.081	0.066	n/a
29	0.007	5.720	0.116	PASS
30	0.002	3.049	0.061	n/a
31	0.006	5.590	0.109	PASS
32	0.002	2.961	0.058	n/a
33	0.006	5.648	0.102	PASS
34	0.002	3.201	0.054	n/a
35	0.006	5.942	0.096	PASS
36	0.002	3.027	0.051	n/a
37	0.005	5.581	0.091	PASS
38	0.001	2.942	0.048	n/a
39	0.005	5.714	0.087	n/a
40	0.001	3.110	0.046	n/a

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

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



## Test Data - Harmonics (continued)

**Maximum harmonic current results**

Hn	I <sub>eff</sub> [A]	% of Limit	Limit [A]	Result
1	0.028			
2	0.004	0.248	1.620	n/a
3	0.010	0.297	3.450	PASS
4	0.002	0.340	0.645	n/a
5	0.010	0.575	1.710	PASS
6	0.004	0.948	0.450	n/a
7	0.010	0.845	1.155	PASS
8	0.003	0.947	0.345	n/a
9	0.010	1.650	0.600	PASS
10	0.002	0.788	0.276	n/a
11	0.010	2.011	0.495	PASS
12	0.002	0.998	0.230	n/a
13	0.010	3.060	0.315	PASS
14	0.003	1.321	0.197	n/a
15	0.009	4.075	0.225	PASS
16	0.003	1.676	0.173	n/a
17	0.009	4.478	0.199	PASS
18	0.003	1.965	0.153	n/a
19	0.009	4.912	0.178	PASS
20	0.003	1.902	0.138	n/a
21	0.008	4.997	0.161	PASS
22	0.002	1.946	0.125	n/a
23	0.008	5.447	0.147	PASS
24	0.002	2.106	0.115	n/a
25	0.008	5.666	0.135	PASS
26	0.002	2.142	0.106	n/a
27	0.007	5.690	0.125	PASS
28	0.002	2.303	0.099	n/a
29	0.007	6.168	0.116	PASS
30	0.002	2.296	0.092	n/a
31	0.007	6.033	0.109	PASS
32	0.002	2.215	0.086	n/a
33	0.006	6.067	0.102	PASS
34	0.002	2.406	0.081	n/a
35	0.006	6.372	0.096	PASS
36	0.002	2.276	0.077	n/a
37	0.005	5.939	0.091	PASS
38	0.002	2.167	0.073	n/a
39	0.005	6.105	0.087	PASS
40	0.002	2.312	0.069	n/a

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

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



Test Data - Voltage Fluctuations

■ AC/DC Adaptor Mode

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

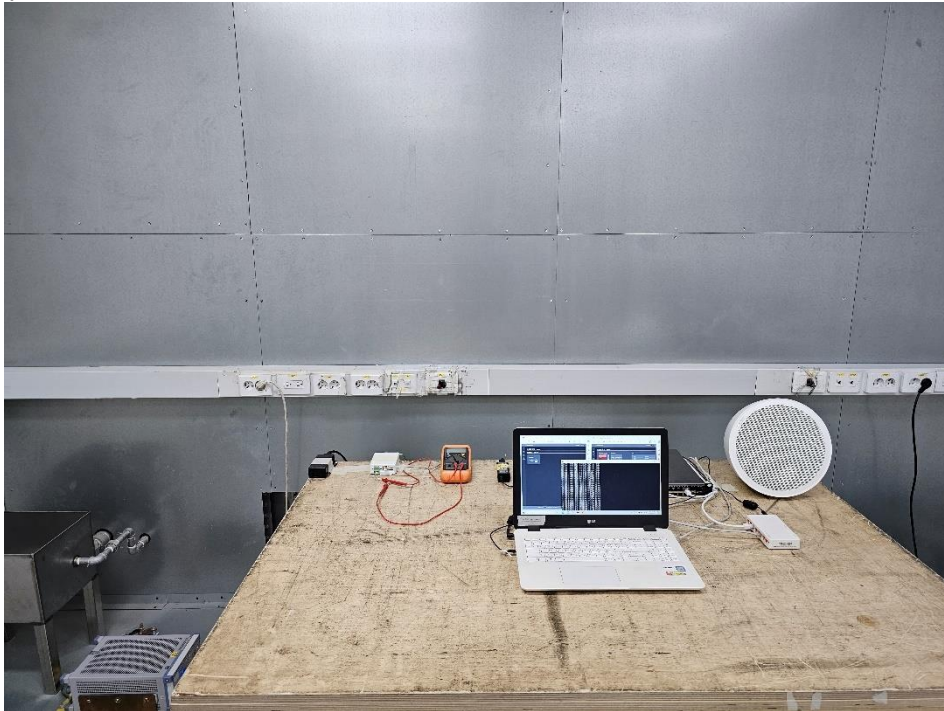




## APPENDIX B – Test Setup Photos and Configuration

### Conducted Emissions at Mains Power Ports

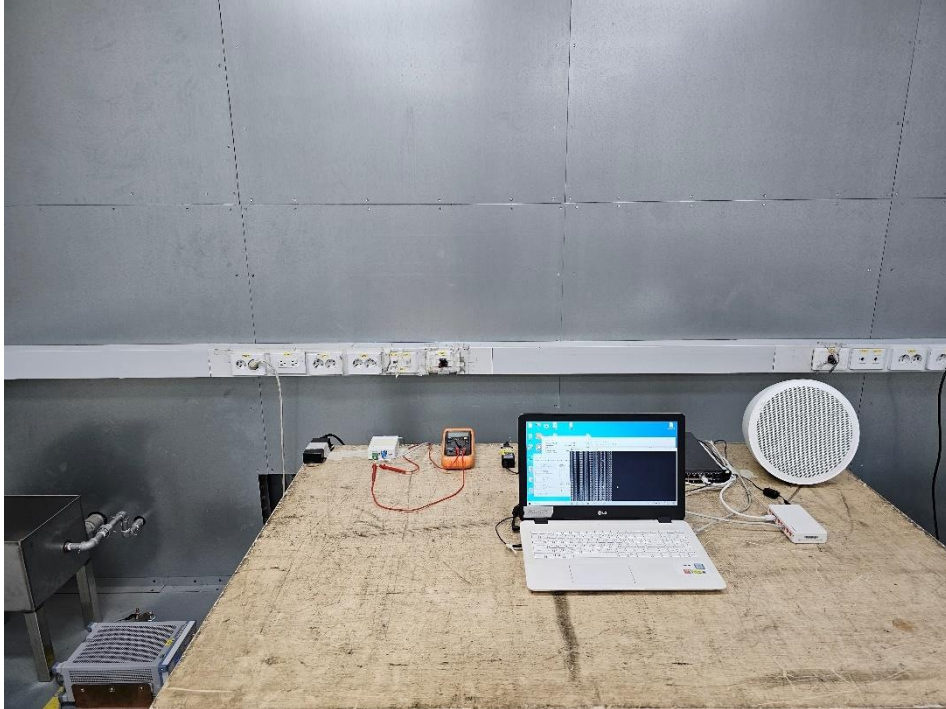
#### ■ AC/DC Adaptor Mode





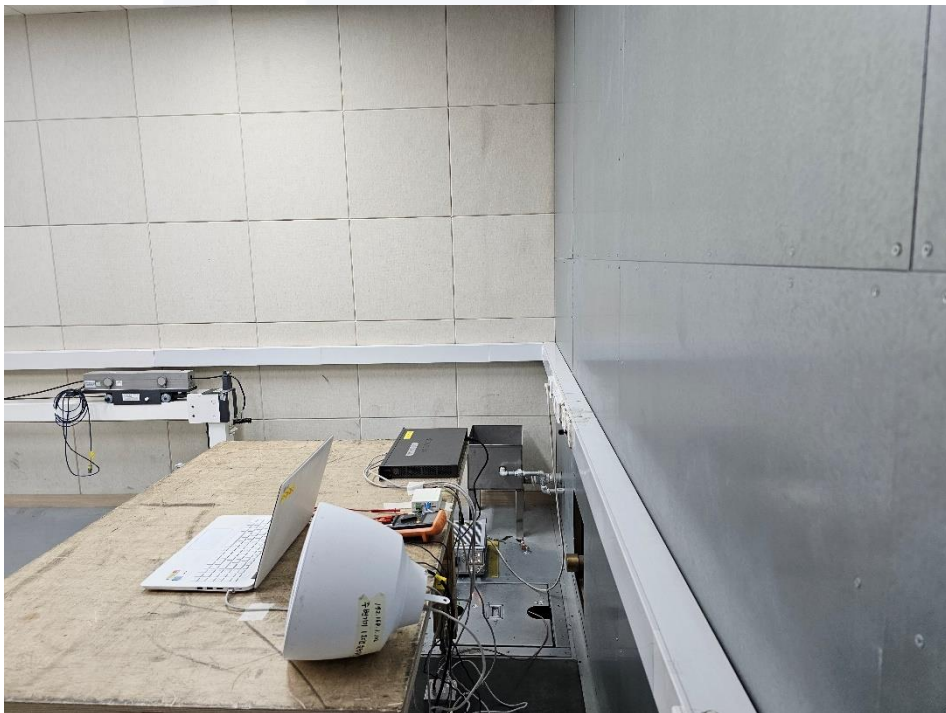
## Conducted Telecommunication Emissions

### ■ AC/DC Adaptor Mode





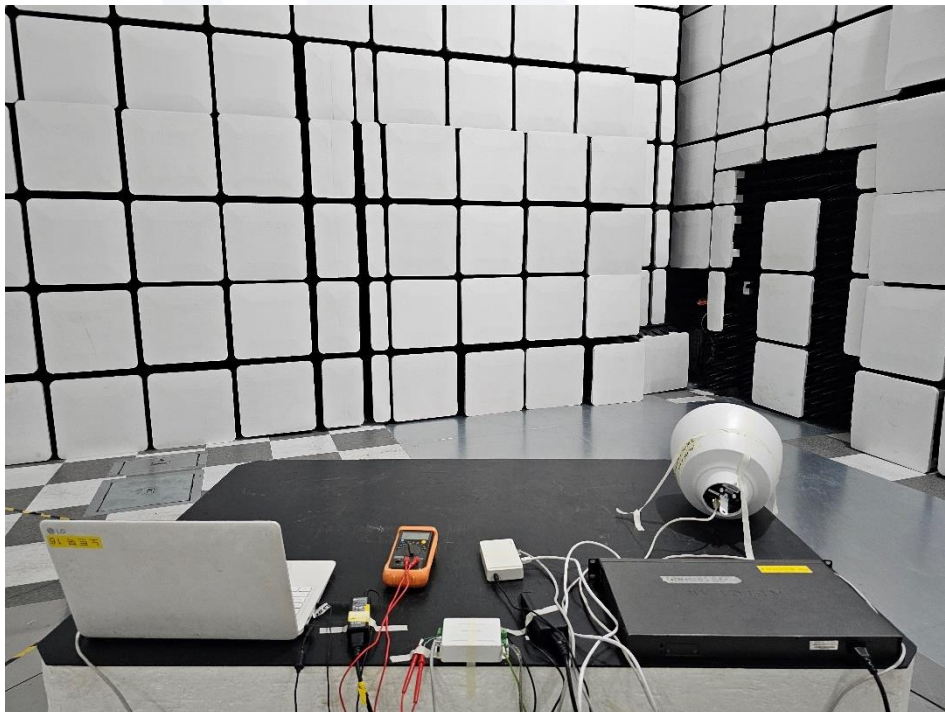
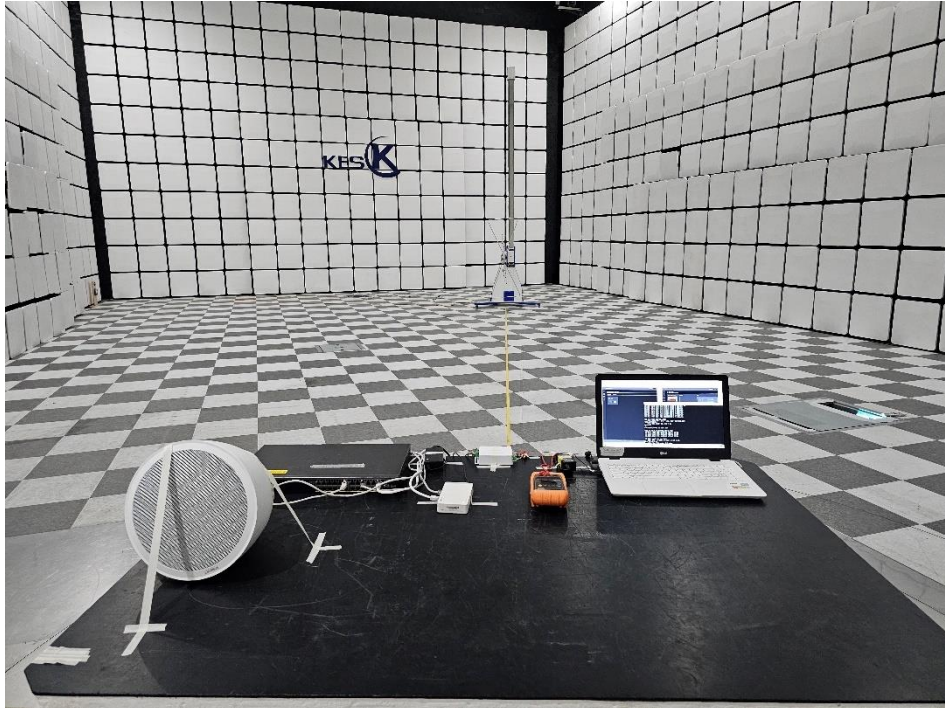
■ PoE Mode





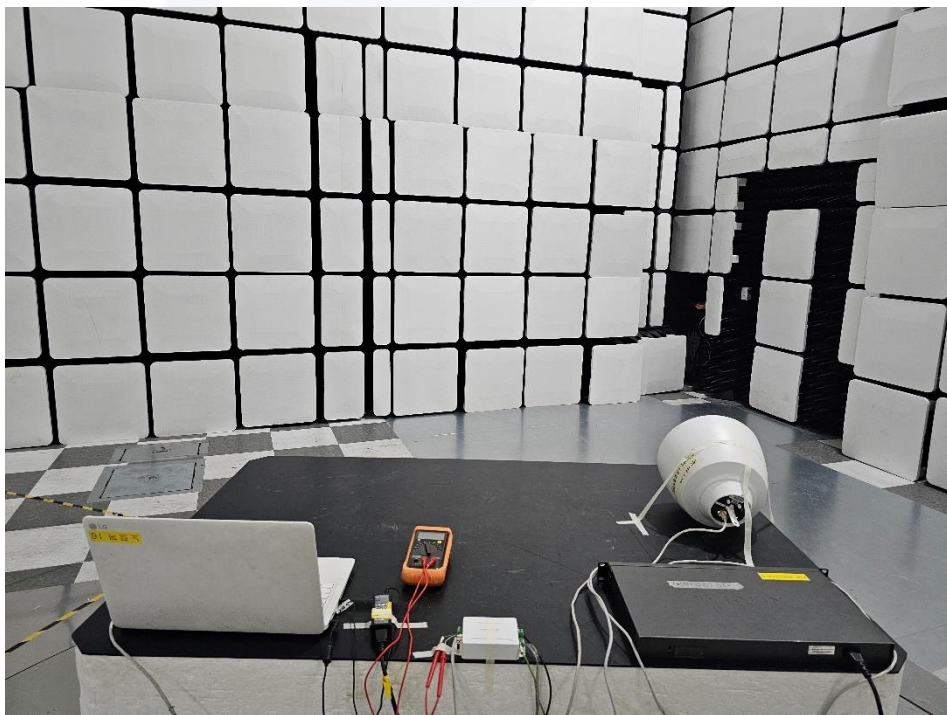
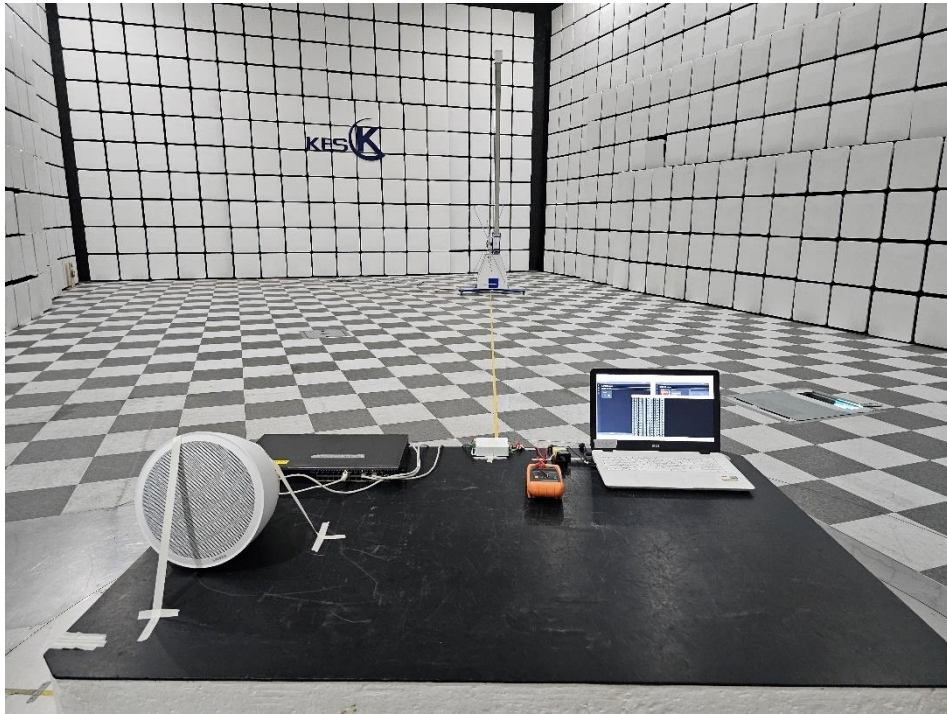
## Radiated Electric Field Emissions(Below 1 GHz)

### ■ AC/DC Adaptor Mode





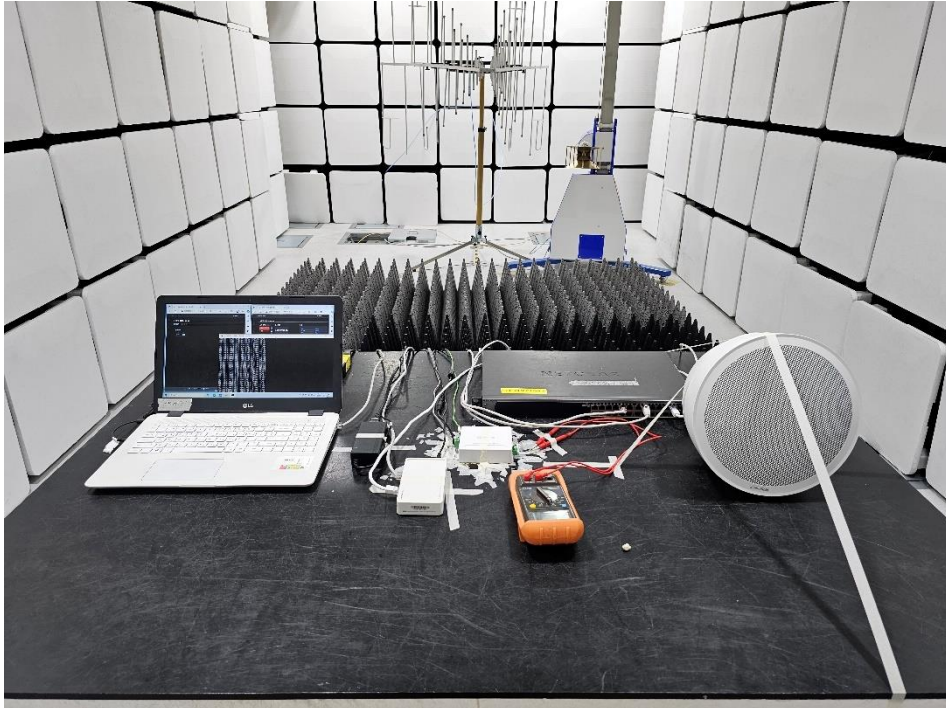
■ PoE Mode





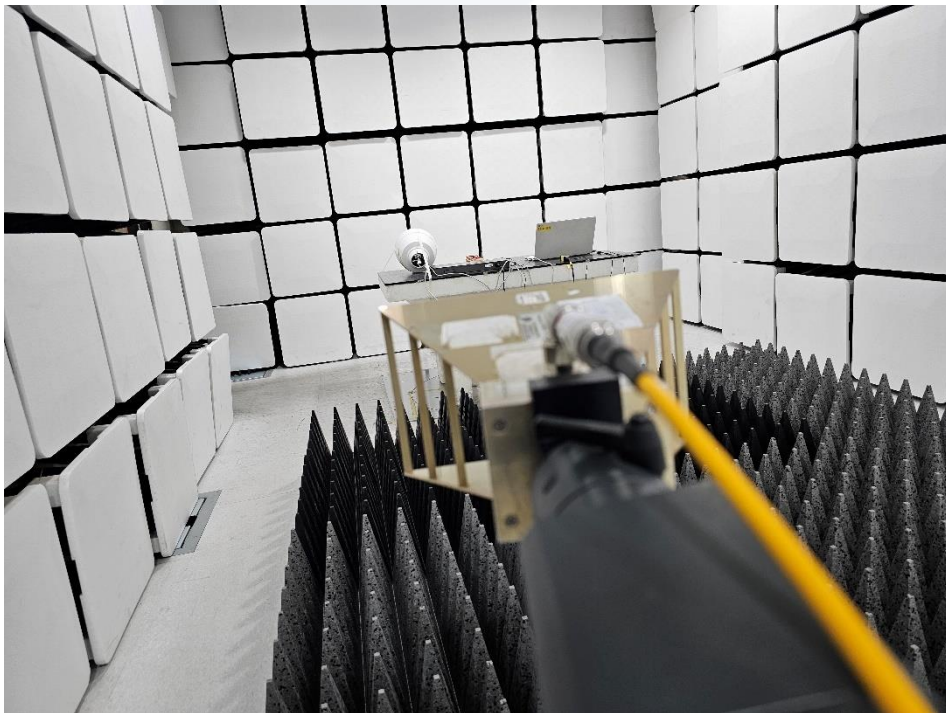
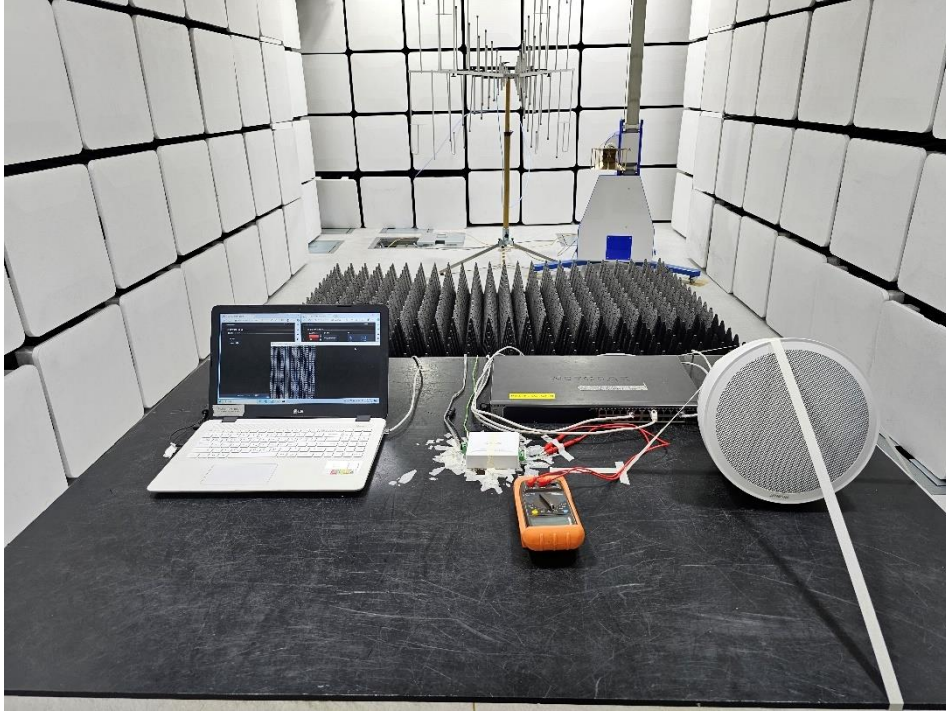
## Radiated Electric Field Emissions(Above 1 GHz)

### ■ AC/DC Adaptor Mode





■ PoE Mode





## Harmonic Current Emissions and Voltage Fluctuations and Flicker

■ AC/DC Adaptor Mode



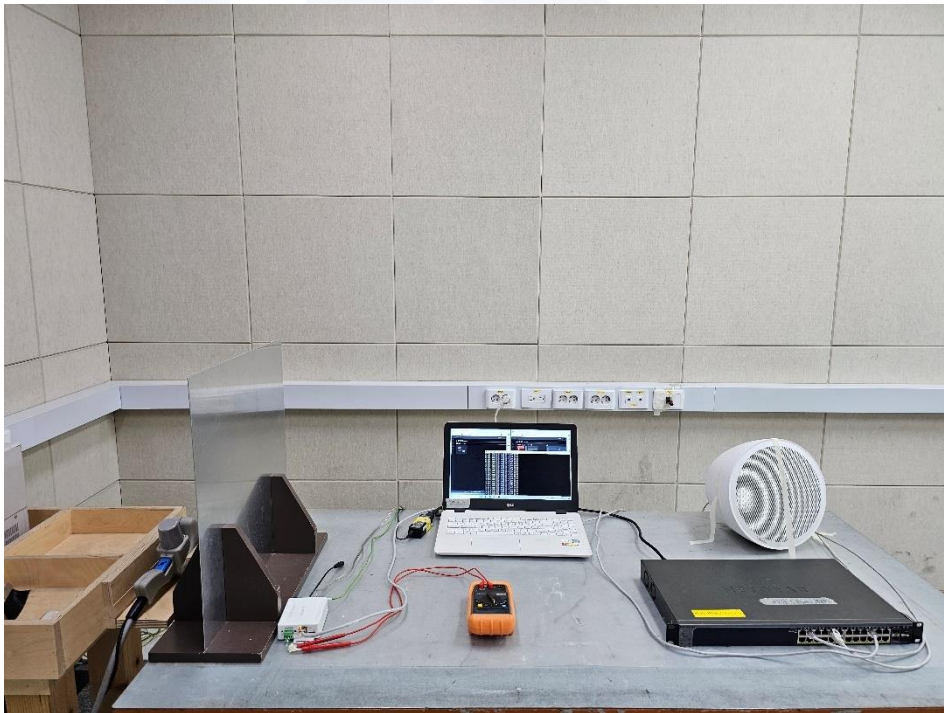


## Electrostatic Discharge

### ■ AC/DC Adaptor Mode



### ■ PoE Mode



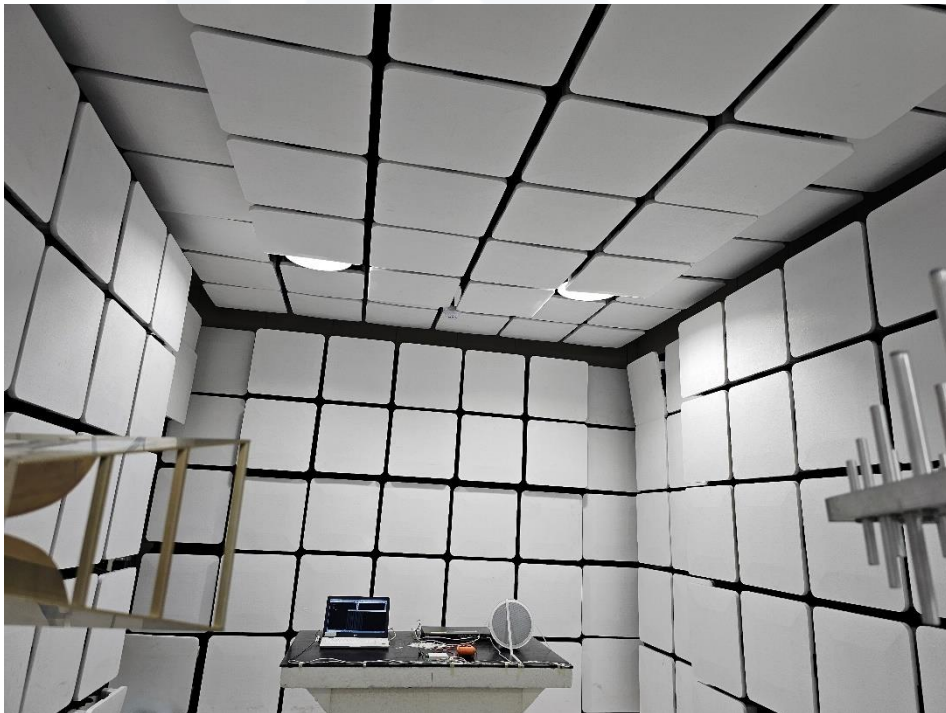


## Radiated Electric Field Immunity

### ■ AC/DC Adaptor Mode



### ■ PoE Mode





## Electrical Fast Transients/Bursts

### ■ AC/DC Adaptor Mode



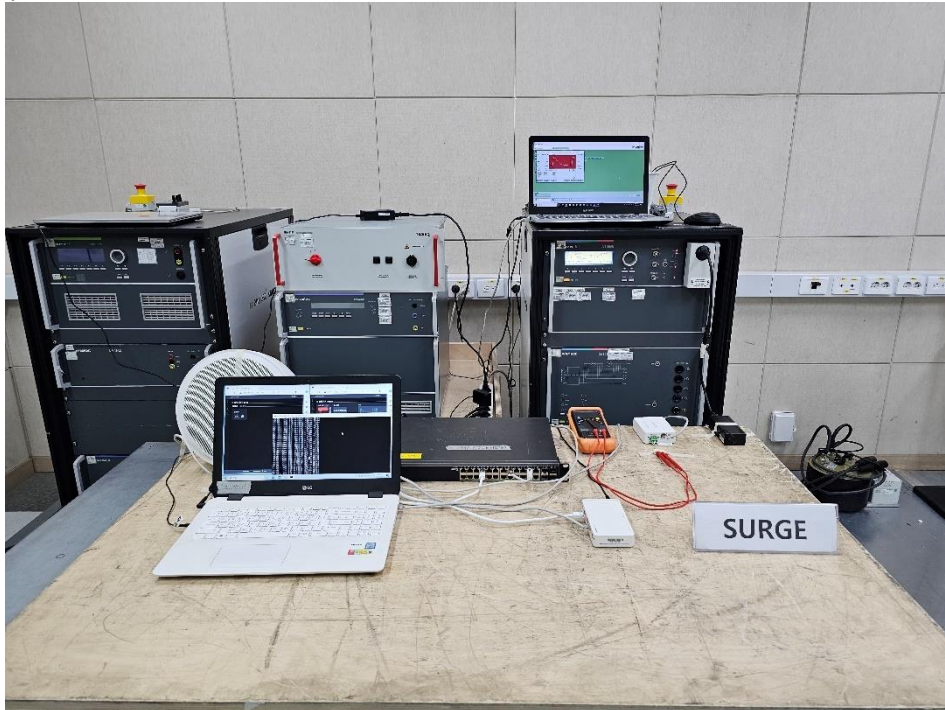
### ■ PoE Mode



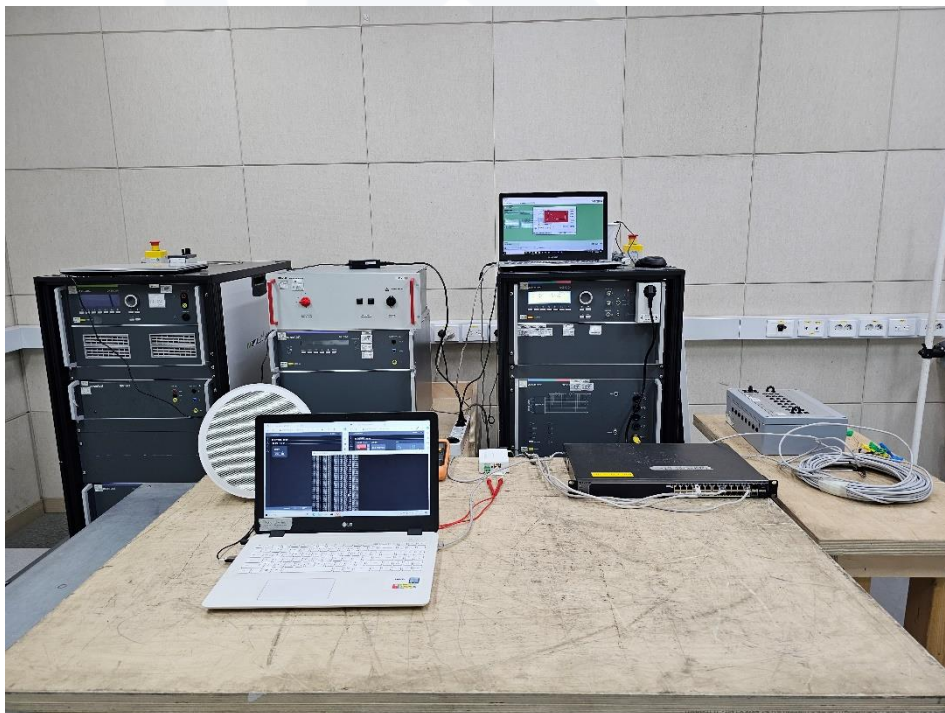


## Surge Transients

### ■ AC/DC Adaptor Mode



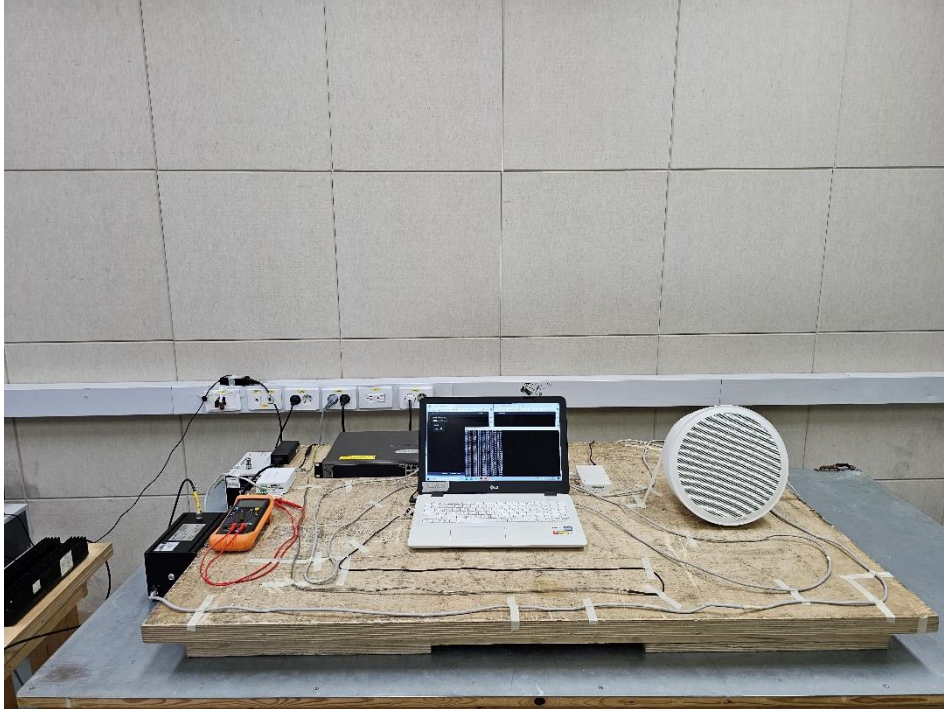
### ■ PoE Mode



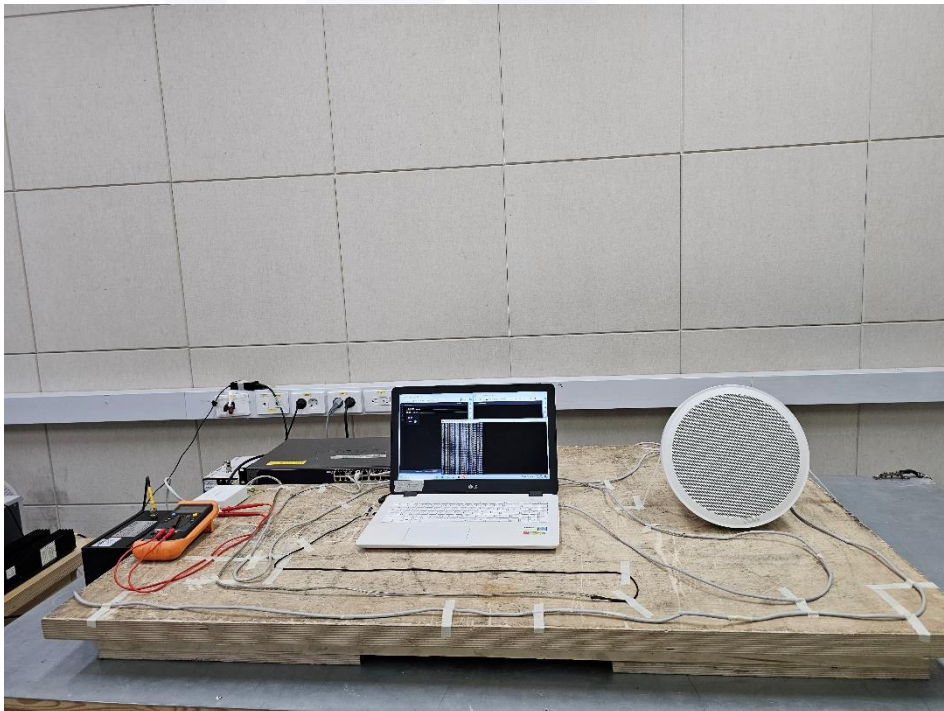


## Conducted Disturbance

### ■ AC/DC Adaptor Mode



### ■ PoE Mode





**Power Frequency Magnetic Field Immunity**

N/A





## Voltage Dips and Short Interruptions

### ■ AC/DC Adaptor Mode





## APPENDIX C – EUT Photographs

### EUT External Photographs

(Top)



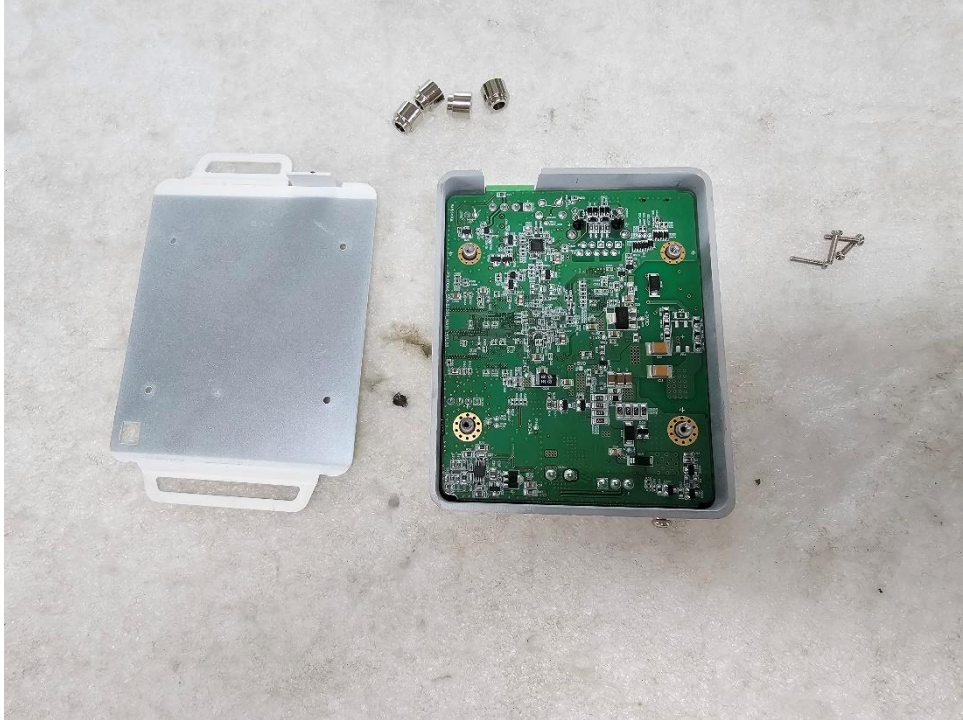
(Bottom)





## EUT Internal Photographs

(Internal View)



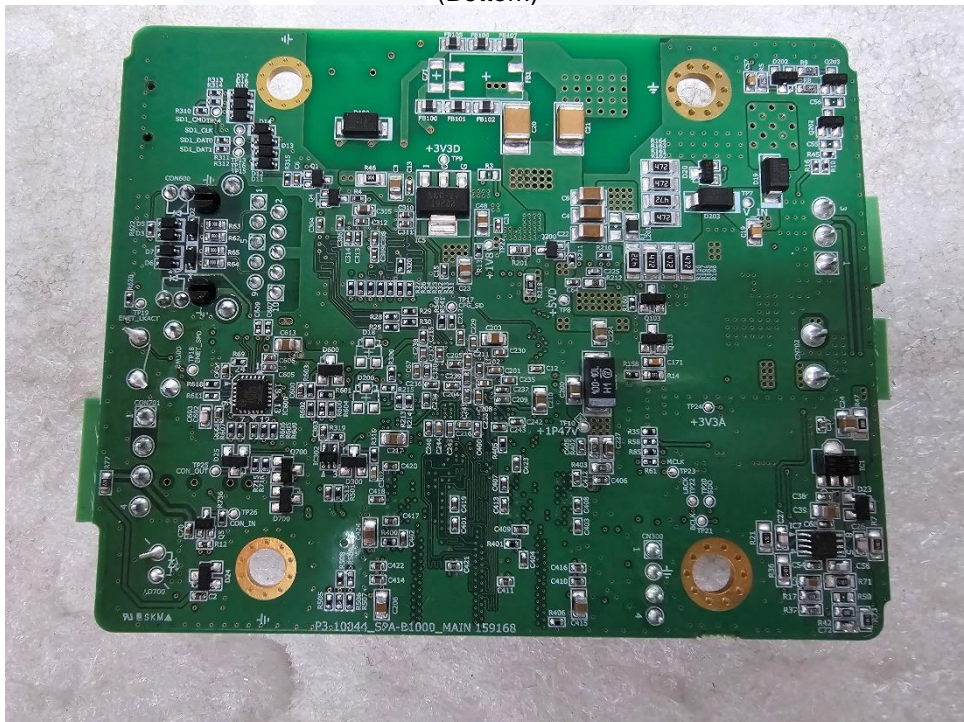


## EUT Internal View – Board

(Top)



(Bottom)





### Label and Location



**IP AUDIO BRIDGE**

Model No : SPA-B1000

Manufacturer : Inter-M Corporation

Made in Korea

