



TEST REPORT



Report No. : KES-EM240348

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KES Co., Ltd.

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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. 23, 2024

5. Date of Issue : Apr. 30, 2024

6. Test Results : In Compliance

Tested by

Reviewed by

Seon Ho, Choi
EMC Test Engineer

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-EM240348 | 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 |



| | |
|---|---|
| Power | |
| PoE | PoE (IEEE 802.3 af type 1 Class 3) |
| PoE+ | DC 8V ~ 24V |
| Embedded MIC | |
| Input Sensitivity | None |
| Frequency Response | None |
| Audio | |
| 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 |
| Speaker | |
| 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 |
| Network Protocol | |
| 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 |
| System Integration | |
| 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 120 V, 60 Hz (AC/DC Adapter Input Power)
- ☒ AC 120 V, 60 Hz (PoE Adapter Input Power)

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

■ DC 24 V 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)

■ DC 24 V Mode, PoE Mode

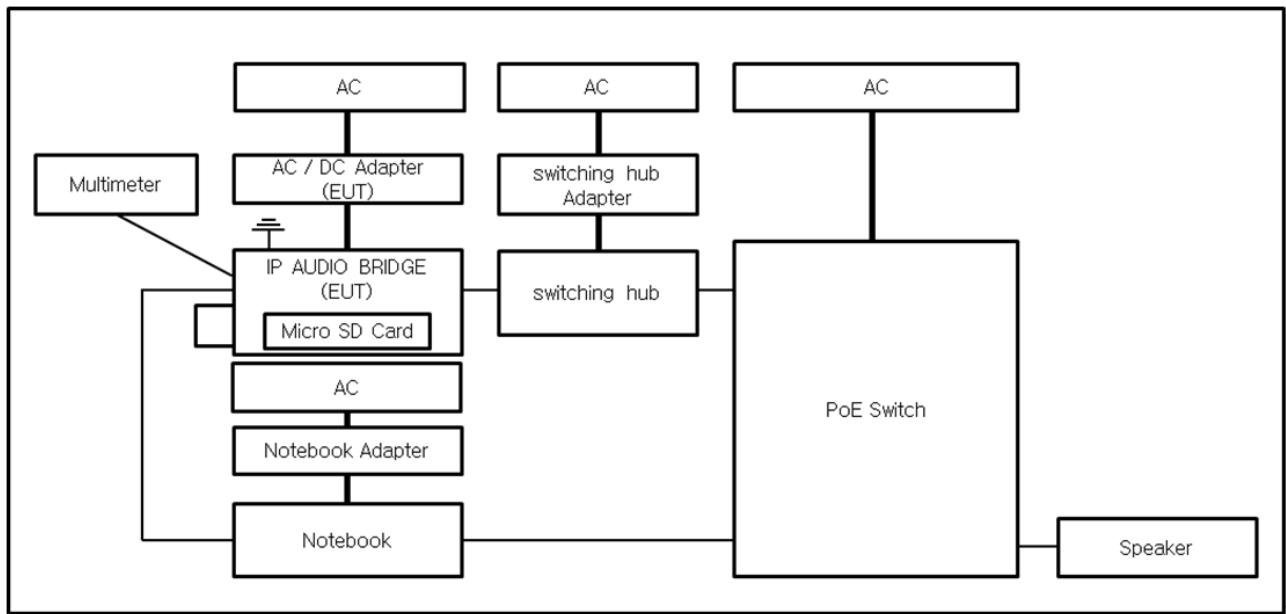
| | |
|-----------|--|
| Test mode | operating |
| Operating | The test was performed by running Pingtest on a laptop to check whether the test equipment was connected properly and whether 1 kHz tone was output to the speaker through the test equipment. |

| EUT Test operating S/W | | |
|------------------------|---------|---------------------|
| Name | Version | Manufacture Company |
| - | - | - |

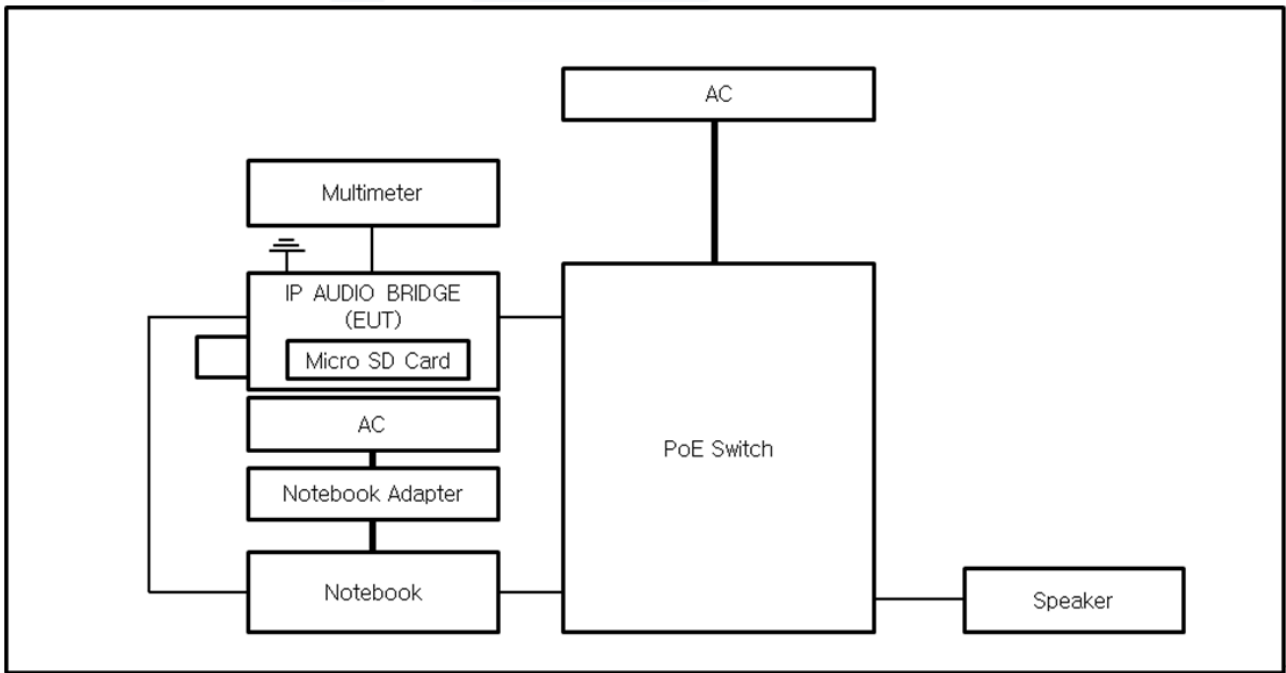


1.8 Configuration

■ DC 24 V Mode



■ PoE Mode





1.9 Remarks when standards applied

In PoE mode, the LAN port operates as a power-related port, so power-related tests were excluded.







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:

☒ **47 CFR Part 15, Subpart B**

☐ CISPR 22:2009 +A1:2010

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B

☒ **IC Regulation ICES-003 Issue 7**

☐ CAN/CSA-CISPR 32:17

☐ Class A

☐ Class B

☒ ANSI C63.4a-2017

☒ Class A

☐ Class B





2.1 Conducted Emissions at Mains Power Ports

Test Date

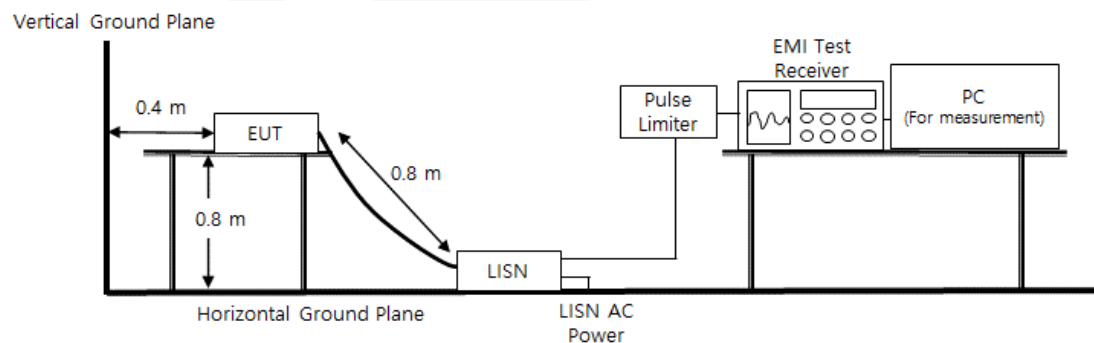
Apr. 23, 2024

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 |

Diagram of test setup



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 Radiated Electric Field Emissions(Below 1 GHz)

Test Date

Apr. 23, 2024

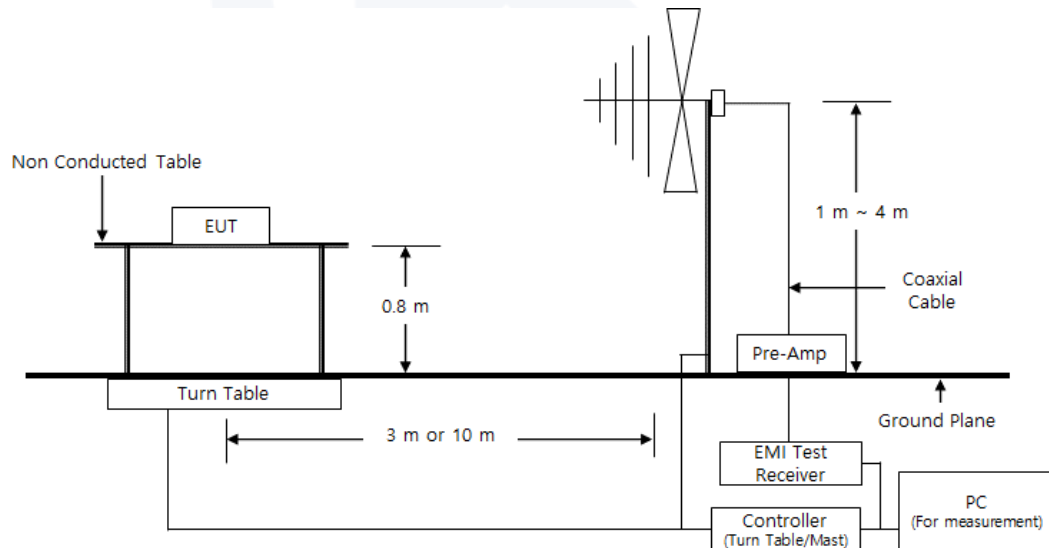
Test Location

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

Test Equipment

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|-------------------------------------|--------------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W | EP5/RE | TOYO Corporation | 6.0.0 | - |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESU26 | R & S | 100551 | 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 |

Diagram of test setup





Test Conditions

Temperature: $(22,8 \pm 0,3) ^\circ\text{C}$
Relative Humidity: $(45,5 \pm 0,3) \% \text{ R.H.}$

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.





2.3 Radiated Electric Field Emissions(Above 1 GHz)

Test Date

Apr. 23, 2024

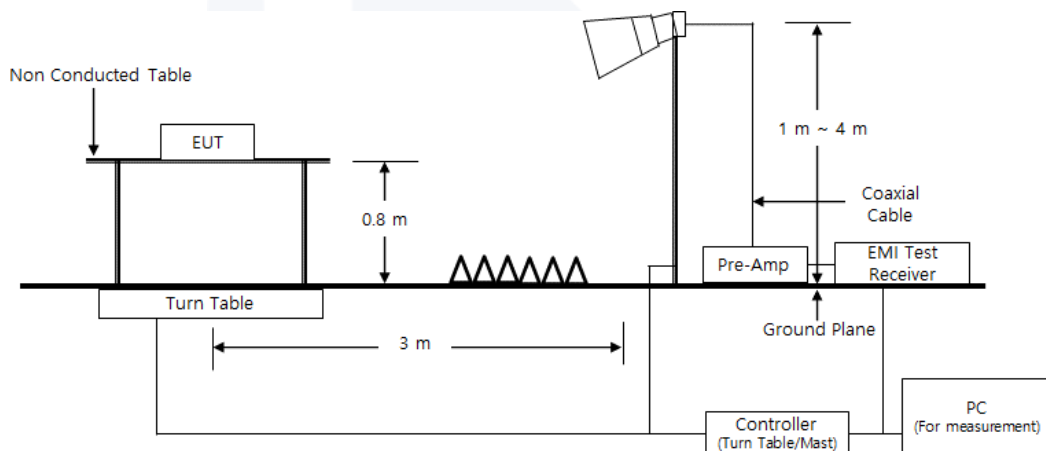
Test Location

SEMI ANECHOIC CHAMBER #5

Test Equipment

| Used | Description | Model Number | Manufacturer | Serial Number | Cal. Due |
|-------------------------------------|-------------------|--------------|------------------|---------------|--------------|
| <input checked="" type="checkbox"/> | EMI Test S/W | ES10/RE | TOYO Corporation | 2022.01.000 | - |
| <input checked="" type="checkbox"/> | EMI TEST RECEIVER | ESU26 | Rohde & Schwarz | 100552 | 02, 13, 2025 |
| <input checked="" type="checkbox"/> | HORN ANTENNA | BBHA 9120D | SCHWARZBECK | 9120D-1802 | 11, 03, 2024 |
| <input checked="" type="checkbox"/> | PREAMPLIFIER | 8449B | HP | 3008A00538 | 05, 31, 2024 |
| <input checked="" type="checkbox"/> | ATTENUATOR | 8491B | HP | 23094 | 02, 13, 2025 |

Diagram of test setup





Test Conditions

Temperature: (23,3 ± 0,2) °C
Relative Humidity: (45,1 ± 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.
- The Average of the test data is the cispr average result.



APPENDIX A – TEST DATA

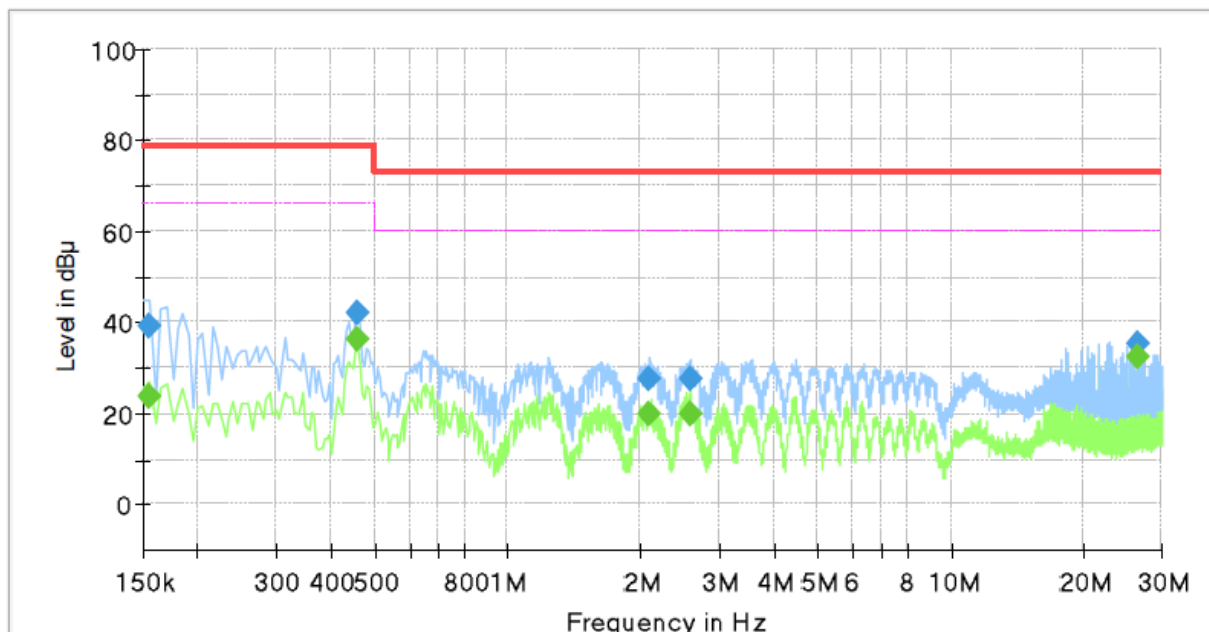
Conducted Emissions at Mains Power Ports

■ DC 24 V Mode

HOT LINE

Common Information

| | |
|-------------------|--------------------|
| Test Description: | Conducted Emission |
| Model No.: | SPA-B1000 |
| Phase: | H |
| Mode: | DC 24 V |
| Operator Name: | KES |



Final Result

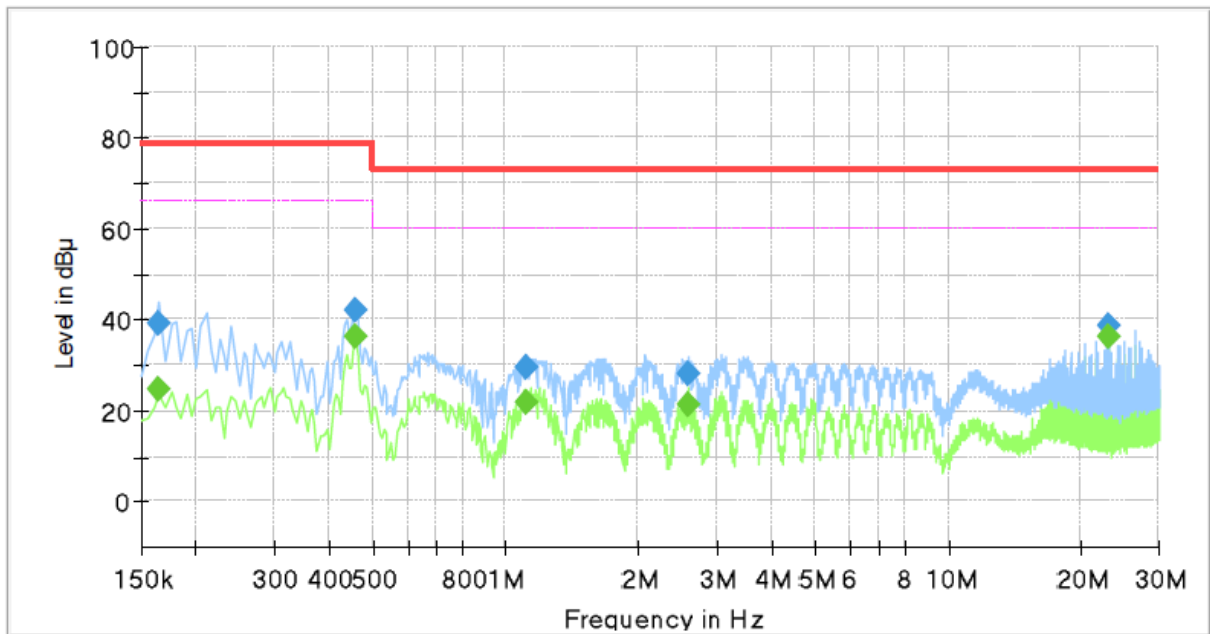
| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.155000 | --- | 24.00 | 66.00 | 42.00 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.155000 | 39.09 | --- | 79.00 | 39.91 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.460000 | --- | 36.25 | 66.00 | 29.75 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.460000 | 42.07 | --- | 79.00 | 36.93 | 1000.0 | 9.000 | L1 | 19.4 |
| 2.095000 | --- | 19.90 | 60.00 | 40.10 | 1000.0 | 9.000 | L1 | 19.5 |
| 2.095000 | 27.86 | --- | 73.00 | 45.14 | 1000.0 | 9.000 | L1 | 19.5 |
| 2.575000 | --- | 19.91 | 60.00 | 40.09 | 1000.0 | 9.000 | L1 | 19.6 |
| 2.575000 | 27.78 | --- | 73.00 | 45.22 | 1000.0 | 9.000 | L1 | 19.6 |
| 26.610000 | --- | 32.38 | 60.00 | 27.62 | 1000.0 | 9.000 | L1 | 20.4 |
| 26.610000 | 35.26 | --- | 73.00 | 37.74 | 1000.0 | 9.000 | L1 | 20.4 |



NEUTRAL LINE

Common Information

Test Description: Conducted Emission
Model No.: SPA-B1000
Phase: N
Mode: DC 24 V
Operator Name: KES

**Final Result**

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.165000 | --- | 24.56 | 66.00 | 41.44 | 1000.0 | 9.000 | N | 19.3 |
| 0.165000 | 39.34 | --- | 79.00 | 39.66 | 1000.0 | 9.000 | N | 19.3 |
| 0.460000 | --- | 36.40 | 66.00 | 29.60 | 1000.0 | 9.000 | N | 19.4 |
| 0.460000 | 42.05 | --- | 79.00 | 36.95 | 1000.0 | 9.000 | N | 19.4 |
| 1.115000 | --- | 21.90 | 60.00 | 38.10 | 1000.0 | 9.000 | N | 19.5 |
| 1.115000 | 29.51 | --- | 73.00 | 43.49 | 1000.0 | 9.000 | N | 19.5 |
| 2.590000 | --- | 21.49 | 60.00 | 38.51 | 1000.0 | 9.000 | N | 19.6 |
| 2.590000 | 28.25 | --- | 73.00 | 44.75 | 1000.0 | 9.000 | N | 19.6 |
| 23.130000 | --- | 36.51 | 60.00 | 23.49 | 1000.0 | 9.000 | N | 20.3 |
| 23.130000 | 38.73 | --- | 73.00 | 34.27 | 1000.0 | 9.000 | N | 20.3 |

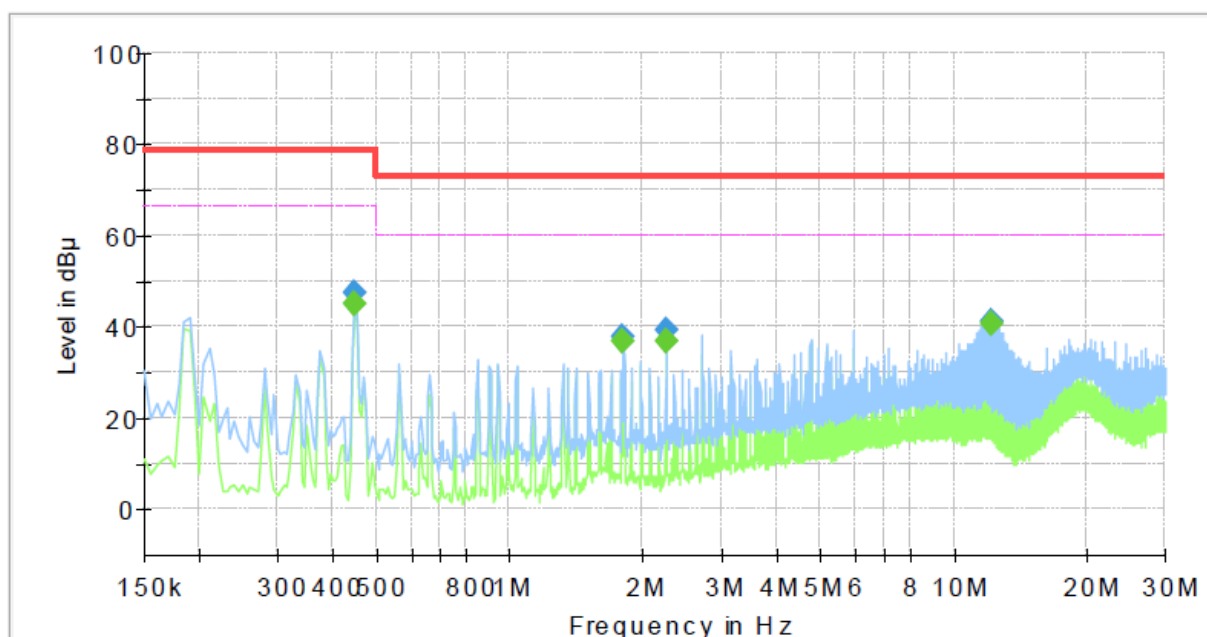


■ PoE Mode

HOT LINE

Common Information

Test Description: Conducted Emission
Model No.: SPA-B1000
Phase: H
Mode: PoE
Operator Name: KES



Final Result

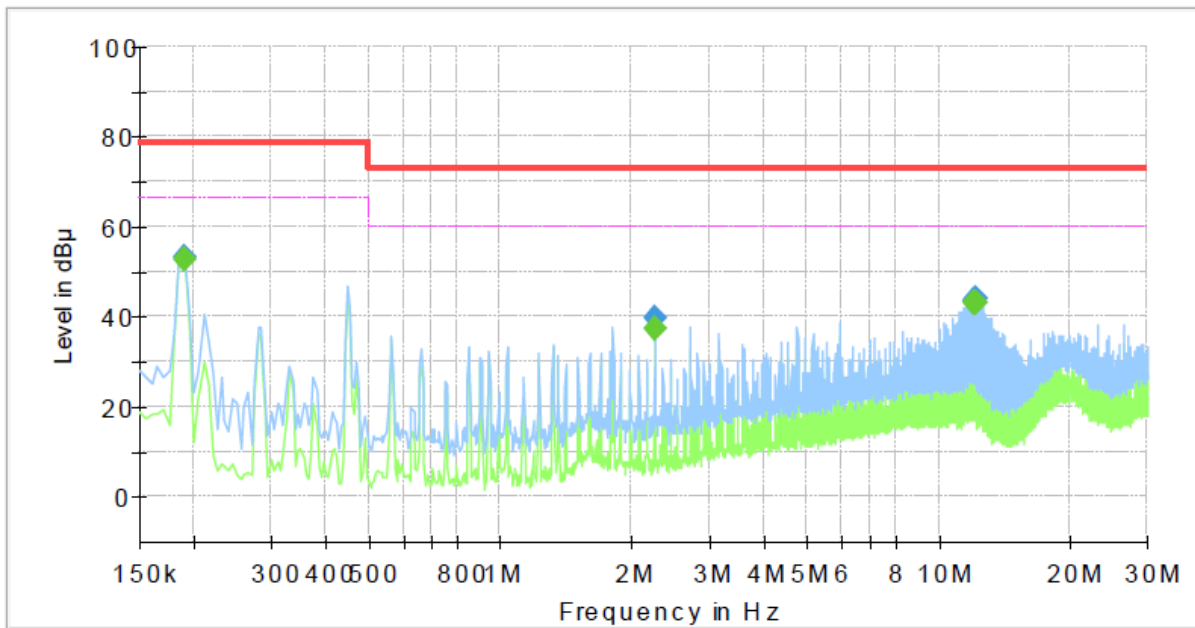
| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.450000 | --- | 45.05 | 66.00 | 20.95 | 1000.0 | 9.000 | L1 | 19.4 |
| 0.450000 | 47.23 | --- | 79.00 | 31.77 | 1000.0 | 9.000 | L1 | 19.4 |
| 1.805000 | --- | 36.88 | 60.00 | 23.12 | 1000.0 | 9.000 | L1 | 19.5 |
| 1.805000 | 37.57 | --- | 73.00 | 35.43 | 1000.0 | 9.000 | L1 | 19.5 |
| 2.255000 | --- | 36.88 | 60.00 | 23.12 | 1000.0 | 9.000 | L1 | 19.5 |
| 2.255000 | 39.23 | --- | 73.00 | 33.77 | 1000.0 | 9.000 | L1 | 19.5 |
| 12.220000 | --- | 40.72 | 60.00 | 19.28 | 1000.0 | 9.000 | L1 | 20.0 |
| 12.220000 | 41.35 | --- | 73.00 | 31.65 | 1000.0 | 9.000 | L1 | 20.0 |



NEUTRAL LINE

Common Information

Test Description: Conducted Emission
Model No.: SPA-B1000
Phase: N
Mode: PoE
Operator Name: KES

**Final Result**

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|------------|
| 0.190000 | --- | 52.78 | 66.00 | 13.22 | 1000.0 | 9.000 | N | 19.3 |
| 0.190000 | 53.13 | --- | 79.00 | 25.87 | 1000.0 | 9.000 | N | 19.3 |
| 2.255000 | --- | 37.31 | 60.00 | 22.69 | 1000.0 | 9.000 | N | 19.5 |
| 2.255000 | 39.57 | --- | 73.00 | 33.43 | 1000.0 | 9.000 | N | 19.5 |
| 12.125000 | --- | 43.01 | 60.00 | 16.99 | 1000.0 | 9.000 | N | 20.0 |
| 12.125000 | 43.67 | --- | 73.00 | 29.33 | 1000.0 | 9.000 | N | 20.0 |
| 12.220000 | --- | 43.19 | 60.00 | 16.81 | 1000.0 | 9.000 | N | 20.0 |
| 12.220000 | 43.82 | --- | 73.00 | 29.18 | 1000.0 | 9.000 | N | 20.0 |

◆ Calculation

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

QuasiPeak / CAverage : The Final Value

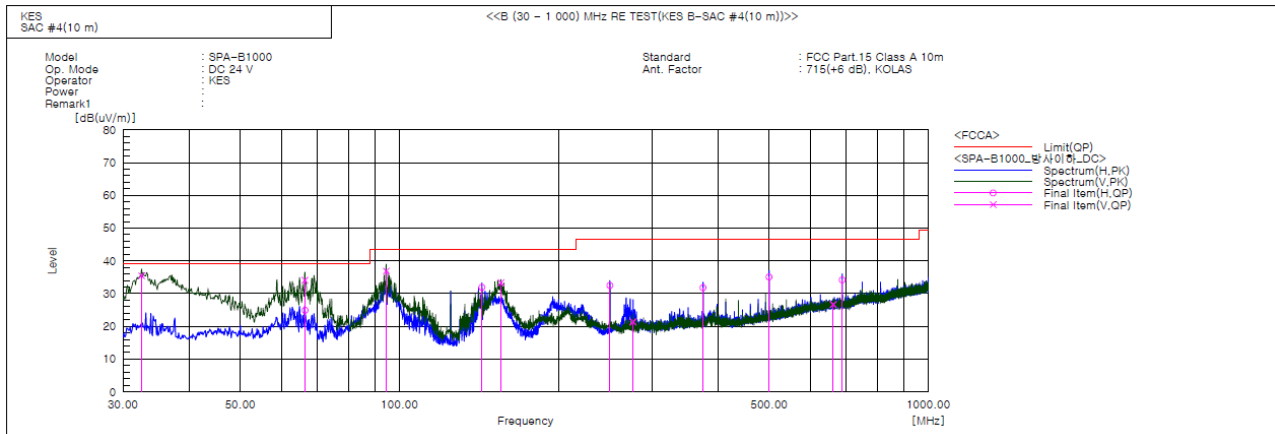
Reading Value : Not shown in the table.

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

**Radiated Electric Field Emissions(Below 1 GHz)**

- 47 CFR Part 15, Subpart B

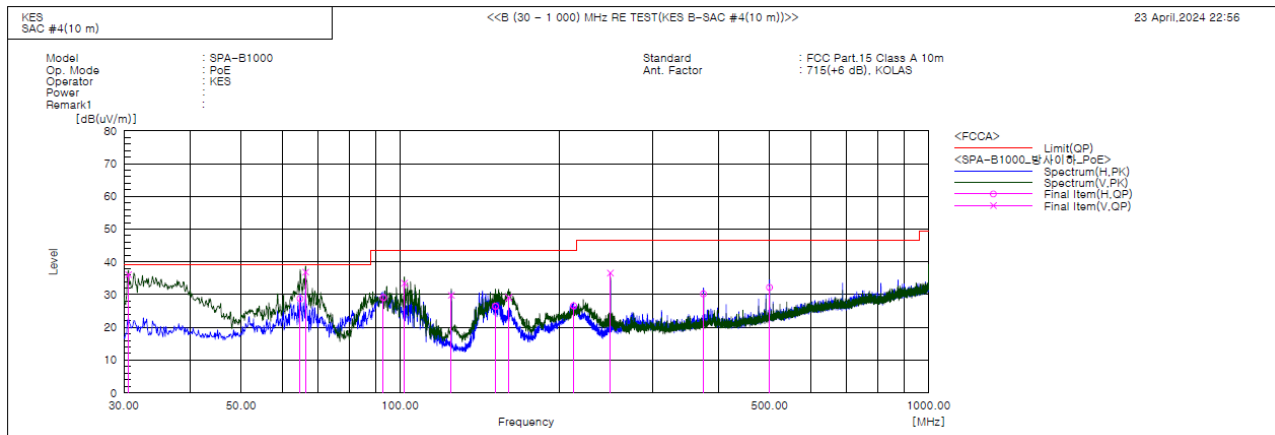
■ DC 24 V Mode

**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 | 32.546 | V | 60.8 | -25.3 | 35.5 | 39.0 | 3.5 | 100.0 | 83.0 | |
| 2 | 66.254 | V | 57.8 | -23.7 | 34.1 | 39.0 | 4.9 | 100.0 | 358.0 | |
| 3 | 66.330 | H | 48.6 | -23.7 | 24.9 | 39.0 | 14.1 | 396.0 | 199.0 | |
| 4 | 94.384 | V | 59.8 | -22.9 | 36.9 | 43.5 | 6.6 | 100.0 | 311.0 | |
| 5 | 143.248 | H | 57.1 | -25.2 | 31.9 | 43.5 | 11.6 | 400.0 | 93.0 | |
| 6 | 155.615 | V | 58.4 | -25.0 | 33.4 | 43.5 | 10.1 | 102.0 | 337.0 | |
| 7 | 249.948 | H | 51.3 | -18.8 | 32.5 | 46.5 | 14.0 | 400.0 | 116.0 | |
| 8 | 276.501 | V | 39.7 | -18.3 | 21.4 | 46.5 | 25.1 | 107.0 | 93.0 | |
| 9 | 374.956 | H | 46.2 | -14.4 | 31.8 | 46.5 | 14.7 | 305.0 | 154.0 | |
| 10 | 500.086 | H | 46.2 | -11.1 | 35.1 | 46.5 | 11.4 | 300.0 | 47.0 | |
| 11 | 660.621 | V | 33.8 | -7.1 | 26.7 | 46.5 | 19.8 | 100.0 | 15.0 | |
| 12 | 687.539 | H | 41.0 | -6.8 | 34.2 | 46.5 | 12.3 | 400.0 | 101.0 | |



■ PoE Mode



Final Result

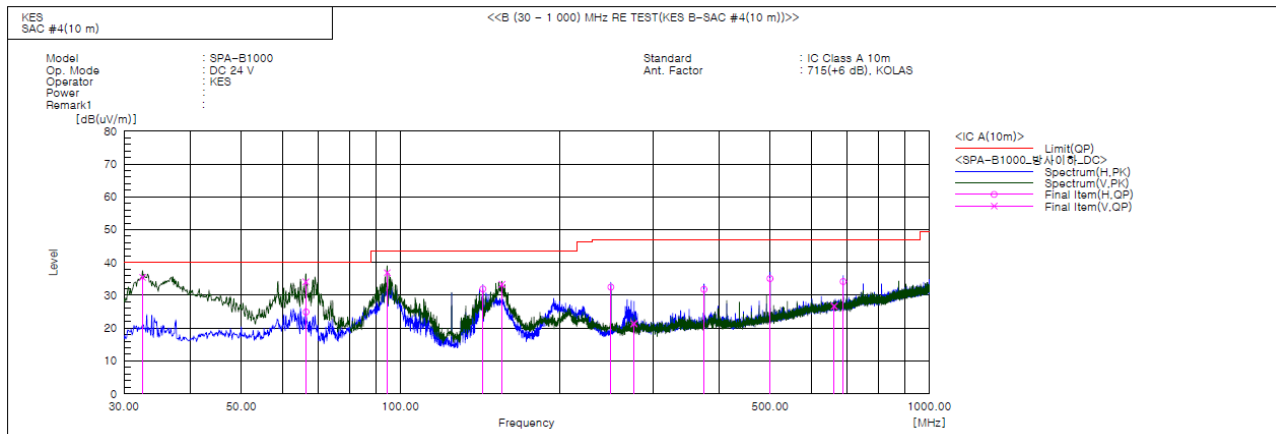
| No. | Frequency [MHz] | (P) | Reading QP [dB(uV)] | c.f [dB(1/m)] | Result QP [dB(uV/m)] | Limit QP [dB(uV/m)] | Margin QP [dB] | Height [cm] | Angle [deg] | Remark |
|-----|--------------------|-----|---------------------------|------------------|----------------------------|---------------------------|----------------------|----------------|----------------|--------|
| 1 | 30.606 | V | 61.6 | -25.5 | 36.1 | 39.0 | 2.9 | 100.0 | 216.0 | |
| 2 | 64.678 | H | 52.1 | -23.3 | 28.8 | 39.0 | 10.2 | 300.0 | 29.0 | |
| 3 | 66.254 | V | 60.6 | -23.7 | 36.9 | 39.0 | 2.1 | 109.0 | 134.0 | |
| 4 | 92.929 | H | 52.3 | -23.2 | 29.1 | 43.5 | 14.4 | 395.0 | 358.0 | |
| 5 | 101.901 | V | 55.9 | -22.4 | 33.5 | 43.5 | 10.0 | 100.0 | 351.0 | |
| 6 | 124.939 | V | 54.4 | -24.6 | 29.8 | 43.5 | 13.7 | 107.0 | 325.0 | |
| 7 | 151.493 | H | 51.5 | -25.1 | 26.4 | 43.5 | 17.1 | 400.0 | 78.0 | |
| 8 | 160.465 | V | 53.9 | -24.8 | 29.1 | 43.5 | 14.4 | 100.0 | 343.0 | |
| 9 | 212.966 | H | 46.4 | -19.8 | 26.6 | 43.5 | 16.9 | 300.0 | 261.0 | |
| 10 | 249.948 | V | 55.4 | -18.8 | 36.6 | 46.5 | 9.9 | 199.0 | 89.0 | |
| 11 | 374.956 | H | 44.6 | -14.4 | 30.2 | 46.5 | 16.3 | 306.0 | 7.0 | |
| 12 | 500.086 | H | 43.3 | -11.1 | 32.2 | 46.5 | 14.3 | 300.0 | 51.0 | |



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■ DC 24 V Mode

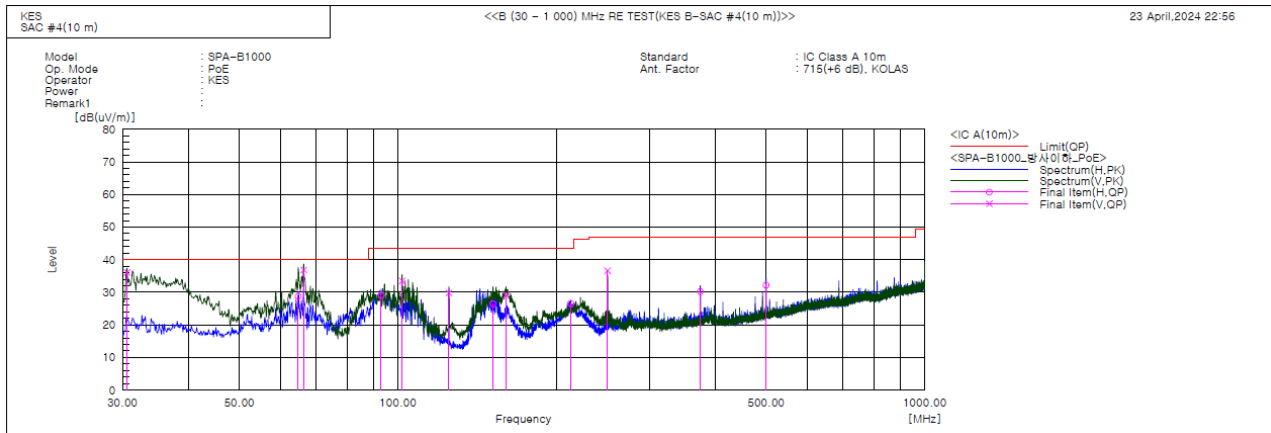


Final Result

| 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 | 60.8 | -25.3 | 35.5 | 40.0 | 4.5 | 100.0 | 83.0 | |
| 2 | 66.254 | V | 57.8 | -23.7 | 34.1 | 40.0 | 5.9 | 100.0 | 358.0 | |
| 3 | 66.330 | H | 48.6 | -23.7 | 24.9 | 40.0 | 15.1 | 396.0 | 199.0 | |
| 4 | 94.384 | V | 59.8 | -22.9 | 36.9 | 43.5 | 6.6 | 100.0 | 311.0 | |
| 5 | 143.248 | H | 57.1 | -25.2 | 31.9 | 43.5 | 11.6 | 400.0 | 93.0 | |
| 6 | 155.615 | V | 58.4 | -25.0 | 33.4 | 43.5 | 10.1 | 102.0 | 337.0 | |
| 7 | 249.948 | H | 51.3 | -18.8 | 32.5 | 47.0 | 14.5 | 400.0 | 116.0 | |
| 8 | 276.501 | V | 39.7 | -18.3 | 21.4 | 47.0 | 25.6 | 107.0 | 93.0 | |
| 9 | 374.956 | H | 46.2 | -14.4 | 31.8 | 47.0 | 15.2 | 305.0 | 154.0 | |
| 10 | 500.086 | H | 46.2 | -11.1 | 35.1 | 47.0 | 11.9 | 300.0 | 47.0 | |
| 11 | 660.621 | V | 33.8 | -7.1 | 26.7 | 47.0 | 20.3 | 100.0 | 15.0 | |
| 12 | 687.539 | H | 41.0 | -6.8 | 34.2 | 47.0 | 12.8 | 400.0 | 101.0 | |



■ 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 | 61.6 | -25.5 | 36.1 | 40.0 | 3.9 | 100.0 | 216.0 | |
| 2 | 64.678 | H | 52.1 | -23.3 | 28.8 | 40.0 | 11.2 | 300.0 | 29.0 | |
| 3 | 66.254 | V | 60.6 | -23.7 | 36.9 | 40.0 | 3.1 | 109.0 | 134.0 | |
| 4 | 92.929 | H | 52.3 | -23.2 | 29.1 | 43.5 | 14.4 | 395.0 | 358.0 | |
| 5 | 101.901 | V | 55.9 | -22.4 | 33.5 | 43.5 | 10.0 | 100.0 | 351.0 | |
| 6 | 124.939 | V | 54.4 | -24.6 | 29.8 | 43.5 | 13.7 | 107.0 | 325.0 | |
| 7 | 151.493 | H | 51.5 | -25.1 | 26.4 | 43.5 | 17.1 | 400.0 | 78.0 | |
| 8 | 160.465 | V | 53.9 | -24.8 | 29.1 | 43.5 | 14.4 | 100.0 | 343.0 | |
| 9 | 212.966 | H | 46.4 | -19.8 | 26.6 | 43.5 | 16.9 | 300.0 | 261.0 | |
| 10 | 249.948 | V | 55.4 | -18.8 | 36.6 | 47.0 | 10.4 | 199.0 | 89.0 | |
| 11 | 374.956 | H | 44.6 | -14.4 | 30.2 | 47.0 | 16.8 | 306.0 | 7.0 | |
| 12 | 500.086 | H | 43.3 | -11.1 | 32.2 | 47.0 | 14.8 | 300.0 | 51.0 | |

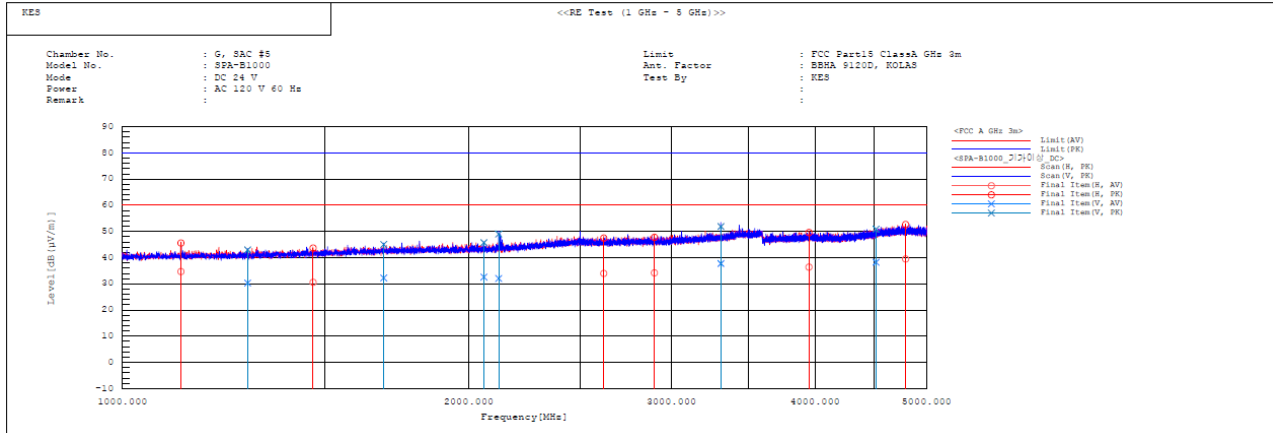
◆ Calculation

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

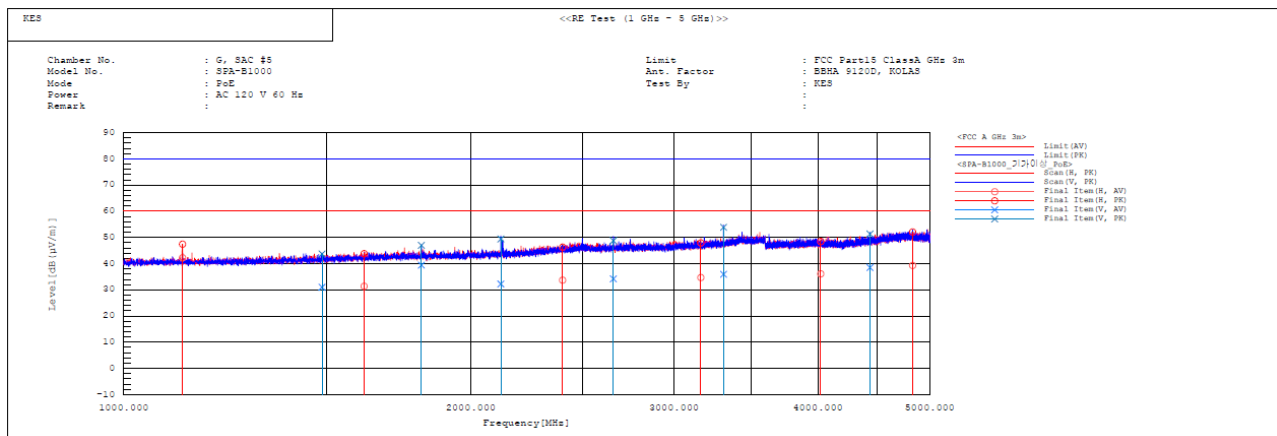
Limit(QP) : Limit value, c.f : (ANT Factor + Cable Loss - Preamp Factor), Margin: Margin value

**Radiated Electric Field Emissions(Above 1 GHz)****■ DC 24 V Mode****Final Result**

| No. | Frequency [MHz] | Pol | Reading AV [dB (μV)] | Reading PK [dB (μV)] | c.f. [dB (1/m)] | Result AV [dB (μV/m)] | Result PK [dB (μV/m)] | Limit AV [dB (μV/m)] | Limit PK [dB (μV/m)] | Margin AV [dB] | Margin PK [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|----------------------|----------------------|-----------------|-----------------------|-----------------------|----------------------|----------------------|----------------|----------------|-------------|-------------|--------|
| 1 | 1124.410 | H | 35.6 | 46.5 | -0.9 | 34.7 | 45.6 | 60.0 | 80.0 | 25.3 | 34.4 | 400.0 | 188.3 | |
| 2 | 1294.800 | V | 30.3 | 43.0 | 0.0 | 30.3 | 43.0 | 60.0 | 80.0 | 29.7 | 37.0 | 100.0 | 24.3 | |
| 3 | 1464.550 | H | 29.7 | 42.8 | 0.9 | 30.6 | 43.7 | 60.0 | 80.0 | 29.4 | 36.3 | 305.0 | 128.1 | |
| 4 | 1696.850 | V | 30.4 | 43.2 | 1.8 | 32.2 | 45.0 | 60.0 | 80.0 | 27.8 | 35.0 | 100.0 | 53.8 | |
| 5 | 2062.000 | V | 29.1 | 42.2 | 3.5 | 32.6 | 45.7 | 60.0 | 80.0 | 27.4 | 34.3 | 106.0 | 6.6 | |
| 6 | 2123.296 | V | 28.4 | 45.3 | 3.7 | 32.1 | 49.0 | 60.0 | 80.0 | 27.9 | 31.0 | 100.0 | 178.7 | |
| 7 | 2620.400 | H | 28.6 | 42.1 | 5.4 | 34.0 | 47.5 | 60.0 | 80.0 | 26.0 | 32.5 | 400.0 | 6.0 | |
| 8 | 2899.755 | H | 27.9 | 41.5 | 6.3 | 34.2 | 47.8 | 60.0 | 80.0 | 25.8 | 32.2 | 306.0 | 316.4 | |
| 9 | 3312.409 | V | 30.7 | 44.9 | 7.0 | 37.7 | 51.9 | 60.0 | 80.0 | 22.3 | 28.1 | 102.0 | 198.9 | |
| 10 | 3950.400 | H | 27.9 | 41.1 | 8.5 | 36.4 | 49.6 | 60.0 | 80.0 | 23.6 | 30.4 | 400.0 | 346.0 | |
| 11 | 4518.000 | V | 27.4 | 40.1 | 10.8 | 38.2 | 50.9 | 60.0 | 80.0 | 21.8 | 29.1 | 196.0 | 268.6 | |
| 12 | 4794.490 | H | 27.7 | 40.9 | 11.8 | 39.5 | 52.7 | 60.0 | 80.0 | 20.5 | 27.3 | 392.0 | 359.2 | |



■ PoE Mode



Final Result

| No. | Frequency [MHz] | Pol | Reading AV [dB (μV)] | Reading PK [dB (μV)] | c.f [dB (1/m)] | Result AV [dB (μV/m)] | Result PK [dB (μV/m)] | Limit AV [dB (μV/m)] | Limit PK [dB (μV/m)] | Margin AV [dB] | Margin PK [dB] | Height [cm] | Angle [deg] | Remark |
|-----|-----------------|-----|----------------------|----------------------|----------------|-----------------------|-----------------------|----------------------|----------------------|----------------|----------------|-------------|-------------|--------|
| 1 | 1124.800 | H | 43.2 | 48.3 | -0.9 | 42.3 | 47.4 | 60.0 | 80.0 | 17.7 | 32.6 | 400.0 | 359.3 | |
| 2 | 1486.000 | V | 30.0 | 42.7 | 1.0 | 31.0 | 43.7 | 60.0 | 80.0 | 29.0 | 36.3 | 100.0 | 251.1 | |
| 3 | 1616.400 | H | 29.8 | 42.2 | 1.6 | 31.4 | 43.8 | 60.0 | 80.0 | 28.6 | 36.2 | 400.0 | 274.2 | |
| 4 | 1812.000 | V | 37.1 | 44.7 | 2.3 | 39.4 | 47.0 | 60.0 | 80.0 | 20.6 | 33.0 | 100.0 | 342.9 | |
| 5 | 2123.600 | V | 28.5 | 45.7 | 3.7 | 32.2 | 49.4 | 60.0 | 80.0 | 27.8 | 30.6 | 108.0 | 161.0 | |
| 6 | 2402.400 | H | 28.7 | 41.3 | 5.0 | 33.7 | 46.3 | 60.0 | 80.0 | 26.3 | 33.7 | 302.0 | 287.2 | |
| 7 | 2658.400 | V | 28.6 | 43.2 | 5.6 | 34.2 | 48.8 | 60.0 | 80.0 | 25.8 | 31.2 | 100.0 | 214.3 | |
| 8 | 3165.600 | H | 27.9 | 41.1 | 6.8 | 34.7 | 47.9 | 60.0 | 80.0 | 25.3 | 32.1 | 296.0 | 287.2 | |
| 9 | 3312.400 | V | 29.0 | 46.9 | 7.0 | 36.0 | 53.9 | 60.0 | 80.0 | 24.0 | 26.1 | 196.0 | 194.4 | |
| 10 | 4022.400 | H | 27.3 | 39.7 | 8.8 | 36.1 | 48.5 | 60.0 | 80.0 | 23.9 | 31.5 | 300.0 | 69.1 | |
| 11 | 4437.600 | V | 28.1 | 40.9 | 10.4 | 38.5 | 51.3 | 60.0 | 80.0 | 21.5 | 28.7 | 105.0 | 186.0 | |
| 12 | 4831.600 | H | 27.4 | 40.2 | 11.9 | 39.3 | 52.1 | 60.0 | 80.0 | 20.7 | 27.9 | 400.0 | 359.3 | |

◆ 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



Test Setup Photos and Configuration

Conducted Emissions at Mains Power Ports

■ DC 24 V Mode





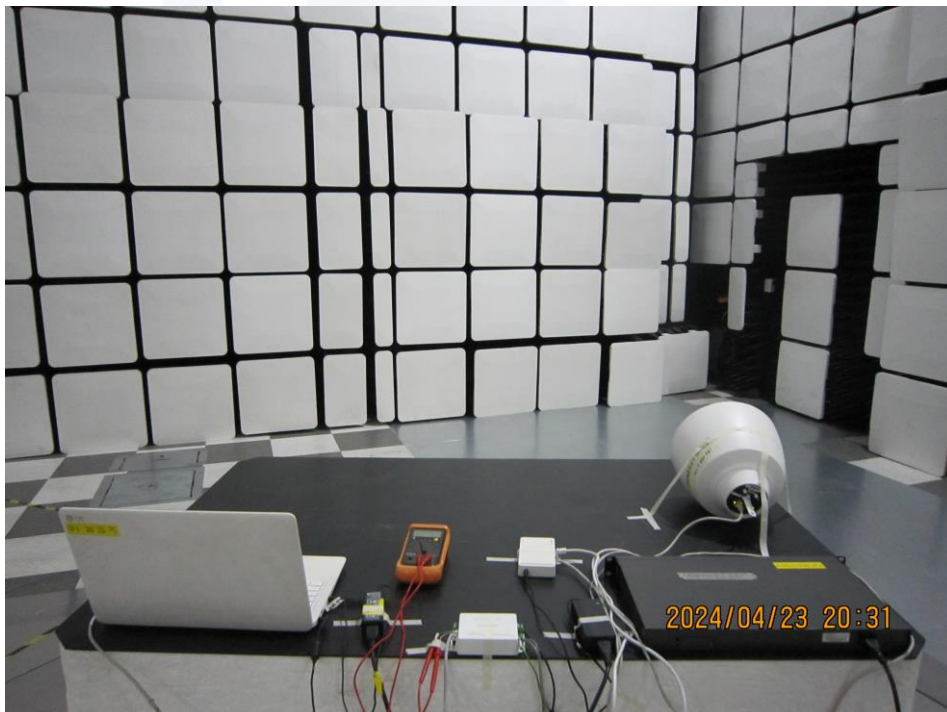
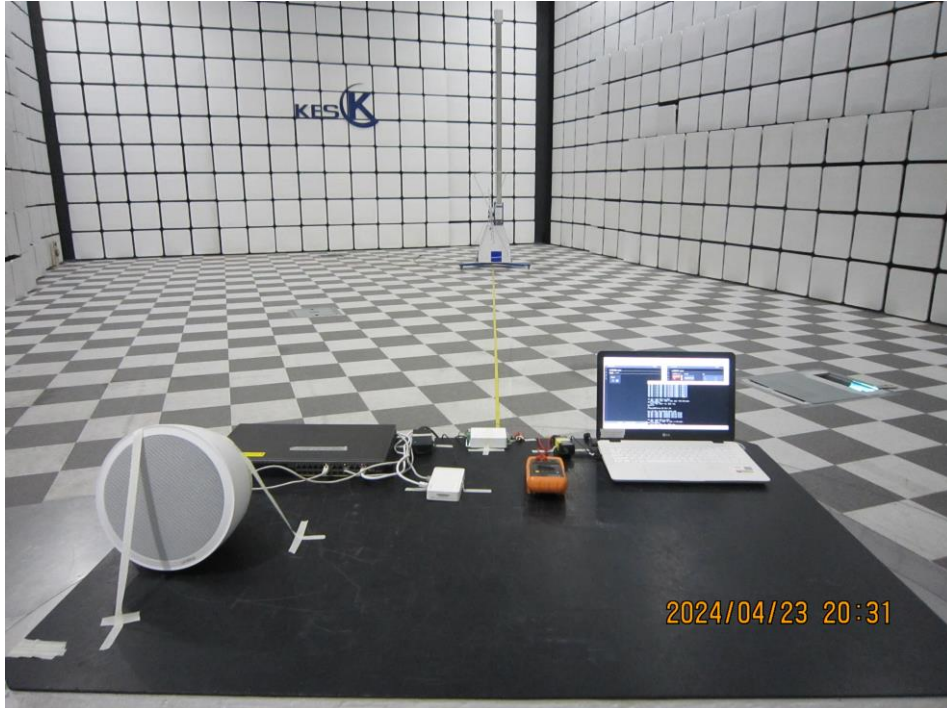
■ PoE Mode





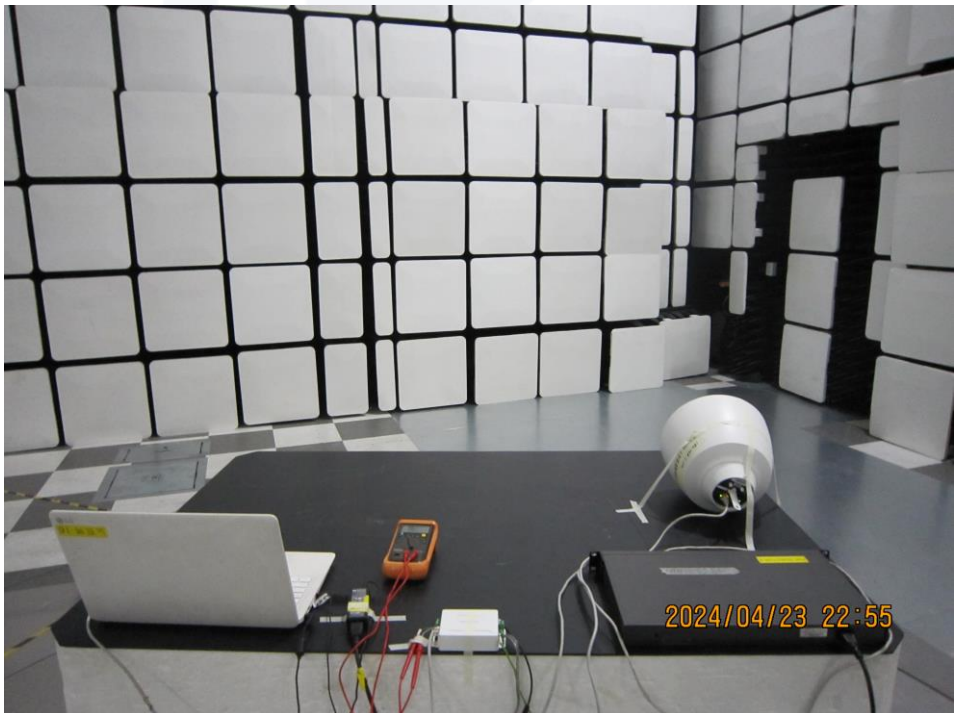
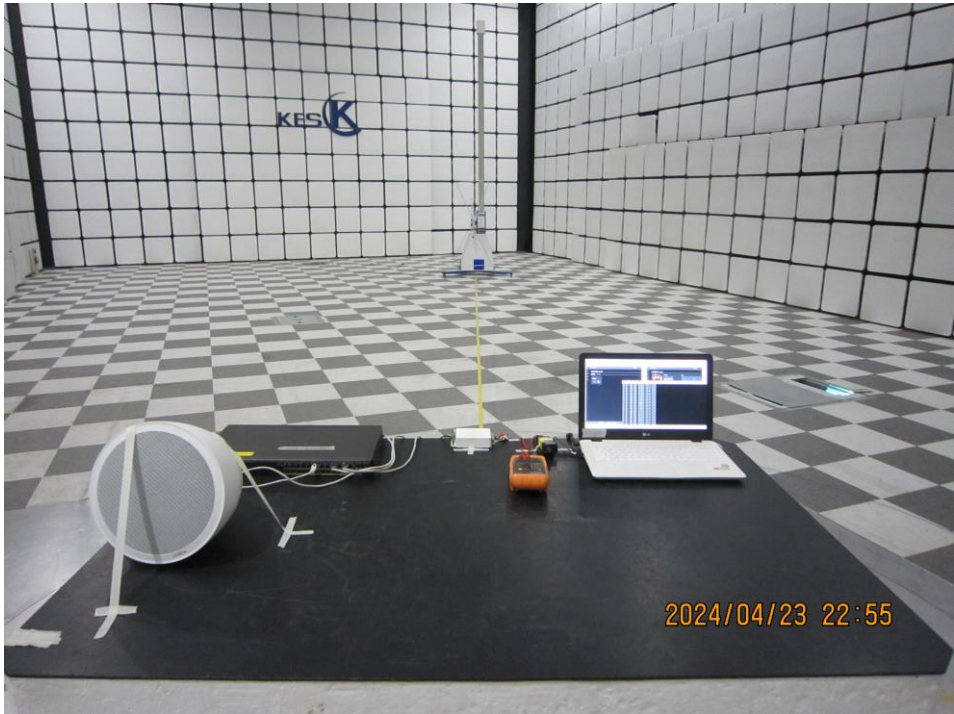
Radiated Electric Field Emissions(Below 1 GHz)

■ DC 24 V Mode





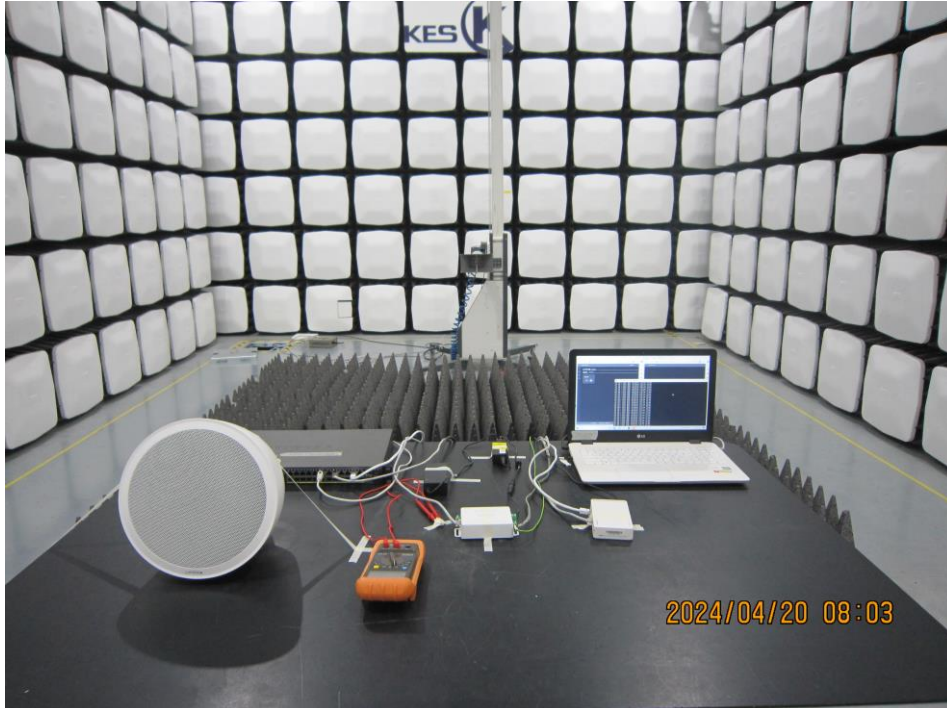
PoE Mode





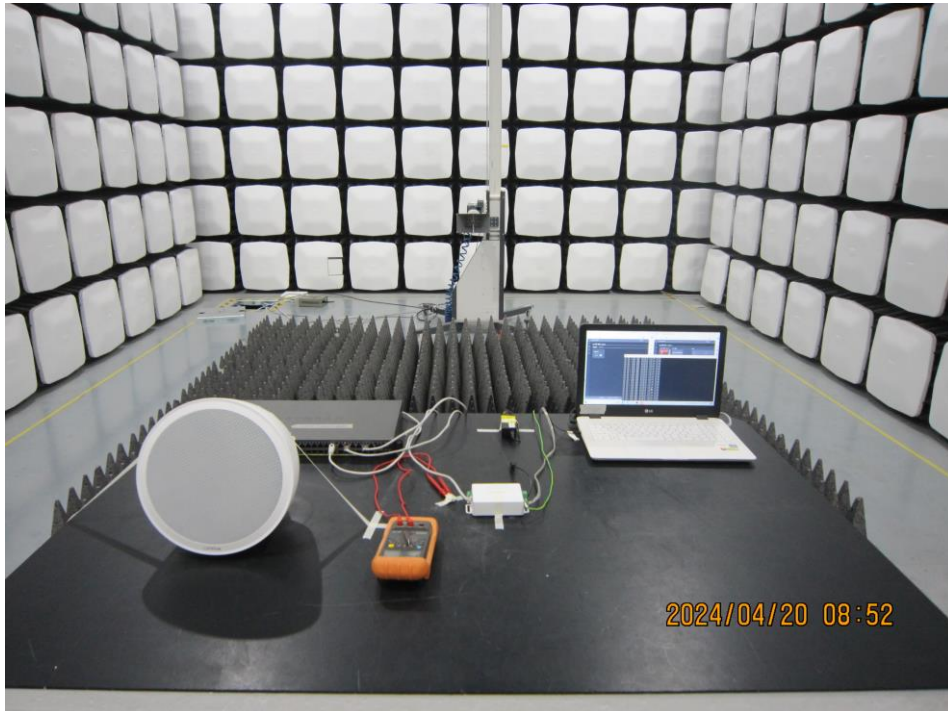
Radiated Electric Field Emissions(Above 1 GHz)

■ DC 24 V Mode





■ PoE Mode





EUT External Photographs

(Top)



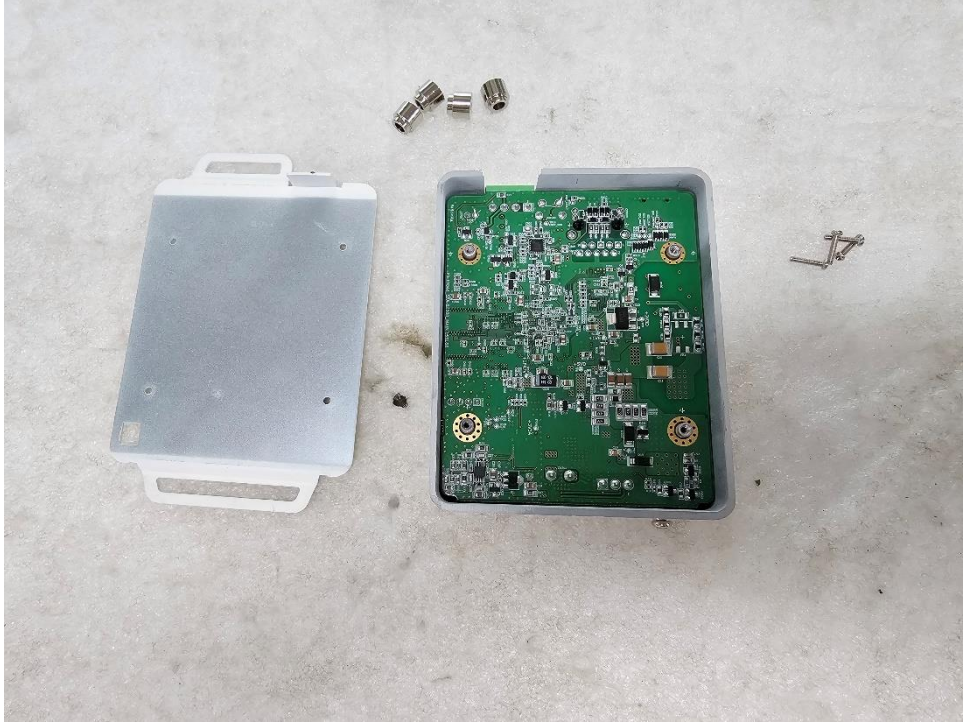
(Bottom)





EUT Internal Photographs

(Internal View)



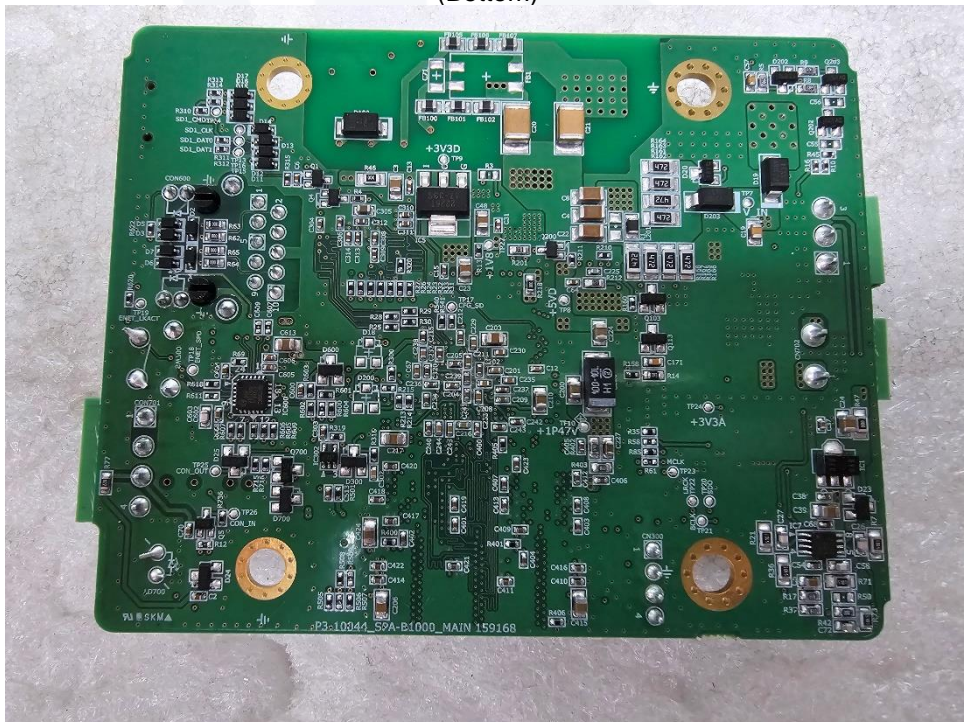


EUT Internal View – Board

(Top)



(Bottom)





Label Photographs

FCC Label



IP AUDIO BRIDGE

SPA-B1000

IC Label

CAN ICES-003(A) / NMB-003(A)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

(1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.