# FCC CERTIFICATION TEST REPORT

| | | |
|---|---|---|
| **Test report No.** | : | TREFCC23-0013 |
| **Applicant** | : | RIFATRON CO.,LTD. |
| **Address** | : | #612, RIFATRON, 108, Gassan Digital 2-ro<br>Geumcheon-gu, Seoul, 08506, Korea |
| **Manufacturer** | : | RIFATRON CO.,LTD. |
| **Address** | | #612, RIFATRON, 108, Gassan Digital 2-ro<br>Geumcheon-gu, Seoul, 08506, Korea |
| **Type of equipment** | : | DVR |
| **Model name** | : | NX20-508KRS4 |
| **FCC ID** | : | 2A96M-508KRS4 |
| **Variant model name** | : | Not applicable |
| **Date of incoming** | : | January 25, 2023 |
| **Date of test** | : | January 30 ~ February 01, 2023 |
| **Date of issue** | : | February 14, 2023 |
| **Test standards** | : | ANSI C 63.4-2014<br>47 CFR Part 15 Subpart B |
| **Type of device** | : | Class A digital devices |
| **Test Result** | : | ☒ Complied ☐ Not Complied |

**Summary**

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose. This test report shall not be reproduced except in full, without the written approval of Lab-T, Inc.

| **Prepared by** | **Approved by** |
|---|---|
| SeungHwan Lee / EMC test engineer | Cheol-Ho, Lee / Technical manager |

If this test report is required to confirmation of authenticity, please contact to info@lab-t.net
This test report is not related to KOLAS.

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# 1. Revision history

| Issued report No. | Version | Issued date | Revision |
|---|---|---|---|
| TREFCC23-0013 | Rev. 00 | February 14 , 2023 | Original |

# 2. Information of test laboratory

| | |
|---|---|
| **Corporate name** | Lab-T, Inc. |
| **Representative** | Duke (Jongyoung) Kim |
| **Address** | 2182-42, Baegok-daero, Mohyeon-eup, Cheoin-gu, Yongin-si |
| | Gyeonggi-do 17036, Korea (Republic of) |
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| | |
|---|---|
| **Test Site** | Building L, A, T |
| **Address** | 2182-40, 2182-44, 2182-42 Baegok-daero, Mohyeon-eup, Cheoin-gu |
| | Yongin-si, Gyeonggi-do 17036, Korea (Republic of) |

* Lab-T, Inc. has been accredited / filed / authorized by the agencies listed in the following table.

| Certificate | Nation | Agency | Code | Mark |
|---|---|---|---|---|
| Accreditation | Korea | KOLAS | KT703 | |
| Site filing | USA | FCC | KR0159 | |
| | Japan | VCCI | R-14282, C-14764<br>T-12276, G-10886<br>G-10887 | |
| | Canada | Industry Canada (IC) | 22000 | |
| Certification | Korea | KC | KR0159 (RRA)<br>KC2019-1 (KATS) | |
| | EU | TUV SUD | CARAT 093449 0007 | |
| | USA | UL | 1706-E-197 | |

# 3. Applicant information

| | |
|---|---|
| **Applicant** | RIFATRON CO.,LTD. |
| **Address** | #612, RIFATRON, 108, Gassan Digital 2-ro<br>Geumcheon-gu, Seoul, 08506, Korea |

| | |
|---|---|
| **Manufacturer** | RIFATRON CO.,LTD. |
| **Address** | #612, RIFATRON, 108, Gassan Digital 2-ro<br>Geumcheon-gu, Seoul, 08506, Korea |

# 4. Description of EUT (Equipment under test)

## 4.1 Product description

| | |
|---|---|
| **Type of EUT** | DVR |
| **Model name** | NX20-508KRS4 |

## 4.2 Product specification

| | | |
|---|---|---|
| Video<br>Video | Input | 8 BNC |
| | Input Resolution | 4 K (8 MP), 5 MP, 4 MP, 3 MP, 2 MP, 960 H |
| | Output | 1 HDMI, 1 VGA, 1 BNC |
| | Output Resolution | UHD, QHD, FHD, SXGA, XGA |
| Recording | Speed | 2 MP : 30 fps/ch<br>3 MP, 4 MP : 15 fps/ch<br>5 MP : 10 fps/ch<br>4 K (8 MP) : 8 fps/ch |
| | Compression | H.265, H.264 |
| | Resolution | 4 K (8 MP), 5 MP, 4 MP, 3 MP, 2 MP, 960 H |
| Playback | Speed | 2 MP : 208 fps<br>3 MP : 146 fps<br>4 MP : 117 fps<br>5 MP : 86 fps<br>4 K : 52 fps |
| | Resolution | 4 K (8 MP), 5 MP, 4 MP, 3 MP, 2 MP, 960 H |
| Audio | Input | 8 RCA |
| | Output | 1 HDMI, 1 RCA |
| Interface | Sensor In / Out | 8 / 1 - NC / NO |
| | USB | - |
| | PTZ / Keyboard | RS485 - Terminal Block |
| | ATM / POS | Ethernet POS |
| Network | Interface | Ethernet 10/100/1G |
| | Compression | H.265, H.264 |
| | Speed | 8 fps (4 K), 10 fps (5 MP), 20 fps (2 MP) |
| | Resolution | Normal 2MP, REC Video Bypass Max. 4K |

| | | |
|---|---|---|
| System | OS | Embedded Linux (Built-in Flash Memory) |
| | Pre / Post-Alarm | 5 sec / 5 sec ~ 5 min |
| | Recording Mode | Continuous, Event, Schedule |
| | Data Search | Calendar, Multi Day / Time, Event, Go to Time |
| | Backup Interface | USB, Network |
| | Backup Type | Video(RMS, AVI), Capture(JPEG), Log List, Setup Data |
| | Alarm Action | Buzzer, PTZ Preset, E-mail , SPOT, Relay, Event Popup, Push |
| | User | 15 Users (Admin, User 1 ~ User 14) |
| | Netwrok Viewer | CMS, Web Viewer, App (iOS, Android), etc |
| | ONVIF | ONVIF Profile T |
| Storage | Primary | 2 HDD |
| General | Size (W x H x D) | 430mm x 270mm x 86mm (WxDxH) |
| | Weight (w/o HDD) | 3 Kg |
| | Temp / Humidity | 5 ~ 40 ℃ / 10 ~ 80 % |
| | Power Supply | 12 V / 5 A |
| | Power Consumption | 60 Watts |

## 4.3 EUT internal operating frequency

| Frequency | Description | Frequency | Description |
|---|---|---|---|
| 1 200 MHz | - | - | - |

## 4.4 Information of additional model

| Division | Model name |
|---|---|
| - | - |

## 4.5 Peripheral equipment

| Product | Model name | Serial No. | Manufacturer |
|---|---|---|---|
| DVR (EUT) | NX20-508KRS4 | - | RIFATRON CO.,LTD. / Korea |
| SWITCHING ADAPTER (EUT) | FH-SW20171205000 | - | SHENZHEN FUJIA APPLIANCE CO., LTD. / - |
| Optical Mouse (EUT) | - | - | - / China |
| Monitor1 | LVM-071W | | Vidente / Korea |
| Monitor 1 Adapter | LSE0107A1240 | - | Dongguang Lite Power 2nd Plant. / China |
| Monitor 2 | - | - | AOC / China |
| Monitor 3 | - | - | AOC / China |
| Camera | - | - | - |
| Camera Adapter | SW36-12003000-Z | - | Shenzhen Smart Power Technology Co.,Ltd / China |
| Smart Phone | LGM-V300S | - | LG Electronics / Korea |
| Multi meter | - | - | - |
| 75 ohm resistance | - | - | - |
| LAPTOP | TP00067A | - | LCFC (HeFei) ElectronicsnTechnology Co., Ltd / Chaina |
| LAPTOP ADAPTER | ADLX65NLC3A | - | CHICONY POWER TECHNOLOGY(SUZHOU) CO., LTD / Chaina |
| USB MEMORY | SDCZ48-064G | - | SanDisk / Chaina |

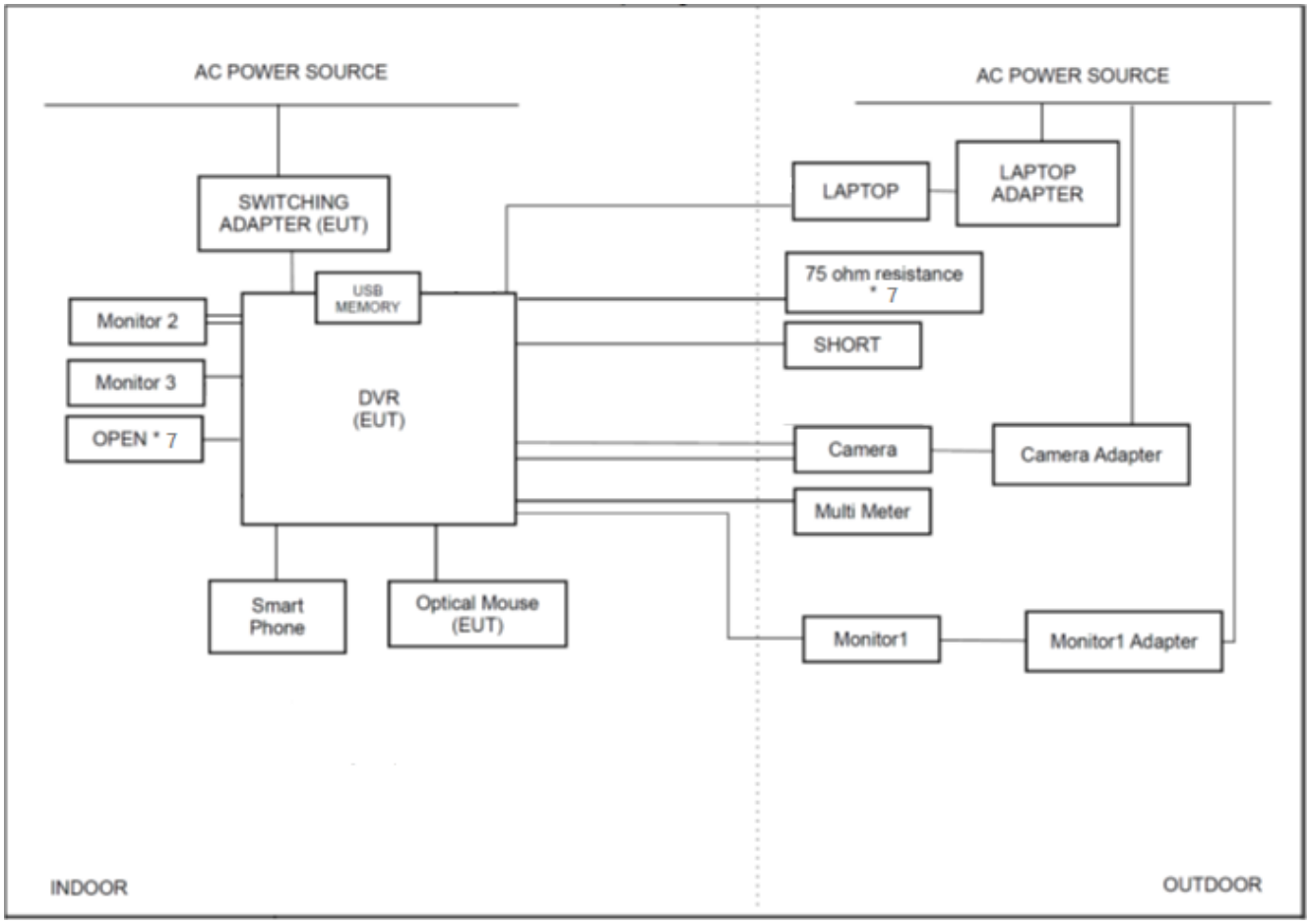
  

## 4.6 Connection cable

| Start-up device | | Connected end device | | Cable specification | |
|---|---|---|---|---|---|
| **Name** | **I/O port** | **Name** | **I/O port** | **Length (m)** | **Spec.** |
| DVR(EUT) | DC IN | SWITCHING ADAPTER (EUT) | DCOUT | 1.4 | Unshield |
| | USB | Optical Mouse (EUT) | USB | 1.2 | Unshield |
| | BNC(VIDEO IN) | Camera | BNC | 3.0 | Shield |
| | RS-485 | | RS-485 | 3.0 | Unshield |
| | BNC(VIDEO OUT) | Monitor1 | BNC | 3.0 | Shield |
| | HDMI | Monitor 2 | HDMI | 1.2 | Shield |
| | RCA(AUDIO OUT) | | AUX | 1.2 | Shield |
| | VGA | Monitor 3 | VGA | 1.2 | Shield |
| | RCA(AUDIO IN) | Smart Phone | AUX(AUDIO) | 1.2 | Shield |
| | RCA(AUDIO) | OPEN * 7 | - | 1.0 | Shield |
| | BNC(VIDEO) | 75 ohm resistance * 7 | - | 3.0 | Shield |
| | ALARM | Multi Meter | - | 3.0 | Unshield |
| | RJ-45(LAN) | LAPTOP | RJ-45(LAN) | 3.0 | Unshield |
| | SENSOR1-8 | SHORT | - | 3.0 | Unshield |
| | USB | USB MEMORY | - | - | Direct |
| SWITCHING ADAPTER (EUT) | AC IN | AC POWER SOURCE | AC OUT | 0.9 | Unshield |
| Monitor1 | DC IN | Monitor1 Adapter | DC OUT | 1.4 | Unshield |
| Camera | DC IN | Camera Adapter | DC OUT | 1.4 | Unshield |
| LAPTOP | DC IN | LAPTOP ADAPTER | DC OUT | 1.8 | Unshield |
| Monitor1 Adapter | AC IN | AC POWER SOURCE | AC OUT | 1.2 | Unshield |
| Camera Adapter | AC IN | AC POWER SOURCE | AC OUT | 1.6 | Unshield |
| LAPTOP ADAPTER | AC IN | AC POWER SOURCE | AC OUT | 1.6 | Unshield |

## 4.7 Test set-up configuration



## 4.8 EUT operating test mode(s)

- During the test, the peripheral devices (LAPTOP, LAPTOP ADAPTER, Camera, Camera Adapter, Multimeter, Monitor 1, Monitor 1 Adapter) are set to OUTDOOR and tested.
- After applying the image through the camera, monitor 1, monitor 2, monitor 3, and LAPTOP web viewer are monitored and tested.
- The equipment to be tested is tested by continuous ping test with LAPTOP.
- After inputting a 1 kHz sound source continuously played through a smartphone, the equipment to be tested checks the sound output operation through monitors 2 .
- The equipment to be tested checks RS-485 communication through PTZ operation.
- Check the buzzer after connecting the multimeter to the ALARM port.
- The equipment to be tested is checked through the system alarm after shorting to the SENSOR port.
- The equipment to be tested checks the recorded video after the test.
- The RCA (AUDIO) ports of the equipment to be tested were opened with the same port and tested.
- The BNC (VEDIO) port of the equipment to be tested was terminated and tested through 75 ohm resistance with the same port.

## 4.9 EUT modification

- Not modification.

# 5. Test standards

## 5.1 Standards

| Test item | Applied standard | Result |
|---|---|---|
| Conducted emission | 47 CFR FCC Part 15 Subpart B §15.107 (Class A) | C |
| Radiated emission (30 MHz ~ 1 000 MHz) | 47 CFR FCC Part 15 Subpart B §15.109 (Class A) | C |
| Radiated emission (Above 1 GHz) | 47 CFR FCC Part 15 Subpart B §15.109 (Class A) | C |
| * C=Comply, N/A=Not applicable | | |

* **Measurement uncertainty**

All measurements involve certain levels of uncertainties, especially in field of EMC.
The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

| Test item | | Uncertainty | Confidence level of approximately |
|---|---|---|---|
| Conducted emission | 150 ㎑ ~ 30 ㎒ | 2.36 ㏈ | Least about 95 %, k = 2 |
| Radiated emission (30 MHz ~ 1 000 MHz) | 30 ㎒ ~ 1 000 ㎒ | 4.80 ㏈ | Least about 95 %, k = 2 |
| Radiated emission (Above 1 GHz) | 1 000 ㎒ ~ 2 000 ㎒ | 5.06 ㏈ | Least about 95 %, k = 2 |

# 6. Emission test results

## 6.1 Conducted emission

| **Test standard** | **47 CFR FCC Part 15 Subpart B §15.107** |
|---|---|
| Test date | 2023.01.30 |
| Test facility | Building A Shielded room (#1) |
| Test voltage | AC 120 V, 60 Hz |
| Temperature | (19.7 ~ 21.2) °C |
| Relative humidity | (50.9 ~ 51.3) % R.H. |
| Test result | Complied |

### 6.1.1 Measurement procedure

If the EUT is table top equipment, it was placed on a non-metal table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.
Also if the EUT is floor-standing equipment, it was placed either directly on the reference ground plane or on insulating material as described in ANSI C 63.4 6.3.3.2. Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN & ISN, if any. Unused measuring port of the LISN & ISN was resistively terminated by 50 ohm terminator. The measuring port of the LISN for EUT was connected to spectrum analyzer. Using conducted emission test software, the emissions were scanned with peak detector mode. After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has quasi-peak detector and CISPR average detector. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

### 6.1.2 Test equipment used

| Equipment | Model | Manufacturer | Serial number | Next cal. date |
|---|---|---|---|---|
| EMI Test Receiver | ESR7 | R&S | 102160 | 2023.06.14 |
| PULSE LIMITER | TFL-007D | KYORITSU | 12-19-121 | 2023.06.15 |
| LISN | ENV216 | R&S | 101416 | 2023.06.14 |
| LISN | NSLK 8127 RC | Schwarzbeck | 05057 | 2023.06.14 |
| LISN Control Unit | LISN Controller | TSJ | 06660-1 | - |
| LISN Control Unit | LISN Controller | TSJ | 06660-2 | - |
| 8-WIRE ISN | ENY81 | R&S | 100359 | 2023.06.14 |
| EMI CE Software | EMI-C | TSJ | - | - |

* All test equipment used is calibrated on a regular basis.

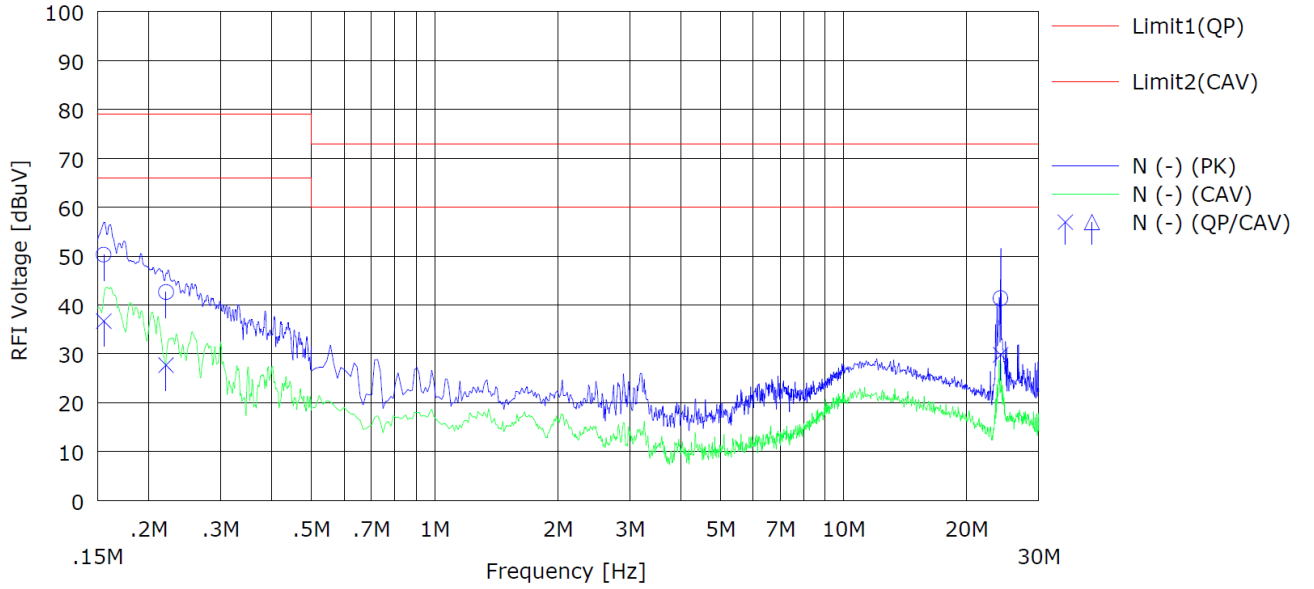
### 6.1.3 Conducted emission limits

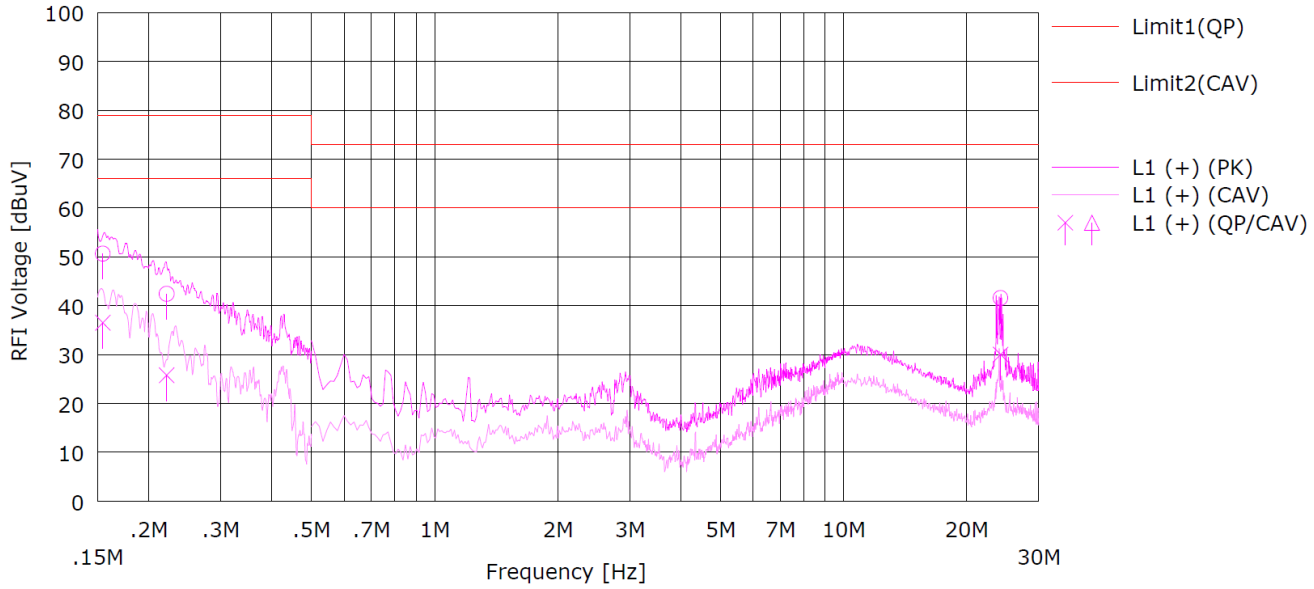
| Frequency (MHz) | Class A (dB(μV)) | | Class B (dB(μV)) | |
|---|---|---|---|---|
| | Quasi-peak | Average | Quasi-peak | Average |
| 0.15 to 0.5 | 79 | 66 | 66 ~ 56* | 56 ~ 46* |
| 0.5 to 5 | 73 | 60 | 56 | 46 |
| 5 to 30 | | | 60 | 50 |
| Remark 1: (*) The limit decreases linearly with the logarithm of frequency. | | | | |

## 6.1.4 Conducted emission limits test data

* Minimum limit margin is 28.3 dB at 0.15448 MHz. (Quasi-peak)



| NO | FREQ | READING | | C.FACTOR | RESULT | | LIMIT | | MARGIN | | PHASE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | QP | CAV | | QP | CAV | QP | CAV | QP | CAV | |
| | [MHz] | [dBuV] | [dBuV] | [dB] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | [dBuV] | |
| 1 | 0.15512 | 40.5 | 26.9 | 9.7 | 50.3 | 36.7 | 79.0 | 66.0 | 28.7 | 29.3 | N (-) |
| 2 | 0.22051 | 32.9 | 17.9 | 9.7 | 42.6 | 27.7 | 79.0 | 66.0 | 36.4 | 38.3 | N (-) |
| 3 | 24.21708 | 31.2 | 19.7 | 10.1 | 41.3 | 29.8 | 73.0 | 60.0 | 31.7 | 30.2 | N (-) |
| 4 | 0.15448 | 40.8 | 26.7 | 9.8 | 50.7 | 36.5 | 79.0 | 66.0 | 28.3 | 29.5 | L1 (+) |
| 5 | 0.22136 | 32.6 | 15.9 | 9.8 | 42.4 | 25.7 | 79.0 | 66.0 | 36.6 | 40.3 | L1 (+) |
| 6 | 24.21559 | 31.3 | 19.8 | 10.2 | 41.6 | 30.0 | 73.0 | 60.0 | 31.4 | 30.0 | L1 (+) |

* Remark: “L1”: (Line), “N”: (Neutral)
* Results [dB(μV)] = Reading [dB(μV)] + C.FACTOR [dB]
* C.FACTOR [dB] = LISN insertion Loss [dB] + Cable loss [dB] + Pulse limiter factor [dB]
* Margin [dB] =Limit [dB(μV)] - Result [dB(μV)]
* QP: Quasi-peak , CAV: CISPR Average

* ex) Measure Value[QP]
Frequency: 0.15512 MHz
Results [dB μ V] = 50.3, Reading [dB μ V] = 40.5, C.FACTOR [dB]= 9.7
50.3 dB μ V = 40.5 dB μ V + 9.7 dB
Margin [dB μ V] = 28.7, Limit[dB μ V] = 79.0, Result [dB μ V] = 50.3
28.7 dB μ V = 79.0 dB μ V – 50.3 dB μ V

## 6.2 Radiated emission (30 MHz ~ 1 000 MHz)

| **Test standard** | **47 CFR FCC Part 15 Subpart B §15.109** |
|---|---|
| Test date | 2023.02.01 |
| Test facility | Building A 10 m chamber |
| Test voltage | AC 120 V, 60 Hz |
| Temperature | (19.4 ~ 19.7) °C |
| Relative humidity | (49.8 ~ 50.2) % R.H. |
| Test result | Complied |

### 6.2.1 Measurement procedure

If the EUT is tabletop equipment, it was placed on a non-metal table with a height of 0.8 m above the reference ground plane and 10 m away from the interference receiving antenna in the semi-anechoic chamber.

Also if the EUT is floor-standing equipment, it was placed either directly on the reference ground plane or on insulating material as described in ANSI C 63.4 6.3.3.2. Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report. For 30 MHz ~ 1 000 MHz frequency range, quasi-peak detector with 120 kHz RBW was used.

### 6.2.2 Test equipment used

| Equipment | Model | Manufacturer | Serial number | Next cal. date |
|---|---|---|---|---|
| EMI Test Receiver | ESW44 | R&S | 101839 | 2023.06.14 |
| Low Noise Preamplifier | MLA-10k01-b01-14 | TSJ | 2060297 | 2023.06.14 |
| Bi-Log Antenna | VULB9168 | Schwarzbeck | 00822 | 2023.03.31 |
| Attenuator | 50FPE-006N | JFW | 6 dB-1 | 2023.04.14 |
| Controller | C3000 | Innco | 45450119 | - |
| Antenna Mast | MA4000-EP | Innco | - | - |
| Turn Table | - | - | - | - |
| EMI RE Software | EMI-R | TSJ | - | - |

* All test equipment used is calibrated on a regular basis.

### 6.2.3 Radiated emission limits

- Limit for radiated emission below 1 000 MHz

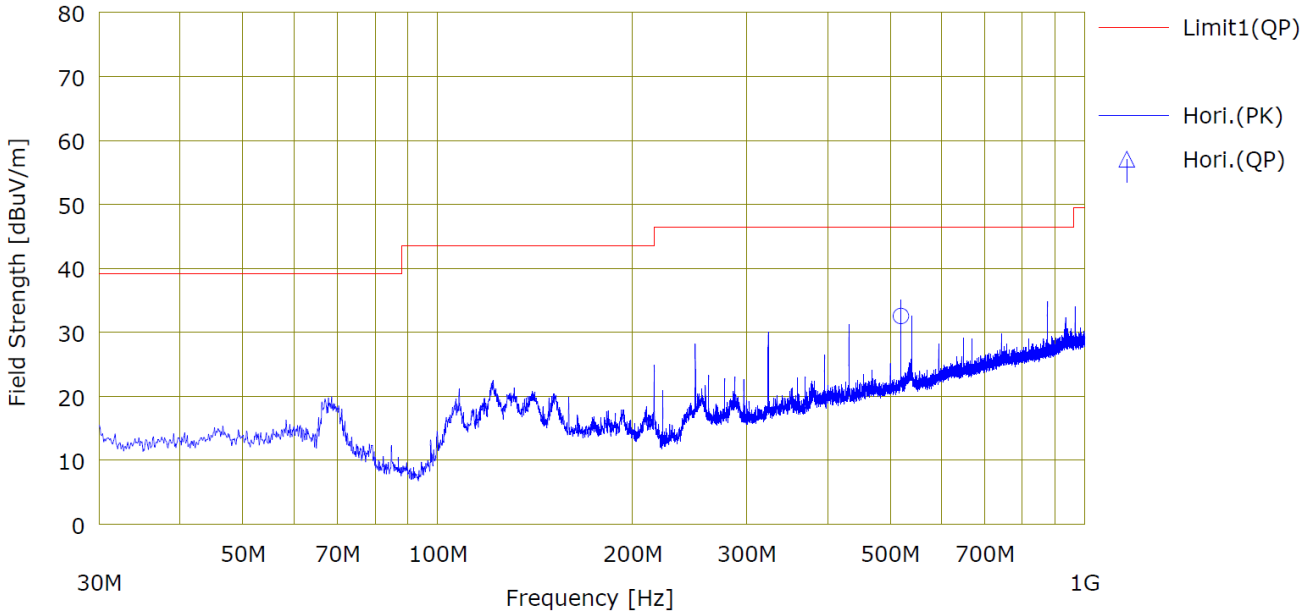
| Frequency range (MHz) | Class A Equipment (10 m distance) | Class B Equipment (3 m distance) |
|---|---|---|
| | Quasi-peak (dB(μV/m)) | Quasi-peak (dB(μV/m)) |
| 30 to 88 | 39.1 | 40 |
| 88 to 216 | 43.5 | 43.5 |
| 216 to 960 | 46.4 | 46 |
| 960 to 1 000 | 49.5 | 54 |

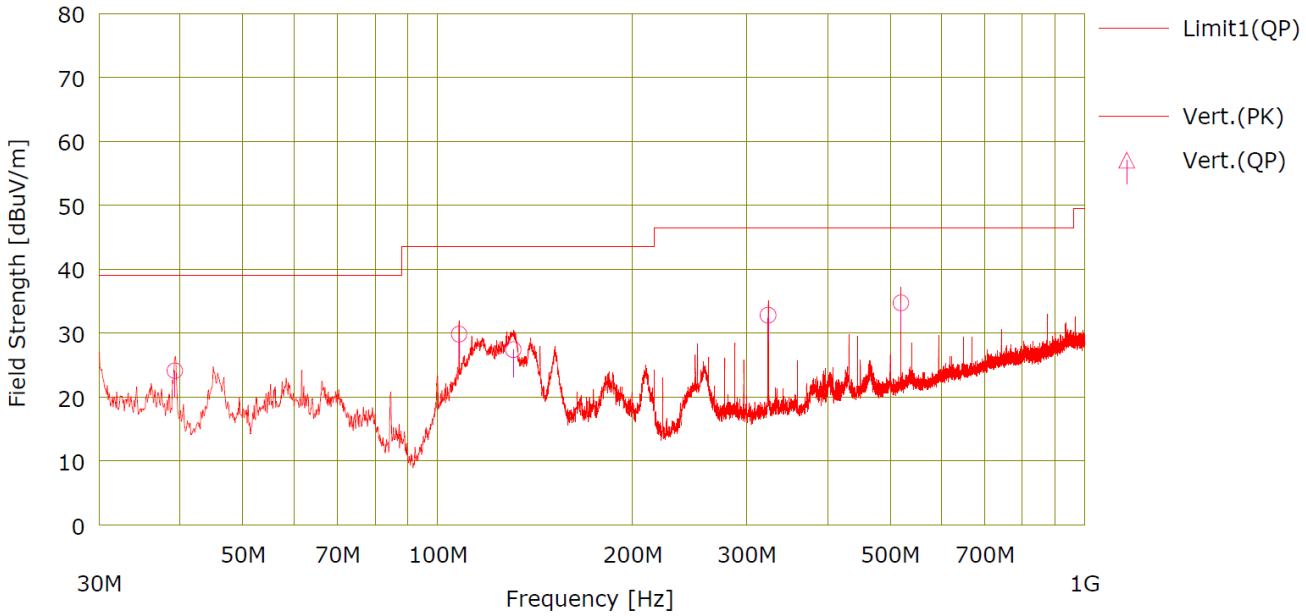
Note 1 The lower limit shall apply at the transition frequency.
Note 2 Additional provisions may be required for cases where interference occurs.
Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

## 6.2.4 Radiated emission test data

* Minimum limit margin is 11.7 dB at 519.789 MHz. (Vertical)



<< QP DATA >>

| No. | Freq. | Readin <QP> | Ant.Fac | Loss | Gain | Result <QP> | Limit <QP> | Margin <QP> | Pola. | Height | Angle | Ant. Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | [MHz] | [dBuV] | [dB/m] | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dB] | [H/V] | [cm] | [deg] | |
| 1 | 519.855 | 49.7 | 24.1 | -41.3 | 0.0 | 32.5 | 46.4 | 13.9 | Hori. | 300 | 208 | VULB9 |
| 2 | 39.278 | 50.2 | 19.2 | -45.3 | 0.0 | 24.1 | 39.1 | 15.0 | Vert. | 200 | 121 | VULB9 |
| 3 | 107.963 | 58.2 | 16.1 | -44.5 | 0.0 | 29.8 | 43.5 | 13.7 | Vert. | 100 | 56 | VULB9 |
| 4 | 130.960 | 53.4 | 18.0 | -44.0 | 0.0 | 27.4 | 43.5 | 16.1 | Vert. | 100 | 23 | VULB9 |
| 5 | 324.012 | 54.6 | 20.2 | -42.0 | 0.0 | 32.8 | 46.4 | 13.6 | Vert. | 100 | 352 | VULB9 |
| 6 | 519.789 | 51.9 | 24.1 | -41.3 | 0.0 | 34.7 | 46.4 | 11.7 | Vert. | 100 | 151 | VULB9 |

* Results [dB(μV/m)] = Reading [dB(μV)] + Antenna factor [dB/m] - Loss
* Loss = Cable loss [dB] - Amp gain [dB]
* Margin [dB] = Limit [dB(μV/m)] - Results [dB(μV/m)]
* QP: Quasi-peak

* ex) Measure Value[QP]
Frequency: 519.855 MHz
Results [dB μ V/m] = 32.5, Reading [dB μ V/m] = 49.7, Antenna factor [dB/m] = 24.1, Loss [dB] = - 41.3, Amp gain [dB] = 0.0
32.5 dB μ V/m = 49.7 dB μ V/m + 24.1 dB/m – 41.3 dB – 0.0 dB
Margin [dB μ V/m] = 13.9, Limit [dB μ V/m] = 46.4, Result [dB μ V/m] = 32.5
13.9 dB μ V/m = 46.4 dB μ V/m – 32.5 dB μ V/m

## 6.3 Radiated emission (Above 1 GHz)

| **Test standard** | **47 CFR FCC Part 15 Subpart B §15.109** |
|---|---|
| Test date | 2023.02.01 |
| Test facility | Building A 10 m chamber |
| Test voltage | AC 120 V, 60 Hz |
| Temperature | (20.9 ~ 21.4) °C |
| Relative humidity | (51.4 ~ 51.9) % R.H. |
| Test result | Complied |

### 6.3.1 Measurement procedure

If the EUT is tabletop equipment, it was placed on a non-metal table with a height of 0.8 m above the reference ground plane and 3 m away from the interference receiving antenna in the chamber. Also if the EUT is floor-standing equipment, it was placed either directly on the reference ground plane or on insulating material as described in ANSI C 63.4 6.3.3.2. Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.
The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report. For peak and average detector with 1 MHz RBW were used for above 1 GHz frequency range.

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### 6.3.2 Test equipment used

| Equipment | Model | Manufacturer | Serial number | Next cal. date |
|---|---|---|---|---|
| EMI Test Receiver | ESW44 | R&S | 101839 | 2023.06.14 |
| Low Noise Preamplifier | MLA-0108-J02-39 | TSJ | 20755 | 2023.06.14 |
| Horn Antenna | BBHA 9120 D | Schwarzbeck | 02067 | 2023.06.02 |
| Controller | C3000 | Innco | 45450119 | - |
| Antenna Mast | MA4640-XP-ET | Innco | - | - |
| Turn Table | - | - | - | - |
| EMI RE Software | EMI-R | TSJ | - | - |

* All test equipment used is calibrated on a regular basis

### 6.3.3 Radiated emission limits

- The test frequency range of radiated disturbance measurements are listed below

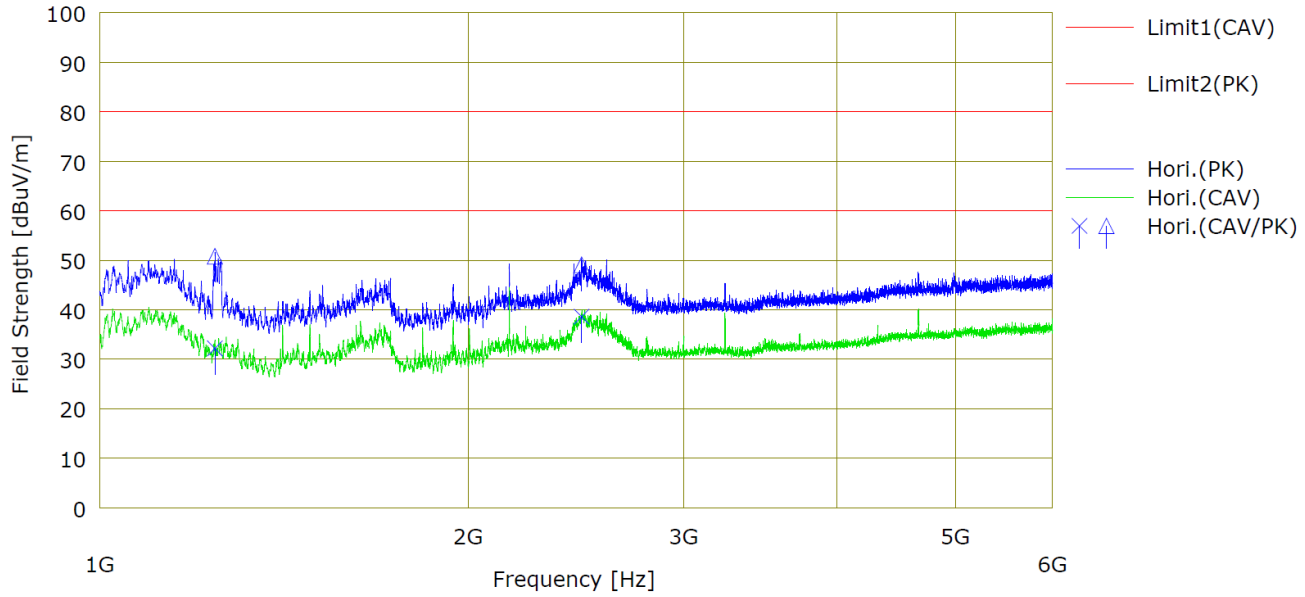
| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz) |
|---|---|
| Below 108 | 1 000 |
| 108 - 500 | 2 000 |
| 500 - 1 000 | 5 000 |
| Above 1 000 | 5th harmonic of the highest frequency or 40 GHz, whichever is lower |

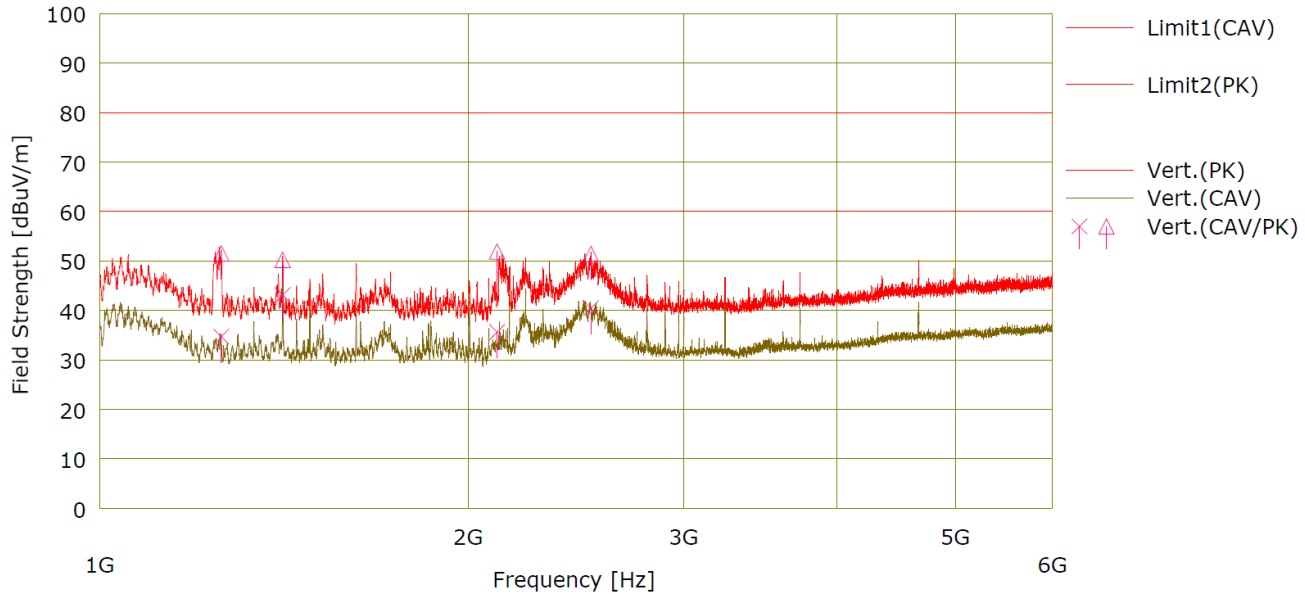
| Frequency (GHz) | Class A equipment (3 m distance) (dB(μV/m)) | | Class B equipment (3 m distance) (dB(μV/m)) | |
|---|---|---|---|---|
| 1 to 2 | Peak | Average | Peak | Average |
| | 80 | 60 | 74 | 54 |

## 6.3.4 Radiated emission test data

* Minimum limit margin is 16.9 dB at 1410.419 MHz. (CISPR Average)



<< CAV/PK DATA >>

| No. | Freq. | Reading | | Ant.Fac | Loss | Gain | S.Fac | Result | | Limit | | Margin | | Pola. | Height | Angle | Ant. Type |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | <CAV> | <PK> | | | | | <CAV> | <PK> | <CAV> | <PK> | <CAV> | <PK> | | | | |
| | [MHz] | [dBuV] | [dBuV] | [dB/m] | [dB] | [dB] | [dB] | [dBuV/m] | [dBuV/m] | [dBuV/m] | [dBuV/m] | [dB] | [dB] | [H/V] | [cm] | [deg] | |
| 1 | 1241.998 | 39.0 | 57.6 | 25.8 | -36.0 | 0.0 | 3.5 | 32.2 | 50.8 | 60.0 | 80.0 | 27.8 | 29.2 | Hori. | 100 | 9 | 3BHA9 |
| 2 | 2474.505 | 42.3 | 52.8 | 27.7 | -34.9 | 0.0 | 3.5 | 38.6 | 49.1 | 60.0 | 80.0 | 21.4 | 30.9 | Hori. | 100 | 193 | 3BHA9 |
| 3 | 1256.618 | 41.4 | 58.2 | 25.8 | -36.1 | 0.0 | 3.5 | 34.7 | 51.5 | 60.0 | 80.0 | 25.3 | 28.5 | Vert. | 200 | 356 | 3BHA9 |
| 4 | 1410.419 | 50.1 | 57.2 | 25.8 | -36.4 | 0.0 | 3.5 | 43.1 | 50.2 | 60.0 | 80.0 | 16.9 | 29.8 | Vert. | 200 | 227 | 3BHA9 |
| 5 | 2111.004 | 40.1 | 56.4 | 27.3 | -35.3 | 0.0 | 3.5 | 35.6 | 51.9 | 60.0 | 80.0 | 24.4 | 28.1 | Vert. | 100 | 224 | 3BHA9 |
| 6 | 2518.400 | 44.2 | 55.2 | 27.5 | -34.8 | 0.0 | 3.5 | 40.4 | 51.4 | 60.0 | 80.0 | 19.6 | 28.6 | Vert. | 100 | 94 | 3BHA9 |

* Results [dB(μV/m)] = Reading [dB(μV)] + Antenna factor [dB/m] - Loss [dB]
* Loss = Cable loss [dB] - Amp gain [dB] + S.Fac
* Margin [dB] = Limit [dB(μV/m)] - Results [dB(μV/ m)]
* QP: Quasi-peak , CAV: CISPR Average

* ex) Measure Value[CAV]
Frequency: 1241.998 MHz
Results [dB μ V/m] = 32.2, Reading [dB μ V/m] = 39.0, Antenna factor [dB/m] = 25.8, Loss [dB] = - 36.0
Amp gain [dB] = -0.0, S.Fac [dB] = 3.5
32.2 dB μ V/m = 39.0 dB μ V/m + 25.8 dB/m – 36.0 dB – 0.0 dB + 3.5 dB
Margin [dB] = 27.8, Limit [dB μ V/m] = 60.0, Result [dB μ V/m] = 32.2
27.8 dB = 60.0 dB μ V/m – 32.2 dB μ V/m