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<http://www.ltalab.com>

## EMC TEST REPORT

Dates of Tests: October 29 – November 03, 2020

Test Report S/N: LR500122011H

Test Site : LTA Co., Ltd.

Model No.

**XRN-1620SB1**

APPLICANT

**Hanwha Techwin Co., Ltd.**

**Equipment Name** : NVR  
**Manufacturer** : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
**Model name** : XRN-1620SB1  
**Test Device Serial No.:** : Identification  
**Rule Part(s)** : AS/NZS CISPR 32:2015  
CISPR 32 Ed2.0

**Date of issue** : November 06, 2020

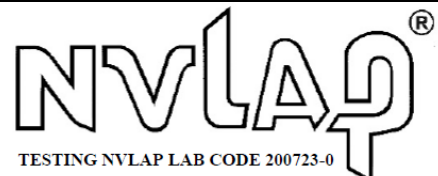
This test report is issued under the authority of:

The test was supervised by:

Young Kyu Shin, Technical Manager

Se Ho Shin, Test Engineer

This test result only responds to the tested sample. It is not allowed to copy this report even partly without the allowance of the test laboratory. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



## Revision history

| Revision | Date of issue | Test report No. | Description |
|----------|---------------|-----------------|-------------|
| 0        | 06.11.2020    | LR500122011H    | Initial     |

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## 1. General information's

### 1-1 Test Performed

Company name : **LTA Co., Ltd**  
 Address : 4, Songju-ro 236beon-gil, Yangji-myeon, Cheoin-gu, Yongin-si, Gyeonggi-do, 17159, Korea  
 Web site : <http://www.ltalab.com>  
 E-mail : [chahn@ltalab.com](mailto:chahn@ltalab.com)  
 Telephone : +82-31-323-6008  
 Facsimile : +82-31-323-6010

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the “General requirements for the competents of calibration and testing laboratory”.

### 1-2 Accredited agencies

LTA Co., Ltd. is approved to perform EMC testing by the following agencies:

| Agency | Country | Accreditation No. | Validity   | Reference             |
|--------|---------|-------------------|------------|-----------------------|
| NVLAP  | U.S.A   | 200723-0          | 2021-09-30 | ECT accredited Lab.   |
| RRA    | KOREA   | KR0049            | -          | RRA accredited Lab.   |
|        | U.S.A   |                   | 2021-04-11 |                       |
|        | CANADA  |                   | 2021-06-16 |                       |
|        | VIETNAM |                   | 2021-04-12 |                       |
| VCCI   | JAPAN   | C-14948           | 2023-09-10 | VCCI registration     |
|        |         | T-12416           | 2023-09-10 |                       |
|        |         | R-14483           | 2023-10-15 |                       |
|        |         | G-10847           | 2021-12-13 |                       |
| KOLAS  | KOREA   | KT551             | 2021-08-20 | KOLAS accredited Lab. |

## 2. Information's about test item

### 2-1 Client / Manufacturer

Company name : Hanwha Techwin Co., Ltd.  
 Address : 6, Pangyo-ro 319 Beon-gil, Bundang-gu, Seongnam-si, Gyeonggi-do, 13488, KOREA  
 Telephone /Facsimile : +82-70-7147-8753(<http://hanhwa-security.com>)

### Factory #1

Company name : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
 Address : Lot O-2, Que Vo Industrial Zone extended area ,Nam Son commune,  
 Bac Ninh city,Bac Ninh province, Vietnam

### Factory #2

Company name : D-TECH CO.,LTD.  
 Address : 173-25, Saneop-ro, Gwonseon-gu, Suwon-si, Gyeonggi-do, Korea  
 (Suwon Industrial Complex)

### 2-2 Equipment Under Test (EUT)

Class : A  
 Category : NVR  
 Model name : XRN-1620SB1  
 Serial number : Identification  
 Date of receipt : October 13, 2020  
 EUT condition : Pre-production, not damaged  
 Interface Ports : AC IN, LAN #1 ~ #16, NETWORK 1, NETWORK 2, AUDIO OUT,  
 USB #1 ~ #3, VGA, HDMI, ALARM IN, ALARM OUT, Ground  
 Console port is engineer port.  
 Power rating : AC 240 V, 50 Hz

### 2-3 Modification

-NONE

### 2-4 Test conditions

Temp. / Humid. / Pressure : (21 - 23) °C / (43) % R.H.  
 Tested Model : XRN-1620SB1  
 Test mode : Rec mode  
 Test Voltage : AC 240 V, 50 Hz

**2-5 List of EUT and ACCESSORY**

| <b>EUT</b>            |                    |                   |                                                                     |                |
|-----------------------|--------------------|-------------------|---------------------------------------------------------------------|----------------|
| <b>Equipment Name</b> | <b>Model Name</b>  | <b>Serial No.</b> | <b>Manufacturer</b>                                                 | <b>Remarks</b> |
| <b>NVR</b>            | <b>XRN-1620SB1</b> | <b>N/A</b>        | <b>HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.<br/>D-TECH CO.,LTD.</b> | <b>-</b>       |
| <b>Mouse</b>          | <b>MOKJUO</b>      | <b>08F03698</b>   | <b>Primax Electronics Ltd</b>                                       | <b>-</b>       |
| <b>ACCESSORY</b>      |                    |                   |                                                                     |                |
| <b>Equipment Name</b> | <b>Model Name</b>  | <b>Serial No.</b> | <b>Manufacturer</b>                                                 | <b>Remarks</b> |
| Monitor #1            | 24BK550Y           | 902NTSU7P406      | LG                                                                  | -              |
| Monitor #2            | 24BK550Y           | 902NTLE7P384      | LG                                                                  | -              |
| NETWORK CAMERA        | QND-8021           | N/A               | HANWHA TECHWIN CO.,LTD                                              | -              |
| Switch Hub            | ipTIME SW1600-mini | N/A               | EFM NETWORKS                                                        | -              |
| Notebook              | P56                | N/A               | HANSUNG                                                             | -              |
| Notebook Adapter      | A10-090P3A         | N/A               | Chicony                                                             | -              |
| USB Memory #1         | USB Memory HOLDER  | N/A               | AXXEN                                                               | 32 GB          |
| USB Memory #2         | USB Memory HOLDER  | N/A               | AXXEN                                                               | 32 GB          |
| JIG Board             | N/A                | N/A               | N/A                                                                 | -              |
| Earphone              | N/A                | N/A               | N/A                                                                 | -              |
| HDD                   | WD20PURX-64P6ZY0   | WCC4M2ZDF293      | WD                                                                  | 2.0 TB         |

**2-6 Cable List**

| Cable List          |                     |                            |                     |               |           |           |
|---------------------|---------------------|----------------------------|---------------------|---------------|-----------|-----------|
| From                |                     | To                         |                     | Length<br>(m) | Shielding |           |
| Type                | I/O Port            | Type                       | I/O Port            |               | Cable     | backshell |
| EUT                 | AC IN               | AC Power Source            | 3 Pin AC Line       | 1.5           | NO        | Plastic   |
|                     | LAN #1              | NETWORK CAMERA             | LAN                 | 3.0           | NO        | Plastic   |
|                     | LAN #2 ~<br>LAN #16 | Switch Hub<br>(terminated) | LAN #2 ~<br>LAN #16 | 1.0           | NO        | Plastic   |
|                     | NETWORK1            | Switch Hub<br>(terminated) | LAN #1              | 1.0           | NO        | Plastic   |
|                     | NETWORK2            | Notebook                   | LAN                 | 3.0           | NO        | Plastic   |
|                     | ALARM IN            | JIG Board                  | ALARM IN            | 0.4           | NO        | Plastic   |
|                     | ALARM OUT           | JIG Board                  | ALARM OUT           | 0.4           | NO        | Plastic   |
|                     | ALARM Ground        | JIG Board                  | Ground              | 0.4           | NO        | Plastic   |
|                     | VGA                 | Monitor#1                  | VGA                 | 1.6           | YES       | Metal     |
|                     | HDMI                | Monitor#2                  | HDMI                | 1.5           | YES       | Metal     |
|                     | USB #1              | Mouse                      | -                   | 1.0           | NO        | Plastic   |
|                     | USB #2              | USB Memory #1              | -                   | -             | -         | -         |
|                     | USB #3              | USB Memory #2              | -                   | -             | -         | -         |
|                     | AUDIO OUT           | Earphone                   | AUX                 | 1.0           | NO        | Plastic   |
|                     | DC OUT              | HDD                        | DC IN               | 0.4           | NO        | Plastic   |
|                     | SATA                | HDD                        | SATA                | 0.4           | NO        | Plastic   |
| Monitor#1           | AC IN               | AC Power Source            | 3 Pin AC Line       | 1.6           | NO        | Plastic   |
| Monitor#2           | AC IN               | AC Power Source            | 3 Pin AC Line       | 1.6           | NO        | Plastic   |
| Notebook            | DC IN               | Notebook Adapter           | DC OUT              | 1.6           | NO        | Plastic   |
| Notebook<br>Adapter | AC IN               | AC Power Source            | 3 Pin AC Line       | 1.5           | NO        | Plastic   |

### 3. Test Report

#### 3.1 Summary of tests

| Parameter           | Applied Standard    | Status |
|---------------------|---------------------|--------|
| <b>I. Emission</b>  |                     |        |
| Conducted Emissions | AS/NZS CISPR32:2015 | C      |
| Radiated Emissions  | AS/NZS CISPR32:2015 | C      |

Note 1: C=Complies    NC=Not Complies    NT=Not Tested    NA=Not Applicable

Note 2: The data in this test report are traceable to the national or international standards.

## 4. Test Items

### 4-1 Conducted Emissions

#### Definition:

The test assesses the ability of the EUT to limit its internal noise from being present on the AC mains Power In/Output/Telecommunication ports.

We were performed the test according to LTA procedure LTA-QI-04.

|                             |                       |
|-----------------------------|-----------------------|
| Test method                 | : AS/NZS CISPR32:2015 |
| Measurement Frequency range | : 150 kHz - 30 MHz    |
| Measurement RBW             | : 9 kHz               |
| Test mode                   | : Rec mode            |
| Result                      | : <b>Complies</b>     |

#### Measurement Data:

- Refer to the Next page (Maximum emission configuration)

#### A sample calculation:

COR. F (correction factor)= LISN Insertion loss + Cable loss + Pulse Limiter Factor

Emission Level= meter reading + COR.F

#### Limits for conducted disturbance at the mains ports of class A ITE

| Frequency Range  | Quasi-peak    | Average       |
|------------------|---------------|---------------|
| (0.15 - 0.5) MHz | 79 dB $\mu$ V | 66 dB $\mu$ V |
| (0.5 – 30) MHz   | 73 dB $\mu$ V | 60 dB $\mu$ V |

Note: The limits will decrease with the frequency logarithmically within 0.15 MHz to 0.5 MHz

#### Limits for conducted disturbance at the mains ports of class B ITE

| Frequency Range  | Quasi-peak           | Average              |
|------------------|----------------------|----------------------|
| (0.15 – 0.5) MHz | (66 – 56) dB $\mu$ V | (56 - 46) dB $\mu$ V |
| (0.5 – 5) MHz    | 56 dB $\mu$ V        | 46 dB $\mu$ V        |
| (5 – 30) MHz     | 60 dB $\mu$ V        | 50 dB $\mu$ V        |

Note: The limits will decrease with the frequency logarithmically within 0.15 MHz to 0.5 MHz

**Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class A equipment**

| Frequency Range  | Voltage limits       |                      | Current limits       |                      |
|------------------|----------------------|----------------------|----------------------|----------------------|
|                  | Quasi-peak           | Average              | Quasi-peak           | Average              |
| (0.15 - 0.5) MHz | (97 – 87) dB $\mu$ V | (84 – 74) dB $\mu$ V | (53 – 43) dB $\mu$ V | (40 – 30) dB $\mu$ V |
| (0.5 – 30) MHz   | 87 dB $\mu$ V        | 74 dB $\mu$ V        | 43 dB $\mu$ V        | 30 dB $\mu$ V        |

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150  $\Omega$  to the telecommunication port under test (conversion factor is  $20 \log_{10} 150/I = 44$  dB)

**Limits of conducted common mode (asymmetric mode) disturbance at telecommunication ports in the frequency range 0.15 MHz to 30 MHz for class B equipment**

| Frequency Range  | Voltage limits       |                      | Current limits       |                      |
|------------------|----------------------|----------------------|----------------------|----------------------|
|                  | Quasi-peak           | Average              | Quasi-peak           | Average              |
| (0.15 - 0.5) MHz | (84 – 74) dB $\mu$ V | (74 – 64) dB $\mu$ V | (40 – 30) dB $\mu$ V | (30 – 20) dB $\mu$ V |
| (0.5 – 30) MHz   | 74 dB $\mu$ V        | 64 dB $\mu$ V        | 30 dB $\mu$ V        | 20 dB $\mu$ V        |

Note 1: The limits decrease linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note 2: The current and voltage disturbance limits are derived for use with an impedance stabilization network (ISN) which presents a common mode (asymmetric mode) impedance of 150  $\Omega$  to the telecommunication port under test (conversion factor is  $20 \log_{10} 150/I = 44$  dB)

## Conducted Emissions (LINE)



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EUT /Model No. : XRN-1620SB1

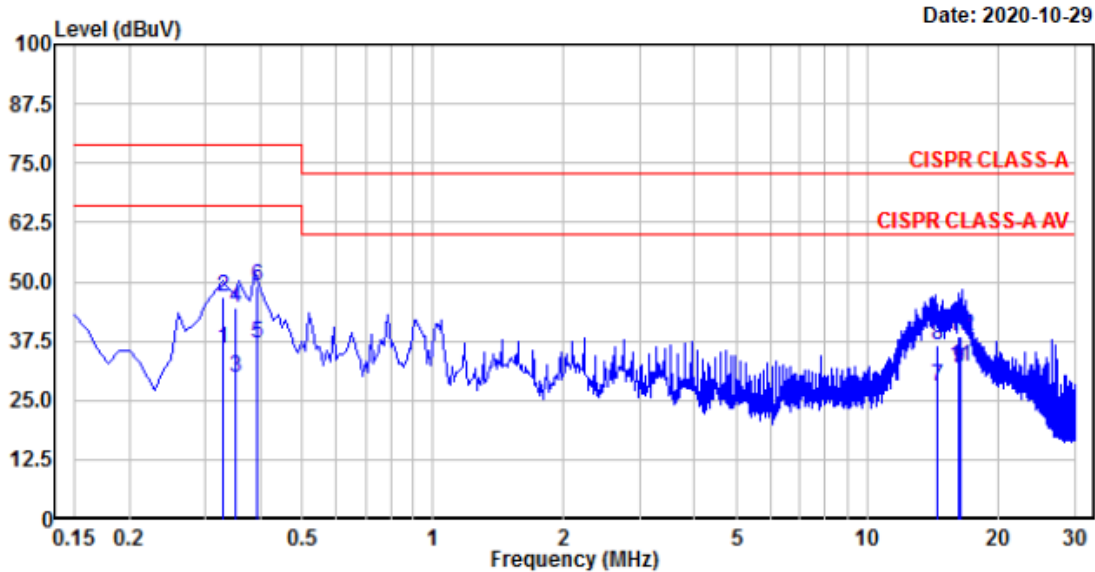
Phase : Line

Test Mode : Rec mode

Test Power : 240 V / 50 Hz

Temp. / Humi. : 23 °C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 0.328       | 27.27            | 16.35            | 19.48     | 46.75                | 35.83                | 79.00               | 66.00               | 32.25              | 30.17              | Line  |
| 4.  | 0.352       | 25.20            | 10.19            | 19.48     | 44.68                | 29.67                | 79.00               | 66.00               | 34.32              | 36.33              | Line  |
| 6.  | 0.393       | 29.56            | 17.67            | 19.49     | 49.05                | 37.16                | 79.00               | 66.00               | 29.95              | 28.84              | Line  |
| 8.  | 14.458      | 16.74            | 8.13             | 19.95     | 36.69                | 28.08                | 73.00               | 60.00               | 36.31              | 31.92              | Line  |
| 10. | 16.229      | 18.64            | 11.81            | 19.98     | 38.62                | 31.79                | 73.00               | 60.00               | 34.38              | 28.21              | Line  |
| 12. | 16.329      | 18.46            | 12.27            | 19.98     | 38.44                | 32.25                | 73.00               | 60.00               | 34.56              | 27.75              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (NEUTRAL)



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EUT /Model No. : XRN-1620SB1

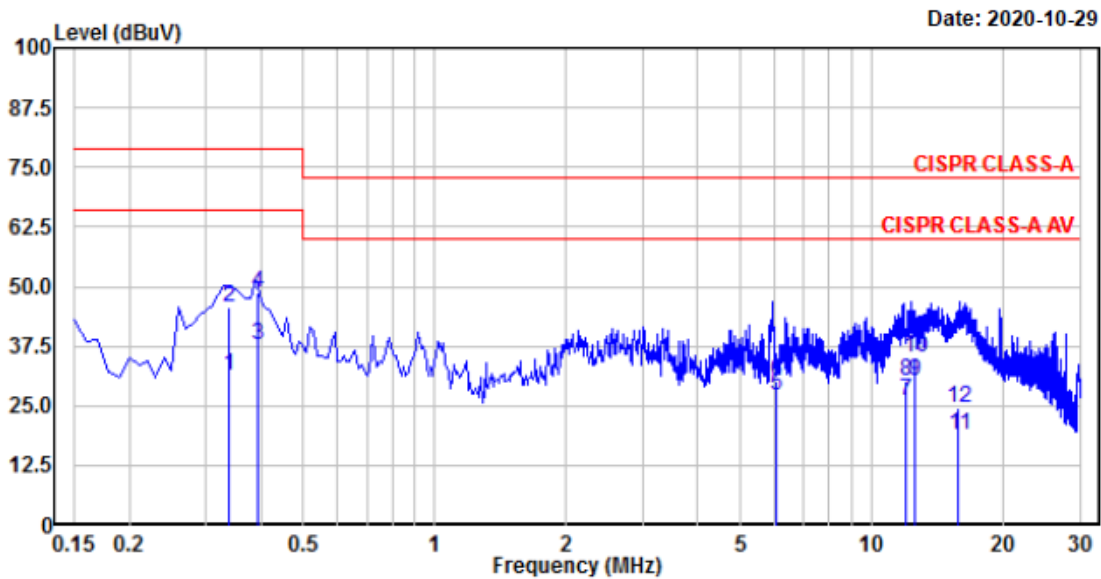
Phase : Neutral

Test Mode : Rec mode

Test Power : 240 V / 50 Hz

Temp. / Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase   |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|---------|
| 2.  | 0.340       | 26.36            | 11.77            | 19.48     | 45.84                | 31.25                | 79.00               | 66.00               | 33.16              | 34.75              | neutral |
| 4.  | 0.393       | 29.24            | 18.12            | 19.49     | 48.73                | 37.61                | 79.00               | 66.00               | 30.27              | 28.39              | neutral |
| 6.  | 6.028       | 10.44            | 7.29             | 19.70     | 30.14                | 26.99                | 73.00               | 60.00               | 42.86              | 33.01              | neutral |
| 8.  | 11.926      | 10.37            | 6.31             | 19.91     | 30.28                | 26.22                | 73.00               | 60.00               | 42.72              | 33.78              | neutral |
| 10. | 12.582      | 15.17            | 10.24            | 19.92     | 35.09                | 30.16                | 73.00               | 60.00               | 37.91              | 29.84              | neutral |
| 12. | 15.792      | 4.63             | -1.01            | 20.00     | 24.63                | 18.99                | 73.00               | 60.00               | 48.37              | 41.01              | neutral |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (TEL\_10 M) / LAN #1



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EUT /Model No. : XRN-1620SB1

Phase : TEL\_10M

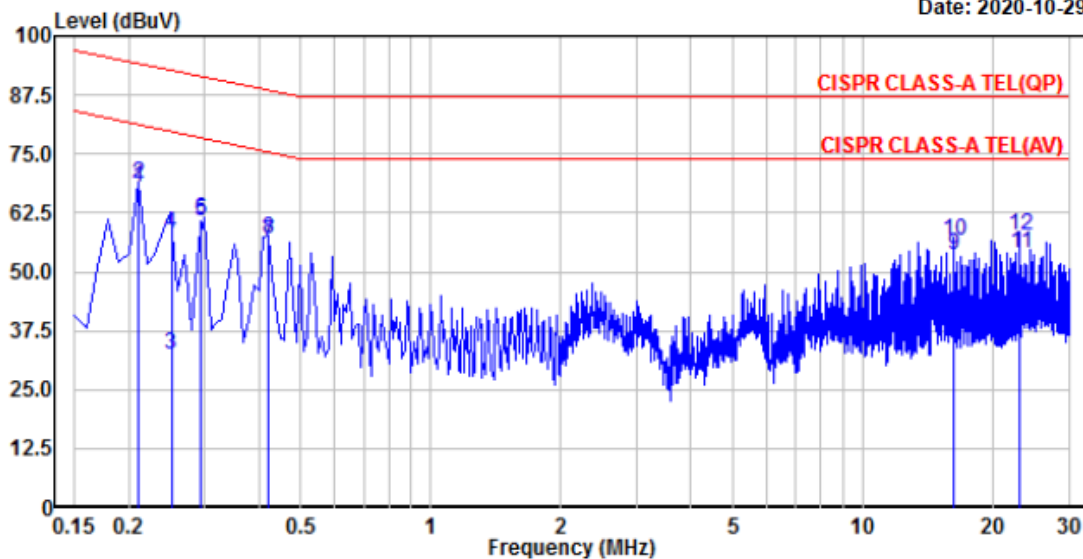
Test Mode : Rec mode (LAN #1)

Test Power : 240 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H

Date: 2020-10-29



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 0.211       | 49.10            | 48.39            | 19.59     | 68.69                | 67.98                | 94.16               | 81.16               | 25.47              | 13.18              | Line  |
| 4.  | 0.251       | 38.60            | 12.85            | 19.53     | 58.13                | 32.38                | 92.72               | 79.72               | 34.59              | 47.34              | Line  |
| 6.  | 0.295       | 41.72            | 41.09            | 19.48     | 61.20                | 60.57                | 91.39               | 78.39               | 30.19              | 17.82              | Line  |
| 8.  | 0.423       | 37.62            | 36.82            | 19.41     | 57.03                | 56.23                | 88.40               | 75.40               | 31.37              | 19.17              | Line  |
| 10. | 16.229      | 36.80            | 34.07            | 19.63     | 56.43                | 53.70                | 87.00               | 74.00               | 30.57              | 20.30              | Line  |
| 12. | 23.130      | 37.63            | 34.08            | 19.95     | 57.58                | 54.03                | 87.00               | 74.00               | 29.42              | 19.97              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (TEL\_1000 M) / LAN #1



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EUT /Model No. : XRN-1620SB1

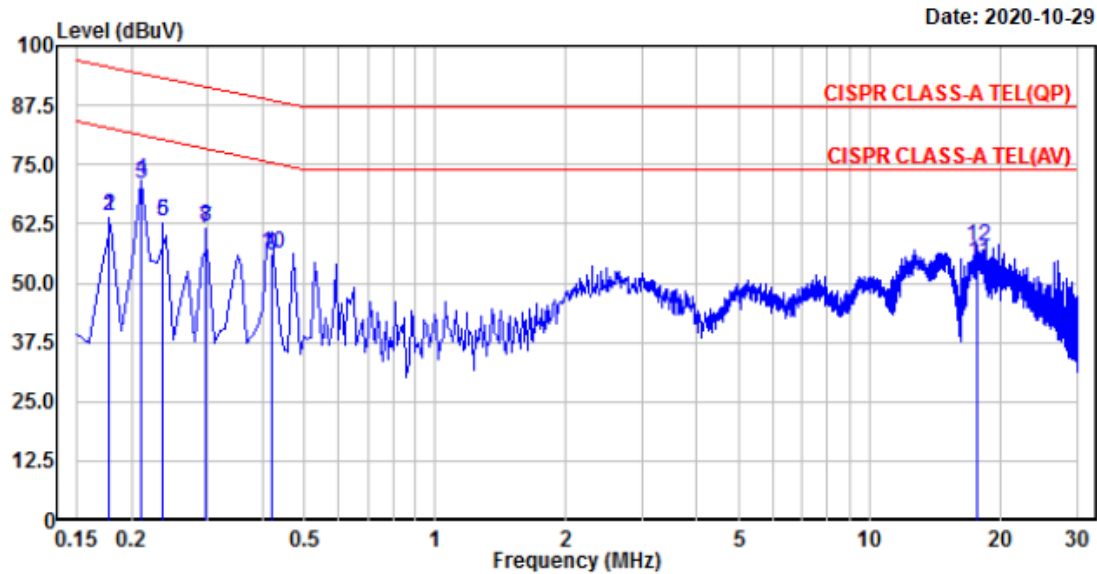
Phase : TEL\_1000M

Test Mode : Rec mode (LAN #1)

Test Power : 240 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 0.177       | 44.36            | 44.37            | 19.61     | 63.97                | 63.98                | 95.61               | 82.61               | 31.64              | 18.63              | Line  |
| 4.  | 0.211       | 52.24            | 51.52            | 19.53     | 71.77                | 71.05                | 94.16               | 81.16               | 22.39              | 10.11              | Line  |
| 6.  | 0.236       | 43.48            | 43.49            | 19.49     | 62.97                | 62.98                | 93.23               | 80.23               | 30.26              | 17.25              | Line  |
| 8.  | 0.295       | 42.57            | 41.97            | 19.42     | 61.99                | 61.39                | 91.37               | 78.37               | 29.38              | 16.98              | Line  |
| 10. | 0.422       | 36.72            | 36.33            | 19.36     | 56.08                | 55.69                | 88.40               | 75.40               | 32.32              | 19.71              | Line  |
| 12. | 17.693      | 38.16            | 34.96            | 19.55     | 57.71                | 54.51                | 87.00               | 74.00               | 29.29              | 19.49              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (TEL\_10 M) / LAN #2



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EUT /Model No. : XRN-1620SB1

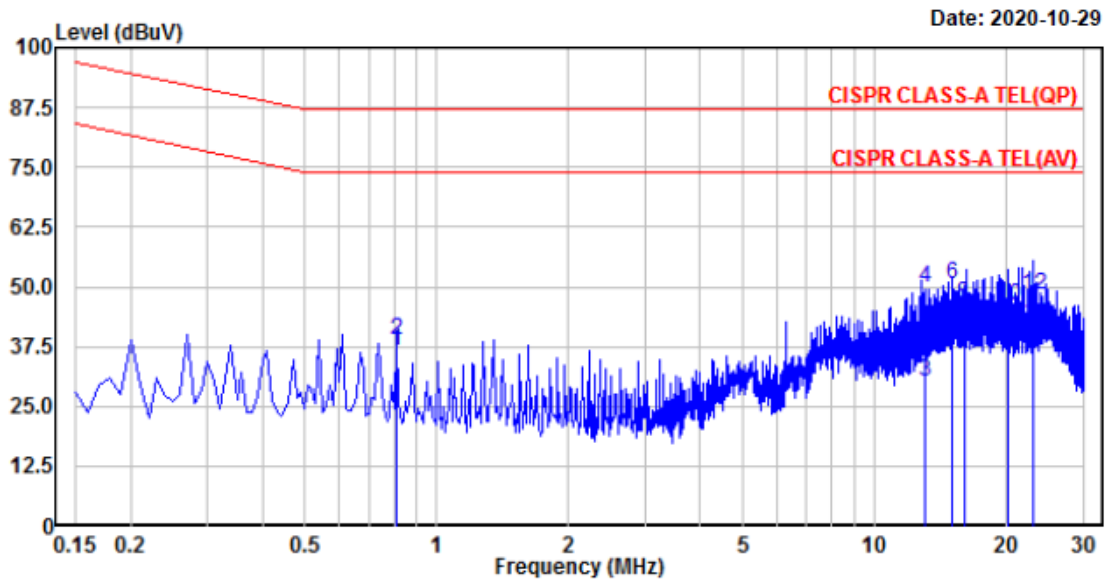
Phase : TEL\_10M

Test Mode : Rec mode (LAN #2)

Test Power : 240 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 0.810       | 19.38            | 17.28            | 19.30     | 38.68                | 36.58                | 87.00               | 74.00               | 48.32              | 37.42              | Line  |
| 4.  | 13.007      | 30.28            | 10.64            | 19.52     | 49.80                | 30.16                | 87.00               | 74.00               | 37.20              | 43.84              | Line  |
| 6.  | 15.022      | 31.11            | 21.28            | 19.58     | 50.69                | 40.86                | 87.00               | 74.00               | 36.31              | 33.14              | Line  |
| 8.  | 15.999      | 26.79            | 19.23            | 19.62     | 46.41                | 38.85                | 87.00               | 74.00               | 40.59              | 35.15              | Line  |
| 10. | 20.258      | 26.32            | 17.30            | 19.80     | 46.12                | 37.10                | 87.00               | 74.00               | 40.88              | 36.90              | Line  |
| 12. | 23.130      | 28.41            | 22.47            | 19.95     | 48.36                | 42.42                | 87.00               | 74.00               | 38.64              | 31.58              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (TEL\_1000 M) / LAN #2



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449-822 Korea  
Tel:+82-31-3236008,9  
Fax:+82-31-3236010

EUT /Model No. : XRN-1620SB1

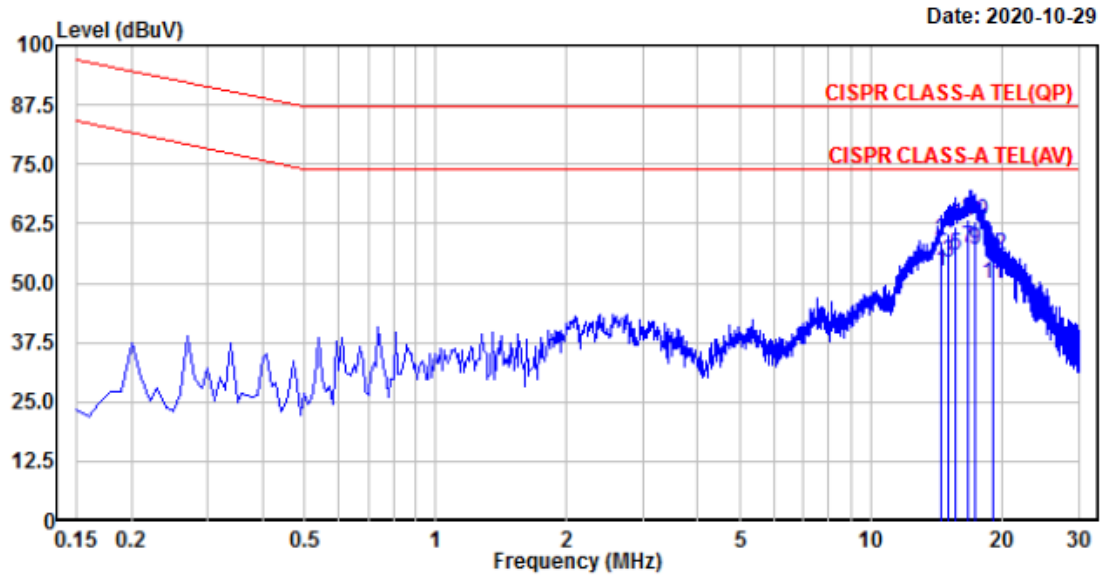
Phase : TEL\_1000M

Test Mode : Rec mode (LAN #2)

Test Power : 240 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 14.510      | 39.26            | 33.09            | 19.49     | 58.75                | 52.58                | 87.00               | 74.00               | 28.25              | 21.42              | Line  |
| 4.  | 15.083      | 41.03            | 34.84            | 19.50     | 60.53                | 54.34                | 87.00               | 74.00               | 26.47              | 19.66              | Line  |
| 6.  | 15.592      | 42.45            | 36.16            | 19.51     | 61.96                | 55.67                | 87.00               | 74.00               | 25.04              | 18.33              | Line  |
| 8.  | 16.769      | 43.68            | 37.67            | 19.54     | 63.22                | 57.21                | 87.00               | 74.00               | 23.78              | 16.79              | Line  |
| 10. | 17.377      | 43.35            | 37.43            | 19.55     | 62.90                | 56.98                | 87.00               | 74.00               | 24.10              | 17.02              | Line  |
| 12. | 19.017      | 36.38            | 30.15            | 19.58     | 55.96                | 49.73                | 87.00               | 74.00               | 31.04              | 24.27              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (TEL\_10 M) / LAN #3



4, Songjuro 236 Beon-gil, Yangji-myeon  
Cheoin-gu, Youngin-si, Gyeonggi-do  
449-822 Korea  
Tel:+82-31-3236008,9  
Fax:+82-31-3236010

EUT /Model No. : XRN-1620SB1

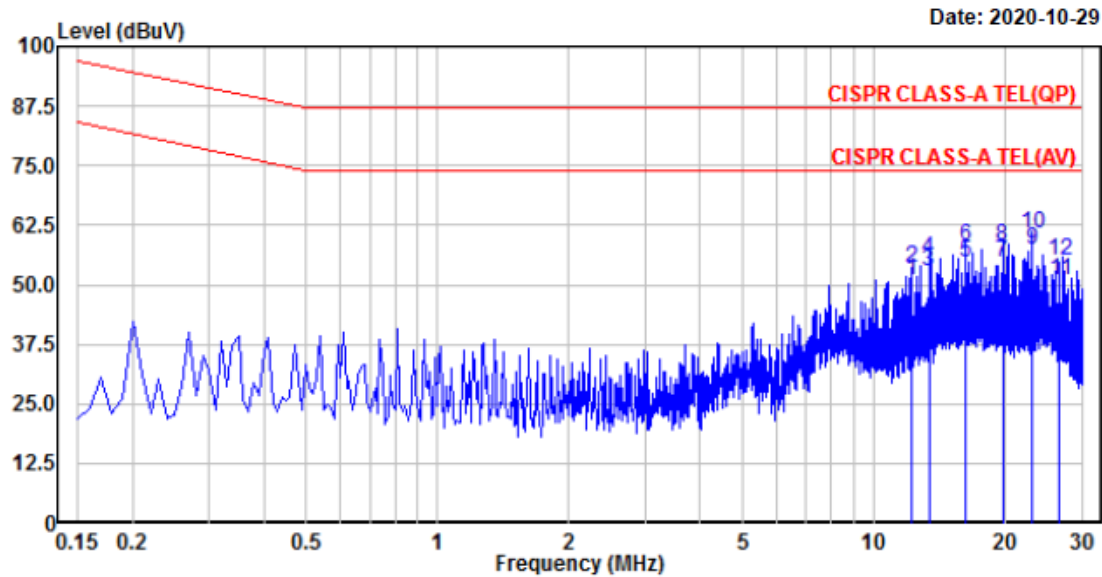
Phase : TEL\_10M

Test Mode : Rec mode (LAN #3)

Test Power : 240 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 12.198      | 34.12            | 31.50            | 19.49     | 53.61                | 50.99                | 87.00               | 74.00               | 33.39              | 23.01              | Line  |
| 4.  | 13.358      | 36.00            | 33.14            | 19.53     | 55.53                | 52.67                | 87.00               | 74.00               | 31.47              | 21.33              | Line  |
| 6.  | 16.229      | 38.35            | 35.08            | 19.63     | 57.98                | 54.71                | 87.00               | 74.00               | 29.02              | 19.29              | Line  |
| 8.  | 19.710      | 38.22            | 34.77            | 19.78     | 58.00                | 54.55                | 87.00               | 74.00               | 29.00              | 19.45              | Line  |
| 10. | 23.128      | 40.94            | 37.56            | 19.95     | 60.89                | 57.51                | 87.00               | 74.00               | 26.11              | 16.49              | Line  |
| 12. | 26.608      | 34.80            | 30.98            | 20.15     | 54.95                | 51.13                | 87.00               | 74.00               | 32.05              | 22.87              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## Conducted Emissions (TEL\_1000 M) / LAN #3



4, Songjuro 236 Beon-gil, Yangji-myeon  
Cheoin-gu, Youngin-si, Gyeonggi-do  
449-822 Korea  
Tel: +82-31-3236008,9  
Fax: +82-31-3236010

EUT /Model No. : XRN-1620SB1

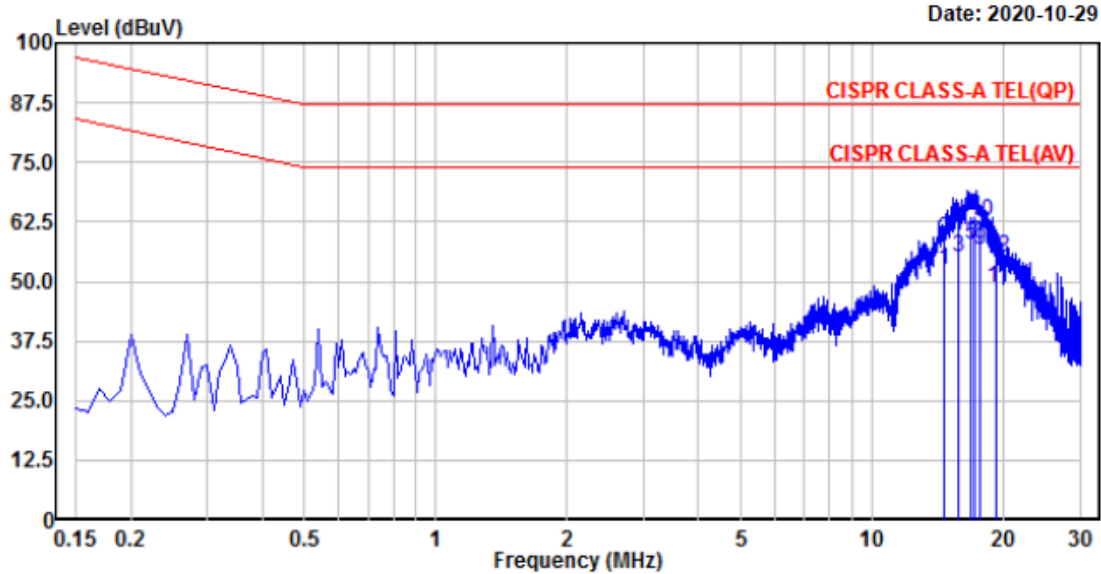
Phase : TEL\_1000M

Test Mode : Rec mode (LAN #3)

Test Power : 240 V / 50 Hz

Temp./ Humi. : 23 'C / 43 % R.H.

Test Engineer : SHIN S H



| No. | Freq<br>MHz | RD<br>QP<br>dBuV | RD<br>AV<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV | Result<br>AV<br>dBuV | Limit<br>QP<br>dBuV | Limit<br>AV<br>dBuV | Margin<br>QP<br>dB | Margin<br>AV<br>dB | Phase |
|-----|-------------|------------------|------------------|-----------|----------------------|----------------------|---------------------|---------------------|--------------------|--------------------|-------|
| 2.  | 14.625      | 39.25            | 33.07            | 19.50     | 58.75                | 52.57                | 87.00               | 74.00               | 28.25              | 21.43              | Line  |
| 4.  | 15.718      | 41.76            | 35.43            | 19.51     | 61.27                | 54.94                | 87.00               | 74.00               | 25.73              | 19.06              | Line  |
| 6.  | 16.812      | 44.08            | 38.28            | 19.54     | 63.62                | 57.82                | 87.00               | 74.00               | 23.38              | 16.18              | Line  |
| 8.  | 17.247      | 44.30            | 38.52            | 19.54     | 63.84                | 58.06                | 87.00               | 74.00               | 23.16              | 15.94              | Line  |
| 10. | 17.694      | 43.15            | 37.21            | 19.55     | 62.70                | 56.76                | 87.00               | 74.00               | 24.30              | 17.24              | Line  |
| 12. | 19.324      | 35.40            | 29.00            | 19.59     | 54.99                | 48.59                | 87.00               | 74.00               | 32.01              | 25.41              | Line  |

Remarks: C.F (Correction Factor) = Insertion loss + Cable loss + Pulse Limiter

## 4-2 Radiated Emissions

### Definition:

The test assesses the ability of ancillary equipment to limit their internal noise from being radiated from the enclosure.

We were performed the test according to LTA procedure LTA-QI-04.

|                             |                                      |
|-----------------------------|--------------------------------------|
| Test method                 | : AS/NZS CISPR32:2013                |
| Measuring Distance          | : 10 m below 1 GHz / 3 m above 1 GHz |
| Measurement Frequency range | : 30 MHz – 6 000 MHz                 |
| Measurement RBW             | : 120 kHz @ 10 m / 1 MHz @ 3 m       |
| Test mode                   | : Rec mode                           |
| Result                      | : <b>Complies</b>                    |

### Measurement Data:

- Refer to the Next page (Maximum emission configuration)
- The highest internal source of an EUT is higher than 108 MHz, the measurement shall only be made up to 6 GHz.  
(The highest internal source of an EUT : 1.9 GHz)

### A sample calculation:

COR. F (correction factor)= Antenna factor + Cable loss- Amp.gain- Distance correction

Emission Level= meter reading + COR.F

**Limit of 10 m below 1 GHz**

## CLASS A

| Frequency Range   | Quasi-peak      |
|-------------------|-----------------|
| (30 – 230) MHz    | 40 dB $\mu$ V/m |
| (230 – 1 000) MHz | 47 dB $\mu$ V/m |

## CLASS B

| Frequency Range   | Quasi-peak      |
|-------------------|-----------------|
| (30 – 230) MHz    | 30 dB $\mu$ V/m |
| (230 – 1 000) MHz | 37 dB $\mu$ V/m |

**Limit of 3m above 1 GHz**

## CLASS A

| Frequency Range     | Average Limit @ 3m<br>(dB $\mu$ V/m) | Peak limit @ 3m<br>(dB $\mu$ V/m) |
|---------------------|--------------------------------------|-----------------------------------|
| (1 000 – 3 000) MHz | 56                                   | 76                                |
| (3 000 – 6 000) MHz | 60                                   | 80                                |

NOTE: The lower limit applies at the transition frequency.

## CLASS B

| Frequency Range     | Average Limit @ 3m<br>(dB $\mu$ V/m) | Peak limit @ 3m<br>(dB $\mu$ V/m) |
|---------------------|--------------------------------------|-----------------------------------|
| (1 000 – 3 000) MHz | 50                                   | 70                                |
| (3 000 – 6 000) MHz | 54                                   | 74                                |

NOTE: The lower limit applies at the transition frequency.

## Radiated Emissions (Below 1 GHz) / V



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Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

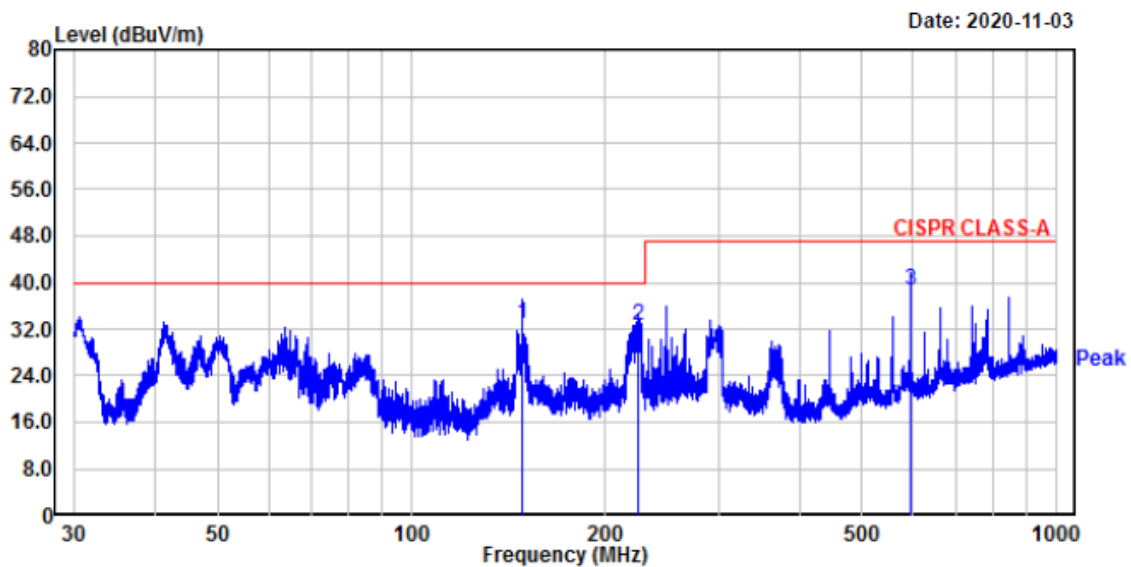
EUT/Model No.: XRN-1620SB1

Temp/Humi: 21 'C / 43 % R.H.

Test Mode : Rec mode

Tested by: SHIN S H

Power : 240 V / 50 Hz



| No. | Freq<br>MHz | Reading<br>dBμV | C.F<br>dB | Result<br>QP<br>dBμV/m | Limit<br>dBμV/m | Margin<br>dB | Height<br>cm | Angle<br>deg | Polarity |
|-----|-------------|-----------------|-----------|------------------------|-----------------|--------------|--------------|--------------|----------|
| 1.  | 148.51      | 45.60           | -12.57    | 33.03                  | 40.00           | 6.97         | 105          | 172          | vertical |
| 2.  | 225.21      | 46.36           | -13.87    | 32.49                  | 40.00           | 7.51         | 102          | 244          | vertical |
| 3.  | 594.09      | 43.08           | -4.54     | 38.54                  | 47.00           | 8.46         | 100          | 347          | vertical |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

## Radiated Emissions (Below 1 GHz) / H



4, Songjuro 236Beon-gil, yanggi-myeon,  
Yongin-si, Gyeonggi-do, Korea  
Tel : +82-31-3236008,9  
Fax : +82-31-3236010  
www.ltalab.com

EUT/Model No.: XRN-1620SB1

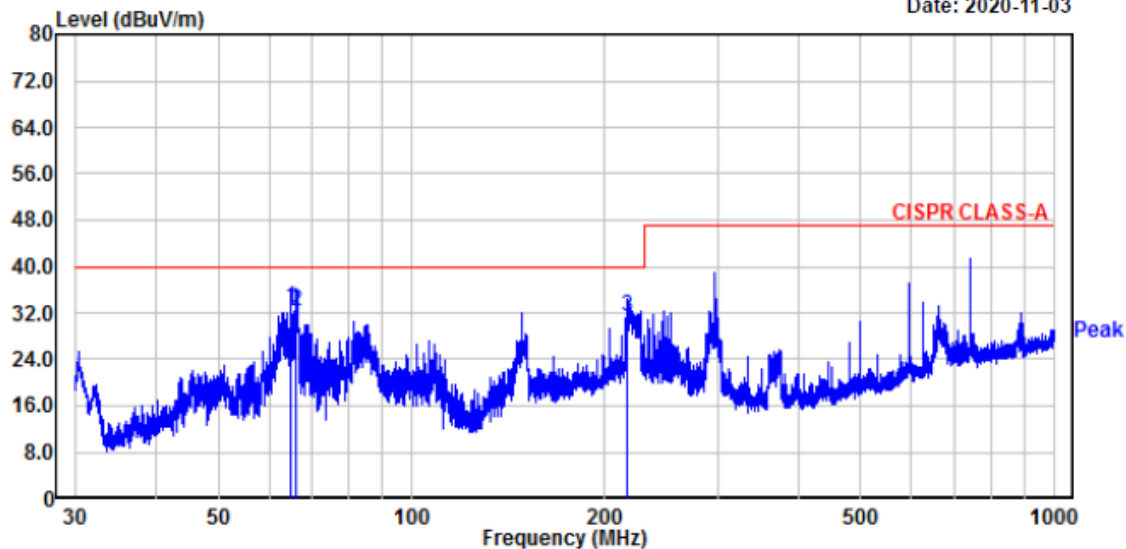
Temp/Humi: 21 'C / 43 % R.H.

Test Mode : Rec mode

Tested by: SHIN S H

Power : 240 V / 50 Hz

Date: 2020-11-03



| No. | Freq<br>MHz | Reading<br>dBuV | C.F<br>dB | Result<br>QP<br>dBuV/m | Limit<br>dBuV/m | Margin<br>dB | Height<br>cm | Angle<br>deg | Polarity   |
|-----|-------------|-----------------|-----------|------------------------|-----------------|--------------|--------------|--------------|------------|
| 1.  | 64.80       | 47.47           | -14.49    | 32.98                  | 40.00           | 7.02         | 366          | 312          | horizontal |
| 2.  | 66.30       | 46.89           | -14.71    | 32.18                  | 40.00           | 7.82         | 342          | 331          | horizontal |
| 3.  | 216.50      | 45.63           | -14.31    | 31.32                  | 40.00           | 8.68         | 311          | 299          | horizontal |

Remarks: C.F (Correction Factor) = Antenna factor + Cable loss - Preamp gain

## Radiated Emissions

(Above 1 GHz) / V

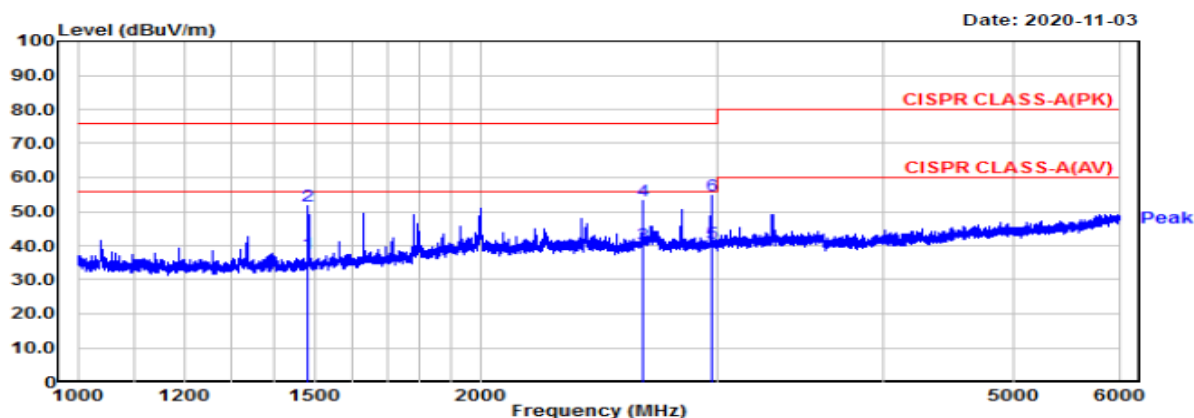
EUT/Model No.: XRN-1620SB1

Temp/Humi: 21 °C / 43 % R.H.

Test Mode : Rec mode

Tested by: SHIN S H

Power : 240 V / 50 Hz



(Above 1 GHz) / H

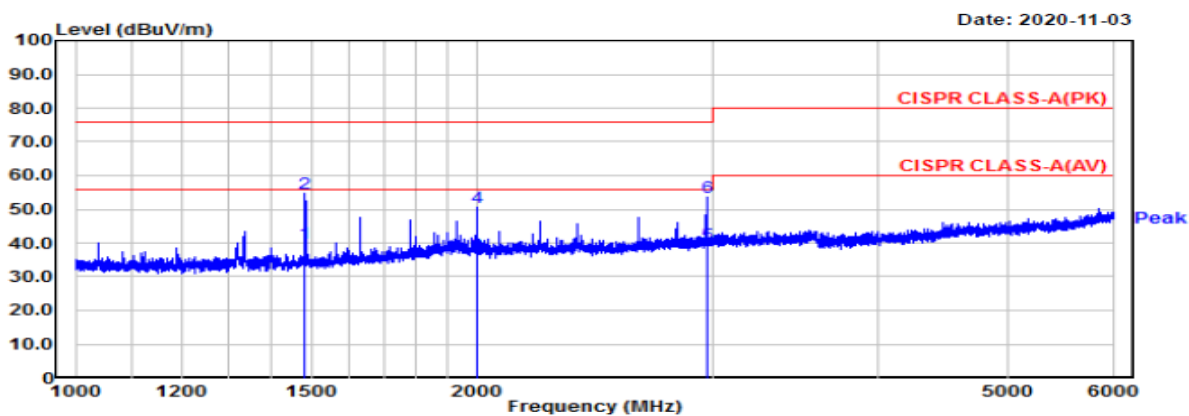
EUT/Model No.: XRN-1620SB1

Temp/Humi: 21 °C / 43 % R.H.

Test Mode : Rec mode

Tested by: SHIN S H

Power : 240 V / 50 Hz



Manufacture : HANWHA TECHWIN SECURITY VIETNAM CO.,LTD.  
D-TECH CO.,LTD.

Test Date

Temp.:  
[°C]Humidity:  
[%]Distance  
(m)

Model : XRN-1620SB1

2020-11-03

21.00

43.00

3.8

TEST mode : Rec mode

| Frequency<br>MHz | Reading(PK)<br>dBuV | Reading(AV)<br>dBuV | C.F<br>dB | Result(PK)<br>dBuV/m | Result(AV)<br>dBuV/m | Limit(PK)<br>dBuV/m | Limit(AV)<br>dBuV/m | Margin(PK)<br>dB | Margin(AV)<br>dB | Height<br>cm | Angle<br>deg | Polarity<br>H/V |
|------------------|---------------------|---------------------|-----------|----------------------|----------------------|---------------------|---------------------|------------------|------------------|--------------|--------------|-----------------|
| 1485.17          | 60.88               | 45.99               | -4.03     | 56.85                | 41.96                | 76.00               | 56.00               | 19.15            | 14.04            | 100          | 128          | H               |
| 1996.05          | 52.02               | 38.13               | 0.69      | 52.71                | 38.82                | 76.00               | 56.00               | 23.29            | 17.18            | 100          | 352          | H               |
| 2970.46          | 51.81               | 37.95               | 3.83      | 55.64                | 41.78                | 76.00               | 56.00               | 20.36            | 14.22            | 100          | 165          | H               |
| 1484.84          | 57.83               | 43.90               | -4.03     | 53.80                | 39.87                | 76.00               | 56.00               | 22.20            | 16.13            | 100          | 77           | V               |
| 2639.75          | 52.15               | 39.30               | 3.05      | 55.20                | 42.35                | 76.00               | 56.00               | 20.80            | 13.65            | 100          | 358          | V               |
| 2969.80          | 52.80               | 38.89               | 3.82      | 56.62                | 42.71                | 76.00               | 56.00               | 19.38            | 13.29            | 100          | 99           | V               |

**APPENDIX A**

**TEST EQUIPMENT AND ANCILLARIES USED FOR TESTS**

To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment are identified by the Test Laboratory.

**Conducted Emissions**

|                                     | Item              | Model Name           | Manufacturer    | Serial No.  | Next Cal.  | Interval |
|-------------------------------------|-------------------|----------------------|-----------------|-------------|------------|----------|
| <input checked="" type="checkbox"/> | EMI TEST Receiver | ESR                  | Rohde & Schwarz | 101499      | 2021.07.02 | 1 year   |
| <input checked="" type="checkbox"/> | Pulse Limiter     | ESH3-Z2              | Rohde & Schwarz | 100710      | 2021.03.16 | 1 year   |
| <input checked="" type="checkbox"/> | ISN               | ISN T800             | TESEQ           | 27109       | 2021.09.07 | 1 year   |
| <input checked="" type="checkbox"/> | ISN               | ENY81-CA6            | Rohde & Schwarz | 101565      | 2021.09.07 | 1 year   |
| <input type="checkbox"/>            | ISN               | ISN S8               | Schwarzbeck     | 79          | 2021.09.04 | 1 year   |
| <input type="checkbox"/>            | CURRENT PROBE     | EZ-17                | Rohde & Schwarz | 100508      | 2021.09.03 | 1 year   |
| <input type="checkbox"/>            | CDN               | TSCDN-C1-BNC-75      | F.C.C           | 07004       | 2021.05.08 | 1 year   |
| <input type="checkbox"/>            | LISN              | ESH3-Z6              | Rohde & Schwarz | 100378      | 2021.09.03 | 1 year   |
| <input type="checkbox"/>            | LISN              | ESH3-Z6              | Rohde & Schwarz | 101468      | 2021.09.03 | 1 year   |
| <input checked="" type="checkbox"/> | LISN(main)        | ENV216               | Rohde & Schwarz | 100408      | 2021.09.04 | 1 year   |
| <input checked="" type="checkbox"/> | LISN(sub)         | LT32C/10             | AFJ             | 32031518210 | 2021.09.03 | 1 year   |
| <input checked="" type="checkbox"/> | TEST PROGRAM      | e3_ce 20181212a (V9) | AUDIX           | -           | -          | -        |

**Radiated Emissions – Below 1 GHz**

|                                     | Item              | Model Name        | Manufacturer    | Serial No. | Next Cal.          | Interval |
|-------------------------------------|-------------------|-------------------|-----------------|------------|--------------------|----------|
| <input checked="" type="checkbox"/> | EMI TEST Receiver | ESU               | Rohde & Schwarz | 100092     | 2021.09.03         | 1 year   |
| <input checked="" type="checkbox"/> | Amplifier (25 dB) | 8447D             | HP              | 2944A07684 | 2021.03.16         | 1 year   |
| <input checked="" type="checkbox"/> | BILOG Antenna     | VULB 9168         | SCHWARZBECK     | 775        | 2021.03.26 (KOLAS) | 2 year   |
| <input type="checkbox"/>            | BILOG Antenna     | VULB 9168         | SCHWARZBECK     | 775        | 2021.11.12 (RRA)   | 2 year   |
| <input checked="" type="checkbox"/> | TEST PROGRAM      | e3 20181212a (V9) | AUDIX           | -          | -                  | -        |

**Radiated Emissions – Above 1 GHz**

|                                     | Item              | Model Name        | Manufacturer    | Serial No. | Next Cal.          | Interval |
|-------------------------------------|-------------------|-------------------|-----------------|------------|--------------------|----------|
| <input checked="" type="checkbox"/> | EMI TEST Receiver | ESU               | Rohde & Schwarz | 100092     | 2021.09.03         | 1 year   |
| <input checked="" type="checkbox"/> | Amplifier         | 8449B             | Agilent         | 3008A02126 | 2021.03.17         | 1 year   |
| <input type="checkbox"/>            | Amplifier         | PAM-840A          | COM-POWER       | 461314     | 2021.03.16         | 1 year   |
| <input type="checkbox"/>            | HORN ANTENNA      | 3116B             | ETS             | 133350     | 2022.05.12         | 2 year   |
| <input type="checkbox"/>            | HORN ANTENNA      | 3116B             | ETS             | 81109      | 2022.05.12         | 2 year   |
| <input checked="" type="checkbox"/> | HORN ANTENNA      | 3115              | ETS             | 114105     | 2021.09.17 (KOLAS) | 2 year   |
| <input type="checkbox"/>            | HORN ANTENNA      | 3115              | ETS             | 114105     | 2021.11.11 (RRA)   | 2 year   |
| <input checked="" type="checkbox"/> | TEST PROGRAM      | e3 20181212a (V9) | AUDIX           | -          | -                  | -        |

**APPENDIX B**

**PHOTOGRAPHS**

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## Conducted Emissions

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## Conducted Emissions (TEL)

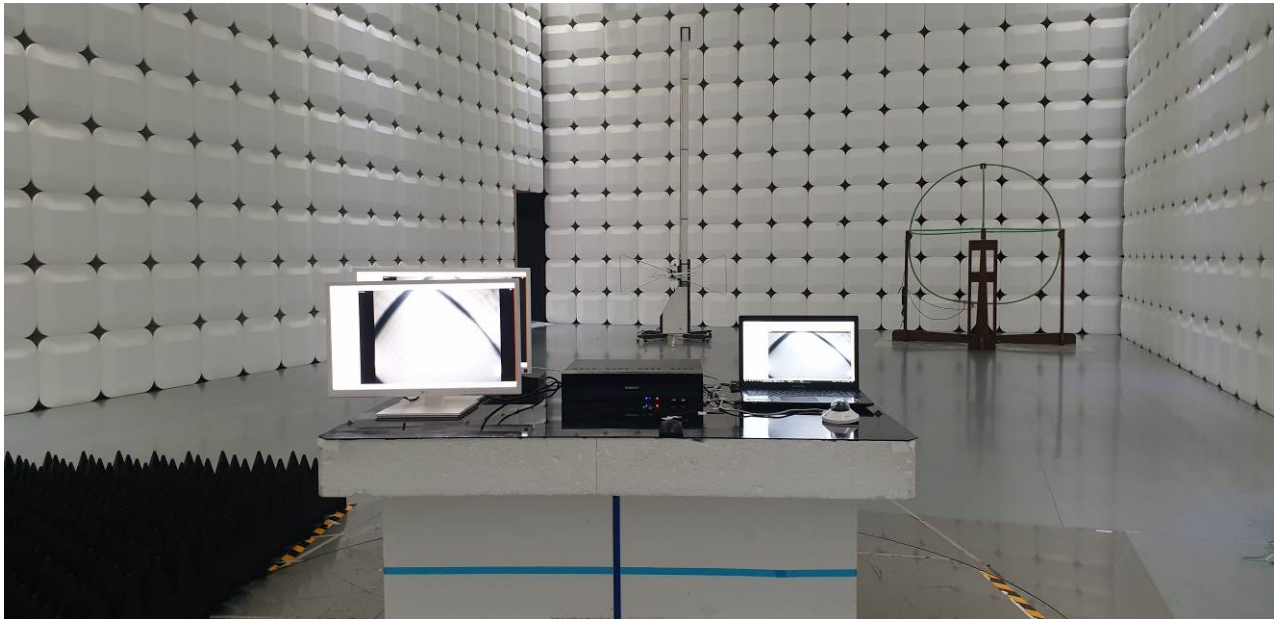
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## Radiated Emissions - Below 1 GHz

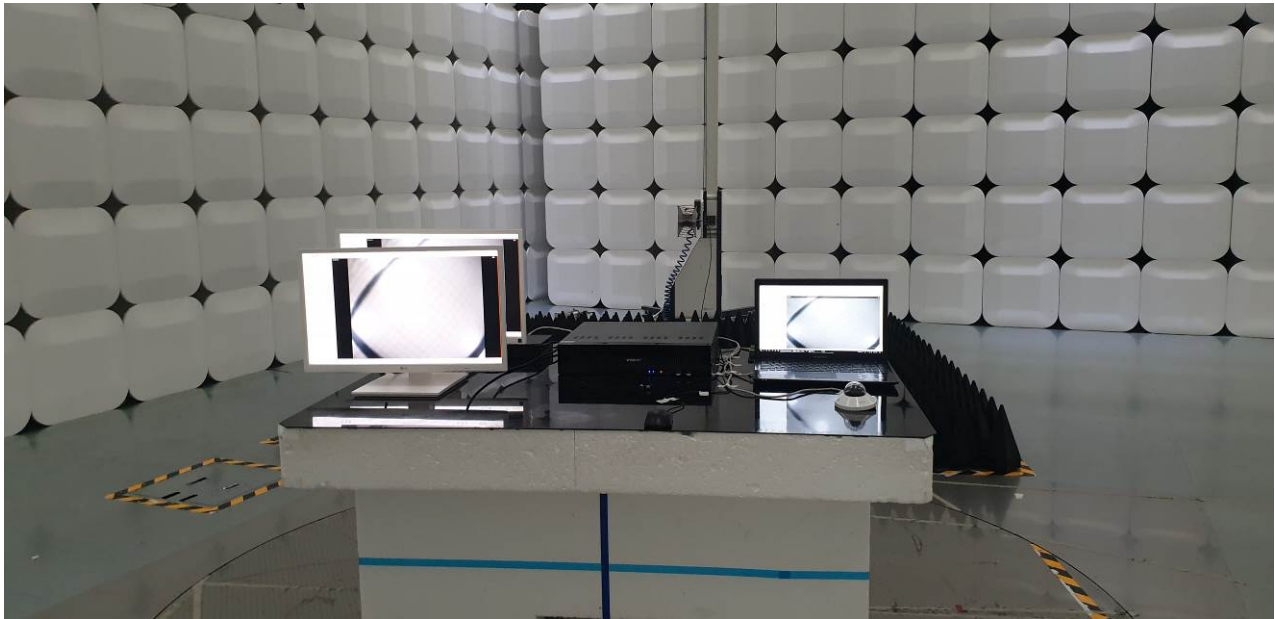
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## Radiated Emissions - Above 1 GHz

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## EUT

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## EUT

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