# EMC TEST REPORT

| | | | |
|---|---|---|---|
| **Project No.** | LBE20220500 | **Issue No.** | 1 |
| **Applicant** | **Name of organization** | Samsung Electronics Co., Ltd. | |
| | **Address** | (Maetan-dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea | |
| | **Date of receipt** | October 17, 2022 | |
| **EUT** | **Type of device** | ■ All other receivers subject to Part 15<br>■ Class B personal computers and peripherals<br>■ Other Class B digital devices and peripherals<br>☐ FM Broadcast Receiver | |
| | **Equipment authorization** | ■ Certification ☐ Supplier's Declaration of Conformity | |
| | **FCC ID** | A3LSMA146M | |
| | **Kind of product** | Mobile Phone | |
| | **Model No.** | SM-A146M/DS | |
| | **Variant Model No.** | Refer to clause 4.6 | |
| | **Manufacturer** | Samsung Electronics Vietnam Thai Nguyen Co., Ltd.<br>Yen Binh Industrial Zone Pho Ten Dist., Thai Nguyen Province, Vietnam | |
| | | SAMSUNG ELECTRONICS DA AMAZONIA<br>Rua Thomas Nilsen Junior Campinas Brasil 13097-105 | |
| **Applied Standards** | | 47 CFR Part 15, Subpart B, Class B / ANSI C63.4-2014 | |
| **Test Period** | | October 17, 2022~ November 18, 2022 | |
| **Issue date** | | November 24, 2022 | |

**Test result : Complied**

The equipment under test has found to be compliant with the applied standards.
(Refer to the attached test result for more detail.)

| | |
|---|---|
| **Tested by** : Young Hun Cheong | **Reviewed by** : Chang Eun Park |
| J. Y. H | C. E. Park |



Samsung Electronics Co., Ltd., Global CS Center
(Maetan dong) 129, Samsung-ro, Yeongtong-Gu, Suwon-Si,Gyeonggi-Do 16677, Korea

# Table of Contents

# 1. Report Information

## 1.1 Revision history

| No. | Date of Issue | Revised detailed information |
|---|---|---|
| Issue 0 | November 23, 2022 | There are no revisions and this version is basic test report. |
| Issue 1 | November 24, 2022 | Revised the EUT description by customer's request (EUT Frequencies) |

※ Remark

Only compliance with Part 15B (Section 15.107 Conducted limits) requirements for the receiver part of the licensed transmitter (equipment code CXX) is covered by this report.

# 2. Summary of test results

## 2.1 Emission

The EUT has been tested according to the following specifications:

| Applied | Test type | Applied standard | Result |
|---|---|---|---|
| ■ | Conducted Emission (Mains port) | 47 CFR Part 15 Subpart B / ANSI C63.4-2014 (Class B) | Complied |
| ■ | Radiated Emission | | Complied |

# 3. General Information

## 3.1 Test facility

The Global CS Center is located on Samsung Electronics Co., Ltd. at (Maetan-dong) 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea.
All testing are performed in Semi-anechoic chambers conforming to the site attenuation characteristics defined by ANSI C63.4, CISPR 32, CISPR 16-1-4 and Shielded rooms.
And all antennas are properly calibrated using ANSI C63.5:2017.

The Global CS Center is an ISO/IEC 17025 accredited testing laboratory by the National Radio Research Agency with designation No. KR0004. for EMC testing.

# 4. Test Setup configuration

## 4.1 Test Peripherals

The cables used for these peripherals are either permanently attached by the peripheral manufacturer or coupled with an assigned cable as defined below.
The following is a listing of the EUT and peripherals utilized during the performance of EMC test:

| Description | Model No. | Serial No. | Manufacturer / Trademark | FCC ID |
|---|---|---|---|---|
| Mobile Phone | SM-A146M/DS | - | SAMSUNG | A3LSMA146M |
| Travel Adapter | EP-TA200 | R37N2L16BN1SE3 | SOLU-M | - |
| Battery | EB-BA146ABY | - | SDI | - |
| Headset | EHS64AVFWE | - | CRESYN | - |
| Data Cable | EP-DR140 | - | SOLU-M | - |
| Micro SD Card | 64GB | - | SAMSUNG | - |
| Laptop Computer | Latitude5580 | 1WYRYM2 | Dell | DoC |
| | | D3HRYM2 | Dell | DoC |
| Laptop AC Adapter | LA65NM130 | 5DEA | Dell | DoC |
| | | 5B3C | Dell | DoC |
| Mouse | AA-SM7PCPB | CN57BA5903634AD V8JJCD4371 | SAMSUNG | DoC |
| | SMH-210UB | TAKGA05788 Z | SAMSUNG | DoC |
| Router | DIR-806A | RF0F1D8018454 | D-Link | DoC |
| | | RF0F1D8011504 | D-Link | DoC |

## 4.2 EUT operating mode

To achieve compliance applied standard specification including CXX, JAB and JBP requirement, the following mode(s) were made during compliance testing:

### 4.2.1 Conducted Emission

| No. | Operating mode |
|---|---|
| 1 | Camera (Rear) + Charging (w/TA) + Cellular receiver (LTE FDD26 Center Frequency) |
| 2 | Camera (Front) + Charging (w/TA) |
| 3 | Video + Audio playback from internal memory + Charging (w/TA) |
| 4 | USB data communication with PC (from external memory) |

### 4.2.2 Radiated Emission

| No. | Operating mode |
|---|---|
| 1 | Camera (Rear) + Charging (w/TA) |
| 2 | Camera (Front) |
| 3 | Video + Audio playback from internal memory |
| 4 | USB data communication with PC (from external memory) |

## 4.3 Details of Sampling

Customer selected, single unit.

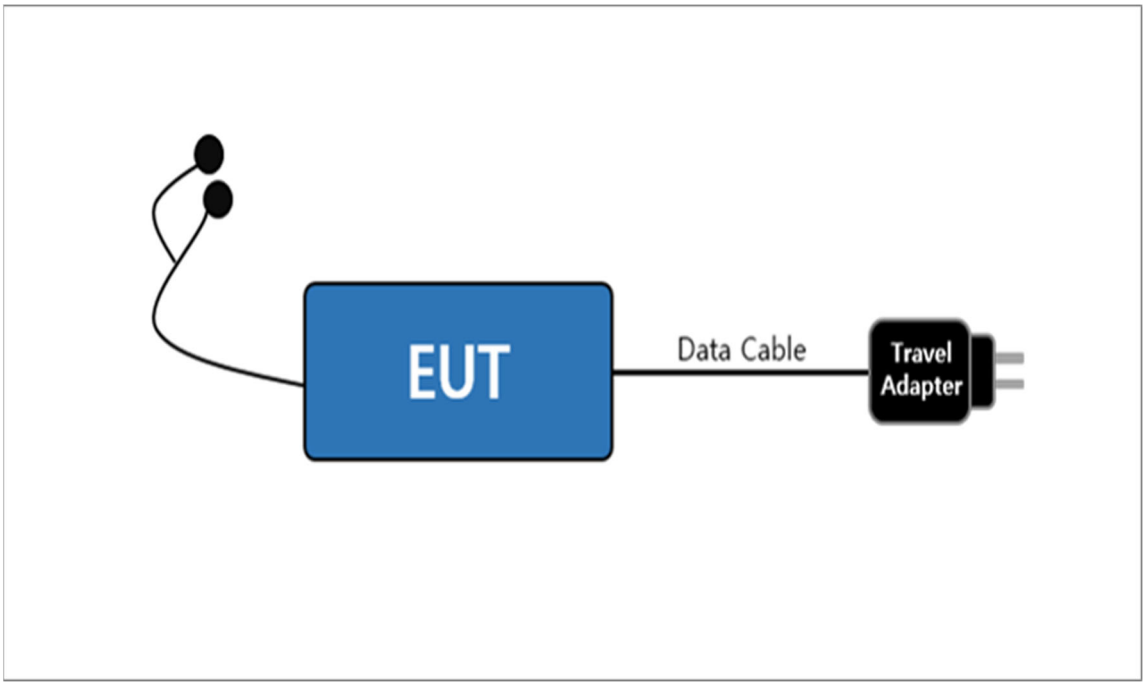
## 4.4 Used cable description

The EUT is configured, installed, arranged and operated in a manner consistent with typical applications. Interface cables/loads/devices are connected to at least one of each type of interface port of the EUT, and where practical, each cable shall be terminated in a device typical of actual usage. The type(s) of interconnecting cables to be used and the interface port (of the EUT) to which these were connected:

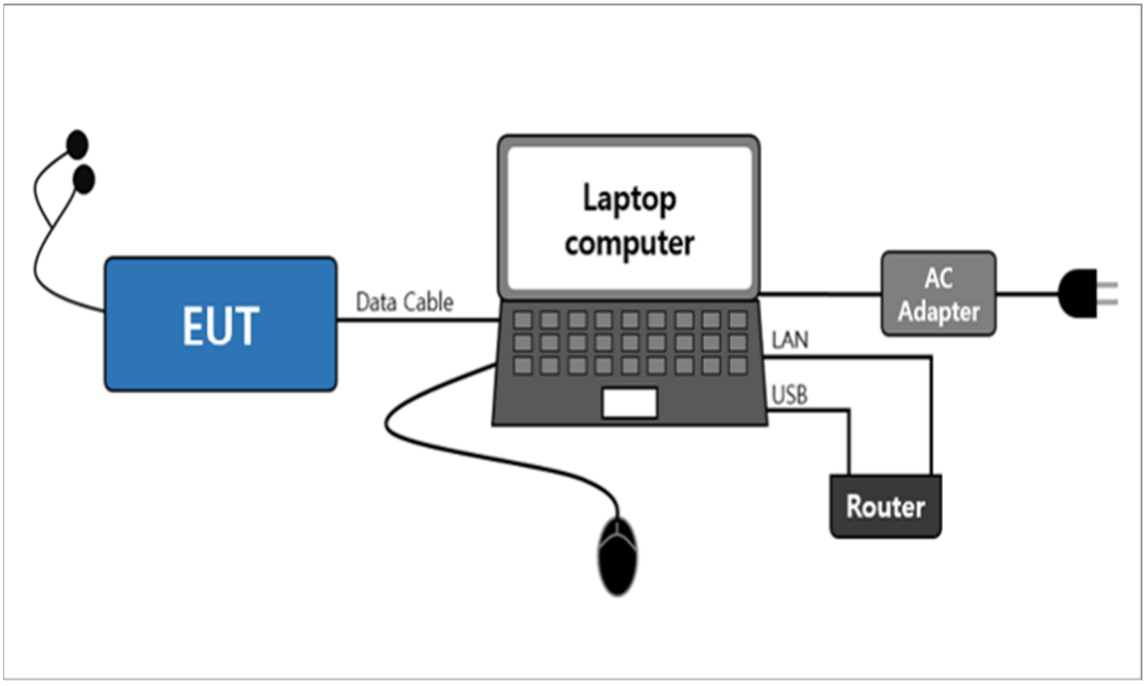
| Connected cable | Length [m] | Shielded [Y/N] | Note |
|---|---|---|---|
| Data Cable | 1.0 | Y | From EUT to Laptop Computer or Travel Adapter |
| Headset | 1.2 | N | For EUT |
| Power | 1.8 | N | From Laptop Computer to AC Adapter |
| Power | 1.5 | N | For Laptop AC Adapter |
| LAN | 1.5 | N | From Laptop Computer to Router |
| USB | 0.8 | Y | From Laptop Computer to Router for DC Power |
| USB | 1.8 | Y | From Laptop Computer to Mouse |

## 4.5 Test arrangement

### 4.5.1 Conducted Emission

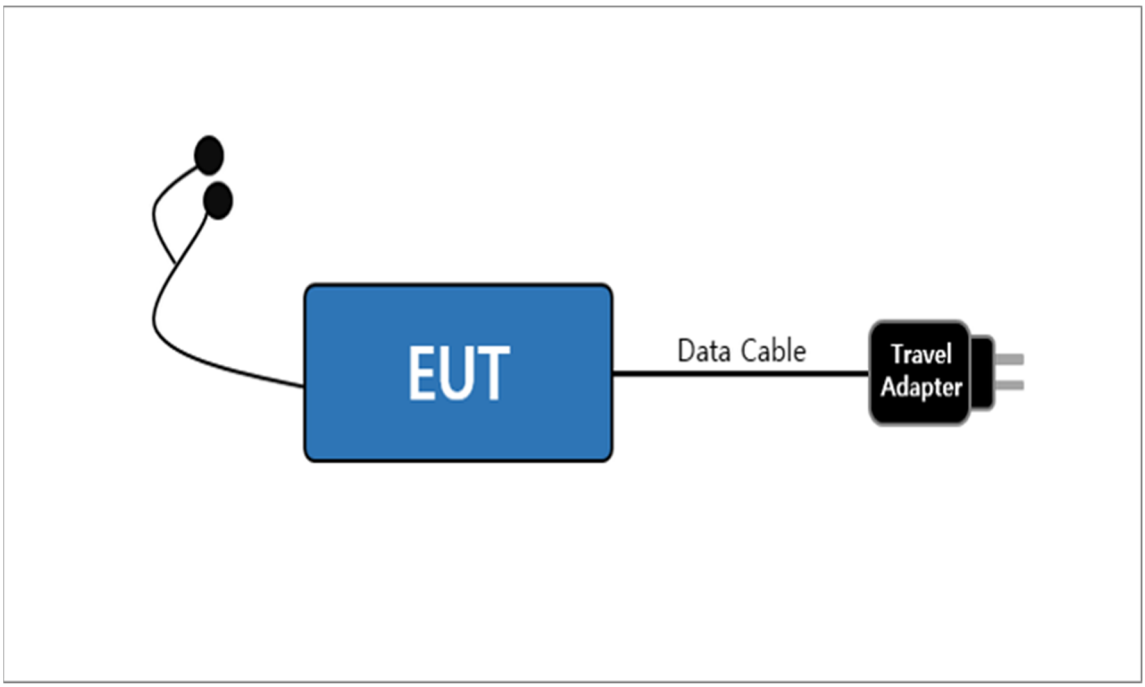



**[ Mode 1 – 3 ]**

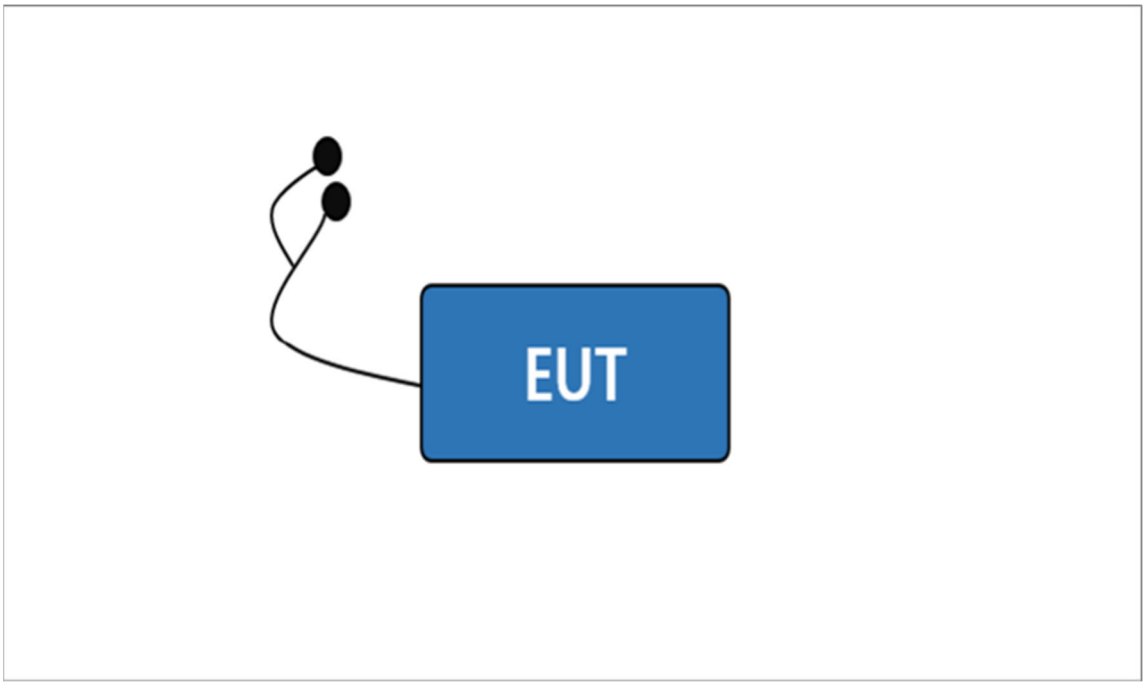



**[ Mode 4 ]**

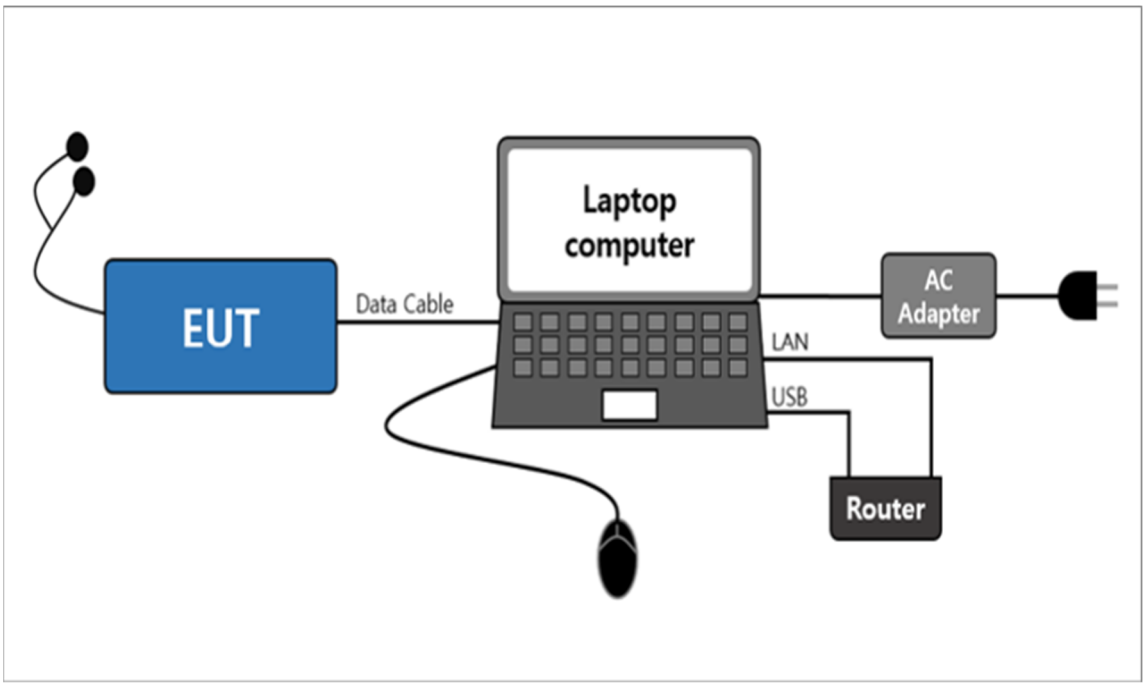
## 4.5.2 Radiated Emission




**[ Mode 1 ]**




**[ Mode 2 – 3 ]**




**[ Mode 4 ]**

## 4.6 EUT Description

The EUT is a bar type mobile phone which can operate on GSM 850/900/1800/1900, WCDMA FDD 1/2/4/5/8, LTE FDD 1/2/3/4/5/7/8/12/13/20/26/28/66, LTE TDD 38/40/41, 5G NR n1/3/5/7/8/28/38/40/41/66/78 and incorporates a Bluetooth, Wi-Fi (802.11 b/g/n/a/ac), Camera, Audio, Video and GNSS.

### 4.6.1 The variant models

- SM-A146M

## 4.7 EUT Frequencies

| The highest frequencies (Generated and used) | Frequency [ MHz ] |
|---|---|
| Wi-Fi | 5 825 |

## 4.8 Test configuration and condition

The system was configured for testing in a typical fashion that a customer would normally use. Cables were attached to each of the available I/O Ports. Where applicable, peripherals were attached to the I/O cables.

All the external I/O ports are exercised, as well as internal and
the external SD card(if available), by writing and reading arbitrary data or charging with TA.

The EUT was investigated in three orientations and the worst case orientation is reported.

For the AC conducted emissions test, the conducted emissions of receiver modes which operate within the frequency range of 30-960 MHz were compared through preliminary tests. However, no significant differences were found to affect the conducted emission, so the test result for one representative receiver frequency band (LTE FDD26) were reported.

The video and audio(1 kHz sound) were repetitively played with the earphone connected.

The camera of the EUT was operated continuously.

Power source for the EUT operating was supplied by CVCF.

**- Test Voltage : AC 120 V, 60 Hz**

## 4.9 Measurement uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus : (According to CISPR 16-4-2 and UKAS M3003)

| Test type | | Measurement uncertainty (C.L. approximately 95 %, $k$ = 2) |
|---|---|---|
| Conducted Emission | AC Mains | 2.83 dB |
| Radiated Emission (Below 1 GHz) | Horizontal | 4.15 dB |
| | Vertical | 4.51 dB |
| Radiated Emission (Above 1 GHz) | Horizontal | 4.99 dB |
| | Vertical | 4.99 dB |

* Remark

1) The values for uncertainty of conducted and radiated emissions are less than the Corresponding values of Ucispr given in CISPR 16-4-2. Therefore no adjustment of measurement results is necessary when comparing them with the relevant limits.

# 5. Results of individual test

## 5.1 Conducted Emission

The EUT is connected to a LISN via travel adapter. If the EUT is connected to the Laptop Computer USB port, the Laptop AC adapter is connected to a LISN.
Both conducted lines are measured in Quasi-Peak and CISPR-Average mode, including the worst-case data points for each tested configuration. The EUT measured in accordance with the methods described in standards.

Limits for Conducted emission at the mains ports of Class B

| Frequency range Limits [ MHz ] | Resolution Bandwidth [ kHz ] | Limits [ dB(μV) ] | |
|---|---|---|---|
| | | Quasi-peak | Average |
| 0.15 to 0.50 | 9 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 9 | 56 | 46 |
| 5 to 30 | 9 | 60 | 50 |
| NOTE 1 The lower limit shall apply at the transition frequency.<br>NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz. | | | |

### 5.1.1 Test instrumentation

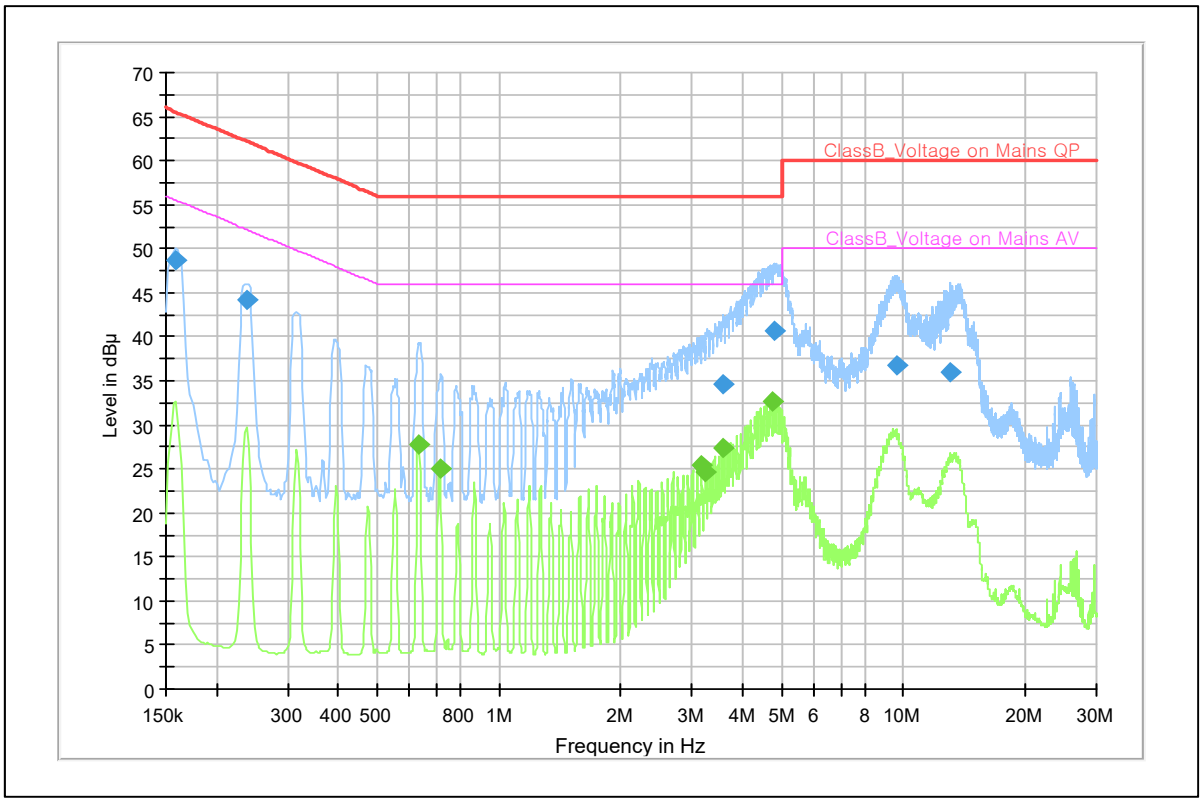
| EMC No. | Test Instrument | Model name | Manufacturer | Serial No. | Next Calibration | |
|---|---|---|---|---|---|---|
| | | | | | Date | Interval (Month) |
| E5I-006 | LTE Communicator | CMW500 | R&S | 132728 | 2023-04-12 | 12 |
| E5I-127 | Two-Line V-Network | ENV216 | R&S | 102061 | 2023-01-17 | 12 |
| E5I-247 | EMI Test Receiver | ESW8 | R&S | 103124 | 2023-07-20 | 12 |
| - | Test software | EMC32 | R&S | Ver 10.60.20 | - | - |

### 5.1.2 Temperature and humidity condition

| | | | |
|---|---|---|---|
| **Test date** | 2022-10-28, 2022-11-01 | **Test engineer** | Young Hun Cheong |
| **Climate condition** | Ambient temperature | (23.4 ± 0.5) ℃ | Limit (15.0 to 35.0) ℃ |
| | Humidity | (38.8 ± 0.5) % R.H. | Limit (25.0 to 75.0) % R.H. |
| | Atmospheric pressure | (101.5 ± 0.5) kPa | Limit (86.0 to 106.0) kPa |
| **Test place** | Shield Room (SR8) | | |

## 5.1.3 Test Results

### □ Operating Mode 1: AC Mains



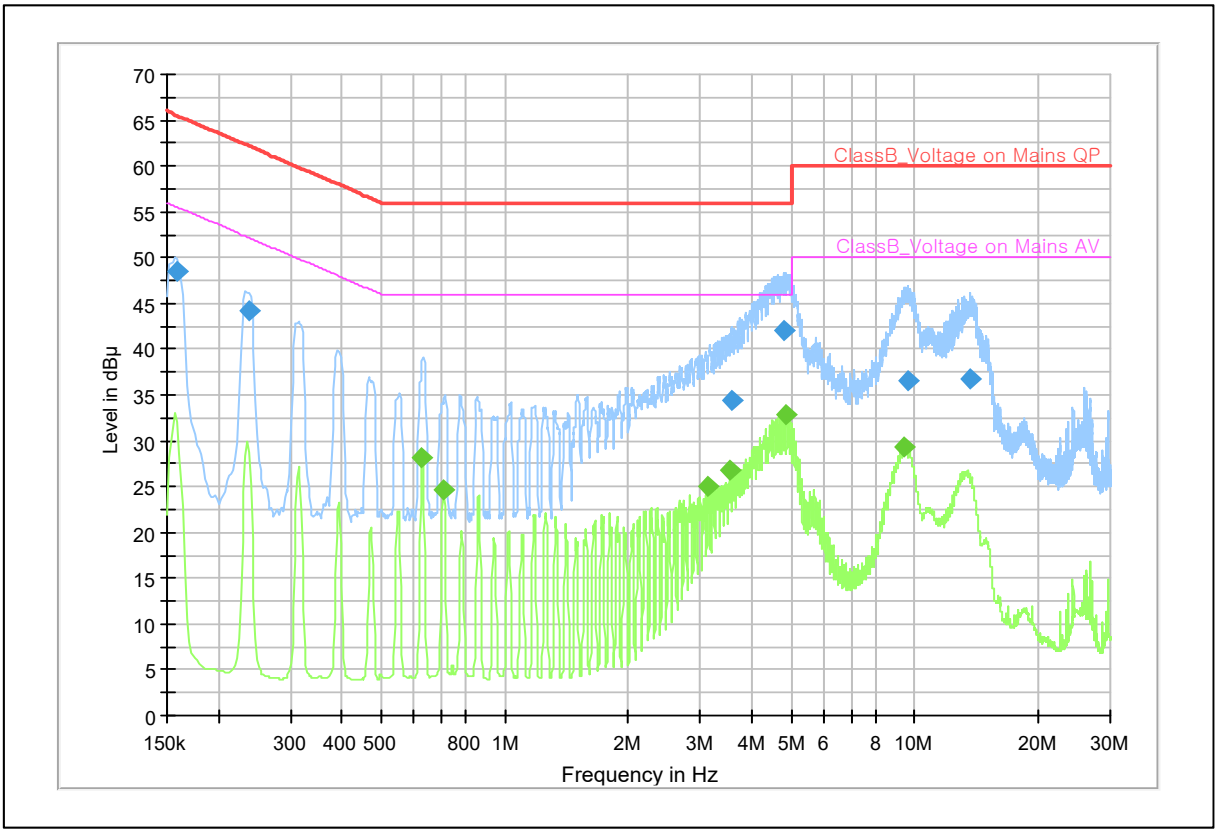

Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

| Frequency (MHz) | QP (dBµV) | CAV (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.159 | 48.6 | --- | 65.5 | 16.9 | N | 10.1 |
| 0.238 | 44.2 | --- | 62.2 | 17.9 | N | 9.9 |
| 0.634 | --- | 27.7 | 46.0 | 18.3 | N | 10.1 |
| 0.713 | --- | 25.0 | 46.0 | 21.0 | N | 10.0 |
| 3.167 | --- | 25.5 | 46.0 | 20.5 | N | 10.0 |
| 3.248 | --- | 24.6 | 46.0 | 21.4 | N | 10.0 |
| 3.566 | --- | 27.4 | 46.0 | 18.7 | N | 10.0 |
| 3.588 | 34.7 | --- | 56.0 | 21.3 | N | 10.0 |
| 4.756 | --- | 32.6 | 46.0 | 13.5 | N | 10.0 |
| 4.808 | 40.7 | --- | 56.0 | 15.3 | N | 10.0 |
| 9.614 | 36.8 | --- | 60.0 | 23.2 | L1 | 10.2 |
| 13.049 | 36.0 | --- | 60.0 | 24.0 | L1 | 10.3 |

Note 2) Level (QP and/or CAV) = Meter Reading (QP and/or CAV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or CAV) = Limit – Level (QP and/or CAV)
QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

## □ Operating Mode 2: AC Mains



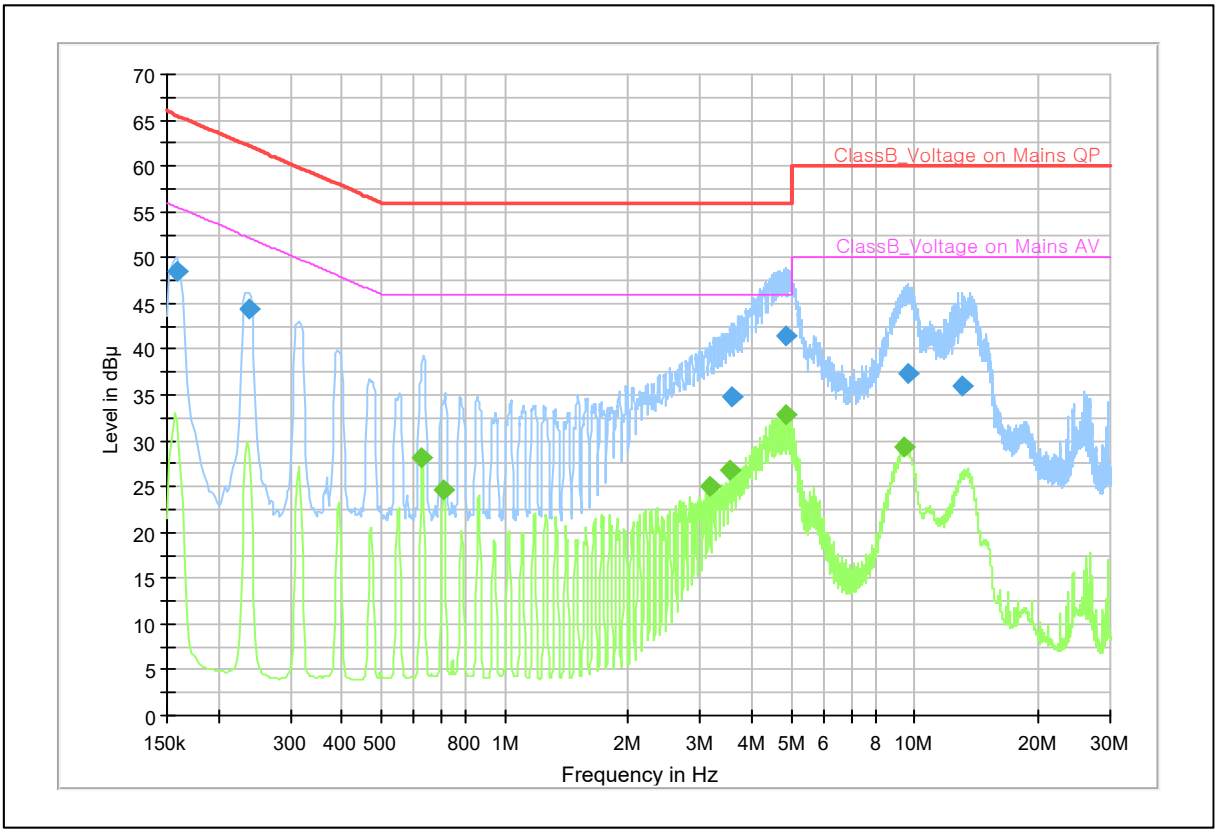

Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

| Frequency (MHz) | QP (dBµV) | CAV (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.159 | 48.4 | --- | 65.5 | 17.1 | L1 | 10.1 |
| 0.238 | 44.2 | --- | 62.2 | 18.0 | N | 9.9 |
| 0.629 | --- | 28.2 | 46.0 | 17.8 | N | 10.1 |
| 0.708 | --- | 24.7 | 46.0 | 21.3 | N | 10.0 |
| 3.131 | --- | 25.0 | 46.0 | 21.0 | N | 10.0 |
| 3.557 | --- | 26.7 | 46.0 | 19.3 | N | 10.0 |
| 3.581 | 34.4 | --- | 56.0 | 21.6 | N | 10.0 |
| 4.817 | 42.0 | --- | 56.0 | 14.0 | N | 10.0 |
| 4.823 | --- | 32.9 | 46.0 | 13.1 | N | 10.0 |
| 9.407 | --- | 29.4 | 50.0 | 20.6 | N | 10.2 |
| 9.634 | 36.6 | --- | 60.0 | 23.4 | L1 | 10.2 |
| 13.614 | 36.8 | --- | 60.0 | 23.2 | N | 10.4 |

Note 2) Level (QP and/or CAV) = Meter Reading (QP and/or CAV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or CAV) = Limit – Level (QP and/or CAV)
QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

## □ Operating Mode 3: AC Mains



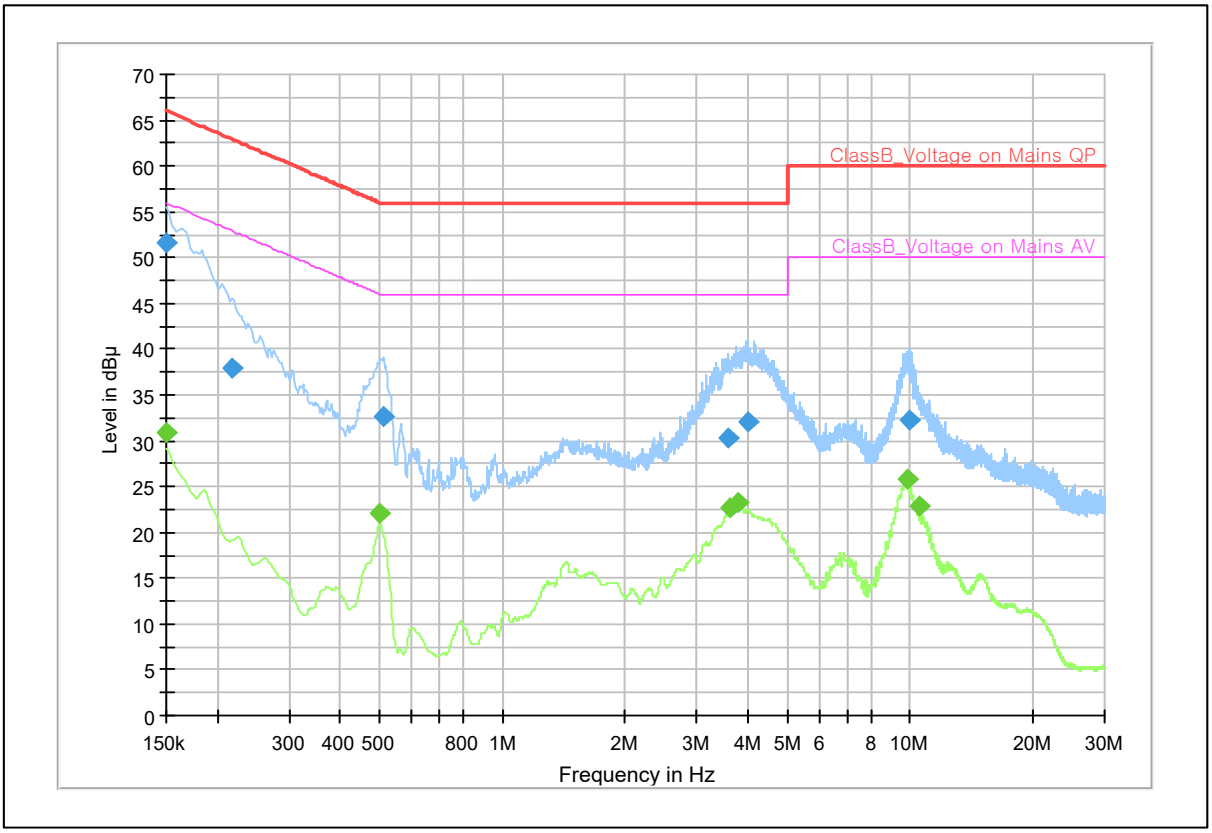

Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

| Frequency (MHz) | QP (dBµV) | CAV (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.159 | 48.5 | --- | 65.5 | 17.0 | L1 | 10.1 |
| 0.238 | 44.3 | --- | 62.2 | 17.9 | N | 9.9 |
| 0.629 | --- | 28.2 | 46.0 | 17.8 | N | 10.1 |
| 0.708 | --- | 24.7 | 46.0 | 21.3 | N | 10.0 |
| 3.161 | --- | 25.0 | 46.0 | 21.0 | N | 10.0 |
| 3.557 | --- | 26.7 | 46.0 | 19.3 | N | 10.0 |
| 3.579 | 34.9 | --- | 56.0 | 21.1 | N | 10.0 |
| 4.823 | --- | 32.9 | 46.0 | 13.1 | N | 10.0 |
| 4.835 | 41.5 | --- | 56.0 | 14.5 | N | 10.0 |
| 9.407 | --- | 29.4 | 50.0 | 20.6 | N | 10.2 |
| 9.643 | 37.4 | --- | 60.0 | 22.6 | L1 | 10.2 |
| 13.038 | 35.9 | --- | 60.0 | 24.1 | L1 | 10.3 |

Note 2) Level (QP and/or CAV) = Meter Reading (QP and/or CAV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or CAV) = Limit – Level (QP and/or CAV)
QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

## □ Operating Mode 4: AC Mains




Note 1) Two graphs measured for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

QP / CAV final measurement results table:

| Frequency (MHz) | QP (dBµV) | CAV (dBµV) | Limit (dBµV) | Margin (dB) | Line | Corr. (dB) |
|---|---|---|---|---|---|---|
| 0.150 | --- | 31.0 | 56.0 | 25.0 | L1 | 9.8 |
| 0.150 | 51.5 | --- | 66.0 | 14.5 | L1 | 9.8 |
| 0.218 | 38.0 | --- | 62.9 | 25.0 | L1 | 9.9 |
| 0.501 | --- | 22.1 | 46.0 | 24.0 | N | 10.0 |
| 0.512 | 32.7 | --- | 56.0 | 23.3 | N | 10.0 |
| 3.581 | 30.3 | --- | 56.0 | 25.7 | N | 9.8 |
| 3.602 | --- | 22.6 | 46.0 | 23.4 | L1 | 9.8 |
| 3.802 | --- | 23.2 | 46.0 | 22.8 | L1 | 9.8 |
| 3.993 | 32.1 | --- | 56.0 | 23.9 | L1 | 9.8 |
| 9.861 | --- | 25.9 | 50.0 | 24.1 | N | 9.9 |
| 9.935 | 32.3 | --- | 60.0 | 27.7 | N | 9.9 |
| 10.480 | --- | 22.8 | 50.0 | 27.2 | N | 9.9 |

Note 2) Level (QP and/or CAV) = Meter Reading (QP and/or CAV) + Corr. (LISN Insertion Loss + Cable Loss)
Margin (QP and/or CAV) = Limit – Level (QP and/or CAV)
QP = Quasi-Peak, CAV = CISPR-Average, Corr. = Correction Factor

## 5.2 Radiated Emission

The following data lists the significant emission frequencies, measured levels, correction factors (for antenna and cables), orientation of table, polarization and height of antenna, the corrected reading, the limit, and the amount of margin.

Peak measurements were made over the changeable frequency range 30 MHz to 1 GHz at a measurement distance of 3 m for the following antenna and turntable arrangements:

| Antenna Height [ cm ] | Antenna Polarization | Resolution Bandwidth [ kHz ] | Video Bandwidth [ kHz ] | Turntable position [ degrees ] |
|---|---|---|---|---|
| 100 ~ 400 | Horizontal, Vertical | 120 | 300 | Continuous |

Measurements within 6 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using quasi-peak detector.

Peak/CISPR-Average measurements were made over the changeable frequency range 1 GHz to 40 GHz or 5th harmonics of the highest frequency generated or used in the device or on which the device operates or tunes at a measurement distance of 3 m for the following antenna and turntable arrangements. The measurements above 1 GHz were performed with the bore-sighting antenna aimed at the EUT.

| Antenna Height [ cm ] | Antenna Polarization | Resolution Bandwidth [ MHz ] | Video Bandwidth [ MHz ] | Turntable position [ degrees ] |
|---|---|---|---|---|
| 100 ~ 400 | Horizontal, Vertical | 1 | 3 | Continuous |

Measurements within 6 dB of the limit were then maximized by adjusting turntable position.
Final measurements were made using peak and CISPR-average detectors.

**Limits for Radiated emission of Class B at a measuring distance of 3 m and 10 m**

| Frequency range Limits [ MHz ] | Field Strength | | |
|---|---|---|---|
| | 3 m [ μV/m ] | 3 m [ dB(μV/m) ] | 10 m [ dB(μV/m) ] |
| 30 to 88 | 100 | 40.0 | 29.5 |
| 88 to 216 | 150 | 43.5 | 33.0 |
| 216 to 960 | 200 | 46.0 | 35.5 |
| Above 960 | 500 | 54.0 | 43.5 |

Note) Distance correction fomula from D1(3m) to D2(10m)
: Limit at D2 = Limit at D1 + 20Log(D1 /D2)
Results checked manually; and points close to the limit line were re-measured.

## 5.2.1 Test instrumentation

| EMC No. | Test Instrument | Model name | Manufacturer | Serial No. | Next Calibration | |
|---|---|---|---|---|---|---|
| | | | | | Date | Interval (Month) |
| E5I-021 | EMI Test Receiver | ESU40 | R&S | 100376 | 2023-01-28 | 12 |
| E5I-018 | EMI Test Receiver | ESU8 | R&S | 100484 | 2023-05-26 | 12 |
| E5I-248 | EMI Test Receiver | ESW44 | R&S | 103129 | 2023-07-20 | 12 |
| E5I-069 | BiLog Antenna | CBL6112D | TESEQ | 35382 | 2023-08-09 | 24 |
| E5I-138 | 6 dB Fixed Attenuator | 8491A | Keysight | MY52462285 | 2023-08-09 | 24 |
| E5I-071 | BiLog Antenna | CBL6112D | TESEQ | 35384 | 2023-08-09 | 24 |
| E5I-136 | 6 dB Fixed Attenuator | 8491A | Keysight | MY52462355 | 2023-08-09 | 24 |
| E5I-073 | Preamplifier | 310N | SONOMA | 332016 | 2023-05-02 | 12 |
| E5I-074 | Preamplifier | 310N | SONOMA | 332017 | 2023-05-02 | 12 |
| E5I-149 | Horn Antenna | HF907 | R&S | 102525 | 2023-04-04 | 12 |
| E5I-039 | Signal Conditioning Unit | SCU-18 | R&S | 10211 | 2023-04-18 | 12 |
| E5I-037 | WideBand Horn Antenna | WBH 18-40K | R&S | 11201 | 2023-03-14 | 12 |
| E5I-042 | Signal Conditioning Unit | SCU-40A | R&S | 10004 | 2023-09-21 | 12 |
| - | Test software | EP7RE | TOYO | Ver 8.0.20 | - | - |
| - | Test software | EMC32 | R&S | Ver 10.60.20 | - | - |

## 5.2.1 Temperature and humidity condition

| **Test date** | 2022-10-17, 2022-10-27, 2022-11-18 | **Test engineer** | Young Hun Cheong |
|---|---|---|---|
| **Climate condition** | Ambient temperature | (23.0 ± 0.5) ℃ | Limit (15.0 to 35.0) ℃ |
| | Humidity | (38.2 ± 0.5) % R.H. | Limit (25.0 to 75.0) % R.H. |
| | Atmospheric pressure | (102.0 ± 0.5) kPa | Limit (86.0 to 106.0) kPa |
| **Test place** | Semi-Anechoic Chamber (SAC5) | | |

## 5.2.3 Test Results

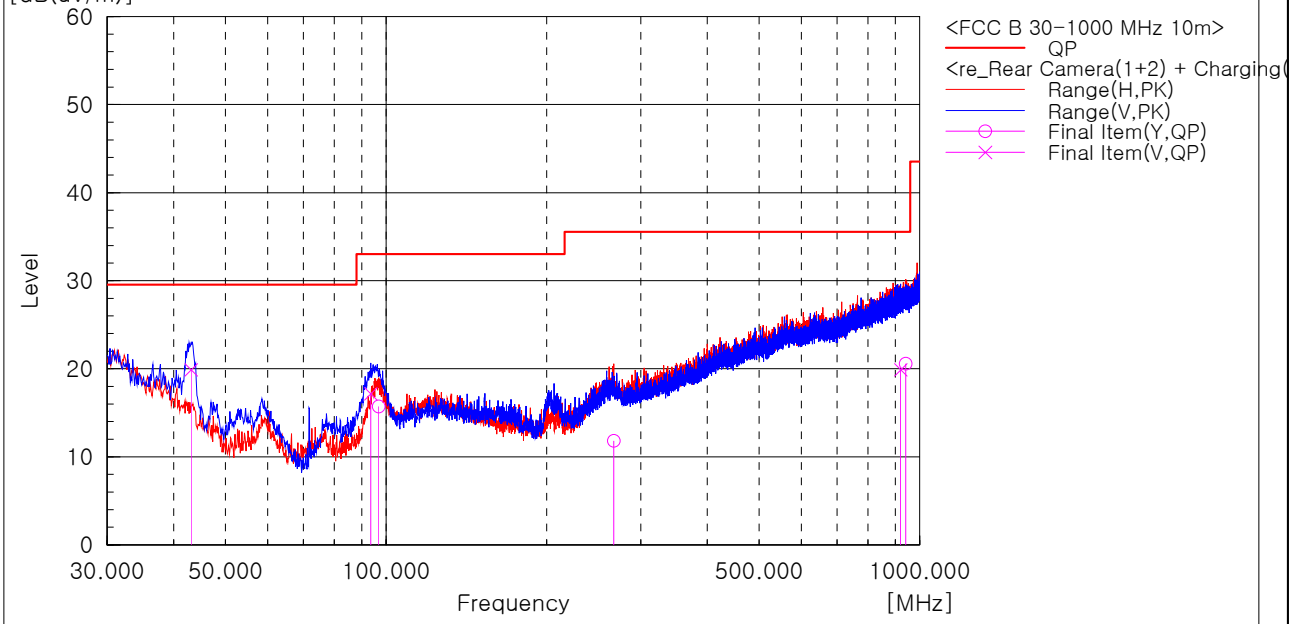
### □ Operating Mode 1

### - Frequencies below 1 GHz

<<>>

Model : SM-A146M/DS
Serial Number :
Operator : YH.Cheong
AC Power :
Temp, Humid :

Limit :
Remark1 : Rear Camera(1+2) + Charging(w/ TA)
Remark2 :
Remark3 :
Remark4 :




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] | System |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 96.809 | H | 30.6 | -14.9 | 15.7 | 33.0 | 17.3 | 400 | 124 | 1 |
| 2 | 43.095 | V | 33.5 | -13.6 | 19.9 | 29.5 | 9.6 | 101 | 307 | 2 |
| 3 | 267.044 | H | 22.3 | -10.5 | 11.8 | 35.5 | 23.7 | 351 | 206 | 1 |
| 4 | 93.535 | V | 32.4 | -15.2 | 17.2 | 33.0 | 15.8 | 140 | 256 | 2 |
| 5 | 941.315 | H | 20.4 | 0.2 | 20.6 | 35.5 | 14.9 | 100 | 38 | 1 |
| 6 | 921.187 | V | 19.3 | 0.6 | 19.9 | 35.5 | 15.6 | 347 | 357 | 2 |

Note1) Receiving antenna polarization : Horizontal, Vertical

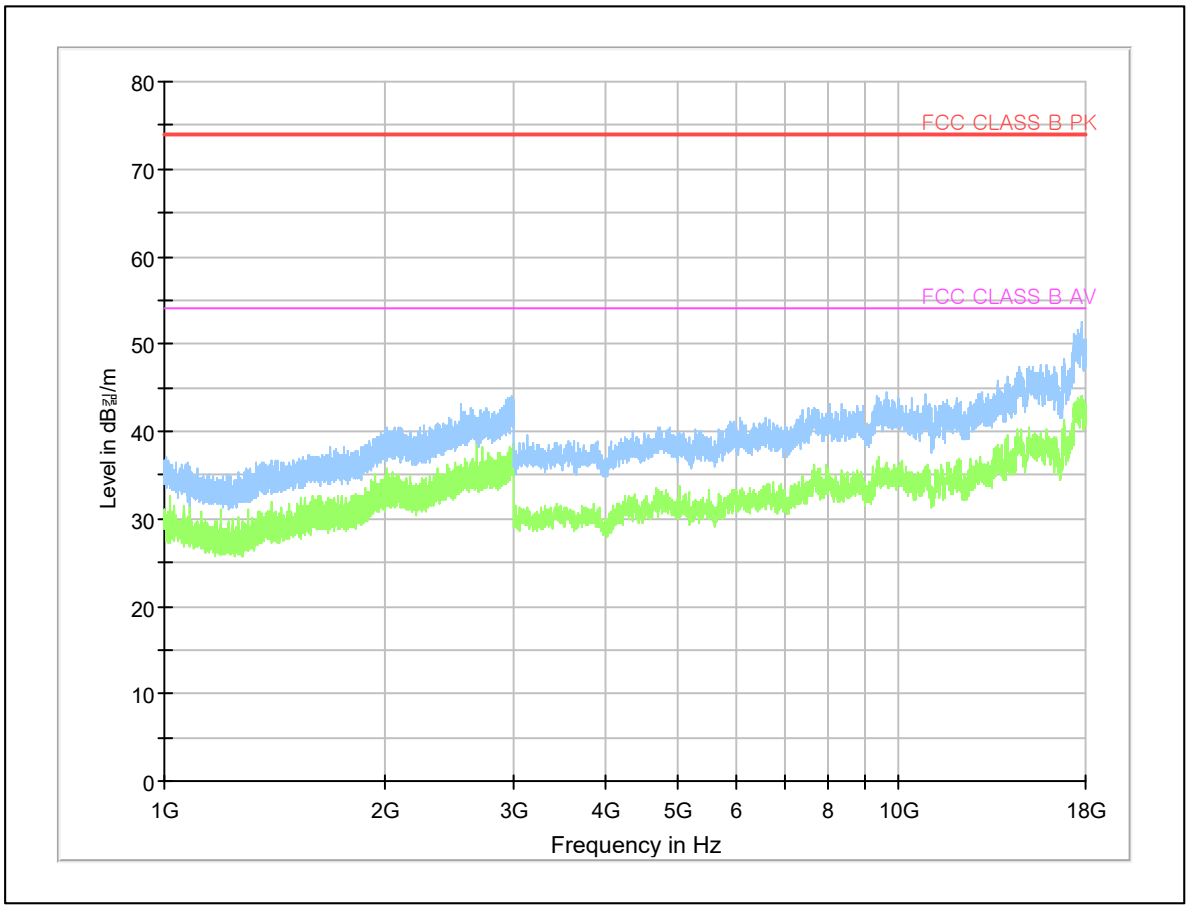
Test Distance : 10 m, Antenna Height : 1 to 4 meters

Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

## - Frequencies above 1 GHz




Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

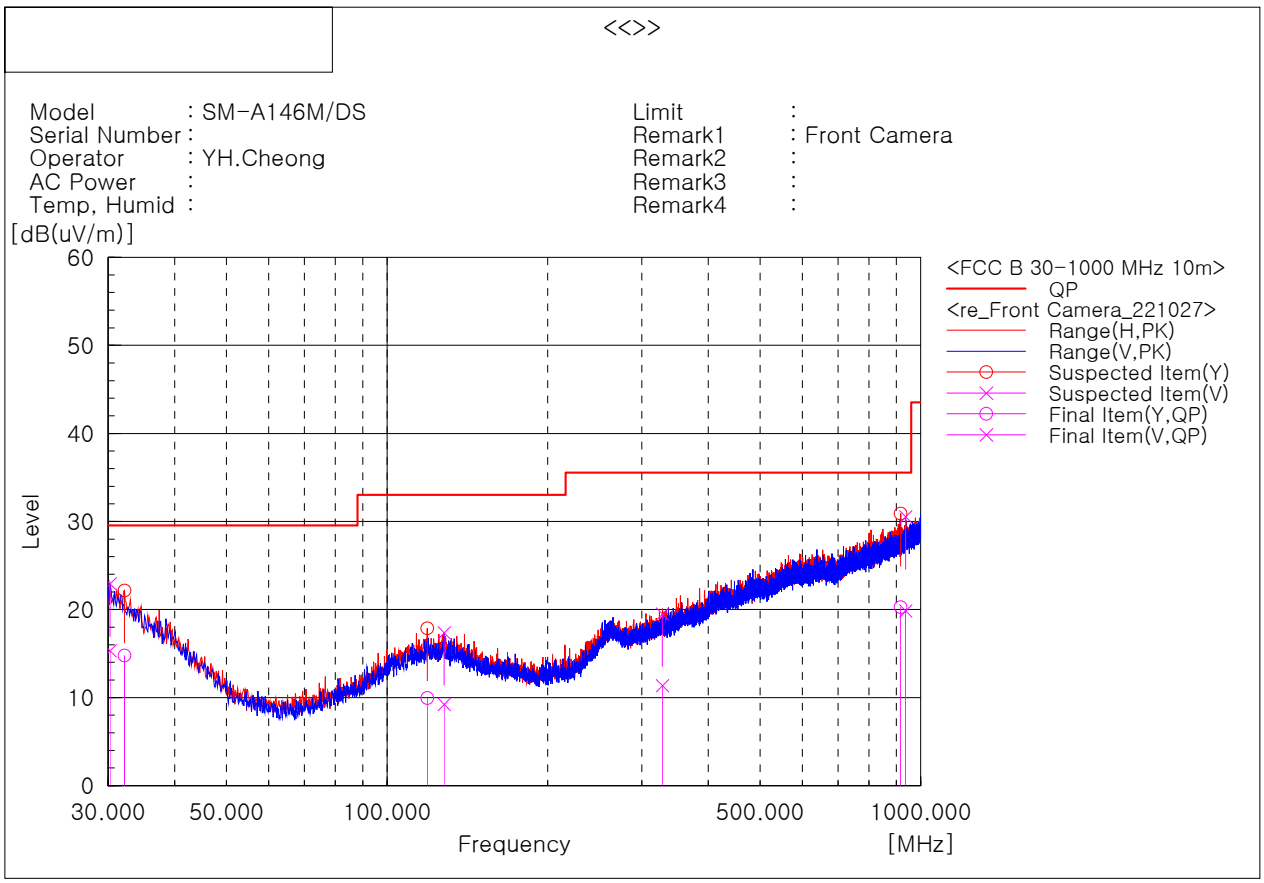
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

## □ Operating Mode 2

### - Frequencies below 1 GHz




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] | System |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30.243 | V | 22.1 | -6.8 | 15.3 | 29.5 | 14.2 | 172 | 210 | 2 |
| 2 | 32.183 | H | 22.9 | -8.1 | 14.8 | 29.5 | 14.7 | 106 | 122 | 1 |
| 3 | 118.876 | H | 22.4 | -12.4 | 10.0 | 33.0 | 23.0 | 133 | 324 | 1 |
| 4 | 127.849 | V | 21.5 | -12.2 | 9.3 | 33.0 | 23.7 | 262 | 188 | 2 |
| 5 | 328.033 | V | 20.6 | -9.2 | 11.4 | 35.5 | 24.1 | 357 | 350 | 2 |
| 6 | 916.822 | H | 20.3 | 0.0 | 20.3 | 35.5 | 15.2 | 194 | 30 | 1 |
| 7 | 937.435 | V | 18.9 | 0.9 | 19.8 | 35.5 | 15.7 | 399 | 200 | 2 |

Note1) Receiving antenna polarization : Horizontal, Vertical

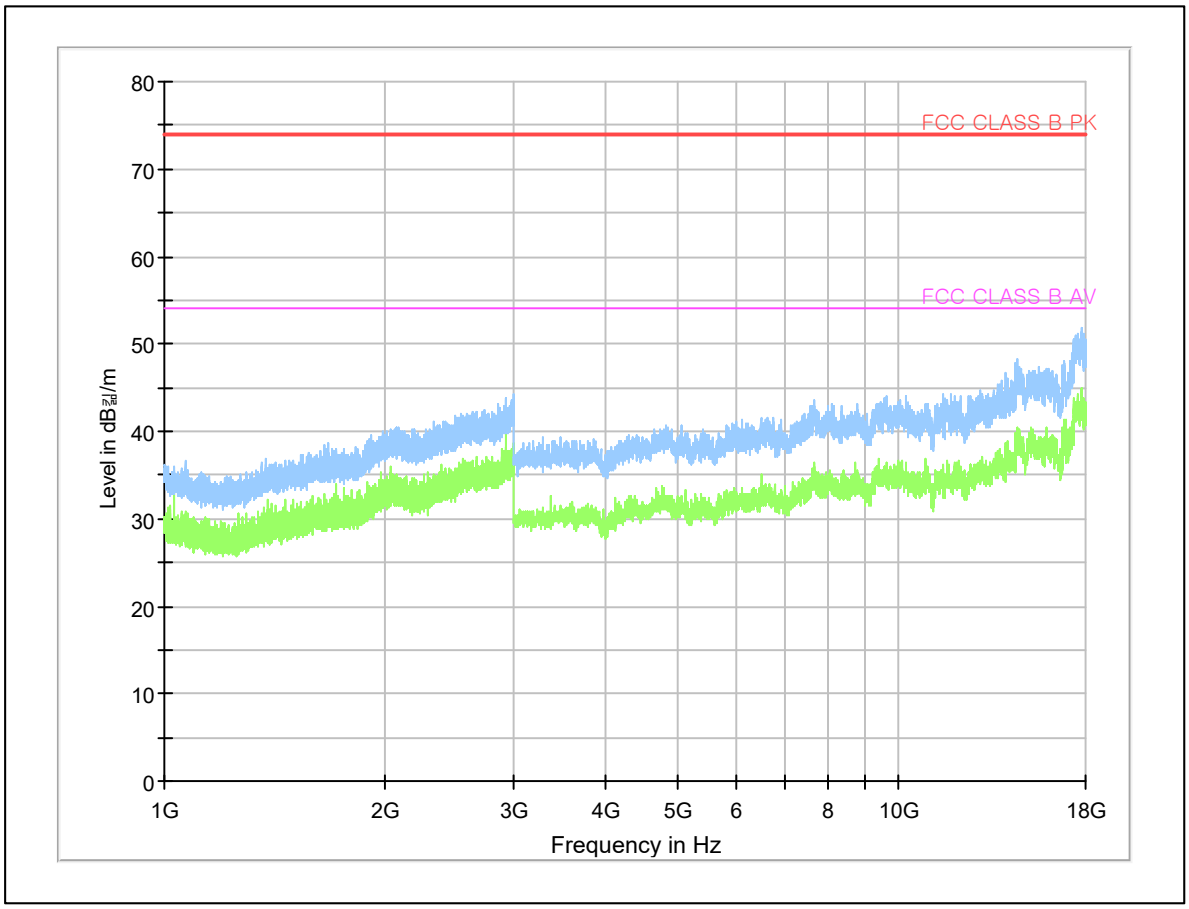
Test Distance : 10 m, Antenna Height : 1 to 4 meters

Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

## - Frequencies above 1 GHz




Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

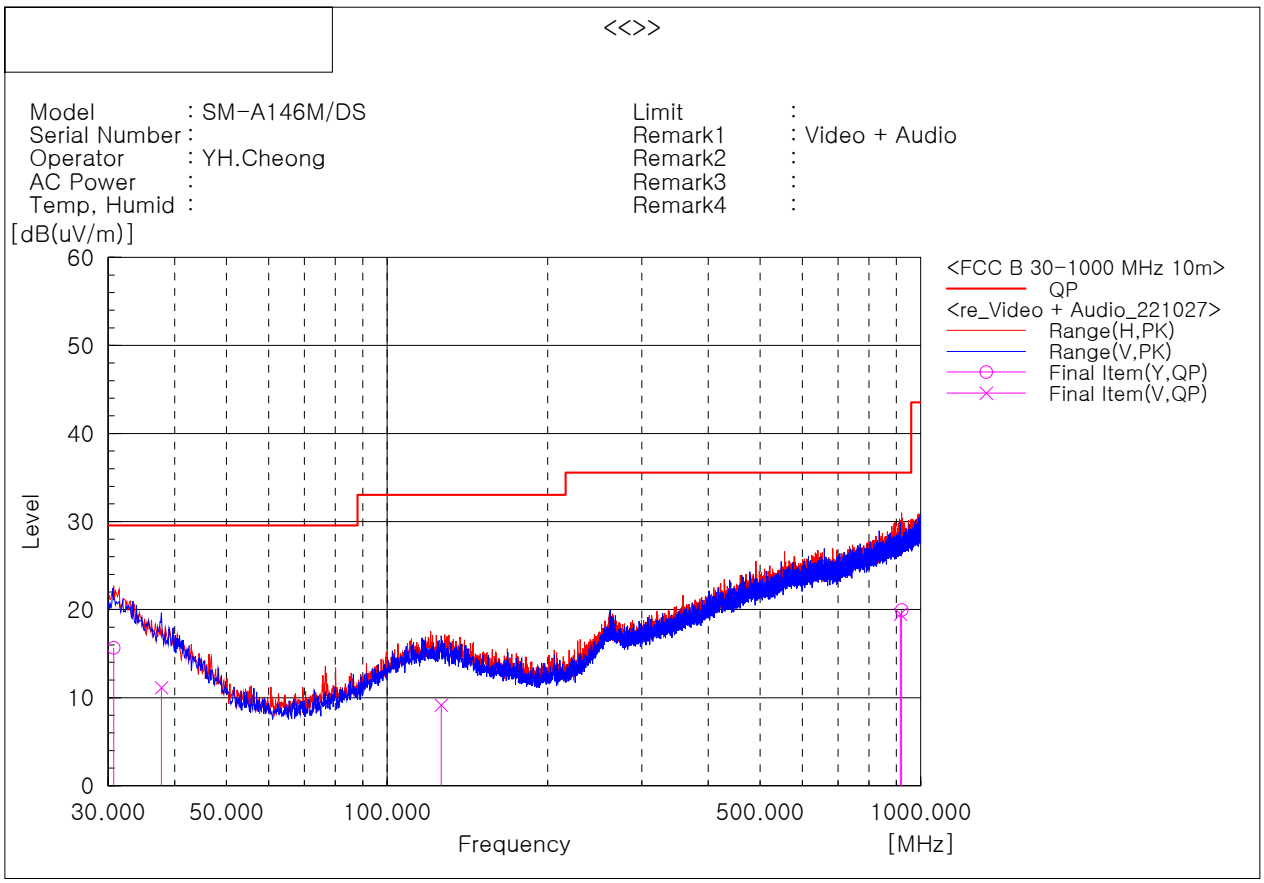
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

## □ Operating Mode 3

### - Frequencies below 1 GHz




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] | System |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30.728 | H | 23.0 | -7.3 | 15.7 | 29.5 | 13.8 | 106 | 242 | 1 |
| 2 | 37.760 | V | 21.7 | -10.6 | 11.1 | 29.5 | 18.4 | 140 | 229 | 2 |
| 3 | 920.824 | H | 20.0 | 0.0 | 20.0 | 35.5 | 15.5 | 168 | 271 | 1 |
| 4 | 126.273 | V | 21.4 | -12.2 | 9.2 | 33.0 | 23.8 | 237 | 20 | 2 |
| 5 | 915.610 | V | 19.0 | 0.5 | 19.5 | 35.5 | 16.0 | 373 | 356 | 2 |

Note1) Receiving antenna polarization : Horizontal, Vertical

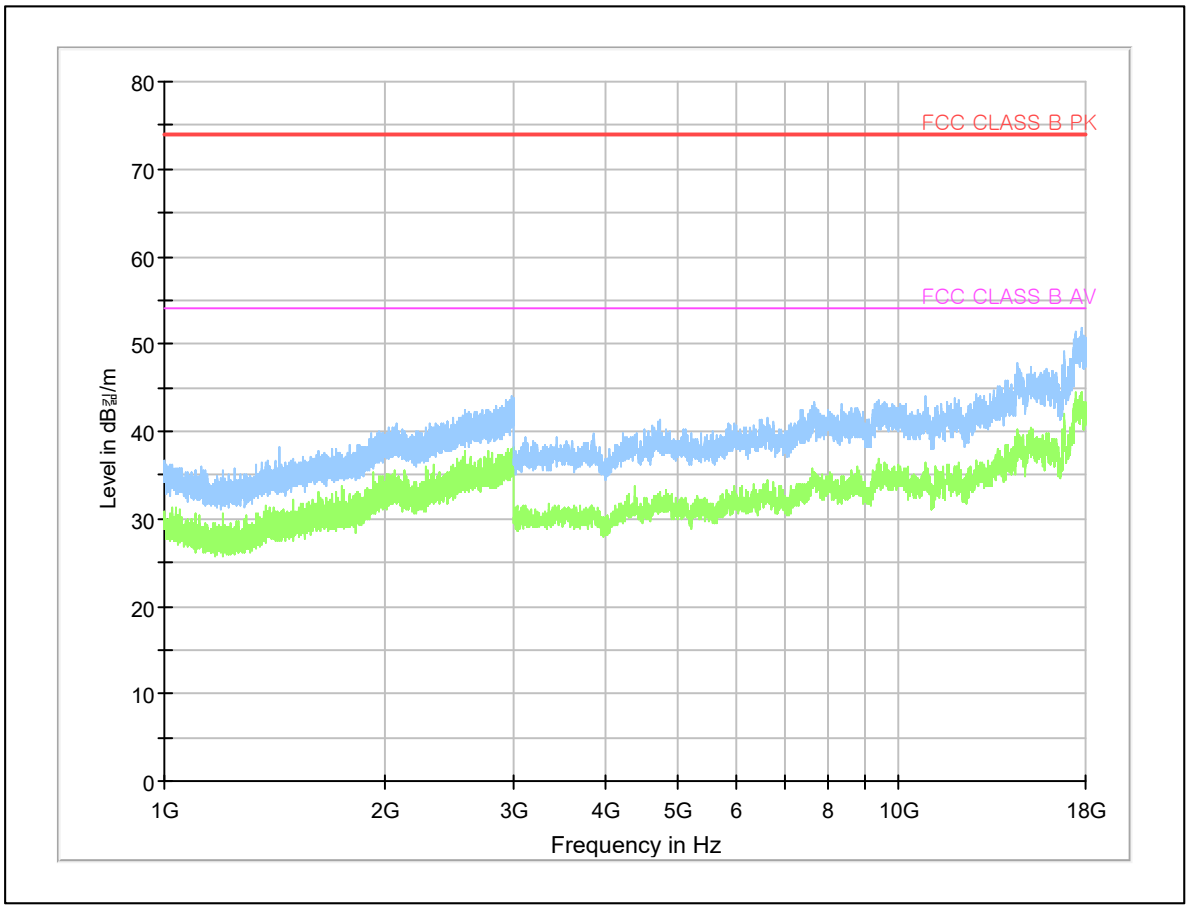
Test Distance : 10 m, Antenna Height : 1 to 4 meters

Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

## - Frequencies above 1 GHz




Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

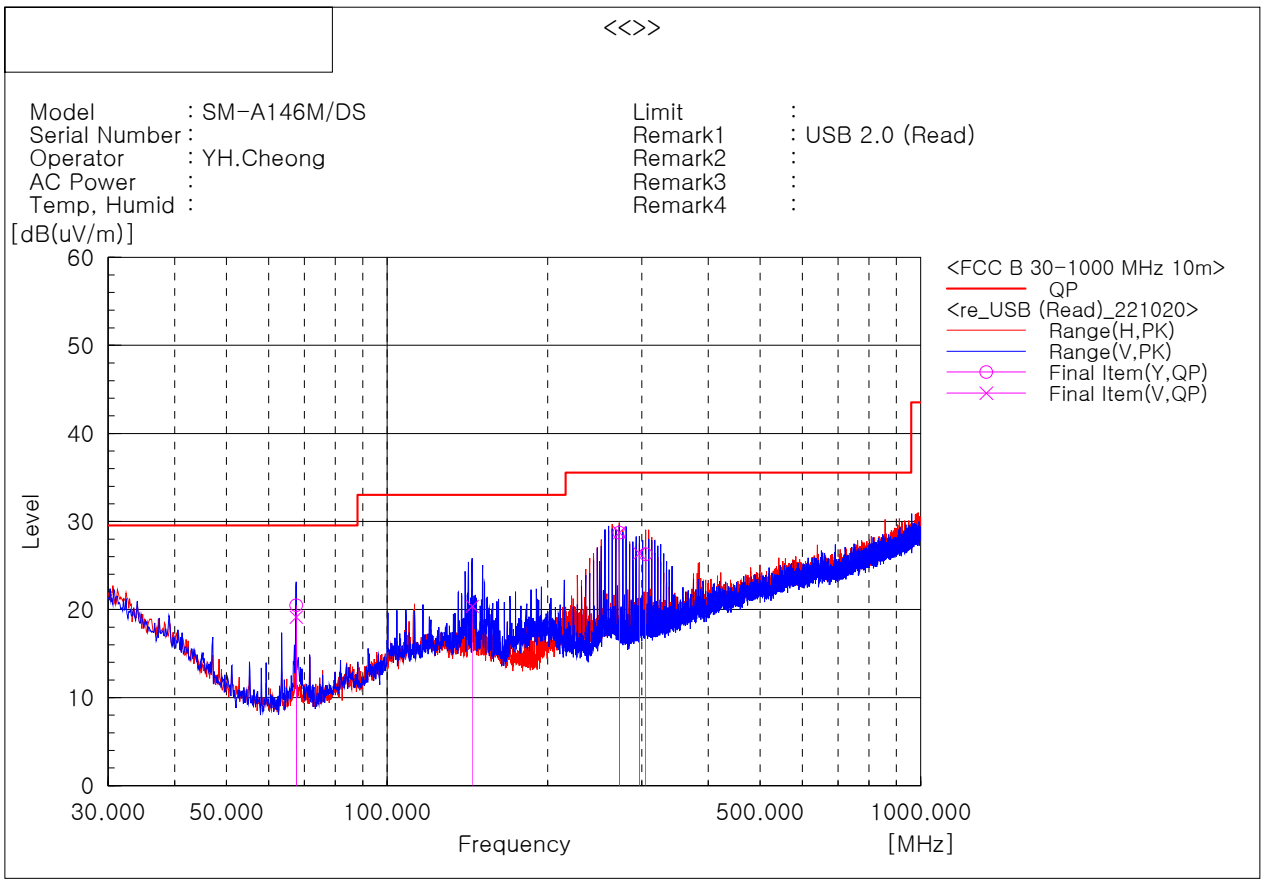
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor

## □ Operating Mode 4

### - Frequencies below 1 GHz




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] | System |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 67.588 | H | 39.4 | -18.9 | 20.5 | 29.5 | 9.0 | 398 | 293 | 1 |
| 2 | 67.588 | V | 37.7 | -18.6 | 19.1 | 29.5 | 10.4 | 400 | 248 | 2 |
| 3 | 144.339 | V | 33.7 | -13.3 | 20.4 | 33.0 | 12.6 | 100 | 250 | 2 |
| 4 | 272.379 | H | 39.6 | -10.8 | 28.8 | 35.5 | 6.7 | 400 | 264 | 1 |
| 5 | 272.379 | V | 38.9 | -10.2 | 28.7 | 35.5 | 6.8 | 102 | 170 | 2 |
| 6 | 296.993 | V | 36.4 | -10.0 | 26.4 | 35.5 | 9.1 | 100 | 169 | 2 |
| 7 | 305.116 | H | 36.6 | -10.3 | 26.3 | 35.5 | 9.2 | 358 | 253 | 1 |

Note1) Receiving antenna polarization : Horizontal, Vertical

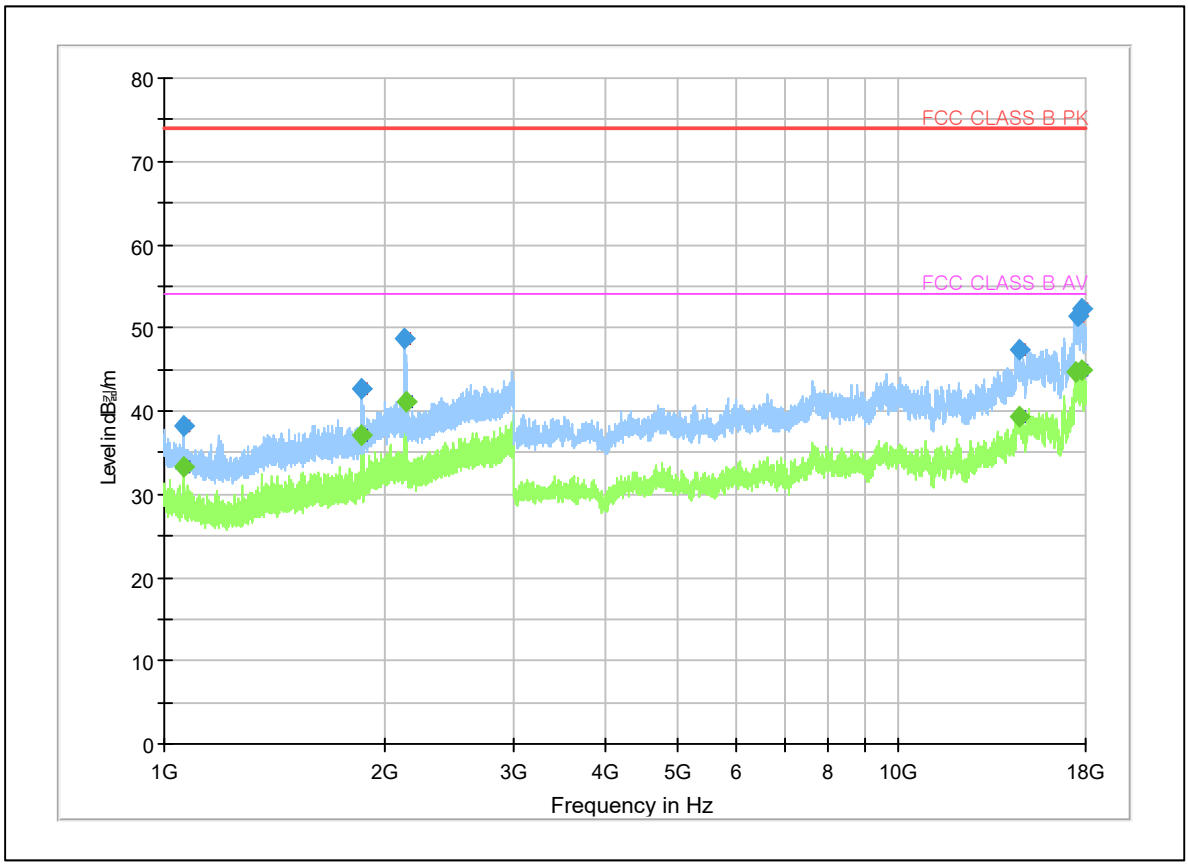
Test Distance : 10 m, Antenna Height : 1 to 4 meters

Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)

Margin (QP) = Limit – Level (QP)

QP = Quasi-Peak, c.f = Correction Factor

## - Frequencies above 1 GHz




| Frequency (MHz) | PK (dBµV/m) | CAV (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB) |
|---|---|---|---|---|---|---|---|---|
| 1 065.400 | --- | 33.19 | 54.00 | 20.81 | 100.0 | V | 239.0 | 7.00 |
| 1 065.400 | 38.30 | --- | 74.00 | 35.70 | 102.0 | V | 239.0 | 7.00 |
| 1 861.600 | 42.66 | --- | 74.00 | 31.34 | 100.0 | V | 131.0 | 12.00 |
| 1 861.600 | --- | 37.12 | 54.00 | 16.88 | 104.0 | V | 131.0 | 12.00 |
| 2 128.200 | 48.62 | --- | 74.00 | 25.38 | 100.0 | V | 22.0 | 14.00 |
| 2 132.200 | --- | 41.22 | 54.00 | 12.78 | 101.0 | V | 22.0 | 14.00 |
| 14 646.000 | --- | 39.36 | 54.00 | 14.64 | 100.0 | H | 138.0 | 31.00 |
| 14 650.500 | 47.29 | --- | 74.00 | 26.71 | 105.0 | H | 6.0 | 31.00 |
| 17 446.500 | --- | 44.71 | 54.00 | 9.29 | 100.0 | H | 153.0 | 37.00 |
| 17 586.000 | 51.36 | --- | 74.00 | 22.64 | 103.0 | H | 111.0 | 37.00 |
| 17 785.500 | --- | 44.90 | 54.00 | 9.10 | 100.0 | H | 187.0 | 38.00 |
| 17 791.500 | 52.24 | --- | 74.00 | 21.76 | 101.0 | V | 68.0 | 38.00 |

Note 1) We have also tested from 18 GHz to 30 GHz and found no emissions.

Note 2) Receiving antenna polarization : Horizontal, Vertical

Test Distance : 3 m, Antenna Height : 1 to 4 meters

Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

Margin (PK and/or CAV) = Limit – Level (PK and/or CAV)

PK = Peak, CAV = CISPR-Average, Corr. = Correction Factor