SEQAL

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# FCC TEST REPORT

**Model : SM-X700**
**Variant Model : None**
**FCC ID : A3LSMX700**
**Application Type : Certification**
**EUT Type : Tablet Device**

Prepared By ..... Date 2021.12.03.....
CH Jeon – Test Engineer

Checked By ..... Date 2021.12.03.....
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Authorized By ..... Date 2021.12.03.....
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# 1. Report Information

1.1 Revision History

| No. | Revised Detailed Information |
|---|---|
| **Issue 1** | There is no revisions and this version is basic test report. |

# 2. General Information

| | |
|---|---|
| **APPLICANT:** | SAMSUNG Electronics Co., Ltd |
| **APPLICANT ADDRESS:** | 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea |
| **TEST SITE:** | SEQAL Korea |
| **TEST SITE ADDRESS:** | 129, Samsung-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16677, Korea |
| **FCC Designation Number** | KR0028 |
| **FCC RULE PART(S):** | 47 CFR Part 15.B |
| **TEST PROCEDURE(S):** | ANSI C63.4-2014 |
| **MODEL NAME:** | SM-X700 |
| **FCC ID:** | A3LSMX700 |
| **DATE(S) OF RECEIPT:** | 2021.10.26 |
| **DATE(S) OF TEST:** | 2021.11.11 ~ 2021.12.02 |
| **TEST DEVICE JOB NO.:** | FCS-023 |
| **TEST DEVICE SERIAL NO.:** | NONE |

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# 3. PRODUCT INFORMATION

## 3.1 Equipment Description

The Equipment Under Test (EUT) is the SM-X700. The test data contained in this report pertains only to the emissions due to the digital circuitry of the EUT.

## 3.2 Device Capabilities

This device contains the following capabilities:

Additional Capabilities:
- Bluetooth, Wi-Fi, Camera, Audio and Video, GNSS, DP

## 3.3 Emission

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

**Table 1-1. Emission**

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## 3.4 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, by writing and reading arbitrary data or charging with TA.

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

The audio and video were played on monitor through Display Out function using direct DP Cable or DP converter.

The camera of the EUT was operated continuously.

Power source for the EUT operating was supplied by CVCF made by the Pacific Corp.

Test Voltage : AC 120 V, 60 Hz

### 3.5 EUT operating mode

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

3.5.1 Radiated Emission

| No. | Operating mode |
|---|---|
| 1 | Camera (rear) + Charging (W/TA) + Key Board Cover + S Pen |
| 2 | Camera (front) + Charging (W/TA) + Key Board Cover + S Pen |
| 3 | Video + Audio playback from internal memory data + Display out (w/DP Cable) |
| 4 | USB Data Communication with PC (from external memory data) |

3.5.2 Conducted Emission

| No. | Operating mode |
|---|---|
| 1 | Camera (rear) + Charging (w/TA) + Key Board Cover + S Pen |
| 2 | Camera (front) + Charging (w/TA) |
| 3 | Video + Audio playback from internal memory data + Charging (w/ TA) |
| 4 | USB Data Communication with PC (from external memory data) |

3.5.3 EUT Frequency

| The highest Frequency | Frequency[MHz] |
|---|---|
| Wi-Fi 6E | 7 125 |

Note: Upper frequency of measurement range(MHz): 5th harmonic of the highest frequency or 40GHz, whichever is lower.

### 3.6 Test Condition

| | |
|---|---|
| Max Temperature | **24.1℃** |
| Max Humidity | **42.1%** |

### 3.7 Identification of Samples Tested

| Date of Receipt | Identification Number: | Information of samples: |
|---|---|---|
| 2021.10.26 | FCS-023-1 | #1 |
| 2021.10.26 | FCS-023-2 | #2 |

### 3.8 EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

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# 4. DESCRIPTION OF TEST

## 4.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Methods of measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment on the Range of 150KHz to 40GHz(ANSI C63.4--2014) was used in the measurement of SM-X700**.**

## 4.2 AC Line Conducted Emissions

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground plane. Power cables for support equipment were routed down to the second LISN while ensuring that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying to the EUT and/or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration / arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 6.3. Automated test software was used to perform the AC line conducted emissions testing. Automated measurement software utilized is TOYO EP5-CE, Version 5.4.40.

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### 4.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

Automated test software, TOYO EP5-RE, Version 5.5.2, was used to perform the radiated emissions testing.

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# 5. TEST EQUIPMENT CALIBRATION AND UNCERTAINTY

## 5.1 Measuring instrument calibration

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

| TEST EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| **Description** | **Model** | **Manufacturer** | **Date of next Calibration** | **S/N** |
| BILOG Antenna | CBL 6112D | TESEQ | 2022-04-01 | 36010 |
| BILOG Antenna | CBL 6112D | TESEQ | 2023-10-11 | 36012 |
| HORN Antenna | HF907 | R&S | 2023-06-04 | 100492 |
| HORN Antenna | 3115 | ETS LINDGREN | 2023-09-14 | 00156306 |
| HORN Antenna | 3115 | ETS LINDGREN | 2023-09-14 | 00143185 |
| Pre-amplifier (1GHz to 18GHz) | SCU-18 | R&S | 2022-01-20 | 10216 |
| HORN Antenna & Pre-amplifier assembly (18GHz to 26.5GHz) | HAP18-26N | Flann | 2022-04-20 | 216249 |
| HORN Antenna & Pre-amplifier assembly (18GHz to 26.5GHz) | HAP18-26N | Flann | 2021-12-11 | 216251 |
| HORN Antenna & Pre-amplifier assembly (18GHz to 26.5GHz) | HAP18-26N | Flann | 2022-07-29 | 216252 |
| HORN Antenna & Pre-amplifier assembly (26.5GHz to 40GHz) | HAP26-40N | Flann | 2021-12-11 | 216253 |
| HORN Antenna & Pre-amplifier assembly (26.5GHz to 40GHz) | HAP26-40N | Flann | 2022-04-20 | 216250 |
| EMI Receiver | ESU40 | R&S | 2022-06-25 | 100370 |
| EMI Receiver | ESU | R&S | 2022-01-11 | 100521 |
| EMI Receiver | ESU8 | R&S | 2022-04-23 | 100474 |
| EMI Receiver | ESCI | R&S | 2022-08-11 | 101367/003 |
| TWO L LINE-V-NETWORK | ENV216 | R&S | 2022-07-01 | 101053 |
| TWO L LINE-V-NETWORK | ENV216 | R&S | 2022-07-01 | 101644 |
| Communication Tester | CMW500 | R&S | 2022-06-30 | 155816 |
| Vector Signal Generator | SMBV100A | R&S | 2022-09-24 | 260252 |
| Test software | EP5-RE | TOYO | - | V5.5.2 |
| Test software | EP5-CE | TOYO | - | V5.4.40 |

**Table 5-1. Annual Test Equipment Calibration Schedule**

### 5.2 Test Support Equipment

| Description | Model | Manufacturer | Serial Number | FCC ID. |
|---|---|---|---|---|
| Note Book PC | NT850XAC | Samsung | OVHJ91ZK300161P | Doc |
| Note Book Power Supply | PA-1181-96 | Samsung | AD-18019B | Doc |
| Mouse | AA-SM7PCP | Samsung | CNBA59003634ADV8J32S6837 | Doc |
| Mouse | AA-SM7PCP | Samsung | CN57BA590363BDV8J56H4145 | Doc |
| Data Cable | EP-DW767JWE | RFTECH | - | - |
| Travel Adapter | EP-TA800 | SOLUM | R37RAL71MT9SEA | - |
| Travel Adapter | EP-TA800 | SOLUM | R37RAL71NN9SEA | - |
| Monitor | 27UD88 | LG | 705ntpc4h256 | Doc |
| DP Cable | DM479 | COMS | - | - |
| Router | DIR-825 | D-Link | F37T32D4000718 | Doc |
| Router Power Supply | CG2412-B | D-Link | LF2R00113129007 | Doc |
| Key Board | EF-DT870 | Samsung | - | - |
| S-Pen | CP-911B-15B | WACOM | - | - |

**Table 5-2. Test Support Equipment Used**

### 5.3 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus

| Test Item | | Measurement Uncertainty (C.L. 95%, k=2) |
|---|---|---|
| Conducted Disturbance | 0.15MHz to 30MHz | 1.39 dB |
| Radiated Disturbance | Below 1GHz (Horizontal) | 4.25 dB |
| | Below 1GHz (Vertical) | 4.81 dB |
| | Above 1GHz (Horizontal) | 4.79 dB |
| | Above 1GHz (Vertical) | 5.04 dB |

**Table 5-3. Measurement Uncertainty**

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# 6. TEST RESULTS

## 6.1 Summary

| FCC Part 15 Section | Description | Test Result |
|---|---|---|
| 15.107 | Conducted Emissions | Complied |
| 15.109 | Radiated Emissions | Complied |

**Table 6-1. Summary of Test Results**

Note: See Appendix A. Test setup photographs for actual system test setup.

## 6.2 Radiated disturbance

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 10 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 operate 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 |
|---|---|---|---|---|
| 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.

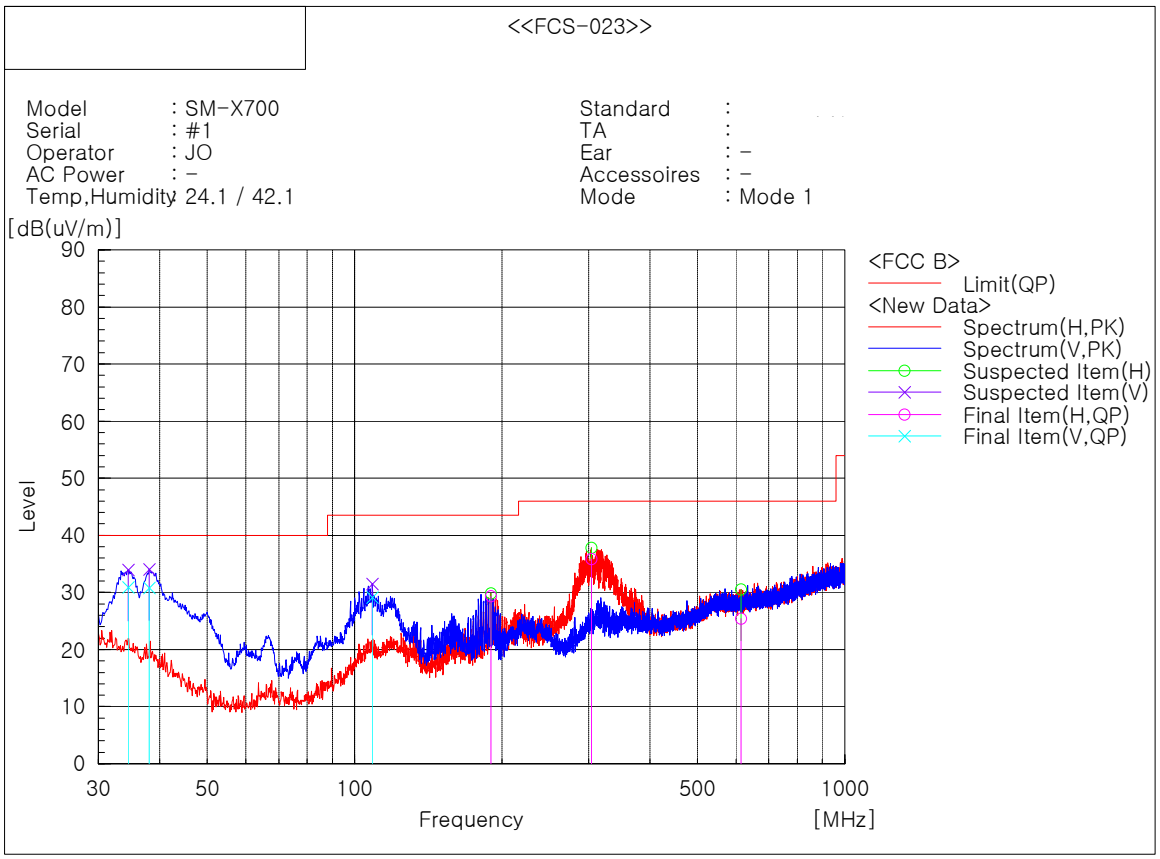
**Limits for radiated disturbance of Class B ITE at a measuring distance of 3 m**

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

Results checked manually; and points close to the limit line were re-measured.

**Operating Mode 1**

**Frequencies below 1 GHz**



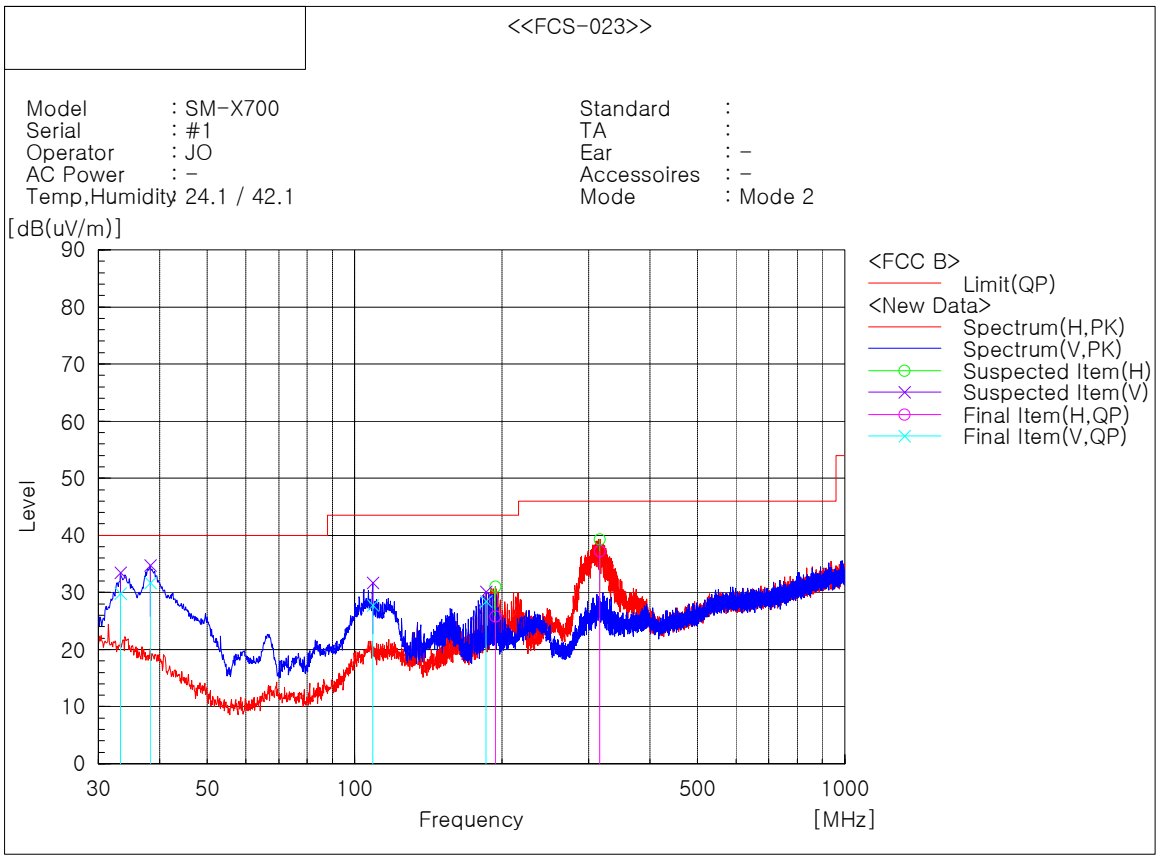

Final Result

| 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] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 34.486 | V | 36.6 | -5.7 | 30.9 | 40.0 | 9.1 | 99.7 | 152.3 | |
| 2 | 38.124 | V | 38.5 | -7.6 | 30.9 | 40.0 | 9.1 | 99.7 | 244.3 | |
| 3 | 303.783 | H | 40.4 | -4.5 | 35.9 | 46.0 | 10.1 | 99.7 | 90.2 | |
| 4 | 189.444 | H | 39.8 | -10.4 | 29.4 | 43.5 | 14.1 | 99.7 | 77.9 | |
| 5 | 108.691 | V | 37.9 | -8.7 | 29.2 | 43.5 | 14.3 | 99.7 | 157.4 | |
| 6 | 613.334 | H | 21.8 | 3.6 | 25.4 | 46.0 | 20.6 | 99.7 | 109.3 | |

Note1) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 3 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

**Operating Mode 2**

**Frequencies below 1 GHz**



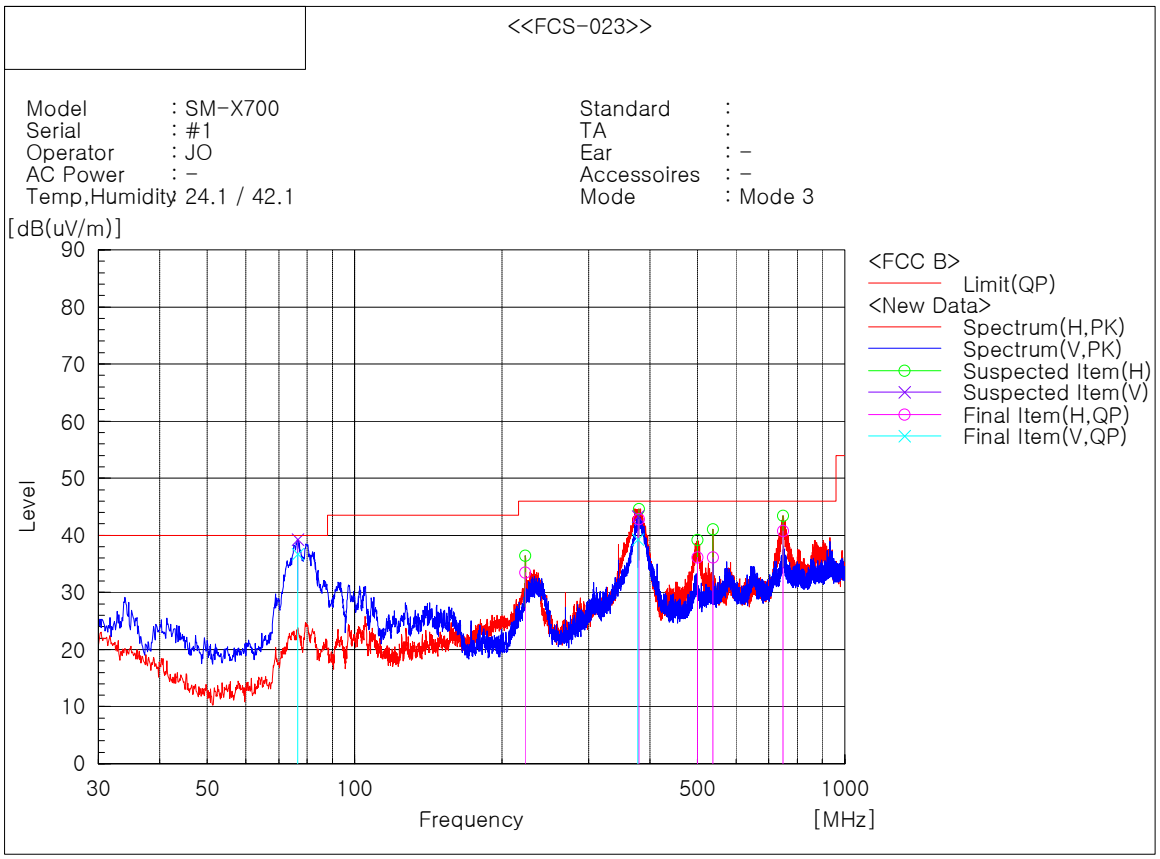

Final Result

| 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] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 33.274 | V | 34.9 | -5.1 | 29.8 | 40.0 | 10.2 | 99.7 | 17.4 | |
| 2 | 38.245 | V | 39.4 | -7.7 | 31.7 | 40.0 | 8.3 | 99.7 | 24.2 | |
| 3 | 108.812 | V | 36.5 | -8.7 | 27.8 | 43.5 | 15.7 | 99.7 | 118.2 | |
| 4 | 185.443 | V | 39.0 | -10.5 | 28.5 | 43.5 | 15.0 | 99.7 | 22.5 | |
| 5 | 193.688 | H | 36.0 | -10.2 | 25.8 | 43.5 | 17.7 | 99.7 | 113.7 | |
| 6 | 316.393 | H | 41.3 | -4.1 | 37.2 | 46.0 | 8.8 | 99.7 | 92.9 | |

Note1) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 3 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

**Operating Mode 3**

**Frequencies below 1 GHz**



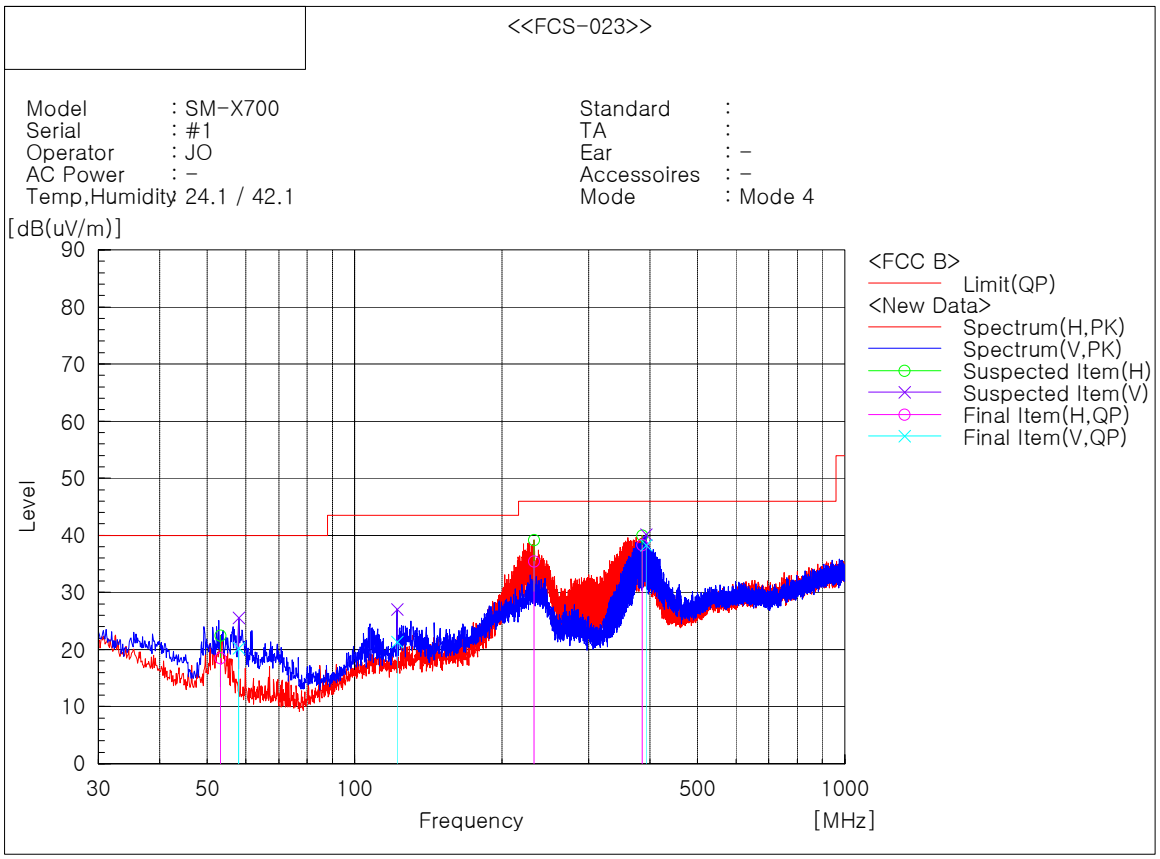

Final Result

| 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] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 380.170 | H | 44.5 | -1.7 | 42.8 | 46.0 | 3.2 | 99.7 | 228.1 | |
| 2 | 76.439 | V | 51.4 | -14.7 | 36.7 | 40.0 | 3.3 | 99.7 | 78.9 | |
| 3 | 748.528 | H | 35.6 | 5.2 | 40.8 | 46.0 | 5.2 | 99.7 | 61.0 | |
| 4 | 378.230 | V | 41.1 | -1.8 | 39.3 | 46.0 | 6.7 | 99.7 | 62.0 | |
| 5 | 499.965 | H | 35.0 | 1.1 | 36.1 | 46.0 | 9.9 | 99.7 | 86.0 | |
| 6 | 538.523 | H | 32.9 | 3.2 | 36.1 | 46.0 | 9.9 | 99.7 | 92.1 | |
| 7 | 223.030 | H | 40.8 | -7.4 | 33.4 | 46.0 | 12.6 | 99.7 | 92.1 | |

Note1) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 3 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

**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] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 53.159 | H | 33.1 | -14.5 | 18.6 | 40.0 | 21.4 | 99.7 | 179.3 | |
| 2 | 58.009 | V | 35.6 | -15.3 | 20.3 | 40.0 | 19.7 | 99.7 | 139.4 | |
| 3 | 121.908 | V | 29.7 | -8.3 | 21.4 | 43.5 | 22.1 | 99.7 | 68.9 | |
| 4 | 232.366 | H | 41.8 | -6.4 | 35.4 | 46.0 | 10.6 | 99.7 | 145.1 | |
| 5 | 386.233 | H | 39.8 | -1.5 | 38.3 | 46.0 | 7.7 | 99.7 | 82.9 | |
| 6 | 393.386 | V | 39.6 | -1.3 | 38.3 | 46.0 | 7.7 | 99.7 | 45.6 | |

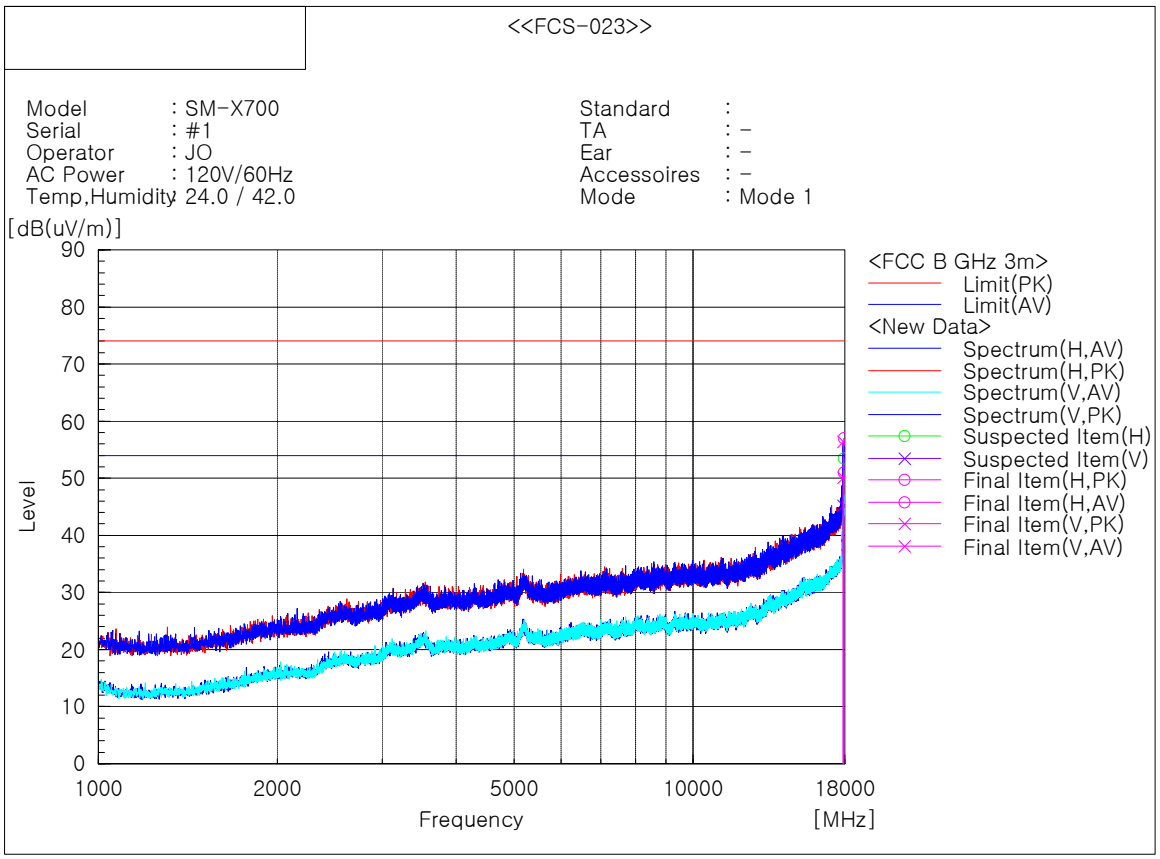
Note1) Receiving antenna polarization : Horizontal, Vertical
Test Distance : 3 m, Antenna Height : 1 to 4 meters
Result (QP) = Reading (QP) + c.f (Antenna Factor + Cable Loss - Amp. Gain)
Margin (QP) = Limit – Level (QP)
QP = Quasi-Peak, c.f = Correction Factor

**Notes:**

1. All modes of operation were investigated and the worst-case emissions are reported.
2. Radiated emissions were measured from 30MHz –1GHz to ensure that the provisions of 15.33(b)(1) are satisfied with respect to the upper frequency scanning range.
3. The radiated limits for unintentional radiators at a distance of 3 meters are used in the table above, as specified in 15.109(a)
4. Measurements are made using a CISPR quasi-peak detector with a 100KHz resolution bandwidth. Above 1GHz, peak measurements are made using a peak detector with a resolution bandwidth of 1MHz and a video bandwidth of 3MHz and average measurements are made with a peak detector using a resolution bandwidth of 1MHz and a video bandwidth of 10Hz.
5. Calibrated linearly polarized broadband and horn antenna were used for measurements below and above 1GHz, respectively. For measurements made below 1GHz, the results recorded using the broadband antenna are known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy.

**Operating Mode 1**

**Frequencies above 1 GHz**




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 17876.250 | V | 23.0 | 16.7 | 33.5 | 56.5 | 50.2 | 74.0 | 54.0 | 17.5 | 3.8 | 100.2 | 65.6 | |
| 2 | 17934.750 | H | 22.8 | 16.8 | 34.2 | 57.0 | 51.0 | 74.0 | 54.0 | 17.0 | 3.0 | 100.2 | 358.7 | |

Note 1) We have also tested from 18GHz to 40GHz and found no emissions

Note 2) Receiving antenna polarization : Horizontal, Vertical

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

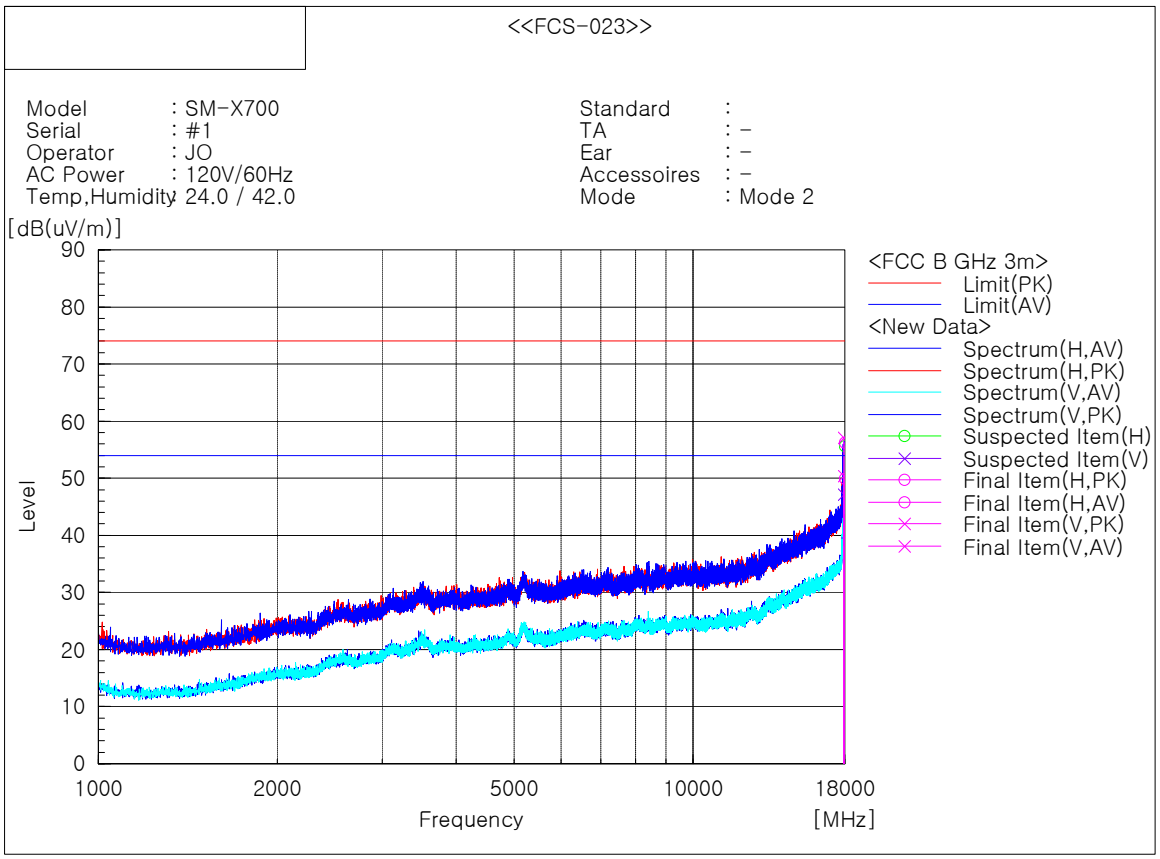
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

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

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

**Operating Mode 2**

**Frequencies above 1 GHz**




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 17904.370 | V | 22.6 | 15.9 | 34.5 | 57.1 | 50.4 | 74.0 | 54.0 | 16.9 | 3.6 | 100.2 | 301.6 | |
| 2 | 17983.120 | H | 23.0 | 16.7 | 33.2 | 56.2 | 49.9 | 74.0 | 54.0 | 17.8 | 4.1 | 100.2 | 85.3 | |

Note 1) We have also tested from 18GHz to 40GHz and found no emissions

Note 2) Receiving antenna polarization : Horizontal, Vertical

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

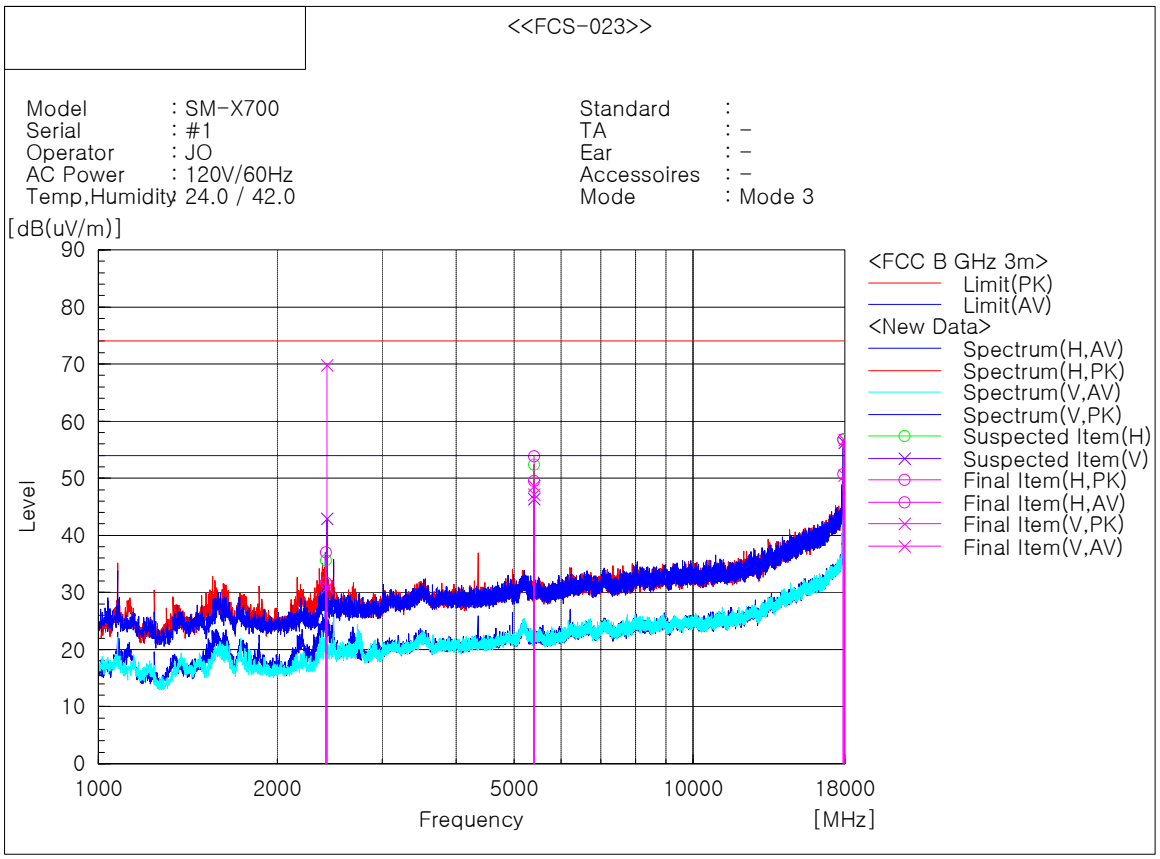
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

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

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

**Operating Mode 3**

**Frequencies above 1 GHz**




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2411.000 | H | 42.0 | 36.6 | -4.9 | 37.1 | 31.7 | 74.0 | 54.0 | 36.9 | 22.3 | 100.2 | 120.9 | |
| 2 | 2422.000 | V | 74.6 | 35.7 | -4.8 | 69.8 | 30.9 | 74.0 | 54.0 | 4.2 | 23.1 | 100.2 | 33.2 | |
| 3 | 5400.000 | H | 51.2 | 46.8 | 2.7 | 53.9 | 49.5 | 74.0 | 54.0 | 20.1 | 4.5 | 100.2 | 127.7 | |
| 4 | 5400.000 | V | 46.0 | 44.5 | 2.7 | 48.7 | 47.2 | 74.0 | 54.0 | 25.3 | 6.8 | 100.2 | 166.0 | |
| 5 | 17894.250 | H | 22.4 | 16.3 | 34.4 | 56.8 | 50.7 | 74.0 | 54.0 | 17.2 | 3.3 | 100.2 | 206.1 | |
| 6 | 17949.370 | V | 22.7 | 16.5 | 34.0 | 56.7 | 50.5 | 74.0 | 54.0 | 17.3 | 3.5 | 100.2 | 359.0 | |

Note 1) We have also tested from 18GHz to 40GHz and found no emissions

Note 2) Receiving antenna polarization : Horizontal, Vertical

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

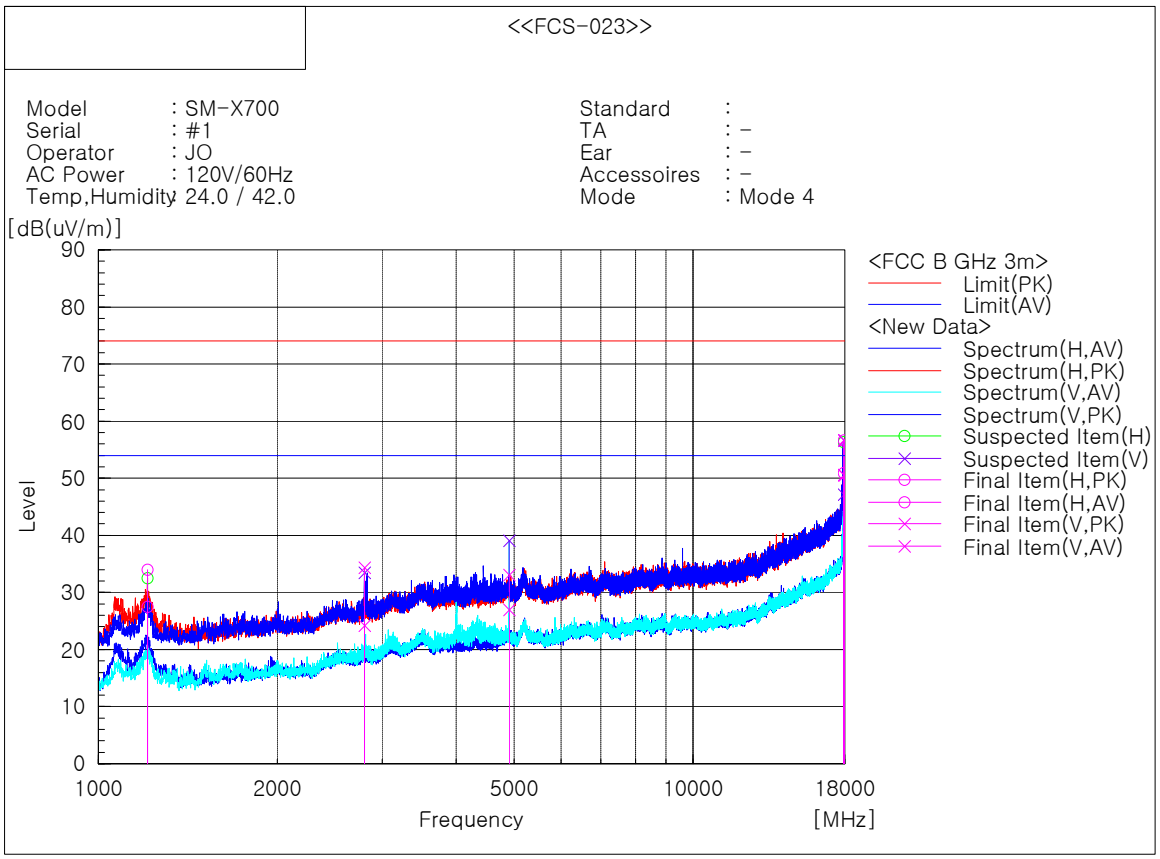
Level (PK and/or CAV) = Reading (PK and/or CAV) + Corr. (Antenna Factor + Cable Loss - Amp. Gain)

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

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

**Operating Mode 4**

**Frequencies above 1 GHz**




Final Result

| No. | Frequency [MHz] | (P) | Reading PK [dB(uV)] | Reading AV [dB(uV)] | c.f [dB(1/m)] | Result PK [dB(uV/m)] | Result AV [dB(uV/m)] | Limit PK [dB(uV/m)] | Limit AV [dB(uV/m)] | Margin PK [dB] | Margin AV [dB] | Height [cm] | Angle [deg] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 17910.000 | H | 22.2 | 16.5 | 34.4 | 56.6 | 50.9 | 74.0 | 54.0 | 17.4 | 3.1 | 99.9 | 324.0 | |
| 2 | 17912.250 | V | 22.3 | 16.2 | 34.4 | 56.7 | 50.6 | 74.0 | 54.0 | 17.3 | 3.4 | 99.9 | 234.0 | |
| 3 | 17953.870 | V | 22.7 | 16.6 | 33.9 | 56.6 | 50.5 | 74.0 | 54.0 | 17.4 | 3.5 | 99.9 | 154.6 | |
| 4 | 1209.000 | H | 45.8 | 39.3 | -11.8 | 34.0 | 27.5 | 74.0 | 54.0 | 40.0 | 26.5 | 99.9 | 65.5 | |
| 5 | 4905.000 | V | 30.5 | 24.4 | 2.5 | 33.0 | 26.9 | 74.0 | 54.0 | 41.0 | 27.1 | 99.9 | 99.7 | |
| 6 | 2800.000 | V | 38.2 | 28.0 | -3.8 | 34.4 | 24.2 | 74.0 | 54.0 | 39.6 | 29.8 | 99.9 | 35.2 | |

Note 1) We have also tested from 18GHz to 40GHz 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

**Notes:**

1. All modes of operation were investigated and the worst-case emissions are reported.
2. Radiated emissions were measured from above 1GHz to ensure that the provisions of 15.33(b)(1) are satisfied with respect to the upper frequency scanning range.
3. The radiated limits for unintentional radiators at a distance of 3 meters are used in the table above, as
4. Measurements are made using a CISPR quasi-peak detector with a 100kHz resolution bandwidth. Above 1GHz, peak measurements are made using a peak detector with a resolution bandwidth of 1MHz and a video bandwidth of 3MHz and average measurements are made with a peak detector using a resolution bandwidth of 1MHz and a video bandwidth of 10Hz.
5. Calibrated linearly polarized broadband and horn antenna were used for measurements below and above 1GHz, respectively. For measurements made below 1GHz, the results recorded using the broadband antenna are known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy.

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### 6.3 Conducted disturbance

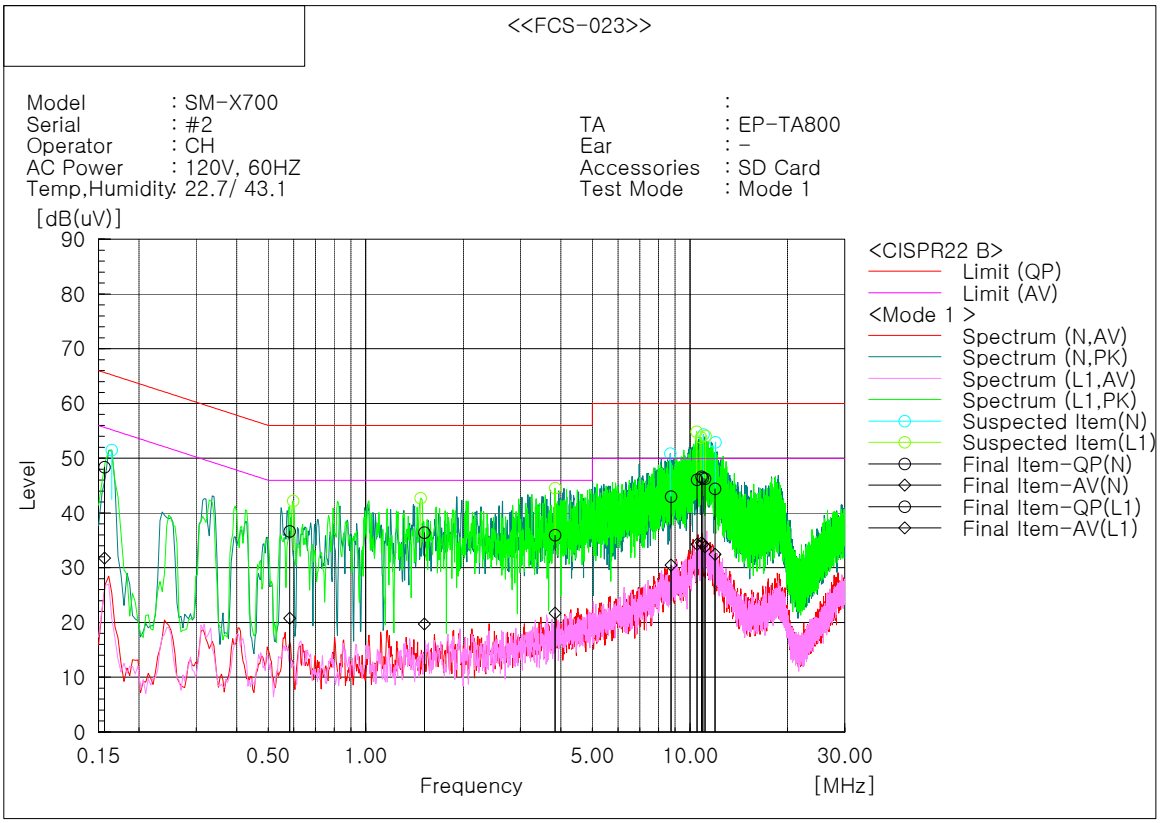
The EUT was connected to the Desk-Top Computer which was powered from one LISN for the measurements. The support equipment power cables were connected to a second LISN.

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 disturbance at the mains ports of Class B ITE**

| 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. | | | |

**Operating Mode 1**




Final Result

--- N Phase ---

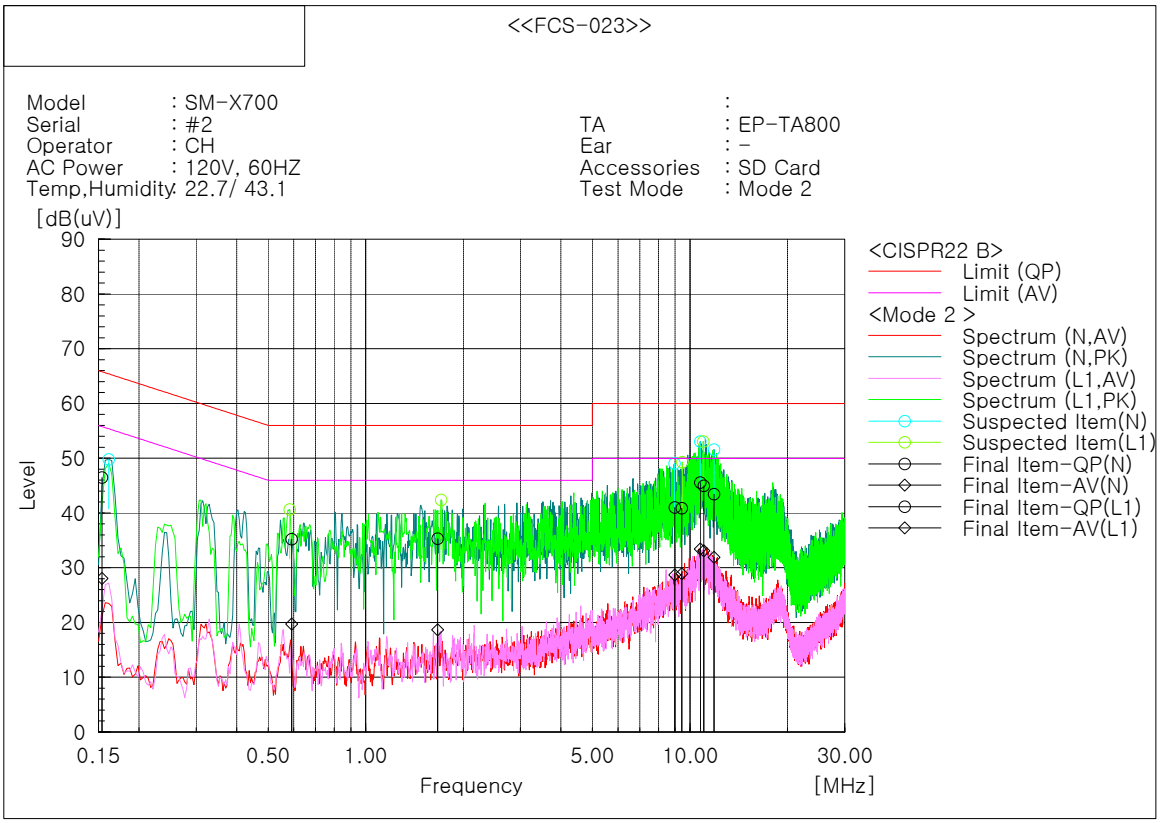
| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.1564 | 38.2 | 21.7 | 10.1 | 48.3 | 31.8 | 65.7 | 55.7 | 17.4 | 23.9 | |
| 2 | 8.74549 | 32.8 | 20.3 | 10.2 | 43.0 | 30.5 | 60.0 | 50.0 | 17.0 | 19.5 | |
| 3 | 10.95579 | 36.1 | 24.1 | 10.3 | 46.4 | 34.4 | 60.0 | 50.0 | 13.6 | 15.6 | |
| 4 | 11.94771 | 34.1 | 22.1 | 10.3 | 44.4 | 32.4 | 60.0 | 50.0 | 15.6 | 17.6 | |

--- L1 Phase ---

| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.58295 | 26.7 | 10.8 | 10.0 | 36.7 | 20.8 | 56.0 | 46.0 | 19.3 | 25.2 | |
| 2 | 1.517 | 26.5 | 9.8 | 9.9 | 36.4 | 19.7 | 56.0 | 46.0 | 19.6 | 26.3 | |
| 3 | 3.83644 | 26.0 | 11.7 | 10.0 | 36.0 | 21.7 | 56.0 | 46.0 | 20.0 | 24.3 | |
| 4 | 10.51577 | 35.9 | 24.1 | 10.2 | 46.1 | 34.3 | 60.0 | 50.0 | 13.9 | 15.7 | |
| 5 | 10.84696 | 36.4 | 24.4 | 10.2 | 46.6 | 34.6 | 60.0 | 50.0 | 13.4 | 15.4 | |
| 6 | 11.13097 | 36.1 | 23.6 | 10.2 | 46.3 | 33.8 | 60.0 | 50.0 | 13.7 | 16.2 | |

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




Final Result

--- N Phase ---

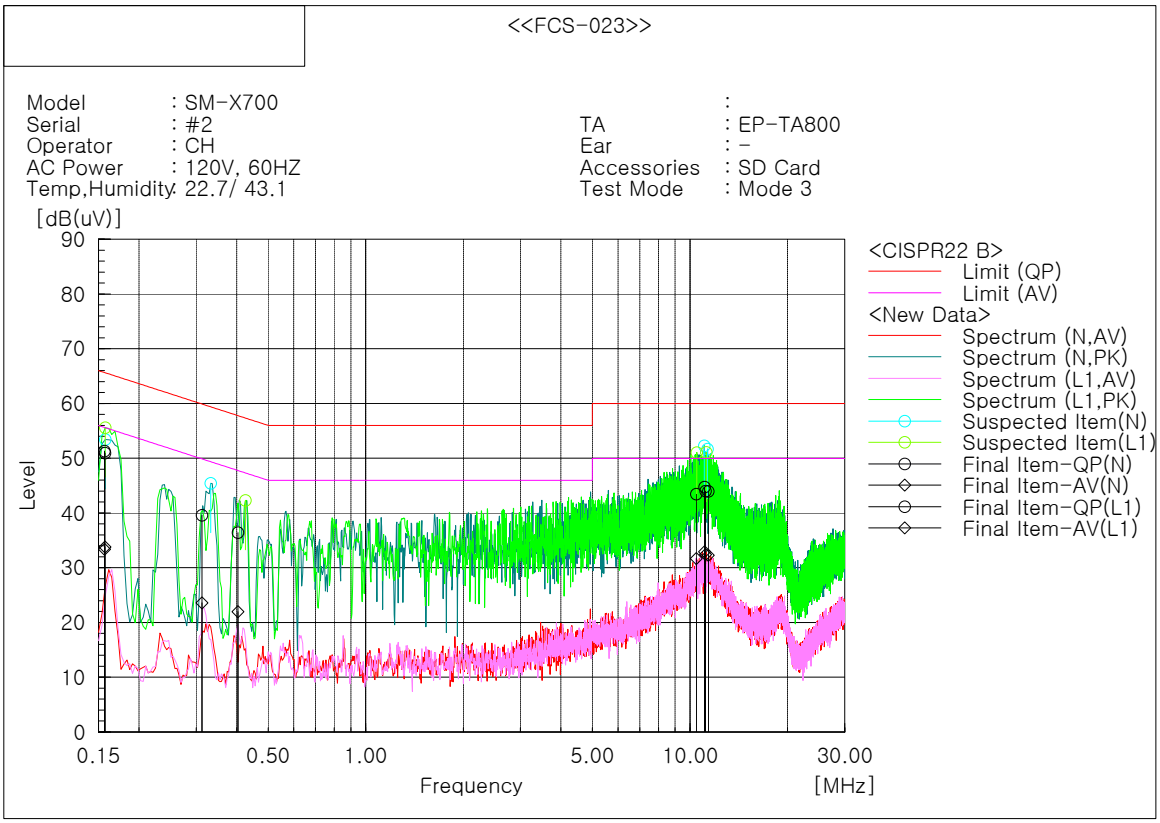
| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.15385 | 36.5 | 18.0 | 10.0 | 46.5 | 28.0 | 65.8 | 55.8 | 19.3 | 27.8 | |
| 2 | 8.97814 | 30.8 | 18.5 | 10.2 | 41.0 | 28.7 | 60.0 | 50.0 | 19.0 | 21.3 | |
| 3 | 10.75877 | 35.2 | 23.1 | 10.3 | 45.5 | 33.4 | 60.0 | 50.0 | 14.5 | 16.6 | |
| 4 | 11.85221 | 33.1 | 21.6 | 10.3 | 43.4 | 31.9 | 60.0 | 50.0 | 16.6 | 18.1 | |

--- L1 Phase ---

| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.59089 | 25.2 | 9.7 | 10.0 | 35.2 | 19.7 | 56.0 | 46.0 | 20.8 | 26.3 | |
| 2 | 1.66713 | 25.4 | 8.8 | 9.9 | 35.3 | 18.7 | 56.0 | 46.0 | 20.7 | 27.3 | |
| 3 | 9.43131 | 30.8 | 18.8 | 10.1 | 40.9 | 28.9 | 60.0 | 50.0 | 19.1 | 21.1 | |
| 4 | 11.02735 | 34.8 | 22.9 | 10.2 | 45.0 | 33.1 | 60.0 | 50.0 | 15.0 | 16.9 | |

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




Final Result

--- N Phase ---

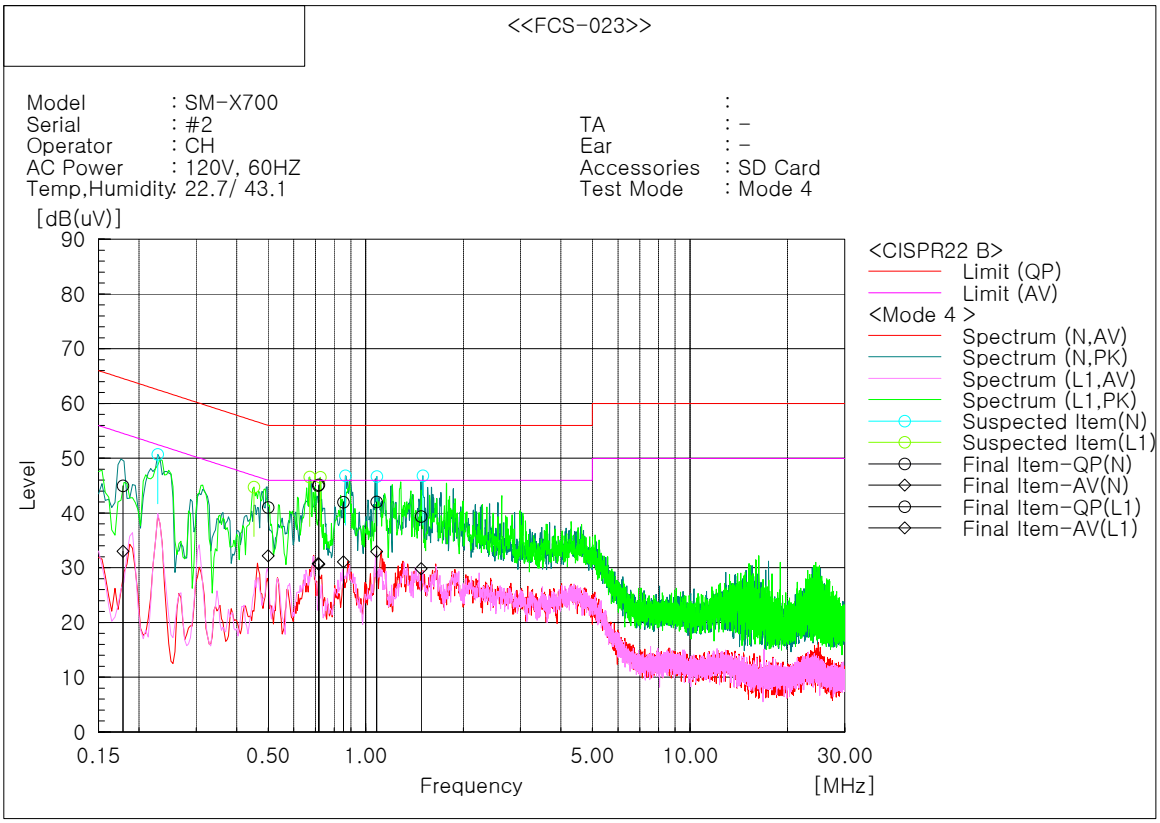
| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.15645 | 41.2 | 23.3 | 10.1 | 51.3 | 33.4 | 65.7 | 55.7 | 14.4 | 22.3 | |
| 2 | 0.31259 | 29.6 | 13.6 | 10.0 | 39.6 | 23.6 | 59.9 | 49.9 | 20.3 | 26.3 | |
| 3 | 11.08323 | 34.4 | 22.6 | 10.3 | 44.7 | 32.9 | 60.0 | 50.0 | 15.3 | 17.1 | |
| 4 | 11.37851 | 33.6 | 22.0 | 10.3 | 43.9 | 32.3 | 60.0 | 50.0 | 16.1 | 17.7 | |

--- L1 Phase ---

| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.15718 | 40.9 | 23.8 | 10.0 | 50.9 | 33.8 | 65.6 | 55.6 | 14.7 | 21.8 | |
| 2 | 0.40341 | 26.4 | 12.0 | 10.0 | 36.4 | 22.0 | 57.8 | 47.8 | 21.4 | 25.8 | |
| 3 | 10.45985 | 33.2 | 21.5 | 10.2 | 43.4 | 31.7 | 60.0 | 50.0 | 16.6 | 18.3 | |
| 4 | 11.17559 | 33.8 | 22.2 | 10.2 | 44.0 | 32.4 | 60.0 | 50.0 | 16.0 | 17.6 | |

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




Final Result

--- N Phase ---

| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.17836 | 34.8 | 22.8 | 10.2 | 45.0 | 33.0 | 64.6 | 54.6 | 19.6 | 21.6 | |
| 2 | 0.8541 | 32.0 | 21.1 | 10.0 | 42.0 | 31.1 | 56.0 | 46.0 | 14.0 | 14.9 | |
| 3 | 1.08055 | 32.1 | 23.1 | 9.9 | 42.0 | 33.0 | 56.0 | 46.0 | 14.0 | 13.0 | |
| 4 | 1.48254 | 29.4 | 19.9 | 10.0 | 39.4 | 29.9 | 56.0 | 46.0 | 16.6 | 16.1 | |

--- L1 Phase ---

| No. | Frequency [MHz] | Reading QP [dB(uV)] | Reading CAV [dB(uV)] | c.f [dB] | Result QP [dB(uV)] | Result CAV [dB(uV)] | Limit QP [dB(uV)] | Limit AV [dB(uV)] | Margin QP [dB] | Margin CAV [dB] | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 0.50013 | 31.0 | 22.2 | 10.0 | 41.0 | 32.2 | 56.0 | 46.0 | 15.0 | 13.8 | |
| 2 | 0.71705 | 35.1 | 20.7 | 10.0 | 45.1 | 30.7 | 56.0 | 46.0 | 10.9 | 15.3 | |
| 3 | 0.71409 | 35.0 | 20.7 | 10.0 | 45.0 | 30.7 | 56.0 | 46.0 | 11.0 | 15.3 | |

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

**Notes:**

1. All modes of operation, were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are specified in Section 15.207 of the Title 47 CFR.
3. Traces shown in plot are made using a peak detector.
4. Deviations to the Specifications: None.

**- - - End of page - - -**

## 7. CONCLUSION

The data collected relate only the item(s) tested and show that the **SM-X700** has been tested to comply with the requirements specified in §15.107 and §15.109 of the FCC Rules.

**- - - End of Report - - -**