



# Radio Test Report

## FCC ID: 2A233-AYANEOAIR

### Change II

**Report No.** : TBR-C-202209-0095-63  
**Applicant** : Shenzhen Konkr Technology Co., Ltd  
**Equipment Under Test (EUT)**  
**EUT Name** : tablet computer  
**Model No.** : AYANEO AIR Pro  
**Series Model No.** : AYANEO AIR  
**Brand Name** : AYANEO  
**Sample ID** : RW-C-202209-0095-5-1#& RW-C-202209-0095-5-2#  
**Receipt Date** : 2022-10-19  
**Test Date** : 2022-10-19 to 2022-11-11  
**Issue Date** : 2022-11-11  
**Standards** : FCC Part 15 Subpart E 15.407  
**Test Method** : ANSI C63.10: 2013  
KDB 789033 D02 General UNII Test Procedures New Rules v02r01  
KDB 662911 D01 Multiple Transmitter Output v02r01  
**Conclusions** : **PASS**

In the configuration tested, the EUT complied with the standards specified above.

**Witness Engineer** :

**Engineer Supervisor** :

**Engineer Manager** :

Wade. W

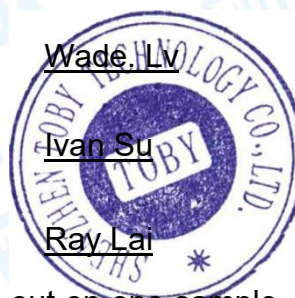
Ivan Su

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This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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## Revision History

| Report No.           | Version | Description             | Issued Date |
|----------------------|---------|-------------------------|-------------|
| TBR-C-202209-0095-63 | Rev.01  | Initial issue of report | 2022-11-11  |
|                      |         |                         |             |
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|                      |         |                         |             |
|                      |         |                         |             |



## 1. General Information about EUT

### 1.1 Client Information

|                     |   |                                                                                                                                    |
|---------------------|---|------------------------------------------------------------------------------------------------------------------------------------|
| <b>Applicant</b>    | : | Shenzhen Konk Technology Co., Ltd                                                                                                  |
| <b>Address</b>      | : | Room 215, Building 22, Maker Town, No. 4109, Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China |
| <b>Manufacturer</b> | : | Shenzhen Konk Technology Co., Ltd                                                                                                  |
| <b>Address</b>      | : | Room 215, Building 22, Maker Town, No. 4109, Liuxian Avenue, Pingshan Community, Taoyuan Street, Nanshan District, Shenzhen, China |

### 1.2 General Description of EUT (Equipment Under Test)

|                            |                          |                                                                                                                                                                                                   |
|----------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT Name</b>            | :                        | tablet computer                                                                                                                                                                                   |
| <b>Models No.</b>          | :                        | AYANEO AIR Pro, AYANEO AIR                                                                                                                                                                        |
| <b>Model Different</b>     | :                        | All these models are identical in the same PCB, layout and electrical circuit, the only difference is model name.                                                                                 |
| <b>Product Description</b> | :                        | Operation Frequency:<br>U-NII-1: 5180MHz~5240MHz, U-NII-3: 5745MHz~5825MHz                                                                                                                        |
|                            | Antenna Gain:            | 5180MHz~5240MHz: 5.0dBi FPC Antenna0<br>-0.34dBi FPC Antenna1<br>5745MHz~5825MHz: 5.64dBi FPC Antenna0<br>2.83dBi FPC Antenna1                                                                    |
|                            | Modulation Type:         | 802.11a: OFDM (QPSK, BPSK, 16QAM)<br>802.11n: OFDM (QPSK, BPSK, 16QAM, 64QAM)<br>802.11ac: OFDM (QPSK, BPSK, 16QAM, 64QAM, 256QAM)<br>802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) |
|                            | Bit Rate of Transmitter: | Up to 1201Mbps (2*2 80MHz)                                                                                                                                                                        |
| <b>Power Rating</b>        | :                        | Adapter(DCTPD65WUS-B1)<br>Input: 100-240V~50/60Hz 1.6A max.<br>Output: DC 20V3.0A<br>DC 11.55V by 3200mAh/36.96Wh Rechargeable Li-ion Battery                                                     |
| <b>Software Version</b>    | :                        | N/A                                                                                                                                                                                               |
| <b>Hardware Version</b>    | :                        | HDF620003-D02                                                                                                                                                                                     |



**Remark:**

- (1) The antenna gain and adapter provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (3) Antenna information provided by the applicant.



## (4)Channel List:

| Frequency Band            | Channel No. | Frequency | Channel No. | Frequency |
|---------------------------|-------------|-----------|-------------|-----------|
| 5180~5240MHz<br>(U-NII-1) | 36          | 5180 MHz  | 44          | 5220 MHz  |
|                           | 38          | 5190 MHz  | 46          | 5230 MHz  |
|                           | 40          | 5200 MHz  | 48          | 5240 MHz  |
|                           | 42          | 5210 MHz  |             |           |

For 20 MHz Bandwidth, use channel 36, 40, 44, 48. For 40 MHz Bandwidth, use channel 38, 46.

For 80 MHz Bandwidth, use channel 42.

| Frequency Band              | Channel No. | Frequency | Channel No. | Frequency |
|-----------------------------|-------------|-----------|-------------|-----------|
| 5260~5320 MHz<br>(U-NII-2A) | 52          | 5260 MHz  | 60          | 5300 MHz  |
|                             | 54          | 5270 MHz  | 62          | 5310MHz   |
|                             | 56          | 5280MHz   | 64          | 5320 MHz  |
|                             | 58          | 5290MHz   |             |           |

For 20 MHz Bandwidth, use channel 52, 56, 60, 64. For 40 MHz Bandwidth, use channel 54, 62.

For 80 MHz Bandwidth, use channel 58.

| Frequency Band              | Channel No. | Frequency | Channel No. | Frequency |
|-----------------------------|-------------|-----------|-------------|-----------|
| 5500~5720 MHz<br>(U-NII-2C) | 100         | 5500 MHz  | 124         | 5620 MHz  |
|                             | 102         | 5510 MHz  | 126         | 5630 MHz  |
|                             | 104         | 5520 MHz  | 128         | 5640 MHz  |
|                             | 106         | 5530 MHz  | 132         | 5660 MHz  |
|                             | 108         | 5540 MHz  | 134         | 5670 MHz  |
|                             | 110         | 5550 MHz  | 136         | 5680 MHz  |
|                             | 112         | 5560 MHz  | 140         | 5700 MHz  |
|                             | 116         | 5580 MHz  |             |           |
|                             | 118         | 5590 MHz  |             |           |
|                             | 120         | 5600 MHz  |             |           |
|                             | 122         | 5610 MHz  |             |           |

For 20 MHz Bandwidth, use channel 100, 104, 108, 112, 116, 120, 124, 128, 132, 136, 140

For 40 MHz Bandwidth, use channel 102, 110, 118, 126, 134

For 80 MHz Bandwidth, use channel 106, 122.

| Frequency Band            | Channel No. | Frequency | Channel No. | Frequency |
|---------------------------|-------------|-----------|-------------|-----------|
| 5745~5825MHz<br>(U-NII-3) | 149         | 5745 MHz  | 157         | 5785 MHz  |
|                           | 151         | 5755 MHz  | 159         | 5795 MHz  |
|                           | 153         | 5765 MHz  | 161         | 5805 MHz  |
|                           | 155         | 5775 MHz  | 165         | 5825 MHz  |



For 20 MHz Bandwidth, use channel 149, 153, 157, 161, 165. For 40 MHz Bandwidth, use channel 151, 159.  
For 80 MHz Bandwidth, use channel 155.

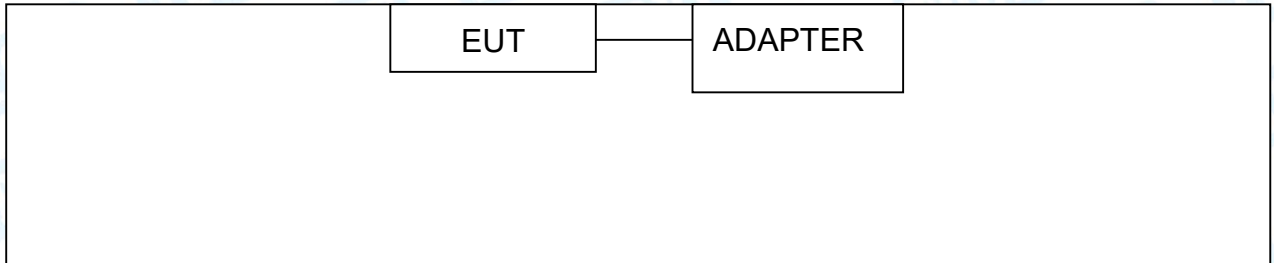
(5)Antenna information

| Mode                                                                                                       |       | TX Antenna (s) | Remark         |                   |
|------------------------------------------------------------------------------------------------------------|-------|----------------|----------------|-------------------|
| 802.11a                                                                                                    |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11n(HT20)                                                                                              |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11ac(VHT20)                                                                                            |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11ac(VHT40)                                                                                            |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11n(HT40)                                                                                              |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11ac(VHT80)                                                                                            |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11ax(HE20)                                                                                             |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11ax(HE40)                                                                                             |       | 2              | ANT. 0+ ANT. 1 |                   |
| 802.11ax(HE80)                                                                                             |       | 2              | ANT. 0+ ANT. 1 |                   |
| 5180MHz~5240MHz                                                                                            |       |                |                |                   |
| Antenna                                                                                                    | Brand | Model Name     | Type           | Antenna Gain(dBi) |
| ANT. 0                                                                                                     | N/A   | N/A            | FPC            | 5.0               |
| ANT. 1                                                                                                     | N/A   | N/A            | FPC            | -0.34             |
| Note:                                                                                                      |       |                |                |                   |
| For MIMO mode: Directional Gain= $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/NANT]$ =5.74dBi |       |                |                |                   |
| 5G working with 802.11a/n/ac/ax has MIMO mode.                                                             |       |                |                |                   |
| 5745MHz~5825MHz                                                                                            |       |                |                |                   |
| Antenna                                                                                                    | Brand | Model Name     | Type           | Antenna Gain(dBi) |
| ANT. 0                                                                                                     | N/A   | N/A            | FPC            | 5.64              |
| ANT. 1                                                                                                     | N/A   | N/A            | FPC            | 2.83              |
| Note:                                                                                                      |       |                |                |                   |
| For MIMO mode: Directional Gain= $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2/NANT]$ =7.36dBi |       |                |                |                   |
| 5G working with 802.11a/n/ac/ax has MIMO mode.                                                             |       |                |                |                   |

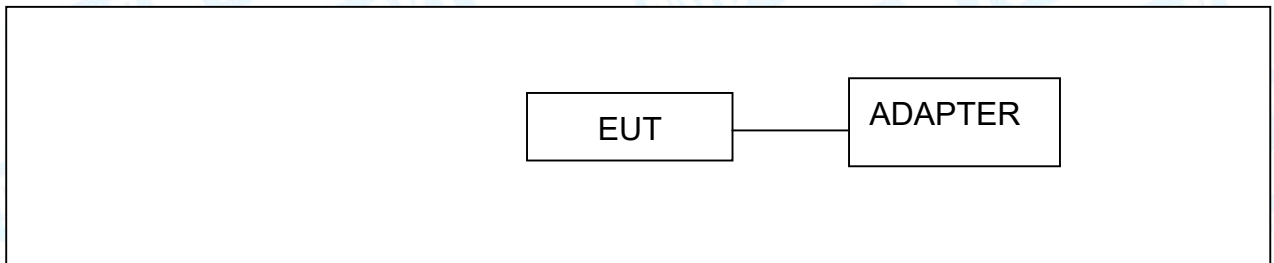


### 1.3 Block Diagram Showing the Configuration of System Tested

#### Conducted Test



#### Radiated Test



### 1.4 Description of Support Units

| Equipment Information                                   |               |              |              |           |
|---------------------------------------------------------|---------------|--------------|--------------|-----------|
| Name                                                    | Model         | FCC ID/SDOC  | Manufacturer | Used “√”  |
| Adapter                                                 | DCTPD65WUS-B1 | ----         | Dachuan      | √         |
| Cable Information                                       |               |              |              |           |
| Number                                                  | Shielded Type | Ferrite Core | Length       | Note      |
| Cable 1                                                 | Yes           | NO           | 1.0M         | Accessory |
| Note: The cables and adapter provided by the Applicant. |               |              |              |           |



## 1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follow was evaluated respectively.

| For Conducted Test                            |                 |                                                  |
|-----------------------------------------------|-----------------|--------------------------------------------------|
| Final Test Mode                               |                 | Description                                      |
| Mode 1                                        |                 | TX a Mode(5180MHz)                               |
| For Radiated Test Below 1GHz                  |                 |                                                  |
| Final Test Mode                               |                 | Description                                      |
| Mode 2                                        |                 | TX a Mode(5180MHz)                               |
| For Radiated Above 1GHz and RF Conducted Test |                 |                                                  |
| Test Band                                     | Final Test Mode | Description                                      |
| U-NII-1                                       | Mode 3          | TX Mode 802.11a Mode Channel 36/44/48            |
|                                               | Mode 4          | TX Mode 802.11n(HT20) Mode Channel 36/44/48      |
|                                               | Mode 5          | TX Mode 802.11ac(VHT20) Mode Channel 36/44/48    |
|                                               | Mode 6          | TX Mode 802.11ax(HE20) Mode Channel 36/44/48     |
|                                               | Mode 7          | TX Mode 802.11n(HT40) Mode Channel 38/46         |
|                                               | Mode 8          | TX Mode 802.11ac(VHT40) Mode Channel 38/46       |
|                                               | Mode 9          | TX Mode 802.11ax(HE40) Mode Channel 38/46        |
|                                               | Mode 10         | TX Mode 802.11ac(VHT80) Mode Channel 42          |
| U-NII-3                                       | Mode 11         | TX Mode 802.11ax(HE80) Mode Channel 42           |
|                                               | Mode 12         | TX Mode 802.11a Mode Channel 149/157/165         |
|                                               | Mode 13         | TX Mode 802.11n(HT20) Mode Channel 149/157/165   |
|                                               | Mode 14         | TX Mode 802.11ac(VHT20) Mode Channel 149/157/165 |
|                                               | Mode 15         | TX Mode 802.11ax(HE20) Mode Channel 149/157/165  |
|                                               | Mode 16         | TX Mode 802.11n(HT40) Mode Channel 151/159       |
|                                               | Mode 17         | TX Mode 802.11ac(VHT40) Mode Channel 151/159     |
|                                               | Mode 18         | TX Mode 802.11ax(HE40) Mode Channel 151/159      |
|                                               | Mode 19         | TX Mode 802.11ac(VHT80) Mode Channel 155         |
|                                               | Mode 20         | TX Mode 802.11ax(HE80) Mode Channel 155          |



**Note:**

- (1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.

According to ANSI C63.10 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

802.11a Mode: OFDM (6 Mbps)  
802.11n (HT20) Mode: MCS 0  
802.11n (HT40) Mode: MCS 0  
802.11ac(VHT20) Mode: MCS 0/ Nss1  
802.11ac(VHT40) Mode: MCS 0/ Nss1  
802.11ac(VHT80) Mode: MCS 0/ Nss1  
802.11ax(HE20) Mode: MCS 0/ Nss1  
802.11ax(HE40) Mode: MCS 0/ Nss1  
802.11ax(HE80) Mode: MCS 0/ Nss1

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a portable unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.



## 1.6 Description of Test Software Setting

During testing channel & Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of RF setting.

| Test Software: QATool_Dbg |                 |            |       |
|---------------------------|-----------------|------------|-------|
| U-NII-1                   |                 |            |       |
| Mode                      | Frequency (MHz) | Parameters |       |
|                           |                 | Ant.0      | Ant.1 |
| 802.11a                   | 5180            | 16         | 16    |
|                           | 5220            | 13.5       | 13.5  |
|                           | 5240            | 13.5       | 13.5  |
| 802.11n(HT20)             | 5180            | 16.5       | 16.5  |
|                           | 5220            | 15         | 15    |
|                           | 5240            | 14.5       | 14.5  |
| 802.11ac(VHT20)           | 5180            | 16         | 16    |
|                           | 5220            | 15         | 15    |
|                           | 5240            | 15         | 15    |
| 802.11ax(HE20)            | 5180            | 17.5       | 17.5  |
|                           | 5220            | 15         | 15    |
|                           | 5240            | 14.5       | 14.5  |
| 802.11n(HT40)             | 5190            | 16         | 16    |
|                           | 5230            | 15         | 15    |
| 802.11ac(VHT40)           | 5190            | 16         | 16    |
|                           | 5230            | 15         | 15    |
| 802.11ax(HE40)            | 5190            | 16         | 16    |
|                           | 5230            | 15         | 15    |
| 802.11ac(VHT80)           | 5210            | 16         | 16    |
| 802.11ax(HE80)            | 5210            | 15         | 15    |
| U-NII-3                   |                 |            |       |
| Mode                      | Frequency (MHz) | Parameters |       |
|                           |                 | Ant.0      | Ant.1 |
| 802.11a                   | 5745            | 14.5       | 14.5  |
|                           | 5785            | 14.5       | 14.5  |
|                           | 5825            | 14.5       | 14.5  |
| 802.11n(HT20)             | 5745            | 15.5       | 15.5  |
|                           | 5785            | 15         | 15    |
|                           | 5825            | 15         | 15    |
| 802.11ac(VHT20)           | 5745            | 15.5       | 15.5  |
|                           | 5785            | 15         | 15    |
|                           | 5825            | 15         | 15    |
| 802.11ax(HE20)            | 5745            | 15         | 15    |
|                           | 5785            | 15.5       | 15.5  |
|                           | 5825            | 15         | 15    |
| 802.11n(HT40)             | 5755            | 15         | 15    |
|                           | 5795            | 15         | 15    |
| 802.11ac(VHT40)           | 5755            | 15.5       | 15.5  |
|                           | 5795            | 15.5       | 15.5  |
| 802.11ax(HE40)            | 5755            | 15.5       | 15.5  |
|                           | 5795            | 15         | 15    |
| 802.11ac(VHT80)           | 5775            | 15         | 15    |
| 802.11ax(HE80)            | 5775            | 15         | 15    |



## 1.7 Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

| Test Item          | Parameters                                        | Expanded Uncertainty ( $U_{Lab}$ ) |
|--------------------|---------------------------------------------------|------------------------------------|
| Conducted Emission | Level Accuracy:<br>9kHz~150kHz<br>150kHz to 30MHz | $\pm 3.50$ dB<br>$\pm 3.10$ dB     |
| Radiated Emission  | Level Accuracy:<br>9kHz to 30 MHz                 | $\pm 4.60$ dB                      |
| Radiated Emission  | Level Accuracy:<br>30MHz to 1000 MHz              | $\pm 4.50$ dB                      |
| Radiated Emission  | Level Accuracy:<br>Above 1000MHz                  | $\pm 4.20$ dB                      |

## 1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1/F., Building 6, Rundongsheng Industrial Zone, Longzhu, Xixiang, Bao'an District, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

### **CNAS (L5813)**

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

### **A2LA Certificate No.: 4750.01**

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01.FCC Accredited Test Site Number: 854351. Designation Number: CN1223.

### **IC Registration No.: (11950A)**

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056.



## 2. Test Summary

| Standard Section       | Test Item                      | Test Sample(s)        | Judgment | Remark |
|------------------------|--------------------------------|-----------------------|----------|--------|
| FCC                    |                                |                       |          |        |
| FCC 15.207(a)          | Conducted Emission             | RW-C-202209-0095-5-1# | PASS     | N/A    |
| FCC 15.209 & 15.407(b) | Radiated Unwanted Emissions    | RW-C-202209-0095-5-1# | PASS     | N/A    |
| FCC 15.203             | Antenna Requirement            | /                     | N/A      | N/A    |
| FCC 15.407(a)          | -26dB Emission Bandwidth       | /                     | N/A      | N/A    |
| FCC 15.407(a)          | 99% Occupied Bandwidth         | /                     | N/A      | N/A    |
| FCC 15.407(e)          | -6dB Min Emission Bandwidth    | /                     | N/A      | N/A    |
| FCC 15.407(a)          | Maximum Conducted Output Power | /                     | N/A      | N/A    |
| FCC 15.407(a)          | Power Spectral Density         | /                     | N/A      | N/A    |
| FCC 15.407(b)& 15.205  | Emissions in Restricted Bands  | /                     | N/A      | N/A    |
| FCC 15.407(b)&15.209   | Conducted Unwanted Emissions   | /                     | N/A      | N/A    |
| FCC 15.407(g)          | Frequency Stability            | /                     | N/A      | N/A    |
| /                      | On Time and Duty Cycle         | /                     | /        | N/A    |

**Note:**

- (1) N/A is an abbreviation for Not Applicable.
- (2) This report is Class II change report for the original equipment have changed, the transmitter module itself has not changed. More information about the test data please refer to the original test report.
- (3) As there is no change regard RF transmitter portion and Antenna assembly, the change will not have effect on Radiated emission above 1GHz by judging for experience, thus testing is performed up to 1GHz only.

## 3. Test Software

| Test Item                | Test Software | Manufacturer | Version No.  |
|--------------------------|---------------|--------------|--------------|
| Conducted Emission       | EZ-EMC        | EZ           | CDI-03A2     |
| Radiation Emission       | EZ-EMC        | EZ           | FA-03A2RE    |
| Radiation Emission       | EZ-EMC        | EZ           | FA-03A2RE+   |
| RF Conducted Measurement | MTS-8310      | MWRfTest     | V2.0.0.0     |
| RF Test System           | JS1120        | Tonscend     | V2.6.88.0336 |



## 4. Test Equipment

| Conducted Emission Test          |                                  |                   |               |               |               |
|----------------------------------|----------------------------------|-------------------|---------------|---------------|---------------|
| Equipment                        | Manufacturer                     | Model No.         | Serial No.    | Last Cal.     | Cal. Due Date |
| EMI Test Receiver                | Rohde & Schwarz                  | ESCI              | 100321        | Jun. 23, 2022 | Jun. 22, 2023 |
| RF Switching Unit                | Compliance Direction Systems Inc | RSU-A4            | 34403         | Jun. 23, 2022 | Jun. 22, 2023 |
| AMN                              | SCHWARZBECK                      | NNBL 8226-2       | 8226-2/164    | Jun. 22, 2022 | Jun. 21, 2023 |
| LISN                             | Rohde & Schwarz                  | ENV216            | 101131        | Jun. 22, 2022 | Jun. 21, 2023 |
| Radiation Emission Test (A Site) |                                  |                   |               |               |               |
| Equipment                        | Manufacturer                     | Model No.         | Serial No.    | Last Cal.     | Cal. Due Date |
| Spectrum Analyzer                | Rohde & Schwarz                  | FSV40-N           | 102197        | Jun. 23, 2022 | Jun. 22, 2023 |
| EMI Test Receiver                | Rohde & Schwarz                  | ESPI              | 100010/007    | Jun. 23, 2022 | Jun. 22, 2023 |
| Bilog Antenna                    | ETS-LINDGREN                     | 3142E             | 00117537      | Feb. 27, 2022 | Feb. 26, 2024 |
| Horn Antenna                     | ETS-LINDGREN                     | 3117              | 00143207      | Feb. 26, 2022 | Feb. 25, 2024 |
| Horn Antenna                     | SCHWARZBECK                      | BBHA 9170         | 1118          | Feb. 26, 2022 | Feb. 25, 2024 |
| Loop Antenna                     | SCHWARZBECK                      | FMZB 1519 B       | 1519B-059     | Feb. 26, 2022 | Feb.25, 2024  |
| Pre-amplifier                    | SONOMA                           | 310N              | 185903        | Feb. 26, 2022 | Feb.25, 2023  |
| Pre-amplifier                    | HP                               | 8449B             | 3008A00849    | Feb. 26, 2022 | Feb.25, 2023  |
| HF Amplifier                     | Tonscend                         | TAP0184050        | AP21C806129   | Sep. 01, 2022 | Aug. 31, 2023 |
| Radiation Emission Test (B Site) |                                  |                   |               |               |               |
| Equipment                        | Manufacturer                     | Model No.         | Serial No.    | Last Cal.     | Cal. Due Date |
| Spectrum Analyzer                | Rohde & Schwarz                  | FSV40-N           | 102197        | Jun. 23, 2022 | Jun. 22, 2023 |
| MXA Signal Analyzer              | Agilent                          | N9020A            | MY47380425    | Sep. 01, 2022 | Aug. 31, 2023 |
| EMI Test Receiver                | Rohde & Schwarz                  | ESU-8             | 100472        | Feb. 26, 2022 | Feb.25, 2023  |
| Bilog Antenna                    | SCHWARZBECK                      | VULB 9168         | 1225          | Dec. 05, 2021 | Dec. 04, 2023 |
| Horn Antenna                     | SCHWARZBECK                      | BBHA 9120 D       | 2463          | Feb. 26, 2022 | Feb.25, 2024  |
| Horn Antenna                     | SCHWARZBECK                      | BBHA 9170         | 1118          | Jun. 26, 2022 | Jun.25, 2024  |
| Loop Antenna                     | SCHWARZBECK                      | FMZB 1519 B       | 1519B-059     | Jun. 26, 2022 | Jun.25, 2024  |
| HF Amplifier                     | Tonscend                         | TAP9E6343         | AP21C806117   | Sep. 01, 2022 | Aug. 31, 2023 |
| HF Amplifier                     | Tonscend                         | TAP051845         | AP21C806141   | Sep. 01, 2022 | Aug. 31, 2023 |
| HF Amplifier                     | Tonscend                         | TAP0184050        | AP21C806129   | Sep. 01, 2022 | Aug. 31, 2023 |
| Antenna Conducted Emission       |                                  |                   |               |               |               |
| Equipment                        | Manufacturer                     | Model No.         | Serial No.    | Last Cal.     | Cal. Due Date |
| Spectrum Analyzer                | Agilent                          | E4407B            | MY45106456    | Jun. 23, 2022 | Jun. 22, 2023 |
| Spectrum Analyzer                | Rohde & Schwarz                  | FSV40-N           | 102197        | Jun. 23, 2022 | Jun. 22, 2023 |
| MXA Signal Analyzer              | Agilent                          | N9020A            | MY49100060    | Sep. 01, 2022 | Aug. 31, 2023 |
| Spectrum Analyzer                | KEYSIGT                          | N9020B            | MY60110172    | Sep. 01, 2022 | Aug. 31, 2023 |
| RF Power Sensor                  | DARE!! Instruments               | RadiPowerRPR3006W | 17I00015SNO26 | Sep. 01, 2022 | Aug. 31, 2023 |
|                                  | DARE!! Instruments               | RadiPowerRPR3006W | 17I00015SNO29 | Sep. 01, 2022 | Aug. 31, 2023 |
|                                  | DARE!! Instruments               | RadiPowerRPR3006W | 17I00015SNO31 | Sep. 01, 2022 | Aug. 31, 2023 |
|                                  | DARE!! Instruments               | RadiPowerRPR3006W | 17I00015SNO33 | Sep. 01, 2022 | Aug. 31, 2023 |
| RF Control Unit                  | Tonsced                          | JS0806-2          | 21F8060439    | Sep. 01, 2022 | Aug. 31, 2023 |
| Temperature and Humidity Chamber | ZhengHang                        | ZH-QTH-1500       | ZH2107264     | Jun. 22, 2022 | Jun. 21, 2023 |



## 5. Conducted Emission Test

### 5.1 Test Standard and Limit

#### 5.1.1 Test Standard

##### FCC Part 15.207

#### 5.1.2 Test Limit

| Frequency     | Maximum RF Line Voltage (dB $\mu$ V) |               |
|---------------|--------------------------------------|---------------|
|               | Quasi-peak Level                     | Average Level |
| 150kHz~500kHz | 66 ~ 56 *                            | 56 ~ 46 *     |
| 500kHz~5MHz   | 56                                   | 46            |
| 5MHz~30MHz    | 60                                   | 50            |

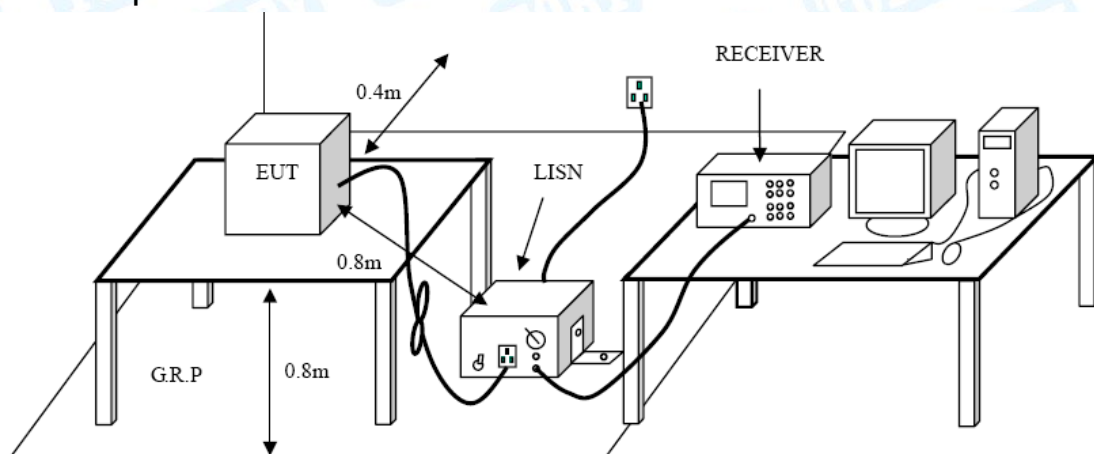
**Notes:**

(1) \*Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 5.2 Test Setup



### 5.3 Test Procedure

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.



- The bandwidth of EMI test receiver is set at 9 kHz, and the test frequency band is from 0.15MHz to 30MHz.

#### 5.4 Deviation From Test Standard

No deviation

#### 5.5 EUT Operating Mode

Please refer to the description of test mode.

#### 5.6 Test Data

Please refer to the Attachment A inside test report.



## 6. Radiated and Conducted Unwanted Emissions

### 6.1 Test Standard and Limit

#### 6.1.1 Test Standard

**FCC Part 15.209 & FCC Part 15.407(b)**

#### 6.1.2 Test Limit

| General field strength limits at frequencies Below 30MHz                                                                                   |                                  |                               |
|--------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|-------------------------------|
| Frequency (MHz)                                                                                                                            | Field Strength (microvolt/meter) | Measurement Distance (meters) |
| 0.009~0.490                                                                                                                                | 2400/F(KHz)                      | 300                           |
| 0.490~1.705                                                                                                                                | 24000/F(KHz)                     | 30                            |
| 1.705~30.0                                                                                                                                 | 30                               | 30                            |
| <b>Note:</b> 1, The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector. |                                  |                               |

| General field strength limits at frequencies above 30 MHz |                              |                               |
|-----------------------------------------------------------|------------------------------|-------------------------------|
| Frequency (MHz)                                           | Field strength (μV/m at 3 m) | Measurement Distance (meters) |
| 30~88                                                     | 100                          | 3                             |
| 88~216                                                    | 150                          | 3                             |
| 216~960                                                   | 200                          | 3                             |
| Above 960                                                 | 500                          | 3                             |

| General field strength limits at frequencies Above 1000MHz |                         |         |
|------------------------------------------------------------|-------------------------|---------|
| Frequency (MHz)                                            | Distance of 3m (dBuV/m) |         |
|                                                            | Peak                    | Average |
| Above 1000                                                 | 74                      | 54      |
| <b>Note:</b>                                               |                         |         |
| (1) The tighter limit applies at the band edges.           |                         |         |
| (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)      |                         |         |

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power

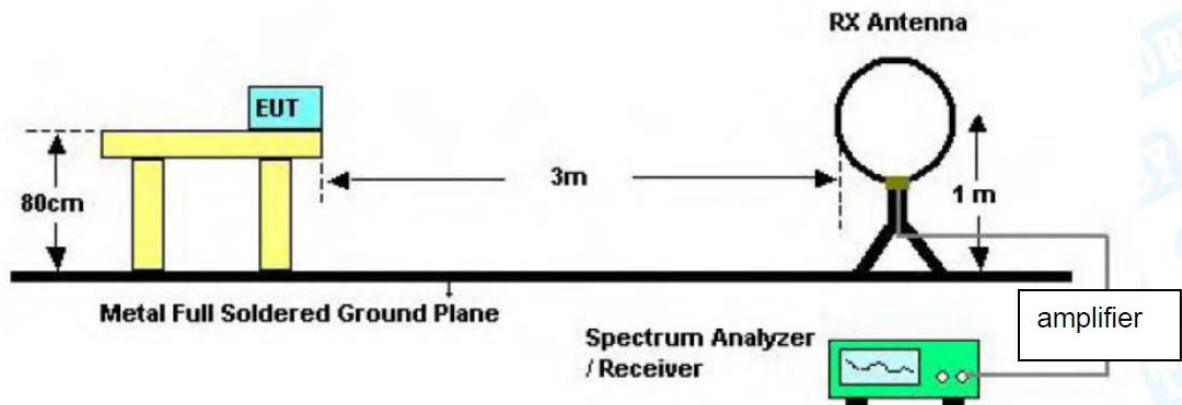


limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

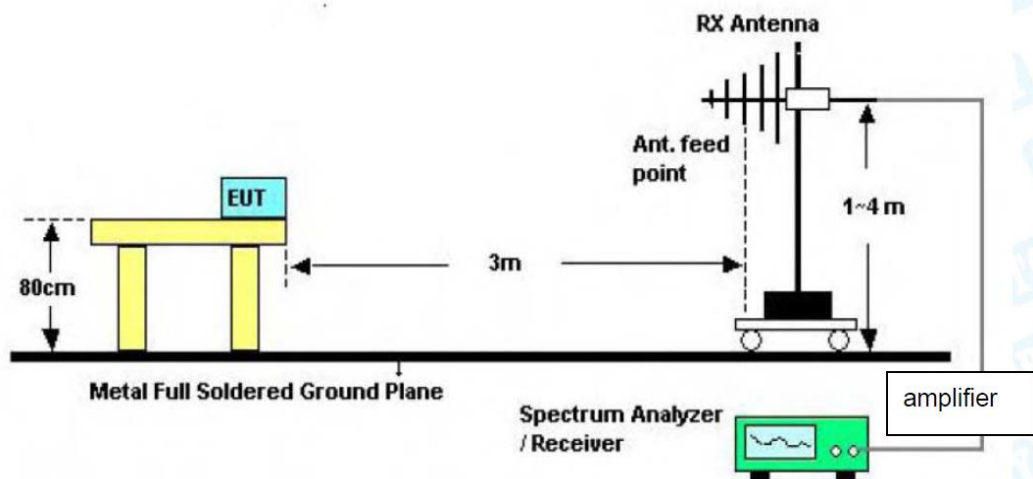


## 6.2 Test Setup

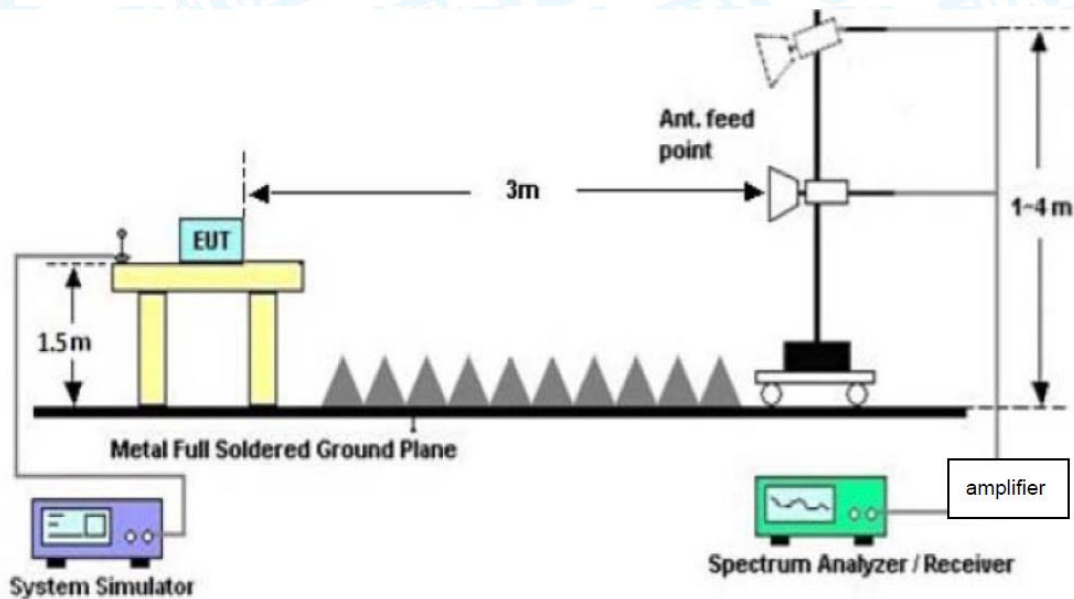
### Radiated measurement



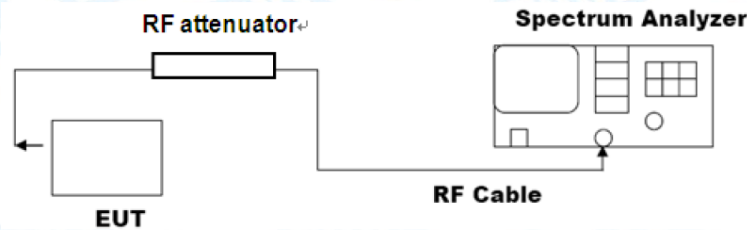
### Below 30MHz Test Setup



### Below 1000MHz Test Setup



### Above 1GHz Test Setup Conducted measurement



## 6.3 Test Procedure

### ---Radiated measurement

- The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Below 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- Testing frequency range 30MHz-1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection. Testing frequency range 9KHz-150Hz the measuring instrument use VBW=200Hz with Quasi-peak detection. Testing frequency range 9KHz-30MHz the measuring instrument use VBW=9kHz with Quasi-peak detection.
- Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- For the actual test configuration, please see the test setup photo.



#### 6.4 Deviation From Test Standard

No deviation

#### 6.5 EUT Operating Mode

Please refer to the description of test mode.

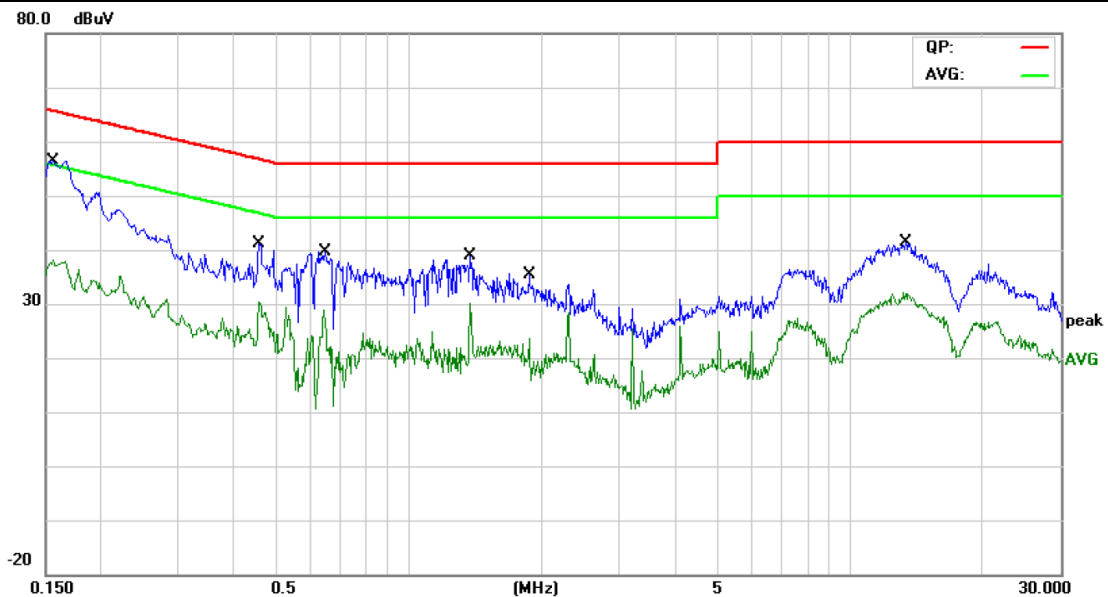
#### 6.6 Test Data

Radiated measurement please refer to the Attachment B inside test report.



## Attachment A-- Conducted Emission Test Data

|               |                              |                    |     |
|---------------|------------------------------|--------------------|-----|
| Temperature:  | 23.4°C                       | Relative Humidity: | 45% |
| Test Voltage: | AC 120V/60Hz                 |                    |     |
| Terminal:     | Line                         |                    |     |
| Test Mode:    | Mode 1                       |                    |     |
| Remark:       | Only worse case is reported. |                    |     |



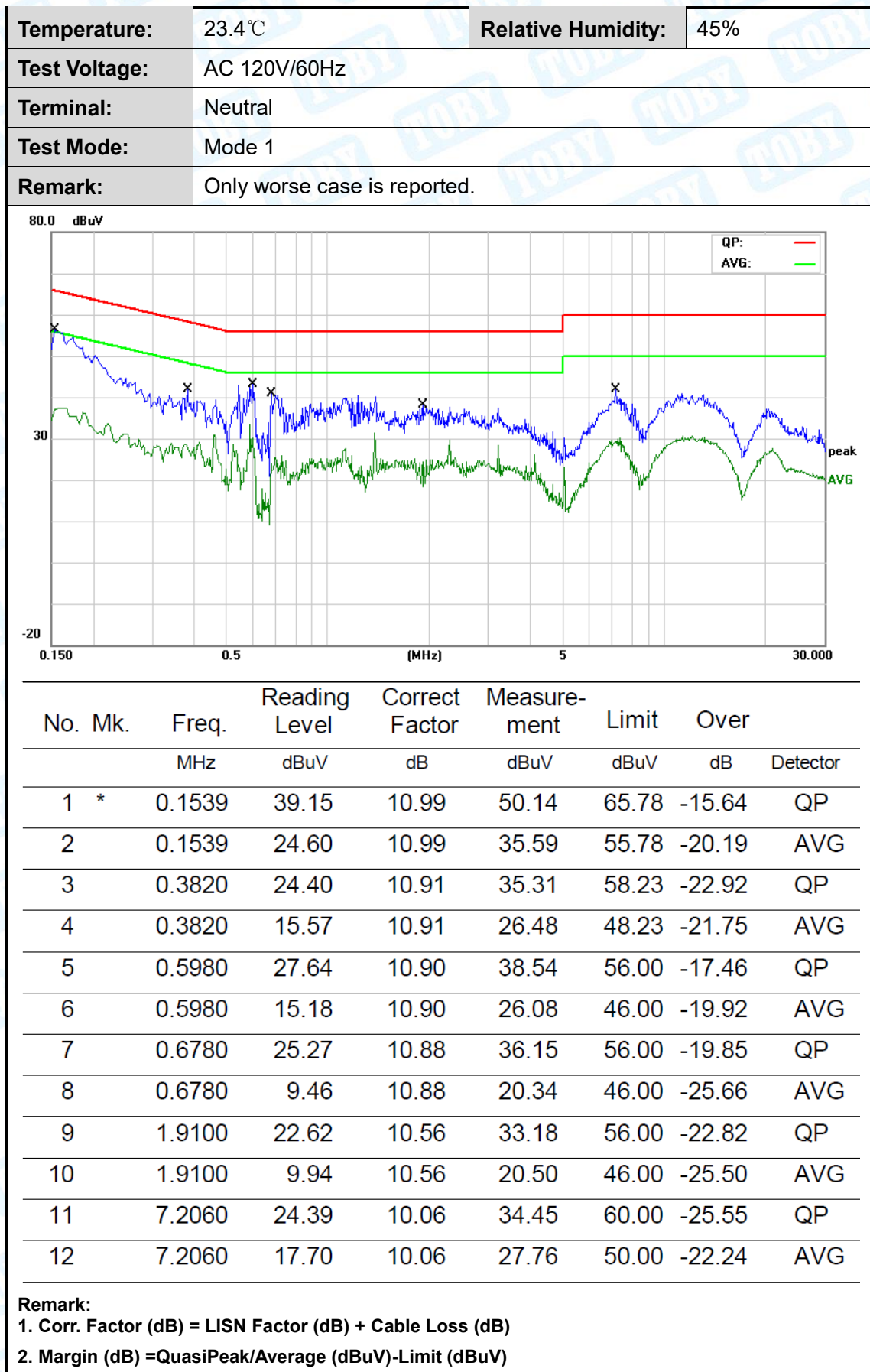
| No. | Mk. | Freq.   | Reading Level | Correct Factor | Measure-ment | Limit | Over   |          |
|-----|-----|---------|---------------|----------------|--------------|-------|--------|----------|
|     |     | MHz     | dBuV          | dB             | dBuV         | dBuV  | dB     | Detector |
| 1   |     | 0.1556  | 38.92         | 11.10          | 50.02        | 65.69 | -15.67 | QP       |
| 2   |     | 0.1556  | 25.74         | 11.10          | 36.84        | 55.69 | -18.85 | AVG      |
| 3   |     | 0.4580  | 25.68         | 10.92          | 36.60        | 56.73 | -20.13 | QP       |
| 4   |     | 0.4580  | 20.55         | 10.92          | 31.47        | 46.73 | -15.26 | AVG      |
| 5   |     | 0.6460  | 27.41         | 10.90          | 38.31        | 56.00 | -17.69 | QP       |
| 6   |     | 0.6460  | 16.32         | 10.90          | 27.22        | 46.00 | -18.78 | AVG      |
| 7   |     | 1.3779  | 24.51         | 10.62          | 35.13        | 56.00 | -20.87 | QP       |
| 8   | *   | 1.3779  | 20.17         | 10.62          | 30.79        | 46.00 | -15.21 | AVG      |
| 9   |     | 1.8740  | 19.99         | 10.52          | 30.51        | 56.00 | -25.49 | QP       |
| 10  |     | 1.8740  | 11.66         | 10.52          | 22.18        | 46.00 | -23.82 | AVG      |
| 11  |     | 13.3700 | 25.85         | 10.26          | 36.11        | 60.00 | -23.89 | QP       |
| 12  |     | 13.3700 | 20.19         | 10.26          | 30.45        | 50.00 | -19.55 | AVG      |

## Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) = QuasiPeak/Average (dBuV) - Limit (dBuV)





## Attachment B-- Unwanted Emissions Data

### ---Radiated Unwanted Emissions

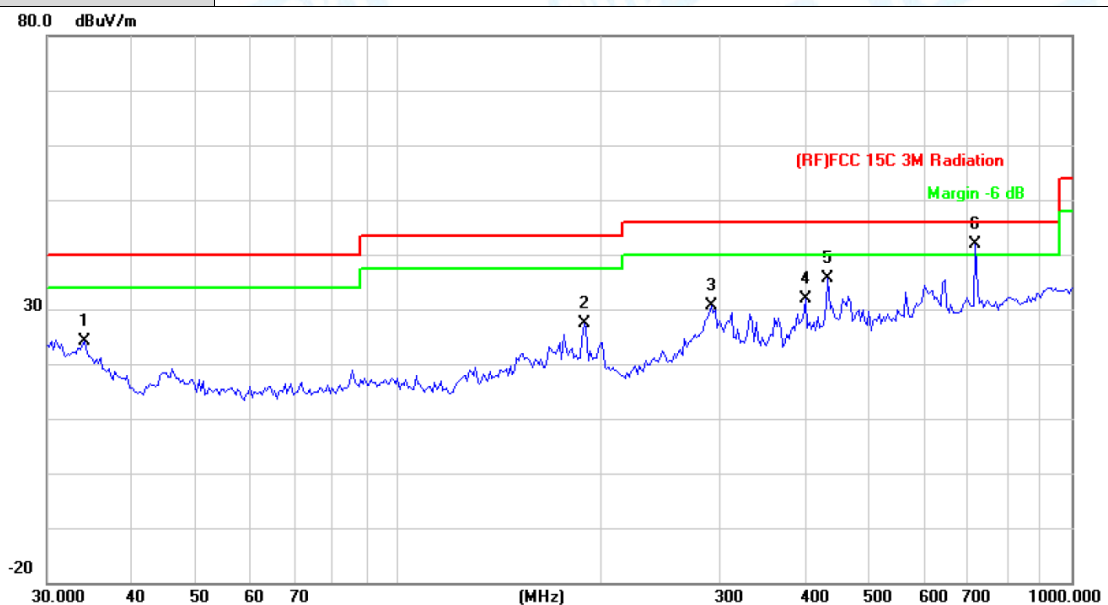
#### 9 KHz~30 MHz

From 9 KHz to 30 MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB  
Below the permissible value has no need to be reported.

#### 30MHz~1GHz

|               |                              |                    |     |
|---------------|------------------------------|--------------------|-----|
| Temperature:  | 23.5℃                        | Relative Humidity: | 46% |
| Test Voltage: | AC 120V/60Hz                 |                    |     |
| Ant. Pol.     | Horizontal                   |                    |     |
| Test Mode:    | Mode 2 TX a Mode(5180MHz)    |                    |     |
| Remark:       | Only worse case is reported. |                    |     |



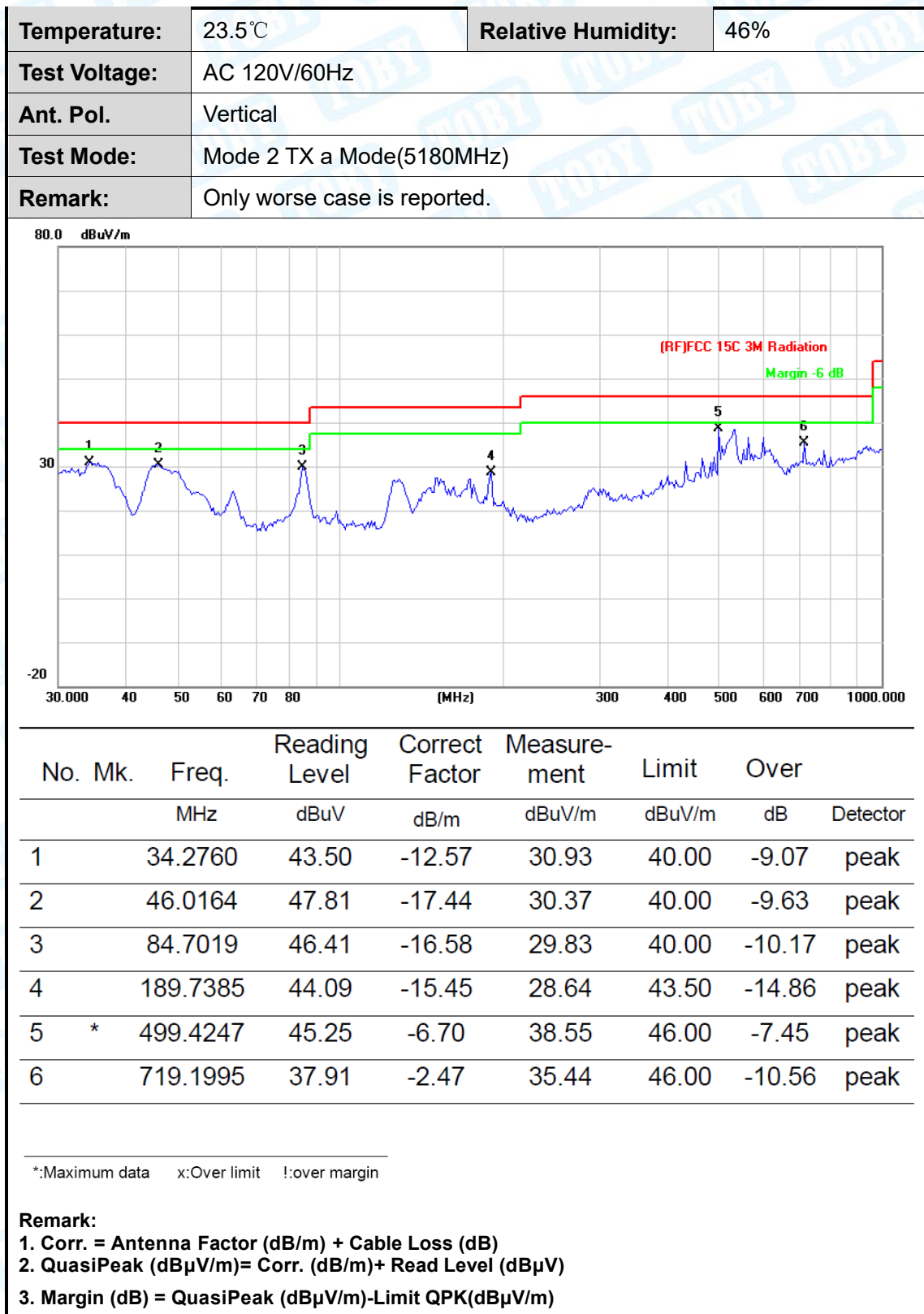
| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB/m | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|---------------------------|----------------------------|-----------------|------------|----------|
| 1   |     | 34.0365      | 36.45                    | -12.37                    | 24.08                      | 40.00           | -15.92     | peak     |
| 2   |     | 188.4125     | 42.74                    | -15.37                    | 27.37                      | 43.50           | -16.13     | peak     |
| 3   |     | 291.0360     | 41.46                    | -10.80                    | 30.66                      | 46.00           | -15.34     | peak     |
| 4   |     | 401.8385     | 38.70                    | -6.77                     | 31.93                      | 46.00           | -14.07     | peak     |
| 5   |     | 434.0651     | 43.20                    | -7.45                     | 35.75                      | 46.00           | -10.25     | peak     |
| 6   | *   | 719.1995     | 44.33                    | -2.47                     | 41.86                      | 46.00           | -4.14      | peak     |

\*:Maximum data    x:Over limit    !:over margin

#### Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
3. Margin (dB) = QuasiPeak (dBμV/m)-Limit QPK(dBμV/m)





-----END OF REPORT-----

