

## Industrial Internet Innovation Center (Shanghai) Co.,Ltd.

## EMC TEST REPORT

|             |                                          |
|-------------|------------------------------------------|
| PRODUCT     | SD-D01                                   |
| BRAND       | ATEL                                     |
| MODEL       | SD-D01                                   |
| APPLICANT   | Asiatelco Technologies Co.               |
| FCC ID      | XYO-SD01                                 |
| ISSUE DATE  | February 21, 2024                        |
| STANDARD(S) | FCC Part 15, Subpart B, ANSI C63.4-2014. |

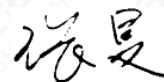
Prepared by: Li Liukai



Reviewed by: Qin Yabin



Approved by: Zhang Min

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## 1 Summary of Test Report

### 1.1 Test Standard (s)

| No.                                                                                                 | Test Standard(s)       | Title                                                                                                                               |
|-----------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| 1                                                                                                   | FCC Part 15, Subpart B | Radio frequency devices                                                                                                             |
| 2                                                                                                   | ANSI C63.4             | Method of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz |
| NOTE: According to customer requirements, test and report using the latest version of the standard. |                        |                                                                                                                                     |

### 1.2 Summary of Test Results

| No.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Item(s)           | Standard(s) | Verdicts for Single Item | Detailed Results |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------|--------------------------|------------------|
| 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Radiated Emission | 15.109(a)   | Pass                     | See section 6.1  |
| <p>NOTE:</p> <p>The SD-D01, manufactured by Asiatelco Technologies Co. is a new product for testing. Industrial Internet Innovation Center (Shanghai) Co., Ltd. only performed test cases which identified with Pass/Fail/Inc result in section 1.3.</p> <p>Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 4 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 1 of this test report.</p> |                   |             |                          |                  |



## 2 General Information of The Laboratory

### 2.1 Testing Laboratory

|                      |                                                            |
|----------------------|------------------------------------------------------------|
| Lab Name             | Industrial Internet Innovation Center (Shanghai) Co.,Ltd.  |
| Address              | Building 4, No. 766, Jingang Road, Pudong, Shanghai, China |
| Telephone            | 021-68866880                                               |
| FCC Registration No. | 708870                                                     |
| FCC Designation No.  | CN1364                                                     |

### 2.2 Laboratory Environmental Requirements

|                      |              |
|----------------------|--------------|
| Temperature          | 15℃~35℃      |
| Relative Humidity    | 25%RH~75%RH  |
| Atmospheric Pressure | 86kPa~106kPa |
| Supply Voltage       | 120V/60Hz    |

### 2.3 Project Information

|                 |                                       |
|-----------------|---------------------------------------|
| Project Manager | Xu Yuting                             |
| Test Date       | January 27, 2024 to February 01, 2024 |

### 3 General Information of The Customer

#### 3.1 Applicant

|           |                                                                                             |
|-----------|---------------------------------------------------------------------------------------------|
| Company   | Asiatelco Technologies Co.                                                                  |
| Address   | #289 Bisheng Road, Building-8, 3F, Zhang jiang Hi-Tech Park, Pudong, Shanghai 201204, China |
| Telephone | 021-51688806                                                                                |

#### 3.2 Manufacturer

|           |                                                                                             |
|-----------|---------------------------------------------------------------------------------------------|
| Company   | Asiatelco Technologies Co.                                                                  |
| Address   | #289 Bisheng Road, Building-8, 3F, Zhang jiang Hi-Tech Park, Pudong, Shanghai 201204, China |
| Telephone | 021-51688806                                                                                |

#### 3.3 Factory

|         |     |
|---------|-----|
| Company | N/A |
| Address | N/A |

## 4 General Information of The Product

### 4.1 Product Description for Equipment under Test (EUT)

|                                                                                                                                                                                                                                                                                                               |                  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| Product                                                                                                                                                                                                                                                                                                       | SD-D01           |
| Model                                                                                                                                                                                                                                                                                                         | SD-D01           |
| Date of Receipt                                                                                                                                                                                                                                                                                               | January 24, 2024 |
| EUT ID*                                                                                                                                                                                                                                                                                                       | S02aa            |
| SN/IMEI                                                                                                                                                                                                                                                                                                       | N/A              |
| Supported Radio Technology and Bands                                                                                                                                                                                                                                                                          | BLE              |
| Hardware Version                                                                                                                                                                                                                                                                                              | P3.0             |
| Software Version                                                                                                                                                                                                                                                                                              | 1.0.0.2          |
| <p>NOTE1: EUT ID is the internal identification code of the laboratory.</p> <p>NOTE2: Photographs of EUT are shown in ANNEX A of this test report.</p> <p>NOTE3: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.</p> |                  |

### 4.2 Description for Auxiliary Equipment (AE)

| AE ID*                                                                                                                   | Description            | Model          | SN/Remark |
|--------------------------------------------------------------------------------------------------------------------------|------------------------|----------------|-----------|
| UA01                                                                                                                     | Serial debugging cable | N/A            | N/A       |
| AE1                                                                                                                      | Notebook PC            | Thinkpad X470P | N/A       |
| <p>NOTE:</p> <p>*AE ID is the internal identification code of the laboratory.</p> <p>*The AE is provided by the lab.</p> |                        |                |           |



## 5 Test Configuration Information

### 5.1 Laboratory Environmental Conditions

#### 5.1.1 Permanent Facilities

|                                                                      |                                             |
|----------------------------------------------------------------------|---------------------------------------------|
| Semi-anechoic chamber SAC3-1 (9 m*8m*6.2m) & SAC3-2 (9.8m*6.7m*6.7m) |                                             |
| Shielding effectiveness                                              | 0.014MHz ~1MHz, >60dB; 1MHz~1000MHz, >90dB. |
| Electrical insulation                                                | > 2MΩ                                       |
| Ground system resistance                                             | < 4Ω                                        |
| Normalised site attenuation (NSA)                                    | < ± 4 dB, 3m distance, from 30 to 1000 MHz  |
| Site voltage standing-wave ratio (SVSWR)                             | Between 0 and 6 dB, from 1GHz to 18GHz      |
| Uniformity of field strength                                         | Between 0 and 6 dB, from 80 to 6000 MHz     |

|                          |                                            |
|--------------------------|--------------------------------------------|
| Shielded room            |                                            |
| Shielding effectiveness  | 0.014MHz~1MHz, >60dB; 1MHz~1000MHz, >90dB. |
| Electrical insulation    | > 2 MΩ                                     |
| Ground system resistance | < 4Ω                                       |

### 5.2 Decision of final test mode

The EUT was tested in conjunction with the accessories in Section 4.2. We tested all of the following test modes and selected the worst mode from the test results and recorded them in the report.

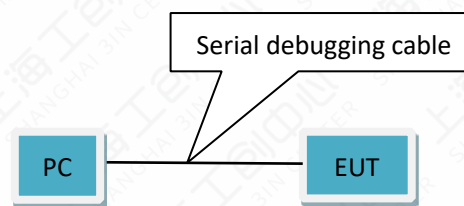
The test configuration modes are as the following:

| Test Item                                                                                         | Test setup and operating modes                              |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------|
| Radiated emission                                                                                 | 30MHz-18GHz frequency range:<br>Mode 1: BLE mode+ UA01+ AE1 |
| Note: The worst case of radiated emission for 30MHz-1GHz is Mode 1 and for 1GHz -18GHz is Mode 1. |                                                             |

### 5.3 EUT System Operation

1. Connect the EUT with AE.
2. Setup the EUT according to the standard.
3. Start testing and monitoring the function.
4. BLE mode: EUT is connected to the PC through the serial debugging cable, and the software on the PC controls EUT to enter the BLE working state.

### 5.4 EUT Connection Diagram of Test System



<Figure 5.5-1> Mode 1

### 5.5 Test Equipment Utilized

| No. | Name                        | Model              | S/N          | SW Version | HW Version | Manuf acturer | Cal. Date  | Cal. Interval |
|-----|-----------------------------|--------------------|--------------|------------|------------|---------------|------------|---------------|
| 1   | Test Receiver               | ESR7               | 102399       | 1.4        | 00         | R&S           | 2023-06-23 | 1 year        |
| 2   | Test Receiver               | FSW43              | 101943       | 1.12       | 00         | R&S           | 2023-08-31 | 1 year        |
| 3   | Trilog Antenna              | VULB9162           | 00426        | N/A        | N/A        | Schwar zbeck  | 2023-07-18 | 1 year        |
| 4   | Double Ridged Guide Antenna | ETS-3117           | 0013588<br>5 | N/A        | N/A        | ETS           | 2023-03-23 | 2 years       |
| 5   | EMI Test Software           | EMC32<br>V10.60.20 | N/A          | N/A        | N/A        | R&S           | N/A        | N/A           |

### 5.6 Measurement Uncertainty

| Item (s)                                                                                                                                         | Uncertainty |
|--------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| Radiated Emission 30MHz-1000MHz                                                                                                                  | 4.86 dB     |
| Radiated Emission 1000MHz-18000MHz                                                                                                               | 5.58 dB     |
| Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$ . |             |



## 6 Test Results

### 6.1 Radiated Emission

#### 6.1.1 Method of Measurement

- a. For 30MHz -1000MHz, the EUT was placed on the top of a rotating 0.8m table above the ground at a semi-anechoic chamber. The distance between the EUT and the received antenna was 3 meters. The table was rotated 360 degree and the received antenna mounted on a variable-height antenna tower was varied from 1m to 4m to find the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.
- b. For 1000MHz -18000MHz, the EUT was placed on the top of a 0.8m table above the ground at a 3m fully anechoic chamber. The maximal emission value was acquired by adjusting the antenna height, The table was rotated 360 degrees to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement

#### 6.1.2 EUT Connection Diagram of Test System

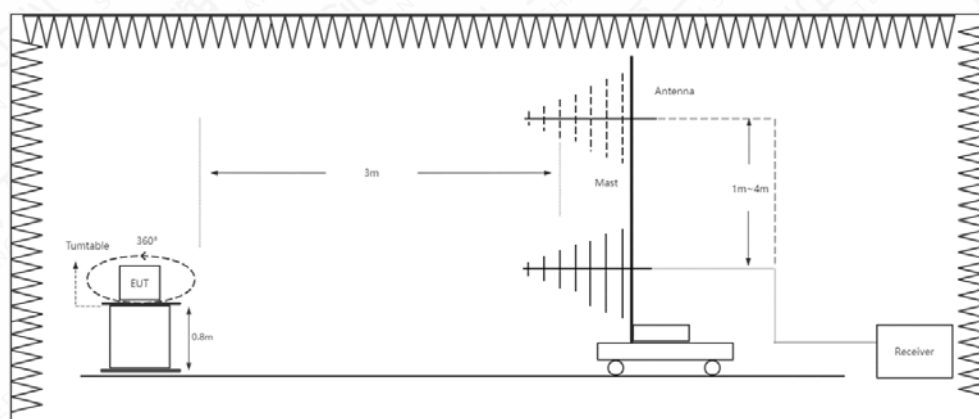


Figure 6.1.2-1 RE 30MHz-1GHz Connection Diagram

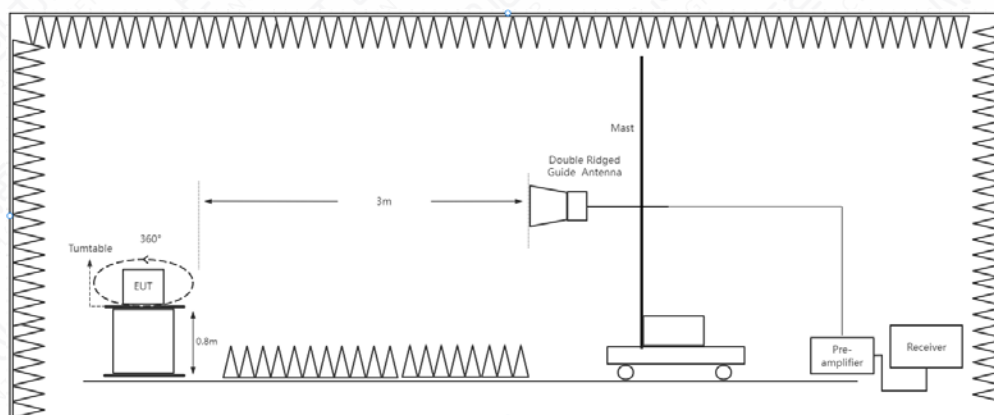


Figure 6.1.2-2 RE Above 1GHz Connection Diagram

### 6.1.3 Test Condition

| Frequency Range (MHz) | RBW/VBW       | Sweep Time (s) |
|-----------------------|---------------|----------------|
| 30-1000               | 120kHz/300kHz | AUTO           |
| 1000-18000            | 1MHz/3MHz     | AUTO           |

### 6.1.4 Limit/Criterion

| Frequency Range (MHz) | Quasi-Peak (dBμV/m) | Peak (dBμV/m) | Average (dBμV/m) |
|-----------------------|---------------------|---------------|------------------|
| 30-88                 | 40                  | N/A           | N/A              |
| 88-216                | 43.5                | N/A           | N/A              |
| 216-960               | 46                  | N/A           | N/A              |
| Above 960             | 54                  | N/A           | N/A              |
| Above 1000            | N/A                 | 74            | 54               |

### 6.1.5 Test environmental conditions

|                      |          |
|----------------------|----------|
| Temperature          | 20.0℃    |
| Relative Humidity    | 38.9%RH  |
| Atmospheric Pressure | 102.3kPa |

### 6.1.6 Test Results

| Mode                                                                       | Frequency (MHz) | Test Results              | Verdicts |
|----------------------------------------------------------------------------|-----------------|---------------------------|----------|
| Mode 1: BLE mode+ UA01+ AE1                                                | 30-1000         | See Annex A.1-1           | Pass     |
| Mode 1: BLE mode+ UA01+ AE1                                                | 1000-18000      | See Annex A.1-2<br>&A.1-3 | Pass     |
| NOTE Abbreviations used in this clause: Pass—P; Fail—F; Not applicable—N/A |                 |                           |          |

## Annex A: Measurement Data

### A.1 Radiated Emission

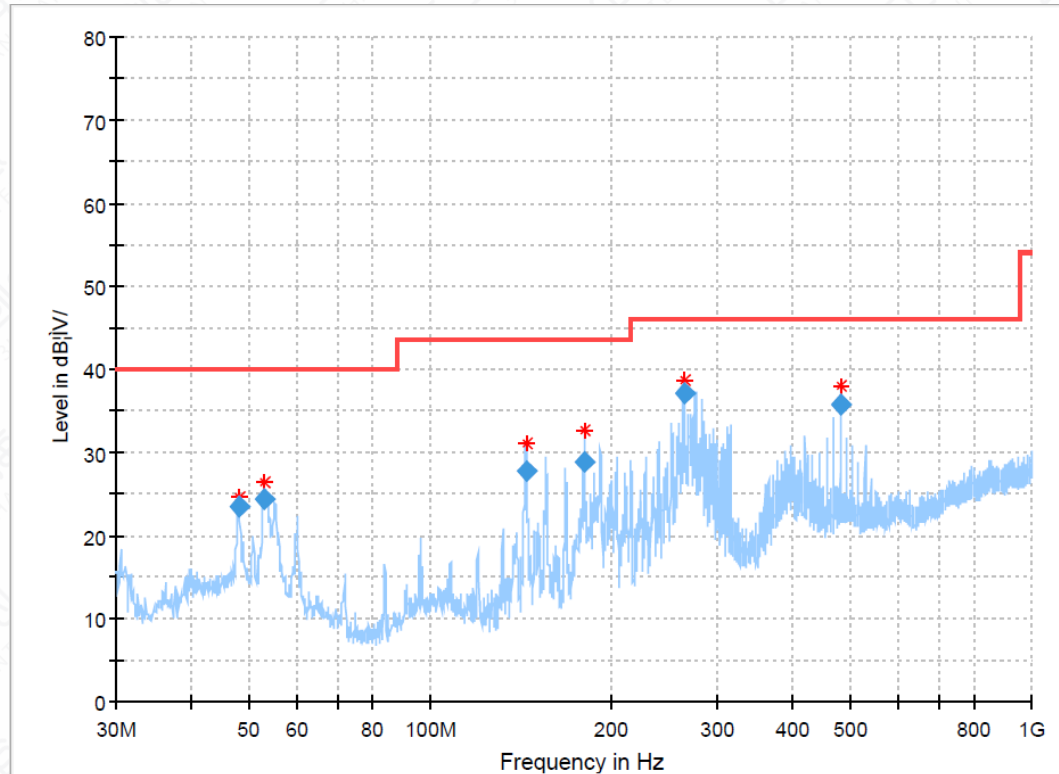


Figure A.1-1 Mode 1 (30M-1GHz)

| Frequency (MHz) | QuasiPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 48.020480       | 23.39              | 40.00          | 16.61       | 100.0       | V   | 261.0         | -11.2        |
| 52.923000       | 24.27              | 40.00          | 15.73       | 100.0       | V   | 287.0         | -11.7        |
| 144.162800      | 27.61              | 43.50          | 15.89       | 200.0       | H   | 0.0           | -16.2        |
| 180.021800      | 28.91              | 43.50          | 14.59       | 200.0       | H   | 0.0           | -14.5        |
| 264.147080      | 37.01              | 46.00          | 8.99        | 100.0       | H   | 309.0         | -10.9        |
| 480.008200      | 35.81              | 46.00          | 10.19       | 100.0       | H   | 0.0           | -5.3         |

Note:

1.Horizontal and vertical polarity is all have been tested, the result of them is synthesized in the above data diagram.



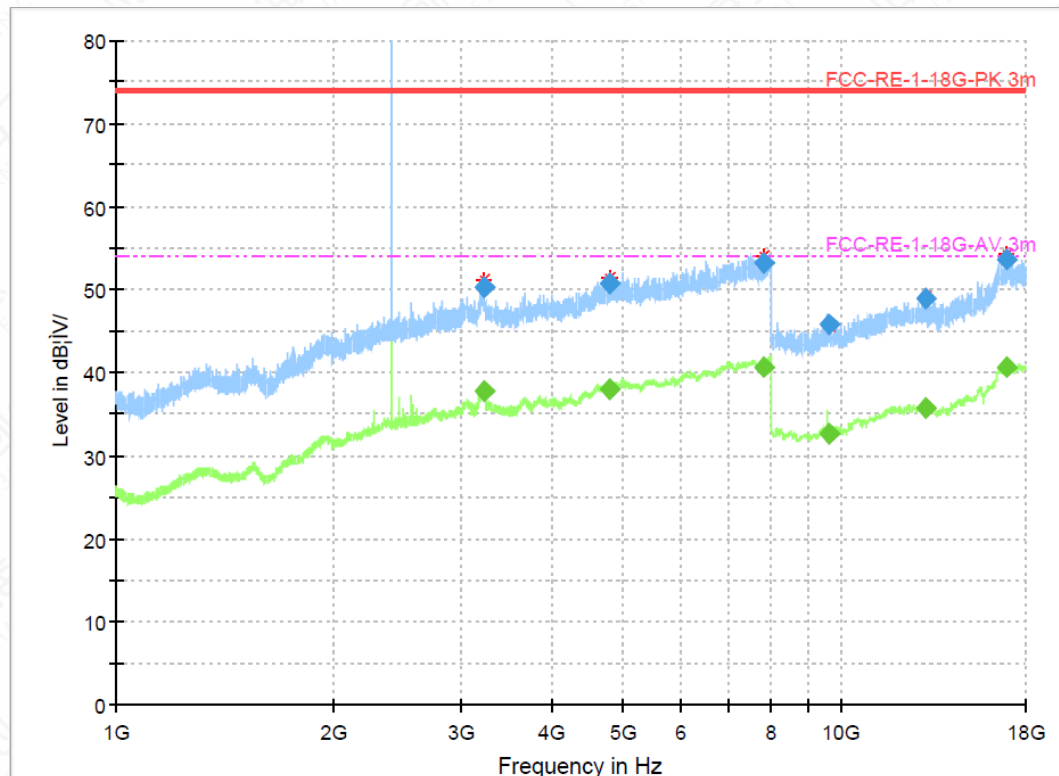


Figure A.1-2 Mode 1 (1GHz-18GHz)-H

Note: The signal that over the limit is the BLE main frequency signal.

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 3213.736250     | 50.22            | ---              | 74.00          | 23.78       | 215.0       | H   | 268.0         | 13.9         |
| 3213.736250     | ---              | 37.66            | 54.00          | 16.34       | 215.0       | H   | 268.0         | 13.9         |
| 4807.323750     | ---              | 37.99            | 54.00          | 16.01       | 102.0       | H   | 200.0         | 15.3         |
| 4807.323750     | 50.67            | ---              | 74.00          | 23.33       | 102.0       | H   | 200.0         | 15.3         |
| 7816.165000     | ---              | 40.68            | 54.00          | 13.32       | 115.0       | H   | 242.0         | 20.7         |
| 7816.165000     | 53.26            | ---              | 74.00          | 20.74       | 115.0       | H   | 242.0         | 20.7         |
| 9610.981250     | ---              | 32.71            | 54.00          | 21.29       | 115.0       | H   | 316.0         | 9.5          |
| 9610.981250     | 45.84            | ---              | 74.00          | 28.16       | 115.0       | H   | 316.0         | 9.5          |
| 13082.065000    | ---              | 35.68            | 54.00          | 18.32       | 115.0       | H   | 78.0          | 15.7         |
| 13082.065000    | 48.99            | ---              | 74.00          | 25.01       | 115.0       | H   | 78.0          | 15.7         |
| 16883.555000    | 53.62            | ---              | 74.00          | 20.38       | 215.0       | H   | 200.0         | 22.0         |
| 16883.555000    | ---              | 40.74            | 54.00          | 13.26       | 215.0       | H   | 200.0         | 22.0         |

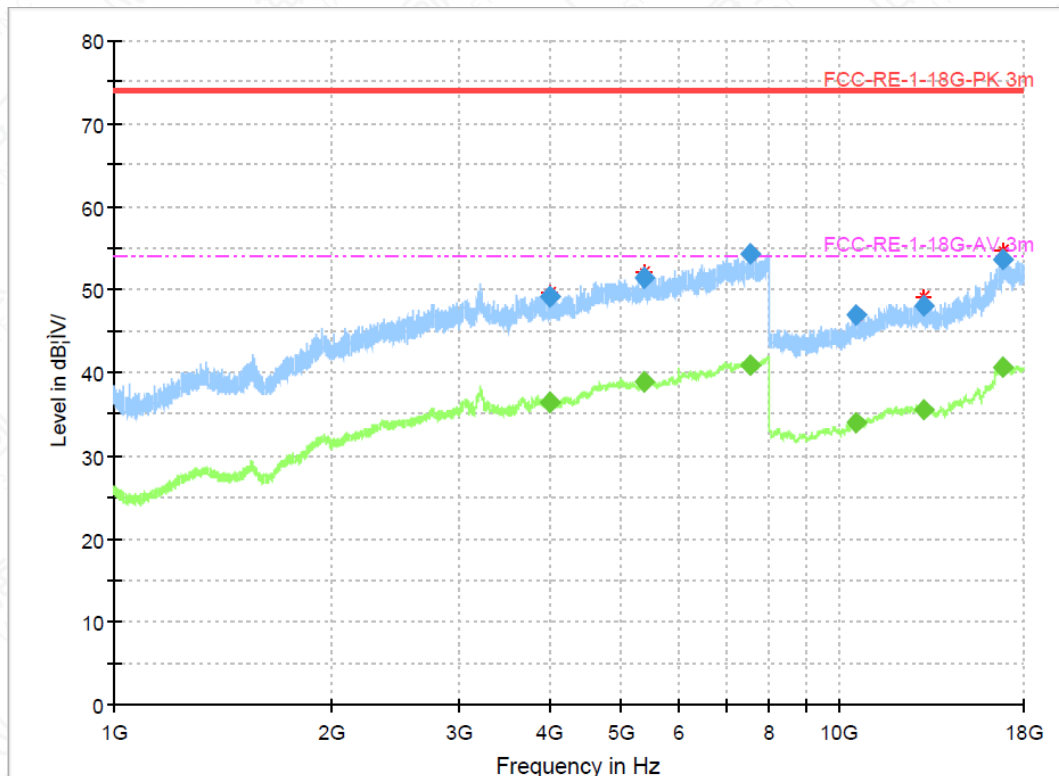


Figure A.1-3 Mode 1 (1GHz-18GHz)-V

| Frequency (MHz) | MaxPeak (dBμV/m) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------|------------------|----------------|-------------|-------------|-----|---------------|--------------|
| 3998.785000     | ---              | 36.34            | 54.00          | 17.66       | 115.0       | V   | 0.0           | 13.2         |
| 3998.785000     | 49.20            | ---              | 74.00          | 24.80       | 115.0       | V   | 0.0           | 13.2         |
| 5387.202500     | ---              | 38.81            | 54.00          | 15.19       | 115.0       | V   | 0.0           | 16.5         |
| 5387.202500     | 51.41            | ---              | 74.00          | 22.59       | 115.0       | V   | 0.0           | 16.5         |
| 7531.146250     | 54.27            | ---              | 74.00          | 19.73       | 115.0       | V   | 344.0         | 20.7         |
| 7531.146250     | ---              | 40.91            | 54.00          | 13.09       | 115.0       | V   | 344.0         | 20.7         |
| 10553.183750    | 46.92            | ---              | 74.00          | 27.08       | 115.0       | V   | 272.0         | 10.6         |
| 10553.183750    | ---              | 34.03            | 54.00          | 19.97       | 115.0       | V   | 272.0         | 10.6         |
| 13127.202500    | ---              | 35.55            | 54.00          | 18.45       | 115.0       | V   | 4.0           | 15.7         |
| 13127.202500    | 48.11            | ---              | 74.00          | 25.89       | 115.0       | V   | 4.0           | 15.7         |
| 16860.848750    | ---              | 40.59            | 54.00          | 13.41       | 115.0       | V   | 79.0          | 21.9         |
| 16860.848750    | 53.57            | ---              | 74.00          | 20.43       | 115.0       | V   | 79.0          | 21.9         |

**Annex B: Revised History**

| Version | Revised Content |
|---------|-----------------|
| 029     | Initial         |



## Annex C: Accreditation Certificate





**Accredited Laboratory**

A2LA has accredited

**INDUSTRIAL INTERNET INNOVATION CENTER  
(SHANGHAI) CO., LTD.**

Shanghai, People's Republic of China

for technical competence in the field of

**Electrical Testing**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).



Presented this 20<sup>th</sup> day of September 2023.



Mr. Trace McInturff, Vice President, Accreditation Services  
For the Accreditation Council  
Certificate Number 3682.01  
Valid to February 28, 2025

*For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.*