

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.

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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
NOTE: 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. 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.				

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
NOTE1: EUT ID is the internal identification code of the laboratory. NOTE2: Photographs of EUT are shown in ANNEX A of this test report. NOTE3: Samples in the test report are provided by the customer. The test results are only applicable to the samples received by the laboratory.	

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
NOTE: *AE ID is the internal identification code of the laboratory. *The AE is provided by the lab.			

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.

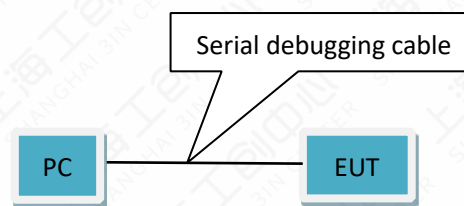
The test configuration modes are as the following:

Test Item	Test setup and operating modes
Radiated emission	30MHz-18GHz frequency range: 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 5	N/A	N/A	ETS	2023-03-23	2 years
5	EMI Test Software	EMC32 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

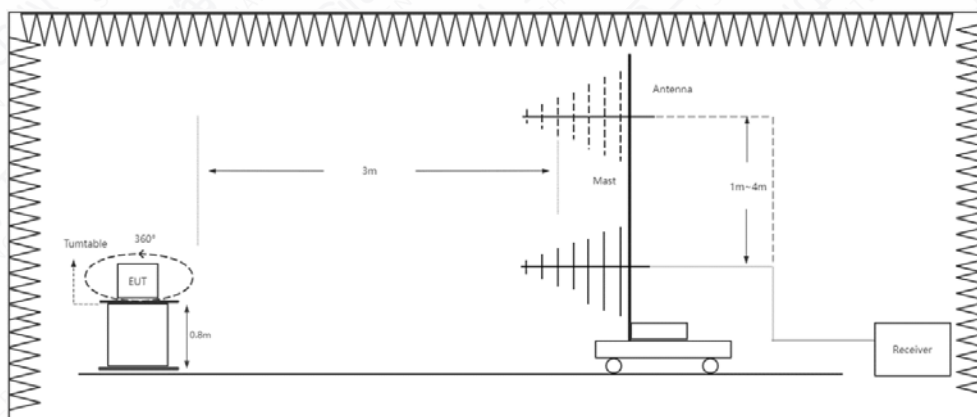


Figure 6.1.2-1 RE 30MHz-1GHz Connection Diagram

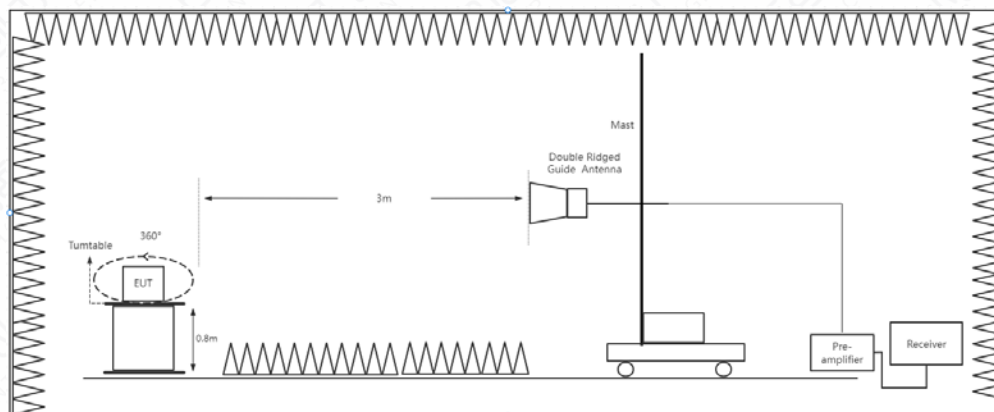


Figure 6.1.2-2 RE Above 1GHz Connection Diagram

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 &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

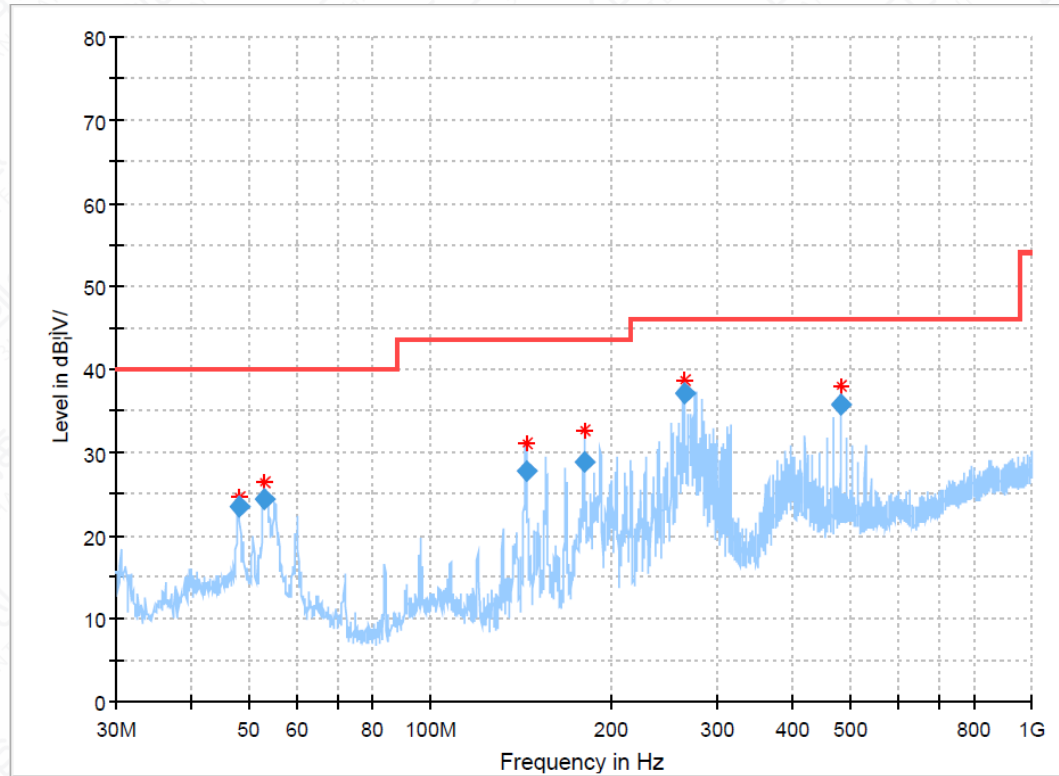


Figure A.1-1 Mode 1 (30M-1GHz)

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.

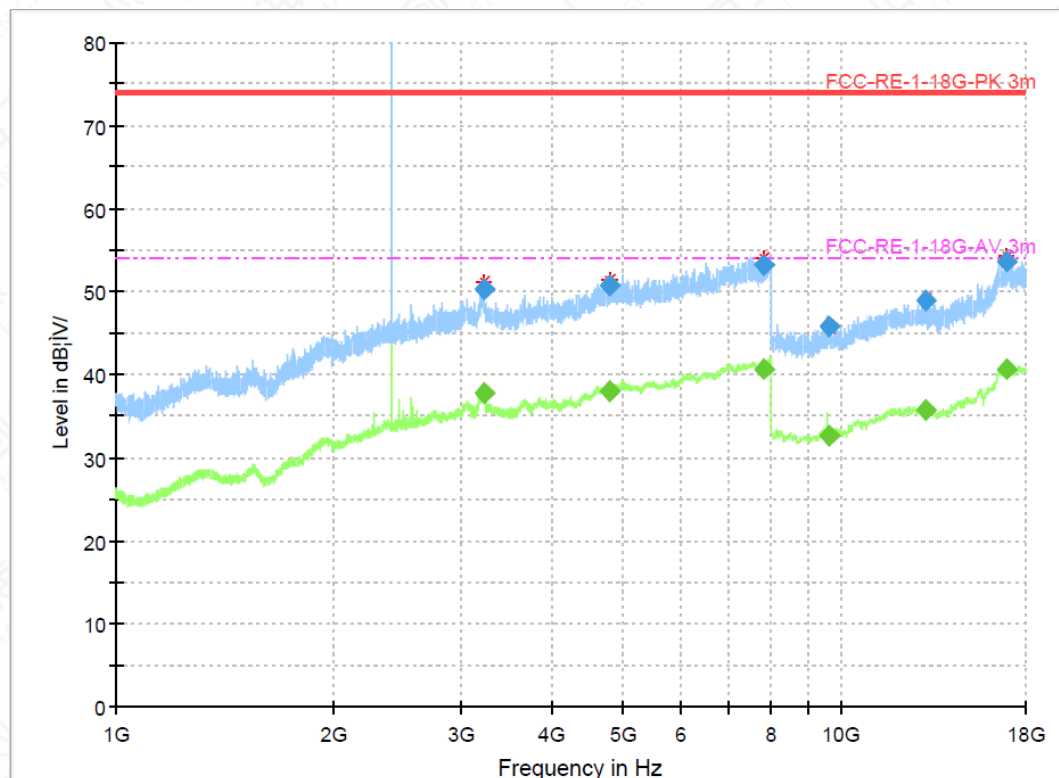


Figure A.1-2 Mode 1 (1GHz-18GHz)-H

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

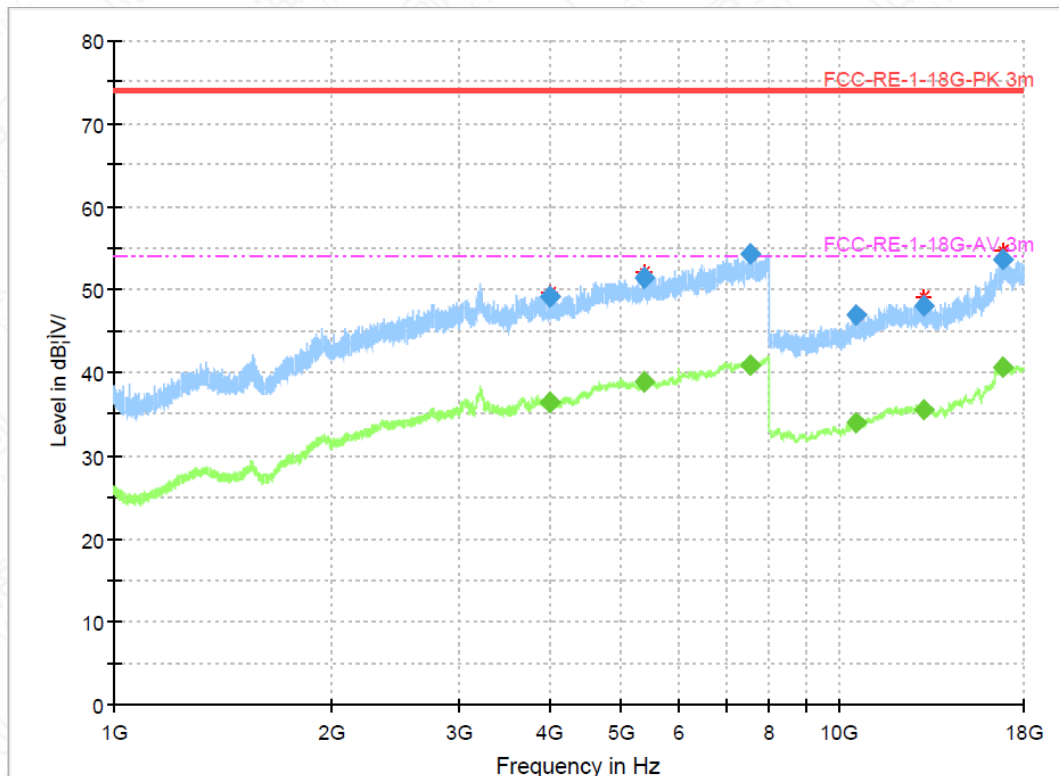


Figure A.1-3 Mode 1 (1GHz-18GHz)-V

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 20th 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.