TEST REPORT

Report Number: I22I30019-EMC01-V01

Applicant	Shanghai Sunmi Technology Co.,Ltd.
Product Name	POS System
Model Name	L3516
Brand Name	SUNMI
FCC ID	2AH25D22ND
IC	22621-D22ND

Industrial Internet Innovation Center (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in FCC Part 15, Subpart B, ANSI C63.4-2014., ICES-003 Issue 7.

Prepared by		Reviewed by	
Approved by		Issue Date	2022-03-18

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

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Test Laboratory:
Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Add: Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
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Revision Version

Report Number	Revision	Date	Memo
I22I30019-EMC01-V00	00	2022-03-11	Initial creation of test report
I22I30019-EMC01-V01	01	2022-03-18	Update the FCC/IC ID

CONTENTS

1. Test Laboratory

1.1. Testing Location

Primary Lab:

Company Name	Industrial Internet Innovation Center (Shanghai) Co., Ltd.
Address	Building 4, No. 766 Jingang Rd, Pudong, Shanghai, China
FCC Registration No.	958356
FCC Designation No.	CN1177
IC designation No.	CN0067

Subcontracting Lab #1:

Company Name	N/A
Address	N/A

1.2. Testing Environment

Normal Temperature	15℃~35℃
Relative Humidity	30%RH~60%RH
Supply Voltage	120V/60Hz

1.3. Project Information

Project Leader	Wang Wenwen
Testing Start Date	2022-02-21
Testing End Date	2022-03-03

2. Client Information

2.1. Applicant Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	+86 18501703215

2.2. Manufacturer Information

Company Name	Shanghai Sunmi Technology Co.,Ltd.
Address	Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China
Telephone	+86 18501703215

3. Equipment under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Product Name	POS System
Model name	L3516
Supported Radio Technology and Bands	BT4.2 BR/EDR/HS/LE WLAN 802.11b,g,n
Hardware Version	Athens_MB_V1.1
Software Version	1.0.8 194

Note: Photographs of EUT are shown in ANNEX B of this test report.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
N02	DA38P1CT40755	Athens_MB_V1.1	1.0.8 194	2022/02/17

*EUT ID: is internally used to identify the test sample in the lab.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Model	SN/Remark
CA01	Adapter	CYZS36-240150	N/A
UA01	Serial port line	N/A	N/A
AE1	Notebook PC	DELL Latitude E6510	N/A
AE2	LAN Cable	N/A	N/A
AE3	USB Cable	N/A	N/A
AE4	Keyboard	KB212-B	CN-0Y88XT-65890-12I-005Q-A00
AE5	Mouse	MS111-P	CN-011D3V-71581-19J-1A64
AE6	Micro SD Card	Kingston SDC4/4GB 77	N/A
AE7	U-disk	DataTraveler 100 G3 64GB	N/A
AE8	Earphone	N/A	N/A
AE9	Money box	N/A	MB1805232478

*AE ID: is internally used to identify the test sample in the lab.

*The AE is provided by the lab.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices	2020/10/1
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	2014
ICES-003	Information Technology Equipment (Including Digital Apparatus)-Limits and Methods of Measurement	Issue 7

5. Test Summary

5.1. Summary of Test Results

Items	Test List	Standard	Verdict
1	Radiated Emission	15.109(a)	Pass
2	AC Conducted Emission	15.107(a)	Pass

5.2. Statements

The L3516, manufactured by Shanghai Sunmi Technology Co.,Ltd. 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 5.1.

Industrial Internet Innovation Center (Shanghai) Co., Ltd. has verified that the compliance of the tested device specified in section 3 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 4 of this test report.

5.3. Decision of final test mode

The EUT was tested together with the above additional components, and a configuration, which produced the worst emission levels, was selected and recorded in this report.

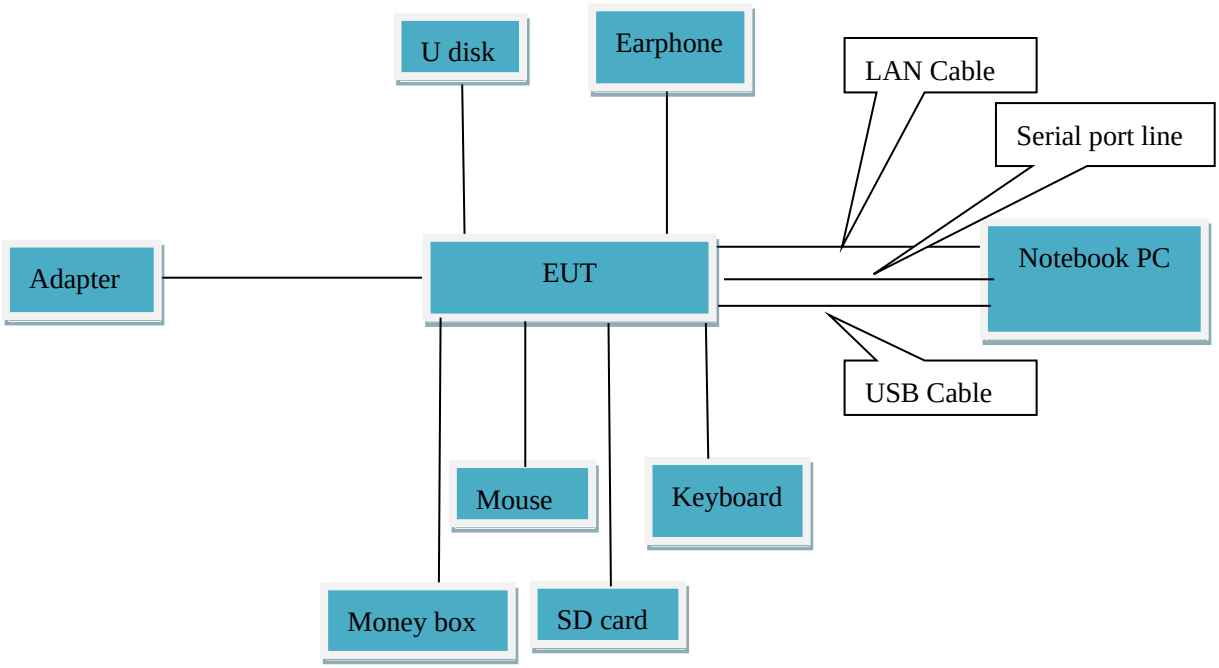
The test configuration modes are as the following:

Test Item	Test setup and operating modes
Radiated emission	Mode 1: Working mode (Full system)
AC Conducted Emission	Mode 1: Working mode (Full system)
Remark: The worst case of radiated emission for 30MHz-1GHz is mode 1 and for 1GHz -18GHz is mode 1. The worst case for conducted emission is mode 1.	

5.4. EUT System Operation

1. Connect the EUT with AE.
2. Setup the EUT according to the standard.
3. Full system mode: The EUT is powered by a power adapter. The EUT is connected to a PC through a serial cable, network cable, and USB cable. Other EUT ports are connected to a mouse, keyboard, USB flash drive, headset, and SD card. etc, and through LAN cable to PC for data exchange of PING command, keep working at maximum load.

5.5. EUT Connection Diagram of Test System



<Figure 1> Mode 1

6. Measurement Results

6.1. Radiated Emission

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 maximal emission value was acquired by adjusting the antenna height, the table was rotated 360 degree to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna were set during the measurement.

Limits for Radiated Emission at a measuring distance of 3m

Table 1:

Frequency Range (MHz)	Quasi-Peak (dBμV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Table 2:

Frequency Range (MHz)	Peak (dBμV/m)	Average (dBμV/m)
Above 1000	74	54

Table 3:

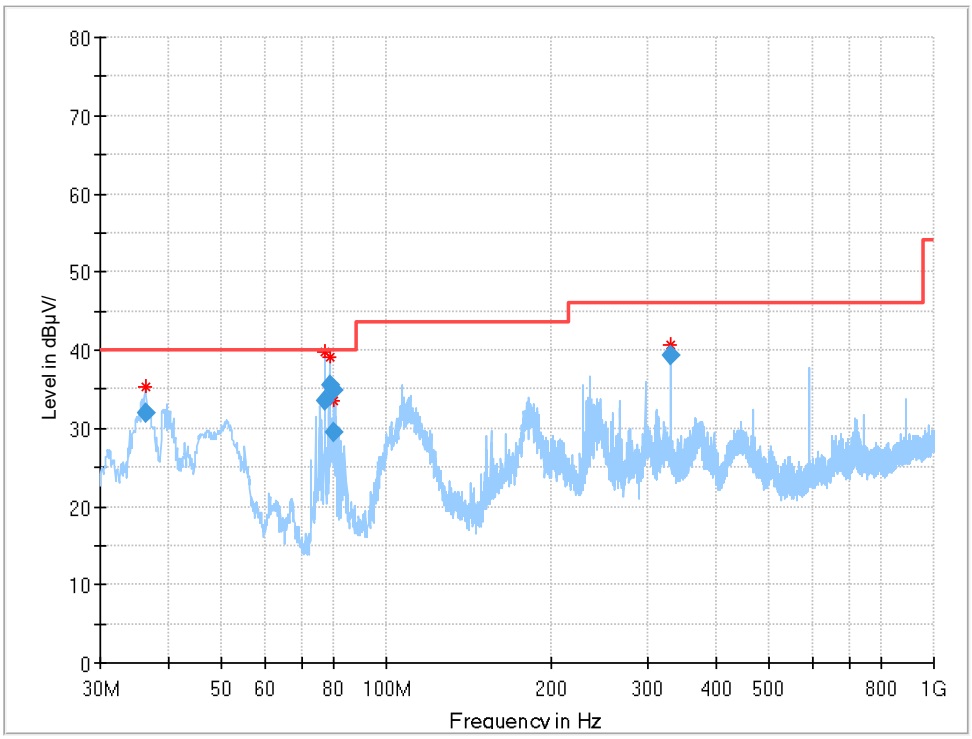
Test conditions

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

Test Results

Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier, the Emissions in the frequency band 18GHz-40GHz is more than 20dB below the limit are not report.

Mode 1: Working mode (Full system)



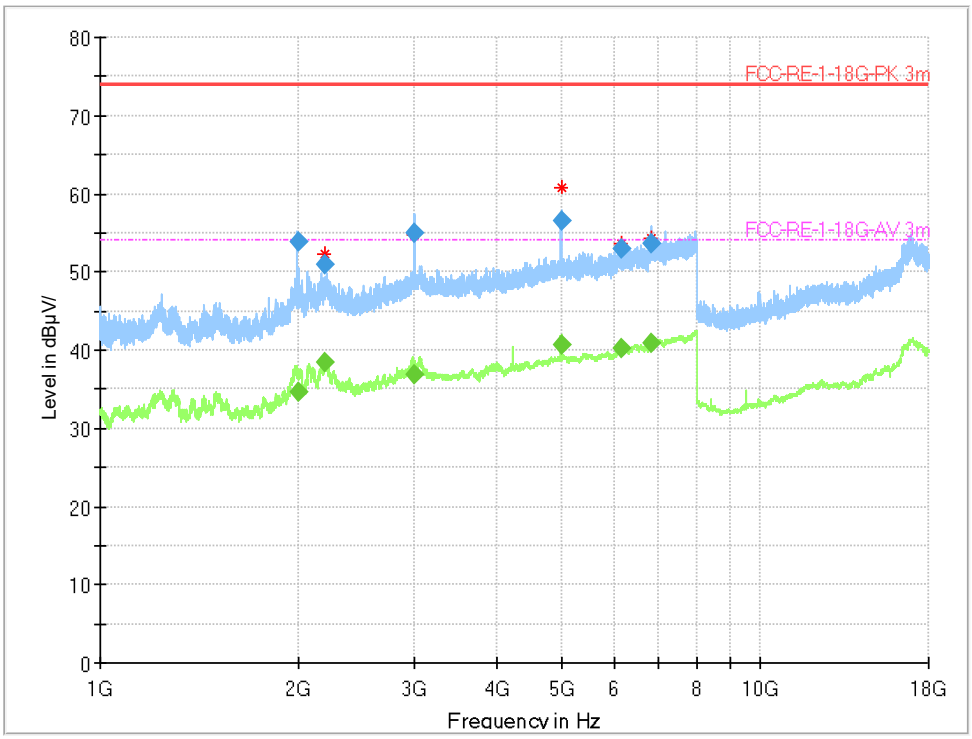
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
36.315440	31.91	40.00	8.09	100.0	V	213.0	-14.2
77.226360	33.45	40.00	6.55	200.0	H	228.0	-17.4
78.777160	35.53	40.00	4.47	200.0	H	219.0	-17.8
80.229440	34.83	40.00	5.17	200.0	H	219.0	-18.0
80.242960	29.46	40.00	10.54	100.0	H	237.0	-18.0
330.041160	39.24	46.00	6.76	100.0	H	304.0	-9.2

Note:

1. Emission level(QP)=Raw value by receiver + Corr(Antenna factor + cable loss - preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

Mode 1: Working mode (Full system): Datalink + CA01+ UA01 (1GHz-18GHz)

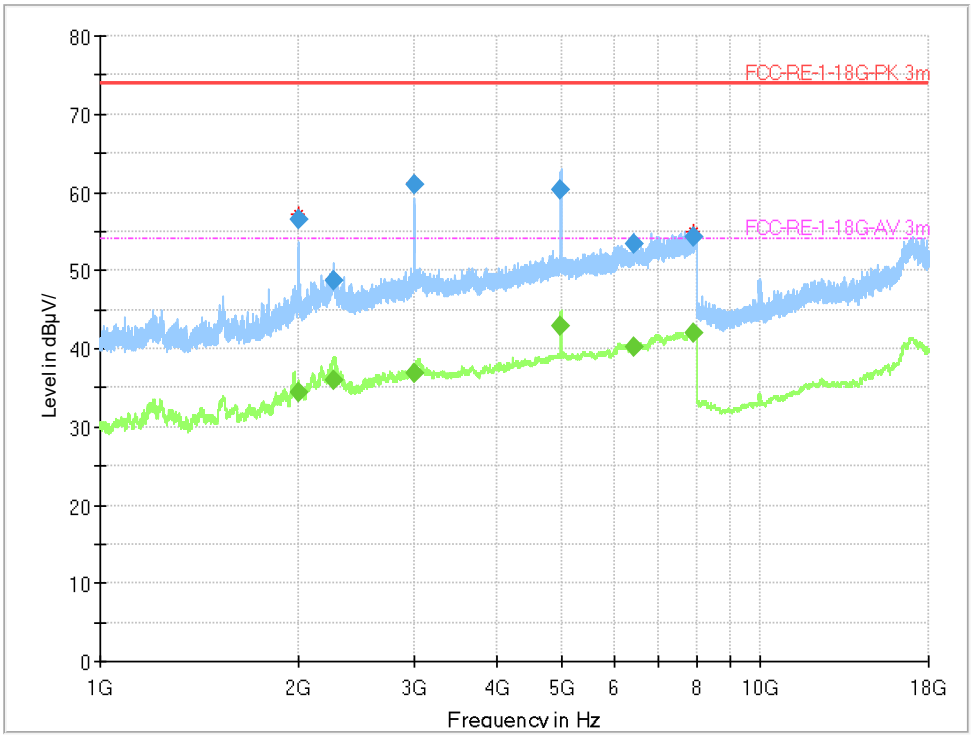


Final Result 1

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1992.09000	---	34.56	54.00	19.44	500.0	1000.00	100.0	H	135.0	6.7
1992.09000	53.82	---	74.00	20.18	500.0	1000.00	100.0	H	135.0	6.7
2195.38750	50.97	---	74.00	23.03	500.0	1000.00	100.0	H	190.0	7.6
2195.38750	---	38.54	54.00	15.46	500.0	1000.00	100.0	H	190.0	7.6
2990.70625	---	36.88	54.00	17.12	500.0	1000.00	188.0	H	104.0	11.6
2990.70625	54.88	---	74.00	19.12	500.0	1000.00	188.0	H	104.0	11.6
4998.17375	56.53	---	74.00	17.47	500.0	1000.00	103.0	H	228.0	16.0
4998.17375	---	40.71	54.00	13.29	500.0	1000.00	103.0	H	228.0	16.0
6145.53875	52.97	---	74.00	21.03	500.0	1000.00	115.0	H	228.0	18.2
6145.53875	---	40.12	54.00	13.88	500.0	1000.00	115.0	H	228.0	18.2
6856.57250	53.57	---	74.00	20.43	500.0	1000.00	115.0	H	0.0	19.3
6856.57250	---	40.99	54.00	13.01	500.0	1000.00	115.0	H	0.0	19.3

Note:

1. Emission level (peak or average)=Raw value by receiver + Corr (Antenna factor+ cable loss-preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.



Final Result 1

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
1998.46500	---	34.46	54.00	19.54	500.0	1000.00	100.0	V	0.0	6.8
1998.46500	56.45	---	74.00	17.55	500.0	1000.00	100.0	V	0.0	6.8
2254.67750	48.75	---	74.00	25.25	500.0	1000.00	100.0	V	344.0	8.0
2254.67750	---	35.91	54.00	18.09	500.0	1000.00	100.0	V	344.0	8.0
2994.15375	---	36.86	54.00	17.14	500.0	1000.00	102.0	V	203.0	11.6
2994.15375	60.97	---	74.00	13.03	500.0	1000.00	102.0	V	203.0	11.6
4987.90625	---	42.80	54.00	11.20	500.0	1000.00	102.0	V	224.0	16.0
4987.90625	60.42	---	74.00	13.58	500.0	1000.00	102.0	V	224.0	16.0
6425.26000	---	40.33	54.00	13.67	500.0	1000.00	115.0	V	224.0	18.4
6425.26000	53.33	---	74.00	20.67	500.0	1000.00	115.0	V	224.0	18.4
7904.55375	54.35	---	74.00	19.65	500.0	1000.00	102.0	V	91.0	21.1
7904.55375	---	42.01	54.00	11.99	500.0	1000.00	102.0	V	91.0	21.1

Note:

1. Emission level (peak or average) = Raw value by receiver + Corr (Antenna factor+ cable loss-preamplifier gain)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.

6.2. AC Conducted Emission

Method of Measurement

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies with the band 150 kHz to 30MHz shall not exceed the limits. Both lines of the power mains connected to the EUT were checked for maximum conducted interference. Tested in accordance with the procedures of ANSI C63.4-2014, section 7.3

Limit of AC Conducted Emission

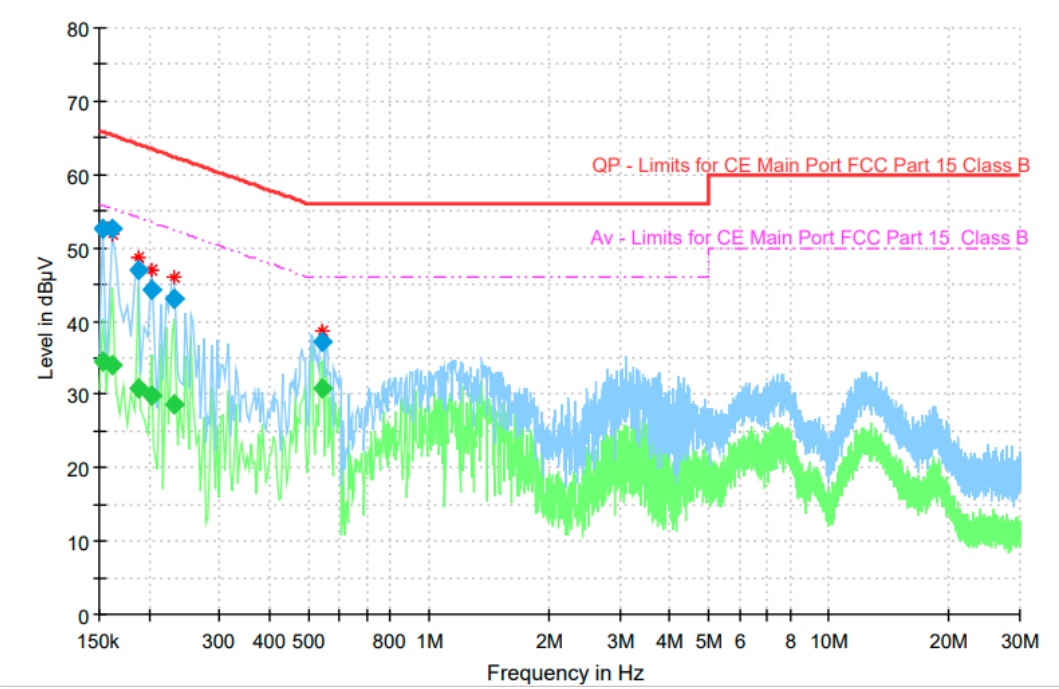
Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency		

Test Condition in Charging Mode

Voltage (V)	Frequency (Hz)	RBW	Sweep Time (s)
120	60	9 kHz	Auto

Test Results

Mode 1: Working mode (Full system)



Final Result 1

Frequency (MHz)	QuasiPeak (dB µ V)	Average (dB µ V)	Limit (dB µ V)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.153731	52.66	---	65.80	13.14	15000.0	9.000	N	ON	9.6
0.153731	---	34.61	55.80	21.19	15000.0	9.000	N	ON	9.6
0.161194	---	34.01	55.40	21.40	15000.0	9.000	L1	ON	9.6
0.161194	52.48	---	65.40	12.92	15000.0	9.000	L1	ON	9.6
0.187313	---	30.83	54.16	23.33	15000.0	9.000	N	ON	9.6
0.187313	46.87	---	64.16	17.29	15000.0	9.000	N	ON	9.6
0.202238	44.25	---	63.52	19.27	15000.0	9.000	L1	ON	9.6
0.202238	---	29.83	53.52	23.69	15000.0	9.000	L1	ON	9.6
0.232088	---	28.51	52.38	23.86	15000.0	9.000	N	ON	9.6
0.232088	43.01	---	62.38	19.37	15000.0	9.000	N	ON	9.6
0.541781	---	30.74	46.00	15.26	15000.0	9.000	N	ON	9.6
0.541781	37.14	---	56.00	18.86	15000.0	9.000	N	ON	9.6

Note:

1. Emission level(quasi-peak or Average peak)=Raw value by receiver + Corr(Insertion loss+ cable loss)
2. The raw value is used to calculate by software which is not shown in the sheet.
3. Margin=limit value – emission level.
4. L1 and N line is all have been tested, the result of them is synthesized in the above data diagram.

7. Test Equipment List

7.1. Radiated Emission Equipment list

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Test Receiver	ESU40	100307	R&S	2021-03-03 2022-02-23	1 year
2	Universal Radio Communication Tester	CMU200	123102	R&S	2021-05-10	1 year
3	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-10	1 year
4	Trilog Antenna	VULB9163	VULB9163-515	Schwarzbeck	2021-02-03	2 years
5	Double Ridged Guide Antenna	BBHA9120D	02112	Schwarzbeck	2021-07-21	2 years
6	EMI Test Software	EMC32 V9.15	N/A	R&S	N/A	N/A

7.2. AC Conducted Emission Equipment list

Item	Equipment Name	Type	Serial Number	Manufacturer	Cal. Date	Cal. interval
1	Test Receiver	ESCI	101235	R&S	2021-03-03 2022-02-23	1 year
2	Universal Radio Communication Tester	CMU200	123102	R&S	2021-05-10	1 year
3	Universal Radio Communication Tester	CMW500	104178	R&S	2021-05-10	1 year
4	2-Line V-Network	ENV216	101380	R&S	2021-03-28	1 year
5	EMI Test Software	EMC32 V10.35.02	N/A	R&S	N/A	N/A

Annex A: Measurement Uncertain

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of *k*=2.

Case	Uncertainty
Radiated Emission 30MHz-1000MHz	4.96 dB
Radiated Emission 1000MHz-18000MHz	5.18 dB
AC Conducted Emission	3.66 dB

Annex B: 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 12th day of April 2021.

Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3682.01
Valid to February 28, 2023

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

************END OF REPORT************