TEST REPORT

Applicant: **Shenzhen Sonoff Technologies Co.,Ltd.**

Address: 3F & 6F, Bldg A, No. 663, Bulong Rd, Shenzhen, Guangdong, China

Product Name: **Smart Home Hub**

Model Number: **AIBridge, AIBridge-26**

Standard(s): **FCC Part 15B**
ICES-003, ISSUE 7, OCTOBER 2020
ANSI C63.4-2014

The above equipment has been tested and found compliance with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **CR221264420-00C**

Date Of Issue: **2023/3/30**

Reviewed By: **Sun Zhong** Sun Zhong

Title: Manager

Test Laboratory: **China Certification ICT Co., Ltd (Dongguan)**
No. 113, Pingkang Road, Dalang Town, Dongguan,
Guangdong, China
Tel: +86-769-82016888

Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0123.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	CR221264420-00C	Original Report	2023/3/30

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	Smart Home Hub
EUT Model:	AIBridge
Multiple Models:	AIBridge-26
Highest Operation Frequency:	2480 MHz
Rated Input Voltage:	DC 5V from Adapter
Serial Number:	1WYT-1
EUT Received Date:	2022/12/30
EUT Received Status:	Good
Note: The Multiple models are electrically identical with the test model. Please refer to the declaration letter for more detail, which was provided by manufacturer.	

Accessory Information:

Accessory Description	Manufacturer	Model
/	/	/

1.2 Description of Test Configuration

1.2.1 EUT Operation Condition:

EUT Operation Mode:	The system was configured for testing in Typical Use Mode, which was provided by the manufacturer. Test Mode: Operating
Equipment Modifications:	No
EUT Exercise Software:	No

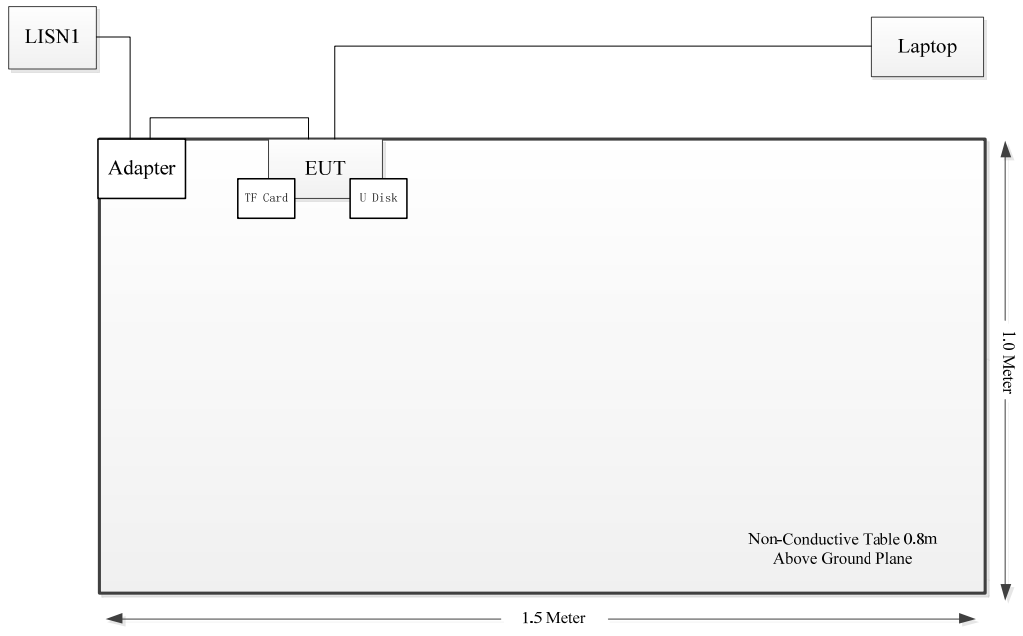
1.2.2 Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
SanDisk	TF Card	32 GB	521005904013
HP	USB Disk	HPFD206W-32	PAA6918477
SZTY	Adapter	TPA-23A050200UU01	AD220930003

1.2.3 Support Cable List and Details

Cable Description	Shielding Type	Ferrite Core	Length (m)	From Port	To
RJ45 Cable	No	Yes	10	EUT	Laptop
USB Cable	No	No	1	EUT	Adapter

1.2.4 Block Diagram of Test Setup



1.3 Measurement Uncertainty

Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Parameter	Measurement Uncertainty
Unwanted Emissions, radiated	30M~200MHz: 4.15 dB,200M~1GHz: 5.61 dB,1G~6GHz: 5.14 dB, 6G~18GHz: 5.93 dB,18G~26.5G:5.47 dB,26.5G~40G:5.63 dB
Temperature	±1℃
Humidity	±5%
AC Power Lines Conducted Emission	2.8 dB (150 kHz to 30 MHz)

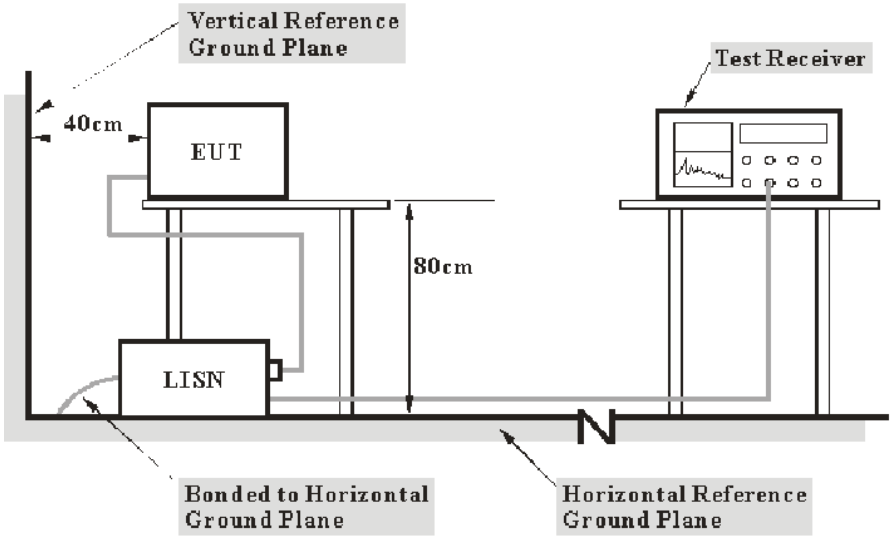
2. SUMMARY OF TEST RESULTS

Standard Clause	Description of Test	Test Result
FCC§15.107 ICES-003§6.1	Conducted emissions	Compliance
FCC§15.109 ICES-003§6.2	Radiated emissions	Compliance

3. REQUIREMENTS AND TEST PROCEDURES

3.1 AC Line Conducted Emissions

3.1.1 EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15 B and Innovation, Science and Economic Development Canada ICES-003 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The adapter was connected to the main LISN with a 120 V/60 Hz AC power source.

3.1.2 EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

Frequency Range	IF B/W
150 kHz – 30 MHz	9 kHz

3.1.3 Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN and the other support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT, the report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

All data was recorded in the Quasi-peak and average detection mode.

The report shall list the six emissions with the smallest margin relative to the limit, unless the margin is greater than 20 dB.

3.1.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = attenuation caused by cable loss + voltage division factor of AMN

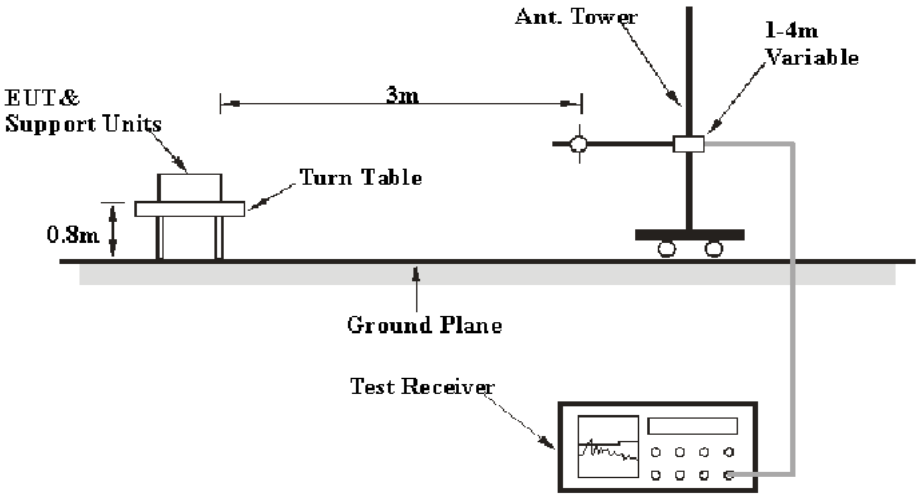
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

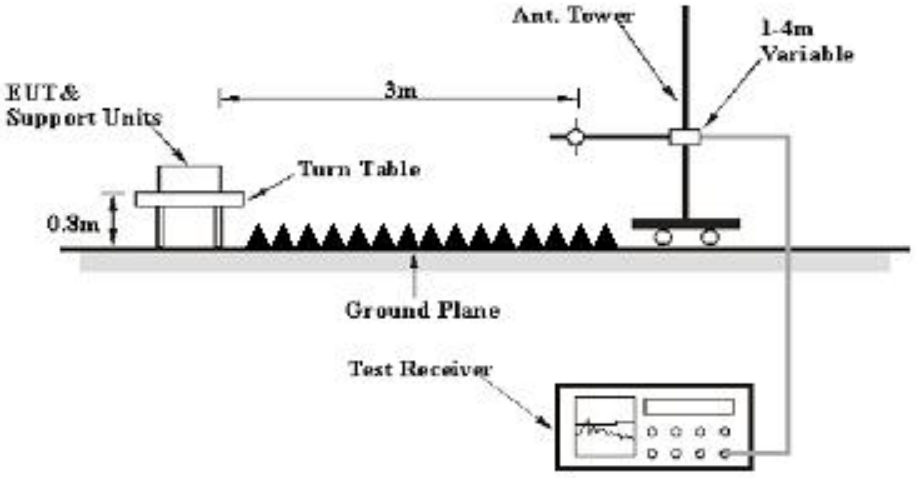
3.2 Radiation Spurious Emissions

3.2.1 EUT Setup

Below 1GHz:



Above 1GHz:



The radiated emission were performed in the 3 meters, using the setup accordance with the ANSI C63.4-2014. The specification used was the FCC Part 15.109 and ICES-003 Class B limits.

3.2.2 EMI Test Receiver Setup

The system was investigated from 30 MHz to 13GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Measurement
30 MHz – 1000 MHz	120 kHz	300 kHz	120 kHz	QP
Above 1 GHz	1 MHz	3 MHz	/	Peak
	1 MHz	Reduced video bandwidth	/	AVG

If the maximized peak measured value complies with under the limit more than 6dB, then it is unnecessary to perform an QP/Average measurement.

3.2.3 Test Procedure

During the radiated emissions, the adapter was connected to the first AC floor outlet and the other support equipments were connected to the second AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The data was recorded in the Quasi-peak detection mode for below 1 GHz, peak and average detection mode above 1 GHz.

All emissions under the average limit and under the noise floor have not recorded in the report.

3.2.4 Corrected Amplitude & Margin Calculation

The basic equation is as follows:

Result = Reading + Factor
Factor = Antenna Factor + Cable Loss- Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. The equation for margin calculation is as follows:

Margin = Limit – Result

4. TEST DATA AND RESULTS

4.1 AC Line Conducted Emissions

Serial Number:	1WYT-1	Test Date:	2023/1/11~2023/2/16
Test Site:	CE	Test Mode:	Operating
Tester:	Vic Du	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	21.4~23.6	Relative Humidity: (%)	42~69	ATM Pressure: (kPa)	101.2~102.1

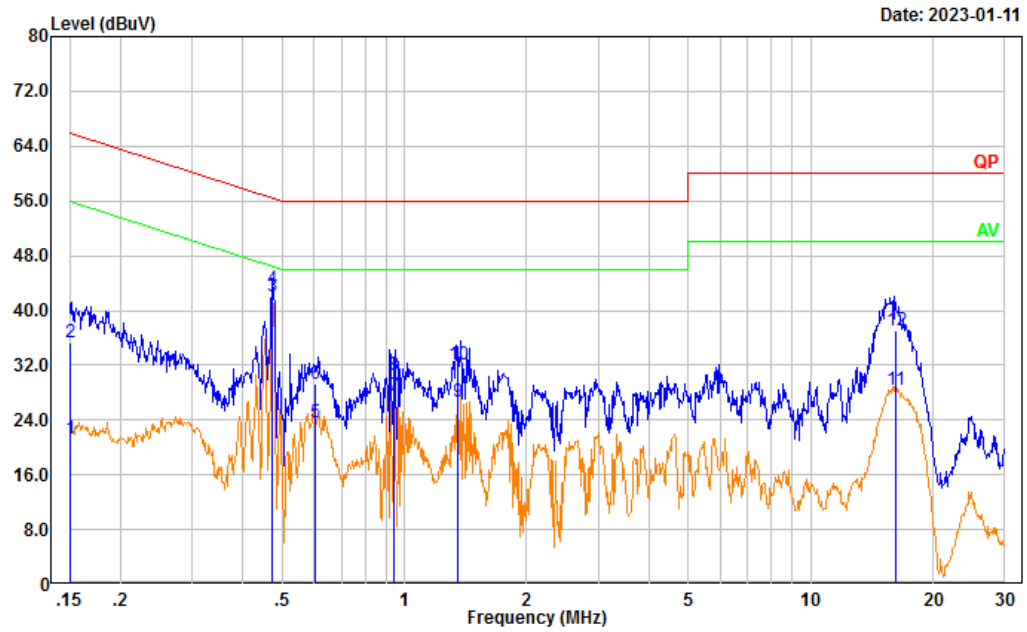
Test Equipment List and Details:

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	LISN	ENV216	101134	2022/04/01	2023/03/31
R&S	EMI Test Receiver	ESR3	102726	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UTIFLEX	C-0200-01	2022/08/07	2023/08/06
Audix	Test Software	E3	190306 (V9)	N/A	N/A

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

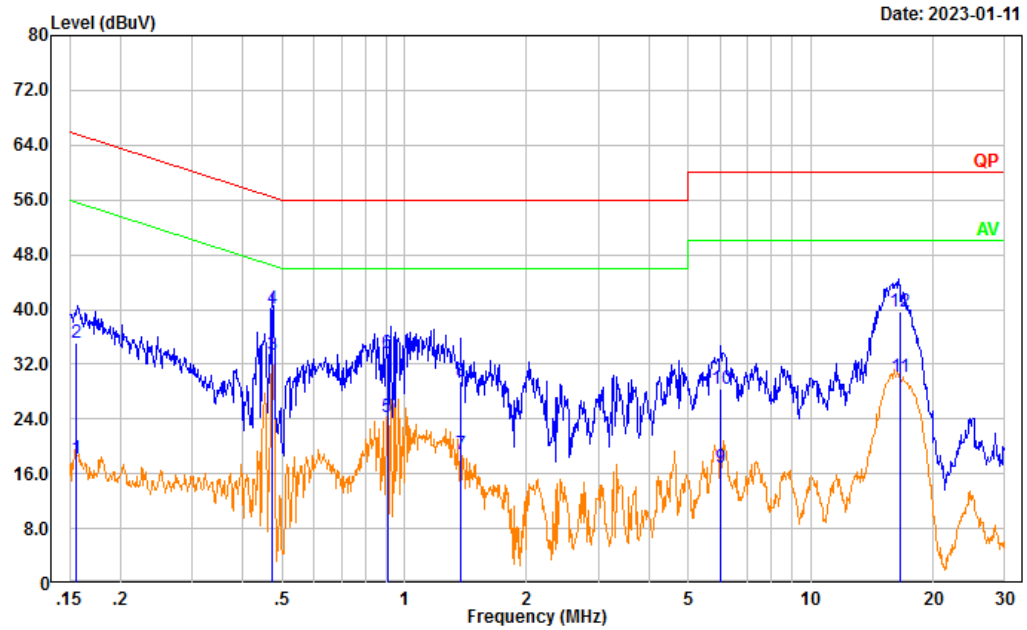
Core Board 1# RV1109:

Test Mode: Operating
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.150	11.56	9.61	21.17	56.00	34.83	Average
2	0.150	25.71	9.61	35.32	66.00	30.68	QP
3	0.474	32.50	9.61	42.11	46.44	4.33	Average
4	0.474	33.47	9.61	43.08	56.44	13.36	QP
5	0.603	14.04	9.62	23.66	46.00	22.34	Average
6	0.603	19.62	9.62	29.24	56.00	26.76	QP
7	0.945	17.89	9.62	27.51	46.00	18.49	Average
8	0.945	21.02	9.62	30.64	56.00	25.36	QP
9	1.358	17.04	9.62	26.66	46.00	19.34	Average
10	1.358	22.40	9.62	32.02	56.00	23.98	QP
11	16.176	18.59	9.71	28.30	50.00	21.70	Average
12	16.176	27.28	9.71	36.99	60.00	23.01	QP

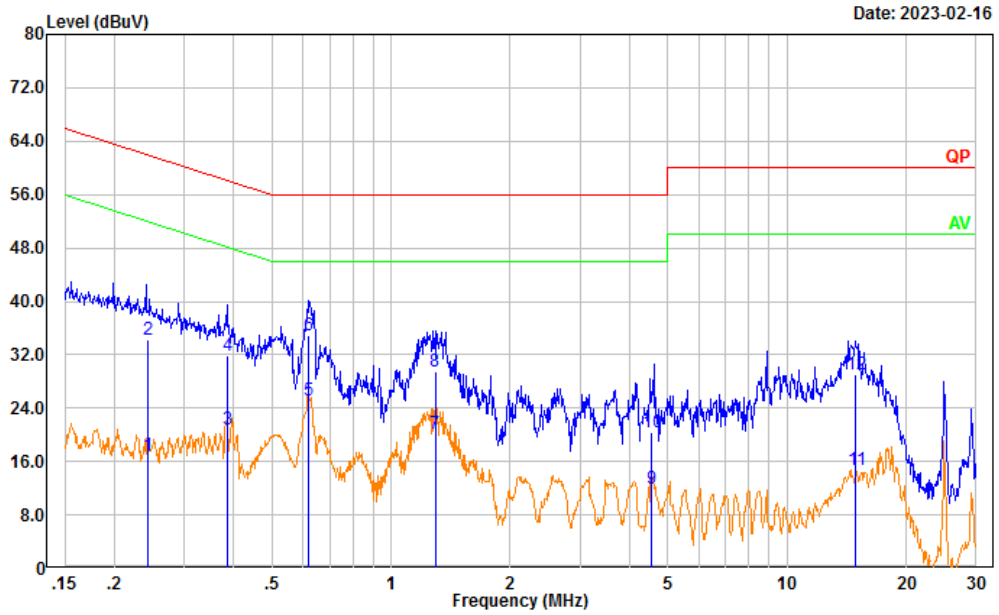
Test Mode: Operating
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.156	8.57	9.61	18.18	55.67	37.49	Average
2	0.156	25.50	9.61	35.11	65.67	30.56	QP
3	0.474	23.74	9.61	33.35	46.44	13.09	Average
4	0.474	30.52	9.61	40.13	56.44	16.31	QP
5	0.907	14.58	9.62	24.20	46.00	21.80	Average
6	0.907	24.08	9.62	33.70	56.00	22.30	QP
7	1.374	9.15	9.62	18.77	46.00	27.23	Average
8	1.374	19.82	9.62	29.44	56.00	26.56	QP
9	6.009	7.29	9.66	16.95	50.00	33.05	Average
10	6.009	18.66	9.66	28.32	60.00	31.68	QP
11	16.534	20.55	9.69	30.24	50.00	19.76	Average
12	16.534	30.06	9.69	39.75	60.00	20.25	QP

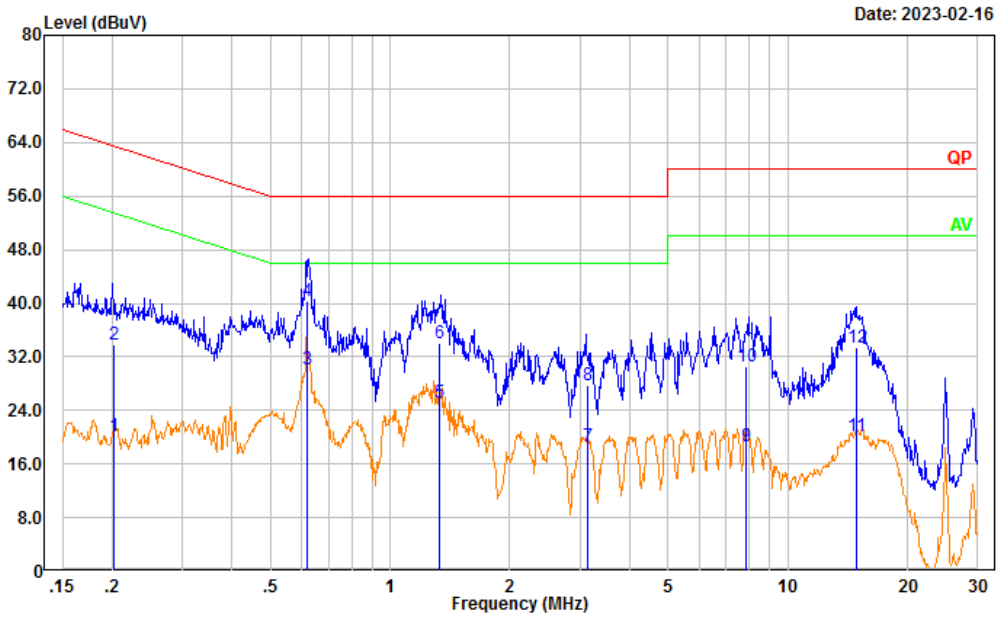
Core Board 2# RV1126:

Test Mode: Operating
Port: Line
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.244	7.19	9.61	16.80	51.96	35.16	Average
2	0.244	24.64	9.61	34.25	61.96	27.71	QP
3	0.386	11.23	9.61	20.84	48.14	27.30	Average
4	0.386	22.34	9.61	31.95	58.14	26.19	QP
5	0.621	15.53	9.62	25.15	46.00	20.85	Average
6	0.621	25.39	9.62	35.01	56.00	20.99	QP
7	1.291	10.56	9.62	20.18	46.00	25.82	Average
8	1.291	19.78	9.62	29.40	56.00	26.60	QP
9	4.531	2.23	9.66	11.89	46.00	34.11	Average
10	4.531	10.75	9.66	20.41	56.00	35.59	QP
11	14.903	5.05	9.69	14.74	50.00	35.26	Average
12	14.903	19.45	9.69	29.14	60.00	30.86	QP

Test Mode: Operating
Port: neutral
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB)	Result (dBµV)	Limit (dBµV)	Margin (dB)	Detector
1	0.202	10.50	9.61	20.11	53.53	33.42	Average
2	0.202	24.32	9.61	33.93	63.53	29.60	QP
3	0.620	20.61	9.62	30.23	46.00	15.77	Average
4	0.620	30.61	9.62	40.23	56.00	15.77	QP
5	1.326	15.55	9.62	25.17	46.00	20.83	Average
6	1.326	24.42	9.62	34.04	56.00	21.96	QP
7	3.145	8.90	9.65	18.55	46.00	27.45	Average
8	3.145	18.06	9.65	27.71	56.00	28.29	QP
9	7.857	8.90	9.67	18.57	50.00	31.43	Average
10	7.857	20.97	9.67	30.64	60.00	29.36	QP
11	14.890	10.40	9.69	20.09	50.00	29.91	Average
12	14.890	23.79	9.69	33.48	60.00	26.52	QP

4.2 Radiation Spurious Emissions

Serial Number:	1WYT-1	Test Date:	2023/1/30~2023/2/17
Test Site:	966-1, 966-2	Test Mode:	Operating
Tester:	Vic Du, Joe Liang	Test Result:	Pass

Environmental Conditions:					
Temperature: (℃)	20.5~23.8	Relative Humidity: (%)	36~59	ATM Pressure: (kPa)	101.3~102.3

Test Equipment List and Details:

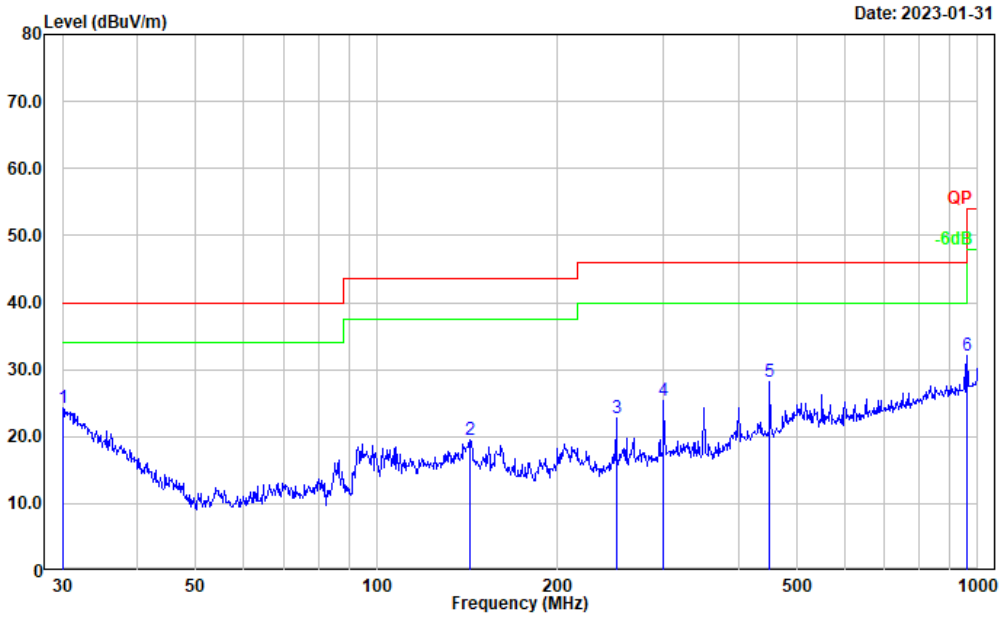
Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB6	A082520-5	2020/10/19	2023/10/18
R&S	EMI Test Receiver	ESR3	102724	2022/07/15	2023/07/14
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0470-02	2022/07/17	2023/07/16
TIMES MICROWAVE	Coaxial Cable	LMR-600-UltraFlex	C-0780-01	2022/07/17	2023/07/16
Sonoma	Amplifier	310N	186165	2022/07/17	2023/07/16
Audix	Test Software	E3	201021 (V9)	N/A	N/A
ETS-Lindgren	Horn Antenna	3115	9912-5985	2020/10/13	2023/10/12
R&S	Spectrum Analyzer	FSV40	101591	2022/07/15	2023/07/14
MICRO-COAX	Coaxial Cable	UFA210A-1-1200-70U300	217423-008	2022/08/07	2023/08/06
MICRO-COAX	Coaxial Cable	UFA210A-1-2362-300300	235780-001	2022/08/07	2023/08/06
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2022/11/09	2023/11/08
E-Microwave	Band Rejection Filter	2400-2483.5MHz	OE01902424	2022/08/07	2023/08/06
Mini Circuits	High Pass Filter	VHF-6010+	31119	2022/08/07	2023/08/06

** Statement of Traceability: China Certification ICT Co., Ltd (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).*

1) 30MHz-1GHz:

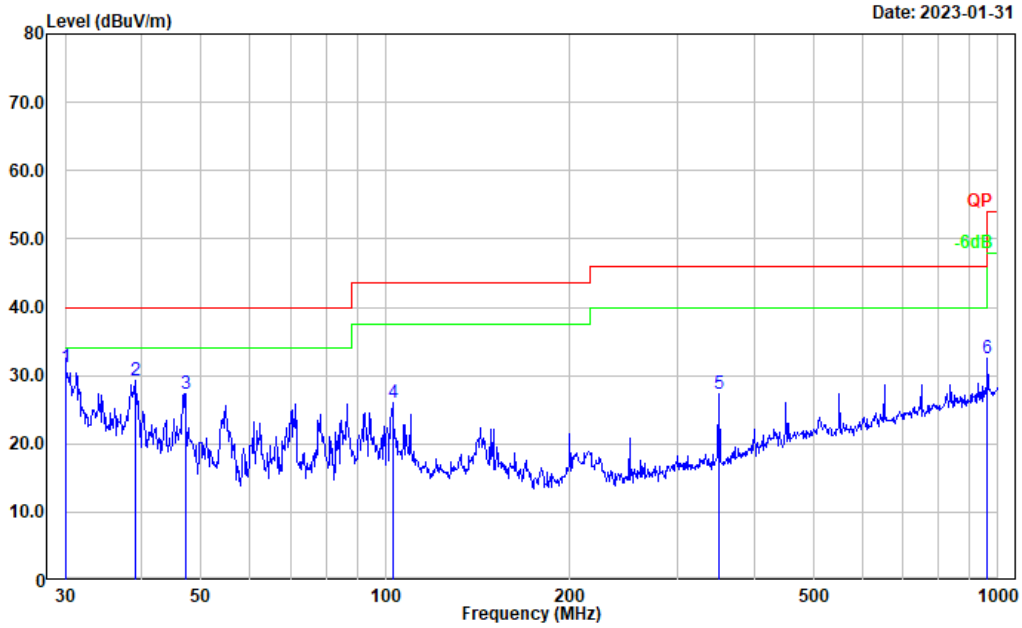
Core Board 1# RV1109:

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.105	28.07	-3.68	24.39	40.00	15.61	Peak
2	142.824	31.32	-11.91	19.41	43.50	24.09	Peak
3	250.301	35.93	-13.08	22.85	46.00	23.15	Peak
4	300.367	35.96	-10.63	25.33	46.00	20.67	Peak
5	451.135	35.20	-6.91	28.29	46.00	17.71	Peak
6	962.162	31.84	0.14	31.98	54.00	22.02	Peak

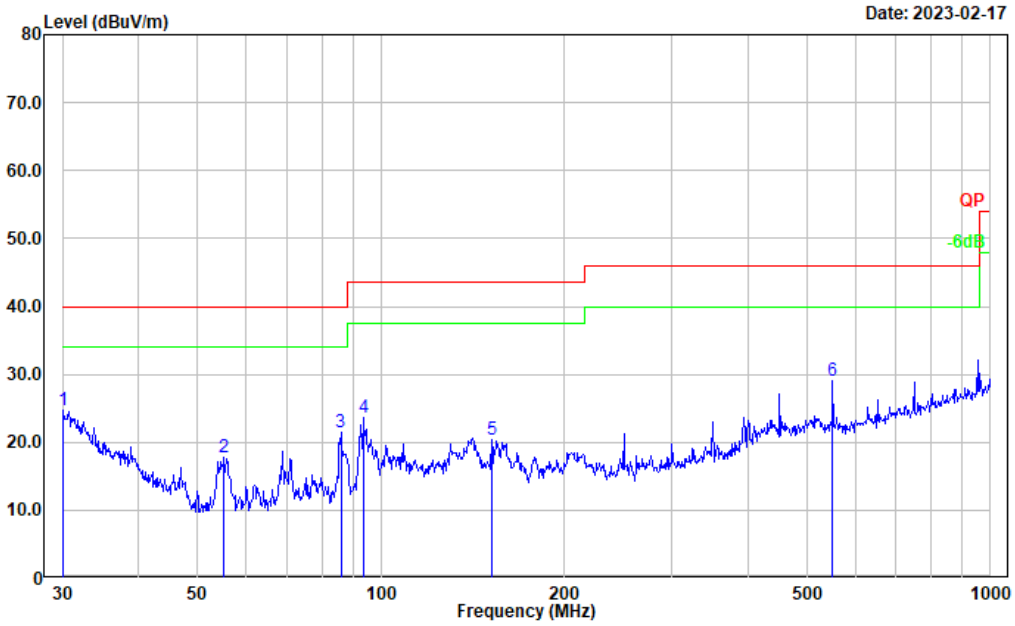
Test Mode: Operating
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.105	34.89	-3.68	31.21	40.00	8.79	Peak
2	39.162	40.00	-10.65	29.35	40.00	10.65	Peak
3	47.160	42.93	-15.52	27.41	40.00	12.59	Peak
4	102.719	39.76	-13.79	25.97	43.50	17.53	Peak
5	350.477	37.29	-10.03	27.26	46.00	18.74	Peak
6	962.162	32.43	0.14	32.57	54.00	21.43	Peak

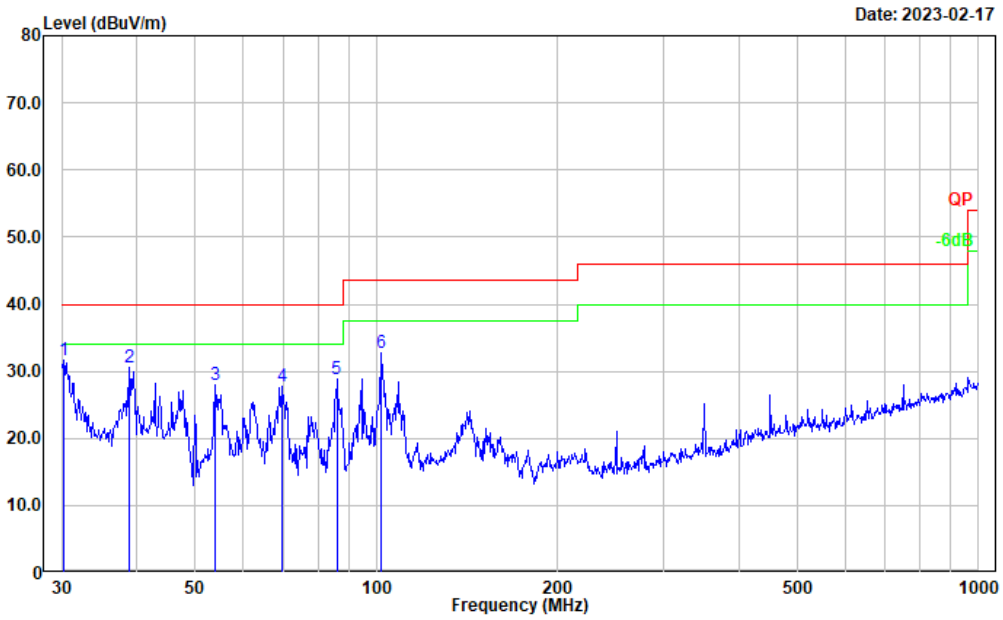
Core Board 2# RV1126:

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.000	28.25	-3.60	24.65	40.00	15.35	Peak
2	55.221	35.11	-17.29	17.82	40.00	22.18	Peak
3	85.898	38.68	-17.15	21.53	40.00	18.47	Peak
4	93.440	39.68	-16.05	23.63	43.50	19.87	Peak
5	151.597	32.33	-12.03	20.30	43.50	23.20	Peak
6	550.948	34.77	-5.74	29.03	46.00	16.97	Peak

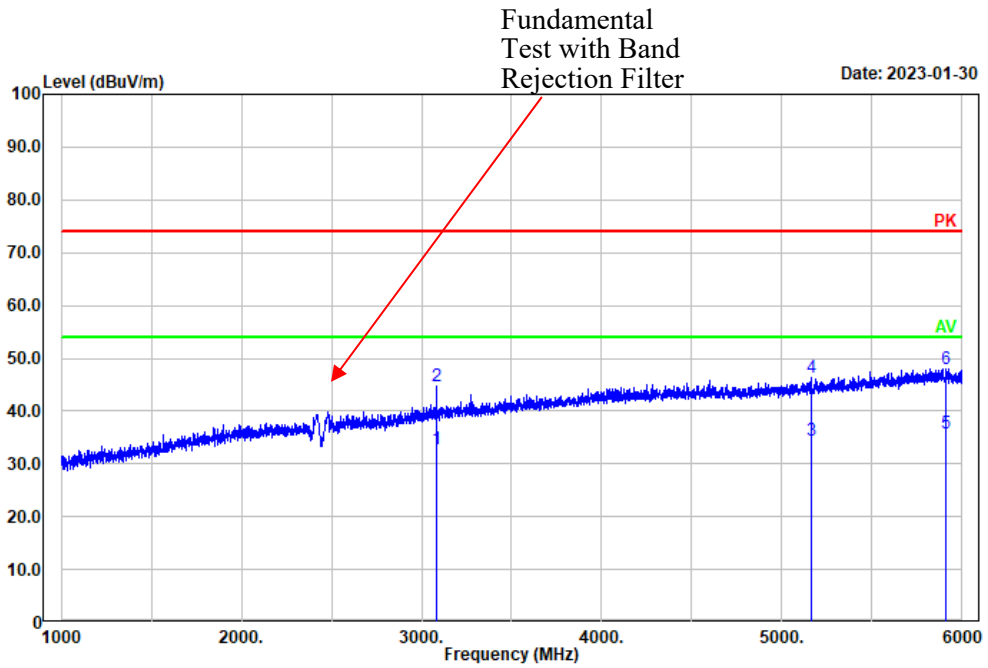
Test Mode: Operating
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	30.211	35.37	-3.76	31.61	40.00	8.39	Peak
2	38.888	41.03	-10.43	30.60	40.00	9.40	Peak
3	54.071	45.13	-17.26	27.87	40.00	12.13	Peak
4	69.600	44.28	-16.52	27.76	40.00	12.24	Peak
5	85.898	45.97	-17.15	28.82	40.00	11.18	Peak
6	102.001	46.62	-13.97	32.65	43.50	10.85	Peak

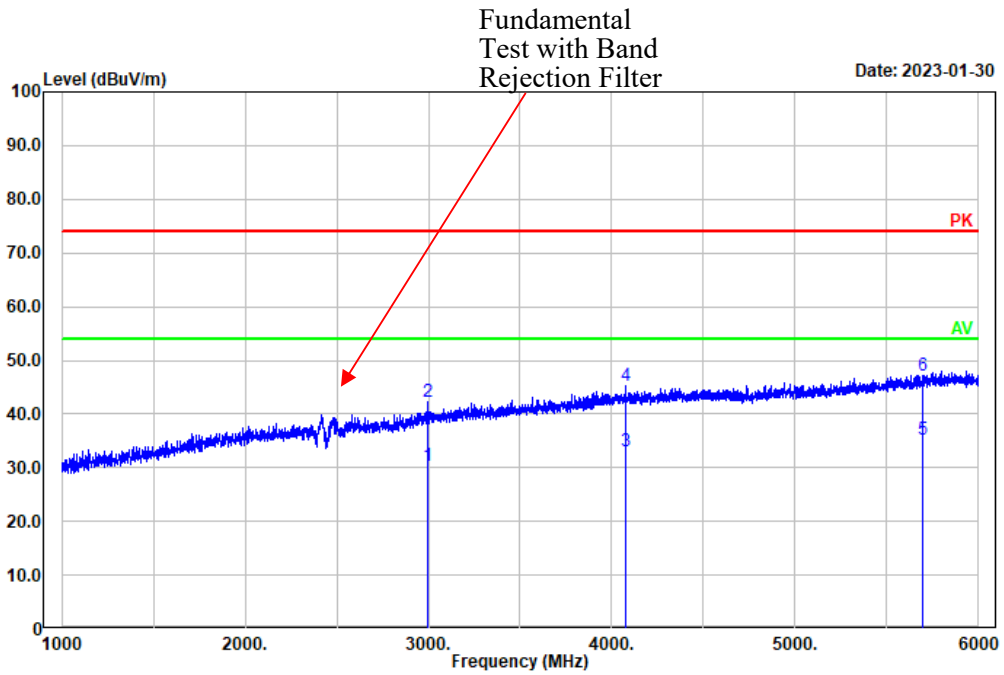
2) 1GHz-13GHz:
Core Board 1# RV1109 was the worst case:

Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	3082.417	26.37	6.33	32.70	54.00	21.30	Average
2	3082.417	38.26	6.33	44.59	74.00	29.41	Peak
3	5159.832	22.98	11.48	34.46	54.00	19.54	Average
4	5159.832	34.77	11.48	46.25	74.00	27.75	Peak
5	5909.982	22.50	13.22	35.72	54.00	18.28	Average
6	5909.982	34.85	13.22	48.07	74.00	25.93	Peak

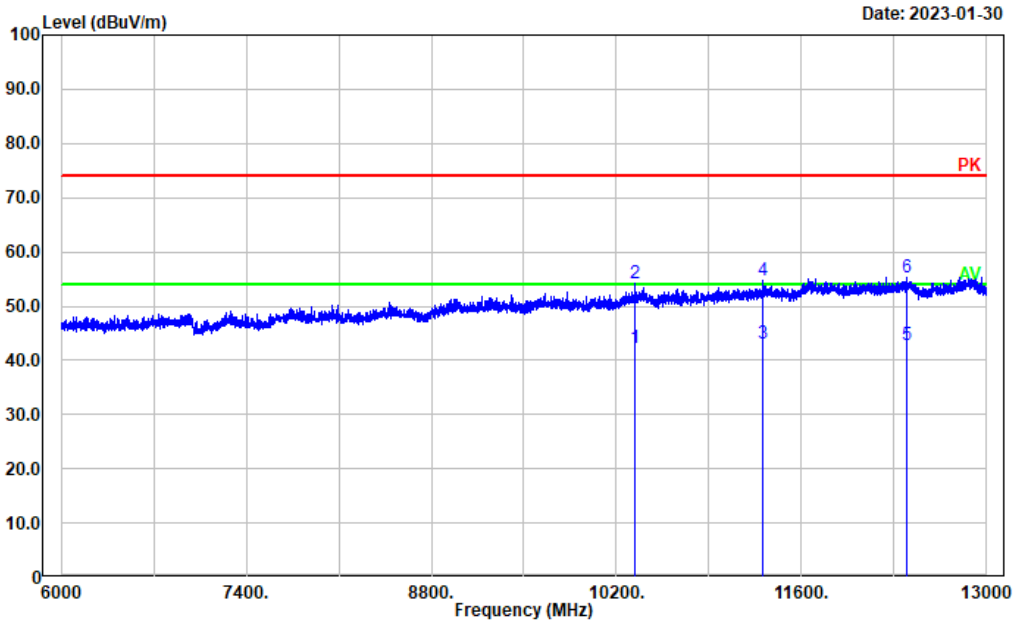
Test Mode: Operating
Polarization: vertical
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	2992.398	24.38	6.06	30.44	54.00	23.56	Average
2	2992.398	36.29	6.06	42.35	74.00	31.65	Peak
3	4073.615	23.53	9.50	33.03	54.00	20.97	Average
4	4073.615	35.88	9.50	45.38	74.00	28.62	Peak
5	5697.939	22.19	13.00	35.19	54.00	18.81	Average
6	5697.939	34.24	13.00	47.24	74.00	26.76	Peak

Horizontal:

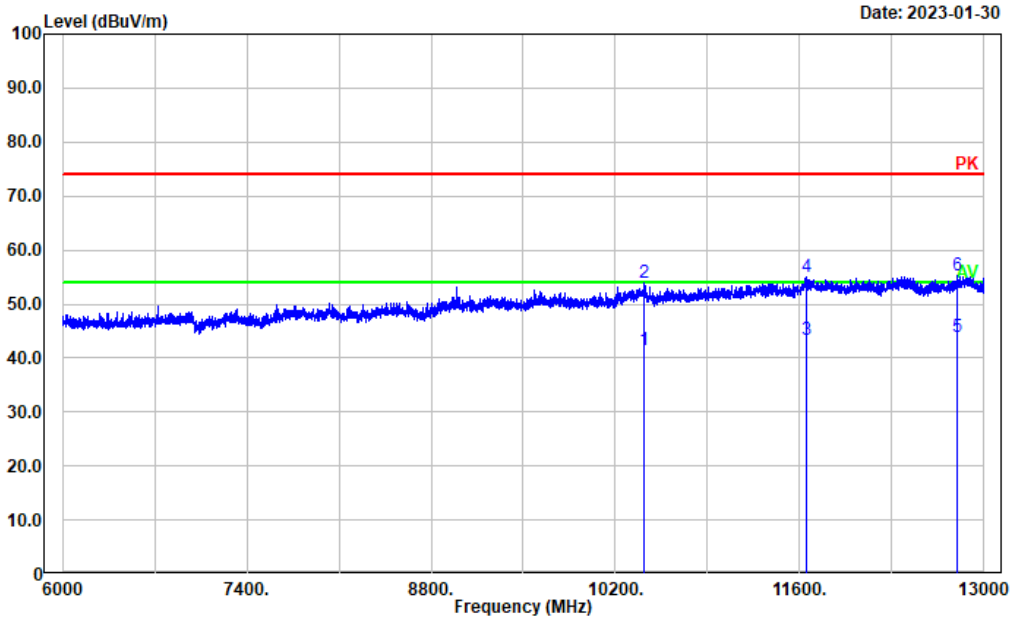
Test Mode: Operating
Polarization: horizontal
Note:



No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	10343.670	23.04	19.18	42.22	54.00	11.78	Average
2	10343.670	35.00	19.18	54.18	74.00	19.82	Peak
3	11311.260	22.38	20.70	43.08	54.00	10.92	Average
4	11311.260	34.04	20.70	54.74	74.00	19.26	Peak
5	12392.280	21.34	21.53	42.87	54.00	11.13	Average
6	12392.280	33.82	21.53	55.35	74.00	18.65	Peak

Vertical:

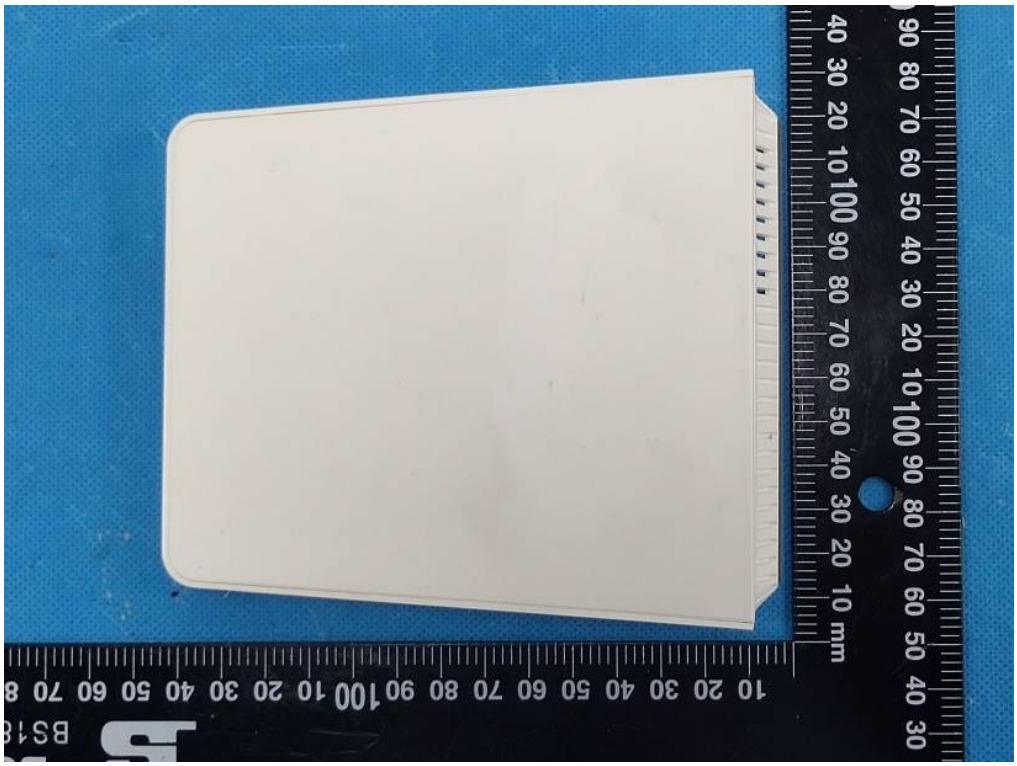
Test Mode: Operating
Polarization: vertical
Note:

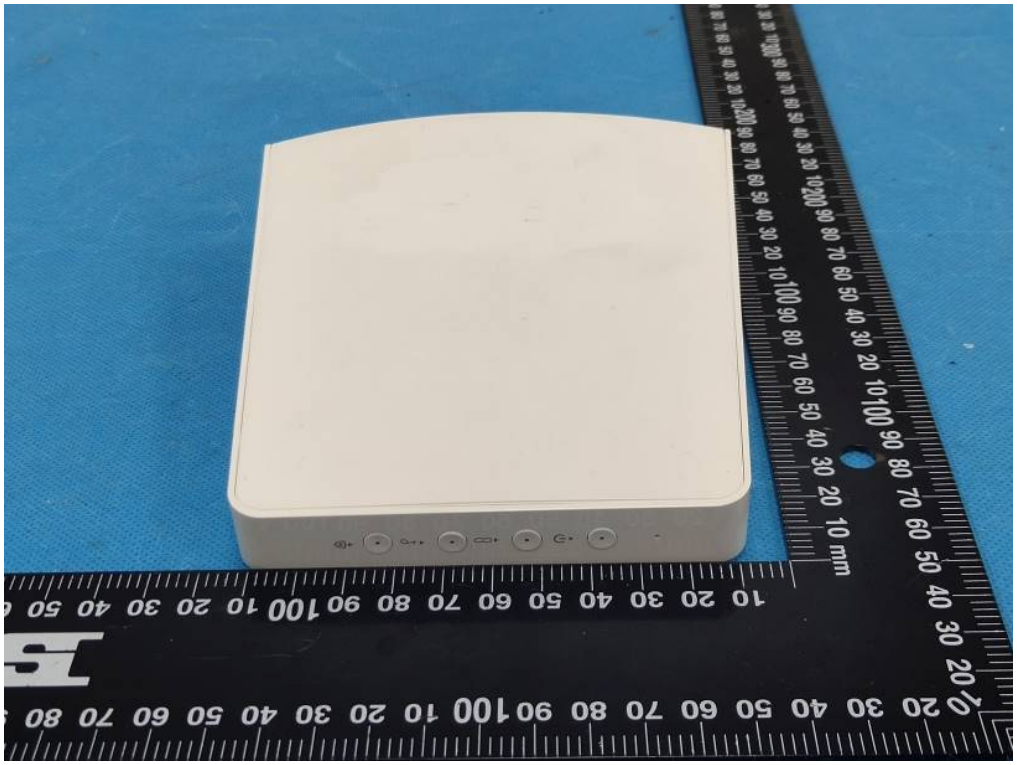


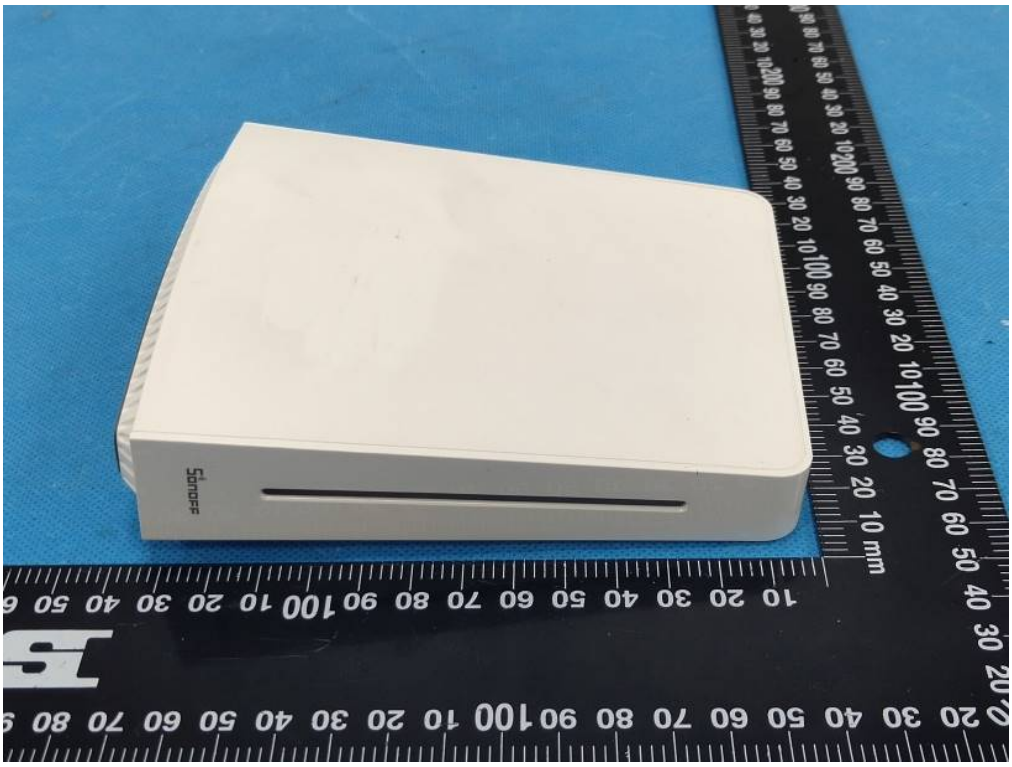
No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
1	10412.280	22.37	19.12	41.49	54.00	12.51	Average
2	10412.280	34.82	19.12	53.94	74.00	20.06	Peak
3	11651.530	22.34	21.07	43.41	54.00	10.59	Average
4	11651.530	34.04	21.07	55.11	74.00	18.89	Peak
5	12791.360	21.95	21.88	43.83	54.00	10.17	Average
6	12791.360	33.51	21.88	55.39	74.00	18.61	Peak

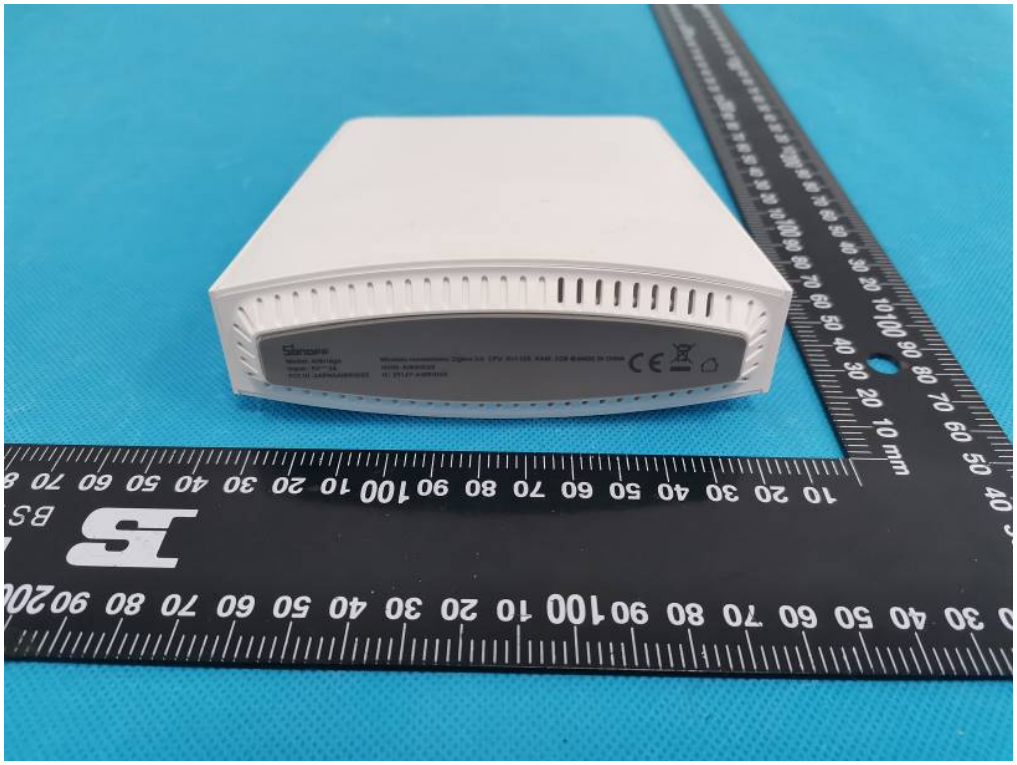
5. EUT PHOTOGRAPHS

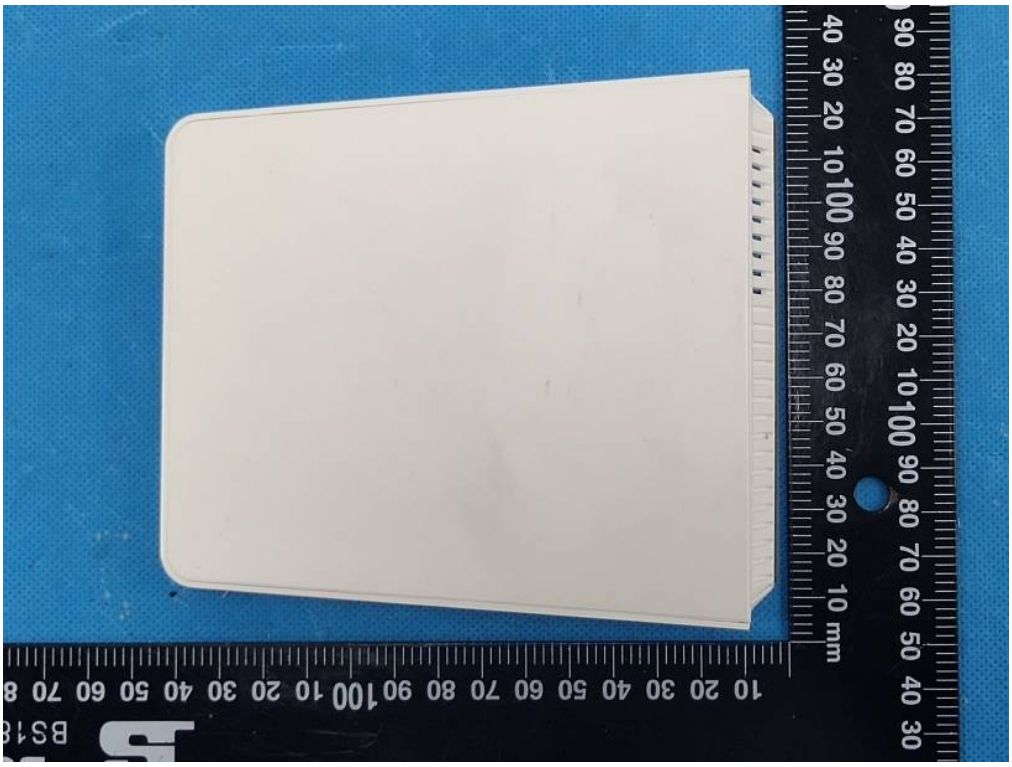
AlBridge



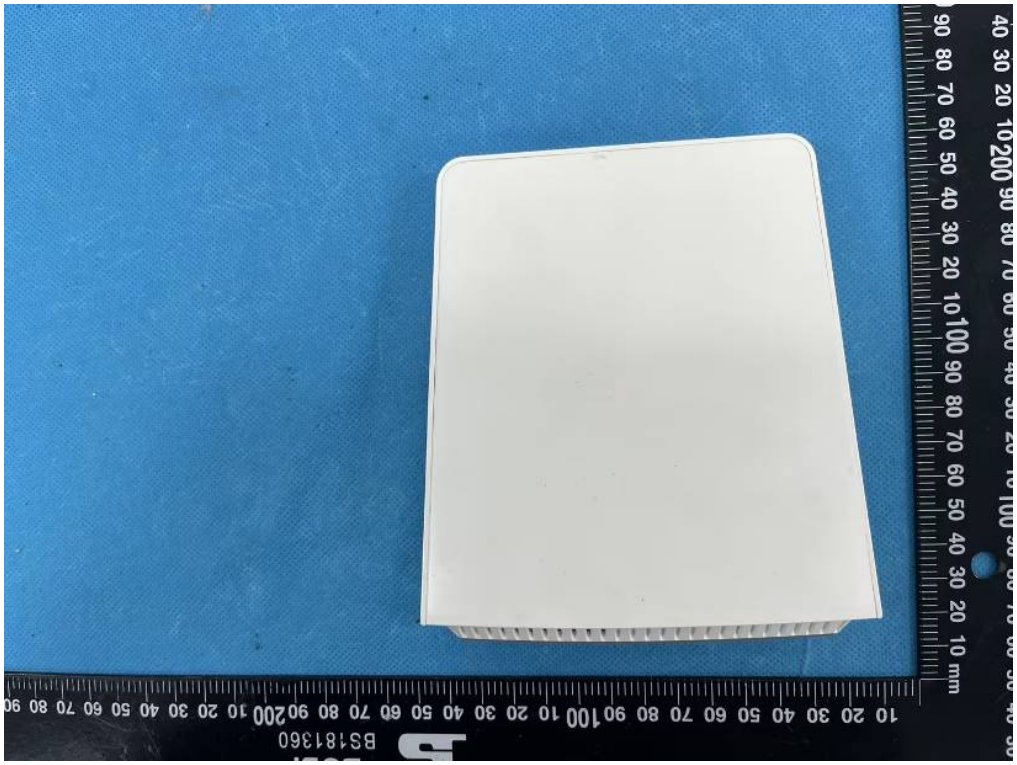


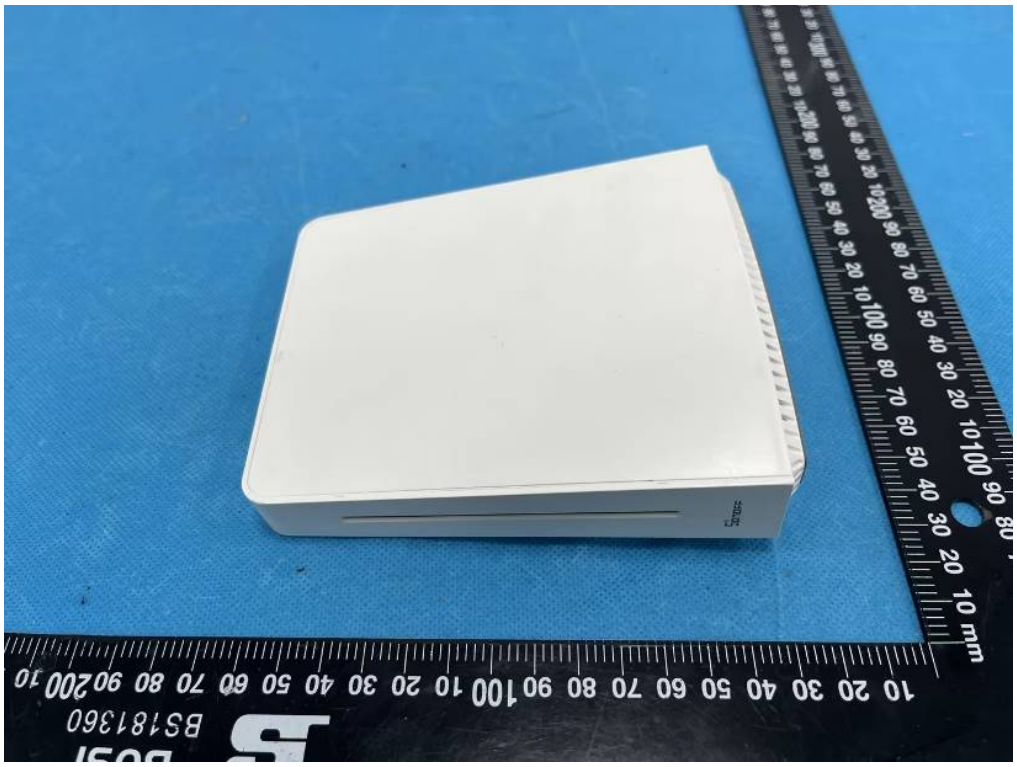

SONOFF

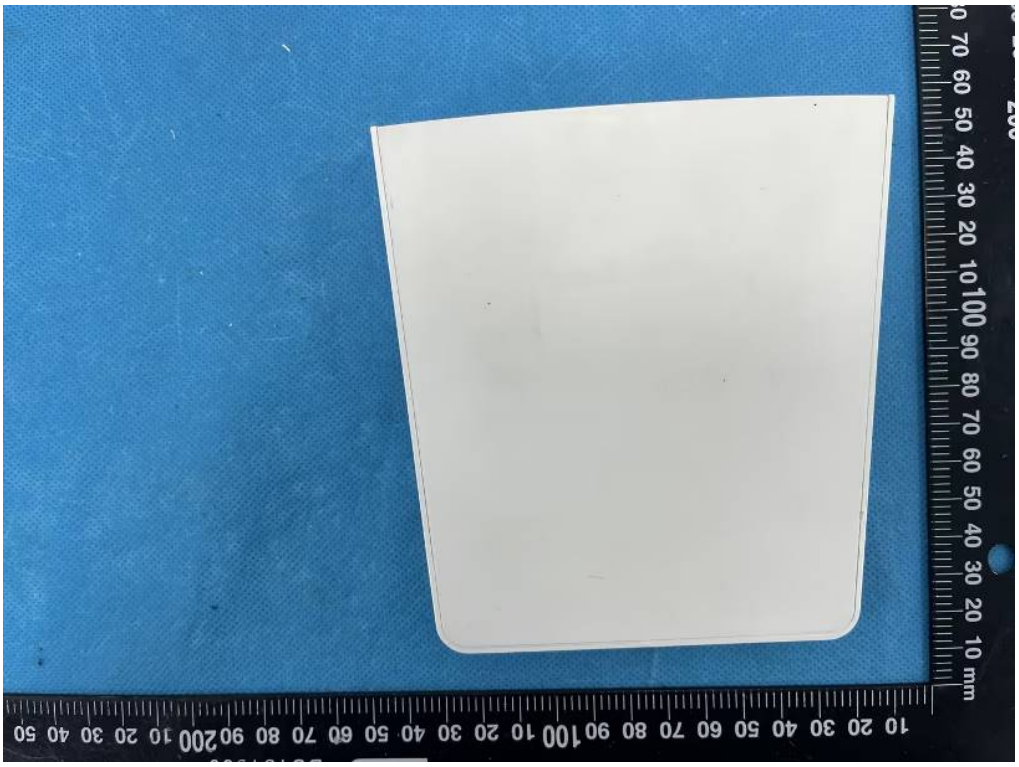




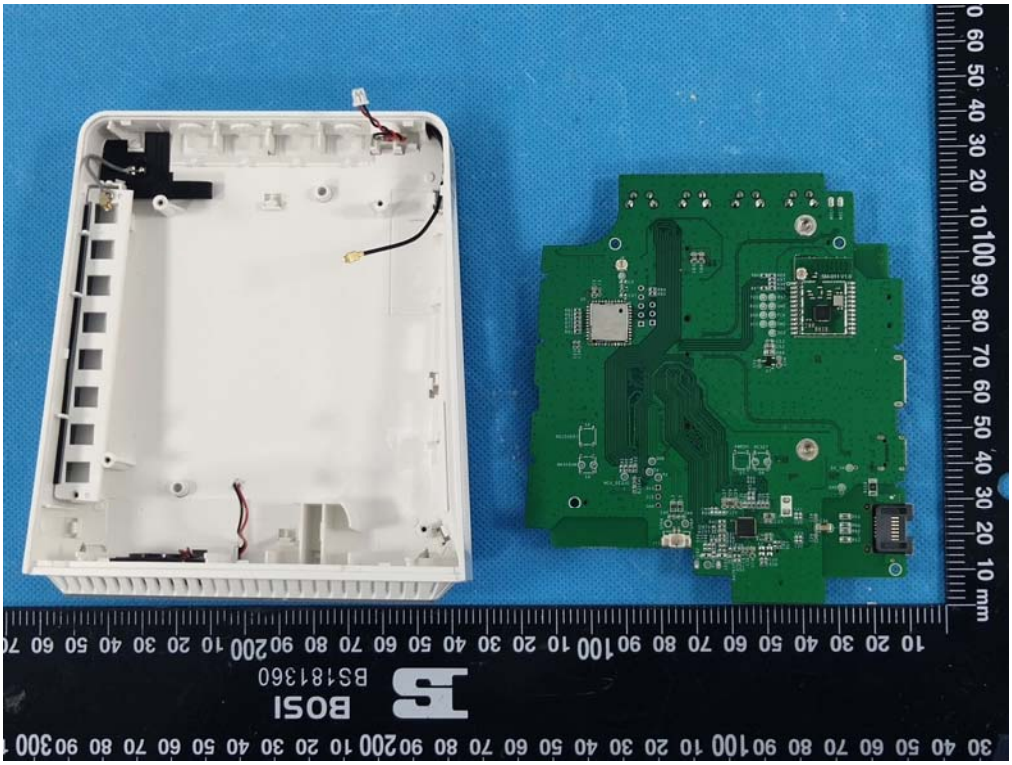
AlBridge-26





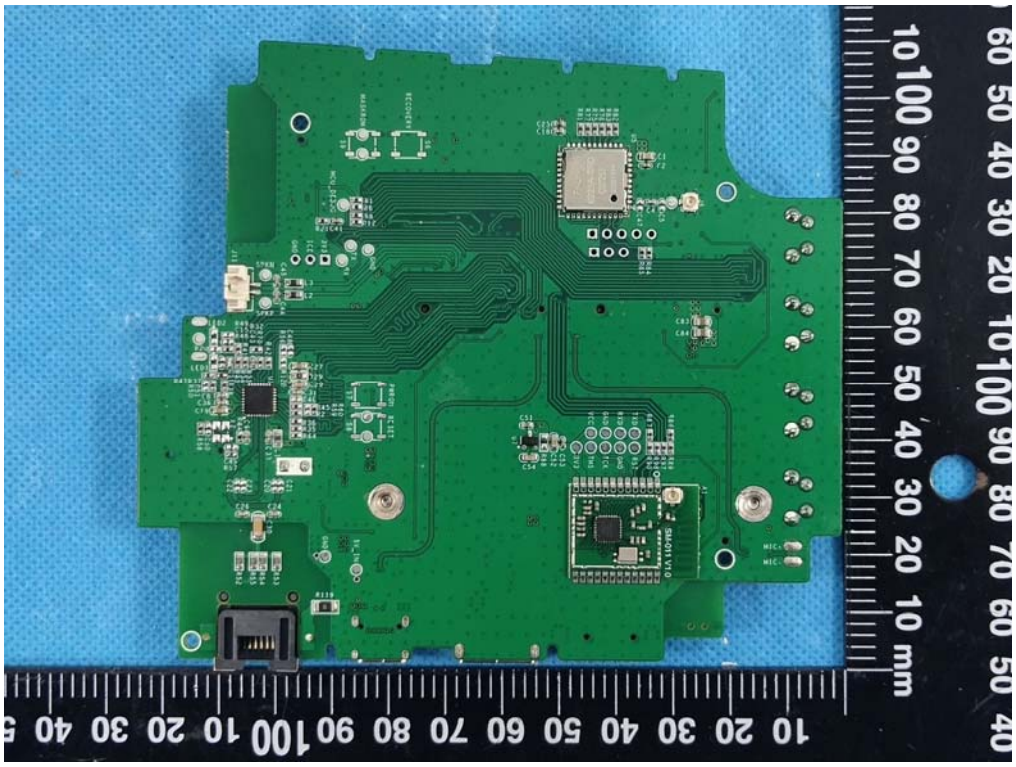


AlBridge



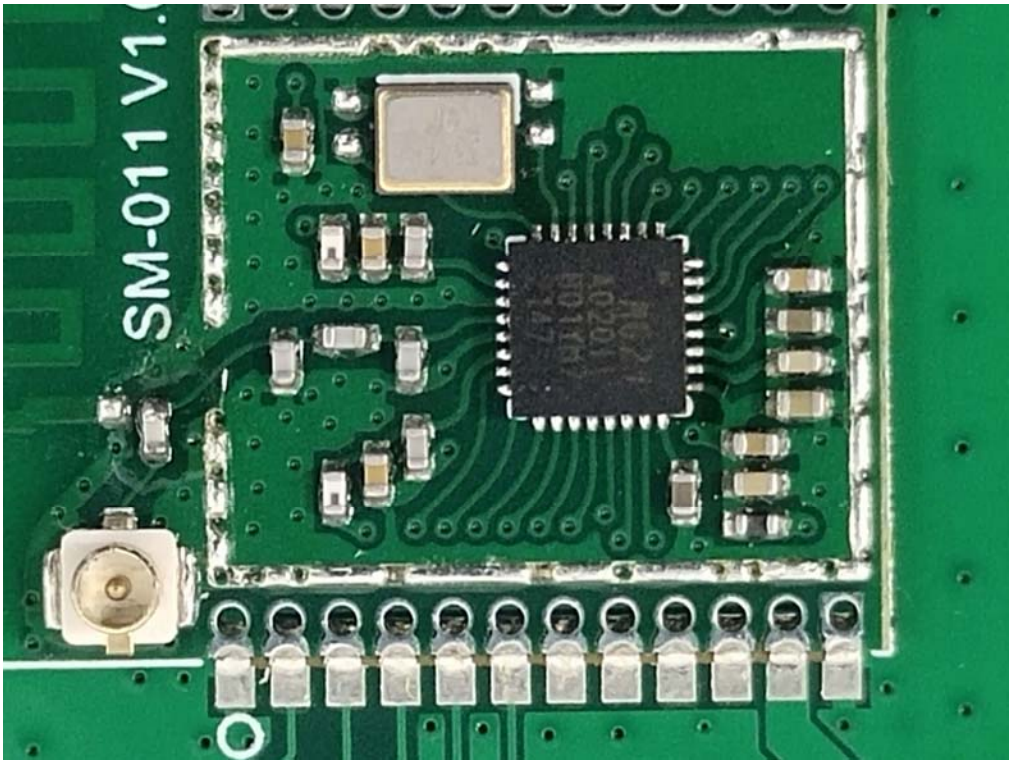
Zigbee Antenna

BLE/WiFi Antenna

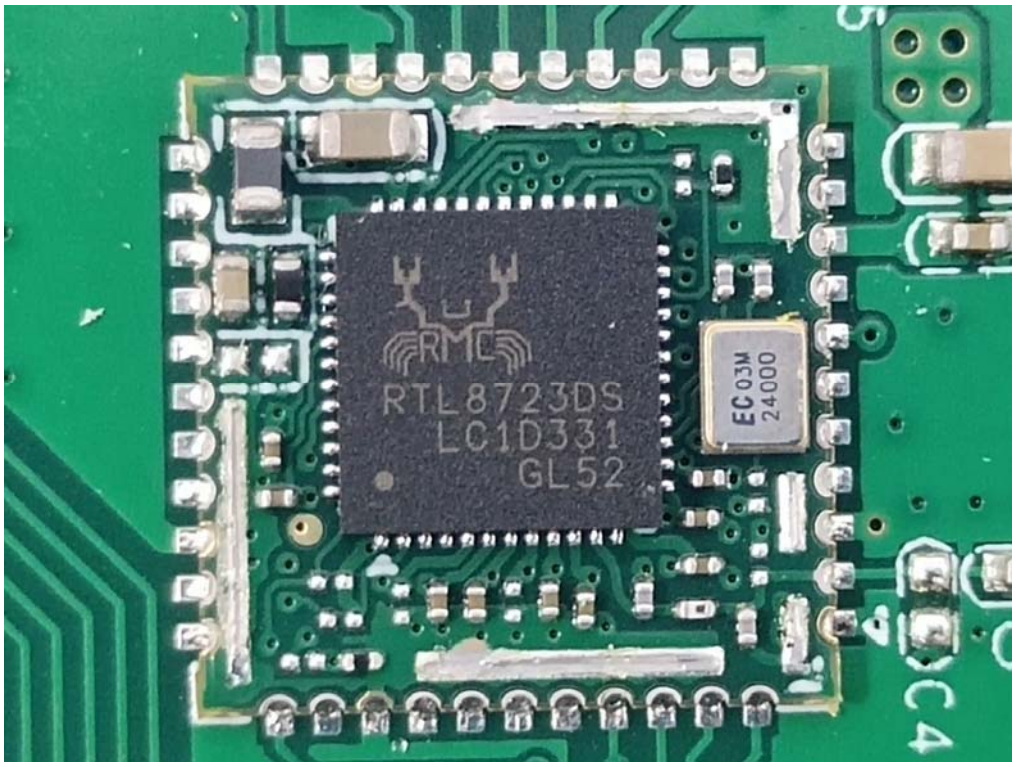



AI-Bridge Base Board
V1.2 2022-11-25

Zigbee chip



BLT/WiFi chip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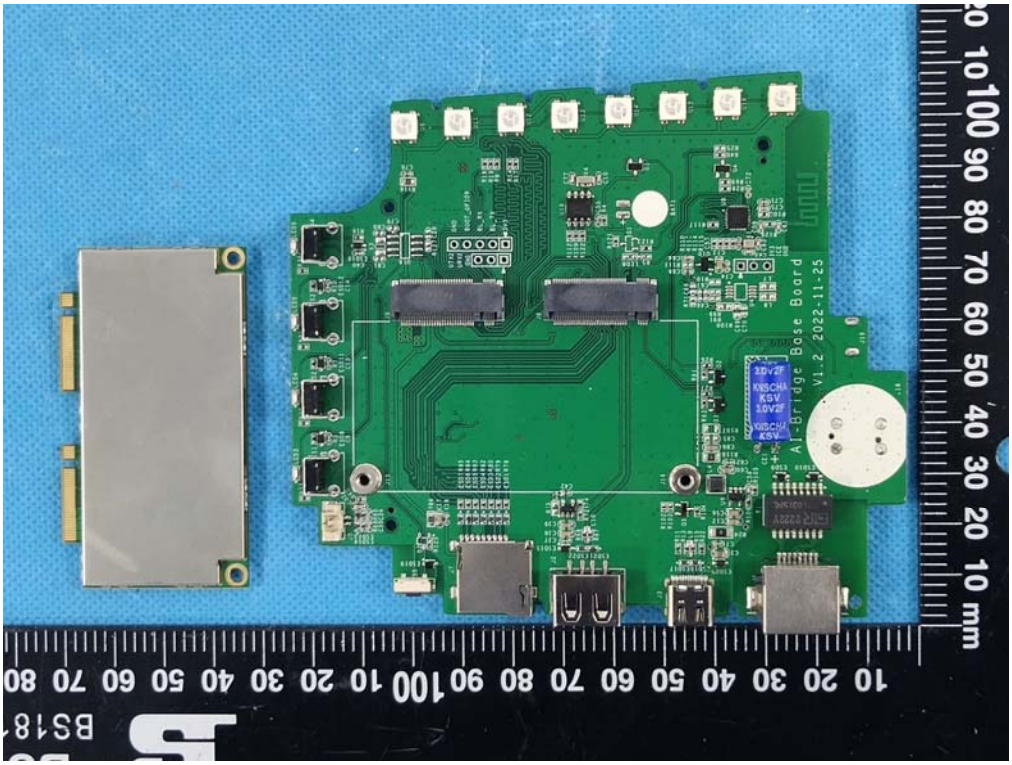
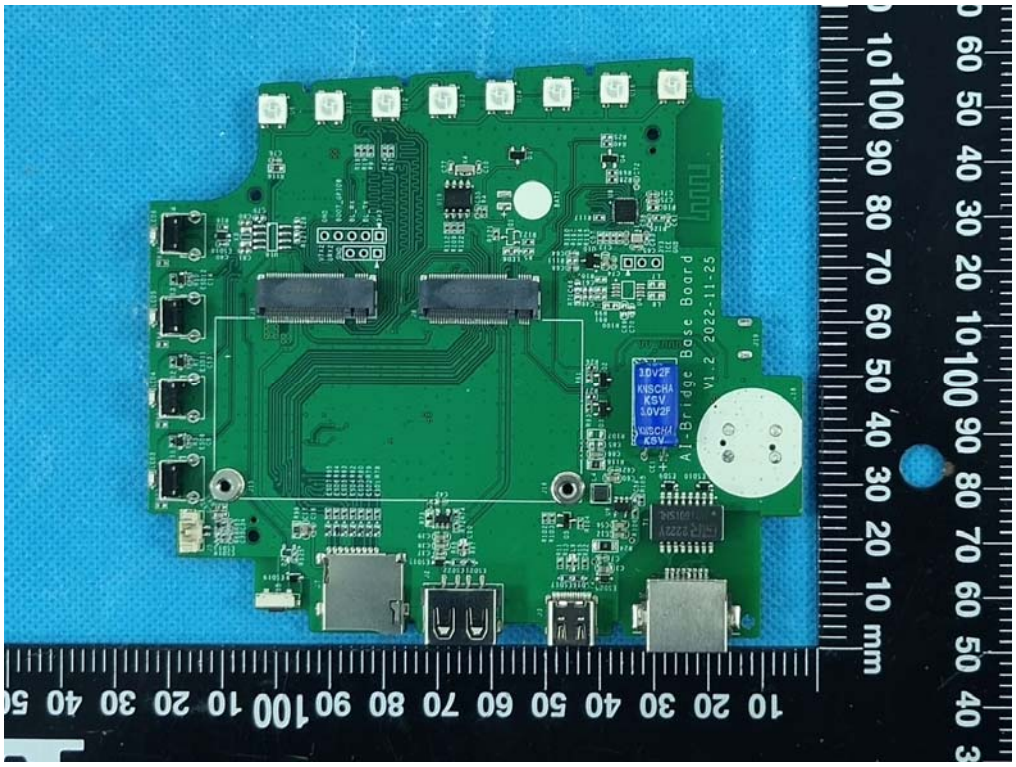
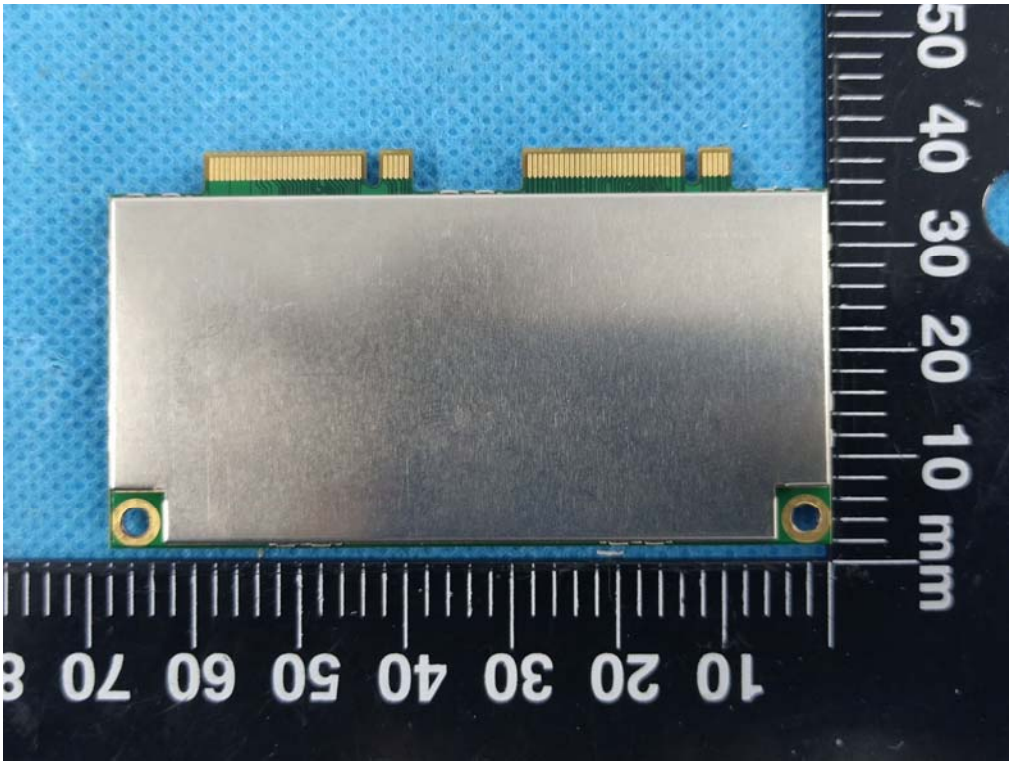
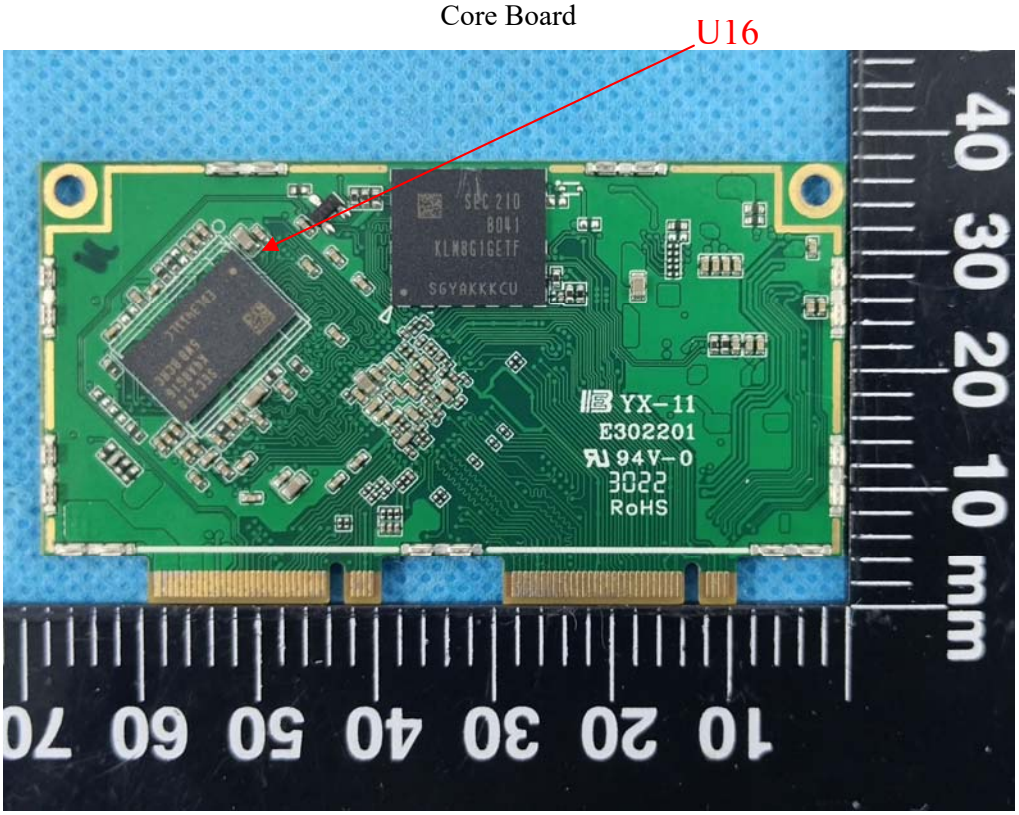
LC1D331
GL52
EC 03M
24000
C4


AI-Bridge Base Board
V1.2 2022-11-25
mm


AI-Bridge Base Board
V1.2 2022-11-25

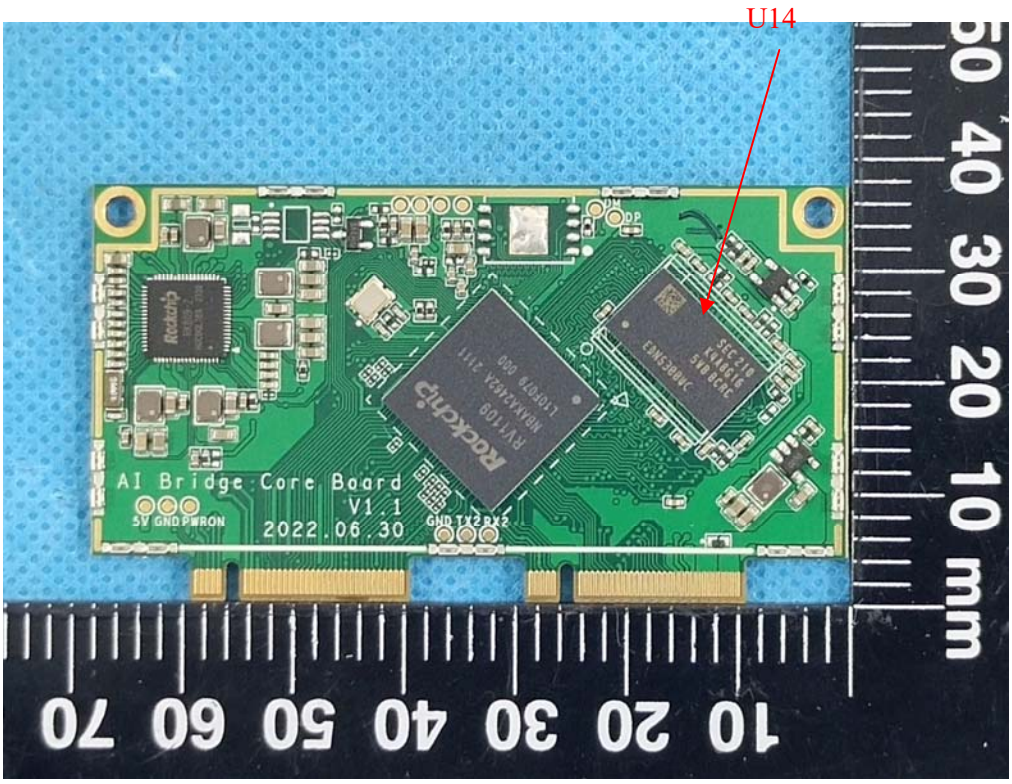


Core Board


U16
SEC 210
B041
KLM8G1GETF
SGYAKKCU
YX-11
E302201
94V-0
3022
RoHS
40 30 20 10 mm
10 20 30 40 50 60 70


SEC 210
B041
KLM8G1GETF
SGYAKKCU

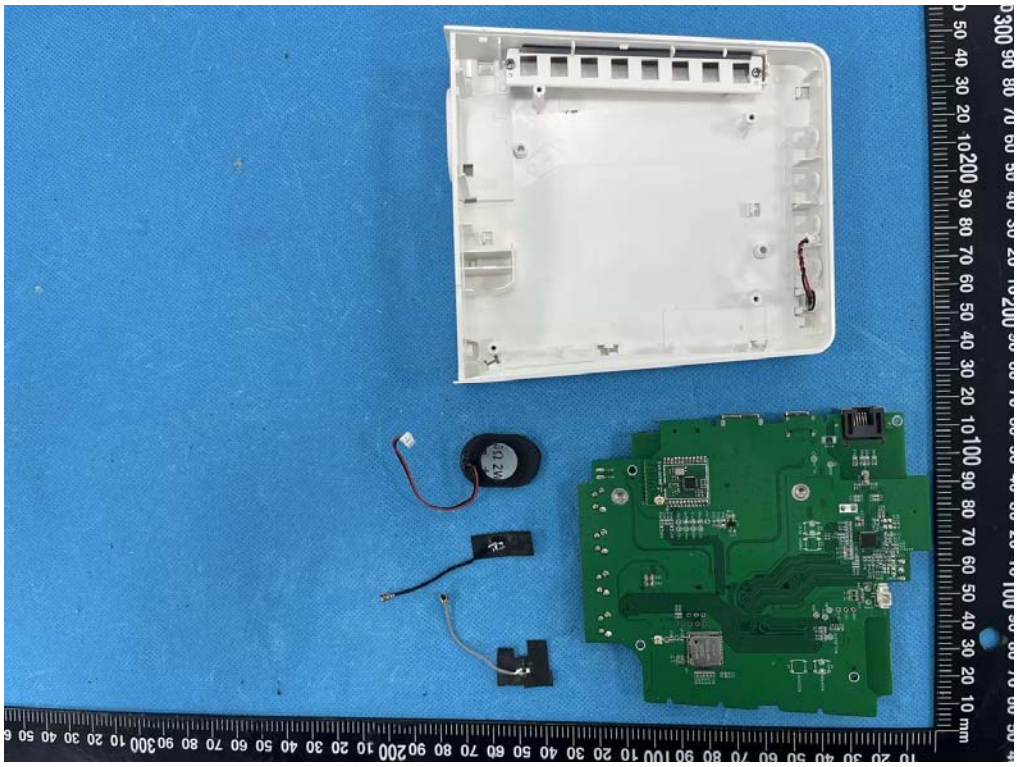

SEC 210
K4A8G16
5WB BCRC
EDL3411LC


U14
AI Bridge Core Board
V1.1
2022.06.30
5V GND PWRON
GND TX2 RX2
10 20 30 40 50 60 70
50 40 30 20 10 mm

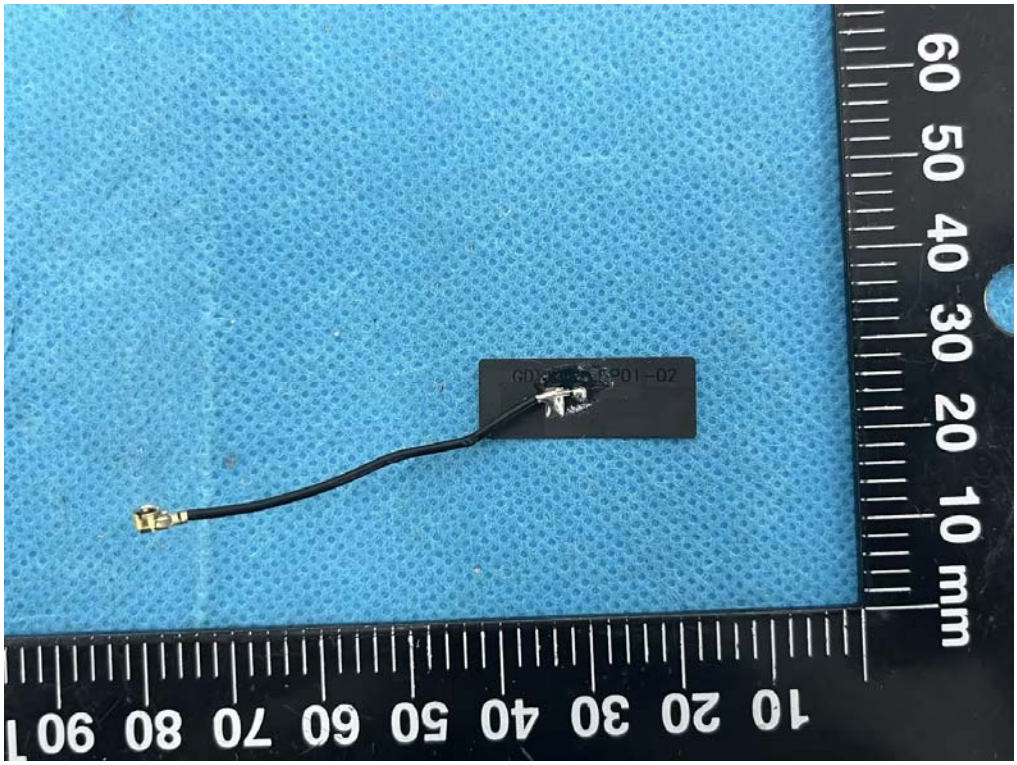

SEC 210
K4A8G16
5WB BCRC
EDN5300WC


Rockchip
RV1109
NBAKA2462A 2111
L10F079 000

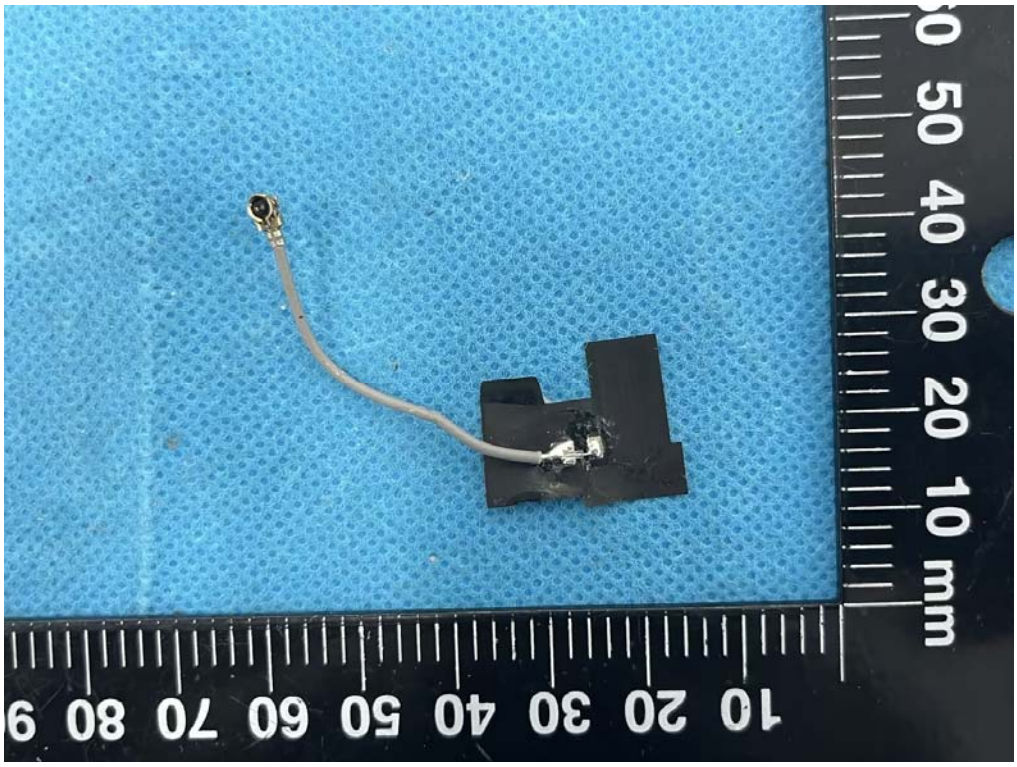
AIBridge-26

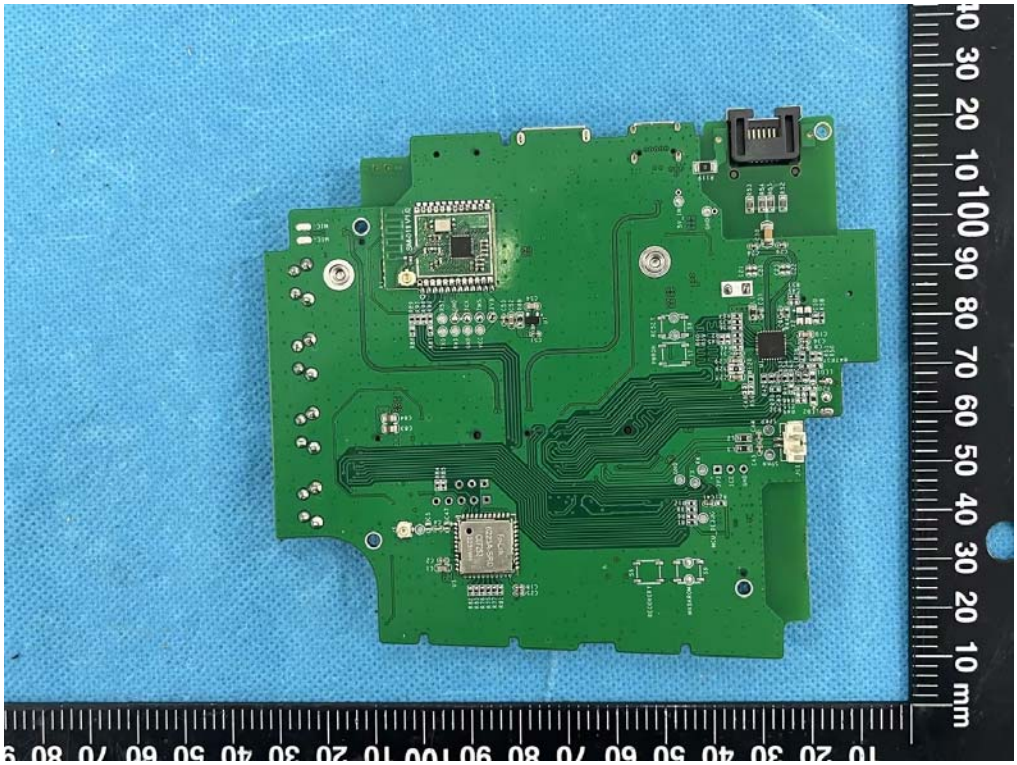


Zigbee Antenna

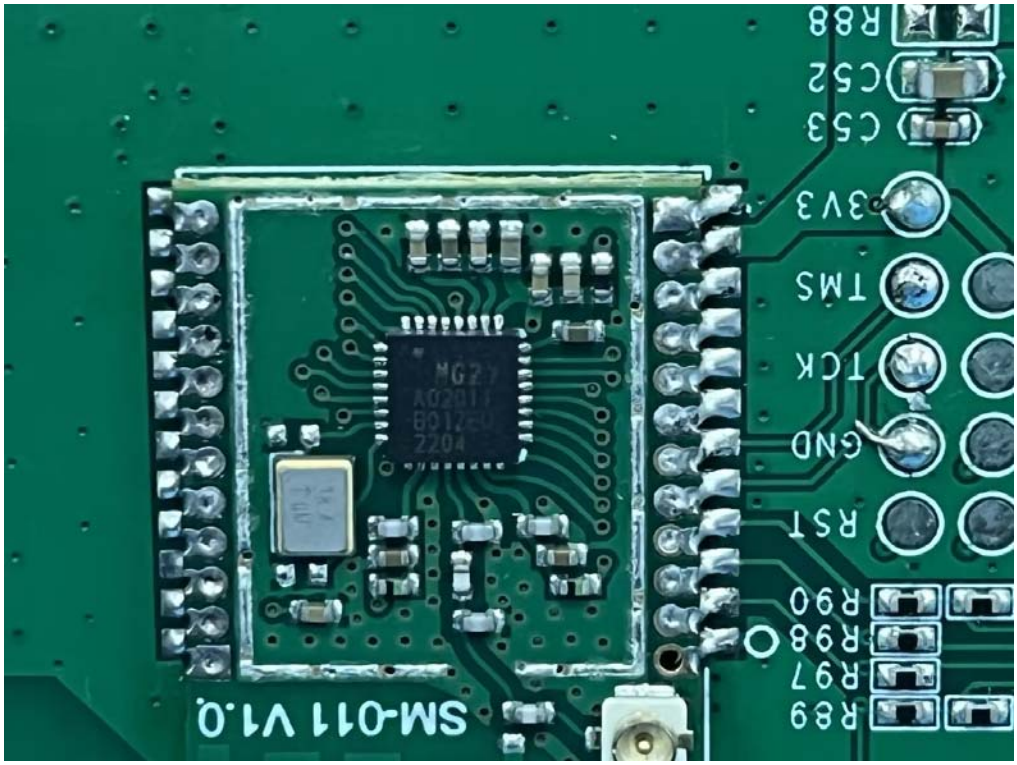


BLE/WiFi Antenna

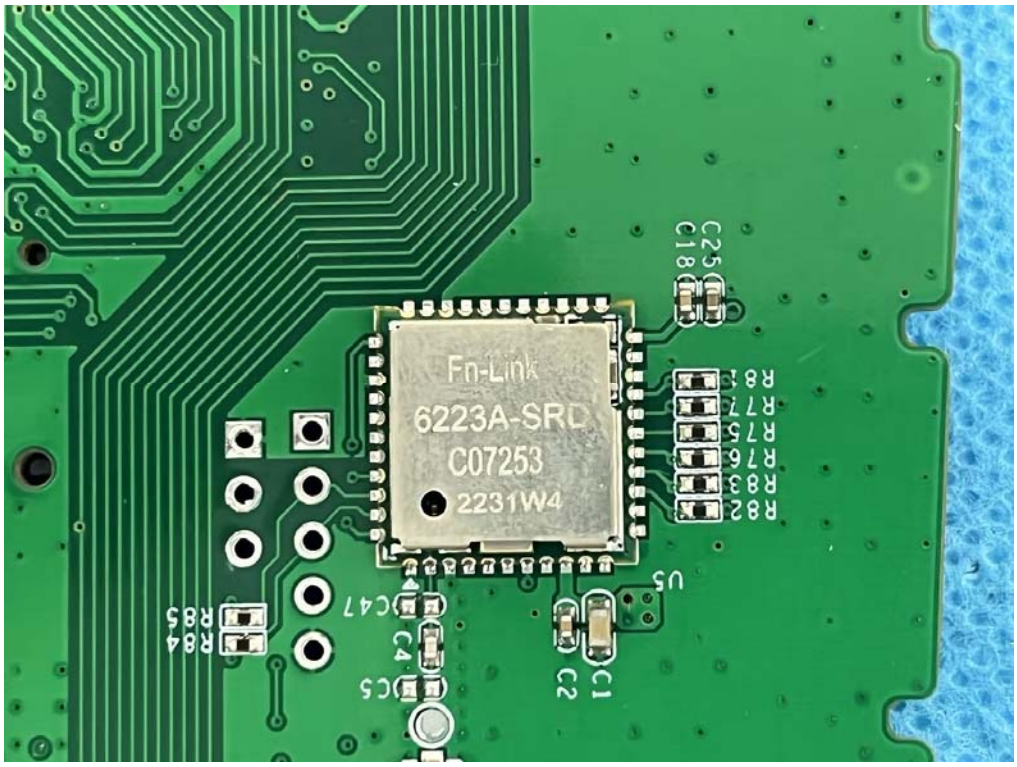


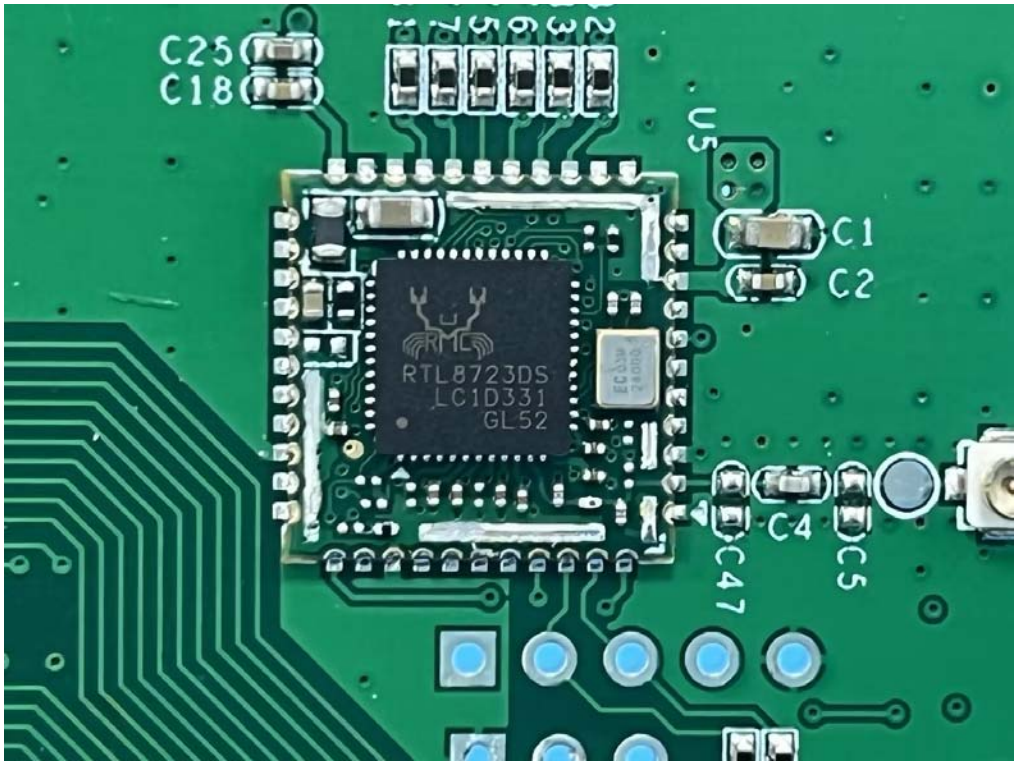


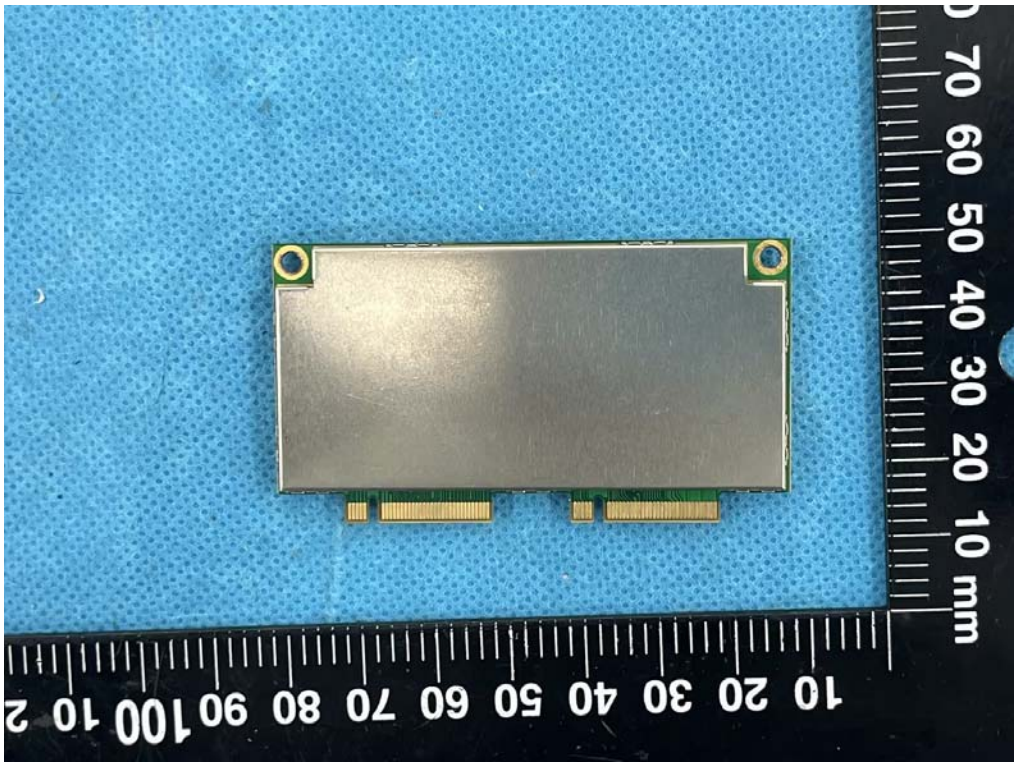
chip



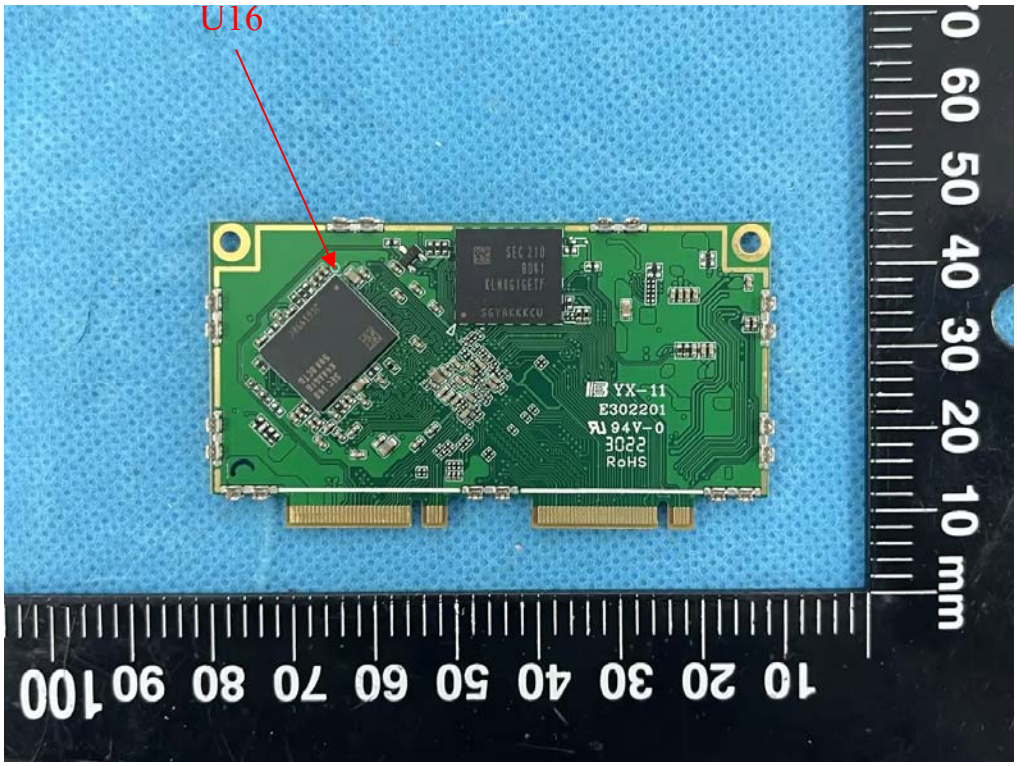
BLT/WiFi chip

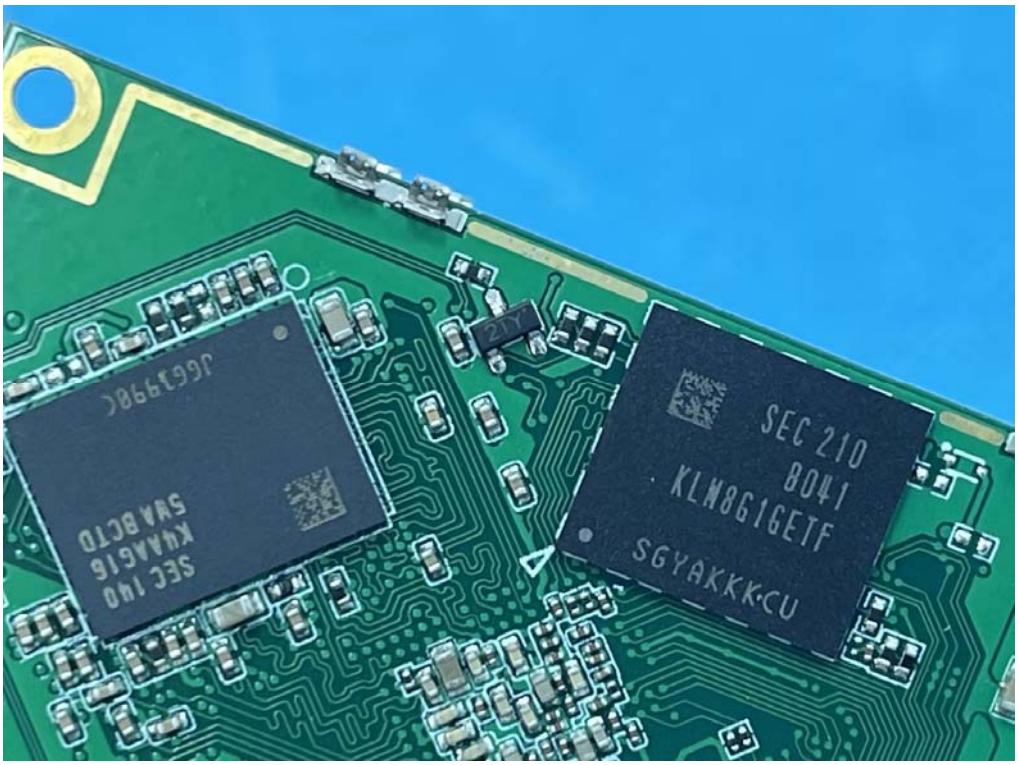






Core Board

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8041
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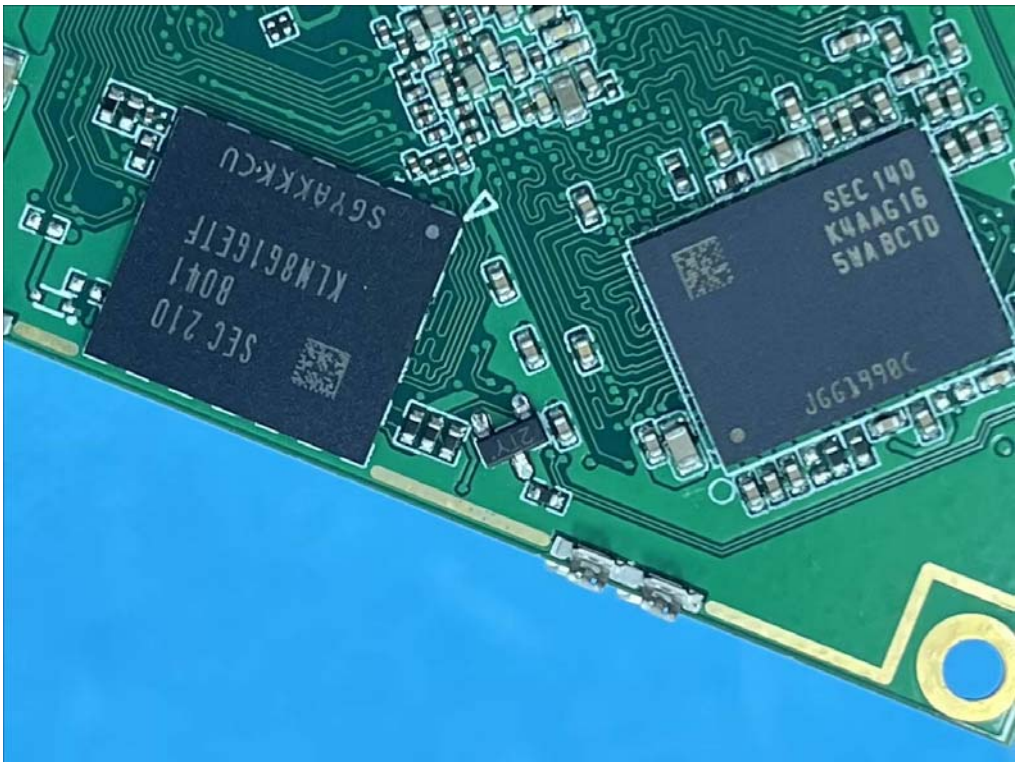
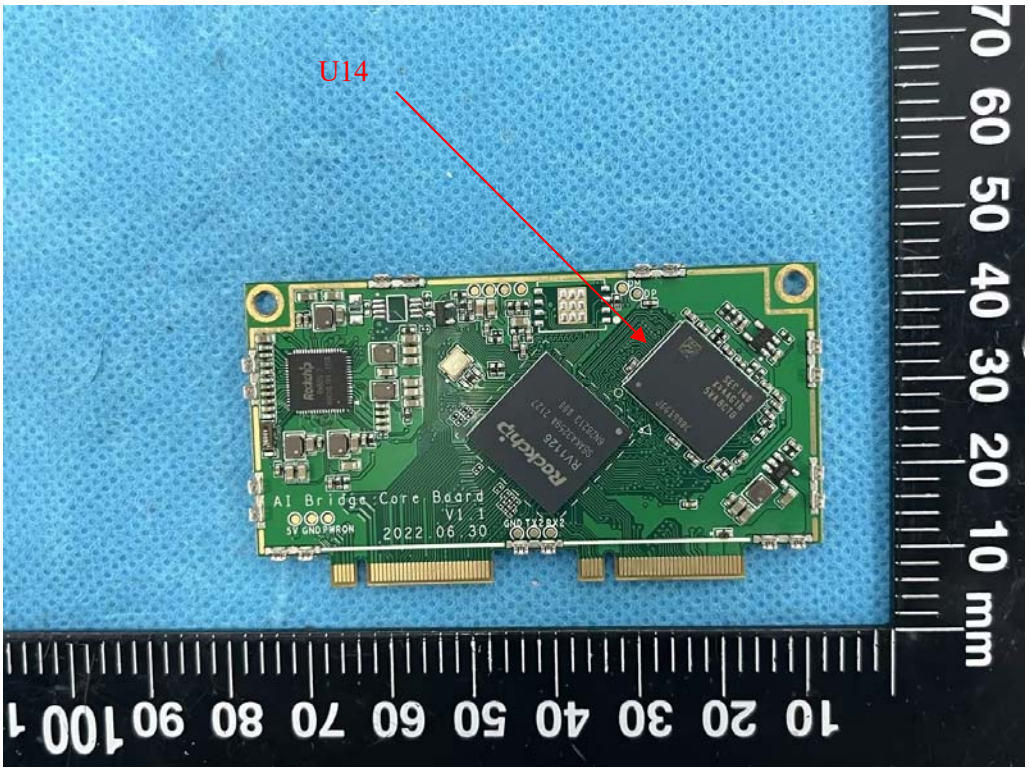
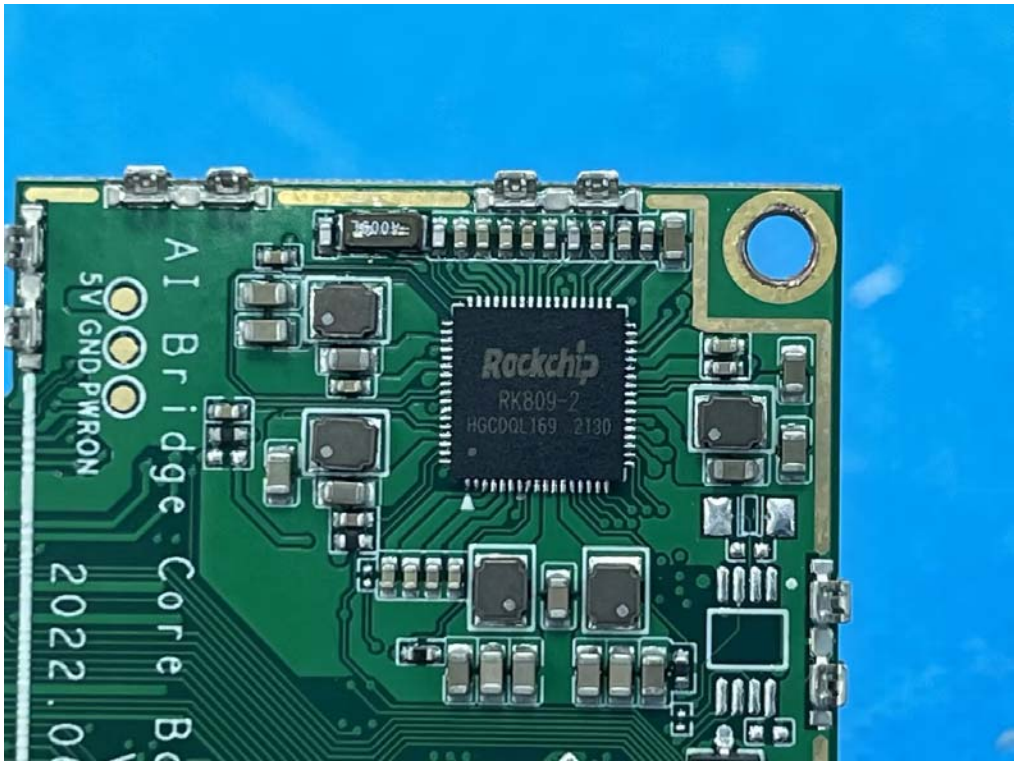
SGYAKKK·CU


SEC 140
K4A4G16
SWA BCTD
JGG1998C


U14
AI Bridge Core Board
V1.1
2022.06.30


SEC 140
K4AAG16
5WA BCTD
RV1126
Rockchip


Rockchip
RV1126
SBAKA3259A 2127
6N28213 000


AI Bridge Core
5V GND PWRON
Rockchip
RK809-2
HGCDQL169 2130

6. TEST SETUP PHOTOGRAPHS

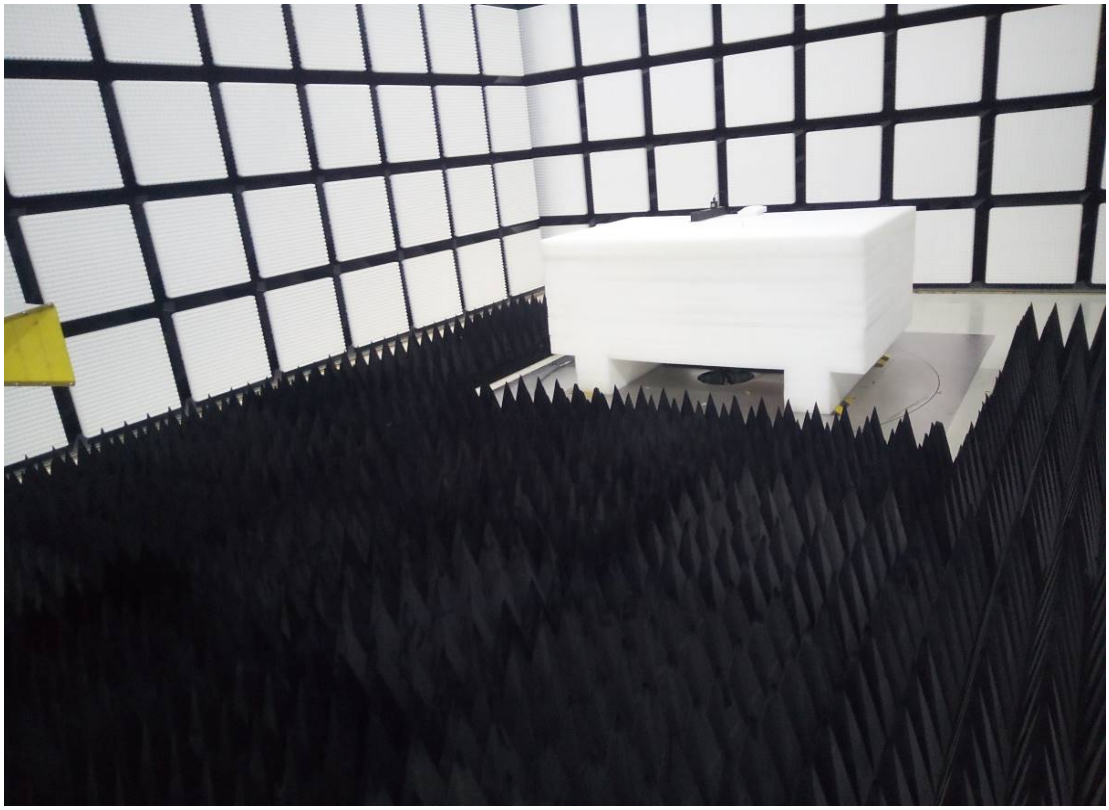
Conducted emissions front View

Conducted emissions side View

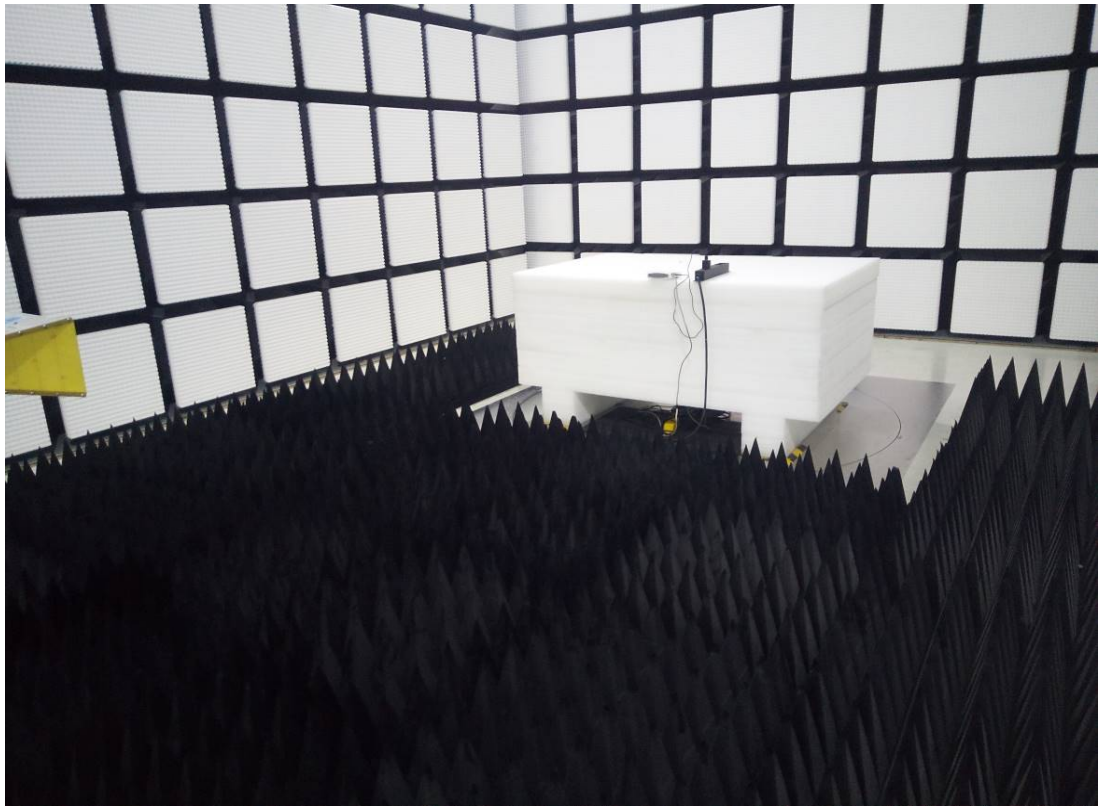
Radiated Emissions Below 1G front View

Radiated Emissions Below 1G Rear View

Radiated Emissions Above 1G front View



Radiated Emissions Above 1G Rear View



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