ETSI EN 301 489-1 V2.2.3 (2019-11)
ETSI EN 301 489-17 V3.2.4 (2020-09)
ETSI EN 301 489-19 V2.2.1 (2022-09)
ETSI EN 301 489-52 V1.2.1 (2021-11)

TEST REPORT

For

Xiamen Milesight IoT Co., Ltd.

Building C09, Software Park Phase III, Xiamen 361024, Fujian, China

Tested Model: UR35-L04EU-G-P-W，UR35-L04EU-G-P-W-485
Multiple Models: UR35-L04EU-P-W, UR35-L04EU-G-P, UR35-L04EU-G-W, UR35-L04EU-W, UR35-L04EU-G, UR35-L04EU-P, UR35-L04EU, UR35-L04EU-P-W-485, UR35-L04EU-G-P-485, UR35-L04EU-G-W-485, UR35-L04EU-W-485, UR35-L04EU-G-485, UR35-L04EU-P-485, UR35-L04EU-485

Report Type:	**Product Type:**
Original Report	Industrial Cellular Router

Report Number:	XMDN220429-17582E-02
Report Date:	2022-10-10
Reviewed By:	Rocky Xiao RF Engineer
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.12, Pulong East 1st Road, Tangxia Town, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Industrial Cellular Router
EUT Model:		UR35-L04EU-G-P-W, UR35-L04EU-G-P-W-485
Multiple Models:		UR35-L04EU-P-W, UR35-L04EU-G-P, UR35-L04EU-G-W, UR35-L04EU-W, UR35-L04EU-G, UR35-L04EU-P, UR35-L04EU, UR35-L04EU-P-W-485, UR35-L04EU-G-P-485, UR35-L04EU-G-W-485, UR35-L04EU-W-485, UR35-L04EU-G-485, UR35-L04EU-P-485, UR35-L04EU-485
Model Difference:		Please refer to the DoS
Rated Input Voltage:		9-48Vdc from Adapter
Adapter Information:	**Model:**	2ABF060R
	Input:	100-240Vac 50/60Hz 1.7A
	Output:	48Vdc 1.25A
Serial Number:		XMDN220429-17582E-RF-S1(UR35-L04EU-G-P-W) XMDN220429-17582E-RF-S2(UR35-L04EU-G-P-W-485) XMDN220429-17582E-RF-S3(UR35-L04EU-P-W) XMDN220429-17582E-RF-S4(UR35-L04EU-G-W) XMDN220429-17582E-RF-S5(UR35-L04EU-W)
EUT Received Date:		2022.05.06
EUT Received Status:		Good

Objective

This report is prepared on behalf of ***Xiamen Milesight IoT Co., Ltd.*** in accordance with ETSI EN 301 489-1 V2.2.3 (2019-11) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility;

ETSI EN 301 489-17 V3.2.4 (2020-09) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems;

ETSI EN 301 489-19 V2.2.1 (2022-09) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications and GNSS receivers operating in the RNSS band providing positioning, navigation, and timing data; Harmonised Standard for ElectroMagnetic Compatibility;

ETSI EN 301 489-52 V1.2.1 (2021-11) ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment.

The objective is to determine the compliance of EUT with: ETSI EN 301 489-1 V2.2.3 (2019-11), ETSI EN 301 489-17 V3.2.4 (2020-09), ETSI EN 301 489-19 V2.2.1 (2022-09), ETSI EN 301 489-52 V1.2.1 (2021-11).

Test Methodology

All measurements contained in this report were conducted with ETSI EN 301 489-1 V2.2.3 (2019-11)ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for ElectroMagnetic Compatibility.

Declarations

BACL 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.

This report cannot be reproduced except in full, without prior written approval of the Company.

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.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk "★".

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

Test mode:
M1: Normal work with Wireless linking (UR35-L04EU-G-P-W)
M2: Normal work with Wireless linking (UR35-L04EU-G-P-W-485)

Where, the wireless linking test mode as following:
Test mode 1: EGPRS/GPRS transmitting (working and monitoring with CMW500)
Test mode 2: WCDMA transmitting (working and monitoring with CMW500)
Test mode 3: LTE transmitting (working and monitoring with CMW500)
Test mode 4: Wi-Fi Communication (working and monitoring with CMW500)
Test mode 5: GPS working (working with N5182B)
Test mode 6: Idle

Equipment Modifications

No modification was made to the EUT.

EUT Exercise Software

Software “LanTest.exe” was used during test.

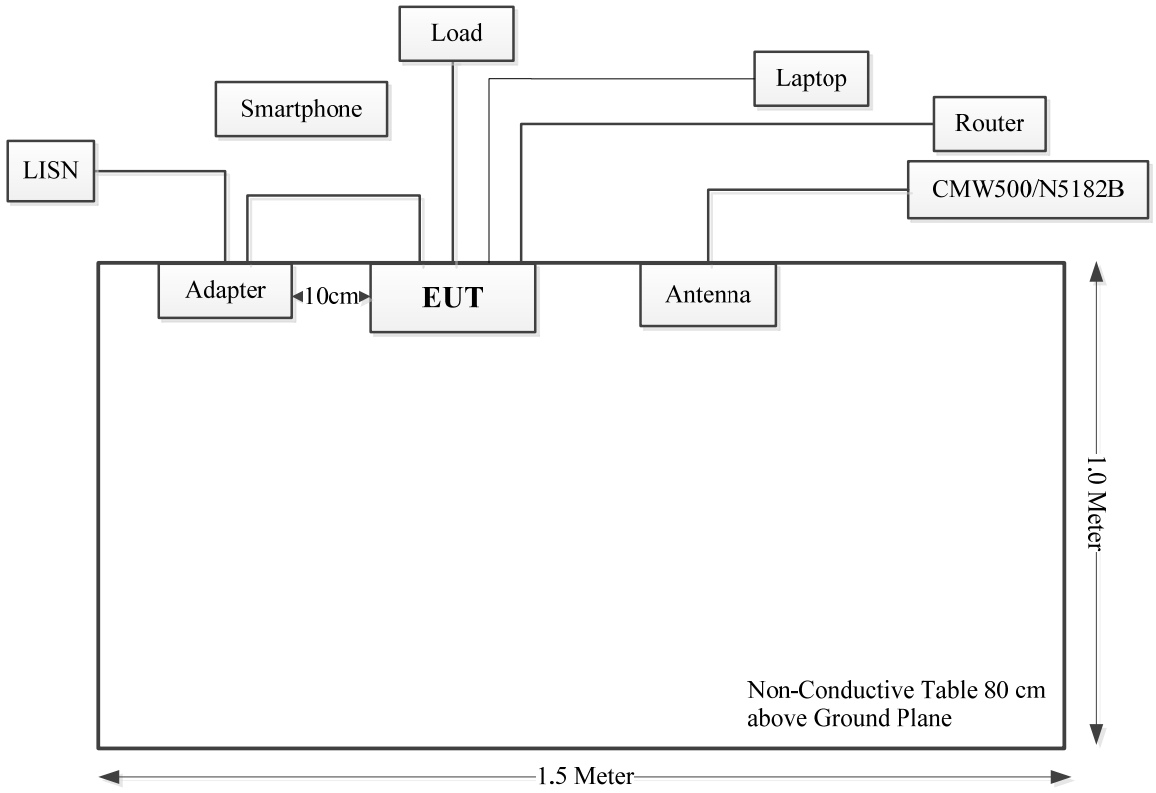
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Apple	Smartphone	A1524	FK1R96VYG5QT
ZIONCOM	Wireless Router	MB-R210-00	EMZBWR21103001
DELL	Laptop	E6410	GMLGPM1
R&S	Wideband Radio Communication Tester	CMW500	144976
Agilent	MXG Vector Signal Generator	N5182B	MY51350142
Bacl	RJ45 Load	RJ45X8	F-EM-PHRJ45X8002
VIETNAM PHIHONG	Adapter	AM24W-080B	XM25784ERFS4

Support Cable List and Details

Cable Description	Shielding Cable	Ferrite Core	Length (m)	From Port	To
DC Cable	No	No	1.5	Adapter	EUT
RJ45 Cable	Yes	No	10	EUT	Laptop/RJ45 Load/Router

Block Diagram of Test Setup



Test Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Conducted emission					
R&S	LISN	ENV 216	101614	2021-10-26	2022-10-25
TESEQ	ISN	T800	34379	2021-10-26	2022-10-25
R&S	EMI Test Receiver	ESCI	101121	2021-07-22	2022-07-21
MICRO-COAX	Coaxial Cable	C-NJNJ-50	C-0200-01	2021-09-05	2022-09-04
R&S	Test Software	EMC32	Version 9.10.00	N/A	N/A
Radiated emissions below 1GHz					
Sunol Sciences	Antenna	JB3	A060611-1	2020-11-10	2023-11-10
R&S	EMI Test Receiver	ESR3	102453	2021-10-26	2022-10-25
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2021-07-19	2022-07-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2021-07-19	2022-07-18
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2021-07-19	2022-07-18
Sonoma	Amplifier	310N	372193	2021-07-18	2022-07-17
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
Radiated emissions above 1GHz					
ETS-Lindgren	Horn Antenna	3115	000 527 35	2021-10-12	2024-10-11
Agilent	Spectrum Analyzer	E4440A	SG43360054	2021-07-22	2022-07-21
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2021-09-04	2022-09-03
AH	Preamplifier	PAM-0118	469	2021-10-13	2022-10-12
Farad	Test Software	EZ-EMC	V1.1.4.2	N/A	N/A
E-Microwave	Band-stop Filters	OBSF-2400-2483.5-S	OE01601525	2021-06-16	2022-06-15
Flicker & Harmonic					
EVERFINE	Harmonic & Flicker TEST ING Power Source	HFS-4000	P624486CD1411122	2022-06-20	2023-06-19
EVERFINE	Harmonic & Flicker Measurement System	HFM3000	P630850CD1411115	2022-06-20	2023-06-19
CS					
HP	Signal Generator	8648A	3246A00831	2021-09-11	2022-09-10
R&S	Power Amplifier	15A250	12934	N/A	N/A
Werlatone	Dual Directional Coupler	C5091-10	113192	2022-02-09	2023-02-08
HP	Power Meter	HP EPM-441A	GB37481494	2021-07-22	2022-07-21
Agilent	8482A Power sensor	8482A	US37296108	2021-07-22	2022-07-21
NARDA	Attenuator	769-6	2754	N/A	N/A
COM-POWER	CDN	M325E	521064	2021-07-22	2022-07-21
COM-POWER	CDN	T8E	581607	2021-07-22	2022-07-21
EFT & Surge & Dips					
EM TEST	Ultra Compact Generator	UCS 500N5	P1406130994	2021-07-22	2022-07-21
EM TEST	Autotransformer	MV2616	P1450144859	N/A	N/A
EM TEST	CDN	CNV508 S1	311137	2022-01-26	2023-01-25
EM TEST	EFT Clamp	N/A	300886	2021-07-22	2022-07-21
ESD					
HAEFELY	Electrostatic Discharge Simulator	ONYX	180786	2021-10-27	2022-10-26
RS					
AR	Antenna	ATL80M1G	0351400	N/A	N/A
AR	Antenna	ATT700M12G	0349410	N/A	N/A
HP	Signal Generator	8665B	3438a00584	2021-07-22	2022-07-21
AR	Power Amplifier	500W1000C	0353561	N/A	N/A
AR	Power Amplifier	60S1G6	0348711	N/A	N/A
PASTERNACK	Dual Directional Coupler	PE2239-30	1711	2021-07-15	2022-07-14
Agilent	EPM Series Power Meter	E4419B	MY45103907	2021-07-22	2022-07-21
Agilent	E-Series Avg Power Sensor	E9301A	MY41497625	2021-07-22	2022-07-21
Agilent	E-Series Avg Power Sensor	E9301A	MY41497628	2021-07-22	2022-07-21

* Statement of Traceability: Bay Area Compliance Laboratories Corp. (Dongguan) attests that all calibrations have been performed, traceable to National Primary Standards and International System of Units (SI).

Environmental Conditions

Test Item:	Conducted emission	Radiated emissions below 1GHz	Radiated emissions above 1GHz	EMS &Flicker
Temperature:	24.5°C	22.8°C	22.6°C	25.4~26.9 °C
Relative Humidity:	57%	32%	49%	55~58 %
ATM Pressure:	101.0kPa	100.0kPa	100.9kPa	100.8kPa
Tester:	April Wu	Leo Yuan	Bill Yang	Kuki Zhang
Test Date:	2022-05-18	2022-06-09	2022-05-17	2022-06-25

SUMMARY OF TEST RESULTS

SN	Rule and Clause	Description of Test	Test Result
1	EN 301 489 Clause 8.2	Enclosure of ancillary equipment measured on a stand alone basis	Compliant
2	EN 301 489 Clause 8.3	DC power input/output ports	Not applicable
3	EN 301 489 Clause 8.4	AC mains power input/output ports	Compliant
4	EN 301 489 Clause 8.5	Harmonic current emissions (AC mains input port)	Not applicable
5	EN 301 489 Clause 8.6	Voltage fluctuations and flicker (AC mains input port)	Compliant
6	EN 301 489 Clause 8.7	Wired network ports	Compliant
7	EN 301 489 Clause 9.2	Radio frequency electromagnetic fields (80 MHz to 6 000 MHz)	Compliant
8	EN 301 489 Clause 9.3	Electrostatic discharges	Compliant
9	EN 301 489 Clause 9.4	Fast transients, common mode	Compliant
10	EN 301 489 Clause 9.5	Radio frequency, common mode	Compliant
11	EN 301 489 Clause 9.6	Transients and surges in the vehicular environment	Not applicable
12	EN 301 489 Clause 9.7	Voltage dips and short interruptions	Compliant
13	EN 301 489 Clause 9.8	Surges	Compliant

Note:
Not Applicable: Please refer to Applicability overview tables in sections 7.1 and 7.2 of EN 301 489-1 requirements for Radio and ancillary equipment.

1 - ENCLOSURE OF ANCILLARY EQUIPMENT MEASURED ON A STAND ALONE BASIS

Measurement Uncertainty

Compliance or non- compliance with a disturbance limit shall be determined in the following manner:

If U_{lab} is less than or equal to U_{cispr} of Table 1, then:
-compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
-non - compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.
If U_{lab} is greater than U_{cispr} of Table 1, then:
-compliance is deemed to occur if no measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit;
-non - compliance is deemed to occur if any measured disturbance level, increased by ($U_{lab} - U_{cispr}$), exceeds the disturbance limit.

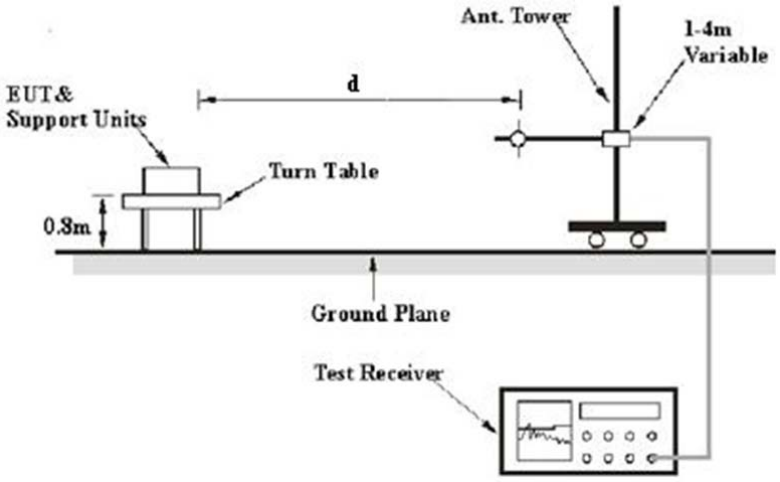
Based on CISPR 16-4-2: 2011, measurement uncertainty of radiated emission at a distance of 10m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.55 dB for Horizontal, 4.57 dB for Vertical; 200M~1GHz: 4.66 dB for Horizontal, 4.56 dB for Vertical; measurement uncertainty of radiated emission at a distance of 3m at Bay Area Compliance Laboratories Corp. (Dongguan) is:30M~200MHz: 4.58 dB for Horizontal, 4.59 dB for Vertical; 200M~1GHz: 4.83 dB for Horizontal, 5.85 dB for Vertical; 1G~6GHz: 4.45 dB, 6G~18GHz: 5.23 dB

Table 1 - Values of U_{cispr}

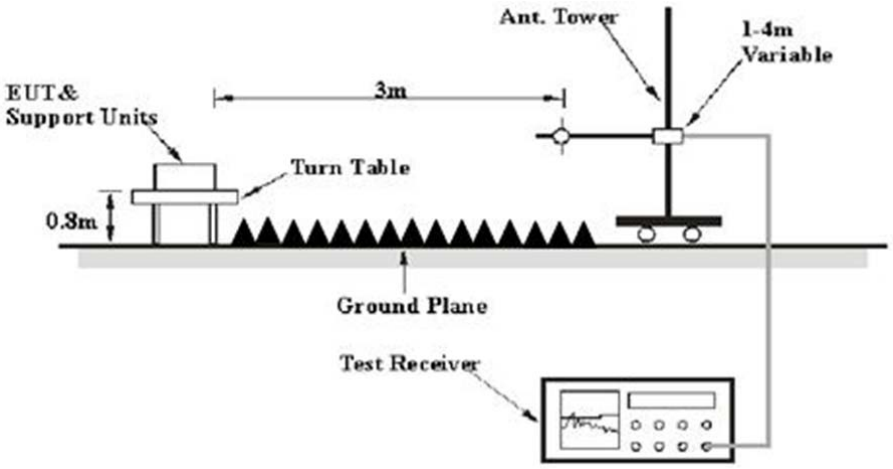
Measurement	U_{cispr}
Radiated disturbance (electric field strength at an OATS or in a SAC)(30 MHz to 1000 MHz)	6.3 dB
Radiated disturbance (electric field strength in a FAR)(1 GHz to 6 GHz)	5.2 dB
Radiated disturbance (electric field strength in a FAR)(6 GHz to 18 GHz)	5.5 dB

Test System Setup

Below 1GHz:



Above 1GHz:



The radiated emission tests below 1GHz were performed in 3 meters, above 1GHz were performed in the 3 meters. The specification used was EN 55032 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40cm long in the middle. The spacing between the peripherals was 10cm.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 6 GHz.

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

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz - 1000 MHz	120 kHz	300 kHz	120kHz	QP
Above 1 GHz	1MHz	3 MHz	/	Peak
	1MHz	10Hz	/	Average

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

Test Procedure

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

All data was recorded in the Quasi-peak detection mode from 30MHz to 1GHz, Peak and average detection mode above 1GHz.

Corrected Amplitude & Margin Calculation

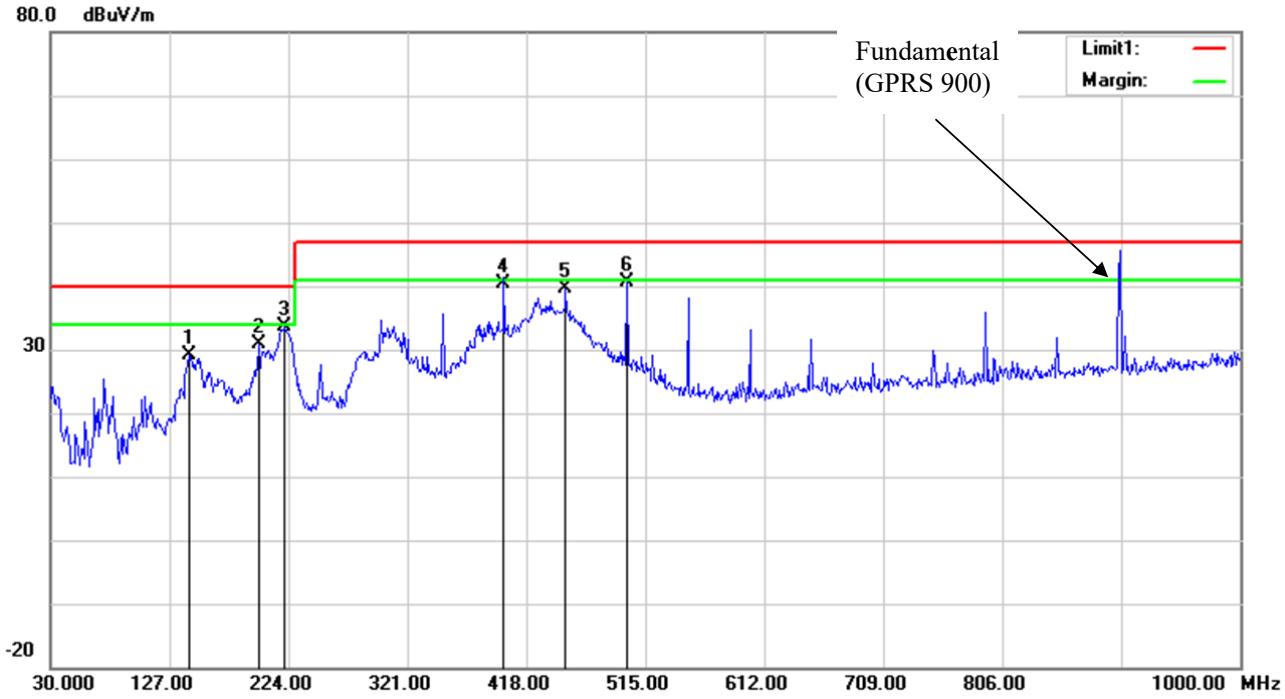
The basic equation is as follows: Result = Meter Reading+ Corrected
Note:
Corrected = Antenna Factor + Cable Loss - Amplifier Gain, or
Corrected = Antenna Factor + Cable Loss + Insertion loss of attenuator - Amplifier Gain
The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit-Result

Test Data

Scan with the two adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R), the worst case please refer to following table and plots:

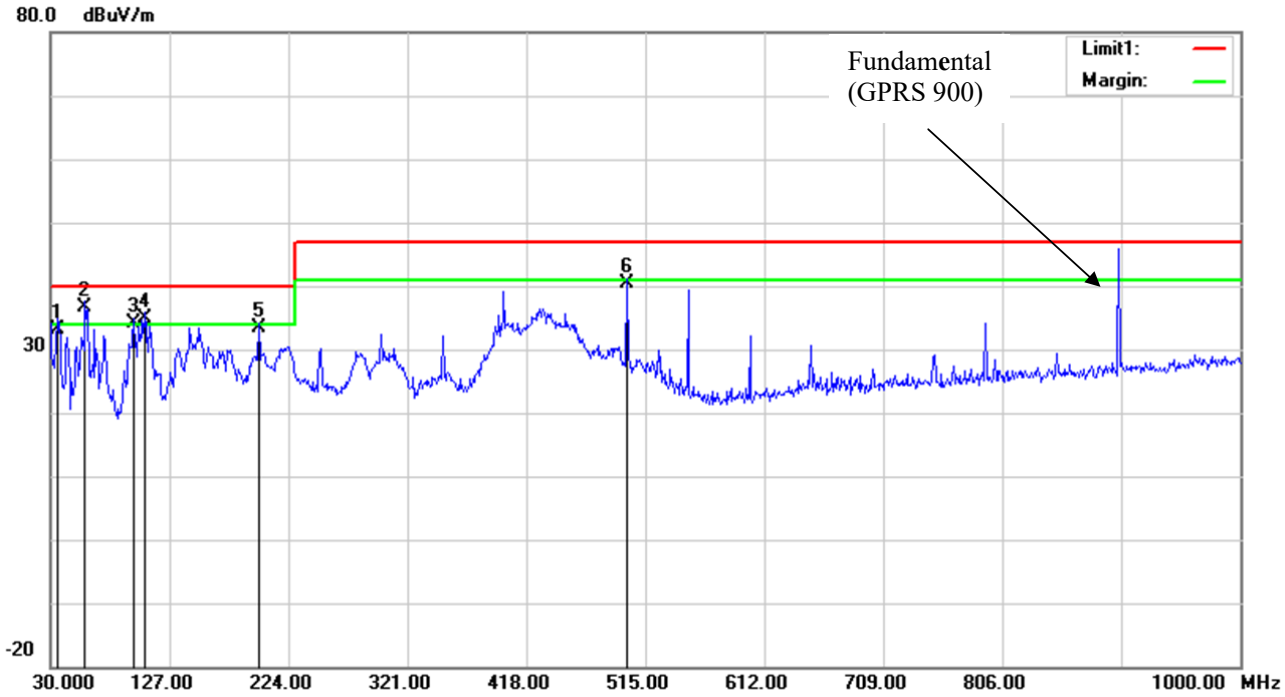
Below 1G

Condition:	EN 301 489 Class B 3m Radiation	**Polarization:**	Horizontal
Test Mode:	M1	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



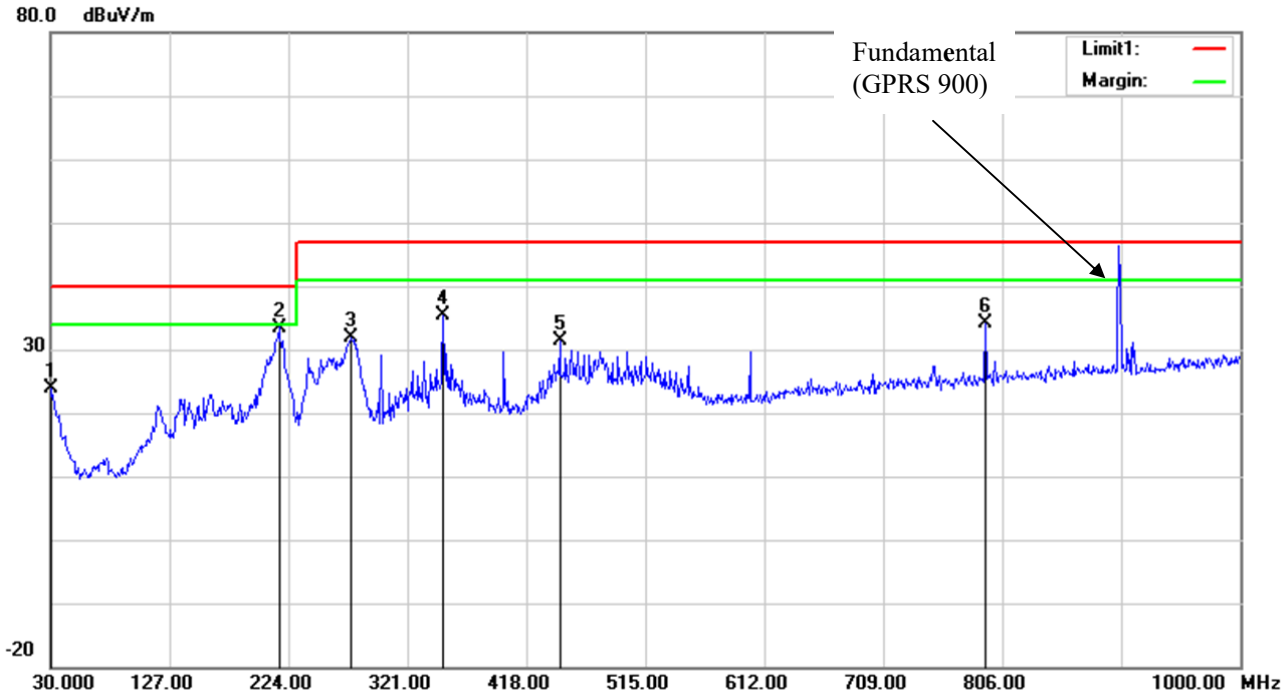
No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	142.5200	40.60	peak	-11.40	29.20	40.00	10.80
2	199.7500	42.99	peak	-12.00	30.99	40.00	9.01
3	221.0900	45.85	peak	-12.18	33.67	40.00	6.33
4	399.5700	48.66	QP	-8.20	40.46	47.00	6.54
5	450.0100	46.20	peak	-6.65	39.55	47.00	7.45
6	499.4800	46.14	peak	-5.52	40.62	47.00	6.38

Condition:	EN 301 489 Class B 3m Radiation	**Polarization:**	Vertical
Test Mode:	M1	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



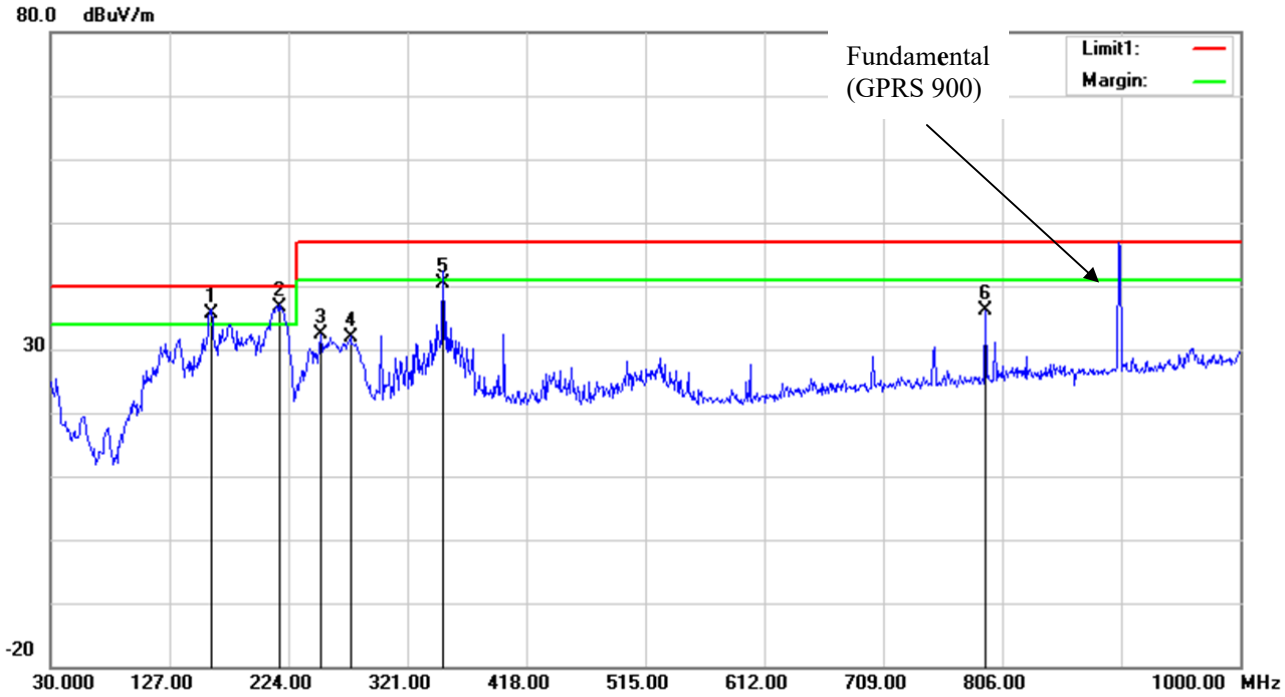
No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	35.8200	40.60	QP	-7.39	33.21	40.00	6.79
2	58.1300	53.65	QP	-16.92	36.73	40.00	3.27
3	97.9000	48.76	QP	-14.63	34.13	40.00	5.87
4	106.6300	47.33	QP	-12.48	34.85	40.00	5.15
5	199.7500	45.47	QP	-12.00	33.47	40.00	6.53
6	499.4800	45.89	QP	-5.52	40.37	47.00	6.63

Condition:	EN 301 489 Class B 3m Radiation	**Polarization:**	Horizontal
Test Mode:	M2	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBµV)		(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
1	30.0000	27.24	peak	-3.34	23.90	40.00	16.10
2	216.2400	45.64	peak	-12.14	33.50	40.00	6.50
3	274.4400	43.14	peak	-11.32	31.82	47.00	15.18
4	350.1000	44.96	peak	-9.52	35.44	47.00	11.56
5	445.1600	38.09	peak	-6.78	31.31	47.00	15.69
6	792.4200	35.52	peak	-1.36	34.16	47.00	12.84

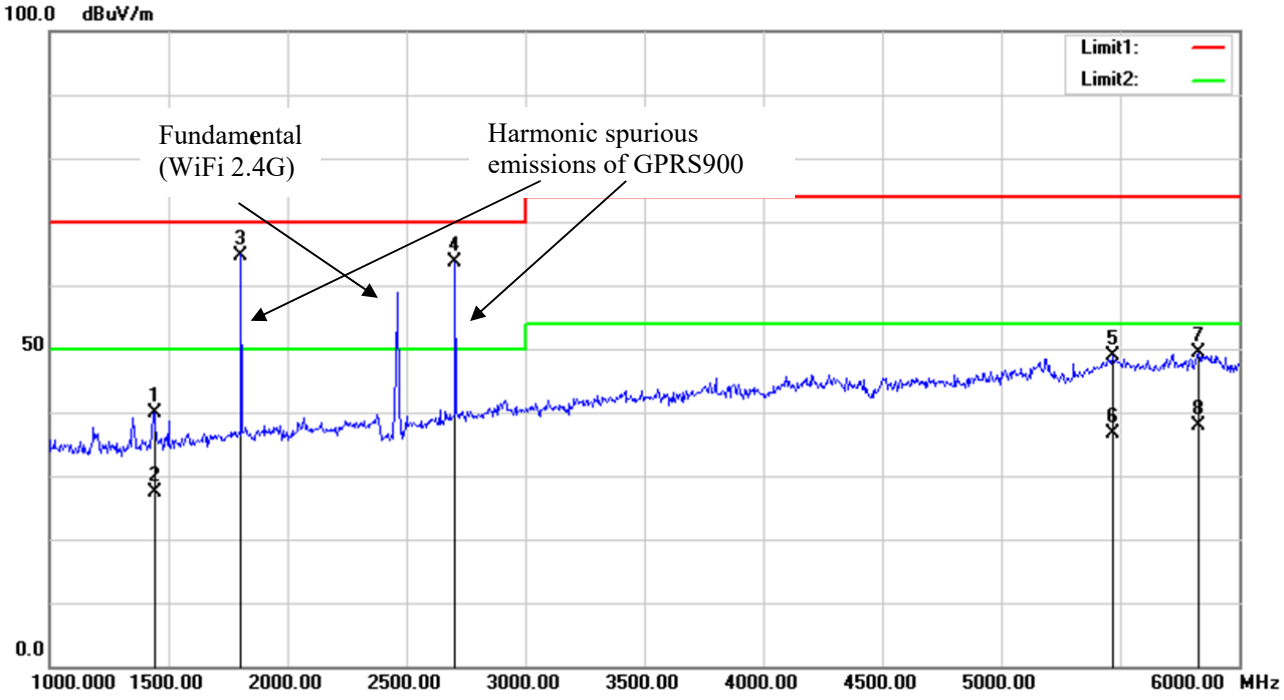
Condition:	EN 301 489 Class B 3m Radiation	**Polarization:**	Vertical
Test Mode:	M2	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	160.9500	47.85	QP	-12.26	35.59	40.00	4.41
2	216.2400	48.66	QP	-12.14	36.52	40.00	3.48
3	250.1900	44.68	peak	-12.23	32.45	47.00	14.55
4	274.4400	43.32	peak	-11.32	32.00	47.00	15.00
5	350.1000	49.78	QP	-9.52	40.26	47.00	6.74
6	792.4200	37.57	peak	-1.36	36.21	47.00	10.79

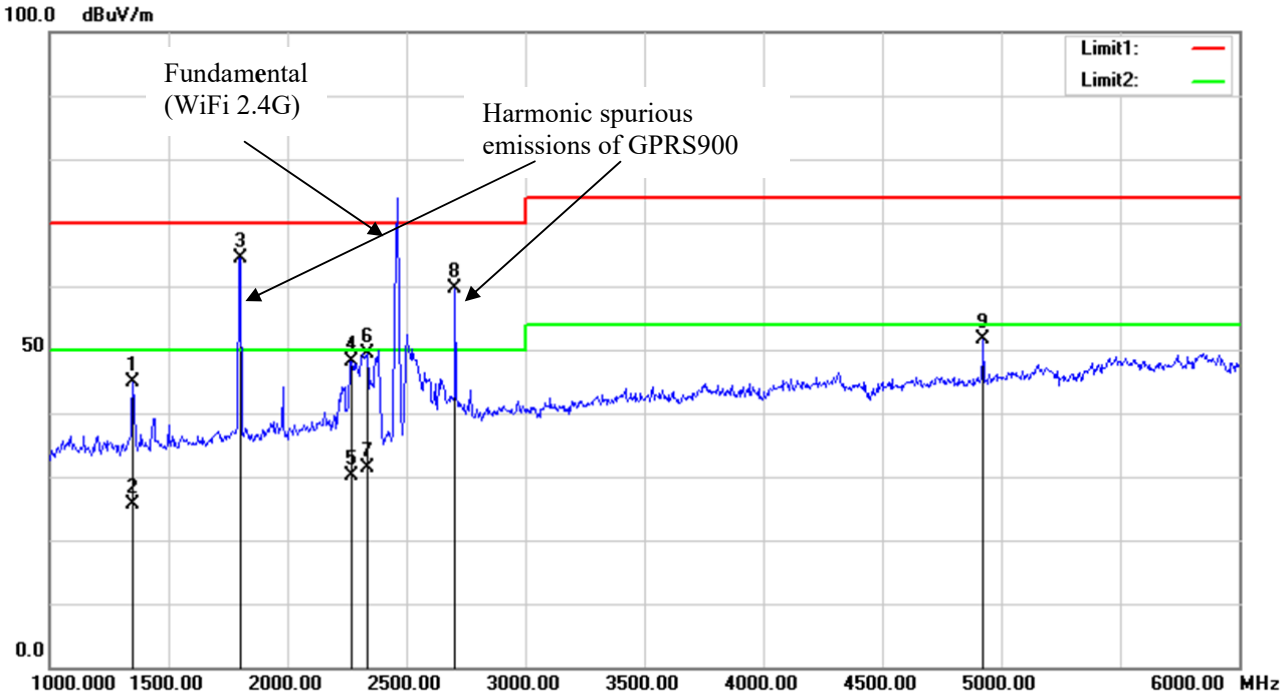
Above 1G

Condition:	EN 301 489 Class B	**Polarization:**	Horizontal
Test Mode:	M1	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



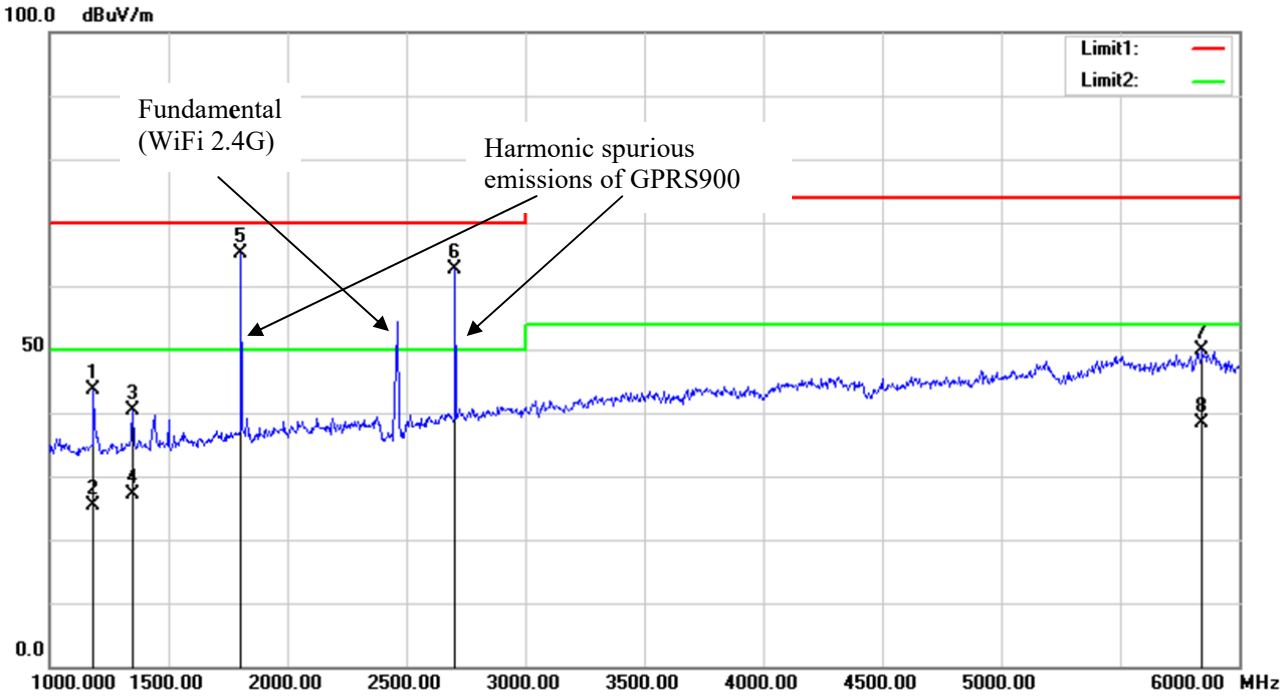
No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBµV)		(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
1	1440.000	53.08	peak	-13.13	39.95	70.00	30.05
2	1440.000	40.57	AVG	-13.13	27.44	50.00	22.56
5	5470.000	49.85	peak	-0.88	48.97	74.00	25.03
6	5470.000	37.54	AVG	-0.88	36.66	54.00	17.34
7	5830.000	49.41	peak	-0.07	49.34	74.00	24.66
8	5830.000	37.87	AVG	-0.07	37.80	54.00	16.20

Condition:	EN 301 489 Class B	**Polarization:**	Vertical
Test Mode:	M1	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



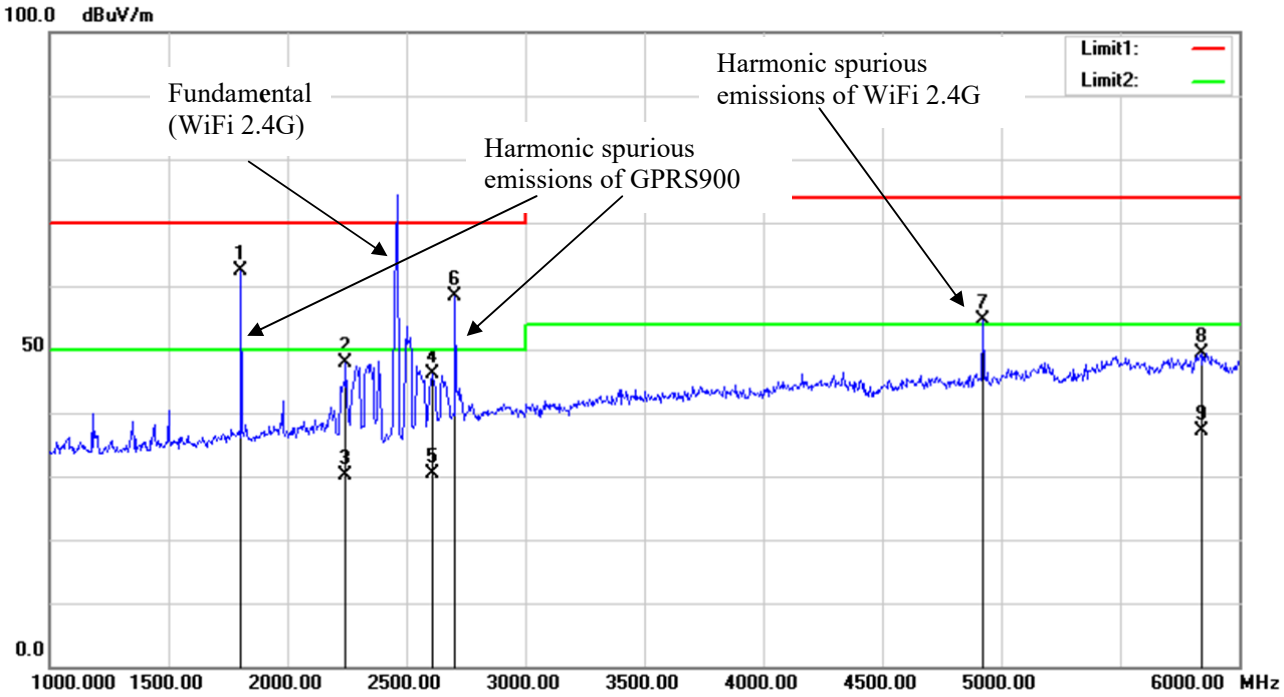
No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBµV)		(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
1	1350.000	58.49	peak	-13.55	44.94	70.00	25.06
2	1350.000	39.27	AVG	-13.55	25.72	50.00	24.28
4	2270.000	58.37	peak	-10.14	48.23	70.00	21.77
5	2270.000	40.25	AVG	-10.14	30.11	50.00	19.89
6	2335.000	59.29	peak	-9.87	49.42	70.00	20.58
7	2335.000	41.27	AVG	-9.87	31.40	50.00	18.60

Condition:	EN 301 489 Class B	**Polarization:**	Horizontal
Test Mode:	M2	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



No.	Frequency (MHz)	Reading (dBµV)	Detector	Corrected (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1	1187.500	57.74	peak	-14.20	43.54	70.00	26.46
2	1187.500	39.57	AVG	-14.20	25.37	50.00	24.63
3	1350.000	54.03	peak	-13.55	40.48	70.00	29.52
4	1350.000	40.57	AVG	-13.55	27.02	50.00	22.98
7	5845.000	49.80	peak	0.15	49.95	74.00	24.05
8	5845.000	38.17	AVG	0.15	38.32	54.00	15.68

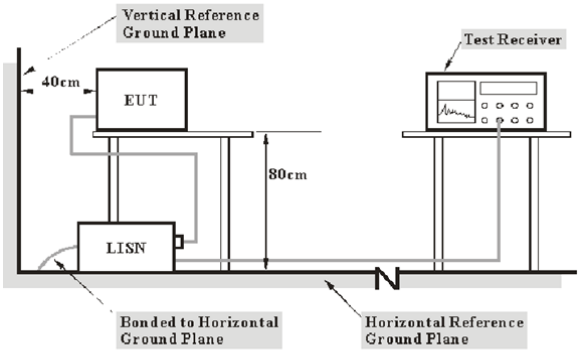
Condition:	EN 301 489 Class B	**Polarization:**	Vertical
Test Mode:	M2	**Distance:**	3m
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking Adapter: 2ABF060R(48Vdc)		



No.	Frequency	Reading	Detector	Corrected	Result	Limit	Margin
	(MHz)	(dBµV)		(dB/m)	(dBµV/m)	(dBµV/m)	(dB)
2	2247.500	58.16	peak	-10.16	48.00	70.00	22.00
3	2247.500	40.17	AVG	-10.16	30.01	50.00	19.99
4	2612.500	55.41	peak	-9.26	46.15	70.00	23.85
5	2612.500	39.67	AVG	-9.26	30.41	50.00	19.59
8	5842.500	49.34	peak	0.11	49.45	74.00	24.55
9	5842.500	37.00	AVG	0.11	37.11	54.00	16.89

3 - AC MAINS POWER INPUT/OUTPUT PORTS

Test System 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 EN 301 489-1 measurement procedures. The specification used was with the EN 301 489-1 limits.

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

The spacing between the peripherals was 10cm.

The adapter was connected to AC230V/50Hz power source.

EMI Test Receiver Setup

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

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

Test Procedure

During the conducted emissions test, the adapter was connected to the main 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.

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

Corrected Amplitude & Margin Calculation

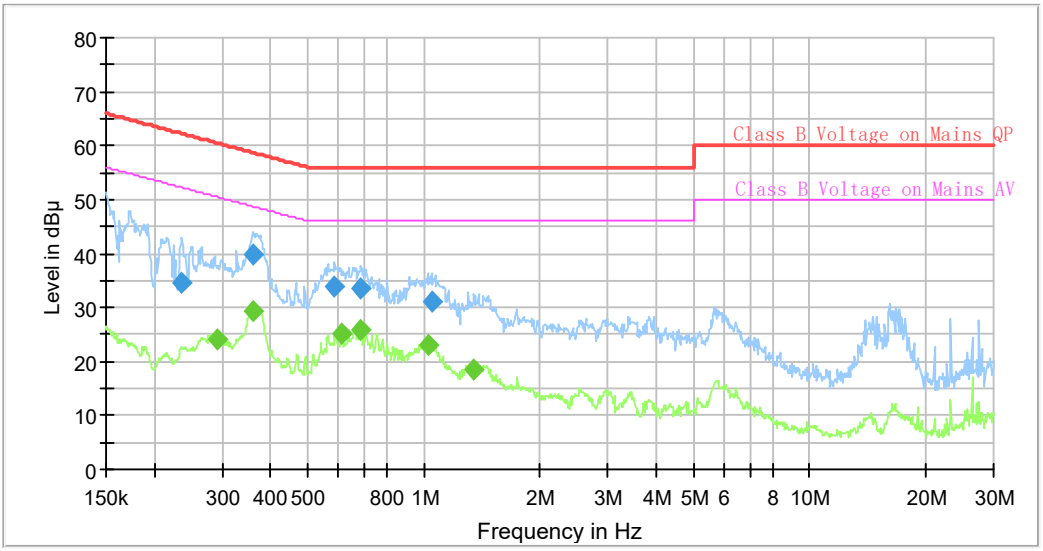
The basic equation is as follows: Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:
Corr. = Cable loss + Factor of coupling device
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit -Result

Test Data

Scan with the two adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R), the worst case please refer to following table and plots:

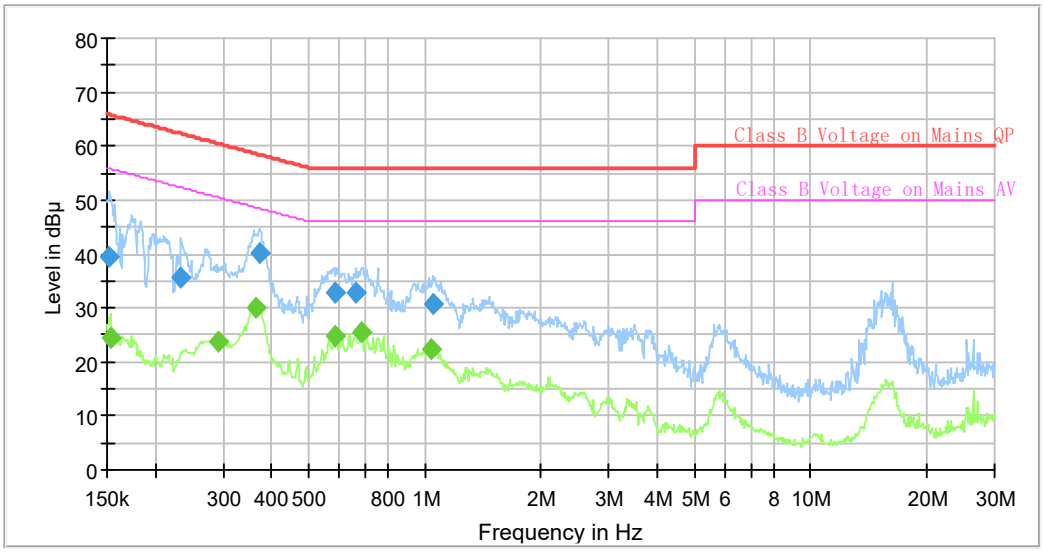
Port:	L
Test Mode:	M1
Power Source:	AC 230V/50Hz
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking(Adapter: 2ABF060R(48Vdc))



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.236158	34.51	---	62.23	27.72	9.000	L1	9.6
0.292647	---	24.08	50.45	26.37	9.000	L1	9.6
0.359048	---	29.51	48.75	19.24	9.000	L1	9.6
0.360843	40.00	---	58.71	18.71	9.000	L1	9.6
0.588291	33.99	---	56.00	22.01	9.000	L1	9.6
0.612239	---	25.08	46.00	20.92	9.000	L1	9.6
0.683241	---	25.87	46.00	20.13	9.000	L1	9.6
0.686657	33.56	---	56.00	22.44	9.000	L1	9.6
1.023352	---	23.13	46.00	22.87	9.000	L1	9.7
1.049193	31.08	---	56.00	24.92	9.000	L1	9.7
1.346351	---	18.37	46.00	27.63	9.000	L1	9.7

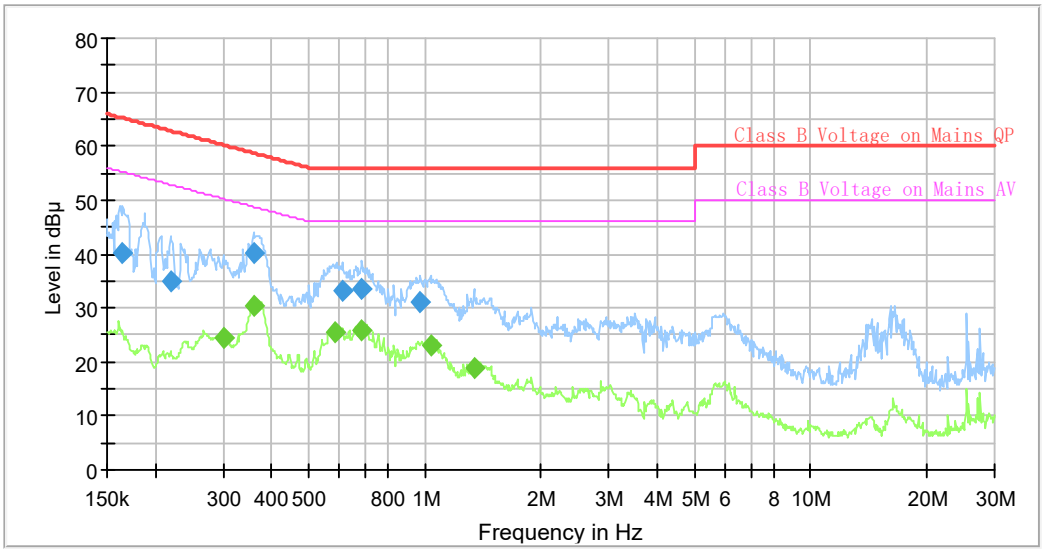
Port:	N
Test Mode:	M1
Power Source:	AC 230V/50Hz
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking(Adapter: 2ABF060R(48Vdc))



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.152261	39.62	---	65.88	26.26	9.000	N	9.6
0.153023	---	24.36	55.83	31.47	9.000	N	9.6
0.233814	35.57	---	62.31	26.74	9.000	N	9.6
0.289742	---	23.87	50.53	26.66	9.000	N	9.6
0.366283	---	30.00	48.58	18.58	9.000	N	9.6
0.371804	40.31	---	58.46	18.15	9.000	N	9.6
0.582452	32.82	---	56.00	23.18	9.000	N	9.6
0.588291	---	24.92	46.00	21.08	9.000	N	9.6
0.663098	32.96	---	56.00	23.04	9.000	N	9.6
0.683241	---	25.47	46.00	20.53	9.000	N	9.6
1.033611	---	22.22	46.00	23.78	9.000	N	9.6
1.049193	30.75	---	56.00	25.25	9.000	N	9.6

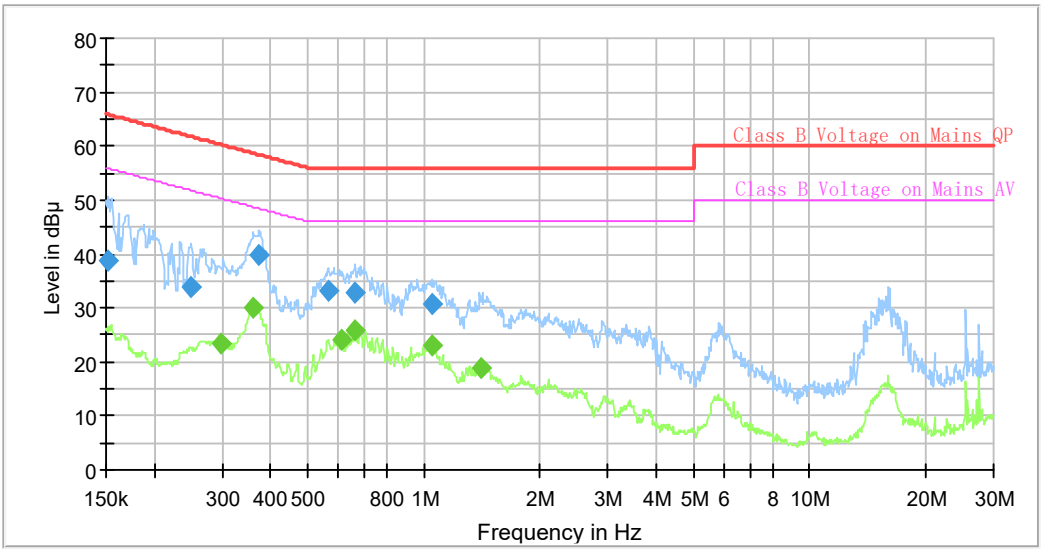
Port:	L
Test Mode:	M2
Power Source:	AC 230V/50Hz
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking(Adapter: 2ABF060R(48Vdc))



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.164910	40.03	---	65.21	25.18	9.000	L1	9.6
0.219135	35.08	---	62.85	27.77	9.000	L1	9.6
0.300036	---	24.43	50.24	25.81	9.000	L1	9.6
0.359048	---	30.41	48.75	18.34	9.000	L1	9.6
0.360843	40.01	---	58.71	18.70	9.000	L1	9.6
0.588291	---	25.63	46.00	20.37	9.000	L1	9.6
0.612239	33.08	---	56.00	22.92	9.000	L1	9.6
0.683241	---	25.86	46.00	20.14	9.000	L1	9.6
0.686657	33.58	---	56.00	22.42	9.000	L1	9.6
0.973564	31.20	---	56.00	24.80	9.000	L1	9.7
1.043973	---	23.15	46.00	22.85	9.000	L1	9.7
1.339653	---	18.76	46.00	27.24	9.000	L1	9.7

Port:	N
Test Mode:	M2
Power Source:	AC 230V/50Hz
Note:	WiFi linking&GPRS900 linking_Worst of Wireless linking(Adapter: 2ABF060R(48Vdc))

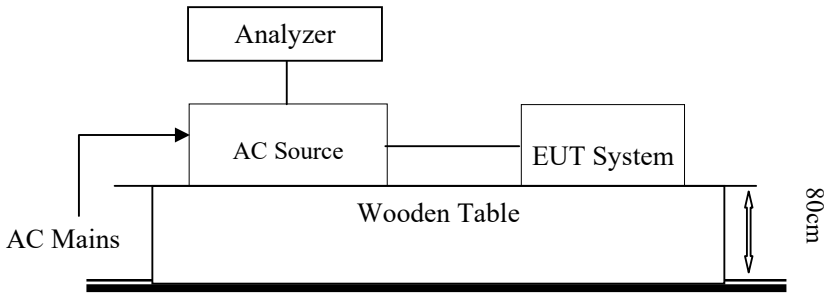


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.152261	38.69	---	65.88	27.19	9.000	N	9.6
0.249476	33.73	---	61.77	28.04	9.000	N	9.6
0.297058	---	23.39	50.32	26.93	9.000	N	9.6
0.360843	---	30.09	48.71	18.62	9.000	N	9.6
0.373663	39.96	---	58.42	18.46	9.000	N	9.6
0.565280	33.02	---	56.00	22.98	9.000	N	9.6
0.612239	---	24.21	46.00	21.79	9.000	N	9.6
0.659799	---	25.76	46.00	20.24	9.000	N	9.6
0.663098	32.99	---	56.00	23.01	9.000	N	9.6
1.049193	---	22.94	46.00	23.06	9.000	N	9.6
1.054439	30.62	---	56.00	25.38	9.000	N	9.6
1.408163	---	18.94	46.00	27.06	9.000	N	9.6

5 - VOLTAGE FLUCTUATIONS AND FLICKER (AC MAINS INPUT PORT)

Test System Setup



Test Standard

EN 61000-3-3:2013+A1:2019

Flicker Test Limits:

The limits shall be applicable to voltage fluctuations and flicker at the supply terminals of the equipment under test, measured or calculated according to clause 4 under test conditions described in clause 6 and annex A. Tests made to prove compliance with the limits are considered to be type tests.
The following limits apply:
- the value of Pst shall not be greater than 1,0;
- the value of Plt shall not be greater than 0,65;
- the value of d(t) during a voltage change shall not exceed 3,3 % for more than 500 ms;
- the relative steady-state voltage change, dc, shall not exceed 3,3 %;
- the maximum relative voltage change dmax, shall not exceed
a) 4 % without additional conditions;
b) 6 % for equipment which is:
– switched manually, or
- switched automatically more frequently than twice per day, and also has either adelayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.
Note: The cycling frequency will be further limited by the Pst and Plt limit. For example: a dmax of 6 % producing a rectangular voltage change characteristic twice per hour will give a Plt of about 0,65.
c) 7 % for equipment which is
- attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
- switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

In the case of equipment having several separately controlled circuits in accordance with 6.6,limits b) and c) shall apply only if there is delayed or manual restart after a power supply interruption; for all equipment with automatic switching which is energized immediately on restoration of supply after a power supply interruption, limits a) shall apply; for all equipment with manual switching, limits b) or c) shall apply depending on the rate of switching. Pst and Plt requirements shall not be applied to voltage changes caused by manual switching. The limits shall not be applied to voltage changes associated with emergency switching or emergency interruptions.

Test Data

Scan with the two adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R), the worst case please refer to following table and plots:

Short time (Pst):	10 min
Observation time:	120 min (12 Flicker measurement)
Test Mode:	M1-M2
Power Source:	AC 230V/50Hz
Test Result	PASS

Maximum Flicker results M1-WiFi linking&GPRS900 linking_Worst of Wireless linking (Adapter: 2ABF060R(48Vdc))

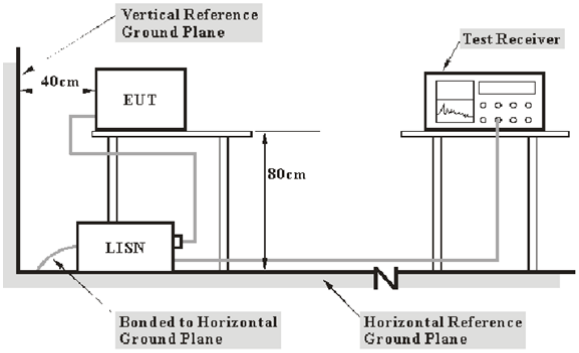
	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.005	3.30	PASS
dmax [%]	0.285	4.00	PASS
dt [s]	0.000	0.50	PASS

Maximum Flicker results M2-WiFi linking&GPRS900 linking_Worst of Wireless linking (Adapter: 2ABF060R(48Vdc))

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.005	3.30	PASS
dmax [%]	0.267	4.00	PASS
dt [s]	0.000	0.50	PASS

6 - WIRED NETWORK PORTS

Test System 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 EN 301 489-1 measurement procedures. The specification used was with the EN 301 489-1 limits.

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

The spacing between the peripherals was 10cm.

EMI Test Receiver Setup

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

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

Test Procedure

During the conducted emissions test, the adapter was connected to the main 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.

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

Corrected Amplitude & Margin Calculation

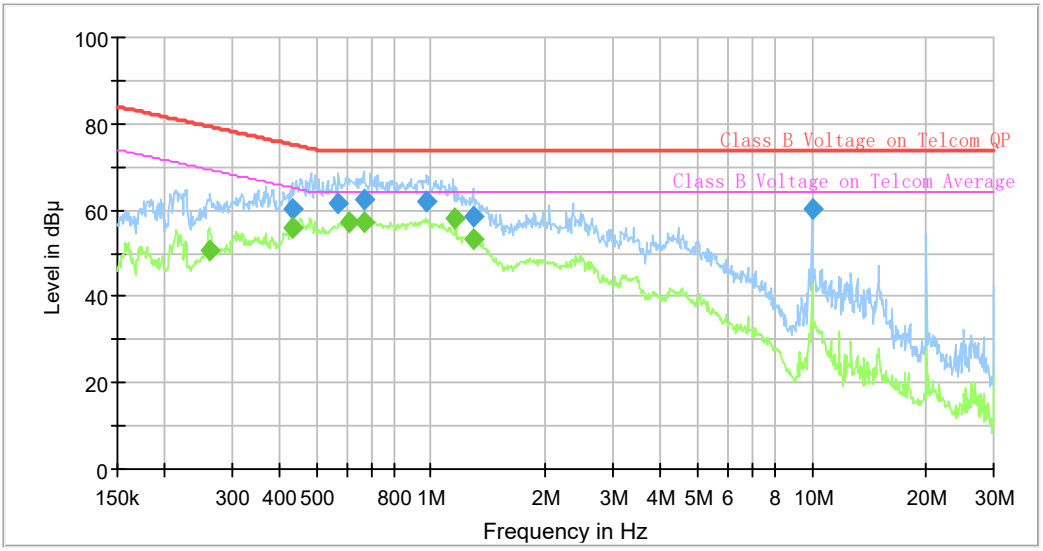
The basic equation is as follows: Result (QuasiPeak or Average) = Meter Reading + Corr.

Note:
Corr. = Cable loss + Factor of coupling device
The "**Margin**" column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows: Margin = Limit -Result

Test Data

Scan with the two adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R), the worst case please refer to following table and plots:

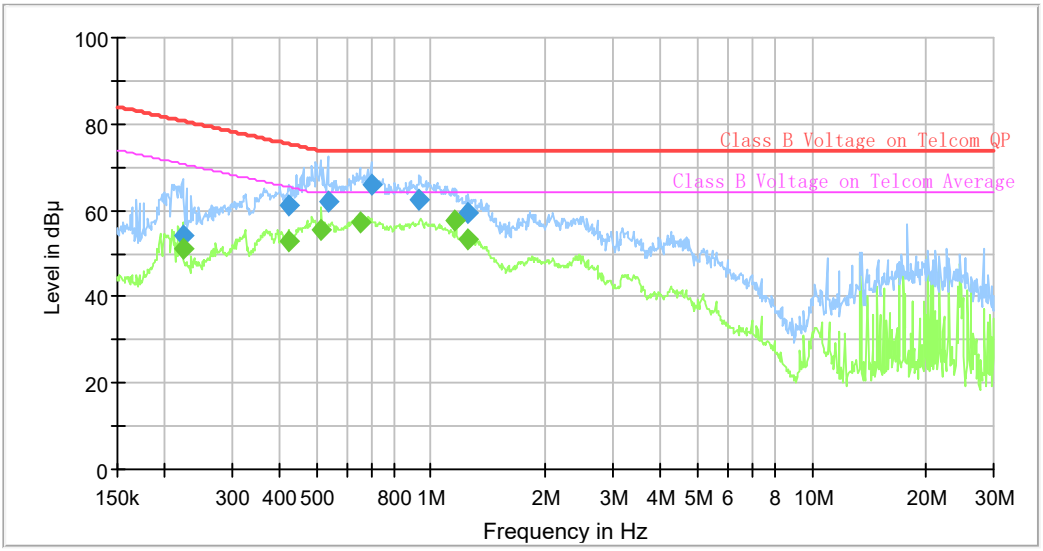
Port:	LAN
Test Mode:	10Mbps
Power Source:	AC 230V/50Hz
Note:	Adapter: 2ABF060R(48Vdc)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line
0.260930	---	50.70	69.40	18.70	9.000	Line 1
0.431814	---	55.77	65.22	9.45	9.000	Line 1
0.431814	60.33	---	75.22	14.89	9.000	Line 1
0.570947	61.67	---	74.00	12.33	9.000	Line 1
0.612239	---	57.14	64.00	6.86	9.000	Line 1
0.666413	62.34	---	74.00	11.66	9.000	Line 1
0.666413	---	57.08	64.00	6.92	9.000	Line 1
0.973564	62.17	---	74.00	11.83	9.000	Line 1
1.159249	---	57.97	64.00	6.03	9.000	Line 1
1.287253	58.70	---	74.00	15.30	9.000	Line 1
1.287253	---	53.11	64.00	10.89	9.000	Line 1
9.998049	60.05	---	74.00	13.95	9.000	Line 1

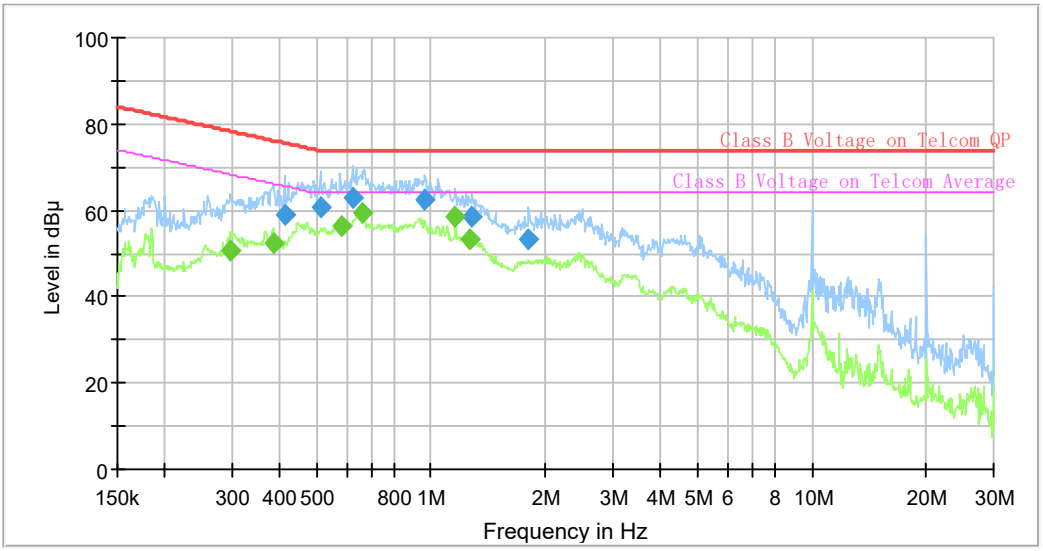
Port:	LAN
Test Mode:	100Mbps
Power Source:	AC 230V/50Hz
Note:	Adapter: 2ABF060R(48Vdc)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.222439	---	50.91	70.73	19.82	9.000	Line 1	10.0
0.222439	53.99	---	80.73	26.74	9.000	Line 1	10.0
0.423284	---	52.96	65.38	12.42	9.000	Line 1	9.8
0.425401	61.17	---	75.34	14.17	9.000	Line 1	9.8
0.514172	---	55.46	64.00	8.54	9.000	Line 1	9.8
0.535103	62.03	---	74.00	11.97	9.000	Line 1	9.8
0.650000	---	57.10	64.00	6.90	9.000	Line 1	9.8
0.697009	65.82	---	74.00	8.18	9.000	Line 1	9.7
0.930829	62.54	---	74.00	11.46	9.000	Line 1	9.7
1.159249	---	57.56	64.00	6.44	9.000	Line 1	9.7
1.255549	---	53.08	64.00	10.92	9.000	Line 1	9.7
1.255549	59.48	---	74.00	14.52	9.000	Line 1	9.7

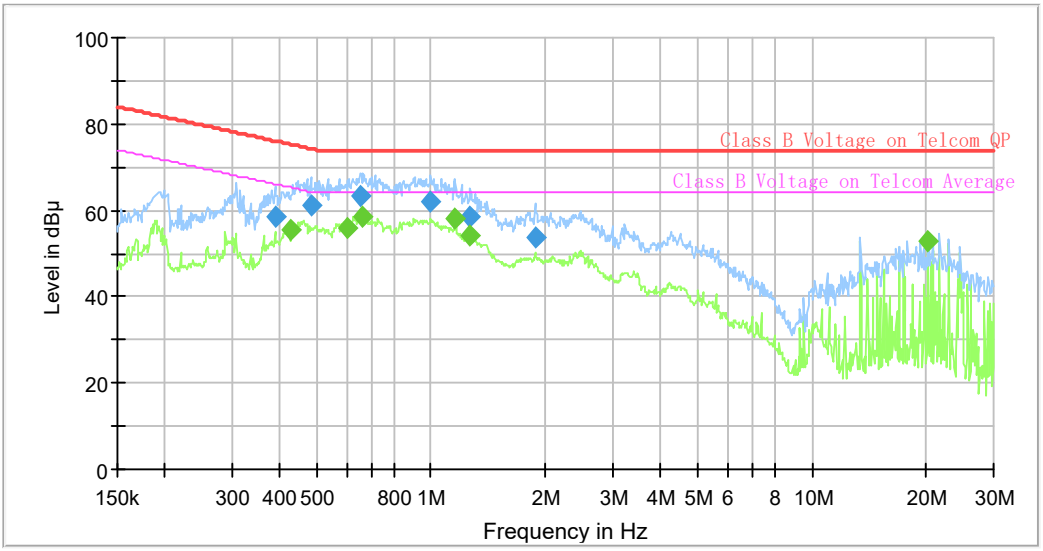
Port:	WAN
Test Mode:	10Mbps
Power Source:	AC 230V/50Hz
Note:	Adapter: 2ABF060R(48Vdc)



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.297058	---	50.69	68.32	17.63	9.000	Line 1	9.9
0.385014	---	52.33	66.17	13.84	9.000	Line 1	9.8
0.412859	58.80	---	75.59	16.79	9.000	Line 1	9.8
0.511614	60.79	---	74.00	13.21	9.000	Line 1	9.8
0.585364	---	56.35	64.00	7.65	9.000	Line 1	9.8
0.621468	62.74	---	74.00	11.26	9.000	Line 1	9.8
0.663098	---	59.51	64.00	4.49	9.000	Line 1	9.7
0.963901	62.24	---	74.00	11.76	9.000	Line 1	9.7
1.159249	---	58.72	64.00	5.28	9.000	Line 1	9.7
1.268136	---	53.34	64.00	10.66	9.000	Line 1	9.7
1.280849	58.31	---	74.00	15.69	9.000	Line 1	9.7
1.806991	53.28	---	74.00	20.72	9.000	Line 1	9.6

Port:	WAN
Test Mode:	100Mbps
Power Source:	AC 230V/50Hz
Note:	Adapter: 2ABF060R(48Vdc)

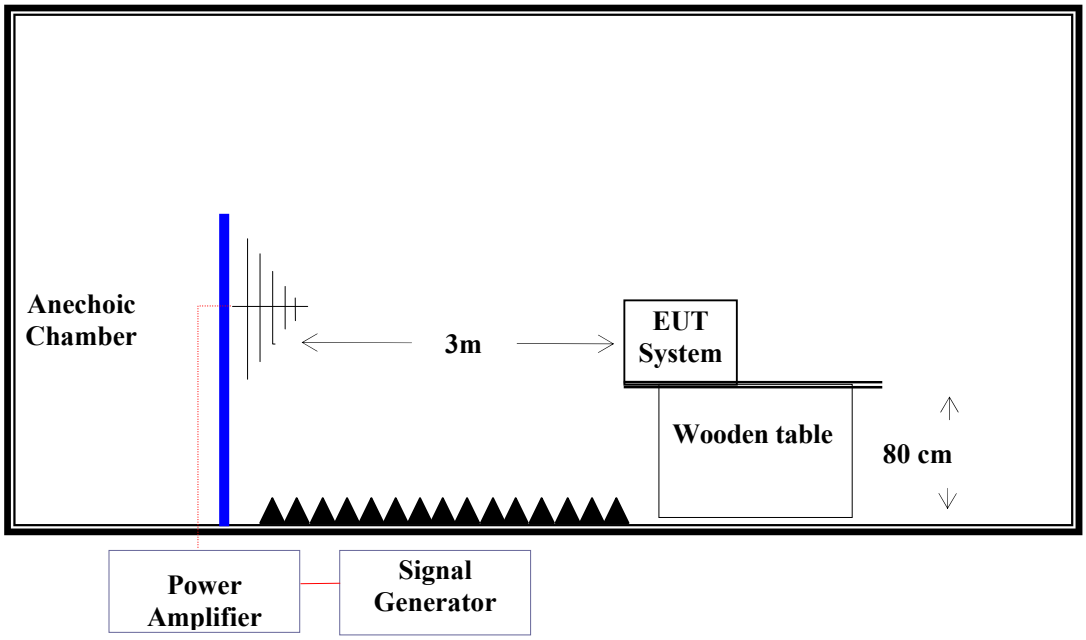


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.388874	58.34	---	76.09	17.75	9.000	Line 1	9.8
0.429665	---	55.57	65.26	9.69	9.000	Line 1	9.8
0.484301	60.97	---	74.26	13.29	9.000	Line 1	9.8
0.603146	---	56.00	64.00	8.00	9.000	Line 1	9.8
0.653250	63.17	---	74.00	10.83	9.000	Line 1	9.7
0.663098	---	58.65	64.00	5.35	9.000	Line 1	9.7
0.998148	61.83	---	74.00	12.17	9.000	Line 1	9.7
1.159249	---	58.08	64.00	5.92	9.000	Line 1	9.7
1.261826	---	54.05	64.00	9.95	9.000	Line 1	9.7
1.268136	58.35	---	74.00	15.65	9.000	Line 1	9.7
1.880549	53.57	---	74.00	20.43	9.000	Line 1	9.6
20.199004	---	53.03	64.00	10.97	9.000	Line 1	9.7

7 - RADIO FREQUENCY ELECTROMAGNETIC FIELDS (80 MHZ TO 6 000 MHZ)

Test System Setup



Test Level

Level	Field Strength V/m
1.	1
2.	3
3.	10
X.	Special

Performance Criterion: A

General Performance Criteria:

A. The apparatus shall continue to operate as intended during and after the test. The manufacturer specifies some minimum performance level. The performance level may be specified by the manufacture as a permissible loss of performance.

B. The apparatus shall continue to operate as intended after the test. This indicates that the EUT does not need to function at normal performance levels during the test, but must recover. Again some minimal performance is defined by the manufacture. No change in operating state or loss or data is permitted.

C. Temporary loss of function is allowed. Operation of the EUT may stop as long as it is either automatically reset or can be manually restored by operation of the controls.

D. The apparatus is broken, cannot be normal operated.

Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above the ground. The EUT is set 3 meters away from the antenna which is mounted on an antenna tower. Both horizontal and vertical polarizations of the antenna are set on test. Each of the four sides of EUT must be faced this antenna and measured individually.

In order to judge the EUT performance, a CCD camera, spectrum, Smartphone and CMW500 were used to monitor the EUT.

Test Data

Please refer to following tables:

Test Mode: **M1,M2**
Note: *Adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R)*

Condition of Test	Remarks
Field Strength	3 V/m (Test Level 2)
RF Signal	1 kHz, 80% AM, sine wave
Sweep Frequency Step	1%, logarithmic
Dwell Time	1 Sec

Test Mode: GPRS/EGPRS communication (working and monitoring with CMW500)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained.

Test Mode: WCDMA communication (working and monitoring with CMW500)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, During and after the test, the apparatus continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level.

Test Mode: HSPA communication (working and monitoring with CMU200)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. UTRA, if the BER (as referred in ETSI TS 134 109) is used, it shall not exceed 0,001 during the test sequence; if the BLER (as referred in ETSI TS 134 109) is used, it shall not exceed 0,01 during the test sequence. The BLER calculation shall be based on evaluating the CRC on each transport block.

Test Mode: LTE communication (working and monitoring with CMW500)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, In the data transfer mode, the performance criteria shall be that the throughput shall be ≥ 95 % of the maximum throughput of the reference measurement channel as specified in annex C in TS 136 101 with parameters specified in tables 7.3.1-1 and 7.3.1-2 in TS 136 101 during the test sequence.

Test Mode: WIFI link (working and monitoring with CMW500)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, during test, operate as intended no loss of function, no degradation of performance, no unintentional transmissions and after test, no degradation of performance, no loss of function, no loss of stored data or user programmable functions.

Test Mode: GPS receiving (working with N5182B and monitoring with CCD camera and FSU26)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, during test, operate as intended no loss function, and after test, operate as intended.

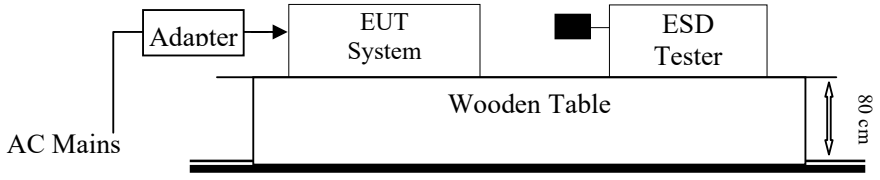
Test Mode: Idle (monitoring with FSU26)

Frequency Range (MHz)	Front Side (3V/m)		Rear Side (3V/m)		Left Side (3V/m)		Right Side (3V/m)	
	VERT	HORI	VERT	HORI	VERT	HORI	VERT	HORI
80-1000	A	A	A	A	A	A	A	A
1000-6000	A	A	A	A	A	A	A	A

Note: "A" stand for, during test, it shall not unintentionally operate.

8 - ELECTROSTATIC DISCHARGES

Test System Setup



Remark: ■ is the tip of the electrode

EN61000-4-2 specifies that a tabletop EUT shall be placed on a non-conducting table which is 80 centimeters above a ground reference plane and that floor mounted equipment shall be placed on a insulating support approximately 10 centimeters above a ground plane. During the tests, the EUT is positioned over a ground reference plane in conformance with this requirement.

For tabletop equipment, a 1.6 by 0.8-meter metal sheet (HCP) is placed on the table and connected to the ground plane via a metal strap with two 470 k Ohms resistors in series. The EUT and attached cables are isolated from this metal sheet by *0.5-millimeter* thick insulating material. A Vertical Coupling Plane (VCP) grounded on the ground plane through the same configuration as in the HCP is used.

Test Level

Level	Test Voltage Contact Discharge (±kV)	Test Voltage Air Discharge (±kV)
1.	2	2
2.	4	4
3.	6	8
4.	8	15
X.	Special	Special

Test Level 3 for Air Discharge at ±8 kV
Test Level 2 for Direct Discharge at ±4 kV

Performance criterion: B

Test Procedure

Air Discharge:

This test is done on a non-conductive surface. The round discharge tip of the discharge electrode shall be approached as fast as possible to touch the EUT. After each discharge, the discharge electrode shall be removed from the EUT. The generator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed.

Contact Discharge:

All the procedure shall be same as Section 8.3.1 of EN 61000-4-2, except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

Indirect discharge for horizontal coupling plane

At least 50 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

Indirect discharge for vertical coupling plane

At least 50 single discharges shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

Test Data

Please refer to following tables:

Test Mode: **M1, M2**
Note: *Adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R)*

Table 1: Electrostatic Discharge Immunity (Air Discharge)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-8 kV	+8 kV	-15 kV	+15 kV
Non-metallic Shell	A	A	A	A	A	A	/	/
RJ45 Port	A	A	A	A	A	A	/	/
DC Port	A	A	A	A	A	A	/	/
Adapter	A	A	A	A	A	A	/	/
AC Port	A	A	A	A	A	A	/	/
Seam	A	A	A	A	A	A	/	/

Table 2: Electrostatic Discharge Immunity (Direct Contact)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Metal shell	A	A	A	A	/	/	/	/
antenna	A	A	A	A	/	/	/	/

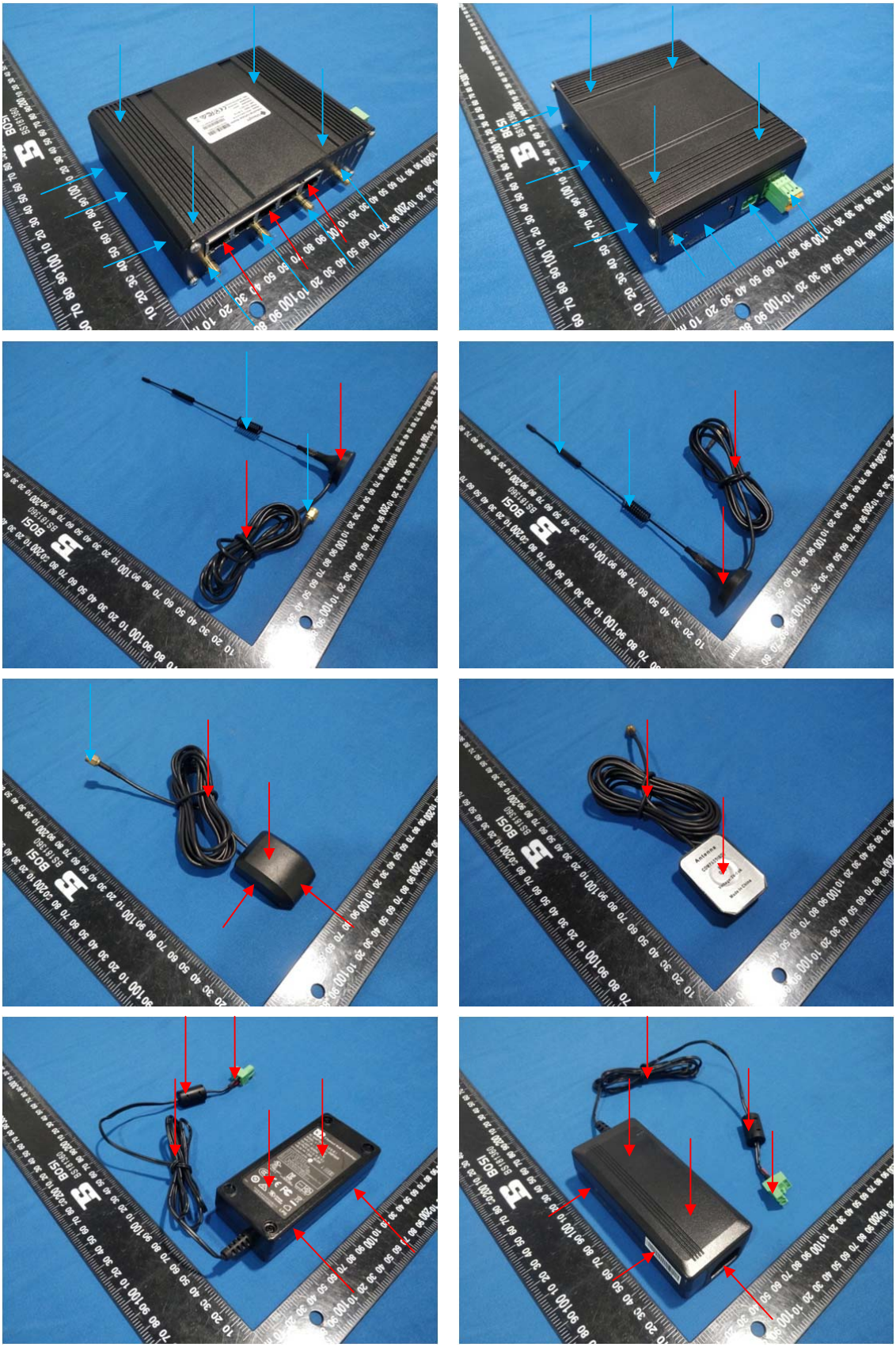
Table 3: Electrostatic Discharge Immunity (Indirect Contact HCP)

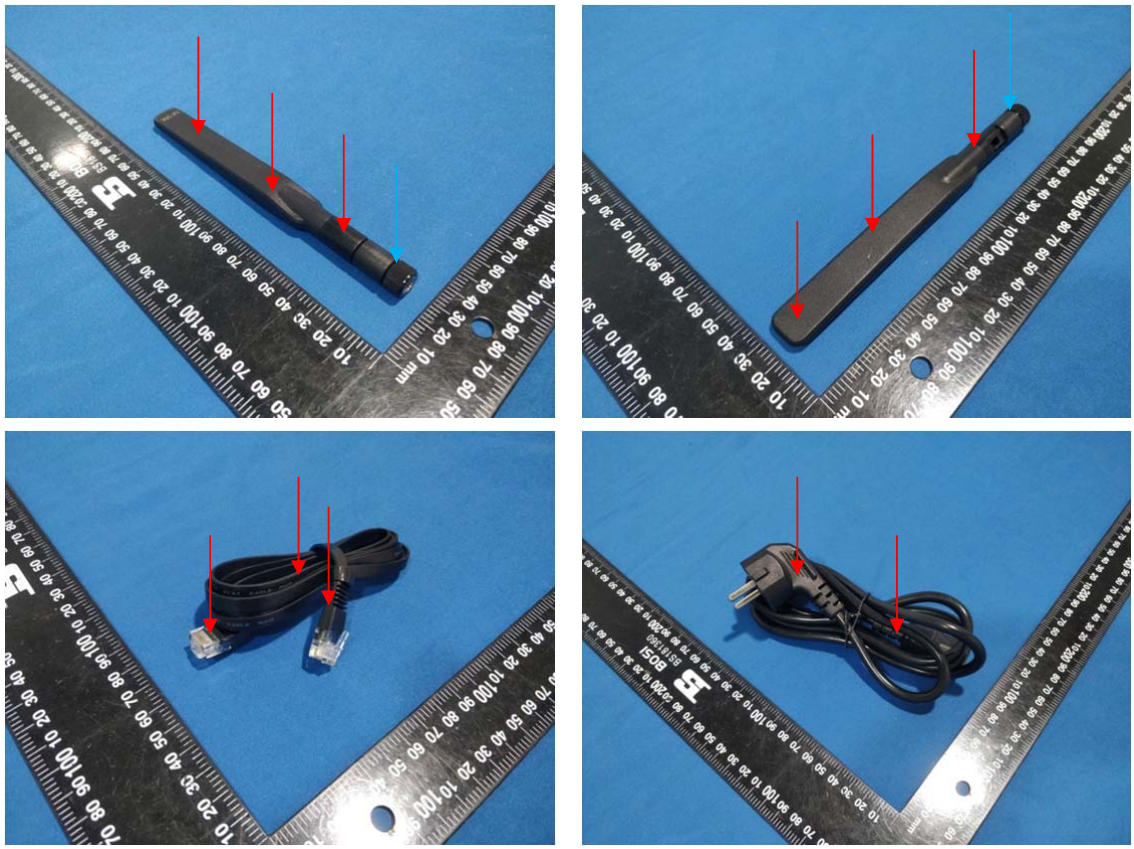
Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

Table 4: Electrostatic Discharge Immunity (Indirect Contact VCP)

Test Points Location	Test Level							
	-2 kV	+2 kV	-4 kV	+4 kV	-6 kV	+6 kV	-8 kV	+8 kV
Front Side	A	A	A	A	/	/	/	/
Back Side	A	A	A	A	/	/	/	/
Left Side	A	A	A	A	/	/	/	/
Right Side	A	A	A	A	/	/	/	/

ESD Location Photo

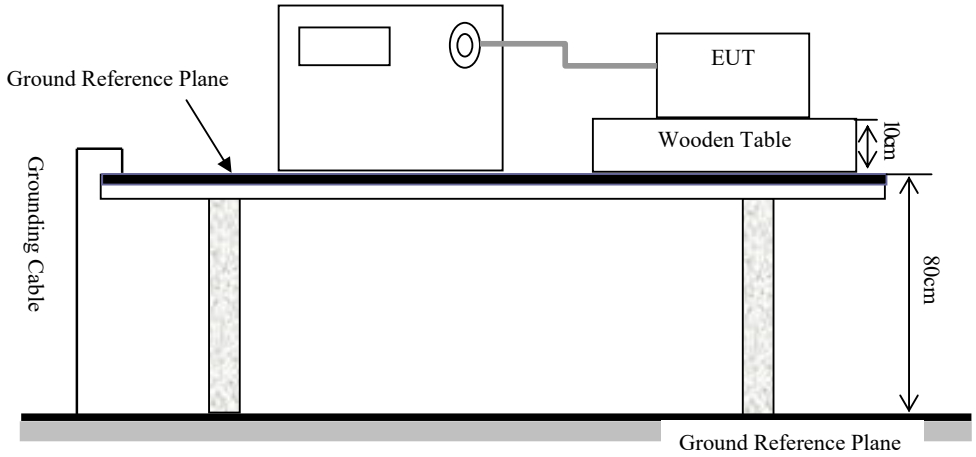




Air Discharge: → Direct Contact: →

9 - FAST TRANSIENTS, COMMON MODE

Test System Setup



Test Level

Open Circuit Output Test Voltage ±10%		
Level	**On Power Supply Lines**	**On I/O (Input/Output) Signal data and control lines**
1	0.5 kV	0.25 kV
2	1 kV	0.5 kV
3	2 kV	1 kV
4	4 kV	2 kV
X	Special	Special

Performance Criterion: B

Test Procedure

The EUT was arranged for Power Line Coupling and for I/O Line Coupling through a capacitive clamp, where applicable. (Note: The I/O coupling test using a capacitive clamp is performed on the I/O interface cables that are longer in length than 3 meters.) A metal ground plane 2.4 meter by 2.0 meter was placed between the floor and the table and is connected to the earth by a 2.0 meter ground rod. The ground rod is connected to the test facility's electrical earth.

Test Data

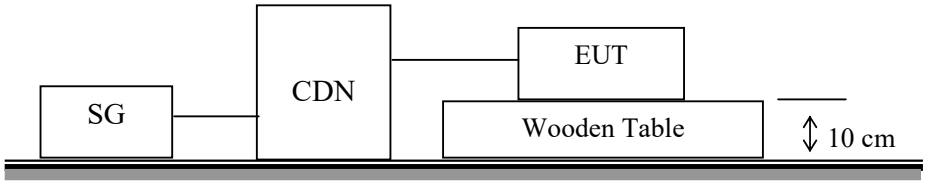
Please refer to following tables:

Test Mode: **M1, M2**
Note: *Adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R)*

Test Points		Test Level (kV)							
		+0.5	-0.5	+1.0	-1.0	+2.0	-2.0	+4.0	-4.0
AC mains power input ports	L	A	A	A	A	/	/	/	/
	N	A	A	A	A	/	/	/	/
	Earth	A	A	A	A	/	/	/	/
	L+N	A	A	A	A	/	/	/	/
	L + Earth	A	A	A	A	/	/	/	/
	N + Earth	A	A	A	A	/	/	/	/
	L+N+Earth	A	A	A	A	/	/	/	/
Signal ports	RJ45	A	A	/	/	/	/	/	/

10 - RADIO FREQUENCY, COMMON MODE

Test System Setup



Test Level

Level	Voltage Level (r.m.s.) (U_0)
1	1
2	3
3	10
X	Special

Performance Criterion: A

Test Procedure

1)Let the EUT work in test mode and test it.
2)The EUT are placed on an insulating support 0.1 m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3 m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible).
3)The disturbance signal described below is injected to EUT through CDN.
4)The EUT operates within its operational mode(s) under intended climatic conditions after power on.
5)The frequency range is swept from 150 kHz to 80 MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1 kHz sine wave.
6) Where the frequency is swept incrementally, the step size shall not exceed 1 % of the preceding frequency value. The dwell time of the amplitude modulated carrier at each frequency shall not be less than the time necessary for the EUT to be exercised and to respond, but shall in no case be less than 0.5 s.
7) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

Test Data

Please refer to following tables:

Test Mode: **M1, M2**
Note: *Adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R)*

Table 1: _____AC___ mains power input port
Frequency range: ___150____kHz to___80____MHz
■Modulated: Amplitude 80%, 1kHz sine wave □ Unmodulated □ Other:
Severity Level: __3____ V Unmodulated , r.m.s

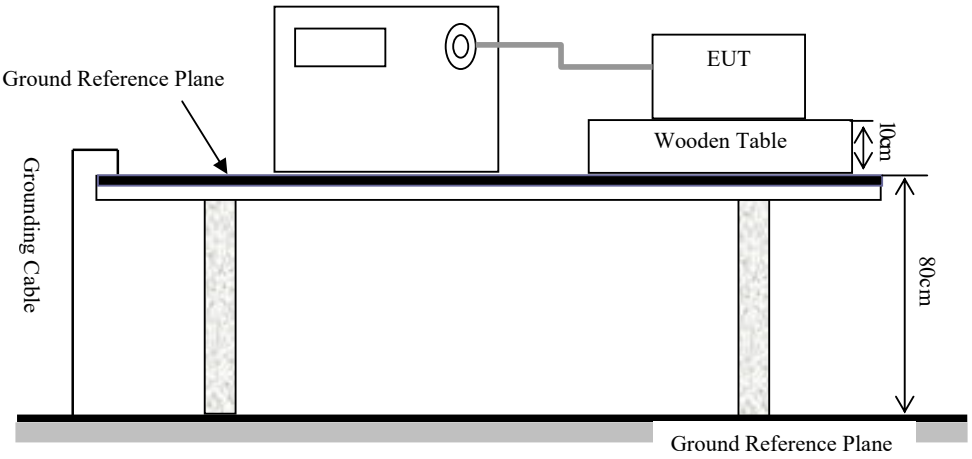
Level	Voltage Level (e.m.f.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

Table 2: Signal Port : ___RJ45___
Frequency range: ___150____ kHz to___80____MHz
■Modulated: Amplitude 80%, 1kHz sine wave □Unmodulated □ Other:
Severity Level: __3____ V Unmodulated , r.m.s

Level	Voltage Level (e.m.f.) U_0	Pass	Fail
1	1	/	/
2	3	A	/
3	10	/	/
X	Special	/	/

12 - VOLTAGE DIPS AND SHORT INTERRUPTIONS

Test System Setup



Test Level and Performance Criterion

Test Level	Voltage dip and short interruptions (%) Residual	Duration (in period)	Performance criterion
1	0	0.5	B
2	0	1	B
3	70	25	C
4	0	250	C

Test Procedure

1) The interruption is introduced at selected phase angles with specified duration.
2) Record any degradation of performance.

Test Data

Please refer to following tables:

Test Mode: **M1, M2 (Adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R))**

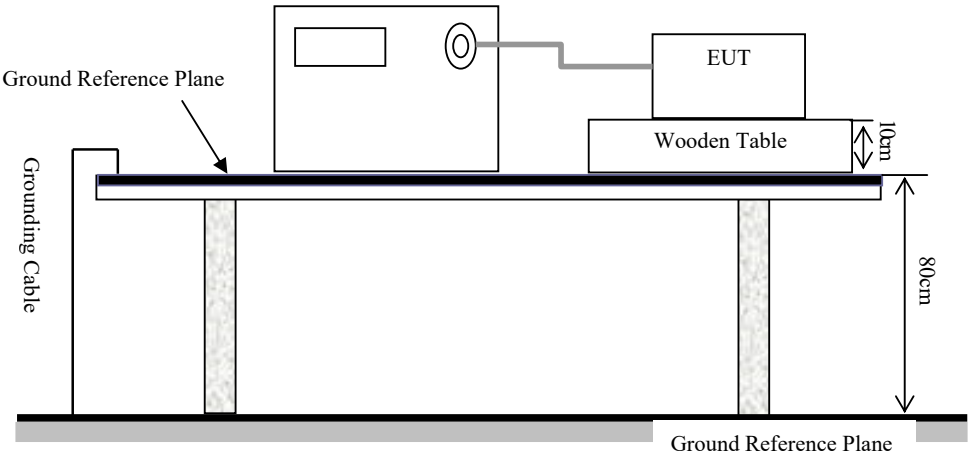
Note: C indicates that the power supply of the EUT was interrupted during the test, and the EUT was restarted. After the test, it can return to normal use manually.

Table 1: Voltage Dips/Interruptions Test

U2 (% Reduction)	Td (Periods)	Phase Angle	N	Result
100	0.5	0/90/180/270	3	A
100	1	0/90/180/270	3	A
30	25	0/90/180/270	3	A
100	250	0/90/180/270	3	C

13 - SURGES

Test System Setup



Test Level

Level	Open Circuit Output Test Voltage ±10%
1	0.5 kV
2	1 kV
3	2 kV
4	4 kV
X	Special

Performance Criterion: B

Test Procedure

1) For line to line coupling mode, provide a 0.5 kV 1.2/50us voltage surge (at open-circuit condition).
2) At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
3) Different phase angles are done individually.
4) Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

Test Data

Please refer to following tables:

Test Mode: **M1, M2**
Note: *Adapter 9Vdc(AM24W-080B) and 48Vdc(2ABF060R)*

Table 1: AC mains power input port

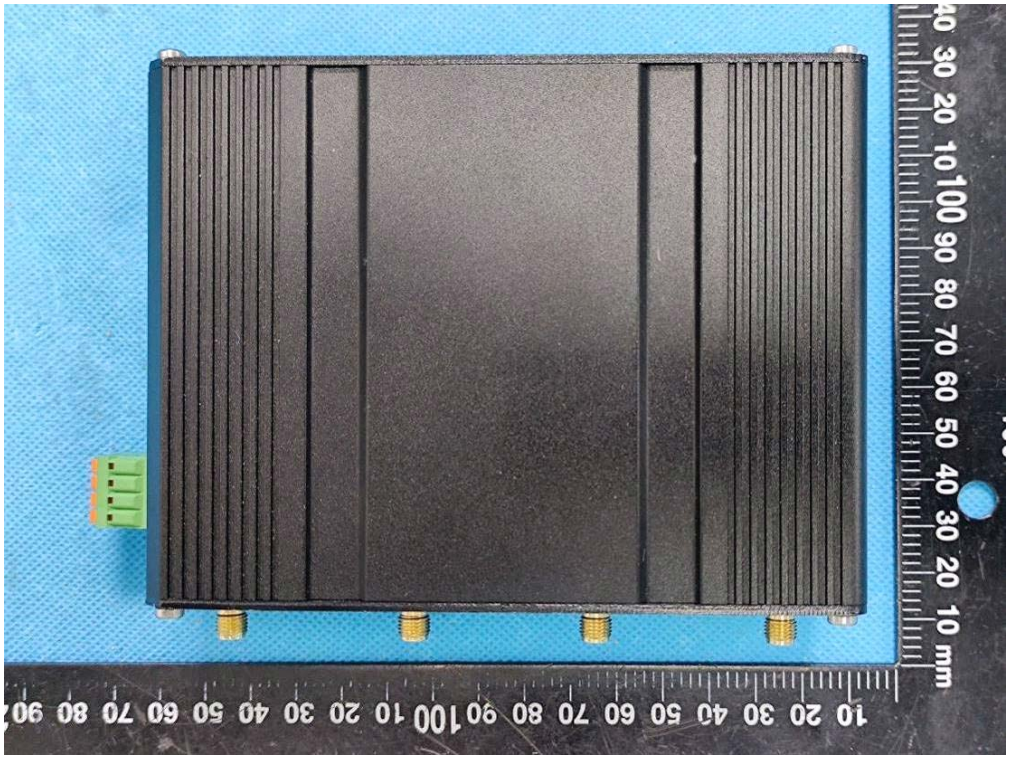
Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	Line-Line,Line-Ground	A	/
2	1kV	±	Line-Line,Line-Ground	A	/
3	2kV	±	Line-Ground	A	/

Table 2: RJ45 I/O Circuit and Lines

Level	Voltage	Poll	Path	Pass	Fail
1	0.5kV	±	Line-Ground	A	/

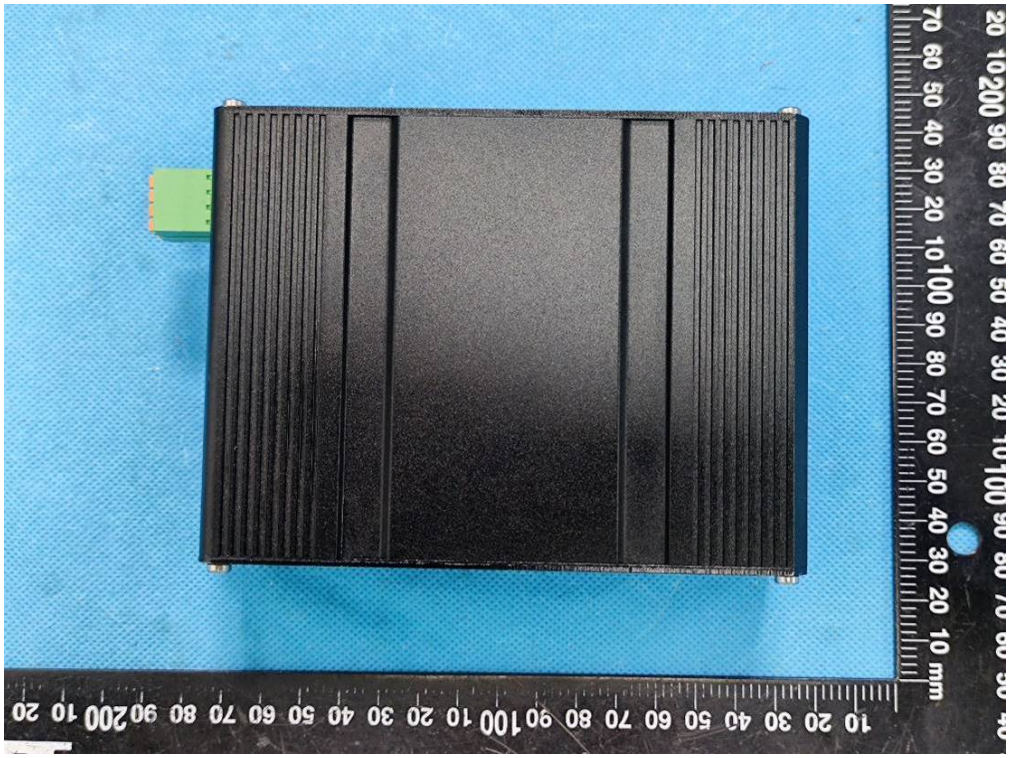
EXHIBITA - EUT PHOTOGRAPHS

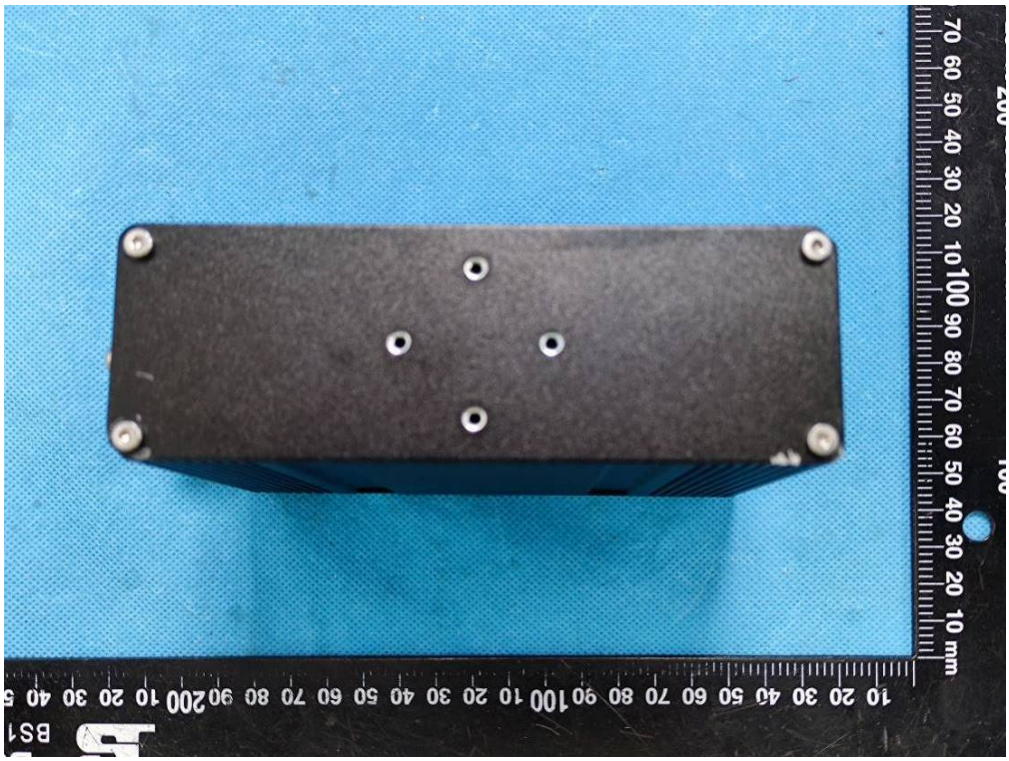
UR35-L04EU-G-P-W

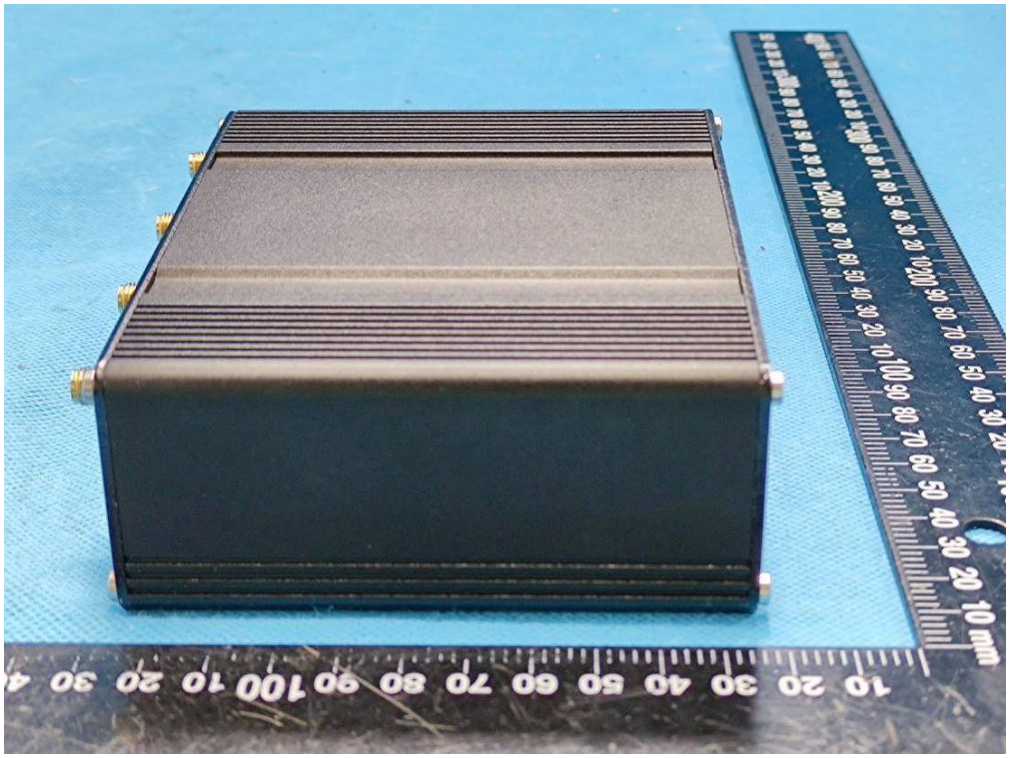


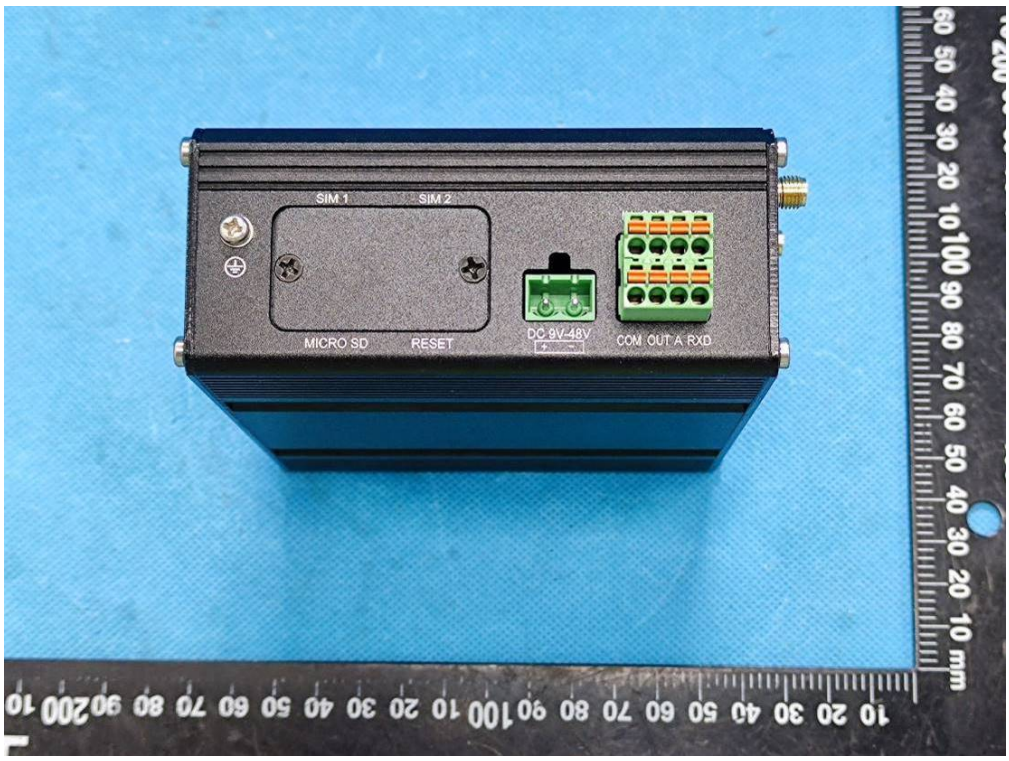

Wi-Fi
AUX
GPS
MAIN
Milesight
SIM
POWER
SYSTEM
Wi-Fi
VPN
UR35
WAN
LAN1
LAN2
LAN3
LAN4


Milesight
Industrial Cellular Router







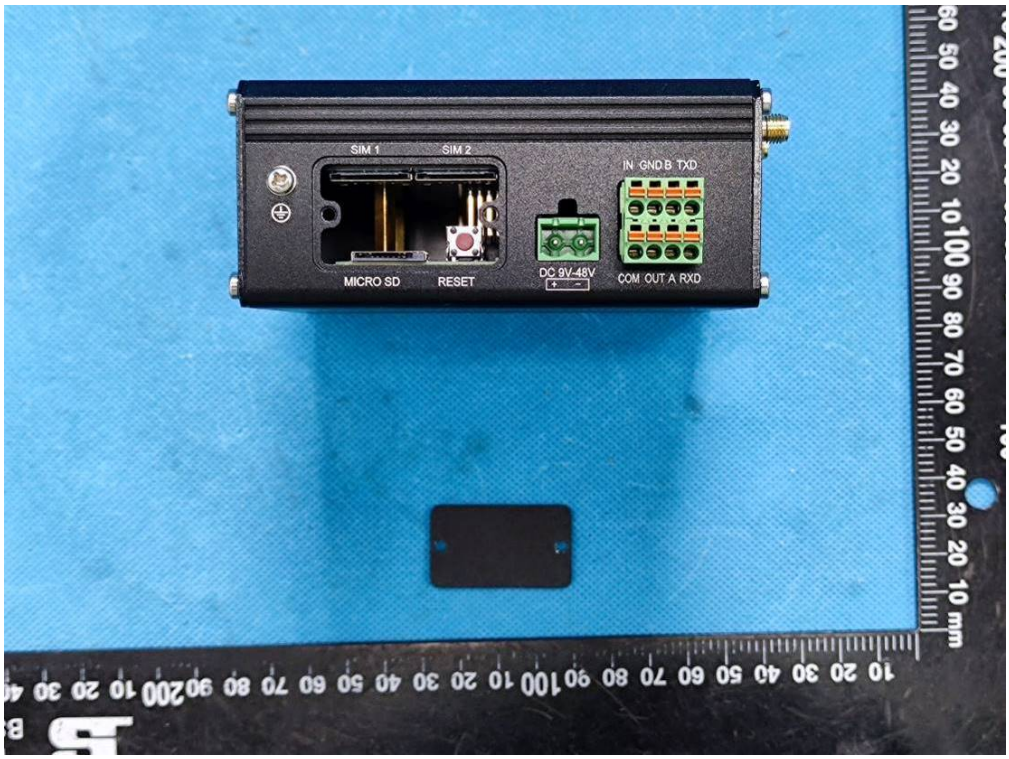

SIM 1
SIM 2
MICRO SD
RESET
DC 9V-48V
COM OUT A RXD

Port


DC 9V-48V
+ -
COM OUT A RXD

Ports


Wi-Fi
AUX
GPS
MAIN
Milesight
SIM
POWER
SYSTEM
Wi-Fi
VPN
UR35
WAN
LAN1
LAN2
LAN3
LAN4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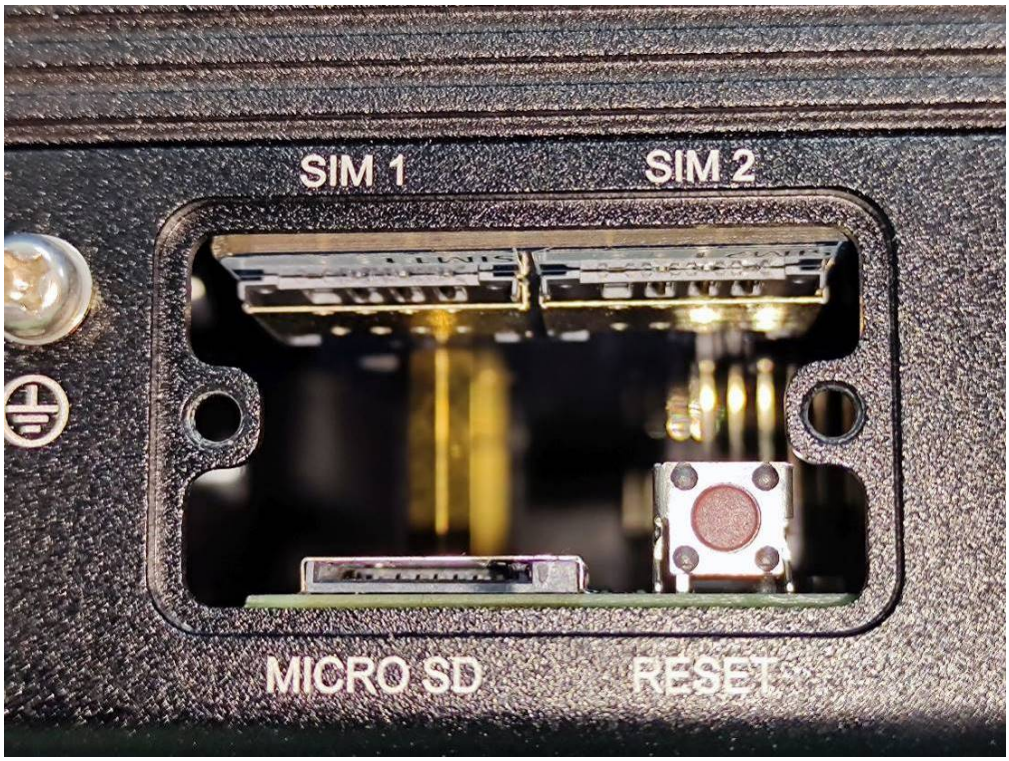
SIM 2
MICRO SD
RESET
DC 9V-48V
IN GND B TXD
COM OUT A RXD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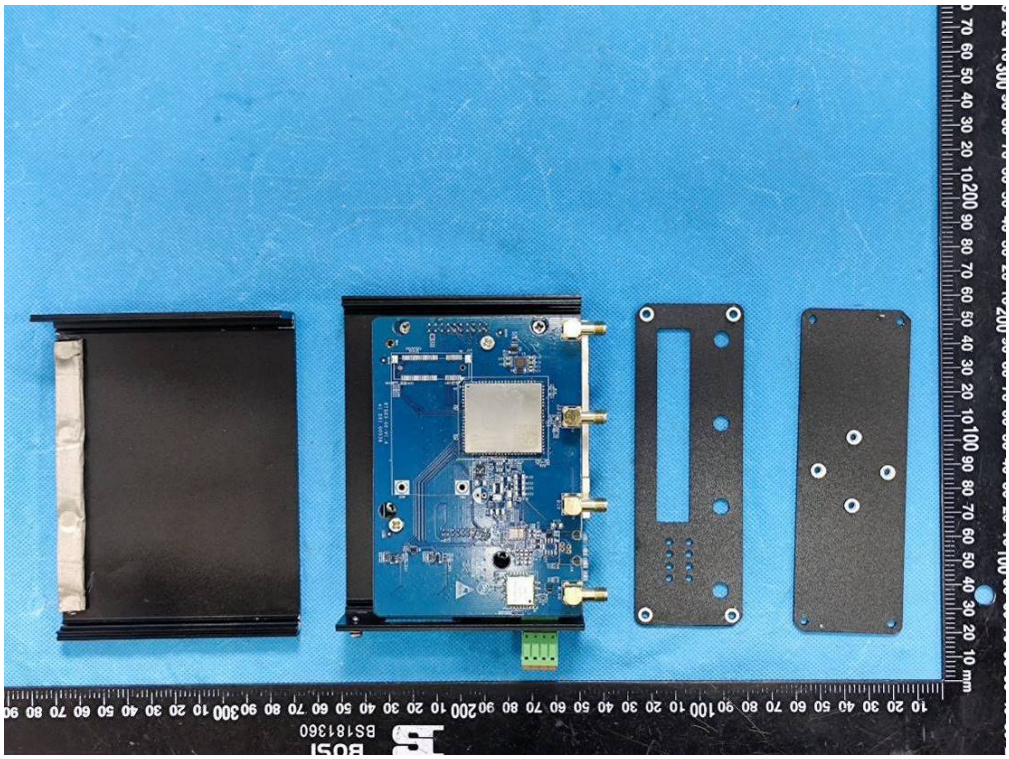
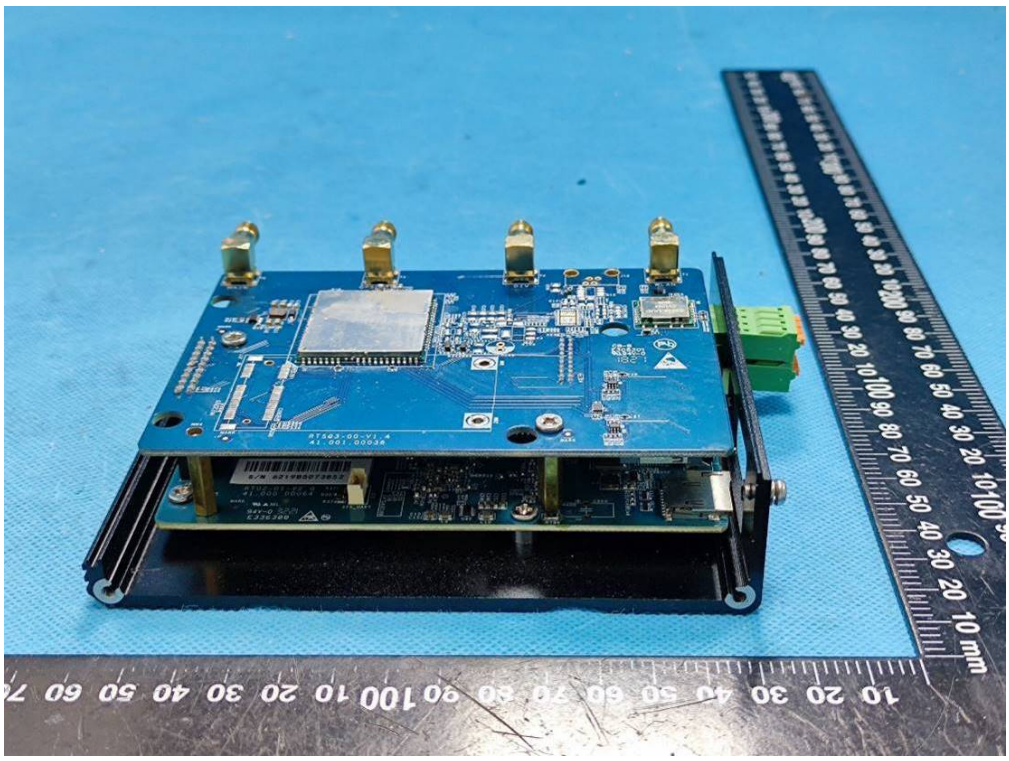
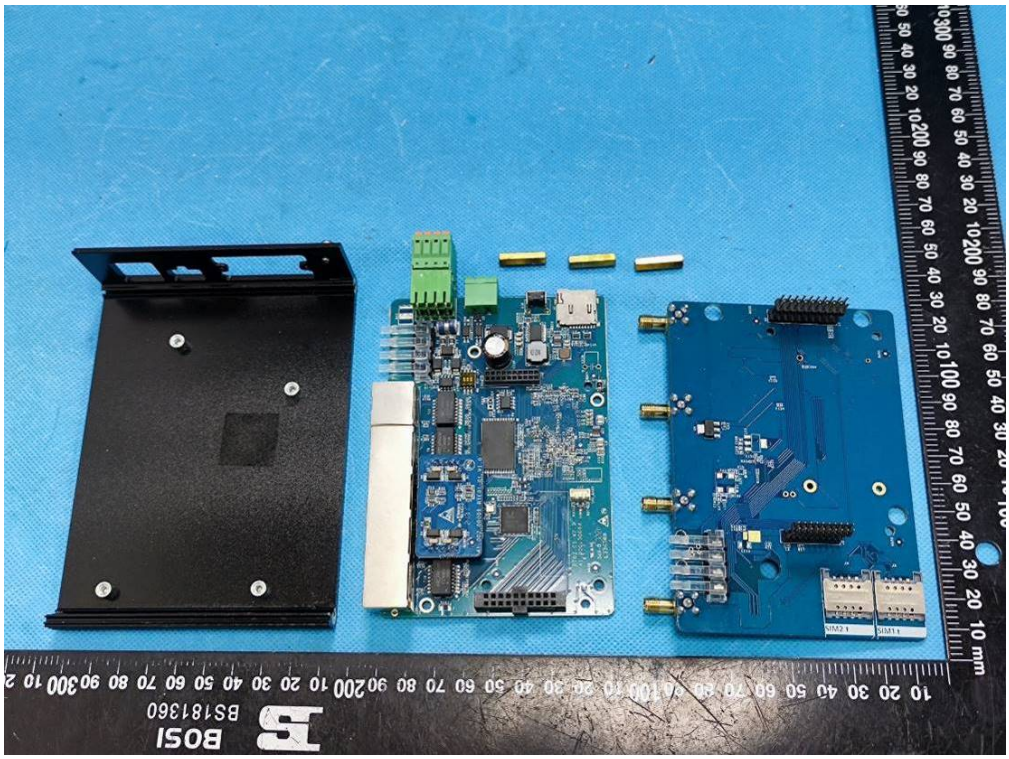
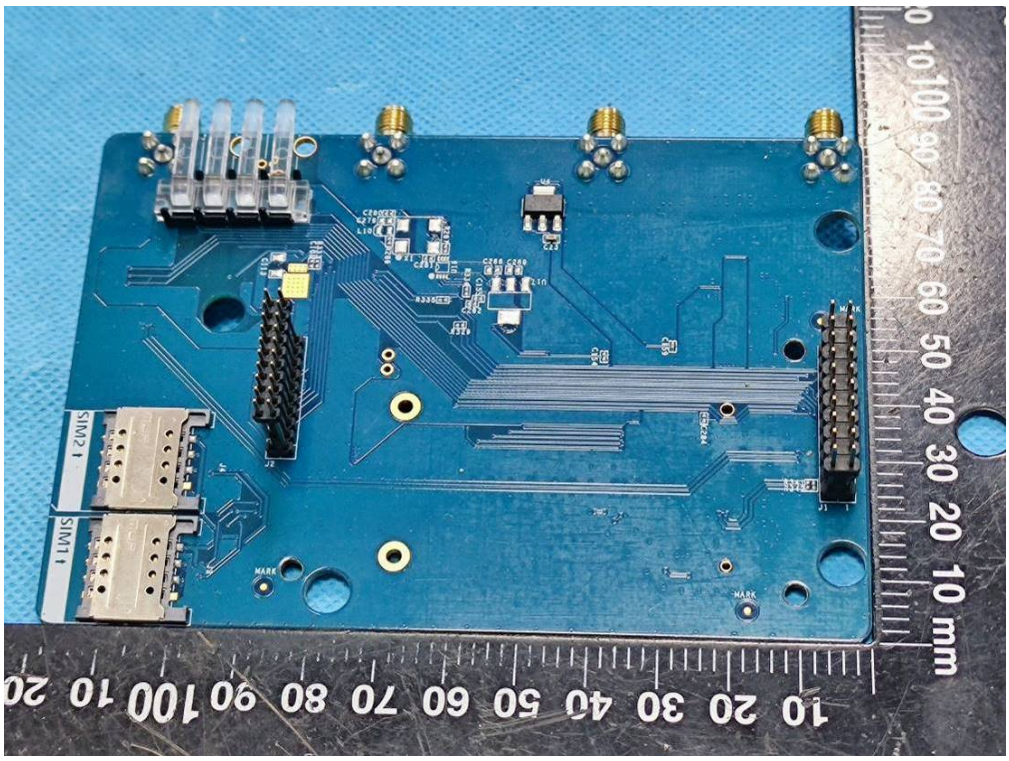
RESET





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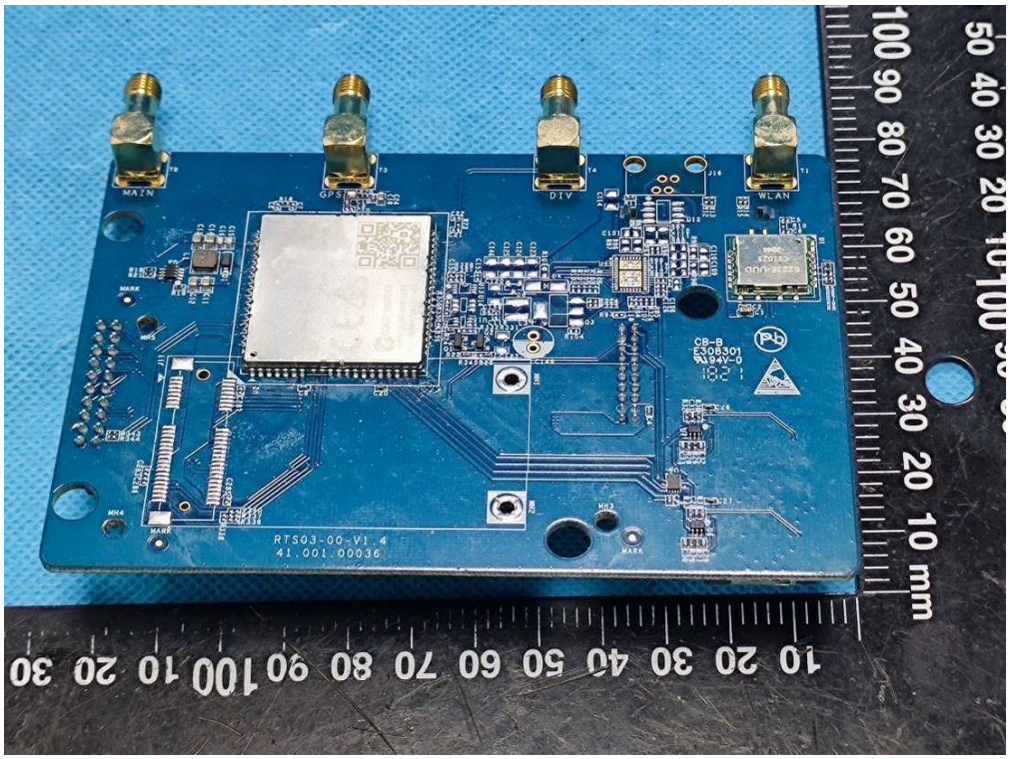
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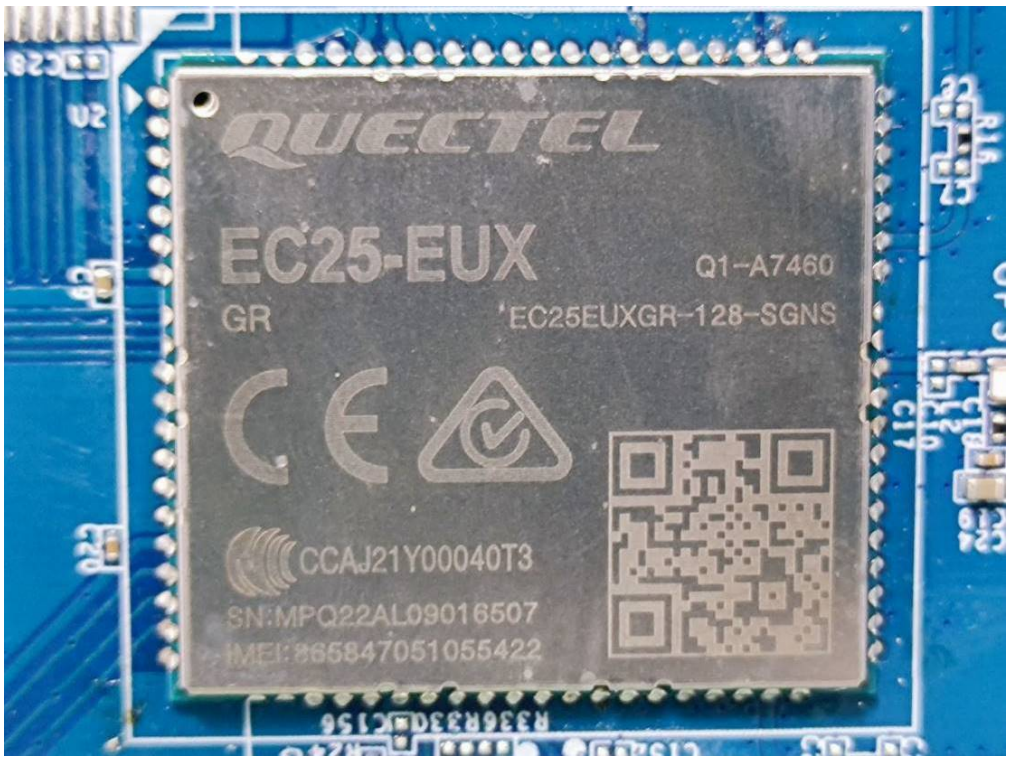
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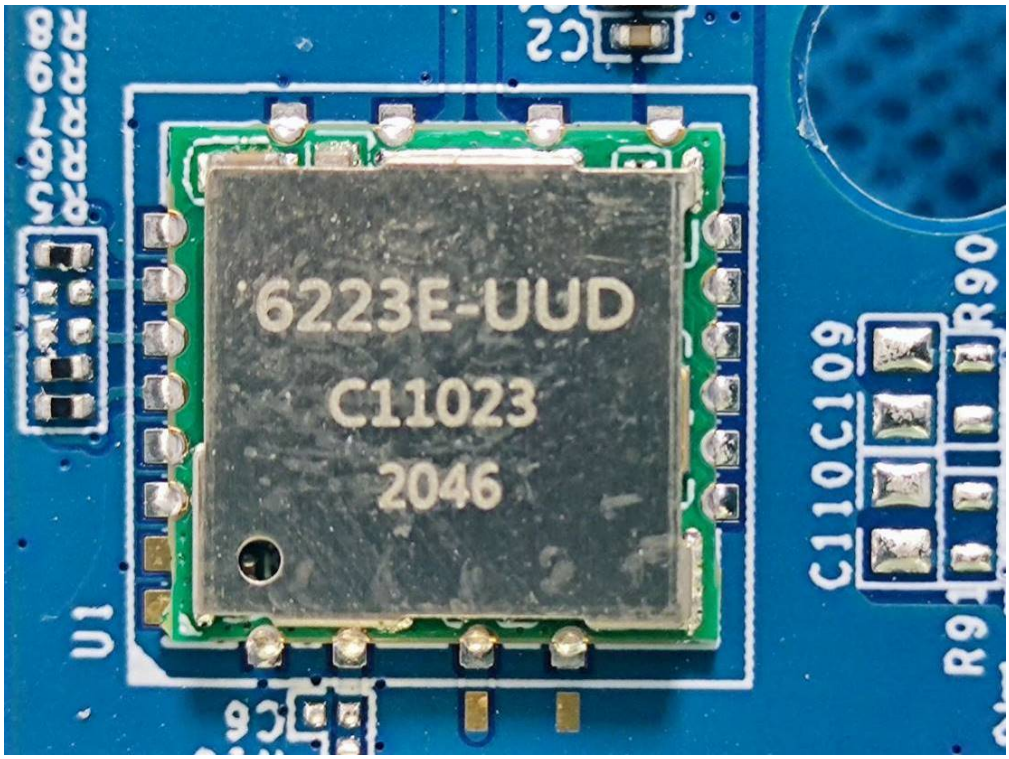
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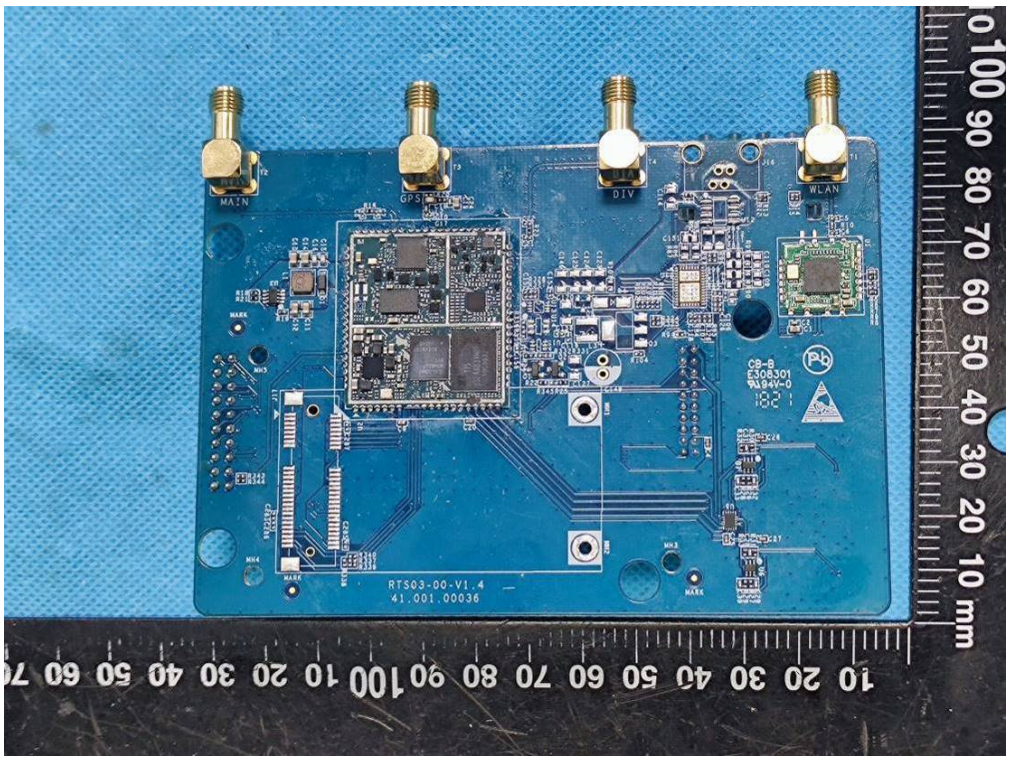
C11023
2046
U1
C110C109
R90


MAIN
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DIV
WLAN
RTS03-00-V1.4
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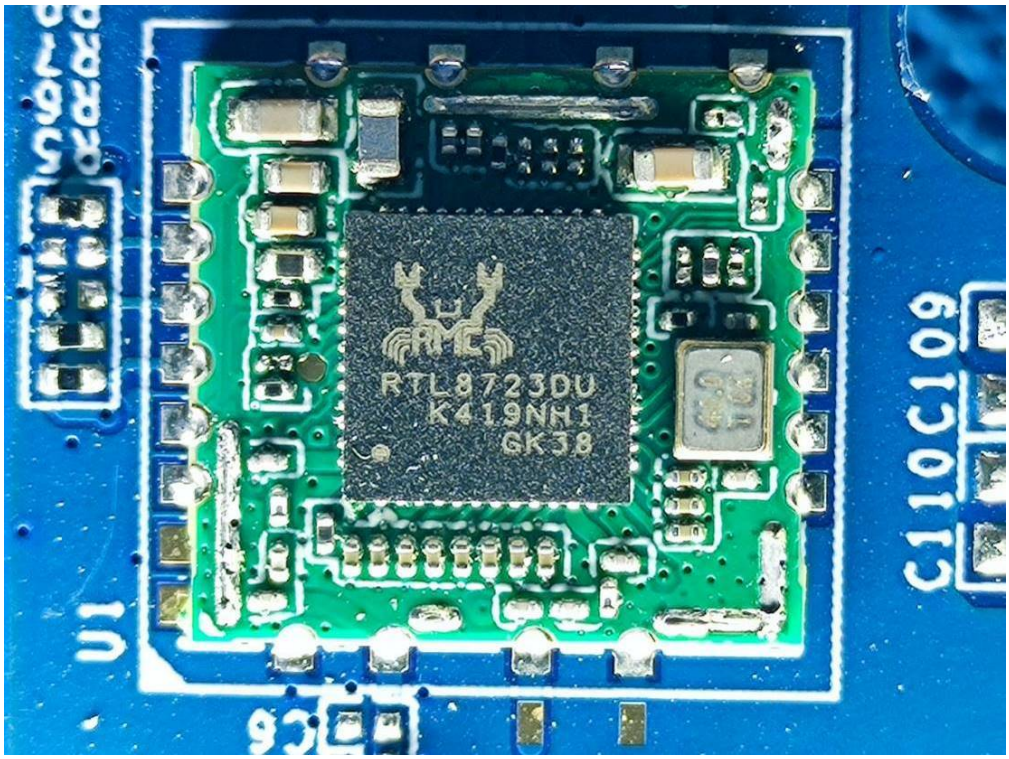
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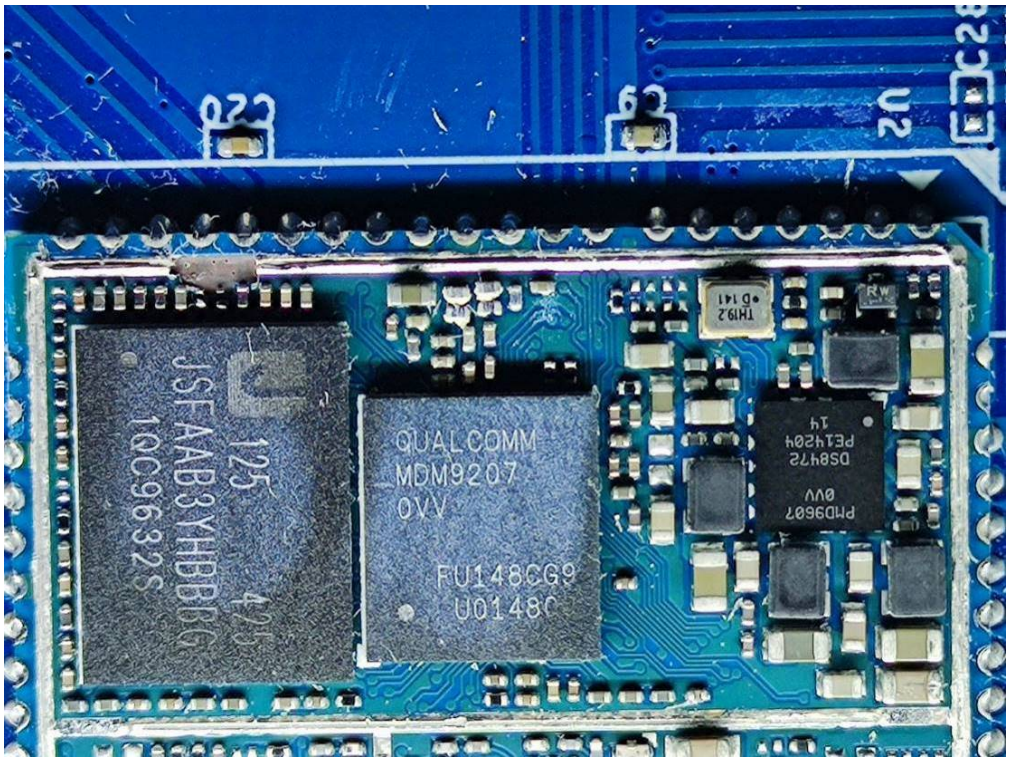
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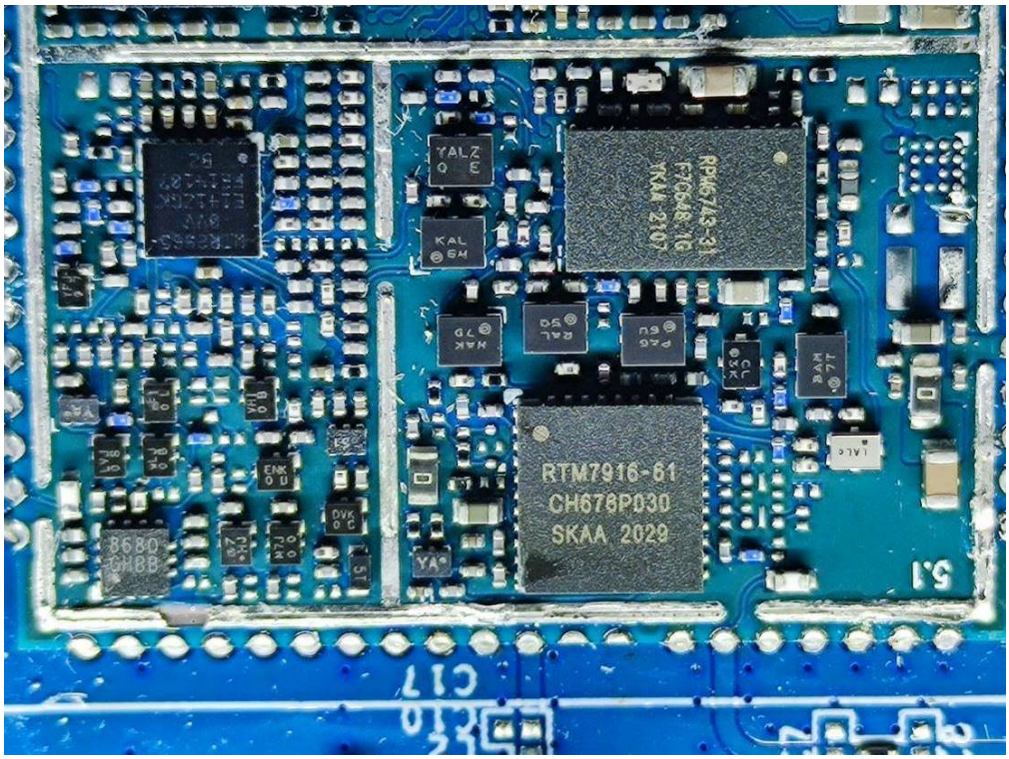

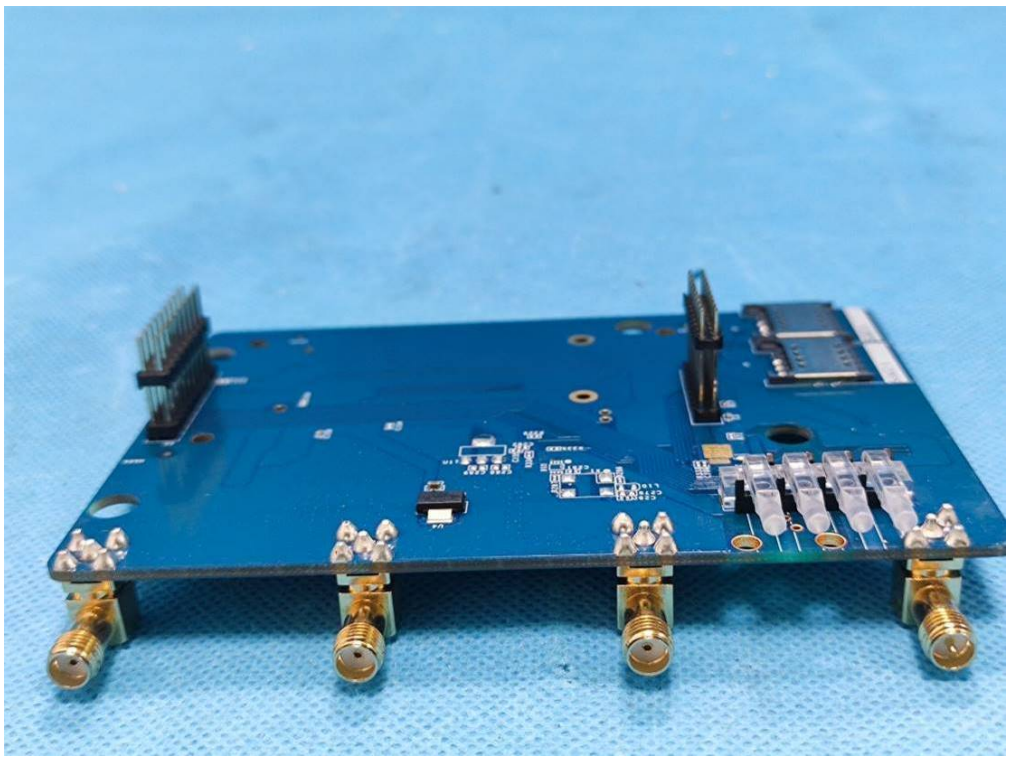

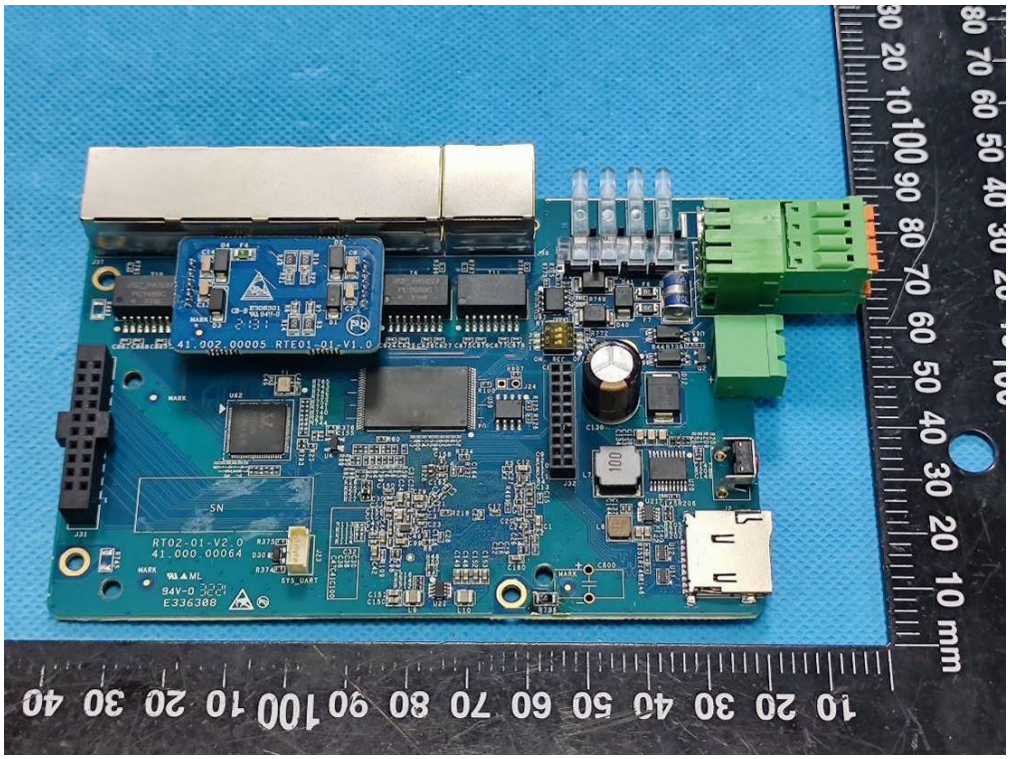
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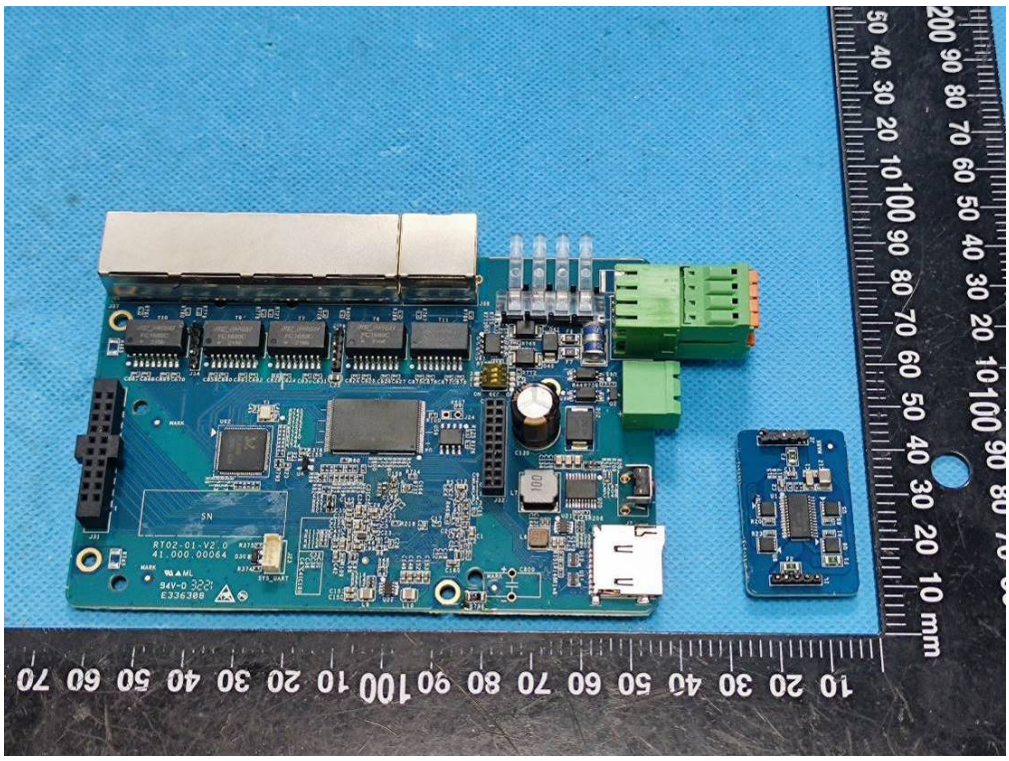
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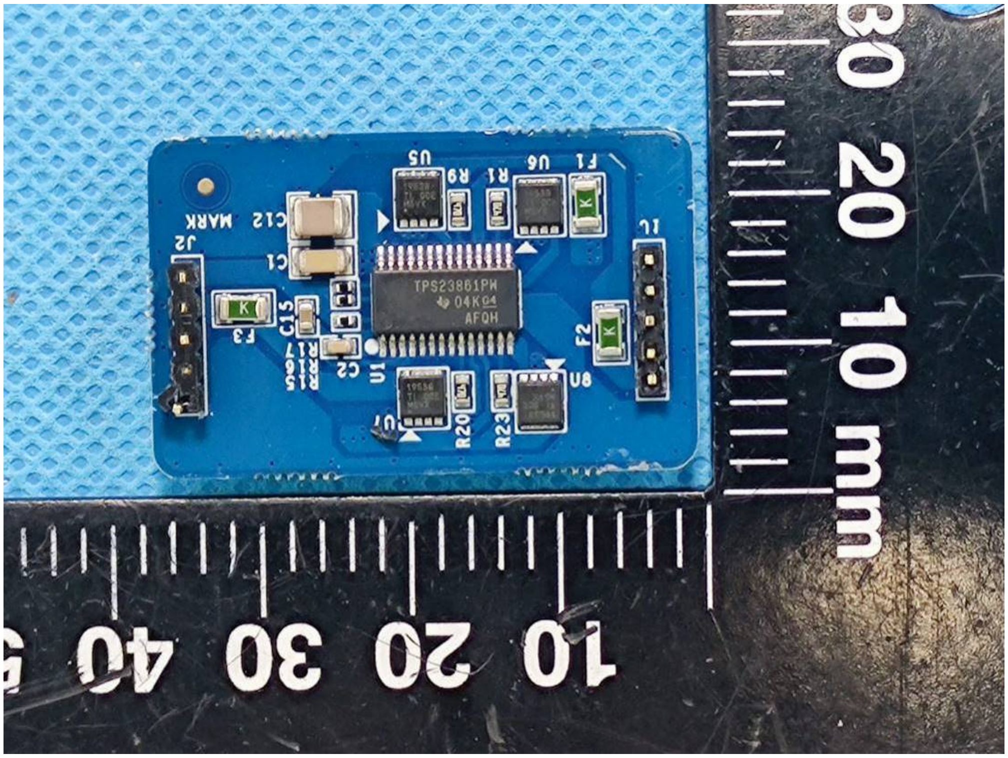
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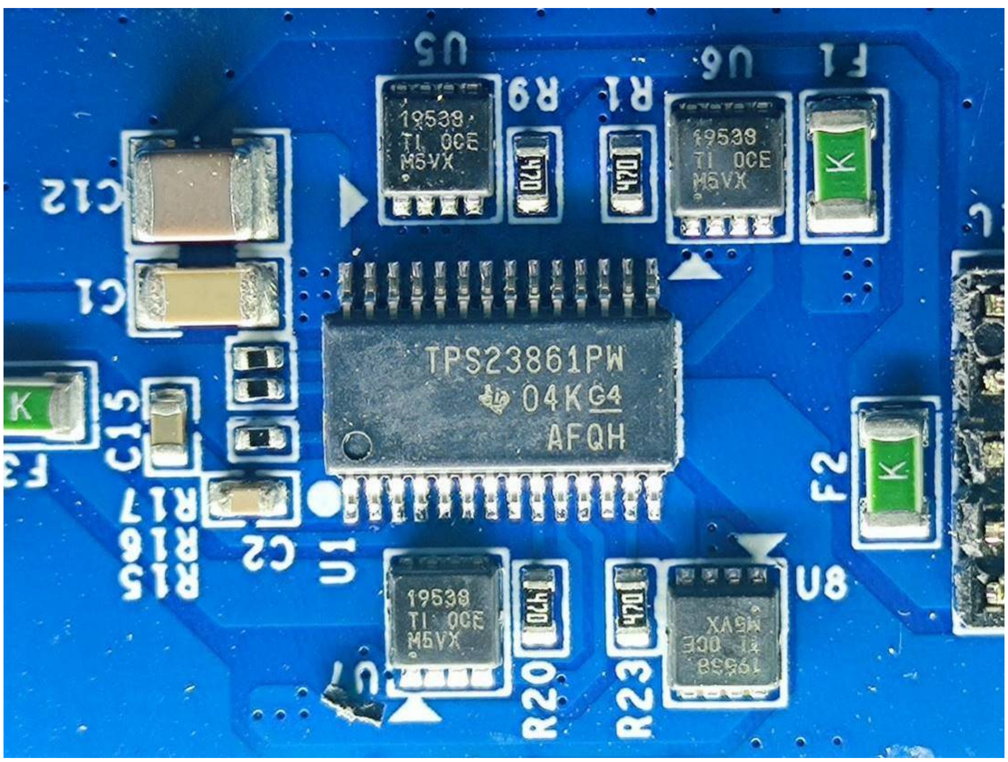
04K G4
AFQH
10 mm

Chip4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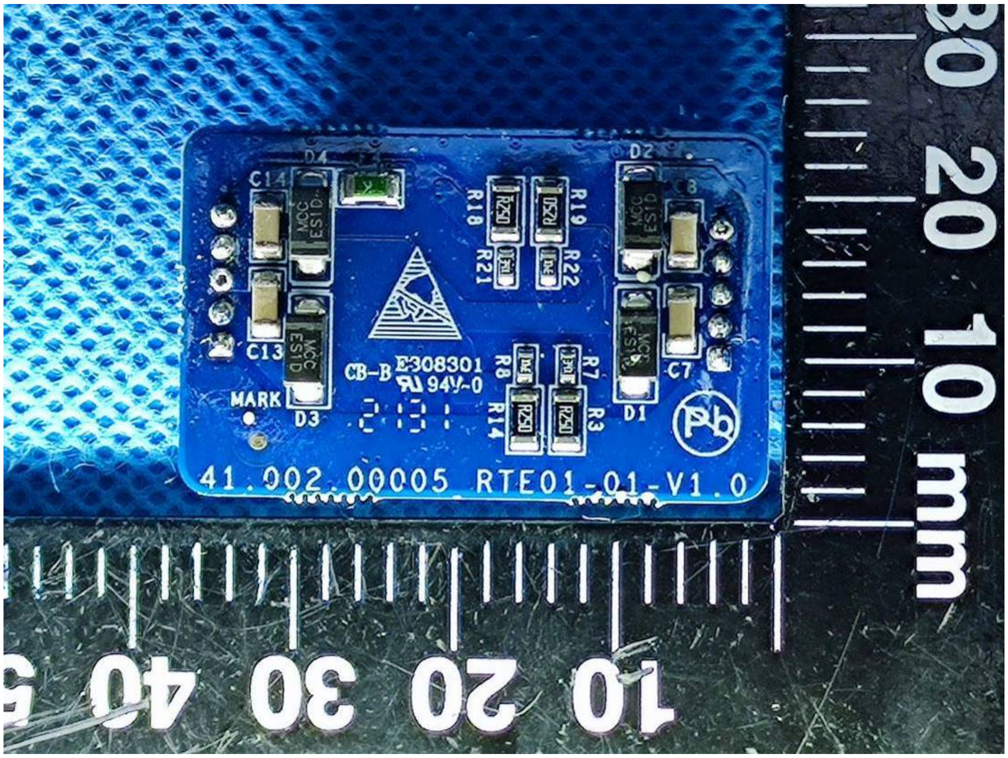
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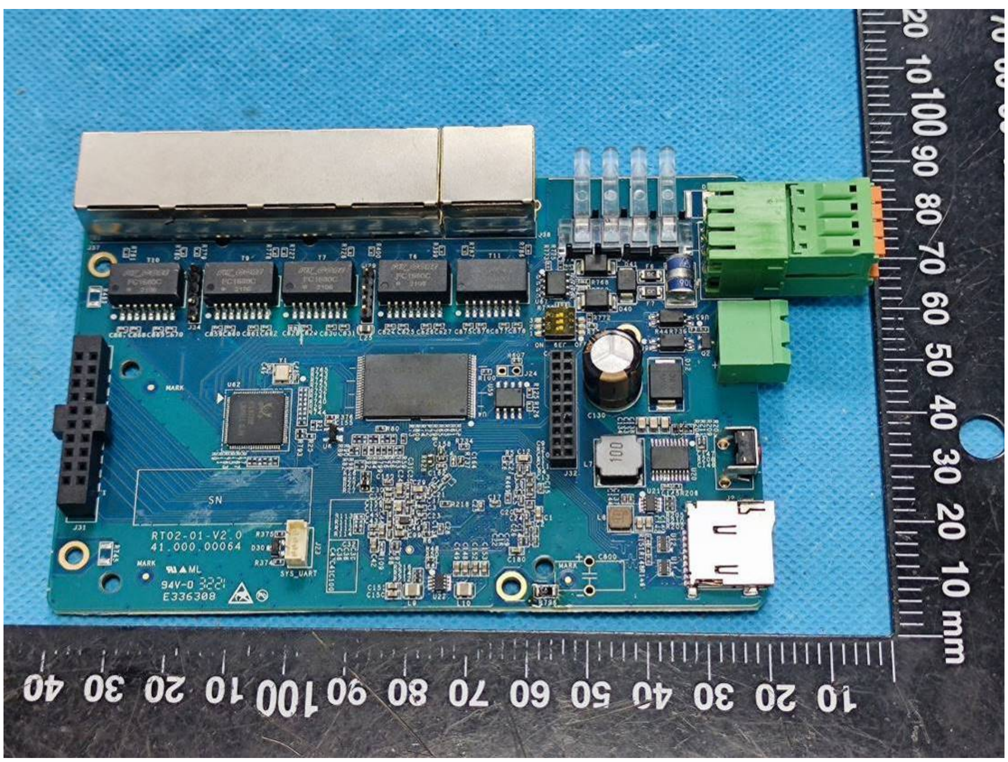
CB-B
MARK
mm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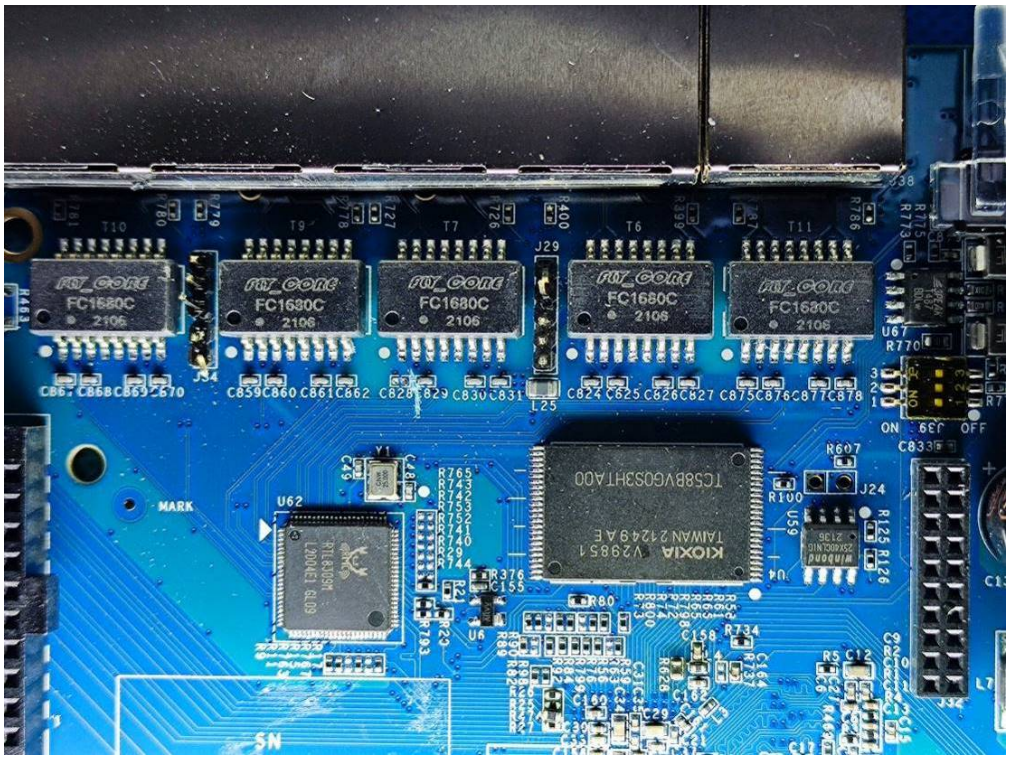
E336308
SN
mm

Chip5



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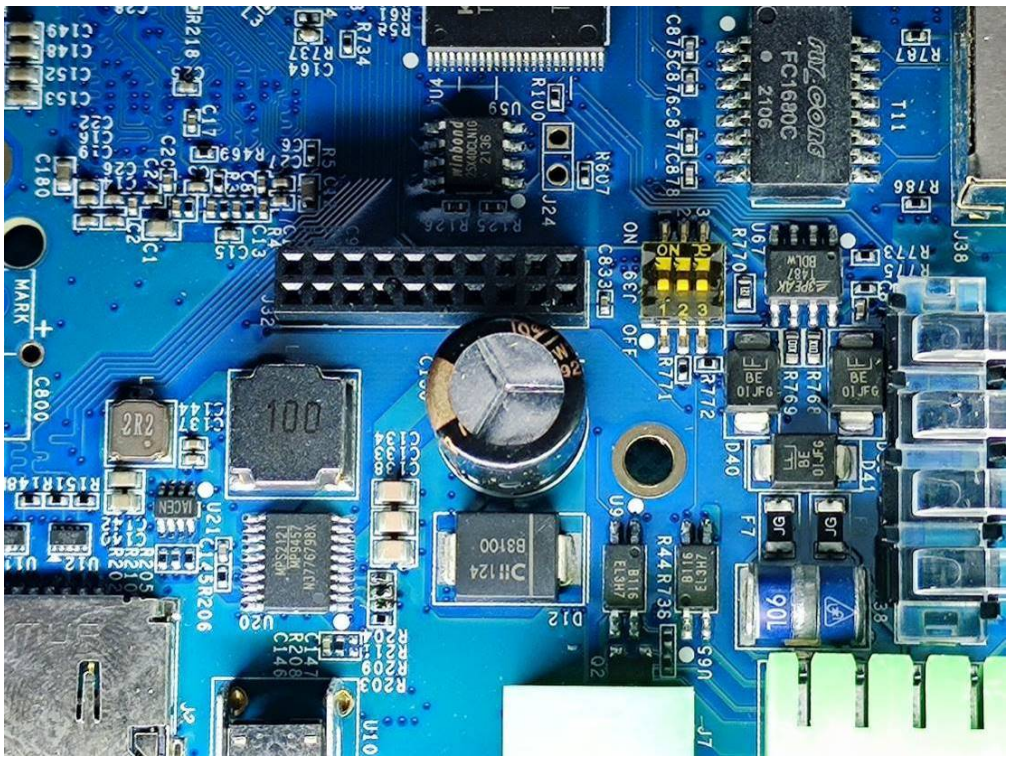

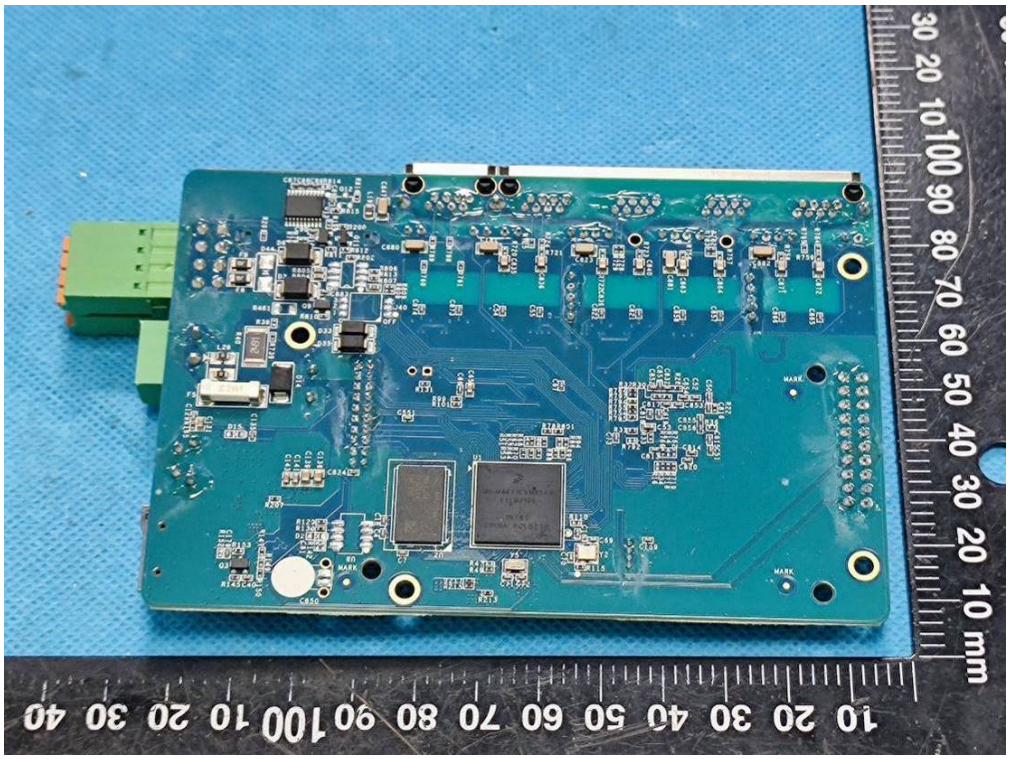

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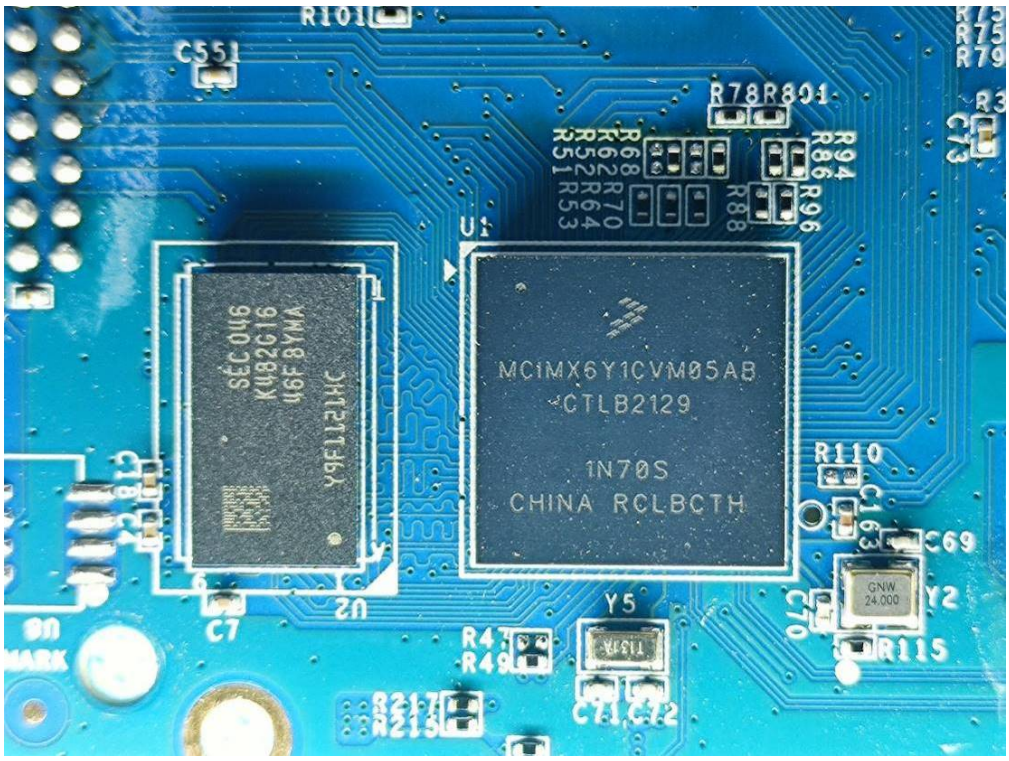
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CHINA RCLBCTH
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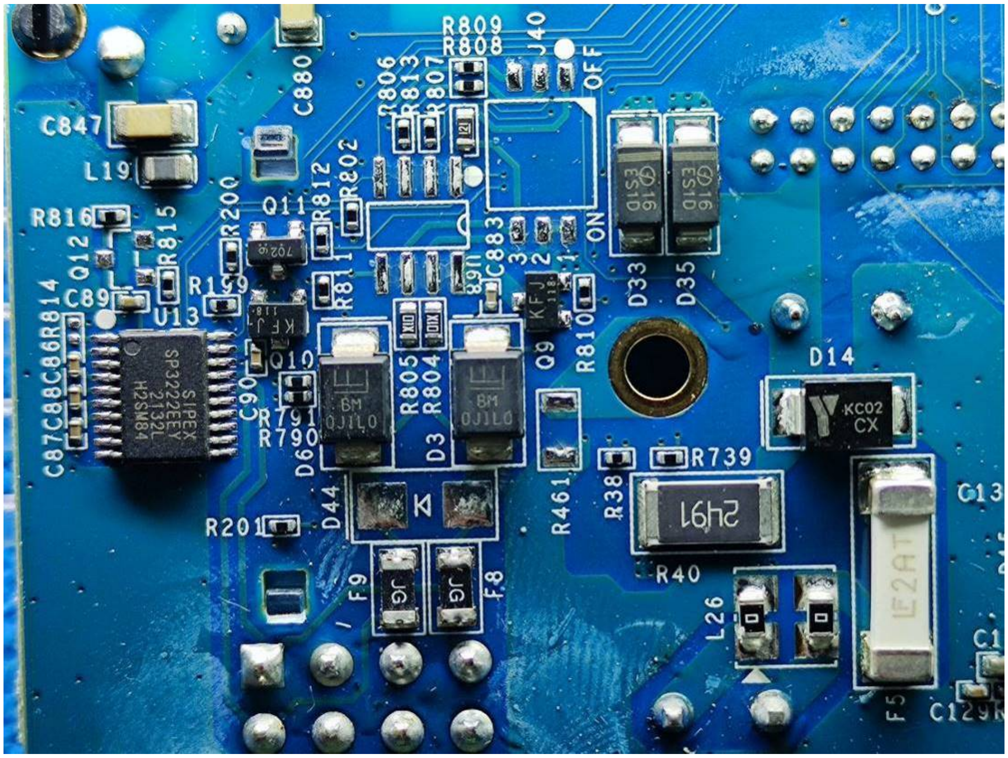
46F8YMA
GNW
24.000

Chip8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H2SM84
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R812
R802
R809
R808
J40
OFF
ON
C880
R806
R813
R807
D33
D35
D14
KC02
CX
R739
R38
R461
R40
L26
F5
R201
D44
F9
F8
JG
D3
D6
R805
R804
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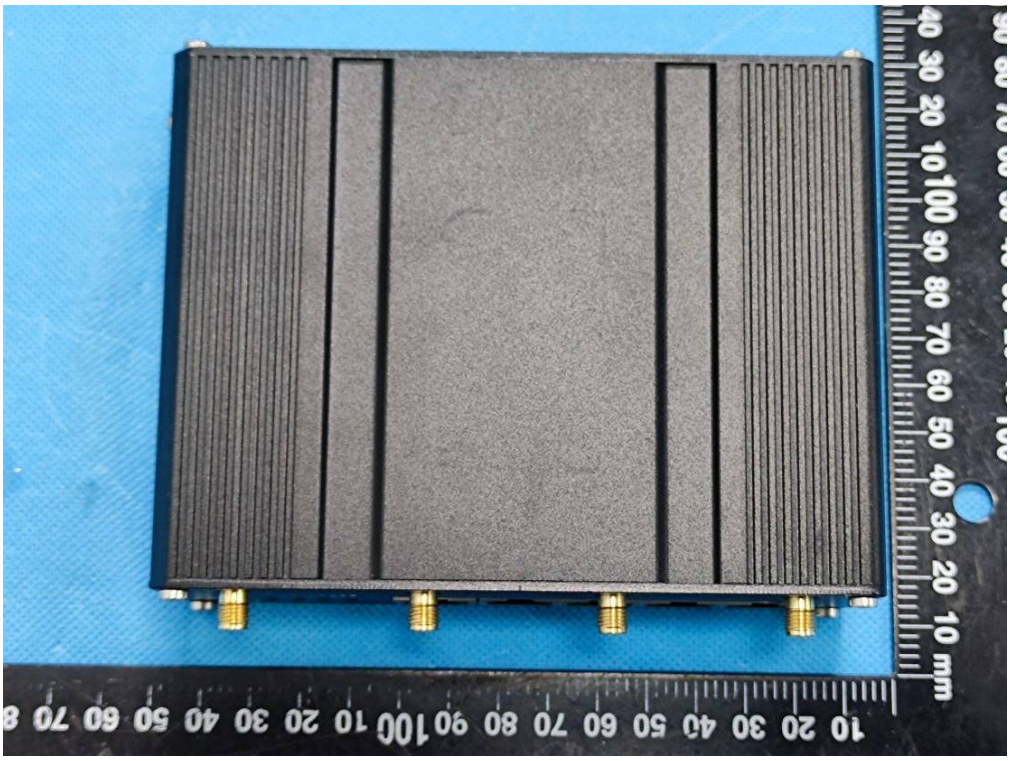
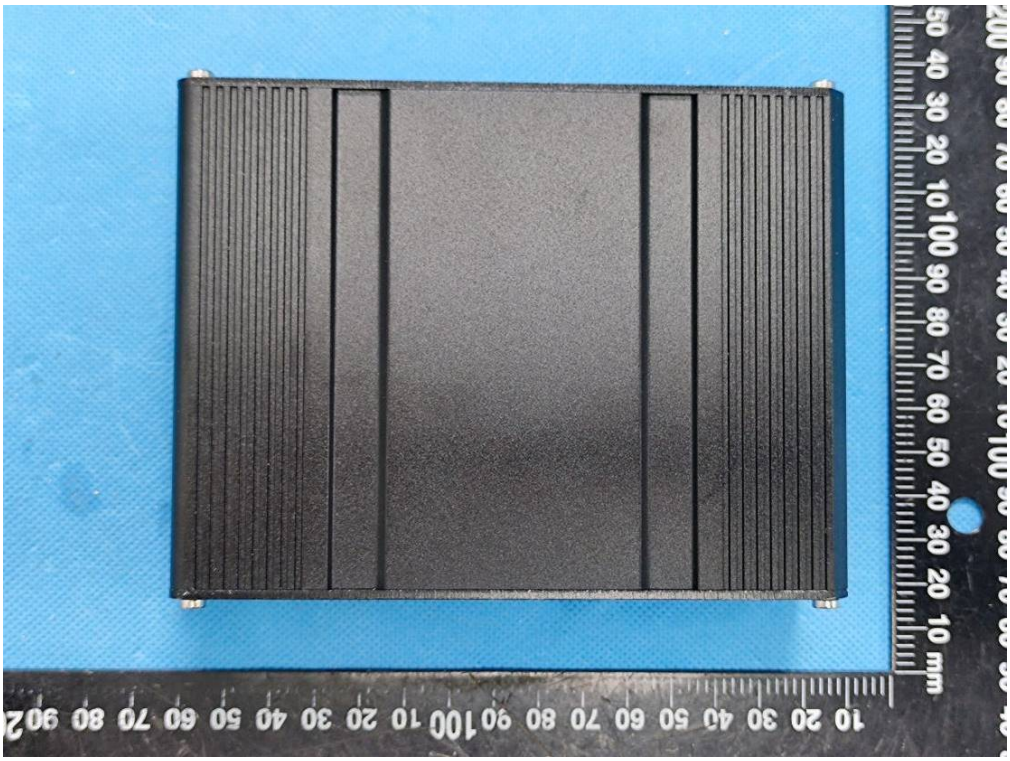
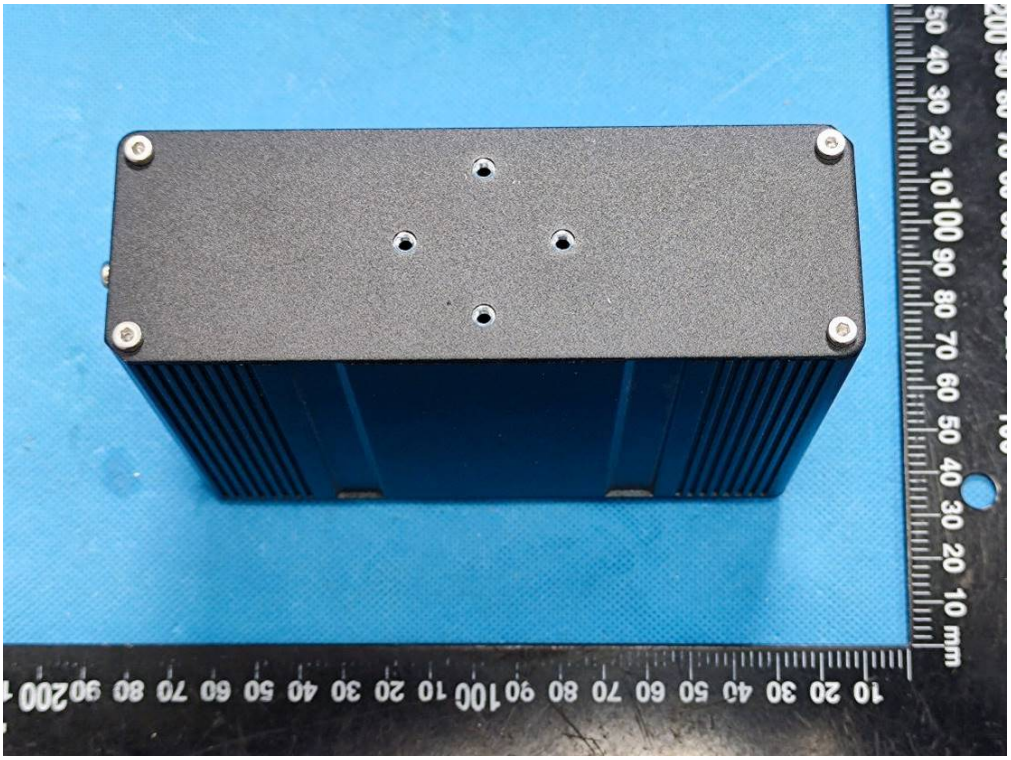
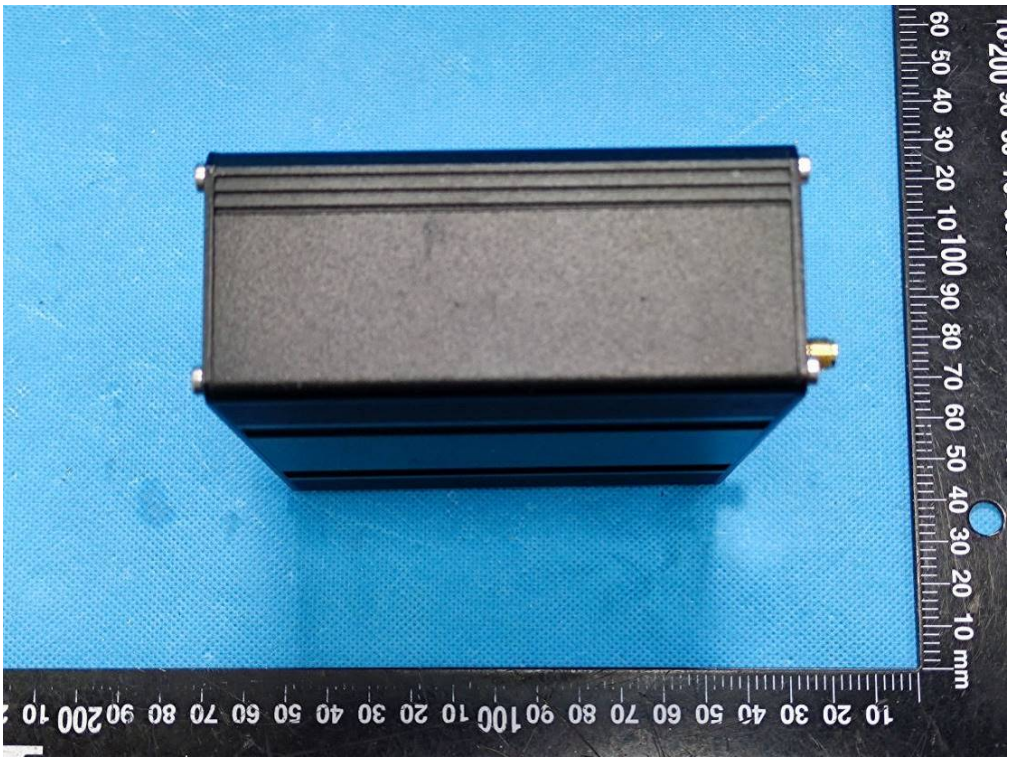
UR35-L04EU-G-P-W-485




Wi-Fi
AUX
GPS
MAIN
Milesight
SIM
UR35
POWER
SYSTEM
Wi-Fi
VPN
WAN
LAN1
LAN2
LAN3
LAN4







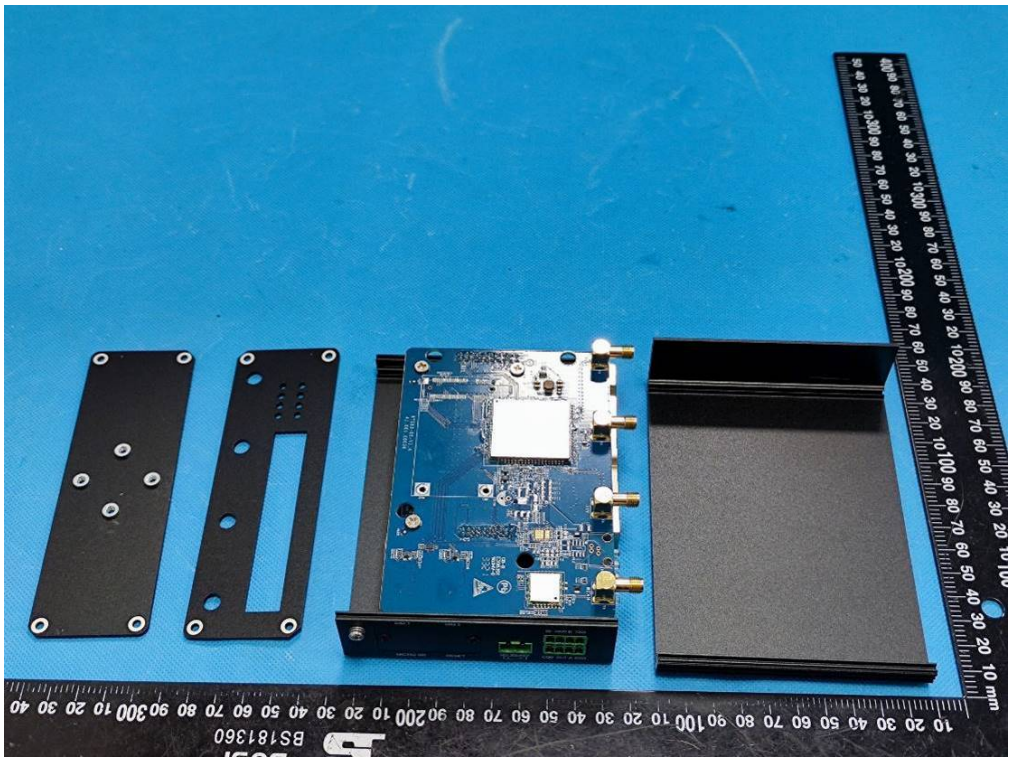

SIM 1
SIM 2
IN GND B TXD
MICRO SD
RESET
DC 9V-48V
COM OUT A RXD

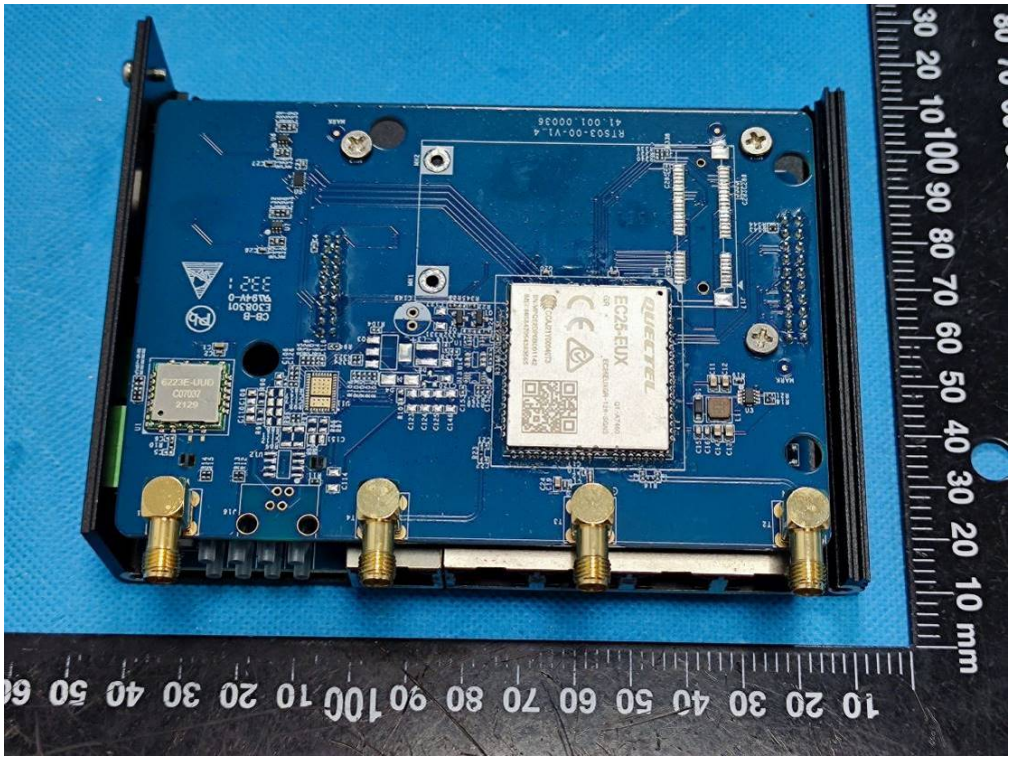
Port


SIM 1
SIM 2
IN GND B TXD
MICRO SD
RESET
DC 9V-48V
COM OUT A RXD

Port

Uncover

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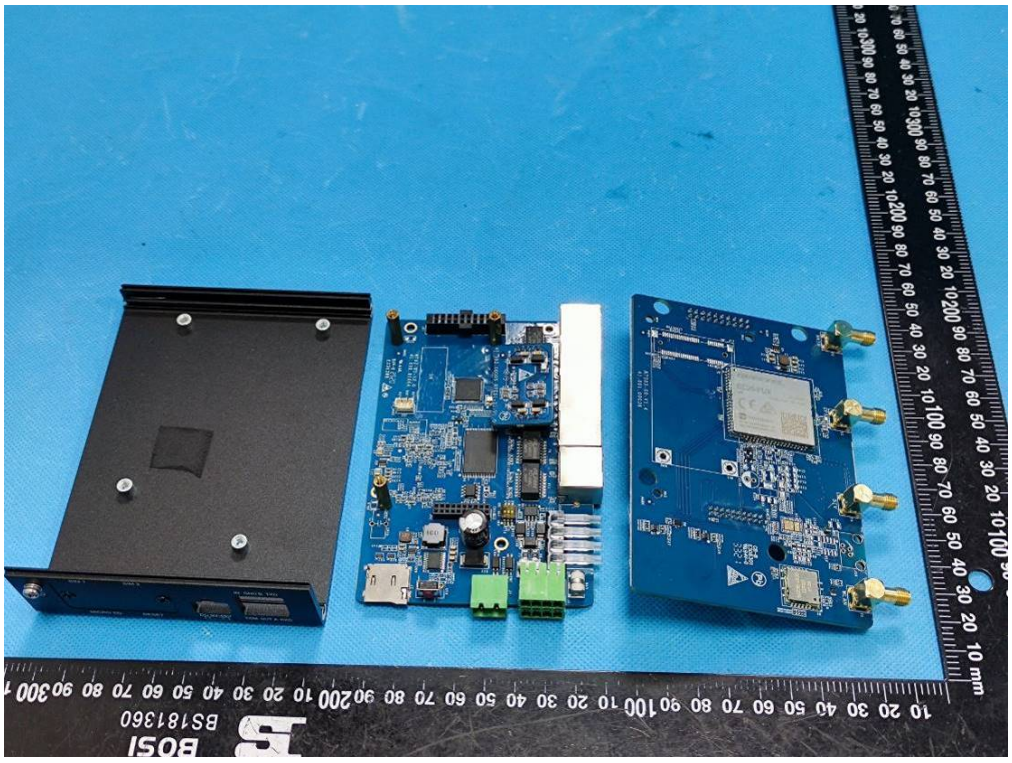

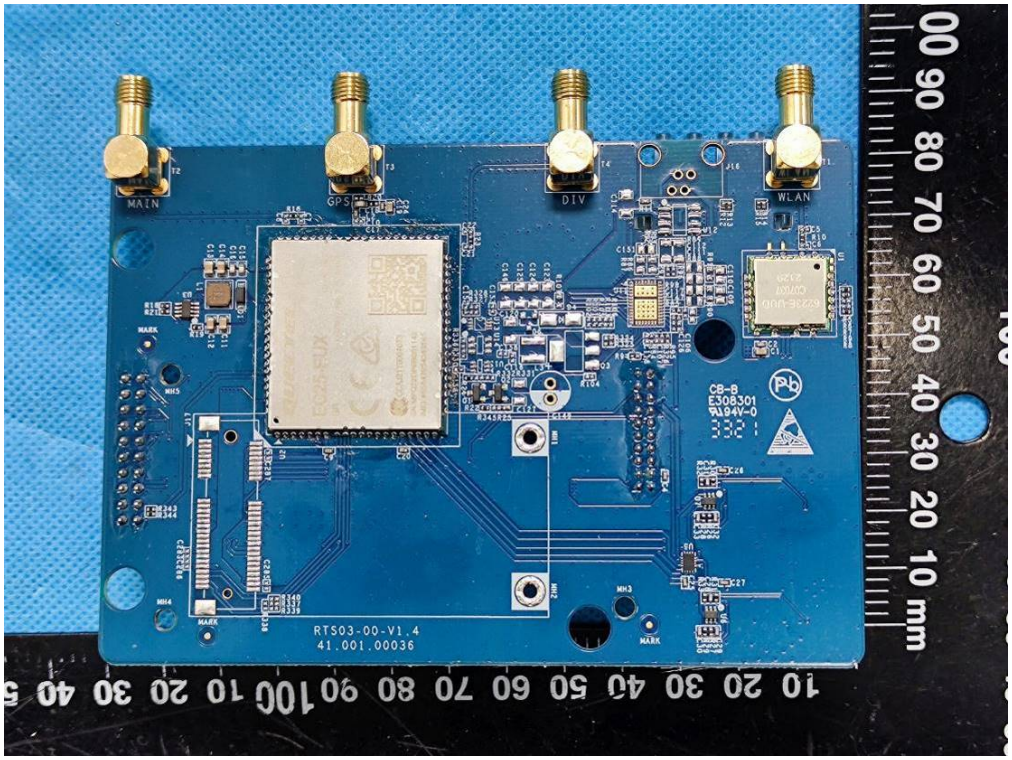
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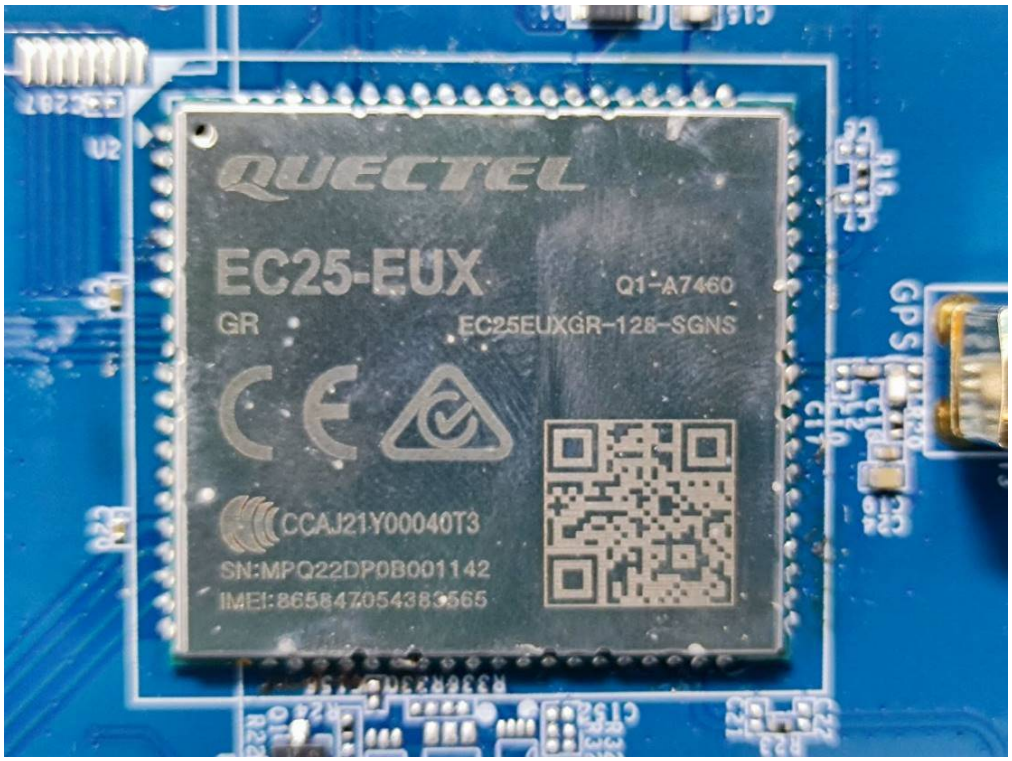
GPS
DIV
WLAN
RTS03-00-V1.4
41.001.00036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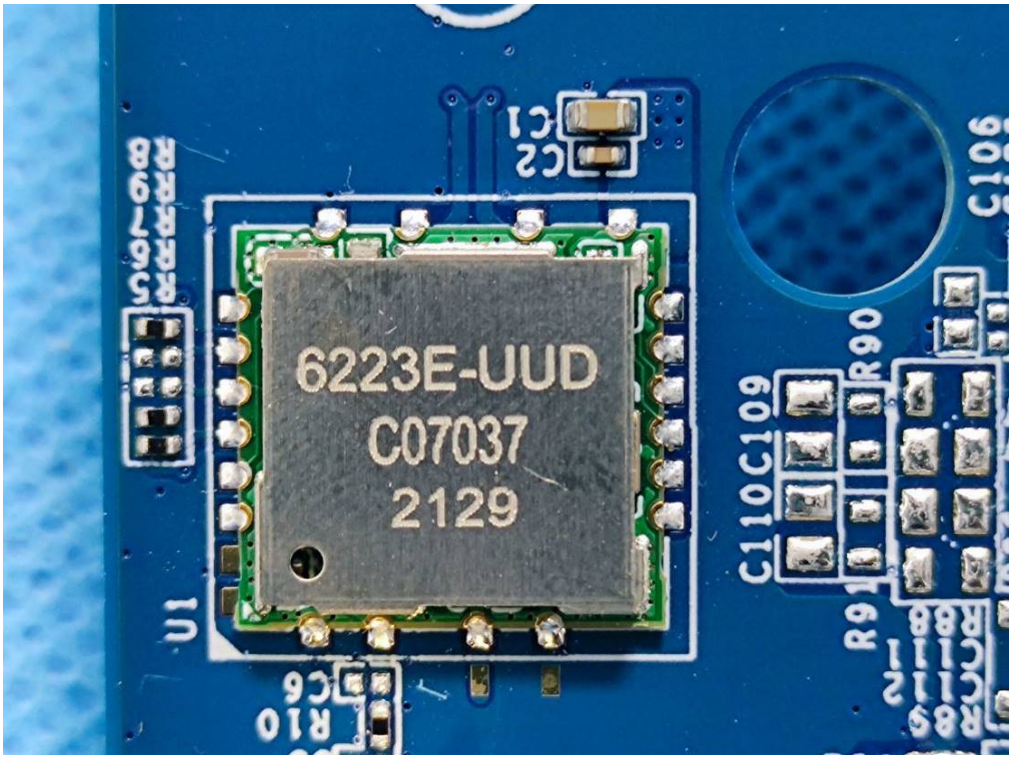
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C2
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R90
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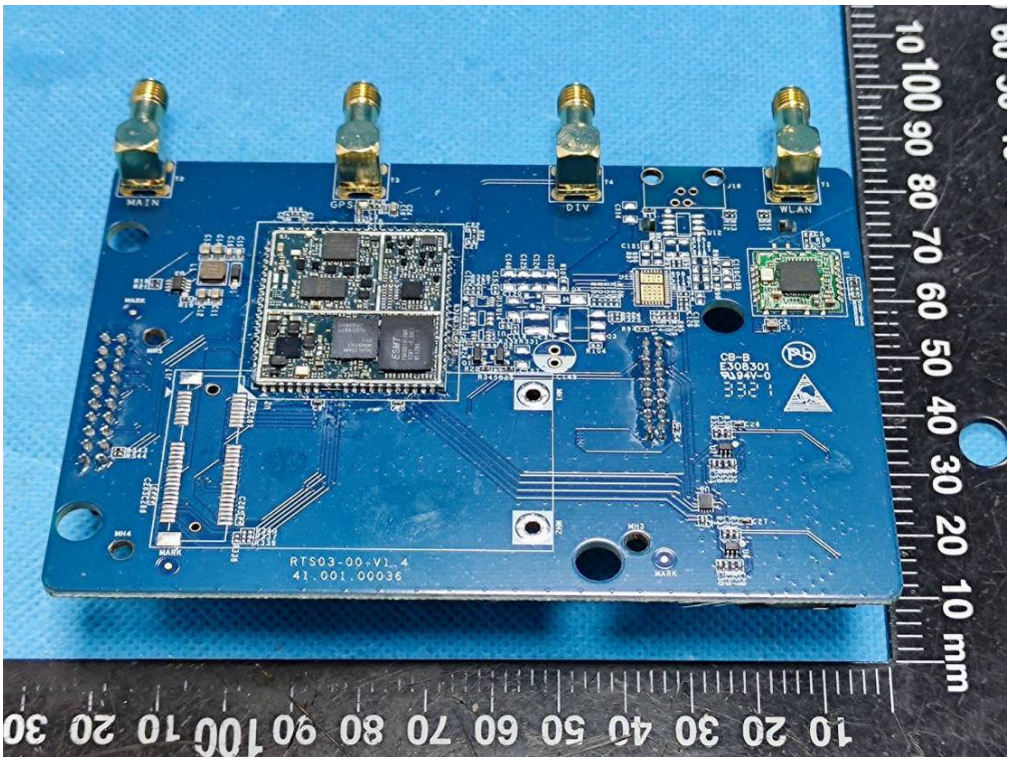
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GPS
DIV
WLAN
RTS03-00-V1.4
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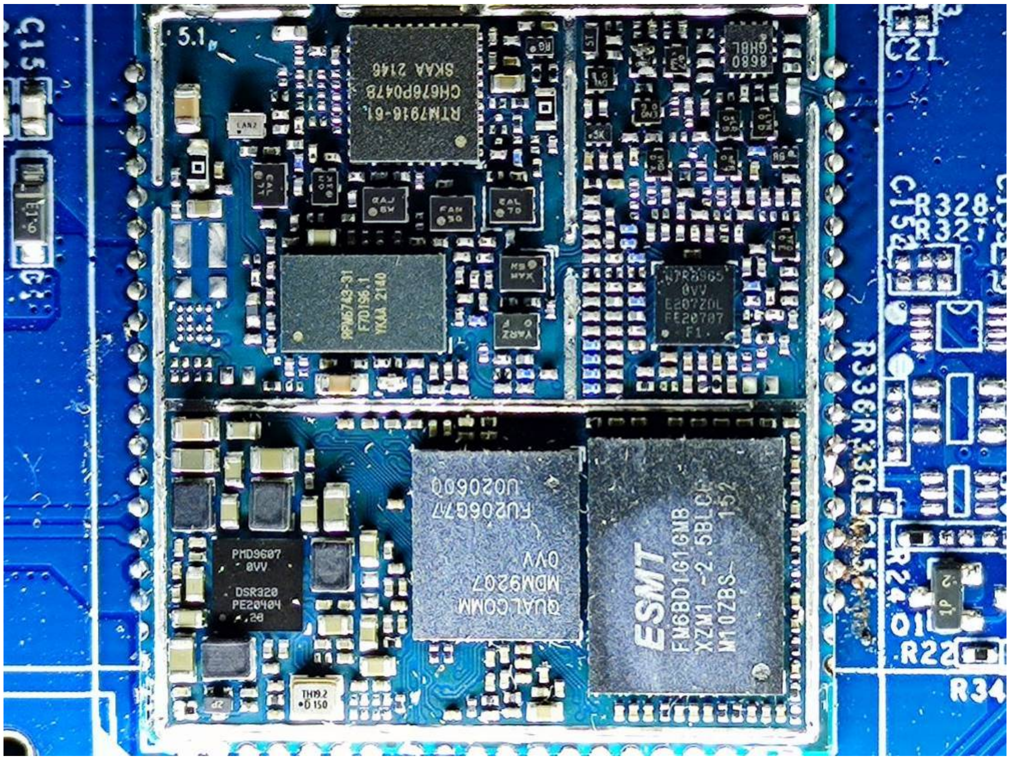
Chip1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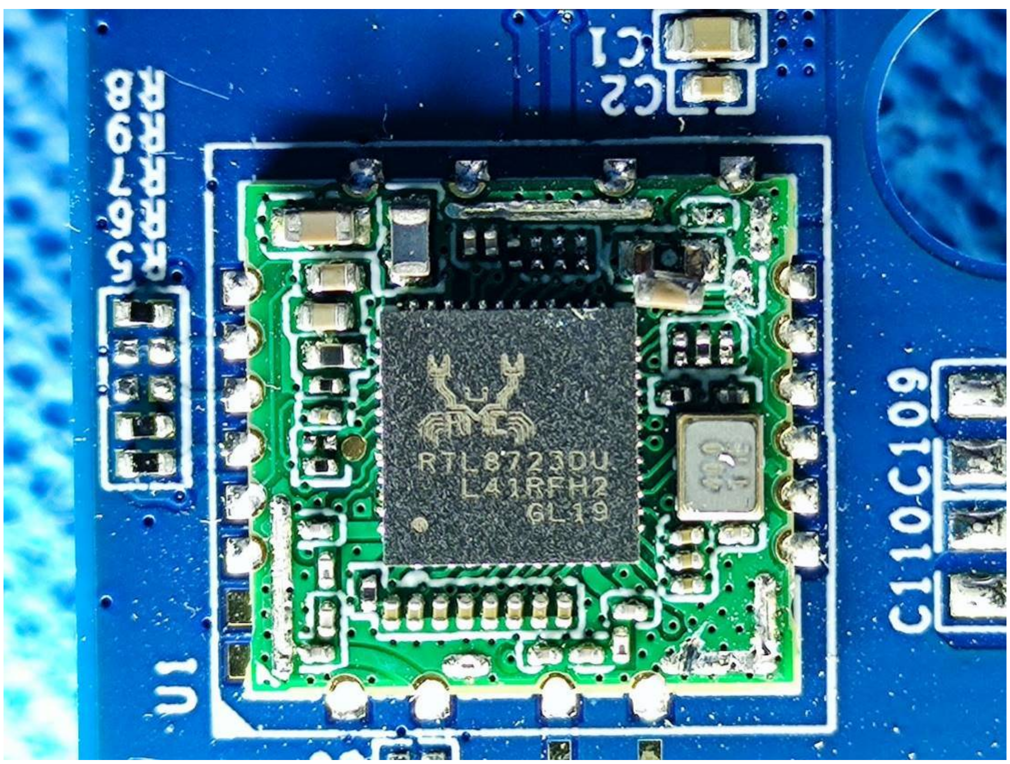
Chip2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C1
C2
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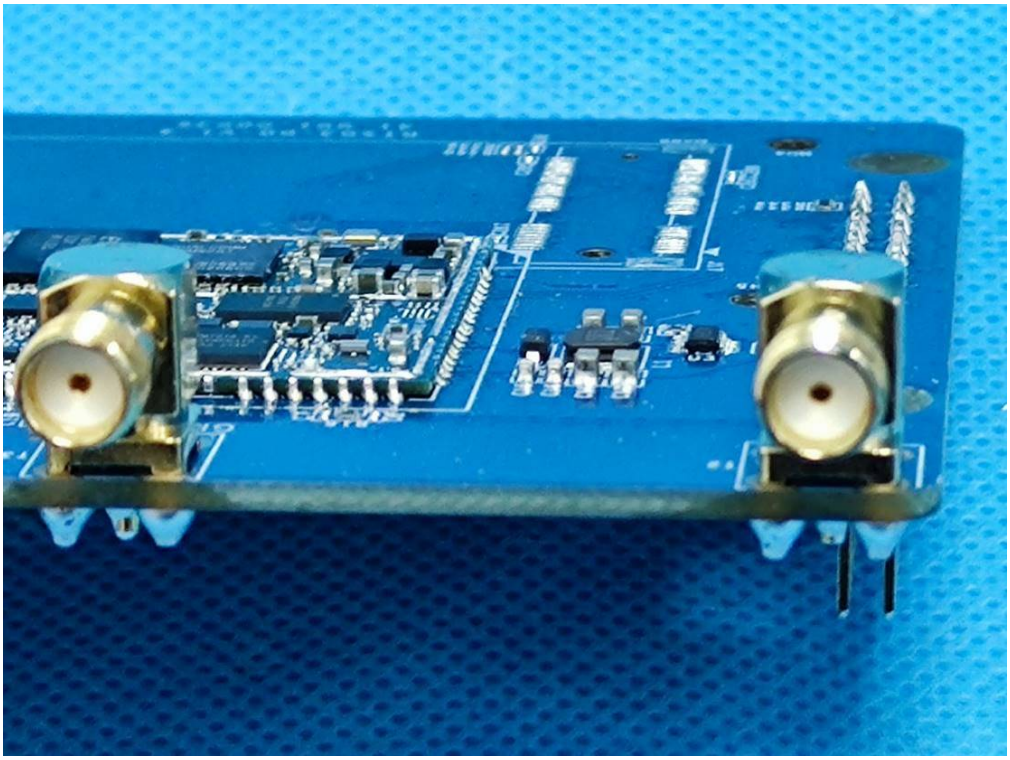
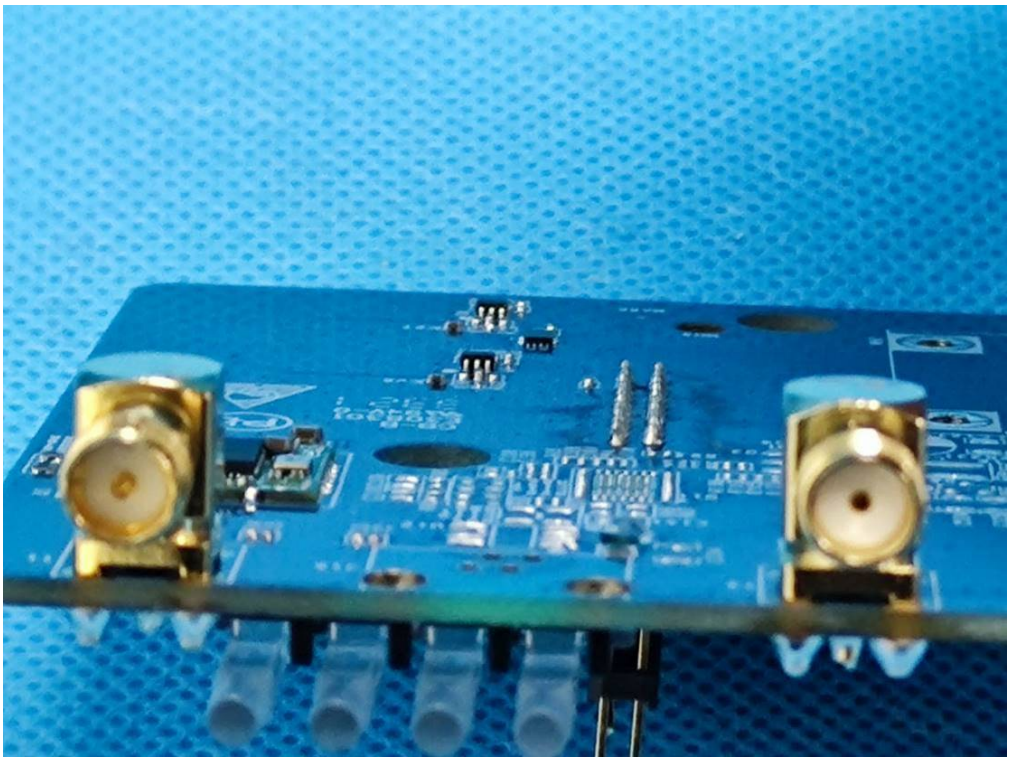
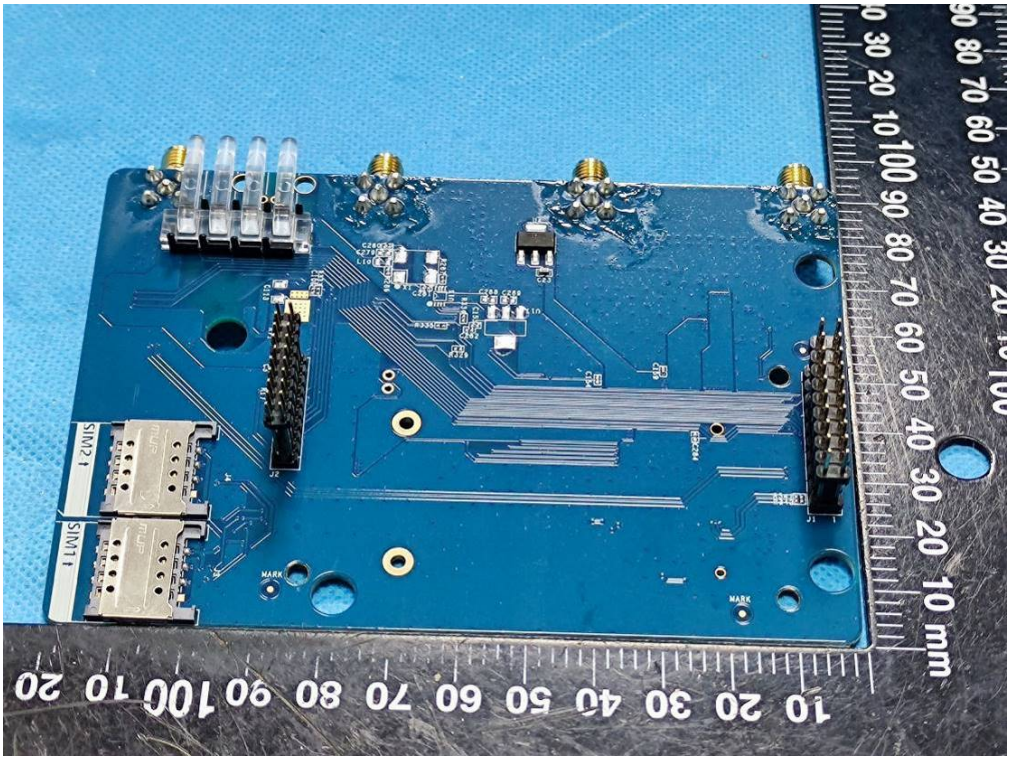
Antenna Port

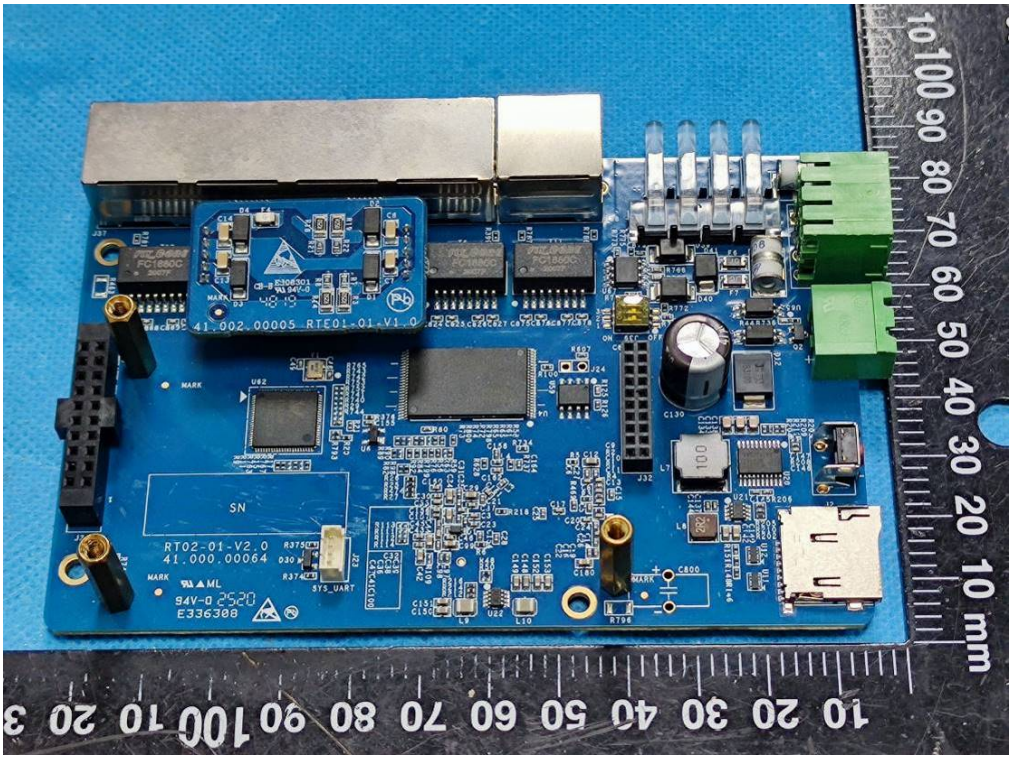


Antenna Port





Port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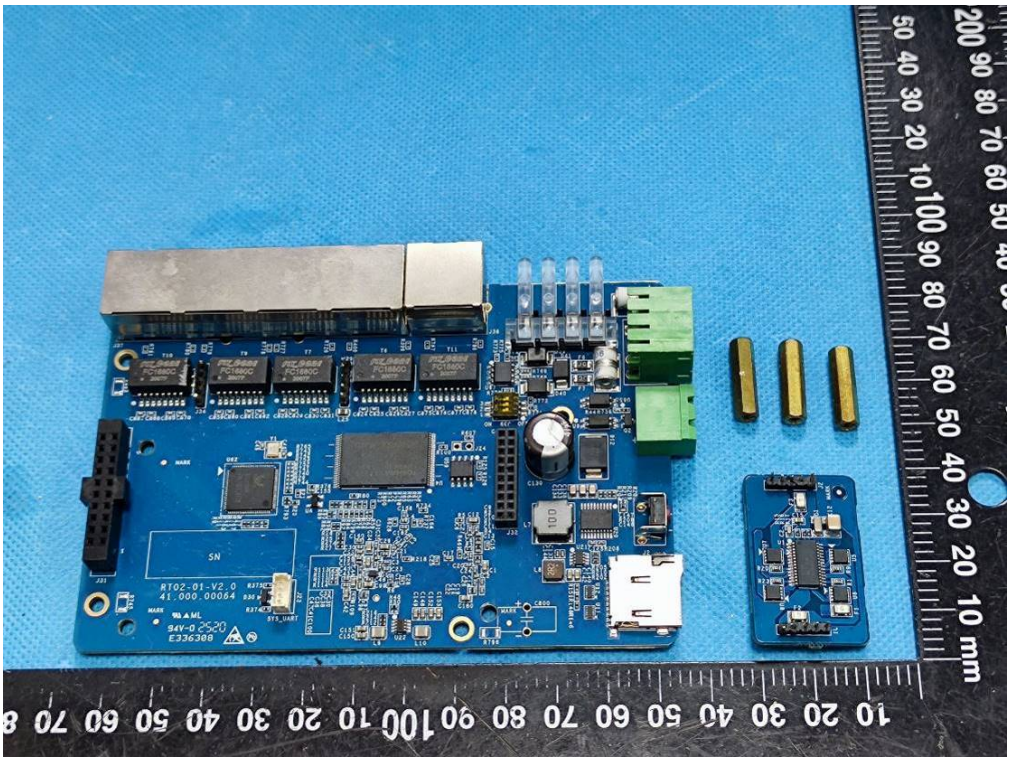
E336308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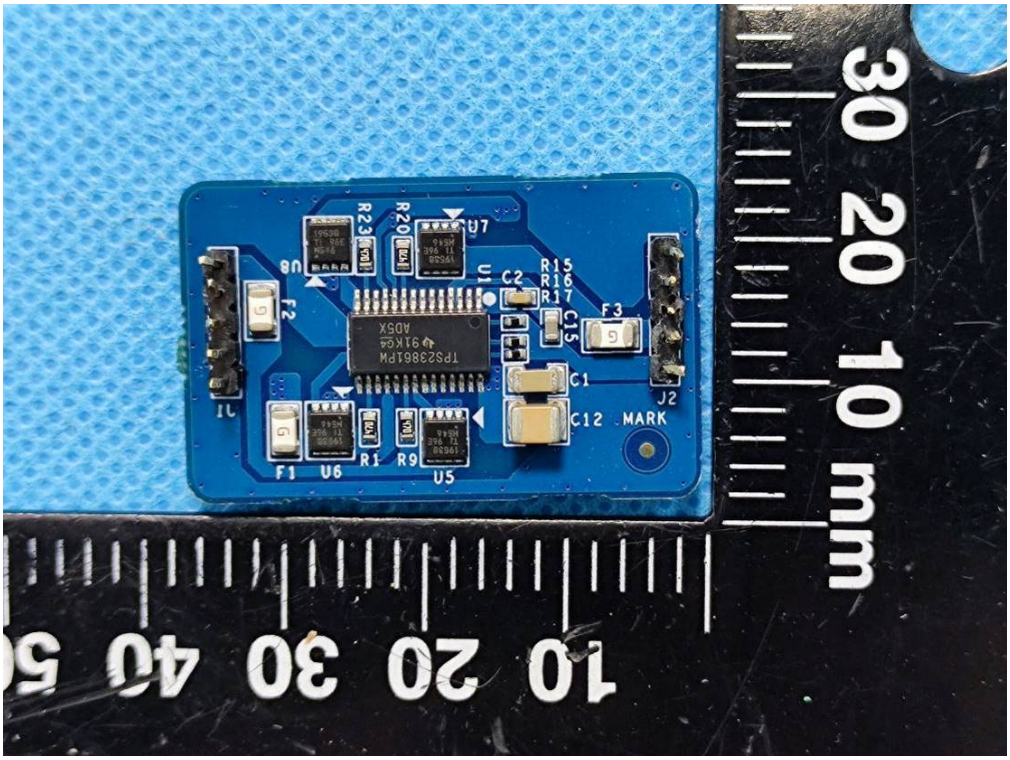
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10 20 30 40 5
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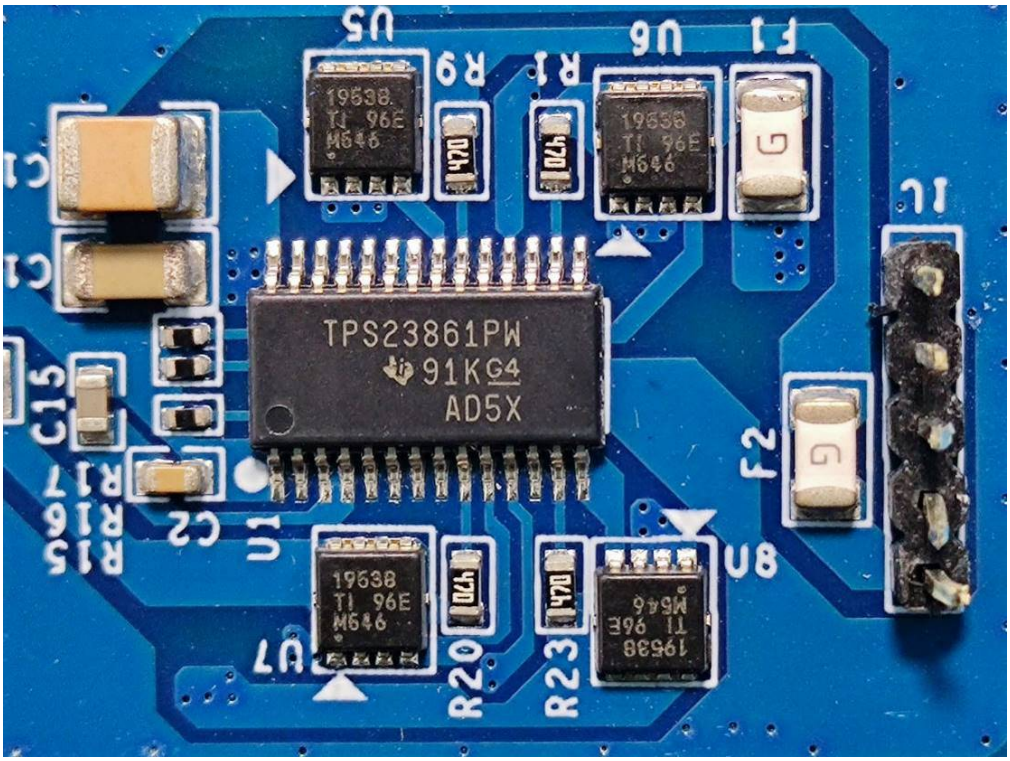
R23
R20
U8
U1
C2
R15
R16
R17
C15
F3
F2
J1
J2
C1
C12
MARK
F1
U6
R1
R9
U5

Chip3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R9
R1
U6
F1
C1
C3
C15
R17
R16
R15
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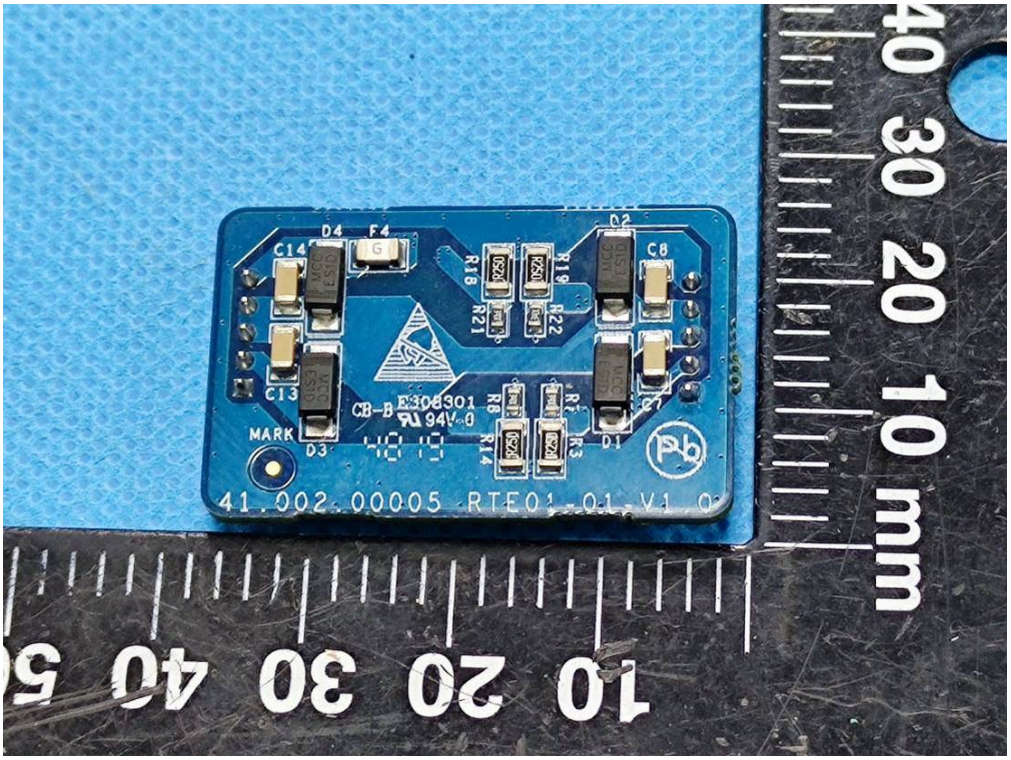
TI 96E
M646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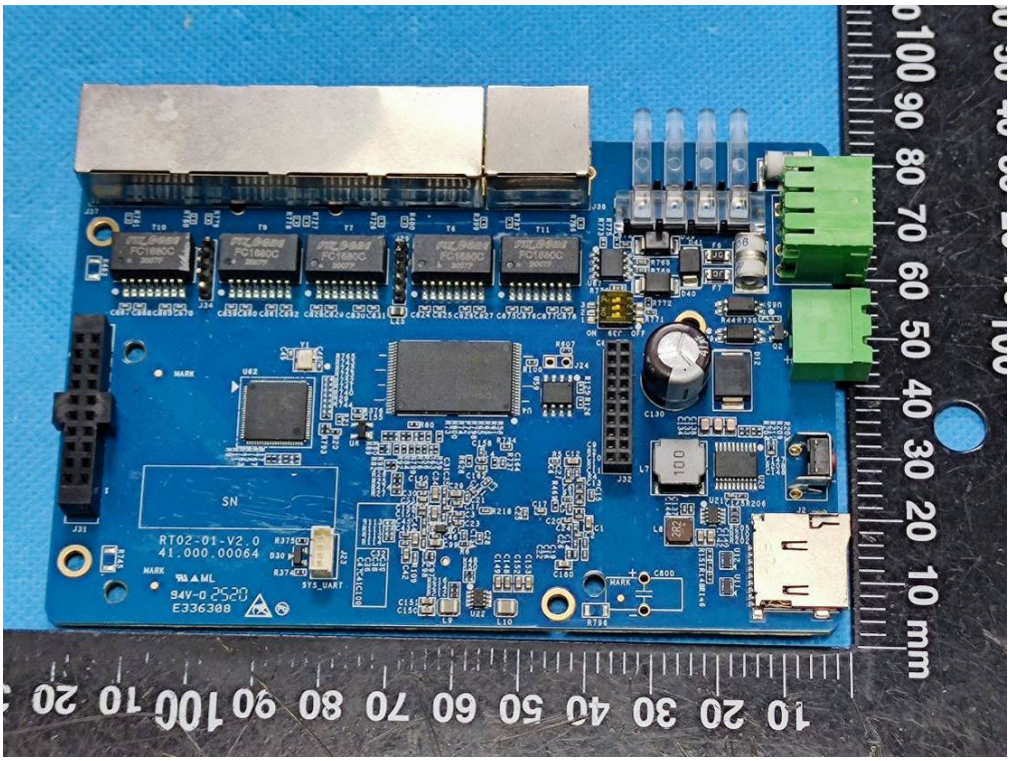
41.002.00005 RTE01-01-V1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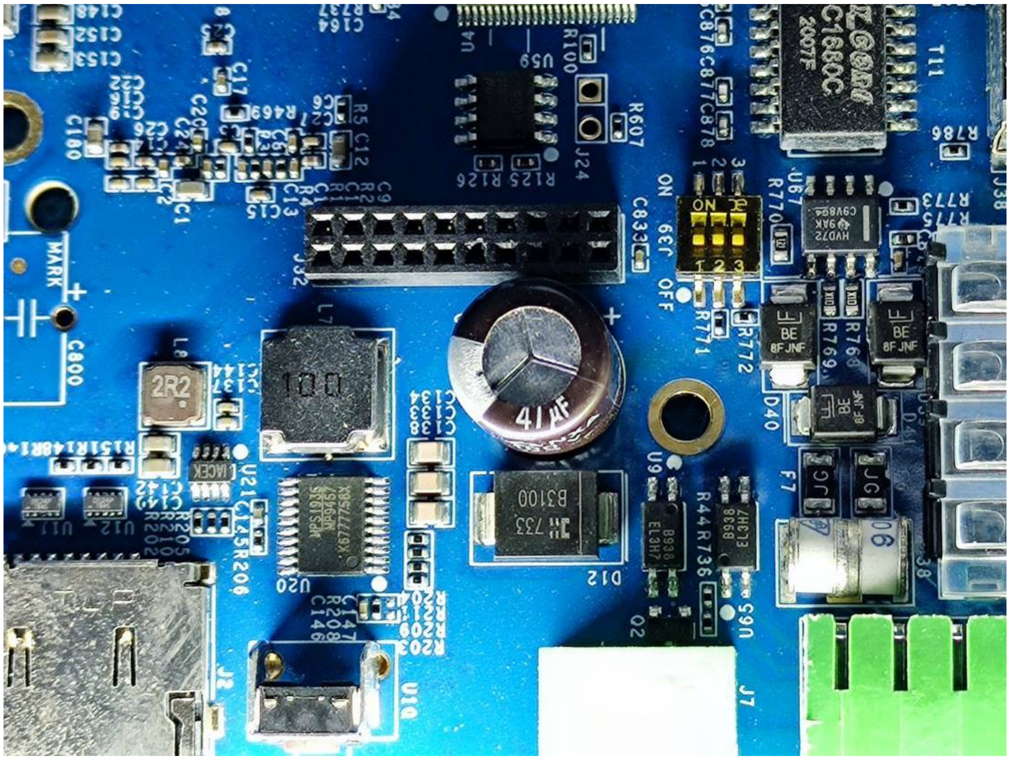
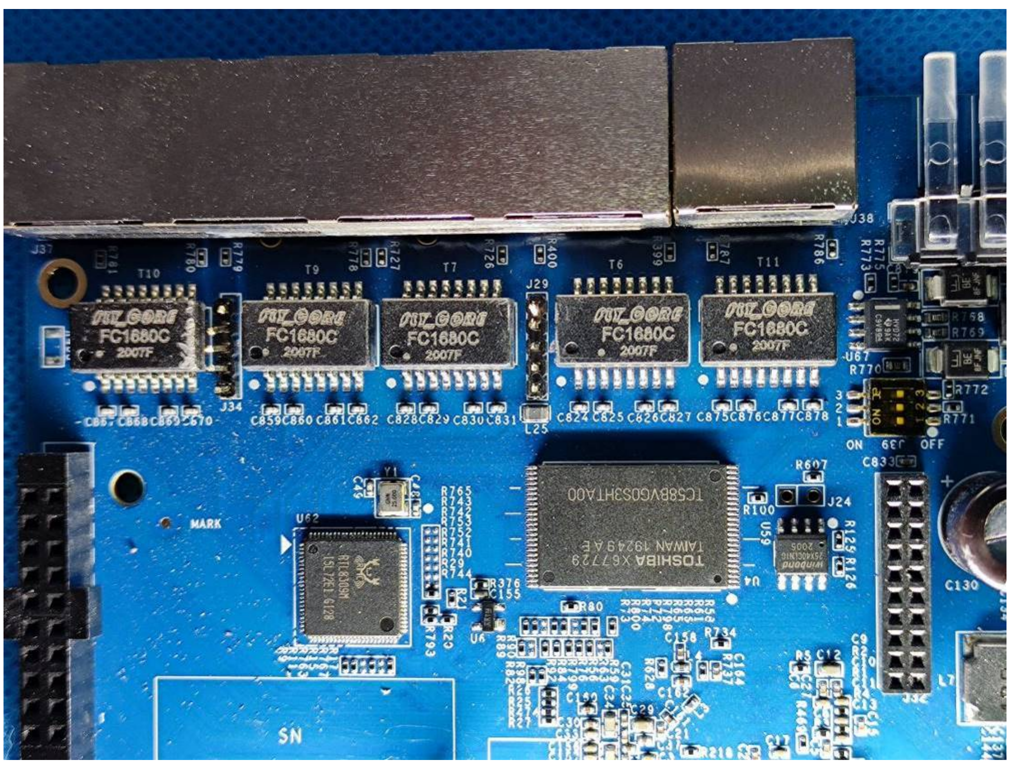
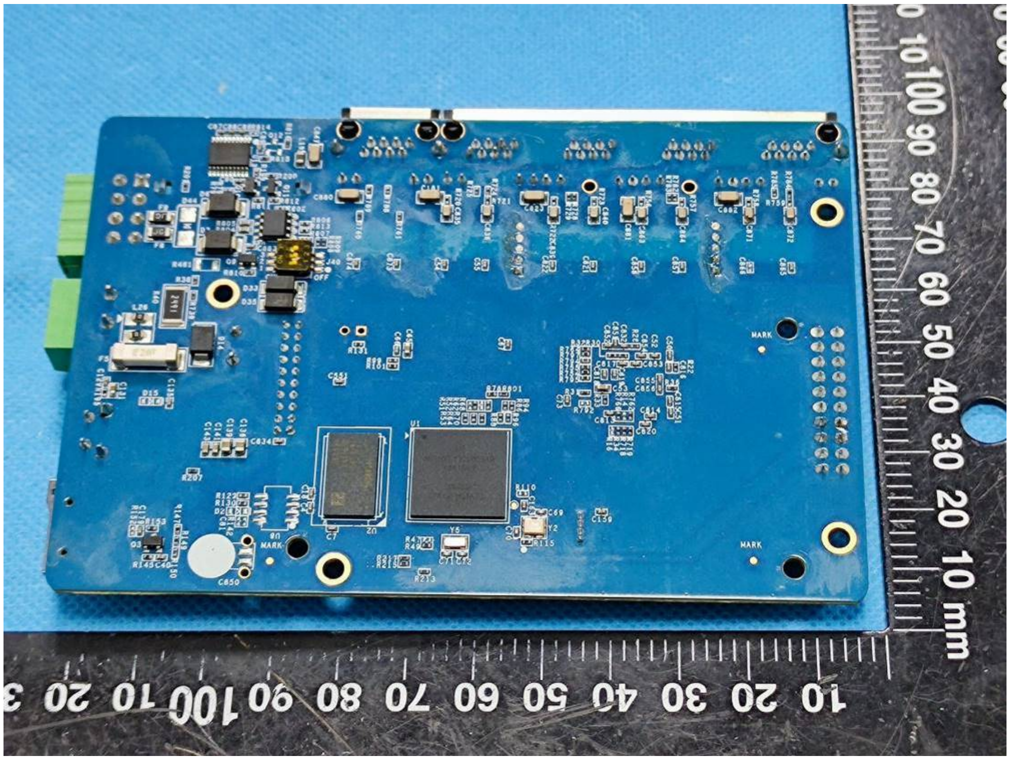
RT02-01-V2.0
41.000.00064
94V-0 2520
E336308

Chip4

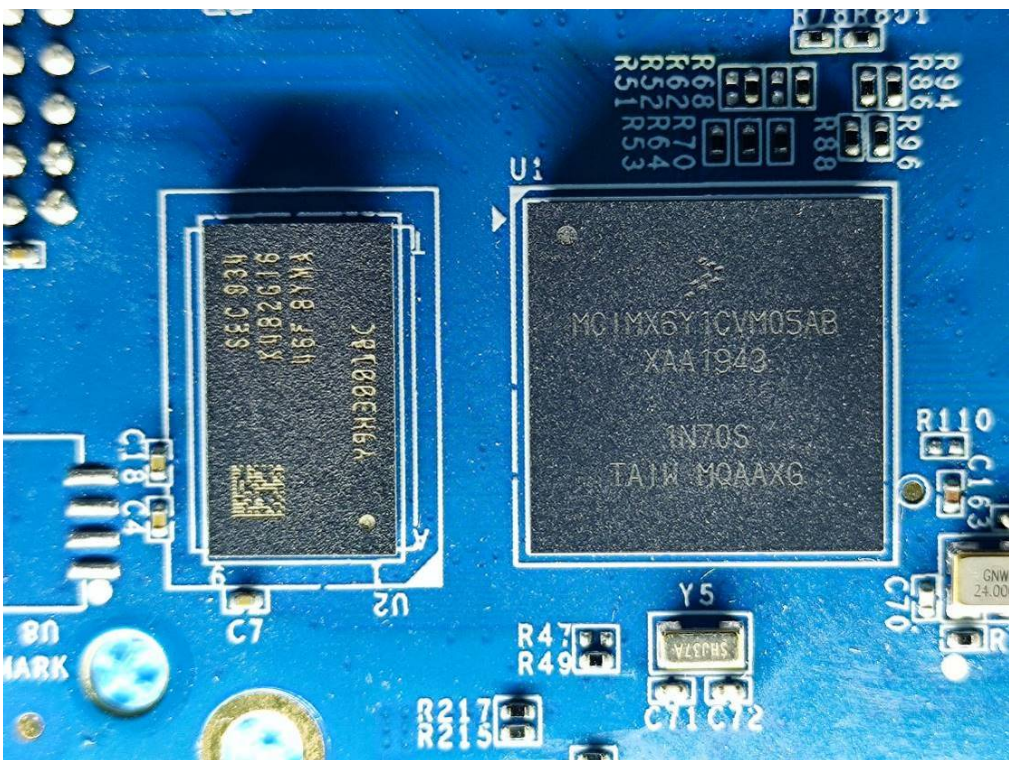


Chip5

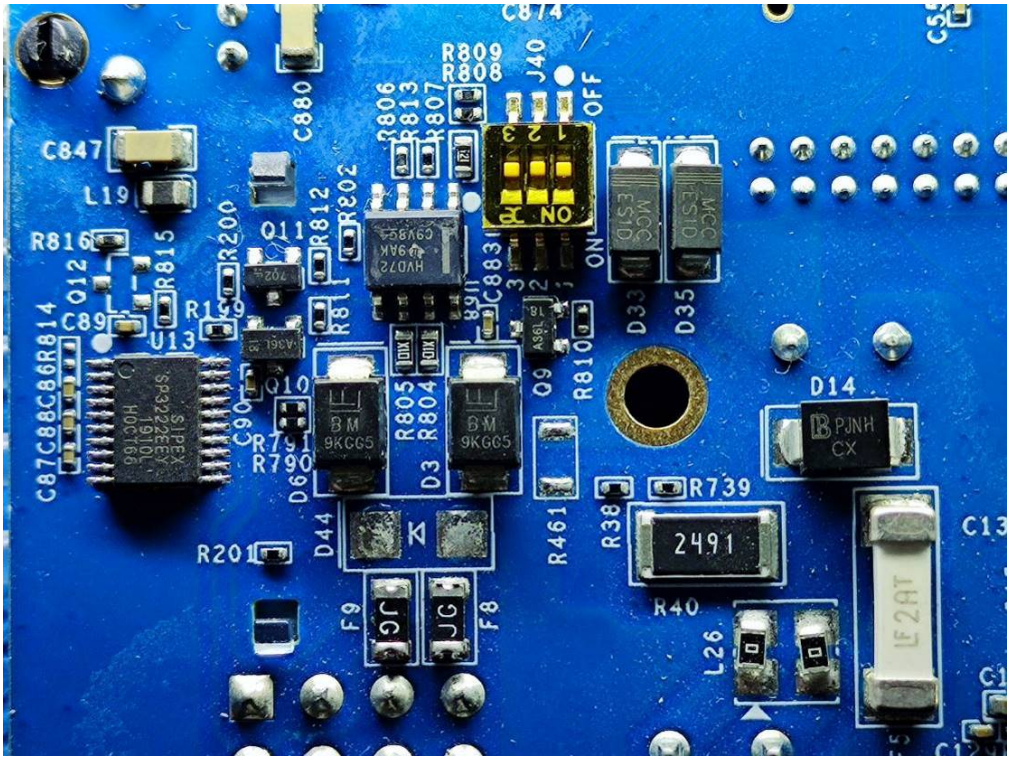




Chip6



Chip7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L19
C880
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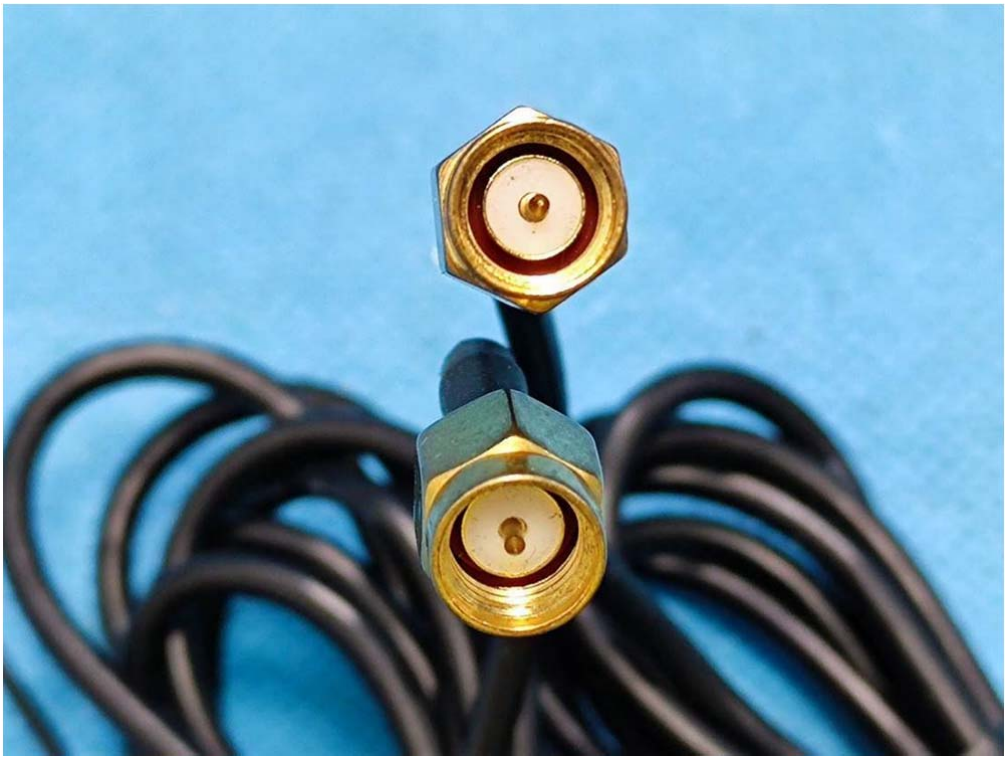
R815
R200
Q11
R812
R802
R806
R813
R807
ON
C883
D33
D35
D14
PJNH
CX
R739
2491
R40
L26
R461
R38
R810
R805
R804
R201
D44
F9
F8
C90
R791
R790
C87C88C86R814
C89
U13
Q10
Q12
R815
R816
LF2AT

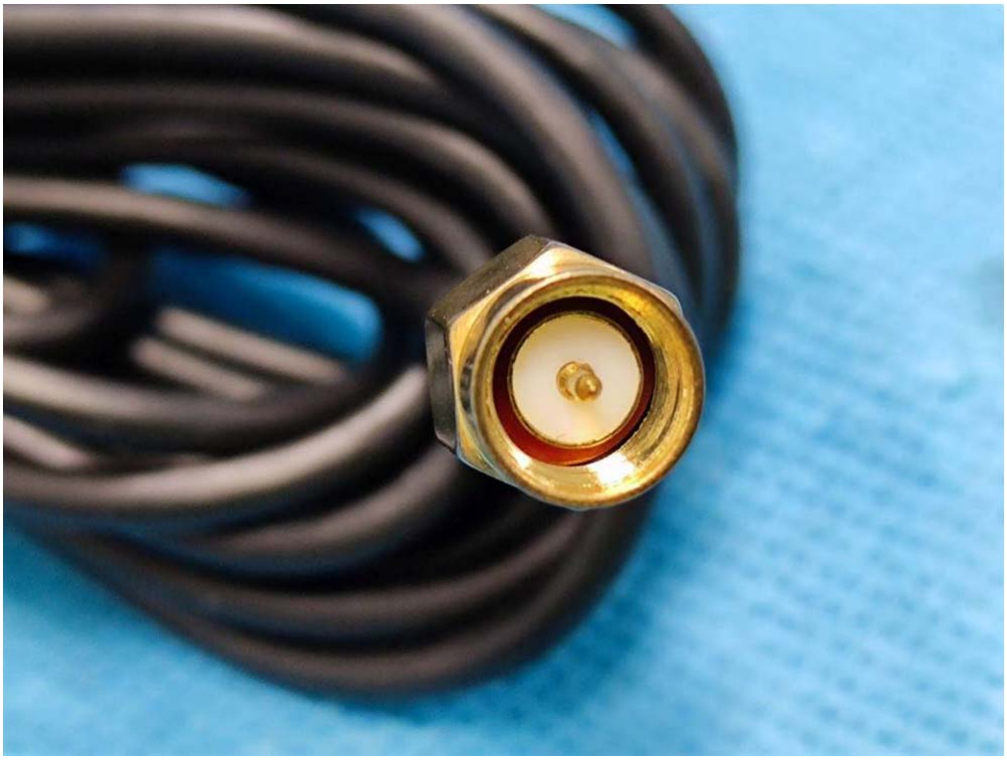

0 20 10 100 90 80 70 60 50 40 30 20 10 mm
10 20 30 40 50 60 70 80 90 100 10 20 30 40 50 60 70

WiFi Antenna

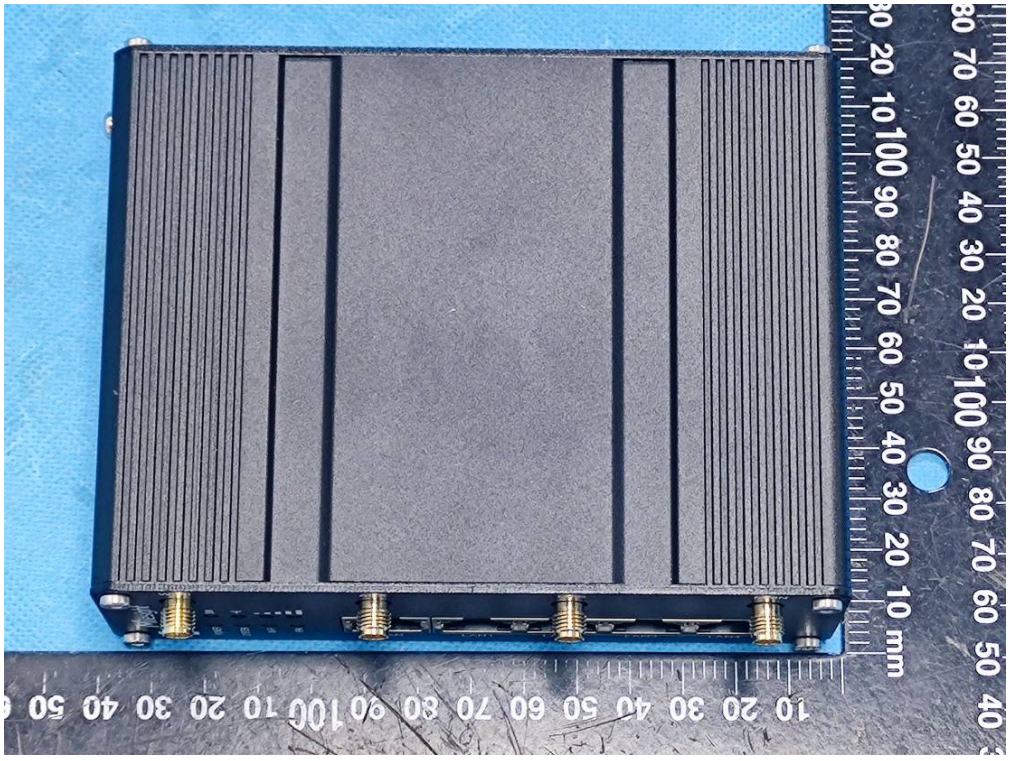
WWAN(2G/3G/4G) Antenna



GPS Antenna

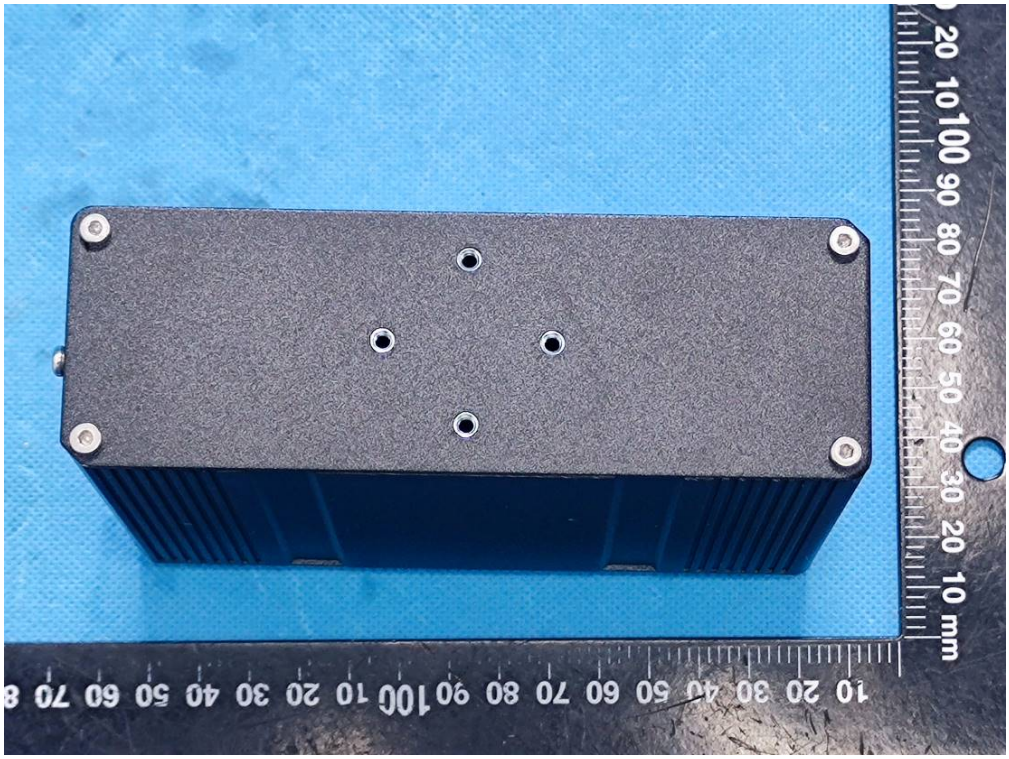


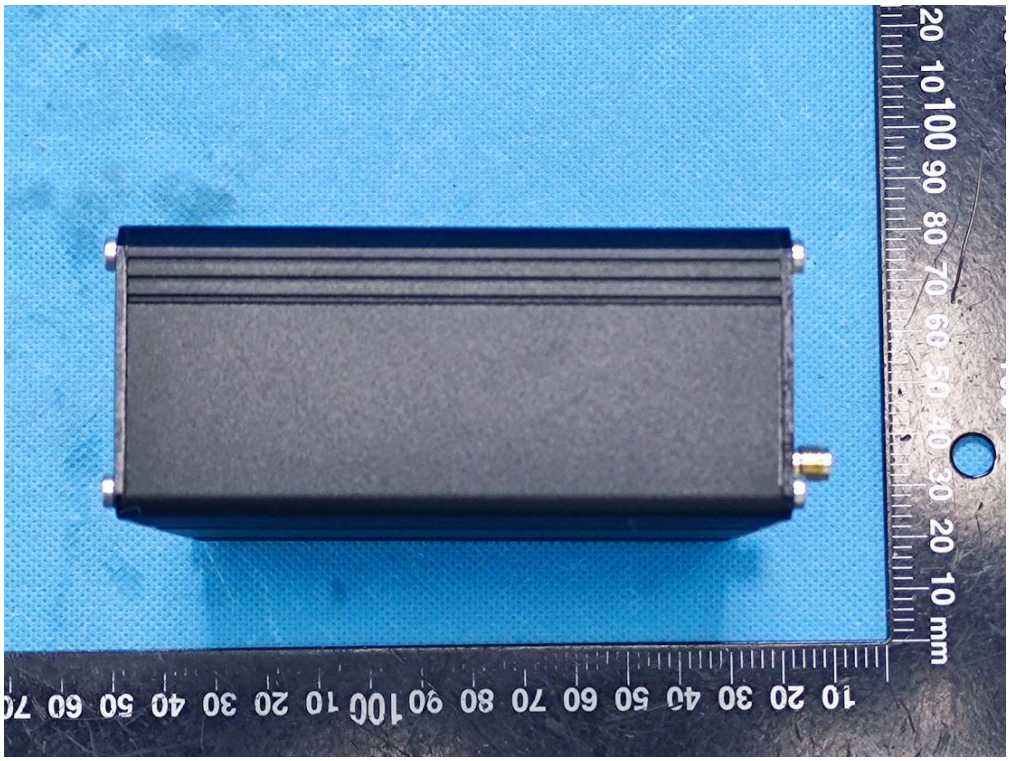
UR35-L04EU-G-W




Wi-Fi
AUX
GPS
MAIN
Milesight
SIM
POWER
SYSTEM
Wi-Fi
VPN
UR35
WAN
LAN1
LAN2
LAN3
LAN4

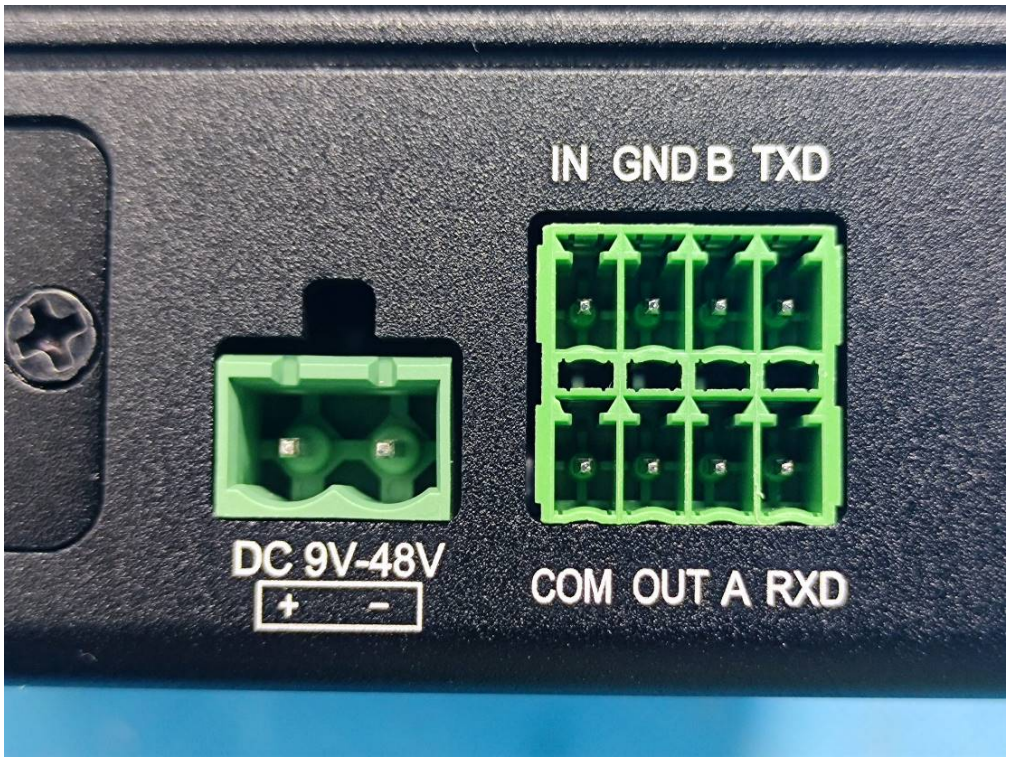

Milesight
Industrial Cellular Router
Model: UR35-L04EU-G-W
Power Input: 9-48V DC
LAN: 192.168.13
Username: admin
Password: password






SIM 1
SIM 2
IN GND B TXD
MICRO SD
RESET
DC 9V-48V
+ -
COM OUT A RXD

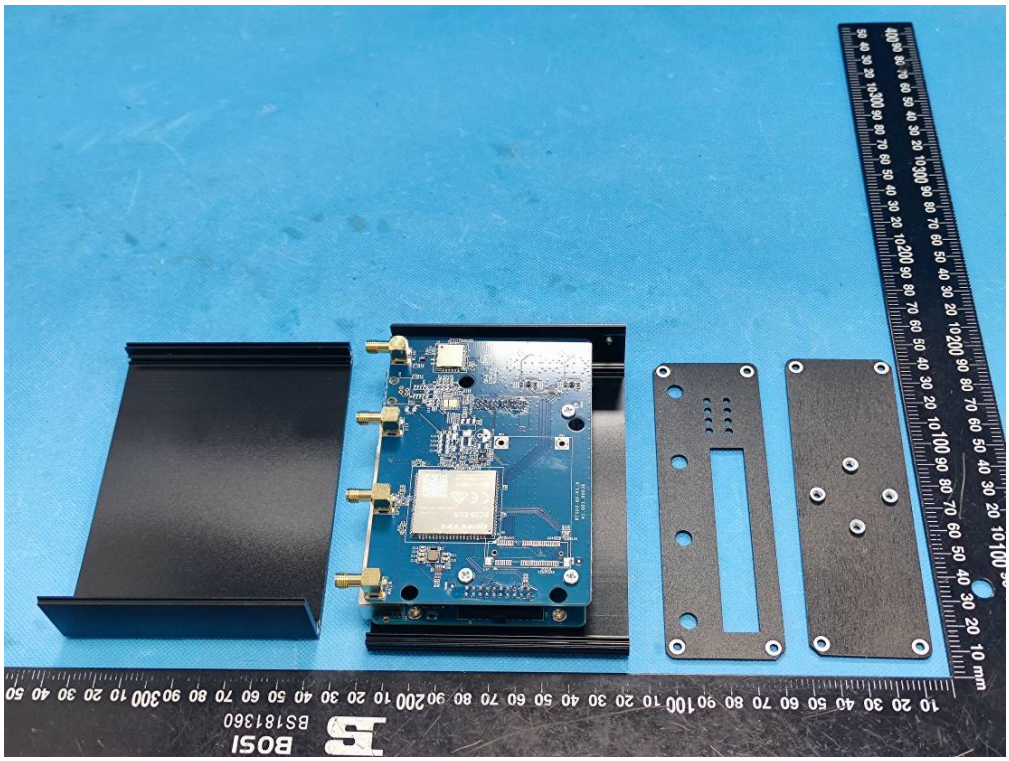
Port

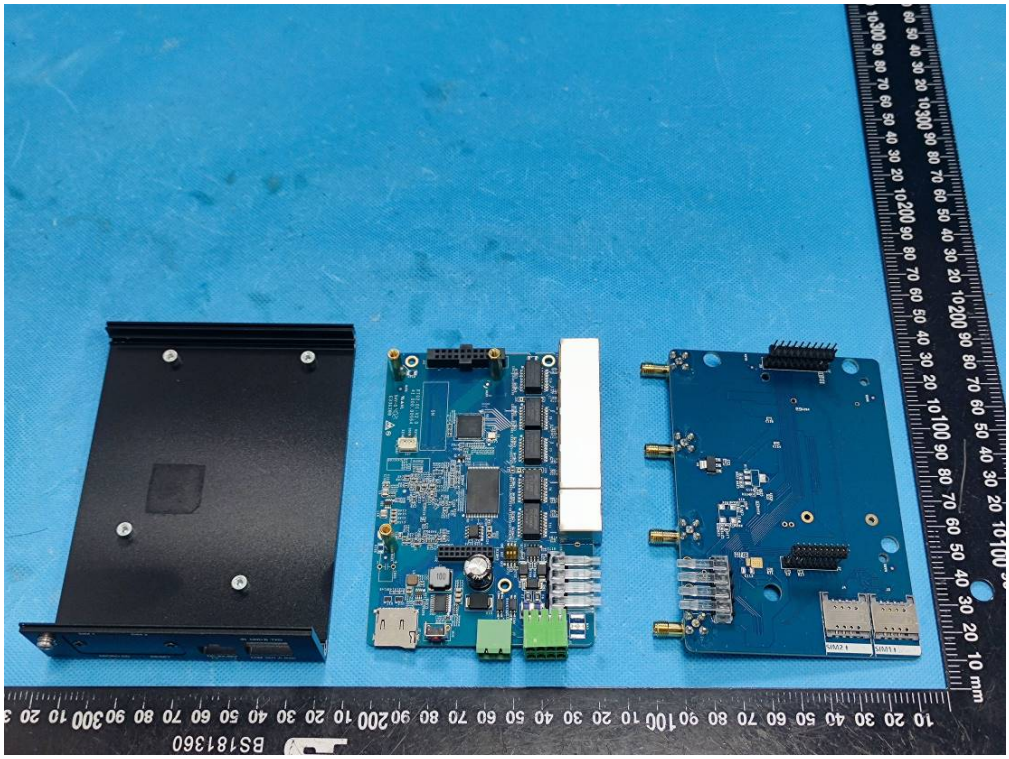

IN GND B TXD
DC 9V-48V
+ -
COM OUT A RXD

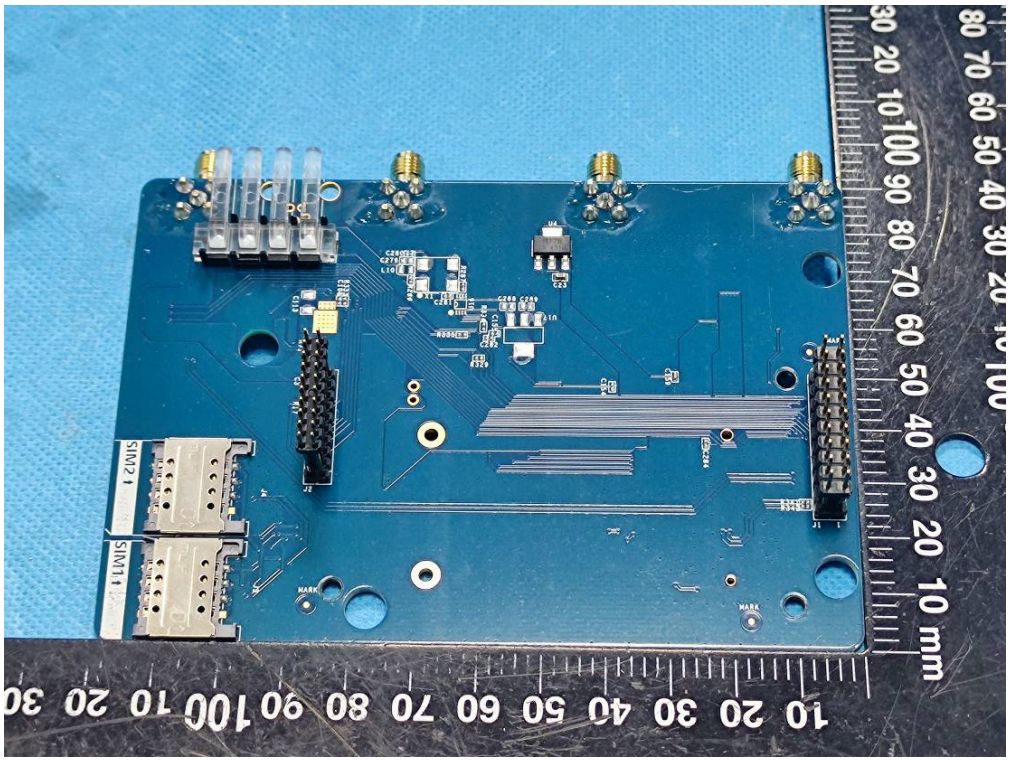
Port

Uncover

Port



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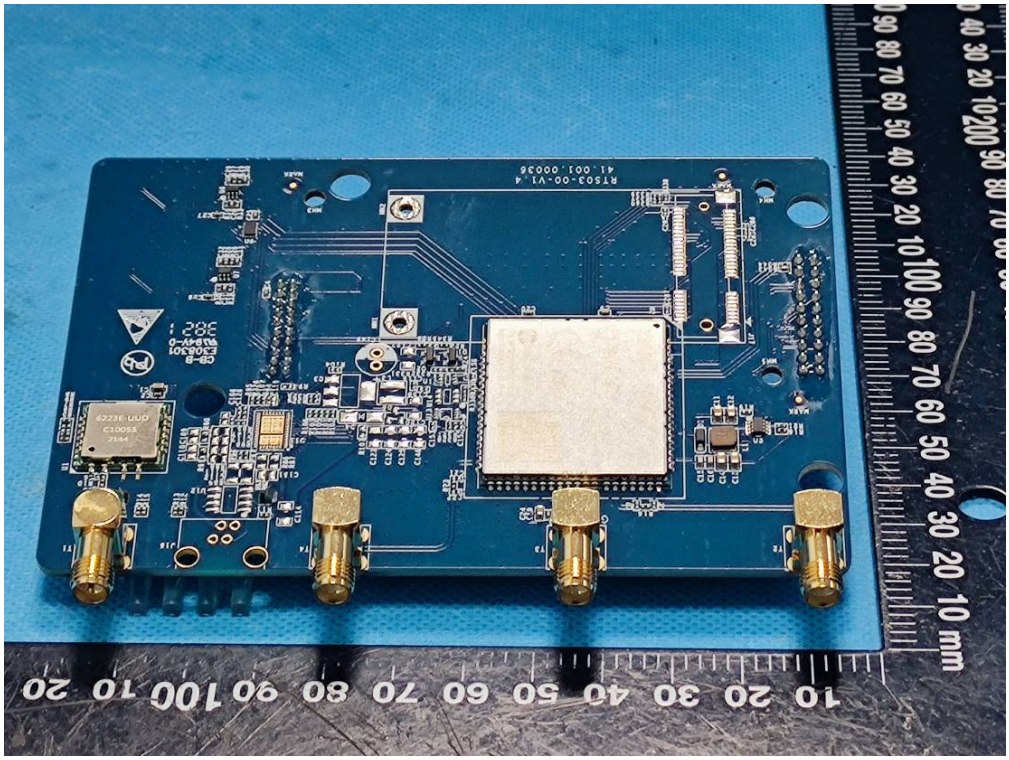
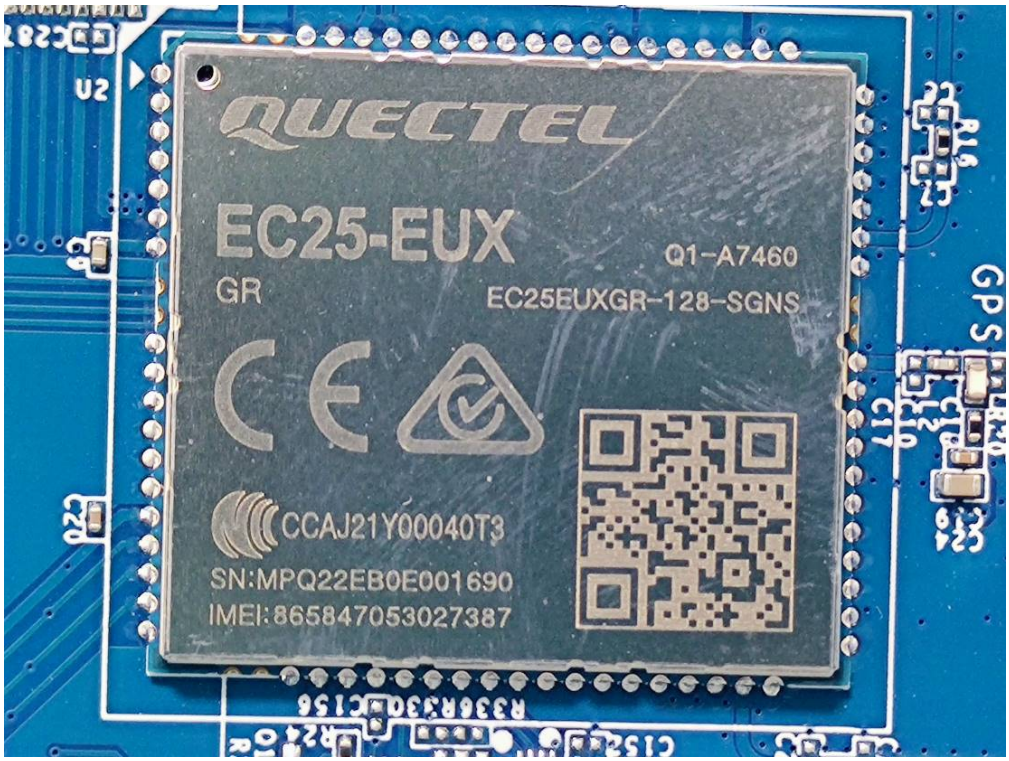
SIM1

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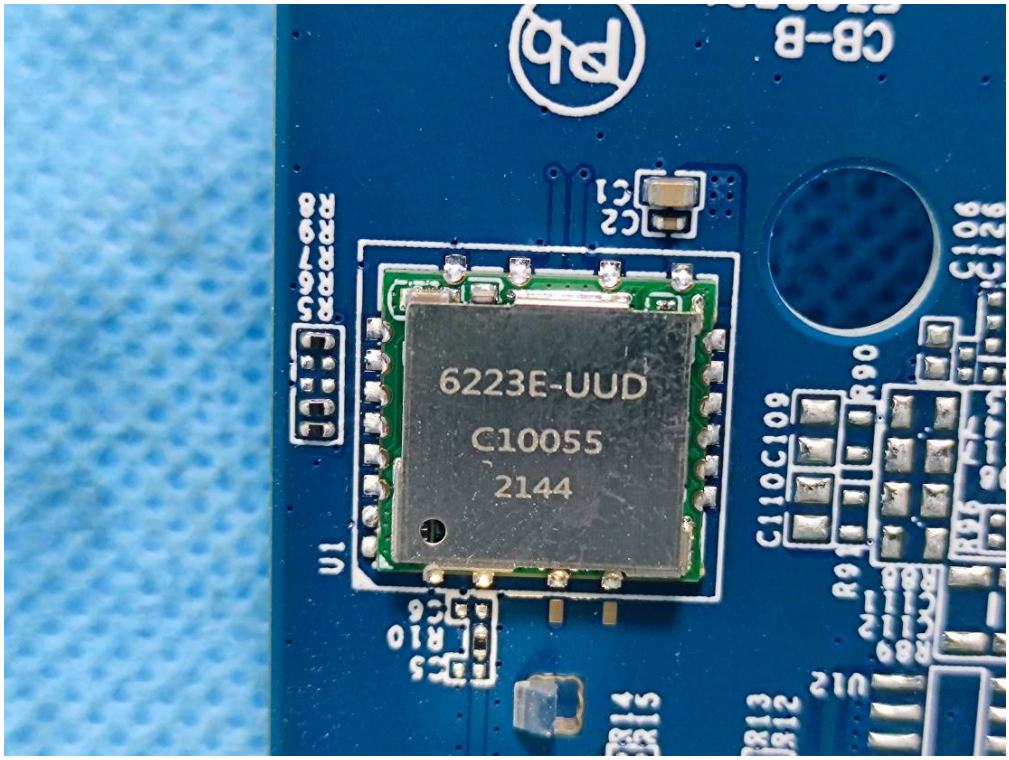
U2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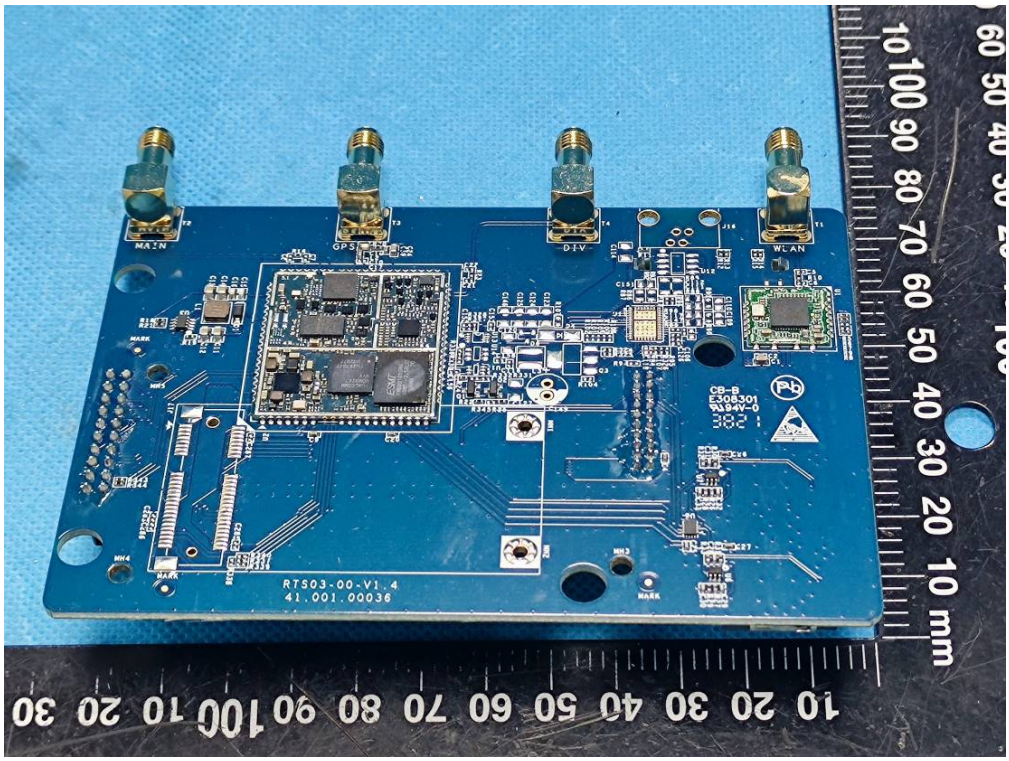
2144
U1


MAIN
GPS
DIV
WLAN
RT503-00-V1.4
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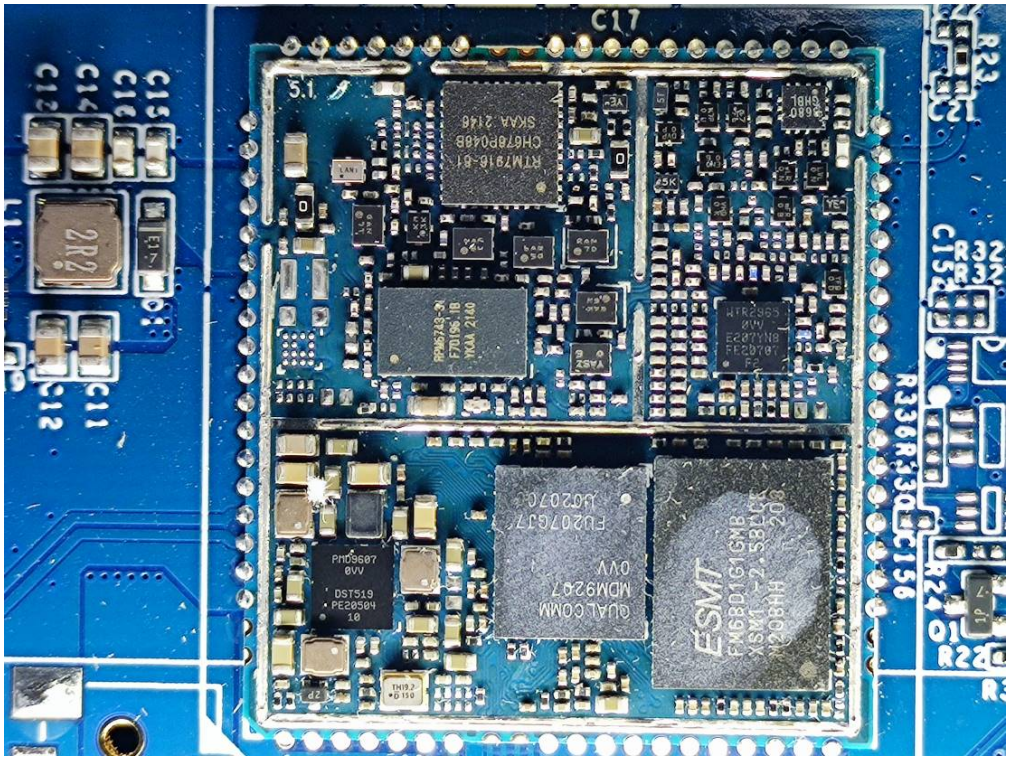
10 100 90 80 70 60 50 40 30 20 10 mm

Chip1



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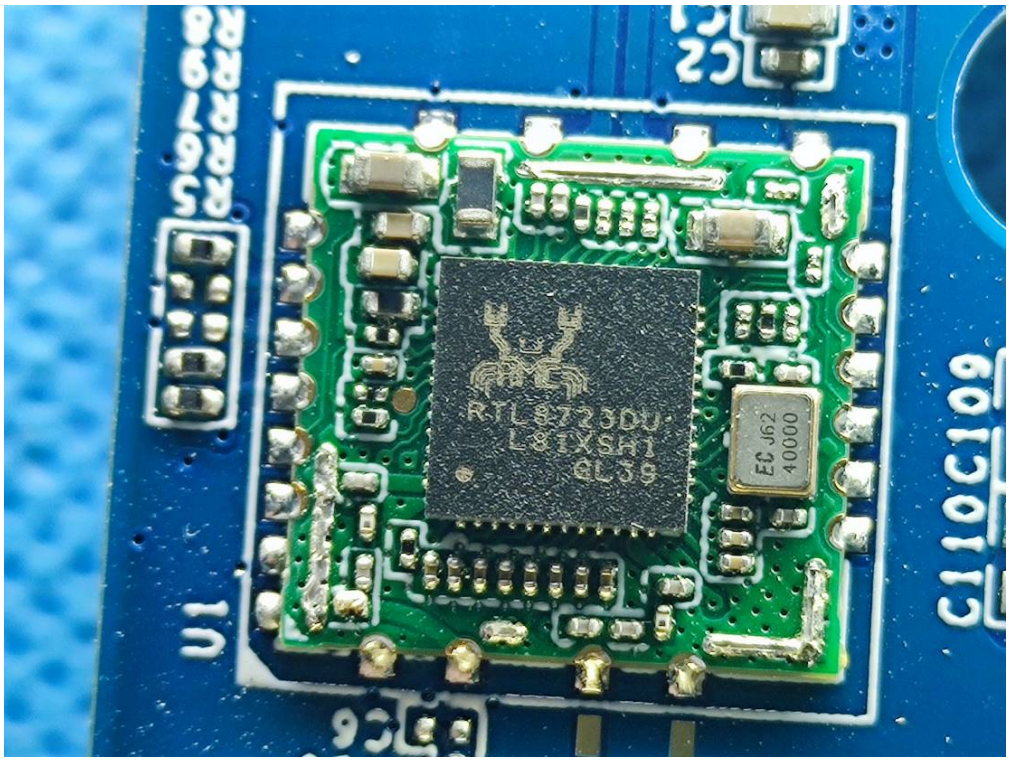
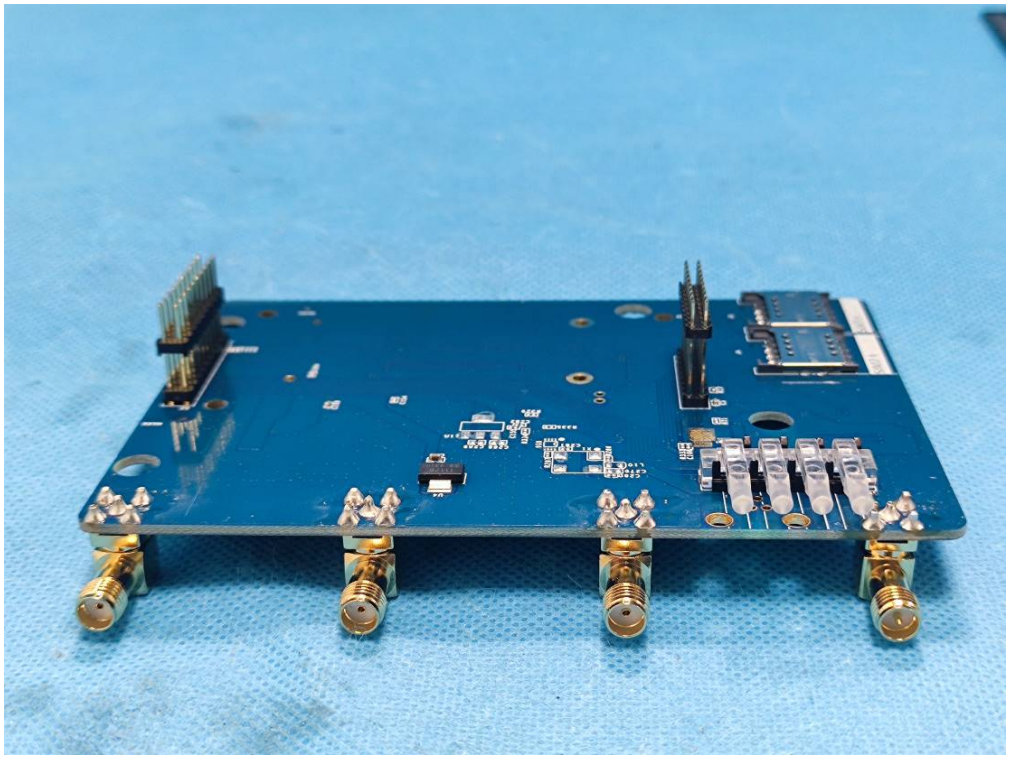
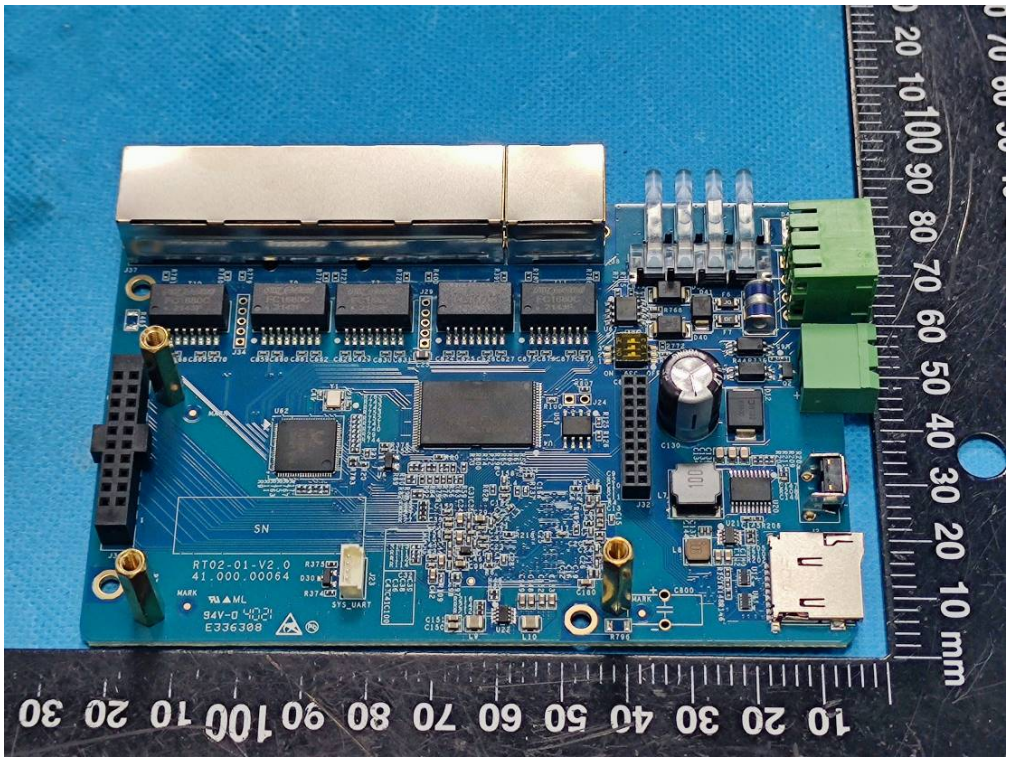
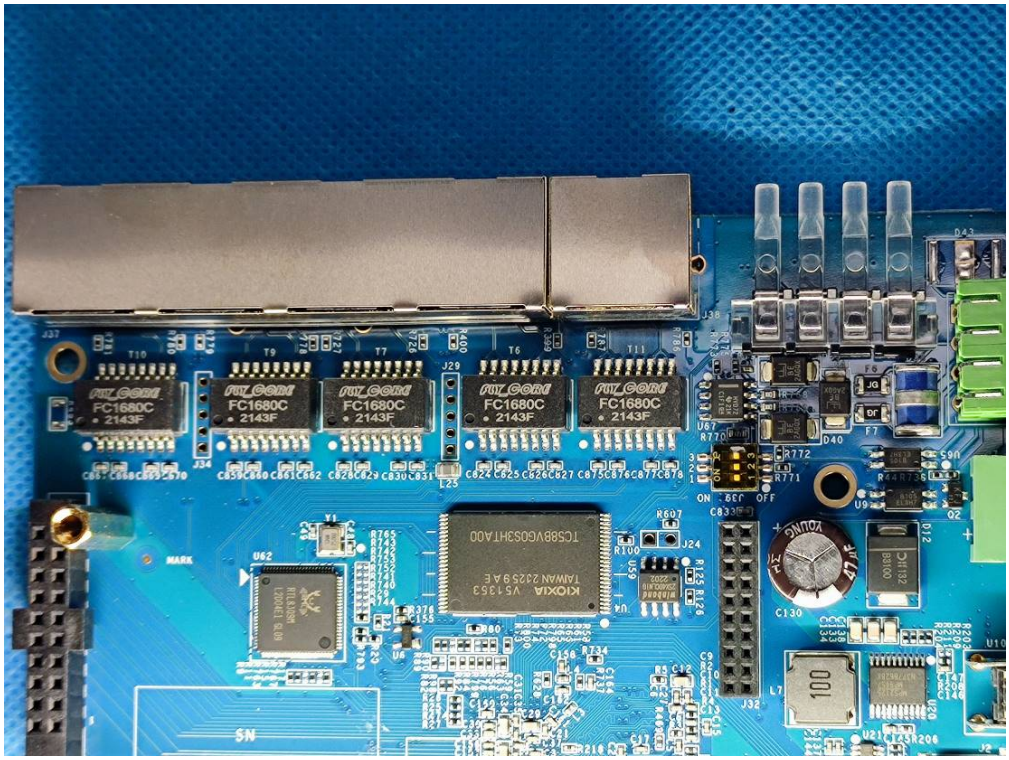


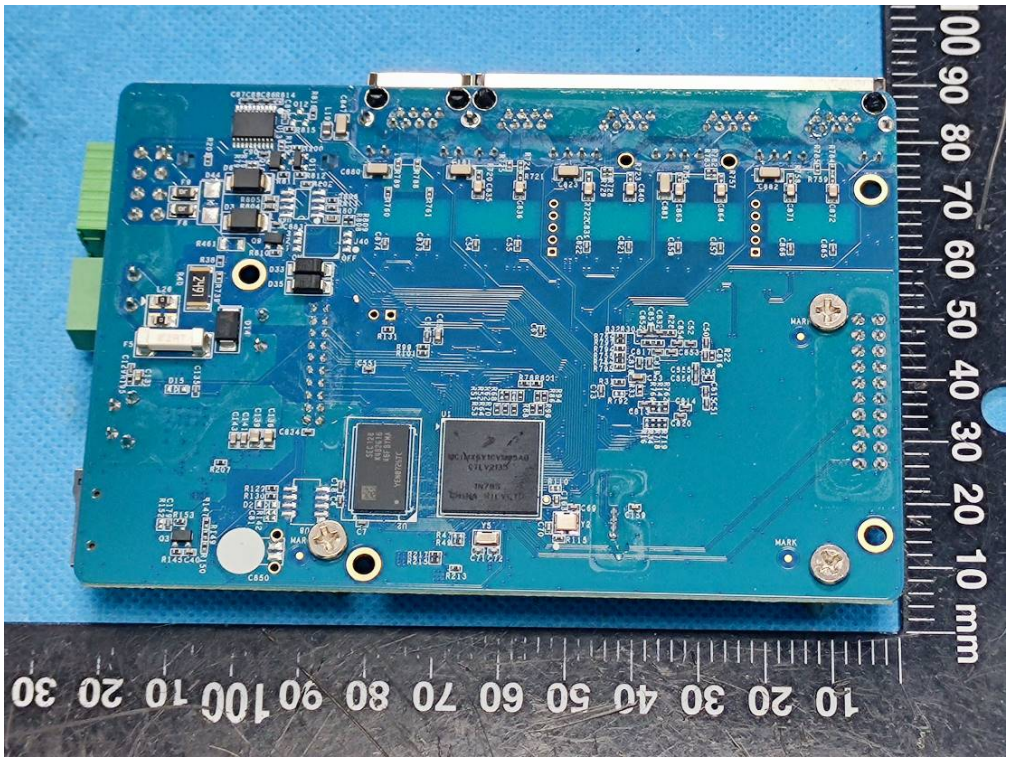
Antenna Port



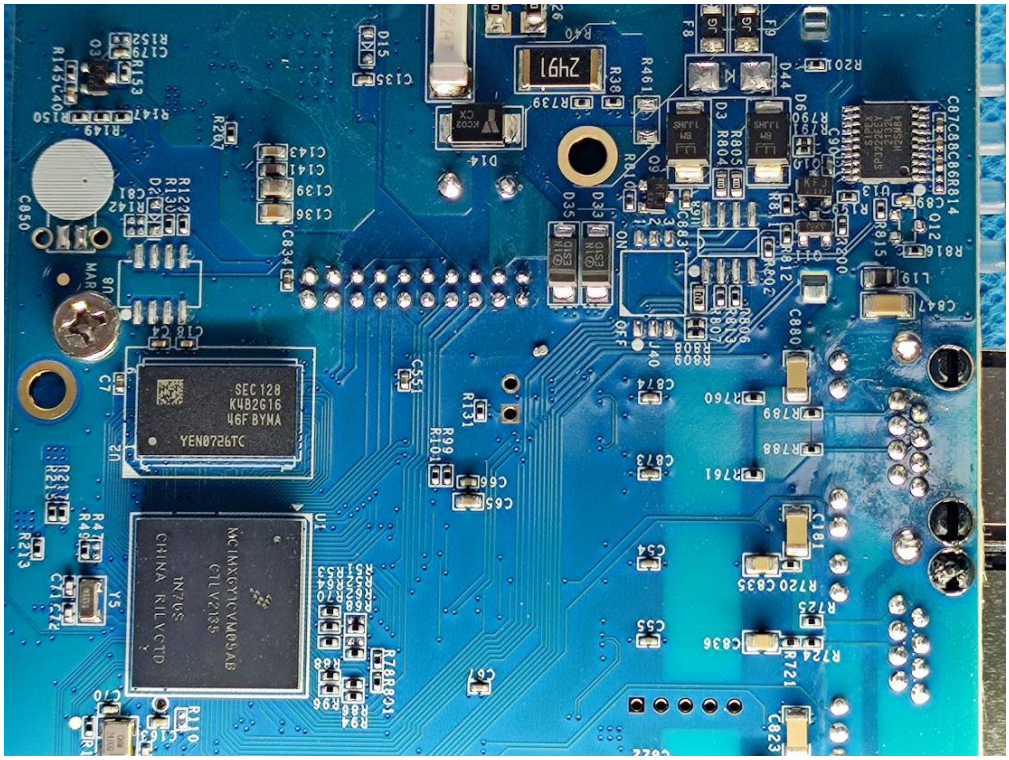


Chip3



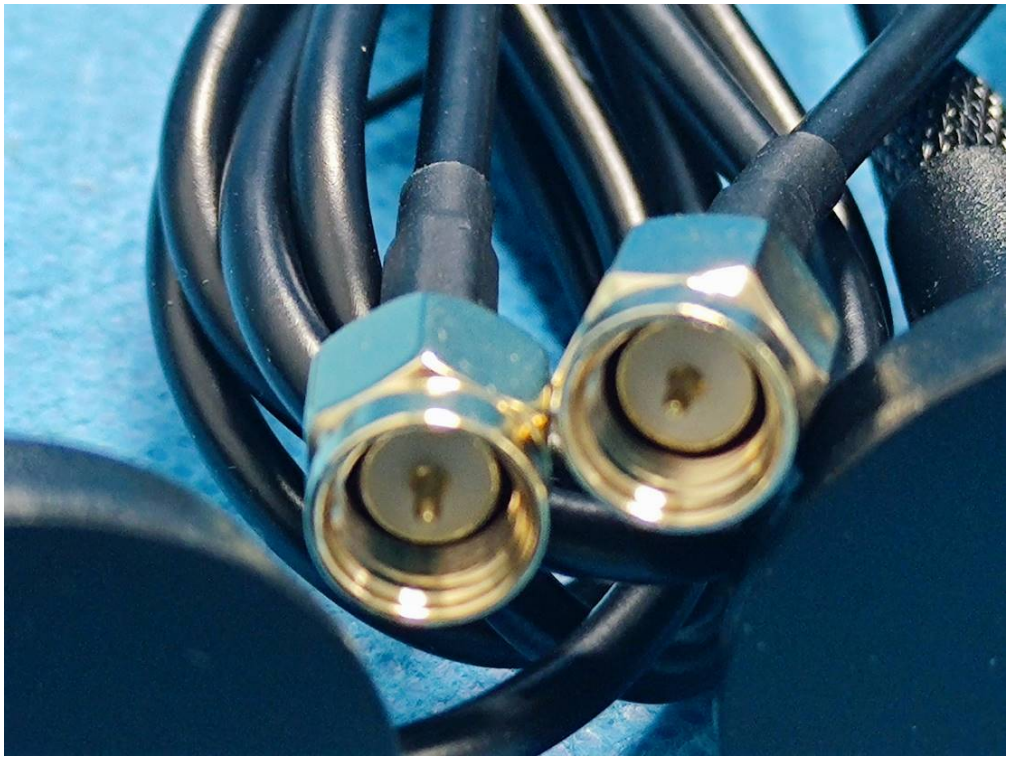


Chip4



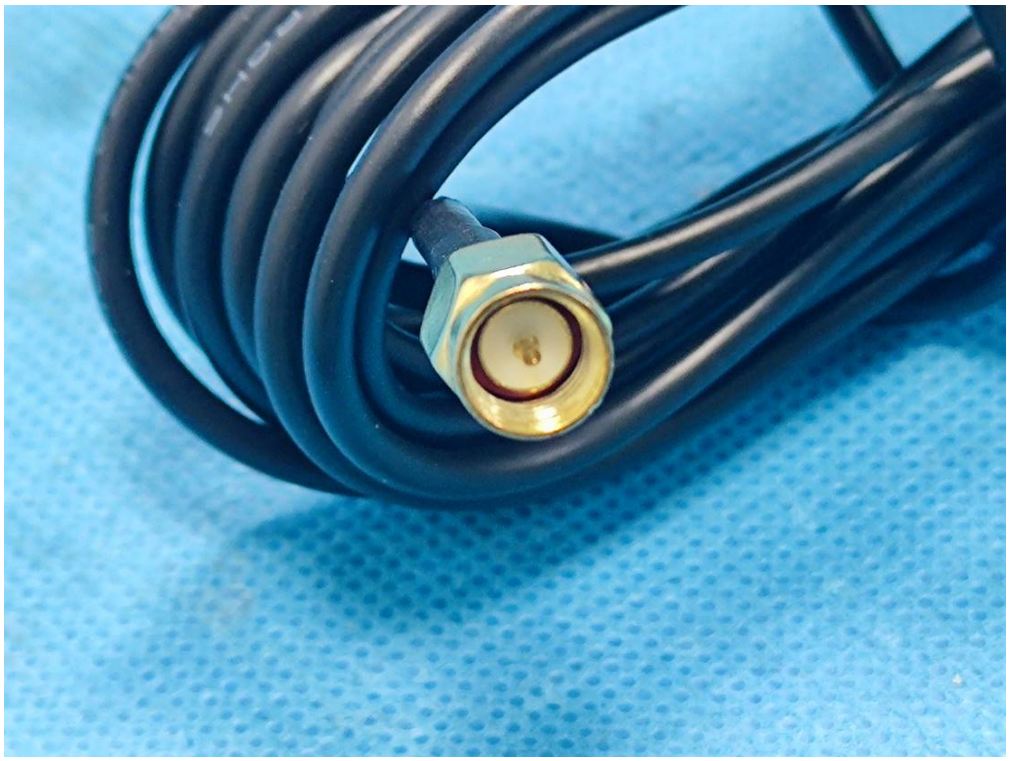
WWAN(2G/3G/4G) Antenna

Port

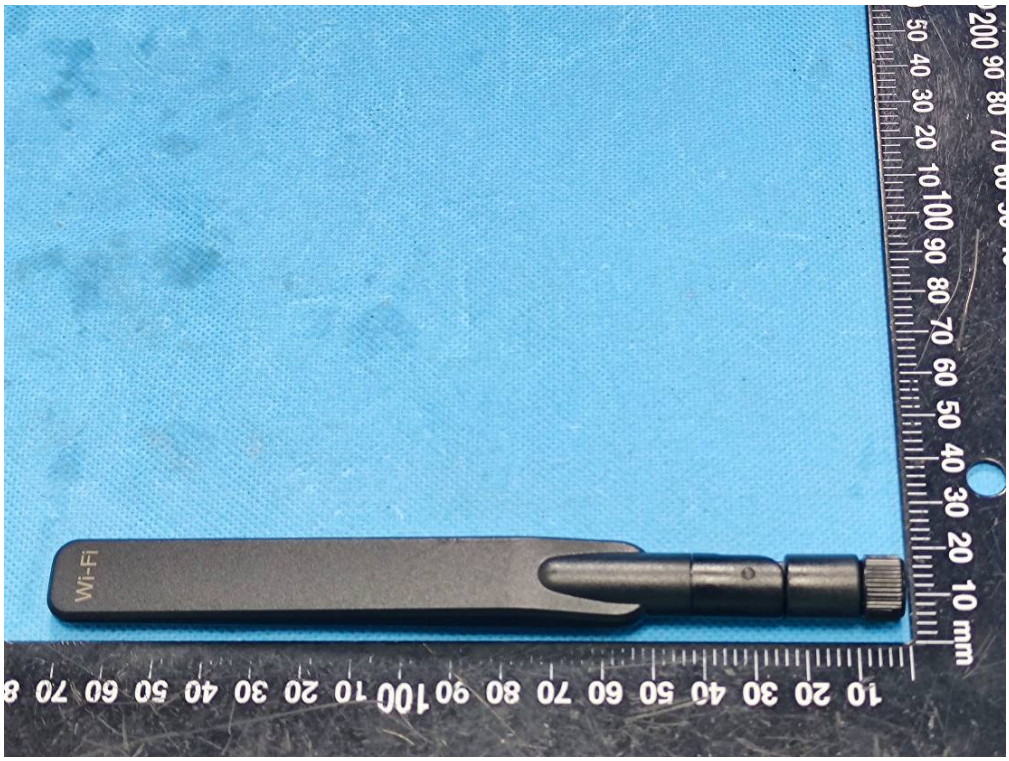


GPS Antenna

Port



WiFi Antenna



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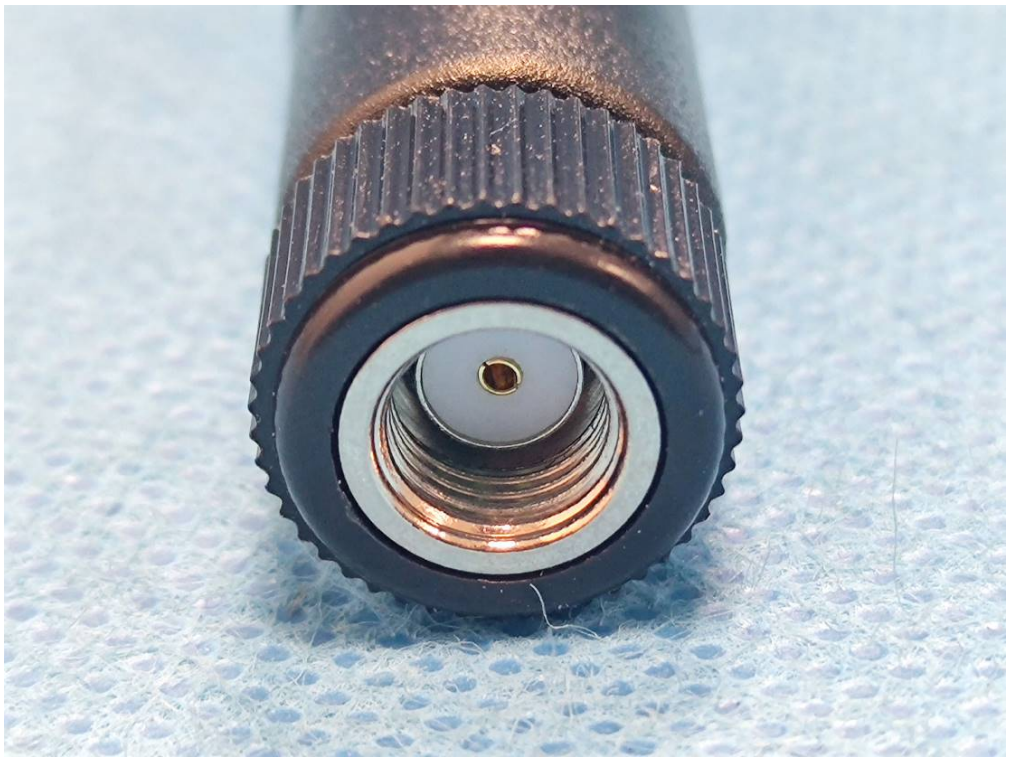
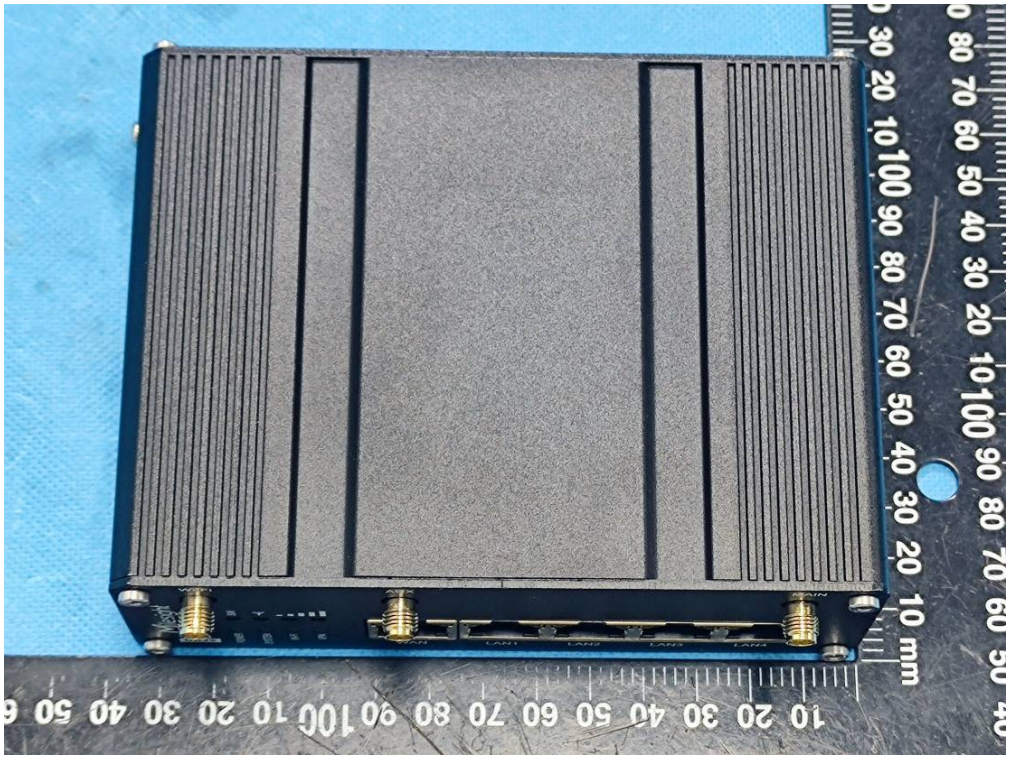
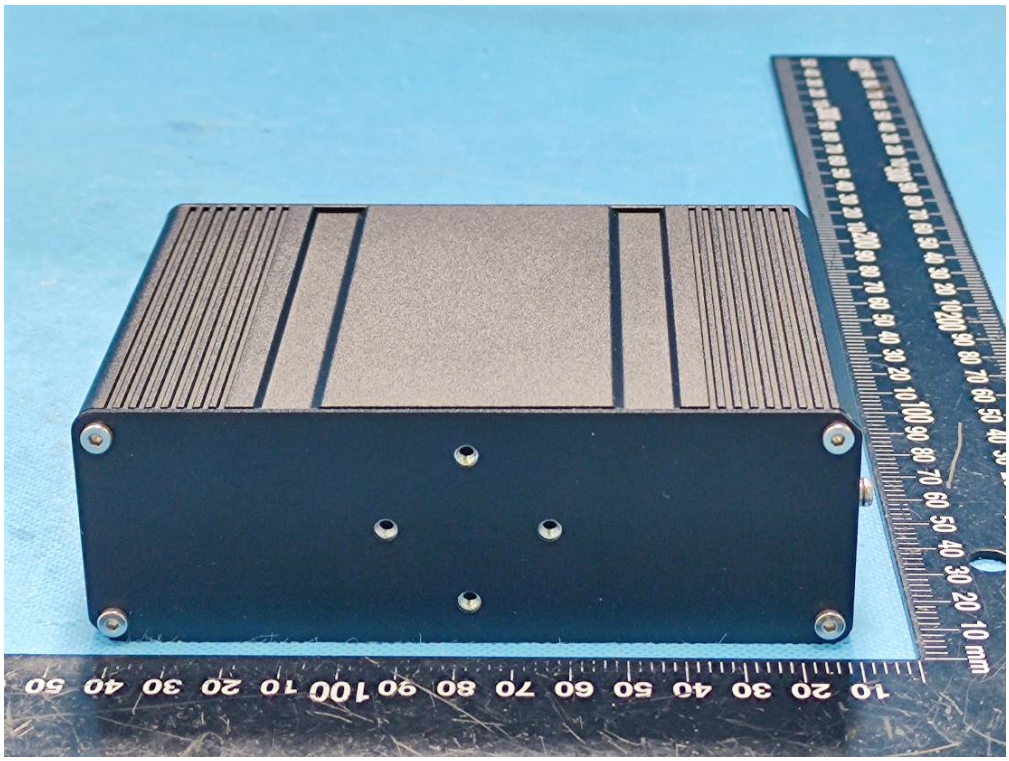


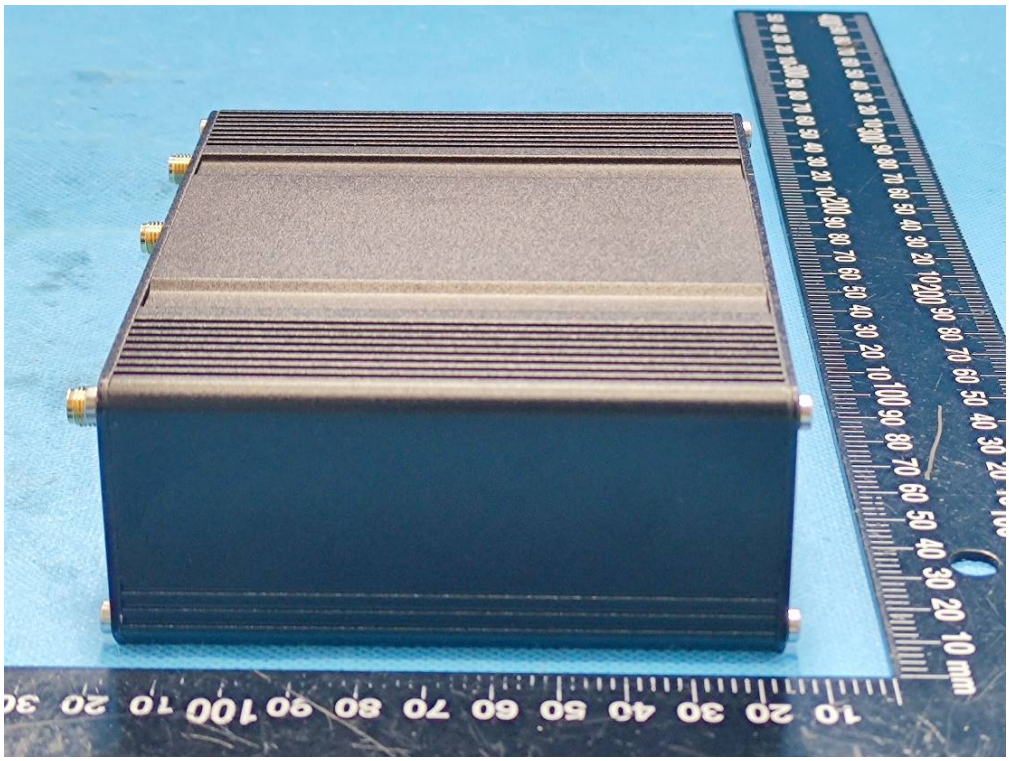
UR35-L04EU-P-W




Wi-Fi
AUX
MAIN
Milesight
SIM
UR35
POWER
SYSTEM
Wi-Fi
VPN
WAN
LAN1
LAN2
LAN3
LAN4

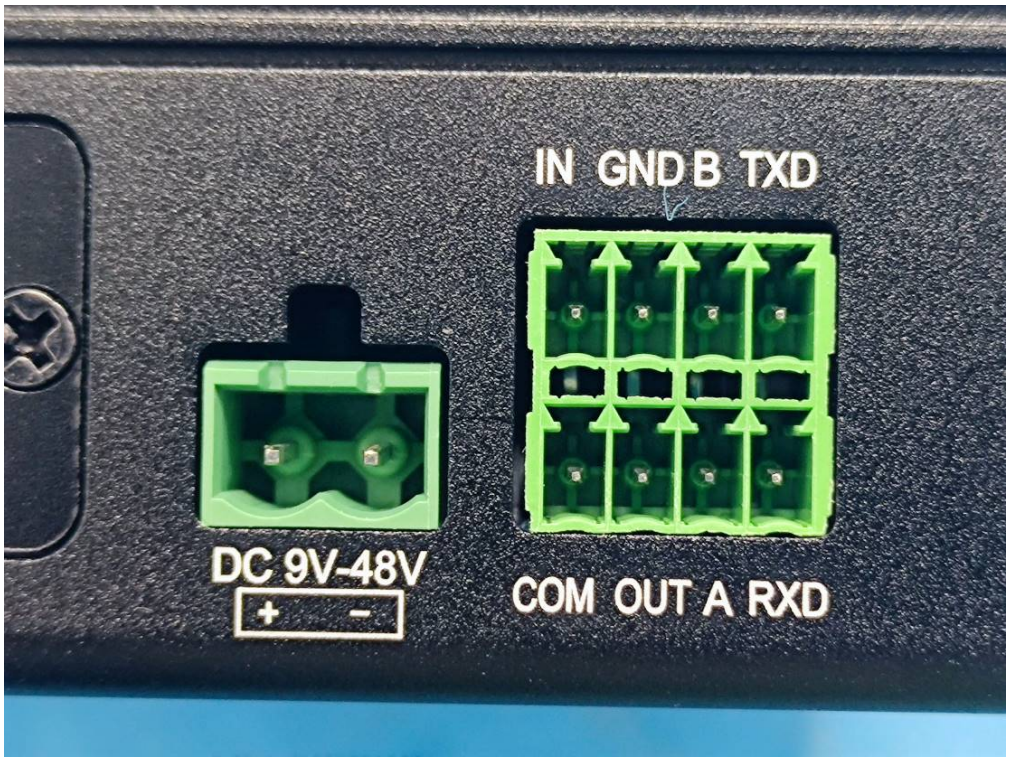



SIM 1
SIM 2
MICRO SD
RESET
DC 9V-48V
IN GND B TXD
COM OUT A RXD



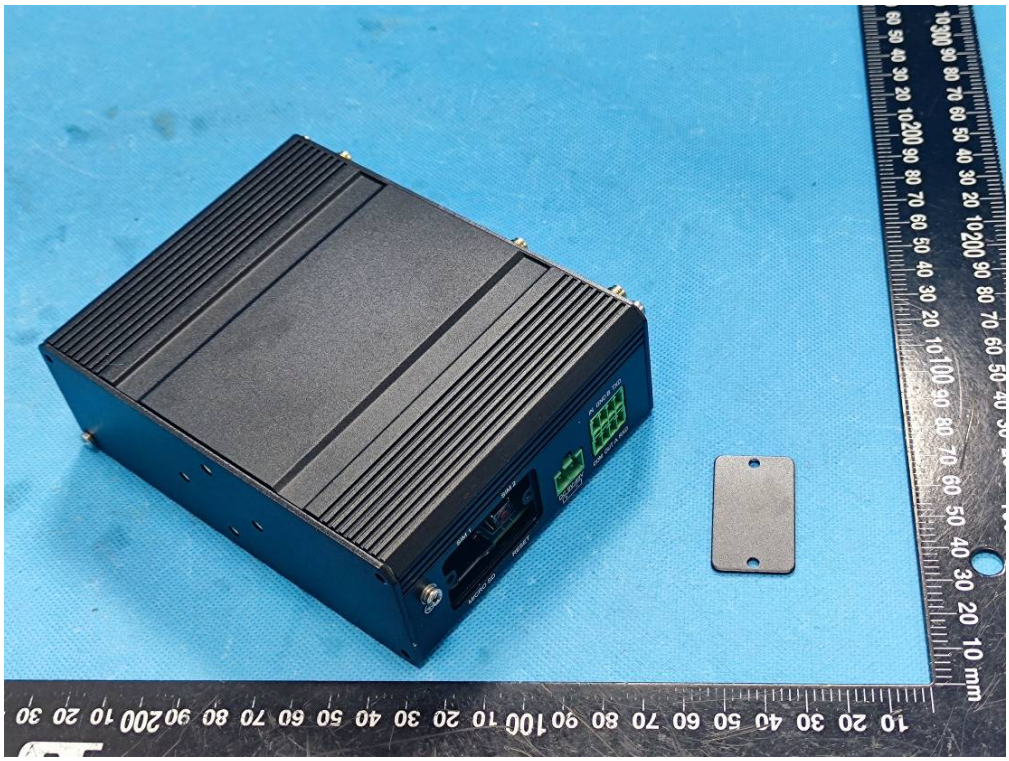

Milesight
Industrial Cellular Router
Model: UR35-L04EU-P-W
Power Input: 9-48V DC
LAN: 192.168.1.1
Username: admin
Password: password
IMEI: 865847050210663
SN: 6219C2253109
MAC: 24E124F5498B-8D

Port


IN GND B TXD
DC 9V-48V
+ -
COM OUT A RXD

Port

Uncover



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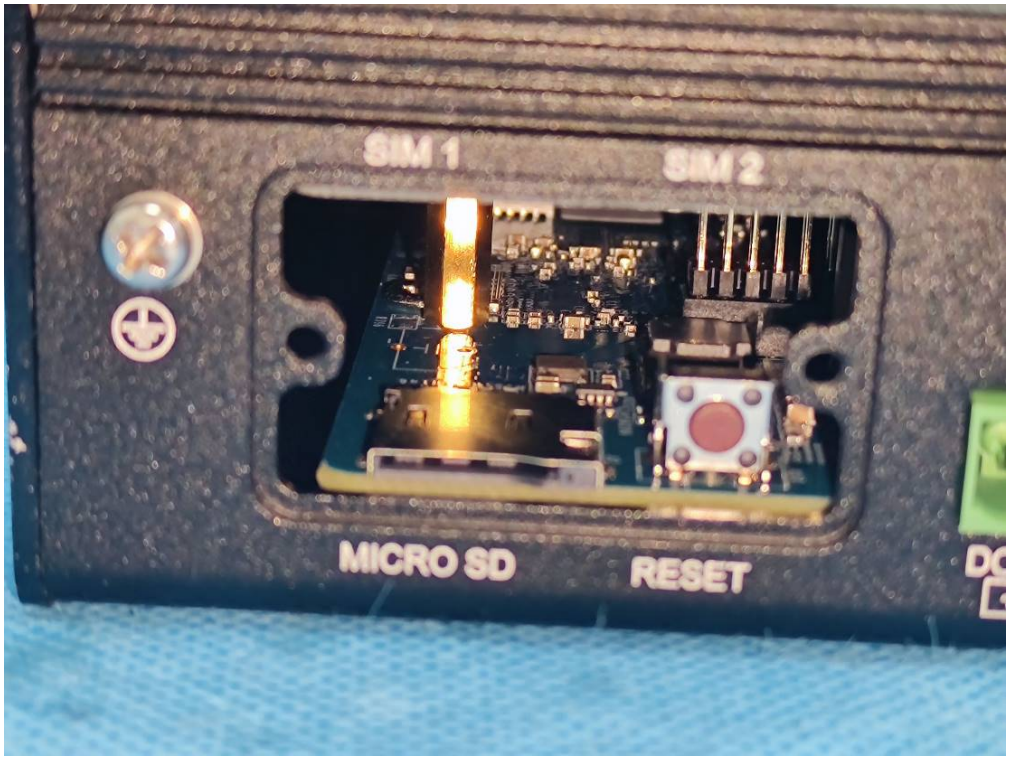

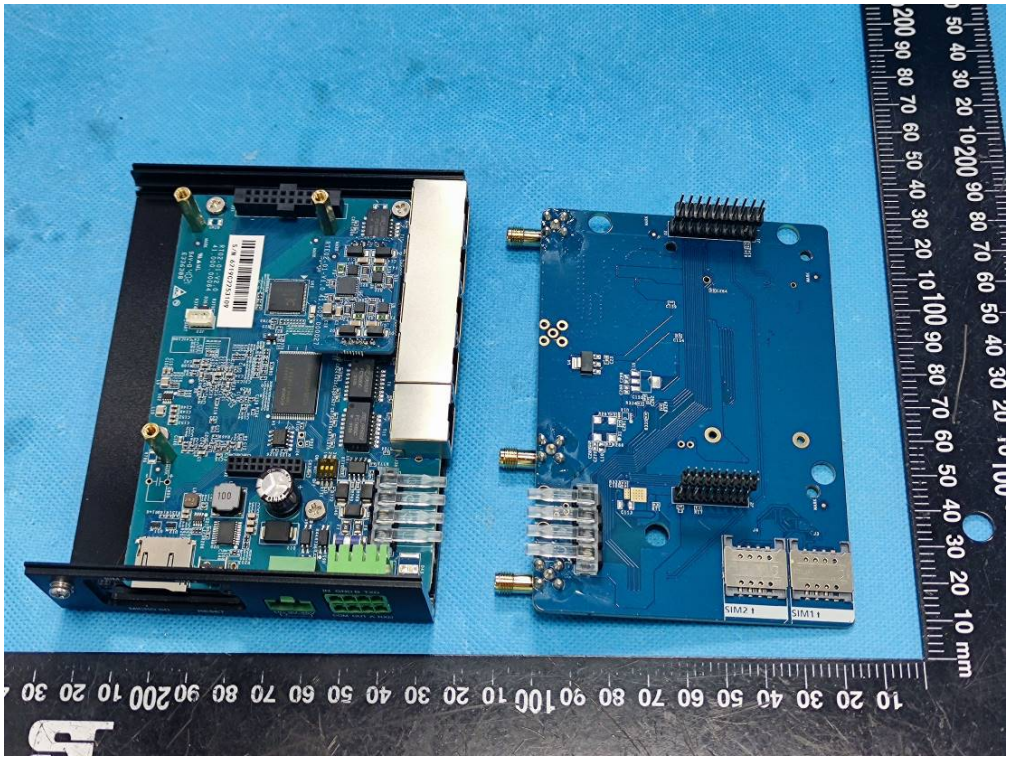
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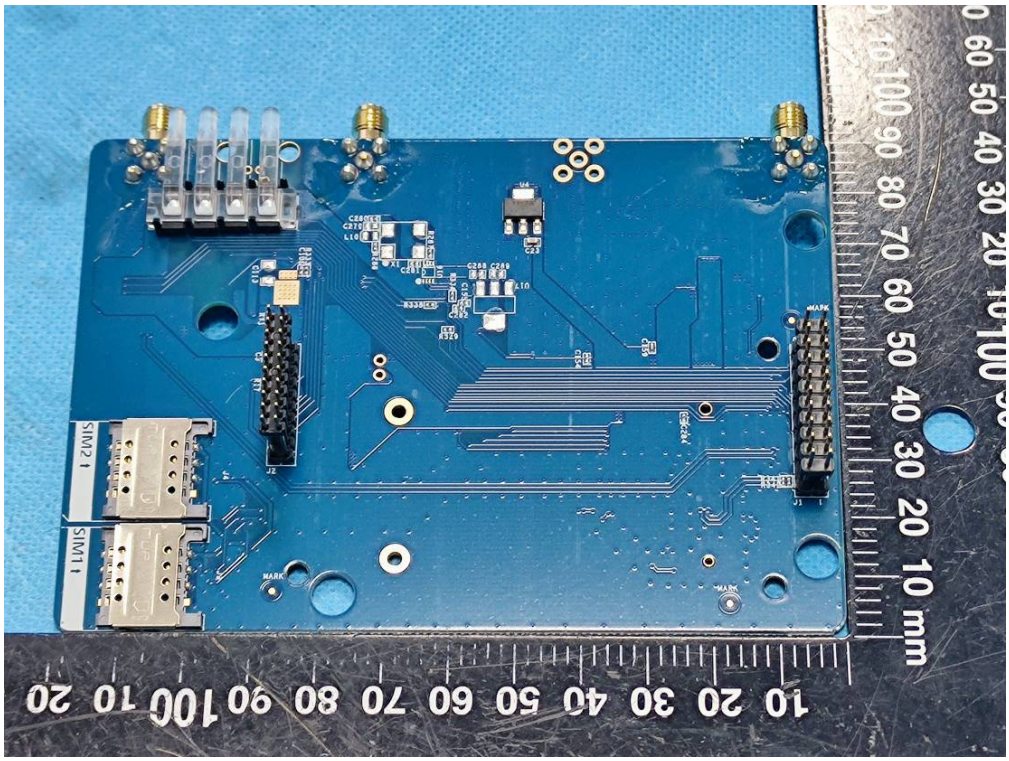
SIM1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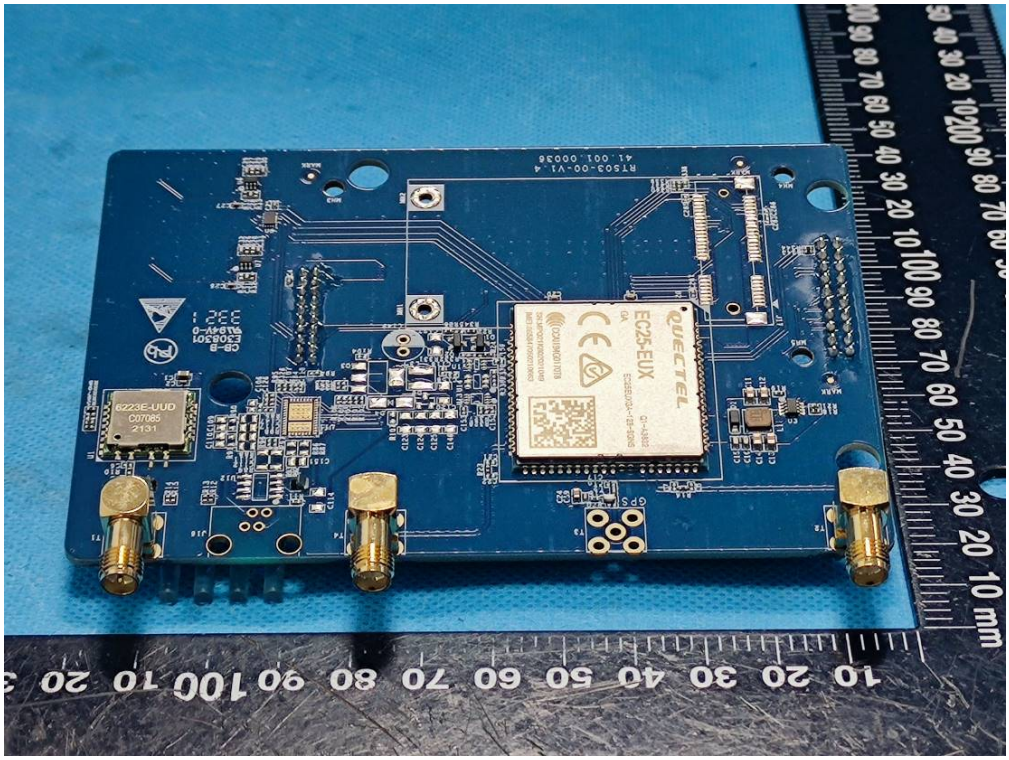
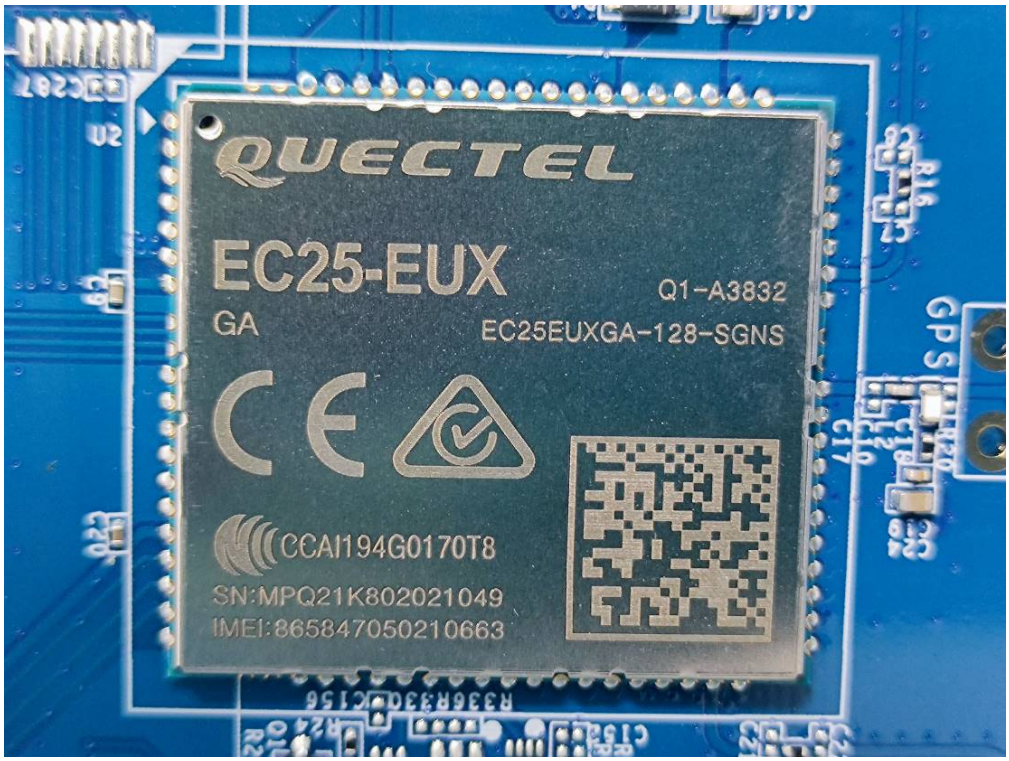
SIM1


EC25-EUX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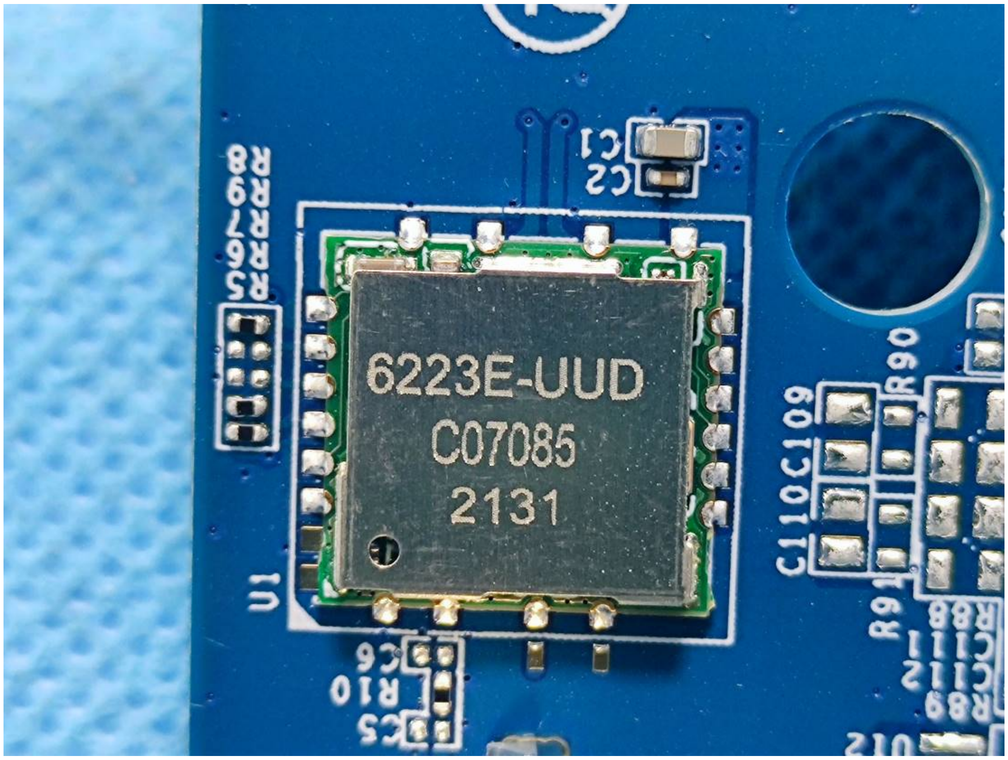
GPS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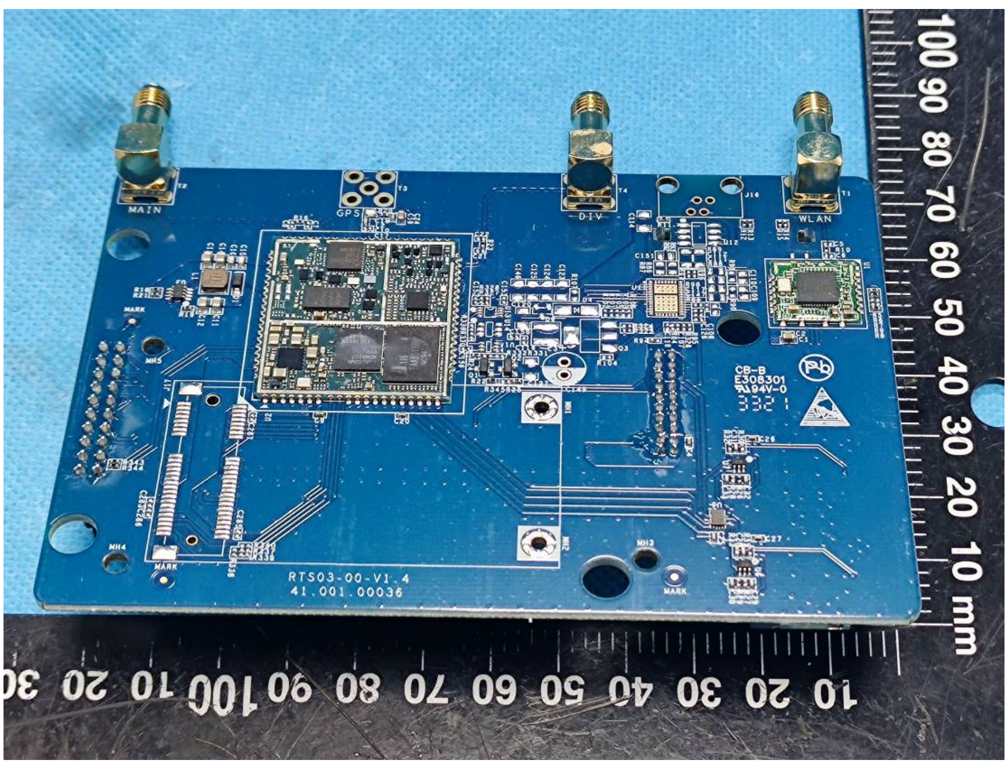
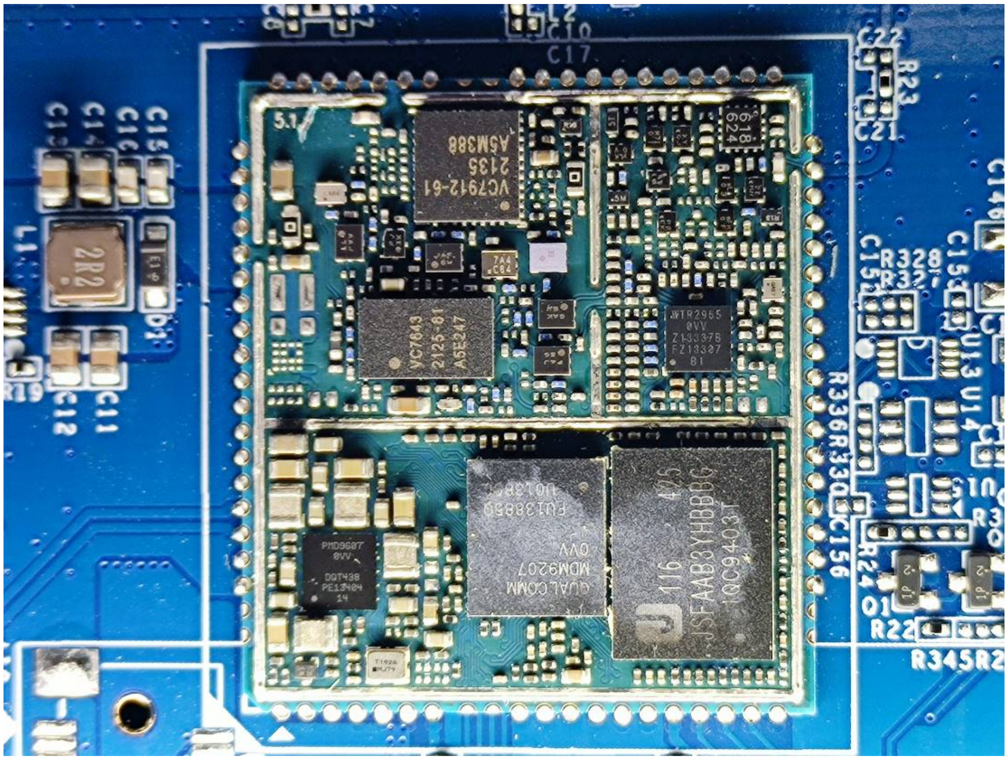
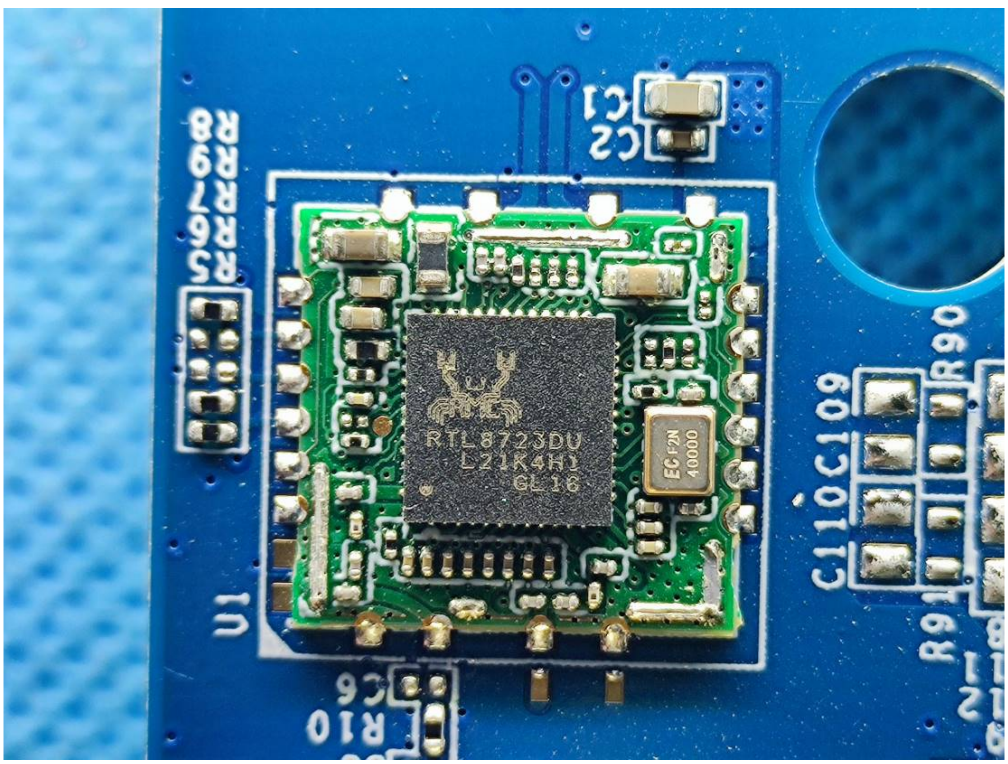
C07085
2131



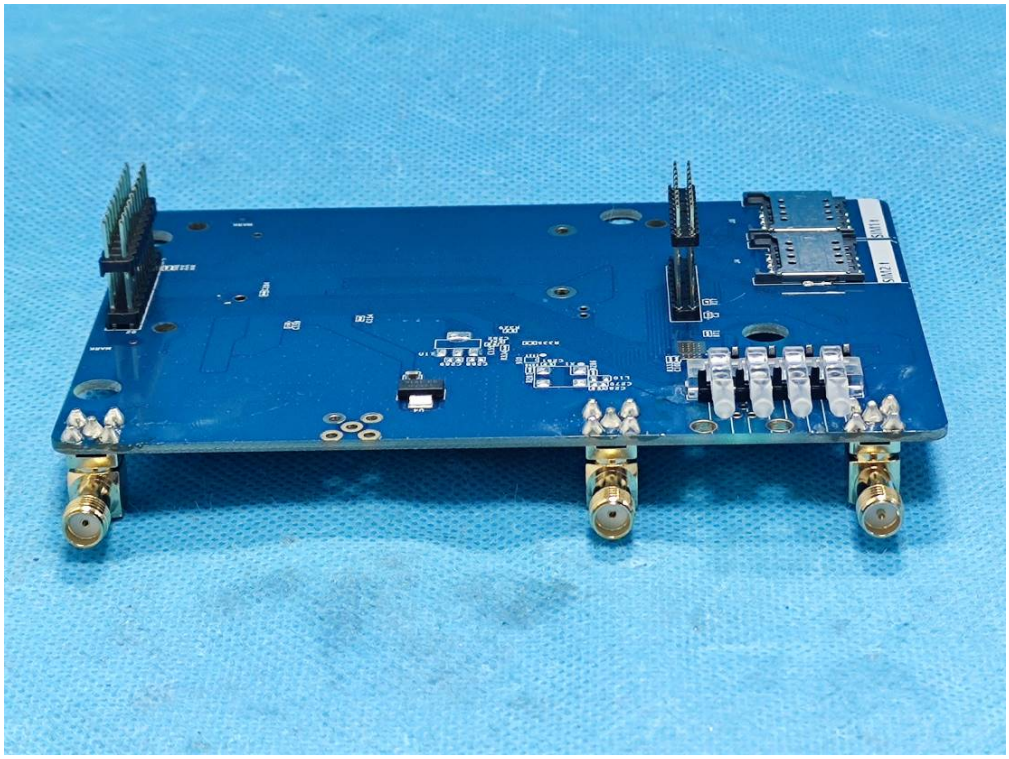
Chip1

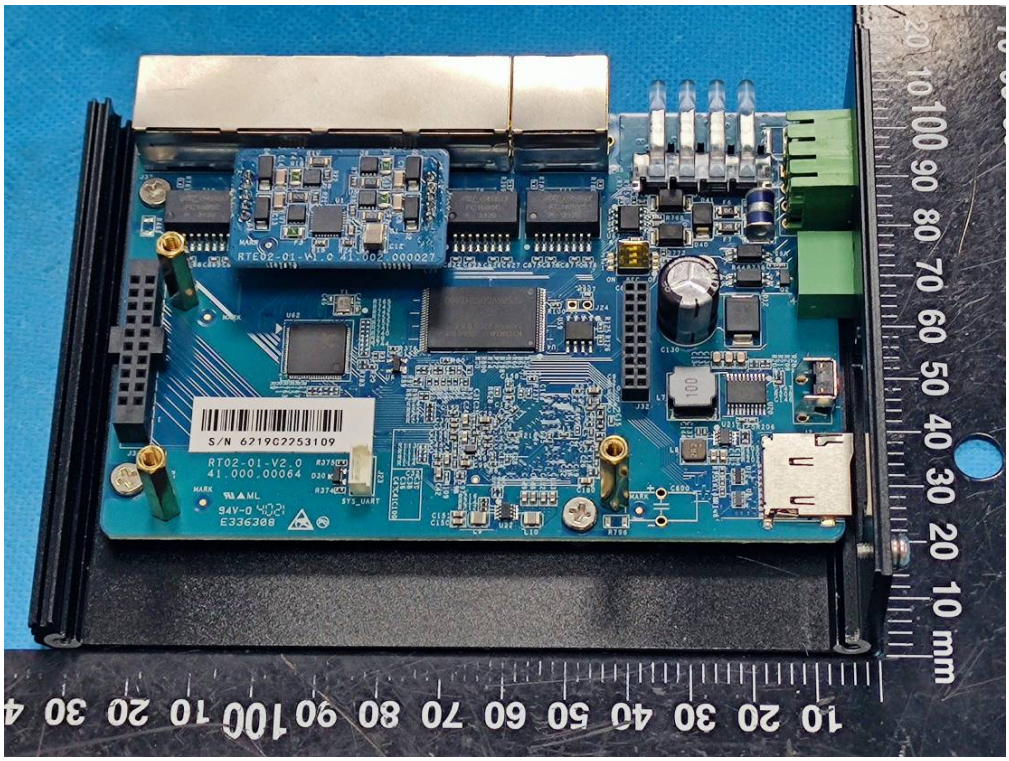


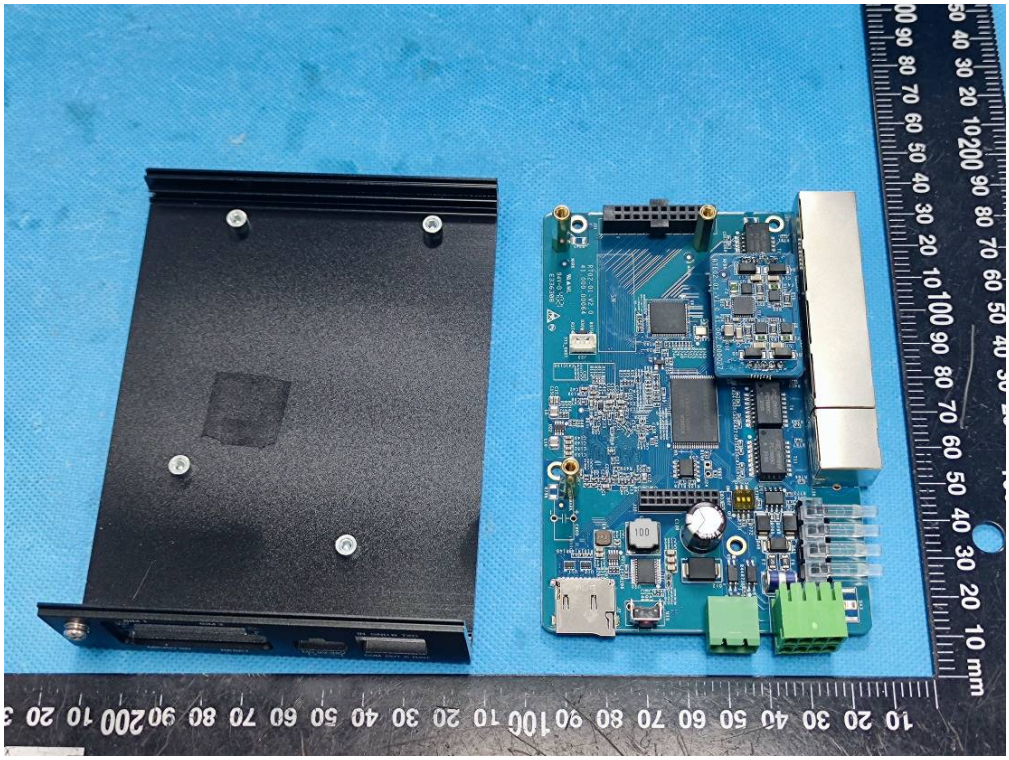
Chip2

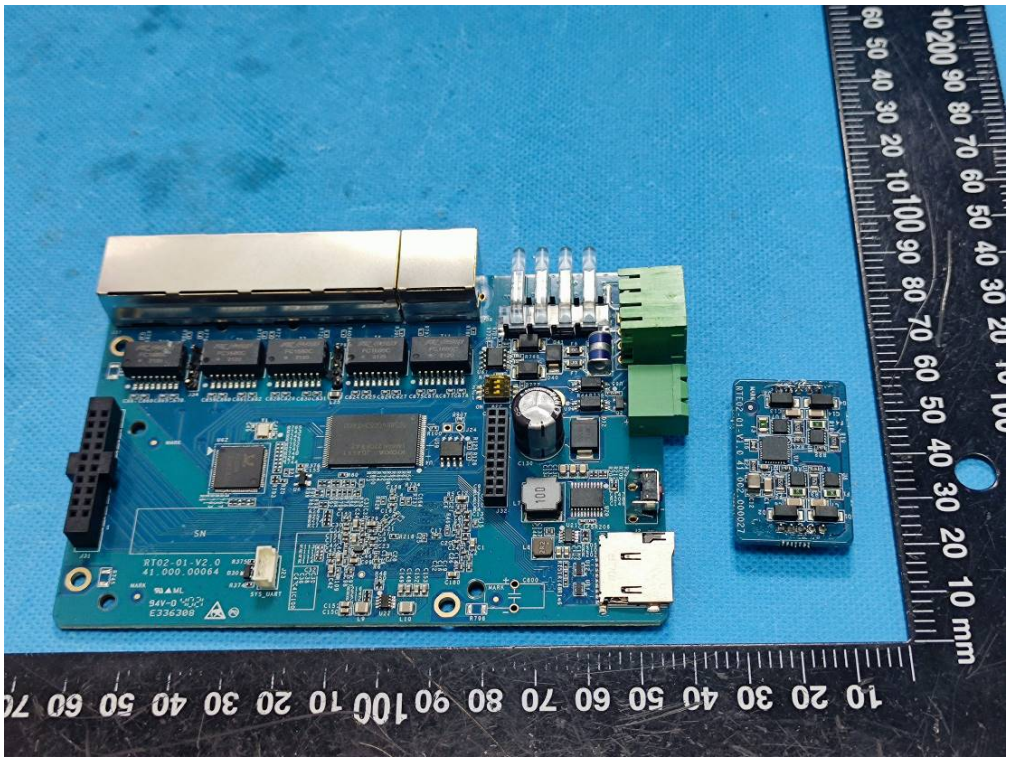


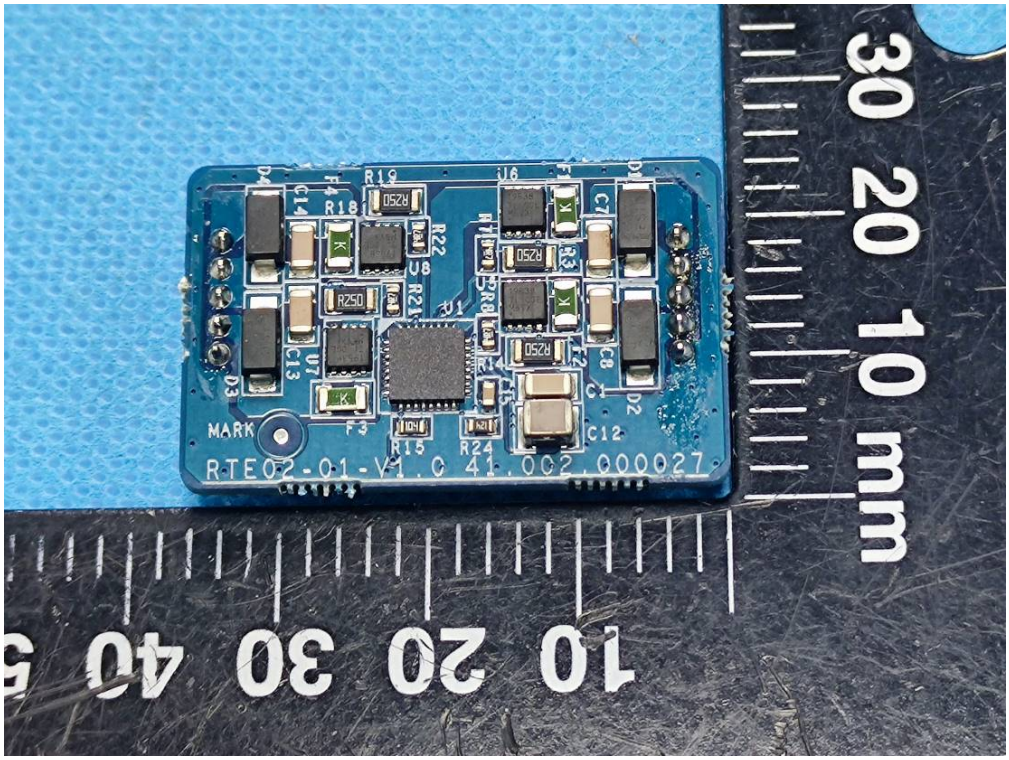
Antenna Port







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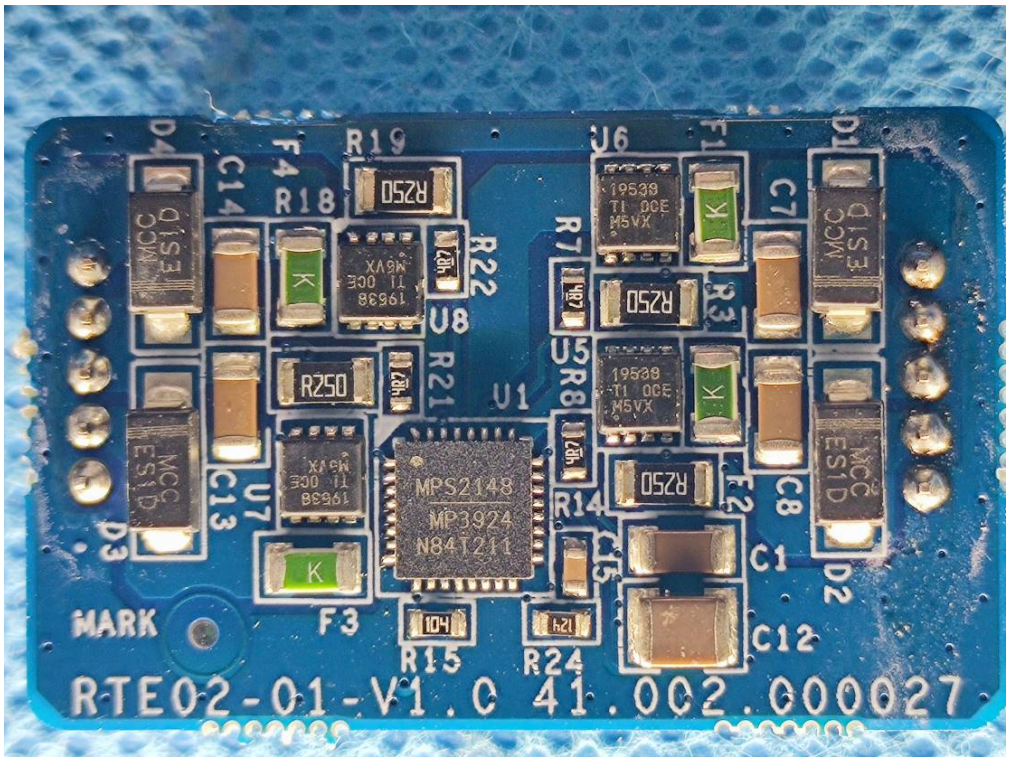
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MP3924
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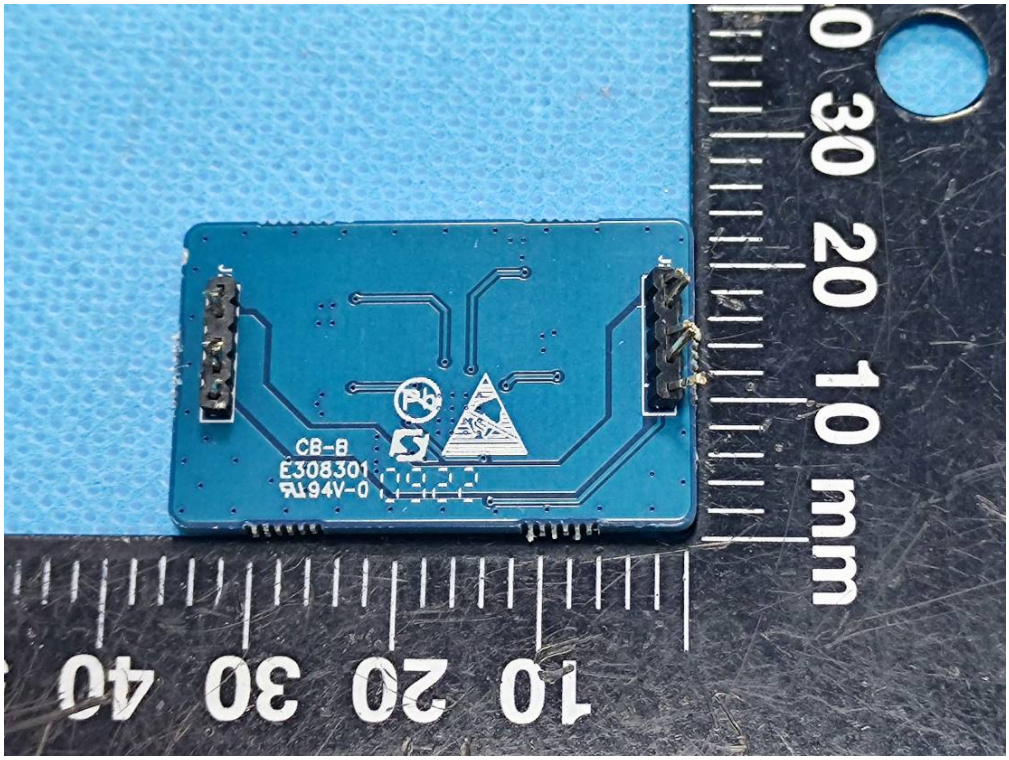
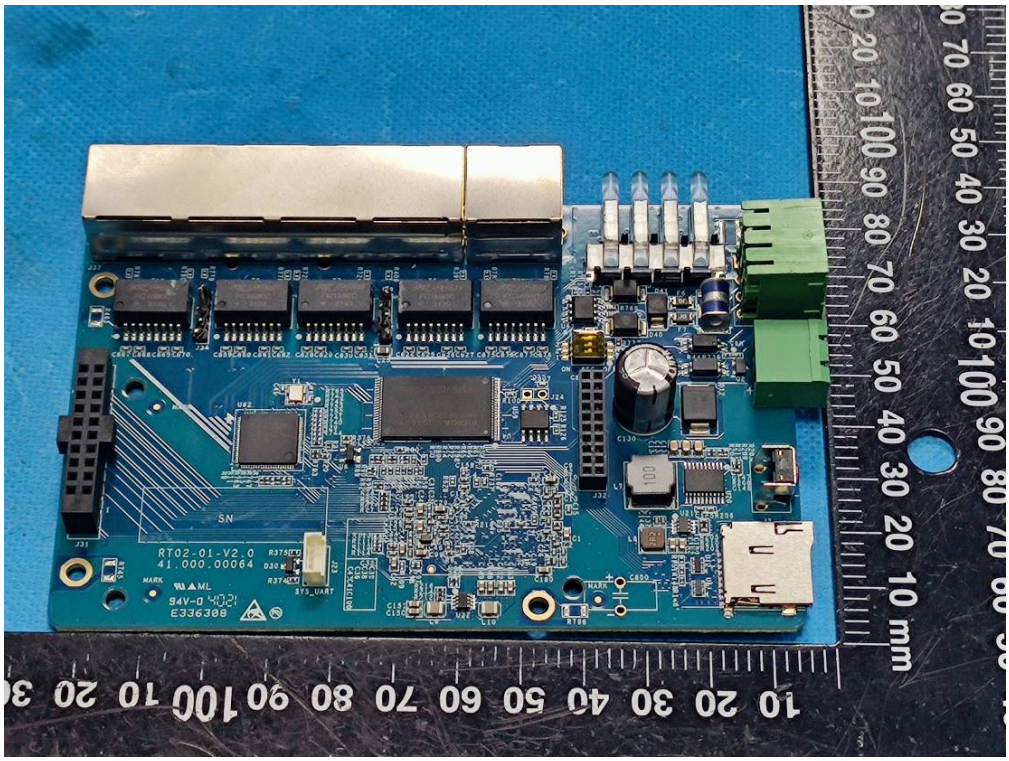

CB-B
E308301
94V-0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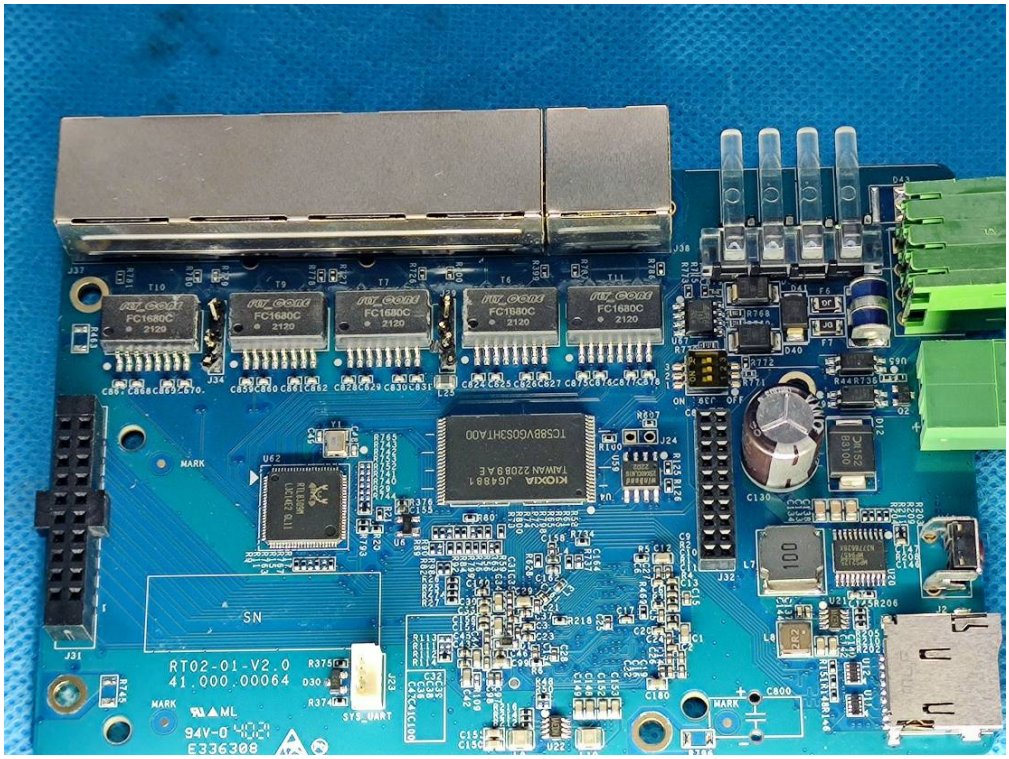
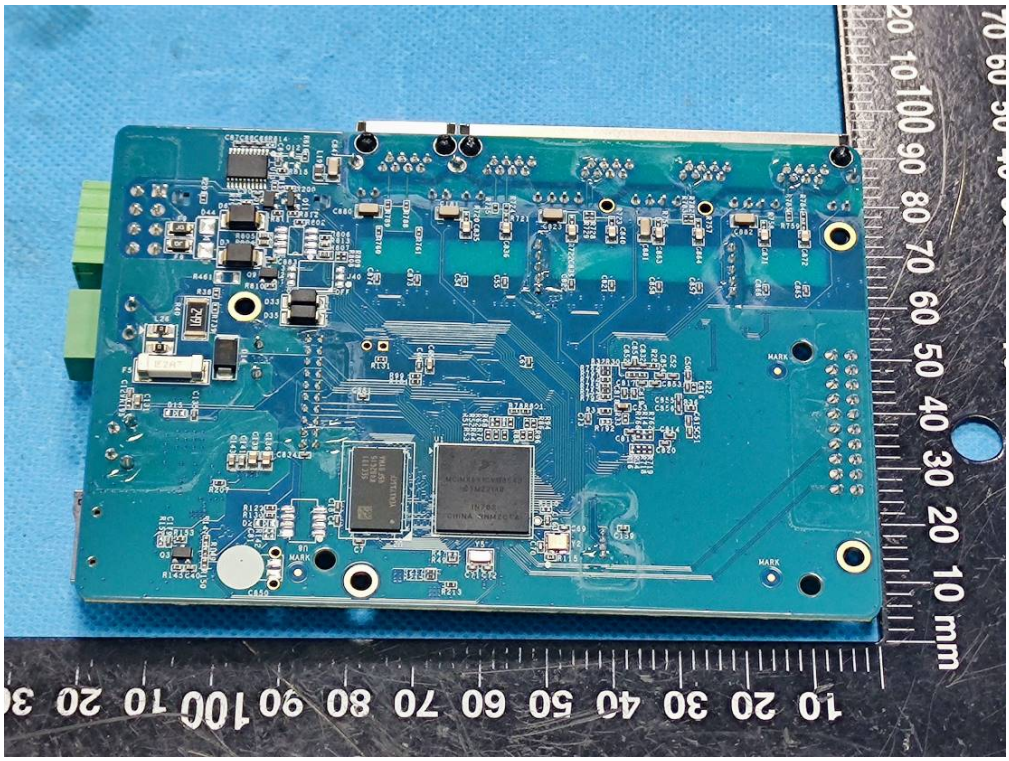
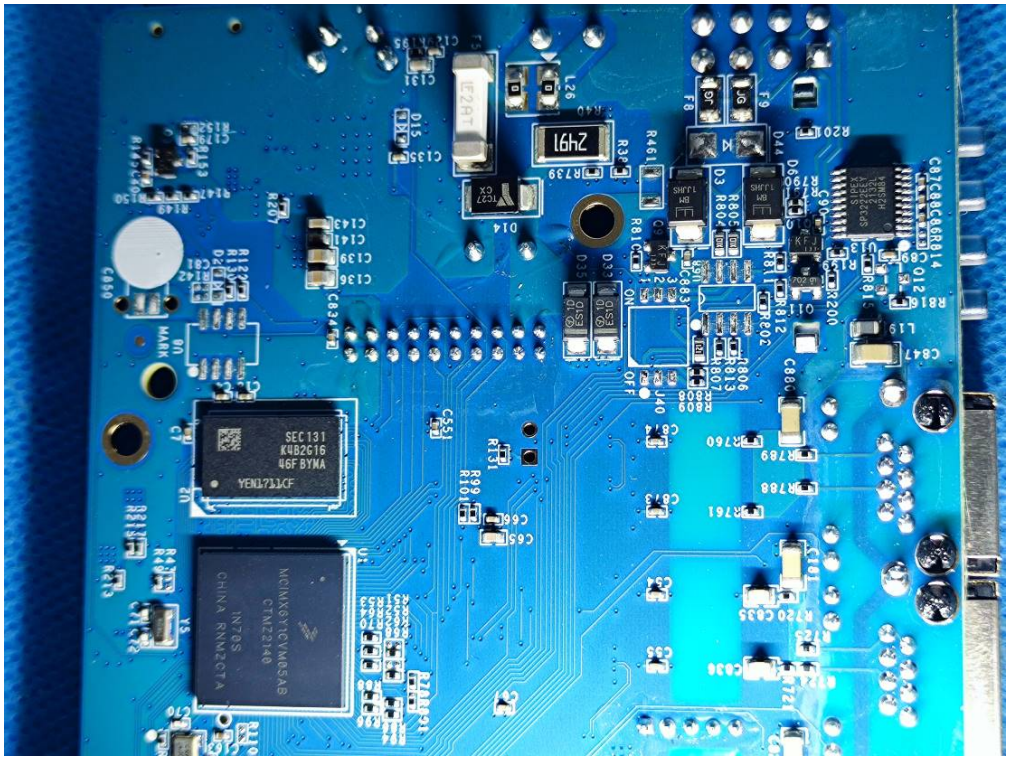
E336308

Chip4





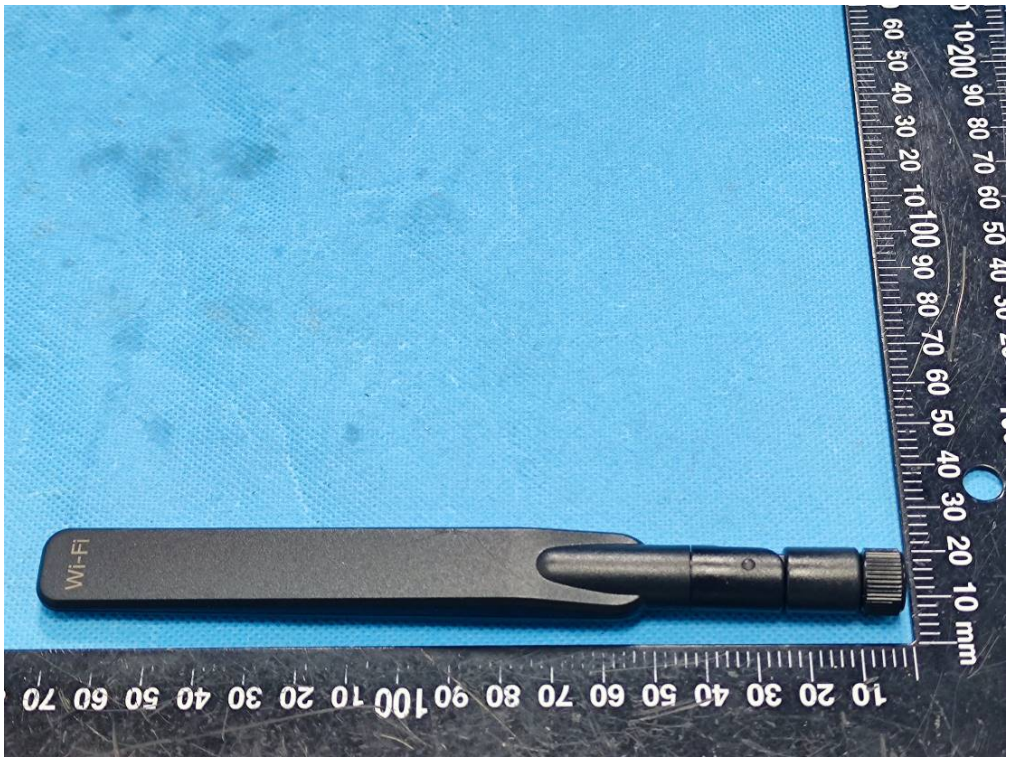
Chip6



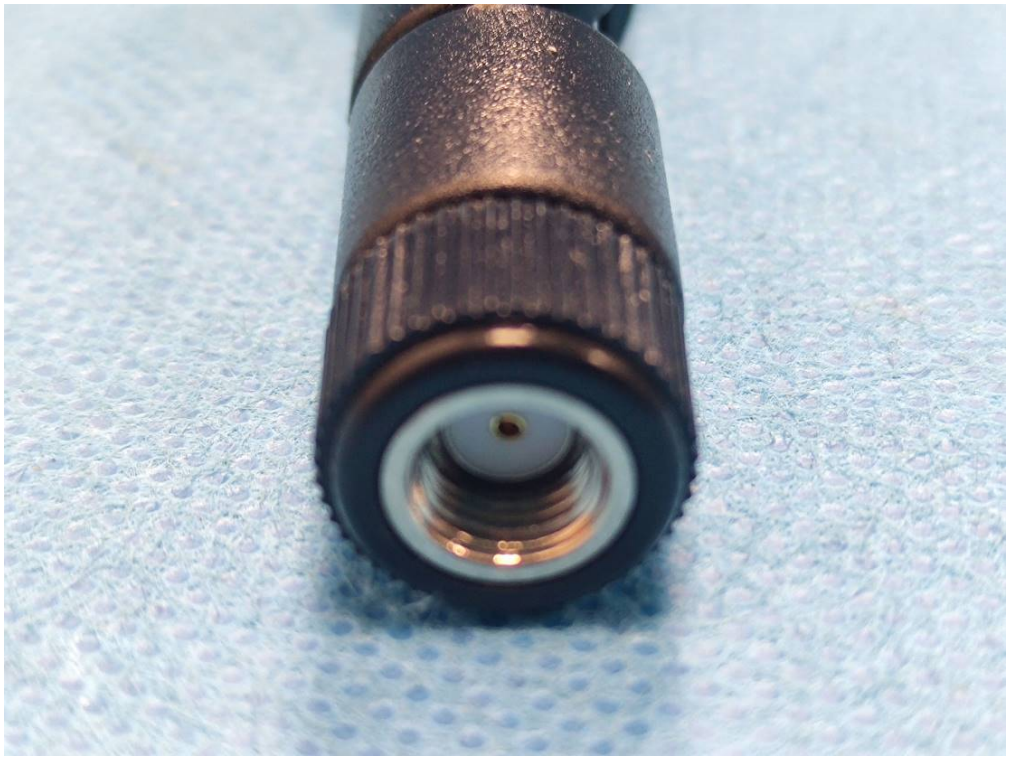
WWAN(2G/3G/4G) Antenna

Port

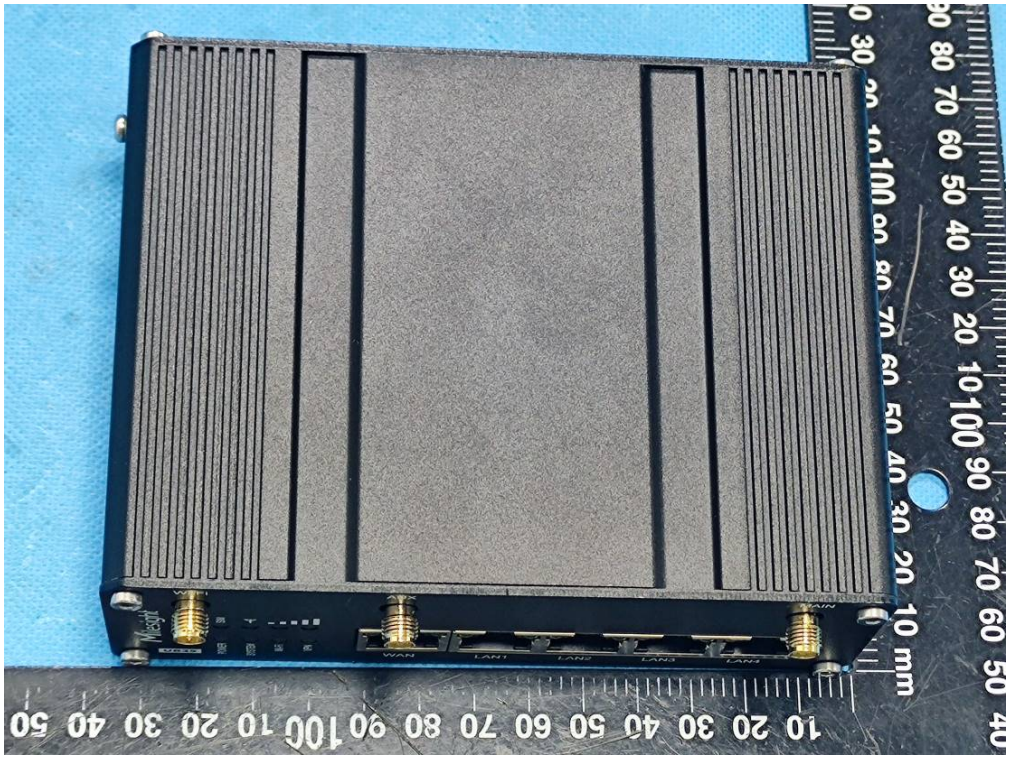
WiFi Antenna



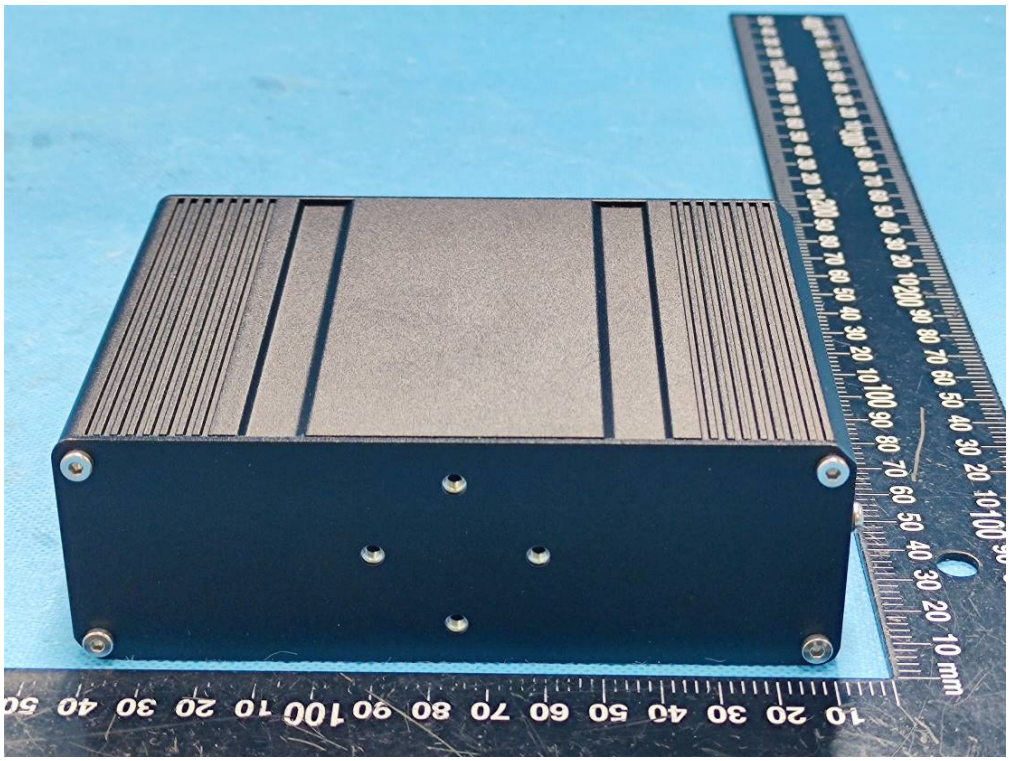
Port



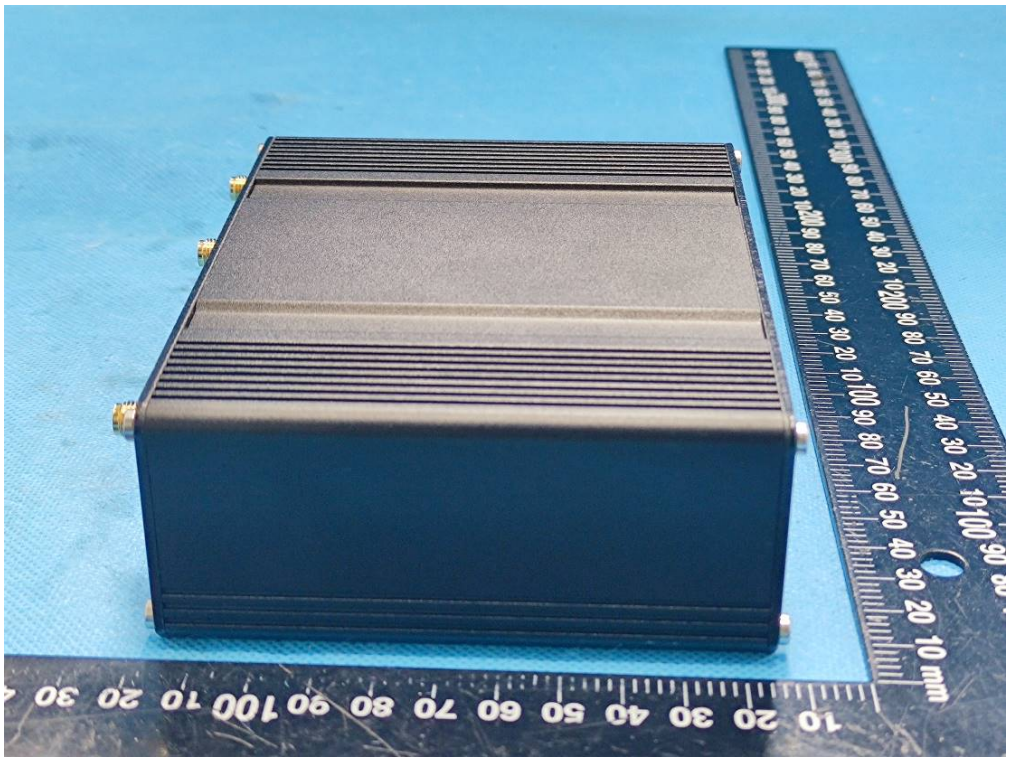
UR35-L04EU-W




Wi-Fi
AUX
MAIN
Milesight
SIM
UR35
POWER
SYSTEM
WI-FI
VPN
WAN
LAN1
LAN2
LAN3
LAN4

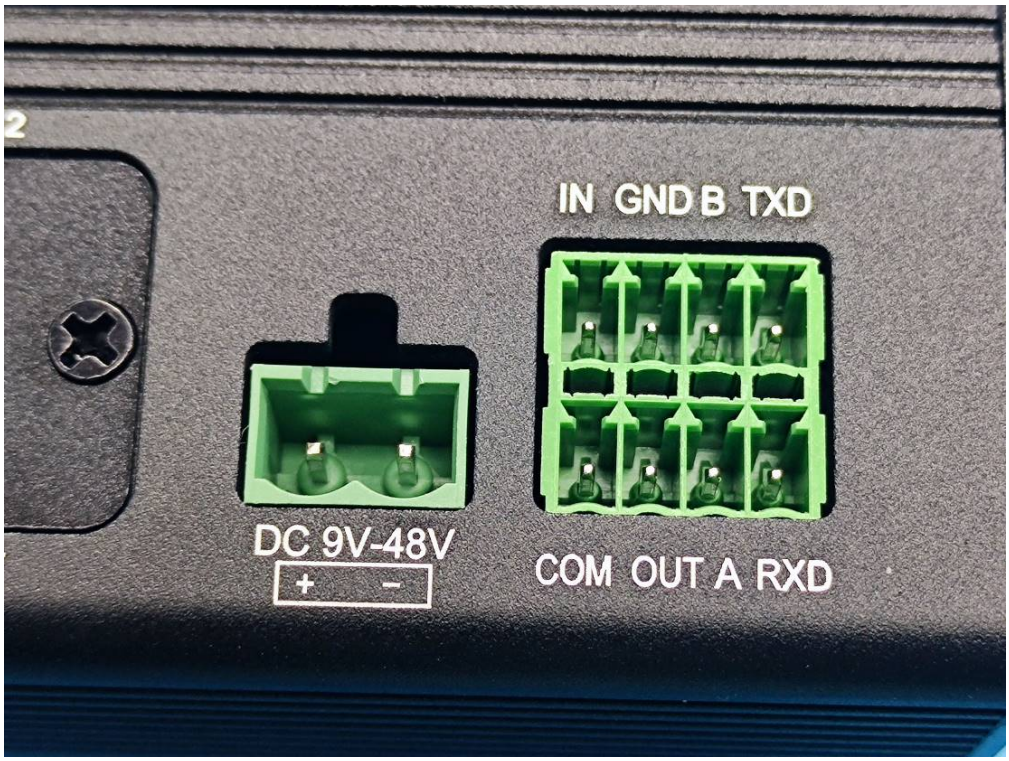



SIM 1
SIM 2
MICRO SD
RESET
DC 9V-48V
IN GND B TXD
COM OUT A RXD




Milesight
Industrial Cellular Router
Model: UR35-L04EU-W
Power Input: 9-48V DC
LAN: 192.168.1.1
Username: admin
Password: password
IMEI: 865847052544028
SN: 6219C1537968
MAC: 24E124F4D644-46

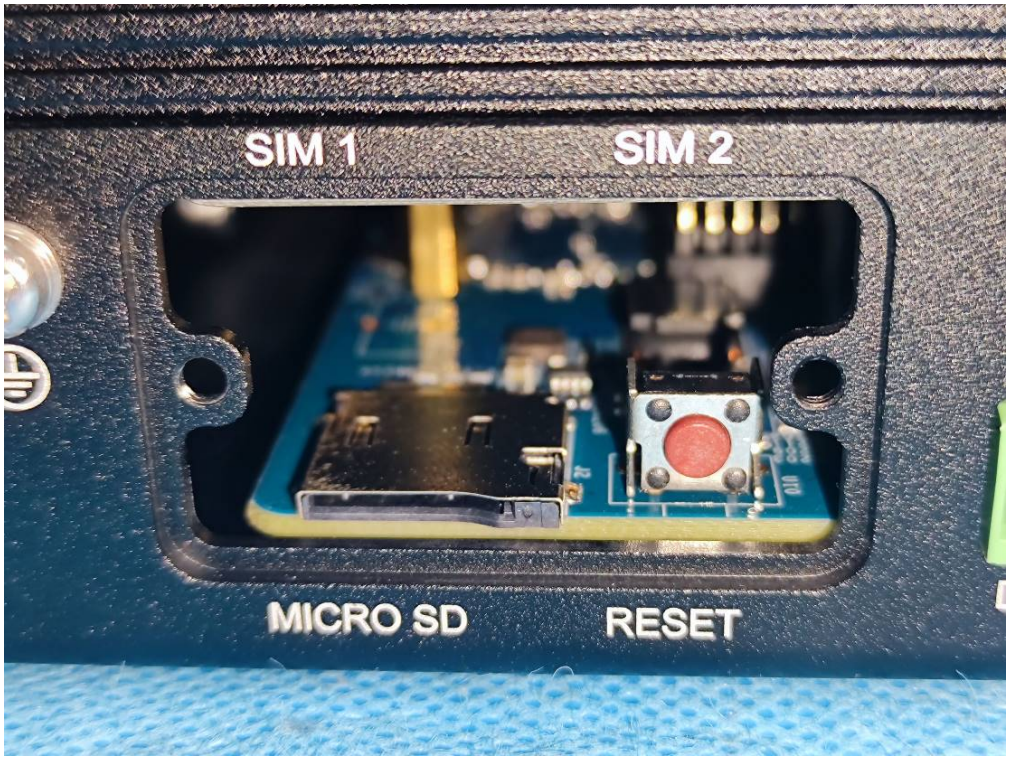
Port

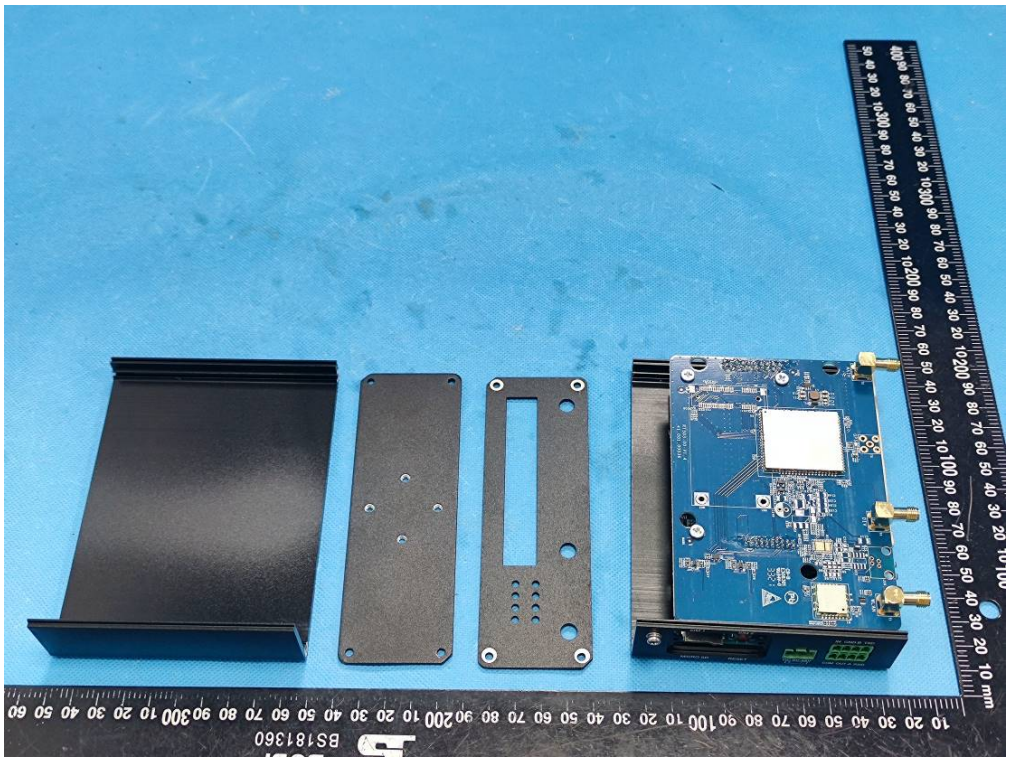

IN GND B TXD
DC 9V-48V
+ -
COM OUT A RXD

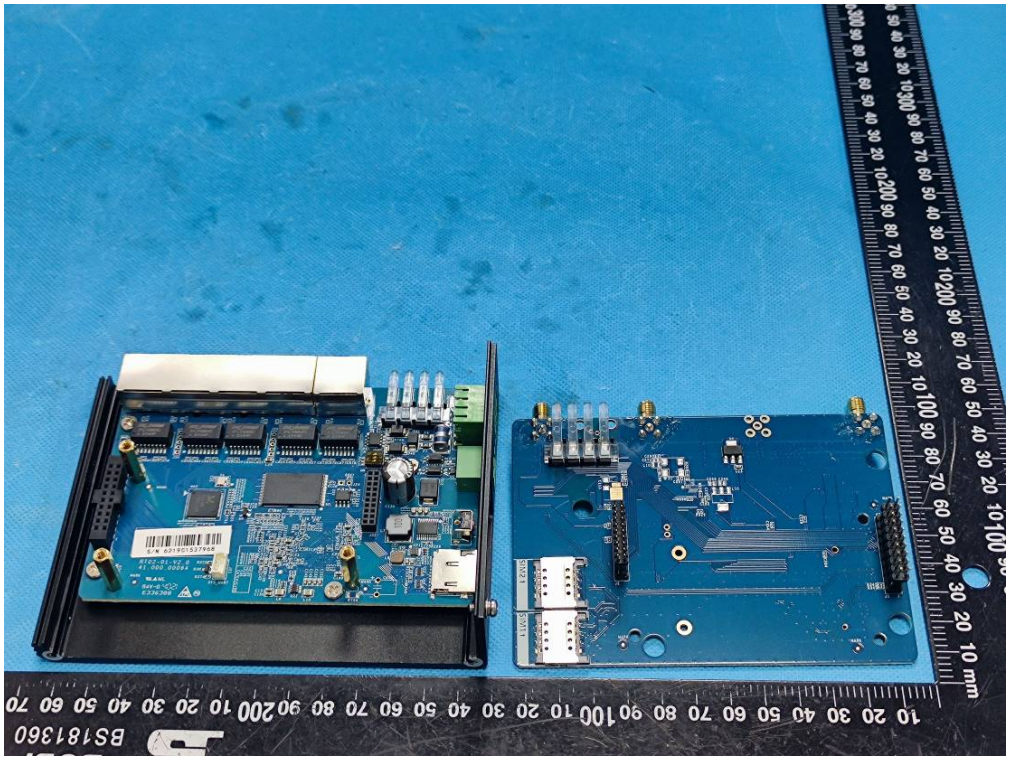
Port

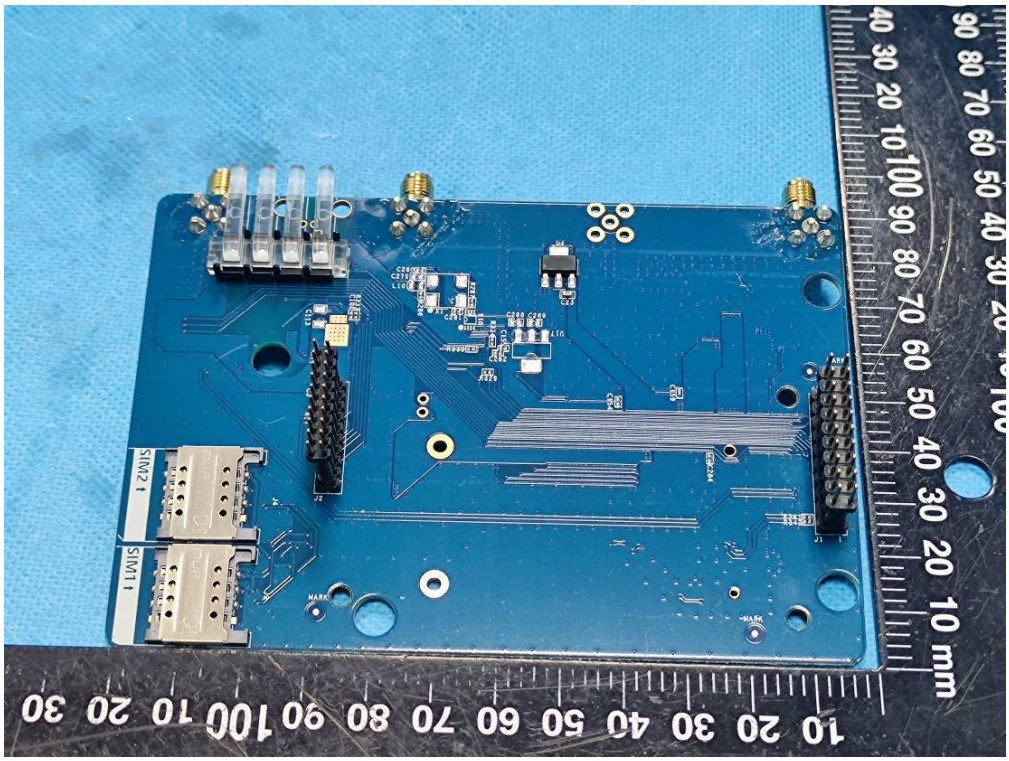
Uncover

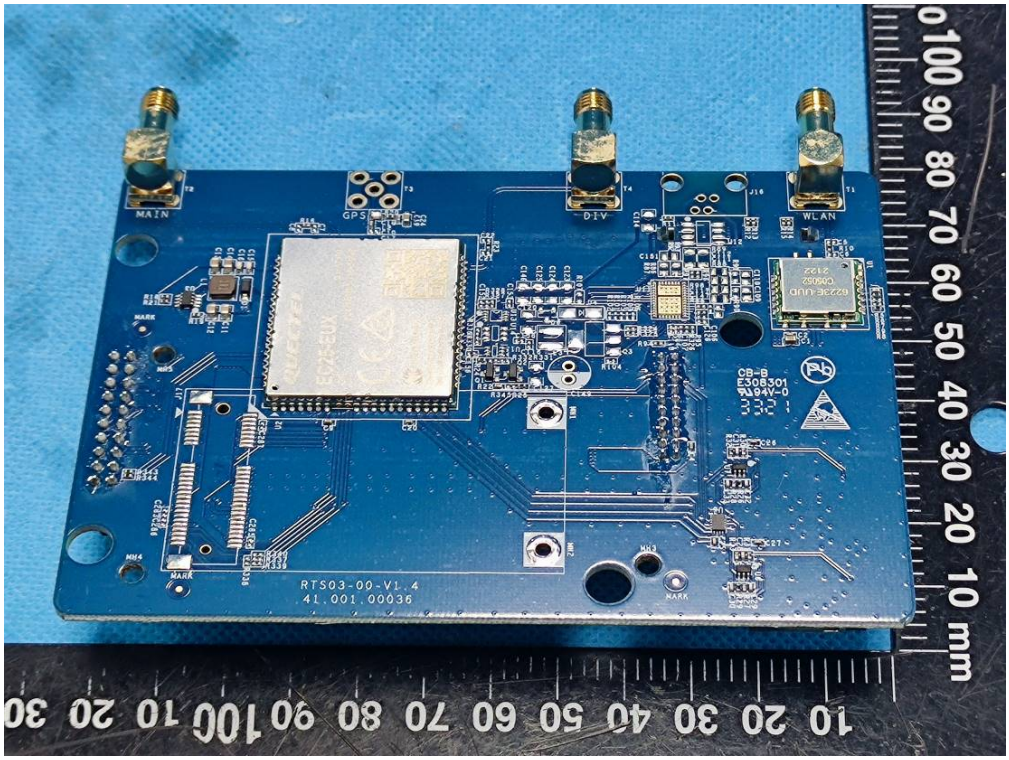
Port

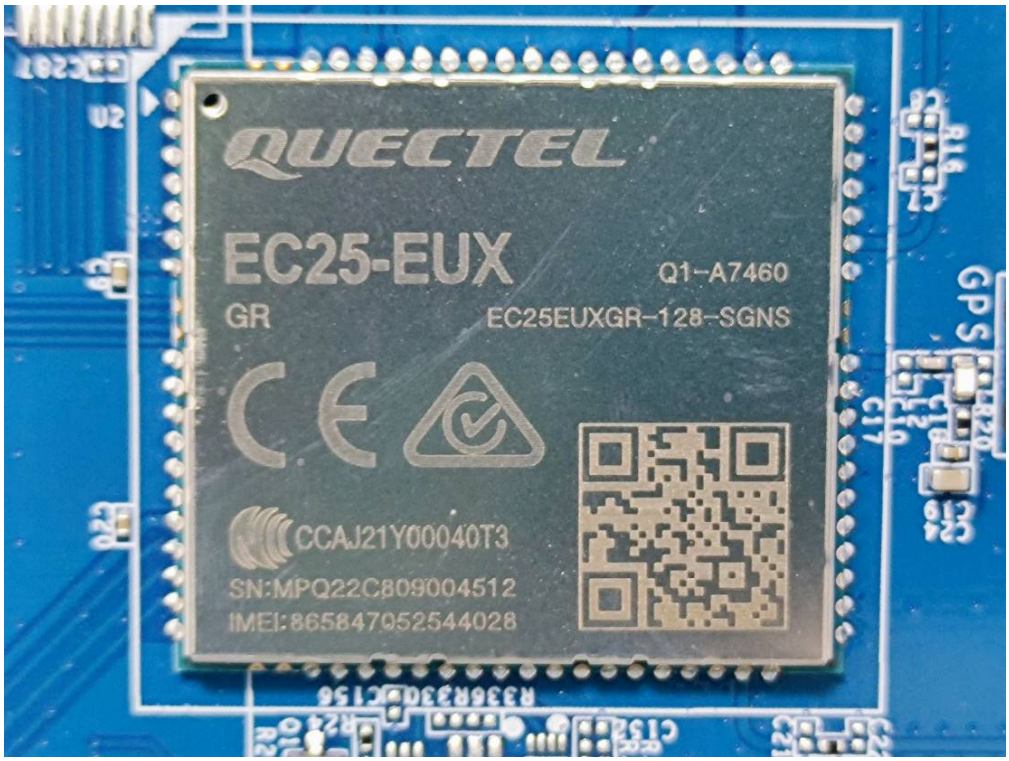







SIM2
SIM1


MAIN
GPS
DIV
WLAN
RTS03-00-V1.4
41.001.00036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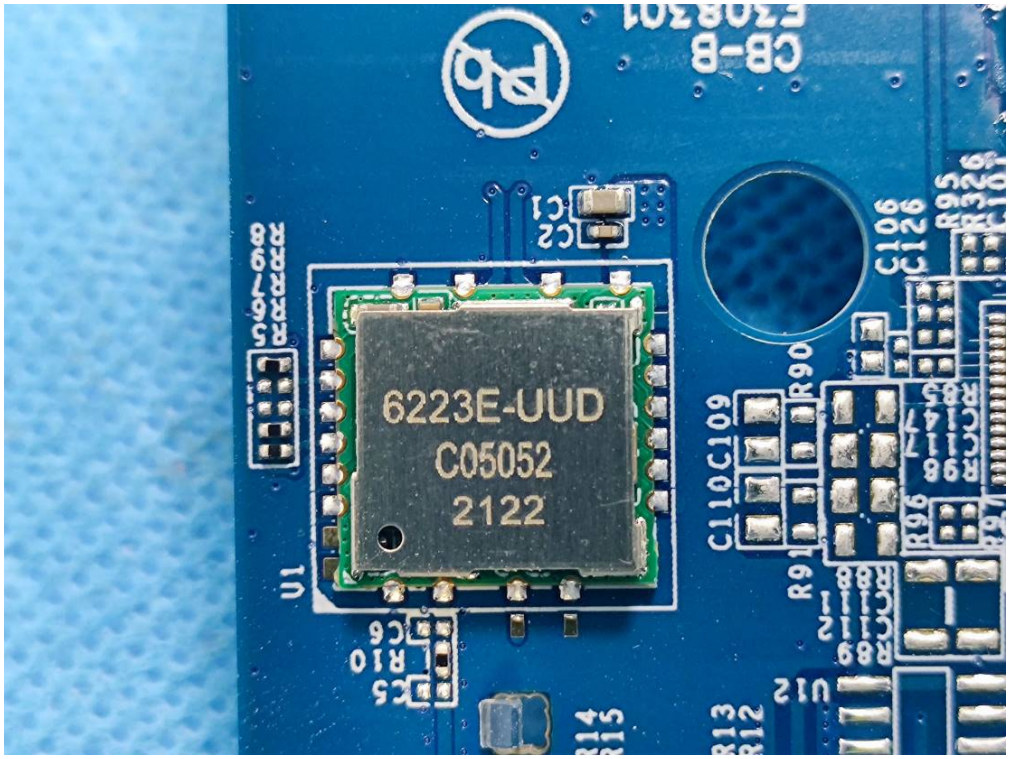
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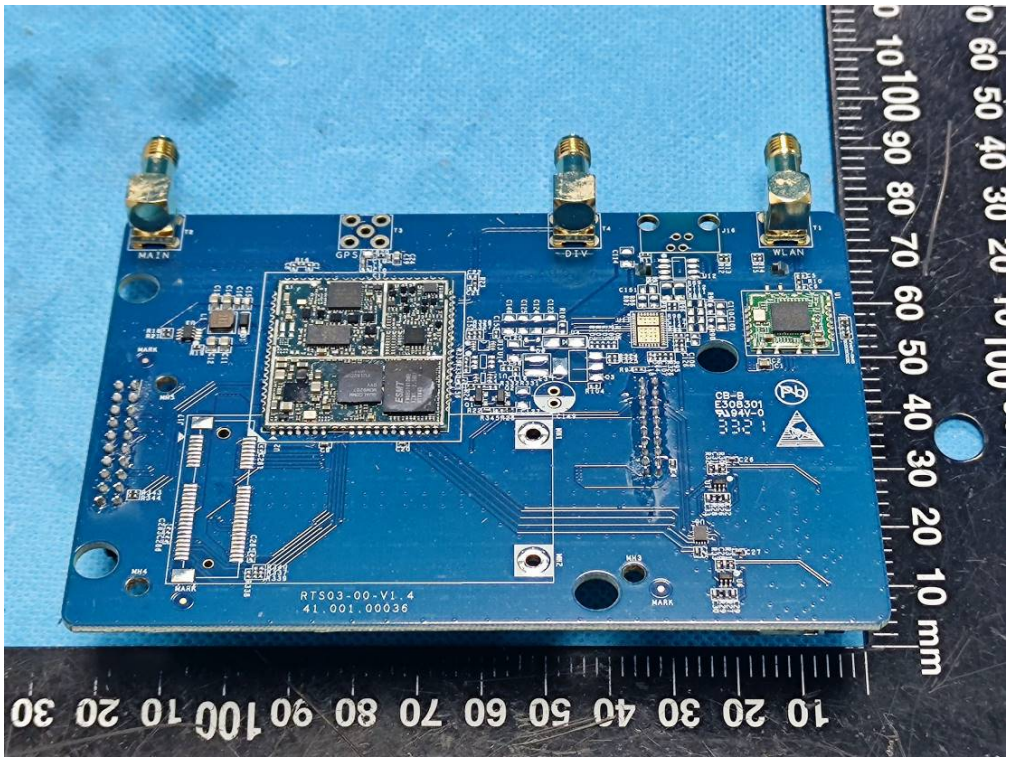
2122
U1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DIV
WLAN
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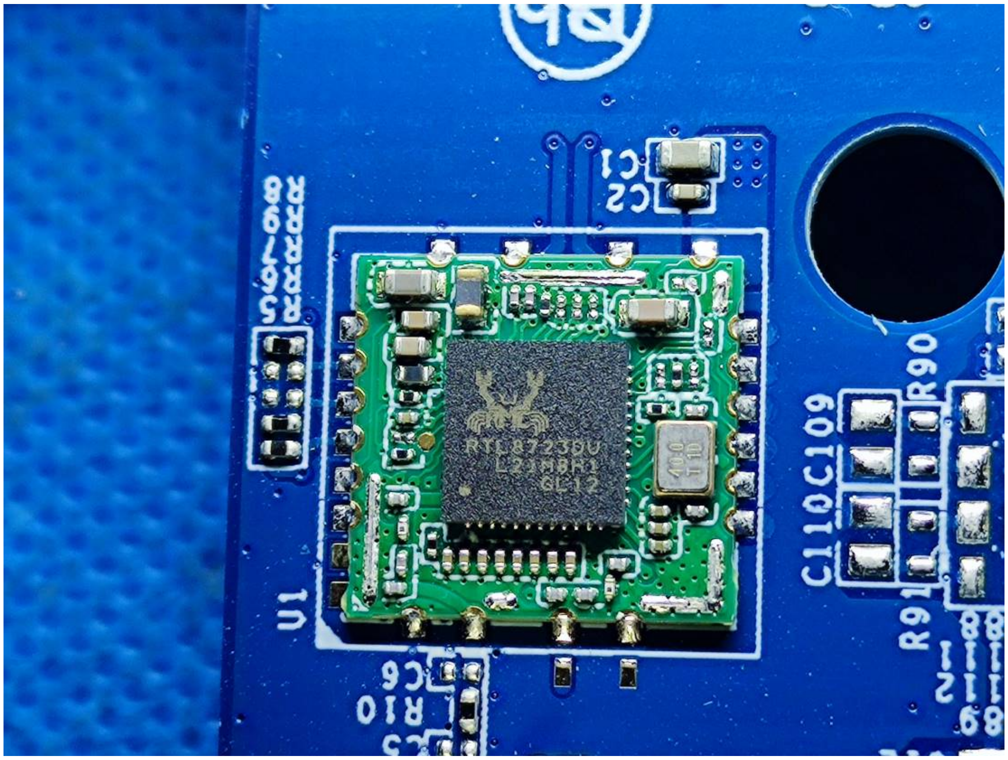
Chip1



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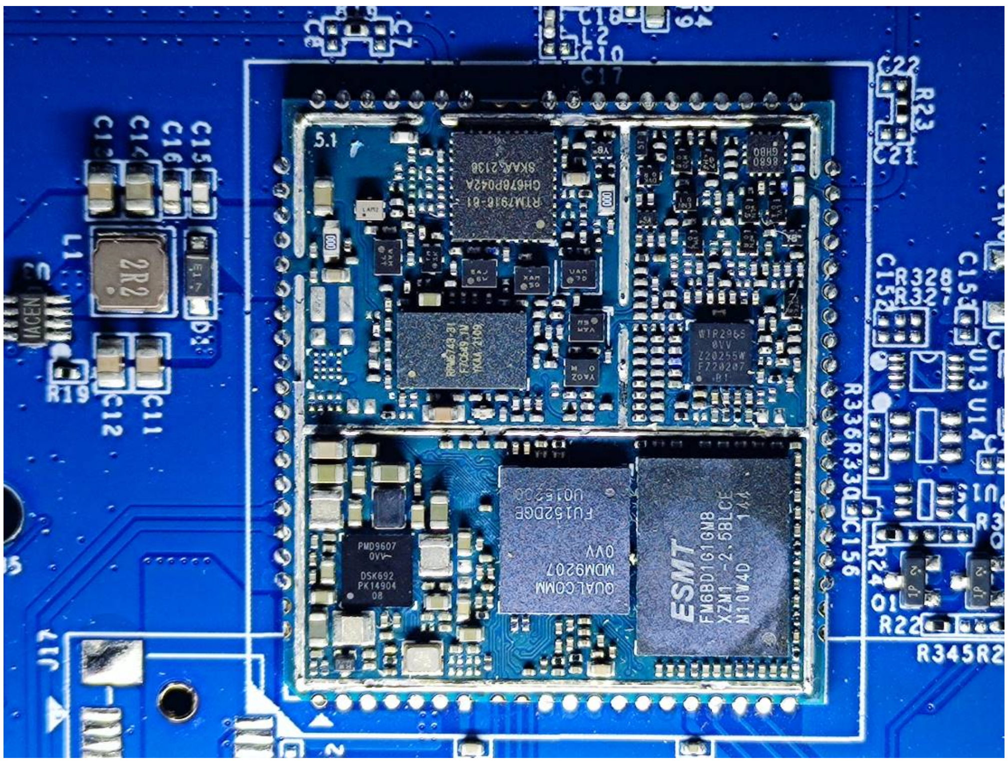
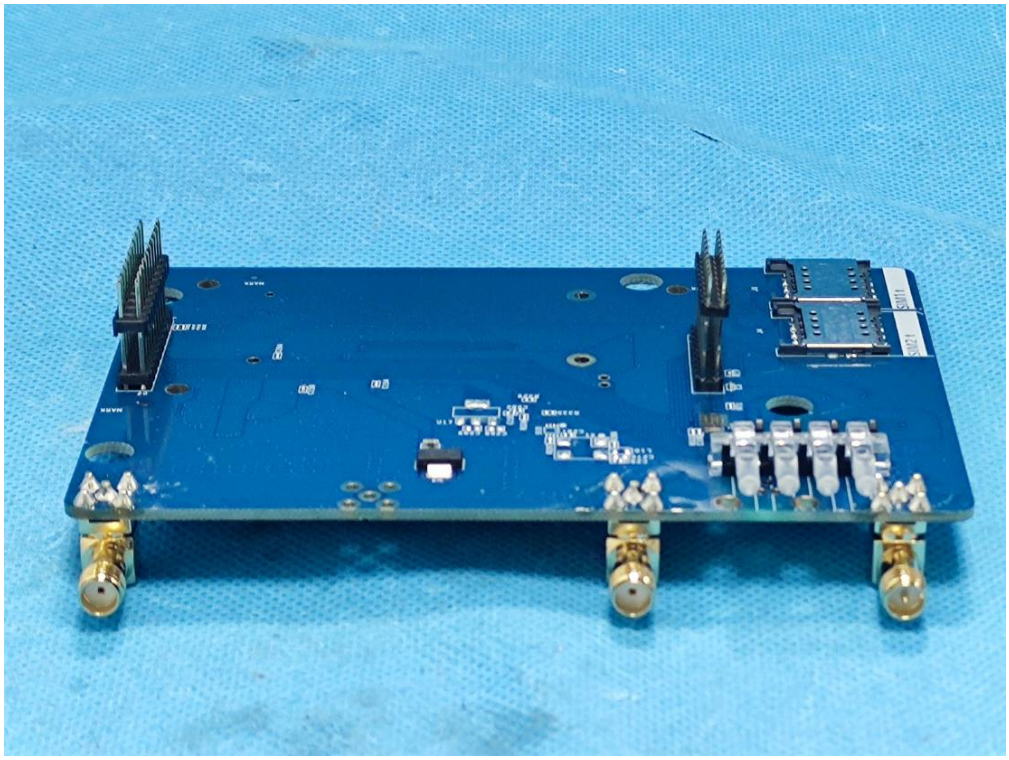
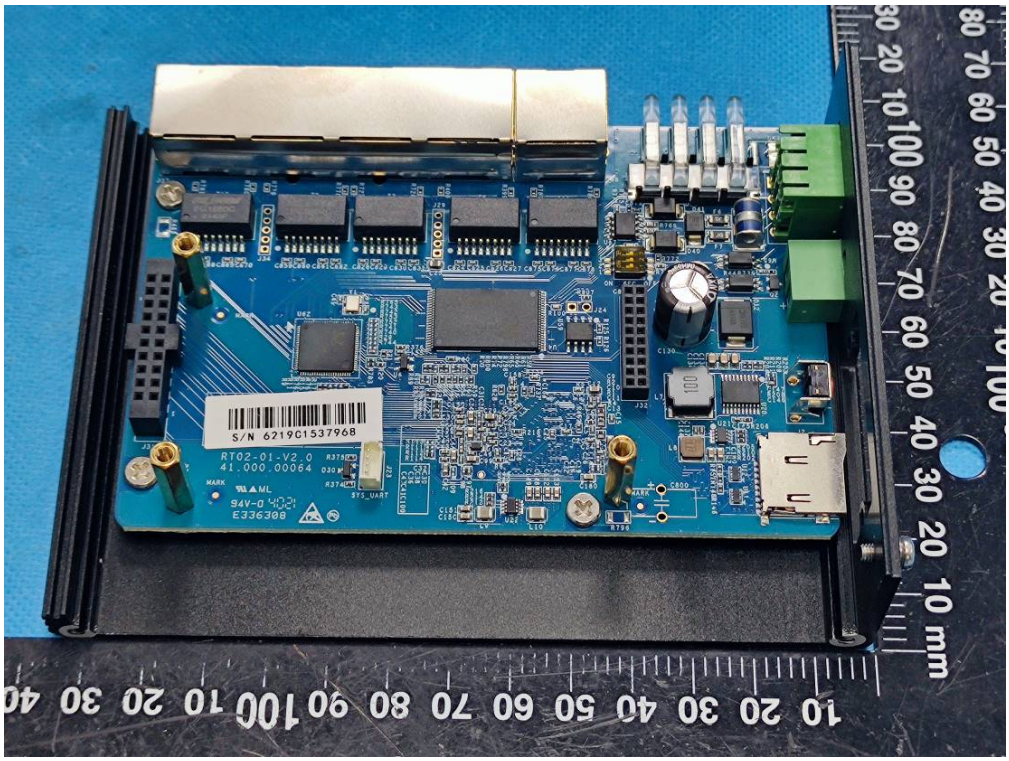
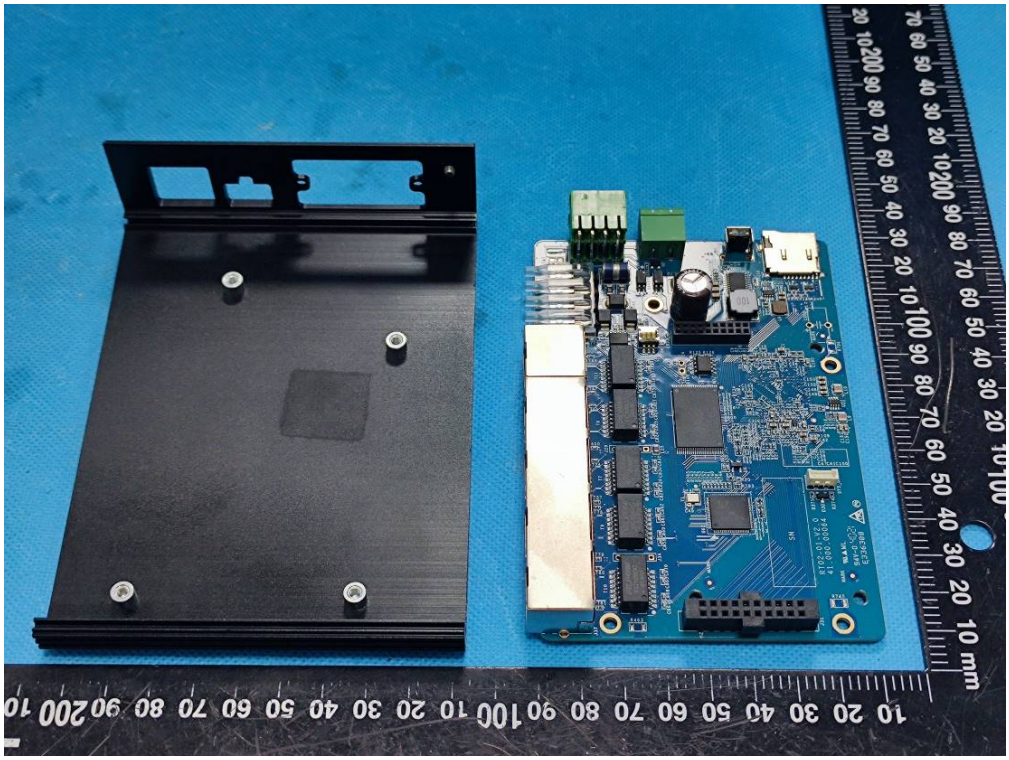
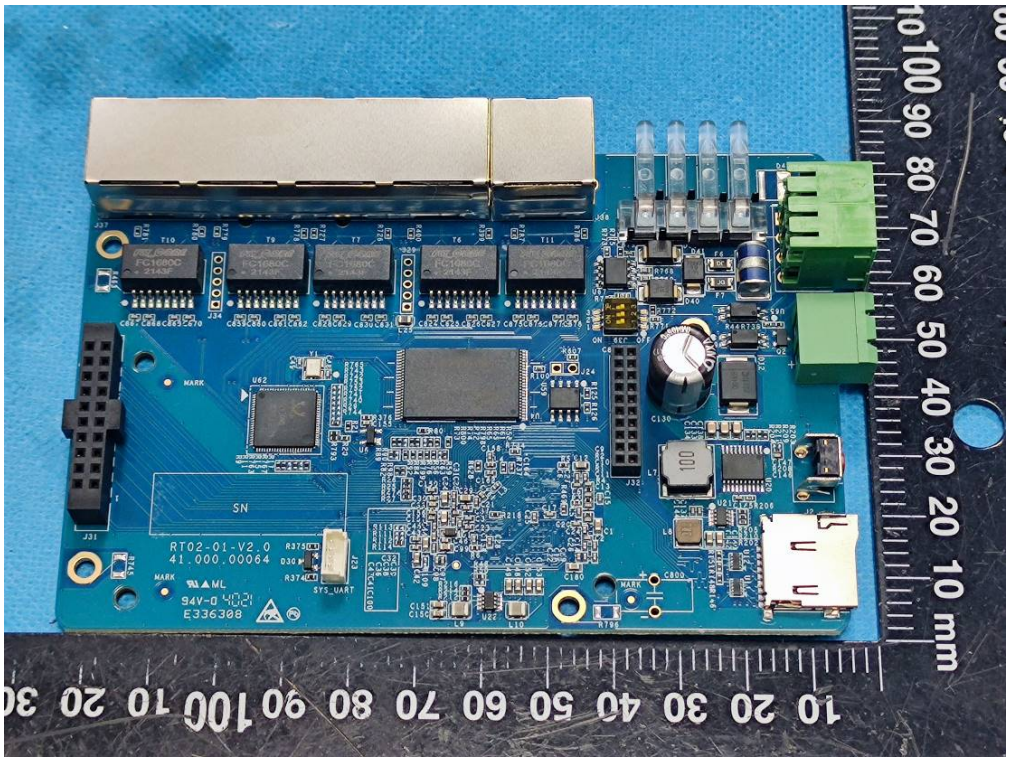


Antenna Port





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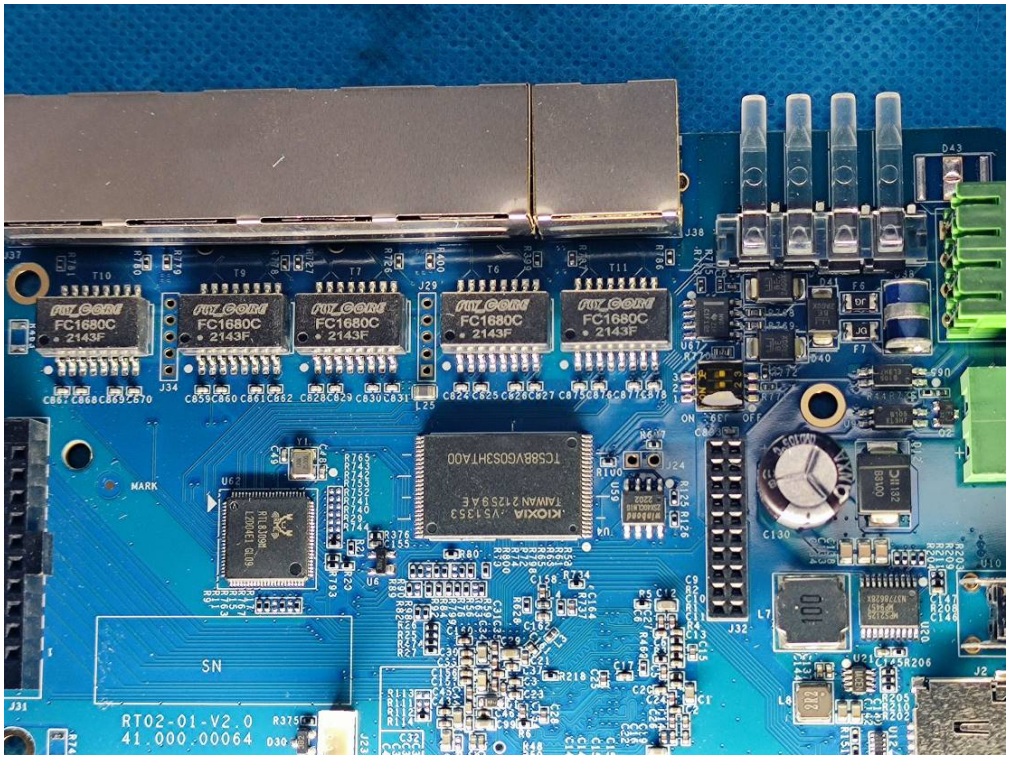
E336308
SN

Port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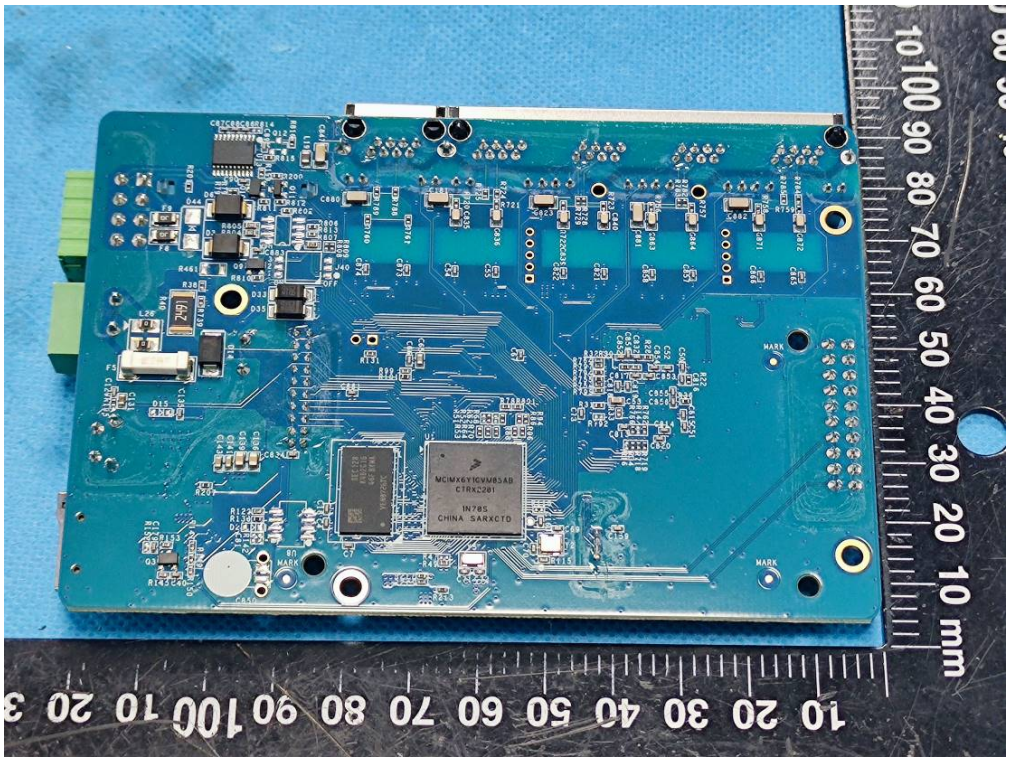
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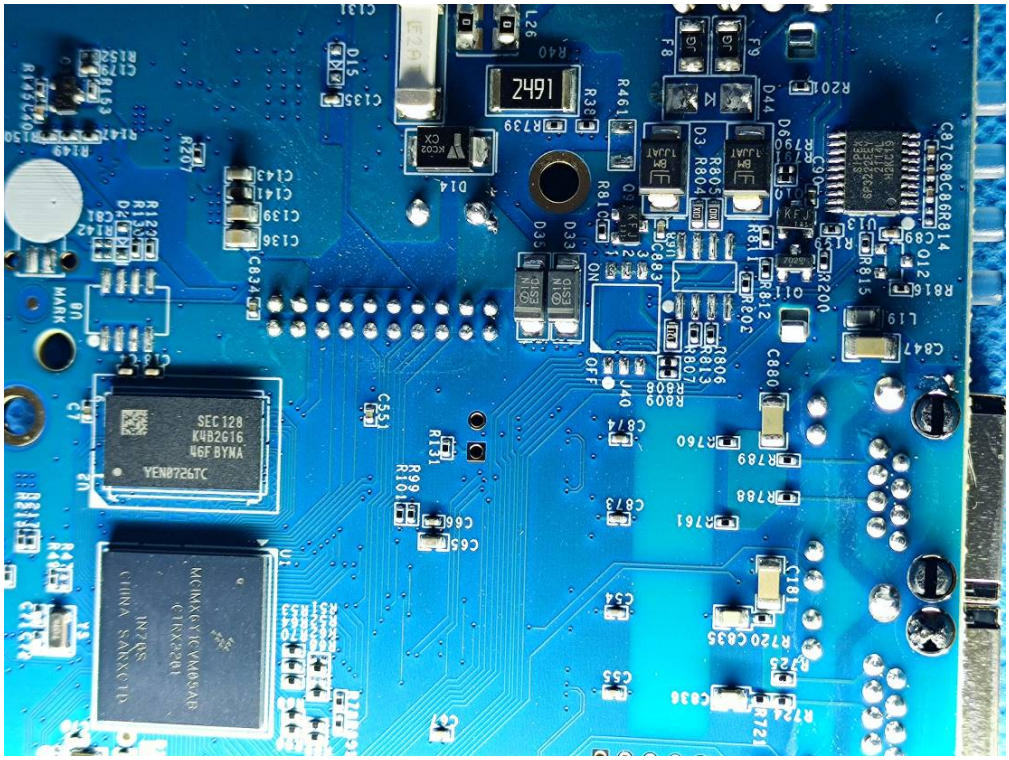
10 100 90 80 70 60 50 40 30 20 10 mm

Port

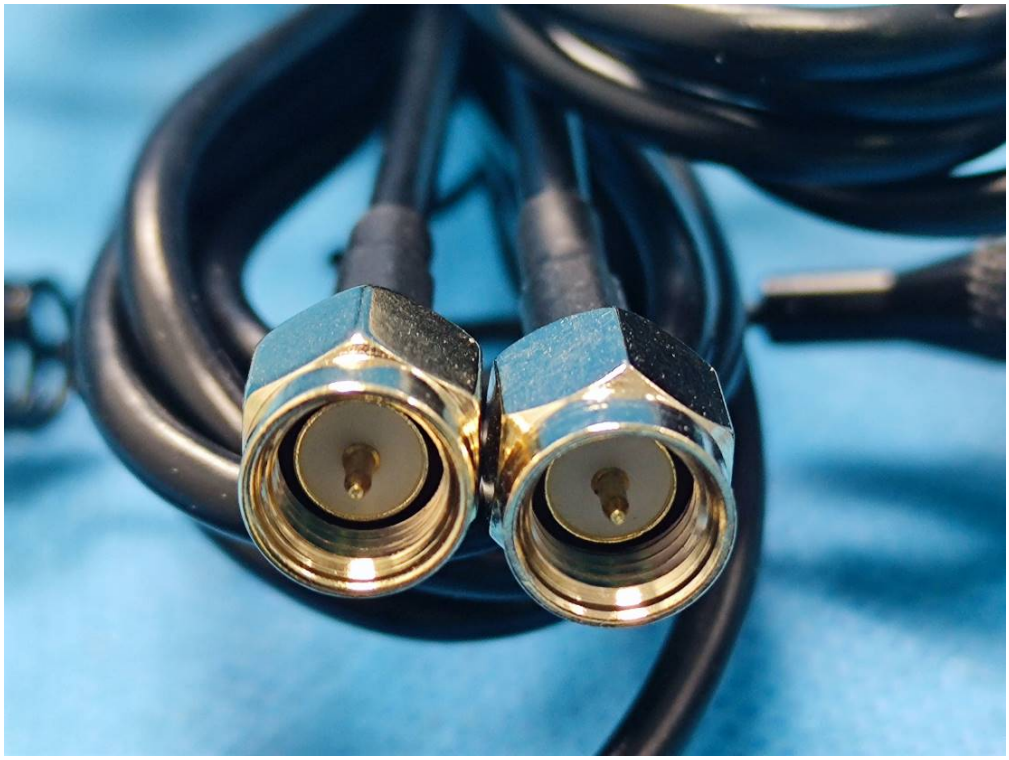


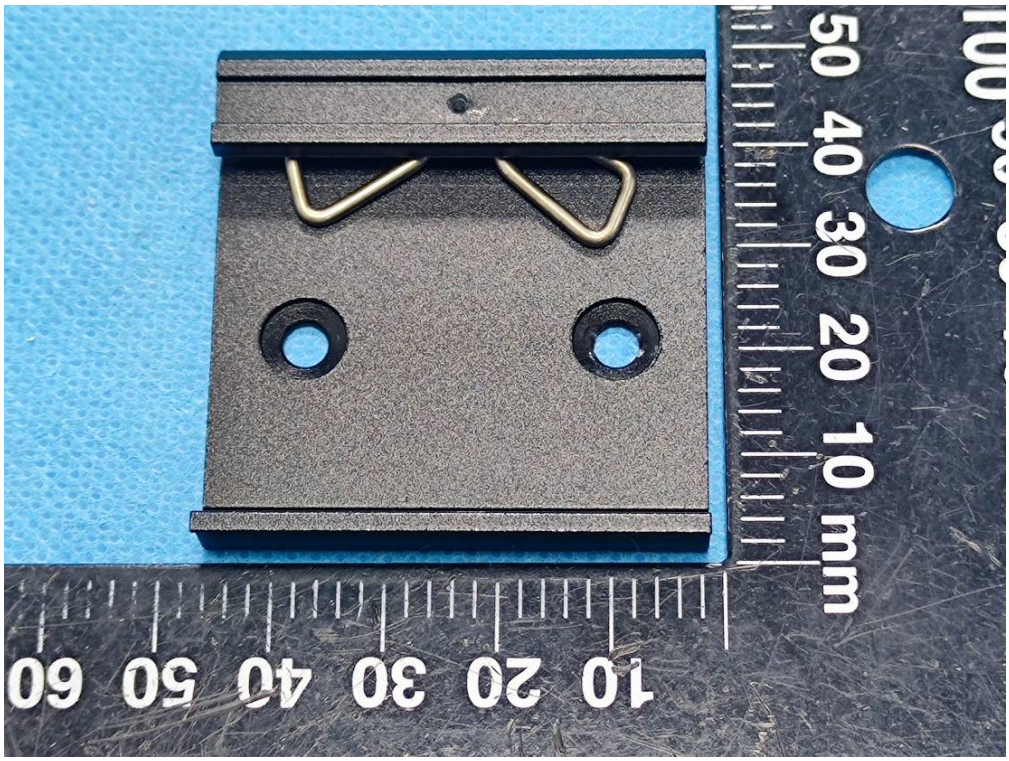
WiFi Antenna

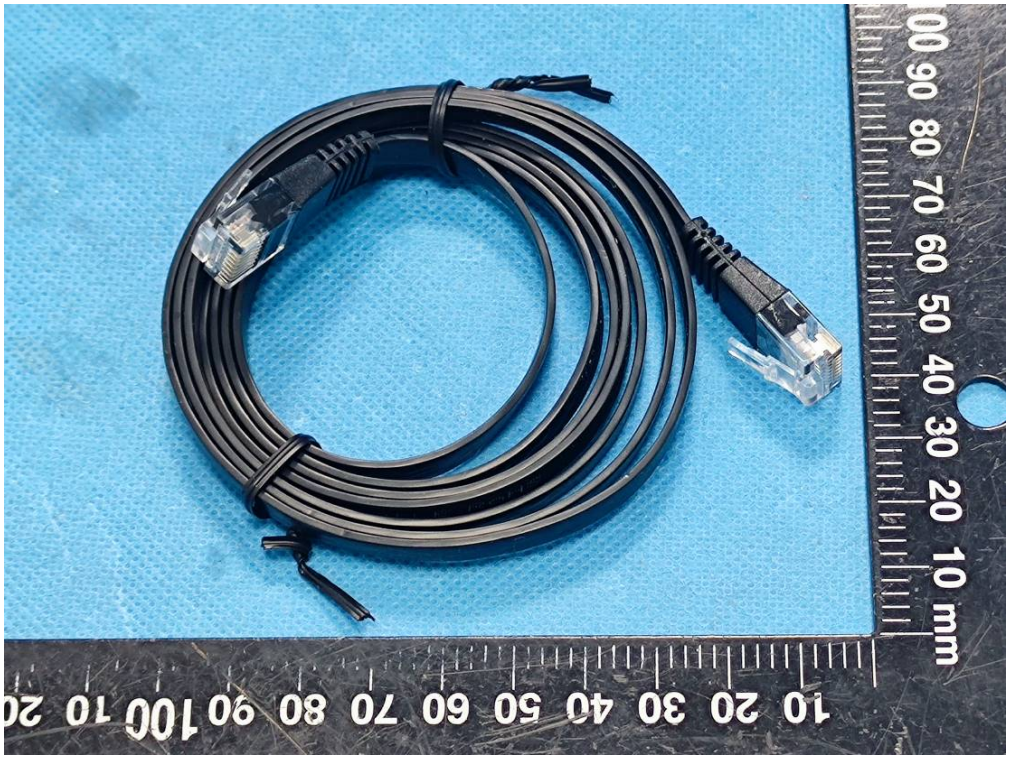
Port

WWAN(2G/3G/4G) Antenna

Port







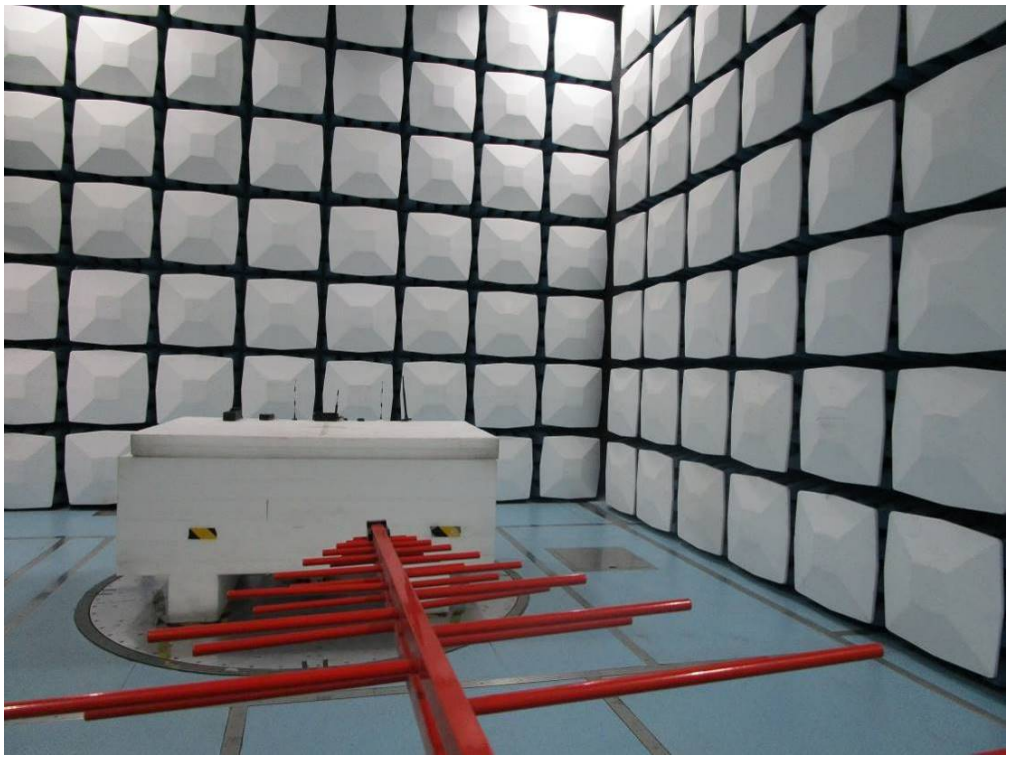

CWT Channel Well Technology
AC ADAPTER
MODEL
INPUT
OUTPUT
EFFICIENCY LEVEL
LPS


CWT Channel Well Technology
AC ADAPTER(电源适配器)
MODEL(型号/모델명): 2ABF060R
INPUT(输入/정격전압):
100-240V~ 50/60Hz 1.7A
OUTPUT(输出/정격출력):
+48.0V 1.25A 60.0W
EFFICIENCY LEVEL: VI
제품명: 직류전원장치
최저소비효율기준만족제품
A/S 센터: Sunflower Energy
A/S No.: 82-070-7011-2806
제조자: Channel Well Technology (Guangzhou) Co., Ltd.
제조국: 중국(Made in China)
주의사항: 실내에서만사용하십시오
LISTED
E161451
I.T.E. POWER SUPPLY
Factory ID: G
HU10587-15026
MSIP-REM-cwt-2ABF060R
AID.CO.,LTD
Energy Verified
CWT
制造商:侨威科技股份有限公司
MADE IN CHINA(中国制造)
LPS

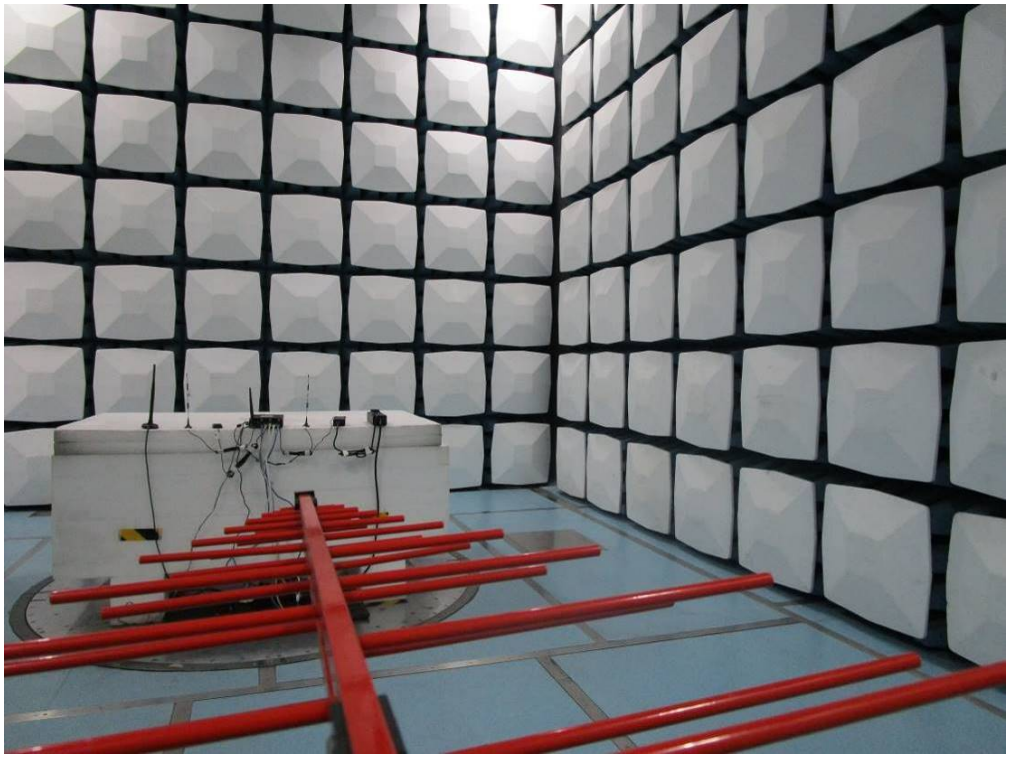
EXHIBITB - TEST SETUP PHOTOGRAPHS

RE

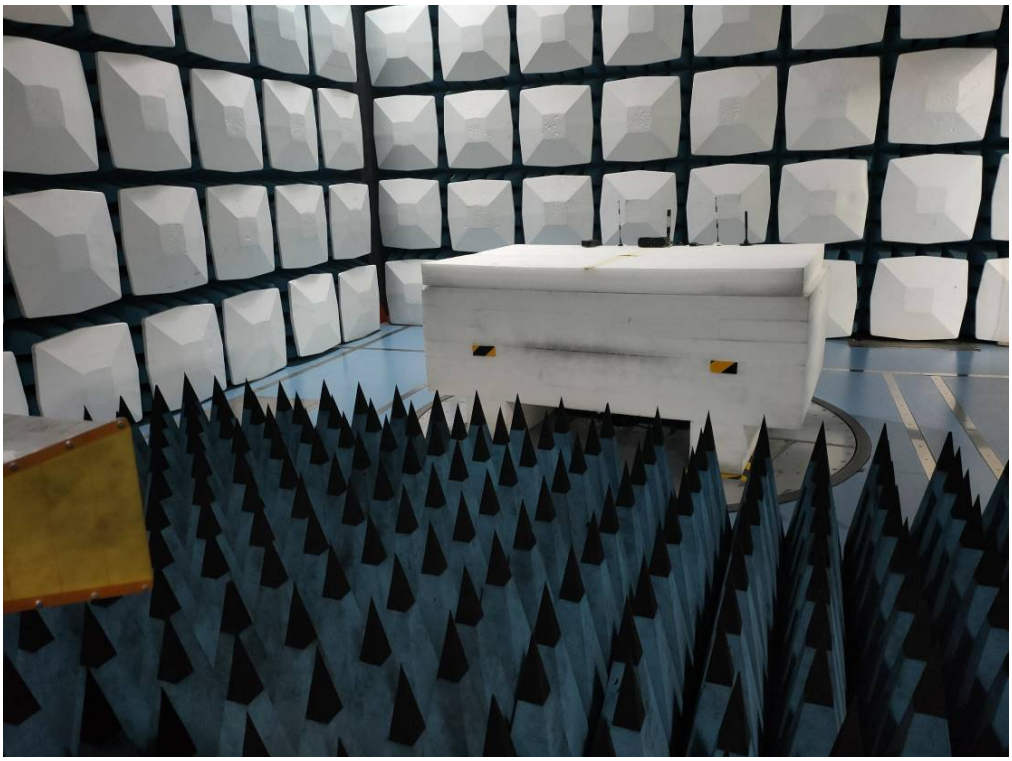
RE Below 1GHz front View



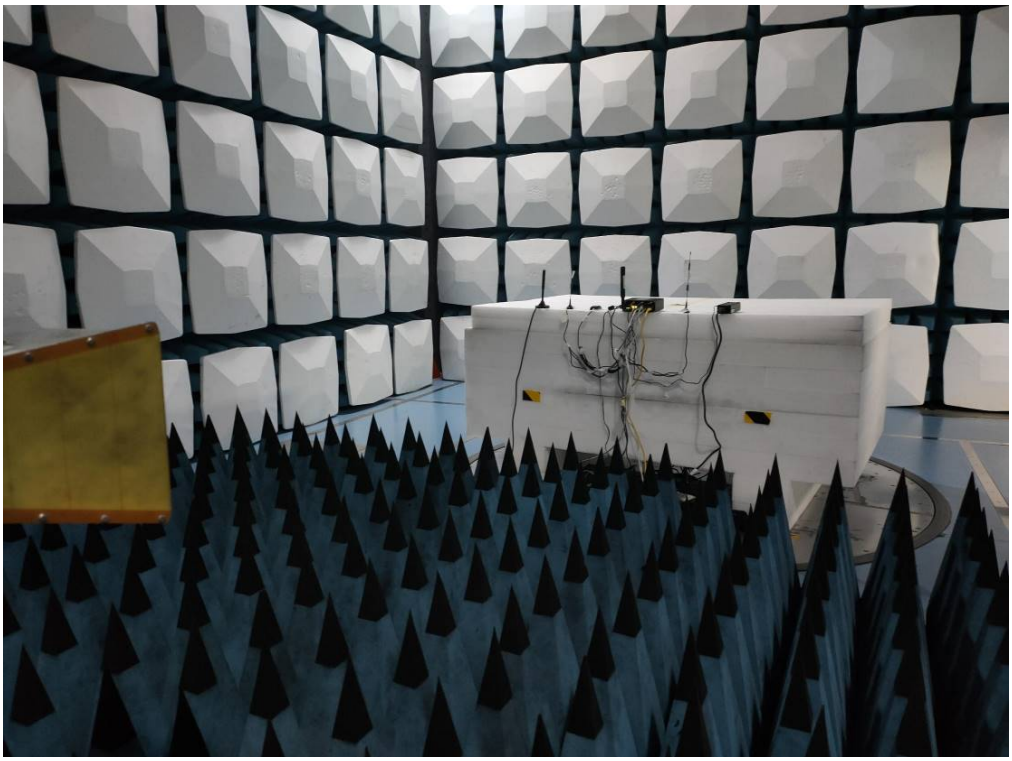
RE Below 1GHz rear View



RE Above 1GHz front View



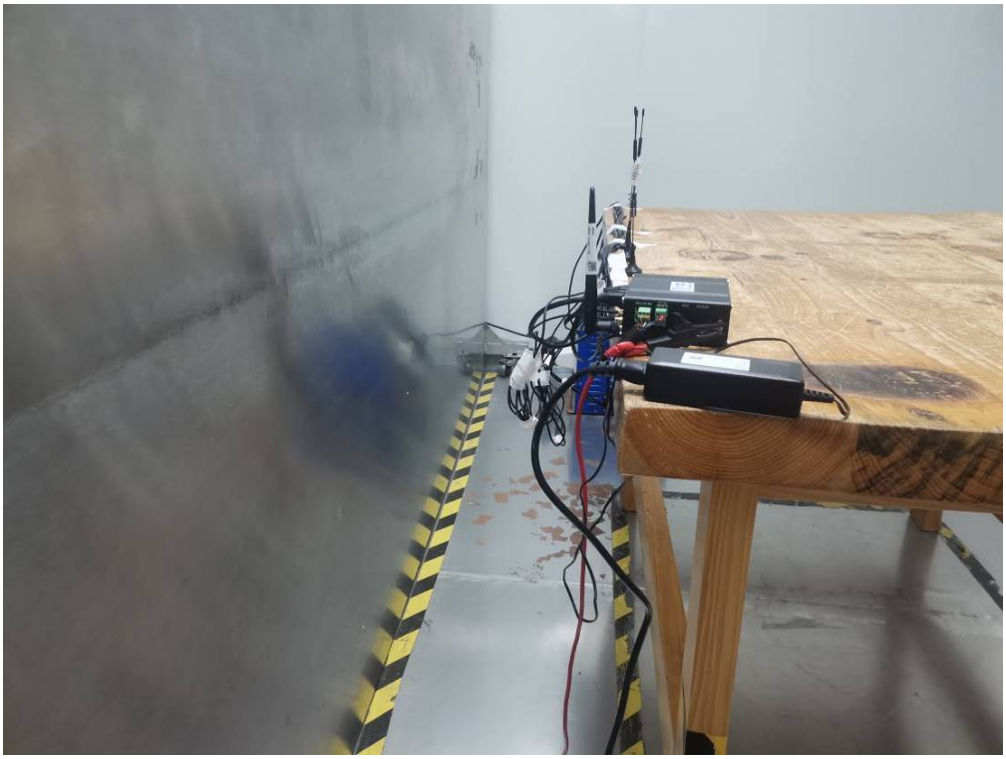
RE Above 1GHz rear View



CE_AC

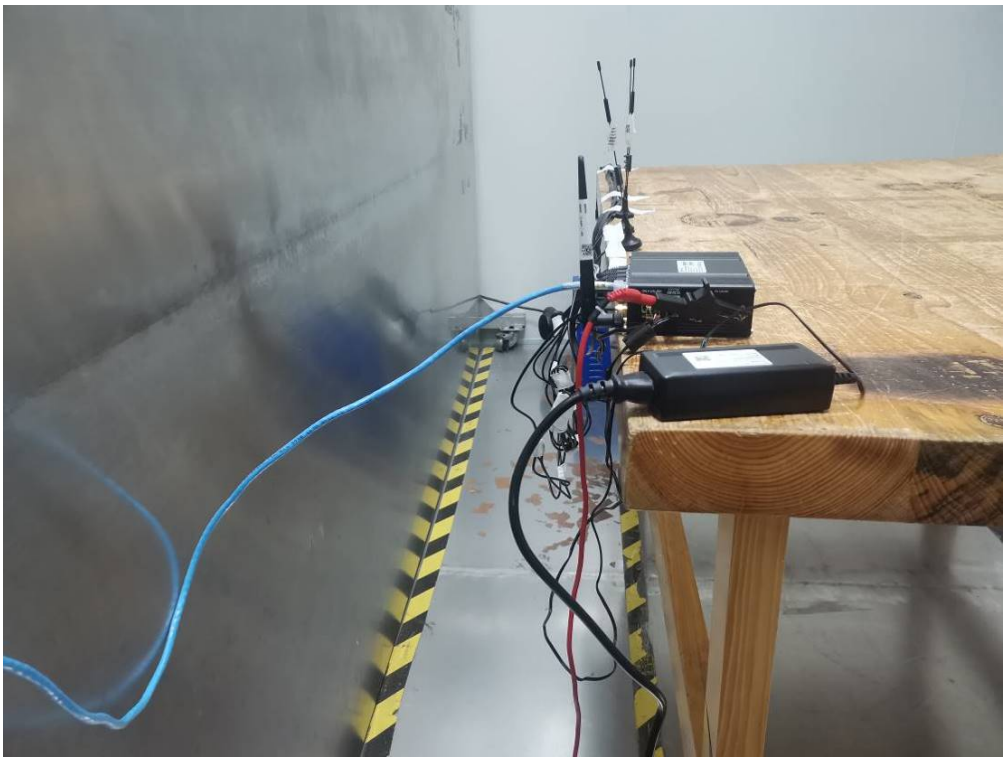
CE front View

CE side View



CE front View ISN

CE side View ISN

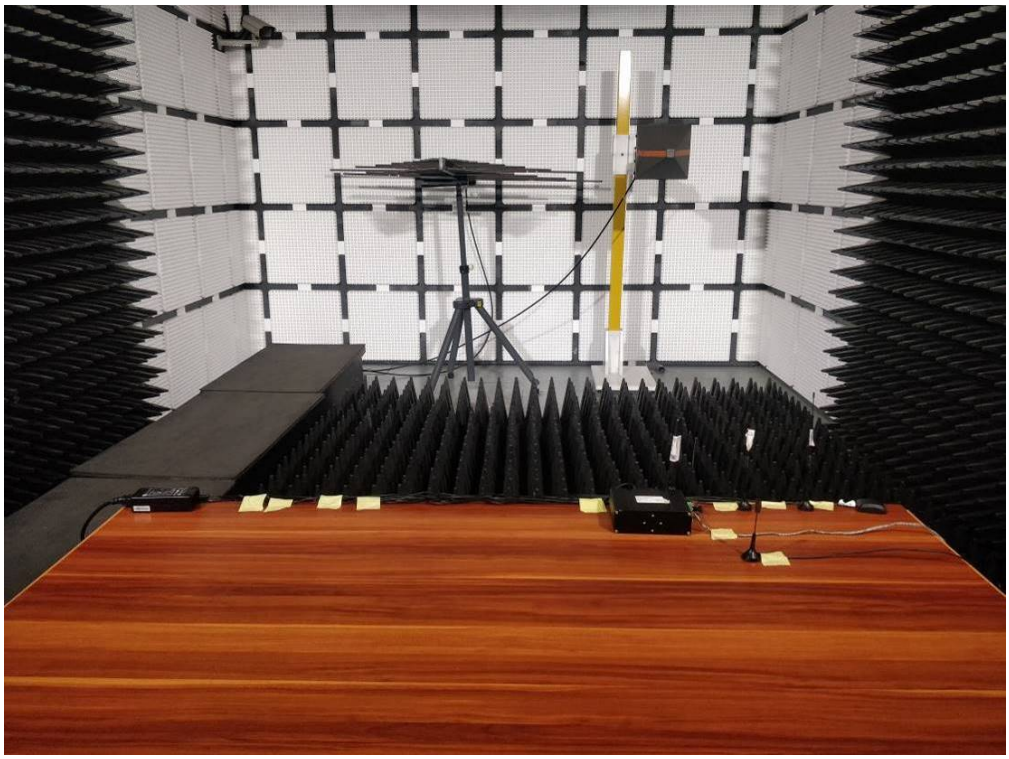


Flicker

Test Setup Photo View

RS

Test Setup Photo View



ESD

Test Setup Photo View

EFT

Test Setup Photo View

Signal Port Test Setup Photo

Dips

Test Setup Photo View

Surge

Test Setup Photo View

Signal Port Test Setup Photo

CS

Test Setup Photo View

Signal Port Test Setup Photo

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