TEST REPORT

Applicant	:	Shanghai AllyNav Technology Co.,Ltd.
Address of Applicant	:	Room 201, Building 1,No 215, Gaoguang RD, Qingpu District,Shanghai, China
Product Name	:	GNSS Receiver
Brand Name	:	N/A
Model Name	:	R73
Sample Acquisition Method	:	Sent by Client
Sample No.	:	E25110056-01#01
FCC ID	:	2AT4H-R73
Standards	:	FCC CFR47 Part 15.247, Subpart C
Date of Receipt	:	2026-01-16
Date of Test	:	2026-01-28 ~ 2026-04-07
Date of Issue	:	2026-04-07

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by: Erik Yang (Erik Yang) Reviewed by: Jennifer Zhou (Jennifer Zhou) Approved by: (Authorized signatory: Echo Mu)

Contents

1 General Information

1.1 Testing Laboratory

Company Name	Shanghai Ingeer Testing Technology Co., Ltd.
Address	No.1298, Pingan Road, Minhang District, Shanghai, China
Telephone	0086 21-51682999

1.2 Details of Application

Applicant Company Name	Shanghai AllyNav Technology Co.,Ltd.
Applicant Company Address	Room 201, Building 1,No 215, Gaoguang RD, Qingpu District,Shanghai, China
Contact Person	Kaibin Yao
Telephone	+86-021-61200339
Email	yaokaibin@allynav.cn
Manufacturer Company Name	Shanghai AllyNav Technology Co.,Ltd.
Manufacturer Company Address	Room 201, Building 1,No 215, Gaoguang RD, Qingpu District,Shanghai, China
Factory Company Name	Shanghai AllyNav Technology Co.,Ltd.
Factory Company Address	Room 201, Building 1,No 215, Gaoguang RD, Qingpu District,Shanghai, China

1.3 Details of EUT

Product Name	GNSS Receiver
Brand Name	N/A
Test Model Name	R73
FCC ID	2AT4H-R73
Mode of Operation	WLAN 802.11b/g/n(HT20/40)
Frequency Range	2400MHz ~ 2483.5MHz
Channel Separation	5 MHz
Number of channels	11
Modulation Type	DSSS, OFDM
Antenna Type	Internal Antenna
Antenna Gain	3.50dBi
Extreme Temperature Range	-40℃~ +75℃
Test Voltage	DC 9-36V
Hardware Version	PCBR70V1.3
Software Version	LS-GNSS-R73 V1.3.3
RF power setting in TEST SW	802.11b: EspRFTestTool_v3.6_Manual.exe_Set Attenuation(0.25dB)_4 802.11g: EspRFTestTool_v3.6_Manual.exe_Set Attenuation(0.25dB)_24 802.11n20: EspRFTestTool_v3.6_Manual.exe_Set Attenuation(0.25dB)_28 802.11n40: EspRFTestTool_v3.6_Manual.exe_Set Attenuation(0.25dB)_28

Note:

1. The above information was declared by the manufacture.

2. For more details, please refer to the User's manual of the EUT.

Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2.412GHz	5	2.432GHz	9	2.452GHz
2	2.417GHz	6	2.437GHz	10	2.457GHz
3	2.422GHz	7	2.442GHz	11	2.462GHz
4	2.427GHz	8	2.447GHz		

Note:

For 20MHz bandwidth system use Channel 1 to Channel 11

For 40MHz bandwidth system use Channel 3 to Channel 9

1.4 Test Methodology

47 CFR Part 15, Subpart C	Telecommunication-Radio Frequency Devices-Intentional Radiators
KDB Publication 558074 D01 v05r02	15.247 Meas Guidance.
ANSI C63.10-2020+Cor.1-2023	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

1.5 Test Summary

Test Item	FCC Rules	Result
Antenna Requirement	FCC Part 15.247(b)(4), Part 15.203	PASS
Maximum conducted (average) output power	FCC Part 15.247(b)(3)	Refer to WIFI module test report No.: R2107A0598-R1
6dB Bandwidth	FCC Part 15.247(a)(2)	Refer to WIFI module test report No.: R2107A0598-R1
Maximum conducted output power spectral density	FCC Part 15.247(e)	Refer to WIFI module test report No.: R2107A0598-R1
Conducted Spurious Emission & Authorized-band band-edge	FCC Part 15.247(d)	Refer to WIFI module test report No.: R2107A0598-R1
Radiated Emission	FCC Part 15.247(d), 15.205, 15.209	PASS
Band Edge (Restricted-band band-edge)	FCC Part 15.247(d), 15.205, 15.209	PASS
Conducted Emission on AC Mains	FCC Part 15.207(a)	PASS

Note(s):

Only the Radiated spurious emissions, Band Edge (Restricted-band band-edge) and Conducted Emission on AC Mains test item were tested in this report, other test data of the items referred to the WIFI module test report (Product name: Wi-Fi & Bluetooth Internet of Things Module; Model name: ESP32-C3-MINI-1U; FCC ID: 2AC7Z-ESPC3MINII; Report No.: R2107A0598-R1).

2 Test Condition

2.1 Environmental conditions

Temperature (°C)	15-35
Humidity (%RH)	30-60
Barometric Pressure (mbar)	860-1060

Note: Actual values will be recorded during the test.

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum Analyzer	Rohde & Schwarz	FSV40N	101450	2025-06-10	2026-06-09
Signal Generator	Rohde & Schwarz	SMR27	100184	2025-06-30	2026-06-29
EMI Test Receiver	Rohde & Schwarz	ESPI3	100173	2025-06-09	2026-06-08
EMI Test Receiver	Rohde & Schwarz	ESR 7	101911	2025-06-09	2026-06-08
V-network	SCHWARZBECK	NSLK 8127	8127-902	2025-06-09	2026-06-08
Attenuator	SCHWARZBECK	VTSD 9561-FN	/	2025-06-09	2026-06-08
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2025-03-24	2027-03-23
Horn Antenna-18G	SCHWARZBECK	BBHA9120D	9120D-1775	2025-06-22	2027-06-21
Loop Antenna	SCHWARZBECK	FMZB 1513	/	2025-06-23	2027-06-22
Horn Antenna-40G	YINGLIAN	LB-180400-KF	N/A	2025-06-22	2027-06-21
Broadband Preamplifier	SCHWARZBECK	BBV 9718	346	2025-06-09	2026-06-08
EMC chamber 9*6*6(L*W*H)	CHANGNING	966	N/A	2025-06-10	2028-06-09
Shielded Enclosure 8*5*4(L*W*H)	CHANGNING	854	N/A	2025-06-10	2028-06-09
Test Software	BL	BL410_E	Version:1.0.0.122	N/A	N/A

2.3 Measurement Uncertainty

The uncertainty is calculated using the methods suggested in the “Guide to the Expression of Uncertainty in measurement” (GUM) published by CISPR and ANSI. The reported uncertainty of measurement y ±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95.45%.

Parameter		Uncertainty
Antenna Port Conducted Emission		±1.04dB
Radiated Emission	30MHz-1GHz	±5.00dB
	1GHz-40GHz	±5.46dB
Conducted Emission on AC Mains	150KHz-30MHz	±3.36dB
Occupied Channel Bandwidth		±39.26KHz
Maximum Conducted Output Power		±1.06dB
Maximum Conducted Output Power Spectral Density		±1.12dB

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software to control EUT work in continuous transmitting and receiving mode. Select test channel as below:
For 802.11b/g/n (HT20)

Channel	Frequency
The lowest channel (CH1)	2412MHz
The middle channel (CH6)	2437MHz
The highest channel (CH11)	2462MHz

For 802.11n(HT40)

Channel	Frequency
The lowest channel (CH3)	2422MHz
The middle channel (CH6)	2437MHz
The highest channel (CH9)	2452MHz

Through Pre-scan under all rate at lowest channel, the data rate as below table described is the worst case, so we choose these data rate for test.

Type	Data rate
802.11b	1Mbps
802.11g	6Mbps
802.11n(20M)	MCS0
802.11n(40M)	MCS0

The basic operation modes are:

A. On
   1. WLAN mode
      a. Transmitting
         i. Low Channel
         ii. Middle Channel
         iii. High Channel
      b. Receiving
B. Standby
C. Off

3.2 Special Accessories and Auxiliary Equipment

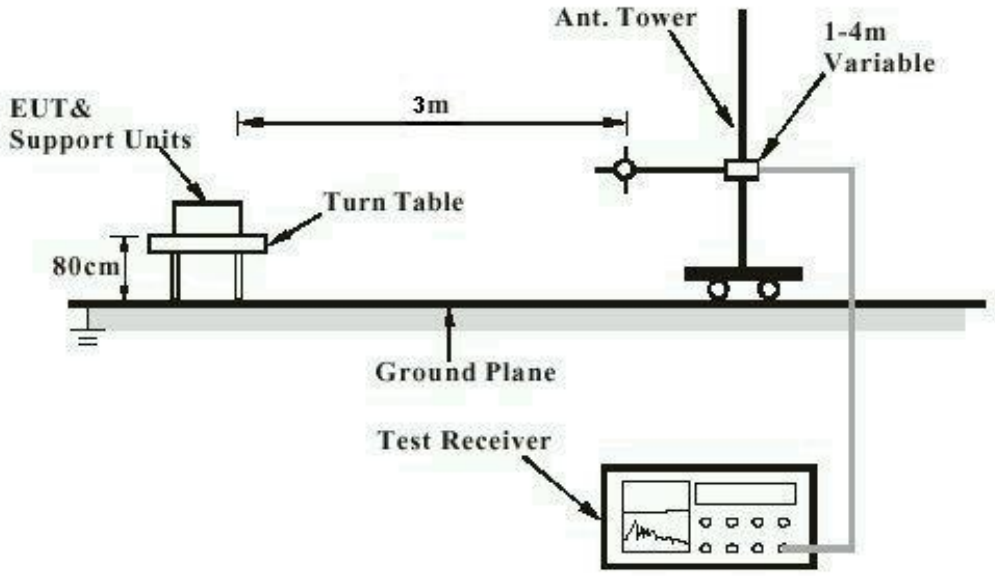
Description	Manufacturer	Model Name	Serial No.
Laptop	HP	HP ZHAN 66 Pro G1	5CD7438R1J
USB Cable	N/A	N/A	1.00m Unshielded
AC/DC ADAPTER	N/A	DSS65-1355000	Input: AC 100-240V 2A 50/60Hz; Output: DC 13.5V 5A

3.3 Support Software

Description	Manufacturer	Software Name
Software	N/A	EspRFTestTool_v3.6_Manual

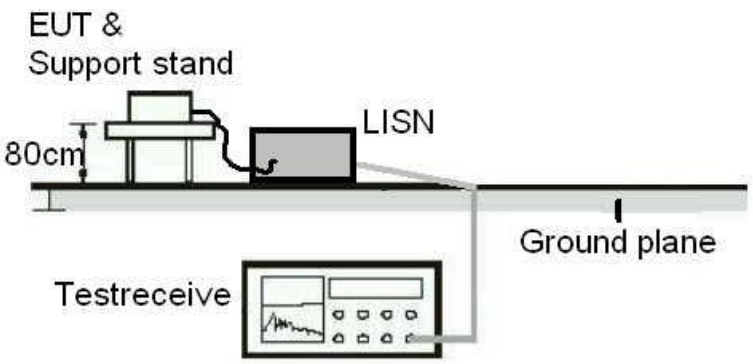
3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 1GHz are done with a table height of 1.5m. In addition, there is RF absorbing material on the floor of the test site for above 1GHz measurement.

Diagram of Measurement Equipment Configuration for Conduction Measurement



4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT: **PASS**

Test standard	:	FCC Part 15.247(b)(4), Part 15.203
Requirement	:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. In addition, If transmitting antennas of directional gain greater than 6dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 3.50dBi. The antenna is an Internal antenna with no possibility of replacement with a non-approved antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

4.1.2 Maximum conducted (average) output power

RESULT: **NOTE**

Test standard	:	FCC Part 15.247(b)(3)
Requirement	:	ANSI C63.10 Clause 11.9.2.3.1 KDB 558074 D01 v05r02, Clause 8.3.2
Kind of test site	:	Shielded room

Note: Please referred to the WIFI module test report (Product name: Wi-Fi & Bluetooth Internet of Things Module; Model name: ESP32-C3-MINI-1U; FCC ID: 2AC7Z-ESPC3MINII; Report No.: R2107A0598-R1).

4.1.3 6dB Bandwidth

RESULT: **NOTE**

Test standard	:	FCC Part 15.247(a)(2)
Requirement	:	ANSI C63.10 Clause 11.8.2 KDB 558074 D01 v05r02, Clause 8.2
Kind of test site	:	Shielded room

Note: Please referred to the WIFI module test report (Product name: Wi-Fi & Bluetooth Internet of Things Module; Model name: ESP32-C3-MINI-1U; FCC ID: 2AC7Z-ESPC3MINII; Report No.: R2107A0598-R1).

4.1.4 Maximum conducted output power spectral density

RESULT: **NOTE**

Test standard	:	FCC Part 15.247(e)
Requirement	:	ANSI C63.10 Clause 11.10.5 KDB 558074 D01 v05r02, Clause 8.4
Kind of test site	:	Shielded room

Note: Please referred to the WIFI module test report (Product name: Wi-Fi & Bluetooth Internet of Things Module; Model name: ESP32-C3-MINI-1U; FCC ID: 2AC7Z-ESPC3MINII; Report No.: R2107A0598-R1).

4.1.5 Conducted Spurious Emission & Authorized-band band-edge

RESULT: **NOTE**

Test standard	:	FCC Part 15.247(d), 15.209
Requirement	:	ANSI C63.10 Clause 11.11.1 KDB 558074 D01 v05r02, Clause 8.5
Kind of test site	:	Shielded room

Note: Please referred to the WIFI module test report (Product name: Wi-Fi & Bluetooth Internet of Things Module; Model name: ESP32-C3-MINI-1U; FCC ID: 2AC7Z-ESPC3MINII; Report No.: R2107A0598-R1).

4.1.6 Radiated Emission

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10 Clause 11.12.1 KDB 558074 D01 v05r02, Clause 8.6
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1.a
Ambient temperature	:	22.3°C
Relative humidity	:	42%

Notes

Test plots please refer to the annex document "SHE25110056-02CE DATA WIFI 2.4GHz-TX EXHIBIT A".

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.

2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.

3. All test modes had been pre-tested, but only the 802.11b at low channel of below 1 GHz is the worst case and recorded in the report.

4. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

4.1.7 Band Edge (Restricted-band band-edge)

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10 Clause 11.12.3 KDB 558074 D01 v05r02, Clause 8.7
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1.a
Ambient temperature	:	22.3C
Relative humidity	:	42%

Notes:

1. Test plots please refer to the annex document "SHE25110056-02CE DATA WIFI 2.4GHz-TX EXHIBIT A".

2. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT: **PASS**

Test standard	:	FCC Part 15.207(a)
Requirement	:	ANSI C63.10 Clause 6.2
Kind of test site	:	Shielded room

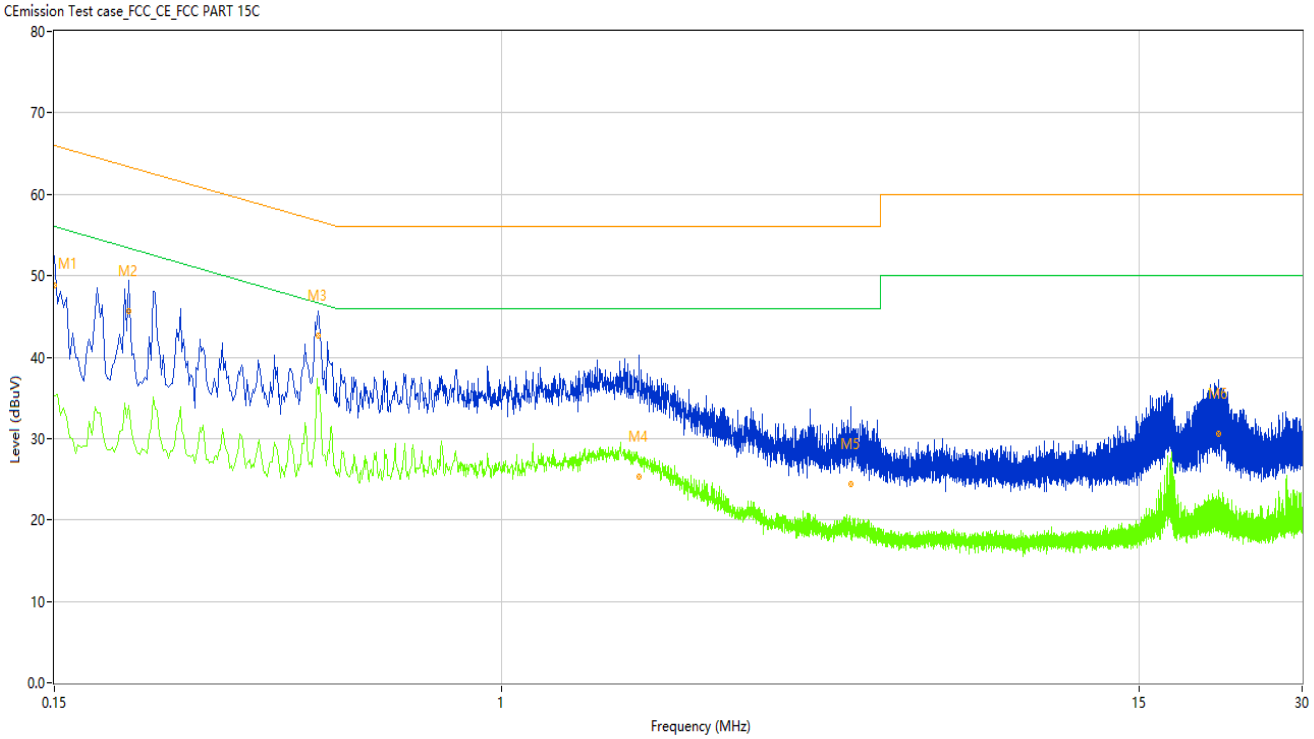
Test setup

Input Voltage	:	DC 13.5V 5A supply by AC adapter (which received AC 120V, 60Hz)
Operation Mode	:	A.1.a
Earthing	:	Connected to GND
Ambient temperature	:	20.1°C
Relative humidity	:	52%

For details refer to following test plot.

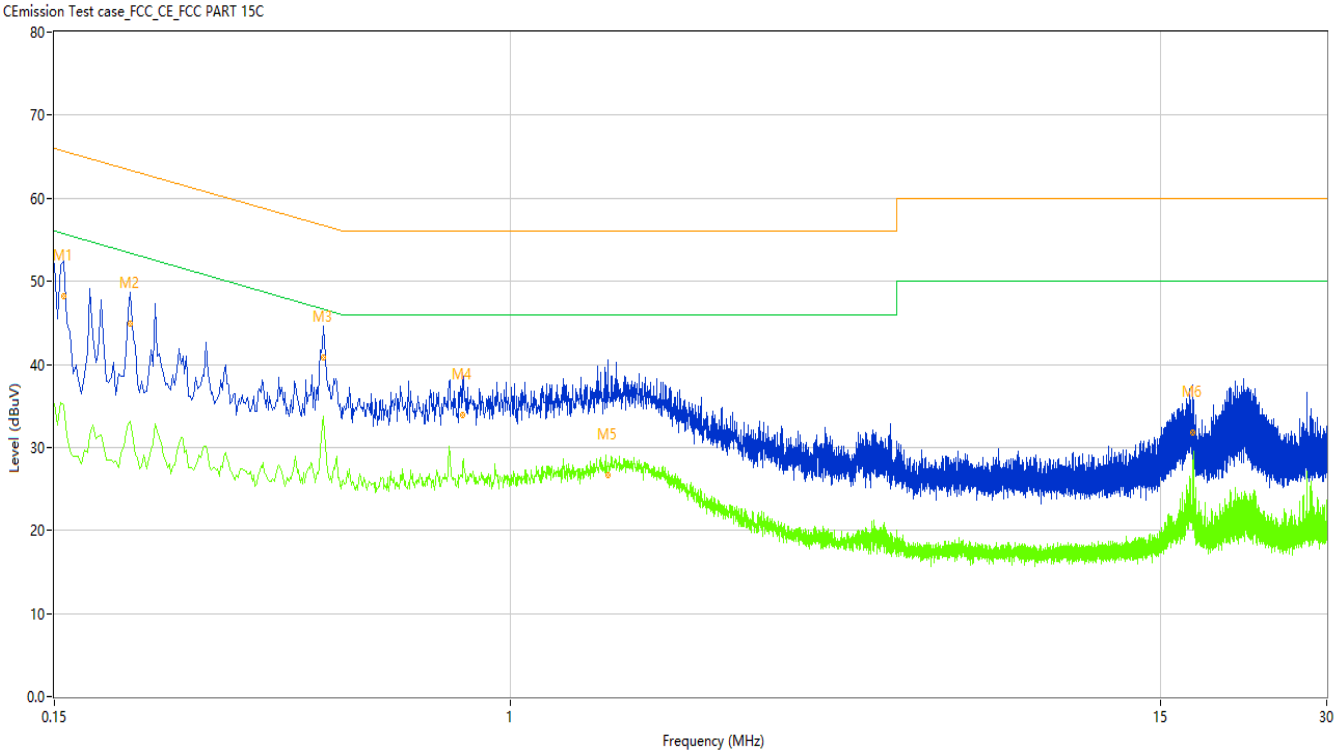
Note: All test modes had been pre-tested, but only the 802.11b at low channel is the worst case and recorded in the report.

Figure 1: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.150	53.29	10.24	66.00	12.71	Peak	L	Pass
1*	0.150	48.87	10.24	66.00	17.13	QP	L	Pass
1**	0.150	35.23	10.24	56.00	20.77	AV	L	Pass
2	0.206	49.88	10.28	63.37	13.49	Peak	L	Pass
2*	0.206	45.68	10.28	63.37	17.69	QP	L	Pass
2**	0.206	34.02	10.28	53.37	19.35	AV	L	Pass
3	0.460	45.55	10.19	56.69	11.14	Peak	L	Pass
3*	0.460	42.69	10.19	56.69	14.00	QP	L	Pass
3**	0.460	35.40	10.19	46.69	11.29	AV	L	Pass
4	1.796	37.04	10.08	56.00	18.96	Peak	L	Pass
4*	1.796	25.25	10.08	56.00	30.75	QP	L	Pass
4**	1.796	27.57	10.08	46.00	18.43	AV	L	Pass
5	4.418	31.29	10.19	56.00	24.71	Peak	L	Pass
5*	4.418	24.45	10.19	56.00	31.55	QP	L	Pass
5**	4.418	19.52	10.19	46.00	26.48	AV	L	Pass
6	21.036	37.30	10.86	60.00	22.70	Peak	L	Pass
6*	21.036	30.61	10.86	60.00	29.39	QP	L	Pass
6**	21.036	21.94	10.86	50.00	28.06	AV	L	Pass

Figure 2: Conducted Emission on AC Mains, N Phase

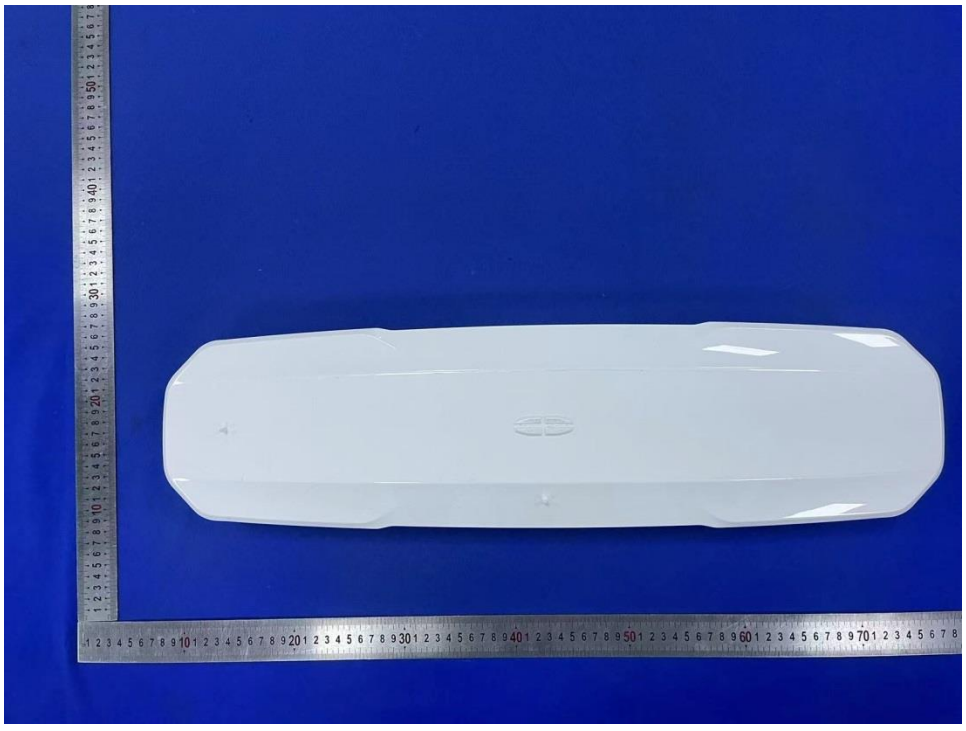


No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Margin (dB)	Detector	Line	Verdict
1	0.156	52.96	10.12	65.67	12.71	Peak	N	Pass
1*	0.156	48.14	10.12	65.67	17.53	QP	N	Pass
1**	0.156	35.14	10.12	55.67	20.53	AV	N	Pass
2	0.206	48.87	10.17	63.37	14.50	Peak	N	Pass
2*	0.206	44.95	10.17	63.37	18.42	QP	N	Pass
2**	0.206	33.12	10.17	53.37	20.25	AV	N	Pass
3	0.460	44.00	10.05	56.69	12.69	Peak	N	Pass
3*	0.460	40.78	10.05	56.69	15.91	QP	N	Pass
3**	0.460	33.71	10.05	46.69	12.98	AV	N	Pass
4	0.822	40.13	10.13	56.00	15.87	Peak	N	Pass
4*	0.822	33.88	10.13	56.00	22.12	QP	N	Pass
4**	0.822	28.09	10.13	46.00	17.91	AV	N	Pass
5	1.504	35.68	9.89	56.00	20.32	Peak	N	Pass
5*	1.504	26.68	9.89	56.00	29.32	QP	N	Pass
5**	1.504	28.11	9.89	46.00	17.89	AV	N	Pass
6	17.152	36.87	10.63	60.00	23.13	Peak	N	Pass
6*	17.152	31.86	10.63	60.00	28.14	QP	N	Pass
6**	17.152	28.52	10.63	50.00	21.48	AV	N	Pass

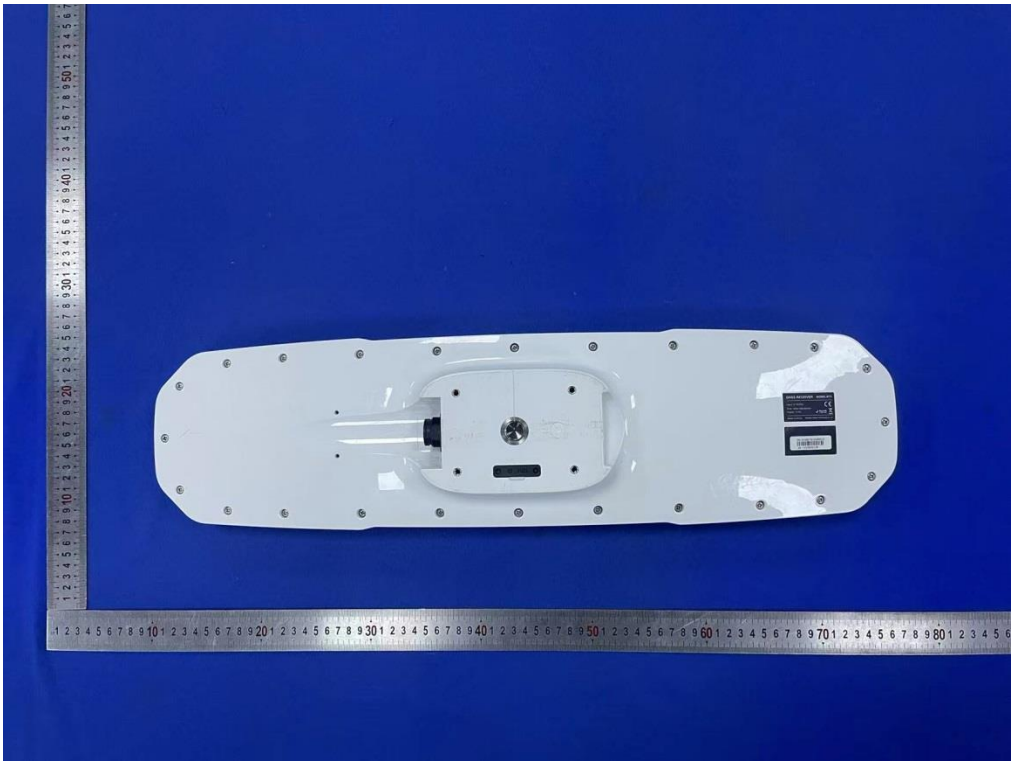
5 Appendixes

5.1 External Photo of the Sample

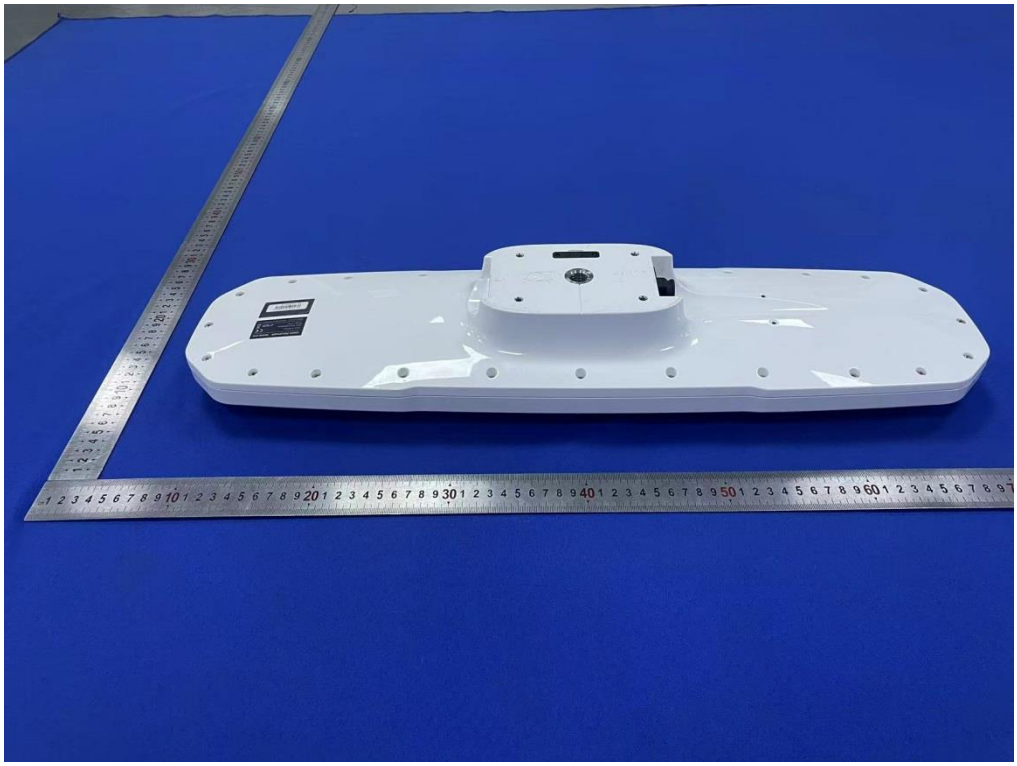
All of the sample



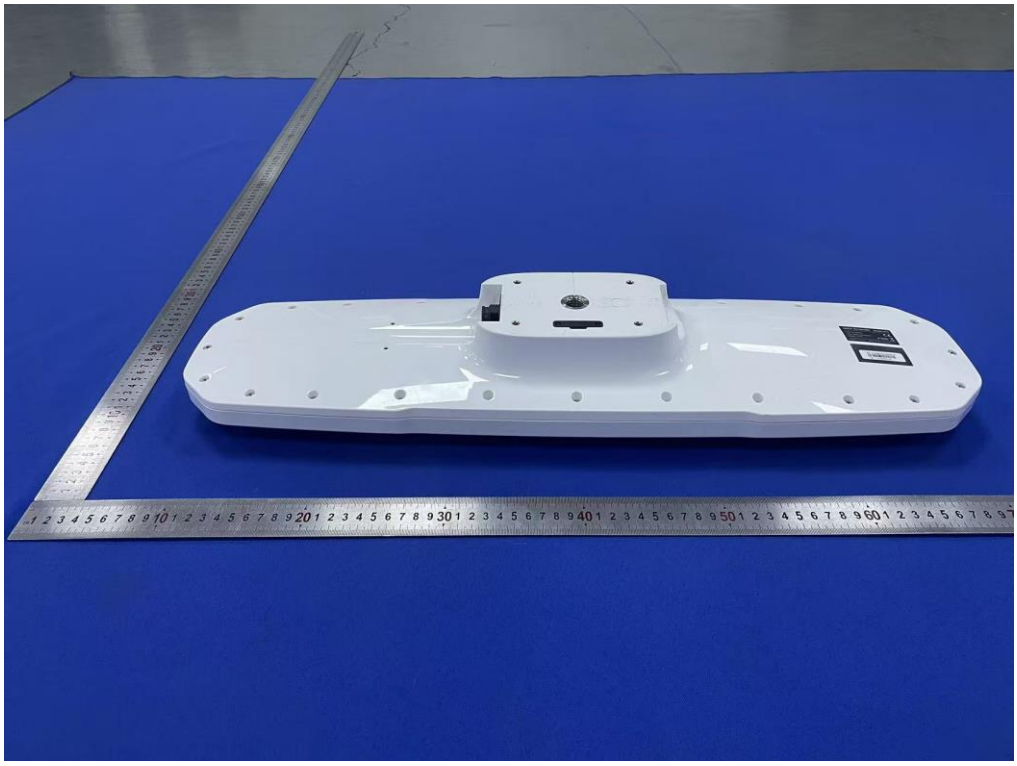
Front of the sample



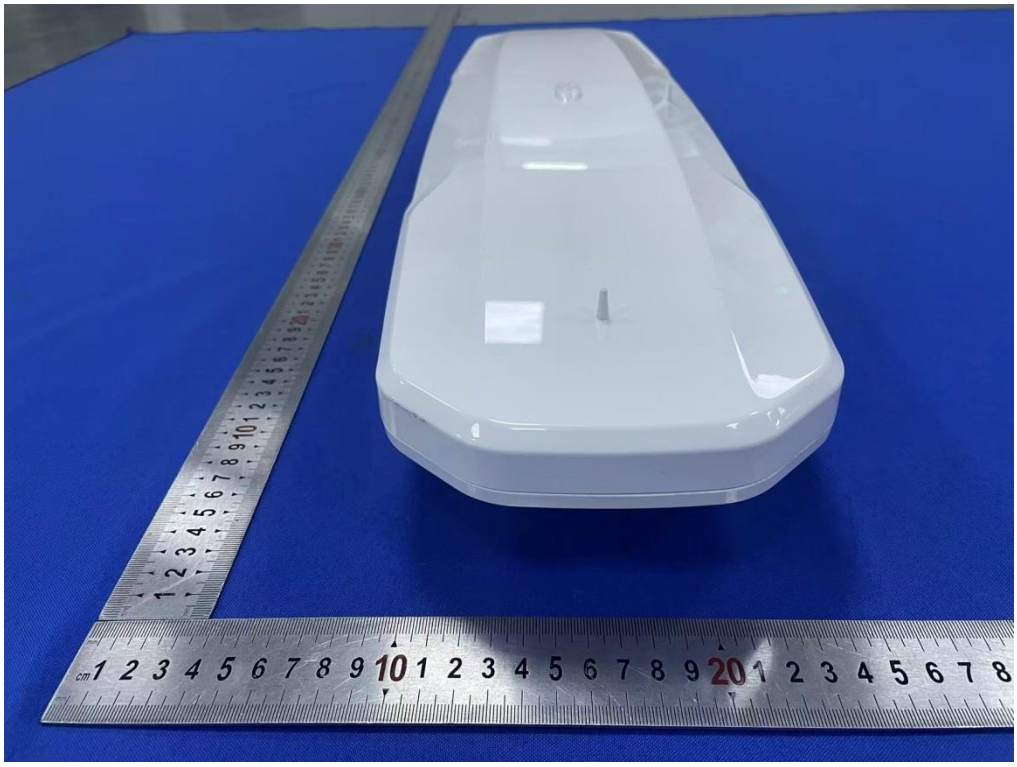
Rear of the sample



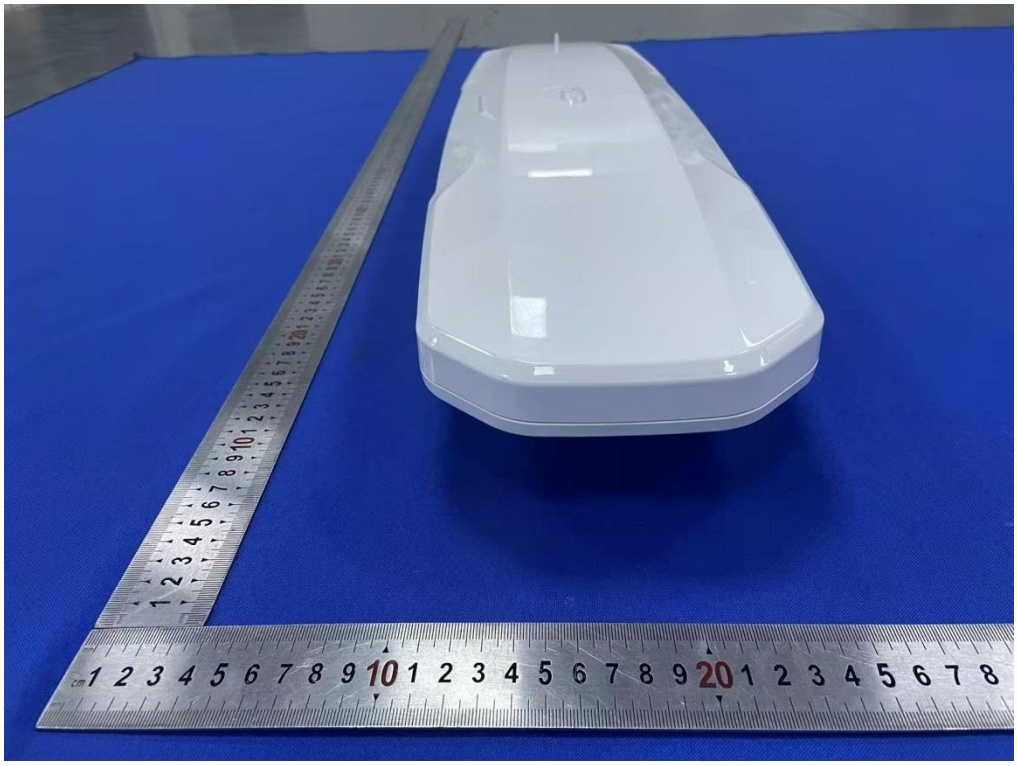
Left of the sample



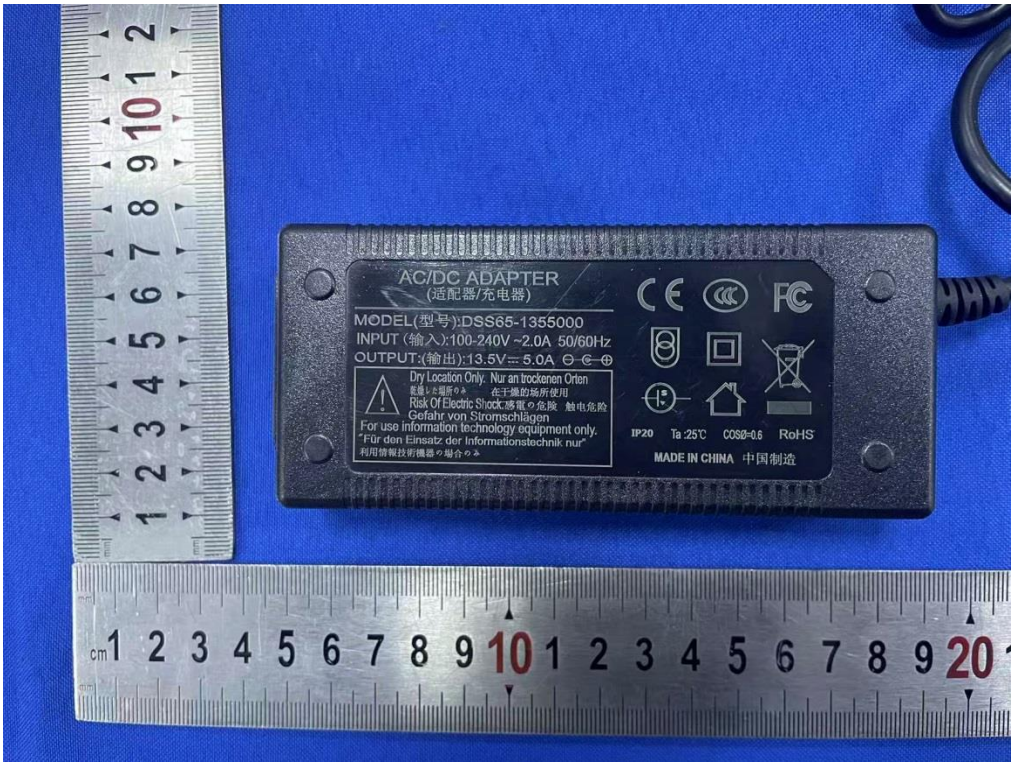
Right of the sample



Top of the sample

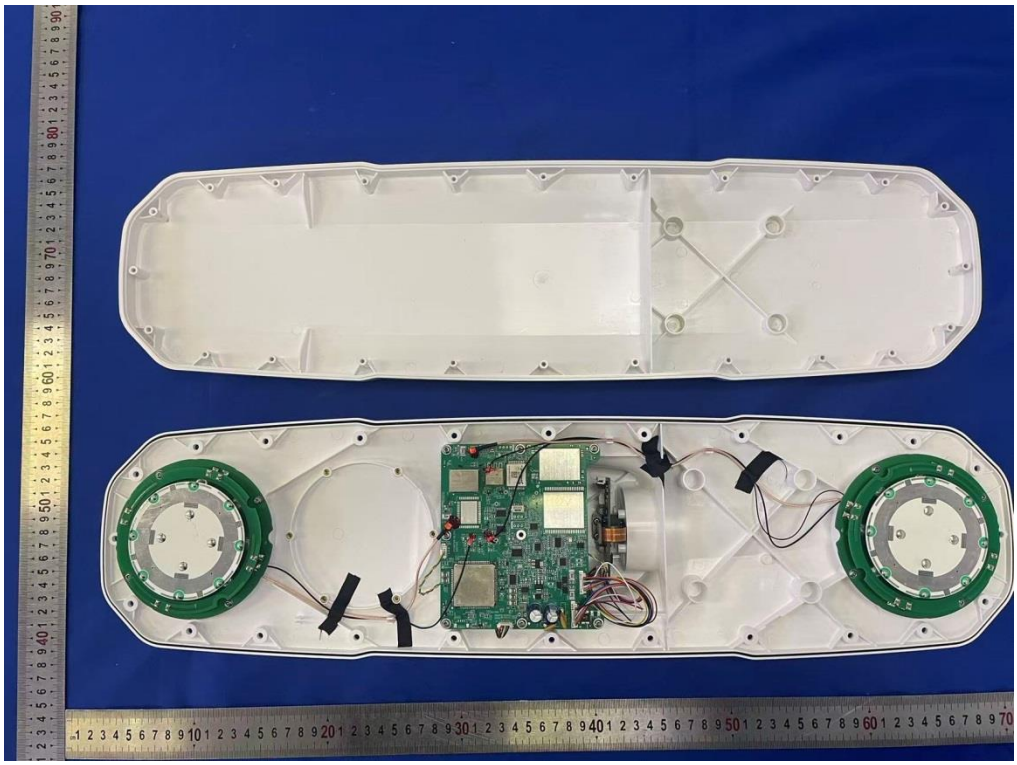


Bottom of the sample

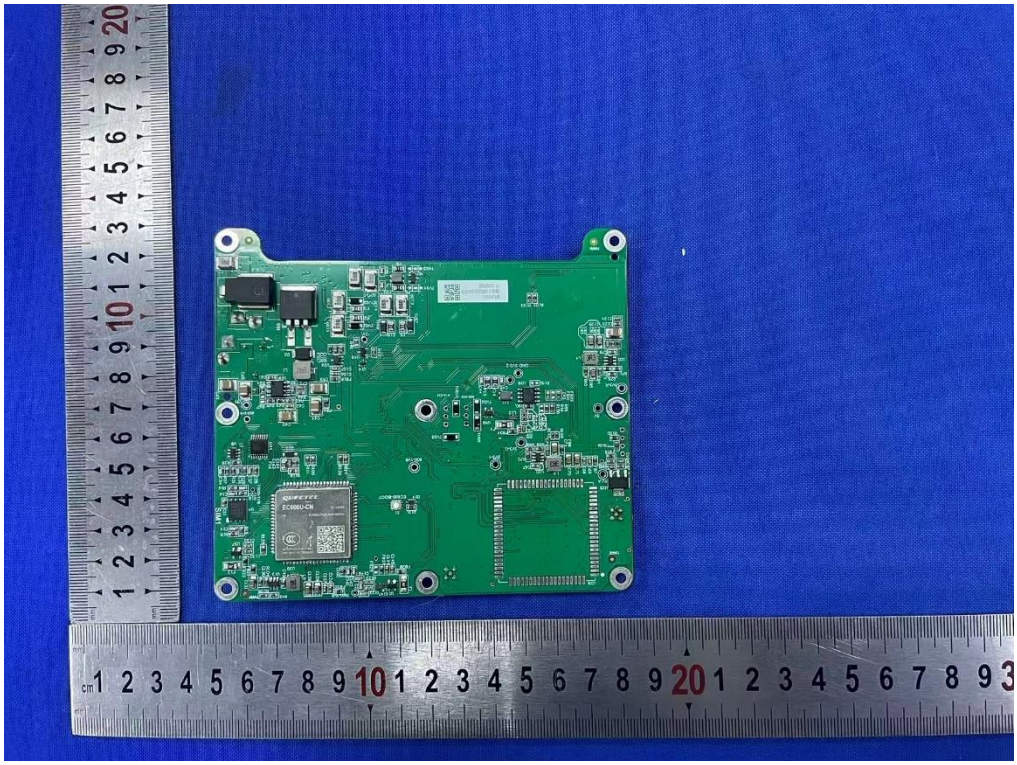


Adapter of the sample

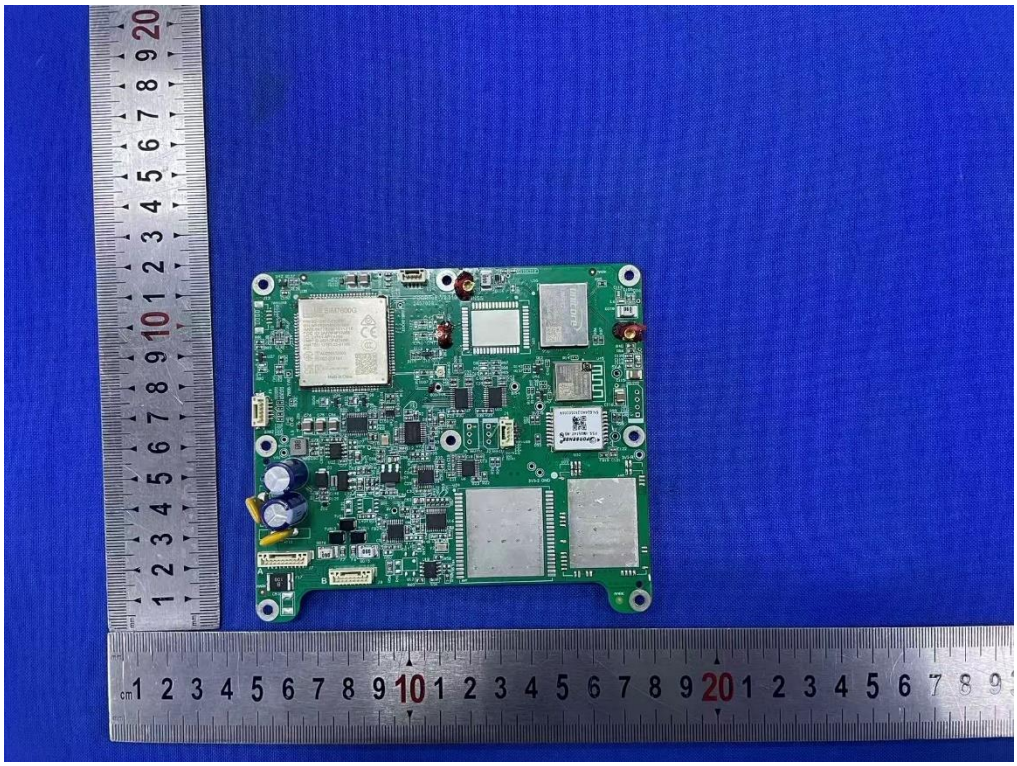
5.2 Internal Photo of the Sample



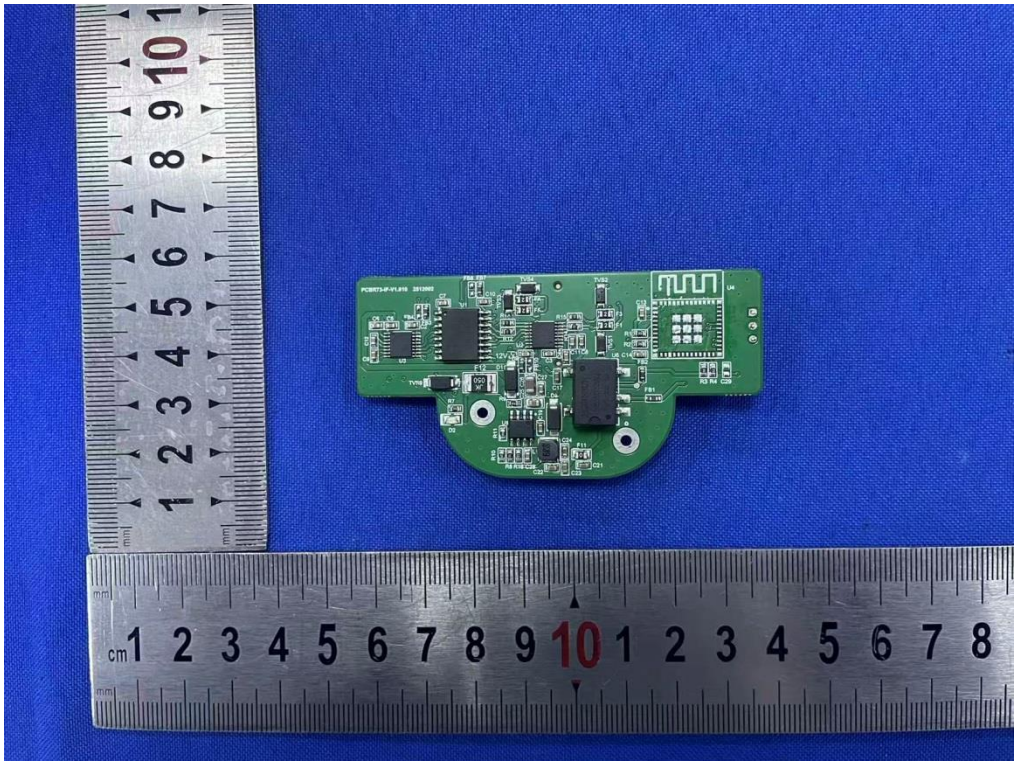
Open of the sample



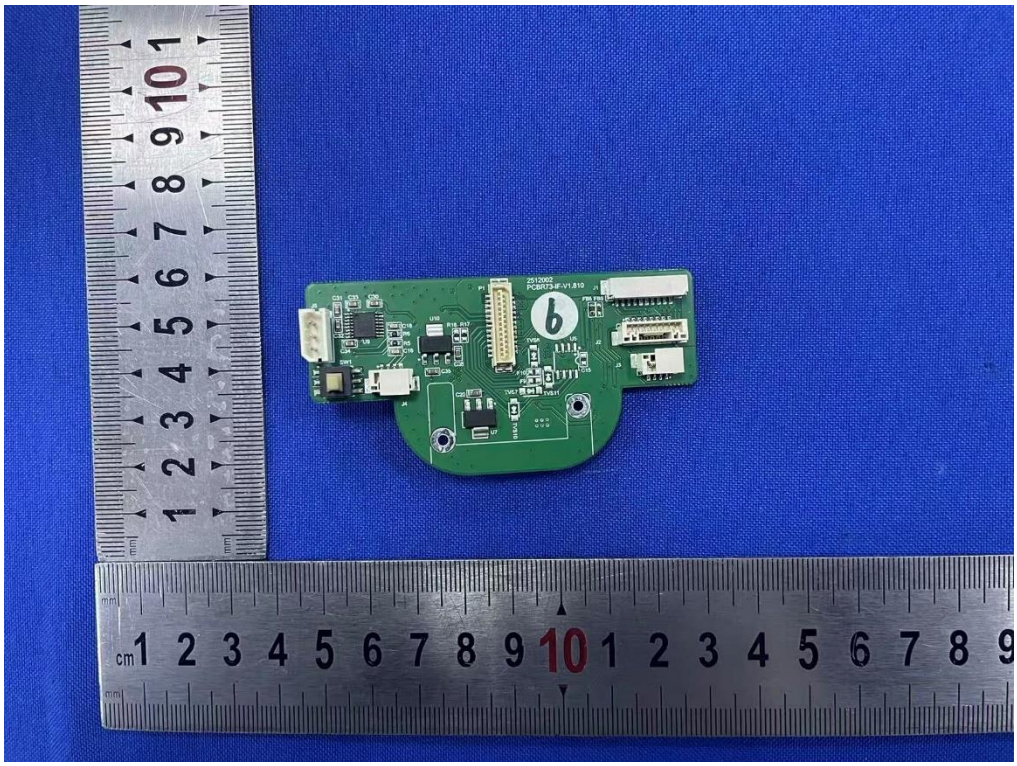
Internal-1 of the sample



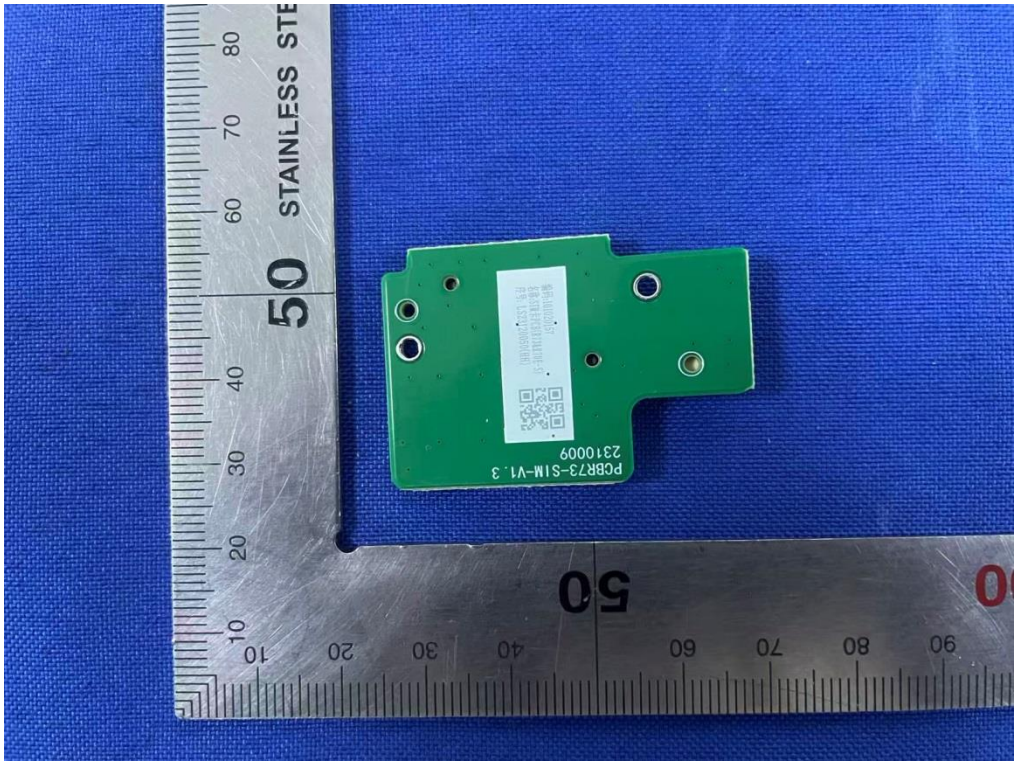
Internal-2 of the sample



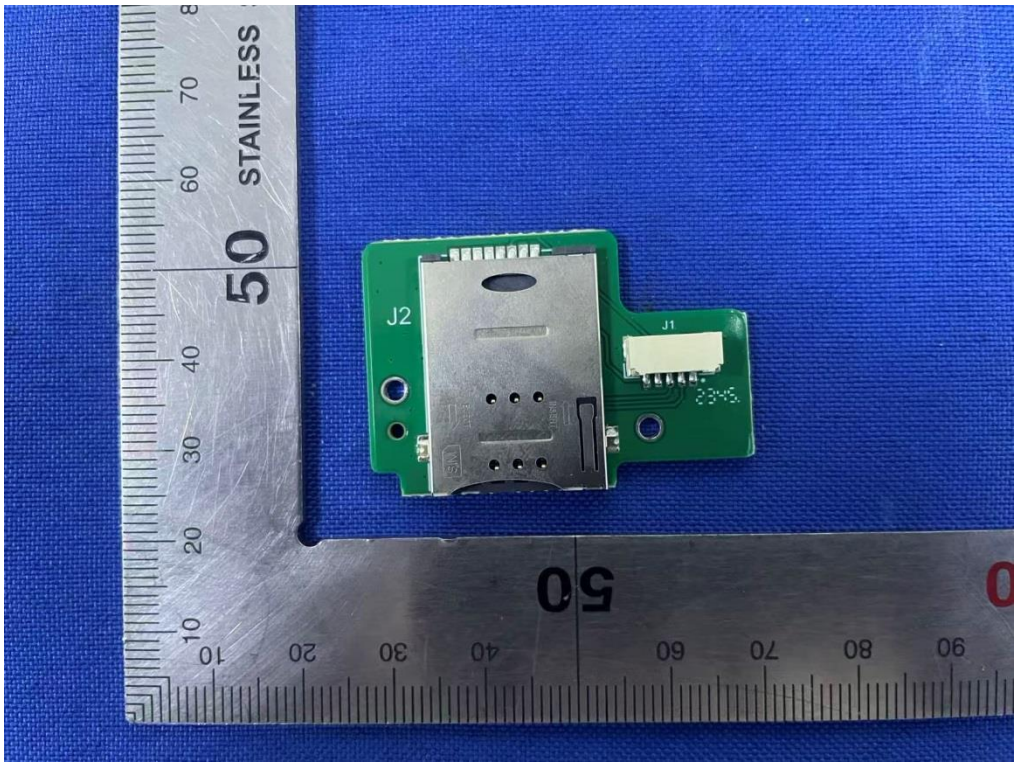
Internal-3 of the sample



Internal-4 of the sample



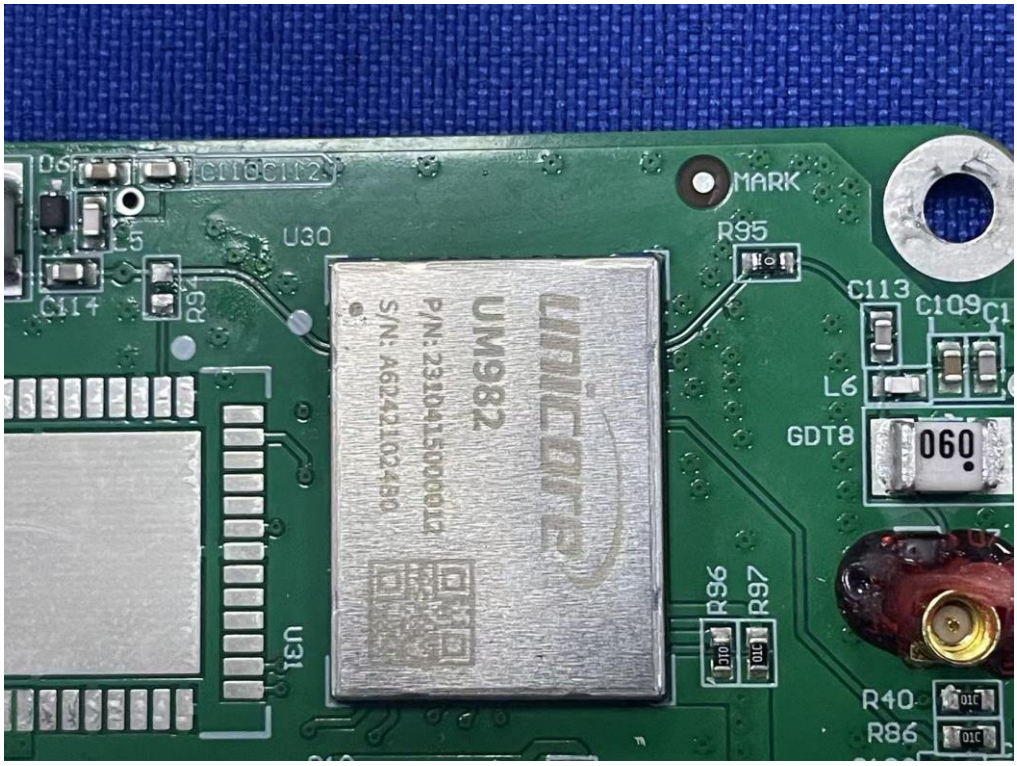
Internal-5 of the sample



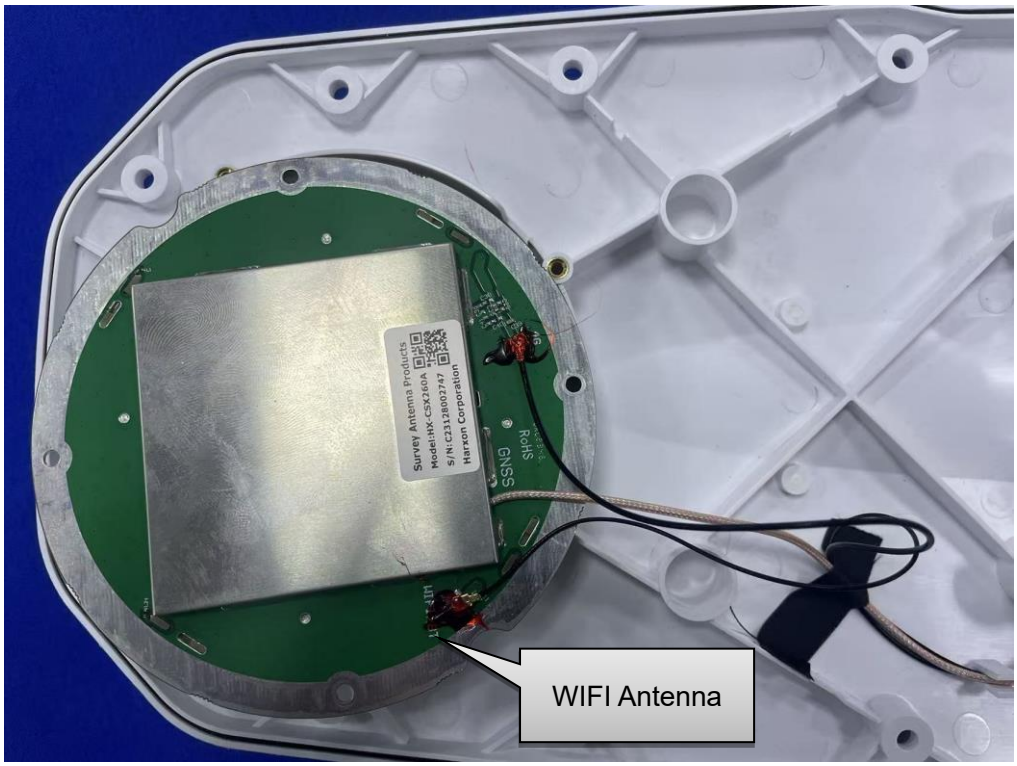
Internal-6 of the sample

LTE Module

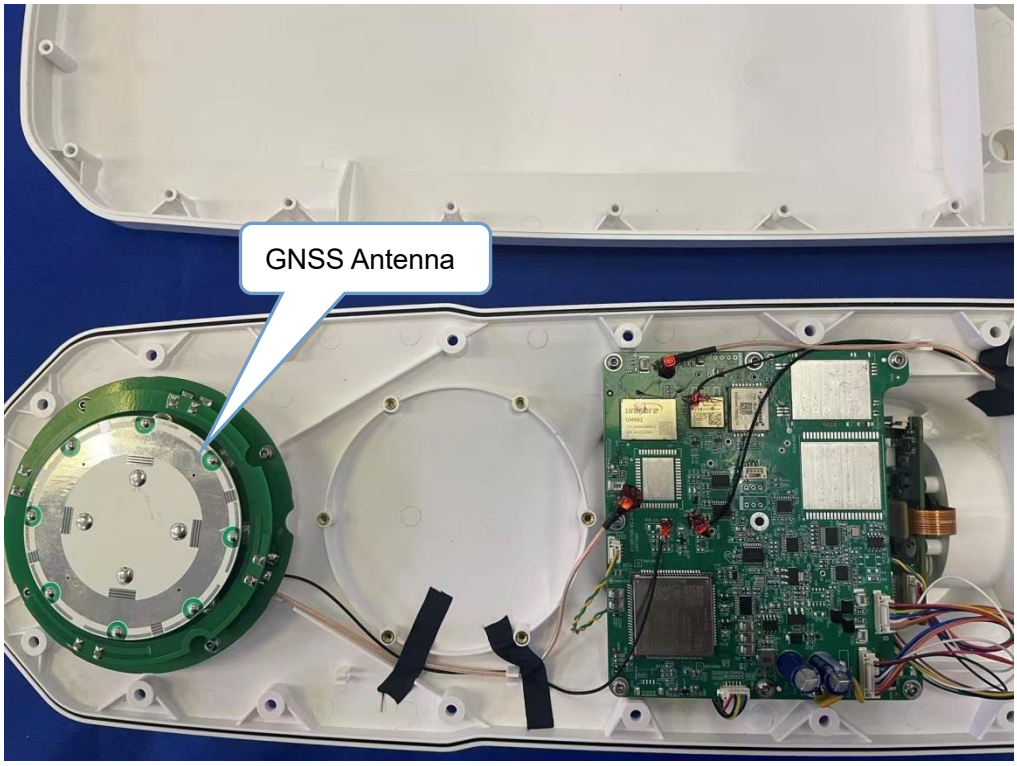
Wi-Fi Module



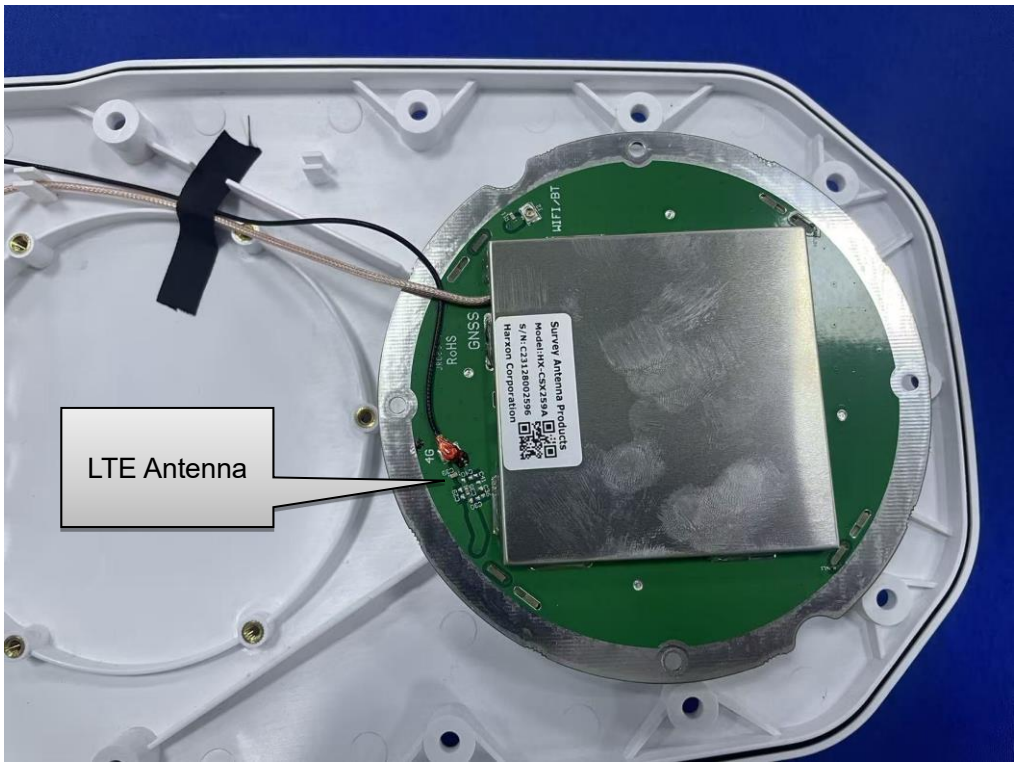
GNSS Module



WIFI Antenna of the sample

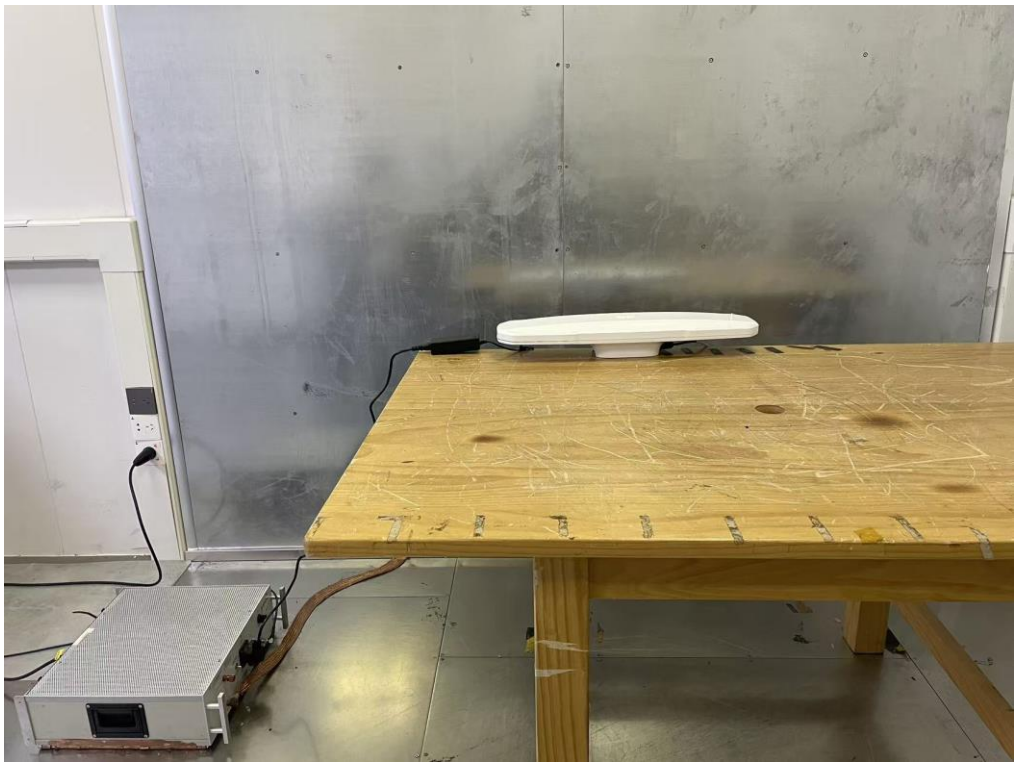


GNSS Antenna of the sample

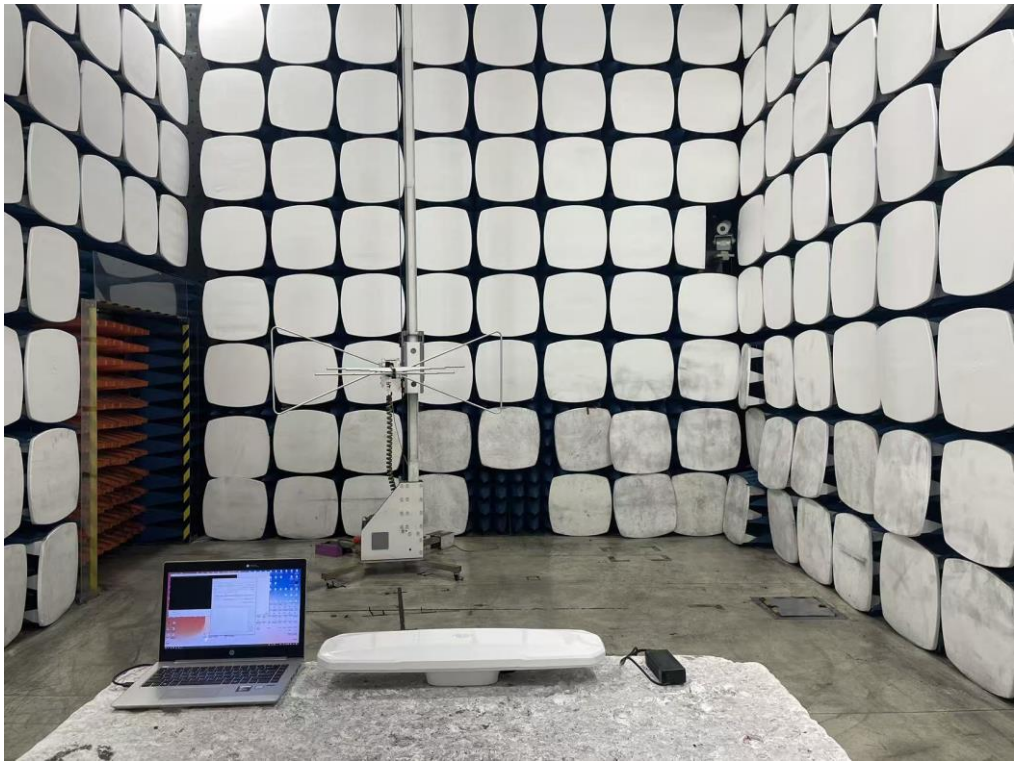


LTE Antenna(7600-4G) of the sample

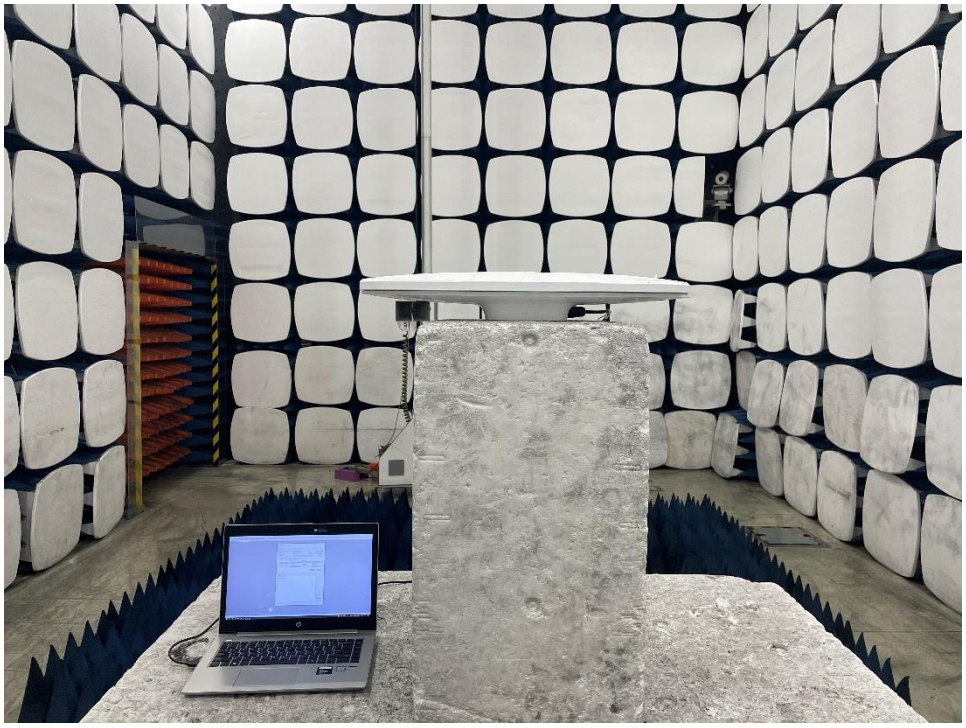
5.3 Set-up for Conducted Emissions



5.4 Set-up for Spurious Emissions below 1GHz



5.5 Set-up for Spurious Emissions above 1GHz



End of the report