



EMC TEST REPORT

Product Name: nRFLR1121

Trade mark: /

Model No.: nRFLR1121 LoRa Transceiver Module, nRFLR1110 LoRa Transceiver Module

S/N: /

Report No.: CTB25021202612E01

Applicant: Shenzhen Elecrow Limited

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Manufacturer: Shenzhen Elecrow Limited

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Sample No.: 25021202612

Date of Receipt: Feb 17, 2025

Date of Test(s): Feb 21, 2025 to Mar. 03, 2025

Date of Issue: Apr. 11, 2025

Test Standard(s): 47 CFR Part 15 Subchapter B, ANSI C63.4: 2014

Test Result: Pass

In the configuration tested, the EUT complied with the standards specified above.

Compiled by:

Michael Niu

Reviewed by:

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Approved by:



Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "★" indicates the testing items were fulfilled by subcontracted lab. "※" indicates the items are not in CNAS accreditation scope.

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1. Description of version

Report No.	Issue Date	Description	Approved
CTB25021202612E01	Apr. 11, 2025	Original	Valid

2. Test summary

Test procedures according to the technical standards:

Standard	Test Item	Test Result
§15.107	Conducted Emission	N/A ¹
§15.109	Radiated Emission	PASS

Note: N/A is abbreviation for Not Applicable.

1. The Product is powered by DC power, this test items is not applicable.

3. Measurement uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %

Test Item	Frequency	Expanded Uncertainty (U_{Lab})
No.1 Conducted Emission	150 kHz to 30 MHz	± 3.1 dB
No.2 Conducted Emission	150 kHz to 30 MHz	± 3.2 dB
Radiated Emission	30 MHz to 1000 MHz	± 4.1 dB
Radiated Emission	1000 MHz to 6000 MHz	± 4.8 dB

4. General information

4.1. Description of EUT

Product name	nRFLR1121
Trade mark	/
Model No.	nRFLR1121 LoRa Transceiver Module
Serial Model No.	nRFLR1110 LoRa Transceiver Module
Model Difference	All models are just named and appearance is different, used to distinguish different sales customers, the rest are the same. Test Sample Model: nRFLR1121 LoRa Transceiver Module.
Rated Power	/
Rated Voltage& current	DC 5V
Highest Internal Frequency	>108MHz
Configuration	☒ Table-top ☐ Floor-standing
Classification	☐ Class A ☒ Class B
The highest frequency of the internal sources of the EUT	☐ below 1.705 MHz, the measurement shall only be made up to 30 MHz. ☐ between 1.705 MHz and 108 MHz, the measurement shall only be made up to 1 GHz. ☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. ☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. ☒ above 1 GHz, the measurement shall be made up to 5th harmonic of the highest frequency or 40 GHz, whichever is lower.

Note: The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

4.2. Description of accessory device

Description	Manufacturer	Model	Specification	Note
Laptop	DELL	Inspiron 5507	/	☐ Applicant ☒ CTB

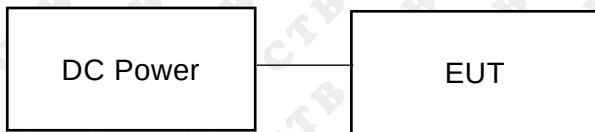
External I/O Cable

Cable Description	Shielded Type	Ferrite Core	Length(m)	Note
/	☐ Shielded ☐ Non-shielded	☐ Yes ☐ No	/	☐ Applicant ☐ CTB

4.3. Test conditions

Temperature: 15-25℃
 Relative Humidity: 30-60 %
 Atmospheric pressure: 800hPa-1060hPa

4.4. Block diagram of EUT configuration



4.5. Operating condition of EUT

The test system was pre-tested based on the consideration of all possible combinations of EUT operation modes according to test plan. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively. All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, (*)the worst data were recorded and reported.

Pretest Test Mode	Description	Test Voltage
Mode 1*	Working	DC 5V

Radiated emission test		
Final Test Mode	Description	Test Voltage
Mode 1*	Working	DC 5V

5. List of Test and Measurement Instruments

Radiated emission(No.1 Chamber)						
No.	Equipment	Manufacturer	Model No.	Serial No.	Firmware version	Calibrated until
1	966 Chamber	C/ R/ T	966	/	/	2027/6/21
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120 D	01911	/	2025/7/06
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00869	/	2025/6/29
4	Preamplifier	Agilent	8449B	3008A01838	/	2025/6/30
5	Amplifier	HP	8447E	2945A02747	/	2025/6/28
6	loop antenna	Schwarzbeck	FMZB 1519B	1519B-224	/	2025/6/29
7	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI	100362	RF_ATTEN_7 (104489/003)	2025/6/28
8	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	A.14.16	2025/6/28
9	26.5G cable	ETS	RFC-SNS-100-N MS-80	/	/	2025/6/28
10	26.5G cable	ETS	RFC-SN-100-NM S-20	/	/	2025/6/28
11	26.5G cable	ETS	RFC-SNS-100-S MS-20	/	/	2025/6/28
12	26.5G cable	ETS	RFC-NNS-100-N MS-300	/	/	2025/6/28
13	EMI test software	Frad	EZ-EMC	Ver/ FA-03A2 RE	/	/

6. Radiated emissions

6.1. Limit

Except for Class A devices (at 3m):

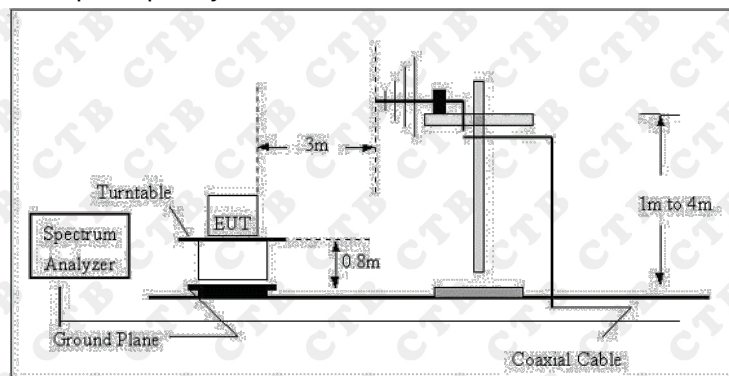
Frequency of emission (MHz)	Field strength (microvolts/meter)	
	(microvolts/meter)	(dB μ V/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

For Class A devices (at 10m):

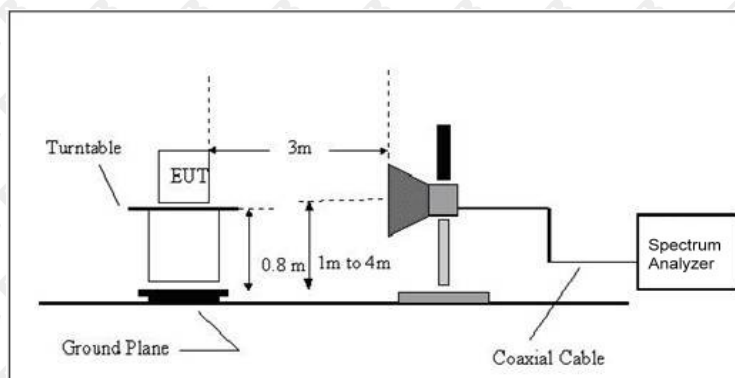
Frequency of emission (MHz)	Field strength (microvolts/meter)	
	(microvolts/meter)	(dB μ V/m)
30-88	90	39
88-216	150	43.5
216-960	210	46.4
Above 960	300	49.5

6.2. Test setup

Radiated Emission Test Set-Up Frequency Below 1 GHz



Radiated Emission Test Set-Up Frequency Above 1GHz



The radiated tests were performed in 3 meter Chamber test site, using the setup accordance with the ANSI C63.4:2014.

6.3. EMI test receiver setup and spectrum analyzer setup

During the radiated emission test, the EMI test receiver and Spectrum Analyzer were set with the following configurations:

Frequency Range	RBW	Video B/W	IF B/W	Detector
30MHz-1000MHz	100kHz	300kHz	120kHz	QP
Above 1GHz	1MHz	3MHz	/	PK
	1MHz	10Hz	/	AVG

6.4. Test procedure

1. The measurement was performed in a semi-anechoic chamber, and instruments used were followed clause 4 of ANSI C63.4
2. Detailed test procedure was following clause 8 of ANSI C63.4.

6.5. Corrected Amplitude & Margin Calculation

1. The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Factor} + \text{Cable Loss} - \text{Amplifier Gain}$$

2. 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:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

6.6. Test results

Up to 1GHz

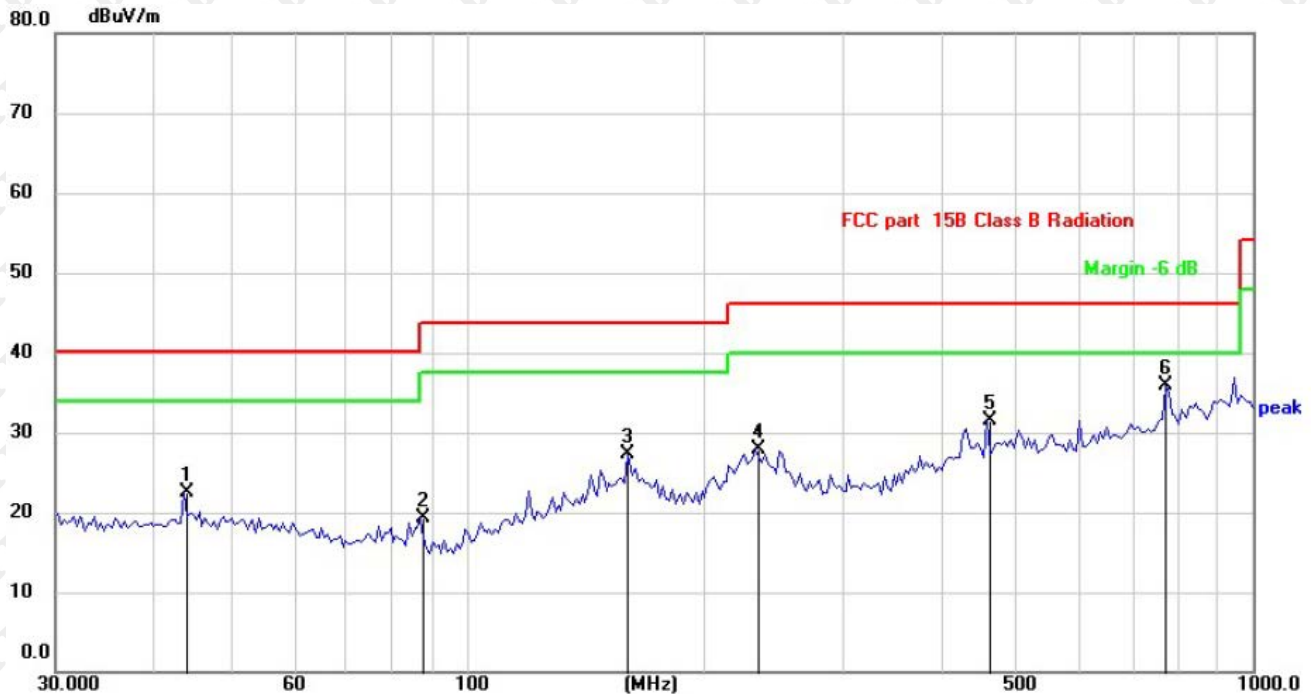
Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	DC 5V	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		46.0971	26.54	-6.73	19.81	40.00	-20.19	QP
2		80.0806	27.89	-8.69	19.20	40.00	-20.80	QP
3		162.8959	26.45	-1.19	25.26	43.50	-18.24	QP
4		273.2341	38.46	-3.39	35.07	46.00	-10.93	QP
5		427.2695	30.98	0.06	31.04	46.00	-14.96	QP
6	*	948.7610	28.06	8.60	36.66	46.00	-9.34	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	DC 5V	Test Mode:	Mode 1

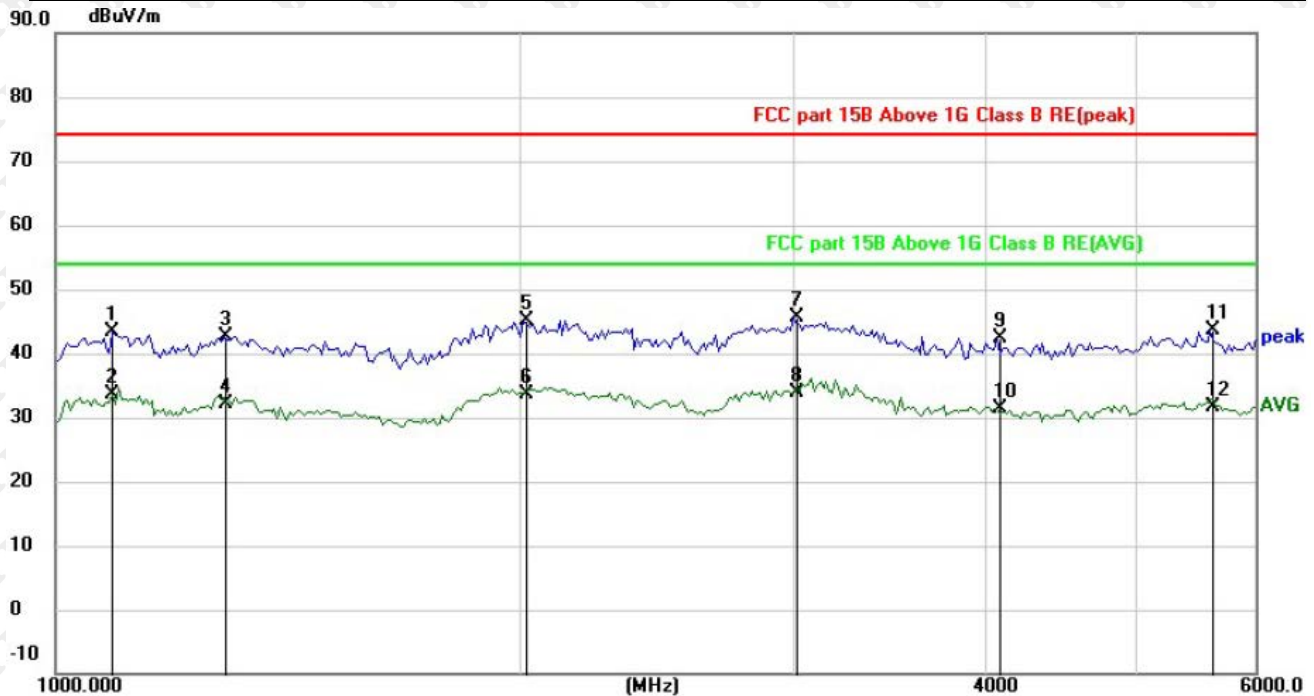


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		43.7352	29.35	-6.80	22.55	40.00	-17.45	QP
2		87.4177	29.05	-9.80	19.25	40.00	-20.75	QP
3		160.0648	28.08	-0.84	27.24	43.50	-16.26	QP
4		233.3487	32.13	-4.15	27.98	46.00	-18.02	QP
5		458.3102	30.56	0.95	31.51	46.00	-14.49	QP
6	*	775.5169	28.98	6.91	35.89	46.00	-10.11	QP

Note: Result=Reading+Factor
Over Limit=Result-Limit

Above 1GHz

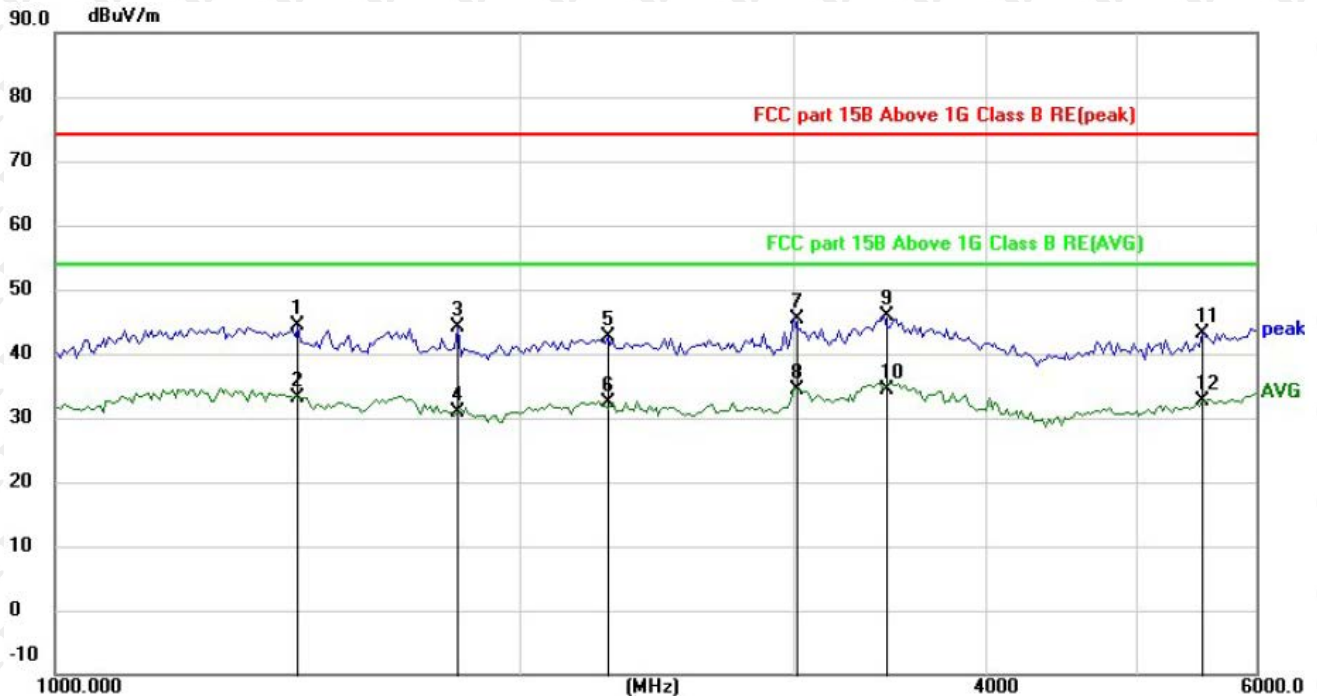
Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	DC 5V	Test Mode:	Mode 1



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			Detector
			dBuV	dB	dBuV/m	dB/m	dB	
1		1088.835	49.97	-6.65	43.32	74.00	-30.68	peak
2		1088.835	40.40	-6.65	33.75	54.00	-20.25	AVG
3		1285.113	49.02	-6.40	42.62	74.00	-31.38	peak
4		1285.113	38.63	-6.40	32.23	54.00	-21.77	AVG
5		2011.310	45.80	-0.59	45.21	74.00	-28.79	peak
6		2011.310	34.17	-0.59	33.58	54.00	-20.42	AVG
7		3009.976	41.62	4.01	45.63	74.00	-28.37	peak
8	*	3009.976	29.77	4.01	33.78	54.00	-20.22	AVG
9		4081.772	34.32	8.16	42.48	74.00	-31.52	peak
10		4081.772	23.19	8.16	31.35	54.00	-22.65	AVG
11		5610.100	30.50	13.20	43.70	74.00	-30.30	peak
12		5610.100	18.41	13.20	31.61	54.00	-22.39	AVG

Note: Result=Reading+Factor
Over Limit=Result-Limit

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	DC 5V	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		1437.393	50.56	-6.24	44.32	74.00	-29.68	peak
2		1437.393	39.35	-6.24	33.11	54.00	-20.89	AVG
3		1822.555	46.64	-2.61	44.03	74.00	-29.97	peak
4		1822.555	33.46	-2.61	30.85	54.00	-23.15	AVG
5		2280.077	41.98	0.65	42.63	74.00	-31.37	peak
6		2280.077	31.84	0.65	32.49	54.00	-21.51	AVG
7		3009.976	41.49	4.01	45.50	74.00	-28.50	peak
8	*	3009.976	30.42	4.01	34.43	54.00	-19.57	AVG
9		3442.900	40.18	5.69	45.87	74.00	-28.13	peak
10		3442.900	28.64	5.69	34.33	54.00	-19.67	AVG
11		5535.214	30.05	13.00	43.05	74.00	-30.95	peak
12		5535.214	19.65	13.00	32.65	54.00	-21.35	AVG

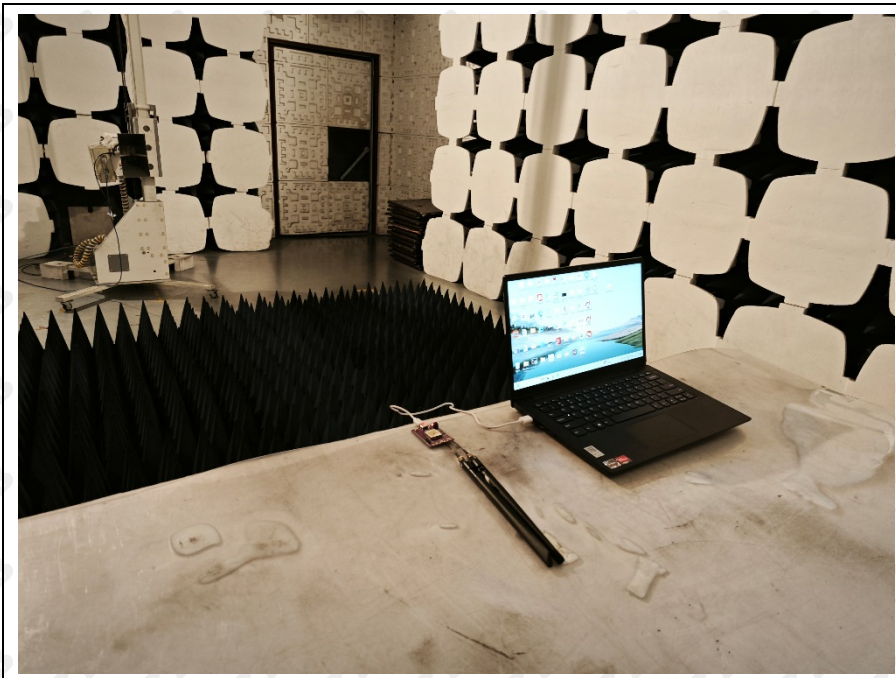
Note: Result=Reading+Factor
Over Limit=Result-Limit

7. Photographs of test setup

Up to 1GHz RE

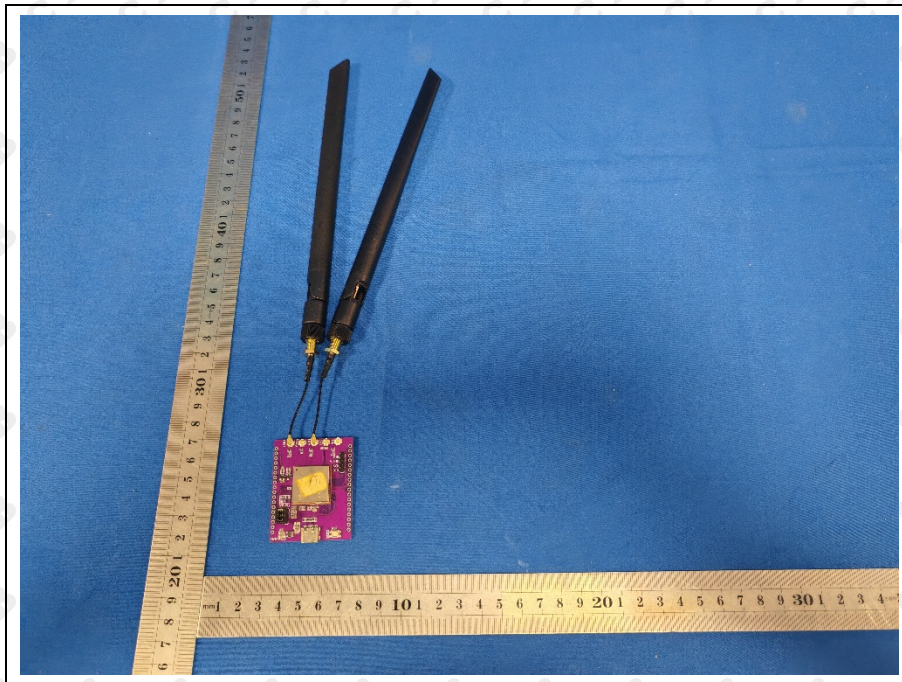


Above 1GHz RE

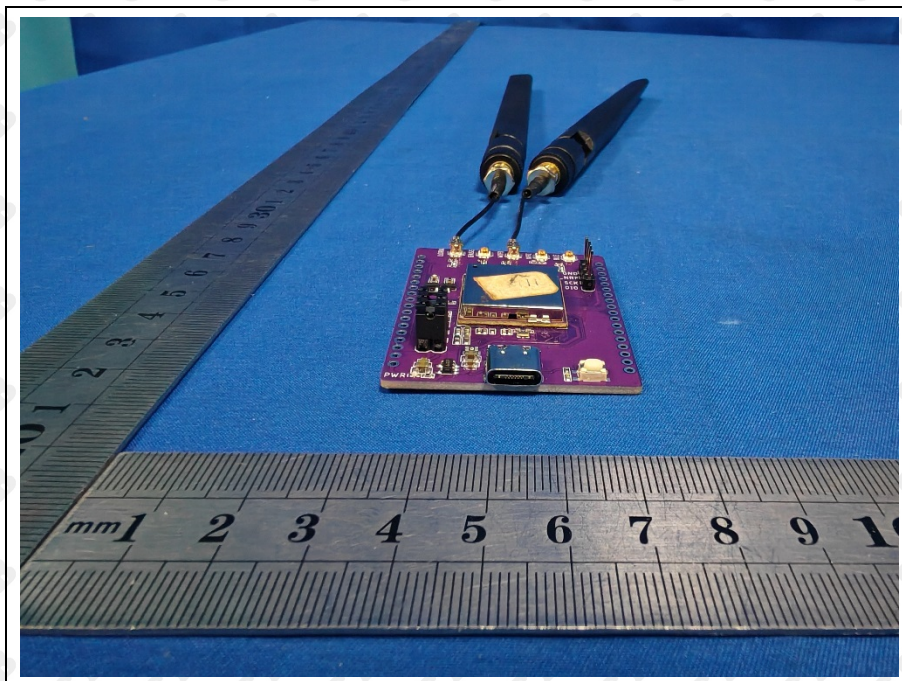


8. Photographs of EUT

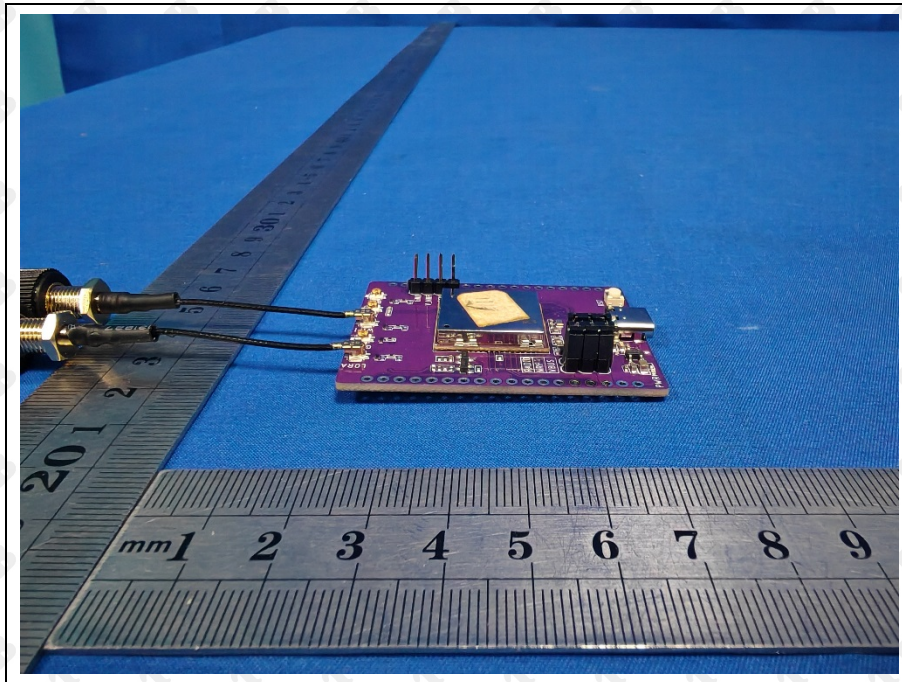
EUT photo 1



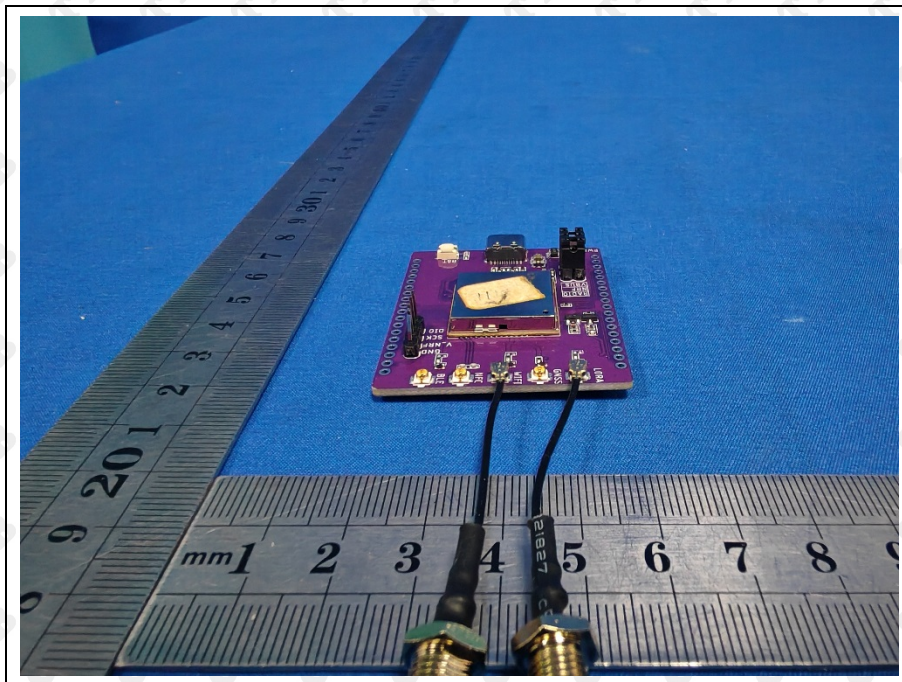
EUT photo 2



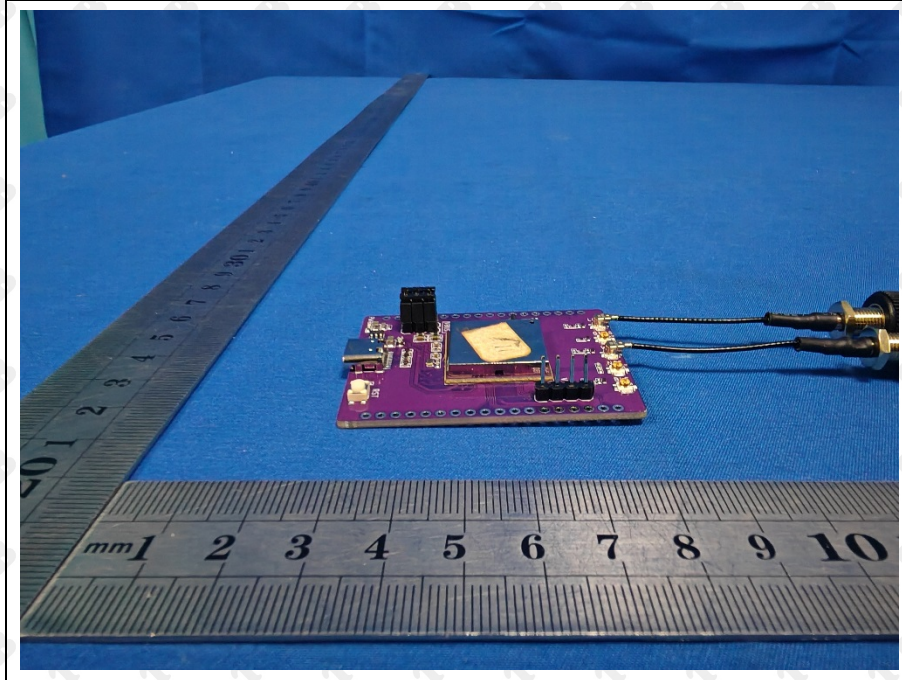
EUT photo 3



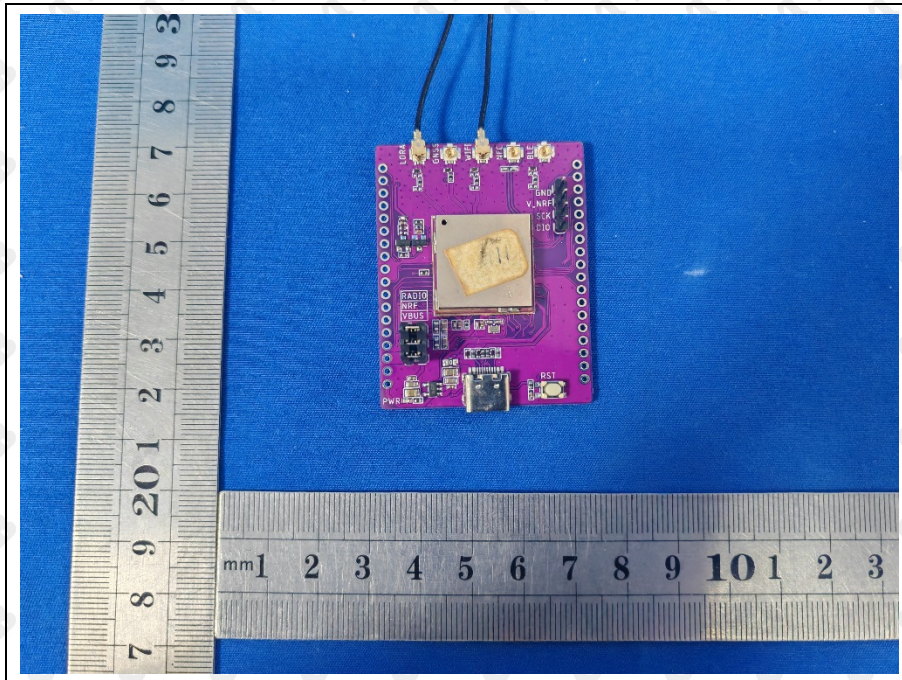
EUT photo 4



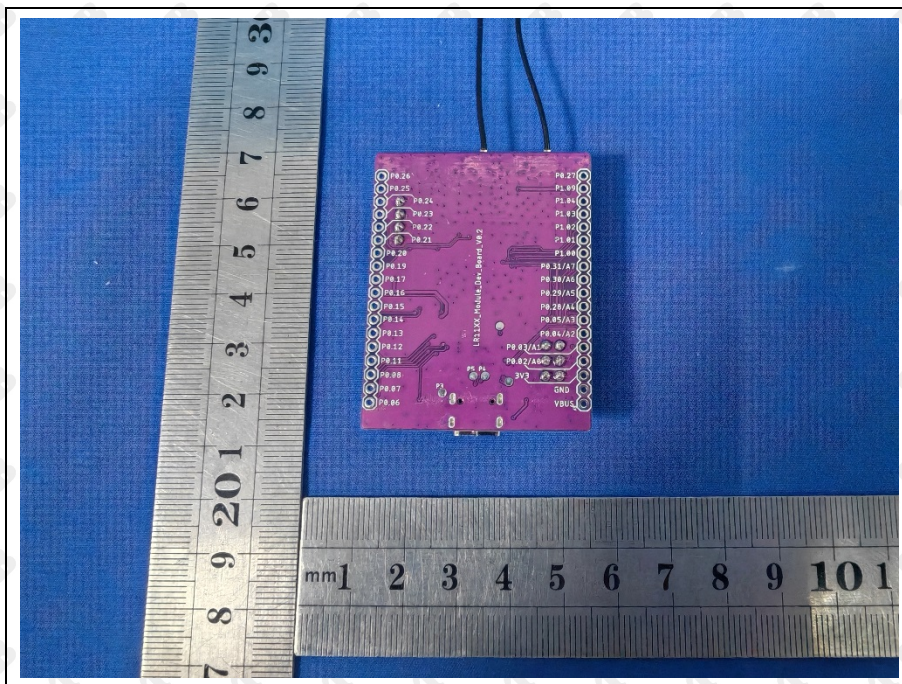
EUT photo 5



EUT photo 6



EUT photo 7



End of report