

RADIO TEST REPORT

Report ID:

REP161536

Project number:

PRJ0096626

Type of assessment:

Class II Permissive Change

Applicant:

Alert Labs Inc

Product:

Sub GHz Radio Module

Model:

ALRM002

FCC ID:

2AKXF-ALB090

ISED Certification number:

22365-ALB090

Specifications:

- ◆ FCC 47 CFR Part 15 Subpart C, §15.247
- ◆ RSS-247, Issue 4, July 2025, Section 6

Date of issue: May 5, 2026

Ibrahim Aksahin, EMC/RF Specialist

Tested by



Signature

Sagarkumar Patel, EMC/RF Specialist

Reviewed by



Signature

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ANAB File Number: AT-3195 (Ottawa); AT-3193 (Pointe-Claire); AT-3194 (Cambridge)

Lab locations

Company name	Nemko Canada Inc.
Facilities	Ottawa site: 303 River Road, Ottawa, ON, Canada, K1V 1H2 Tel: +1 613 737 9680 Test site registration number: CA2040 Montréal site: 292 Labrosse Avenue, Pointe-Claire, QC, Canada, H9R 5L8 Tel: +1 514 694 2684 Test site registration number: CA2041 Cambridge site: 1-130 Saltsman Drive, Cambridge, ON, Canada, N3E 0B2 Tel: +1 519 650 4811 Test site registration number: CA0101
Website	www.nemko.com

Limits of responsibility

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025. All results contained in this report are within Nemko Canada's ISO/IEC 17025 accreditation.

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Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart C, Clause 15.247	Operation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz
RSS-247, Issue 4, July 2025, Section 6	Digital Transmission Systems, Frequency Hopping Systems and Licence-Exempt Local Area Network Devices in 902–928 MHz, 2400–2483.5 MHz, 5150–5350 MHz, and 5470–5895 MHz bands

1.2 Test methods

558074 D01 15.247 Meas Guidance v05r02 (April 2, 2019)	Guidance for compliance measurements on digital transmission system, frequency hopping spread spectrum system, and hybrid system devices operating under section 15.247 of the FCC rules.
KDB 996369 D04 Module Integration Guide v02	MODULAR TRANSMITTER INTEGRATION GUIDE GUIDANCE FOR HOST PRODUCT MANUFACTURERS
ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
RSS-Gen, Issue 5, February 2021	General Requirements for Compliance of Radio Apparatus

1.3 Exclusions

Partial testing was performed to support the Class II Permissive Change (C2PC) assessment associated with the antenna modification. This evaluation was limited to radiated spurious emissions of the radio module operating with the new antenna. Testing was performed using a stand-alone configuration, where the radio module, antenna matching network, and antenna were mounted on a carrier board and operated outside of any enclosure. All other requirements are excluded from the scope of this report.

1.4 Statement of compliance

Statement of Conformity:

The reported results have been evaluated against the specified limits of the standard(s) listed in **Section 1.1** of this report.

Conformity with the specified requirements is determined by comparing the measured results directly to the applicable limits. Measurement uncertainty is not applied to adjust or attribute to the measured value for the purpose of compliance determination.

In the configuration tested, the **Equipment Under Test (EUT)** was found to be compliant. Unless otherwise noted in **Section 1.3**, all testing was performed against the relevant requirements of the applicable test standard(s).

The results obtained indicate that the product under test complies in full with the requirements tested, and the test results relate only to the items tested.

Refer to the **Summary of Test Results** section for full details.

1.5 Test report revision history

Table 1.5-1: Test report revision history

Revision #	Date of issue	Details of changes made to test report
REP161536	May 5, 2026	Original report issued

Section 2 Engineering considerations

2.1 Modifications incorporated in the EUT for compliance

There were no modifications performed to the EUT during this assessment.

2.2 Technical judgment

The evaluated setup consists of the Alert Labs ALRM002 sub-GHz radio module (FCC ID:2AKXF-ALB090 , ISED:22365-ALB090) integrated on a carrier PCB together with the antenna matching network and a PCB-printed helical antenna.

This assessment was performed as part of a Class II Permissive Change (C2PC) to evaluate the impact of an antenna modification.

No changes have been made to the radio module itself; only the antenna implementation has been updated.

Testing was conducted in a stand-alone radiated configuration in accordance with FCC/ISED requirements. Radiated spurious emissions were evaluated with the transmitter operating on representative low, mid, and high channels.

The new antenna has a peak gain of 0.01 dBi, which is lower than the original antenna gain of 2.5 dBi.

2.3 Model variant declaration

There were no model variants declared by the applicant.

2.4 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 3 Test conditions

3.1 Atmospheric conditions

Temperature	15 °C – 35 °C
Relative humidity	20 % – 75 %
Air pressure	86 kPa (860 mbar) – 106 kPa (1060 mbar)

When it is impracticable to carry out tests under these conditions, a note to this effect stating the ambient temperature and relative humidity during the tests shall be recorded and stated.

3.2 Power supply range

The normal test voltage for equipment to be connected to the mains shall be the nominal mains voltage. For the purpose of the present document, the nominal voltage shall be the declared voltage, or any of the declared voltages $\pm 5\%$, for which the equipment was designed.

Section 4 Information provided by the applicant

4.1 Disclaimer

This section contains information provided by the applicant and has been utilized to support the test plan. Inaccurate information provided by the applicant can affect the validity of the results contained within this test report. Nemko accepts no responsibility for the information contained within this section and the impact it may have on the test plan and resulting measurements.

4.2 Applicant/Manufacturer

Applicant name	Alert Labs Inc
Applicant address	102 - 410 Albert Street, Waterloo, Ontario , N2L 3V3
Manufacturer name	Same as applicant
Manufacturer address	Same as applicant

4.3 EUT information

Product	Sub GHz Radio Module
Model	ALRM002
Power supply requirements	Battery: 3 V(DC)
Product description and theory of operation	The equipment is a sub GHz radio module intended for 2-way communication between itself and an Alert Labs hub device. The radio module uses chirp spread spectrum modulation in the 902 to 928 MHz band for point-to-point communications with another Alert Labs device

4.4 Radio technical information

Category of Wideband Data Transmission equipment	☐ Frequency Hopping Spread Spectrum (FHSS) equipment
	☒ Other types of Wideband Data Transmission equipment (e.g. DSSS, OFDM, etc.).
Frequency band	902–928 MHz
Frequency Min (MHz)	902.5MHz
Frequency Max (MHz)	926.5MHz
Type of modulation	LoRa (Chirp-Spread-Spectrum)
Antenna information	Manufacturer: Antenna pattern printed on the PCB Type: Helical Peak Gain: 0.01 dBi

4.5 EUT setup details

4.5.1 Radio exercise details

Operating conditions	There are 3 versions of firmware hard-coded to transmit bytes as rapidly as possible on low, mid, and high channels in the 902 to 928 MHz band.
Transmitter state	The device transmitted 255 bytes followed by 1 ms of no transmission, then another 255 bytes and repeat as long as the device is powered. This configuration does not represent normal device operation but was used solely for measurement purposes.

4.5.2 EUT setup configuration

Table 4.5-1: EUT interface ports

Description	Qty.
DC Power Port	1

Note: The EUT is battery-powered; however, it was tested using a DC power supply.

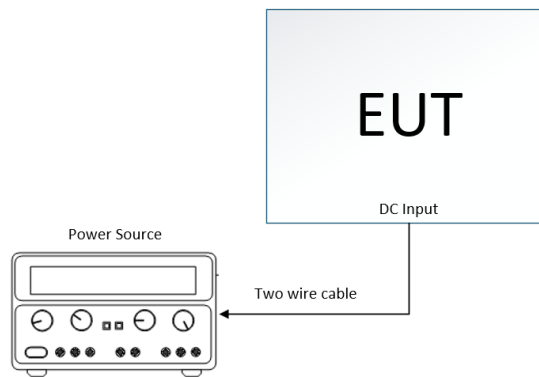


Figure 4.5-1: Radiated testing block diagram

Section 5 Summary of test results

5.1 Testing period

Test start date	April 22, 2026	Test end date	April 22, 2026
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5.2 Sample information

Receipt date	April 22, 2026	Nemko sample ID number(s)	PRJ00966260001 PRJ00966260002 PRJ00966260003
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5.3 FCC Part 15, Test results

Table 5.3-1: FCC requirements results

Part	Test description	Verdict
§15.247(d)	Spurious emissions	Pass
Notes:	This is a partial assessment, only radiated spurious emissions test was performed. All other requirements are excluded from the scope of this report.	

5.4 ISED RSS-Gen/ ISED RSS-247, Test results

Table 5.4-1: RSS-Gen/ ISED RSS-247 requirements results

Part	Test description	Verdict
ISED RSS-247, 6.6	Unwanted emissions	Pass
Notes:	This is a partial assessment, only radiated spurious emissions test was performed. All other requirements are excluded from the scope of this report.	

Section 6 Test equipment

6.1 Test equipment list

Table 6.1-1: Equipment list

Equipment	Manufacturer	Model no.	Asset no.	Cal./Ver. cycle	Next cal./ver.
3 m EMI test chamber	TDK	SAC-3	FA003012	1 year	October 31, 2026
Flush mount turntable	SUNAR	FM2022	FA003006	—	NCR
Controller	SUNAR	SC110V	FA002976	—	NCR
Antenna mast	SUNAR	TLT2	FA003007	—	NCR
Receiver/spectrum analyzer	Rohde & Schwarz	ESR26	FA002969	1 year	May 28, 2026
Horn antenna (1–18 GHz)	ETS Lindgren	3117	FA002911	1 year	June 2, 2026
Preamp (1–18 GHz)	ETS Lindgren	124334	FA002956	1 year	April 10, 2027
Bilog antenna (20–3000 MHz)	Sunol	JB3	FA002108	1 year	June 27, 2026
50 Ω coax cable	Huber + Suhner	None	FA003047	1 year	August 6, 2026
50 Ω coax cable	Huber + Suhner	None	FA003402	1 year	August 6, 2026
DC Power Supply	GW INSTEK	GPR-3060D	—	—	NCR
High pass filter 1.2 - 12 GHz	Microwave Circuits	H1G212G1	FA003031	—	NCR

Notes: NCR - no calibration required,
All equipment related to the contribution of measurement has been included in this list. Such items include, but are not limited to, cables, attenuators, directional couplers, and pre-amps.

Table 6.1-2: Automation software details

Test description	Manufacturer of Software	Details
Radio/EMC test software	Rohde & Schwarz	EMC32, Software for EMC Measurements, Version 10.60. 00

Table 6.1-3: Measurement uncertainty calculations based on equipment list

Measurement	Measurement uncertainty, $\pm$ dB
Radiated spurious emissions (30 MHz to 1 GHz)	4.14
Radiated spurious emissions (1 GHz to 6 GHz)	4.74
Radiated spurious emissions (6 GHz to 10 GHz)	5.33

Notes: UKAS Lab 34, TIA-603 and ETSI TR 100 028-1&2 have been used as guidance for measurement uncertainty reasonable estimations with regards to previous experience and validation of data. Nemko Canada Inc. follows these test methods in order to satisfy ISO/IEC 17025 requirements for estimation of uncertainty of measurement for wireless products. Measurement uncertainty calculations assume a coverage factor of $K = 2$ with 95% certainty.

Section 7 Testing data

7.1 Spurious (out-of-band) unwanted emissions

7.1.1 References, definitions and limits

FCC §15.247:

- (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

RSS-247, Clause 6.6:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum device, digitally modulated device, or hybrid system is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power – based on either an RF conducted or a radiated measurement – provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under section 6.3.2, the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

RSS-Gen:

- 8.9 Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table below.
- 8.10 Restricted frequency bands are designated primarily for safety-of-life services (distress calling and certain aeronautical activities), certain satellite downlinks, radio astronomy and some government uses. The following conditions related to the restricted frequency bands apply:
- a The transmit frequency, including fundamental components of modulation, of licence-exempt radio apparatus shall not fall within the restricted frequency bands.
 - b Unwanted emissions that fall into restricted frequency bands listed in table 7 shall comply with the limits specified in table below.
 - c Unwanted emissions that do not fall within the restricted frequency bands shall comply either with the limits specified in the applicable RSS or with those specified in table below.

Table 7.1-1: FCC §15.209 and RSS-Gen – Radiated emission limits

Frequency, MHz	Field strength of emissions		Measurement distance, m
	µV/m	dBµV/m	
0.009–0.490	2400/F	$67.6 - 20 \times \log_{10}(F)$	300
0.490–1.705	24000/F	$87.6 - 20 \times \log_{10}(F)$	30
1.705–30.0	30	29.5	30
30–88	100	40.0	3
88–216	150	43.5	3
216–960	200	46.0	3
above 960	500	54.0	3

Notes: In the emission table above, the tighter limit applies at the band edges.
For frequencies above 1 GHz the limit on peak RF emissions is 20 dB above the maximum permitted average emission limit applicable to the equipment under test.

References, definitions and limits, continued

Table 7.1-2: ISSED restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	12.57675–12.57725	399.9–410	7.25–7.75
0.495–0.505	13.36–13.41	608–614	8.025–8.5
2.1735–2.1905	16.42–16.423	960–1427	9.0–9.2
3.020–3.026	16.69475–16.69525	1435–1626.5	9.3–9.5
4.125–4.128	16.80425–16.80475	1645.5–1646.5	10.6–12.7
4.17725–4.17775	25.5–25.67	1660–1710	13.25–13.4
4.20725–4.20775	37.5–38.25	1718.8–1722.2	14.47–14.5
5.677–5.683	73–74.6	2200–2300	15.35–16.2
6.215–6.218	74.8–75.2	2310–2390	17.7–21.4
6.26775–6.26825	108–138	2483.5–2500	22.01–23.12
6.31175–6.31225	149.9–150.05	2655–2900	23.6–24.0
8.291–8.294	156.52475–156.52525	3260–3267	31.2–31.8
8.362–8.366	156.7–156.9	3332–3339	36.43–36.5
8.37625–8.38675	162.0125–167.17	3345.8–3358	
8.41425–8.41475	167.72–173.2	3500–4400	Above 38.6
12.29–12.293	240–285	4500–5150	
12.51975–12.52025	322–335.4	5350–5460	

Note: Certain frequency bands listed in Table 7.1-2 and above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

Table 7.1-3: FCC restricted frequency bands

MHz	MHz	MHz	GHz
0.090–0.110	16.42–16.423	399.9–410	4.5–5.15
0.495–0.505	16.69475–16.69525	608–614	5.35–5.46
2.1735–2.1905	16.80425–16.80475	960–1240	7.25–7.75
4.125–4.128	25.5–25.67	1300–1427	8.025–8.5
4.17725–4.17775	37.5–38.25	1435–1626.5	9.0–9.2
4.20725–4.20775	73–74.6	1645.5–1646.5	9.3–9.5
6.215–6.218	74.8–75.2	1660–1710	10.6–12.7
6.26775–6.26825	108–121.94	1718.8–1722.2	13.25–13.4
6.31175–6.31225	123–138	2200–2300	14.47–14.5
8.291–8.294	149.9–150.05	2310–2390	15.35–16.2
8.362–8.366	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675	156.7–156.9	2690–2900	22.01–23.12
8.41425–8.41475	162.0125–167.17	3260–3267	23.6–24.0
12.29–12.293	167.72–173.2	3332–3339	31.2–31.8
12.51975–12.52025	240–285	3345.8–3358	36.43–36.5
12.57675–12.57725	322–335.4	3600–4400	Above 38.6
13.36–13.41			

7.1.2 Test summary

Verdict	Pass		
Test date	April 22, 2026	Temperature	24 °C
Tested by	Ibrahim Aksahin	Air pressure	980 mbar
Test location	Cambridge	Relative humidity	29 %

7.1.3 Observations, settings and special notes

- Only radiated spurious emissions within restricted bands were evaluated.
- As part of the current assessment, the test range of 9 kHz to 10th harmonic has been fully considered and compared to the actual frequencies utilized within the EUT. Since the EUT contains a transmitter in the GHz range, the EUT has been deemed compliant without formal testing in the 9 kHz to 30 MHz test range, therefore formal test results (tabular data and/or plots) are not provided within this test report.
- Radiated measurements were performed at a distance of 3 m.
- DTS emissions in restricted frequency bands test was performed as per KDB 558074, section 8.6 with reference to ANSI C63.10 subclause 11.12.

Spectrum analyser settings (Measurements within restricted bands below 1 GHz)

Resolution bandwidth:	Measurements below 1 GHz: 100 kHz Peak or 120 kHz Q-Peak
Video bandwidth:	Measurements below 1 GHz: 300 kHz
Detector mode:	Peak or Q-Peak
Trace mode:	Max Hold

Spectrum analyser settings (Measurements within restricted bands above 1 GHz)

Resolution bandwidth:	1 MHz
Video bandwidth:	3 MHz
Detector mode:	Peak / RMS
Trace mode:	Max Hold / Average

7.1.4 Test data

Table 7.1-4: Radiated field strength measurement results

Channel	Frequency, MHz	Peak Field strength, dBµV/m		Margin, dB	Average Field strength, dBµV/m		Margin, dB
		Measured	Limit		Measured	Limit	
Low	2707.00	53.13	74.00	20.87	48.04	54.00	5.96
Mid	2744.75	50.06	74.00	23.94	44.80	54.00	9.20
High	2780.25	48.22	74.00	25.78	38.55	54.00	15.45

Notes:	Field strength includes correction factor of antenna, cable loss, amplifier, and attenuators where applicable.
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Test data, continued

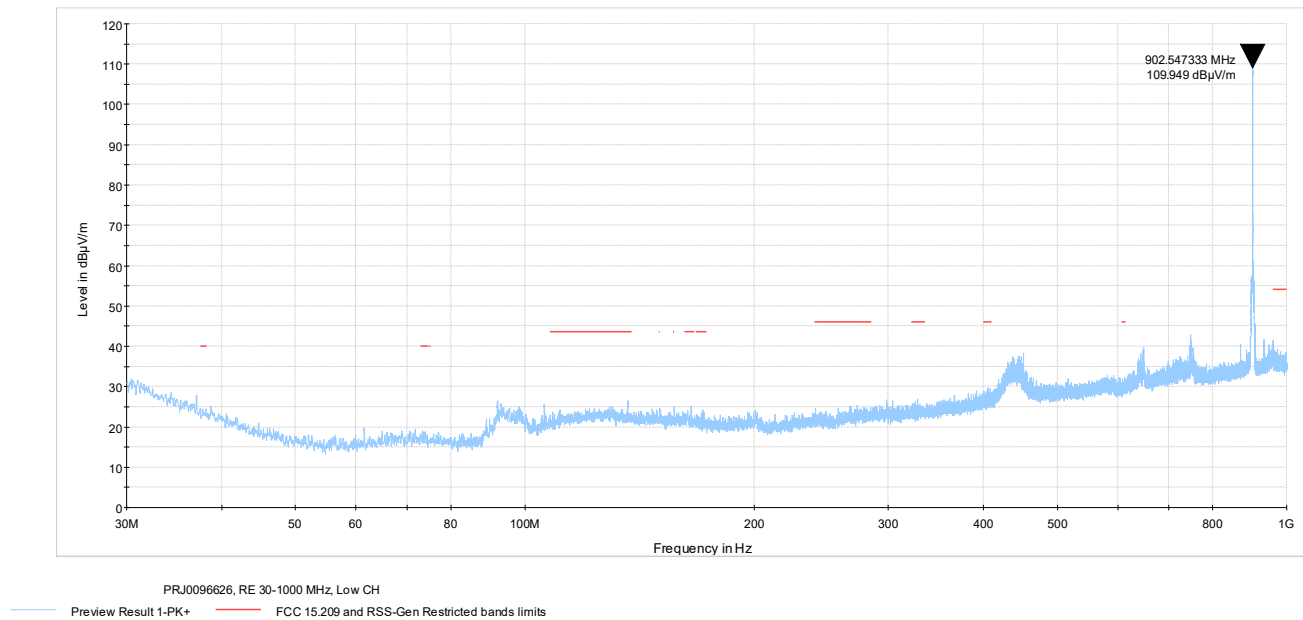


Figure 7.1-1: Radiated spurious emissions 30-1000 MHz low channel

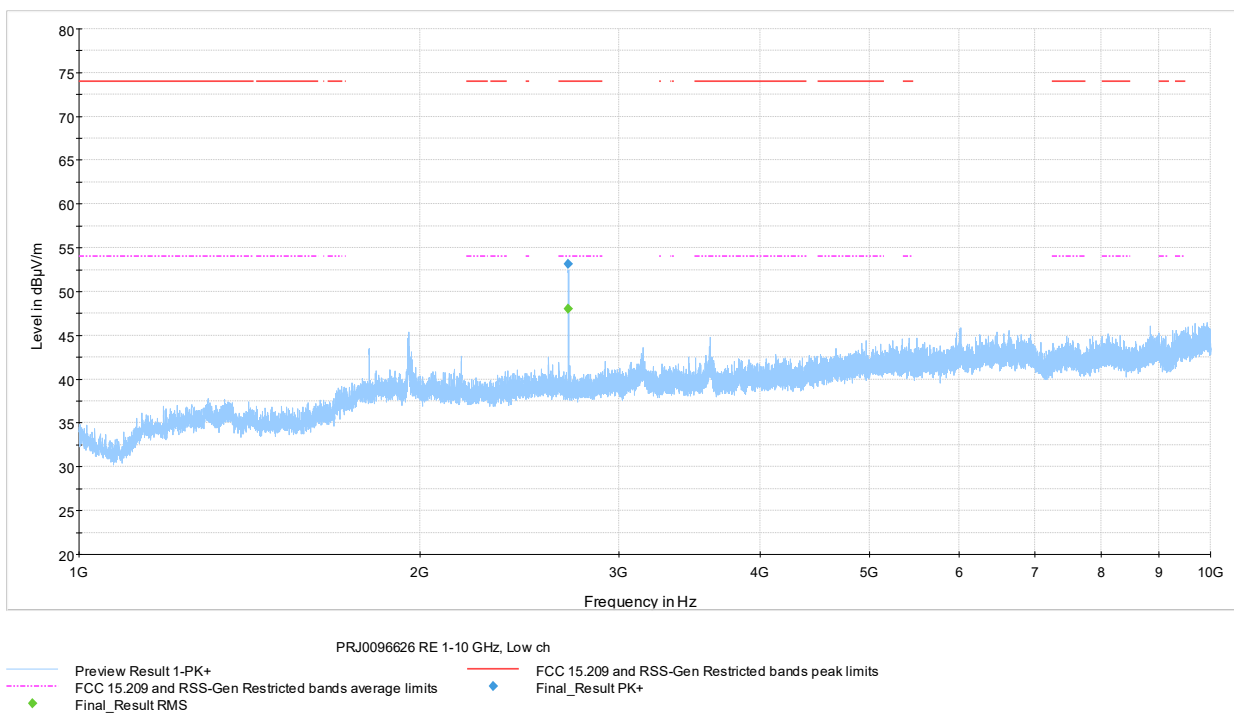


Figure 7.1-2: Radiated spurious emissions 1-10 GHz low channel

Test data, continued

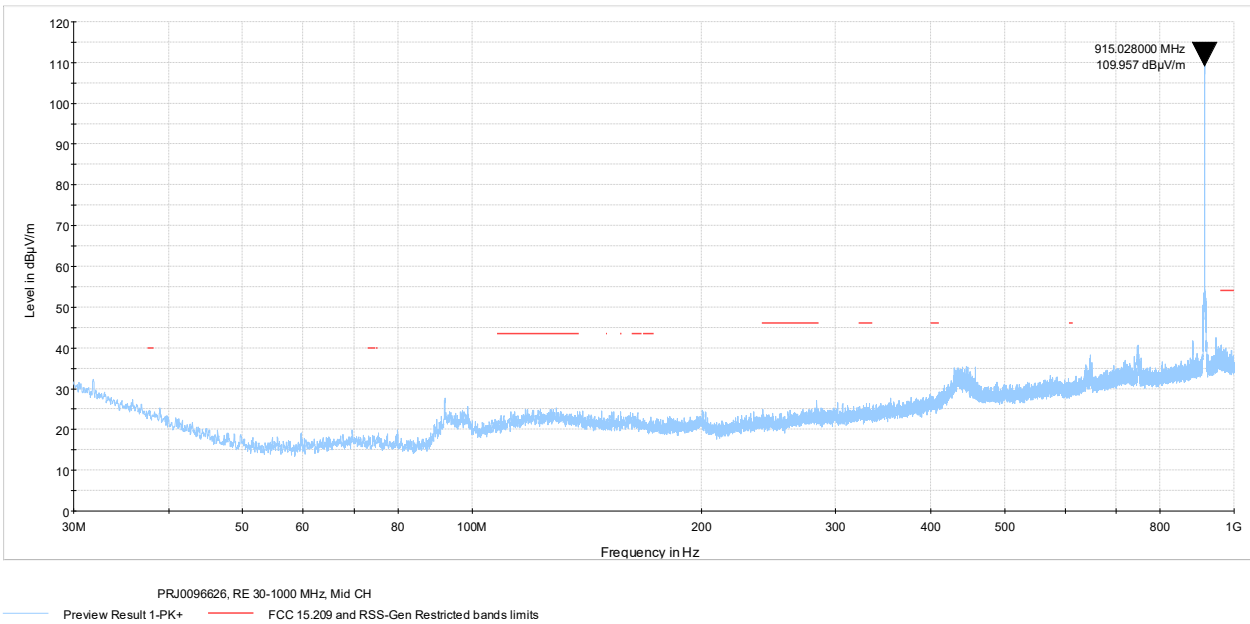


Figure 7.1-3 :Radiated spurious emissions 30-1000 MHz mid channel

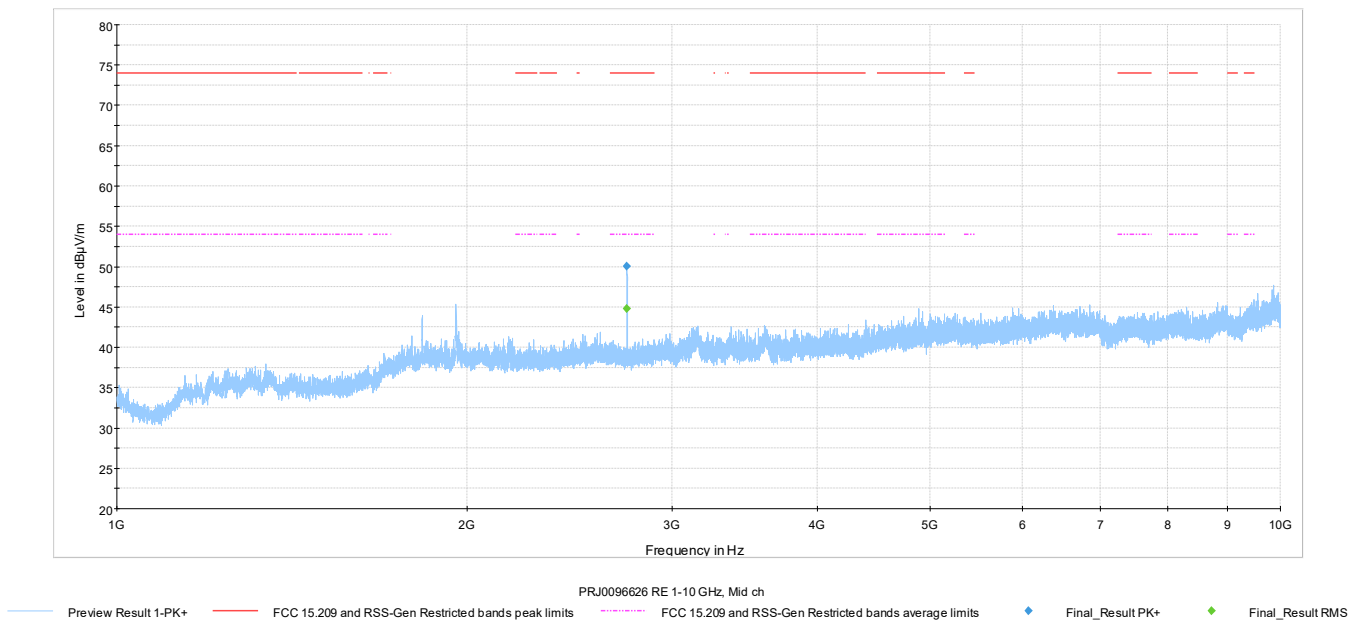


Figure 7.1-4: Radiated spurious emissions 1-10 GHz mid channel

Test data, continued

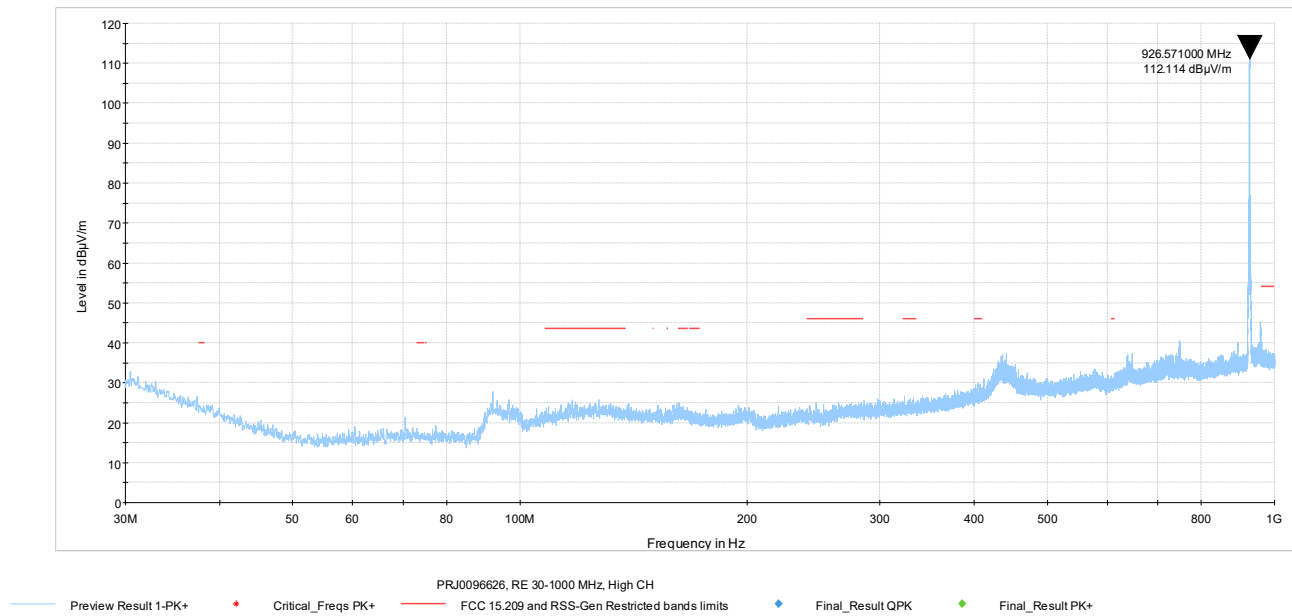


Figure 7.1-5: Radiated spurious emissions 30-1000 MHz high channel

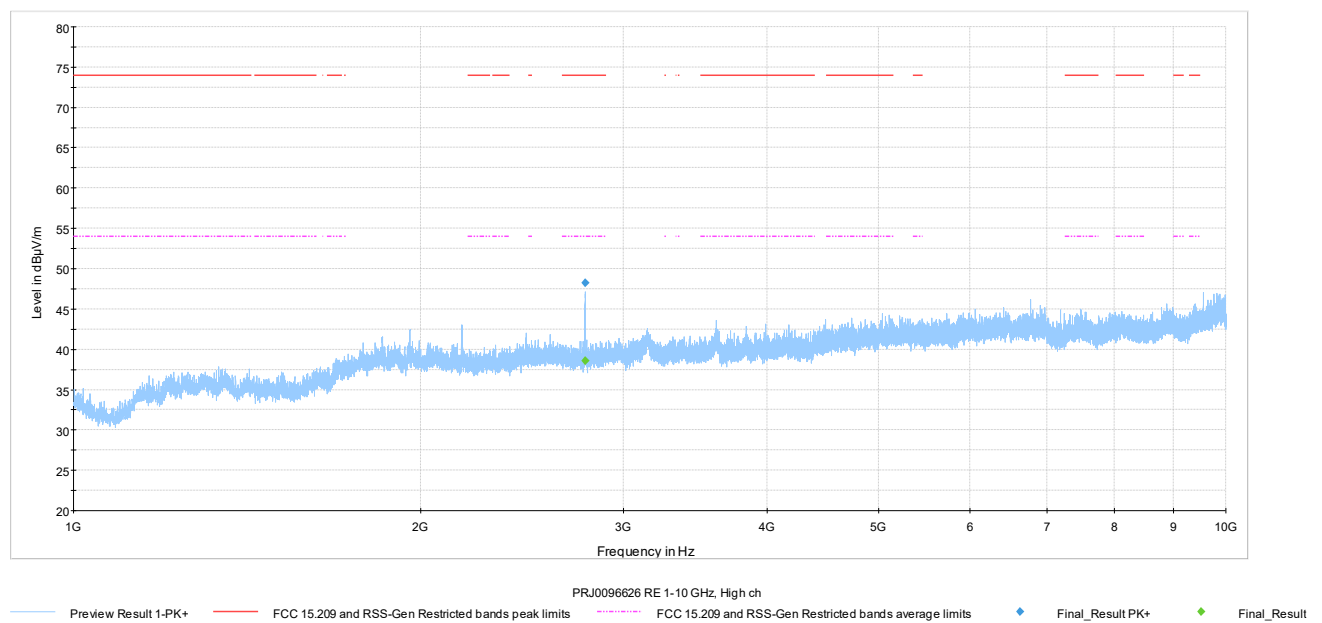


Figure 7.1-6: Radiated spurious emissions 1-10 GHz high channel

7.1.5 Setup photos

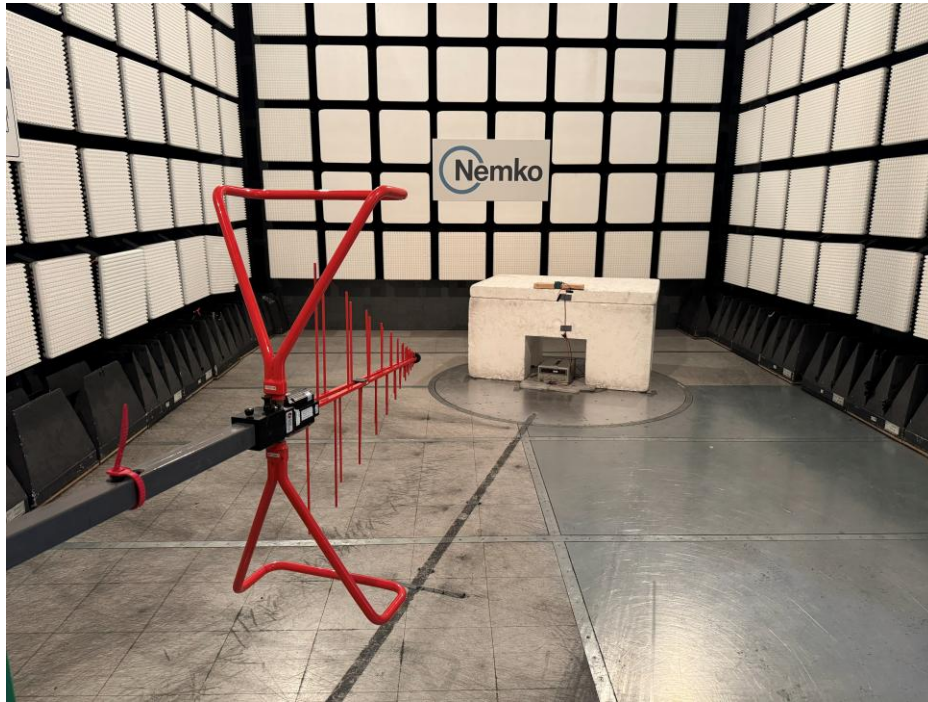


Figure 7.1-7: Radiated Spurious emissions setup photo – below 1 GHz

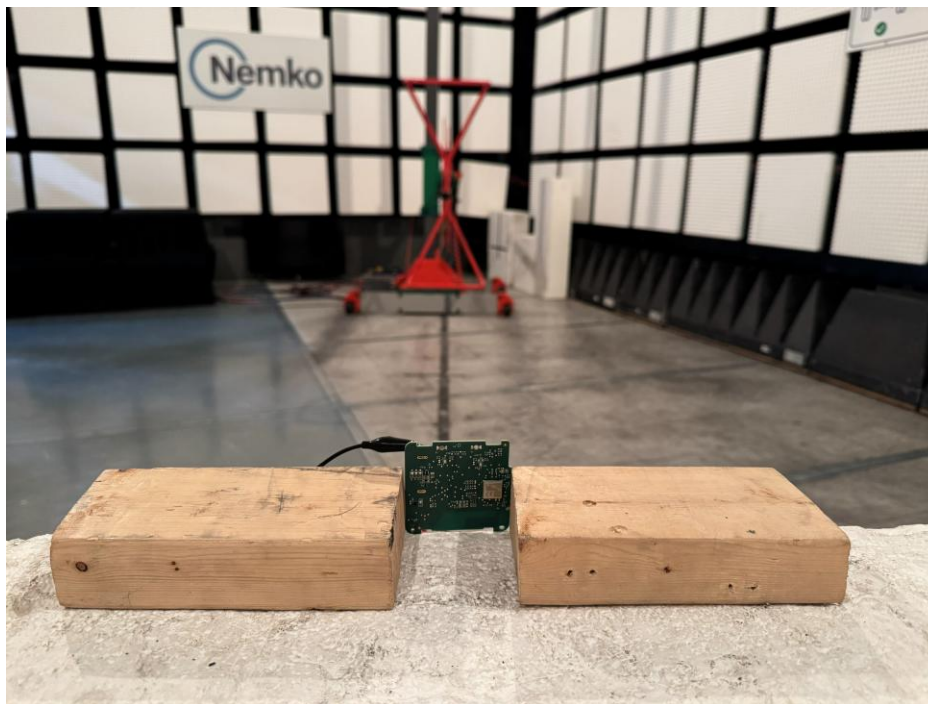


Figure 7.1-8: Radiated Spurious emissions setup photo – below 1 GHz

Setup photos, continued

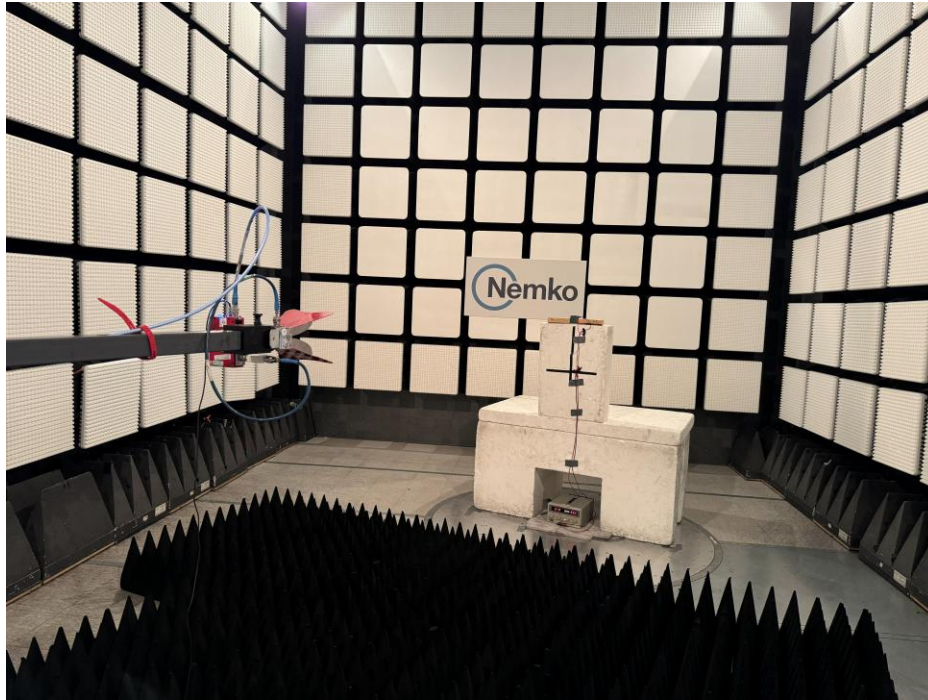


Figure 7.1-9: Radiated Spurious emissions setup photo – above 1 GHz



Figure 7.1-10: Radiated Spurious emissions setup photo – above 1 GHz

Section 8 EUT photos

8.1 External photos

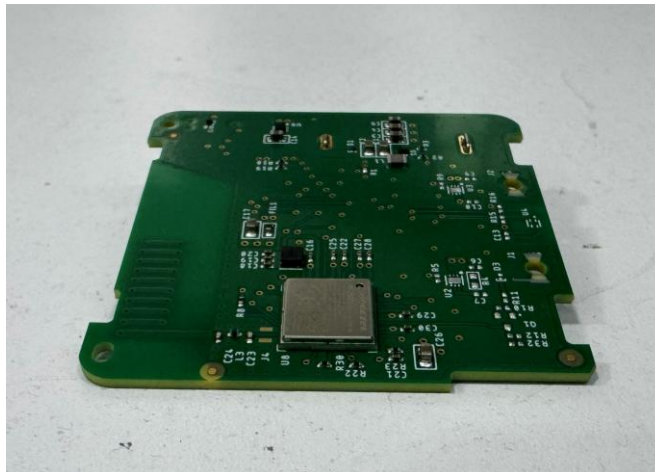


Figure 8.1-1: Front view photo

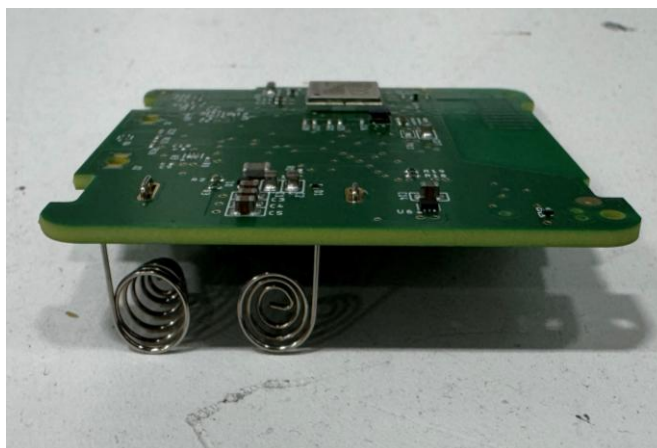


Figure 8.1-2: Rear view photo

External photos, continued

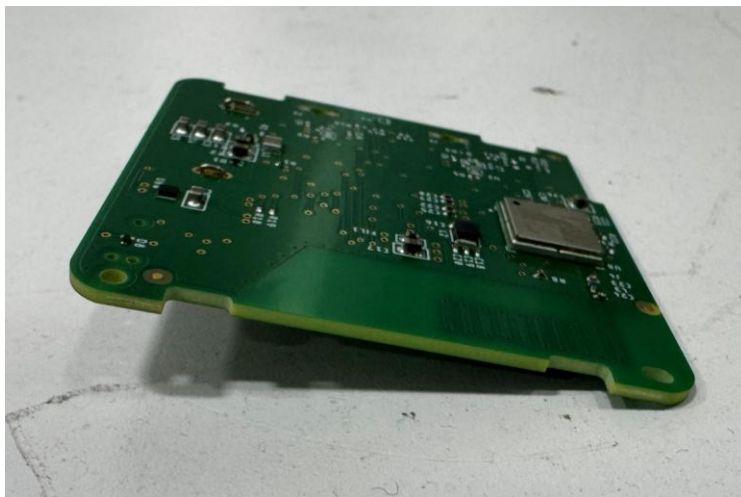


Figure 8.1-3: Side view photo

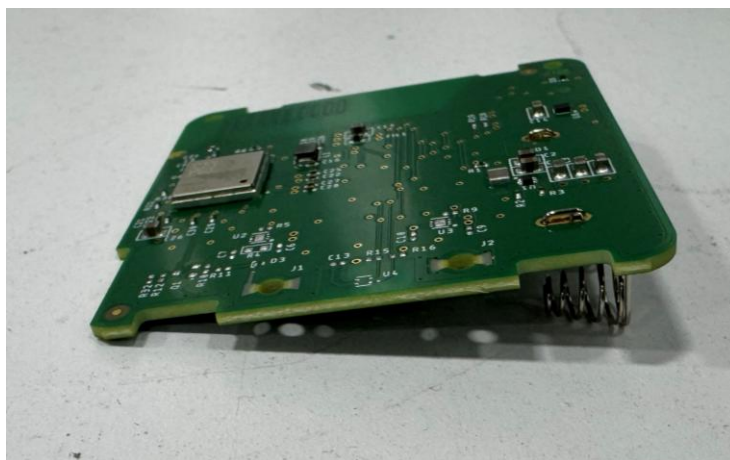


Figure 8.1-4: Side view photo

External photos, continued

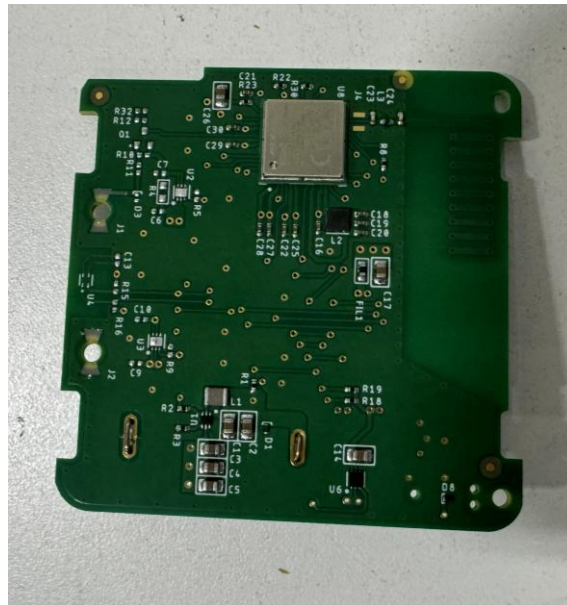


Figure 8.1-5: Top view photo

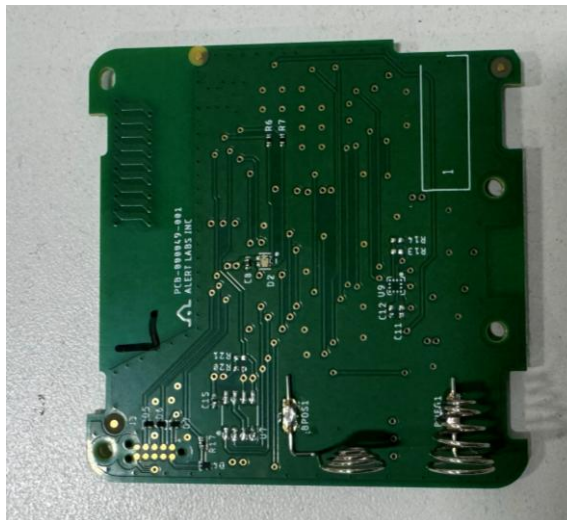


Figure 8.1-6: Bottom view photo

End of the test report