



Test report

467684-1TRFEMC

Date of issue: August 11, 2022

Applicant:

Fujitsu Network Communications, Inc.

Product:

Gen2 Tri Band RU for North America

Model:

G2_N71N29N26-RU

Variant(s):

None

Specifications:

- ◆ FCC 47 CFR Part 15, Subpart B – Verification

Lab and test locations

| | |
|--------------------|---|
| Company name | Nemko USA Inc. |
| Address | 2210 Faraday Ave, Suite 150 |
| City | Carlsbad |
| State | California |
| Postal code | 92008 |
| Country | USA |
| Telephone | +1 760 444 3500 |
| Website | www.nemko.com |
| FCC Site Number | Test Firm Registration Number: 392943; Designation Number: US5058 |
| ISED Test Site | 2040B-3 |
| Tested by | Lan Sayasane, EMC Test Engineer |
| Reviewed by | James Cunningham, EMC/MIL/WL Supervisor |
| Review date | August 11, 2022 |
| Reviewer signature |  |

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 USA's ISO/IEC 17025 accreditation.

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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Section 1 Report summary

1.1 Test specifications

FCC 47 CFR Part 15, Subpart B – Verification

Title 47: Telecommunication; Part 15—Radio Frequency Devices

1.2 Exclusions

None.

1.3 Statement of compliance

Testing was performed against all relevant requirements of the test standard(s).

Results obtained indicate that the product under test complies in full with the tested requirements.

The test results relate only to the item(s) tested.

See "Section 2 Summary of test results" for full details.

1.4 Test report revision history

Table 1.4-1: Test report revision history

| Revision # | Issue Date | Details of changes made to test report |
|----------------|----------------|--|
| 467684-1TRFEMC | 11 August 2022 | Original report issued |

Section 2 Summary of test results

2.1 Sample information

| | |
|------------------------|-----------|
| Receipt date | 15-Jul-22 |
| Nemko sample ID number | 467684 |

2.2 Testing period

| | |
|-----------------|-----------|
| Test start date | 18-Jul-22 |
| Test end date | 21-Jul-22 |

2.3 Emissions test results

Table 2.3-1: FCC 47 CFR Part 15, Subpart B and ICES-003 Issue 7 results

| Standard | Clause | Test description | Verdict |
|-------------------------------|---------|--|-------------------|
| FCC 47 CFR Part 15, Subpart B | §15.109 | Radiated emissions limits ¹ | Pass |
| FCC 47 CFR Part 15, Subpart B | §15.107 | Conducted emissions limits (AC mains) ¹ | Pass ² |

Notes: ¹ Product classification B

² The EUT is DC powered

Section 3 Equipment under test (EUT) details

3.1 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 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.

3.2 Applicant

| | |
|-----------------|--------------------------------------|
| Company name | Fujitsu Network Communications, Inc. |
| Address | 2801 Telecom Parkway |
| City | Richardson |
| State | TX |
| Postal/Zip code | 75082 |
| Country | USA |

3.3 Manufacturer

| | |
|-----------------|--------------------------------------|
| Company name | Fujitsu Network Communications, Inc. |
| Address | 2801 Telecom Parkway |
| City | Richardson |
| State | TX |
| Postal/Zip code | 75082 |
| Country | USA |

3.4 EUT information

| | |
|---------------------------------|---|
| Product name | Gen2 Tri Band RU for North America |
| Model | G2_N71N29N26-RU |
| Variant(s) | None |
| Serial number | 10003 |
| Part number | TA08029-B214/01 |
| Power requirements | DC 48V |
| Description/theory of operation | The radio unit (RU) is one of the components to configure the 5G RAN mobile communication system. The RU has three band frequencies: band n26, band n29 and band n71. Four antenna ports are shared across the frequency bands. |
| Operational frequencies | n26: 859 - 894 MHz; n29: 717 - 728 MHz; n71: 617 - 652 MHz |
| Software details | N/A |

3.5 EUT exercise and monitoring details

EUT description of the methods used to exercise the EUT and all relevant ports:

- During Emissions, EUT was setup and power on standby mode for FCC Part 15B (Unintentional).

EUT setup/configuration rationale:

- The EUT setup in a configuration that was expected to produce the highest amplitude emissions relative to the limit and that satisfy normal operation/installation practice by the end user.
- The type and construction of cables used in the measurement set-up were consistent with normal or typical use. Cables with mitigation features (for example, screening, tighter/more twists per length, ferrite beads) have been noted below:
 - None
- The EUT was setup in a manner that was consistent with its typical arrangement and use. The measurement arrangement of the EUT, local ancillary equipment and associated cabling was representative of normal practice. Any deviations from typical arrangements have been noted below:
 - None

3.6 EUT setup details

Table 3.6-1: EUT sub assemblies

| Description | Brand name | Model/Part number | Serial number | Rev. |
|------------------|--------------------------------------|---------------------------------|---------------|------|
| Gen2 Tri Band RU | Fujitsu Network Communications, Inc. | G2_N71N29N26-RU/TA08029-B214/01 | 10003 | -- |

Table 3.6-2: EUT interface ports

| Description | Qty. |
|---------------|------|
| Port #A | 1 |
| Port #B | 1 |
| Port #C | 1 |
| Port #D | 1 |
| Fiber port | 1 |
| Ethernet port | 2 |
| DC 48V | 1 |

Table 3.6-3: Support equipment

| Description | Brand name | Model/Part number | Serial number | Rev. |
|-----------------------|-----------------|-------------------|---------------|------|
| DC Power Supply | Xantrex | XFR 60-46 | B0001754 | -- |
| DC Power Supply | Hewlett Packard | E3614A | KR52401339 | -- |
| JIGS | Fujitsu | TA22452-B101 | -- | -- |
| 10/100 Network Switch | D-Link | DSS-16+/BSS16+A | F30N5B8001330 | H1 |
| Laptop | Fujitsu | LifeBook E Series | R7100055 | -- |

Table 3.6-4: Inter-connection cables

| Cable description | From | To | Length (m) |
|-------------------|---------------------------|--------------------|------------|
| Ethernet | 10/100 Network Switch | Laptop | 2 |
| Ethernet | 10/100 Network Switch | JIGS | 2 |
| Ethernet | 10/100 Network Switch | Gen 2 Dual Band RU | 3 |
| DC Power cable | DC Power Supply (Xantrex) | Gen 2 Dual Band RU | 3 |
| DC Power cable | DC Power Supply (HP) | JIGS | 0.5 |
| Fiber cable | JIGS | Gen 2 Dual Band RU | 5 |

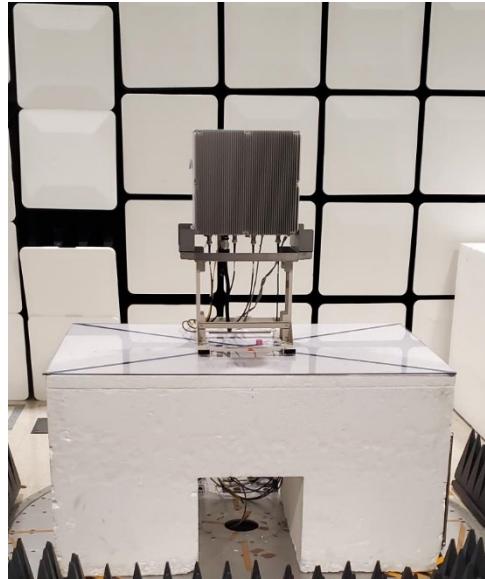


Figure 3.6-1: Test setup diagram

Section 4 Engineering considerations

4.1 Modifications incorporated in the EUT

None.

4.2 Technical judgement

None.

4.3 Deviations from laboratory test procedures

None.

Section 5 Test conditions

5.1 Atmospheric conditions

| | |
|-------------------|------------|
| Temperature | 15–30 °C |
| Relative humidity | 20–75 % |
| Air pressure | 86–106 kPa |

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.

5.2 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 6 Measurement uncertainty

6.1 Uncertainty of measurement

Nemko USA Inc. has calculated measurement uncertainty and is documented in EMC/MUC/001 "Uncertainty in EMC measurements." Measurement uncertainty was calculated using the methods described in CISPR 16-4-2 Specification for radio disturbance and immunity measuring apparatus and methods – Part 4-2: Uncertainties, statistics, and limit modelling – Measurement instrumentation uncertainty. The expression of Uncertainty in EMC testing. Measurement uncertainty calculations assume a coverage factor of K=2 with 95% certainty.

Table 6.1-1: Measurement uncertainty calculations

| Measurement | | U_{cisp} dB | U_{lab} dB |
|--|-------------------|---------------|--------------|
| Conducted disturbance at AC mains and other port power using a V-AMN | 9 kHz to 150 kHz | 3.8 | 2.9 |
| | 150 kHz to 30 MHz | 3.4 | 2.3 |
| Conducted disturbance at telecommunication port using AAN | 150 kHz to 30 MHz | 5.0 | 4.3 |
| Conducted disturbance at telecommunication port using CVP | 150 kHz to 30 MHz | 3.9 | 2.9 |
| Conducted disturbance at telecommunication port using CP | 150 kHz to 30 MHz | 2.9 | 1.4 |
| Conducted disturbance at telecommunication port using CP and CVP | 150 kHz to 30 MHz | 4.0 | 3.1 |
| Radiated disturbance (electric field strength in a SAC) | 30 MHz to 1 GHz | 6.3 | 5.5 |
| Radiated disturbance (electric field strength in a FAR) | 1 GHz to 6 GHz | 5.2 | 4.7 |
| Radiated disturbance (electric field strength in a FAR) | 6 GHz to 18 GHz | 5.5 | 5.0 |

Notes: Compliance assessment:

If U_{lab} is less than or equal to U_{cisp} 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_{cisp} then:

- compliance is deemed to occur if no measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level, increased by $(U_{lab} - U_{cisp})$, exceeds the disturbance limit

V-AMN: V type artificial mains network
 AAN: Asymmetric artificial network
 CP: Current probe
 CVP: Capacitive voltage probe
 SAC: Semi-anechoic chamber
 FAR: Fully anechoic room

Section 7 Terms and definitions

7.1 Product classification definitions

7.1.1 Title 47: Telecommunication – Part 15 – Radio Frequency devices, Subpart A – General

| | |
|---|---|
| Class A digital device | A digital device that is marketed for use in a commercial, industrial, or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home. |
| Class B digital device | A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business, and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public. |
| <p>Note: The responsible party may also qualify a device intended to be marketed in a commercial, business, or industrial environment as a Class B device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.</p> | |

7.1.2 ICES-003 – Equipment classification

| | |
|--|---|
| Class B ITE | Limits of radio noise for ITE for residential operation. |
| Class A ITE | Limits of radio noise for ITE for non-residential operation. |
| Conditions | Only ITE intended strictly for non-residential use in commercial, industrial, or business environments, and whose design or other characteristics strongly preclude the possibility of its use in a residential environment, shall be permitted to comply with the less stringent Class A limits. |
| <p>All ITE that cannot meet the conditions for Class A operation shall comply with the Class B limits.</p> | |
| <p>The ITE shall comply with both the power line – conducted and the radiated emissions limits within the same Class, with no intermixing.</p> | |

7.2 General definitions

7.2.1 Title 47: Telecommunication – Part 15-Radio Frequency devices, Subpart A – General

| | |
|--|--|
| Digital device (Previously defined as a computing device) | An unintentional radiator (device or system) that generates and uses timing signals or pulses at a rate in excess of 9,000 pulses (cycles) per second and uses digital techniques; inclusive of telephone equipment that uses digital techniques or any device or system that generates and uses radio frequency energy for the purpose of performing data processing functions, such as electronic computations, operations, transformations, recording, filing, sorting, storage, retrieval, or transfer. A radio frequency device that is specifically subject to an emanation requirement in any other FCC Rule part or an intentional radiator subject to subpart C of this part that contains a digital device is not subject to the standards for digital devices, provided the digital device is used only to enable operation of the radio frequency device and the digital device does not control additional functions or capabilities. |
| <p>Note: Computer terminals and peripherals that are intended to be connected to a computer are digital devices.</p> | |

7.2.2 ICES-003

| | |
|--|--|
| Information technology equipment (including Digital Apparatus) | Information Technology Equipment (ITE) is defined as devices or systems that use digital techniques for purposes such as data processing and computation. ITE is any unintentional radiator (device or system) that generates and/or uses timing signals or pulses having a rate of at least 9 kHz and employs digital techniques for purposes such as computation, display, data processing and storage, and control. |
|--|--|

Section 8 Testing data

8.1 Radiated emissions

8.1.1 References and limits

- FCC 47 CFR Part 15, Subpart B: §15.109
- ICES-003: §3.2.2
- Test method: ANSI C63.4-2014

Table 8.1-1: Requirements as per for radiated emissions for Class A

| Facility | Frequency range [MHz] | Distance [m] | Measurement Detector type/ bandwidth | limits [dB μ V/m] |
|------------------------------|-----------------------|--------------|---|--------------------------|
| FCC Part 15 Subpart B | | | | |
| SAC | 30–88 | | | 49.5 |
| | 88–216 | | | 54.0 |
| | 216–960 | | | 56.9 |
| | 960–1000 | | | 60.0 |
| FAR | >1000 | 3 | Linear average/1 MHz Peak/1 MHz | 60.0 80.0 |
| SAC | 30–88 | | | 39.0 |
| | 88–216 | | | 43.5 |
| | 216–960 | | | 46.4 |
| | 960–1000 | | | 49.5 |
| ICES-003 | | | | |
| SAC | 30–88 | | | 50.0 |
| | 88–216 | | | 54.0 |
| | 216–230 | 3 | Quasi peak/120 kHz | 56.9 |
| | 230–960 | | | 57.0 |
| | 960–1000 | | | 60.0 |
| FAR | >1000 | 3 | Linear average/1 MHz Peak/1 MHz | 60.0 80.0 |
| SAC | 30–88 | | | 40.0 |
| | 88–216 | | | 43.5 |
| | 216–230 | 10 | Quasi peak/120 kHz | 46.4 |
| | 230–960 | | | 47.0 |
| | 960–1000 | | | 49.5 |

Table 8.1-2: Requirements as per for radiated emissions for Class B

| Facility | Frequency range [MHz] | Distance [m] | Measurement Detector type/ bandwidth | limits [dB μ V/m] |
|------------------------------|-----------------------|--------------|---|--------------------------|
| FCC Part 15 Subpart B | | | | |
| SAC | 30–88 | | | 40.0 |
| | 88–216 | | | 43.5 |
| | 216–960 | | | 46.0 |
| | 960–1000 | | | 54.0 |
| FAR | >1000 | 3 | Linear average/1 MHz Peak/1 MHz | 54.0 74.0 |
| SAC | 30–88 | | | 29.5 |
| | 88–216 | | | 33.1 |
| | 216–960 | | | 35.6 |
| | 960–1000 | | | 43.5 |
| ICES-003 | | | | |
| SAC | 30–88 | | | 40.0 |
| | 88–216 | | | 43.5 |
| | 216–230 | 3 | Quasi peak/120 kHz | 46.0 |
| | 230–960 | | | 47.0 |
| | 960–1000 | | | 54.0 |
| FAR | >1000 | 3 | Linear average/1 MHz Peak/1 MHz | 54.0 74.0 |
| SAC | 30–88 | | | 30.0 |
| | 88–216 | | | 33.1 |
| | 216–230 | 10 | Quasi peak/120 kHz | 35.6 |
| | 230–960 | | | 37.0 |
| | 960–1000 | | | 43.5 |

Notes: Where there is a step in the applicable limit, the lower value was applied at the transition frequency.

8.1.2 Test summary

| | | | |
|---------------|---|-------------------|-------------|
| Verdict | Pass | | |
| Test date | July 18, 2022 | Temperature | 22 °C |
| Test engineer | Lan Sayasane, EMC Test Engineer | Air pressure | 1005.0 mbar |
| Test location | <input type="checkbox"/> 10m semi anechoic chamber <input checked="" type="checkbox"/> 3m semi anechoic chamber <input type="checkbox"/> Other: | Relative humidity | 60 % |

8.1.3 Notes

The spectral plots within this section have been corrected with all relevant transducer factors.

8.1.4 Setup details

| | |
|-----------------------------|--|
| Port under test | Enclosure port |
| EUT power input during test | DC 48V |
| EUT setup configuration | <input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor standing <input type="checkbox"/> Other: |
| Measuring distance | <input type="checkbox"/> 10m <input checked="" type="checkbox"/> 3m <input type="checkbox"/> Other: |
| Antenna height variation | 1 – 4 m |
| Turn table position | 0 – 360° |
| Measurement details | Preview measurements were performed with the receiver in continuous scan or sweep mode. Emissions detected within 6 dB or above limit (minimum of 6 frequencies) were maximized by rotating the EUT and adjusting the antenna height and polarization. At the position of maximum emission, the signal was measured with the appropriate detector against the corresponding limit and recorded as the final measurement. |

Receiver/spectrum analyzer settings for frequencies below 1 GHz:

| | |
|----------------------|---|
| Resolution bandwidth | 120 kHz |
| Detector mode | <ul style="list-style-type: none"> – Peak (Preview measurement) – Quasi-peak (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | <ul style="list-style-type: none"> – 100 ms (Peak preview measurement) – 5000 ms (Quasi-peak final measurement) |

Receiver/spectrum analyzer settings for frequencies above 1 GHz:

| | |
|----------------------|---|
| Resolution bandwidth | 1 MHz |
| Detector mode | <ul style="list-style-type: none"> Peak (Preview measurement) Peak and Average (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | <ul style="list-style-type: none"> – 100 ms (Peak preview measurement) – 5000 ms (Peak and Average final measurement) |

Table 8.1-3: Radiated emissions equipment list

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|-------------------|-----------------|-----------|-----------|-----------|-------------|
| EMI Test Receiver | Rohde & Schwarz | ESU 40 | E1121 | 1 year | 31-May-2023 |
| System Controller | Sunol Sciences | SC104V | E1191 | NCR | NCR |
| Antenna, Bilog | Schaffner-Chase | CBL 6111D | 1763 | 2 years | 01-Apr-2024 |
| Antenna, DRG Horn | ETS-Lindgren | 3117-PA | E1139 | 2 years | 19-Apr-2023 |

Notes: N/A – not applicable

NCR – no calibration required

VOU – verify on use

Table 8.1-4: Radiated emissions test software details

| Manufacturer of Software | Details |
|--------------------------|------------------|
| Rohde & Schwarz | EMC 32 V10.60.15 |

Notes: None

8.1.5 Test data

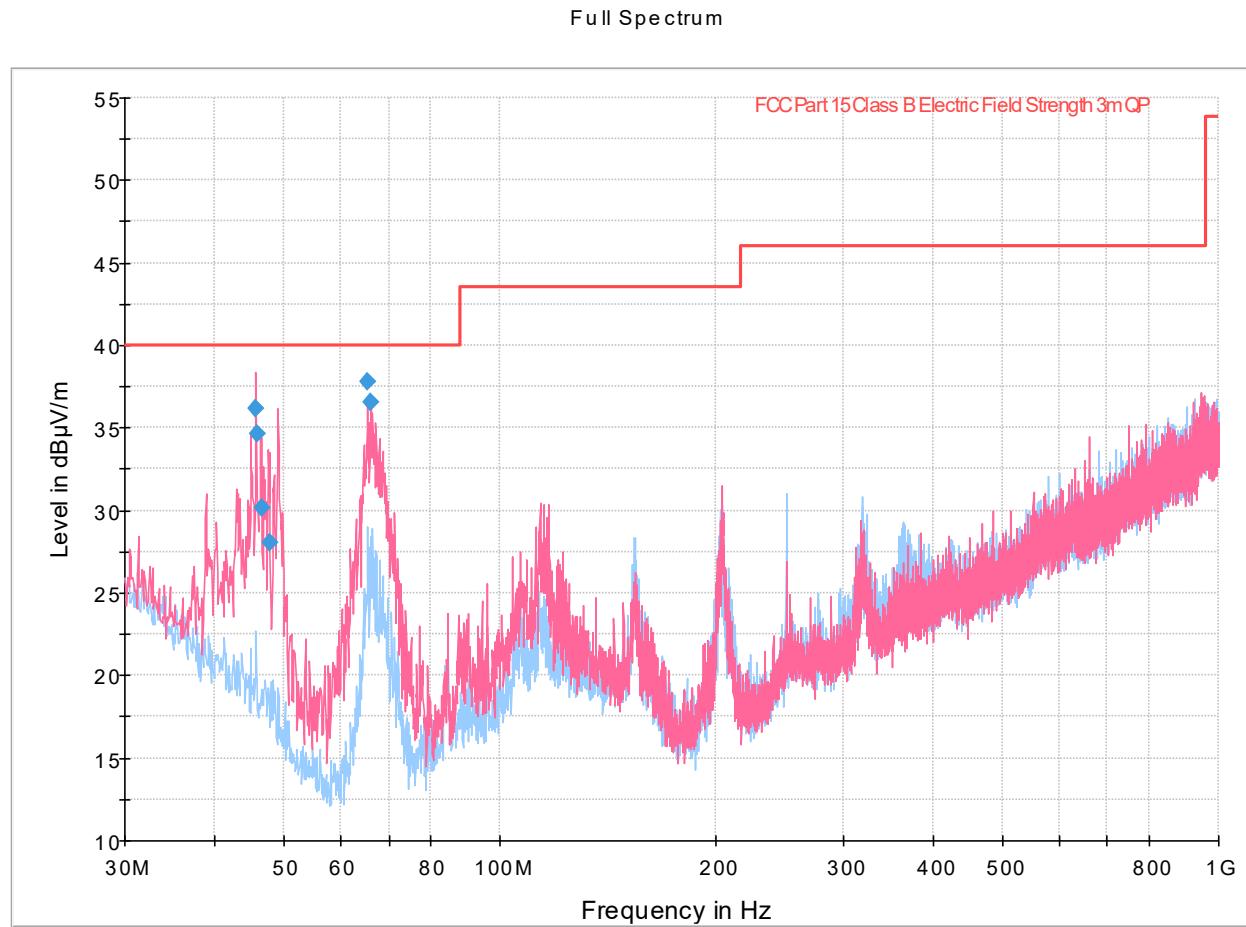


Figure 8.1-1: Radiated emissions spectral plot (30 MHz - 1 GHz)

Table 8.1-5: Radiated emissions results

| Frequency (MHz) | QuasiPeak (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|--------------------------|----------------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| 45.714000 | 36.13 | 40.00 | 3.87 | 5000.0 | 120.000 | 100.0 | V | 0.0 | 18.2 |
| 45.778000 | 34.65 | 40.00 | 5.35 | 5000.0 | 120.000 | 100.0 | V | 119.0 | 18.1 |
| 46.477000 | 30.12 | 40.00 | 9.88 | 5000.0 | 120.000 | 108.0 | V | 127.0 | 17.8 |
| 47.812000 | 28.05 | 40.00 | 11.95 | 5000.0 | 120.000 | 104.0 | V | 0.0 | 17.2 |
| 65.324000 | 37.76 | 40.00 | 2.24 | 5000.0 | 120.000 | 145.0 | V | 97.0 | 13.1 |
| 66.084000 | 36.60 | 40.00 | 3.40 | 5000.0 | 120.000 | 262.0 | V | 328.0 | 13.2 |

Notes:

¹ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

Full Spectrum

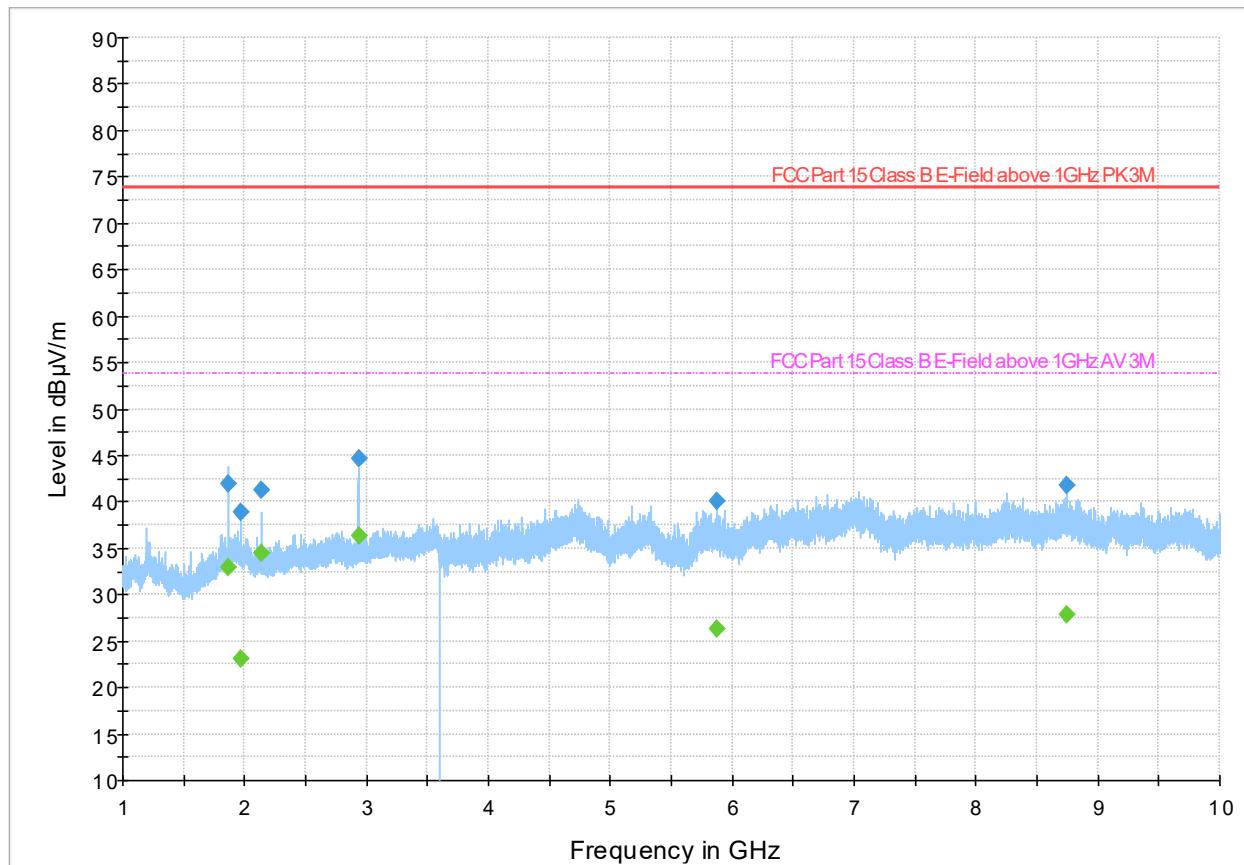


Figure 8.1-2: Radiated emissions spectral plot (1 GHz - 10 GHz)

Table 8.1-6: Radiated emissions results

| Frequency (MHz) | MaxPeak (dB μ V/m) | CAverage (dB μ V/m) | Limit (dB μ V/m) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Height (cm) | Pol | Azimuth (deg) | Corr. (dB/m) |
|-----------------|------------------------|-------------------------|----------------------|-------------|-----------------|-----------------|-------------|-----|---------------|--------------|
| 1866.700000 | 41.90 | --- | 73.90 | 32.00 | 5000.0 | 1000.000 | 386.0 | V | 176.0 | -10.9 |
| 1866.700000 | --- | 32.88 | 53.90 | 21.02 | 5000.0 | 1000.000 | 386.0 | V | 176.0 | -10.9 |
| 1964.500000 | --- | 23.04 | 53.90 | 30.86 | 5000.0 | 1000.000 | 231.0 | V | 98.0 | -10.7 |
| 1964.500000 | 38.87 | --- | 73.90 | 35.03 | 5000.0 | 1000.000 | 231.0 | V | 98.0 | -10.7 |
| 2133.400000 | 41.30 | --- | 73.90 | 32.60 | 5000.0 | 1000.000 | 166.0 | V | 150.0 | -11.3 |
| 2133.400000 | --- | 34.44 | 53.90 | 19.46 | 5000.0 | 1000.000 | 166.0 | V | 150.0 | -11.3 |
| 2933.600000 | --- | 36.31 | 53.90 | 17.59 | 5000.0 | 1000.000 | 150.0 | V | 145.0 | -8.3 |
| 2933.600000 | 44.66 | --- | 73.90 | 29.24 | 5000.0 | 1000.000 | 150.0 | V | 145.0 | -8.3 |
| 5880.100000 | 40.03 | --- | 73.90 | 33.87 | 5000.0 | 1000.000 | 243.0 | V | 0.0 | -0.7 |
| 5880.100000 | --- | 26.26 | 53.90 | 27.64 | 5000.0 | 1000.000 | 243.0 | V | 0.0 | -0.7 |
| 8748.700000 | 41.68 | --- | 73.90 | 32.22 | 5000.0 | 1000.000 | 121.0 | V | 131.0 | 2.8 |
| 8748.700000 | --- | 27.88 | 53.90 | 26.02 | 5000.0 | 1000.000 | 121.0 | V | 131.0 | 2.8 |

Notes: ¹ Field strength (dB V/m) = receiver/spectrum analyzer value (dB V) + correction factor (dB)

² Correction factors = antenna factor ACF (dB) + cable loss (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.1.6 Setup photos

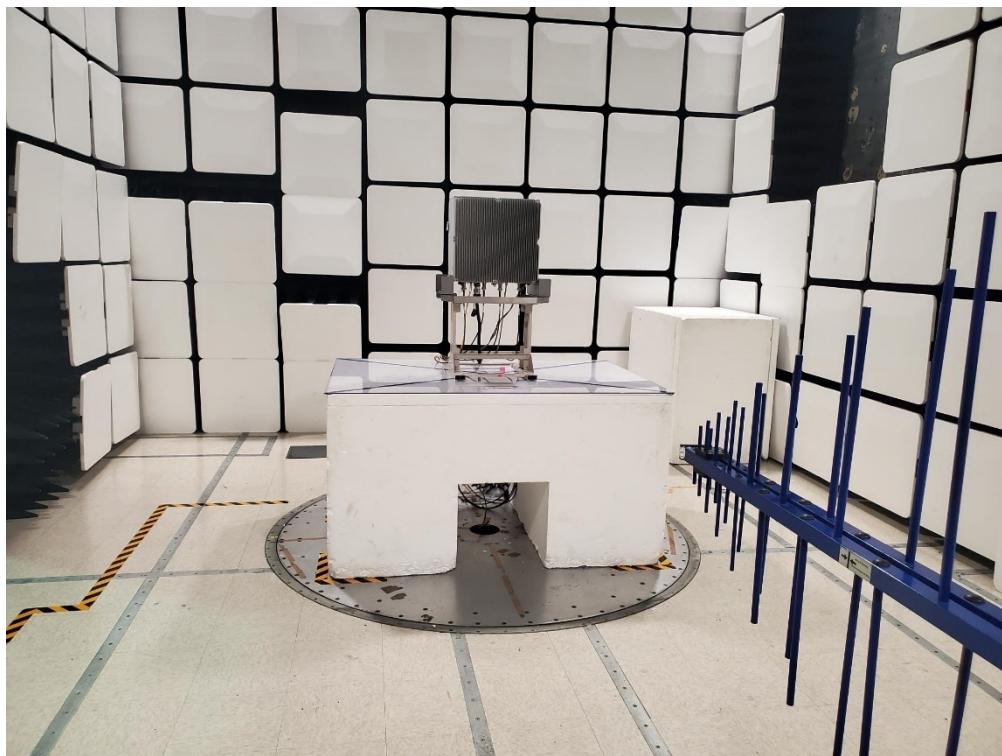


Figure 8.1-3: Radiated emissions setup photo – below 1 GHz

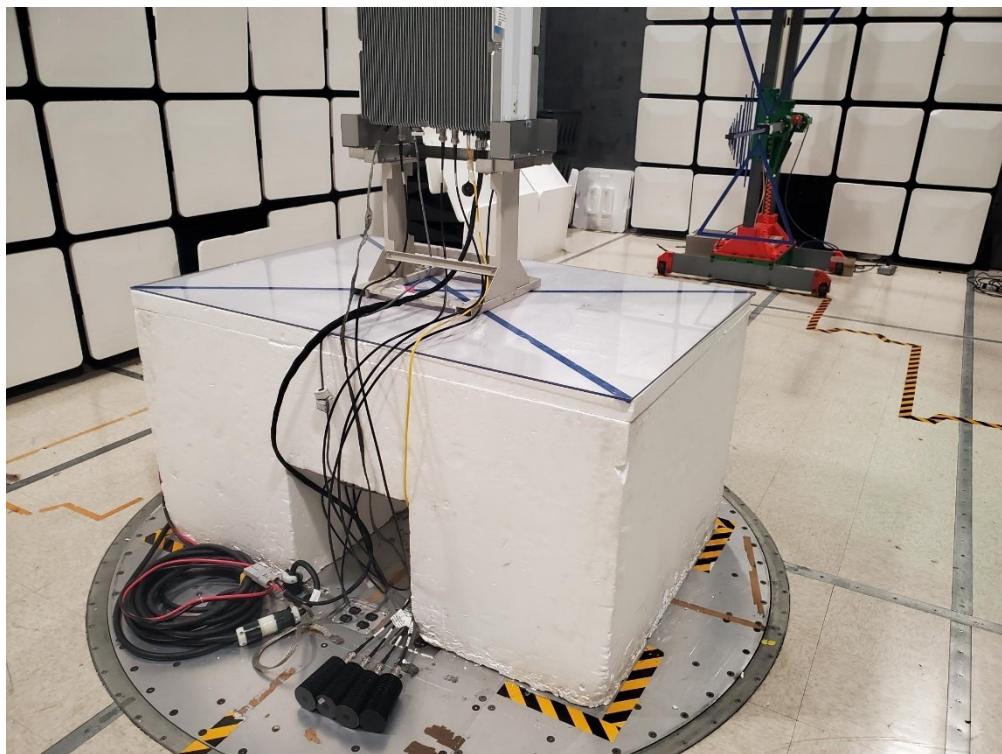


Figure 8.1-4: Radiated emissions setup photo – below 1 GHz

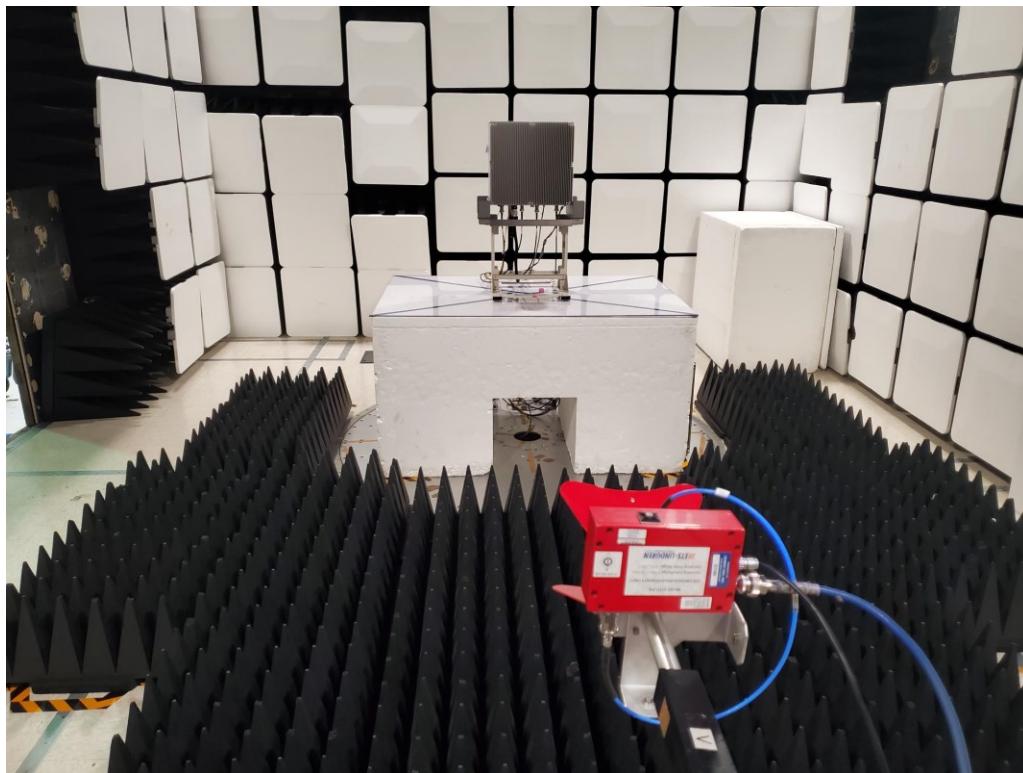


Figure 8.1-5: Radiated emissions setup photo – above 1 GHz

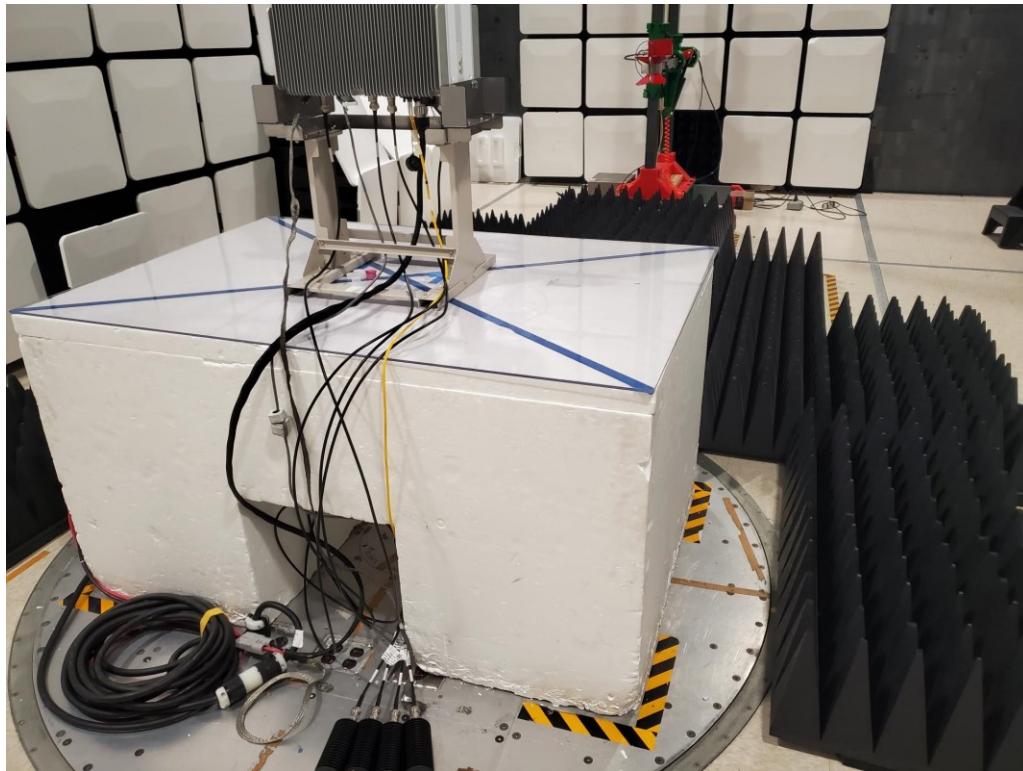


Figure 8.1-6: Radiated emissions setup photo – above 1 GHz

8.2 Conducted emissions from AC mains ports

8.2.1 References and limits

- FCC 47 CFR Part 15, Subpart B: §15.107
- ICES-003: §3.2.1
- Test method: ANSI C63.4-2014

Table 8.2-1: Requirements for conducted emissions from the AC mains power ports for Class A

| Frequency range [MHz] | Coupling device | Measurement | Limits [dB μ V] |
|-----------------------|-----------------|--------------------------|---------------------|
| | | Detector type/ bandwidth | |
| 0.15–0.5 | | Quasi peak/9 kHz | 79.0 |
| 0.5–30 | | | 73.0 |
| 0.15–0.5 | AMN | Average/9 kHz | 66.0 |
| 0.5–30 | | | 60.0 |

Table 8.2-2: Requirements for conducted emissions from the AC mains power ports for Class B

| Frequency range [MHz] | Coupling device | Measurement | Limits [dB μ V] |
|-----------------------|-----------------|--------------------------|---------------------|
| | | Detector type/ bandwidth | |
| 0.15–0.5 | | Quasi peak/9 kHz | 66.0–56.0 |
| 0.5–5 | | | 56.0 |
| 5–30 | AMN | | 60.0 |
| 0.15–0.5 | | Average/9 kHz | 56.0–46.0 |
| 0.5–5 | | | 46.0 |
| 5–30 | AMN | | 50.0 |

Notes: The lower limit shall apply at the transition frequency.

8.2.2 Test summary

| | | | |
|---------------|---|-------------------|-------------|
| Verdict | Pass | | |
| Test date | July 21, 2022 | Temperature | 21 °C |
| Test engineer | Lan Sayasane, EMC Test Engineer | Air pressure | 1004.0 mbar |
| Test location | <input checked="" type="checkbox"/> Ground plane <input type="checkbox"/> Other: | Relative humidity | 64 % |

8.2.3 Notes

The spectral plots within this section have been corrected with all relevant transducer factors.

Equipment with a DC power port powered by a dedicated AC/DC power converter is considered to be AC mains powered equipment and tested with a power converter. Where the manufacturer provided the power converter, the supplied converter was used.

8.2.4 Setup details

| | |
|-----------------------------------|---|
| Port under test – Coupling device | DC Power Supply Mains – Artificial Mains Network (AMN) |
| EUT power input during test | 120V/60Hz |
| EUT setup configuration | <input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor standing <input type="checkbox"/> Other: |
| Measurement details | A preview measurement was generated with the receiver in continuous scan mode. Selected emissions were re-measured with the appropriate detector(s) against the correlating limit(s) and recorded as the final measurement. |

Receiver settings:

| | |
|----------------------|---|
| Resolution bandwidth | 9 kHz |
| Detector mode | <ul style="list-style-type: none"> – Peak and Average (Preview measurement) – Quasi-peak and Average (Final measurement) |
| Trace mode | Max Hold |
| Measurement time | <ul style="list-style-type: none"> – 100 ms (Peak and Average preview measurement) – 5000 ms (Quasi-peak and Average final measurement) |

Table 8.2-3: Conducted emissions from AC mains port equipment list

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|--------------------|-------------------|---------------|-----------|-----------|-------------|
| EMI Test Receiver | Rohde & Schwarz | ESCI 7 | E1026 | 1 year | 22-Mar-2023 |
| Transient Limiter | Hewlett Packard | 11947A | E1159 | 1 year | 18-Feb-2023 |
| Two Line V-Network | Rohde & Schwarz | ENV216 | E1019 | 1 year | 20-Sep-2022 |
| LISN | Solar Electronics | 9348-50-R-BNC | 384 | 1 year | 01-Sep-2022 |
| DC Power Supply | Hewlett Packard | 6554A | E1283 | NCR | NCR |

Notes: N/A – not applicable

NCR – no calibration required

VOU – verify on use

Table 8.2-4: Conducted emissions from AC mains port test software details

| Manufacturer of Software | Details |
|--------------------------|------------------|
| Rohde & Schwarz | EMC 32 V10.60.15 |

Notes: None

8.2.5 Test data

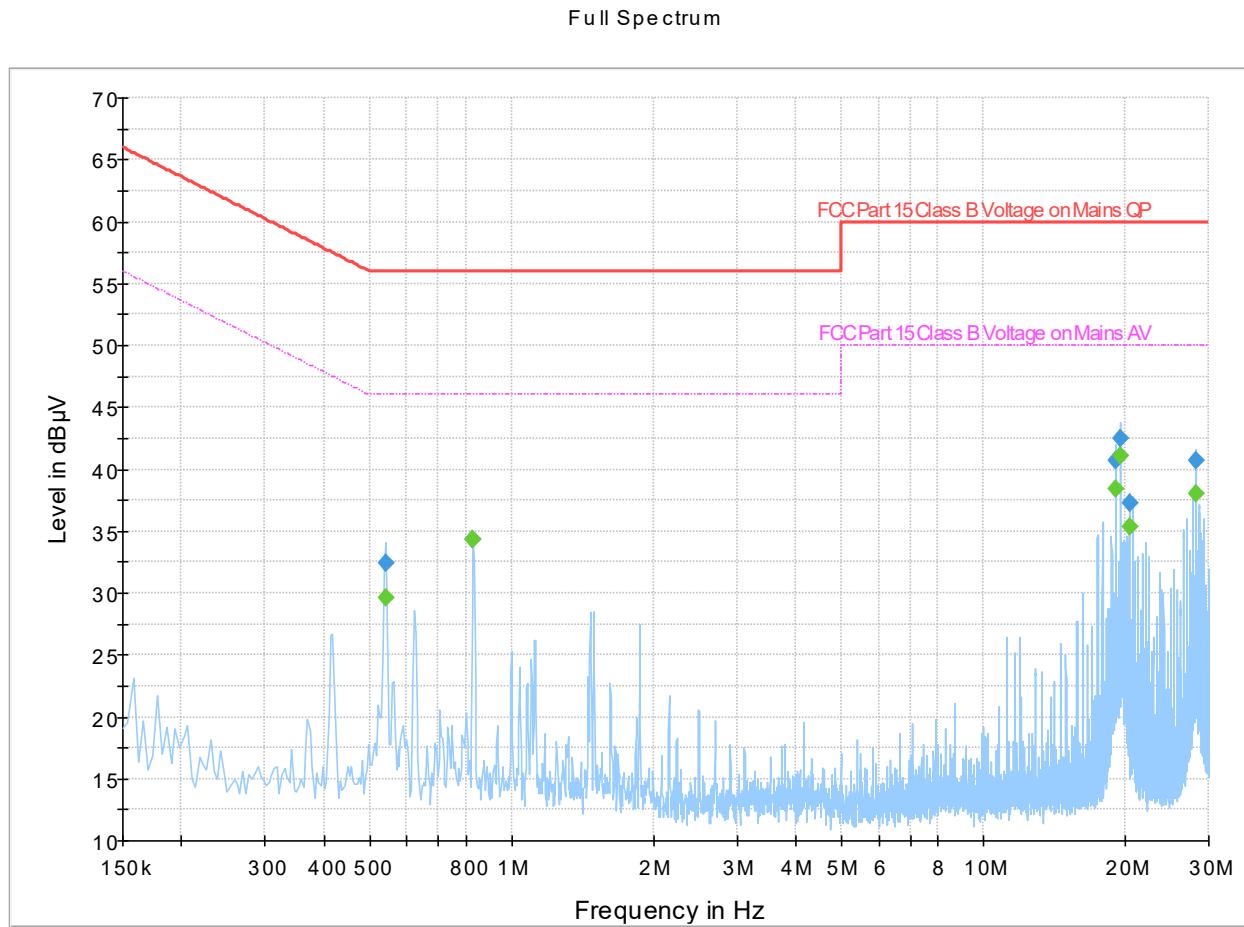


Figure 8.2-1: Conducted emissions at mains port spectral plot (150 kHz - 30 MHz)

Table 8.2-5: Conducted emissions at mains port results

| Frequency (MHz) | QuasiPeak (dBμV) | CAverage (dBμV) | Limit (dBμV) | Margin (dB) | Meas. Time (ms) | Bandwidth (kHz) | Line | Filter | Corr. (dB) |
|-----------------|------------------|-----------------|--------------|-------------|-----------------|-----------------|------|--------|------------|
| 0.542000 | --- | 29.65 | 46.00 | 16.35 | 5000.0 | 9.000 | L1 | ON | 19.4 |
| 0.542000 | 32.42 | --- | 56.00 | 23.58 | 5000.0 | 9.000 | L1 | ON | 19.4 |
| 0.830000 | --- | 34.28 | 46.00 | 11.72 | 5000.0 | 9.000 | L1 | ON | 19.4 |
| 0.830000 | 34.36 | --- | 56.00 | 21.64 | 5000.0 | 9.000 | L1 | ON | 19.4 |
| 19.102000 | --- | 38.42 | 50.00 | 11.58 | 5000.0 | 9.000 | L1 | ON | 20.2 |
| 19.102000 | 40.67 | --- | 60.00 | 19.33 | 5000.0 | 9.000 | L1 | ON | 20.2 |
| 19.522000 | --- | 41.13 | 50.00 | 8.87 | 5000.0 | 9.000 | L1 | ON | 20.2 |
| 19.522000 | 42.50 | --- | 60.00 | 17.50 | 5000.0 | 9.000 | L1 | ON | 20.2 |
| 20.350000 | 37.28 | --- | 60.00 | 22.72 | 5000.0 | 9.000 | N | ON | 20.2 |
| 20.350000 | --- | 35.29 | 50.00 | 14.71 | 5000.0 | 9.000 | N | ON | 20.2 |
| 28.246000 | 40.73 | --- | 60.00 | 19.27 | 5000.0 | 9.000 | L1 | ON | 20.0 |
| 28.246000 | --- | 37.97 | 50.00 | 12.03 | 5000.0 | 9.000 | L1 | ON | 20.0 |

Notes:

¹ Result (dBμV) = receiver analyzer value (dBμV) + correction factor (dB).

² Correction factors = LISN factor IL (dB) + cable loss (dB) + transient limiter (dB)

³ Emissions that were continuously present for a minimum of 1 second and occurred more than once for every 15 seconds observation period were considered valid emissions. The maximum value of valid emissions has been recorded.

8.2.6 Setup photos

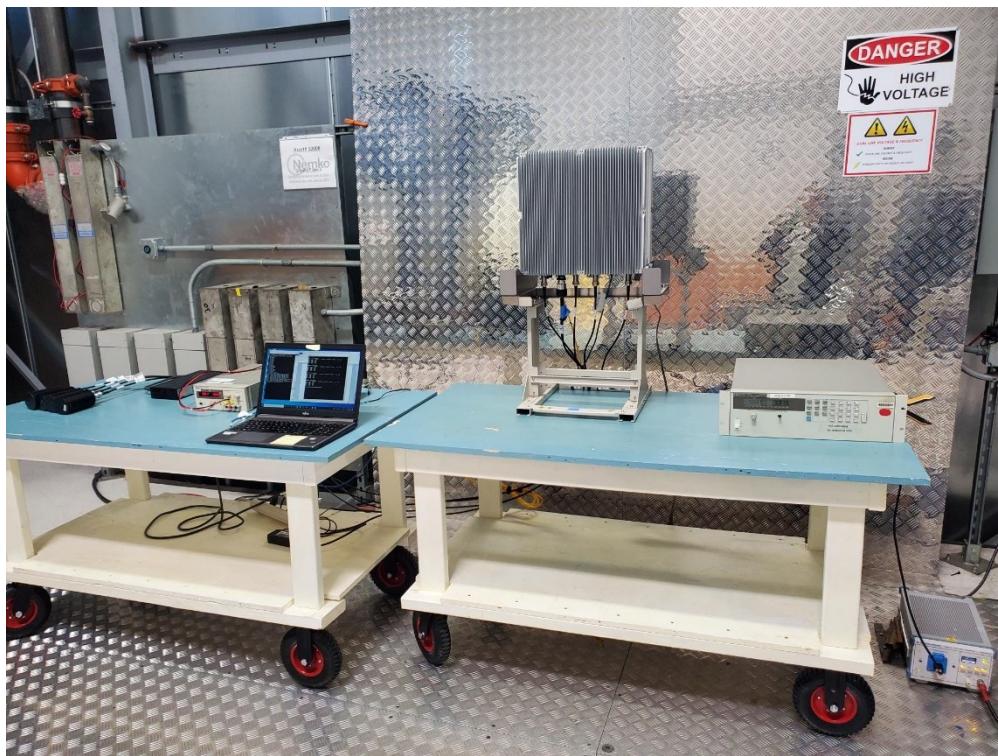


Figure 8.2-2: Conducted emissions from AC mains power ports setup photo



Figure 8.2-3: Conducted emissions – from AC mains power ports setup photo

Section 9 EUT photos

9.1 External photos

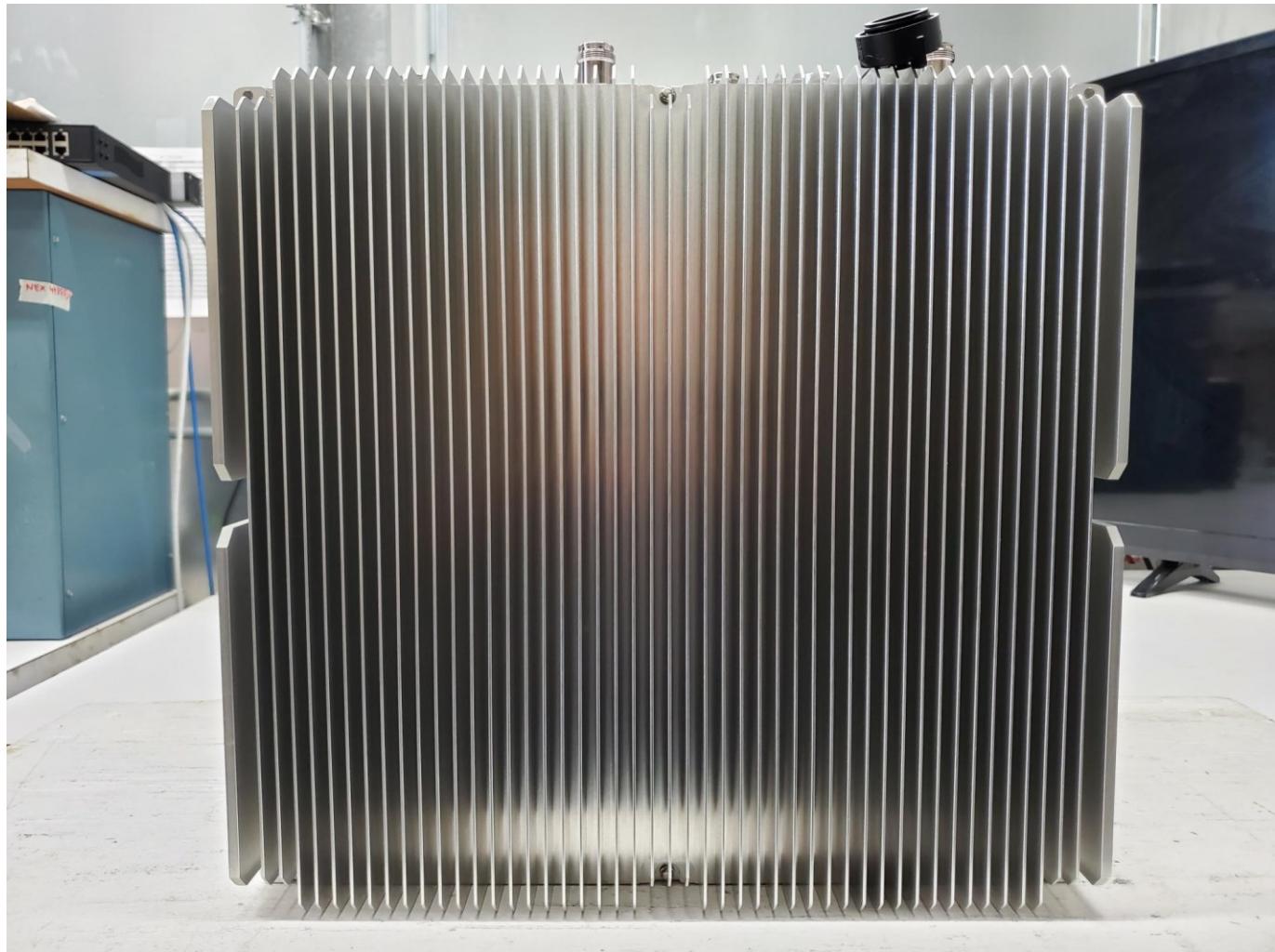


Figure 9.1-1: Front view photo

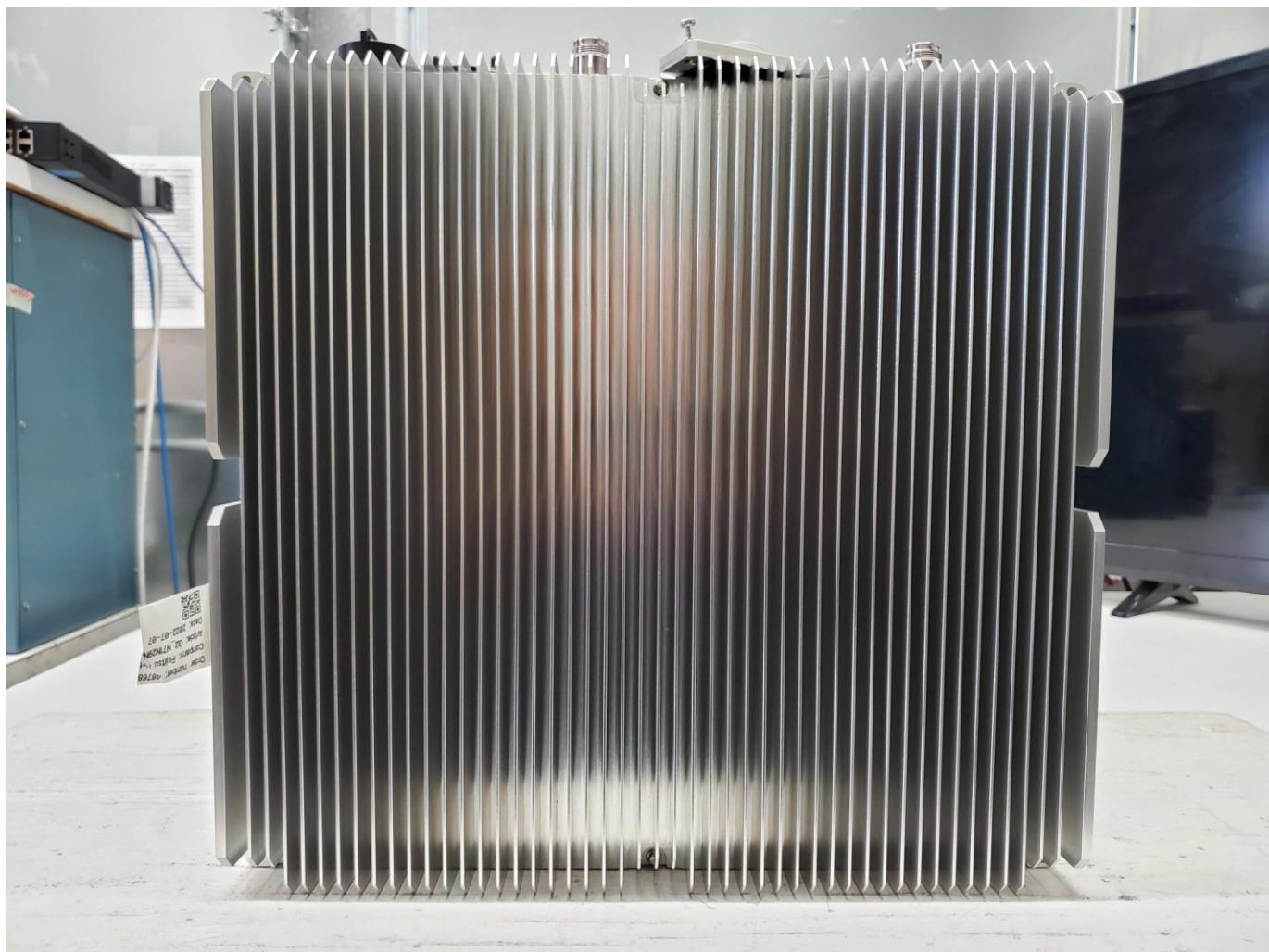


Figure 9.1-2: Rear view photo



Figure 9.1-3: Side view photo



Figure 9.1-4: Side view photo



Figure 9.1-5: Top view photo

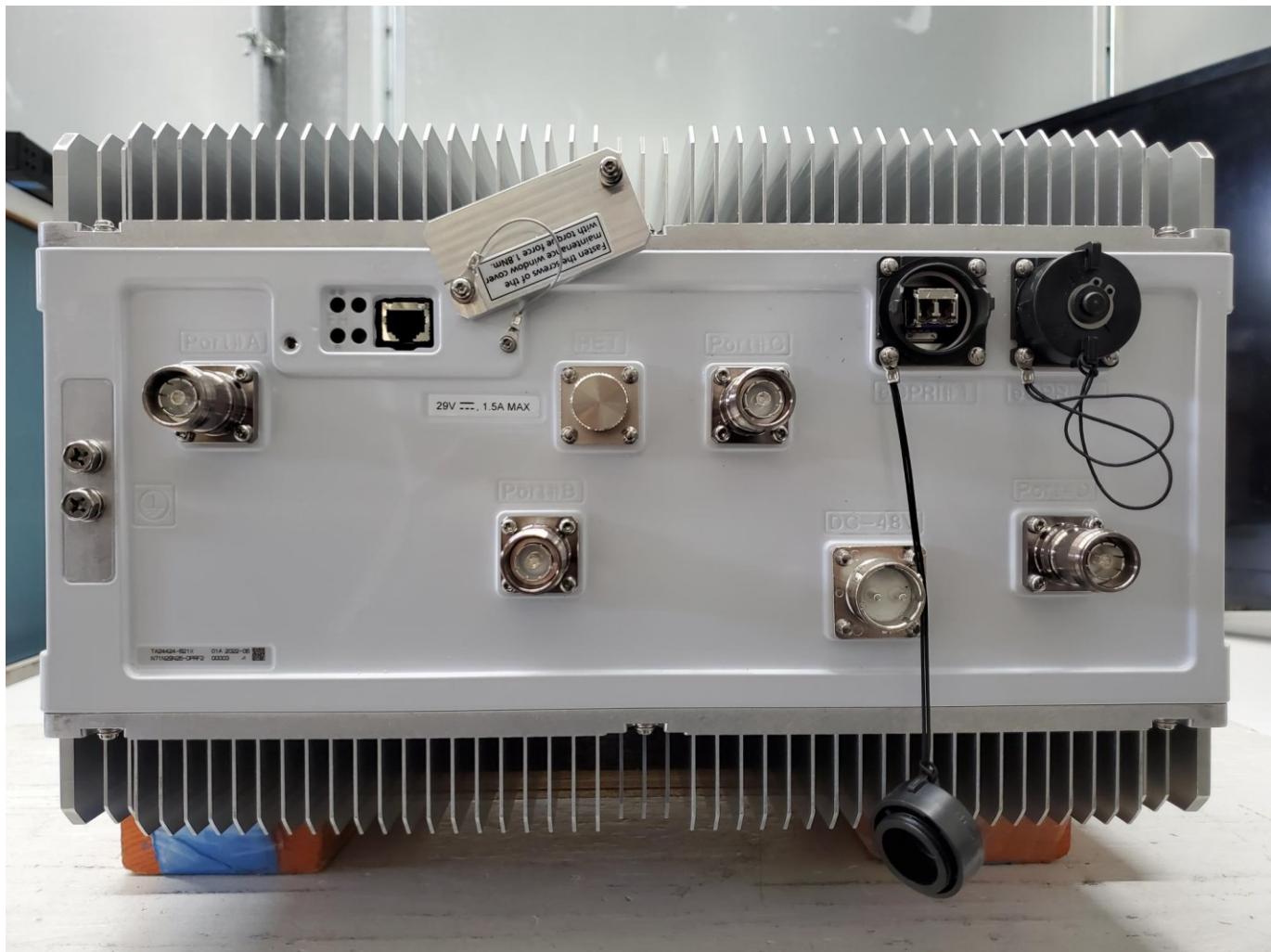


Figure 9.1-6: Bottom view photo

End of test report