

RADIO TEST REPORT – 460958-2TRFWL

Type of assessment:

Final product testing

Applicant:

M.A.E. ELETTRONICA S.R.L.

Via Presolana, 31/33 – 24030 Medolago (Bg) – Italy

Product:

RFID Dashboard

Model:

RTADM001

FCC ID:

2AVGH-RTADM001

IC Registration number:

25794-RTADM001

Specifications:

- ◆ FCC 47 CFR Part 15 Subpart C
- ◆ RSS-210, Issue 10, Amendment (April 2020), Section 7.2

Date of issue: **March 11, 2022**

P. Barbieri

Tested by



Signature

D. Guarnone

Reviewed by



Signature

Lab locations

| | |
|--------------|---|
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| Postal code | 20853 |
| Country | Italy |
| Telephone | +39 039 220 12 01 |
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| Website | www.nemko.com |
| Site number | 682159 and 9109A (10 m semi anechoic chamber) |

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 contain in this report are within Nemko Spa ISO/IEC 17025 accreditation.

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Section 1. Report summary

1.1 Test specifications

| | |
|--|-------------------------------|
| FCC 47 CFR Part 15, Subpart C | Intentional radiators |
| RSS-210, Issue 10, Amendment (April 2020), Section 7.2 | General field strength limits |

1.2 Test methods

| | |
|---|--|
| ANSI C63.10 v2013 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices |
| RSS-Gen, Issue 5, Amendment 1 (March 2019), Amendment 2 (February 2021) | General Requirements for Compliance of Radio Apparatus |

1.3 Statement of compliance

In the configuration tested, the EUT was found compliant.

Testing was completed against all relevant requirements of the test standard. Results obtained indicate that the product under test complies in full with the requirements tested. The test results relate only to the items tested.

See "Summary of test results" for full details.

1.4 Exclusions

None

1.5 Test report revision history

| Revision # | Details of changes made to test report |
|---------------|--|
| 460958-2TRFWL | Original report issued |

Section 2. Summary of test results

2.1 FCC Part 15 Subpart C, general requirements test results

| Part | Test description | Verdict |
|------------|---|-------------------|
| §15.207(a) | Conducted limits | Not applicable |
| §15.31(e) | Variation of power source | Pass ¹ |
| §15.31(m) | Number of operating frequencies | Pass ² |
| §15.203 | Antenna requirement | Pass ³ |
| §15.209 | Radiated emission limits; general requirements. | Pass |

Notes: The EUT is supplied by a vehicle battery.

¹ Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. No noticeable output power variation was observed

² The use a single operating frequency of 134 kHz nominal.

³ The Antennas use a unique coupling to the intentional radiator.

2.2 IC RSS-GEN, Issue 5, Amendment 1 (March 2019), Amendment 2 (February 2021), test results

| Part | Test description | Verdict |
|------|---|-------------------|
| 6.7 | Occupied bandwidth | Pass |
| 6.9 | Operating bands and selection of test frequencies | Pass ¹ |
| 6.11 | Transmitter frequency stability | Pass ² |
| 7.2 | AC power lines conducted emission limits | Not applicable |

Notes: The EUT is supplied by a vehicle battery.

¹ The use a single operating frequency of 134 kHz nominal.

² Measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, was performed with the supply voltage varied between 85 % and 115 % of the nominal rated supply voltage. No noticeable output power variation was observed. No requirements for temperature variation.

2.3 IC RSS-210, Issue 10, Amendment (April 2020), test results

| Part | Test description | Verdict |
|------|-------------------------------|---------|
| 7.2 | General field strength limits | Pass |

Notes:

Section 3. Equipment under test (EUT) details

3.1 Applicant/Manufacture

| | |
|---------------------|--|
| Applicant name | M.A.E. ELETTRONICA S.R.L. |
| Applicant address | Via Presolana, 31/33 – 24030 Medolago (Bg) – Italy |
| Manufacture name | Same as applicant |
| Manufacture address | Same as applicant |

3.2 Sample information

| | |
|------------------------|-------------------|
| Receipt date | February 28, 2022 |
| Nemko sample ID number | 460958 |

3.3 EUT information

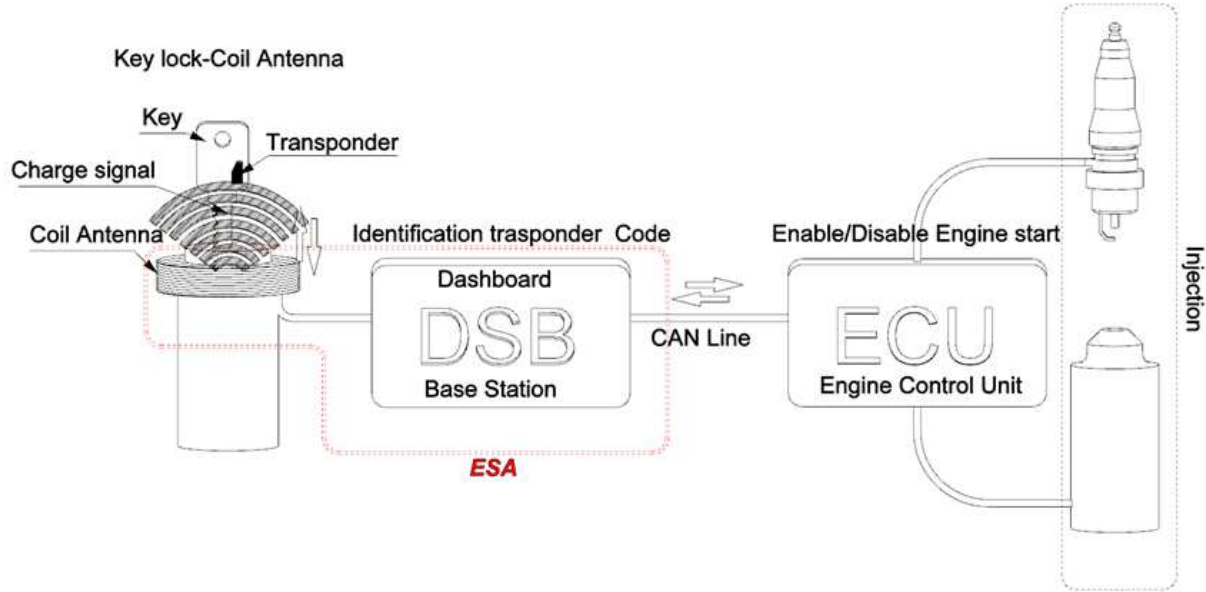
| | |
|---------------|---|
| Product name | Dashboard |
| Model | RTADM001 |
| Model variant | -- |
| Serial number | 4609580003 (Number assigned by Nemko Spa) |

3.4 Technical information

| | |
|--------------------------------------|---|
| Operating band | -- |
| Operating frequency | 134.42 kHz |
| Modulation type | FSK |
| Occupied bandwidth (99 %) | 11.32 kHz |
| Field strength, dB μ V/m @ 10 m | 44.15 dB μ V/m |
| Emission designator | 11K3F1D |
| Spurious emission, dB μ V/m @3 m | 36.6 dB μ V/m (@61.8900 MHz) |
| Power supply requirements | Battery 3.7 V DC and USB 5 V DC |
| Antenna information | EUT is designed so that the end user may replace a broken antenna. (The EUT has a non-standard antenna jack or electrical connector.) |

3.5 Product description and theory of operation

The EUT is a motorcycle dashboard. It is able to drive directly some loads presents on the bike (high & low beam, claxon), and with CAN line it is able to send and receive data from/to other devices joined to the line. The EUT is provided with an immobilizer system working at 134 kHz.



3.6 EUT exercise details

The EUT has been tested forced in continuous transmission mode by a dedicated firmware preinstalled by the manufacturer. Firmware version: 07.03.09

3.7 EUT interface ports

| Description | Qty. |
|---------------------|------|
| DSB cable (34 pins) | 1 |

3.8 Support equipment

| Description | Brand name | Model, Part number, Serial number, Revision level |
|-------------|---------------------------|---|
| Simulator | M.A.E. ELETTRONICA S.R.L. | DSB 1900 |

Section 4. Engineering considerations

4.1 Modifications incorporated in the EUT

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

4.2 Technical judgment

None

4.3 Deviations from laboratory tests procedures

No deviations were made from laboratory procedures.

Section 5. Test conditions

5.1 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.

The following instruments are used to monitor the environmental conditions:

| Equipment | Manufacturer | Model no. | Asset no. | Cal date | Next cal. |
|--------------------------------|--------------|-----------|--------------|----------|-----------|
| Thermo-hygrometer data loggers | Testo | 175-H2 | 20012380/305 | 2020-12 | 2022-12 |
| Thermo-hygrometer data loggers | Testo | 175-H2 | 38203337/703 | 2020-12 | 2022-12 |
| Barometer | Castle | GPB 3300 | 072015 | 2021-04 | 2022-04 |

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

The measurement uncertainty was calculated for each test and quantity listed in this test report, according to CISPR 16-4-2 and other specific test standard and is documented in Nemko Spa working manual WML1002.

The assessment of conformity for each test performed on the equipment is performed not taking into account the measurement uncertainty. The two following possible verdicts are stated in the report:

P (Pass) - The measured values of the equipment respect the specification limit at the points tested. The specific risk of false accept is up to 50% when the measured result is close to the limit.

F (Fail) - One or more measured values of the equipment do not respect the specification limit at the points tested. The specific risk of false reject is up to 50% when the measured result is close to the limit.

Hereafter Nemko's measurement uncertainties are reported:

| EUT | Type | Test | Range | Measurement Uncertainty | Notes |
|--------------------------------------|------------------------------|---|----------------------|-------------------------|-------|
| Transmitter | Conducted | Frequency error | 0.001 MHz ÷ 40 GHz | 0.08 ppm | (1) |
| | | Carrier power RF Output Power | 0.009 MHz ÷ 30 MHz | 1.1 dB | (1) |
| | | | 30 MHz ÷ 18 GHz | 1.5 dB | (1) |
| | | | 18 MHz ÷ 40 GHz | 3.0 dB | (1) |
| | | | 40 MHz ÷ 140 GHz | 5.0 dB | (1) |
| | | Adjacent channel power | 1 MHz ÷ 18 GHz | 1.4 dB | (1) |
| | | Conducted spurious emissions | 0.009 MHz ÷ 18 GHz | 3.0 dB | (1) |
| | | | 18 GHz ÷ 40 GHz | 4.2 dB | (1) |
| | | | 40 GHz ÷ 220 GHz | 6.0 dB | (1) |
| | | Intermodulation attenuation | 1 MHz ÷ 18 GHz | 2.2 dB | (1) |
| | | Attack time – frequency behaviour | 1 MHz ÷ 18 GHz | 2.0 ms | (1) |
| | | Attack time – power behaviour | 1 MHz ÷ 18 GHz | 2.5 ms | (1) |
| | | Release time – frequency behaviour | 1 MHz ÷ 18 GHz | 2.0 ms | (1) |
| | | Release time – power behaviour | 1 MHz ÷ 18 GHz | 2.5 ms | (1) |
| | | Transient behaviour of the transmitter– Transient frequency behaviour | 1 MHz ÷ 18 GHz | 0.2 kHz | (1) |
| | | Transient behaviour of the transmitter – Power level slope | 1 MHz ÷ 18 GHz | 9% | (1) |
| | | Frequency deviation - Maximum permissible frequency deviation | 0.001 MHz ÷ 18 GHz | 1.3% | (1) |
| | | Frequency deviation - Response of the transmitter to modulation frequencies above 3 kHz | 0.001 MHz ÷ 18 GHz | 0.5 dB | (1) |
| | | Dwell time | - | 3% | (1) |
| | Hopping Frequency Separation | 0.01 MHz ÷ 18 GHz | 1% | (1) | |
| | Occupied Channel Bandwidth | 0.01 MHz ÷ 18 GHz | 2% | (1) | |
| | Modulation Bandwidth | 0.01 MHz ÷ 18 GHz | 2% | (1) | |
| | Radiated | Radiated spurious emissions | 0.009 MHz ÷ 26.5 GHz | 6.0 dB | (1) |
| 26.5 GHz ÷ 66 GHz | | | 8.0 dB | (1) | |
| 66 GHz ÷ 220 GHz | | | 10 dB | (1) | |
| Effective radiated power transmitter | | 10 kHz ÷ 26.5 GHz | 6.0 dB | (1) | |
| | | 26.5 GHz ÷ 66 GHz | 8.0 dB | (1) | |
| | | 66 GHz ÷ 220 GHz | 10 dB | (1) | |

NOTES:

(1) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor $k = 2$, which for a normal distribution corresponds to a coverage probability of approximately 95 %

Section 7. Test equipment

7.1 Test equipment list

Table 7.1-1: Equipment list

| Equipment | Manufacturer | Model no. | Asset no. | Cal cycle | Next cal. |
|-----------------------------|-----------------------------|------------------------------|---------------|-----------|-----------|
| EMI receiver | R&S | ESU8 | 100202 | 2021-09 | 2022-09 |
| EMI Receiver | Rohde & Schwarz | ESW44 | 101620 | 2021-08 | 2022-08 |
| Antenna Trilog 25MHz - 8GHz | Schwarzbeck Mess-Elektronik | VULB9162 | 9162-025 | 2021-07 | 2024-07 |
| Antenna 1 - 18 GHz | Schwarzbeck Mess-Elektronik | STLP9148 | STLP 9148-152 | 2021-09 | 2024-09 |
| Broadband Amplifier | Schwarzbeck Mess-Elektronik | BBV9718 | BBV9718-137 | 2021-04 | 2022-04 |
| Antenna Loop Attiva | Teseq | HLA6121+PI6121 | 45749 | 2020-07 | 2023-07 |
| Controller | Maturo | FCU3.0 | 10041 | NCR | NCR |
| Tilt antenna mast | Maturo | TAM4.0-E | 10042 | NCR | NCR |
| Turntable | Maturo | TT4.0-5T | 2.527 | NCR | NCR |
| Semi-anechoic chamber | Nemko S.p.a. | 10m semi-anechoic chamber | 530 | 2021-09 | 2023-09 |
| EMI receiver | R&S | ESU8 | 100202 | 2021-09 | 2022-09 |
| Attenuator | Aeroflex / Weinschel | 2 | CC8577 | 2021-07 | 2022-07 |
| LISN 9 kHz ÷ 30 MHz | R&S | ESH2-Z5 | 881 362/006 | 2021-03 | 2022-03 |
| Shielded room | Siemens | Conducted emission test room | 1862 | NCR | NCR |

Notes: NCR - no calibration required, VOU - verify on use

Section 8. Testing data

8.1 RSS-Gen 6.7 Occupied bandwidth

8.1.1 Definitions and limits

The occupied bandwidth or the “99% emission bandwidth” is defined as the frequency range between two points, one above and the other below the carrier frequency, within which 99% of the total transmitted power of the fundamental transmitted emission is contained. The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs.

The following conditions shall be observed for measuring the occupied bandwidth:

The transmitter shall be operated at its maximum carrier power measured under normal test conditions.

The span of the spectrum analyzer shall be set large enough to capture all products of the modulation process, including the emission skirts, around the carrier frequency, but small enough to avoid having other emissions (e.g. on adjacent channels) within the span.

The detector of the spectrum analyzer shall be set to “Sample”. However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or “Max Hold”) may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.

The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

Note: It may be necessary to repeat the measurement a few times until the RBW and VBW are in compliance with the above requirement.

For the 99% emission bandwidth, the trace data points are recovered and directly summed in linear power level terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached, and that frequency recorded. The process is repeated for the highest frequency data points (starting at the highest frequency, at the right side of the span, and going down in frequency). This frequency is then recorded. The difference between the two recorded frequencies is the occupied bandwidth (or the 99% emission bandwidth).

8.1.2 Test summary

| | | | |
|-----------|-------------|-----------|----------------|
| Verdict | Pass | | |
| Tested by | P. Barbieri | Test date | March 10, 2022 |

8.1.3 Observations, settings and special notes

Spectrum analyser settings:

| | |
|-----------------------|---------------------------------|
| Resolution bandwidth: | 1% to 5% of the actual occupied |
| Video bandwidth: | $\geq 3 \times \text{RBW}$ |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

8.1.4 Test equipment used

| Equipment | Manufacturer | Model no. | Asset no. |
|-----------------------------------|--------------|---------------------------|-----------|
| EMI receiver | R&S | ESU8 | 100202 |
| Antenna Loop Attiva+Power Inseter | Teseq | HLA6121+PI6121 | 45749 |
| Controller | Maturo | FCU3.0 | 10041 |
| Tilt antenna mast | Maturo | TAM4.0-E | 10042 |
| Turntable | Maturo | TT4.0-5T | 2.527 |
| Semi-anechoic chamber | Nemko S.p.a. | 10m semi-anechoic chamber | 530 |

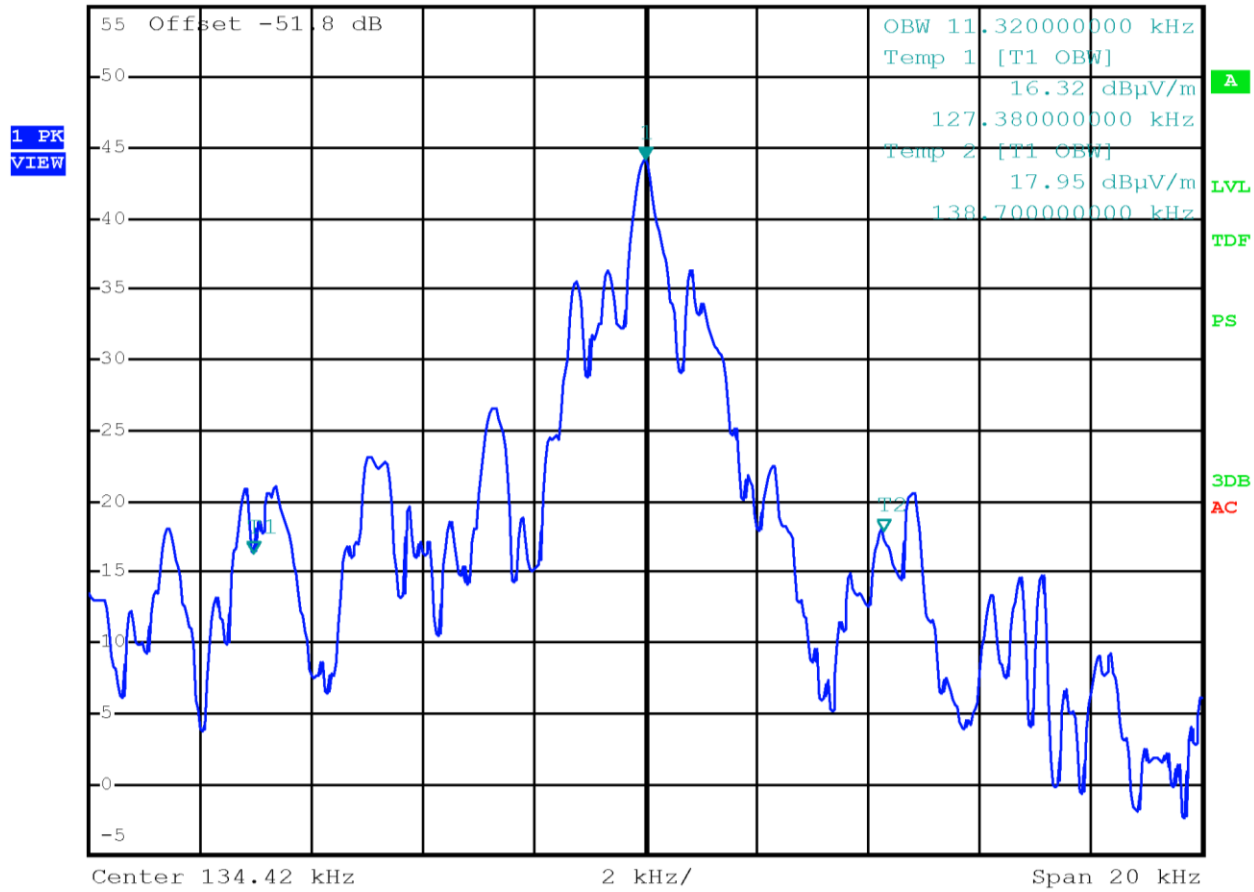
8.1.5 Test data

Table 8.1-1: 99 % bandwidth results

| Modulation | 99 % bandwidth |
|------------|----------------|
| FSK | 11.3 kHz |



* RBW 300 Hz Marker 1 [T1]
 * VBW 1 kHz 44.15 dBμV/m
 Ref 55 dBμV/m * Att 15 dB SWT 225 ms 134.420000000 kHz



8.2 FCC 15.209(a) and RSS-210, Radiated emissions limits

8.2.1 Definitions and limits

FCC:

- (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the Table 8.2-1 below.
- (c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other sections within this part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
- (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

IC:

Unless otherwise indicated, equipment for which emissions fall within the restricted frequency bands listed in RSS-Gen shall comply with the provisions set forth in RSS-Gen.

RSS-Gen includes the general field strength limits of unwanted emissions, where applicable, for transmitters and receivers operating in accordance with the provisions specified in this standard.

Unless otherwise indicated, unwanted emissions of transmitters and receivers are permitted to fall within the restricted frequency bands listed in RSS-Gen and the TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-602 MHz; however, fundamental emissions are prohibited in these bands, except where equipment operation is permitted in the applicable RSS.

Transmitters whose wanted and unwanted emissions fall within the general field strength limits specified in RSS-Gen may operate licence-exempt in any of the frequency bands, other than the restricted frequency bands listed in RSS-Gen and the TV bands 54-72 MHz, 76-88 MHz, 174-216 MHz and 470-602 MHz, and shall be certified under RSS-210. Under no circumstances shall the level of any unwanted emissions exceed the level of the fundamental emissions

Devices operating below 490 kHz for which all emissions are at least 40 dB below the general field strength limit listed in RSS-Gen (for transmitters at frequencies below 30 MHz) are Category II devices and are subject to the requirements specified in RSS-310, Licence-Exempt Radio Apparatus: Category II Equipment.

Table 8.2-1: 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.

8.2.1 Definitions and limits, continued

Table 8.2-2: IC restricted frequency bands

| MHz | MHz | MHz | GHz |
|-----------------|---------------------|---------------|-------------|
| 0.090–0.110 | 12.51975–12.52025 | 399.9–410 | 5.35–5.46 |
| 2.1735–2.1905 | 12.57675–12.57725 | 608–614 | 7.25–7.75 |
| 3.020–3.026 | 13.36–13.41 | 960–1427 | 8.025–8.5 |
| 4.125–4.128 | 16.42–16.423 | 1435–1626.5 | 9.0–9.2 |
| 4.17725–4.17775 | 16.69475–16.69525 | 1645.5–1646.5 | 9.3–9.5 |
| 4.20725–4.20775 | 16.80425–16.80475 | 1660–1710 | 10.6–12.7 |
| 5.677–5.683 | 25.5–25.67 | 1718.8–1722.2 | 13.25–13.4 |
| 6.215–6.218 | 37.5–38.25 | 2200–2300 | 14.47–14.5 |
| 6.26775–6.26825 | 73–74.6 | 2310–2390 | 15.35–16.2 |
| 6.31175–6.31225 | 74.8–75.2 | 2655–2900 | 17.7–21.4 |
| 8.291–8.294 | 108–138 | 3260–3267 | 22.01–23.12 |
| 8.362–8.366 | 156.52475–156.52525 | 3332–3339 | 23.6–24.0 |
| 8.37625–8.38675 | 156.7–156.9 | 3345.8–3358 | 31.2–31.8 |
| 8.41425–8.41475 | 240–285 | 3500–4400 | 36.43–36.5 |
| 12.29–12.293 | 322–335.4 | 4500–5150 | Above 38.6 |

Note: Certain frequency bands listed in Table 8.2-2 and above 38.6 GHz are designated for low-power licence-exempt applications. These frequency bands and the requirements that apply to the devices are set out in this Standard

8.2.2 Definitions and limits, continued

Table 8.2-3: 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 | | | |

8.2.3 Test summary

| | | | |
|-----------|-------------|-----------|---------------|
| Verdict | Pass | | |
| Tested by | P. Barbieri | Test date | March 8, 2022 |

8.2.4 Observations, settings and special notes

The spectrum was searched from 30 MHz to the 10th harmonic.
 EUT was set to receiving mode.
 Radiated measurements were performed at a distance of 10 m and 3 m.

Spectrum analyser settings for radiated measurements within restricted bands below 1 GHz:

| | |
|-----------------------|----------|
| Resolution bandwidth: | 100 kHz |
| Video bandwidth: | 300 kHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

Spectrum analyser settings for peak radiated measurements within restricted bands above 1 GHz:

| | |
|-----------------------|----------|
| Resolution bandwidth: | 1 MHz |
| Video bandwidth: | 3 MHz |
| Detector mode: | Peak |
| Trace mode: | Max Hold |

8.2.5 Test equipment used

| Equipment | Manufacturer | Model no. | Asset no. |
|-----------------------------------|-----------------------------|---------------------------|---------------|
| EMI Receiver | Rohde & Schwarz | ESW44 | 101620 |
| Antenna Loop Attiva+Power Inseter | Teseq | HLA6121+PI6121 | 45749 |
| Antenna Trilog 25MHz - 8GHz | Schwarzbeck Mess-Elektronik | VULB9162 | 9162-025 |
| Antenna 1 - 18 GHz | Schwarzbeck Mess-Elektronik | STLP9148 | STLP 9148-152 |
| Broadband Amplifier | Schwarzbeck Mess-Elektronik | BBV9718 | BBV9718-137 |
| Controller | Maturo | FCU3.0 | 10041 |
| Tilt antenna mast | Maturo | TAM4.0-E | 10042 |
| Turntable | Maturo | TT4.0-5T | 2.527 |
| Semi-anechoic chamber | Nemko S.p.a. | 10m semi-anechoic chamber | 530 |

8.2.6 Test data

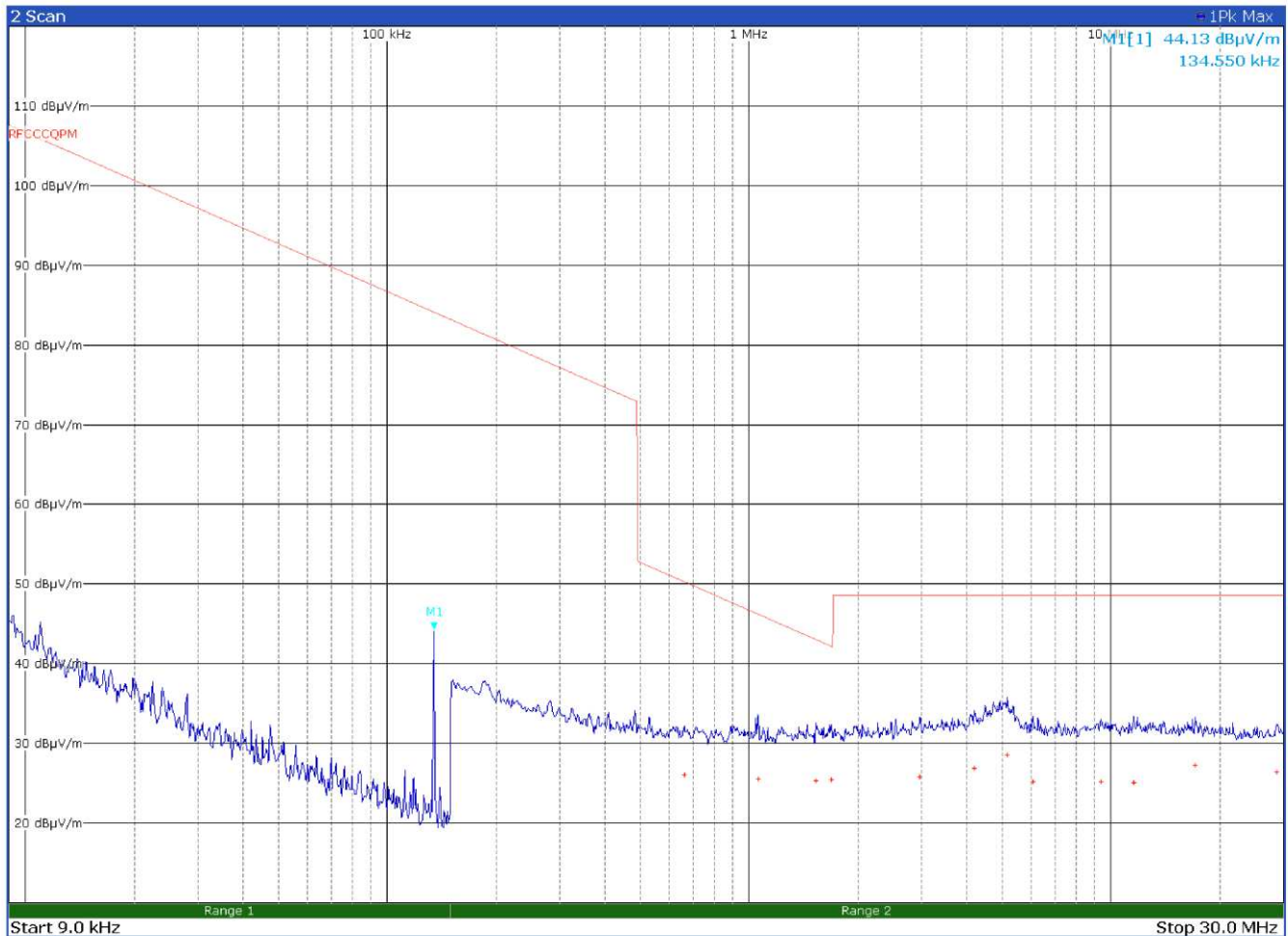


Figure 8.2-1: Radiated emissions with antenna loop

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| 0.1345 | 44.1 | CARRIER | | |
| 0.6630 | 26.1 | 50.3 | -24.2 | QP |
| 1.0590 | 25.6 | 46.2 | -20.6 | QP |
| 1.5315 | 25.4 | 43.0 | -17.6 | QP |
| 1.6868 | 25.5 | 42.2 | -16.7 | QP |
| 2.9715 | 25.8 | 48.6 | -22.8 | QP |
| 4.1888 | 27.0 | 48.6 | -21.6 | QP |
| 5.1720 | 28.6 | 48.6 | -20.0 | QP |
| 9.3795 | 25.3 | 48.6 | -23.3 | QP |
| 11.5733 | 25.1 | 48.6 | -23.5 | QP |
| 17.0858 | 27.3 | 48.6 | -21.3 | QP |
| 28.7880 | 26.5 | 48.6 | -22.1 | QP |

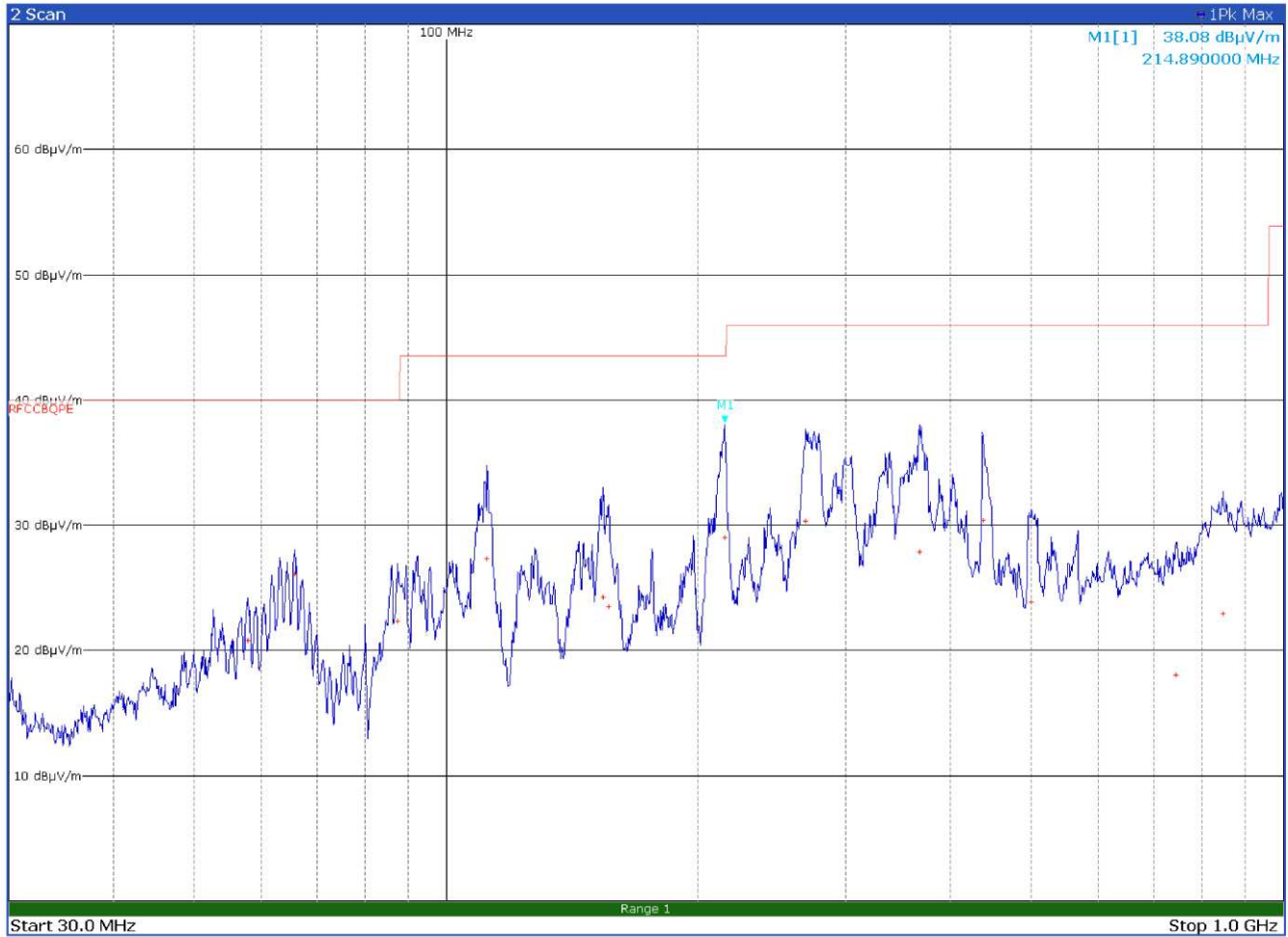


Figure 8.2-2: Radiated emissions with antenna in horizontal polarization

| Frequency (MHz) | Level (dBµV/m) | Limit (dBµV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| 57.8700 | 20.9 | 40.0 | -19.1 | QP |
| 65.9100 | 26.2 | 40.0 | -13.8 | QP |
| 87.4200 | 22.4 | 40.0 | -17.6 | QP |
| 111.8100 | 27.4 | 43.5 | -16.1 | QP |
| 153.9300 | 24.3 | 43.5 | -19.2 | QP |
| 156.3000 | 23.6 | 43.5 | -19.9 | QP |
| 214.8900 | 29.0 | 43.5 | -14.5 | QP |
| 268.6200 | 30.4 | 46.0 | -15.6 | QP |
| 367.3800 | 27.9 | 46.0 | -18.1 | QP |
| 437.0400 | 30.4 | 46.0 | -15.6 | QP |
| 499.9200 | 23.9 | 46.0 | -22.1 | QP |
| 743.3700 | 18.1 | 46.0 | -27.9 | QP |
| 847.0500 | 23.0 | 46.0 | -23.0 | QP |

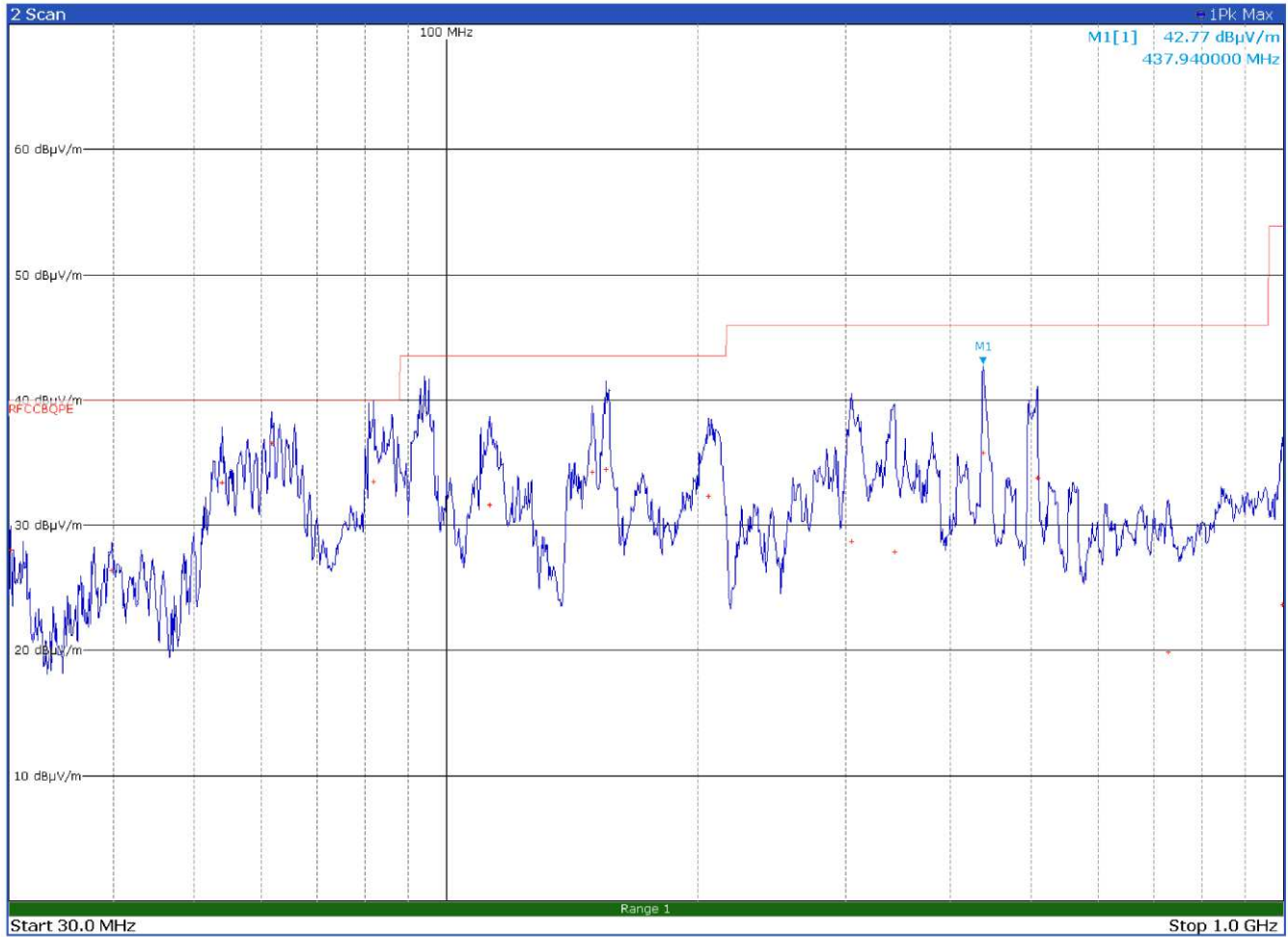


Figure 8.2-3: Radiated emissions with antenna in vertical polarization

| Frequency (MHz) | Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Detector |
|-----------------|----------------|----------------|-------------|----------|
| 30.1500 | 28.0 | 40.0 | -12.0 | QP |
| 39.8400 | 26.4 | 40.0 | -13.6 | QP |
| 53.9400 | 33.4 | 40.0 | -6.6 | QP |
| 61.8900 | 36.6 | 40.0 | -3.4 | QP |
| 81.8400 | 33.5 | 40.0 | -6.5 | QP |
| 112.5900 | 31.7 | 43.5 | -11.8 | QP |
| 149.2800 | 34.3 | 43.5 | -9.2 | QP |
| 155.1000 | 34.5 | 43.5 | -9.0 | QP |
| 205.7100 | 32.4 | 43.5 | -11.1 | QP |
| 304.6200 | 28.7 | 46.0 | -17.3 | QP |
| 342.8700 | 27.9 | 46.0 | -18.1 | QP |
| 437.9400 | 35.8 | 46.0 | -10.2 | QP |
| 508.2300 | 33.8 | 46.0 | -12.2 | QP |
| 727.5000 | 19.9 | 46.0 | -26.1 | QP |
| 996.3600 | 23.7 | 53.9 | -30.2 | QP |

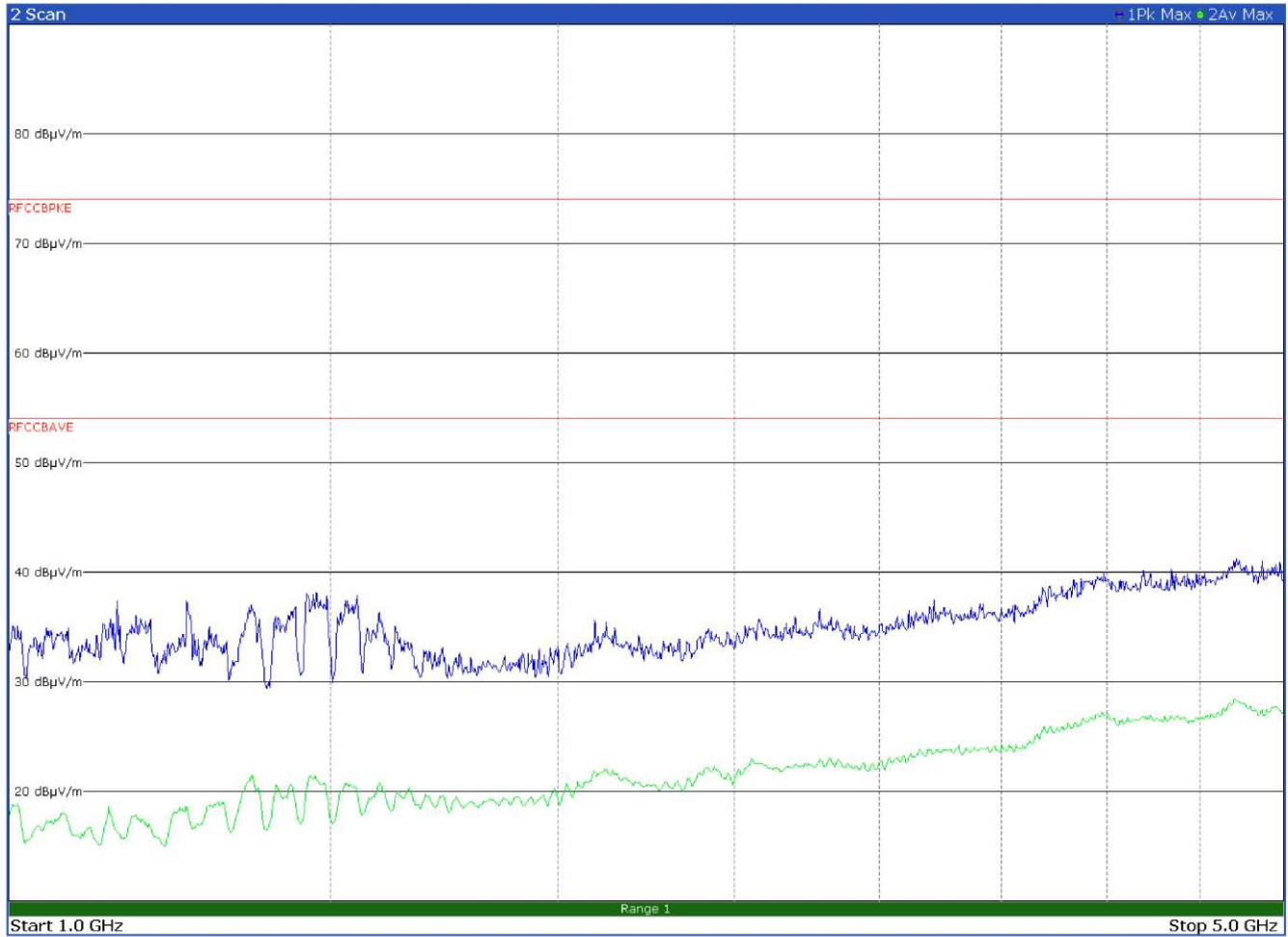


Figure 8.2-4: Radiated emissions with antenna in horizontal polarization

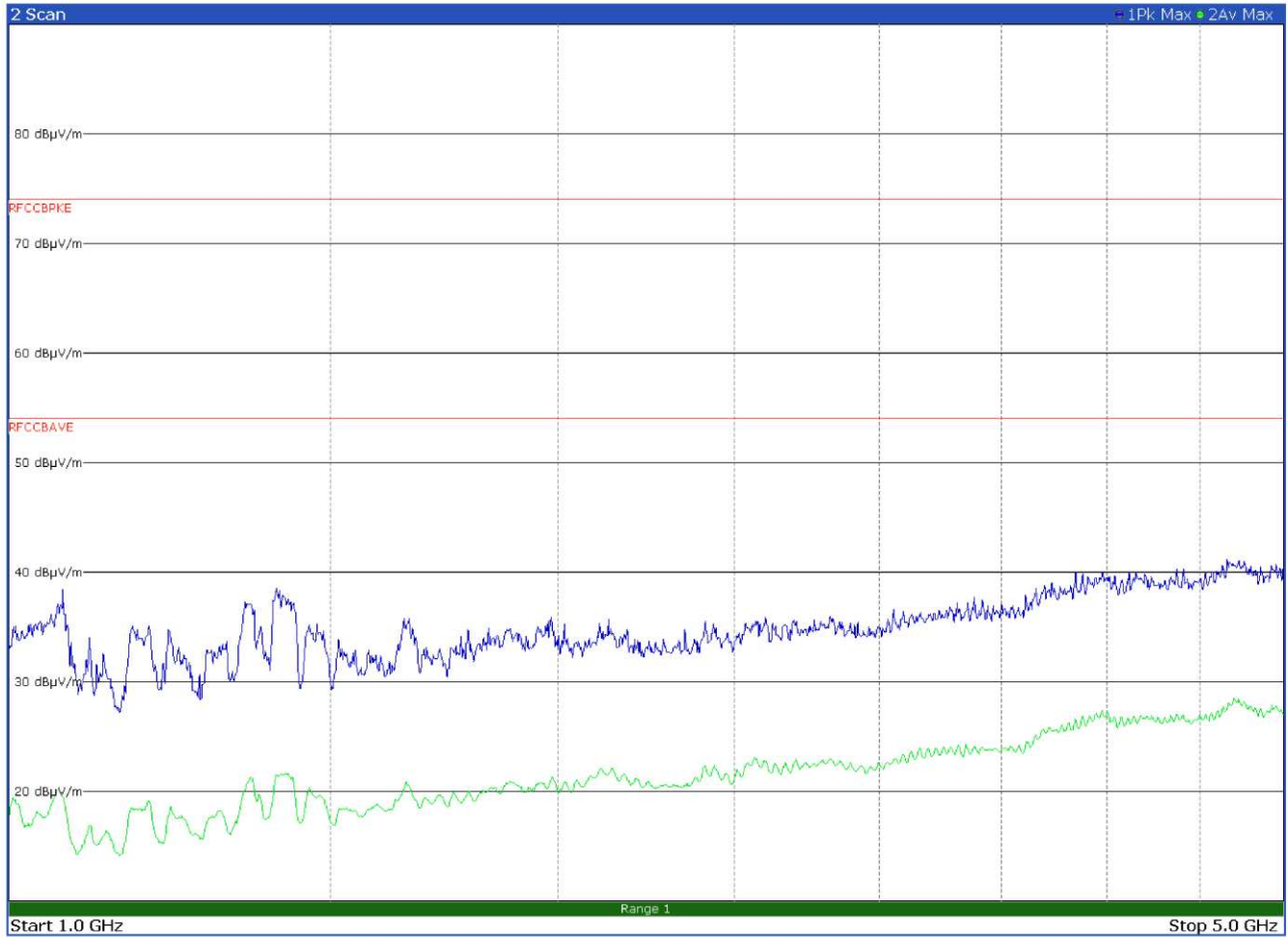
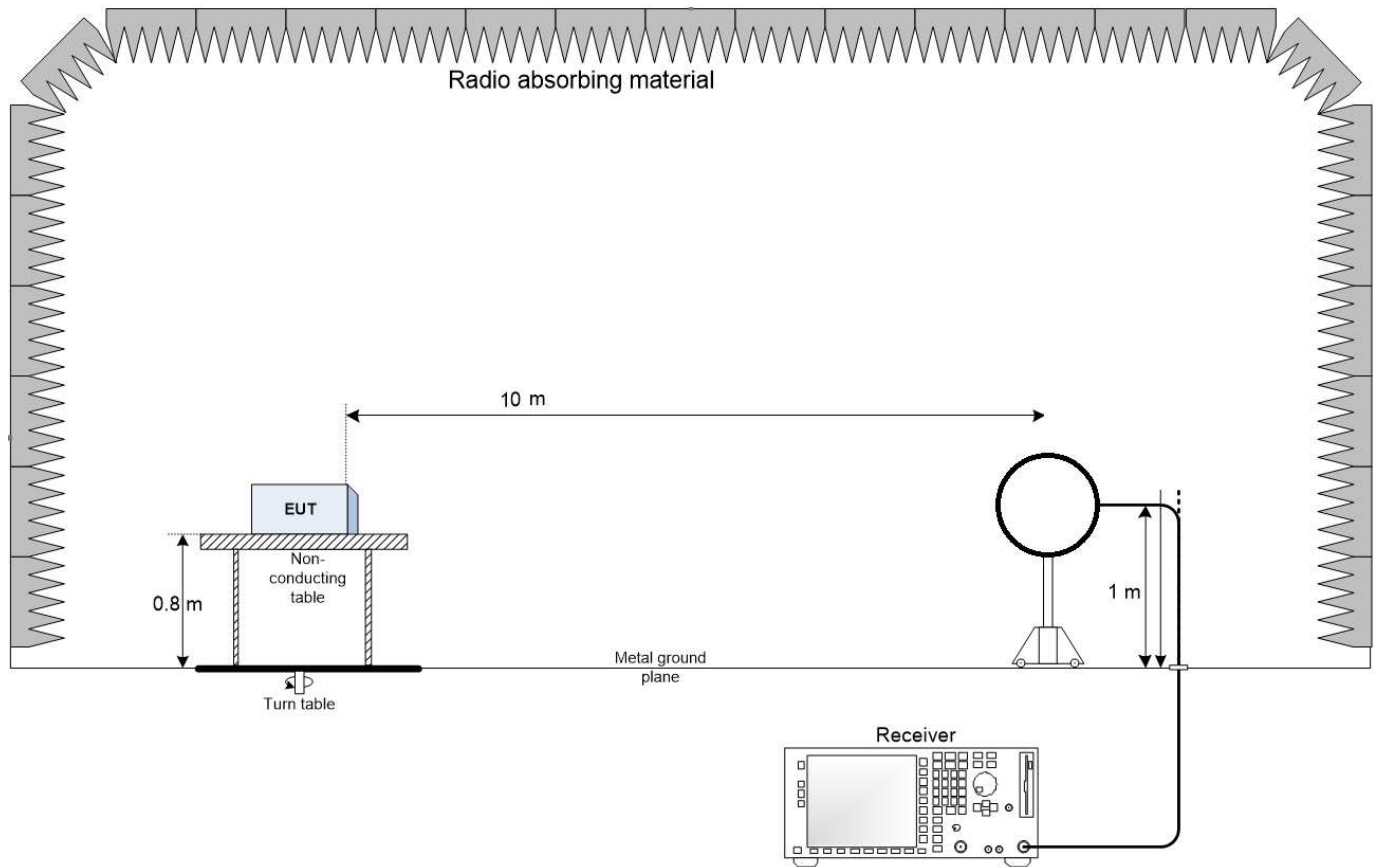


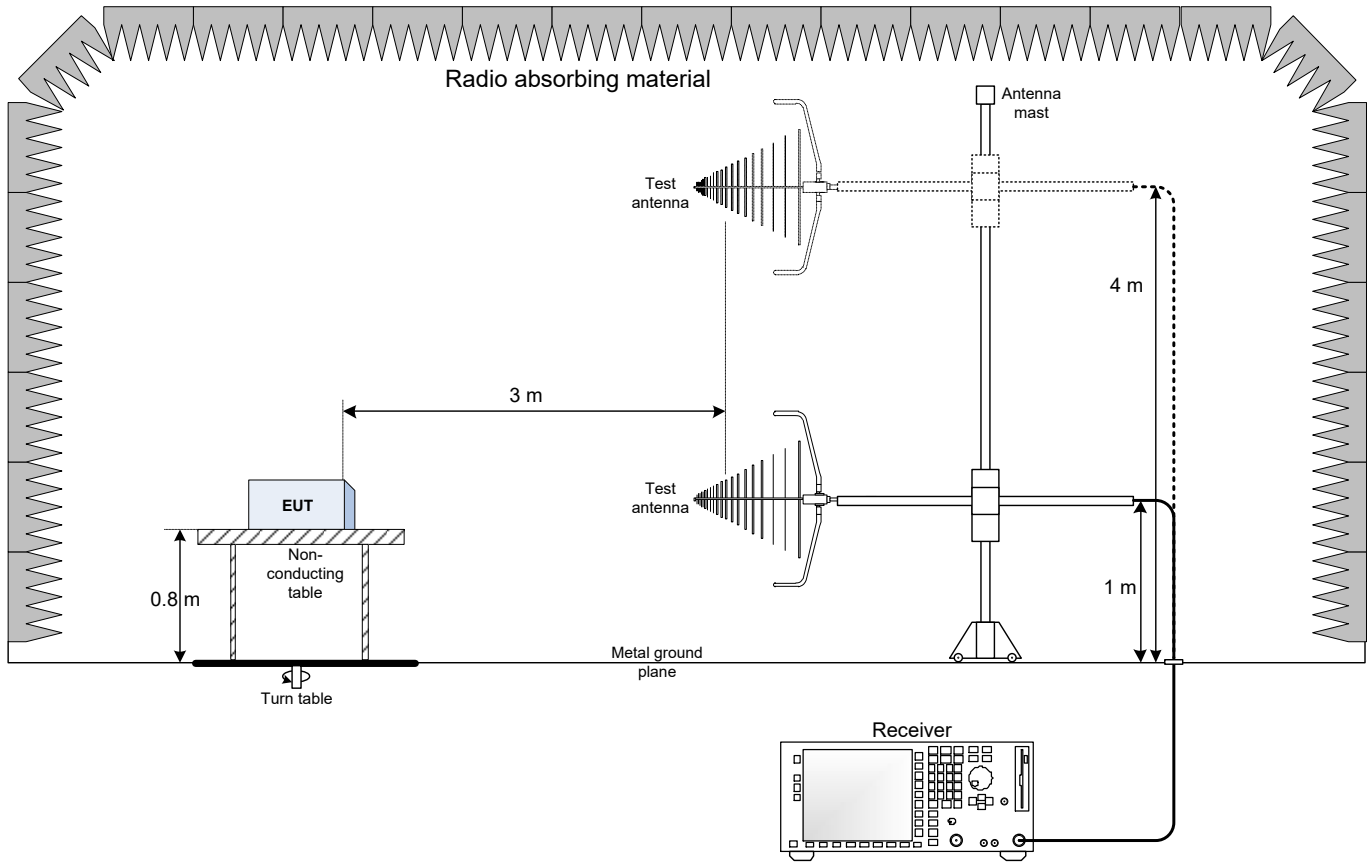
Figure 8.2-5: Radiated emissions with antenna in vertical polarization

Section 9. Block diagrams of test set-ups and EUT photos

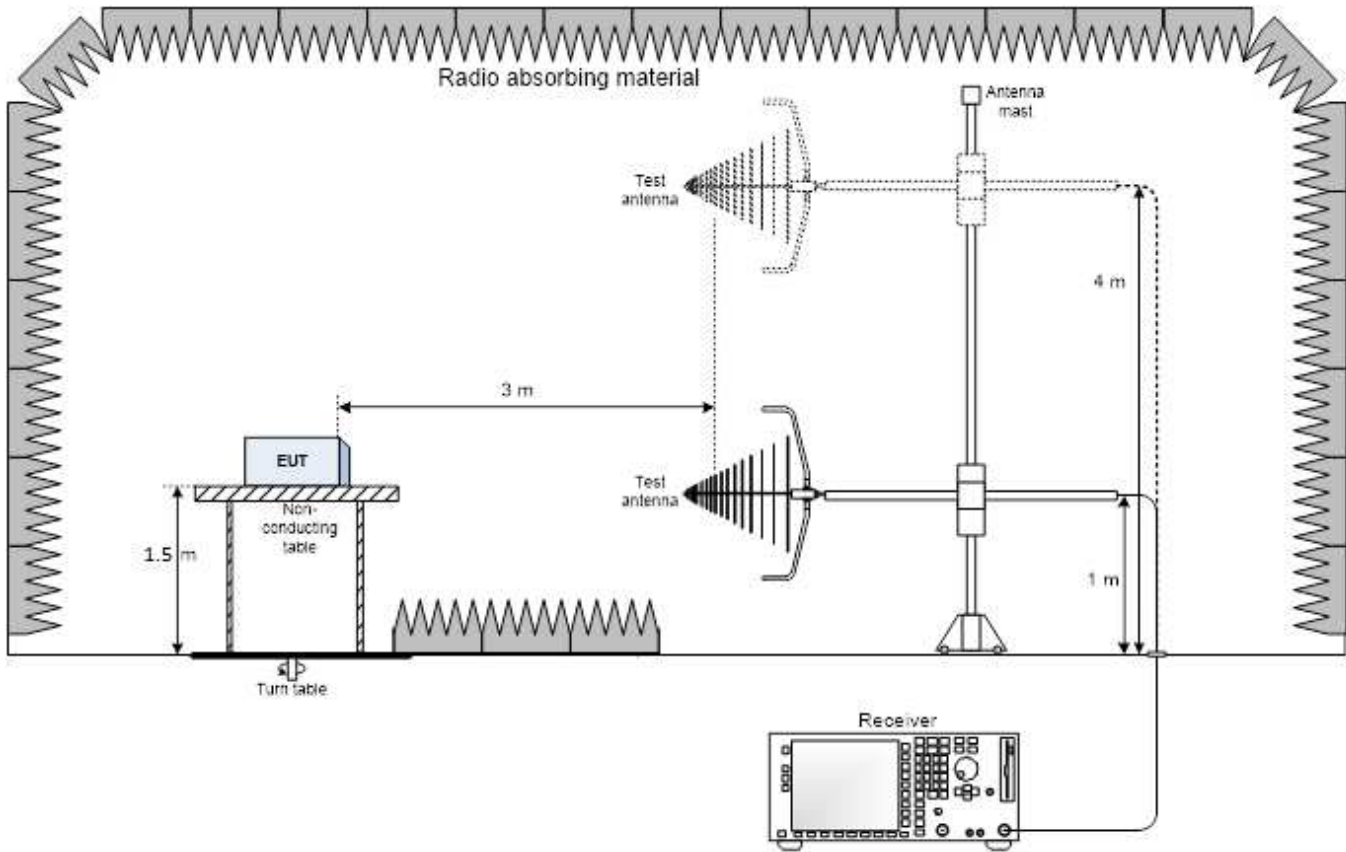
9.1 Radiated emissions set-up below 30 MHz



9.2 Radiated emissions set-up above 30 MHz and below 1 GHz



9.3 Radiated emissions set-up above 1 GHz



9.4 Set-up photos

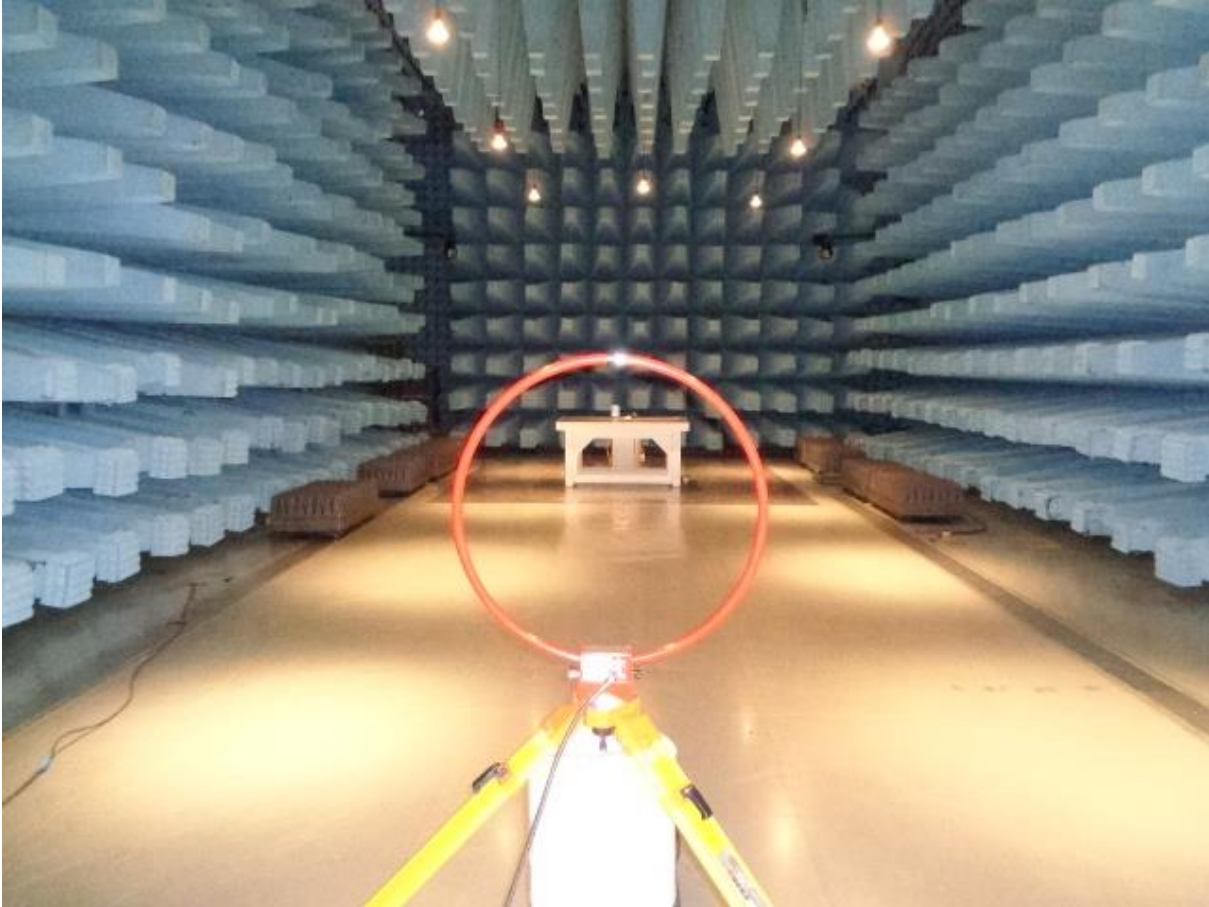


Figure 9.4-1: Radiated emissions set-up for frequencies below 30 MHz

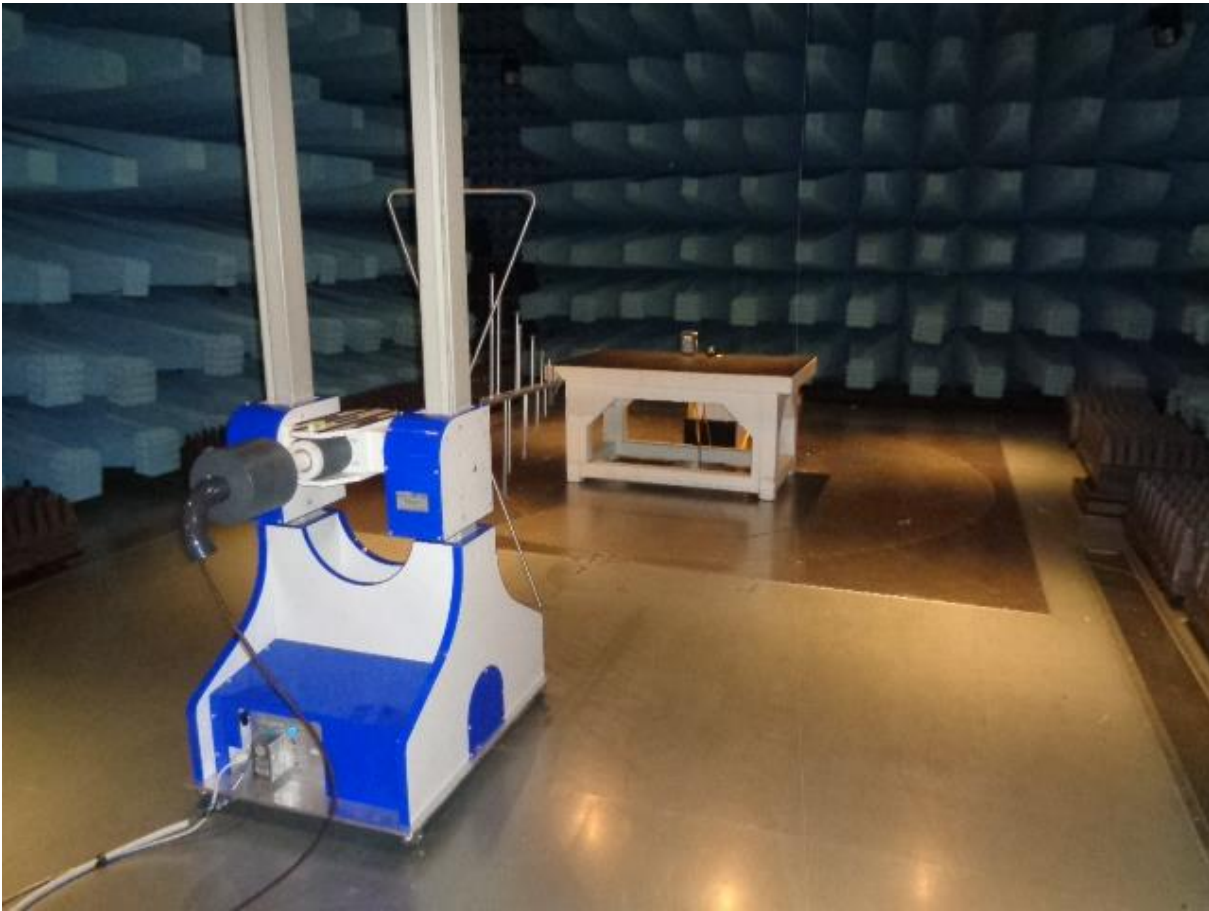


Figure 9.4-2: Radiated emissions set-up for frequencies above 30 MHz

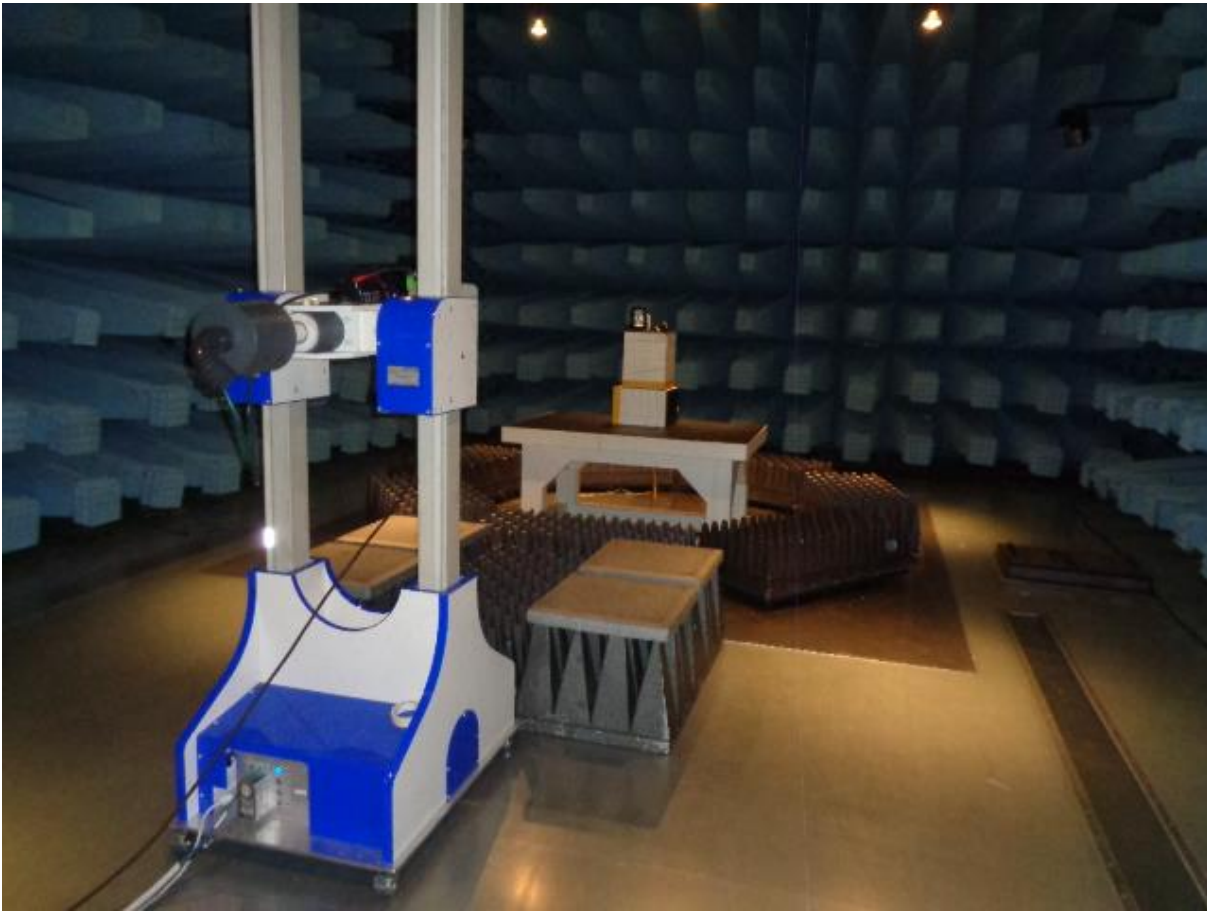


Figure 9.4-3: Radiated emissions set-up for frequencies above 1000 MHz

9.5 External photos



Figure 9.5-1: Front view photo



Figure 9.5-2: Rear view photo



Figure 9.5-3: Antenna photo

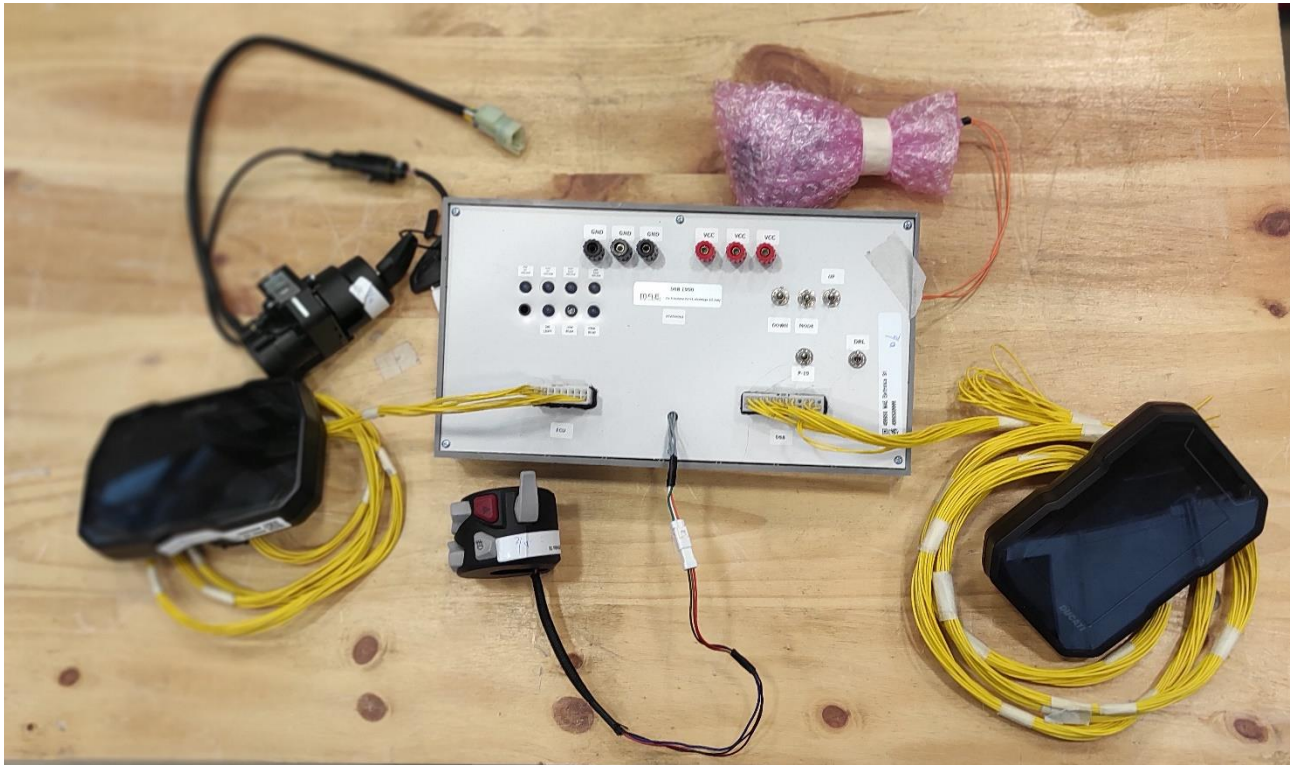


Figure 9.5-4: Simulator photo

End of the test report