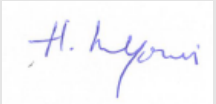
# Test Report

# 23-1-0014801T035a-C1

| | | | |
|---|---|---|---|
| **Number of pages:** | 19 | **Date of Report:** | 2025-Apr-11 |
| **Testing company:** | cetecom advanced GmbH<br>Untertuerkheimer Str. 6-10<br>66117 Saarbruecken<br>GERMANY | **Applicant:** | VALEO Telematik und Akustik GmbH |
| **Product:** | **Remote Keyless Entry Transceiver & GNSS antenna** | | |
| **Model:** | **ARTEMIS-NAR-01** | | |
| **FCC ID:** | QWY-ARTEMIS-NAR01 | **IC:** | 6588A-ARTEMISNAR1 |
| **Testing has been carried out in accordance with:** | **FCC Regulations**<br>**Title 47 CFR, Chapter I, Subchapter A, Part 15**<br>**Subpart B Unintentional Radiators**<br>§ 15.107 Conducted limits<br>§ 15.109 Radiated emission limits<br><br>**ISED-Regulations**<br>**Radio Standards Specification**<br>**RSS-Gen, Issue 5**<br>General Requirements for Compliance of Radio Apparatus<br>**ICES-003, Issue 7**<br>Information Technology Equipment (including Digital Apparatus) | | |
| **Tested Technology:** | | | |
| **Test Results:** | **☒ The EUT complies with the requirements in respect of all parameters subject to the test.**<br>The test results relate only to devices specified in this document<br>The current version of Test Report TR23-1-0014801T035-C1 replaces the test report TR23-1-0014801T035 dated 2024-Jun-27. The replaced test report is herewith invalid. | | |
| **Signatures:** |  |  | |
| | Wolfgang Markus<br>Lab Manager<br>Authorization of test report | | Hicham Laayouni<br>Testing Manager<br>Responsible of test report |

# Table of Contents

| Table of Annex | | | |
|---|---|---|---|
| **Annex No.** | **Contents** | **Reference Description** | **Total Pages** |
| **Annex 1** | Test result diagrams | **TR23-1-0014801T035a-A1-C1** | 4 |
| **Annex 2** | Internal photographs of EUT | **Not applicable** | -- |
| **Annex 3** | External photographs of EUT | **TR23-1-0014801T035a-A3-C1** | 4 |
| **Annex 4** | Test set-up photographs | **TR23-1-0014801T035a-A4-C1** | 3 |
| The listed attachments are separate documents. | | | |

# 1 General information

## 1.1 Disclaimer and Notes

The test results of this test report relate exclusively to the test item specified in this test report as specified in chapter 2.7. cetecom advanced does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.
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Also we refer on special conditions which the applicant should fulfill according §2.927 to §2.948, special focus regarding modification of the equipment and availability of sample equipment for market surveillance tests.

## 1.2 Attestation

I declare that all measurements were performed by me or under my supervision and that all measurements have been performed and are correct to my best knowledge and belief to Industry Canada standards. All of the above requirements are met in accordance with enumerated standards.

## 1.3 Summary of Test Results

| Test case | Reference in FCC ☒ | Reference in ISED ☒ | Reference in RSS-GEN ☒ | Page | Remark | Result |
|---|---|---|---|---|---|---|
| AC-Power Lines Conducted Emissions | §15.107 | ICES-003, Issue 7 | RSS Gen, Issue 5, Chapter 8.8 | -- | -- | -- |
| Radiated field strength emissions 30 MHz – 1 GHz | §15.109<br>§15.33<br>§15.35 | ICES-003, Issue 7 | RSS-Gen., Issue 5 Chapter 8.9, Chapter 7.3 | 9 | -- | PASS |
| Radiated field strength emissions above 1 GHz | §15.109<br>§15.33<br>§15.35 | ICES-003, Issue 7 | RSS-Gen., Issue 5 Chapter 8.9, Chapter 7.3 | 12 | -- | PASS |

| | |
|---|---|
| PASSED | The EUT complies with the essential requirements in the standard. |
| FAILED | The EUT does not comply with the essential requirements in the standard. |
| N/A | Test case does not apply to the test object. |
| NP | The test was not performed by the cetecom advanced laboratory. |

Decision Rule: cetecom advanced GmbH follows ILAC G8:2019 chapter 4.2.1 (Simple Acceptance Rule).

## 1.4 Summary of Test Methods

| Test case | Test method |
|---|---|
| AC-Power Lines Conducted Emissions | ANSI C63.4-2014 chapter 7 |
| Radiated field strength emissions 30 MHz – 1 GHz | ANSI C63.4-2014 chapter 8.2.3 |
| Radiated field strength emissions above 1 GHz | ANSI C63.4-2014 chapter 8.3 |

# 2 Administrative Data

## 2.1 Identification of the Testing Laboratory

| | |
|---|---|
| Company name: | cetecom advanced GmbH |
| Address: | Untertuerkheimer Str. 6-10<br>66117 Saarbruecken<br>Germany |
| Responsible for testing laboratory: | Niels Jeß |
| Accreditation scope: | **DAkkS Webpage: FCC ISED** |
| IC Lab company No. / CAB ID: | 3462D / DE0001 |
| Test location 1: | Im Teelbruch 116; 45219 Essen |
| Test location 2: | -- |

## 2.2 General limits for environmental conditions

| | |
|---|---|
| Temperature: | 22±2 °C |
| Relative. humidity: | 45±15 % rH |

## 2.3 Test Laboratories sub-contracted

| | |
|---|---|
| Company name: | -- |

## 2.4 Organizational Items

| | |
|---|---|
| Responsible test manager: | Hicham Laayouni |
| Receipt of EUT: | 2023-Oct-31 |
| Date(s) of test: | 2024-Jan-22 to 2024-Jan-25 |
| Version of template: | 23.0401 |

## 2.5 Applicant's details

| | |
|---|---|
| Applicant's name: | VALEO Telematik und Akustik GmbH |
| Address: | Max-Planck-Str. 28-32<br>61381 Friedrichsdorf<br>Hesse<br>Germany |
| Contact Person: | Martin Fleckenstein |
| Contact Person's Email: | martin.fleckenstein@valeo.com |

## 2.6 Manufacturer's details

| | |
|---|---|
| Manufacturer's name: | VALEO Telematik und Akustik GmbH |
| Address: | Max-Planck-Str. 28-32<br>61381 Friedrichsdorf<br>Deutschland |

## 2.7 Equipment under Test (EUT)

| EUT No.*) | Sample No. | Product | Model | Type | SN | HW | SW |
|---|---|---|---|---|---|---|---|
| EUT 1 | 23-1-00148S109_C01 | Antenna and Remote Telematics Integrated System | ARTEMIS-NAR-01 | - | P88000002898 | D4 | E20 R550 |

*) EUT short description is used to simplify the identification of the EUT in this test report.

## 2.8 Untested Variant (VAR)

| VAR No.*) | Sample No. | Product | Model | Type | SN | HW | SW |
|---|---|---|---|---|---|---|---|

*) The listed additional untested model variant(s) (VAR) is/are not object of evaluation of compliance. For further information please see Annex 5: Declaration of applicant of model differences.
If the table above does not show any other line than the headline, no untested variants are available.

## 2.9 Auxiliary Equipment (AE)

| AE No.*) | Sample No. | Auxiliary Equipment | Model | SN | HW | SW |
|---|---|---|---|---|---|---|
| AE 1 | 23-1-00148S11_C01 | Metal Ground Plate | N/A | N/A | N/A | N/A |
| AE 2 | 23-1-00148S12_C01 | Laptop | ThinkPad | IDB00004567 | N/A | N/A |
| AE 3 | 23-1-00148S125_C01 | EMC Load Box | N/A | N/A | N/A | N/A |

*) AE short description is used to simplify the identification of the auxiliary equipment in this test report. If the table above does not show any other line than the headline, no AE was used during testing nor was taken into account for evaluation

## 2.10 Connected cables (CAB)

| CAB No.*) | Sample No. | Cable Type | Connectors / Details | Length |
|---|---|---|---|---|
| CAB 1 | 23-1-00148S18_C01 | Inverter PCB | | cm |

*) CAB short description is used to simplify the identification of the connected cables in this test report. If the table above does not show any other line than the headline, no cable was used during testing nor was taken into account for evaluation

## 2.11 Software (SW)

| SW No.*) | Sample No. | SW Name | Description | SW Status |
|---|---|---|---|---|

*) SW short description is used to simplify the identification of the used software in this test report. If the table above does not show any other line than the headline, no SW was used during testing nor was taken into account for evaluation.

## 2.12 EUT set-ups

| set-up no.*) | Combination of EUT and AE | Description |
|---|---|---|
| 1 | EUT 1 + AE 2 + AE 3 + CAB 1 | Used for all measurements |

*) EUT set-up no. is used to simplify the identification of the EUT set-up in this test report.

## 2.13 EUT operation modes

| EUT operating mode no.*) | Operating modes | Additional information |
|---|---|---|
| 1 | UMTS, LTE and 5G in IDLE mode and RKE aktive | EUT 1 is in cellular IDLE mode and the RKE was active during the measurements. |
| 2 | Ping Mode | Ping test on 2 LAN ports during the tests |

*) EUT operating mode no. is used to simplify the test report.

# 3 Equipment under test (EUT)

## 3.1 General Data of Main EUT as Declared by Applicant

| | | |
|---|---|---|
| **Firmware** | ☒ for normal use | ☐ Special version for test execution |
| **Power supply** | ☐ AC Mains | - |
| | ☒ DC Mains | 12 V DC |
| | ☐ Battery | - |
| **Operational conditions** | $T_{nom}$ = +21 °C | Value assumed, if not specified different by the manufacturer |
| **EUT sample type** | Engineering Samples | |
| **Weight** | 0.86 kg | |
| **Size [LxWxH]** | 61.0 cm x 11.0 cm x 4.5 cm | |
| **Interfaces/Ports** | 2 LAN ports | |
| **For further details refer Applicants Declaration & following technical documents** | | |

## 3.2 Modifications on Test sample

| | |
|---|---|
| Additions/deviations or exclusions | -- |

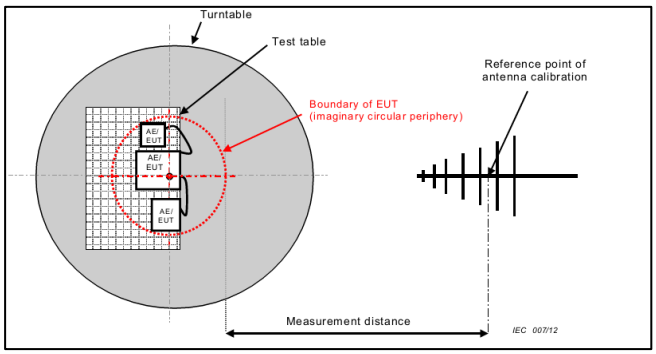
# 4 Measurements

## 4.1 Radiated field strength emissions 30 MHz – 1 GHz

### 4.1.1 Description of the general test setup and methodology, see below example:

Test site: Measurements between 30 MHz and 1 GHz are performed in the NSA compliant Semi Anechoic Chamber (SAC) according to EMC basic standard. The test site is compliant to CISPR 16-1-4:2019 chap. 5.3 and ANSI C63.4:2014 chap. 5.4.2 to 5.4.4.

**Schematic below 1 GHz:**




**Testing method below 1 GHz:**

Step 1:
Pre-measurement, variation of turntable positions: The EUT is set in the worst case operating mode determined. The tests are also carried out as a pre-measurement with peak detector (PK), repetitive scan and max-hold mode. Azimuth step of turntable = 90°, antenna heights = 1.0 m & 1.82 m, both polarisations (H/V). If the mounting/usual operating position is defined, the under and the top side of the EUT/test set-up will not be measured. The results are documented in a diagram. The peak values shown in this graphic are not finally maximized. Peak values closer than 6 dB to the limit line are displayed explicitly in a table. If no critical frequencies are found (margin to limit >6 dB) the final measurement will be omitted.

Step 2:
Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc. either on 10 m OATS or 5 m or 3 m semi-anechoic room.
Final measurement: For the critical frequencies a maximum search is done with PK and CISPR QP detectors: First a frequency zoom within +/- 1.2 MHz (= 10*IF-BW) of the critical frequencies, then the EUT/test set-up is rotated continuously (if applicable, the EUT orientation will be changed to measure the under and the top side) and the antenna height changed between 1 m & 4 m in order to find the worst case position. The final measurement with the QP detector is carried out in this position and the values are stored in the final result table, which can be found after the diagram.

**Formula:**

$E_C = E_R + AF + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

AF = Antenna factor
$C_L$ = Cable loss
$D_F$ = Distance correction factor (if used)
$E_C$ = Electrical field – corrected value
$E_R$ = Receiver reading
$G_A$ = Gain of pre-amplifier (if used)
$L_T$ = Limit
M = Margin

All units are dB-units, positive margin means value is below limit.

### 4.1.2 Test receiver settings

| Detector | Peak | Quasi peak |
|---|---|---|
| Min. attenuation | 0 dB | 0 dB |
| Resolution bandwidth | 120 kHz | 120 kHz |
| Dector Meas-time | 10 ms | 1 s |
| Step size | 40 kHz | Selected frequencies |
| Preamp | Off | Off |

### 4.1.3 Measurement Protocol(s)

| | |
|---|---|
| **Measurement No.** | P1M1 |
| **Environmental conditions** | Temperature: 20.0 °C<br>Humidity: 42.0 % rH |
| **Test date** | 2023-Jul-05 |
| **Operator** | Hicham Laayouni |
| **EuT power supply:** | DC +12.0 V |
| **Operating mode** | 01 |
| **Setup** | 01 |
| **Remarks** | |

| Diagram | Measurement Details | | | Result |
|---|---|---|---|---|
| **3.01** | EUT position | ☐ standing | ☒ laying | **PASS** |
| | | ☐ Mounting position / usual operating position is defined (under and top side of EUT are not measured)<br>☒ Mounting position / usual operating position undefined (under and top side of EUT are measured) | | |
| | Critical frequencies found: | ☐ no, margin to limit > 10 dB (only Step 1 carried out)<br>☒ yes, final measurement (Step 2 carried out) | | |

Remark: for more information and graphical plot see annex A1 **TR23-1-0014801T035a-A1-C1**

### 4.1.4 Limits

| Frequency Range [MHz] | Class B ☒ (3 meters) | | Class A ☐ (3 meters) | |
|---|---|---|---|---|
| | Limit [µV/m] | Limit [dBµV/m] | Limit [µV/m] | Limit [dBµV/m] |
| 30 - 88 | 100 | 40.0 | 90 | 49.0 |
| 88 - 216 | 150 | 43.5 | 150 | 53.5 |
| 216 - 960 | 200 | 46.0 | 210 | 56.4 |
| 960 - 1000 | 500 | 54.0 | 300 | 59.5 |

### 4.1.5 Result

| Test case | Reference in FCC ☒ | Reference in ISED ☒ | Reference in RSS-GEN ☒ | Remark | Result |
|---|---|---|---|---|---|
| Radiated field strength emissions 30 MHz – 1 GHz | §15.109<br>§15.33<br>§15.35 | ICES-003, Issue 7 | RSS-Gen., Issue 5 Chapter 8.9, Chapter 7.3 | -- | PASS |

### 4.1.6 Measurement Location and Equipment list

| ID | Description | Manufacturer | SerNo | CheckType | Last Check | Interval | Next Check |
|---|---|---|---|---|---|---|---|
| | 120901 - SAC3 - Radiated Emission <1GHz | | | calchk | cal: 2015-Jul-21<br>chk: 2021-Jul-27 | cal: 10Y<br>chk: 12M | cal: 2025-Jul-21<br>chk: 2022-Jul-27 |
| 20341 | Digital Multimeter Fluke 112 | Fluke Deutschland GmbH / Glottertal | 81650455 | cal | cal: 2022-May-18 | cal: 24M | cal: 2024-May-18 |
| 20442 | Semi Anechoic Chamber | ETS-Lindgren Gmbh / Taufkirchen | - | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20482 | filter matrix Filter matrix SAR 1 | CETECOM GmbH | - | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20574 | Biconilog Hybrid Antenna BTA-L | Frankonia GmbH / Heideck | 980026L | cal | cal: 2022-Jun-15 | cal: 36M | cal: 2025-Jun-15 |
| 20620 | Test Receiver ESU26 | Rohde & Schwarz Messgerätebau GmbH / Memmingen | 100362 | cal | cal: 2023-May-24 | cal: 12M | cal: 2024-May-24 |
| 20885 | Power Supply EA3632A | Agilent Technologies Deutschland GmbH | 75305850 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 25038 | Loop Antenna HFH2-Z2 | Rohde & Schwarz Messgerätebau GmbH / Memmingen | 879824/13 | cal | cal: 2022-Jul-04 | cal: 24M | cal: 2024-Jul-04 |

### 4.1.7 Legend

| Note / remarks | Interval of calibration & Verification |
|---|---|
| 2W | 2 weeks |
| 12M | 12 months |
| 24M | 24 months |
| 36M | 36 months |
| 10Y | 10 Years |

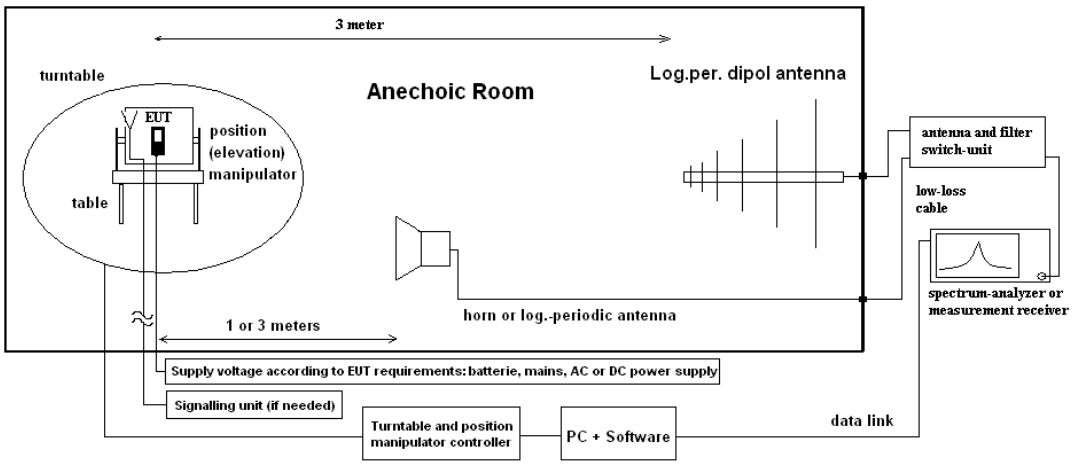
| Abbreviation Check Type | Description |
|---|---|
| cnn | Calibration and verification not necessary |
| cal | Calibration |
| calchk | Calibration plus intermediate Verification |
| chk | Verification |
| cpu | Verification before usage |

## 4.2 Radiated field strength emissions above 1 GHz

### 4.2.1 Description of the general test setup and methodology, see below example:

Evaluating the emissions have to be done first by an exploratory emissions measurement and a final measurement for most critical frequencies. The tests are performed in a CISPR 18-1-4:2010 compliant fully anechoic room (FAR) recognized by the regulatory commission. The measurement distance was set to 3 meter for frequencies up to 18 GHz and 2 meter above 18 GHz. A logarithmic periodic antenna is used for the frequency range 30 MHz to 1 GHz. Horn antennas are used for frequency range 1 GHz to 40 GHz. The EUT is aligned within 3 dB beam width of the measurement antenna with three orthogonal axis measurements on the EUT.

### Schematic:




### Testing method:

The measurement is made according to relevant reference clauses:
(See Tables *Summary of Test Results* and *Summary of Test Methods* on page 5)

**Exploratory, preliminary measurements**

The EUT and its associated accessories are placed on a non-conductive position manipulator (tipping device) of 1.55 m height which is placed on the turntable. By rotating the turntable (range 0° to 360°, step 15°) and the EUT itself either on 3-orthogonal axis (portable equipment) or 2-orthogonal axis (defined operational position of EUT) the emission spectrum and its characteristics was recorded with an EMI-receiver, broadband antenna and software.
The measurements are performed in horizontal and vertical polarization of the measurement antennas. The results are documented in a diagram. Critical frequencies (low margin to limit) are saved within a table for further investigations. If various operating modes are supported, further investigations are made to find the worst-case of them. Also the interconnection cables and equipment position were varied in order to maximize the emissions.

**Final measurement on critical frequencies**

Based on the exploratory measurements, the most critical frequencies are re-measured by main-taining the EUT's worst-case operation mode, cable position, etc.

First a frequency zoom around the critical frequency is done to locate the frequency more precisely. After this step, for all identified critical frequencies, the maximum peak was determined.
Following parameters were varied: the turntable angle continuously in the range 0 to 360 degree, the EUT itself over 3-orthogonal axis and the height for EUT with large dimensions or three axis scan for portable/small equipment.

On the determined worst-case position, a final measurement with necessary bandwidth and detector according standard has been carried out.

### Formula:

$E_C = E_R + A_F + C_L + D_F - G_A$ (1)

$M = L_T - E_C$ (2)

$E_C$ = Electrical field – corrected value
$E_R$ = Receiver reading
M = Margin
$L_T$ = Limit
$A_F$ = Antenna factor
$C_L$ = Cable loss
$D_F$ = Distance correction factor (if used)
$G_A$ = Gain of pre-amplifier (if used)

All units are dB-units, positive margin means value is below limit.

## 4.2.2 Sample calculation

| Raw-Value [dBuV/m] | Antenna factor | Distance Correction [dB] | Cable Loss + Preamplifier | Resulting correction value [dB] | Final result [dBuV/m] | Remarks |
|---|---|---|---|---|---|---|
| 29.37 | 41.20 | -- | 24.28 | 16.92 | 46.3 | CableLoss and PreAmp data in one data correction file |

Remark: This calculation is based on an example value at 10 GHz

## 4.2.3 Test receiver / spectrum analyzer settings

| Detector | Peak | Average |
|---|---|---|
| Min. attenuation | 10 dB | 10 dB |
| Resolution bandwidth | 1 MHz | 1 MHz |
| Dector Meas-time | Pre-measurement 10 ms<br>Final measurement 1 s | Pre-measurement 10 ms<br>Final measurement 1 s |
| Step size | Pre-measurement: 400 kHz<br>Final measurement: selected frequencies | Pre-measurement: 400 kHz<br>Final measurement: selected frequencies |
| Preamp | Off below 6 GHz<br>30 dB above 6 GHz | Off below 6 GHz<br>30 dB above 6 GHz |

### 4.2.1 Measurement Protocol(s)

| | |
|---|---|
| **Measurement No.** | P2M1 |
| **Environmental conditions** | Temperature: 20.0 °C<br>Humidity: 40.0 % rH |
| **Test date** | 2023-Apr-25 |
| **Operator** | Hicham Laayouni |
| **EuT power supply:** | Battery |
| **Operating mode** | 01 |
| **Setup** | 01 |
| **Remarks** | |

| Diagram | Measurement Details | | | Result |
|---|---|---|---|---|
| **4.01** | EUT position | ☒ standing | ☒ laying | PASS |
| | | ☐ Mounting position / usual operating position is defined (under and top side of EUT are not measured)<br>☒ Mounting position / usual operating position undefined (under and top side of EUT are measured) | | |
| | Critical frequencies found: | ☒ no, margin to limit > 10 dB (only Step 1 carried out)<br>☐ yes, final measurement (Step 2 carried out) | | |

Remark: for more information and graphical plot see annex A1 **TR23-1-0014801T035a-A1-C1**

### 4.2.2

| | |
|---|---|
| **Measurement No.** | P2M2 |
| **Environmental conditions** | Temperature: 20.0 °C<br>Humidity: 40.0 % rH |
| **Test date** | 2023-Apr-25 |
| **Operator** | Hicham Laayouni |
| **EuT power supply:** | Battery |
| **Operating mode** | 01 |
| **Setup** | 01 |
| **Remarks** | |

| Diagram | Measurement Details | | | Result |
|---|---|---|---|---|
| **4.02** | EUT position | ☒ standing | ☒ laying | PASS |
| | | ☐ Mounting position / usual operating position is defined (under and top side of EUT are not measured)<br>☒ Mounting position / usual operating position undefined (under and top side of EUT are measured) | | |
| | Critical frequencies found: | ☒ no, margin to limit > 10 dB (only Step 1 carried out)<br>☐ yes, final measurement (Step 2 carried out) | | |

Remark: for more information and graphical plot see annex A1 **TR23-1-0014801T035a-A1-C1**

### 4.2.3 Limits

| Frequency Range [MHz] | Class B ☒ (3 meters) | | Class A ☐ (3 meters) | | Detector |
|---|---|---|---|---|---|
| | Limit [µV/m] | Limit [dBµV/m] | Limit [µV/m] | Limit [dBµV/m] | |
| Above 1000 | 500 | 54 | 950 | 59.5 | Average |
| Above 1000 | 5000 | 74 | 9500 | 79.5 | Peak |

### 4.2.4 Result

| Test case | Reference in FCC ☒ | Reference in ISED ☒ | Reference in RSS-GEN ☒ | Remark | Result |
|---|---|---|---|---|---|
| Radiated field strength emissions above 1 GHz | §15.109<br>§15.33<br>§15.35 | ICES-003, Issue 7 | RSS-Gen., Issue 5 Chapter 8.9, Chapter 7.3 | -- | PASS |

## 4.2.5 Measurement Location and Equipment list

| ID | Description | Manufacturer | SerNo | CheckType | Last Check | Interval | Next Check |
|---|---|---|---|---|---|---|---|
| | 120907 - FAC2 - Radiated Emissions | | | chk | chk: 2023-Feb-21 | chk: 12M | chk: 2024-Feb-21 |
| 20005 | AC - LISN 50 Ohm/50µH ESH2-Z5 | Rohde & Schwarz Messgerätebau GmbH / Memmingen | 861741/005 | cal | cal: 2022-May-19 | cal: 12M | cal: 2023-May-19 |
| 20133 | Horn Antenna 3115 (Meas 1) | EMCO Elektronik GmbH | 9012-3629 | cal | cal: 2020-Apr-08 | cal: 36M | cal: 2023-Apr-08 |
| 20302 | Horn Antenna BBHA9170 (Meas 1) | Schwarzbeck Mess-Elektronik OHG / Schönau | 155 | cpu | chk: 2020-Apr-15 | chk: 12M | |
| 20412 | Fully Anechoic Chamber 2 | ETS-Lindgren Gmbh / Taufkirchen | without | chk | chk: 2023-Apr-14 | chk: 6M | chk: 2023-Oct-14 |
| 20729 | FS-Z140 | Rohde & Schwarz Messgerätebau GmbH | 101004 | cal | cal: 2020-May-26 | cal: 36M | cal: 2023-May-26 |
| 20730 | FS-Z110 | Rohde & Schwarz Messgerätebau GmbH | 101468 | cal | cal: 2020-Jun-19 | cal: 36M | cal: 2023-Jun-19 |
| 20731 | FS-Z75 | Rohde & Schwarz Messgerätebau GmbH / Memmingen | 101022 | cal | cal: 2022-May-18 | cal: 36M | cal: 2025-May-18 |
| 20732 | Signal- and Spectrum Analyzer FSW67 | Rohde & Schwarz Messgerätebau GmbH / Memmingen | 104023 | cal | cal: 2022-Jun-08 | cal: 12M | cal: 2023-Jun-08 |
| 20733 | Harmonic Mixer FS-Z220 | RPG-Radiometer Physics GmbH | 101009 | cal | cal: 2021-May-27 | cal: 36M | cal: 2024-May-27 |
| 20734 | Harmonic Mixer FS-Z325 | RPG-Radiometer Physics GmbH | 101005 | cal | cal: 2021-May-27 | cal: 36M | cal: 2024-May-27 |
| 20765 | Pickett-Potter Horn Antenna FH-PP 40-60 | RPG-Radiometer Physics GmbH / Meckenheim | 010001 | cal | cal: 2020-Sep-15 | cal: 36M | cal: 2023-Sep-15 |
| 20767 | Pickett-Potter Horn Antenna FH-PP 140-220 | RPG-Radiometer Physics GmbH / Meckenheim | 010011 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20811 | Horn Antenna ASY-SGH-124-SMA | Antenna Systems Solutions S.L | 29F14182337 | cal | cal: 2021-Oct-20 | cal: 36M | cal: 2024-Oct-20 |
| 20812 | Pickett-Potter Horn Antenna FH-PP-325 | RPG-Radiometer Physics GmbH | 10024 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20813 | Pickett-Potter Horn Antenna FH-PP 075 | RPG-Radiometer Physics GmbH / Meckenheim | 10006 | cal | cal: 2020-Sep-09 | cal: 36M | cal: 2023-Sep-09 |
| 20814 | Pickett-Potter Horn Antenna FH-PP 140 | RPG-Radiometer Physics GmbH | 10008 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20815 | Pickett-Potter Horn Antenna FH-PP 110 | RPG-Radiometer Physics GmbH | 10014 | cal | cal: 2020-Sep-04 | cal: 36M | cal: 2023-Sep-04 |
| 20816 | SGH Antenna SGH-26-WR10 | Anteral S.L. | 1144 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20817 | Waveguide Rectangular Horn Antenna SAR-2309-22-S2 | ERAVAN | 13254-01 | cal | cal: 2020-Jul-29 | cal: 36M | cal: 2023-Jul-29 |
| 20836 | 1-18 GHz Amplifier | Wright Technologies, Inc., Inc. / Roseville | 0001 | chk | | chk: 36M | |
| 20877 | JS42-08001800-16-8P Verstärker | Miteq Inc. | 2079991 / 2079992 | chk | chk: 2023-Feb-27 | chk: 6M | chk: 2023-Aug-27 |
| 20907 | Waveguide WR-15 attenuator STA-30-15-M2 | SAGE Millimeter Inc. | 13256-01 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20908 | Waveguide WR 10 attenuator STA-30-10-M2 | SAGE Millimeter Inc. | 13256-01 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20909 | Waveguide Horn Antenna PE9881-24 | Pasternack Enterprises, Inc. | 37/2016 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20910 | Frequency Multiplier 936VF-10/385 | MI-Wave, Millimeter Wave Products Inc. | 142 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20911 | Frequency Multiplier 938WF-10/387 | MI-Wave, Millimeter Wave Products Inc. | 141 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 20912 | Low noise Amplifier Module 0.5-4GHz | RF-Lambda Europe GmbH / Rüsselsheim | 19041200083 | cpu | chk: 2020-Dec-01 | chk: 6M | chk: 2021-Jun-01 |
| 20913 | Phase Amplitude Stable Cable Assembly DC-40GHz | RF-Lambda Europe GmbH | AC19040001 | cnn | cal: -<br>chk: - | cal: -<br>chk: - | cal: -<br>chk: - |
| 25457 | DRG Horn Antenna SAS-574 | A.H. Systems, Inc. / Chatsworth | 383 | cal | cal: 2022-Mar-28 | cal: 36M | cal: 2025-Mar-28 |

Tools used in 'P2M1'

# 5 Results from external laboratory

| | |
|---|---|
| None | - |

# 6 Opinions and interpretations

| | |
|---|---|
| None | - |

# 7 List of abbreviations

| | |
|---|---|
| None | - |

# 8 Measurement Uncertainty valid for conducted/radiated measurements

The reported uncertainties are calculated based on the standard uncertainty multiplied with the appropriate coverage factor **k**, such that a confidence level of approximately 95% is achieved. For uncertainty determination, each component used in the concrete measurement set-up was taken in account and it contribution to the overall uncertainty according its statistical distribution calculated.

| RF-Measurement | Reference | Frequency range | Calculated uncertainty based on a confidence level of 95% | Remarks |
|---|---|---|---|---|
| Conducted emissions ($U_{CISPR}$) | CISPR 16-2-1 | 9 kHz - 150 kHz<br>150 kHz - 30 MHz | 4.00 dB<br>3.58 dB | - |
| Radiated emissions<br>Enclosure | CISPR 16-2-3 | 30 MHz - 300 MHz<br><br><br>300 MHz - 1 GHz<br><br><br>1 GHz - 6 GHz<br>1 GHz - 18 GHz | SAC1: 2.60 dB<br>SAC2: 2.62 dB<br>SAC3: 4.20 dB<br>SAC1: 2.90 dB<br>SAC2: 3.00 dB<br>SAC3: 4.20 dB<br>SAC2: 4.10 dB<br>SAC1: 4.98 dB<br>SAC3: 5.10 dB | E-Field |

# 9 Versions of test reports (change history)

| Version | Applied changes | Date of release |
|---|---|---|
| -- | Initial release | 2024-Jun-27 |
| C1 | Chapter 2.13 updated | 2025-Apr-11 |
| -- | -- | -- |

## End Of Test Report