**Test report issued under the responsibility of:**
EMITECH ILE DE FRANCE Laboratory
MRA US-EU Designation Number: FR0004
IC Assigned Code: 4379A

# RADIO TESTS REPORT

**FCC 47 CFR PART 15 : 2024**
**RSS-210 Issue 11 : 2024**
**RSS GEN Issue 5 : 2018 / AMD1 : 2019 / AMD2 : 2021**

| | |
|---|---|
| **Company** ..... : | **SMARTWARE** |
| Address..... : | *7, Avenue des Andes*<br>*91940 LES ULIS*<br>*FRANCE* |

| | |
|---|---|
| **Test item description**. ..... : | *RFID & contact card reader* |
| Trade Mark. ..... : | MX-Nano |
| Manufacturer..... : | Smartware |
| Model/Type reference..... : | Assy MX-Nano-1I1P v1r03a / 19G11-11001 |
| Ratings..... : | *24 Vdc +- 10 %* |

| | |
|---|---|
| **Testing Laboratory** ..... : | **EMITECH ILE DE FRANCE Laboratory** |
| Address..... : | 30-32, AVENUE DES 3 PEUPLES<br>78180 MONTIGNY LE BRETONNEUX<br>FRANCE |

| | |
|---|---|
| **Report Reference No**..... : | **RRA-EMIESS24H745SMA-01A v0** |
| Test procedure. ..... : | FCC and CANADA marking |
| Diffusion..... : | Mr. POULIQUEN and Mr. AZOULAY |
| Applicant's name. ..... : | SMARTWARE |
| Date of issue..... : | 05/05/2025 |
| Total number of pages..... : | 37 |
| Revision. ..... : | v0 |
| Compiled by..... : | N. PEREZ |
| Technical verification. ..... : |  <br>Pellerin Bruno<br>Technical Entity Manager |
| Quality approval..... : |  <br>Pellerin Bruno<br>Technical Entity Manager |

***Certain services reported in this document are not covered by the accreditation. They are identified by the symbol (*)***

*Duplication of this test report is only permitted for an integral photographic facsimile. It includes the number of pages referenced here above. This document is the result of testing a specimen or a sample of the product submitted. It does not imply an assessment of the conformity of the whole manufactured products of the tested sample.*

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**REVISION HISTORY:**

| Revision | Date | Modified pages | Modifications |
|---|---|---|---|
| v0 | 05/05/2025 | Creation | |

# 1. GENERAL INFORMATION

This document submits the results of Radio tests performed on the equipment (denominated hereafter E.U.T.: equipment under test) according to documents listed in §2 of this test report.

| TESTING PROCEDURE AND TESTING LOCATION: | |
|---|---|
| **Testing Laboratory** ..... : | **EMITECH ILE DE FRANCE Laboratory** |
| Address. ..... : | 30-32, AVENUE DES 3 PEUPLES<br>78180 MONTIGNY LE BRETONNEUX<br>FRANCE |
| Test procedure. ..... : | FCC and CANADA marking |
| Tested by ..... : | N. PEREZ |
| Test supervisor ..... : | B. PELLERIN |
| Date of receipt of test item ..... : | 28/04/2025 |
| Dates of performance of tests ..... : | From 28/04/2025 – 29/04/2025 |

| APPLICANT'S GENERAL INFORMATION: | |
|---|---|
| **Company name** ..... : | ***SMARTWARE*** |
| Company address. ..... : | *7, Avenue des Andes*<br>*91940 LES ULIS*<br>*France* |
| Persons present during the tests..... : | *Mr. POULIQUEN* |
| Responsible. ..... : | *Mr. AZOULAY* |

**GENERAL REMARKS:**

***The information in italics is declared by the manufacturer and is under his responsibility.***
**The test results presented in this report relate only to the object tested.**
**The results contained in this report reflect the results for this particular model and serial number. It is the responsibility of the manufacturer to ensure that all production models meet the intent of the requirements detailed within this report.**

This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.
Throughout this report the decimal separator is point.

| POSSIBLE TEST CASE VERDICTS: | |
|---|---|
| Test case does not apply to the test object.: | N/A |
| Test case not performed..... : | N/P |
| Test object does meet the requirement..... : | P (Pass) |
| Test object does not meet the requirement. ..... : | F (Fail) |
| Test object was not subjected to all tests... : | I (Inconclusive) |

**DEFINITIONS AND ABBREVIATIONS:**

| | | | |
|---|---|---|---|
| E.U.T. | Equipement under test | AE | Auxiliary / Associated equipment |
| RBW | Resolution bandwidth | VBW | Video bandwidth |
| OATS | Open area test site | FAR | Full anechoic room |
| RF | Radio frequency | NTR | Nothing to report |

## 2. REFERENCE DOCUMENTS

| NORMATIVE REFERENCES: |
|---|
| The following referenced documents are necessary for the application of the present test report.<br><br>**FCC 47 CFR Part 15 : 2024**<br>ode of federal regulations<br>Title 47- Telecommunication Chapter 1- Federal Communication Commission<br>Part 15- Radio frequency devices Subpart B- Unintentional Radiators<br>Limits and methods of measurement of radio disturbance<br>Characteristic of information technology equipment.<br><br>**RSS-Gen Issue 5 : 2018 / AMD1 : 2019 / AMD2 : 2021**<br>General Requirements and Information for the Certification of Radio Apparatus<br><br>**RSS-210_Issue 11 : June 2024**<br>Licence-Exempt Radio Apparatus: Category I Equipment<br><br>**ANSI C63.10 : 2014**<br>American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. |
| **INFORMATIVE REFERENCES:** |
| - |

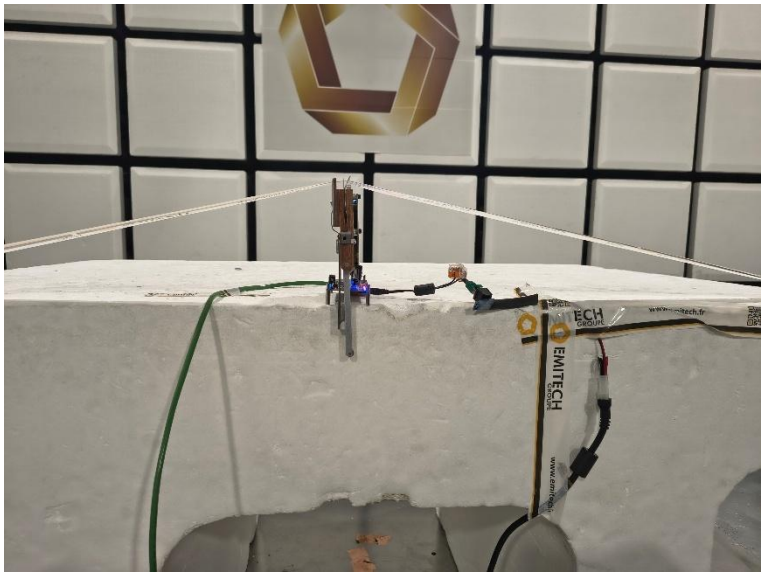
# 3. EQUIPMENT TECHNICAL DESCRIPTION

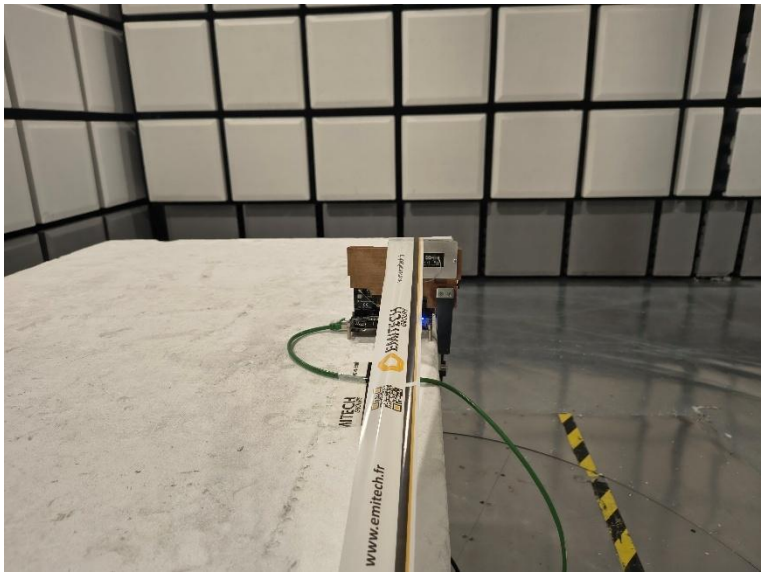
## 3.1. Test Conditions

| | |
|---|---|
| Test item description. ..... : | *RFID & contact card reader* |
| Model/Type reference..... : | Assy MX-Nano-1I1P v1r03a / 19G11-11001 |
| Trade Mark. ..... : | MX-Nano |
| Serial number (S/N). ..... : | MXNANO#2438EA103a_015F |
| Part number (P/N). ..... : | *Not communicated* |
| Software version. ..... : | *Smart studio V3R09d* |
| Firmware version. ..... : | *Solutions for Production v2r27t1_DC* |
| Fcc ID ..... : | *RPM-MXNANO1I1P* |
| N°IC ..... : | *4783A-MXNANO1I1P* |
| Type of sample. ..... : | *Pre-serial* |
| Function. ..... : | *RFID reader* |
| Manufacturer name. ..... : | *Smartware* |
| Address. ..... : | 7, Avenue des Andes<br>91940 LES ULIS<br>France |

**General product information:** No

## 3.2. EUT Overview



### 3.3. EUT Marking Plate

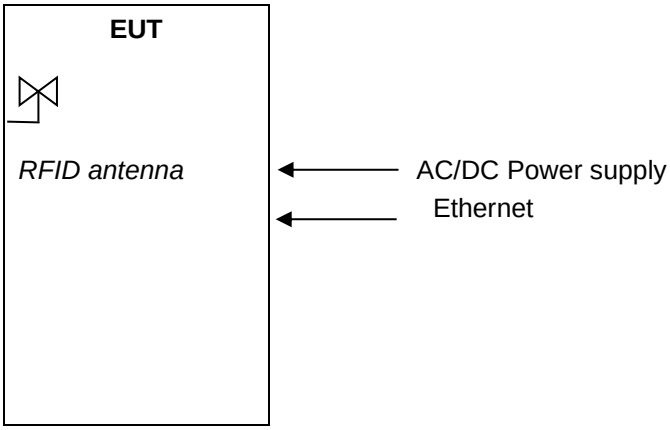
-

## 3.4. EUT Mechanical and Electrical Design

Power supply. ..... : *24 Vdc*
Power supply range. ..... : *24 Vdc +- 10%*
Power type. ..... : *DC*
Power (W). ..... : *3.6*
Nominal current (mA). ..... : *150*
Dimensions (L x W x H) (cm). ..... : *122.9 x 112 x 13 mm*
Weight (g). ..... : *100*
Temperature range (°C). ..... : *+5 to +55*
Ground bounding strap. ..... : *No*

**Comments:** No

## 3.5. EUT Input/Output ports




| PORT | NAME | TYPE | LENGHT | CABLE TYPE | COMMENTS |
|---|---|---|---|---|---|
| 0 | Main frame | N/E | N/A | - | |
| 2 | AC/DC Power Supply | AC/DC | < 3m | N/A | |
| 3 | Ethernet | TP | < 3 m | Shielded | |

| | | | | | |
|---|---|---|---|---|---|
| AC/DC: | AC/DC Converter port | AC: | Alternative current port | DC: | Discontinuous current port |
| I/O: | Input or Output port | TP: | Telecommunication port | RF: | Radio frequency port |
| N/E: | Non Electrical port | | | | |

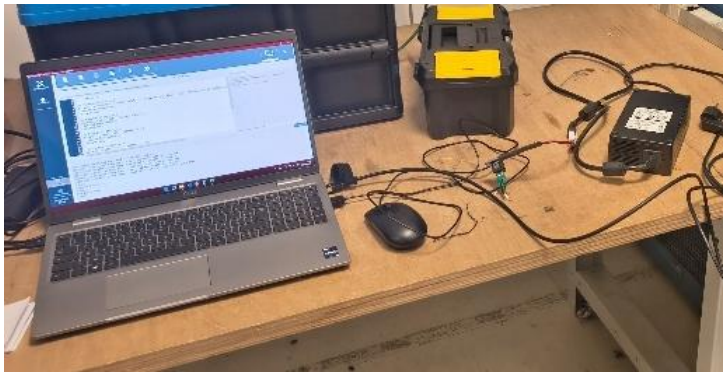
## 3.6. Supporting Equipment Used During Test

Sample subject to the tests was tested with following equipment.

| PRODUCT TYPE | MANUFACTURER | MODEL | N°EMITECH / COMMENTS |
|---|---|---|---|
| | | | |

**(AE)**

*PC To configure the device + AC/DC Power supply*



## 3.7. EUT Radio Specifications

| a) GENERAL INFORMATION | |
|---|---|
| According to manufacturer's declarations : | |
| EUT type..... : | Transceiver |
| Technology ..... : | RFID |
| Environmental profile..... : | Industrial light |
| Temperature range..... : | Low extreme conditions: 0°C<br>High extreme conditions: +55°C |
| Antenna type ..... : | External |
| Antenna Gain..... : | Not communicated |
| **Comments:** No | |

| b) TRANSMITTER PARAMITTERS (TX/RX) | |
|---|---|
| Frequency bands..... : | 13.110 MHz – 14.010 MHz |
| RF Power..... : | Not communicated |
| Number of channels / Separation..... : | 1 |
| Modulation type ..... : | ASK |
| Duty cycle ..... : | Not communicated |
| Tested frequency..... : | 13.5600 MHz |

## 4. RESULT SUMMARY

Subpart B of the standard FCC part 15 – Unintentional radiators

| TEST DESIGNATION | TEST PROCEDURE | VERDICT | COMMENTS |
|---|---|---|---|
| **Measurement of conducted emission on AC mains=** | **15.107** | **N/A** | Not connected to AC public supply in the final version of the product |
| **Radiated emission limits** | **15.109** | **N/A** | RFID Transceiver |

Subpart C of the standard FCC part 15 – Intentional radiators

| TEST DESIGNATION | TEST PROCEDURE | VERDICT | COMMENTS |
|---|---|---|---|
| **Restriction bands of operation** | **15.205** | **PASS** | |
| **Measurement of conducted emission on AC mains ports** | **15.207** | **N/A** | Not connected to AC public supply in the final version of the product |
| **Radiated emission limits; general requirements** | **15.209** | **PASS** | |
| **Operation within the band 13.110-14.010 MHz** | **15.225** | | |
| - (a) The field strength of any emissions within the band 13.553-13.567 MHz | - | **PASS** | |
| - (b) Spurious emission in the 13.410-13.553 MHz and 13.567-13.710 MHz bands | - | **PASS** | |
| - (c) Spurious emission in the 13.110-13.410 MHz and 13.710-14.010 MHz bands | - | **PASS** | |
| - (d) Spurious emission outside the 13.110-14.010 MHz band | - | **PASS** | |
| - (e) The frequency tolerance of the carrier signal | - | **PASS** | |

Standard RSS-Gen Issue 5 : 2018 / AMD1 : 2019 / AMD2 : 2021

| TEST DESIGNATION | TEST PROCEDURE | VERDICT | COMMENTS |
|---|---|---|---|
| **6 Technical Requirements** | | | |
| - 6.12 Transmitter Output Power | - | **N/A** | |
| - 6.13 Transmitter unwanted emissions | - | **PASS** | |
| **8.Licence-Exempt radio Apparatus** | | | |
| - 8.8 AC Power Line Conducted Emission Limits for licence-Exempt Radio Apparatus | - | **N/A** | Not connected to AC public supply in the final version of the product |
| - 8.9 Transmitter Emission Limits | - | **PASS** | |

Standard RSS-210 Issue 10 : December 2019

| TEST DESIGNATION | TEST PROCEDURE | VERDICT | COMMENTS |
|---|---|---|---|
| **7 Technical specifications** | | | |
| - 7.1 Emission falling within restricted frequency bands | - | **PASS** | |
| - 7.2 General field strength limits | - | **PASS** | |
| - 7.3 Transmitters with wanted and unwanted emissions that are within the general field strength limits | - | **PASS** | |
| - 7.4 Cordless telephones | - | **N/A** | |
| **Annex B.Devices operating in frequency bands for any application** | | | |
| - B.6 Band 13.110-14.010 | - | **PASS** | |

Sample subject to the test **complies** with the requirements of the reference document listed in §2 of this test report and, where applicable, with deviations specified in this document.

To declare, or not, the compliance with the specifications, it was not explicitly taken account of uncertainty associated with the results.

Modifications : No

## 5. MEASUREMENT UNCERTAINTY

| PARAMETER | MAXIMAL EMITECH UNCERTAINTY | MINIMAL STANDARD UNCERTAINTY |
|---|---|---|
| Radio frequency | ± 1 x $10^{-7}$ | ±1 x $10^{-7}$ |
| RF power, conducted | | |
| RF power | ± 0.8dB | ± 1 dB |
| RF power (EN 300328 / EN 301893) | ± 1.3dB | ± 1.5 dB |
| Power spectral density | ± 2.3dB | ± 3 dB |
| Occuped bandwidth | | |
| RF power | ± 3.8 % | ± 5 % |
| RF power (EN 300328 / EN 301893) | ± 3.8 % | ± 5 % |
| Maximum frequency deviation | | |
| 300 Hz < audio frequency < 6 kHz | ± 1.2 % | ± 5 % |
| 6 kHz < audio frequency < 25 kHz | ± 1.2 % | ± 3 dB |
| Adjacent channel power | ± 1.6 dB | ± 3 dB |
| Sensibility of receiver (conducted) | ± 2.0 dB | ± 3 dB |
| Blocking | ± 4.0 dB | ± 4 dB |
| Transitory | | |
| Amplitude | ± 8.5 % | ± 20 % |
| At the frequency | ± 166 Hz | ± 250 Hz |
| Conducted emission (spurious) | | |
| f ≤ 1 GHz | ± 0.8 dB | ± 3 dB |
| 1 GHz - 12.75 GHz | ± 1.6 dB | |
| Radiated emission (PAR / PIRE / RNE) | | |
| f ≤ 62.5 MHz | ± 5.1 dB | ± 6 dB |
| 62.5 MHz - 1 GHz | ± 5.1 dB | ± 6 dB |
| 1 GHz - 18 GHz | ± 5.2 dB | ± 6 dB |
| 18 GHz – 26 GHz | ± 5.1 dB | ± 6 dB |
| 26 GHz – 40 GHz | ± 5.4 dB | ± 6 dB |
| RF power (EN 300328 / EN 301893) | ± 5.3 dB | ± 6 dB |
| PIRE and power spectral density with diode | ± 5.4 dB | ± 6 dB |
| Radiated emission (magnetic field) | | |
| 9kHz – 30MHz | ± 3 dB | ± 6 dB |
| RF level for a given BER | ± 0.8 dB | ± 1.5 dB |
| Supply voltages | ± 3 % | ± 3 % |
| Temperature | ± 1 °C | ± 1°C |
| Humidity | ± 5 % | ± 5 % |
| Time / Duty cycle | ± 4.4 % | ± 5 % |
| Adaptivity | ± 2.9 dB | / |
| Radiated emission (electric field for FCC standard) | | |
| 9kHz – 30MHz | ± 2.7 dB | / |
| 30MHz – 1GHz | ± 5.0 dB | / |
| 1GHz – 18GHz | ± 5.6 dB | / |
| 18GHz – 26GHz | ± 5.7 dB | / |
| 26GHz – 40GHz | ± 5.7 dB | / |

For the calcul of expanded uncertainty, the confidence interval is 95 % (k=2).

# 6. TEST CONDITIONS AND RESULTS

## 6.1. Spurious emission outside the 13.110-14.010 MHz band

| | |
|---|---|
| **Reference standard:** | FCC 47 CFR PART 15 : 2024<br>RSS-210 Issue 11 : June 2024 |
| **Test method:** | §15.225 of FCC 47 CFR PART 15<br>§15.209 of FCC 47 CFR PART 15<br>§B.6 (a)(iv) of RSS-210<br>§8.9 of RSS Gen |
| **General test setup:** E.U.T. is set on an insulating support at 0.8 m (>30MHz) above the ground reference plane. For maximum meter reading at each frequency, the antenna height is adjusted between 1 m and 4 m above the ground plane. A 360 degrees rotation of the EUT is performed in vertical and horizontal polarization.<br><br>E.U.T. is set on an insulating support at 0.8 m (<30MHz) above the ground reference plane. For maximum meter reading at each frequency, the antenna height is 1 m above the ground plane. A 360 degrees rotation of the EUT is performed in parallel, perpendicular and 45° loop antenna. | |

| TESTED CONFIGURATION | PARAMETER | VERDICT |
|---|---|---|
| Maxhold 360° | 9kHz-30MHz | **PASS** |
| Maxhold 360° | 30MHz-1GHz | **PASS** |

| LABORATORY PARAMETERS: | REQUIRED PRIOR TO THE TEST | DURING THE TEST |
|---|---|---|
| Ambient Temperature | 10 to 40 °C | 23°C |
| Relative Humidity | 10 to 90 % | 35% |
| Atmospheric pressure | N/A | N/A |
| **Test method deviation:** No | | |
| Supplementary information: - | | |

**TEST EQUIPMENT USED**

| CATEGORY | BRAND | TYPE | IDENTIFIER | CAL. DATE | CAL. DUE |
|---|---|---|---|---|---|
| Antenna | Schwarzbeck | VHBB 9124 + BBA 9106 | 19406 | 15/02/2024 | 15/04/2026 |
| Antenna | Schwarzbeck | UHALP 9108A | 03106 | 20/02/2025 | 20/04/2027 |
| Antenna | Emco | 6502 | 09579 | 06/02/2025 | 06/04/2027 |
| Attenuator | HYTEM | 03.02.917 | 19804 | 23/07/2024 | 23/09/2027 |
| Cable | Huber + Suhner | N-10m | 17272 | 30/08/2024 | 30/10/2026 |
| Cable | HYTEM | HY17D53UFA0200 017D | 19859 | 14/08/2024 | 14/10/2026 |
| Cable | HYTEM | HY17D53UFA0400 017D | 19868 | 14/08/2024 | 14/10/2026 |
| Cable | HYTEM | HY17D53UFA0400 017D | 19870 | 14/08/2024 | 14/10/2026 |
| Data Acquisition Switch Unit | OMEGA | DL 23A | 02319 | 12/12/2024 | 12/02/2026 |
| Multimeter | FLUKE | 8840A | 01330 | 15/01/2025 | 15/03/2027 |
| Preamplifier | Hewlett Packard | 8447F H64 | 16970 | 29/05/2024 | 29/07/2025 |
| Receiver | Rohde & Schwarz | ESW44 | 17058 | 28/10/2024 | 28/12/2025 |
| Software | Nexio | BAT EMC | 00000 | | |
| Stabilized power supply | Voltcraft | DPPS-16-30 | 15480 | | |
| Test enclosure | Emitech | HC4 | 14878 | | |

BAT-EMC software version: V3.18.0.26

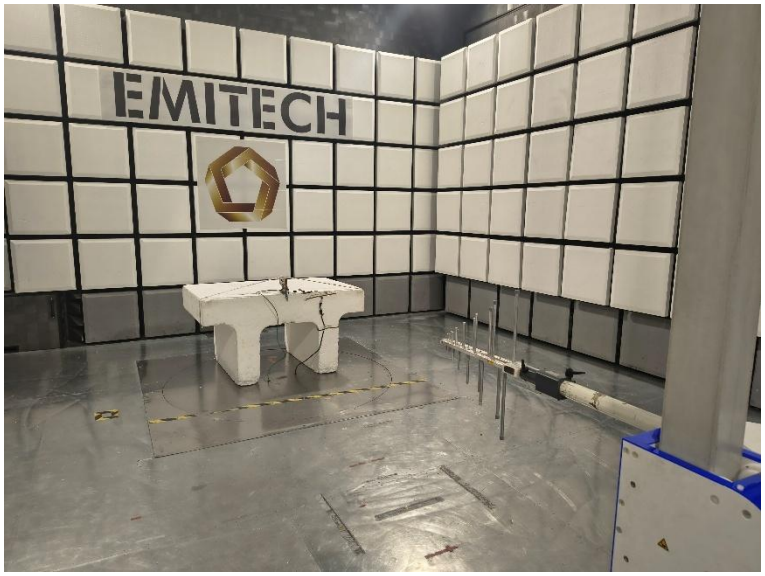
Blank cells = Permanent validity

| TEST SETUP PHOTO - 9KHZ – 30MHZ |
| --- |
|  <br>  |

| TEST SETUP PHOTO - 9KHZ – 30MHZ |
| --- |
|  |

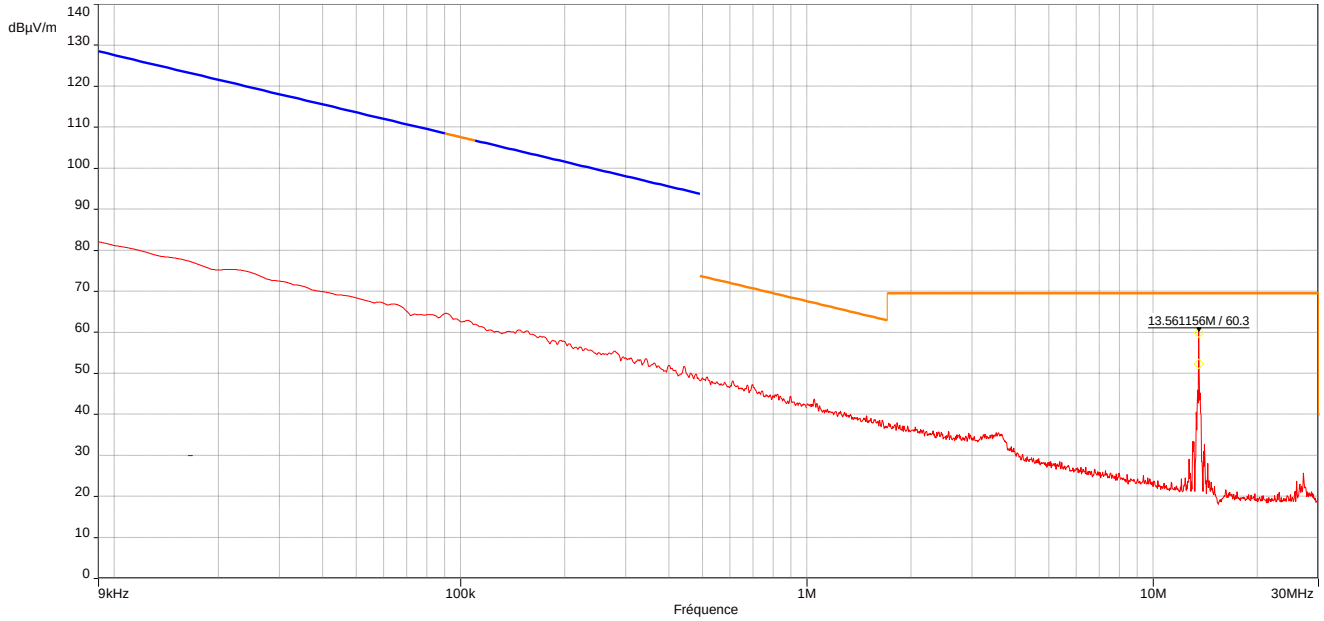
| TEST SETUP PHOTO - 30MHZ – 1GHZ |
| --- |


| TEST SETUP PHOTO - 30MHZ – 1GHZ |
| --- |

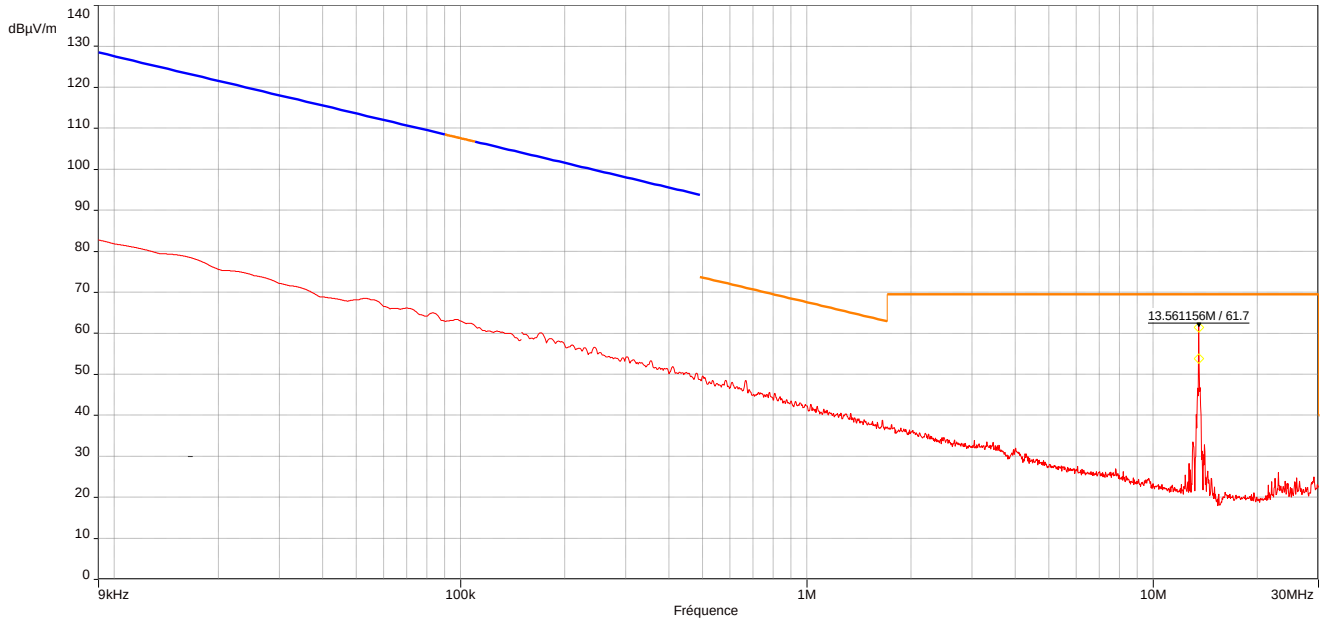



| RADIATED SPURIOUS EMISSIONS - GRAPH |
|---|
| MAXHOLD 360° - 9KHZ – 30 MHZ |
| **EUT mode:** the product is emitting every seconde and a card is in the reader |

*Parallel antenna position*

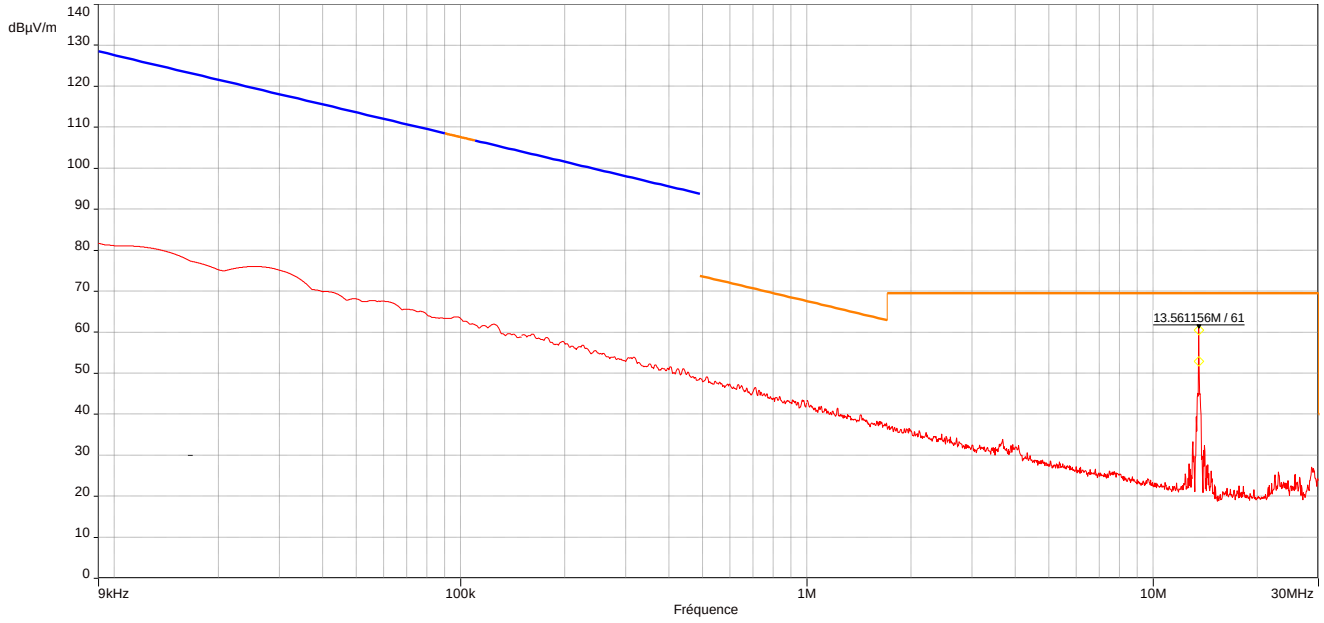



*45° antenna position*



| RADIATED SPURIOUS EMISSIONS - GRAPH |
|---|
| MAXHOLD 360° - 9KHZ – 30 MHZ |
| **EUT mode:** the product is emitting every seconde and a card is in the reader |

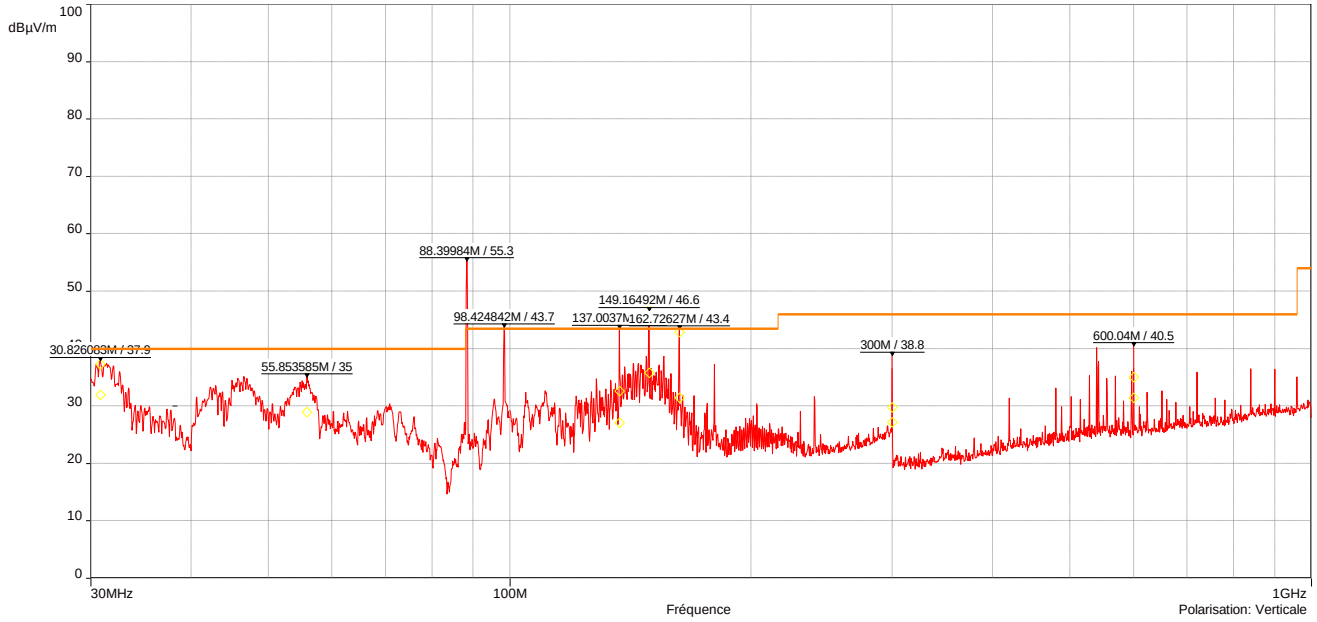
*Perpendicular antenna position*

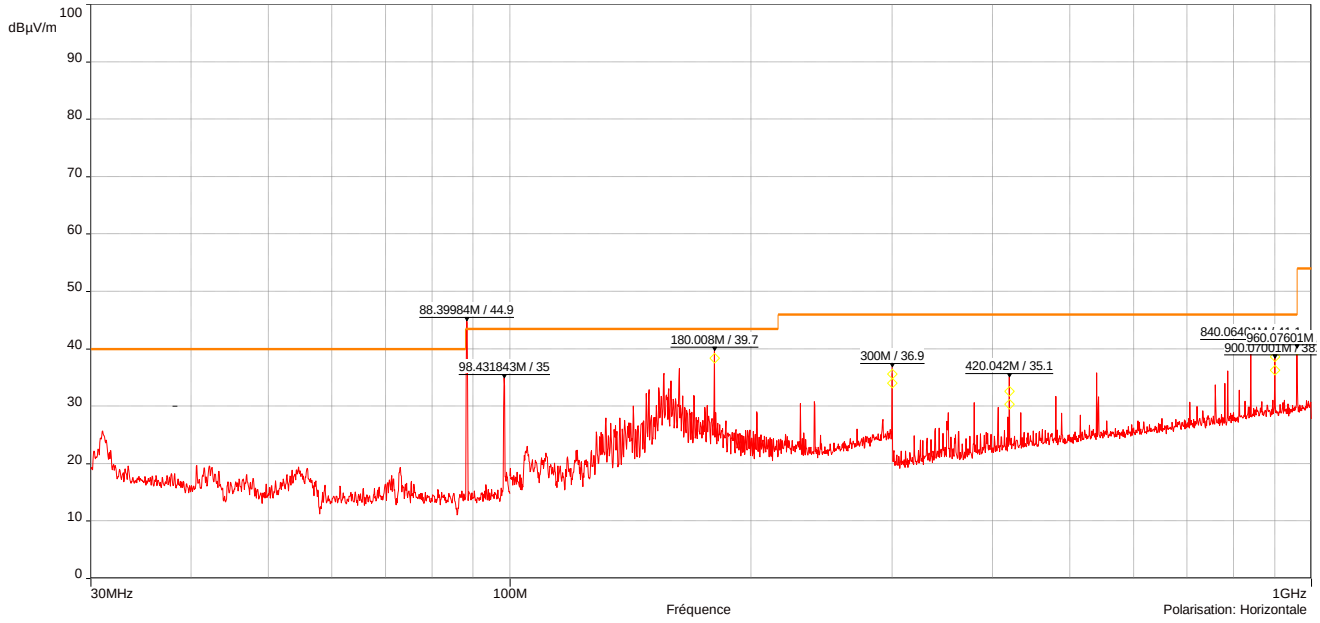



| FREQUENCIES | RBW | VBW | DETECTOR |
|---|---|---|---|
| 9kHz-150kHz | 1kHz | 3kHz | Peak |
| 150kHz-1MHz | 10kHz | 30kHz | Peak |
| 1MHz-10MHz | 10kHz | 30kHz | Peak |
| 10MHz-30MHz | 10kHz | 30kHz | Peak |

| | |
|---|---|
| **Configuration:** | Measurements maximized at 360° in peak maxhold mode.<br>Measurements have been made in 0° / 45° / 90° position antenna. |
| Comments: | The frequency at 13.56 MHz is the RFID carrier frequency. |
| EUT modification: No | |

| RADIATED SPURIOUS EMISSIONS - GRAPH |
|---|
| MAXHOLD 360° - 30 MHZ – 1 GHZ |
| **EUT mode:** the product is emitting every seconde and a card is in the reader |



| RADIATED SPURIOUS EMISSIONS - GRAPH | | | | |
|---|---|---|---|---|
| MAXHOLD 360° - 30 MHz – 1 GHz | | | | |
| **EUT mode:** the product is emitting every seconde and a card is in the reader | | | | |
| **POSITION** | **FREQUENCIES** | **RBW** | **VBW** | **DETECTOR** |
| Vertical | 30MHz-200MHz | 100kHz | 300kHz | Peak |
| Vertical | 200MHz-400MHz | 100kHz | 300kHz | Peak |
| Vertical | 400MHz-600MHz | 100kHz | 300kHz | Peak |
| Vertical | 600MHz-1GHz | 100kHz | 300kHz | Peak |
| Horizontal | 30MHz-200MHz | 100kHz | 300kHz | Peak |
| Horizontal | 200MHz-400MHz | 100kHz | 300kHz | Peak |
| Horizontal | 400MHz-600MHz | 100kHz | 300kHz | Peak |
| Horizontal | 600MHz-1GHz | 100kHz | 300kHz | Peak |
| **Configuration:** | Measurements maximized at 360° in peak maxhold mode. | | | |
| **Comments:** | Frequencies at 88.4 and 98.4MHz are external frequencies (FM radio) | | | |
| EUT modification: No | | | | |

| TRANSCEIVER SPURIOUS EMISSIONS - TABULATED RESULTS | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| MAXHOLD 360° - 30 MHZ – 1 GHZ – RADIO OFF | | | | | | | | | |
| **Test Freq. (MHz)** | **Meter Reading (dBµV)** | **Detector (Pk/QP/ Av)** | **Ant. position** | **Azimuth (°)** | **Ant. Height (cm)** | **Cor. Factor (dB)** | **Level (dBµV/ m)** | **Limit (dBµV/ m)** | **Margin (dB)** |
| 30.8 | / | QP | Vertical | 360 | 100 | - | 31.9 | 40.0 | 8.1 |
| 55.8 | / | QP | Vertical | 360 | 100 | - | 28.9 | 40.0 | 11.1 |
| 137.0 | / | QP | Vertical | 230 | 100 | - | 27.1 | 43.5 | 16.4 |
| 149.1 | / | QP | Vertical | 200 | 100 | - | 35.7 | 43.5 | 7.8 |
| 162.7 | / | QP | Vertical | 230 | 100 | - | 31.4 | 43.5 | 13.1 |
| 300.0 | / | QP | Vertical | 250 | 200 | - | 27.2 | 46.0 | 18.8 |
| 600.0 | / | QP | Vertical | 137 | 177 | - | 31.4 | 46.0 | 14.6 |
| 180.0 | / | QP | Horizontal | 80 | 100 | - | 38.3 | 43.5 | 5.2 |
| 300.0 | / | QP | Horizontal | 280 | 100 | - | 34.0 | 46.0 | 12.0 |
| 420.0 | / | QP | Horizontal | 50 | 100 | - | 30.3 | 46.0 | 15.7 |
| 840.0 | / | QP | Horizontal | 315 | 100 | - | 40.4 | 46.0 | 5.6 |
| 900.0 | / | QP | Horizontal | 330 | 100 | - | 36.2 | 46.0 | 9.8 |
| 960.0 | / | QP | Horizontal | 330 | 150 | - | 39.7 | 46.0 | 6.3 |
| Supplementary information: No | | | | | | | | | |

## 6.2. Field strength and spurious emission within the band 13.110-14.010 MHz

| | |
|---|---|
| **Reference standard:** | FCC 47 CFR PART15 : 2024<br>RSS-210 Issue 11 : June 2024 |
| **Test method:** | §15.225 (a)(b)(c) of FCC 47 CFR PART 15<br>§B6(a)(i)(ii)(ii) of RSS-210 Issue 11<br>ANSI C63.10 : 2013 |
| **General test setup:** E.U.T. is set on an insulating support at 80 cm above the ground reference plane.<br>Measurement are done on a normalized test site.<br><br>E.U.T. is set on an insulating support at 0.8 m (<30MHz) above the ground reference plane.<br>For maximum meter reading at each frequency, the antenna height is 1 m above the ground plane. A 360 degrees rotation of the EUT is performed in parallel, perpendicular and 45° loop antenna. | |

| LABORATORY PARAMETERS: | REQUIRED PRIOR TO THE TEST | DURING THE TEST |
|---|---|---|
| Ambient Temperature | 10 to 40 °C | 23°C |
| Relative Humidity | 10 to 90 % | 35 % |
| Atmospheric pressure | N/A | N/A |
| **Test method deviation:** No | | |
| Supplementary information: - | | |

**TEST EQUIPMENT USED**

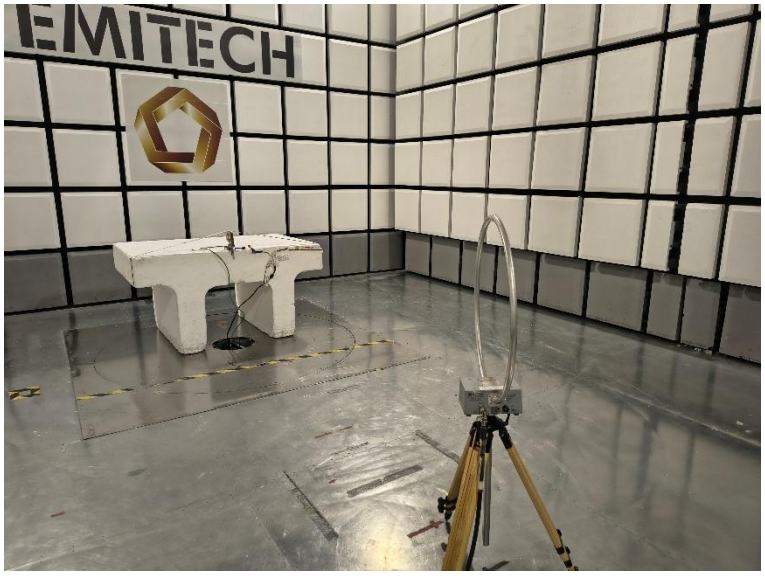
| CATEGORY | BRAND | TYPE | IDENTIFIER | CAL. DATE | CAL. DUE |
|---|---|---|---|---|---|
| Antenna | Emco | 6502 | 09579 | 06/02/2025 | 06/04/2027 |
| Cable | Huber + Suhner | N-10m | 17272 | 30/08/2024 | 30/10/2026 |
| Cable | Hytem | HY17D53UFA04000 17D | 19868 | 14/08/2024 | 14/10/2026 |
| Cable | Hytem | HY17D53UFA04000 17D | 19870 | 14/08/2024 | 14/10/2026 |
| Test enclosure | Emitech | HC4 | 14878 | | |
| Preamplifier | Hewlett Packard | 8447F H64 | 16970 | 29/05/2024 | 29/07/2025 |
| Receiver | Rohde & Schwarz | ESW44 | 17058 | 28/10/2024 | 28/12/2025 |

Blank cells = Permanent validity

| TEST SETUP PHOTO - 9KHZ – 30MHZ |
|---|

Parallel antenna position


45° antenna position

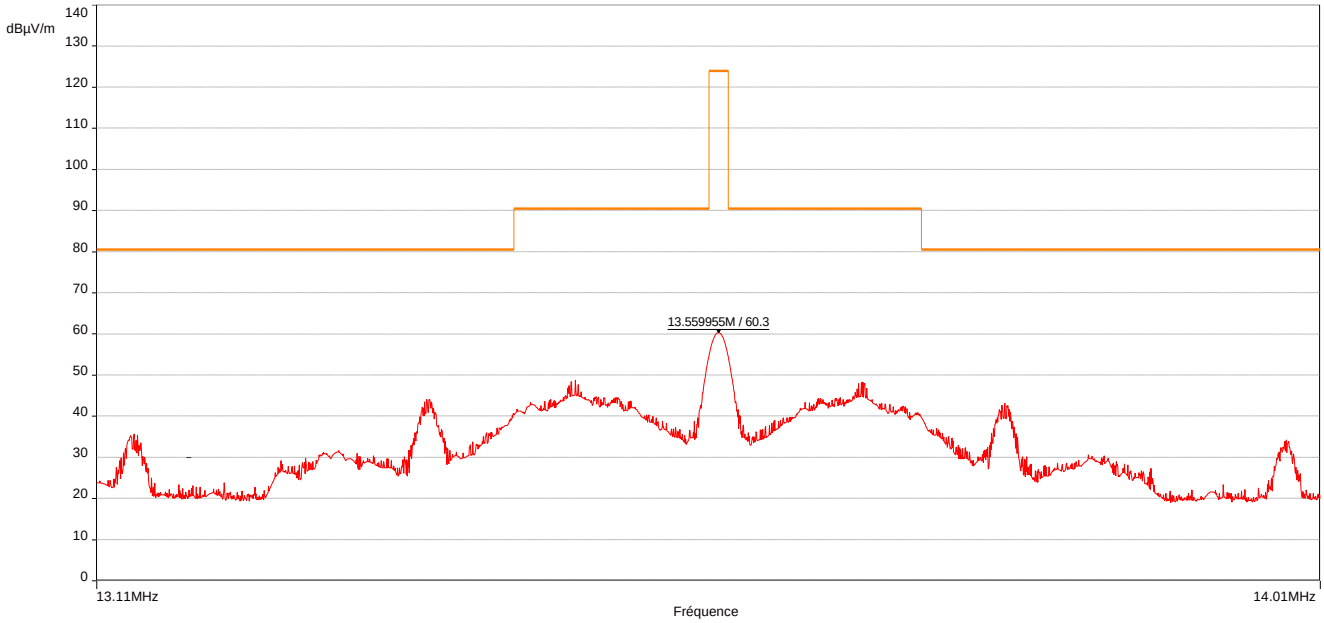


| TEST SETUP PHOTO - 9KHZ – 30MHZ |
| --- |
| Perpendicular antenna position<br>  |

E.U.T. position:

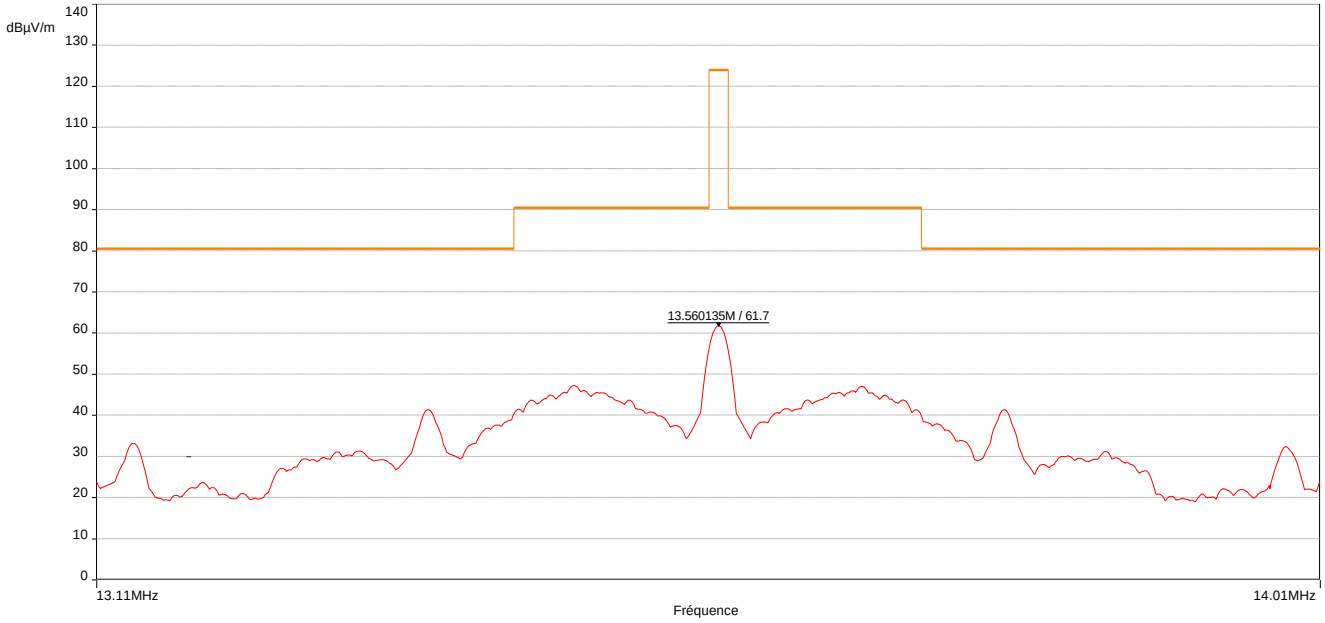
**Parallel antenna position**

| Frequency (MHz) | Electro-magnetic field (dBµV/m) | Limit (dBµV/m) |
|---|---|---|
| **13.5599** | +52.4 @ 3 m | + 124 @ 3 m |



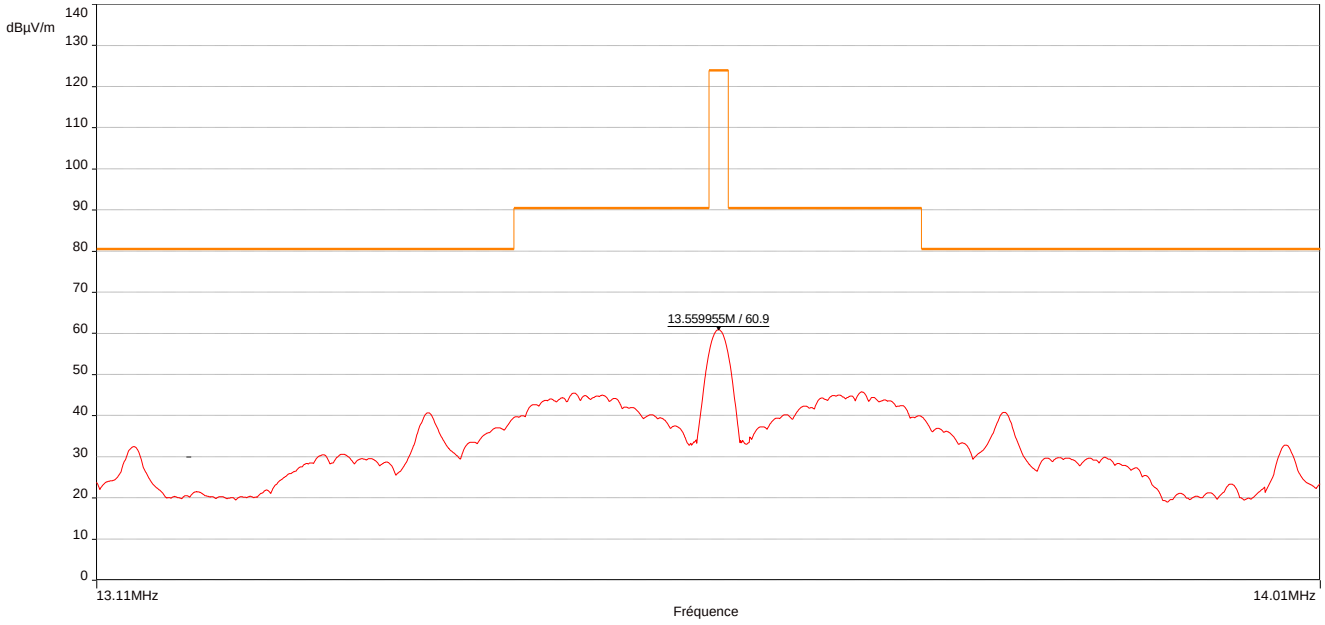
**45° Antenna position**

| Frequency (MHz) | Electro-magnetic field (dBµV/m) | Limit (dBµV/m) |
|---|---|---|
| **13.5601** | +53.8 @ 3 m | + 124 @ 3 m |



**Perpendicular antenna position**

| Frequency (MHz) | Electro-magnetic field (dBµV/m) | Limit (dBµV/m) |
|---|---|---|
| **13.5599** | +52.4 @ 3 m | + 124 @ 3 m |



## 6.3. 99% Occupied bandwith

| | |
|---|---|
| **Reference standard:** | FCC 47 CFR PART 15 : 2024<br>RSS GEN Issue 5 : 2018 / AMD1 : 2019 / AMD2 : 2021 |
| **Test method:** | §15.215 of FCC 47 CFR PART<br>§ 6.7 of RSS GEN |
| **General test setup:** E.U.T. is set on an insulating support at 80 cm above the ground reference plane. Measurement are done on a normalized test site.<br><br>E.U.T. is set on an insulating support at 0.8 m (<30MHz) above the ground reference plane.<br>For maximum meter reading at each frequency, the antenna height is 1 m above the ground plane. A 360 degrees rotation of the EUT is performed in parallel, perpendicular and 45° loop antenna. | |

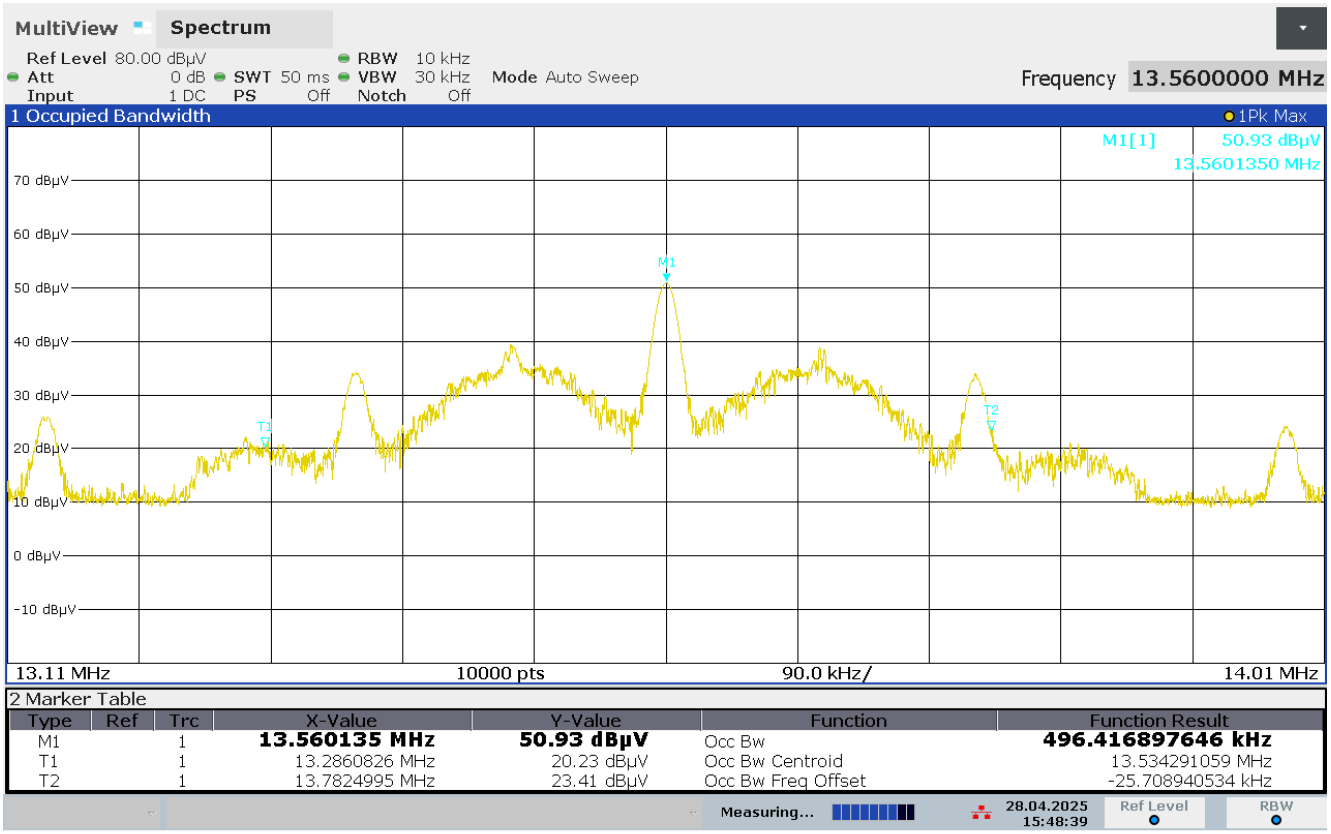
| LABORATORY PARAMETERS: | REQUIRED PRIOR TO THE TEST | DURING THE TEST |
|---|---|---|
| Ambient Temperature | 10 to 40 °C | 23°C |
| Relative Humidity | 10 to 90 % | 35 % |
| Atmospheric pressure | N/A | 1014 |
| **Test method deviation:** No | | |
| Supplementary information: - | | |

| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| CATEGORY | BRAND | TYPE | IDENTIFIER | CAL. DATE | CAL. DUE |
| Antenna | Emco | 6502 | 09579 | 06/02/2025 | 06/04/2027 |
| Cable | Huber + Suhner | N-10m | 17272 | 30/08/2024 | 30/10/2026 |
| Cable | Hytem | HY17D53UFA0400017D | 19868 | 14/08/2024 | 14/10/2026 |
| Cable | Hytem | HY17D53UFA0400017D | 19870 | 14/08/2024 | 14/10/2026 |
| Test enclosure | Emitech | HC4 | 14878 | | |
| Preamplifier | Hewlett Packard | 8447F H64 | 16970 | 29/05/2024 | 29/07/2025 |
| Receiver | Rohde & Schwarz | ESW44 | 17058 | 28/10/2024 | 28/12/2025 |

| TEST SETUP PHOTO |
| --- |
|  |

**99% Bandwidth**

| Frequency | Results (kHz) | Limit (kHz) |
|---|---|---|
| **13.56 MHz** | 496.4 | 900 |




15:48:40 28.04.2025

## 6.4. Frequency Tolerance of the carrier signal

| | |
|---|---|
| **Reference standard:** | FCC 47 CFR PART 15 : 2022<br>RSS-210 Issue 11 : 2024 |
| **Test method:** | §15.225 (e) of FCC 47 CFR PART 15<br>B.6 of RSS-210 |
| **General test setup:** E.U.T. is set on an insulating support at 5 cm above the ground on the climatic chamber.<br><br>The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency over a temperature variation of −20°C to + 50°C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20°C.<br>For battery operated equipment, the equipment tests shall be performed using a new battery. | |

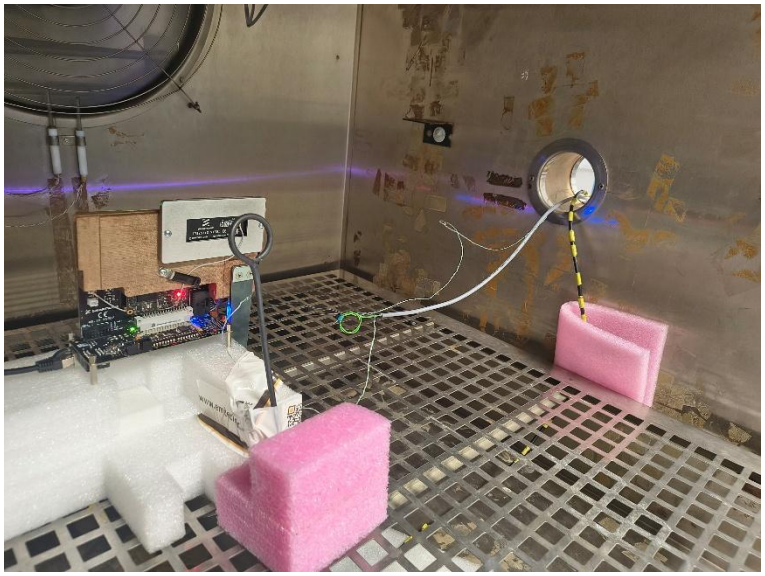
| TESTED CONFIGURATION | VERDICT |
|---|---|
| RFID | **PASS** |

| LABORATORY PARAMETERS: | REQUIRED PRIOR TO THE TEST | DURING THE TEST |
|---|---|---|
| Ambient Temperature | 10 to 40 °C | 23°C |
| Relative Humidity | 10 to 90 % | 35% |
| Atmospheric pressure | N/A | N/A |
| **Test method deviation:** No | | |
| Supplementary information: - | | |

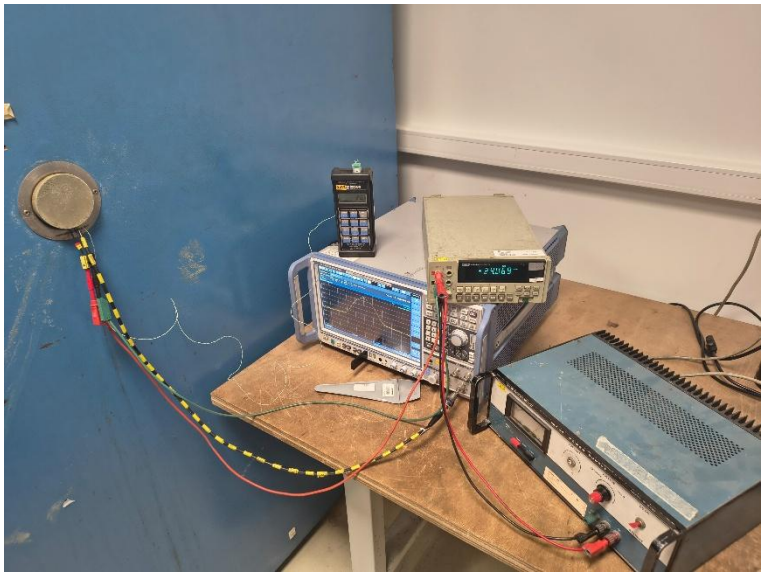
| TEST EQUIPMENT USED | | | | | |
|---|---|---|---|---|---|
| **CATEGORY** | **BRAND** | **TYPE** | **IDENTIFIER** | **CAL. DATE** | **CAL. DUE** |
| Climatic chamber | Sapratin | Phoenix 800l | 00118 | 29/04/2022 | 29/06/2024 |
| Data Acquisition Switch Unit | YCT | YC-747UD | 08332 | 22/02/2022 | 22/04/2023 |
| Data Acquisition Switch Unit | Omega | DL 23A | 02319 | 12/12/2024 | 12/02/2026 |
| Multimeter | Fluke | 8840A | 01330 | 13/11/2020 | 13/01/2023 |
| Power supply | Heathkit | IP-2710<br>30V-3A | 01313 | | |
| Receiver | Rohde & Schwarz | ESW44 | 17058 | 28/03/2022 | 28/05/2023 |
| stabilized power supply | Voltcraft | DPPS-16-30 | 15480 | | |
| Test enclosure | Emitech | HC4 | 14878 | | |

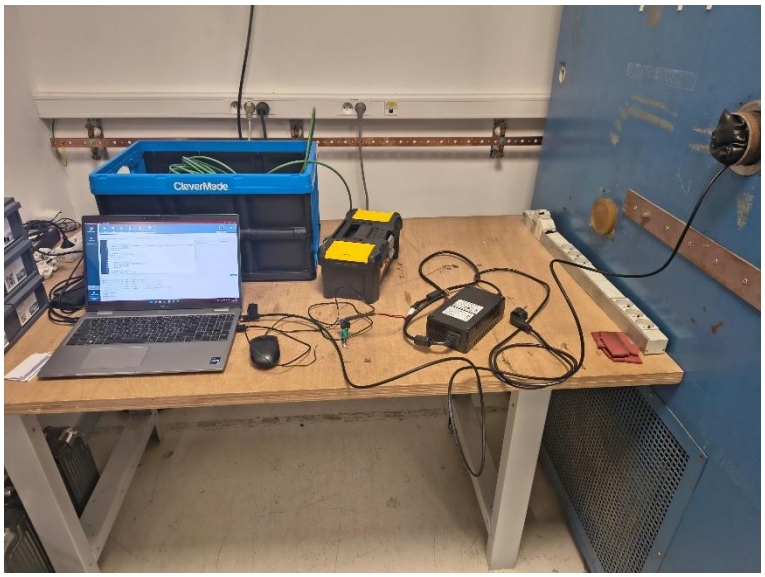
Blank cells = Permanent validity

## TEST SETUP PHOTO



## TEST SETUP PHOTO





**Nominal frequency: 13.5600MHz**

| | | | Center frequecy (MHz) | Frequency drift (ppm) |
|---|---|---|---|---|
| **Normal conditions** | Temperature (°C): 20 | Nominal power source (V) : 24Vdc | 13.560127 | +9.4 |
| | | Minimal power source (V) : 20.4Vdc | 13.560147 | +10.8 |
| | | Maximal power source (V) : 27.6Vdc | 13.560352 | +26.0 |
| **Extrem conditions** | Minimal temperature (°C) : -20 | Nominal power source (V) : 24Vdc | 13.560047 | +3.4 |
| | Maximal temperature (°C) : +50 | Nominal power source (V) : 24Vdc | 13.560197 | +14.5 |
| **Limit of the frequency tolerance (ppm)** | | | - | +/-100 |

**End of test report**