



Testing laboratory accredited by CGCRE according to ABNT NBR/ISO IEC 17025, under number CRL 0143

Radio Frequency Identification System model BVDR 2.0

Functional test report, EMC and electrical safety



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IBEC Report 221942 - Rev. 1.0

This revision cancels and replaces the previously issued version.

Hortolândia, February 13, 2026

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**Confidencial IBEC / AUMOVIO
BRAZIL INDUSTRY**

**Radio Frequency Identification System model
BVDR 2.0**

Functional test report, EMC and electrical safety

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Functional test report, EMC and electrical safety Posted on Radio Frequency Identification System model BVDR 2.0

1. INTRODUCTION

The purpose of this document is to describe the tests Performed on the equipment described in Item 2.1 and document the results obtained.

| FUNCTIONAL TESTS * ¹ | | |
|--|---|-------------------------------|
| Seq. * ² | Relevant tests | Results (item of this report) |
| 02 | Chapter II of Resolution No. 680 ↳ Article 8 – General emission limits (Table II) | Annex A |
| * ¹ ANATEL Resolution No. 680, of June 27, 2017 – “Regulation on restricted radiation radio communication equipment”, revised by Resolution No. 705, of December 21, 2018 , by the Resolution No. 718, of February 07, 2020 , and by the Resolution No. 726, of May 05, 2020 . ANATEL Act No. 14,448, of December 4, 2017 – “Technical requirements for conformity assessment of restricted radiation radio communication equipment”, as revised by Act No. 1,379, of February 28, 2019 , by Act No. 2,506, of May 07, 2020 , by Act No. 4,776, of September 1, 2020 , by Act 1,306, of February 26, 2021 and by the Act 423, of January 12, 2022 . ANATEL Act No. 237, of January 07, 2022 – “Test procedures for the conformity assessment of restricted radiation radio communication equipment”. | | |
| * ² Order of execution of the tests. | | |

Table 1 – Standards used and tests performed – Functional tests

| FUNCTIONAL TESTS * ¹ | | |
|--|--|-------------------------------|
| Seq. * ² | Relevant tests | Results (item of this report) |
| 03 | Item 13.1 of Act 14.448 (2017) & Act 1.379 (2019) – Radio frequency identification (RFID) systems, operating in the bands 119-135 kHz, 13.11-13.36 MHz, 13.41-14.01 MHz, 433.5-434.5 MHz, 860-869 MHz, 894-898.5 MHz, 902-907.5 MHz, 915-928 MHz, 2,400-2,483.5 MHz and 5,725-5,850 MHz ↳ Fundamental field strength ↳ Out-of-band emission | Annex A |
| * ¹ ANATEL Resolution No. 680, of June 27, 2017 – “Regulation on restricted radiation radio communication equipment”, revised by Resolution No. 705, of December 21, 2018 , by the Resolution No. 718, of February 07, 2020 , and by the Resolution No. 726, of May 05, 2020 . ANATEL Act No. 14,448, of December 4, 2017 – “Technical requirements for conformity assessment of restricted radiation radio communication equipment”, as revised by Act No. 1,379, of February 28, 2019 , by Act No. 2,506, of May 07, 2020 , by Act No. 4,776, of September 1, 2020 , by Act 1,306, of February 26, 2021 and by the Act 423, of January 12, 2022 . ANATEL Act No. 237, of January 07, 2022 – “Test procedures for the conformity assessment of restricted radiation radio communication equipment”. | | |
| * ² Order of execution of the tests. | | |

Table 2 – Standards used and tests performed – Functional tests

| EMC TESTING *¹ | | | |
|---|-------------------------------|--|----------------------------------|
| Seq. * ² | Relevant tests | Standards | Results (item of this report) |
| 01 | Radiated RF | IEC 61000-4-3 Ed. 2.1 (2002) | Annex B |
| 05 | Electrostatic Discharge (ESD) | IEC 61000-4-2 Ed. 1.1 (1999) + A2 (2000) | Annex B |
| <p>*¹ ANATEL Act No. 1,120, of February 19, 2018 – “<i>Technical requirements of electromagnetic compatibility for conformity assessment of telecommunications products</i>”.</p> <p>ANATEL Act No. 237, of January 07, 2022 – “<i>Test procedures for the conformity assessment of restricted radiation radio communication equipment</i>”.</p> | | | |
| * ² Order of execution of the tests. | | | |

Table 3 – Standards used and tests performed – EMC tests

| ELECTRICAL SAFETY TESTING *¹ | | |
|--|------------------------|----------------------------------|
| Seq. * ² | Relevant tests | Results (item of this report) |
| 04 | Overheating protection | Annex C |
| <p>*¹ ANATEL Act No. 950, of February 08, 2018 – “<i>Technical electrical safety requirements for conformity assessment of telecommunications products</i>”.</p> | | |
| * ² Order of execution of the tests. | | |

Table 4 – Standards used and tests performed – Electrical safety tests

Observation:

This report has undergone the following changes:

Revision 0.0 September 15, 2022 – Initial version.

Revision 1.0 February 13, 2026 – Revised report to change the manufacturer's name in Table 5 and include the modulation description in item 2.2 Test Configuration.

1.1. Place and Date of the tests

- IBEC EMC Laboratory
- Date: 05, 12 to September 14, 2022

1.2. Disclaimer

IBEC is responsible for the data presented here for the sample(s) of the equipment described in 2.1, not being responsible for similar products produced by the manufacturer(s) of the EUT, for differences due to the manufacturing process, or for current and future design changes.

The final analysis of the results obtained during the tests, declaring compliance or not with the applicable requirements, is the responsibility of the certification, approval or approval bodies of equipment.

1.3. Witnesses

The tests were not accompanied by representatives of the Aumovio Brazil Industry Ltda.

The interface between the manufacturer and IBEC was conducted by the BRACERT Certification Body.

2. DESCRIPTION OF THE EQUIPMENT AND TEST CONFIGURATIONS

2.1. Equipment under test (ESE)

Aumovio Brazil Industry Ltda. provided and is responsible for the data below, declaring that they are sufficient to fully characterize the equipment tested.

Table 5 describes the equipment under test.

| Sample No. | Equipment | Model | Manufacturer (or brand) | S/N | Country of origin |
|------------|---------------------------------------|----------|--|----------|-------------------|
| #01 | Radio Frequency Identification System | BVDR 2.0 | Continental Brazil Industria Automotiva Ltda | 45000049 | Brazil |

Table 5 – Description of the equipment under test



Photo 1 – Radio Frequency Identification System model BVDR 2.0 – Front View



Photo 2 – Radio Frequency Identification System model BVDR 2.0 – Rear view



**Radio Frequency Identification System model
BVDR 2.0**

Functional test report, EMC and electrical safety

Photo 3 – Radio Frequency Identification System model BVDR 2.0 – Side view 1



Photo 4 – Radio Frequency Identification System model BVDR 2.0 – Side view 2



Photo 5 – Radio Frequency Identification System model BVDR 2.0 – Bottom view with the graduated ruler

Photo 6 – Radio Frequency Identification System model BVDR 2.0 – Top view with the graduated ruler (Location of the identification)

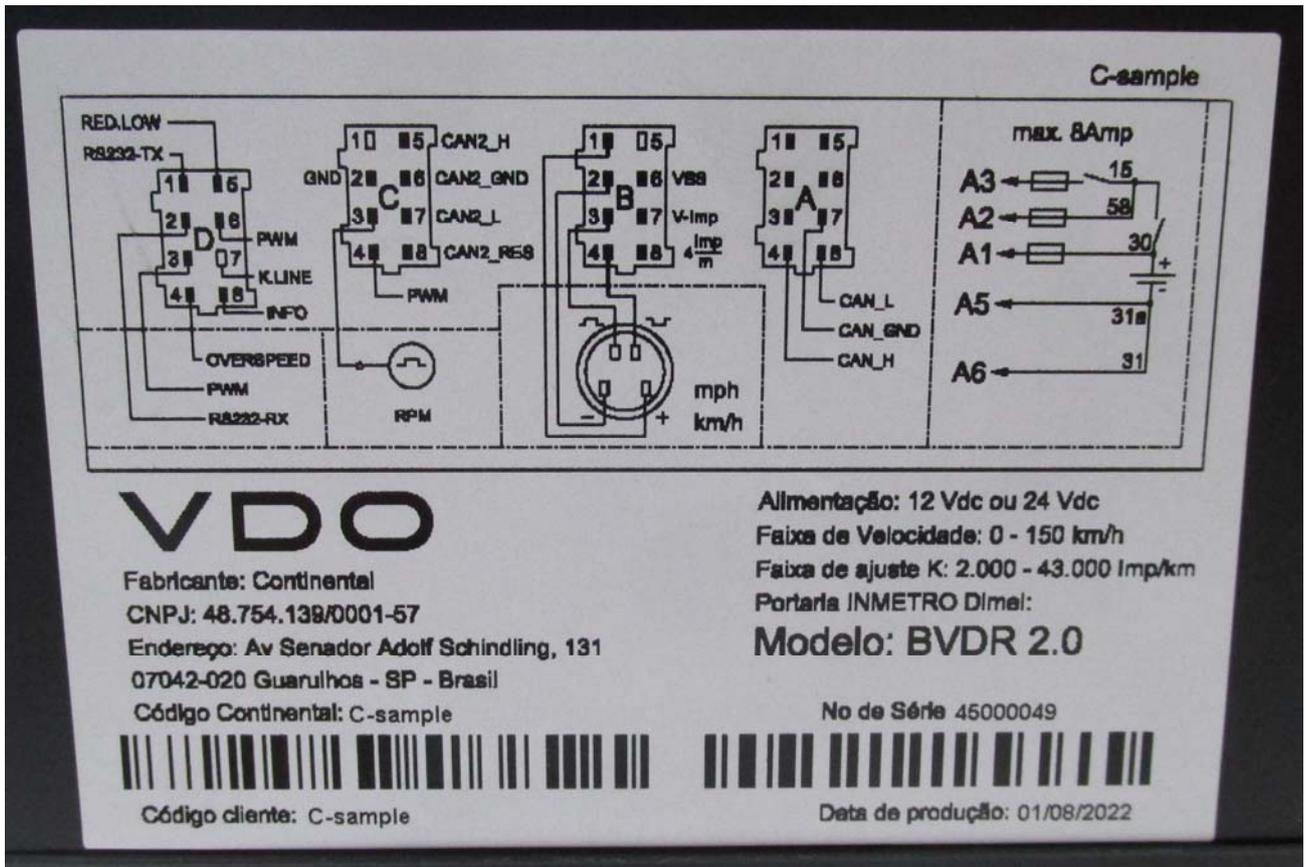


Photo 7 – EUT identification detail



Photo 8 – EUT identification detail

2.1.1. Deviations

As required by the normative requirements of **NBR ISO/IEC 17025:2017** (items 7.4.3 and 7.8.2.2), IBEC shall record in this test report any deviations of the sample received from the conditions specified in the technical/commercial proposal, and shall also record any modifications implemented in the EUT, when these modifications may affect the results of the tests. It is up to the Certification Bodies to analyse the relevance of these deviations.

No deviation was detected in the receipt of the EUT.

2.1.2. Modifications

No modifications were made to the EUT.

2.2. Configuration for the tests

A Table 6 describes the support equipment used during the tests.

| Code. IBEC / Sample no. | Equipment | Model | Manufacturer | S/N |
|-------------------------|--------------------------|--------------|--------------|------------|
| — | Power Supply | SYS1357-1812 | Sunny | Not listed |
| 1468 | Spectrum Analyzer | MS2668C | Anritsu | 6200039070 |
| 2940 | DC Dimmable Power Supply | HF-3205S | Hikari | Not listed |
| 2942 | DC Dimmable Power Supply | KPS605D | wanptek | Not listed |
| #03 | RFID Card | Not listed | Not listed | Not listed |

Table 6 – Description of the support equipment



Photo 9 – Power Supply



Photo 10 – Power Supply



Photo 11 – Detail of the identification of the Power Supply



Photo 12 – Adjustable Power Supply - Code. IBEC 2940



Photo 13 – Adjustable Power Supply - Code. IBEC 2940



Photo 14 – Detail of the identification of the Adjustable Power Supply - Code. IBEC 2940



Photo 15 – Adjustable Power Supply - Code. IBEC 2942



Photo 16 – Adjustable Power Supply - Code. IBEC 2942

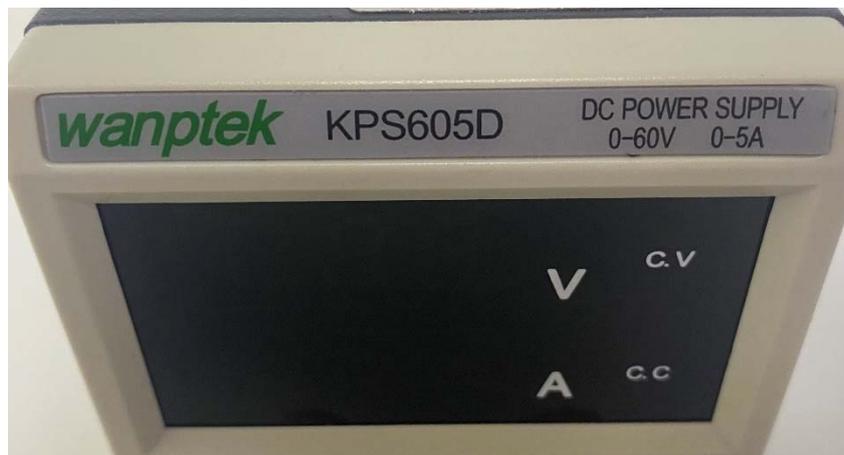


Photo 17 – Detail of the identification of the Adjustable Power Supply - Code. IBEC 2942

Except as otherwise described in the result sheets (see Appendices to this report), the sample was exercised as follows:

- Resolution 680 functional tests: EUT was configured for continuous transmission. The technical characteristics of EUT are described in the result sheet (see Annex A of this report).
- EMC & Electrical Safety Tests: During the tests, the EUT communication interfaces remained active and were exercised as shown in the table below:

| EUT interface | Support equipment used | Exercise / software / app |
|------------------------------------|------------------------|---------------------------|
| 13.56 MHz (RFID) ASK Modulation | RFID Card | Intermittent transmission |

2.3. Criteria for evaluating results and rule for decision of conformity

2.3.1. Functional tests

The EUT tested according to the methods established by **Resolution 680 + Act 14.448 (2017)**, **meets or does not** meet the criteria, limits and/or specifications thereof. These limits are described in the scoresheets (see Annex A to this report).

Compliance or not, declared in the tables of results of this report, were obtained after analysis of the test results, and their comparison with the applicable regulatory requirements/limits.

The decision rule adopted by the IBEC is the normative criterion in question. In situations where measurement uncertainty affects the analysis of compliance, IBEC adopts as a decision rule that results whose uncertainty reaches the limits, the degree of confidence of compliance or not is 95% probability. This is an opinion and interpretation of IBEC and is not part of the scope of accreditation of this laboratory.

2.3.2. EMC Testing

▪ Immunity assays

Parameters to be checked in the tests, as applicable:

In the absence of requirements in the specific regulations on the equipment to be certified, where applicable, the following parameters shall be verified in the assessment of the performance characteristics of the equipment:

- a) Alarm Indication
- b) possibility of establishing or interrupting connections
- c) Error rate in digital interfaces
- d) frame error rate (FER)
- e) in analog or voice interfaces – differential signal level resulting from the demodulation of the radio frequency disturbance. In this case, in the absence of another prescription, the limit is a level of -40 dBm over an impedance of 600 Ω (regardless of the impedance actually used), selectively measured at 1 kHz, with a passing range less than or equal to 100 Hz, with the line being active and connected to the appropriate auxiliary equipment

For radio communication equipment, consider in addition, when applicable, the following characteristics: (...)

- c) unintentional transmission or emission of radio signals
- d) No loss of functionality
- e) No loss of linkage.

Criterion for evaluating the results:

For the purpose of verifying compliance with the requirements of electromagnetic immunity of equipment, in the absence of prescriptions in specific regulations for the product, the following criteria are defined to be observed in the evaluation of performance:

- **Criterion A:** *During the test, the equipment must operate normally in accordance with its technical specifications or without changes in performance and the evaluated characteristics.*
Applied to *Radiated RF Immunity assays*.
- **Criterion B:** *Abnormalities in the performance of the equipment will only be admitted at the time of application of the disturbance. However, there must be no loss of connection, alarms or loss of stored data. Once the application of the disturbance ceases, the equipment must present the original operating conditions, according to its technical specifications.*
Applied to *Electrostatic Discharge (ESD) tests*.

2.3.3. Electrical safety tests

The evaluation criteria are described in the result sheets (see Annex C of this report).

Compliance or not, declared in the tables of results of this report, were obtained after analysis of the test results, and their comparison with the applicable regulatory requirements/limits.

The decision rule adopted by the IBEC is the normative criterion in question. In situations where measurement uncertainty affects the analysis of compliance, IBEC adopts as a decision rule that results whose uncertainty reaches the limits, the degree of confidence of compliance or not is 95% probability. This is an opinion and interpretation of IBEC and is not part of the scope of accreditation of this laboratory.

2.4. Equipment used

The equipment used in the tests is described in the respective test results tables.

2.5. Measurement uncertainties

The expanded combined uncertainties of the test measurement results, where applicable, are presented in the results tables. The reported expanded measurement uncertainty is stated as the standard measurement uncertainty multiplied by the coverage factor k , such that the coverage probability is approximately 95%.

Such uncertainties are valid for this report and because they are continuously being reassessed, they may change at future dates. These uncertainties have been calculated in accordance with internal procedure No. PG021.

3. TEST RESULTS

The results and photos of the tests can be found on the completed test forms attached to this document (see Annex A to Annex C).

4. CONCLUSION

As per 1.2, the results presented here are valid only for the sample tested and the test conditions adopted. IBEC is not responsible for the extrapolation of the results to other equipment of the same model.

It is the responsibility of the competent bodies accredited for this purpose, the certification, approval or approval of the equipment model.

_____ / ANNEXES



**Confidencial IBEC / AUMOVIO
BRAZIL INDUSTRY**

**Radio Frequency Identification System model
BVDR 2.0**

Functional test report, EMC and electrical safety

ANNEX A

Results of functional tests

Standard: **Resolução n° 680 (2017) & Ato n° 14.448 (2017) & Ato n° 237 (2022)**

Procedure: **PEE067**

Project number: **IBEC 221942**

EUT characteristics and operation mode

EUT width (L): **0,17 m** Power supply: **12 Vdc**
EUT depth (P): **0,23 m** Operation mode: **As described in the item 2.2 of this test report.**
Average radius: $R_m = [(L + P) / 4]$: **0,10 m**

Equipment used in the test

| IBEC code | Description | IBEC code | Description | IBEC code | Description |
|-----------|-------------------|-----------|-----------------------|-----------|------------------|
| 2.452 | Spectrum analyzer | 2.911 | Biconilog antenna | 53 | Amplifier |
| 2.834 | Loop antenna | 2.755 | Semi-anechoic chamber | 2.345 | Thermohigrometer |
| 2.771 | Thermohigrometer | | | | |

Standard: Resolução nº 680 (2017) & Ato nº 14.448 (2017) & Ato nº 237 (2022)
Procedure: PEE067
Project number: IBEC 221942

Photo 01

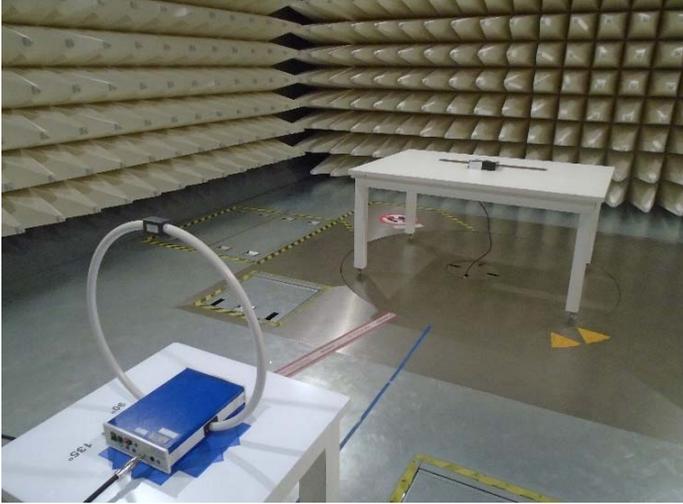


Photo 02



Photo 03



Photo 04



Resolution n° 680, Art. 8° & Act 14.448 (2017), item 4 – GENERAL EMISSION LIMITS & HARMONICS

Standard: **Resolução n° 680 (2017) & Ato n° 14.448 (2017) & Ato n° 237 (2022)**
 Project number: **IBEC 221942** Test date: **09/12/2022** Technician: **OCF** Procedure: **PEE067**
 Test condition: Temperature: **21,6°C ~ 23,0°C** Humidity: **60% ~ 66%** Atmospheric pressure: **710 ± 10 mmHg** Amostra: **#01**

EUT operation range: 13,553-13,567 MHz

Specified limits & Performance criteria

The equipment, tested according the methods established by the reference standards, complies or does not comply the limits defined in these standards, transcribed below.

Measure range: 9 kHz to 1 GHz

Requirements:

Art. 8° of Resolution n° 680

The transmissions from the restricted radiation equipment shall not to be greater than the levels of field intensity specified in Table II.

Table II of Resolution n° 680 – General limits of emission

*1 – For frequency range below 30 MHz, the limit was extrapolated using the factor of 40 dB/decade as described in ANATEL Act n° 237 (2022).

| Frequency range [MHz] | Values specified in the Resolution | | Converted/extrapolated values | |
|-------------------------|------------------------------------|------------------------|-------------------------------|------------------------|
| | Field intensity [µV/m] | Measure distance [m] | Field intensity [dBµV/m] | Measure distance [m] |
| 9-490 kHz | 2.400 / f [kHz] | 300 | 147,60 to 112,89 | 1 |
| 490 -1705 kHz | 24.000 / f [kHz] | 30 | 92,89 to 82,05 | 1 |
| 1,705-30 MHz | 30 | 30 | 88,63 | 1 |
| 30-88 MHz | 100 | 3 | 40,00 | 3 |
| 88-216 MHz | 150 | 3 | 43,52 | 3 |
| 216-960 MHz | 200 | 3 | 46,02 | 3 |
| 960-1000 MHz | 500 | 3 | 53,98 | 3 |
| > 1 GHz | 500 | 3 | 53,98 | 3 |

Item 4 of Act ANATEL n° 14.448 (2017)

In addition to the general conditions established in the Regulation on Radiocommunication Equipment of Restricted Radiation, shall be observed in the procedures of conformity assessment:

- The average field intensity of a restricted radiation equipment operating in the bands 26.96-27.28 MHz and 49.82-49.90 MHz shall not exceed 500 microvolts per meter at 3 meters from the emitter, for emissions outside of band, including harmonics, at any radio frequency farther than 10 kHz from the carrier.
- The average field intensity limits (fundamental and harmonics), measured at a distance of 3 meters, from a restricted radiation equipment operating in the bands 902-907.5 MHz, 915-928 MHz, 2,400-2,483.5 MHz and 5,725-5,875 MHz shall not exceed that specified in Table I. The peak field intensity of any emission shall not exceed the average value specified by more than 20 dB. Emissions outside the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB of the fundamental level or comply with the general emission limits of Table II (of Resolution n° 680), with the lowest attenuation prevailing.

Remarks / Legend of results table

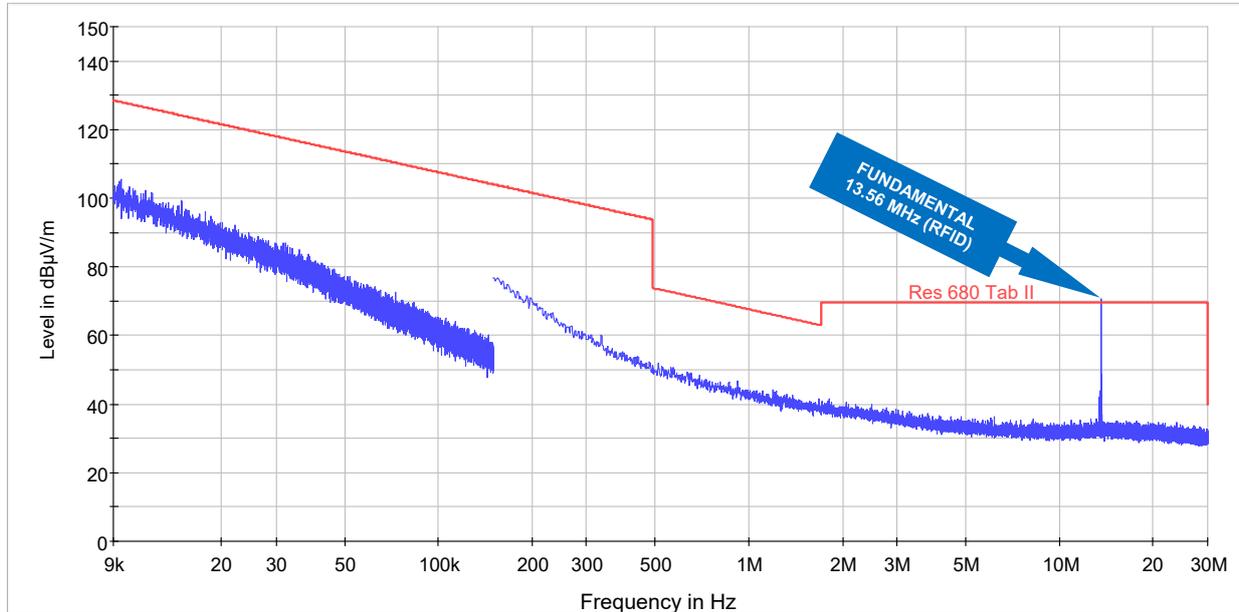
Measure = Measure of field level Az = Azimuth position used in the measurement *1 – Expanded combined uncertainty for factor k = 2.00
 Delta = Measure – Limit h = Antenna height used in the measurement and confidence level of approximately 95%.

| Test results – General emission limits – Range of 9 kHz to 30 MHz | | | | | | | | |
|---|-------------------|--------------------|------------------|--------------|---------------------------------|----------------|--------------------|---------|
| Polarization | Frequency [kHz] | Measure [dBµV/m] | Limit [dBµV/m] | Delta [dB] | Uncertainty *1 [dB] | Az (EUT) [°] | Az (Antenna) [°] | h [m] |
| Vertical | ---- | ---- | ---- | ---- | 5,0 | 0°-360° | 0°-360° | 1,0 |
| Test results – General emission limits – Range of 30 to 1000 MHz | | | | | | | | |
| Polarization | Frequency [MHz] | Measure [dBµV/m] | Limit [dBµV/m] | Delta [dB] | Uncertainty *1 [dB] | Az [°] | h [m] | |
| Vertical | ---- | ---- | ---- | ---- | 5,0 (f≤200MHz) & 6,2 (f>200MHz) | 0°-360° | | 1 ~ 4 |
| Horizontal | ---- | ---- | ---- | ---- | 5,0 (f≤200MHz) & 6,2 (f>200MHz) | 0°-360° | | 1 ~ 4 |

Resolution n° 680, Art. 8° & Act 14.448 (2017), item 4 – GENERAL EMISSION LIMITS & HARMONICS

| | | | |
|---|------------------------------|--|--------------------------|
| Standard: Resolução n° 680 (2017) & Ato n° 14.448 (2017) & Ato n° 237 (2022) | | | |
| Project number: IBEC 221942 | Test date: 09/12/2022 | Technician: OCF | Procedure: PEE067 |
| Test condition: Temperature: 21,6°C ~ 23,0°C | Humidity: 60% ~ 66% | Atmospheric pressure: 710 ± 10 mmHg | Amostra: #01 |

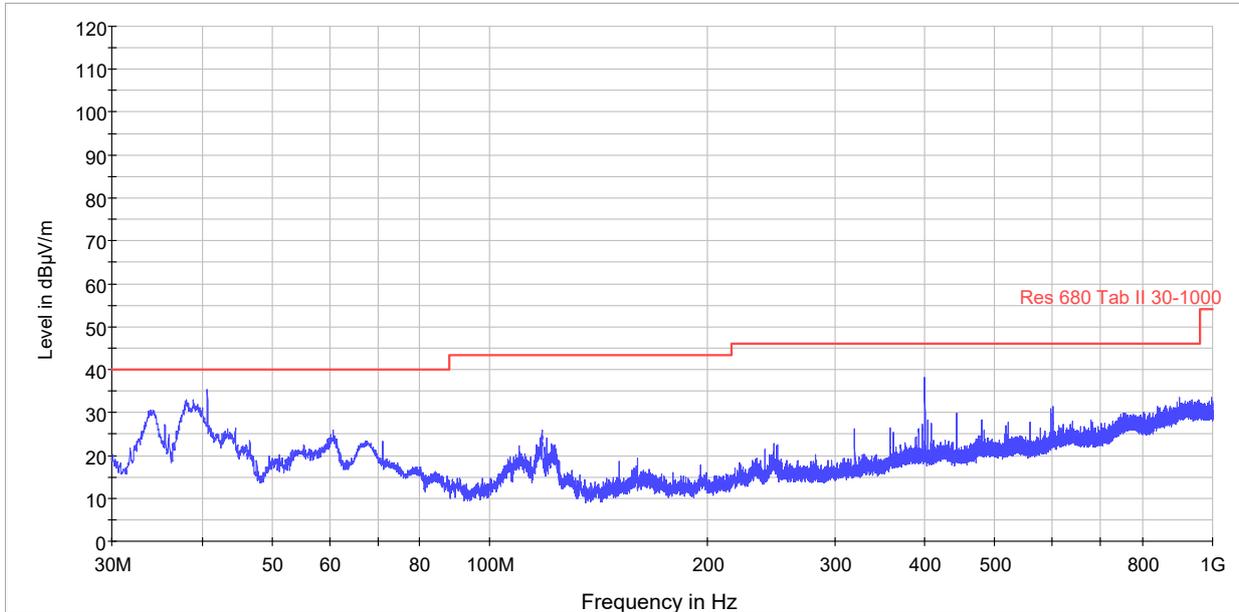
Graphic: Vertical polarization – Range of 9 kHz to 30 MHz



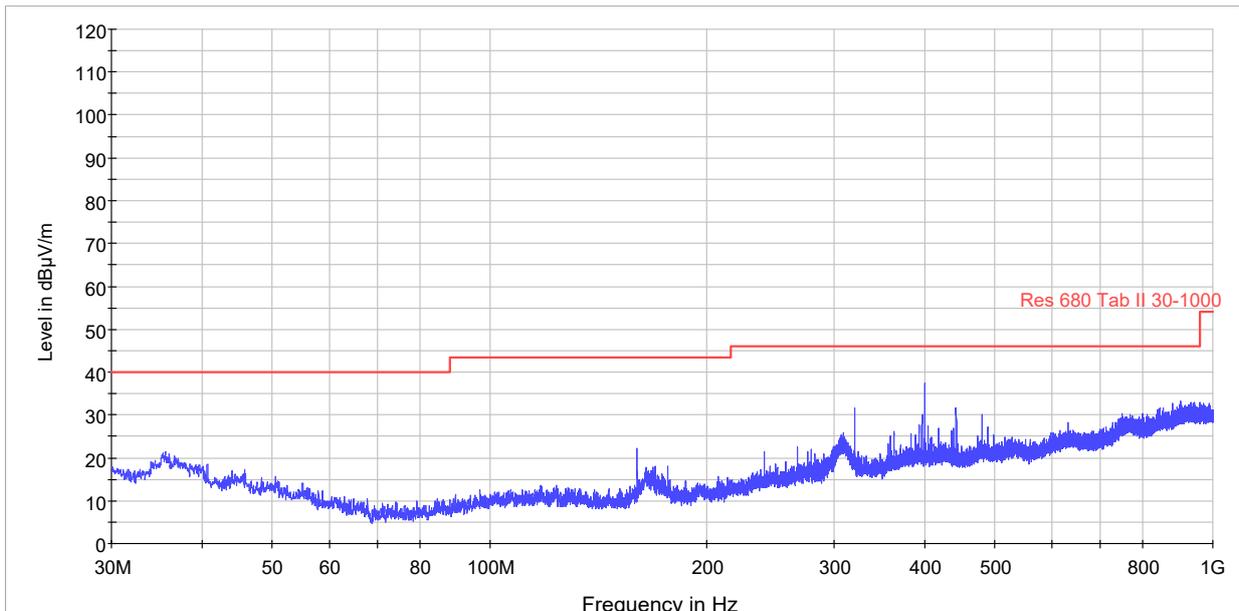
Resolution n° 680, Art. 8° & Act 14.448 (2017), item 4 – GENERAL EMISSION LIMITS & HARMONICS

| | | | |
|---|------------------------------|--|--------------------------|
| Standard: Resolução n° 680 (2017) & Ato n° 14.448 (2017) & Ato n° 237 (2022) | | | |
| Project number: IBEC 221942 | Test date: 09/12/2022 | Technician: OCF | Procedure: PEE067 |
| Test condition: Temperature: 21,6°C ~ 23,0°C | Humidity: 60% ~ 66% | Atmospheric pressure: 710 ± 10 mmHg | Amostra: #01 |

Graphic: Vertical polarization – Range of 30 to 1000 MHz



Graphic: Horizontal polarization – Range of 30 to 1000 MHz



Act 14.448 (2017), item 13 – RADIO FREQUENCIES IDENTIFICATION SYSTEMS

Standard: **Resolução n° 680 (2017) & Ato n° 14.448 (2017) & Ato n° 237 (2022)**
 Project number: **IBEC 221942** Test date: **09/13/2022** Technician: **OCF** Procedure: **PEE067**
 Test condition: Temperature: **21,6°C ~ 23,0°C** Humidity: **60% ~ 66%** Atmospheric pressure: **710 ± 10 mmHg** Amostra: **#01**

EUT operation range: 13,553-13,567 MHz

RADIO FREQUENCIES IDENTIFICATION SYSTEMS (RFID)

Specified limits & Performance criteria

The equipment, tested according the methods established by the reference standards, complies or does not comply the limits defined in these standards, transcribed below.

| Table V Frequency range | Values specified in the Resolution | | Converted/extrapolated values | |
|----------------------------|--|---------------------------|---|---------------------------|
| | Field intensity [$\mu\text{V/m}$] | Measure distance [m] | Field intensity [$\text{dB}\mu\text{V/m}$] | Measure distance [m] |
| 119-135 kHz | 2400 / F (kHz) | 300 | 105,67 | 3 |
| 13,11-13,36 MHz | 106 | 30 | 80,51 | 3 |
| 13,41-13,553 MHz | 334 | 30 | 90,47 | 3 |
| 13,553-13,567 MHz | 15.848 | 30 | 124,00 | 3 |
| 13,567-13,710 MHz | 334 | 30 | 90,47 | 3 |
| 13,710-14,01 MHz | 106 | 30 | 80,51 | 3 |
| 433,5-434,5 MHz | 70.359 | 3 | 96,95 | 3 |
| 860-869 MHz | 70.359 | 3 | 96,95 | 3 |
| 894-898,5 MHz | 70.359 | 3 | 96,95 | 3 |
| 902-907,5 MHz | 70.359 | 3 | 96,95 | 3 |
| 915-928 MHz | 70.359 | 3 | 96,95 | 3 |
| 2400-2483,5 MHz | 50.000 | 3 | 93,98 | 3 |
| 5725-5850 MHz | 50.000 | 3 | 93,98 | 3 |

Remarks:

*1 – For frequency range below 30 MHz, the limit was extrapolated using the factor of 40 dB/decade [Ref.: ANATEL Act n° 237 (2022)].

*2 – For frequency range above 30 MHz, the limit was extrapolated using the factor of 20 dB/decade [Ref.: ANATEL Act n° 237 (2022)].

Note: Table V was modified by ANATEL Act n° 1.379 (2019).

Requirement:

Radio Frequency Identification Systems (RFID) operating in the bands 119-135 kHz, 13.11-13.36 MHz, 13.41-14.01 MHz, 433.5-434.5 MHz, 860-869 MHz, 894-898.5 MHz, 902-907.5 MHz, 915-928 MHz, 2,400-2,483.5 MHz and 5,725-5,850 MHz shall meet the limits of Table V.

- The field intensity limits shall be measured using the average detector and in the transition radio frequencies, the most restrictive field strength value is applied.
- The peak field intensity of any emission shall not exceed the values specified in Table V by more than 20 dB.
- Undesirable emissions outside the frequency bands established here, other than harmonics, shall be attenuated at least 50 dB in relation to the fundamental frequency level or shall comply with the general limits established in Art. 8° of Resolution n° 680, with the lowest attenuation prevailing.

Act 14.448 (2017), item 13 – RADIO FREQUENCIES IDENTIFICATION SYSTEMS

Standard: **Resolução nº 680 (2017) & Ato nº 14.448 (2017) & Ato nº 237 (2022)**
 Project number: **IBEC 221942** Test date: **09/13/2022** Technician: **OCF** Procedure: **PEE067**
 Test condition: Temperature: **21,6°C ~ 23,0°C** Humidity: **60% ~ 66%** Atmospheric pressure: **710 ± 10 mmHg** Amostra: **#01**

EUT operation range: 13,553-13,567 MHz

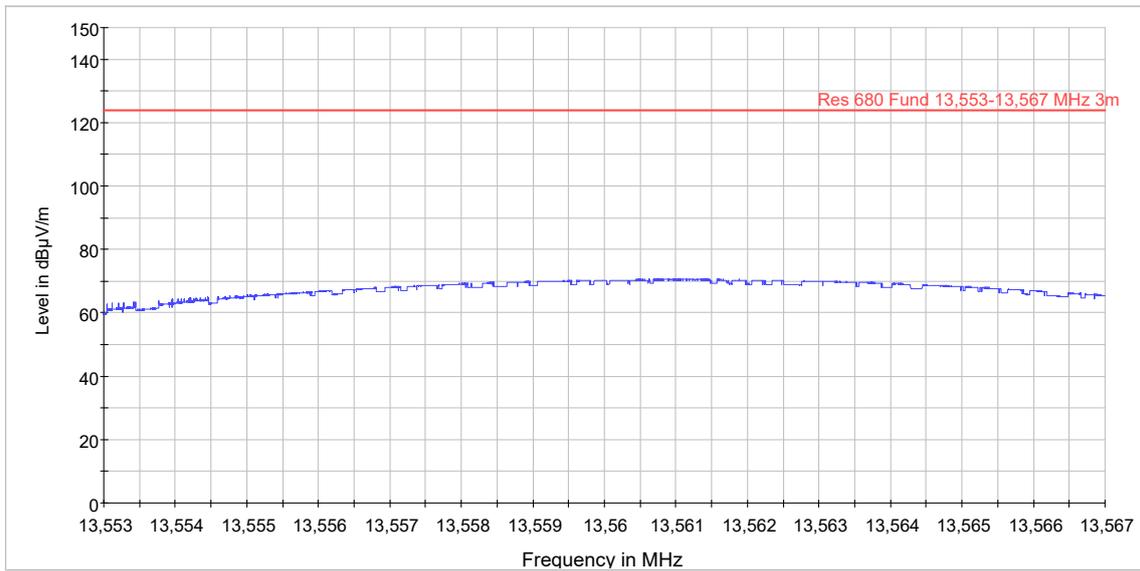
Remarks / Legend of results table

Measure = Measure of field level Az = Azimuth position used in the measurement *1 – Expanded combined uncertainty for factor k = 2.00
 Delta = Measure – Limit h = Antenna height used in the measurement and confidence level of approximately 95%.

Test results – Fundamental field intensity & Harmonics

| Polarization | Frequency [MHz] | Measure [dBµV/m] | Limit [dBµV/m] | Delta [dB] | Uncertainty *1 [dB] | Az ESE [°] | Az Antena [°] | h [m] |
|--------------|-------------------|--------------------|------------------|--------------|-----------------------|--------------|-----------------|---------|
| Vertical | 13,56 | 70,5 | 124,00 | -53,5 | 5,0 | 360,0 | 0,0 | 1,0 |

Graphic: Fundamental intensity field measurement





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BRAZIL INDUSTRY**

**Radio Frequency Identification System model
BVDR 2.0**

Functional test report, EMC and electrical safety

ANNEX B

EMC Assay Results

RADIATED, RADIO-FREQUENCY, ELECTROMAGNETIC FIELD IMMUNITY TEST –

Standard: **IEC 61000-4-3 Ed. 2.1 (2002)** Procedure: **PEE009**
 Project number: **IBEC 221942** Test date: **09/05/2022** Technician: **GBL/OCF** Sample: **#01**
 Test condition: Temperature: **19,8°C ~ 21,5°C** Humidity: **47% ~ 58%** heric pressure: **710 ± 10 mmHg**

Equipment used in the test

| IBEC code | Description | IBEC code | Description | IBEC code | Description |
|-----------|-----------------------|-----------|---------------------|-----------|-----------------------|
| 2.849 | Coupler | 2.850 | Coupler | 2.946 | Amplifier (< 200 MHz) |
| 2.066 | Amplifier (< 1 GHz) | 2.713 | Amplifier (> 1 GHz) | 2.289 | Biconilog antenna |
| 289 | Semi-anechoic chamber | 2.702 | Signal generator | 2.853 | Power meter |
| 2.851 | Power head | 2.852 | Power head | 2.433 | Thermohigrometer |
| 2.751 | Thermohigrometer | | | | |

EUT characteristics and operation mode

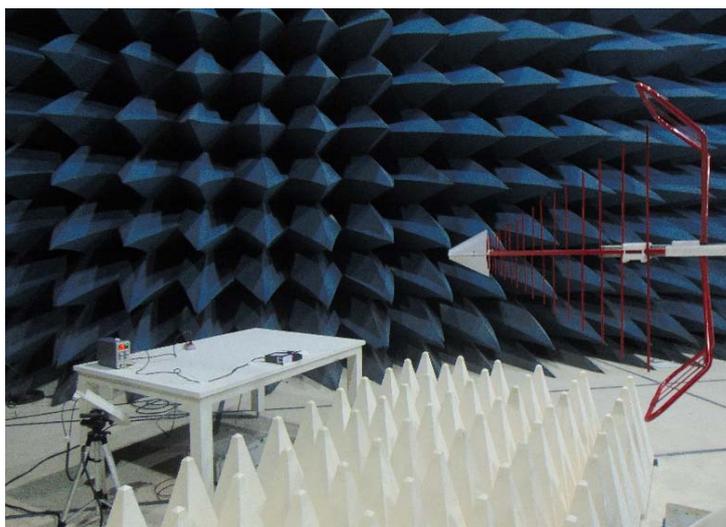
EUT power supply: **12 Vdc**
 EUT operation mode: **As described in the item 2.2 of this test report.**

Test specification & Performance criteria

Frequency range: **80 to 1000 MHz and from 1.4 to 2 GHz**
 Test severity: **3 V/m** Antenna polarization: **Vertical and horizontal**
 Modulation: **AM 80%, 1 kHz, sinusoidal**
 Performance criteria: **Performance criteria A (see item 2.3 of this test report)**
 Product standard: **ANATEL Act n.º 1.120 (2018), item 7**

| Radiated, radio-frequency, electromagnetic field immunity test results | | | | |
|--|---------------------|------------------------|------------|------------------------------|
| Level [V/m] | Freq. range [MHz] | Polarization (Antenna) | Face (EUT) | Occurrences / Remarks |
| 3 V/m | 80 to 200 MHz | Vertical | Frontal | No occurrences were verified |
| | | | Left | No occurrences were verified |
| 3 V/m | 80 to 200 MHz | Horizontal | Frontal | No occurrences were verified |
| | | | Left | No occurrences were verified |
| 3 V/m | 200 to 1000 MHz | Vertical | Frontal | No occurrences were verified |
| | | | Left | No occurrences were verified |
| 3 V/m | 200 to 1000 MHz | Horizontal | Frontal | No occurrences were verified |
| | | | Left | No occurrences were verified |
| 3 V/m | 1,4 a 2 GHz | Vertical | Frontal | No occurrences were verified |
| | | | Left | No occurrences were verified |
| 3 V/m | 1,4 a 2 GHz | Horizontal | Frontal | No occurrences were verified |
| | | | Left | No occurrences were verified |

Setup photo



ELECTROSTATIC DISCHARGE IMMUNITY TEST –

| | | | |
|---|------------------------------|---------------------------------------|--------------------------|
| Standard: IEC 61000-4-2 Ed. 1.1 (1999) + A2 (2000) | Test date: 09/14/2022 | Technician: LSC | Procedure: PEE061 |
| Project number: IBEC 221942 | Humidity: 55% ~ 58% | (tm. pressure: 710 ± 10 mmHg) | Sample: #01 |
| Test condition: Temperature: 22,5°C ~ 22,7°C | | | |

Equipment used in the test

| IBEC code | Description | IBEC code | Description | IBEC code | Description |
|-----------|------------------|-----------|-------------------------------|-----------|-------------------------------|
| 2.923 | ESD generator | ---- | HCP (horizontal coupling plar | ---- | VCP (vertical coupling plane) |
| 2.725 | Thermohigrometer | | | | |

EUT characteristics and operation mode

EUT power supply: **12 Vdc**
EUT operation mode: **As described in the item 2.2 of this test report.**

Test specification & Performance criteria

Test severity – Direct discharge: **± 6 kV**
Test severity – Air discharge: **± 8 kV**
N° of discharges: **10 discharges (positive polarity) and 10 discharges (negative polarity) at each preselected point**
Interval between discharges: **1 second**
Performance criteria: **Performance criteria B (see item 2.3 of this test report)**

Product standard: **ANATEL Act n.º 1.120 (2018), item 7**

| Electrostatic discharge immunity test results | | |
|---|------|-------------------------------|
| DIRECT CONTACT – Level: ± 6 kV | | |
| Point | Pol. | Occurrences / Remarks |
| ---- | + | No discharge point was found. |
| | – | No discharge point was found. |
| AIR DISCHARGE – Nivel: ± 8 kV | | |
| Point | Pol. | Occurrences / Remarks |
| ---- | + | No discharge point was found. |
| | – | No discharge point was found. |
| CONTACT INDIREC DISCHARGE (HCP) – Level: ± 6 kV | | |
| Side | Pol. | Occurrences / Remarks |
| Frontal | + | No occurrences were verified |
| | – | No occurrences were verified |
| Rear | + | No occurrences were verified |
| | – | No occurrences were verified |
| Right | + | No occurrences were verified |
| | – | No occurrences were verified |
| Left | + | No occurrences were verified |
| | – | No occurrences were verified |
| CONTACT INDIREC DISCHARGE (VCP) – Level: ± 6 kV | | |
| Side | Pol. | Occurrences / Remarks |
| Frontal | + | No occurrences were verified |
| | – | No occurrences were verified |
| Rear | + | No occurrences were verified |
| | – | No occurrences were verified |
| Right | + | No occurrences were verified |
| | – | No occurrences were verified |
| Left | + | No occurrences were verified |
| | – | No occurrences were verified |

ELECTROSTATIC DISCHARGE IMMUNITY TEST –

Standard: **IEC 61000-4-2 Ed. 1.1 (1999) + A2 (2000)**

Project number: **IBEC 221942**

Test date: **09/14/2022**

Technician: **LSC**

Procedure: **PEE061**

Test condition: Temperature: **22,5°C ~ 22,7°C**

Humidity: **55% ~ 58%**

atm. pressure: **710 ± 10 mmHg**

Sample: **#01**

Setup photo





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**Radio Frequency Identification System model
BVDR 2.0**

Functional test report, EMC and electrical safety

ANNEX C

Electrical safety test results

Plug inspection

Standard: **ANATEL Act nº 950, of February 8, 2018**

Procedure: **PEE026**

Project number: **IBEC 221942**

Test date: **09/14/2022**

Technician: **LSC**

Amostra: **#01**

Test specification

On the application of this Regulation the following conditions must be observed:

The Class I equipment must carry written information, in a visible location to the user, containing the following words:

"This equipment must be connected on the mains socket-outlet with earthing connection (three pins), according to ABNT NBR 5410, to guarantee the user's safety against electric shocks."

("Este equipamento deve ser conectado obrigatoriamente em tomada de rede de energia elétrica que possua aterramento (três pinos), conforme a Norma NBR ABNT 5410, visando a segurança dos usuários contra choques elétricos.")

| Test results |
|---|
| Test occurrences: Not applicable (Class III equipment). |

Protection against overheat

Standard: **ANATEL Act nº 950, of February 8, 2018** Procedure: **PEE026**
 Project number: **IBEC 221942** Test date: **09/14/2022** Technician: **LSC** Amostra: **#01**
 Test condition: Temperature: **22,5°C ~ 22,7°C** Humidity: **57% ~ 59%** Atmospheric pressure: **710 ± 10 mmHg**

Equipment used in the test

| IBEC code | Description | IBEC code | Description |
|-----------|-------------------|-----------|-----------------|
| 2.586 | Temperature meter | 2.725 | Thermohyrometer |

Test specification & Performance criteria

The elevation of temperature in relation to the environment, of any external part of the equipment to be certified that is accessible to man, must not exceed the limits of the table below.

| Type of surface | Metallic | Non-metallic |
|--------------------------|-------------|--------------|
| Often touched parts | 30°C | 40°C |
| Eventually touched parts | 45°C | 55°C |

EUT characteristics & EUT operation during the test

Rated power supply: **12 Vdc**
 EUT operation: **As described in the item 2.2 of this test report.**

Remarks / Legend of results table

*1 – Combined expanded uncertainty (Uc_exp), for coverage factor k = 2,00 and level of confidence of approximately 95%.

Ts = Surface temperature Ts – Ta = Temperature elevation measure
 Ta = Ambient temperature Delta = (Ts – Ta) – Limit

| Test results – Measure with the EUT powered with [xxx V / xx Hz] | | | | | | | | |
|--|--------------|-----------------|---------|---------|--------------|------------|--------------|----------------|
| Identification of measure point | Surface type | Touch frequency | Ts [°C] | Ta [°C] | Ts – Ta [°C] | Limit [°C] | Delta [°C] | Uc_exp *1 [°C] |
| 01. Face frontal | Não metálica | Frequente | 28,5 | 22,7 | 5,8 | 40,0 | -34,2 | 3,1 |

Photos of test setup



Protection against overheat

Standard: **ANATEL Act nº 950, of February 8, 2018**

Procedure: **PEE026**

Project number: **IBEC 221942**

Test date: **09/14/2022**

Technician: **LSC**

Amostra: **#01**

Test Cond.: Temperature: **22,5°C ~ 22,7°C**

Humidity: **57% ~ 59%**

Atmospheric pressure: **710 ± 10 mmHg**

Photos of measurement points – 12 Vdc

01. Face frontal

