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RODOLFO PEREZ
Representante Legal
ELECTROPAR S.A.

# 1 – INTRODUCTION

0000141

In response to the test requisition CDP n° 2675/15, issued by Mr. José Roberto Medeiros from Toshiba South America Ltda., the 1.3 – Damp Heat Test, Cyclic was accomplished on 10/29/2015.

The objectives of the tests were to submit the specimens to temperature condition, in according to *Specification Environmental Test – Climate – IEC60068-2-30:2005.*

The test was carried out at the Integration and Tests Laboratory – LIT/INPE.

# 2 –REFERENCE DOCUMENTS

[1] E-LIT: 1589.15. PRO

[2] Proposal LIT/PAC LIT/PAC 2675/15

[3] Request by José Roberto < jose.roberto@toshiba.com.br > – Tue, 21 Mai 2015

[4] Thermotron SE - Series Environmental Chamber Manual

# 3 – RESPONSABILITIES

## 3.1 – Responsible for environmental test conditions:

LIT/INPE: Marcio Bueno dos Santos
George Favale e Fernandes
Anderson Antonio da Rosa
Vinicius Derrico da Silva
Osvaldo Donizeti da Silva
Jaderôge Costa

## 3.2 – Responsible for specimens:

Toshiba South America Ltda. – Mr. José Roberto Medeiros

# 4 – TEST FACILITIES

Climatic Chamber **Thermotron Model SE-300-3-3**;

Dimensions: volume: 289 liters
Height: 710 mm
Width: 610 mm
Depth: 670 mm

Thermal System:

Temperature Range: -70 °C to +180 °C
Average Heating Rate: 11,1 °C/min
Average Cooling Rate: 5,4 °C/min

Humidity System:

Measuring and Control Psychometrically



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Humidity Range: 10% to 98%

Command/Control System:

8800 Programmer / Controller with 12" tochscreen
2 ports USB;
Ethernet & RS-232 Computer Interface;

Temperature and Humidity inside Climactic Chamber:

The temperature-humidity data for the thermal and humidity profiles monitoring were provided two Pt 100 Platinum sensors installed in the Climatic Chamber.

## 5 – DATA ACQUISITION

The acquisition was made every 1 minute and recorded on Computers. The monitoring was made by screens.

## 6 – TEST SPECIFICATION

IEC 60068-2-30:2005.

| | |
|---|---|
| Environment Temperature | : 23°C / 50% RH |
| Transition | : 23° / 50% RH to 25°C / 95% RH |
| Transition | : 25°C to 55°C with 95% RH / 3h |
| Maximum Temperature | : 55°C with 95% RH / 12h |
| Transition | : 55°C to 25°C with 95% RH / 3h |
| Intermediate Temperature | : 25°C with 95% RH / 6h |
| Total duration of cycle | : 24h |
| Amount of cycles | : 06 Cycles |

Total Duration: 146 hours

## 7 – SPECIMEN IDENTIFICATION

- *Name* ..... : ***Electronic Control Single Phase Voltage Regulators***
- *Amount* ..... : 1 (one) unit.
- *Code*.....: TVC -MP



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## 8 – TEST RESULTS

0000143

The curves representing the development of temperature inside the climate chamber are in Appendix B.

## 9 – CONCLUSION AND COMMENTS

The results indicate that the tests were carried out within the conditions specified.

According to Toshiba South America Ltda., engineers it can be said that the specimen functioned normally and showed no signs of deterioration on opening the climatic chamber.

The photos of assembly and installation of the test specimens inside the Climatic Chamber can be found in Appendix A.

The test began at 05:06pm the day 10/23/2015 completed at 07:20pm the day 10/29/2015.

Engº. George Favale e Fernandes

Dr. Márcio Bueno dos Santos



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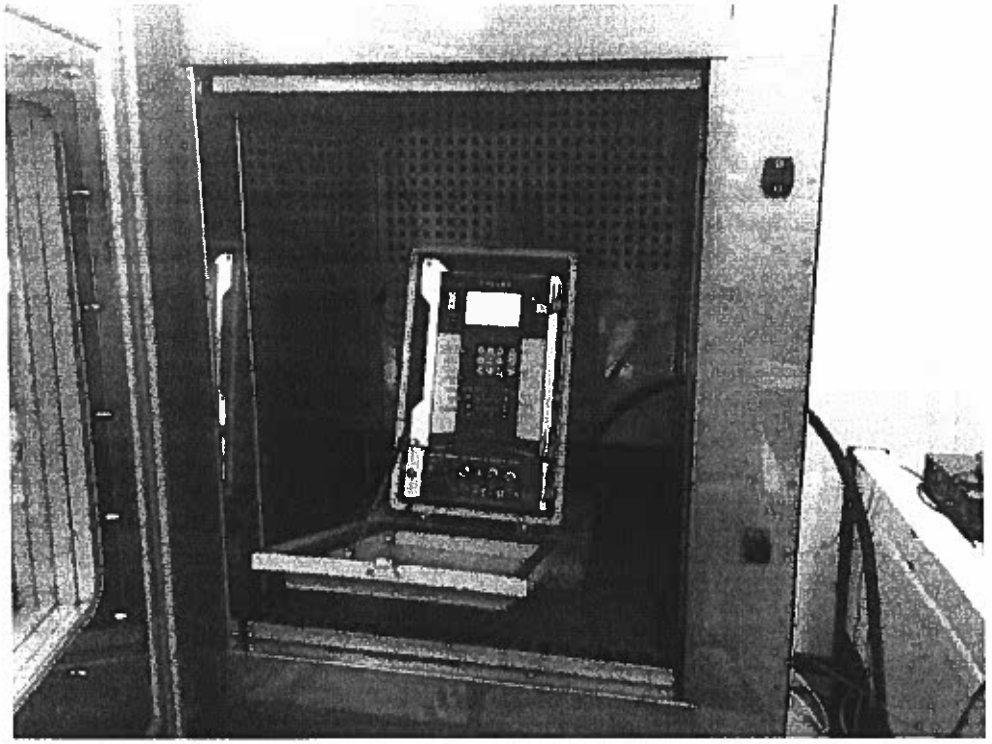
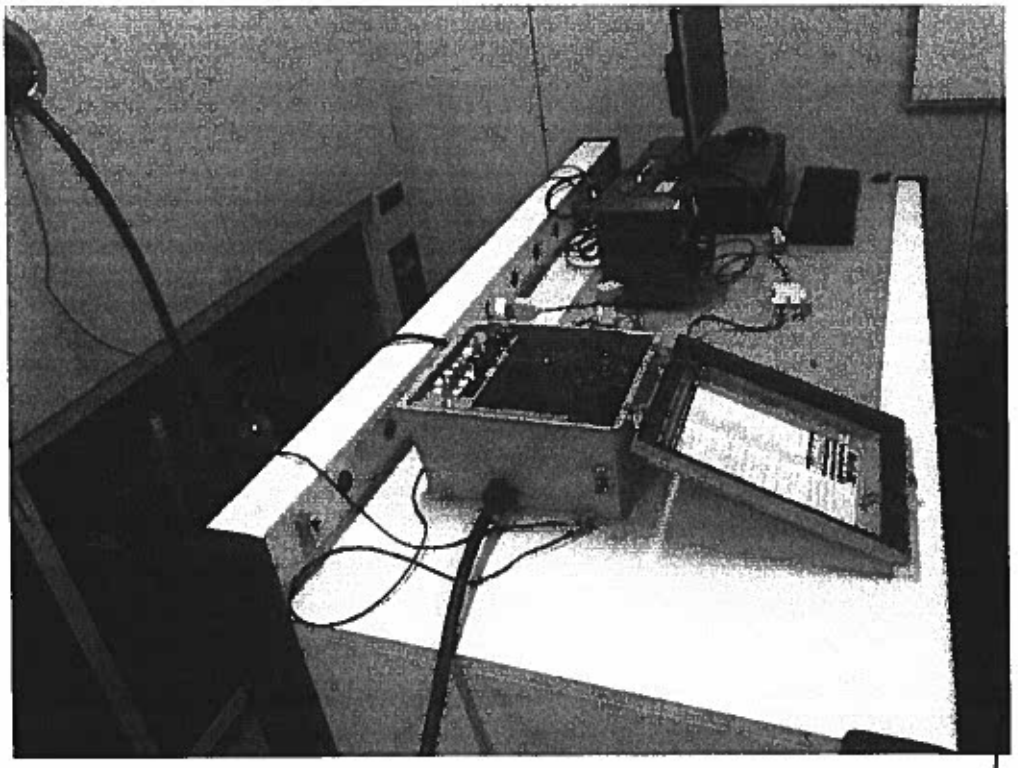
Representante Legal
ELECTROPAR S.A.

# APENDIX A: SPECIMEN INSIDE OF CLIMATIC CHAMBER.







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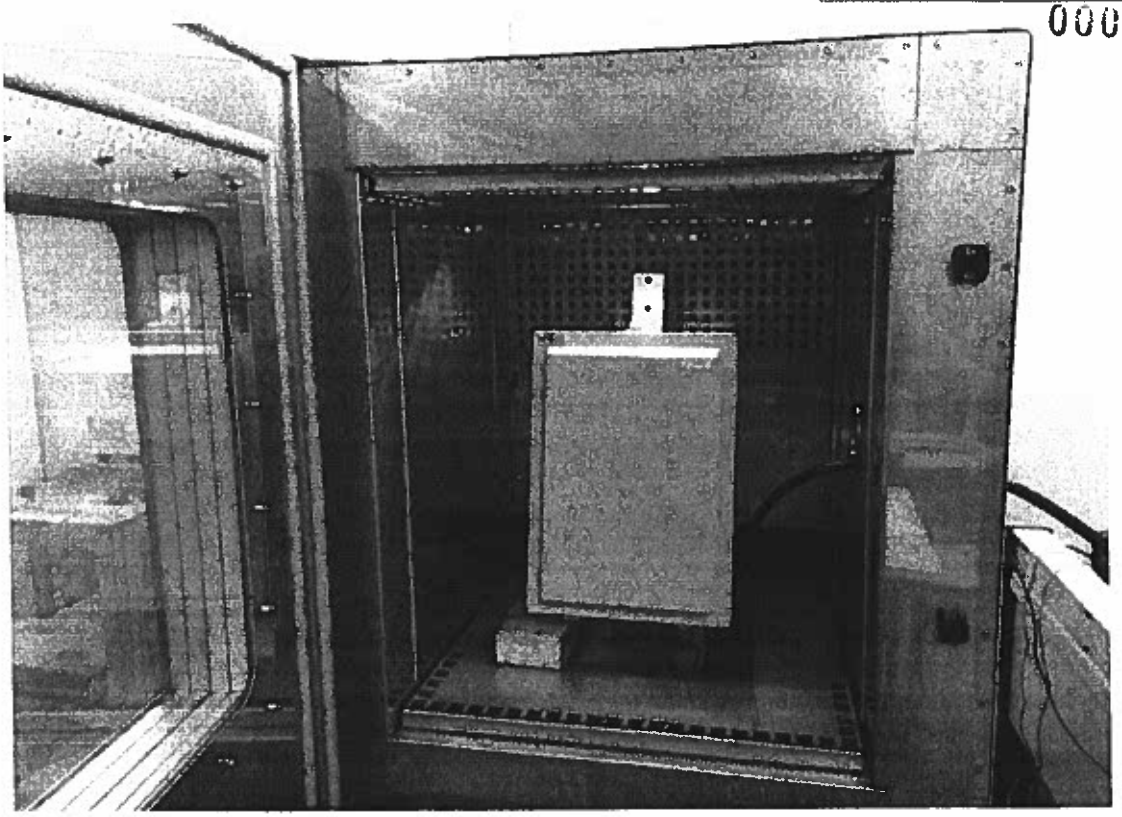

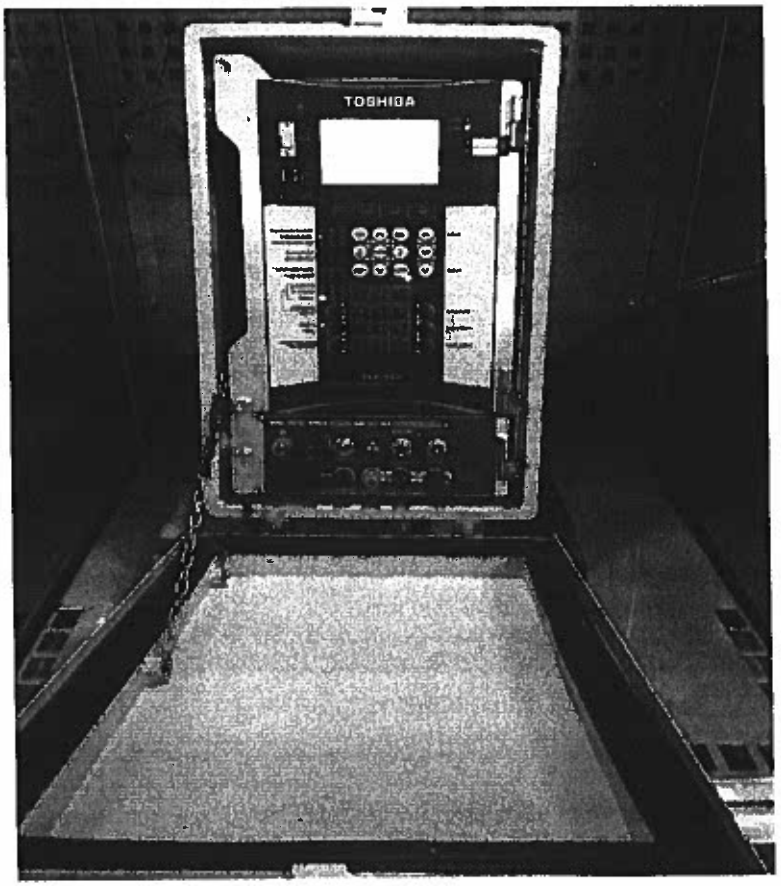




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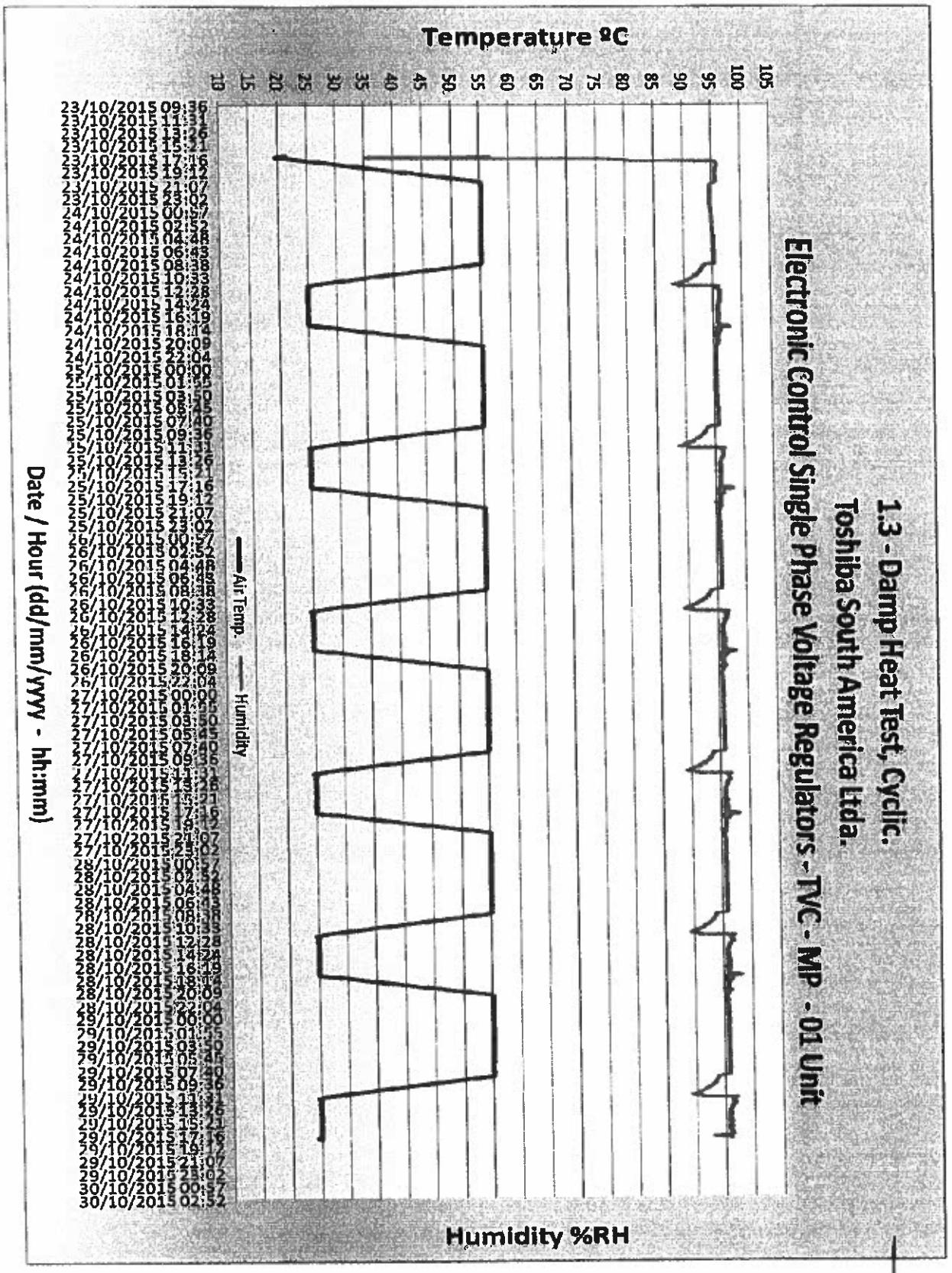
# APENDIX B: GRAPHICS – TEST GRAPHIC DATA. 0000146



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INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS

0000147

# National Institute for Space Research
## Integrate and Testing Laboratory – LIT

TEST REPORT

| | | | |
|---|---|---|---|
| CUSTOMER: | Toshiba South America Ltda | | |
| TEST ITEM: | Electronic Control Single Phase Voltage Regulators | | |
| TEST: | Cold Test | | |
| REPORT NUMBER: | THBTD02 – R01 | | |
| DATE: | November 13 of 2015 | VERSION: | 1 |

INPE.LIT.PX.034/15

REVIEWED BY: _____
ENG. GEORGE FAYALE E FERNANDES

PREPARED BY: _____
ENG. VINICIUS DERRICO DA SILVA



RODOLFO PEREZ
Representante Legal
ELECTROPAR S.A.

VERSION CONTROL

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|---|---|---|---|
| | 1 | | |

# REPORT OF TERMO-CLIMATIC TEST

| | |
|---|---|
| **Customer** | **Toshiba South America Ltda.** |
| **Document** | INPE.LIT.PX.034/15 |
| **Report Number** | THBTD02 - R01 |
| **Process LIT/PAC Nº.:** | 1589.15.PRO |
| **Service** | 424365 |
| **SO** | 0049.15 |
| **Report Name** | Test Report |
| **Area Code** | LIT-01 |
| **Test Kind** | Cold Test |
| **Specimen** | Electronic Control Single Phase Voltage Regulators |
| **Manufacturer** | Toshiba South America Ltda. |
| **Test Begin** | November 04 of 2015 |
| **Test End** | November 08 of 2015 |
| **Report Date** | November 13 of 2015 |



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# 1 – INTRODUCTION

In response to the test requisition CDP n° 2675/15, issued by Mr. José Roberto Medeiros from Toshiba South America Ltda., the 1.1 – Cold Test was accomplished on 11/08/2015.

The objectives of the tests were to submit the specimens to temperature condition, in according to *Specification Environmental Test – Climate – IEC60068-2-1:2007*.

The test was carried out at the Integration and Tests Laboratory – LIT/INPE.

# 2 –REFERENCE DOCUMENTS

[1] E-LIT: 1589.15. PRO

[2] Proposal LIT/PAC LIT/PAC 2675/15

[3] Request by José Roberto < jose.roberto@toshiba.com.br > – Tue, 21 Mai 2015

[4] Thermotron ATS – Thermal-Shock Chamber Manual

# 3 – RESPONSABILITIES

## 3.1 – Responsible for environmental test conditions:

LIT/INPE: Marcio Bueno dos Santos
George Favale e Fernandes
Anderson Antonio da Rosa
Vinicius Derrico da Silva
Osvaldo Donizeti da Silva
Jaderôge Costa

## 3.2 – Responsible for specimens:

Toshiba South America Ltda. – Mr. José Roberto Medeiros

# 4 – TEST FACILITIES

Thermal-Shock Chamber **ATS-320-V-10-705 THERMOTRON**;

Dimensions: volume: 118,2 liters
Height: 440 mm
Width: 640 mm
Depth: 420 mm

Thermal System:

Hot Box: +60°C to +200 °C
Cold Box: -73°C to +177°C
Temperature stability: +/- 1.0°C
Time programmable switching between cameras.

Command/Control System:

8825 Programmer / Controller with 12" tochscreen



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2 ports USB;
Ethernet & RS-232 Computer Interface;

## 5 – DATA ACQUISITION

The acquisition was made every 1 minute and recorded on Computers. The monitoring was made by screens.

## 6 – TEST SPECIFICATION

IEC 60068-2-1:2007.

| | | |
|---|---|---|
| Environment Temperature | : | 23°C. |
| Transition | : | 23°C to -45°C / 0.5h. |
| Minimum Temperature | : | -40°C / 96h. |
| Transition | : | -40°C to 23°C / 0.5h. |

Total Duration: 97 hours

## 7 – SPECIMEN IDENTIFICATION

- *Name* ..... : ***Electronic Control Single Phase Voltage Regulators***
- *Amount* ..... : 1 (one) unit.
- *Code*.....: TVC -MP

## 8 – TEST RESULTS

The curves representing the development of temperature inside the climate chamber are in Appendix B.



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# 9 – CONCLUSION AND COMMENTS

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The results indicate that the tests were carried out within the conditions specified.

According to Toshiba South America Ltda., engineers it can be said that the specimen functioned normally and showed no signs of deterioration on opening the climatic chamber.

The photos of assembly and installation of the test specimens inside the Climatic Chamber can be found in Appendix A.

The test began at 10:00am the day 11/04/2015 completed at 11:20am the day 11/08/2015.

Engº. George Favale e Fernandes

Dr. Márcio Bueno dos Santos



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# APENDIX A: SPECIMEN INSIDE OF CLIMATIC CHAMBER.

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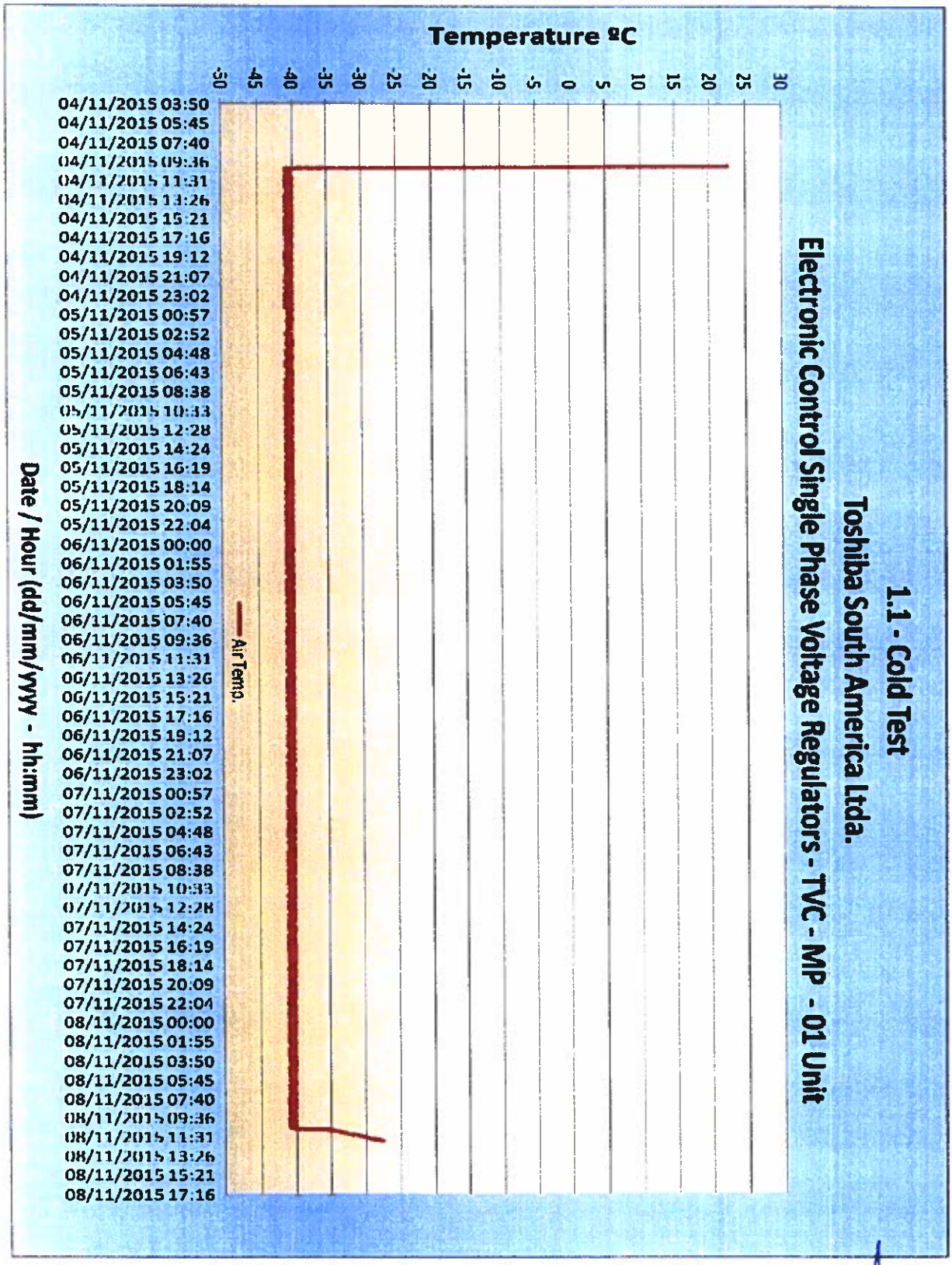
# APENDIX B: GRAPHICS – TEST GRAPHIC DATA.



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Representante Legal
ELECTROPAR S.A.

# National Institute for Space Research
## Integrate and Testing Laboratory – LIT

TEST REPORT

| | | | |
|---|---|---|---|
| CUSTOMER: | **Toshiba South America Ltda** | | |
| TEST ITEM: | **Electronic Control Single Phase Voltage Regulators** | | |
| TEST: | **Dry Heat Test** | | |
| REPORT NUMBER: | **THBTD02 – R02** | | |
| DATE: | **November 13 of 2015** | VERSION: | **1** |

**INPE.LIT.PX.034/15**

REVIEWED BY: _____
ENG. GEORGE FAVALE E FERNANDES

PREPARED BY: _____
ENG. VINICIUS DERRICO DA SILVA



RODOLFO PEREZ
Representante Legal
ELECTROPAR S.A.

0000157

VERSION CONTROL

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# REPORT OF TERMO-CLIMATIC TEST

| | |
|---|---|
| **Customer** | **Toshiba South America Ltda.** |
| **Document** | INPE.LIT.PX.034/15 |
| **Report Number** | THBTD02 - R02 |
| **Process LIT/PAC Nº.:** | 1589.15.PRO |
| **Service** | 424361 |
| **SO** | 0050.15 |
| **Report Name** | Test Report |
| **Area Code** | LIT-01 |
| **Test Kind** | Dry Heat Test |
| **Specimen** | Electronic Control Single Phase Voltage Regulators |
| **Manufacturer** | Toshiba South America Ltda. |
| **Test Begin** | October 15 of 2015 |
| **Test End** | October 19 of 2015 |
| **Report Date** | November 13 of 2015 |



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Representante Legal
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Representante Legal
ELECTROPAR S.A.

# 1 – INTRODUCTION

In response to the test requisition CDP n° 2675/15, issued by Mr. José Roberto Medeiros from Toshiba South America Ltda., the 1.2 – Dry Heat Test was accomplished on 10/15/2015.

The objectives of the tests were to submit the specimens to temperature condition, in according to *Specification Environmental Test – Climate – IEC60068-2-2:2007.*

The test was carried out at the Integration and Tests Laboratory – LIT/INPE.

# 2 –REFERENCE DOCUMENTS

[1] E-LIT: 1589.15. PRO

[2] Proposal LIT/PAC LIT/PAC 2675/15

[3] Request by José Roberto < jose.roberto@toshiba.com.br > – Tue, 21 Mai 2015

[4] Votsch Industrietechnik- Temperature Test Chamber Series VT Manual

# 3 – RESPONSABILITIES

## 3.1 – Responsible for environmental test conditions:

LIT/INPE: Marcio Bueno dos Santos
George Favale e Fernandes
Anderson Antonio da Rosa
Vinicius Derrico da Silva
Osvaldo Donizeti da Silva
Jaderôge Costa

## 3.2 – Responsible for specimens:

Toshiba South America Ltda. – Mr. José Roberto Medeiros

# 4 – TEST FACILITIES

Climatic Chamber **VÖTSCH Industrietechnik VT 4020;**

Dimensions: volume: 200 liters
Height: 550 mm
Width: 550 mm
Depth: 660 mm

Thermal System:

Temperature Range: -40 °C to +180 °C
Average Heating Rate: 2,0 °C/min
Average Cooling Rate: 2,0 °C/min

Humidity System:

Measuring and Control Psychometrically



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Humidity Range: 10% to 98%

Command/Control System:

VT 7033 com C-Terminal

Temperature and Humidity inside Climactic Chamber:

The temperature-humidity data for the thermal and humidity profiles monitoring were provided two Pt 100 Platinum sensors installed in the Climatic Chamber.

## 5 – DATA ACQUISITION

The acquisition was made every 1 minute and recorded on Computers. The monitoring was made by screens.

## 6 – TEST SPECIFICATION

IEC 60068-2-2:2007.

| | | |
|---|---|---|
| Environment Temperature | : | 23°C. |
| Transition | : | 23°C to 85°C / 1h. |
| Maximum Temperature | : | 85°C / 96h. |
| Transition | : | 85°C to 23°C / 1h. |

Total Duration: 98 hours

## 7 – SPECIMEN IDENTIFICATION

- *Name* ..... : ***Electronic Control Single Phase Voltage Regulators***
- *Amount* ..... : 1 (one) unit.
- *Code*.....: TVC -MP

## 8 – TEST RESULTS

The curves representing the development of temperature inside the climate chamber are in Appendix B.



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Representante Legal
ELECTROPAR S.A.

# 9 – CONCLUSION AND COMMENTS

The results indicate that the tests were carried out within the conditions specified.

According to Toshiba South America Ltda., engineers it can be said that the specimen functioned normally and showed no signs of deterioration on opening the climatic chamber.

The photos of assembly and installation of the test specimens inside the Climatic Chamber can be found in Appendix A.

The test began at 02:30pm the day 10/15/2015 completed at 04:30pm the day 10/19/2015.

Engº. George Favale e Fernandes

Dr. Márcio Bueno dos Santos



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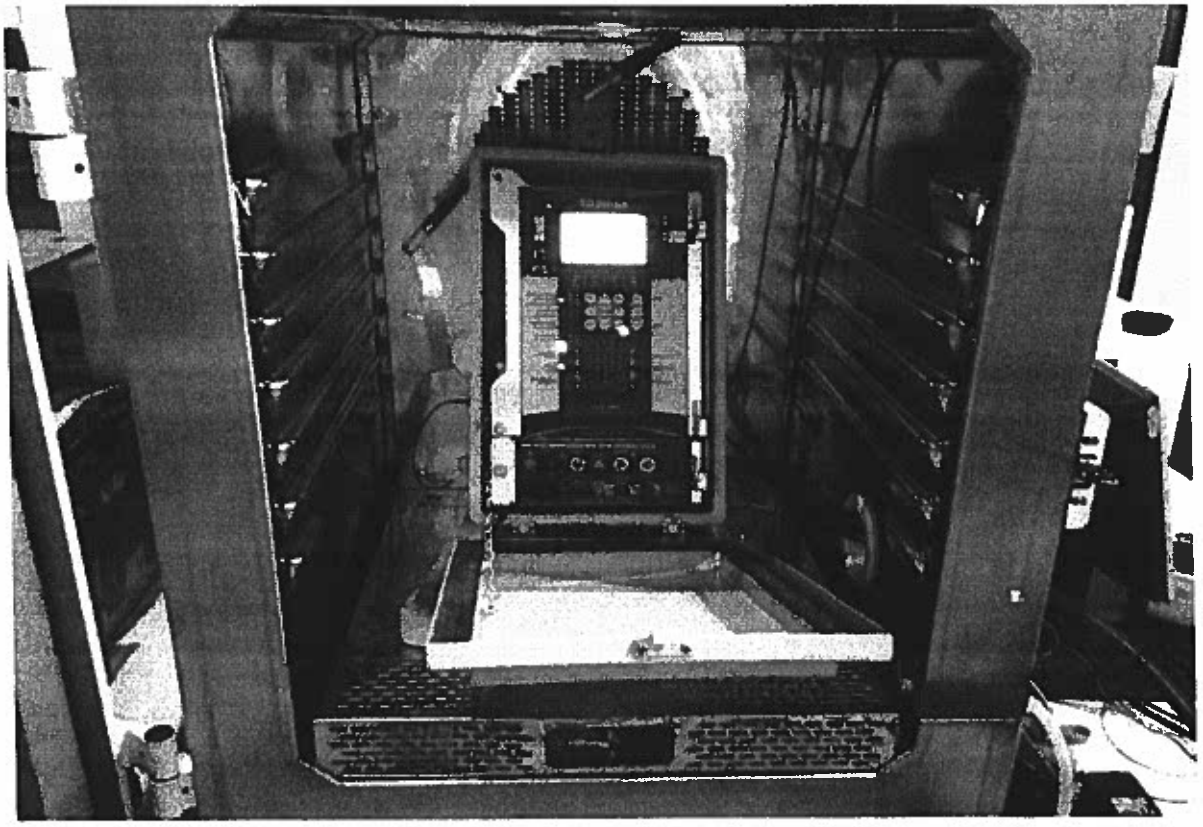
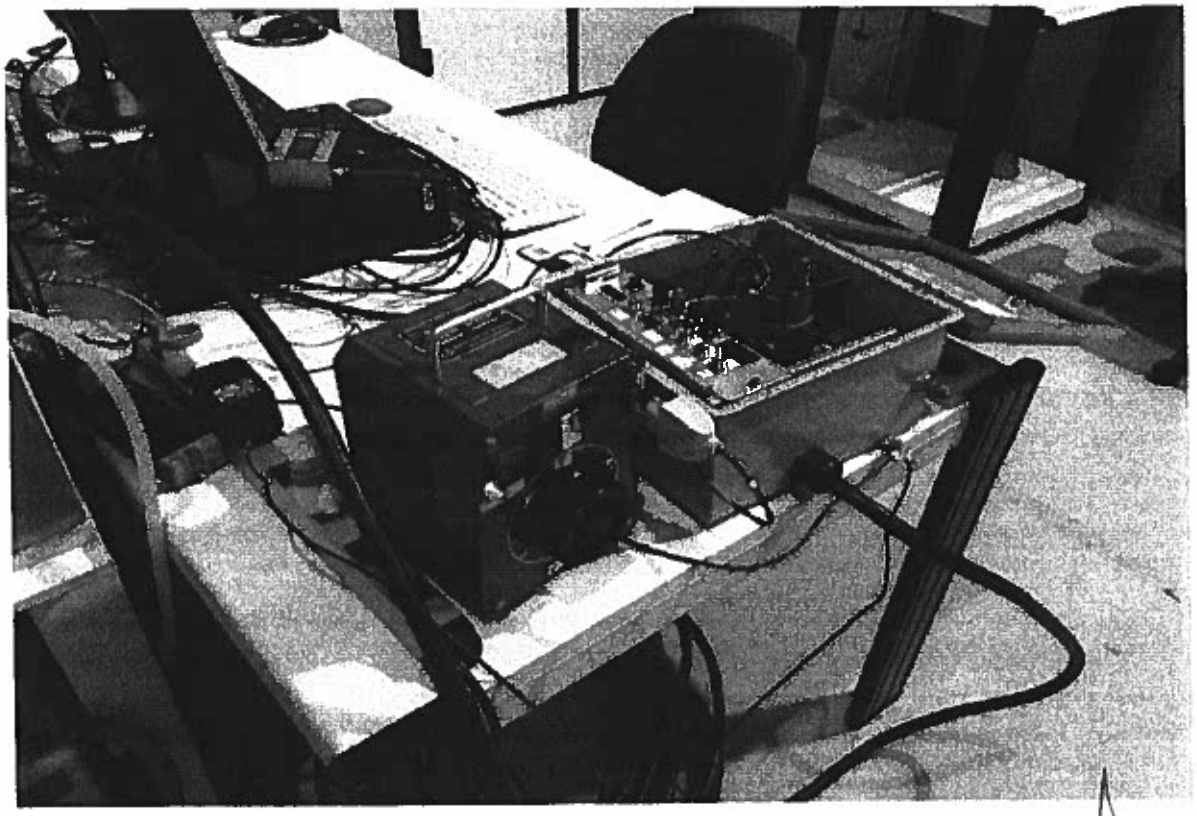
# APENDIX A: SPECIMEN INSIDE OF CLIMATIC CHAMBER.

0000162







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Representante Legal
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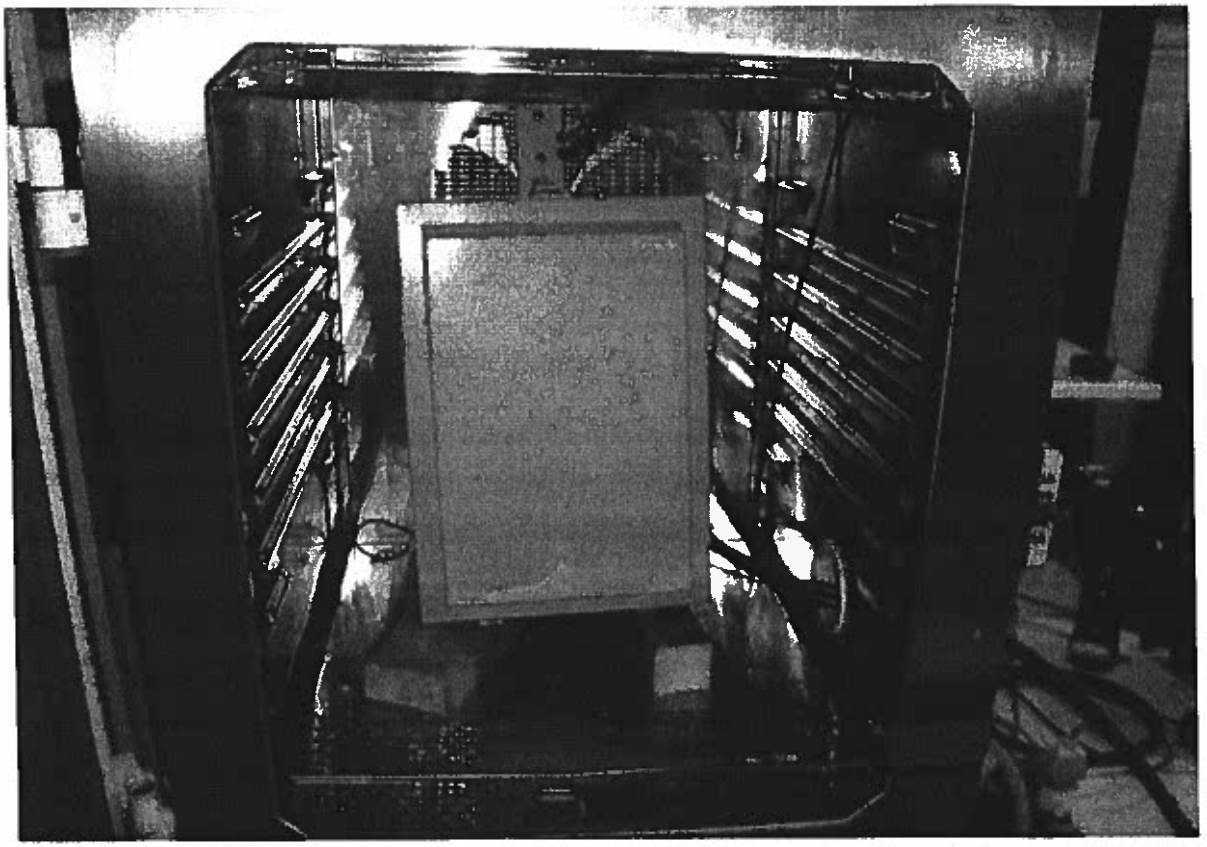

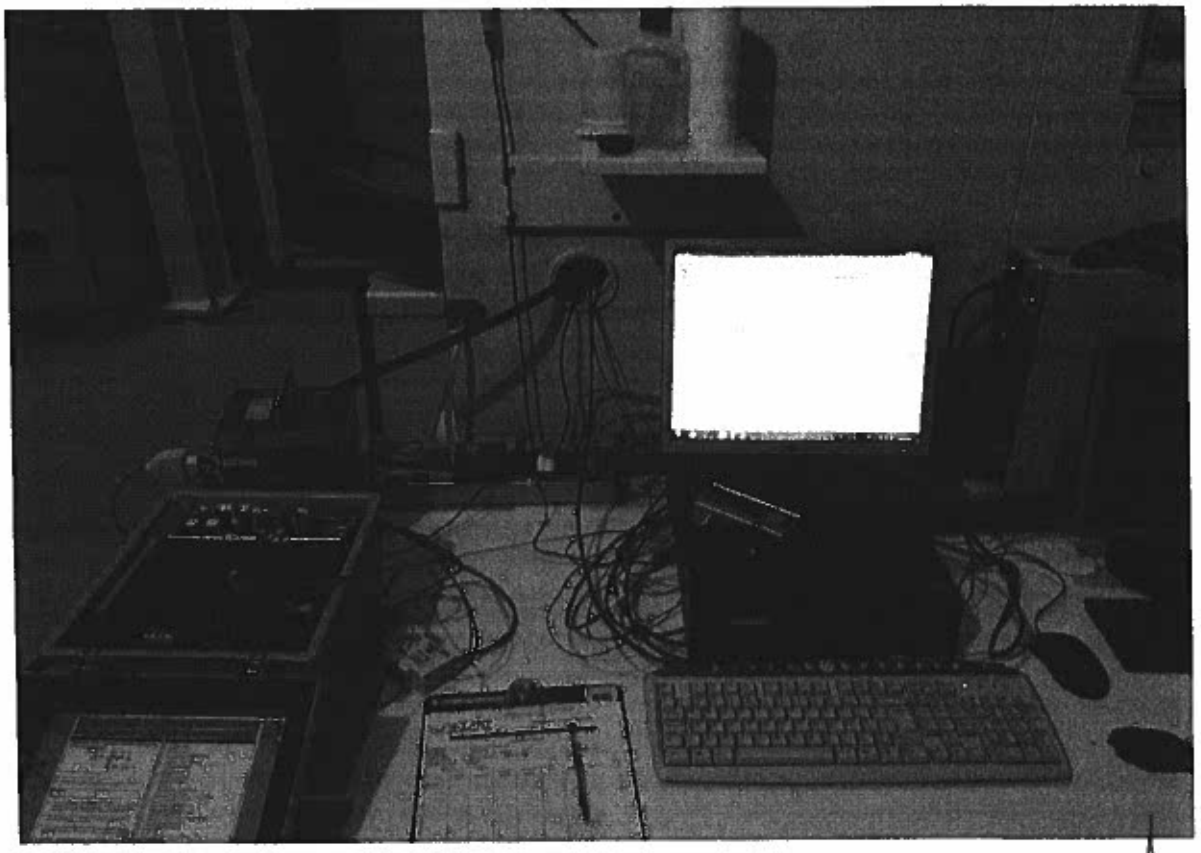



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Representante Legal
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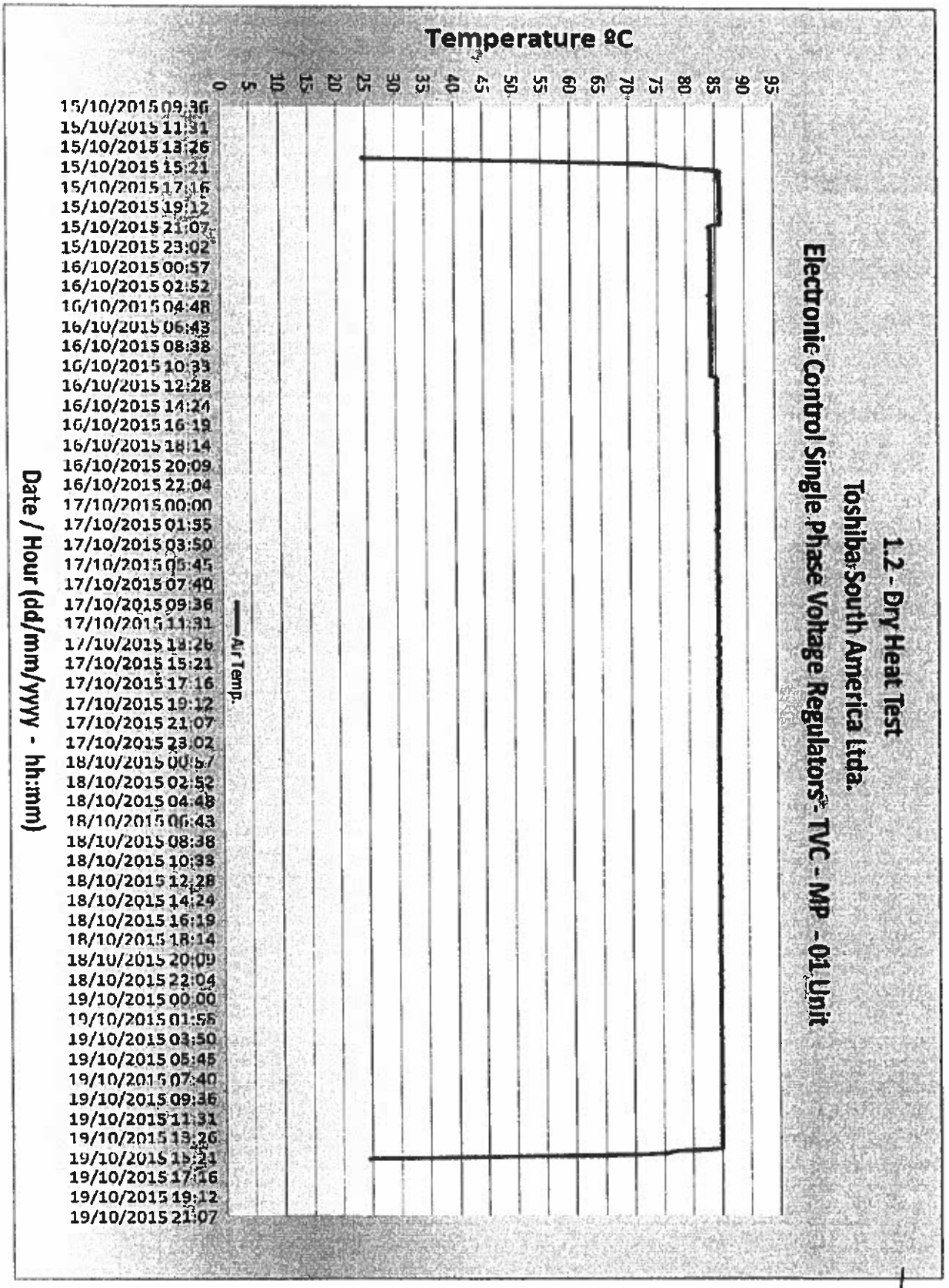
# APENDIX B: GRAPHICS – TEST GRAPHIC DATA.



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INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS

0000165

# National Institute for Space Research
## Integrate and Testing Laboratory – LIT

TEST REPORT

| | | | |
|---|---|---|---|
| CUSTOMER: | **Toshiba South America Ltda** | | |
| TEST ITEM: | **Electronic Control Single Phase Voltage Regulators** | | |
| TEST: | **Humidity Test** | | |
| REPORT NUMBER: | **THBTD02 – R04** | | |
| DATE: | **November 13 of 2015** | VERSION: | 1 |

**INPE.LIT.PX.034/15**

REVIEWED BY: _____
ENG. GEORGE FAVALE E FERNANDES

PREPARED BY: _____
ENG. VINICIUS DERRICO DA SILVA

Av. dos Astronautas, 1758 - Caixa Postal 515 - CEP: 12227-010 - São José dos Campos - SP - Tel.: (0xx12) 3208-6262

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Representante Legal
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VERSION CONTROL

0000166

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# REPORT OF TERMO-CLIMATIC TEST

| | |
|---|---|
| **Customer** | **Toshiba South America Ltda.** |
| **Document** | INPE.LIT.PX.034/15 |
| **Report Number** | THBTD02 - R04 |
| **Process LIT/PAC Nº.:** | 1589.15.PRO |
| **Service** | 463151 |
| **SO** | 0052.15 |
| **Report Name** | Test Report |
| **Area Code** | LIT-01 |
| **Test Kind** | Humidity Test |
| **Specimen** | Electronic Control Single Phase Voltage Regulators |
| **Manufacturer** | Toshiba South America Ltda. |
| **Test Begin** | October 14 of 2015 |
| **Test End** | October 15 of 2015 |
| **Report Date** | November 13 of 2015 |



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Representante Legal
ELECTROPAR S.A.

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Representante Legal
ELECTROPAR S.A.

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# 1 – INTRODUCTION

In response to the test requisition CDP n° 2675/15, issued by Mr. José Roberto Medeiros from Toshiba South America Ltda., the 1.4 - Humidity Test was accomplished on 10/15/2015.

The objectives of the tests were to submit the specimens to temperature condition, in according to *Specification Environmental Test – Climate – IEC60068-2-78:2012.*

The test was carried out at the Integration and Tests Laboratory – LIT/INPE.

# 2 –REFERENCE DOCUMENTS

[1] E-LIT: 1589.15. PRO

[2] Proposal LIT/PAC LIT/PAC 2675/15

[3] Request by José Roberto < jose.roberto@toshiba.com.br > – Tue, 21 Mai 2015

[4] Votsch Industrietechnik- Temperature Test Chamber Series VT Manual

# 3 – RESPONSABILITIES

## 3.1 – Responsible for environmental test conditions:

LIT/INPE: Marcio Bueno dos Santos
George Favale e Fernandes
Anderson Antonio da Rosa
Vinicius Derrico da Silva
Osvaldo Donizeti da Silva
Jaderôge Costa

## 3.2 – Responsible for specimens:

Toshiba South America Ltda. – Mr. José Roberto Medeiros

# 4 – TEST FACILITIES

Climatic Chamber **VÖTSCH Industrietechnik VT 4020**;

Dimensions: volume: 200 liters
Height: 550 mm
Width: 550 mm
Depth: 660 mm

Thermal System:

Temperature Range: -40 °C to +180 °C
Average Heating Rate: 2,0 °C/min
Average Cooling Rate: 2,0 °C/min

Humidity System:

Measuring and Control Psychometrically



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Representante Legal
ELECTROPAR S.A.

0000169

Humidity Range: 10% to 98%

Command/Control System:

VT 7033 com C-Terminal

Temperature and Humidity inside Climactic Chamber:

The temperature-humidity data for the thermal and humidity profiles monitoring were provided two Pt 100 Platinum sensors installed in the Climatic Chamber.

## 5 – DATA ACQUISITION

The acquisition was made every 1 minute and recorded on Computers. The monitoring was made by screens.

## 6 – TEST SPECIFICATION

IEC 60068-2-78:2012.

| | | |
|---|---|---|
| Environment Temperature | : | 23°C / 50% RH. |
| Transition | : | 23°C / 50%RH to 40°C / 93%RH +/- 2% / 1h. |
| Maxmum Temperature | : | 40°C / 93%RH +/-2%RH / 16h. |
| Transition | : | 40°C / 93%RH to 23°C / 50%RH / 1h. |

Total Duration: 18 hours

## 7 – SPECIMEN IDENTIFICATION

- *Name* ..... : ***Electronic Control Single Phase Voltage Regulators***
- *Amount* ..... : 1 (one) unit.
- *Code*.....: TVC -MP

## 8 – TEST RESULTS

The curves representing the development of temperature inside the climate chamber are in Appendix B.



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## 9 – CONCLUSION AND COMMENTS

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The results indicate that the tests were carried out within the conditions specified.

According to Toshiba South America Ltda., engineers it can be said that the specimen functioned normally and showed no signs of deterioration on opening the climatic chamber.

The photos of assembly and installation of the test specimens inside the Climatic Chamber can be found in Appendix A.

The test began at 05:40pm the day 10/14/2015 completed at 12:00am the day 10/15/2015.

Engº. George Favale e Fernandes

Dr. Márcio Bueno dos Santos



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