



# ENVIRONMENTAL TEST REPORT

ENVRPT\_S1100C-11APR2K6.doc

date: April 11, 2006

Prot.: 190-06/serms srl

**Laboratorio per lo Studio degli Effetti delle Radiazioni sui Materiali per lo Spazio**  
Via Pentima Bassa, 21 Terni - 05100 TR - phone/fax: +39.0744.49.29.13

## test performed on:

Four UGPS QM Boards  
G&A Engineering  
INFN-Sezione di Roma

code	assembly name	contractor	manufacturer	part number	serial number
01	UGPS Board	G&A	G&A		
02	UGPS Board	G&A	G&A		
03	UGPS Board	G&A	G&A		
04	UGPS Board	G&A	G&A		
-					

*signature*

test report prepared by:	11/04/06 <i>data</i>	<i>S. Borsini</i> <i>Test Engineers</i>
test report controlled by:	11/04/06 <i>data</i>	<i>Ing. Stefano Lucidi</i> <i>QA manager</i>
approved by:	11/04/06 <i>data</i>	<i>Dott.ssa Di Masso</i> <i>LaboratoryResponsible</i>

## change record

date	change description	revision
11/04/2006	first issue	A01

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#### **TEST REPORT DESCRIPTION**

This document is generated by the S.E.R.M.S. Laboratory and reports on the setup, the operation and the results of the vibration test performed on the customer Device Under Test (D.U.T.); several sections compose this report: all of them have been integrated and adapted to the specific tests performed on the D.U.T.

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### GENERAL INFORMATION

Job Number: S110C - PRVT05-S1101C-24FEB2K6

Test performed on:

code	assembly name	contractor	manufacturer	part number	serial number
01	UGPS Board	G&A	G&A		
02	UGPS Board	G&A	G&A		
03	UGPS Board	G&A	G&A		
04	UGPS Board	G&A	G&A		
-					

contractor: G&A Engineering – Loc. Miole snc – 67063 Oricola (Aq)- Tel. +39 08 63909003 - Fax +39 08 63907616  
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Moro, 2 00185 Roma

contractor responsible: R. Bellarosa (G&A)  
A. Bartoloni (INFN Roma)

subcontractor: NA

### TEST DIARY

TDS01-dut incoming: March 27, 2006 - 15:00

TDS02- test initiated: March 27, 2006

TDS03-Thermo-Vacuum Test: March 27, 2006 – 19:00

code	assembly name	contractor	manufacturer	part number	serial number
01	UGPS Board	G&A	G&A		
02	UGPS Board	G&A	G&A		
03	UGPS Board	G&A	G&A		
04	UGPS Board	G&A	G&A		

end test: April 01, 2006 – 07:40

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### APPLICABLE LAWS AND RULES

#### CUSTOMER TEST PROCEDURE

Doc. No.: 29265001A12TPRD

#### THERMOVACUUM TEST PROCEDURE

#### S.E.R.M.S Lab. - INTERNAL TEST PROCEDURE

##### D.L. 19 settembre 1994, n.626

Attuazione delle direttive 89/391/CEE, 89/654/CEE, 89/655/CEE, 89/656/CEE, 90/269/CEE, 90/270/CEE, 90/394/CEE e 90/679/CEE riguardanti il miglioramento della sicurezza e della salute dei lavoratori sul luogo di lavoro, e successive modifiche;

##### MIL-HDBK-831 23 Aprii 1999

Preparation of Test Reports (guidance only);

##### UNI –10653 – November 1997

Quality product technical documentation (guidance only) ;

##### UNI CEI EN45001

general criterion for test laboratory operation;

##### UNI CEI 70001

norm certificate test laboratory terms and definitions;

##### UNI CEI 70011

guide for test result presentation;

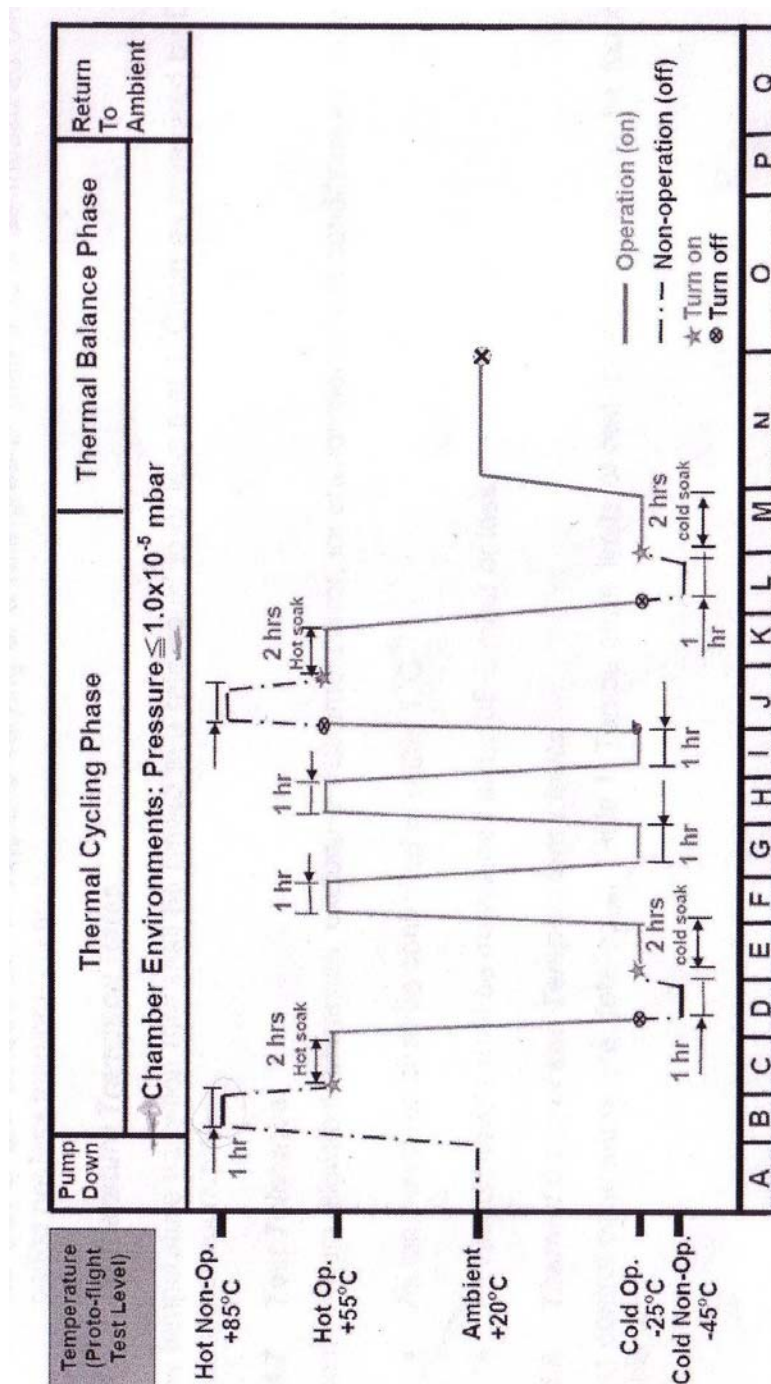
### SERMS FACILITY - QUALITY ASSURANCE INFORMATION

item	description	manufacturer	calibration/maintenance due date
Thermal Vacuum Chamber		Angelantoni	
DAQ Sensors		Angelantoni Minco Sensors	

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### REPORT SUMMMARY

For all items, performed test type are:



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## TEST RESULTS

The customer hardware of the G&A Engineering and INFN - Rome composed by:

code	assembly name	contractor	manufacturer	part number	serial number
01	UGPS Board	G&A	G&A		
02	UGPS Board	G&A	G&A		
03	UGPS Board	G&A	G&A		
04	UGPS Board	G&A	G&A		

has been tested in thermal vacuum chamber on March 2006 at S.E.R.M.S. Lab. in Terni.

The planned test according to the test procedure were executed and the functionality of the D.U.T. were verified by G&A and INFN-Rome personnel.

All the functional test on the equipment are reported on the customer document n. 29294301A12TRPT

### Logbook Thermo-vacuum Test

The complete set of test data recorded will be provided on customer request; in this report will be summarized only the most significant test data.

## REMARKS

None.

A continuum monitoring of the temperature sensor installed on the D.U.T. have been performed during each sub-test.

The complete set of test data recorded will be provided on customer request; in this report will be summarized only the most significant test data.

## SENSOR LAYOUT

N° Board	N° of sensor	Position of sensor	Sensor Name
01	9	Figure 2	T1
02	8	Figure 3	T2
03	10	Figure 4	T3
04	19	Figure 5	T4

The boards were installed on the lower Cold Plate using an aluminium plate provided by G&A. The CTS (Control Temperature Sensor) were installed on this plate. The CTS drove the cold plate temperature. All the temperature sensors used are PT100 sensor provided by Minco and were installed on the board using a Kapton tape.

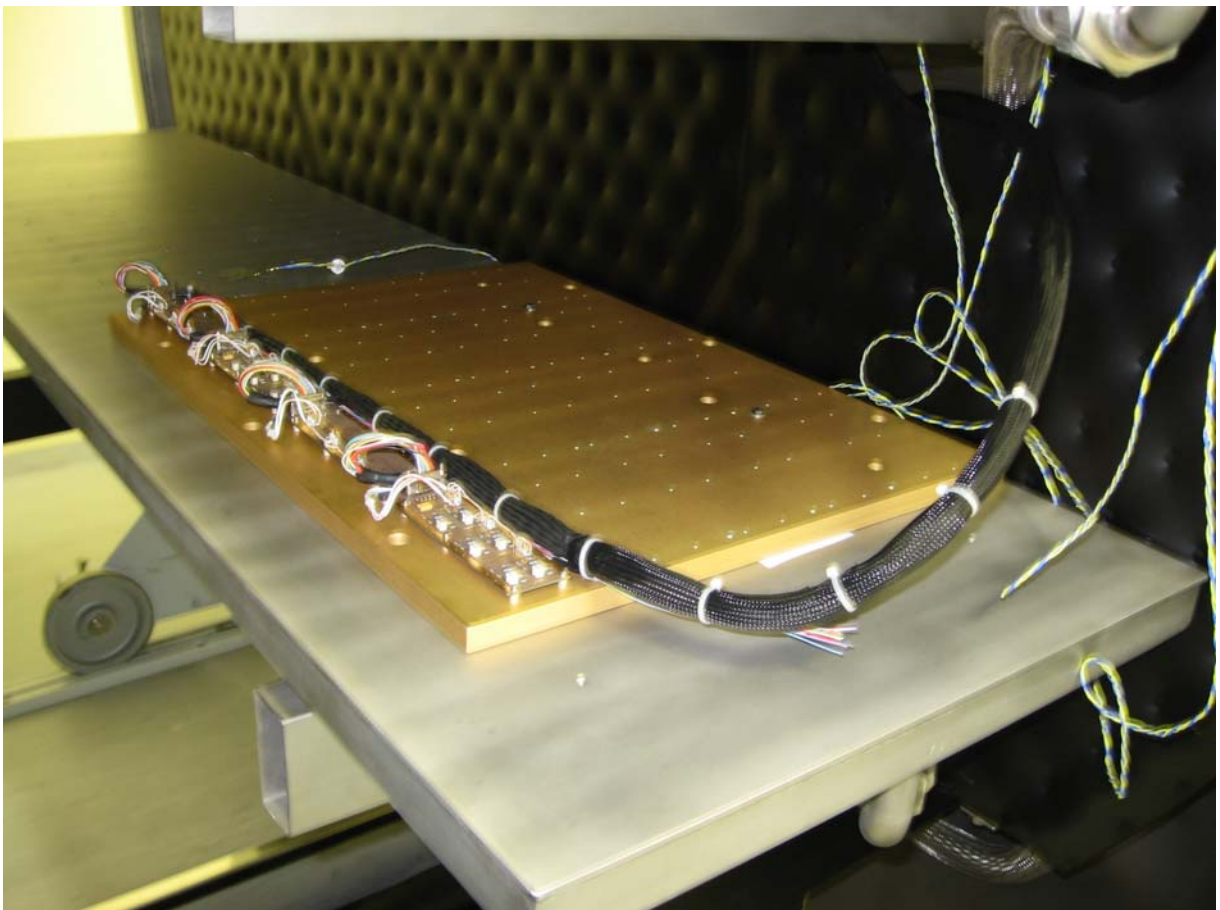


Figure 1: UGPS Boards on Al adaptor placed on the lower cold plate of the thermo-vacuum chamber.



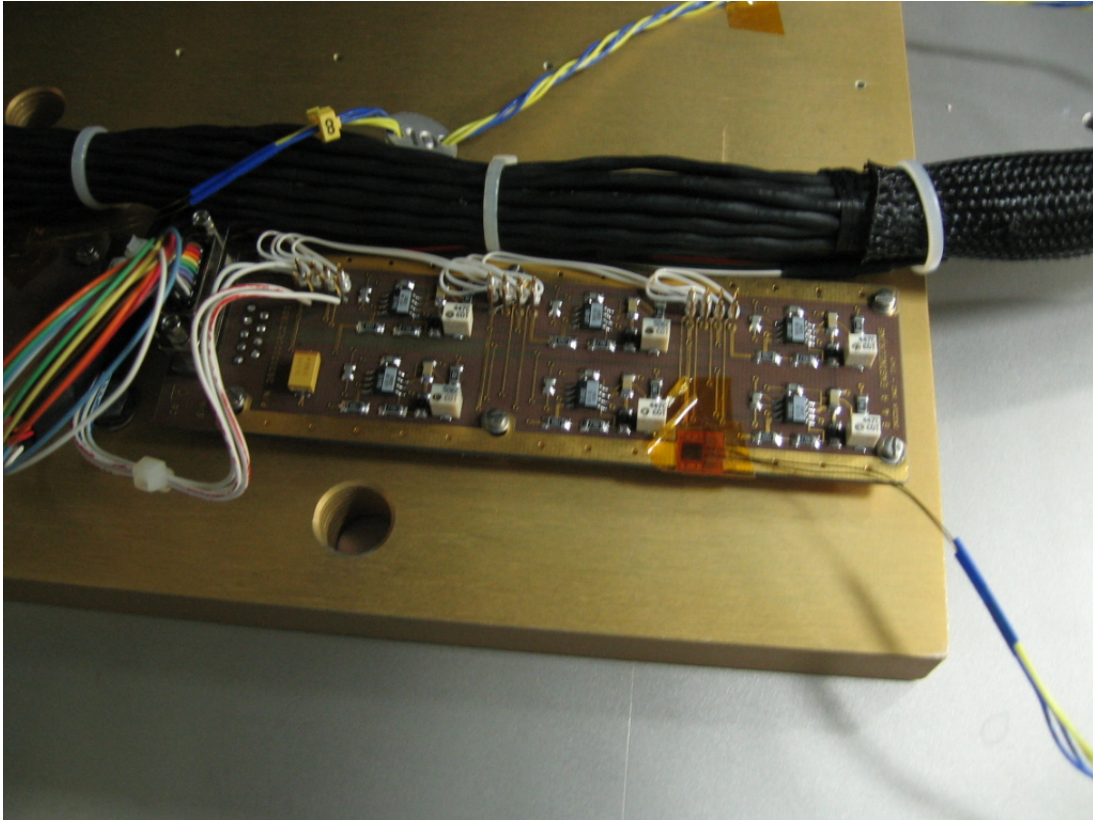
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**Figure 2: Board #1 with temperature sensor n° 9.**

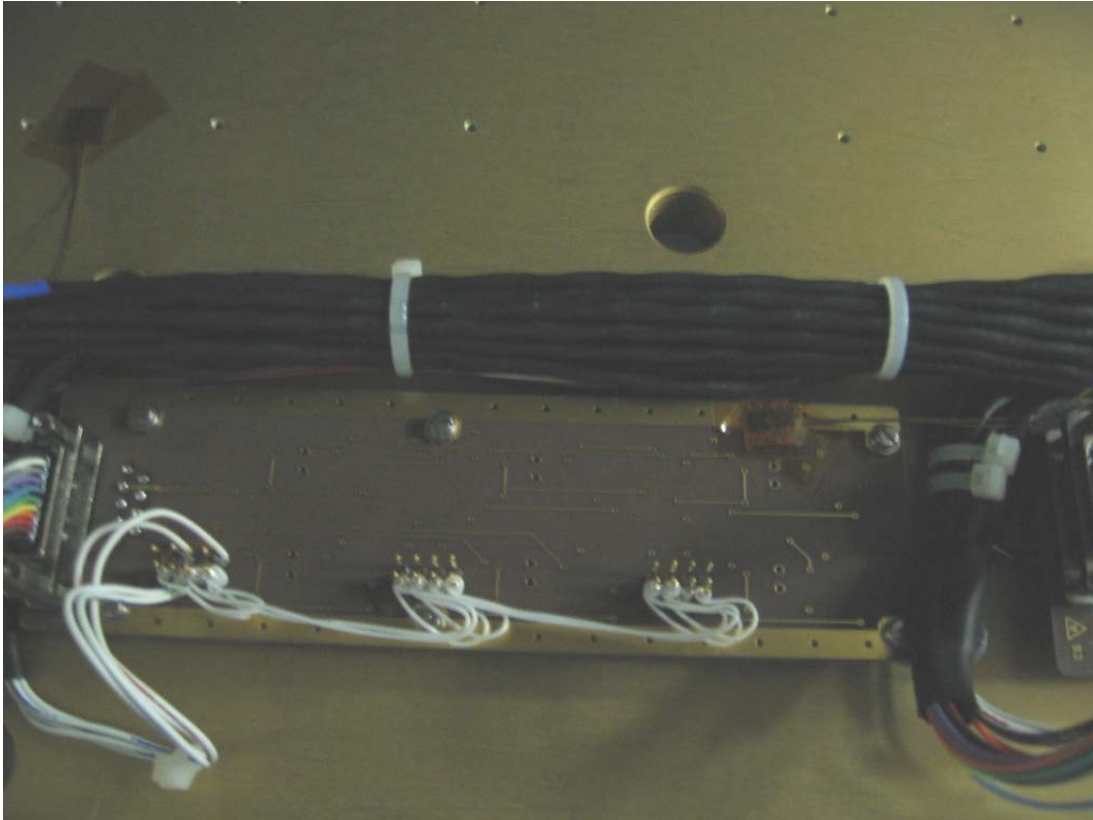
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**Figure 3: Board #2 with temperature sensor n° 8.**

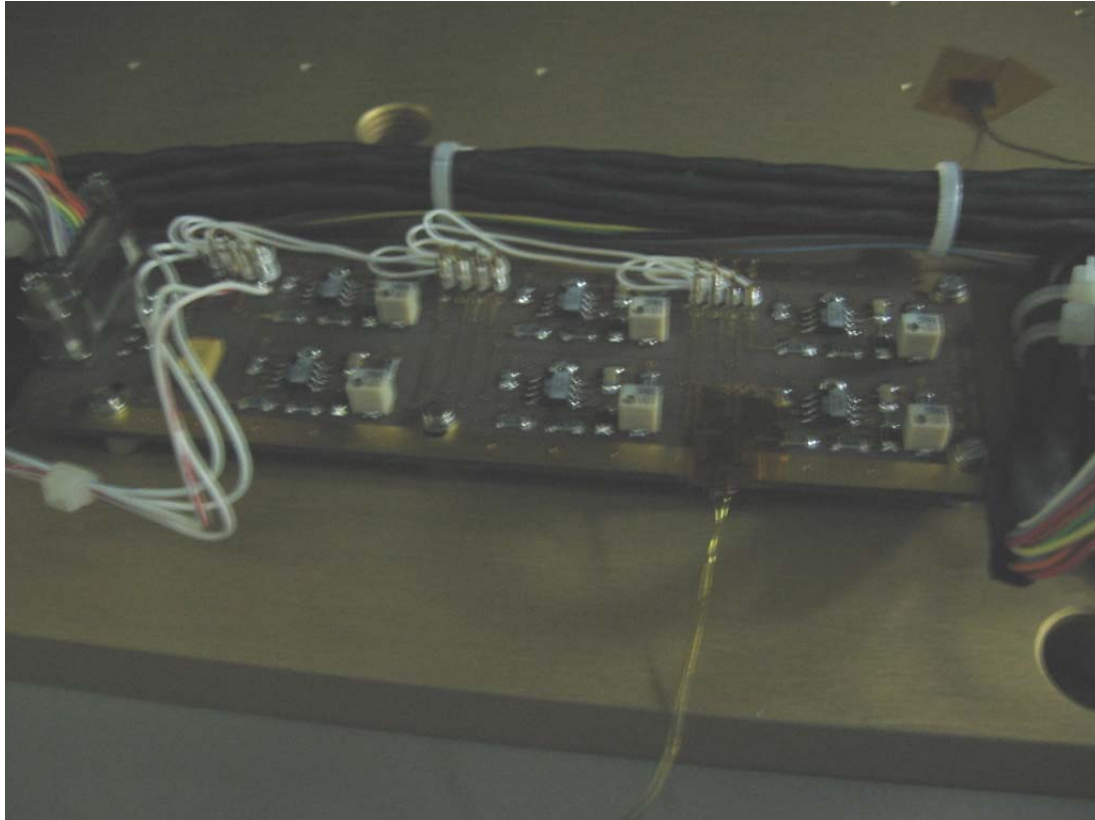
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**Figure 4: Board #3 with temperature sensor n° 10.**

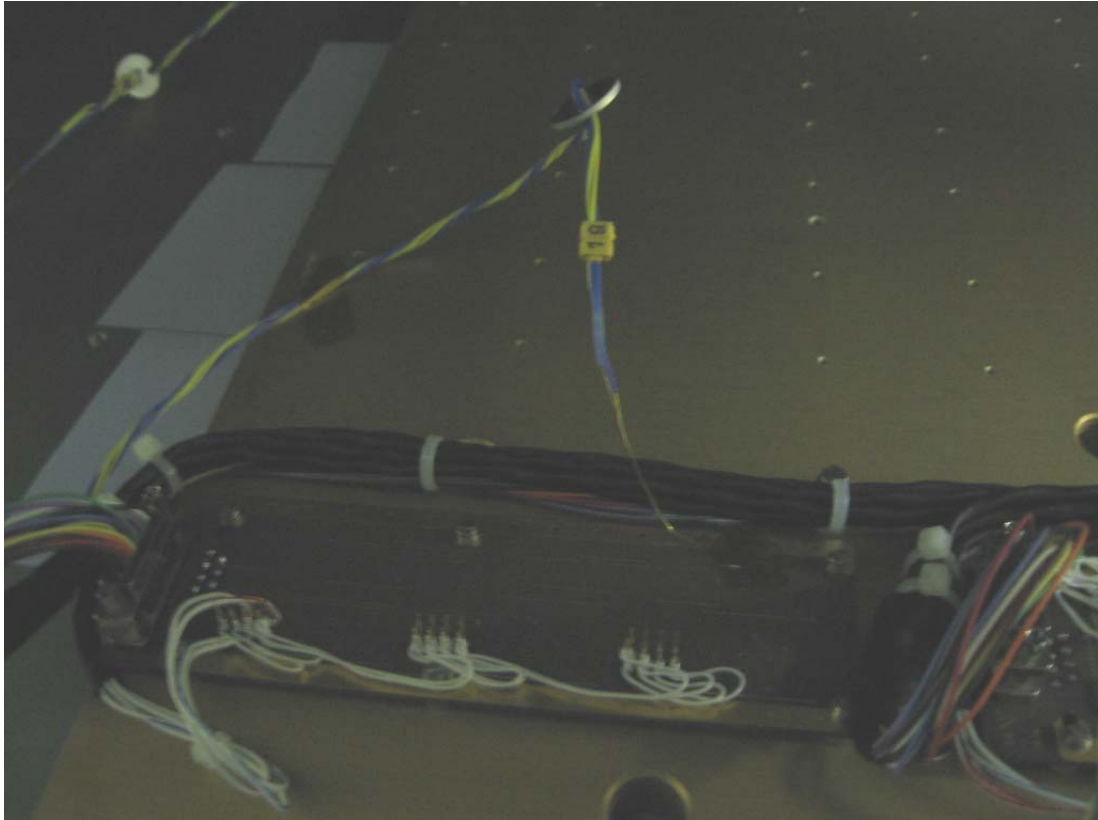
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**Figure 5: Board #4 with temperature sensor n° 19.**

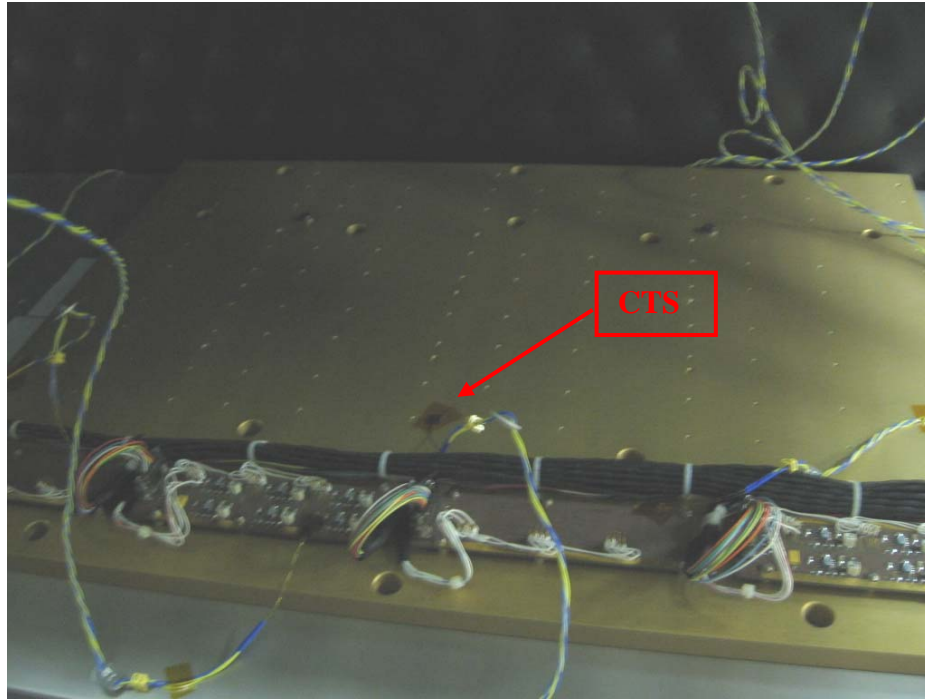
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**Figure 6: CTS on AI Adaptor.**

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### **SUB-TEST PARAMETERS AND SUB-TEST GRAPHICS**

The S.E.R.M.S. Lab. guarantees that the test set-up and management is done only by authorized and qualified members of the S.E.R.M.S staff according to the customer specifications.

After the input of the test engineer, the control system records the parameters for all the different sub-tests and automatically generates the corresponding printable output files.

The graphs are automatically generated during the test by the control system and directly inserted into this report;

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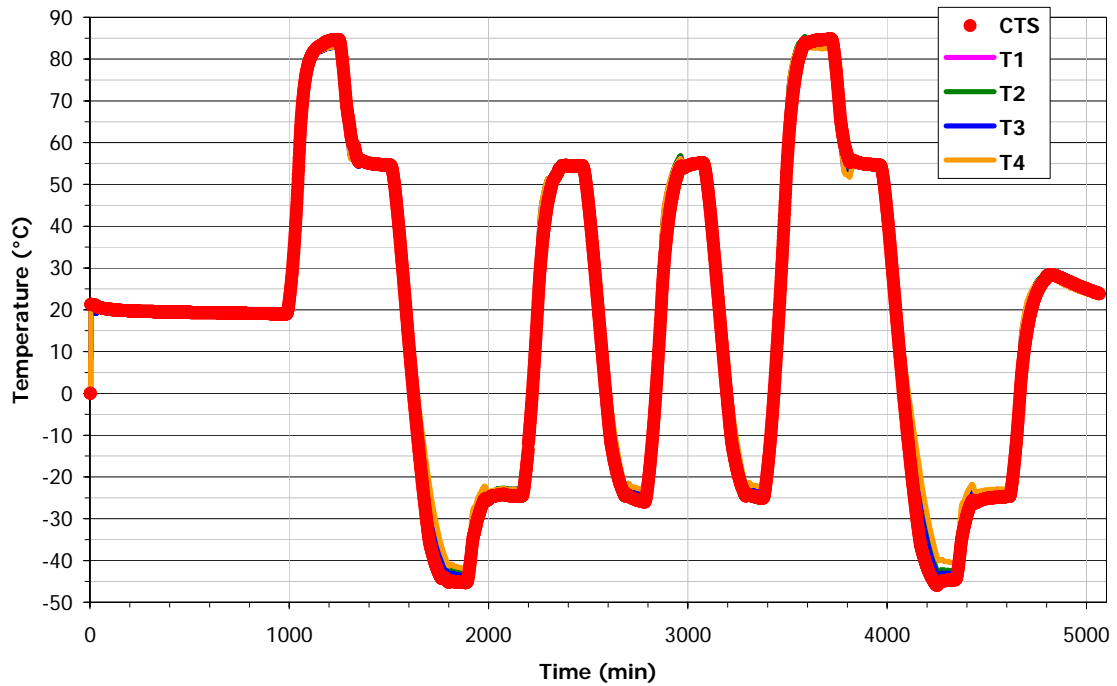


Figure 7: Temperature profile of the Thermo-vacuum test on UGPS QM boards.

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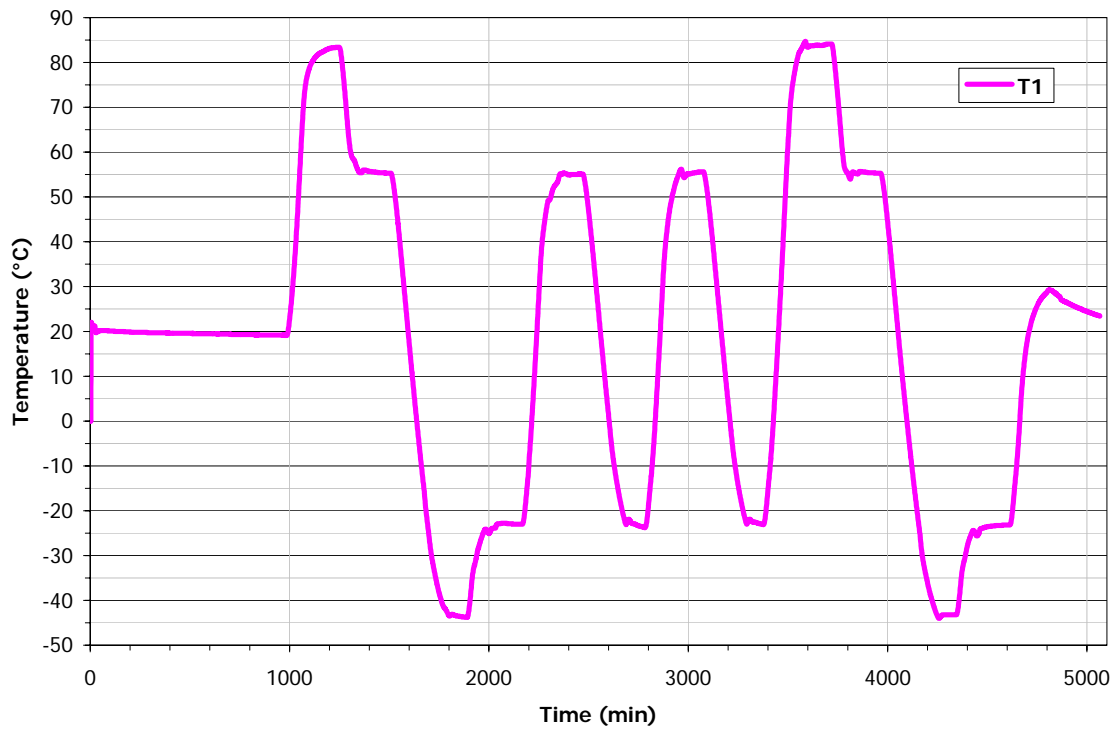


Figure 8: Temperature profile of the sensor on board #1.



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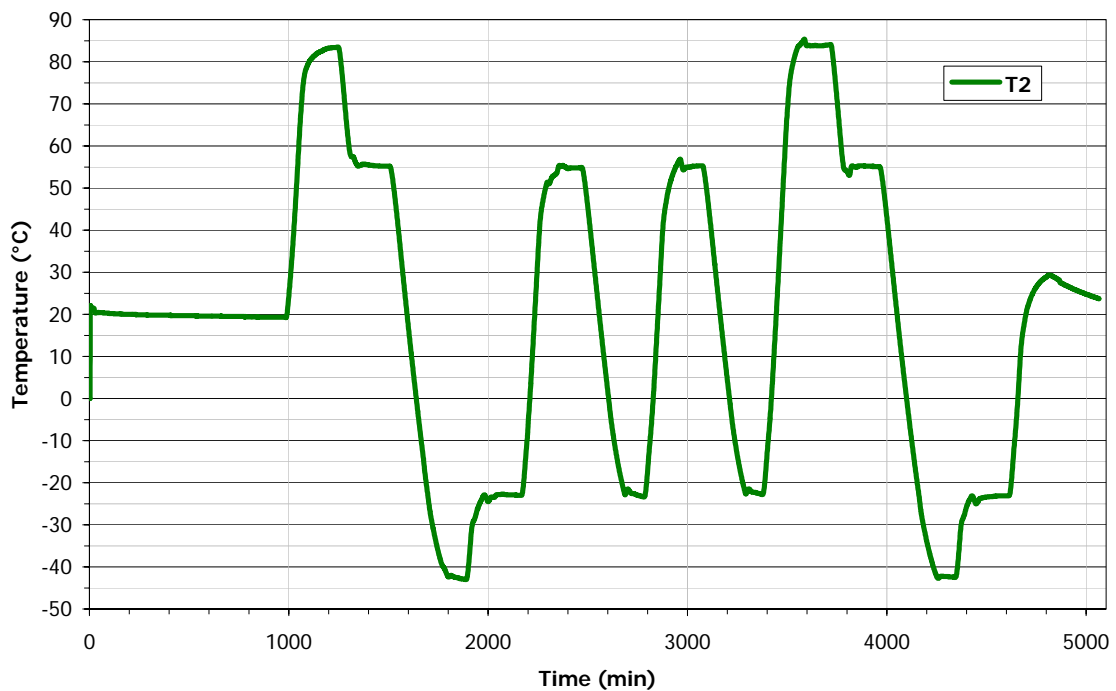


Figure 9: Temperature profile of the sensor on board #2.

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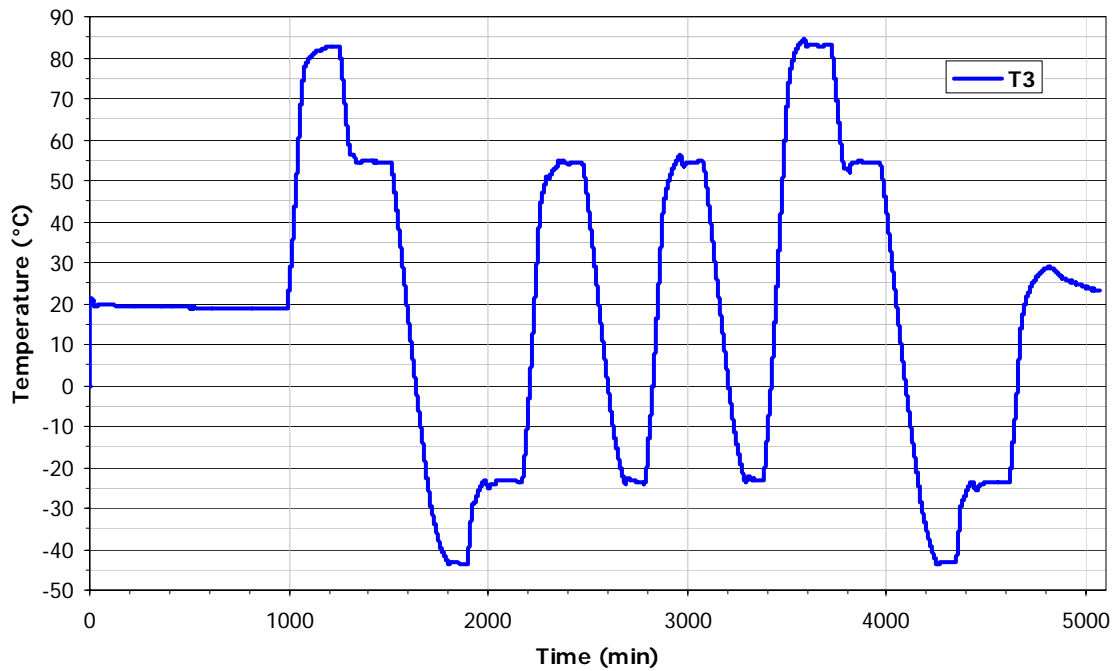


Figure 10: Temperature profile of the sensor on board #3.

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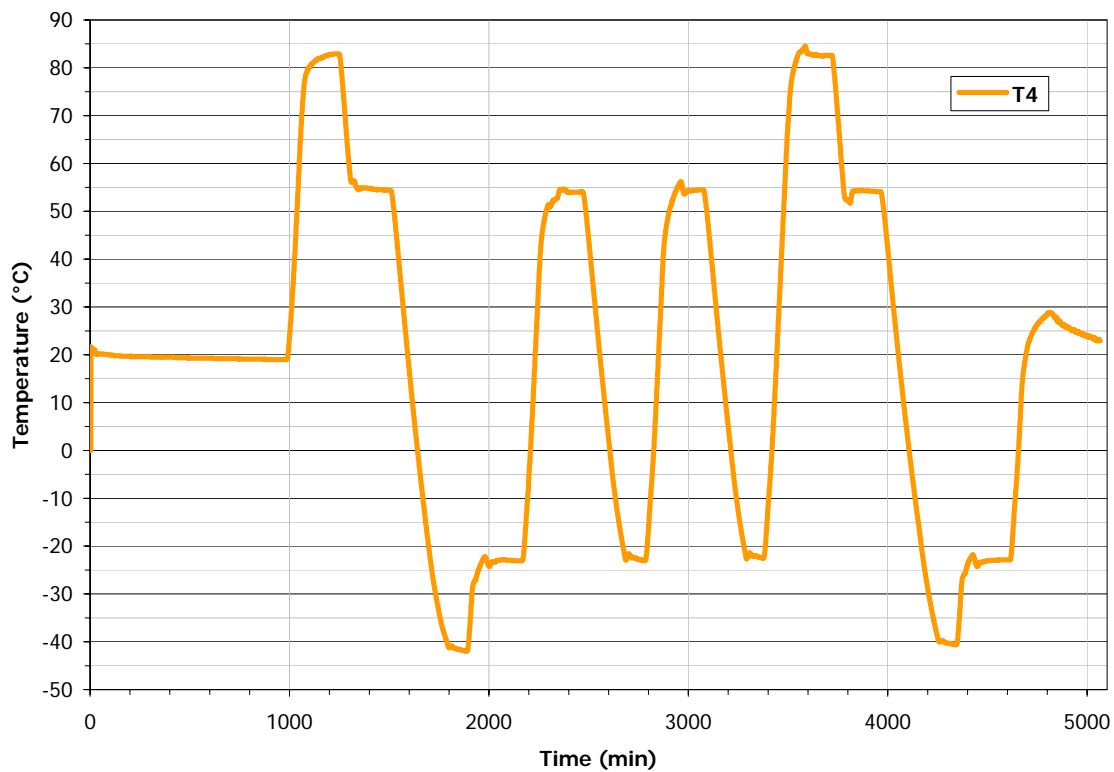


Figure 11: Temperature profile of the sensor on board #4.

**END OF DOCUMENT**

**UGPS QM FUNCTIONAL TEST REPORT**  
29294301A12TRPT

Rev A, 21 Jun 2006

Reserved

## 1. TEST OBJECT

Item	Description	Code	Manufacturer
1	UGPS QM	29242701A121A01	G & A Engineering

## 2. TEST PURPOSE

The test purpose is to verify the functionality of the output channels. Each UGPS QM board has six output voltage channels (PSSIGOUT1 ÷ PSSIGOUT6). The four UGPS QM boards have been tested at the same time.

## 3. TEST LOGISTICS

### Instrumentation

Item	Description	Manufacturer	Code
1	POWER SUPPLIER	AGILENT	E3643A 0÷35 V 1.4 A 0÷60 V 0.8 A
2	POWER SUPPLIER	AGILENT	0÷25 V 1 A
3	MULTIMETER	AGILENT	34401A 6½ digit
4	ATD 80 CHANNEL BOARD	NATIONAL INSTRUMENTS	PCI-6225M
5	PERSONAL COMPUTER	SIEMENS	FLUKE 80TK

## 4. TEST CONDITIONS

Test Location: SERMS Labs, Terni - Italy

Time: start March 27, 2006 – 19:00 / end April 01, 2006 – 07:40

Temp. variable, Umidity 0%, Pressure  $10^{-5}$  atm

Rev A, 21 Jun 2006

Reserved

## 5. TEST RESULTS

### Test setup

It has been created a setup to measure the output voltage channels under the conditions established by the Thermovacuum Test Procedure.

The UGPS QM boards have been connected to the power supplies and to the ATD board using two custom cables: one inside the thermovacuum chamber and one outside.

Each board has been powered with three voltages: 4.94 V, 5.06 V and 12 V. The multimeter has been used to set up and monitor the supply voltages.

The Personal Computer has been equipped with a *Virtual Instrument* created under a LabVIEW development system.

### Voltage measurement

With the UGPS QM boards ON, it has been measured the output voltages using the ATD boards. The software has been set up to show all the measures in real time at the same time. With a target value of 4.10 V and an admissible variation of  $\pm 50$  mV, the values inside this range are shown in black. When a measured value is out of the correct band, it is shown in red, so the operator can immediately see which signal is not corrected and in which DUT is generated.

Rev A, 21 Jun 2006

Reserved

## 6. SCREENSHOTS

### UGPS QM output voltages at 25 °C:

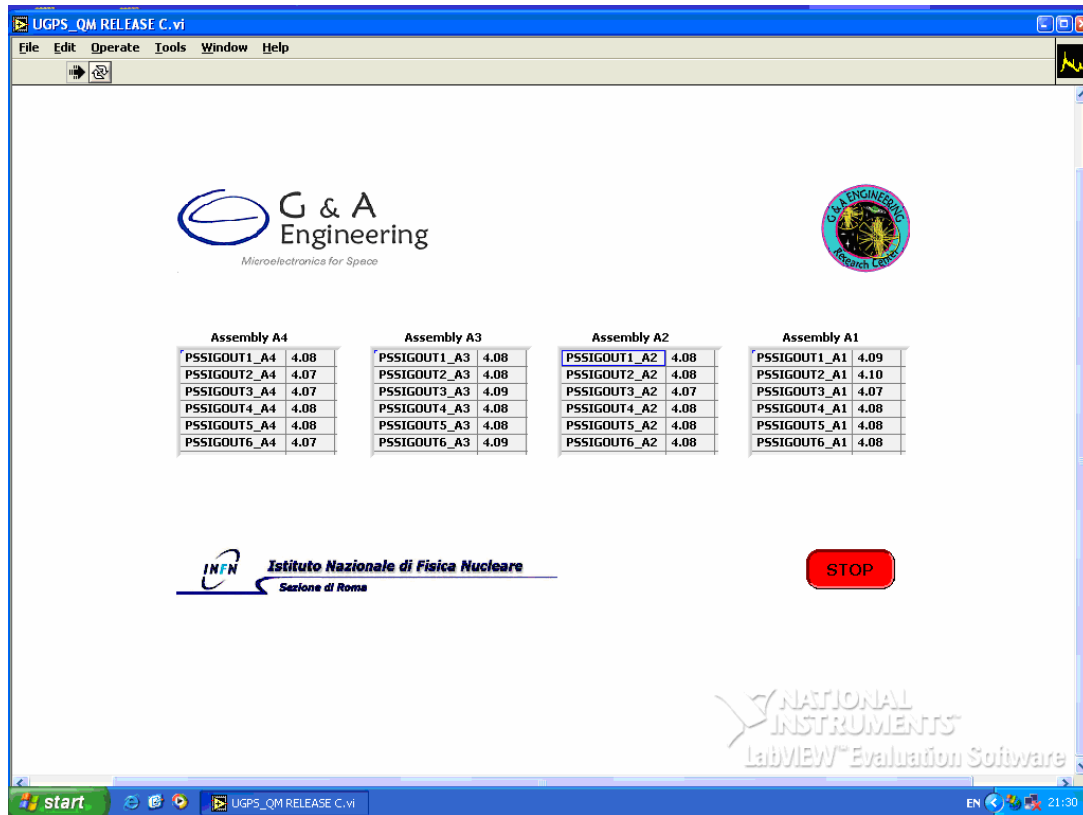
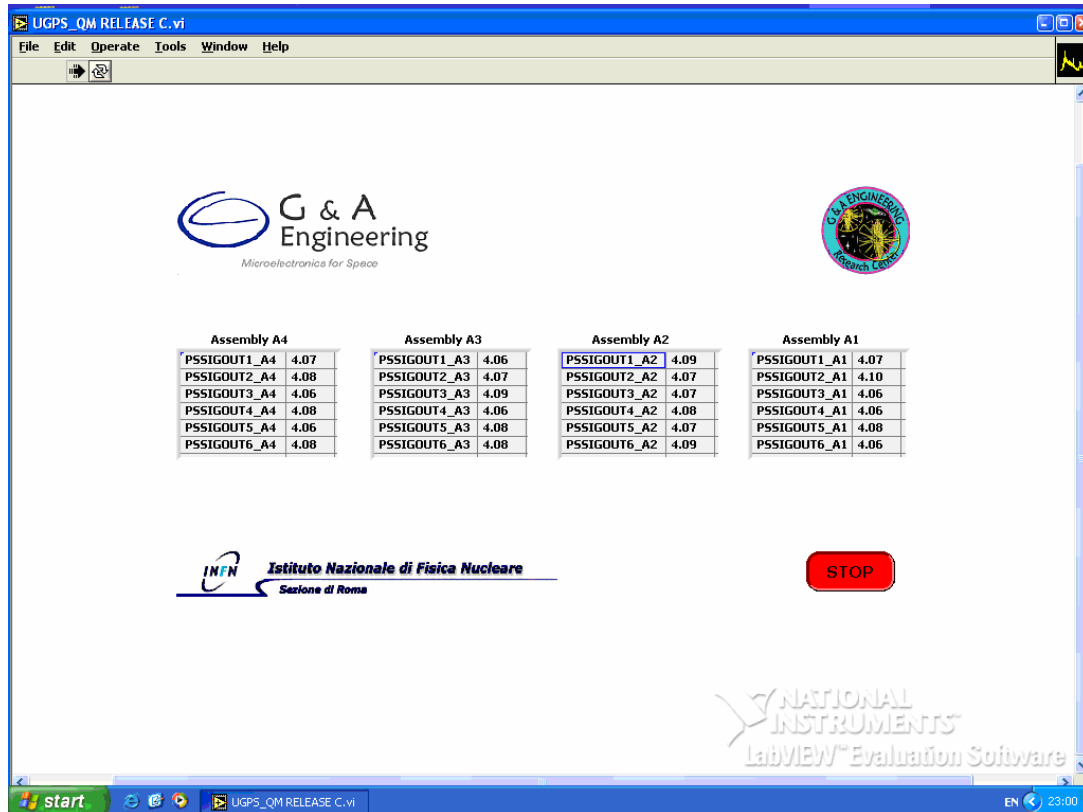


FIG. 1

Rev A, 21 Jun 2006

Reserved

**UGPS QM output voltages at -15 °C:**



**FIG. 2**



Rev A, 21 Jun 2006

Reserved

Example of one Output voltage vs Time for a selected assembly. The picture shows that the values are within the specified range. The time intervals when the voltage drops to zero are those when the boards are powered OFF.

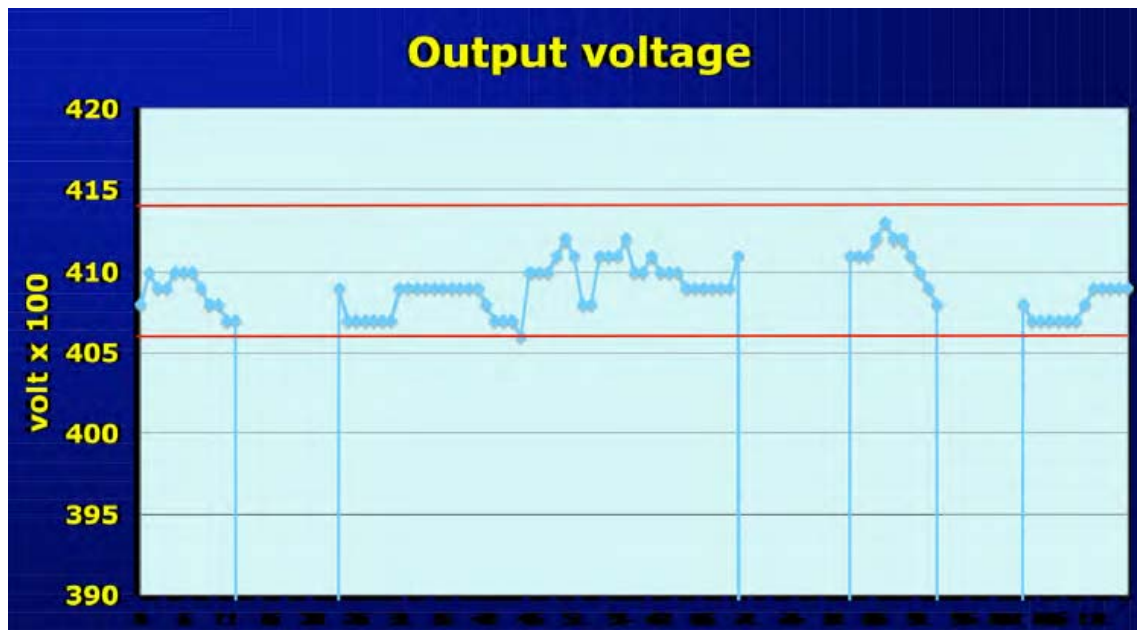


FIG. 3

Rev A, 21 Jun 2006

Reserved

## 7. REMARKS

NONE

### PERSONS RESPONSIBLE FOR TESTS

From G & A Engineering



Renato Bellarosa

From G & A Engineering



Marco Tucceri