

NANOPOWER BP8 100WH

Qualification Certificate

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Prepared / Owned by:	Lars Vestergaard	PA Manager	LAV	2025-12-15
Verified / Reviewed by:	Tim Nielsen	Product Owner	TINI	2025-12-18
Approved by:	Poul Hove Kristensen	Commercial Product Manager	PHK	2025-12-18

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References

Reference	Document title	Document number	Revision, Date
[RD-1]	GomSpace Qualification Program	1012670	Rev. 2.3, 2023-03-24
[RD-2]	gs-qtrp-NanoPower BP8 Structural and Mechanical Vibration Test Report	1043385	Rev. 1.0, 2022-11-03
[RD-3]	gs-qtrp-nanopower-bp8 Mechanical Shock Test Report	1047283	Rev. 1.0, 2023-01-18
[RD-4]	gs-qtrp-NanoPower BP8 Thermal Vacuum Test Reportv1-1	1043910	Rev. 1.2, 2025-04-25
[RD-5]	gs-qtrp-NanoPower BP8 Radiation Total Ionizing Dose Test Report 3rd	1024842	Rev. 1.6, 2025-04-25
[RD-6]	gs-qtrp-nanopower-bp8 Thermal Stress Test Report	1049161	Rev. 1.1, 2025-04-25
[RD-7]	gs-qtct-nanopower-bp8 Qualification Certificate	1050634	Rev. 1.2, 2025-05-01

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1. Qualification Tests

1.1 Purpose

This document describes the environmental qualification tests which is carried out on this specific product. In the following sections, the tests and the corresponding test results are described.

1.2 Product

Manufacturer Name: GomSpace
Product Name: NanoPower BP8 100Wh
Product Number: 112311

The NanoPower BP8 100Wh, with part number 112311, is introduced as a replacement for the NanoPower BP8, with part number 101651. The main difference between the two products are the battery cells, which are changed from 3000mAh to 3500mAh. The cells have the same physical dimensions and mass.

Because of the similarity of the two variants, the qualification tests from 101651 are inherited on 112311. See the qualification certificate for 101651 [RD-7].

In the following sections, the tests and the corresponding test results are described.

1.3 Vibration Tests

The product has been subjected to the following tests.

Tests: Random Vibration
Sinusoidal Vibration
Quasi-static / Sine burst

Conditions: Product is mounted in a 6U GomSpace structure which is mounted inside a GomSpace Qualification POD. It is tested under the following test conditions.

Test Description	Test Conditions
Random Vibration	20Hz, 0.026G2/Hz 20-50Hz, +6 dB/oct 50-800Hz, 0.16G2/Hz 800-2000Hz, -6 dB/oct 2000Hz, 0.026G2/Hz Overall, 14.1Grms
Sinusoidal Vibration	5-8Hz, 10mm pp 8-100Hz, 4.5G
Quasi-static / Sine burst	30Hz, 15G, 19 cycles / 7 loaded cycles

Conclusion: The NanoPower BP8 is tested according to the above-mentioned conditions. The electrical / functional tests are passed. This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.

1.4 Shock Tests

The product has been subjected to the following tests.

Tests: Shock

Conditions: Product is mounted in the fixture for the GomSpace shock bench.
The device is exposed to three impacts at each axis, X, Y and Z.
It is tested under the following test conditions.

Test Description	Test Conditions
Shock Response Spectrum (SRS):	100Hz, 40G 1000Hz, 1000G 2000Hz, 1500G 10000Hz, 1500G +/- 6db from the nominal shock 50% of the measured shock shall be above nominal shock

Conclusion: The NanoPower BP8 is tested according to the above-mentioned conditions.
The visual mechanical inspection and electrical / functional tests are passed.
This certificate ensures that performance, test condition and test equipment are
according to GomSpace quality.

1.5 Thermal Vacuum Tests

The product has been subjected to the following tests.

Tests: Thermal Vacuum (TVAC)

Conditions: Product is mounted in a 6U GomSpace structure, prepared with thermocouples and harness, installed in the TVAC chamber for test. The temperature range defined in the table below refers to the thermal interface of the product during test to ensure its operating temperatures are within specifications. It is tested under the following test conditions.

Test Description	Test Conditions
Temperature	-15 to 38°C, Charging -15 to 63°C, Discharging
Pressure	<1e-5 mbar
Cycles	8
Dwell time	2 hours

Conclusion: The NanoPower BP8 is tested according to the above-mentioned conditions. The electrical / functional tests performed the are passed. This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.

1.6 Radiation TID Tests

The product has been subjected to the following tests.

Tests: Radiation TID (Total Ionizing Dose)

Conditions: Product is mounted at plate for TID testing, prepared with harness and necessary logging equipment.
It is tested under the following test conditions.

Test Description	Test Conditions
Method	Direct (Online)
Rate	Low dose – 36 to 360 rad(Si)/hour
Total dose	Target: 20 krad Resilient up to 15 krad
Condition	Biased at room temperature
Annealing	>24 hours
Ageing	>168 hours

Remarks: Test shows two components of product is TID resilient up to 16.6 krad.

Conclusion: The NanoPower BP8 is tested according to the above-mentioned conditions. The electrical / functional tests performed are partly passed for 20krad. Based on data logs and tests, the TID resilience therefore is specified up to 15 krad. This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.

1.7 Thermal Stress Test

The product has been subjected to the following tests.

Tests: Thermal Stress (Accelerated Lifetime)

Conditions: Product is prepared with thermocouples and installed at the shelf of the Thermal Stress chamber. It is tested under the following test conditions.

Test Description	Test Conditions
Temperature – hot plateau	100°C +15 /-0°C
Temperature – cold plateau	-55°C +0 /-10°C
Cycles	150
Dwell time	15 minutes

Conclusion: The NanoPower BP8 is tested according to the above-mentioned conditions. The visual mechanical inspection and electrical / functional tests are passed. This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.

1.8 Flight Heritage

The new NanoPower BP8 100Wh (112311) is at TRL 8 and is expected to be launched in Q2 2026. As described above the New NanoPower BP8 100Wh is upgraded with new battery cells only.

The existing NanoPower BP8 (101651) is at TRL 9 and have flight heritage since March 2024 on various customer missions.

Furthermore, the existing NanoPower BP8 has flight heritage on the Juventas satellite, part of the ESA HERA mission. The HERA satellite was launched in October 2024.

The new battery cell, LG Chem INR18650 MJ1, is tested by JPL in a comparison test of commercial 18650 cells, where the MJ1 cell outperformed the other cells in the test.

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