GomSpace A/S
Langagervej 6
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NANOTORQUE GST600 MK2

Qualification Certificate

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1.0	2025-11-07	LAV/ANBY	Initial revision

References

Reference	Document title	Document number	Revision, Date
[RD-1]	GomSpace Qualification Program	1012670	Rev. 2.3, 2023-03-24
[RD-2]	gs-qtrp-NanoTorque GST600 MK2 Mechanical Vibration Test Report	1071537	Rev 1.0, 2025-08-12
[RD-3]	gs-qtrp-Nanotorque GST600 MK2 Mechanical Shock Test Report	1075555	Rev. 1.0 2025-11-07
[RD-4]	gs-qtrp-NanoTorque GST600 MK2 TID Assessment	1066228	Rev 1.0, 2025-02-07
[RD-5]			

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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(s). In the following sections, the tests and the corresponding test results are summarized.

1.2 Product

Manufacturer Name:	GomSpace
Product Name:	NanoTorque GST600 MK2
Product Number:	111549

1.3 Vibration Tests

The product has been subjected to the following tests.

Tests: Random Vibration
Sinusoidal Vibration

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

Test Description	Test Conditions
Random Vibration	20Hz, 0.052 g^2/Hz 20-50Hz, +6 dB/oct 50-800Hz, 0.32 g^2/Hz 800-2000Hz, -6 dB/oct 2000Hz, 0.052 g^2/Hz Overall, 20 g_{rms}
Sinusoidal Vibration	5-8Hz, 10mm pp 8-100Hz, 4.5G

Remarks: For details see the vibration test report, [RD-2]

Conclusion: The NanoTorque GST600 MK2 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.

1.4 Shock Tests

The product has been subjected to the following tests.

Tests: Shock

Conditions: The 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, 50G 1000Hz, 1500G 2000Hz, 2000G 10000Hz, 2000G +6dB / -3dB from the nominal shock 50% of the measured shock shall be above nominal shock

Remarks: For details see the shock test report, [RD-3]

Conclusion: The NanoTorque GST600 MK2 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 Radiation TID Assessment

The NanoTorque GST600 MK2 consists of three coils and a PCBA with only one active component, which is a temperature sensor, TMP100.

Since the product contains only one component that could be sensitive to the relatively low radiation doze an assessment is made as described in [RD-4]

The temperature sensor is used for information only, and therefore not critical for the operation of the magnetorquer. Hence, if it fails, the performance of the product is not affected.

Tests: Radiation TID (Total Ionizing Dose)

Conditions: The specific temperature sensor has been tested in other GomSpace products under the conditions described below.

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

Remarks: For details see the radiation test assessment [RD-4]

Conclusion: The only active component in NanoTorque GST600 MK2 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 Flight Heritage

The NanoTorque GST600 MK2 is currently assessed at TRL 8, while its predecessor, the NanoTorque GST600 (part number 200272), has achieved TRL 9.

The MK2 version retains the same torquer rods and temperature sensor (TMP100) as the previous model, ensuring continuity in proven component performance.

The original NanoTorque GST600 has demonstrated reliable in-orbit performance since 2016 across multiple LEO missions, providing a strong flight heritage basis for the MK2 design.