

# **NANOSTRUCTURE 12U**

## **Qualification Certificate**

Reference: 1047564  
Revision: 1.0  
Date: 2022-12-15

<b>Document Title:</b>	NanoStructure 12U Qualification Certificate		
<b>Reference:</b>	1047564	<b>Document Class</b>	QTCT
<b>Revision number:</b>	1.0	<b>Date:</b>	2022-12-15

**Release Table:**

Action	Name	Function	Initials / Signature	Date
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**Document Change Log (Not mandatory)**

Revision	Date	Initials	Description
0.1	2022-12-15	PEEW	Initial draft
1.0	2022-12-20	PEEW	Review and release

**References**

Reference	Document title	Document number	Revision, Date
[RD-1]	GomSpace Qualification Program	1012670	Rev. 2.2, 2021-08-20
[RD-2]	gs-qtrp-12U Mechanical Qualification Test Report	1037811	Rev 1.0, 2022-12-02
[RD-3]	gs-qtrp-12U Shock Test Report	1041796	Rev 1.0, 2022-08-17

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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 Scope

The tests performed and described below is performed on a 12U structure mounted with dummy masses in a configuration representing a typical 12U satellite. The total mass of this test item was 20 kg including the structure itself.

### 1.3 Product

Manufacturer Name: GomSpace  
Product Name: NanoStructure 12U  
Product Number: 110115

### 1.4 MSGE

In the tests described in the certificate the following MGSE has been used.

Manufacturer Name: GomSpace  
Product Name: MGSE 12U Transport and vibration box  
Product Number: 110222

## 1.5 Vibration Tests

The product has been subjected to the following tests.

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

**Conditions:** The 12U structure was mounted in the MGSE 12U Transport and vibration box designed for the 12U structure. It is tested under the following test conditions.

Test Description	Test Requirements
Random Vibration	20Hz, 0.026g <sup>2</sup> /Hz 20-50Hz, +6 dB/oct 50-800Hz, 0.16g <sup>2</sup> /Hz 800-2000Hz, -6 dB/oct 2000Hz, 0.026g <sup>2</sup> /Hz Overall, 14.1Gms
Sinusoidal Vibration	5-8Hz, 17,5mm 0-p 8-100Hz, 4.5G
Quasi-static / Sine burst	30Hz, 15G, 19cycles / 7 loaded cycles

**Remarks:** None

**Conclusion:** The NanoStructure 12U is tested according to the above-mentioned conditions. The visual mechanical inspection is passed with no remarks. This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.

## 1.6 Shock Tests

The product has been subjected to the following tests.

**Tests:** Mechanical Shock

**Conditions:** The 12U structure was mounted in the MGSE 12U Transport and vibration box and fixated to the shock bench.  
The device is exposed to four impacts at each axis, X, Y and Z.  
It is tested under the following test conditions.

Test Description	Test Requirements
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

**Remarks:** None

**Conclusion:** The NanoStructure 12U is tested according to the above-mentioned conditions. The visual mechanical inspection is passed with no remarks. This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.