

## **QUALIFICATION CERTIFICATE**

*NanoDock ADCS-6*

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**Document Change Log**

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1.0	09-11-2021	SEAN	Initial release

# Table of Contents

<b>1. INTRODUCTION .....</b>	<b>4</b>
1.1 PURPOSE .....	4
1.2 REFERENCES STANDARDS.....	4
<b>2. QUALIFICATION TESTS .....</b>	<b>5</b>
2.1 STRUCTURAL AND MECHANICAL TESTS .....	5
2.2 THERMAL VACUUM TEST .....	6
2.3 RADIATION TID TESTS.....	6
2.4 FLIGHT HERITAGE .....	6
<b>3. CONCLUSION .....</b>	<b>6</b>

## 1. Introduction

### 1.1 Purpose

This document describes the environmental qualification tests carried out on the following product:

- 200282 - NanoDock ADCS-6

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

### 1.2 References Standards

Table 1 presents the tests included in the Qualification Program with reference to ECSS documentation.

Table 1: Reference Standards

Test		ECSS/ESCC Reference
Structural and Mechanical	Random Vibration	ECSS-E-ST-10-03C
	Sinusoidal Vibration	ECSS-E-ST-10-03C
	Mechanical Shock	ECSS-E-ST-10-03C
	Quasi static	ECSS-E-ST-10-03C
Thermal	Thermal Ambient	ECSS-E-ST-10-03C
	Thermal Vacuum	ECSS-E-ST-10-03C
Radiation TID		ESCC 22900
Thermal Stress		ECSS-Q-ST-70-38C

## 2. Qualification tests

It is hereby certified that the product mentioned above has been subjected to the tests executed in relation to the standards mentions in section 1.2

### 2.1 Structural and Mechanical tests

<b>Sinusoidal Vibration</b>		
	Frequency [Hz]	Level [g]
<b>Sine Sweep Vibration</b>	5-8	20mm peak-peak
	8-100	4,5
<b>Sweep rate: 2 Octaves per minute</b>		

<b>Random Vibration</b>		
	Frequency [Hz]	ASD Level [ $g^2/Hz$ ]
<b>Sine Sweep Vibration</b>	20	0,026
	50	0,16
	800	0,16
	2000	0,026
	Overall	14,1G RMS
<b>Duration: 120 Seconds on each axis</b>		

<b>Mechanical Quasi-Static</b>			
<b>Sine Burst</b>	Frequency [Hz]	Cycles	Level[g]
	15	19	10G
<b>No. of burst: 8 (<math>\approx</math> 10sec)</b>			

<b>Shock Response Spectrum (SRS) Qualification Levels</b>	
Shock levels based on Q = 10 quality factor	
Frequency [Hz]	Level [g] (+/- 6db)
100	40
1000	1000
2000	1500
10000	1500

Remarks: None

## 2.2 Thermal Vacuum Test

Thermal Vacuum Qualification levels		
Temperature range: -5°C to +50°C		
Pressure level: < 1.0 x 10 <sup>-5</sup> mbar		
Number of Cycles: 12		
Thermal Vacuum Test	CFT	Temperature [°C]
	1	10
	2	50
	3	-5
	4	50
	5	15
	6	-5
	7	35
	8	-5
	9	50
	10	-5
	11	8
12	22	
Test duration: 146min		

Remarks: None

## 2.3 Radiation TID Tests

Total Ionizing Dose		
Dose Rate:	24,6kRad/h	
Dose	54,8min	20 kRad (SI)
Annealing	>24 hours	25 degC
Aging	168 hours	85 degC

Remarks: None

## 2.4 Flight Heritage

The NanoDock ADCS-6 is TRL 9 and has extensive flight heritage including GomSpace missions like GOMX4.

## 3. Conclusion

The NanoDock ADCS-6 is tested according to the above-mentioned conditions and is fully functional and have the expected performance.

This certificate ensures that performance, test condition and test equipment are according to GomSpace quality.