

## **QUALIFICATION CERTIFICATE**

*NovAtel OEM719*

Reference: 1028533  
Revision: 1.0  
Date: 09-11-2021

<b>Document Title:</b>	Gs-Qtct-NovAtel OEM719		
<b>Reference:</b>	1028533	<b>Document Class</b>	Qtct
<b>Revision number:</b>	1.0	<b>Date:</b>	09-11-2021

#### Release Table:

Action	Name	Function	Signature	Date
Prepared / Owned by:	Sebastian Andersen	Junior Engineer	SEAN	29/09/2020
Verified / Reviewed by:	Morten Bisgaard	Head of Spacecraft and Solution	MBD	06-11-2020
Approved by:	Lars Vestergaard	Head of Products and Solutions	LAV	06-11-2020

#### Document Change Log

Revision	Date	Name	Description
1.0	09-11-2021	SEAN	Initial release
1.1	09-11-2021	LAV	Updated with mechanical shock test at 1500G

# Table of Contents

<b>1.</b>	<b>INTRODUCTION .....</b>	<b>4</b>
1.1	PURPOSE .....	4
1.2	REFERENCES STANDARDS.....	4
<b>2.</b>	<b>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.</b>	<b>CONCLUSION .....</b>	<b>6</b>

## 1. Introduction

### 1.1 Purpose

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

- 104791 - NovAtel OEM719 GNSS Receiver

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 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 mentioned in section 1.2

### 2.1 Structural and Mechanical tests

**Test Condition:** Tested as part of integrated satellite.

<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>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

**Test condition:** Tested as part of integrated satellite.

Thermal Vacuum Qualification levels		
Temperature range: -5°C to +50°C		
Pressure level: < 1.0 x 10 <sup>-5</sup> mbar		
Number of Cycles: 4		
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

Thermal Vacuum Qualification levels		
Temperature range: -20°C to +35°C		
Pressure level: < 1.0 x 10 <sup>-5</sup> mbar		
Number of Cycles: 5		
Thermal Vacuum Test	CFT	Temperature [°C]
	1	20
	2	35
	3	-20
	4	35
	5	-20
	6	35
	7	-20
	8	35
	9	-20
	10	35
	11	-20

**Remarks:** None

## 2.3 Radiation TID Tests

**Test condition:** Radiation tested at PCBA level without additional shielding.

Total Ionizing Dose		
Dose Rate:	14,09kRad/h	
Dose	85,1min	18 kRad (SI)
Annealing	>24 hours	25 degC
Aging	168 hours	85 degC

**Remarks:** None

## 2.4 Flight Heritage

The NovAtel OEM719 is TRL 9 and has extensive flight heritage including GomSpace missions like GOMX4 as well as many customer missions.

## 3. Conclusion

The NovAtel OEM719 is tested according to the above-mentioned conditions and is fully functional and has the expected performance.

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