

## GMU 44 Environmental Qualification Form

Nomenclature:

GMU 44 Magnetometer

Type/Model/Part Number:

GMU 44 GPN 010-00296-( ) (Includes 011-00870-( ))

TSO Number:

TSO – C6d

Manufacturer's Specification And/Or Other Applicable Specification:

004-00130-00

Manufacturer:

Garmin Ltd. or its subsidiaries

Address:

1200 East 151<sup>st</sup> Street  
Olathe, Kansas 66062  
U.S.A.

Date Tested:

October 2003 – January 2004 (original tests); March 2009 (most recent additional testing).

RTCA DO-160D Conditions	DO-160D Section and Date of Issue	Description of Conducted Tests
Temperature and Altitude Ground Survival Low/Operating Low Ground Survival High/Short-Time Operating High Operating Temperature High In-Flight Loss of Cooling  Altitude Decompression Overpressure	4.0 4.5.1 4.5.2 4.5.3 4.5.4  4.6.1 4.6.2 4.6.3  (Issued 07/29/97)	Equipment tested to Category F 2    Not Applicable – Cooling Not Required  Not Applicable – Non-Pressurized Location Not Applicable – Non-Pressurized Location
Temperature Variation	5.0 (Issued 07/29/97)	Equipment tested to Category A
Humidity	6.0 (Issued 07/29/97)	Equipment tested to Category B
Operational Shocks & Crash Safety	7.0	Equipment tested to Category B
Sustained Crash Safety	7.3.2 (Issued 07/29/97)	Equipment tested to Aircraft Type 5, Test Type R

Vibration	8.0 (Change No. 1 Issued 12/14/2000)	<p>GMU 44 (011-00870-00) equipment with mounting rack 115-00481-00 or 115-00481-10 with hole set A tested to Category S2, Test Curve B2, and Category S, Test Curves L and M</p> <p>GMU 44 (011-00870-10) equipment with mounting rack 115-00481-00 or 115-00481-10 with hole set A tested to Category S, Test Curves B, L, M, and T</p> <p>GMU 44 (011-00870-10) equipment with mounting rack 115-00481-10 with hole set B tested to Category S, Test Curves B, E, L, M, and T and Category U, Test Curve G</p> <p>(Notes 1 and 6 are applicable to all 011-00870-( ).)</p>
Explosion Proofness	9.0 (Issued 07/29/97)	Equipment identified as Category X, no test performed
Waterproofness	10.0 (Issued 07/29/97)	Equipment tested to Category W
Fluids Susceptibility	11.0 (Issued 07/29/97)	Equipment identified as Category X, no test performed
Sand and Dust	12.0 (Issued 07/29/97)	Equipment identified as Category X, no test performed
Fungus Resistance	13.0 (Issued 07/29/97)	Equipment identified as Category X, no test performed
Salt Spray	14.0 (Issued 07/29/97)	Equipment tested to Category S
Magnetic Effect	15.0 (Issued 07/29/97)	Equipment tested to Class Z
Power Input  Average Voltage Ripple Voltage Momentary Power Interruption Normal Surge Voltage Engine Starting Under Voltage Steady State Voltage Low Voltage Momentary Under Voltage Abnormal Surge Voltage	16.0  16.5.2.1 16.5.2.2 16.5.2.3 16.5.2.4 16.5.2.5 16.5.4.1 16.5.4.2 16.5.4.3 16.5.4.4 (Change No. 2 Issued 6/12/2001)	Equipment tested to Categories A ( ) B (See Notes 2 and 3.) Equipment tested to Categories B Z Equipment tested to Categories B Z Equipment tested to Categories A ( ) B Equipment tested to Categories B Z Equipment tested to Categories B Z Equipment tested to Categories B Z Equipment tested to Categories B Z Equipment tested to Categories B Z Equipment tested to Categories B Z Equipment tested to Categories B Z
Voltage Spike	17.0 (Issued 07/29/97)	Equipment tested to Category A (See Note 2.)
Audio Frequency Conducted Susceptibility — Power Inputs	18.0 (Change No. 2 Issued 6/12/2001)	Equipment tested to Categories B Z (See Note 2.)
Induced Signal Susceptibility	19.0 (Issued 07/29/97)	Equipment tested to Category A (See Note 2.)
Radio Frequency Susceptibility (Radiated and Conducted)	20.0 (Change No. 1 Issued 12/14/2000)	Equipment tested to Category T (See Note 4.)
Emission of Radio Frequency Energy	21.0 (Issued 07/29/97)	Equipment tested to Category H

Lightning Induced Transient Susceptibility	22.0 (Change No. 3 Issued 12/05/2002)	GMU 44 (011-00870-00) equipment tested to Categories A4XXX  GMU 44 (011-00870-10) equipment tested to Categories Z4XXX (See Note 5)  (Note 4 is applicable to all 011-00870-( ).)
Lightning Direct Effects	23.0 (Issued 07/29/97)	Equipment identified as Category X, no test performed
Icing	24.0 (Issued 07/29/97)	Equipment tested to Category A
Electrostatic Discharge (ESD)	25.0 (Issued 07/29/97)	Equipment identified as Category X, no test performed
<u>Notes and Remarks:</u>  1. Vibration Test Curve M was increased as follows: 0.1 inches pk-pk double amplitude from 15Hz to 17Hz and 1.5g pk from 17Hz to 55Hz.  2. During Sections 16, 17, 18, and 19 tests, test stimulus was applied to power inputs of GRS 77, which supplies power to the GMU 44.  3. For Momentary Power Interruption, the unit does not reset for Category A( ) and B interrupts (200 ms max), but does reset for Category Z interrupts (1 second max). The GMU 44 meets Category Z except for the one second interrupt in Section 16.5.2.3. This requirement corresponds to Test Condition Numbers 8 and 15 in Table 16-1A referenced by Sections 16.5.2.3 and 16.5.1.4.b.  4. Qualification to additional levels and configurations are shown in Garmin Report 005-00329-06 Supplemental Qualification Summary.  5. The following pin injection tests were performed: Waveform 3, Level 4; Waveform 4, Level 4; and Waveform 5A, Level 4. These constitute pin injection waveform sets A and B as described in DO-160D.  6. Hole sets for the GMU 44 installation rack, 115-00481-10, are defined in the GRS/GMU Install manual, 190-00303-10.		