



TÜV SÜD America Inc., 5945 Cabot Parkway, Alpharetta, GA 30005
Website: www.TUVamerica.com

Monday, December 17, 2018

Johnson Outdoors

1220 Old Alpharetta Road Suite 340
Alpharetta, GA 30005
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Our investigation of the **Helix 9** has concluded. The results of the investigation are listed below:

Customer requested tests from the following test standard(s) and/or specification(s):

STANDARD	TEST DESCRIPTION	RESULT
EN-60945: 2002	Maritime navigation and radiocommunication equipment and systems – General requirements – Methods of testing and required test results	PASS

Model Variants: Helix 9 Chirp GPS G3N, Helix 9X Chirp GPS G3N, Helix 9 MDI GPS G3N, Helix 9X MDI GPS G3N, Helix 9 MSI GPS G3N, Helix 9X Chirp MSI GPS G3N, Helix 8 Chirp GPS G3N, Helix 8X Chirp GPS G3N, Helix 8 MDI GPS G3N, Helix 8X MDI GPS G3N, Helix 8 MSI GPS G3N, Helix 8X Chirp MSI GPS G3N

Testing was concluded on **10/10/2018** at our facility in Alpharetta, GA.

This letter serves as proof of compliance for the product listed above and may be accompanied by test data for this product and any other supporting documentation of the testing performed.

If you have any additional questions, please contact me.

Kind Regards,

A handwritten signature in blue ink, appearing to read "Eugene Sello".

Eugene Sello
EMC Technician
Testing Division



Test Results

The minimum Compass safe Distance of this device is 25CM to the Standard Compass and 5CM to the Steering Compass

1.1 Test Equipment

Table 1: Test Equipment – Compass Safe Distance Testing

Asset ID	Manufacturer	Model	Equipment Type	Serial Number	Last Calibration Date	Calibration Due Date
456	ACS	MG1-1	Antenna	456	NCR	NCR
43	Hewlett Packard	6286A	Power Supplies	2109A-06095	NCR	NCR
350	Cammenga	3H	Sight Compass	21-26460-02E	NCR	NCR
239	Walker Scientific	ELF-50D	Mag Field Meter	K72387-4	04/03/2018	04/03/2019

1.2 Test Methodology

Each unit of the EUT shall be tested in the position and altitude relative to the compass or magnetometer which the error produced at the compass would be a maximum, provided the item can be fitted in this way.

The compass safe distance of any unit of the EUT is defined as the distance between the nearest point of the unit and the center of the compass or magnetometer at which it will not produce a deviation in the standard compass of more than 5.4 degree/H where H is the Horizontal component of the magnetic flux density in uT (microtesla) at the place of testing.

For steering compass, the standby steering compass and the emergency compass, the permitted deviation is 18 degree/H, H being defined as above.

Each unit of the EUT shall be tested:

- In the magnetic condition in which it is received with the EUT un-powered;
- After normalizing with the EUT un-powered;
- In the power condition, if the unit is capable of being energized electrically.

Normalizing means a procedure to maximize the homogeneity of the magnetic flux in the EUT by placing it in Helmholtz coils or by other adequate means.

In each of the above tests, the unit shall be rotated to determine the direction in which it produced the maximum deviation.

1.3 Test Setup Photographs



Figure 1.3-1: Compass Safe Distance Test Setup

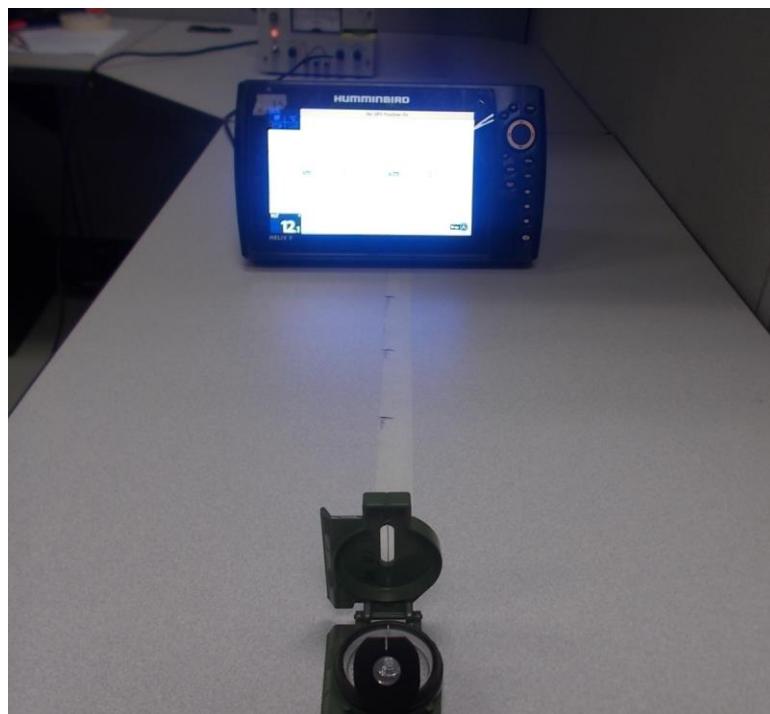


Figure 1.3-2: Compass Safe Distance Test Setup



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1.4 Compass Safe Distance Test

Test Parameters:

Test Date:	October10, 2018	Temperature (°C)	22
Technician:	Eugene Sello	Humidity (%)	35
Equipment Tested:	Helix 9	Barometric Pressure (mBar)	1020
Tested Modes:	Unpowered and powered as per test method		
AC Input Power:	N/A		
DC Input Power:	12VDC		

Orientation	Angle of Deflection (0.25/0.8)	Standard Compass Distance	Steering Compass Distance	Mode
0	(0.25/0.8)	10	5	As received, EUT unpowered
90	(0.25/0.8)	5	5	As received, EUT unpowered
180	(0.25/0.8)	5	5	As received, EUT unpowered
270	(0.25/0.8)	10	5	As received, EUT unpowered
0	(0.25/0.8)	10	5	Unpowered, normalized on X axis
90	(0.25/0.8)	15	5	Unpowered, normalized on X axis
180	(0.25/0.8)	5	5	Unpowered, normalized on X axis
270	(0.25/0.8)	15	5	Unpowered, normalized on X axis
0	(0.25/0.8)	25	5	Unpowered, normalized on Y axis
90	(0.25/0.8)	5	5	Unpowered, normalized on Y axis
180	(0.25/0.8)	10	5	Unpowered, normalized on Y axis
270	(0.25/0.8)	10	5	Unpowered, normalized on Y axis
0	(0.25/0.8)	25	5	Unpowered, normalized on Z axis
90	(0.25/0.8)	20	5	Unpowered, normalized on Z axis
180	(0.25/0.8)	5	5	Unpowered, normalized on Z axis
270	(0.25/0.8)	15	5	Unpowered, normalized on Z axis
0	(0.25/0.8)	10	5	EUT powered
90	(0.25/0.8)	10	5	EUT powered
180	(0.25/0.8)	5	5	EUT powered
270	(0.25/0.8)	10	5	EUT powered

Notes: