

Vibrational (Transit) Test Report

Date of Testing: Dec 7, 2024

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Equipment Under Test: VxMark / VSAP with VotingWorks Modifications

Overview

This report documents the results of vibrational (transit) testing designed to simulate conditions encountered during typical product transportation. Testing included multi-axis vibration exposures to ensure that normal shipping, handling, and transit environments would not adversely affect the product's integrity or functionality.

Additionally, one production unit was shipped via standard freight to validate real-world transit conditions. All tests passed, providing high confidence that the product will pass more rigorous testing.

Test Objectives

- Verify EUT mechanical robustness and functional stability under simulated transit vibrations.
- Validate EUT durability through real-world shipping conditions.
- Confirm that no damage, loosening of components, or performance degradation occurs due to vibration.

Test Setup

- **Environment:** Ambient lab conditions (approximately 23°C, 45% RH).
- **Test Equipment:**
 - Electrodynamic shaker system capable of producing vibrations.
 - Fixtures and mounting straps designed to replicate packaging or standard transit orientations.
- **Sample Size:** 2 units

Test Procedures

1. **Lab Vibrations Testing (In-Lab Unit):**
 - EUT was subjected to vibrations along three principal axes (X, Y, Z), one axis at a time.

- Sustained random vibrations were performed at ~55 Hz.
- Duration was approx 30 mins on each axis.
- 2. **Freight Shipment Evaluation (Real-World Unit):**
 - EUT was packaged per standard shipping protocols and sent via freight over typical transport routes.
 - Upon arrival, EUT was unboxed and inspected for any transit-induced damage or functional degradation.
- 3. **Functional Checks Pre- and Post-Test:**
 - Baseline functional tests were conducted before vibration exposure and shipping.
 - Post-test and post-shipment functional tests verified no performance loss.

Acceptance Criteria

- No visible loosening of fasteners, connectors, or internal components.
- No cosmetic or structural damage (e.g., cracks, deformation).
- All functional features must operate identically before and after the vibration exposure.

Results

- **Mechanical Integrity:** No visible damage, no loose components, no fastener or connector failures.
- **Functional Verification:** All units fully operational after testing. No changes in performance or functionality noted.

Conclusions

All EUTs, including the one shipped via freight, passed vibrational (transit) testing. The product demonstrated sufficient durability and stability under both simulated and real-world shipping and handling conditions.

This provides high confidence that the EUT will pass the more rigorous standards-based testing.