

## CASE STUDY:

# CONQUERING ELECTROMAGNETIC COMPATIBILITY HURDLES IN TREADMILLS

### AT A GLANCE

#### *Requirements*

- ✓ Effective EMI solution to reduce all electrical noise, leading to EMC challenges that hindered the certification process.
- ✓ A 20-amp filter designed to target the precise frequency range from 150 kilohertz to 30 megahertz.
- ✓ Despite this, lower frequencies continued to cause the device to surpass the defined thresholds.
- ✓ The main noise frequencies fell below the 150-kilohertz range, necessitating a customized solution for resolution.

#### *Benefits*

- ✓ Astrodyne TDI collaborates closely with the manufacturer's engineering team to provide modified filters tailored to specific requirements.
- ✓ These filters undergo in-house testing at the Intertek SEMKO Certified Safety Lab level 4.
- ✓ They are fully approved and certified by various agencies, including UL 1283, IEC/EN 60939-3, UL 60939-3, and CSA C22.2 No. 8.



### OVERVIEW

Addressing electromagnetic compatibility (EMC) challenges regarding treadmills is crucial for a seamless and secure user experience. Incorporating EMI/EMC filter solutions into the design of treadmills is a key strategy to overcome these challenges and ensure safety compliance. These filters are vital in minimizing unwanted signals and noise, ultimately enhancing the equipment's performance and reliability. By implementing the right EMI/EMC filter solutions, manufacturers can ensure that treadmills operate efficiently without causing interference to other electronic devices.

### EMC CHALLENGES

A well-known treadmill manufacturer initially encountered electromagnetic compatibility challenges when using standard single-stage filters. These filters proved inadequate in suppressing all electrical noise, resulting in EMC issues that impeded the certification process. Seeking assistance from Astrodyne TDI led to a significant breakthrough. The experts at Astrodyne TDI suggested a dual-stage 20 amp filter tailored to address the specific frequency range of 150 kilohertz to 30 megahertz. While this solution notably improved the situation, further analysis revealed that specific lower frequencies were still causing the unit to exceed the specified limits.

### ASTRODYNE TDI'S SOLUTION

Working closely with the manufacturer's engineering team, Astrodyne TDI identified and resolved noise issues by adjusting filters for optimal performance in the 30-100 kHz range. This fine-tuning resulted in an additional 10 to 15 DBs of insertion loss in the lower frequencies, ultimately ensuring the treadmill met the necessary standards and received certification.

