TECHNICAL BULLETIN

MULTI-TRANSMITTER RF BEST PRACTICES ● JUNE 2026

THRIVE SMART SYSTEMS

ISSUE DISCOVERED

Multiple Thrive Transmitter™ units in a single enclosure can introduce RF coupling and interference between antenna systems. This has been seen in situations where the Thrive Transmitters™ are mounted in a steel enclosure using external pancake antennas. Field deployments with more than four transmitters in a shared cabinet may experience reduced range, communication dropouts, and receiver desensitization.

This occurs when antennas lack proper spacing, feed cables are bundled together, or standoffs from the steel enclosure are missing. The TEVO-04 series was engineered and tuned for optimal performance with individual antenna elements. While higher densities are possible with proper RF practices, each installation is unique and may require additional engineering effort.

RECOMMENDATIONS

Standard Deployment: A maximum of four (4) Thrive Transmitter™ units per controller/cabinet provides optimal performance with minimal RF complexity.

Beyond Four Transmitters: Higher densities are possible with proper RF practices, though installation becomes more art than science. Each site has unique characteristics requiring iterative testing and refinement. Note: If more than 4 are being installed, use a separate power source outside the controller.

Best Practices for Multi-Transmitter Deployments

Antenna Selection

Thrive Smart Systems recommends using the standard stick antenna supplied with the Thrive Transmitter™. These devices have been engineered and tuned specifically for this antenna configuration and will achieve optimal performance with its use. When the standard stick antenna cannot be deployed, alternative antenna options such as pancake-style antennas may be considered; however, performance characteristics may differ from the original design specification. Performance validation through field testing is recommended when using alternative antennas.

Enclosure which houses the Thrive Transmitters™

Thrive Transmitter™ units will achieve optimal performance when housed in plastic enclosures. Plastic enclosures eliminate the RF containment effects of Faraday caging, which can occur with steel or metal enclosures and may impact system performance. If steel or metal enclosures are required, the RF best practices outlined in this bulletin should be implemented.

Steel Enclosure: Antenna Spacing & Orientation

When deploying multiple transmitters within a steel enclosure, maintain a minimum of 10 to 15 inches of separation between antenna connectors. For pancake-style antennas in close proximity, stagger antenna orientations (vertical, horizontal, angled) to reduce RF coupling between transmitters.

Steel Enclosure: Antenna Standoffs & Grounding

When mounting antennas, utilize rigid plastic standoffs (acrylic, HDPE, or PVC) measuring a minimum of 1/4 inch to 1/2 inch in height. Avoid foam, rubber, or neoprene standoffs, which may absorb moisture and degrade over time, potentially affecting antenna tuning.

Cable Routing & Shielding

Maintain physical separation between antenna feed cables; a minimum spacing of 6 to 12 inches between cable runs is recommended. Avoid coiling or bundling antenna cables together. When possible, use cable trays, cable clips, or separate conduit sections to maintain cable separation. If antenna cables must cross other electrical cables, ensure they intersect at 90 degree angles rather than in parallel runs.

MOVING FORWARD

Multi-transmitter installations can achieve excellent performance when designed with RF principles in mind. However, Thrive Smart Systems recognizes that deployments exceeding four transmitters may require additional effort and iteration. If you encounter coupling issues or need guidance on site-specific optimization, please contact us at info@thrivesmartsystems.com.

We appreciate your partnership and remain committed to your deployment success.