

Avi-on In-Fixture Assembly Workflow

Maximizing Antenna Performance

How can you maximize antenna performance when installing an Avi-on controller in an indoor fixture?

Best Practices for Maximizing Radio Frequency (RF) Transmission

- For most fixtures, just putting the fixture device (IFAC, LVFA) inside the fixture will work fine
- See below for additional considerations to assure good antenna performance*

Standard Internal Mounting

Most fixtures have enough holes and seams in the case that the radio signal can get outside adequately. As long as the case metal is less than 18 gauge. The number, size, and shape of fixture holes, folded seams and lens port can also impact this guideline.

- **LVFA:** The standard LVFA uses an internal antenna. Just locate the LVFA a few inches away from the driver, or any other dense metal objects in the fixture
- **IFAC:** Do your best to pull the antenna outside the fixture, drilling a 1/4" hole if needed. Or place the antenna next to vent holes/slots in the fixture. If not possible, it will usually be ok

Heavy Gauge Metal Case or Junction Box

If the fixture has a metal greater than 18 gauge, then it is necessary to route the antenna outside the case

- **LVFA:** Order the outdoor antenna (-OA) version of the LVFA and install the antenna through the case per the outdoor antenna instructions
- **IFAC:** It is necessary to pull the antenna outside the fixture, drilling a 1/4" hole if needed

Mounting Individual Fixture XFAC (AVI-XFAC-16A-1CH-CL1-IF)

- The XFAC is often mounted outside the fixture case as an alternative when an IFAC will not fit inside a fixture
- The XFAC internal antenna will perform fine with no additional consideration

Junction Box Mounting

- Anytime an Avi-on device is mounted inside a metal junction box (LVFA, XFAC, IFAC, SIM, RCO), it is necessary to pull the antenna outside the junction box
- **LVFA-OA:** If mounting an LVFA inside a metal box (very uncommon), request an outdoor (-OA) antenna version of the LVFA

Note

*** Radio Performance Testing.** Because Bluetooth radio signals propagate and bounce around inside the case and inside the building (this is why Avi-on devices have such reliable radio performance), it is very difficult to test the Bluetooth performance in an individual fixture without careful testing

- The signal at various directions will be very different due to the placement of holes and seams, and the specific location of each device in the fixture. Once in the field, that directionality could help or hurt the radio performance depending on the specific orientation of the fixture itself, other nearby fixtures, walls, ceiling ducts, etc.
- Fixture signal strength in any specific direction is not a reliable indicator of overall network performance
- The presence of multiple devices significantly changes the mesh propagation patterns, so any testing that is done must be in an environment with no other Avi-on devices powered, and must include testing in multiple directions
- Overall, Avi-on recommends following the guidelines above, when in doubt be sure the antenna is pulled outside the case if possible. These guidelines will ensure solid radio performance in virtually all environments