

RFID technology

Both active and passive RFID tags send radio wave energy back to the RFID reader at low power levels. Low power is necessary in order to control the path, or back scatter, of the responses within the read range so that signals are not bouncing everywhere they are not needed. This causes interference and signal communications with the wrong readers. Various frequencies used have certain operational advantages, the most important of which centers around the "read distances" since an inductive coupling is required between the tag and the reader equipment; and, power levels drop off as the inverse square of the separation distance.

ISO STD 8000 Air	Interference Frequency	Read Distance	Applications
Low	124, 125, and 135KHz	12"	close-up, hand-held
High	13.56MHz	36"	intermediate distances
UHF	860 - 930MHz, 2.45GHz, 5.8GHz and 4.33.92MHz (special)	up to 100'-0"	passing traffic, warehouse, etc.

factors affecting performance

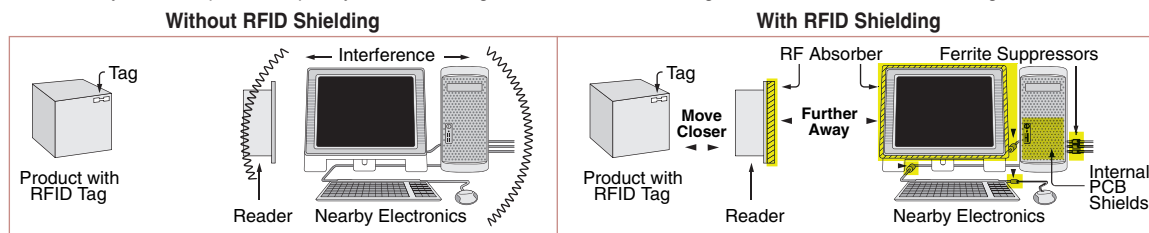
Because power levels are low and reader fields are narrow, signals must be as unencumbered as possible. Nearby equipment of all types are the source of interference signals; i.e., motors, conveyors, robots, manufacturing equipment, wireless LAN's, cordless phones, computers – actually, any device with a microchip and a power cord or cable (antenna-like structure) will emit RF energy which can interfere with the ability of the reader to receive a clean signal.

protecting the reader – three approaches can be used

- 1) **Immunize the reader**
 - Reduce sensitivity to unwanted incoming signals, especially higher harmonics of lower frequency clock rates.
 - Tune the antenna for directional sensitivity if practical.
 - Move closer to the tag source.
- 2) **Reduce the sources of interference**
 - Move them further away or eliminate them entirely if practical.
 - Shield the nearby equipment at least addressing the interrogation frequency of the reader.
- 3) **Reduce RF emissions from readers**
 - Shield readers from rebroadcasting tag back scatter signals. This cleans up the local reader network environment from unwanted signals; and, also introduces security against unwanted scrutiny.

RFID shielding attenuation of unwanted interference signals

Our family of RFID specific frequency-tuned shielding solutions addresses the greatest needs encountered at tag reader sites.



Some of the most valuable tools and techniques recommended for RFID signal interference control are:

- RFID signal interference probe (see below)
- RFID frequency-specific ferrite absorbers for cables
- RFID frequency-specific absorber shields
- RFID frequency-specific PCB shields