

Magnetic Absorber in RFID Systems



ARC Wave-X® Magnetic Absorber in RFID Systems

The problem: communication failure induced by nearby metals

In a 13.56MHz RFID system, metals near an antenna degrade communication performance.

For example:

- With an RFID tag, the antenna is placed on or near printed circuit boards or a battery pack surrounded by metals
- The RFID tag is attached directly to a metallic surface
- A reader/writer is placed on a metal table or the antenna is positioned near metals in an enclosure
- System performance is deteriorated because when magnetic flux from a reader/writer encounters metals, eddy currents flow on the metal surfaces.
- These eddy currents generate a demagnetizing field which cancels the magnetic field passing through the RFID tag

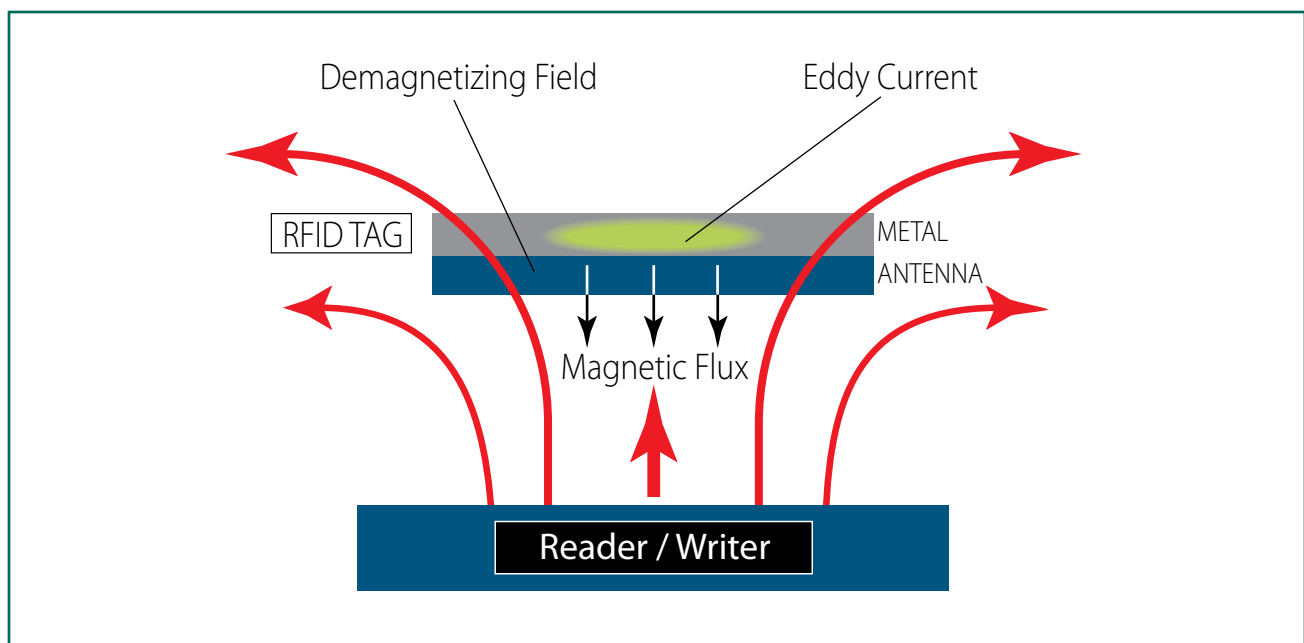


Figure 1a — Communication Malfunction

The solution: ARC Technologies Wave-X® absorber

- When a magnetic absorber sheet is inserted between the metal surfaces and the antenna of an RFID tag and/or a reader/writer the magnetic flux is drawn toward the absorber.
- Interference with metal surfaces is suppressed and system communication distance is enhanced.
- This solution also reduces null problems within the system.

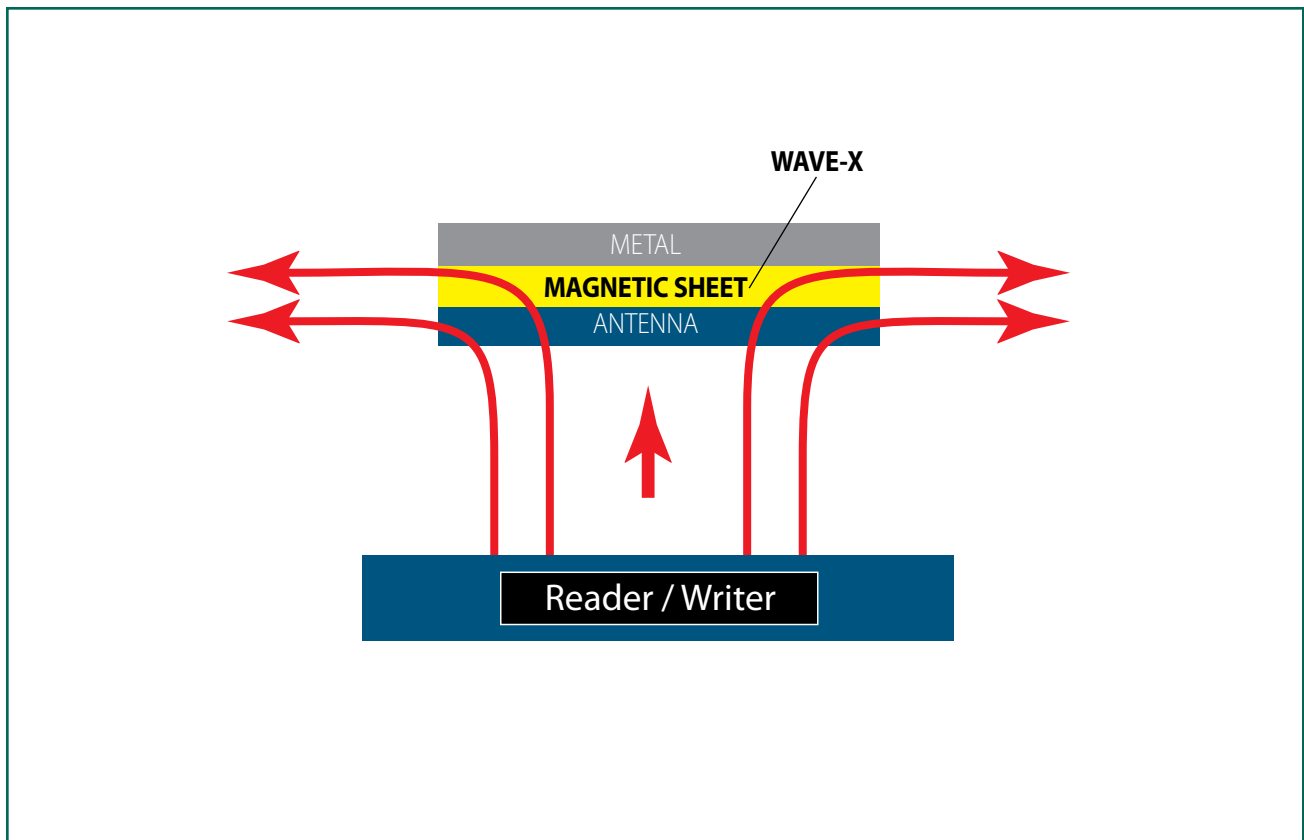
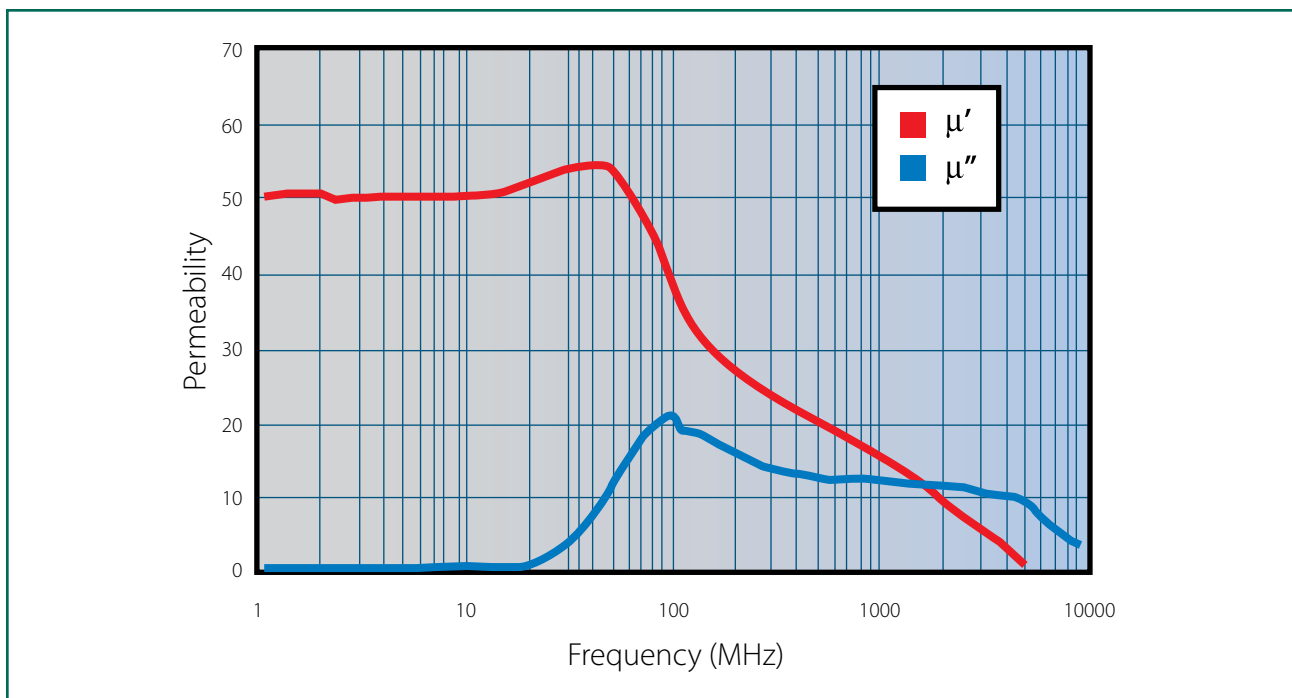


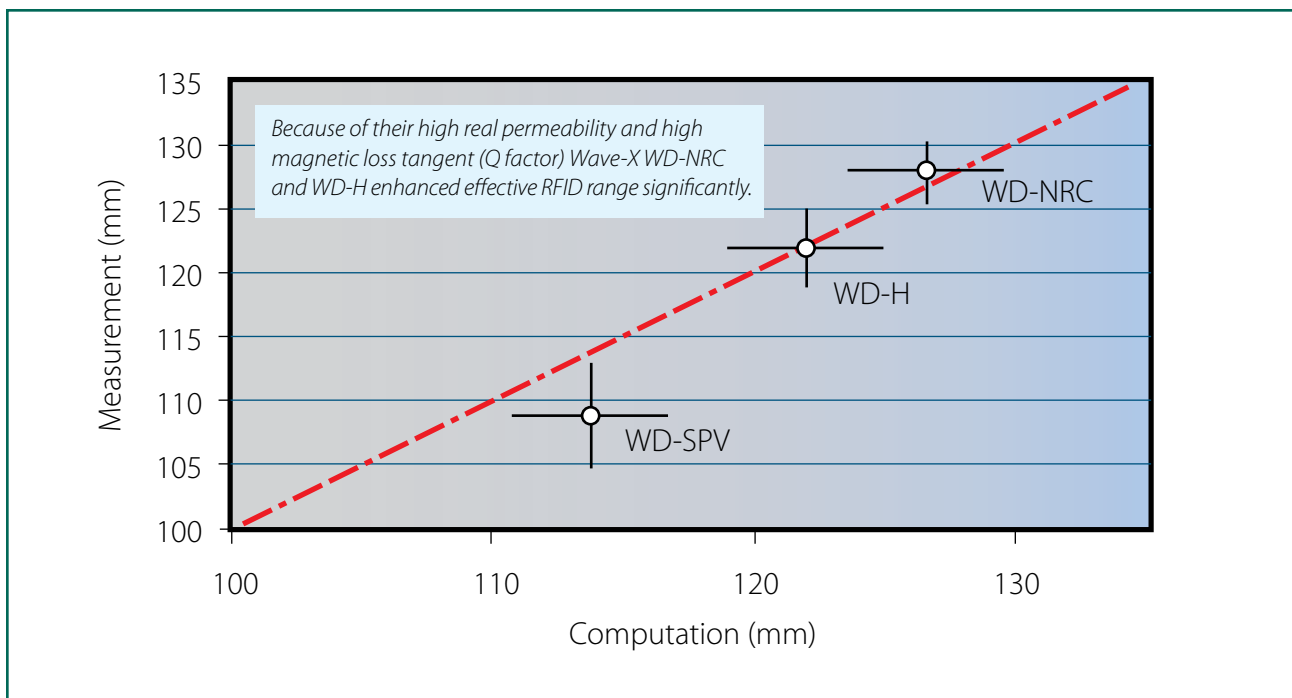
Figure 1b — Improved Communication with a Magnetic Sheet

Optimal absorber characteristics:

- The ideal absorber choice for antenna performance enhancement in 13.56MHz RFID systems will exhibit both high magnetic flux convergence and low loss.
- Magnetic flux convergence is expressed and measured as high real permeability (μ') while low loss is expressed as low imaginary permeability or μ'' .
- An excellent choice for RFID performance enhancement is Wave-X WD-NRC from ARC Technologies.
- WD-NRC exhibits a μ' value of 50 and μ'' of <1 at 13.56MHz. The ratio of μ''/μ' is the magnetic loss tangent or "Q".
- The very high Q of WD-NRC ensures metal objects will not interfere with optimal RFID reading and/or writing.



WAVE-X WD-NRC Permeability



Communication distance with magnetic sheets



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