RFID Antenna: A Growing Area of Innovation

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RFID system design has never been about plug-and-play. As a matter of fact, according to the recent survey conducted by Larstan Business Reports, "deployment" and "complexity" were the specific reasons cited by the respondents with a total of 13.2% compared to the "cost" at 16.6% (3).

Reader Antenna Design is a component that contributes to the complexity because reader antennae may vary greatly in size and dimension, depending on their particular applications requirements. As the conduit for data communication between chip-based RFID tag and reader, the design and placement of antennae are crucial in determining the coverage zone, range and data communication reliability.

Basically, the data transmission between tag and reader antennae is based on inductive coupling, in which the reader antenna generates a magnetic field that couples with the antenna on the tag.

During the generation of a magnetic field, there is a chance that the propagated electromagnetic waves arrive at a tag in different phases due to different paths taken by the waves. Attenuation resulted from the combined waves at the tag is known as the multipath interference problem. The increasing distance between reader and tag will increase the probability of multipath interference occurrence in a non-controlled environment, which often happens in Ultra High Frequency (UHF) band applications.

Verification and Evaluation

The recent press release from OMRON Corporation claims that its embedded antenna technology can reduce multipath interference by using the reader to control the antenna propagation directivity, and thus improving the RFID tag reading performance (1).

The wishful thinking of gaining improvement in tag-reader data communication reliability for various RFID applications through this technology should be balanced with some thorough and objective verification and evaluation. Otherwise, the vision of improvement will only become another hype that impedes the acceleration of RFID technology innovation and adoption.

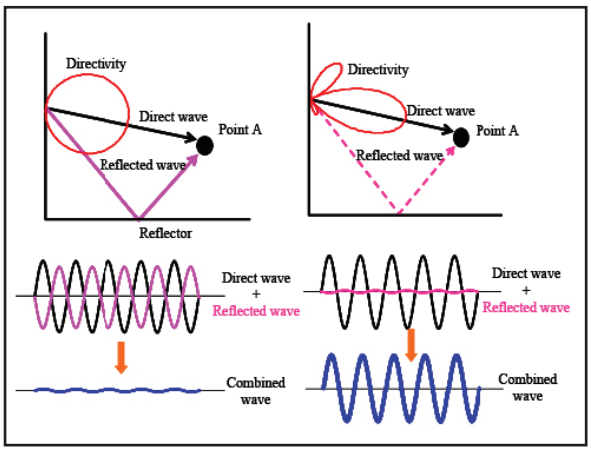

Figure 1: Conventional Propagation vs. Expected Propagation with New Antenna Technology (2)

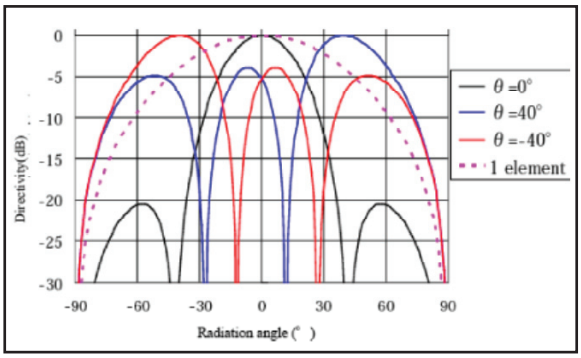

Figure 2: Radiation Angle vs. Directivity of Phased Array Antenna (2)

References

1. OMRON Corporation (2006). **OMRON Develops World's First Antenna Technology That Boosts UHF RFID Tag Read Performance**. OMRON Corporation, Japan.
2. OMRON Corporation (2006). **ScanAntenna Whitepaper.** OMRON Corporation, Japan.
3. Persinos, J. (2006). RFID: **The Future is Now!**. Larstan Business Reports, Potomac, MD, USA.
4. Tedjasaputra, A. and Sari E. (2006). **RFID Solutions for Business**.TRANSLATE-EASY, Indonesia.

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