

Antenna Technology
for
RFID
Supply Chain Management

KATHREIN
SCALA DIVISION
Professional Antennas and Filters



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Designing antenna systems for RFID applications is not a trivial task. Virtually every system, nearly every site, is a unique exercise in technical know-how and experience. Such factors as distance from the target, presence of reflective surfaces, environmental conditions, placement of the tag on the target commodity, physical features, numbers of readers in close proximity, and the frequency of the system itself must all be considered to assure reliable operation. Antenna design and placement are as important as the tags and readers themselves in assuring a system enjoying the confidence of its operators.

The Kathrein-Scala technical staff has had many years designing and building antennas that are used in RFID systems. The tools we employ are the best available for antenna design and evaluation. Our engineering experience provides the expertise to provide the best antenna solution for any RFID installation.

In a simple, single reader system very little attention need be paid to antenna placement and/or its design. A read zone can be somewhat undefined as long as the reader responds to a tag within its sensitive area.

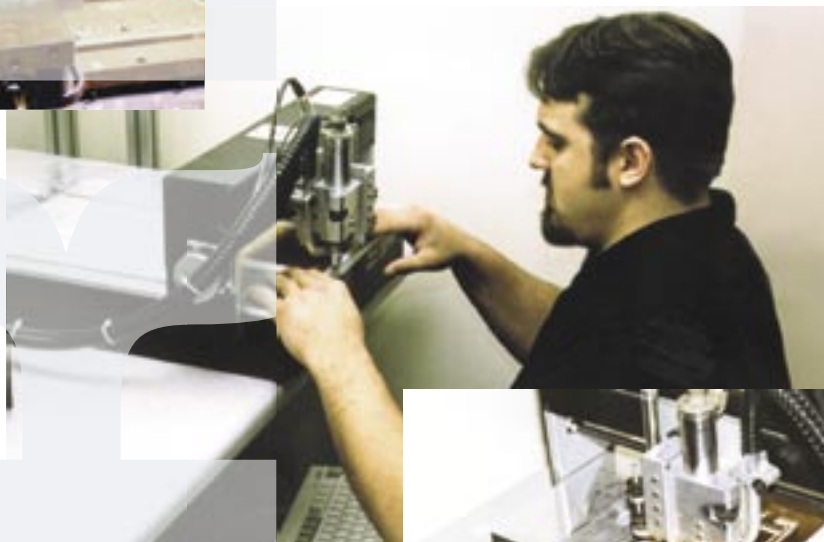
In a multiple reader system, where many readers are required to capture data, coverage issues are more critical, particularly when read zones are adjacent to one another. Narrow read zones become the rule, rather than the exception.

Most antennas are specified using their horizontal and vertical beam widths as measured in the far field, and Kathrein's products are no different in that regard, but for RFID applications, most systems operate in the "near field" of an antenna, where the far field characteristics do not apply. The near field is usually specified as being less than 10 wavelengths from the antenna (22 ft/6.7 m at 432 MHz.,



Prototyping Systems:

T-Tech Circuit Board milling system
Complete mechanical model shop



Certification:

ISO 9001 Certified
ISO 14000 Certified

10.5 ft/3.2 m at 915 MHz, and 4 ft/1.2 m at 2400 MHz). Since most RFID applications are inside the near field zone, the far field beamwidths are meaningless and in many cases, misleading.

Kathrein-Scala has developed measurement protocols that determine the response characteristics of RFID tags. Using carefully controlled environments, our engineers can evaluate the read/write zones for most tag types, for both near and far field. This knowledge, along with specifics of the intended application, allows us the ability to tailor an antenna for optimum use in the target environment. Tags for use on ordinary packaging materials (wood, cardboard, paper), are somewhat different from those employed for use on/near metal containers or liquids, and must be considered when designing a system where mixed goods are present. The tag reader antenna must achieve a balance that assures the accuracy of the data stream.

Antenna Features:

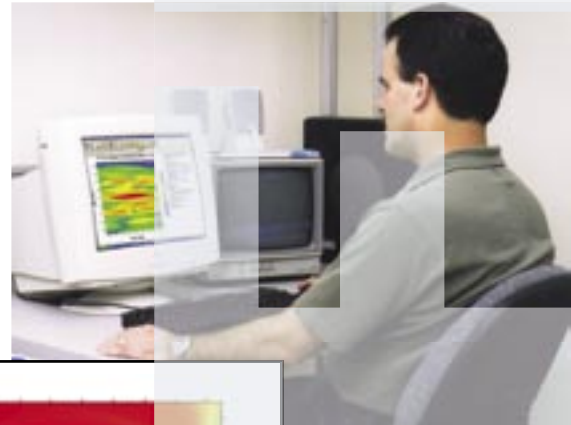
- Robust outdoor applications
- Integrated antenna - reader capability
- Versatile mounting hardware
- Low visual impact due to stealth and size

Kathrein-Scala’s half million-dollar indoor test range allows our engineers to measure and interpret the near field characteristics of an antenna and relate them to the actual usage intended for an antenna. Awareness of the application allows us to tailor the performance of an antenna.

Kathrein-Scala has been designing and building antennas for use in harsh environments for many years. Our choice of materials results in robust products that survive the roughest of usage. Heavy-duty fiberglass radomes and stout mounting hardware insure longevity and reliability. Inexpensive thermoplastics are never employed in our commercial products.

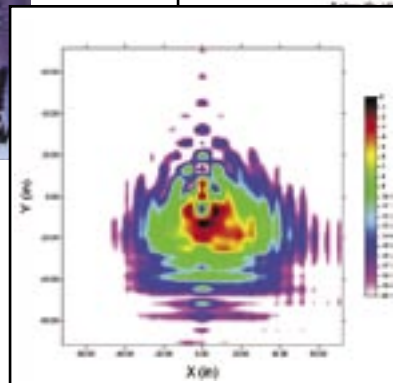
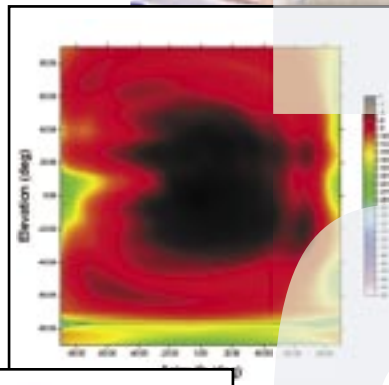
Antenna Design Tools:

- Ansoft HFSS
- SolidWorks
- COSMOS – Finite Element Analysis
- Eagleware – Genesys
- NEC Win – NEC II Code



Nearfield Antenna Test Range

Far-field Amplitude



Near-field Amplitude

U.S. and International Spectrum Capabilities:

- 400 MHz
- 800/900 MHz
- 2400 MHz
- 5800 MHz

KATHREIN SCALA DIVISION

Kathrein Inc., Scala Division, an ISO 9001 and ISO 14000 certified company, is a leading manufacturer of professional antenna and filter systems for communications and broadcasting, serving commercial and governmental markets worldwide. Our product groups include professional antennas, RF filters, and accessories for a wide range of applications that include wireless mobile communications, TV and FM broadcasting, radio paging systems, data and control networks, and land-mobile radio communications systems of all types

Scala Electronic Corporation was founded in California in 1954 and operated there until 1979 when operations were moved to Medford, Oregon. In 1985, Scala aligned with the Kathrein Group of companies, the worldwide leader in professional antenna systems by distributing certain Kathrein antennas for the emerging cellular market. Since then, Scala has been fully integrated into the Kathrein Group. In addition to its own designs, the company builds antennas having their origins at Kathrein, but have been redeveloped for the North American marketplace. With Kathrein firmly positioned as the world's oldest and largest source of antenna and filter products for wireless communications and broadcast technology, it made good sense to align Scala with that visibility and the company became Kathrein Inc., Scala Division on January 1, 2000.

RFID as a viable tool has compelled Kathrein-Scala to devote its resources to the development of custom antenna solutions for RFID applications. Kathrein has on staff several professionals with many years of hands-on experience in the design, manufacture, and application of RFID antenna products. We offer their expertise and our capabilities in implementing an antenna solution for your unique situation.

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General:

83,000 Sq. Ft. (7470 m²) Facility
Electrical and Mech. Engineering staff in RFID since 1984
Lab for certifying ETS 300 019-2-4 and IEC 721-3-4
Environmental tests

Dipole Technology:

Horizontal, Vertical and Circular polarization

