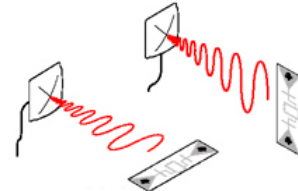


RFID Frequencies for Animal Care

by **Bob Scher, CEO, Dynasys**

Radio Frequency Identification (RFID) technology covers a very wide spectrum of different types of devices. Let us first state that most of the passive RFID devices being used today do not use RADIO technology at all. Repeat: Most RFID does not use RADIO technology. Hopefully we just got your attention! Read on...

The emission of electro-magnetic energy is stringently regulated by government agencies throughout the world. In the U.S. the Federal Communications Commission (FCC) directly regulates the allocation of frequencies. In Europe as in other countries the use of the spectrum is dictated by private industry associations such as CEN, the European Committee for Standardization or European Telecommunications Standards Institute (ETSI). RFID must operate on channel bands designated for unlicensed radio service.



Starting with the lower frequencies, 125 kHz or 134.2 kHz have been the de-facto standard for use in popular animal tags. These are the tags being used to identify animals as injectable transponders, ear and tail tags, bolus tags and used in prox cards for accessing secure laboratory areas. Low frequency works well in the proximity of liquids. In fact the Natural Resource departments implant low frequency transponders into fish to track their migration path through

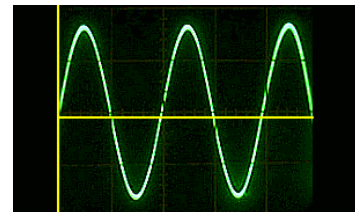
rivers.

High Frequency RFID operates on 13.56 MHz. These transponders are seen as electronic labels and used to track documents, library books and are even found in industrial uniforms to identify them after going through commercial washing services.



Low Frequency devices tend to interfere with each other when multiple transponders are in the field. High Frequency transponders on the other hand feature an anti-collision algorithm that allows hundreds of tags to be separated successfully without interference from one another.

A parameter to consider is the wavelength that each of these frequencies create. The energy wave created at 125 kHz is over a mile long. The wave created by the High Frequency at 13.56 MHz is 66 feet long. Since both of these types of passive transponders operate within a range of 5 feet this detection distance is but a small fraction of a wavelength. Since we are detecting the tags at a distance which is a fraction of one wavelength we are operating within the “Near Field”.



Near Field radiation is mostly Magnetic – not electromagnetic. True “Radio” waves exhibit Electromagnetic principles, thus it can be concluded that these RFID devices operating on the principles of magnetic induction do not exhibit radio characteristics.

So what! – You say. Magnetic energy is bounded by any metal in its proximity and thus these RFID technologies do not operate well near metal cage racks and metal hoods. These RFID technologies feature very limited range and are not suited for the tracking of cages for census inventory.



The next passive RFID technology we will explore is Ultra-High Frequency (UHF). These devices operate at 900 MHz. At this frequency the wavelength is 12 inches. The range detection expected from UHF tags is 5 – 25 feet, exhibiting distances of multiple wavelengths. This is said to operate in the “Far Field” and exhibits Electro-Magnetic properties – like real radio waves.

UHF radio waves reflect off of surfaces as the energy propagates through the laboratory room. The wave reflections arithmetically combine with the incident waves causing dead spots within the electromagnetic field. In order to attain a reliable detection of all of the tagged cages within a densely packed room we must employ multiple antenna arrays and relative motion between the reader and the RFID tags. Dynasys has developed a mobile reader cart special for this purpose.

Dynasys engineers have chosen UHF technology to tag the metal animal cage card holders. Our tags operate at 900 MHz and adhere to the worldwide accepted EPCglobal specifications for Electronic Product Code Generation 2 protocols. This technology features the optimum anti-collision capability allowing hundreds of cage tags to be detected each second without interference from each other.

Dynasys RFID tags are built onto ceramic substrates that allow them to operate at autoclave sterilization temperatures. Additionally, a specially tuned internal antenna circuit allows these tags to exhibit reliable detection characteristics when being directly mounted onto standard metal cage card holders.



These outstanding design features are the results of years of development experience. Dynasys now brings this state of the art RFID technology to Animal Care Services. RFID tagging can reduce the time for census tracking from days to minutes and reduce errors to a minimum. RFID for Animal Care Services will soon become the standard for the industry.