

# Visible Assets Promotes RuBee Tags for Tough-to-Track Goods

The company is seeking IEEE standardization for its low-frequency transceivers.

By Mary Catherine O'Connor

June 19, 2006—Aside from being "people who work late at night and have great respect for Maxwell's equations," engineers at [Visible Assets](#), a Miami-based company that sells product and asset-tracking solutions, are also Rolling Stones fans, according to Chairman John Stevens. It's no mystery, then, that they named their latest tag technology "RuBee," after the Stones' 1967 hit song, "Ruby Tuesday."

The protocol RuBee is based on, however, has recently earned a much more workaday moniker: P1902.1. That's the [Institute of Electrical and Electronics Engineers'](#) (IEEE) candidate specification, based on Visible Assets' RuBee protocol, under which the standards group is beginning work to standardize the technology. Tags based on the P1902.1 specification can be either active or passive, and all operate at a low frequency, 132 kHz, rather than the high-frequency (13.56 MHz) or ultrahigh-frequency (916 MHz) ranges used in the most widely deployed RFID systems.

Conventional HF and UHF RFID tags, whether active or passive, primarily use the radio portion of electromagnetic induction to transmit a signal. RuBee tags, however, use "99.9 percent magnetic waves and 0.01 percent radio waves," Stevens explains—and because magnetic waves are not attenuated by water, as radio waves are, RuBee tags can be used in the presence of liquids. Low frequencies are also less affected by metal, which significantly impacts radio signals. Thus, RuBee tags can be much more easily read around, in or on metal or water than HF or UHF tags. "You can take a [active] RuBee tag and put it inside a sealed steel can and read the tag from 2 feet away. Take the lid off, and that range should grow to about 8 feet," says Stevens.

Some makers of passive UHF tags are starting to design tags optimized to reflect signals using the magnetic field when the tag is close to an interrogator, and the radio field (which gives a greater read distance at ultrahigh frequencies) when the tag is located farther from the interrogator. These tags are being built for use at the item level since they would make items easier to singulate at close range (such as at the point of sale), and because any metal and water content in the product would not impact the transmission in the magnetic field. (See [Wal-Mart Seeks UHF for Item Level](#).)

Stevens says that while RuBee is not an appropriate protocol as an alternative to the ones used by conventional RFID tags, the technology excels in applications where HF or UHF RFID fails. Plus, he says, low-frequency technology "is in widespread use all over the world—and in using lower frequencies, the chips we use are also significantly cheaper."

Still, there is a downside. Because low frequencies have significantly smaller bandwidth for data transfer, relative to higher frequencies, Stevens says only six RuBee tags (active or passive) can be read per second, while several dozen passive HF tags and several hundred passive UHF tags can be interrogated in that same span of time. For tracking assets, however, the main type of application Visible Assets is currently deploying

for its customers—which Stevens can't name due to non-disclosure agreements—the inability to read many tags quickly has not been a problem. That's because his customers are interested in tracking the locations of assets rather than the passage of fast-moving tagged goods through portals, for which passive UHF tags are optimized.

The RuBee tags commercially available now contain a lithium cell battery with an expected lifespan of 10 years. Stevens says those tags have anywhere from 8 to 20 feet of read range. In deployments, however, Visible Assets has reportedly been able to extend that range to up to 50 feet.

According to Stevens, the average price of an active RuBee tag—"a handful of dollars"—is lower than that of HF and UHF active RFID tags. He expects that price to come down as large manufacturers begin licensing the RuBee specification. Stevens says an undisclosed Japanese manufacturer has already licensed the technology, explaining that Visible Assets holds a number of low-frequency RFID patents.

Visible Assets contracts with other companies to make its tags and readers, which it calls routers. It also provides asset-tracking software, to which the routers send each RuBee tag's unique ID and the timestamps of each read event.

If the IEEE standardizes the technology, the market for active tags made with the RuBee specification is likely to grow. Stevens says the same spec can be used to create a passive RuBee tag, which Visible Assets expects to release this fall. Unlike other passive, or batteryless tags, the RuBee passive tag does not use backscatter to transmit an RF signal, explains Stevens. Instead, the passive tags require that an energy source—in the form of a 132 kHz radio transmitter—be nearby. It then harvests energy from that source's magnetic field, using it to transmit its signal.

"Our first IEEE meeting is in six weeks," says Stevens, who is chair of the IEEE P1902.1 working group. "There, we'll grind out a first version of the protocol. It will likely take nine to 14 months to finalize the standard." Once it becomes a standard, he predicts, the market for tags and readers based on the RuBee spec is likely to grow. "The purpose of standardizing the spec is to allow for interoperability with other [low-frequency] tags made by companies that license the RuBee protocol," he says. "Our customers are asking for multiple sources."

Systems integrator [Rush Tracking Systems](#) is partnering with Visible Assets on the undisclosed applications. Toby Rush, president of Rush Tracking Systems, says RuBee's imperviousness to metal and water, as well as its highly reliable performance, makes it an appropriate technology for tracking high-value goods from which customers require "Six Sigma" tracking performance.

Outside of asset tracking, another likely application Rush and Stevens recommend for RuBee passive tags is livestock tracking. Low-frequency tags are already widely used for this type of tracking, they claim, because it offers longer range than other LF tags. Exposure to low frequency does not appear to cause any negative health affects, so RuBee tags could also be used in implantable medical devices. To that end, Stevens says, Visible Assets hopes to develop implantable RuBee passive or active tags for use with sensors to track as pH or glucose levels in the body.