

10 Questions to Ask RFID Vendors

Before you begin an RFID pilot or rollout, there are some important questions you need to ask RFID tag and reader providers to guarantee the success of the project and future-proof your investment.

This year, many companies will launch their first RFID pilot or begin their first rollout of the technology. If your company is among them, you are likely starting to evaluate different suppliers of RFID tags and readers. The choices you make might not have a major effect on your pilot, but they could have a profound impact on the long-term success of your RFID project and the return on investment you get from it.

Whether you purchase RFID tags and readers directly from the manufacturer or through a distributor or value-added reseller, there are many issues to consider, including the frequency, protocols and standards supported; the interoperability of the hardware with RFID systems from other vendors; the cost of upgrading and maintaining equipment; and the vendor's ability to customize some elements of the system according to your needs. *RFID Journal* has put together a list of 10 questions you should ask tag and reader suppliers before investing in an RFID system.

1. Which frequencies and standards do you support?

If you are deploying RFID to comply with requirements established by Wal-Mart or the Department of Defense, you already know that you need to use an RFID tag that operates in the UHF (868 to 956 MHz) spectrum, uses the Class 1 or Class 0 Electronic Product Code protocol and carries a 96-bit EPC, and you'll need to move to Gen 2 when Gen 2 tags become available. But if you are one of the many other users with vastly different needs, making sure you choose hardware that operates at the right frequency and supports the right standards is critical.

The cattle industry uses mainly low frequency (125 to 134 KHz) tags that conform to International Organization for Standardization (ISO) standards 11784 and 11785. Certain other applications, including access control, smart shelves and some manufacturing scenarios, could require high-frequency tags (13.56 MHz).

In general, most companies are looking at UHF systems for supply chain applications. UHF delivers read ranges of 15 to 20 feet, making it possible to read tags going through a dock door. Vendors that sell only one type of technology—say, a 13.56 MHz system—might tell you that their products will work for your application. That may well be true—there are no hard and fast rules about when to use one frequency or another—but you should ask the company to demonstrate their system in your environment and talk to vendors that sell systems that operate at other frequencies to make sure you are applying the right tag for the job.

RFID standards are far from settled at this point. ISO has proposed standard protocols for each frequency. EPC has emerged as a potential rival standard. It's important to know which standard your hardware vendor supports because if EPC technology takes off, as now appears will be the case, that will drive down the price of tags and readers.

2. Can you back up your performance claims?

RFID technology is still immature, and the same type of system (say, a UHF system) can show vast differences in performance from one vendor to the next. It's also possible for an unscrupulous vendor to demonstrate significant read ranges under ideal conditions even though the same tags and readers will perform poorly in the real world. Ask the vendors that you are working with to demonstrate their tags and readers on your products in your facility. If you can't get them to do that, it's worth buying tags and readers from the top three vendors you are considering and test them yourself.

3. Do you do site inspections?

Typically, companies selling RF equipment, including wireless LANs, will visit the distribution center, warehouse or manufacturing facility where you plan to use their equipment. Site inspections are important because the vendor can see what other wireless equipment you are using, whether it might interfere with RFID equipment and how to get around the interference issue. The vendor can also assess environmental issues that could affect the performance of a system, such as the presence of a lot of metal shelving or water, which interferes with radio waves. The inspection will cost \$2,000 to \$5,000 or more, depending on the size of your facility and the nature of your products. But you need to have this done by only one reliable vendor.

4. How will you help me protect my investment?

Standards are in flux. EPCglobal, a joint venture set up by the Uniform Code Council and EAN International to commercialize EPC technology, is working on a second generation of the Class 1 EPC protocol that will be significantly different from the existing Class 1 protocol. It's possible that ISO standards and EPC standards could merge over time. No company wants to invest in technology only to find out that it is not compatible with newer standards that emerge.

It's important to insure that any reader you purchase today can be upgraded remotely over a local or wide area network to comply with new standards that emerge. Typically, this involves installing new firmware in the reader. Many, but not all, companies now offer readers that can be upgraded remotely.

Some companies are offering readers that can operate using several different protocols and even different frequencies. This is one way to guarantee that whatever protocol emerges as a standard, your hardware will be able to cope. However, there may be some trade-offs. Some multiprotocol readers are more expensive than single-protocol readers, and there can be a decline in performance if the reader is set up to try to run through a series of protocols to detect which types of tags are in the read field. Compare prices and ask vendors to demonstrate the reader using several dozen tags using a variety of protocols on a variety of products.

5. How will you help me minimize my maintenance costs?

The big benefit from an RFID system is that there is no additional cost for reading tags because you don't need to pay someone to scan tags at each point in the supply chain, as you would using a bar code system. But you do have to maintain the readers. In small systems, that's not a big issue. But once you begin deploying RFID technology more widely, making sure hundreds or even thousands of readers are functioning properly could become a massive, expensive headache.

Ask potential reader suppliers how their product can be maintained in a cost-effective way. Will your system administrator receive an alert if a reader is no longer detected on the network? Can readers be rebooted remotely? Do the readers have self-diagnostic systems? What kind of warranty do the readers come with? All of these issues should be considered, along with the cost, performance, frequency and protocol of the readers you are considering purchasing.

6. Have you done any interoperability testing?

ISO has standards for testing conformance with protocol standards. However, there are currently no standards for guaranteeing interoperability between EPC tags and readers produced by different manufacturers. That's not a big issue right now because only Alien Technology and Matrics produce EPC

tags, and there are only a handful of vendors producing readers that can read EPC tags.

The first Class 1 tags using microchips made by ST Microelectronic hit the market this year. And more and more reader makers will begin to offer Class 1 and Class 0 EPC readers or multiprotocol readers that read both. As the number of EPC tag and reader makers expands, it will become increasingly important to ensure interoperability. EPCglobal is expected to certify EPC equipment that conforms to its standards, but until that happens, end users will need to make sure the readers they buy have been thoroughly tested with tags from different manufacturers. Ask the vendor you are seriously considering to demonstrate that its readers work with Class 0 and Class 1 tags from different manufacturers.

7. Do you offer middleware?

Some companies simply sell you the tags and readers and you're on your own. Others provide software for managing and upgrading all the readers on a network. Still others provide "concentrators"—hardware and software that aggregates RFID data and converts it into XML or other formats that can be used by an enterprise software application. In general, having software that at least allows you to remotely configure RFID readers on the network is valuable. Middleware that manages some of the data may also be important, but companies that have all but the most modern enterprise applications will still need to do custom integration work to get RFID data flowing into their back-end systems.

8. Do you have a partner who can integrate the readers with backend systems?

Deploying RFID hardware properly is no simple matter. Antennas have to be tuned. Tags have to be put on product in a location where they can be read reliably. You'll need to find a system integrator who is familiar with the hardware you choose. If the RFID hardware vendor has an existing relationship with a skilled integrator, then using that integrator can make the deployment process a lot smoother. On the other hand, if you have a system integrator that you have been using for a while and trust, it's worth talking to that company to see if it has a relationship with an RFID hardware vendor. Either way, you want to make sure that the hardware you buy can be installed properly.

9. Will you work with me to customize tags if I need them?

For tracking cases of products that don't contain a lot of metal or liquid, you'll be able to use standard RFID tags. But many products—cans of soup, coffee and soft drinks and bottles of detergent, spring water and cooking oil—are not "RF friendly." Radio waves can't penetrate metal and can bounce off metal in ways that make it impossible to read tags. Water and other liquids absorb RF waves, which greatly reduces the read range.

These problems can be overcome by correctly positioning the tag on the case and sometimes through the design of the tag itself. If the right amount of space is left between the tag's antenna and an item's metal surface, the metal can be used as a mirror that actually increases the read distance. Many companies make "metal-mount tags," and these may work well in your situation. But metal-mount tags tend to be expensive and are usually designed to be attached to a reusable metal container.

If you are tagging canned goods, you might need to work with a vendor to create a custom metal-mount tag for your products. The design work can be expensive, and many RFID vendors won't create custom tags because it's not profitable (unless you plan to buy 100 million of them) or they don't have the capability. If your products contain a lot of metal or water, talk to your vendor about whether you might need a custom tag and if they would be willing to design one for you.

10. Can you deliver the volumes I need?

If you are launching a pilot, or starting your initial RFID rollout, you probably aren't too worried about vendors being able to supply enough tags. But if you are one of Wal-Mart's or the U.S. Department of Defense's top 100 suppliers, you will likely be using millions of tags per year within 18 months and perhaps

tens or hundred of millions within five years. Volume is going to be an issue in the near term. The RFID industry is still immature, and there isn't a great deal of capacity to churn out that many tags.

A number of companies have been investing in technology to mass-assemble RFID tags. Alien Technology has Fluidic Self Assembly technology that flows thousands of tiny chips into small bow-tie-shaped straps that can be attached to an antenna. Matrics has developed a system it called PICA. SmartCode of Israel has its own high-speed assembly machine. But given that many organizations are planning to deploy RFID in their supply chains—Metro, Target, Tesco, the U.S. Department of Defense and Wal-Mart—at roughly the same time means that these advances and others might not be enough to satisfy demand.

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