

The Price of EPC Gen 2

The protocol has great features, but will it delay widespread adoption of RFID?

By Mark Roberti

May 23, 2005—Is it better to have an RFID tag that performs well but costs a little more, or a tag that doesn't perform as well but costs less? That was one of the major issues facing the EPCglobal Hardware Action Group (HAG), which developed the second-generation Electronic Product Code air-interface protocol. End user companies that are subscribers to EPCglobal were responsible for submitting their requirements to the HAG, and they ultimately decided that a better performing tag was preferable. That might turn out to be the correct decision, but right now, companies are struggling to justify their investment in RFID systems, and a more expensive tag will only make that harder.

Let's be clear: The second generation Electronic Product Code air-interface protocol is, without a doubt, the most sophisticated UHF protocol ever developed. It combines the best features of the ISO 18000-6 protocol and the first generation EPC UHF protocol, and adds some sophisticated new features that will help end users get the most out of their RFID systems (see our special report: [Understanding the EPC Gen 2 protocol](#)). That's the good news.

The downside is that the cost of EPC Gen 2 tags will be higher than Gen 1 tags. Here's why. A Gen 2 microchip will have about 40,000 transistors, compared with just 12,000 for a microchip used in a Gen 1 Class 1 EPC tag. Silicon chips for Gen 2, if made with the same fabrication processes used for Gen 1 tags, would be nearly twice as large. (The chips would not be more than three times as large because only about a third of the chip is used for digital circuitry. The rest is used for a charge pump, voltage regulator and other elements that don't shrink as easily as circuits.)

Companies such as [Philips Semiconductors](#) and [Texas Instruments](#) will use more advanced silicon processes that will enable them to squeeze more circuits on a microchip that is the same size or smaller than a Gen 1 chip. But these more advanced silicon processes are more expensive than older processes.

What that means is prices will not fall as fast as they would have if Gen 1 technology was given more time to gain traction or if the Gen 2 protocol had been designed to keep the microchip as simple as possible. There were reasons why EPCglobal decided not to stick with Gen 1 longer. Class 0 and Class 1 tags are not compatible and don't work well in every region of the globe.

It's easy to second guess the decision to go for a more robust protocol, but my concern is that if end users who are already struggling with how to justify the investment in tags and readers don't see tag prices fall from 2004 levels, they might grow disillusioned with EPC technology and conclude that the return on investment will never be there. Some of the bloom is already off the rose (see [Is RFID Losing Momentum?](#)). Those who are not required to use EPC tags by a customer mandate will put off any investment in the technology. Those who are mandated to use EPC tags might drag their feet and try to tag as few cases as possible to keep costs down.

On the other hand, one major benefit of Gen 2 is that more vendors are supporting it than supported the Gen 1

protocol. That means there will be more competition and more innovation, and that could help drive down the price to where the more advanced protocol is less expensive than Gen 1 technology. Also, there is a great deal of money being invested in new ways to print and attach antennas and other innovations that could help reduce the cost of the tags.

It's not clear how things will play out. The power of a few super-adopters, including Metro, Target, Tesco, Wal-Mart and the U.S. Department of Defense, could force enough suppliers to tag enough goods to drive the price of Gen 2 technology down to the point where it delivers an ROI sooner rather than later. Or the momentum that was building last year could continue to slow. If that happens, the decision to go with a more expensive, more robust protocol will be a costly one for both end users and RFID technology providers.

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