

The Gen 2 Standard: What Is It, and What Does It Mean?

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EPCglobal ratified the specification for the UHF Generation-2 air interface protocol in December. This really is great news for the RFID industry. However, we must temper this excitement with a dose of reality. Let's take a closer look at what the UHF Gen2 standard is all about.

Features of the UHF Gen2 Standards:

The Gen2 protocol takes the best features of the Gen1 Class 1, Gen1 Class 2, and ISO protocols to make what promises to be a greatly improved standard. The Gen2 standard promises a number of much more sophisticated features than the Gen 1 protocols:

Global, open, interoperable standard: Gen2 incorporates the frequency and performance requirements for worldwide use.

Faster read rates: Gen2 promises read rates at up to 10 times faster than Gen 1 protocols. This is especially important in countries where the narrow bandwidth limits the data rates to 30% of that that we can achieve in the US.

Size: Chips are expected to be approximately 20% smaller than Gen1 chips.

High Reliability: Tags will have high read rates.

Dense reader operation: Mode for operation in dense reader environments

'Better' read algorithms (Bit Mask Filtering):

- Eliminates duplicate reads
- Allows tags to enter reader field late and still be read
- Allows tags to stay quiet until asked to talk – making it faster to find a specific tag

Kill Security: Tag security is enhanced with 32-bit password encryption and permanent kill capability.

Improved write capability: Write schemes enhance write speed function.

Memory: In addition to the required EPC data, there is optional memory to support user-specific data.

Gen2 issues still to be overcome:

In spite of all of the great features, there are still some issues for which users need to be prepared:

Production versus Theoretical Performance:

While the EPC specification theoretically allows for all of the great performance improvements listed above, none of these benefits have yet been proven in actual silicon parts. Based upon some of our experiences with earlier generation RFID products, we recommend that these benefits be regarded with caution until we are able to test with actual production silicon parts.

Intellectual Property:

EPCglobal states that this specification does not require use of any of Intermec's Intellectual property. However, Intermec states that any system robust enough to work in a real-world environment will require use of their patents. It is up to each technology provider to negotiate directly with Intermec regarding royalties. In addition, there are users outside the EPC community who own intellectual property related to RFID. It remains to be seen whether any of these owners will step up with royalty demands.

Interoperability:

This EPC 'specification' is better described as providing implementation guidelines than as a detailed specification to which a design is developed. There are basic minimum compliance requirements and then additional optional features. Therefore, designing so that all chips and readers are interoperable at first release will be difficult. To overcome this issue, some of the chip manufacturers have entered into agreements to work together to assure that their chips will be interoperable at first release.

ISO Compliance:

The EPCglobalUHF Gen2 specification describes a new air interface protocol. The Gen2 protocol was very similar to, but not in full conformance with, the existing protocols described by ISO 18000 Part 6a and Part 6b specifications.

In order to make Gen2 ISO compliant, EPCglobal was required to modify their Gen2 document allowing for the optional use of an Application Family Identifier (AFI). The AFI is a value in the data string that is used to identify a numbering administration authority.

ISO began work on the AFI modified Gen2 document in late January. The ISO plan is to incorporate Gen2 into ISO standards as ISO 18000 Part c. Work on the new Part c document is expected to be complete by mid 2006.

Timing: When will we have it?

Some of the RFID chip manufacturers announced delivery of emulator tags this March. Emulator tags are large plate models that emulate the performance of the actual silicon chip. These more aggressive companies are promising sample silicon-based tags in Q2 with production volume in Q3. Availability of the emulator and sample tags will be the pacing item for development of readers to support Gen2.

Less aggressive chip manufacturers are quoting production availability as late as Q1-06.

Based upon history in the RFID industry, Paxar tends to believe that the date will lag somewhat behind the Q3-04 promises for a free-flowing supply chain of fully interoperable Gen2 products. In the meantime, Paxar is doing everything necessary to assure that we will be ready to be among the first to market with both Gen2 media and Gen2 RFID Printers/Encoders.

What does this mean to my Gen 1 customers?

For your Gen 1 customers, there is no need to wait for Gen2 to begin their RFID program. Both Wal-mart and the DoD have announced plans for an 18 to 24 month overlap of Gen 1 and Gen2 products. Paxar offers a full range of products and services, including our Technology Investment Protection Program to assure a seamless, risk-free transition to Gen2. No other RFID printer and supply manufacturer in the industry can make this promise and back it up with the depth and breadth of field service support to make it happen!

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