

Japan Offers ISO a Gen 2 Alternative

A consortium of Japanese companies proposes its own UHF specification, likened to a scaled-down version EPC Gen 2, for candidacy as an ISO standard.

By Mary Catherine O'Connor

Feb. 10, 2005—As [EPCglobal](#) worked on developing a second-generation air-interface protocol, the goal was to create one standard that could serve for all classes of UHF RFID tags with worldwide regulatory compliance. Although the process was not easy or quick, the group did manage to declare its Gen 2 protocol a standard and work around a sticky issue regarding 8 bits of code (see [Gen 2 Finds a Path to ISO Approval](#)) in time for the ISO standard's committee meeting held Jan. 24-25 in Boca Raton, Fla. Here, EPCglobal submitted the technical specifications for its Gen 2 protocol as a candidate for approval under the ISO 18000-6 standard. ISO has since entered Gen 2's technical specifications as a candidate amendment (to be called ISO 18000-6, Part C) and begun the balloting process to approve it as part of ISO 18000-6. If the amendment is approved, all UHF RFID technology, whether it complies with EPC Gen 2 or with ISO 18000-6, Part C, will use the same air-interface protocol.

But during the meeting in Boca Raton, a group of Japanese companies proposed that ISO consider a different specification, called the Hibiki proposal, for inclusion under the 18000-6 standard for UHF RFID. The Hibiki proposal is very close to the Gen 2 standard—in fact it was presented as a stripped-down "subset" of the Gen 2 standard. The only difference, according to the group, is the way the Hibiki proposal specifies how data be encoded and sent between the tag to the reader.

In the EPC UHF Gen 2 air interface, two data encoding options, FM0 or Miller-subcarrier, are allowed. In the Hibiki specification, the Miller-subcarrier option is eliminated. The Hibiki group says the removal of this encoding method would allow chipmakers to build the chip for the Hibiki-based tag on a die that is 40 percent smaller than the one used for Gen 2-based tag, and therefore cheaper. In fact, the Hibiki consortium claims that chips based on its specification would cost 5 yen (approximately 5 cents) each, based on production of 100 million per month. But ISO committee members who heard the group's presentation say they do not believe that removing the Miller-subcarrier option, in addition to some other changes in how data is passed between tags and readers, could possibly lead to a chip that is any more than a few percentage points smaller.

The companies that presented the specification are members of the Hibiki consortium, formed by Japan's [Ministry of Economy, Trade and Industry](#) (METI) in 2003 to study and develop low-cost RFID chips. Representatives from [Hitachi](#), as well as from [Dai Nippon Printing](#), [Toppan Printing](#) and [NEC](#) are the leading members of the consortium.

Takamitsu Yoneyama, a Hitachi spokesman, says the Hibiki group is not interested in working against the EPC Gen 2 standard, but that its proposed standard would work alongside. "We want to make it clear that we respect [the] EPCglobal approach and manner to enhance [the] new emerging market of RFID," he says.

Michael Guillory, an independent technical consultant who is the vice chair of ISO's U.S. Technical Advisory Group and attended the Boca Raton meeting, says that the Japanese group had requested in November that

ISO include an agenda item for the Boca Raton meeting to hear a report on the Hibiki proposal. However, the Hibiki consortium did not formally submit the proposal for candidacy as an ISO standard two weeks prior to the date of the Boca Raton meeting, as would have been required for a formal submission. Instead, on Jan. 24, the group presented its proposal to the ISO committee as part of the agenda item it had requested in November.

On Jan. 25, members of the ISO committee that heard the proposal offered the Hibiki group feedback on the specifications—specifically those surrounding data encoding. The ISO committee members, including Guillory, explained that they doubted that the specification elements cited by the Hibiki group would allow for a 40 percent smaller chip. Hitachi, which is the lead chip manufacturer in the Japanese consortium, had not yet created a prototype chip based on the Hibiki proposal (Hitachi plans to have one by the summer of 2006), so the ISO technical committee was forced to draw conclusions on the specifications alone.

However, ISO did offer to create an ad hoc committee to continue discussions with the Hibiki group about the merits and technical accuracy of the Hibiki proposal. Guillory says that the ad hoc committee has had a couple of e-mail exchanges with the group since the January meeting, and will continue to do so. If the Hibiki group is able to prove that its specification is technically viable and give compelling proof that it would be a better candidate for a global standard, the committee could make changes to the 18000-6, Part C, candidate amendment during a June ballot resolution meeting, held to discuss and debate the technical merits of the amendment. These changes would reflect elements of the Hibiki proposal that differ from the EPC Gen 2 standard.

If the candidate amendment is changed, which Guillory says is extremely unlikely, then EPCglobal would have to remove the Miller-subcarrier data encoding option from its EPC UHF Gen 2 standard in order for it to be compatible with ISO 18000-6 Part C.

Guillory personally believes the Hibiki proposal was presented to ISO in order to stall the movement of the Gen 2 standard's specifications through ISO. "Japan is not a member of the EPCglobal community, and they've been busy promoting the mu-chip, not working on a design based on Gen 2. I believe they'd realized that Gen 2 was moving to the international stage, so they made this proposal to slow it down." (For more on the mu-chip, see [Hitachi Unveils Integrated RFID Tag](#).)

According to Yoneyama, the Hibiki proposal was made in order to offer the global RFID community a simpler version of the EPCglobal standard and one that would make Gen 2 easier to implement outside of North America. He says that Miller-subcarrier encoding is not beneficial in regions of the world that have a limited range of frequencies for RFID use, and that the Hibiki proposal also would allow manufacturers to produce a less expensive chip.

Steve Halliday, chair of the ISO working group for RFID air interfaces and a member of EPCglobal's hardware action group that developed the Gen 2 standard, says he knew of the Hibiki group but did not know they would attend the ISO meeting, adding that he was a bit surprised to see them there, presenting new specifications at a meeting designed to begin the standardization process based on EPC Gen 2. Halliday concurs that the likelihood of the Hibiki proposal leading to a change in the ISO 18000-6, Part C, amendment is extremely low.

Regardless of whether the Hibiki revisions are made to the candidate amendment during the June ballot resolution meeting, the amendment will then be moved into the final draft amendment balloting process. During that time, nontechnical comments can be offered. After this, the amendment will move into a final ballot period of one month during ISO members may only offer a yes or no vote to accept or reject it.