# European EPC Competence Center Releases UHF Tag Study

To help companies compare tags and select the RFID transponders best suited to their products and applications, the EECC tested 20 passive EPC UHF tags from six manufacturers.

By Rhea Wessel

July 9, 2007—The European EPC Competence Center (EECC), in an effort to ease and speed the roll out of RFID, has performed standardized tests on 20 passive EPC UHF tags provided by six manufacturers. The results of the tests were published in a report designed to help companies compare tags easily and select the right RFID transponders for their products and applications.

The 20 tag models were made by Alien Technologies, Avery Dennison, Checkpoint Systems, Impinj, KSW Microtec, Omron, RSI ID Technologies, Motorola (formerly Symbol) and UPM Raflatac. The EECC tested the tags' production consistency, orientation sensitivity, backscatter range (a measure of a tag's ability to reflect the energy it receives from an RFID interrogator) and read ranges in five attachment scenarios: unattached to any product (freestanding), attached to a 2-millimeter-thick layer of Teflon (simulating RF behavior when tags are affixed to paper products), fastened to a 10-millimeter-thick layer of Teflon (simulating the RF behavior of tags placed on plastic cases), attached to a plastic (PET) bottle of water and attached to a metal surface. To keep the test results reader-independent, the tags were tested in a controlled environment in an anechoic chamber using National Instruments test equipment running EECC's test software.

GS1 Germany and German retailer Metro Group jointly founded the EECC in late 2005 to support the implementation of RFID and EPCglobal standards. The center broadened its services earlier this year to include consulting for companies looking to deploy UHF RFID systems based on EPCglobal standards (see European EPC Competence Center Expanding Its Services). Although it is not operated by Metro Group, the EECC is located in a Metro facility and its members include Metro, as well as GS1 Germany, DHL Exel Supply Chain and Karstadt Warenhaus.

Gerd Wolfram, managing director of Metro Group's IT services provider, MGI Metro Group Information Technology, and managing director of the EECC, says the performance of the tag models varied widely. All tags tested comply with EPCglobal's Class 1 Gen 2 protocol and the ISO 18000-6C standard (click here to view a table describing the evaluated tag models), but there were differences among the tags' integrated circuits nonetheless.

"There is a specification for [EPCglobal's] Gen 2," Wolfram explains, "and we know that tag makers rely on this, but there are points where large performance or consistency differences between the RFID transponder occur."
The tests showed that not all tag models perform well in global operations. The EECC tested the 20 tags across a range of frequencies used throughout the world, from 800 MHz to 1,000 MHz. "What we were looking for is a global tag," Wolfram says. "What we found is that some tags work better in the United States

and Europe than in Asia, because they are tuned to [the frequency band used in] that environment."

Moreover, the EECC discerned wide variations among the tags' orientation sensitivity—the change in read rates caused by a tag's position on an object and its consequential orientation to an interrogator's antenna. For some tag models, orientation had a big effect on read rates. Tag models also showed a wide variation in read range, some proving readable from a distance of 10 meters. Sometimes, Wolfram notes, it is not only read range in free air that determines performance on a special mounting material, but production consistency as well. These findings are documented in the report, which was first presented in May at a conference held for Metro suppliers.

According to Wolfram, Metro asked the EECC to carry out the tests because the retailer had observed quality differences among tags on the market. It wanted to apply the study's results to its own internal RFID use, and to make the results available to hundreds of Metro suppliers, system integrators and other RFID users gearing up to tag objects being shipped to Metro. The report, entitled "UHF Tag Performance Survey," can be purchased online for €595 ($811), with a 25 percent discount available to EPCglobal subscribers.

"It's very important to have tags with good performance and high production consistency," says Wolfram. "In the past, companies could rely only on what tag makers promised."

RELATED_ARTICLES The tests were sponsored by Intel, which did not supply any of the chips or tags that the EECC tested (the chips used in the tested tags were made either by Alien, NXP Semiconductors or Impinj). Intel opted to support the tests because it hopes the report will increase transparency in the market. Network services company T-Systems also provided sponsorship as part of its efforts to foster the adoption of RFID technology.

Since the tag test has been standardized, the report can be expanded in the future to include more tags and additional testing. There is no cost to tag makers for participation in the tests.