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RFID News: Understanding UHF Tag Performance

Read Range Requirements, Application Scenario, Regulatory Requirements and Surfaces to be Tagged are Key, European Test Center Says; "On-Metal" Performance has Increased Rapidly

SCDigest Editorial Staff

Clearly, RFID tag-reader performance continues to improve across many attributes, especially in the ability to work with tough materials such as metal, but there can still be significant differences in how well different tags following the same base standards will perform in specific applications.

That's'part of the message from a recent report from **the European EPC Competence Center** (EECC), according to the center's manager **Conrad von Bonin.**

Earlier this year, the center ran substantial tests on some 30 different tags from a variety of manufacturers, as they have done in previous years.

One noticeable finding – tag performance on tough to read metal surfaces is improving, and the goal of having one tag that can go across metal and other surfaces effectively has probably arrived.

"All ten specialised UHF transponders produced metal tagging read ranges of 4 to 10 metres, which debunks the myth that RFID is unsuited for metal environments," von Bonin said. He added that some tested metal transponders are designed specially to work regardless of the material being tagged. This enables effective tagging of liquid containers, as well.

The EECC has developed a detailed methodology that allows it to calculate what will be actual tag read ranges in operational environments. The read range of transponders is the most important criterion in determining whether RFID can be used for a particular application, von Bonin says.

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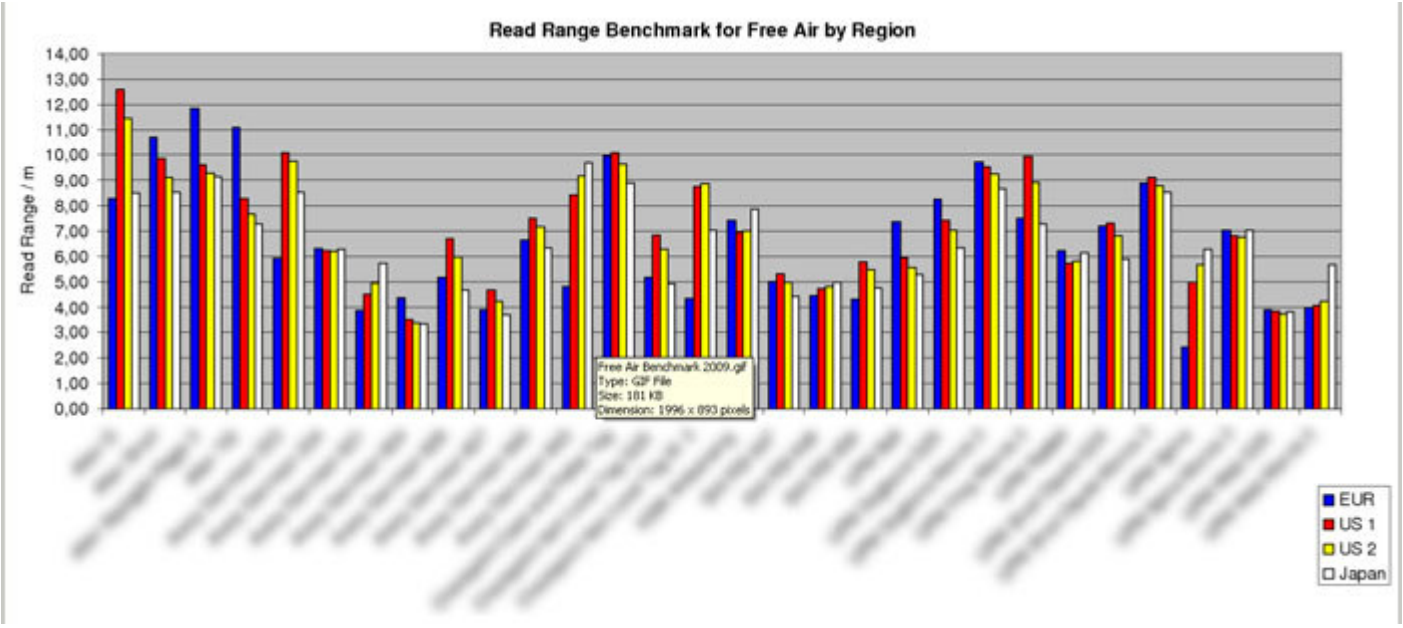
(See chart on page 2, showing the read range estimates by different tag manufacturers and frequencies, based on the EECC testing method; the specific tag names are greyed out, as the EECC sells this report.)

What Drives Read Range Performance?

Despite the tremendous overall progress in RFID and EPC technology, "The performance of tags differs extraordinarily," von Bonin told SCDigest. "It depends on which material and on the frequency used, and which tag fits best the needs of the users. For example, in near field applications where you have lots of tags it might be better to have a tag with low read range to avoid false positive reads. In other applications, you would want to choose a high read range to optimize the read performance."

The read ranges can vary from as few as 3 meters to as much as 12 meters in "free air," the EECC study found.

RFID News: Understanding UHF Tag Performance (Con't)



"It is clear that you should use different tags for different applications," von Bonin says.

According to von Bonin, read ranges are dependent on several variables:

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- The tag and especially antenna engineering design
- The size of the tag
- The type of material to be tagged
- The frequency used; with the specific frequency requirement differing across the US, Europe and Asia.

"Different tags are optimized for different surfaces," von Bonin told SCDigest.

In tagging metal products, for example, a specialized "on metal" tag is generally required. A metal surface acts in most cases to "detune" standard RFID frequencies and therefore performance, requiring tags that can minimize this substrate impact.

Von Bonin says that in the latest EECC tag study, the center tested 10 different tags designed for maximum "on metal" performance.

"Most of these are small band tags and can only be used in the designated frequency band for each regulation area," von Bonin says. "But in our 2009 benchmark we found that there is only one tag for metal which can be used in all UHF-frequency bands. So users have to know that there are solutions, but you have to find them."

How should potential RFID users proceed?

"Users should well understand the read range they need in their application," von Bodin added. "This read range must be reached in all used frequencies. From all tags that deliver this capability, they can then choose the cheapest, smallest, whatever."