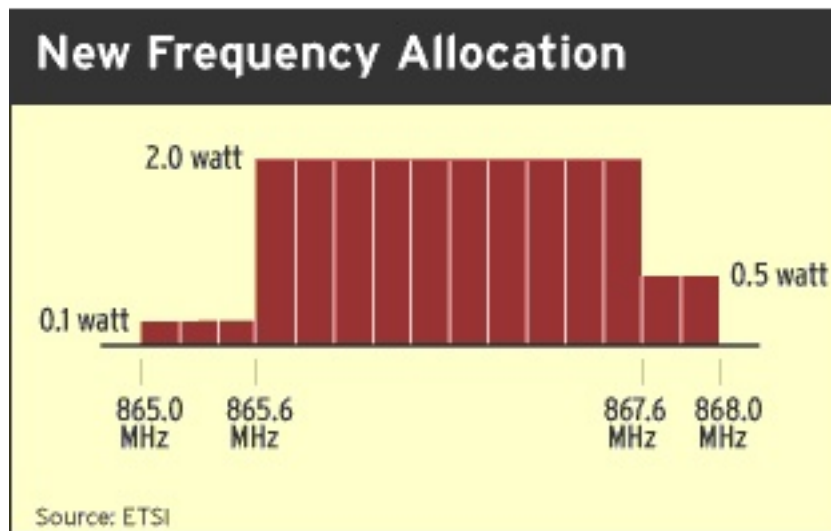


European regulators have agreed to allow RFID readers to operate in a wider band and with more power, but some issues remain around slower data transfer rates.

By Mark Roberti

Nov. 9, 2004—The 46 national communications authorities in Europe voted on Sept. 3 to adopt new regulations developed by [European Telecommunications Standards Institute](#) (ETSI), which will allow RFID readers to use more power and operate in a wider UHF band. This was hailed as good news for end users in Europe that are looking to implement new supply chain solutions.

The new regulations, dubbed ETSI 302-208, will allow European RFID readers operating in the UHF band to perform nearly as well as UHF readers operating under Federal Communication Commission rules in the United States. But some European retailers will not switch to readers operating under the new rules immediately because they are not sure how long it will take for vendors to begin mass-producing such readers and because of concerns about how fast tags and readers can exchange data under the new regulations.



ETSI 302-208 provides an additional frequency range from 865 to 868 MHz in which RFID readers can operate (currently they operate between 869.4 and 869.65 MHz), increasing the spectrum band from 250 kHz to 3 MHz. The number of channels readers can broadcast on has been increased from one to 15. The new band is divided into three sub-bands. Under the old regulations, UFF readers were restricted to half a watt of effective radiated power (ERP). The new regulations allow them to emit up to 2 watts ERP between 865.6 and 867.6 MHz; 0.5 watts ERP between 867.6 and 868 MHz; and 0.1 watts ERP between 865 and 865.5 MHz.

Most end users will want to operate readers deployed in their supply chain at 2 watts ERP in the 865.6 to 867.6 MHz band to get the extra read range the power increase allows (the power output is still slightly below the amount allowable in the United States). Having 10 channels in this band will also improve the performance of European RFID systems by enabling more readers to operate simultaneously in the same facility without interfering with one another, because they can be on different channels.

The new rules replace the duty cycle restrictions with something called "listen before talk" (LBT). The reader can be on for four seconds on the selected channel, but then must stop emitting energy for at least 0.1 second to provide other devices with the opportunity to use the channel. Alternatively, the reader could switch immediately to any other unoccupied channel and transmit for up to a further four seconds. (Readers without LBT capabilities are limited to a 0.1 percent duty cycle.)

"The new regulations are very significant because the previously permitted power levels of half a watt were not adequate to get the read range you need in logistics applications, such as reading pallets as they move through a dock door," says Andrew Osborne, chief technical officer at [e.centre](#), the U.K. authority for EPCglobal and for the EAN.UCC numbering system and technology used on product bar codes. At half a watt of power, a UHF reader can read a tag no more than 3 meters (about 10 feet) away, under ideal conditions. With 2 watts of power, a reader can read a tag from 5 meters or more away (15 feet). Many warehouse applications require a read range of 10 feet or more.

Complete Content Not Available in PDF Format See: <http://www.rfidjournal.com/article/view/1229>

The one downside to the new regulations is that the data rate between the reader and the tag is less than in the United States. This is because only 3 MHz of spectrum is available in Europe for RFID, while 26 MHz is available in the U.S. The rest of the spectrum at UHF is already allocated to primary services, such as public broadcast, and to mobile phones. In order to permit optimum use of the available spectrum, EN 302-208 divides the band into 15 channels of 200 kHz.

To enable readers in the same facility to operate on adjacent channels, the regulations require the readers use only one channel at a time and conform to something called a "spectral mask"—essentially, the amount a broadcast can bleed outside of the channel. Compare with the United States, where readers can emit radio waves within plus or minus 3 MHz of the frequency of the channel they are supposed to be using. This wide range allows the reader to send more information more quickly.

"The good news is you get four times the power, eight times the bandwidth and 10 times the channels and the equivalent of more than nine times the duty cycle," says Andrew Berger, VP Europe and International for [Alien Technology](#), a Morgan Hill, Calif., provider of RFID systems. "The lower data rate is determined by the spectral mask imposed by the new standards. Over time, we will get data rates back up to U.S. levels through agreed revisions to the specification and advanced radio engineering."

The spectral mask limits an RFID reader's data transfer rate to about 30 percent of what it would be in the United States. Metro, Germany's largest retailer, and Royal Ahold, a Netherlands-based retailer, are reportedly sticking with the older ETSI rules for now because of concerns of data rates and worries that vendors won't have new readers that operate under the new regulations for many months.

Alien's Berger says he doesn't believe the data transfer issue will slow adoption of the new regulations. "It just means that business processes in Europe will have to adapt to doing things slightly slower than you would be able to do in the U.S., unless the spectral mask gets changed," he says. "The relevant ETSI committee is aware of the issue and is looking at ways to address it."

Before the new standard can come fully into effect, it has to be published in the Official Journal of the European Union, which documents the legislative and judicial decisions of the European Union (EU) member countries. The standard has to be translated into the languages of the EU, so publication could take up to six months. In parallel with the activity in the EU, individual countries must pass laws adopting the recommendations on permitted power levels and frequency allocations. These processes are expected to be largely complete by May 2005.

But readers based on the new regulations will be on the market before that. That's because vendors can begin selling readers based on the new rules if they get independent certification from an accredited test house that their readers comply with the standard and apply formally to each EU country to sell readers based on the new rules in that country. Approval is normally given, after a 28-day notification period.

"We have a reader that is compliant and has been certified by test houses and will be available in early December," says Alien's Berger. "We are also launching a new Lepton EPC Class 1 tag, which we are producing with [ST Microelectronics](#) in France. The microchips in the Lepton tags are designed to work better at the lower European data rate."

Berger adds that Alien expects to have readers based on the new ETSI regulations in Austria, Germany, Netherlands, Belgium, France, Switzerland and the United Kingdom in trials within the next few weeks. Other reader manufacturers have also begun the process of certifying that their new European readers comply with the new regulations. E.centre's Osborne believes that most retailers and suppliers will want to use them.

"The changes in the regulations came about because of pressure from industry," he says. "The reason is that half a watt made it hard to use RFID in logistics applications because you can't get the read range. The expectation is that people will migrate to readers with the higher power output."

ETSI's Task Group 34, which wrote the new standard, is about to start work on a code of practice for RFID at UHF. The group will use the opportunity to assess the extent to which the lower data rate in Europe is a real problem to end users. "Based on what we find, we will then decide whether we should

try to modify the standard," says John Falck, chairman of TG 34.