

The New RFID Standard in Europe

The new ETSI standard governing the use of RFID readers in the UHF spectrum should meet the needs of most end users.

Nov. 15, 2004—Members of Task Group 34 (TG 34) of the [European Telecommunications Standards Institute](#) (ETSI), were interested to read a recent article in *RFID Journal* written by Hendrik van Eeden of [iPico Identification](#). The article, [Europe Needs New RFID Regulations](#), comments on the provisions in the new ETSI standard EN 302 208 covering the use of RFID at UHF at power levels up to 2 watts of effective radiated power (ERP). The article states that the standard will fail to meet the needs of end users operating at sites with a large number of interrogators.

It may be helpful firstly for *RFID Journal* readers to understand the way in which ETSI operates. Task groups are established within ETSI in response to market needs and include interested parties from industry. The task groups generate standards and other technical documents that subsequently pass through an established approval process. ETSI has always welcomed participation by as wide a body as possible at their task group meetings. We would encourage iPico and other RFID companies to attend future meetings of TG34 and would be keen to receive their input.

EN 302 208 was developed with the co-operation and support of a wide body of RFID manufacturers from around the world. Many of the requirements in the standard are based on their input. These manufacturers believe that the new standard will enable them to meet the needs of end-users in Europe. As a result of their contributions, the new standard shows significant improvement for RFID over that permitted under EN 300 220. Details of the new standard have been published in *RFID Journal* (see [New ETSI RFID Rules Move Forward](#)), but to summarize, the principal changes are:

- The maximum permitted intentional transmitted power is increased from 500 microwatts (half a watt) ERP to 2 watts ERP.
- The number of available channels of operation is increased from one to 15.
- The restriction of a 10 percent duty cycle has been replaced by “listen before talk.”

These changes are very significant and mean that it is now possible for RFID systems in Europe to operate at ranges comparable to those achieved in the United States. Furthermore, the mandatory use of “listen before talk,” when combined with “frequency agility,” ensures that users will obtain maximum utilisation of the allocated spectrum. This technique compares favourably with the Frequency Hopped Spread Spectrum (FHSS) approach where performance will increasingly degrade as channel occupancy progressively rises above 30%.

In his article, Mr van Eeden is critical of the threshold level of -96 decibels, which is the value specified in the standard for the “listen” mode. He claims that this figure would permit detection of another co-channel 2 watt interrogator at a distance of 200 km. Although the ETSI figure in free space is closer to 80 km, in practice the maximum distance in outdoor conditions is unlikely to exceed 20 km. Furthermore since most

installations will be indoors and located in urban and semi-urban areas, the upper distance at which detection of another interrogator might occur will be below 2 km. However given that interrogators must be fitted with directional antennas, the detection distance frequently will be substantially less than this.

The high population density in Europe rules out the idealized scenario proposed by Mr van Eeden, in which narrow-band UHF RFID readers are allowed to operate at 866.6 MHz without LBT and with a 100 percent duty cycle. The concept of continuous transmission by any short-range device (SRD) is wholly unacceptable to European administrations. Furthermore, his suggestion of 250 interrogators transmitting continuously from a single site at 2 watts represents an aggregated transmitted power of 500 watts. This raises not only serious problems of incompatibility with other users in the band but also issues of human safety. This type of operation could therefore only be considered in a separate dedicated band.

A close look at the new standard shows that interrogators are required to transmit for no longer than is necessary to perform the intended operation. In most cases a read cycle with multiple tags present can be accomplished within 500 milliseconds. Typically a large distribution center with say 60 loading bays in use will wish to read loads comprising up to 50 tagged items at a rate of 4 loads per second. The new standard permits the simultaneous use of up to 10 channels at 2 watts. Dividing each channel into notional 500-millisecond timeslots gives a total availability on site of 20 timeslots per second. Since, in this example, the distribution center requires only 4 timeslots per sec, there is sufficient capacity to meet its requirements. Thus, by means of both frequency agility and time sharing it should be possible to accommodate a large number of interrogators at a single site.

It is too early to say how successful this technique will be in practice. Interrogators that comply with EN 302 208 are only just beginning to appear on the market. We need first to assess the performance of RFID at sites with a large number of interrogators before we can make a definitive judgement. Only then should we consider if a change is required to the standard. In the meantime it is in the interests of the RFID industry to make the new standard work as well as possible.

For sure, this new approach will involve re-thinking by RFID manufacturers during the design phase of their products. It will also require an appropriate level of expertise by system integrators. However, the result should be one in which RFID performs to the satisfaction of the end-user and should ensure that RFID is compatible with other systems operating in the band.

The article by Mr van Eeden ends with a summary that ETSI should investigate the availability of additional spectrum and operate RFID systems in a way that is very different to that described within EN 302 208. One of the major problems facing TG34 is that no spare spectrum is available in Europe at this frequency. It is already allocated to primary users.

ETSI does not have authority to allocate, or re-allocate any spectrum. This responsibility rests with individual countries, coordinated through the Electronic Communications Committee (ECC) within the European Conference of Postal and Telecommunications Administrations (CEPT). So to secure additional spectrum it will first be necessary to undertake further studies within CEPT to obtain a change in use of a suitable band. Negotiations would then have to take place on a country-by-country basis for the release of this band from an existing licensed user such as the mobile phone industry. Even if existing licensees of spectrum are prepared to sell some of their allocated band, this could only be achieved by the exchange of a very significant amount of money. RFID at UHF is still in its infancy in Europe. It is by no means clear that funds would currently be available to support such a course of action.

John Falck is the chairman of ETSI's Task Group 34, which developed the new regulations governing the use of UHF RFID readers in Europe. To comment on this article, click on the link below.

