

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of )  
 )  
Modification of Parts 2 and 15 of the ) ET Docket No. 03-201  
Commission's Rules for Unlicensed )  
Devices and Equipment Approval. )

**COMMENTS OF RICHARD REES**

Richard Rees files these comments in response to the above-captioned Further Notice of Proposed Rule Making.<sup>1</sup>

I have been involved in the development of RFID systems, especially passive UHF which provides the primary data carrier for the EPCGlobal system, for over 15 years.

I am President of Scanology, a leading European RFID solutions provider, and am a past member of the Supervisory Board of EAN UK (now GS1 UK).

I chair the British Standards Institution technical committee responsible for automatic data capture techniques, and which shadows the equivalent ISO IEC committee. I participate in the ISO, EPC Global and ETSI standards programs.

The views expressed in these comments are my own.

---

<sup>1</sup> *Modification of Parts 2 and 15 of the Commission's Rules for Unlicensed Devices and Equipment Approval*, 22 FCC Rcd 11383 (2007) ("Notice").

I welcome the initiative by the FCC to conduct a review the operation of the Commission's rules for unlicensed Devices and Equipment Approval.

This provides the opportunity to not only review the most effective way to manage changed needs of the many high and low power users of unlicensed spectrum within the USA, but also to take account of the work of other radio administrations in resolving similar issues.

In particular, in relation to the operation of passive UHF RFID in the 902-928 MHz, I would ask FCC to take into account the work done by ETSI within EN 302 208. Many US experts and corporations participated in this work, underscoring the need to develop so far as practically possible a consistent global approach to this topic.

EN 302 208 uses a preferred channel management strategy coupled with synchronized interrogators to provide a pragmatic means of allowing high and low power SRD systems to work in harmony within the overall 865-868 MHz band. A consequence is that high power transmissions to energize and communicate with passive RFID tags will typically occur in no more than 4 channels, compared with the 10 previously permitted.

Extensive development work has been done, and will continue to be done to create the EPCglobal C1G2/ISO IEC 18000-6Cair interface protocol for passive UHF RFID tags. The result of this is a very competent, function rich system, particularly able to meet the challenges of the retail sector.

However, the delivery of this functionality, especially the requirement for selective addressing of tags within a group and/or the selective addressing of data stored in the memory of RFID tags, comes with two important effects for the efficient use of spectrum.

Firstly, the interrogator needs not only emit a potentially high power beam to energize the tag, but also has to modulate this beam to allow reader to tag communications in the form of commands.

This consumes significant bandwidth.

It also means that the reader channel cannot be used simply to move data from (and to) the tag memory. The channel capacity will be consumed to a lesser or greater extent by the need for the interrogator to issue commands to the tag, and for the tag to acknowledge these.

However many supply chain processes require a very much simpler level of functionality, and may simply be required to operate as a 'license plate'

The attention of FCC is respectfully drawn to a passive UHF system presently being used extensively in many parts of the world. This so-called TOTAL system is currently being considered by ISO as an optional part of ISO 18000-6 Rev 1.

Like all tags, writing to TOTAL tags requires the reader to modulate in addition to delivering a strong powering beam.

However, during tag reading; which typically occupies a far greater amount of time compared with writing, the interrogator does not need to modulate, only emit a powering beam typically 15 KHz wide. Tags receiving sufficient energy from this beam will wake up and simply transmit their entire stored data to the interrogator. This is particularly useful in reading fast moving groups of tags. However it is stressed that this system is complementary to the interrogator talks first system.

The effect on spectrum utilization is two-fold

- the system requires substantially less bandwidth to operate, due to the absence of a high power modulated beam
- the channel is fully available to move data as no commands are being issued to the tag (or acknowledgements sent). This can facilitate the movement of longer data messages, e.g. as a result of data encryption or the presence of sensor data as an attribute to the basic tag identity.

The technology contained in TOTAL is not new, and has been in use for some 15 years. The technology has been considered by FCC previously and approved under Part 15. The current ISO standards work is designed to make a small modification to the TOTAL protocol to ensure that

TOTAL and EPCG C1 G2 tags may co-habit when interrogated in the same location at the same time.

The FCC is asked to ensure that, in the event of the development of an operating etiquette for 902-928 MHz, this does not adversely effect the operation of the TOTAL technique.

Respectfully submitted,

**Richard Rees**  
**President, Scanology BV**  
**Van Sasse van Ysselstraat 8**  
**5831 HD Boxmeer**  
**The Netherlands**

October 15, 2007

**+31 485 561616**