Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Reassessment of Federal Communications Commission Radio Frequency Exposure Limits and Policies	)	ET Docket No. 13-84
	)	
	)	
Proposed Changes in the Commission's Rules Regarding Human Exposure to Radio Frequency Electromagnetic Fields	)	ET Docket No. 03-137

Comments of Sensormatic Electronics, LLC

Sensormatic Electronics, LLC ("Sensormatic") hereby submits these comments in response to the Notice of Inquiry ("NOI") portion of the *First Report and Order, Further Notice of Proposed Rulemaking, and Notice of Inquiry* in the above-referenced dockets. As a leading supplier of security solutions for the world's retailers for over 35 years, including Electronic Article Surveillance ("EAS") anti-theft systems and Radio Frequency Identification ("RFID") systems, and as an active participant in multi-stakeholder industry standards organizations, Sensormatic supports (i) the extension of the lower frequency of applicability of the Commission's human exposure limits from the current 100 kHz down to 9 kHz, and (ii) the adoption of the related IEEE C95.1-2005 as the standard for human exposure to electromagnetic fields at all frequencies, including those in the new lower frequencies. This IEEE standard has ample support and was developed as a consensus document by many experts.

In addition, Sensormatic understands that other parties might file comments attempting to expand the scope of this proceeding to include issues related to potential radio

frequency interference with medical devices, claiming that low frequency emitters, such as EAS systems, may inappropriately interact with those devices. The technical and regulatory issues related to human exposure to radiofrequencies are completely distinct from those involved in medical device performance issues. Moreover, the Food and Drug Administration ("FDA"), which has primary responsibility for the safety of medical devices, has already successfully addressed the matter of potential interactions between EAS systems and medical devices, through a multi-stakeholder process, together with ongoing technical analysis. FDA's conclusion: the widespread deployment of EAS systems is fully compatible with protecting medical device implants from harmful interference. No evidence suggests that conclusion was, or is, in error.

Background

Sensormatic has unique expertise as a leading supplier of EAS and RFID systems and has been proactively involved in the development both of global standards for human exposure to electromagnetic fields and FDA policies addressing potential interactions between medical implants and certain electromagnetic fields.

Sensormatic's products address shrinkage, or inventory loss, at retail stores, a problem that costs retailers over $35 billion annually. These are costs that are ultimately passed on to every consumer - $400 per family - according the annual National Retail Security Survey conducted by the University of Florida.[1] To protect against shrinkage, most retailers rely on

[1] Kays, Joseph. Business Expense: "The Retail Industry Relies on UF's Annual Security Survey to Track Trends in Shoplifting and Employee Theft", *available at* http://www.research.ufl.edu/publications/explore/past/fall2010/story_5/documents/BusinessExpense.pdf (last visited August 29, 2013).

EAS anti-theft systems. Over one million EAS systems are currently installed in retail stores around the world.

The concept behind EAS systems involves placing an electronic "sensor," in the form of a disposable label or a reusable hard tag, on retail merchandise, and installing interrogation pedestals that generate electromagnetic fields at specific frequencies at the exits.[2] When a customer pays for merchandise, the clerk removes the reusable hard tag with a mechanical device, or in the case of a disposable label, the cashier electronically deactivates it. Should the customer attempt to leave the store without paying for the merchandise, however, the exit pedestal senses the presence of an active (not-deactivated) label or a hard tag that was not removed and sounds an alarm.

Sensormatic has marketed EAS systems employing all of the "known" EAS sensor technologies. These systems span the frequency spectrum from a low of 74 Hz to a high of 2450 MHz. It is Sensormatic's acousto-magnetic technology, however, which depends on emitting a modulated radio frequency signal at 58 kHz, that has emerged as the leading EAS technology. That system operates as an intentional radiator under Part 15, subpart C, of the FCC's Rules and Regulations and fully complies with the emissions limitations of Section 15.209.

There are several reasons why the 58 kHz acousto-magnetic technology has become the *de facto* industry standard: (i) the acousto-magnetic tag is magnetostrictive and it generates a unique resonance signal that is in essence free of false alarms, which is an important feature to retailers; (ii) the system is very flexible in its ability to provide anti-theft

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[2] "How Anti-shoplifting Devices Work", *available at* http://electronics.howstuffworks.com/everyday-tech/anti-shoplifting-device.htm (last visited August 28, 2013).

protection for the wide exits at mall stores; (iii) it is the most effective system for combating organized retail crime techniques such as the use of foil lined bags for shoplifting; and (iv) the acousto-magnetic tag can be placed on a much wider variety of merchandise than other EAS technologies, making it the preferred choice for source tagging, i.e., the tagging of retail merchandise during the manufacturing process.

On the latter point, moving the tagging process to the manufacturers of goods has allowed the EAS tags to become an integral part of the merchandise package, which has reduced the overall cost of EAS. A very large eco-system of retail supply chain manufacturers has developed to support acousto-magnetic source tagging, and many thousands of manufacturers are involved in this global effort.

Discussion

The Commission has asked for comments on the adoption of limits for safe human exposure to radiofrequency or electromagnetic fields. *See NOI*, paras. 214 and 229. It notes that both the Institute of Electrical and Electronic Engineers ("IEEE") C95.1-2005 standard, developed by its International Committee on Electromagnetic Safety ("ICES"),[3] and the ICNIRP 1998 and 2010 guidelines, developed by the International Commission on Non-Ionizing Radiation Protection ("ICNIRP"), which is sponsored by the United Nation's World Health Organization, encompass similar frequency ranges.[4]

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[3] IEEE standard C95.1-2005, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".

[4] ICNIRP-1998, "ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300 GHz)", Health Physics, vol. 74, no. 4, pp. 494-522, 1998; ICNIRP-2010, "ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (1 Hz -100 kHz)", Health Physics, vol. 99, no. 6, pp. 818-836, 2010.

Sensormatic supports adoption of the IEEE standard, across all frequencies, for several reasons. First, the ICES committee that developed the standard included more than 125 expert members from many disciplines, and from 25 countries, working together in an open consensus environment. Further, the ICES committee built its standard on the body of knowledge and research behind the previous versions. Since the earlier version (IEEE C95.1-1991) is currently cited in the FCC Rules, along with recommendations from the National Council on Radiation Protection and Measurements (NCRP 1986), the updated IEEE C95.1-2005 standard would appear to be a logical selection. Adoption of the IEEE standard would also align the FCC with the prevalent international position that SAR calculations should be made by averaging over 10 grams of tissue.

Sensormatic also supports the extension of the lower frequency boundary from the current 100 kHz down to 9 kHz, which is the lowest frequency for which there is an allocated service that the Commission licenses. With several significant kinds of devices now operating below 100 kHz (including wireless chargers and electric cars, in addition to EAS), it is important that they, too, meet an appropriate human exposure standard.

Interestingly, while the Commission notes that the IEEE and ICNIRP standards have arrived at the same limits at the higher frequencies, that is not the case at the lower frequencies. The IEEE Maximum Permissible Exposure Levels ("MPEs") below 100 kHz are significantly higher than the ICNIRP Reference Levels. For example, at some frequencies the IEEE C95.1-2005 MPEs are 8 times higher than the ICNIRP-2010 Reference Levels and 32 times higher than the ICNIRP-1998 Reference Levels.[5]

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[5] *See supra* notes 3-4.

Unlike the consensus-based work of the IEEE, there does not appear to be any scientific or other justification for adopting the ICNIRP Reference Levels in the low frequency range. To the best of our knowledge, no scientific rationale has been offered justifying the lower ICNIRP Reference Levels. Indeed, in its own 1998 Guidelines, ICNIRP specifically noted that its Basic Restrictions are the actual limits for human exposure, and that exceeding the Reference Levels does not mean that the Basic Restrictions have been exceeded.

Sensormatic would, however, also be comfortable with the ICNIRP-2010 Guidelines, so long as they are adopted comprehensively, and include the ICNIRP Basic Restrictions. The ICNIRP Guidelines recognize two alternate paths – the Reference Levels and the Basic Restrictions – for establishing compliance. The simpler Reference Level path measures the physical quantity of the emitted electromagnetic field relative to the guidelines' acceptable Reference Levels. The Basic Restrictions use a more accurate, but time-consuming, computer analysis of the human body. Sensormatic relies upon that more accurate Basic Restriction path.

As an aside, when ICNIRP-1998 was first issued, Sensormatic met with a number of the ICNIRP members to seek a scientific explanation for the extremely low Reference Levels. It was explained that the Reference Levels were based on a large parametric model better suited for assessment of far field exposure comparisons rather that the near field that characterizes the EAS environment; they therefore advised that Sensormatic use the Basic Restrictions, which as previously pointed out, is more accurate and one which Sensormatic's products readily meet. (Notably, the IEEE also have a comprehensive set of Basic Restrictions and MPE's, the latter being the physically measurable quantity.)

For the foregoing reasons then, Sensormatic recommends that the Commission adopt as its standard for human exposure to electromagnetic fields the limits of the Basic Restrictions of the IEEE C95.1-2005 standard or, alternatively, the comprehensive ICNIRP-2010 Guidelines, including both the ICNIRP Reference Levels and the Basic Restrictions. This standard would then apply to both low and high frequencies, from 9 kHz upwards.

* * *

While the issue of potential interference with medical implants was not specifically noted in the *NOI*, the compatibility of medical implant devices, or the potential for interactions with radio frequency devices, is sometimes identified as a concern when electromagnetic field levels are discussed. The Commission may therefore receive comments on this subject.

At the outset, it should be noted that the IEEE and ICNIRP human exposure standards specifically state that the compatibility of medical implant devices is beyond the scope of their charter. In other words, the human exposure standards are intended to only cover human exposure, not compatibility with medical implant devices.

The FDA, which is responsible for addressing safety requirements for medical implant devices and medical equipment, has been active in evaluating the performance of medical devices in the presence of EAS and RFID systems, as well as other radio frequency emitting devices. Sensormatic has been actively involved in, and very supportive of, this work.

Beginning in 1998, in a series of public meetings, the FDA's Technical Electronic Products Radiation Safety Standards Committee ("TEPRSSC"), along with local and federal government agencies, EAS manufacturers and many of the country's leading cardiologists, came together to address the potential of EAS systems to interact with pacemakers and

defibrillators.[6] The leading cardiologists participating in these proceedings specifically urged the FDA not to overreact and create any unsettling anxiety in the minds of their patients, because that would adversely affect their patients' quality of life, with no corresponding medical benefit.

Following these meetings, the FDA endorsed the recommendations of the medical community that implant patients simply practice a "Don't Linger, Don't Lean" approach to EAS systems, which EAS manufactures also endorsed.[7] Put another way, medical implant patients need only walk through EAS systems at a normal pace.

The FDA specifically observed that:

> *[T]he likelihood of anti-theft systems interfering with implantable electronic devices is low. The number of adverse event reports indicates that a relatively small number of individuals have been affected within a large population of implant wearers. Further, the reports describe a majority of the interactions as moderate or mild in nature, with little or no significant effect on the implant wearers.*

Thereafter, between 2002 and 2008, the FDA undertook an extensive and detailed series of tests of EAS and RFID systems at its state-of-the-art EMI facility to assess the performance of pacemakers and defibrillators when exposed to these fields. Representatives from the FDA, the EAS manufacturers, and the medical implant industry jointly developed the test protocols. These tests confirmed that transient exposures to EAS and RFID systems do not pose any relevant risk to medical implant patients.

The EAS industry, through its own International Electronic Article Surveillance Manufacturers Association ("IEASMA"), has also proactively initiated and funded a permanent EAS test facility at the Georgia Tech Research Institute ("GTRI"). GTRI was

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[6] Guidance for Industry, "Labeling for Electronic Anti-Theft Systems," U.S. Food and Drug Administration, Center for Devices and Radiological Health," August 15, 2000.

[7] *Id*.

chosen because of its experience in testing early pacemakers for interference from radar and microwave ovens. The GTRI facility went live in 1995 and has operated continuously since then. Today, the facility includes a permanent installation of a number of EAS and RFID systems, as well as emitters from other industries, with a test robot that automates the tests.[8] Medical implant manufacturers and EAS/RFID manufacturers regularly contract with GTRI to have their new products tested for safe operation.

Perhaps the best measure of the success of this approach is the fact that pacemaker and defibrillator patients have made, and continue to make, billions of safe passages through EAS systems.

Conclusion

Therefore, based on the foregoing, Sensormatic urges the Commission to act consistent with these comments.

[8] Becker, T.J., "Close Encounters of an Electromagnetic Kind, GTRI Center Helps Manufacturers Reduce Interference Between Medical Devices and Electromagnetic Emissions," Research Horizons, winter 2006.

Respectfully Submitted,

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