

October 28, 2002

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Mr. Edmund J. Thomas
Chief, Office of Engineering and Technology
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

RE: Savi Technology Request for Changes to Part 15 of the
Commission's Rules; OET Docket No. 01-278

Dear Mr. Thomas:

On October 15, 2002, the National Telecommunications and Information Administration ("NTIA"), through its Office of Spectrum Management ("OSM"), provided a letter in opposition to rule changes permitting enhanced duty cycles for radiofrequency identification ("RFID") devices in the 425 to 435 MHz band.¹ Savi Technology ("Savi") herein responds to NTIA's concerns, reiterating its position that its requested rule modifications only require an increase in the duty cycle for the signal between a single RFID interrogator and tag. Additionally, Savi also attaches extensive technical papers that refute the interference concerns of the NTIA for the RFID rule changes requested.

As the Commission is aware, Savi has been attempting to receive Commission approval of a minor change to the Part 15 rules to permit increased duty cycles for its RFID equipment for nearly two years.² During this two year period, Savi has had a series of meetings with NTIA staff, including a detailed technical briefing for the Interdepartment Radio Advisory Committee in February of 2001, whose members represent all the affected Government users. Savi has brought this rule change to the Commission in response to requests by its Government users, most notably the Department of Army. These users have requested an increase in the duty cycle of communications between a single RFID interrogator and tag to expedite the time needed to upload and download 128 kilobytes of data between the tag and interrogator. Additionally, in the intervening two years, critical homeland security efforts have arisen that are ideally suited to the Savi RFID product. In particular, the Savi RFID tags can be placed on commercial shipping containers, along with an electronic seal, to ensure that these containers are not tampered with

¹ See Letter from Fredrick R. Wentland, Acting Associate Administrator, Office of Spectrum Management, NTIA to Edmond J. Thomas, Chief of the Office of Engineering and Technology, FCC, dated October 15, 2002.

² See Savi Technology petition for rule making filed November 22, 2000, RM-10051.

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during shipments. An increase in the duty cycle limitations will enable Savi to provide the needed functionality to the Army, as well as permit the commercial deployment of RFID products that will increase the security and visibility of commercial containers.

The attached detailed technical analyses for each of the particular radar systems (airborne, shipborne and ground-based) demonstrate that Savi's products do not and will not harmfully interfere with the operations of the Government radar systems. Gene Robinson, a retired Senior Fellow of Texas Instruments, and former engineer at Raytheon who has experience with radar systems similar to the affected Government radar types, performed each of these analyses. In particular, the Savi analyses demonstrate that the NTIA analysis suffers from many shortcomings. Specifically:

- The NTIA analysis fails to understand that the duty cycle is only a limit on a single RFID interrogator communication with a single RFID tag. In fact, many Savi systems already deployed throughout the world operate their interrogators on a nearly continuous basis. The only limitation on their duty cycle is on the communication path between a *single* interrogator and tag. Therefore, concerns about the increase in duty cycle are misplaced when considering the current operating environment.
- Savi does not require an increase in the average or peak field strength for its system. As is demonstrated in the NTIA analysis, the current average field strength limit is 11,000 microvolts per meter as is the new proposed average field strength limit; the current peak field strength limit is 110,000 microvolts per meter as is the new proposed peak field strength limit.³
- The use of the I/N ratio of -6 dB as a harmful interference threshold is completely inappropriate. As is further defined in the attached analyses, the -6 dB threshold only dictates where additional engineering study should occur and does not demonstrate that a radar system will receive harmful interference. Actual measurement of radar effectiveness is based on statistical decision and probability theory.

³ See Table 1; Section 15.231(a)/(b) vs. Section 15.240 comparisons. Changes to Section 15.231(e) proposed by the Commission are not pertinent to the Savi system and are therefore not considered in this response.

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- The NTIA analysis fails to consider processing gain inherent in the radar systems as well as the differences in the radar receiver bandwidth and the Savi modulation bandwidth, which provides an additional 60 to 120 dB of interference protection.
- The NTIA analysis, if followed, would demonstrate that Amateur systems (operating at 56 to 86 dB higher than RFID systems) are causing cataclysmic interference to Government radar systems.

However, Savi believes that additional modifications to attempt to alleviate some NTIA concerns could be accomplished. In particular:

- Savi believes that decreasing the available band for advanced RFID products from 425 to 435 MHz to 433 to 435 MHz would be consistent with other international allocations and would eliminate some NTIA concerns about use throughout the band.
- The peak to average ratio of 20 dB proposed by the Commission in its NPRM could be lowered to 14 dB without adverse effect to RFID products.
- The definition for RFID products could be strengthened, including adding language to forbid the transmission of voice communications in the advanced RFID band.
- Use of advanced RFID products could be limited to commercial or industrial locations.

Savi strongly encourages the Commission to move forward in permitting the modification to its rules to allow the enhanced use of RFID products for Federal and commercial purposes. As Savi has demonstrated clearly, concerns that these products will cause harmful interference to Government radar systems are inaccurate and are refuted by the characteristics of the bandwidth of each of these systems and the processing gains associated with the Government radars.

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Sincerely,

/s/ Robert L. Pettit

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Attachments

cc: Mr. Julius Knapp (FCC)
Mr. Fredrick Wentland (NTIA)
Mr. Alan Scrimme (FCC)
Ms. Geraldine Matisse (FCC)
Mr. Ira Keltz (FCC)
Mr. Hugh Van Tuyl (FCC)
Mr. William Doolan (NTIA)